

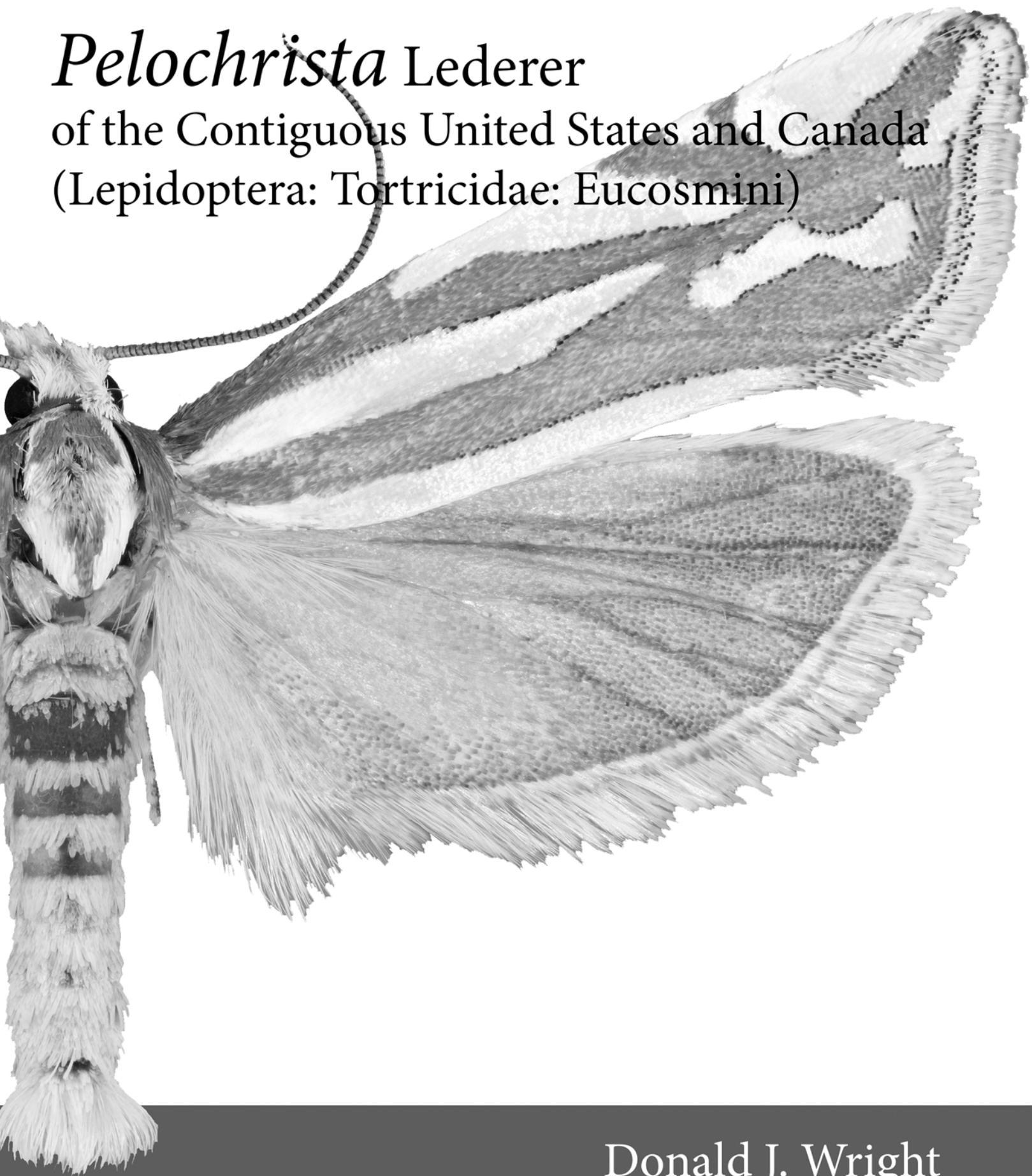
*Pelochrista* Lederer  
of the Contiguous United States and Canada  
(Lepidoptera: Tortricidae: Eucosmini)



Donald J. Wright  
Todd M. Gilligan



*Pelochrista* Lederer  
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(Lepidoptera: Tortricidae: Eucosmini)



Donald J. Wright  
Todd M. Gilligan



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# The Moths of North America

Fascicle 9.5

## TORTRICOIDEA

TORTRICIDAE (Part)

OLETHREUTINAE (Part)

EUCOSMINI (Part)

*Pelochrista*

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## Abstract

We review 168 species of *Pelochrista* from the contiguous United States and Canada, emphasizing diagnostic morphological features useful in species identification. Fifteen new species are described: *P. arizonae* Wright and Gilligan, sp.n.; *P. artesiana* Wright and Gilligan, sp.n.; *P. aurantiaca* Wright and Gilligan, sp.n.; *P. chiricahuae* Wright and Gilligan, sp.n.; *P. comancheana* Wright and Gilligan, sp.n.; *P. erema* Wright and Gilligan, sp.n.; *P. flava* Wright and Gilligan, sp.n.; *P. fremonti* Wright and Gilligan, sp.n.; *P. kimballi* Wright and Gilligan, sp.n.; *P. murina* Wright and Gilligan, sp.n.; *P. olivacea* Wright and Gilligan, sp.n.; *P. opleri* Wright and Gilligan, sp.n.; *P. polingana* Wright and Gilligan, sp.n.; *P. rufula* Wright and Gilligan, sp.n.; and *P. wagneri* Wright and Gilligan, sp.n. Three taxa are elevated to species status: *Pelochrista argentifurcatana* (Grote), stat.rev., formerly a synonym of *P. ridingsana* (Robinson); *P. argentialbana* (Walsingham), stat.rev., formerly a subspecies of *P. agricolana*; and *P. bactrana* (Heinrich), stat. rev., formerly a synonym of *P. abstemia* (Meyrick). Twenty-nine lectotypes are designated, and 18 new synonymies are proposed: *P. gilletteana* (Dyar), syn.n., with *P. agassizii* (Robinson); *P. argentialbana britana* (McDunnough), syn.n., with *P. agricolana* (Walsingham); *P. smithiana* (Walsingham), syn.n., with *P. agricolana* (Walsingham); *P. barbara* (Miller), syn.n., with *P. agricolana* (Walsingham); *P. langstoni* (Powell), syn.n., with *P. russeolla* (Heinrich); *P. costastrigulana* (Kearfott), syn.n., with *P. comatulana* (Zeller); *P. pediasios* (Miller), syn.n., with *P. comatulana* (Zeller); *P. rindgei* (Miller), syn.n., with *P. comatulana* (Zeller); *P. austrina* (Miller), syn.n., with *P. comatulana* (Zeller); *P. magnidicana* (Heinrich), syn.n., with *P. ridingsana* (Robinson); *P. betana* (McDunnough), syn.n., with *P. immaculana* (Kearfott); *P. williamsi* (Powell), syn.n., with *P. eburata* (Heinrich); *P. expolitana* (Heinrich), syn.n., with *P. canana* (Walsingham); *P. metariana* (Heinrich), syn.n., with *P. canana* (Walsingham); *P. nuntia* (Heinrich), syn.n., with *P. corosana* (Walsingham); *P. excusabilis* (Heinrich), syn.n., with *P. juncticiliana* (Walsingham); *P. ophonana* (McDunnough), syn.n., with *P. serpentana* (Walsingham); and *P. fofana* (Kearfott), syn.n., with *P. dodana* (Kearfott). Included are 720 adult images, 945 genitalia drawings, and discussions of several unresolved species complexes.



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# Introduction

*Pelochrista* Lederer is a large Holarctic genus in the Tortricidae. Nearly three-quarters of the 226 described species (Gilligan and Wright 2013b) are native to North America, and the highest species richness occurs in the western half of that continent. The genus has a long history of taxonomic confusion, particularly with regard to its sister genus *Eucosma* Hübner. Those two generic names were effectively synonymized during the first half of the twentieth century until Obraztsov (1967) resurrected *Pelochrista*. Recently, Gilligan et al. (2014) conducted a phylogenetic analysis of *Pelochrista*, *Eucosma*, and related taxa, with the objective of clarifying the generic concepts and resolving associated taxonomic problems. The present volume, along with its predecessor “*Eucosma* Hübner of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)” (Wright and Gilligan 2015), is the culmination of that study and the first comprehensive treatment of North American *Eucosma* and *Pelochrista* species since Heinrich (1923).

Most North American *Pelochrista* (approximately 85%) are known only from the adult stage, a likely consequence of the concealed feeding habits of the larvae and the fact that none have been reported as significant economic pests. All but two of the recorded host plants are in the family Asteraceae. The exceptions are in the families Boraginaceae (*P. henei*) and Crassulaceae (*P. hasseanthi*). The primary sources of life history information are Heinrich (1923), who reported hosts for reared specimens deposited in the USNM, Powell and Opler (2006, 2009), who conducted an extensive survey of Tortricidae that bore in roots of woody Asteraceae in California and neighboring states, and labels on museum specimens, which occasionally include the name of the host and, less frequently, the part of the plant in which the larva was collected. The historical records are often difficult to interpret due to the long standing taxonomic confusion that has beset this genus and the difficulty in identifying many of its species without genitalic dissection. Powell and Opler (2006) provide a detailed account of the rearing techniques they employed and report, among other results, host associations for 14 species of *Pelochrista*. For many species, particularly in the West, adult flight occurs over a period of 3–5 months. Whether or not these species have more than one brood per season is unknown. Some species are clearly univoltine (e.g., *P. dodana*, which flies in Colorado during the first half of July at elevations around 12,000 feet). Others, particularly from southern and southwestern United States, have bimodal collection patterns that suggest well-defined spring and fall broods.

Nearctic *Pelochrista* exhibit considerable intraspecific variation in size and forewing appearance. Forewing length serves as a proxy for size (Miller 1977), and it ranges in the genus from 4.4 to 17.2 mm, with an average of 9.7 mm. Intraspecific variation (based on species with 10 or more measurements) ranges from as little as 1.3 mm (*P. lynxana*) to as much as 8.9 mm (*P. scintillana*), with an average of 3.5 mm. Forewing color and maculation can vary substantially within local populations and from one population to another in geographically widespread species. Genitalia character states are relatively stable within species, but they can be unreliable in distinguishing between closely related species. Under these circumstances, species circumscription by classical morphological techniques can be problematic. Our approach is to recognize only those species that can be clearly defined by discrete morphological character states. As a result, our treatment includes about a dozen instances in which a particular taxon is probably an unresolved complex of similar species that we are unable to diagnose effectively, either for lack of sufficient material or because of intergradation of character states. In those instances we discuss the associated taxonomic issues and illustrate the various phenotypes that are involved.



## Taxonomic History

*Pelochrista* was described by Lederer (1859) as a subgenus of *Grapholitha* (a misspelling of *Grapholita* Treitschke), with *Paedisca mancipiana* Mann subsequently designated as the type species by Fernald (1908). The name was elevated to generic rank by Walker (1863) but was returned to subgeneric status under *Grapholitha* by Wocke (1871) in the Staudinger catalogue of European Lepidoptera. In the next edition of the Staudinger catalogue, Rebel (1901) treated *Pelochrista*, along with several other eucosmine genera, as synonyms of *Epiblema* Hübner. Shortly thereafter, Fernald (1908) synonymized *Pelochrista*, *Epiblema*, and 24 other generic names with *Eucosma*, and Walsingham (1914) expanded the number of junior synonyms of *Eucosma* to 38, effectively treating the tribe Eucosmini as a single genus.

In the 1920s, the use of genitalic characters produced fundamental changes in tortricid taxonomy. Pierce and Metcalfe (1922) published the first comprehensive work to include genitalia descriptions and illustrations for European Tortricidae. They treated *Eucosma* as the modern-day *Pelochrista*, likely because of a misinterpretation of the type species of *Eucosma* (Gilligan and Wright 2013). At the same time in North America, Heinrich (1923) published a revision of the Nearctic Olethreutinae based on characters of the male genitalia. He resurrected many of the generic names synonymized by Fernald (1908) and Walsingham (1914) but retained the synonymy of *Eucosma* and *Pelochrista*. In the same publication, Heinrich (1923) divided Nearctic *Eucosma* into two genera, *Eucosma* and *Thiodia* Hübner, distinguished by the presence or absence of a costal fold in the male forewing. The ensuing confusion regarding these genera and *Phaneta* Stephens is detailed in Wright and Gilligan (2015).

Approximately 20 years after Heinrich's (1923) revision, Nicholas Obraztsov began a comprehensive review of the Palearctic Tortricidae. His (Obraztsov 1946) initial classification system attempted to reconcile the differences between the North American and European interpretations of *Eucosma* and closely related genera. He treated the subfamily Eucosminae as the tribe Eucosmini and transferred Pierce and Metcalfe's (1922) *Eucosma* (= *Pelochrista*) species to *Pseudeucosma* Obraztsov. In two posthumous publications, Obraztsov (1967, 1968) proposed his most influential changes by separating *Pelochrista* (= *Pseudeucosma*) from *Eucosma* based on differences in the male and female genitalia. He included subgeneric refinements of *Pelochrista* (*Pelochrista* and *Pseudeucosma*) and *Eucosma* (*Eucosma*, *Palpocrinia* Kennel, *Phaneta*, and *Pygolopha* Lederer), but the subgenera were not retained by subsequent authors (e.g., Powell 1983, Razowski 1989). Obraztsov did little to clarify the distinction between *Eucosma* and *Pelochrista*. He characterized *Pelochrista* by the presence of a basally projecting lobe on the distal margin of the basal excavation of the male valva, which he referred to as a "pulvinus." This structure, which is more appropriately termed the "basal process" of the valva, is too variable to be a generic-level synapomorphy for *Pelochrista* (Gilligan et al. 2014). Other authors (e.g., Wright 2007, 2008; Powell and Opler 2009) dealt with this generic ambiguity by relying primarily on the presence of a large "spike" on the ventral margin of the cucullus for assignment of species to *Pelochrista*. The latter character is also variable and is highly modified or absent in many species traditionally placed in *Pelochrista*. The lack of diagnostic generic-level synapomorphies for *Pelochrista* and *Eucosma* resulted in essentially tentative assignments to these genera for North American species described during the last 50 years.

We addressed these problems in a series of four publications (Gilligan and Wright 2013a, b; Gilligan et al. 2014; Wright and Gilligan 2015). Gilligan and Wright (2013a) stabilized *Eucosma* by designating a neotype for *E. circulana* Hübner, the type species for the genus. Gilligan et al. (2014) produced revised circumscriptions of *Pelochrista*, *Eucosma*, and related genera based on a combined phylogenetic analysis of morphological characters and a molecular data set consisting of three nuclear and one mitochondrial gene. The implications from that study for generic assignment within the Eucosmini were reported as a revised world catalogue of *Eucopina*, *Eucosma*, *Pelochrista*, and *Phaneta* (Gilligan and Wright 2013b). Finally, in

the companion to this volume, Wright and Gilligan (2015) produced a comprehensive treatment of all 133 species of North American *Eucosma*.

*Pelochrista* and *Eucosma* are currently distinguished by the sterigma–sternum 7 structure in the female. Three forms of this structure (referred to as Types I–III) were identified by Gilligan et al. (2014). Type I is found in *Eucosma*, Types II and III in *Pelochrista*. In the Type I arrangement, the posterior margin of sternum 7 is deeply invaginated, usually to the full length of the sterigma, the posterior lobes of that sternite are fused with or approximate to the lateral margins of the lamella postvaginalis, and the sterigma has a ringlike lamella antevaginalis. Type II differs from Type I in that the invagination of the posterior margin of sternum 7 is reduced, and the posterior lobes of sternum 7 diverge laterally from the sterigma. In Type III, the lamella antevaginalis is absent and the anterior margin of the ostium is fused with sternum 7.

Here we review 168 species of *Pelochrista* that occur in the contiguous United States and Canada. We describe 15 new species, elevate two junior synonyms and one subspecies to species status, propose 18 new synonymies, designate 29 lectotypes, and discuss several unresolved species complexes. The species accounts are accompanied by 720 images of adults and 945 drawings of genitalia.

## Materials and Methods

We examined approximately 9,500 adult specimens and 2,400 associated genitalia preparations. Depositories for individual specimens referred to in the text are abbreviated as follows:

- AMNH = American Museum of Natural History, New York, New York, USA
- ANSP = The Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania, USA
- BMNH = The Natural History Museum, London, United Kingdom
- CDB = Charles D. Bird collection, Erskine, Alberta, Canada
- CEH = Chuck E. Harp collection, Littleton, Colorado, USA
- CFS-E = Canadian Forest Service, Edmonton, Alberta, Canada
- CMNH = Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
- CSU = Colorado State University, Fort Collins, Colorado, USA
- CNC = Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario, Canada
- CUIC = Cornell University Insect Collection, Ithaca, New York, USA
- DJW = Donald J. Wright collection, Cincinnati, Ohio, USA
- DMNS = Denver Museum of Nature & Science, Denver, Colorado, USA
- ECK = Edward C. Knudson collection, Houston, Texas, USA
- EHM = Eric H. Metzler collection, Alamogordo, New Mexico, USA
- EME = Essig Museum of Entomology, University of California, Berkeley, USA
- ESUW = University of Wyoming, Laramie, Wyoming, USA
- FSCA = Florida State Collection of Arthropods, Gainesville, Florida, USA
- INHS = Illinois Natural History Survey, Champaign, Illinois, USA
- JJD = Jason J. Dombroskie collection, Cornell University, Ithaca, New York, USA
- KMR = Kelly M. Richers collection, Bakersfield, California, USA
- LACM = Natural History Museum of Los Angeles County, Los Angeles, California, USA
- LDG = Loran D. Gibson collection, Florence, Kentucky, USA
- MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
- MEM = Mississippi Entomological Museum, Mississippi State University, Starkville, Mississippi, USA

MGCL = McGuire Center for Lepidoptera, Florida Museum of Natural History, Gainesville, Florida, USA  
 TMG = Todd M. Gilligan collection, Loveland, Colorado, USA  
 UASM = Strickland Museum, University of Alberta, Edmonton, Alberta, Canada  
 UCMS = University of Connecticut, Storrs, Connecticut, USA  
 UMSP = University of Minnesota Insect Collection, St. Paul, Minnesota, USA  
 USNM = National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA  
 WSDA = Washington State Department of Agriculture Collection, Olympia, Washington, USA

Morphological terminology follows Gilligan et al. (2008). Descriptive comments regarding forewing appearance utilize as much as possible the nomenclature for the reputed ancestral fasciate tortricid forewing pattern proposed by Brown and Powell (1991) and modified by Baixeras (2002).

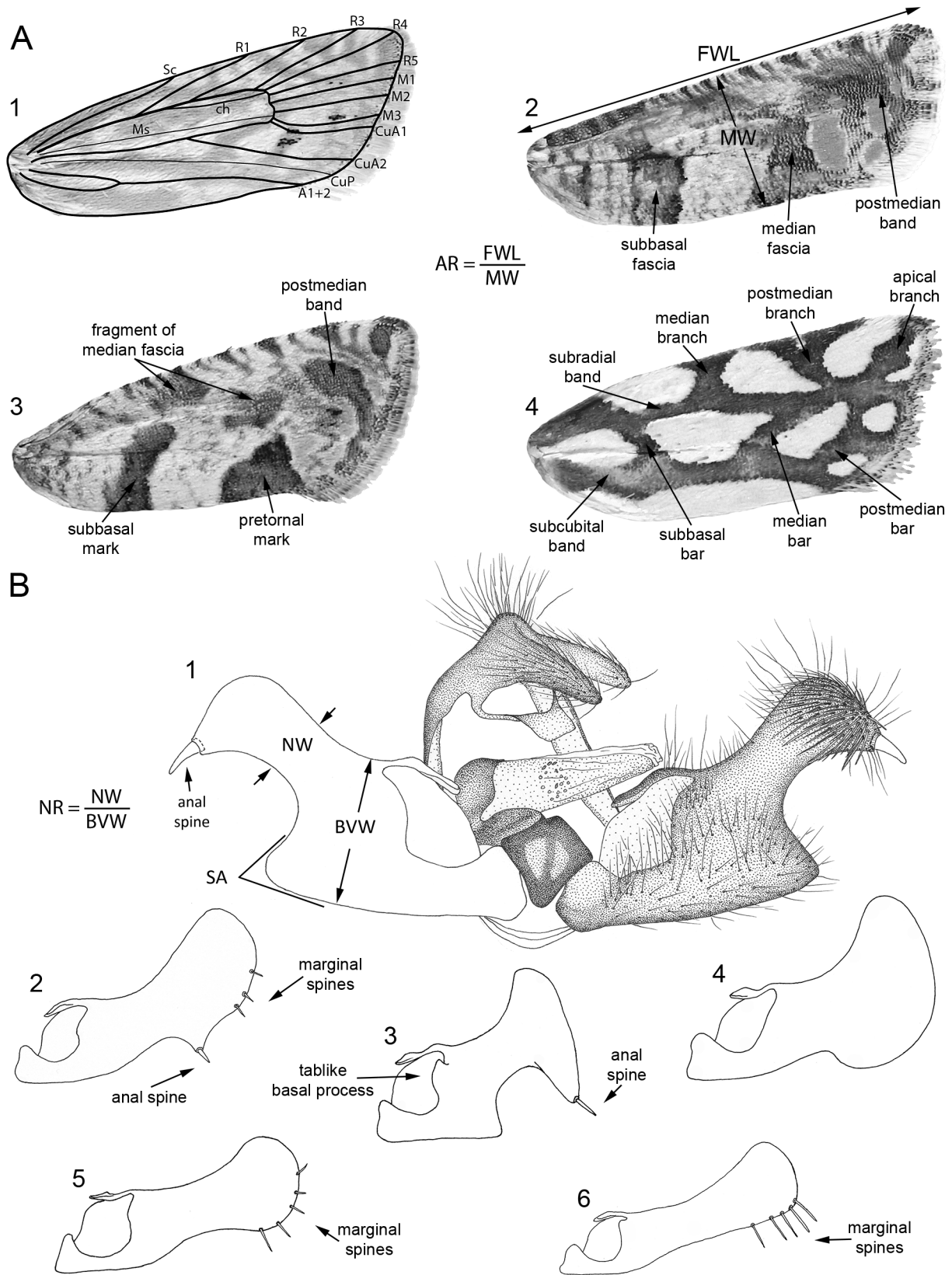
About 65% of the species recognized here have a fasciate (Fig. A2) or semifasciate (Fig. A3) forewing. The former pattern features relatively complete and well-defined subbasal and median fasciae and usually an at least partially expressed postmedian band; the latter pattern has fragmented remnants of those elements. In 17% of Nearctic *Pelochrista*, the maculation consists primarily of longitudinal bands and/or streaks (Figs. A1, A4); in the remaining 18% the forewing either is immaculate or has a pattern that is idiosyncratic in some respect. Under these circumstances we find it useful to introduce a few terms describing certain pattern elements.

The semifasciate pattern usually includes a **subbasal mark** on the cubitus (often extending from the inner margin to the cell) and one to three disjunct marks in the median area (Fig. A3). The largest of the median marks is located on the inner margin adjacent to the ocellus and is referred to as the **pretornal mark**. Three-fourths of the longitudinally marked species (Figs. A1, A4) have a pattern that is based on two primary bands: a **subradial band** from the base to the termen that is located mostly between the radius and the cubitus, and a **subcubital band** from the base to the tornus that tracks the cubitus and CuA<sub>2</sub>. Emanating from those bands may be one or more appendages. Those that terminate on the margin of the wing we call **branches**, those that connect the two longitudinal bands are referred to as **bars**.

Forewing length is used as an indication of specimen size and was measured to the nearest 0.1 millimeter. It is reported for each species as a range of values accompanied by an average value, once in Appendix A and again in the captions for the adult images (Plates A–VV). Terms pertaining to the geometry of the forewing are defined as follows (Fig. A2):

AR = forewing aspect ratio = forewing length divided by medial forewing width  
 FWL = forewing length = distance from base to apex including fringe  
 MW = medial forewing width, measured perpendicular to the inner margin

In Nearctic *Pelochrista*, the male genitalia exhibit considerable variation in the armament and shape of the valva (Fig. B). Approximately 60% of the species feature one or more spiniform setae on the margin of the cucullus. We refer to those setae as **marginal spines**. They project outward from (and usually perpendicular to) the margin and are thicker than the nearby setae on the medial surface of the cucullus. In many cases there is one particularly stout seta at the vertex of the anal angle that we call the **anal spine** (Figs. B1–B3). The anal spine may or may not be accompanied by additional groups/series of marginal spines. The number and distribution of marginal spines can vary from one valva to the other in a single specimen, but the general arrangement of these elements is relatively stable in a given species and can be useful in distinguishing among similar looking species. In many *Pelochrista* the medial portion of the distal margin of the basal excavation is developed into a basally directed process that is often raised somewhat



Figures A–B. Morphological terms used to describe forewing geometry and markings and male genitalia structures; abbreviations and ratios are explained in the text. A, adult wing pattern and venation. B, male genitalia.



from the medial surface of the valva. We refer to this feature as the **basal process** (Fig. B3). It varies from a weakly convex bulge to a prominent tonguelike projection.

The geometry of the male valva (Fig. B) is somewhat resistant to precise quantification due to intraspecific variation, but there are two morphometric characters (neck ratio and saccular angle) that have been recognized by previous authors (e.g., Miller 1985; Wright 2011) and used for taxonomic purposes. They and their constituent measurements are defined as follows (Fig. B1):

- BVW = basal valva width = perpendicular distance from the base of the costa to the ventral margin of the sacculus, taken near the distal margin of the basal excavation  
NR = neck ratio = neck width divided by basal valva width  
NW = neck width = width of the valva at the narrowest point of the neck  
SA = saccular angle = angle formed at the distal end of the sacculus by linear approximations to the ventral margins of the sacculus and the base of the neck

These measurements were taken on projected images of the genitalia generated by a Ken-A-Vision X1000-1 microprojector and were recorded to the nearest degree (SA) or nearest 0.5 millimeter (NW, BVW). The SA and NR for an individual specimen were recorded as averages of those quantities obtained from the two valvae, and the values assigned to a particular species were then calculated as the average of the specimen values associated with several representative specimens. The SA is reported to the nearest degree, and the NR is rounded to two decimal places. Males of most Nearctic *Pelochrista* have a cluster of cornuti in the vesica. The cornuti are always deciduous, the number can be quite variable between and within species, and the counts reported here for a particular species are given as a range of values that are often determined by an examination of the sockets.

In the female genitalia, there is a membranous area between the pads of the papillae anales that contains the openings for the ovipore and the anus. We refer to this area as the **ventral opening**. Its length in relation to the length of the pads is useful in arranging the species in groups.

We identified four distinct forms of the papillae anales (Figs. C1–C4) described as follows:

- Type 1.** Pads confluent posterior to ventral opening, forming a relatively broad, flat, and (Fig. C1) ventrally facing single pad with distal portion divided into two semicircular projections by a V-shaped medial indentation; anterior extremities developed into laterally-facing ventrally-projecting lobes (called **ventral extensions**) that flank the ventral opening; setation of posterior projections hairlike, with setae long, ventrally-curving, and densely spaced along margins but relatively short and sparsely distributed otherwise; ventral extensions with hook-tipped setae on margins of ventral opening.
- Type 2.** Posterior lobes narrower than in Type 1, facing ventrally, fused at the posterior (Fig. C2) extremity of the ventral opening, and separated distally; anterior lobes facing ventrolaterally, lacking well-defined ventral extensions, but sometimes with the margins of the ventral opening slightly produced; setation of posterior lobes hairlike, uniformly and densely distributed, with setae on margins long and curving ventrally; anterior lobes with conspicuous clusters of hook-tipped setae that usually are substantially thicker than nearby hairlike setae; additional hook-tipped setae on margins of ventral opening and sometimes sparsely distributed on ventrolaterally facing surfaces.

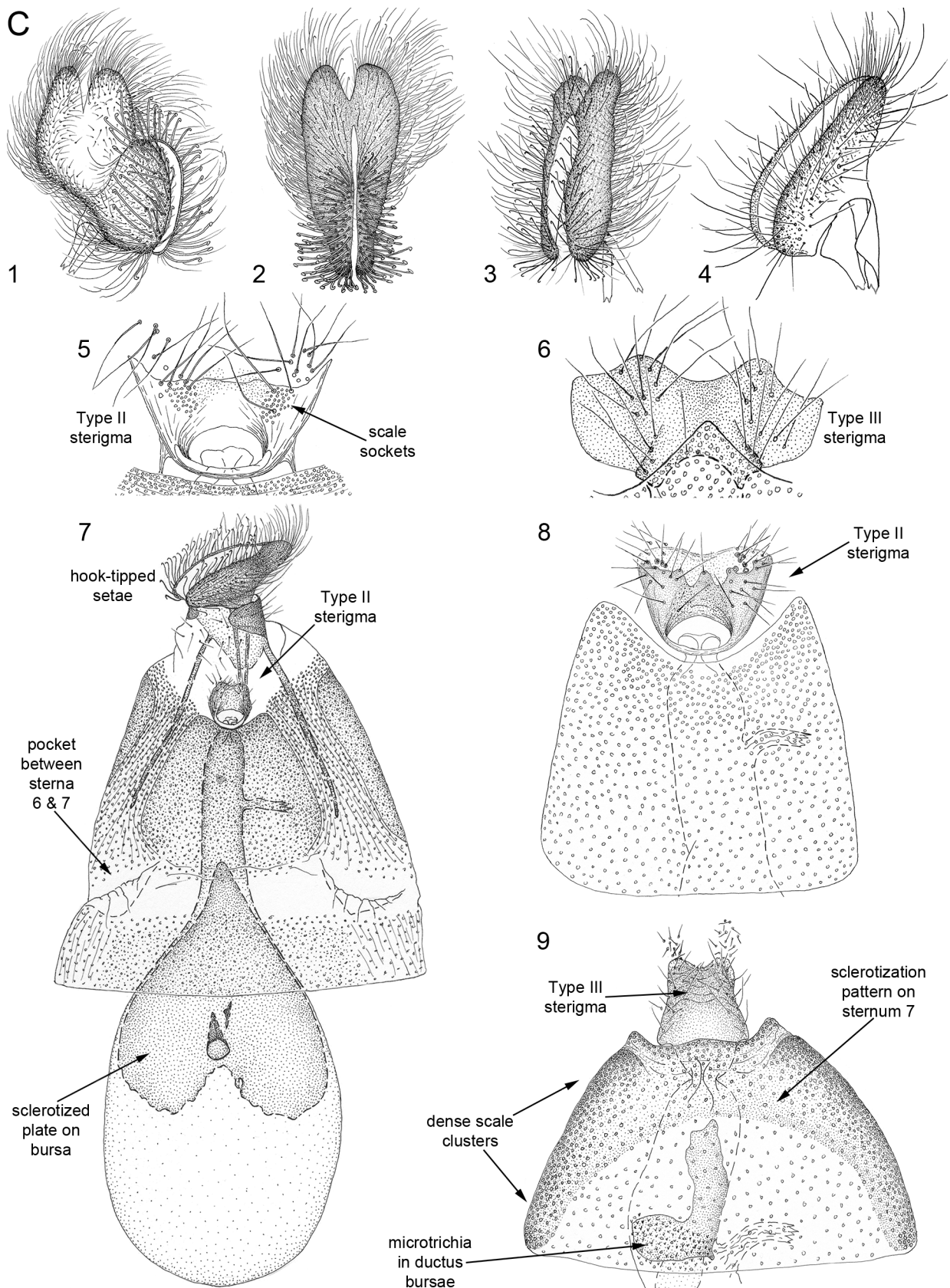


Figure C. Morphological terms used to describe the different types of female genitalia (explained in the text).

**Type 3.** Pads relatively uniform in width, facing ventrolaterally or laterally throughout, (Fig. C3) uniformly and densely setose, with transverse cross-sections convex; length of ventral opening about three-fourths to nearly full length of pads; pads fused at distal extremity of ventral opening but separated beyond that point into distinct (but sometimes small) posterior lobes; setae on lateral margins of pads long and curving ventrally; anterior lobes with hook-tipped setae.

**Type 4.** Pads laterally facing, substantially flat, sparsely to moderately setose, and (Fig. C4) lacking hook-tipped setae; length of ventral opening equal to that of pads.

The pads in most Type 4 species are flat and sparsely setose, but in some cases the ventral margins are curled medially and/or the transverse cross sections are weakly convex, reminiscent of Type 3. We treat the latter species as Type 4 based on the absence of hook-tipped setae and the length of the ventral opening.

Additional taxonomically useful characteristics of the female genitalia include sterigma Type (II or III, Figs. C5–9) and the presence or absence of the following features: a pair of invaginations, called **pockets**, of the intersegmental membrane between sterna 6 and 7 (Fig. C7); idiosyncratic patterns of sclerotization of sternum 7 (Fig. C9); and clusters of densely packed and firmly socketed scales on sternum 7 (Fig. C9). The female genitalia may have various taxonomically informative types of microprotuberances, particularly on the papillae anales, the intersegmental membrane posterior to sternum 8, the lamella postvaginalis, and the inner surface of the ductus bursae near the ductus seminalis. These projections are sclerotized, socketless, vary in form from hairlike to sawtooth-shaped, and usually are clearly visible only under relatively high magnification. We use the general term **microtrichia** for all such structures. Finally, there may be a patch of sclerotization on the surface of the ductus bursae (C9) or the corpus bursae (C7) whose shape is useful in identifying species.

Adults were examined with a Leica MZ95 stereomicroscope equipped with an ocular micrometer, genitalia with a Leica DME compound microscope. Adult photographs were taken with a Canon EOS digital SLR and edited using Adobe Photoshop CS5/6 Extended. Lighting was provided by an Aristo DA-10 light box with a T55 (5500K) “daylight” bulb to maintain color correctness or with a Canon 430EX II or MR-14EX flash, in which case color was manually adjusted in Adobe Photoshop. Some photos are combinations of several images stacked with Zerene Stacker. Several photographs are provided for most species in order to illustrate multiple phenotypes. With the exception of those listed in the acknowledgments, all adult photos were taken by D. J. Wright and T. M. Gilligan. Genitalia drawings were based on pencil tracings of projected images produced with a Ken-A-Vision X1000-1 microprojector. They were refined during examination of the genitalia with a compound microscope and then inked with KOH-I-NOOR Rapidograph pens using 4×0 and 3×0 nibs. Genitalia drawings were scanned with an Epson Perfection 2400 Photo scanner and compiled into plates using Adobe Photoshop. Multiple drawings are provided for most species in order to illustrate intraspecific variation in features such as valva and sterigma shape. All drawings were produced by D. J. Wright.

The adult images were cropped and sized in a uniform manner to fit in the rectangular 5×3 arrays that comprise the adult plates. Consequently, they do not illustrate size differences between species. Size information for a particular species is presented in the caption heading on the page facing the associated plate, and the data for all the species are tabulated in Appendix A. The genitalia drawings were sized to fit allotted spaces in the genitalia plates and do not conform to any standard scale. They are, therefore, not comparable sizewise, either within a given species or between different species. Many illustrations were flipped horizontally in Adobe Photoshop, so what appears on the page to be a right forewing or right valva may in fact be the left such structure on the insect.

Plant names follow the most recent taxonomy listed in the USDA, ARS, National Genetic Resources Program *Germplasm Resources Information Network* (GRIN) online database ([www.ars-grin.gov](http://www.ars-grin.gov)) and the USDA, ARS, NRCS *PLANTS Database* ([plants.usda.gov](http://plants.usda.gov)). Both databases were accessed October, 2016.

Our geographic coverage includes all of continental North America north of Mexico except Alaska. A list of the moths of Alaska published by Ferris et al. (2012) includes three names that are currently referred to *Pelochrista*. Those species range widely through western North America and are, therefore, reviewed here. Most North American species of *Pelochrista* have not been sufficiently well sampled to yield accurate determinations of their geographic distributions. Our comments on the range of a particular species are based on selected specimens from institutional collections, specimens from various private collectors, and our own field experience. We excluded literature records that could not be confirmed. The result is at best a crude approximation to the actual range of the insect.

Forty-five percent of the recognized North American *Pelochrista* were described prior to the practice of designating a unique name-bearing specimen. Sixty-one of these names were authored by Lord Walsingham or W. D. Kearfott, each based on a series of one or more syntypes. Most of the Walsingham material resides in the BMNH. Heinrich did not examine those specimens while preparing his 1923 review of the North American Eucosmini, and his statements “*Type*. —In British Museum” and “*Type locality*. —” usually do not identify a unique specimen. In the 1960s, in preparation for a revisionary study of Nearctic Olethreutinae, Obraztsov examined the Walsingham syntypes and selected specimens to serve as lectotypes, but he died without publishing the designations. His photographs (35 mm slides) of the selected specimens and their genitalia were deposited in the AMNH and are now on long term loan to the MEM. Most of the Kearfott material was acquired by the AMNH. Heinrich did examine those specimens, and Klots (1942) reported lectotypes in the AMNH for many of the Kearfott names, attributing most of the designations to Heinrich (1923). However, in many instances Heinrich’s remarks are not sufficiently detailed to single out a unique name-bearing specimen. Some of these type fixation issues have since been resolved by authors such as Darlington (1947), Miller (1970, 1973, 1974, 1985), and Wright (2005, 2007a, c, 2008, 2011a, b, 2012, 2014), who designated lectotypes as needed in their taxonomic studies. Today there remain 29 names (five of which are synonyms) that have not been stabilized, and to that end we include a lectotype designation for each, using when possible the specimens selected by Obraztsov or Klots. We utilize the following abbreviations for the various types reported here: HTP = holotype, PTP = paratype, LTP = lectotype, PLTP = paralectotype, SNTP = syntype.





## Species Accounts

The species accounts are organized in five sections; the first four correspond to the four papillae anales Types (Figs. C1–C4), the fifth includes species for which the female is unknown. In sections 1–4, many of the species are treated in groups based on similarities in forewing appearance and/or genitalia, with the name of the earliest described group member serving as the group title.

The table of contents lists the species in the order of their appearance in the text. Recognized valid names are numbered; synonyms are indented and not numbered. The number assigned to a particular species also identifies the adult images and genitalia illustrations associated with that taxon. Multiple illustrations for a given species are further identified by lower case letters a, b, c, etc. The female genitalia are often illustrated with two or three drawings showing different taxonomically significant components, frequently with the corpus busae detached and placed beside the rest of the genitalia in order to conserve space. A single letter is assigned to multiple drawings based on one specimen, and multiple letters indicate components drawn from different specimens. The components associated with a given species are not necessarily presented at the same scale. Although 169 numbers are utilized for the species, there are only 168 recognized valid names—the number 113 refers to a group of three morphospecies that are illustrated here but not described. The Animal Name Index lists the species in alphabetical order.

### *Pelochrista* Lederer

*Pelochrista* Lederer, 1859, Wiener Entomologische Monatschrift 3: 331. Type species: *Paedisca mancipiana* Mann, 1855.

*Callimosema* Clemens, 1865, Proceedings of the Entomological Society of Philadelphia 5: 141. Type species: *Callimosema scintillana* Clemens, 1865.

*Eucosmoides* Obraztsov, 1946, Zeitschrift der Wiener Entomologischen Gesellschaft Wien 30: 38. Type species: *Paedisca decolorana* Freyer, 1842.

*Pseudeucosma* Obraztsov, 1946, Zeitschrift der Wiener Entomologischen Gesellschaft Wien 30: 37. Type species: *Tortrix caecimaculana* Hübner, [1776-1799].

*Pygolopha* Lederer, 1859, Wiener Entomologische Monatschrift 3: 123. Type species: *Pygolopha trinacriana* Lederer, 1859.

**Diagnosis and description.** *Pelochrista* differs from *Eucosma* in the structure of the female sterigma-sternum 7. In *Pelochrista* it takes two distinct forms: posterior margin of sternum 7 diverging laterally from the sterigma and separated from the ostium by a ringlike lamella antevaginalis (Type II), or lamella antevaginalis absent and anterior margin of the ostium fused with sternum 7 (Type III). In *Eucosma*, the posterior margin of sternum 7 is deeply invaginated (usually to the full length of the sterigma), and the resulting posterior lobes of the sternite are approximate to or fused with the lateral margins of the lamella postvaginalis (Type I). The structure of the papillae anales in *Pelochrista* has four substantially different forms defined in terms of the orientation of the pads, the presence or absence of ventral extensions, and the presence or absence of hook-tipped setae. *Eucosma* have laterally facing pads, lack ventral extensions, and lack hook-tipped setae.

Male character states do not reliably separate *Pelochrista* from *Eucosma*. All male *Pelochrista* have a costal fold at the base of the forewing, and the vast majority of *Eucosma* males do not. Many *Pelochrista* have marginal spines on the cucullus and/or an anal spine at the vertex of the anal angle, features that rarely occur in *Eucosma*. *Epiblema* resembles *Pelochrista* in that males have a costal fold and females have a Type II sterigma, but the presence of a clasper on the distal margin of the basal excavation in males of *Epiblema* distinguishes that genus from both *Pelochrista* and *Eucosma*.



*Wings* (Figs. A1–A4). Forewing with  $R_4$  and  $R_5$  separate,  $M_2$  and  $M_3$  separate, chorda weak; males with costal fold present; mean FWL: 9.7 mm; mean AR: 3.01; maculation variable, with fasciate, semifasciate, longitudinal, and immaculate patterns; ocellus variably expressed, often reduced or absent. Hindwing with  $R_s$  and  $M_1$  approximate,  $M_2$  and  $M_3$  approximate,  $M_3$  and  $CuA_1$  stalked or united.

*Male genitalia* (Figs. B1–B6). Uncus weakly to moderately developed, usually well differentiated from dorsolateral shoulders of tegumen, with apical margin rounded or medially indented; socii fingerlike, moderately elongate, and setose; phallus stout to elongate, tapering distally; caulis often elongate; cornuti present or absent in vesica, deciduous when present; valva with costal margin concave to nearly straight, neck usually well defined, ventral margin straight to deeply emarginated; distal margin of basal excavation with variably developed basal process (tonguelike/tablike/absent); saccular corner variably angulate, with SA usually obtuse; cucullus with medial surface densely setose, apex variably produced and usually rounded, distal margin convex to nearly straight, anal angle variably developed; distal margin of cucullus and/or ventral margin of neck often with spiniform setae (= marginal spines); vertex of anal angle often with one large isolated spiniform seta (= anal spine).

*Female genitalia* (Figs. C1–C9). Papillae anales of four types (Figs. C1–C4): posterior lobes facing ventrally, pads confluent posterior to ventral opening, ventral extensions present, hook-tipped setae present; posterior lobes facing ventrally, pads fused at posterior extremity of ventral opening, ventral extensions absent, hook-tipped setae present; pads facing ventrolaterally, length of ventral opening less than length of pads, ventral extensions absent, hook-tipped setae present; pads facing laterally, length of ventral opening equal to length of pads, ventral extensions absent, hook-tipped setae absent. Lamella postvaginalis well developed, variable in shape; posterior margin of sternum VII diverging laterally from sterigma, either separated from ostium by ringlike lamella antevaginalis or fused with anterior margin of ostium; ductus bursae frequently with sclerotized ring or patch approximate to juncture with ductus seminalis; corpus bursae usually with two signa of unequal size, infrequently with one or none, sometimes with sclerotization of the membrane adjacent to the smaller signum.

**Immature stages.** The immature stages of North American *Pelochrista* are mostly unknown. Eggs and pupae for those that have been described are typical Eucosmini. *Pelochrista* larvae lack an anal comb, a character that, in Eucosmini, separates internal feeders such as *Eucosma*, *Epiblema*, *Pelochrista*, and *Rhyacionia* (Brown 1987; Horak 1998; MacKay 1959) from external feeders such as most *Epinotia* and *Pseudexentera* (Wright and Gilligan 2015).

The following morphological information is summarized from the descriptions and illustrations in Peterson (1965) and Passoa (2008) (for eggs of Eucosmini); Brown (1987) and Horak (1998) (for Eucosmini larvae); MacKay (1959) and Swatschek (1958) (for *Pelochrista* larvae); and Mosher (1916) and Horak (1998) (for Eucosmini pupae). The larval description is based primarily on the few species described in detail by MacKay (1959) and likely does not represent the full range of variation in Nearctic *Pelochrista*.

*Egg.* Oval, scalelike (“flat”), watery white, and variably translucent; chorion bright, with a rough irregular surface.

*Larva.* Head hypgnathous; L-group on T1 trisetose, never enlarged or extending under the spiracle; L1 and L2 setae adjacent on A1–8; SV-group setal counts on A1, 2, 7, 8, 9 usually 2:2:2:2:2(1); SD1 seta on A8 dorsal or anterodorsal to the spiracle; D2 setae on A9 usually located on the same pinaculum, rarely on separate pinacula; D1 and SD1 setae located on the same pinaculum on A9; L-group on A9 bi- or trisetose; V1 setae on A9 the same or farther apart than those on A8; crochets uniordinal, arranged in a circle or oval; anal comb absent.

*Pupa.* A2–7 with two rows of spines; A8–10 usually with one row of spines; maxillary palpi extending into the proximolateral angles of the maxillae; maxillae about  $0.4 \times$  FWL; labial palpi usually  $0.5 \times$  length of the maxillae; cauda with 4–8 flat hooked setae; anal rise with 1–2 or rarely 3 setae on each side; cremaster absent.

**Biology.** Life history information is summarized from Brown et al. (1983), Heinrich (1923), MacKay (1959), and Powell and Opler (2006, 2009). Recorded larval hosts are Asteraceae except for one species each from Boraginaceae and Crassulaceae. Females lay eggs in bark crevices near the base of the host plant. Early instar larvae burrow into above ground stems; later instars move into the root crowns. Late instar larvae form a pupal cell in the soil with their head oriented upward allowing for emergence via a silk track. Powell and Opler (2006) did not detect a diapause in any of the root-borers they reared.

## Section 1. Type 1 Papillae Anales.

### The *agassizii* group (species 1–3)

The members of this group (*P. agassizii*, *P. bolanderana*, and *P. laticurva*) are remarkably similar in forewing appearance and genitalia. The species concepts are based primarily on subtle differences in maculation and size. Shared characteristics include:

*Forewing.* Mean FWL: 8.8–11.1 mm, AR: 3.15–3.26; dorsal surface white with longitudinal brown markings, the latter variably edged with black. Maculation includes: a sinuous subradial band comprised of a subcostal segment from base to mid-wing, a straight segment from mid-costa to distal end of cell, and a diagonal segment from cell to apex, the last with a short branch enclosing a white spot on the termen between  $M_3$  and  $R_5$ ; a narrow mark on the distal one-half of the costa that is sometimes broken into two or three components and is often connected to the subradial band by a postmedian branch; and a subcubital band (variably interrupted in *P. bolanderana* and *P. laticurva*) that follows CuP from base to tornus. The area between the subradial and subcubital bands is referred to in the literature as the “white serpentine band” and is often crossed by an oblique subbasal and/or median bar.

*Male genitalia.* Uncus strongly developed and clearly differentiated from dorsolateral shoulders of tegumen, with distal margin semicircular to rectangular; socii fingerlike, often narrow basally and slightly bulbous distally; phallus tapering distally, with base loosely surrounded by anellus; vesica with 1–6 cornuti; valva with costal margin strongly concave, ventral emargination shallow, neck moderately long, NR: 0.57–0.59, SA: 151–156°; cucullus with dorsal lobe strongly developed, apex rounded, distal margin convex with slightly angular bend at two-thirds distance from anal angle to apex, ventral lobe weakly developed, anal angle broadly rounded, setation of medial surface fine.

*Female genitalia.* Papillae anales with posterior lobes broad and fanlike; hook-tipped setae on ventral extensions relatively stout; tergum 8 narrow and collar-like; membrane between anterior lobes of papillae anales and ventral extremities of tergum 8 weakly sclerotized (not shown in the illustrations); length of apophyses anteriores about twice that of apophyses posteriores; sterigma Type II; lamella postvaginalis triangular, with posterior margin variably indented; sternum 7 trapezoidal, with width at anterior margin 3–4 × that at posterior margin and with posterior margin concavely indented to about one-third length of sterigma; scaling of sternum 7 uniform; ductus bursae lacking sclerotization; corpus bursae with two signa, one slightly larger than the other.

### 1. *Pelochrista agassizii* (Robinson, 1869)

(Plate A, 1a–i; Plate 1, 1a–e)

*Conchylis agassizii* Robinson 1869:284.

*Paedisca agassizii*: Fernald 1882:37.

*Eucosma agassizii*: Fernald 1903:455; Heinrich 1923:85; McDunnough 1939:45; Powell 1983:34; Brown 2005:314.

*Eucosma agassizii*: Barnes and McDunnough 1917:169 [misspelling]

*Pelochrista agassizii*: Gilligan and Wright 2013b:316.

*Eucosma gilletteana* Dyar 1903:180; Barnes and McDunnough 1917:169; Heinrich 1923:85; McDunnough 1939:45; Powell 1983:34; Brown 2005:320; new synonymy.

*Pelochrista gilletteana*: Gilligan and Wright 2013b:321.

**Types.** *Conchylis agassizii*. Holotype. ♂, Texas, Waco County, Belfrage, “17 May,” lost. *Eucosma gilletteana*. Lectotype (here designated) (Plate A:1e). ♂, Arizona, Williams, slide 142489, USNM.

Robinson (1869) described *C. agassizii* from a single male collected in “Waco County,” Texas, a site that is probably located near the present city of Waco in McLennan County. That specimen has been interpreted as the “Type” (or holotype), but its location is unknown (Heinrich 1923; Brown 2005). Robinson (1869, plate VIII, fig. 75) published an illustration of the adult that presumably is based on that specimen, and he enclosed the capture date in quotation marks, suggesting that its accuracy may be in doubt. Moreover, he may have been mistaken about the sex of the holotype because his illustration shows a white costal mark on the forewing that we found to be present only in females (see discussion below). The “description” of *E. gilletteana* consists of a few lines in Dyar’s (1903) key to the “white-marked” species of *Eucosma* in which he purports to diagnose *E. agassizii*, *E. bolanderana*, and *E. gilletteana*. Dyar (1903) did not specify any syntypes, but there are five specimens (4 ♂, 1 ♀) in the USNM that bear his red “Type No. 6737 U.S.N.M.” labels, one from Arizona, the others from Colorado. The Arizona specimen has a handwritten label with the inscription “*Eucosma gilletteana* Dyar Type,” and it is that specimen that is designated here as the lectotype.

We examined 62 *agassizii/gilletteana*-like specimens and found considerable variation in forewing appearance. The white subcostal band on the distal one-half of the wing may be continuous (Plate A:1a–d) or divided into two elongate spots by a postmedian branch (Plate A:1e–i); the “white serpentine band” may be unbroken (Plate A:1a–c) or partially to fully interrupted by a subbasal and/or median bar; and the white streak on the inner margin is variable in length and is partially to fully interrupted in the subbasal area by a variably expressed branch from the subcubital band. Robinson (1869) described and illustrated a narrow white spot on the costa just before mid-wing (Plate A:1a, b, d, g, h). We found this to be absent in males but present in females, in the latter case sometimes extending to the base of the wing as a narrow white costal streak (hence the aforementioned confusion regarding the reputed sex of the holotype). The distal end of the “white serpentine band” is separated from the wing margin by a narrow brown band along the termen from the tornus to  $M_3$ ; the proximal end may or may not be separated from the base by a brown basal bar. Robinson’s illustration shows a divided white subcostal band but otherwise closely resembles the specimen in Plate A:1b. Dyar (1903) distinguished *P. gilletteana* from *P. agassizii* by two criteria: the length of the white streak on the inner margin and whether or not the “white serpentine band” extends completely to the base of the wing. We find these character states to be unstable and therefore unsuitable for species diagnosis, hence the new synonymy. The presence of an uninterrupted subcubital band from base to tornus distinguishes *P. agassizii* from *P. bolanderana* and *P. laticurva*.

We examined specimens from Arizona, southern California, Colorado, Illinois, Oklahoma, Texas, and Utah. The Illinois records consist of two males, one in the INHS (slide DJW 1998) collected on 14 June by T. Harrison at Sand Ridge State Forest, the other (Plate A:1c) in the DJW collection (abdomen missing) collected on 29 May by R. Panzer at H. A. Gleason Nature Preserve. Both sites are located in Mason County and feature sand prairie habitat near the Illinois River. Most adult capture dates range from mid-April to late June, but a few Texas specimens were collected in September. In the USNM there are six specimens from Arizona that were reared from larvae feeding in *Gutierrezia* Lag., four in *G. sarothrae* (Pursh) Britton & Rusby (broom snakeweed), two in *G. microcephala* (DC.) A. Gray (threadleaf snakeweed).

## 2. *Pelochrista bolanderana* (Walsingham, 1879)

(Plate A, 2a–f; Plate 1, 2a–d)

*Paedisca bolanderana* Walsingham 1879:42; Fernald 1882:37.

*Eucosma bolanderana*: Fernald 1903:455; Barnes and McDunnough 1917:169; Heinrich 1923:85; McDunnough 1939:45; Powell 1983:34; Brown 2005:316.

*Pelochrista bolanderana*: Gilligan and Wright 2013b:318.

**Lectotype** (here designated, Plate A:2a). ♂, California, Siskiyou County, Mount Shasta, Walsingham, 2 August–1 September 1871, BMNH(E) 819917, slide 11602, BMNH.

Walsingham (1879) described this species from five syntypes (3 ♂, 2 ♀) that he collected at the type locality. The specimen designated here as the lectotype was selected by Obraztsov and bears a circular BMNH “LECTOTYPE” label.

In *P. bolanderana* the subcubital band usually consists of a small basal spot and a disjunct serpentine portion that arises on the inner margin at the subbasal position, extends transversely to the cubitus, and continues from there to the tornus, following the distal one-half of the inner margin (Plate A:2a–b). The two components are separated by a white spot on the inner margin that extends to the radius. In some specimens (Plate A:2c, e, f) the distal component is broken in the median area by a transverse white spot connecting the inner margin and the “white serpentine band.” The specimens illustrated in Plate A:2d, f are unusual in that the subradial and subcubital bands are connected by a median bar. The images in Plate A:2e, f are representative of a series of *bolanderana*-like specimens in the USNM from west Texas and southeastern Arizona with markings that are not as sharply defined as in typical *P. bolanderana*. They do, however, agree with *P. bolanderana* in genitalia.

We examined specimens from Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, and Utah. Capture dates range from late April to late September. The USNM has two specimens (1 ♂, 1 ♀) labeled “rootborer” that were reared by G. P. Engelhardt in Pinal County, Arizona from *Dieteria canescens* (Pursh) Nutt. var. *canescens* (hoary tansyaster) (reported by Brown et al. 1983 as *M. canescens*).

## 3. *Pelochrista laticurva* (Heinrich, 1929)

(Plate B, 3a–d; Plate 1, 3a–e)

*Eucosma laticurva* Heinrich 1929:4; McDunnough 1939:45; Powell 1983:34; Brown 2005:323.

*Pelochrista laticurva*: Gilligan and Wright 2013b:323.

**Holotype**. ♂, California, Sierra Nevada, slide 72809, USNM.

Heinrich (1923) based *P. laticurva* on two California males, one from “Sierra Nevada,” the other from “Mount Shasta district.” He selected a unique name-bearing specimen (holotype) by reporting the “Type” locality.

*Pelochrista laticurva* resembles *P. bolanderana* but is a little larger (mean FWL = 11.1 vs. 8.8 mm) and has the subcubital band reduced to a triangular subbasal mark and a variably expressed mark near the tornus, both situated on the inner margin. The specimen illustrated in Plate A:3d is one of a male-female pair in the EME in which the white areas of the forewing are especially bright and bold. They were collected at Big Pines in the San Gabriel Mountains, Los Angeles County, California and represent what we interpret here as a somewhat unusual phenotype of *P. laticurva*.

This species is known only from California. We examined specimens from Del Norte, Humboldt, Lassen, Los Angeles, Plumas, Sierra, and Siskiyou counties that were captured between early June and the end of

August. Powell and Opler (2006) reported rearing *P. laticurva* from *Erigeron inornatus* (A. Gray) A. Gray (California rayless fleabane).

## The *denverana* group (species 4–5)

*Pelochrista denvereana* and *P. hazelana* are placed here because of their similarity in genitalia with members of the *agassizii* group. They are the only other Nearctic *Pelochrista* with Type 1 papillae anales, a Type II sterigma, an absence of sclerotization on the ductus bursae, and an *agassizii*-like valva shape. They are readily distinguished from members of the *agassizii* group and from each other by forewing appearance.

### 4. *Pelochrista denverana* (Kearfott, 1907)

(Plate B, 4a–b; Plate 2, 4a–d)

*Eucosma denverana* Kearfott 1907a:77; Barnes and McDunnough 1917:170; Heinrich 1923:116; McDunnough 1939:47; Powell 1983:34; Brown 2005:318.

*Pelochrista denverana*: Gilligan and Wright 2013b:319.

**Lectotype** (designated by Heinrich 1923). ♂, Colorado, Denver, E. J. Osler, AMNH.

Kearfott (1907a) based this species on five male syntypes from Denver, Colorado, four collected by E. J. Osler, one by Dyar and Caudell. The AMNH has one of the Osler specimens; the other four syntypes reside in the USNM. Thus, Heinrich's (1923) remarks suffice as a lectotype designation.

*Pelochrista denverana* is recognized by its moderately large size (mean FWL = 11.7 mm) and its immaculate brown forewing, the color varying from dark bronze to pale yellowish brown. The only markings are two weakly expressed thin lines on the termen, one whitish, the other concolorous with the rest of the wing, both extending from the tornus to the apex.

This species is a common resident of the high plains east of the Rocky Mountains at elevations of 5,000–6,500 feet. We examined specimens from Colorado and New Mexico with capture dates varying from late July through the end of September.

### 5. *Pelochrista hazelana* (Klots, 1936)

(Plate B, 5a–c; Plate 2, 5a–e)

*Eucosma hazelana* Klots 1936:1; McDunnough 1939:45; Powell 1983:34; Brown 2005:321; Wright 2007:49.

*Pelochrista hazelana*: Gilligan and Wright 2013b:322.

**Holotype**. ♂, Colorado, El Paso County, Colorado Springs, Fountain Valley School, A. B. Klots, 20–31 August 1932, slide ABK 18 December 1932, AMNH.

Besides the holotype, the type series for *P. hazelana* includes two male paratypes, one in the USNM labeled “S. W. Col. [Colorado] 7-99,” the other in the AMNH labeled “Col.”

This medium-sized species (mean FWL = 10.7 mm) has a distinctive fasciate forewing pattern. The brown basal, subbasal, and median fasciae are separated by white interfascial bands that extend from the inner margin nearly to the costa. The distal one-half of the wing is brown with two white spots on the costa, a narrow white band on the termen between  $M_2$  and  $R_5$ , and a relatively large white tornal spot that



occupies the position of the ocellus. Other *Pelochrista* that might be confused with *P. hazelana* based on size and overall forewing appearance include *P. spaldingana* (species 52) and the yellow-brown form of *P. curlewensis* (species 54), but the white areas in the former are more silvery, and the pattern in the latter is more intricate. The three species are readily separated by genitalia.

*Pelochrista hazelana* is poorly represented in collections. We examined eight specimens (7 ♂, 1 ♀) from El Paso and Otero counties, Colorado; Carter County, Montana; Cimarron County, Oklahoma (at the west end of the panhandle); and Coahuila, Mexico. One specimen (a paratype) was collected on an unspecified date in July, the others from mid-August to late September.

## The *robinsonana* group (species 6–9)

The *robinsonana* group consists of four small to medium-sized species (mean FWL: 6.8–10.3) that are similar in genitalia but easily distinguished by forewing appearance. Shared genitalic characteristics include:

*Male genitalia.* Uncus somewhat bulbous, with height about one-half basal width; dorsolateral shoulders of tegumen weakly developed; socii moderately short; phallus long, narrow, tapering distally, with base loosely surrounded by anellus; vesica without cornuti; valva spatulate, with costal margin weakly concave, ventral emargination long and shallow, NR: 0.56–0.66, SA: 138–158°; cucullus weakly differentiated from neck, with dorsal lobe moderately developed, ventral lobe weakly developed to absent, distal margin nearly straight, setation of medial surface mostly coarse; ventral margin of cucullus with 4–8 long marginal spines that tend to cluster near the anal angle and sometimes extend to distal end of neck.

*Female genitalia.* Papillae anales and tergum 8 as in *agassizi* group; sterigma Type III; lamella postvaginalis triangular to rectangular, with width at posterior margin 3–5 × ostium diameter; ostium variably shielded by a medial protrusion of the posterior margin of sternum 7; sternum 7 triangular and uniformly scaled; ductus bursae with elongate sclerotized patch from juncture with ductus seminalis nearly to constriction anterior to ostium; corpus bursae with two signa, one of moderate size, the other greatly reduced and sometimes scarlike, the latter situated on a patch of sclerotized membrane.

## 6. *Pelochrista robinsonana* (Grote, 1872)

(Plate B, 6a–f; Plate 2, 6a–e)

*Conchylis robinsonana* Grote 1872:101.

*Paedisca robinsonana*: Fernald 1882:37.

*Eucosma robinsonana*: Fernald 1903:455 [synonym of *P. quinque-maculana*]; Barnes and McDunnough 1917:169; Heinrich 1923:80; McDunnough 1939:45; Miller 1987:48; Powell 1983:34; Brown 2005:326; Gilligan et al. 2008:102.

*Pelochrista robinsonana*: Gilligan and Wright 2013b:326.

*Eucosma robinsoniana* Kearfott 1905:350, misspelling.

*Eucosma robinsoniana tryonana* Kearfott 1905:350, misspelling; synonymy by Heinrich 1923:80.

*Paedisca quintana* Zeller 1875:304; synonymy by Fernald 1882a:37.

**Types.** *Conchylis robinsonana*. Holotype. ♂, Alabama, ANSP. *Paedisca quintana*. Lectotype (here designated). ♂, Texas, Dallas, Boll, MCZ. *Eucosma robinsonana tryonana*. Lectotype (designated by Heinrich 1923). ♂, North Carolina, Tryon, W. F. Fiske, 17 May, AMNH.

Grote (1872) mentioned a male, which is considered the defacto holotype, and Heinrich (1923) reported the “Type” depository as the ANSP. Zeller (1875) based *P. quintana* on two males collected by Jacob Boll in Texas. He reported retaining one in his personal collection and returning the other to



the MCZ. Miller and Hodges (1990) reported two syntypes in the MCZ. One, designated here as the lectotype, was labeled as such by W. E. Miller, but his designation was never published. Kearfott (1905) mentioned three male syntypes of *E. r. tryonana* from Tryon, North Carolina. The AMNH has one of these specimens, so Heinrich's (1923) remarks constitute a lectotype designation. The other two syntypes, one dated 17 May, the other 1 June 1904, are located in the USNM.

*Pelochrista robinsonana* is the smallest member of the group (mean FWL = 6.8 vs. 8.1–10.3 mm). The forewing is dark brown with a small white spot at the base, white interfascial areas separating the basal, subbasal, and median fasciae, two white spots on the distal one-half of the costa, and a variably expressed whitish ocellus that is usually edged laterally by pinkish transverse bars. In males the white band between the subbasal and median fasciae extends from the inner margin to the radius (Plate B:6a–d); in females it continues to the costa (Plate B:6e–f). This species was once confused with *P. quinquemaculana* (species 155) (Fernald 1903), but Kearfott (1905) treated the two as distinct (with little in the way of explanation), and Heinrich (1923) confirmed this conclusion with his examination of the male genitalia. The two species are in fact readily separated by forewing appearance. *Pelochrista quinquemaculana* has a larger white basal spot, only one transverse white band in the proximal one-half of the wing, and a white spot without trace of pink in the position of the ocellus.

Distinctive genitalic features include a series of long marginal spines on the cucullus from the anal angle to the distal end of neck, a triangular medial protrusion of the posterior margin of sternum 7, and an elongate troughlike signum on the dorsal surface of the corpus bursae that is medially located on a large patch of sclerotized membrane.

This species is broadly distributed in the eastern United States. We examined specimens ranging from Massachusetts to Michigan to central Nebraska, south to Florida, Louisiana, and eastern Texas. Adults have been captured between 14 February and 15 August. Most Midwestern specimens are collected in May and June. In Florida, and perhaps throughout the Deep South, there appear to be two flights, one concentrated in March and the other in midsummer. The USNM has one specimen labeled “*Salidago*, 11/884; From Glovers coll. 83.,” suggesting it was reared from *Solidago* L. (goldenrod).

## 7. *Pelochrista guttulana* (Blanchard, 1979)

(Plate C, 7a–d; Plate 3, 7a–e)

*Eucosma guttulana* Blanchard 1979:214; Brown 2005:321.

*Pelochrista guttulana*: Gilligan and Wright 2013b:321.

**Holotype.** ♂, Texas, Kleberg County, Padre Island National Seashore, A. and M. E. Blanchard, 19 July 1976, USNM.

This species was described from a long series of specimens, most of which were collected on Padre Island along the coast of southern Texas.

The forewing is blackish gray (Plate C:7a–c) to brown (Plate C:7d) and is extensively sprinkled with small white spots of variable size and shape. The ocellus resembles that of *P. robinsonana*, with pinkish bars on the lateral margins. The white speckles sometimes align into what resembles highly fragmented versions of the white markings in *P. robinsonana*. *Pelochrista guttulana* is a little larger than *P. robinsonana* (mean FWL = 8.6 vs. 6.8 mm). There are no substantial differences in genitalia between the two taxa.

This species appears to be associated with sandy soils. We examined specimens from southern Alabama, coastal North Carolina, Oklahoma, and Texas. Adults have been collected between 1 March and 10 November.

## 8. *Pelochrista fritillana* (Blanchard and Knudson, 1981)

(Plate C, 8a–c; Plate 3, 8a–e)

*Eucosma fritillana* Blanchard and Knudson 1981a:170; Brown 2005:320.

*Pelochrista fritillana*: Gilligan and Wright 2013b:321.

**Holotype.** ♂, Texas, Anderson County, Engeling Wildlife Management Area, near Tennessee Colony, A. and M. E. Blanchard, 28 June 1978, USNM.

*Pelochrista fritillana* is intermediate in size between *P. robinsonana* and *P. guttulana* (mean FWL = 8.1 vs. 6.8 and 8.6 mm, respectively). It is separated from the other members of the group by forewing color and maculation. The dorsal surface is predominantly creamy white with variable brown fasciate markings that are sometimes partially edged with black. The result is an overall mottled appearance. This species is distinguished from the brown phenotype of *P. guttulana* by the size of the whitish forewing spots (large vs. small) and by the color of the maculation (grayish-brown vs. reddish brown).

Genitalia characteristics distinguishing *P. fritillana* from other members of the group include: the apex of the uncus is slightly angular; the cucullus has 3–5 marginal spines clustered near the anal angle; the lamella postvaginalis is crescent-shaped, with the width at the posterior margin nearly 5 × the ostium diameter; and the dorsal signum in the corpus bursae is reduced, its base narrowly surrounded by a ring of sclerotized membrane.

This species is known only from the type series, collected in Anderson and Freestone counties in eastern Texas, about midway between Dallas and Houston. Those specimens were collected in June.

## 9. *Pelochrista mobilensis* (Heinrich, 1923)

(Plate C, 9a–c; Plate 3, 9a–e)

*Eucosma mobilensis* Heinrich 1923:125; McDunnough 1939:47; Powell 1983:35; Brown 2005:324.

*Pelochrista mobilensis*: Gilligan and Wright 2013b:324.

**Holotype.** ♂, Alabama, Baldwin County, near Daphne, eastern shore of Mobile Bay, emerged 3 October 1920, slide 72807, USNM.

Heinrich (1923) described *P. mobilensis* from two specimens (1 ♂, 1 ♀) that were reared from larvae collected at the type locality. He specified the male as the “Type,” illustrated its genitalia, and referred to the female as a paratype, hence the interpretation of the male as a holotype.

*Pelochrista mobilensis* is the largest member of the group (mean FWL = 10.3 vs. 6.8–8.6 mm). The forewing is pale brown with very fine dark brown reticulations, the latter producing a uniformly and finely speckled effect. Aside from a weakly expressed thin brown line along the termen, the dorsal surface is unmarked. Heinrich (1923) compared this species with *P. nandana* (species 98), which has a dark gray forewing that is similarly speckled with pale gray, but the latter species also has blackish subbasal and pretornal shading. Males of the two species are somewhat similar in genitalia; females of *P. mobilensis* differ from those of *P. nandana* in papillae anales Type (1 vs. 3) and sterigma Type (III vs. II).

In males, the marginal spines cluster near the anal angle. In females, the sterigma has a rectangular appearance produced by flangelike projections at the anterolateral corners, and the smaller of the two signa is surrounded by a relatively small patch of sclerotized membrane.

The types were reared by G. P. Englehardt from roots of *Chrysoma pauciflosculosa* (Michx.) Greene (woody goldenrod) collected by T. van Aller on a sandy beach on Mobile Bay, Baldwin County, Alabama.

Englehardt noted that the larva bores “tortuous channels from the base of the plantstalk downwards” and pupates in a circular tube constructed of “minute plant chips and silk” (Heinrich 1923). The host plant is native to the Gulf Coast and Atlantic states from Mississippi to North Carolina. We examined specimens from coastal Alabama and the Florida Panhandle, one collected in May, the others in September or October.

### The *crambitana* group (species 10–12)

The next three species are large eucosmines (mean FWL: 13.5–15.8 mm) with similar genitalia. They are easily distinguished from other Nearctic *Pelochrista* and from each other by forewing appearance. Shared genitalia characteristics include:

*Male genitalia.* Uncus weakly to moderately developed, semicircular, and clearly differentiated from dorsolateral shoulders of tegumen; socii long, fingerlike, and attenuating distally; phallus long and narrow, with base loosely surrounded by anellus; vesica with 1–5 cornuti; valva with costal margin weakly concave, ventral emargination long and shallow, NR: 0.48–0.63, SA: 111–132°; cucullus with dorsal lobe weakly developed and apically rounded, distal margin convex, ventral lobe weakly to moderately developed, setation of medial surface course; cucullus with 3–5 marginal spines evenly distributed on ventral one-half of distal margin or clustered at anal angle.

*Female genitalia* (*P. crambitana* and *P. richersana*). Papillae anales with posterior lobes moderately wide and ventral extensions moderately developed; sterigma Type III; lamella postvaginalis rectangular, with width about 2 × length; ostium strongly shielded by triangular projection from posterior margin of sternum 7; sternum 7 trapezoidal, with width at anterior margin 2.5–3.0 × that at posterior margin; ductus bursae without sclerotization; corpus bursae with two signa, one much smaller than the other.

#### 10. *Pelochrista crambitana* (Walsingham, 1879)

(Plate C, 10a–b; Plate 4, 10a–e)

*Paedisca crambitana* Walsingham 1879:43; Fernald 1882:37.

*Eucosma crambitana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:81; McDunnough 1939:45; Powell 1983:34; Brown 2005:318; Powell and Opler 2009:134.

*Pelochrista crambitana*: Gilligan and Wright 2013b:319.

**Lectotype** (here designated). ♂, California, Siskiyou County, Mount Shasta, Walsingham, 2 August–1 September 1871, BMNH(E) 819918, slide 11603, BMNH.

Walsingham (1879) did not specify the number or sex of the syntypes, but he reported both male and female wingspans. The male designated here as the lectotype was selected by Obraztsov from four specimens (3 ♂, 1 ♀) in the BMNH. Mean FWL = 15.8 mm.

The forewing is slivery white with parallel golden-brown subradial and subcubital bands, the former with an apical branch, the latter ending at the termen just above the tornus. The maculation is similar to that of *P. canariana* (species 43) and *P. aurilineana* (species 65), but the latter two taxa have a median bar that aligns with the apical branch. The markings are lemon yellow in *P. canariana* and golden brown in *P. aurilineana*. The distal one-half of the costa is immaculate in *P. crambitana* and *P. canariana* but has two or three elongate brown marks in *P. aurilineana*. *Pelochrista crambitana* is readily separated from *P. canariana* and *P. aurilineana* by genitalia: males differ substantially in valval shape, females in sterigma Type (III vs. II) and in papillae anales Type (1 vs. 2 and 3, respectively).

This species is widely distributed in western North America, from North Dakota to Washington and south to New Mexico and California. Adults fly from mid-July to October. Powell and Opler (2009) reported rearing *P. crambitana* in California from roots of *Ericameria nauseosa* (Pall. ex Pursh) G.L. Nesom & Baird (rubber rabbitbrush), *E. linearifolia* (DC.) Urbatsch & Wussow (narrowleaf goldenbush), *E. ericoides* (Less.) Jeps. (California goldenbush), and *Chrysothamnus viscidiflorus* (Hook.) Nutt. (yellow rabbitbrush).

### 11. *Pelochrista richersana* Wright, 2014

(Plate C, 11; Plate 4, 11a–d)

*Pelochrista richersana* Wright 2014a:191.

**Holotype** (Plate C:11). ♂, California, San Luis Obispo County, Montana de Oro State Park, 310 feet, K. Richers, 18 September 2009, slide 145018, USNM.

*Pelochrista richersana* is somewhat similar to *P. ridingsana* (species 60) and *P. aurilineana* (species 65) in forewing appearance but has a more intricate pattern of white spots and streaks produced by brown bands, bars, and branches on an otherwise white background. It is also larger than *P. ridingsana* and *P. aurilineana* (mean FWL = 15.5 mm vs. 10.9 and 14.4, respectively).

In males, the *socii* narrow abruptly at midlength to about one-half the basal width, and the cucullus has four marginal spines of similar size that are distributed from the anal angle to half the distance to the apex. Females are distinguished from those of *P. aurilineana* and other members of the *ridingsana* group by papillae anales Type (1 vs. 3), males by the shape of the *socii* (more strongly attenuated) and the shape of the valva (neck longer, ventral emargination shallower, dorsal lobe of the cucullus less strongly developed).

This species is known only from the type locality, which is situated about midway between San Francisco and Los Angeles on the California coast. The eight specimens we examined were collected between mid-August and mid-September. They included only one female, whose genitalia were worn to the extent that only setal sockets remained to indicate the setation of the papillae anales (Plate 4:11d).

### 12. *Pelochrista crabtreei* Wright, 2014

(Plate C, 12a–b; Plate 4, 12a–c)

*Pelochrista crabtreei* Wright 2014a:193.

**Holotype** (Plate C:12a). ♂, Nevada, Nye County, 24 mi N of Carvers, State Highway 376, 5,500 feet, L. L. Crabtree, 13 June 2005, slide 145020, USNM.

*Pelochrista crabtreei* is the smallest member of the group (mean FWL = 13.4 vs. 15.5–15.8 mm) and is easily recognized by its distinctive forewing appearance. The white dorsal surface is generously speckled with black dots and smudges, producing a pale gray effect. There are no well-defined fasciate markings, but a series of 4–5 rectangular black marks on the distal one-half of the costa serve to separate several costal strigulae. The ocellus is discernable but concolorous with the rest of the wing. No other Nearctic *Pelochrista* of this size has a similar forewing appearance. Although the female is unknown, we placed this species in *Pelochrista* based on similarities in male genitalia with the other taxa in this group.

In the male genitalia, the *socii* broaden abruptly near the base and then taper evenly to a narrowly rounded apex, the tablike basal process is conspicuous, and the cucullus has a weakly-developed semicircular

dorsal lobe and 3–4 marginal spines clustered at the anal angle.

The type series was collected in Big Smoky Valley just east of the Toiyabe Mountain Range in south central Nevada. Adult capture dates range from late May to mid-June.

## The *agricolana* group (species 13–18)

The earliest recognized species in the *agricolana* group were described by Walsingham in the late 1800s: *Paedisca agricolana* (1879), *Paedisca argentialbana* (1879), *Paedisca morrisoni* (1884), and *Paedisca smithiana* (1895). Fernald (1902) transferred these taxa to *Eucosma* Hübner and later (1905) described *Eucosma pergandeana* and *Eucosma pergandeana flavana*, two species that he presumably recognized as close relatives of *P. agricolana* and *P. argentialbana* despite the fact that his paper makes no mention of the Walsingham species. The moths associated with these names are distributed widely across North America and are particularly abundant from the Great Plains to the Pacific coast. *Eucosma morrisoni* is the only one of the six that is easily identified (due to its orange-brown forewing markings). The other five are similar to one another in forewing appearance and exhibit considerable variation in color and maculation.

Heinrich's (1923) analysis of the male genitalia reinforced the opinion that these taxa are closely related congeners but did not yield a clearer circumscription of the species, partially because he did not detect differences in the male genitalia of *E. agricolana* and *E. argentialbana*. In fact, not having examined the types (in the BMNH), he confused the two taxa, illustrating under each name the genitalia of the other species. He proposed only one taxonomic change, that *E. smithiana* be synonymized with *E. argentialbana*, citing an inability to separate the two taxa based on Walsingham's descriptions. The next 50 years produced no substantial progress in these matters, although McDunnough (1927) proposed the name *Eucosma argentialbana britana* for what he considered to be unusually marked specimens of *E. argentialbana*, and Forbes (1937) described *Eucosma lathamii* based on *morrisoni*-like specimens from Long Island, New York.

Miller (1974) attempted to resolve the *agricolana*-*argentialbana* problem by interpreting *E. agricolana* as a transcontinental species with eastern and western subspecies *E. a. argentialbana* and *E. a. agricolana*, respectively, separating the two at 105° west longitude (approximately through Denver, Colorado). He placed *E. pergandeana* and *E. p. flavana* in the synonymy under *E. a. argentialbana*, resurrected *E. smithiana*, and treated *E. a. britana* as a synonym of *E. smithiana*. He also proposed the name *E. barbara* for some specimens that he distinguished from *E. smithiana* by subtle differences in genitalia. Miller's conclusions were based on genitalia characters, and like Heinrich (1923), he confused the male genitalia of *E. agricolana* with those of *E. argentialbana*. Also, he appears not to have realized that the male and female genitalia of *E. agricolana* are indistinguishable from those of *E. smithiana*.

All of these species were transferred to *Pelochrista* by Gilligan and Wright (2013b). Our treatment of the *agricolana*-like taxa is based on examination of the genitalia of the primary types. We propose that *P. agricolana* and *P. argentialbana* be considered distinct species, that *P. pergandeana*, *P. p. flavana*, and *P. a. britana* remain in the synonymy under revised senior synonyms, and that *P. smithiana* and *P. barbara* be placed in the synonymy under *P. agricolana*.

Miller (1974) did not comment on *P. morrisoni* or *P. lathamii*, species that are substantially identical in both forewing appearance and genitalia. We apply the former name to specimens from western North America (roughly west of the Mississippi River) and retain the latter name for individuals that appear to comprise disjunct populations in New England (New York to Maine) and the eastern Great Lakes region.

*Pelochrista heathiana* Kearfott (1907a), *Pelochrista russeola* Heinrich (1929), and *Pelochrista langstoni* Powell (1963) are included in the *agricolana*-group by virtue of their genitalia, but they are easily distinguished from the other group members by forewing appearance. *Pelochrista langstoni* is recognized here as a junior synonym of *P. russeola*. Group characteristics include:



*Forewing* (*P. agricolana*, *P. argentialbana*, *P. morrisoni*, and *P. lathamii*). Mean FWL: 7.8–9.1 mm, AR: 3.00–3.20; dorsal surface white to pale yellowish orange, often with some gray suffusion; markings grayish brown to orange brown, including narrow variably expressed subradial and subcubital bands, a median bar connecting the two bands, and a series of marks and/or striae on the distal one-half of the costa associated with the sometimes obscurely defined strigulae; ocellus obscure to undetectable; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia*. Uncus strongly developed, usually rectangular, often with apical margin medially indented; socii slender and cylindrical, length about 4 × diameter; phallus moderately long, tapering distally, with base loosely surrounded by anellus; vesica with 7–27 cornuti; valva with costal margin concave, ventral emargination somewhat U-shaped, NR: 0.48–0.53, saccular corner angulate, SA: 72–111°, basal process tablike and moderately developed; cucullus with dorsal lobe moderately to strongly developed, apex rounded, distal margin convex, ventral lobe strongly developed and triangular, basoventral margin weakly overlapping ventral margin of neck; vertex of anal angle with stout anal spine.

*Female genitalia*. Papillae anales with posterior lobes of moderate width; ventral extensions strongly developed, with moderately stout hook-tipped setae present along ventral margin and clustering at anterior extremities of anterior lobes; tergum 8 narrow and collarlike; membrane between anterior lobes of papillae anales and ventral extremities of tergum 8 weakly sclerotized (not shown in the illustrations); sterigma Type III, lamella postvaginalis often rectangular, sometimes broadening slightly posteriorly, with lateral margins weakly curled inward, posterior margin variably indented, and central trough weakly depressed and microtrichiate; sternum 7 trapezoidal, with width at anterior margin about 1.3–2.0 × that at posterior margin; scaling of sternum 7 dense on lateral and posterior margins, comparatively sparse elsewhere; membrane between sterna 6 and 7 with pair of variably developed pockets; ductus bursae with variably shaped patch of sclerotization posterior to juncture with ductus seminalis and, with the exception of *P. russeola*, a patch of microtrichia on inner surface near ductus seminalis; corpus bursae with two signa, one larger than the other.

### 13. *Pelochrista agricolana* (Walsingham, 1879)

(Plate D, 13a–o; Plate 5, 13a–o)

*Paedisca agricolana* Walsingham 1879:42; Fernald 1882a:37.

*Eucosma agricolana*: Fernald 1903:456; Barnes and McDunnough 1917:169.

*Eucosma agricolana agricolana*: Miller 1974:601.

*Pelochrista agricolana*: Gilligan and Wright 2013b:317.

*Eucosma argentialbana* (not Walsingham 1879): Heinrich 1923:88 [misidentification]; McDunnough 1939:46.

*Eucosma argentialbana britana* McDunnough 1927:273; McDunnough 1939:46; Miller 1974:603 [= *smithiana*]; Powell 1983:34;

Brown 2005:327; new synonymy.

*Paedisca smithiana* Walsingham 1895:506; new synonymy.

*Eucosma smithiana*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:88 [= *argentialbana*]; McDunnough 1939:46

[= *argentialbana*]; Miller 1974:603; Powell 1983:34; Miller 1987:49; Brown 2005:327; Gilligan et al. 2008:104.

*Pelochrista smithiana*: Gilligan and Wright 2013b:327.

*Eucosma barbara* Miller 1974:604; Powell 1983:34; Miller 1987:49; Brown 2005:316; new synonymy.

*Pelochrista barbara*: Gilligan and Wright 2013b:317.

**Types.** *Paedisca agricolana*. Lectotype (designated by Miller 1974, Plate D:13a). ♂, Oregon, Douglas County, Umpqua River, Walsingham, 28 April–3 May 1872, BMNH(E) 819870, slide 5745, BMNH. *Paedisca smithiana*. Lectotype (designated by Miller 1974, Plate D:13d). ♂, Colorado, Loveland, 5,000 feet, W. G. Smith, July 1891, BMNH(E) 819901, slide 3282, BMNH. *Eucosma argentialbana britana*. Holotype. ♂, Canada, British Columbia, Seton Lake, J. McDunnough, 20 June 1926, No. 2588, CNC. *Eucosma barbara*. Holotype (Plate D:13f). ♀, Minnesota, Ramsey County, North Oaks, W. E. Miller, 28 July 1965, slide P. Jacus 261, AMNH.



*Paedisca agricolana* was based on five males (now in the BMNH) that Walsingham collected in California and Oregon in 1871 and 1872. Those specimens bear “SYNTYPE” labels attached by K. Tuck. We examined the lectotype (Plate D:13a), which was selected by Obraztsov and designated by Miller (1974), and two of the paralectotypes. The male-female association presented here is based on several pairs from Kelowna, British Columbia (in the CNC), Larimer County, Colorado (in the DJW collection), and Yukon Territory (in the CNC) in which the male agrees with the lectotype and the female matches the male in forewing color and maculation.

*Paedisca smithiana* was described from two syntypes (1 ♂, 1 ♀) collected by W. G. Smith at Loveland, Colorado. Obraztsov selected the male as the lectotype and Miller (1974) published the designation. The female (Plate D:13e) agrees in forewing appearance with *E. agricolana* types (Plate D:13a–b); the male (Plate D:13d) is paler, with very faint markings. Both sexes agree with *E. agricolana* in genitalia. Pale and/or weakly marked specimens (like the lectotype) are common in the Great Plains and the Great Basin (Plate D:13k–o) and have been collected in association with strongly marked individuals at localities in Colorado, Idaho, Minnesota, Washington, and Wyoming. We attribute the differences to intraspecific variation. Heinrich (1923) synonymized *E. smithiana* with *E. argentialbana* rather than *E. agricolana* because he confused the male genitalia of the latter two species. Miller (1974) restored *E. smithiana* to species status based on male and female genitalic features, but he seems to have been unaware that the character states he relied upon to diagnose *E. smithiana* also occur in *E. agricolana*.

McDunnough (1927) described *E. argentialbana britana* from seven males collected at Seton Lake in British Columbia. We found no substantial differences between these specimens and our revised concept of *E. agricolana*. This arrangement is consistent with Miller’s (1974) interpretation of *E. a. britana* as a synonym of *E. smithiana* (treated here as a junior synonym of *E. agricolana*).

Miller (1974) described *E. barbara* from Minnesota and South Dakota based on 13 specimens (6 ♂, 7 ♀) that he distinguished from *E. smithiana* by subtle differences in genitalia: uncus shorter with apex rounded, short stubby setae on the ventral extensions of papillae anales arranged in a line (vs. two rows in *E. smithiana*), and lamella postvaginalis wider. He also reported that the two species fly together at the type locality.

We examined the genitalia of 34 female *agricolana-smithiana-barbara* specimens from various localities in the western United States and Canada and found the characters utilized by Miller (1974) to diagnose *E. barbara* to be unstable. The short stubby setae on the ventral extensions of the papillae anales vary in number (from 3 to 5; usually 4) and configuration (from nearly aligned to forming the vertices of a small parallelogram, the latter being the most common arrangement) (Plate 5:13j–o). The lamella postvaginalis is rectangular to trapezoidal, with the posterior margin often indented medially. It exhibits variable patterns of sclerotization which influence the interpretation of its shape (Plate 5:13i–o). Variation in uncus shape is illustrated in Plate 5:13a–f. Figure 13f is a paratype of *E. barbara*. We find the variation in these character states sufficient to question their reliability in diagnosing *E. agricolana*, *E. smithiana*, and *E. barbara*, hence the new synonymies.

*Pelochrista agricolana* is slightly smaller than *P. argentialbana* (mean FWL = 7.8 vs. 9.1 mm). Pale weakly marked specimens (Plate D:13k–o) often can be identified by forewing appearance, but boldly marked individuals can be confused with some phenotypes of *P. argentialbana* (e.g., Plate D:13a, c vs. Plate E:14g, h). The primary genitalia features distinguishing *P. agricolana* from *P. argentialbana* are: the dorsal lobe of the cucullus is less strongly produced; the saccular angle is slightly obtuse instead of acute (SA = 98 vs. 72°); the posterior lobes of the papillae anales are smaller in comparison to the ventral extensions; the ventral extensions have a cluster of 3–5 thick stubby setae at the posteroventral corner (absent in *P. argentialbana*); the apophyses are more robust; and the pockets in the membrane between sterna 6 and 7 are deeper.

List (1932) reported larvae (identified as *argentialbana*) feeding in roots of *Chrysanthemum* in Colorado. We found one such male (a small, mostly white specimen with pale grayish apical markings) in the USNM

labeled “breeding cage 8-12-31, Colo 4954,” slide 70272. The USNM has four specimens (1 ♂, slide 70248; 3 ♀, slide 70250) collected near Clarkston, Washington that were reared by J. F. G. Clarke on *Artemisia vulgaris* L. (common wormwood) (reported by Brown et al. 1983).

The specimens we examined document a range extending from the southwest corner of the Yukon Territory to Minnesota, south to western Texas, southeastern Arizona, and central California. Adults fly from May through August.

#### 14. *Pelochrista argentialbana* (Walsingham, 1879), revised status (Plate E, 14a–o; Plate 6, 14a–j)

*Paedisca argentialbana* Walsingham 1879:44; Fernald 1882a:37.

*Eucosma argentialbana*: Fernald 1903:456; Barnes and McDunnough 1917:169.

*Eucosma agricolana argentialbana*: Miller 1974:603; Powell 1983:34; Brown 2005:314.

*Pelochrista agricolana argentialbana*: Gilligan and Wright 2013b:317.

*Eucosma agricolana* (not Walsingham 1879): Heinrich 1923:91; McDunnough 1939:46; Miller 1987:49; Gilligan et al. 2008:104.

*Eucosma pergandeana* Fernald 1905:399; Barnes and McDunnough 1917:169; Heinrich 1923:90; McDunnough 1939:46;

Miller 1970:292; synonymy by Miller 1974:603; Powell 1983:34; Brown 2005:315.

*Pelochrista pergandeana*: Gilligan and Wright 2013b:317.

*Eucosma pergandeana flavana* Fernald 1905:399; Barnes and McDunnough 1917:169; Heinrich 1923:91; McDunnough 1939:46;

Miller 1970:292; synonymy by Miller 1974:603; Powell 1983:34; Brown 2005:314.

*Steganoptycha ochreana* Clemens 1864:520; Fernald 1882a:38 [= *E. cataclystiana*, misidentification]; Fernald 1903:456;

Barnes and McDunnough 1917:169; Heinrich 1923:135; McDunnough 1939:48; Miller 1973:218; Miller 1974:603

[unused senior synonym of *E. a. argentialbana*, proposed nomen oblitum status]; Powell 1983:34; Brown 2005:314.

*Pelochrista ochreana*: Gilligan and Wright 2013b:317.

**Types.** *Paedisca argentialbana*. Lectotype (designated by Miller 1974, Plate E:14a). ♀, Texas, Bosque County, Belfrage, 14 May 1876, BMNH(E) 819872, slide BM 3242. *Steganoptycha ochreana*. Lectotype (designated by Darlington 1947). ♀, Virginia, No. 7213, ANSP. *Eucosma pergandeana*. Lectotype (designated by Miller 1970, Plate E:14c). ♂, Virginia, T. Pergande, 4 June 1882, slide DJW 2895, USNM. *Eucosma pergandeana flavana*. Lectotype (designated by Miller 1970, Plate E:14e). ♂, Texas, slide 72798, USNM.

Walsingham described *P. argentialbana* from two syntypes (1 ♂, 1 ♀) collected in Texas by Belfrage in May of 1876. He labeled the male as “Type,” but the female was chosen by Obraztsov and designated by Miller (1974) as the lectotype, probably because the male lacks an abdomen.

Fernald (1905) based *E. pergandeana* on 16 syntypes (13 ♂, 3 ♀) collected in Ontario, Arizona, Colorado, Massachusetts, New Jersey, Texas, and Virginia. Heinrich (1923) considered the “Type” to be a male from Virginia collected by Theodore Pergande, and Miller (1970) designated that specimen as the lectotype. Fernald (1905) also proposed the subspecific name *E. p. flavana* for an unspecified number of the syntypes of *E. pergandeana* from Arizona, Colorado, and Texas that have pale yellow to cream colored forewings. Heinrich (1923) interpreted *E. p. flavana* as a western variety of *E. pergandeana* and referred to the type locality as Texas; Miller (1970) designated a Texas male as the lectotype.

Clemens (1864) described *S. ochreana* from an unknown number of specimens from Virginia. All that remains of the lectotype (designated by Darlington 1947) are the right fore- and hindwings, which were illustrated by Miller (1973). This name was placed in the synonymy under *Pelochrista cataclystiana* (Walker) by Walsingham (1879) and remained there until Miller (1974) recognized it as an unused senior synonym of *P. argentialbana* and proposed that it be treated as a *nomen oblitum*.

Dominant forewing color varies from white (Plate E:14f) to pale yellow orange (Plate E:14m), with varying degrees of gray suffusion. The reddish-brown phenotype in Plate E:14o was collected along with a series of uniformly gray specimens (Plate E:14n) at an elevation of about 10,000 feet in southeastern

Wyoming. The subradial and subcubital bands are reduced to lines of variable expression, and the ocellus is obscure but usually marked by two or three black dots. We found no clear geographic patterns in the distribution of color phenotypes, but the yellow-orange form (Fernald's *E. p. flavana*) appears to be associated with particularly arid habitat in the Southwest, and the uniformly gray form (Plate E:14n) has been collected at a number of high elevation sites in the Rocky Mountain Region. Mean FWL = 9.1 mm.

Many specimens of *E. argentialbana* are superficially similar to certain phenotypes of *E. agricolana* and require examination of the genitalia for an accurate determination. The most conspicuous genitalia differences are discussed under the latter taxon. In *E. argentialbana*, the ventral extensions of the papillae anales lack the thick stubby setae characteristic of *E. agricolana* but do have narrow bands of hook-tipped setae along the margins of the ventral opening, and those setae are relatively stout compared to the long hairlike setae on the margins of the posterior lobes.

We examined specimens from Prince Edward Island to British Columbia south to North Carolina, central Texas, and northern California. This species is sympatric with *E. agricolana* in the western part of its range (Manitoba, Minnesota, Iowa, Kansas, and Texas to the Pacific coast).

### 15. *Pelochrista morrisoni* (Walsingham, 1884)

(Plate F, 15a–f; Plate 7, 15a–f)

*Paedisca morrisoni* Walsingham 1884:138.

*Eucosma morrisoni*: Fernald 1903:460; Barnes and McDunnough 1917:169; Heinrich 1923:90; McDunnough 1939:46; Powell 1983:34; Miller 1987:49; Brown 2005:324; Gilligan et al. 2008:103.

*Pelochrista morrisoni*: Gilligan and Wright 2013b:325.

**Holotype** (Plate F:15a). ♀, Montana, Yellowstone River, Morrison, 1880, BMNH(E) 819878, slide 11545, BMNH.

*Pelochrista morrisoni* was described from a single female collected in Montana by H. K. Morrison. It is similar in size to *P. agricolana* and *P. argentialbana* (mean FWL = 8.7 vs. 7.8 and 9.1 mm) and usually can be separated from those two species by its orange-brown forewing markings, but the color is subject to some variation (e.g., Plate F:15e–f). The longitudinal bands are much broader in *P. morrisoni* than in the other two species. In most specimens, the subradial band is generously suffused with black, and the subcubital band is edged with black from the base of the wing to the origin of CuA<sub>2</sub>. The forewing appearance is most similar to that of *P. lathamii* (species 16), the differences being discussed in the account for that species.

The genitalia resemble those of *P. agricolana* in that the saccular angle is slightly obtuse (SA = 94°) and the pockets in the membrane between sterna 6 and 7 are moderately well developed, but the setation of the ventral extensions is similar to that of *P. argentialbana*.

We examined specimens from northwestern Wisconsin, central Illinois, and western Texas to British Columbia, eastern Oregon, central Nevada, and southern California. Adults fly from mid-May to early September.

### 16. *Pelochrista lathamii* (Forbes, 1937)

(Plate F, 16a–c; Plate 7, 16a–d)

*Eucosma lathamii* Forbes 1937:131; McDunnough 1939:46; Powell 1983:34; Brown 2005:323.

*Pelochrista lathamii*: Gilligan and Wright 2013b:323.

**Holotype.** ♂, New York, Long Island, Orient, R. Latham, 18 June 1935, USNM.

Forbes (1937) proposed this name for a population of *morrisoni*-like specimens collected by Roy Latham on Long Island, New York. The description does not mention the number of specimens in the type series. We located five specimens labeled as paratypes, one female in the USNM and four males in the CUIC.

There is little in the way of maculational characteristics to distinguish this species from *P. morrisoni*. It appears to be slightly smaller (mean FWL = 8.2 vs. 8.7 mm) and has somewhat darker bands (sometimes almost entirely black) that divide the forewing into what seem to be bolder white patches, especially the one in the ocelloid region. Unlike *P. morrisoni*, the ocellus itself is not expressed. There are no substantial genitalia differences between the two species.

We examined 44 specimens (30 ♂, 14 ♀) from Atlantic coastal localities in Suffolk County, New York; Dukes County, Massachusetts; New Haven County, Connecticut; and Cumberland County, Maine. We also examined a photograph of a specimen in the CNC from dunes on Manitoulin Island in Lake Huron that we believe to be this species. Adults have been collected from April to September.

The ranges of *P. morrisoni* and *P. lathamii* appear to be disjunct, the former lying west of the Mississippi River, the latter mostly east of the Appalachian Mountains. This suggests that at one time there may have been a single transcontinental species that eventually split into eastern and western subgroups that have diverged only slightly from one another. We retain the two names primarily to recognize that distinction.

## 17. *Pelochrista heathiana* (Kearfott, 1907)

(Plate F, 17a–b; Plate 8, 17a–f)

*Eucosma heathiana* Kearfott 1907a:56; Barnes and McDunnough 1917:170; Heinrich 1923:88; McDunnough 1939:46; Powell 1983:34; Miller 1987:48; Brown 2005:321; Gilligan et al. 2008:103.  
*Pelochrista heathiana*: Gilligan and Wright 2013b:322.

**Lectotype** (designated by Heinrich 1923). ♂, Canada, Manitoba, Cartwright, E. F. Heath, AMNH.

Kearfott (1907a) described *E. heathiana* from eleven syntypes collected by E. F. Heath at Cartwright, Manitoba and by A. J. Brown in Washington County, Arkansas. The AMNH has four of those specimens, one from Cartwright and the other three from Arkansas, so Heinrich's remarks regarding the "Type" locality serves to identify a unique specimen in the AMNH.

*Pelochrista heathiana* is easily recognized by forewing appearance: white except for an elongate blackish-gray blotch along the inner margin and some short black dashes and golden-brown striae associated with the costal strigulae. It might conceivably be confused with *Eucosma giganteana* (Gilligan et al. 2008: species 150; Wright and Gilligan 2015: species 8), but in that species the blackish coloration surrounds the ocellus, and the medial portion of the inner margin is white. Also, *P. heathiana* is smaller than *E. giganteana* (mean FWL = 7.8 vs. 12.8 mm).

This species has the largest saccular angle in the *agricolana* group (111° vs. 72–98°). Females have two moderately deep pockets in the membrane between sterna 6 and 7, and the shape and setation of the papillae anales are similar to those of *E. argentialbana*.

*Pelochrista heathiana* is primarily a resident of the tall grass prairie region of the Midwest. We examined 34 specimens from Ohio to Manitoba, south to Arkansas, and one from Long Island, New York. Metzler et al. (2005) reported it from Kansas and coastal Massachusetts. Adults fly from June to August.



## 18. *Pelochrista russeola* (Heinrich, 1929)

(Plate F, 18a–d; Plate 8, 18a–f)

*Eucosma russeola* Heinrich 1929:6, Fig. 20; Powell 1983:34; Brown 2005:326.

*Pelochrista russeola*: Gilligan and Wright 2013b:327.

*Eucosma langstoni* Powell 1963:235, Figs. 1, 3; Powell 1983:34; Brown 2005:322; new synonymy.

*Pelochrista langstoni*: Gilligan and Wright 2013b:323.

**Types.** *Eucosma russeola*. Holotype (Plate F:18a). ♂, California, Los Angeles, K. R. Coolidge, 11 June 1921, slide 72803, USNM. *Eucosma langstoni*. Holotype. ♂, California, San Luis Obispo County, Pozo, J. Powell, 3 May 1962, CAS.

Heinrich (1929) described *E. russeola* from four specimens (2 ♂, 2 ♀) from Los Angeles and San Bernardino counties, California. He illustrated the genitalia of a male that he called the “Type,” and that specimen has subsequently been interpreted as a holotype (Brown 2005; Gilligan and Wright 2013b). Powell (1963) based *E. langstoni* on nine specimens (4 ♂, 5 ♀) from San Luis Obispo County, California. We found no grounds for distinguishing it from *P. russeola*.

*Eucosma russeola* is the largest member of the *agricolana* group (mean FWL = 10.2 vs. 7.8–9.1 mm). It is recognized by its uniformly orange-brown forewing. Forewing maculation varies from absent to weakly expressed and may consist of one or more of the following elements: a black line along the proximal one-half of the cubitus, some blackish suffusion in the form of an obscure longitudinal streak in the distal portion of the cell, and a narrow blackish line along the termen.

The genitalia are similar to those of *E. morrisoni*, but females lack microtrichia on the inner surface of the ductus bursae and well-defined pockets in the membrane between the sterna 6 and 7.

This species is known only from southern California. We examined 48 specimens from Kern, Los Angeles, Riverside, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties. Adults fly from April to September.

## The *albiguttana* group (species 19–22)

This group is comprised of four very similar looking species: *P. albiguttana*, *P. graciliana*, *P. galenapunctana* (which were named more than a century ago), and a new species described below. Historical attempts to diagnose the three earliest described members (Kearfott 1905, 1908) referred mostly to aspects of forewing maculation that subsequently have proven to be unreliable due to intraspecific variation. Heinrich’s (1923) treatment of those species purported to separate them by male genitalia, but he was operating under a then accepted misunderstanding in North America as to the identity of *P. albiguttana*. He adopted Kearfott’s concept of that taxon, crediting the determination to Fernald, and it appears that neither he nor Kearfott examined the type material. They mistakenly applied the name to a rather small species in the eastern United States that is modestly well represented in collections but has never been recognized. It is described here as *P. kimballi*, new species. Miller (1987) provided some clarification on these issues but introduced some additional confusion. He published the first accurate illustrations of the forewing and male valva of *P. albiguttana*, but his drawing of the sterigma for that species seems to have been based on a female of *P. kimballi*. His photograph of the forewing and drawing of the valva of *P. graciliana* are appropriate for *P. kimballi*, and his drawing of the sterigma of *P. graciliana* is based on a specimen of *P. galenapunctana*.

Of the three original members of the group, only *P. graciliana* has had a clearly designated lectotype, a female in the AMNH collected by Fiske in North Carolina. A lectotype for *P. albiguttana* was selected by Obraztsov in the 1960s, and that specimen (a male in the BMNH) is so designated below. Kearfott (1908)

described *P. galenapunctana* from a series of specimens collected in Colorado. Klots (1942) reported eight syntypes in the AMNH, including a female lectotype whose selection he attributed to Heinrich (1923). Since Heinrich's remarks about the "Type" are ambiguous, we include a lectotype designation for the female in the AMNH that bears Klots' green "LECTOTYPE" label.

Since two of the group members (*P. graciliana* and *P. galenapunctana*) have female primary types, circumscription of the various species requires an understanding of the female genitalia and a supply of well documented male-female pairs. The lectotypes of *P. graciliana* and *P. galenapunctana* had not been dissected prior to our examination of them, and the genitalia of true *P. albiguttana* was not known until sometime in the 1960s when Obraztsov dissected two syntypes (1 ♂, 1 ♀) in the BMNH.

For *P. albiguttana* and *P. galenapunctana* we found male-female pairs among the syntypes and in several other series that include both sexes associated by date and collection site. For *P. graciliana* the male-female association is uncertain. The type series for this species is comprised of a female lectotype collected in July (1904) and three male paralectotypes collected in May (1903 and 1904), all from Tryon, North Carolina. Apart from their similarity in forewing appearance (which also resembles that of *P. albiguttana*) there is no compelling reason to believe that the female is conspecific with the males. Moreover, the syntypes are not clearly separated from other members of the group by genitalia. The lectotype and paralectotypes are similar in that respect to *P. albiguttana* and *P. galenapunctana*, respectively. This situation is complicated by the occurrence in the Midwest of tentatively associated male-female pairs in which the females agree with *P. albiguttana* in all respects except for scaling patterns on sternum 7 and the males have *galenapunctana*-like genitalia. The association of the sexes in these Midwest specimens is uncertain because on three occasions these pairs were collected along with *P. galenapunctana* females, raising the possibility that the males are *P. galenapunctana*.

Two plausible interpretations of the "*graciliana*" type material suggest themselves, neither of which is particularly satisfying. Since the lectotype of *P. graciliana* agrees substantially in forewing appearance and genitalia with the female syntypes of *P. albiguttana* (Plate G:21a vs. Plate G:19b; Plate 10:21c vs. Plate 9:19i), one might be tempted to treat these two names as synonyms. This would imply that at some time in the past the range of *P. albiguttana* extended into one or more of the eastern seaboard states, but to date we have seen no specimens of *P. albiguttana* (other than, perhaps, the *P. graciliana* lectotype) from east of the Appalachian Mountains. It would also mean that the male syntypes of *P. graciliana* are either conspecific with *P. galenapunctana* or represent an unnamed species. Alternatively, the four syntypes of *P. graciliana* may indeed be conspecific, resulting in a taxon with females that resemble *P. albiguttana* and males that can not be distinguished from *P. galenapunctana* by genitalia. Neither of these scenarios accounts for the Midwest females that differ from *P. albiguttana* in the scaling of sternum 7 (Plate 9:19k). The latter females have been collected in association with males of *P. albiguttana* in northern Illinois and central Kentucky and with males in western Iowa and central Kansas that have *galenapunctana*-like genitalia. They probably represent another new species in this group, but we hesitate to propose a name for them without some means of unambiguously associating the sexes. Consequently, we retain the name *P. graciliana*, illustrate the genitalia of the syntypes, and illustrate the features of sternum 7 that distinguish the above mentioned Midwest females from typical *P. albiguttana*. This provides little or no guidance in the application of the name *graciliana*, but it does alert the reader to the difficulties involved, and it might stimulate future efforts to resolve the situation. Group characteristics include:

*Forewing.* Mean FWL: 5.6–9.1 mm, AR: 2.87–3.10; dorsal surface golden brown to brownish yellow, lacking fasciate markings, but liberally sprinkled with white/gray spots; ocellus conspicuous, edged laterally by transverse metallic gray bars, with brownish central field crossed by two or three black longitudinal dashes, the third often greatly reduced; costa with prominent whitish strigulae separated by short golden-brown to blackish dashes; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia.* Uncus well developed, with basal width about 1.5–2.3 × height; socii of moderate length



and fingerlike; phallus tapering distally, with base loosely surrounded by anellus; vesica with 7–31 cornuti; valva with costal margin concave, ventral emargination deep, neck narrow, NR: 0.26–0.37, saccular corner angulate, SA: 49–125°, basal process tablike, weakly-raised, and variably developed; cucullus with dorsal lobe moderately to strongly developed, apex rounded, distal margin nearly straight to slightly convex (sometimes with weak concave indentation near anal angle), ventral lobe strongly developed; anal angle with 1–4 marginal spines.

*Female genitalia.* Posterior lobes of papillae anales broad and fanlike in *P. galenapunctana*, comparatively narrow in other group members; tergum 8 narrow and collarlike; lamella antevaginalis present as membranous ring in *P. kimballi* and *P. galenapunctana*, absent in other group members; lamella postvaginalis microtrichiate, with posterior margin medially indented and central trough weakly depressed; lateral margins/anterolateral corners of sternum 7 with taxonomically informative patches of densely clustered and firmly socketed scales; ductus bursae with variable patterns of sclerotization from juncture with ductus seminalis nearly to constriction anterior to ostium; inner surface of ductus bursae with patch of microtrichia near ductus seminalis; corpus bursae with two signa, one larger than the other.

### 19. *Pelochrista albiguttana* (Zeller, 1875)

(Plate G, 19a–i; Plate 9, 19a–k)

*Paedisca albiguttana* Zeller 1875:313; Fernald 1882a:37.

*Eucosma albiguttana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:93; Powell 1983:34; Miller 1987:50; Brown 2005:315; Gilligan et al. 2008:106.

*Pelochrista albiguttana*: Gilligan and Wright 2013b:317.

**Lectotype.** *Pelochrista albiguttana*. Lectotype (here designated, Plate G:19a). ♂, Texas, Dallas, Boll, “401,” slide 11504, BMNH.

In the description of *P. albiguttana*, Zeller (1875) referred to several specimens collected by Jacob Boll at Dallas, Texas, stating “One good male in my collection, more in the Cambridge Museum [MCZ],” but he did not indicate the number of specimens that he examined or retained. We examined two syntypes that had made their way to the BMNH via the Walsingham collection (1 ♂, slide BM 11504; 1 ♀, slide BM 11758). The male bears a green Zeller determination label and was selected by Obraztsov as the lectotype. It is so designated here, an action that differs from previous reports regarding the sex and/or depository of the name-bearing specimen (Heinrich 1923; Brown 2005; Gilligan and Wright 2013b). We also examined a pair of specimens in the MCZ that were collected by Boll at the type locality (1 ♂, slide DJW 953; 1 ♀, slide DJW 954) and additional male-female pairs from Arizona, Colorado, Illinois, Kansas, Michigan, and Oklahoma that are associated by collection site and date.

The forewing spots in *P. albiguttana* are white with metallic-gray edging, but the edging is variable and sometimes so reduced (Plate G:19f) as to be nearly undetectable. We found no maculational characters that would reliably distinguish this species from *P. kimballi* or *P. graciliana*. The spots in *P. galenapunctana* are often solid gray, but in some populations they have white centers. Forewing color varies from dark golden brown to pale brownish yellow, hindwing color from black to pale gray brown (Plate G:19e, f).

Examination of the genitalia is necessary for positive identification. This is the only member of the group with an acute saccular angle (SA = 49° vs. 108–125°). The distal margin of the saccular angle is weakly scooped-out. The basal process is tablike and variable in development; it is essentially absent in specimens from the West (including the lectotype) (Plate 9:19a, b, d, e) but is strongly developed in populations in the Midwest (Plate 9:19c, f–h). Females have a strongly sclerotized crescent-shaped patch that extends along the lateral and posterior margins of sternum 7 from one anterolateral corner to the

other. They also have conspicuous bands of densely clustered and strongly socketed scales along the lateral margins of that sternite from the anterolateral corners to just before the posterolateral corners (Plate 9:19j).

The specimens illustrated in Plate G:19g–i and Plate 9:19k are representative of the Midwest females and their putative male associates discussed in the group comments above. We cannot refer them with any confidence to any named member of the group, but we include them here for comparison with *P. albiguttana*. They are indistinguishable from *P. albiguttana* and *P. graciliana* in forewing appearance. The males resemble *P. galenapunctana* in genitalia and are, therefore, distinct from males of *P. albiguttana*. The female genitalia agree with those of *P. albiguttana* and *P. graciliana* in all respects except the extent of the bands of densely spaced scales on the lateral margins of sternum 7 (Plate 9:19k vs. Plate 9:19j and Plate 10:21c). The arching of the medial portion of the posterior margin of sternum 7 (Plate 9:19k) appears to be stronger than in *P. albiguttana* (Plate 9:19j) and weaker than in the lectotype of *P. graciliana* (Plate 10:21c), but there is enough intraspecific variation in that character to question its diagnostic utility.

We examined about 165 adult specimens of typical *P. albiguttana* from Arizona, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, New Mexico, Oklahoma, and Texas. Capture dates range from mid-May to the end of August. In northern Illinois, adults have been captured while resting diurnally on leaves of *Parthenium integrifolium* L. (wild quinine) (Karl Gnaedinger, pers. comm.). The Midwest specimens with distinctive scaling of sternum 7 have been collected in Putnam County, Illinois; Monona County, Iowa; Riley County, Kansas; and Bullitt County, Kentucky between 23 June and 1 August.

## 20. *Pelochrista kimballi* Wright and Gilligan, new species

(Plate G, 20a–d; Plate 9, 20a–f)

**Diagnosis.** *Pelochrista kimballi* is the smallest species in the *albiguttana* group (mean FWL = 5.6 vs. 7.8–9.1 mm) and usually can be distinguished from other members of the group by size alone. It differs from other group members in various aspects of the genitalia. Compared to *P. albiguttana*, the SA is obtuse instead of acute ( $108^\circ$  vs.  $49^\circ$ ), and the length of the ventral lobe of the cucullus is nearly equal to vs. noticeably greater than that of the dorsal lobe. In *P. graciliana* and *P. galenapunctana*, the dorsal lobe of the cucullus is about twice as long as the ventral lobe, and the anal angle has two or three marginal spines vs. one anal spine in *P. kimballi*. Females differ from all group members except *P. galenapunctana* in the scaling of sternum 7 (large dense patches of scales on the anterolateral portions of sternum 7 vs. elongate bands of such scales along the lateral margins of that sternite). The sterigma-sternum 7 structure resembles that of *P. galenapunctana*, but the lamella postvaginalis has nearly parallel lateral margins rather than the substantial lateral projections prominent in the latter species. Moreover, the posterior lobes of the papillae anales are relatively narrow and elongate and do not form a nearly circular pad as in *P. galenapunctana*.

**Description.** *Head.* Frons tan; vertex golden brown; labial palpus whitish, shading to golden brown on dorsal margin, with third segment contrastingly darker brown; antenna with thin brown dorsal streak and whitish lateral scaling. *Thorax.* Dorsal surface golden brown; legs tan to whitish, with dark brown tarsal annulations. Forewing: ♂ FWL 4.7–6.3 mm (mean = 5.6,  $n = 48$ ), AR = 2.89; ♀ FWL 4.7–6.5 mm (mean = 5.6,  $n = 11$ ), AR = 2.85; costa weakly arched; apical angle about  $90^\circ$ ; termen nearly straight; dorsal surface golden brown with uniformly distributed small whitish spots that are variably edged with gray; costa marked from base to apex with short brown dashes delimiting white strigulae; ocellus conspicuous, edged laterally by lustrous gray bars, with central field white to pale golden brown and crossed by two narrow black dashes; termen with narrow salt-and-pepper-colored band from tornus to apex; fringe pale golden brown. Hindwing: Brownish gray. *Abdomen.* Male genitalia ( $n = 14$ ): Typical of the group; vesica with 8–17 cornuti; NR = 0.37; SA =  $108^\circ$ ; saccular corner of valva with small flaplike projection; cucullus

with dorsal and ventral lobes of nearly equal length, the former somewhat wider with semicircular apex, the latter somewhat attenuated with one anal spine. Female genitalia (n = 8): Papillae anales typical of the group; sterigma somewhat intermediate between Type II and Type III, with weakly developed ringlike lamella antevaginalis; lamella postvaginalis rectangular and microtrichiate, with posterior margin irregularly emarginated; sternum 7 with posterior margin concave, anterolateral corners acute and broadly developed, width at anterior margin about 3 × that at posterior margin; scaling of sternum 7 moderately dense on anterolateral corners and in a narrow band along posterior margin, relatively sparse elsewhere; ductus bursae irregularly sclerotized, with patch of microtrichia on inner surface near juncture with ductus seminalis; corpus bursae with two signa, one substantially larger than the other.

**Holotype** (Plate G:20a, Plate 9:20e). ♂, North Carolina, Macon County, Highlands, J. G. Franclemont, 15 August 1958, slide DJW 3472, USNM.

**Paratypes.** ALABAMA. Clay County, Cheaha State Park, 33.4689° N, 85.8347° W, R. L. Brown and J. MacGowan, 18 May 1998 (1 ♂) MEM. CONNECTICUT. East River, C. R. Ely, 4 September 1907, (1 ♂), USNM. ILLINOIS. Putnam County, M. O. Glenn, 25 August 1940 (1 ♂), 3 September 1940 (1 ♂), INHS; Union County, Bald Knob Cross, T. Harrison and J. Wiker, 28 July 1995, (1 ♀, slide DJW 550), 7 August 1997, (1 ♂, slide DJW 549), DJW. INDIANA. St. Joseph County, South Bend, B. Mather, 15 July 1964, (1 ♂), USNM. IOWA. Monona County, Loess Hills State Forest, G. J. Balogh, 2 July 1992, (1 ♂), 3 July 1992 (1 ♂), DJW. KENTUCKY. Boone County, Big Bone Lick State Park, L. D. Gibson, 25 August 1989 (1 ♂, slide LDG 88), LDG; Bullitt County, S side of Rt. 480, 6.9 mi E of Rt. 61, L. D. Gibson, 23 June 1989, (1 ♂, slide LDG 29), LDG; Bullitt County, Pine Creek Forest, L. D. Gibson, 22 July 1989, (1 ♂), LDG; Christian County, Pennyryle State Forest, L. D. Gibson, 14–15 August 1987, (1 ♀), LDG. MAINE. Kennebeck County, Augusta, A. E. Brower, 15 July 1942, (1 ♀, slide DJW 3473), 18 July 1942 (2 ♂), USNM. MASSACHUSETTS. Dukes County, Martha's Vineyard, F. M. Jones, 16 July, (1 ♂), USNM. MISSISSIPPI. Lowndes County, T17N R16E S34, Black Belt Prairie, R. L. Brown, 20 May 1992 (1 ♂), MEM, 24 August 1993, (1 ♂, DJW 675), DJW; Oktibbeha County, T19N R15E S16, J. MacGowan and T. Schiefer, 7 June 1989, (1 ♂, slide DJW 3584; 1 ♀, slide DJW 715), DJW, D. M. Pollock, 9 June 1989, (1 ♂, slide DJW 714), DJW, R. L. Brown, 24 August 1993, (1 ♀, slide DJW 676), DJW, R. L. Brown and D. Pollock, 24 August 1993 (2 ♂), MEM; Oktibbeha County, Osborne Prairie, 33.5114° N, 88.7356° W, T. M. Gilligan, 24 June 2008 (1 ♂), 26 June 2008, (3 ♂, 1 ♀, slide DJW 3474), TMG. NEW HAMPSHIRE. Rockingham County, Hampton, S. A. Shaw, 13 July 1911, (1 ♂, slide 70326), USNM. NORTH CAROLINA. Macon County, Highlands, J. G. Franclemont, 9 August 1958, (1 ♂), 15 August 1958, (1 ♂), USNM; Pender County, Holly Shelter Gamelands, J. B. Sullivan, 1 July 1998, (1 ♀, slide DJW 3541), 7 August 1997, (1 ♂, slide 141772), USNM; Southern Pines, 8-15 July, (1 ♂), USNM. VIRGINIA. Fortress Monroe, W. D. Kearfott, 19 July 1903, (1 ♂), USNM. WASHINGTON, DC. A. Busck, September 1902, (1 ♀, slide DJW 3542), USNM.

**Etymology.** The specific epithet refers to C. P. Kimball, who collected a series of about a dozen specimens of this species at Barnstable, Massachusetts in the 1940s (deposited in the MCZ).

## 21. *Pelochrista graciliana* (Kearfott, 1905)

(Plate G, 21a–b; Plate 10, 21a–c)

*Eucosma graciliana* Kearfott 1905:352; Barnes and McDunnough 1917:169; Heinrich 1923:93; McDunnough 1939:46; Powell 1983:34; Miller 1987:50; Brown 2005:32.

*Pelochrista graciliana*: Gilligan and Wright 2013b:321.

**Lectotype** (designated by Heinrich 1923, Plate G:21a, Plate 10:21c). ♀, North Carolina, Polk County, Tryon, W. F. Fiske, 3 July 1904, slide DJW 1487, AMNH.

Kearfott (1905) reported four male syntypes of *P. graciliana*, all collected by Fiske at Tryon, North Carolina. We located four specimens with the appropriate data (3 ♂ in the USNM; 1 ♀ in the AMNH), each bearing a red “TYPE Collection of W. D. Kearfott” label and a handwritten Kearfott “Cotype” label. They do not agree entirely with Kearfott’s comments in that the specimen in the AMNH is female rather than male, but we believe they are the syntypes. Since only one of these specimens resides in the AMNH, Heinrich’s (1923) comments “*Type*. —In American Museum” and “*Type Locality*. —Tryon, North Carolina” constitute a lectotype designation. That female bears a green “LECTOTYPE” label attached by Klots.

The syntypes of *P. graciliana* (e.g., Plate G:21a, b) are similar to *P. albiguttana* and *P. kimballi* in forewing appearance (Plate G:19, 20). The lectotype resembles *P. albiguttana* in genitalia (Plate 10:21c vs. Plate 9:19i, j), the only apparent difference being the stronger development of the medial projection of the posterior margin of sternum 7 in *P. graciliana*. The paralectotypes have *galenapunctana*-like genitalia (Plate 10:21a, b vs. Plate 10:22a-f).

As indicated in the introductory discussion of the *albiguttana* group, the lectotype may not be conspecific with the paralectotypes, and there are no reliable genitalia characters that distinguish females from *P. albiguttana* or males from *P. galenapunctana*. Whether or not *P. graciliana* is a valid species remains to be determined.

## 22. *Pelochrista galenapunctana* (Kearfott, 1908)

(Plate H, 22a–o; Plate 10, 22a–h)

*Eucosma galenapunctana* Kearfott 1908:169; Barnes and McDunnough 1917:169; Heinrich 1923:94; McDunnough 1939:46; Powell 1983:34; Brown 2005:321.

*Pelochrista galenapunctana*: Gilligan and Wright 2013b:321.

**Lectotype** (here designated, Plate H:22a). ♀, Colorado, Denver, E. J. Oslar, 15 July 1905, slide DJW 3645, AMNH.

Kearfott (1908) described *P. galenapunctana* from 27 syntypes. Eight of those specimens are located in the AMNH (Klots 1942), including a female that Klots (1942) reported as the lectotype, attributing the selection to Heinrich (1923). We include here a designation of that specimen. Its unique genitalia characteristics form the basis of our interpretation of this taxon.

*Pelochrista galenapunctana* is the largest member of the *albiguttana* group (mean FWL = 9.1 vs. 5.6–8.2 mm), but it is also the member with the greatest amount of variation in FWL (6.0–12.0 mm). It has historically been distinguished from *P. albiguttana* and *P. graciliana* by the color of the forewing spots (solid gray vs. white with gray edging), but we have seen specimens from Mississippi and North Carolina with typical *P. galenapunctana* genitalia whose forewing spots have a mixture of white and gray. The spots are sometimes very weakly expressed, especially in material from the Southwest (e.g., Plate H:22d, j–l). Forewing color is moderately variable. Specimens collected east of the Rocky Mountains tend to be golden brown (Plate H:22a, g–h); those from the Southwest are usually pale brownish yellow (Plate H:22d, k, l). The reddish-brown phenotype in Plate H:22f has been collected in Colorado and central Arizona, and some specimens from southern California have varying amounts of dark brown suffusion (Plate H:22m–o). Pale specimens resemble *P. polingana* (species 30) in forewing appearance (Plate H:22l vs. Plate L:30a–c).

This species is distinguished from all other group members by the shape of the papillae anales (posterior lobes broad, forming a distinctly circular pad). It resembles *P. kimballi* in the shape and scaling of sternum 7 and in the presence of a ringlike membranous (sometimes barely developed) lamella antevaginalis, but it differs from that species in the shape of the lamella postvaginalis (with variably developed lateral projections vs. nearly parallel lateral margins). It differs from *P. albiguttana* and *P. graciliana* in sterigma



Type (II vs. III). Males are separated from other members of the group except *P. graciliana* by valva shape and the number of marginal spines at the anal angle (2–4 vs. 1). As interpreted here, *P. galenapunctana* is transcontinental in distribution. We examined specimens from Arizona, California, Colorado, Illinois, Iowa, Kansas, Kentucky, Michigan, Mississippi, New Mexico, North Carolina, Texas, Utah, Washington DC, Wisconsin, and Wyoming. Adult capture dates range from early April (in southern California) to late September (in Colorado).

Given the variation in size, forewing appearance, and valva shape it is conceivable that this material represents a complex of several similar species. There appears to be some geographical influence on size, the smaller specimens being from the East and Midwest, the larger ones from the Rocky Mountain region and the Southwest. However, the subtly different valva shapes are not concordant with geographic distribution or color phenotype, and the female genitalia are quite uniform across the various populations.

### The *comatulana* group (species 23–32)

The *comatulana* group is a confusing assemblage of species that are similar in genitalia and forewing appearance. Eleven of the North American *Pelochrista* recognized by Gilligan and Wright (2013b) are referable to this group. Of the eleven, eight were described between 1875 and 1925, and in each of those instances the name is based on a small amount of material (a single specimen in four species, a few specimens collected at a single location in the others). The remaining three names were proposed by Miller (1985) in a review of *P. comatulana* and its close relative *P. vagana*.

In the past 90 years a great deal of *comatulana*-like material has accumulated in collections, including numerous phenotypes that have not been evaluated with regard to affiliation with the currently available names. Even a casual examination of this material makes it abundantly clear that the members of this group are quite variable in forewing appearance and genitalia. The two eastern species, *P. wandana* and *P. vagana*, are reasonably well defined and correctly determined in most collections. The western taxa, however, are numerous, poorly diagnosed, and often misidentified.

Our treatment of this group is based on an examination of more than 670 adult specimens and approximately 234 associated genitalia preparations. We propose four new synonymies and three new species. In some instances (*P. comatulana*, *P. serapicana*, and *P. watertonana*) we interpret several different phenotypes as conspecific while recognizing that each of the resulting taxa may well be a complex of two or more distinct species. In these cases we did not find relationships between the various maculational and genitalic character states that would clearly diagnose additional taxa, and we suspect that different taxonomic tools will be necessary for further resolution of these complexes. Group characteristics include:

*Forewing.* Mean FWL: 7.3–11.2 mm, AR: 2.62–3.21; forewing brownish gray to tan to white, often with pale brown to olive-gold striae and/or suffusion; maculation blackish brown to dark gray, usually obscure, sometimes (*P. exclusoriana*, *P. wandana*, and some phenotypes of *P. comatulana*) suggesting vaguely defined subbasal and median fasciae, often including dark mottling or speckling; costal strigulae usually conspicuous; ocellus present though sometimes obscure; termen with a narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia.* Uncus moderately to strongly developed and clearly differentiated from dorsolateral shoulders of tegumen; socii relatively long, fingerlike, and usually curving ventrally; phallus weakly tapering distally, with base loosely surrounded by anellus; vesica with 7–29 cornuti; valva with costal margin concave, ventral emargination moderate, NR: 0.44–0.68, saccular corner angulate, SA: 91–140°, basal process weakly raised and of variable shape and size; cucullus with dorsal and ventral lobes well developed, the former with apex rounded, the latter triangular with a stout anal spine; distal margin of dorsal lobe of cucullus nearly straight, that of ventral lobe sometimes with a shallow concave indentation near anal angle.



*Female genitalia.* Posterior lobes of papillae anales narrow to moderate in width; tergum 8 narrow and collarlike; sterigma Type III; lamella postvaginalis usually slightly broader at posterior margin than anterior margin, sometimes (*P. polingana* and *P. comancheana*) with well developed lateral projections, always with posterior margin medially indented and with medial trough shallow and microtrichiate; sternum 7 with posterior one-half rectangular, posterior margin concave (except in *P. comancheana*), anterolateral corners flared laterally (except in *P. polingana*, *P. wandana*, and *P. comancheana*); posterior two-thirds of sternum 7 moderately sclerotized, anterior portion weakly sclerotized, the line of separation arching from one anterolateral corner to the other; scaling of sternum 7 dense in a narrow band along posterior margin and in substantial patches at anterolateral corners, relatively sparse otherwise; ductus bursae with variably shaped patch of sclerotization between juncture with the ductus seminalis and constriction anterior to the ostium; inner surface of ductus bursae with a patch of microtrichia near ductus seminalis; corpus bursae with two signa, one larger than the other.

### 23. *Pelochrista comatulana* (Zeller, 1875)

(Plates I and J, 23a–x; Plate 11, 23 a–m)

*Paedisca comatulana* Zeller 1875:316.

*Eucosma comatulana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:92; McDunnough 1939:46; Powell 1983:34; Miller 1985:240; Brown 2005:319; Gilligan et al. 2008:104.

*Pelochrista comatulana*: Gilligan and Wright 2013b:318.

*Eucosma costastrigulana* Kearfott 1908:171; Barnes and McDunnough 1917:169; Heinrich 1923:92; McDunnough 1939:46; Powell 1983:34; Brown 2005:318; new synonymy.

*Pelochrista costastrigulana*: Gilligan and Wright 2013b:319.

*Eucosma pediasios* Miller 1985:241; Brown 2005:325; new synonymy.

*Pelochrista pediasios*: Gilligan and Wright 2013b:325.

*Eucosma rindgei* Miller 1985:243; Miller 1987; Brown 2005:326; new synonymy.

*Pelochrista rindgei*: Gilligan and Wright 2013b:326.

*Eucosma austrina* Miller 1985:243; Brown 2005:315; new synonymy.

*Pelochrista austrina*: Gilligan and Wright 2013b:317.

**Types.** *Paedisca comatulana*. Holotype (Plate I:23a). ♀, Texas, Bosque County, Belfrage, 26 August 1871, BMNH(E) 819873, BMNH (abdomen missing). *Eucosma costastrigulana*. Lectotype (designated by Heinrich 1923, Plate I:23h, Plate 11:23g). ♂, California, San Diego County, Julian, G. H. Field, 10 July, slide D. Hagler 619811, AMNH. *Eucosma pediasios*. Holotype (Plate I:23l). ♂, Texas, Terrell County, Sanderson, 25 April 1981, E. C. Knudson, slide JCL 1101832, USNM. *Eucosma ridgei*. Holotype (Plate I:23m, Plate 11:23c). ♂, Colorado, Denver, E. J. Osler, slide DH 630811, AMNH. *Eucosma austrina*. Holotype (Plate I:23i). ♂, Texas, Hemphill County, Canadian, 15 August 1971, A. and M. E. Blanchard, slide AB 2903, USNM.

*Pelochrista comatulana* was based on a single female from Bosque County, Texas, about fifty miles south of Dallas-Fort Worth. Kearfott (1908) described *P. costastrigulana* from four males collected by George H. Field at San Diego, California. We located three of the four syntypes, and only one resides in the AMNH (two in the USNM), so Heinrich's (1923) statement "*Type*. —In American Museum" identifies a unique specimen and serves as a lectotype designation.

Miller's (1985) concept of *P. comatulana* rested on a mistaken belief that the holotype for this taxon is conspecific with the lectotype of *P. mandana* (Kearfott) (which is also a female). He based this conclusion on forewing color (which he described as "strong rust" in both cases) and on the presence in each species of a strongly expressed ocellus. Unable to compare the genitalia of the two specimens (the abdomen of the *P. comatulana* holotype is lost), he illustrated the genitalia of the *P. mandana* lectotype as that of *P. comatulana* and suggested that *P. comatulana* might be known only from those two type specimens. Miller (1985)

also proposed the name *P. pediasios* (Plate I:23l) for the taxon illustrated by Heinrich (1923, fig. 164) as *P. comatulana* and described two new brownish species, *P. rindgei* (Plate I:23m) and *P. austrina* (Plate I:23i), that he distinguished from *P. pediasios* and from each other by subtle differences in male genitalia.

We examined the lectotype of *P. mandana* (which was collected in Washington, D. C.) and found it to be a species of *Epiblema*, possibly *Epiblema strenuana* (Walker) or a member of a species complex associated with *Epiblema abruptana* (Walsingham). The holotype of *P. comatulana* (Plate I:23a) has obscurely defined subbasal and median markings of pale rust coloration, but we believe that specimen is faded with age and that Plate I:23b is a more accurate representation of this species. We examined 338 individuals (223 ♂, 115 ♀) with *comatulana*-like genitalia, including the primary types of *P. comatulana*, *P. costastrigulana*, *P. pediasios*, *P. rindgei*, and *P. austrina*. These specimens are moderate in size (mean FWL = 7.7 mm, n = 189) and vary in forewing appearance (as illustrated in Plates I, J:23a–x). The holotype of *P. pediasios* (Plate I:23l) lacks some of the olive-brown coloration in typical *P. comatulana* (Plate I:23b) but is otherwise indistinguishable from that phenotype. The holotype of *P. rindgei* (Plate I:23m) has a prominent black streak on the cubital vein, but within this group the state of that character varies from conspicuous (Plate I:23c, h, m) to nearly indiscernable (Plate I:23f, k, o). The *P. austrina* phenotype (Plate I:23i) closely resembles material from southern California with a reddish-brown tint to the forewing (Plate I:23j). Heinrich (1923) determined such specimens as *P. costastrigulana* but admitted that he could not distinguish between *P. costastrigulana* and *P. comatulana*. He decided not to sink the name *costastrigulana* without some supporting life history information. This reddish-brown phenotype is fairly common in San Diego County, California, but those same populations include specimens with typical *comatulana* coloration.

Miller (1985) distinguished *P. pediasios*, *P. rindgei*, and *P. austrina* from one another by subtle aspects of the male genitalia: neck ratio, a second ratio intended to quantify differences in valva neck length, and uncus shape. With regard to neck ratio, he separated the three species according to NR: <, >, or  $\approx$  0.50, respectively. In 80 male genitalia preparations we found NR values that vary from 0.39 to 0.72 (mean = 0.53) without any clear subdivision into three discreet ranges. We were unable to assess his conclusions about neck length because we are uncertain as to how those measurements were taken, but our observations, as illustrated in Plate I:23a–k, indicate a fair amount of variation in that regard. As for uncus shape, we identified four subtly different shapes but found no connections between those forms and forewing phenotype or valva shape. In short, we find the criteria previously used to diagnose *P. costastrigulana*, *P. pediasios*, *P. rindgei*, and *P. austrina* to be too unstable for such purposes, hence the four new synonymies.

The specimens in Plate J:23r–t are representative of a population of *comatulana*-like individuals in Coconino County, Arizona that have particularly prominent subbasal and median markings. Similarly marked specimens have been collected in southeastern Utah (Plate J:23v), eastern Colorado (Plate J:23p, q, w), and southwestern Kansas (Plate J:23x). Plate J:23u shows a phenotype from northwestern New Mexico with yet another variation on the dark markings. We did not find any genitalia differences that would clearly support treating one or more of these phenotypes as a distinct species, so we refer them provisionally to *P. comatulana*.

In males, the uncus is moderately broad (basal width about  $2 \times$  height) with the distal margin semicircular to flattened, the socii curve ventrally, the vesica has 13–28 cornuti, the valva has a U-shaped ventral emargination, NR = 0.53, and SA =  $120^\circ$ . In females, the posterior lobes of the papillae anales are relatively narrow, the lamella postvaginalis is slightly broader at the posterior margin than at the anterior margin, and the anterolateral corners of sternum 7 are developed into lateral projections that have conspicuous patches of densely packed scales on their posterolateral margins.

We have collected this species in abundance in open sage brush habitat in the high plains east of the Rocky Mountains. We examined specimens from Manitoba, Arizona, southern California, Colorado, Kansas, Michigan, Montana, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. Most capture dates are in July, August, and September, but there is one record from southeastern Arizona in early

November, and the *P. costastrigulana* phenotype has been collected frequently in southern California in May and June.

## 24. *Pelochrista vagana* (McDunnough, 1925)

(Plate J, 24a–f; Plate 11, 24a–f)

*Eucosma vagana* McDunnough 1925a:19; McDunnough 1939:46; Powell 1983:34; Brown 2005:328; Gilligan et al. 2008:105.  
*Pelochrista vagana*: Gilligan and Wright 2013b:328.

**Holotype** (Plate J:24a). ♂, Canada, Manitoba, Aweme, N. Criddle, 27 June 1922, slide TOR 1849, CNC.

McDunnough (1925a) proposed this name for a single male from Aweme, Manitoba. The taxonomic history of *P. vagana* is entangled with that of *Eucosma mandana* Kearfott (1907b), which was described from four syntypes (3 ♂, USNM; 1 ♀, AMNH) collected at Washington, D. C., Plummers' Island, Maryland, and Montclair, New Jersey. Heinrich's (1923) statement "*Type*. —In American Museum" designated the female as the lectotype. As pointed out in the *P. comatulana* account (species 23), that specimen is an *Epiblema*, possibly *E. strenuana*. However, the three male paralectotypes are conspecific with *P. vagana*, and Heinrich (1923, Fig. 168) illustrated the genitalia of one of those specimens in his account of *Eucosma mandana*. Miller (1985) mistakenly considered the lectotype of *E. mandana* to be conspecific with the holotype of *P. comatulana* and therefore treated the former name as a junior synonym of the latter. In fact, the name *mandana* belongs in the synonymy under one of the currently recognized species of *Epiblema*, but we are uncertain as to which is most appropriate.

*Pelochrista vagana* is slightly larger than *P. comatulana* (mean FWL = 8.2 vs. 7.7 mm). The forewing is dark rusty brown with vaguely discernable subbasal and median fasciae represented by slightly darker shades of brown. The ocellus is inconspicuous, as are the brownish-gray costal strigulae, the latter delimited by dark brown dashes. The male genitalia are similar to those of *P. comatulana*, with NR = 0.50 and SA = 123°, but the neck is a little longer, the cucullus seems to be a little narrower, and the anal spine is angled slightly toward the saccular corner. The two species are also nearly identical in female genitalia. Plate 11:24f shows prominent depressed troughs in the lateral projections of sternum 7, but this feature is not present in all specimens (Plate 11:24e) and might be an unintended consequence of the handling with forceps during preparation of the slide.

Current data suggest that this species is predominantly eastern in distribution, but J. F. G. Clarke collected a series of rather pale specimens (Plate J:24f) in Whitman County, Washington that agree with typical *P. vagana* in genitalia. We examined specimens from Manitoba, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Missouri, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Texas, and Washington. Adult capture dates range from 29 May to 24 August, with the vast majority of collections from June and July. The Washington specimens were reared from larvae feeding in roots of *Solidago* L. (goldenrod), with emergence dates of 16 March to 16 June. There is also one specimen in the USNM from Silver Springs, Maryland that was reared by Clarke from *Solidago*.

## 25. *Pelochrista exclusoriana* (Heinrich, 1923)

(Plate K, 25a–c; Plate 12, 25a–f)

*Eucosma exclusoriana* Heinrich 1923:110; McDunnough 1939:47; Powell 1983:34; Brown 2005:319.  
*Pelochrista exclusoriana*: Gilligan and Wright 2013b:317.

**Holotype** (Plate K:25a, Plate 12:25b). ♂, Texas, La Salle County, Cotulla, Crawford and Pratt, 12 May 1906, slide 72796, USNM.

Heinrich (1923) based *P. exclusoriana* on nine specimens. He illustrated the genitalia of the male reported here as the holotype and referred to that specimen as the “Type.” Besides the holotype, we examined eight specimens bearing Heinrich’s handwritten paratype labels: three from Cotulla, Texas (2 ♀, slides DJW 1975, 3125, USNM; 1 ♀, AMNH), four from San Antonio, Texas (2 ♀, USNM; 1 ♂, slide CH 22 Dec 1920, 1 ♀, AMNH), and one from Tiger Hill, Texas (1 ♂, AMNH). Heinrich (1923) mistook the three females from Cotulla as males and the male from Tiger Hill as having been collected at San Antonio. According to Heinrich (1923), the material from San Antonio and Tiger Hill had been separated out in Kearfott’s collection under the manuscript name “*Eucosma atomosana* Fernald” (not to be confused with *Paedisca atomosana* Walsingham). Kearfott’s manuscript name was never published, but Klots (1942) interpreted Heinrich’s (1923, page 111) remarks as validating it (as a synonym of *E. exclusoriana*) and designated the male in the AMNH from San Antonio as the lectotype.

*Pelochrista exclusoriana* is the smallest member of the *comatulana* group (mean FWL = 7.3 vs. 7.7–11.2 mm). It is similar in forewing appearance to some phenotypes of *P. comatulana* (Plate J:23p–q) in that the interfascial areas are tan and the fasciate markings are blackish brown and rather conspicuous. The subbasal fascia is represented by an irregularly shaped spot on the cubitus, the median fascia by an often vague and/or fragmented band from mid-costa to the pretornal portion of the inner margin.

In males, the dorsal lobe of the cucullus is strongly developed and tapers evenly to a narrowly rounded apex, the ventral lobe is weakly developed, and the anal spine is quite long. These features, though sometimes subtle, distinguish *P. exclusoriana* from other members of the *comatulana* group. Sternum 7 is unusually short and broad for a species in this group (the width at the broadest point is substantially greater than the length). Its anterolateral corners are strongly developed and have large patches of densely spaced scales.

We examined 22 specimens (11 ♂, 11 ♀) from Bexar, Cameron, Kimball, La Salle, and Uvalde counties, all in the southernmost part of Texas. Adult capture dates range from 27 March to 15 May.

## **26. *Pelochrista rufula* Wright and Gilligan, new species** (Plate K, 26a–c; Plate 12, 26a–f)

**Diagnosis.** Compared with other members of the *comatulana* group, *P. rufula* is average in size (mean FWL = 8.9 mm) and has a slightly more elongate forewing (AR = 3.21 vs. 2.62–3.13). It is the only reddish-orange member of the group. It has conspicuous white costal strigulae that are more prominent than in any other member of the group except perhaps some phenotypes of *P. comatulana*. The male valva shape is most similar to that of *P. comancheana*, but in the latter species the basal process is more strongly developed and much more rectangular. In females, the sterigma-sternum 7 structure most closely resembles that of *P. serapicana*, *P. watertonana*, and *P. wandana*, three species that are easily separated from *P. rufula* by forewing appearance.

**Description.** *Head.* Frons tan; vertex reddish brown; labial palpus tan with darker brown scales at distal end of second segment; antenna with thin brown dorsal streak and whitish lateral scaling. *Thorax.* Dorsal surface concolorous with vertex; fore- and mid-leg tan with reddish-brown anterior surfaces, whitish posterior surfaces, and dark brown tarsal annulations; hind-leg whitish with weakly contrasting tarsal annulations. Forewing: ♂ FWL 7.7–10.2 mm (mean = 9.0, n = 17), AR = 3.25; ♀ FWL 8.1–8.8 mm (mean = 8.5, n = 4), AR = 3.04; costa nearly straight; apex acute; termen weakly convex; dorsal surface reddish orange, lacking fasciate markings, and variably speckled with small dark gray spots; distal two-thirds



of costa with conspicuous white strigulae delimited by reddish-brown/blackish dashes and thin lustrous gray striae; ocellus conspicuous, with lateral margins edged with lustrous gray bars and with reddish-brown central field crossed by up to four thin black dashes; termen with prominent salt-and-pepper-colored band from tornus to apex; fringe reddish brown. Hindwing: Brownish gray. *Abdomen*. Male genitalia (n = 5): Typical of the group; uncus semicircular; basal process tablike; vesica with 10–13 cornuti; NR = 0.57; SA = 129°; cucullus often with a second marginal spine near the anal spine. Female genitalia (n = 4): Similar to those of *P. comatulana*, with scale patches on anterolateral projections of sternum 7 moderately dense.

**Holotype** (Plate K:26a, Plate 12:26c). ♂, Arizona, Coconino County, 3.33 mi EESE of Flagstaff, Walnut Canyon, 6,500 feet, J. G. Franclemont, 19 August 1965, slide DJW 2878, USNM.

**Paratypes**. ARIZONA. Coconino County, 3.33 mi EESE of Flagstaff, Walnut Canyon, 6,500 feet, J. G. Franclemont, 28 June 1965 (1 ♂, slide DJW 1241), 2 August 1965 (1 ♀), 4 August 1965 (1 ♂), 5 August 1965 (1 ♂, slide DJW 1235; 1 ♀, slide DJW 3530), 16 August 1964 (1 ♂; 1 ♀, slide DJW 1242), 19 August 1965 (1 ♂), 23 August 1965 (1 ♂), 30 August 1965 (2 ♂); Coconino County, 7.5 mi NW of Flagstaff, Fort Valley, 7,350 feet, R. W. Hodges, 29 July 1961 (1 ♀, slide DJW 1236). UTAH. Garfield County, 3 mi W of Bryce Junction, 7,552 feet, J. A. Powell, 28–29 June 1992 (3 ♂, slide EME 5713; 1 ♀, slide DJW 3529), 15 mi W of Bryce Canyon, 7,500 feet, R. Robertson, 10 August 1999 (5 ♂, slide DJW 2879). Paratype depositories: DJW, EME, USNM.

**Etymology**. The specific epithet refers to the reddish-orange color of the forewing.

**Discussion**. In addition to the specimens reported above, we examined five males from Garfield County, Utah, one male from Clark County, Nevada, and one male from San Bernardino County, California (all deposited in the EME) that are similar in genitalia and forewing maculation to *P. rufula* but whose forewings are pale yellow orange instead of reddish orange. We tentatively refer them to this species but do not include them as paratypes.

## 27. *Pelochrista serapicana* (Heinrich, 1923)

(Plate K, 27a–f; Plate 13, 27a–j)

*Eucosma serapicana* Heinrich 1923:266; McDunnough 1939:46; Powell 1983:34; Brown 2005:327.

*Pelochrista serapicana*: Gilligan and Wright 2013b:327.

**Holotype** (Plate K:27a, Plate 13:27a). ♂, Montana, Great Falls, 8–21 July 1921, H. G. Dyar, slide 72799, USNM.

*Pelochrista serapicana* is the largest member of the *comatulana* group (mean FWL = 11.2 vs. 7.3–10.0 mm). It was described from a single male whose forewing is stained (Plate K:27a), perhaps due to the application of a wetting agent in order to examine the venation. The color of most of the forewing has been affected, but the unstained margin of the apex is gray (as in Plate K:27b), which is the dominant color of other specimens we have seen from the northern Great Plains that resemble the holotype in maculation and genitalia. In the USNM there are substantial series of similar specimens collected in the 1960s by Franclemont and Hodges at several locations near Flagstaff, Arizona. In those populations the color phenotypes intergrade from gray to pale fawn (Plate K, 27d–f), and the genitalia exhibit a fair amount of subtle variation (Plate 13:27d–g). We provisionally refer all of this material to *P. serapicana*.

Forewing color varies from gray (Plate K:27c) to fawn (Plate K:27f). In intermediate specimens (Plate K:27d,e) the proximal two-thirds of the wing has varying amounts of gray suffusion and the distal one-third has fawn striae emanating from the costa. There are no recognizable fasciate markings, but most specimens are generously and uniformly speckled with small grayish dots. The central field of the ocellus is crossed transversely by three black dashes that are sometimes reduced to near obsolescence.



Variation in cucullus shape is illustrated in Plate 13:27a–g. In many individuals from northern Arizona (Plate 13:27d–f) the dorsal lobe appears to be a little more elongate than in the holotype (Plate 13:27a), but these populations also include more typical forms (Plate 13:27g). Variation in the female genitalia consists mostly of subtle differences in the shape and setation of the ventral extensions of the papillae anales. In gray specimens from the northern Great Plains the anteroventral margins of the extensions are nearly straight, sometimes with a very shallow concave indentation at the anterior extremity of the lobe, and the hook-tipped setae near the apex are relatively short (Plate 13:27h). In specimens from northern Arizona the anteroventral margins of the ventral extensions are broadly rounded and the hook-tipped setae are more uniform in length (Plate 13:27i). We also encountered a few specimens from Idaho and Utah that are somewhat intermediate in this respect.

We examined specimens from Lethbridge, Alberta; Coconino County, Arizona; Park County, Colorado; Oneida County, Idaho; Cascade County, Montana; San Miguel and Sandoval counties, New Mexico; Garfield County, Utah; Spokane County, Washington; and Albany, Carbon, Crook, and Park counties, Wyoming. Nearly all were collected in June or July.

**28. *Pelochrista atomosana*** (Walsingham, 1879)  
(Plate K, 28a–c; Plate 13, 28a–c)

*Paedisca atomosana* Walsingham 1879:42; Fernald 1882a:37.

*Eucosma atomosana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:94; McDunnough 1939:46; Powell 1983:34; Brown 2005:315.

*Pelochrista atomosana*: Gilligan and Wright 2013b:317.

**Lectotype** (here designated, Plate K:28a, Plate 13:28b). ♂, California, Sonoma County, Santa Rosa, Walsingham, 18 May 1871, BMNH(E) #819869, slide 11505, BMNH.

Walsingham (1879) described this species from two male syntypes, both now located in the BMNH. There is some confusion in the literature regarding the type locality. The data reported by Walsingham for these specimens are San Francisco, California, 18 May 1871 and Bear Valley, California, 26 April 1871. The syntype collected on 18 May was selected and labeled as the lectotype by Obraztsov and is so designated here, but its locality label gives Santa Rosa, California as the collection site. Moreover, the collection label on the Bear Valley syntype gives a different date (27 April 1871) from that reported by Walsingham (26 April 1871).

There has been considerable confusion among North American taxonomists regarding the identity of *P. atomosana*, mostly because Heinrich (1923, fig. 165) illustrated under this name the genitalia of a specimen in the *P. galenapunctana* complex. Moreover, the name *atomosana* has appeared in the literature in another context. In the description of *E. reversana*, Kearfott (1907:23) referred to *Eucosma atomosana* Fernald, which (according to Heinrich 1923:111) was a manuscript name associated with five specimens that Kearfott considered to be a new species. Heinrich (1923) treated those five specimens as paratypes of *P. exclusoriana*, and Klots (1942), considering the name to have been validated by Heinrich, designated a lectotype for it.

*Pelochrista atomosana* is a medium-sized species (mean FWL = 10.0 mm) with a golden-brown forewing that is unmarked except for a generous sprinkling of white and gray-brown irrorations, resulting in a finely speckled appearance. The ocellus is barely discernable, and the costal strigulae are weakly expressed. This species is distinguished from similar looking *Pelochrista* (e.g., *P. comatulana*) by the conspicuous white scaling on the head and thorax.

*Pelochrista atomosana* is similar to members of the *agricolana* group in the shape of the male valva but differs from those species in that the uncus is divided medially into two well-defined lobes and is considerably broader (basal width approximately twice the height). The female genitalia are unknown.

This species appears to be absent from North American institutional collections. We examined only three specimens: the lectotype, the paralectotype, and one additional male (not included in the type series) that was captured by Walsingham at the same locality as the paralectotype. These three specimens were collected on 18 May and 27 June in Sonoma and Colusa counties, California, just north of San Francisco.

## 29. *Pelochrista watertonana* (McDunnough, 1925)

(Plate L, 29 a–f; Plate 14, 29a–g)

*Eucosma watertonana* McDunnough 1925b:115; McDunnough 1939:46; Powell 1983:34; Brown 2005:328.

*Pelochrista watertonana*: Gilligan and Wright 2013b:329.

**Holotype** (Plate L:29a). ♂, Canada, Alberta, Waterton Lakes, J. McDunnough, 25 July 1923, CNC.

The type series consists of 15 specimens that were collected by McDunnough at Waterton Lakes, Alberta in mid-July. We examined the holotype, six paratypes in the CNC (4 ♂, 2 ♀), and four paratypes in the USNM (2 ♂, 2 ♀).

*Pelochrista watertonana* is a medium-sized species (mean FWL = 9.7 mm) with a pale golden-brown forewing. The maculation consists primarily of whitish strigulae on the distal one-half of the costa, a sometimes weakly expressed but usually well-defined ocellus, and a sprinkling of variably-expressed small gray spots in the median area. In most of the types the gray speckling is absent to barely discernable (e.g., Plate L:29a–c), but this condition appears to be variable. We encountered specimens from Colorado and Wyoming that we refer to this taxon in which the speckling intergrades from absent (Plate L:29d) to conspicuous (Plate L:29f).

In males, the uncus is semicircular, the socii curve ventrally, NR = 0.59, SA = 137°, and the length of the dorsal lobe of the cucullus is about twice that of the ventral lobe. In females, sternum 7 is relatively short (the length is less than the width at the anterior margin) and has laterally produced anterolateral corners with moderately dense patches of scales. In this respect, *P. watertonana* most closely resembles *P. exclusoriana*, but the two species are readily distinguished by size (mean FWL = 9.7 vs. 7.3 mm), forewing appearance (fasciate markings absent vs. present), and distribution (northern Rocky Mountain region vs. southern Texas).

We examined specimens from Alberta; British Columbia; Alamosa, Chaffee, Larimer, and Teller counties, Colorado; Oneida County, Idaho; Carter County, Montana; Clark County, Nevada; and Albany County, Wyoming. Adult capture dates range from 15 May to 31 August, but most collections are from late June through July. Nearly all of the collections sites are at elevations of 7,500–9,500 feet.

