The Moths of America North of Mexico

FASCICLE 7.1

GELECHIOIDEA
Gelechiidae (Part)

RONALD W. HODGES

1986

THE WEDGE ENTOMOLOGICAL RESEARCH FOUNDATION

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Fascicle 20.2B **Bombycoidea,** Saturniidae (conclusion)
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Fascicle 13.1A **Pyraloidea,** Pyralidae (in part)
31 October 1972

Fascicle 13.1B **Pyraloidea,** Pyralidae (in part)
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Fascicle 20.1 **Mimallonoidea,** Mimallonidae
and **Bombycoidea,** Apatelodidae, Bombycidae, Lasiocampidae
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Fascicle 13.1C **Pyraloidea,** Pyralidae (conclusion of Part 1)
31 January 1974

Fascicle 6.2 **Gelechioidea,** Oecophoridae 1 July 1974

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25 May 1985

Fascicle 15.2 **Pyraloidea,** Pyralidae (in part)
20 February 1986

Check List
30 May 1983

THE MOTHS OF AMERICA NORTH OF MEXICO

The Moths of America North of Mexico

INCLUDING GREENLAND

FASCICLE 7.1

GELECHIOIDEA

GELECHIIDAE (PART)

DICHOMERIDINAE

RONALD W. HODGES
SYSTEMATIC ENTOMOLOGY LABORATORY
UNITED STATES DEPARTMENT OF AGRICULTURE

COLOR PHOTOGRAPHS BY
KJELL B. SANDVED
SMITHSONIAN INSTITUTION

MONOCHROME PHOTOGRAPHS BY
RONALD W. HODGES

DRAWINGS BY
MARY LOU COOLEY
LINDA H. LAWRENCE
AND ELAINE R. S. HODGES

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To my parents
LESTER AND ELMA HODGES
who have given me so much
that mere thanks are inadequate

PREFACE

This is the first of several parts of fascicle seven that will treat the Gelechiidae of America north of Mexico. The North American Gelechiidae have not been revised in contemporary times. Busck (1939) defined *Gelechia* Hübner and many related genera and associated species with them, Hodges (1966) revised the genera associated with *Lita* Treitschke, and Povolný (1967) associated New World species with several genera related to *Gnorimoschema* Busck.

The higher classification of the Gelechioidea remains unsatisfactory in many aspects although some progress has been made since my comments in fascicle 6.1 (1978: 6–11). Within the last two years I have surveyed about 230 genera of Gelechioidea and several genera of other superfamilies to find characters and character states that would serve to define entities within the superfamily. Some very useful characters that appear to associate genera have been discovered; however, conclusions suitable for publication have not been obtained. My comments on Gelechiidae and its three constituent subfamilies result from this study. I have not found a sister-group to the Gelechioidea.

The Gelechiidae are a difficult group to approach because suitable keys to the North American genera do not exist, and in most collections relatively few species are correctly identified. Many genera can be identified only by genital characters; this makes preliminary sorting difficult. The fauna is much larger than cited in the Check List (Hodges, 1983), perhaps by more than 100%.

Each part on the Gelechiidae will be a taxonomic revision but will follow the format of the series. All the species are described in a standard format to make comparative data available. None of the earlier descriptions treated characters that could be compared from one description to another. Complete specimen label data are on file at the U. S. National Museum of Natural History in Washington. 7,647 specimens and 833 genital and wing preparations were studied. Genital preparations of more than 200 exotic species and several hundred specimens were studied.

No state or province has been well sampled for Gelechiidae. Greenland is relatively well known; however, only three gelechiids occur on the island (Wolff, 1964: 44). Nova Scotia and Ontario are the best known provinces; California, Kentucky, Maryland, New Jersey, New York, Ohio, and Pennsylvania are the best known states. West of the Mississippi no Canadian province is well known and only Arizona, Colorado, Missouri, Texas, and Washington are somewhat well sampled. States and provinces that are particularly poorly known are Alabama, Alaska, Arkansas, Delaware, Georgia, Idaho, Indiana, Iowa, Kansas, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oregon, Rhode Island, South Dakota, Tennessee, Utah, Vermont, West Virginia, Wisconsin, Wyoming, Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Northwest Territories, Prince Edward Island, Quebec, Saskatchewan, and Yukon. Because the gelechiid fauna is so poorly known, some conclusions in this study are necessarily preliminary. Only *Dichomeris ligulella* Hübner has been reasonably well collected in our area. I have studied 1,160 specimens of *ligulella* from all states east of the Mississippi except Maine and Vermont and from six states west of the Mississippi but only from Nova Scotia and Ontario in Canada. At the other extreme 16 species are known from five or fewer specimens, and 36 species are known from 6–50 specimens.

Hosts are known for 33 of the 84 species of Dichomeridinae. Many new host records are reported based on specimen label data. Literature citations are documented; however, I have not attempted to cite all references. Often, subsequent citations repeat earlier published statements or give less detailed information than earlier ones. In most instances voucher material is not available to document the literature, and sometimes I question the identity of the moths.

PREFACE

I have had a problem associating the scientific names of the host plants with common names and determining the current valid names for those used in the past. I have attempted to use valid plant names insofar as possible. This may result in the name of the host being different from the one cited in the literature. For instance, *Gossypium thurberi* Todaro is the valid name for *Thurberia thespesioides* Gray and is used for the host of *Scodes deflecta* (Busck) (p. 136). Reference to Busck's 1914 paper shows that he used *Thurberia thespesioides.* I have not attempted to provide scientific names for common names from specimen label data or from the literature except sometimes at the generic level.

The text figures nearly always were drawn from single genital preparations as the specimen appears on the slide. Exceptions to this practice are when the position of the accessory bursa or ductus seminalis would make the drawing too expansive. Then, the structure was folded to make the resulting drawing more compact. The male and female genitalia of a species usually are drawn to different scales, but the male genital capsule and aedoeagus are drawn to the same scale. In no instance is the absolute size of the genitalia taxonomically important. The number of the genital or wing preparation from which the drawing was made is in parentheses in the legends for the text figures. USNM refers to the US National Museum of Natural History Lepidopteran slide series; RWH to my series; and SAB to the series of Sally Adams Brady.

Genital characters may vary in unpredictable ways as do characters of color pattern, hue, and venation. Particularly noteworthy in *Dichomeris* are the size and shape of the lobes from the vinculum, the shape of the lobes of the juxta, the shape of the distal third of the valva, the shape of the aedoeagus, the shape of the posterior margin of the uncus, the shape and degree of sclerotization of the genital plate and the antrum, and the sclerotized areas in the wall of the corpus bursae.

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Many individuals and organizations have made facilities and collecting areas available for my field work over the years; their help has been inestimable: Archbold Biological Station, Lake Placid, Florida; Big Bend National Park, Texas (H. Evans); Fort Niobrara and Valentine National Wildlife Refuges, Cherry County, Nebraska (R. M. Ellis and L. McDaniel); Fort Valley Experiment Station, Coconino National Forest, Flagstaff, Arizona (R. and W. Bierwagen); Great Sand Dunes National Monument, Colorado (R. Reynolds and R. Schultz); Great Basin and Range Experiment Station, Manti Lasal National Forest, Ephraim, Utah (A. R. Tiedemann); Hardy Work Center, Black Hills National Forest, South Dakota; Highlands Biological Station, Highlands, North Carolina; Sierra Diablo Wildlife Management Area, Van Horn, Texas; University of Arkansas, Department of Entomology—Devil's Den State Park, Fayetteville, Arkansas (L. O. Warren).

My fellow editors have been particularly helpful through their constructive criticism; S. A. Brady has provided technical support throughout the project; Roy H. Clark, Jr. provided much needed photographic support; M. L. Cooley, L. H. Lawrence, and E. R. S. Hodges did the excellent line drawings (Cooley and Lawrence did all but one of the drawings of genitalia; Hodges did most of the others); K. B. Sandved took the color photographs of the moths; and V. M. Lee typed the final manuscript.

Throughout this work my wife, Elaine, has been highly supportive; to her go special thanks.

SUPERFAMILY
GELECHIOIDEA

FAMILY
Gelechiidae Stainton

Type genus: *Gelechia* Hübner [1825]

Anacampsidae Bruand, 1850, *Mém. Soc. Libre d'Emulation du Doubs,* **3**: 40.
Type genus: *Anacampsis* Curtis, 1827.

NOTE—Anacampsidae is a senior synonym of Gelechiidae Stainton, 1854, but apparently has never been used for the family (Sattler, 1973: 161). To maintain stability an application should be made to the International Commission on Zoological Nomenclature to have Gelechiidae Stainton, 1854 placed on the *Official List of Family-Group Names in Zoology* and have the usage by Bruand of Anacampsidae suppressed.

Gelechidae Stainton, 1854, *List of the Specimens of the British Animals in the Collection of the British Museum,* **16**: 52.

NOTE—Stainton incorrectly formed the family name based on the genus *Gelechia.* The combined councils of the Oxford University Entomological Society and the Cambridge Entomological Society correctly emended the spelling to Gelechiidae in *An Accentuated List of the British Lepidoptera, with Hints on the Derivation of the Names,* **1858**: 83.

Dichomeridae Hampson, 1918, *Novitates Zoologicae,* **25**: 386.
Type genus: *Dichomeris* Hübner, 1818.

NOTE—The stem to which the familial ending "-idae" must be added is "*-merid-*" from the genitive *meridos* of the Greek word *meris* meaning part, portion, or share. The correct formation of the family-group name is Dichomerididae, not Dichomeridae. [*International Code of Zoological Nomenclature* (third edition), 1985, Article 29].

The Gelechiidae are a large family with more than 4,000 described species in the world. Seventy-seven genera and 629 described species occur in America north of Mexico. Emphasis is placed on described because my studies show that in the large genera more species are undescribed than are described. Lack of adequate data prevents a good summary of distribution of genera and species throughout the world. However, representatives of the largest subfamily, the Gelechiinae are broadly distributed. Genera related to *Isophrictis* Meyrick occur in the Holarctic, Australian, and Ethiopian Regions; genera related to *Chionodes* Hübner, *Gnorimoschema* Busck and allies, and *Filatima* Busck are extremely well developed in semiarid areas such as the western United States and adjacent Mexico, much of temperate Africa, and Eurasia; and genera related to *Anacampsis* are well represented in tropical regions. Dichomeridinae are generally distributed throughout the world. Pexicopiinae are Australasian, Ethiopian, and Neotropical. In America north of Mexico the greatest species' diversity is in the genera *Aristotelia* Hübner, *Coleotechnites* Chambers, *Gnorimoschema* and allies, *Chionodes, Filatima, Aroga* Busck, *Anacampsis* Curtis, and *Dichomeris* Hübner.

Introduced species include *Metzneria lapella* (Linnaeus), *M. paucipunctella* Zeller, *Chrysoesthia drurella* (Fabricius), *C. sexguttella* (Thunberg), *Recurvaria nanella* (Denis & Schiffermüller), *Exoteleia dodecella* (Linnaeus), *Athrips mouffetella* (Linnaeus), *A. pruinosella* (Lienig & Zeller), *A. rancidella* (Herrich-Schäffer), *Xenolechia aethiops* (Humphreys & Westwood), *Phthorimaea operculella*

(Zeller), *Neofaculta infernella* (Herrich-Schäffer), *Mirificarma flamella* (Hübner), *Aproaerema anthyllidella* (Hübner), *Anacampsis populella* (Clerck), *Brachyacma palpigera* (Walsingham), *Anarsia lineatella* Zeller, *Sitotroga cerealella* (Olivier), *Pectinophora gossypiella* (Saunders), *Platyedra subcinerea* (Haworth), *Dichomeris picrocarpa* (Meyrick), *D. marginella* (Fabricius), and *D. acuminata* (Staudinger). Among the introductions are some of the most important pest species in the family. These are the pink boll worm (*P. gossypiella*), the potato tuber moth (*P. operculella*) and the Angoumois grain moth (*S. cerealella*). *Dichomeris picrocarpa,* a minor pest of foliage of cherry in Japan and peach in Korea has not proved to be damaging economically in North America to date.

Endemic genera are *Enchrysa* Zeller, *Theisoa* Chambers, *Stereomita* Braun, *Numata* Busck, *Glauce* Chambers, *Naera* Chambers, *Agnippe* Chambers, *Tosca* Heinrich, *Argyrolacia* Keifer, *Sinoe* Chambers, *Trypanisma* Clemens, *Pseudochelaria* Dietz, *Neodactylota* Walsingham, *Eudactylota* Walsingham, *Fascista* Busck, and *Exceptia* Povolný. Holarctic genera are *Megacraspedus* Zeller, *Isophrictis, Monochroa* Heinemann, *Chrysoesthia* Hübner, *Recurvaria* Haworth, *Evippe* Chambers, *Exoteleia* Wallengren, *Xenolechia* Meyrick, *Teleiopsis* Sattler, *Ptycerata* Busck, *Lita* Treitschke, *Bryotropha* Heinemann, *Gnorimoschema* Busck, *Caryocolum* Gregor & Povolný, *Agonochaetia* Povolný, *Sophronia* Hübner, *Syncopacma* Meyrick, and *Hypatima* Hübner. Genera with holarctic and neotropical distribution are *Scrobipalpula* Povolný, *Chionodes, Filatima, Aroga, Anacampsis* (*specularis* (Meyrick) from India and Ceylon is a *Dichomeris,* NEW COMBINATION), and *Compsolechia* Meyrick (*permagna* (Meyrick) was transferred to *Erickssonella* Janse by Janse (1960: 171)). New World genera are *Nealyda* Dietz, *Coleotechnites, Leucogoniella* Fletcher, *Arogalea* Walsingham, *Telphusa* Chambers, *Arla* Clarke, *Friseria* Busck, *Rifseria* Hodges, *Symmetrischema* Povolný, *Keiferia* Busck, *Tildenia* Povolný, *Frumenta* Busck, *Faculta* Busck, *Calliprora* Meyrick, *Untomia* Busck, *Battaristis* Meyrick, *Strobisia* Clemens, *Holophysis* Walsingham, *Prostomeus* Busck, and *Epilechia* Busck. Genera that occur in most zoogeographic regions are *Aristotelia* Hübner, *Scrobipalpa* Janse, *Stegasta* Meyrick, *Polyhymno* Chambers, *Brachyacma* Meyrick, and *Dichomeris.*

Genera introduced from the Old World are *Metzneria* Zeller, *Athrips* Billberg, *Teleiodes* Sattler, *Neofaculta* Gozmány, *Mirificarma* Gozmány, *Aproaerema* Durrant, *Sitotroga* Heinemann, *Pectinophora* Busck, and *Platyedra* Meyrick. *Phthorimaea* Meyrick was introduced from the Neotropical Region.

Adults of most species are active at night and can be collected at lights of varying wave lengths; often a combination of incandescent and black light sources is better than either alone. Several tropical species are active during the day. Many of them have brightly colored scales on the forewings; they fly a short distance, land, and then run around on a leaf surface. *Anacampsis levipedella* (Clemens) and *Strobisia iridipennella* Clemens in eastern North America behave in this manner. In the alpine zone above 12,000 feet elevation in the Colorado Rocky Mountains several species are active in the daytime. They can be found on the ground as they hop or jump; most rarely fly. Females of some of these species are brachypterous (personal observation). Adults of overwintering *Dichomeris* species will come to bait of fermented fruit.

Larvae of most species are leaf rollers or leaf tiers. However, many feed within flower heads, developing seed pods, form stem or root galls, or mine needles or leaves. Larvae have been reared from at least 26 plant families with no strong preference for individual families (Powell, 1980: 145, 146). Host families include Caryophyllaceae, Compositae, Fagaceae, Gramineae, Leguminosae, Myrtaceae, Pinaceae, Polygonaceae, Rosaceae, Salicaceae, and Solanaceae. A few feed on mosses, plant refuse, or stored plant products. Less than two percent of the species feed on three or more plant families. Pupation usually occurs in a slight cocoon made in the last larval habitat or in litter on the ground. The pupa remains in the cocoon at eclosion. In the temperate Nearctic Region most species are univoltine, but many have two or more broods per year. Overwintering may occur in any life stage: adult, egg, larva, or pupa.

Adult gelechiids can be recognized by the presence of a radial retinaculum (text figure 1 *a*) on the undersurface of the forewing in the female (Braun, 1924: 247). The females of other gelechioids except some Blastobasidae lack a radial retinaculum. The Blastobasidae with a radial retinaculum also have a cubital retinaculum in the female (text figure 1 *b*).

Following the conclusions of my unpublished, continuing study of higher categories of Gelechioidea, Lecithocerinae and Physoptilinae are removed from the Gelechiidae and treated as allies of the Oecophoridae. The females of *Deoclona yuccasella* Busck, *Taygete attributella* (Walker), *Taygete de-*

cemaculella (Chambers), and *Ymeldia janae* Hodges have a cubital pecten and are related to Oecophoridae, not Gelechiidae.

Two characters that serve for recognition of North American Gelechiidae are 1) the apex of the relatively broad hindwing produced to a point or lobe and the outer margin slightly excavated behind the apex and 2) the forewing lacking vein CuP.

Three subfamilies are recognized in the Gelechiidae: Gelechiinae, Pexicopiinae, and Dichomeridinae. They are defined by the abdominal support structure on the second sternum. 1) Gelechiinae: well-developed venulae and apodemes (text figure 2 *a*) varying to a form with well-developed venulae that have sclerotized, lateral extensions and have the anterior margin of the second sternite sclerotized mesially (text figure 2 *b*). The two character states are not discrete; and *Caryocolum* species (USNM genitalia slides 7,340 and 7,341), *Lita variabilis* (Busck), *Faculta triangulella* (Busck), and *Hypatima zesticopa* (Meyrick) show intergradation between the two states. 2) Pexicopiinae: venulae absent or perhaps represented as a heavily sclerotized zone, apodemes well developed and hollow (text figure 2 *c, d*). 3) Dichomeridinae: apodemes absent, well-developed venulae terminate anteriorly with a rounded lobe on the anterior margin of the eighth sternum, anterior margin of eighth sternum with a mesial sclerotized band connecting the venulae (text figure 2 *e*).

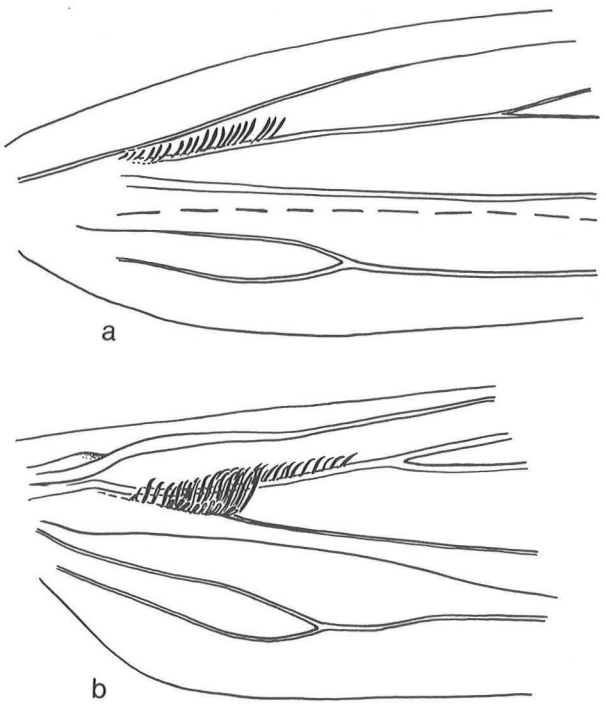

FIGURE 1: RETINACULUM OF FEMALE GELECHIIDAE AND BLASTOBASIDAE

a. Radial retinaculum, *Dichomeris ligulella* Hübner, Gelechiidae.

b. Cubital and radial retinacula, *Valentinia glandulella* (Riley), Blastobasidae.

KEY TO SUBFAMILIES OF GELECHIIDAE OF AMERICA NORTH OF MEXICO

1. Abdominal support system on second sternum a pair of venulae, anterior end of each venula not developed as an apodeme, anterior margin of second sternum usually sclerotized mesially (text figure 2 *e*); forewing usually with CuA_1 and CuA_2 stalked or connate and directed somewhat posteriorly from end of cell (text figure 8 *b*), rarely separate and directed posteriorly from end of cell; male with or without juxta; female with secondary bursa arising from corpus bursae (text figure 8 *a*) .... Dichomeridinae this page

— Abdominal support system on second sternum with or without venulae, with a pair of apodemes anteriorly (text figure 2 *a*); if support system of venulae only, then forewing with CuA_1 and CuA_2 separate, male genitalia without juxta, female lacking secondary bursa from corpus bursae 2

2. Abdominal support system on second sternum a pair of venulae, terminating in a pair of apodemes anteriorly or connected mesially and with lateral extensions (text figure 2 *a*); antennal pecten of a single, slender scale rarely present (*Bryotropha* Heinemann) ..... Gelechiinae (subsequent parts)

— Abdominal support system on second sternum a pair of apodemes at or near anterior margin, venulae absent (text figure 2 *c, d*); antennal pecten of several slender scales often present ..... Pexicopiinae (subsequent part)

SUBFAMILY

Dichomeridinae Hampson

Dichomeridae Hampson, 1918, *Novitates Zoologicae,* **25**: 386.
Type genus: *Dichomeris* Hübner, 1818.

Brachmiinae Heslop, 1938, *Catalogue of the British Lepidoptera,* 80.
Type genus: *Brachmia* Hübner, 1825.

The Dichomeridinae are a medium-sized subfamily

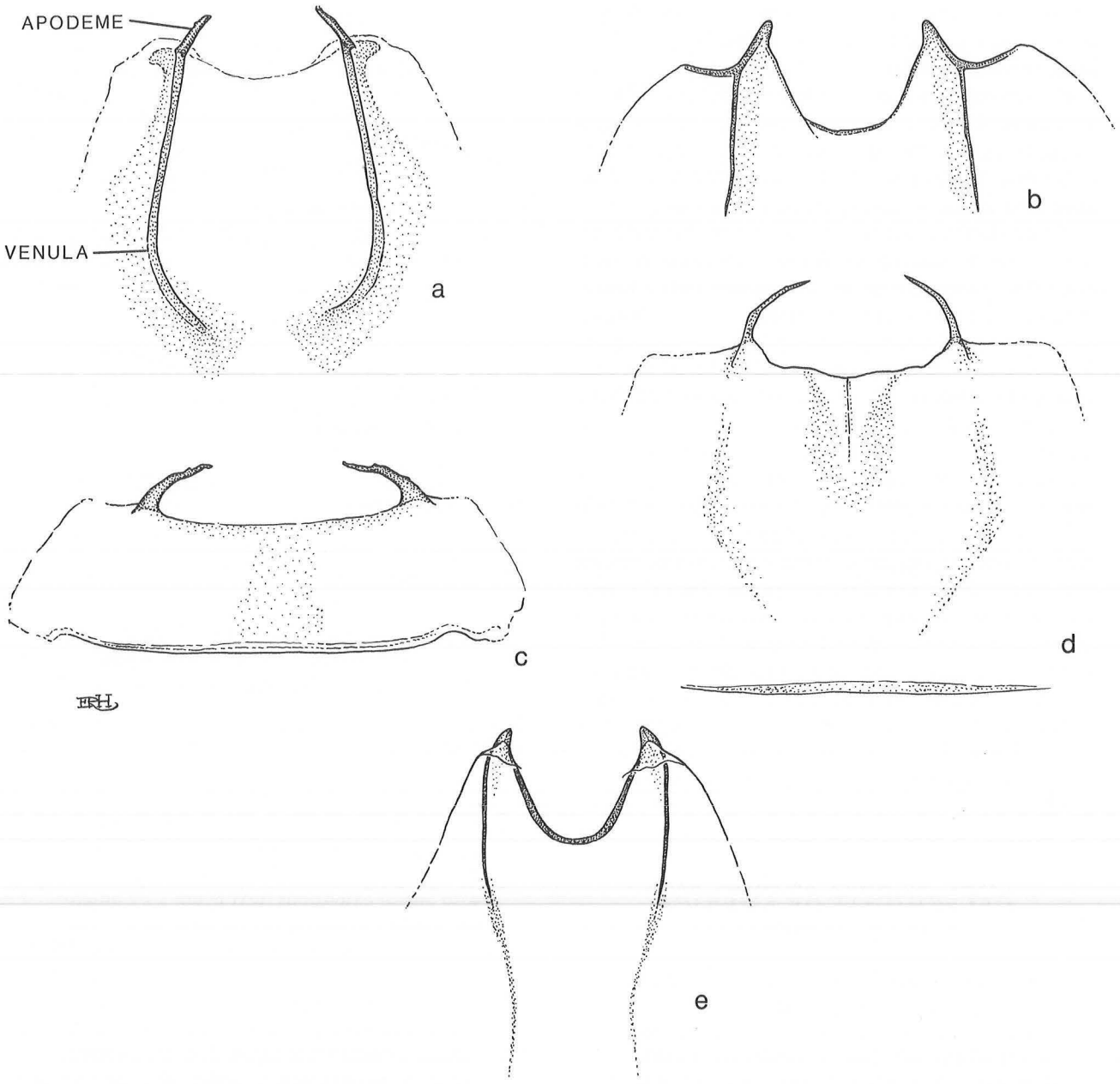

FIGURE 2: ABDOMINAL STERNAL SUPPORT SYSTEM OF GELECHIIDAE

a. Gelechiinae (*Gelechia rhombelliformis* Staudinger); *b.* (*Anacampsis niveopulvella* (Chambers)). *c.* Pexicopiinae (*Pectinophora gossypiella* (Saunders);
d. (*Platyedra subcinerea* (Haworth)). *e.* Dichomeridinae (*Dichomeris blanchardorum* Hodges).

with at least six genera and several hundred species. These occur on all continents except Antarctica. No species are native in New Zealand; or Hawaii, but two species have been introduced into Hawaii. Three genera and 84 species are found in America north of Mexico. Until the type specimens of the described species of many Gelechiidae and Oecophoridae have been dissected and studied, it is impossible to give an accurate count for the number of species in the world. Many species described in *Brachmia, Onebala* Walker, and *Gaesa* Walker have proved to belong to Oecophoridae or Lecithoceridae when the genitalia have been studied; so, I presume that more instances of incorrect family-group association re-

main to be discovered. *Onebala* Walker with type species *blandiella* Walker, 1864, belongs to the Lecithoceridae based on the abdominal support structure, the uncus-gnathos of the male genitalia, the spined abdominal terga, and the long stalked M_3 + CuA_1 in the hindwing.

Several species of *Dichomeris* have restricted ranges in eastern North America. Only four species have been found on the West Coast from British Columbia to California. *Helcystogramma fernaldella* occurs from Nova Scotia west to Dawson, Yukon Territory and College, Alaska in the north but does not extend farther south than the mountains of South Dakota and Wyoming. No dichomeridine occurs on Greenland (Wolff, 1964).

Characters of the subfamily are as follows: Labial palpus often with second segment bearing a ventroanteriorly directed scale tuft or dorsal surface with scale tuft, third segment usually slender, erect, and tapering to acute apex, labial palpus sometimes porrect, sexually dimorphic in some species with male having specialized scale tufts on second segment, whereas the female lacks them. Antenna usually slender and ciliate, segments rarely swollen; sometimes shaft with a basal notch in male; pecten absent. Ocellus present or absent. Abdominal support structure a pair of venulae terminating anteriorly with a rounded lobe on margin of second sternum, usually connected on anterior margin by a sclerotized band; rest of abdomen usually unmodified; seventh segment often distinctively shaped in male. Forewing slender, ratio of width to length = 0.13–0.33; 12 veins usually present, R_4 and R_5 and CuA_1 and CuA_2 may be fused; R_{4+5} usually stalked, R_5 to margin; R_3 rarely stalked with R_{4+5}; M_1 usually free, rarely stalked with R_{4+5}; CuA_1 and CuA_2 usually stalked and directed posteriorly from end of cell or near end of cell. Hindwing broader than forewing, ratio of width to length = 0.22–0.47; seven or eight veins present; R_1 joining Sc near base of wing; Rs and M_1 stalked, connate or separate, diverging beyond base; M_3 and CuA_1 usually connate or stalked; cell usually closed; cubital pecten present or absent. Male genitalia: tegumen and vinculum not directly connected, joined by appendix appendicular and a varyingly sclerotized lobe that often has a tuft of long scales in pleural region; juxta present or absent; aedoeagus often with sclerotized lobes extending from zone, cornutus present or absent; valva usually with lobe extending from costal margin; gnathos well developed, hook shaped, culcitula present, sclerite supporting free part of gnathos and shape of posterolateral part of tegumen as in text figure 7 *a*.

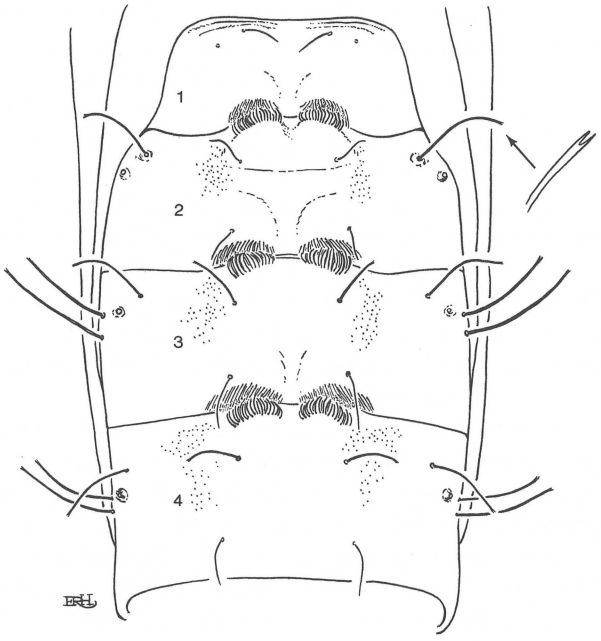

FIGURE 3: ABDOMINAL TERGA 1–4 OF PUPA OF *DICHOMERIS SETOSELLA*

Female genitalia: ostium bursae on eighth sternum or between seventh and eighth sterna; corpus bursae often multiple lobed, varyingly sclerotized, often with parallel, sclerotized ridges, inwardly directed spinules, and/or sclerotized parts of the wall; ductus seminalis arising from base of bursa copulatrix to anterior part of bursa copulatrix, often with a heavily sclerotized ring near junction with bursa copulatrix; a secondary bursa arising from the bursa copulatrix, often from the area of a generalized signum; signum present or absent, often not well defined, consisting of inwardly directed spicules and/or sclerotized areas.

Diagnostic characters are the abdominal support structure, the shape of the sclerite supporting the free part of the gnathos, the shape of the posterolateral part of the tegumen; the presence of a secondary bursa arising from the corpus bursae in the female; and the presence of raised mesial or submesial prominences on abdominal terga one, two, three, and four of the pupa (text figure 3). These form three paired, excavated structures on the margins of the segments. Each facing surface has many setae. (Often the posterior surface has many, very fine setae; whereas the anterior, opposing surface has fewer, larger, and often recurved setae. In *Dichomeris* and *Scodes* the structures are paired on each side of the meson; in *Helcystogramma* they are mesial, and the excavated area is nearly circular when viewed from

the lateral aspect.) In America north of Mexico the venational character of forewing with CuA_1 and CuA_2 stalked or connate and somewhat downcurved from the end of the cell, and the hindwing with R_1 visible and moving to Sc, usually before ½ the length of the cell, are useful characters to place specimens to Dichomeridinae without having to dissect the genitalia and abdomen. In other parts of the world the stalked CuA_1 + CuA_2 in the forewing is shared with many species of Lecithoceridae and many depressariine Oecophoridae. Females of the latter lack a subradial pecten and have a subcubital pecten on the undersurface of the forewing.

The larvae are leaf tiers, occasionally leaf rollers on several plant families including Araliaceae, Compositae, Convolvulaceae, Cruciferae, Ericaceae, Fagaceae, Gramineae, Leguminosae, Malvaceae, Myricaceae, Onagraceae, Pinaceae, Rhamnaceae, Rosaceae, and Rutaceae. Pupation occurs in a cocoon within the larval site or between other tied leaves.

KEY TO GENERA OF DICHOMERIDINAE

1. Juxta present (lost in one neotropical species) ..... *Dichomeris* this page

— Juxta absent 2

2. Vinculum with mediodistal margin lyre-shaped in ventral view (text figure 29 *e*), extending anteriorly beyond base of tegumen at least ¾ length; lobe extending medially from saccular margin of valva lightly sclerotized apically, mesial margin straight, not reaching middle; male with accessory, subradial retinaculum; female with three spines in frenulum ..... *Helystogramma* p. 122

— Vinculum with mediodistal margin a pair of rounded lobes in ventral view (text figure 31 *e*), extending anteriorly beyond base of tegumen about ⅓ length; lobe extending medially from saccular margin of valva heavily sclerotized apically, mesial margin convex, often overlapping with lobe from other side; male without accessory retinaculum; female with two spines in frenulum ..... *Scodes* p. 134

GENUS
Dichomeris Hübner

Dichomeris Hübner, 1818, *Zuträge zur Sammlung exotischer Schmettlinge* [sic], **1**: 25.
Type species: *Dichomeris ligulella* Hübner, 1818. Designated by Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 87.

Oxybelia Hübner [1825], *Verzeichniss bekannter Schmettlinge* [sic], 407.
Type species: *Tinea capucinella* Hübner, 1796, now considered to be a junior synonym of *Tinea ustalella* Fabricius, 1794. Designated by Meyrick, 1925, *Genera Insectorum,* **184**: 174.

Rhinosia Treitschke, 1833, *Die Schmetterlinge von Europa,* **9**(2): 9.
Type species: *Tinea ustalella* Fabricius, 1794. Designated by Duponchel, 1838, *Histoire naturelle des Lepidoptères ou Papillons de France,* **11**: 15.

Anorthosia Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 161. REVISED SYNONYMY.
Type species: *Anorthosia punctipennella* Clemens, 1860, Monotypy.

Trichotaphe Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 166. REVISED SYNONYMY.
Type species: *Trichotaphe setosella* Clemens, 1860. Designated by Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 89.

Rhobonda Walker, 1864, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **29**: 802.
Type species: *Rhobonda punctatella* Walker, 1864. Monotypy.
NOTE—*Rhobonda* Walker, 1864, is a junior homonym of *Rhobonda* Walker, 1863, in the Lepidoptera.

Vazugada Walker, 1864, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **29**: 803. REVISED SYNONYMY.
Type species: *Vazugada strigiplenella* Walker, 1864. Monotypy.

Gaesa Walker, 1864, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **29**: 803. REVISED SYNONYMY.
Type species: *Gaesa decusella* Walker, 1864. Monotypy.

Tocmia Walker, 1864, *List of the Specimens of*

Lepidopterous Insects in the Collection of the British Museum, **29**: 805. NEW SYNONYMY.
Type species: *Tocmia versicolorella* Walker, 1864. Monotypy.

Carna Walker, 1864, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **30**: 1038.
Type species: *Rhobonda punctatella* Walker, 1864. Monotypy.
NOTE—*Carna* Walker, 1864, is a replacement name for *Rhobonda* Walker, 1864. It is a junior homonym of *Carna* Gistel, 1848, in the Echinodermata.

Noeza Walker, 1866, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **35**: 1839. NEW SYNONYMY.
Type species: *Noeza telegraphella* Walker, 1866. Monotypy.
NOTE—*Noeza* Walker, 1866, is a junior homonym of *Noeza* Meigen, 1800, in the Diptera.

Acanthophila Heinemann, 1870, *Die Schmetterlinge Deutschlands und der Schweiz,* part 2, **2**(1): 320. NEW SYNONYMY.
Type species: *Gelechia alacella* Zeller, 1839. Monotypy.

Sagaritis Chambers, 1872, *Can. Ent.,* **4**: 255. REVISED SYNONYMY.
Type species: *Sagaritis gracilella* Chambers, 1872, now considered to be a junior synonym of *Anorthosia punctipennella* Clemens, 1860. Monotypy.
NOTE—*Sagaritis* Chambers, 1872, is a junior homonym of *Sagaritis* Billberg, 1820, in the Crustacea.

Begoe Chambers, 1872, *Can. Ent.,* **4**: 209. REVISED SYNONYMY.
Type species: *Begoe costolutella* Chambers, 1872, now considered to be a junior synonym of *Trichotaphe setosella* Clemens, 1860. Monotypy.

Epicorthylis Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 248. REVISED SYNONYMY.
Type species: *Epicorthylis inversella* Zeller, 1873. Monotypy.

Malacotricha Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 280. REVISED SYNONYMY.
Type species: *Gelechia* (*Malacotricha*) *bilobella* Zeller, 1873. Designated by Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 90.

Atasthalistis Meyrick, 1886, *Trans. Ent. Soc. London,* **1886**: 279.
Type species: *Atasthalistis pyrocosma* Meyrick, 1886. Designated by Meyrick, 1925, *Genera Insectorum,* **184**: 136.

Zalithia Meyrick, 1894, *Trans. Ent. Soc. London,* **1894**: 18.
Type species: *Zalithia uranopis* Meyrick, 1894. Monotypy.

Pappophorus Walsingham, 1897, *Trans. Ent. Soc. London,* **1897**: 39. NEW SYNONYMY.
Type species: *Pappophorus eurynotus* Walsingham, 1897. Original designation.

Arotria Meyrick, 1904, *Proc. Linn. Soc. New South Wales,* **29**: 387. NEW SYNONYMY.
Type species: *Arotria iophaea* Meyrick, 1904. Monotypy.

Croesopola Meyrick, 1904, *Proc. Linn. Soc. New South Wales,* **29**: 410. NEW SYNONYMY.
Type species: *Atasthalistis euchroa* Lower, 1900. Monotypy.

Hypelictis Meyrick, 1905, *Jour. Bombay Nat. Hist. Soc.,* **16**: 600.
Type species: *Hypelictis acrochlora* Meyrick, 1905. Monotypy.

Paristhmia Meyrick, 1909, *Ann. Transvaal Mus.,* **2**: 13. NEW SYNONYMY.
Type species: *Paristhmia barathrodes* Meyrick, 1909. Monotypy.

Hylograptis Meyrick, 1910, *Trans. Ent. Soc. London,* **1910**: 450. NEW SYNONYMY.
Type species: *Hylograptis thryptica* Meyrick, 1910. Monotypy.

Schematistis Meyrick, 1911, *Ann. Transvaal Mus.,* **3**: 67. NEW SYNONYMY.
Type species: *Schematistis analoxa* Meyrick, 1911. Monotypy.

Paranoea Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 78. NEW SYNONYMY.
Type species: *Paranoea latescens* Walsingham (1911). Original designation.

Plocamosaris Meyrick, 1912, *Trans. Ent. Soc. London,* **1911**: 706. NEW SYNONYMY.
Type species: *Plocamosaris pandora* Meyrick, 1912. Monotypy.

Machlotricha Meyrick, 1912, *Ann. South African Mus.,* **10**: 61. NEW SYNONYMY.

Type species: *Machlotricha caeca* Meyrick, 1912. Monotypy.

Holaxyra Meyrick, 1913, *Jour. Bombay Nat. Hist. Soc.*, **22**: 176.
Type species: *Holaxyra ampycota* Meyrick, 1913. Original designation.

Carbatina Meyrick, 1913, *Jour. Bombay Nat. Hist. Soc.*, **22**: 181. NEW SYNONYMY.
Type species: *Carbatina picrocarpa* Meyrick, 1913. Original designation.

Zomeutis Meyrick, 1913, *Jour. Bombay Nat. Hist. Soc.*, **22**: 182. NEW SYNONYMY.
Type species: *Zomeutis dicausta* Meyrick, 1913. Monotypy.

Ilingiotis Meyrick, 1914, *Trans. Ent. Soc. London,* **1914**: 275. NEW SYNONYMY.
Type species: *Gelechia sevectella* Walker, 1864. Original designation.

Pachysaris Meyrick, 1914, *Trans. Ent. Soc. London,* **1914**: 276. NEW SYNONYMY.
Type species: *Pachysaris rurigena* Meyrick, 1914. Original designation.

Deimnestra Meyrick, 1918, *Exotic Microlepidoptera,* **2**: 150.
Type species: *Hypelictis thyrsicola* Meyrick, 1913. Original designation.

Daemonarcha Meyrick, 1918, *Ann. Transvaal Mus.*, **6**: 27. NEW SYNONYMY.
Type species: *Daemonarcha cyprophanes* Meyrick, 1918. Monotypy.

Macrozancla Turner, 1919, *Proc. Royal Soc. Queensland,* **31**: 130.
Type species: *Macrozancla mendica* Turner, 1919. Monotypy.

Euryzancla Turner, 1919, *Proc. Royal Soc. Queensland,* **31**: 131.
Type species: *Euryzancla melanophylla* Turner, 1919. Original designation.

Rhadinophylla Turner, 1919, *Proc. Royal Soc. Queensland,* **31**: 166. NEW SYNONYMY.
Type species: *Rhadinophylla siderosema* Turner, 1919. Monotypy.

Eurysara Turner, 1919, *Proc. Royal Soc. Queensland,* **31**: 167.
Type species: *Eurysara pleurophaea* Turner, 1919. Monotypy.

Iochares Meyrick, 1921, *Ann. Transvaal Mus.*, **8**: 81. NEW SYNONYMY.
Type species: *Iochares festa* Meyrick, 1921. Original designation.

Eporgastis Meyrick, 1921, *Ann. Transvaal Mus.*, **8**: 81. NEW SYNONYMY.
Type species: *Eporgastis maturata* Meyrick, 1921. Original designation.

Aphnogenes Meyrick, 1921, *Ann. Transvaal Mus.*, **8**: 88. NEW SYNONYMY.
Type species: *Aphnogenes zonaea* Meyrick, 1921. Monotypy.

Uliaria Dumont, 1921, *Bull. Soc. Ent. France,* **1920**: 329. NEW SYNONYMY.
Type species: *Anacampsis rasilella* Herrich-Schäffer, 1854. Original designation.

Taphrosaris Meyrick, 1922, *Trans. Ent. Soc. London,* **1922**: 104. NEW SYNONYMY.
Type species: *Taphrosaris malthacopa* Meyrick, 1922. Monotypy.

Prophoraula Meyrick, 1922, *Trans. Ent. Soc. London,* **1922**: 105. NEW SYNONYMY.
Type species: *Prophoraula pyrrhopis* Meyrick, 1922. Monotypy.

Acribologa Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 622.
Type species: *Nothris malacodes* Meyrick, 1910. Original designation.

Ageliarchis Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 622. NEW SYNONYMY.
Type species: *Ageliarchis rhizogramma* Meyrick, 1923. Monotypy.

Myrophila Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 624. NEW SYNONYMY.
Type species: *Trichotaphe carycina* Meyrick, 1914. Original designation.

Brochometis Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 625.
Type species: *Dichomeris plexigramma* Meyrick, 1922. Original designation.

Neochrista Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 625. NEW SYNONYMY.
Type species: *Noeza auritogata* Walsingham, (1911). Original designation.

Semiomeris Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 626. NEW SYNONYMY.

Type species: *Noeza pyretodes* Meyrick, 1914. Original designation.

Mythographa Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 626. NEW SYNONYMY.
Type species: *Trichotaphe chartaria* Meyrick, 1913. Original designation.

Cymotricha Meyrick, 1923, *Exotic Microlepidoptera,* **2**: 626.
Type species: *Dichomeris miltophragma* Meyrick, 1922. Original designation.

Sathrogenes Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 2. NEW SYNONYMY.
Type species: *Trichotaphe malachias* Meyrick, 1913. Original designation.

Cotyloscia Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 3.
Type species: *Trichotaphe caustonota* Meyrick, 1914. Original designation.

Sirogenes Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 3. NEW SYNONYMY.
Type species: *Sirogenes thermophaea* Meyrick, 1923. Monotypy.

Musurga Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 3. NEW SYNONYMY.
Type species: *Anorthosia sandycitis* Meyrick, 1908. Original designation.

Thelyasceta Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 27. NEW SYNONYMY.
Type species: *Dasycera nonstrigella* Chambers, 1878. Original designation.

Oxysactis Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 27. NEW SYNONYMY.
Type species: *Brachyacma sciritis* Meyrick, 1918. Original designation.

Rhynchotona Meyrick, 1923, *Exotic Microlepidoptera,* **3**: 35. NEW SYNONYMY.
Type species: *Rhynchotona phaeostrota* Meyrick, 1923. Monotypy.

Gomphocrates Meyrick, 1925, *Entomologist,* **58**: 184. NEW SYNONYMY.
Type species: *Anacampsis rasilella* Herrich-Schäffer, 1854. Monotypy.
NOTE—*Gomphocrates* Meyrick, 1925, is a junior objective synonym of *Uliaria* Dumont, 1921.

Catoptristis Meyrick, 1925, *Genera Insectorum,* **184**: 134. NEW SYNONYMY.
Type species: *Strobisia trissoxantha,* Meyrick, 1922. Original designation.

Cymatoplex Meyrick, 1925, *Genera Insectorum,* **184**: 223. NEW SYNONYMY.
Type species: *Homaloxestis aestuosa* Meyrick, 1913. Original designation.
NOTE—*Cymatoplex* Meyrick, 1925, is a junior homonym of *Cymatoplex* Turner, 1910, in the Lepidoptera.

Catelaphris Meyrick, 1925, *Genera Insectorum,* **184**: 182. NEW SYNONYMY.
Type species: *Brachmia torrefacta* Meyrick, 1914. Original designation.

Cerycangela Meyrick, 1925, *Genera Insectorum,* **184**: 134.
Type species: *Zalithia sacricola* Meyrick, 1922. Original designation.

Epicharta Meyrick, 1926, *Exotic Microlepidoptera,* **3**: 285. NEW SYNONYMY.
Type species: *Epicharta gnomonodes* Meyrick, 1927. Monotypy.

Orsodytis Meyrick, 1926, *Exotic Microlepidoptera,* **3**: 286. NEW SYNONYMY.
Type species: *Brachycrossata marginata* Walsingham, 1891. Original designation.

Prasodryas Meyrick, 1926, *Exotic Microlepidoptera,* **3**: 287. NEW SYNONYMY.
Type species: *Anorthosia fracticostella* Walsingham, 1891. Original designation.

Xenorrhythma Meyrick, 1926, *Sarawak Mus. Jour.,* **3**: 154.
Type species: *Myrophila traumatias* Meyrick, 1923. Original designation.

Thyrsomnestis Meyrick, 1929, *Trans. Ent. Soc. London,* **76**: 514. NEW SYNONYMY.
Type species: *Thyrsomnestis ceramoxantha* Meyrick, 1929. Monotypy.

Desmophylax Meyrick, 1935, *Exotic Microlepidoptera,* **4**: 588. NEW SYNONYMY.
Type species: *Desmophylax barymochla* Meyrick, 1935. Monotypy.

Ereboscaeas Meyrick, 1937, *Exotic Microlepidoptera,* **5**: 93. NEW SYNONYMY.
Type species: *Ereboscaeas amorpha* Meyrick, 1937. Monotypy.

Chthonogenes Meyrick, 1938, *in* Caradja and Meyrick, *Deutsche Ent. Zeits. Iris,* **52**: 4.

Type species: *Chthonogenes synclepta* Meyrick, 1938. Monotypy.

Cymatoplicella Fletcher, 1940, *Entomologist's Record and Jour. Variation,* **52**: 18. NEW SYNONYMY.
Type species: *Homaloxestis aestuosa* Meyrick, 1913. Original designation as type species of *Cymatoplex* Meyrick, 1925.
NOTE—*Cymatoplicella* Fletcher, 1940, is an objective replacement name for *Cymatoplex* Meyrick, 1925.

Neopachnistis Janse, 1954, *The Moths of South Africa,* **5**: 353. NEW SYNONYMY.
Type species: *Pachnistis microphanta* Meyrick, 1921. Original designation.

Leuropalpa Janse, 1960, *The Moths of South Africa,* **6**: 186. NEW SYNONYMY.
Type species: *Holaxyra reducta* Janse, 1951. Original designation.

Picroptera Janse, 1960, *The Moths of South Africa,* **6**: 186. NEW SYNONYMY.
Type species: *Dichomeris orthacma* Meyrick, 1926. Original designation.

Parabrachmia Janse, 1960, *The Moths of South Africa,* **6**: 191. NEW SYNONYMY.
Type species: *Parabrachmia trisignella* Janse, 1960. Original designation.

Deltolophos Janse, 1960, *The Moths of South Africa,* **6**: 204. NEW SYNONYMY.
Type species: *Deltolophos haplopa* Janse, 1960. Original designation.

Mimomeris Povolný, 1978, *Acta Musei Moraviae,* **63**: 142. REVISED SYNONYMY.
Type species: *Dichomeris* (*Mimomeris*) *steueri* Povolný, 1972, now considered to be a junior synonym of *Acompsia scotosiella* Hackman, 1945. Original designation.
NOTE—*Bruchiana* Jorgensen, 1919, *Physis,* **2**: 363, with type species *Bruchiana cassiaella* Jorgensen, 1916, by monotypy appears to be a dichomeridine and may well be a junior synonym of *Dichomeris.* However, until the type specimen can be found and studied, the placement of the genus remains uncertain.

Dichomeris is a large genus with several hundred species in the world. It is species rich in all areas except Australia; and it is absent from New Zealand, the Pacific Islands, and the arctic and subarctic areas. Seventy-four species (40 described herein) are in America north of Mexico. *Dichomeris* differs from other genera in the subfamily by having a juxta in the male genitalia; the juxta is absent in the male genitalia of the other genera. I have been unable to find consistent differences in the female genitalia that separate the genus from others in the subfamily. Characters of *Dichomeris,* otherwise, are as for the subfamily.

I treated (1983: 24, 25) *bidiscomaculella* Chambers, 1874, as a species of *Dichomeris* and *griseella* Chambers, 1874, as a species of *Trichotaphe.* Increased knowledge of North American moths and careful rereading of the original descriptions lead to these conclusions: 1) *Gelechia bidiscomaculella* is a junior synonym of *Anacampsis fullonella* (Zeller, 1873), NEW COMBINATION, NEW SYNONYMY. Busck (1903: 914) placed *bidiscomaculella* in *Trichotaphe* based on a specimen in the USNM that he thought was the type of *bidiscomaculella.* This specimen has labial palpi, but in the original description (Chambers, 1874: 241) the unique specimen was noted as lacking the palpi. I have been unable to locate the type of *bidiscomaculella* and believe that it is lost. I treat *bidiscomaculella* as a junior synonym of *fullonella* because Chambers said that it was allied to *subruberella* Chambers, 1874, and may be a variety of it (*subruberella* is a junior synonym of *fullonella*) and because there is no evidence to argue against this conclusion. 2) *Nothris griseella* Chambers, 1874, poses a problem. No specimens are extant. The original description (Chambers, 1874: 245) provides information to enable me to conclude that the species very likely is a *Gelechia.* The two characters, in combination, are that the ventral scale tuft on the second segment of the labial palpus ends in a right angle and that the forewings are gray. The ventral scale tuft in species of *Dichomeris* ends in an acute angle, and the forewings usually are not gray. Only *Dichomeris inversella* and *kimballi* have gray forewings, but the ventral scale tuft is weak and ends in an acute angle. For these reasons *griseella* is transferred to *Gelechia,* NEW COMBINATION, where it remains an unrecognized species.

Larvae of *Dichomeris* species mainly are leaf tiers. In America north of Mexico they have been reared from many hosts in the plant families Araliaceae, Betulaceae, Compositae, Convolvulaceae, Cruciferae, Ericaceae, Fagaceae, Gramineae, Juglandaceae, Leguminosae, Malvaceae, Myricaceae, Ona-

graceae, Pinaceae, Rhamnaceae, Rosaceae, Rutaceae, and Tiliaceae. Many of the species appear to have a somewhat restricted choice of hosts, often within one plant family, but the larvae of *ligulella* have been reared from species in six plant families.

Citation of 81 generic names, including four junior homonyms, in the synonymy of *Dichomeris* is an indication of the variation in characters of the labial palpus, antenna, ocellus, venation, and wing shape within the genus. Walsingham (1911: 87) was the first to relegate many of the generic names to synonymy with *Dichomeris.* Meyrick (1925 and many other papers) restored most of the generic names, and he proposed many new names. Recent authors such as Povolný (1980, 1983) and Sattler (1973) have synonymized some generic names with *Dichomeris,* and Zimmerman (1978: 1706) suggested that *Trichotaphe* was a junior synonym of *Dichomeris.* My study has included examination of external characters and male and female genital characters of several hundred species in the genus from throughout the world. I have examined the type species of all the generic names; for those genera proposed and illustrated by Janse in *The Moths of South Africa,* volume 6, I have relied on his drawings, photographs, and text.

Nineteen species-groups are present in America north of Mexico. Many of them equate with earlier generic concepts; others do not. Many of these species-groups occur in other parts of the world, and many others are extralimital. The *setosella* species-group is the largest species-group in America north of Mexico. The *ligulella* species-group, on which the valid generic name is based, is exclusively New World and mainly neotropical. Diagnoses of the species-groups are given throughout the text. Table 1 summarizes characters and character states for the species of species-groups in America north of Mexico. The summary of data shows the characters studied and analyzed and the diversity of character states possessed by some species-groups. It also permits comprehension of why previous authors, who did not study genital characters and who were impressed with sex-linked characters, proposed many generic names for species of *Dichomeris.*

Males of some species in the *ligulella* group are immediately recognizable by the very long vinculum that has a break or folding zone that often is preceded by a long extension of the vinculum. In *ligulella* the point of articulation, which normally is between the vinculum and tegumen, is at this folding zone, and the extensions of the vinculum probably function as valvae. In some neotropical species of the *ligulella* group the vinculum is shorter, and the folding zone is lost. Also, this is the only species-group in which at least one species has lost the juxta.

The simplest, probably nonexistent, condition (=ancestral) for male genitalia of *Dichomeris,* would have an unmodified vinculum (without lobes, folding zones, solid in the saccal area); appendices appendiculares a sclerotized band; juxta a single plate or evenly sclerotized basally and with symmetrical, paired lobes distally; aedoeagus free, without cornutus, sclerotized bands in the wall, or sclerotized extensions from the zone; gnathos a strong hook; basomesial surface of the valva terminating in a small, lightly sclerotized lobe; and uncus with the posterior margin evenly rounded and with many small setae on posteroventral surface. Modifications (=derived) from these states, but not limited to them, are vinculum with a distinct break in the saccal area, posterolateral margins with one or more lobes (sometimes very broad as in *inversella* and *flavocostella*), a folding zone, and separation into multiple sclerites; juxta a heavily sclerotized median lobe, multilobed from a common base, separate lobes, or absent; aedoeagus with cornutus, heavily sclerotized bands in the wall posterad of the zone, various heavily sclerotized lobes from the zone, ankylosed with juxta and with a heavily sclerotized lobe between the aedoeagus and the juxta (*ventrella* and *georgiella*); appendices appendiculares with patch of long scales, lobed and appearing as a second set of valvae (*caia*); lobe from costal margin of valva heavily sclerotized and variably shaped; apex of gnathos bilobed; uncus terminating in one to three heavily sclerotized ridges or a lightly sclerotized point with stout setae on posteroventral surface. Modifications in female genitalia relate to relative lengths of the apophyses anteriores and posteriores to each other and to length of the rest of the abdomen; presence of conical lobes from the posterior part of the lamella antevaginalis; bursa copulatrix with heavily sclerotized ridges, zones of inwardly directed spicules, and/or heavily sclerotized zones; ductus seminalis arising at different points from the bursa copulatrix and often preceded by a heavily sclerotized ring; papillae anales very lightly sclerotized to heavily sclerotized.

Within a species-group the genitalia of the included species usually are similar by sex; however, within some of the large species-groups some character states of one sex diverge and become those of another species-group.

TABLE I
CHARACTERS AND CHARACTER STATES OF SPECIES-GROUPS OF *DICHOMERIS*

CHARACTERS	SPECIES-GROUPS								
	ligulella	*acuminata*	*condali-avorella*	*citri-foliella*	*margi-nella*	*sola-trix*	*hypochloa*	*puncti-pennella*	*puncti-discella*
1	3	3	4	3	3	3	0	♂2, ♀3	3
2	0	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	0	1	0
4	0	0	0	0	0	0	0	0	0
5	1	0, 1	1	1	1	0	1	0	1
6	0	1	0	0	0	0	0	1	0
7	0	1	0	1	0	1	0	1	1
8	0.13–0.19	0.24–0.25	0.30	0.31	0.25	0.21	0.28	0.25	0.23–0.31
9	46–52	46–52	80	86–101	53	47	87	57–60	50–69
10	0	0	3	0	0	0	0	♂0, 1 ♀3	0
11	2	2	2	2	2	2	2	2	2
12	0.26	0.27–0.28	0.41	0.39–0.40	0.35	0.27	0.32	0.24	0.27–0.30
13	4	2	2	2, 3	1	3	1	3	1, 2
14	2	0, 1	0	0	0	0	0	0	0
15	2	2	2	2	2	1	2	2	0, 1
16	1, 2	2	1	1	1	1	2	0	1
17	1	0	0	0	0	0	0	0	0
18	0	1	0	0	1	1	0	0	0
19	1	0	0	0, 1	0	0	0	0	0
20	0	1	0	1	0	0	1	0	0
21	0	0	0	0	0	0	0	1	0, 1
22	1	1	1	1	1	1	1	1	1
23	0	0	0	0	0	0	0	0	0
24	0	1	0	0	0	0	1	0	0
25	1	1	0	1	1	1	1	1	1
26	0	0	1	1	0	1	1	1	1
27	1	1	1	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1	1
29	0	0	0	0	0	0	0	0	0
30	0.47–0.52	0.90	0.70	0.97–1.35	1.07	1.58	1.02	1.02	0.78–0.87
31	1.0	1.11	0.92	1.00–1.03	0.91	0.93	0.98	1.02	1.00–1.24
32	2.3–3.0	2.1–2.4	2.0–2.3	2.25–2.26	2.07	2.20	2.55–2.80	3.67	1.87–2.56
33	1	1	0	0	0	1	0	0	0
34	0, 1	1	1	1	0	1	0	1	1
35	1	1	0	0	0	0	1	0	1
36	1	1	1	1	1	1	1	1	1
37	0, 1	0	0	0	0	0	0	0	0
38	0	0	0	1	0	0	0	0	0

Legend: Description of the Characters and States

1. Scale tufts on second segment of labial palpus: absent (0), ventral tuft (1), dorsal tuft (2), dorsal and ventral tufts (3), thickened (4).
2. Second segment of labial palpus of male (female unmodified): without dorsal tuft of scales arising near base (0), with tuft of long scales arising from dorsal surface near base (1).
3. Shaft of antenna: antenna normal (0), with a notch on segments three and four in male (1).
4. Shaft of antenna: normal (0), segments expanded and thickened with scales, particularly on posterior margin (1).
5. Ocellus: absent (0), present (1).
6. Metallic scales (usually on head and/or thorax): absent (0), present (1).

TABLE I
EXTENDED

SPECIES-GROUPS									
hirculella	*siren*	*flavo-costella*	*inversella*	*ventrella*	*setosella*	*glenni*	*costaru-foella*	*picro-carpa*	*sybilla*
3	4	2	2	3	2, 3, 4	3	2, 4	2	2
0	0	0	0	0	0	0	0	0	/
0	0	0	0	0	0	0	0	0	/
0	0	0	0	0	0, 1	0	0	0	0
1	1	1	0?	1	1	1	1	0	1
0, 1	1	1	0	0	0, 1	1	0, 1	1	0
1	1	0	0	0	0, 1	1	0	1	/
0.23–0.25	0.25	0.26–0.28	0.27–0.30	0.25–0.29	0.21–0.34	0.33	0.24–0.30	0.24	0.26
55–62	72	70–80	90–92	67–79	52–100	105	68–80	85	/
0, 2	0	0	0	0	0, 3	0	0, 2	1	0
1, 2	2	2	2	2	1, 2	2	2	2	2
0.23–0.24	0.25	0.34–0.35	0.37	0.36–0.38	0.29–0.38	0.47	0.30–0.35	0.36	/
2.3	1	0	2	0	0–3	3	0	2	1
0	0	0	0, 2	0	0	0	0	2	0
0, 1	1	2	2	1, 2	0, 1, 2	1	2	2	1
0, 1	2	2	0, 1?	1, 2	1, 2	1	1	1	1
0	0	0	0	0	0	0	0	0	/
0, 1	0	0	1	0	1	1	1	0	/
0	0	1	1	0	0, 1	1	0	1	/
1	1	1	0	1	0, 1	1	1	0	/
0, 1	0	1	0	0	0	1	0	0	/
1	1	1	0	1	1	1	1	1	/
0	0	0	0	1	0	0	0	0	/
0	0	1	0	0	1	0	0	0	/
1	1	1	1	0	0, 1	1	0, 1	0	/
1	0	0	0	1	0, 1	0	0	1	/
1	1	1	1	1	1	1	1	1	/
1	1	1	1	1	1	1	1	1	/
2	0	0	0	0	0, 1	0	0, 1	0	/
0.75–0.98	1.25	0.87–1.09	0.97–1.13	1.00–1.32	0.88–1.40	1.31	1.15–1.39	1.02	/
0.59–0.65	0.97	0.87–1.11	0.74–0.93	1.12–1.20	0.85–1.24	0.97	0.79–1.06	0.95	/
2.09–3.29	/	2.11–3.57	3.60–5.50	1.44–2.75	1.57–17.50	2.00	1.70–2.46	2.83	3.57
0	/	0	1	1	0	1	1	0	/
1	/	1	0	0, 1	0, 1	0	1	0	0
1	/	0	1	0, 1	1	1	1	1	0
1	/	1	1	1	1	1	1	1	1
0, 1	/	0	0	0	0	0	0	0	0
0	/	1	0	0	0, 1	0	0	0	0

7. Tuft of long scales arising from anepisternum in male, held between pleurites of second and third thoracic segments: absent (0), present (1).
8. Ratio of forewing width (maximum distance measured at a right angle with the costal margin) to length (distance from base of wing at costal margin to apex of wing).
9. Apical angle of forewing (angle formed by the intersection of R_3 and the costal margin, the apex of the wing and the intersection of CuA_1 and the margin.
10. Relationship of vein R_3 to vein R_{4+5} in the forewing: separate (0), approximate (1), connate (2), stalked (3).
11. Relationship of veins CuA_1 and CuA_2 in the forewing: separate (0), connate (1), stalked (2).

KEY TO SPECIES OF *DICHOMERIS* BASED ON EXTERNAL CHARACTERS

(Including *Scodes deflecta*)

1. Forewing immaculate dark violet, labial palpus orange 2
— Forewing with some marks, labial palpus variously colored 3

2. Dorsal surface of antenna heavily clothed with long scales from base to ⅔ length (antenna appears thick) ..... *nonstrigella* p. 95
— Dorsal surface of antenna with short scales, antenna uniformly slender ..... *purpureofusca* p. 94

3. Second segment of labial palpus bright orange 4
— Second segment of labial palpus another color or colors, orange (if present) on ventral margin, or apex white 5

4. Forewing with costal margin light orange from base to ¾ length ..... *achne* p. 97
— Forewing with metallic silver-blue scales on costal margin from base to ¾ length, a patch of silver-blue scales on fold at ¾ length of fold, and a subterminal band of silver-blue scales ..... *ochripalpella* p. 96

←

12. Ratio of hindwing width (maximum distance measured at a right angle with the costal margin) to length (distance from base of wing at costal margin to apex of wing).
13. Development of pecten on base of CuA on dorsal surface of the hindwing: absent (0), few scales at base of CuA (1), many scales at base of CuA (2), scales on CuA on the basal ½ of the cell (3), scales on CuA the entire length of the cell (4).
14. Relationship of veins Rs and M_1 in the hindwing: separate (0), connate (1), stalked (2).
15. Relationship of veins M_3 and CuA_1 in the hindwing: separate (0), connate (1), stalked (2).
16. Distal closure of discal cell in hindwing: open (0), weakly closed (1), closed (2).
17. Folding zone in vinculum of male genitalia: absent (0), present (1).
18. Sclerotized lobes from basolateral margin of vinculum of male genitalia: absent (0), present (1).
19. Sclerotized lobes from mediolateral margin of vinculum of male genitalia: absent (0), present (1).
20. Degree of sclerotization in saccal area of vinculum of male genitalia: weakly sclerotized, a definite break in vinculum (0), heavily sclerotized, a solid sclerite (1).
21. Lobes of juxta: arising from common base (0), separately (1).
22. Number of lobes of juxta of male genitalia: one (0), two (1), three (2).
23. Condition of aedoeagus relative to juxta in male genitalia: free (0), ankylosed (1).
24. Cornutus in aedoaegus: absent (0), present (1).
25. Sclerotized band(s) in wall of aedoeagus: absent (0), present (1).
26. Sclerotized lobe(s) arising from zone of aedoeagus: absent (0), present (1).
27. Patch of setae associated with appendix appendicular: absent (0), present (1).
28. Lobe associated with appendix appendicular: absent (0), present (1).
29. Shape of uncus of male genitalia: normal (margin rounded or curved but subquadrate) (0), short laterally, with a median ridge (1), elliptical with pointed apex (2).
30. Ratio of length of tegumen + uncus to length of vinculum of male genitalia.
31. Ratio of length of valva to length of tegumen + uncus of male genitalia.
32. Ratio of length of apophyses posteriores to length of apophyses anteriores in female genitalia.
33. Condition of wall of ductus seminalis in female genitalia: without inwardly directed spinules (0), with inwardly directed spinules (1).
34. Condition of wall of bursa copulatrix of female genitalia: sclerotized ridges absent (0), sclerotized ridges present (1).
35. Condition of wall of bursa copulatrix in female genitalia: patch(es) of inwardly directed spinules absent (0), patch(es) or inwardly directed spinules present (1).
36. Condition of wall of bursa copulatrix in female genitalia: sclerotized area(s) absent (0), sclerotized area(s) present (1).
37. Lamella antevaginalis of female genitalia with pair of slender, posteriorly directed lobes: absent (0), present (1).
38. Degree of sclerotization of papillae anales in female: very light (0), heavy (1).