## 30. *Pelochrista polingana* Wright and Gilligan, new species

(Plate L, 30a–c; Plate 14, 30a–e)

**Diagnosis.** Similarities between *P. polingana* and some phenotypes of *P. galenapunctana* (Plate H:22d, l), *P. watertonana* (Plate L:29e, f), and *P. comancheana* (Plate L:31c) effectively preclude distinguishing these four species on the basis of forewing appearance, but differences in genitalia can be relied upon to separate them. In males of *P. polingana* the length of the dorsal lobe of the cucullus is about equal to that of the ventral lobe as opposed to twice as long in the other three taxa. Females of *P. polingana*

differ from those of *P. galenapunctana* in sterigma Type (III vs. II), the shape of the papillae anales (Plate 14:30d vs. Plate 10:22g), and the shape of sternum 7 (lateral margins parallel vs. laterally produced into substantial anterolateral corners). They differ from *P. watertonana* in the shape of sternum 7 (rectangular vs. trapezoidal) and in the shape of the lamella postvaginalis (rectangular lateral projections present vs. absent). Subtle genitalia differences between females of *P. polingana* and *P. comancheana* include: papillae anales slightly broader; sternum 7 rectangular instead of weakly trapezoidal; scales at anterolateral corners of sternum 7 more densely clustered (Plate 14:30c vs Plate 15:31c); and the two signa more closely equal in size (Plate 14:30e vs. Plate 15:31e).

**Description.** *Head.* Frons whitish; vertex pale brown; labial palpus whitish, shading to tan at distal and dorsal margins of second segment, third segment tan; antenna whitish. *Thorax.* Dorsal surface tan; legs with anterior surfaces brown, posterior surfaces whitish; tarsus with dark brown annulations. Forewing: ♂ FWL 8.2 mm (n = 1), AR = 3.04; ♀ FWL 7.3–9.2 mm (mean = 8.1, n = 12), AR = 3.06; costa weakly arched; apical angle slightly acute; termen nearly straight; dorsal surface tan, lightly sprinkled with small metallic gray spots; costa with series of short brown dashes from base to apex delimiting white costal strigulae; ocellus somewhat obscure but clearly discernable, edged laterally by pale silvery gray bars, the tan central field crossed by two or three variably expressed blackish dashes; termen with whitish line from  $M_2$  to apex followed distally by narrow salt-and-pepper-colored band from tornus to apex; fringe pale tan to whitish. Hindwing: Brownish gray. *Abdomen.* Male genitalia (n = 1): Uncus semicircular; socii fingerlike and of uniform width; vesica with 11 cornuti; valva with neck moderately long and broad, NR = 0.49, saccular corner angulate, SA = 117°; cucullus broadest at one-third distance from anal angle to apex, with dorsal and ventral lobes of nearly equal development, the former tapering to a semicircular apex, the latter to a narrowly rounded anal angle; cucullus with an anal spine and a series of six additional marginal spines on the ventral one-half of the distal margin. Female genitalia (n = 8): Papillae anales typical of group, with posterior lobes somewhat broader; lamella postvaginalis rectangular and broad (width about 2 × length), with posterior margin concavely indented medially and with central trough shallow and microtrichiate; sternum 7 with lateral margins parallel and posterior margin weakly sinuous; sclerotization of sternum 7 moderately strong on posterior two-thirds, weak otherwise; scaling of sternum 7 moderately dense on anterolateral corners and along posterior margin, relatively sparse elsewhere; ductus bursae with elongate sclerotized band from juncture with ductus seminalis nearly to constriction anterior to ostium and with patch of microtrichia on inner surface near ductus seminalis; corpus bursae with two signa, one larger than the other.

**Holotype** (Plate L:30a, Plate 14:30a–b). ♂, New Mexico, Grant County, State Route 90 at Gold Gulch Road, 6,325 feet, 32.5250° N, 108.4517° W, D. J. Wright, 9 August 1999, slide DJW 666, USNM.

**Paratypes.** COLORADO. Otero County, Vogel Canyon Picnic Area, 15 mi S of La Junta, 4,340 feet, 37.7703° N, 103.5128° W, D. J. Wright, 18 August 1997 (5 ♀, slides DJW 428, 3466–3469). NEW MEXICO. Same data as holotype (6 ♀, slides DJW 664, 3410). UTAH. Iron County, Cedar City, T. Spalding, June 1919 (1 ♀, slide DJW 3579). Paratype depositories: DJW, USNM.

**Etymology.** The specific epithet refers to Otho C. Poling, a prolific collector of Lepidoptera in the southwestern United States during the first quarter of the twentieth century.

### 31. *Pelochrista comancheana* Wright and Gilligan, new species (Plate L, 31a–c; Plate 15, 31a–f)

**Diagnosis.** Forewing color readily distinguishes the pale phenotype (Plate L:31a–b) of *P. comancheana* from other members of the *comatulana* group. The only other truly whitish specimens in the group are the very pale phenotypes of *P. comatulana* (e.g., Plate J:23x), but they have blackish-brown fasciate markings that are absent in *P. comancheana*. The pale golden-brown phenotypes of *P. comancheana* (Plate L:31c)

are similar in forewing appearance to *P. polingana* and to pale specimens of *P. galenapunctana* (e.g., Plate H:22d, k), but these taxa can be separated by genitalia. Males of *P. galenapunctana* are different in valva shape (Plate 10:22a–f vs. Plate 15:31a–b) and in the number of marginal spines at the vertex of the anal angle (2 or more vs. 1). Females of *P. galenapunctana* differ from those of *P. comancheana* in sterigma Type (II vs. III) and in the shape of the posterior lobes of the papillae anales (Plate 10:22g vs. Plate 15:31d). Males of *P. comancheana* differ from those of *P. polingana* in cucullus shape (Plate 15:31a–b vs. Plate 14:30a–b); females in the width of the posterior lobes of the papillae anales (narrow vs. moderately broad), in the scaling of the anterolateral corners of sternum 7 (similar to vs. denser than on the rest of the sternite), and in the relative sizes of the signa in the corpus bursae (one substantially larger vs. slightly larger than the other).

**Description.** *Head.* Frons and vertex white to pale tan; labial palpus whitish, sometimes with tan suffusion on lateral surfaces; antenna white. *Thorax.* Dorsal surface white to pale golden brown; fore- and mid-leg whitish, sometimes with pale tan anterior surfaces; hind-leg whitish; tarsus with dark annulations, sometimes not discernable in uniformly white specimens. Forewing: ♂ FWL 8.7 mm (n = 1), AR = 3.11; ♀ FWL 8.3–9.1 mm (mean = 8.7, n = 3), AR = 3.08; costa straight; apex acute; termen nearly straight; dorsal surface white to pale golden brown, unmarked except for an obscure ocellus that is edged laterally by metallic gray bars and whose central field has a few black scales aligned in three longitudinal dashes; distal one-half of costa with white strigulae (sometimes barely discernable) defined by pale golden-brown dashes and several associated metallic gray striae; termen with narrow salt-and-pepper-colored band from tornus to apex; fringe white to very pale golden brown. Hindwing: Pale brownish gray. *Abdomen.* Male genitalia (n = 1): Uncus with shallow medial indentation in distal margin; socii bending ventrally; vesica with 18 cornuti; NR = 0.44; SA = 115°; basal process large and rectangular, with length about 2 × width; cucullus with dorsal and ventral lobes attenuating distally, the former with apex rounded, the latter with vertex of anal angle rather pointed and bearing a moderately-sized anal spine; distal margin of cucullus with medial portion flanked dorsally and ventrally by shallow concave indentations and with a series of marginal spines evenly distributed from anal angle to two-thirds distance to apex. Female genitalia (n = 3): Papillae anales typical of group; ventral extensions with angulate posteroventral apex and very shallow indentation in ventral margin near anterior extremity; lamella postvaginalis rectangular (width about 2 × length), with substantial lateral projections and a medially indented posterior margin; sternum 7 rectangular, with width at anterior margin slightly larger than at posterior margin and with a weakly developed medial projection on posterior margin shielding ostium; scaling of sternum 7 relatively uniform, lacking densely packed patches at anterolateral corners; ductus bursae irregularly sclerotized, somewhat contorted posterior to juncture with ductus seminalis; inner surface of ductus bursae with patch of microtrichia near ductus seminalis; corpus bursae with two signa, one very small and pinlike.

**Holotype** (Plate L:31a, Plate 15:31a–b). ♂, Otero County, Vogel Canyon Picnic Area, 15 mi S of La Junta, 4,340 feet, 37.7703° N, 103.5128° W, D. J. Wright, 18 August 1997, slide DJW 380, USNM.

**Paratypes.** NEW MEXICO. Lincoln County, Valley of the Fires National Recreation Area, 4 mi NW of Carrizozo, 5,250 feet, 33.6773° N, 105.9277° W, D. J. Wright, 17 August 2005 (2 ♀, slides DJW 1405, 3577), 19 August 2005 (♀, slide DJW 1421), USNM.

**Etymology.** The specific epithet refers to the Comanche Nation, whose historical territory once included the sites where this species has been collected.

### 32. *Pelochrista wandana* (Kearfott, 1907)

(Plate L, 32a–c; Plate 15, 32a–d)

*Eucosma wandana* Kearfott 1907b:24; Barnes and McDunnough 1917:170; Heinrich 1923:124; McDunnough 1939:47; Powell 1983:35; Gibson and Miller 1994:69; Brown 2005:328; Gilligan et al. 2008:112.



*Pelochrista wandana*: Gilligan and Wright 2013b:328.

*Eucosma eumaea* Meyrick 1912:34, unnecessary replacement name for *wandana*.

*Eucosma uta* Clarke 1953:226; synonymy by Gibson and Miller 1994:69.

*Pelochrista uta*: Gilligan and Wright 2013b:329.

*Eucosma ustulatana* Blanchard and Knudson 1983:849; synonymy by Gibson and Miller 1994:69.

*Pelochrista ustulatana*: Gilligan and Wright 2013b:328.

**Holotypes.** *Eucosma wandana*. ♂, Ohio, Hamilton County, Cincinnati, A. F. Braun, 25 July, slide CH 14 December 1919, AMNH. *Eucosma uta*. ♂, Illinois, Putnam County, M. O. Glenn, 10 July 1939, slide 72814, USNM. *Eucosma ustulatana*. ♂, Texas, Washington County, Brenham, E. C. Knudson, 4 June 1979, slide 89157, USNM.

*Eucosma wandana* was described from a single specimen. Heinrich (1923) reviewed this species under Meyrick's replacement name *eumaea*, a choice repeated by McDunnough (1939), but Powell (1983) correctly listed *wandana* as the valid name. This species has been redescribed twice, once as *Eucosma uta* Clarke (1953) and again as *Eucosma ustulatana* Blanchard and Knudson (1983). Gibson and Miller (1994) recognized the conspecificity of the three taxa and relegated the last two names to the synonymy.

*Pelochrista wandana* is sexually dimorphic with regard to forewing color; the interfascial areas are blackish brown in males and brownish yellow in females. Both sexes have vaguely defined blackish markings that include a chevron-shaped subbasal fascia and a bandlike median fascia. In males the fasciae are only slightly darker than the interfascial areas (Plate L:32a); in females the contrast between the two is substantial (Plate L:32b–c). The ocellus is well defined, with lustrous bars on the lateral margins and two or three thin black dashes across the central field. The costal strigulae are whitish and defined from base to apex by dark marks and striae. The hindwing varies from gray to blackish gray; in females the fringe is whitish. Mean FWL = 7.8 mm; AR = 2.62.

In males, the uncus is moderately developed (basal width about  $2 \times$  height), the socii bend slightly ventrally, the vesica has 13–24 cornuti, the valva has a concave costal margin, a moderate ventral emargination, NR = 0.68, and SA =  $140^\circ$ . The cucullus has a strongly developed dorsal lobe of nearly uniform width. Its apex is semicircular, the distal margin is weakly bent at one-third the distance from the anal angle to the apex, and the weakly developed ventral lobe bears a stout anal spine. In females, the lamella postvaginalis is somewhat expanded at the posterolateral corners, sternum 7 is trapezoidal with posterior margin concavely emarginated to about one-half the length of the sterigma, the ductus bursae has a sclerotized patch at the juncture with the ductus seminalis and a patch of microtrichia on the inner surface opposite that juncture, and the corpus bursae has two signa of unequal size.

The range extends from Ohio to Kansas and south to Florida and Texas. Adult capture dates vary from 4 June to 15 September. Adults have been observed in association with *Rudbeckia hirta* L. (blackeyed Susan) (Gilligan et al. 2008), but no confirmed larval host has been reported.

## The *palabundana* group (species 33–35)

The *palabundana* group is comprised of *P. palabundana*, *P. rosaocellana*, and *P. salaciana*, species that are sufficiently similar in forewing pattern and genitalia to give cause to question whether they are indeed distinct taxa. They differ subtly in size and coloration and appear to be essentially allopatric (ranging through the upper Midwest, the central Great Plains, and southern Texas, respectively). We maintain the current nomenclatorial distinctions between these populations based mostly on distributional patterns. This situation is further complicated by the relatively recent discovery in eastern Utah and southern New Mexico of *palabundana*-like specimens that are subtly different in forewing appearance from the



currently recognized taxa but indistinguishable from those species in genitalia. They may represent one or more additional species in this group, but more material will be required to reach an informed decision in that regard. In these cases, we illustrate the different phenotypes and provisionally refer the specimens to *P. rosaocellana*.

*Forewing.* Mean FWL: 6.9–8.7 mm, AR: 2.74–2.86; dorsal surface with brown to blackish-brown subbasal and median fasciae and brownish-gray to grayish-white interfascial areas, the former moderately well defined and bandlike, the latter often with brown/gray transverse reticulations; costa with numerous small dark brown marks and/or dashes associated with white strigulae; ocellus with pinkish bars on the lateral margins and three variably expressed black dashes in the central field.

*Male genitalia.* Uncus strongly developed, tapering distally to a somewhat flattened apex, and weakly differentiated from dorsolateral shoulders of the tegumen; socii short and narrow; phallus tapering distally, with base closely surrounded by anellus; vesica with 7–17 cornuti; valva with costal margin strongly concave, ventral emargination deep and U-shaped, neck short and narrow, NR: 0.31–0.37, saccular corner angulate, SA: 96–109°; cucullus nearly uniform in width, with dorsal lobe approximately twice as long as ventral lobe, the former with apex rounded, the latter triangular.

*Female genitalia.* Papillae anales with posterior lobes and ventral extensions rectangular (Plate 16:34g, 35f), the latter with depth about 0.5 × length; margins of posterior lobes with long hairlike setae that curve ventrally; ventral extensions with hook-tipped setae of hairlike thickness along anterior one-half of ventral opening; tergum 8 narrow and collarlike; sterigma Type III; lamella postvaginalis microtrichiate, rectangular to trapezoidal (length about equal to width), with central trough shallow; sternum 7 rectangular to slightly trapezoidal, with width at anterior margin slightly greater than that at posterior margin; scaling of sternum 7 mostly uniform but slightly more dense near posterior margin; ductus bursae encircled with elongate sclerotized patch posterior to ductus seminalis; corpus bursae with two signa, one slightly larger than the other.

### 33. *Pelochrista palabundana* (Heinrich, 1923)

(Plate M, 33a–d; Plate 16, 33a–e)

*Eucosma palabundana* Heinrich 1923:267; McDunnough 1939:46; Powell 1983:34; Miller 1987:51; Brown 2005:325; Gilligan et al. 2008:107.

*Pelochrista palabundana*: Gilligan and Wright 2013b:325.

**Holotype.** ♂, Canada, Manitoba, Aweme, N. Criddle, 2 July 1921, slide TOR 4248, CNC.

Heinrich (1923) based the description of *P. palabundana* on three males, two from Aweme, Manitoba, the third from Hessville, in the northwest corner of Indiana. He illustrated the genitalia of one of the specimens from Aweme, called it the “Type,” and referred to the other two specimens as paratypes, hence the holotype designation.

This species is slightly smaller than the other members of the group (mean FWL = 6.9 mm vs. 7.4 and 8.7). Its overall appearance is grayish brown as opposed to pale brown in *P. rosaocellana* and blackish brown in *P. salaciana*. Usually the fasciate markings are clearly defined, but in some instances (Plate M:33d) extensive brown suffusion in the interfascial areas renders the margins of the fasciae obscure. We found no genitalia characteristics that clearly distinguish *P. palabundana* from the other members of the group.

This species is a resident of the upper Midwest and seems to prefer habitat with sandy soil. We examined specimens from Manitoba, Ontario, Illinois, Indiana, Michigan, Minnesota, and Ohio. Adult capture dates range from early June to early September.

### 34. *Pelochrista rosaocellana* (Knudson, 1986)

(Plate M, 34a–h; Plate 16, 34a–h)

*Eucosma rosaocellana* Knudson 1986:322; Brown 2005:326.

*Pelochrista rosaocellana*: Gilligan and Wright 2013b:326.

**Holotype.** ♂, Texas, Hemphill County, Gene Howe Wildlife Management Area, E. C. Knudson, 18 May 1985, USNM.

This is the largest member of the group (mean FWL = 8.7 mm). Typical specimens with brown fasciate markings and pale but strongly reticulated interfascial areas are illustrated in Plate M:34a–d. The specimens depicted in Plate M:34e–g are from southeastern Utah and may represent one or more additional species in this group. Their genitalia (e.g., Plate 16:34c, d, f) are not sufficiently distinctive to separate them from the currently recognized taxa, and the limited amount of available material does not allow for an adequate evaluation of the variation in forewing appearance. The pale specimen illustrated in Plate M:34h and Plate 16:34e is representative of a *rosaocellana*-like population at White Sands National Monument, Otero County, New Mexico.

We examined material from eastern Colorado, western Iowa, southwestern Kansas, southern New Mexico, southeastern Montana, north central Nebraska, northern Texas, and southeastern Utah. Adult capture dates range from early June to early September.

### 35. *Pelochrista salaciana* (Blanchard and Knudson, 1981)

(Plate M, 35a–c; Plate 16, 35a–f)

*Eucosma salaciana* Blanchard and Knudson 1981b:176; Brown 2005:326.

*Pelochrista salaciana*: Gilligan and Wright 2013b:327.

**Holotype** (Plate M:35a). ♂, Texas, Nueces County, North Padre Island, A. and M. E. Blanchard, 13 October 1979, USNM.

This species was described from 30 specimens (18 ♂, 12 ♀) from Texas, one from Colorado County (west of Houston) in April, the others from North Padre Island in Nueces County (near Corpus Christi) in September and October. We examined the holotype and 23 of the paratypes, all in the USNM.

Compared to other members of the group, this species is intermediate in size (mean FLW = 7.4 vs. 6.9 and 8.7 mm) and has the darkest forewing appearance, the dominant color being blackish brown. In the male genitalia, the valva appears to be more sharply pointed at the vertex of the anal angle, and the cucullus is slightly narrower, but these differences are subtle, variable, and perhaps diagnostically unreliable.

## Species not assigned to a group

### 36. *Pelochrista daemonicana* (Heinrich, 1923)

(Plate N, 36a–e; Plate 17, a–h)

*Eucosma daemonicana* Heinrich 1923:111; McDunnough 1939:47.

*Pelochrista daemonicana*: Powell 1983:35; Brown 2005:478; Gilligan and Wright 2013b:319.

**Holotype.** ♂, New Mexico, Manzano National Forest, Hell Canyon, C. Heinrich, 14 September 1916, slide 72791, USNM.

*Pelochrista daemonicana* was described from a single male. It resembles *P. collilonga* (species 37) in forewing pattern but is substantially larger (mean FWL = 9.4 vs. 6.6 mm) and usually has reddish-brown instead of yellowish-brown interfascial areas. The dark-brown maculation includes a partially expressed subbasal fascia (comprised of a prominent spot on the cubitus and a smaller mark on the inner margin), a fragmented median fascia with three components (one on the costa, one at the distal end of the cell, one on the pretornal portion of the inner margin), a postmedian band that often expands into a blackish-brown patch at the costal margin of the ocellus, a thin line on the proximal one-half of the cubitus, and several rectangular marks on the costa that separate tan strigulae. The ocellus is clearly expressed, with two or three black dashes in the central field that are sometimes connected in a zig-zag pattern (Plate N:36b).

In males, the uncus is clearly differentiated from the dorsolateral shoulders of the tegumen, the socii have somewhat serrate lateral margins, the valva neck is moderately long and broad, NR = 0.58, and the sacculus corner is angulate (SA = 140°). The cucullus is rectangular, with medial the surface coarsely setose and with 5–7 marginal spines distributed evenly along the distal margin. In females, the papillae anales are similar to those in the *palabundana* group, but the ventral extensions are more weakly developed (length about 3 × depth). The sterigma is Type III, the lamella postvaginalis is rectangular and strongly developed laterally (width about 3 × length), the ductus bursae is sclerotized from the constriction anterior to the ostium to the juncture with the ductus seminalis (the latter arising relatively near the former), and the corpus bursae has two signa of moderate and nearly equal size.

We examined specimens from Mohave County, Arizona; Prowers County, Colorado; Morton County, Kansas; Sweet Grass County, Montana; Socorro County, New Mexico; and Hemphill County, Texas. Adults fly from mid-August in Montana to late September in Arizona, New Mexico, and Texas.

### **37. *Pelochrista collilonga* Blanchard and Knudson, 1984**

(Plate N, 37a–e; Plate 17, 37a–g)

*Pelochrista collilonga* Blanchard and Knudson 1984:446; Brown 2005:478; Gilligan and Wright 2013b:318.

**Holotype.** ♂, Texas, Brown County, Lake Brownwood State Park, A. and M. E. Blanchard, 21 April 1966, slide 25498, USNM.

*Pelochrista collilonga* is similar in forewing appearance to *P. daemonicana* (species 36) and *P. reversana* (species 91) but is considerably smaller (mean FWL = 6.6 vs. 9.4 and 9.0 mm) and more whitish in overall appearance. The forewing is less elongate than in *P. daemonicana* (AR = 3.09 vs. 3.32) and has less sharply defined markings than in *P. reversana*. The three species are easily separated by genitalia.

Males of *P. collilonga* differ from those of *P. daemonicana* and *P. reversana* in having a long narrow valval neck that is strongly arched laterally, a smaller NR (0.33 vs. 0.58 and 0.76), and a smaller SA (104° vs. 140° and 145°). They also have a relatively small cucullus with a strongly produced dorsal lobe, a weakly produced ventral lobe, a moderately stout anal spine, and 1–3 slightly smaller marginal spines. Females of *P. collilonga* differ from those of *P. daemonicana* and *P. reversana* in sterigma Type (II vs. III), sclerotization of the ductus bursae (absent or very weakly expressed vs. conspicuous and extending from the constriction anterior to ostium to the ductus seminalis), and scaling of the lamella postvaginalis (present in small patches on either side of the central trough vs. absent). The papillae anales in *P. collilonga* are similar to those of *P. daemonicana* but differ in type from those of *P. reversana* (1 vs. 3). In *P. collilonga* the lateral portions of sternum 7 have large raised blisterlike protrusions that are more densely scaled than the medial

portion of that sternite. This feature is not present in either of the other two taxa.

We examined specimens from Colorado, Idaho, Kansas, New Mexico, Texas, Utah, and Wyoming. Adults fly from late June through September.

### 38. *Pelochrista fraudabilis* (Heinrich, 1923)

(Plate N, 38a–b; Plate 18, 38a–e)

*Eucosma fraudabilis* Heinrich 1923:98; McDunnough 1939:46; Powell 1983:34; Brown 2005:320; Gilligan and Wright 2013a:502.

*Pelochrista fraudabilis*: Gilligan and Wright 2013b:321.

**Holotype** (Plate N:38a). ♂, North Carolina, Moore County, Southern Pines, slide 74784, USNM.

Heinrich (1923) described this species from 18 specimens collected at the type locality. He illustrated the genitalia of a male that he called the “Type” and referred to the other 17 specimens (13 ♂, 4 ♀) as paratypes, hence the holotype designation.

*Pelochrista fraudabilis* is a rather small species (mean FWL = 7.1 mm) with a broad forewing (AR = 2.57). It was recently reviewed by Gilligan and Wright (2013a) as a potential type species of the genus *Eucosma*. It shares forewing pattern elements (especially in the ocelloid area) with *P. fratrueolis* (species 157), *P. scintillana* (species 100), and members of the *Eucosma circulana* and *E. refusana* groups (as defined by Wright and Gilligan 2015). It differs from these taxa in having 2 (vs. 0 or 1) transverse metallic gray bands in the median area of the forewing, in valva shape, and in papillae anales Type (see Gilligan and Wright 2013a and Wright and Gilligan 2015).

This species is most similar in genitalia to members of the *comatulana* group (notably *P. exclusoriana*, species 25) but was not included in that group because of its distinctly different forewing appearance. Females differ from *P. exclusoriana* in sterigma Type (II vs. III) and in the relative sizes of the two signa (one much vs. slightly smaller than the other).

This species has been collected in the Atlantic coastal states from New Jersey to northern Florida and in Louisiana. Adults fly from late May to mid-August.

### 39. *Pelochrista adamantana* (Guenée, 1845)

(Plate N, 39a–c; Plate 18, 39a–f)

*Argyroptera adamantana* Guenée 1845:303.

*Eucosma adamantana*: Fernald 1903:459; Barnes and McDunnough 1917:169; Heinrich 1923:84; McDunnough 1939:45; Powell 1983:34; Brown 2005:314.

*Pelochrista adamantana*: Gilligan and Wright 2013b:316.

**Type(s)?** Lapponia?, “Oberthür Collection”. (Deposition uncertain).

Guenée’s description contains no information about syntypes. Heinrich (1923) reported that the “Type” is in the Oberthür Collection. We corresponded with the two main depositories of Oberthür specimens, the French National Museum of Natural History in Paris and the BMNH, but were unable to locate any specimens upon which the description might have been based.

*Pelochrista adamantana* is a medium-sized species (mean FWL = 9.3 mm). The forewing is divided into four bright white patches by a reddish-brown X-shaped mark comprised of a transverse band from mid-costa to the tornus and a second band that extends along the inner margin from the base to mid-wing and diagonally from there to the apex. The only *Pelochrista* in eastern North America with which it might be

confused based on forewing appearance is *P. quinquemaculana* (species 155), but that species has a more intricate pattern consisting of five white spots separated by three transverse bands and a partial diagonal band.

In males, the uncus is broad, with a shallow medial indentation in the distal margin; the vesica lacks cornuti; the valva has a concave costal margin, a moderately shallow ventral emargination, a long neck, an angulate saccular corner ( $SA = 125^\circ$ ), and  $NR = 0.48$ . The cucullus has a well developed dorsal lobe, a nearly undeveloped ventral lobe, an anal angle of approximately  $90^\circ$ , and a few marginal spines (including an anal spine) on the ventral one-half of the distal margin. In females, the posterior lobes of the papillae anales are small, the ventral opening is about three-fourths as long as the pads, and the ventral extensions are corresponding long but weakly developed (length about  $8 \times$  depth). The margins of the ventral opening have hook-tipped setae, the sterigma is Type III, the lamella postvaginalis is rectangular (width slightly larger than length), sternum 7 is somewhat ovate and uniformly scaled, the ductus bursae lacks sclerotization, and the corpus bursae has two signa of unequal size.

This species occurs in the Atlantic coastal states from New Jersey to Florida. We examined adults collected from late August (in New Jersey) to early December (in Florida).

## Section 2. Type 2 Papillae Anales.

### The *caniceps* group (species 40–44)

The next five species are similar in size (mean FWL: 12.6–14.1 mm) and genitalia but distinctive in forewing pattern and/or coloration. Shared genitalic features include:

*Male genitalia.* Uncus clearly differentiated from dorsolateral shoulders of tegumen; socii fingerlike, relatively broad medially, and moderately tapered toward base and apex; phallus tapering distally, with base loosely surrounded by anellus; vesica with 5–29 cornuti; valva with costal margin concave, ventral emargination shallow,  $NR: 0.63–0.75$ ,  $SA: 135–155^\circ$ ; cucullus with dorsal lobe strongly developed, apex rounded, distal margin weakly convex, ventral lobe weakly developed, anal angle broadly rounded, setation of medial surface relatively fine.

*Female genitalia.* Papillae anales relatively narrow, with posterior extremities separated into small ventrally facing lobes, length of ventral opening  $0.50–0.75 \times$  length of pads, anterior lobes facing ventrolaterally; sterigma Type II, somewhat U-shaped, with width at posterior margin about  $1.50–2.25 \times$  ostium diameter; lamella postvaginalis with long hairlike setae flanking a weakly depressed central trough, the setae continuing in bands on the intersegmental membrane toward the ventral extremities of tergum 8; sternum 7 rectangular, with scaling relatively uniform except for a narrow dense band along the concave posterior margin; ductus bursae with small patch of sclerotization near ductus seminalis (except in *P. canariana*); corpus bursae with two signa, one slightly larger than the other.

#### 40. *Pelochrista caniceps* (Walsingham, 1884)

(Plate O, 40a–e; Plate 19, 40a–g)

*Paedisca caniceps* Walsingham 1884:137.

*Eucosma caniceps*: Fernald 1903:460; Barnes and McDunnough 1917:169; Heinrich 1923:83; McDunnough 1939:45; Powell 1983:34; Brown 2005:317.

*Pelochrista caniceps*: Gilligan and Wright 2013b:318.



**Holotype.** ♂, Montana, Yellowstone River, Morrison, 1880, BMNH(E) 819931, slide 5749, BMNH.

*Pelochrista caniceps* is a large species (mean FWL = 13.7 mm) that was described from a single male. The forewing is salmon colored with thin white longitudinal streaking. It is similar in forewing pattern to *P. optimana* (species 41), but that species is brownish gray and usually has bolder white longitudinal markings.

Forewing color varies from deep salmon (Plate O:40a) to pale yellowish orange (Plate O:40d). Maculational elements include thin uninterrupted white streaks on the costa and inner margin, a variably expressed white line that follows the cubitus and CuA<sub>2</sub> from the base to the tornus, and a short white dash at the apex along R<sub>4</sub>. Some specimens have a barely discernable streak in the cell. Dark specimens often have some gray suffusion in the apical area and a pale gray line along the termen (Plate O:40a–c). The specimen illustrated in Plate O:40e and Plate 19:40c is referred here to *P. caniceps* based on its color and genitalia, but its white markings more closely resemble those of *P. optimana*.

The male genitalia differ subtly from those of *P. optimana* in that the uncus is a little less strongly developed and the ventral emargination of the valva is slightly shallower. In females, the hook-tipped setae on the anterior lobes of the papillae anales are more robust than in *P. optimana*, and the lamella postvaginalis has clusters of scales mixed with the setae on either side of the central trough (not present in *P. optimana*).

*Pelochrista caniceps* has been reared on two occasions in California: from *Artemisia tridentata* Nutt. (big sagebrush) in Mono County and from another *Artemisia* species (not *tridentata*) in Inyo County (Powell and Opler 2006). We examined specimens from California, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Adults fly in July, August, and early September.

#### **41. *Pelochrista optimana* (Dyar, 1903)**

(Plate O, 41a–e; Plate 19, 41a–h)

*Eucosma optimana* Dyar 1903:180; Barnes and McDunnough 1917:169; Heinrich 1923:85; McDunnough 1939:45; Powell 1983:34;

Brown 2005:325; Powell and Opler 2009:134.

*Pelochrista optimana*: Gilligan and Wright 2013b:325.

**Lectotype** (designated by Heinrich 1923). ♂, Colorado, Garfield County, Glenwood Springs, W. Barnes, 1–7 October, slide 72810, USNM.

Dyar (1903) based this species on two syntypes (1 ♂, 1 ♀) from Garfield and Eagle counties in west central Colorado. Heinrich (1923) designated the lectotype by specifying the type locality.

*Pelochrista optimana* is similar in size to *P. caniceps* (mean FWL 13.8 vs. 13.7 mm). The dorsal surface is brownish gray with a network of white longitudinal streaks and dashes that includes a thin costal streak, a longitudinal dash in the cell, a sometimes fragmented streak that follows the cubitus in the medial portion of the wing and then proceeds toward the tornus, a subterminal streak from the tornus to R<sub>5</sub>, a streak on the middle one-third of the inner margin, a dash from the base of CuA<sub>1</sub> to the middle of M<sub>2</sub>, and usually an outwardly oblique dash from the base of the inner margin to the radius. Variation in these markings results in a variety of intergrading phenotypes featuring combinations of the following character states: costal streak complete or interrupted by brownish-gray marks on the distal one-half of the wing; dash from CuA<sub>1</sub> to M<sub>2</sub> disjunct from the other white marks or joined to the cubital streak and/or terminal streak, in the latter case along M<sub>3</sub>; cubital streak separated from or joined with terminal streak at the tornus; oblique basal dash strongly expressed to absent, in the former case often joined with the dash in the cell; streak on inner margin thin to moderately wide, sometimes divided into two elongate spots.

The male genitalia are similar to those of *P. caniceps*; the subtle distinctions are discussed under the latter taxon. Females of the two species differ in the absence (*P. optimana*) vs. presence (*P. caniceps*) of clusters of scales flanking the medial trough of the lamella postvaginalis (Plate 19:41h vs. Plate 19:40g). Females with typical forewing markings (Plate O:41b) have a band of long hairlike setae along the posterior margin of tergum 8. In more boldly marked specimens (Plate O:41e), that band contains of a mixture of setae and scales. Darker and more strongly marked individuals (Plate O:41d–e) have been collected in south central Colorado and may represent an unnamed species, but we provisionally refer them to *P. optimana* pending availability of more material.

We examined specimens from British Columbia, Arizona, California, Colorado, Montana, Nevada, North Dakota, Oregon, Utah, Washington, and Wyoming. Adult capture dates range from 30 July to 27 September. Powell and Opler (2009) reported rearing this species from larvae boring in roots of *Artemisia tridentata* Nutt. (big sagebrush) in Mono County, California.

#### **42. *Pelochrista hyponomeutana* (Walsingham, 1895)** (Plate O, 42a–e; Plate 20, 42a–f)

*Paedisca hyponomeutana* Walsingham 1895:502.

*Eucosma hyponomeutana*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:114; McDunnough 1939:47;

Powell 1983:34; Brown 2005:322.

*Pelochrista hyponomeutana*: Gilligan and Wright 2013b:322.

**Holotype.** ♂, Colorado, Larimer County, Loveland, W. G. Smith, June 1891, BMNH(E) 819932, slide 11573, BMNH.

*Pelochrista hyponomeutana* was described from a single male sent by W. G. Smith to Walsingham for evaluation. This species is variable in size (FWL: 9.1–15.0 mm), but most specimens are moderately large (mean FWL = 12.7 mm).

The forewing is white with uniformly distributed black speckling. In typical specimens (Plate O:42a–b) the black spots are numerous, slightly elongate, and have a tendency to align in series from the costa to the inner margin. The specimens in Plate O:42d–e represent a population from Comanche National Grassland, Otero County, Colorado in which the black spots are greatly reduced in both size and number, and Plate O:42c shows a specimen from Valley of Fires Recreational Area in Lincoln County, New Mexico with an intermediate expression of the speckling. All of the phenotypes have two black bars on the termen (sometimes with matching bars in the fringe), one between  $R_4$  and  $R_5$ , the other between  $CuA_1$  and  $M_2$ . These bars distinguish *P. hyponomeutana* from other white western *Pelochrista* of similar size (e.g., *P. piperata*, *P. nordini*, and *P. larana*).

In males, the cucullus is slightly more tapered toward the apex than in other members of the group, but that difference is subtle and may not be reliable. Females have a few scales mixed with the setae on either side of the central trough of the lamella postvaginalis (Plate 20:42f).

This species seems to be most common in the short grass prairie region along the eastern slope of the Rocky Mountains. We have found it to be abundant at times in open sage brush habitat in eastern Colorado, where it flies in mid-August. The specimens we examined document a range that includes eastern Colorado, western Kansas, southern New Mexico, and northern Texas. Most were collected at elevations of 1,800–5,200 feet, but a few from localities in Chaffee and Conejos counties, Colorado were found at 7,500–8,000 feet. Adult capture dates vary from 28 July to 23 September.

#### 43. *Pelochrista canariana* (Kearfott, 1907)

(Plate P, 43a–c; Plate 20, 43a–e)

*Eucosma canariana* Kearfott 1907b:18; Barnes and McDunnough 1917:169; Heinrich 1923:81; McDunnough 1939:45; Powell 1983:34; Brown 2005:317.

*Pelochrista canariana*: Gilligan and Wright 2013b:318.

**Lectotype** (here designated). ♂, Utah, Tooele County, Stockton, T. Spalding, 1 August, AMNH.

Kearfott (1907b) described this species from eight syntypes collected in Utah and Colorado. The AMNH has four of these specimens, including two males from Stockton, Utah, so Heinrich's (1923) comments about the "Type" are ambiguous, hence the present lectotype designation.

*Pelochrista canariana* is a moderately large species (mean FWL = 14.1 mm) that is easily recognized by forewing appearance: silvery white with lemon-yellow subradial and subcubital bands, the former with an apical branch that aligns with a median bar connecting the longitudinal bands. Plate P:43c shows a color variant from Lassen County, California in which the markings are suffused with brown.

There is little in the way of genitalia characteristics to distinguish males from other members of the *caniceps* group, but the socii appear to be more uniform in width, the saccular angle is a little larger (SA = 155 vs. 135–146°), and the neck is a little wider (NR = 0.75 vs. 0.63–0.70). In females, a lack of sclerotization on the ductus bursae separates *P. canariana* from the other species in the group. In addition, the papillae anales are more uniform in width and have anterior lobes that are somewhat bulbous.

This species appears to be most common in the Great Basin region, but it also has been collected on the east side of the Rocky Mountains. We examined specimens from Lassen and Modoc counties, California; Chaffee, Mesa, and Montezuma counties, Colorado; Oneida County, Idaho; Sanpete County, Utah; and Albany County, Wyoming. Adult capture dates range from 9 July to 19 August.

#### 44. *Pelochrista avalona* (McDunnough, 1938)

(Plate P, 44a–c; Plate 20, 44a–e)

*Eucosma avalona* McDunnough 1938:58; McDunnough 1939:45; Powell 1983:34; Brown 2005:316; Powell and Opler 2009:134.

*Pelochrista avalona*: Gilligan and Wright 2013b:317.

**Holotype**. ♂, California, Los Angeles County, Santa Catalina Island, Avalon, D. Meadows, 21 September 1932, CNC.

*Pelochrista avalona* is a moderately large species (mean FWL = 12.6 mm) that is readily distinguished from other North American *Pelochrista* by forewing appearance: white with a network of four brown longitudinal streaks, one between the costa and the radius, two between the cubitus and the inner margin that originate at the base and merge near the tornus, and one in the cell that branches at mid-wing into four weakly defined streaks that extend to the termen. This pattern seems to be unique in Nearctic *Pelochrista*.

In males, the uncus has a ridge on the distal margin of the ventrolateral surface, NR = 0.65, and SA = 135°. In females, the papillae anales have especially stout hook-tipped setae on the anterior lobes, the sterigma resembles that of *P. caniceps* in shape and in the presence of patches of scales flanking the central trough, and the ductus bursae has a weakly sclerotized patch near the juncture with the ductus seminalis.

This species occurs in coastal California from the San Francisco Bay area to the northern Channel Islands (Powell and Opler, 2009). We examined 16 specimens collected between 26 August and 28 September. Powell and Opler (2009) reported larvae feeding in the roots of *Artemisia californica* Less. (coastal sagebrush).

## The *persolita* group (species 45–47)

The *persolita* group is comprised of three species that are similar in forewing pattern and genitalia. Shared characteristics include:

*Forewing.* Mean FWL 8.5–13.5 mm; AR = 2.84–3.31; dorsal surface pale brown to brownish gray with dark brown maculation, the latter including a variably expressed subbasal mark and an oblique band from the distal end of cell to the apex, part of which is often reduced to a vague grayish-brown shade.

*Male genitalia.* Uncus clearly differentiated from dorsolateral shoulders of tegumen; socii long, fingerlike, and moderately broad; phallus long, narrow, slightly attenuating distally, with base loosely surrounded by anellus; vesica with 0–4 cornuti; valva with costal margin weakly to moderately concave, ventral emargination shallow, neck long and moderately broad, NR: 0.55–0.75, saccular corner weakly defined, SA: 143–151°; dorsal and ventral lobes of cucullus moderately and weakly developed, respectively, with anal angle broadly rounded and with 7–8 marginal spines distributed from the anal angle to two-thirds the distance to the apex.

*Female genitalia.* Papillae anales with pads nearly uniform in width and with stout hook-tipped setae on anterior lobes; sterigma Type II; lamella postvaginalis widening posteriorly, with clusters of setae flanking a weakly depressed central trough; sternum 7 with scales evenly distributed except for a moderately dense band along the posterior margin; corpus bursae with two signa, one somewhat larger than the other.

### 45. *Pelochrista persolita* (Heinrich, 1929)

(Plate P, 45a–c; Plate 21, 45a–f)

*Eucosma persolita* Heinrich 1929:7; McDunnough 1939:47; Powell 1983:34; Brown 2005:325.

*Pelochrista persolita*: Gilligan and Wright 2013b:326.

**Holotype.** ♂, Texas, Cameron County, San Benito, 16–23 March, USNM.

Heinrich (1929) described *P. persolita* from 32 specimens collected in southern Texas: 19 at San Benito, 13 at Brownsville. He labeled one of the males as the “TYPE” and the rest (27 ♂, 4 ♀) as paratypes, hence the interpretation of the above specimen as a holotype.

This is the smallest member of the group (mean FWL = 8.5 vs. 12.2–13.5 mm). The forewing is pale brownish gray, with a conspicuous subbasal spot on the cubitus, a triangular pretornal mark, and a narrow postmedian band arching along the costodistal margin of the ocellus. The oblique band referred to in the group discussion above is vaguely defined, blackish-gray, and extends from a brown spot in the cell to a brown spot at the apex. This is the only member of the group with a conspicuous ocellus, its lateral and tornal margins being defined by pinkish-gray bars/spots. The costa is marked by numerous thin brown dashes delimiting whitish strigulae. *Pelochrista persolita* resembles members of the *pulveratana* group in forewing appearance but is quite different from those taxa in genitalia.

Males lack cornuti in the vesica, have a weakly defined saccular corner (SA = 143°), and have a moderately broad valval neck (NR = 0.69). In females, the width of the lamella postvaginalis at the posterior margin is about twice the ostium diameter, the ductus bursae is encircled by a sclerotized band at the juncture with the ductus seminalis, and the base of the smaller signum expands into a small sclerotized patch on the surface of the bursa which is adjoined laterally by minute sclerotized dots that may be remnants of a broader patch.

We examined about a dozen specimens, half of which were from the type series. They were collected in southern and far western Texas (Cameron, Culberson, Hidalgo, and Terrel counties, and Big Bend National Park). Adults were captured in February and March and again from mid-August to mid-November, suggesting a bivoltine life cycle.

#### 46. *Pelochrista graziella* (Blanchard, 1968)

(Plate P, 46a–c; Plate 21, 46a–e)

*Eucosma graziella* Blanchard 1968:143; Powell 1983:34; Brown 2005:321.

*Pelochrista graziella*: Gilligan and Wright 2013b:321.

**Holotype.** ♂, Texas, Brewster County, Big Bend National Park, Green Gulch, A. and M. E. Blanchard, 11 October 1966, slide 72793, USNM.

*Pelochrista graziella* is the largest member of the *persolita* group (mean FWL = 13.5 vs. 8.5–12.2 mm) and is easily recognized by forewing appearance. The dorsal surface is pale gray with a tan subterminal band and a thin white line along the termen. The subbasal spot on the cubitus is conspicuous and slightly crescent-shaped. The distal one-third of the oblique band is bright brown and fails to reach the apex; the proximal two-thirds are gray and weakly contrasting with the adjacent portion of the wing. The ocellus is barely discernable, and the obscure costal strigulae are weakly separated by small brown marks.

The male genitalia of *P. graziella* are similar to those of *P. persolita*, but the ventral surface of the uncus has a medial ridge, the vesica has 2–4 cornuti (vs. 0), and the neck is slightly narrower (NR = 0.55 vs. 0.69). In females, the lamella postvaginalis has substantial lateral projections, the ostium is encircled by a ringlike bulge, the ductus bursae lacks sclerotization, and one of the two signa in the corpus bursae is located medially on a moderately large patch of sclerotized membrane.

We examined nine specimens in the USNM (4 ♀, 5 ♂), all collected in October at Big Bend National Park. The current data, though somewhat sparse, suggests that this species is a resident of the Chihuahuan Desert, which ranges through southwest Texas, southern New Mexico, southeastern Arizona, and portions of northeastern Mexico.

#### 47. *Pelochrista diabolana* (Blanchard, 1979)

(Plate P, 47a–c; Plate 21, 47a–d)

*Eucosma diabolana* Blanchard 1979:214; Brown 2005:318.

*Pelochrista diabolana*: Gilligan and Wright 2013b:319.

**Holotype.** ♂, Texas, Culberson County, Sierra Diablo Wildlife Management Area, 6,000 feet, A. and M. E. Blanchard, 31 March 1970, USNM.

*Pelochrista diabolana* is intermediate in size between the other two members of this group (mean FWL = 12.2 mm). The forewing is yellowish brown with dark brown maculation and a whitish line on the termen. It has conspicuous subbasal and pretornal marks, the latter connected to the oblique band. The oblique band may be complete (Plate P:47b) or divided into a spot or dash at the apex and a conspicuous dash at the distal end of the cell. The ocellus is not expressed, and the costal strigulae are barely discernable.

In males, the ventral surface of the uncus has a medial ridge, the vesica lacks cornuti, NR = 0.75, and SA = 151°. In females, the ductus bursae lacks sclerotization, and the base of the smaller signum is not surrounded by a sclerotized patch.

Blanchard (1979) reported 29 paratypes (26 ♂, 3 ♀), 28 from the type locality and one from the Davis Mountains in Jeff Davis County, Texas. We examined 12 specimens in the USNM from the type locality. All of this material was collected between 26 March and 30 May.



## The *maculosa* group (species 48–49)

The *maculosa* group consists of two species that are remarkably similar in forewing appearance and genitalia. Shared characteristics include:

*Forewing.* Forewing moderately long (mean FWL = 10.9, 12.3) and narrow (AR = 3.31, 3.46); dorsal surface pale brownish yellow, unmarked to finely irrorated.

*Male genitalia.* Uncus strongly developed and clearly differentiated from dorsolateral shoulders of tegumen; socii long, fingerlike, and substantially uniform in width; phallus long and narrow, with bulbous base loosely surrounded by anellus; vesica with 6–13 cornuti; valva with costal margin weakly concave, ventral emargination shallow, neck long and relatively narrow (NR = 0.43, 0.51), saccular corner angulate (SA = 138, 139°); cucullus with dorsal lobe well developed, apex rounded, ventral lobe weakly developed, medial surface coarsely setose; distal margin of cucullus with 4–5 marginal spines distributed from anal angle to three-fourths the distance to the apex.

*Female genitalia.* Papillae anales tapering gradually from evenly rounded posterior lobes to more narrowly rounded anterior lobes, the latter with numerous hook-tipped setae; sterigma Type III; lamella postvaginalis rectangular and substantially flat, with width nearly 3 × length, posterior margin weakly indented medially, and central trough weakly depressed; posterior margin of sternum 7 sinuate, with medial projection shielding ostium; scaling of sternum 7 substantially uniform; ductus bursae lacking sclerotization; corpus bursae with two signa, one larger than the other.

### 48. *Pelochrista maculosa* (Wright, 2012)

(Plate Q, 48a–d; Plate 22, 48a–e)

*Eucosma maculosa* Wright 2012:30.

*Pelochrista maculosa*: Gilligan and Wright 2013b:323.

**Holotype** (Plate Q:48a). ♂, Wyoming, Albany County, W side of Gelatt Lake, 41.2333° N, 105.8433° W, 7,250 feet, J. S. Nordin, 18 July 2005, USNM.

*Pelochrista maculosa* is similar to *P. lafontainei* but is smaller (mean FWL = 10.9 vs. 12.3 mm) and differs in forewing appearance (distal one-third speckled with brown vs. immaculate). The ocellus is obscure but recognizable, with a transverse line of blackish-brown dots in the central field, and the whitish strigulae on the distal one-half of the costa are defined by small brownish marks and striae. Most specimens have an obscure grayish-brown band from the distal end of the cell to the apex. By contrast, the forewing of *P. lafontainei* is essentially unicolorous, with fine, faint, and uniformly distributed reticulations that are of a slightly darker shade of brownish yellow than the rest of the wing. *Pelochrista maculosa* can also be confused with *P. gelattana* (species 59) based on forewing appearance, but the two species have very different genitalia.

The male genitalia of *P. maculosa* differ from those of *P. lafontainei* in that the uncus is slightly more bulbous, the phallobase is spherical vs. comprised of two semispherical sections, and the cucullus is a little more elongate. Females of *P. maculosa* have large patches of scales on the lateral portions of the lamella postvaginalis (Plate 22:48e), a feature that is not present in *P. lafontainei* (Plate 22:49f).

All 14 specimens in the type series were collected by J. S. Nordin at Gelatt Lake, which is located about 15 miles WSW of Laramie, Wyoming in desert-like habitat known for its alkali soil. Their capture dates range from 29 June to 29 July. We also examined photographs (supplied by E. LaGasa) of a male collected on 9 September in Yakima County, Washington that we believe to be *P. maculosa*.

#### 49. *Pelochrista lafontainei* (Wright, 2012)

(Plate Q, 49a–d; Plate 22, 49a–f)

*Eucosma lafontainei* Wright 2012:30.

*Pelochrista lafontainei*: Gilligan and Wright 2013b:323.

**Holotype** (Plate 22:49c). ♂, Wyoming, Albany County, W side of Gelatt Lake, 41.2333° N, 105.8433° W, 7,250 feet, J. S. Nordin, 28 July 2005, slide 142443, USNM.

*Pelochrista lafontainei* is recognized by its moderately large size (mean FWL = 12.3 mm) and its unmarked but finely reticulated forewing. It might be confused with the immaculate phenotype of *P. gelattana* (Plate S:59a) or the yellowish phenotype of *P. immaculana* (Plate U:64b), but it is readily separated from these taxa by genitalia. *Pelochrista lafontainei* differs from *P. maculosa* (species 48) in forewing appearance and genitalia, as discussed in the account of the latter taxon.

This species is sympatric with *P. maculosa* and *P. gelattana* in southeastern Wyoming. Most of the specimens in the type series for the three species were collected in July by J. S. Nordin at Gelatt Lake in Albany County, Wyoming. We also examined a paratype collected on 22 August by J. D. Lafontaine at Pueblo, Colorado and a paratype taken on 12 July by C. D. Bird at Dry Island Buffalo Jump, Alberta.

#### The *fuscosparsa* group (species 50–51)

The two species in this group are distinguishable by forewing appearance but are nearly identical in genitalia. Shared characteristics include:

*Male genitalia.* Uncus broad and weakly divided into two lobes by a medial indentation of the distal margin; socii long, fingerlike, and arching medially; phallus long, attenuating distally, with base loosely surrounded by anellus; vesica with 12–27 cornuti; valva with costal margin weakly concave, ventral emargination shallow, neck long and gradually tapering distally (NR = 0.46, 0.58), saccular corner broadly rounded (SA = 145, 153°); cucullus with weakly developed dorsal and ventral lobes, a rounded apex, a stout anal spine, 1–4 smaller marginal spines, and a coarsely setose medial surface.

*Female genitalia.* Papillae anales with posterior lobes moderately large and well separated from one another distally; anterior lobes with a mixture of hairlike and hook-tipped setae of similar length and thickness; sterigma Type III; lamella postvaginalis broad and rectangular (width about 2 × length), with posterior margin medially indented; sternum 7 rectangular, with medial projection of posterior margin weakly shielding the ostium; ductus bursae relatively short, with patchlike or ringlike sclerotization at juncture with ductus seminalis; corpus bursae with two signa, one considerably smaller than the other.

#### 50. *Pelochrista fuscotriata* Wright, 2008

(Plate Q, 50; Plate 23, 50a–c)

*Pelochrista fuscotriata* Wright 2008:228; Gilligan and Wright 2013b:321.

**Holotype** (Plate Q:50). ♂, California, San Mateo County, Edgewood Park “A”, J. A. Powell, 14 May 1991, slide DJW 1968, EME.

*Pelochrista fuscotriata* is smaller than *P. fuscosparsa* (species 51) (mean FWL = 9.3 vs. 11.1 mm) and has a more longitudinally streaked forewing appearance, the veins being highlighted in pale tan on an otherwise

brown to blackish gray background. It has color and maculational similarities with some phenotypes of *P. fuscosparsa* (Plate Q:51c, e) and *P. mediotriata* (Plate KK:114a, e) but differs from both in the presence along the termen of a pale tan line with blackish-gray edges.

Genitalia features distinguishing *P. fuscotriata* from *P. fuscosparsa* include: the width of the uncus (more than twice vs. nearly equal to the height), the sclerotization of the ductus bursae (a small patch vs. a narrow ring), and the shape of the smaller signum (scarlike vs. tacklike). This species is separated from *P. mediotriata* by the shapes of the uncus, valva, and sterigma (Plate 23:50a, c vs. Plate 50:104a, d).

*Pelochrista fuscotriata* is associated with serpentine grassland habitat in central California (Wright 2008). It is known from only six specimens that were collected in San Mateo, Santa Clara, and San Benito counties in mid-May. The paratypes are deposited in the EME and the USNM.

## **51. *Pelochrista fuscosparsa* (Walsingham, 1895)**

(Plate Q, 51a–f; Plate 23, 51a–e)

*Paedisca fuscosparsa* Walsingham 1895:507.

*Eucosma fuscosparsa*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:116; McDunnough 1939:47.

*Pelochrista fuscosparsa*: Powell 1983:35; Brown 2005:479; Wright 2008:228; Gilligan and Wright 2013b:321.

**Lectotype** (designated by Wright 2008). ♂, Colorado, Larimer County, Loveland, J. B. Smith, 5,000 feet, July 1891, slide 11572, BMNH(E) 819937, BMNH.

Walsingham (1895) described *P. fuscosparsa* from two males collected by J. B. Smith at the type locality. Obraztsov selected the lectotype, and Wright (2008) published the designation.

This species is medium in size (mean FWL = 11.1 mm) and exhibits considerable variability in color and maculation. Most specimens have tan to grayish forewings and a variety of dark gray to blackish-brown spots/speckles that do not coalesce into recognizable fasciae (Plate Q:51b, d). Some specimens have extensive blackish suffusion that emphasizes contrastingly pale veins, producing a longitudinally streaked effect (Plate Q:51c, e), and others are uniformly tan (Plate Q:51a) or gray brown (Plate Q:51f) with only a slight indication of darker markings. None of the phenotypes include an ocellus or clearly defined costal strigulae. Unmarked individuals might be confused with pale phenotypes of *P. mediotriata* (Plate KK:114d), and streaked specimens have similarities with typical *P. mediotriata* (Plate KK:114a–b) and with *P. fuscotriata* (Plate Q:50). *Pelochrista fuscosparsa* is easily separated from *P. mediotriata* by genitalia, and it is distinguished from *P. fuscotriata* by the presence in the latter species of a pale line along the termen. Subtle genitalia differences between *P. fuscosparsa* and *P. fuscotriata* are discussed under the latter taxon.

We examined specimens from Colorado, Idaho, Montana, Washington, and Wyoming. Adult capture dates range from 28 May to 23 August, but most specimens were captured in late June or July.

## **Species not assigned to a group**

## **52. *Pelochrista spaldingana* (Kearfott, 1907)**

(Plate R, 52a–c; Plate 23, 52a–d)

*Eucosma spaldingana* Kearfott 1907b:19; Barnes and McDunnough 1917:169; Heinrich 1923:84; McDunnough 1939:45; Powell 1983:34;

Brown 2005:327; Wright 2007:48.

*Pelochrista spaldingana*: Gilligan and Wright 2013b:327.

**Lectotype** (designated by Wright 2007). ♂, Utah, Tooele County, Stockton, T. Spalding, 28 July 1903, slide DJW 1548, AMNH.

Kearfott (1907b) described this species from 14 specimens (sex not reported) collected by Tom Spalding at the type locality, the capture dates ranging from 19 June to 11 August. The lectotype was selected by Wright (2007) from six males in the AMNH that satisfy Heinrich's (1923) comments about the "Type."

This is a medium-sized species (mean FWL = 12.1 mm) with a silvery white forewing and orange-brown maculation. The markings include a small basal spot, bandlike subbasal and median fasciae that are connected by a narrow band along the costa, and a large subapical patch that connects to the median fascia, costa, apex, termen, and tornus. The subapical patch has pale longitudinal streaks at approximately  $R_5$ ,  $M_1$ , and  $M_2$ . The overall forewing appearance is somewhat similar to that of *P. hazelana* (species 5), but the two species differ in genitalia and in geographic distribution (west vs. east of the Rocky Mountains).

The male valva has a concave costal margin, a shallow ventral emargination, and a broad neck (NR = 0.74). The cucullus tapers evenly from a broadly rounded anal angle to a more narrowly rounded apex, the dorsal lobe is strongly developed, the anal angle is weakly developed, and the distal margin is nearly straight. In females, the anterior lobes of the papillae anales are rather narrow and bear conspicuous patches of hook-tipped setae, the sterigma is Type II, the ductus bursae lacks sclerotization, and the corpus bursae has two signa of nearly equal size.

We examined 72 specimens from California, Nevada, Oregon, and Utah. Adult capture dates range from 21 May to 29 September, but the vast majority are from July and August.

### 53. *Pelochrista fandana* (Kearfott, 1907)

(Plate R, 53a–f; Plate 24, 53a–e)

*Eucosma fandana* Kearfott 1907b:19; Barnes and McDunnough 1917:169; Heinrich 1923:81; Heinrich 1929:4; McDunnough 1939:45; Powell 1983:34; Brown 2005:319; Wright 2007:42.

*Eucosma argyraula* Meyrick 1912:34, unnecessary replacement name for *fandana*.

*Pelochrista fandana*: Gilligan and Wright 2013b:320.

*Eucosma gandana* Kearfott 1907b:20; Barnes and McDunnough 1917:169; Heinrich 1923:83; McDunnough 1939:45; Powell 1983:34; Brown 2005:319; synonymy by Wright 2007:42.

*Pelochrista gandana*: Gilligan and Wright 2013b:320.

**Types.** *Eucosma fandana*. Holotype (Plate R:53b). ♀, Colorado, Denver, Dyar and Caudell, slide DJW 1488, AMNH. *Eucosma gandana*. Holotype (Plate R:53e, Plate 24:53d). ♀, Colorado, Denver, E. J. Oslar, 10 September, slide DJW 1489, AMNH.

*Pelochrista fandana* and *P. gandana* were each described from a single female collected at Denver, Colorado. Kearfott (1907b) separated these yellowish species by the presence (in *P. fandana*) vs. the absence (in *P. gandana*) of white longitudinal streaks in the forewing. Wright (2007) treated *P. gandana* as a junior synonym of *P. fandana* based on similarity of genitalia and variation in forewing appearance that includes the typical *fandana* and *gandana* phenotypes.

*Pelochrista fandana* is a moderately large species (mean FWL = 13.7 mm) with a brownish-yellow to lemon-yellow forewing. The typical phenotype (Plate R:53b–c) has a narrow white subcostal streak and a broader white streak in the cell. The *P. gandana* phenotype is uniformly yellow (Plate R:53e–f). Intermediate forms show varying amounts of yellowish suffusion in one or the other of the white streaks (Plate R:53a, d). The forewing color and markings are somewhat similar to those of *P. crambitana* (species 10) and *P. canariana* (species 43), both of which have three longitudinal white bands, one along the costa,

one in the cell, and one along the inner margin. In *P. canariana*, the central white band is crossed by a yellow median bar, a feature not found in *P. fandana*.

The genitalia are distinctive. In males, the uncus is divided medially into two moderately developed lobes that have conspicuously wrinkled ventral surfaces, the distal portions of the socii curve medially, the vesica lacks cornuti, and the exterior surface of the phallus has a few minute spinelike setae arranged in groups of three or four at the base and/or mid-phallus. The valva has a concave costal margin, a moderate ventral emargination (NR = 0.53), and an angulate saccular corner (SA = 139°). The cucullus is long and relatively narrow (length 2.5–3 × width), with the dorsal and ventral margins nearly parallel and the anal angle very weakly developed. In females, the papillae anales are densely setose and gradually narrowing anteriorly, with hook-tipped setae sparsely scattered along the pads; the sterigma is triangular, with patches of scales on the substantial posterolateral projections of the lamella postvaginalis and with a moderately depressed microtrichiate central trough; the lamella antevaginalis is ringlike; the ductus bursae lacks sclerotization; and the corpus bursae has only one signum.

This species occurs throughout much of the northern Great Plains. We examined specimens from Manitoba, Saskatchewan, Colorado, Montana, North Dakota, and Utah. Adult capture dates range from early July to late September.

#### **54. *Pelochrista curlewensis*** (Wright, 2007)

(Plate R, 54a–f; Plate 24, 54a–g)

*Eucosma curlewensis* Wright 2007a:47.

*Pelochrista curlewensis*: Gilligan and Wright 2013b:319.

**Holotype.** ♀, Idaho, Oneida County, Curlew National Grassland, 4 mi ENE of Holbrook, 42.1828° N, 112.5853° W, D. J. Wright, 25 July 2003, USNM.

*Pelochrista curlewensis* is medium in size (mean FWL = 11.3 mm) and variable in color. The forewing has a white background and pale orange-brown to blackish-brown maculation, the latter including transverse bands in the basal, subbasal, median, and subterminal areas and various bars and/or branches connecting one band to another or to some portion of the wing margin. The result is a rather intricate pattern with numerous and variably shaped white spots in the interfascial areas. There appears to be a geographic component to the distribution of color phenotypes, with paler specimens found in the northern one-half of the Great Basin and darker forms in southern California. *Pelochrista* species with somewhat similar looking forewings include *P. hazelana*, *P. robinsonana*, *P. fritillana*, and some forms of *P. bolanderana*, but all of these taxa are easily separated from *P. curlewensis* by genitalia.

In males, the uncus is well developed, slightly bulbous (width about equal to height), and often has a weakly developed medial ridge on the ventral surface; the phallus is long and narrow; and the vesica has 0–2 cornuti. The valva has a concave costal margin, a moderate ventral emargination, a relatively broad neck (NR = 0.66), and an angular saccular corner (SA = 143°). The cucullus is rectangular, with rounded apical corners and 5–6 marginal spines along the ventral two-thirds of the distal margin. In females, the papillae anales are densely setose, with the posterior lobes conspicuously wider than the anterior lobes; the anterior lobes are somewhat raised and bear clusters of especially stout hook-tipped setae; the lamella postvaginalis has a concavely indented posterior margin, a depressed central trough, and clusters of long hairlike setae on moderately produced posterolateral projections; the lamella antevaginalis has a liplike projection that shields the ostium; each anterolateral corner of the sterigma has a long rodlike projection (a feature unique to this species in *Pelochrista*); the ductus bursae lacks sclerotization; and the corpus bursae has two signa, one larger than the other.



We examined specimens from Coconino County, Arizona; Lassen, Los Angeles, Modoc, Orange, San Diego, and Santa Barbara counties, California; Gunnison and Mesa counties, Colorado; Oneida County, Idaho; Elko and Nye counties, Nevada; Baker County, Oregon; and Beaver and Juab counties, Utah. Adults fly from mid-June to mid-September.

## 55. *Pelochrista biquadrana* (Walsingham, 1879)

(Plate S, 55a–c; Plate 25, 55a–d)

*Paedisca biquadrana* Walsingham 1879:45.

*Eucosma biquadrana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:129; McDunnough 1939:47; Powell 1983:35; Brown 2005:316; Wright 2008:229.

*Pelochrista biquadrana*: Gilligan and Wright 2013b:317.

*Eucosma palousana* Kearfott 1907b:34; Barnes and McDunnough 1917:170; Heinrich 1923:130; McDunnough 1939:47.

*Pelochrista palousana*: Powell 1983:35; Brown 2005:480; synonymy by Wright 2008:229; Gilligan and Wright 2013b:318.

*Eucosma tahoensis* Heinrich 1923:112; McDunnough 1939:47.

*Pelochrista tahoensis*: Powell 1983:35; Brown 2005:481; synonymy by Wright 2008:229; Gilligan and Wright 2013b:318.

*Eucosma tahoensis subditiva* Heinrich 1929:9; McDunnough 1939:47.

*Pelochrista tahoensis subditiva*: synonymy by Powell 1983:35; Brown 2005:481; Gilligan and Wright 2013b:320.

**Types.** *Paedisca biquadrana*. Lectotype (designated by Wright 2008, Plate S:55a). ♂, California, Shasta County, Pitt River, Walsingham, 21–26 July 1871, BMNH(E) 819973, slide 11517, BMNH. *Eucosma palousana*. Lectotype (designated by Heinrich 1923). ♂, Washington, Whitman County, Pullman, C. V. Piper, 14 August 1898, slide CH 20 Apr 1921, USNM. *Eucosma tahoensis*. Holotype. ♂, California, Deer Park Springs, Lake Tahoe, 8–15 July, slide 72829, USNM. *Eucosma tahoensis subditiva*. Holotype. ♂, California, Deer Park Springs, Lake Tahoe, 24–30 June, slide 72804, USNM.

The lectotype for *P. biquadrana* was selected by Obraztsov from two male syntypes and was designated by Wright (2008). Kearfott (1907b) described *E. palousana* from 10 syntypes, five of which were later determined by Heinrich (1923) to be *Sonia filiana* Busck. Of the three syntypes reported by Klots (1942) in the AMNH, two are *S. filiana* specimens, so Heinrich's (1923) remark “*Type*. —In American Museum” is interpreted as a lectotype designation. The holotype for *E. t. subditiva* was selected by Heinrich (1929) from a series of three males. He labeled it “*Type*” and referred to the other two specimens as paratypes. A more complete discussion of the type fixation issues can be found in Wright (2008).

*Pelochrista biquadrana* is a medium-sized grayish-brown species. The forewing markings are dark brown and include strongly expressed subbasal and pretornal marks and a narrow postmedian band that arcs along the costodistal margin of the ocellus. The interfascial areas are whitish with numerous transverse brownish-gray irrorations. This species strongly resembles *P. shastana* (species 144) in forewing appearance, but that species is larger (mean FWL = 13.7 vs. 10.2 mm) and differs substantially from *P. biquadrana* in genitalia.

In males, the uncus is relatively broad (basal width greater than height) and divided into two lobes by a medial indentation in the distal margin, the phallus is long and narrow, and the vesica has 0–8 cornuti. The proximal one-third of the valva tapers gradually from base to neck, the neck is relatively long and narrow (NR = 0.48), and the saccular corner is angulate (SA = 141°). The cucullus has a strongly developed and apically rounded dorsal lobe, a weakly developed ventral lobe, and a series of 5–6 marginal spines. In females, the sterigma is Type II and U-shaped, the width of the lamella postvaginalis at the posterior margin is at least twice the ostium diameter, the ductus bursae lacks sclerotization, and the corpus bursae has two signa of distinctly different size. The papillae anales are remarkably similar to those of *P. fuscotriata* and *P. fuscosparsa* (species 50 and 51).

We examined specimens from California, Idaho, Nevada, Oregon, and Washington. Adult capture dates range from 24 June to 23 August.

## 56. *Pelochrista mescalerana* (Wright, 2012)

(Plate S, 56a–b; Plate 25, 56a–d)

*Eucosma mescalerana* Wright 2012:28.

*Pelochrista mescalerana*: Gilligan and Wright 2013b:324.

**Holotype** (Plate S:56a). ♂, New Mexico, Chaves County, Mescalero Dunes east of Roswell, G. J. Balogh, 22 September 2003, slide 142437, USNM.

*Pelochrista mescalerana* resembles *P. blanchardi* (species 94) and some forms of *P. matutina* (species 117) in forewing appearance and in size (mean FWL = 7.9, 6.7, and 7.6 mm, respectively). The interfascial areas are white. The maculation includes brown subbasal and median fasciae (the former interrupted on the radius), well-defined white costal strigulae beyond the median fascia, a gray-brown crescent bordering the costal margin of the ocellus, pinkish bars on the lateral margins of the ocellus, and a narrow salt-and-pepper-colored band along the termen. The forewing is a little more elongate than in *P. blanchardi* and *P. matutina* (AR = 3.03 vs. 2.85 and 2.64, respectively). Often *P. mescalerana* can be separated from *P. blanchardi* by its brighter overall forewing appearance (it lacks the grayish reticulations in the interfascial areas of the latter species), but an examination of the genitalia may be necessary to distinguish it from some specimens of *P. matutina*.

The male genitalia are similar to those of *P. blanchardi* (Plate 41:94), but differ in that the valva neck is shorter, the basoventral margin of the cucullus does not extend in a ridgelike manner onto the medial surface of the neck, and the marginal spines are thinner and more numerous (12–13 vs. 7–8). The male genitalia differ from those of *P. matutina* in the structure of the socii (longer and much more slender), the shape of the anal angle (much less produced and pointed), and in the presence of marginal spines (absent in *P. matutina*). The female genitalia of *P. mescalerana* differ from those of *P. blanchardi* and *P. matutina* in papillae anales Type (2 vs. 3 and 4) and sterigma Type (III vs. II and II).

This species is poorly represented in collections. We examined seven specimens (3 ♂, 4 ♀) that were collected in Cochise and Santa Cruz counties, Arizona, Chaves County, New Mexico, and Culberson County, Texas, with capture dates of 22 June, 1–6 August, and 22 September.

## 57. *Pelochrista fremonti* Wright and Gilligan, new species

(Plate S, 57; Plate 25, 57)

**Diagnosis.** *Pelochrista fremonti* is described from a single female with distinctive genitalia. Each of the pads of the papillae anales has a transverse ridgelike projection at the distal extremity of the ventral opening. A somewhat similar ridge occurs in *P. fandana*, *P. curlewensis*, and *P. fuscosparsa*, species that also have Type 2 papillae anales. *Pelochrista fremonti* is easily separated from *P. fandana* and *P. curlewensis* by forewing appearance and differs from *P. fuscosparsa* in the shape of the sterigma, the shape of sternum 7, and the lack of sclerotization on the ductus bursae.

The overall brownish-gray appearance of *P. fremonti* is somewhat similar to that of *P. heinrichi* (species 160), a species for which the female is unknown. *Pelochrista heinrichi* is variable in forewing appearance (Plate UU:160a–c), and it is conceivable that the holotype of *P. fremonti* is referable to that taxon, but without associated males and females, that conclusion would be highly speculative. We prefer to propose a name for this specimen and defer the resolution of this matter until additional representatives of the two taxa become available.

**Description.** *Head.* Frons and vertex white; labial palpus with medial surface, first segment, and third segment white, lateral surface of second segment suffused with pale brownish gray; antenna concolorous

with vertex. *Thorax*. Dorsal surface whitish, with some pale brown suffusion at base of tegula; fore- and mid-leg pale tan with slightly darker anterior surfaces and faint tarsal annulations; hind-leg whitish. Forewing: ♀ FWL = 11.6 mm, AR = 3.31 (n = 1); costa nearly straight; apex acute; termen slightly convex; interfascial areas whitish with a slight yellowish tint and with weakly expressed brown reticulations; markings brown, including: a partial subbasal fascia from inner margin to mid-cell that is constricted on cubitus and interrupted on  $A_{1+2}$ , a fragmented median fascia that includes an irregularly shaped mark at distal end of cell and a spot adjacent to proximal margin of ocellus, three prominent rectangular marks on distal one-half of costa separating whitish strigulae, and a pale subapical patch in which  $R_s$ ,  $M_1$ , and  $M_2$  are highlighted with darker brown; ocellus obscure but discernable, concolorous with interfascial areas, with two dark dashes in central field; fringe pale yellowish white. Hindwing: Brownish gray. *Abdomen*. Male genitalia: Unknown. Female genitalia (n = 1): Papillae anales Type 2, densely setose, moderately tapering anteriorly, with a conspicuous transverse ridge projecting from each pad just posterior to ventral opening; setation of papillae anales including long ventrally curving setae along lateral and posterior margins and a mixture of hook-tipped and hairlike setae of similar diameter on anterior lobes; tergum 8 somewhat narrow and collarlike; length of apophyses anteriores about  $2.5 \times$  that of apophyses posteriores; sterigma Type III; lamella postvaginalis flat and broad (width about  $3 \times$  ostium diameter), with posterior margin scalloped, anterolateral corners rounded, and medial trough shallow; sternum 7 trapezoidal, uniformly scaled, with medial portion of posterior margin developed into a substantial triangular projection shielding ostium; ductus bursae lacking sclerotization; corpus bursae wrinkled and somewhat contorted, with two signa, one large, the other small and nearly vestigial.

**Holotype** (Plate S:57, Plate 25:57). ♀, Colorado, Fremont County, 4.6 mi SE of Salida, W side of US Highway 50, 7,200 feet, 38.495° N, 105.920° W, D. J. Wright, 13 August 1999, slide DJW 577, USNM.

**Etymology**. The specific epithet refers to John C. Frémont, the famous mid-nineteenth century soldier, politician, and explorer of the American West who is the namesake for the county in which the holotype was collected.

## 58. *Pelochrista momana* (Kearfott, 1907)

(Plate S, 58a–c; Plate 26, 58a–d)

*Eucosma momana* Kearfott 1907b:30; Barnes and McDunnough 1917:171; Heinrich 1923:105; McDunnough 1939:46; Powell 1983:34; Brown 2005:324.

*Eucosma metaschista* Meyrick 1912:35, unnecessary replacement name for *momana*.

*Pelochrista momana*: Gilligan and Wright 2013b:324.

**Holotype**. ♂, Arizona, Yuma County, J. B. Smith, 10 April, AMNH.

Kearfott (1907b) described this species from a single specimen, the genitalia of which were illustrated by Heinrich (1923).

The forewing has transverse gray-brown fasciate markings and whitish interfascial areas, the former including a large basal patch, a broad band from mid-costa to the inner margin, and a narrow postmedian band along the costodistal margin of the ocellus. It is somewhat similar in overall appearance and size to *P. lolana* (species 149) and *P. eburata* (species 74) (mean FWL = 10.2, 9.5, and 11.9 mm, respectively), species from which it is easily separated by genitalia.

The genitalia of *P. momana* are unlike those of any other North American *Pelochrista*. In males, the uncus is about twice as broad as high and is divided into two prominent lobes by a medial indentation of the distal margin, the vesica lacks cornuti, and the valva is nearly uniform in width from base to apex. The

neck and saccular angle are barely discernable, and the cucullus is differentiated primarily by its oblique orientation relative to the proximal portion of the valva. The medial surface of the cucullus is densely covered with short fine setae. In females, the papillae anales are large, flat, facing ventrally, densely setose along the margins, and lacking hook-tipped setae; the margins of the ventral opening are slightly raised above the plane of the pads; the sterigma is U-shaped, with patches of scales flanking the moderately depressed central trough; the ductus bursae lacks sclerotization; and the corpus bursae has two signa of unequal size.

This species is poorly represented in collections, but the available material indicates that it is a resident of the desert southwest. We examined specimens from Brewster and Jeff Davis counties and Big Bend National Park in west Texas; Grant County, New Mexico; the Pinal Mountains in Arizona; and San Diego and Imperial counties in southern California. Adult capture dates suggest that there are two annual broods: April–May and August–October.

**59. *Pelochrista gelattana* Wright, 2007**  
(Plate S, 59a–f; Plate 26, 59a–g)

*Pelochrista gelattana* Wright 2007c:121; Gilligan and Wright 2013b:321.

**Holotype.** ♂, Wyoming, Albany County, T15N R75W S29, W side of Gelatt Lake, 7,250 feet, J. S. Nordin, 6 June 2004, USNM.

*Pelochrista gelattana* is a medium-sized golden-brown species (mean FWL = 12.0 mm). The forewing lacks fasciate markings but is sometimes generously irrorated with small blackish-brown specks. Most specimens have faint to well-defined square brown marks on the costa separating obscure whitish strigulae. This species can be confused with *P. maculosa* (species 48) or *P. lafontainei* (species 49) based on size and forewing appearance, but it differs substantially from those taxa in genitalia.

In males, the uncus is weakly differentiated from the dorsolateral shoulders of the tegumen, the socii are broad, the phallus is long and slender, and the vesica has 2–9 cornuti. The valva has a nearly straight costal margin, a long and shallow ventral emargination, a neck that is long and moderately broad (NR = 0.61), and an angulate saccular corner (SA = 127°). The dorsal lobe of the cucullus is weakly developed and broadly rounded; the ventral lobe is triangular and bears a ventrodistally projecting anal spine. In females, the papillae anales are densely setose, with long hairlike setae curving ventrally from the margins of the pads; the sterigma is Type III; the lamella postvaginalis has strongly developed posterolateral projections, a medial V-shaped indentation in the posterior margin, and a scattering of scales and setae flanking a weakly depressed central trough. The posterior margin of sternum 7 has a triangular projection that shields the ostium; the ductus bursae has a small sclerotized patch between the ductus seminalis and the constriction anterior to the ostium; and the corpus bursae has two signa, one considerably larger than the other. Males have similarities in genitalia with *P. argenteana* (species 147) and *P. corosana* (species 99), but females differ from these taxa in papillae anales Type (2 vs. 4 and 3).

We examined about 75 specimens from Alberta, Canada; Daggett County, Utah; and Albany County, Wyoming. All but four were collected in the high desert habitat surrounding Gelatt Lake, which is located about 15 miles WSW of Laramie, Wyoming. Adult capture dates range from 3 June to 24 July. The male-female association is conjectural. We have seen only one female (from Daggett County, Utah), and it was not collected in association with males. We tentatively refer it to this species based on its similarity to the males in forewing appearance.

## Section 3. Type 3 Papillae Anales.

### The *ridingsana* group (species 60–67)

We recognize eight species in this group that are remarkably similar in genitalia and, with the exception of *P. immaculana*, substantially similar in forewing pattern. Two new synonymies are proposed (*P. magnidicana* = *P. ridingsana*, and *P. betana* = *P. immaculana*), and *P. argentifurcatana* is resurrected from synonymy with *P. ridingsana* and applied to *ridingsana*-like specimens from eastern North America. Group characteristics include:

*Forewing* (excluding *P. immaculana*). Mean FWL: 9.0–14.4 mm; AR: 2.90–3.41; dorsal surface silvery white with golden-brown, dark-brown, or pinkish-red markings, the maculation including a subradial band with 1–3 branches extending to the costa/apex and a subcubital band with 1–3 bars connecting it to the subradial band; postmedian branch often bifurcated near costa; markings narrowly edged with black; inner margin with white streak from base to tornus; termen with thin salt-and-pepper-colored line from tornus to apex.

*Male genitalia*. Uncus moderately developed and clearly differentiated from dorsolateral shoulders of tegumen; socii fingerlike, tapering slightly toward apex; phallus long and narrow, with base loosely surrounded by anellus; vesica with 1–15 cornuti; valva with costal margin concave, ventral emargination shallow to moderate, NR = 0.51–0.64, SA = 138°–150°; cucullus with dorsal lobe moderately developed, distal margin convex and bearing 6–8 marginal spines, ventral lobe weakly developed and broadly rounded, medial surface coarsely setose.

*Female genitalia*. Sterigma intergrading between Types II and III, with membrane between ostium and sternum 7 usually folded into a ringlike structure that is not sclerotized; lamella postvaginalis rectangular to trapezoidal, with hairlike setae flanking a weakly depressed central trough; sternum 7 trapezoidal, with scaling uniform except for a band of densely packed scales along the concavely indented posterior margin; ductus bursae lacking sclerotization; corpus bursae with two signa of unequal size.

#### 60. *Pelochrista ridingsana* (Robinson, 1869)

(Plate T, 60a–i; Plate 27, 60a–i)

*Conchylis ridingsana* Robinson 1869:285.

*Paedisca ridingsana*: Fernald 1882:37.

*Eucosma ridingsana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:81; McDunnough 1939:45; Powell 1983:34;

Miller 1987:48; Brown 2005:326; Gilligan et al. 2008:103; Powell and Opler 2009:134.

*Pelochrista ridingsana*: Gilligan and Wright 2013b:326.

*Eucosma magnidicana* Heinrich 1923:83; McDunnough 1939:45; Powell 1983:34; Brown 2005:323; new synonymy.

*Pelochrista magnidicana*: Gilligan and Wright 2013b:323.

**Types.** *Conchylis rindingsana*. Holotype (Plate T:60a). ♂, Colorado Territory, James Ridings, ANSP. *Eucosma magnidicana*. Holotype (Plate T:60g). ♂, Southwest Colorado, slide CH 28 October 1920, AMNH.

Robinson (1869) described this species from a single male. The holotype was presumed lost by Heinrich (1923) and has been reported so by subsequent authors (Brown 2005; Gilligan and Wright 2013b). We believe the specimen illustrated in Plate T:60a is, in fact, the holotype. It resides in the ANSP and is listed



in the museum's type database. *Eucosma magnidicana* was described from a single *ridingsana*-like male with reddish-brown markings and especially large silvery white spots (Plate T:60g). Heinrich (1923) considered it nearest to *P. fernaldana*, but it lacks the pinkish color characteristic of that species. It more closely resembles the darker specimens of *P. ridingsana* (e.g., Plate T:60h), and its genitalia (Plate 27:60b) are indistinguishable from those of *P. ridingsana* males. Lacking any other examples of this somewhat unusual phenotype, we treat it here as a variant of *P. ridingsana*.

In *P. ridingsana* the median branch of the subradial band is usually absent, but some specimens appear to have a remnant of that maculational element in the form of a bulge on the costal margin of the band (e.g., Plate T:60f), and we discovered one specimen from Weld County, Colorado, in which the median branch is complete (Plate T:60d). The postmedian and apical branches are present, the former with or without a subcostal bifurcation, and the combination of the two often produce a conspicuous V-shaped mark in the subapical area. The median bar aligns with the apical branch, forming a relatively straight band from the base of CuP to the apex; the subbasal and postmedian bars are not expressed. Variation in the color of the markings includes orange brown (Plate T:60e), golden brown (Plate T:60a–d), reddish brown (Plate T:60h), and blackish brown (Plate T:60i), the last being associated with specimens from sandy habitat in coastal California.

*Pelochrista ridingsana* is sufficiently similar to *P. argentifurcatana* (species 61) and *P. griselda* (species 62) in forewing appearance that we are unable to separate the three species based on forewing pattern alone. *Pelochrista ridingsana* differs from *P. argentifurcatana* in size (mean FWL = 10.9 vs. 9.0 mm) and geographic distribution (primarily west vs. east of the Mississippi River) and from *P. griselda* in size (mean FWL = 10.9 vs. 12.7 mm) and flight period (July through October vs. late March through May). However, there is considerable overlap in FWL among the three species, and *P. ridingsana* may be sympatric with *P. argentifurcatana* in parts of the Midwest bordering the Mississippi River. Nevertheless, we find that most *ridingsana*-like specimens can be assigned with reasonable confidence to one or another of these three weakly differentiated species.

There are some subtle genitalia differences among the three species. In *P. griselda* the basal width of the uncus is about twice its height vs. nearly equal to its height in the other two taxa. *Pelochrista argentifurcatana* has a rectangular bulgelike protuberance on the medial surface of the valva at the distal margin of the basal excavation, a feature that is not present in *P. ridingsana* or *P. griselda*. The apex of the cucullus in *P. griselda* is somewhat more angulate than in the other two species. Females exhibit differences in the shape of the lamella postvaginalis: trapezoidal with posterior edge irregularly emarginated in *P. ridingsana*, rectangular and often with hornlike projections at the posterolateral corners in *P. argentifurcatana*, and trapezoidal with irregularly projecting posterior margin in *P. griselda*.

We examined more than 200 specimens that we refer to *P. ridingsana*. That material documents a range that extends from North Dakota to Texas, west to the Pacific Coast of the United States, and north into western Canada as far as the Yukon Territory. The root boring larva has been reared from several woody Asteraceae, including: *Heterotheca villosa* (Pursh) Shinners (hairy false goldenaster) by Clarke in southeastern Washington (Brown et al. 1983); *Gutierrezia* Lag. (snakeweed) by Hetz and Werner (1969) and by Powell and Opler (2006) in western Arizona; *Gutierrezia microcephala* (DC.) A. Gray (threadleaf snakeweed) by Powell and Opler (2006) in San Diego County, California; *Grindelia hirsutula* Hook. & Arn. (hairy gumweed) by Powell and Opler (2006) in Contra Costa County, California; *Corethrogyne filaginifolia* (Hook. & Arn.) Nutt. var. *californica* (DC.) J. P. Saroyan (California sandaster) by Powell and Opler (2006) in San Luis Obispo County, California; and *Isocoma menziesii* (Hook. & Arn.) G. L. Nesom (Menzies' goldenbush) by Powell and Opler (2006) in San Diego County, California.

**61. *Pelochrista argentifurcatana*** (Grote, 1876), revised status  
(Plate T, 61a–c; Plate 27, 61a–f)

*Conchylis argentifurcatana* Grote 1876:206; Fernald 1882:37 [synonym of *Paedisca ridingsana*].

*Pelochrista argentifurcatana*: Gilligan and Wright 2013b:326.

*Conchylis hipeana* Grote 1876:207; synonymy by Fernald 1882:37.

*Pelochrista hipeana*: Gilligan and Wright 2013b:326.

**Types.** *Conchylis argentifurcatana*. Lectotype (here designated). ♂, Canada, Ontario, Port Stanley, W. Saunders, USNM (abdomen missing). *Conchylis hipeana*. Holotype. ♀, Canada, Ontario, Port Stanley, W. Saunders, USNM.

Grote (1876) described *C. argentifurcatana* from two syntypes whose depositories were reported as unknown by Heinrich (1923). One specimen with appropriate data was later discovered at the USNM and was reported as a syntype by Brown (2000). That specimen is designated here as the lectotype. It has a label with the inscription “London, Ont., W. Saunders,” which suggests that the specimen was collected at London, Ontario, but Grote’s (1876) statement “from W. Saunders, London, Ont.; taken at Port Stanley, Ont.” indicates that the type locality is Port Stanley and that Saunders resided at London, Ontario. Grote (1876) also proposed the name *C. hipeana* for a single female with the same collection data as that of the syntypes of *C. argentifurcatana*. The distinctions he observed between the two species were implicitly attributed to intraspecific variation by Fernald (1882) when he treated both names as synonyms of *P. ridingsana*. This specimen has been reported previously as a male by Brown (2005) and Gilligan and Wright (2013b). The *ridingsana*-like specimens from eastern North America more closely resemble the lectotype of *C. argentifurcatana* than the holotype of *P. ridingsana*, and we find the subtle differences between the two taxa to be sufficient to recognize two species with eastern and western distributions, respectively, hence the reinstatement of *P. argentifurcatana*.

*Pelochrista argentifurcatana* is the smallest member of the *ridingsana* group (mean FWL = 9.0 vs. 10.9–14.4 mm). In most males that we examined the subradial band is interrupted at the distal end of the costal fold (Plate T:61a–b), but there are a few specimens from Illinois in which that element is complete. We found that band to be complete in all females except one from Southern Pines, North Carolina. All of the females (Plate T:61c) and none of the males (Plate T:61a, b) have a median branch extending to mid-costa, and both males and females have a bifurcated postmedian branch. A complete subbasal bar was present in only one specimen (Plate T:61c), a female from Lowndes County, Mississippi. In all the other specimens that bar was either absent (Plate T:61a) or partially expressed (Plate T:61b).

Distinctive genitalia characteristics include: a conspicuous rectangular protuberance on the medial surface of the valva at the distal margin of the basal excavation, a valval neck that is rather short compared to other members of the group, and a lamella postvaginalis with parallel lateral margins and hornlike projections at the posterolateral corners. The last feature is not unique to this species; we also observed it in a population of *P. ridingsana* in Coconino County, Arizona.

We examined specimens from Ontario, Arkansas, Illinois, Louisiana, Massachusetts, Mississippi, New Jersey, and North Carolina. This species has been collected in remnant grasslands east of the Mississippi River and in various Atlantic coastal locations, including Martha’s Vineyard and Nantucket Island, Massachusetts and Southern Pines, North Carolina. Adult capture dates range from 30 July (Putnam County, Illinois) to 1 October (Lowndes County, Mississippi).

## 62. *Pelochrista griselda* (Blanchard and Knudson, 1981)

(Plate T, 62a–c; Plate 27, 62a–e)

*Eucosma griselda* Blanchard and Knudson 1981b:173; Brown 2005:321.

*Pelochrista griselda*: Gilligan and Wright 2013b:321.

**Holotype** (Plate T:62a). ♂, Texas, Brewster County, Chisos Basin, Big Bend National Park, A. and M. E. Blanchard, 7 April 1967, USNM.

This is the second largest member of the group (mean FWL = 12.7 mm), exceeded only by *P. aurilineana* (mean FWL = 14.4 mm). It is the only member of the group that flies in the spring. It most closely resembles *P. ridingsana* in forewing appearance and sometimes cannot be separated from large individuals of that species in the southern Great Plains without referring to flight period.

In *P. griselda* the median branch of the subradial band is absent in males (Plate T:62a) and present to partially expressed in females (Plate T:62b–c). In all individuals, the postmedian branch lacks a subcostal bifurcation, and the subbasal bar is absent. There seem to be subtle unquantified differences between *P. griselda* and *P. ridingsana* in the size and shape of the silvery forewing spots, but these features vary considerably in the latter species and are probably not reliable for diagnostic purposes (e.g., Plate T:60e, h vs. Plate T:62a).

Distinctive genitalia characters include: the basal width of the uncus is conspicuously larger than the height, the apex of the cucullus is somewhat angular, the lamella postvaginalis is trapezoidal with an irregularly projecting posterior margin, and the setation of the lamella postvaginalis includes rows of long hairlike setae flanking the central trough.

We examined the holotype and 22 paratypes from far western Texas (Culberson and Jeff Davis counties and Big Bend National Park) and six females from southeastern Arizona (Cochise County). Adult capture dates range from 28 March to 2 June.

## 63. *Pelochrista fernaldana* (Grote, 1880)

(Plate U, 63a–f; Plate 28, 63a–i)

*Paedisca fernaldana* Grote 1880:98.

*Eucosma fernaldana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:82; McDunnough 1939:45; Powell 1983:34; Brown 2005:319; Powell and Opler 2009:134.

*Pelochrista fernaldana*: Gilligan and Wright 2013b:320.

**Holotype**. ♂, Colorado, USNM.

Grote's (1880) description of *P. fernaldana* identifies the type locality as Colorado but provides no indication of how many specimens he examined. The name bearing specimen reported here has been interpreted previously as a syntype (Brown 2005; Gilligan and Wright 2013b). It bears a white "Col." locality label, a red-bordered determination label with the inscription "*Paedisca fernaldana* Type Grote," and a yellow "Fernald Collection" label. We have encountered no other syntypes, hence the interpretation of this specimen as a holotype.

The only substantial difference between *P. fernaldana* and *P. ridingsana* is the color of the forewing markings, pinkish red vs. golden brown to dark brown, but even that distinction is not always clear. Some pale specimens of what we consider to be *P. ridingsana* have light pinkish tints, and occasionally the color seems to vary with the inclination of the reflected light. We sequenced cytochrome c oxidase (COI) for distinctive representatives of the two species and for individuals with intermediate coloration, and

we found that sequence similarity for this single gene does not correlate with forewing color or current species boundaries. Nevertheless, most specimens can be assigned readily to one or the other taxon based on forewing color, and we retain both names in order to recognize that distinction until a more detailed genetic analysis is conducted.

Females exhibit both the trapezoidal lamella postvaginalis (Plate 28:63h, i) that is typical of *P. ridingsana* and a more rectangular form (Plate 28:63g) that we associate with *P. argentifurcatana*. In the latter case, however, the posterior margin is relatively straight and lacks hornlike developments at the posterolateral corners. We found no stable male genitalia differences between *P. fernaldana* and *P. ridingsana*.

We examined more than 100 specimens from Conejos, Ebert, Fremont, Gilpin, and Hinsdale counties, Colorado; Carter County, Montana; and Albany County, Wyoming. Adult capture dates range from 26 July to 8 September.

#### **64. *Pelochrista immaculana* (Kearfott, 1907)**

(Plate U, 64a–i; Plate 28, 64a–g)

*Eucosma immaculana* Kearfott 1907b:35; Barnes and McDunnough 1917:169; Heinrich 1923:102; McDunnough 1939:46; Powell 1983:34; Brown 2005:322.

*Pelochrista immaculana*: Gilligan and Wright 2013b:322.

*Eucosma betana* McDunnough 1942:68; Powell 1983:34; Brown 2005:316; new synonymy.

*Pelochrista betana*: Gilligan and Wright 2013b:317.

**Types.** *Eucosma immaculana*. Lectotype (designated by Heinrich 1923). ♀, Washington, Pullman, C. V. Piper, 10 August 1898, AMNH. *Eucosma betana*. Holotype (Plate U:64f). ♂, Canada, Saskatchewan, Swift Current, A. R. Brooks, 24 August 1939, slide TOR 4226, CNC.

Kearfott's (1907b) statement about the number of syntypes, "Four specimens: two male and three female," is self contradictory. Nevertheless, there is exactly one syntype in the AMNH, so Heinrich's (1923) remarks about the "Type" constitute a lectotype designation. We found two male syntypes in the USNM. *Pelochrista betana* was described from a single specimen that does not differ substantially from pinkish specimens of *P. immaculana*.

*Pelochrista immaculana* is a medium-sized species (mean FWL = 12.0 mm) with an unmarked forewing that is pale brown, brownish yellow, or pale pink, often with a mixture of those tints. The specimens illustrated in Plate (U:64g–i) are representative of a number of individuals we examined with *immaculana*-like coloration and faint indications of a *ridingsana*/*fernaldana*-like forewing pattern. We tentatively refer them here to *P. immaculana* based on color and the lack of distinguishing genitalia characteristics. We found no genitalic features that would reliably distinguish *P. immaculana* from *P. ridingsana* or *P. fernaldana*. It appears that these three taxa are quite closely related and might, in fact, hybridize.

This species is poorly represented in collections. We examined 14 typical specimens from Saskatchewan, Utah, Washington, and Wyoming with capture dates between 24 July and 24 August. The specimens with *ridingsana*-like maculation were collected in Grand County, Colorado; Malheur County, Oregon; Uintah County, Utah; and Albany County, Wyoming between 29 June and 4 September.

#### **65. *Pelochrista aurilineana* (Ferris, 2005)**

(Plate V, 65a–d; Plate 29, 65a–e)

*Eucosma aurilineana* Ferris 2005:2.

*Pelochrista aurilineana*: Gilligan and Wright 2013b:317.

**Holotype.** ♂, Wyoming, Albany County, 1 mi SE of Laramie, 41.2981° N, 105.5253° W, 7,499 feet, C. D. Ferris, 10 September 2004, USNM.

*Pelochrista aurilineana* is the largest member of the group (mean FWL = 14.4 vs. 9.0–12.7 mm). It most closely resembles *P. ridingsana* in forewing color and maculation but lacks a postmedian branch and has instead a series of 3–4 elongate marks on the distal two-thirds of the costa.

Genitalia characteristics distinguishing *P. aurilineana* from other members of the group include: fewer cornuti (1–2 vs. 3–15), a more strongly developed ventral lobe of the cucullus, a more U-shaped sterigma, and a more clearly defined lamella antevaginalis.

We examined specimens from Modoc County, California; Uintah County, Utah; and Albany County, Wyoming. Ferris (2005) reported specimens from Mohave County, Arizona; Mono County, California; and Humboldt County, Nevada. Adults fly from the end of July to mid-September. Powell and Opler (2006) reported rearing one specimen in Mono County, California from a larva boring in roots of *Chrysothamnus viscidiflorus* (Hook.) Nutt. (yellow rabbitbrush).

The ***sandiego-atascosana* subgroup** (species 66–67). The next two species have genitalia that are typical of *P. ridingsana* and its cohorts, but they present a slightly more complicated forewing pattern. In addition to the full complement of bands, bars, and branches illustrated in Figure A4, they often have a short branch from the postmedian bar to the termen that produces two small white spots near the tornus.

## **66. *Pelochrista sandiego*** (Kearfott, 1908)

(Plate V, 66a–f; Plate 29, 66a–d)

*Eucosma sandiego* Kearfott 1908:172; Barnes and McDunnough 1917:169; Heinrich 1923:84; McDunnough 1939:45; Powell 1983:34;

Powell and Opler 2006:191; Brown 2005:327.

*Eucosma sandiegana* Meyrick 1912:34, unnecessary replacement name for *sandiego*.

*Pelochrista sandiego*: Gilligan and Wright 2013b:327.

**Lectotype** (here designated, Plate V:66a). ♂, California, San Diego, G. H. Field, 15 September, slide 70197, USNM.

Kearfott (1908) based *P. sandiego* on four syntypes from southern California. Three (2 ♂, 1 ♀) were collected in September by George H. Field at San Diego and currently reside in the USNM; the fourth is a female that, according to Kearfott (1908), was collected in April at “Walters St., California.” Heinrich (1923) referred to a “Type” from San Diego that was deposited in the AMNH, but Klotz (1942) reported that the only syntype in the AMNH is the female from “Walters St.” and that Heinrich was mistaken about the disposition of the “lectotype.” Given these circumstances, we designate as lectotype the male syntype in the USNM whose genitalia were illustrated by Heinrich (1923: fig. 181).

The dominant forewing color is orange brown (Plate V:66a–d) or yellow brown (Plate V:66e–f), the latter phenotype associated with a pale desert race mentioned by Powell and Opler (2006). The postmedian branch is bifurcated, and the proximal portion is usually fused with the median branch at the costa; the subradial band is sometimes interrupted/constricted in the subbasal area (Plate V:66b–c); and the three bars connecting the subradial and subcubital bands are complete. The maculational elements are wider and less clearly defined than in *P. atascosana*, and the silvery spots are correspondingly smaller.

Although the genitalia of *P. sandiego* are virtually identical to those of *P. atascosana*, we did find a potential difference between the two species in the number of cornuti in the vesica. Nine genitalia



preparations (six of *P. sandiego* and three of *P. atascosana*) revealed of 3–6 in the former species and 9–11 in the latter.

*Pelochrista sandiego* appears to be restricted to southern California. We examined specimens from Los Angeles, Orange, San Bernardino, and San Diego counties. Powell and Opler (2006) reared adults from larvae boring in roots of *Isocoma acradenia* (Greene) Greene (alkali goldenbush) and *Isocoma menziesii* (Hook. & Arn.) G. L. Nesom (Menzies' goldenbush) in Kern and San Diego counties, respectively. Adult capture dates range from mid-August to mid-October.

## **67. *Pelochrista atascosana* (Blanchard, 1980)**

(Plate V, 67a–e; Plate 29, 67a–d)

*Eucosma atascosana* Blanchard 1979 [1980]:212; Brown 2005:315.

*Pelochrista atascosana*: Gilligan and Wright 2013b:317.

**Holotype** (Plate V:67a, Plate 29:67a). ♂, Texas, Cameron County, Laguna Atascosa National Wildlife Refuge, A. and M. E. Blanchard, 22 November 1973, slide 69756, USNM.

*Pelochrista atascosana* is slightly smaller than *P. sandiego* (mean FWL = 11.1 vs. 12.0 mm) but is similar to that taxon in forewing appearance. The two species differ in the size and shape of the white forewing spots; those in *P. atascosana* are conspicuously bolder, with somewhat smoother margins. Moreover, the subradial band is complete in *P. atascosana* and often interrupted in the subbasal area in *P. sandiego*. We found no differences in genitalia between these two species except, perhaps, the number of cornuti in the vesica (9–11 in *P. atascosana*, 3–6 in *P. sandiego*). The ranges of the two insects appear to be disjunct. *Pelochrista atascosana* is known only from southern Texas, and *P. sandiego* seems to be restricted to southern California.

We examined the holotype and 12 paratypes, all of which were collected in Cameron County (at the southern extremity of Texas) or San Patricio County (just north of Corpus Christi, Texas). Capture dates range from 9 September to 13 November.

## **The *luridana* group (species 68–77)**

The *luridana* group is comprised of ten medium to large species (mean FWL: 8.5–14.7 mm) that are similar in genitalia but diverse in forewing appearance. We recognize three subgroups based on similarity in forewing color and maculation. Shared genitalia characteristics include:

*Male genitalia.* Uncus well developed and clearly differentiated from dorsolateral shoulders of tegumen; socii long and fingerlike; phallus tapering distally, with base loosely surrounded by anellus; vesica with cluster of cornuti (except in *P. invicta*); valva with costal margin concave, ventral emargination weak to moderate, NR: 0.55–0.78, SA: 141–160°; cucullus with dorsal lobe strongly developed, apex rounded to somewhat angular, distal margin convex to nearly straight, ventral lobe weakly developed, anal angle rounded, setae of medial surface fine to moderately stout.

*Female genitalia.* Length of ventral opening about  $2/3$ – $3/4$  × length of pads; sterigma Type II; lamella postvaginalis widening posteriorly, with central trough weakly depressed and flanked by hairlike setae that extend in bands on the intersegmental membrane to the ventral extremities of tergum 8; sternum 7 rectangular to somewhat trapezoidal, with posterior margin concave; ductus bursae lacking sclerotization (except in *E. luridana* and *E. eburata*); corpus bursae with two signa, one larger than the other.

## 68. *Pelochrista luridana* (Walsingham, 1879)

(Plate W, 68a–g; Plate 30, 68a–h)

*Paedisca luridana* Walsingham 1879:44; Fernald 1882:37.

*Eucosma luridana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:100; McDunnough 1939:46; Powell 1983:34; Brown 2005:323.

*Pelochrista luridana*: Gilligan and Wright 2013b:323.

**Lectotype** (here designated, Plate W:68a). ♂, California, Siskiyou County, Bulls Meadow, Walsingham, 6–7 September 1871, BMNH(E) 819874, slide 11503, BMNH.

This species was described from two males collected by Walsingham in 1871. The specimen designated here as the lectotype was selected and labeled as such by Obraztsov. The collection data are taken from the specimen labels and include more detail than was mentioned in the description.

Most specimens of *P. luridana* have a nearly unicolorous forewing (pale brownish yellow to salmon) with a weakly expressed dark line on the cubitus from the base to the origin of  $CuA_2$  and sometimes with a narrow salt-and-pepper-colored band along the termen (Plate W:68b–d). Faint indications of a subbasal and/or median fascia are often discernable in the form of darker shades of the forewing color. The specimens illustrated in Plate W:68f–g are representative of a series of males collected in Grand County, Colorado at an elevation of about 8,000 feet. They are darker and more strongly marked than typical *P. luridana* but are similar to that species in size and genitalia. We have not seen any females from this population, but we tentatively refer these specimens to *P. luridana* based on male characters. Mean FWL = 9.1 mm; AR = 3.10.

In males, the vesica has 1–8 cornuti, NR = 0.60, SA = 141°, and the cucullus has a series of 4–8 marginal spines on the ventral two-thirds of the distal margin. In females, the sterigma is somewhat triangular (length of posterior margin about 2 × ostium diameter), and the ductus bursae has a small sclerotized patch near the juncture with the ductus seminalis.

We examined specimens from California, Colorado, Idaho, Nevada, Oregon, and Utah, most of which were collected in July or early August at elevations of 3,300–5,000 feet.

The ***totana-taosana* subgroup** (species 69–70). According to specimen labels in the USNM, Heinrich considered *P. taosana* to be a dark form of *P. totana*. Wright (2005) recognized *P. taosana* as a distinct species based primarily on differences in maculation. Shared forewing characteristics include:

**Forewing.** Forewing medium in length (mean FWL = 9.9, 8.5 mm) and somewhat narrow (AR = 3.16, 3.19); markings brown, including a subbasal spot on the cubitus, a fragmented median fascia comprised of a narrow dash at mid-costa, a triangular mark based on  $CuA_2$ , and, in *P. totana*, a chevron-shaped mark at the distal end of the cell, and a narrow postmedian band that arches along the costodistal margin of the ocellus; ocellus conspicuous, with pinkish-gray bars on the lateral margins; costal strigulae from mid-wing to apex whitish, prominent, and delimited by small brown marks and striae; termen with a narrow salt-and-pepper-colored band from tornus to apex.

## 69. *Pelochrista totana* (Kearfott, 1907)

(Plate W, 69a–e; Plate 30, 69a–h)

*Eucosma totana* Kearfott 1907b:32; Barnes and McDunnough 1917:169; Heinrich 1923:108; McDunnough 1939:46; Powell 1983:34; Brown 2005:328; Wright 2005:125.

*Pelochrista totana*: Gilligan and Wright 2013b:328.

*Eucosma spodias* Meyrick 1912:35, unnecessary replacement name for *totana*.

**Lectotype** (designated by Heinrich 1923). ♂, South Utah, O. C. Poling, July 1900, slide CH 2 Dec 1919, AMNH.

Kearfott (1907b) mentioned five syntypes, some collected by Tom Spalding at Stockton, Utah, the rest by O. C. Poling in “South Utah.” Heinrich (1923) illustrated the genitalia of a male that he called the “Type,” thereby designating a unique name-bearing specimen. It is the only syntype we found from “South Utah.” We located four specimens (3 ♂ in the USNM, 1 ♀ in the AMNH) from Stockton, Utah that we believe to be the other syntypes. One of the males is *E. totana*, two are *E. taosana*, and the female is not *P. totana* but is otherwise undetermined. This differs somewhat from Heinrich’s (1923) findings in that he considered none of the four paralectotypes to be conspecific with *E. totana*.

*Pelochrista totana* is a medium-sized species (mean FWL = 9.9 mm) with blackish-brown to orange-brown forewing markings and gray-brown to yellow-brown interfascial areas. It differs from *P. taosana* in the following respects: it has a thin dark line from the base to the tornus that follows the cubitus and CuA<sub>2</sub> (absent in *P. taosana*), the median fascia includes a chevron-shaped component at the distal end of the cell (absent in *P. taosana*), and it lacks the conspicuous orange-brown longitudinal lines (one along the costa, the other along A<sub>1+2</sub>) that are characteristic of *P. taosana*. Other species with similar forewing appearance include *P. popana* (species 89) and *P. powelli* (species 90), two taxa that are readily distinguished from *P. totana* by genitalia.

In males, the uncus is triangular, with a distinctive wedge-shaped medial ridge on the ventral surface, and the distal margin of the cucullus has 8–10 marginal spines that are not substantially stouter than the adjacent setae on the medial surface. In females, the lamella postvaginalis is nearly rectangular, with the width at the posterior margin about twice the ostium diameter, and the ductus bursae lacks sclerotization.

We examined specimens from Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, and Wyoming. The USNM has a specimen collected by W. F. Barr in Lincoln County, Idaho from *Ericameria nauseosa* (Pall. ex Pursh) G. L. Nesom & Baird (rubber rabbitbush) (reported by Brown et al. 1983). This species is often abundant in open sagebrush habitat at elevations between 5,000 and 8,000 feet. Nearly all of the adults we examined were collected in July or August, but a couple of the Arizona specimens have October capture dates.

## **70. *Pelochrista taosana* (Wright, 2005)**

(Plate W, 70a–c; Plate 30, 70a–d)

*Eucosma taosana* Wright 2005:130.

*Pelochrista taosana*: Gilligan and Wright 2013b:328.

**Holotype.** ♂, New Mexico, Taos County, S side of US 64, 10 mi SE of Tres Piedres, 7,550 feet, 36.5750° N, 105.8033° W, D. J. Wright, 11 August 1999, slide 124075, USNM.

*Pelochrista taosana* is similar to *P. totana* but is slightly smaller (mean FWL = 8.5 vs. 9.9 mm). It has brown interfascial areas, an orange-brown subcostal streak from base to apex, and a thin orange-brown streak along A<sub>1+2</sub>, features that distinguish it from *P. totana*. Moreover, it lacks the chevron-shaped mark at the distal end of the cell that is typical of the latter species. The male genitalia differ from those of *P. totana* in that the ventral surface of the uncus lacks a medial ridge, the vesica has 1–5 vs. 7–12 cornuti, and the valva tapers slightly from base to neck. The female is unknown.

We examined 31 males from Apache County, Arizona; Luna, McKinley, and Taos counties, New Mexico; Tooele County, Utah; and Albany County, Wyoming. Adults have been collected from late June to the end of August.

The *larana-nordini-piperata* subgroup (species 71–73). The members of this subgroup are medium in size (mean FWL: 10.1–11.7 mm) and are associated primarily on the basis of their overall whitish appearance. Well-marked specimens are easily recognized by forewing maculation, but there are nearly immaculate phenotypes of each species that can be difficult to identify without dissection.

## 71. *Pelochrista larana* (Walsingham, 1879)

(Plate X, 71a–e; Plate 31, 71a–g)

*Paedisca larana* Walsingham 1879:43; Fernald 1882:37.

*Eucosma larana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:110; McDunnough 1939:47; Powell 1983:34; Brown 2005:322; Wright 2005:124.

*Pelochrista larana*: Gilligan and Wright 2013b:323.

**Lectotype** (designated by Wright 2005). ♂, California, Siskiyou County, Sheep Rock, Walsingham, 3 September 1871, BMNH(E) 819919, slide 11502, BMNH.

*Pelochrista larana* was described from three syntypes (2 ♂, 1 ♀) that are deposited in the BMNH. The lectotype was selected by Obraztsov and designated by Wright (2005). Heinrich (1923) confused this species with *P. emaciatana* (Walsingham), but his illustration of the male genitalia (Heinrich 1923: fig. 197) is based on a correctly identified specimen of *P. larana* (Wright 2005).

The creamy white forewing is variably suffused with brownish yellow and pale gray, often resulting in a mottled appearance. Well-marked specimens (Plate X:71d–e) have a semifasciate forewing pattern featuring brownish-yellow/grayish blotches. In all phenotypes the ocellus is obscure but usually marked by a couple of black dots in the central field, and the costal strigulae are weakly defined by small gray marks and brownish-yellow striae. The images in Plate X:71b–c depict a pale phenotype from southern Idaho (elevation 5,000 feet) in which the markings are barely discernable; the more strongly marked specimens in Plate X:71d–e are from southeast Wyoming (elevation 7,500 feet).

Males are distinguished from those of *P. nordini* and *P. piperata* by subtle aspects of valva shape. The ventral emargination is slightly deeper (NR = 0.66 vs. 0.78 and 0.71, respectively), the apex of the cucullus is more evenly rounded, and the distal margin of the cucullus is nearly straight. In females, the sterigma has more strongly developed lateral projections than in *P. nordini* (width at the posterior margin about 2.5 vs. 1.5 × ostium diameter), and it differs from the sterigma of *P. piperata* in the absence of scales flanking the central trough. The signa in *P. larana* and *P. nordini* are similar, the smaller greatly reduced and pinlike; in *P. piperata* they are nearly equal in size.

We examined material from northern California, southern Idaho, central Utah, and southeast Wyoming. Adults fly from early July to the beginning of September at elevations of 5,000–8,000 feet.

## 72. *Pelochrista nordini* (Wright, 2005)

(Plate X, 72a–c; Plate 31, 72a–f)

*Eucosma nordini* Wright 2005:129.

*Pelochrista nordini*: Gilligan and Wright 2013b:325.

**Holotype**. ♂, Wyoming, Albany County, Medicine Bow National Forest, 11.5 mi SE of Laramie, Junction of Forest Roads 707 and 705, 8,220 feet, 41.1958° N, 105.3950° W, D. J. Wright, slide 124072, USNM.

*Pelochrista nordini* is an immaculate yellowish-white species, the forewing marked only by a pale gray streak on the costal fold. It is readily separated from most specimens of *P. larana* and *P. piperata* by its lack of forewing mottling/speckling but is barely distinguishable in that respect from the uniformly white phenotype of the last species (Plate X:73d). Mean FWL = 11.7 mm.

In males, the uncus is somewhat triangular, the ventral emargination of the valva is shallow (NR = 0.78), and the cucullus is larger than in the other members of this subgroup. In females, the sterigma is distinctly U-shaped, with the lateral projections of the lamella postvaginalis less strongly produced than in *P. larana* and *P. piperata* (length of the posterior margin about 1.5 vs. greater than 2 × ostium diameter). A lack of scales on the lamella postvaginalis and the conspicuous size difference between the two signa also distinguish *P. nordini* from *P. piperata*.

The specimens we examined were collected at elevations of 6,400–9,600 feet in Chaffee County, Colorado; Gallatin County, Montana; and Albany, Teton, and Washakie counties, Wyoming. Adults fly from late July through August.

### 73. *Pelochrista piperata* (Wright, 2005)

(Plate X, 73a–d; Plate 32, 73a–e)

*Eucosma piperata* Wright 2005:129.

*Pelochrista piperata*: Gilligan and Wright 2013b:326.

**Holotype.** ♂, Utah, Utah County, Vineyard, T. Spalding, 9 July 1912, slide 70391, USNM.

*Pelochrista piperata* is a predominantly white species of medium size (mean FWL = 11.6 mm). The forewing has fine black speckling that varies from conspicuous (Plate X:73a–b) to absent (Plate X:73d), and the distal one-half of the costa has 3–4 small brownish-gray marks separating otherwise undetectable strigulae. A prominent brownish apical dash is present in all but the most immaculate specimens, but even those exhibit a discernable fragment of that mark (Plate X:73d). In well-marked specimens the fringe has a pale orange-brown tint. As in *P. nordini*, males have a pale gray-brown streak on the costal fold.

Males have a weakly developed transverse ridge on the ventral surface of the uncus, a feature that apparently is absent in the other two members of the subgroup. The apex of the cucullus is more angulate than in *E. larana* and never flattened/truncate as is often the case in *E. nordini*. The sterigma has a semicircular anterior margin and a mixture of scales and setae flanking the central trough. The two signa are more robust than in *P. larana* and *P. nordini*, and neither is pinlike.

This species seems to be restricted to the Great Basin, where we have collected it in open sage brush habitat. We examined specimens from Arizona, east central California, southern Idaho, Nevada, eastern Oregon, and Utah. One specimen was collected in mid-June; the others from 3–23 July.

The ***eburata-invicta-subinvicta-snyderana* subgroup** (species 74–77). The next four species are moderately large (mean FWL: 11.9–14.7 mm) and similar in genitalia and forewing pattern. Shared forewing characteristics include:

*Forewing.* Interfascial areas generally white, with varying amounts of gray and/or brown suffusion; subbasal and median fasciae brown and/or gray, variably expressed, and often vaguely defined; white interfascial spot on inner margin often conspicuous; costal strigulae and terminal strigulae whitish and variably expressed; ocellus obscure but detectable, often with a transverse line of black dots along distal margin.



#### 74. *Pelochrista eburata* (Heinrich, 1929)

(Plate X, 74a–c; Plate 32, 74a–f)

*Eucosma eburata* Heinrich 1929:6; McDunnough 1939:46; Powell 1983:34; Brown 2005:319.

*Pelochrista eburata*: Gilligan and Wright 2013b:320.

*Eucosma williamsi* Powell 1963:237; Powell 1983:34; Brown 2005:328; Powell and Opler 2009:134; new synonymy.

*Pelochrista williamsi*: Gilligan and Wright 2013b:329.

**Types.** *Eucosma eburata*. Holotype. ♂, Arizona, Mojave County, 24–31 August, slide 72788, USNM. *Eucosma williamsi*. Holotype. ♂, California, Alameda County, Oakland Hills, Leona Heights, 29 July 1909, F. X. Williams, CAS.

Heinrich (1929) described *P. eburata* from four specimens (1 ♂, 3 ♀) collected in Mojave County, Arizona. He labeled the male as “TYPE,” illustrated its genitalia, and labeled the females as paratypes. Two of the paratypes are in the USNM, the third in the AMNH. The holotype is in poor condition. Its forewings are worn and faded to the extent that the color and maculation cannot be accurately assessed. Its genitalia are indistinguishable from those of *P. williamsi*, and the genitalia of females of the two species are also identical, hence the new synonymy.

The interfascial areas are white with extensive gray suffusion; the markings are brown to blackish brown, often partially gray, and usually not sharply defined. The subbasal fascia is represented by a transverse band that is sometimes interrupted on the radius and/or  $A_{1+2}$ . It is heavily suffused with gray, and its distal margin is variably edged with black. The median fascia consists of an obscure mark at mid-costa and a large rectangular pretornal mark, the two usually separated by grayish scaling on the radius. The subapical area has a brown spot with black edges, the edges merging into a series of black dots on the distal margin of the ocellus. The costal strigulae beyond the median fascia are whitish and generally well defined. The forewing color and maculation are similar to those of *P. invicta*. In both species the head is brown, a feature that reliably separates them from *P. subinvicta* and *P. snyderana*. Mean FWL = 11.9 mm.

The male genitalia differ from those of other members of the subgroup in that the valva is somewhat spatulate, and the neck is more strongly constricted (NR = 0.55 vs. 0.68–0.73). In females, the lamella postvaginalis has a mixture of scales and setae flanking the central trough (absent in *P. invicta* and *P. subinvicta*), the ductus bursae has a lightly sclerotized patch and some weakly developed microtrichia on the inner surface near the ductus seminalis (absent in *P. invicta* and *P. subinvicta*), and the corpus bursae usually has two signa, one moderate in size, the other minute (sometimes absent) vs. two signa of nearly equal size in other subgroup members.

The range of *P. eburata* includes Mojave County in west central Arizona (the type locality) and most of coastal California, with many records from San Francisco south to San Diego. The type series of *P. williamsi* was reared by F. X. Williams in Alameda County, California from larvae boring in roots of *Baccharis pilularis* DC. (coyotebrush) (Powell 1963), and additional rearings from the same host have been reported from San Luis Obispo, San Mateo, and Santa Barbara counties, California (Powell and Opler 2006). The adult flight period extends from late June to early October, with the majority of collections in July and August.

#### 75. *Pelochrista invicta* (Walsingham, 1895)

(Plate Y, 75a–e; Plate 33, 75a–d)

*Paedisca invicta* Walsingham 1895:509.

*Eucosma invicta*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:107; McDunnough 1939:46; Powell 1983:34; Brown 2005:322; Wright 2007:44.

*Pelochrista invicta*: Gilligan and Wright 2013b:322.

**Lectotype** (designated by Wright 2007, Plate Y:75a). ♂, Colorado, Larimer County, 5,000 feet, W. G. Smith, July 1891, BMNH(E) 819935, slide 11574, BMNH.

Walsingham (1895) did not report the number of syntypes but explicitly mentioned both sexes. Obratzsov's unpublished notes refer to a male lectotype and eight male specimens, all with the same data. We examined two syntypes, the lectotype (selected and labelled by Obratzsov) and another male that had been labelled mistakenly as a female by Walsingham.

In typical *P. invicta*, the interfascial spot on the inner margin is white with varying amounts of pale reddish-brown suffusion. The subbasal fascia is represented by a relatively broad gray/brown band from the inner margin to the cell that is separated from the interfascial spot by a thin black line; the median fascia is an obscure and sometimes fragmented grayish-brown band that borders the distal margin of the interfascial spot. The subterminal area has a series of black dots from the tornus to  $R_5$  that splits on  $M_3$  to form two series that enclose an elongate brownish subapical spot. Plate Y:75e shows a particularly pale phenotype in which the maculation is reduced to some black speckling on a nearly all white ground. Such specimens can be confused with pale forms of *P. subinvicta* (e.g., Plate Y:76d), but all phenotypes of *P. invicta* are reliably separated from *P. subinvicta* by head color (reddish brown vs. white), an observation made by Kearfott (1907b).

In males, the uncus has a relatively broad base, the socii are uniform in width and curve medially, the vesica lacks cornuti but has two small sclerotized bars near the distal end of the phallus, and the apex of the cucullus is more semicircular than in other members of the subgroup. Females lack scales on the sterigma (distinguishing them from *P. eburata* and *P. snyderana*) and microtrichia on the inner surface of the ductus bursae (distinguishing them from *P. subinvicta*). They also differ from *P. eburata* in having two signa of nearly equal size in the corpus bursae.

We examined specimens from Alberta, Saskatchewan, California, Colorado, western Kansas, Montana, Nevada, New Mexico, Utah, and Wyoming. Most were collected in August and September, but a few have capture dates in June and July, and one individual in the AMNH from Denver, Colorado is dated 11 April.

## **76. *Pelochrista subinvicta* (Kearfott, 1907)**

(Plate Y, 76a–e; Plate 33, 76a–d)

*Eucosma subinvicta* Kearfott 1907b:33; Barnes and McDunnough 1917:171; Heinrich 1923:107; McDunnough 1939:46; Powell 1983:34; Brown 2005:327; Wright 2007:45.

*Pelochrista subinvicta*: Gilligan and Wright 2013b:328.

**Holotype** (Plate Y:76a). ♀, Arizona, Coconino County, Williams, slide DJW 1547, AMNH.

Kearfott (1907) reported the type locality as Williams, Arizona but did not indicate the number or sex of the syntypes. He stated that the “type” was in his collection and that there were other specimens in the USNM. Heinrich (1923) mentioned two females from Williams, Arizona in the USNM and a female “Type” in the AMNH. The specimen in the AMNH has since been interpreted as the holotype.

The forewing pattern is similar to that of *P. invicta*, but the fasciae are gray with little or no brown suffusion, and the interfascial spot on the inner margin is pure white. In dark specimens (Plate Y:76a–b) the subbasal and median fasciae are complete but often vaguely defined; in pale specimens (Plate Y:76c–e) these markings are reduced and often fragmented into one or more pale gray blotches. All phenotypes have a white head, which separates them from *P. invicta* and *P. eburata*.

In males, the ventral surface of the uncus is developed into a buttelike projection, the socii are broad medially and taper basally and distally, the vesica has 7–18 cornuti, and the dorsal lobe of the cucullus

is strongly developed. In females, the sterigma is U-shaped, scaleless, and has relatively few setae on the posterolateral corners of lamella postvaginalis, and the inner surface of the ductus bursae has microtrichia near the ductus seminalis.

We examined specimens from Coconino County, Arizona; Lassen, Los Angeles, Modoc, Mono, Plumas, Riverside, and San Bernardino counties, California; and Garfield, Juab, Kane, and Washington counties, Utah. Most were collected in July or August. In the USNM there are two series of specimens from Glendora, California, one collected in May, the other in September, suggesting that this species may be double brooded in southern California.

## **77. *Pelochrista snyderana* (Kearfott, 1907)**

(Plate Y, 77a–c; Plate 33, 77a–d)

*Eucosma snyderana* Kearfott 1907b:89; Barnes and McDunnough 1917:171; Heinrich 1923:107; McDunnough 1939:46; Powell 1983:34; Brown 2005:327; Wright 2007:42.

*Pelochrista snyderana*: Gilligan and Wright 2013b:327.

*Eucosma sperryana* McDunnough 1942:69; Powell 1983:34; Brown 2005:327; synonymy by Wright 2007.

**Types.** *Eucosma snyderana*. Holotype (Plate Y:77a). ♂, Idaho, Bingham County, Blackfoot, A. J. Snyder, 3 June, slide CH 16-Dec-1919, AMNH. *Eucosma sperryana*. Holotype (Plate Y:77e). ♂, Wyoming, Lincoln County, Opal, G. and J. Sperry, 24 June 1933, slide TOR 4249, CNC.

*Eucosma snyderana* and *E. sperryana* were each described from a single male. The holotype of *E. sperryana* was recognized by Wright (2007) as an especially gray phenotype of *E. snyderana*.

The forewing is grayish with considerable brown suffusion. The fasciate markings are brown and include a partial subbasal fascia from the inner margin to the radius and a sometimes obscure median fascia that is often weakly expressed from mid-costa to the distal end of the cell. The various phenotypes differ primarily in the amount of gray suffusion in the interfascial areas, the spot on the inner margin varying from white and conspicuous (Plate Y:77b) to gray and barely detectable (Plate Y:77e). A specimen of the latter phenotype was described by McDunnough as *E. sperryana*. This species differs from other members of the subgroup in the presence of obscure white lines following the cubitus and  $A_{1+2}$ , though this feature is difficult to detect in individuals with a bright white interfascial spot. All phenotypes have at least some black edging on the margins of the fasciate markings.

In males, the ventral surface of the uncus has a medial wedgelike ridge, and the apex of the cucullus is slightly more angulate than in other members of the subgroup. In females, the sterigma has a mixture of scales and setae on the posterolateral portions of the lamella postvaginalis, and the ductus bursae has a weakly sclerotized patch and sometimes weakly developed microtrichia on the inner surface near the ductus seminalis.

We examined specimens from Inyo and Modoc counties, California; Bingham County, Idaho; Crook County, Oregon; Beaver and Garfield counties, Utah; Walla Walla and Yakima counties, Washington; and Albany County, Wyoming. Adults fly from mid-May to mid-July.

## **The *canana* group (species 78–87)**

The earliest recognized members of this group (*P. canana* and *P. passerana*) were described by Walsingham (1879) from specimens he collected in northern California. Kearfott (1907a, b) contributed four subsequent names (*P. womonana*, *P. zomonana*, *P. rorana*, and *P. vandana*), three of which are primarily

eastern species, and Heinrich (1923) proposed *P. metariana* and *P. expolitana* for what he considered to be two additional western taxa. The eastern species (*P. womonana*, *P. zomonana*, and *P. vandana*) are reliably identified by superficial characteristics and are, for the most part, accurately curated in the collections we visited. The western species have never been satisfactorily circumscribed, and the associated names have been applied rather indiscriminately for nearly 100 years.

The moths in this group have distinctive and remarkably uniform genitalia, making group placement straightforward but providing relatively little diagnostic information at the species level. With the exception of *P. flava*, they are also similar in forewing pattern and coloration. In many instances we have no reliable means of determining which subtle differences indicate distinct species and which are attributable to intraspecific variation, and this situation is complicated by the presence of a fair amount of intergradation between what might otherwise seem to be fairly distinctive forewing phenotypes. The members of the *canana* group and those of the *pulveratana* group have similar semifasciate forewing patterns, but the two groups can be separated by the color of the third segment of the labial palpus (black in the *canana* group, concolorous with segments 1 and 2 in the *pulveratana* group). Genitalia differences between the two groups include the number of marginal spines (one vs. several) and sterigma Type (III vs. II).

Except for *P. flava*, which has a distinctive cucullus shape, we found no male genitalia characteristics that are consistent enough to identify other members of the group. Females exhibit differences in the shape and sclerotization of sternum 7 which, though sometimes subtle, are useful in distinguishing between species. The species concepts presented here are based largely on forewing pattern, geographic distribution, and properties of sternum 7. We expect that further resolution of this group into well-defined species will have to await the availability of additional information such as host preferences and molecular data.

We found the diagnostic comments in the literature to be insufficient to distinguish *P. canana*, *P. metariana*, and *P. expolitana* from one another, and our own investigations failed to reveal any substantial differences between these taxa. We therefore treat the latter two names as junior synonyms of *P. canana*. Our treatment also proposes names for four previously unrecognized phenotypes from southwestern United States that are distinguished by forewing appearance and/or female genitalia. Group characteristics include:

*Forewing.* Mean FWL = 5.8–9.4 mm; AR = 2.75–3.24; maculation yellow brown to blackish brown; interfascial areas whitish, gray, or blackish brown, in the lighter cases often reticulated with brown or gray brown; subbasal fascia represented by a prominent subbasal mark from inner margin to cell and an associated obscure spot on the costa; median fascia comprised of a conspicuous pretornal mark and a narrow bar at mid-costa, the two components usually separated along the radius by a streak of pale interfascial coloration; postmedian band narrow, extending from costa to termen, arching along costal margin of ocellus, striate at costal extremity, and often interrupted on radius; ocellus well developed, with pink or gray bars on the lateral margins and with two or three variably expressed blackish dashes in the central field; costal strigulae whitish and sharply defined.

*Male genitalia.* Uncus weakly developed, evenly rounded, and barely differentiated from dorsolateral shoulders of tegumen; socii long, broad, gradually narrowing distally, with dorsal margin indented at base; phallus relatively long, tapering distally, with base loosely surrounded by anellus; vesica with 4–25 cornuti; valva with costal margin nearly straight from base of neck to apex of cucullus, ventral emargination moderate (NR: 0.42–0.47), saccular corner angulate, SA: 64–88°; medial surface of neck with conspicuous subcostal line of hairlike setae; cucullus with dorsal lobe weakly developed (except in *P. flava*) and rounded, ventral lobe moderately developed, often somewhat triangular, with a stout anal spine directed ventrodistally from the vertex of the anal angle, setation of medial surface course and relatively sparse.

Slide mounting of the male genitalia usually distorts the socii, often forcing them into laterally directed orientations (e.g., Plate 34:79a). In normal position they project ventromedially with the flat surfaces facing laterally. Some of the illustrations (e.g., Plate 34:78a and Plate 35:81a) depict the socii in the normal

ventromedial position but with the flat surfaces facing dorsally. These figures show the lateral profile of the socius and the indentation at the base of the dorsal margin but do not conform to the natural orientation.

*Female genitalia.* Papillae anales uniformly setose, with hook-tipped setae along margins of ventral opening; sterigma Type III, with ostium shielded by V-shaped projection from posterior extremity of sternum 7; lamella postvaginalis rectangular and microtrichiate, often with posterior margin concave; sclerotization of sternum 7 strong in bands along lateral margins, weak otherwise; membrane between sterna 6 and 7 with variably developed pockets enclosing the anterior extremities of the sclerotized bands on sternum 7; ductus bursae often with weakly expressed and poorly defined patch of sclerotization near the ductus seminalis and usually with a patch of microtrichia on the inner surface at that location; juncture of ductus bursae and corpus bursae located on dorsal surface of bursa, with the adjacent dorsal and lateral portions of the surface thickened and wrinkled (Plate 34:78f); corpus bursae with two signa of nearly equal size, one situated on posterior one-half of ventral surface, the other on dorsal surface near juncture with ductus bursae.

## 78. *Pelochrista canana* (Walsingham, 1879) (Plate Z, 78a–l; Plate 34, 78a–h)

*Paedisca canana* Walsingham 1879:50; Fernald 1882:39.

*Eucosma canana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:131; McDunnough 1939:48; Powell 1983:35; Brown 2005:317.

*Pelochrista canana*: Gilligan and Wright 2013b:318.

*Eucosma expositana* Heinrich 1923:132; McDunnough 1939:48; new synonymy.

*Pelochrista expositana*: Powell 1983:35; Brown 2005:479; Gilligan and Wright 2013b:320.

*Eucosma metariana* Heinrich 1923:133; McDunnough 1939:48; new synonymy.

*Pelochrista metariana*: Powell 1983:35; Brown 2005:480; Gilligan and Wright 2013b:324.

**Types.** *Pelochrista canana*. Lectotype (here designated, Plate Z:78a). ♂, California, Lake County, Scott's Valley, Walsingham, 17–19 June 1871, BMNH(E) 819880, slide 11521, BMNH. *Eucosma expositana*. Holotype (Plate Z:78c, Plate 34:78b). ♂, Utah, Utah County, Provo, T. Spalding, 11 August 1908, slide 72792, USNM. *Eucosma metariana*. Holotype (Plate Z:78d, Plate 34:78c). ♂, California, Siskiyou County, Shasta Retreat, 24–30 June, slide 72812, USNM.

*Pelochrista canana* was described from five syntypes (4 ♂, 1 ♀) collected in May and June by Walsingham in Lake and Mendocino counties, California. The lectotype was selected by Obratzsov and bears a circular red-bordered “Type H. T.” label. Heinrich (1923) based *P. expositana* on 10 specimens (7 ♂, 3 ♀) collected at Provo and Eureka, Utah in July and August. He illustrated the genitalia of the “Type,” and referred to the other specimens as paratypes, hence the holotype interpretation. The type series for *P. metariana* was comprised of nine male specimens collected from mid-June to mid-July in Siskiyou County, California, King County, Washington, and Victoria, British Columbia. Again, Heinrich (1923) illustrated the genitalia of the “Type” and referred to the other specimens as paratypes.

We examined more than 150 specimens that we refer to *P. canana*. They have a mean FWL of 7.4 mm and exhibit some subtle differences in appearance (Plate Z:78a–l), but all agree in the following respects: the forewing markings are blackish brown, the interfascial areas are whitish with brownish-gray reticulations, the costal component of the median fascia is a thin bar that is often difficult to discern, the bars on the lateral margins of the ocellus have a pale pinkish tint, and the fringe is grayish white near the tornus and brownish gray from CuA<sub>1</sub> to the apex. The subbasal mark is of nearly uniform width, and the pretornal mark is rectangular but weakly constricted on CuA<sub>2</sub>.

We examined 28 genitalia preparations (14 ♂, 14 ♀). The shape of the male valva is somewhat variable



(Plate 34:78a–e), with  $NR = 0.46$  and  $SA = 72^\circ$ . The vesica has 6–9 cornuti. In females, sternum 7 is triangular and rather elongate, with long narrow bands of sclerotization along the lateral margins. The sclerotization of the ductus bursae is weak, variable, and often difficult to detect.

The range of *P. canana* extends roughly from the Rocky Mountain region south to west Texas and west to the Pacific Coast. We examined specimens from British Columbia, Arizona, California, Colorado, Idaho, New Mexico, west Texas, Utah, Washington, and Wyoming. Adult capture dates vary from early March (in far southern Texas) to mid-August.

## 79. *Pelochrista artesiana* Wright and Gilligan, new species

(Plate Z, 79a–c; Plate 34, 79a–d)

**Diagnosis.** *Pelochrista artesiana* is the largest member of the *canana* group (mean FWL = 9.4 mm vs. 5.8–8.2). It is distinguished from all group members except *P. erema* by the predominantly white coloration of the interfascial areas. It differs from *P. erema* in size (mean FWL = 9.4 vs. 6.9 mm), the shape of the subbasal mark (rectangular vs. triangular), the expression of the costal component of the median fascia (a prominent rectangular mark vs. a narrow bar), and the extent of the brownish-gray reticulations in the interfascial areas (moderate vs. barely discernable). Females of *P. artesiana* are recognized by the shape and sclerotization of sternum 7. That sternite is rectangular, with width substantially greater than length, lateral margins parallel, posterolateral corners broadly rounded, and the V-shaped projection shielding the ostium clearly differentiated from the posterior margin. In the other members of the group, sternum 7 tapers posteriorly, blending into the V-shaped projection, and the sclerotized bands on sternum 7 are not as broad.

**Description.** *Head.* Mostly white, with blackish-brown marks at the anterior and dorsal margins of eye and at base of antenna; labial palpus with medial surface white, lateral surface of second segment white with blackish-gray mark along dorsal margin and with long blackish-gray scaling on ventral margin, third segment black with white apex; antenna whitish with blackish-gray mark on medial surface of the scape. *Thorax.* Dorsal surface with alternating white and blackish-gray transverse bands; fore- and mid-leg blackish gray, with three white bands on the tibia and four on the tarsus; hind-leg whitish. Forewing: ♂ FWL 8.4–9.9 mm (mean = 9.3,  $n = 7$ ),  $AR = 2.88$ ; ♀ FWL 8.3–11.2 mm (mean = 9.6,  $n = 6$ ),  $AR = 2.69$ ; costa nearly straight; apex slightly acute; termen straight; fasciate markings blackish gray, including a thin basal band, a prominent rectangular subbasal mark extending from inner margin to cell, a median fascia comprised of a rectangular pretornal mark and a small rectangular mark at mid-costa, and a narrow postmedian band usually interrupted at radius; interfascial areas white with brown to gray-brown transverse reticulations; costal strigulae white and sharply defined by blackish-gray dashes and striae; ocellus with pinkish bars on lateral margins, a pinkish spot at tornal margin, and two black dots in central field; fringe whitish near tornus, blackish gray near apex. Hindwing: Pale brownish gray. *Abdomen.* Male genitalia ( $n = 3$ ): Typical of the group, with 8–11 cornuti in the vesica,  $NR = 0.46$ , and  $SA = 86^\circ$ . Female genitalia ( $n = 6$ ): Typical of the group; sternum 7 rectangular (width about  $1.75 \times$  length), with lateral margins parallel, posterolateral corners broadly rounded, and anterior margin weakly concave; sclerotized bands along lateral margins of sternum 7 broad posteriorly and attenuating to narrowly rounded anterior extremities; posteromedial portion of sternum 7 (including V-shaped posterior projection) weakly sclerotized; intersegmental pockets between sterna 6 and 7 shallow; ductus bursae lacking sclerotization but with a patch of microtrichia near ductus seminalis.

**Holotype** (Plate Z:79a, Plate 34:79d). ♀, Texas, La Salle County, Artesia Wells, A. and M. E. Blanchard, 25 May 1971, slide DJW 3730, USNM.

**Paratypes.** TEXAS. Same location and collector as holotype, 25 May 1971 (5 ♂, slides DJW 3728,

3729), 28 September 1971 (1 ♀, slide 90238) USNM; Kerr County, Kerrville, (1 ♀, slide 70506), March 1909, (1 ♀, slide 70505) USNM, March 1910, H. Lacey, (1 ♀, slide 70504) USNM; Comal County, Canyon Lake, E. C. Knudson, 8 May 1982 (1 ♀), 20 May 1979, (1 ♀, slide 95195), USNM; Cameron County, Brownsville, March 1913, (1 ♂, slide 70507), USNM.

**Etymology.** The specific epithet refers to the type locality, Artesia Wells, an unincorporated community in La Salle County, Texas, located approximately 55 miles north of Laredo.

## 80. *Pelochrista erema* Wright and Gilligan, new species

(Plate AA, 80a–e; Plate 35, 80a–d)

**Diagnosis.** *Pelochrista erema* is similar to *P. canana* but is slightly smaller (mean FWL = 7.0 vs. 7.4 mm). We recognize it as a distinct species based on differences in forewing appearance, sternum 7, and geographical distribution. The interfascial areas in *P. erema* are whiter than those of *P. canana* and are barely vs. conspicuously reticulated with grayish brown; the subbasal mark is triangular instead of rectangular; the pretornal mark is less strongly developed and more inwardly oblique; and the dashes delimiting the costal strigulae are finer. We found no substantial differences in male genitalia between the two taxa, but females of *P. erema* differ from those of *P. canana* in having broader bands of sclerotization along the lateral margins of sternum 7. The specimens of *P. erema* that we examined were from Arizona and New Mexico, mostly from the desert region along the Mexican border. *Pelochrista canana* is much more widely distributed in the West, ranging as far north as British Columbia and as far east as Colorado and Wyoming. The two taxa appear to be sympatric in Arizona and New Mexico, where we find some individuals of uncertain determination that intergrade in forewing appearance between *P. erema* and *P. canana*.

**Description.** *Head.* White, sometimes with pale brownish suffusion on upper vertex; labial palpus with medial surface of segments one and two white, lateral surface of second segment gray brown, third segment black, long scales on ventral margin gray brown; antenna whitish. *Thorax.* Dorsal surface pale brownish white; fore- and mid-leg with anterior surfaces blackish brown, posterior surfaces whitish, hind-leg whitish; tarsus with alternating dark and light annulations. Forewing: ♂ FWL 5.0–7.7 mm (mean = 6.7, n = 46), AR = 2.99; ♀ FWL 6.4–8.4 mm (mean = 7.5, n = 21), AR = 2.91; costa nearly straight; apex slightly acute; termen straight; markings blackish gray; interfascial areas white, usually connected by white subradial streak from base nearly to apex, sometimes with gray suffusion in darker specimens (Plate AA:80e); basal fascia represented by narrow transverse bar, interrupted in cell; subbasal fascia outwardly oblique from inner margin to cell, tapering to relatively sharp vertex; median fascia comprised of an irregularly-shaped pretornal mark and a narrow dash at mid-costa; costal strigulae white and sharply defined by blackish-gray dashes and striae; ocellus conspicuous, with pinkish-gray edging on lateral and subtornal margins and with one or two black spots in the central field; fringe white near tornus, grayish near apex. Hindwing: Pale gray brown. *Abdomen.* Male genitalia (n = 6): Typical of group, with 6–12 cornuti in vesica, NR = 0.44, and SA = 72°. Female genitalia (n = 6): Typical of group; sternum 7 triangular, tapering posteriorly into V-shaped projection shielding ostium; sclerotized bands along lateral margins of sternum 7 moderate in width; intersegmental pockets between sterna 6 and 7 moderately deep; inner surface of ductus bursae with patch of microtrichia near juncture with ductus seminalis.

**Holotype** (Plate AA:80a). ♂, New Mexico, Grant County, State Route 90 at Gold Gulch Road, 6,325 feet, 32.5250° N, 108.4517° W, D. J. Wright, 9 August 1999, USNM.

**Paratypes.** ARIZONA. Cochise County, Chiricahua Mountains, Southwest Research Station, 5,600 feet, 31.8810° N, 109.2070° W, J. W. Brown, 12 August 2010 (1 ♂, 1 ♀), 15 August 2011 (1 ♀) USNM; 6 mi S of Sierra Vista, Ash Canyon Road, 31.3883° N, 110.2367° W, D. J. Wright, 8 August 1999 (1 ♂) DJW; Coconino County, West Fork, 16 mi. SW of Flagstaff, 6,500 feet, R. W. Hodges, 13 August 1961

(1 ♂), 19 July 1961, (1 ♂, slide 70660) USNM; Coconino County, Fort Valley, 7.5 mi NW of Flagstaff, 7,350 feet, R. W. Hodges, 29 July 1961 (1 ♂, slide 70656), 24 July 1967 (1 ♂, slide 70657) USNM; Gila County, 4 mi ESE of Pine, 5,400 feet, R. W. Hodges, 1 September 1961 (1 ♀, slide DJW 3731) USNM; Pima County, Baboquivari Mountains, Brown Canyon, J. W. Brown, 7 August 2005 (2 ♂; 1 ♀, slide DJW 3733); Santa Cruz County, Peña Blanca Canyon, R. W. Hodges, 7 August 1959 (1 ♂), 8 August 1959 (1 ♀), 11 August 1959 (1 ♀), 24 August 1959, (2 ♂), 26 August 1959 (5 ♂, slide DJW 3726; 3 ♀, slide DJW 3727) CUIIC; Santa Rita Mountains, Madera Canyon, 4,880 feet, J. G. Franclemont, 14 May 1963 (1 ♂, slide DJW 3732) USNM, R. W. Hodges, 24 July 1959 (1 ♀), 25 July 1959 (1 ♂), 28 July 1959 (1 ♂), 29 July 1959 (1 ♂, slide DJW 3724; 1 ♀), 30 July 1959 (1 ♂), 1 August 1959 (1 ♂; 1 ♀, slide DJW 3725), 25 August 1959 (1 ♀) CUIIC. NEW MEXICO. Same data as holotype (26 ♂, slides DJW 530, 579, 3282; 9 ♀, slides DJW 575, 3283, 3284) DJW, USNM.

**Etymology.** The specific epithet comes from the Latin *eremus*, meaning desert. It refers to the fact that most of the specimens of this species have been collected in the Sonoran and Chihuahuan deserts of southern Arizona and New Mexico.

### 81. *Pelochrista rorana* (Kearfott, 1907)

(Plate AA, 81a–e; Plate 35, 81a–f)

*Eucosma rorana* Kearfott 1907b:31; Barnes and McDunnough 1917:170; Heinrich 1923:132; McDunnough 1939:48.

*Eucosma sceletopa* Meyrick 1912:35, unnecessary replacement name for *rorana*.

*Pelochrista rorana*: Powell 1983:35; Brown 2005:481; Gilligan et al. 2008:118; Gilligan and Wright 2013b:326.

**Lectotype** (here designated, Plate AA:81a, Plate 35:81b). ♂, Utah, Tooele County, Stockton, T. Spalding, slide 70652, USNM.

Kearfott (1907b) described *P. rorana* from six syntypes collected between 29 June and 3 July by Tom Spalding at Stockton, Utah. Klots (1942) reported a lectotype and two paralectotypes in the AMNH, crediting Heinrich (1923) with the lectotype designation. We found two syntypes (1 ♂, 1 ♀) in the AMNH, both of which were covered with mold, and because Heinrich (1923) did not mention the sex of the “Type,” his remarks do not identify a unique specimen. We also found two syntypes (1 ♂, 1 ♀) in the USNM that are in much better condition. Heinrich (1923) illustrated the genitalia of the male, and it is that specimen that we designate as the lectotype.

*Pelochrista rorana* is a medium-sized species (mean FWL = 8.0 mm) that is distinguished from other members of the group by its substantially complete chevron-shaped subbasal and median fasciae. The interfascial areas are white and often have gray-brown reticulations. The costal strigulae are white and sharply defined, and the lateral and tornal margins of the conspicuous ocellus are marked by pinkish bars and a pinkish spot, respectively. This species is somewhat similar in forewing appearance to *P. rosaocellana* (species 34), but the latter is larger (mean FWL = 8.7 vs. 8.0 mm) and differs from *P. rorana* in genitalia.

We found no male genitalia characteristics that would reliably distinguish this species from other members of the group. In females, sternum 7 is moderately tapered posteriorly, the pockets in the membrane between sterna 6 and 7 are deep, and the inner surface of the ductus bursae has a patch of microtrichia near the ductus seminalis.

We examined specimens from Idaho, Kansas, New Mexico, Utah, and Washington. Adults fly from mid-June to the end of August. The USNM has several specimens that J. F. G. Clarke reared from larvae boring in the roots of *Helianthus annuus* L. (common sunflower) in Whitman County, Washington.

## 82. *Pelochrista vandana* (Kearfott, 1907)

(Plate AA, 82a–e; Plate 36, 82a–f)

*Eucosma vandana* Kearfott 1907b:24; Barnes and McDunnough 1917:170; Heinrich 1923:134; McDunnough 1939:48.

*Eucosma pholas* Meyrick 1912:34, unnecessary replacement name for *vandana*.

*Pelochrista vandana*: Powell 1983:35; Brown 2005:482; Gilligan and Wright 2013b:328.

**Lectotype** (here designated). ♂, Florida, Saint Johns County, Hastings, April, slide DJW 3711, AMNH.

Kearfott's (1907b) account of *P. vandana* mentions 16 syntypes collected in March, April, and October at Hastings, Florida. We located what we believe to be seven of these specimens in the AMNH. They are in poor condition, many covered with mold, and only one bears a handwritten Kearfott "Cotype" label. We also examined five specimens in the USNM that have collection data appropriate for the syntypes, two of which bear a Kearfott "Cotype" label. Heinrich (1923) stated that the "Type" is in the AMNH, and Klots (1942) reported a lectotype and six paralectotypes in the AMNH, crediting Heinrich (1923) with the lectotype designation. We did not find a syntype in the AMNH with one of Klots' "LECTOTYPE" labels. Because Heinrich's remarks regarding the "Type" are ambiguous, we designate here as lectotype the syntype in the AMNH that is in the best condition.

*Pelochrista vandana* is recognized by forewing appearance: uniformly blackish brown with fine whitish reticulations, the latter often producing a speckled effect (Plate AA:82a–d). The interfacial areas are so thoroughly suffused with blackish-brown that the slightly darker fasciate markings are only weakly discernable. Heinrich (1923) considered *P. vandana* to be a Florida species. He based his account on the type series, which was collected at Hastings, a small town in northeastern Florida. In the ninety-some years since that publication, similar looking specimens have been found in the Great Plains, most notably a long series in the USNM collected by R. W. Hodges in Cherry County, Nebraska. The Nebraska specimens are somewhat larger than the Florida specimens (mean FWL = 8.2 mm, n = 18, vs. 6.9 mm, n = 25), but we found no substantial differences in maculation or genitalia between these populations. Consequently, we aggregate all of this material under *P. vandana*, producing a taxon with mean FWL = 7.7 mm. Most specimens are blackish brown, but in the Nebraska population we found a few pale brown individuals (Plate AA:82e).

The male genitalia are similar to those of other members of the group. The vesica has 12–20 cornuti, and the saccular corner is acute (SA = 67°). In females, the sclerotized bands on sternum 7 are relatively long and narrow, the pockets between sterna 6 and 7 are deep, and the ductus bursae has a weakly sclerotized patch and a band of microtrichia near the juncture with the ductus seminalis.

We examined specimens from Manatee, Marion, Pinellas, Putnam, and St. Johns counties, Florida; Sioux City, Iowa; Riley County, Kansas; Cherry County, Nebraska; and Burnett, Harris, and Kerr counties, Texas. In Florida, most of the adults were captured between 21 February and 30 April, but there are two records from October. The specimens from Kansas and Nebraska were all collected in June; the Iowa specimen has an August capture date; and the Texas records are from June and August.

## 83. *Pelochrista passerana* (Walsingham, 1879)

(Plate BB, 83a–c; Plate 36, 83a–e)

*Paedisca passerana* Walsingham 1879:49; Fernald 1882:39.

*Eucosma passerana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:133; McDunnough 1939:48.

*Pelochrista passerana*: Powell 1983:35; Brown 2005:481; Gilligan and Wright 2013b:325.



**Lectotype** (here designated, Plate BB:83a). ♂, California, Mendocino County, Head of Noyo River, Walsingham, 8–11 June 1871, BMNH(E) 819977, slide 11520, BMNH.

Walsingham (1879) described this species from four male syntypes that he collected in northern California. Obraztsov selected the lectotype.

*Pelochrista passerana* is indistinguishable from *P. womonana* in size (mean FWL = 6.8 mm) and forewing appearance. Both taxa have dark gray forewings with brownish-gray fasciate markings, interfascial areas that are strongly suffused with brownish-gray reticulations, and a whitish interfascial spot on the inner margin that contrasts moderately with the rest of the forewing. Historically, *P. passerana* has been interpreted as a West Coast species, and similar looking material from eastern North America has been referred to *P. womonana* (described from Ohio). The two groups seem to be well separated geographically by the Rocky Mountains, and we retain the two names primarily to recognize that difference.

We found a subtle but possibly unreliable difference between *P. passerana* and *P. womonana* in the number of cornuti in the male genitalia: 5–7 vs. 12–25 (based on four and six preparations, respectively). Otherwise, males of the two species are quantitatively quite similar: SA = 72° vs. 64°, NR = 0.47 vs. 0.43. We examined only one female of *P. passerana*, a specimen in the BMNH from the type locality. The staining of its slide-mounted genitalia (BM 11661) is such that some of the fine detail is difficult to discern. Our interpretation of the sterigma-sternum 7, based on that slide, is illustrated in Plate 36:83e. We could not detect any sclerotization on the ductus bursae, and we found no evidence of microtrichia near the ductus seminalis. There appear to be shallow pockets between sterna 6 and 7, but that membrane was partially destroyed in separating the pelt from the genitalia. Sclerotization of the ductus bursae appears to be a variable character in the *canana* group, but if a lack of microtrichia in the ductus bursae proves to be consistent in *P. passerana*, then it would distinguish *P. passerana* from *P. womonana*.

We examined 15 specimens from California and Washington. Adult capture dates range from 22 May to 9 July.

#### **84. *Pelochrista womonana* (Kearfott, 1907)**

(Plate BB, 84a–c; Plate 36, 84a–d)

*Eucosma womonana* Kearfott 1907b:88; Barnes and McDunnough 1917:170; Heinrich 1923:134; McDunnough 1939:48.

*Eucosma seminitis* Meyrick 1912:35, unnecessary replacement name for *womonana*.

*Pelochrista womonana*: Powell 1983:35; Brown 2005:482; Gilligan et al. 2008:119; Gilligan and Wright 2013b:329.

**Lectotype** (designated by Heinrich 1923). ♂, Ohio, Hamilton County, Cincinnati, A. F. Braun, 11 July 1906, slide CH 15 May 1921, AMNH.

*Pelochrista womonana* was described from two syntypes collected by Annette Braun in Cincinnati, Ohio. Heinrich (1923) singled out the lectotype by illustrating its genitalia. We did not find the second syntype at either the AMNH or the USNM.

This species is similar in size and forewing appearance to *P. passerana* and *P. vandana* (mean FWL = 6.8 mm vs. 6.8 and 7.7 mm, respectively). It differs from the former primarily in geographic distribution (see species 83). It differs from *P. vandana* in its grayer overall forewing coloration, the presence of a clearly discernable grayish-white interfascial spot on the inner margin, and the lack of a white speckled appearance. *Pelochrista womonana* has sometimes been confused with *P. milleri* (species 159) based on forewing appearance, but the latter species has a broader forewing (AR = 2.53 vs. 2.75), white edging on the margins of the fasciate markings, and substantially different genitalia.