5. Forewing light yellow, a few grayish-orange scales at termen ..... *hypochloa* p. 50
— Forewing variously colored, not entirely light yellow 6

6. Wing length 3.5 mm or less, forewing marked with lustrous orange yellow, a broad, subterminal grayish-yellow band and a darker grayish-yellow costal spot at ⅔ length ..... *siren* p. 64
— Wing length 4.0 mm or more, forewing with different pattern 7

7. Forewing with a white band on anterior and posterior margins, separated by a broad yellowish-brown band ..... *marginella* p. 46
— Forewing lacking white anterior and posterior bands 8

8. Forewing as in plate 3, figure 36, second segment of labial palpus nearly 3 × length of third segment (text figure 30) ..... *Scodes deflecta* p. 136
— Forewing otherwise, second segment of labial palpus no more than 2 × length of third segment 9

9. Second segment of labial palpus with a strong, ventral tuft at apex, dorsal margin sometimes tufted (text figure 4 *a*) 10
— Second segment of labial palpus with closely appressed scales following outline of segment on ventral margin (or directed slightly ventrad on distal ½), dorsal margin with or without a tuft (text figure 4 *b–e*) 35

10. Forewing with costal margin narrowly pale yellow from base to apex 11
— Forewing with costal margin concolorous with rest of wing or gray brown, or pale yellow only to ½ length 12

11. Hindwing with strong cubital pecten dorsally (text figure 8 *b*) ..... *ligulella* (in part) p. 33
— Hindwing lacking cubital pecten .... *pelta* (in part) p. 99

12. Forewing with a roughly triangularly shaped dark-brown to black mark at base or on basal ⅓, mark not reaching costal or posterior margin 13
— Forewing lacking a distinct mark at base or on basal ⅓ of wing, or with indistinct brown patch touching posterior margin 19

13. Forewing with basal dark mark bordered anteriorly with pale yellow, pale yellow usually contrasting strongly with ground color of wing 14
— Basal dark mark of forewing not bordered anteriorly with pale yellow, this area not contrasting with ground color of wing 17

14. Anterior margin of triangular dark mark on forewing straight ..... *mulsa* p. 83
— Anterior margin of triangular dark mark on forewing strongly indented 15

15. Forewing with a well-defined, pale-yellow subterminal line 16
— Forewing lacking a well-defined subterminal line ..... *mica* p. 84

16. Scale tuft arising from mesothoracic anepisternum in male (text figure 5) unicolorous pale orange (sometimes pale brown distally); subterminal line of forewing usually sinuous, particularly at middle of wing ..... *setosella* p. 79
— Scale tuft arising from mesothoracic anepisternum in male pale orange basally, dark brown distally; subterminal line of forewing straight or broadly curved, usually not sinuous at middle ..... *vindex* p. 83

17. Triangular dark mark at basal ⅓ of forewing with length of posterior margin more than 1½ times distance from anterior to posterior margins ..... *aglaia* p. 85
— Triangular dark mark at basal ⅓ of forewing with length of posterior margin equal to distance from anterior to posterior margins 18

18. Triangular mark at base of forewing unicolorous brown black ..... *gleba* p. 87
— Triangular mark at base of forewing brown with a black streak on fold and a black spot on outer margin near apex ..... *delotella* p. 86

19. Hindwing with cubital pecten (text figure 8 *b*) 20
— Hindwing without cubital pecten 32

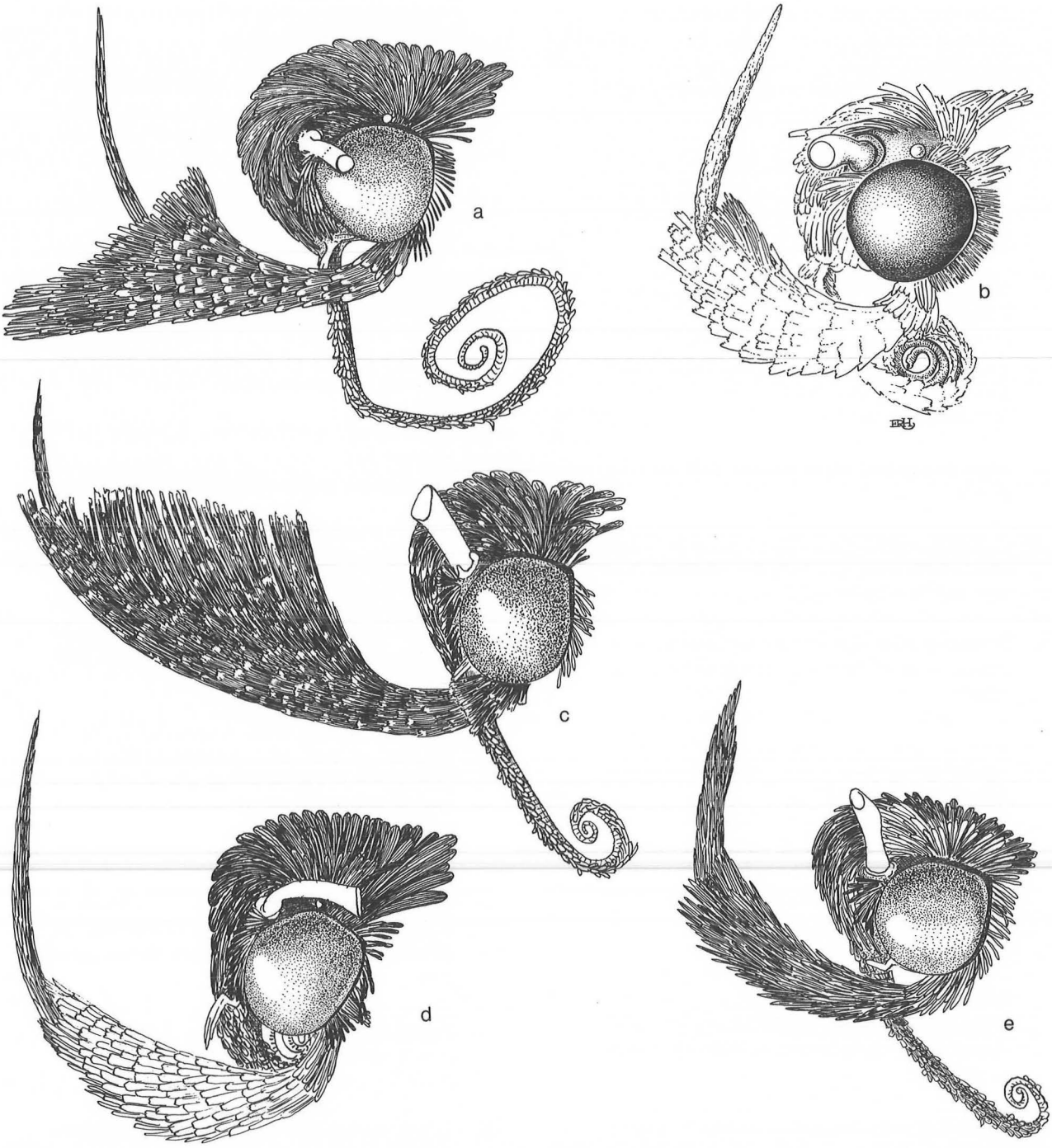

FIGURE 4: LATERAL VIEW OF HEADS OF *DICHOMERIS* SPECIES

a. Dichomeris ligulella. b. Dichomeris simpliciella. c. Dichomeris inversella. d. Dichomeris purpureofusca. e. Dichomeris picrocarpa.

20. Third antennal segment of male deeply notched on dorsal surface (text figure 6) (see plate 4, figures 3–5 for habitus) ..... *punctipennella* p. 53

— Third segment of antenna of male normal, not notched 21

21. Forewing orange 22

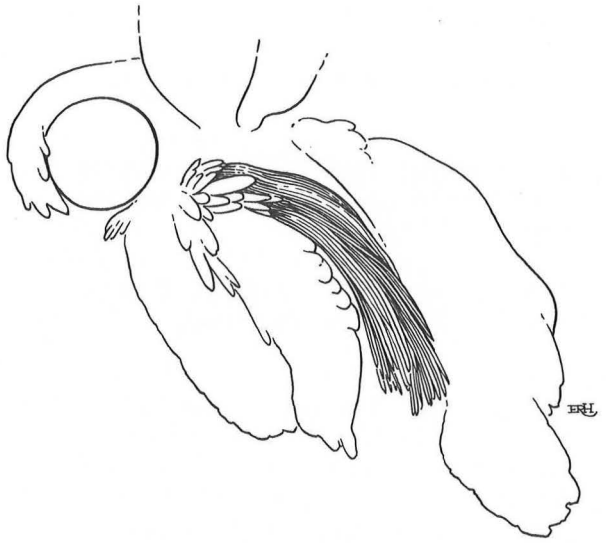

FIGURE 5: SCALE TUFT ON MESOTHORACIC ANEPISTERNUM OF *DICHOMERIS SETOSELLA*

— Forewing pale yellow to dark brown, never orange 23

22. Head with row of scales above eye pale orange, apexes of scales not contrasting in shade .... *acuminata* p. 38

— Head with row of scales above eye medium to dark gray, apexes of scales contrasting pale gray ..... *nenia* p. 40

23. Forewing yellowish white, marked with dark gray ..... *solatrix* p. 48

— Forewing brown or dark gray 24

24. Hindwing thinly scaled, nearly translucent; veins heavily scaled, appearing dark against pale purplish-gray ground color 25

— Hindwing more heavily scaled, veins not standing out against background 26

25. Basal 6 or 7 segments of shaft of antenna bearing a short spine on posterior surface in male (female unmodified) (southern Arizona) .. *gausapa* p. 37

— Shaft of antenna not modified by having spines (East Coast west to central Texas) .... *ligulella* (in part) p. 33

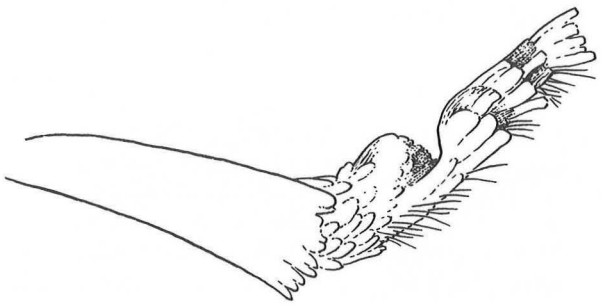

FIGURE 6: NOTCHED ANTENNA OF MALE OF *DICHOMERIS PUNCTIPENNELLA*

26. Forewing dark brownish gray, costa from base to ½ length pale yellow ..... *sylphe* p. 58

— Forewing yellowish gray to dark brownish gray, costa concolorous with rest of wing or slightly paler, not a strongly contrasting hue 27

27. Scales on head very pale yellowish gray, almost white above eye; forewing yellowish gray to brownish gray, usually appearing pale 28

— Scales on head medium brown to dark gray brown; forewings brownish gray to brown, appearing dark 29

28. An eastern species (Nova Scotia to Florida, west to Texas) (see keys based on genital characters and discussion of *punctidiscella,* p. 54, and *empusa,* p. 59) ..... *punctidiscella* p. 54

— A southwestern species (known from northern Arizona) ..... *empusa* p. 59

29. Apex of second segment of labial palpus pale gray, apexes of scales broadly pale gray 30

— Apex of second segment of labial palpus appearing mottled pale gray and dark brown, apexes of scales narrowly pale gray ..... *diva* p. 57

30. Undersurface of hindwing with numerous pale-orange scales between cell and fold (area appears more nearly opaque than regions directly anterad or posterad) in male ..... *hirculella* p. 60

— Undersurface of hindwing relatively evenly scaled in male 31

31. Tegula mainly dark grayish brown, apex pale yellowish gray ..... *ardelia* p. 62

— Tegula mainly pale yellowish gray, base grayish brown ..... *caia* p. 62

32. Forewing pale to medium brown with a pair of dark-brown spots (one at end of cell and one at ⅔ length of cell) each ringed with white scales, often with a streaked effect caused by dark-brown scales through the cell and on the veins beyond the cell ..... *bipunctella* p. 78

— Forewing generally uniformly brown, lightly overlaid with dark scales, or mottled brown 33

33. Third segment of labial palpus pale orange, yellow to white on basal half; scape of antenna brown dorsally, off-white ventrally, two colors meeting in a straight line 34

— Outer surface of third segment of labial palpus pale with a dark-brown, poorly defined band just beyond base; scape of antenna brown dorsally, off-white ventrally, brown extending onto ventral surface at apex ..... *vacciniella* p. 76

34. Forewing relatively uniformly brownish orange to light brown evenly overlaid with transverse brown flecks, brown spots usually poorly defined ..... *georgiella* p. 75

— Forewing yellowish brown to reddish brown, often with distinct brown maculae, brown spots in cell usually prominent ..... *ventrella* p. 74

35. Second segment of labial palpus tufted dorsally (text figures 4 *b, c*), tuft most noticeable on distal half and on mesial surface when weak .. 37

— Second segment of labial palpus not tufted 36

36. Middle of vertex of head with metallic-brown (with purple luster) scales, outer margin of forewing with a row of pale-yellow scales ... . *picrocarpa* p. 119

— Middle of vertex of head with pale-yellow to pale yellowish-gray scales, outer margin of forewing unicolorous brown ..... *gnoma* (in part) p. 106

37. Third segment of labial palpus less than ½ length of second segment 38

— Third segment of labial palpus more than ⅔ length of second segment 40

38. Costal margin of forewing yellow ..... *barnesiella* p. 104

— Costal margin of forewing pale to dark gray ... 39

39. Forewing with a slender dark-gray mark on costal margin from ⅝–¾ wing length, posterior margin of mark rounded ..... *kimballi* p. 71

— Forewing without such a mark, costal margin usually dark gray from base to apex ..... *inversella* p. 69

40. Anterior ½ or ⅓ of forewing varying shades of yellow or orange, diffusely streaked with reddish orange and/or brown between the veins, contrasting with brown posterior ½ of wing ... 41

— Anterior part of forewing either not pale and contrasting with posterior ½; or bright pale yellow, strongly contrasting with dark-brown posterior part, and yellow area not streaked; or base of forewing with brownish-orange or grayish-orange scales 43

41. Terminal, dark-gray part of forewing separated from pale area by black line ..... *scrutaria* p. 93

— Terminal, dark-gray part of forewing not separated from pale area by a line 42

42. Outer surface of second segment of labial palpus dark brown, apex yellowish white ..... *crepida* p. 118

— Outer surface of second segment of labial palpus grayish brown to pale yellow, apex not a different hue ... *baxa, gnoma* (in part), *simpliciella* pp. 105, 106, 105

43. Costal margin of forewing bright yellowish white, margined posteriorly with black from base to ⅔ length; posterior margin dark gray or brown with purple or brown luster 44

— Forewing generally unicolorous, if costal margin pale, then not solid yellow 53

44. Second and third segments of labial palpus clear yellowish white, sometimes second segment tinged with orangish white distally .... *serrativittella, xanthoa, isa, simulata, imitata* pp. 101, 102, 103, 104, 104

— Second segment of labial palpus with dark scales, orange red, reddish brown, or brown ... 45

45. Forewing with posterior margin of yellowish-white region relatively straight, gradually

trending from middle of wing at base to costal margin or apex (plate 2, figure 36) 46

— Forewing with posterior margin of yellowish-white region variously excavated or produced, with a sharp angle before trending to costal margin (plate 1, figure 24) 50

46. Forewing with costal margin gray beyond base; posterior margin of yellowish-white region meeting costa before apex of wing, yellowish-white region usually without black scales or spot just beyond base 47

— Forewing with costal margin yellow beyond base; posterior margin of yellowish-white region meeting costa at apex, yellowish-white region with a small black spot just beyond base ..... *pelta* (in part) p. 99

47. Outer surface of second segment of labial palpus with red-brown scales, particularly on ventral half ..... *bolize* p. 100

— Outer surface of second segment of labial palpus without red-brown scales 48

48. Posterior margin of yellow band on forewing with two small notches, nearly smooth (plate 2, figure 38) 49

— Posterior margin of yellow band on forewing with three notches, highly irregular on distal half (plate 2, figure 39) ..... *mimesis* p. 101

49. Midleg with apexes of tarsal segments one, two, three, and five white ..... *illusio* p. 101

— Midleg with apexes of tarsal segments dark gray brown or slightly pale gray ..... *legnotoa* p. 101

50. Costal margin of forewing with gray scales from base to ⅔ length 51

— Costal margin of forewing with dark-gray to brown scales at base 52

51. Forewing with medium-gray costal margin well defined, posterior margin of yellow part with a broad excision at middle of wing ..... *aleatrix* p. 91

— Forewing with pale-gray costal margin not distinct, posterior margin of yellow part gradually arched anteriorly at middle of wing .. *flavocostella* p. 66

52. Forewing with posterior margin of yellow area a series of three concave arcs ..... *fistuca* p. 68

— Forewing with posterior margin of yellow area generally straight from base to ⅝ wing length, excised (central part flat) to ⅔ wing length, then straight or slightly convex to costal margin at ¾ wing length ..... *inserrata* p. 98

53. Forewing with a transverse, dark-brown mark extending from posterior margin ⅔ the distance to costal margin just before ½ wing length (plate 4, figure 41) ..... *euprepes* p. 110

— Forewing without such a mark 54

54. Forewing with a medial, angulate dark-brown or black mark from base or near base to ⅓ or ½ wing length 55

— Forewing lacking such a mark 60

55. Forewing mainly dark bluish gray; an irregular, pale-yellow spot at end of cell .... *washingtoniella* p. 107

— Forewing usually with numerous yellow scales (giving wing brownish cast); pale yellow spot lacking, or spot composed mainly of black scales bordered basally and distally with pale-yellow scales 56

56. Second segment of labial palpus with inner surface dark gray or brownish gray 57

— Second segment of labial palpus with inner surface pale yellow (sometimes with some dull-yellow scales ventrally) 59

57. Hindwing with pecten on base of cubitus, occurring in mountains of southern Arizona .. *alphito* p. 88

— Hindwing without pecten on base of cubitus, occurring in eastern North America 58

58. Forewing relatively uniformly colored, dark mark at base of wing very prominent, lacking a spot at end of cell or spot very small .... *laetitia* p. 88

— Forewing moderately contrastingly colored, dark bluish gray (with brown overtones) of outer margin set off by becoming darker at base and then narrowly bordered with light-yellow to pale-orange scales, a black spot (bordered basally and distally with light-yellow to pale-orange scales) at end of cell ..... *bilobella* p. 90

59. Forewing with subterminal line weakly sinuous, costal ⅓ of line directed toward apex of wing (plate 2, figure 23), central Utah to West Coast ..... *stipendiaria* p. 89

— Forewing with subterminal line nearly straight (plate 2, figure 30), an eastern species ..... *furia* p. 93

60. Forewing yellowish gray with a black spot just beyond ½ length of cell and one just below it on fold ..... *glenni* p. 112

— Forewing variously colored, lacking a pair of black spots 61

61. Forewing dark violet gray with brownish orange or grayish orange at base and running costally for varying distances 62

— Forewing yellowish gray to dark bluish gray, lacking orange scales at base 63

62. Hindtibia uniformly dark gray to gray brown, apex slightly pale, costal margin of forewing usually brownish orange at base (an eastern species, occurring from Nova Scotia to Illinois) ..... *copa* p. 92

— Hindtibia with dorsal scales yellowish white, apex yellowish white, costal margin of forewing orange at base (a midwestern species occurring from central Indiana to Manitoba and New Mexico) ..... *costarufoella* p. 114

63. Forewing yellowish gray to brownish gray 64

— Forewing mainly dark purplish gray to lavender gray 67

64. Forewing with a patch of yellow-white scales on posterior margin at base and a dark-brown spot at end of fold, male with scale tuft from mesothoracic anepisternum (text figure 5) ... . *citrifoliella* p. 45

— Forewing lacking yellow-white scales on posterior margin and/or dark-brown patch at end of fold, male with or without scale tuft from mesothoracic anepisternum 65

65. Undersurface of forewing unicolorous brown or yellowish brown, occurring in southern Florida or southern Arizona 66

— Undersurface of forewing brown anterad of fold, contrasting pale yellow or yellowish gray posterad of fold, occurring in southern Texas .. .. *blanchardorum* p. 43

66. Forewing with series of black spots on outer margin, occurring in southern Florida .... *condaliavorella* p. 41

— Forewing without series of black spots on outer margin, occurring in mountains of southern Arizona ..... *sybilla* p. 121

67. Forewing with an orange to reddish-orange overlay between ½ and ⅝ length ..... *offula* p. 117

— Forewing generally unicolorous 68

68. Second and third segments of labial palpus reddish orange to brown laterally (appearing dark) 69

— Third segment of labial palpus yellowish white or pale orange laterally (a light color), second segment yellowish white or with some brown scales 71

69. Forewing with subterminal line slightly convex ..... *mercatrix* p. 110

— Forewing with subterminal line sinuous, incurved medially 70

70. Forewing with two discrete patches of black scales basally, one just beyond base, the other just before middle of cell, a shining gold spot in cell and one at end of cell ..... *levisella* p. 108

— Forewing with a diffuse patch or overlay of black scales from near base to middle of cell, pale spots yellowish white or absent ... *leuconotella* p. 109

71. Outer surface of second and third segments of labial palpus unicolorous yellowish white, anterior margin of third segment yellowish gray; forewing with an outwardly curved, transverse, dark subterminal band; scales on occiput shining dark gray (sometimes nearly black), with intense metallic-yellow reflections ..... *juncidella* p. 110

— Outer surface of second segment of labial palpus with numerous grayish-brown scales, third segment yellowish white; forewing with a straight, transverse, dark band at ¾ length; scales on vertex shining pale yellowish gray

above eye, gray medially, with faint metallic-yellow reflections ..... *agonia* p. 117

KEY TO SPECIES OF *DICHOMERIS* BASED ON CHARACTERS OF THE MALE GENITALIA

(*D. alphito, D. euprepes, D. illusio, D. legnotoa, D. mercatrix, D. mimesis,* and *D. sybilla* not included)

1. Lateral arms of vinculum with distinct fracture; lobes of juxta longer than vinculum, uniformly very slender (text figure 7 *a*) 2
— Vinculum not completely fractured; juxta longer or shorter than vinculum, if longer, then lobes swollen at some point 3

2. Lateral process extending from left side of vinculum (arising from fracture zone) more than 8 times length of process on right side, extending beyond vinculum (text figure 7 *a*) ..... *ligulella* p. 33
— Lateral processes arising from fracture zone of vinculum subequal in length, right one longer than left one, not extending beyond apex of vinculum (plate A, figure 1) ..... *gausapa* p. 37

3. Saccal region of vinculum produced, drawn to acute lobe (text figure 14 *b*) 4
— Saccal region of vinculum broadly rounded, straight, or slightly excavated 7

4. Lobes of juxta symmetrical 5
— Lobes of juxta asymmetrical, left lobe with an accessory, basal projection (text figure 14 *b*) ..... *hypochloa* p. 50

5. Aedoeagus with a pair of slender, lateral lobes arising before middle, heavily sclerotized structure in vesica with broad apex ..... *condaliavorella* p. 41
— Aedoeagus with a single, slender, lateral lobe arising before middle, cornutus pointed distally 6

6. Lobes of juxta with series of serrate projections on lateral margins medially ..... *nenia* p. 40
— Lobes of juxta lacking series of serrate projections on lateral margins medially ..... *acuminata* p. 38

7. Apex of uncus with a slender, terminal spine; valva short, reaching apex of tegumen (text figure 17 *c*) 8
— Uncus lacking a terminal spine, if produced, entire medial region involved; valva extending beyond apex of uncus 10

8. Apexes of lobes of juxta bifurcate ..... *ardelia* p. 62
— Apexes of lobes of juxta simple, acute 9

9. Lobes of juxta symmetrical (text figure 17 *c*) ..... *caia* p. 62
— Lobes of juxta asymmetrical, left lobe curved, apex directed toward right lobe (plate B, figure 3) ..... *hirculella* p. 60

10. Cornutus present 29
— Cornutus absent 11

11. Aedoeagus with heavily sclerotized lateral lobe or lobes distad of zone (text figure 27 *b*) 12
— Aedoeagus lacking heavily sclerotized lateral lobe 25

12. Apexes of each lobe of juxta bifurcate .. *picrocarpa* p. 119
— Apexes of each lobe of juxta simple, or apex of left lobe slightly excavated 13

13. Lobe from base of vinculum bulbous, arms of vinculum separated in saccal area (text figure 13 *c*) ..... *solatrix* p. 48
— Lacking this combination of characters 14

14. Vinculum more than twice as broad near articulation with tegumen than anteriorly, saccal region emarginate and lightly sclerotized (text figure 12 *c*) ..... *marginella* p. 46
— Vinculum evenly narrow throughout, saccal region straight, rounded, or slightly produced 15

15. Valva with a pointed projection on costal margin (plate C, figure 5) 16
— Valva lacking projections on costal margin ... 17

16. Lobes of juxta twisted or bent at apex, tapering to acute apexes; spines on valvae arising symmetrically just before apexes of valvae .. *vacciniella* p. 76

— Left lobe of juxta expanded at apex, distal margin excavated, right lobe straight, tapering to acute apex; spines of valvae (one on each valva) arising from middle of valva, the left one slightly more basad than the right one . . *bipunctella* p. 78

17. Each lobe (two present) on aedoeagus bifurcate almost to base; manica sclerotized, aedoeagus ankylosed to juxta (text figure 21 *b, c*) 18
— Lobes of aedoeagus simple; manica lightly sclerotized to membranous, aedoeagus joined to juxta by membrane 19

18. Lobes of juxta nearly semicircular, apex of each directed to right; lobes on aedoeagus relatively straight (plate C, figures 3, 4) ..... *georgiella* p. 75
— Lobes of juxta parallel and straight for most of length, lobes on aedoeagus curved (text figure 21 *b, c*) ..... *ventrella* p. 74

19. Lobes of juxta separated at base (text figure 15 *c*), apex of longest lateral lobe of aedoeagus not reaching apex of aedoeagus ..... *punctipennella* p. 53
— Lobes of juxta arising from common, sclerotized base or connected by a narrow, sclerotized band; apex of longest lateral lobe of aedoeagus exceeding apex of aedoeagus 20

20. Lobes of juxta arising from a common base, symmetrical, apexes directed slightly medially 21
— Lobes of juxta arising independently, joined by a narrow, sclerotized band at base, slightly asymmetrical 23

21. Aedoeagus with paired, symmetrical lobes from zone (text figure 11 *c*) 22
— Aedoeagus with single lobe from zone (text figure 18 *b*) ..... *siren* p. 64

22. Lobes of juxta extending beyond base of vinculum (plate A, figure 5) ..... *blanchardorum* p. 43
— Lobes of juxta about ½ length of vinculum (text figure 11 *c*) ..... *citrifoliella* p. 45

23. Lobes of juxta symmetrical, slightly sinuous, apex of each lobe directed toward base of vinculum (plate A, figure 7) ..... *diva* p. 57
— Lobes of juxta asymmetrical, apex of right lobe directed toward lateral margin of vinculum (text figure 15 *c*) 24

24. Lobes of juxta directed laterally at apex (text figure 15 *c*) ..... *punctidiscella, sylphe* pp. 54, 58
— Left lobe of juxta generally straight, right lobe curved at middle then directed laterally to apex (plate B, figure 1) ..... *empusa* p. 59

25. Lobes of juxta united at base, apexes simple 26
— Lobes of juxta separated at base, apexes bifurcate (text figure 24 *b*) ..... *glenni* p. 112

26. Uncus with a ventromedial protrusion, lateral margins excavated (text figure 25 *a*) . . *costarufoella* p. 114
— Posterior margin of uncus rounded or subquadrate, not as above 27

27. A pair of lightly sclerotized, setose lobes arising in membrane near distal part of vinculum 28
— A pair of moderately heavily sclerotized, setose lobes arising from distal part of vinculum (plate O, figure 2) ..... *crepida* p. 118

28. Juxtal lobe with numerous, pointed protrusions from base to apex, inner margins of these lobes roughly parallel (plate O, figure 1) ... *offula* p. 117
— Juxtal lobe with sparse, pointed protrusions laterally, most numerous on apical ⅔, inner margins of these lobes slightly converging apically, giving appearance of being curved (text figure 26 *b*) ..... *agonia* p. 117

29. Lobes of juxta bifurcate or trifurcate, appearing as antlers (plate H, figure 5) 30
— Lobes of juxta simple 33

30. Each lobe of juxta trifurcate, lateral branch longest (plate H, figure 5) ..... *purpureofusca* p. 94
— Each lobe of juxta bifurcate, if one lobe trifurcate, then mesial branch much longer than remaining two 31

31. Aedoeagus with a pair of heavily sclerotized, lateral projections that extend to apex ..... *furia* p. 93
— Aedoeagus lacking lateral projections 32

32. Setose lobe arising from distal part of vinculum long, slender (length more than 4 × width at middle of lobe), apex bluntly acute (plate I, figure 1) ..... *nonstrigella* p. 95

— Setose lobe arising from distal part of vinculum short, broad (distance from base to apex less than width), apex concave (plate G, figure 6) ..... *aleatrix* p. 91

33. A pair of broad plates arising from distal ½ of vinculum (text figure 20 *c*) 34

— Lacking such plates 37

34. Plates arising from distal ½ of vinculum asymmetrical, juxta with lobes lightly sclerotized or heavily sclerotized and less than ½ length of vinculum 36

— Plates arising from distal ½ of vinculum symmetrical; juxta a single, heavily sclerotized rod, nearly as long as vinculum 35

35. Mesial margin of sclerotized lobe of vinculum distinct and heavily sclerotized to base, with small dentate projections (text figure 20 *c*) .. .. *inversella* p. 69

— Mesial margin of sclerotized lobe of vinculum distinct medially to base of juxta, lateral margin distinct, but not heavily sclerotized, to lateral margin of vinculum (plate C, figure 1) .. .. *kimballi* p. 71

36. Apexes of plates arising from distal part of vinculum attaining same level, right plate approximately parallel sided for distal ⅔ (plate B, figure 7) ..... *fistuca* p. 68

— Apex of right plate extending farther posteriorly than left one, approaching basal end of vinculum, right plate with parallel margins on middle ⅓ of length, then becoming narrower to multispined apex (text figure 19 *b*) ..... *flavocostella* p. 66

37. Aedoeagus with paired bi- or trilobed extensions from the zone (plate N, figure 3) .. *leuconotella* p. 109

— Aedoeagus with paired, unilobed extensions from the zone or none 38

38. Posterior margin of uncus emarginate laterally, four stout spines on ventral surface (plate N, figure 5) ..... *juncidella* p. 110

— Posterior margin of uncus rounded or subquadrate, without such spines 39

39. Lobes of juxta gradually tapering from base to apex, apex of left lobe rounded, apex of right lobe acute (text figure 23 *b*) .. *ochripalpella, achne* pp. 96, 97

— Not this combination of characters 40

40. Aedoeagus with paired, pointed, ventrolateral lobes from zone (plate G, figure 2; plate H, figure 4) 41

— Aedoeagus without such lobes 47

41. Aedoeagus with ventrolateral lobes reaching apex of aedoeagus (plate H, figure 2) 42

— Aedoeagus with ventrolateral lobes at most ½ length of distance between zone and apex of aedoeagus 43

42. Lobes of juxta fused basally, inner margins strongly concave (plate I, figure 5) ..... *inserrata* p. 98

— Lobes of juxta separate at base, inner margins slightly concave (plate H, figure 1) ..... *scrutaria* p. 93

43. Ventrolateral lobes from zone of aedoeagus very short, apex of ventrodistal sclerotized band in wall of aedoeagus conical and directed ventrally (plate K, figure 4) ..... *isa* p. 103

— Not this combination of characters 44

44. Ventrolateral lobes from zone of aedoeagus heavily sclerotized, cylindrical, about ⅖ length of distal part of aedoeagus; vinculum concave in saccal region (plate G, figures 4, 5) ..... *copa* p. 92

— Not this combination of characters 45

45. Ventrolateral lobes from zone of aedoeagus triangular in outline (plate F, figure 4), lobes of juxta without lateral pointed projection before apex (plate F, figure 3) ..... *laetitia* p. 88

— Ventrolateral lobes from zone of aedoeagus conical in outline, slender for distal ½ (plate F, figure 6); lobes of juxta with lateral pointed projection before apex (plate F, figure 5) 46

46. Lobes of juxta nearly symmetrical (plate G, figure 1), protrusions from zone of aedoeagus slightly curved dorsally (plate G, figure 2) ... . *bilobella* p. 90

— Lobes of juxta asymmetrical (plate F, figure 5), left lobe about ⅔ length of right lobe; protrusions from zone of aedoeagus nearly straight (plate F, figure 6) ..... *stipendiaria* p. 89

47. Aedoeagus with paired dorsolateral, sclerotized lobes from zone (plate K, figure 2) .. *xanthoa* p. 102
— Aedoeagus without such lobes 48

48. Aedoeagus with distolateral sclerite (plate M, figure 2) 49
— Aedoeagus without distolateral sclerite 55

49. Each lobe of juxta with a lateral, pointed projection before apex (plate M, figure 1) 50
— Lobes of juxta without such projections (plate E, figure 5) 52

50. Distolateral lobe of aedoeagus almost coiled distally, cornutus usually short and stout (plate M, figure 3), interior British Columbia and Washington ..... *gnoma* p. 106
— Not this combination of characters 51

51. Distolateral lobe of aedoeagus cylindrical, stout, apex pointed dorsally; cornutus stout, shorter than aedoeagus (plate L, figures 6, 8); Black Hills, South Dakota to eastern Washington and south to Texas, Arizona, and Nevada .. *simpliciella* p. 105
— Distolateral lobe of aedoeagus cylindrical but almost knifelike apically, cornutus nearly as long as aedoeagus (plate M, figure 2), California ..... *baxa* p. 105

52. Juxta with left lobe longer than right lobe, lobes of juxta more heavily sclerotized distally (plate E, figure 5) 53
— Juxta with left lobe shorter than right lobe, lobes of juxta evenly sclerotized (plate N, figure 4) 54

53. Cornutus very heavily sclerotized, tapering very gradually from base to apex (plate F, figure 2); basolateral lobe from vinculum conical, tapering from base to apex ..... *gleba* p. 87
— Cornutus heavily sclerotized, usually broadest at ½ length (plate E, figure 6); basolateral lobe from vinculum nearly cylindrical for distal ¾ (plate E, figure 5) ..... *delotella* p. 86

54. Cornutus short (⅖ length of aedoeagus) and stout (maximum width ¼ length) (plate M, figure 6); lateral margin of uncus flared, distolateral region with an acute angle (plate M, figure 5) ..... *washingtoniella* p. 107
— Cornutus long (⅝ length of aedoeagus) and slender (maximum width ⅛ length) (plate N, figure 1); lateral margin of uncus smoothly curved, distolateral region rounded (plate N, figure 4) ..... *levisella* p. 108

55. Sclerite at base of very large setose patch between vinculum and tegumen semicircular or U-shaped (text figure 22 *a*) 56
— Sclerite at base of setose patch between vinculum and tegumen straight or slightly curved 57

56. Lobes of juxta usually relatively symmetrical, often with toothlike projections both laterally and ventrally at apex, lobes usually approximate at base (text figure 22 *a*) ..... *setosella* p. 79
— Lobes of juxta asymmetrical, left lobe longer than right one, lateral projection on right lobe basad of the one on the left lobe, toothlike projections, when present, sparse at apex and sometimes one anterad of major projection on right lobe, lobes often distant at base (plate D, figure 4) ..... *vindex* p. 83

57. Each lobe of juxta with a lateral pointed projection before apex (plate L, figure 3) 58
— Each lobe of juxta without a lateral pointed projection before apex (plate E, figure 3) 60

58. Lobes of juxta nearly symmetrical (plate L, figure 3) ..... *barnesiella* p. 104
— Lobes of juxta asymmetrical, left lobe longer than right lobe 59

59. Lateral lobes of vinculum long, very slender for distal ½ (plate D, figure 3) ..... *mulsa* p. 83
— Lateral lobes on vinculum short, very broad (plate E, figure 1) ..... *mica* p. 84

60. Right lobe of juxta about ⅔ length of left lobe (plate E, figure 3) ..... *aglaia* p. 85
— Lobes of juxta equal in length 61

61. Lobes of juxta dentate laterally (plate J, figure 5) 62
— Lobes of juxta smooth margined, or nearly so, laterally (plate L, figure 1) 63

62. Aedoeagus with ventrodistal apex conical and directed slightly ventrally; cornutus with short opening, usually less than 1/6 length of cornutus (plate J, figure 6) ..... *serrativittella* p. 101
— Aedoeagus with ventrodistal apex heavily sclerotized and not directed ventrally; cornutus with opening about 1/3 length of cornutus (plate K, figure 6) ..... *simulata* p. 104

63. Lobes of juxta becoming farther apart from base to apex (plate L, figure 1) ..... *imitata* p. 104
— Lobes of juxta approaching each other apically or mesial margins parallel 64

64. Dorsal and ventral margins of lobes on vinculum relatively parallel, lobes cylindrical; lobes of juxta approaching each other apically, lateral margins smooth (plate J, figure 3); cornutus massive, few ridges in wall (plate J, figure 4) ..... *bolize* p. 100
— Dorsal and ventral margins of lobes on vinculum angulate, lobes conical; lobes of juxta nearly parallel mesially, laterally margins rough (plate J, figure 1); cornutus slender, fine ridges in wall (plate J, figure 2) ..... *pelta* p. 99

KEY TO SPECIES OF *DICHOMERIS* BASED ON CHARACTERS OF THE FEMALE GENITALIA

(*D. achne, D. fistuca, D. imitata, D. scrutaria, D. simulata,* and *D. siren* not included)

1. A pair of posteriorly directed lobes arising laterad of ostium bursae, extending to apex of eighth sternum (text figure 8 *a*) ..... *ligulella* p. 33
— Sternum lacking such projections 2

2. Dorsal surface of antrum with a pair of spiculose patches (text figure 24 *a*) ..... *glenni* p. 112
— Dorsal surface of antrum lacking a pair of spiculose patches 3

3. Corpus bursae usually lightly sclerotized; a series of heavily sclerotized striae on ventral surface from base to 1/3 length or nearly to apex on left side; base of ductus seminalis spiculose; a spiculose area on dorsal surface beyond middle, or laterally at end of striate region (text figure 22 *c*) 4
— Lacking this combination of characters 16

4. Heavily sclerotized striae less than 3/5 length of bursa copulatrix, usually much shorter 5
— Heavily sclerotized striae more than 2/3 length of bursa copulatrix 9

5. Striae at base of corpus bursae short on right side, becoming approximately twice as long on left side 6
— Striae at base of corpus bursae about 1/3 longer on left side than on right side (plate FF, figure 1) ..... *offula* p. 117

6. Anterior margin of eighth tergum evenly curved posteriorly (text figure 11 *a*) 8
— Anterior margin of eighth tergum not evenly curved posteriorly (text figure 25 *b*) 7

7. Anterior margin of eighth tergum incurved with two pairs of arcs (the lateral pair convex, the medial pair concave (text figure 25 *b*) .. *costarufoella* p. 114
— Anterior margin of eighth tergum incurved with one pair of convex arcs (text figure 26 *a*) .. *agonia* p. 117

8. Patch of spicules on corpus bursae well defined, spicules stout (plate FF, figure 2) ..... *crepida* p. 118
— Patch of spicules on corpus bursae poorly defined, spicules generally scattered, very slender (text figure 11 *a*) ..... *citrifoliella* p. 45

9. A duct (base of accessory bursa) arising at end of striate area on corpus bursae (plate W, figure 1) 10
— Without a duct arising at end of striate area on corpus bursae 11

10. Corpus bursae with a small patch of spicules just beyond end of striate region (plate W, figure 1) ..... *aglaia* p. 85
— Corpus bursae without such a patch (plate X, figure 1) ..... *gleba* p. 87

11. Corpus bursae with a heavily sclerotized ventral lobe at base (plate W, figure 3) ..... *delotella* p. 86
— Corpus bursae without such a lobe 12

12. Corpus bursae with duct leading to accessory bursa arising from anterior margin of spiculose patch (text figure 23 *a*) 13
— Corpus bursae with duct leading to accessory bursa arising from lateral margin of spiculose patch (text figure 22 *c*) ..... *setosella* p. 79

13. Lamella antevaginalis short, distance from anterior to posterior margin less than ⅛ width ... 14
— Lamella antevaginalis moderately long, distance from anterior to posterior margin approximately ½ width (text figure 23 *a*) ..... *ochripalpella* p. 96

14. Left side of ductus bursae extending more distad ventrolaterally than right side, overlapping lamella antevaginalis (plate W, figure 2) 15
— Left side of ductus bursae not extending more distad ventrolaterally than right side, a lightly sclerotized region between lamella antevaginalis and heavily sclerotized part of ductus bursae (plate V, figure 1) ..... *vindex* p. 83

15. Apophyses anteriores angled laterally before apex (plate W, figure 2) ..... *mica* p. 84
— Apophyses anteriores nearly straight (plate V, figure 2) ..... *mulsa* p. 83

16. Corpus bursae with a broad-based accessory lobe on right side, or with lobe arising from dorsal surface at base, lobe often following outline of corpus bursae, apex of lobe often with a sclerotized ring (text figure 13 *a*) 17
— Corpus bursae without such an accessory lobe, if a duct arises in this position, base is narrow 30

17. Ventral wall of ductus bursae with roughly trapezoidal sclerite (text figure 13 *a*) .....*solatrix* p. 48
— Ductus bursae without such a plate 18

18. Accessory lobe of corpus bursae terminating before ¾ length of corpus bursae 19
— Accessory lobe longer than corpus bursae 22

19. Accessory lobe of corpus bursae coiled (text figure 9 *a*) 20
— Accessory lobe of corpus bursae not coiled 21

20. Antrum with ventral plate longer than broad, anterior margin convex (plate Q, figure 1) .. .. *nenia* p. 40
— Antrum with ventral plate shorter than broad, anterior margin concave (text figure 9 *a*) ....*acuminata* p. 38

21. Accessory lobe of corpus bursae extremely broad at base (approximately ½ length of corpus bursae), anterior half of corpus bursae with numerous, fine lines (text figure 15 *a*) .... *punctipennella* p. 53
— Accessory lobe of corpus bursae approximately ⅙ length of corpus bursae at base, corpus bursae with numerous, parallel, heavily sclerotized lines (text figure 10 *b*) ..... *condaliavorella* p. 41

22. Posterior margin of lamella antevaginalis with teeth or a strong, pointed, lateral projection (text figure 16 *b*) 23
— Posterior margin of lamella antevaginalis smooth 27

23. Posterior margin of lamella antevaginalis with a pair of projections at lateral edge (plate S, figure 2) ..... *hirculella* p. 60
— Posterior margin of lamella antevaginalis lacking a pair of projections at lateral edge, several teeth laterally 24

24. Teeth on posterior margin of lamella antevaginalis short, broader than long (plate R, figure 1) ..... *diva* p. 57
— Teeth on posterior margin of lamella antevaginalis longer than broad 25

25. Heavily sclerotized ventral flange on ductus bursae becoming broader from midpoint to base (plate R, figure 2) 26
— Heavily sclerotized ventral flange on ductus bursae becoming narrower from midpoint to base (plate S, figure 1) ..... *empusa* p. 59

26. Posterior margin of lamella antevaginalis with

five pairs of lateral teeth, each tooth bifid (plate R, figure 2) ..... *sylphe* p. 58

— Posterior margin of lamella antevaginalis with numerous lateral teeth (text figure 16 *b*) .... *punctidiscella* p. 54

27. Right margin of corpus bursae with a heavily sclerotized band (text figures 17 *a*, 19 *a*) 28
— Right margin of corpus bursae lacking a heavily sclerotized band (text figure 14 *a*) ... *hypochloa* p. 50

28. Ductus bursae nearly membranous (plate Q, figure 2) ..... *blanchardorum* p. 43
— Ductus bursae sclerotized (text figure 17 *a*) ... 29

29. Striae on ductus bursae generally parallel with one another (plate S, figure 3) ..... *ardelia* p. 62
— Striae on ductus bursae in two directions (text figure 17 *a*) ..... *caia* p. 62

30. Posterior margin of lamella antevaginalis a pair of broadly rounded lobes, lamella postvaginalis a pair of rounded lobes (narrower than lobes of lamella antevaginalis) (text figure 19 *a*) 31
— Both lamella antevaginalis and postvaginalis not rounded lobes 32

31. Posterior edge of eighth tergite evenly sclerotized (text figure 19 *a*) ..... *flavocostella* p. 66
— Posterior edge of eighth tergite with an elliptical, unsclerotized hole (plate T, figure 1) .. .. *fistuca* p. 68

32. Basal half of corpus bursae heavily striate, a spiculose patch beyond middle on left side, a duct (base of accessory bursa) arising immediately anterad of this patch, walls of anterior half of corpus bursae finely and irregularly striate (plate DD, figure 2) ..... *washingtoniella* p. 107
— Lacking this combination of characters 33

33. Corpus bursae with strongly sclerotized striae from base nearly to apex, posterior margin of eighth tergum indented medially (plate AA, figure 6) 34
— Lacking this combination of characters 35

34. Notch on apical margin of eighth tergum small, width less than $\frac{1}{10}$ that of eighth tergum; antrum well defined, tapering from base to ostium bursae (plate Y, figure 2) ..... *aleatrix* p. 91
— Notch on apical margin of eighth tergum relatively broad, width approximately $\frac{1}{3}$ that of eighth tergum; antrum not well defined (plate AA, figure 6) ..... *levisella* p. 108

35. Wall of bursa copulatrix with irregularly shaped, heavily sclerotized patches from base to apex (plate AA, figure 7) ..... *euprepes* p. 110
— Lacking this character 36

36. Corpus bursae with heavily sclerotized striae from base to apex 37
— Corpus bursae with at least anterior half free of heavily sclerotized striae 54

37. Accessory bursa arising from, or very near, anterior margin of corpus bursae 40
— Accessory bursa arising between $\frac{2}{3}$ to $\frac{3}{4}$ length of corpus bursae 38

38. Ostium bursae well defined, flanked by a pair of lobes (plate Z, figure 1) ..... *furia* p. 93
— Ostium bursae not well defined, posterior margin of antrum without lobes 39

39. Ventral wall of antrum with a pair of heavily sclerotized rings, anterior $\frac{1}{2}$ of corpus bursae lacking prominent spicules (plate Z, figure 3) ..... *nonstrigella* p. 95
— Ventral wall of antrum lacking a pair of heavily sclerotized rings, anterior $\frac{1}{2}$ of corpus bursae heavily spiculose (plate CC, figure 2) .... *serrativittella* p. 101

40. Ventral wall of antrum with a pair of heavily sclerotized rings (plate Z, figure 2) .. *purpureofusca* p. 94
— Ventral wall of antrum without heavily sclerotized rings 41

41. Ventral wall of antrum with a triangular medial unit flanked by a pair of lobes, posterior margin thus formed as a letter "W" (plate EE, figure 2) ..... *leuconotella* p. 109
— Ventral wall of antrum not so modified 42

42. Ventral wall of antrum heavily sclerotized, with folds and ridges; a pair of lightly sclerotized plates adjacent to duct leading to accessory bursa (plate BB, figure 3) ..... *illusio* p. 101
— Lacking this combination of characters 43

43. Apophyses anteriores short (approximately 1/10 the length of apophyses posteriores), appearing as small stubs jutting out from anterior margin of eighth tergite (plate BB, figure 1) ..... *bolize* p. 100
— Apophyses anteriores longer (at least 1/3 length of apophyses posteriores) 44

44. Base of accessory bursa arising as an extension of the anterior margin of the corpus bursae (broad at base, rapidly becoming narrow) (plate X, figure 4) 45
— Base of accessory bursa arising as a narrow duct from anterior margin of corpus bursae 49

45. Ventral surface of antrum with two nipple-shaped invaginations (plate X, figure 4) .... *copa* p. 92
— Ventral surface of antrum without nipple-shaped invaginations 46

46. Posterior margin of antrum with two, transverse, heavily sclerotized bands (plate Y, figure 1) ..... *bilobella* p. 90
— Posterior margin of antrum lacking these bands 47

47. Anterior margin of papillae anales more heavily sclerotized than rest of papillae anales, caudal margin of eighth tergite evenly rounded medially (plate X, figure 2) 48
— Papillae anales relatively evenly sclerotized, caudal margin of eighth tergite nearly flat medially (plate X, figure 3) ..... *stipendiaria* p. 89

48. Corpus bursae striate all around (plate X, figure 2) ..... *laetitia* p. 88
— Corpus bursae striate on left side (plate S, figure 5) ..... *alphito* p. 88

49. Corpus bursae slender, lateral walls parallel from base to apex (plate AA, figure 8) 50
— Corpus bursae relatively broad, rounded 51

50. Posterior margin of eighth tergum nearly straight, corpus bursae moderately heavily sclerotized (plate AA, figure 8) ..... *juncidella* p. 110
— Posterior margin of eighth tergum slightly produced and rounded medially, corpus bursae very heavily sclerotized (plate AA, figure 5) .. .. *baxa* p. 105

51. Sclerotized fold on posterior margin of eighth tergum short and narrow, width less than 1/3 that of segment (plate AA, figure 4) ... *simpliciella* p. 105
— Sclerotized fold on posterior margin of eighth tergum longer and wider, width more than 2/3 that of segment 52

52. A pair of short pouches in ventral wall of antrum or base of ductus bursae; posterior margin of eighth tergum produced medially, rounded (plate EE, figure 1) 53
— Lacking short pouches in ventral wall of antrum; posterior margin of eighth tergum convex, not produced (plate AA, figure 3) .. *barnesiella* p. 104

53. Dorsal wall of ductus bursae (antrum) with semicircular sclerite, several sclerotized ridges in bursa copulatrix (plate EE, figure 1) ..... *gnoma* p. 106
— Dorsal wall of ductus bursae without semicircular sclerite, few sclerotized ridges in bursa copulatrix (plate DD, figure 3) ..... *isa* p. 103

54. Antrum heavily sclerotized (at least in part), walls usually with lobes and/or heavily sclerotized ridges (plate BB, figure 2) 58
— Antrum not well defined as a heavily sclerotized unit, walls with or without numerous folds 55

55. Ductus bursae and base of corpus bursae with striae (plate DD, figure 1) 56
— Ductus bursae and base of corpus bursae without striae, but with a heavily sclerotized curved band (plate CC, figure 1) ..... *mimesis* p. 101

56. Corpus bursae densely spiculose on anterior 1/4–1/2 (plate DD, figure 1) ..... *xanthoa* p. 102
— Corpus bursae not densely spiculose (plate AA, figure 1) 57

57. Wall of basal 1/2 of corpus bursae with numer-

ous folds, distal ½ spiculose; long setae arising near anterior margin of papillae anales strongly curved on distal ½ (plate AA, figure 1) .. *inserrata* p. 98

— Wall of basal ½ of corpus bursae with 4–5 folds, distal ½ with a few, very fine spicules; long setae arising near anterior margin of papillae anales slightly curved medially (plate AA, figure 2) ..... *pelta* p. 99

58. Antrum with a transverse sclerotized band on ventral wall, apophyses anteriores less than ¼ length of apophyses posteriores (plate BB, figure 2) ..... *legnotoa* p. 101

— Lacking this combination of characters 59

59. Anterior margin of lamella postvaginalis two semicircular lobes (plate EE, figure 3) ... *mercatrix* p. 110

— Anterior margin of lamella postvaginalis otherwise 60

60. Corpus bursae relatively evenly and moderately heavily sclerotized, spicules absent (text figure 12 *a*) ..... *marginella* p. 46

— Corpus bursae very lightly sclerotized, sometimes with heavily sclerotized areas; walls spiculose or finely lined 61

61. Posterior margin of eighth tergite produced medially, flanked by a pair of spurs laterally (plate S, figure 4) ..... *bipunctella* p. 78

— Posterior margin of eighth tergite produced or convex medially, lacking lateral projections ... 62

62. Posterior margin of eighth tergite roughly triangular medially, apex acute (plate GG, figure 1) ..... *sybilla* p. 121

— Posterior margin of eighth tergite rounded 63

63. Heavily sclerotized part of bursa copulatrix with three, very heavily sclerotized invaginations (two ventral, one dorsolateral on left side), the dorsolateral one largest (text figure 27 *c*) .... *picrocarpa* p. 119

— Heavily sclerotized part of bursa copulatrix lacking three such invaginations 64

64. Left margin of antrum very heavily sclerotized, appearing as a black rim (text figure 21 *a, d*) 67

— Left margin of antrum not very heavily sclerotized 65

65. Ductus bursae with heavily sclerotized Y- or T-shaped band on ventral surface (plate T, figure 2) ..... *kimballi* p. 71

— Ductus bursae without such a band (text figure 20 *d*) 66

66. Ductus bursae with pair of lateral, heavily sclerotized bands, apex of each band directed laterally (plate P, figure 4) ..... *gausapa* p. 37

— Ductus bursae without such bands (text figure 20 *d*) ..... *inversella* p. 69

67. Left margin of antrum with a pair of heavily sclerotized lobes and a heavily sclerotized ring on ductus seminalis (usually preceding lamella antevaginalis) (text figure 21 *a, d*) ..... *ventrella* p. 74

— Lacking this combination of characters 68

68. Right part of antrum with a large lobe, extending as far anteriorly as those on left side, three or four discrete, very heavily sclerotized concave surfaces (plate U, figure 1) ..... *georgiella* p. 75

— Right part of antrum lacking a large lobe; a single, very heavily sclerotized unit on left side (plate U, figure 2) ..... *vacciniella* p. 76

ligulella GROUP

Dichomeris ligulella and *gausapa* comprise the *ligulella* group in America north of Mexico. Several species occur in the Neotropical Region. The species-group is confined to the New World. It is characterized by the strong scale tufts on the dorsal and ventral surfaces of the second segment of the labial palpus; lack of metallic scales on the head, thorax, and wings; well-developed cubital pecten on the hindwing; and the relatively long vinculum (compared with the tegumen), usually with a folding zone preceded by paired extensions of the vinculum. No characters of the females appear distinctive.

In some neotropical species the vinculum is shorter relative to the tegumen, and the folding zone is lost. There is a trend toward reduction of the juxta, and the juxta is absent in one species.

Dichomeris ligulella Hübner (Palmerworm*; Chenille Pelerine, Fr.)

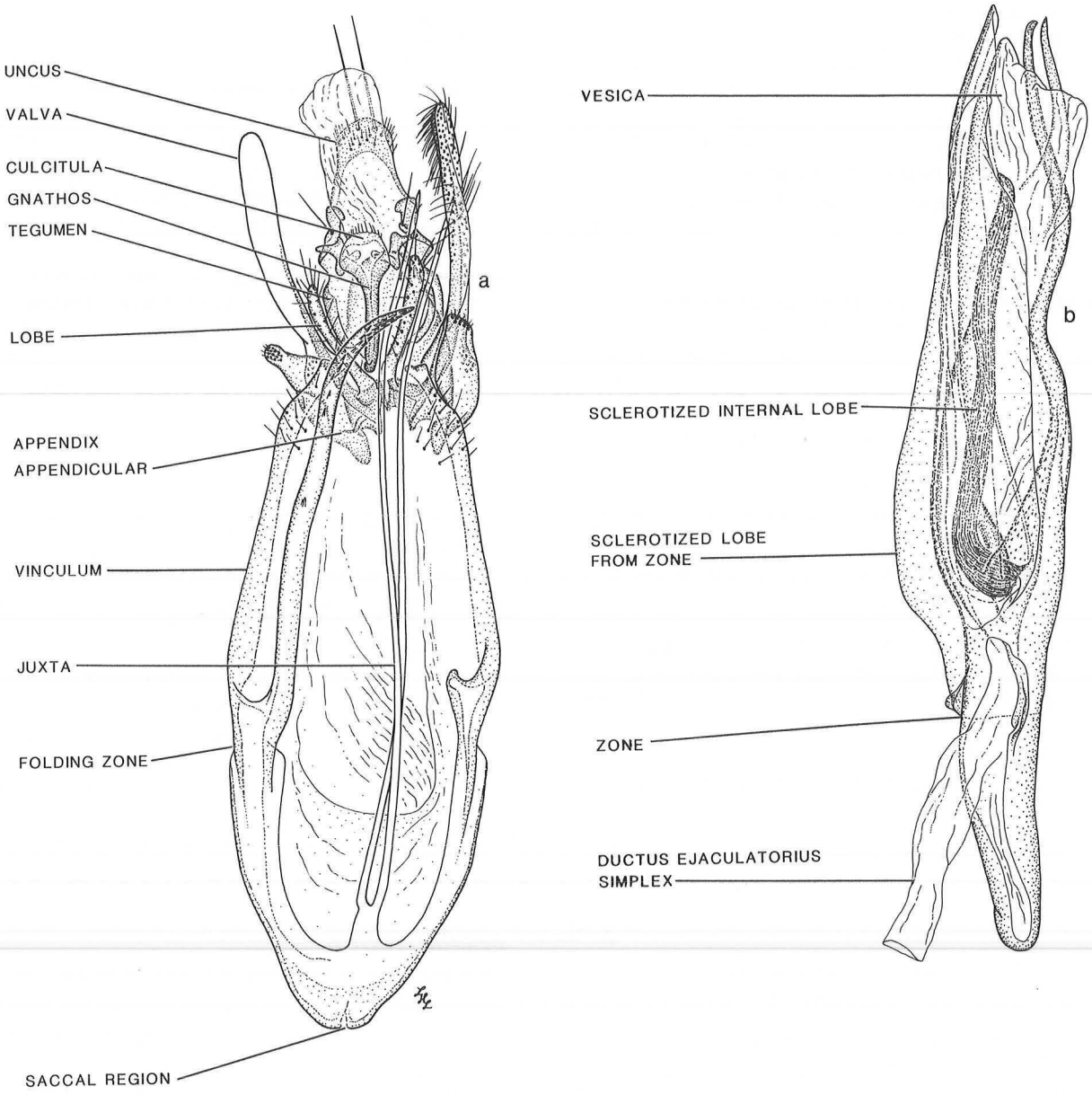

FIGURE 7: MALE GENITALIA OF *DICHOMERIS LIGUELLA*
a. Genital capsule (USNM 8804). *b.* Aedoeagus (USNM 8804).

PL. 1, FIGS. 1–7. TEXT FIGS. 1 *a*; 4 *a*; 7 *a, b*; 8 *a, b* (RWH 2281).

Dichomeris ligulella Hübner, 1818, *Zuträge zur Sammlung exotischer Schmettlinge* [sic], **1**: 25, pl. [25], figs. 143, 144.
Type locality: Georgia. [lost]

Rhinosia pometella Harris, 1853, *Cambridge* [Massachusetts] *Chronicle,* **8**(30): 1 (23 July 1853).
Type locality: not given, but several places in New England and New York cited, including Cambridge, Massachusetts. [lost]

Chaetochilus contubernalellus Fitch, 1853, *Jour. New-York State Agricultural Soc.,* **4**(5): 38.
Type locality: not given, but Fitch mentioned caterpillars collected in his garden [Salem, New York]. [lost]

Chaetochilus malifoliellus Fitch, 1856, *Trans. New-York State Agricultural Soc.,* **15**: 463.
Type locality: not given, but Fitch mentioned

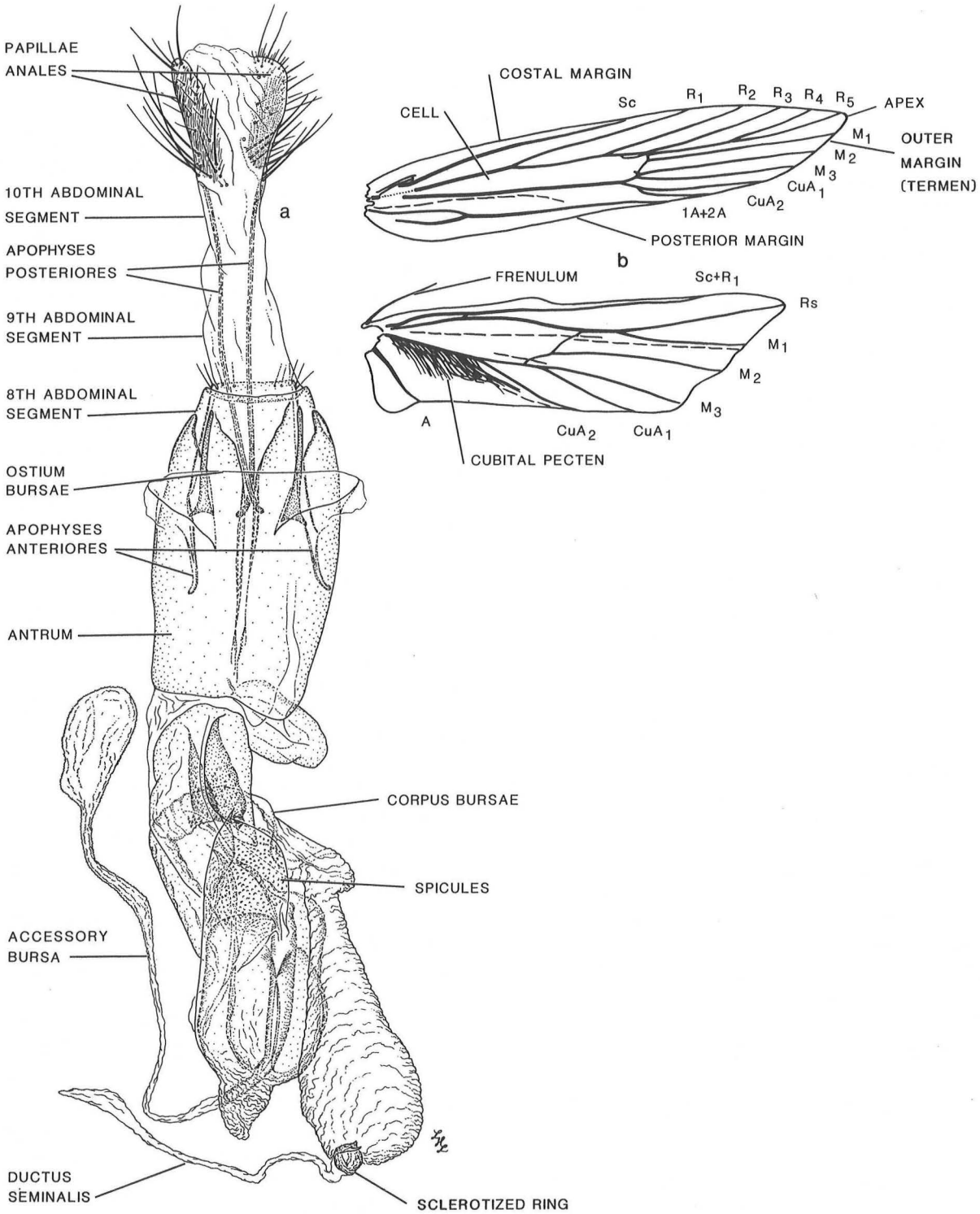

FIGURE 8: FEMALE GENITALIA AND VENATION OF *DICHOMERIS LIGULELLA*
a. Genitalia (USNM 8802). *b.* Venation (USNM 8816).

that he had collected the caterpillars, probably Salem, New York. [lost]

Ypsolophus pauciguttellus Clemens, 1863, *Proc. Ent. Soc. Philadelphia,* **2**: 123.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—No locality was indicated in the original description nor does one accompany the type specimen. Throughout the paper Clemens indicated the source of material that he received from others, and at the end of the paper he stated "I have now nearly worked up my collection of Tineina, and would beg those who feel interested in the continuation of these studies, to aid me in extending my knowledge of species, by contributing collections from their various neighborhoods." In some instances he included observations on the life history of a species, an indication that he was publishing information about individuals that he had studied in the field. Thus, I conclude that his home and environs in Easton, Pennsylvania, is the type locality.

Ypsolophus flavivittellus Clemens, 1864, *Proc. Ent. Soc. Philadelphia,* **2**: 429.
Type locality: Virginia. [apparently lost, it should be in ANSP]

Ypsolophus reedella Chambers, 1872, *Can. Ent.,* **4**: 222.
Type locality: [Kentucky]. [MCZ]

Ypsolophus quercipominella Chambers, 1872: *Can. Ent.,* **4**: 222.
Type locality: Kentucky. [MCZ]

Dichomeris ligulella, although highly variable in maculation, is easily recognized by the combination of the narrow wings, the well-developed scale tuft on the second segment of the labial palpus, and the stalked CuA_1 and CuA_2 in the forewing.