We are unable to distinguish between *P. womonana* and *P. vandana* based on genitalia characters. In



males, the cornuti count is 12–25 vs. 12–20, SA = 64° vs. 67°, and NR = 0.43 vs. 0.44. In females of both species, the medial projection of the posterior margin of sternum 7 is weakly developed, the sclerotized bands on sternum 7 are long and narrow, the pockets in the membrane between sterna 6 and 7 are deep, the ductus bursae has a weakly developed (sometimes barely discernable) patch of sclerotization opposite the ductus seminalis, and the inner surface of the ductus bursae has a longitudinal band of microtrichia near the ductus seminalis.

This species is widely distributed in eastern United States, from Minnesota to Maryland and south to Texas and Mississippi. We examined specimens from Washington County, Arkansas; Bullitt and Henderson counties, Kentucky; Adams County, Ohio; and Colorado, Harris, and Washington counties, Texas. The vast majority of adult capture dates are from early June to late August, but we encountered two April records from Texas and one May record from Arkansas.

### 85. *Pelochrista zomonana* (Kearfott, 1907)

(Plate BB, 85a–c; Plate 37, 85a–f)

*Eucosma zomonana* Kearfott 1907a:80; Barnes and McDunnough 1917:170; Heinrich 1923:134; McDunnough 1939:48.

*Eucosma explosa* Meyrick 1912: 36, unnecessary replacement name for *zomonana*.

*Pelochrista zomonana*: Powell 1983:35; Brown 2005:482; Gilligan et al. 2008:119; Gilligan and Wright 2013b:329.

**Lectotype** (designated by Heinrich 1923, Plate 37:85b). ♂, Pennsylvania, Beaver County, New Brighton, F. A. Merrick, 22 May, slide DJW 3712, AMNH.

Kearfott (1907a) described *P. zomonana* from five syntypes collected by F. A. Merrick at New Brighton, Pennsylvania. Klots (1942) reported a lectotype and one “pseudotype” in the AMNH, attributing the designation of the former to Heinrich (1923). We examined the lectotype, which bears a bluish Klots “LECTOTYPE” label, and found that the abdomen was separated from the specimen and had been placed by Klots in a folded piece of paper with a note stating that it positively belongs to the lectotype. We made a slide mounted genitalia preparation from that abdomen, and the genitalia are typical of the species commonly determined in collections as *P. zomonana*. Finding no other syntypes in the AMNH, we conclude that Heinrich’s (1923) remarks constitute a valid lectotype designation. We located two male syntypes of *P. zomonana* in the USNM, and we examined a specimen in the AMNH that may be the pseudotype referred to by Klots (1942). An in situ examination of the genitalia confirmed that the last specimen is not a member of the *canana* group.

*Pelochrista zomonana* is one of the easiest members of the *canana* group to identify. It is the smallest member of the group (mean FWL = 5.8 mm vs. 6.8–9.6) and has a smoky-gray forewing. The subbasal and pretornal marks are conspicuous but not sharply defined and are expressed as blackish-brown bars that extend from the inner margin to the cell, often with associated disjunct marks on the costa (Plate BB:85c). The interfascial areas are gray and relatively free of darker reticulations. The ocellus and costal strigulae are concolorous with the interfascial areas.

Compared to *P. womonana* and *P. vandana*, the male genitalia appear to be distinguished only by the number of cornuti (9–14 vs. 12–25 and 12–20) and the SA (85° vs. 64° and 67°). In females, the medial projection of the posterior margin of sternum 7 is more strongly developed; the sclerotized bands on sternum 7 are broader; and the pockets between sterna 6 and 7 are somewhat shallower.

The range of this species includes the region from Minnesota to Connecticut, south to Mississippi and North Carolina. We examined specimens from Arkansas, Illinois, Connecticut, Kentucky, Ohio, Pennsylvania, and Virginia. Adult capture dates range from late May to mid-September.

**86. *Pelochrista olivacea*** Wright and Gilligan, new species

(Plate BB, 86a–c; Plate 37, 86a–d)

**Diagnosis.** *Pelochrista olivacea* is a resident of the arid Southwest. It is recognized by the faint olive-brown tint of the forewing and the substantially complete subbasal and median fasciae. It is similar in size to *P. rorana* (mean FWL = 8.0 mm in both species) but lacks the contrast between fasciate markings and interfascial areas in the latter species. *Pelochrista artesiana* is larger (mean FWL = 9.6 mm) and whiter than *P. olivacea*, and the other members of the group are somewhat smaller (mean FWL: 5.8–7.4 mm). Females most closely resemble *P. zomonana* in the shape and sclerotization of sternum 7: in both species the shape is more rectangular than triangular, the projection shielding the ostium is moderately differentiated from the posterior margin, and the sclerotized bands are relatively broad. *Pelochrista olivacea* is readily separated from *P. zomonana* by size (mean FWL = 8.0 vs. 5.8 mm) and geographic distribution (Arizona, New Mexico, and Texas vs. eastern United States).

**Description.** *Head.* Frons whitish; vertex whitish medially, pale brown laterally; labial palpus with medial surface white, lateral surface of second segment brown, third segment black, long scales on ventral margin brownish gray; antenna pale brown. *Thorax.* Dorsal surface whitish with brown transverse bands; fore- and mid-leg with anterior surfaces dark brown, posterior surfaces tan; hind-leg mostly tan; tarsus with alternating dark brown and tan annulations. Forewing: ♂ FWL 6.7–8.8 mm (mean = 7.9,  $n = 12$ ), AR = 2.89; ♀ FWL 3.3–9.2 mm (mean = 8.1,  $n = 13$ ), AR = 2.83; costa slightly arched; apex acute; termen nearly straight; dorsal surface with olive-brown fasciate markings and whitish interfascial areas, the latter generously suffused with pale olive brown; subbasal fascia chevron-shaped, strongly expressed from inner margin to cell, often faint to interrupted on radius; median fascia bandlike, widening toward inner margin into prominent pretornal mark; ocellus well defined, edged on lateral and tornal margins with salmon-colored bars/spots, capped with a conspicuous blackish-gray subcostal spot; costal strigulae whitish, well defined from base to apex, and delimited by dark thin dashes and paler striae; fringe scales grayish white from tornus to  $CuA_1$ , blackish gray with pale tips from  $CuA_1$  to apex. Hindwing: Medium gray brown, with fringe slightly paler. *Abdomen.* Male genitalia ( $n = 5$ ): Typical of group, with 8–12 cornuti in the vesica, NR = 0.43, SA = 80°. Female genitalia ( $n = 4$ ): Typical of group, with posterior projection of sternum 7 moderately developed, sclerotized bands on lateral margins of sternum 7 relatively broad, pockets between sterna 6 and 7 deep, ductus bursae lacking sclerotization, microtrichia present on inner surface of ductus bursae near ductus seminalis.

**Holotype** (Plate BB:86a). ♀, Arizona, Cochise County, 3 mi up Paradise Road near Portal, B. Walsh, 20 August 2011, slide DJW 3214, USNM.

**Paratypes.** ARIZONA. Cochise County, Ash Canyon Road, 6 mi S of Sierra Vista, D. J. Wright, 8 August 1999 (1 ♂, slide DJW 565) DJW; John Hands Campground, Chiricahua Mountains, 31.8780° N, 109.223° W, 5,645 feet, 13 August 2012, B. Walsh (1 ♀, slide DJW 3723); 1.9 mi W of Paradise Road, near Portal, 17 August 2011, J. W. Brown (1 ♀); 4.6 mi W of Paradise Road, near Portal, 19 August 2011, J. W. Brown (1 ♂); Southwest Research Station, Chiricahua Mountains, J. W. Brown, 31.8810° N, 109.2070° W, 5,350 feet, 11 August 2012 (1 ♂, slide DJW 3289), 5,600 feet, 14 August 2011 (1 ♂), 5,400 feet, 15 August 2011 (1 ♂, slide DJW 3722), USNM; 3 mi up Paradise Road from Portal, 31.9310° N, 109.1770° W, J. W. Brown, 14 August 2012, (2 ♂), B. Walsh, 20 August 2011 (3 ♂, slide DJW 3288; 1 ♀), USNM; Sunny Flats Picnic Area, 3 mi SW of Portal, 5,130 feet, B. Walsh, 16 August 2011 (2 ♀), 18 August 2011 (3 ♂); Santa Cruz County, Peña Blanca Canyon, R. W. Hodges, 3 August 1959 (1 ♀), 8 August 1959 (1 ♂; 2 ♀), 11 August 1959 (1 ♂; 3 ♀) CUIC. NEW MEXICO. Lincoln County, Valley of the Fires RA, 4 mi NW of Carrizozo, 5,250 feet, D. J. Wright, 17 August 2005 (1 ♀, slide DJW 1404), DJW. TEXAS. Culberson County, Sierra Diablo Wildlife Management Area, 6,000 feet, A. and M. E.

Blanchard, 29 May 1973 (1 ♂, slide 70236) USNM; Kerr County, Kerrville, H. Lacey, 14 November, (1 ♀, slide 70687) USNM.

**Etymology.** The specific epithet refers to the faint olive-brown tint of the forewing.

### 87. *Pelochrista flava* Wright and Gilligan, new species

(Plate BB, 87a–c; Plate 37, 87a–d)

**Diagnosis.** *Pelochrista flava* is the only member of the group with a pale yellowish forewing and weakly expressed subbasal and median fasciae. Males are distinguished by the strongly developed dorsal lobe of the cucullus and the small number of cornuti in the vesica (4 vs. 6–25). The female genitalia most closely resemble those of *P. artesiana*, but in *P. flava* the sterigma is less elongate, sternum 7 is more triangular, and the sclerotized bands on sternum 7 are not as broad.

**Description.** *Head.* Pale yellowish white; labial palpus with third segment dark brown, otherwise with medial surfaces whitish and lateral surfaces pale brown; antenna concolorous with vertex. *Thorax.* Dorsal surface pale yellowish white; fore- and mid-leg with anterior surfaces brown, posterior surfaces whitish; hind-leg mostly whitish; fore- and mid-tibia with whitish annuli at the proximal, medial, and distal positions; tarsus with alternating brown and whitish annulations. Forewing: ♂ FWL 6.4–6.9 mm (mean = 6.7, n = 2), AR = 3.39; ♀ FWL 6.2–7.9 mm (mean = 6.9, n = 4), AR = 3.16; costa nearly straight; apex acute; termen straight; dorsal surface pale yellowish white with brown markings and some pale brown suffusion; subbasal fascia chevron-shaped, weakly expressed, usually interrupted on radius; median fascia represented by faint brown shade from mid-costa to pretornal portion of inner margin and usually including two darker dashes, one on proximal margin of ocellus, the other in distal portion of cell; ocellus clearly defined, with brown central field and pale salmon-colored bars/spots on lateral and tornal margins, the former usually with one or two small blackish dashes/dots; costal strigulae whitish and well defined by brown marks and striae; fringe whitish near tornus, brownish gray toward apex. Hindwing: Pale brownish gray. *Abdomen.* Male genitalia (n = 3): Typical of group but with dorsal lobe of cucullus more strongly developed; vesica with 4 cornuti; NR = 0.46; SA = 88°. Female genitalia (n = 4): Typical of group; sternum 7 triangular, with posterior projection moderate and sclerotized bands rather broad; ductus bursae lacking sclerotization.

**Holotype** (Plate BB:87a; Plate 37:87b). ♂, New Mexico, Sierra County, Highway 195, near I-25, Exit 83, G. J. Balogh, 15 October 2001, slide DJW 1124, USNM.

**Paratypes.** ARIZONA. Pima County, Tucson, Bryant, 26 March 1934 (1 ♂, slide DJW 3754) USNM. NEW MEXICO. Lincoln County, Valley of the Fires National Recreation Area, 4 mi NW of Carrizozo, 5,250 feet, 33.6773° N, 105.9277° W, D. J. Wright, 17 August 2005 (4 ♀, slides DJW 1416, 1420, 3038, 3746) USNM; Otero County, Dog Canyon Road south of Alamogordo, G. J. Balogh, 14 September 2004 (1 ♀, slide DJW 2064) USNM; Otero County, White Sands National Monument, 32.7620° N, 106.1887° W, E. H. Metzler, 25 August 2009 (1 ♂, slide DJW 2539) EHM.

**Etymology.** The specific epithet comes from the Latin *flavus*, meaning yellow, and refers to the dominant forewing color.

**Comment.** The male-female association reported here is tentative because the two sexes have yet to be collected on the same night at the same location.

### The *emaciatana* group (species 88–90)

The grouping of the next three species is based on similarity of forewing pattern and valva shape. Shared characteristics include:

*Forewing.* Mean FWL: 7.9–10.8 mm; AR: 3.21–3.40; interfascial areas grayish white to brownish gray; fasciate markings brown to black; subbasal fascia represented by an outwardly oblique bar on the cubitus that sometimes extends from inner margin to cell; median fascia fragmented, consisting of a variably expressed bar at mid-costa, an irregularly shaped patch at the distal end of the cell, and a triangular pretornal mark; ocellus obscure but detectable, sometimes with pinkish transverse bars on lateral margins; costal strigulae whitish and usually well delimited on distal one-half of costa by 2–4 dark marks and various striae; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia.* Uncus clearly differentiated from dorsolateral shoulders of tegumen; socii fingerlike and curving medially; phallus long, narrow, and tapering distally; vesica with 0–11 cornuti; valva with costal margin concave, ventral emargination shallow to moderate, neck elongate, NR: 0.48–0.68, SA: 121–145°; cucullus with dorsal lobe strongly developed, apex rounded, ventral lobe weakly developed, setation of medial surface course; margin of cucullus with a stout anal spine and 2–5 smaller marginal spines.

*Female genitalia.* Papillae anales facing ventrolaterally, with transverse cross-sections convex; length of ventral opening about three-fourths that of pads; sternum 7 rectangular; corpus bursae with two signa.

## **88. *Pelochrista emaciatana*** (Walsingham, 1884)

(Plate CC, 88a–c; Plate 38, 88a–g)

*Paedisca emaciatana* Walsingham 1884:137.

*Eucosma emaciatana*: Fernald 1903:460; Barnes and McDunnough 1917:171; McDunnough 1939:46; Powell 1983:34; Brown 2005:319.

*Pelochrista emaciatana*: Wright 2005:130; Gilligan and Wright 2013b:320.

*Eucosma perpropinqua* Heinrich 1929:8; McDunnough 1939:47; synonymy by Wright 2005:130.

*Pelochrista perpropinqua*: Powell 1983:35; Brown 2005:481; Gilligan and Wright 2013b:320.

**Types.** *Paedisca emaciatana*. Lectotype (designated by Wright 2005). ♂, Arizona, Morrison, 1882, slide 11571, BMNH. *Eucosma perpropinqua*. Holotype. ♂, Arizona, Pima County, Indian Oasis, Sells Post Office, 15–30 April 1923, O. C. Poling, slide 72797, USNM.

Wright (2005) reviewed this species and discussed the confusion that prevailed in 20<sup>th</sup> century North American literature regarding *P. emaciatana*, *P. perpropinqua*, and *P. larana*. Briefly, Heinrich (1923) confused *P. emaciatana* with *P. larana* and later (1929) interpreted a series of true *P. emaciatana* as a new species that he described as *P. perpropinqua*.

*Pelochrista emaciatana* is the largest member of the group (mean FWL = 10.8 mm). The forewing is pale grayish brown with brown maculation consisting of a subbasal dash, a fragmentary median fascia, a pale band connecting the distal end of the cell to the apex, and three marks on the distal one-half of the costa separating the whitish strigulae. The ocellus is weakly expressed, with a transverse series of small black dots in the central field, and the termen has an inconspicuous whitish line from the tornus nearly to the apex.

In males, the vesica lacks cornuti, the valva neck is moderately broad, NR = 0.64, the saccular corner is broadly rounded (SA = 145°), the ventral margin of the cucullus has a small triangular projection supporting a moderately stout anal spine, and the distal margin of the cucullus has 2–5 variably distributed marginal spines. In females, the sterigma is Type II, with a narrow ringlike lamella antevaginalis and a rectangular lamella postvaginalis, the latter with the central trough weakly depressed and microtrichiate; the ductus bursae lacks sclerotization; and the corpus bursae has a large sclerotized plate on the dorsal surface near the juncture with the ductus bursae, a minute signum projecting from the medial portion of that plate, and a large signum on the ventral surface.

This species is a resident of the desert areas of southwestern United States. We examined specimens from Arizona, southern California, Nevada, New Mexico, and Texas. Most of the material was collected



from early March to the end of May, but there are a few capture dates in September and one at the beginning of October.

### 89. *Pelochrista popana* (Kearfott, 1907)

(Plate CC, 89a–c; Plate 38, 89a–g)

*Eucosma popana* Kearfott 1907b:31; Barnes and McDunnough 1917:169; Heinrich 1923:109; McDunnough 1939:47.

*Eucosma carcharias* Meyrick 1912:35, unnecessary replacement name for *popana*.

*Pelochrista popana*: Powell 1983:35; Wright 2005:131; Brown 2005:481; Gilligan and Wright 2013b:326.

**Lectotype** (here designated). ♀, Utah, Tooele County, Stockton, T. Spalding, 3 July 1904, slide DJW 1085, AMNH.

Kearfott (1907b) described *P. popana* from 27 syntypes collected by T. Spalding at Stockton, Utah. Klots (1942) reported 13 of these specimens in the AMNH, including a male lectotype whose selection he attributed to Heinrich (1923). We examined the AMNH material and found that it includes at least three different species and that the specimen labeled LECTOTYPE is a female, contrary to Klots' statement. Consequently, Heinrich's (1923) comments are insufficient to identify a lectotype, and Klots' statement is partially incorrect. To avoid future confusion, we designate here as lectotype the female labeled as such by Klots, thereby correcting inaccuracies in recent statements about the type (Wright 2005, Brown 2005). Gilligan and Wright (2013b) reported these corrections without explanation.

*Pelochrista popana* is slightly smaller than the other members of the group (mean FWL = 7.9 vs. 8.9–10.8 mm). The interfascial areas are whitish with dark gray reticulations, and the blackish maculation includes a partial subbasal fascia, a median fascia that is interrupted on the cubitus, a conspicuous Y-shaped mark that tracks the costal margin of the ocellus and branches to the apex and mid-termen, and several black marks and striae on the costa separating whitish strigulae. The result is an overall black and white appearance. The ocellus is usually bordered laterally by pinkish transverse bars.

Males have 3–9 cornuti in the vesica. The cucullus has a moderately-developed dorsal lobe, a weakly-developed triangular ventral lobe, a stout anal spine, and 2–5 smaller marginal spines. In females, the sterigma is Type III, the trapezoidal lamella postvaginalis has a somewhat scalloped posterior margin, the posterior margin of sternum 7 has a weakly developed medial projection that shields the ostium, the intersegmental membrane between sterna 6 and 7 has two shallow pockets (not illustrated), the ductus bursae is sclerotized from the constriction anterior to the ostium nearly to the juncture with the ductus seminalis, and the corpus bursae has two signa of nearly equal size.

This species is broadly distributed and often quite common in western United States. We examined specimens from California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. Adults fly from the beginning of June to late August, with most capture dates in July.

### 90. *Pelochrista powelli* Wright, 2005

(Plate CC, 90a–d; Plate 39, 90a–g)

*Pelochrista powelli* Wright 2005:132; Gilligan and Wright 2013b:326.

**Holotype**. ♂, Idaho, Oneida County, Curlew National Grassland, 4 mi ENE of Holbrook, Junction of Forest Roads 56 and 57, 5,050 feet, 42.1892° N, 112.5820° W, D. J. Wright, 7 July 2001, slide 124078, USNM.



In *P. powelli*, forewing color varies from brownish yellow (Plate CC:90d) to gray brown (Plate CC:90b), but most specimens are pale brown (Plate CC:90a, c). The fragmentary fasciate markings tend to be less conspicuous than in the other two members of the group, and the ocellus is weakly to moderately discernable, with 2–3 dark dashes in the central field and pinkish bars on the lateral margins. This species might be confused with *P. ainsliei* based on forewing appearance, but the two species have substantially different genitalia, and their ranges appear to be disjunct (Great Basin vs. high plains east of the Rocky Mountains).

Examination of the genitalia is recommended for a positive determination. Males are distinguished from *P. emaciatana* by the presence of cornuti in the vesica (2–11) and from *P. popana* by the shape of the cucullus. Females differ from *P. emaciatana* in the lack of a sclerotized patch on the corpus bursae and from *P. popana* in sterigma Type (II vs. III).

We examined specimens from Inyo County, California; Oneida County, Idaho; Elko County, Nevada; Harney County, Oregon; and Daggett, Garfield, and Juab counties, Utah. Adult capture dates range from 28 June to 18 August.

### The *reversana* group (species 91–93)

This group consists of three species that are similar in forewing appearance and male genitalia. Group characteristics include:

*Forewing.* Mean FWL: 7.8–9.0 mm; AR: 3.11–3.34; interfascial areas whitish to pale tan, often with grayish suffusion; fasciate markings brown; subbasal fascia represented by outwardly oblique bar from inner margin to discal cell; median fascia fragmented, consisting of a small mark at mid-costa, a sizable patch at the distal end of the cell, and a triangular pretornal mark; ocellus moderately well defined, with metallic beige/gray bars on the lateral margins and two or three short black dashes in the central field; costal strigulae pale and well delimited on distal one-half of costa by 4 triangular marks and numerous striae; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia.* Uncus well developed, basal width about 2 × height, clearly differentiated from dorsolateral shoulders of tegumen; socii long and fingerlike; phallus long and narrow, with base loosely surrounded by anellus; vesica lacking cornuti; valva with costal margin weakly concave, ventral emargination shallow to nearly absent, neck long and broad, NR: 0.75–0.78, SA: 145–151°; cucullus barely differentiated from neck, with an unusually stout anal spine and 2–4 marginal spines midway between anal spine and apex; medial surface of cucullus coarsely setose.

*Female genitalia.* Papillae anales with length of ventral opening about three-fourths length of pads; sterigma Type II or III; sternum 7 rectangular, with weakly developed medial projection on posterior margin; ductus bursae and corpus bursae with taxonomically useful patterns of sclerotization; corpus bursae with one or two signa, in the latter case with one considerably larger than the other.

#### 91. *Pelochrista reversana* (Kearfott, 1907)

(Plate CC, 91a–e; Plate 39, 91a–g)

*Eucosma reversana* Kearfott 1907b:22; Barnes and McDunnough 1917:170; Heinrich 1923:112; McDunnough 1939:47.

*Pelochrista reversana*: Powell 1983:35; Brown 2005:481; Wright 2008:226; Gilligan and Wright 2013b:326.

**Lectotype** (designated by Heinrich 1923). ♂, Texas, Bexar County, San Antonio, slide CH 16 Dec 1919, AMNH.

Kearfott (1907b) described this species from three syntypes (2 ♂, 1 ♀) from the William Barnes collection, all of which are from the type locality. Two of the syntypes (1 ♂, 1 ♀) were acquired by the AMNH; the other male resides in the USNM. Heinrich (1923) illustrated the genitalia of the male in the AMNH and referred to it as the “Type,” hence the interpretation of that specimen as a lectotype. He also pointed out that the female paratype is referable to *P. exclusoriana*.

This is the most distinctively marked species in the *reversana* group, with four conspicuous brown blotches (subbasal, median, subapical, and pretornal) that are separated by whitish interfascial coloration, the latter generously reticulated with pale orange brown. The brown markings are more sharply defined than in similar looking species (e.g., *P. popana*, *P. ainsliei*, and *P. kingi*).

Genitalia characteristics include: an especially large anal spine, four marginal spines located midway between the anal angle and the apex, a Type III sterigma, a variably shaped lamella postvaginalis (Plate 39:91d–g), sclerotization of the ductus bursae from the constriction anterior to the ostium to the ductus seminalis, and two signa in the corpus bursae, one considerably smaller than the other.

We examined specimens from Yavapai and Mojave counties, Arizona; Otero County, Colorado; Morton County, Kansas; Colfax and Hidalgo counties, New Mexico; and Bexar, Dallas, Jim Wells, Kimble, Shackelford, Starr, Terrel, and Uvalde counties, Texas. Most of the capture dates range from mid-August through November, but there are three records in mid-April from Kimble County, Texas.

## 92. *Pelochrista ainsliei* Wright, 2008

(Plate DD, 92a–d; Plate 40, 92a–f)

*Pelochrista ainsliei* Wright 2008:222; Gilligan and Wright 2013b:317.

*Eucosma occipitana*: (not Zeller 1875) Heinrich 1923:111; McDunnough 1939:47.

*Pelochrista occipitana*: (not Zeller 1875) Powell 1983:35; Brown 2005:480.

**Holotype.** ♂, New Mexico, Dona Ana County, Mesilla, C. N. Ainslie, slide 70620, USNM.

*Pelochrista ainsliei* is a rather nondescript pale brown species with dark brown maculation. Strongly marked specimens (Plate DD:92a–b) have a subbasal spot on the cubitus, a triangular pretornal mark, and a vaguely defined longitudinal band from the distal end of the cell to the apex. In weakly marked specimens (Plate DD:92d) these features are barely discernable. *Pelochrista ainsliei* most closely resembles *P. kingi* (species 93) and *P. powelli* (species 90) in forewing appearance. It is slightly smaller than *P. kingi* (mean FWL = 7.8 vs. 8.8 mm) and does not have the grayish interfascial areas and the reddish-brown tint in the subcostal and/or apical areas typical of that species. It is also a little smaller than *P. powelli* (mean FWL = 7.8 vs. 8.9 mm) but is best separated from that species by genitalia characters.

Male genitalia differences between the group members are somewhat subtle. The anal spine is longer in *P. reversana* than in the other two species; the cucullus is more rectangular in *P. kingi*, with the apical corner angulate instead of rounded; and the distal margin of the uncus is medially indented in *P. kingi* but rounded in the other two species. All three species differ from *P. powelli* in the number of cornuti in the vesica (0 vs. 2–11). Females of *P. ainsliei* and *P. reversana* have a Type III sterigma vs. Type II in *P. kingi*. The three group members have different patterns of sclerotization on the ductus bursae and/or corpus bursae. In *P. reversana* the sclerotization extends from the constriction near the ostium to the ductus seminalis; in *P. ainsliei* it forms a plate on the dorsolateral surface of the posterior one-fourth of the corpus bursae; and in *P. kingi* both of these elements are present. The ductus bursae in *P. powelli* is not sclerotized.

This species appears to be a resident of the high plains east of the Rocky Mountains. We examined specimens from Larimer, Otero, and Weld counties, Colorado; Custer County, Montana; Dona Ana County, New Mexico; and Weston County, Wyoming. Adults fly from mid-June through August.

**93. *Pelochrista kingi*** Wright, 2008  
(Plate DD, 93a–e; Plate 40, 93a–g)

*Pelochrista kingi* Wright 2008:225; Gilligan and Wright 2013b:323.

**Holotype.** ♂, Canada, Saskatchewan, Saskatoon, K. M. King, 29 July 1923, CNC.

*Pelochrista kingi* resembles *P. ainsliei* in forewing pattern but is more grayish in overall appearance and often has reddish-brown tints in the apical area. The specimen illustrated in Plate DD:93e represents some especially gray *kingi*-like populations in Colorado, Utah, and Wyoming located at elevations of about 9,000–10,000 feet. They are a little larger than typical *P. kingi* (mean FWL = 9.6 vs. 8.8 mm), but they agree with *P. kingi* in male genitalia. We have not seen any females from these populations, but we tentatively refer the males to *P. kingi*.

In males, the cucullus is rectangular and slightly better defined than in the other members of the group by a shallow indentation of the ventral margin of the neck. Females have a Type II sterigma, a ductus bursae that is almost entirely sclerotized, and a corpus bursae with only one signum.

Most of the specimens we examined were collected in Alberta, British Columbia, Saskatchewan, Montana, South Dakota, and Wyoming between late June and early September at elevations of 1,200–7,500 feet. There is one August record from Coconino County, Arizona, and the higher elevation gray specimens were collected in Grand County, Colorado; Sanpete County, Utah, and Carbon County, Wyoming in late July and early August.

## Species not assigned to a group

**94. *Pelochrista blanchardi*** (Wright, 2012)  
(Plate DD, 94a–d; Plate 41, 94a–e)

*Eucosma blanchardi* Wright 2012:27.

*Pelochrista blanchardi*: Gilligan and Wright 2013b:318.

**Holotype.** ♂, Arizona, Pima County, Madera Canyon, Santa Rita Mountains, R. W. Hodges, 4,400 feet, 12 October 1959, USNM.

*Pelochrista blanchardi* is a relatively small species (mean FWL = 6.7 mm). The forewing has brown fasciate markings and white interfascial areas, the latter lightly reticulated with gray and/or brown. The subbasal fascia is represented by a bar from the inner margin to the cell; the bandlike median fascia is often complete from mid-costa to the pretornal portion of the inner margin but is sometimes interrupted on the radius. In very pale specimens (Plate DD:94d) these markings can be difficult to discern. The ocellus is well expressed, with pinkish bars on the lateral margins and with 0–3 black dots on a white central field. Other Nearctic *Pelochrista* with similar forewing appearance (e.g., *P. mescalerana*, *P. momana*, and members the *palabundana* group) are distinguishable from *P. blanchardi* by size and/or genitalia.

In males, the socii are long and attenuate to a narrowly rounded apex, the sacculus corner is angular (SA = 128°), and the neck is long and narrow (NR = 0.42). The cucullus has a well developed dorsal lobe, a weakly developed ventral lobe, and a basoventral margin that extends in a ridgelike fashion onto the medial surface of the neck. The distal margin of the cucullus is evenly convex and has a series of 7–8 marginal spines distributed from the anal angle to three-fourths the distance to the apex. Females have a Type II

sterigma, a rectangular lamella postvaginalis (width about twice length), an absence of sclerotization on the ductus bursae, and two signa of unequal size in the corpus bursae. The male genitalia are similar to those of *P. mescalerana*, but in the latter species the basoventral margin of the cucullus does not extend onto the neck, and the marginal spines are more numerous (12–13 vs. 7–8) and not as stout. Females of the two species differ in sterigma Type (II vs. III) and papillae anales Type (3 vs 2).

We examined specimens from Pima and Santa Cruz counties, Arizona; Grant, Otero, and Sierra counties, New Mexico; and Brewster, Culberson, Presidio, Terrel, and Val Verde counties, Texas. Adult capture dates range from late July to mid-October.

### **95. *Pelochrista johnstoni* (Wright, 2012)**

(Plate DD, 95a–b; Plate 41, 95a–e)

*Eucosma johnstoni* Wright 2012:34.

*Pelochrista johnstoni*: Gilligan and Wright 2013b:322.

**Holotype** (Plate DD:95a). ♂, Arizona, Mojave County, 3 mi SE of Kingman, P. A. Opler and J. A. Powell, 3 June 1968, slide JAP 3657, EME.

*Pelochrista johnstoni* is a moderately small species (mean FWL = 7.6 mm) with mostly yellowish-brown markings on an otherwise white forewing. The maculation includes thin subradial and subcubital bands that are often overlaid with black scaling (reminiscent of *P. morrisoni*), a median bar joining the two bands, and a narrow salt-and-pepper-colored band on the termen. The markings are variably expressed and sometimes interrupted, producing a somewhat mottled overall appearance. The ocellus is obscure but detectable, with a transverse series of three or four dots in the central field; the costal strigulae are whitish and vaguely delimited by yellow-brown marks and striae; and the fringe is white with a thin blackish line from the tornus to the apex. The forewing pattern is somewhat similar to that of *P. serpentana*, but the latter species is slightly larger (mean FWL = 8.5 vs. 7.6 mm) and usually has brownish-gray markings. The two species are easily separated by genitalia.

Males are similar in genitalia to *P. invicta* and *P. subinvicta* but *P. johnstoni* is readily distinguished from those taxa by size (mean FWL = 7.6 vs. 14.7 and 13.6 mm) and forewing appearance. Females have a simple U-shaped sterigma. The rectangular lamella postvaginalis is platelike, with lateral edges curled inward, and lacks microtrichia; the lamella antevaginalis is narrow, ringlike, and weakly sclerotized.

This species is poorly known but appears to be distributed through the arid Southwest. It was described from Mojave County, Arizona; Orange County, California; Hidalgo County, New Mexico; and Brewster County, Texas, where adults fly in May and June.

### **96. *Pelochrista ragonoti* (Walsingham, 1895)**

(Plate EE, 96a–f; Plate 41, 96a–e)

*Paedisca ragonoti* Walsingham 1895:503.

*Eucosma ragonoti*: Dyar 1903:179; Fernald 1903:460; Barnes and McDunnough 1917:169; Heinrich 1923:87; McDunnough 1939:45; Powell 1983:34; Brown 2005:326.

*Pelochrista ragonoti*: Gilligan and Wright 2013b:326.

*Eucosma ragonoti barnesiana* Dyar 1903:180; Barnes and McDunnough 1917:169; synonymy by Heinrich 1923:87.

*Pelochrista ragonoti barnesiana*: Gilligan and Wright 2013b:326.

**Types.** *Paedisca ragonoti*. Lectotype (here designated). ♀, Colorado, Larimer County, Loveland, 5,000 feet, Smith 31138, July 1891, BMNH(E) 819938, slide 11546, BMNH. *Eucosma ragonoti barnesiana*. Lectotype (here designated). ♂, Colorado, Garfield County, Glenwood Springs, W. Barnes, USNM.

Walsingham's (1895) description of *P. ragonoti* mentions "several specimens" (including both sexes) collected by W. G. Smith at Loveland, Colorado. The lectotype designated here was selected by Obratzov from a series of 13 specimens (11 ♂, 2 ♀) in the BMNH. Dyar (1903) proposed the name *E. ragonoti barnesiana* for seven specimens from Glenwood Springs, Colorado that he considered to have unusual markings, but Heinrich (1923) relegated the subspecific name to synonymy, pointing out that the form recognized by Dyar is just one of several forewing variants of *P. ragonoti*. The lectotype is labeled "type" and has been referred to as a holotype by Brown (2005) and as a lectotype by Gilligan and Wright (2013b).

*Pelochrista ragonoti* is easily recognized by forewing appearance, which features olive-gray markings on an otherwise white background. The markings include three outwardly oblique bands from the costa to the inner margin, one at the base, one in the subbasal position, and one in the median position. The median band is connected to the apex by a diagonal band with subapical branches to the costa and termen. Variations include interruptions in one or more of the markings and sometimes additional subdivisions of the white background.

In males, the vesica lacks cornuti, and the valva has a concave costal margin, a shallow ventral emargination, a broad neck (NR = 0.77), and a moderately angulate saccular corner (SA = 152°). The cucullus is nearly uniform in width and has a series of about 10 marginal spines distributed along the ventral three-fourths of the distal margin. In females, the sterigma is Type II, and the lamella postvaginalis is elongate, with the posterior margin deeply indented and with numerous long hairlike setae flanking a shallow microtrichiate central trough. The ductus bursae lacks sclerotization, and the corpus bursae has two signa, one of medium size, the other minute.

This species is common in sagebrush habitat in the high plains east of the Rocky Mountains. We examined specimens from northeastern California, Colorado, Montana, New Mexico, North Dakota, South Dakota, Texas, Utah, and Wyoming. Adults fly from late July through September.

## 97. *Pelochrista kandana* (Kearfott, 1907)

(Plate EE, 97a–f; Plate 42, 97a–i)

*Eucosma kandana* Kearfott 1907b:20; Barnes and McDunnough 1917:169; Wright 2007:46.

*Eucosma argillacea* Meyrick 1912:34, unnecessary replacement name for *kandana*.

*Eucosma perdricana*: (not Walsingham, 1895) Heinrich 1923:99; McDunnough 1939:46; Powell 1983:34; Brown 2005:325.

*Pelochrista kandana*: Gilligan and Wright 2013b:323.

**Lectotype** (designated by Klots 1942). ♂, Utah, Tooele County, Stockton, T. Spalding, slide CH 16 Dec 1919, AMNH.

*Eucosma kandana* was based on six syntypes (1 ♂, 1 ♀ in the AMNH; 1 ♂, 3 ♀ in the USNM), all collected by Tom Spalding at Stockton, Utah. Heinrich (1923) stated that the "Type" is in the AMNH but did not indicate its sex. Klots (1942) reported a male lectotype in the AMNH, so we attribute the designation of the lectotype to him. Heinrich (1923) treated *E. kandana* as a junior synonym of *E. perdricana*, based on his examination of the Kearfott syntypes and on Walsingham's description of the latter species. Wright (2007) examined the lectotype of *E. perdricana*, observed that it differs from *E. kandana* in size and genitalia, resurrected the latter name, and treated *E. perdricana* as a junior synonym of *E. irroratana*.



*Pelochrista kandana* is a non-descript golden-brown species of medium size (mean FWL = 8.5 mm). The forewing has vaguely defined brownish reticulations on a pale yellowish background, producing a somewhat mottled effect. The only markings are a thin dark line on the cubitus from the base to mid-wing and a vaguely discernable ocellus, the central field of the latter often with a few black dots. Most specimens have a narrow, weakly-expressed, salt-and-pepper-colored band on the termen. Other Nearctic *Pelochrista* with similar looking forewings include *P. irroratana*, *P. occipitana*, *P. lafontainei*, pale specimens of *P. ainsliei*, and some phenotypes of *P. comatulana*, all of which are distinguished from *E. kandana* by genitalia.

In males, the uncus is triangular and clearly differentiated from the dorsolateral shoulders of the tegumen, the ventral emargination of the valva is moderate, NR = 0.61, SA = 138°, and the distal margin of the cucullus has a series of 5–6 marginal spines from the anal angle to about one-half the distance to the apex. Cucullus shape is somewhat variable (Plate 42:97a–f) and often includes a small indentation in the distal margin near the anal angle. In females, the sterigma is Type II, the ductus bursae is sclerotized from the ductus seminalis nearly to the constriction anterior to the ostium, and the corpus bursae has two signa of distinctly different sizes.

We examined specimens from California, Colorado, Idaho, southwest Kansas, Montana, Nevada, New Mexico, Oregon, Utah, and Washington. Adults fly from mid-June to late August.

## 98. *Pelochrista nandana* (Kearfott, 1907)

(Plate EE, 98a–c; Plate 42, 98a–f)

*Eucosma nandana* Kearfott 1907b:17; Barnes and McDunnough 1917:170; Heinrich 1923:119; McDunnough 1939:47; Powell 1983:34; Miller 1987:52; Brown 2005:324; Gilligan *et al.* 2008:110.

*Eucosma chersaea* Meyrick 1912:34, unnecessary replacement name for *nandana*.

*Pelochrista nandana*: Gilligan and Wright 2013b:325.

**Lectotype** (designated by Heinrich 1923). ♀, Canada, Manitoba, Rounthwaite, Marmont, July, slide M. A. Menke 412792, AMNH.

Kearfott (1907b) mentioned six syntypes from Rounthwaite, Manitoba; Regina, Saskatchewan; Chicago, Illinois; and Iowa. Klots (1942) reported three syntypes (1 ♂, 2 ♀) in the AMNH, only one of which is from Rounthwaite, Manitoba, so Heinrich's (1923) remarks constitute a lectotype designation.

*Pelochrista nandana* is a large species (mean FWL = 12.8 mm) with a uniformly brown to charcoal-gray forewing that is densely speckled with white, the latter effect produced by whitish-tips on otherwise dark scales. The only markings are a subbasal fascia, usually discernable as a dark shade from the inner margin to the cell and, sometimes, a barely contrasting pretornal mark. Somewhat similar looking eucosmines include *Eucosma landana* Kearfott and *Eucosma sombreana* Kearfott, each of which is distinguished from *P. nandana* by genitalia (see Wright and Gilligan 2015: species 10 and 15, respectively).

In males, the uncus is broad and weakly differentiated from the dorsolateral shoulders of the tegumen, the socii are broad basally and taper distally to a narrowly rounded apex, the valva is somewhat spatulate and has a weakly concave costal margin, a shallow ventral emargination, a relatively long and broad neck (NR = 0.63), and a weakly angulate saccular corner (SA = 146°). The cucullus has a series of 6–8 marginal spines projecting from the semicircular anal angle. Females have a Type II sterigma, a rectangular lamella postvaginalis, a weakly sclerotized and ringlike lamella antevaginalis, a trapezoidal sternum 7 with evenly distributed scaling, two pockets in the membrane between sterna 6 and 7 at the anterolateral corners of sternum 7, a small patch of sclerotization on the ductus bursae near the ductus seminalis, a large heart-shaped sclerotized plate on the dorsal surface of the corpus bursae that extends slightly onto the ductus bursae, and two signa in the corpus bursae with the smaller medially located on the sclerotized patch.

This is a Midwestern species that seems to prefer prairie habitat. We examined specimens from Illinois, Indiana, Nebraska, Ohio, and Wisconsin; Kearfott (1907b) mentioned syntypes from Manitoba, Saskatchewan, and Iowa; and Miller (1987) reported records from Minnesota. Adult capture dates range from 12 August to 3 October.

**99. *Pelochrista corosana*** (Walsingham, 1884)

(Plate FF, 99a–o; Plate 43, 99a–o)

*Paedisca corosana* Walsingham 1884:139.

*Eucosma corosana*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:127; McDunnough 1939:47; Brown 2005:318.

*Pelochrista corosana*: Powell 1983:35; Miller 1987:55; Wright 2007c:118; Gilligan et al. 2008:118; Gilligan and Wright 2013b:319.

*Eucosma nuntia* Heinrich 1929:10; McDunnough 1939:47; Powell 1983:35; Brown 2005:324; Wright 2007c:123; new synonymy.

*Pelochrista nuntia*: Gilligan and Wright 2013b:325.

**Types.** *Paedisca corosana*. Holotype (Plate FF:99a, Plate 43:99a). ♂, Montana, Yellowstone River, Morrison, 1880, slide 11570, BMNH(E) 819934, BMNH. *Eucosma nuntia*. Holotype (Plate FF:99b, Plate 43:99b). ♂, Utah, Juab County, Callao, 17 June 1922, slide 72811, USNM.

Walsingham (1884) described *P. corosana* from a single male (deposited in the BMNH) that was collected by H. K. Morrison in the high plains of southeastern Montana. Heinrich (1923) did not examine that specimen. His interpretation of this taxon is represented by a male in the USNM from Denver, Colorado that has moderately prominent subbasal and median fasciae (much like the specimen in Plate FF:99k) and a valva shape (Heinrich 1923, figure 219) similar to that in Plate 43:99i. This forewing phenotype is common in the Great Plains and has been accepted by later authors (e.g., Miller 1987; Wright 2007c; Gilligan et al. 2008) as typical of *P. corosana*.

Heinrich (1929) described *E. nuntia* from three specimens (2 ♂, 1 ♀) collected at Callao, Utah, a small community at the southwestern corner of the Great Salt Lake Desert. He labeled one of the males as the “Type,” illustrated its genitalia, and referred to the other two specimens as paratypes, hence the holotype designation. The USNM has the holotype and two males bearing Heinrich’s “PARATYPE” labels, so it appears that Heinrich misidentified the sex of one of the specimens in the type series. He also misreported the capture date of the holotype and one of the paratypes as “17-IV-22” rather than 17 June 1922. Heinrich distinguished *E. nuntia* from *P. corosana* by its paler and less prominently marked forewing and its “different” genitalia.

We examined the holotypes of *P. corosana* and *P. nuntia* and found them to be indistinguishable in both forewing appearance (Plate FF:99a–b) and genitalia (Plate 43:99a–b), hence the new synonymy. We also examined 282 adults (210 ♂, 72 ♀) previously determined as *P. corosana* or *P. nuntia* and 74 associated genitalia preparations (62 ♂, 12 ♀). These specimens agree in forewing pattern but differ in color and in the degree of contrast between the interfascial areas and the fasciate markings (Plate FF). We found no substantial variation in the female genitalia, but females of some phenotypes were not available for examination. The male genitalia vary in three primary respects (Plate 43): the shape of the cucullus, the number of marginal spines, and the shape of the basal process. This material may represent two or more distinct taxa, but we were unable to further subdivide it into well-circumscribed species due to intergradation of character states in the male valva.

*Pelochrista corosana* is a medium sized species (mean FWL = 8.9 mm). Forewing color varies from pale brown (Plate FF:99e) to pale olive gray (Plate FF:99j) to dark olive brown (Plate FF:99c), often with grayish tints in the interfascial areas. Individuals from northern California (Plate FF:99d) often have an orange-brown appearance, and some specimens from Coconino County, Arizona (Plate FF:99o) have interfascial areas that are strongly suffused with shades of wine red. The markings include an incomplete (sometimes

barely discernable) subbasal bar from the inner margin to the cell, a variably expressed median band from mid-costa to the tornus, and a triangular subapical patch, the last sometimes not detectable in pale specimens but usually prominent in well-marked individuals. The distal margin of the median band is defined by a whitish line that is particularly conspicuous along the proximal margin of the ocellus; the ocellus is obscure but discernable; the termen has a narrow whitish line from approximately  $CuA_1$  to the apex; and the distal one-half of the costa has pale strigulae that are variably delimited by darker costal marks and striae.

In males, the uncus is triangular and clearly differentiated from the dorsolateral shoulders of the tegumen, with a weakly developed bulgelike projection on the ventral surface at the base of the socii; the socii are fingerlike, with the distal one-half tapering toward the apex; the phallus is long and narrow, with the base loosely surrounded by the anellus; the vesica has 5–17 cornuti; and the valva has a weakly concave costal margin, a shallow ventral emargination, a long and laterally arched neck ( $NR = 0.59$ ), and an angular saccular corner ( $SA = 130^\circ$ ). The basal process varies from tonguelike (Plate 43:99l–m) to tablike (Plate 43:99j–k) to weakly developed (Plate 43:99a–i); the cucullus varies in the shapes and comparative sizes of the dorsal and ventral lobes and in the number of marginal spines (1–8); and the medial surface of the cucullus is coarsely setose. In females, the papillae anales have hook-tipped setae on the anterior lobes and along the margins of the ventral opening; the Type II sterigma is U-shaped; the central trough of the lamella postvaginalis is weakly depressed and microtrichiate; the lamella antevaginalis is ringlike and often weakly developed, with the anterior margin of the ostium sometimes barely differentiated from the posterior margin of sternum 7; sternum 7 is large, trapezoidal, and weakly raised in a bulgelike fashion near the posterior margin; the ductus bursae has a sclerotized patch near the juncture with the ductus seminalis; and the corpus bursae has two large signa of equal size that are symmetrically located near the juncture with the ductus bursae and project anteriorly into the bursa.

There appears to be some geographic influence on the distribution of forewing phenotypes. The dominant form in the Great Plains is illustrated in Plate FF:99j–l, where the fasciate markings tend to be moderately to strongly expressed and the color varies from olive-gray to blackish-gray. That phenotype extends into Arizona and New Mexico (Plate FF:99m–o), where the color is often brownish or includes reddish suffusion. The male genitalia of these specimens have a cucullus shape that conforms to those illustrated in Plate 43:99i–m and a basal process that varies from tablike (Plate 43:99i) to tonguelike (Plate 43:99m), with varying intermediate degrees of development. The phenotypes with less strongly expressed subbasal and median fasciae (Plate FF:99a–i) are broadly distributed through western United States and have valvae with weakly-developed semi-tablike basal processes (Plate 43:99a–i). The paler individuals (Plate FF:99b, d, e) tend to be associated with the Great Basin region but are not unknown in Wyoming and eastern Colorado (Plate FF:99f, h), and the dark forms (Plate FF:99c) have been collected in southwestern North Dakota and western Kansas. The specimens illustrated in Plate FF:99g–i are somewhat intermediate in the expression of the fasciate markings and are poorly represented in the material examined. We found only a few such individuals (from Colorado, Nevada, and Wyoming), none of which were female.

Adult capture dates range from late May to early October, with one specimen from Coconino County, Arizona dated 10 January.

## **100. *Pelochrista scintillana* (Clemens, 1865)**

(Plate GG, 100a–o; Plate 44, 100a–k)

*Collimosema scintillana* Clemens 1865:142.

*Eucosma scintillana*: Heinrich 1923:97; McDunnough 1939:46; Darlington 1947:95; Miller 1973:221.

*Pelochrista scintillana*: Powell 1983:35; Miller 1987:55; Brown 2005:481; Gilligan et al. 2008:117; Powell and Opler 2009:135;

Gilligan and Wright 2013b:327.

*Paedisca circulana* (not Hübner): Fernald 1882:36 (senior synonym of *C. scintillana*).

*Eucosma circulana* (not Hübner): Fernald 1903:455; Barnes and McDunnough 1917:169 (senior synonym of *E. scintillana*).

*Paedisca dodecana* Zeller 1875:311; Fernald 1882:36 (junior synonym of *Paedisca circulana*).

*Eucosma dodecana*: resurrected by Barnes and McDunnough 1917:169; Heinrich 1923:97 (junior synonym of *E. scintillana*).

*Pelochrista dodecana*: Gilligan and Wright 2013b:327.

*Eucosma randana* Kearfott 1907b:21; Barnes and McDunnough 1917:169.

*Eucosma paraglypta*: Meyrick 1912:34, unnecessary replacement name for *randana*.

*Pelochrista randana*: Brown 2005:481; Gilligan and Wright 2013b:327.

*Eucosma scintillana randana*: Heinrich 1923:97.

*Pelochrista scintillana randana*: Powell 1983:35.

**Types.** *Collimosema scintillana*. Holotype (Plate GG:100a). ♂, type locality unknown, Type no. 7212, ANSP. *Paedisca dodecana*. Lectotype (here designated, Plate GG:100b). ♂, Texas, L[ö]w 71, 24/5, BMNH(E) 819916, BMNH. *Eucosma randana*. Lectotype (here designated, Plate GG:100c, Plate 44:100b). ♂, Colorado, Denver, E. J. Osler, slide DJW 1181, AMNH.

In remarks following his description of *C. scintillana*, Clemens (1865) stated that he originally had two specimens of this species and that one had been accidentally destroyed. The surviving specimen has been interpreted as a holotype by various authors (Darlington 1947; Miller 1973; Brown 2005; Gilligan and Wright 2013b) and is so treated here.

Prior to the widespread taxonomic use of genitalia characters, *P. scintillana* frequently was confused with *Eucosma circulana*. The checklists published by Fernald (1882, 1903) and Barnes and McDunnough (1917) treated *scintillana* as a junior synonym of *circulana*, but Heinrich (1923) recognized the distinction between the two taxa and restored *scintillana* to species status, placing it in *Eucosma*. Sixty years later, Powell (1983) transferred *E. scintillana* to *Pelochrista*.

Zeller (1875) did not indicate the number of syntypes supporting the description of *P. dodecana*, but he specifically mentioned two males collected by Belfrage on 24 and 29 May in Texas, and he also referred to some “greasy females.” We located nine specimens that likely were part of the type series, four males in the BMNH (including the two collected by Belfrage) and five specimens (3 ♂, 2 ♀) in the MCZ that were collected by Boll at Dallas, Texas. The latter five were reported by Miller and Hodges (1990) and by Brown (2005). Eight of these specimens bear green determination labels handwritten by Zeller as follows: *Paedisca dodecana* Z. (1 ♂, MCZ), *Grapholitha dodecana* Z. (2 ♂, 2 ♀, MCZ), *dodecana* Z. (1 ♂, BMNH), *Gr. dodecana* Z. (1 ♂, BMNH), and *Grapholitha doedacana* Z. (1 ♂, BMNH). The ninth, though lacking a determination label, was retained by Zeller and eventually passed by way of the Walsingham collection to the BMNH. Zeller did not necessarily attach a determination label to every specimen in a type series (K. Tuck, pers. comm.), so the ninth specimen may well have been one of the original syntypes. The ambiguity in generic assignment on the designation labels suggests that Zeller was initially undecided as to the proper placement of *dodecana* and, after publishing the name under *Paedisca*, neglected to revise the other labels. One of the BMNH specimens was labeled “Type” by Durant, but it lacks an abdomen (K. Tuck, pers. comm.). One of the MCZ specimens bears a red label with the inscription “*Grapholitha dodecana*, LECTOTYPE, des. W. E. Miller”, but that designation was never published (W. E. Miller, pers. comm.). We designate here as lectotype for *P. dodecana* the specimen in the BMNH dated 24/5, which appears to be one of the two males specifically mentioned by Zeller. The conspecificity of *dodecana* and *scintillana* was proposed by Fernald (1882, 1903), who considered both names to be synonyms of *circulana*. Barnes and McDunnough (1917) regarded *dodecana* as a distinct taxon, and Heinrich (1923), after distinguishing between *P. scintillana* and *E. circulana*, treated *dodecana* as a synonym of *scintillana*.

Kearfott (1907) described *Eucosma randana* from eight specimens collected by E. J. Osler at Denver and Clear Creek, Colorado. We found what we believe to be all of the syntypes, three (2 ♂, 1 ♀) in the AMNH, five (4 ♂, 1 ♀) in the USNM. Heinrich (1923) used the name *randana* in a subspecific capacity for what he considered a western race of *E. scintillana*. He mentioned a “Type” from Denver in the AMNH but did not specify its sex. Klots (1942) interpreted Heinrich’s remarks as a lectotype designation and



placed one of his “LECTOTYPE” labels on the only Denver male in the AMNH. However, the female in the AMNH is also from Denver, so to avoid possible confusion we designate here as lectotype the specimen so interpreted by Klots. Following Heinrich (1923), Powell (1983) listed *randana* as a subspecies of *P. scintillana*. Brown (2005) treated *randana* as a synonym of *P. scintillana*.

We examined 425 specimens (299 ♂, 126 ♀) previously determined as *P. scintillana* or *P. s. randana*, including individuals from 39 states and 5 Canadian provinces. We found considerable variation in forewing appearance (as illustrated in Plate GG), but no clear pattern of geographic segregation of forewing phenotypes. The range documented by this material extends across North America from southern Canada to the Gulf of Mexico. We also examined 52 genitalia preparations (32 ♂, 20 ♀) and found a moderate amount of variation (Plate 44) but no consistent relationships between forewing phenotype, valva shape, and/or sterigma shape. Consequently, we tentatively refer all of this material to *P. scintillana*.

*Pelochrista scintillana* is a medium-sized species (mean FWL = 9.1 mm), but the variation in FWL is quite large (5.6–14.5 mm). Specimens from the western one-third of the United States tend to be slightly larger than those from the eastern two-thirds. We compared FWL values for 56 individuals collected in or west of the Rocky Mountain region with 102 individuals collected in or east of the Great Plains, obtaining ranges of 7.4–14.5 mm (mean = 11.0) and 5.6–12.0 mm (mean = 8.6), respectively.

The most striking feature of the *P. scintillana* forewing is the large circular ocelloid region, the dorsal one-half of which contains three prominent rows of five black dots, each separated into groups of one or two dots by three transverse metallic-gray bars. In most specimens (e.g., Plate GG:100a, e, h) the costal one-half of the ocelloid region is filled with alternating dark and light longitudinal streaks along the veins, but in some phenotypes those streaks are barely discernable due to extensive dark suffusion (e.g., Plate GG:100k, o). In most specimens, the area between the costa and the ocelloid region is yellow, orange, or gold with various transverse metallic gray striae and with four pairs of conspicuous white costal strigulae. Again, there are exceptions among the darker phenotypes (e.g., Plate GG:100k–l). Usually the proximal one-half of the wing is predominantly gray to gray brown, but in the specimen depicted in Plate GG:100n (from the sand prairies of eastern Colorado) that region is entirely yellow. Other markings include a whitish streak on the radius from base to mid-wing that varies from conspicuous (Plate GG:100a, g, m) to absent (Plate GG:100l, n, o) and a narrow transverse band from mid-costa to the inner margin that varies in color from dark gray brown (Plate GG:100e, f, l) to orange (Plate GG:100m) and is sometimes not expressed (Plate GG:100g, n).

*Pelochrista scintillana* resembles *P. fraudabilis* (species 38) and *P. fratrueis* (species 157) in the appearance of the distal one-third of the forewing, but it differs from those taxa in the number of rows of black dots in the ocellus (3 vs. 4), in the lack of a gray-brown basal patch (present in *P. fratrueis*), and in the lack of two conspicuous transverse bands in the median area (present in *P. fraudabilis*). Moreover, *P. scintillana* is somewhat larger than *P. fraudabilis* and substantially larger than *P. fratrueis* (mean FWL = 9.1 mm vs. 7.1 and 5.9 mm, respectively). The three species are readily separated by genitalia.

In males, the uncus is triangular and clearly differentiated from the dorsolateral shoulders of the tegumen, the socii are moderately broad basally and taper to a narrowly rounded apex, and the vesica has 1–2 cornuti. The costal margin of the valva is concave, the ventral emargination is moderate (NR = 0.62), and the saccular corner is angulate (SA = 128°). The cucullus is somewhat variable (Plate 44:100a–f) in shape and has a stout anal spine. In females, the papillae anales have arched transverse cross-sections and hook-tipped setae on the anterior lobes and along the margins of the ventral opening, the sterigma is Type II and U-shaped, the lamella postvaginalis is rectangular but somewhat variable in shape (Plate 44:100g–k) with hairlike setae flanking a shallow microtrichiate central trough, sternum 7 is trapezoidal (width at the anterior margin 2–3 × that at the posterior margin) with a strongly sclerotized band that arches along the lateral and posterior margins from one anterolateral corner to the other, the ductus bursae has a variably expressed and weakly sclerotized patch near the juncture with the ductus seminalis, and the corpus bursae



has two signa of distinctly different size. The sclerotized band on sternum 7 is sometimes weakly raised from the otherwise flat surface of the sternite, forming moundlike bulges along the lateral margins (Plate 44:100g, h).

The forewing phenotype represented by the lectotype (Plate GG:100a–f) is broadly distributed in North America, from the Pacific Coast to the Appalachian Mountains. Some of the other phenotypes seem to have more restricted ranges. One case, illustrated in Plate GG:100g–i, is characterized by the following features: the distal one-half of the wing is predominantly pale yellow (aside from the ocelloid region), the proximal one-half is gray to brownish gray, the white streak on the radius is conspicuous, and the median area lacks a dark transverse band. These specimens occur mostly from the upper Midwest to the Gulf Coast, but we have seen one individual from Golden, Colorado and one from Jemez Springs, New Mexico. The specimens of this type (Plate GG:100g–i) that we examined from Manitoba, South Dakota, Minnesota, Wisconsin, Nebraska, Kansas, western Iowa, and Arkansas have a conspicuous black spot on the vertex between the antennae; those from Louisiana and Mississippi lack such a spot. A second frequently encountered phenotype, illustrated in Plate GG:100k–l, has a nearly uniform brownish-gray forewing with little or no yellow coloration, a well-defined dark median band, and only weakly discernable streaks in the costal one-half of the ocelloid region. These individuals occur in a band from the central Midwest to the central East Coast, including Kansas, Iowa, Ohio, Kentucky, western Pennsylvania, Delaware, Maryland, and North Carolina. Plate GG:100j illustrates a specimen that is intermediate between the previous two phenotypes. The distinctive phenotypes illustrated in Plate GG:100n–o are currently represented by only a few specimens. The first (Plate GG:100n) is known from the high plains of eastern Colorado, the second (Plate GG:100o) from Coconino County, Arizona. We suspect that some of these phenotypes represent distinct species, but diagnosis of additional taxa based on the traditional morphological characters studied here is problematic due to a great deal of intergradation in forewing color and maculation and, in some cases, a lack of sufficient material for an adequate evaluation. Perhaps other information, such as larval hosts or molecular data, will someday provide a resolution of these issues.

Adults have been captured as early as mid-April and as late as mid-October, but the vast majority of records are from May through July. Walker (1936) reported rearing several adults from larvae feeding in the flower heads of *Helianthus* L. (sunflower) in Kansas.

## Section 4. Type 4 Papillae Anales.

### The *pulveratana* group (species 101–113)

Members of the *pulveratana* group are remarkably similar in forewing pattern and genitalia. They are particularly prevalent in western North America, but a few species occur in the Midwest, and one appears to be restricted to Florida. Walsingham described *Paedisca pulveratana* in 1879, and during the subsequent 130 years only four more names were proposed to accommodate the many specimens that had accumulated in institutional and private collections. Wright (2011a) reviewed the group, synonymized one of the early names, and described eight new species, for a group total of 12. Here we treat those 12 taxa and illustrate three putative morphospecies that are not sufficiently well understood to warrant formal descriptions. Circumscribing the western species is still a work in progress due to the difficulty in diagnosing the various taxa based on traditional morphological techniques. The group is defined by the following characteristics:

*Forewing.* Mean FWL = 6.4–11.7 mm; AR = 2.82–3.18; costa slightly arched; apex acute; termen straight to weakly convex; interfascial areas whitish to brownish gray, sometimes with reddish-brown

or pale orange tints; markings various shades of brown and often thinly edged with white; maculation including: a subbasal mark that extends from the inner margin nearly to the radius, a triangular pretornal mark, and a less conspicuous postmedian band from costa to mid-termen that is often interrupted near the costal terminus; ocellus present and varying from obscure to well defined.

*Male genitalia.* Uncus weakly differentiated from dorsolateral shoulders of tegumen, with apex rounded in *P. mirosignata* and *P. mojaveana* but otherwise divided into two small lobes by a shallow medial indentation; socii moderately short, fingerlike, attenuating distally, and often relatively broad at the base; phallus long and narrow, gradually tapering distally, with base loosely surrounded by anellus; vesica with 1–8 cornuti; valva with costal margin concave, ventral emargination moderate, neck short and broad, NR: 0.59–0.73, saccular corner angulate, SA: 32–138°, basal process conspicuous and tablike; cucullus with dorsal and ventral lobes moderately developed, apex variably rounded, anal angle approximately 90°, distal margin convex and bearing 1–8 marginal spines, setation of medial surface course.

*Female genitalia.* Papillae anales moderately setose; sterigma Type II, usually with lateral margins concave, posterolateral corners flared laterally, and posterior margin medially indented; lamella antevaginalis ringlike and variably sclerotized; sternum 7 trapezoidal, with posterior margin concavely emarginated to about one-half length of sterigma and with width at anterior margin about 3–4 × that at posterior extremity; sclerotization of sternum 7 strong in bands along lateral margins, weak medially; membrane between sterna 6 and 7 often with two pockets; ductus bursae usually with sclerotized patch between ductus seminalis and constriction anterior to ostium (absent in two species); interior surface of ductus bursae with patch of microtrichia near juncture with ductus seminalis; corpus bursae with two signa of unequal size, the larger located at about mid-bursa, the other closer to the ductus bursae; membrane adjacent to smaller signum sclerotized to varying degrees, from a broad plate extending laterally from the signum to a patch of conspicuous microspinules.

### **101. *Pelochrista pulveratana* (Walsingham, 1879)**

(Plate HH, 101a–d; Plate 45, 101a–j)

*Paedisca pulveratana* Walsingham 1879:45; Fernald 1882:40.

*Eucosma pulveratana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:128; McDunnough 1939:47; Powell 1983:35; Brown 2005:326; Wright 2011a:103.

*Pelochrista pulveratana*: Gilligan and Wright 2013b:326.

**Lectotype** (designated by Wright 2011a, Plate HH:101a). ♂, California, San Francisco, Walsingham, 16 May 1871, BMNH(E) 819980, slide 11527, BMNH.

Walsingham (1879) described *P. pulveratana* from four males that he collected near San Francisco, California. Obraztsov selected the lectotype, and Wright (2011a) published the designation.

This species is quite variable in size (FWL: 5.3–10.0 mm, mean = 7.7). The forewing is brownish gray, the semifasciate markings are dark brown, the interfascial areas have fine brown reticulations, the postmedian band is weakly expressed (sometimes barely discernable), and the costal strigulae are inconspicuous. Similar looking species include *P. consobrinana* and *P. coconana*. *Pelochrista pulveratana* differs from *P. consobrinana* in size (mean FWL = 7.7 vs. 6.4 mm), in geographic distribution (far western United States vs. central Great Plains), in the size of the sclerotized patch associated with the smaller signum (small vs. strongly developed laterally), and in the occurrence of intersegmental pockets between sterna 6 and 7 (absent vs. strongly developed). *Pelochrista coconana* is larger than *P. pulveratana* (mean FWL = 10.1 vs. 7.7 mm), has a larger SA (79° vs. 55°), and has a larger number of marginal spines on the cucullus (mean = 5.7 vs. 3.8). Currently it is known only from Coconino County in north central Arizona, where it is sympatric with *P.*

*pulveratana*. *Pelochrista pulveratana* has been confused at times with *Eucosma tomonana* (Kearfott) based on forewing appearance (see Wright and Gilligan 2015, species 97; Gilligan et al. 2008, species 116), but the latter species has an eastern distribution, lacks a costal fold at the base of the male forewing, and is readily separated from *P. pulveratana* by genitalia.

Historically, *P. pulveratana* has been a catchall taxon for the numerous similar looking western specimens in this group. We examined approximately 240 individuals that we refer to this species. They come from 12 counties in California (Modoc to San Diego); from Apache, Cochise, and Coconino counties in Arizona; and from southern and western New Mexico. The California specimens (Plate HH:101a–c) are substantially homogeneous in forewing appearance and genitalia, and they compare favorably with the lectotype. The Arizona and New Mexico populations (Plate HH:101d) exhibit greater variation in size, coloration, and genitalia and may represent two or more subtly different sibling species whose morphological features intergrade with those of *P. pulveratana*. Adult capture dates range from early March to November. In southern California, capture records have a bimodal distribution, with peaks in April–May and September–October, suggesting two annual broods.

## **102. *Pelochrista consobrinana* (Heinrich, 1923)**

(Plate HH, 102a–e; Plate 45, 102a–i)

*Paedisca consobrinana* Heinrich 1923:128.

*Eucosma consobrinana*: McDunnough 1939:47; Powell 1983:35; Brown 2005:318; Gilligan et al. 2008:114; Wright 2011a:104.

*Pelochrista consobrinana*: Gilligan and Wright 2013b:319.

**Holotype** (Plate HH:102a). ♂, South Dakota, Union County, Elk Point, C. N. Ainslie, August 1913, slide 72845, USNM.

Heinrich (1923) described this species from 10 specimens, seven (3 ♂, 4 ♀) in the USNM and three (2 ♂, 1 ♀) in the AMNH, all collected by C. N. Ainslie at Elk Point, South Dakota and Sioux City, Iowa. Heinrich identified the “Type” by illustrating its genitalia and referred to the other specimens as paratypes. We examined all 10 of these specimens, and the sex determinations reported here differ somewhat from those in Heinrich (1923).

*Pelochrista consobrinana* is similar in forewing appearance to *P. pulveratana* but is smaller (mean FWL = 6.4 vs. 7.7 mm) and usually has a dark mark at mid-costa that is absent to barely discernable in *P. pulveratana*. The ranges of the two species appear to be disjunct (central Great Plains vs. far western United States), but there is some confusion in New Mexico where there are populations of uncertain affiliation that intergrade between these taxa.

Intraspecific variation in the male genitalia of both species makes identification on that basis unreliable, but females present some distinctive characteristics. In *P. consobrinana*, the intersegmental membrane between sterna 6 and 7 has moderately deep pockets, and the sclerotized plate associated with the smaller signum is large though often somewhat fragmented. These female characters are not present in *P. pulveratana*.

The specimens we examined document a geographic distribution that extends from approximately the Mississippi River to the high plains on the eastern side of the Rocky Mountains and from southern Manitoba to Mississippi and southern Texas. In Texas there appear to be two adult flights: March–April and September–November. Most records from the central Great Plains are from August.

We also examined nearly 50 specimens from Catron, Cibola, Cochise, and Grant counties in New Mexico that intergrade between *P. consobrinana* and *P. pulveratana*. They are intermediate in size (mean FWL = 6.7 vs. 6.4 and 7.7 mm, respectively), have intersegmental pockets between sterna 6 and 7 that are

shallow vs. strongly developed or absent, and have a rather fragmented sclerotized section of the corpus bursae that is intermediate in size between those of *P. consobrinana* and *P. pulveratana*. These specimens may represent an undescribed species, but distinguishing it from *P. consobrinana* and *P. pulveratana* based on traditional morphological characters is problematic.

### 103. *Pelochrista suadana* (Heinrich, 1923)

(Plate HH, 103a–d; Plate 46, 103a–g)

*Eucosma suadana* Heinrich 1923:130; McDunnough 1939:48; Powell 1983:35; Brown 2005:327, Wright 2011a:105.

*Pelochrista suadana*: Gilligan and Wright 2013b:328.

*Eucosma aeana* McDunnough 1942:68; Powell 1983:35; Brown 2005:314, synonymy by Wright 2011a:105.

*Pelochrista aeana*: Gilligan and Wright 2013b:328.

**Types.** *Eucosma suadana*. Holotype (Plate HH:103a). ♂, Utah, Utah County, Vineyard, T. Spalding, 10 July 1912, slide 72802, USNM. *Eucosma aeana*. Holotype. ♂, Utah, Millard County, Filmore, D. H. Bishoff, 10 August 1940, slide TOR 4229, CNC.

*Pelochrista suadana* was described from seven specimens, five (3 ♂, 2 ♀) in the USNM and two (2 ♀) in the AMNH, all collected by Tom Spalding at Vineyard, Utah. Heinrich (1923) illustrated the male genitalia of the “Type” and referred to the other specimens as paratypes, hence the holotype designation. McDunnough (1942) based *E. aeana* on a single specimen.

This species is distinguished from other members of the group by its whitish interfascial areas. It is similar in many respects to *P. seamansi*, but the latter species is smaller (mean FWL = 8.0 vs. 10.0 mm), has considerable brownish-gray suffusion in the interfascial areas, and differs in geographic distribution (northern Great Plains vs. central Rocky Mountain and Great Basin regions). Males of *P. suadana* are not distinguishable from those of *P. seamansi* based on genitalia (average number of marginal spines = 5.9 and 5.8, SA = 66 and 62°, NR = 0.70 and 0.73, respectively), but females of the latter species have well developed pockets in the membrane between sterna 6 and 7, a feature that is absent in *P. suadana*.

We examined specimens from Cache, Millard, Uintah, and Utah counties, Utah; Nye, Teton, and White Pine counties, Nevada; and Albany and Sublette counties, Wyoming. Adult capture dates range from 6 June to 10 August.

### 104. *Pelochrista seamansi* (Wright, 2011)

(Plate HH, 104a–b; Plate 46, 104a–g)

*Eucosma seamansi* Wright 2011a:105.

*Pelochrista seamansi*: Gilligan and Wright 2013b:327.

**Holotype** (Plate HH:104a). ♂, Canada, Alberta, Lethbridge, H. L. Seamans, 13 July 1928, slide TOR 1772, CNC.

*Pelochrista seamansi* is a poorly known species from the northern Great Plains. It is similar to *P. suadana* in that the median fascia and postmedian band are strongly developed, but it differs from that species in size (mean FWL = 8.0 vs 10.0 mm) and in the color of the interfascial areas (generously suffused with brownish gray vs. mostly white). Males of the two species are not separable based on genitalia; females differ in the development of the pockets between sterna 6 and 7 (moderately deep in *P. seamansi*, absent in *P. suadana*).

This species appears to be associated with prairie habitat. We examined specimens from Lethbridge, Alberta; Aweme and Cartwright, Manitoba; and Johnson and Pocahontas counties, Iowa. Adult capture dates range from 6 June and 25 August.

**105. *Pelochrista coconana*** (Wright, 2011)

(Plate II, 105a–c; Plate 46, 105a–g)

*Eucosma coconana* Wright 2011a:110.

*Pelochrista coconana*: Gilligan and Wright 2013b:318.

**Holotype.** ♂, Arizona, Coconino County, Fort Valley, 7.5 mi NW of Flagstaff, 7,350 feet, J. G. Franclemont, 22 July 1964, USNM.

*Pelochrista coconana* is similar in size to *P. suadana*, *P. sepiana*, and *P. mirosignata* (mean FWL = 10.1 vs. 10.0, 9.8, and 9.8 mm, respectively). It differs from *P. suadana* and *P. sepiana* in forewing color (interfascial areas gray brown rather than white and yellow brown, respectively) and from *P. mirosignata* in color (brownish vs. grayish) and in the edging of the fasciate markings (subdued to absent in *P. coconana*, white and conspicuous in *P. mirosignata*).

This is the only described species in the group in which the saccular angle is nearly a right angle (SA = 79°), but there is a putative morphospecies discussed below as species 113a with SA = 85°. In *P. suadana* and *P. sepiana* the saccular angle is acute (66° and 59°, respectively); in *P. mirosignata* it is obtuse (122°). The female genitalia of *P. coconana*, *P. suadana*, and *P. sepiana* appear to be indistinguishable. In each of these species the membrane between sterna 6 and 7 lacks pockets and the sclerotization associated with the smaller signum in the corpus bursae is reduced to a patch of microspinules. Females of *P. mirosignata* have deep pockets and a large sclerotized plate on the corpus bursae that expands laterally from the smaller signum.

This species is currently known from a few locations near Flagstaff, Arizona. It was described from long series collected by Franclemont and Hodges in the 1960s. Adult capture dates range from 16 June to 9 September, but most of the records are from July.

**106. *Pelochrista sepiana*** (Wright, 2011)

(Plate II, 106a–c; Plate 47, 106a–g)

*Eucosma sepiana* Wright 2011a.

*Pelochrista sepiana*: Gilligan and Wright 2013b:327.

**Holotype** (Plate II:106a). ♂, Utah, Juab County, Eureka, T. Spalding, 16 August 1911, slide 95243, USNM.

*Pelochrista sepiana* is distinguished from the other members of the *pulveratana* group by forewing color: interfascial areas yellow brown, semifasciate markings a darker shade of the same color. It is similar to *P. suadana* and *P. coconana* in size (mean FWL = 9.8 vs. 10.0 and 10.1 mm), forewing shape (AR = 2.99 vs. 3.00 and 2.99), and forewing maculation (dark mark at mid-costa present in all three taxa). This species is sympatric with *P. suadana* in the central Rocky Mountain region, but its range appears not to overlap with that of *P. coconana* (Coconino County, Arizona). Females of all three species lack pockets in the membrane between sterna 6 and 7 and have the sclerotization of the corpus bursae near the smaller signum reduced



to a patch of conspicuous microspinules. Males exhibit subtle differences in the size of the saccular angle (SA = 59, 66, and 79°, respectively) but are otherwise indistinguishable based on genitalia.

We examined specimens from Bear Lake and Oneida counties, Idaho; Juab County, Utah; Walla Walla and Whitman counties, Washington; and Teton County, Wyoming. These sites vary in elevation from 950 feet (at Walla Walla, Washington) to 7,150 feet (in Bear Lake County, Idaho). Adult capture dates range from 11 July to 18 September. Two of the specimens from Pullman, Washington, were included by Kearfott (1907b) in the type series for *Eucosma palousana*, a name that was interpreted by Wright (2008) as a synonym of *P. biquadrana*.

We also examined 10 males in the AMNH, the CNC, and the USNM that closely resemble *P. sepiana* but differ slightly from the types in size (mean FWL = 10.6 vs. 9.8 mm) and in the color of the interfascial areas (pale brown vs. yellow brown) (Plate II:106c vs. 106a–b). They were collected at elevations between 7,500 and 10,000 feet in Colorado, Montana, Nevada, and New Mexico, and we tentatively refer them to *P. sepiana* until additional material, especially females, can be obtained for a complete comparison.

### **107. *Pelochrista parapulveratana* (Wright, 2011)**

(Plate II, 107a–f; Plate 47, 107a–f)

*Eucosma parapulveratana* Wright 2011a:110.

*Pelochrista parapulveratana*: Gilligan and Wright 2013b:325.

**Holotype** (Plate II:107a, Plate 47:107a). ♂, Kansas, Morton County, Cimarron River and Highway 51, G. J. Balogh, 25 September 1999, USNM.

*Pelochrista parapulveratana* is a medium-sized species (mean FWL = 8.7 mm) with a relatively narrow forewing (AR = 3.18). The interfascial areas vary from pale gray to pale brown and have very faint transverse reticulations; the semifasciate markings are brownish gray to blackish brown. This species is a resident of the high plains east of the Rocky Mountains, where it is sympatric with *P. consobrinana* and *P. costastriata*. It is larger and paler than *P. consobrinana* (mean FWL = 8.7 vs. 6.4 mm) and differs from *P. costastriata* in the form of the dark marks delimiting the costal strigulae (intermixed striate and triangular vs. striate only).

In males, the saccular corner is more narrowly tapered than in *P. consobrinana* (SA = 51° vs. 69°) and less so than in *P. costastriata* (SA = 32°). Females of *P. parapulveratana* and *P. costastriata* are virtually identical in genitalia. Both have shallow pockets between sterna 6 and 7 and a patch of microspinules in the corpus bursae surrounding the small signum. *Pelochrista consobrinana*, on the other hand, has relatively deep intersegmental pockets and a moderately large sclerotized plate associated with the small signum.

We examined specimens from southeastern Wyoming, eastern Colorado, southwestern Kansas, northeastern New Mexico, and the Texas Panhandle. Adult capture dates range from mid-May to late September.

### **108. *Pelochrista floridensis* (Wright, 2011)**

(Plate II, 108a–c; Plate 47, 108a–e)

*Eucosma floridensis* Wright 2011a:111.

*Pelochrista floridensis*: Gilligan and Wright 2013b:320.

**Holotype** (Plate II:108a). ♂, Florida, Highlands County, Lake Placid, Archbold Biological Station, D. C. Ferguson, 17 February 1985, USNM.

*Pelochrista floridensis* is known only from Florida and appears to be the only species in the *pulveratana* group that has been recorded from Florida. It is easily recognized by the pinkish tint in the distal one-half of the forewing and the wine-red postmedian band, two features that do not occur in other members of the group.

Males have a relatively small saccular angle ( $46^\circ$ ) and only 2–3 marginal spines; females have moderately deep intersegmental pockets and a patch of microspinules on the corpus bursae that extends laterally from the smaller signum.

We examined six specimens (5 ♂, 1 ♀), all from Highlands County, Florida. Four were collected in January and February, the other two in October and November.

### **109. *Pelochrista navajoensis*** (Wright, 2011)

(Plate JJ, 109a–c; Plate 48, 109a–g)

*Eucosma navajoensis* Wright 2011a:111.

*Pelochrista navajoensis*: Gilligan and Wright 2013b:325.

**Holotype** (Plate JJ:109a, Plate 48:109c). ♂, Utah, San Juan County, Comb Ridge W of Bluff, G. J. Balogh, 26 September 2003, slide 141863, USNM.

*Pelochrista navajoensis* is known only from the type series, which consists of 11 specimens (4 ♂, 7 ♀) collected from 19–27 September at approximately 4,500 feet elevation in southeastern Utah. It is recognized by its large size (mean FWL = 11.7 mm) and pale grayish-fawn forewing color. It might be confused with *P. mojaveana* (species 112) based on forewing color, but the latter species is smaller (mean FWL = 8.9 mm), has a rounded vs. bilobed uncus, an obtuse rather than acute saccular angle ( $133^\circ$  vs.  $66^\circ$ ), and a broad sclerotized plate vs. a patch of microspinules associated with the smaller signum. The only other *pulveratana*-like specimens of this size that we have encountered are discussed below under morphospecies 113b (mean FWL = 11.6 mm). They are much darker than *P. navajoensis* (Plate JJ:113b vs. 109a–c) and were collected in Teller County, Colorado in mid-July at an elevation of approximately 8,500 feet.

### **110. *Pelochrista costastriata*** (Wright, 2011)

(Plate JJ, 110a–c; Plate 48, 110a–i)

*Eucosma costastriata* Wright 2011a:114.

*Pelochrista costastriata*: Gilligan and Wright 2013b:319.

**Holotype** (Plate JJ:110a). ♂, Nebraska, Cherry County, Valentine National Wildlife Refuge, Hackberry Lake, R. W. Hodges, 30 June 1983, USNM.

This species is a resident of the central Great Plains. Historically it has been confused with the sympatric *P. consobrinana* (e.g., Miller 1987), but it is larger (mean FWL = 7.9 vs. 6.4 mm) and lacks the dark mark at mid-costa that is present in the latter species.

With regard to genitalia, *P. costastriata* differs from *P. consobrinana* in that the saccular corner is much more narrowly attenuated (SA =  $32^\circ$  vs.  $69^\circ$ ) and the sclerotization near the smaller signum consists of a patch of microspinules vs. a moderately large plate. In overall forewing appearance, *P. costastriata* most closely resembles *P. mirosignata* (species 111). Both have finely reticulated grayish interfascial areas, subbasal

and pretornal markings with conspicuous white edging, and fine striate dashes defining the costal strigulae. *Pelochrista mirosignata* differs from *P. costastriata* in having a rounded vs. bilobed uncus, an obtuse vs. acute saccular angle (SA = 122° vs. 32°), a broad sclerotized plate vs. a patch of microspinules surrounding the smaller signum, and a lack of sclerotization vs. a conspicuous sclerotized patch on the ductus bursae.

We examined 36 specimens that document a range extending from southeastern Montana, southeastern North Dakota, northern Wisconsin, and southwestern Michigan to the Texas Panhandle. Included are records from six counties in eastern Colorado and from several patches of remnant prairie near Chicago, Illinois. Adult capture dates range from 30 June to 11 September.

### 111. *Pelochrista mirosignata* (Heinrich, 1929)

(Plate JJ, 111a–c; Plate 49, 111a–i)

*Eucosma mirosignata* Heinrich 1929:11, McDunnough 1939:47; Powell 1983:35; Wright 2011a:114.

*Eucosma microsignata*: Brown 2005:324, misspelling.

*Pelochrista mirosignata*: Gilligan and Wright 2013b:324.

**Holotype.** ♂, Arizona, Pima County, Baboquivari Mountains, O. C. Poling, 15–30 October 1924, slide 70483, USNM.

Heinrich (1929) reported a type series comprised of 21 specimens (1 ♂, 20 ♀), 16 from Pima County, Arizona and the rest from four locations in southern California. He referred to the male as the “Type” and illustrated its genitalia. We located 18 of the females (13 in the USNM, 3 in the AMNH, 2 in the CNC), each of which bears Heinrich’s handwritten “PARATYPE” label.

The forewing is pale gray to brownish gray with conspicuous white edging on the margins of the dark brown subbasal and pretornal marks. The interfascial areas are faintly reticulated, the costal strigulae are defined by short thin striae, and the ocellus is bordered laterally by pinkish-gray lustrous bars. In these respects, *P. mirosignata* resembles *P. costastriata*, but it differs from that taxon in size (mean FWL = 9.8 vs. 7.9 mm), in geographic distribution (southwestern states bordering Mexico vs. central Great Plains), and in genitalia. Males are easily distinguished from those of *P. costastriata* by uncus shape (apex rounded vs. bilobed) and the size of the saccular angle (122° vs. 32°); and females by the lack of sclerotization of the ductus bursae and the presence of a large sclerotized plate on the surface of the corpus bursae.

We examined approximately 70 specimens collected in southern California, southern Arizona, southern New Mexico, and southwest Texas. Most of the locations are in counties bordering the Mexican border. Adult capture dates range from 24 March to 15 November, with concentrations in April and September.

### 112. *Pelochrista mojaveana* (Wright, 2011)

(Plate JJ, 112a–c; Plate 49, 112a–g)

*Eucosma mojaveana* Wright 2011a:117.

*Pelochrista mojaveana*: Gilligan and Wright 2013b:324.

**Holotype** (Plate JJ:112a, Plate 49:112d). ♀, California, San Bernardino County, Afton Road, 12 mi SW of Baker, Kitayama, Cave, and Chemsak, 23 April 1977, slide DJW 2287, EME.

*Pelochrista mojaveana* appears to be closest to *P. mirosignata*. It is a little smaller (mean FWL = 8.9 vs. 9.8 mm), and the forewing is orange brown rather than gray brown, but the two species are similar in

many other respects. Shared genitalia features include a rounded uncus, an obtuse saccular angle, pockets between sterna 6 and 7, a lack of sclerotization on the ductus bursae, and a substantial sclerotized plate associated with the smaller signum. *Pelochrista mojaveana* differs from *P. mirosignata* in the size of the saccular angle (138° vs. 122°), the depth of the ventral emargination of the neck (shallow vs. moderate), the number of marginal spines (2–4, mean = 2.6 vs. 5–8, mean = 6.3), the depth of the intersegmental pockets (shallow vs. deep), and the size of the sclerotized plate on the corpus bursae (moderate vs. large).

This species seems to be restricted to the Mojave Desert. We examined specimens from Mojave and Yavapai counties in western Arizona and from Imperial, Riverside, and San Bernardino counties in southern California. Most of the capture dates were from April, May, and June, but there was one each from late September and early October. In addition to this material, we examined four females in the CNC from Blythe, California that are somewhat darker in forewing appearance but otherwise similar to *P. mojaveana*, and we tentatively refer them to this taxon.

### 113. Miscellaneous morphospecies

(Plate JJ, 113a–c; Plate 49, 113a–c)

We encountered a fair number of *pulveratana*-like specimens that do not seem to be referable to any of the currently named species but which are not available in sufficient numbers for a proper comparison with those taxa. Here we illustrate three such putative morphospecies, each represented by males only. We leave their descriptions to a time when additional material, especially reliably associated females, can be obtained to support diagnoses.

**a.** (Plate JJ:113a, Plate 49:113a). The specimen illustrated in Plate JJ:113a is one of three males (in the EME) collected by A. J. Slater and J. A. Powell on 24 April 1966 at the mouth of the Ventura River in Ventura County, California. Its olive-brown forewing color sets it apart from the other species in the group. Morphological features include: mean FWL = 8.3 mm, AR = 2.94, uncus bilobed, SA = 85°, NR = 0.60, anal angle with 1–3 marginal spines.

**b.** (Plate JJ:113b; Plate 49:113b). This specimen is representative of 11 males collected in mid-July near Florissant in Teller County, Colorado. These specimens are similar to *P. navajoensis* in size and resemble *P. coconana* in forewing appearance. Their biometric data are as follows: mean FWL = 11.6 mm, AR = 3.15, SA = 71°, NR = 0.59, marginal spines: 4–8 (mean = 6.5).

**c.** (Plate JJ:113c; Plate 49:113c). The image depicts one of a rather long series of especially dark males collected by J. S. Nordin in late June and throughout July at Gelatt Lake in Albany County, Wyoming. In this case we have some similar looking females that may be conspecific with the males, but we cannot rule out the possibility that they are dark phenotypes of *P. suadana*, a species that also has been collected at this site. The male data include: mean FWL = 10.6 mm, AR = 3.17, SA = 100°, NR = 0.68, marginal spines: 3–5 (mean = 4.3). This is the only member of the group we have encountered with both a bilobed uncus and a saccular angle that is greater than 90°.

### The *palpana* group (species 114–116)

The next three species have similar genitalia but are easily distinguished by forewing appearance. Shared genitalia characteristics include:

*Male genitalia.* Uncus clearly differentiated from dorsolateral shoulders of tegumen; socii moderately long and fingerlike; phallus long and narrow, with base loosely surrounded by anellus; vesica with 3–42 cornuti; valva with costal margin weakly concave, ventral emargination shallow to moderate, NR: 0.50–0.81, SA: 140–147°; cucullus rectangular, with a coarsely setose medial surface, 1–4 marginal spines on the distal margin, and a stout anal spine at the weakly developed anal angle.

*Female genitalia* (*P. mediotriata* and *P. palpana*). Lamella postvaginalis U-shaped; sternum 7 rectangular, with small medial projection of the posterior margin shielding ostium; sclerotization of ductus bursae reduced (*P. mediotriata*) to absent (*P. palpana*); corpus bursae with one (*P. mediotriata*) or two (*P. palpana*) signa.

#### 114. *Pelochrista mediotriata* (Walsingham, 1895)

(Plate KK, 114a–f; Plate 50, 114a–d)

*Paedisca mediotriata* Walsingham 1895:508; Fernald 1882:39.

*Eucosma mediotriata*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:116; McDunnough 1939:47; Powell 1983:34; Brown 2005:323.

*Pelochrista mediotriata*: Wright 2008:221; Gilligan and Wright 2013b:324.

*Eucosma sepulcrana* Meyrick 1927:334.

*Eucosma sepulchrana*: synonymy by Clarke 1958:420 [misspelling of *sepulcrana*].

*Pelochrista sepulcrana*: Gilligan and Wright 2013b:324.

**Types.** *Paedisca mediotriata*. Lectotype (designated by Wright 2008). ♂, Colorado, Larimer County, Loveland, 5,000 feet, W. G. Smith, BMNH(E) 819936, slide JFGC 6388, BMNH. *Eucosma sepulcrana*. Lectotype (designated by Clarke 1958). ♂, Utah, Tooele County, Dividend, 26 June, slide JFGC 6386, BMNH.

Walsingham (1895) described *P. mediotriata* from five males collected at Loveland, Colorado by W. G. Smith. Obraztsov selected the lectotype, and Wright (2008) published the designation. Meyrick (1927) reported 12 syntypes of *E. sepulcrana*, all with the same data. Clarke (1958) designated the lectotype, illustrated its forewing and genitalia, and recognized its conspecificity with *P. mediotriata*.

The forewing color is variable (olive brown to yellowish brown to gray). The specific epithet refers to the longitudinal whitish streak in the cell, a feature that is prominent in many specimens (Plate KK:114a) and barely discernable in others (Plate KK:114d). Most specimens have some additional white streaking along the costa, the median branches, CuA<sub>2</sub>, and/or A<sub>1+2</sub>. The hindwings are black with white fringe.

In males, the vesica has 18–42 cornuti, the valval neck is broad (NR = 0.81), the saccular corner is moderately angulate (SA = 147°), and the medial surface of the valva has a bulgelike mound projecting from the ventral one-half of the distal margin of the basal excavation. The cucullus is weakly differentiated from the neck, the anal spine is long and moderately stout, and the distal margin has 2–4 marginal spines located midway between the anal angle and the apex. In females, the papillae anales are flat and sparsely setose; the lamella antevaginalis is membranous and somewhat ringlike; sternum 7 is rather narrow (length about 1.75 × width); the ductus bursae has a small sclerotized patch near the juncture with the ductus seminalis; and the corpus bursae has one small signum.

We examined about 174 specimens that document a range from south-central Washington to southeastern Alberta, and south to northern California, central Nevada, and the Texas Panhandle. Adult capture dates vary from 17 April (in Texas) to 12 August.



**115. *Pelochrista palpana*** (Walsingham, 1879)

(Plate KK, 115a–d; Plate 50, 115a–d)

*Paedisca palpana* Walsingham 1879:54; Fernald 1882:39.

*Eucosma palpana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:113; McDunnough 1939:47.

*Pelochrista palpana*: Powell 1983:34; Brown 2005:321; Wright 2008:226; Gilligan and Wright 2013b:325.

**Lectotype** (designated by Wright 2008). ♂, California, Shasta County, Pit River, Walsingham, 21–26 July 1871, BMNH(E) 819975, slide 11519, BMNH.

Walsingham (1879) reported six syntypes that he collected in northern California. Five of those specimens (4 ♂, 1 ♀) reside in the BMNH along with 36 additional specimens collected by Walsingham, probably at the type locality. Another six presumed topotypes are located in North American institutions, one in the AMNH and five in the USNM, the latter by way of the Fernald Collection. Obraztsov selected the lectotype, and Wright (2008) published the designation.

*Pelochrista palpana* is a relatively small species (mean FWL = 6.9 mm) with a brown forewing. The maculation includes subbasal and pretornal marks and a thin postmedian band, all of which contrast weakly with the generously reticulated interfascial areas. The costal strigulae are white and well defined, the ocellus is obscure, and the termen has a narrow salt-and-pepper-colored band from the tornus to the apex.

In males, the vesica has 8–14 cornuti, the valval neck tapers distally (NR = 0.52), and the saccular corner is broadly rounded (SA = 142°). The cucullus has a large anal spine and three marginal spines distributed along the ventral two-thirds of the distal margin. In females, the papillae anales have arched transverse cross-sections and long ventrally curving setae along the lateral margins; the lamella postvaginalis is U-shaped and broad (nearly as wide as the posterior margin of sternum 7), with clusters of hairlike setae on the posterolateral corners; sternum 7 is rectangular; the ductus bursae lacks sclerotization; and the corpus bursae has two signa of unequal size.

We examined 17 specimens from Monterey, San Bernardino, Shasta, Siskiyou, and Tuolumne counties in California, one from Jefferson County, Oregon, and eight with little or no data (five labeled “CAL” from the Fernald Collection). The specimens with capture dates were collected in June or July.

**116. *Pelochrista gilligani*** Wright, 2008

(Plate KK, 116a–e; Plate 50, 116a–d)

*Pelochrista gilligani* Wright 2008:227; Gilligan and Wright 2013b:321.

**Holotype** (Plate KK:116a). ♂, Utah, Sanpete County, Ephraim Canyon Road, 9,450 feet, T. M and J. M. Gilligan, 39.3097° N, 111.4602° W, 20 July 2006, USNM.

*Pelochrista gilligani* is a moderately small species (mean FWL = 7.4 mm) with a fairly distinctive forewing appearance. The color varies from dark brown to brownish yellow. The markings are white and include: a longitudinal streak in the cell, a line along the termen from  $M_3$  to the apex, and a variably expressed polygonal line consisting of a subbasal segment from the inner margin to the cubitus, a second segment along the cubitus and  $CuA_2$ , and a third segment angling from there toward the apex and terminating at the proximal margin of the ocellus. In well-marked specimens (Plate KK:116a–b) the polygonal line and the pinkish bar on the proximal margin of the ocellus combine to form a distinctive

M-shaped mark. The ocellus is conspicuous, with two or three black dashes on the central field; the costal strigulae are white and well defined; and the termen has a narrow salt-and-pepper-colored band from the tornus to the apex.

The male genitalia are similar to those of *P. palpana*, but the vesica has fewer cornuti (3–4 vs. 8–14), and the cucullus has fewer marginal spines (1–2 vs. 3). The number of marginal spines may vary between valvae in a single specimen (Plate 50:116b–c). The female genitalia are unknown.

We examined 23 males from Lassen and Modoc counties, California; Nye and Washoe counties, Nevada; Sanpete and Tooele counties, Utah; and Yakima County, Washington. Adult capture dates range from 30 May to 15 August.

## The *matutina* group (species 117–121)

This group was recently reviewed by Wright (2014b). The five species included here are similar in forewing pattern and genitalia. Group characteristics include:

*Forewing.* Mean FWL = 5.8–9.5 mm; AR = 2.56–3.15; fasciate markings dark brown, often with white edging; interfascial areas white to brownish gray; ocellus conspicuous; strigulae well defined on distal one-half of costa; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia.* Uncus weakly differentiated from dorsolateral shoulders of tegumen; socii short and stout; phallus with base closely surrounded by anellus; vesica with 1–50 cornuti; valva with costal margin concave, ventral emargination moderate, neck broad; NR: 0.60–0.77; saccular corner angulate to broadly rounded; SA: 142–158°; cucullus nearly uniform in width, with dorsal lobe strongly developed, apex rounded, distal margin weakly concave to slightly convex, ventral lobe moderately developed and triangular; anal angle narrowly rounded.

*Female genitalia.* Papillae anales moderately setose, with margins of ventral opening curled medially; sterigma Type II; lamella postvaginalis rectangular and microtrichiate, with lateral margins curling inward; lamella antevaginalis ringlike or flangelike; sternum 7 trapezoidal (width at anterior margin about 2 × that at posterior margin), with posterior margin emarginated to about one-third length of sterigma; ductus bursae with taxonomically significant patterns of sclerotization; corpus bursae with either two large signa or one small scarlike signum.

### 117. *Pelochrista matutina* (Grote, 1873)

(Plate LL, 117a–e; Plate 51, 117a–g)

*Penthina matutina* Grote 1873:92.

*Paedisca matutina*: Fernald 1882:41.

*Eucosma matutina*: Fernald 1903:459; Barnes and McDunnough 1917:170; McDunnough 1939:47; Powell 1983:34; Miller 1985:243; Miller 1987:51; Brown 2005:323; Gilligan et al. 2008:108.

*Pelochrista matutina*: Gilligan and Wright 2013b:324; Wright 2014b:64.

*Eucosma grotiana* Kearfott 1908:170; Barnes and McDunnough 1917:170; Heinrich 1923:106; McDunnough 1939:46; Powell 1983:34; synonymy by Miller 1985:243; Brown 2005:323.

*Pelochrista grotiana*: Gilligan and Wright 2013b:324.

**Types.** *Penthina matutina*. Neotype (designated by Miller 1985). ♀, BMNH (abdomen missing). *Eucosma grotiana*. Lectotype (designated by Wright 2014b). ♀, Iowa, C. P. Gillette, AMNH.

*Pelochrista matutina* was described from a single specimen (sex not specified) collected by G. W. Belfrage in Texas. Kearfott (1908) and Heinrich (1923) believed that the BMNH acquired the holotype when

it purchased the Grote collection (Mallis 1971), and neither author examined that specimen. Kearfott (1908) described *E. grotiana* from 15 specimens he had previously considered to be *P. matutina* but later decided were representatives of a similar but different species. Heinrich (1923) treated *E. grotiana* as a valid species and misidentified *P. matutina*, illustrating under the latter name the genitalia of the species now known as *P. notialis*. Miller (1985) reviewed this situation and, without comment on the fate of the holotype, designated the neotype reported above for *P. matutina*. That specimen is reputed to be the only Grote specimen of *P. matutina* collected prior to 1874 (Miller 1985; based on a note found in the AMNH). Miller (1985) treated *grotiana* as a junior synonym of *matutina*, interpreting the two taxa as dark and light phenotypes, respectively, of a single species.

The forewing has dark brown fasciate markings and white interfascial areas. Dark specimens (Plate LL:117e) have broad fasciae, gray suffusion in the interfascial areas, and gray bars on the lateral margins of the ocellus. In light specimens (Plate LL:117c–d) the fasciae are paler and less clearly defined, and the bars bordering the ocellus are pale pink. The most common phenotype is intermediate between these extremes (Plate LL:117a–b) and is frequently encountered in the Midwest and upper Great Plains. The darkest specimens examined were from Kentucky, and the pale phenotype seems to be concentrated in the lower Great Plains and on the eastern slope of the Rocky Mountains. The only member of the group that might be confused with *P. matutina* based on forewing appearance is *P. sullivani*, but that species is considerably smaller (mean FWL = 5.9 vs. 7.6 mm) and has distinctively different genitalia. The pale specimens are similar to the southwestern *P. mescalerana* (species 56) in size and forewing appearance, but again the genitalia of the two species are quite different.

The male genitalia most closely resemble those of *P. fiskeana* (species 118) in that the cucullus in both species has a well-developed triangular ventral lobe, but the latter species is larger (mean FWL = 9.5 vs. 7.6 mm) and has much darker interfascial areas. In females, the length of the lamella postvaginalis is greater than the width, the ductus bursae is contorted by a sclerotized patch opposite the ductus seminalis, and the membrane between sterna 6 and 7 has two shallow pockets, features that are not present in other members of the group.

*Pelochrista matutina* is distributed throughout much of the eastern United States, from Maine, Wisconsin, and Montana south to Alabama, southern Texas, and New Mexico. Adult capture dates range from 9 May (Brazoria County, Texas) to 3 October (Harris County, Texas), but most records are from early July to early September.

### 118. *Pelochrista fiskeana* (Kearfott, 1905)

(Plate LL, 118a–e; Plate 51, 118a–g)

*Eucosma fiskeana* Kearfott 1905:358; Barnes and McDunnough 1917:171; Heinrich 1923:127; McDunnough 1939:47; Powell 1983:35; Brown 2005:319; Gilligan et al. 2008:114.

*Pelochrista fiskeana*: Gilligan and Wright 2013b:320; Wright 2014b:63.

*Eucosma pandana* Kearfott 1907b:17; Barnes and McDunnough 1917:170; Heinrich 1923:127; McDunnough 1939:47; Powell 1983:35; Brown 2005:325; synonymy by Wright 2014b:63.

*Eucosma sardiopa* Meyrick 1912:34, unnecessary replacement name for *pandana*.

*Pelochrista pandana*: Gilligan and Wright 2013b:325.

**Types.** *Eucosma fiskeana*. Lectotype (designated by Heinrich 1923, Plate LL:118a). ♂, North Carolina, Polk County, Tryon, W. F. Fiske, 2 August 1903, AMNH (abdomen missing). *Eucosma pandana*. Lectotype (designated by Wright 2014b, Plate LL:118e). ♀, Texas, Kerr County, Kerrville, AMNH.

*Eucosma fiskeana* was described from three syntypes (2 ♂, 1 ♀) collected by W. F. Fiske at Tryon, North Carolina. One of those specimens resides in the AMNH, the other two in the USNM, so Heinrich's

(1923) remark “*Type*. —in American Museum” designates a unique specimen. Kearfott (1907b) described *E. pandana* from five syntypes, three from Kerrville, Texas (2 ♀ in the AMNH, 1 ♀ in the USNM), and two from Cochise County, Arizona (1 ♀ in the AMNH, 1 ♂ in the USNM). The latter two specimens were determined by Heinrich (1923) to be *P. corosana*. Wright (2014b) designated one of the two females in the AMNH as the lectotype.

*Pelochrista fiskeana* is the largest member of the group (mean FWL = 9.5 vs. 5.8–7.6 mm). The forewing has brownish-gray interfascial areas and weakly contrasting darker brown fasciate markings, the latter with distal margins thinly edged with white. This species is superficially similar to *P. lynxana* (species 121) and *P. milleri* (species 159), but it is considerably larger than the first of these species (mean FWL = 9.5 vs. 5.8 mm) and differs from both in genitalia.

Distinctive genitalia characteristics include: apex of the uncus flattened or weakly concave; distal margin of the cucullus weakly concave, producing a semifalcate anal angle; inner surface of ductus bursae without microtrichia; and corpus bursae with two large semicircular signa of nearly equal size.

The range of *P. fiskeana* includes the region from North Carolina, Ohio, and Illinois south and west to Florida, Mississippi, and Texas. Adults have been collected from 15 April (in Texas) to 5 November (in Florida), but the vast majority of records are from June, July, and August.

### 119. *Pelochrista symbolaspis* (Meyrick, 1927)

(Plate LL, 119; Plate 52, 119a–b)

*Eucosma symbolaspis* Meyrick 1927:334; Clarke 1958:391.

*Epiblema symbolaspis*: McDunnough 1939:48; Powell 1983:35; Brown 2005:286.

*Pelochrista symbolaspis*: Gilligan and Wright 2013b:328; Wright 2014b:70.

**Lectotype** (designated by Clarke 1958). ♂, Texas, Brewster County, Alpine, 7,000 feet, April 1926, slide 6387, BMNH.

Meyrick (1927) reported a series of 18 syntypes collected at Alpine, a small town in west Texas located approximately 80 miles north of the “big bend” in the Rio Grande River. The collector of those specimens is unknown. Sixteen of the syntypes (all males) reside in the BMNH (K. Tuck, pers. comm.), including a lectotype designated and illustrated by Clarke (1958). We examined four syntypes and determined two to be a species of *Pelochrista* with genitalia typical of the *canana* group (species 78–87).

The two specimens of *P. symbolaspis* that we examined have tan interfascial areas and weakly contrasting brown fasciate markings, resulting in a rather dull overall appearance (possibly due to age and condition). The forewing pattern resembles that of *P. sullivanii* and *P. lynxana*, but *P. symbolaspis* is a slightly larger species (mean FWL = 6.8 vs. 5.9 and 5.8 mm, respectively) with a range that is disjunct from those taxa (west Texas vs. east of the Mississippi River).

In males, the uncus is triangular and barely differentiated from the dorsolateral shoulders of the tegumen, the socii are short and stout, the vesica has one cornutus ( $n = 2$ ), the distal margin of the cucullus is nearly straight and sometimes has a shallow concave indentation near the anal angle, and the anal angle is rounded. The female genitalia are unknown.

We know of no specimens of *P. symbolaspis* other than the type series in the BMNH. They were collected in April and May in Brewster County, Texas.

**120. *Pelochrista sullivan*** Wright, 2014

(Plate LL, 120a–b; Plate 52, 120a–f)

*Pelochrista sullivan* Wright 2014b:70.

**Holotype** (Plate LL:120a). North Carolina, Carteret County, Millis Road Savannah, J. B. Sullivan, 24 August 1993, slide 145318, USNM.

Though similar to *P. matutina* in forewing color and maculation, *P. sullivan* is smaller (mean FWL = 5.9 vs. 7.6 mm) and differs from that species in genitalia. It closely resembles *P. lynxana* in size (mean FWL = 5.9 vs. 5.8 mm) and forewing pattern but lacks the extensive brown/gray suffusion in the interfascial areas of that taxon. The material currently available suggests that the two taxa also differ in habitat preference (coastal savannah in North Carolina and Mississippi vs. remnant prairie/cedar glade in the eastern Midwest and northern Mississippi).

In males, the uncus has a somewhat angular apex, the socii are short and stout, the vesica has 1–4 cornuti, and the saccular corner of the valva is moderately angulate (SA = 155°). In females, the sterigma has a narrow flangelike development along the anterior one-half of the ostium, the sclerotization of the ductus bursae is comprised of three components (a ringlike portion adjacent to the ostium, a cylindrical section from the constriction anterior to the ostium nearly to the ductus seminalis, and a bandlike patch anterior to the ductus seminalis), the inner surface of the ductus bursae has a patch of microtrichia opposite the ductus seminalis, and the corpus bursae has one vestigial (often scarlike) signum.

This species is known from longleaf pine savannah near the Gulf Coast in Harrison and Jackson counties, Mississippi and from Atlantic coastal savannah in Carteret County, North Carolina. Most of the adults examined were collected in April and from mid-August to mid-September, suggesting a life cycle with spring and late summer broods.

**121. *Pelochrista lynxana*** Wright, 2014

(Plate LL, 121a–b; Plate 52, 121a–f)

*Pelochrista lynxana* Wright 2014b:71.

**Holotype** (Plate LL:121a). Ohio, Adams County, 1 mi SE of Lynx, D. J. Wright, 1 August 1997, slide 145321, USNM.

*Pelochrista lynxana* differs from *P. sullivan* in the following respects: the vertex, the lateral surface of the labial palpus, the antenna, and the forewing interfascial areas are grayish brown rather than white; the saccular corner of the valva is very broadly rounded instead of moderately angulate; the anal angle of the cucullus is somewhat truncated as opposed to triangular; and the sclerotization of the ductus bursae anterior to the constriction near the ostium consists of one vs. two components. Moreover, the ranges of the two insects appear to be disjunct. *Pelochrista lynxana* has been collected in remnant prairies and cedar glades in Ohio, Kentucky, and northern Mississippi, whereas *P. sullivan* is known only from coastal savannah habitat on the Atlantic and Gulf coasts.

There are several Nearctic Eucosmini with which *P. lynxana* might be confused based on size and forewing appearance, including *P. palabundana* (species 33), *P. womonana* (species 84), and *Sonia divaricata* Miller (Gilligan et al. 2008, species 204), but none that are not readily distinguishable by genitalia. *Pelochrista womonana* can be reliably separated from *P. lynxana* by the color of the third segment of the labial palpus (black vs. brownish gray).



*Pelochrista lynxana* is known from Adams and Erie counties, Ohio; Bullitt County, Kentucky; and Chickasaw, Lowndes, and Oktibbeha counties, Mississippi. Adult capture dates range from 20 July to 8 September.

### The *juncticiliana* group (species 122–123)

The following two species are similar in forewing appearance and male genitalia. *Pelochrista juncticiliana* is known only from California and Idaho, while *P. derelicta* has a transcontinental distribution. Shared characters include:

*Forewing.* Forewing small to medium-sized (mean FWL = 8.5, 6.7 mm) and moderately broad (AR = 2.75, 2.60); interfascial areas pale brown to grayish brown with transverse brown reticulations; fasciate markings dark brown to reddish brown; subbasal fascia chevron-shaped, variably expressed, fading near costa, sometimes extending to base and forming a basal patch; median fascia bandlike, with proximal margin diffuse and distal margin sharply defined by thin whitish line from mid-costa to tornus; termen with black line from tornus to apex; ocellus weakly expressed to obsolete; costal strigulae inconspicuous and separated by brown costal marks and striae.

*Male genitalia.* Uncus semicircular and clearly differentiated from dorsolateral shoulders of tegumen; socii short and stout; phallus tapering distally, with base loosely surrounded by anellus; vesica with 0–16 cornuti; valva with costal margin concave, ventral emargination moderate, NR = 0.77, 0.47; cucullus with dorsal lobe strongly developed, apex rounded, ventral lobe triangular; vertex of anal angle with 1 or 2 marginal spines.

*Female genitalia.* Papillae anales flat, sparsely setose, and finely microtrichiate; sterigma Type II; lamella postvaginalis rectangular, with posterior margin concavely indented, lateral margins curling inward, and central trough shallow and microtrichiate; sternum 7 trapezoidal (width at anterior margin 3–4 × that at posterior margin), with posterior margin concavely indented to about two-thirds length of sterigma; ductus bursae with elongate sclerotized patch near juncture with ductus seminalis; corpus bursae with two signa, one slightly larger than the other.

#### 122. *Pelochrista juncticiliana* (Walsingham, 1879)

(Plate MM, 122a–d; Plate 53, 122a–h)

*Rhyacionia juncticiliana* Walsingham 1879:75.

*Paedisca juncticiliana*: Fernald 1882:40.

*Eucosma juncticiliana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:122; Heinrich 1929:12;

McDunnough 1939:47; Powell 1983:35; Brown 2005:322.

*Pelochrista juncticiliana*: Gilligan and Wright 2013b:323.

*Eucosma excusabilis* Heinrich 1923:123; Heinrich 1929:12; McDunnough 1939:47; Powell 1983:35; Brown 2005:322; new synonymy.

*Pelochrista excusabilis*: Gilligan and Wright 2013b:320.

**Types.** *Rhyacionia juncticiliana*. Lectotype (here designated). ♂, California, Shasta County, Hatchet Creek, 14–17 July 1871, Walsingham, slide 11526, BMNH. *Eucosma excusabilis*. Holotype. ♂, California, Deer Park Springs, Lake Tahoe, slide 72815, USNM.

Walsingham (1879) described *P. juncticiliana* from seven syntypes collected at the type locality. The specimen designated here as the lectotype was dissected by Obraztsov and presumably was his choice for that role. The type series for *E. excusabilis* is comprised of three males (two in the USNM, one in the AMNH) collected at the type locality. Heinrich (1923) identified a unique name bearing specimen

by illustrating its genitalia. This specimen has been interpreted previously as a holotype (Brown 2005; Gilligan and Wright 2013b).

North American authors from Fernald (1882) to Heinrich (1929) confused *P. juncticiliana* with the taxon now known as *P. derelicta*. Heinrich (1923), lacking authoritatively determined specimens of *P. juncticiliana*, mistakenly illustrated under that name the genitalia of *P. derelicta*. He also proposed the name *P. excusabilis* for three males from California that are indistinguishable from *P. juncticiliana* (sensu Walsingham) based on forewing appearance. Later, having received Walsingham exemplars of *P. juncticiliana* from the Fernald collection, Heinrich (1929) described *P. derelicta*, recognizing differences in male genitalia between the two taxa. He retained *P. excusabilis* and *P. juncticiliana* as separate species based on differences in valva shape. We examined 17 males with *excusabilis/juncticiliana*-like genitalia and found the variation in valva shape to be too great to maintain Heinrich's distinction between the two species, hence the new synonymy.

*Pelochrista juncticiliana* is poorly represented in collections. We examined four specimens in the USNM from the Fernald Collection (presumed to be from the type locality) that have no data, the three types of *P. exclusoriana*, and 11 specimens in the EME. This species resembles *P. derelicta* in forewing color and maculation but differs from that taxon in size (mean FWL = 8.4 vs 6.7 mm) and in the lack of an ocellus. Heinrich (1929) noted that the forewing termen is slightly convex in *P. juncticiliana* and straight to weakly concave in *P. derelicta*, a subtle distinction affirmed by our observations. In California, where the two species are sympatric, these differences are less pronounced, and examination of the genitalia may be required for an accurate determination. Females of both species are collected infrequently. The association of sexes presented here for *P. juncticiliana* is based on a pair of specimens in the EME that were taken at the same site in Tuolumne County, California, one on 16 July 1961, the other on 20 July 1961.

Male genitalia differences between *P. juncticiliana* and *P. derelicta* include: number of cornuti 0–1 vs. 13–16; saccular corner angulate with papillate vertex vs. weakly defined with a protruding crescent-shaped flap on the medial surface; neck substantially broader (NR = 0.77 vs. 0.47) with ventral margin concave vs. convex; distal margin of the cucullus straight to moderately convex vs. weakly concave; ventral lobe of the cucullus less strongly developed; and vertex of the anal angle usually with two relatively short marginal spines vs. one long anal spine. In females, the scaling of sternum 7 is more uniform in *P. juncticiliana* than in *P. derelicta*. In the latter species, the central section of that sternite has two sparsely scaled areas flanking a medial band of more densely spaced scales.

We examined 23 specimens, one from Blaine County, Idaho, the rest from Contra Costa, Marin, Shasta, Tuolumne, and Ventura counties and Lake Tahoe, California. Capture dates range from 4 June to 25 July.

### 123. *Pelochrista derelicta* (Heinrich, 1929)

(Plate MM, 123a–d; Plate 53, 123a–f)

*Eucosma derelicta* Heinrich 1929:13; McDunnough 1939:47; Powell 1983:35; Miller 1987:53; Brown 2005:322; Gilligan et al. 2008:112.  
*Pelochrista derelicta*: Gilligan and Wright 2013b:319.

**Holotype.** ♂, North Carolina, Tryon, 13 August 1904, W. F. Fiske, slide 72786, USNM.

The holotype is the only one of the thirteen specimens in the type series that was collected in Tryon, North Carolina. Heinrich (1929) called it the “Type” and referred to all the other specimens as paratypes.

Differences between *P. derelicta* and *P. juncticiliana* are discussed under the latter taxon. Males of the two species are readily separated by valva shape; females differ in the scaling of sternum 7.

*Pelochrista derelicta* is broadly distributed across the United States and southern Canada, from Nova

Scotia to British Columbia and south to Florida, Alabama, New Mexico, and California. Adult capture dates range from 22 June to 2 September. This species is a common resident of prairie and old field habitat in eastern North America and is often abundant in late August. The larva is a root-borer in *Solidago* L. (goldenrod) (Heinrich 1929; Čapek 1971). The USNM has one specimen that was reared from *Solidago* in Whitman County, Washington by J. F. G. Clarke.

### The *cataclystiana* group (species 124–125)

This group consists of *P. cataclystiana* and *P. conspiciendana*, sister species with eastern and western distributions, respectively. They were recently reviewed by Wright (2012). Shared characteristics include:

*Forewing.* Forewing medium in length and breadth (mean FWL = 8.0, 8.3 mm, AR = 3.03, 3.04); costal margin weakly arched; apex acute; termen straight to weakly concave; dorsal surface brownish yellow, reddish brown, or yellowish gray; markings including a narrow weakly expressed median fascia from mid-costa to inner margin that abuts the proximal margin of the ocellus, a thin dark streak on the cubitus from base to mid-wing, well-defined costal strigulae with associated metallic gray striae, a conspicuous ocellus, and a narrow salt-and-pepper-colored band on the termen from tornus to apex.

*Male genitalia.* Uncus triangular, clearly differentiated from dorsolateral shoulders of tegumen, with apex rounded and basal width approximately equal to height; socii moderately broad and fingerlike; phallus tapering distally, with base loosely surrounded by anellus; vesica with 0–12 cornuti; valva with costal margin strongly concave, neck short and moderately broad (NR = 0.61, 0.79), saccular corner angulate (SA = 128, 112°), and rectangular basal process strongly developed; cucullus with dorsal lobe strongly developed, apex rounded, distal margin nearly straight, ventral lobe weakly developed and triangular, basoventral margin extending in ridgelike manner onto medial surface of neck, setation of medial surface short and fine.

*Female genitalia.* Papillae anales flat, sparsely setose, and minutely microtrichiate along margins of ventral opening; sterigma Type II; lamella postvaginalis trapezoidal, with length of posterior margin approximately 1.5 × ostium diameter and with central trough microtrichiate; lamella antevaginalis ringlike; sternum 7 with posterior margin concavely indented to about two-thirds length of sterigma and with anteromedial portion weakly sclerotized; corpus bursae with two signa, one larger than the other.

#### 124. *Pelochrista cataclystiana* (Walker, 1863)

(Plate MM, 124a–d; Plate 54, 124a–e)

*Paedisca cataclystiana* Walker 1863:378; Walsingham 1879:46; Fernald 1882:38.

*Eucosma cataclystiana*: Fernald 1903:456; Dyar 1903:180; Barnes and McDunnough 1917:169; Heinrich 1923:135; McDunnough 1939:48;

Powell 1983:35; Miller 1987:54; Brown 2005:317; Gilligan et al. 2008:115; Wright 2012:39.

*Pelochrista cataclystiana*: Gilligan and Wright 2013b:318.

**Lectotype** (designated by Wright 2012). ♀, North America, slide 11531, BMNH.

Walker (1863) described this species from two females in the BMNH. It is not clear who selected the lectotype, but that specimen was dissected in 1965, probably by W. G. Tremewan, and bears a round purple-bordered “Lectotype” label. Wright (2012) published the designation. For approximately a century (Walsingham 1879 to Miller 1973), the name *Steganoptycha ochreana* Clemens was treated as a synonym of *P. cataclystiana*, but Miller (1974) recognized it as an unused senior synonym of *P. argentialbana* and proposed that it be treated as a *nomen oblitum*.

The forewing is pale brownish yellow (sometimes with reddish-brown tints) with weakly contrasting brown markings. In addition to an obscure median fascia, the maculation includes thin longitudinal lines, the most prominent of which extends along the cubitus from the base to the ocellus. *Pelochrista cataclystiana* has often been confused with the western *P. conspiciendana*, based on forewing appearance, but the two species usually can be separated by head color (brownish yellow in the former, reddish brown in latter). The anterior one-half of the forewing termen is weakly concave in *P. cataclystiana* (producing a slightly falcate apex) vs. straight in *P. conspiciendana*.

In males, the vesica has 9–12 cornuti, the saccular corner is papillate, SA = 128°, the medial surface of the neck is densely setose, NR = 0.61, the cucullus is relatively small and tapers slightly toward the apex, and the anal angle has a cluster of moderately long setae. In females, the lamella postvaginalis has ridgelike lateral margins, the anteromedial section of sternum 7 has a conspicuous weakly-sclerotized “window,” and the ductus bursae has a substantial sclerotized patch at the juncture with the ductus seminalis.

The range of *P. cataclystiana* extends from the Rocky Mountains to the Atlantic coast and from southern Canada to the Gulf of Mexico. This species was once reported from California (Walsingham 1879), but those records were determined by Wright (2012) to be misidentifications of other Eucosmini (mostly *P. conspiciendana*). Adult capture dates vary from early April to the end of September. Putman (1942) reported *Euthamia graminifolia* (L.) Nutt. (flat-top goldenrod) as a host in Ontario, Canada, the larva boring in the lower stem and rhizomes.

## 125. *Pelochrista conspiciendana* (Heinrich, 1923)

(Plate MM, 125a–c; Plate 54, 125a–e)

*Eucosma conspiciendana* Heinrich 1923:135; McDunnough 1939:48; Powell 1983:35; Brown 2005:318; Wright 2012:38.

*Pelochrista conspiciendana*: Gilligan and Wright 2013b:319.

**Holotype.** ♂, Utah, Tooele County, Stockton, T. Spalding, 4 July 1904, slide CH 29 May 1920, AMNH.

Heinrich (1923) based the description of *P. conspiciendana* on 5 specimens (4 ♂, 1 ♀) from Stockton and Eureka, Utah, Loma Linda, California, and St. Ignatius, Montana. He illustrated the genitalia of the specimen he called the “Type” and referred to the other four specimens as paratypes, hence the holotype interpretation.

The forewing in *P. conspiciendana* usually is more strongly suffused with reddish brown than in *P. cataclystiana*, and it lacks the longitudinal streaking that is often present in the latter species. Most specimens can be recognized by head color (bright reddish-brown), but there are exceptions (Plate MM:125c) in which both the head and forewing are predominantly yellowish gray. The metallic gray striae associated with the costal strigulae usually are more strongly expressed in *P. conspiciendana* than in *P. cataclystiana*.

Genitalia differences between *P. conspiciendana* and *P. cataclystiana* include the number of cornuti (0–8 vs. 9–12), the shape of the saccular corner (narrowly rounded vs. papillate), and the width of the neck (NR = 0.79 vs. 0.61). In *P. conspiciendana*, the cucullus is longer and more uniform in width, the lateral ridges of the lamella postvaginalis are much more strongly developed, the ductus bursae lacks sclerotization, and the size difference between the two signa is much greater.

*Pelochrista conspiciendana* is a western species. Its range extends from the eastern slope of the Rocky Mountains to the Pacific Coast and from southern Alberta to the Mexican border. It is sympatric with *P. cataclystiana* in the high plains east of the Rocky Mountains. Most adult capture dates are from mid-June to mid-August, but the USNM has one male collected on 24 April in Napa County, California.

## The *grandiflavana* group (species 126–132)

The *grandiflavana* group is comprised of seven species (two described here as new) that are similar in forewing appearance and genitalia. These taxa differ primarily in size, color, and subtle aspects of male valva shape. Additional information (such as life histories or DNA analysis) would be desirable to help clarify the current species concepts, but those data are not available at this time. Group features include:

*Forewing.* Mean FWL = 10.0–15.1 mm; AR = 2.58–2.98; forewing color substantially uniform (gray, brown, olive brown, orange brown or pale yellow brown), often with weakly expressed darker shades in the subbasal and median areas, in some species with a sprinkling of metallic gray scales that tend to be arranged in inconspicuous transverse reticulations. In one species (*P. grandiflavana*) the forewing is generously overlaid with dark gray-brown speckling.

*Male genitalia.* Uncus triangular to semicircular; socii short, fingerlike, and often rather narrow; phallus relatively short and tapering distally, with base loosely surrounded by anellus; vesica with 2–26 cornuti; valva with costal margin concave, ventral emargination shallow, neck short and broad, NR: 0.72–0.88, saccular corner weakly defined, SA: 157–171°; cucullus with dorsal lobe strongly developed and often tapering toward apex, ventral lobe weakly developed and broadly rounded, distal margin convex of nearly uniform curvature, setae on medial surface short and fine.

*Female genitalia.* Papillae anales flat and sparsely setose; sterigma U-shaped; lamella postvaginalis rectangular (width approximately 2 × length); lamella antevaginalis ringlike; sternum 7 rectangular, with posterior margin concavely indented and with scaling uniform except for a band of more densely spaced scales on the posterior margin; ductus bursae without sclerotization; corpus bursae with two signa, one somewhat larger than the other.

### 126. *Pelochrista grandiflavana* (Walsingham, 1879)

(Plate NN, 126a–c; Plate 55, 126a–e)

*Paedisca grandiflavana* Walsingham 1879:47; Fernald 1882:39.

*Eucosma grandiflavana*: Fernald 1903:457; Barnes and McDunnough 1917:169; Heinrich 1923:114; McDunnough 1939:47; Powell 1983:34; Brown 2005:321; Powell and Opler 2009:134.

*Pelochrista grandiflavana*: Gilligan and Wright 2013b:321.

**Lectotype** (here designated, Plate NN:126a). ♂, California, Lake County, Scott's Valley, Walsingham, 17–19 June 1871, BMNH(E) 819867, slide 11514, BMNH.

Walsingham (1879) described *P. grandiflavana* from three syntypes (1 ♂, 2 ♀). The male was selected by Obraztsov as the lectotype and is so designated here.

*Pelochrista grandiflavana* is the largest member of the group (mean FWL = 15.1 vs. 10.0–13.9 mm). The golden-yellow forewing is rather broad (AR = 2.58) and is generously speckled with brownish spots and blotches that tend to coalesce into curved transverse lines. This combination of color and maculation readily distinguishes *P. grandiflavana* from all other species in the group.

Subtle differences in male genitalia between *P. grandiflavana* and other group members include: the socii are somewhat shorter and broader (except in *P. murina*), the cucullus is more obliquely aligned with respect to the neck, and the dorsal lobe of the cucullus is less strongly tapered toward the apex (except in *P. aurantiaca*). We found no character states in the female genitalia that would reliably discriminate among the members of this group.

We examined nine specimens from Lake, Modoc, Nevada, and Shasta counties in northern California. Collection dates range from 17 June to 23 July.



## 127. *Pelochrista subflavana* (Walsingham, 1879)

(Plate NN, 127a–e; Plate 55, 127a–e)

*Paedisca subflavana* Walsingham 1879:48; Fernald 1882:39.

*Eucosma subflavana*: Fernald 1903:457; Barnes and McDunnough 1917:169; Heinrich 1923:101; McDunnough 1939:46; Powell 1983:34; Powell and Opler 2009:134; Brown 2005:327.

*Pelochrista subflavana*: Gilligan and Wright 2013b:326.

**Lectotype** (here designated, Plate NN:127a). ♂, Oregon, Josephine County, Rouge River, Walsingham, 7 May 1872, BMNH(E) 819868, slide 11515, BMNH.

The specimen designated here as the lectotype was selected by Obraztsov from three syntypes (2 ♂, 1 ♀) reported by Walsingham (1879).

*Pelochrista subflavana* is variable in size (FWL: 10.3–16.5 mm), but on average it is slightly smaller than *P. grandiflavana* (mean FWL = 13.9 vs. 15.1 mm) and has a slightly more elongate forewing (AR = 2.73 vs. 2.58). Forewing color varies from pale golden yellow (Plate NN:127d) to olive gray (Plate MM:127c). Somewhat darker patches of color in the subbasal and median areas are suggestive of obscure fasciae that weakly contrast with the paler interfascial areas. Fresh specimens appear to be sprinkled with fine silvery dots, an effect produced by whitish tips on many of the forewing scales. We examined a variety of individuals from the Great Basin and the far West that are substantially similar to *P. subflavana* in forewing appearance and genitalia, but we are unable to say with any confidence whether the subtle differences we observed indicate distinct species or are attributable to variation within a single species. We therefore tentatively refer to *P. subflavana* all of this material except those specimens that Heinrich (1923) recognized (based mostly on size) as *P. consociana* (species 128).

In *P. subflavana*, *P. consociana*, *P. murina*, and *P. handana*, the dorsal lobe of the cucullus tapers evenly to a rather narrowly rounded apex, a feature that distinguishes these four species from *P. grandiflavana* and *P. aurantiaca* and, to a lesser extent, from *P. irroratana*.

We examined specimens from Inyo, Lassen, and Modoc counties, California; Oneida County, Idaho; Baker, Josephine, and Wheeler counties, Oregon; Chelan, Okanogan, Stevens, and Whitman counties, Washington; and Teton County, Wyoming. Adult capture dates range from 7 May to 27 September. The EME has two females from Modoc County, California that were collected by D. L. Wagner in association with *Balsamorhiza sagittata* (Pursh) Nutt. (arrowleaf balsamroot).

## 128. *Pelochrista consociana* (Heinrich, 1923)

(Plate NN, 128a–c; Plate 55, 128a–e)

*Eucosma consociana* Heinrich 1923:101; McDunnough 1939:46; Powell 1983:34; Brown 2005:322.

*Pelochrista consociana*: Gilligan and Wright 2013b:318.

**Holotype** (Plate NN:128a, Plate 55:128d). ♂, Utah, Juab County, Eureka, T. Spalding, 29 July 1911, slide 72783, USNM.

Heinrich (1923) based his description of *P. consociana* on five males from Eureka, Utah. Four of those specimens are located in the USNM, and one was reported by Klots (1942) in the AMNH. Heinrich (1923) identified the “Type” by illustrating its genitalia, and he referred to the other four specimens as paratypes, hence the holotype interpretation.

*Pelochrista consociana* looks like a small version of *P. subflavana* (mean FWL = 10.0 vs. 13.9 mm) with a less mottled forewing. It differs from *P. subflavana* in that the dark patches in the subbasal and median

areas are barely discernable, the hindwing seems to be consistently blackish (vs. pale to medium brownish gray), and the forewing is slightly more elongate ( $AR = 2.82$  vs.  $2.73$ ). The cucullus is noticeably narrower than in *P. subflavana*, but we found no other genitalia characters that would separate the two species.

We examined twelve specimens from Lassen and Modoc counties, California; White Pine County, Nevada; and Juab County, Utah. The capture dates range from the end of May to mid-August. One specimen in the EME, a female from Modoc County, California, has a label indicating that it was collected on *Balsamorhiza sagittata* (Pursh) Nutt. (arrowleaf balsamroot).

### 129. *Pelochrista murina* Wright and Gilligan, new species

(Plate NN, 129; Plate 56, 129a–b)

**Diagnosis.** *Pelochrista murina* is the only member of the *grandiflavana* group with a uniformly gray forewing. *Pelochrista subflavana* has an olive-gray phenotype (Plate NN:127c), but that species is substantially larger (mean FWL = 13.9 vs. 11.6 mm) and has a subtly different forewing geometry ( $AR = 2.73$  vs.  $2.61$ ). The male genitalia most closely resemble those of *P. subflavana*, but the *socii* are less slender, and there seem to be fewer cornuti in the vesica (4–8 vs. 8–16) (based on 9 preparations, 2 of *P. murina* and 7 of *P. subflavana*). Females of *P. murina* are unknown.

**Description.** *Head.* Frons and vertex whitish; labial palpus with medial surface whitish, lateral surface pale gray; antenna concolorous with vertex. *Thorax.* Dorsal surface gray; tegulae whitish; legs mostly whitish; fore-leg very pale brownish gray with whitish tarsal anulations. Forewing: ♂ FWL 10.7–12.5 mm (mean = 11.6,  $n = 2$ ),  $AR = 2.61$ ; ♀ unknown; costa weakly arched; apical angle approximately  $90^\circ$ ; termen convex; interfascial areas pale gray; maculation darker gray, including a weakly defined patch on middle third of inner margin extending to cell and an obscure median band from mid-costa to tornus broadening at distal end of cell; postmedian and subterminal areas with thin metallic gray striae emanating from vaguely defined costal strigulae; fringe scales pale gray with white apices. Hindwing: Dark gray with pale whitish fringe. *Abdomen.* Male genitalia ( $n = 2$ ): Uncus semicircular and moderately well differentiated from dorsolateral shoulders of tegumen; *socii* fingerlike, short, and relatively broad; vesica with 4–8 cornuti; valva with neck short and broad,  $NR = 0.77$ , saccular corner weakly defined,  $SA = 162^\circ$ ; cucullus with dorsal lobe tapering to a narrowly rounded apex, ventral lobe weakly developed and broadly rounded, ventral two-thirds of distal margin convex of nearly uniform curvature, setation of medial surface short and fine.

**Holotype** (Plate NN:129; Plate 55, 129a). ♂, California, Lassen County, 7 mi E of Bieber, L. L. Crabtree, 2 August 2010, slide DJW 2762, USNM.

**Paratype** (Plate 55, 129b). ♂, California, Modoc County, 4 mi W of Adin, L. L. Crabtree, 12 June 2007, slide DJW 2717, USNM.

**Etymology.** The specific epithet comes from the Latin *murinus*, meaning mouse-gray colored.

**Distribution and biology.** This species is known from two males collected in Lassen and Modoc counties, California. The capture dates of 12 June and 2 August suggest that the flight period may extend through the summer.

### 130. *Pelochrista irroratana* (Walsingham, 1879)

(Plate NN, 130a–c; Plate 56, 130)

*Paedisca irroratana* Walsingham 1879:48; Fernald 1882:38.

*Eucosma irroratana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:101; McDunnough 1939:46; Powell 1983:34; Brown 2005:322; Wright 2007:46.

*Pelochrista irroratana*: Gilligan and Wright 2013b:322.

*Paedisca perdricana* Walsingham 1879:49.

*Eucosma perdricana*: Fernald 1903:457; Barnes and McDunnough 1917:170; Heinrich 1923:99; McDunnough 1939:46; Powell 1983:34; Brown 2005:325; synonymy by Wright 2007:46.

*Pelochrista perdricana*: Gilligan and Wright 2013b:322.

**Types.** *Paedisca irroratana*. Lectotype (designated by Wright 2007, Plate NN:130a). ♂, California, Mendocino County, Head of Noyo River, Walsingham 91898, 8–11 June 1871, BMNH(E) 819970, slide 11512, BMNH. *Paedisca perdricana*. Lectotype (designated by Wright 2007, Plate NN:130c, Plate 56:130). ♂, California, Shasta County, Burney Falls, Walsingham, 18–20 July 1871, BMNH(E) 819971, slide 11509, BMNH.

Walsingham (1879) mentioned five male syntypes of *P. irroratana* that he collected from 8–12 June 1871 in Mendocino County, California. He collected six additional males that were not reported as part of the type series, all captured in June in Lane or Mendocino counties, California. Ten of these specimens reside in the BMNH; one was given to the USNM. The USNM also has a male with a yellow “Fernald Collection” label and a red bordered determination label with the inscription “Cal. Type.” This specimen bears no additional collection data, but it may have been part of the original *irroratana* series. *Paedisca perdricana* was described from two males (deposited in the BMNH) that were collected in July in Shasta County, California.

The aforementioned twelve males are the only specimens of *P. irroratana* that we have been able to locate in institutional collections. This is the only member of the *grandiflavana* group with a dark brown forewing. The distal one-half of the forewing has thin transverse lustrous gray reticulations and striae emanating from obscure costal strigulae but no other discernable markings except a few black scales near the tornus. This species is similar in size to *P. murina* (mean FWL = 11.4 vs. 11.6 mm) but has a more elongate forewing (AR = 2.84 vs. 2.61). The male genitalia are similar to those of *P. subflavana* but appear to have fewer cornuti in the vesica (2–4 vs. 8–16). The female is unknown.

We examined the lectotype, a paralectotype, a specimen collected by Walsingham at the type locality, and the specimen in the USNM from the Fernald Collection. We also examined the lectotype of *P. perdricana*. All of this material was collected in northern California between 8 June and 20 July.

### 131. *Pelochrista handana* (Kearfott, 1907)

(Plate OO, 131a–c; Plate 56, 131a–e)

*Eucosma handana* Kearfott 1907b:20; Barnes and McDunnough 1917:169; Heinrich 1923:102; McDunnough 1939:46; Powell 1983:34; Brown 2005:321; Wright 2007:46.

*Eucosma ceramitis* Meyrick 1912:34, unnecessary replacement name for *handana*.

*Eucosma caramitis* Heinrich 1923:102, misspelling of *ceramitis*.

*Pelochrista handana*: Gilligan and Wright 2013b:321.

**Lectotype** (designated by Wright 2007, Plate OO:131a). ♂, Utah, Tooele County, Stockton, T. Spalding, slide DJW 1505, AMNH.

Kearfott (1907b) described this species from five male syntypes collected by Tom Spalding at Stockton, Utah. The four paralectotypes are divided evenly between the AMNH and the USNM.

*Pelochrista handana* is a medium-sized species (mean FWL = 11.7 mm). The orange-brown forewing lacks well-defined fasciate markings, but most specimens have an obscure triangular patch of somewhat darker color that extends from the inner margin into the cell. The only other forewing markings are the moderately well-defined orangish strigulae on the the costa and an inconspicuous thin brown line on the

termen from the tornus to the apex. Forewing color separates this species from all other members of the group except *P. aurantiaca* (species 132), which differs from *P. handana* primarily in male valva shape. The specimen illustrated as *P. handana* by Wright (2007, fig. 16) lacks the orangish color of typical *P. handana* and is possibly referable to *P. subflavana*, but its forewing is a little more elongate than in the latter species (AR = 3.05 vs. 2.73).

The male genitalia of *P. handana* are similar to those of *P. subflavana*, *P. consociana*, and *P. murina* in that the dorsal lobe of the cucullus tapers conspicuously to a narrowly rounded apex. In *P. aurantiaca*, the dorsal lobe of the cucullus is not as strongly developed, and its apex is much more broadly rounded. The female genitalia are substantially the same as those of other members of the group.

We examined 16 specimens (13 ♂, 3 ♀) from Tooele County, Utah (nine in the USNM, six in the AMNH, one in the EME). Collection dates (available for 12 of those specimens) range from 29 June to 7 August. The similar looking *P. aurantiaca* is known from only three specimens collected in northern California (Lassen County), so the ranges of these two taxa may be disjunct.

### 132. *Pelochrista aurantiaca* Wright and Gilligan, new species

(Plate OO, 132a–c; Plate 56, 132a–b)

**Diagnosis.** *Pelochrista aurantiaca* is similar to *P. handana* in size (mean FWL = 11.7 mm in both species), color (orange brown), and forewing appearance (mottled and lacking well-defined markings). It differs from that species in the shape of the cucullus (dorsal lobe less strongly developed, with apex broadly rounded vs. distinctly tapering toward a narrowly rounded apex) and in the number of cornuti (2–4 vs. 13–15). *Pelochrista aurantiaca* is readily distinguished from other members of the group by its orangish forewing color.

**Description.** *Head.* Whitish with pale orange tints; lateral surface of labial palpus orange; antenna whitish with a pale orange streak on the dorsal surface. *Thorax.* Dorsal surface pale orange; legs whitish; anterior surfaces of fore-leg pale orange. Forewing: ♂ FWL 10.0–13.0 mm (mean = 11.7, n = 3), AR = 2.98; ♀ unknown; costa weakly arched; apical angle slightly acute; termen nearly straight; interfascial areas whitish with variable pale orange suffusion; maculation orange to orange brown; subbasal fascia represented by obscure shade from inner margin to cell; median fascia bandlike and extending from mid-costa to tornus; termen with thin lustrous white line from tornus to apex (sometimes barely detectable); costa lacking well-defined strigulae; ocellus absent. Hindwing: Pale gray with orange tints along margins, fringe slightly paler. *Abdomen.* Male genitalia (n = 2): Uncus triangular and clearly differentiated from dorsolateral shoulders of tegumen; socii short, fingerlike, and of uniform width; vesica with 2–4 cornuti; valva with neck short and broad, NR = 0.88, saccular corner weakly defined, SA = 162°; distal margin of basal excavation with narrow band of short stiff setae; cucullus with dorsal lobe well developed and broadly rounded at apex, ventral lobe weakly developed and broadly rounded, distal margin convex and nearly uniform in curvature, setation of medial surface short and fine.

**Holotype** (Plate OO:132a, Plate 56:132a). ♂, California, Lassen County, Turtle Mountain, 4,100 feet, L. L. Crabtree, 23 August 2008, slide DJW 2756, USNM.

**Paratypes.** CALIFORNIA. Same data as holotype (1 ♂, abdomen missing) USNM; Lassen County, 1 mi NW of Turtle Mountain, 4,100 feet, L. L. Crabtree, 25 July 2009, (1 ♂, slide DJW 2668), USNM.

**Etymology.** The specific epithet comes from the Latin *aurantiacus*, meaning orange-colored.

**Distribution and biology.** The three types were collected in Lassen County in northern California on 25 July and 23 August.

## The *primulana* group (species 133–136)

The members of this group are similar in genitalia. The species concepts are based on sometimes subtle differences in color and/or maculation and to some extent on geographic distribution and habitat preference. Group characteristics include:

*Forewing.* Mean FWL: 8.8–11.7 mm, AR: 2.73–3.11; dorsal surface yellow, orange brown, or brown, with brown markings; subbasal fascia varying from a spot on CuP to a bar from inner margin to cell; median fascia represented by an oblique bar at distal end of cell, sometimes extending from mid-costa to ocellus; costal strigulae absent to weakly discernable.

*Male genitalia.* Uncus weakly developed but moderately well differentiated from dorsolateral shoulders of tegumen; socii fingerlike and short; phallus tapering distally, with base loosely surrounded by anellus; vesica with 0–5 cornuti; valva with costal margin concave, ventral emargination shallow to absent, neck short and broad, NR: 0.84–0.91, saccular corner barely discernable, SA: 165–180°; cucullus with dorsal lobe strongly developed, apex rounded, distal margin convex with nearly uniform curvature, ventral lobe weakly developed and broadly rounded, setation of medial surface fine.

*Female genitalia.* Papillae anales flat, sparsely setose, lacking microtrichia; sterigma Type II; lamella postvaginalis rectangular, lacking microtrichia, and often not uniformly sclerotized; sternum 7 with posterior margin roundly indented from one-third to one-half length of sterigma; ductus bursae lacking sclerotization (except in *P. primulana*); corpus bursae with one or two signa, in the latter case with one somewhat larger than the other.

### 133. *Pelochrista primulana* (Walsingham, 1879)

(Plate OO, 133a–c; Plate 57, 133a–f)

*Paedisca primulana* Walsingham 1879:45; Fernald 1882:38.

*Eucosma primulana*: Fernald 1903:456; Barnes and McDunnough 1917:171; Heinrich 1923:118; McDunnough 1939:47; Powell 1983:34; Brown 2005:326.

*Pelochrista primulana*: Gilligan and Wright 2013b:326.

**Lectotype** (here designated, Plate OO:133a, Plate 57:133b). ♂, California, Mendocino County, head of Noyo River, Walsingham, 8–11 June 1871, BMNH(E) 819922, slide 11508, BMNH.

Walsingham (1879) mentioned seven syntypes (6 ♂, 1 ♀) that he collected in 1871 at the type locality. He reported the collection date as 10 June, but the specimen labels give the date as 8–11 June. The type series and 11 additional specimens (7 ♂, 4 ♀) are deposited in the BMNH (K. Tuck, pers. comm.). Miller and Hodges (1990) reported one specimen in the MCZ that was collected by Walsingham at the type locality on 10 June 1871. The lectotype designated here was selected by Obratzsov and bears a circular BMNH “LECTOTYPE” label.

The forewing is pale yellow with most markings poorly defined, producing a mottled effect. Many specimens have two outwardly oblique brown bars emanating from the costa, one arising at mid-costa, the other parallel to the first and slightly displaced from it toward the apex. The subbasal fascia is barely discernable as a brownish shade from the inner margin to the cubitus, and the termen is marked with a narrow brown band from the tornus to the apex. The ocellus is not expressed. Mean FWL = 8.8 mm.

Males in this group are essentially indistinguishable from one another based on genitalia, but the dorsal lobe of the cucullus appears to be a little less tapered in *P. primulana*. Females of *P. primulana* differ from those of other group members in the number of signa in the corpus bursae (one instead of two) and in the presence of sclerotization on the ductus bursae (absent in the other taxa). The membrane posterior



to tergum 8 has a collarlike section that is densely microtrichiate, a feature shared with *P. biplagata* but which is less strongly developed in *P. hennei* and *P. hasseanthi*.

We examined specimens from Lake, Mendocino, and Sonoma counties in northern California. Adults fly from late March to late June.

### **134. *Pelochrista biplagata* (Walsingham, 1895)**

(Plate OO, 134a–c; Plate 57, 134a–f)

*Paedisca biplagata* Walsingham 1895:507.

*Eucosma biplagata*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:118; McDunnough 1939:47; Powell 1963:241; Powell 1983:34; Brown 2005:316.

*Pelochrista biplagata*: Gilligan and Wright 2013b:326.

**Lectotype** (here designated). ♂, Colorado, Loveland, 12,000 feet, July 1891, Smith 30859, BMNH(E) 819929, slide 11568, BMNH.

Walsingham (1895) described this species from two syntypes collected by W. G. Smith at Loveland, Colorado. He reported one of the two specimens as a male and referred to it as the “Type.” Obratzsov selected that specimen as the lectotype, and it is so designated here.

The forewing is uniformly lemon yellow with two variably expressed brown markings, an irregularly shaped subbasal spot on  $A_{1+2}$  and a narrow oblique dash at the distal end of the cell. *Pelochrista biplagata* differs from *P. primulana* in its lack of a brown band on the termen and its greater uniformity in forewing color. In some specimens (Plate OO:134c) the brown markings are completely obsolete.

Genitalia differences between *P. biplagata* and *P. primulana* include: the dorsal lobe of the cucullus tapers to a more narrowly rounded apex, the ductus bursae lacks sclerotization, and the corpus bursae has two signa instead of one.

We examined specimens from northern California, Colorado, Idaho, Washington, and Wyoming. Capture dates range from early July to late August.

### **135. *Pelochrista hennei* (Clarke, 1947)**

(Plate OO, 135a–b; Plate 58, 135a–c)

*Eucosma hennei* Clarke 1947:51; Powell 1983:35; Brown 2005:321; Powell and Opler 2009:135.

*Pelochrista hennei*: Gilligan and Wright 2013b:326.

**Holotype** (Plate OO:135a, Plate 58:135a). ♂, California, Los Angeles County, El Segundo Dunes, C. Henne, emerged 3 October 1940, slide 72790, USNM.

Clarke (1947) described *P. hennei* from the holotype and 17 paratypes (8 ♂, 9 ♀) that were reared from larvae collected by C. Henne in the stems/roots of *Phacelia ramosissima* Douglas ex Lehm. (branching phacelia; Hydrophyllaceae) at the type locality. The adults emerged between 13 September and 13 October 1940.

*Pelochrista hennei* has a gray-brown forewing with numerous dark brown transverse reticulations and two brown bandlike shades, one in the subbasal position from the inner margin to the cubitus, the other from mid-costa to the tornus. There are three or four black dots in the ocelloid region, but the ocellus itself is not expressed. This pattern resembles that of *P. hasseanthi* (species 136), but the latter species has a yellow-brown to orange-brown forewing. The genitalia of *P. hennei* and *P. hasseanthi* appear to be indistinguishable.

We examined the holotype and five paratypes, all from coastal dunes in Los Angeles County, California. These specimens were reared, so natural flight data was unavailable. Powell and Opler (2009) reported rearing *P. hennei* from *P. ramosissima* at the Santa Maria dunes on the coast of San Luis Obispo County, California.

### 136. *Pelochrista hasseanthi* (Clarke, 1952)

(Plate OO, 136; Plate 58, 136a–e)

*Eucosma hasseanthi* Clarke 1952:60; Powell 1963:242; Powell 1983:34; Brown 2005:321; Powell and Opler 2009:135.

*Pelochrista hasseanthi*: Gilligan and Wright 2013b:326.

**Holotype** (Plate OO:136). ♂, California, Orange County, Orange, T. W. Hower, emerged 23 August 1936, slide 70428, USNM.

Clarke (1952) described *P. hasseanthi* from the holotype and four paratypes (1 ♂, 3 ♀) that were reared by T. W. Hower from *Dudleya variegata* (S. Watson) Moran (variegated liveforever; Crassulaceae) at Orange, California.

This species is similar to *P. hennei* in all respects except possibly forewing color. The holotype (Plate OO:136) has orange-brown instead of gray-brown interfascial areas, but this character seems to be variable. Powell and Opler (2009) suggest that the two taxa may be conspecific, citing rearings of *P. hasseanthi* from *Phacelia ramosissima* Douglas ex Lehm. (branching phacelia; Hydrophyllaceae) (the larval host of *P. hennei*) and collections of specimens of *P. hennei* from San Luis Obispo County that resemble *P. hasseanthi*. We adopt a conservative approach and treat the two species as distinct until further data become available.

We examined a dozen specimens from Orange, Riverside, and San Diego counties, California. Those that were not reared were collected in August or September, with one record from late June.

### The *dorsisignatana* group (species 137–140)

The earliest described members of this group, *P. dorsisignatana* and *P. similiana*, have complicated taxonomic histories involving numerous synonymies. They were reviewed by Wright (2011b), who revised the arrangement of synonyms and described a previously unrecognized species, *P. oraria*, from the Atlantic coast. Another new species, *P. wagneri*, is described here from California. The four taxa are remarkably similar in genitalia, and the species concepts are based mostly on differences in size, maculation, and/or geographic distribution. Group characteristics include:

*Forewing*. Mean FWL: 8.4–10.8 mm, AR: 2.78–2.97; interfascial areas brownish gray to pale orange brown, with brown transverse reticulations; markings dark orange brown to reddish brown, thinly edged with white, and including a tonguelike subbasal mark, a broad band arising at mid-costa and approaching the inner margin near the tornus, and a narrow variably expressed postmedian band; strigulae on distal one-half of costa weakly expressed and concolorous with interfascial areas; ocellus absent; termen with narrow salt-and-pepper-colored band from tornus to apex.

*Male genitalia*. Uncus triangular and weakly differentiated from dorsolateral shoulders of tegumen; socii short and fingerlike; phallus mildly tapering distally, with base closely surrounded by anellus; vesica with 8–31 cornuti; valva with costal margin concave, ventral emargination shallow, neck short and broad; NR: 0.71–0.82, SA: 153–157°; cucullus with dorsal lobe moderately developed, apex broadly rounded, distal margin convex and nearly uniform in curvature, ventral lobe weakly developed, anal angle broadly rounded, setation of medial surface short and fine.

*Female genitalia.* Papillae anales flat, moderately setose, and densely microtrichiate along margins of ventral opening; sterigma Type II, U-shaped, and microtrichiate; lamella postvaginalis rectangular, with lateral margins curled inward and with posterior edge appearing to be deeply emarginated due to reduced sclerotization of the medial trough; medial trough flanked by hairlike setae; lamella antevaginalis ringlike; sternum 7 rectangular, with posterior margin indented to about one-third length of sterigma; scaling of sternum 7 uniform except for a moderately dense band along the posterior margin; ductus bursae with patch of sclerotization (sometimes fragmented) near juncture with ductus seminalis; corpus bursae with one large signum, sometimes with a second vestigial signum in the form of a small sclerotized scar and/or a cluster of sclerotized dots on the membrane.

### 137. *Pelochrista dorsisignatana* (Clemens, 1860)

(Plate PP, 137a–e; Plate 59, 137a–g)

*Poecilochroma dorsisignatana* Clemens 1860:353.

*Paedisca dorsisignatana*: Fernald 1882:42.

*Eucosma dorsisignatana*: Fernald 1903:459; Barnes and McDunnough 1917:171; Heinrich 1923:120; McDunnough 1939:47; Powell 1983:34; Miller 1985:244; Miller 1987:53; Brown 2005:319; Gilligan et al. 2008:111; Wright 2011b:176.

*Pelochrista dorsisignatana*: Gilligan and Wright 2013b:319.

*Paedisca clavana* Zeller 1875:303; synonymy by Fernald 1882:42.

*Eucosma clavana*: Fernald 1903:459; Barnes and McDunnough 1917:171; Heinrich 1923:120; McDunnough 1939:47; Powell 1983:34; Miller 1985:245; Brown 2005:319; Wright 2011b:176.

*Pelochrista clavana*: Gilligan and Wright 2013b:320.

*Carpocapsa distigmata* Walker 1863:394; synonymy by Fernald 1882:42.

*Eucosma distigmata*: Fernald 1903:459; Barnes and McDunnough 1917:171; Heinrich 1923:120; McDunnough 1939:47; Powell 1983:34; Miller 1985:245; Brown 2005:319; Wright 2011b:176.

*Pelochrista distigmata*: Gilligan and Wright 2013b:320.

*Eucosma dorsisignatana diffusana* Kearfott 1905:355; Barnes and McDunnough 1917:171; Heinrich 1923:121; McDunnough 1939:47; Powell 1983:34; Miller 1985:246; Brown 2005:319; synonymy by Wright 2011b:176.

*Pelochrista dorsisignatana diffusana*: Gilligan and Wright 2013b:320.

**Types.** *Poecilochroma dorsisignatana*. Lectotype (designated by Darlington 1947). ♂, no 7217, ANSP. *Paedisca clavana*. Lectotype (designated by Miller 1985). ♂, Cambridge, Boll, BMNH(E) 819883, slide 11565, BMNH. *Carpocapsa distigmata*. Holotype. ♀, North America, BMNH(E) 819882, slide 11543, BMNH. *Eucosma dorsisignatana diffusana*. Lectotype (designated by Heinrich 1923). ♂, Louisiana, Vernon Parish, G. Coverdale, August, slide DJW 2570, AMNH.