Upper surface as figured. Head with maxillary palpus and base of haustellum off-white; outer surface of first and second segment of labial palpus brownish orange, becoming brown before apex of second segment, apex of second segment pale gray, inner surface of second segment orange white dorsally, orange gray ventrally, scales at apex brown tipped with pale gray, third segment pale orange posteriorly, mottled pale orange and brown anteriorly, a brown ring just before apex, second segment with a strong ventro-anterior scale tuft; frons pale orange medially, dark brown between base of antenna and base of haustellum; vertex and occiput brownish orange medially, scales immediately above eye light yellow, scales pale tipped; ocellus present; scape of antenna brown dorsally, yellowish white ventrally, shaft pale yellow ventrally, individual segments brownish gray on basal ½, brownish orange on distal ½ of dorsal surface, sensory areas narrow, located on anteroventral surface of alternate half segments, sensory cilia very short. Foreleg mainly dark brownish gray, scale bases pale; apex of coxa off-white; off-white scales present at base of epiphysis, apex of tibia, and apexes of tarsal segments, fourth tarsal segment with off-white scales laterally. Midleg much as for foreleg, coxa mainly yellowish white, tibia with a faint pale streak at ⅔ length. Hindleg much as for foreleg but much paler, dorsal surface of tibia off-white, apexes of all tarsal segments broadly off-white. Abdomen mainly orange gray dorsally, segments pale on caudolateral margins; ventral surface yellowish white, mottled with brownish gray laterally. Wing length 6.3–9.0 mm. Male genitalia as illustrated; vinculum approximately twice as long as tegumen plus uncus, a folding zone at approximately ⅗ length, left side with a linear process, extending beyond base of vinculum, arising from folding zone; juxta paired lobes, very slender, extending beyond base of uncus; aedoeagus with a lateral, slender, loosely coiled rod, a heavily sclerotized, internal rod, and a short cornutus, a sclerotized plate rising from zone extending to apex of aedoeagus. Female genitalia as illustrated; pair of spines laterad of ostium bursae not extending beyond eighth segment; antrum quadrate, heavily sclerotized, broad; corpus bursae with accessory pouch arising from dorsal surface beyond middle, walls spiculose near base dorsally and at middle ventrally.

Slingerland (1901) gives a full account of the life history of *ligulella* in New York. *Ligulella* is univoltine with the adult emerging in late June and early July and overwintering. Eggs are laid the following spring, and the rest of the life cycle is in May and June. He listed oak, apple, plum, and cherry trees as hosts. The larvae tie leaves and feed on foliage and on fruit and on oak-apple galls. At long, irregular intervals the species has been abundant to the point of being economically injurious: 1791, 1853, and 1900. Schaffner (1950: 460) noted severe defoliation on oak and hazel in northern Minnesota in 1941. In 1978 it was extremely abundant in Pennsylvania and Maryland; however, there was no report of injury to apple orchards, probably as a result of the pesticide regimen practiced at this time. Prentice (1965: 760) listed the following hosts for south-

ern Ontario: aspen (*Populus tremuloides* Michaux, *P. grandidentata* Michaux), basswood (*Tilia americana* Linnaeus), hickory (*Carya* sp.), oaks (*Quercus alba* Linnaeus, *Q. macrocarpa* Michaux, *Q. rubra* Linnaeus), sugar maple (*Acer saccharum* Marshall), and white birch (*Betula papyrifera* Marshall). Rearing records from examined specimens are azalea, witch hazel (*Corylus* sp.), various oaks, *Betula* sp., black walnut (*Juglans nigra* Linnaeus), chestnut (*Castanea dentata* Marshall (Borkhausen)), flowers of deerberry, *Vaccinium corymbosum* Linnaeus, *Tilia* sp., *Oxydendron arboreum* (Linnaeus) Candolle, quince, and lettuce. I question the last record. *Ligulella* is a general feeder; however, its preferred hosts are oaks.

Ligulella occurs from the East Coast and southern Canada to Florida and eastern Texas. It probably occurs west into the plains as far as oak does. I have not seen collection records for New Brunswick, Quebec, Maine, Vermont, Rhode Island, or Nebraska. Adults have been taken throughout the year in some states. They emerge in June and July in the North and as early as late March in central Florida. *Ligulella* often is the most abundant species of gelechiid that comes to black light in midsummer.

Dichomeris gausapa Hodges, NEW SPECIES PL. 1, FIG. 8; PL. A, FIGS. 1, 2; PL. P, FIG. 4.

Dichomeris gausapa Hodges.
Type locality: Madera Canyon, 4880′, Santa Rita Mts., Arizona. [CU]

Upper surface as figured. Head with apex of maxillary palpus and base of haustellum dark brown, scale bases pale, rest of scaled part of haustellum yellowish white; outer surface of first and second segments of labial palpus brown, scale bases pale, scales tipped with pale gray on dorsodistal margin, inner surface pale gray, almost white dorsally, becoming yellowish gray ventrally, second segment strongly tufted dorsally and ventrally at apex, third segment very slender, brown anteriorly, pale gray posteriorly; frons mainly pale gray, brown scales bordering eye from base of antenna to base of haustellum; vertex and occiput mainly pale yellowish white, many scales becoming medium gray before apex, apex gray; ocellus present; scape of antenna mainly brown dorsally, scale bases pale, yellowish white from ⅓ length to apex ventrally, shaft grayish brown dorsally, pale yellow ventrally, segments 2–7 with a pair of short spines on posterodorsal surface. Thorax mottled shades of brown, gray brown, pale yellow, and dull yellow. Foreleg mainly grayish brown, scale base pale, apexes of coxa and tibia slightly pale; some off-white scales at apexes of first, second, third, and fifth tarsal segments. Midleg much as for foreleg, coxa and base of femur pale yellowish white. Hindleg with coxa mainly yellowish white and with scattered brown scales on posterior ½; femur yellowish white dorsally, becoming brown ventrally; tibia with gray-brown tipped scales ventrally, yellowish white dorsally, dorsal tuft slightly darker than adjacent scales, spurs brown; tarsus with many gray-brown tipped scales, apexes of all segments pale, base of first segment pale. Abdominal color pattern not noted before dissections were made. Wing length 6.5–7.0 mm. Hindwing with cubital pecten long, extending from base nearly to origin of vein CuA_2. Male genitalia as illustrated; vinculum approximately twice length of tegumen plus uncus; vinculum with a fracture zone before ½ length and another medially in saccal zone; heavily sclerotized extensions of anterior part of vinculum asymmetrical, right one longer than left one, each bearing a pointed, ventral tooth beyond ½ length; lobes of juxta equal to length of vinculum, very slender, roughly symmetrical; aedoeagus slender, ventral surface with a moderately heavily sclerotized rod extending from zone to apex, a second rod on dorsal surface arising just beyond ½ length and extending nearly to apex; posterior surface of culcitula rounded; setal tuft near base of tegumen arising from a short lobe. Female genitalia as in plate P, figure 4; ductus bursae very broad, heavily sclerotized laterally; an irregular, heavily sclerotized band at base of corpus bursae, accessory bursa arising from anterior part of left portion of corpus bursae; a sclerotized ring terminating right part of corpus bursae, leading to ductus seminalis.

The immature stages are unknown.

TYPES. Holotype: ♂. Madera Canyon, 4,880′, Santa Rita Mts., Arizona, 6 August 1959; R. W. Hodges; RWH genital slide 3323. CU. Paratypes: 1 ♂, 1 ♀. Same locality as for holotype; 10 October 1959; R. W. Hodges (1 ♂). Same locality as for holotype, except 5,600′; 23 September 1959; R. W. Hodges (1 ♀). USNM.

Gausapa is extremely similar to many specimens of *ligulella* and cannot be separated from them with certainty by external appearance. The series of spines on the base of the shaft of the antenna will define

males of *gausapa*. Genital characters to separate the two species are given in the keys. The species are allopatric.

acuminata GROUP

Dichomeris acuminata and *nenia* comprise the *acuminata* group in America north of Mexico. *Acuminata* may be pantropical or pansubtropical, and a small number of species are in the New World tropics. The species-group is characterized by the uniformity of color pattern on the forewing; strong scale tufts on the dorsal and ventral surfaces of the second segment of the labial palpus; lack of metallic scales on head, thorax, and wings; hindwing with a well-developed pecten at the base of the cubitus; lobes of juxta arising from a common base, parallel, and usually fused for ⅓ length, often nearly for entire length; vinculum with pair of heavily sclerotized lobes from near base; aedoeagus with a sclerotized band on the outer wall and with a well-developed cornutus; female genitalia with a coiled lobe on right side; corpus bursae with many inwardly pointed projections, heavily sclerotized ridges, and often with one or two stout thorn-shaped signa.

Dichomeris acuminata (Staudinger)
PL. 4, FIG. 1. TEXT FIG. 9 (RWH 2284).

Mesophleps (?) *acuminatus* Staudinger, *in* Kalchberg, 1876, *Entomologische Zeit. zu Stettin,* **37**: 148.
Type locality: Valdesi, near Palermo, Sicily. [BMNH]

Hypsolophus ianthes Meyrick, 1887, *Trans. Ent. Soc. London,* **1887**: 273.
Type locality: St. Denis, Reunion. [BMNH]

Ypsolophus rusticus Walsingham, 1892, *Proc. Zoological Soc. London,* **1891**: 525.
Type locality: West Indies, St. Vincent, windward side. [BMNH]

Ypsolophus lotellus Constant, 1893, *Ann. Soc. Ent. France,* **62**: 398, pl. 11, fig. 7. NEW SYNONYMY.
Type locality: France, Alluvions du Var (Alpes-Maritimes). [MNHP]

Ypsolophus ammoxanthus Meyrick, 1904, *Proc. Linn. Soc. New South Wales,* **29**: 430.
Type locality: Duaringa, Queensland. [BMNH]

Ypsolophus ochrophanes Meyrick, 1907, *Jour. Bombay Nat. Hist. Soc.,* **17**: 981.
Type locality: Ambulangoda, Ceylon (=Sri Lanka). [BMNH]

Upper surface as figured. Head with maxillary palpus and base of haustellum brownish gray, haustellum becoming pale brownish gray distally; outer surface of first and second segments of labial palpus mainly brown, scales tipped with pale gray, particularly on second segment, apex of second segment with white-tipped scales from dorsal margin to approximately ½ length along distal margin, a strong tuft, produced to a point on ventro-apical margin, inner surface of first and second segments mainly pale gray, scales darkest before apex of individual scales, apexes pale, third segment white orange, pale brown on anterior margin; frons shining pale gray medially, brown between base of antenna and base of haustellum in front of eye; vertex and occiput orange above eye, pale brownish gray to orange gray medially, a row of brown scales behind eye; scape of antenna grayish brown dorsally, pale orange on ventral surface, shaft mainly grayish brown, some scales paler on basal halves of segments, sensory areas on ventral surface of male covering most of segment (individual segments separated by a row of scales), cilia short, approximately ½–⅔ depth of segment basally, shorter distally, sensory areas in female very restricted, cilia very short. Thorax mainly orange, base and lateral margin of tegula brown, brown scales intermixed with orange ones on middle part of mesothorax. Forewing mainly orange, mottled with grayish-brown blotches, ventral surface nearly uniformly pale orange gray. Hindwing pale orange gray, relatively thinly scaled on basal ½; pecten well developed on basal ½ to ⅔ length of cubitus in cell. Foreleg with coxa, femur, and tibia nearly uniformly gray brown; tarsus brown with individual scales pale basally, yellowish-white scales at apexes of first four tarsal segments. Midleg with a tuft of scales arising on anepisternum in male; coxa yellowish white, almost white; femur, tibia, and tarsus mainly brown, scales pale at bases; apexes of first four tarsal segments with yellowish-white scales. Hindleg with coxa yellowish white, almost white; femur yellowish white dorsally, pale grayish brown ventrally; tibia mainly pale, ventral surface slightly darker, tibial spurs gray brown, somewhat darker than tibia; tarsal segments pale gray, apexes of segments slightly paler than rest of segments. Abdomen mainly brownish gray on dorsal surface with metallic reflections at certain angles of light incidence, last segment orangish white; ventral surface pale orangish to yellowish white. Wing length 4.8–6.1

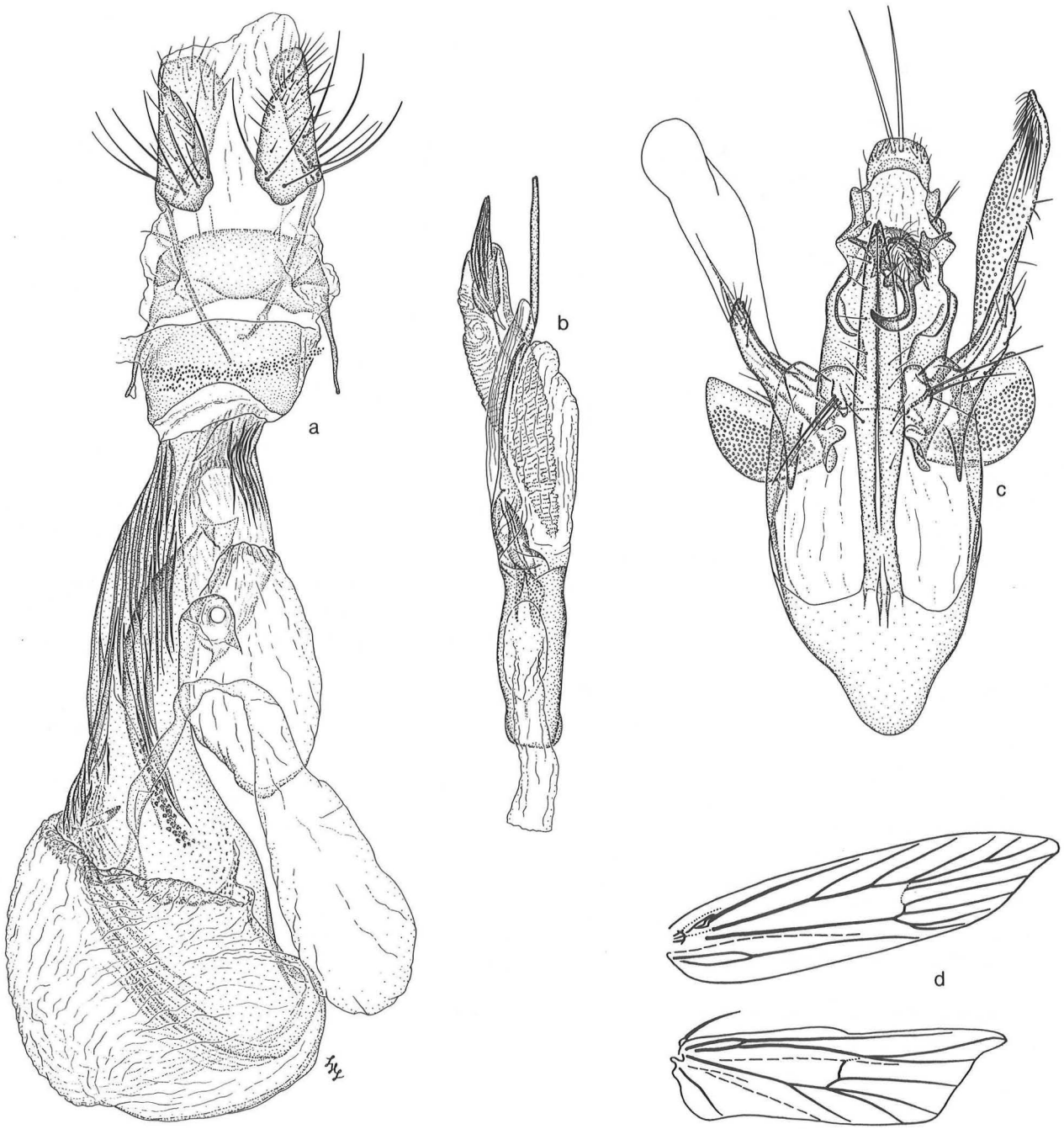

FIGURE 9: GENITALIA AND VENATION OF *DICHOMERIS ACUMINATA*
a. Female genitalia (USNM 9303). *b.* Aedoeagus (USNM 9300). *c.* Male genital capsule (USNM 9300). *d.* Venation (USNM 9304).

mm. Male genitalia as illustrated; vinculum slightly longer than length of tegumen plus uncus, vinculum broad in saccal region, somewhat produced medially, a pair of almost pointed protrusions at base of vinculum; juxtal lobes symmetrical, nearly as long as vinculum, a few scattered setae on ventral surface; aedoeagus relatively slender, a stout cornutus present, a slender spine or rod arising just beyond zone, distal part of aedoeagus beyond zone membranous; base of setal patch associated with appendix appendicular large; eight or nine setae on each side of ventral surface of uncus, a pair of very long setae

arising on dorsal surface of uncus medially; culcitula densely spiculose. Female genitalia as illustrated; antrum heavily sclerotized, broad, subquadrate, anterior margin concave; ductus bursae broad, lightly sclerotized at base, then heavily sclerotized; corpus bursae heavily sclerotized on left part, lightly sclerotized on right part, left part with series of striae running from base to beyond ½ length, a series of short lobes medially, a spiculose patch on right side and another on left side, lobe of corpus bursae leading to ductus seminalis coiled, a heavily sclerotized ring before juncture with ductus seminalis; a heavily sclerotized, slightly curved cornutus at ½ length of corpus bursae on left side. The forewings of some specimens are nearly uniformly orange with only two gray-brown dots in the cell; others are mainly brown. *Acuminata* is most closely allied to *nenia.* The slight differences are given in the keys.

The larvae feed on leaves of many leguminous plants. They have been reared on *Sesbania* species and hairy indigo in Florida (specimens studied). Zimmerman (1978: 1708) records *Medicago sativa* Linnaeus (alfalfa), *Cyamopsis* species, *Desmodium gyroides* Candolle (indigo), *Medicago* species, *Cajanus cajan* (Linnaeus) Huth (pigeon pea), *Sesbania sericea* (Willdenow) Candolle, and *Tephrosia* species as hosts. Rarely, *acuminata* may be a pest on indigo and alfalfa. Fletcher (1921: 90) describes the life history in India. The species is multivoltine with a generation requiring 25 days. Zimmerman (op. cit., 1712) illustrates characters of the larva and pupa.

Acuminata has been collected throughout Florida and in most months of the year. Whether it has been introduced is unknown. The earliest collection records that I have seen are in 1952 at Siesta Key (Sarasota). Elsewhere, *acuminata* is pantropical.

Dichomeris nenia Hodges, NEW SPECIES
PL. 4, FIG. 2; PL. A, FIGS. 3, 4; PL. Q, FIG. 1.

Dichomeris nenia Hodges.
Type locality: Bandera County, Texas. [USNM]

Upper surface as figured. Head with maxillary palpus and base of haustellum brown, rest of haustellum pale gray to pale orange gray; outer surface of first and second segments of labial palpus brown, apexes of scales narrowly margined with pale gray (almost white), extreme apical margin white from dorsal surface to about ½ length, a well-developed, triangular scale tuft on ventral surface, inner surface of first and second segments gray brown, darker ventrally, scales tipped with pale gray, almost white, third segment shorter than second segment, brown on anterior surface, pale orange on posterior and lateral surfaces; lower part of frons mainly shining brown, upper part of frons, vertex, and occiput shining gray brown, apexes of scales tipped with pale gray, a few orange scales near posterior margin of occiput, a row of brown scales behind eye; scape of antenna gray brown dorsally, yellow white to orange white ventrally, shaft mainly shining gray brown, many scales brown, ventral surface mainly orange, sensory areas brown, covering most of segments in male, cilia approximately ½ depth of antennal segments at base, much shorter distally, sensory areas much more restricted in female, cilia slightly shorter but easily visible. Thorax mainly orange laterally, gray brown medially, base and part of lateral margin of tegula brown, scales tipped with pale gray. Foreleg mainly brown to grayish brown, scale bases often pale; apexes of tarsal segments with yellowish-white scales. Midleg with a tuft of scales arising from anepisternum in male, coxa off-white; tibia and tarsus mainly grayish brown, apexes of first four tarsal segments with yellowish-white scales. Hindleg with coxa pale brownish gray; trochanter pale brownish gray, off-white distally; femur brownish gray, paler dorsally; tibia brownish gray, off-white to pale gray dorsally, tibial spurs brown, contrasting with tibia; tarsus brownish gray, paler dorsally, apexes of segments yellowish white. Abdomen shining dark gray medially, shining pale yellowish gray laterally; ventral surface mainly pale and light gray, apexes of segments uniformly pale. Wing length 4.5–5.9 mm. Forewing with undersurface of membrane brownish orange, fringe orange. Hindwing with cubital pecten well developed. Male genitalia as illustrated; vinculum approximately 1½ times length of tegumen plus uncus, vinculum slightly produced in saccal region, a pair of ventrally directed, sharply pointed lobes arising from near base of vinculum; lobes of juxta symmetrical, entire juxta longer than vinculum, lateral margins of lobes with series of teeth just beyond base, scattered setae on distal ½; aedoeagus slender, cornutus a stout spine, a lightly sclerotized rod or spine arising from zone, distal ½ of aedoeagus mainly membranous; culcitula with numerous projections; apex of uncus with 8–10 setae on each side of ventral margin, a pair of long setae arising from middle of dorsal margin; base of setal patch between base of tegumen and vinculum relatively large, semielliptical. Female genitalia as illustrated; ventral wall of antrum heavily sclerotized, quadrate, longer than wide, anterior margin slightly convex; ductus bursae broad, membranous at base; corpus bursae heavily

sclerotized on left side, lightly sclerotized on right side, right part leading to ductus seminalis coiled, a heavily sclerotized ring at inception of ductus seminalis; a lightly spiculose patch on right side of corpus bursae, another on left side; signum a stout spine just before middle of corpus bursae; anterior ⅓–½ of corpus bursae less heavily sclerotized than posterior part.

R. O. Kendall reared two specimens of *nenia* from *Indigofera lindheimeri* Scheele. The larvae were tieing the leaves.

TYPES. Holotype: ♂. Bandera County, Texas; larva coll. 12 May 1966; R. O. and C. A. Kendall. USNM. Paratypes: 10 ♂, 6 ♀. Same data as for holotype (1 ♂). N. Padre Island, Nueces Co., Texas; 6–11 June 1978; A. and M. E. Blanchard (4 ♂, 1♀). Same data as preceding except collected 30 September 1975 (1 ♂, 1 ♀). Devil's Den State Park, Washington Co. Arkansas; 14, 19 July 1966; R. W. Hodges (2 ♀). Gainesville, Florida; 8 July 1927; J. Speed Rogers (1 ♂). Archbold Biological Station, Lake Placid, Florida; 31 March 1959; R. W. Hodges (1 ♂). Homestead, Florida; 16 April 1959; D. O. Wolfenbarger (1 ♀). CU and USNM.

Nenia is most closely related to *acuminata,* but the two species can be separated by the characters cited in the keys. The species are known to be sympatric in Florida; however, all newly collected, non-Floridian material should be carefully examined because the geographic distribution of neither species is well known.

condaliavorella GROUP

Dichomeris condaliavorella is the only species in the group in the world. It is characterized by the second segment of the labial palpus being thickened with scales on the dorsal and ventral surfaces; lack of metallic scales on head, thorax, and wings; hindwing with well-developed cubital pecten; male genitalia with the juxta arising from a fused base and the lobes fused nearly to ¼ length, vinculum without posterolateral lobes, aedoeagus with a pair of long, slender rods arising from the zone, without cornutus; female genitalia with ductus seminalis arising from a stout accessory lobe on the right side of the corpus bursae.

Dichomeris condaliavorella (Busck)

PL. 1, FIG. 9. TEXT FIG. 10 *a–d* (RWH 2275).

Trichotaphe condaliavorella Busck, 1900, *Proc. U. S. Natl. Mus.,* **23**: 232.

Type locality: Palm Beach, Florida. [USNM]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "15843"; 2. "Palm Beach Fla."; 3."Collection Dr H G Dyar"; 4. "*Trichotaphe condaliavorella* Type. Busck"; 5. "Type No. 4940 U.S.N.M."; 6. "♂ genitalia slide 2991"; 7. "LECTOTYPE *Trichotaphe condaliavorella* Bsk. by R. W. Hodges"; 8. "Genitalia slide by RWH ♂ USNM 10643." The three specimens in the type series are males, not two males and one female as Busck stated.

Upper surface as figured. Head with maxillary palpus and base of haustellum dark brown, haustellum becoming pale brown to off-white distally; first and second segments of labial palpus dark brown on outer surface, apex of second segment off-white, inner surface of first and second segments gray brown, apex off-white, a small dorsal tuft on second segment, third segment yellowish gray on anterior surface, pale yellow on lateral and posterior surfaces, apex brown; frons brown between base of eye and haustellum, gray brown medially; vertex and occiput yellowish brown, scales paler apically, row of scales above eye uniformly yellowish white; anterior surface of scape of antenna brown at base and extreme apex, pale yellowish white medially, dorsal surface gray, ventral surface yellowish white, shaft pale yellowish gray, many scales slightly darker, sensory areas on ventral surface very broad in male, covering entire segment from base to ⅔ length, cilia equal to depth of antenna at base, becoming shorter by ⅓ length of shaft, very short toward apex, sensory areas of female narrow, situated on anteroventral margin of segments, cilia very short, barely visible. Thorax shades of grayish brown, some brown scales toward apex of mesothorax. Abdomen mainly grayish brown. Foreleg nearly uniformly brown, apexes of tarsal segments slightly paler. Midleg nearly uniformly brown, coxa somewhat paler. Hindleg gray brown; coxa mainly yellowish brown; dorsal surface of tibia gray, tibial spurs dark brown, contrasting with rest of tiba. Wing length 5.7–7.8 mm. Hindwing with cubital pecten relatively short from base to ½ length of cubitus. Male genitalia as illustrated; vinculum approximately 1⅓–1½ times length of tegumen plus uncus, vinculum somewhat pointed in saccal area, a heavily sclerotized, narrow band running between arms of vinculum near base of juxta; juxta relatively slender, expanded at base, lateral margin serrated from base to ⅓ length, juxta longer than vinculum, left lobe slightly longer than right lobe, each lobe with scattered setae on distal ½;

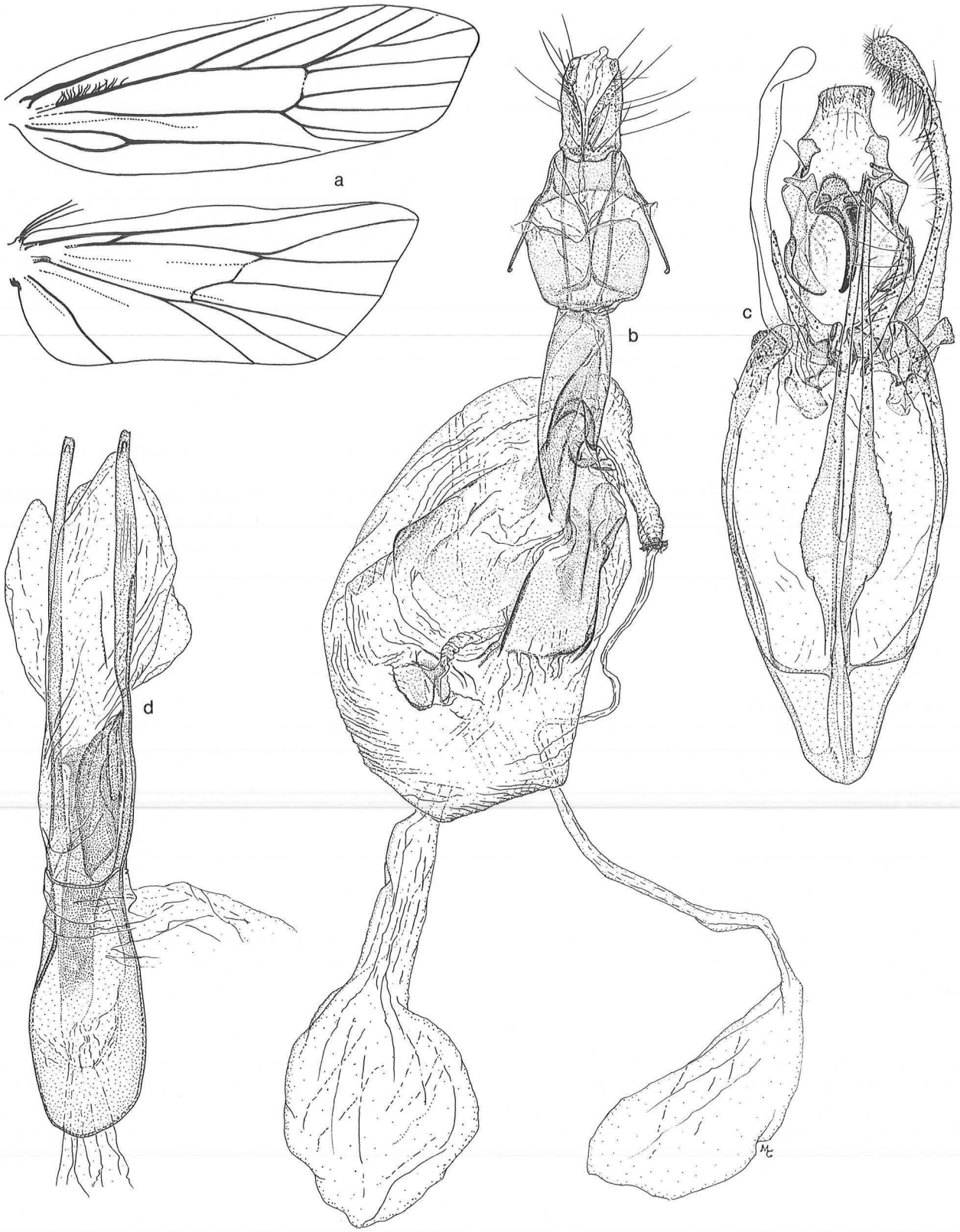

FIGURE 10: GENITALIA AND VENATION OF *DICHOMERIS CONDALIAVORELLA*

a. Venation (USNM 12093). *b.* Female genitalia (USNM 11877). *c.* Male genital capsule (USNM 11876). *d.* Aedoeagus (USNM 11876).

aedoeagus relatively slender, lateral margins parallel, length approximately 7 times maximum width, a pair of slender, lateral rods extending from zone to apex, cornutus absent; base of setal tuft located between base of tegumen and vinculum developed, apex truncated; culcitula with numerous fine lobes; setae on ventral surface of uncus relatively uniform in size. Female genitalia as illustrated; antrum as broad as eighth abdominal segment, moderately heavily sclerotized; corpus bursae a large sack with a tube leading from caudal surface to juncture with ductus seminalis, a heavily sclerotized ring at end of this tube; an accessory pouch arising from anterior end (or near anterior end) of corpus bursae; walls of corpus bursae relatively heavily sclerotized in some areas but not as distinct sclerites, walls apparently folded or creased in some specimens.

Condaliavorella is relatively uniform in appearance. It could be confused only with *citrifoliella,* but can be separated from the latter by forewing having a uniformly dark ventral surface and having the posterior margin dark basally on the dorsal surface. The male and female genitalia are highly distinctive but ally the species with the *acuminata* and *citrifoliella* species-groups.

The larvae tie leaves of *Krugiodendron ferreum* (Vahl) Urban (cited as *Condalea ferrea* (Rhamnaceae) in the original description), and pupation occurs in the larval chamber. Dyar (1901: 473) described the pattern of three larval instars.

Adults have been collected in most months of the year in southern Florida from Palm Beach into the Keys. Most recent records are from the Keys.

citrifoliella GROUP

Dichomeris blanchardorum and *citrifoliella* comprise the *citrifoliella* group in America north of Mexico. An undescribed species is known from Rio de Janiero, Brazil; and *carycina* (Meyrick), *caryophragma* (Meyrick), and *diacnista* (Meyrick), all from British Guiana, likely are in this species-group or a very closely allied species-group. The *citrifoliella* group is characterized by the second segment of the labial palpus thickened with scales on the ventral surface and with a fairly strong dorsal scale tuft; lack of metallic scales on head, thorax, and wings; forewing with R_3 separate from R_{4+5}, CuA_1 and CuA_2 stalked; hindwing with cubital pecten; male genitalia with the juxta arising from a fused base; aedoeagus with a pair of slender lobes from the zone, lacking cornutus; and the female genitalia with the papillae anales heavily sclerotized.

Dichomeris blanchardorum Hodges, NEW SPECIES

PL. 1, FIGS. 10, 11; PL. A, FIGS. 5, 6; PL. Q, FIG. 2. TEXT FIG. 2 *e.*

Dichomeris blanchardorum Hodges.

Type locality: Laguna Atascosa, Cameron County, Texas. [USNM]

Upper surface as figured. Maxillary palpus and scales on base of haustellum yellowish brown, anterior surface of haustellum from near base to near apex pale yellowish brown, extreme base of haustellum and some scales on maxillary palpus pale yellowish brown; lateral surface of first and second segments of labial palpus medium brown, some scale bases pale yellowish brown, apex of second segment pale yellowish gray, mesial surface of first and second segments pale yellowish gray dorsally becoming darker yellowish gray to yellowish brown ventrally, a strong scale tuft dorsally, third segment pale yellowish gray basally becoming darker brown at apex; frons with brown scales between base of antenna and haustellum; vertex and occiput mainly yellowish gray, some yellowish-gray scales on middle of frons; dorsal surface of antenna mainly yellowish gray, most of dorsal surface of scape brown but anterior margin and extreme apex pale yellowish gray to yellowish white, sensory areas on ventral surface of shaft in male broad, separated by a row of scales on alternate half segments, sensory cilia longer than depth of segment basally becoming very short by ⅔ length, sensory areas restricted and cilia very short in female; dorsal surface of thorax mainly yellowish gray to pale brown, slightly darker medially. Foreleg mainly brown, many scale bases pale yellowish brown; apex of coxa, tibia, and each tarsomere yellowish gray. Midleg much as for foreleg but slightly paler. Hindleg mainly pale yellowish gray to yellowish brown; tibial spurs mainly brown, contrasting with tibia; tarsomeres two–five with medium-brown scales on dorsal surface from base to ⅗ length. Abdomen mottled pale yellowish gray and yellowish brown, many scales with shining reflections, pale yellowish gray laterally and at apex of some segments, ventral surface generally paler. Wing length 6.0–7.3 mm. Forewing grayish brown ventrally, pale yellowish gray scales on costa from ⅓–⅗ wing length and posterad of line of vein CuP. Hindwing with cubital pecten developed on basal ⅓ of cell, ventral surface mottled pale yellow and brown on anterior ½ and yellowish gray and pale yellow on posterior ½. Male genitalia as illustrated; vinculum without extensions from the lateral margins; juxta heavily

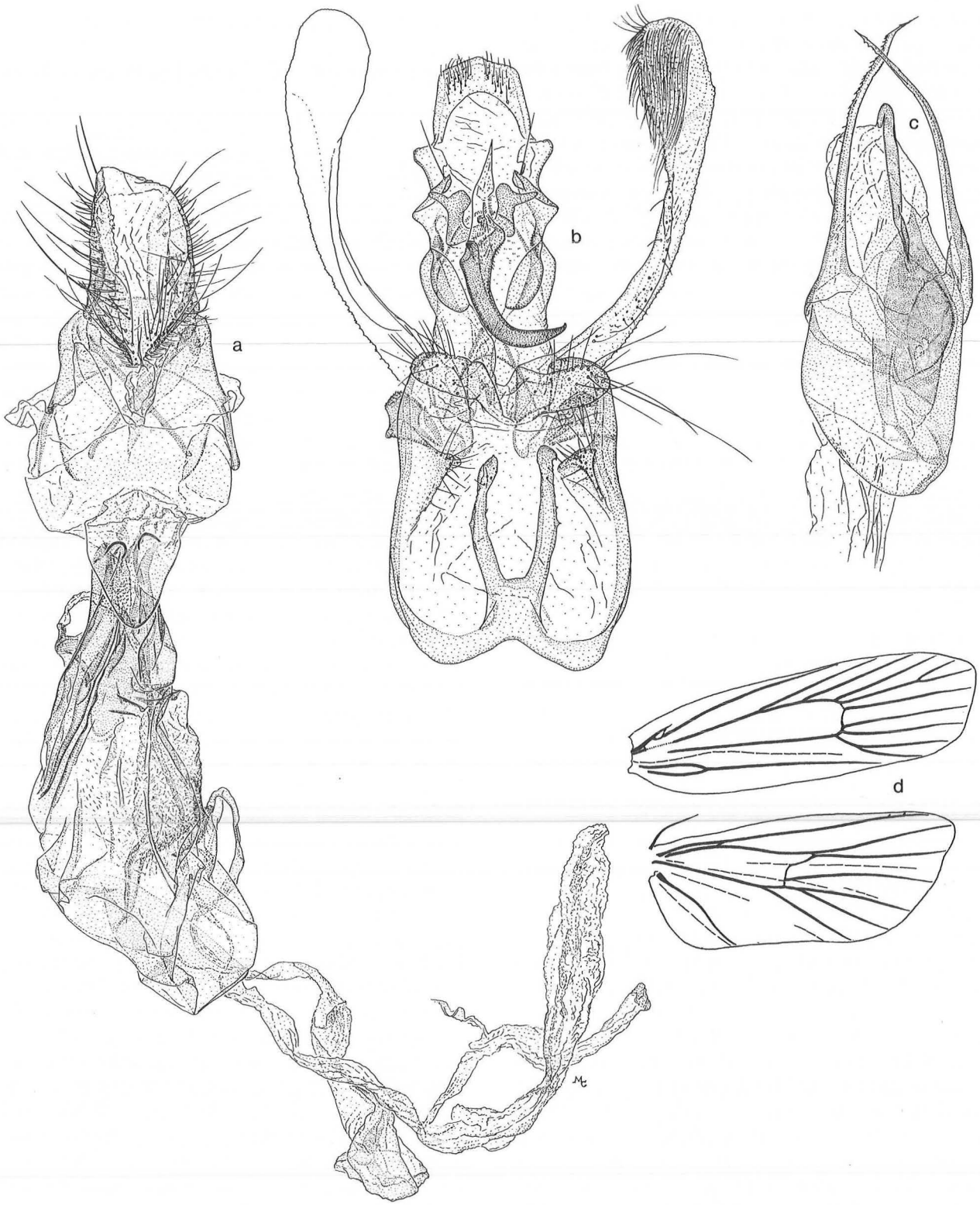

FIGURE 11: GENITALIA AND VENATION OF *DICHOMERIS CITRIFOLIELLA*

a. Female genitalia (USNM 11880). *b.* Male genital capsule (USNM 10976). *c.* Aedoeagus (USNM 10976). *d.* Venation (USNM 9171).

sclerotized, lobes extending nearly to base of gnathos; appendix appendicular with a sclerotized, distally expanded lobe; valva with a long lobe from base of saccular margin; aedoeagus lacking cornutus, a pair of slender lobes extending from zone laterally, a heavily sclerotized zone in wall of aedoeagus dorsodistally. Female genitalia as illustrated; apophyses anteriores short, about ½–⅔ length of apophyses posteriores; ductus seminalis arising from anterior end of coiled lobe of corpus bursae at heavily sclerotized ring; a pair of small, concave sclerotized plates at juncture with accessory pouch from corpus bursae; corpus bursae with a heavily sclerotized, folded band on right side.

The immature states are unknown.

TYPES. Holotype: ♂. Laguna Atascosa, Cameron Co., Texas; 22.XI.1973; A & ME Blanchard; USNM genital slide 10975. USNM. Paratypes: 3 ♂, 3 ♀. Same locality data; 6.III.1978 and 22.XI.1973; USNM genital slides 10972, 10974, 11878, 11879. AB, USNM.

The short type series is highly variable in color on the dorsal surface of the forewings: one specimen is nearly uniformly pale yellow to yellowish brown, most are medium to dark yellowish gray to brown. The extreme base of the costal margin of the forewing is dark brown. None of the specimens is fresh.

Blanchardorum is similar superficially to some specimens of *citrifoliella* and *condaliavorella.* From the latter it differs by geographic distribution, the bicolored ventral surface of the forewing, and genital characters. From *citrifoliella,* with which it is most closely allied on the basis of genitalia, it differs by the concolorous posterior margin of the forewing; the base of the posterior margin of the forewing is pale yellowish gray in *citrifoliella.*

Dichomeris citrifoliella (Chambers)
PL. 1, FIGS. 12, 13. TEXT FIG. 11 *a–d* (RWH 2292).

Nothris citrifoliella Chambers, 1880, *Jour. Cincinnati Soc. Nat. Hist.,* **2**: 184.
Type locality: Florida. [USNM]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "766"; 2. "No. 196. *Nothris* sp? V. T. Chambers, October/79."; 3. "*Nothris citrifoliella* Cham."; 4. "Lectotype *Nothris citrifoliella* Chambers by R. W. Hodges." The lectotype lacks an abdomen.

Upper surface as figured. Head with apex of maxillary palpus and basal ⅓ of haustellum brown, base of maxillary palpus yellowish white to white, scales of haustellum mixed pale gray brown and off-white beyond ½ length; outer surface of first and second segments of labial palpus brown, apex of second segment tufted dorsally and ventrally, white to yellowish white, inner surface of first and second segments brown basally, dorsal margin yellowish white to white, apex of second segment and most of dorsal tuft white, third segment mainly yellowish white, apex brown; frons brown in front of eye between base of antenna and base of haustellum, yellowish white medially; vertex and occiput yellowish white, a row of dark-brown scales behind eye; scape of antenna yellowish white on anterior margin and on ventral surface from ½ length to apex, brown to dark brown elsewhere, shaft mainly yellowish white, several scales brown distally on basal ½ of segments, sensory areas broad on ventral surface in male, covering entire segment at base, separated by a narrow row of scales from ⅓ length of apex, cilia approximately equal depth of segment at base, becoming much shorter distally, sensory areas in female covering most of ventral surface of segment, separated by a row of scales on alternate half segments from base to apex, cilia slightly less than depth of segment at base, becoming much shorter distally. Thorax yellowish white mottled with grayish yellow, tegula dark brown anteriorly. Foreleg brown on coxa, femur, and tibia, apex of tibia and coxa pale; tarsus mainly yellowish gray at base, mottled with gray-brown scales, tarsomeres becoming darker distally. Midleg with coxa yellowish gray becoming almost white apically; a tuft of yellowish-white scales arising on anepisternum in male; femur and tibia mainly brown, some scale bases pale; tarsus mainly brown, scale bases pale, apexes of segments pale yellow laterally. Hindleg with coxa mottled off-white and yellowish gray; femur mainly gray brown, mottled with pale-gray scales; tibia mainly yellowish gray to dark yellowish gray, tuft off-white to white, tibial spurs brown, apex of segment yellowish white; tarsomeres yellowish gray at bases, yellowish white at apex of first and second tarsomeres, third and fourth tarsomeres unicolorous yellowish gray, fifth tarsomere yellowish white. Abdomen with dorsal surface mainly yellowish brown, overlaid in part with yellowish gray, caudal margins of segments pale; ventral surface mainly yellowish white, mottled with pale-brown scales laterally. Wing length 6.8–9.0 mm. Forewing with ventral surface mainly yellowish gray, area between fold and posterior margin yellowish white. Hindwing mainly yellowish gray, pecten well developed at base of cubitus, costal area mainly yel-

lowish white. Male genitalia as illustrated; vinculum approximately 5/8 length of tegumen plus uncus, saccal margin slightly incurved to incurved medially, a pair of lobes extending ventrally, arising at approximately 1/3 length; juxtal lobes arising from a common base, slightly asymmetrical, right lobe longer than left one, sparsely setate toward apex; aedoeagus stout, a pair of slender rods rising from zone laterally, extending beyond apex of aedoeagus, a heavily sclerotized rod on ventral margin beyond zone, extending from 2/3 length to apex; base of setose patch lying between tegumen and vinculum with a heavily sclerotized medial lobe; culcitula with very few fine lobes; setae along outer margin of ventral surface of uncus nearly uniform in size, a bare area medially. Female genitalia as illustrated; ventral surface of antrum heavily sclerotized along caudal margin, then becoming lightly sclerotized; ductus bursae very heavily sclerotized, appearing as a series of plates and lobes; corpus bursae lightly sclerotized, a large spiculose area on right side on basal 1/2; an accessory bursa arising from this spiculose area; ductus seminalis arising from near base of ductus bursae.

Citrifoliella varies in the color of the forewings: specimens from most of the range are yellowish gray or grayish brown with a well-defined brown mark on the posterior margin at 3/4 the length of the wing. Some specimens lack the brown mark. Many specimens from the Florida Keys are uniformly dark yellowish brown. The combination of wing length, forewing color pattern, and the presence of pale-yellow scales on the posterior margin of the forewing basally will serve for immediate recognition of *citrifoliella.*

The larvae roll leaves and attack buds of orange (*Citrus* species) and prickly ash (*Xanthoxylum americanum* Miller) according to Forbes (1923: 285) and *Ptelea trifoliata* Linnaeus (data with specimen in USNM) in the Rutaceae. It can be a pest on *Citrus.*

Citrifoliella occurs from Michigan and Wisconsin south to Florida and Texas. The relatively few collections suggest that it may be found along the Gulf Coast and north along the Mississippi drainage system. No specimens are known from east of the Appalachians. In southern Florida and Texas adults have been collected throughout the year. In the north adults are present in spring through mid-August.

marginella GROUP

Dichomeris marginella is the only member of the species-group in North America, and it was introduced from the Palearctic Region. It and *D. juniperella* (Linnaeus) comprise the group throughout the world. They may be the only species of *Dichomeris* that feed on *Juniperus.* Some important characters are ocellus present; male without scale tuft on mesothoracic anepisternum; hindwing with weak pecten on base of cubitus, vinculum lightly sclerotized in saccal region and with a distinct break; vinculum with pair of well-developed lobes from base; lobes of juxta paired, asymmetrical, joined for very short distance basally; aedoeagus free, cornutus absent, two heavily sclerotized bands distad of zone, without sclerotized lobes from zone; female with distinct ductus bursae, basal part of corpus bursae heavily sclerotized and with some inwardly directed spicules, corpus bursae without parallel ridges, wall of corpus bursae near junction with accessory bursa with a pair of sclerites.

Dichomeris marginella (Fabricius) (Juniper Webworm*)

PL. 1, FIG. 14. TEXT FIG. 12 *a–d* (RWH 2282).

Alucita marginella Fabricius, 1781, *Species Insectorum,* **2**: 307.
Type locality: England. [probably lost]

Tinea fimbriella Thunburg, 1788, *Museum naturalium Academiae Upsaliensis. Dissertationes,* pt. **6**: 78.
Type locality: Sweden. [Uppsala, Sweden]

Upper surface as figured. Haustellum and maxillary palpus dark brown with some pale-gray scale bases; outer surface of first and second segments of labial palpus light brown with some darker brown scales, particularly on ventral scale tuft, apex of second segment white dorsally becoming yellowish white ventrally, second segment with strong dorsal and ventral scale tuft; inner surface of first and second segments white dorsally becoming grayish orange ventrally, third segment mainly white or pale yellowish white with many grayish-orange to light-brown scales on anterior surface and toward apex; frons dark brown in front of eye, white medially; vertex and occiput white; antenna brownish orange on dorsal surface of scape and first segment of shaft, ventral surface of scape off-white, in male dorsal surface of shaft dark brown, sensory areas broad and narrowly contiguous from base to apex, sensory setae about equal to depth of segments, in female dorsal surface of shaft brownish orange, sensory areas very narrow and restricted on basal segments becoming larger and narrowly contiguous by 1/3 length,

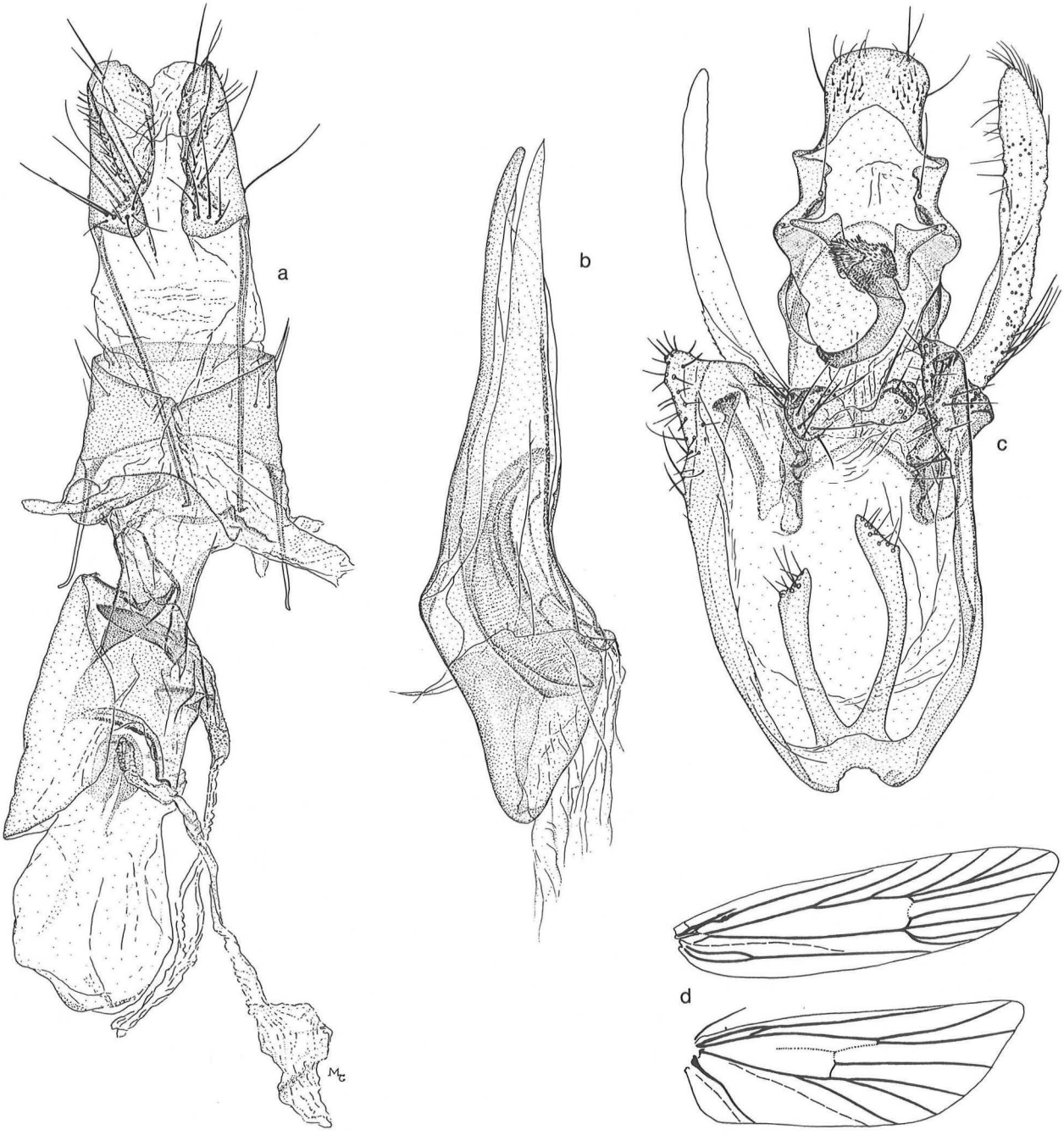

FIGURE 12: GENITALIA AND VENATION OF *DICHOMERIS MARGINELLA*

a. Female genitalia (USNM 9103). *b.* Aedoeagus (USNM 9102).
c. Male genital capsule (USNM 9102). *d.* Venation (USNM 8822).

sensory setae very short on basal segments and slightly longer at apex; ocellus present; a row of light-brown scales behind eye. Tegula light brown. Dorsal surface of mesothorax white. Male without scale tuft from mesothoracic anepisternum. Legs nearly uniformly medium brown, mid- and hindcoxae yellow to yellowish orange, dorsal scale tuft on hindtibia yellowish white. Abdomen shining off-white and yellowish white dorsally, darker yellowish gray ventrally. Wing length 5.6–8.1 mm. Hindwing with pecten at base of cubitus. Male genitalia as figured; vinculum with a distinct break in the saccal area

and with a heavily sclerotized projection from the basal part of the lateral arm; aedoeagus free, lacking cornutus and sclerotized lobes from the zone. Female genitalia as figured; ductus bursae a defined region; corpus bursae lacking series of parallel ridges.

In New Jersey (Weiss and Lott, 1922) and central Illinois (Nordin and Appleby, 1969) adults emerge during several weeks with the peak in mid-June. First instar larvae are found in early July, and overwintering occurs in the larval stage, usually sixth or seventh instar. Larvae begin to feed in early July, initially mining needles, later feeding externally. They resume feeding in April and May and pupate from mid-May into June. The larvae construct webbing between branchlets. In later instars the webbing of different individuals overlaps. *Marginella* feeds on several species of *Juniperus,* including *J. chinensis* Linnaeus, *J. communis* Linnaeus, *J. horizontalis* Moench, *J. recurva* Buchanan-Hamilton, and *J. virginiana* Linnaeus. There is one generation per year.

Marginella has a highly distinctive color pattern and should not be confused with any other gelechiid in North America. Specimens vary in the hue of orange brown on the labial palpi and forewings.

Marginella has been introduced into North America more than once. Forbes (1923: 286) reported introductions to Westchester, Pennsylvania and Tarrytown and Plandome, New York. The British Columbia and Oregon records probably represent separate introductions, and it was found in the Los Angeles area in the 1920's and supposedly was exterminated (Ryan, 1928: 17). *Marginella* occurs from Nova Scotia, Ontario, and southern Michigan south to South Carolina, Tennessee, and Missouri. In the West it occurs in British Columbia and Oregon. Adults have been collected from mid-May to mid-August. One very late record is 22 October for Missouri.

solatrix GROUP

Dichomeris solatrix is the only species in the group. Characters and character states of the species-group are second segment of the labial palpus with strong ventral scale tuft and slight dorsal scale tuft; ocellus present; antenna in male without special modifications; male with scale tuft from mesothoracic anepisternum; hindwing with strong pecten on basal ⅓ of cubitus; aedoeagus free, without cornuti, with a sclerotized band on wall distad of zone; vinculum with strong break in saccal region, a pair of bulbous lobes from base; lobes of juxta nearly symmetrical, arising from sclerotized base; gnathos relatively long and heavily sclerotized; posterior margin of uncus broadly rounded; ovipositer lobes relatively heavily sclerotized; apophyses anteriores short, about ½ length of apophyses posteriores; ductus bursae distinct, lightly sclerotized, a heavily sclerotized, trapezoidal plate in ventral wall; corpus bursae broadly rounded, a secondary lobe leading to ductus seminalis arising on right side from base to ½ length, a part of this lobe spiculose; accessory bursa arising on right side.

The sclerotized, trapezoidal plate in the ventral wall of the ductus bursae, the bulbous lobes arising from the base of the vinculum and the complete break in the saccal region of the vinculum are distinctive features of the *solatrix* group.

Dichomeris solatrix Hodges, NEW SPECIES
PL. 1, FIG. 15. TEXT FIG. 13 *a–d.*

Dichomeris solatrix Hodges.
Type locality: Peña Blanca Canyon, Santa Cruz County, Arizona. [CU]

Upper surface as figured. Haustellum and maxillary palpus mottled gray and pale yellow; outer surface of first and second segments of labial palpus mainly dark gray brown with pale scale bases to ¾ length of second segment, apex of dorsal and ventral scale tufts white to off-white, inner surface of first and second segments mainly off-white with yellowish tinge, ventral part of ventral scale tuft with many gray-brown scales, third segment mottled dark brown and pale yellow; frons, vertex, and occiput pale yellow to yellowish white with shining reflections, some brown scales immediately in front of eye, lower part of frons with gray-tipped scales; dorsal surface of scape of antenna gray brown, anterior and ventral surfaces pale yellow, shaft pale yellow with alternate rows of gray-brown scales starting at ¼ length; in male sensory setae about equal to depth of segments from base to apex, sensory areas broad throughout, narrowly separated by row of scales on basal ¼, more widely separated to apex, in female sensory setae very short at base becoming larger by ½ length of antenna and separated by row of scales on alternate half segments; a row of brown scales behind eye. Anterior margin of tegula brown, dorsal surface pale yellow. Dorsal surface of mesothorax pale yellow, mainly dark brown medially, particularly at apex. Foreleg coxa mottled brown and yellowish white, apex mainly yellowish white to white; femur, tibia, and tarsus mottled brown and yellowish gray; apexes of femur, tibia, and tarsal segments one, two, three, and five with white scales, a few white scales opposite base of epiphysis. Midleg similar to foreleg

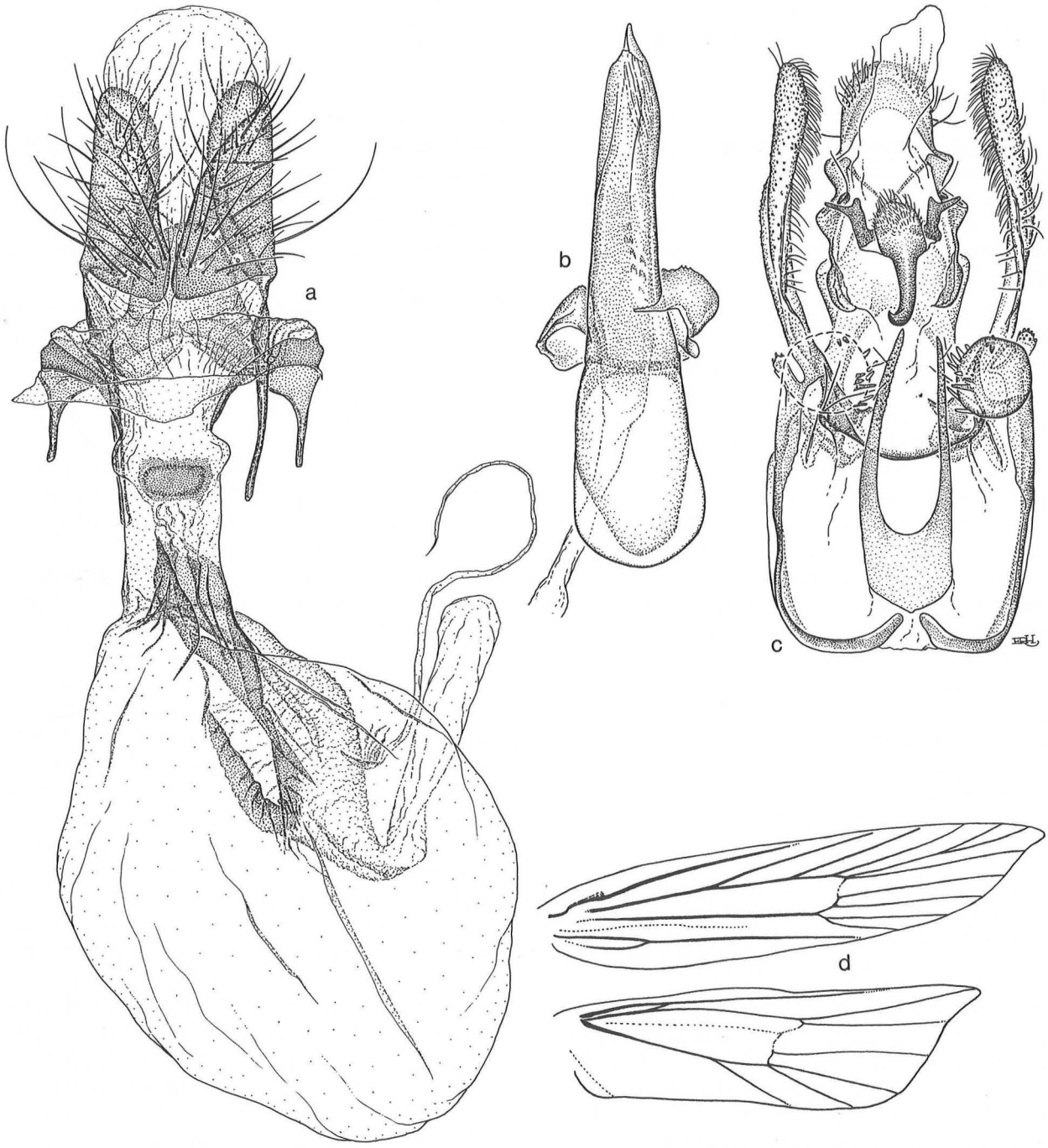

FIGURE 13: GENITALIA AND VENATION OF *DICHOMERIS SOLATRIX*
a. Female genitalia (USNM 9299). *b.* Aedoeagus (USNM 11881).
c. Male genital capsule (11881). *d.* Venation (USNM 5051).

but generally paler, coxa mainly shining yellowish white. Hindleg coxa, tibia, and tarsus mainly shining yellowish white; femur with many gray-brown-tipped scales laterally; outer tibial spurs with gray-brown-tipped scales before apex. Male with scale tuft from mesothoracic anepisternum. Wing length 5.9–6.2 mm. Male and female genitalia illustrated. The immature stages are unknown.

TYPES. Holotype: ♀. Peña Blanca Canyon, Santa Cruz Co., Ariz.; 11 August 1959; R. W. Hodges; Genitalia Slide by RWH ♀ USNM 9299. [CU]. Para-

type: 1 ♂. Santa Cruz Co., Ariz.: Peña Blanca Lake, Oro Blanco Mountains, 10 mi WNW Nogales, elev. 3700 feet; 3 September 1973; W. A. Harding (light trap). LACM.

The color pattern of the forewing and tufts on the second segment of the labial palpus are distinctive. These characters in combination with the bulbous lobes from the base of the vinculum and the trapezoidal, sclerotized plate in the ventral wall of the ductus bursae distinguish *solatrix* from all other species of *Dichomeris.*

hypochloa GROUP

Dichomeris hypochloa is the only species in the species-group. *Dichomeris sacricola* (Meyrick), new combination, from Brazil very likely is a member of it; and *D. mendica* (Turner), new combination, from Australia has female genitalia very similar to those of *hypochloa.* Characters of the species-group are: second segment of the labial palpus decidedly longer than the third segment and without scale tufts; ocellus present; metallic scales absent; forewing with vein R_3 separate from R_{4+5}, CuA_1 and CuA_2 stalked; hindwing with pecten on base of cubitus; male genitalia with unlobed vinculum, lobes of juxta arising from a common base, aedoeagus with a stout cornutus and a heavily sclerotized slender lobe arising from the right side of the zone.

Dichomeris hypochloa Walsingham

PL. 1, FIG. 16. TEXT FIG. 14 *a–d* (RWH 2280).

Dichomeris hypochloa Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 102, tab. III, fig. 23. Type locality: Mexico, Sonora. [BMNH]

Upper surface as figured. Base of haustellum brown, becoming grayish yellow distally, scale bases pale; maxillary palpus pale yellow; outer surface of first segment of labial palpus brown at base, becoming grayish yellow apically, all of second and third segments and inner surface of first segment pale yellow, a few grayish-yellow scales near dorsal surface of first segment, third segment shorter than second segment; frons, vertex, and occiput pale yellow, a few brown scales in front of base of antenna and in front of eye immediately adjacent to maxillary palpus, a row of brown scales behind eye; antenna mainly pale yellow, base of scape with a few brown scales, male with sensory areas broad, covering width of segments ventrally, sensory areas separated by a row of scales on alternate half segments by fourth or fifth segment of shaft, cilia of two lengths: longer ones approximately three times depth of antennal segment, shorter ones about ½ length of longer ones at base, both becoming much shorter distally so that by ⅔ length of antenna cilia are much shorter than depth of segments, in female sensory areas narrow, confined to anteroventral portion of shaft, cilia very short. Thorax pale yellow, base of tegula with brown scales. Foreleg mottled grayish brown and pale grayish brown, tarsal segments somewhat lighter than rest of leg, a few pale scales at apexes of tarsal segments. Midleg mottled grayish brown and pale yellow, entire leg paler than foreleg. Hindleg mottled yellowish white and grayish brown, mainly yellowish white; tibial spurs concolorous with tibia. Abdomen pale yellow. Wing length 5.5–7.0 mm. Forewing pale yellow, scattered areas of grayish-orange scales on membrane and a patch of grayish-brown scales on outer margin, another on costa at ¾ wing length; undersurface slightly darker, mottled pale grayish brown and pale yellow at base, becoming lighter apically. Hindwing pale yellowish white, pecten at base of cubitus. Male genitalia as illustrated; vinculum equal to length of tegumen plus uncus, slightly produced in saccal region; juxta asymmetrical, lobes as long as vinculum, left lobe with a basal prong or flange, right lobe lacking such a projection; aedoeagus relatively slender, approximately six times as long as wide, a heavily sclerotized rod or flange on one margin from zone to apex, most of distal portion membranous, lacking cornutus; culcitula moderately heavily lobed; setae on ventral surface of uncus small, separated by a broad, asetose area medially. Female genitalia as illustrated; antrum broad, margins tapering to middle anteriorly; ductus bursae relatively broad, margins tapering, lightly sclerotized; corpus bursae a broad pouch with a heavily sclerotized band at base, a broad duct leading from base of corpus bursae to ductus seminalis, a slightly heavily sclerotized area at end of this duct, a very small setose patch near anterior end of corpus bursae from which arises an accessory corpus.

The immature stages are unknown.

The pale-yellow forewings of *hypochloa* will serve to separate this species from other North American species. Specimens that I have examined are worn, but the brown mark near the termen of the forewing may be well developed or nearly absent.

To date five specimens of *hypochloa* have been collected in the Baboquivari, Guadalupe, and Santa Catalina Mountains of southern Arizona. Dates of collection are somewhat evenly spread from 15 May to 7 August.