The challenges involved in type fixation for species described by Brackenridge Clemens were discussed by Darlington (1947) and Miller (1973). Clemens often did not indicate the number of syntypes supporting his descriptions, and later authors have had varying amounts of success in finding and authenticating those specimens. The lectotype for *P. dorsisignatana* was designated by Darlington (1947), but Miller (1973) raised doubt as to whether that specimen is actually a syntype, citing a discrepancy between a number on a label attached to the specimen and a corresponding number in a list maintained by Clemens. We did not examine that specimen, and we expect that at this point it is impossible to determine with confidence whether or not it was a member of the original type series. It has been treated as a valid lectotype by various authors, including Brown (2005), Wright (2011b), and Gilligan and Wright (2013b).

In *P. dorsisignatana* the forewing has reddish-brown markings and brownish-gray interfascial areas. The separation of the subbasal and median marks by a broad band of interfascial coloration is the basis for distinguishing this species from the otherwise similar *P. similiana*. The median mark is often accompanied by a small disjunct spot on the inner margin (Plate PP:137b, d, e) and is sometimes fused with that spot (Plate OO:137c). The well-defined postmedian band is often constricted or interrupted near the costa.

*Pelochrista dorsisignatana* is similar to *P. wagneri* (species 138) in forewing maculation but differs from that species in size (mean FWL = 9.5 vs. 8.4 mm) and color (reddish brown vs. orange brown).

The male genitalia of *P. dorsisignatana* are indistinguishable from those of *P. wagneri* and differ from those of *P. similiana* only to the extent that the uncus and socii in the last species are more strongly developed and more clearly differentiated from the dorsolateral shoulders of the tegumen. Females of these three species are virtually identical in genitalia, but the sclerotized patch on the ductus bursae seems to be smaller and more fragmented in *P. wagneri* (based on two preparations).

We examined more than 100 specimens that document a range extending across southern Canada from Nova Scotia to British Columbia, south to the Gulf of Mexico, and southwest to a line from eastern Oregon to eastern Texas. Adults fly from August through October. East of the Mississippi River this species can be abundant in old fields and grasslands during September. Fernald (1882) reported that the larva is a root borer in *Solidago canadensis* L. (Canada goldenrod).

### **138. *Pelochrista wagneri* Wright and Gilligan, new species** (Plate PP, 138a–c; Plate 59, 138a–e)

**Diagnosis.** *Pelochrista wagneri* differs from the other members of the *dorsisignatana* group in size (mean FWL = 8.4 vs. 9.3–10.8 mm) and coloration (pale orange brown vs. gray brown). It is currently known only from Plumas County in northern California. It resembles *P. dorsisignatana* in maculation, but the fasciate markings are less strongly developed and are not conspicuously edged with white. There is no substantial difference in genitalia between these two species. *Pelochrista wagneri* is reliably separated from *P. similiana* and *P. oraria* by geographic distribution (northern California vs. eastern North America and the Atlantic coast, respectively).

**Description.** *Head.* Frons, vertex, labial palpi, and antennae uniformly orange brown. *Thorax.* Dorsal surface concolorous with head; fore- and mid-leg with anterior surfaces orange brown, posterior surfaces paler; hind-leg pale orangish white; tarsus with white annulations. Forewing: ♂ FWL 6.4–10.0 mm (mean = 8.0, n = 5), AR = 3.05; ♀ FWL 7.7–9.4 mm (mean = 8.6, n = 7), AR = 2.91; costa weakly arched; apical angle acute; termen nearly straight; dorsal surface pale orange brown with darker orange-brown maculation; subbasal mark extending from inner margin to rounded apex in discal cell, with lateral margins nearly parallel; median band weakly expressed, extending to inner margin, and only vaguely discernable between costa and radial vein; postmedian band defined by dark lines along its proximal and distal margins, otherwise concolorous with interfascial areas. Hindwing: Brownish gray. *Abdomen.* Male genitalia (n = 3): Typical of group; vesica with 13–20 cornuti; NR = 0.71; SA = 154°. Female genitalia (n = 2): As described for group; sclerotized patch on ductus bursae small and fragmented.

**Holotype** (Plate PP:138a, Plate 59:138b). ♂, California, Plumas County, 2 mi E of Bucks Lake, D. L. Wagner, 10 September 1983, slide JAP 5054, EME.

**Paratypes.** CALIFORNIA. Plumas County, 2 mi E of Bucks Lake, D. L. Wagner, 10 September 1983 (2 ♂, slide DJW 3671; 3 ♀, slide DJW 3672), 2 mi NE of Bucks Lake, J. A. Powell, 12 September 1983 (1 ♂, 1 ♀); 8 mi E of Quincy, Green Horn Creek, 4,700 feet, J. A. Powell, 10 September 1983 (3 ♀, slide 3673); 1 mi S of Meadow Valley, J. A. DeBenedictis, 9–16 September 1983, (1 ♂, slide DJW 3670). Paratype depositories: EME, USNM.

**Etymology.** The specific epithet honors Dr. David L. Wagner, University of Connecticut, who collected most of the specimens in the type series.

**Host.** Two of the paratypes have a label with the inscription “*Solidago canadensis elongata*.”



### 139. *Pelochrista similiana* (Clemens, 1860)

(Plate OO, 139a–d; Plate 60, 139a–f)

*Poecilochroma similiana* Clemens 1860:353.

*Paedisca similana*: Fernald 1882:42, misspelling.

*Eucosma similana*: Fernald 1903:459; Barnes and McDunnough 1917:171, misspelling.

*Eucosma dorsisignatana similana* Heinrich 1923:121; McDunnough 1939:47; Powell 1983:34, misspelling.

*Eucosma similiana*: Miller 1985:246; Miller 1987:53; Brown 2005:327; Gilligan et al. 2008:111; Wright 2011b:176.

*Pelochrista similiana*: Gilligan and Wright 2013b:327.

*Eucosma dorsisignatana confluana* Kearfott 1905:355; Barnes and McDunnough 1917:171; Heinrich 1923:121; McDunnough 1939:47;

Powell 1983:34; Miller 1985:246; Brown 2005:319; synonymy by Wright 2011b:177.

*Pelochrista dorsisignatana confluana*: Gilligan and Wright 2013b:327.

*Eucosma engelana* Kearfott 1908:169; Barnes and McDunnough 1917:170; synonymy by Wright 2011b:176.

*Pelochrista engelana*: Gilligan and Wright 2013b:327.

*Eucosma dorsisignatana engelana* Heinrich 1923:122; McDunnough 1939:47; Powell 1983:34; Brown 2005:319;

revised synonymy by Wright 2011b:176.

**Type.** *Poecilochroma similiana*. Lectotype (designated by Darlington 1947). ♀, no. 7316, ANSP. *Eucosma dorsisignatana confluana*. Lectotype (designated by Wright 2011b). ♂, New Jersey, Essex County, Montclair, W. D. Kearfott, 24 August 1899, AMNH. *Eucosma engelana*. Lectotype (designated by Heinrich 1923). ♂, Pennsylvania, Allegheny County, Pittsburgh, H. Engel, 20 August 1906, slide CH 16 Dec 1919, AMNH.

Clemens' (1860) description of *P. similiana* may have been based solely on female specimens because he suggested that this form might be the female of *P. dorsisignatana*. Fernald (1882) placed *P. similiana* in the synonymy under *P. dorsisignatana* but misspelled the name as *P. similana*, leading to considerable taxonomic confusion (discussed in Miller 1985 and Wright 2011b). Miller (1985) reinstated *P. similiana* as a distinct species, citing a lack of intergradation between its forewing pattern and that of *P. dorsisignatana*.

*Pelochrista similiana* agrees with *P. dorsisignatana* in size (mean FWL = 9.3 vs. 9.5 mm) and color but differs from that species in that the subbasal mark extends into the cell and fuses there with the median band. There are two primary phenotypes, distinguished by whether the part of the median band between the radius and the costa is clearly defined (Plate PP:139a–b) or barely discernable (Plate PP:139c–d). The lectotype resembles the specimen in Plate PP:139a. That is the form to which Kearfott (1905) applied the name *Eucosma dorsisignatana confluana* at a time when *similiana* was treated as a synonym of *dorsisignatana*. The second phenotype (Plate PP:139c–d) is the form Kearfott (1905) had in mind when he described *Eucosma dorsisignatana diffusana*. That name appears above as a synonym of *P. dorsisignatana* instead of *P. similiana* because the type series for that taxon is mixed, and the lectotype (designated by Heinrich 1923) has the *dorsisignatana* forewing maculation (illustrated by Wright 2011b). The two phenotypes were considered conspecific by Miller (1985) and have been treated as such by subsequent authors.

The male genitalia of *P. similiana* and *P. dorsisignatana* are nearly indistinguishable. Valva shape is somewhat variable in both species and provides no reliable means of diagnosis. Wright (2011b) observed some subtle differences in the uncus and socii, two structures that are more strongly developed and more strongly differentiated from the tegumen in *P. similiana* than in *P. dorsisignatana*. There are no consistent differences in female genitalia between the two species.

*Pelochrista similiana* ranges through much of eastern North America: Nova Scotia to Manitoba, south to Arkansas, Mississippi, and Georgia. Adults have been captured from mid-July to the end of October and are often found flying with *P. dorsisignatana* in late August and early September. The larva is a root borer in *Solidago* L. (goldenrod). Čapek (1971) studied this insect as a possible biological control for introduced *Solidago* in Central and Western Europe.



#### 140. *Pelochrista oraria* (Wright, 2011)

(Plate PP, 140a–c; Plate 60, 140a–e)

*Eucosma oraria* Wright 2011b:180.

*Pelochrista oraria*: Gilligan and Wright 2013b:325.

**Holotype** (Plate PP:140a, Plate 60:140a). ♂, Canada, Nova Scotia, Kings County, Grand Pré, D. C. Ferguson, 26 August 1952, slide 142426, USNM.

*Pelochrista oraria* is the largest member of the *dorsisignatana* group (mean FWL = 10.8 vs. 8.4–9.5 mm) and is readily identified by forewing appearance. The median fascia is disjunct from the subbasal fascia (distinguishing *P. oraria* from *P. similiana*) and has an oblique branch attenuating distally to the apex (distinguishing *P. oraria* from *P. dorsisignatana* and *P. wagneri*). The postmedian band is obsolete in some specimens (Plate PP:140c) and only partially expressed in others (Plate PP:140a–b). The genitalia are typical of the group.

*Pelochrista oraria* appears to be restricted to the Atlantic coast, from Nova Scotia to North Carolina. We examined specimens from Nova Scotia, Connecticut, Maryland, Massachusetts, New Jersey, New York, North Carolina, and Virginia. Many were taken in habitat described as dunes, coastal marsh, or maritime scrub. Aside from one record from 30 May at Riverside, New York, adult collection dates range from 24 August to 6 November.

### Species not assigned to a group

#### 141. *Pelochrista dilatana* (Walsingham, 1895)

(Plate QQ, 141a–c; Plate 61, 141a–e)

*Paedisca dilatana* Walsingham 1895:510.

*Eucosma dilatana*: Fernald 1903:460; Barnes and McDunnough 1917:171; Heinrich 1923:119; McDunnough 1939:47; Powell 1983:34; Brown 2005:318.

*Pelochrista dilatana*: Gilligan and Wright 2013b:319.

**Holotype** (Plate QQ:141a). ♂, Arizona, Morrison, 1883, BMNH(E) 819877, slide 5746, BMNH.

*Pelochrista dilatana* is a moderately large species (mean FWL = 11.7 mm) that was described from a single specimen. The forewing is gray brown with dark brown markings, the latter thinly edged with white. The maculation includes a prominent basal patch, a relatively small pretornal mark, an irregularly expressed diagonal band from the distal end of the cell to the apex (sometimes interrupted in the subapical area), and a narrow band on the termen from the tornus to the apex. The ocellus is not expressed and the costal strigulae are very weakly defined.

In males, the uncus is weakly differentiated from the dorsolateral shoulders of the tegumen, the socii are fingerlike and nearly uniform in width, and the vesica has 10–21 cornuti. The valva has a strongly concave costal margin, a moderate to shallow ventral emargination, a broad neck (NR = 0.77), and an angulate saccular corner (SA = 139°). The cucullus is uniform in width, with a strongly developed dorsal lobe, a distinctive semicircular ventral lobe, and a weakly convex distal margin that is slightly indented near the anal angle. In females, the papillae anales are moderately setose, the Type II sterigma is funnel-shaped, the trapezoidal lamella postvaginalis has straight lateral margins and a medially indented posterior margin, the lamella antevaginalis is ringlike, the ductus bursae has a sclerotized patch and a few microtrichia near

the ductus seminalis, and the corpus bursae has two signa of slightly different size.

We examined 11 specimens (6 ♂, 5 ♀) in the USNM from Cochise and Santa Cruz counties in southern Arizona. Adult capture dates range from 10–27 April and 13 August–14 September.

#### 142. *Pelochrista arizonae* Wright and Gilligan, new species

(Plate QQ, 142a–b; Plate 61, 142)

**Diagnosis.** *Pelochrista arizonae* is similar in size and somewhat similar in forewing appearance to *P. dilatana*. It differs from the latter species in that the forewing color is tan with a faint rosey tint (instead of brown), the basal and subbasal fasciae are not fused into a prominent basal patch, the diagonal band is longer (sometimes fragmented and extending to the inner margin), the markings are not edged with white, and the overall forewing appearance is mottled. Males of this species are unknown. The female genitalia differ from those of *P. dilatana* in the following respects: the sterigma is U-shaped vs. trapezoidal, the lateral margins and posterolateral corners of the lamella postvaginalis are inwardly curling and bulgelike, respectively, vs. flat and sharply pointed, the ductus bursae lacks sclerotization, and the inner surface of the ductus bursae has numerous (vs. a few) microtrichia near the juncture with the ductus seminalis.

**Description.** *Head.* Frons, vertex, labial palpus, and antennae pale brown. *Thorax.* Dorsal surface concolorous with head; fore- and mid-leg with anterior surfaces pale brown, posterior surfaces whitish, hind-leg largely whitish, tarsus with inconspicuous annulations. Forewing: ♀ FWL 11.4–12.6 mm (mean = 12.0, n = 9), AR = 2.78; costa weakly arched; apex slightly acute; termen weakly convex; dorsal surface with rosey-tan interfascial areas and brown markings, the latter including a thin basal fascia, an outwardly oblique subbasal band from inner margin to mid-costa, an obscurely defined diagonal band from middle of inner margin to apex that is interrupted near the apex and on A<sub>1+2</sub>, and a small pretornal mark; interfascial areas speckled with brown; ocellus not expressed; costal strigulae concolorous with interfascial areas and barely discernable; fringe brown. Hindwing: Pale brownish gray. *Abdomen.* Male genitalia: Unknown. Female genitalia: Papillae anales moderately setose and microtrichiate; sterigma Type II and U-shaped; lamella postvaginalis with a moderately indented posterior margin, inwardly curling lateral margins, outwardly bulging posterolateral corners, and a shallow microtrichiate medial trough; lamella antevaginalis ringlike; sternum 7 trapezoidal, with posterior margin weakly concave; scales on sternum 7 uniformly distributed; ductus bursae lacking sclerotization; inner surface of ductus bursae with conspicuous patch of microtrichia near ductus seminalis; corpus bursae with two signa, one slightly larger than the other.

**Holotype** (Plate QQ:142a). ♀, Arizona, Santa Cruz County, Madera Canyon, Santa Rita Mountains, 5,600 feet, J. G. Franclemont, 17 May 1963, slide 145004, USNM.

**Paratypes.** ARIZONA. Cochise County, Palmerlee (1 ♀, slide DJW 3753) USNM; same location and collector as holotype, 8 May 1963 (2 ♀, slide DJW 3705), 17 May 1963 (2 ♀), 22 May 1963 (1 ♀), 26 May 1963 (1 ♀), 27 May 1963 (1 ♀, slide DJW 3659) USNM.

**Etymology.** The specific epithet refers to the state of Arizona, where the type series was collected.

#### 143. *Pelochrista sierrae* (Blanchard and Knudson, 1983)

(Plate QQ, 143a–b; Plate 61, 143a–d)

*Eucosma sierra* Blanchard and Knudson 1983:850; Brown 2005:327.

*Pelochrista sierrae*: Gilligan and Wright 2013b:331.

**Holotype** (Plate QQ:143a). ♂, Texas, Culberson County, Sierra Diablo Wildlife Management Area, 6,400 feet, J. G. Franclemont, 30 August 1970, USNM.

This species was described from four males collected at the type locality on 30–31 August 1970 and 1 September 1969. The forewing is olive brown to olive gray and uniformly sprinkled with small whitish specks. The dark olive-brown maculation includes a basal patch that is well defined from the inner margin to the radius but fades toward the costa, a prominent pretornal mark, a faint suggestion of a median fascia in the form of a weakly defined dark shade from mid-costa to the pretornal mark, an obscure ocellus, and an inconspicuous thin line along the termen. Mean FWL = 10.6 mm, AR = 2.78.

Male genitalia characteristics include a bulgelike uncus that is weakly differentiated from the dorsolateral shoulders of the tegumen, socii that are broad, moderately long, and somewhat wrinkled, and a slightly tapering phallus with 10–15 cornuti in the vesica. The valva has a concave costal margin, a moderate ventral emargination (NR = 0.62), and an acute saccular corner (SA = 51°). The cucullus is nearly uniform in width, with the dorsal lobe strongly developed, the apex semicircular, the distal margin nearly straight, the ventral lobe triangular, and the basoventral margin weakly extending onto the medial surface of the neck. In females, the papillae anales have arched transverse cross-sections, the sterigma is Type II, the lamella postvaginalis is rectangular (width about 2 × length), the anterior margin of the ostium is membranous, sternum 7 is rectangular and strongly sclerotized on the posterior and lateral margins, the ductus bursae is sclerotized from the ductus seminalis nearly to the constriction anterior to the ostium, and the corpus bursae has two signa of nearly equal size. The male genitalia are rather similar to those of *P. dilatana*, but the two are easily separated by the saccular angle (acute vs. obtuse).

This species is poorly represented in collections. We examined the four members of the type series, collected between 30 August and 1 September in Culberson County, Texas, one male collected on 5 November in Hidalgo County, Texas, and one female collected in early September at Big Bend National Park, Brewster County, Texas.

#### 144. *Pelochrista shastana* (Walsingham, 1879)

(Plate QQ, 144a–b; Plate 62, 144a–d)

*Paedisca shastana* Walsingham 1879:46; Fernald 1882:39.

*Eucosma shastana*: Fernald 1903:457; Barnes and McDunnough 1917:171; Heinrich 1929:10; McDunnough 1939:47; Powell 1983:34;

Brown 2005:327; Wright 2008:230.

*Pelochrista shastana*: Gilligan and Wright 2013b:326.

**Lectotype** (designated by Wright 2008, Plate QQ:144a, Plate 62:144a–b). ♂, California, Siskiyou County, Mount Shasta, Walsingham, 2 August–1 September 1871, slide 11516, BMNH.

Walsingham described *P. shastana* from two syntypes (1 ♂, 1 ♀), both deposited in the BMNH. Obratzsov selected the male as the lectotype, and Wright (2008) published the designation. The illustration presented here of the genitalia for the lectotype (Plate 62:144a) is based on a slide preparation made by Obratzsov (slide BM 11516), and that slide bears a note indicating that the abdomen of this specimen had been dislodged at some time and reattached with glue. Heinrich (1923) confused this species with *Eucosma tahoensis* Heinrich (a name treated by Wright (2008) as a synonym of *P. biquadrana*) and later (1929) corrected his error, illustrating the genitalia of a male from the Fernald Collection that had been determined by Walsingham. The genitalia of the latter specimen agree with those of the lectotype.

*Pelochrista shastana* is known from very few specimens. The forewing has dark brown markings and whitish interfascial areas, the latter generously reticulated with brown. The maculation includes a partial subbasal fascia from the inner margin to the radius, a prominent median fascia that is complete except

for whitish interruptions on  $CuA_2$  and  $A_{1+2}$ , a postmedian band along the distal margin of the ocellus that does not reach the costa but connects to the apex, three large marks on the distal one-half of the costa that separate the strigulae, and a thin black line on the termen. This species has been confused with *P. biquadrana* (species 55) based on forewing appearance, but differs from that species in size (mean FWL = 13.7 vs. 10.2 mm) and in the presence of the oblique connection between the postmedian band and the apex. The two species are most reliably separated by genitalia.

Males of *P. shastana* differ from those of *P. biquadrana* in that the uncus is less bulbous and not divided into two lobes, the neck is broader (NR = 0.69 vs. 0.48), and the cucullus is larger and lacks marginal spines. Females of the two species are easily separated by papillae anales Type (4 vs. 2).

We examined one female in the AMNH, one male in the USNM, two males in the EME, and photographs of the two syntypes in the BMNH. The male in the USNM was given to Fernald by Walsingham. It has no collection data but likely came from the type locality. The other five specimens were collected in Mono and Siskiyou counties, California and Klamath and Lake counties, Oregon in late July or August.

#### 145. *Pelochrista notialis* (Miller, 1985)

(Plate QQ, 145a–d; Plate 62, 145a–d)

*Eucosma notialis* Miller 1985:244; Brown 2005:324.

*Eucosma matutina* (not Grote 1873): Heinrich 1923:109, misidentification.

*Pelochrista notialis*: Gilligan and Wright 2013b:325; Wright 2014:68.

**Holotype.** ♂, Texas, Kerr County, Kerrville, H. Lacey, 6 June, slide 70599, USNM.

Heinrich (1923) misidentified this species as *P. matutina* (species 117), and that confusion prevailed until Miller (1985) corrected the error and described *P. notialis*.

*Pelochrista notialis* is a moderately small species (mean FWL = 7.3 mm). The forewing is white to pale brownish yellow with brown to yellow-brown markings. The maculation includes a partial subbasal mark that is interrupted on  $A_{1+2}$  and a fragmented median fascia comprised of a rectangular component at midcosta, an irregularly shaped mark in the cell, and a triangular pretornal mark. The costal strigulae are white and sharply defined, the variably expressed ocellus is bordered laterally by lustrous bars, and the termen has a narrow salt-and-pepper-colored band from the tornus to the apex.

In males, the uncus is strongly produced, the socii are long and relatively narrow, the base of the phallus is closely surrounded by the anellus, and the vesica has 13–19 cornuti. The valva has a concave costal margin, a shallow ventral emargination, a wide neck (NR = 0.76), and an angulate saccular corner (SA = 153°). The cucullus is relatively large, with the dorsal lobe strongly developed, the apex broadly rounded, the distal margin convex and uniform in curvature, and the anal angle weakly developed and broadly rounded. In females, the papillae anales are flat and sparsely setose, the Type II sterigma is U-shaped, the lamella postvaginalis is rectangular (width greater than length) with lateral margins curled inward, the ductus bursae lacks sclerotization, and the corpus bursae has two signa of markedly different size.

This species appears to prefer grasslands of the Great Plains from Colorado to Texas. We examined specimens from Baca, Larimer, Morgan, Otero, Weld, and Yuma counties in eastern Colorado and from Brown, Cottle, Culberson, Hemphill, Jeff Davis, and Kerr counties in western Texas and the Texas Panhandle. Adult capture dates range from 13 April to 18 August.

#### 146. *Pelochrista angelana* (Wright, 2012)

(Plate QQ, 146a–b; Plate 62, 146a–e)

*Eucosma angelana* Wright 2012:31.

*Pelochrista angelana*: Gilligan and Wright 2013b:317.

**Holotype** (Plate QQ:146a, Plate 62:146c). ♂, California, Los Angeles County, Mint Canyon, C. Henne, 15 October 1941, slide JAP 4602, EME.

*Pelochrista angelana* is known only from the type series, which consists of 15 specimens collected in early October at two locations in Los Angeles County, California. This moderately large species (mean FWL = 11.9 mm) has pale brownish-gray forewings. The blackish-brown maculation includes a subbasal mark, a fragmented median fascia (three components), an obscure band from the distal end of the cell to the apex, several conspicuous marks on the costa delimiting the strigulae, and a well-defined ocellus with three black dots in the central field and lustrous pinkish bars on the lateral margins. In overall appearance, *P. angelana* could be confused with *Sonia vovana* (Kearfott) (see Gilligan et al. 2008, species 203), but the latter species has more contrast between the forewing markings and the interfascial areas, and the genitalia of the two species are not similar.

The male genitalia are closest to those of *P. matutina* (species 117), but the two species are readily separated by size (mean FWL = 11.9 vs. 7.6 mm) and forewing appearance. Moreover, the cucullus in *P. angelana* is less elongate than in *P. matutina*, and the vesica has fewer cornuti (8–11 vs. 13–34). In females, the sterigma is Type II, the lamella postvaginalis is trapezoidal (width at the posterior margin about 2 × the ostium diameter) with lateral margins curling inwards and a V-shaped indentation in the posterior margin, the ductus bursae has a patch of microtrichia on the inner surface near the ductus seminalis but lacks sclerotization, and the corpus bursae has two signa of substantially different size. The larval host is undocumented, although many of the paratypes bear a label with the inscription “*Artemisia*.”

#### 147. *Pelochrista argenteana* (Walsingham, 1895)

(Plate RR, 147a–f; Plate 63, 147a–i)

*Paedisca argenteana* Walsingham 1895:504.

*Eucosma argenteana*: Fernald 1903:460; Barnes and McDunnough 1917:169; Heinrich 1923:86; McDunnough 1939:47.

*Pelochrista argenteana*: Powell 1983:35; Brown 2005:478; Wright 2007c:118; Gilligan et al. 2008:116; Gilligan and Wright 2013b:317.

*Eucosma idahoana* Kearfott 1907b:90; Barnes and McDunnough 1917:169; Heinrich 1923:86; McDunnough 1939:45.

*Pelochrista idahoana*: Powell 1983:35; Brown 2005:479; synonymy by Wright 2007c:118; Gilligan and Wright 2013b:317.

**Types.** *Paedisca argenteana*. Lectotype (designated by Wright 2007c). ♂, Colorado, Larimer County, Loveland, W. G. Smith, July 1891, BMNH(E) 819927, slide 11566, BMNH. *Eucosma idahoana*. Holotype. ♂, Idaho, Bingham County, Blackfoot, A. J. Snyder, 3 June, slide CH 2 December 1919, AMNH.

Walsingham (1895) described *P. argenteana* from eight syntypes (4 ♂, 4 ♀) collected in 1891 by W. G. Smith. Those specimens reside in the BMNH. The lectotype was selected by Obratzsov, and the designation was published by Wright (2007c). *Eucosma idahoana* was based on a single male. Heinrich (1923) noted the similarity in forewing appearance between *E. idahoana* and *P. argenteana* but retained the distinction between the two taxa based on differences in cucullus shape (see Plate 63:147f vs. b). Wright (2007c) recognized those shapes as two expressions of the intraspecific variation exhibited by *P. argenteana* (Plate 63:147a–g) and relegated *E. idahoana* to synonymy.



*Pelochrista argenteana* is a medium-sized narrow-winged species (mean FWL = 9.7 mm, AR = 3.48). The forewing is straw yellow with prominent white streaks on the costa, the cubitus, and  $A_{1+2}$  as well as inconspicuous white lines along the median branches and  $CuA_2$ . The cubital streak expands in the cell, where it is variably overlaid with blackish-brown scaling. The termen is marked by a narrow white band and a thin black line, both extending from the tornus to the apex. In some specimens the longitudinal streaking is only faintly discernable (Plate RR:147d), in others the straw-yellow areas are suffused with blackish brown (Plate RR:147f), but in all cases the black line on the termen is conspicuous. Hindwing color varies from blackish brown to pale brownish gray.

In males, the triangular uncus is clearly differentiated from the dorsolateral shoulders of the tegumen and has a transverse ridge on the ventral surface, the fingerlike socii are broad medially and taper toward the apex, the phallus is long and narrow with the base loosely surrounded by the anellus, and the vesica has 5–11 cornuti. The valva has a slightly concave costal margin, a long neck that is strongly arched laterally, NR = 0.55, and an angulate saccular corner (SA = 116°). The cucullus has a weakly developed and broadly rounded dorsal lobe, a distally projecting ventral lobe of variable length, and a prominent anal spine projecting distally from the vertex of the anal angle. Cucullus shape varies considerably (Plate 63:147a–g), depending on the length of the ventral lobe. In females, the papillae anales are flat, sparsely setose, and lack microtrichia; the triangular sterigma is Type II, with lamella antevaginalis ringlike and the medial portion of the lamella postvaginalis microtrichiate; sternum 7 has an outwardly-bulging protuberance near the posterior margin that extends transversely across most of the sternite, forming a ridge that weakly shields the anterior margin of the ostium; the sclerotization of the ductus bursae extends from the constriction anterior to the ostium to the juncture with the corpus bursae where it expands into two large lobes that project onto the surface of the bursa; and the corpus bursae has two signa of slightly different size.

We examined about 225 specimens that document a range extending from British Columbia to Saskatchewan to western Iowa and south to northern California, Utah, New Mexico, and Texas. Adult capture dates vary from 30 May to 28 July, with one record of 18 September at Sioux City, Iowa.

#### 148. *Pelochrista serpentana* (Walsingham, 1895)

(Plate RR, 148a–i; Plate 63, 148a–h)

*Paedisca serpentana* Walsingham 1895:504.

*Eucosma serpentana*: Fernald 1903:460; Dyar 1903:180; Barnes and McDunnough 1917:169; Heinrich 1923:87; McDunnough 1939:45; Powell 1983:34; Brown 2005:327.

*Pelochrista serpentana*: Gilligan and Wright 2013b:327.

*Eucosma ophionana* McDunnough 1925a:18; McDunnough 1939:46; Powell 1983:34; Brown 2005:325, new synonymy.

*Pelochrista ophionana*: Gilligan and Wright 2013b:325.

**Types.** *Pelochrista serpentana*. Lectotype (here designated). ♂, Colorado, Larimer County, Loveland, 5,000 feet, W. G. Smith, July 1891, BMNH(E) 819879, slide 11576, BMNH. *Eucosma ophionana*. Holotype (Plate RR:148f). ♂, Canada, Alberta, Nordegg, J. McDunnough, 23 June 1921, CNC.

Walsingham (1895) described *P. serpentana* from four male syntypes collected by Smith in July at Loveland, Colorado. The specimen designated here as lectotype has a circular BMNH “Type H.T.” label and has been interpreted previously as a holotype (Brown 2005). It looks a great deal like the specimen depicted in Plate RR:148a. *Pelochrista ophionana* was described from seven males collected from 20–29 June at Nordegg, Lethbridge, and Waterton Lakes, Alberta. We examined the holotype and four paratypes and found McDunnough’s diagnosis insufficient to separate this species from the highly variable *P. serpentana*.

In typical specimens (Plate RR:148a–b), the forewing is white with gray-brown markings, the latter including a partial subbasal fascia from the inner margin to the radius, a variably expressed median fascia

that often is interrupted on the cubitus, a diagonal band joining the median fascia (at the distal end of the cell) to the apex, three marks on the distal one-half of the costa separating strigulae, and a narrow band along the termen. The weakly defined ocellus is white with a gray-brown spur projecting into the central field from the aforementioned diagonal band. In the Great Basin there is a pale form of *P. serpentana* with a yellowish-white forewing and markings that vary from weakly expressed (Plate RR:148g) to obsolete (Plate RR:148i).

In males, the uncus is triangular to bluntly rounded, the fingerlike socii are long and weakly curved, the valva neck is well defined, NR = 0.65, and the saccular corner is angulate (SA = 144°). The cucullus is substantially uniform in width, with the dorsal lobe strongly developed, the apex rounded, the ventral lobe weakly developed, and five or six marginal spines evenly distributed from the anal angle to three-fourths the distance to the apex. In females, the papillae anales have short stiff setae sparsely-distributed on the flat laterally facing pads, hairlike setae on the margins of the ventral opening, and a longitudinal line of four or five long hairlike setae located medially on the lateral surface of each pad. The membrane posterior to tergum 8 is densely covered with narrow, flat, dentate microtrichia; the sterigma is Type II; the ductus bursae is sclerotized from the constriction anterior to ostium to the ductus seminalis; and the corpus bursae has two signa of unequal size.

We examined specimens from Alberta, Arizona, Colorado, Idaho, Iowa, Montana, Nevada, New Mexico, North Dakota, Washington, and Wyoming. Adults fly from the end of May to mid-September. Most of the material we examined was associated with open habitat dominated by *Artemisia* L. (sagebrush).

#### **149. *Pelochrista lolana* (Kearfott, 1907)**

(Plate SS, 149a–e; Plate 64, 149a–g)

*Eucosma lolana* Kearfott 1907b:29; Barnes and McDunnough 1917:170; Heinrich 1923:105; McDunnough 1939:46; Powell 1983:34; Brown 2005:323.

*Pelochrista lolana*: Gilligan and Wright 2013b:323.

*Eucosma leucomalla* Meyrick 1912:35, unnecessary replacement name for *lolana*.

**Lectotype** (designated by Heinrich 1923). ♂, Colorado, Gillette, Dyar, and Caudell, slide CH 14 December 1919, AMNH.

Kearfott (1907b) mentioned two syntypes from Colorado. One was acquired by the AMNH and was referred to by Heinrich (1923) as the “Type.” The other, according to Kearfott (1907b), was deposited in the USNM, but Heinrich (1923) indicated that Kearfott was mistaken in that regard. We were unable to find the second syntype in either of these institutions and conclude that Heinrich’s remarks about the “Type” constitute a valid lectotype designation.

*Pelochrista lolana* is a medium-sized species (mean FWL = 9.5 mm) with an overall dark gray appearance. The forewing features whitish interfascial areas and charcoal-gray markings, the latter including a basal patch, a broad bandlike median fascia from mid-costa to the pretornal portion of the inner margin, three or four conspicuous marks separating white strigulae on the distal one-half of the costa, several dots on the whitish/gray central field of the obscure ocellus, and a vaguely defined triangular mark between the ocellus and the apex. The basal patch and median fascia are separated by a conspicuous white spot on the inner margin. The somewhat paler specimens illustrated in Plate SS:149b–c (from southern Idaho) have considerable white suffusion in the postmedian area; the pinkish phenotype depicted in Plate SS:149e is representative of a series of specimens collected by J. F. G. Clarke on Columbia Mountain in Ferry County, Washington. In all forms the hindwing is black, with white to pale-gray fringe. The forewing is somewhat similar to that of *P. momana* (species 58), but the two species are easily separated by genitalia.

In males, the uncus is triangular and well differentiated from the dorsolateral shoulders of the tegumen, the socii are short and stout, and the vesica lacks cornuti. The valva has a weakly concave costal margin, a short shallow ventral emargination, a wide neck ( $NR = 0.89$ ), a weakly defined saccular corner ( $SA = 162^\circ$ ), and a band of short stiff setae along the distal margin of the basal excavation. The cucullus has moderately developed and broadly rounded dorsal and ventral lobes, a convex distal margin of nearly uniform curvature, and a finely setose medial surface. In females, the moderately setose papillae anales have arched transverse cross-sections, the apophyses anteriores are particularly long (length about  $1.4 \times$  that of the apophyses posteriores), the U-shaped sterigma is Type II, the lamella postvaginalis is weakly sclerotized, the lamella antevaginalis is membranous, sternum 7 is long and rectangular (length about  $4 \times$  width), the ductus bursae is long and lacks sclerotization, and the corpus bursae has two signa of unequal size.

We examined specimens from Alberta, British Columbia, California, Colorado, Idaho, Nevada, Utah, Washington, and Wyoming that were collected at elevations between 5,000 feet (Oneida County, Idaho) and 10,300 feet (Albany County, Wyoming). Adult capture dates range from 24 May to 5 August.

### **150. *Pelochrista hohana* (Kearfott, 1907)**

(Plate SS, 150a–c; Plate 64, 150a–g)

*Eucosma hohana* Kearfott 1907b:28; Barnes and McDunnough 1917:171; Heinrich 1923:129; McDunnough 1939:47; Powell 1963:243; Powell 1983:35; Brown 2005:321.

*Eucosma syrtodes* Meyrick 1912:35, unnecessary replacement name for *hohana*.

*Pelochrista hohana*: Gilligan and Wright 2013b:322.

**Lectotype** (designated by Heinrich 1923). ♂, Canada, Alberta, Mount Piran, 17 August, slide CH 14 December 1919, AMNH.

Kearfott (1907b) reported two syntypes with identical data. Heinrich (1923) illustrated the genitalia of one of those specimens (in the AMNH) and referred to it as the “Type,” thereby selecting a lectotype. We could not find the second syntype in either the AMNH or the USNM.

*Pelochrista hohana* is a rather nondescript medium-sized species (mean FWL = 9.0 mm) with a pale brownish-gray forewing that is liberally speckled with dark-gray/black dashes and dots that often align in transverse reticulations. The fasciate markings are not well defined but often include partially expressed but obscure subbasal and median fasciae and dark marks on the distal one-half of the costa that delimit pale gray strigulae. The termen has a thin white line from the tornus to the apex that is edged proximally by a thin gray line; the fringe scales are pale gray.

In males, the weakly-developed uncus is barely differentiated from the dorsolateral shoulders of the tegumen, the socii are short, and the vesica lacks cornuti. The valva has a weakly concave costal margin, a broad shallow ventral emargination, a broad neck ( $NR = 0.77$ ), and an angulate saccular corner ( $SA = 129^\circ$ ). The cucullus has a moderately developed dorsal lobe with an angular apex, a weakly developed and broadly rounded ventral lobe, a convex distal margin of nearly uniform curvature, and a finely setose medial surface. In females, the flat papillae anales have weakly-developed posterior lobes and long narrow anterior lobes that taper to a point, the former sparsely setose, the latter lacking setae (Plate 64:150f). The apophyses posteriores are long (length about  $1.5 \times$  that of the apophyses anteriores); the membrane posterior to tergum 8 telescopes and is densely covered with sharply-pointed dentate microtrichia; the U-shaped sterigma is Type II, with an outwardly projecting lamella antevaginalis that forms a cylindrical shield for the ostium; the lamella postvaginalis has patches of microtrichia flanking the central trough, lacks setae, and has inwardly curling lateral margins; the ductus bursae has a weakly sclerotized patch anterior to the ductus seminalis; and the corpus bursae has two signa, one considerably reduced.

We examined 35 specimens (23 ♂, 12 ♀) from Banff, Moraine Lake, and Mount Piran, Alberta; Hedley, British Columbia; Mono Pass, Inyo County, California; Mount Barcroft, Mono County, California; Columbia Mountain and Sherman Pass, Ferry County, Washington; Mount Rainier, Washington; and Albany County and Yellowstone National Park, Wyoming. Much of this material was collected at elevations of 10,000–12,500 feet, but the Canadian specimens come from sites at 6,000–8,000 feet. Powell (1963) reported specimens flying diurnally “amongst rocky outcroppings around the small dry alpine meadows at Mount Barcroft.” Adults fly from the end of June to the middle of August.

### 151. *Pelochrista maculatana* (Walsingham, 1879)

(Plate SS, 151a–e; Plate 65, 151a–f)

*Paedisca maculatana* Walsingham 1879:48; Fernald 1882:39.

*Eucosma maculatana*: Fernald 1903:457; Barnes and McDunnough 1917:171; Heinrich 1923:102; McDunnough 1939:46; Powell 1983:34; Brown 2005:323; Powell and Opler 2009:134.

*Pelochrista maculatana*: Gilligan and Wright 2013b:323.

**Lectotype** (here designated). ♂, California, Lake County, Scott’s Valley, Walsingham, 17–19 June 1871, BMNH(E) 819974, slide 11518, BMNH.

Walsingham (1879) based *P. maculatana* on six syntypes (3 ♂, 3 ♀) with identical data. The specimen designated here as the lectotype was selected by Obraztsov and bears a red BMNH “Type H. T.” label.

*Pelochrista maculatana* is a medium-sized species (mean FWL = 9.3) with a moderately broad forewing (AR = 2.88). The color varies from pale rosy brown to brownish gray, with dark brown forewing markings that include a conspicuous outwardly oblique bar from the middle of the inner margin to the cell and a narrower, more weakly expressed band from mid-costa to the tornus. The interfascial areas adjacent to the median bar are whitish and faintly irrorated with brown.

The male genitalia feature an elongate uncus (height about equal to basal width) that is clearly differentiated from the dorsolateral shoulders of the tegumen, short stubby socii, and 1–6 cornuti in the vesica. The valva has a concave costal margin, a shallow ventral emargination, a short wide neck (NR = 0.92), and a weakly defined saccular corner (SA = 168°). The cucullus has a moderately developed dorsal lobe with a somewhat angular but rounded apex, a weakly developed and broadly rounded ventral lobe, a convex distal margin, and relatively short stiff setae on the medial surface. In females, the papillae anales are long, narrow, and sparsely setose, with the anterior lobes attenuating to a point (rather like *P. hohana*); the apophyses are unusually stout; the U-shaped sterigma is Type II, with a ringlike lamella antevaginalis and a rectangular lamella postvaginalis, the latter with weakly concave lateral margins and hornlike projections at the posterolateral corners; the ductus bursae lacks sclerotization; and the corpus bursae has two signa, one considerably smaller than the other.

We examined specimens from Mendocino, Modoc, San Bernardino, and Siskiyou counties, California; Oneida County, Idaho; Klamath County, Oregon; and Sanpete County, Utah. Adult capture dates range from 1 June to 28 August.

### 152. *Pelochrista dodana* (Kearfott, 1907)

(Plate TT, 152a–f; Plate 65, 152a–h)

*Eucosma dodana* Kearfott 1907b:27; Barnes and McDunnough 1917:171; Heinrich 1923:106; McDunnough 1939:46; Powell 1983:34; Brown 2005:319.

*Eucosma spilophora* Meyrick 1912:35, unnecessary replacement name for *dodana*.

*Pelochrista dodana*: Gilligan and Wright 2013b:319.

*Eucosma fofana* Kearfott 1907b:28; Barnes and McDunnough 1917:171; Heinrich 1923:106; McDunnough 1939:46; Powell 1983:34; Brown 2005:319; new synonymy.

*Eucosma annulata* Meyrick 1912:35, unnecessary replacement name for *fofana*.

*Pelochrista fofana*: Gilligan and Wright 2013b:320.

**Types.** *Pelochrista dodana*. Lectotype (designated by Heinrich 1923). ♂, Southwest Colorado, W. G. Dietz, 13 July, AMNH. *Pelochrista fofana*. Holotype. ♂, Colorado, Berthoud Pass, A. J. Snyder, 22 August 1900, slide CH 2 December 1919, AMNH.

This species was described from a series of 10 syntypes. The lectotype bears a handwritten Kearfott determination label with the inscription “*Eucosma dodana* Type Kearf” and presumably is the specimen that Heinrich (1923) called the “Type” and Klots (1942) reported as the lectotype. It is the only specimen in the AMNH that is labeled as being from Southwest Colorado, so Heinrich’s (1923) remarks suffice as a lectotype designation. Besides the lectotype, we examined six specimens in the AMNH (reported by Klots 1942 as paralectotypes) and two specimens in the USNM with handwritten “*E. dodana* Cotype” labels. Miller and Hodges (1990) reported one paralectotype in the MCZ from southwest Colorado. *Pelochrista fofana* was described from a single specimen. Both Kearfott (1907b) and Heinrich (1923) commented on the likelihood that it is conspecific with *P. fofana*, and we found no reason to treat it otherwise.

The interfascial areas are gray to dark grayish brown with black reticulations; the markings are black and fragmented. The subbasal fascia consists of a mark on the costa and a bar from the inner margin to the cell (the latter sometimes interrupted on  $A_{1+2}$ ), and the median fascia is usually divided into three components (a bar at mid-costa, an irregularly shaped mark in the cell, and a triangular pretornal mark). The strigulae on the distal one-half of the costa are usually conspicuous and separated by five prominent triangular marks, one of which is located at the apex and is often connected to a variably defined postmedian band. The termen is marked with a thin inconspicuous black line that in some specimens (Plate TT:152c) is interrupted by pale terminal strigulae. The images in Plate TT:152e–f depict a brown phenotype from Alaska in which the markings vary from weakly expressed to nearly obsolete.

In males, the uncus is distinctly bilobed, the socii are broad at the base and attenuate distally, the base of the phallus is somewhat closely surrounded by the anellus, and the vesica has 5–17 cornuti. The valva has a weakly concave costal margin, a shallow ventral emargination, a broad neck ( $NR = 0.78$ ), and a well-defined saccular corner ( $SA = 147^\circ$ ). The cucullus has a well-developed dorsal lobe with a broadly rounded apex, a weakly convex distal margin, and a weakly developed anal angle. In females, the papillae anales have arched transverse cross-sections, the U-shaped sterigma is Type II, the ductus bursae lacks sclerotization, and the corpus bursae has two signa of unequal size.

We examined specimens from Laggan and Mount Piran, Alberta; Whitehorse, Yukon Territory; Schrader Lake, Alaska; and Berthoud Pass, Goliath Peak north of Mount Evans, and Mount Warren Summit in Clear Creek County, Colorado. In Colorado this species flies diurnally in the first half of July at elevations of 11,300–13,300 feet. The Mount Piran specimen was collected on 17 August, the specimen from Whitehorse in June.

### **153. *Pelochrista bactrana* (Heinrich, 1923), revised status** (Plate TT, 153a–c; Plate 66, 153a–d)

*Eucosma bactrana* Heinrich 1923:117.

*Pelochrista bactrana*: Gilligan and Wright 2013b:316.

*Eucosma abstemia* Meyrick 1932:224, unnecessary replacement name for *bactrana*; McDunnough 1939:47; Powell 1983:35; Brown 2005:314.

*Pelochrista abstemia*: Gilligan and Wright 2013b:316.



**Holotype.** ♂, Colorado, San Juan County, Silverton, 16–23 July, slide 72782, USNM.

Heinrich (1923) described this species in the genus *Eucosma*. He designated a holotype by illustrating its genitalia and referring to the other four specimens in the type series as paratypes. Meyrick (1932) proposed the replacement name *E. abstemia*, stating that *baetrana* is “preoccupied in this genus by *baetrana* Kennel [1901].” Kennel [1901] described *baetrana* in the genus *Semasia*. For Meyrick’s statement to be correct, *Semasia baetrana* would have to have been reassigned to *Eucosma* at some point between 1901 and 1923, but Meyrick supplied no reference for such an action. It appears that *baetrana* Kennel was first placed in *Eucosma* by Obraztsov (1968) and was subsequently transferred to *Bactra* (Razowski 2003). Thus Meyrick’s *abstemia* is an unnecessary replacement name.

*Pelochrista baetrana* is a moderately large species (mean FWL = 11.5 mm) with a nondescript elongate forewing (AR = 3.20). There are two slightly different color phenotypes, pale yellowish brown and medium brown (Plate TT:153a and b, respectively). The maculation consists of an obscure brownish band from the distal end of the cell to the apex, a sometimes barely discernable blackish line on the termen, some weakly expressed strigulae on the distal one-half of the costa, and a sparse sprinkling of blackish dots in the median area. This species has conspicuously long and narrow labial palpi.

The genitalia suggest that *P. baetrana* is allied with the *pulveratana* group. We did not place it there for several reasons: the labial palpi are much longer and narrower, the forewing lacks the semifasciate maculation that is typical of that group, and the shape of the sterigma is substantially different. In males, the valva has a concave costal margin, a moderate ventral emargination, a short broad neck (NR = 0.76), and an angulate saccular corner (SA = 128°). The cucullus has a semicircular apex, a concave indentation in the distal margin near the anal angle, and a tablike ventral lobe bearing 2–3 marginal spines. In females, the papillae anales are flat, moderately setose, and have microtrichia along the margin of the ventral opening; the Type II sterigma is somewhat hourglass-shaped, with the width at the medial constriction slightly smaller than the ostium diameter and the width at the posterior margin about twice the ostium diameter. The setal sockets on the lamella postvaginalis are illustrated in Plate 66:153d, but there were no setae remaining on this specimen to indicate their length or thickness. The width of sternum 7 at the anterior margin about 3 × that at the posterior margin, and the posterior margin is concavely indented to about one half the sterigma length. The sclerotization of sternum 7 is strong in broad bands along the posterior and lateral margins and weak otherwise. The ductus bursae has a sclerotized band at the juncture with the ductus seminalis, and the corpus bursae has two signa, the smaller expanding at its base into a small sclerotized patch on the bursa membrane.

We examined several long series of males (mostly from the EME) that were collected in Cochise County, Arizona at elevations of 7,000 to 8,500 feet; four males from Imperial County, California; one male from each of Coconino County, Arizona, Larimer County, Colorado, and Albany County, Wyoming; and one female from the La Sal Mountains in southeastern Utah. The California specimens were collected on 2 November, the others between mid-July and the end of August.

#### **154. *Pelochrista inquadrana* (Walsingham, 1884)**

(Plate TT, 154a–c; Plate 66, 154a–d)

*Aphelia inquadrana* Walsingham 1884:134.

*Bactra inquadrana*: Fernald 1903:449; Barnes and McDunnough 1917:167.

*Eucosma inquadrana*: Heinrich 1926:191; McDunnough 1939:47; Powell 1983:35; Brown 2005:322.

*Pelochrista inquadrana*: Gilligan and Wright 2013b:322.

**Lectotype** (here designated, Plate TT:154a, Plate 66:154d). ♀, Arizona, Morrison, 1883, BMNH(E) 819899, slide 11666, BMNH.

Walsingham's (1884) remarks indicate that he based the description of *P. inquadrana* on at least one male and one female. Obraztsov's unpublished notes from the 1960s refer to a male and a female that he examined at the BMNH. He selected the female as the lectotype, and that specimen is so designated here.

*Pelochrista inquadrana* is a relatively small species (mean FWL = 6.7 mm) that seems to be recorded only from southern Arizona. The forewing is pale grayish brown with dark brown markings, the latter including a partial subbasal fascia, a fragmented median fascia comprised of three components, an obscure band joining the middle component of the median fascia to the apex, and several dark marks and striae on the distal one-half of the costa that delimit the whitish strigulae. The overall appearance of the forewing is similar to that of several Nearctic *Pelochrista*, including *P. emaciatana*, *P. powelli*, *P. ainsliei*, and *P. kingi*, but those taxa are larger (mean FWL: 7.8–10.8 mm) and differ from *P. inquadrana* in genitalia.

Males have a distinctive valva shape. The costal margin is weakly concave, the neck is short and broad (NR = 0.87), and the saccular corner is weakly defined (SA = 144°). The cucullus is large and has a broadly rounded apex, a relatively straight distal margin, a weakly developed triangular ventral lobe, and a finely setose medial surface. In females, the papillae anales are flat and sparsely setose, the membrane posterior to tergum 8 has numerous dentate microtrichia, the Type II sterigma is elongate and slightly constricted at the posterior margin of the ostium, the lamella postvaginalis is rectangular, the lamella antevaginalis is ringlike, the posterior margin of sternum 7 is indented to about one-half the length of the sterigma, the ductus bursae has a large sclerotized patch posterior to the ductus seminalis, and the corpus bursae has two signa of unequal size.

We examined the genitalia slide for the lectotype (prepared by Obraztsov), photographs of the lectotype and paralectotype, and 18 males in the USNM from Arizona (one collected in Maricopa County by R.W. Hodges, the others in Pima County by O. C. Polling). Capture dates range from 20 March to 17 May.

### **155. *Pelochrista quinquemaculana* (Robinson, 1869)**

(Plate TT, 155a–c; Plate 67, 155a–e)

*Conchylis quinquemaculana* Robinson 1869:284.

*Paedisca quinquemaculana*: Fernald 1882:36.

*Eucosma quinquemaculana*: Fernald 1903:455; Barnes and McDunnough 1917:169; Heinrich 1923:79; McDunnough 1939:45;

Powell 1983:34; Brown 2005:326; Gilligan et al. 2008:102.

*Pelochrista quinquemaculana*: Gilligan and Wright 2013b:326.

**Holotype.** ♂, Pennsylvania, T. Bunte, AMNH.

Robinson did not mention the number of syntypes supporting the various descriptions in his 1869 paper, but for some species he reported the [forewing] “Expanse” as a single measurement and for others as a range of values. In the case of *P. quinquemaculana* it was a single measurement, suggesting that this taxon was based on one specimen, hence the holotype interpretation. That specimen bears a green Klots “LECTOTYPE” label, a white label with “type” written in red letters, and a handwritten label with the inscription “*Conchylis 5 maculana*.” The type locality and collector were obtained from the description and do not appear on the specimen labels. The holotype has been reported previously as a lectotype (Klots 1942; Brown 2005; Gilligan and Wright 2013b).

In the late 1800s this species was confused with *P. robinsonana* (species 6) (Fernald 1882), but it differs from that insect in size (mean FWL = 8.5 vs. 6.8 mm) and in the number of white spots on the forewing (5 vs. 4). The forewing is medium brown, sometimes irrorated with darker brown, with white spots as follows: a small round spot at the base, a relatively broad subbasal band from the inner margin to the costa that expands in the cell, two large spots in the postmedian area (one on the costa and one in the position of the ocellus), and a smaller subapical spot on the costa.

*Pelochrista quinquemaculana* has distinctive genitalia that easily distinguish it from *P. robinsonana*. In males, the uncus is broad (basal width about  $2 \times$  height) and weakly differentiated from the dorsolateral shoulders of the tegumen, the socii are fingerlike and taper distally, and the vesica lacks cornuti. The costal margin of the valva is nearly straight, the neck is not differentiated from the rest of the valva (NR = 0.91), and the saccular corner is often weakly defined (SA =  $144^\circ$ ). The cucullus is a short rounded extension of the neck that lacks typical dorsal and ventral lobes. It has coarse setation on the medial surface, a stout anal spine, and 1–2 marginal spines. In females, the papillae anales are flat, moderately setose, and triangular, with a conspicuous dorsal protrusion supporting several long hairlike setae at the base of the apophyses posteriores; the sterigma is Type III; the lamella postvaginalis is rectangular (length about  $2 \times$  width) and microtrichiate, with the posterior margin medially indented; the posterior margin of sternum 7 has a medial triangular projection that shields the ostium; the ductus bursae lacks sclerotization; and the corpus bursae has two signa, one near the juncture with the ductus bursae that is surrounded by contorted/wrinkled membrane, the other in the anterior one-half of the bursa.

This species occurs in the Atlantic and Gulf coastal states from New York to Florida to Mississippi. There is also a record from south central Kentucky. Adults fly from September through mid-November.

### **156. *Pelochrista pallidipalpana* (Kearfott, 1905)**

(Plate UU, 156a–d; Plate 67, 156a–g)

*Eucosma pallidipalpana* Kearfott 1905:353; Barnes and McDunnough 1917:169; Heinrich 1923:99; McDunnough 1939:46.

*Pelochrista pallidipalpana*: Powell 1983:35; Brown 2005:480; Gilligan et al. 2008:117; Gilligan and Wright 2013b:325.

**Lectotype** (here designated). ♂, District of Columbia, Washington, A. Busck, July 1901, AMNH.

Kearfott (1905) described this species from seven syntypes collected at Washington, D. C., Tryon, North Carolina, and Fortress Monroe, Virginia. The AMNH has two syntypes that satisfy Heinrich's (1923) requirements for the "Type," hence the need for the lectotype designation.

*Pelochrista pallidipalpana* is a small broad-winged species (mean FWL = 6.0 mm, AR = 2.59) with a distinctive forewing appearance that features brownish-gold interfascial areas and dark brown markings. The subbasal and median fasciae are narrow, bandlike, complete, and connected by two longitudinal streaks, one in the cell, the other on the cubitus. The latter streak appears to be a component of a longer line along the cubitus from base to mid-wing that is interrupted at the subbasal fascia. In some specimens (Plate UU:156d) the interfascial areas are suffused with gray and brown to the extent that the fasciate markings are barely discernable. The ocellus is well defined, with metallic gray bars on the lateral margins and three black dashes crossing a golden central field. The termen has a salt-and-pepper-colored band from the tornus to the apex, and the costa has a series of conspicuous white strigulae that are delimited by short blackish-brown dashes.

In males, the uncus is broadly rounded (basal width about  $2 \times$  height) and clearly differentiated from the dorsolateral shoulders of the tegumen, the base of the phallus is closely surrounded by the anellus, and the vesica has 1–4 cornuti. The valva has a concave costal margin, a moderate ventral emargination, a

well-defined neck (NR = 0.62), and an angulate saccular corner (SA = 147°). The cucullus has a strongly developed dorsal lobe with rounded apex, a weakly convex distal margin, and a weakly-developed triangular ventral lobe that bears a thin anal spine. In females, the papillae anales are moderately setose and taper from a broadly rounded anterior lobe to a narrowly rounded posterior lobe; the sterigma is Type II; the microtrichiate lamella postvaginalis has a medially indented posterior margin and inwardly curling lateral margins; sternum 7 is trapezoidal, with the posterior edge concavely indented to about one-half the sterigma length; the sclerotization of sternum 7 is strong along the lateral and posterior margins and weak otherwise; the ductus bursae has an irregularly shaped sclerotized patch from the ductus seminalis nearly to the constriction anterior to the ostium; and the corpus bursae has two signa of different size.

We examined 30 specimens that document a range extending from Connecticut to western Iowa and south to North Carolina, Georgia, and Mississippi. Though broadly distributed in eastern United States, this species appears to be localized and absent in many portions of its broadly defined range. Adult capture dates extend from 25 June to 8 August.

### 157. *Pelochrista fratrueolis* (Heinrich, 1923)

(Plate UU, 157; Plate 68, 157a–d)

*Eucosma fratrueolis* Heinrich 1923:98; McDunnough 1939:46.

*Pelochrista fratrueolis*: Powell 1983:35; Brown 2005:479; Gilligan and Wright 2013b:321.

**Holotype.** ♂, North Carolina, Moore County, Southern Pines, 8–15 August, slide 72785, USNM.

Heinrich (1923) described this species from 14 specimens (11 ♂, 3 ♀) collected at Southern Pines, North Carolina. He singled out the “Type” by illustrating its genitalia, and he referred to the other specimens as paratypes, hence the holotype interpretation.

The forewing of *P. fratrueolis* is short and broad (mean FWL = 5.9 mm, AR = 2.53) and resembles that of *P. fraudabilis* (species 38) and *P. scintillana* (species 100). It differs from *P. fraudabilis* in ground color (orange rather than gold) and in the number of gray crossbands in the median area (one vs. two). It differs from *P. scintillana* in size (mean FWL = 5.9 vs. 9.1 mm.) and in the presence of a well-defined basal patch on the forewing (absent in *P. scintillana*).

In males, the uncus is weakly differentiated from the dorsolateral shoulders of the tegumen, the phallus base is closely surrounded by the anellus, and the vesica has two cornuti. The valva has a concave costal margin, a moderate ventral emargination, a short neck (NR = 0.50), and an angulate saccular corner (SA = 108°). The cucullus has a moderately developed dorsal lobe with the apex broadly rounded, a convex distal margin of nearly uniform curvature, a small ventral lobe bearing a stout anal spine, and a basoventral margin that extends in a ridgelike manner onto the medial surface of the neck. In most of these respects, *P. fratrueolis* resembles *P. milleri* (species 159), but the two species are substantially different in forewing appearance. In females, the papillae anales are flat, the sterigma is Type II, the lamella postvaginalis tapers somewhat posteriorly (width of the posterior margin about equal to the ostium diameter), the ductus bursae lacks sclerotization, and the corpus bursae has a moderately large signum on the ventral surface and a much smaller signum on the dorsal surface that is located on a broad sclerotized ridge near the juncture with the ductus bursae. Females of *P. fratrueolis* are easily distinguished from those of *P. fraudabilis* by papillae anales Type (4 vs. 1) and from those of *P. scintillana* by the sclerotization of sternum 7 (uniform vs. strong on lateral margins and weak otherwise) and by the presence vs. absence of a sclerotized ridge associated with the smaller signum.

*Pelochrista fratrueolis* occurs in the southeastern and Gulf coastal states from North Carolina to Louisiana. We examined specimens from Escambia and Gulf counties, Florida; Fulton County, Georgia;

Saint Tammy Parish, Louisiana; Forest, Hancock, and Harrison counties, Mississippi; and Moore County, North Carolina. Adults fly from early August to early October.

**158. *Pelochrista chiricahuae*** Wright and Gilligan, new species

(Plate UU, 158; Plate 68, 158)

**Diagnosis.** This species is recognized by its medium size (mean FWL = 10.4 mm) and finely streaked dull brown forewing. Other Nearctic *Pelochrista* of similar size and forewing appearance include *P. fuscostriata* (species 50), certain phenotypes of *P. fuscosparsa* (species 51), and *P. mediotriata* (species 114). *Pelochrista chiricahuae* differs from the first two taxa in papillae anales Type (4 vs. 2) and sterigma Type (II vs. III) and is distinguished from *P. mediotriata* by sterigma shape (broadly expanded laterally vs. rectangular), the shape and sclerotization of sternum 7 (broadly expanded laterally with weakly sclerotized medial area vs. narrow, rectangular, and uniformly sclerotized), and the number of signa in the ductus bursae (2 vs. 1). The male genitalia are unknown.

**Description.** *Head.* Frons and vertex pale tan; labial palpus elongate, with medial surface pale tan, lateral surface tan with long brown scales on ventrodistal margin; antenna concolorous with vertex. *Thorax.* Dorsal surface tan; fore- and mid-leg with anterior surfaces medium tan, posterior surfaces creamy white; hind-leg creamy white; tarsus with pale annulations. Forewing: ♀ FWL 10.0–10.7 mm (mean = 10.4, n = 2), AR = 2.90; costa with basal one-third arched, distal two-thirds straight; apex acute; termen straight; dorsal surface dull brown with longitudinally streaked appearance produced by thin, variably-expressed, pale lines, the most prominent along cubitus from base to mid-cell; ocellus and costal strigulae not discernable; termen with thin white line from tornus to apex edged proximally by dark semi-metallic gray scales; fringe tan. *Abdomen.* Male genitalia: Unknown. Female genitalia (n = 2): Papillae anales flat, with margins of ventral opening curling medially and finely microtrichiate, lateral surfaces sparsely setose; sterigma Type II; lamella postvaginalis expanded laterally to a width of about 2 × ostium diameter, with straight lateral margins and a deep, U-shaped, medial invagination of posterior margin; lamella antevaginalis ringlike; sternum 7 trapezoidal (width at anterior margin about 2 × that at posterior margin), with lateral margins weakly convex and posterior margin concavely indented to about one-half length of sterigma; sclerotization of sternum 7 strong in a band arching along lateral and posterior margins from one anterolateral corner to other, weak otherwise; ductus bursae with a small sclerotized patch at juncture with ductus seminalis; corpus bursae with two signa of unequal size, the smaller located medially on a small sclerotized plate near juncture with ductus bursae.

**Holotype** (Plate UU:158). ♀, Arizona, Cochise County, Chiricahua Mountains, Rustler Park, 8,500 feet, J. A. Powell, 14 July 1972, slide DJW 2005, EME.

**Paratypes.** ARIZONA. Same data as holotype except, 27 July 1972 (1 ♀, slide DJW 3706), USNM.

**Etymology.** The specific epithet refers to the Chiricahua Mountains in southeastern Arizona.

**159. *Pelochrista milleri*** Wright, 2007

(Plate UU, 159a–c; Plate 68, 159a–d)

*Pelochrista milleri* Wright 2007b:84; Gilligan et al. 2008:119; Gilligan and Wright 2013b:324.

**Holotype** (Plate UU:159a). ♂, Ohio, Adams County, 1 mi SE of Lynx, 38.7936° N, 83.4053° W, D. J. Wright, 25 July 1997, slide 126401, USNM.



*Pelochrista milleri* is a moderately small species (Mean FWL = 7.7 mm) with a rather broad forewing (AR = 2.53). The interfascial areas are dark gray with white reticulations. They contrast weakly with the dark brown forewing markings, which include a broad subbasal mark, a moderately broad median fascia that is usually divided into two components, and a narrow postmedian band that fades near the costa. The fasciate markings are thinly edged with white, the ocellus is concolorous with the interfascial areas but clearly discernable, and the distal one-half of the costa has well-defined white strigulae. Several Eucosmini resemble *P. milleri* in forewing appearance, e.g., *P. fiskeana* (species 118), *P. womonana* (species 84), and *Sonia divaricata* (Gilligan et al. 2008, species 204), but they differ from *P. milleri* in genitalia.

In males, the uncus is barely differentiated from the dorsolateral shoulders of the tegumen, and the vesica has one cornutus. The valva has a weakly concave costal margin, a moderate ventral emargination, a well-defined neck (NR = 0.69), and an angulate saccular corner (SA = 110°). The cucullus has a semicircular dorsal lobe and a moderately developed ventral lobe bearing a stout anal spine. In females, the sterigma is Type II and U-shaped, the lateral margins of the lamella postvaginalis curl inward, sternum 7 has strongly sclerotized bands along the lateral margins and is weakly sclerotized otherwise, the ductus bursae lacks sclerotization, and the corpus bursae has a large signum on the ventral surface, two sclerotized plates on the dorsal surface flanking the large signum, and a small thornlike signum on the dorsal surface near the juncture with the ductus bursae.

This species is broadly distributed in eastern North America but is not well represented in collections. We examined specimens from Manitoba, Quebec; Washington County, Arkansas; Putnam County, Illinois; Bath, Bullitt, Campbell, Laurel, and Rowan counties, Kentucky; Tishomingo County, Mississippi; Benton and Jefferson counties, Missouri; Rockingham County, New Hampshire; Adams, Athens, Greene, and Hamilton counties, Ohio; Beaver County, Pennsylvania; and Fairfax County, Virginia. Adult capture dates range from 18 June to 28 August. One specimen from Quebec (in the CNC) was reared from a larva boring in roots of *Helianthus tuberosus* L. (Jerusalem artichoke).

## Section 5. Female Unknown.

### 160. *Pelochrista heinrichi* (McDunnough, 1925)

(Plate UU, 160a–c; Plate 69, 160a–c)

*Eucosma heinrichi* McDunnough 1925a:19; McDunnough 1939:47; Powell 1983:34; Brown 2005:321.

*Pelochrista heinrichi*: Gilligan and Wright 2013b:322.

**Holotype** (Plate UU:160a). ♂, Canada, Manitoba, Aweme, N. Criddle, 10 August 1921, slide TOR 4056, CNC.

McDunnough (1925) described *P. heinrichi* from a single male collected at Aweme, Manitoba. The forewing interfascial areas are whitish and generously suffused with pale grayish brown; the markings are brown and vaguely defined. The latter include a subbasal spot on the cubitus, an obscure shade at mid-costa, a vague band from the distal end of the cell to the apex, and a mixture of marks and striae on the distal one-half of the costa that delimit whitish strigulae. The ocellus is obscure but discernable, with two or three black dashes on the central field, and the termen has an inconspicuous white line from CuA<sub>1</sub> to the apex and a very narrow salt-and-pepper-colored band from the tornus to the apex.

The male genitalia resemble those of *P. collilonga* in the following respects: the uncus is well developed, somewhat rectangular, and clearly differentiated from the dorsolateral shoulders of the tegumen; the socii

are long, fingerlike, and taper distally; the vesica has 6–13 cornuti; and the long-necked valva is strongly arched laterally. The cucullus has a moderately developed dorsal lobe with a rounded apex, a weakly developed ventral lobe, and an evenly convex distal margin with 4–5 marginal spines from the anal angle to two-thirds the distance to the apex. *Pelochrista heinrichi* differs from *P. collilonga* in size (mean FWL = 9.7 vs. 6.6 mm), in the width of the valva neck (NR = 0.49 vs. 0.33), in the size of the saccular angle (104° vs. 123°), and in the shape of the cucullus (broad vs. narrow).

There are not many representatives of this taxon in collections. The ten we examined from Jasper National Park, Alberta; Aweme, Manitoba; Tompkins, Saskatchewan, Carter County, Montana; and Park and Fremont counties, Wyoming suggest that *P. heinrichi* is a resident of the northern Great Plains. Adult capture dates range from 25 June to 4 September.

### 161. *Pelochrista opleri* Wright and Gilligan, new species

(Plate UU, 161a–c; Plate 69, 161a–c)

**Diagnosis.** This moderately large species (mean FWL = 11.7 mm) is readily recognized by forewing characteristics, especially the rusty-brown coloration and the acute apical angle (58°). It is somewhat similar to members of the *dorsisignatana* group in maculation and male valva shape, but the median mark arises on the inner margin instead of the costa and extends only halfway across the wing, the uncus is more bulgelike, and the socii are broader.

**Description.** *Head.* Frons and vertex whitish tan; labial palpus with medial surface whitish, lateral surface pale rusty brown; antenna concolorous with vertex. *Thorax.* Dorsal surface whitish tan; fore- and mid-leg with anterior surfaces pale rusty brown, posterior surfaces whitish, hind-leg largely whitish, tarsus lacking annulations. Forewing: ♂ FWL 11.2–12.1 mm (mean = 11.7, n = 8), AR = 3.12; costa nearly straight; apex acute; termen weakly convex; interfascial areas pale yellowish brown to reddish brown with faint dark brown reticulations; markings rusty brown, including an outwardly oblique subbasal mark and an inwardly oblique pretornal mark; costal strigulae barely discernable and concolorous with interfascial areas; ocellus absent; termen with thin blackish line from tornus to apex; fringe gray. Hindwing: Medium to dark brownish gray. *Abdomen.* Male genitalia (n = 5): Uncus bulgelike and weakly differentiated from dorsolateral shoulders of tegumen, with basal width about 3 × height; socii short and broad; phallus long and narrow, with base loosely surrounded by anellus; vesica with 10–11 cornuti; valva with costal margin weakly concave, ventral emargination shallow, neck broad, NR = 0.71, SA = 138°; cucullus with dorsal and ventral lobes moderately developed, the former broader than the latter, with apex rounded, distal margin weakly convex, anal angle rounded, medial surface finely setose.

**Holotype** (Plate UU:161a). ♂, Wyoming, Teton County, Teton National Park, Vista Point Trailhead, P. A. Opler, 9 August 1998, slide DJW 700, USNM.

**Paratypes.** WASHINGTON. Chelan County, 1.6 mi N of Eagle Creek Road on Forest Road 7520, 2,170 feet, D. J. Wright, 9 July 2010 (1 ♂, slide DJW 2573). WYOMING. Same data as holotype (14 ♂, slides DJW 2455, 2456, TMG 434). Paratype depositories: CSU, DJW, USNM.

**Etymology.** The specific epithet honors Dr. Paul A. Opler, Colorado State University, who collected all but one of the specimens in the type series.

### 162. *Pelochrista dapsilis* (Heinrich, 1929)

(Plate VV, 162a–c; Plate 69, 162a–c)

*Eucosma dapsilis* Heinrich 1929:5; McDunnough 1939:45; Powell 1983:34; Brown 2005:318.

*Pelochrista dapsilis*: Gilligan and Wright 2013b:319.

**Holotype** (Plate VV:162a). ♂, Wyoming, [Yellowstone] N[ational] Park, slide 72787, USNM.

Heinrich (1929) based this species on five specimens from the type locality. He illustrated the genitalia of the “Type” and referred to the other four specimens as paratypes, hence the holotype interpretation. We located three of the paratypes, one each in the AMNH, the CNC, and the USNM.

*Pelochrista dapsilis* is a large species (mean FWL = 13.1 mm) with a serpentine forewing pattern that is somewhat similar to those of *P. bolanderana*, *P. optimana*, and *P. ragonoti*. The forewing is white with brown markings. The maculation includes a prominent polygonal band comprised of three segments: one along the costa from the base to mid-wing, the second from mid-costa to the distal end of the cell, and the third extending diagonally from there to the apex. The third segment has branches to the costa and termen, forming a tridentlike subapical mark, and the juncture of the second and third segments is connected to the tornus by a narrow serpentine band that is sometimes interrupted near its distal extremity. Other markings include transverse basal and subbasal bands, a longitudinal band from the middle of the inner margin to the tornus that tapers nearly to a point at its distal extremity, and a pair of small marks (sometimes fused) on the distal one-half of the costa. The termen has two white strigulae between  $M_1$  and  $M_3$  that are separated by a small brown dash.

The male genitalia are similar to those of several *Pelochrista* species, such as *P. optimana*, *P. nordini*, and the members of the *agassizii*-group, taxa that are associated with three different papillae anales Types (1–3). The socii are long and of uniform width, the vesica has 6–13 cornuti, and the valva has a concave costal margin, a shallow ventral emargination (NR = 0.69), and a moderately angulate saccular corner (SA = 152°).

The meager amount of available material suggests that *P. dapsilis* is most likely to be found at moderately high elevations. We examined specimens from Alpine County, California (at about 5,500 feet), three locations in Grand County, Colorado (at 8,200–9,000 feet), and from Yellowstone National Park, Wyoming (average elevation 8,000 feet). Adults were collected from 29 May to 16 August.

### 163. *Pelochrista rufocostana* (Wright, 2012)

(Plate VV, 163a–c; Plate 69, 163a–d)

*Eucosma rufocostana* Wright 2012:35.

*Pelochrista rufocostana*: Gilligan and Wright 2013b:326.

**Holotype** (Plate VV:163a). ♂, Idaho, Oneida County, Curlew National Grassland, 5 mi SSE of Holbrook, 4,800 feet, 42.1039° N, 112.6160° W, D. J Wright, 18 July 2001, USNM.

The forewing is pale brownish yellow from the base to mid-wing, shading into pale reddish brown in the apical area, and the costa is reddish brown. The most conspicuous markings are four silvery-white striae emanating from the distal one-half of the costa. Three are outwardly oblique and divide the apical area into relatively broad reddish-brown bands; the fourth arises near the apex, runs parallel to the termen, and is interrupted at approximately  $CuA_1$ . The termen has a thin whitish line from the tornus to the apex that in some specimens is edged distally by a thin salt-and-pepper-colored line (Plate VV:163a). In these respects, *P. rufocostana* resembles *P. conspiciendana* (species 125), but the two species differ in size (mean FWL = 10.6 vs. 8.3 mm) and genitalia.

The uncus is broad (basal width about 2 × height) with a rounded to weakly indented apex; the socii are short and stout; and the valva has a weakly concave costal margin, a shallow ventral emargination, a wide neck (NR = 0.82), a weakly defined saccular corner (SA = 147°), and a tablike basal process. The dorsal lobe of the cucullus is strongly developed, with apex broadly rounded; the ventral lobe is weakly

developed, with the basoventral margin extending slightly onto the medial surface of the neck; and the distal margin is convex.

We examined specimens from Modoc County, California; Oneida County, Idaho; Nye County, Nevada; Garfield and Weber counties, Utah; and Albany County, Wyoming. Adults fly from the end of May to the end of July.

**164. *Pelochrista jejunana*** (McDunnough, 1942)

(Plate VV, 164; Plate 70, 164a–b)

*Eucosma jejunana* McDunnough 1942:67; Powell 1983:35; Brown 2005:322.

*Pelochrista jejunana*: Gilligan and Wright 2013b:331.

**Holotype** (Plate VV:164, Plate 70:164a). ♂, Canada, Ontario, Blackburn, J. McDunnough, 20 May 1941, slide TOR 4252, CNC.

*Pelochrista jejunana* is a moderately small species (mean FWL = 7.2 mm) that was described from three males, two collected by J. McDunnough on 20 May 1941 at Blackburn, Ontario, the third by G. S. Walley on 10 June 1935 at Kazubazua, Quebec (slide TOR 3112). We examined the holotype and the paratype from Kazubazua, both of which are in the CNC, but we did not find the second Blackburn specimen or any other representatives of this taxon.

The forewing has gray interfascial areas with gray-brown reticulations and dark grayish-brown semifasciate markings, the latter including a subbasal mark, a pretornal mark, and two narrow transverse bands in the postmedian area. One of the postmedian bands bisects a barely discernable ocellus. The costal strigulae are gray and well defined by dark dashes and striae.

The uncus tapers to a narrowly rounded point, the socii are short and stout, and the vesica lacks cornuti. The valva has a concave costal margin, a shallow ventral emargination, a moderately broad neck (NR = 0.76), and a weakly defined saccular corner (SA = 146°). The cucullus is relatively large, with the dorsal lobe strongly developed, the distal margin convex, the anal angle broadly rounded, and the medial surface finely setose.

**165. *Pelochrista louisana*** (McDunnough, 1944)

(Plate VV, 165; Plate 70, 165a–b)

*Eucosma louisana* McDunnough 1944:154; Powell 1983:34; Brown 2005:323.

*Pelochrista louisana*: Gilligan and Wright 2013b:323.

**Holotype** (Plate VV:165a, Plate 70:165b). ♂, Canada, Alberta, Lake Louise, G. S. Walley, 7,600 feet, 19 July 1938, TOR 4251, CNC.

*Pelochrista louisana* was described from two males, the holotype from Lake Louise, Alberta and a paratype collected by J. K. Jacob at Blue Lake, British Columbia (4 August 1938; elevation 7,000 feet). We examined these two specimens and found no other representatives of this species in the collections we visited.

The forewing is dark brown with a conspicuous white interfascial spot at the middle of the inner margin. The maculation includes a somewhat obscure basal patch and a weakly defined median fascia. The ocellus is present but not clearly defined, and the distal one-half of the costa has prominent whitish

strigulae that are separated by blackish-brown quadrate costal marks. The holotype has a FWL of 9.5 mm and an AR of 2.97. As observed by McDunnough (1944), *P. louisana* is similar in these respects to *P. lolana* (species 149), but it differs from that species in male genitalia and in having less white suffusion along the distal one-half of the costa.

The uncus is broad (basal width about 2 × the height), medially divided into two moderately developed lobes, and clearly differentiated from the dorsolateral shoulders of the tegumen; the phallus is long and narrow, with the base loosely surrounded by the anellus; and the vesica has 0–1 cornuti. The costal margin of the valva is weakly concave, the ventral emargination is moderate, the neck is well defined (NR = 0.63), and the saccular corner is angulate (SA = 137°). The cucullus has moderately developed dorsal and ventral lobes, a basoventral margin that extends slightly onto the medial surface of the neck, and four marginal spines on the rounded anal angle.

The holotype was collected near the southwestern border of Alberta (in Banff National Park), and the paratype comes from southeastern British Columbia. Their capture dates suggest that this species flies in the last half of July.

### 166. *Pelochrista cinereolineana* (Heinrich, 1923)

(Plate VV, 166a–c; Plate 70, 166)

*Thiodia cinereolineana* Heinrich 1923:52; McDunnough 1939:44.

*Phaneta cinereolineana*: Powell 1983:33; Brown 2005:492; Wright 2013:183.

*Pelochrista cinereolineana*: Gilligan and Wright 2013b:318.

**Holotype** (Plate VV:166a). ♂, Utah, Juab County, Eureka, T. Spalding, 21 April 1910, slide 72762, USNM.

*Pelochrista cinereolineana* is a small (mean FWL = 6.8 mm) nondescript species that is represented in collections by very few specimens. Heinrich (1923) described it from a single male.

The forewing is medium gray with fine longitudinal black streaks, including a thin line along CuP from base to tornus. Forewing markings include a rectangular blackish mark at mid-costa, black marks and striae on the distal one-half of the costa that delimit whitish strigulae, a conspicuous ocellus whose whitish central field is crossed by two prominent black bars, and a thin black line on the termen from the tornus to the apex that is bordered distally by a slightly wider white line. The forewing is elongate (AR = 3.29), with costa nearly straight, apex acute, and termen straight to very slightly concave.

This species is most easily recognized by its distinctive male genitalia. The uncus is semicircular (with basal width about 2 × height) and barely differentiated from the dorsolateral shoulders of the tegumen, the socii are short and stout, the base of the phallus is closely surrounded by the anellus, and the vesica has 11–13 cornuti. The valva has a weakly convex costal margin, a broad neck (NR = 0.61), an angulate saccular corner (SA = 114°), and an unusual pointed projection oriented perpendicular to the medial surface at the dorsal extremity of the basal excavation (Plate 70:166). The cucullus has a well-developed dorsal lobe with a rounded apex, a distal margin that is convex except for a weak indentation near the anal angle, 3–5 moderately stout marginal spines, and a narrow fingerlike projection at the anal angle that bears a stout anal spine. In overall shape the valva resembles that of *P. pallidipalpna*, but the anal angle is more strongly developed, and *P. pallidipalpna* lacks the marginal spines on the distal margin of the cucullus and the distinctive projection at the dorsal extremity of the basal excavation.

We examined five males: two from the southeastern corner of Alberta, and one each from Tulare County, California; Clark County, Nevada; and Juab County, Utah. Capture dates range from 21 April to 22 May.



**167. *Pelochrista candida*** (Wright, 2012)

(Plate VV, 167; Plate 70, 167a–c)

*Eucosma candida* Wright 2012:31.

*Pelochrista candida*: Gilligan and Wright 2013b:318.

**Holotype** (Plate VV:167, Plate 70:167a). ♂, California, Los Angeles County, Hungry Valley, 4 air mi S of Gorman, J. A. Powell, 16 July 1975, slide DJW 1159, EME.

This poorly known species has a bright white forewing with brown subbasal and pretornal marks. Small triangular brown marks separate strigulae on the distal one-half of the costa, and a prominent band on the termen from CuA<sub>1</sub> to the apex encloses a white bar from M<sub>2</sub> to R<sub>5</sub>. Mean FWL = 10.8 mm; AR = 3.50.

The uncus is clearly differentiated from the dorsolateral shoulders of the tegumen, the socii are fingerlike, and the vesica has 9–10 cornuti. The valva has a concave costal margin, a shallow ventral emargination, a broad neck (NR = 0.71), and an angulate saccular corner (SA = 150°). The dorsal lobe of the cucullus is strongly developed and has a rather angular apex, the ventral lobe is weakly developed and broadly rounded, and the distal margin is evenly convex.

*Pelochrista candida* is known from three males collected in Coconino County, Arizona and Los Angeles and Ventura counties, California. The capture dates are 16, 17, and 18 July.

**168. *Pelochrista graduatana*** (Walsingham, 1879)

(Plate VV, 168; Plate 70, 168)

*Paedisca graduatana* Walsingham 1879:54; Fernald 1882:12 [synonym of *E. dorsisignatana*].

*Eucosma graduatana*: Fernald 1903:459 [synonym of *E. dorsisignatana*]; Barnes and McDunnough 1917:171 [synonym of *E. dorsisignatana*];

Heinrich 1923:122; McDunnough 1939:47; Powell 1983:35; Brown 2005:321.

*Pelochrista graduatana*: Gilligan and Wright 2013b:321.

**Holotype** (Plate VV:168). ♂, Texas, Bosque County, G. W. Belfrage, 26 March 1876, BMNH(E) 819881, slide 11564, BMNH.

*Pelochrista graduatana* was described from a single male (deposited in the BMNH) that was collected in Bosque County, Texas (about 80 miles southwest of Dallas). Fernald (1882, 1903) treated this name as a synonym of *P. dorsisignatana*, as did Barnes and McDunnough (1917). Kearfott (1905) expressed a contrary opinion (based on a male from Aweme, Manitoba that he interpreted as *P. graduatana*). Heinrich (1923) did not have access to the holotype, but he examined the Aweme specimen (which lacks an abdomen) and a similar looking female (which he reported as part of Kearfott's material from Aweme) and reinstated *P. graduatana* as a valid species.

There is no doubt that *P. graduatana* is distinct from *P. dorsisignatana* based on male genitalia (Plate 70:168 vs. Plate 59:137a). It is not so clear that the two specimens from Aweme (now in the AMNH) are conspecific with *P. graduatana*. Their hindwings are bright orange, not brown as described by Walsingham (1879) and depicted in Plate VV:168 for the *P. graduatana* holotype. They do appear to be conspecific with one another based on forewing and hindwing appearance, but it is not possible at this time to compare their genitalia with those of *P. graduatana*. The holotype of *P. graduatana* was dissected by Obratzsov, and his photograph (now at the MEM) of the genitalia compares favorably with our illustration (Plate 70:168) of a male in the USNM from Carson County, Texas (in the Texas Panhandle). We cannot compare its genitalia with that of the Aweme male because the abdomen of the latter specimen is lost. Moreover, we know of no females that are clearly associated with *P. graduatana*. The putative *P. graduatana* female in the

AMNH was collected by A. F. Winn at “Highgate” on 15 June 1907, a site that we have been unable to locate. Heinrich (1923) was under the impression that this specimen came from Aweme, Manitoba, but a database of Winn’s records compiled by L. Handfield suggests that it probably was collected in Quebec (L. Handfield, pers. comm.). We dissected it and found genitalia characters, particularly the papillae anales and apophyses anteriores, that raise doubts as to whether this specimen is in fact a *Pelochrista*.

**169. *Pelochrista occipitana* (Zeller, 1875)**

(Plate VV, 169a–b; Plate 70, 169a–b)

*Paedisca occipitana* Zeller 1875:315; Fernald 1882:38.

*Eucosma occipitana*: Fernald 1903:456; Barnes and McDunnough 1917:169; Heinrich 1923:111; McDunnough 1939:47; Wright 2008:217.

*Pelochrista occipitana*: Powell 1983:35; Brown 2005:480.

Unplaced Eucosmini: Gilligan and Wright 2013b:331.

**Holotype** (Plate VV:169a, Plate 70:169b). ♂, Texas, Bosque County, G. W. Belfrage, 24 June 1871, BMNH(E) 819969, slide 5756, BMNH.

Zeller (1875) described *P. occipitana* from a single male. That specimen was initially retained by Zeller, subsequently acquired by Walsingham (with the rest of Zeller’s collection), and eventually deposited in the BMNH. It is the only authoritatively determined representative of this species. Wright (2008) reported a second specimen (Plate VV:169b, Plate 70:169a) that he tentatively identified as *P. occipitana*. It was collected on Pawnee National Grassland in northeastern Colorado on 8 August 2004 and is substantially similar to the holotype in all respects except color (yellow brown vs. brown). The color difference might be a consequence of the age and storage history of the holotype.

Lacking a female, we cannot say with any confidence that this poorly known species belongs in *Pelochrista*. Its placement in that genus is based on the series of spines on the distal margin of the cucullus, a feature that it shares with numerous other members of the genus.



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# PLATES





Plates A–VV

## **Adult Photos**

## PLATE A

1. *Pelochrista agassizii* (Robinson). FWL: 7.5–12.6 mm (mean = 10.5).
  - a. ♀. Texas, Hemphill County, Canadian, 28 September 1970, A. and M. E. Blanchard, USNM.
  - b. ♀. Oklahoma, Oklahoma City, 23 June 1955, D. R. Davis, USNM.
  - c. ♂. Illinois, Mason County, H. A. Gleason Nature Preserve, 29 May 1999, R. Panzer, DJW.
  - d. ♀. Arizona, Cochise County, Cave Creek Ranch, 15 April 1988, G. J. Balogh, DJW.
  - e. ♂. Arizona, Williams, USNM. [LTP. *P. gilletteana*]
  - f. ♂. Colorado, USNM. [PLTP. *P. gilletteana*]
  - g. ♀. Texas, Guadalupe Mountains, Nickel Creek, 22 May 1973, A. and M. E. Blanchard, USNM.
  - h. ♀. Arizona, Maricopa County, Tempe, 26 April 1922, USNM.
  - i. ♂. California, San Diego County, Miller Valley, N. Bloomfield, 27 April 2011, USNM.
2. *Pelochrista bolanderana* (Walsingham). FWL: 6.9–10.7 mm (mean = 8.8).
  - a. ♂. LTP. California, Siskiyou County, Mount Shasta, 2 August–1 September 1871, Walsingham, BMNH.
  - b. ♂. Utah, Sanpete County, Ephraim County Road, 17 July 2006, D. J. Wright, DJW.
  - c. ♂. Idaho, Oneida County, Caribou National Forest, 27 July 2003, D. J. Wright, DJW.
  - d. ♂. Colorado, Chaffee County, 8 mi E of Buena Vista, 11 July 1982, R. W. Hodges, USNM.
  - e. ♂. Arizona, Cochise County, Cave Creek Canyon, Chiricahua Mountains, 12 June 1966, J. G. Franclemont, USNM.
  - f. ♂. Texas, Culberson County, Guadalupe Mountains, Smith Canyon, 22 May 1973, R. W. Hodges, USNM.



1a



1b



1c



1d



1e



1f



1g



1h



1i



2a



2b



2c



2d



2e



2f

## PLATE B

3. *Pelochrista laticurva* (Heinrich). FWL: 9.8–13.2 mm (mean = 11.1).
  - a. ♂.HTP. California, USNM.
  - b. ♂.California, Del Norte County, Rowdy Creek Road, 6 mi E of Smith River, 27 July 1990, D. C. Ferguson, USNM.
  - c. ♂.California, Lassen County, 3 mi SE of Milford, 15 August 1998, L. L. Crabtree, DJW.
  - d. ♀.California, Los Angeles County, Big Pines, San Gabriel Mountains, 19 August 1966, C. Henne, EME.
4. *Pelochrista denverana* (Kearfott). FWL: 10.3–12.9 mm (mean = 11.7).
  - a. ♂.New Mexico, Lincoln County, 6.5 mi W of Carrizozo, Malpais lava flow, 24 September 2003, G. J. Balogh, DJW.
  - b. ♂.Colorado, Larimer County, Rist Canyon, 19 September 1991, P. A. Opler, DJW.
5. *Pelochrista hazelana* (Klots). FWL: 7.7–12.7 mm (mean = 10.7).
  - a. ♂.HTP. Colorado, El Paso County, Colorado Springs, 20–31 August 1932, A. B. Klots, AMNH.
  - b. ♂.Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, DJW.
  - c. ♂.Oklahoma, Cimarron County, Black Mesa State Park, 6 September 2006, C. Harp, CEH.
6. *Pelochrista robinsonana* (Grote). FWL: 4.4–8.7 mm (mean = 6.8).
  - a. ♂.Kentucky, Laurel County, Forest Service Road 4176, 6 June 1992, D. J. Wright, DJW.
  - b. ♂.Alabama, Baldwin County, Bon Secour NWR, 16 April 1993, R. L. Brown, MEM.
  - c. ♂.South Carolina, Charleston County, Wedge Plantation, 30 April 1981, R. W. Hodges, USNM.
  - d. ♂.Arkansas, Washington County, Devil's Den State Park, 30 May 1966, R. W. Hodges, USNM.
  - e. ♀.Florida, Putnam County, Welaka, 12 March 1962, D. C. Ferguson, USNM.
  - f. ♀.New Jersey, Ocean County, Lakehurst, 25 June 1964, J. G. Franclemont, USNM.





## PLATE C

7. *Pelochrista guttulana* (Blanchard). FWL: 6.7–10.7 mm (mean = 8.6).
  - a. ♂.Alabama, Baldwin County, Bon Secour NWR, 8–9 August 1994, R. L. Brown, DJW.
  - b. ♀.Alabama, Baldwin County, Bon Secour NWR, 13–16 May 1994, R. L. Brown, MEM.
  - c. ♀.Texas, Cameron County, South Padre Island, 10 November 1999, L. D. Gibson, DJW.
  - d. ♂.PTP. Texas, Cottle County, Paducah, 8 August 1968, A. and M. E. Blanchard, USNM.
8. *Pelochrista fritillana* (Blanchard and Knudson). FWL: 7.2–9.0 mm (mean = 8.1).
  - a. ♂.HTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, USNM.
  - b. ♀.PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, USNM.
  - c. ♂.PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, USNM.
9. *Pelochrista mobilensis* (Heinrich). FWL: 8.5–11.4 mm (mean = 10.3).
  - a. ♂.HTP. Alabama, Baldwin County, E shore of Mobile Bay, 3 October 1920, G. P. Englehardt, USNM.
  - b. ♀.Alabama, Baldwin County, 1 mi E of Oyster Bay, 13 October 1990, R. L. Brown, DJW.
  - c. ♂.Alabama, Baldwin County, 1 mi E of Oyster Bay, 4 September 1988, R. L. Brown, MEM.
10. *Pelochrista crambitana* (Walsingham). FWL: 12.9–17.2 mm (mean = 15.8).
  - a. ♂.Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, DJW.
  - b. ♀.Colorado, Chaffee County, 2.5 mi ESE of Buena Vista, 23 August 1997, D. J. Wright, DJW.
11. *Pelochrista richersana* Wright. FWL: 14.3–16.3 mm (mean = 15.5).
  - a. ♂.HTP. California, San Luis Obispo County, Montana de Oro State Park, 18 September 2009, K. Richers, USNM.
12. *Pelochrista crabtreei* Wright. FWL: 11.0–14.8 mm (mean = 13.4).
  - a. ♂.HTP. Nevada, Nye County, 24 mi N of Carvers, 13 June 2005, L. L. Crabtree, USNM.
  - b. ♂.PTP. Nevada, Nye County, 24 mi N of Carvers, 27 May 2000, L. L. Crabtree, USNM.





7a



7b



7c



7d



8a



8b



8c



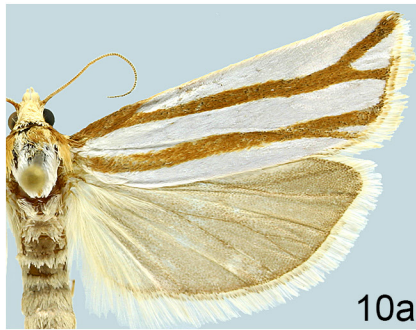
9a



9b



9c



10a



10b



11



12a



12b

## PLATE D

13. *Pelochrista agricolana* (Walsingham). FWL: 5.7–10.7 mm (mean = 7.8).
- a. ♂.HTP. Oregon, Douglas County, Umpqua River, 28 April–3 May 1872, Walsingham, BMNH.
  - b. ♂.PLTP. California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, BMNH.
  - c. ♂.Canada, British Columbia, Seton Lake, Lillooet, 15 June 1926, J. McDunnough, USNM [PTP. *P. argentialbana britana*].
  - d. ♂.Colorado, Larimer County, Loveland, July 1891, W. G. Smith, BMNH [LTP. *P. smithiana*].
  - e. ♀.Colorado, Larimer County, Loveland, July 1891, W. G. Smith, BMNH [ALTP. *P. smithiana*].
  - f. ♂.Minnesota, Ramsey County, North Oaks, 29 July 1965, W. E. Miller, AMNH [HTP. *P. barbara*].
  - g. ♂.Arizona, Coconino County, Fort Valley, 7.5 mi NW of Flagstaff, 9 August 1961, R. W. Hodges, USNM.
  - h. ♂.Washington, Asotin County, Clarkston, 20 March 1931, J. F. G. Clarke, USNM.
  - i. ♂.New Mexico, Cibola County, Lobo Canyon Picnic Area, 9 August 2005, D. J. Wright, DJW.
  - j. ♀.Colorado, Fremont County, 4.6 mi SE of Salida, 22 August 1997, D. J. Wright, DJW.
  - k. ♂.Idaho, Oneida County, Holbrook Summit, 10 July 2006, D. J. Wright, DJW.
  - l. ♂.Wyoming, Albany County, W side of Gelatt Lake, 21 June 2007, J. S. Nordin, DJW.
  - m. ♂.Nevada, Douglas County, Walley's Hot Springs, 4 July 1993, J. A. Powell, DJW.
  - n. ♀.Washington, Whitman County, Snake River, 25 May 1932, J. F. G. Clarke, USNM.
  - o. ♂.Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, DJW.

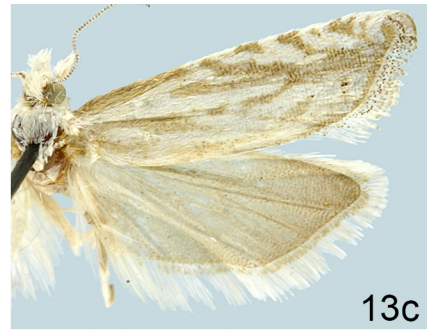




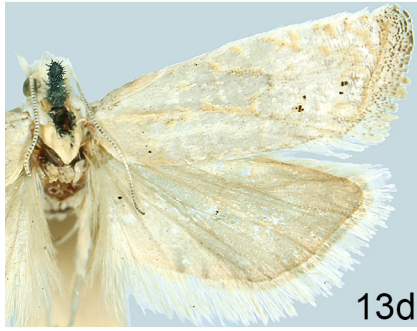
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13b



13c



13d



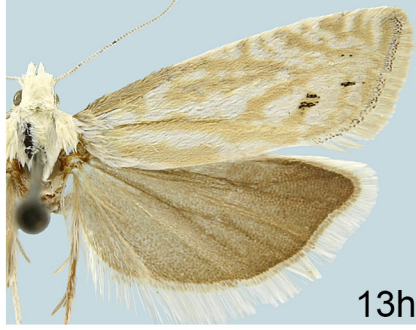
13e



13f



13g



13h



13i



13j



13k



13l



13m



13n



13o



## PLATE E

14. *Pelochrista argentialbana* (Walsingham). FWL: 6.6–11.8 mm, (mean = 9.1).
- a. ♀.LTP. Texas, Bosque County, 14 May 1876, G. W. Belfrage, BMNH.
  - b. ♂.PLTP. Texas, Bosque County, 3 May 1876, G. W. Belfrage, BMNH.
  - c. ♂.Virginia, June, USNM [LTP. *P. pergandeana*].
  - d. ♂.New Jersey, Essex County, June 1911, W. D. Kearfott, USNM  
[PLTP. *P. pergandeana*].
  - e. ♂.Texas, USNM [LTP. *P. pergandeana flavana*].
  - f. ♂.North Carolina, Macon County, Highlands, 18 July 1958, R. W. Hodges, USNM.
  - g. ♂.Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, DJW.
  - h. ♂.Canada, British Columbia, Tranquille Ecological Reserve, 29 June 2009,  
J. J. Dombroskie, JJD.
  - i. ♂.New Jersey, Ocean County, Lakehurst, 30 May 1962, R. W. Hodges, USNM.
  - j. ♂.Wyoming, Albany County, T15N R73W S1, 17 June 2002, J. S. Nordin, DJW.
  - k. ♂.Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.
  - l. ♂.Wyoming, Albany County, W side Gelatt Lake, 15 July 2005, J. S. Nordin, DJW.
  - m. ♂.Wyoming, Albany County, W side Gelatt Lake, 21 July 2004, J. S. Nordin, DJW.
  - n. ♂.Wyoming, Albany County, N of Sally Creek, 23 July 2003, D. J. Wright, DJW.
  - o. ♂.Wyoming, Albany County, N of Sally Creek, 23 July 2003, D. J. Wright, DJW.



14a



14b



14c



14d



14e



14f



14g



14h



14i



14j



14k



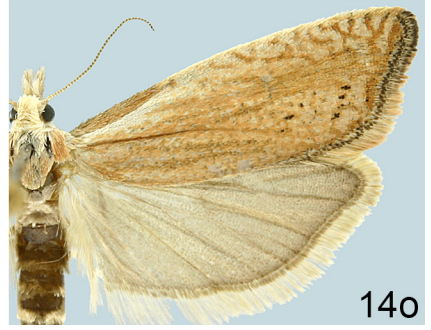
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14m



14n

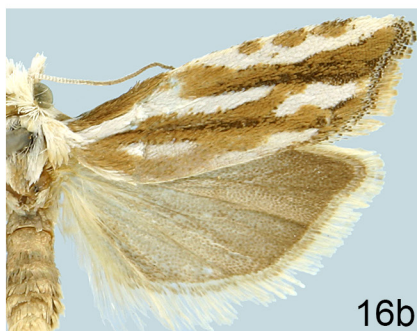
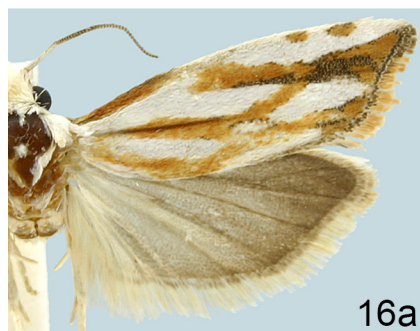
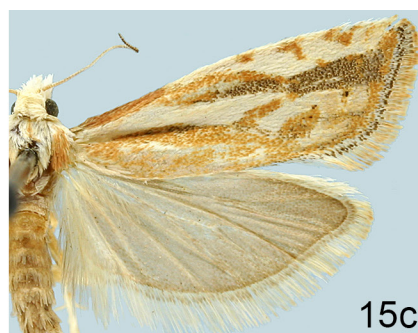
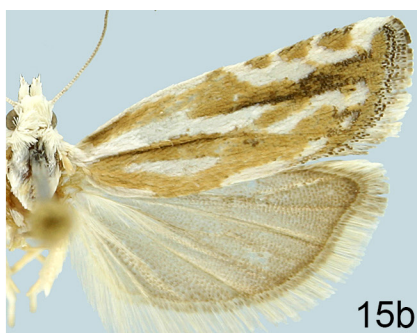


14o

## PLATE F

15. *Pelochrista morrisoni* (Walsingham). FWL: 6.8–10.8 mm (mean = 8.7).  
a. ♀. HTP. Montana, Yellowstone River, 1880, H. K. Morrison, BMNH.  
b. ♀. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, DJW.  
c. ♂. California, San Bernardino County, Upper Santa Anna River, 2 August 1947, G. H. Sperry, CNC.  
d. ♂. Colorado, Larimer County, 3 mi W of Bellvue, 11 July 1993. D. J. Wright, DJW.  
e. ♂. Wyoming, Albany County, T15N R73W S1, 4 July 2002, J. S. Nordin, DJW.  
f. ♂. Canada, Yukon Territory, Carmacks, 17 July 2006, J.-F. Landry and G. Pohl, CNC.
16. *Pelochrista lathamii* (Forbes). FWL: 6.5–9.4 mm (mean = 8.2).  
a. ♂. Connecticut, New Haven County, Milford Point Audubon Center, 2 July 2004, M. Volovski, DJW.  
b. ♂. Massachusetts, Dukes County, Martha's Vineyard, 1 August 1941, F. M. Jones, CNC.  
c. ♀. Massachusetts, Dukes County, Martha's Vineyard, 11 August 1944, F. M. Jones, USNM.
17. *Pelochrista heathiana* (Kearfott). FWL: 6.7–8.7 mm (mean = 7.8).  
a. ♂. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, DJW.  
b. ♀. Illinois, Putnam, 29 July 1941, M. O. Glenn, USNM.
18. *Pelochrista russeola* (Heinrich). FWL: 8.4–11.8 mm (mean = 10.2).  
a. ♂. HTP. California, Los Angeles, 11 June 1921, USNM.  
b. ♂. California, Ventura County, Camp Ozena, Upper Cuyana, 3 July 1964, C. W. Kirkwood, MCZ.  
c. ♀. California, San Luis Obispo County, Pozo, 3 May 1962, J. A. Powell, EME [PTP. *P. langstoni*].  
d. ♀. California, Tulare County, Smokey Valley, 21 June 1945, C. Henne, EME.

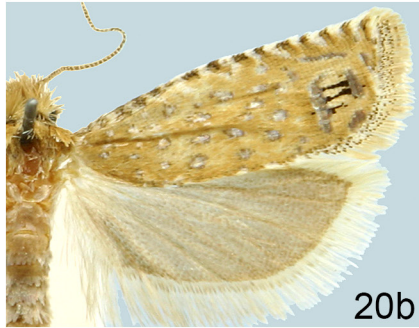
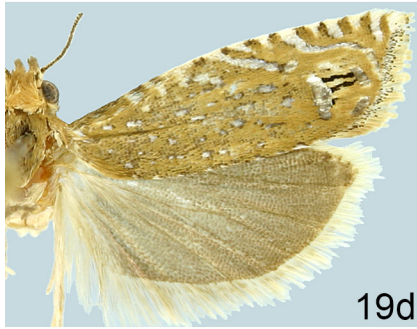
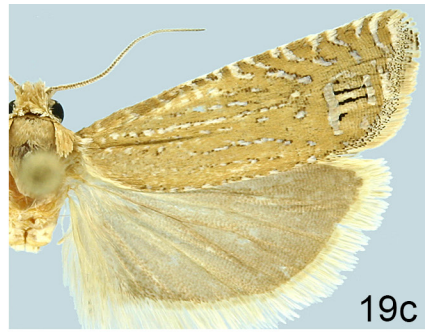




## PLATE G

19. *Pelochrista albiguttana* (Zeller). FWL: 5.6–9.8 mm (mean = 7.8).
- a. ♂.LTP. Texas, Dallas, J. Boll, BMNH.
  - b. ♀.PLTP. Texas, Dallas, J. Boll, BMNH.
  - c. ♂.Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, DJW.
  - d. ♂.Illinois, Lee County, Green River West, 6 July 2002, R. Panzer, DJW.
  - e. ♂.Kentucky, Bullitt County, S side of Route 480, 8 July 1988, L. D. Gibson, LDG.
  - f. ♀.Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, DJW.
  - g. ♀.Kentucky, Bullitt County, S side of Route 480, 8 July 1988, L. D. Gibson, LDG [determination tentative].
  - h. ♂.Kentucky, Bullitt County, 7 mi E of Shepherdsville, 8 July 1988, D. J. Wright, DJW [determination tentative].
  - i. ♀.Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, DJW [determination tentative].
20. *Pelochrista kimballi* Wright and Gilligan. FWL: 4.7–6.5 mm (mean = 5.6).
- a. ♂.HTP. North Carolina, Macon County, Highlands, 15 August 1958, J. G. Franclemont, USNM.
  - b. ♂.PTP. Kentucky, Bullitt County, Pine Creek Forest Road, 22 July 1989, L. D. Gibson, LDG.
  - c. ♂.PTP. Mississippi, Oktibbeha County, Osborne Prairie, 26 June 2008, T. M. Gilligan, TMG.
  - d. ♂.PTP. Mississippi, Oktibbeha County, T19N R15E S16, 7 June 1989, J. MacGowan and T. Schiefer, MEM.
21. *Pelochrista graciliana* (Kearfott). FWL: 7.7–8.8 mm (mean = 8.2).
- a. ♀.LTP. North Carolina, Polk County, Tryon, 3 July 1904, Fiske, AMNH.
  - b. ♂.PLTP. North Carolina, Polk County, Tryon, 24 May 1904, Fiske, AMNH.





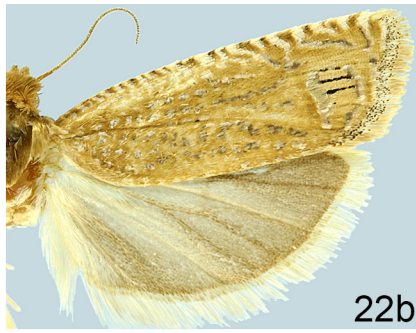
## PLATE H

22. *Pelochrista galenapunctana* (Kearfott). FWL: 6.0–12.0 mm (mean = 9.1).
- a. ♀. LTP. Colorado, Denver, 15 July 1905, E. J. Osler, AMNH.
  - b. ♀. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, DJW.
  - c. ♂. Wyoming, Weston County, 6 mi NW of Newcastle, 18 July 1965, R. W. Hodges, USNM.
  - d. ♀. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, DJW.
  - e. ♂. Colorado, Alamosa County, Zapata Ranch, 26 June 1982, R. W. Hodges, USNM.
  - f. ♀. Arizona, Coconino County, Walnut Canyon, 31 August 1965, J. G. Franclemont, USNM.
  - g. ♂. Wisconsin, Green County, Muralt Prairie, 30 July 1982, G. J. Balogh, DJW.
  - h. ♀. Kentucky, Bullitt County, 7 mi E of Shepherdsville, 8 July 1988, D. J. Wright, DJW.
  - i. ♀. Mississippi, Lowndes County, Black Belt Prairie, 7 July 1991, D. M. Pollock, MEM.
  - j. ♂. California, San Bernardino County, Pine Canyon, 30 May 1940, C. Henne, EME.
  - k. ♀. Arizona, Cochise County, Huachuca Mountains, Pueblo Del Sol, 28 May 1985, R. S. Wielgus, USNM.
  - l. ♀. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 5 June 1969, A. and M. E. Blanchard, USNM.
  - m. ♂. California, Los Angeles County, Tugunga, 14 May 1940, C. Henne, EME.
  - n. ♀. California, Ventura County, Camp Ozena, Upper Cuyama, 16 June 1963, C. W. Kirkwood, EME.
  - o. ♂. California, San Benito County, Pinnacles, 13 May 1937, E. C. Johnston, USNM.





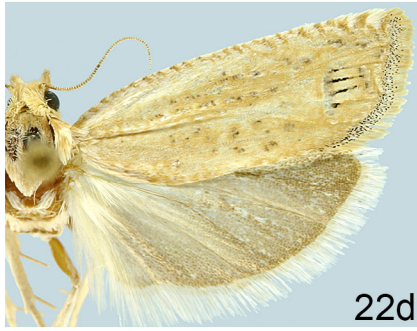
22a



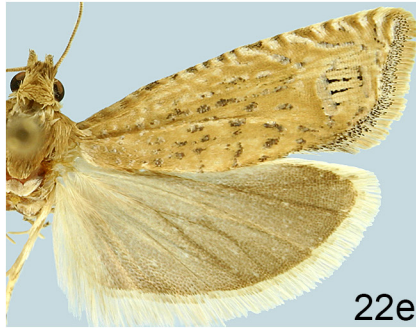
22b



22c



22d



22e



22f



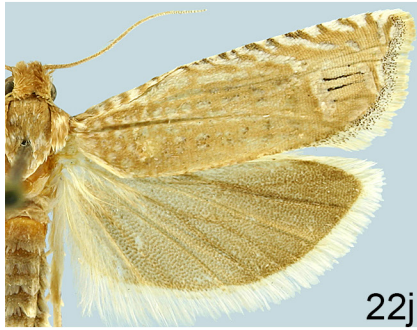
22g



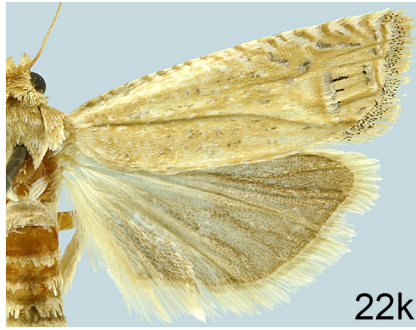
22h



22i



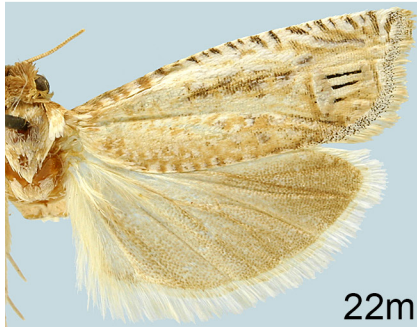
22j



22k



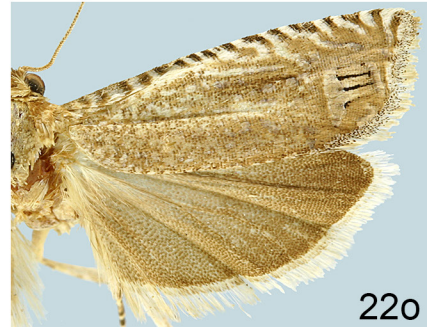
22l



22m



22n



22o

## PLATE I

23. *Pelochrista comatulana* (Zeller). FWL: 5.2–9.5 mm (mean = 7.7).
- a. ♀. LTP. Texas, Bosque County, 26 August 1871, G. W. Belfrage, BMNH.
  - b. ♂. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.
  - c. ♂. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.
  - d. ♂. Colorado, Weld County, 2 mi E of Roggen, 26 July 2012, D. J. Wright, DJW.
  - e. ♂. Colorado, Weld County, 2 mi E of Roggen, 26 July 2012, D. J. Wright, DJW.
  - f. ♀. Arizona, Santa Cruz County, Peña Blanca Canyon, 7 August 1959, R. W. Hodges, CUIC.
  - g. ♂. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, DJW.
  - h. ♂. California, San Diego County, Julian, 10 July, G. H. Field, AMNH [LTP. *P. costastrigulana*].
  - i. ♂. Texas, Hemphill County, Canadian, 15 August 1971, A. and M. E. Blanchard, USNM [HTP. *P. austrina*].
  - j. ♂. California, San Diego County, Torrey Pines, 10–17 June 2005, N. Bloomfield, USNM.
  - k. ♂. Arizona, Coconino County, 16 mi SW of Flagstaff, 13 August 1961, R. W. Hodges, USNM.
  - l. ♂. Texas, Terrell County, Sanderson, 25 April 1981, E. C. Knudson, USNM [HTP. *P. pediasios*].
  - m. ♂. Colorado, Denver, E. J. Osler, AMNH [HTP. *P. rindgei*].
  - n. ♀. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.
  - o. ♂. Kansas, Gove County, Monument Rocks, 24 September 1999, G. J. Balogh, DJW.





23a



23b



23c



23d



23e



23f



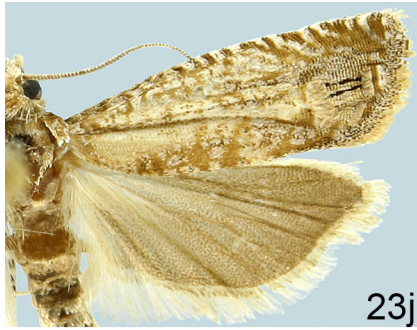
23g



23h



23i



23j



23k



23l



23m



23n



23o



## PLATE J

- 23. *Pelochrista comatulana*** (Zeller). FWL: 5.2–9.5 mm (mean = 7.7).
- p. ♂. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.
  - q. ♂. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.
  - r. ♂. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 20 July 1964, J. G. Franclemont, USNM.
  - s. ♀. Arizona, Coconino County, 10 mi NNW of Flagstaff, 12 July 1961, R. W. Hodges, USNM.
  - t. ♂. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 6 July 1964, J. G. Franclemont, USNM.
  - u. ♂. New Mexico, Cibola County, Lobo Canyon Picnic Area, 9 August 2005, D. J. Wright, DJW.
  - v. ♂. Utah, Garfield County, 18 mi N of Escalante, 29 July 1965, F. P. and M. Rindge, AMNH.
  - w. ♂. Colorado, Weld County, 2 mi E of Roggen, 26 July 2012, D. J. Wright, DJW.
  - x. ♂. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, DJW.
- 24. *Pelochrista vagana*** (McDunnough). FWL: 6.3–9.7 mm (mean = 8.2).
- a. ♂. HTP. Canada, Manitoba, Aweme, 27 June 1922, N. Criddle, CNC.
  - b. ♂. New Jersey, Essex County, Montclair, 1 July, W. D. Kearfott, USNM [PLTP. *P. mandana*].
  - c. ♂. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1997, D. J. Wright, DJW.
  - d. ♂. Iowa, Pocahontas County, Kalsow Prairie, 25 June 1997, D. J. Wright, DJW.
  - e. ♀. Ohio, Erie County, Resthaven Wildlife Area, 12 July 1991, D. J. Wright, DJW.
  - f. ♀. Washington, Whitman County, Almota, emerged 7 May 1934, J. F. G. Clarke, USNM.



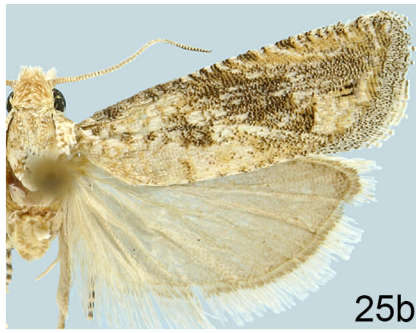
## PLATE K

25. *Pelochrista exclusoriana* (Heinrich). FWL: 6.5–8.0 mm (mean = 7.3).  
a. ♂.HTP. Texas, La Salle County, Cotulla, 12 May 1906, Crawford and Pratt, USNM.  
b. ♂.Texas, Kimble County, Junction, 16 April 1974, A. and M. E. Blanchard, USNM.  
c. ♀.Texas, Cameron County, Brownsville, 26 April 1928, F. H. Benjamin, USNM.
26. *Pelochrista rufula* Wright and Gilligan. FWL: 7.7–10.2 mm (mean = 8.9).  
a. ♂.HTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, 19 August 1965, J. G. Franclemont, USNM.  
b. ♀.PTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, 16 August 1964, J. G. Franclemont, USNM.  
c. ♂.PTP. Utah, Garfield County, 15 mi W of Bryce Canyon, 10 August 1999, R. Robertson, EME.
27. *Pelochrista serapicana* (Heinrich). FWL: 9.5–12.9 mm (mean = 11.2).  
a. ♂.HTP. Montana, Cascade County, Great Falls, 8–21 July 1921, H. G. Dyar, USNM.  
b. ♂.Wyoming, Park County, 1 mi S of Ralston, 25 June 1980, M. Pogue, DJW.  
c. ♀.Idaho, Oneida County, Holbrook Summit, 10 July 2006, D. J. Wright, DJW.  
d. ♀.Arizona, Coconino County, 7.5 mi NW of Flagstaff, 7 July 1961, R. W. Hodges, USNM.  
e. ♂.Arizona, Coconino County, 7.5 mi NW of Flagstaff, 20 July 1964, J. G. Franclemont, USNM.  
f. ♂.Arizona, Coconino County, 7.5 mi NW of Flagstaff, 24 July 1961, R. W. Hodges, USNM.
28. *Pelochrista atomosana* (Walsingham). FWL: 9.0–11.0 mm (mean = 10.0).  
a. ♂.LTP. California, Sonoma County, Santa Rosa, 18 May 1871, Walsingham, BMNH.  
b. ♂.PLTP. California, Colusa County, Bear Valley, 27 June 1871, Walsingham, BMNH.  
c. ♂.California, Colusa County, Bear Valley, 27 June 1871, Walsingham, BMNH.





25a



25b



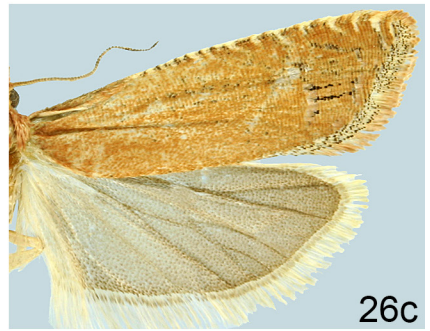
25c



26a



26b



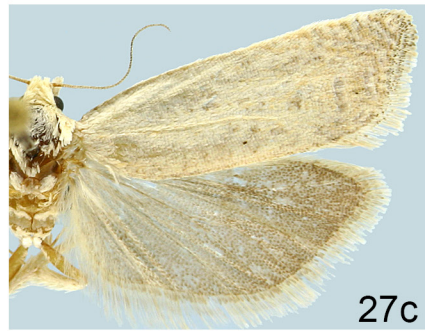
26c



27a



27b



27c



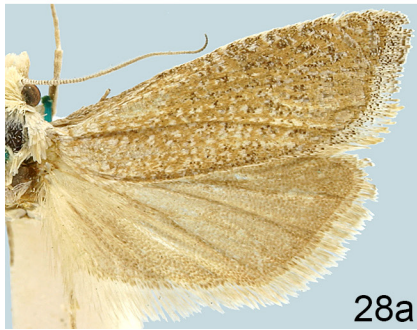
27d



27e



27f



28a



28b

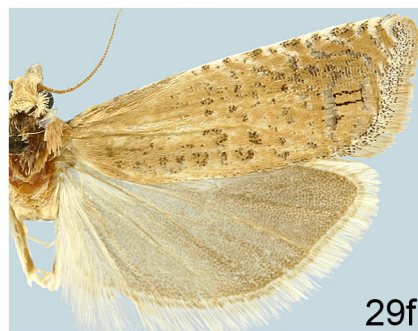


28c



## PLATE L

29. *Pelochrista watertonana* (McDunnough). FWL: 7.2–11.3 mm (mean = 9.7).  
a. ♂.HTP. Canada, Alberta, Waterton Lakes, 25 July 1923, J. McDunnough, CNC.  
b. ♂.PTP. Canada, Alberta, Waterton Lakes, 25 July 1923, J. McDunnough, CNC.  
c. ♀.PTP. Canada, Alberta, Waterton Lakes, 19 July 1923, J. McDunnough, CNC.  
d. ♂.Wyoming, Albany County, T15N R73W S1, 13 July 2001, J. S. Nordin, DJW.  
e. ♀.Canada, British Columbia, Penticton, 7 June 1933, J. McDunnough, CNC.  
f. ♂.Colorado, Chaffee County, Base of Mt. Yale, 12 July 1982, J.-F. Landry, CNC.
30. *Pelochrista polingana* Wright and Gilligan. FWL: 7.1–9.2 mm (mean = 8.1).  
a. ♂.HTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, USNM.  
b. ♀.PTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.  
c. ♀.PTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.
31. *Pelochrista comancheana* Wright and Gilligan. FWL: 8.3–9.1 mm (mean = 8.7).  
a. ♂.HTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW. USNM.  
b. ♀.PTP. New Mexico, Lincoln County, Valley of Fires Recreation Area, 17 July 2005, D. J. Wright, DJW.  
c. ♀.PTP. New Mexico, Lincoln County, Valley of Fires Recreation Area, 19 July 2005, D. J. Wright, DJW.
32. *Pelochrista wandana* (Kearfott). FWL: 6.9–8.7 mm (mean = 7.8).  
a. ♂.Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, DJW.  
b. ♀.Ohio, Hamilton County, Cincinnati, 29 June 1994, D. J. Wright, DJW.  
c. ♀.Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, DJW.



## PLATE M

33. *Pelochrista palabundana* (McDunnough). FWL: 5.7–8.4 mm (mean = 6.9).  
a. ♂. Michigan, Leelanau County, T32N R11W S13, 12 August 1988, G. J. Balogh, LDG.  
b. ♀. Michigan, Allegan County, T2N R14W S26, 25 July 1987, G. J. Balogh, DJW.  
c. ♂. Illinois, Lake County, Illinois Beach State Park, 3 July 1999, R. Panzer, DJW.  
d. ♀. Minnesota, Chisago County, Wyoming Dunes Wildlife Management Area, 11 August 1996, M. Sabourin, MGCL.
34. *Pelochrista rosaocellana* (Knudson). FWL: 7.2–10.4 mm (mean = 8.7).  
a. ♂. Texas, Hemphill County, Gene Rowe Wildlife Management Area, 31 July 2005, L. D. Gibson, LDG.  
b. ♂. Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, DJW.  
c. ♂. Iowa, Woodbury County, Liberty Township, S6, 30 June 1992, G. J. Balogh, DJW.  
d. ♂. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, DJW.  
e. ♂. Utah, San Juan County, Comb Ridge, 26 September 2003, G. J. Balogh, DJW.  
f. ♀. Utah, Kane County, Ponderosa Grove Campground, 22 September 2000, G. J. Balogh, DJW.  
g. ♂. Utah, Emery County, Route 24 and Goblin Valley Road, 11 May 2001, J. S. Nordin, DJW.  
h. ♂. New Mexico, Otero County, White Sands National Monument, 14 September 2009, E. H. Metzler, EHM.
35. *Pelochrista salaciana* (Blanchard and Knudson). FWL: 6.3–8.2 mm (mean = 7.4).  
a. ♂. HTP. Texas, Nueces County, North Padre Island, 13 October 1979, A. and M. E. Blanchard, USNM.  
b. ♀. PTP. Texas, Nueces County, North Padre Island, 24 September 1979, A. and M. E. Blanchard, USNM.  
c. ♂. PTP. Texas, Nueces County, North Padre Island, 12 October 1979, E. C. Knudson, USNM.





33a



33b



33c



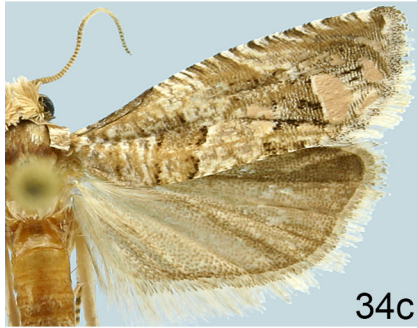
33d



34a



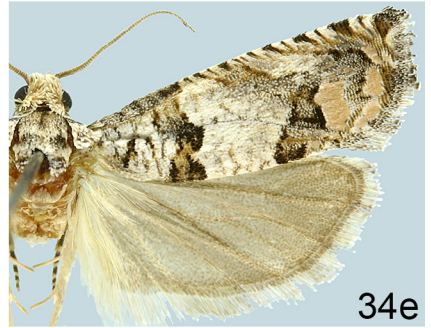
34b



34c



34d



34e



34f



34g



34h



35a



35b



35c



## PLATE N

36. *Pelochrista daemonicana* (Heinrich). FWL: 8.0–11.0 mm (mean = 9.4).  
a. ♂. Arizona, Mojave County, 3 mi SE of Fredonia, 23 September 2000, G. J. Balogh, DJW.  
b. ♂. Kansas, Morton County, Cimarron River and Highway 51, 26 September 1999, G. J. Balogh, DJW.  
c. ♀. Montana, Sweet Grass County, Howie Road, 19 August 1969, J. G. Franclemont, USNM.  
d. ♂. Texas, Hemphill County, Canadian, 27 September 1968, A. and M. E. Blanchard, USNM.  
e. ♂. New Mexico, Socorro County, Highway 60, mi 91–93, 25 September 2003, G. J. Balogh, DJW.
37. *Pelochrista collilonga* (Blanchard and Knudson). FWL: 5.3–7.9 mm (mean = 6.6).  
a. ♂. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, DJW.  
b. ♀. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, DJW.  
c. ♀. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, DJW.  
d. ♂. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, DJW.  
e. ♀. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, DJW.
38. *Pelochrista fraudabilis* (Heinrich). FWL: 5.1–7.8 mm (mean = 7.1).  
a. ♂. HTP. North Carolina, Moore County, Southern Pines, 8–15 July, USNM.  
b. ♂. Louisiana, Tangipahoa Parish, Sandy Hollow Wildlife Area, D. Pollock, 26 May 1993, MEM.
39. *Pelochrista adamantana* (Guenée). FWL: 7.7–10.5 mm (mean = 9.3).  
a. ♀. New Jersey, Ocean County, Lakehurst, 29 August 1955, J. G. Franclemont, USNM.  
b. ♂. North Carolina, Maxton, 22 September 1944, A. B. Klots, AMNH.  
c. ♂. New Jersey, Camden County, Lucaston, September 1911, F. Haimbach, USNM.



36a



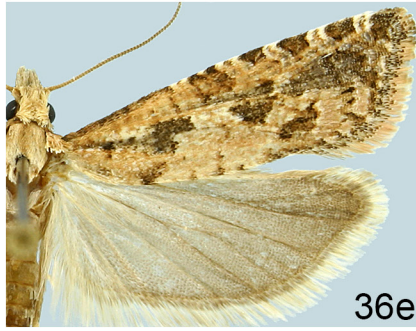
36b



36c



36d



36e



37a



37b



37c



37d



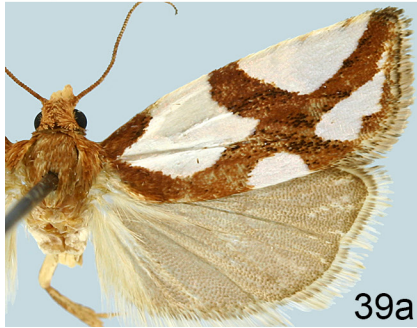
37e



38a



38b



39a



39b

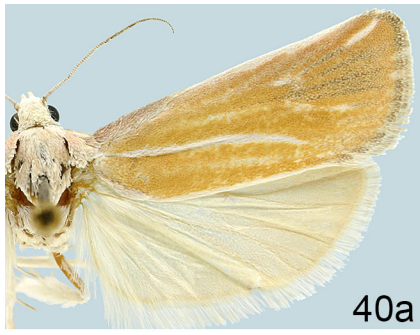


39c

## PLATE O

40. *Pelochrista caniceps* (Walsingham). FWL: 11.4–15.3 mm (mean = 13.7).  
a. ♂. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.  
b. ♂. California, Modoc County, Dismal Swamp, 30 August 2008, L. L. Crabtree, DJW.  
c. ♂. Oregon, Harney County, 7 mi W of Burns, 21 July 2001, D. J. Wright, DJW.  
d. ♀. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.  
e. ♂. California, Modoc County, Surprise Valley, 11 September 2010, L. L. Crabtree, DJW.
41. *Pelochrista optimana* (Dyar). FWL: 12.4–15.4 mm (mean = 13.8).  
a. ♂. Colorado, Summit County, 5.3 mi S of Frisco, 20 July 2008, D. J. Wright, DJW.  
b. ♀. Utah, Uintah County, N of Vernal, 4 September, 2000, D. J. Wright, DJW.  
c. ♂. Colorado, Mesa County, Lands End Road, 2 September 2000, D. J. Wright, DJW.  
d. ♂. Colorado, Costilla County, 7.4 mi ENE of Fort Garland, 4 August 2013, C. Harp, CEH.  
e. ♀. Colorado, Costilla County, Mountain Home Reservoir SWA, 17 August 2004, C. Harp, USNM.
42. *Pelochrista hyponomeutana* (Walsingham). FWL: 9.1–15.0 mm (mean = 12.7).  
a. ♂. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.  
b. ♀. Colorado, Weld County, County Road 91, N of I-76, 6 August 1996, D. J. Wright, DJW.  
c. ♀. New Mexico, Lincoln County, Valley of Fires, 19 August 2005, D. J. Wright, DJW.  
d. ♂. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.  
e. ♂. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.





40a



40b



40c



40d



40e



41a



41b



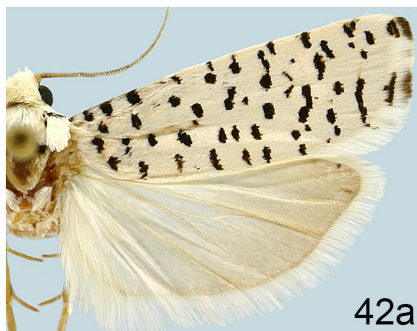
41c



41d



41e



42a



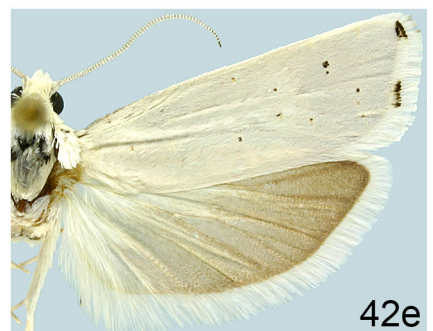
42b



42c



42d



42e



## PLATE P

43. *Pelochrista canariana* (Kearfott). FWL: 11.7–16.0 mm (mean = 14.1).  
a. ♂. Utah, Sanpete County, Ephraim State Wildlife Management Area, 19 July 2006, D. J. Wright, DJW.  
b. ♀. Colorado, Mesa County, Grand Mesa National Forest, 30 July 2003, D. J. Wright, DJW.  
c. ♂. California, Lassen County, Rye Patch Canyon, 19 August 1995, L. L. Crabtree, DJW.
44. *Pelochrista avalona* (McDunnough). FWL: 10.9–14.6 mm (mean = 12.6).  
a. ♂. HTP. California, Los Angeles County, Santa Catalina Island, 21 September 1932, CNC.  
b. ♂. California, Monterey County, Arroyo Seco, 26 August 1962, R. L. Langston, EME.  
c. ♀. California, Los Angeles County, La Tuna Canyon, 5 September 1947, W. H. Evans, USNM.
45. *Pelochrista persolita* (Heinrich). FWL: 6.8–10.5 mm (mean = 8.5).  
a. ♂. HTP. Texas, Cameron County, San Benito, 16–23 March, USNM.  
b. ♂. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 18 August 1984, E. C. Knudson, USNM.  
c. ♀. Texas, Big Bend National Park, 11 October 1969, A. and M. E. Blanchard, USNM.
46. *Pelochrsita graziella* (Blanchard). FWL: 11.5–15.0 mm (mean = 13.5).  
a. ♂. HTP. Texas, Big Bend National Park, 11 October 1966, A. and M. E. Blanchard, USNM.  
b. ♂. Texas, Big Bend National Park, 12 October 1969, A. and M. E. Blanchard, USNM.  
c. ♂. Texas, Big Bend National Park, 4 October 1967, A. and M. E. Blanchard, USNM.
47. *Pelochrista diabolana* (Blanchard). FWL: 9.7–12.9 mm (mean = 12.2).  
a. ♂. HTP. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 31 March 1970, A. and M. E. Blanchard, USNM.  
b. ♂. Texas, Jeff Davis County, Mount Locke, Davis Mountains, 29 March 1970, A. and M. E. Blanchard, USNM.  
c. ♂. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 27 May 1973, R. W. Hodges, USNM.



43a



43b



43c



44a



44b



44c



45a



45b



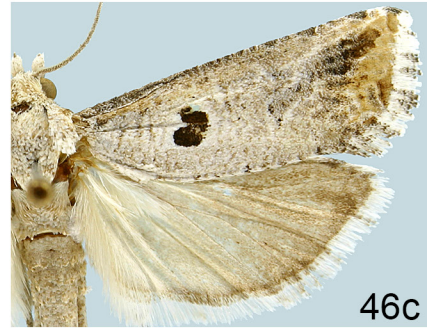
45c



46a



46b



46c



47a



47b



47c



## PLATE Q

48. *Pelochrista maculosa* (Wright). FWL: 9.8–11.7 mm (mean = 10.9).  
a. ♂.HTP. Wyoming, Albany County, W side Gelatt Lake, 18 July 2005, J. S. Nordin, USNM.  
b. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 29 June 2006, J. S. Nordin, DJW.  
c. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 28 July 2005, J. S. Nordin, DJW.  
d. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 28 July 2005, J. S. Nordin, DJW.
49. *Pelochrista lafontainei* (Wright). FWL: 11.2–13.5 mm (mean = 12.3).  
a. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 18 July 2005, J. S. Nordin, DJW.  
b. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 29 July 2005, J. S. Nordin, DJW.  
c. ♂.PTP. Wyoming, Albany County, W side Gelatt Lake, 28 July 2005, J. S. Nordin, EME.  
d. ♀.PTP. Wyoming, Albany County, W side Gelatt Lake, 28 July 2005, J. S. Nordin, DJW.
50. *Pelochrista fuscostriata* Wright. FWL: 8.1–10.7 mm (mean = 9.3).  
a. ♂.HTP. California, San Mateo County, Edgewood Park, 14 May 1991, J. A. Powell, EME.
51. *Pelochrsita fuscosparsa* (Walsingham). FWL: 7.9–13.8 mm (mean = 11.1).  
a. ♂.Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, DJW.  
b. ♂.Wyoming, Albany County, T15N R73W S1, 11 July 2002, J. S. Nordin, DJW.  
c. ♂.Wyoming, Albany County, T15N R73W S1, 28 June 2002, J. S. Nordin, DJW.  
d. ♂.Wyoming, Albany County, T15N R73W S1, 14 July 2004, J. S. Nordin, DJW.  
e. ♂.Wyoming, Albany County, T15N R73W S1, 20 June 2006, J. S. Nordin, DJW.  
f. ♂.Wyoming, Albany County, T15N S73W S1, 29 July 2003, C. D. Ferris, DJW.



48a



48b



48c



48d



49a



49b



49c



49d



50



51a



51b



51c



51d



51e



51f



## PLATE R

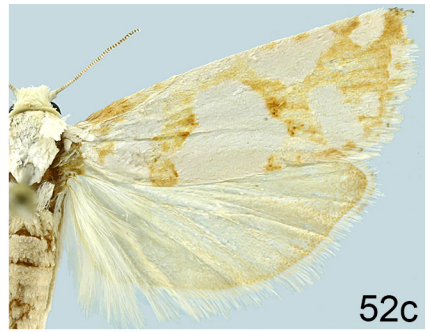
52. *Pelochrista spaldingana* (Kearfott). FWL: 10.4–14.5 mm (mean = 12.2).  
a. ♂. Utah, Tooele County, Stocton, 5 August 1907, T. Spalding, USNM.  
b. ♂. California, Lassen County, 7 mi E of Bieber, 1 August 2010, L. L. Crabtree, DJW.  
c. ♂. California, Lassen County, 8 mi E of Bieber, 21 August 2010, L. L. Crabtree, DJW.
53. *Pelochrista fandana* (Kearfott). FWL: 10.7–15.7 mm (mean = 13.7).  
a. ♂. North Dakota, Billings County, near Sully Springs, 6 September, 2002, G. J. Balogh, DJW.  
b. ♀. HTP. Colorado, Denver, Dyar and Caudell, AMNH.  
c. ♂. Colorado, Alamosa County, Great Sand Dunes, 20–21 July 1954, H. E. and M. A. Evans, USNM.  
d. ♂. North Dakota, Slope County, Columnar Juniper Area, 3 September 2002, G. J. Balogh, DJW.  
e. ♀. Colorado, Denver, 10 September, E. J. Oslar, AMNH [HTP. *P. gandana*].  
f. ♂. Colorado, Alamosa County, Great Sand Dunes, 20–21 July 1954, H. E. and M. A. Evans, USNM.
54. *Pelochrista curlewensis* (Wright). FWL: 6.6–12.9 mm (mean = 11.2).  
a. ♂. PTP. Idaho, Oneida County, 5 mi SSE of Holbrook, 18 July 2001, D. J. Wright, DJW.  
b. ♀. PTP. Idaho, Oneida County, 4 mi ENE of Holbrook, 26 July 2003, D. J. Wright, DJW.  
c. ♂. California, Riverside County, Rancho La Sierra, 25 August 1949, F. H. Rindge, AMNH.  
d. ♂. California, Orange County, Rancho Mission Viejo, 15–18 September 1999, N. Bloomfield, DJW.  
e. ♂. PTP. California, San Diego County, Torrey Pines, 9–26 July 2005, N. Bloomfield, USNM.  
f. ♂. PTP. California, San Diego County, Torrey Pines, 8–15 August 2005, N. Bloomfield, USNM.



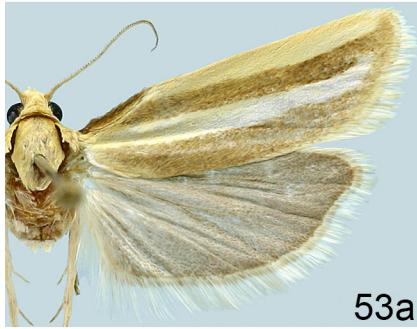
52a



52b



52c



53a



53b



53c



53d



53e



53f



54a



54b



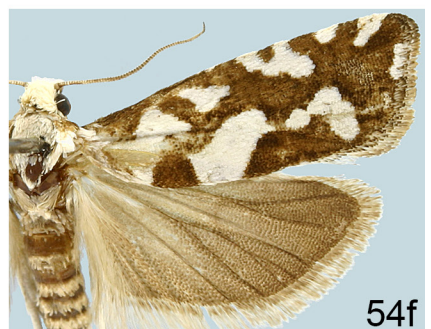
54c



54d



54e



54f

## PLATE S

55. *Pelochrista biquadrana* (Walsingham). FWL: 7.2–12.3 mm (mean = 10.2).  
a. ♂.LTP. California, Shasta County, Pit River, 21–26 July 1871, Walsingham, BMNH.  
b. ♂.Oregon, Grant County, Ritter, 17 July 1962, J. F. G. Clarke, USNM.  
c. ♂.California, Plumas County, 1 mi W of Pilot Park, 21 July 2010, L. L. Crabtree, DJW.
56. *Pelochrista mescalerana* (Wright). FWL: 6.7–8.7 mm (mean = 7.9).  
a. ♂.HTP. New Mexico, Chaves County, Mescalero Dunes, 22 September 2003, G. J. Balogh, DJW.  
b. ♀.Texas, Culberson County, Guadalupe Mountains National Park, 22–23 June 1989, E. C. Knudson, ECK.
57. *Pelochrista fremonti* Wright and Gilligan. FWL = 11.6 mm (n = 1).  
♀.HTP. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, DJW.
58. *Pelochrista momana* (Kearfott). FWL: 9.0–11.2 mm (mean = 10.2).  
a. ♂.Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, DJW.  
b. ♀.Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, DJW.  
c. ♀.California, San Diego County, Borrego, 3 May 1941, G. H. Sperry, USNM.
59. *Pelochrista gelattana* Wright. FWL: 10.2–13.4 mm (mean = 12.0).  
a. ♂.HTP. Wyoming, Albany County, W side of Gelatt Lake, 6 June 2004, J. S. Nordin, USNM.  
b. ♀.Utah, Uintah County, 4 mi S of Manila, 20 July 1994, G. J. Balogh, DJW.  
c. ♂.PTP. Wyoming, Albany County, W side of Gelatt Lake, 6 June 2006, J. S. Nordin, DJW.  
d. ♂.PTP. Wyoming, Albany County, W side of Gelatt Lake, 12 June 2007, J. S. Nordin, DJW.  
e. ♂.PTP. Wyoming, Albany County, W side of Gelatt Lake, 27 June 2005, J. S. Nordin, DJW.  
f. ♂.PTP. Wyoming, Albany County, W side of Gelatt Lake, 21 June 2005, J. S. Nordin, DJW.





55a



55b



55c



56a



56b



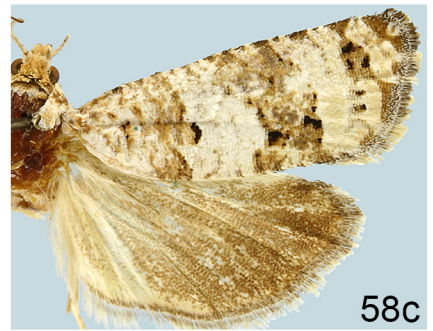
57



58a



58b



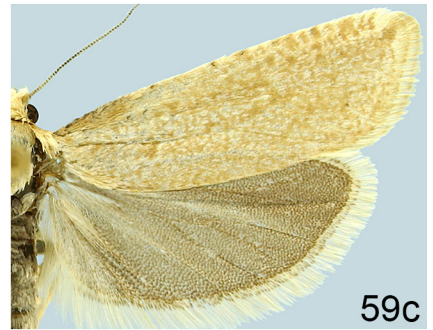
58c



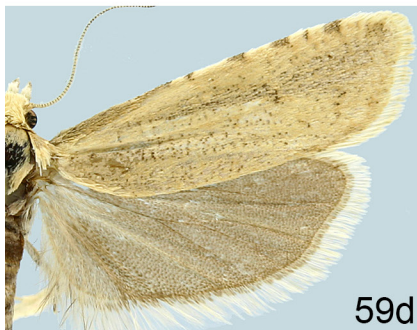
59a



59b



59c



59d



59e

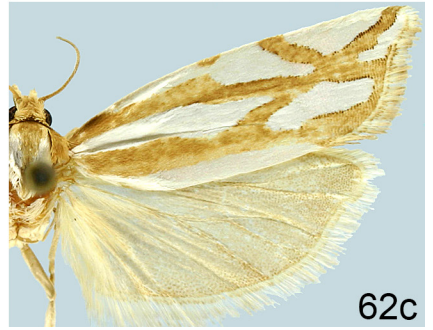
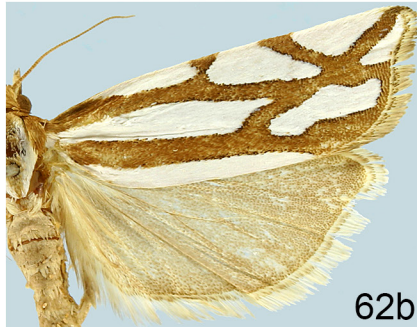
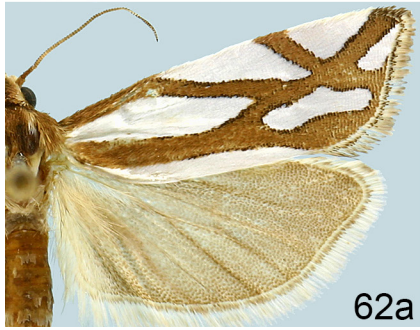
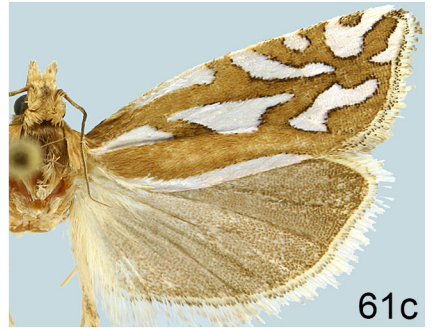
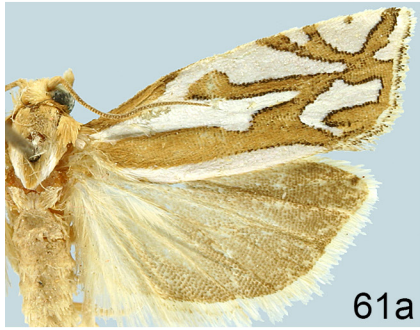
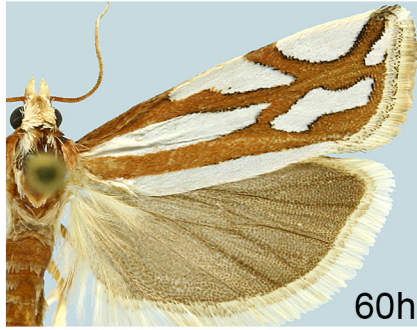
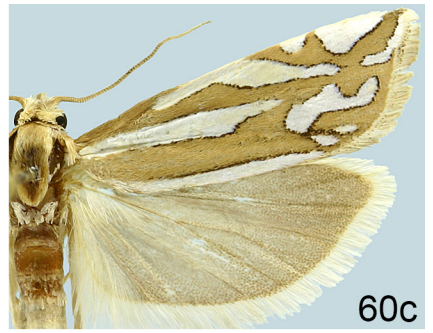
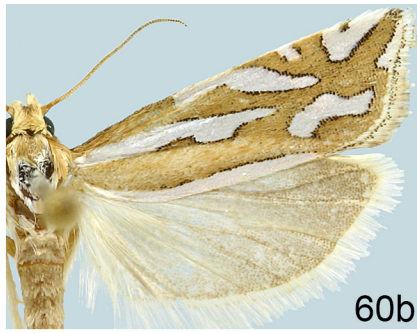


59f



## PLATE T

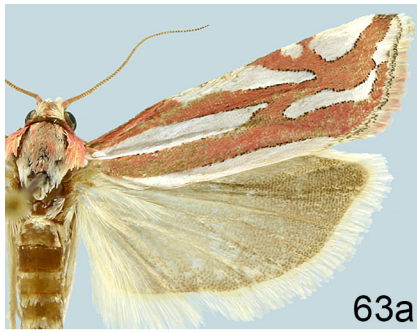
60. *Pelochrista ridingsana* (Robinson). FWL: 6.8–13.5 mm (mean = 10.9).  
a. ♂.HTP. Colorado Territory, James Ridings, ANSP.  
b. ♂.Wyoming, Albany County, 10.5 mi SE of Laramie, 4 August 2001, D. J. Wright, DJW.  
c. ♂.Wyoming, Albany County, T15N R73W S1, 22 August 2002, J. S. Nordin, DJW.  
d. ♀.Colorado, Weld County, Pawnee National Grassland, 31 August 2007, T. M. Gilligan and P. A. Opler, TMG.  
e. ♀.Utah, Carbon County, 12 mi N of Price, 29 July 2003, D. J. Wright, DJW.  
f. ♂.Canada, Yukon Territory, Klondike, 17 July 2006, J.-F. Landry and G. Pohl, CNC.  
g. ♂.Southwest Colorado, Dietz, AMNH [HTP. *P. magnidicana*].  
h. ♂.Arizona, Coconino County, Walnut Canyon, 18 August 1965, J. G. Franclemont, USNM.  
i. ♂.California, Contra Costa, Point Molate, Richmond, 21 September 1966, J. Wolf and J. Powell, EME.
61. *Pelochrista argentifurcatana* (Grote). FWL: 7.6–11.5 mm (mean = 9.0).  
a. ♂.Illinois, Putnam County, 24 September 1939, M. O. Glenn, INHS.  
b. ♂.Massachusetts, Nantucket Island, INHS.  
c. ♀.Mississippi, Lowndes County, T17N R16E S34, 1 October 1991, D. M. Pollock, MEM.
62. *Pelochrista griselda* (Blanchard and Knudson). FWL = 10.0–13.9 mm (mean = 12.7).  
a. ♂.HTP. Texas, Big Bend National Park, 7 April 1967, A. and M. E. Blanchard, USNM.  
b. ♀.PTP. Texas, Big Bend National Park, 12 May 1966, A. and M. E. Blanchard, USNM.  
c. ♀.Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 25 May 1966, J. G. Franclemont, USNM.



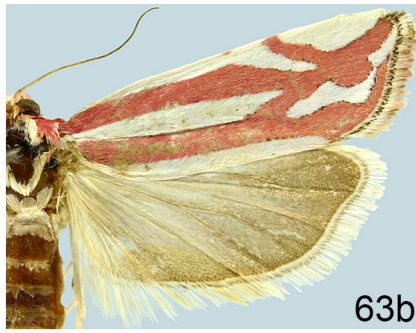


## PLATE U

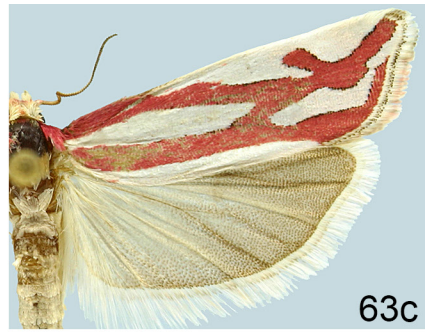
63. *Pelochrista fernaldana* (Grote). FWL: 9.1–13.9 mm (mean = 11.7).
- a. ♂. Montana, Carter County, Medicine Rocks State Park, 5 September 2002, G. J. Balogh, DJW.
  - b. ♀. Wyoming, Albany County, T15N R73W S1, 10 August 2001, J. S. Nordin, DJW.
  - c. ♂. Wyoming, Albany County, T15N R73W S1, 9 August 2006, J. S. Nordin, DJW.
  - d. ♀. Colorado, Fremont County, 4.6 mi SE of Salida, 22 August 1997, D. J. Wright, DJW.
  - e. ♀. Colorado, Elbert County, 2 mi E of Elizabeth, 8 September 2007, C. Harp, DJW.
  - f. ♂. Wyoming, Albany County, T15N S73W S1, 1 August 2003, C. D. Ferris, DJW.
64. *Pelochrista immaculana* (Kearfott). FWL: 10.1–13.5 mm (mean = 12.0).
- a. ♂. Washington, Washington County, Union Flat, 3 August 1930, J. F. G. Clarke, CNC.
  - b. ♂. Washington, Washington County, Union Flat, 3 August 1930, J. F. G. Clarke, CNC.
  - c. ♂. Wyoming, Sublette County, Middle Piney Lake, 11 August 1935, A. B. Klots, USNM.
  - d. ♂. California, Duchesne County, Iron Mine Campground, 24 July 2006, D. and J. Powell, EME.
  - e. ♀. California, Duchesne County, Iron Mine Campground, 24 July 2006, D. and J. Powell, EME.
  - f. ♂. Canada, Saskatchewan, Swift Current, 24 August 1939, A. R. Brooks, CNC [HTP. *P. betana*].
  - g. ♂. Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, MGCL.
  - h. ♂. Oregon, Malheur County, Jordan Valley, 12 August 1967, K. Goeden, USNM.
  - i. ♂. Utah, Uintah County, Vernal, 1624 W, US Highway 40, 3 September 2000, D. J. Wright, DJW.



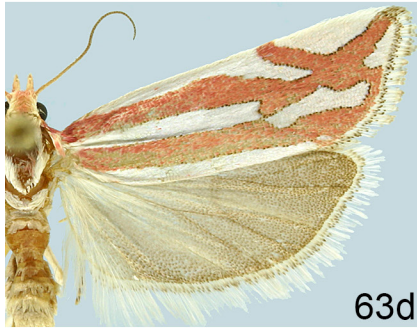
63a



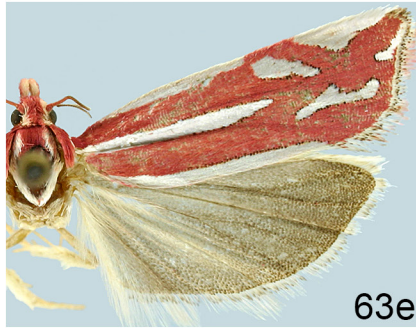
63b



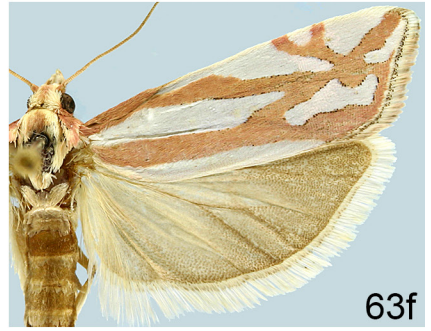
63c



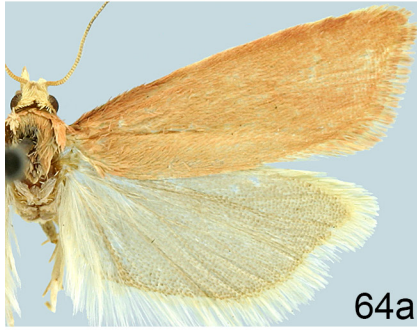
63d



63e



63f



64a



64b



64c



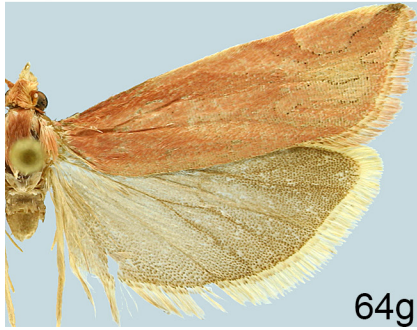
64d



64e



64f



64g



64h

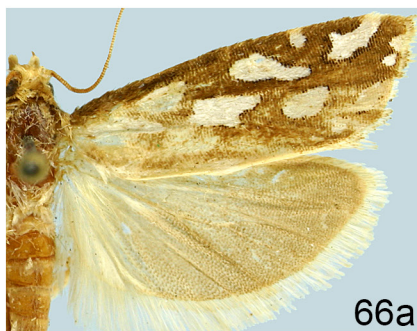


64i



## PLATE V

- 65. *Pelochrista aurilineana*** (Ferris). FWL: 11.9–16.2 mm (mean = 14.4).  
a. ♂. Utah, Uintah County, 3 mi N of Vernal, 4 September 2000, D. J. Wright, DJW.  
b. ♂. Wyoming, Albany County, T15N R73W S1, 31 August 2006, J. S. Nordin, DJW.  
c. ♂. Utah, Uintah County, 3 mi N of Vernal, 4 September 2000, D. J. Wright, DJW.  
d. ♀. Wyoming, Albany County, T15N R73W S1, 5 September 2005, J. S. Nordin, DJW.
- 66. *Pelochrista sandiego*** (Kearfott). FWL: 9.0–13.4 mm (mean = 12.0).  
a. ♂. LTP. California, San Diego County, San Diego, 15 September, G. W. Field, USNM.  
b. ♂. California, San Diego County, Torrey Pines, 22–29 August 2009, N. Bloomfield, USNM.  
c. ♂. California, San Diego County, Torrey Pines, 18–25 September 2005, N. Bloomfield, USNM.  
d. ♂. California, San Diego County, 4 mi SE of El Cajon, 4 October 1967, Rude and Opler, EME.  
e. ♂. California, San Diego County, 6 mi E of Banner, 2 September 1966, Powell, Rude, and Wolf, EME [emerged 29 September 1966].  
f. ♀. California, San Diego County, 6 mi E of Banner, 2 September 1966, Powell, Rude, and Wolf, EME [emerged 20 September 1966].
- 67. *Pelochrista atascosana*** (Blanchard). FWL: 9.0–12.5 mm (mean = 11.1).  
a. ♂. HTP. Texas, Cameron County, Laguna Atascosa, 22 November 1973, A. and M. E. Blanchard, USNM.  
b. ♀. PTP. Texas, Cameron County, Laguna Atascosa, 22 October 1973, A. and M. E. Blanchard, USNM.  
c. ♂. PTP. Texas, Cameron County, Laguna Atascosa, 22 November 1973, A. and M. E. Blanchard, USNM.  
d. ♀. PTP. Texas, Cameron County, Brownsville, 5 September 1969, A. and M. E. Blanchard, USNM.  
e. ♀. PTP. Texas, Cameron County, Brownsville, 5 September 1969, A. and M. E. Blanchard, USNM.





## PLATE W

68. *Pelochrista luridana* (Walsingham). FWL: 7.2–11.0 mm (mean = 9.1).
- a. ♂.LTP. California, Siskiyou County, Bulls Meadow, 6–7 September 1871, Walsingham, BMNH.
  - b. ♂.Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, DJW.
  - c. ♂.Idaho, Oneida County, 4 mi ENE of Holbrook, 18 July 2001, D. J. Wright, DJW.
  - d. ♀.Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, DJW.
  - e. ♂.Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, DJW.
  - f. ♂.Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, DJW.
  - g. ♂.Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, DJW.
69. *Pelochrista totana* (Kearfott). FWL: 7.4–12.0 mm (mean = 9.9).
- a. ♂.Colorado, Grand County, Beaver Creek, 11 August 1996, D. J. Wright, DJW.
  - b. ♂.Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, DJW.
  - c. ♂.Oregon, Harney County, 7 mi W of Burns, 21 July 2001, D. J. Wright, DJW.
  - d. ♂.Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, DJW.
  - e. ♂.Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, DJW.
70. *Pelochrista taosana* (Wright). FWL: 7.5–9.2 mm (mean = 8.5).
- a. ♂.PTP. New Mexico, Taos County, 10 mi SE of Tres Piedras, 11 August 1999, D. J. Wright, DJW.
  - b. ♂.PTP. New Mexico, Taos County, 10 mi SE of Tres Piedras, 11 August 1999, D. J. Wright, DJW.
  - c. ♂.PTP. New Mexico, Taos County, 10 mi SE of Tres Piedras, 11 August 1999, D. J. Wright, DJW.



68a



68b



68c



68d



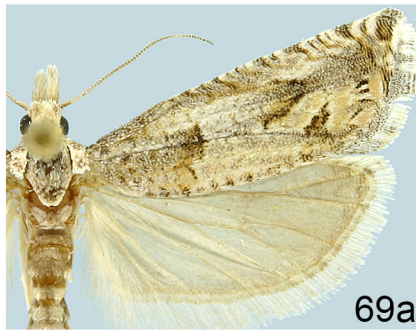
68e



68f



68g



69a



69b



69c



69d



69e



70a



70b



70c



## PLATE X

71. *Pelochrista larana* (Walsingham). FWL: 8.4–11.6 mm (mean = 10.1).  
a. ♂.LTP. California, Siskiyou Sheep Rock, 3 September 1871, Walsingham, BMNH.  
b. ♀.Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, DJW.  
c. ♂.Idaho, Oneida County, 4 mi ENE of Holbrook, 18 July 2001, D. J. Wright, DJW.  
d. ♂.Wyoming, Albany County, T15N R73W S1, 13 July 2001, J. S. Nordin, DJW.  
e. ♂.Wyoming, Albany County, T15N S73W S1, 1 August 2002, C. D. Ferris, DJW.
72. *Pelochrista nordini* (Wright). FWL: 10.0–13.7 mm (mean = 11.7).  
a. ♂.PTP. Wyoming, Albany County, 11.5 SE of Laramie, 4 August 2001, D. J. Wright, DJW.  
b. ♀.PTP. Wyoming, Albany County, T15N S73W S1, 22 August 2002, C. D. Ferris, DJW.  
c. ♂.PTP. Wyoming, Albany County, T15N S73W S1, 10 August 2002, C. D. Ferris, DJW.
73. *Pelochrista piperata* (Wright). FWL: 9.7–13.5 mm (mean = 11.6).  
a. ♂.PTP. Idaho, Oneida County, 4 mi ENE of Holbrook, 18 July 2001, D. J. Wright, DJW.  
b. ♀.Idaho, Oneida County, 5 mi ENE of Holbrook, 9 July 2006, D. J. Wright, DJW.  
c. ♂.Utah, Sanpete County, Ephraim State Wildlife Management Area, 19 July 2006, D. J. Wright, DJW.  
d. ♂.Utah, Sanpete County, Ephraim State Wildlife Management Area, 19 July 2006, D. J. Wright, DJW.
74. *Pelochrista eburata* (Heinrich). FWL: 8.7–14.8 mm (mean = 11.9).  
a. ♀.California, Santa Barbara County, 11 mi ENE of Santa Maria, 12 April 1967, J. A. Powell, EME.  
b. ♀.California, San Luis Obispo County, Montana Del Oro State Park, 14 July 2012, K. Richers, KMR.  
c. ♂.California, Contra Costa County, Pleasant Hill, 9 July 1959, W. E. Ferguson, EME [PTP. *P. williamsi*].



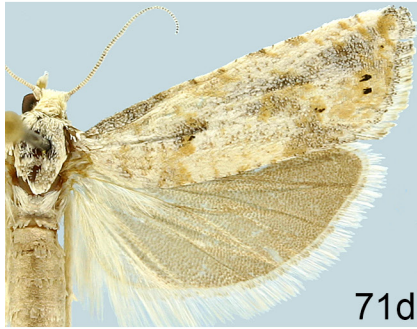
71a



71b



71c



71d



71e



72a



72b



72c



73a



73b



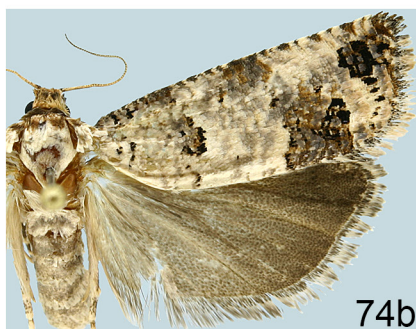
73c



73d



74a



74b

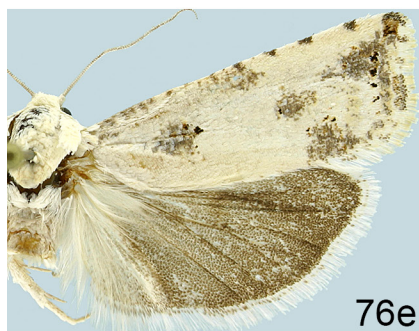
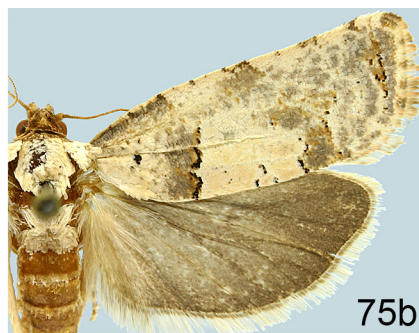


74c

## PLATE Y

75. *Pelochrista invicta* (Walsingham). FWL: 11.5–17.2 mm (mean = 14.7).  
a. ♂. LTP. Colorado, Larimer County, July 1891, W. G. Smith, BMNH.  
b. ♀. Colorado, Adams County, Bennett, 15–16 September 2007, C. Harp, DJW.  
c. ♂. California, Lassen County, Turtle Mountain, 23 August 2008, L. L. Crabtree, DJW.  
d. ♂. Utah, San Juan County, Valley of the Gods, 19 September 2000, G. J. Balogh, DJW.  
e. ♂. Wyoming, Natrona County, Alcova, 14 August 1965, D. F. Hardwick, CNC.
76. *Pelochrista subinvicta* (Kearfott). FWL: 10.2–15.9 mm (mean = 13.6).  
a. ♀. HTP. Arizona, Coconino County, Williams, AMNH.  
b. ♀. Arizona, Coconino County, Walnut Canyon, 30 July 1965, J. G. Franclemont, USNM.  
c. ♂. California, Riverside County, Rancho La Sierra, 24 July 1942, F. Rindge, AMNH.  
d. ♀. Data unknown.  
e. ♂. California, Lassen County, 1 mi NW of Turtle Mountain, 25 July 2009, L. L. Crabtree, DJW.
77. *Pelochrista snyderana* (Kearfott). FWL: 11.7–16.5 mm (mean = 14.0).  
a. ♂. HTP. Idaho, Bingham County, Blackfoot, 3 June, A. J. Snyder, AMNH.  
b. ♂. Wyoming, Albany County, T15N R73W S1, 10 June 2001, J. S. Nordin, DJW.  
c. ♂. Wyoming, Albany County, T15N S73W S1, 5 July 2003, C. D. Ferris, DJW.  
d. ♂. Wyoming, Albany County, T15N R73W S1, 7 July 2008, J. S. Nordin, DJW.  
e. ♂. Wyoming, Lincoln County, Opal, 24 June 1933, G. H. Sperry, CNC  
[HTP. *P. sperryana*].







## PLATE Z

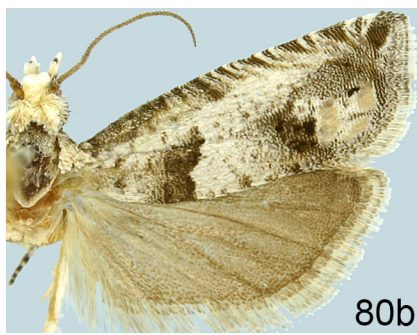
78. *Pelochrista canana* (Walsingham). FWL: 5.6–9.6 mm (mean = 7.4).
- a. ♂.LTP. California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, BMNH.
  - b. ♂.LPTP. California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, BMNH.
  - c. ♂.Utah, Utah County, Provo, 11 August 1908, T. Spalding, USNM [HTP. *P. expolitana*].
  - d. ♂.California, Siskiyou County, Shasta Retreat, 24–30 June, USNM [HTP. *P. metariana*].
  - e. ♂.California, Siskiyou County, Shasta Retreat, 16–23 June, USNM [PTP. *P. metariana*].
  - f. ♂.California, Siskiyou County, Shasta Retreat, 24–30 June, AMNH [PTP. *P. metariana*].
  - g. ♂.Idaho, Oneida County, T14S R37E S32, 27 July 2003, D. J. Wright, DJW.
  - h. ♂.Idaho, Oneida County, Holbrook Summit, 17 July 2006, D. J. Wright, DJW.
  - i. ♂.Wyoming, Albany County, 12 mi SE of Laramie, 14 July 2001, D. J. Wright, DJW.
  - j. ♀.New Mexico, Cibola County, Coal Mine Canyon Campground, 9 August 2005, D. J. Wright, DJW.
  - k. ♂.Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, DJW.
  - l. ♀.Arizona, Santa Cruz County, 2 mi W of Fort Huachuca, 6 August 1999, D. J. Wright, DJW.
79. *Pelochrista artesiana* Wright and Gilligan. FWL: 8.3–11.2 mm (mean = 9.4).
- a. ♀.HTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, USNM.
  - b. ♂.PTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, USNM.
  - c. ♂.PTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, USNM.





## PLATE AA

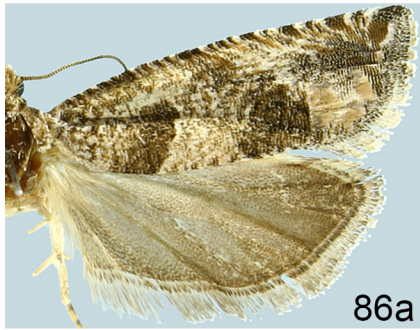
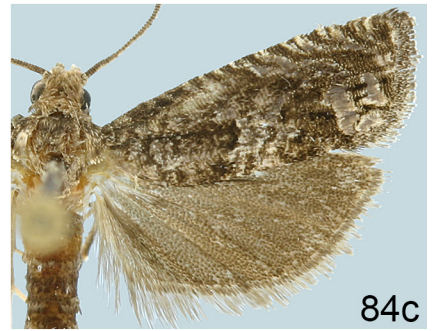
80. *Pelochrista erema* Wright and Gilligan. FWL: 5.0–8.4 mm (mean = 7.0).
- a. ♂.HTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, USNM.
  - b. ♂.PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, DJW.
  - c. ♀.PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, DJW.
  - d. ♀.PTP. Arizona, Santa Rita Mountains, Madera Canyon, 1 August 1959, R. W. Hodges, USNM.
  - e. ♂.PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, USNM.
81. *Pelochrista rorana* (Kearfott). FWL: 7.0–9.2 mm (mean = 8.0).
- a. ♂.LTP. Utah, Tooele County, Stockton, T. Spalding, USNM.
  - b. ♂.Idaho, Oneida County, Holbrook Summit, 15 July 2006, D. J. Wright, DJW.
  - c. ♀.Washington, Whitman County, Almota, 29 June 1934, J. F. G. Clarke, USNM.
  - d. ♂.Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, DJW.
  - e. ♀.New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, DJW.
82. *Pelochrista vandana* (Kearfott). FWL: 5.7–9.2 mm (mean = 7.7).
- a. ♂.Florida, Putnam County, Palatka, 21 November 1991, H. D. Baggett, DJW.
  - b. ♀.Florida, Putnam County, Palatka, 7 September 1990, H. D. Baggett, MEM.
  - c. ♂.Florida, Manatee County, Oneco, 31 March 1955, J. G. Franclemont, USNM.
  - d. ♂.Nebraska, Cherry County, Valentine National Wildlife Refuge, 21 June 1983, R. W. Hodges, USNM.
  - e. ♂.Nebraska, Cherry County, Valentine National Wildlife Refuge, 28 June 1983, R. W. Hodges, USNM.





## PLATE BB

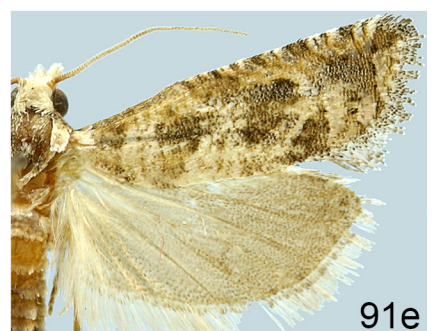
83. *Pelochrista passerana* (Walsingham). FWL: 6.1–7.8 mm (mean = 6.8).  
a. ♂.LTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
b. ♂.PLTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
c. ♂.Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, DJW.
84. *Pelochrista womonana* (Kearfott). FWL: 5.5–8.2 mm (mean = 6.8).  
a. ♂.Ohio, Adams County, 1 mi SE of Lynx, 5 July 2002, D. J. Wright, DJW.  
b. ♂.Ohio, Adams County, 1 mi SE of Lynx, 5 July 2002, D. J. Wright, DJW.  
c. ♂.Ohio, Adams County, 1 mi SE of Lynx, 2 July 2003, D. J. Wright, DJW.
85. *Pelochrista zomonana* (Kearfott). FWL: 4.9–6.8 mm (mean = 5.8).  
a. ♂.Ohio, Hamilton County, Cincinnati, 4 September 2007, D. J. Wright, DJW.  
b. ♂.Ohio, Greene County, Wright-Patterson Air Force Base, 6 September 1992, E. H. Metzler, DJW.  
c. ♀.Kentucky, Gallatin County, Markland Dam, 2 June 1989, D. J. Wright, DJW.
86. *Pelochrista olivacea* Wright and Gilligan. FWL: 6.7–9.2 mm (mean = 8.0).  
a. ♀.HTP. Arizona, Cochise County, 3 mi up Paradise Road, 20 August 2011, B. Walsh, USNM.  
b. ♂.PTP. Arizona, Cochise County, Southwest Research Station, 11 August 2012, J. W. Brown, USNM.  
c. ♀.PTP. New Mexico, Lincoln County, Valley of Fires Recreation Area, 17 August 2005, D. J. Wright, DJW.
87. *Pelochrista flava* Wright and Gilligan. FWL: 6.2–7.9 mm (mean = 6.8).  
a. ♂.HTP. New Mexico, Sierra County, Highway 195 near I-25 exit 83, 15 October 2001, G. J. Balogh, USNM.  
b. ♂.PTP. New Mexico, Otero County, White Sands National Monument, 25 August 2009, E. H. Metzler, EHM.  
c. ♀.PTP. New Mexico, Lincoln County, Valley of Fires Recreational Area, 17 August 2005, D. J. Wright, DJW.





## PLATE CC

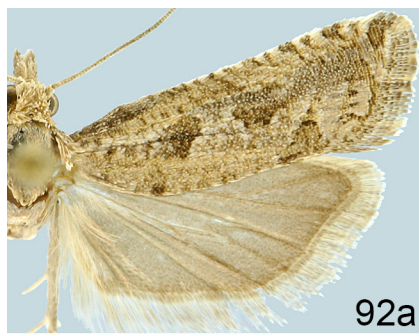
88. *Pelochrista emaciatana* (Walsingham). FWL: 7.9–13.4 mm (mean = 10.8).  
a. ♂. Arizona, Santa Cruz County, Santa Rita Mountains, Madera Canyon, 21 April 1963, J. G. Franclemont, USNM.  
b. ♂. Arizona, Cochise County, Chiricahua Mountains, Cave Run Canyon, 26 April 1966, J. G. Franclemont, USNM.  
c. ♀. Arizona, Cochise County, Huachuca Mountains, Pueblo Del Sol, 24 May 1986, R. S. Wielgus, USNM.
89. *Pelochrista popana* (Kearfott). FWL: 6.7–9.8 mm (mean = 7.9).  
a. ♂. Colorado, Chaffee County, 8 mi E of Buena Vista, 4 July 1982, R. W. Hodges, USNM.  
b. ♂. Colorado, Mesa County, Grand Mesa National Forest, 30 July 2003, D. J. Wright, DJW.  
c. ♀. Colorado, Mesa County, Grand Mesa National Forest, 30 July 2003, D. J. Wright, DJW.
90. *Pelochrista powelli* Wright. FWL: 7.1–10.5 mm (mean = 8.9).  
a. ♂. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.  
b. ♂. PTP. Utah, Daggett County, 4 mi S of Manila, 20 July 1994, G. J. Balogh, DJW.  
c. ♀. PTP. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, DJW.  
d. ♀. PTP. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, DJW.
91. *Pelochrista reversana* (Kearfott). FWL: 7.7–10.9 mm (mean = 9.0).  
a. ♂. Texas, Jim Wells County, Alice, 19 October 1970, A. and M. E. Blanchard, USNM.  
b. ♂. Texas, Kimble County, Junction, 26 August 1973, A. and M. E. Blanchard, USNM.  
c. ♂. Texas, Kimble County, Junction, 24 August 1973, A. and M. E. Blanchard, USNM.  
d. ♀. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, DJW.  
e. ♂. Texas, Kimble County, Junction, 26 August 1973, A. and M. E. Blanchard, USNM.





## PLATE DD

92. *Pelochrista ainsliei* Wright. FWL: 6.4–9.3 mm (mean = 7.8).  
a. ♂.PTP. Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, DJW.  
b. ♂.PTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997,  
D. J. Wright, DJW.  
c. ♀.Colorado, Weld County, Pawnee National Grassland, 28 June 2010, D. J. Wright, DJW.  
d. ♀.PTP. Colorado, Otero County, Comanche National Grassland, 27 August 2000,  
D. J. Wright, DJW.
93. *Pelochrista kingi* Wright. FWL: 7.9–10.0 mm (mean = 8.8).  
a. ♂.HTP. Canada, Saskatchewan, Saskatoon, 26 July 1923, K. M. King, CNC.  
b. ♂.PTP. Canada, Alberta, Jasper, 24 July 1926, J. McDunnough, CNC.  
c. ♂.PTP. Wyoming, Albany County, T15N R73W S1, 1 August, 2006, J. S. Nordin, DJW.  
d. ♂.PTP. Canada, Alberta, Nordegg, 22 July 1933, K. Bowman, UASM.  
e. ♂.Utah, Sanpete County, head of Ephraim Canyon, 28 July 1981, R. W. Hodges, USNM.
94. *Pelochrista blanchardi* (Wright). FWL: 5.2–8.2 mm (mean = 6.7).  
a. ♂.PTP. New Mexico, Otero County, Dog Canyon Road, 14 September 2004, G. J. Balogh,  
DJW.  
b. ♂.PTP. New Mexico, Otero County, Dog Canyon Road, 14 September 2004, G. J. Balogh,  
DJW.  
c. ♀.New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999,  
D. J. Wright, DJW.  
d. ♀.New Mexico, Lincoln County, Valley of Fires Recreational Area, 17 August 2005,  
D. J. Wright, DJW.
95. *Pelochrista johnstoni* (Wright). FWL: 6.4–8.7 mm (mean = 7.6).  
a. ♂.HTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, J. A. Powell, EME.  
b. ♂.PTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, J. A. Powell, EME.





## PLATE EE

96. *Pelochrista ragonoti* (Walsingham). FWL: 7.9–11.8 mm (mean = 10.1).
- a. ♂. Wyoming, Albany County, Fox Creek, NW of Woods Landing, 31 July 2007, J. S. Nordin, DJW.
  - b. ♀. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, DJW.
  - c. ♂. Utah, Sanpete County, Head of Ephraim Canyon, 28 July 1981, R. W. Hodges, USNM.
  - d. ♀. Colorado, Chaffee County, 2.5 mi ESE of Buena Vista, 23 August 1997, D. J. Wright, DJW.
  - e. ♀. North Dakota, Slope County, Columnar Juniper Area, 3 September 2002, G. J. Balogh, DJW.
  - f. ♂. Colorado, Garfield County, Glenwood Springs, August 1892, W. Barnes, USNM [PLTP. *P. ragonoti barnesiana*].
97. *Pelochrista kandana* (Kearfott). FWL: 6.2–10.9 mm (mean = 8.5).
- a. ♂. Idaho, Oneida County, Curlew National Grassland, 1 August 2001, D. J. Wright, DJW.
  - b. ♂. Colorado, Weld County, Pawnee National Grassland, 28 June, 2010, D. J. Wright, DJW.
  - c. ♂. Colorado, Weld County, Pawnee National Grassland, 28 June, 2010, D. J. Wright, DJW.
  - d. ♂. Kansas, Morton County, 7.5 mi N of Elkhart, 2 August 1999, D. J. Wright, DJW.
  - e. ♀. Kansas, Morton County, 6 mi N of Wilburton, 1 August 1999, D. J. Wright, DJW.
  - f. ♀. New Mexico, Santa Fe County, Jaconita, 15 August 2005, D. J. Wright, DJW.
98. *Pelochrista nandana* (Kearfott). FWL: 9.0–14.8 mm (mean = 12.8).
- a. ♂. Illinois, Will County, Grant Creek, 30 August 2003, R. Panzer, DJW.
  - b. ♂. Illinois, Will County, Grant Creek, 30 August 2003, R. Panzer, DJW.
  - c. ♀. Illinois, Putnam County, 20 September 1938, M. O. Glen, INHS.



96a



96b



96c



96d



96e



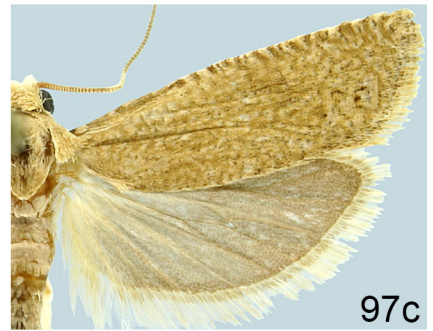
96f



97a



97b



97c



97d



97e



97f



98a



98b



98c



## PLATE FF

99. *Pelochrista corosana* (Walsingham). FWL: 6.3–10.6 mm (mean = 8.9).
- a. ♂. HTP. Montana, Yellowstone River, 1880, H. K. Morrison, BMNH.
  - b. ♂. Utah, Juab County, Callao, 17 June 1922, USNM [HTP. *P. nuntia*].
  - c. ♂. Kansas, Gove County, Monument Rocks, 24 September 1999, G. J. Balogh, DJW.
  - d. ♂. California, Lassen County, 4 mi E of Bieber, 26 August 2010, L. L. Crabtree, DJW.
  - e. ♂. Nevada, Douglas County, Walley's Hot Springs, 4 July 1993, J. A. Powell, DJW.
  - f. ♂. Colorado, Larimer County, Fort Collins, Fossil Creek, 2 August 1988, P. A. Opler, EME.
  - g. ♂. Nevada, Nye County, 25 mi N of Carvers, 2 June 2012, L. L. Crabtree, DJW.
  - h. ♂. Wyoming, Sweetwater County, 19.6 mi E of Rock Springs, 15 July 1980, DJW.
  - i. ♂. Colorado, Grand County, Beaver Creek, 11 August 1996, D. J. Wright, DJW.
  - j. ♂. Colorado, Weld County, County Road 91, 7 August 1996, D. J. Wright, DJW.
  - k. ♂. Colorado, Weld County, County Road 91, 7 August 1996, D. J. Wright, DJW.
  - l. ♂. Kansas, Morton County, Cimarron River and Highway 51, 25 September 1999, G. J. Balogh, DJW.
  - m. ♂. Arizona, Santa Cruz County, Peña Blanca Canyon, 9 September 1959, R. W. Hodges, USNM.
  - n. ♂. New Mexico, Lincoln County, Valley of Fires Recreation Area, 17 August 2005, D. J. Wright, DJW.
  - o. ♂. New Mexico, Coconino County, Fort Valley, 25 July 1961, R. W. Hodges, USNM.



99a



99b



99c



99d



99e



99f



99g



99h



99i



99j



99k



99l



99m



99n



99o

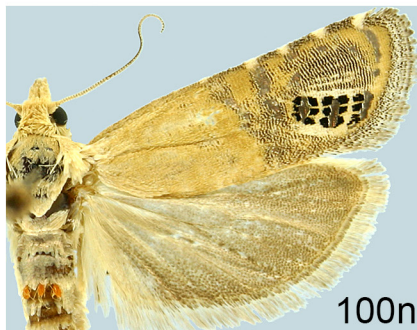
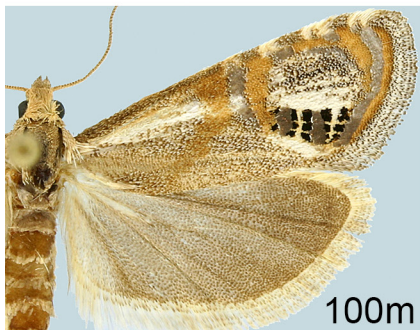
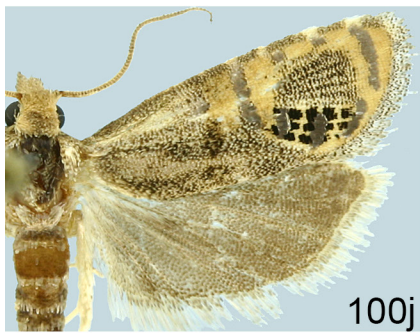
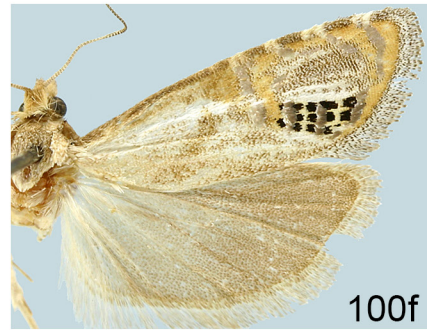
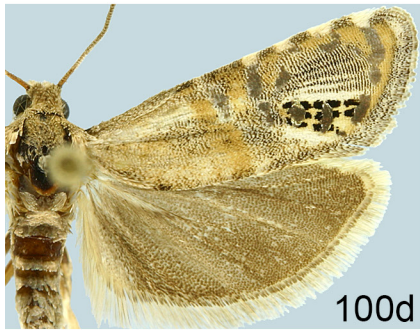
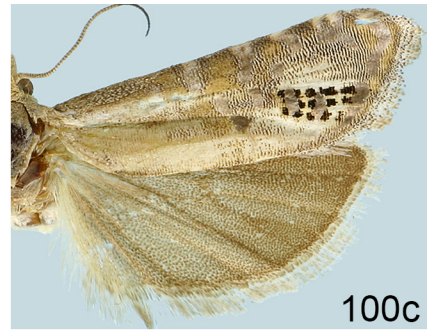


## PLATE GG

**100. *Pelochrista scintillana*** (Clemens). FWL: 5.6–14.5 mm (mean = 9.1).

- a. ♂. HTP. Type Number 7212, ANSP.
- b. ♂. Texas, L[ö]w 71, 24/5, BMNH [LTP. *P. dodecana*].
- c. ♂. Colorado, Denver, E. J. Oslar, AMNH [LTP. *E. randana*].
- d. ♂. Iowa, Pocahontas County, Kalsow Prairie, 22 June 2000, D. J. Wright, DJW.
- e. ♂. New Mexico, Dona Anna County, Aquirre Springs Campground, 14 April 2005, G. J. Balogh, DJW.
- f. ♂. Arizona, Coconino County, Fort Valley, 16 June 1964, J. G. Franclemont, USNM.
- g. ♂. Nebraska, Cherry County, Valentine National Wildlife Refuge, 9 June 1983, R. W. Hodges, USNM.
- h. ♀. Nebraska, Cherry County, Valentine National Wildlife Refuge, 9 June 1983, R. W. Hodges, USNM.
- i. ♂. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, DJW.
- j. ♂. Kentucky, McCracken County, Paducah Zip Track, 12 August 2008, D. J. Wright, DJW.
- k. ♂. Ohio, Erie County, Resthaven Wildlife Area, 20 July 1990, D. J. Wright, DJW.
- l. ♂. Iowa, Pocahontas County, Kalsow Prairie, 22 June 2000, D. J. Wright, DJW.
- m. ♂. Nevada, Lander County, 5 mi NW of Kingston, 5 July 2005, L. L. Crabtree, DJW.
- n. ♀. Colorado, Weld County, 2 mi E of Roggen, 26 July 2013, D. J. Wright, DJW.
- o. ♀. New Mexico, Coconino County, Walnut Canyon, 13 August 1965, J. G. Franclemont, USNM.

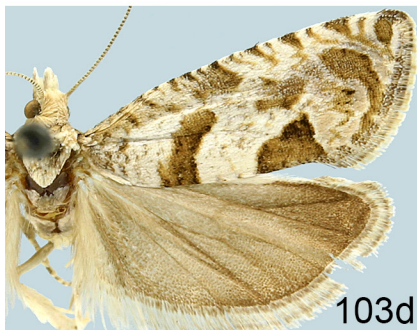
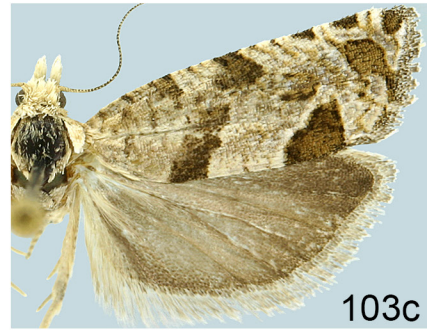
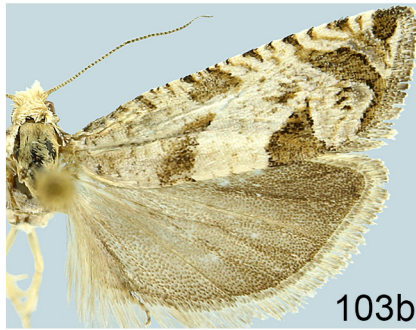
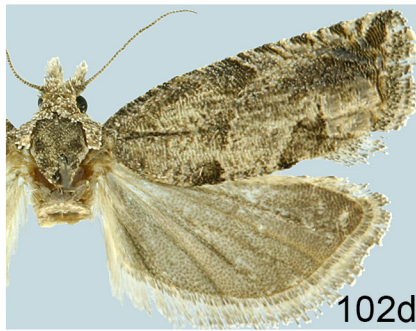
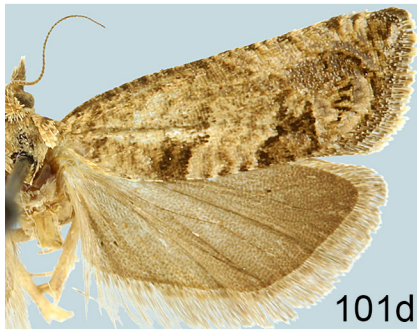




## PLATE HH

- 101. *Pelochrista pulveratana*** (Walsingham). FWL: 5.3–10.0 mm (mean = 7.7).  
a. ♂.LTP. California, San Francisco, 16 May 1871, Walsingham, BMNH.  
b. ♂.California, Santa Cruz Island, 21–24 May 1984, D. L. Wagner, EME.  
c. ♂.California, San Bernardino County, Loma Linda, 8–15 June, USNM.  
d. ♀.Arizona, White Mountains, 1–15 August 1925, O. C. Poling, USNM.
- 102. *Pelochrista consobrinana*** (Heinrich). FWL: 5.3–7.7 mm (mean = 6.4).  
a. ♂.HTP. South Dakota, Union County, Elk Point, August 1913, C. N. Ainslie, USNM.  
b. ♂.Iowa, Monona County, Loess Hills State Park, 1 August 1995, D. J. Wright, DJW.  
c. ♀.Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, DJW.  
d. ♀.Colorado, Cheyenne County, Kit Carson, 11 August 2009, T. M. Gilligan, DJW.  
e. ♂.Mississippi, Oktibbeha County, Osborn Prairie, 26 August 2003, D. J. Wright, DJW.
- 103. *Pelochrista suadana*** (Heinrich). FWL: 8.4–11.8 mm (mean = 10.0).  
a. ♂.HTP. Utah, Utah County, Vineyard, 10 July 1912, T. Spalding, USNM.  
b. ♂.Wyoming, Albany County, Fox Creek, 14 July 2002, J. S. Nordin, DJW.  
c. ♀.Wyoming, Albany County, Gelatt Lake, 21 July 2004, J. S. Nordin, DJW.  
d. ♂.Wyoming, Sublette County, Green River Lake, 30 July 1935, A. B. Klots, AMNH.
- 104. *Pelochrista seamansi*** (Wright). FWL: 7.2–9.0 mm (mean = 8.0).  
a. ♂.HTP. Canada, Alberta, Lethbridge, 13 July 1928, H. L. Seamans, CNC.  
b. ♂.PTP. Iowa, Pocahontas County, Kalsow Prairie, 18 June 1992, D. J. Wright, DJW.







## PLATE II

- 105. *Pelochrista coconana*** (Wright). FWL: 8.5–11.1 mm (mean = 10.1).  
a. ♂.HTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 22 July 1964, J. G. Franclemont, USNM.  
b. ♂.PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 13 July 1964, J. G. Franclemont, USNM.  
c. ♂.PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 21 June 1961, R. W. Hodges, USNM.
- 106. *Pelochrista sepiana*** (Wright). FWL: 9.0–10.9 mm (mean = 9.8).  
a. ♂.HTP. Utah, Juab County, Eureka, 16 August 1911, T. Spalding, USNM.  
b. ♂.PTP. Idaho, Bear Lake County, 2 mi E of Danish Flat, 17 August 2004, T. M. Gilligan, TMG.  
c. ♂.Nevada, Elko County, 9 mi SSE Lamoille, 5 July 1966, F. Rindge, AMNH.
- 107. *Pelochrista parapolveratana*** (Wright). FWL: 6.5–10.5 mm (mean = 8.7).  
a. ♂.HTP. Kansas, Morton County, Cimarron River and Highway 51, 25 September 1999, G. J. Balogh, USNM.  
b. ♂.PTP. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, DJW.  
c. ♀.PTP. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, DJW.  
d. ♂.Wyoming, Albany County, Gelatt Lake, 21 July 2004, J. S. Nordin, DJW.  
e. ♂.Texas, Hemphill County, Canadian, 2 June 1970, A. and M. E. Blanchard, USNM.  
f. ♂.PTP. Wyoming, Albany County, T15N R73W S1, 30 July 2001, J. S. Nordin, DJW.
- 108. *Pelochrista floridensis*** (Wright). FWL: 7.0–8.6 mm (mean = 7.9).  
a. ♂.HTP. Florida, Highlands County, Archbold Biological Station, 17 February 1985, D. C. Ferguson, USNM.  
b. ♂.PTP. Florida, Highlands County, Archbold Biological Station, 17 February 1985, D. C. Ferguson, USNM.  
c. ♀.PTP. Florida, Highlands County, Highlands Hammock State Park, 15 November 1987, G. J. Balogh, DJW.



105a



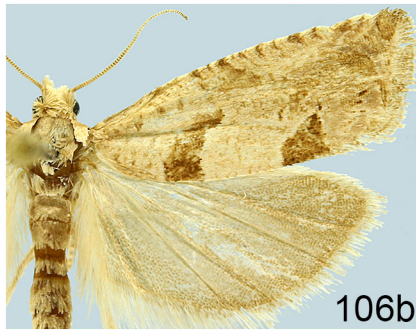
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105c



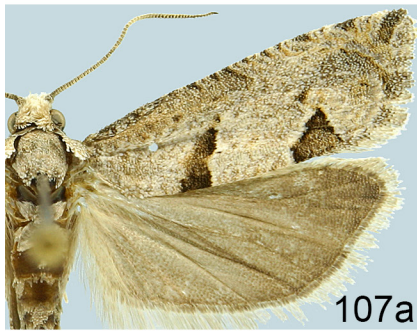
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106b



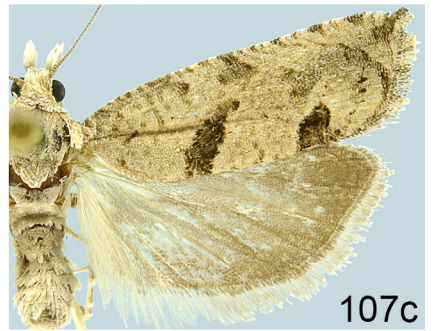
106c



107a



107b



107c



107d



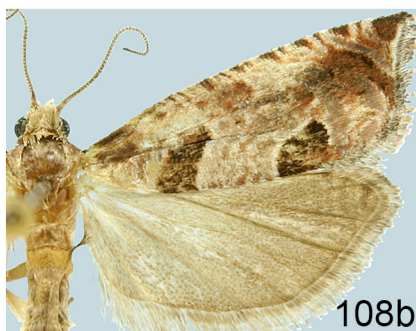
107e



107f



108a



108b



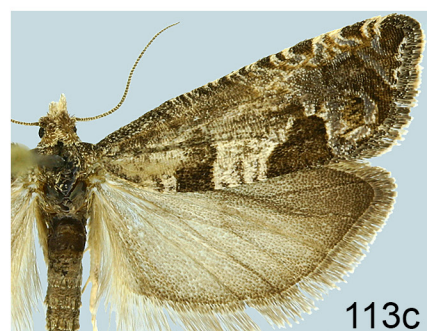
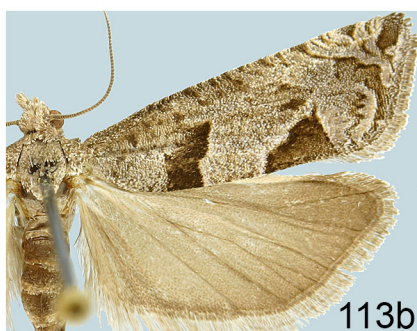
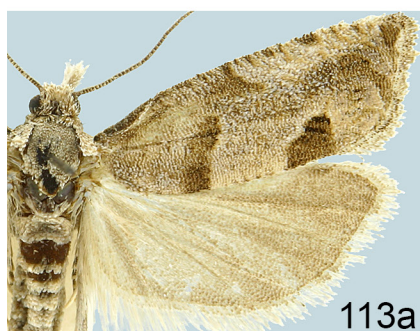
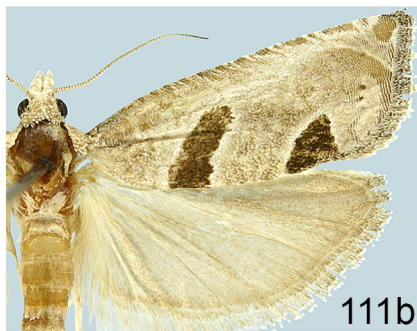
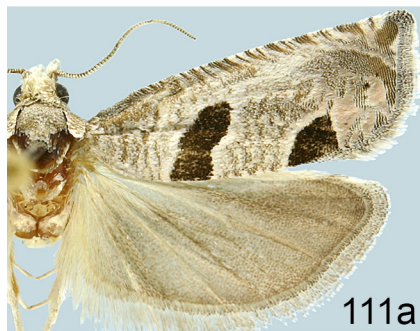
108c



## PLATE JJ

- 109. *Pelochrista navajoensis*** (Wright). FWL: 10.9–12.6 mm (mean = 11.7).  
a. ♂.HTP. Utah, San Juan County, Comb Ridge, 26 September 2003, G. J. Balogh, USNM.  
b. ♂.PTP. Utah, San Juan County, Comb Ridge, 26 September 2003, G. J. Balogh, USNM.  
c. ♀.PTP. Utah, San Juan County, Comb Ridge, 27 September 2003, G. J. Balogh, DJW.
- 110. *Pelochrista costastriata*** (Wright). FWL: 6.6–9.1 mm (mean = 7.9).  
a. ♂.HTP. Nebraska, Cherry County, Valentine National Wildlife Refuge, 10 June 1983, R. W. Hodges, USNM.  
b. ♂.PTP. Michigan, Allegan County, T2N R15W S1, 25 July 1992, G. J. Balogh, DJW.  
c. ♀.PTP. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, DJW.
- 111. *Pelochrista mirosignata*** (Heinrich). FWL: 7.5–11.6 mm (mean = 9.8).  
a. ♂.Texas, Jeff Davis County, Fort Davis, 20 September 2004, G. J. Balogh, DJW.  
b. ♂.Arizona, Santa Cruz, Aqua Caliente Canyon, 27 March 2006, G. J. Balogh, DJW.  
c. ♂.New Mexico, Eddy County, Dark Canyon Road, 13 April 2005, G. J. Balogh, DJW.
- 112. *Pelochrista mojaveana*** (Wright). FWL: 8.1–10.4 mm (mean = 8.9).  
a. ♀.HTP. California, San Bernardino County, 23 mi SW of Baker, 23 April 1977, Kitayama, Cave, and Chemsak, EME.  
b. ♀.PTP. California, San Bernardino County, 10 mi N of Earp, 22 April 1960, J. F. Lawrence, EME.  
c. ♂.PTP. California, Riverside County, Palm Springs, 19 April 1950, E. C. Johnson, CNC.
- 113. *Pelochrista pulveratana* group.**  
a. ♂.California, Ventura County, mouth of Ventura River, 24 April 1966, A. J. Slater, DJW.  
b. ♂.Colorado, Teller County, 5 mi S of Florissant, 15 July 1982, G. J. Balogh, DJW.  
c. ♂.Wyoming, Albany County, W side of Gelatt Lake, 2 July 2011, J. S. Nordin, DJW.





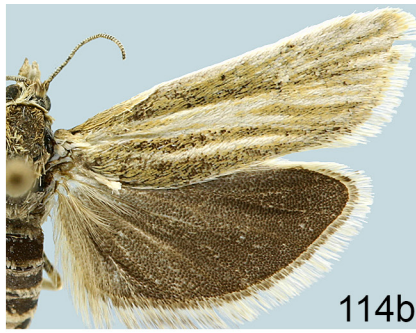
## PLATE KK

- 114. *Pelochrista mediotriata*** (Walsingham). FWL: 6.1–13.1 mm (mean = 10.2).
- a. ♂. Colorado, Larimer County, Viestenz-Smith Mountain Park, 22 May 1996, P. A. Opler, DJW.
  - b. ♂. Colorado, Otero Canyon, Comanche National Grassland, Picketwire Canyon, 12 May 2006, C. Harp, CEH.
  - c. ♂. Washington, Asotin County, 1.5 mi S of Anatone, 22 June 1970, J. F. G. Clarke, USNM.
  - d. ♂. Wyoming, Albany County, W side of Gelatt Lake, 20 June 2005, J. S. Nordin, DJW.
  - e. ♂. Utah, Sanpete Canyon, Ephraim Canyon Road, 18 July 2006, D. J. Wright, DJW.
  - f. ♂. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, DJW.
- 115. *Pelochrista palpana*** (Walsingham). FWL: 6.3–7.6 mm (mean = 6.9).
- a. ♂. LTP. California, Shasta County, Pit River, 21–26 July 1871, Walsingham, BMNH.
  - b. ♂. California, Siskiyou County, 1 mi SE of Bartle, 11 June 1974, J. A. Powell, EME.
  - c. ♂. California, USNM [FERNALD collection].
  - d. ♀. Oregon, Jefferson County, Crooked River National Grassland, 23 July 2001, D. J. Wright, DJW.
- 116. *Pelochrista gilligani*** Wright. FWL: 6.1–9.0 mm (mean = 7.4).
- a. ♂. HTP. Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, T. M. and J. M. Gilligan, USNM.
  - b. ♂. Washington, Yakima County, Ahtanum State Forest, 7 July 2020, J. Vargo, DJW.
  - c. ♂. California, Lassen County, 7 mi E of Bieber, 2 August 2010, L. L. Crabtree, DJW.
  - d. ♂. California, Lassen County, 1 mi NW of Turtle Mountain, 6 August 2011, L. L. Crabtree, DJW.
  - e. ♂. Nevada, Nye County, 25 mi N of Carvers, 11 June 2011, L. L. Crabtree, DJW.





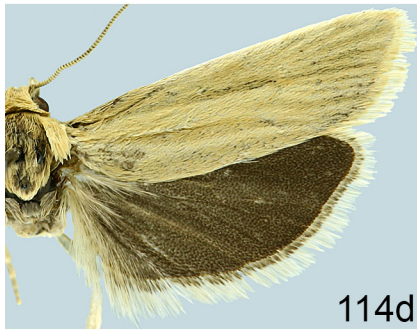
114a



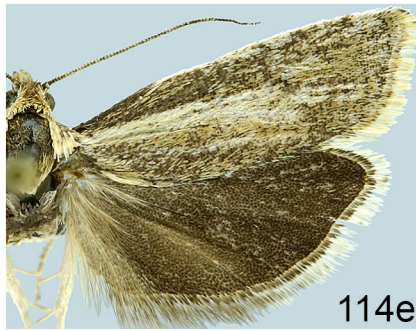
114b



114c



114d



114e



114f



115a



115b



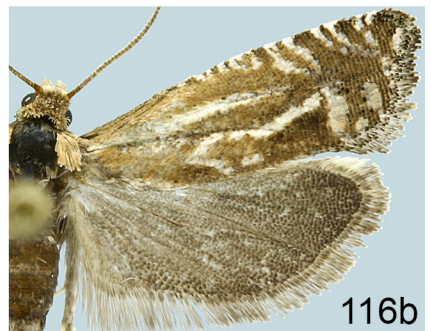
115c



115d



116a



116b



116c



116d

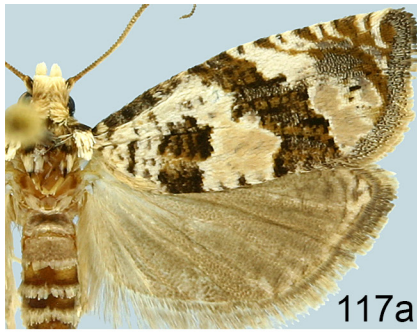


116e



## PLATE LL

- 117. *Pelochrista matutina*** (Grote). FWL: 5.7–10.2 mm (mean = 7.6).  
a. ♂. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, DJW.  
b. ♂. Montana, Powder River County, T2S R47E S33, 12 August 2004, D. J. Wright, DJW.  
c. ♀. Kansas, Morton County, 7.5 mi N of Elkhart, 25 August 2000, D. J. Wright, DJW.  
d. ♀. Kansas, Morton County, 7.5 mi N of Elkhart, 25 August 2000, D. J. Wright, DJW.  
e. ♂. Kentucky, Bullitt County, Pine Creek Forest Road, 22 July 1989, D. J. Wright, DJW.
- 118. *Pelochrista fiskeana*** (Kearfott). FWL: 7.0–13.5 mm (mean = 9.5).  
a. ♂. LTP. North Carolina, Polk County, Tryon, 2 August 1903, W. F. Fiske, AMNH.  
b. ♂. Ohio, Adams County, 1 mi SE of Lynx, 3 August 1998, D. J. Wright, DJW.  
c. ♂. Ohio, Adams County, 1 mi SE of Lynx, 5 July 2002, D. J. Wright, DJW.  
d. ♂. Ohio, Adams County, 1 mi SE of Lynx, 1 August 1997, D. J. Wright, DJW.  
e. ♀. Texas, Kerr County, Kerrville, AMNH [LTP. *P. pandana*].
- 119. *Pelochrista symbolaspis*** (Meyrick). FWL: 6.3–7.2 mm (mean = 6.8).  
♂. PLTP. Texas, Brewster County, May 1926, BMNH.
- 120. *Pelochrista sullivan*** Wright. FWL: 4.9–6.5 mm (mean = 5.9).  
a. ♂. HTP. North Carolina, Carteret County, Millis Road Savanna, 24 August 1993, J. B. Sullivan, USNM.  
b. ♂. PTP. North Carolina, Carteret County, Millis Road Savanna, 24 August 1993, J. B. Sullivan, USNM.
- 121. *Pelochrista lynxana*** Wright. FWL: 5.4–6.7 mm (mean = 5.8).  
a. ♂. HTP. Ohio, Adams County, 1 mi SE of Lynx, 1 August 1997, D. J. Wright, USNM.  
b. ♂. PTP. Mississippi, Chickasaw County, Tombigbee National Forest, 4 September 2005, R. L. Brown and J. G. Hill, MEM.

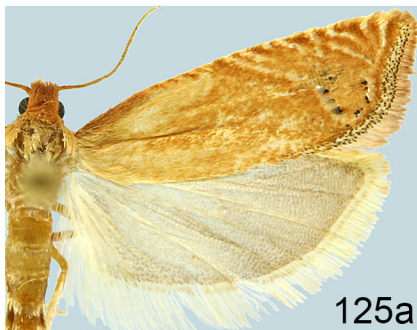
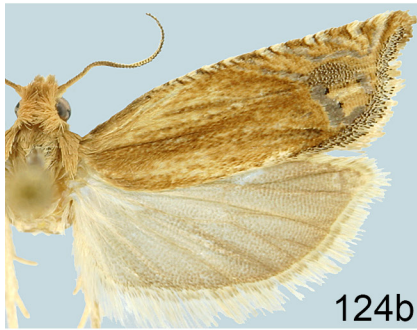




## PLATE MM

- 122. *Pelochrista juncticiliana*** (Walsingham). FWL: 6.9–10.3 mm (mean = 8.5).  
a. ♂. USNM [Fernald Collection].  
b. ♂. California, Lake Tahoe, Deer Park Springs, USNM [PTP. *P. excusabilis*].  
c. ♀. California, Tuolumne County, Twain Harte, 20 July 1961, M. Lundgren, EME.  
d. ♂. California, Marin County, Point Reyes National Seashore, 4 June 1977, J. A. Powell, EME.
- 123. *Pelochrista derelicta*** (Heinrich). FWL: 5.3–8.2 mm (mean = 6.7).  
a. ♂. Ohio, Adams County, 1 mi SE of Lynx, 12 August 1998, D. J. Wright, DJW.  
b. ♂. Ohio, Adams County, 1 mi SE of Lynx, 3 August 1998, D. J. Wright, DJW.  
c. ♂. Montana, Sweet Grass County, 7.75 mi N of Big Timber, 6 August, 1969, J. G. Franclemont, USNM.  
d. ♂. California, Humboldt County, coast near Crescent City, 23 August 1973, R. H. Leuschner, EME.
- 124. *Pelochrista cataclystiana*** (Walker). FWL: 6.6–9.2 mm (mean = 8.0).  
a. ♂. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, DJW.  
b. ♂. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, DJW.  
c. ♂. Canada, Nova Scotia, Queens, Lake Kejimikujik, 13 July 1961, D. C. Ferguson, USNM.  
d. ♂. Colorado, Larimer County, 2 mi W of Mishawaka, 9 July 1993, D. J. Wright, DJW.
- 125. *Pelochrista conspiciendana*** (Heinrich). FWL: 6.0–10.0 mm (mean = 8.3).  
a. ♂. Utah, Sanpete County, Ephraim State Wildlife Management Area, 19 July 2006, D. J. Wright, DJW.  
b. ♂. Wyoming, Albany County, Gelatt Lake, 29 June 2006, J. S. Nordin, DJW.  
c. ♂. California, Monterey County, Paloma Creek, 6 June 1975, J. A. Powell, DJW.





## PLATE NN

- 126. *Pelochrista grandiflavana*** (Walsingham). FWL: 14.2–15.6 mm (mean = 15.1).  
a. ♂.LTP. California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, BMNH.  
b. ♂.California, Lake Tahoe, Deer Park Springs, 24–30 June, USNM.  
c. ♀.Fernald Collection, USNM.
- 127. *Pelochrista subflavana*** (Walsingham). FWL: 10.3–16.5 mm (mean = 13.9).  
a. ♂.LTP. Oregon, Josephine County, Rouge River, 7 May 1872, Walsingham, BMNH.  
b. ♂.California, Lassen County, 7 mi E of Bieber, 29 August 2009, L. L. Crabtree, DJW.  
c. ♂.Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, DJW.  
d. ♂.California, Lassen County, 8 mi E of Adin, 17 September 2011, L. L. Crabtree, DJW.  
e. ♂.California, Lassen County, 7 mi E of Bieber, 21 July 2013, L. L. Crabtree, DJW.
- 128. *Pelochrista consociana*** (Heinrich). FWL: 8.5–10.5 mm (mean = 10.0).  
a. ♂.HTP. Utah, Juab County, Eureka, 29 July 1911, T. Spalding, USNM.  
b. ♂.California, Lassen County, 9 mi E of Adin, 30 July 2005, L. L. Crabtree, DJW.  
c. ♂.California, Lassen County, 8 mi E of Adin, 30 July 2005, L. L. Crabtree, DJW.
- 129. *Pelochrista murina*** Wright and Gilligan. FWL: 10.7–12.5 mm (mean = 11.6).  
♂.HTP. California, Lassen County, 7 mi E of Bieber, 2 August 2010, L. L. Crabtree, USNM.
- 130. *Pelochrista irroratana*** (Walsingham). FWL: 9.2–13.7 mm (mean = 11.4).  
a. ♂.LTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
b. ♂.California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
c. ♂.California, Shasta County, Burney Falls, 18–20 July 1871, Walsingham, BMNH [LTP. *P. perdricana*].





126a



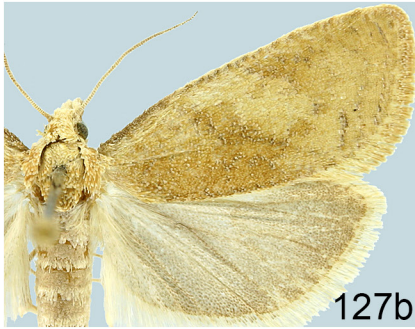
126b



126c



127a



127b



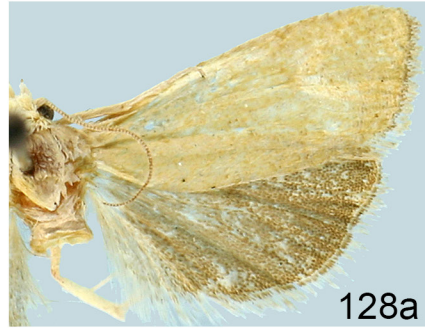
127c



127d



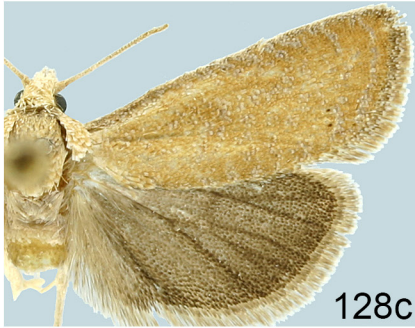
127e



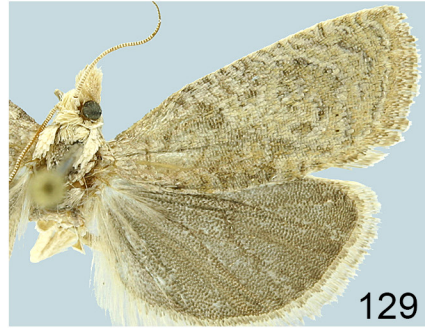
128a



128b



128c



129



130a



130b



130c



## PLATE OO

- 131. *Pelochrista bandana*** (Kearfott). FWL: 10.0–14.2 mm (mean = 11.7).  
a. ♂.LTP. Utah, Tooele County, Stockton, T. Spalding, AMNH.  
b. ♂.Utah, Tooele County, Stockton, 30 July 1913, T. Spalding, USNM.  
c. ♂.PLTP. Utah, Tooele County, Stockton, T. Spalding, USNM.
- 132. *Pelochrista aurantiaca*** Wright and Gilligan. FWL: 10.0–13.0 mm (mean = 11.7).  
a. ♂.HTP. California, Lassen County, Turtle Mountain, 23 August 2008, L. L. Crabtree, USNM.  
b. ♂.PTP. California, Lassen County, Turtle Mountain, 23 August 2008, L. L. Crabtree, USNM.  
c. ♂.PTP. California, Lassen County, 1 mi NW of Turtle Mountain, 25 July 2009, L. L. Crabtree, USNM.
- 133. *Pelochrista primulana*** (Walsingham). FWL: 6.8–11.0 mm (mean = 8.8).  
a. ♂.LTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
b. ♀.PLTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.  
c. ♀.PLTP. California, Mendocino County, head of Noyo River, 8–11 June 1871, Walsingham, BMNH.
- 134. *Pelochrista biplagata*** (Walsingham). FWL: 8.8–13.1 mm (mean = 11.7).  
a. ♀.Colorado, Grand County, Beaver Creek, 25 August 1997, D. J. Wright, DJW.  
b. ♂.Colorado, Larimer County, 8.5 mi W of Rustic, 13 August 1996, D. J. Wright, DJW.  
c. ♂.Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright DJW.
- 135. *Pelochrista hennei*** (Clarke). FWL: 7.9–12.0 mm (mean = 10.2).  
a. ♂.HTP. California, Los Angeles County, El Segundo Dunes, emerged 3 October 1940, C. Henne, USNM.  
b. ♀.PTP. California, Los Angeles County, El Segundo Dunes, emerged 17 September 1940, C. Henne, USNM.
- 136. *Pelochrista hasseanthi*** (Clarke). FWL: 9.4–11.7 mm (mean = 10.4).  
♂.HTP. California, Orange County, Orange, emerged 23 August 1936, T. W. Hower, USNM.



131a



131b



131c



132a



132b



132c



133a



133b



133c



134a



134b



134c



135a



135b

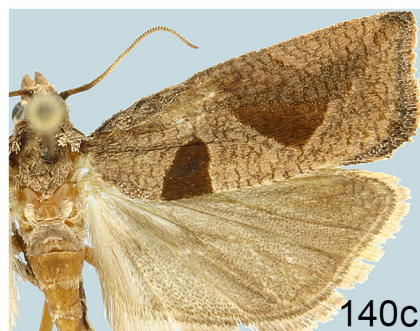
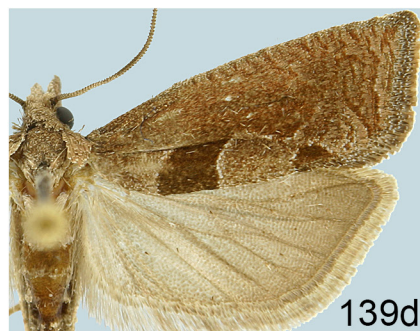
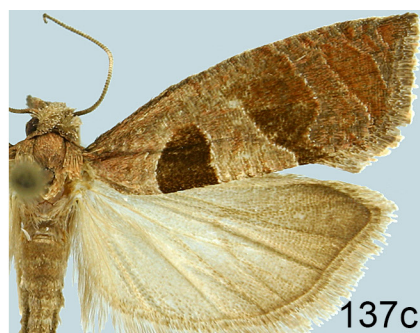


136

## PLATE PP

- 137. *Pelochrista dorsisignatana*** (Clemens). FWL: 7.1–11.5 mm (mean = 9.5).  
a. ♂. Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, DJW.  
b. ♀. New York, Tompkins County, Ithaca, 17 September 1957, J. G. Franclemont, USNM.  
c. ♂. Canada, Nova Scotia, Halifax, West Dover, 11 September 1961, D. C. Ferguson, USNM.  
d. ♂. Colorado, Larimer County, Stove Prairie Road, 9 August 2004, D. J. Wright, DJW.  
e. ♀. Colorado, Grand County, Beaver Creek, 25 August 1997, D. J. Wright, DJW.
- 138. *Pelochrista wagneri*** Wright and Gilligan. FWL: 6.4–10.0 mm (mean = 8.4).  
a. ♂. HTP. California, Plumas County, 2 mi E of Bucks Lake, 10 September 1983, D. L. Wagner, EME.  
b. ♀. PTP. California, Plumas County, 2 mi E of Bucks Lake, 10 September 1983, D. L. Wagner, EME.  
c. ♀. PTP. California, Plumas County, 8 mi E of Quincy, 10 September 1983, J. A. Powell, EME.
- 139. *Pelochrista similiana*** (Clemens). FWL: 6.6–11.2 mm (mean = 9.3).  
a. ♂. Pennsylvania, Susquehanna County, Dimock, 16 August 1988, D. F. B., USNM.  
b. ♀. Ohio, Hamilton County, Miami Whitewater Forest, 2 September 1988, D. J. Wright, DJW.  
c. ♀. Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, DJW.  
d. ♂. Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, DJW.
- 140. *Pelochrista oraria*** (Wright). FWL: 7.3–13.2 mm (mean = 10.8).  
a. ♂. HTP. Canada, Nova Scotia, Kings, Grand Pré, 28 August 1952, D. C. Ferguson, USNM.  
b. ♀. PTP. Virginia, Accomack County, Chincoteague, 23 September 1984, D. C. Ferguson, USNM.  
c. ♂. PTP. Maryland, Worcester County, Assateague Island, 7 October 1993, J. Glaser, USNM.





## PLATE QQ

- 141. *Pelochrista dilatana*** (Walsingham). FWL: 9.2–13.0 mm (mean = 11.7).  
a. ♂.HTP. Arizona, Morrison, BMNH.  
b. ♂.Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 24 April 1966, J. G. Franclemont, USNM.  
c. ♂.Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 2 September 1966, J. G. Franclemont, USNM.
- 142. *Pelochrista arizonae*** Wright and Gilligan. FWL: 11.4–12.6 mm (mean = 12.2).  
a. ♀.HTP. Arizona, Santa Cruz County, Santa Rita Mountains, Madera Canyon, 17 May 1963, J. G. Franclemont, USNM.  
b. ♀.PTP. Arizona, Santa Cruz County, Santa Rita Mountains, Madera Canyon, 27 May 1963, J. G. Franclemont, USNM.
- 143. *Pelochrista sierrae*** (Blanchard and Knudson). FWL: 9.6–11.9 mm (mean = 10.6).  
a. ♂.HTP. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 30 August 1970, J. G. Franclemont, USNM.  
b. ♂.PTP. Texas, Culberson County, Sierra Diablo Wildlife Management Area, 31 August 1970, A. and M. E. Blanchard, USNM.
- 144. *Pelochrista shastana*** (Walsingham). FWL: 12.8–14.3 mm (mean = 13.7).  
a. ♂.LTP. California, Siskiyou County, Mount Shasta, 2 August–1 September 1871, Walsingham, BMNH.  
b. ♂.California, USNM [Fernald Collection].
- 145. *Pelochrista notialis*** (Miller). FWL: 5.9–8.5 mm (mean = 7.3).  
a. ♂.Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.  
b. ♂.Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, DJW.  
c. ♂.Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, DJW.  
d. ♂.Colorado, Baca County, Picture Canyon Picnic Area, 6 August 2005, D. J. Wright, DJW.
- 146. *Pelochrista angelana*** (Wright). FWL: 11.3–12.7 mm (mean = 11.9).  
a. ♂.HTP. California, Los Angeles County, Mint Canyon, 15 October 1941, C. Henne, EME.  
b. ♂.PTP. California, Los Angeles County, 6 mi W of Lancaster, 2 October 1967, J. A. Powell, DJW.





141a



141b



141c



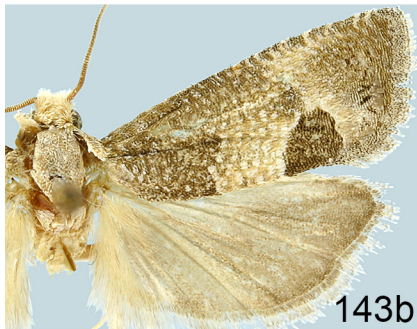
142a



142b



143a



143b



144a



144b



145a



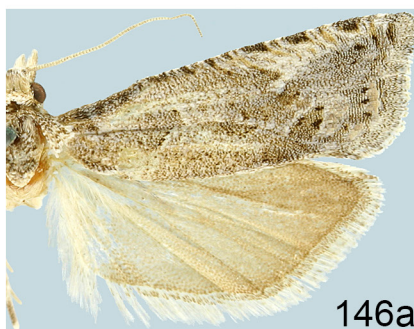
145b



145c



145d



146a

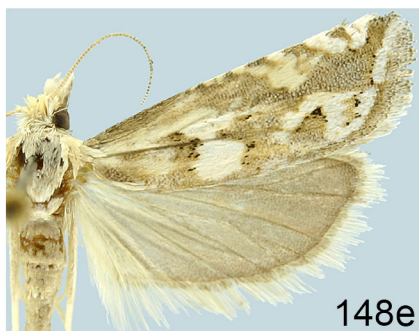


146b



## PLATE RR

- 147. *Pelochrista argenteana*** (Walsingham). FWL: 7.6–12.5 mm (mean = 9.7).
- a. ♂. Wyoming, Albany County, W side of Gelatt Lake, 19 July 2005, J. S. Nordin, DJW.
  - b. ♂. Colorado, Chaffee County, Castles, 8 mi E of Buena Vista, 11 July 1982, R. W. Hodges, USNM.
  - c. ♀. Montana, Custer County, 2.5 mi S of Miles City, 12 July 2010, D. J. Wright, DJW.
  - d. ♂. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.
  - e. ♂. Wyoming, Albany County, W side of Gelatt Lake, 6 July 2005, J. S. Nordin, DJW.
  - f. ♀. Montana, Custer County, 2.5 mi S of Miles City, 12 July 2010, D. J. Wright, DJW.
- 148. *Pelochrista serpentana*** (Walsingham). FWL: 7.1–10.8 mm (mean = 8.5).
- a. ♂. Colorado, Chaffee County, Castles, 8 mi E of Buena Vista, 8 July 1982, R. W. Hodges, USNM.
  - b. ♂. Colorado, Weld County, County Road 91, N of I-76, 26 July 1995, D. J. Wright, DJW.
  - c. ♂. Colorado, Chaffee County, 5 mi N of Buena Vista, 19 July 1982, R. W. Hodges, USNM.
  - d. ♂. Nevada, Humboldt County, Humboldt National Forest, Paradise Valley, 23 June 1974, J. F. G. Clarke, USNM.
  - e. ♂. Wyoming, Albany County, Fox Creek, NW of Woods Landing, 30 July 2006, J. S. Nordin, DJW.
  - f. ♂. Canada, Alberta, Nordegg, 23 June 1921, J. McDunnough, CNC [HTP. *P. ophioana*].
  - g. ♀. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.
  - h. ♂. Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, DJW.
  - i. ♂. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, DJW.



## PLATE SS

**149. *Pelochrista lolana*** (Kearfott). FWL: 7.1–10.9 mm (mean = 9.5).

- a. ♂. Wyoming, Albany County, N Fork of Sally Creek, 26 July 2008, J. S. Nordin, DJW.
- b. ♂. Idaho, Oneida County, 6.5 mi ENE of Holbrook, 10 July 2006, D. J. Wright, DJW.
- c. ♂. Idaho, Lemhi County, Lemhi Pass, 16 July 1978, J. F. G. Clarke, USNM.
- d. ♂. Washington, Ferry County, Columbia Mountain, 22 July 1962, J. F. G. Clarke, USNM.
- e. ♂. Washington, Ferry County, Columbia Mountain, 22 July 1962, J. F. G. Clarke, USNM.

**150. *Pelochrista hobana*** (Kearfott). FWL: 7.1–11.0 mm (mean = 9.0).

- a. ♂. PLTP. Canada, Alberta, Mount Piran, 17 August, USNM.
- b. ♂. Canada, Alberta, Banff, 20 July 1925, O. Bryant, USNM.
- c. ♂. Washington, Mount Rainier, Paradise Valley, 16–23 July, USNM.
- d. ♀. California, Mono County, White Mountains, 21 July 1961, J. A. Powell, USNM.
- e. ♂. Wyoming, Albany County, W of Mill Pond Lake, 1 July 2006, J. S. Nordin, DJW.

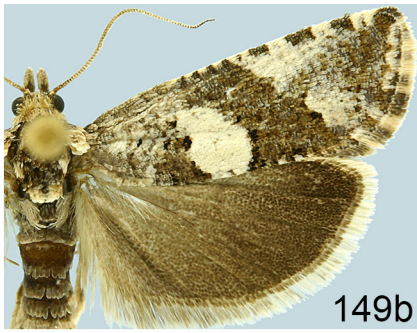
**151. *Pelochrista maculatana*** (Walsingham). FWL: 7.5–11.1 mm (mean = 9.3).

- a. ♀. PLTP. California, Mendocino County, head of Noyo River, 8–11 July 1871, Walsingham, BMNH.
- b. ♂. Utah, Sanpete County, Willow Creek Road, 21 July 1980, D. C. Ferguson, USNM.
- c. ♀. Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, DJW.
- d. ♀. California, San Bernardino County, Loma Linda, 1–7 June, USNM.
- e. ♀. Idaho, Oneida County, Holbrook Summit, 15 July 2006, D. J. Wright, DJW.





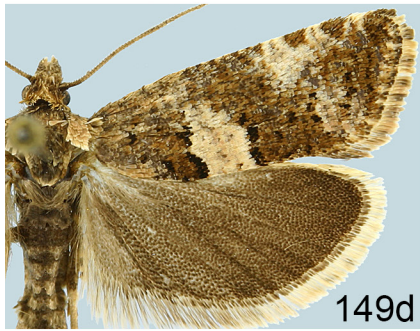
149a



149b



149c



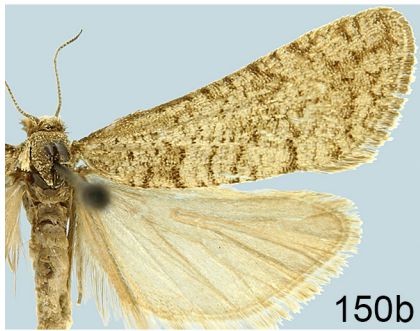
149d



149e



150a



150b



150c



150d



150e



151a



151b



151c



151d

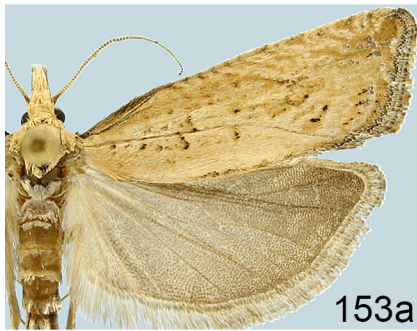
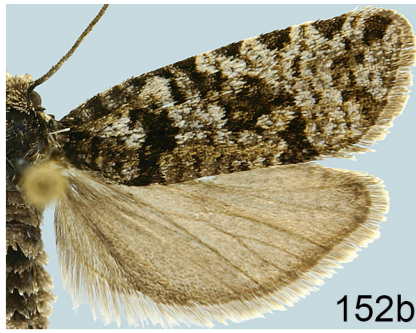


151e

## PLATE TT

- 152. *Pelochrista dodana*** (Kearfott). FWL: 8.7–11.0 mm (mean = 10.0).  
a. ♀. PLTP. Colorado, USNM.  
b. ♂. Colorado, Clear Creek County, Mount Warren Summit, 11 July 2002, J. S. Nordin, DJW.  
c. ♀. Colorado, Clear Creek County, Mount Evans, Goliath Peak, 11 July 2002, J. S. Nordin, DJW.  
d. ♂. Alaska, Schrader Lake, 8 July 1973, J. F. G. Clarke, USNM.  
e. ♂. Alaska, Schrader Lake, 2 July 1973, J. F. G. Clarke, USNM.  
f. ♂. Alaska, Schrader Lake, 6 July 1973, J. F. G. Clarke, USNM.
- 153. *Pelochrista bactrana*** (Heinrich). FWL: 9.7–12.4 mm (mean = 11.5).  
a. ♂. Arizona, Coconino County, Hart Prairie, 6 August 2005, L. D. Gibson, LDG.  
b. ♂. Arizona, Cochise County, Huachuca Mountains, 8 August 1974, D. and J. A. Powell, DJW.  
c. ♀. Utah, La Sal Mountains, 21 July 1936, R. S. Warner, AMNH.
- 154. *Pelochrista inquadana*** (Walsingham). FWL: 5.9–7.4 mm (mean = 6.7).  
a. ♀. LTP. Arizona, 1883, Morrison, BMNH.  
b. ♂. Arizona, Maricopa County, Thunderbird Mountain Park, 20 March 1976, R. Wielgus, USNM.  
c. ♂. Arizona, Pima County, Sells Post Office, Indian Oasis, 1–15 April 1923, O. C. Poling, USNM.
- 155. *Pelochrista quinquemaculana*** (Robinson). FWL: 6.1–9.8 mm (mean = 8.5).  
a. ♀. Georgia, Houston County, Oaky Woods WMA, 6 October 2001, J. K. Adams, DJW.  
b. ♂. Florida, Alachua County, Gainesville, 27 October 1987, C. M. Stevens, MGLC.  
c. ♀. Florida, Escambia County, Pensacola, 27 September 1961. S. Hills, USNM.

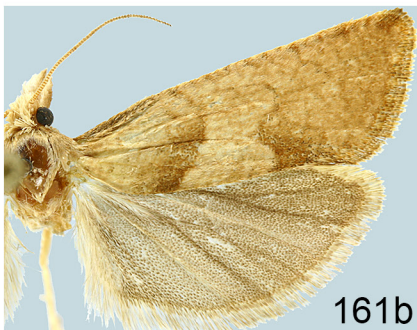
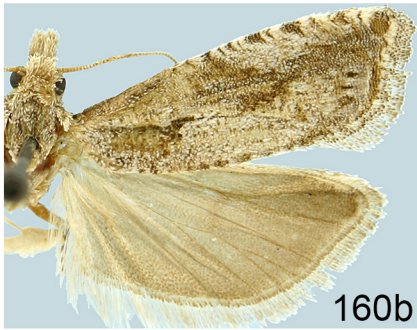






## PLATE UU

- 156. *Pelochrista pallidipalpata*** (Kearfott). FWL: 8.7–11.0mm (mean = 10.0).  
a. ♂.Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, DJW.  
b. ♂.Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, DJW.  
c. ♂.North Carolina, Macon County, Highlands, 18 July 1958, R. W. Hodges, USNM.  
d. ♂.Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, DJW.
- 157. *Pelochrista fratruei*** (Heinrich). FWL: 9.7–12.4 mm (mean = 11.5).  
a. ♂.Data unknown.
- 158. *Pelochrista chiricahuae*** Wright and Gilligan. FWL: 5.9–7.4 mm (mean = 6.7).  
a. ♀.HTP. Arizona, Cochise County, Rustler Park, 14 July 1972, J. A. Powell, EME.
- 159. *Pelochrista milleri*** Wright. FWL: 6.1–9.8 mm (mean = 8.5).  
a. ♂.HTP. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1997, D. J. Wright, USNM.  
b. ♀.PTP. Ohio, Adams County, 1 mi SE of Lynx, 12 July 1998, D. J. Wright, USNM.  
c. ♀.PTP. Kentucky, Rowan County, County Road 1274, 26 August 1994, D. J. Wright, DJW.
- 160. *Pelochrista heinrichi*** (McDunnough). FWL: 6.1–9.8 mm (mean = 8.5).  
a. ♂.HTP. Canada, Manitoba, Aweme, 10 August 1921, N. Criddle, CNC.  
b. ♂.Canada, Manitoba, Aweme, 1 August 1928, N. Criddle, CNC.  
c. ♂.Wyoming, Park County, 1 mi S of Ralston, 25 June 1980, Pogue and Lavigne, DJW.
- 161. *Pelochrista opleri*** Wright and Gilligan. FWL: 6.1–9.8 mm (mean = 8.5).  
a. ♂.HTP. Wyoming, Teton County, Teton National Park, Vista Point Trailhead, 9 August 1998, USNM.  
b. ♂.PTP. Wyoming, Teton County, Teton National Park, Vista Point Trailhead, 9 August 1998, USNM.  
c. ♂.PTP. Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, DJW.





## PLATE VV

- 162. *Pelochrista dapsilis*** (Heinrich). FWL: 12.1–14.2 mm (mean = 13.1).  
a. ♂.HTP. Wyoming, Yellowstone National Park, USNM.  
b. ♂.Colorado, Grand County, Rocky Mountain National Park, Harbison Picnic Area, 29 May 1995, P. A. Opler, CSU.  
c. ♂.Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, MGLC.
- 163. *Pelochrista rufocostana*** (Wright). FWL: 9.2–11.8 mm (mean = 10.6).  
a. ♂.HTP. Idaho, Oneida County, 5 mi SSE of Holbrook, 18 July 2001, D. J. Wright, USNM.  
b. ♂.PTP. Idaho, Oneida County, 5 mi SSE of Holbrook, 18 July 2001, D. J. Wright, DJW.  
c. ♂.PTP. Nevada, Nye County, 24 mi N of Carvers, 3 July 2002, L. L. Crabtree, DJW.
- 164. *Pelochrista jejunana*** (McDunnough). FWL: 7.1–7.3 mm (mean = 7.2).  
a. ♂.HTP. Canada, Ontario, Blackburn, 20 May 1941, J. McDunnough, CNC.
- 165. *Pelochrista louisana*** (McDunnough). FWL: 9.5 mm (mean = 9.5).  
a. ♂.HTP. Canada, Alberta, Lake Louise, 19 July 1938, G. S. Walley, CNC.
- 166. *Pelochrista cinereolineana*** (Heinrich). FWL: 6.2–7.6 mm (mean = 6.8).  
a. ♂.HTP. Utah, Juab County, Eureka, 21 April 1910, T. Spalding, USNM.  
b. ♂.Nevada, Clark County, Charleston Mountains, 26 April 1950, E. C. Johnston, CNC.  
c. ♂.Canada, Alberta, 10 km S of Onefour, 22 May 1982, J.-F. Landry, CNC.
- 167. *Pelochrista candida*** (Wright). FWL: 10.4–11.3 mm (mean = 10.8).  
a. ♂.HTP. California, Los Angeles County, Hungry Valley, 4 air miles S of Gorman, 16 July 1975, J. A. Powell, EME.
- 168. *Pelochrista graduatana*** (Walsingham). FWL: 7.4 mm (mean = 7.4).  
a. ♂.HTP. Texas, Bosque County, G. W. Belfrage, 26 March 1876, BMNH.
- 169. *Pelochrista occipitana*** (Zeller). FWL: 6.6 mm (mean = 6.6).  
a. ♂.HTP. Texas, Bosque County, 24 June 1871, G. W. Belfrage, BMNH.  
b. ♂.Colorado, Weld County, Pawnee National Grassland, 8 August 2004, D. J. Wright, DJW [determination tentative].





162a



162b



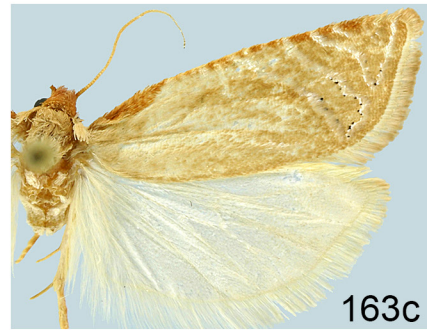
162c



163a



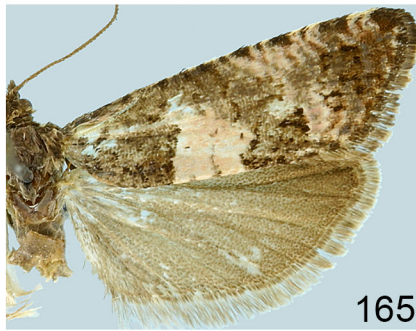
163b



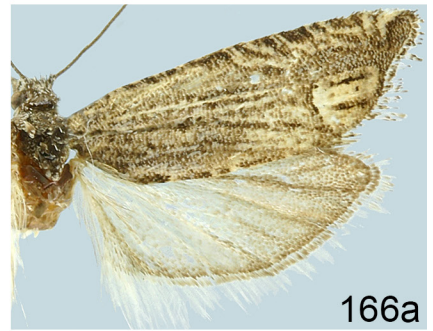
163c



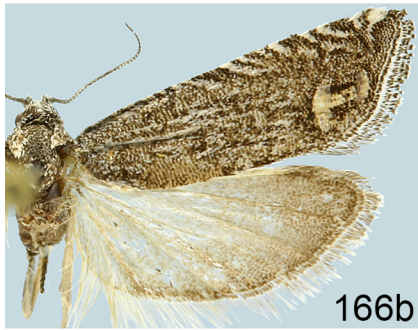
164



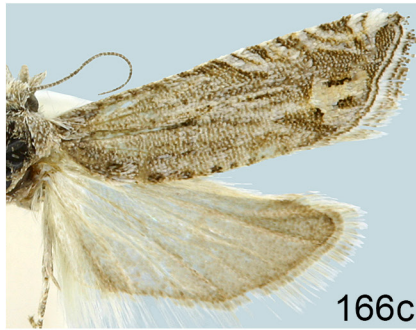
165



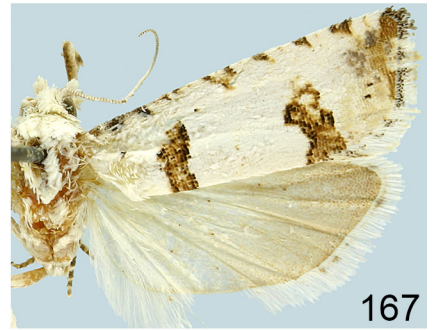
166a



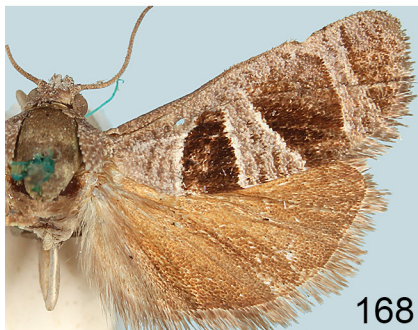
166b



166c



167



168



169a



169b



Plates 1–70

## **Genitalia Drawings**





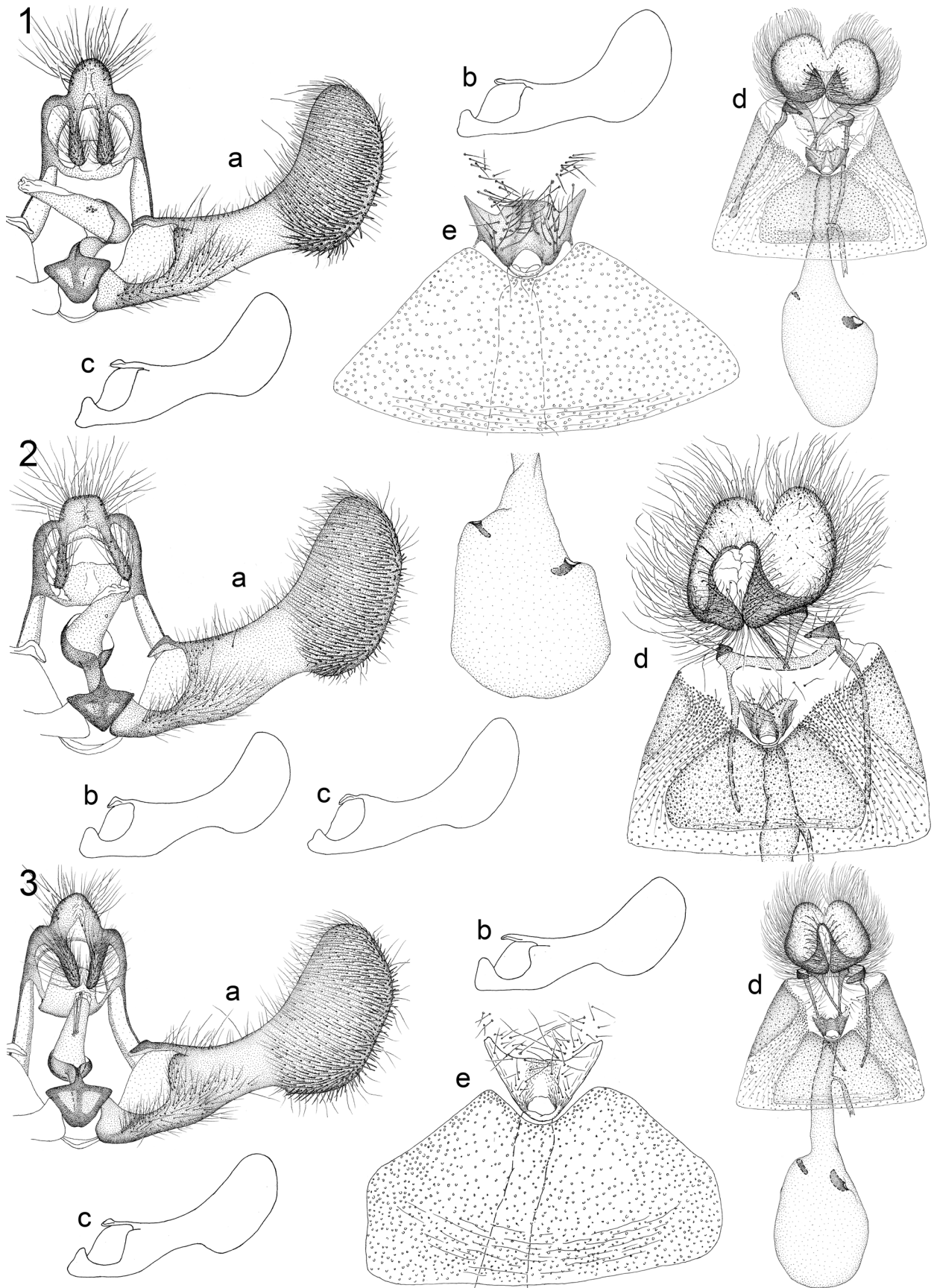


PLATE 1. 1. *Pelochrista agassizii*: a, male; b–c, valva; d, female; e, sterigma/sternum 7. 2. *P. bolanderana*: a, male; b–c, valva; d, female. 3. *P. laticurva*: a, male; b–c, valva; d, female; e, sterigma/sternum 7.

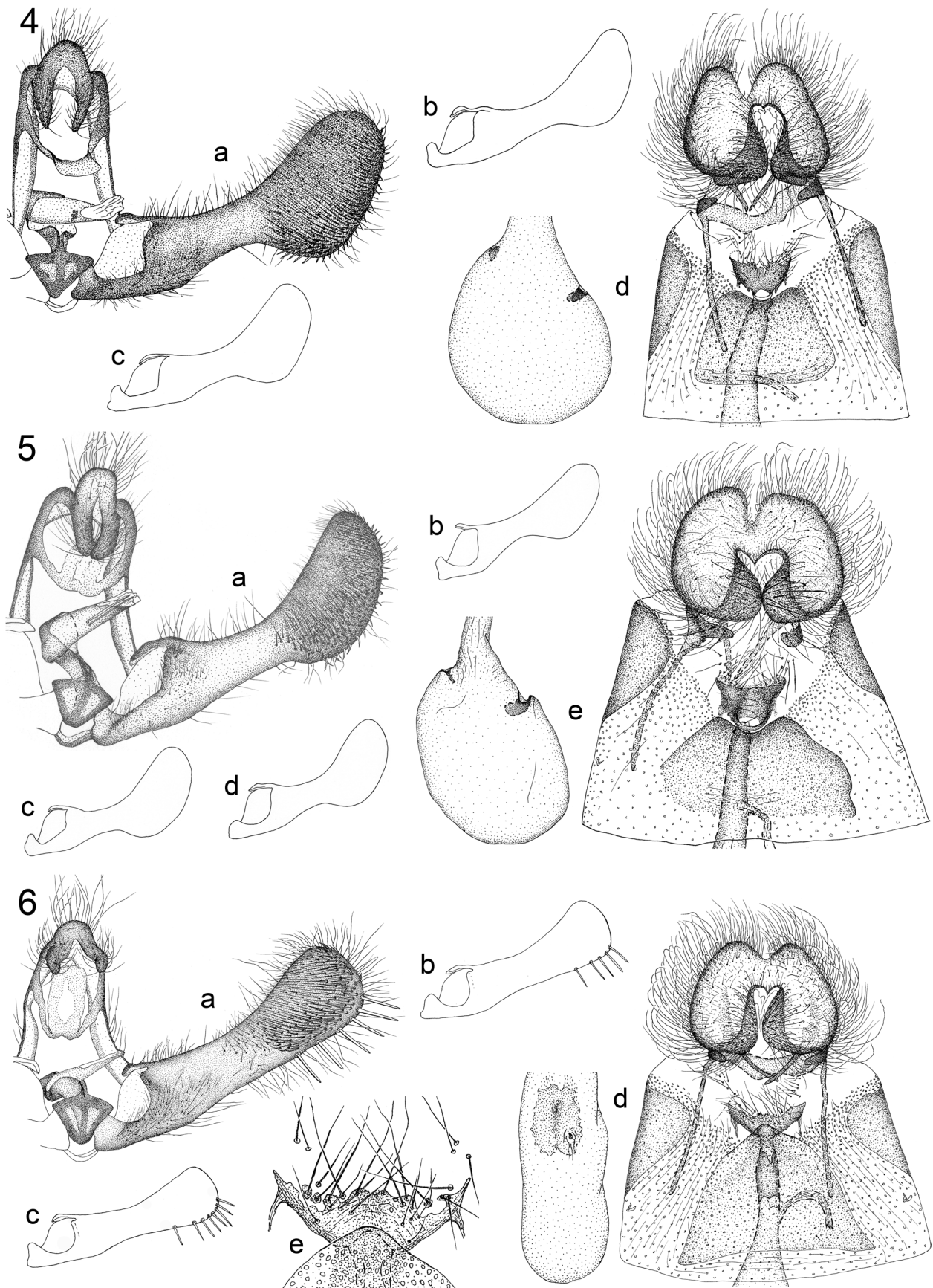


PLATE 2. 4. *Pelochrista denverana*: a, male; b-c, valva; d, female. 5. *P. hazelana*: a, male; b-d, valva; e, female. 6. *P. robinsonana*: a, male; b-c, valva; d, female; e, sterigma.



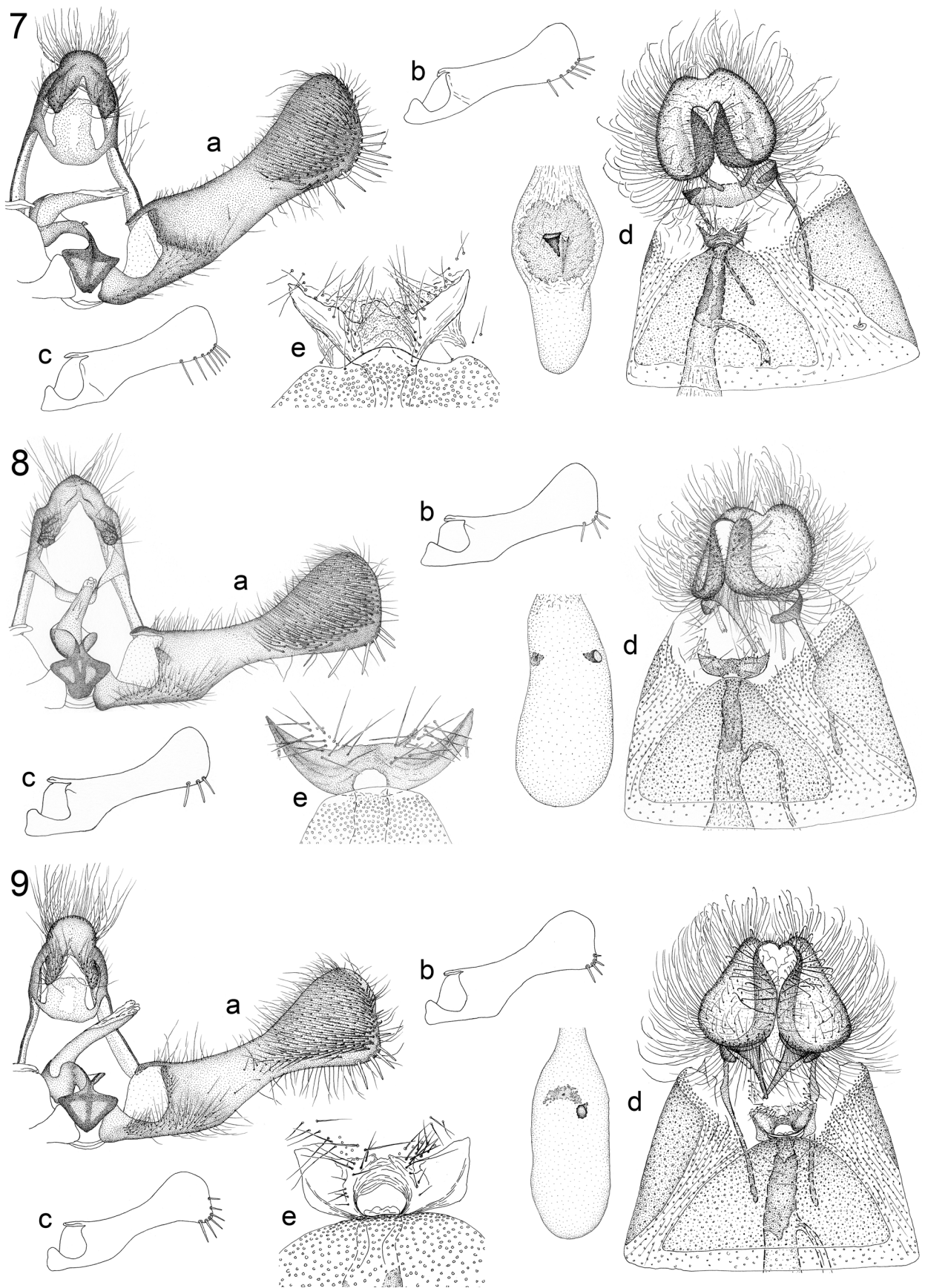
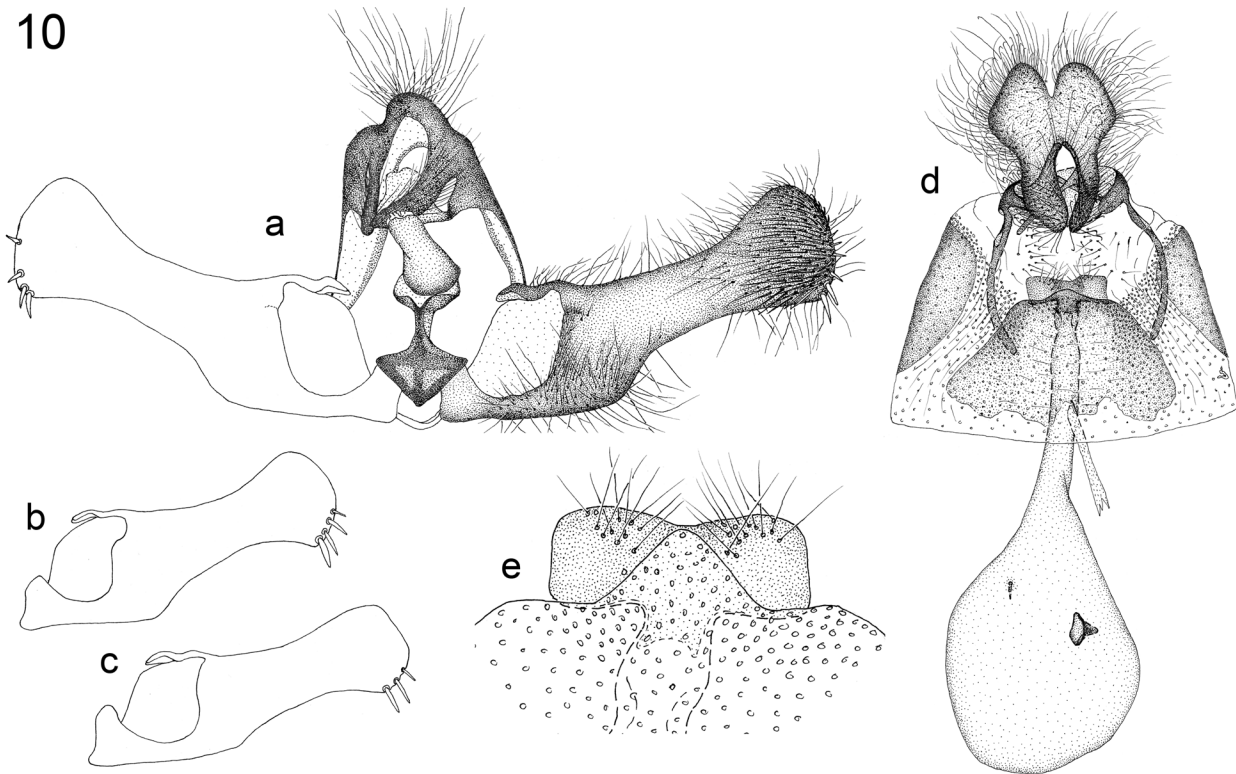
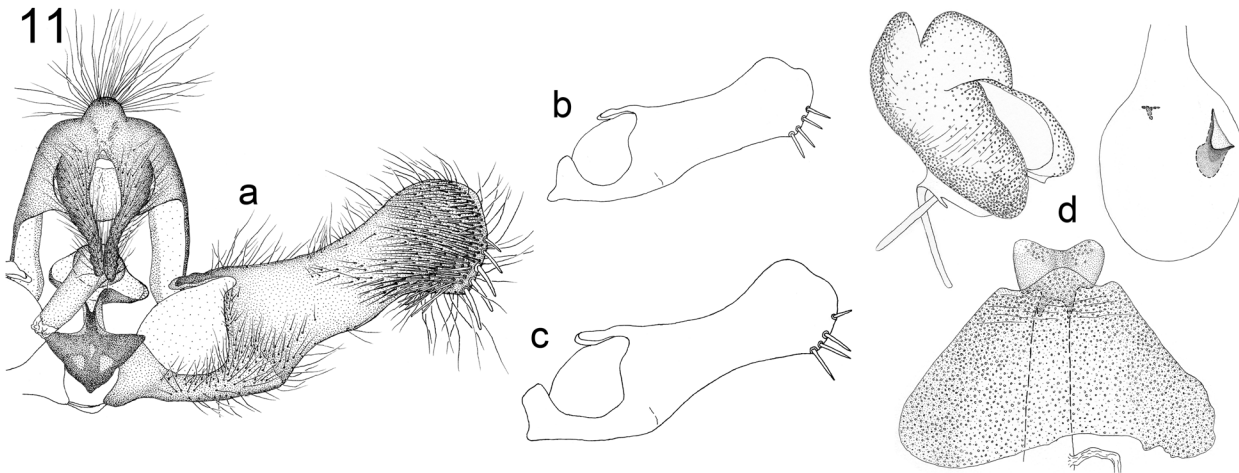


PLATE 3. 7. *Pelochrista guttulana*: a, male; b–c, valva; d, female; e, sterigma. 8. *P. fritillana*: a, male; b–c, valva; d, female; e, sterigma. 9. *P. mobilensis*: a, male; b–c, valva; d, female; e, sterigma.

10



11



12

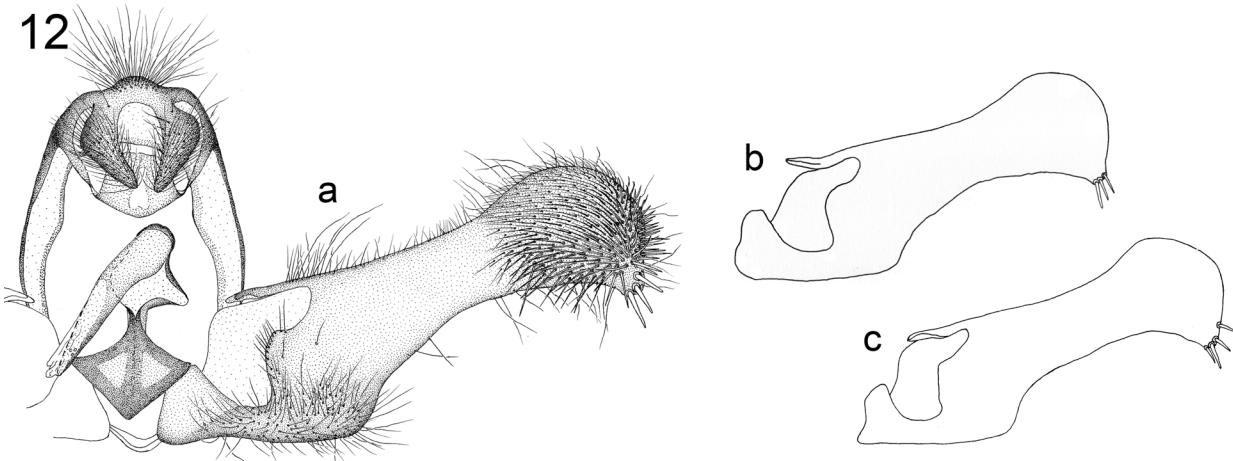


PLATE 4. 10. *Pelochrista crambitana*: a, male; b-c, valva; d, female; e, sterigma. 11. *P. richersana*: a, male; b-c, valva; d, female. 12. *P. crabtreei*: a, male; b-c, valva.



13

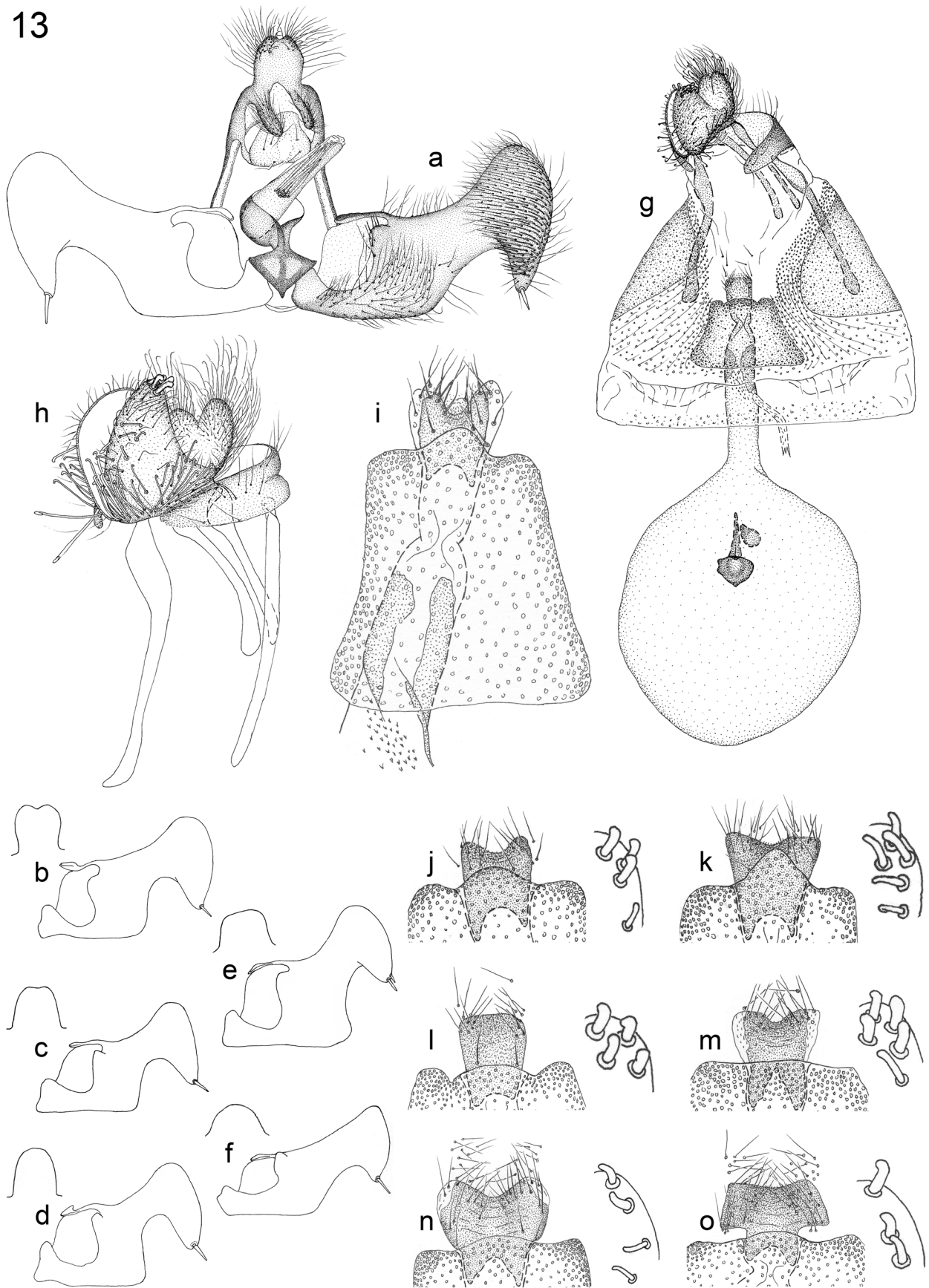


PLATE 5. 13. *Pelochrista agricolana*: a, male; b–f, uncus and associated valva; g, female; h, papillae anales/tergum 8; i, sterigma/sternum 7; j–o, sterigma and associated short stubby setae on ventral extensions of papillae anales.



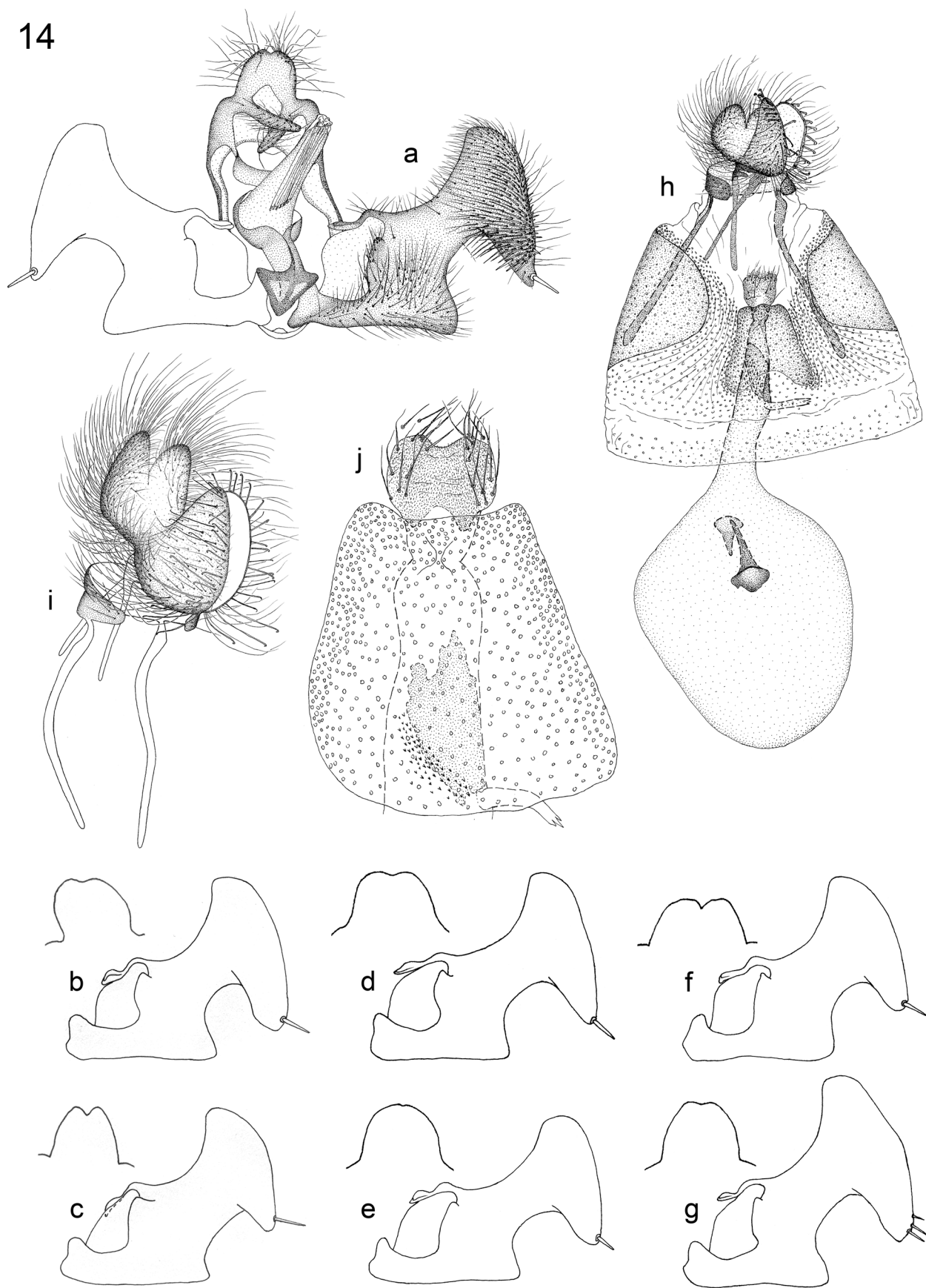
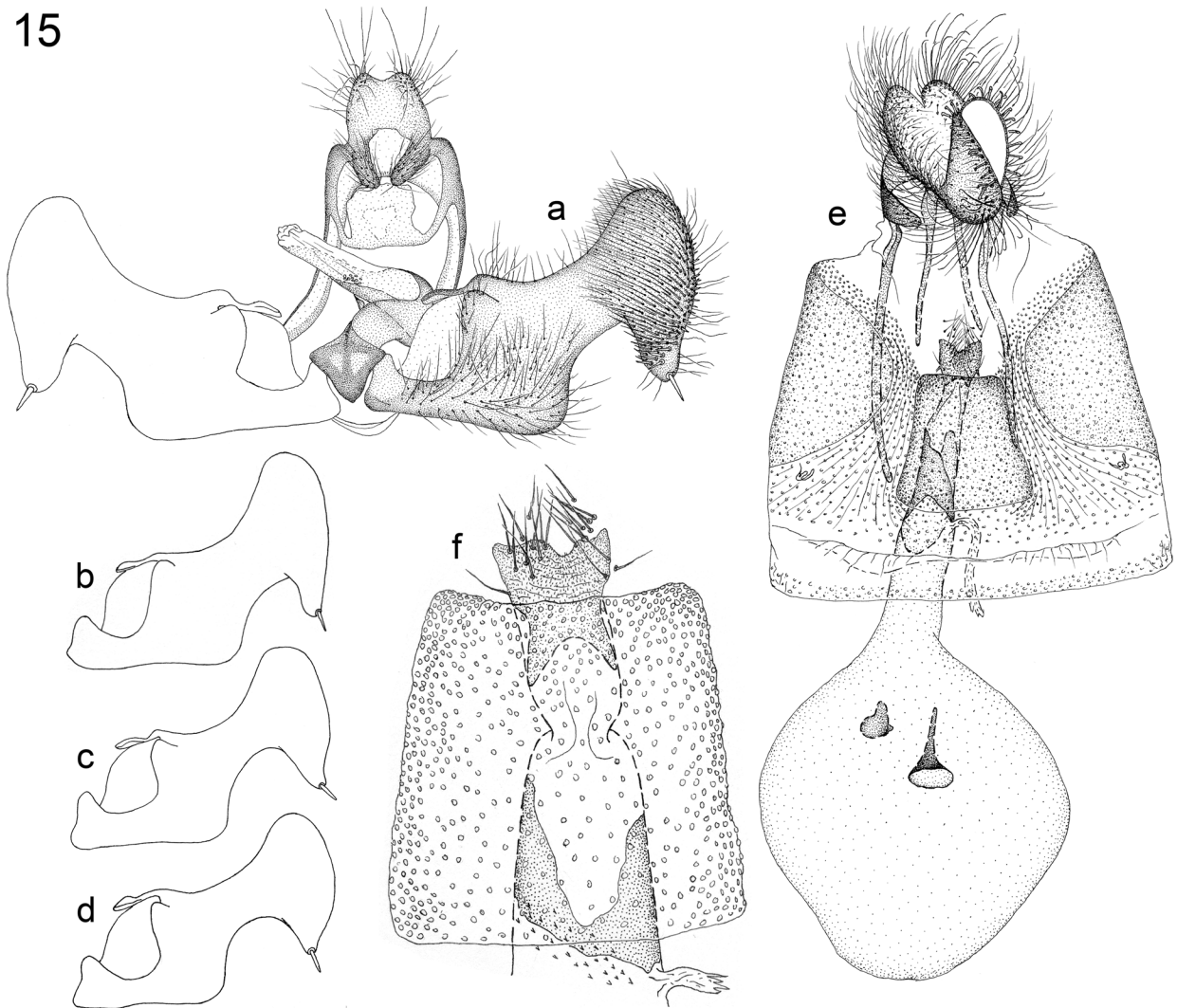


PLATE 6. 14. *Pelochrista argentialbana*: a, male; b–g, uncus and associated valva; h, female; i, papillae anales/tergum 8; j, sterigma/sternum 7.

15



16

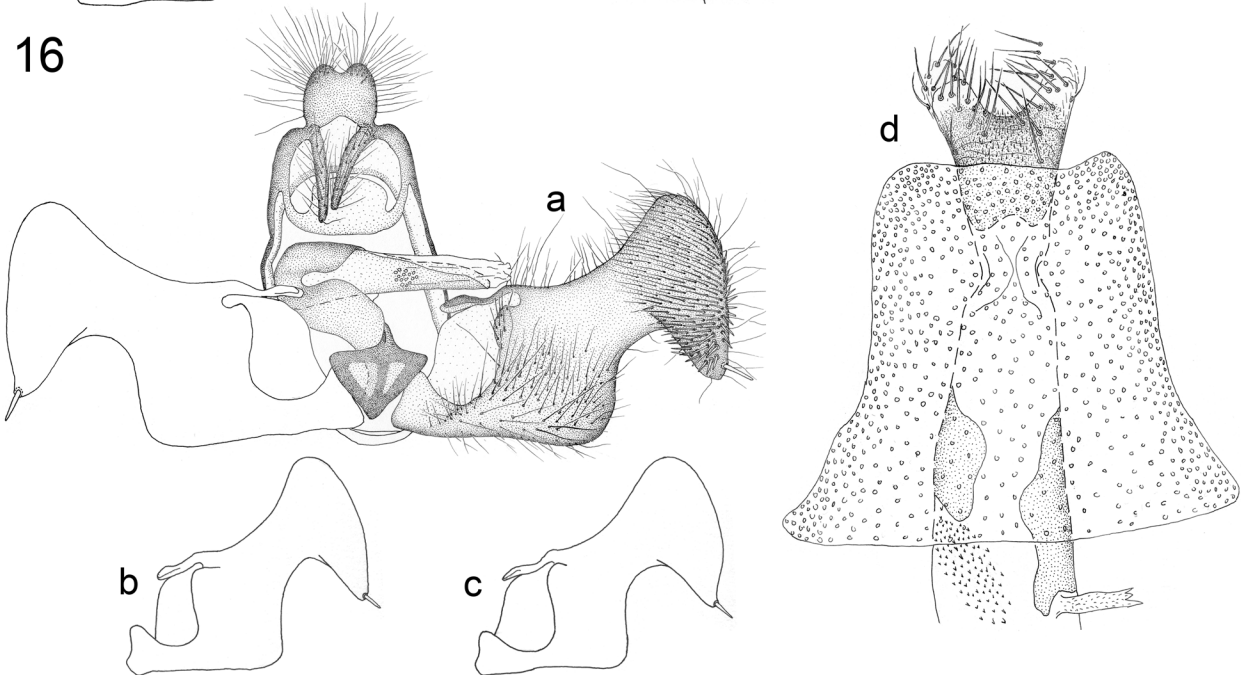
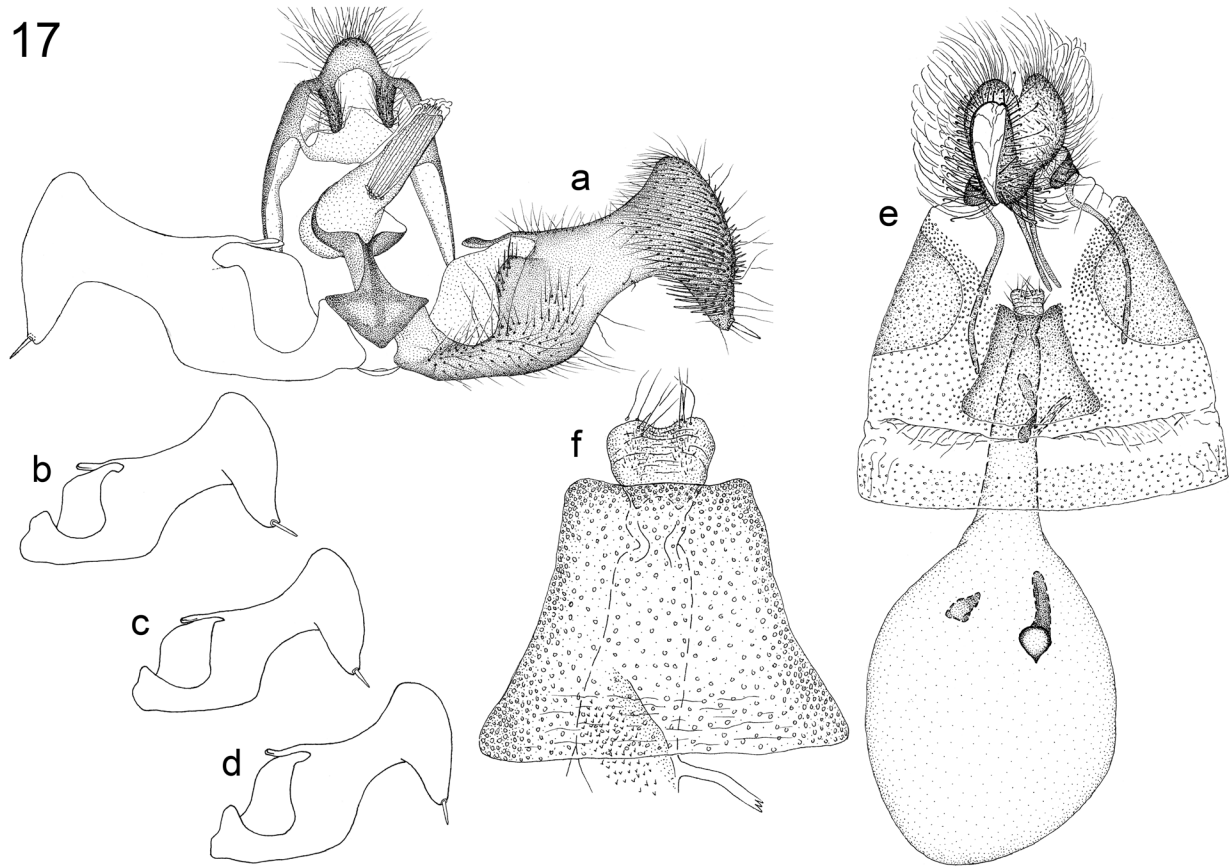


PLATE 7. 15. *Pelochrista morrisoni*: a, male; b–d, valva; e, female; f, sterigma/sternum 7. 16. *P. lathami*: a, male; b–c, valva; d, sterigma/sternum 7.



17



18

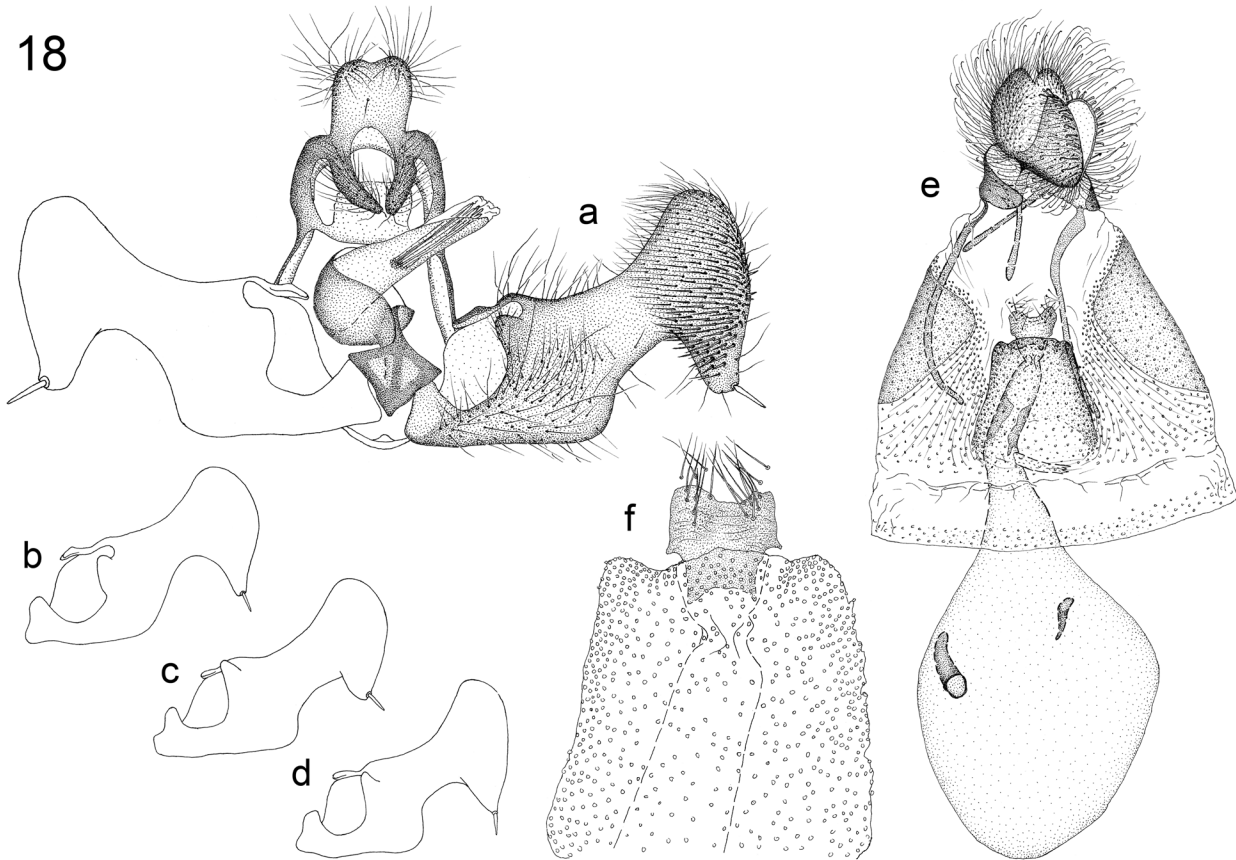


PLATE 8. 17. *Pelochrista beathiana*: a, male; b-d, valva; e, female; f, sterigma/sternum 7. 18. *P. russeola*: a, male; b-d, valva; e, female; f, sterigma/sternum 7.



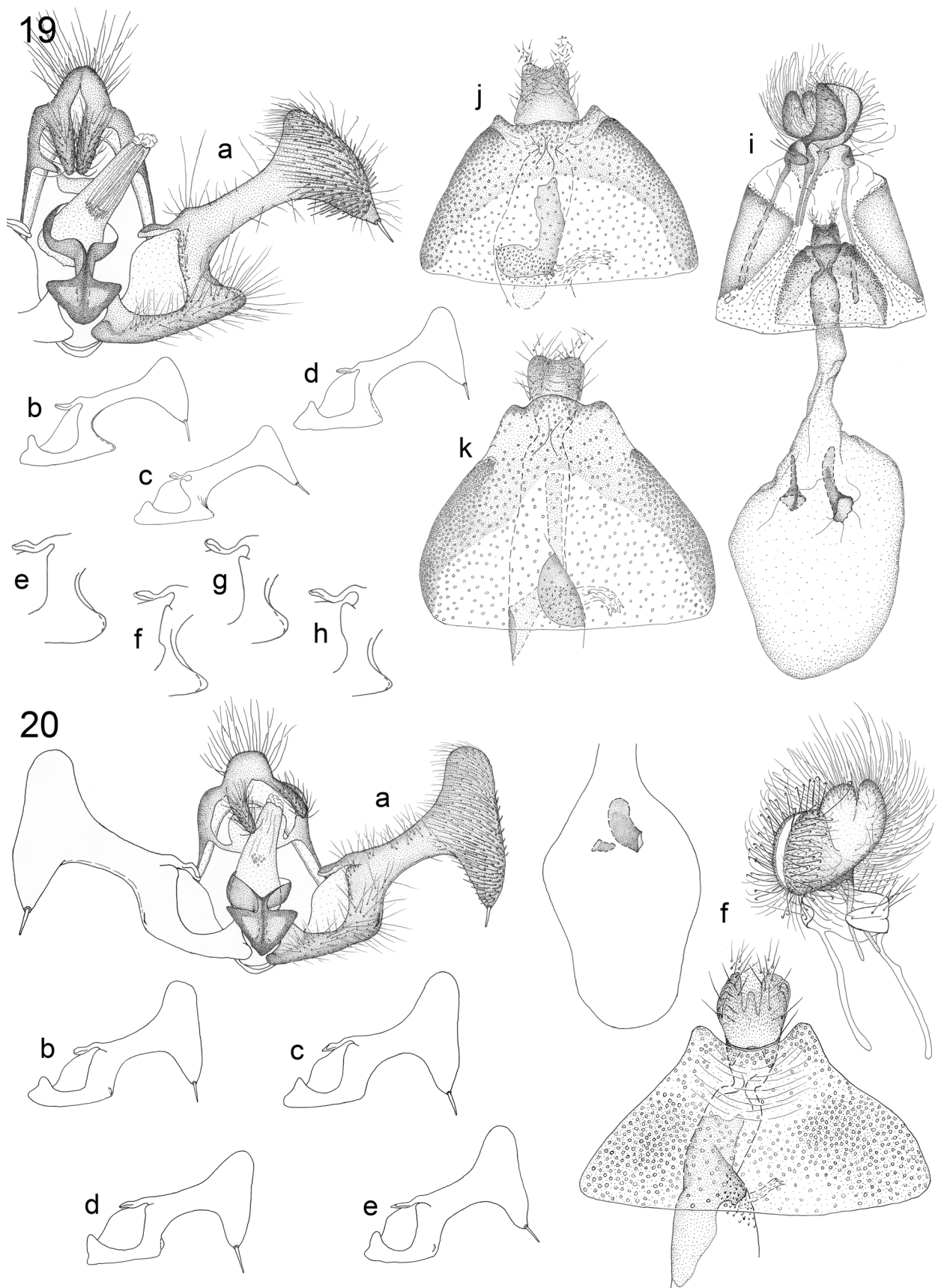


PLATE 9. 19. *Pelocrista albiguttana*: a, male; b–d, valva; e–h, saccular angle and basal process; i, female; j–k, sterigma/sternum 7. 20. *P. kimballi*: a, male; b–e, valva; f, female.

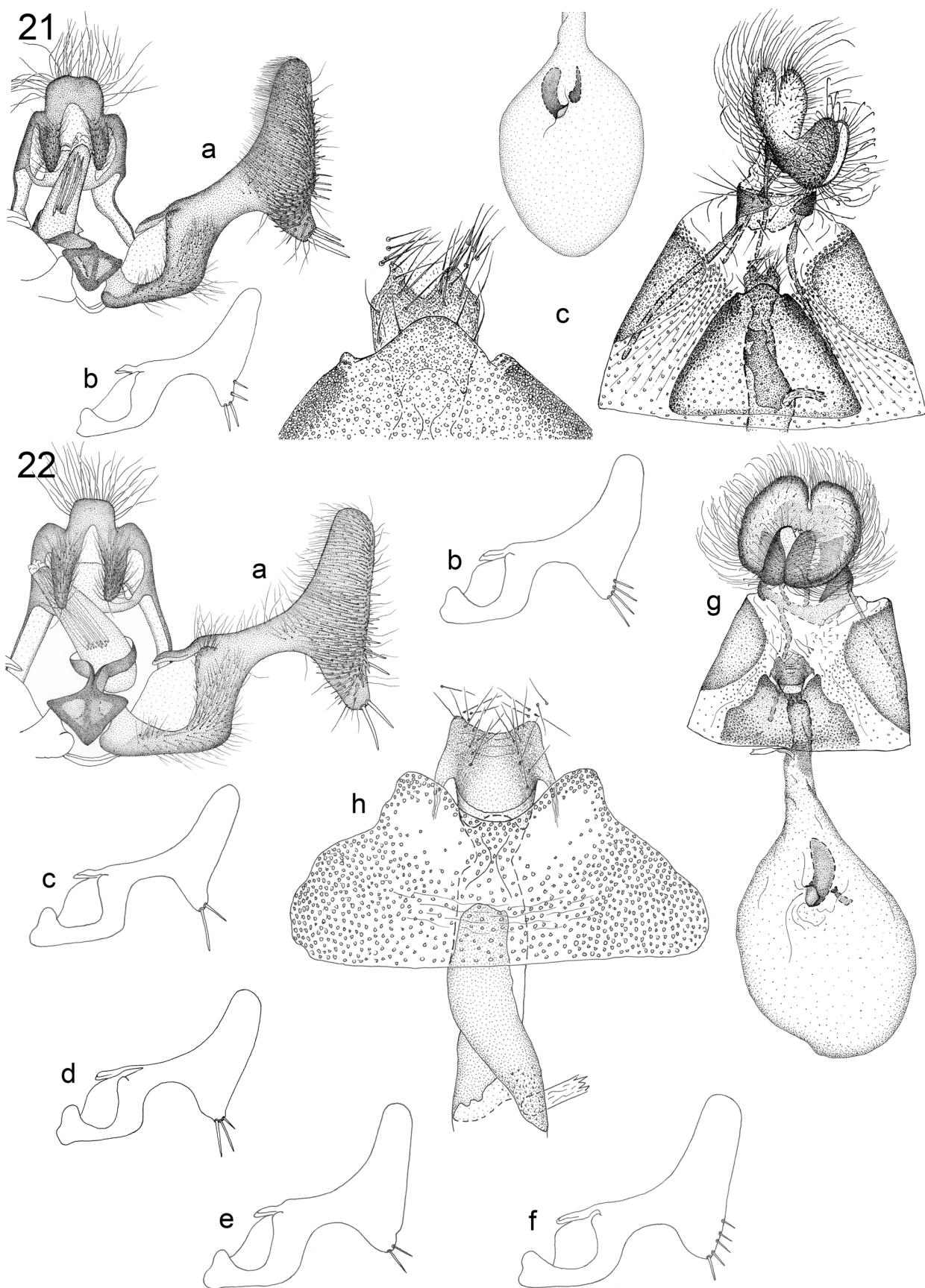


PLATE 10. 21. *Pelochrista graciliana*: a, male; b, valva; c, female. 22. *P. galenapunctana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7.



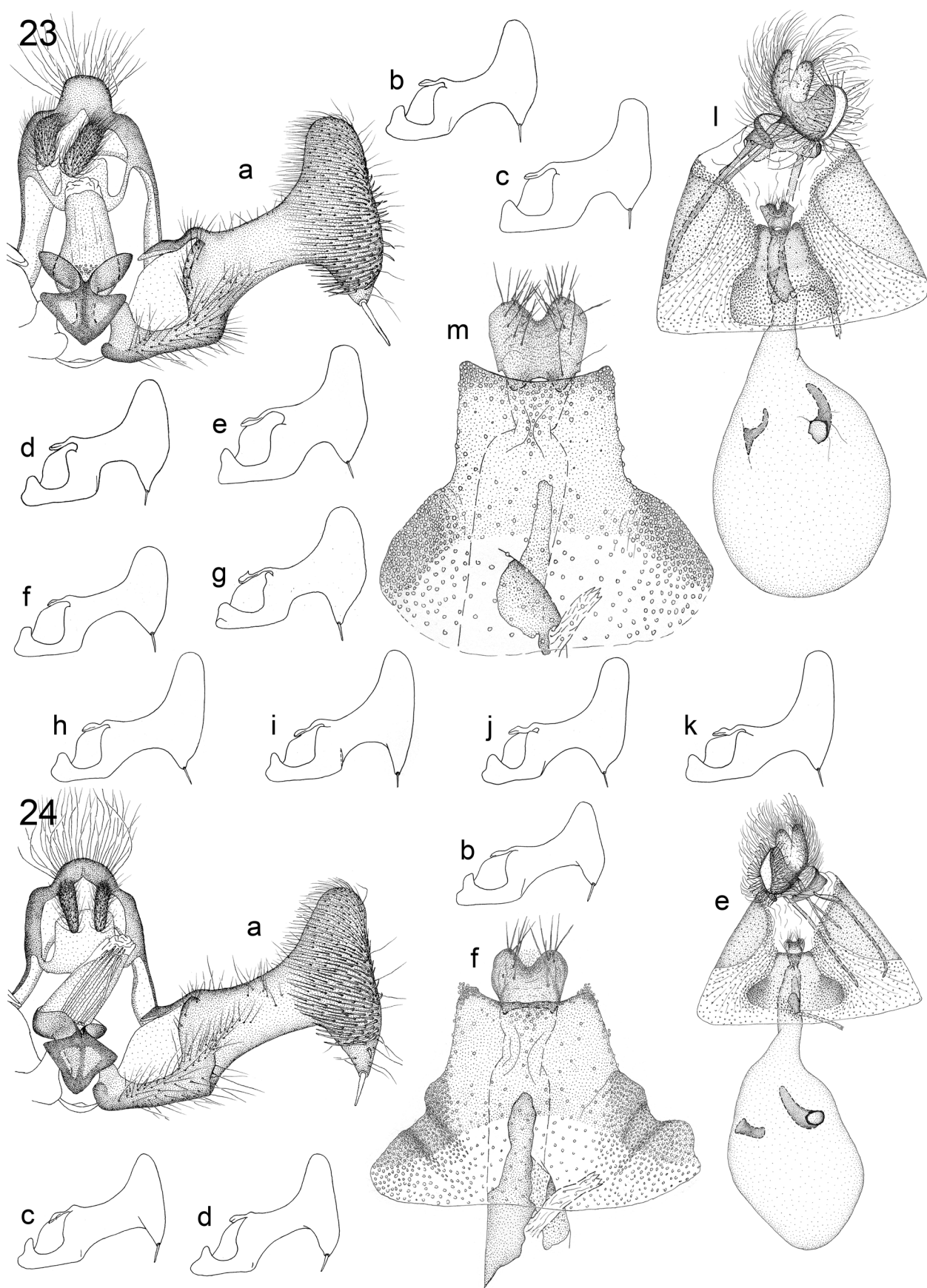
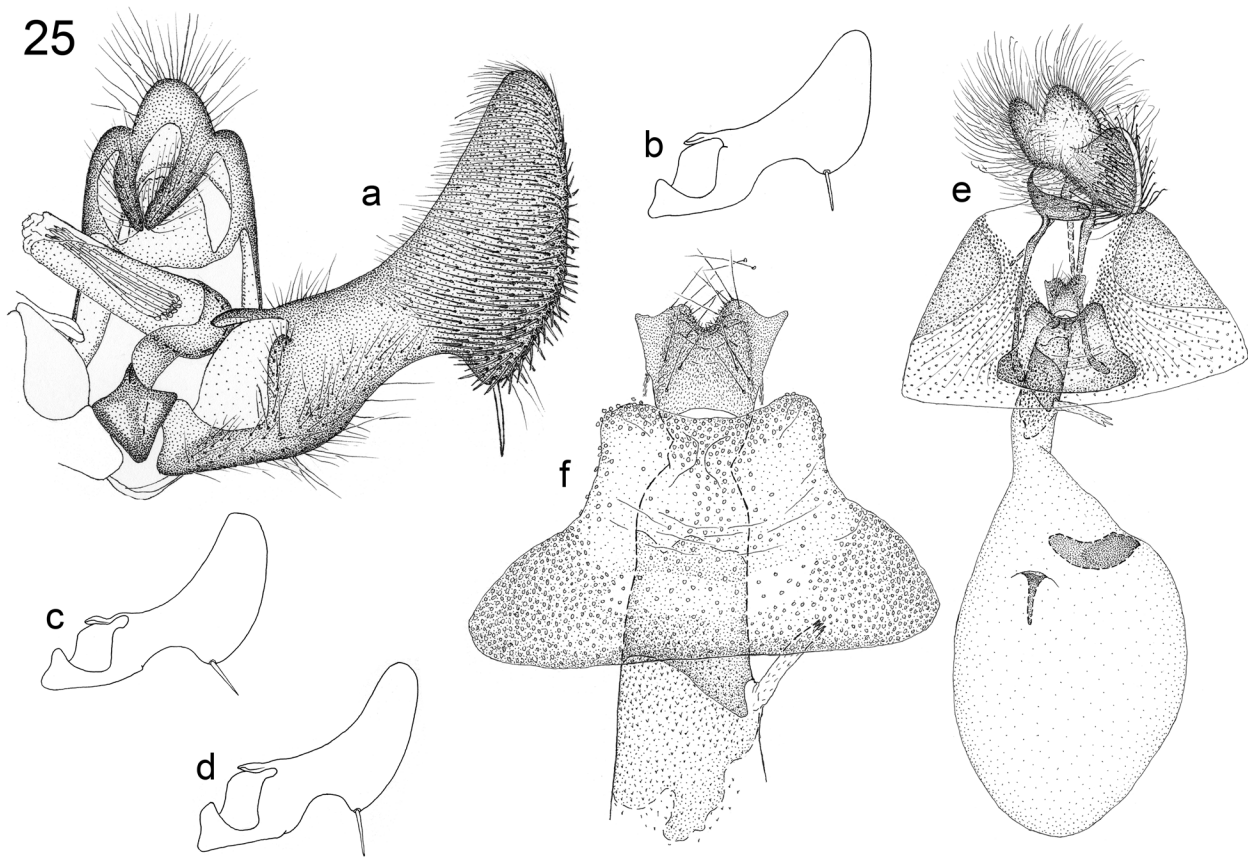


PLATE 11. 23. *Pelochrista comatulana*: a, male; b–k, valva; l, female; m, sterigma/sternum 7. 24. *P. vagana*: a, male; b–d, valva; e, female; f, sterigma/sternum 7.



25



26

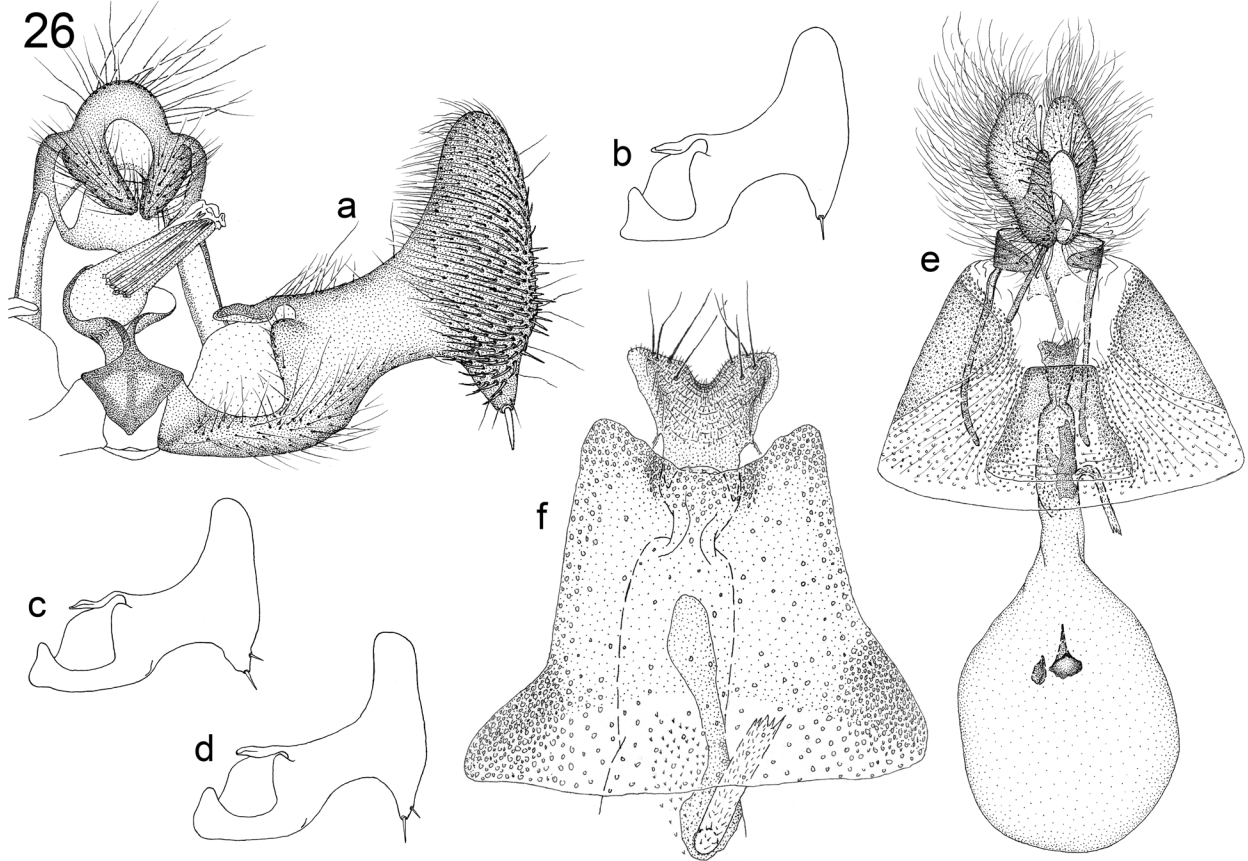


PLATE 12. 25. *Pelochrista exclusoriana*: a, male; b-d, valva; e, female; f, sterigma/sternum 7. 26. *P. rufula*: a, male; b-d, valva; e, female; f, sterigma/sternum 7.

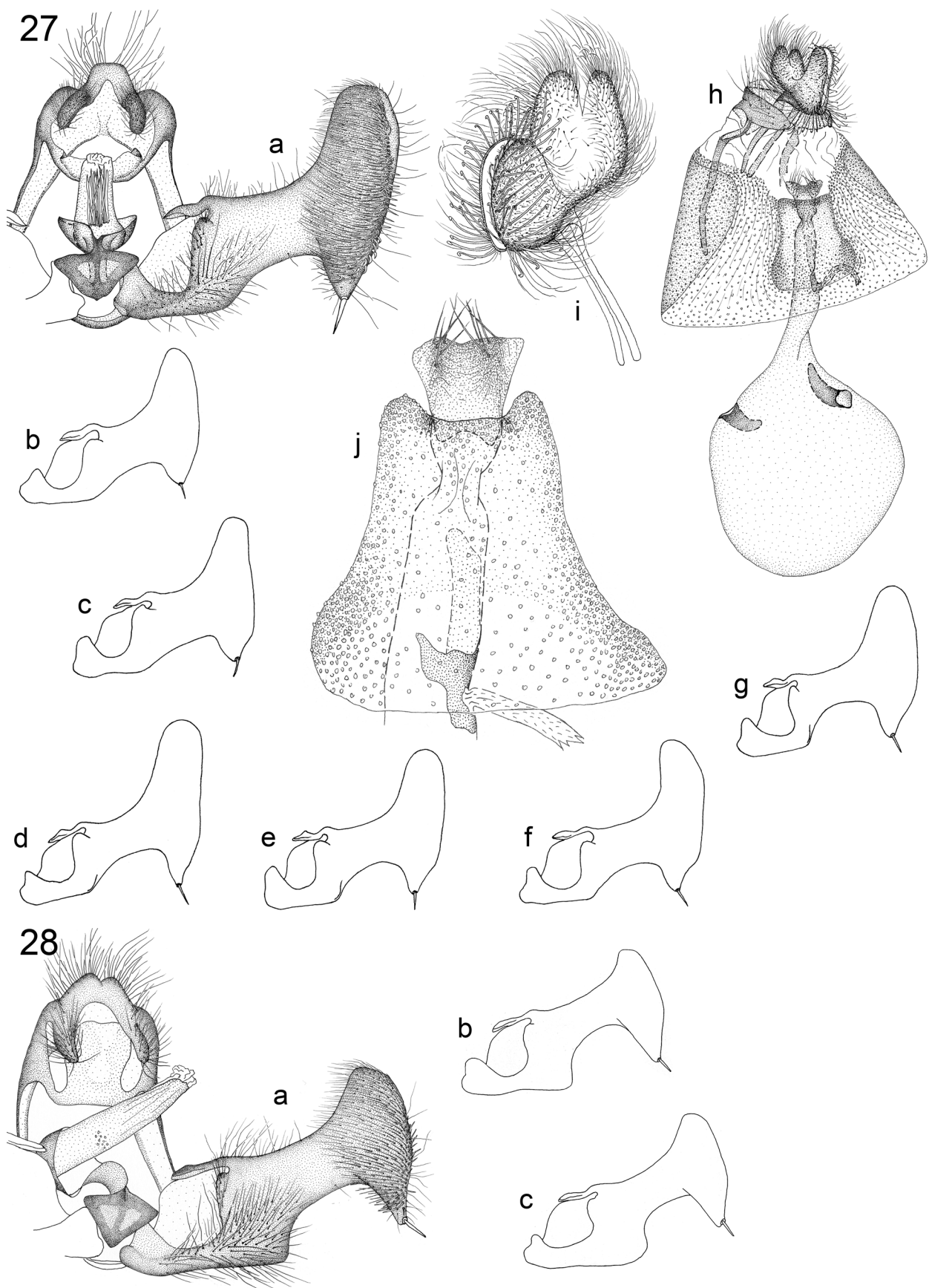


PLATE 13. 27. *Pelochrista serapicana*: a, male; b–g, valva; h, female; i, papillae anales; j, sterigma/sternum 7.  
 28. *P. atomosana*: a, male; b–c, valva.



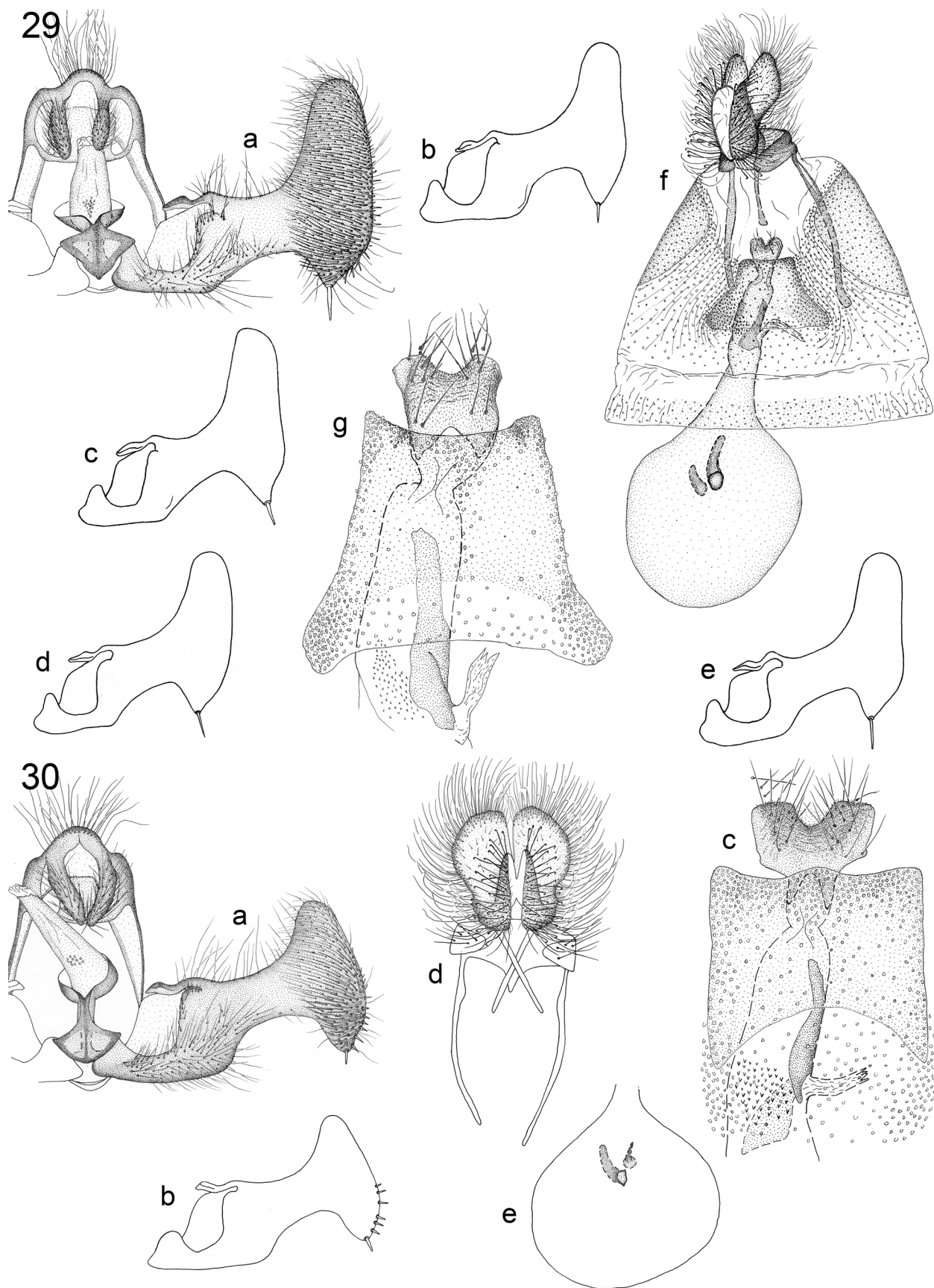


PLATE 14. 29. *Pelochrista watertonana*: a, male; b–e, valva; f, female; g, sterigma/sternum 7. 30. *P. polingana*: a, male; b, valva; c, sterigma/sternum 7; d, papillae anales/tergum 8; e, corpus bursae.