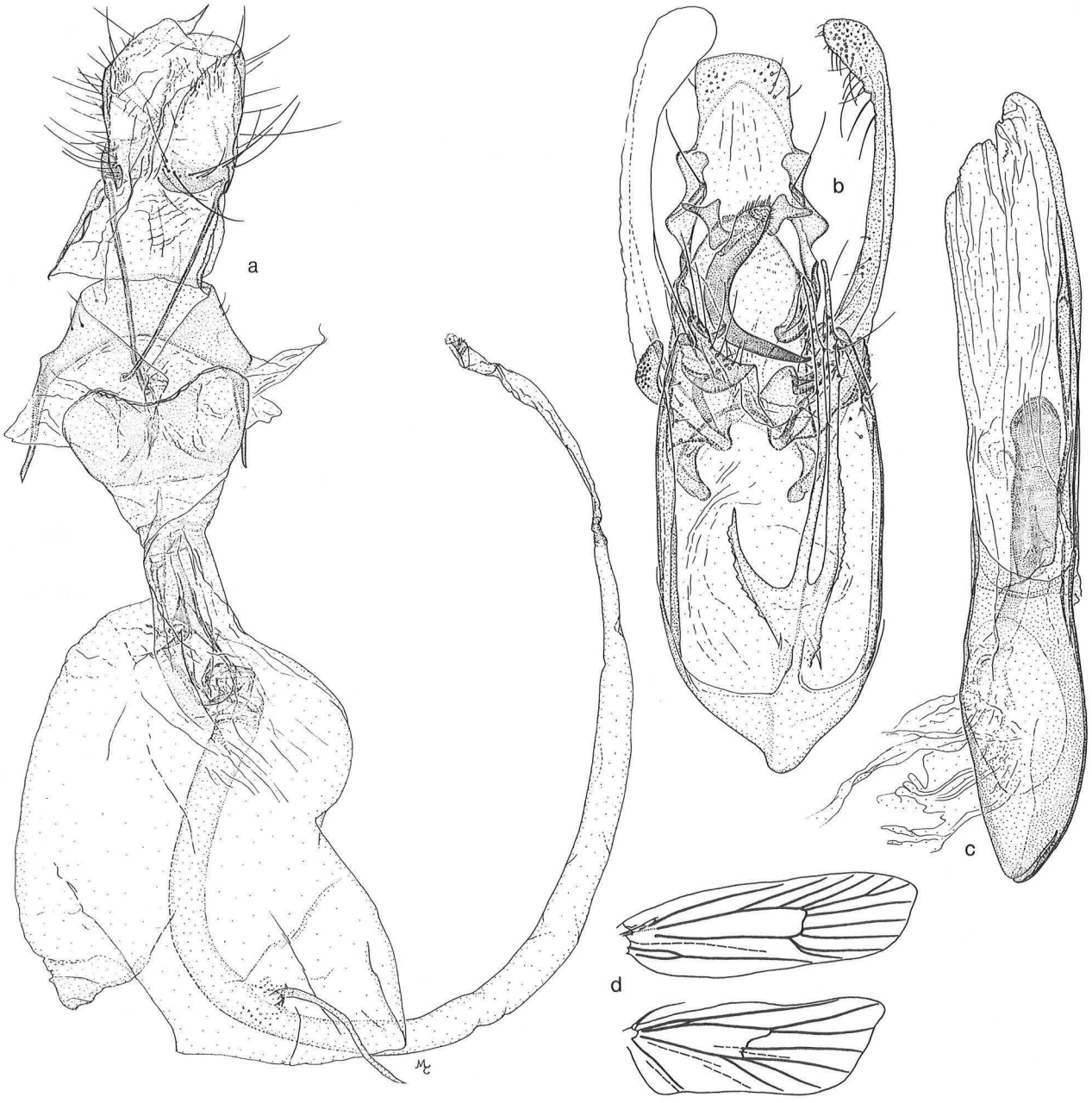

FIGURE 14: GENITALIA AND VENATION OF *DICHOMERIS HYPOCHLOA*
a. Female genitalia (USNM 9294). *b.* Male genital capsule (USNM 9293).
c. Aedoeagus (USNM 9293). *d.* Venation (USNM 9272).

punctipennella GROUP

Dichomeris punctipennella is the only member of the species-group in America north of Mexico; its other allies are in Central America. It is characterized by males having the third segment of the labial palpus porrect, the second segment with a strong dorsal scale tuft and without a ventral scale tuft, and the shaft of the antenna with a notch on the dorsal surface of segments two and three. The female lacks an ocellus, whereas the male has a very small ocellus. The female genitalia are not distinct from those of the *punctidiscella* group. The male genitalia have the lateral margins of the vinculum convex instead of parallel and the lobes of the juxta straight and

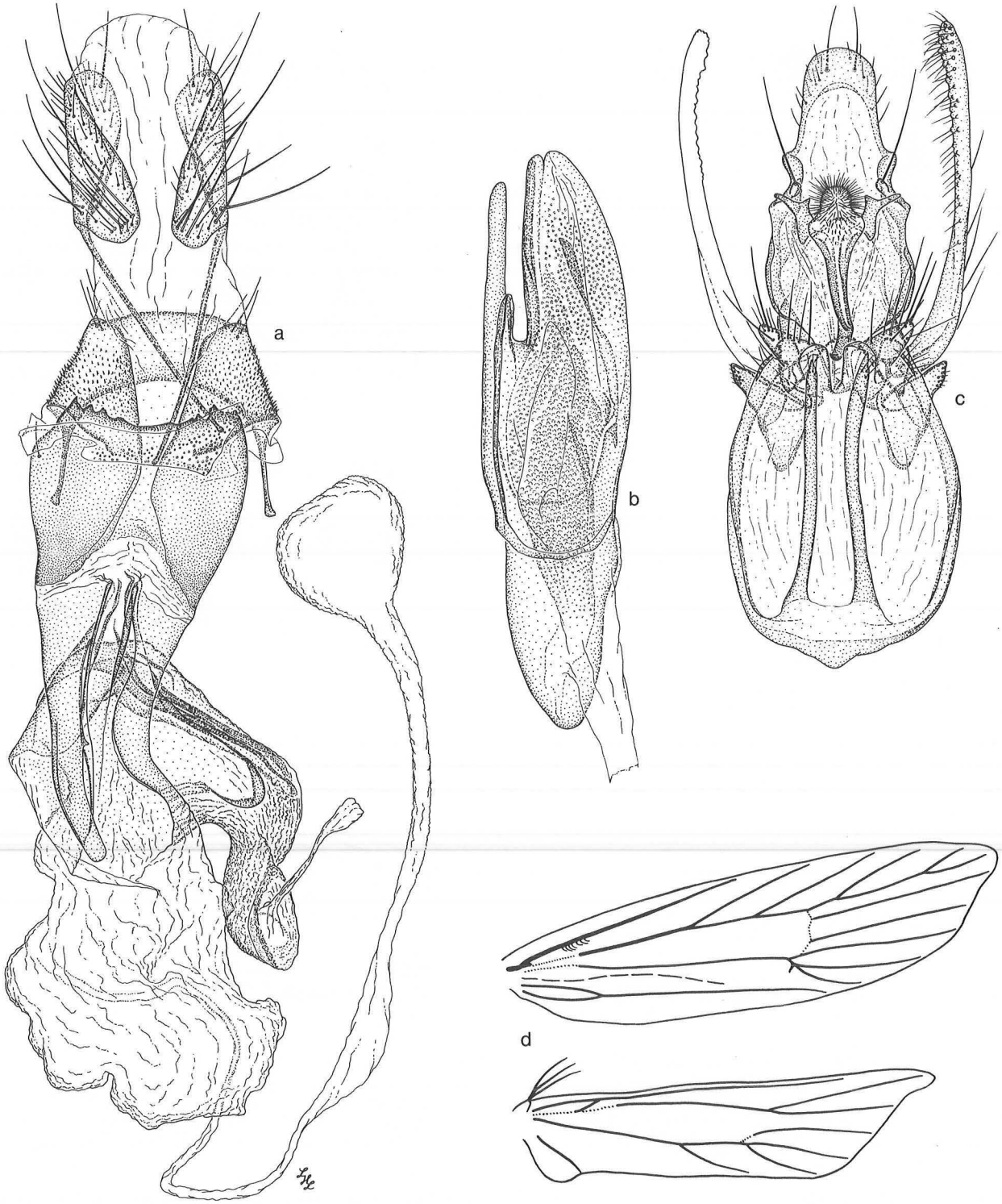

FIGURE 15: GENITALIA AND VENATION OF *DICHOMERIS PUNCTIPENNELLA*
a. Female genitalia (USNM 9179). *b.* Aedoeagus (USNM 9174).
c. Male genital capsule (USNM 9178). *d.* Venation (USNM 9177).

parallel rather than curved and not parallel as for the *punctidiscella* group.

The *punctidiscella* and *hirculella* groups seem to depart from *punctipennella.* Species of the *punctidiscella* group (*diva, punctidiscella, empusa,* and *sylphe*) are slightly larger in wing expanse than *punctipennella.* None of them has the second segment of the labial palpus modified with a strong anteroventral tuft in the male. All agree in having a poorly developed (a small number of scales) scale tuft on the mesothoracic anepisternum in the male. The male genitalia of these four species are much alike in that each has a long, heavily sclerotized projection on the lateral margin of the aedoeagus, extending from the zone. This projection extends well beyond the apex of the aedoeagus. Each has a heavily sclerotized, almost rodlike, band in the distal portion of the aedoeagus medially. Each has a slender projection near the base of the aforementioned rod. The juxta of each is a pair of quite slender lobes; these arise almost separately at the base. The vinculum is consistently relatively narrow, and the species basically lack a heavily sclerotized lobe at the base of the vinculum. The uncus of each is relatively broad, slightly rounded at the apex. The eighth tergite of each is relatively long in relation to the width: the maximum width at the base is about half the length. Also, the anterior margin of this sclerite is strongly emarginate. In the female genitalia the antrum is broad, heavily sclerotized; the base of the ductus bursae is almost nonexistent (or nondifferentiated); heavily sclerotized plates are present at the base of the corpus bursae (in part the ductus bursae). The corpus bursae consists of a medial lobe and a lateral, coiled lobe; the latter lobe extends from the right margin of the corpus bursae near the base, and is looped, often making almost a complete loop; the ductus seminalis arises from the distal end of this lobe. The caudal margin of the antrum of these species is denticulate laterally. And, each has a heavily sclerotized band, often very narrow, on the right margin of the main portion of the corpus bursae.

The *hirculella* group (*caia, ardelia,* and *hirculella*) superficially appears more nearly like *punctipennella* than the preceding four species. None of them has the second segment of the labial palpus with a very long tuft in the male, and none has a notch in the second antennal segment although the males hold the antennae as though they were in some way different from those of many other species. The male genitalia of these three species are modified as follows: the uncus is almost elliptical, and the caudal margin terminates in a pointed projection; the valvae are narrow at the base, shorter than the tegumen, and are abruptly expanded at ½ their length; the lobes of the juxta are consistently relatively broad and usually asymmetrical; the aedoeagus has a heavily sclerotized lateral rod, as does that of *punctipennella*; however, this rod may extend beyond the apex of the aedoeagus or not reach the apex; the eighth tergum is broader than long, and the anterior margin is only slightly bent inwardly if at all. The female genitalia are quite similar to those of the preceding group; however, the lateral lobe of the corpus bursae is not as long as it is in the preceding four species and does not make a full coil, also, the caudal margin of the antrum is not dentate laterally (in *hirculella* there is a lateral projection, almost a tooth).

Dichomeris punctipennella (Clemens)

PL. 4, FIGS. 3–5. TEXT FIGS. 6; 15 *a–d* (RWH 2288).

Anorthosia punctipennella Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 161.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Sagaritis gracilella Chambers, 1874, *Can. Ent.,* **4**: 226.
Type locality: Kentucky. [lost]

Upper surface as figured. Head with maxillary palpus and base of haustellum grayish brown, haustellum becoming pale yellowish white distally; outer surface of first and second segments of labial palpus dark grayish brown, apex of second segment light yellow, inner surface of both segments grayish brown on ventral surface, becoming pale yellowish white dorsally, second segment with a strongly developed tuft dorsally and at apex ventrally, third segment slightly shorter than second (appearing much shorter than second because of scale tuft), brown on anterior surface, yellowish white to grayish yellow on posterior surface, in female scale tuft on second segment developed ventro-apically and dorsally but not as long as for male; frons shining grayish yellow; vertex and occiput shining grayish yellow medially, light yellow to pale grayish yellow above eye, a row of shining olive-brown to dark grayish-brown scales behind eye; scape of antenna pale yellow on anterior margin and ventrally, grayish-brown scales on dorsal surface and anterior margin at extreme base,

segments of shaft alternating bands of pale or light yellow and grayish brown, sensory areas in male covering ½ of each segment, cilia relatively short, less than ⅔ depth of segment, a dorsal notch in second segment of shaft in male, lacking in female, sensory areas in female much restricted, a triangular patch on anteroventral margin, cilia extremely short, barely visible. Thorax mottled pale grayish yellow and dark brown to grayish brown, base of tegula dark brown. Abdomen shining brownish gray, genital segments grayish yellow, ventral surface with pale orange-gray scales medially. Foreleg dark yellowish white to white. Midleg with coxa orange gray, rest of leg brownish gray to grayish brown, apexes of tarsal segments yellowish white to off-white, a pale light-yellow to grayish-yellow scale tuft arising on base of coxa in male. Hindleg shining orange gray on coxa, femur, and part of tibia, apexes of tibia and tarsal segments off-white, apexes of tibial spurs pale. Wing length 4.0–6.1 mm. Forewing mottled pale grayish yellow and grayish brown, spots in cell and on fold dark brown; undersurface grayish brown, fringe grayish yellow, contrasting with membrane. Hindwing nearly uniformly pale brownish gray; pecten well developed, extending from base to ½ length of cubitus. Male genitalia as illustrated; vinculum slightly shorter than combined length of tegumen plus uncus, vinculum relatively slender, slightly produced in saccal region; lobes of juxta symmetrical, slender, linear, widely separated at base, with a few setae at apex; aedoeagus stout, maximum width approximately ⅓ that of length; cornutus lacking, a heavily sclerotized rod on lateral margin and another sclerotized band on distal ½; culcitula heavily spinose; setae on ventral surface of juxta relatively uniform in size, patches well separated medially, a pair of moderately long setae on dorsal margin. Female genitalia as illustrated; antrum broad, heavily sclerotized, caudal margin irregular with a series of short, pointed protrusions; ductus bursae scarcely defined; base of corpus bursae with heavily sclerotized plates, corpus bursae with two major lobes, right one leading to ductus seminalis, medial one with walls lined or creased, an accessory corpus arising from main part of corpus bursae at anterior end.

The immature stages are unknown.

Superficially, *punctipennella* is similar to *caia, ardelia,* and *hirculella*; however, the forewings of *punctipennella* usually are distinctly yellow brown rather than gray brown. The modification of the second segment of the labial palpus and the dorsal notch in the second segment of the shaft of the antenna serve for recognition of males. Diagnostic characters of the genitalia are indicated in the keys.

Variation is expressed mainly in differences in size and in the amount of gray-brown to dark gray-brown scales on the head, thorax, and forewings. Some specimens have a fairly heavy overlay of gray-brown scales, and some nearly lack the gray-brown spots on the forewings.

Punctipennella occurs commonly in eastern North America from Nova Scotia, Ontario, and Michigan south to Florida and eastern Texas. I have recorded data from specimens from all states east of the Mississippi River but Alabama, Delaware, Georgia, Indiana, Mississippi, Rhode Island, Vermont, and Wisconsin. In the north it is single brooded with adults present in late June through August; in Florida it may be on the wing throughout the year.

punctidiscella GROUP

Dichomeris punctidiscella, diva, sylphe, and *empusa* comprise the *punctidiscella* group in America north of Mexico. *Dichomeris indigna* (Walsingham) and *lypetica* Walsingham and some undescribed species from Panama, Colombia, and Argentina belong to this apparently New World group. All the species are similar in appearance. The second segment of the labial palpus has a strong dorsal and ventral scale tuft; an ocellus present; the antenna lacks a notch in the male; the male has a scale tuft arising from the mesothoracic anepisternum. In the male genitalia the lateral margins of the vinculum are nearly parallel, saccal region normally with a distinct fracture; lobes of juxta usually asymmetrical, arising separately but joined by a very slender, sclerotized band; the eighth abdominal tergum is emarginate basally. Some of the neotropical species differ in having the lobes of the juxta arising from a common base, having the posterior margin of the uncus rounded, and having the eighth abdominal tergum with a straight or slightly curved anterior margin.

Dichomeris punctidiscella (Clemens)

PL. 1, FIGS. 17–20. TEXT FIG. 16 *a–d* (RWH 2283).

Ypsolophus punctidiscellus Clemens, 1863, *Proc. Ent. Soc. Philadelphia,* **2**: 123.

Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Ypsolophus straminiella Chambers, 1872, *Can. Ent.,* **4**: 224.

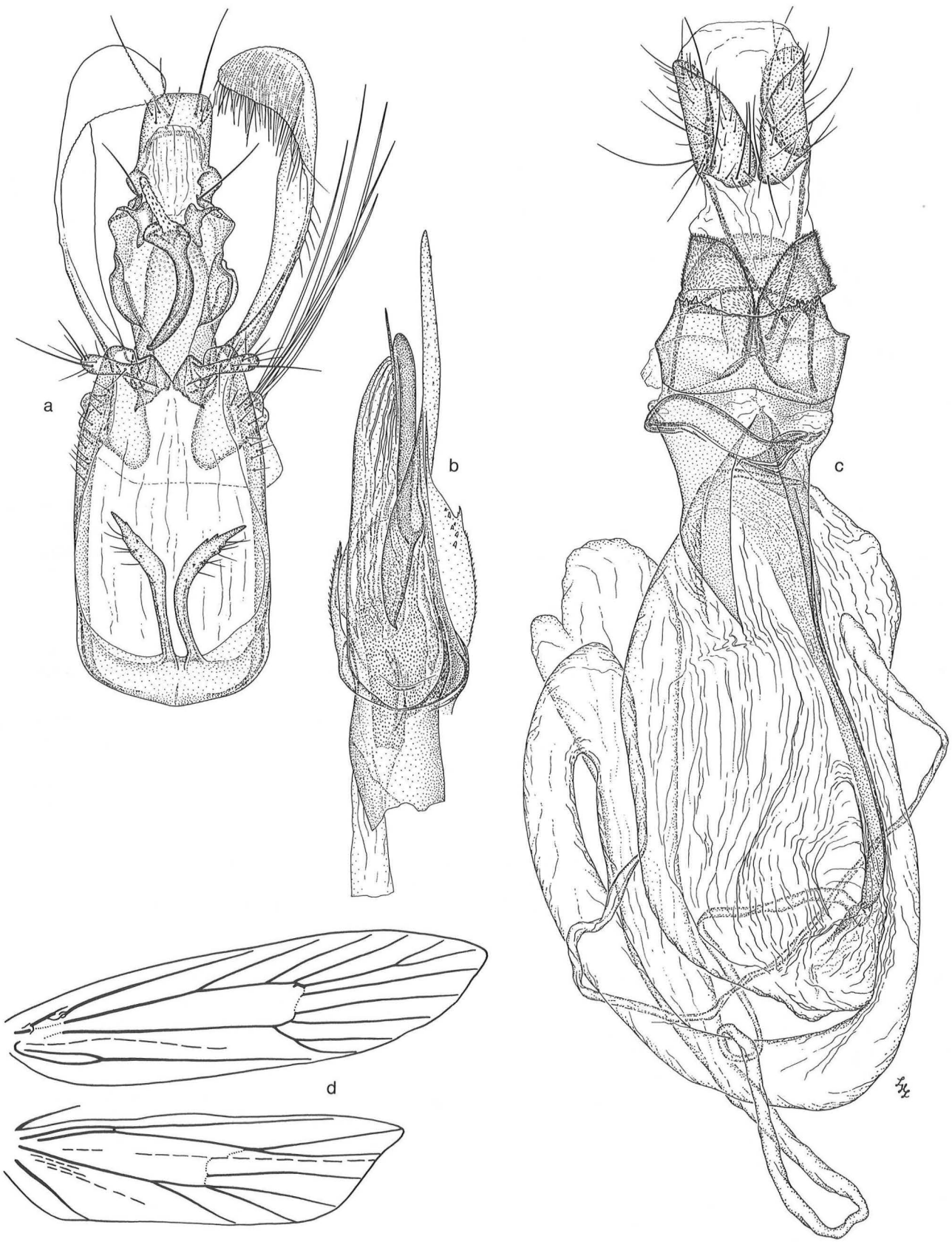

FIGURE 16: GENITALIA AND VENATION OF *DICHOMERIS PUNCTIDISCELLA*

a. Male genital capsule (USNM 10954). *b.* Aedoeagus (USNM 10954).
c. Female genitalia (USNM 9120). *d.* Venation (USNM 9117).

Type locality: Kentucky. [MCZ]

NOTE—The lectotype, ♀, present designation, bears the following labels: 1. "Type 1558"; 2. "Kentucky. Chambers."; 3. "59"; 4. "*straminiella* Chamb."; 4. "Lectotype R W Hodges."

Anarsia suffusella Chambers, 1874, *Can. Ent.*, **6**: 243. NEW SYNONYMY.

Type locality: Waco, Texas. [lost]

NOTE—This synonymy is based on the shape and color pattern of the labial palpus, the coloration of the forewing, the size of the moth, the distribution, and date of collection. A character that I would question is that Chambers described the apex of the second segment of the labial palpus as ochreous. I see this color as white or off-white. However, he described (1872: 224) the apex of the second segment of *straminiella* as "pale straw color." I have examined his specimens of *straminiella* and am confident that they are *punctidiscella* and that the color is white to off-white.

Upper surface as figured. Head with frons, maxillary palpus and base of haustellum shining grayish brown, haustellum becoming somewhat paler distally; outer surface of first and second segments of labial palpus dark grayish brown, apex of second segment white, a strong dorsal and ventral scale tuft on second segment, inner surface of first and second segments mottled pale gray and grayish brown, paler dorsally, white at apex and on dorsal tuft, third segment grayish brown anteriorly, white becoming grayish yellow distally on lateral and posterior surfaces; vertex and occiput pale yellowish gray, a row of brown scales behind eye; scape and shaft of antenna mainly pale yellowish gray, dark brown at base of anterior margin and a few brown scales scattered on dorsal surface, scales of shaft pale yellowish gray and grayish brown, alternate half segments pale and dark basally, sensory areas in male covering ventral surface of alternate half segments, a row of scales between each area, cilia about ½ depth of segments at base, in female sensory areas restricted to anteroventral margin, cilia very short, one or two on each sensory area. Thorax mainly brownish gray medially, tegula pale yellowish gray except dark brown at base. Abdomen shining yellowish gray to orange gray medially, yellowish white to pale yellowish gray laterally, scales associated with genital capsule pale orange; ventral surface mottled pale yellowish gray and yellowish white, becoming lighter caudally, caudal margins of individual segments paler than rest of segment. Foreleg mainly dark grayish brown, apexes of coxa, tibia, and tarsal segments paler. Midleg much as for foreleg except that coxa and femur are paler. Hindleg mainly pale yellowish gray, tibial spurs darker grayish brown, contrasting with tibia. Wing length 5.5–7.6 mm. Forewing pale yellowish gray with gray to grayish-brown areas, spots on cell and on fold tinged with pale to light orange, a band of pale yellowish-white (nearly white) scales at extreme anal angle; ventral surface nearly uniformly brownish gray, pale yellowish-gray to yellowish-white blotches just beyond margin of wing on costal and outer fringes. Hindwing nearly uniformly dark yellowish gray, some veins scaled with darker gray; pecten on basal ½ of cubitus. Male genitalia as illustrated; vinculum approximately equal to total length of tegumen plus uncus, arms of vinculum relatively narrow, slender throughout, saccal region slightly curved; aedoeagus relatively narrow, maximum width ⅕ length, a sclerotized free lobe on lateral margin extending beyond apex of aedoeagus, this lobe with a broadened area on basal ½, four or five teeth toward apex of this area, mediodistal part of aedoeagus with a heavily sclerotized band extending to apex, remaining lateral margin with a short lobe, cornutus absent; slender curved lobes of juxta slightly asymmetrical, curved outwardly beyond middle, lightly setose beyond ½ length, lobes narrowly connected at base; base of culcitula lightly spinose, spines scarcely visible; valva extending beyond apex of uncus; uncus nearly quadrate on caudal margin, two pairs of long setae on dorsal surface, the anterior pair longer than the posterior pair, a pair of lateral setal patches on ventral surface; base of setose patch associated with appendix appendicular short, relatively small. Female genitalia as illustrated; antrum heavily sclerotized, subquadrate, wider than long, caudal margin with series of short teeth laterally, ones toward lateral margin longest; ductus bursae lightly sclerotized; base of corpus bursae with heavily sclerotized plates, corpus bursae consisting of a medial lobe and an accessory lateral lobe extending from base of medial lobe and forming nearly a complete coil, a heavily sclerotized band running from base of corpus bursae nearly to apex on right side.

The immature stages are unknown.

Punctidiscella is highly variable in coloration of the head, thorax, and forewings. Specimens vary in the proportion of yellowish-brown overlay from very pale yellowish gray to relatively dark yellowish brown and in the presence of shining orange overlay on the dark spots on the forewing.

Punctidiscella is very near *sylphe* on genital characters; but the forewings of *punctidiscella* are yellowish gray to yellowish brown, those of *sylphe* are

dark brown. *Punctidiscella* and *empusa* are distinct on genital characters and distribution but not on maculation or coloration.

Punctidiscella occurs from southern Quebec, Ontario, and north central Nebraska to southern Florida and southeastern Texas. Adults are present in late spring and early summer, and from somewhat limited data the species appears to be single brooded.

Dichomeris diva Hodges, NEW SPECIES
PL. 1, FIG. 21; PL. A, FIGS. 7, 8; PL. R, FIG. 1.

Dichomeris diva Hodges.
Type locality: 1 mi S Patagonia, Santa Cruz Co., Arizona. [USNM]

Upper surface as figured. Head with maxillary palpus and base of haustellum dark grayish brown, haustellum becoming pale grayish brown distally; outer surface of first and second segments of labial palpus dark grayish brown, scale bases somewhat pale, scales on apical margin narrowly tipped with white, inner surface of first and second segments yellowish gray, paler dorsally, apexes of scales at apex white, a strong dorsal and ventral scale tuft on second segment, third segment brown on anterior margin, pale yellowish white at base on lateral and posterior surfaces, becoming pale yellow at apex; frons, vertex, and occiput grayish brown, scales above eye slightly paler, almost very pale yellowish gray, a row of brown scales behind eye; dorsal surface of scape of antenna dark grayish brown, ventral surface mottled dark grayish brown and pale yellowish white (mainly the latter), shaft mainly brownish gray, sensory areas in male covering ventral surface of segments at base, separated by a row of scales on alternate half segments by 1/5–1/4 length, cilia approximately 1/2 depth of segment, sensory areas much reduced in female, on anteroventral surface, cilia barely visible, very short. Thorax mainly grayish brown, central part somewhat darker than distal part of tegula. Male with a scale tuft arising from mesothoracic anepisternum. Foreleg mainly dark brownish gray, apexes of tarsal segments off-white to white. Midleg dark brownish gray; coxa paler than femur and tibia; apexes of tarsal segments white, individual tarsal segments becoming paler toward apex of each segment. Hindleg brownish gray, paler than preceding legs, mottled with somewhat darker scales; tibial spurs dark brownish gray, contrasting with color of tibia; apexes of tarsal segments off-white to white, second through fifth tarsal segments with dark brownish-gray saddles at base extending nearly to apex of each segment. Abdomen not observed before dissections were made. Wing length 5.8–6.1 mm. Forewing mottled dark and light gray brown, light streaks on outer margin of wing pale grayish yellow to yellowish white; ventral surface nearly uniformly pale yellowish gray, fringe somewhat darker with a repeat of pale yellowish-white blotches just beyond margin of membrane. Hindwing nearly uniformly pale yellowish gray, pecten on basal 1/2 of cubitus. Male genitalia as illustrated; vinculum slightly shorter than combined length of tegumen plus uncus, arms of vinculum relatively narrow throughout, slightly rounded in saccal region; aedoeagus relatively slender, maximum width approximately 1/6 that of length, a sclerotized, lateral flange extending well beyond apex, base of flange with one long and two or three very short teeth, a heavily sclerotized band in medial part of aedoeagus from about 1/2 length to apex, lacking cornuti; lobes of juxta symmetrical, slender, somewhat curved, each with scattered setae on distal 1/3, approximately 1/3 length of vinculum; valva extending beyond apex of uncus; culcitula lightly spinose, spines very fine; caudal margin of uncus broadly lobed, setae on ventral surface in two lateral patches, a pair of relatively long setae on dorsal surface and a pair of shorter setae on dorsal margin almost at apex. Female genitalia as illustrated; antrum wider than long, caudal margin with a series of short teeth (most numerous laterally); ductus bursae very broad, not well defined, a lightly sclerotized section between antrum and corpus bursae; base of corpus bursae with heavily sclerotized plates, corpus bursae comprised of a main lobe and a lateral lobe, extending from right side of main lobe near base and making nearly a complete loop around it, a heavily sclerotized band on right margin of corpus bursae at middle or slightly beyond middle, walls of corpus bursae finely lined.

The immature stages are unknown.

TYPES. Holotype: ♂. 1 mi S Patagonia, Santa Cruz Co., Arizona, 29–30 July 1964; D. R. Davis; USNM genital slide 9114. USNM. Paratype: 1 ♀. Peña Blanca Canyon, Santa Cruz Co., Arizona; September 1, 1959; R. W. Hodges. CU.

Diva may be separated from *punctidiscella* and *empusa* by having the forewings dark grayish brown rather than pale yellowish gray or grayish yellow. From *sylphe* it may be separated by lacking a pale-yellow costal margin on the forewing. Characters of

the male and female genitalia separating *diva* from these same three species are indicated in the keys.

Because *diva* has not been collected elsewhere in the Southwest and neighboring Sonora is extremely poorly known for gelechiids, I guess that the species reaches its northern limits in southern Arizona. Of the two specimens known the one collected in late July is more rubbed than the one collected in early September.

Dichomeris sylphe Hodges, NEW SPECIES PL. 1, FIG. 22; PL. A, FIGS. 9, 10; PL. R, FIG. 2.

Dichomeris sylphe Hodges.
Type locality: Archbold Biological Station, Lake Placid, Florida. [CU]

Upper surface as figured. Head with maxillary palpus dark brown; base of haustellum slightly lighter brown, becoming pale grayish brown, then slightly darker beyond ½ length; outer surface of first and second segments of labial palpus dark grayish brown, some scale bases pale, apex of second segment white, a strong dorsal and ventral scale tuft on second segment, inner surface of first and second segments pale yellowish gray dorsally, becoming grayish brown ventrally, apex broadly margined with white, individual scales with a gray band just before apex, third segment dark brown anteriorly and on most of lateral surfaces, posterior surface pale yellowish white, this area becoming restricted toward apex and not reaching extreme apex; frons grayish brown; vertex a series of pale yellowish-gray to yellowish-white scales extending around base of antenna to middle; occiput pale gray to gray brown medially, a row of yellowish-white scales above eye, a row of dark-brown scales on anterior surface at base, shaft alternating scale rows of brown and yellowish gray, sensory areas in male covering ventral surface of half segments, alternating with rows of scales, cilia approximately ½ depth of antenna, sensory areas of female restricted to anteroventral surface of shaft, cilia very short. Thorax mainly dark brownish gray or grayish brown; tegula mottled brownish gray and yellowish gray, dark brown at extreme base. Male with scale tuft from mesothoracic anepisternum. Foreleg dark brown, apex of coxa slightly paler, apex of tibia with a few yellowish-white scales, apexes of first, second, third, and fifth tarsal segments with yellowish-white to white scales. Midleg with coxa yellowish white to off-white, femur becoming darker to brown at apex, tibia and tarsus mainly brown with apexes of tarsal segments (except fourth) off-white. Hindleg paler than preceding legs, tibia shining yellowish gray on ventral surface, pale yellowish gray to yellowish white on dorsal tuft, tibial spurs dark grayish brown; tarsus mottled pale yellowish gray and grayish brown, apexes of segments pale. Abdomen yellowish gray, mottled with dark (almost brown) scale margins medially, scales of dorsal surface shining at some angles of light incidence, tuft of scales associated with genital capsule yellowish gray; ventral surface mottled yellowish gray and darker grayish brown, scales shining at some angles of light incidence. Wing length 5.4–6.6 mm. Forewing mainly dark grayish brown, a few black scales associated with spots in cell, and pale yellowish-white scales associated with same; costal margin pale yellow from base to ⅔ length; small streaks in fringe along outer margin pale yellow; extreme costa at base dark brown; undersurface grayish brown, costal margin pale yellowish white, repetition of streaks of yellowish white on outer margin. Hindwing nearly uniformly yellowish gray, pecten on basal ⅓ of cubitus. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Lake Placid, Archbold Biological Station, Florida; 1 April 1959; R. W. Hodges. CU. Paratypes: 11 ♂, 17 ♀. Same locality as for holotype; 28 March–4 April 1959 (10 ♂, 17 ♀). De Land, Florida; 27 March 1954; A. K. Wyatt (1 ♂). CU, FMNH, USNM.