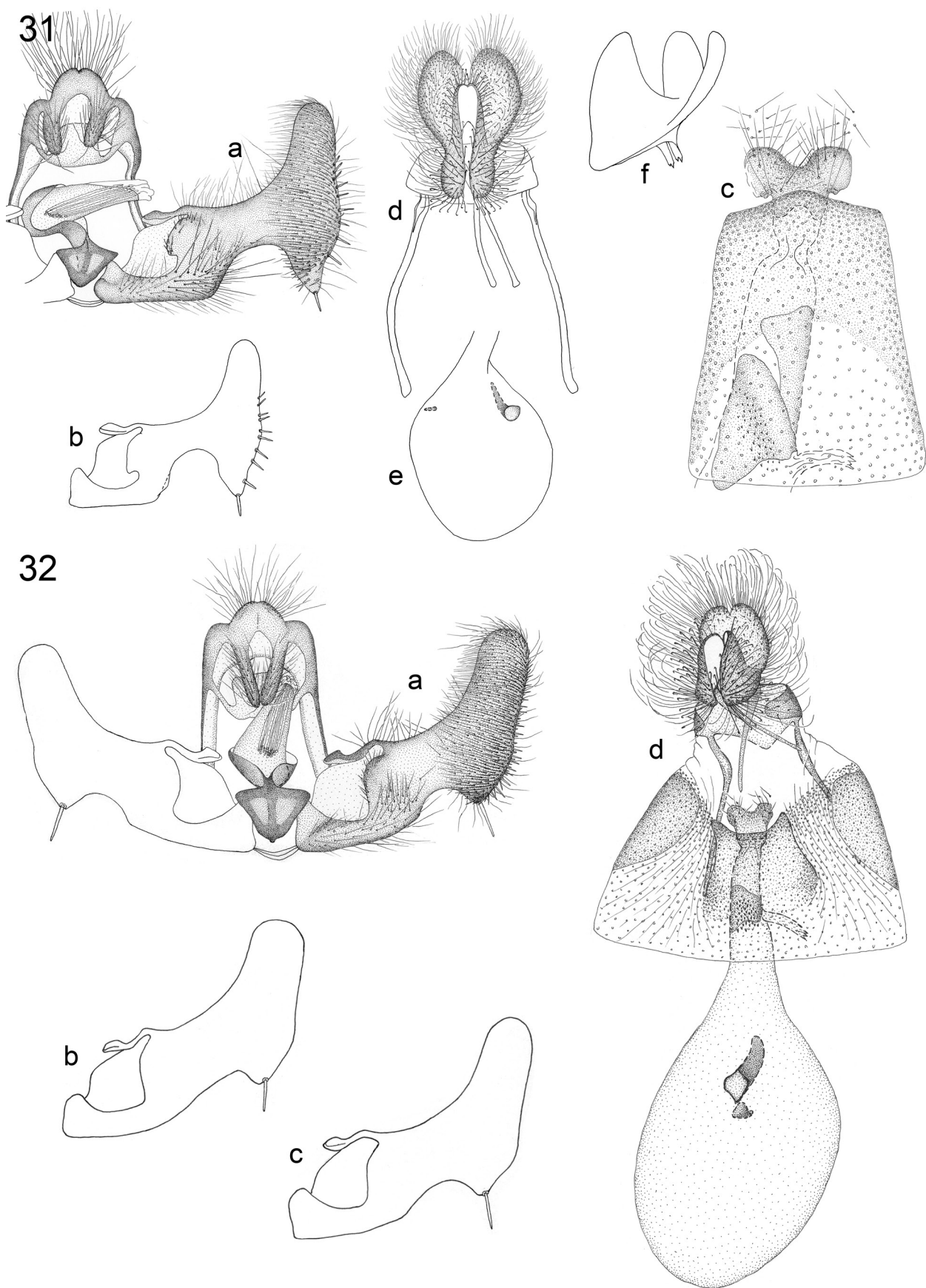


PLATE 15. 31. *Pelochrista comancheana*: a, male; b, valva; c, sterigma/sternum 7; d, papillae anales/tergum 8; e, corpus bursae; f, profile of ventral extension. 32. *P. wandana*: a, male; b–c, valva; d, female.

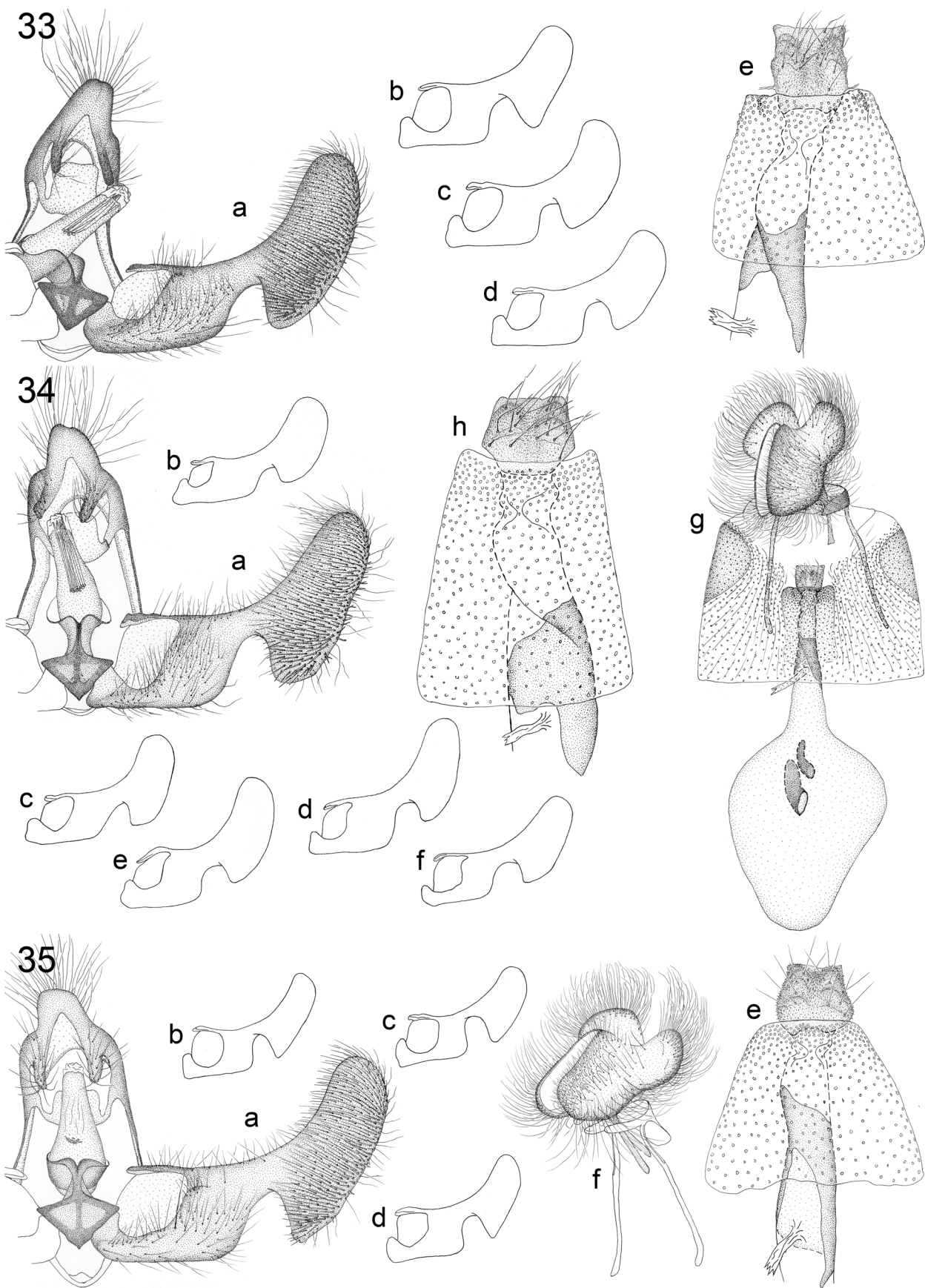


PLATE 16. 33. *Pelochrista palabundana*: a, male; b–d, valva; e, sterigma/sternum 7. 34. *P. rosaocellana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7. 35. *P. salaciana*: a, male; b–d, valva; e, sterigma/sternum 7; f, papillae anales/tergum 8.



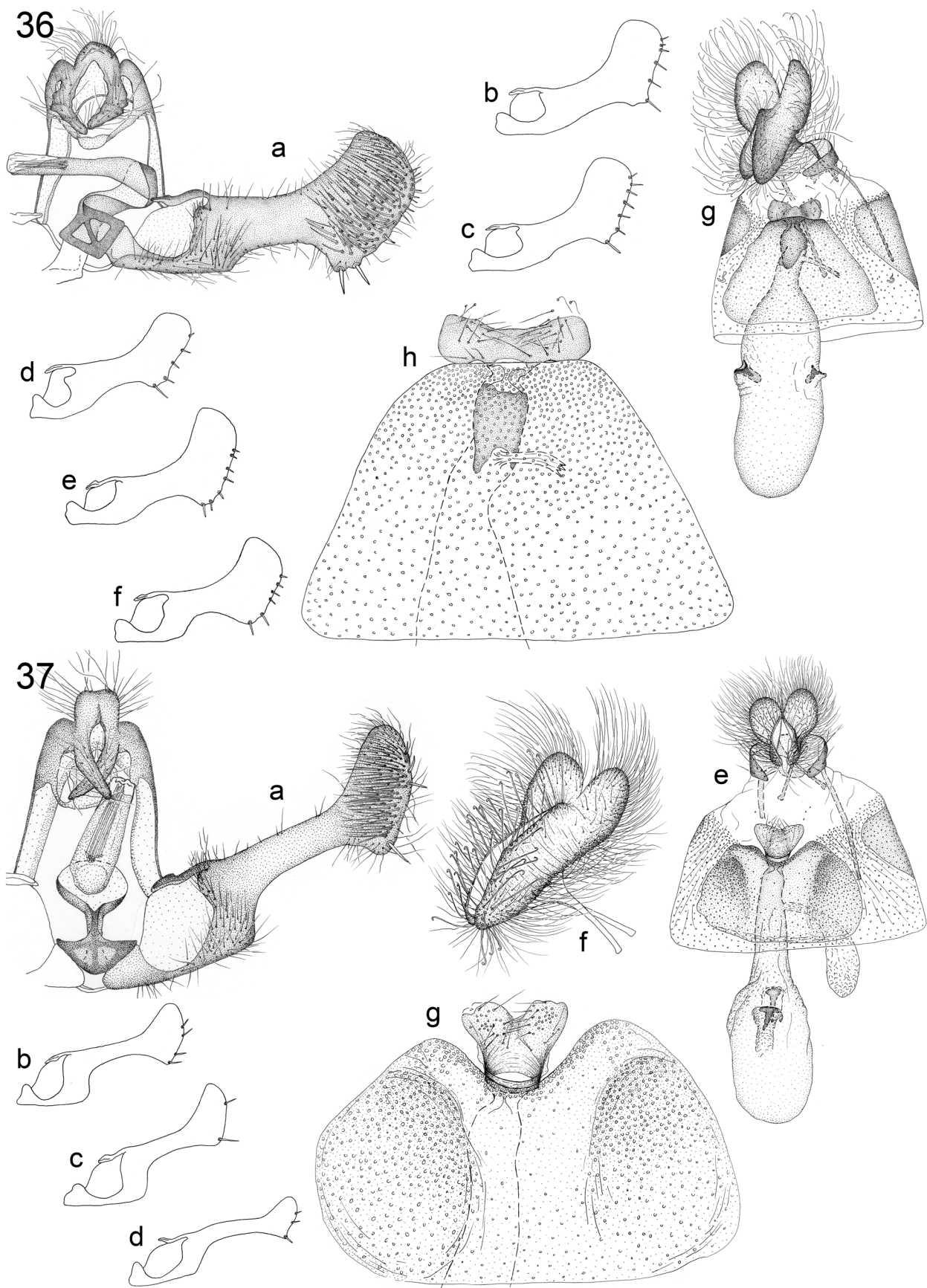
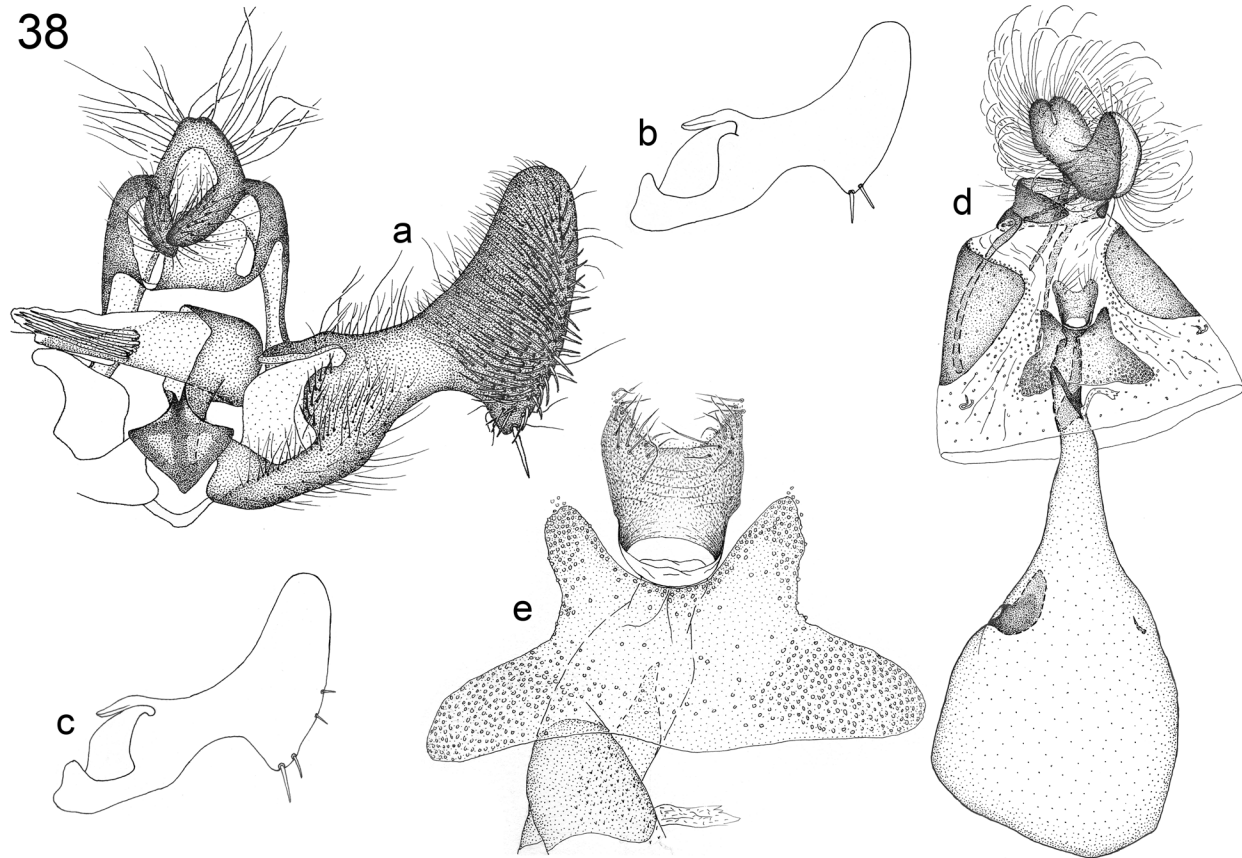


PLATE 17. 36. *Pelochrista daemonicana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7. 37. *P. collilonga*: a, male; b–d, valva; e, female; f, papillae anales; g, sterigma/sternum 7.



38



39

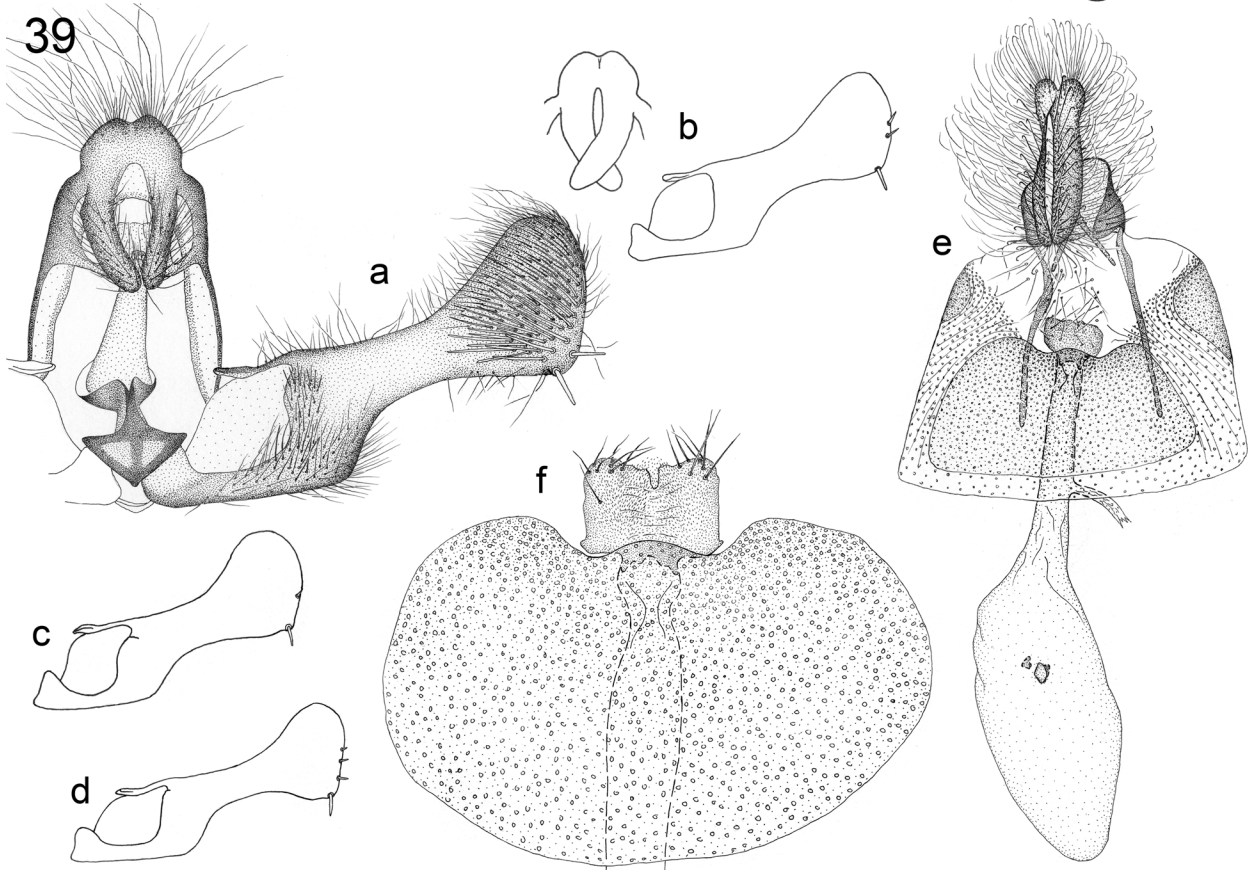


PLATE 18. 38. *Pelochrista fraudabilis*: a, male; b–c, valva; d, female; e, sterigma/sternum 7. 39. *P. adamantana*: a, male; b, uncus/socii and associated valva; c–d, valva; e, female; f, sterigma/sternum 7.

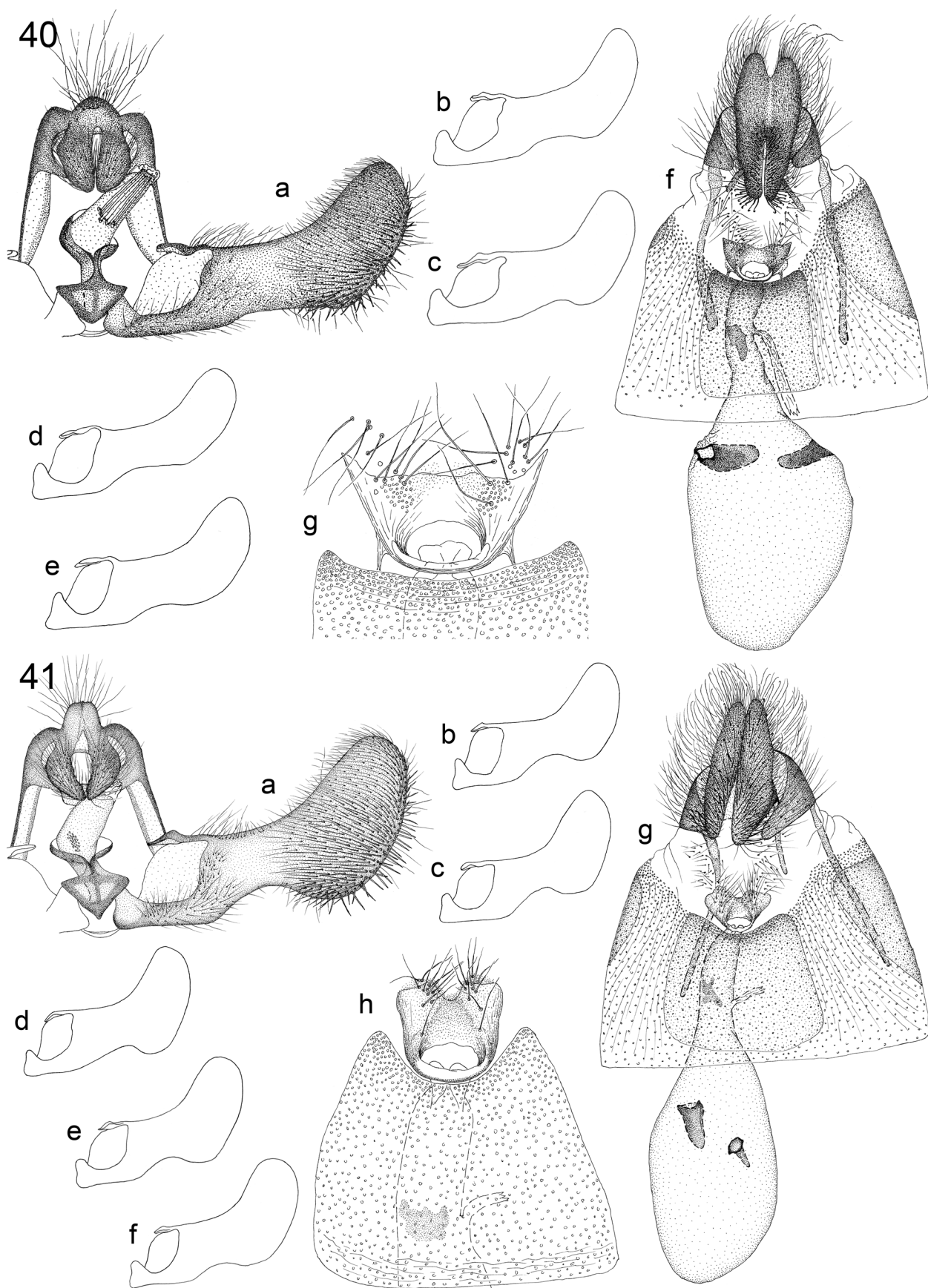


PLATE 19. 40. *Pelochrista caniceps*: a, male; b–e, valva; f, female; g, sterigma. 41. *P. optimana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7.



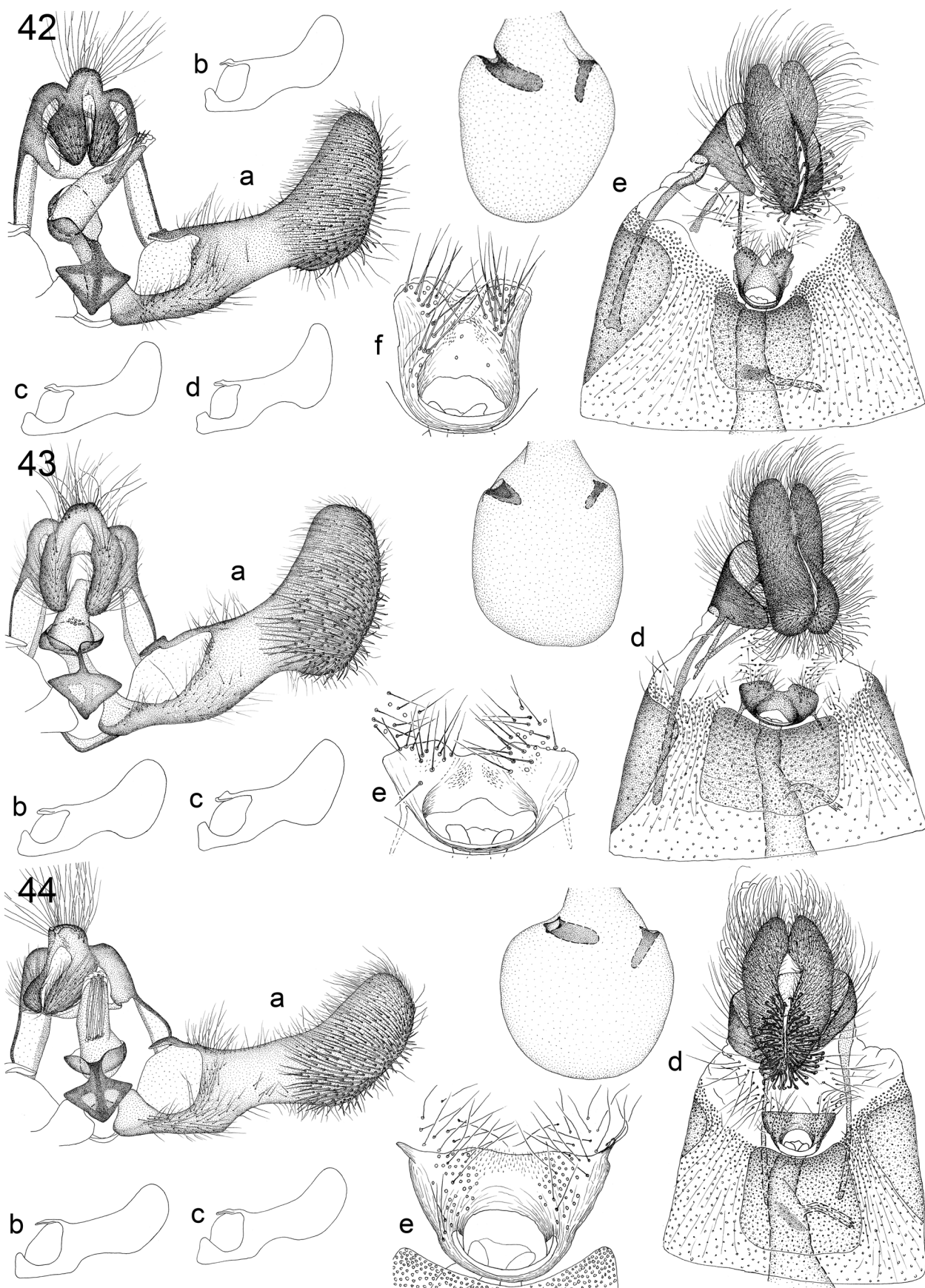


PLATE 20. 42. *Pelochrista hyponomeutana*: a, male; b–d, valva; e, female; f, sterigma. 43. *P. canariana*: a, male; b–c, valva; d, female; e, sterigma. 44. *P. avalona*: a, male; b–c, valva; d, female; e, sterigma.



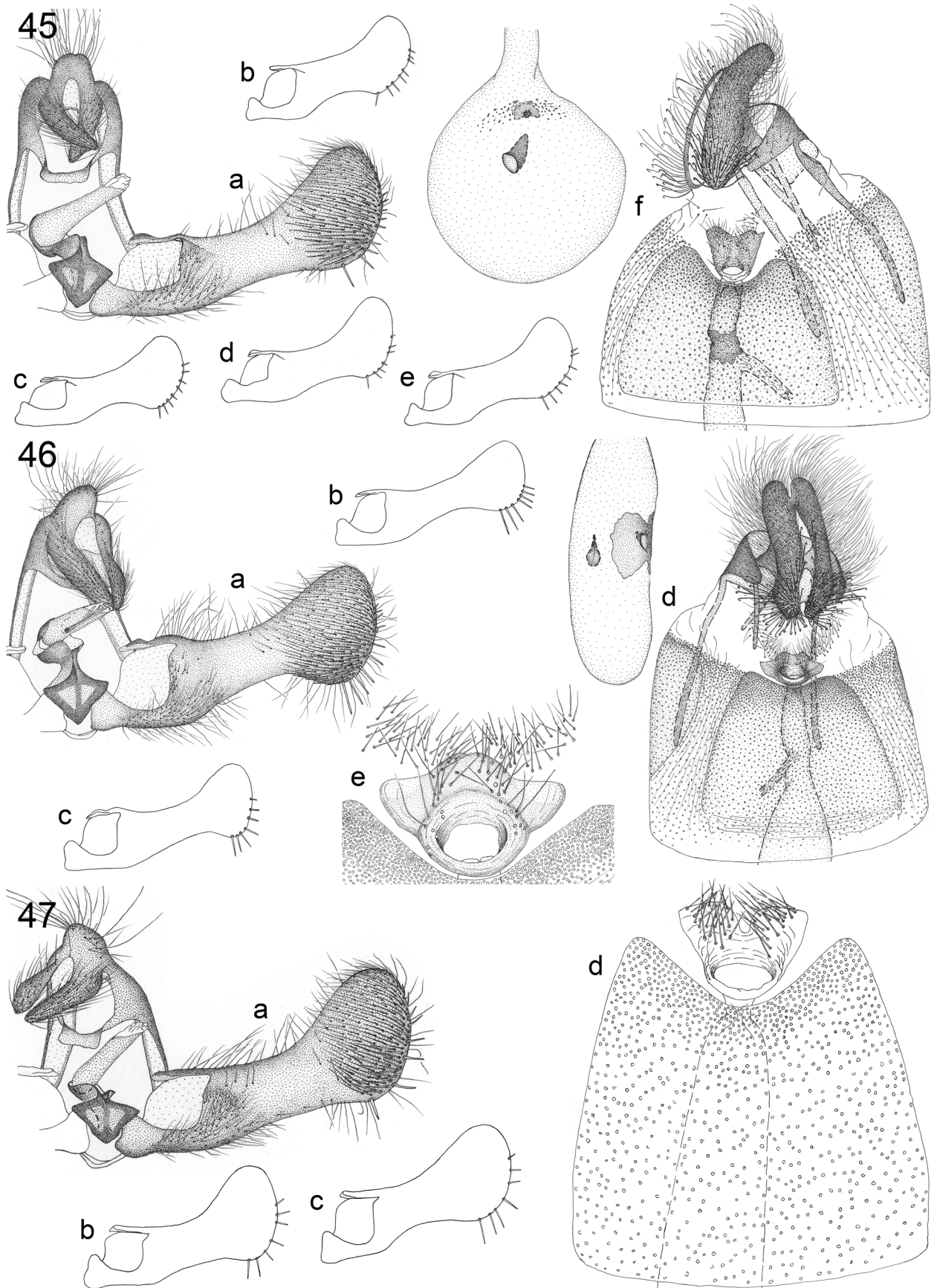
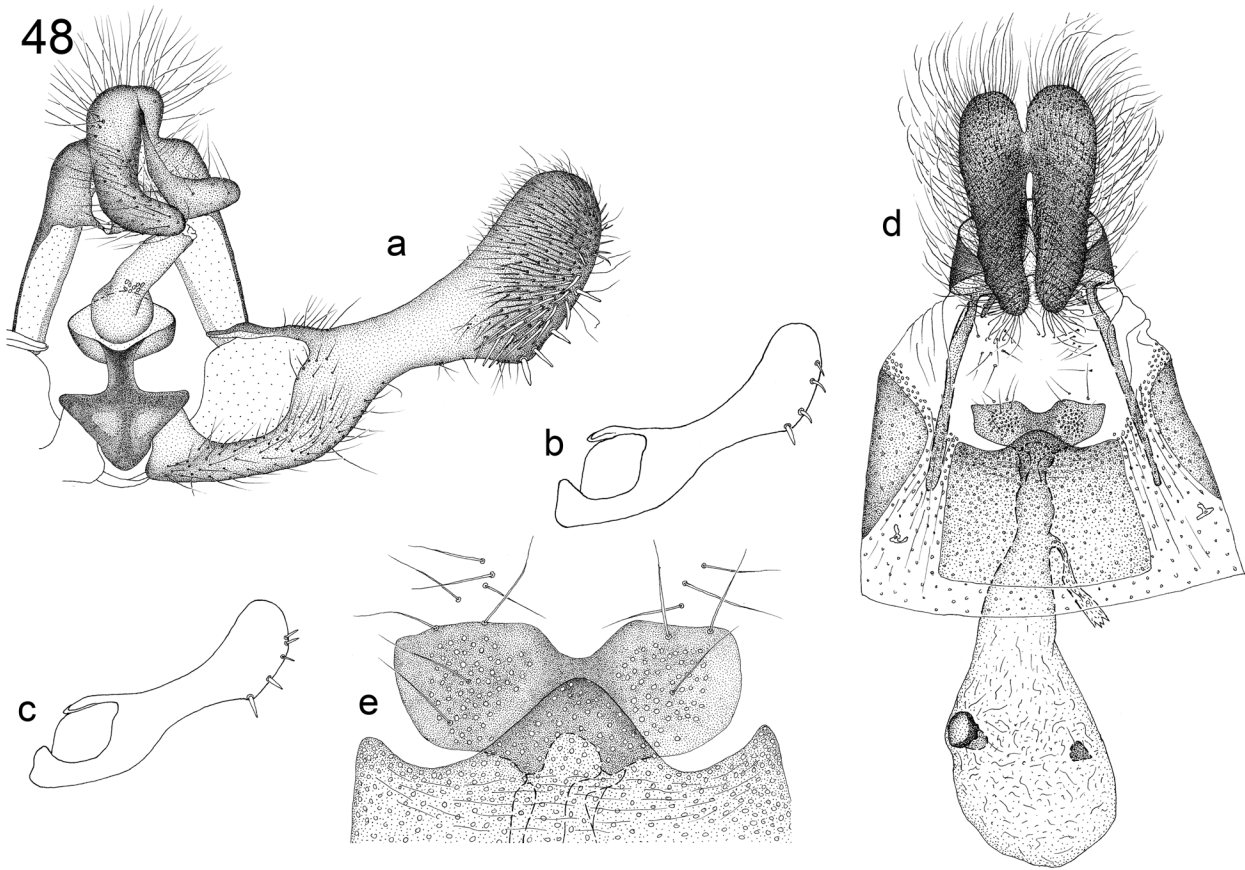


PLATE 21. 45. *Pelochrista persolita*: a, male; b–e, valva; f, female. 46. *P. graziella*: a, male; b–c, valva; d, female; e, sterigma. 47. *P. diabolana*: a, male; b–c, valva; d, sterigma/sternum 7.

48



49

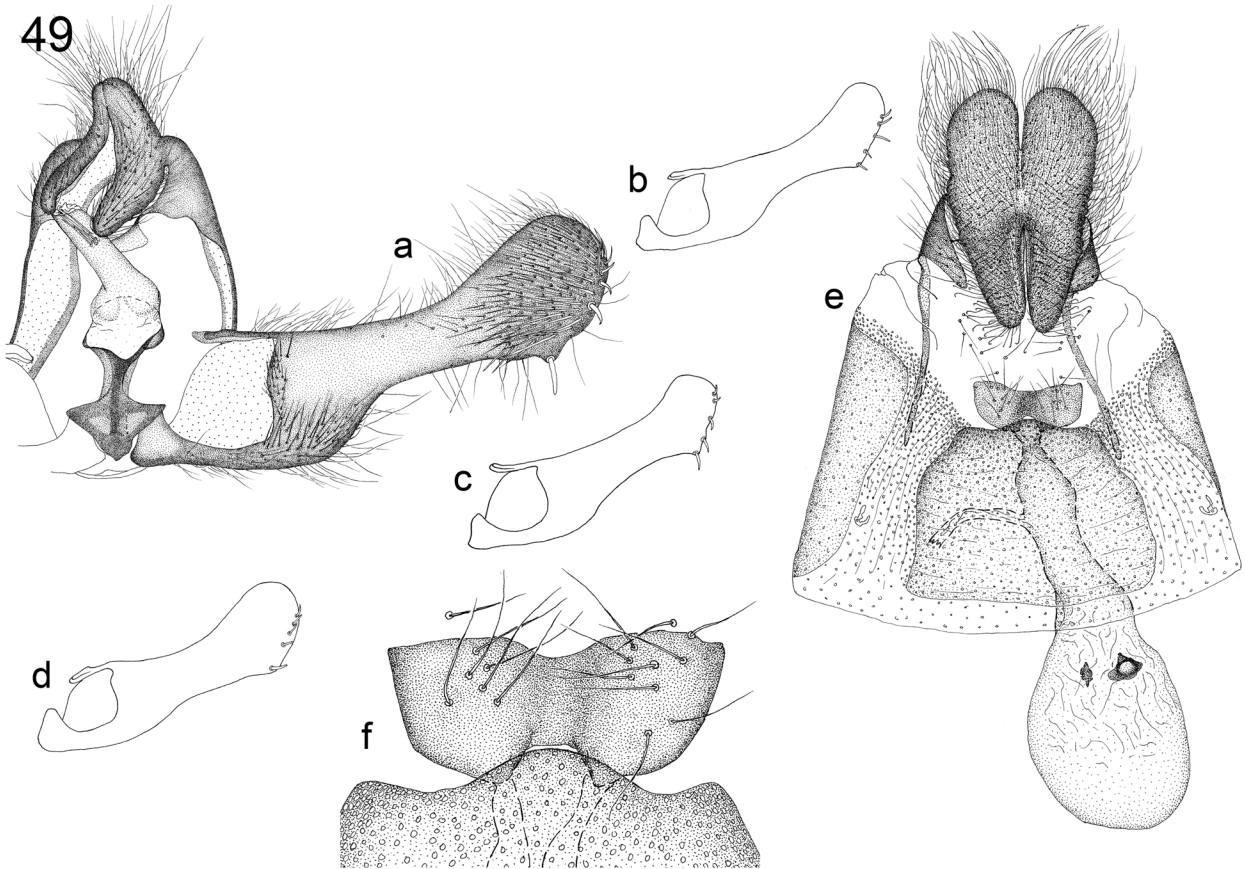
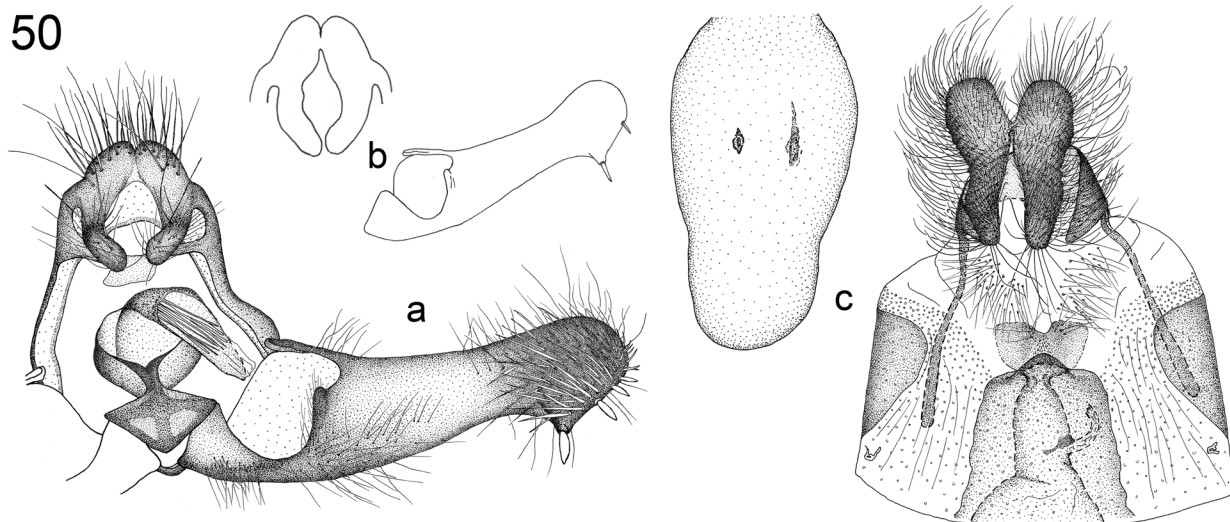


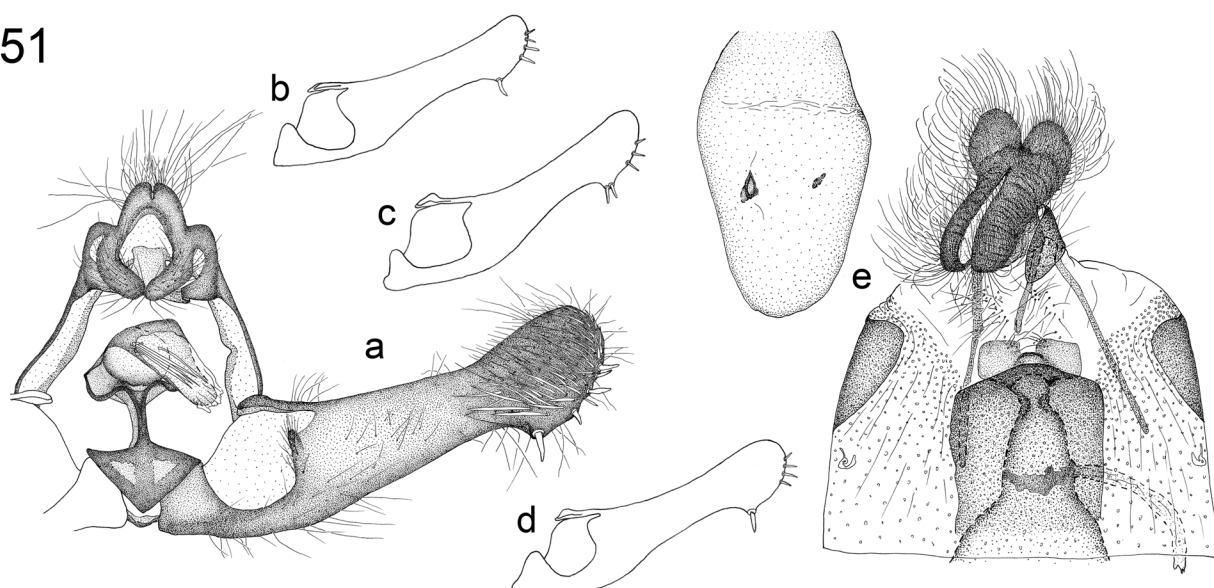
PLATE 22. 48. *Pelochrista maculosa*: a, male; b–c, valva; d, female; e, sterigma. 49. *P. lafontainei*: a, male; b–d, valva; e, female; f, sterigma.



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51



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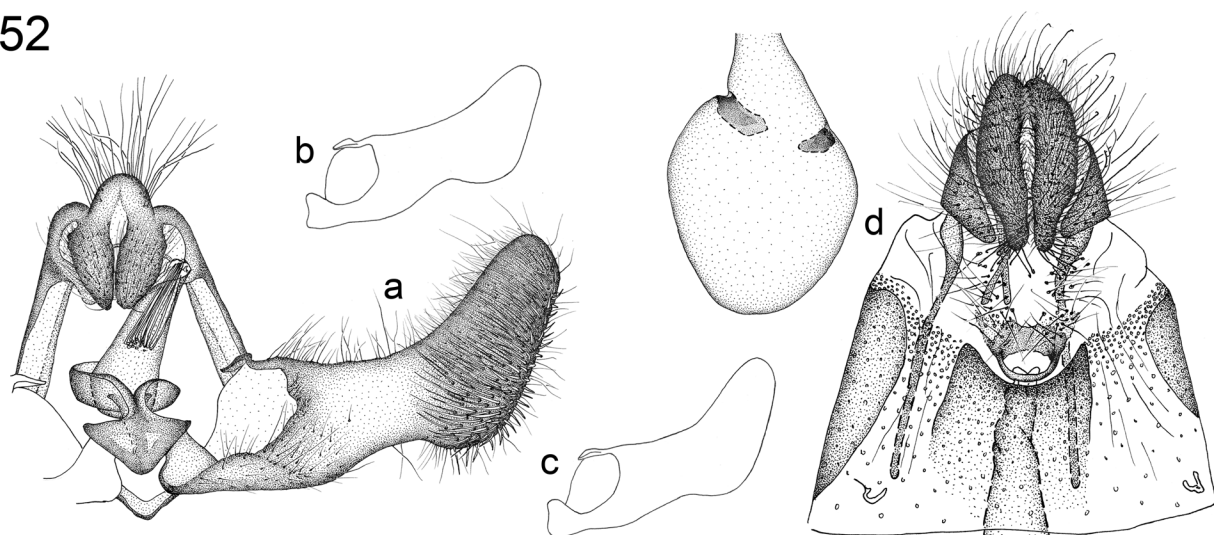


PLATE 23. 50. *Pelochrista fuscotriata*: a, male; b, uncus/socii and associated valva; c, female. 51. *P. fuscosparsa*: a, male; b–d, valva; e, female. 52. *P. spaldingana*: a, male; b–c, valva; d, female.



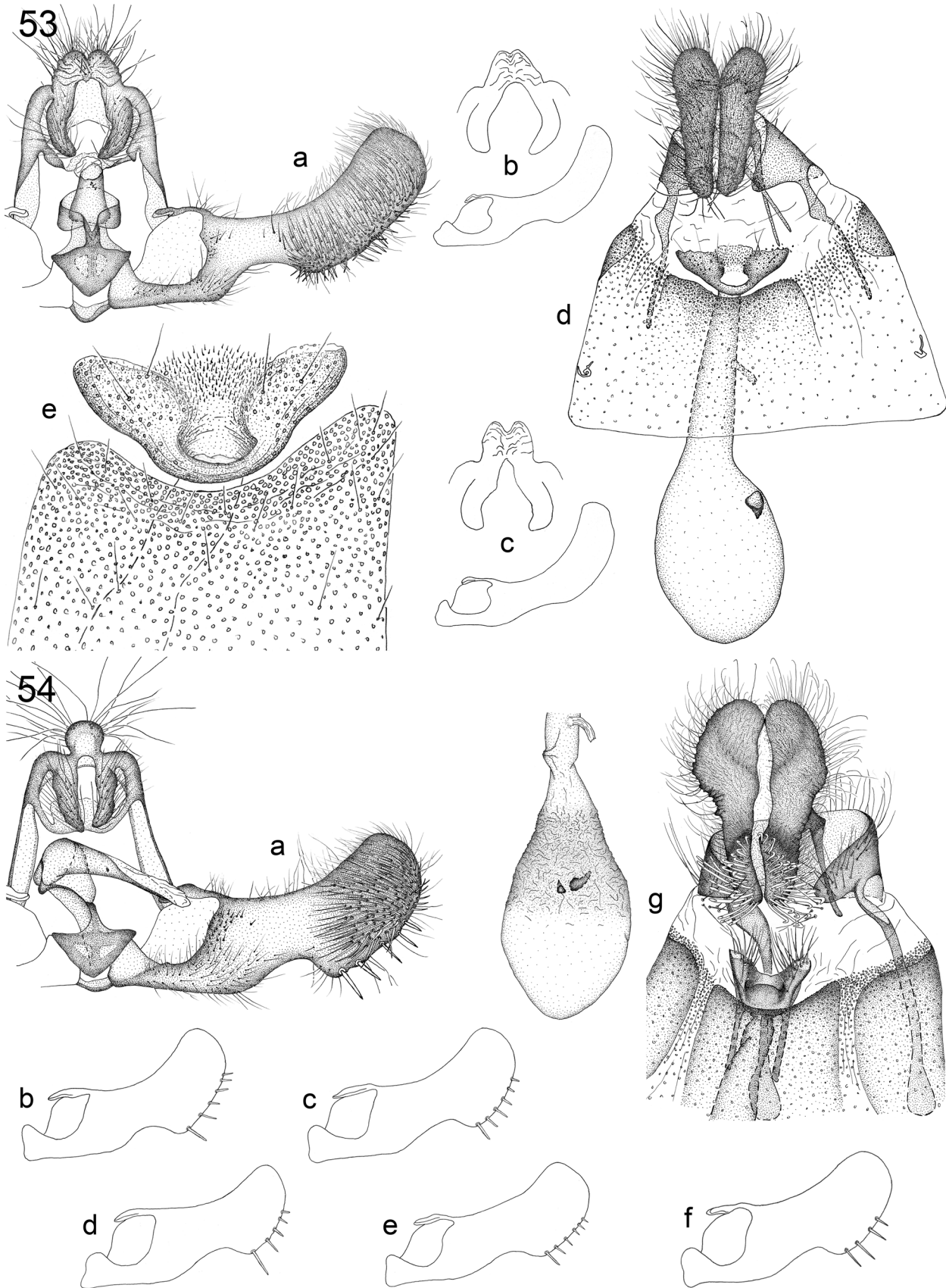
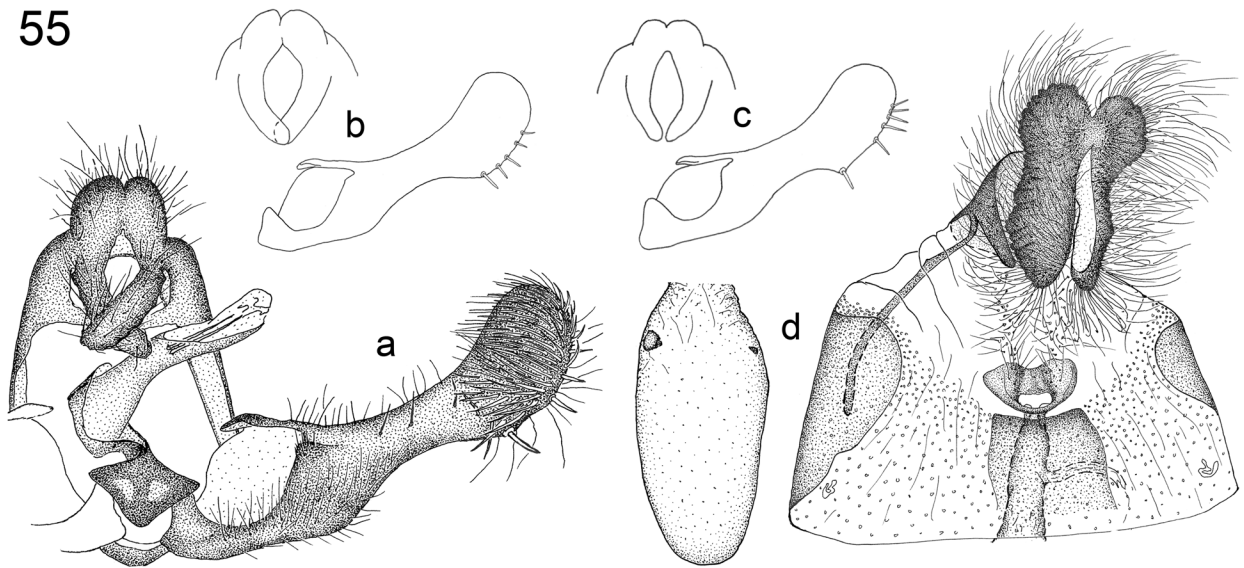
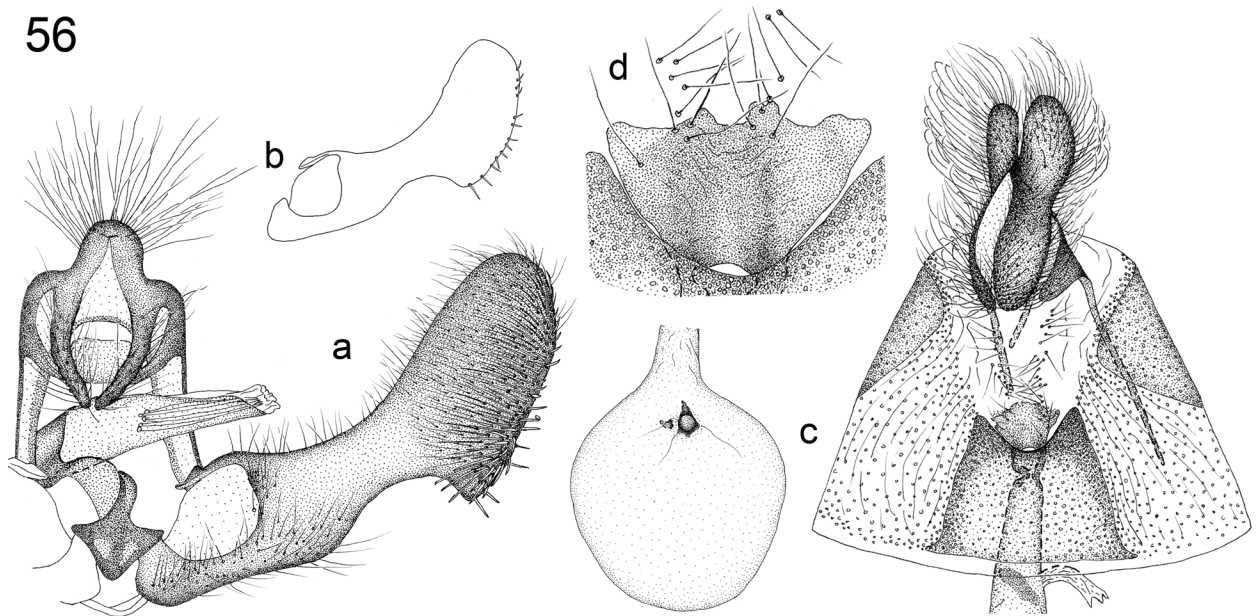


PLATE 24. 53. *Pelochrista fandana*: a, male; b–c, uncus/socii and associated valva; d, female; e, sterigma. 54. *P. curlewensis*: a, male; b–f, valva; g, female.

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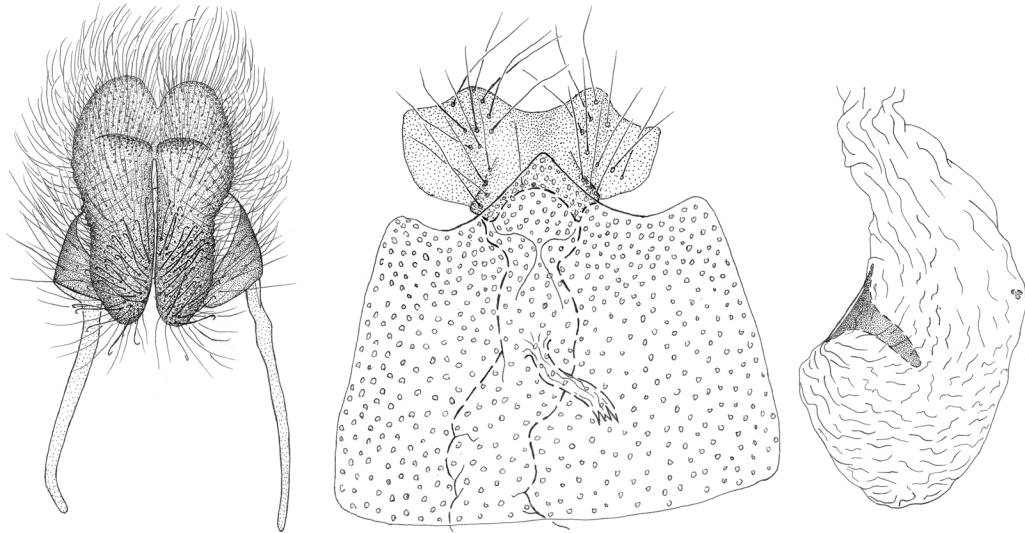
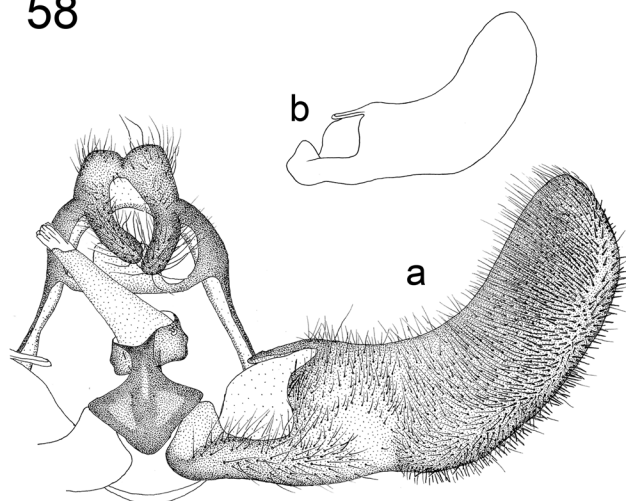


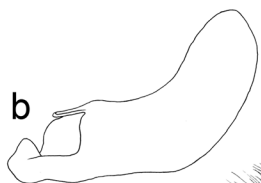
PLATE 25. **55. *Pelochrista biquadrana***: a, male; b–c, uncus/socii and associated valva; d, female. **56. *P. mescalerana***: a, male; b, valva; c, female; d, sterigma. **57. *P. fremonti***: female (papillae anales/tergum 8, sterigma/sternum 7, corpus bursae).



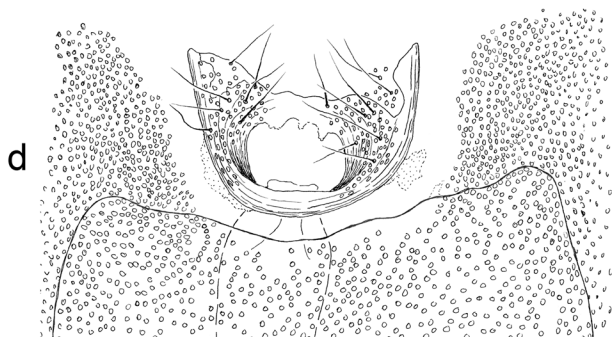
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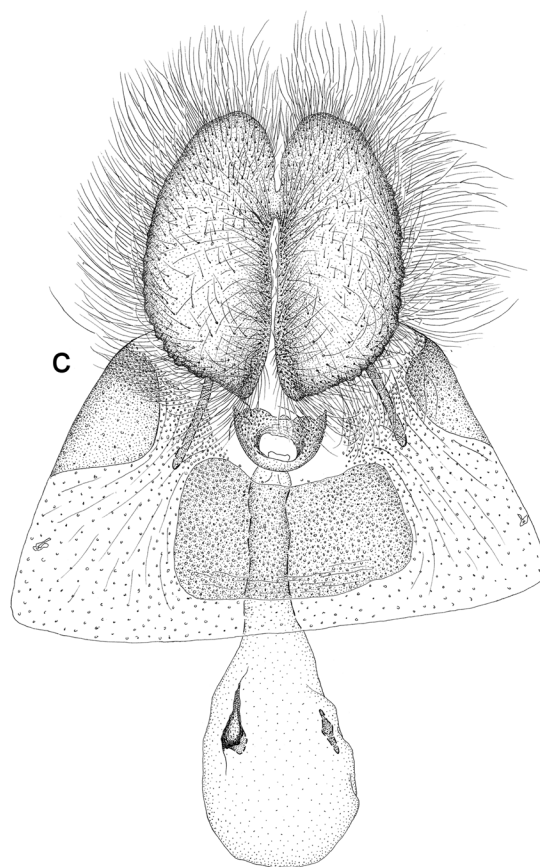
b



a

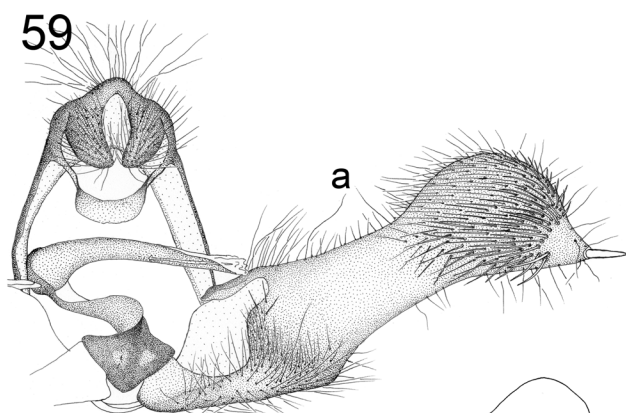


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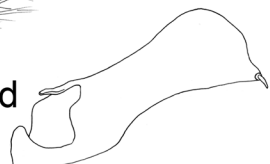
c

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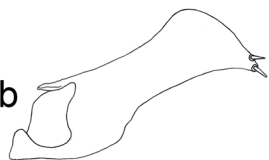


a

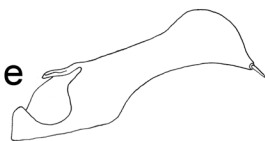
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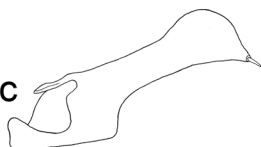
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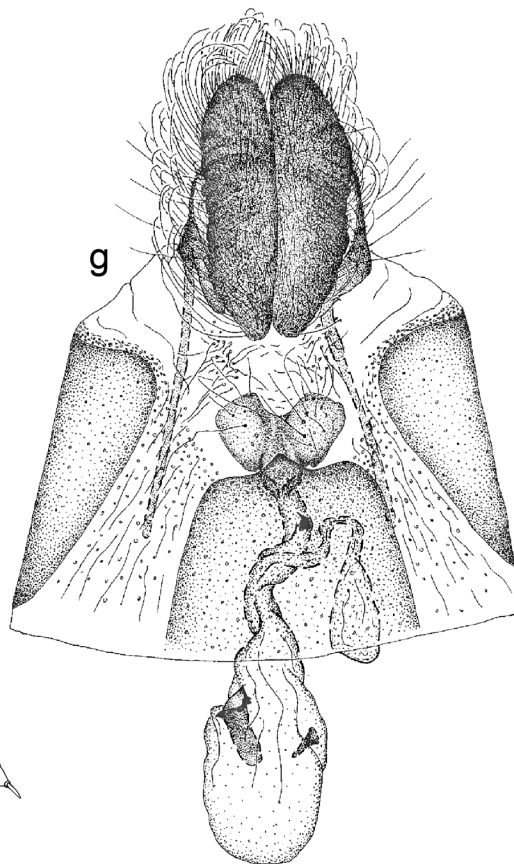
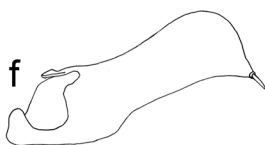
e



c



f



g

PLATE 26. 58. *Pelochrista momana*: a, male; b, valva; c, female; d, sterigma. 59. *P. gelattana*: a, male; b–f, valva; g, female.



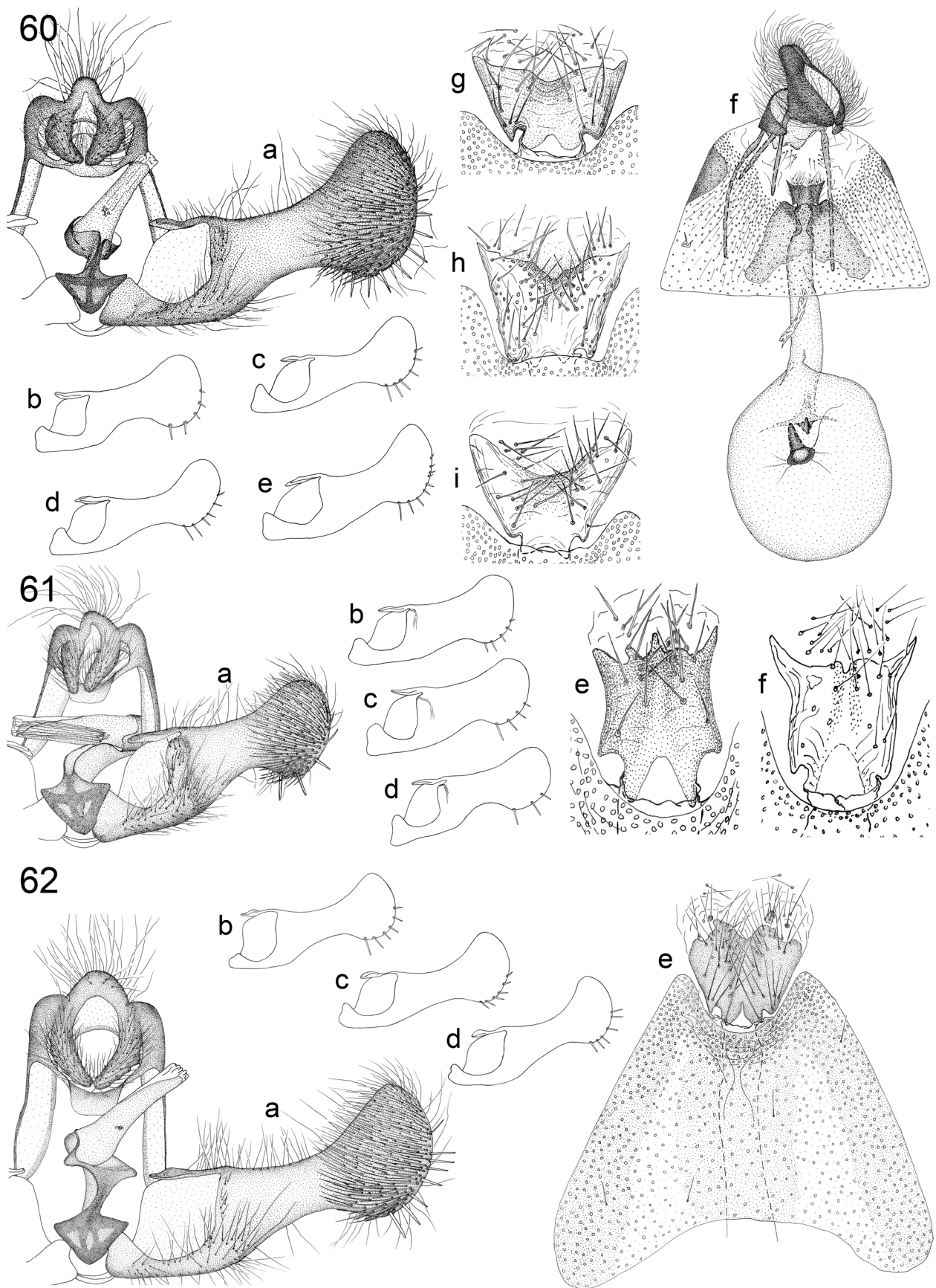
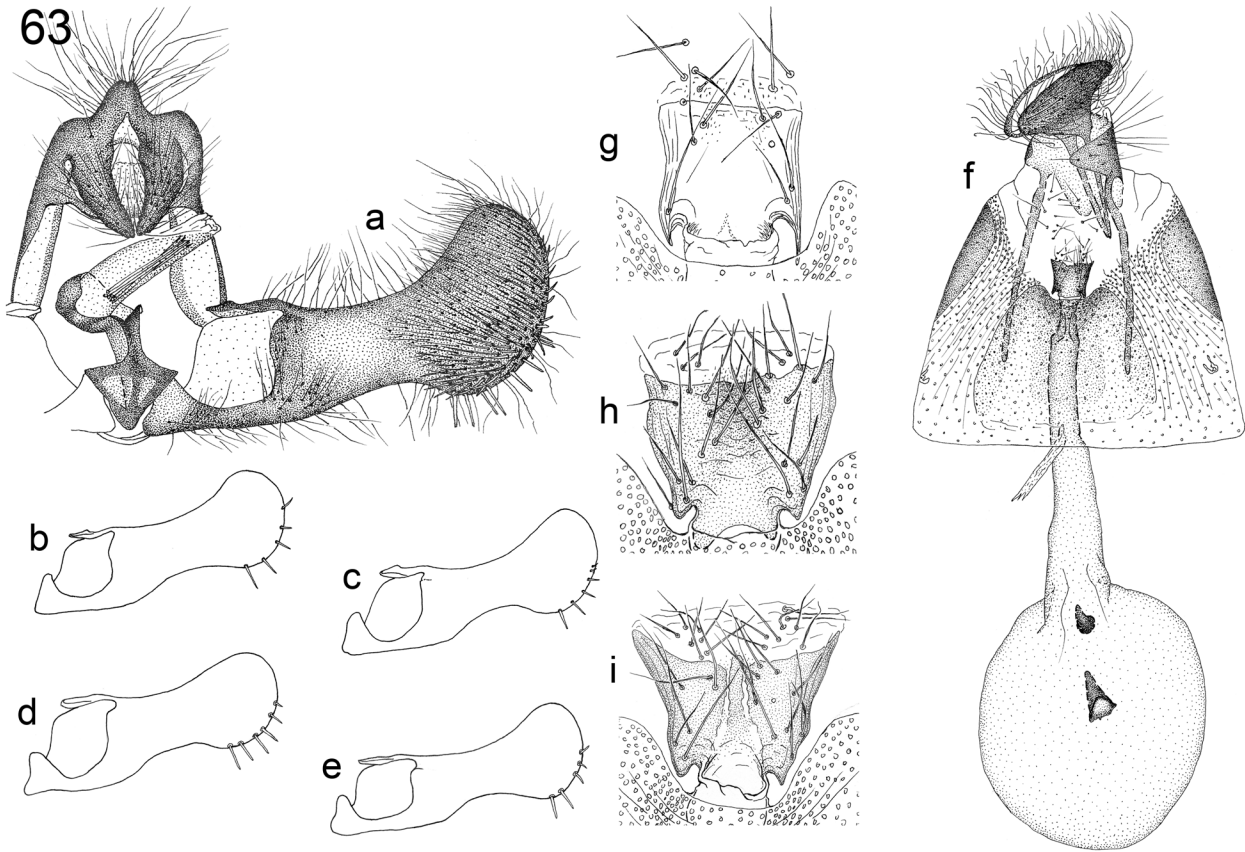


PLATE 27. 60. *Pelochrista ridingsana*: a, male; b–e, valva; f, female; g–i, sterigma. 61. *P. argentifurcatana*: a, male; b–d, valva; e–f, sterigma. 62. *P. griselda*: a, male; b–d, valva; e, sterigma/sternum 7.

63



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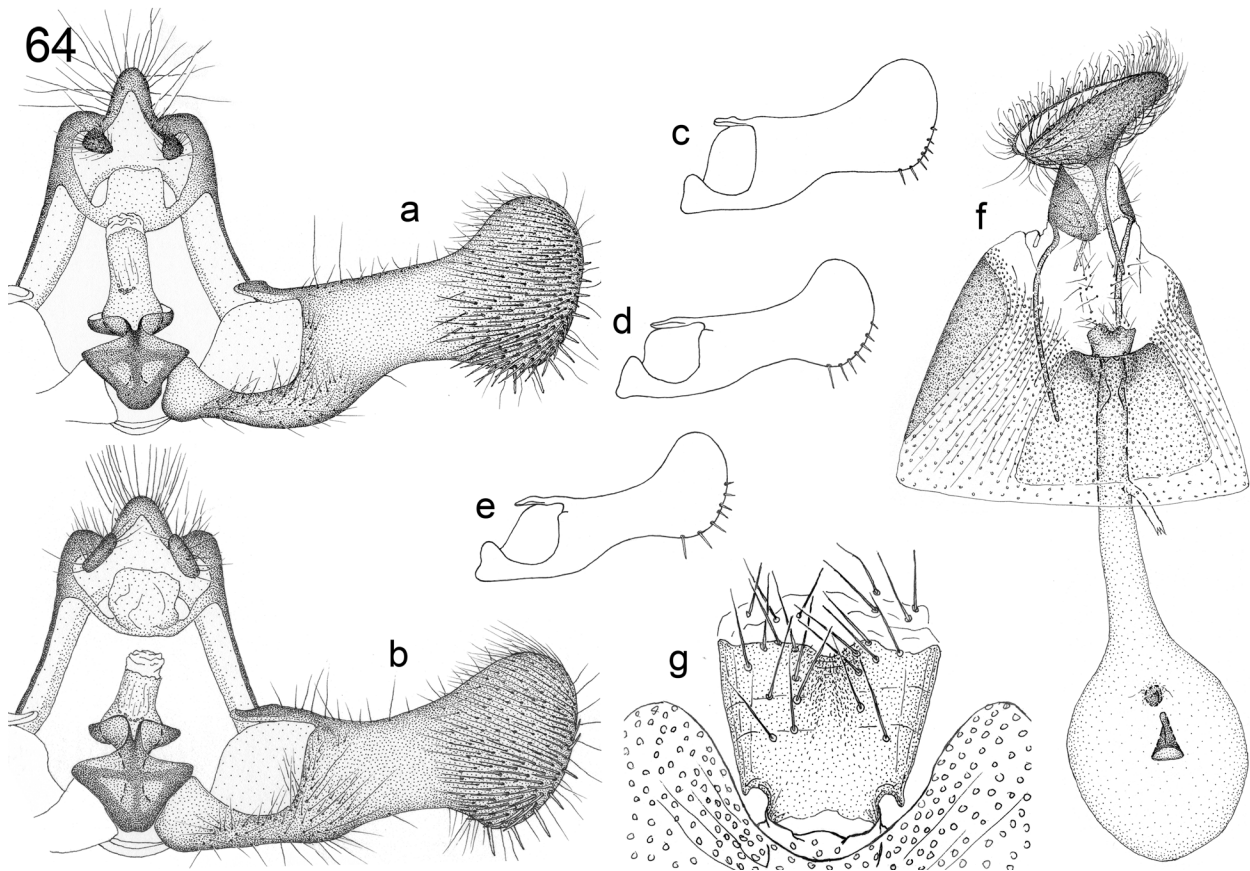


PLATE 28. 63. *Pelochrista fernaldana*: a, male; b-e, valva; f, female; g-i, sterigma. 64. *P. immaculana*: a-b, male; c-e, valva; f, female; g, sterigma.



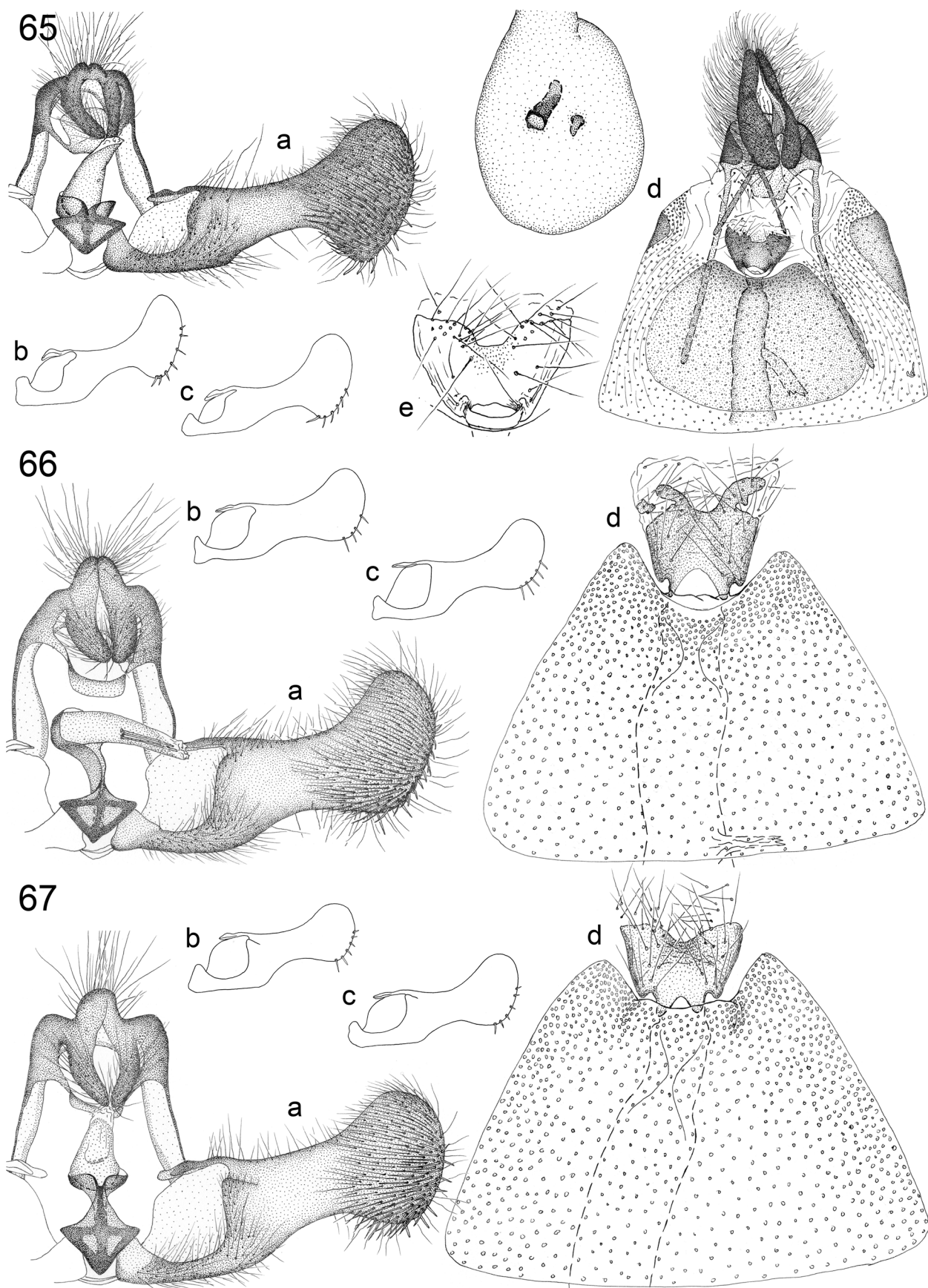
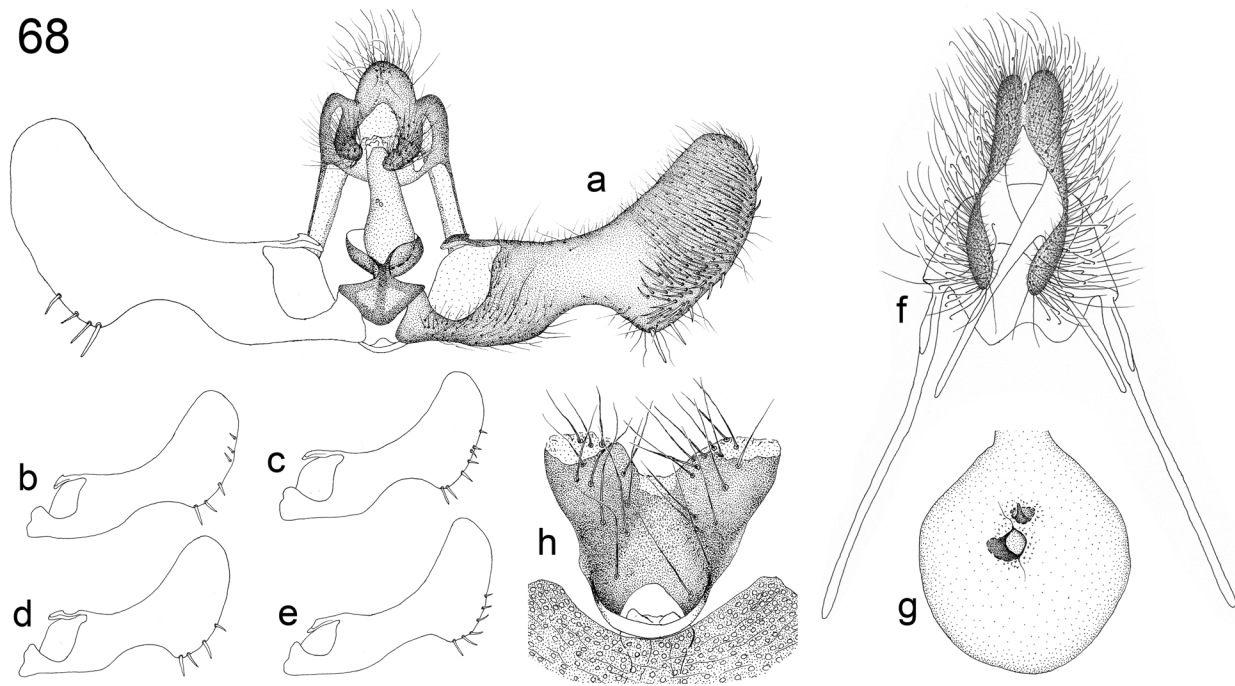


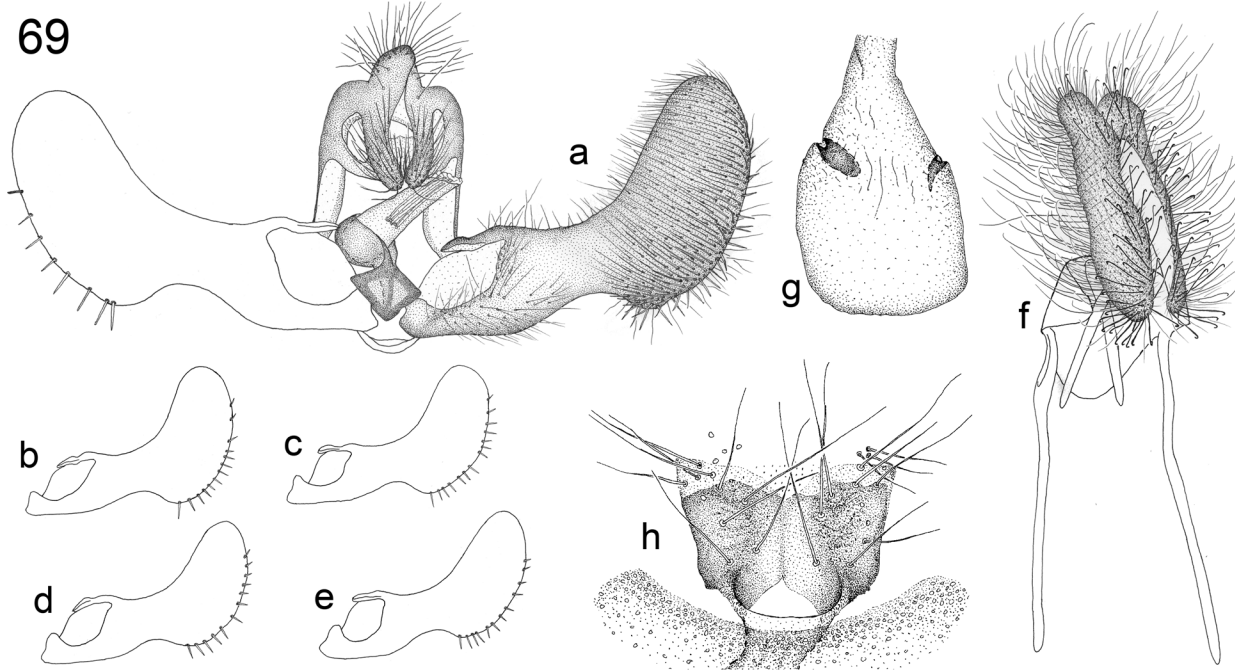
PLATE 29. 65. *Pelochrista aurilineana*: a, male; b–c, valva; d, female; e, sterigma. 66. *P. sandiego*: a, male; b–c, valva; d, sterigma/sternum 7. 67. *P. atascosana*: a, male; b–c, valva; d, sterigma/sternum 7.



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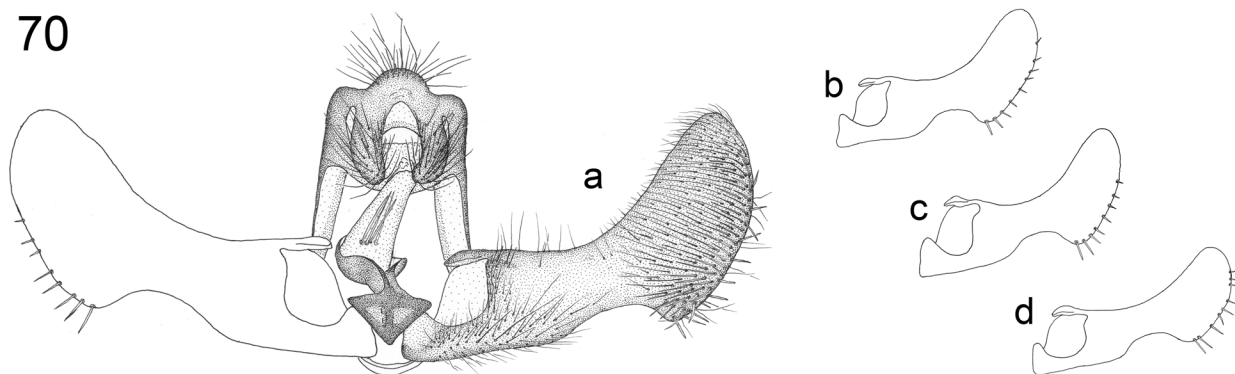


PLATE 30. **68. *Pelochrista luridana*:** a, male; b–e, valva; f, papillae anales/tergum 8; g, corpus bursae; h, sterigma. **69. *P. totana*:** a, male; b–e, valva; f, papillae anales/tergum 8; g, corpus bursae; h, sterigma. **70. *P. taosana*:** a, male; b–d, valva.

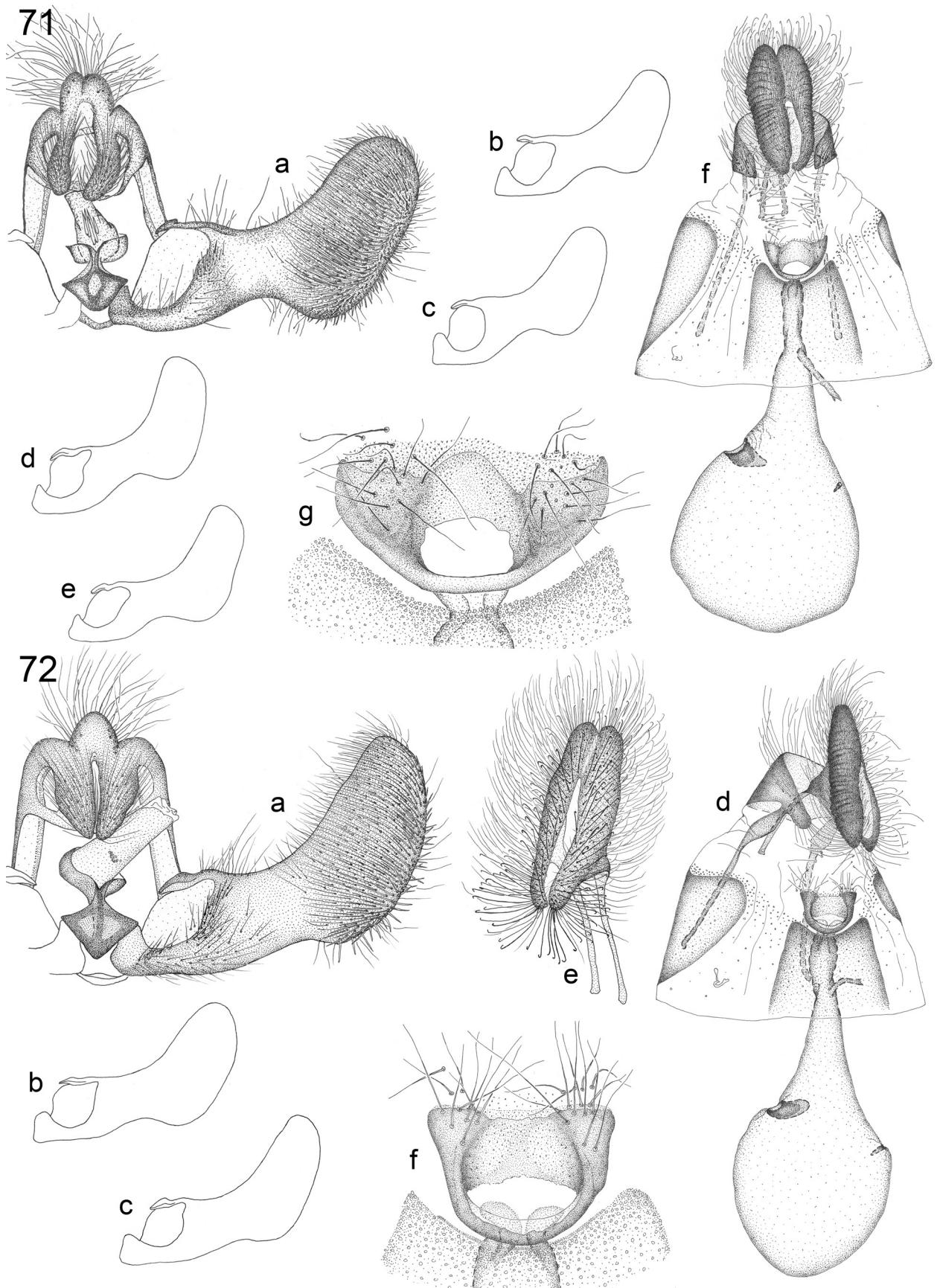


PLATE 31. 71. *Pelochrista larana*: a, male; b–e, valva; f, female; g, sterigma. 72. *P. nordini*: a, male; b–c, valva; d, female; e, papillae anales; f, sterigma.



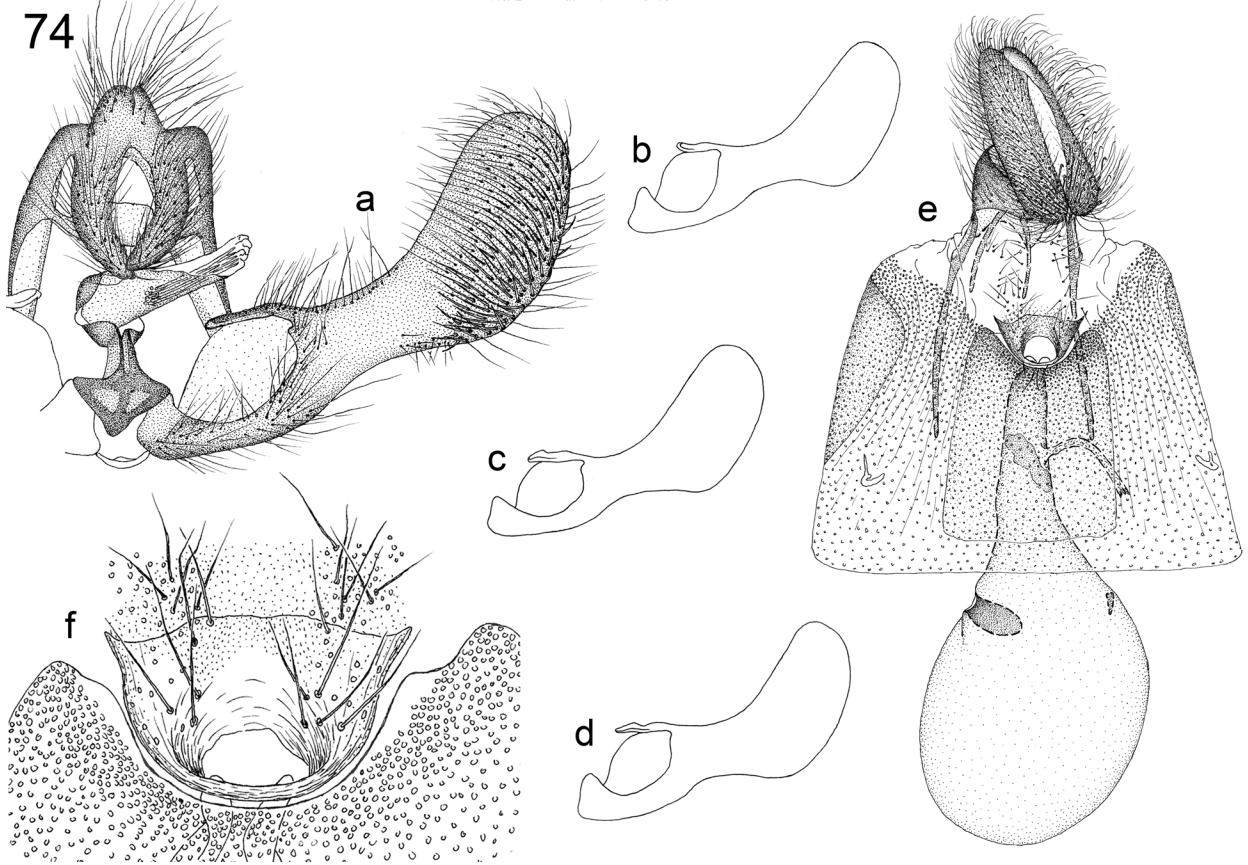
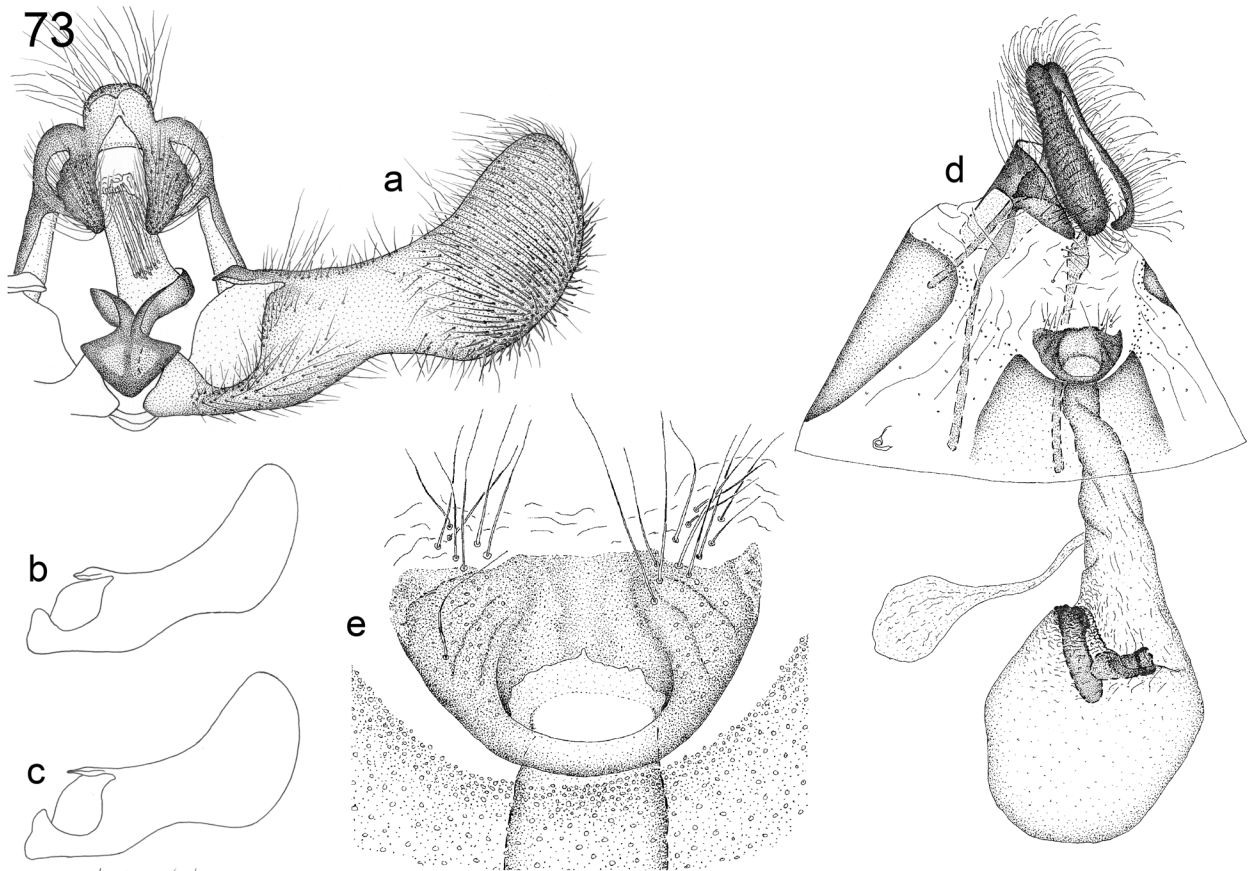


PLATE 32. 73. *Pelochrista piperata*: a, male; b–c, valva; d, female; e, sterigma. 74. *P. eburata*: a, male; b–d, valva; e, female; f, sterigma.



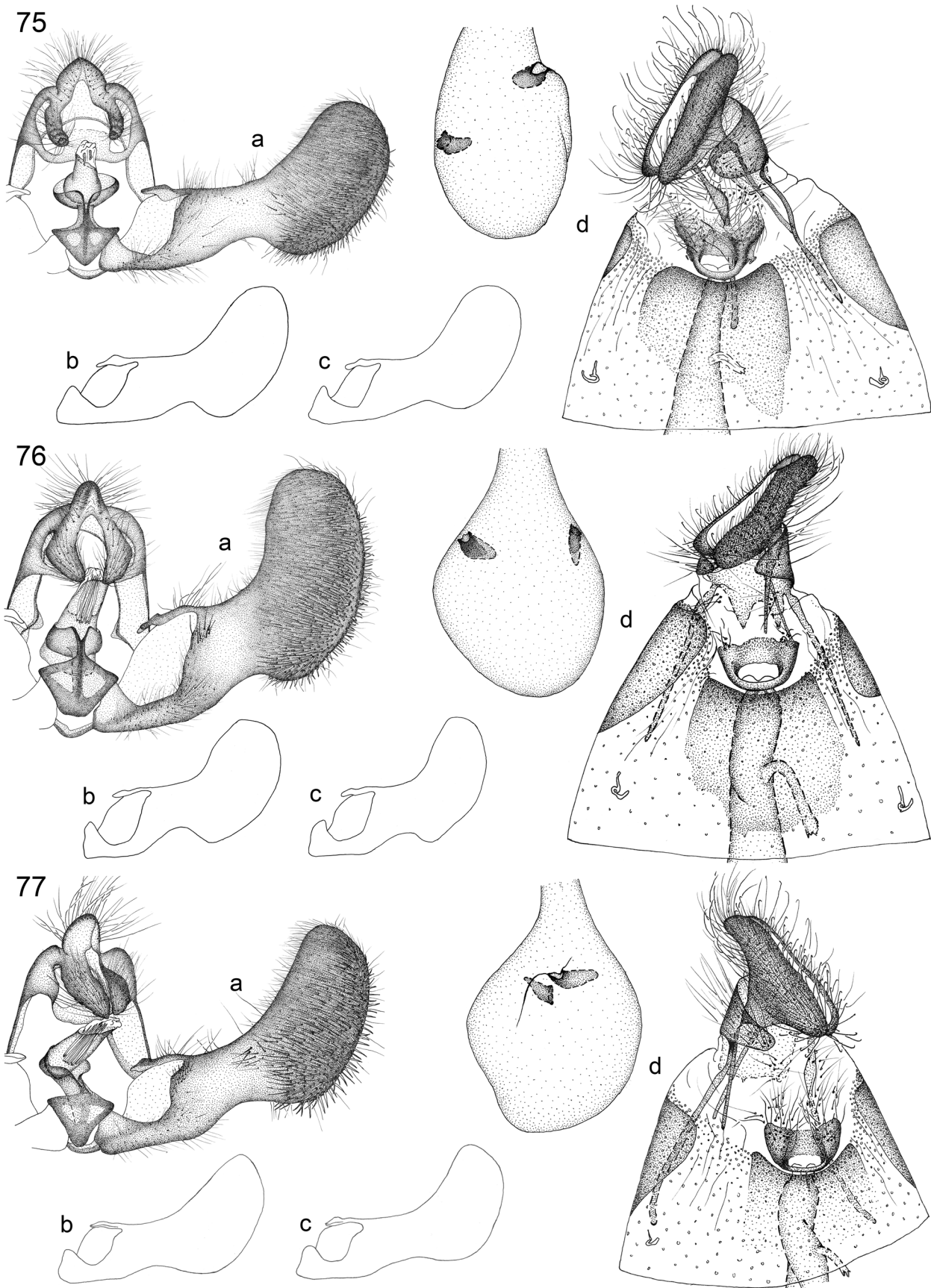
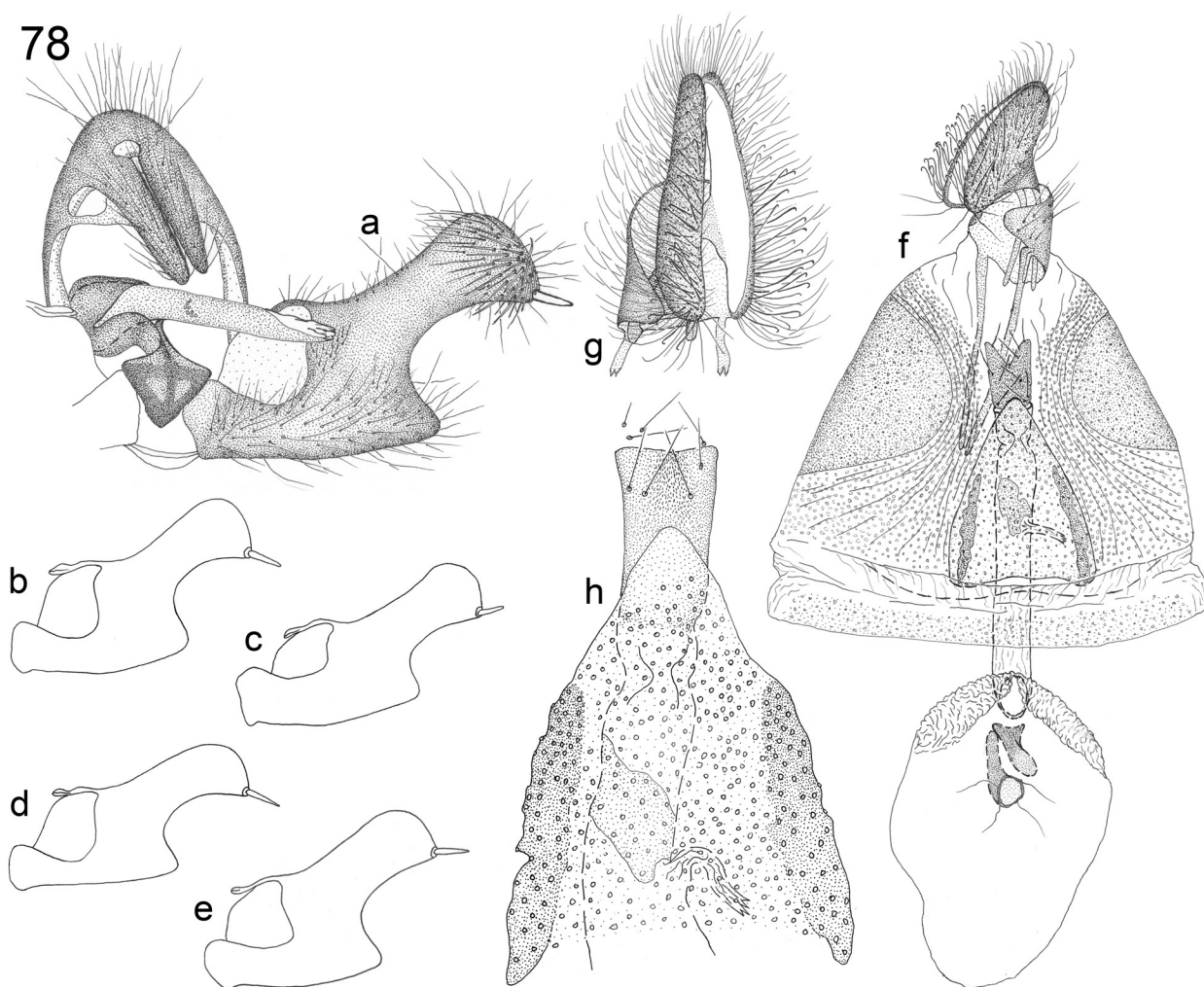


PLATE 33. 75. *Pelochrista invicta*: a, male; b-c, valva; d, female. 76. *P. subinvicta*: a, male; b-c, valva; d, female. 77. *P. snyderana*: a, male; b-c, valva; d, female.

78



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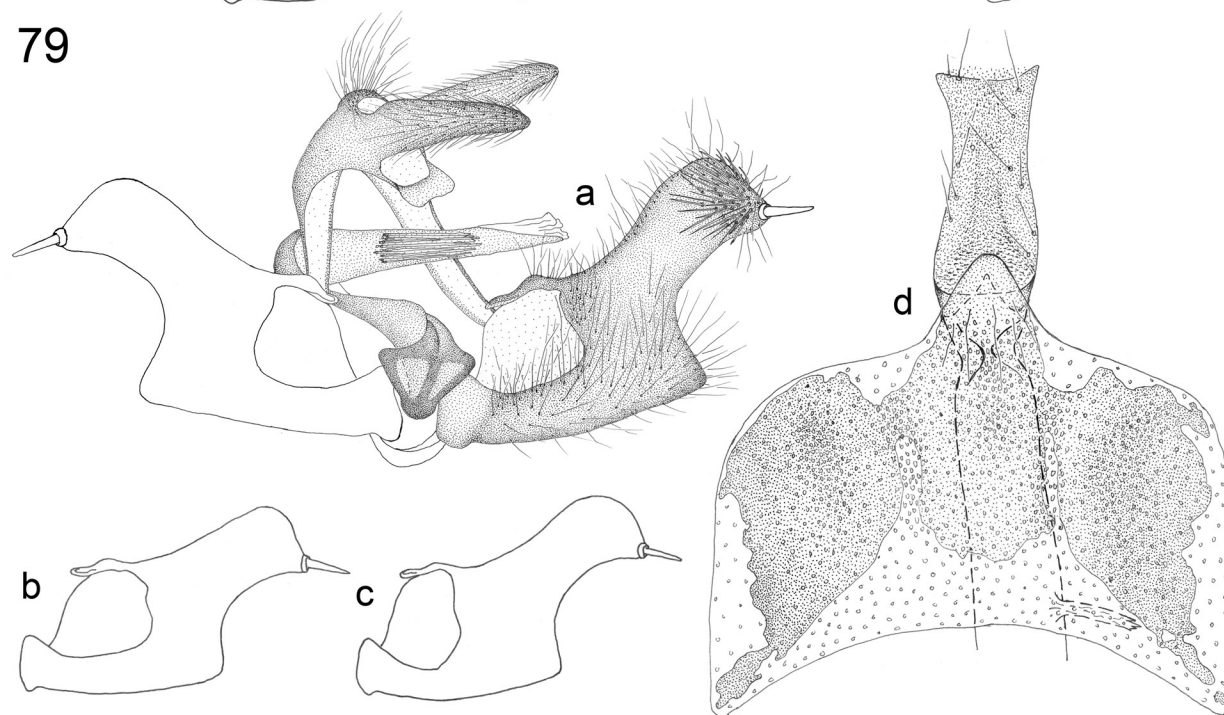
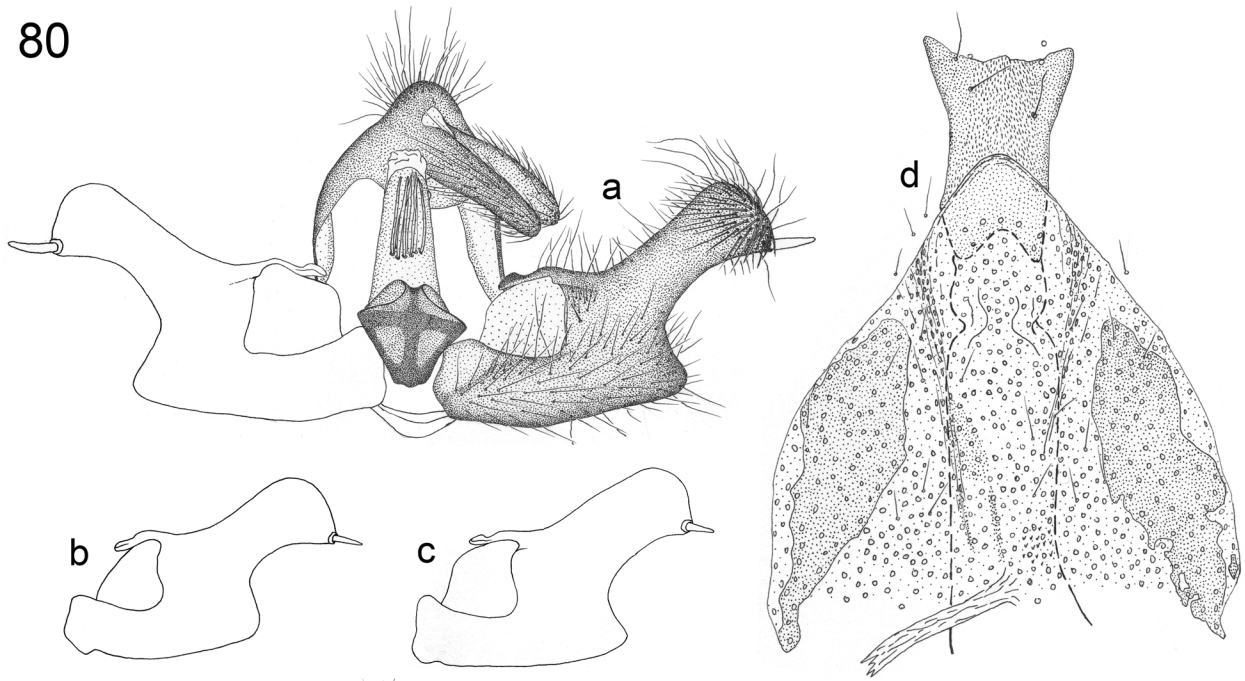


PLATE 34. 78. *Pelochrista canana*: a, male; b-e, valva; f, female; g, papillae anales; h, sterigma/sternum 7. 79. *P. artesiana*: a, male; b-c, valva; d, sterigma/sternum 7.



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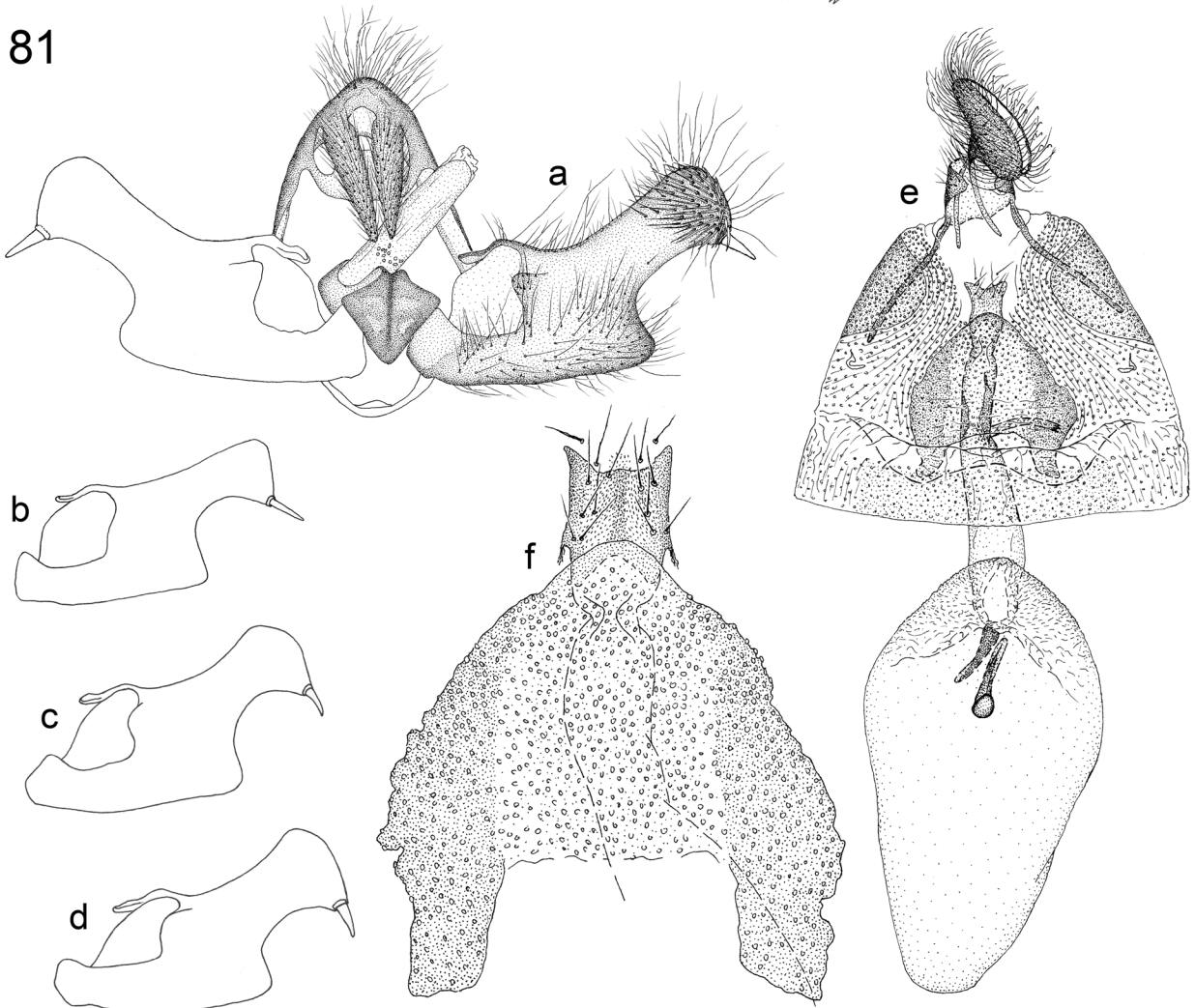


PLATE 35. **80. *Pelochrista erema***: a, male; b–c, valva; d, sterigma/sternum 7. **81. *P. rorana***: a, male; b–d, valva; e, female; f, sterigma/sternum 7.



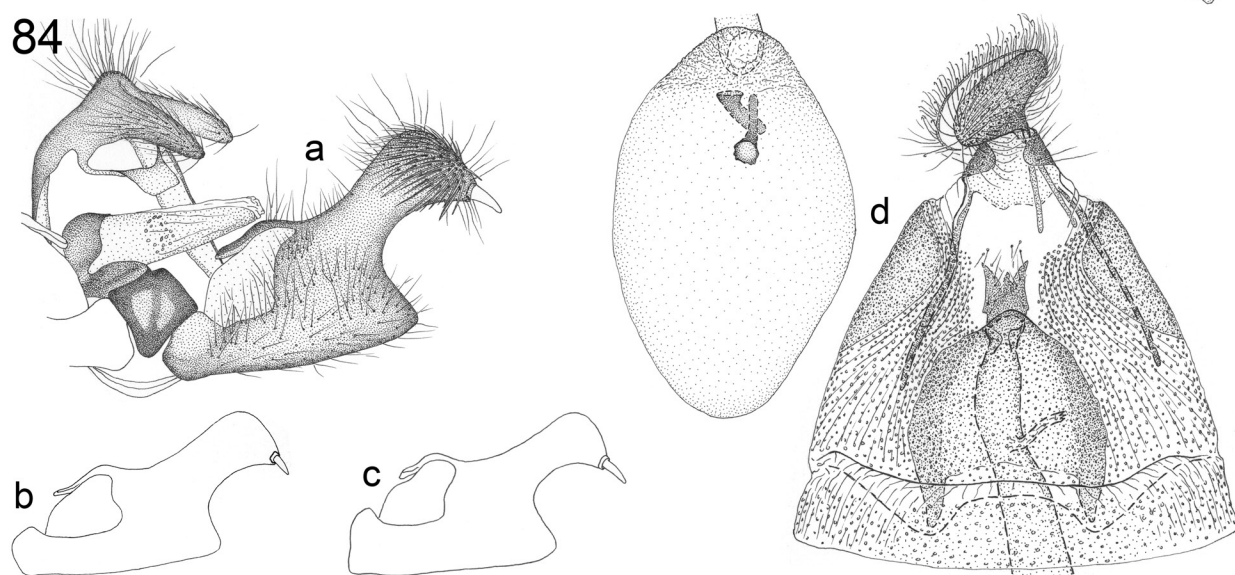
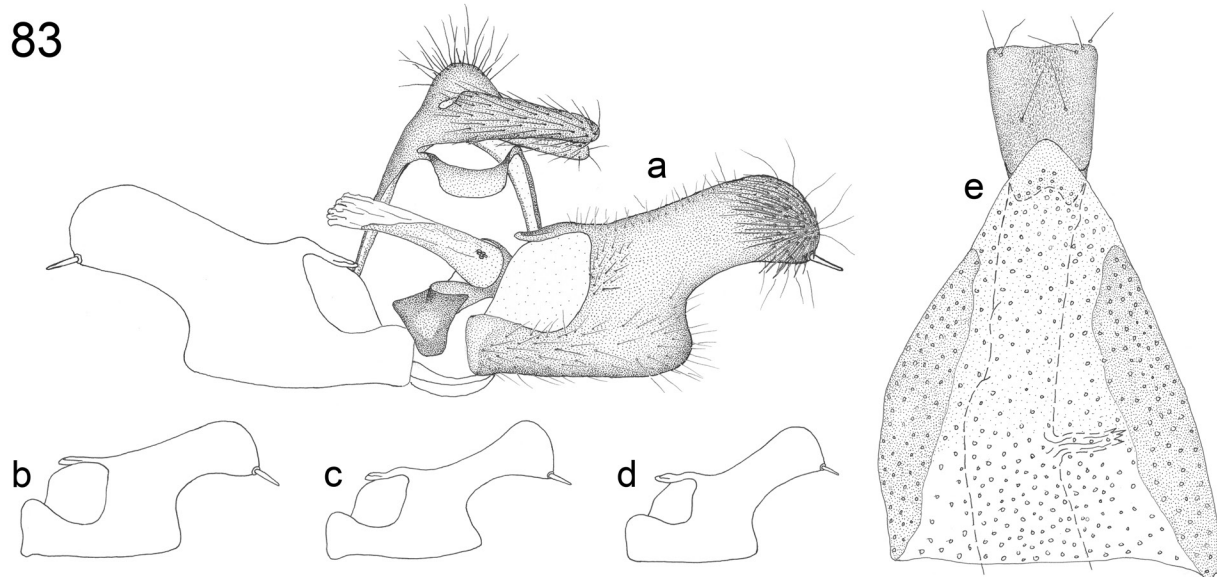
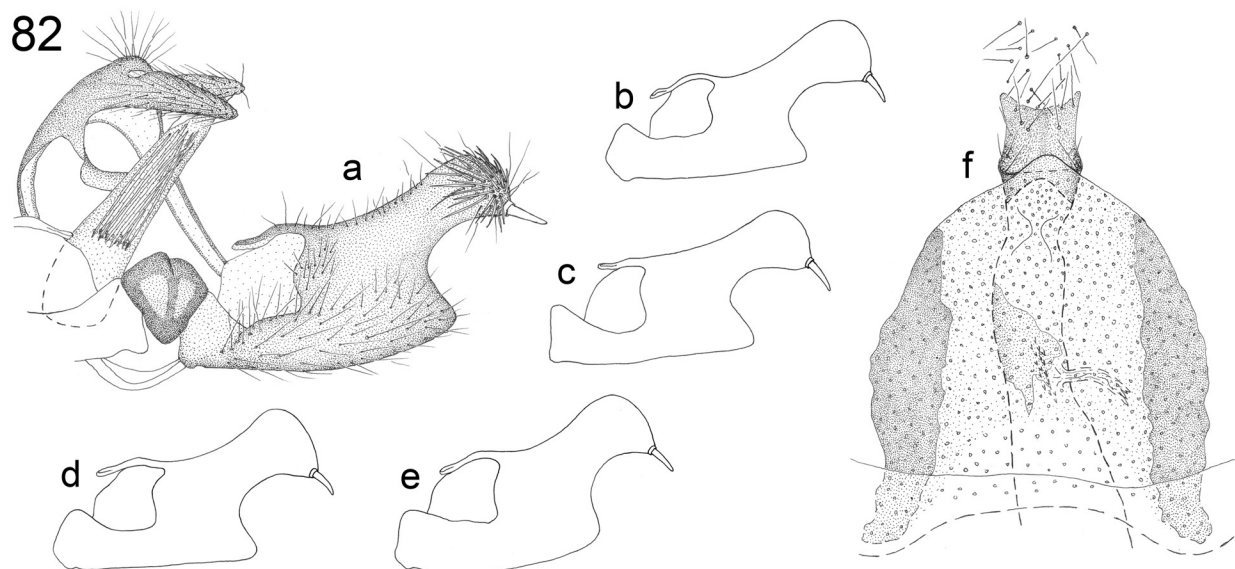


PLATE 36. 82. *Pelochrista vandana*: a, male; b–e, valva; f, sterigma/sternum 7. 83. *P. passerana*: a, male; b–d, valva; e, sterigma/sternum 7. 84. *Pelochrista womonana*: a, male; b–c, valva; d, female.

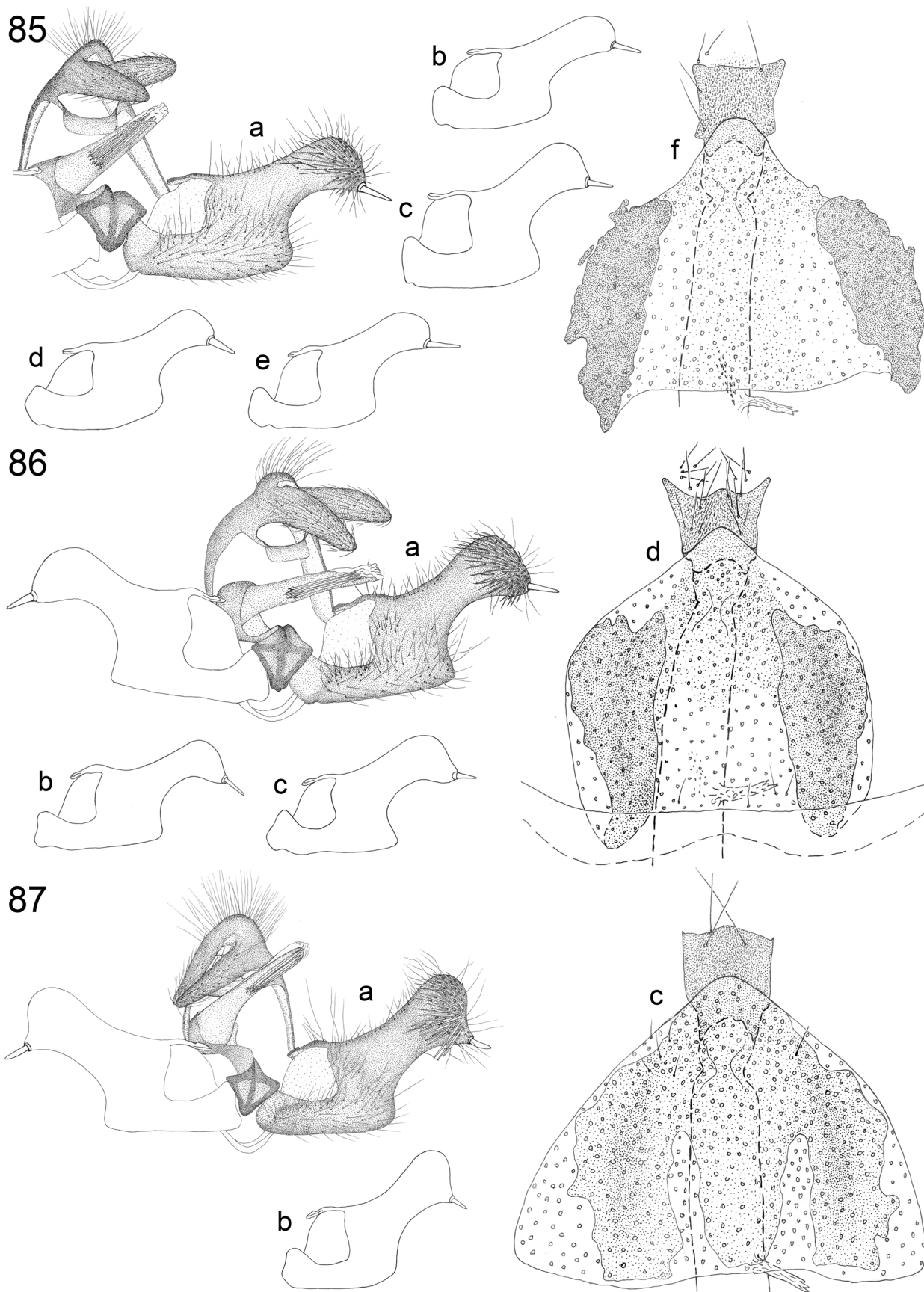


PLATE 37. **85. *Pelochrista zomonana***: a, male; b–e, valva; f, sterigma/sternum 7. **86. *P. olivacea***: a, male; b–c, valva; d, sterigma/sternum 7. **87. *Pelochrista flava***: a, male; b, valva; c, sterigma/sternum 7.



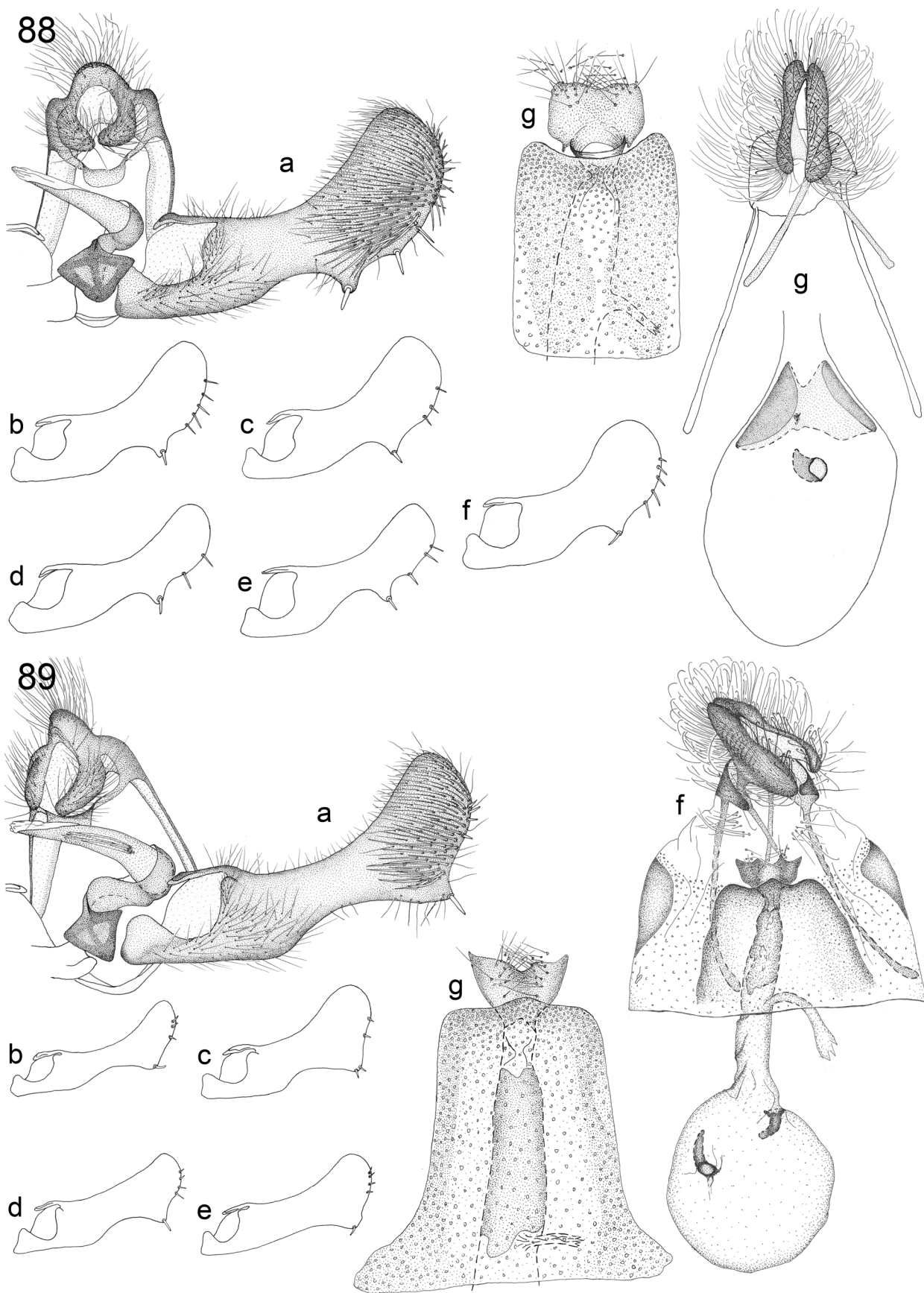


PLATE 38. 88. *Pelochrista emaciatana*: a, male; b–f, valva; g, female (sterigma/sternum 7, papillae anales/tergum 8, corpus bursae). 89. *P. popana*: a, male; b–e, valva; f, female; g, sterigma/sternum 7.



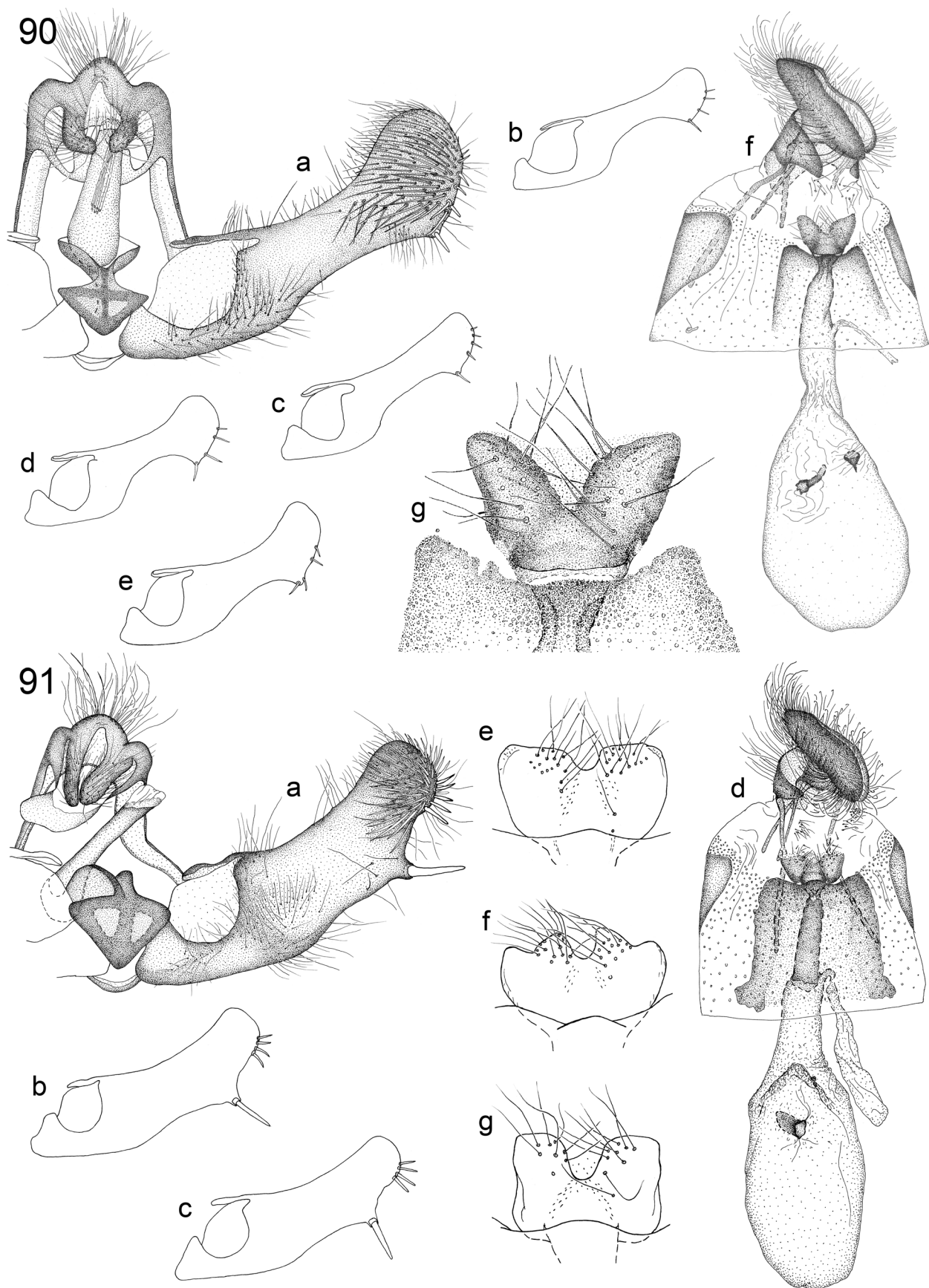
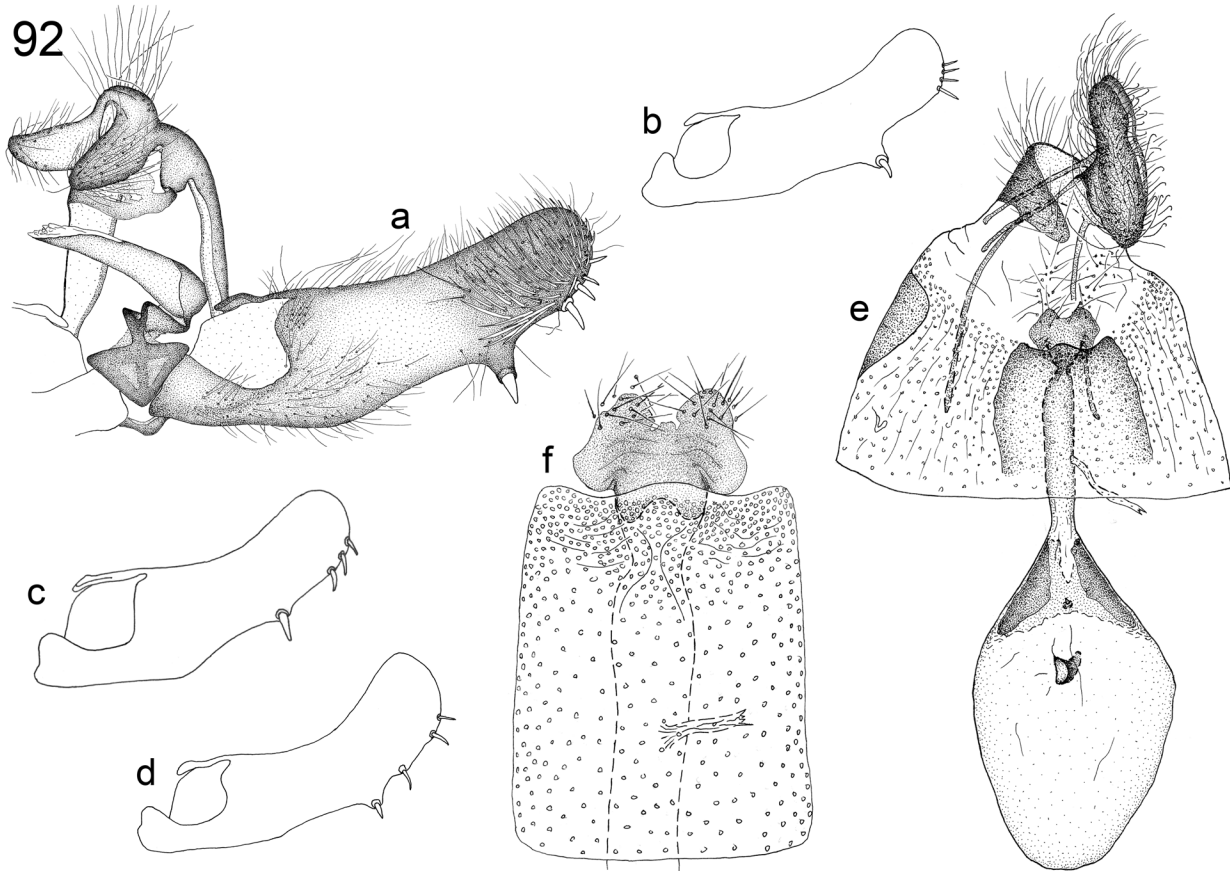


PLATE 39. 90. *Pelochrista powelli*: a, male; b–e, valva; f, female, g, sterigma. 91. *P. reversana*: a, male; b–c, valva; d, female; e–g, sterigma.

92



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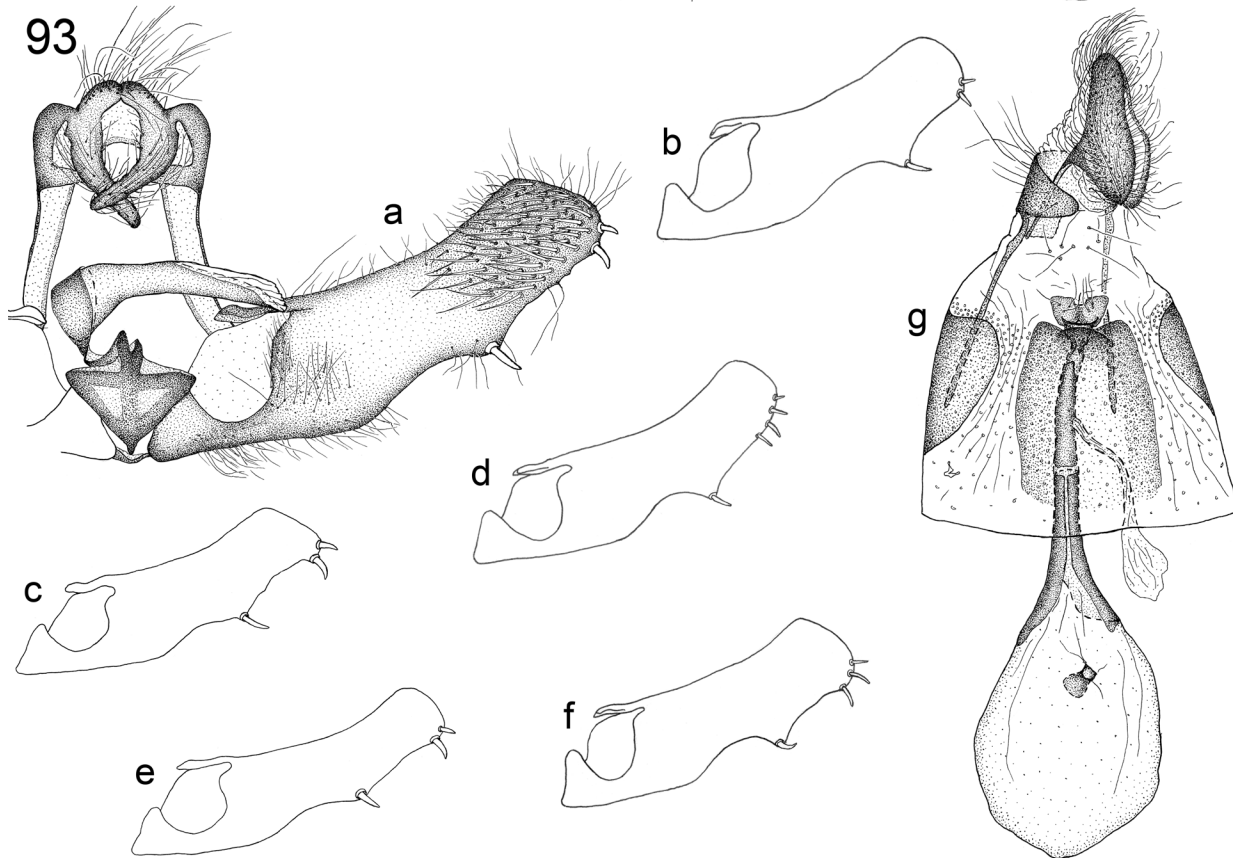


PLATE 40. 92. *Pelochrista ainsliei*: a, male; b–d, valva; e, female; f, sterigma/sternum 7. 93. *P. kingi*: a, male; b–f, valva; g, female.



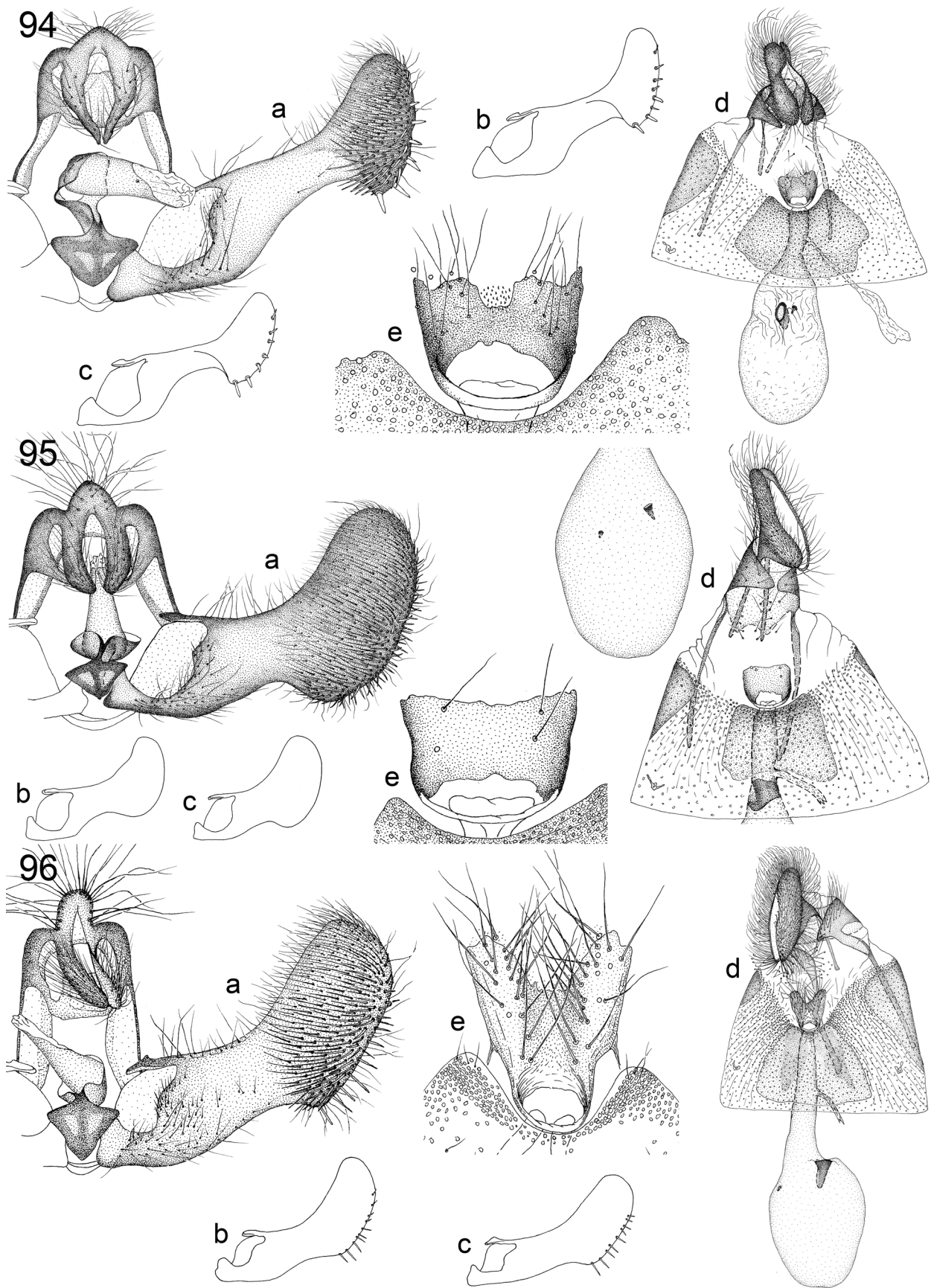


PLATE 41. 94. *Pelochrista blanchardi*: a, male; b-c, valva; d, female; e, sterigma. 95. *P. johnstoni*: a, male; b-c, valva; d, female; e, sterigma. 96. *P. ragonoti*: a, male; b-c, valva; d, female; e, sterigma.



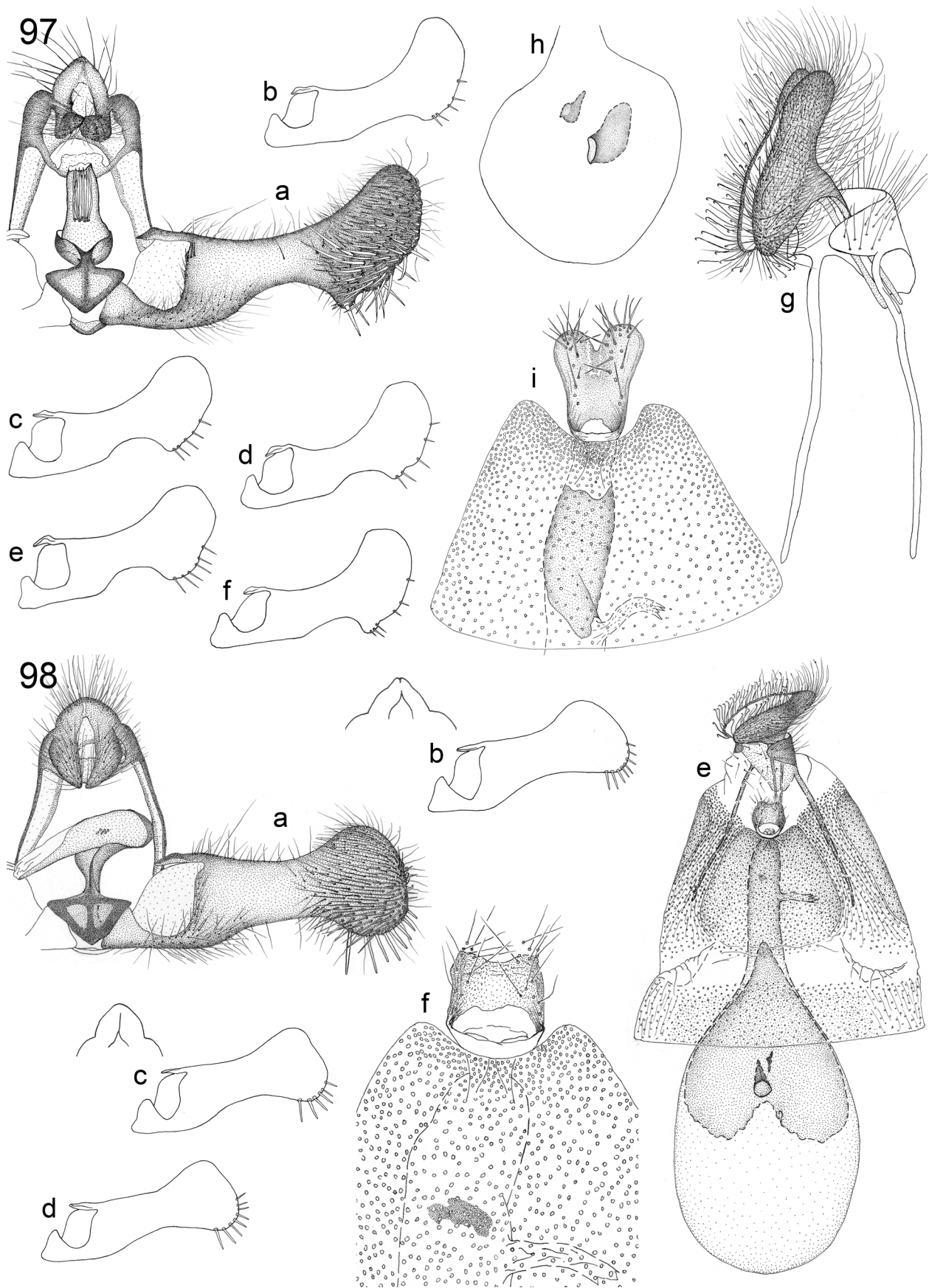


PLATE 42. 97. *Pelochrista kandana*: a, male; b–f, valva; g, papillae anales/tergum 8; h, corpus bursae; i, sterigma/sternum 7. 98. *P. nandana*: a, male; b–c, uncus and associated valva; d, valva; e, female; f, sterigma/sternum 7.

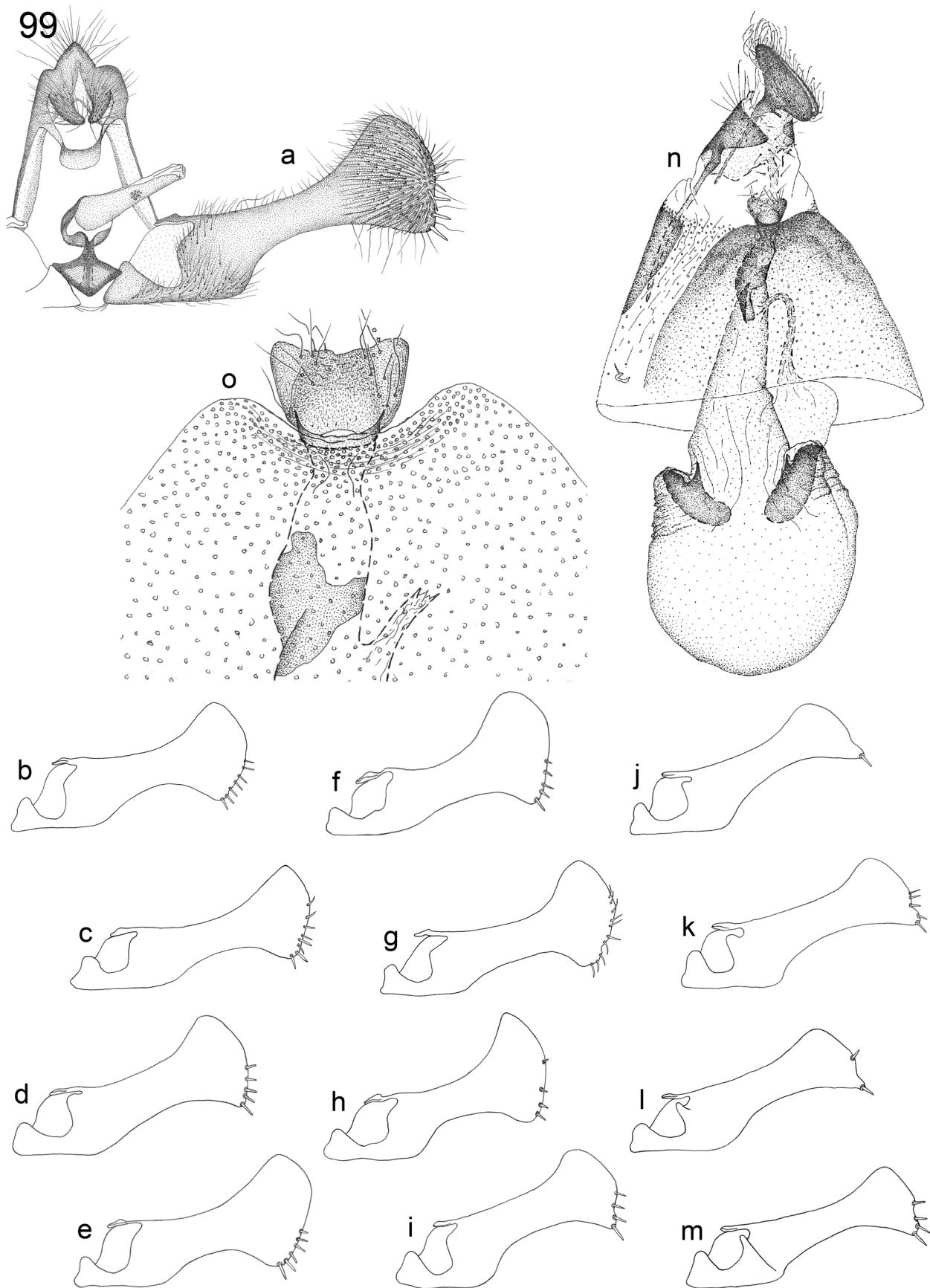


PLATE 43. 99. *Pelochrista corosana*: a, male; b–m, valva; n, female; o, sterigma/sternum 7.

100

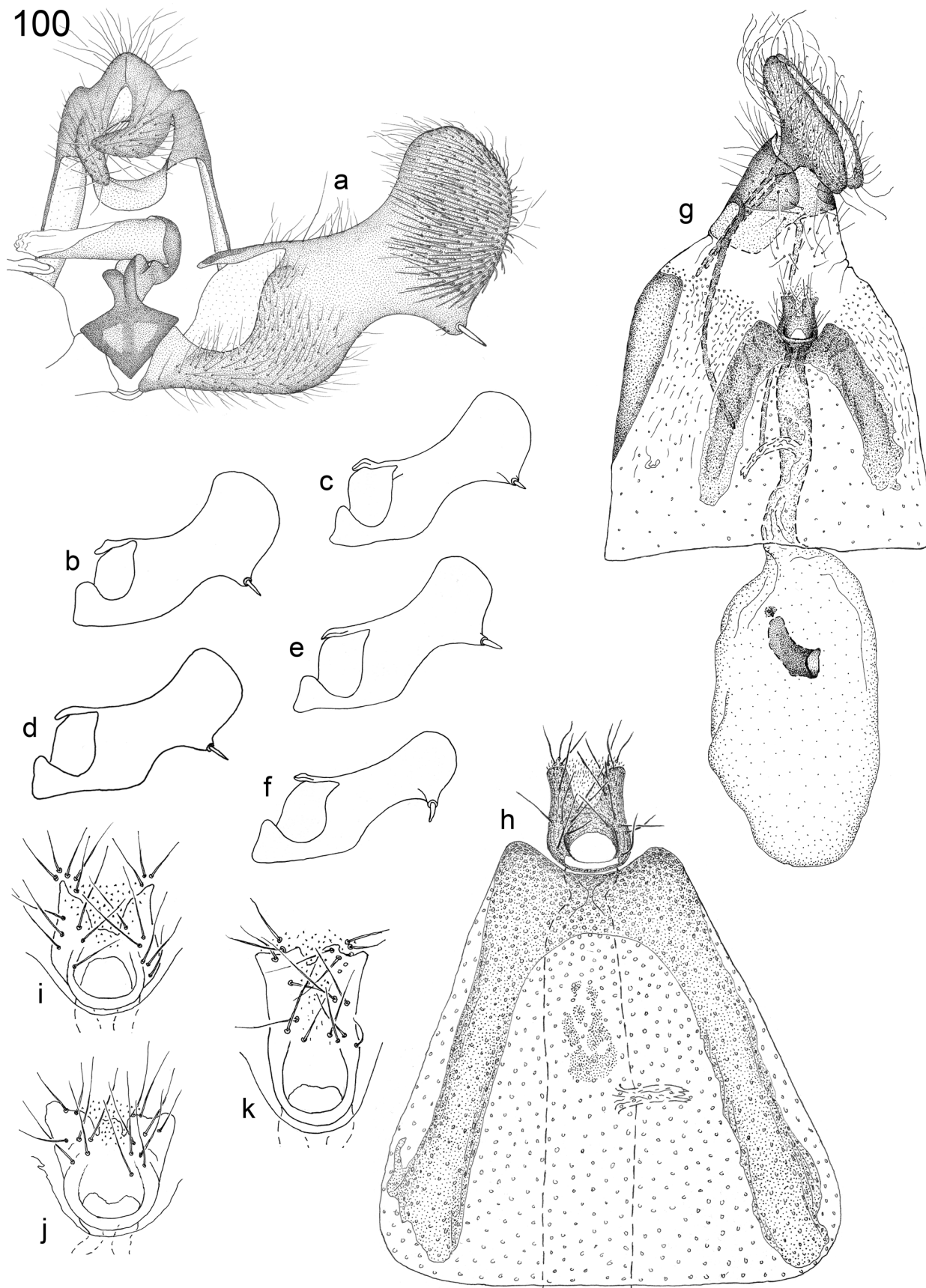


PLATE 44. 100. *Pelochrista scintillana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7; i–k, sterigma.



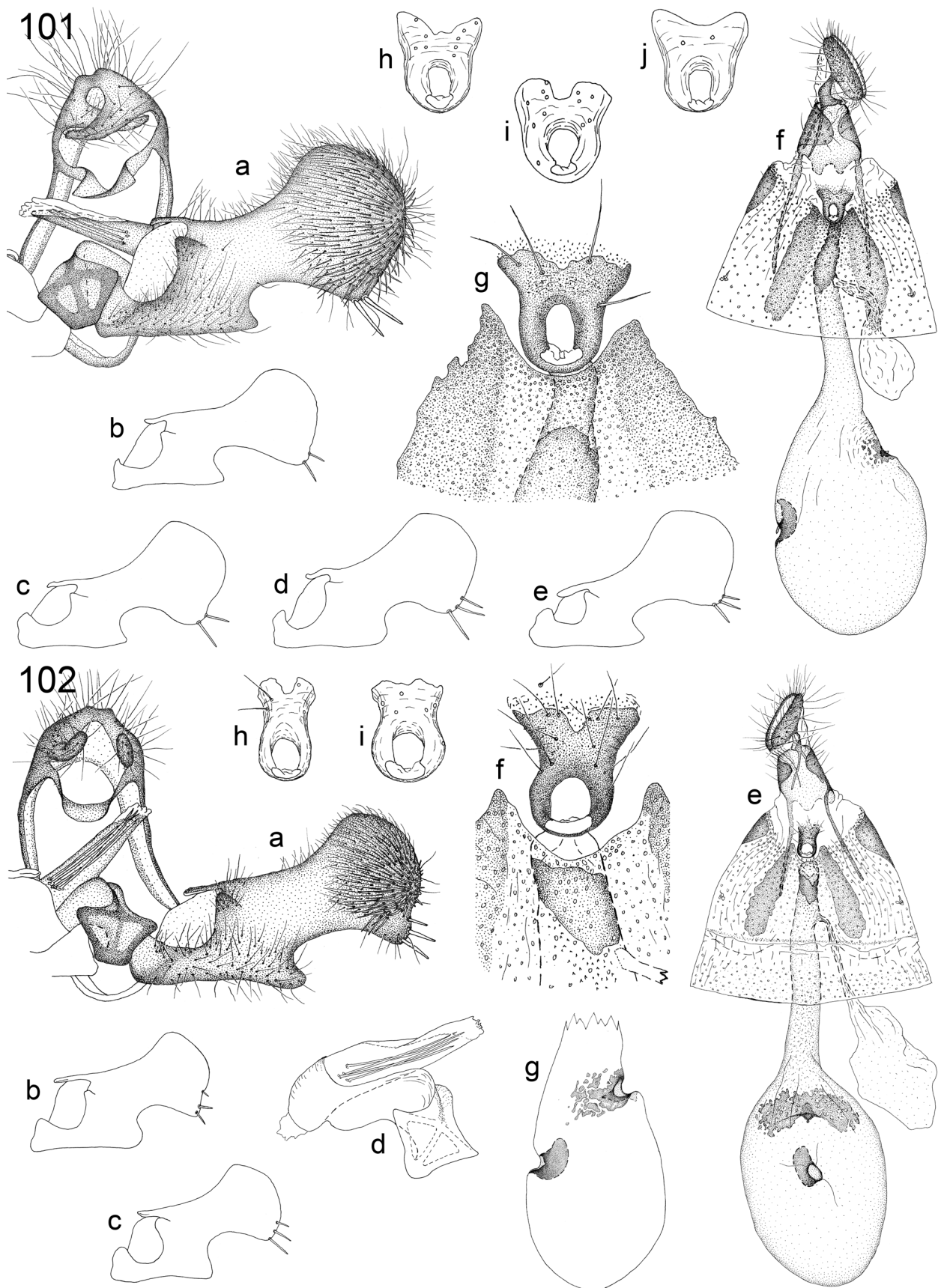


PLATE 45. 101. *Pelochrista pulveratana*: a, male; b–e, valva; f, female; g, sterigma/sternum 7; h–j, sterigma. 102 *P. consobrinana*: a, male; b–c, valva; d, juxta, caulis, anellus, and phallus; e, female; f, sterigma/sternum 7; g, corpus bursae; h–i, sterigma.

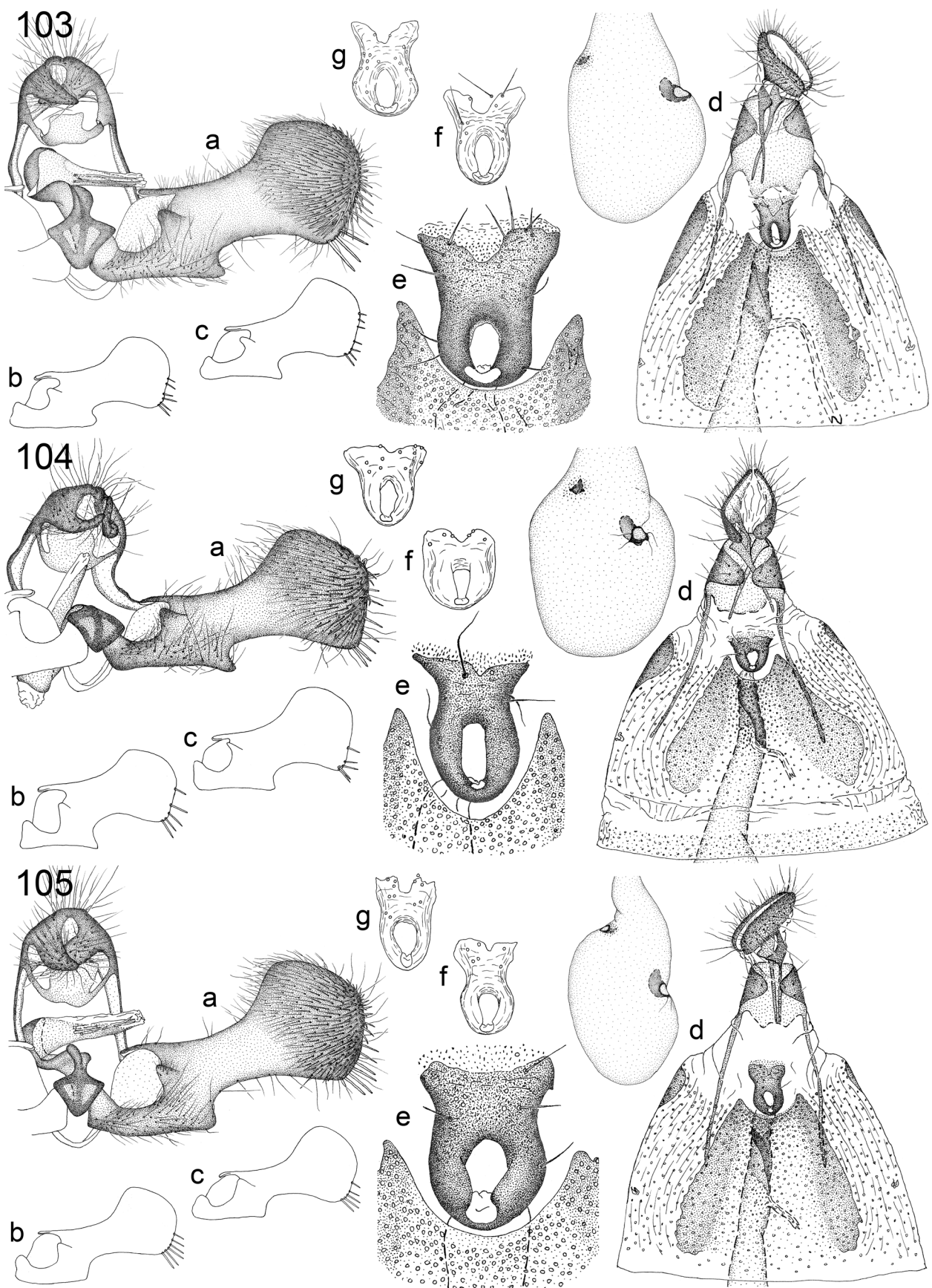


PLATE 46. 103. *Pelochrista suadana*: a, male; b-c, valva; d, female; e-g, sterigma. 104. *P. seamansi*: a, male; b-c, valva; d, female; e-g, sterigma. 105. *P. coconana*: a, male; b-c, valva; d, female; e-g, sterigma.



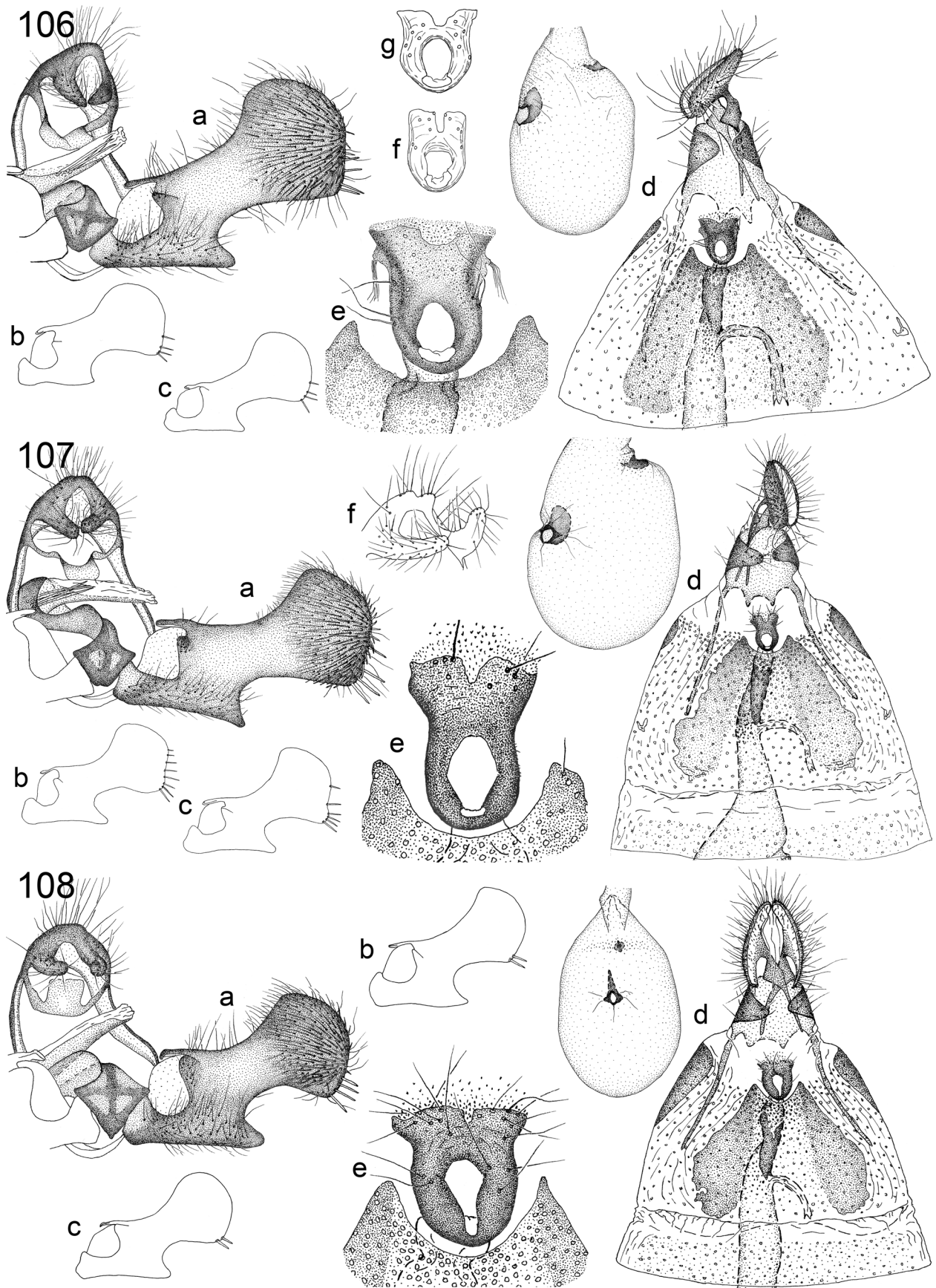
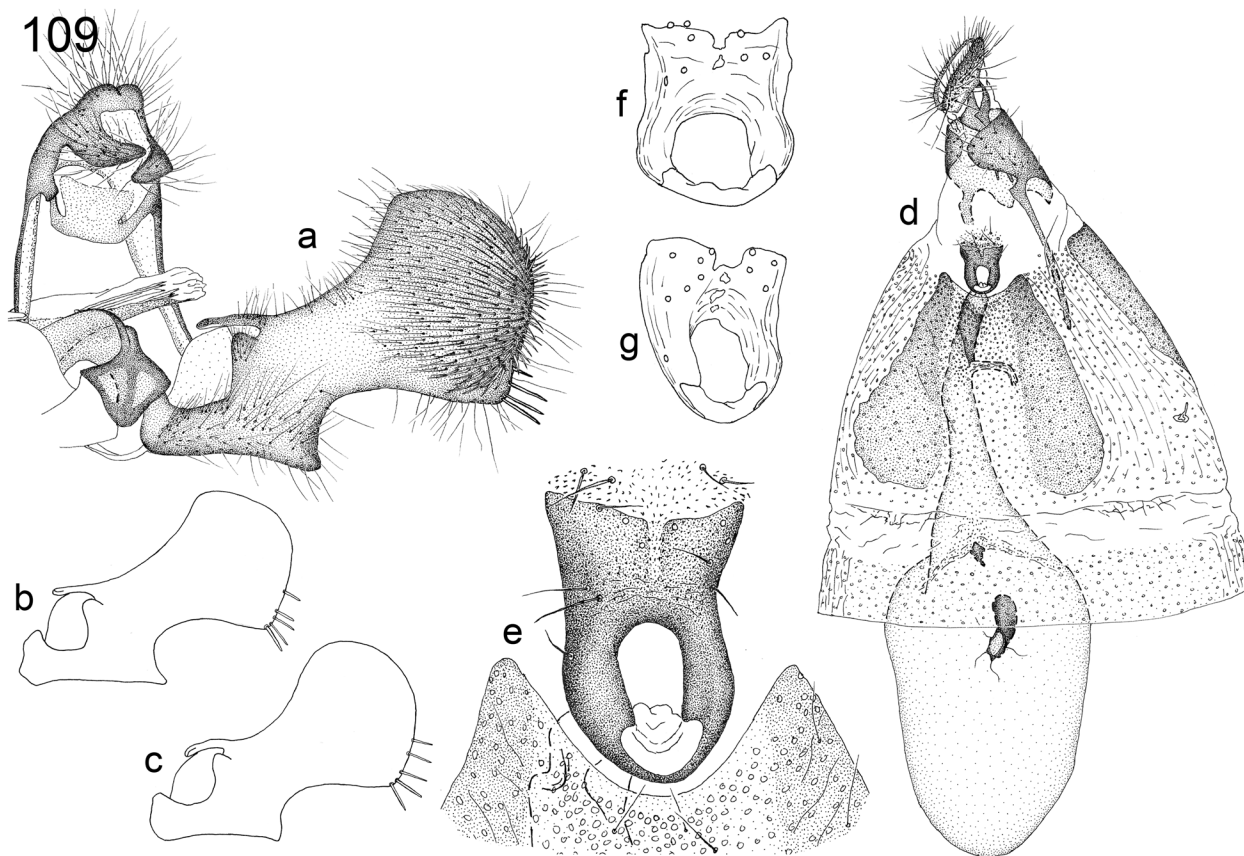


PLATE 47. 106. *Pelochrista sepiana*: a, male; b-c, valva; d, female; e-g, sterigma. 107. *P. parapulveratana*: a, male; b-c, valva; d, female; e, sterigma; f, uncus and socii. 108. *P. floridensis*: a, male; b-c, valva; d, female; e, sterigma.



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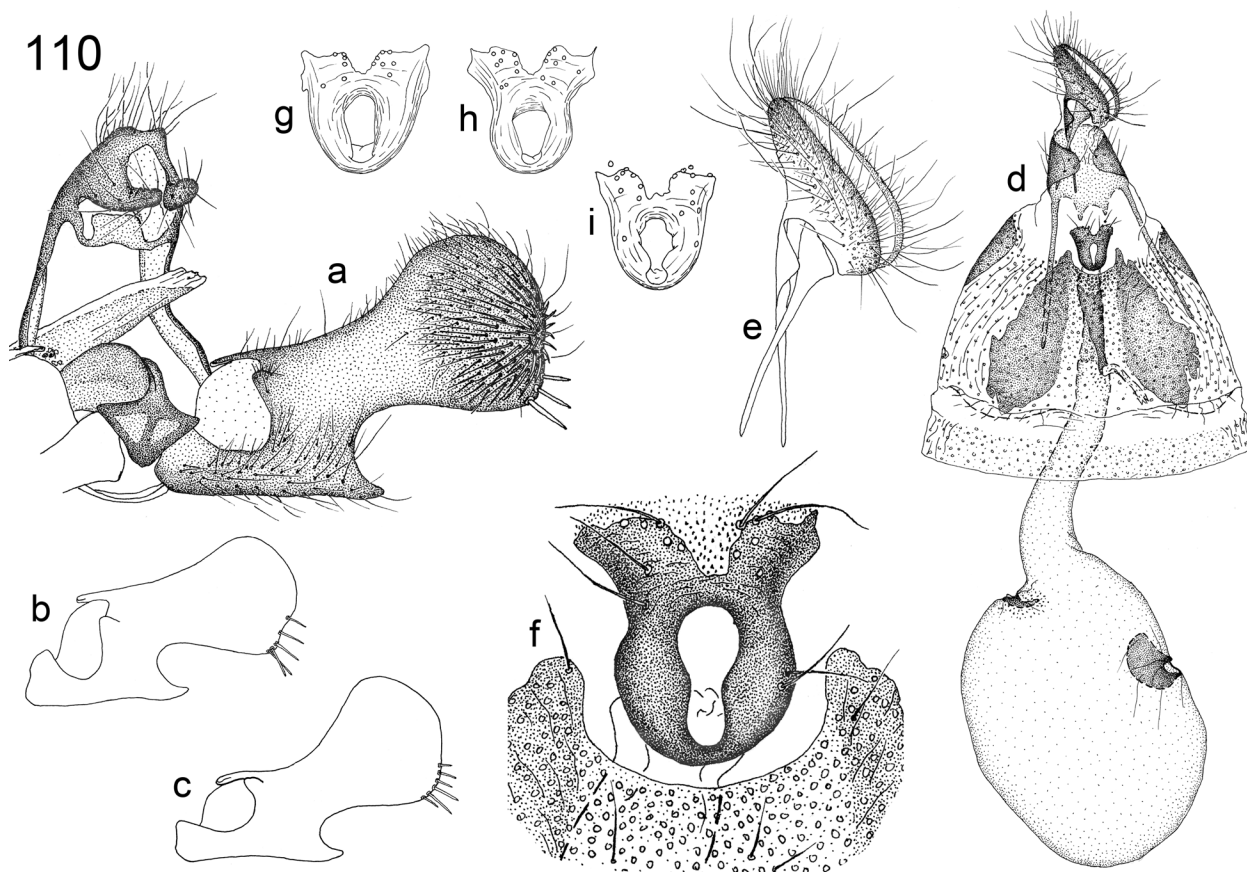


PLATE 48. **109. *Pelochrista navajoensis***: a, male; b–c, valva; d, female; e–g, sterigma. **110. *P. costastriata***: a, male; b–c, valva; d, female; e, papillae anales; f–i, sterigma.

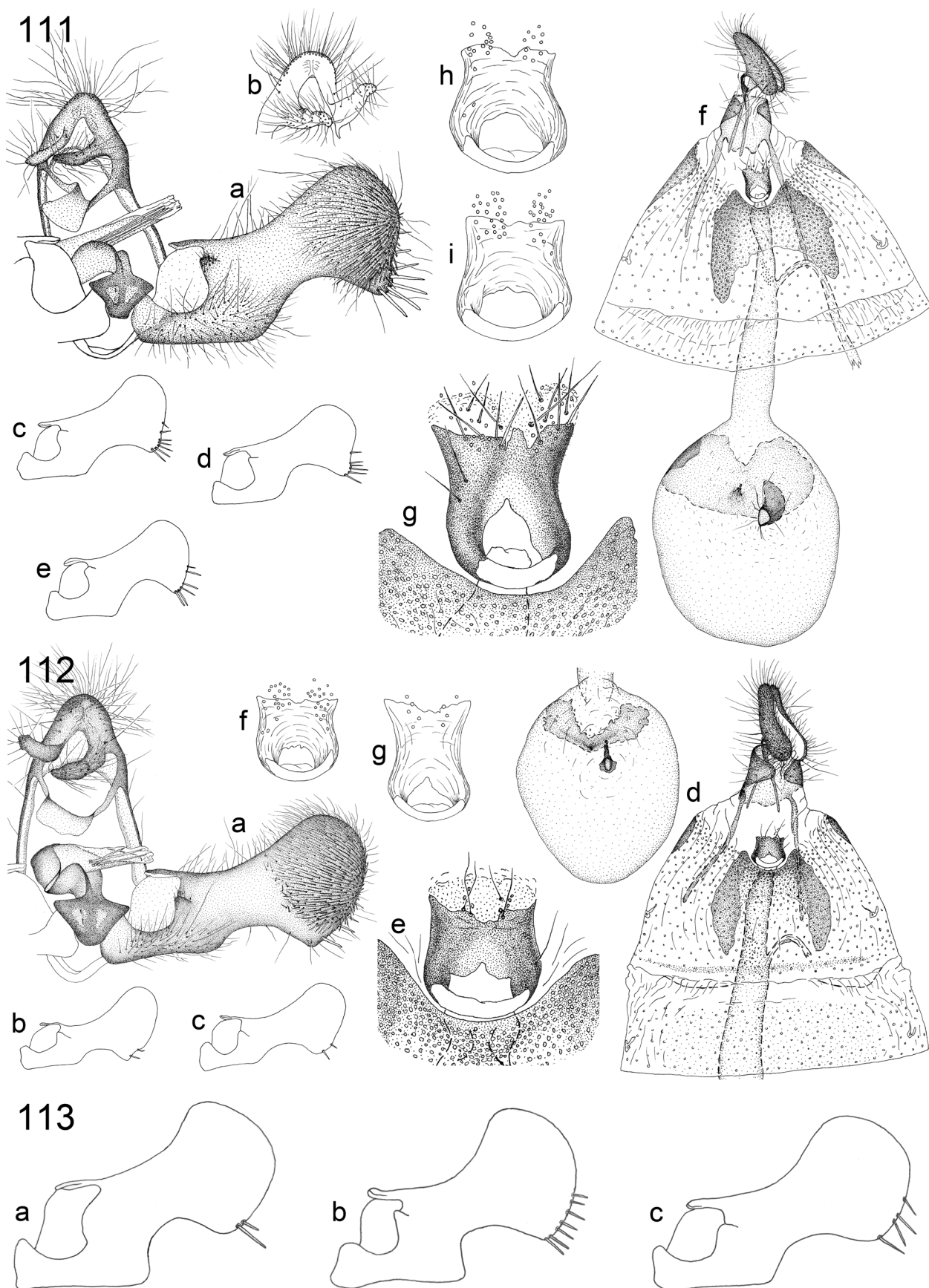


PLATE 49. 111. *Pelochrista mirosignata*: a, male; b, uncus and papillae anales; c-e, valva; f, female; g-i, sterigma. 112. *P. mojaveana*: a, male; b-c, valva; d, female; e-g, sterigma. 113. **Miscellaneous morphospecies**: a-c, valva.



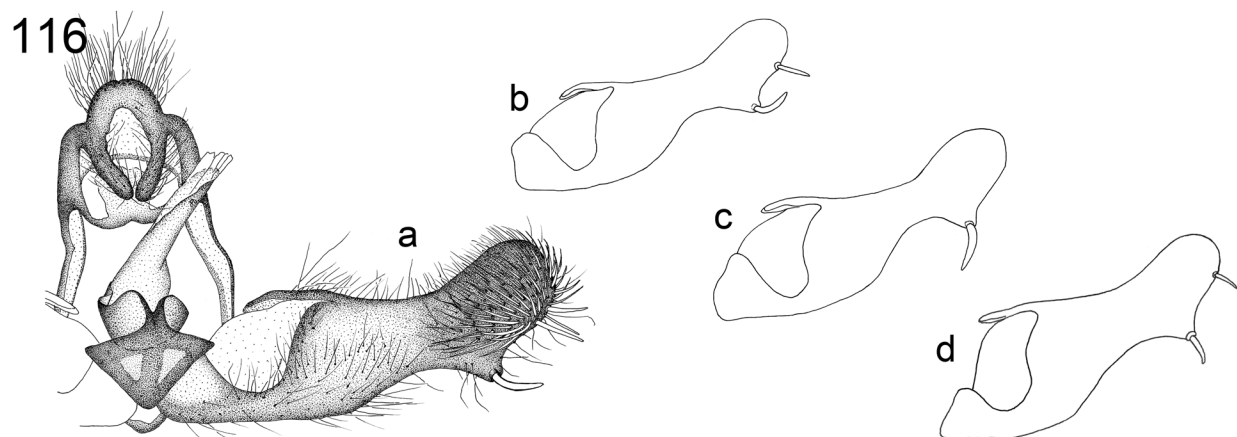
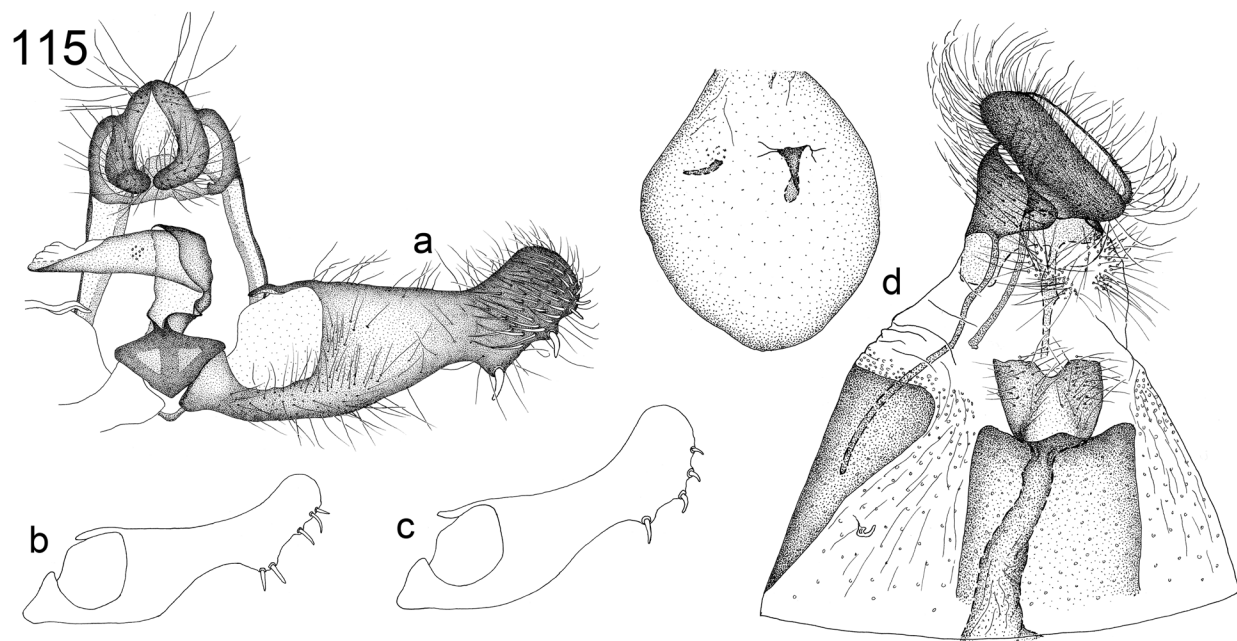
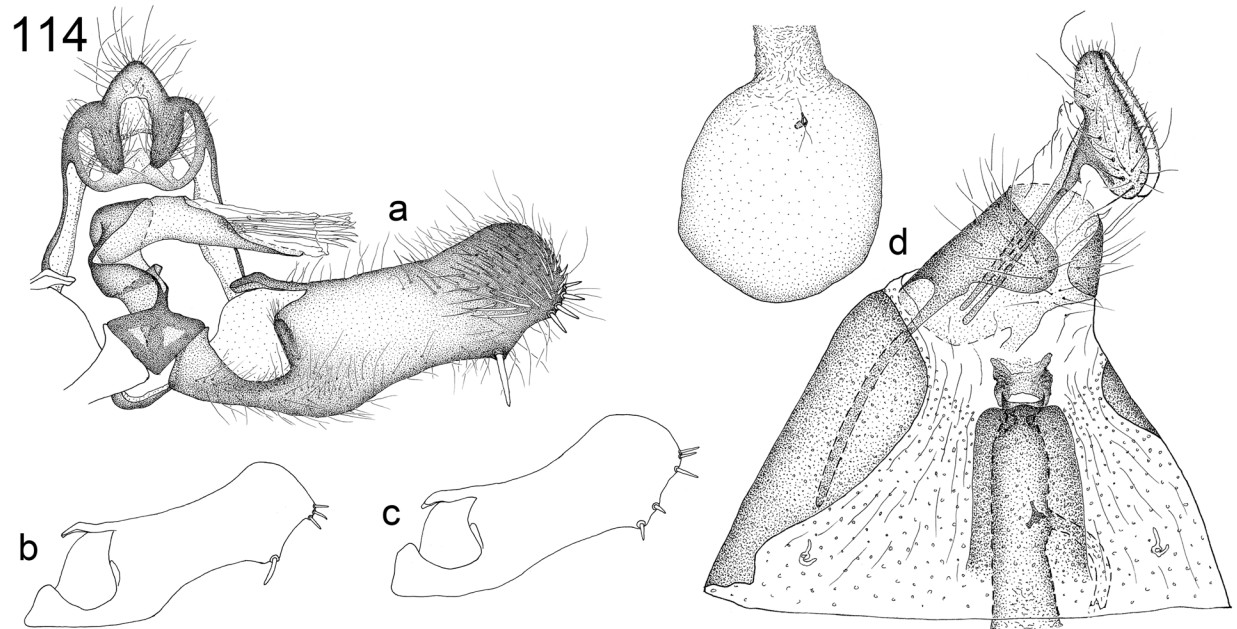
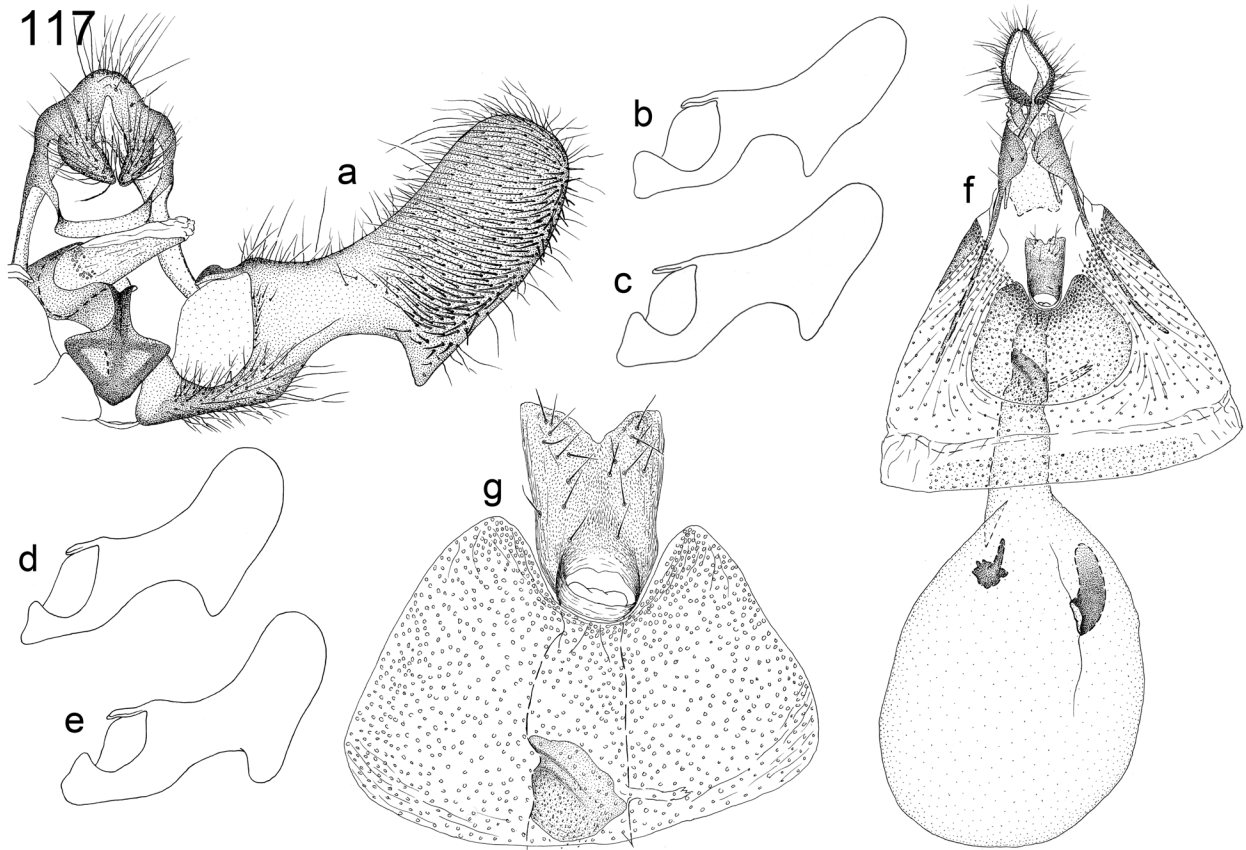


PLATE 50. 114. *Pelochrista mediotriata*: a, male; b–c, valva; d, female. 115. *P. palpana*: a, male; b–c, valva; d, female. 116. *P. gilligani*: a, male; b–d, valva.



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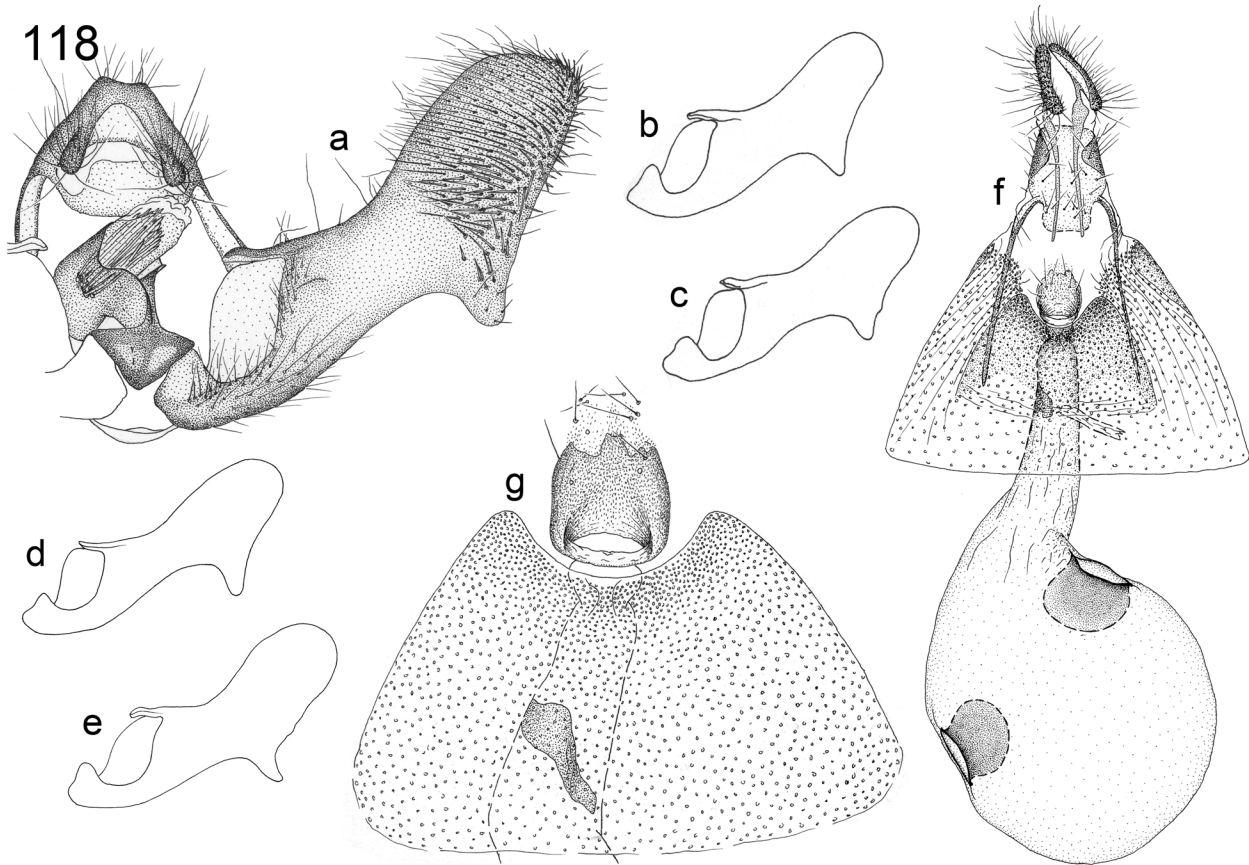
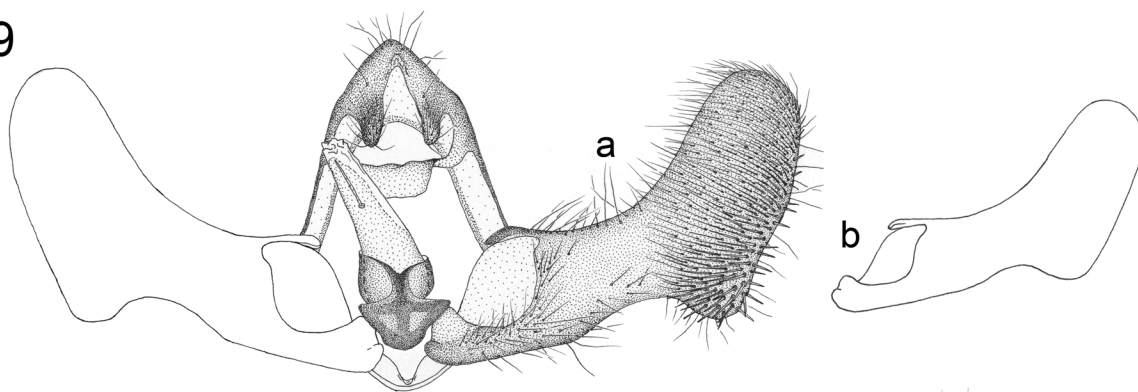
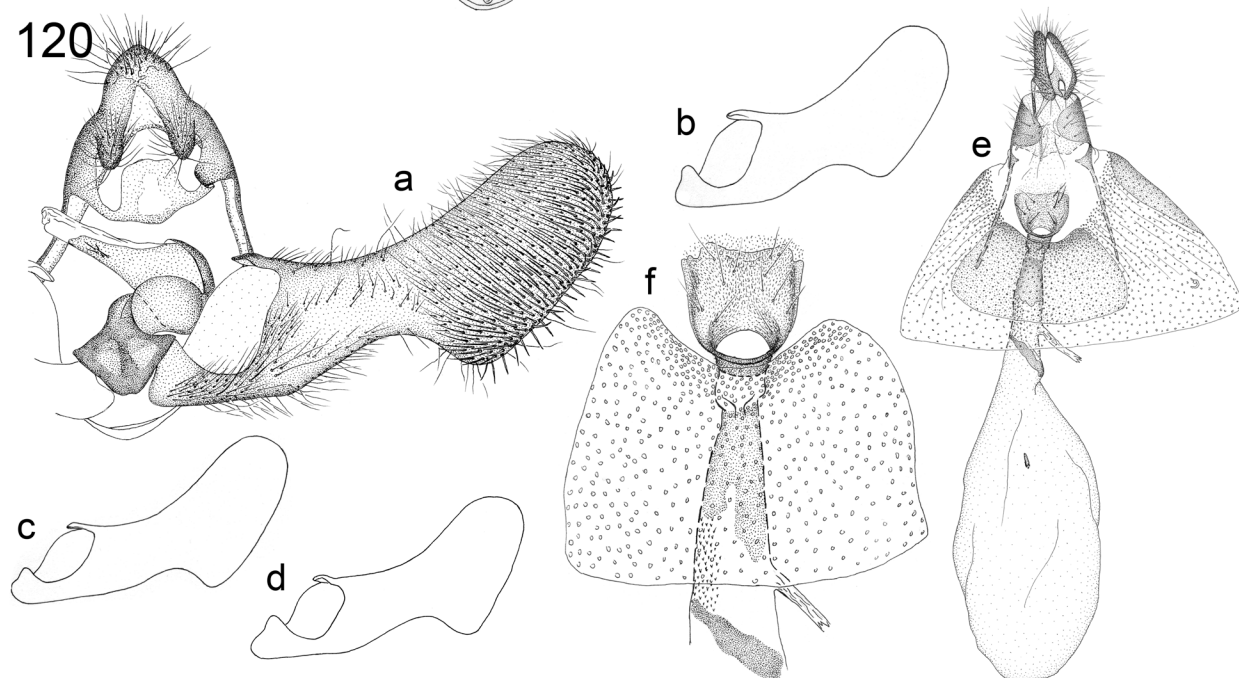


PLATE 51. 117. *Pelochrista matutina*: a, male; b–e, valva; f, female; g, sterigma/sternum 7. 118. *P. fiskeana*: a, male; b–e, valva; f, female; g, sterigma/sternum 7.

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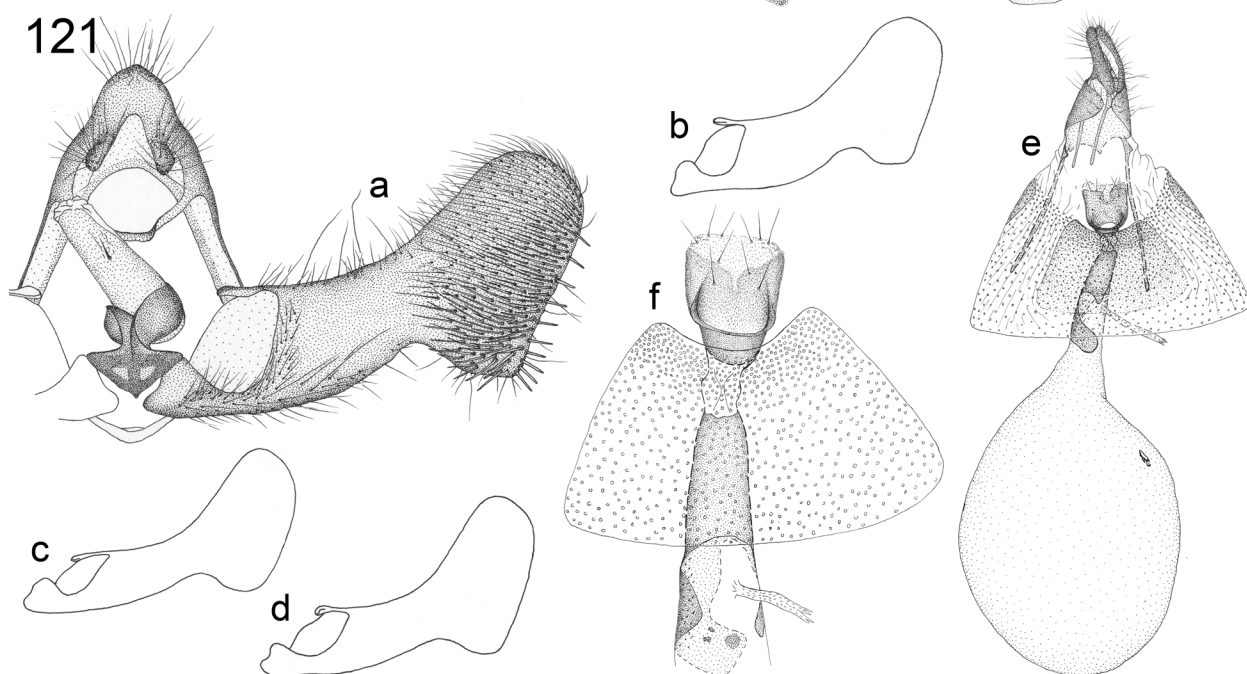
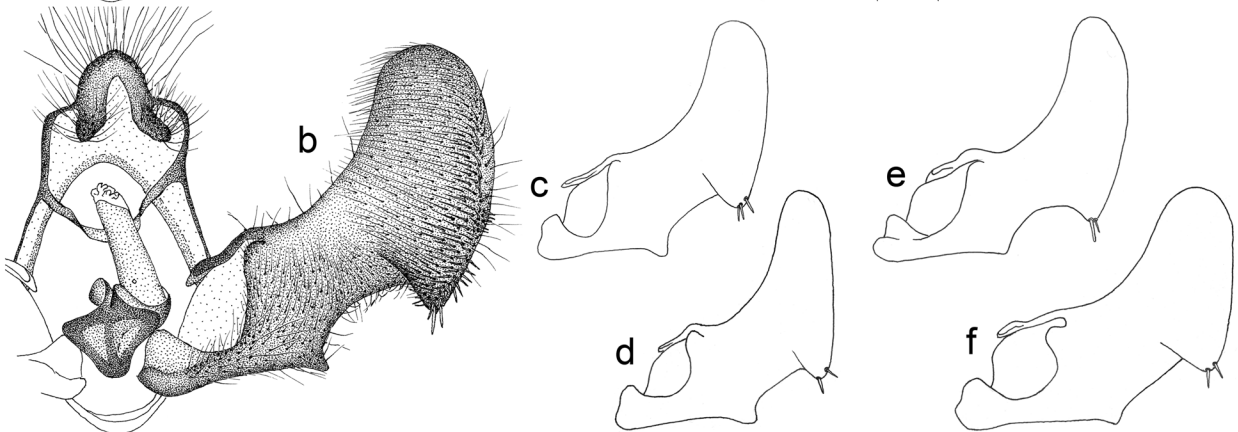
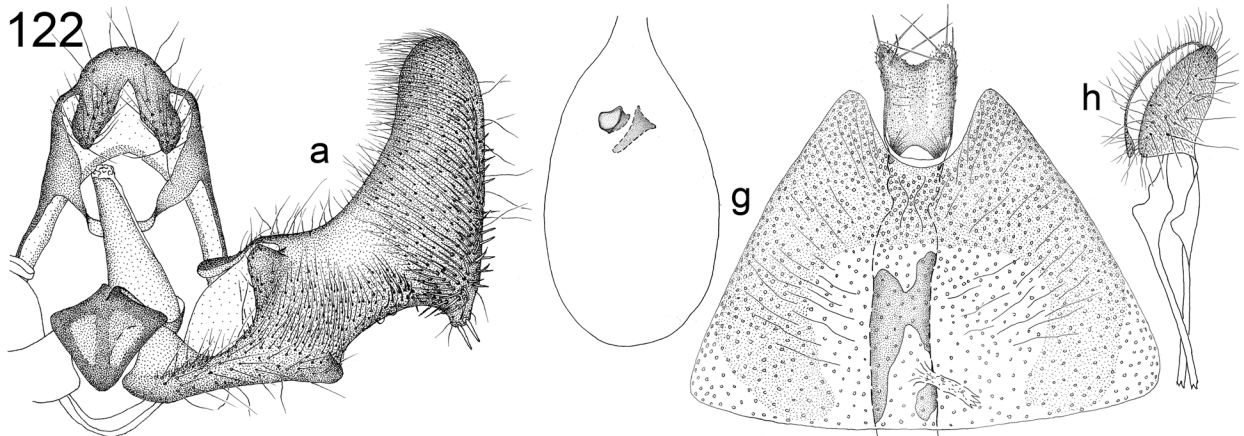


PLATE 52. 119. *Pelochrista symbolaspis*: a, male; b, valva. 120. *P. sullivanii*: a, male; b–d, valva; e, female; f, sterigma/sternum 7. 121. *P. lynxana*: a, male; b–d, valva; e, female; f, sterigma/sternum 7.



122



123

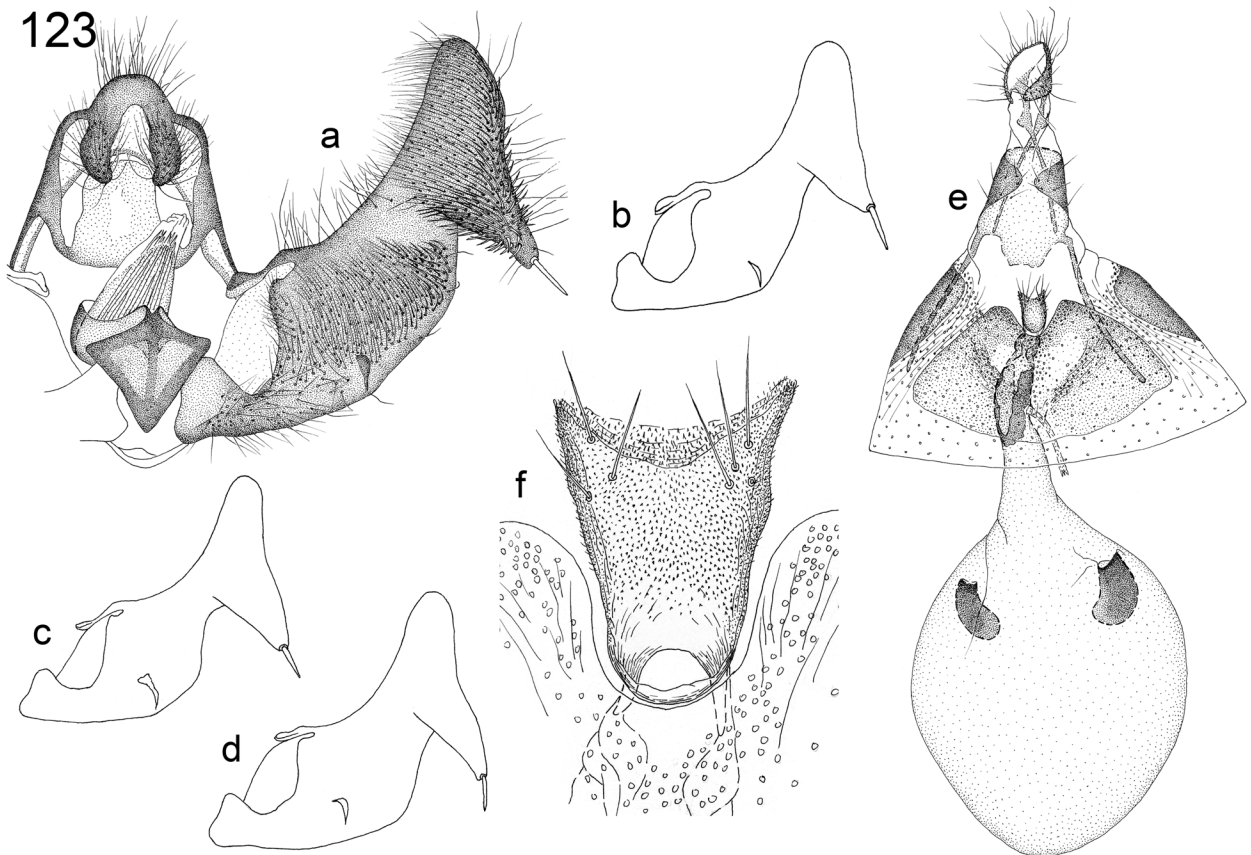


PLATE 53. 122. *Pelochrista junciciliana*: a–b, male; c–f, valva; g, corpus bursae and sterigma/sternum 7; h, papillae anales. 123. *P. derelicta*: a, male; b–d, valva; e, female; f, sterigma.



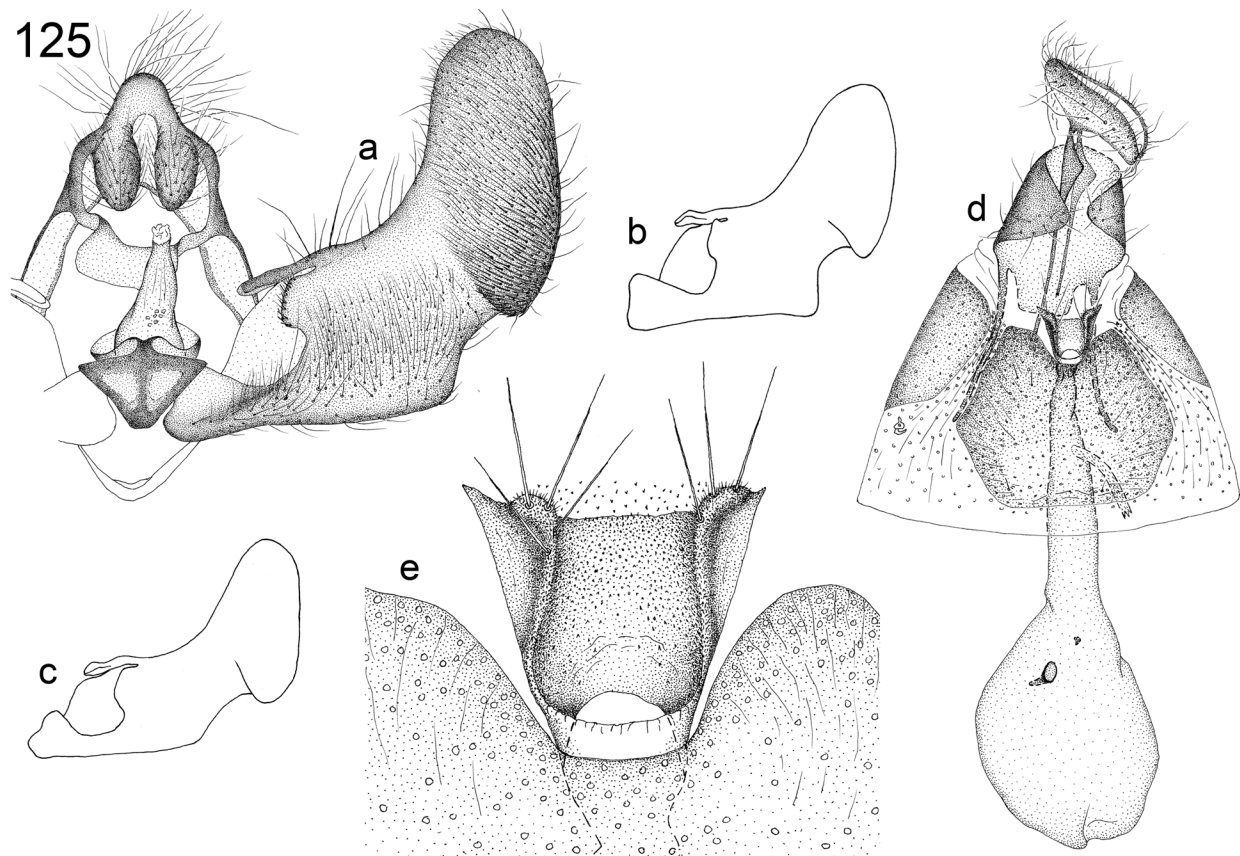
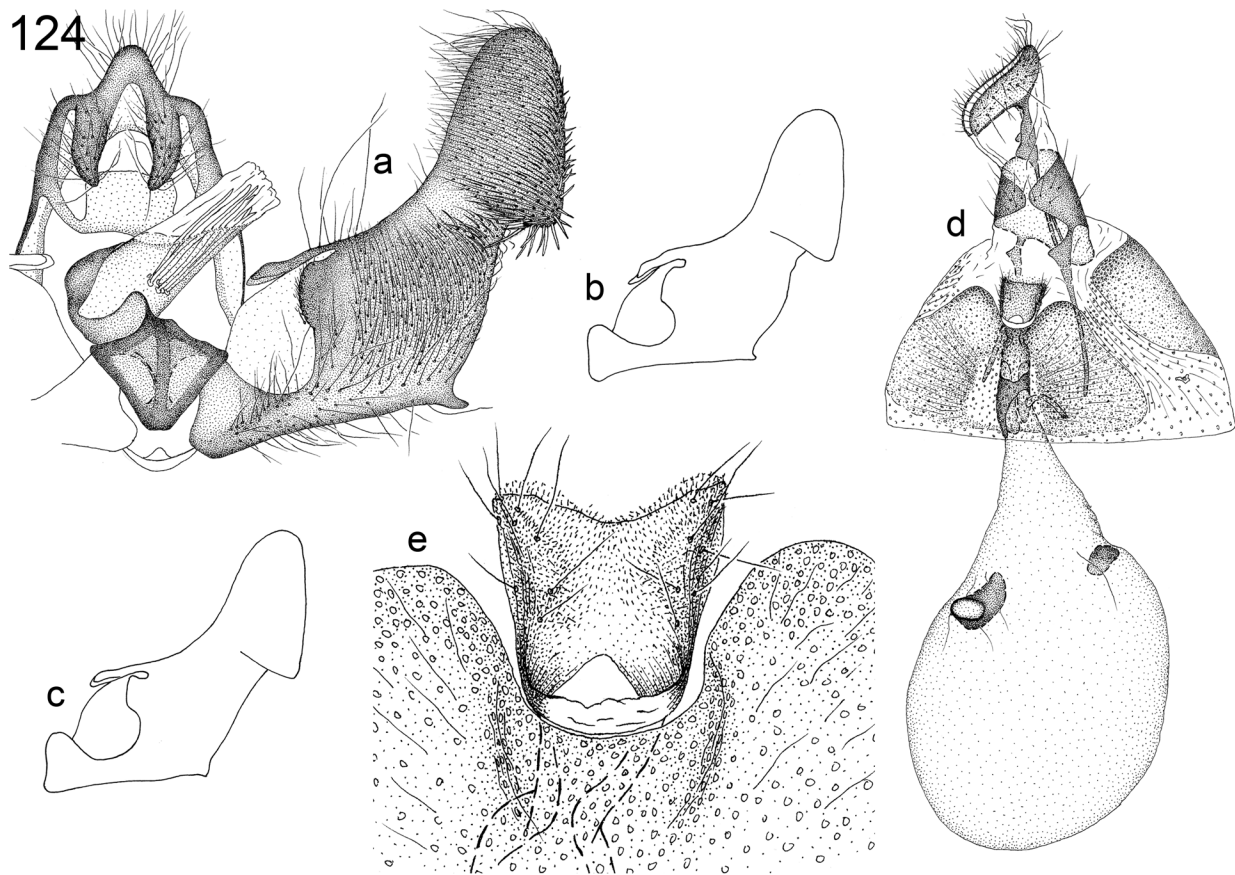


PLATE 54. 124. *Pelochrista cataclystiana*: a, male; b–c, valva; d, female; e, sterigma. 125. *P. conspiciendana*: a, male; b–c, valva; d, female; e, sterigma.

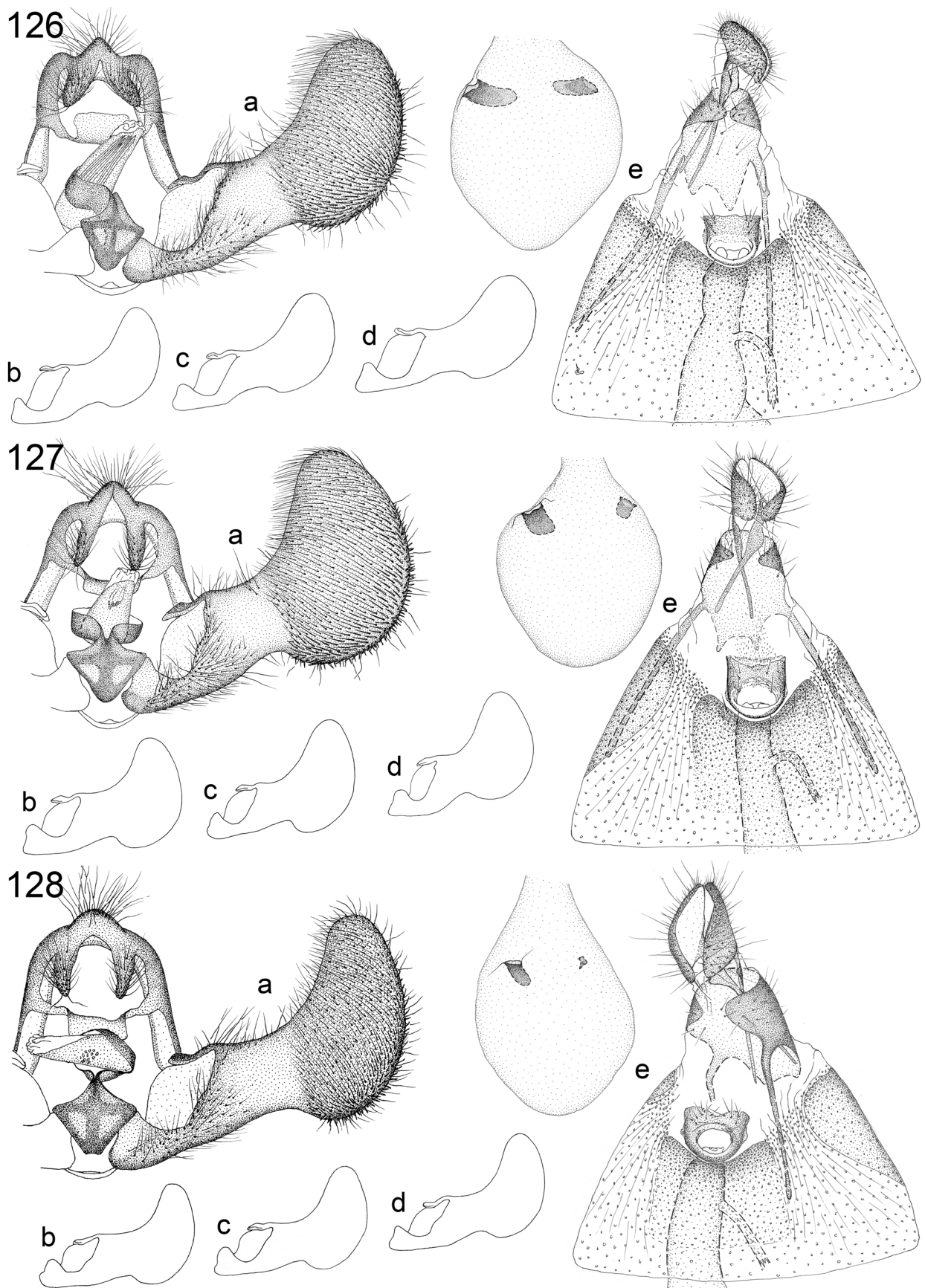


PLATE 55. 126. *Pelochrista grandiflavana*: a, male; b–d, valva; e, female. 127. *P. subflavana*: a, male; b–d, valva; e, female. 128. *P. consociana*: a, male; b–d, valva; e, female.



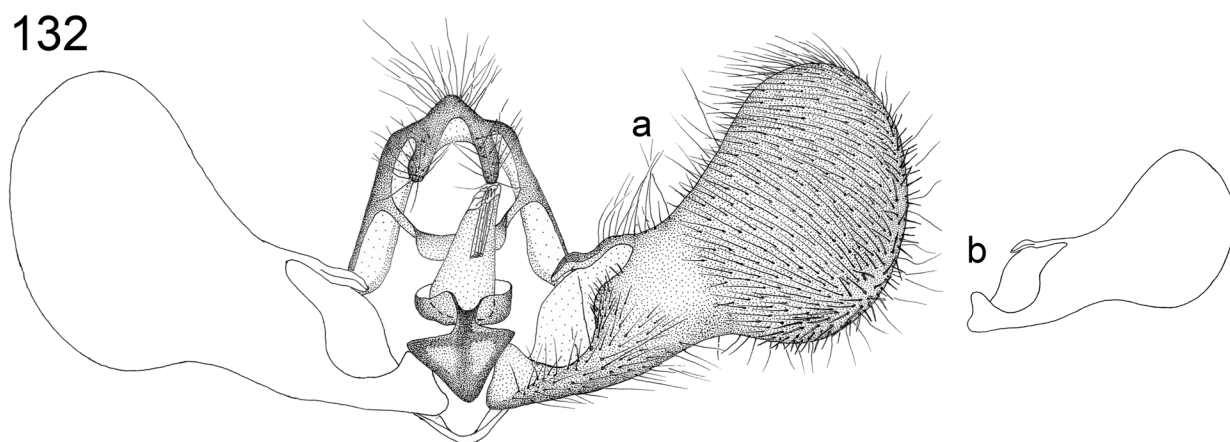
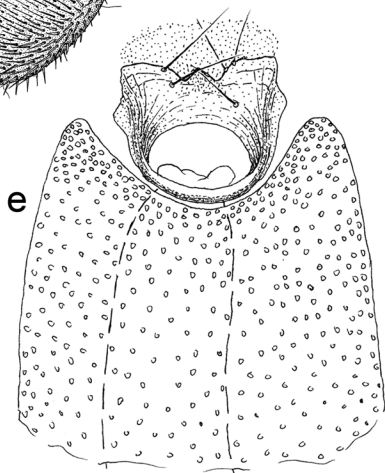
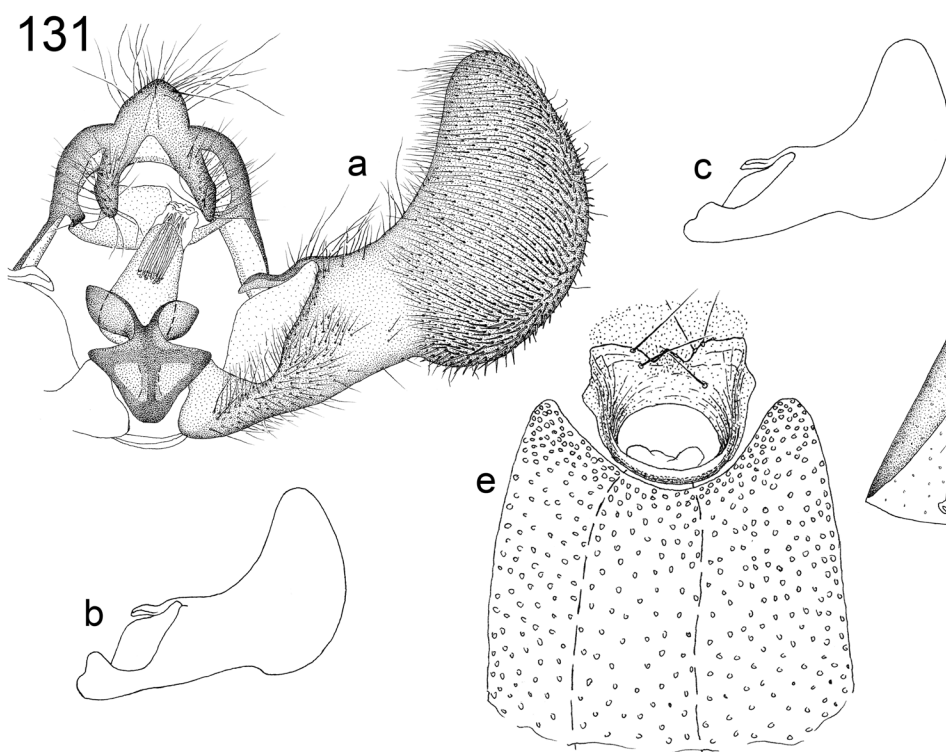
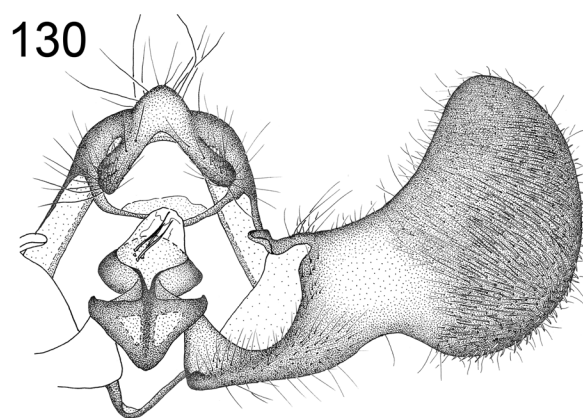
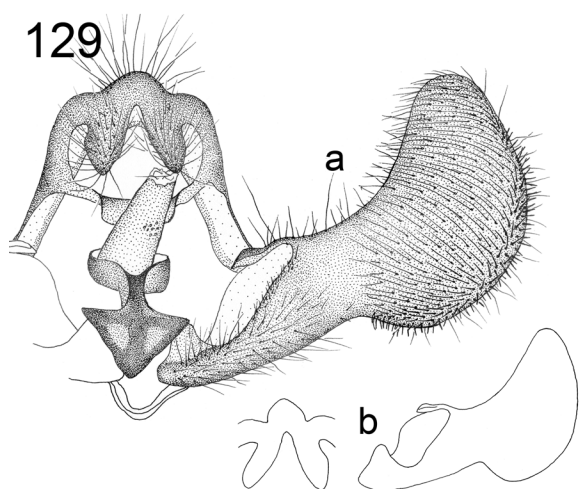
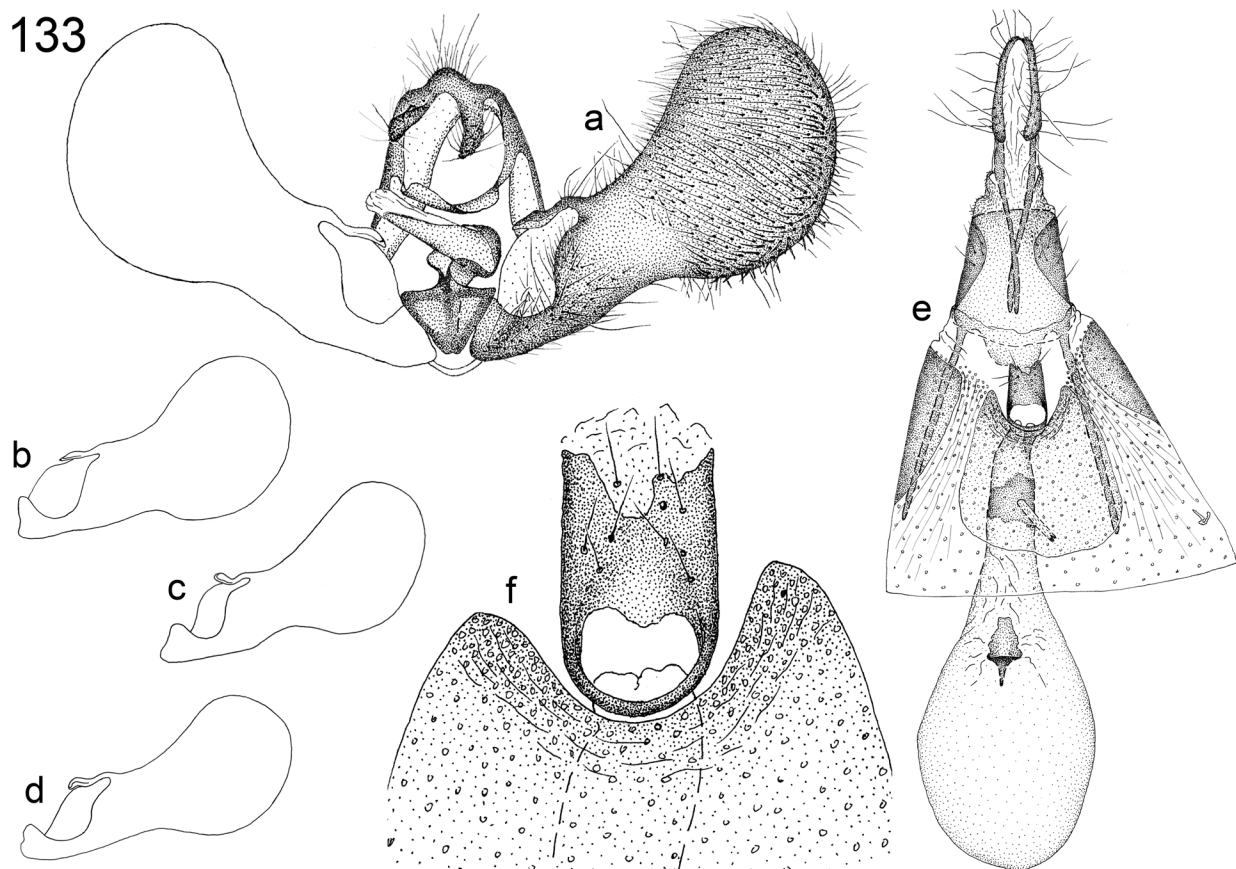


PLATE 56. 129. *Pelochrista murina*: a, male; b, uncus/socii and associated valva. 130. *P. irroratana*: male. 131. *P. handana*: a, male; b–c, valva; d, female; e, sterigma/sternum 7. 132. *P. aurantiaca*: a, male; b, valva.



133



134

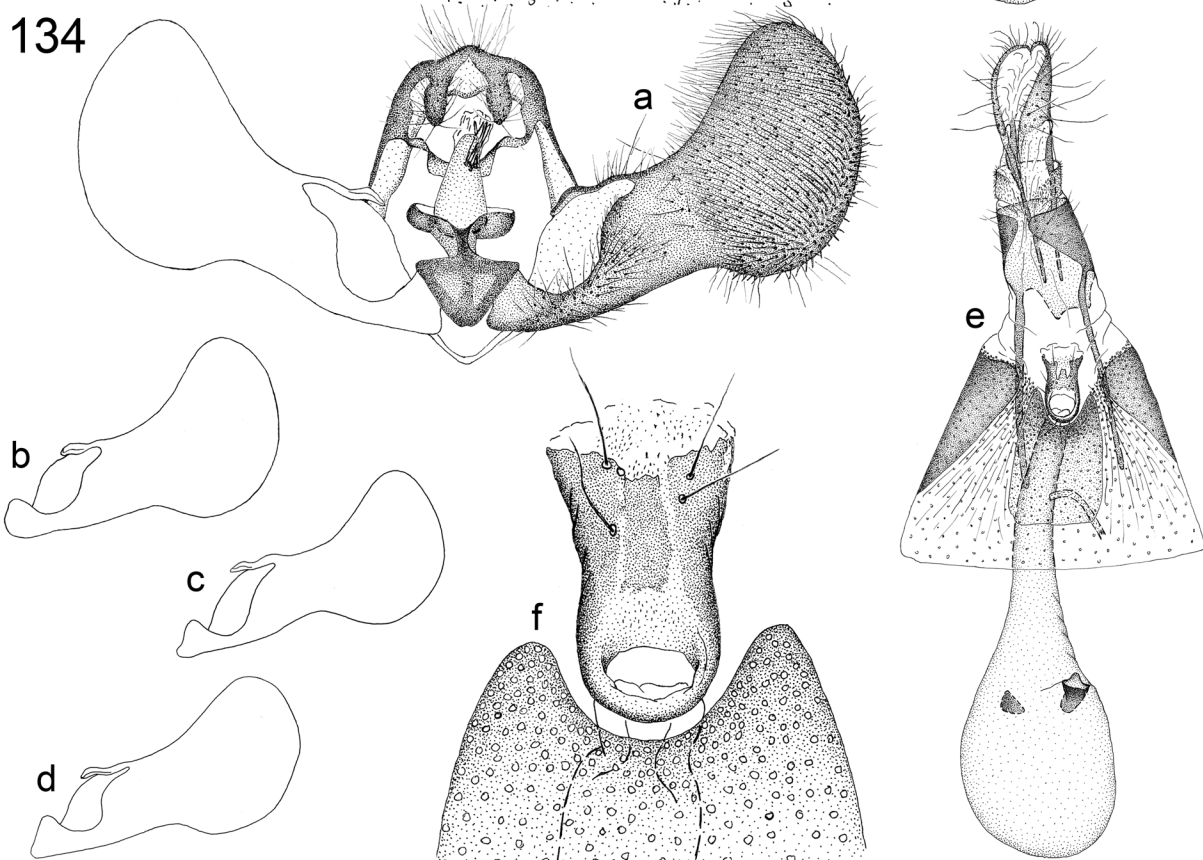
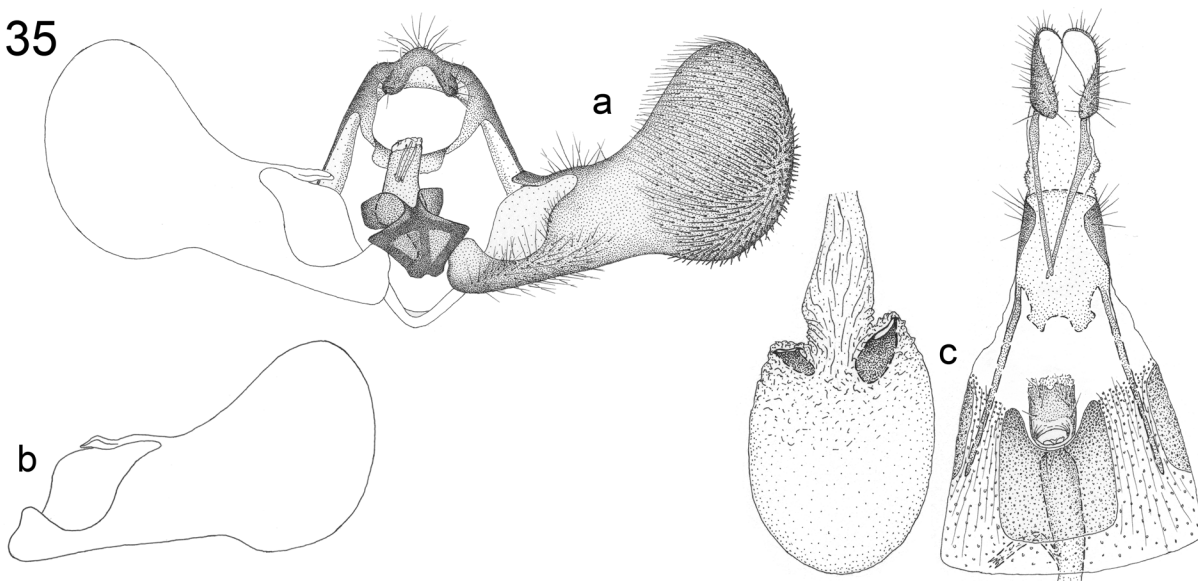


PLATE 57. 133. *Pelochrista primulana*: a, male; b–d, valva; e, female; f, sterigma. 134. *P. biplagata*: a, male; b–d, valva; e, female; f, sterigma.

135



136

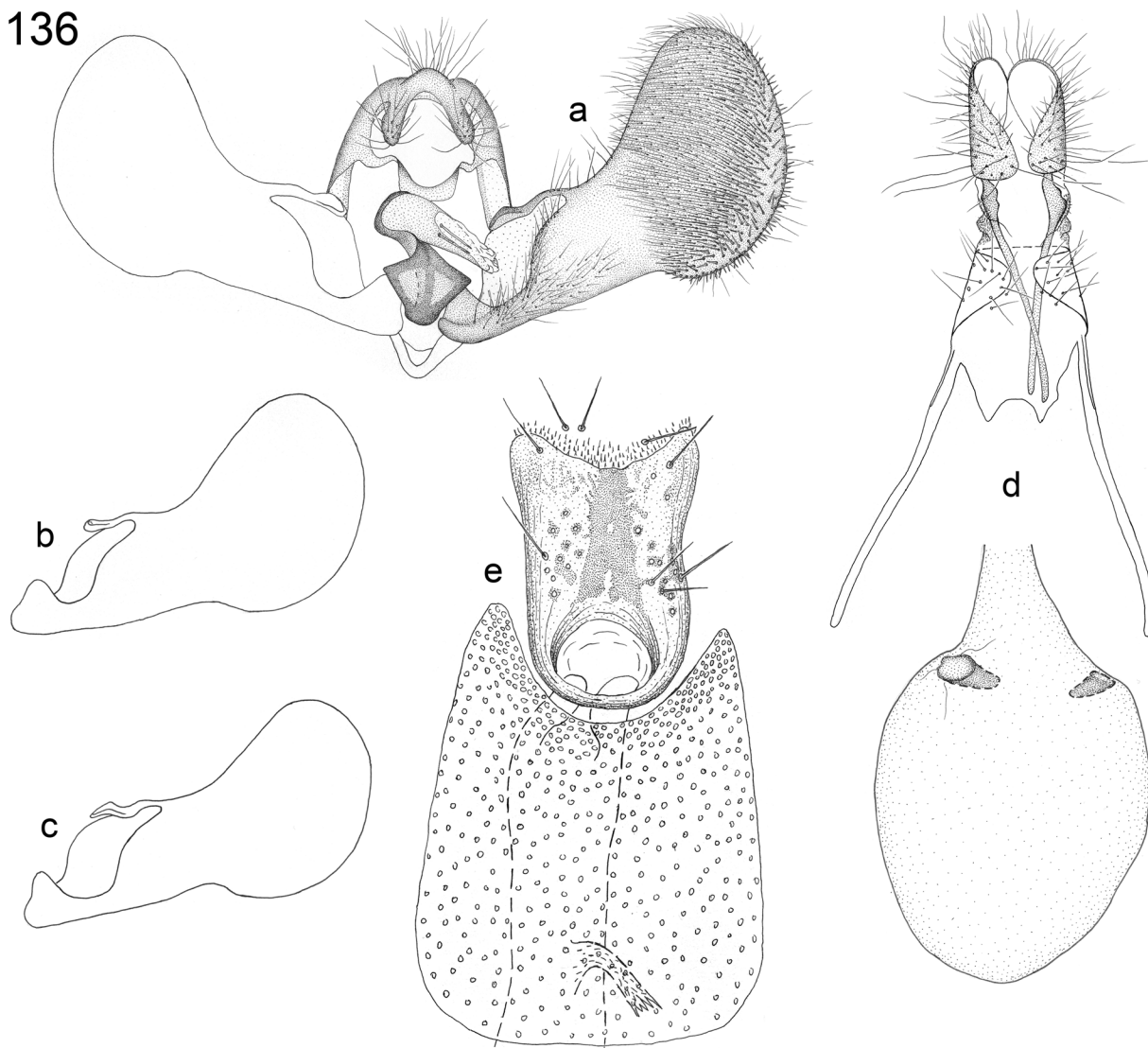
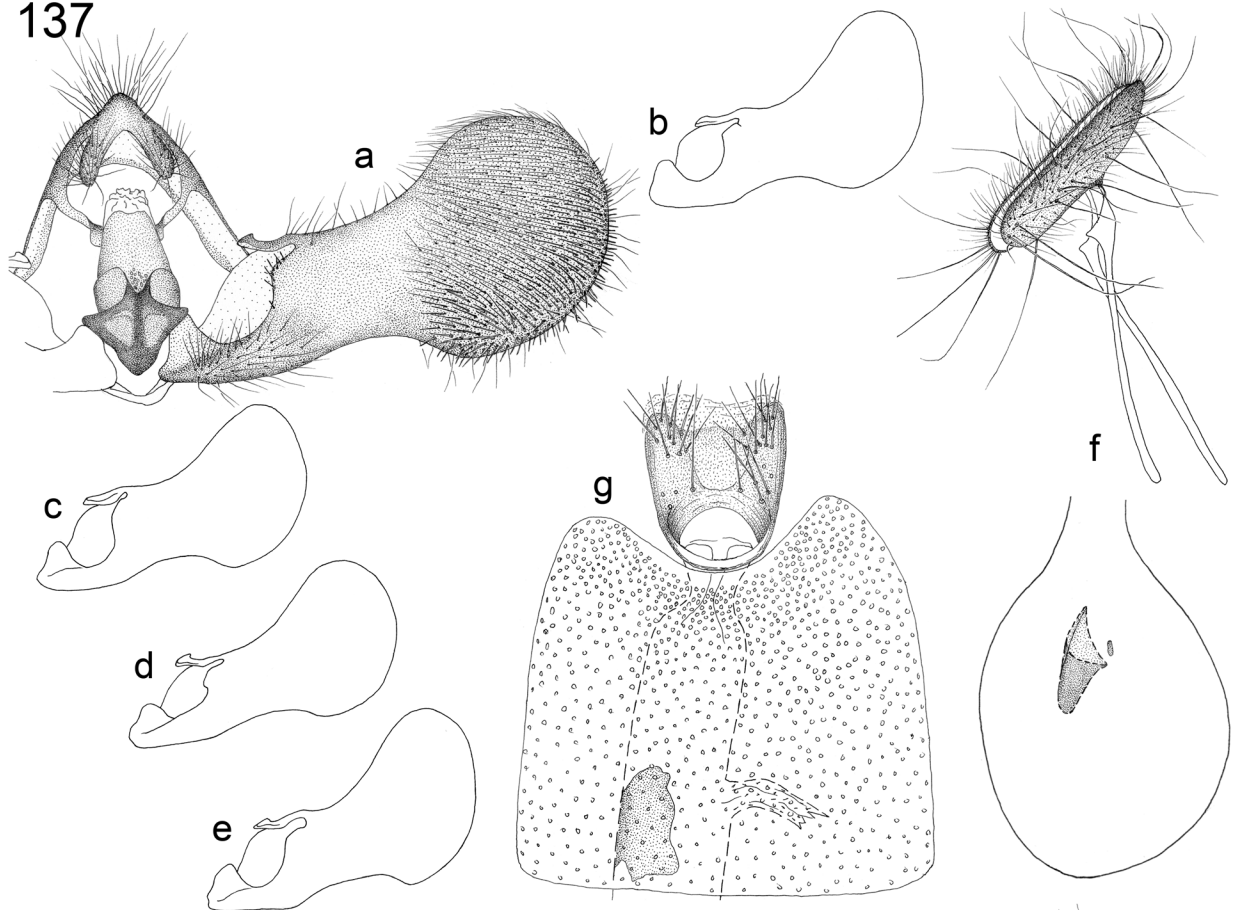


PLATE 58. 135. *Pelochrista bennei*: a, male; b, valva; c, female. 136. *P. hasseanthi*: a, male; b–c, valva; d, papillae anales/tergum 8 and associated corpus bursae; e, sterigma/sternum 7.



137



138

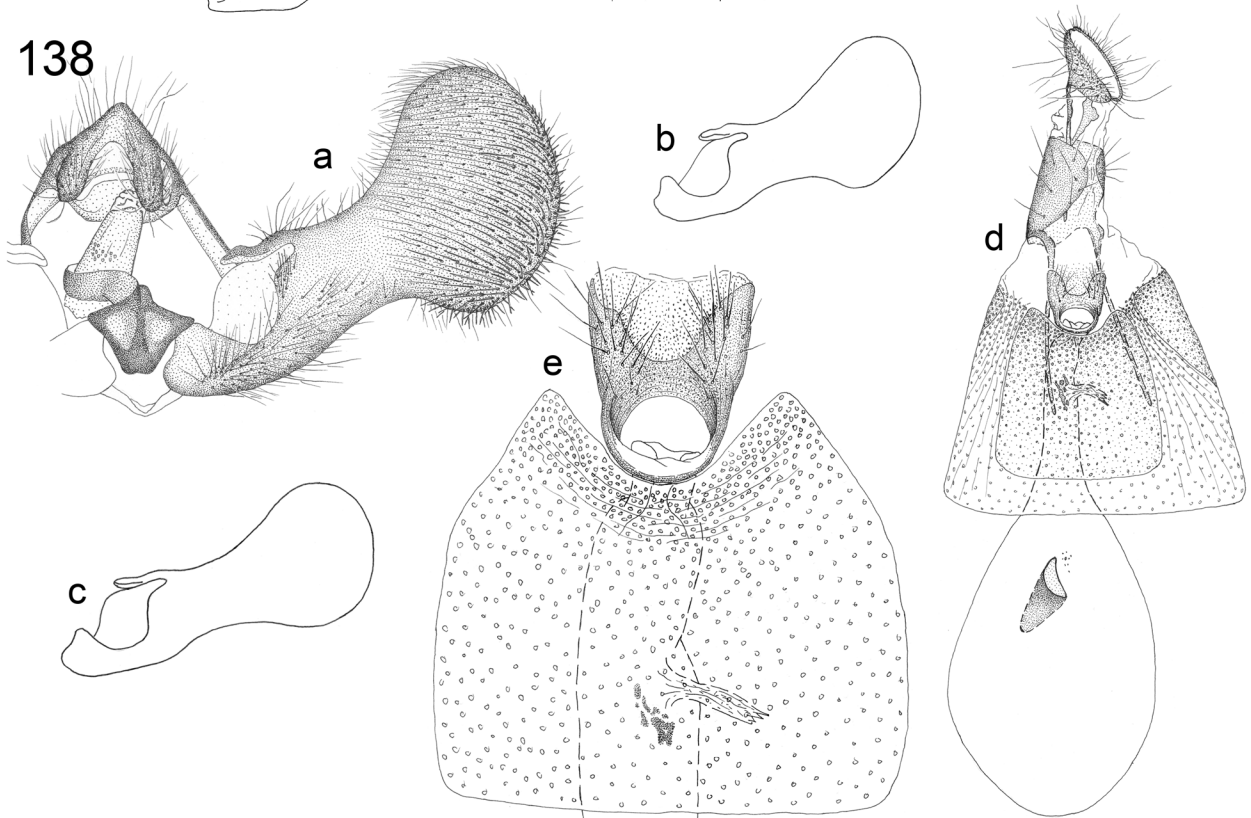
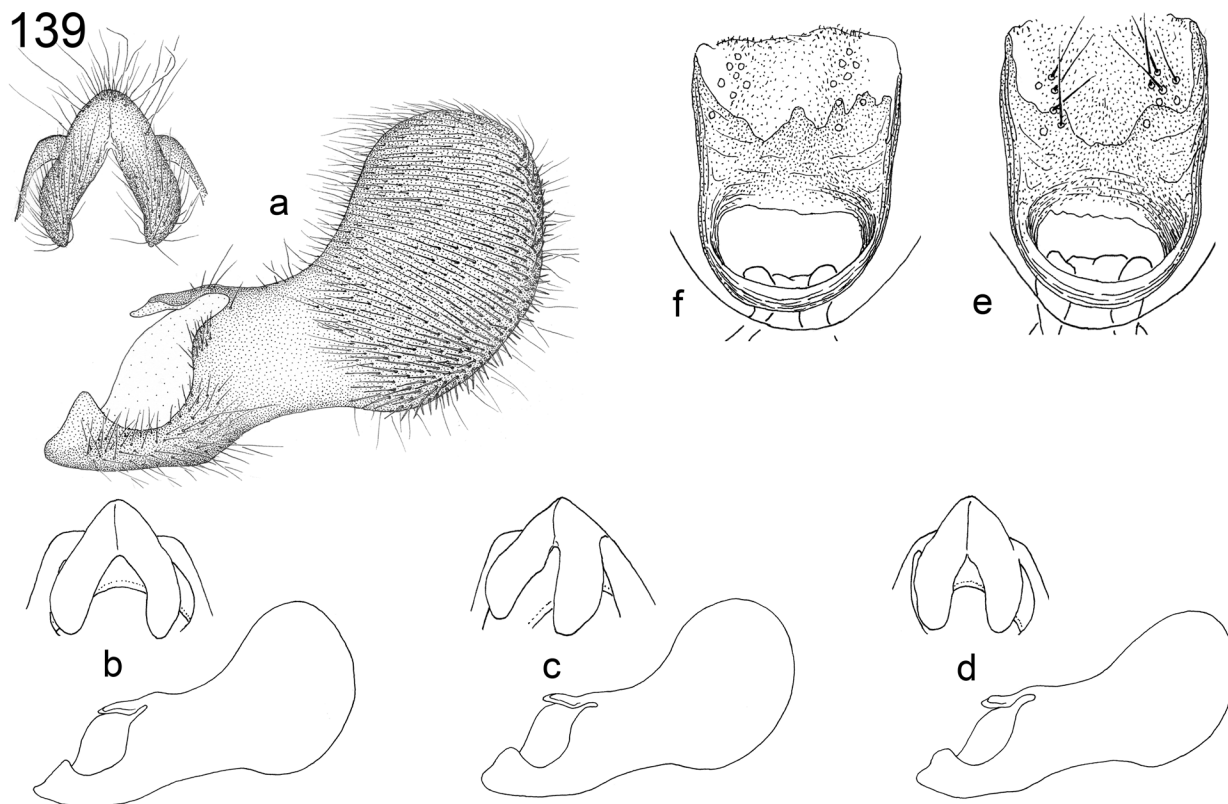


PLATE 59. 137. *Pelochrista dorsisignatana*: a, male; b–e, valva; f, papillae anales and associated corpus bursae; g, sterigma/sternum 7. 138. *P. wagneri*: a, male; b–c, valva; d, female; e, sterigma/sternum 7.



139



140

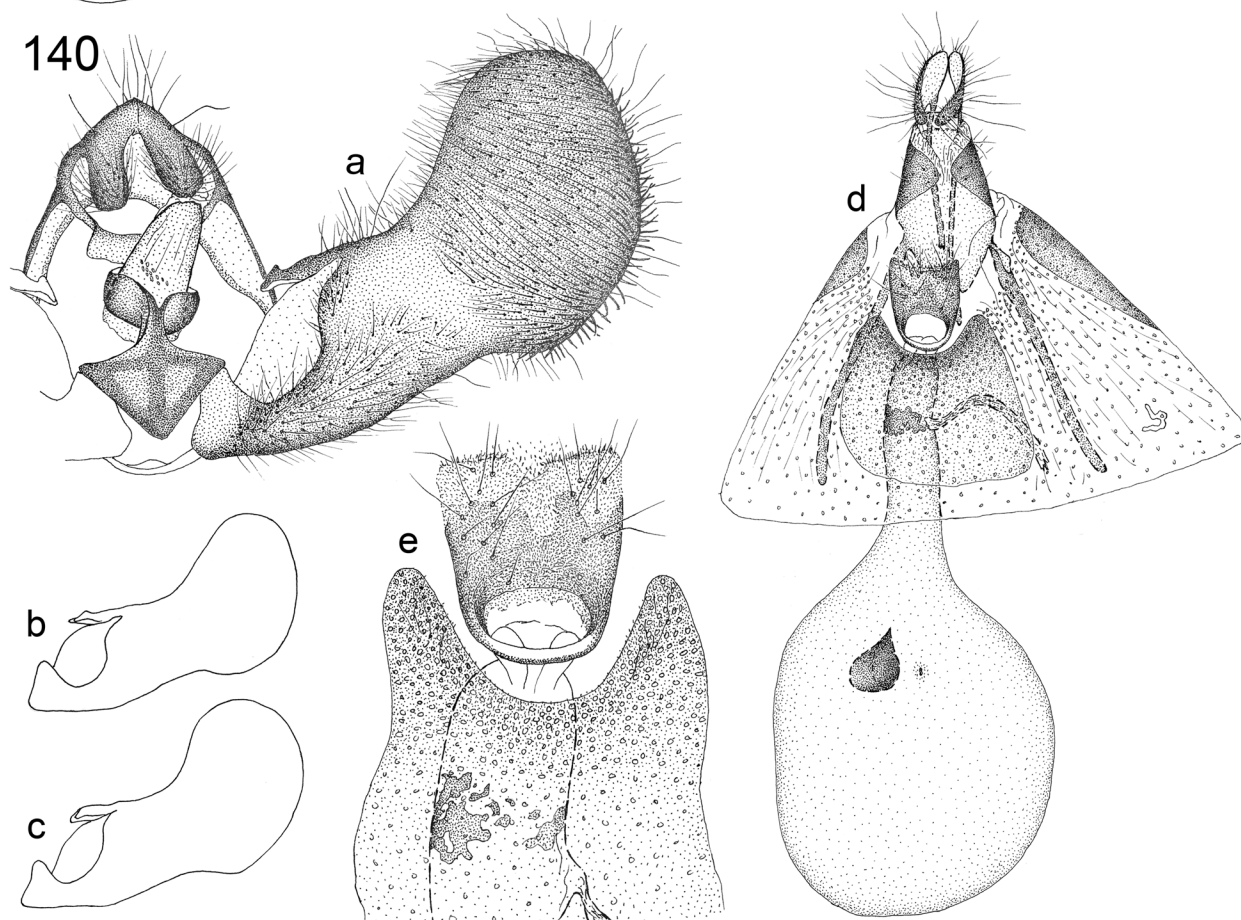
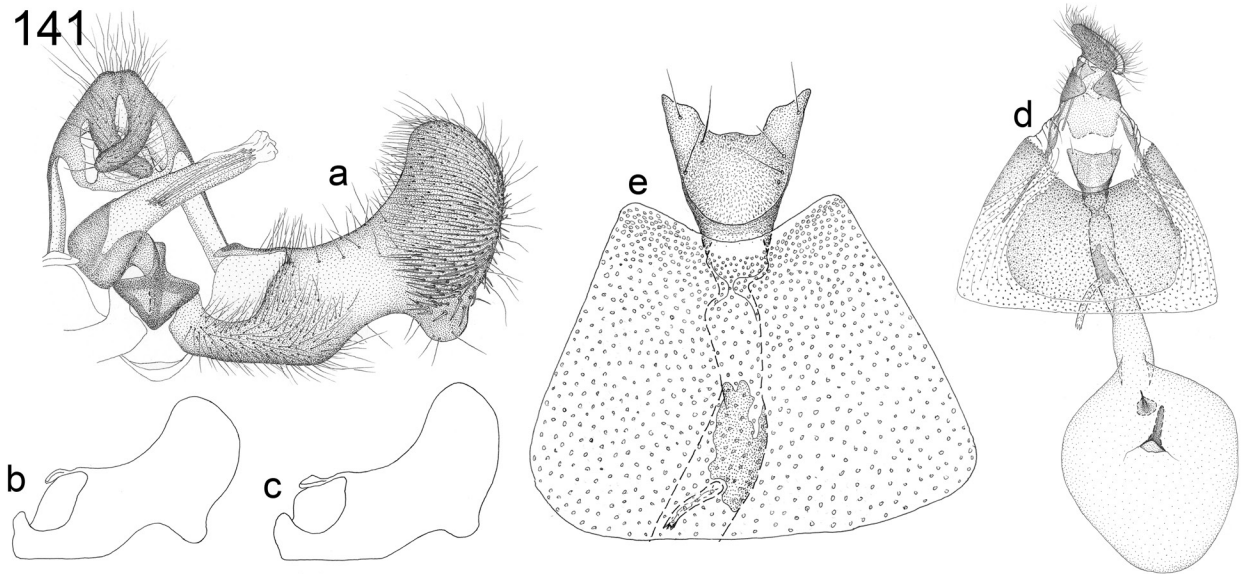
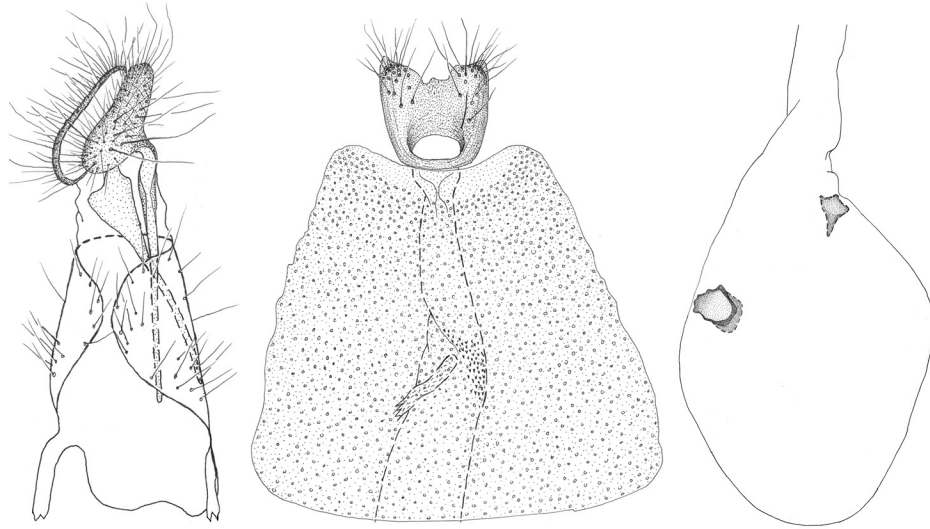


PLATE 60. 139. *Pelochrista similiana*: a–d, uncus/socii and associated valva; e–f, sterigma. 140. *P. oraria*: a, male; b–c, valva; d, female; e, sterigma/sternum 7.

141



142



143

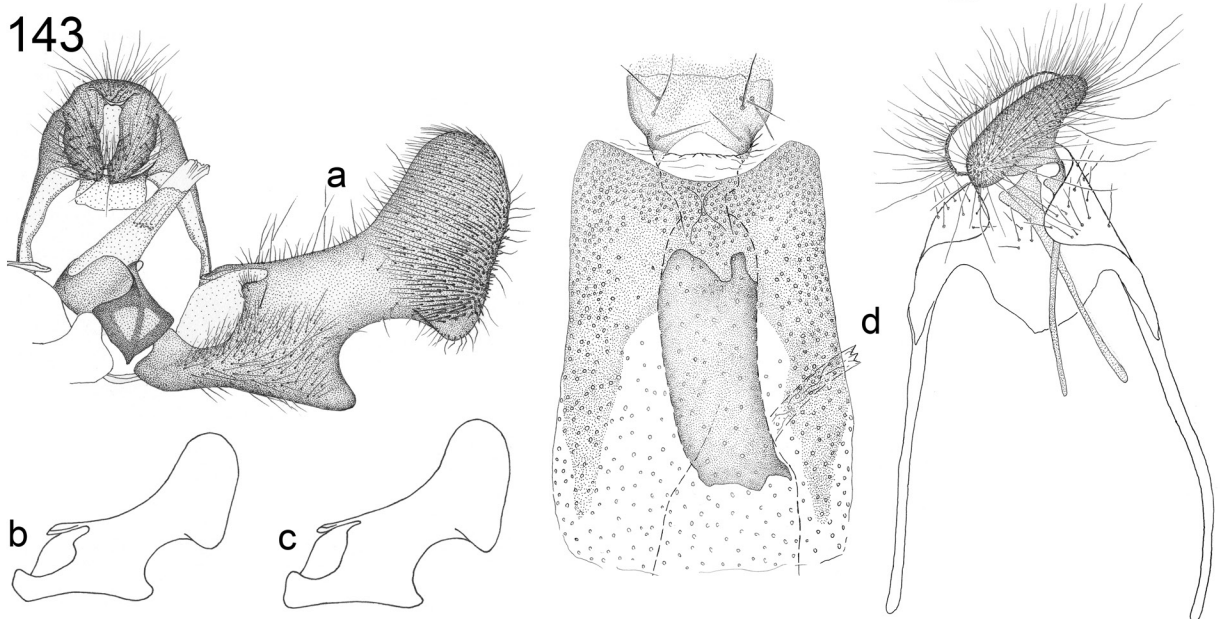


PLATE 61. 141. *Pelochrista dilatana*: a, male; b–c, valva; d, female; e, sterigma/sternum 7. 142. *P. arizonae*: female (papillae anales/tergum 8, sterigma/sternum 7, corpus bursae). 143. *P. sierrae*: a, male; b–c, valva; d, sterigma/sternum 7 and papillae anales/tergum 8.



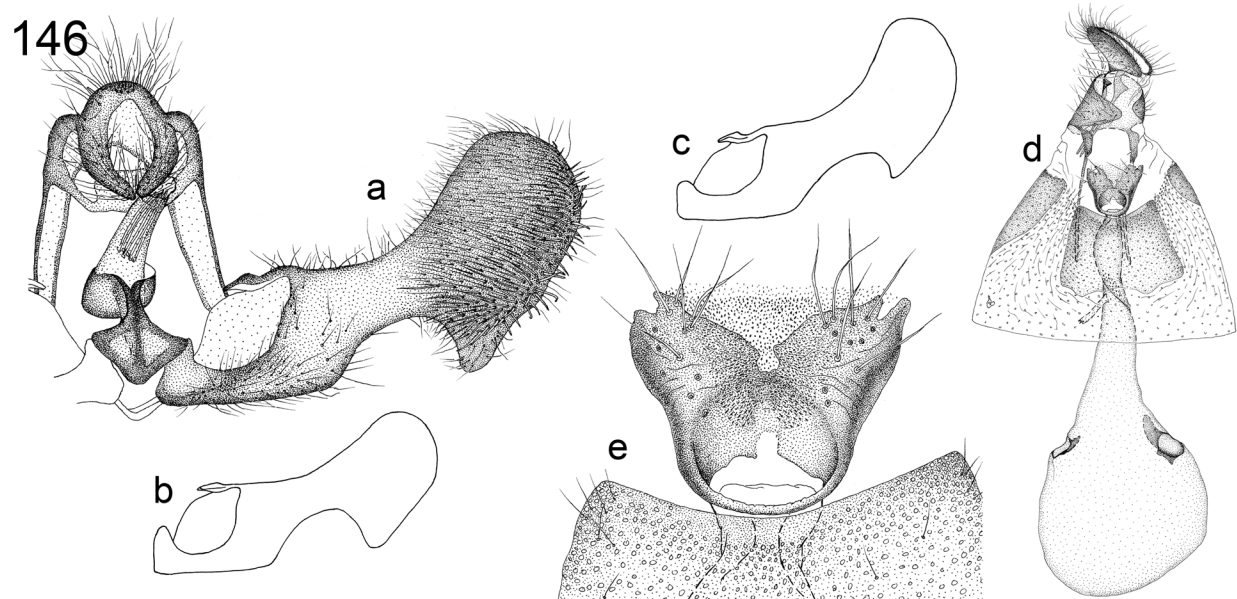
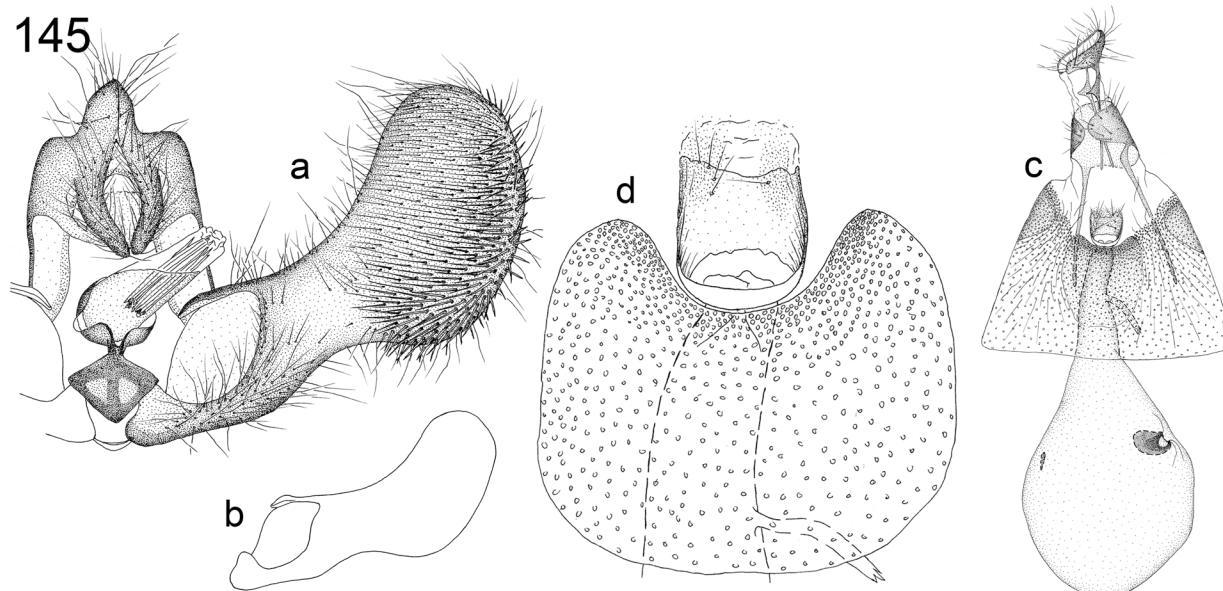
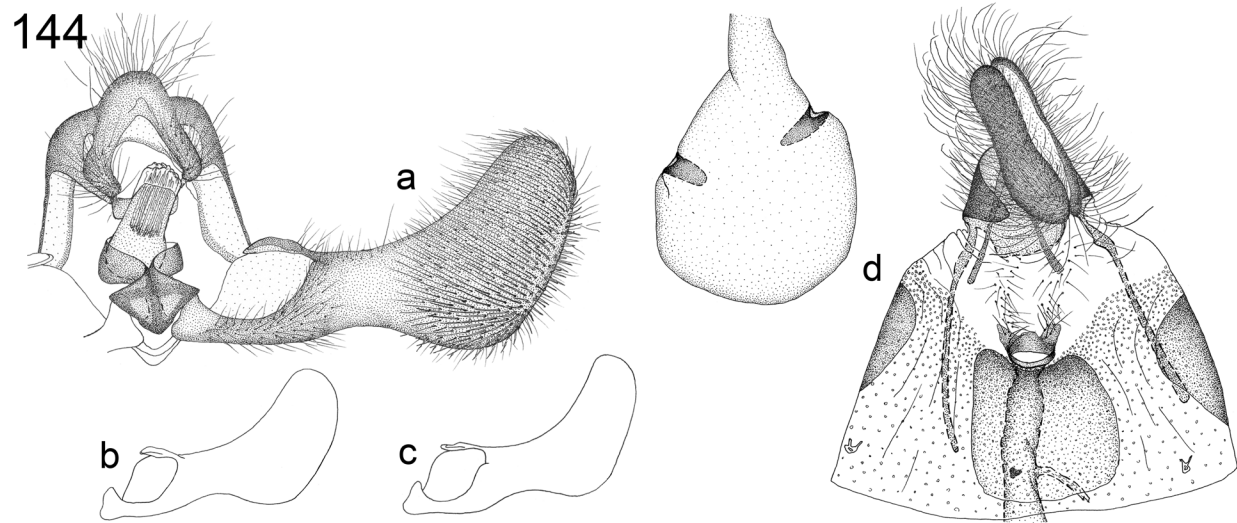


PLATE 62. 144. *Pelochrista shastana*: a, male; b-c, valva; d, female. 145. *P. notialis*: a, male; b, valva; c, female; d, sterigma/sternum 7. 146. *P. angelana*: a, male; b-c, valva; d, female; e, sterigma.



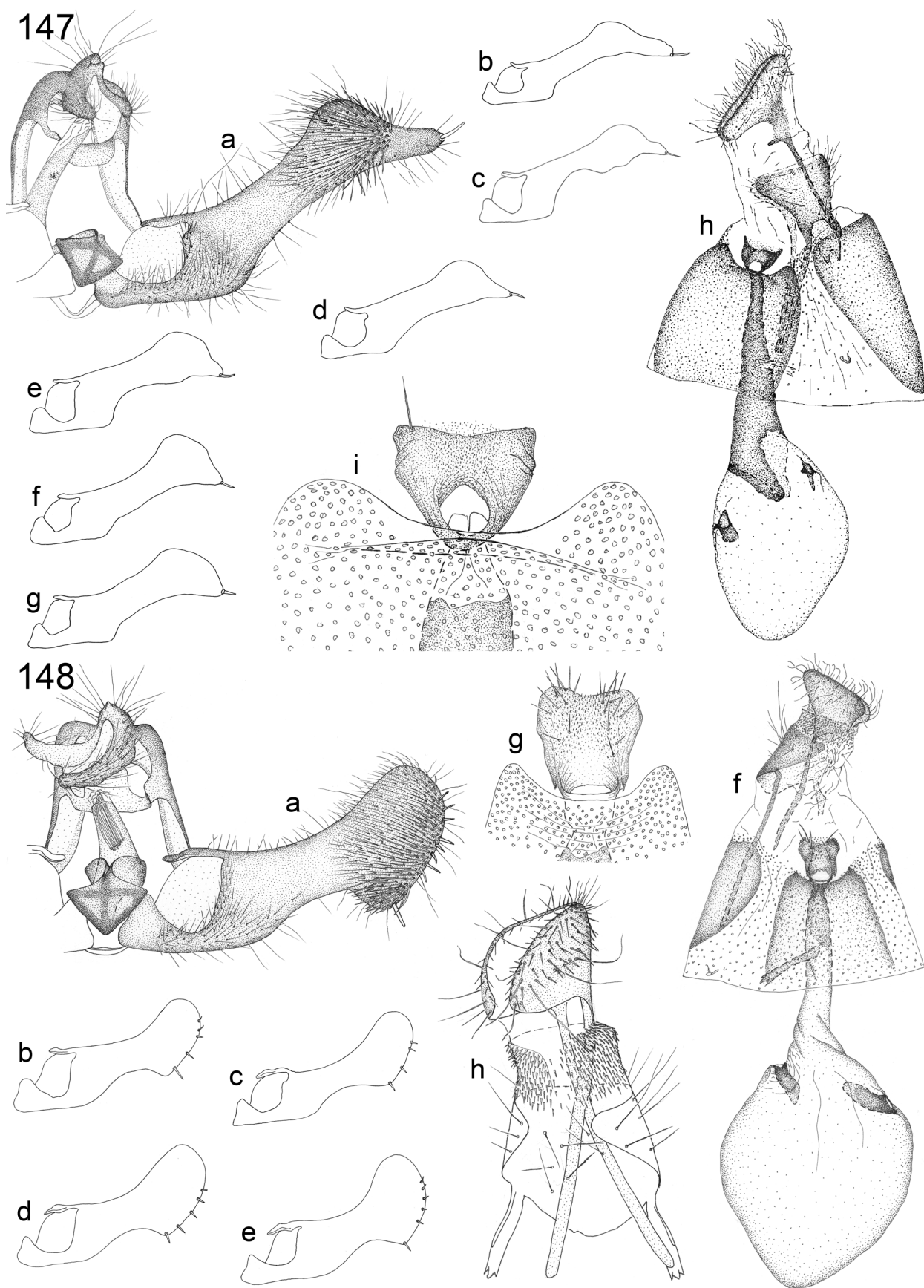
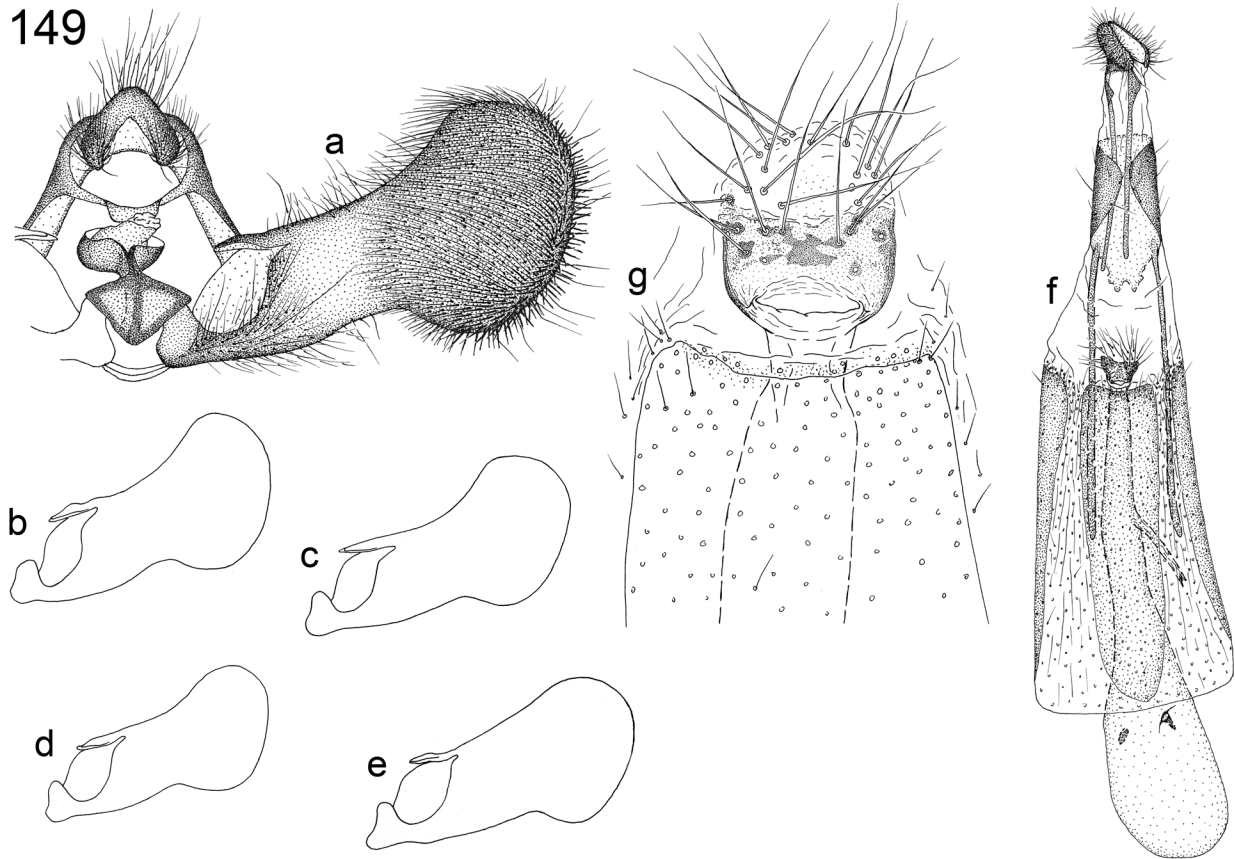


PLATE 63. 147. *Pelochrista argenteana*: a, male; b–g, valva; h, female; i, sterigma. 148. *P. serpentana*: a, male; b–e, valva; f, female; g, sterigma; h, papillae anales/tergum 8.

149



150

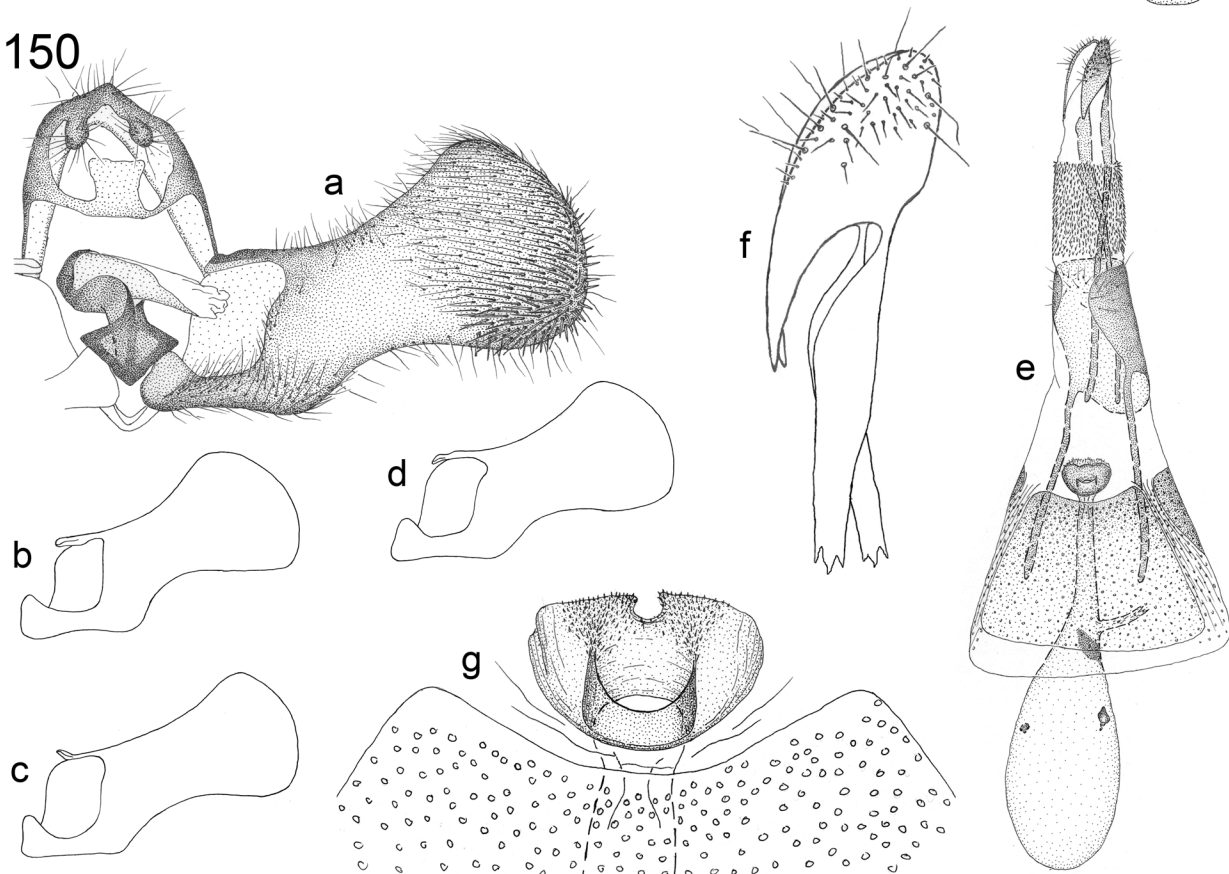
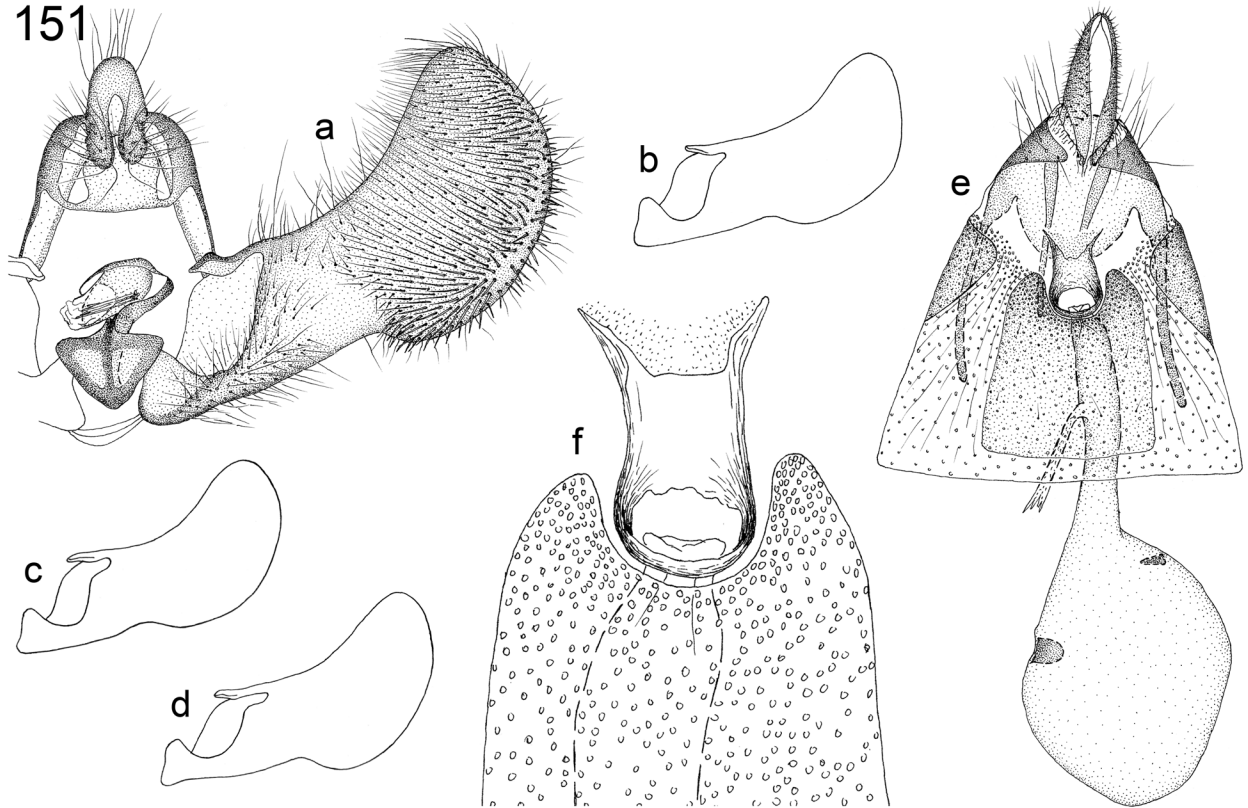


PLATE 64. 149. *Pelochrista lolana*: a, male; b-e, valva; f, female; g, sterigma. 150. *P. hobana*: a, male; b-d, valva; e, female; f, papillae anales; g, sterigma.



151



152

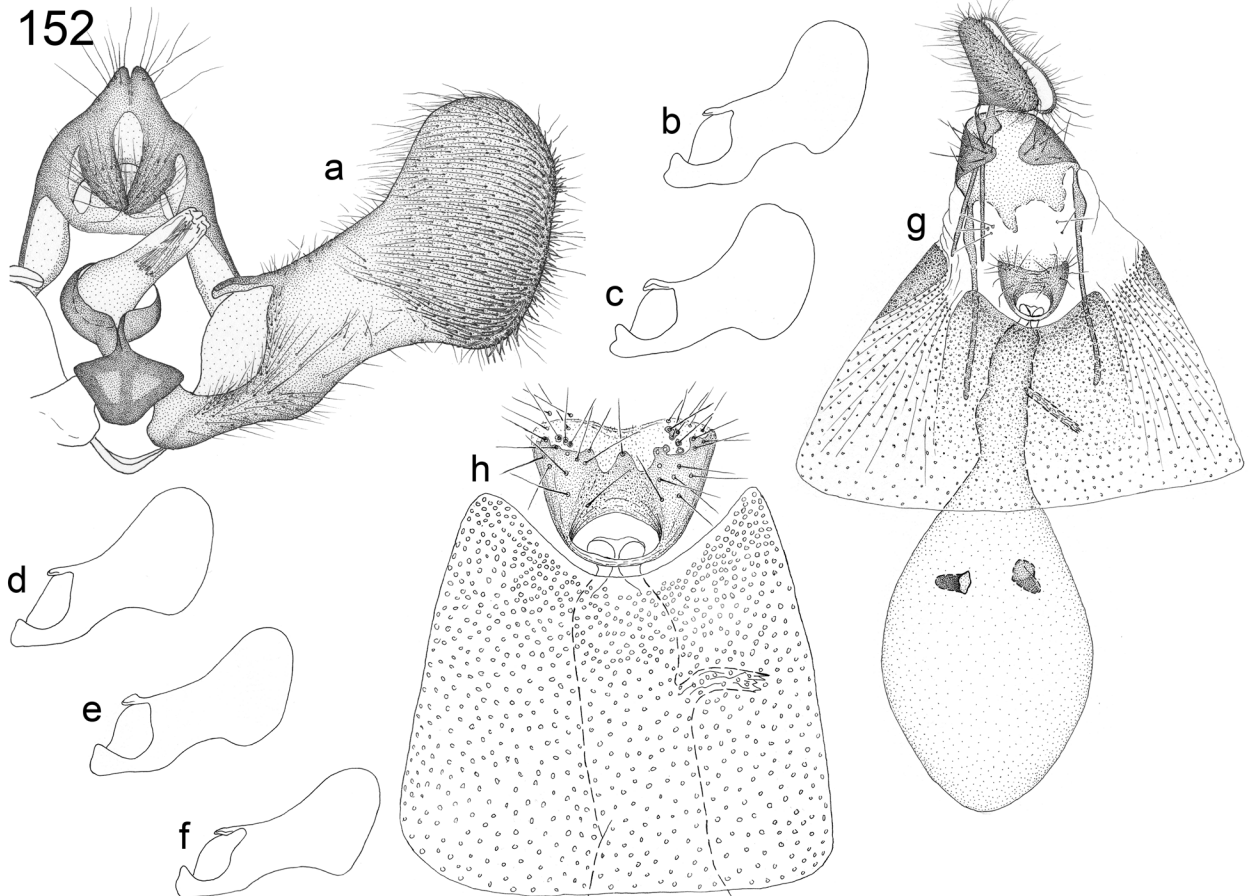
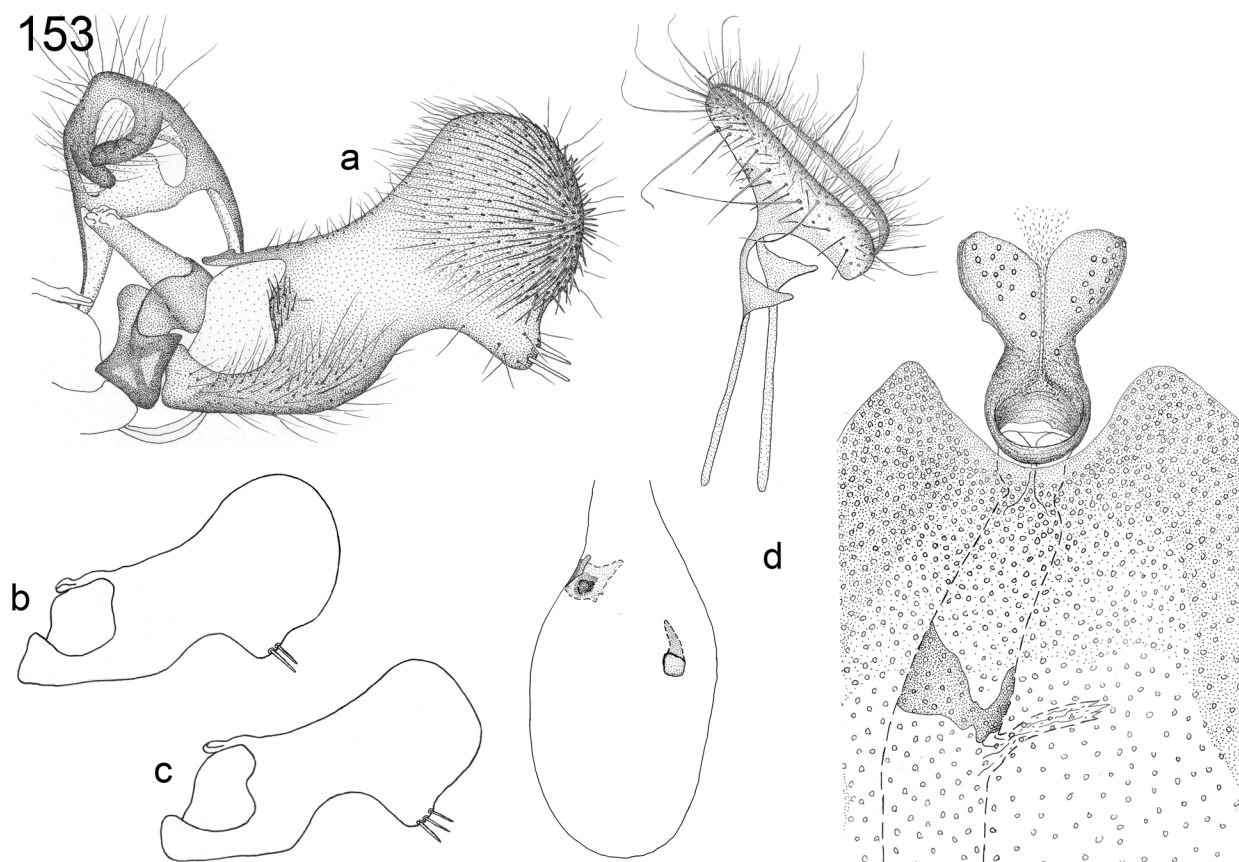


PLATE 65. 151. *Pelochrista maculatana*: a, male; b–d, valva; e, female; f, sterigma. 152. *P. dodana*: a, male; b–f, valva; g, female; h, sterigma/sternum 7.



153



154

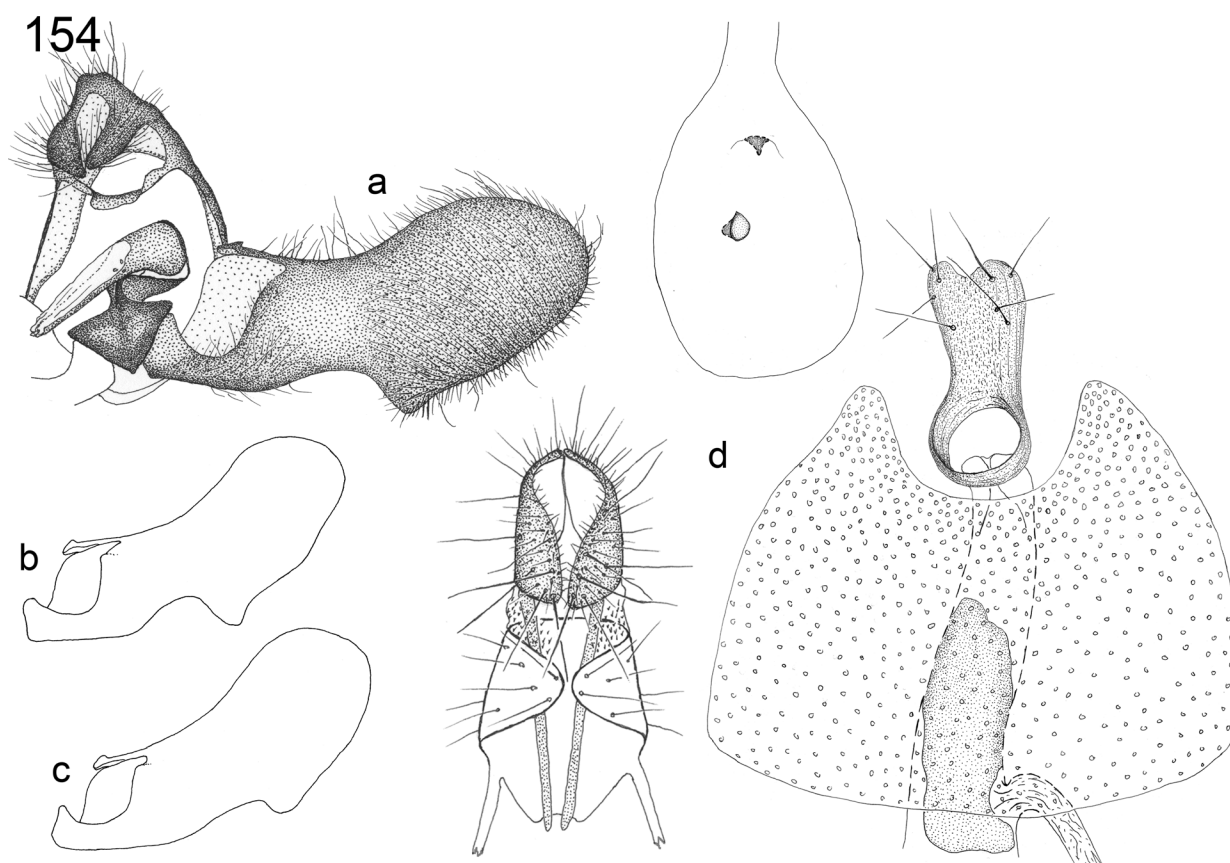


PLATE 66. 153. *Pelochrista bactrana*: a, male; b–c, valva; d, female (corpus bursae, papillae anales, sterigma).  
154. *P. inquadrana*: a, male; b–c, valva; d, female (papillae anales/tergum 8, corpus bursae, sterigma/sternum 7).

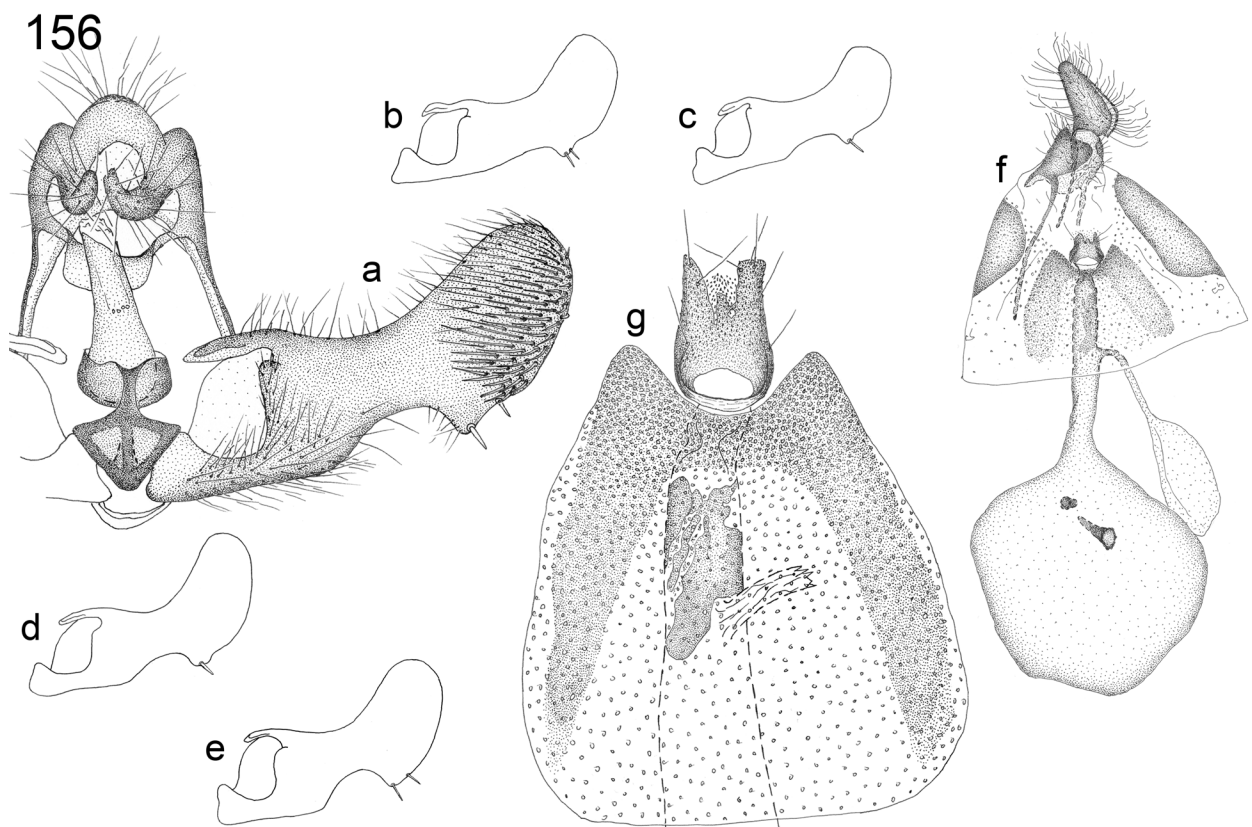
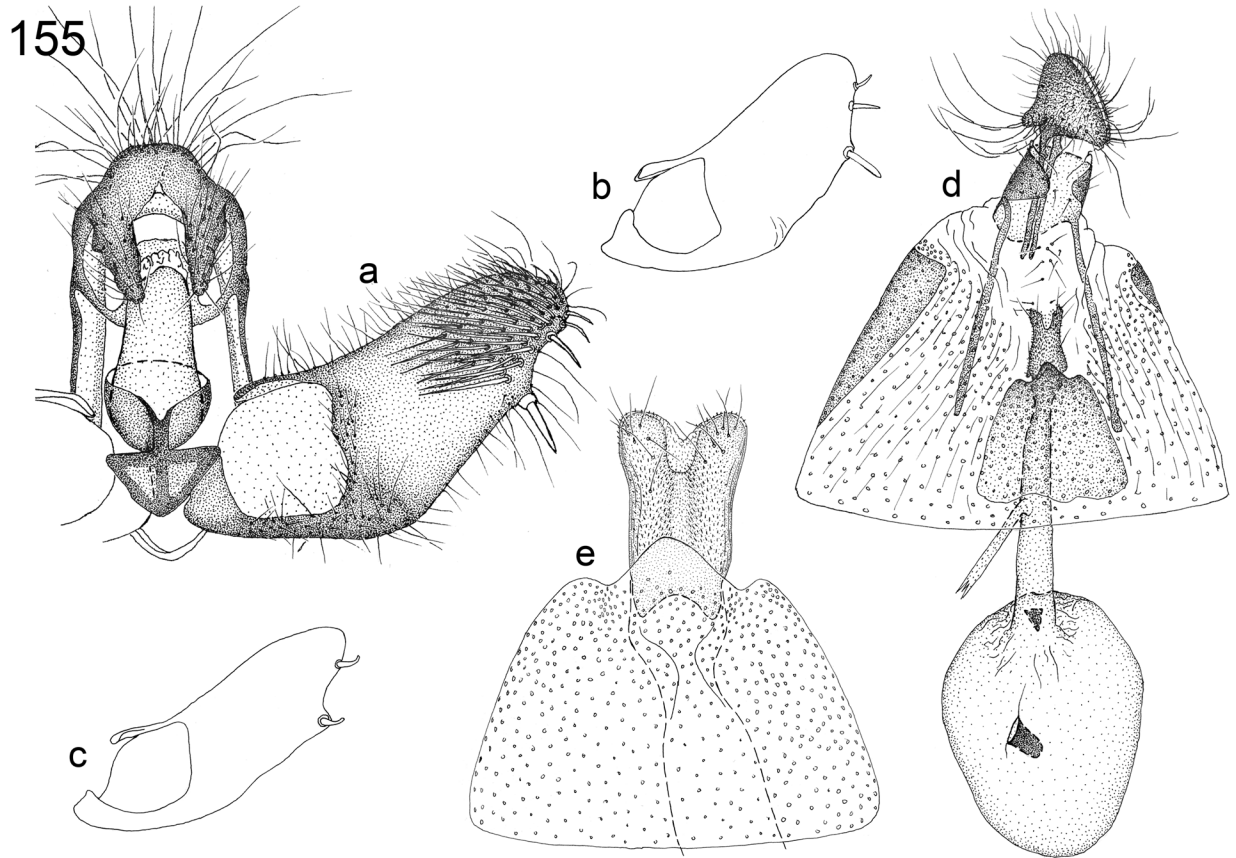
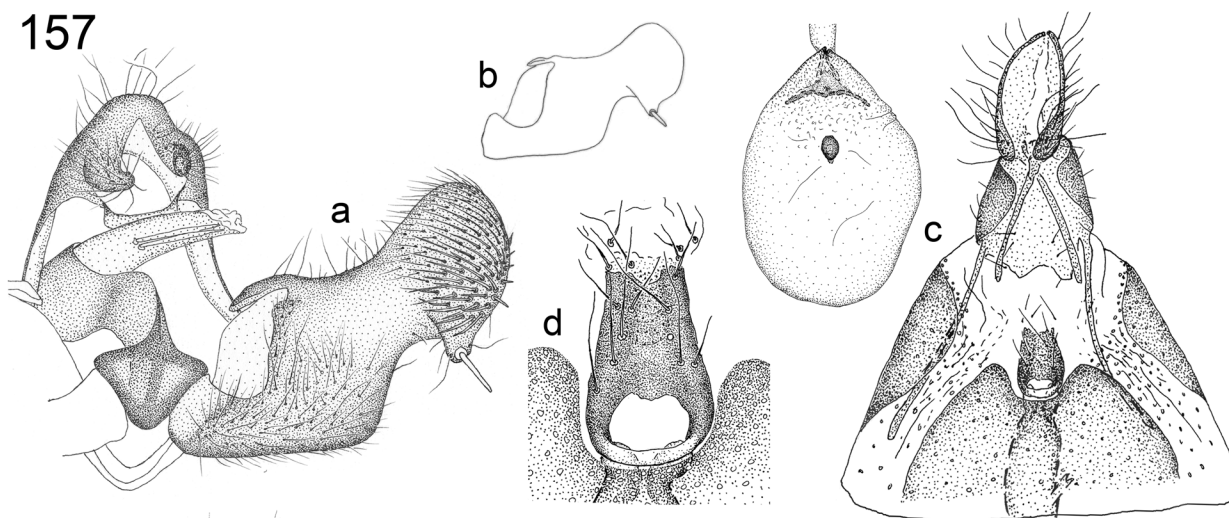


PLATE 67. 155. *Pelochrista quinquemaculana*: a, male; b–c, valva; d, female; e, sterigma/sternum 7. 156. *P. pallidipalpana*: a, male; b–e, valva; f, female; g, sterigma/sternum 7.



157



158



159

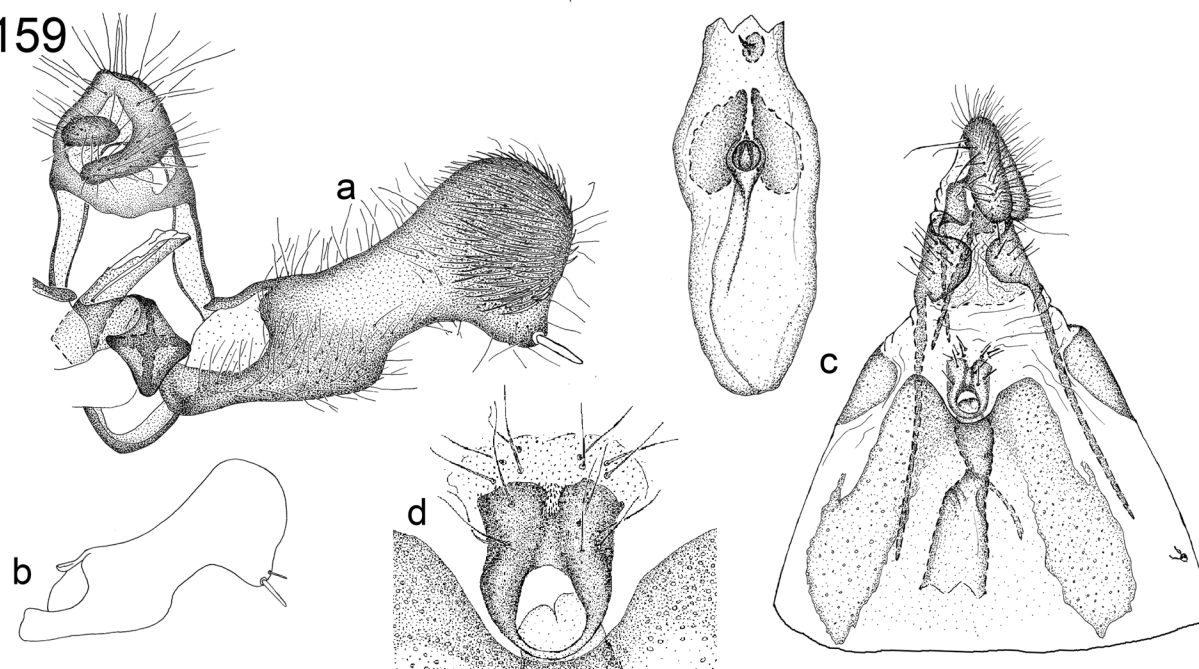
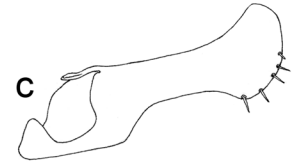
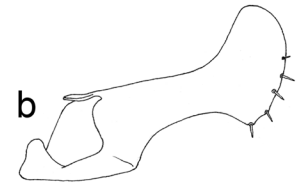
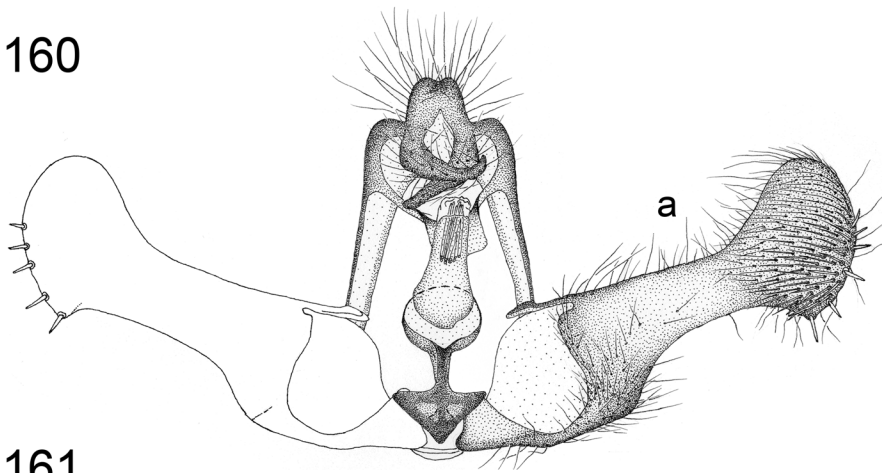


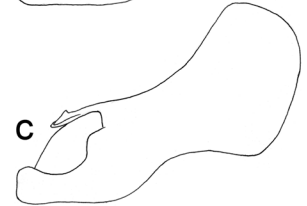
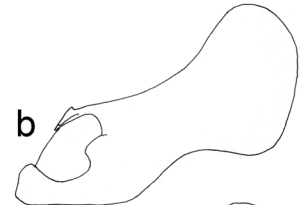
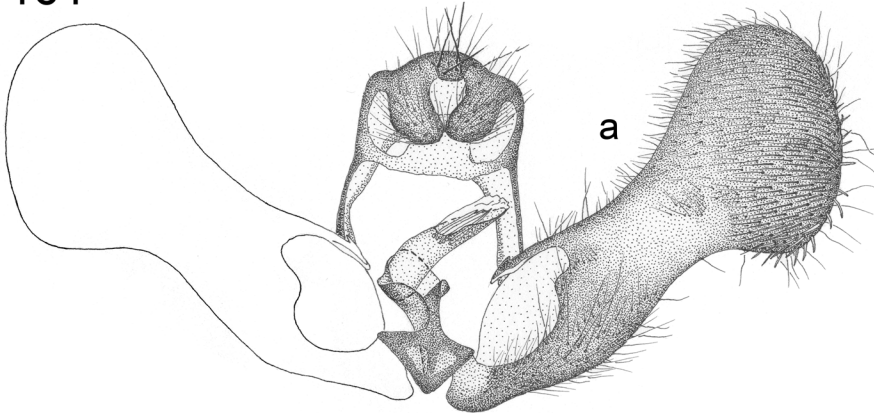
PLATE 68. 157. *Pelochrista fratrueis*: a, male; b, valva; c, female; d, sterigma. 158. *P. chiricahuae*: female (papillae anales/tergum 8, sterigma/sternum 7, corpus bursae). 159. *P. milleri*: a, male; b, valva; c, female; d, sterigma.



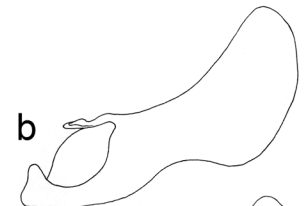
160



161



162



163

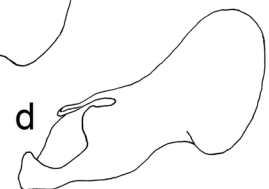
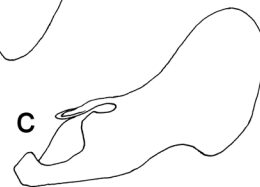
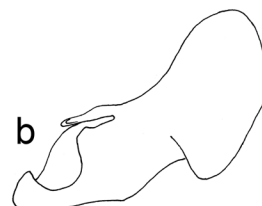
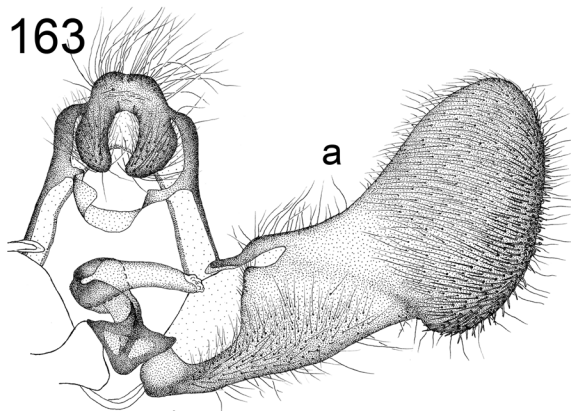
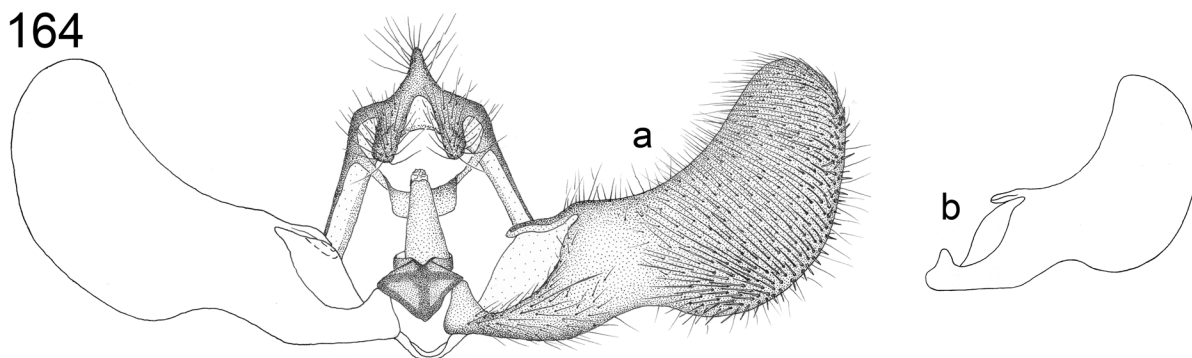
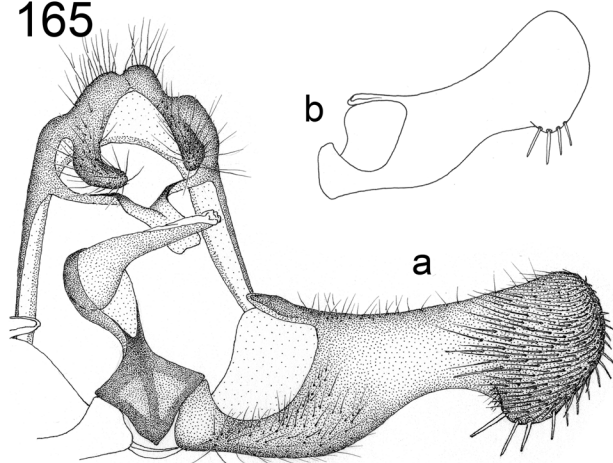


PLATE 69. 160. *Pelochrista heinrichi*: a, male; b–c, valva. 161. *P. opleri*: a, male; b–c, valva. 162. *P. dapsilis*: a, male; b–c, valva. 163. *P. rufocostana*: a, male; b–d, valva.

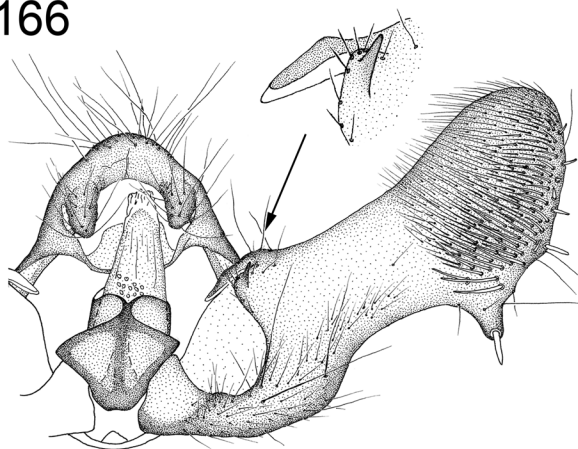
164



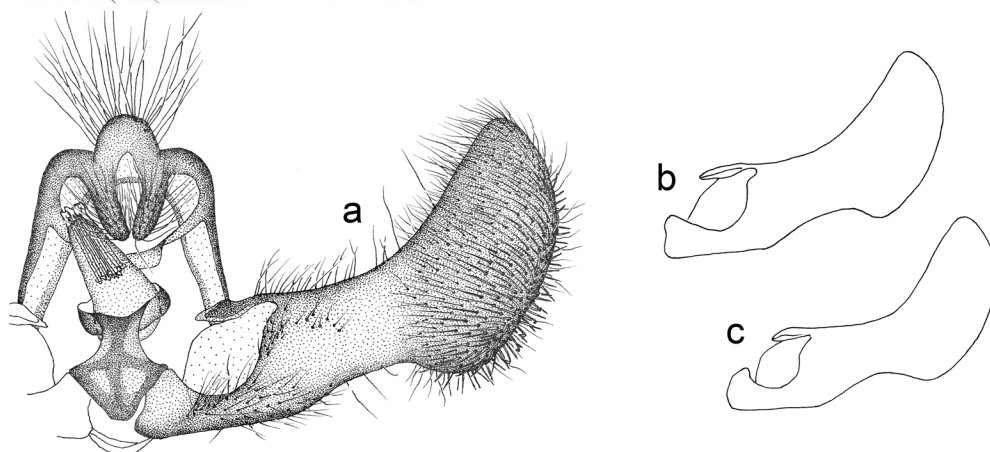
165



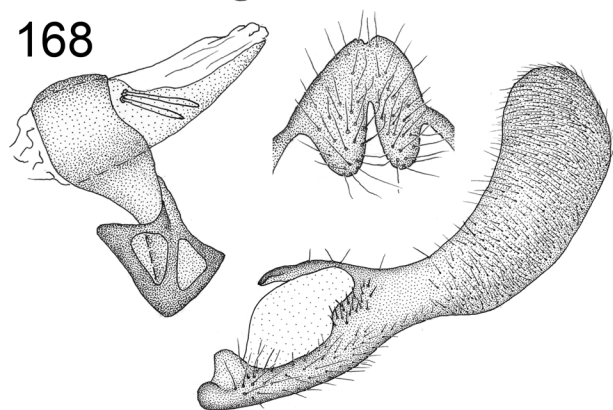
166



167



168



169

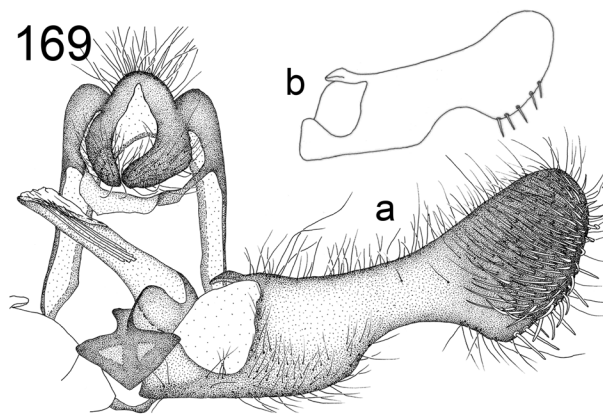


PLATE 70. 164. *Pelochrista jejunana*: a, male; b, valva. 165. *P. louisana*: a, male; b, valva. 166. *P. cinereolineana*: male. 167. *P. candida*: a, male; b–c, valva. 168. *P. graduatana*: a, male. 169. *P. occipitana*: a, male; b, valva.

## **Appendix A**

# **Numerical Data**



			FWL (mm)			MEAN		
Sp #	Species	Cornuti	Range	Avg	N	AR	SA°	NR
Type 1 Papillae Anales								
1	<i>agassizii</i>	3-6	7.5-12.6	10.5	50	3.26	154	0.59
2	<i>bolanderana</i>	1-3	6.9-10.7	8.8	36	3.15	156	0.59
3	<i>laticurva</i>	3-6	9.8-13.2	11.1	12	3.18	151	0.57
4	<i>denverana</i>	2-7	10.3-12.9	11.7	18	2.99	145	0.54
5	<i>hazelana</i>	1-3	7.7-12.7	10.7	8	3.26	154	0.51
6	<i>robinsonana</i>	0	4.4-8.7	6.8	8	2.93	158	0.65
7	<i>guttulana</i>	0	6.7-10.7	8.6	25	2.89	157	0.66
8	<i>fritillana</i>	0	7.2-9.0	8.1	14	2.95	138	0.56
9	<i>mobilensis</i>	0	8.5-11.4	10.3	9	2.70	144	0.60
10	<i>crambitana</i>	1-3	12.9-17.2	15.8	53	3.32	132	0.51
11	<i>richersana</i>	2-5	14.3-16.3	15.5	8	3.13	121	0.63
12	<i>crabtreei</i>	2-3	11.0-14.8	13.4	7	3.12	111	0.48
13	<i>agricolana</i>	7-27	5.7-10.7	7.8	211	3.11	98	0.48
14	<i>argentialbana</i>	8-20	6.6-11.8	9.1	303	3.17	72	0.53
15	<i>morrisoni</i>	8-16	6.8-10.8	8.7	143	3.20	94	0.51
16	<i>lathamii</i>	15-18	6.5-9.4	8.2	38	3.00	86	0.48
17	<i>heathiana</i>	15-19	6.7-8.7	7.8	18	2.77	111	0.48
18	<i>russeola</i>	8-11	8.4-11.8	10.2	37	2.95	99	0.51
19	<i>albiguttana</i>	12-31	5.6-9.8	7.8	108	3.10	49	0.26
20	<i>kimballi</i>	8-17	4.7-6.5	5.6	48	2.87	108	0.37
21	<i>graciliana</i>	9-14	7.7-8.8	8.2	4	3.09	125	0.34
22	<i>galenapunctana</i>	7-20	6.0-12.0	9.1	158	2.99	110	0.31
23	<i>comatulana</i>	13-28	5.2-9.5	7.7	189	3.00	120	0.53
24	<i>vagana</i>	21-29	6.3-9.7	8.2	62	2.77	123	0.50
25	<i>excluseriana</i>	13-19	6.5-8.0	7.3	18	3.00	137	0.65
26	<i>rufula</i>	10-13	7.7-10.2	8.9	21	3.21	129	0.57
27	<i>serapicana</i>	12-25	9.5-12.9	11.2	72	3.04	135	0.60
28	<i>atomosana</i>	7-12	9.0-11.0	10.0	3	3.02	91	0.49
29	<i>watertonana</i>	12-24	7.2-11.3	9.7	57	3.13	137	0.59
30	<i>polingana</i>	11	7.1-9.2	8.1	13	3.06	117	0.49
31	<i>comancheana</i>	18	8.3-9.1	8.7	4	3.09	115	0.44
32	<i>wandana</i>	13-24	6.9-8.7	7.8	13	2.62	140	0.68
33	<i>palabundana</i>	9-17	5.7-8.4	6.9	20	2.74	96	0.37
34	<i>rosaocellana</i>	7-11	7.2-10.4	8.7	48	2.85	109	0.37
35	<i>salaciana</i>	10-16	6.3-8.2	7.4	23	2.86	101	0.31
36	<i>daemonicana</i>	2-11	8.0-11.0	9.4	13	3.32	140	0.58
37	<i>collilonga</i>	6-12	5.3-7.9	6.6	70	3.09	104	0.33
38	<i>fraudabilis</i>	9-20	5.1-7.8	7.1	29	2.59	143	0.53
39	<i>adamantana</i>	0	7.7-10.5	9.3	13	2.81	125	0.48
Type 2 Papillae Anales								
40	<i>caniceps</i>	9-24	11.4-15.3	13.7	61	3.04	146	0.70
41	<i>optimana</i>	8-29	12.4-15.4	13.8	26	3.01	144	0.65
42	<i>hyponomeutana</i>	5-13	9.1-15.0	12.7	24	3.06	144	0.63

Sp #	Species	Cornuti	FWL (mm)			MEAN		
			Range	Avg	N	AR	SA°	NR
43	<i>canariana</i>	9-17	11.7-16.0	14.1	34	3.30	155	0.75
44	<i>avalona</i>	14-17	10.9-14.6	12.6	18	3.09	135	0.65
45	<i>persolita</i>	0	6.8-10.5	8.5	10	2.84	143	0.69
46	<i>graziella</i>	2-4	11.5-15.0	13.5	14	2.98	149	0.55
47	<i>diabolana</i>	0	9.7-12.9	12.2	11	3.31	151	0.75
48	<i>maculosa</i>	8-9	9.8-11.7	10.9	15	3.46	139	0.43
49	<i>lafontainei</i>	6-13	11.2-13.5	12.3	9	3.31	138	0.51
50	<i>fuscotriata</i>	12-24	8.1-10.7	9.3	5	3.11	153	0.58
51	<i>fuscosparsa</i>	12-27	7.9-13.8	11.1	84	3.20	145	0.46
52	<i>spaldingana</i>	8-17	10.4-14.5	12.1	48	3.12	152	0.74
53	<i>fandana</i>	0	10.7-15.7	13.7	21	3.33	139	0.54
54	<i>curlensis</i>	0-2	6.6-12.9	11.2	82	3.16	143	0.67
55	<i>biquadrana</i>	0-8	7.2-12.3	10.2	55	2.98	141	0.48
56	<i>mescalerana</i>	5-6	6.7-8.7	7.9	7	3.03	137	0.49
57	<i>fremonti</i>	unknown	11.6	11.6	1	3.31	unknown	unknown
58	<i>momana</i>	0	9.0-11.2	10.2	10	2.68	163	0.87
59	<i>gelattana</i>	2-9	10.2-13.4	12.0	50	3.39	127	0.61
<b>Type 3 Papillae Anales</b>								
60	<i>ridingsana</i>	4-12	6.8-13.5	10.9	199	3.23	150	0.60
61	<i>argentifurcatana</i>	11-15	7.6-11.5	9.0	39	2.93	149	0.63
62	<i>griselda</i>	6-9	10.0-13.9	12.7	29	3.12	140	0.53
63	<i>fernaldana</i>	9-15	9.1-13.9	11.7	97	3.34	146	0.64
64	<i>immaculana</i>	6-14	10.1-13.5	12.0	12	3.08	138	0.64
65	<i>aurilineana</i>	1-2	11.9-16.2	14.4	16	3.41	145	0.51
66	<i>sandiego</i>	3-6	9.0-13.4	12.0	33	2.96	143	0.61
67	<i>atascostana</i>	9-11	9.0-12.5	11.1	13	2.90	138	0.58
68	<i>luridana</i>	1-8	7.2-11.0	9.1	83	3.10	141	0.60
69	<i>totana</i>	7-12	7.4-12.0	9.9	93	3.16	151	0.63
70	<i>taosana</i>	1-5	7.5-9.2	8.5	12	3.19	141	0.58
71	<i>larana</i>	5-7	8.4-11.6	10.1	23	3.15	149	0.66
72	<i>nordini</i>	5-10	10.0-13.7	11.7	21	3.30	160	0.78
73	<i>piperata</i>	12-18	9.7-13.5	11.6	24	3.05	147	0.71
74	<i>eburata</i>	12-22	8.7-14.8	11.9	34	2.65	147	0.55
75	<i>invicta</i>	0	11.5-17.2	14.7	39	3.19	155	0.68
76	<i>subinvicta</i>	7-18	10.2-15.9	13.6	50	2.98	143	0.68
77	<i>snyderana</i>	7-20	11.7-16.5	14.0	38	3.24	155	0.73
78	<i>canana</i>	6-9	5.6-9.6	7.4	126	2.98	72	0.46
79	<i>artesianana</i>	8-11	8.3-11.2	9.4	12	2.79	86	0.46
80	<i>erema</i>	6-12	5.0-8.4	7.0	67	2.97	72	0.44
81	<i>rorana</i>	11-14	7.0-9.2	8.0	26	2.79	75	0.42
82	<i>vandana</i>	12-20	5.7-9.2	7.7	37	2.86	67	0.44
83	<i>passerana</i>	5-7	6.1-7.8	6.8	14	2.92	72	0.47
84	<i>womonana</i>	12-25	5.5-8.2	6.8	54	2.75	64	0.43
85	<i>zomonana</i>	9-14	4.9-6.8	5.8	19	2.87	85	0.42

Sp #	Species	Cornuti	FWL (mm)			MEAN		
			Range	Avg	N	AR	SA°	NR
86	<i>olivacea</i>	8-12	6.7-9.2	8.0	25	2.86	80	0.43
87	<i>flava</i>	4	6.2-7.9	6.8	6	3.24	88	0.46
88	<i>emaciatana</i>	0	7.9-13.4	10.8	20	3.40	145	0.64
89	<i>popana</i>	3-9	6.7-9.8	7.9	35	3.21	143	0.68
90	<i>powelli</i>	2-11	7.1-10.5	8.9	16	3.25	121	0.48
91	<i>reversana</i>	0	7.7-10.9	9.0	31	3.14	145	0.76
92	<i>ainsliei</i>	0	6.4-9.3	7.8	33	3.34	151	0.75
93	<i>kingi</i>	0	7.9-10.0	8.8	32	3.11	146	0.78
94	<i>blanchardi</i>	1-6	5.2-8.2	6.7	51	2.86	128	0.42
95	<i>johnstoni</i>	0	6.4-8.7	7.6	23	3.30	151	0.69
96	<i>ragonoti</i>	0	7.9-11.8	10.1	82	3.29	152	0.77
97	<i>kandana</i>	5-15	6.2-10.9	8.5	85	2.98	138	0.61
98	<i>nandana</i>	6-11	9.0-14.8	12.8	13	2.70	146	0.63
99	<i>corosana</i>	5-17	6.3-10.6	8.9	162	2.84	130	0.59
100	<i>scintillana</i>	1-2	5.6-14.5	9.1	268	3.08	128	0.62
<b>Type 4 Papillae Anales</b>								
101	<i>pulveratana</i>	1-7	5.3-10.0	7.7	150	3.07	55	0.64
102	<i>consobrinana</i>	4-6	5.3-7.7	6.4	58	2.92	69	0.64
103	<i>suadana</i>	2-5	8.4-11.8	10.0	33	3.00	66	0.70
104	<i>seamansi</i>	1-5	7.2-9.0	8.0	14	2.82	62	0.73
105	<i>coconana</i>	2-4	8.5-11.1	10.1	47	2.99	79	0.60
106	<i>sepiana</i>	2-6	9.0-10.9	9.8	26	2.99	59	0.67
107	<i>parapulveratana</i>	3-7	6.5-10.5	8.7	68	3.18	51	0.66
108	<i>floridensis</i>	4-6	7.0-8.6	7.9	6	3.02	46	0.59
109	<i>navajoensis</i>	6-8	10.9-12.6	11.7	11	2.95	66	0.70
110	<i>costastriata</i>	6-8	6.6-9.1	7.9	28	3.03	32	0.63
111	<i>mirosignata</i>	2-8	7.5-11.6	9.8	50	3.17	122	0.66
112	<i>mojaveana</i>	2-5	8.1-10.4	8.9	17	2.89	138	0.71
113	misc. sp. a	4-5	7.7-8.9	8.3	3	2.94	85	0.60
113	misc. sp. b	3	10.8-12.4	11.6	10	3.15	71	0.59
113	misc. sp. c	1-3	9.0-11.5	10.6	12	3.17	100	0.68
114	<i>mediostriata</i>	18-42	6.1-13.1	10.2	92	3.32	147	0.81
115	<i>palpana</i>	8-14	6.3-7.6	6.9	22	3.01	142	0.52
116	<i>gilligani</i>	3-4	6.1-9.0	7.4	20	3.12	140	0.50
117	<i>matutina</i>	13-34	5.7-10.2	7.6	101	2.64	142	0.62
118	<i>fiskeana</i>	24-50	7.0-13.5	9.5	73	2.56	154	0.60
119	<i>symbolaspis</i>	1	6.3-7.2	6.8	2	3.15	158	0.77
120	<i>sullivani</i>	1-4	4.9-6.5	5.9	41	2.65	155	0.69
121	<i>lynxana</i>	1-3	5.4-6.7	5.8	39	2.59	153	0.70
122	<i>juncticiliana</i>	0-1	6.9-10.3	8.5	20	2.75	139	0.77
123	<i>derelicta</i>	13-16	5.3-8.2	6.7	52	2.60	127	0.47
124	<i>cataclystiana</i>	9-12	6.6-9.2	8.0	36	3.03	128	0.61
125	<i>conspiciendana</i>	0-8	6.0-10.0	8.3	72	3.04	112	0.79
126	<i>grandiflavana</i>	13-26	14.2-15.6	15.1	9	2.58	157	0.02



Sp #	Species	Cornuti	FWL (mm)			MEAN		
			Range	Avg	N	AR	SA°	NR
127	<i>subflavana</i>	8-16	10.3-16.5	13.9	31	2.73	156	0.76
128	<i>consociana</i>	6-16	8.5-10.5	10.0	12	2.82	163	0.82
129	<i>murina</i>	4-8	10.7-12.5	11.6	2	2.61	162	0.77
130	<i>irroratana</i>	2-4	9.2-13.7	11.4	5	2.84	156	0.82
131	<i>handana</i>	11-15	10.0-14.2	11.7	14	2.93	171	0.87
132	<i>aurantiaca</i>	2-4	10.0-13.0	11.7	3	2.98	162	0.88
133	<i>primulana</i>	0-3	6.8-11.0	8.8	17	3.11	165	0.85
134	<i>biplagata</i>	4-5	8.8-13.1	11.7	18	3.03	168	0.84
135	<i>hennei</i>	3-4	7.9-12.0	10.2	5	2.75	180	0.91
136	<i>hasseanthi</i>	2-5	9.4-11.7	10.4	11	2.73	172	0.87
137	<i>dorsisignatana</i>	8-18	7.1-11.5	9.5	55	2.85	155	0.81
138	<i>wagneri</i>	13-20	6.4-10.0	8.4	12	2.97	154	0.71
139	<i>similiana</i>	15-31	6.6-11.2	9.3	64	2.83	153	0.79
140	<i>oraria</i>	13-15	7.3-13.2	10.8	38	2.78	157	0.82
141	<i>dilatana</i>	10-21	9.2-13.0	11.7	10	2.73	139	0.77
142	<i>arizonae</i>	unknown	11.4-12.6	12.2	3	2.82	unknown	unknown
143	<i>sierrae</i>	10-15	9.6-11.9	10.6	5	2.78	51	0.62
144	<i>shastana</i>	9-17	12.8-14.3	13.7	4	3.11	153	0.69
145	<i>notialis</i>	13-19	5.9-8.5	7.3	38	2.94	153	0.76
146	<i>angelana</i>	8-11	11.3-12.7	11.9	10	3.06	126	0.50
147	<i>argenteana</i>	5-11	7.6-12.5	9.7	117	3.48	116	0.55
148	<i>serpentana</i>	7-17	7.1-10.8	8.5	107	3.20	144	0.65
149	<i>lolana</i>	0	7.1-10.9	9.5	38	2.93	162	0.89
150	<i>hohana</i>	0	7.1-11.0	9.0	17	3.28	129	0.77
151	<i>maculatana</i>	1-6	7.5-11.1	9.3	30	2.88	168	0.92
152	<i>dodana</i>	5-17	8.7-11.0	10.0	39	2.87	147	0.78
153	<i>abstemia</i>	3-8	9.7-12.4	11.5	8	3.20	128	0.76
154	<i>inquadrana</i>	3-10	5.9-7.4	6.7	19	3.26	144	0.87
155	<i>quinquemaculana</i>	0	6.1-9.8	8.5	11	2.79	144	0.91
156	<i>pallidipalpana</i>	1-4	5.2-6.6	6.0	25	2.59	147	0.62
157	<i>fratruelis</i>	2	5.0-6.6	5.9	14	2.53	108	0.50
158	<i>chiricahuae</i>	unknown	10.0-10.7	10.4	2	2.90	unknown	unknown
159	<i>milleri</i>	1	5.5-9.6	7.7	40	2.53	110	0.69
<b>Female Unknown</b>								
160	<i>heinrichi</i>	6-13	8.5-11.3	9.7	9	3.20	123	0.49
161	<i>opleri</i>	10-11	11.2-12.1	11.7	8	3.12	138	0.71
162	<i>dapsilis</i>	7-14	12.1-14.2	13.1	11	3.11	152	0.69
163	<i>rufocostana</i>	0	9.2-11.8	10.6	18	3.07	147	0.82
164	<i>jejunana</i>	0	7.1-7.3	7.2	2	3.24	146	0.76
165	<i>louisana</i>	0-1	9.5	9.5	1	2.97	137	0.63
166	<i>cinereolineana</i>	11-13	6.2-7.6	6.8	4	3.29	114	0.61
167	<i>candida</i>	9-10	10.4-11.3	10.8	3	3.50	150	0.71
168	<i>graduatana</i>	2	7.4	7.4	1	2.74	158	0.49
169	<i>occipitana</i>	7	6.6	6.6	1	3.30	126	0.61



## **Appendix B**

# **Genitalia Data**



1. *Pelochrista agassizii* (Robinson)
  - a. Colorado, Denver, 9 June 1899, slide DJW 2792, MCZ.
  - b. Oklahoma, Tenkiller Lake, 23 June 1955, D. R. Davis, slide 70199, USNM.
  - c. Utah, Emery County, Goblin Valley Road, 9 May 2007, J. S. Nordin, slide DJW 1991, DJW.
  - d. Colorado, Denver, 9 June 1899, slide DJW 2793, MCZ.
  - e. Colorado, slide DJW 2958, USNM [PLTP. *P. gilletteana*].
2. *Pelochrista bolanderana* (Walsingham)
  - a. Arizona, Santa Cruz County, 2 mi W of Fort Huachuca, 6 August 1999, D. J. Wright, slide DJW 557, DJW.
  - b. Arizona, Cochise County, Lower Miller Canyon, 18 July 2001, G. J. Balogh, slide DJW 419, DJW.
  - c. Idaho, Oneida County, Caribou National Forest, 27 July 2003, D. J. Wright, slide DJW 2814, DJW.
  - d. Idaho, Oneida County, Curlew National Grassland, 18 July 2001, D. J. Wright, slide DJW 2815, DJW.
3. *Pelochrista laticurva* (Heinrich)
  - a. California, Del Norte County, 6 mi E of Smith River, 27 July 1990, D. C. Ferguson, slide DJW 2924, USNM.
  - b. California, Los Angeles County, San Gabriel Mountains, 30 August 1962, C. Henne, slide JAP 6704, EME.
  - c. California, Lassen County, 3 mi SE of Milford, 15 August 1998, L. L. Crabtree, slide DJW 2715, DJW.
  - d. California, Plumas County, 14 mi SW of Johnsonville, 9 August 1965, J. S. Buckett, slide DJW 2926, EME.
  - e. California, Los Angeles County, San Gabriel Mountains, Big Pines, 19 August 1966, C. Henne, slide DJW 2927, EME.
4. *Pelochrista denverana* (Kearfott)
  - a. New Mexico, Lincoln County, Valley of Fires, D. J. Wright, 24 September 2003, slide DJW 1076, DJW.
  - b. Colorado, Larimer County, Rist Canyon, 19 September 1991, P. A. Opler, slide DJW 277, DJW.
  - c. Colorado, Larimer County, Mail Creek, 9 September 1989, P. A. Opler, slide DJW 386, DJW.
  - d. Colorado, Weld County, Pawnee National Grassland, 31 August 2007, T. M. Gilligan, slide DJW 2484, DJW.
5. *Pelochrista hazelana* (Klots)
  - a. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, slide DJW 1067, DJW.
  - b. PTP. SW Colorado, July 1899, Dietz, slide 70718, USNM.
  - c. Colorado, El Paso County, Foster Ranch, F. M. Brown, slide DJW 3429, USNM.
  - d. Oklahoma, Cimarron County, Black Mesa State Park, 6 September 2006, C. Harp, slide DJW 3434, CEH.
  - e. Colorado, Otero County, Arkansas Valley Research Center, 18 September 1993, F. Schweissing, slide DJW 1781, CSU.
6. *Pelochrista robinsonana* (Grote)
  - a. Kentucky, Laurel County, Forest Service Road 4176, 6 June 1992, D. J. Wright, slide DJW 1379, DJW.
  - b. Florida, Miami-Dade County, Homestead, 17 May 1978, C. V. Covell, slide DJW 2485, DJW.
  - c. Ohio, Lucas County, Oak Openings, 22 June 1990, D. J. Wright, slide DJW 2482, DJW.
  - d. Alabama, Baldwin County, Bon Secour NWR, 11–16 May 1994, R. W. Hodges, slide DJW 2560, USNM.
  - e. New Jersey, Ocean County, Lakehurst, 25 June 1954, J. G. Franclemont, slide DJW 2561, USNM.
7. *Pelochrista guttulana* (Blanchard)
  - a. Alabama, Baldwin County, Bon Secour NWR, 8–9 August 1994, R. L. Brown, slide DJW 2518, DJW.
  - b. Texas, Cameron County, S Padre Island, 10 November 1999, L. D. Gibson, slide DJW 2519, DJW.
  - c. Alabama, Baldwin County, Bon Secour NWR, 8–9 August 1994, R. L. Brown, slide DJW 2518, DJW [left valva].
  - d. Texas, Cameron County, S Padre Island, 10 November 1999, L. D. Gibson, slide DJW 2520, DJW.
  - e. Alabama, Baldwin County, Bon Secour NWR, 13–16 May 1994, R. L. Brown and D. Pollock, slide DJW 2521, MEM.
8. *Pelochrista fritillana* (Blanchard and Knudson)
  - a. PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, slide 24888, USNM.
  - b. PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, slide DJW 3336, USNM.
  - c. PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, slide DJW 3422, USNM.
  - d. PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, slide DJW 3335, USNM.
  - e. PTP. Texas, Anderson County, Tennessee Colony, 28 June 1978, A. and M. E. Blanchard, slide 24889, USNM.
9. *Pelochrista mobilensis* (Heinrich)
  - a. Alabama, Baldwin County, Bon Secour NWR, 15 October 1996, T. L. Schiefer, slide DJW 2969, DJW.
  - b. Alabama, Baldwin County, Bon Secour NWR, 15 October 1996, T. L. Schiefer, slide DJW 2968, DJW.
  - c. Alabama, Baldwin County, 1 mi E of Oyster Bay, 4 September 1988, R. L. Brown, slide DJW 3014, MEM.
  - d. Alabama, Baldwin County, 1 mi E of Oyster Bay, 13 October, 1990, R. L. Brown, slide DJW 3013, DJW.
  - e. Alabama, Baldwin County, 1 mi E of Oyster Bay, 13 October, 1990, R. L. Brown, slide DJW 2970, MEM.

10. *Pelochrista crambitana* (Walsingham)
  - a. Wyoming, Albany County, 1 mi E of Laramie, 8 August 2002, J. S. Nordin, slide DJW 2469, DJW.
  - b. Colorado, Chaffee County, 2.5 mi ESE of Buena Vista, 23 August 1997, D. J. Wright, slide DJW 2471, DJW.
  - c. Utah, San Juan County, Comb Ridge, 20 September 2000, G. J. Balogh, slide DJW 2472, DJW.
  - d. New Mexico, Chaves County, Mescalero Dunes, 22 September 2003, G. J. Balogh, slide DJW 2473, DJW.
  - e. North Dakota, Slope County, Columnar Juniper Area, 3 September 2002, G. J. Balogh, slide DJW 2470, DJW.
11. *Pelochrista richersana* Wright
  - a. PTP. California, San Luis Obispo County, Montana de Oro State Park, 18 September 2008, K. Richers, slide DJW, 2965, DJW.
  - b. PTP. California, San Luis Obispo County, Montana de Oro State Park, 18 September 2008, K. Richers, slide DJW, 2964, KMR.
  - c. HTP. California, San Luis Obispo County, Montana de Oro State Park, 18 September 2008, K. Richers, slide DJW, 2971, USNM.
  - d. PTP. California, collection data uncertain, K. Richers, slide DJW 2967, USNM.
12. *Pelochrista crabtreei* Wright
  - a. HTP. Nevada, Nye County, 24 mi N of Carvers, 13 June 2005, L. L. Crabtree, slide DJW 2972, USNM.
  - b. PTP. Nevada, Nye County, 25 mi N of Carvers, 30 May 2013, L. L. Crabtree, slide DJW 3297, USNM.
  - c. PTP. Nevada, Nye County, 24 mi N of Carvers, 27 May 2000, L. L. Crabtree, slide DJW 2623, DJW.
13. *Pelochrista agricolana* (Walsingham)
  - a. PLTP. California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, slide DJW 2891, BMNH.
  - b. LTP. Oregon, Douglas County, Umpqua River, 26 April – 3 May 1872, Walsingham, slide 5745, BMNH.
  - c. Idaho, Oneida County, Holbrook Summit, 15 July 2001, D. J. Wright, slide DJW 2838, DJW.
  - d. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 137, DJW.
  - e. Wyoming, Albany County, T15N R73W S1, 17 July 2001, J. S. Nordin, slide DJW 831, DJW.
  - f. Minnesota, Ramsey County, North Oaks, 8 July 1965, W. E. Miller, slide JAB 14, AMNH [PTP. *P. barbara*].
  - g. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 1848, DJW.
  - h. Colorado, Sangre de Christo Range, 16 July 1934, A. F. Braun, slide DJW 2897, USNM.
  - i. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 1414, DJW.
  - j. Arizona, Santa Cruz County, 2 mi W of Fort Huachuca, 6 August 1999, D. J. Wright, slide DJW 544, DJW.
  - k. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, slide DJW 440, DJW.
  - l. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 1848, DJW.
  - m. Minnesota, Ramsey County, North Oaks, 4 July 1965, W. E. Miller, slide PJ 223, UMSP.
  - n. Minnesota, Ramsey County, North Oaks, 6 August 1965, W. E. Miller, slide PJ 262, UMSP [PTP. *P. barbara*].
  - o. Minnesota, Ramsey County, North Oaks, 6 August 1965, W. E. Miller, slide PJ 263, UMSP [PTP. *P. barbara*].
14. *Pelochrista argentialbana* (Walsingham)
  - a. Wyoming, Albany County, T15N R73W S1, 17 June 2002, J. S. Nordin, slide DJW 1372, DJW.
  - b. Virginia, 4 June 1882, slide DJW 2895, USNM [LTP. *P. pergandeana*].
  - c. Texas, slide 72798, USNM [LTP. *P. pergandeana flavana*].
  - d. California, Lassen County, 4 mi E of Bieber, 26 June 2010, L. L. Crabtree, slide DJW 2827, DJW.
  - e. Wyoming, Albany County, W side of Gelatt Lake, 21 July 2004, J. S. Nordin, slide DJW 1187, DJW.
  - f. Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, slide DJW 2834, DJW.
  - g. Wyoming, Albany County, N of Sally Creek, 23 July 2003, D. J. Wright, slide DJW 2843, DJW.
  - h. Washington, Chelan County, Forest Road 7528, 9 July 2010, D. J. Wright, slide DJW 2830, DJW.
  - i. Wyoming, Albany County, T15N R73W S1, 18 June 2002, J. S. Nordin, slide DJW 1373, DJW.
  - j. Iowa, Pocahontas County, Kalsow Prairie, 18 July 2003, D. J. Wright, slide DJW 1847, DJW.
15. *Pelochrista morrisoni* (Walsingham)
  - a. Wyoming, Albany County, T15N R73W S1, 26 June 2002, J. S. Nordin, slide DJW 2824, DJW.
  - b. Canada, British Columbia, Penticton, 6 June 1933, J. McDunnough, slide TOR 3000, CNC.
  - c. South Dakota, Harding County, Picnic Springs Campground, 2 September 2002, G. J. Balogh, slide DJW 2823, DJW.
  - d. Arizona, Santa Cruz County, Harshaw Creek Road, 5 August 1999, D. J. Wright, slide DJW 2816, DJW.
  - e. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 2821, DJW.
  - f. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, slide DJW 1415, DJW.
16. *Pelochrista lathami* (Forbes)
  - a. Connecticut, New Haven County, Milford Point Audubon Center, 2 July 2004, M. Volovski, slide DJW 1739, UCMS.
  - b. New York, Suffolk County, Long Island, Orient, 8 August 1934, R. Latham, slide DJW 3146, CUIC.
  - c. PTP. New York, Suffolk County, Long Island, Orient, 2 August 1950, R. Latham, slide DJW 3145, CUIC.
  - d. New York, Suffolk County, Long Island, Napeague, 20 July 1941, R. Latham, slide DJW 3148, CUIC.

17. *Pelochrista heathiana* (Kearfott)
  - a. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, slide DJW 1378, DJW.
  - b. PLTP. Arkansas, Washington County, August, slide 70208, USNM.
  - c. Ohio, Greene County, Wright-Patterson AFB, Huffman Prairie, 28 August 1992, E. H. Metzler, slide DJW 2845, USNM.
  - d. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, slide DJW 2846, DJW.
  - e. New York, Suffolk County, Long Island, Orient, 8 June 1954, R. Latham, slide DJW 2884, USNM.
  - f. South Dakota, Union County, Elk Point, August 1913, C. N. Ainslie, slide DJW 2885, USNM.
18. *Pelochrista russeola* (Heinrich)
  - a. California, Riverside County, 9 mi S of Perris, 23 September 1981, R. J. Ford, slide DJW 2825, LACM.
  - b. California, San Luis Obispo County, Pozo, 6 May 1962, slide DJW 2864, J. A. Powell, EME [PTP. *P. langstoni*].
  - c. HTP. California, Los Angeles, 11 June 1921, K. R. Coolidge, slide 72803, USNM.
  - d. California, San Diego County, Torrey Pines, 1–8 September 2005, N. Bloomfield, slide DJW 2915, USNM.
  - e. California, Ventura County, Camp Ozena, Upper Cuyana, 8 July 1964, C. W. Kirkwood, slide DJW 2826, MCZ.
  - f. California, Ventura County, Camp Ozena, Upper Cuyana, 8 July 1964, C. W. Kirkwood, slide DJW 2784, MCZ.
19. *Pelochrista albiguttana* (Zeller)
  - a. Colorado, Cheyenne County, Wild Horse Post Office, 22 August 2008, T. Gilligan and C. Harp, slide DJW 2586, DJW.
  - b. LTP. Texas, Dallas, Boll, slide 11504, BMNH.
  - c. Illinois, Lee County, Green River West, 7 July 2002, R. Panzer, slide DJW 1308, DJW.
  - d. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, slide DJW 667, DJW.
  - e. Arizona, White Mountains, 15–20 June 1925, O. C. Poling, slide DJW 1237, USNM.
  - f. Michigan, Allegan County, T2N R51W S1, 25 July 1992, G. J. Balogh, slide DJW 3497, DJW.
  - g. Kentucky, Bullitt County, S side of Route 480, 8 July 1988, L. D. Gibson, slide DJW 3492, LDG.
  - h. Indiana, Lake County, Biesecker Prairie, 2 August 2004, R. Panzer, slide DJW 3406, DJW.
  - i. Texas, Dallas, Boll, slide DJW 954, MCZ [possible SNTP].
  - j. Colorado, Baca County, Picture Canyon Picnic Area, 6 August 2005, D. J. Wright, slide DJW 3408, DJW.
  - k. Kentucky, Bullitt County, S side of Route 480, 8 July 1988, L. D. Gibson, slide DJW 3491, LDG [determination tentative].
20. *Pelochrista kimballi* Wright and Gilligan
  - a. PTP. Illinois, Union County, Bald Knob Cross, 28 July 1995, T. Harrison and J. Wilker, slide DJW 549, DJW.
  - b. PTP. Mississippi, Oktibbeha County, T19N R15E S16, 9 June 1990, D. M. Pollock, slide DJW 714, DJW.
  - c. PTP. Maine, Kennebec County, Augusta, 15 July 1942, A. E. Brower, slide DJW 3473, USNM.
  - d. PTP. Iowa, Monona County, Loess Hills State Forest, 2 July 1992, G. J. Balogh, genitalia in vial, DJW.
  - e. HTP. North Carolina, Macon County, 15 August 1958, J. G. Franclemont, slide DJW 3472, USNM.
  - f. PTP. Mississippi, Oktibbeha County, Osborne Prairie, 26 June 2008, T. M. Gilligan, slide DJW 3474, DJW.
21. *Pelochrista graciliana* (Kearfott)
  - a. PLTP. North Carolina, Polk County, Tryon, 24 May 1904, W. F. Fiske, slide DJW 1494, USNM.
  - b. PLTP. North Carolina, Polk County, Tryon, 22 May 1904, W. F. Fiske, slide 70306, USNM.
  - c. LTP. North Carolina, Polk County, Tryon, 3 July 1904, W. F. Fiske, slide DJW 1487, AMNH.
22. *Pelochrista galenapunctana* (Kearfott)
  - a. Wyoming, Weston County, 6 mi NW Newcastle, 18 July 1965, R. W. Hodges, slide DJW 3413, USNM.
  - b. Colorado, Alamosa County, Zapata Ranch, 26 June 1982, R. W. Hodges, slide DJW 3416, USNM.
  - c. Mississippi, Oktibbeha County, Osborne Prairie, 26 June 2008, T. M. Gilligan, slide DJW 3411, DJW.
  - d. Texas, Jeff Davis County, Fort Davis, 31 May 1959, M. R. MacKay, slide DJW 2396, CNC.
  - e. Colorado, Chaffee County, 4 mi N of Buena Vista, 15 August 1999, D. J. Wright, slide DJW 660, DJW.
  - f. California, Los Angeles County, Claremont, Baker, slide 70580, USNM.
  - g. New Mexico, San Miguel County, Las Vegas, W. G. Dietz, slide DJW 1100, MCZ.
  - h. Wyoming, Weston County, 6 mi NW Newcastle, 20 July 1965, R. W. Hodges, slide DJW 2566, USNM.
23. *Pelochrista comatulana* (Zeller)
  - a. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 138, DJW.
  - b. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, slide D. J. Wright, DJW 2854, DJW.
  - c. Colorado, Denver, E. J. Oslar, slide DH 630811, AMNH [HTP. *P. rindgeri*].
  - d. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, slide DJW 668, DJW.
  - e. Canada, Manitoba, Aweme, 6 July 1921, N. Criddle, slide 70305, USNM.
  - f. Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, slide DJW 370, DJW.
  - g. California, San Diego, Julian, 10 July, G. H. Field, slide DH 619811, AMNH [LTP. *P. costastrigulana*].
  - h. Utah, Garfield County, 18 mi N of Escalante, 29 July 1965, F. Rindge, slide DJW 1090, AMNH.
  - i. California, San Diego County, USMC Air Station, 13 May 2011, N. Bloomfield, slide DJW 3521, USNM.



- j. Arizona, Coconino County, Hart Prairie, 24 July 2005, T. M. Gilligan, slide DJW 1669, TMG.
- k. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 20 July 1964, J. G. Franclemont, slide DJW 3517, USNM.
- l. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, slide DJW 1207, DJW.
- m. Montana, Custer County, 2.5 mi S of Miles City, 12 July 2010, D. J. Wright, slide DJW 2575, DJW.

**24. *Pelochrista vagana* (McDunnough)**

- a. Ohio, Erie County, Resthaven WLA, 20 July 1990, D. J. Wright, slide DJW 153, DJW.
- b. Iowa, Johnson County, Iowa City, C. N. Ainslie, slide 70454, USNM.
- c. Louisiana, St. Tammany Parish, 4.2 mi E of Abita Springs, 14 June 1984, V. A. Brou, slide 25857, USNM.
- d. Washington, Whitman County, Almota, emerged 7 May 1934, J. F. G. Clarke, slide 70456, USNM.
- e. Ohio, Erie County, Resthaven WLA, 12 July 1991, D. J. Wright, slide DJW 2851, DJW.
- f. Ohio, Erie County, Resthaven WLA, 12 July 1991, D. J. Wright, slide DJW 2852, DJW.

**25. *Pelochrista exclusoriana* (Heinrich)**

- a. Texas, Cameron County, Brownsville, 27–28 March, F. H. Benjamin, slide DJW 3127, USNM.
- b. HTP. Texas, La Salle County, Cotulla, 10 May 1906, Crawford and Pratt, slide 72796, USNM.
- c. PTP. Texas, Bexar County, San Antonio, slide CH 22 Dec 1920, AMNH.
- d. Texas, Cameron County, 8–15 May, San Benito, slide 70393, USNM.
- e. Texas, Cameron County, Brownsville, 26–28 April, F. H. Benjamin, slide DJW 3126, USNM.
- f. PTP. Texas, La Salle County, Cotulla, 10 May 1906, Crawford and Pratt, slide DJW 3125, USNM.

**26. *Pelochrista rufula* Wright and Gilligan**

- a. PTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, Walnut Canyon, 28 June 1965, J. G. Franclemont, slide DJW 1241, USNM.
- b. PTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, Walnut Canyon, 5 August 1965, J. G. Franclemont, slide DJW 1235, USNM.
- c. HTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, Walnut Canyon, 19 August 1965, J. G. Franclemont, slide DJW 2878, USNM.
- d. PTP. Utah, Garfield County, 15 mi W of Bryce Canyon, 10 August 1999, R. Robertson, slide DJW 2879, EME.
- e. PTP. Arizona, Coconino County, 6.33 mi EESE of Flagstaff, Walnut Canyon, 16 August 1964, J. G. Franclemont, slide DJW 1242, USNM.
- f. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 29 July 1961, R. W. Hodges, slide DJW 1236, USNM.

**27. *Pelochrista serapicana* (Heinrich)**

- a. HTP. Montana, Cascade County, Great Falls, 8–21 July 1921, H. G. Dyar, slide 72799, USNM.
- b. Wyoming, Albany County, Fox Creek Bog, 14 July 2002, J. S. Nordin, slide DJW 894, DJW.
- c. Wyoming, Park County, 1 mi South of Ralston, 25 June 1980, M. G. Pogue, slide DJW 598, DJW.
- d. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 19 July 1961, R. W. Hodges, slide DJW 1209, USNM.
- e. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 7 July 1961, R. W. Hodges, slide 70583, USNM.
- f. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 15 July 1961, R. W. Hodges, slide DJW 2861, USNM.
- g. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 24 July 1961, R. W. Hodges, slide 70584, USNM.
- h. Wyoming, Crook County, 0.3 mi N of Beulah, Red Water Creek, 16 July 1983, R. Lavigne, slide DJW 844, ESUW.
- i. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 7 July 1961, R. W. Hodges, slide DJW 2863, USNM.
- j. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 7 July 1961, R. W. Hodges, slide DJW 2863, USNM.

**28. *Pelochrista atomosana* (Walsingham)**

- a. California, Calusa County, Bear Valley, 27 June 1871, Walsingham, slide DJW 3507, BMNH.
- b. LTP. California, Sonoma County, Santa Rosa, 18 May 1871, Walsingham, slide 11505, BMNH.
- c. PLTP. California, Calusa County, Bear Valley, 27 June 1871, Walsingham, slide 6879, BMNH.

**29. *Pelochrista watertonana* (McDunnough)**

- a. PTP. Canada, Alberta, Waterton Lakes, 25 July 1923, J. McDunnough, slide DJW 2899, CNC.
- b. Wyoming, Albany County, T15N R73W S1, 13 July 2001, J. S. Nordin, slide DJW 768, DJW.
- c. Wyoming, Albany County, NE of Pole Mountain, 24 July 2003, J. S. Nordin, slide DJW 2853, DJW.
- d. Colorado, Alamosa County, Zapata Ranch, 21 June 1982, R. W. Hodges, slide DJW 3414, USNM.
- e. Colorado, Alamosa County, Zapata Ranch, 27 June 1982, R. W. Hodges, slide DJW 3493, USNM.
- f. PTP. Canada, Alberta, Waterton Lakes, 25 July 1923, J. McDunnough, slide DJW 2890, CNC.
- g. PTP. Canada, Alberta, Waterton Lakes, 25 July 1923, J. McDunnough, slide DJW 2889, CNC.

**30. *Pelochrista polingana* Wright and Gilligan**

- a. HTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 666, USNM.
- b. HTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 666, USNM.

- c. PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 3410, DJW.
- d. PTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 3468, DJW.
- e. PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 664, DJW.

**31. *Pelochrista comancheana* Wright and Gilligan**

- a. HTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 380, USNM.
- b. HTP. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 380, USNM.
- c. PTP. New Mexico, Lincoln County, Valley of Fires, 19 August 2005, D. J. Wright, slide DJW 1421, DJW.
- d. PTP. New Mexico, Lincoln County, Valley of Fires, 19 August 2005, D. J. Wright, slide DJW 1421, DJW.
- e. PTP. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 1405, DJW.
- f. PTP. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 1405, DJW.

**32. *Pelochrista wandana* (Kearfott)**

- a. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 1300, DJW.
- b. Ohio, Hamilton County, Cincinnati, 23 July 1994, D. J. Wright, slide DJW 163, DJW.
- c. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, slide DJW 449, DJW.
- d. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 3139, DJW.

**33. *Pelochrista palabundana* (Heinrich)**

- a. Iowa, Woodbury County, Liberty Township S6, 30 June 1992, G. J. Balogh, slide DJW 179, DJW.
- b. Indiana, Lake County, Clark and Pine, 6 June 2004, R. Panzer, slide DJW 1431, DJW.
- c. Michigan, Allegan County, Allegan SGA, 21 July 1984, G. J. Balogh, slide DJW 1356, DJW.
- d. Michigan, Otsego County, 1 mi S of Old State Road on Old 27, 5 July 1994, D. J. Wright, slide DJW 185, DJW.
- e. Michigan, Allegan County, T2N R14W S26, 25 July 1987, G. J. Balogh, slide DJW 3133, DJW.

**34. *Pelochrista rosaocellana* (Knudson)**

- a. Colorado, Weld County, County Road 91, 0.5 mi N of I-76, 26 July 1995, D. J. Wright, slide DJW 180, DJW.
- b. New Mexico, Chaves County, Mescalero Dunes, 22 September 2003, G. J. Balogh, slide DJW 1144, DJW.
- c. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, slide DJW 1145, DJW.
- d. Colorado, San Juan County, Comb Ridge, W of Bluff, 26 September 2003, G. J. Balogh, slide DJW 1127, DJW.
- e. New Mexico, Otero County, White Sands National Monument, 14 September 2009, E. H. Metzler, slide DJW 2535, EHM.
- f. Utah, Emery County, Goblin Valley State Park, 13 May 2008, J. Sloten and C. Harp, slide DJW 3424, DJW.
- g. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, slide DJW 2998, DJW.
- h. Colorado, Weld County, 2 mi E of Roggen, 26 July 2012, D. J. Wright, slide DJW 3132, DJW.

**35. *Pelochrista salaciana* (Blanchard and Knudson)**

- a. PTP. Texas, Nueces County, North Padre Island, 13 October 1979, A. and M. E. Blanchard, slide 90194, USNM.
- b. PTP. Texas, Nueces County, North Padre Island, 12 October 1979, E. C. Knudson, slide 25185 USNM.
- c. PTP. Texas, Padre Island National Seashore, 13 October 1979, A. and M. E. Blanchard, slide 90195, USNM.
- d. PTP. Texas, Colorado County, Eagle Lake, 27 April 1978, A. and M. E. Blanchard, slide 90193, USNM.
- e. PTP. Texas, Nueces County, North Padre Island, 12 October 1979, A. and M. E. Blanchard, slide 90199, USNM.
- f. PTP. Texas, Nueces County, North Padre Island, 13 October 1979, A. and M. E. Blanchard, slide 25187, USNM.

**36. *Pelochrista daemoniana* (Heinrich)**

- a. Arizona, Mohave County, 3 mi SE of Fredonia, 23 September 2000, G. J. Balogh, slide DJW 1370, DJW.
- b. Arizona, Mohave County, 3 mi SE of Fredonia, 23 September 2000, G. J. Balogh, slide DJW 3538, DJW [right valva].
- c. Arizona, Mohave County, 3 mi SE of Fredonia, 23 September 2000, G. J. Balogh, slide DJW 3538, DJW [left valva].
- d. Kansas, Morton County, Cimarron National Grassland, 26 September 1999, G. J. Balogh, slide DJW 649, DJW.
- e. New Mexico, Socorro County, Hwy 60, mi 91–93, 25 September 2003, G. J. Balogh, slide DJW 3537, DJW [right valva].
- f. New Mexico, Socorro County, Hwy 60, mi 91–93, 25 September 2003, G. J. Balogh, slide DJW 3537, DJW [left valva].
- g. Colorado, Prowers County, Lamar, 24 September 1945, E. C. Johnston, slide DJW 1359, CNC.
- h. Montana, Sweet Grass County, Howie Road, 19 August 1969, J. G. Franclemont, slide DJW 3536, USNM.

**37. *Pelochrista collilonga* (Blanchard and Knudson)**

- a. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, slide DJW 553, DJW.
- b. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 779, DJW.
- c. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 1392, DJW.
- d. Colorado, Larimer County, Stonewall Creek, 30 July 2005, J. S. Nordin, slide DJW 1430, DJW.
- e. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 3032, DJW.
- f. Colorado, Fremont County, 4.6 mi SE of Salida, 22 August 1997, D. J. Wright, slide DJW 406, DJW.
- g. Colorado, Fremont County, 4.6 mi SE of Salida, 22 August 1997, D. J. Wright, slide DJW 423, DJW.

38. *Pelochrista fraudabilis* (Heinrich)
- Louisiana, Tangipahoa Parish, Sandy Hollow WMA, 31 May 1994, D. P. Pashley, slide DJW 2017, MEM.
  - North Carolina, Moore County, Southern Pines, 8–15 July, slide DJW 1329, AMNH.
  - New Jersey, Essex County, Essex County Park, 15 August, slide DJW 1180, AMNH.
  - PTP. North Carolina, Moore County, Southern Pines, 8–15 July, slide DJW 1330, USNM.
  - PTP. North Carolina, Moore County, Southern Pines, 1–7 July, slide DJW 3164, AMNH.
39. *Pelochrista adamantana* (Guenée)
- Florida, Volusia County, Blue Springs State Park, December 1984, D. P. Profant, slide DJW 946, DJW.
  - North Carolina, Maxton County, 12 September 1944, A. B. Klots, slide DJW 3653, AMNH.
  - Florida, Volusia County, Blue Springs State Park, 20 November 1982, D. P. Profant, slide DJW 3141, DJW.
  - North Carolina, Polk County, Tryon, 1 September 1904, W. F. Fiske, slide 70194, USNM.
  - South Carolina, Charleston County, McClellanville, 22 November 1967, D. C. Ferguson, slide DJW 3156, USNM.
  - New Jersey, Ocean County, Lakehurst, 29 August 1955, J. G. Franclemont, slide DJW 3153, USNM.
40. *Pelochrista caniceps* (Walsingham)
- Oregon, Harney County, 7 mi W of Burns, 21 July 2001, D. J. Wright, slide DJW 2526, DJW.
  - Wyoming, Albany County, 1.5 mi NW of Woods Landing, 19 July 2001, J. S. Nordin, slide DJW 783, DJW.
  - California, Modoc County, Surprise Valley, 11 September 2010, L. L. Crabtree, slide DJW 3430, DJW.
  - Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, slide DJW 2527, DJW.
  - Idaho, Oneida County, 4 mi ENE of Holbrook, 18 July 2001, D. J. Wright, slide DJW 784, DJW.
  - Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, slide DJW 2529, DJW.
  - Idaho, Oneida County, 5 mi ENE of Holbrook, 15 July 2006, D. J. Wright, slide DJW 2333, DJW.
41. *Pelochrista optimana* (Dyar)
- Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, slide DJW 255, DJW.
  - Arizona, Mohave County, Rosy Canyon Road, 22 September 2000, G. J. Balogh, slide DJW 2940, DJW.
  - Colorado, Mesa County, John Brown Canyon, 24 September 2008, J. S. Nordin, slide DJW 2941, DJW.
  - Utah, Kane County, Ponderosa Group Campground, 22 September 2000, G. J. Balogh, slide DJW 1916, DJW.
  - Colorado, Conejos County, 7.4 mi ENE of Fort Garland, 4 August 2013, C. Harp, slide DJW 3433, CEH.
  - Colorado, Conejos County, 7.4 mi ENE of Fort Garland, 4 August 2013, C. Harp, slide DJW 3432, CEH.
  - Wyoming, Albany County, T15N R73W S1, 24 August 2001, J. S. Nordin, slide DJW 2939, DJW.
  - Colorado, Grand County, Beaver Creek, 25 August 1997, D. J. Wright, slide DJW 1915, DJW.
42. *Pelochrista hyponomeutana* (Walsingham)
- Colorado, Weld County, County Road 91, 7 August 1996, D. J. Wright, slide DJW 2463, DJW.
  - Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 415, DJW.
  - New Mexico, Chaves County, Mescalero Dunes, 22 September 2003, G. J. Balogh, slide DJW 2464, DJW.
  - Colorado, Yuma County, Bonny Reservoir SRA, 5 August 1996, D. J. Wright, slide DJW 414, DJW.
  - New Mexico, Lincoln County, Valley of Fires, 19 August 2005, D. J. Wright, slide DJW 2466, DJW.
  - Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 443, DJW.
43. *Pelochrista canariana* (Kearfott)
- Wyoming, Albany County, W side of Gelatt Lake, 18 July 2005, J. S. Nordin, slide DJW 1545, DJW.
  - California, Lassen County, Rye Patch Canyon, 19 August 1995, L. L. Crabtree, slide DJW 2625, DJW.
  - Utah, Sanpete County, Ephraim SWMA, 19 July 2006, D. J. Wright, slide DJW 2467, DJW.
  - Colorado, Montezuma County, S of Cortez, 2 August 2005, C. Harp, slide DJW 1546, DJW.
  - Colorado, Mesa County, Grand Mesa National Forest, 30 July 2003, D. J. Wright, slide DJW 2468, DJW.
44. *Pelochrista avalona* (McDunnough)
- California, San Luis Obispo County, Montana de Oro State Park, 30 April 2011, K. Richers, slide DJW 2966, KMR.
  - California, Monterey County, 26 August 1961, R. L. Langston, slide JAP 1219, EME.
  - California, Santa Catalina Island, 14–17 September 2004, J. De Benedictis, slide DJW 2976, DJW.
  - California, Santa Cruz Island, Casacada, Central Valley, 17 September 1999, J. A. Powell, slide DJW 2977, DJW.
  - California, Los Angeles County, La Tuna Canyon, 5 September 1947, W. H. Evans, slide DJW 3591, USNM.
45. *Pelochrista persolita* (Heinrich)
- Texas, Big Bend National Park, 9 October 1969, A. and M. E. Blanchard, slide DJW 3160, USNM.
  - PTP. Texas, Cameron County, Brownsville, February 1918, slide 70389, USNM [left valva].
  - PTP. Texas, Cameron County, Brownsville, 8–15 March, slide 70390, USNM.
  - Texas, Hidalgo County, Santa Ana Refuge, 13 November 1971, A. and M. E. Blanchard, slide 90401, USNM.
  - PTP. Texas, Cameron County, Brownsville, February 1918, slide 70389, USNM [right valva].



f. PTP. Texas, Cameron County, San Benito, 16–23 March, slide DJW 3161, USNM.

**46. *Pelochrista graziella* (Blanchard)**

- a. Texas, Big Bend National Park, 12 October 1969, A. and M. E. Blanchard, slide DJW 3183, USNM.
- b. Texas, Big Bend National Park, 6 October 1967, A. and M. E. Blanchard, slide DJW 3663, USNM.
- c. PTP. Texas, Big Bend National Park, 11 October 1966, A. and M. E. Blanchard, slide DJW 3664, USNM.
- d. Texas, Bear Canyon, Guadalupe Mountains, 2 October 1969, A. and M. E. Blanchard, slide DJW 3184, USNM.
- e. Texas, Big Bend National Park, 3 October 1967, A. and M. E. Blanchard, slide DJW 3662, USNM.

**47. *Pelochrista diabolana* (Blanchard)**

- a. Texas, Culberson County, Sierra Diablo, 30 May 1973, R. W. Hodges, slide DJW 3185, USNM.
- b. PTP. Texas, Culberson County, Sierra Diablo WMA, 27 May 1963, A. and M. E. Blanchard, slide DJW 3596, USNM.
- c. Texas, Culberson County, Sierra Diablo, 30 May 1973, R. W. Hodges, slide DJW 3597, USNM.
- d. PTP. Texas, Culberson County, Sierra Diablo WMA, 27 May 1973, A. and M. E. Blanchard, slide 90215, USNM.

**48. *Pelochrista maculosa* (Wright)**

- a. PTP. Wyoming, Albany County, W side of Gelatt Lake, 15 July 2005, J. S. Nordin, slide DJW 1411, DJW.
- b. PTP. Wyoming, Albany County, W side of Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 1927, DJW.
- c. PTP. Wyoming, Albany County, W side of Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 1928, DJW.
- d. PTP. Wyoming, Albany County, W side of Gelatt Lake, 9 July 2007, J. S. Nordin, slide DJW 1874, DJW.
- e. PTP. Wyoming, Albany County, W side of Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 1666, DJW.

**49. *Pelochrista lafontainei* (Wright)**

- a. PTP. Wyoming, Albany County, W side of Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 2423, DJW.
- b. PTP. Wyoming, Albany County, W side of Gelatt Lake, 29 July 2005, J. S. Nordin, slide DJW 1929, DJW.
- c. HTP. Wyoming, Albany County, W side of Gelatt Lake, 18 July 2005, J. S. Nordin, slide DJW 2422, DJW.
- d. PTP. Colorado, Pueblo County, 5 mi N of Pueblo, 22 August 1975, J. D. Lafontaine, slide DJW 1164, CNC.
- e. PTP. Canada, Alberta, Dry Island Buffalo Jump, 12 July 2003, C. D. Bird, slide DJW 1899, CDB.
- f. PTP. Wyoming, Albany County, W side of Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 1930, DJW.

**50. *Pelochrista fuscostriata* Wright**

- a. PTP. California, San Mateo County, Edgewood Park A, 14 May 1991, J. A. Powell, slide DJW 1970, EME.
- b. HTP. California, San Mateo County, Edgewood Park, 14 May 1991, J. A. Powell, slide EME 6033, EME.
- c. PTP. California, San Mateo County, Edgewood Park A, 14 May 1991, J. A. Powell, slide DJW 1971, EME.

**51. *Pelochrista fuscosparsa* (Walsingham)**

- a. Wyoming, Albany County, T15N R73W S1, 20 June 2006, J. S. Nordin, slide DJW 1869, DJW.
- b. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, slide DJW 1873, DJW.
- c. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, slide DJW 965, DJW.
- d. Wyoming, Albany County, T15N R73W S1, 20 June 2002, J. S. Nordin, slide DJW 884, DJW.
- e. Wyoming, Albany County, T15N S73W S1, 17 July 2002, C. D. Ferris, slide DJW 1871, DJW.

**52. *Pelochrista spaldingana* (Kearfott)**

- a. Utah, Tooele County, Stockton, 28 July 1907, T. Spalding, slide DJW 1503, USNM.
- b. California, Lassen County, 7 mi E of Bieber, 1 August 2010, L. L. Crabtree, slide DJW 3462, DJW.
- c. California, Lassen County, 4 mi E of Bieber, 21 August 2010, L. L. Crabtree, slide DJW 3463, DJW.
- d. Utah, Wasatch County, 5 mi SW of Midway, 29 July 1971, D. C. Ferguson, slide DJW 1504, USNM.

**53. *Pelochrista fandana* (Kearfott)**

- a. Colorado, Morgan County, 9 mi S and 3 mi W of Fort Morgan 22 August 1992, T. S. Dickel, slide DJW 1490, DJW.
- b. North Dakota, Slope County, Columnar Juniper Area, 3 September 2002, G. J. Balogh, slide DJW 1573, DJW.
- c. North Dakota, Billings County, near Sully Springs, 6 September 2002, G. J. Balogh, slide DJW 1491, DJW.
- d. Colorado, Denver, 10 September 190?, E. J. Oslar, slide DJW 1489, AMNH [HTP. *P. gandana*].
- e. Colorado, Morgan County, 9 mi S and 3 mi W of Fort Morgan 12 September 1992, T. S. Dickel, slide DJW 1012, DJW.

**54. *Pelochrista curlewensis* (Wright)**

- a. PTP. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1501, DJW.
- b. Nevada, Nye County, 25 mi N of Carvers, Big Smoky Valley, 11 June 2011, L. L. Crabtree, slide DJW 2986, DJW.
- c. PTP. California, San Diego County, Torrey Pines, 27 July 2005, N. Bloomfield, slide 126428, USNM.
- d. PTP. Idaho, Oneida County, 5 mi SSE of Holbrook, 18 July 2001, D. J. Wright, slide DJW 786, DJW.
- e. PTP. California, Orange County, Rancho Mission Viejo, 15 September 1999, N. Bloomfield, slide DJW 691, DJW.

- f. California, Riverside County, Rancho La Sierra, 25 August 1949, F. H. Rindge, slide DJW 3656, AMNH.  
g. PTP California, San Diego County, Torrey Pines, 27–30 July 2005, N. Bloomfield, slide 1499, USNM.
55. *Pelochrista biquadrana* (Walsingham)  
a. Washington, Godman Springs, Blue Mountains, 20 July 1935, J. F. G. Clarke, slide DJW 1004, USNM.  
b. Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, slide DJW 2571, DJW.  
c. California, Plumas County, 1 mi W of Pilot Peak, 21 July 2010, L. L. Crabtree, slide DJW 3590, DJW.  
d. Idaho, Oneida County, Holbrook Summit, 12 mi W of Malad City, 15 July 2006, D. J. Wright, slide DJW 1596, DJW.
56. *Pelochrista mescalerana* (Wright)  
a. PTP Arizona, Cochise County, Chiricahua Mountains, 1 August 1986, J. W. Brown, slide DJW 1319, EME.  
b. PTP New Mexico, Chaves County, Mescalero Dunes, 22 September 2003, G. J. Balogh, slide DJW 1154, DJW.  
c. PTP Arizona, Cochise County, Pueblo Del Sol, 22 June 1986, R. S. Wielgus, slide DJW 1934, USNM.  
d. PTP Arizona, Santa Cruz County, 2 mi W of Fort Huachuca, 6 August 1999, D. J. Wright, slide DJW 1153, DJW.
57. *Pelochrista fremonti* Wright and Gilligan  
HTP. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, slide DJW 577, USNM.
58. *Pelochrista momana* (Kearfott)  
a. Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, slide DJW 2677, DJW.  
b. Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, slide DJW 687, DJW.  
c. Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, slide DJW 2682, DJW.  
d. Texas, Brewster County, Tony Brown Ranch, 11 August 1999, E. H. Metzler, slide DJW 2678, DJW.
59. *Pelochrista gelattana* Wright  
a. PTP Wyoming, Albany County, Gelatt Lake, 19 June 2006, J. S. Nordin, slide DJW 3618, DJW.  
b. PTP Wyoming, Albany County, Gelatt Lake, 3 July 2005, J. S. Nordin, slide DJW 3617, DJW.  
c. PTP Wyoming, Albany County, Gelatt Lake, 3 June 2004, J. S. Nordin, slide DJW 1112, DJW.  
d. PTP Wyoming, Albany County, Gelatt Lake, 6 June 2004, J. S. Nordin, slide DJW 1286, DJW.  
e. PTP Wyoming, Albany County, Gelatt Lake, 6 June 2004, J. S. Nordin, slide DJW 1287, DJW.  
f. PTP Wyoming, Albany County, Gelatt Lake, 29 June 2006, J. S. Nordin, slide DJW 3616, DJW.  
g. Utah, Daggett County, 4 mi S of Manila, 20 July 1994, G. J. Balogh, slide DJW 711, DJW.
60. *Pelochrista ridingsana* (Robinson)  
a. Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, slide DJW 2488, DJW.  
b. Southwest Colorado, Dietz, slide CH 28 October 1920, AMNH [HTP. *P. magnidicana*].  
c. North Dakota, Billings County, near Sully Springs, 7 September 2002, G. J. Balogh, slide DJW 2490, DJW.  
d. Utah, Uintah County, 3 mi N of Vernal, 4 September 2000, D. J. Wright, slide DJW 708, DJW.  
e. New Mexico, Cibola County, 11 mi NE of Grants, 8 August 2005, D. J. Wright, slide DJW 2489, DJW.  
f. Colorado, Fremont County, 4.6 mi SE of Salida, 13 August 1999, D. J. Wright, slide DJW 2495, DJW.  
g. Colorado, Grand County, Beaver Creek, 25 August 1997, D. J. Wright, slide DJW 3632, DJW.  
h. Utah, Carbon County, 6 mi N of Price, 29 July 2003, D. J. Wright, slide DJW 3631, DJW.  
i. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 2494, DJW.
61. *Pelochrista argentifurcatana* (Grote)  
a. Illinois, Champaign County, Urbana, 20 August 1886, slide DJW 3626, INHS.  
b. Massachusetts, Nantucket Island, slide DJW 3623, INHS.  
c. Illinois, Cook County, Orland Grasslands, 18 August 2003, R. Panzer, slide DJW 3642, DJW.  
d. Louisiana, Bossier Parish, Barksdale AFB, 15 August 1996, D. M. Pollock, slide DJW 2491, DJW.  
e. Illinois, Putnam County, 6 September 1945, M. O. Glenn, slide DJW 3624, INHS.  
f. Mississippi, Lowndes County, T15N R16E S34, 1 October 1991, D. M. Pollock, slide DJW 2043, DJW.
62. *Pelochrista griselda* (Blanchard and Knudson)  
a. PTP Texas, Big Bend National Park, 7 April 1967, A. and M. E. Blanchard, slide DJW 3640, USNM.  
b. PTP Texas, Big Bend National Park, 27 March 1971, A. and M. E. Blanchard, slide 90409, USNM.  
c. PTP Texas, Big Bend National Park, 31 March 1971, A. and M. E. Blanchard, slide 90432, USNM.  
d. PTP Texas, Big Bend National Park, 14 May 1966, A. and M. E. Blanchard, slide 90411, USNM.  
e. PTP Texas, Culberson County, Sierra Diablo WMA, 30 May 1974, A. and M. E. Blanchard, slide 90437, USNM.
63. *Pelochrista fernaldana* (Grote)  
a. Wyoming, Albany County, T15N R73W S1, 19 August 1995, J. S. Nordin, slide DJW 2509, DJW.

- b. Wyoming, Albany County, T15N S73W S1, 10 August 2001, C. D. Ferris, slide DJW 2508, DJW.
- c. Wyoming, Albany County, T15N R73W S1, 10 August 2002, J. S. Nordin, slide DJW 2507, DJW.
- d. Montana, Carter County, Medicine Rocks State Park, 5 September 2002, G. J. Balogh, slide DJW 3619, DJW.
- e. Wyoming, Albany County, T15N R73W S1, 21 August 2001, J. S. Nordin, slide DJW 3620, DJW.
- f. Colorado, Elbert County, 2 mi E of Elizabeth, 8 September 2007, C. Harp, slide DJW 2506, DJW.
- g. Wyoming, Albany County, T15N R73W S1, 13 August 2001, J. S. Nordin, slide DJW 2504, DJW.
- h. Colorado, Fremont County, 4.6 mi SE of Salida, 22 August 1997, D. J. Wright, slide DJW 3621, DJW.
- i. Colorado, Hinsdale County, Lake City, 31 July 1997, A. R. Ellingson, slide DJW 3622, DJW.

**64. *Pelochrista immaculana* (Kearfott)**

- a. Washington, Washington County, Union Flat, 3 August 1930, J. F. G. Clarke, slide TOR 3030, CNC.
- b. Canada, Saskatchewan, Swift Current, 24 August 1939, A. R. Brooks, slide TOR 4226, CNC [HTP: *P. betana*].
- c. Wyoming, Teton County, Gros Ventre River, 29 July 1994, P. A. Opler, slide DJW 274, CSU.
- d. Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, slide DJW 3276, FSCA.
- e. Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, slide DJW 3277, FSCA.
- f. Utah, Duchesne County, Iron Mine Campground, 24 July 2006, D. and J. Powell, slide DJW 2868, EME.
- g. Utah, Grand County, 28 mi ESE of Moab, 30 July 1960, F. P. and B. Rindge, slide DJW 3665, AMNH.

**65. *Pelochrista aurilineana* (Ferris)**

- a. Utah, Uintah County, 3 mi N of Vernal, 4 September 2000, D. J. Wright, slide DJW 2479, DJW.
- b. Wyoming, Albany County, T15N R73W S1, 31 August 2006, J. S. Nordin, slide DJW 2476, DJW.
- c. Utah, Uintah County, 3 mi N of Vernal, 4 September 2000, D. J. Wright, slide DJW 710, DJW.
- d. Wyoming, Albany County, T15N R73W S1, 5 September 2005, J. S. Nordin, slide DJW 2477, DJW.
- e. Wyoming, Albany County, T15N R73W S1, 5 September 2005, J. S. Nordin, slide DJW 2477, DJW.

**66. *Pelochrista sandiego* (Kearfott)**

- a. California, San Diego County, Torrey Pines, 22–29 August 2009, N. Bloomfield, slide DJW 3329, USNM.
- b. PLTP. California, San Diego County, G. H. Field, slide 70197, USNM.
- c. California, Orange County, Rancho Mission Viejo, 1–13 September 1999, N. Bloomfield, slide DJW 690, DJW.
- d. California, San Diego County, San Diego, 29 September, G. H. Field, slide DJW 3328, USNM.

**67. *Pelochrista atascosana* (Blanchard)**

- a. HTP. Texas, Cameron County, Laguna Atascosana, 22 November 1973, A. and M. E. Blanchard, slide 69756, USNM.
- b. PTP. Texas, Cameron County, Laguna Atascosana, 22 November 1973, A. and M. E. Blanchard, slide 90635, USNM.
- c. PTP. Texas, San Patricio County, Welder WF, 12 September 1965, A. and M. E. Blanchard, slide 90637, USNM.
- d. PTP. Texas, Cameron County, Brownsville, 5 November 1969, A. and M. E. Blanchard, slide DJW 3332, USNM.

**68. *Pelochrista luridana* (Walsingham)**

- a. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 759, DJW.
- b. Colorado, Grand County, N side of US 40, 9 August 1996, D. J. Wright, slide DJW 2437, DJW.
- c. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 2439, DJW.
- d. Colorado, Grand County, N side of US 40, 9 August 1996, D. J. Wright, slide DJW 2438, DJW.
- e. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1103, DJW.
- f. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 3464, DJW.
- g. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 2440, DJW.
- h. Idaho, Oneida County, 4 mi ENE of Holbrook, 25 July 2003, D. J. Wright, slide DJW 990, DJW.

**69. *Pelochrista totana* (Kearfott)**

- a. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1022, DJW.
- b. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 780, DJW.
- c. Oregon, Harney County, 7 mi W of Burns, 21 July 2001, D. J. Wright, slide DJW 1031, DJW.
- d. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1101, DJW.
- e. Colorado, Grand County, Beaver Creek, 11 August 1996, D. J. Wright, slide DJW 246, DJW.
- f. Colorado, Chaffee County, 2.5 mi ESE of Buena Vista, 23 August 1997, D. J. Wright, slide DJW 3455, DJW.
- g. Wyoming, Albany County, T15N S73W S1, 27 July 2002, C. D. Ferris, slide DJW 1028, DJW.
- h. Wyoming, Albany County, T15N S73W S1, 27 July 2002, C. D. Ferris, slide DJW 1028, DJW.

**70. *Pelochrista taosana* (Wright)**

- a. PTP. New Mexico, Taos County, 10 mi SE of Tres Piedres, 11 August 1999, D. J. Wright, slide DJW 528, DJW.
- b. PTP. New Mexico, Taos County, 10 mi SE of Tres Piedres, 11 August 1999, D. J. Wright, slide DJW 1034, DJW.
- c. PTP. New Mexico, Taos County, 10 mi SE of Tres Piedres, 11 August 1999, D. J. Wright, slide DJW 3459, DJW.
- d. PTP. New Mexico, Taos County, 10 mi SE of Tres Piedres, 11 August 1999, D. J. Wright, slide DJW 3460, DJW.



71. *Pelochrista larana* (Walsingham)
- Wyoming, Albany County, T15N R73W S1, 13 July 2001, J. S. Nordin, slide DJW 763, DJW.
  - Idaho, Oneida County, 4 mi ENE of Holbrook, 18 August 2001, D. J. Wright, slide DJW 792, DJW.
  - Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 793, DJW.
  - Wyoming, Albany County, T15N S73W S1, 24 July 2002, C. D. Ferris, slide DJW 987, DJW.
  - Wyoming, Albany County, T15N S73W S1, 1 August 2002, C. D. Ferris, slide DJW 947, DJW.
  - Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 789, DJW.
  - California, Tulare County, Monachee Meadows, 16–23 July, slide DJW 1059, LACM.
72. *Pelochrista nordini* (Wright)
- PTP Wyoming, Albany County, T15N S73W S1, 22 August 2002, C. D. Ferris, slide DJW 1077, DJW.
  - PTP Wyoming, Albany County, T15N S73W S1, 19 August 2003, C. D. Ferris, slide DJW 1078, DJW.
  - PTP Wyoming, Albany County, T15N R73W S1, 11 August 1995, J. S. Nordin, slide DJW 271, DJW.
  - PTP Wyoming, Albany County, T15N S73W S1, 22 August 2002, C. D. Ferris, slide DJW 1073, DJW.
  - PTP Wyoming, Albany County, T15N S73W S1, 19 August 2002, C. D. Ferris, slide DJW 3456, DJW.
  - PTP Wyoming, Albany County, T15N S73W S1, 22 August 2002, C. D. Ferris, slide DJW 1073, DJW.
73. *Pelochrista piperata* (Wright)
- PTP Idaho, Oneida County, 4 mi ENE of Holbrook, 18 July 2001, D. J. Wright, slide DJW 762, DJW.
  - Utah, Sanpete County, Ephraim State WMA, 19 July 2006, D. J. Wright, slide DJW 3435, DJW.
  - Utah, Sanpete County, Ephraim State WMA, 19 July 2006, D. J. Wright, slide DJW 3436, DJW.
  - PTP Arizona, Apache County, Lupton, 3 July 1951, A. K. Wyatt, slide DJW 1061, USNM.
  - PTP Arizona, Apache County, Lupton, 3 July 1951, A. K. Wyatt, slide DJW 1061, USNM.
74. *Pelochrista eburata* (Heinrich)
- California, Contra Costa County, Pleasant Hill, 9 July 1959, W. E. Ferguson, slide DJW 2874, EME [PTP *P. williamsi*].
  - California, San Mateo County, Portola Valley, 22 August 1968, B. D. Williams, slide DJW 2809, DJW.
  - California, Contra Costa County, Pleasant Hill, 9 July 1959, W. E. Ferguson, slide DJW 3603, EME [PTP *P. williamsi*].
  - California, San Diego County, Torrey Pines, 14 August 2011, N. Bloomfield, slide DJW 3604, USNM.
  - California, Santa Barbara County, Santa Cruz Island, 9 June 1966, R. L. Langston, slide DJW 2875, EME.
  - California, San Mateo County, Portola Valley, 25 August 1968, B. D. Williams, slide DJW 2810, DJW.
75. *Pelochrista invicta* (Walsingham)
- Kansas, Trego County, Wakeeney, 30 July 1994, J. K. Adams, slide DJW 160, DJW.
  - Utah, San Juan County, Valley of the Gods, 19 September 2000, G. J. Balogh, slide DJW 1129, DJW.
  - California, Lassen County, Beckwourth Pass, 9 August 2003, L. L. Crabtree, slide 124539, USNM.
  - Canada, Alberta, Lethbridge, 17 August 1931, H. L. Seamans, slide DJW 1555, CNC.
76. *Pelochrista subinvicta* (Kearfott)
- California, Los Angeles County, Glendora, May 1937, G. H. Sperry, slide DJW 1552, USNM.
  - California, Los Angeles County, Glendora, May 1937, L. Hulbirt, slide DJW 1551, USNM.
  - California, Los Angeles County, Glendora, May 1937, L. Hulbirt, slide DJW 1550, USNM.
  - Arizona, Coconino County, 7.5 mi NW of Flagstaff, 16 July 1961, R. W. Hodges, slide DJW 1514, USNM.
77. *Pelochrista snyderana* (Kearfott)
- Wyoming, Albany County, T15N R73W S1, 8 July 1995, J. S. Nordin, slide DJW 267, DJW.
  - Wyoming, Albany County, T15N S73W S1, 5 July 2003, C. D. Ferris, slide DJW 1500, DJW.
  - Wyoming, Albany County, T15N S73W S1, 29 June 2003, C. D. Ferris, slide DJW 1519, DJW.
  - Wyoming, Albany County, T15N R73W S1, 23 June 2002, J. S. Nordin, slide DJW 1492, DJW.
78. *Pelochrista canana* (Walsingham)
- PLTP California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, slide DJW 3326, BMNH.
  - Utah, Utah County, Provo, T. Spalding, 11 August 1908, slide 72792, USNM [HTP *P. exopolitana*].
  - California, Siskiyou County, Shasta Retreat, 24–30 June, slide 72812, USNM [HTP *P. metariana*].
  - Wyoming, Albany County, 10 mi ESE of Laramie, 16 July 2001, D. J. Wright, slide DJW 3281, DJW.
  - Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, slide DJW 3740, DJW.
  - Washington, Whitman County, Pullman, 24 July 1933, J. F. G. Clarke, slide DJW 3743, USNM.
  - California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, slide DJW 3327, BMNH.
  - California, Lake County, Scott's Valley, 17–19 June 1871, Walsingham, slide DJW 3327, BMNH.

79. *Pelochrista artesiana* Wright and Gilligan  
 a. PTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, slide DJW 3729, USNM.  
 b. PTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, slide DJW 3728, USNM.  
 c. PTP. Texas, Cameron County, Brownsville, March 1913, slide 70507, USNM.  
 d. HTP. Texas, La Salle County, Artesia Wells, 25 May 1971, A. and M. E. Blanchard, slide DJW 3730, USNM.
80. *Pelochrista erema* Wright and Gilligan  
 a. PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 3282, DJW.  
 b. New Mexico, Santa Cruz County, Madera Canyon, 14 May 1963, J. G. Franclemont, slide DJW 3732, USNM.  
 c. PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 579, DJW.  
 d. PTP. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 3283, DJW.
81. *Pelochrista rorana* (Kearfott)  
 a. Idaho, Oneida County, Holbrook Summit, 15 July 2006, D. J. Wright, slide DJW 2880, DJW.  
 b. LTP. Utah, Tooele County, Stockton, T. Spalding, slide 70652, USNM.  
 c. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, slide DJW 721, DJW.  
 d. Kansas, Riley County, Konza Prairie, 12 June 1999, J. A. MacGown, slide DJW 603, DJW.  
 e. Idaho, Oneida County, Holbrook Summit, 15 July 2006, D. J. Wright, slide DJW 2882, DJW.  
 f. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 2883, DJW.
82. *Pelochrista vandana* (Kearfott)  
 a. LTP. Florida, Saint Johns County, Hastings, April, slide DJW 3711, AMNH.  
 b. PLTP. Florida, Saint Johns County, Hastings, April, slide 70685, USNM.  
 c. Florida, Putnam County, Palatka, 21 February 1991, H. D. Baggett, slide DJW 3290, DJW.  
 d. Nebraska, Cherry County, Valentine NWR, 21 June 1983, R. W. Hodges, slide DJW 3287, USNM.  
 e. Nebraska, Cherry County, Valentine NWR, 28 June 1983, R. W. Hodges, slide DJW 3719, USNM.  
 f. Florida, Putnam County, Palatka, 7 September 1990, H. D. Baggett, slide DJW 3715, MEM.
83. *Pelochrista passerana* (Walsingham)  
 a. LTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide 11520, BMNH.  
 b. Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, slide DJW 3286, DJW.  
 c. California, Santa Barbara County, Santa Barbara Island, 22–28 May 2001, J. A. Powell, slide DJW 3285, DJW.  
 d. PLTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide DJW 3752, BMNH.  
 e. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide 11661, BMNH.
84. *Pelochrista womonana* (Kearfott)  
 a. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1997, D. J. Wright, slide DJW 3236, DJW.  
 b. Ohio, Adams County, 1 mi SE of Lynx, 18 June 2002, D. J. Wright, slide DJW 908, DJW.  
 c. Arkansas, Washington County, Devils Den State Park, 12 May 1966, R. W. Hodges, slide 70694, USNM.  
 d. Ohio, Adams County, 1 mi SE of Lynx, 3 August 1998, D. J. Wright, slide DJW 3235, DJW.
85. *Pelochrista zomonana* (Kearfott)  
 a. Ohio, Hamilton County, Cincinnati, 4 September 2007, D. J. Wright, slide DJW 3292, DJW.  
 b. LTP. Pennsylvania, Beaver County, New Brighton, 22 May 1902, H. D. Merrick, slide DJW 3712, AMNH.  
 c. PLTP. Pennsylvania, Beaver County, New Brighton, 14 September 1902, H. D. Merrick, slide DJW 3716, AMNH.  
 d. Kentucky, Christian County, Pennyrite State Park, 2 August 1992, D. J. Wright, slide DJW 1717, DJW.  
 e. Maryland, Montgomery County, Plummer's Island, 3 June 1906, A. Busck, slide 70665, USNM.  
 f. Illinois, Will County, Romeoville Prairie, 11 June 2002, R. Panzer, slide DJW 3293, DJW.
86. *Pelochrista olivacea* Wright and Gilligan  
 a. PTP. Arizona, Cochise County, Southwest Research Station, 15 August 2011, J. W. Brown, slide DJW 3722, USNM.  
 b. PTP. Arizona, Cochise County, 6 mi S of Sierra Vista, 8 August 1999, D. J. Wright, slide DJW 565, DJW.  
 c. PTP. Arizona, Cochise County, Southwest Research Station, 11 August 2012, J. W. Brown, slide DJW 3289, USNM.  
 d. PTP. Arizona, Cochise County, Chiricahua Mountains, 13 August 2012, B. Walsh, slide DJW 3723, USNM.
87. *Pelochrista flava* Wright and Gilligan  
 a. PTP. New Mexico, Otero County, White Sands NM, 25 August 2009, E. H. Metzler, slide DJW 2539, EHM.  
 b. PTP. Arizona, Pima County, Tucson, 26 March 1934, Bryant, slide DJW 3754, USNM.  
 c. HTP. Arizona, Sierra County, Highway 195, near I-25, 15 October 2001, G. J. Balogh, slide DJW 1124, USNM.  
 d. PTP. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 3038, DJW.

88. *Pelochrista emaciatana* (Walsingham)
- Arizona, Santa Cruz County, Madera Canyon, 21 April 1963, J. G. Franclemont, slide DJW 3560, USNM.
  - Arizona, Cochise County, Chiricahua Mountains, 15 April 1966, J. G. Franclemont, slide 95273, USNM.
  - Arizona, Cochise County, Peña Blanca Lake, 23 April 1988, G. J. Balogh, slide DJW 331, DJW.
  - California, San Diego County, Jacumba, 27 April 1924, slide 70627, USNM.
  - Arizona, Cochise County, Chiricahua Mountains, 26 April 1966, J. G. Franclemont, slide 95278, USNM.
  - California, San Diego County, Jacumba, 11 April 1924, slide 70625, USNM.
  - Arizona, Cochise County, Pueblo Del Sol, 24 May 1986, R. S. Wielgus, slide DJW 3561, USNM.
89. *Pelochrista popana* (Kearfott)
- Utah, Utah County, Vineyard, 27 May 1913, T. Spalding, slide 70617, USNM.
  - Colorado, Grand County, N side of US 40, 10 August 1996, D. J. Wright, slide DJW 250, DJW.
  - Utah, Tooele County, Stockton, 4 June 1913, T. Spalding, slide 70615, USNM.
  - Colorado, Mesa County, Grand Mesa NE, T12S R97W S20, 30 April 2003, D. J. Wright, slide DJW 1081, DJW.
  - New Mexico, Taos County, 10 mi SE of Tres Piedres, 11 August 1999, D. J. Wright, slide DJW 713, DJW.
  - LTP Utah, Tooele County, Stockton, 3 July 1904, T. Spalding, slide DJW 1085, AMNH.
  - Colorado, Mesa County, Grand Mesa NE, T12S R97W S20, 30 April 2003, D. J. Wright, slide DJW 3565, DJW.
90. *Pelochrista powelli* Wright
- Idaho, Oneida County, Curlew National Grassland, 15 August 2006, D. J. Wright, slide DJW 3567, DJW.
  - Idaho, Oneida County, Curlew National Grassland, 15 August 2006, D. J. Wright, slide DJW 3566, DJW.
  - PTP Idaho, Oneida County, 4 mi ENE of Holbrook, 25 July 2003, D. J. Wright, slide DJW 1027, DJW.
  - PTP Colorado, Daggett County, 4 mi S of Manilla, 29 July 1994, G. J. Balogh, slide DJW 697, DJW.
  - PTP Colorado, Daggett County, 4 mi S of Manilla, 29 July 1994, G. J. Balogh, slide DJW 705, DJW.
  - Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, slide DJW 1024, DJW.
  - Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, slide DJW 1024, DJW.
91. *Pelochrista reversana* (Kearfott)
- Texas, Kimble County, Junction, 26 August 1973, A. and M. E. Blanchard, slide DJW 1908, CSU.
  - Texas, Dallas, slide 70623, USNM [left valva].
  - Texas, Dallas, slide 70623, USNM [right valva].
  - Texas, Uvalde County, Garner State Park, 6 October 1984, E. C. Knudson, slide DJW 1007, USNM.
  - Texas, Kimble County, Junction, 26 August 1973, A. and M. E. Blanchard, slide DJW 1926, USNM.
  - Texas, Kimble County, Junction, 26 August 1973, A. and M. E. Blanchard, slide DJW 1925, USNM.
  - Texas, Kimble County, Junction, 19 September 1968, A. and M. E. Blanchard, slide 90506, USNM.
92. *Pelochrista ainsliei* Wright
- PTP Wyoming, Weston County, 6 mi NW of Newcastle, 23 June 1965, R. W. Hodges, slide DJW 1859, USNM.
  - PTP New Mexico, Dona Ana County, Mesilla, C. N. Ainslie, slide DJW 1344, AMNH.
  - Colorado, Weld County, Pawnee National Grassland, 28 June 2010, D. J. Wright, slide DJW 3595, DJW.
  - Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, slide DJW 148, DJW.
  - PTP New Mexico, Dona Ana County, Mesilla, C. N. Ainslie, slide DJW 1860, AMNH.
  - Colorado, Weld County, Pawnee National Grassland, 28 June 2010, D. J. Wright, slide DJW 3594, DJW.
93. *Pelochrista kingi* Wright
- PTP Wyoming, Albany County, T15N R73W S1, 23 June 2007, J. S. Nordin, slide DJW 1855, DJW.
  - Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, slide DJW 1903, DJW.
  - PTP South Dakota, Yankton County, Yankton, 3 August 1949, M. O. Glenn, slide DJW 1065, USNM.
  - Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, D. J. Wright, slide DJW 1593, DJW.
  - PTP Wyoming, Albany County, T15N R73W S1, 1 August 2006, J. S. Nordin, slide DJW 1671, DJW.
  - Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, D. J. Wright, slide DJW 1902, DJW.
  - PTP Canada, Alberta, Jasper, 24 July 1926, J. McDunnough, slide DJW 1856, CNC.
94. *Pelochrista blanchardi* (Wright)
- PTP Arizona, Cochise County, Southwest Research Station, 1 September 1959, J. R. Powers, slide DJW 2410, EME.
  - PTP New Mexico, Otero County, Dog Canyon Road, 14 September 2004, G. J. Balogh, slide DJW 1743, DJW.
  - PTP Texas, Presidio County, Shafter, 9 September 1969, A. and M. E. Blanchard, slide 90419, USNM.
  - PTP Arizona, Santa Rita Mountains, Madera Canyon, 27 September 1959, R. W. Hodges, slide DJW 2406, USNM.
  - New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 2408, DJW.



**95. *Pelochrista johnstoni* (Wright)**

- a. PTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, Opler and Powell, slide DJW 2421, EME.
- b. PTP. New Mexico, Hidalgo County, Lordsburg, 9 May 1950, E. C. Johnston, slide DJW 2420, CNC.
- c. PTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, Opler and Powell, slide DJW 1167, EME.
- d. PTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, Opler and Powell, slide DJW 2419, EME.
- e. PTP. Arizona, Mojave County, 3 mi SE of Kingman, 3 June 1968, Opler and Powell, slide DJW 1169, EME.

**96. *Pelochrista ragonoti* (Walsingham)**

- a. Wyoming, Albany County, T15N R73W S1, 9 August 2005, J. S. Nordin, slide DJW 1557, DJW.
- b. New Mexico, Lincoln County, Valley of Fires, 17 August 2005, D. J. Wright, slide DJW 2807, DJW.
- c. Colorado, Grand County, N side of US 40, 9 August 1996, D. J. Wright, slide DJW 256, DJW.
- d. North Dakota, Slope County, Columnar Juniper Area, 2 September 2002, G. J. Balogh, slide DJW 2808, DJW.
- e. New Mexico, Grant County, Route 90 at Gold Gulch Road, 9 August 1999, D. J. Wright, slide DJW 2806, DJW.

**97. *Pelochrista kandana* (Kearfott)**

- a. Idaho, Oneida County, 5 mi SSE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 766, DJW.
- b. Colorado, Weld County, Pawnee National Grassland, 28 June 2010, D. J. Wright, slide DJW 3446, DJW.
- c. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, slide DJW 824, DJW.
- d. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, slide DJW 597, DJW.
- e. Colorado, Weld County, Pawnee National Grassland, 28 June 2010, D. J. Wright, slide DJW 3447, DJW.
- f. Kansas, Morton County, Cimarron National Grassland, 2 August 1999, D. J. Wright, slide DJW 533, DJW.
- g. New Mexico, Santa Fe County, Jaconita, 15 August 2005, D. J. Wright, slide DJW 3448, DJW.
- h. Kansas, Morton County, Cimarron National Grassland, 1 August 1999, D. J. Wright, slide DJW 3449, DJW.
- i. Kansas, Morton County, Cimarron National Grassland, 1 August 1999, D. J. Wright, slide DJW 3449, DJW.

**98. *Pelochrista nandana* (Kearfott)**

- a. Indiana, Lake County, Toll Road Prairie, September 1988, R. Panzer, slide DJW 412, DJW.
- b. Illinois, Cook County, Gensburg-Markham Prairie, 9 September 1997, R. Panzer, slide DJW 416, DJW.
- c. Illinois, Will County, Grant Creek Prairie, 30 August 2003, R. Panzer, slide DJW 1426, DJW.
- d. Illinois, Will County, Grant Creek Prairie, 14 September 1997, R. Panzer, slide DJW 1309, DJW.
- e. Illinois, Lee County, Green River, 27 September 2002, R. Panzer, slide DJW 3227, DJW.
- f. Illinois, Cook County, Bartell Grassland, 10 September 2002, R. Panzer, slide DJW 1427, DJW.

**99. *Pelochrista corosana* (Walsingham)**

- a. HTP. Montana, Yellowstone River, 1880, Morrison, slide 11570, BMNH.
- b. Utah, Juab County, Callao, 17 June, 1922, slide 72811, USNM [HTP. *P. nuntia*].
- c. Nevada, Douglas County, Walley's Hot Springs, 4 July 1993, J. A. Powell, slide DJW 1665, EME.
- d. North Dakota, Slope County, Columnar Juniper Area, 24 September 1999, G. J. Balogh, slide DJW 3609, DJW.
- e. California, Lassen County, 4 mi E of Bieber, 26 August 2010, L. L. Crabtree, slide DJW 2720, DJW.
- f. Colorado, Grand County, Beaver Creek, 11 August 1996, D. J. Wright, slide DJW 248, DJW.
- g. Wyoming, Sweetwater County, 19.6 mi E of Rock Springs, 15 July 1980, slide DJW 806, DJW.
- h. Nevada, Nye County, 25 mi N of Carvers, 2 June 2012, L. L. Crabtree, slide DJW 3701, DJW.
- i. New Mexico, Santa Fe County, Jaconita, 15 August 2005, D. J. Wright, slide DJW 3610, DJW.
- j. Colorado, Weld County, County Road 386, 28 August 1997, D. J. Wright, slide DJW 3755, DJW.
- k. Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, slide DJW 3756, DJW.
- l. Arizona, Santa Cruz County, Peña Blanca Canyon, 9 September 1959, R. W. Hodges, slide DJW 3697, USNM.
- m. Colorado, Weld County, County Road 91, 7 August 1996, D. J. Wright, slide DJW 3614, DJW.
- n. Kansas, Gove County, Monument Rocks, 24 September 1999, G. J. Balogh, slide DJW 1283, DJW.
- o. Utah, Sevier County, Richfield, 21 May 1929, slide 119020, USNM.

**100. *Pelochrista scintillana* (Clemens)**

- a. Iowa, Pocahontas County, Kalsow Prairie, 22 June 2000, D. J. Wright, slide DJW 3707, DJW.
- b. Colorado, Denver, E. J. Oslar, slide DJW 1181, AMNH [LTP. *E. randana*].
- c. Nevada, Lander County, 5 mi NW of Kingston, 5 July 2005, L. L. Crabtree, slide DJW 3708, DJW.
- d. New Mexico, Dona Ana County, Mesilla, slide 72670, USNM.
- e. Nebraska, Cherry County, Valentine NWR, 9 June 1983, R. W. Hodges, slide 119010, USNM.
- f. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 1000, DJW.
- g. Arizona, Coconino County, Fort Valley, 22 June 1961, R. W. Hodges, slide DJW 1275, USNM.
- h. Iowa, Howard County, Hayden Prairie, 28 June 1995, D. J. Wright, slide DJW 1203, DJW.
- i. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 1195, DJW.
- j. Arizona, Coconino County, Walnut Canyon, 13 August 1965, J. G. Franclemont, slide 119009, USNM.
- k. Kansas, Barber County, Medicine Lodge, 2 June 1975, J. R. Heitzman, slide DJW 1201, AMNH.

**101. *Pelochrista pulveratana* (Walsingham)**

- a. California, San Diego County, NAS Miramar 3, 10 April 1997, N. Bloomfield, slide DJW 1256, EME.
- b. California, San Diego County, Chula Vista, 20 April 1919, slide JAP 140, EME.
- c. California, Ventura County, San Nicolas Island, 6 May 1978, J. Chemsak and J. A. Powell, slide JAP 4224, EME.
- d. California, Yolo County, Davis, 10 May 1959, F. E. Strong, slide JAP 818, EME.
- e. California, Los Angeles County, Clermont, Metz, slide 70490, USNM.
- f. California, San Bernardino County, Loma Linda, slide DJW 1257, EME.
- g. California, San Bernardino County, Loma Linda, slide DJW 1257, EME.
- h. California, Contra Costa County, Antioch, 15 May 1958, J. A. Powell, slide DJW 2073, EME.
- i. California, Los Angeles County, Clermont, Metz, slide 70491, USNM.
- j. California, Yuba County, 4 mi NW of Smartville, 5 May 1980, J. A. Powell, slide DJW 2075, EME.

**102. *Pelochrista consobrinana* (Heinrich)**

- a. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 133, DJW.
- b. Texas, Kimble County, Junction, 26 October 1973, A. and M. E. Blanchard, slide 90211, USNM.
- c. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 314, DJW.
- d. Texas, Harris County, Houston, 7 September 1965, A. and M. E. Blanchard, slide 90479, USNM.
- e. Colorado, Otero County, Vogel Canyon Picnic Area, 18 August 1997, D. J. Wright, slide DJW 2275, DJW.
- f. PTP. South Dakota, Union County, Elk Point, August 1913, C. N. Ainslie, slide 70485, USNM.
- g. PTP. South Dakota, Union County, Elk Point, August 1913, C. N. Ainslie, slide DJW 2273, USNM.
- h. Kansas, Riley County, Konza Prairie, 23 July 1995, D. J. Wright, slide DJW 1213, DJW.
- i. PTP. Iowa, Woodbury County, Sioux City, 1916, C. N. Ainslie, slide DJW 2272, USNM.

**103. *Pelochrista suadana* (Heinrich)**

- a. Wyoming, Albany County, W side of Gelatt Lake, 16 July 2007, J. S. Nordin, slide DJW 2069, DJW.
- b. PTP. Utah, Utah County, Vineyard, 14 July 1912, T. Spalding, slide DJW 2070, USNM.
- c. Wyoming, Albany County, Fox Creek bog, 14 July 2002, J. S. Nordin, slide DJW 893, DJW.
- d. PTP. Utah, Utah County, Vineyard, 10 July 1912, T. Spalding, slide DJW 2072, USNM.
- e. Wyoming, Albany County, W side of Gelatt Lake, 21 July 2004, J. S. Nordin, slide DJW 1188, DJW.
- f. PTP. Utah, Utah County, Vineyard, 10 July 1912, T. Spalding, slide 70499, USNM.
- g. Wyoming, Albany County, Gelatt Lake, 28 July 2005, J. S. Nordin, slide DJW 2278, DJW.

**104. *Pelochrista seamansi* (Wright)**

- a. HTP. Canada, Alberta, Lethbridge, 13 July 1928, H. L. Seamans, slide DJW 2081, CNC.
- b. PTP. Canada, Alberta, Lethbridge, 4 July 1922, H. L. Seamans, slide DJW 2330, CNC.
- c. PTP. Iowa, Pocahontas County, Kalsow Prairie, 18 June 1992, D. J. Wright, slide DJW 2082, DJW.
- d. PTP. Canada, Alberta, Lethbridge, 4 July 1922, H. L. Seamans, slide DJW 2313, CNC.
- e. PTP. Canada, Alberta, Lethbridge, 12 July 1922, H. L. Seamans, slide DJW 2080, CNC.
- f. PTP. Canada, Alberta, Lethbridge, 7 June 1921, H. L. Seamans, slide DJW 2316, CNC.
- g. PTP. Iowa, Johnson County, Iowa City, 23 August, C. N. Ainslie, slide DJW 2314, USNM.

**105. *Pelochrista coconana* (Wright)**

- a. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 14 July 1964, J. G. Franclemont, slide DJW 2325, USNM.
- b. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 14 July 1964, J. G. Franclemont, slide DJW 2325, USNM.
- c. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 10 July 1964, J. G. Franclemont, slide DJW 2322, USNM.
- d. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 22 August 1961, R. W. Hodges, slide DJW 2321, USNM.
- e. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 28 June 1961, R. W. Hodges, slide DJW 2323, USNM.
- f. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 29 July 1961, R. W. Hodges, slide 70512, USNM.
- g. PTP. Arizona, Coconino County, 7.5 mi NW of Flagstaff, 14 June 1964, R. W. Hodges, slide DJW 2324, USNM.

**106. *Pelochrista sepiana* (Wright)**

- a. PTP. Utah, Juab County, Eureka, 30 August 1911, T. Spalding, slide DJW 2306, USNM.
- b. PTP. Wyoming, Teton County, Moran, 19 July 1938, G. H. Sperry, slide DJW 2304, CNC.
- c. PTP. Idaho, Bear Lake County, 2 mi E of Danish Flat, 17 August 2004, T. M. and J. M. Gilligan, slide DJW 2307, TMG.
- d. PTP. Washington, Whitman County, Pullman, 11 July 1898, C. V. Piper, slide 95244, USNM.
- e. PTP. Washington, Whitman County, Pullman, 11 July 1898, C. V. Piper, slide 95244, USNM.
- f. PTP. Washington, Walla Walla County, Walla Walla, 27 August 1953, H. P. Lanchester, slide DJW 2302, USNM.
- g. PTP. Washington, Whitman County, Pullman, 8 August 1898, C. V. Piper, slide 70650, USNM.

**107. *Pelochrista parapulveratana* (Wright)**

- a. HTP. Colorado, Morgan County, 9 mi S of Fort Morgan, 28 July 1995, D. J. Wright, slide DJW 1040, USNM.
- b. PTP. Wyoming, Albany County, T15N R73W S1, 30 July 2001, J. S. Nordin, slide DJW 829, DJW.

- c. PTP. Wyoming, Albany County, T15N R73W S1, 21 July 2004, J. S. Nordin, slide DJW 1190, DJW.
- d. PTP. Wyoming, Albany County, T15N R73W S1, 30 July 2006, J. S. Nordin, slide DJW 2288, DJW.
- e. PTP. Wyoming, Albany County, Gelatt Lake, 9 July 2007, J. S. Nordin, slide DJW 1875, DJW.
- f. PTP. Wyoming, Albany County, T15N R73W S1, 30 July 2001, J. S. Nordin, slide DJW 829, DJW.

**108. *Pelochrista floridensis* (Wright)**

- a. PTP. Florida, Highlands County, Highlands Hammock State Park, 1 October 1985, G. J. Balogh, slide DJW 2310, DJW.
- b. PTP. Florida, Highlands County, Archbold Biological Station, 17 February 1985, D. C. Ferguson, slide DJW 2309, USNM.
- c. PTP. Florida, Highlands County, Archbold Biological Station, 22 January 1967, S. W. Frost, slide DJW 1161, USNM.
- d. PTP. Florida, Highlands County, Highlands Hammock State Park, 15 November 1987, G. J. Balogh, slide DJW 2311, DJW.
- e. PTP. Florida, Highlands County, Highlands Hammock State Park, 15 November 1987, G. J. Balogh, slide DJW 2311, DJW.

**109. *Pelochrista navajoensis* (Wright)**

- a. PTP. Utah, San Juan County, Comb Ridge, W of Bluff, 26 September 2003, G. J. Balogh, slide DJW 2296, DJW.
- b. PTP. Utah, San Juan County, Valley of the Gods, 21 September 2000, G. J. Balogh, slide DJW 2298, DJW.
- c. HTP. Utah, San Juan County, Comb Ridge, W of Bluff, 26 September 2003, G. J. Balogh, slide DJW 1075, USNM.
- d. PTP. Utah, San Juan County, Valley of the Gods, 19 September 2000, G. J. Balogh, slide DJW 2299, DJW.
- e. PTP. Utah, San Juan County, Comb Ridge, W of Bluff, 27 September 2003, G. J. Balogh, slide DJW 1163, USNM.
- f. PTP. Utah, San Juan County, Valley of the Gods, 19 September 2000, G. J. Balogh, slide DJW 2301, DJW.
- g. PTP. Utah, San Juan County, Valley of the Gods, 19 September 2003, G. J. Balogh, slide DJW 2297, DJW.

**110. *Pelochrista costastriata* (Wright)**

- a. PTP. Illinois, Cook County, Bartel Wetland, 5 September 2002, R. Panzer, slide DJW 2294, DJW.
- b. PTP. Iowa, Muscatine County, Big Sand Mound, 11 September 1993, G. J. Balogh, slide DJW 350, DJW.
- c. PTP. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, slide DJW 253, DJW.
- d. PTP. Colorado, Morgan County, Muir Springs Park, 1 August 1972, T. S. Dickel, slide DJW 2293, MEM.
- e. PTP. Colorado, Morgan County, Muir Springs Park, 1 August 1972, T. S. Dickel, slide DJW 2293, MEM.
- f. PTP. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, slide DJW 1037, DJW.
- g. PTP. Colorado, Lincoln County, Hugo, 11 August 2009, T. M. Gilligan, slide DJW 2393, TMG.
- h. PTP. Montana, Carter County, Medicine Rocks State Park, 4 September 2002, G. J. Balogh, slide DJW 2392, DJW.
- i. PTP. Indiana, Lake County, Du Pont Savanna, 3 August 1999, R. Panzer, slide DJW 2295, DJW.

**111. *Pelochrista mirosignata* (Heinrich)**

- a. New Mexico, Eddy County, Dark Canyon Road, 13 April 2005, G. J. Balogh, slide DJW 2222, DJW.
- b. Texas, Jeff Davis County, Fort Davis, 20 September 2004, G. J. Balogh, slide DJW 2223, DJW.
- c. Texas, Jeff Davis County, Davis Mountains, Aguja Canyon, 18 May 1968, A. and M. E. Blanchard, slide DJW 1258, USNM.
- d. New Mexico, Eddy County, Dark Canyon Road, 13 April 2005, G. J. Balogh, slide DJW 1849, DJW.
- e. Texas, Jeff Davis County, Fort Davis, 20 September 2004, G. J. Balogh, slide DJW 2223, DJW.
- f. Arizona, Santa Cruz County, Peña Blanca Canyon, 26 August 1959, R. W. Hodges, slide DJW 1264, USNM.
- g. New Mexico, Eddy County, Dark Canyon Road, 15 April 2005, G. J. Balogh, slide DJW 1850, DJW.
- h. Arizona, Pima County, Baboquivari Mountains, 15–30 May 1924, O. C. Poling, slide DJW 1260, USNM.
- i. California, San Diego County, La Jolla, 7 July 1963, J. A. Powell, slide DJW 1854, EME.

**112. *Pelochrista mojaveana* (Wright)**

- a. PTP. Arizona, Mojave County, Beaver Dam Canyon, 26 September 2000, G. J. Balogh, slide DJW 1131, DJW.
- b. PTP. California, Imperial County, Ocotillo, 5 October 1967, P. A. Opler, slide DJW 2285, EME.
- c. PTP. California, Riverside County, Palm Springs, 19 April 1950, E. C. Johnston, slide DJW 1851, CNC.
- d. HTP. California, San Bernardino County, 23 mi SE of Baker, 23 April 1977, Kitayama, Cave, and Chemsak, slide DJW 2287, USNM.
- e. PTP. Arizona, Mojave County, 8–15 June, slide DJW 2286, USNM.
- f. PTP. California, San Bernardino County, Providence Mountains, 10 May 1936, slide DJW 2382, AMNH.
- g. PTP. California, San Bernardino County, 10 mi N of Earp, 22 April 1960, J. F. Lawrence, slide DJW 1160, EME.

**113. Miscellaneous morphospecies**

- a. California, Ventura County, mouth of Ventura River, 24 April 1996, A. J. Slater, slide DJW 2385, EME.
- b. Colorado, Teller County, Sanborn Ranch, 18 July 1982, G. J. Balogh, slide DJW 339, DJW.
- c. Wyoming, Albany County, Gelatt Lake, 8 July 2008, J. S. Nordin, slide DJW 2280, DJW.

**114. *Pelochrista mediostriata* (Walsingham)**

- a. Utah, Sanpete County, Ephraim Canyon Road, 17 July 2006, D. J. Wright, slide DJW 1863, DJW.
- b. Idaho, Oneida County, Curlew National Grassland, 28 July 2003, D. J. Wright, slide DJW 966, DJW.
- c. Colorado, Larimer County, Viestenz-Smith Mountain Park, 22 May 1996, P. A. Opler, slide DJW 383, DJW.



- d. Colorado, Larimer County, Phantom Canyon Ranch, 27 July 1990, P. A. Opler, slide DJW 1862, DJW.
- 115. *Pelochrista palpana* (Walsingham)**
- California, Walsingham, slide DJW 1924, USNM [labelled *Paedisca graminana* Type].
  - California, Walsingham, slide 70633, USNM.
  - California, Monterey County, Big Creek Reserve, 8–9 June 2001, J. A. Powell, slide DJW 1158, DJW.
  - Oregon, Jefferson County, Crooked River National Grassland, 23 July 2001, D. J. Wright, slide DJW 771, DJW.
- 116. *Pelochrista gilligani* Wright**
- PTP. Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, T. M. and J. M. Gilligan, slide DJW 1911, USNM.
  - PTP. Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, T. M. and J. M. Gilligan, slide DJW 1912, DJW [left valva].
  - PTP. Utah, Sanpete County, Ephraim Canyon Road, 20 July 2006, T. M. and J. M. Gilligan, slide DJW 1912, DJW [right valva].
  - Nevada, Washoe County, 10 mi N of Cedarville, 23 June 2005, L. L. Crabtree, slide DJW 2624, DJW.
- 117. *Pelochrista matutina* (Grote)**
- Iowa, Pocahontas County, Kalsow Prairie, 19 July 1998, D. J. Wright, slide DJW 3047, DJW.
  - Ohio, Adams County, 1 mi SE of Lynx, 3 August 1998, D. J. Wright, slide DJW 1354, DJW.
  - Kansas, Morton County, Cimarron National Grassland, 25 August 2000, D. J. Wright, slide DJW 3045, DJW.
  - Montana, Power River County, Custer National Forest, 12 August 2004, D. J. Wright, slide DJW 3044, DJW.
  - Kansas, Morton County, Cimarron National Grassland, 26 August 2000, D. J. Wright, slide DJW 3046, DJW.
  - Ohio, Erie County, Resthaven WLA, 20 July 1990, D. J. Wright, slide DJW 1151, DJW.
  - Iowa, Pocahontas County, Kalsow Prairie, 19 July 1998, D. J. Wright, slide DJW 3043, DJW.
- 118. *Pelochrista fiskeana* (Kearfott)**
- Ohio, Adams County, 1 mi SE of Lynx, 18 June 2002, D. J. Wright, slide DJW 1294, DJW.
  - Texas, Kerr County, Kerrville, October 1999, H. Lacey, slide DJW 3170, USNM.
  - Illinois, Cook County, Gensburg-Markham Prairie, 27 June 1998, R. Panzer, slide DJW 492, DJW.
  - Illinois, Cook County, Gensburg-Markham Prairie, 3 August 1998, R. Panzer, slide DJW 494, DJW.
  - Mississippi, Oktibbeha County, T19N R15E S16, 1 September 1990, D. M. Pollock, slide DJW 601, DJW.
  - Ohio, Adams County, 1 mi SE of Lynx, 25 July 1997, D. J. Wright, slide DJW 3049, DJW.
  - Texas, Kerr County, Kerrville, slide DJW 3157, USNM [PTP. *P. pandana*].
- 119. *Pelochrista symbolaspis* (Meyrick)**
- PLTP. Texas, Brewster County, Alpine, May 1926, slide DJW 3325, BMNH.
  - PLTP. Texas, Brewster County, Alpine, May 1926, slide DJW 3334, BMNH.
- 120. *Pelochrista sullivan* Wright**
- HTP. North Carolina, Carteret County, Millis Road Savannah, 24 August 1993, J. B. Sullivan, slide DJW 3029, USNM.
  - PTP. North Carolina, Carteret County, Millis Road Savannah, 24 August 1993, J. B. Sullivan, slide DJW 3250, USNM.
  - PTP. Mississippi, Jackson County, Sandhill Crane NWR, 25 April 1995, J. A. MacGown, slide DJW 3249, DJW.
  - PTP. Mississippi, Jackson County, Sandhill Crane NWR, 25 April 1995, J. A. MacGown, slide DJW 983, DJW.
  - PTP. North Carolina, Carteret County, Millis Road Savannah, 9 September 1993, J. B. Sullivan, slide DJW 3028, USNM.
  - PTP. North Carolina, Carteret County, Millis Road Savannah, 9 September 1993, J. B. Sullivan, slide DJW 3027, USNM.
- 121. *Pelochrista lynxana* Wright**
- PTP. Ohio, Adams County, 1 mi SE of Lynx, 1 August 1997, D. J. Wright, slide DJW 3237, DJW.
  - PTP. Kentucky, Bullitt County, S side of Route 480, 8 September 1988, L. D. Gibson, slide LDG 151, LDG.
  - PTP. Mississippi, Chickasaw County, Tombigbee NF, 4 September 2005, R. Brown and J. Hill, slide DJW 3253, MEM.
  - PTP. Mississippi, Chickasaw County, Tombigbee NF, 4 September 2005, R. Brown and J. Hill, slide DJW 3251, MEM.
  - PTP. Mississippi, Chickasaw County, Tombigbee NF, 4 September 2005, R. Brown and J. Hill, slide DJW 3255, MEM.
  - PTP. Mississippi, Chickasaw County, Tombigbee NF, 4 September 2005, R. Brown and J. Hill, slide DJW 3252, MEM.
- 122. *Pelochrista juncitciliana* (Walsingham)**
- California, slide DJW 2562, USNM [Fernald Collection].
  - California, Lake Tahoe, Deer Park Springs, slide 72815, USNM [HTP. *P. excusabilis*].
  - California, Ventura County, Ozena Forestry Camp, 5 July 1964, C. W. Kirkwood, slide JAP 1743, EME.
  - No collection data, slide CH 9 May 1921, AMNH.
  - California, Lake Tahoe, Deer Park Springs, slide DJW 3532, USNM [PTP. *P. excusabilis*].
  - Idaho, Blaine County, Alturas Lake, 25 July 1956, F. and P. Rindge, slide DJW 3651, AMNH.

- g. California, Contra Costa County, Tilden Park, Berkeley Hills, 25 June 1977, J. A. Powell, slide DJW 3661, EME
- h. California, Tuolumne County, Twain Harte, 20 July 1961, M. Lundgren, slide DJW 3660, EME.

**123. *Pelochrista derelicta*** (Heinrich)

- a. Ohio, Adams County, 1 mi SE of Lynx, 3 August 1998, D. J. Wright, slide DJW 2522, DJW.
- b. Ohio, Adams County, 1 mi SE of Lynx, 12 August 1998, D. J. Wright, slide DJW 1303, DJW.
- c. Ohio, Erie County, Resthaven WLA, 20 July 1990, D. J. Wright, slide DJW 2523, DJW.
- d. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 444, DJW.
- e. Kentucky, Bracken County, Meldahl Dam, D. J. Wright, 24 August 1994, slide DJW 2524, DJW.
- f. Ohio, Hamilton County, Miami Whitewater Forest, 2 September 1988, D. J. Wright, slide DJW 2525, DJW.

**124. *Pelochrista cataclystiana*** (Walker)

- a. Kentucky, McCracken County, Paducah Zip Track, 12 August 2008, D. J. Wright, slide DJW 2517, DJW.
- b. Ohio, Adams County, 1 mi SE of Lynx, 25 July 1998, D. J. Wright, slide DJW 2514, DJW.
- c. Montana, Powder River County, Custer National Forest, 12 August 2004, D. J. Wright, slide DJW 1141, DJW.
- d. Arkansas, Sebastian County, Hartford, 8 June 1966, R. W. Hodges, slide DJW 2555, USNM.
- e. Florida, Escambia County, Pensacola, 29 July 1961, S. Hills, slide DJW 2556, USNM.

**125. *Pelochrista conspiciendana*** (Heinrich)

- a. Utah, Daggett County, S of Manilla, Sheep Creek and Hwy 44, 19 July 1994, G. J. Balogh, slide DJW 695, DJW.
- b. Wyoming, Albany County, Gelatt Lake, 12 July 2004, J. S. Nordin, slide DJW 1231, DJW.
- c. Washington, Klickitat County, Brooks State Park, 27 June 1975, J. A. Powell, slide DJW 2411, EME.
- d. Nevada, Lander County, Austin Summit, 21 July 1969, J. A. Powell, slide DJW 2414, EME.
- e. Nevada, Lander County, Austin Summit, 21 July 1969, J. A. Powell, slide DJW 2414, EME.

**126. *Pelochrista grandiflavana*** (Walsingham)

- a. California, Nevada County, Truckee, Route 89, 10 July 2008, K. Richers, slide DJW 2760, USNM.
- b. California, Lake Tahoe, Deer Park Springs, 24–30 June, slide 70402, USNM.
- c. California, Shasta County, Mount Lassen, 11 July 1941, G. H. Sperry, slide DJW 3750, USNM.
- d. California, Modoc County, Warner Mountains, 15–23 July 1922, A. W. Lindsey, slide DJW 3751, USNM.
- e. California, Modoc County, Warner Mountains, 8–15 July 1922, A. W. Lindsey, slide DJW 2761, USNM.

**127. *Pelochrista subflavana*** (Walsingham)

- a. Washington, Chelan County, Forest Road 7520, 9 July 2010, D. J. Wright, slide DJW 2572, DJW.
- b. California, Modoc County, 3 mi E of Davis Creek, 8–15 July 1922, A. W. Lindsey, slide 70330, USNM.
- c. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 757, DJW.
- d. Washington, Whitman County, Pullman, 8 June 1898, C. V. Piper, slide 70331, USNM.
- e. Washington, Whitman County, Pullman, 11 July 1930, J. F. G. Clarke, slide DJW 2766, USNM.

**128. *Pelochrista consociana*** (Heinrich)

- a. PTP. Utah, Juab County, Eureka, 16 August 1911, T. Spalding, slide DJW 2886, USNM.
- b. PTP. Utah, Juab County, Eureka, 29 July 1911, T. Spalding, slide 70329, USNM.
- c. Nevada, White Pine County, 7 air miles E of McGill, 4 August 1978, J. A. Powell, slide DJW 2948, EME.
- d. HTP. Utah, Juab County, Eureka, 29 July 1911, T. Spalding, slide 72783, USNM.
- e. California, Modoc County, 9 km NE of Adin, 30 July 1980, D. L. Wagner, slide DJW 2949, EME.

**129. *Pelochrista murina*** Wright and Gilligan

- a. HTP. California, Lassen County, 7 mi E of Bieber, 2 August 2010, L. L. Crabtree, slide DJW 2762, USNM.
- b. PTP. California, Modoc County, 4 mi W of Adin, 12 June 2007, L. L. Crabtree, slide DJW 2717, USNM.

**130. *Pelochrista irroratana*** (Walsingham)

California, Shasta County, Burney Falls, 18–20 July 1871, Walsingham, slide 11509, BMNH [LTP. *P. perdricana*].

**131. *Pelochrista bandana*** (Kearfott)

- a. PLTP. Utah, Tooele County, Stockton, T. Spalding, slide DJW 2950, USNM.
- b. PLTP. Utah, Tooele County, Stockton, 20 July 1903, T. Spalding, slide DJW 1590, USNM.
- c. Utah, Tooele County, Stockton, 29 June 1904, T. Spalding, slide 70333, USNM.
- d. Utah, Tooele County, Stockton, 4 August 1907, T. Spalding, slide 124529, USNM.
- e. Utah, Tooele County, Tooele, 27 July 1977, R. Leuschner, slide DJW 2938, EME.

- 132. *Pelochrista aurantiaca*** Wright and Gilligan
- HTP. California, Lassen County, Turtle Mountain, 23 August 2008, L. L. Crabtree, slide DJW 2756, USNM.
  - PTP. California, Lassen County, NW of Turtle Mountain, 25 July 2009, L. L. Crabtree, slide DJW 2668, USNM.
- 133. *Pelochrista primulana*** (Walsingham)
- PLTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide DJW 2498, BMNH.
  - LTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide 11508, BMNH.
  - California, Lake County, Lake Pillsbury, 21 June 1935, E. C. Johnston, slide 70595, USNM.
  - California, Sonoma County, 10–25 May, A. H. Vachell, slide 70596, USNM.
  - PLTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide DJW 2499, BMNH.
  - PLTP. California, Mendocino County, Head of Noyo River, 8–11 June 1871, Walsingham, slide 11530, BMNH.
- 134. *Pelochrista biplagata*** Walsingham)
- Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 2500, DJW.
  - Colorado, Larimer County, 8.5 mi W of Rustic, 13 August 1996, D. J. Wright, slide DJW 251, DJW.
  - Washington, Walla Walla County, Walla Walla, 20 June 1930, D. R. Brannon, slide 70427, USNM.
  - Washington, Whitman County, Pullman, 23 July 1898, C. V. Piper, slide 70431, USNM.
  - Colorado, Larimer County, 8.5 mi W of Rustic, 13 August 1996, D. J. Wright, slide DJW 2502, DJW.
  - Colorado, Grand County, Beaver Creek, 23 August 1997, D. J. Wright, slide 2501, DJW.
- 135. *Pelochrista hennei*** (Clarke)
- HTP. California, Los Angeles County, El Segundo Dunes, emerged 3 October 1940, C. Henne, slide 72790, USNM.
  - PTP. California, Los Angeles County, El Segundo Dunes, emerged 3 October 1940, C. Henne, slide DJW 3682, USNM.
  - PTP. California, Los Angeles County, El Segundo Dunes, emerged 4 October 1940, C. Henne, slide 70443, USNM.
- 136. *Pelochrista hasseanthi*** (Clarke)
- PTP. California, Orange County, Orange, emerged 15 August 1936, T. W. Hower, slide DJW 3418, USNM.
  - HTP. California, Orange County, Orange, T. W. Hower, slide 70428, USNM.
  - California, San Diego County, Miller Valley, 9–16 September 2009, N. Bloomfield, slide DJW 3420, USNM.
  - California, San Diego County, Miller Valley, 9–16 September 2009, N. Bloomfield, slide DJW 3421, USNM.
  - California, Riverside County, Riverside, emerged 7 June 1962, J. A. Powell, slide DJW 3419, USNM.
- 137. *Pelochrista dorsisignatana*** (Clemens)
- Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 1307, DJW.
  - Louisiana, Vernon Parish, August, G. Coverdale, slide DJW 2570, AMNH [LTP. *P. d. diffusana*].
  - Oregon, Baker County, Spring Creek, 30 August 1959, J. H. Baker, slide DJW 2449, USNM.
  - Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 2448, DJW.
  - Wyoming, Albany County, S of Happy Jack Road, 3 September 2001, J. S. Nordin, slide DJW 865, DJW.
  - Ohio, Adams County, 1 mi SE of Lynx, 8 October 1993, D. J. Wright, slide DJW 2446, DJW.
  - Ohio, Hamilton County, Cincinnati, 30 September 1988, D. J. Wright, slide DJW 1311, DJW.
- 138. *Pelochrista wagneri*** Wright and Gilligan
- PTP. California, Plumas County, 1 mi S of Meadow Valley, 9–16 September 1983, J. De Benedictis, slide DJW 3670, EME.
  - HTP. California, Plumas County, 2 mi E of Bucks Lake, 10 September 1983, D. L. Wagner, slide JAP 5054, EME.
  - PTP. California, Plumas County, 2 mi E of Bucks Lake, 10 September 1983, D. L. Wagner, slide DJW 3671, EME.
  - PTP. California, Plumas County, 8 mi E of Quincy, 10 September 1983, J. A. Powell, slide DJW 3673, EME.
  - PTP. California, Plumas County, 2 mi E of Bucks Lake, 10 September 1983, D. L. Wagner, slide DJW 3672, EME.
- 139. *Pelochrista similiana*** (Clemens)
- Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 1304, DJW.
  - North Carolina, Polk County, Tryon, W. F. Fiske, slide 70434, USNM.
  - Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 2452, DJW.
  - District of Columbia, Washington, A. Busck, slide 70425, USNM.
  - Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 2450, DJW.
  - Ohio, Adams County, 1 mi SE of Lynx, 12 September 1998, D. J. Wright, slide DJW 1305, DJW.
- 140. *Pelochrista oraria*** (Wright)
- HTP. Nova Scotia, Kings County, Grand-Pré, 28 August 1953, D. C. Ferguson, slide DJW 2444, USNM.
  - PTP. Massachusetts, Dukes County, Martha's Vineyard, F. M. Jones, slide DJW 2445, USNM.
  - PTP. New Jersey, Cumberland County, 2.5 mi W of Port Norris, 28 September 2002, S. Johnson, slide DJW 901, DJW.
  - PTP. Virginia, Accomack County, Chincoteague, 23 September 1984, D. C. Ferguson, slide DJW 2443, USNM.



- e. PTP. Massachusetts, Dukes County, Martha's Vineyard, F. M. Jones, slide DJW 2454.

**141. *Pelochrista dilatana*** (Walsingham)

- a. Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 24 April 1966, J. G. Franclemont, slide DJW 3167, USNM.
- b. Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 24 April 1966, J. G. Franclemont, slide DJW 3601, USNM.
- c. Arizona, Cochise County, Huachuca Mountains, Sunnyside Canyon, 14 September 1974, R. and J. Wielgus, slide DJW 3600, USNM.
- d. Arizona, Cochise County, Chiricahua Mountains, Cave Creek Canyon, 10 April 1966, J. G. Franclemont, slide DJW 3166, USNM.
- e. Arizona, Cochise County, Palmerlee, slide DJW 3704, USNM.

**142. *Pelochrista arizonae*** Wright and Gilligan

- PTP. Arizona, Santa Cruz County, Madera Canyon, 8 May 1963, J. G. Franclemont, slide DJW 3705, USNM.

**143. *Pelochrista sierrae*** (Blanchard and Knudson)

- a. PTP. Texas, Culberson County, Sierra Diablo WMA, 30 August 1970, A. and M. E. Blanchard, slide DJW 3162, USNM.
- b. PTP. Texas, Culberson County, Sierra Diablo WMA, 1 September 1969, A. and M. E. Blanchard, slide 90417, USNM.
- c. PTP. Texas, Culberson County, Sierra Diablo WMA, 31 August 1970, A. and M. E. Blanchard, slide 90416, USNM.
- d. Texas, Brewster County, Chisos Basin, 6–10 September 2008, Blanchard and Knudson, slide DJW 3348, ECK.

**144. *Pelochrista shastana*** (Walsingham)

- a. LTP. California, Siskiyou County, Mount Shasta, 2 August–1 September 1871, Walsingham, slide 11516, BMNH.
- b. LTP. California, Siskiyou County, Mount Shasta, 2 Aug.–1 Sept. 1871, Walsingham, slide 11516, BMNH [left valva].
- c. Oregon, Lake County, 10 mi S of Silver Lake, 23 July 1966, J. A. Powell, slide DJW 3703, EME.
- d. California, Mono County, Casa Diablo Hot Springs, 5 August 1938, G. H. Sperry, slide DJW 1973, AMNH.

**145. *Pelochrista notialis*** (Miller)

- a. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, slide DJW 3030, DJW.
- b. Colorado, Baca County, Picture Canyon Picnic Area, 8 August 2005, D. J. Wright, slide DJW 3031, DJW.
- c. Colorado, Yuma County, Bonny Reservoir, 5 August 1996, D. J. Wright, slide DJW 3033, DJW.
- d. Colorado, Morgan County, County Road I, 28 July 1995, D. J. Wright, slide DJW 421, DJW.

**146. *Pelochrista angelana*** (Wright)

- a. PTP. California, Los Angeles County, 6 mi W of Lancaster, 2 October 1967, J. A. Powell, slide DJW 1312, DJW.
- b. PTP. California, Los Angeles County, 6 mi W of Lancaster, 2 October 1967, J. A. Powell, slide JAP 2292, EME.
- c. HTP. California, Los Angeles County, Mint Canyon, 15 October 1941, C. Henne, slide JAP 4602, EME.
- d. PTP. California, Los Angeles County, 6 mi W of Lancaster, 5 October 1964, J. A. Powell, slide DJW 2056, USNM.
- e. PTP. California, Los Angeles County, 6 mi W of Lancaster, 2 October 1967, J. A. Powell, slide DJW 1313, DJW.

**147. *Pelochrista argenteana*** (Walsingham)

- a. Wyoming, Albany County, T15N R73W S1, 21 July 2004, J. S. Nordin, slide DJW 3674, DJW.
- b. Wyoming, Weston County, 6 mi NW of Newcastle, 7 July 1965, R. W. Hodges, slide DJW 1251, USNM.
- c. Wyoming, Albany County, W side of Gelatt Lake, 6 July 2005, J. S. Nordin, slide DJW 3675, DJW.
- d. South Dakota, Lawrence County, Hardy Work Center, 30 June 1965, R. W. Hodges, slide DJW 1250, USNM.
- e. Wyoming, Albany County, T15N R73W S1, 26 July 2001, J. S. Nordin, slide DJW 861, DJW.
- f. Wyoming, Albany County, W side of Gelatt Lake, 12 July 2004, J. S. Nordin, slide DJW 1245, DJW.
- g. Colorado, Chaffee County, 4 mi SW of Buena Vista, 10 July 1982, R. W. Hodges, slide DJW 1271, USNM.
- h. Wyoming, Albany County, W side of Gelatt Lake, 21 July 2004, J. S. Nordin, slide DJW 1246, DJW.
- i. Wyoming, Albany County, W side of Gelatt Lake, 11 July 2005, J. S. Nordin, slide DJW 3677, DJW.

**148. *Pelochrista serpentana*** (Walsingham)

- a. Colorado, Larimer County, Stonewall Creek, 30 July 2005, J. S. Nordin, slide DJW 3450, DJW.
- b. Idaho, Oneida County, 4 mi ENE of Holbrook, 26 July 2003, D. J. Wright, slide DJW 995, DJW.
- c. Canada, Alberta, Lethbridge, 22 June 1922, H. L. Seamans, slide TOR 2994, CNC [PTP. *P. ophioides*].
- d. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1102, DJW.
- e. Colorado, Weld County, County Road 91, 26 July 1995, D. J. Wright, slide DJW 149, DJW.
- f. Idaho, Oneida County, 4 mi ENE of Holbrook, 1 August 2001, D. J. Wright, slide DJW 1079, DJW.
- g. Wyoming, Albany County, T15N R73W S1, 9 August 2006, J. S. Nordin, slide DJW 3453, DJW.
- h. Colorado, Larimer County, Stonewall Creek, 30 July 2005, J. S. Nordin, slide DJW 3452, DJW.

**149. *Pelochrista lolana*** (Kearfott)

- a. California, Modoc County, Dismal Swamp, 15 July 2006, L. L. Crabtree, slide DJW 2666, DJW.

- b. Idaho, Oneida County, 5 mi SSE of Holbrook, 18 July 2001, D. J. Wright, slide DJW 761, DJW.
- c. Wyoming, Albany County, N Fork of Sally Creek, 26 July 2008, J. S. Nordin, slide DJW 2192, DJW.
- d. Wyoming, Albany County, Nash Fork, W of Mill Pond Lake, 7 July 2002, J. S. Nordin, slide DJW 949, DJW.
- e. Washington, Ferry County, Columbia Mountain, 22 July 1962, J. F. G. Clarke, slide DJW 3569, USNM.
- f. Idaho, Oneida County, 5 mi ENE of Holbrook, 6 July 2006, D. J. Wright, slide DJW 2667, DJW.
- g. Wyoming, Albany County, Nash Fork, W of Mill Pond Lake, 7 July 2002, J. S. Nordin, slide DJW 2670, DJW.

**150. *Pelochrista hobana* (Kearfott)**

- a. Wyoming, Albany County, S of Mill Pond Lake, 29 June 2002, J. S. Nordin, slide DJW 3225, DJW.
- b. Washington, Mount Rainier, 13 August 1939, E. C. Johnston, slide 70593, USNM.
- c. PLTP. Canada, Alberta, Mount Piran, 17 August, slide DJW 3648, USNM.
- d. Wyoming, Albany County, S of Mill Pond Lake, 29 June 2002, J. S. Nordin, slide DJW 3225, DJW.
- e. Wyoming, Albany County, S of Mill Pond Lake, 29 June 2002, J. S. Nordin, slide DJW 2241, DJW.
- f. Washington, Ferry County, Columbia Mountain, 23 July 1962, J. F. G. Clarke, slide DJW 3647, USNM.
- g. Washington, Ferry County, Columbia Mountain, 23 July 1962, J. F. G. Clarke, slide DJW 3647, USNM.

**151. *Pelochrista maculatana* (Walsingham)**

- a. Idaho, Oneida County, Holbrook Summit, 12 mi W of Malad City, 10 July 2006, D. J. Wright, slide DJW 2402, DJW.
- b. Idaho, Oneida County, Holbrook Summit, 12 mi W of Malad City, 10 July 2006, D. J. Wright, slide DJW 2910, DJW.
- c. California, Siskiyou County, Shasta Retreat, 8–15 June, slide 70341, USNM.
- d. Collection data unknown, slide 70342, USNM.
- e. Idaho, Oneida County, Holbrook Summit, 12 mi W of Malad City, 10 July 2006, D. J. Wright, slide DJW 2403, DJW.
- f. Utah, Sanpete County, Ephraim Canyon Road, 18 July 2006, D. J. Wright, slide DJW 2907, DJW.

**152. *Pelochrista dodana* (Kearfott)**

- a. Colorado, Clear Creek County, Mount Warren Summit, 11 July 2002, J. S. Nordin, slide DJW 2780, DJW.
- b. Colorado, Clear Creek County, Mount Evans, 5 July 1996, P. A. Opler, slide DJW 387, DJW.
- c. Alaska, Schrader Lake, 2 July 1973, K. W. Philip, slide 24159, USNM.
- d. Canada, Alberta, Mount Piran, 17 August, slide 70370, USNM.
- e. Colorado, Clear Creek County, Mount Warren Summit, 11 July 2002, J. S. Nordin, slide DJW 950, DJW.
- f. Canada, Alberta, Laggan, 10 July 1925, D. Bryant, slide 70371, USNM.
- g. Colorado, Clear Creek County, Mount Warren Summit, 11 July 2002, J. S. Nordin, slide DJW 3143, DJW.
- h. Colorado, Clear Creek County, Mount Evans, Goliath Peak, 11 July 2002, P. A. Opler, slide DJW 2779, DJW.

**153. *Pelochrista bactrana* (Heinrich)**

- a. Colorado, Larimer County, Rocky Mountain NP, 6 August 1994, R. J. Muckenthaler, slide DJW 285, DJW.
- b. Arizona, Cochise County, Huachuca Mountains, 8 August 1974, J. A. Powell, slide DJW 1316, DJW.
- c. Arizona, Cochise County, Chiricahua Mountains, 14 July 1972, J. A. Powell, slide DJW 1317, DJW.
- d. Utah, La Sal Mountains, 21 July 1936, R. W. Warner, slide DJW 3681, AMNH.

**154. *Pelochrista inquadana* (Walsingham)**

- a. Arizona, Pima County, Santa Rita Mountains, 1–7 May, slide DJW 2121, USNM.
- b. Arizona, Pima County, Sells Post Office, Indian Oasis, 15–30 April 1923, O. C. Poling, slide DJW 2124, USNM.
- c. Arizona, Pima County, Sells Post Office, Indian Oasis, 15–30 April 1923, O. C. Poling, slide DJW 2123, USNM.
- d. LTP. Arizona, 1883, H. K. Morrison, slide 11666, BMNH.

**155. *Pelochrista quinque maculana* (Robinson)**

- a. Georgia, Emanuel County, Ohoopee Dunes, 1 September 2007, J. K. Adams, slide DJW 2480, DJW.
- b. Georgia, Houston County, Oaky Woods WMA, 6 October 2001, J. K. Adams, slide DJW 1383, DJW.
- c. North Carolina, Polk County, Tryon, W. F. Fiske, slide 70169, USNM.
- d. Georgia, Houston County, Oaky Woods WMA, 6 October 2001, J. K. Adams, slide DJW 2481, DJW.
- e. Florida, Escambia County, Pensacola, S. Hills, 27 September 1961, slide 124840, USNM.

**156. *Pelochrista pallidipalpna* (Kearfott)**

- a. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 595, DJW.
- b. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 3564, DJW.
- c. Arkansas, Washington County, Devil's Den State Park, R. W. Hodges, slide 70611, USNM.
- d. District of Columbia, Washington, July 1901, A. Busck, slide 70612, USNM.
- e. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 3563, DJW.
- f. Iowa, Monona County, Loess Hills State Forest, 1 August 1995, D. J. Wright, slide DJW 584, DJW.
- g. Arkansas, Washington County, Devil's Den State Park, 25 June 1966, R. W. Hodges, slide DJW 3562, USNM.

- 157. *Pelochrista fratrueolis*** (Heinrich)  
 a. Mississippi, Forest County, Camp Shelby, 1–15 September 1944, C. D. Michener, slide DJW 3165, AMNH.  
 b. Georgia, Fulton County, Atlanta, 10 August 1943, P. W. Fattig, slide DJW 1005, USNM.  
 c. PTP. North Carolina, Moore County, Southern Pines, 8–15 September, slide DJW 1003, USNM.  
 d. PTP. North Carolina, Moore County, Southern Pines, 8–15 September, slide DJW 1003, USNM.
- 158. *Pelochrista chiricahuae*** Wright and Gilligan  
 PTP. Arizona, Cochise County, Chiricahua Mountains, Rustler Park, 27 July 1972, J. A. Powell, slide DJW 3706, USNM.
- 159. *Pelochrista milleri*** Wright  
 a. HTP. Ohio, Adams County, 1 mi SE of Lynx, D. J. Wright, 25 July 1997, slide DJW 384, DJW.  
 b. PTP. Ohio, Greene County, Wright-Patterson AFB, Huffman Prairie, 28 August 1992, E. Metzler, slide DJW 1170, DJW.  
 c. PTP. Ohio, Adams County, 1 mi SE of Lynx, D. J. Wright, 12 July 1998, slide DJW 569, DJW.  
 d. PTP. Ohio, Adams County, 1 mi SE of Lynx, D. J. Wright, 12 July 1998, slide DJW 569, DJW.
- 160. *Pelochrista heinrichi*** (McDunnough)  
 a. Wyoming, Fremont County, W of Jeffrey City, 18 July 1982, J.-F. Landry, slide DJW 3090, CNC.  
 b. Canada, Manitoba, Aweme, 1 August 1928, N. Criddle, slide DJW 3091, CNC.  
 c. Wyoming, Park County, 1 mi S of Ralston, 25 June 1980, M. Pogue, slide DJW 599, DJW.
- 161. *Pelochrista opleri*** Wright and Gilligan  
 a. HTP. Wyoming, Teton County, Grand Teton NP, 9 August 1988, P. A. Opler, slide DJW 700, USNM.  
 b. PTP. Wyoming, Teton County, Grand Teton NP, 9 August 1988, P. A. Opler, slide DJW 2456, USNM.  
 c. PTP. Wyoming, Teton County, Grand Teton NP, 9 August 1988, P. A. Opler, slide DJW 2455, USNM.
- 162. *Pelochrista dapsilis*** (Heinrich)  
 a. Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, slide DJW 3274, MGCL.  
 b. Colorado, Grand County, Rocky Mountain NP, Harbison PA, 29 May 1995, P. A. Opler, slide DJW 385, DJW.  
 c. Colorado, Grand County, Saint Louis Creek Campground, 15 July 1985, V. P. Lucas, slide DJW 3275, MGCL.
- 163. *Pelochrista rufocostana*** (Wright)  
 a. PTP. Idaho, Oneida County, Malad City, 18 July 2001, D. J. Wright, slide DJW 758, DJW.  
 b. PTP. California, Modoc County, 8 mi S of Eagleville, 23 July 1968, J. A. Powell, slide JAP 2490, EME.  
 c. PTP. Wyoming, Albany County, Gelatt Lake, 19 June 2006, J. S. Nordin, slide DJW 2204, DJW.  
 d. PTP. Utah, Garfield County, Bryce Junction, 28 June 1992, J. A. Powell, slide EME 5718, EME.
- 164. *Pelochrista jejuna*** (McDunnough)  
 a. HTP. Canada, Ontario, Blackburn, 20 May 1942, J. McDunnough, slide TOR 4252, CNC.  
 b. PTP. Canada, Quebec, Kazubazua, 10 June 1935, G. S. Walley, slide TOR 3112, CNC.
- 165. *Pelochrista louisana*** (McDunnough)  
 a. PTP. Canada, British Columbia, Blue Lake, 4 August 1938, J. K. Jacob, slide DJW 3026, CNC.  
 b. HTP. Canada, Alberta, Lake Louise, 19 July 1938, G. S. Walley, slide TOR 4251, CNC.
- 166. *Pelochrista cinereolineana*** (Heinrich)  
 Canada, Alberta, 10 mi S of Onewfour, 22 May 1982, J.-F. Landry, slide DJW 2266, CNC.
- 167. *Pelochrista candida*** (Wright)  
 a. HTP. California, Los Angeles County, Hungry Valley, 16 July 1975, J. A. Powell, slide DJW 1159, EME.  
 b. PTP. California, Ventura County, Ozena Forest Camp, 18 July 1986, C. W. Kirkwood, slide JAP 2476, EME.  
 c. PTP. Arizona, Coconino County, NNW of Flagstaff, 17 July 1964, J. G. Franclemont, slide DJW 1062, USNM.
- 168. *Pelochrista graduatana*** (Walsingham)  
 Texas, Carson County, 12 mi N of White Deer, 26 April 1942, H. A. Freeman, slide DJW 3531, USNM.
- 169. *Pelochrista occipitana*** (Zeller)  
 a. Colorado, Weld County, Pawnee National Grassland, 8 August 2004, D. J. Wright, slide DJW 1138, DJW.  
 b. HTP. Texas, Bosque County, 24 June 1871, G. W. Belfrage, slide 5756, BMNH.



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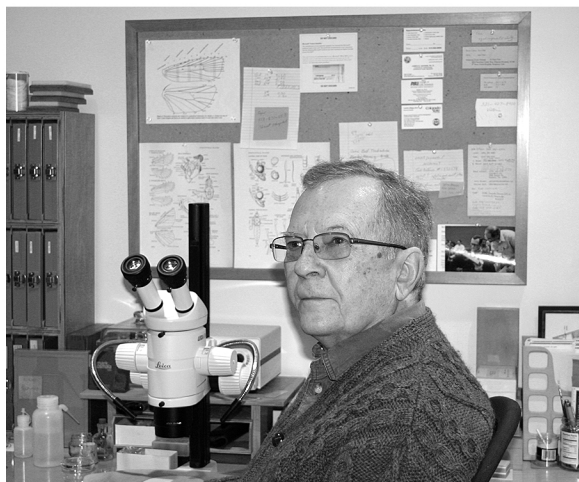
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**Don Wright** is Professor Emeritus at the University of Cincinnati, where he taught Mathematics for nearly forty years. Born and raised in rural Iowa, he acquired an early enthusiasm for the natural world and its creatures, particularly birds. In mid-life he had the good fortune of meeting a number of amateur lepidopterists from Ohio and Kentucky, and fostered by those friendships he developed a strong avocational interest in Nearctic Lepidoptera. For the past two decades he has focused on the taxonomy of the subfamily Olethreutinae, with emphasis on the tribe Eucosmini, publishing more than twenty papers on the genera *Phaneta*, *Eucosma*, *Pelochrista*, and *Epiblema* and a book coauthored with Todd M. Gilligan and Loran D. Gibson entitled *Olethreutine Moths of the Midwestern United States*. The current book, together with and its companion volume on *Eucosma* (Wright and Gilligan 2015), completes an effort spanning nearly twenty years to clarify the application of the nearly 400 available names for Nearctic species in the genera *Eucosma* and *Pelochrista*.

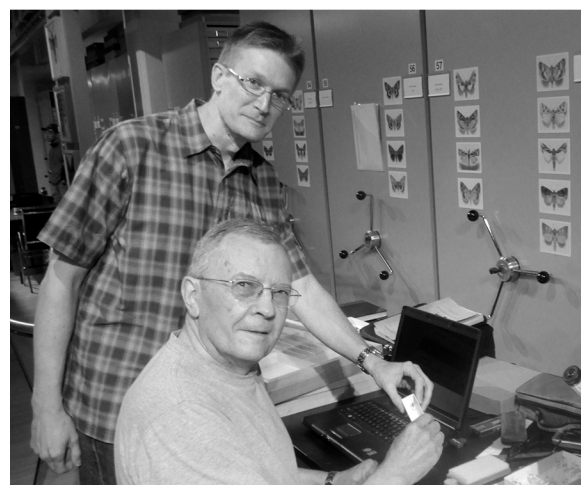


Photo by Charles V. Covell, Jr.

**Todd Gilligan** is a Taxonomist with the USDA-APHIS-PPQ Identification Technology Program in Fort Collins, Colorado. He obtained his Ph.D. in entomology from Colorado State University in 2012, where he remains a faculty affiliate in the Department of Bioagricultural Sciences and Pest Management. He currently leads a team of researchers that develops molecular-based assays designed to detect and diagnose economically important Lepidoptera. Todd has authored or coauthored more than thirty peer-reviewed publications, mostly on Tortricidae, including the companion to this volume (Wright and Gilligan 2015) and several other publications coauthored with Don Wright on the systematics of *Eucosma* and related genera. He maintains a website dedicated to tortricids ([www.tortricid.net](http://www.tortricid.net)) and hosts the *Online World Catalogue of the Tortricidae* along with other tortricid resources. Todd served as President of the Lepidopterists' Society from 2013-2015 and currently sits on the Board of Directors for the Wedge Entomological Research Foundation.

*Pelochrista* Lederer is a large Holarctic genus in the Tortricidae. Nearly three-quarters of the 226 described species are native to North America, and the highest species richness occurs in the western half of that continent. This book is the companion to Wright and Gilligan's 2015 *Eucosma* volume, and both provide the first comprehensive treatments of these diverse North American genera to be published in more than 90 years. One hundred and sixty-eight species are reviewed from the contiguous United States and Canada. Fifteen new species are described, 18 new synonymies are proposed, 29 lectotypes are designated, and several unresolved species complexes are discussed. Diagnostic morphological features useful in species identification are emphasized and illustrated with 720 color adult images and 945 detailed genitalia drawings.

"After many years of being unable to identify species in the most specious group of genera of tortricid moths, there is now a solution. This informative and beautifully illustrated monograph on *Pelochrista* includes 1,665 images and drawings for 168 species, including 15 new, in the United States and Canada. The authors are the most knowledgeable researchers on this group of moths, and they have provided essential diagnostic characters for making identifications and have clarified many species synonymies. Combined with the earlier published *Eucosma* volume, this newest monograph completes an essential set of references for lepidopterists, collection managers, and others interested in moths."

— Richard L. Brown  
Mississippi Entomological Museum



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