Sylphe may be separated from others in the *punctidiscella* group by the forewing having a pale-yellow costal margin and lacking the pale scales on the anal margin. The male and female genitalia indicate that *sylphe* is most nearly allied with *punctidiscella*; the two species appear inseparable by these sets of characters. *Sylphe* may be a color form of *punctidiscella.* If this is so, the fact that *punctidiscella* with relatively normal coloration occurs in the Pensacola area of northwestern Florida and that *sylphe* occurs in central and south central Florida necessitates a cline or a disjunction in characters of coloration and maculation in northern Florida. Further collecting in appropriate areas may yield additional information on this point. Negative information on the distribution is that C. P. Kimball, who collected microlepidoptera intensively on Siesta Key on the west coast of Florida about 70 miles from Lake Placid, never took *sylphe* or *punctidiscella.* To judge from other species' pairs in the genus, it seems that two species, which are highly distinct on the basis

of maculation such as *achne* and *ochripalpella,* may be very similar, if separable, in genital characters.

Color and maculational differences are slight in the small type series; however, some variation occurs in the relative amounts of dark-brown scales present on nearly all surfaces. Some specimens have the antenna and thorax nearly uniformly dark brown.

Dichomeris empusa Hodges, NEW SPECIES PL. 1, FIG. 23; PL. B, FIGS. 1, 2; PL. S, FIG. 1.

Dichomeris empusa Hodges.
Type locality: West Fork, 6,500′, 16 mi SW Flagstaff, Coconino County, Arizona. [USNM]

Upper surface as figured. Head with maxillary palpus and extreme base of haustellum dark grayish brown (scale bases slightly paler), haustellum becoming very pale gray with some darker gray scales laterally; outer surface of first and second segments of labial palpus grayish brown with pale scale bases, second segment with a strong scale tuft dorsally and ventrally on distal ½, apex white, scales at apex intermingled at their bases with some pale yellowish white, inner surface of first and second segments paler than outer surface, distal ½ of second segment mainly pale with admixture of pale yellowish-white and white scales, apex nearly white, anterior margin of third segment brown, lateral and posterior surfaces pale yellowish white to white, slightly darker at apex than at base; frons brown just before eye, pale yellowish gray medially; vertex and occiput mainly pale yellowish gray, area immediately above eye paler than middle of head, a row of medium-brown scales behind eye; scape of antenna brown at base, anterior margin pale yellowish gray, dorsal surface mixed pale yellowish gray and grayish brown, dorsal surface of shaft banded with pale yellowish gray to yellowish white and brown (half segments alternating in color), ventral surface mainly pale yellowish gray, sensory areas of male covering most of ventral surface on half segments with bands of scales on alternate half segments, cilia short, less than ½ depth of segment, sensory areas in female much restricted, located on anteroventral margin of alternate half segments. Thorax with medial part of mesothorax grayish brown; lateral surface yellowish gray, scales tipped with slightly darker shades; tegula mainly yellowish gray, base brown. Foreleg with coxa and femur mottled yellowish gray and grayish brown, generally dark; tibia much the same but slightly darker, apex off-white; tarsal segments mainly grayish brown, apexes of all but fourth segment white. Midleg much as for foreleg except surfaces slightly paler, apexes of all tarsal segments with white scales. Hindleg mainly yellowish gray, dorsal surface of tibia and tibial tuft yellowish white to very pale yellowish gray, tibial spurs mainly yellowish gray, somewhat darker than tibia; tarsus mainly very pale yellowish gray, bases of segments with a darker gray saddle. Abdomen somewhat mottled pale yellowish gray and very pale yellowish gray, scales shining at certain angles of light incidence, caudal margin of some segments much paler than rest of segment, scales associated with genital capsule pale yellowish white; ventral surface mainly very pale yellowish gray medially, lateral margins darker yellowish gray at base of abdomen. Wing length 5.7–7.2 mm. Forewing with ventral surface mottled pale yellowish gray and grayish brown. Hindwing nearly uniformly yellowish gray on dorsal and ventral surfaces, pecten relatively short on basal ½ of cubitus. Male genitalia as illustrated; vinculum slightly longer than length of tegumen plus uncus, lateral arms of vinculum relatively narrow, broadly rounded (almost quadrate) in saccal region, series of setae on basal ½ in area where lobes often are present; aedoeagus as described for species-group, base of flange on right margin with a lateral lobe, latter with short teeth on margin; juxta a pair of slender lobes, right lobe curved at middle, apex pointing toward arm of vinculum, a few setae on distal ⅓ of each lobe, lobes connected by very narrow sclerotized line at base, lobes slightly longer than ½ length of vinculum; base of setose patch between tegumen and vinculum lobate, relatively short; valva extending beyond apex of uncus; cucullus lightly spinose with a narrow, medial lobe; dorsal surface of uncus with a pair of long setae and a much shorter pair nearly on caudal margin, ventral surface with a pair of lateral patches of short setae. Female genitalia as illustrated; antrum heavily sclerotized, nearly as long as broad, caudal margin with series of relatively long teeth laterally; ductus bursae not well defined; base of corpus bursae with series of heavily sclerotized plates, one extending from base nearly to anterior margin of right side of major part of corpus bursae, a lateral lobe extending from base on right side, making a complete loop around central part of corpus bursae.

The immature stages are unknown.

TYPES. Holotype: ♂. West Fork, 6,500′, 16 mi SW Flagstaff, Coconino, Co., Arizona; 4 July 1961; Ronald W. Hodges; USNM genital slide 9125. USNM.

Paratypes: 10 ♂, 2 ♀. Same data as for holotype; 4–15 July 1961. CU, USNM.

No characters of habitus have been found to separate *empusa* from *punctidiscella.* In the male genitalia of *empusa* the right lobe of the juxta is strongly angulate at the middle, and the left lobe is nearly straight; whereas in *punctidiscella* these lobes are slightly angulate at or slightly beyond ½ their length, and the apexes point laterally. The females of *empusa* have the antrum nearly square; in *punctidiscella* the antrum is decidedly broader than long. Also, the lateral teeth on the caudal margin of the antrum of *empusa* are much longer, some are nearly twice as long as broad, than in *punctidiscella* for which the maximum length is approximately equal to the basal width.

Empusa is known from the west fork of Oak Creek in north central Arizona. This locality has an interesting amalgamation of species distinctive of both the Sonoran Region to the south and the Colorado Plateau to the north. Until additional specimens have been taken in either of the two areas, it is impossible to associate the species with a region.

hirculella GROUP

Dichomeris hirculella, caia, and *ardelia* comprise the *hirculella* group in America north of Mexico. The species-group appears to be restricted to the New World with *tactica* Meyrick from Ecuador and several undescribed species from Panama and the Antilles. It is characterized by three characters of the male genitalia: the lobes of the juxta usually arising separately and far apart, the appendix appendicular bearing a large lobe that appears like a second valva, and the uncus terminating in a slender point. The female genitalia ally the species-group with *punctipennella* and *punctidiscella.*

Dichomeris hirculella Busck

PL. 4, FIG. 6; PL. B, FIGS. 3, 4; PL. S, FIG. 2. TEXT FIG. 17 *d* (RWH 2279).

Dichomeris hirculella Busck, 1909, *Proc. Ent. Soc. Washington,* **11**: 89.

Type locality: East River, Connecticut. [USNM]

NOTE—The lectotype ♀, present designation, bears the following labels: 1. "East River, Ct., July 18, 1908, Chas. R. Ely"; 2. "Type No. 12264, U.S.N.M."; 3. "*Ypsolophus hirculellus* Busck, Type"; 4. "Genitalia Slide by RWH, ♀ USNM 10684"; 5. "LECTOTYPE *Dichomeris hirculella* Bsk, By R. W. Hodges."

Upper surface as figured. Head with maxillary palpus and base of haustellum grayish brown, haustellum becoming somewhat paler distally; outer surface of first and second segments of labial palpus dark grayish brown, second segment with a strong ventro-apical tuft and a dorsal tuft, apical margin narrowly bordered with pale yellowish-gray to very pale-gray scales, inner surface of first and second segments pale yellowish gray dorsally, gradually becoming darker grayish brown ventrally, anterior surface of third segment mainly brown, rest of segment pale yellowish white, frons shining brown and grayish brown with purple and yellow reflections; vertex and occiput somewhat paler yellowish gray, shining at some angles of light incidence, scales immediately above eye pale yellowish white, a row of brown scales behind eye; scape of antenna mainly brown, anteroventral margin from beyond base to apex pale yellowish gray, ventral surface yellowish white, shaft banded with yellowish gray and grayish brown on alternate ½ segments, ventral surface yellowish white, sensory areas in male covering ½ segments, alternating with single rows of scales, cilia slightly longer than ½ depth of segment, sensory areas in female restricted to anteroventral part, cilia very short. Thorax pale to dark yellowish gray; base of tegula grayish brown, apex yellowish gray. Foreleg grayish brown, segments becoming darker distally, apex of coxa slightly paler than rest of coxa, apexes of tarsal segments and tibia pale yellowish white to white. Midleg much as for foreleg but coxa paler. Hindleg with coxa yellowish white; femur yellowish gray to grayish brown; ventral surface of tibia yellowish gray, dorsal surface yellowish white, spurs brown, apexes of spurs yellowish gray, spurs contrasting in shade with tibia; tarsal segments mainly pale yellowish gray, base of segments darker. Abdomen with dorsal surface yellowish gray to yellowish white, ventral surface much the same. Wing length 5.1–6.0 mm. Forewing mainly grayish brown, many scale bases pale, giving surface a blotchy appearance, dark areas grayish brown, light areas yellowish white; undersurface mainly yellowish gray, base of fringe mainly yellowish white, fringe becoming darker yellowish gray apically. Hindwing yellowish gray, base of fringe pale yellowish white; undersurface yellowish gray on costal ½, becoming paler or yellowish white on posterior ½, area between cubitus and fold with opaque yellowish-white to orange-white scales in male; pecten long on base of cubitus. Male genitalia as illustrated; vinculum about 1⅓ length of tegumen plus uncus, margin slightly incurved medially in saccal region, lateral arms relatively uniform in width with a ventral, toothed projection near base; ae-

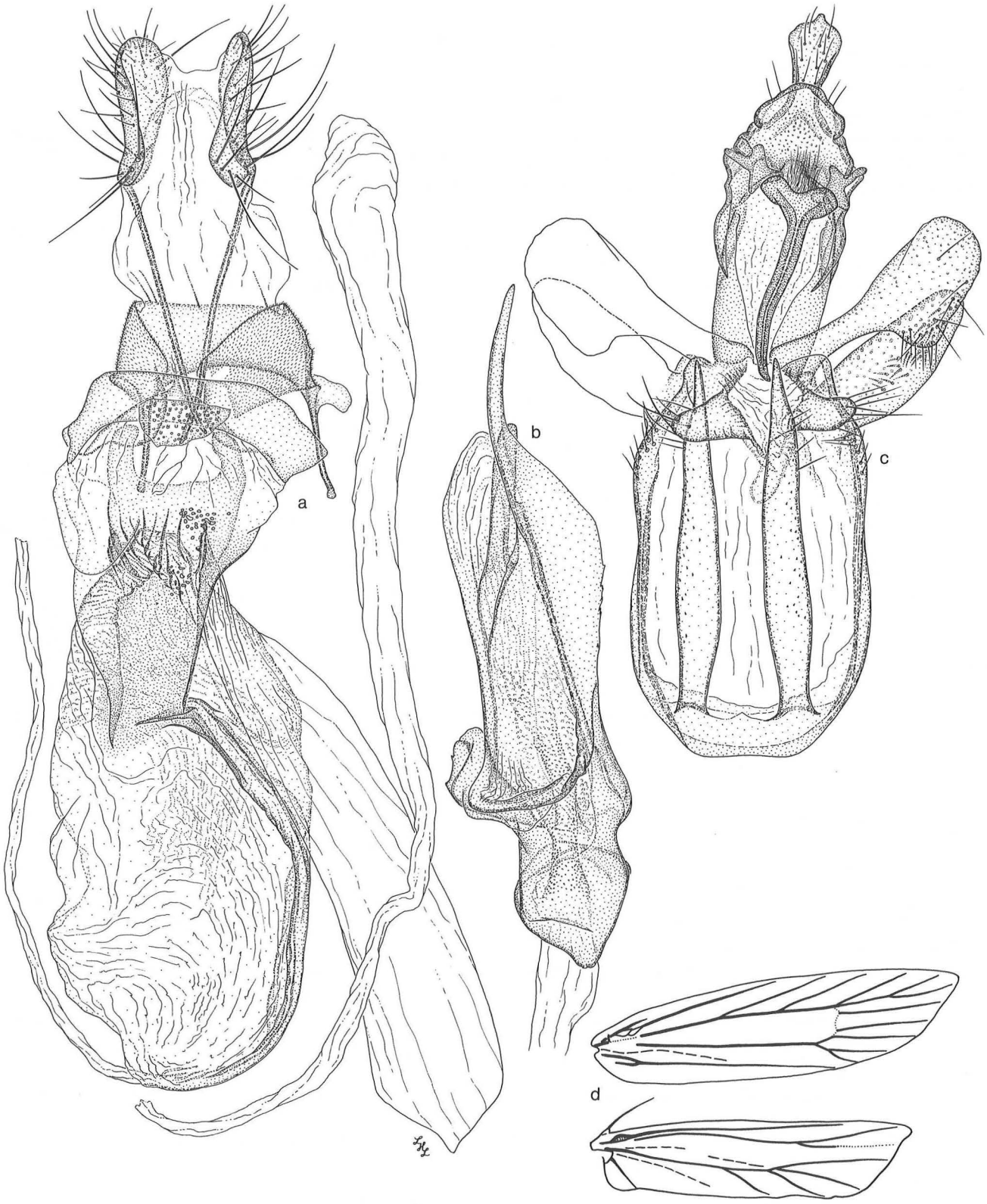

FIGURE 17: GENITALIA AND VENATION OF *DICHOMERIS HIRCULELLA* GROUP

a. Dichomeris caia, female genitalia (USNM 9134); *b.* Aedoeagus (USNM 9130); *c.* Male genital capsule (USNM 9130). *d. Dichomeris hirculella,* venation (USNM 9142).

doeagus with a heavily sclerotized rod on right margin beyond zone, apex of rod slightly exceeding apex of aedoeagus, a second, medial rod is shorter than lateral one and curved near base, left margin of aedoeagus with a heavily sclerotized, short rod from zone; lobes of juxta asymmetrical, connected basally, right one relatively straight, left one curved with apex directed medially, ventrolateral margins of these lobes with series of short teeth from just before middle nearly to apex; valva short, approximately equal to length of tegumen; culcitula rounded, spinose; uncus tear shaped, ending in a short spine, very few setae on ventral surface. Female genitalia as illustrated; antrum heavily sclerotized, quadrate, longer than wide, caudal margin nearly straight medially, projecting posteriorly on lateral margin; ductus bursae not clearly defined or clearly separated from corpus bursae and antrum, heavily sclerotized; corpus bursae a medial lobe and a lateral lobe, lateral lobe arising from right side at base and coiled nearly around rest of corpus bursae.

The immature stages are unknown.

The few specimens of *hirculella* are very similar in appearance, and adults of *caia* and *ardelia* are extremely similar. Males can be distinguished by the opaque yellowish to orange-white scales between the cubitus and fold on the undersurface of the hindwing. Genital characters that separate the three species are given in the keys.

The few specimens were collected at the type locality in July and early August, and one other was collected in New Hampshire.

Dichomeris caia Hodges, NEW SPECIES
PL. 4, FIG. 7. TEXT FIG. 17 *a–c.*

Dichomeris caia Hodges.
Type locality: Putnam County, Illinois. [USNM]

Upper surface as figured. Habitus as for *hirculella* except that the undersurface of the hindwing is nearly uniformly yellowish gray and the cubital pecten is on the basal ½ of the cell. Wing length 4.2–5.6 mm. Male genitalia as illustrated; vinculum slightly longer than length of tegumen plus uncus, arms of vinculum relatively slender, margin slightly flattened in saccal area; aedoeagus with a lateral flange on right side, apex of flange extended to a slender point ending beyond apex of aedoeagus, right margin with a heavily sclerotized lobe at zone, a heavily sclerotized band on distal ⅓ of aedoeagus; lobes of juxta symmetrical, slender, nearly as long as vinculum, lobes separated at base, apex of each pointed, series of setae on distal ½ of each lobe; base of setal patch between tegumen and vinculum enlarged, forming what appears to be a second pair of valvae; culcitula lightly spinose; uncus nearly tear shaped with a terminal spine, a few scattered setae on ventral surface. Female genitalia as illustrated; antrum broader than long, caudal margin rounded, without teeth; ductus bursae not well defined, either base of corpus bursae or ductus bursae with heavily sclerotized band running from base to apex on right side of corpus bursae; an accessory bursa starting from right side of corpus bursae and paralleling right margin of corpus bursae.

The immature stages are unknown.

TYPES. Holotype: ♂. Putnam Co., Illinois; 11 June 1947; M. O. Glenn; USNM genital slide 9133. USNM. Paratypes: 18 ♂, 4 ♀. Same locality as for holotype; 7 July 1940, 25 August–2 September 1948 (3 ♂, 1 ♀). Hyattsville, Maryland; September 1906; Aug. Busck (1 ♂). Plummers I [Montgomery Co.], Maryland; June, 1 September 1903; Aug. Busck (2 ♂). 3 mi E Balsam, Jackson Co., North Carolina, 1132 m; D. and M. Davis; 11 July 1974 (1 ♂). Highlands, 3,865′, Macon Co., North Carolina; 15, 20 July 1958; R. W. Hodges (1 ♂, 1 ♀). Mineral Springs, Adams Co., Ohio; 12 September 1928; A. F. Braun (1 ♂). Oak Station, Allegheny Co., Pennsylvania; 19 June 1908; F. Marloff (1 ♂). Washington, D.C.; May, June 1901, 1902; A. Busck (4 ♂). White Point Beach, Queens Co., Nova Scotia; 22–28 July 1934; J. McDunnough (2 ♂, 1 ♀). Blackburn, Ontario; 7 July 1939, G. A. Hobbs (1 ♂). Kiloloe, Ontario; 24 July 1935; F. A. Urquhart (1 ♂). Ottawa, Ontario; 24 July 1905; C. H. Young (1 ♀). CNC, LACM, USNM.

Caia is readily separable from *hirculella* and *ardelia* by genital characters as indicated in the keys. In general habitus it is extremely similar to the same species. From the sympatric *hirculella,* males of *caia* differ by having uniformly yellowish-gray scales on the undersurface of the hindwings.

Observed variation is limited to wing length and relative amounts of dark gray-brown and pale yellowish-gray marks on individual scales. The geographic distribution is from Nova Scotia and southern Ontario to central Illinois, southern Ohio and the southern Appalachian mountains in North Carolina.

Dichomeris ardelia Hodges, NEW SPECIES
PL. 4, FIG. 8; PL. B, FIGS. 5, 6; PL. S, FIG. 3.

Dichomeris ardelia Hodges.
Type locality: Archbold Biological Station, Lake Placid, Florida. [USNM]

Upper surface as figured. Head with maxillary palpus and base of haustellum dark grayish brown, haustellum becoming paler grayish brown by ¼ length; outer surface of first and second segments of labial palpus dark grayish brown, apexes of scales at apex of second segment pale gray, a strong ventral tuft and a moderate dorsal tuft on second segment, inner surface of first and second segments pale gray on dorsal ⅔, grayish brown on ventral margin, third segment slightly shorter than second segment; frons shining brown, yellowish to golden scintillations at certain angles of light incidence; vertex and occiput mainly grayish brown, scales tipped slightly paler, scales above eye yellowish white, a row of brown scales behind eye; scape of antenna brown, an anteroventral yellowish-white patch from about ½ length nearly to apex and a few yellowish-white scales on apex dorsally, shaft mottled brown and pale yellowish gray (not distinctly banded), sensory areas of male separated by a row of scales on alternate half segments, sensory areas narrower than scaled areas, cilia approximately ½ depth of segment, sensory areas of female restricted to anteroventral margin of segments. Thorax mainly grayish brown, slightly paler medially; apex of tegula with pale grayish-yellow scales. Foreleg shining dark grayish brown, apexes of coxa, femur, and tarsal segments with white scales except for fourth tarsal segment. Midleg much as for foreleg except coxa much paler, almost yellowish gray. Hindleg pale yellowish gray, tibial spurs mainly shining brown, apexes off-white, main part of spur contrasting with yellowish gray of tibia; apexes of all tarsal segments yellowish white to white. Abdomen shining gray to yellowish gray, scales associated with genital capsule pale yellowish gray to yellowish white. Wing length 4.1–4.9 mm. Forewing mainly grayish brown, spotted with darker brown, pale areas yellowish white; ventral surface mainly yellowish gray, costal margin brown, series of pale yellowish-white blotches on margin. Hindwing mainly yellowish gray, pecten on basal ½ of cubitus. Male genitalia as illustrated; vinculum slightly longer than length of tegumen plus uncus, lateral arms with a ventrally projecting flange from near base to about ⅝ length, saccal margin flattened medially; aedoeagus relatively slender, heavily sclerotized band and rod on right margin beyond zone with series of 4–5 strong teeth, apex of rod not reaching apex of aedoeagus, left side of aedoeagus with a short, heavily sclerotized lobe at zone, a lightly sclerotized medial band from ¾ length to apex of aedoeagus; lobes of juxta nearly symmetrical, connected at base, apexes of lobes bifurcate, three or four setae at middle of bifurcation, lobes ⅗ length of vinculum; valva short, approximately equal to length of tegumen; culcitula spinose, base somewhat triangular; uncus tear shaped, drawn to a point apically, series of short setae on ventral surface. Female genitalia as illustrated; antrum very broad, approximately four times as wide as long, caudal margin slightly rounded, nearly flat in middle; ductus bursae heavily sclerotized with numerous, heavily sclerotized plates; corpus bursae relatively short, a heavily sclerotized band on right margin, an accessory bursa extending from base of corpus bursae on right side and nearly making a complete circle around central part of corpus bursae.

The immature stages are unknown.

TYPES. Holotype: ♂. Archbold Biological Station, Lake Placid, Florida; 1–7 May 1964; R. W. Hodges; USNM genital slide 9138. USNM. Paratypes: 4 ♂, 6 ♀. Same locality as for holotype; 1 April 1959, 1–7 May 1964 (2 ♀). Fisheating Cr., Palmdale, Florida; 7–10 May 1964; R. W. Hodges (2 ♀). Homestead, Florida; 12 March 1964; D. O. Wolfenbarger (1 ♂). Parker Is., Highlands Co., Florida; 4–7 June 1964; R. W. Hodges (2 ♂). Lakeland, Florida; 4 March 1918; C. N. Ainslie (1 ♀). Orlando, Florida; 16 February 1918; G. G. Ainslie (1 ♀). Royal Palm State Park, Florida; 17–18 March 1939; J. C. Bradley (1 ♂). CU, FSCA, and USNM.

Ardelia is nearest *caia* in maculation but usually may be separated by the more generally uniform dark grayish-brown coloration, and the head is much darker than that of *caia*. The geographic range of *ardelia* is allopatric with those of *caia* and *hirculella*.

The sexes are slightly dimorphic: the scale tuft on the ventral surface of the second segment of the labial palpus is shorter in the female than in the male.

siren GROUP

Dichomeris siren is the only species in the group in America north of Mexico. *Dichomeris latescens* (Walsingham) from Veracruz and Tabasco, Mexico is a member of the group as may be *Dichomeris ceramoxantha* (Meyrick) from Gorgona Island, Colombia. *Ceramoxantha* is known from a single female; thus, genital characters cannot be compared,

but it is very small, has a shining color pattern, and has veins R_4 and R_5 fused in the forewing. Characters of the species-group are: ocellus present; male with tuft of scales from mesothoracic anepisternum; forewing with R_4 and R_5 fused, R_3 separate or stalked with R_{4+5}; hindwing with a pecten on basal half of the cubitus; juxta paired symmetrical lobes that are joined at the base; aedoeagus free, cornutus absent, with sclerites beyond the zone; culcitula with very fine, relatively sparse projections; uncus with short, fine setae on ventral surface, dorsal surface with two or more long setae; female unknown.

I have tentatively associated the species-group with the *punctidiscella* and *hirculella* groups because of the sclerites on the distal part of the aedoeagus, lack of a cornutus, and the relatively fine setae on the ventral surface of the uncus.

Dichomeris siren Hodges, NEW SPECIES
PL. 4, FIG. 9. TEXT FIG. 18 *a–d.*

Dichomeris siren Hodges.
Type locality: Henson Creek, Oxon Hill, Maryland. [USNM]

Upper surface as figured. Head with maxillary palpus and haustellum dull pale yellowish white, haustellum becoming paler, almost white, distally; outer surface of first and second segments of labial palpus shining pale yellow, apex almost white, inner surface pale yellow, apex almost white, ventral surface with scales directed away from axis of segment, dorsal surface lacking tuft, third segment yellowish gray on anterior surface, pale yellowish white on posterior surface; frons very pale yellowish white medially, scales margining eye light yellow; vertex and occiput shining pale yellow with a gray overlay, row of scales behind eye yellowish gray; scape of antenna shining yellowish white, a few pale yellowish-gray scales on dorsal surface at apex, shaft alternating bands of pale yellowish white and yellowish gray, ventral surface yellowish white, sensory areas in male covering most of segment, alternating with single rows of scales, cilia approximately equal to depth of segment in male. Thorax mottled shining grayish yellow and pale yellow, grayish yellow medially, pale yellow on tegula. Male with tuft of scales arising from anepisternum. Foreleg shining grayish yellow with scintillations of yellowish. Midleg shining grayish yellow, tibia and tarsus yellowish gray, apexes of tarsal segments with pale yellowish-white scales. Hindleg with coxa and femur shining pale yellow, almost white; tibia yellowish white to off-white, tibial spurs nearly concolorous; tarsus shining yellowish white, apexes of segments paler. Abdomen dark gray with shining yellow and purple reflections on upper surface; ventral surface mainly pale yellow, becoming yellowish gray distally with shining reflections; male genital capsule pale yellow. Wing length 3.1–3.8 mm. Forewing with light areas shining pale to light yellow, dark areas grayish yellow with reflections of pale yellow at certain angles of light incidence, scales of fringe pale yellowish white at extreme apex; undersurface mainly yellowish gray, area dorsad of fold pale yellowish white, cilia on outer margin pale yellow. Hindwing yellowish gray, pecten on base of cubitus. Male genitalia as illustrated; vinculum shorter than length of tegumen plus uncus, lateral arms relatively narrow, saccal region flat and almost at right angle with lateral arms, a subtriangular, lightly sclerotized lobe extending ventrally from lateral arm at approximately ⅓ length; aedoeagus slender, a heavily sclerotized, slender lobe on right margin with apex extending slightly beyond apex of aedoeagus, a heavily sclerotized band on right margin paralleling lobe that extends to apex, cornutus absent; lobes of juxta symmetrical, shorter than vinculum, joined at base, subparallel and approaching each other distally; culcitula finely spinose, rounded; valva longer than length of tegumen plus uncus; dorsal surface of uncus with a pair of long setae arising submedially, setae on ventral surface sparse, very short; base of setal patch between tegumen and vinculum lobate. Female genitalia: no specimens known.

The immature stages are unknown.

TYPES. Holotype: ♂. Henson Creek, Oxon Hill [Prince George's Co.], Maryland; 7 August 1978; D. R. Davis. USNM. Paratypes: 9 ♂. Same locality and collector as for holotype; 7 July, 17 September 1978, 8 September 1979 (4 ♂). East River, Connecticut; August 1911; Chas. R. Ely (1 ♀). Ocqueoc Lake [Cheboygan Co.], Michigan; 25–26 July 1970; RW and ER Hodges (1 ♂). Essex Co. Park, New Jersey; 24 June; W. D. Kearfott (2 ♂). Bull Run Park, Fairfax Co., Virginia; 20 May 1962; R. W. Hodges (1 ♂). USNM.

Siren is the smallest species of *Dichomeris* in America north of Mexico. Additionally, the shining coloration of the forewings, head, and thorax will serve to separate it from all others. I judge that it has been infrequently collected because of its small size.

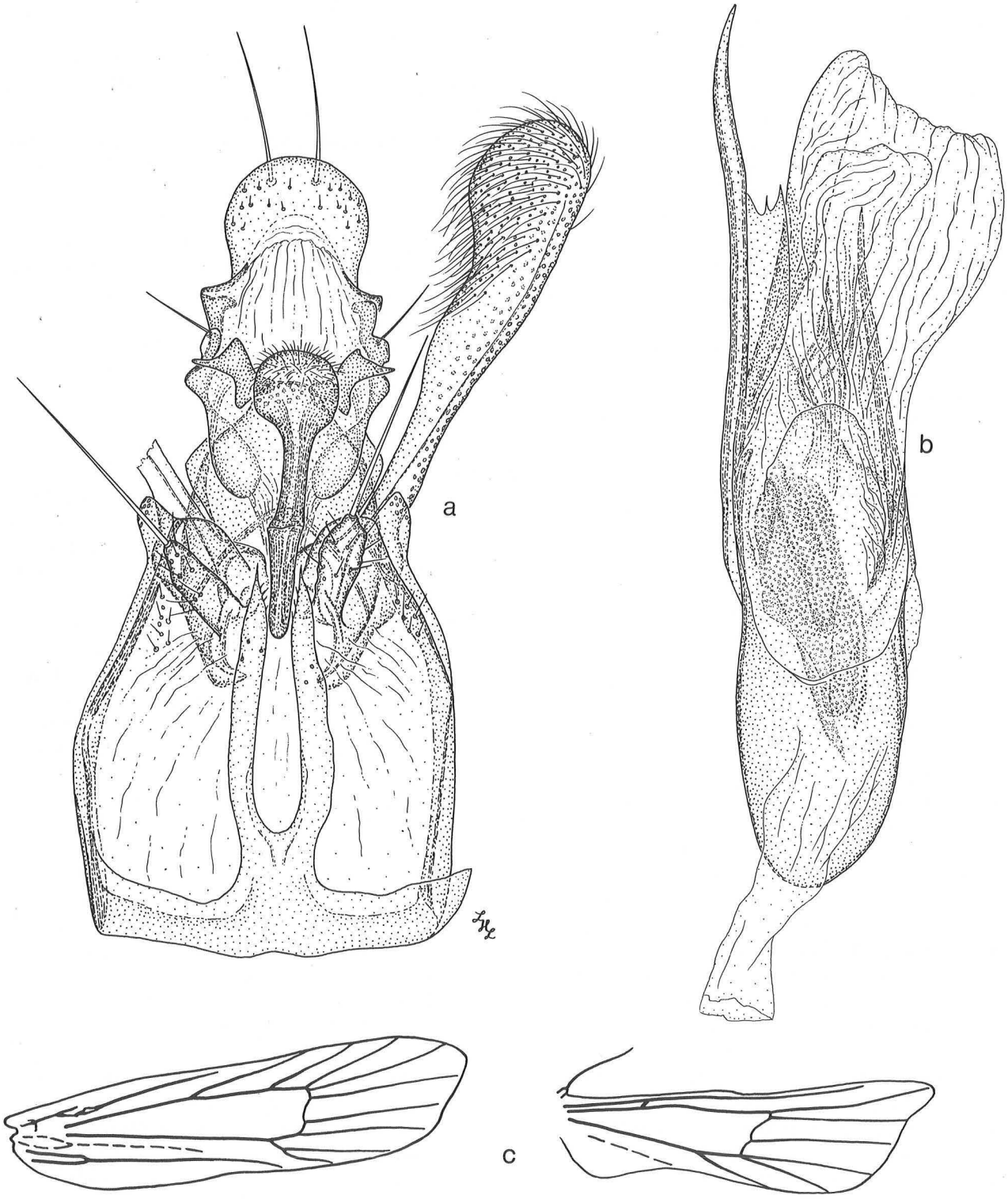

FIGURE 18: GENITALIA AND VENATION OF *DICHOMERIS SIREN*
a. Male genital capsule (USNM 9298). *b.* Aedoeagus (USNM 9298). *c, d.* Venation (USNM 9297).

flavocostella GROUP

Dichomeris flavocostella and *fistuca* comprise this species-group, and they occur in eastern North America. The species-group is characterized by the second segment of the labial palpus tufted on the dorsal surface only; the male lacking a scale tuft on the mesothoracic anepisternum; the cubital pecten absent; the male genitalia with a pair of large lobes arising from the distal part of the vinculum, the lobes of the juxta lightly sclerotized, the aedoeagus with a single cornutus and lacking lobes from the zone; and the female genitalia with the corpus bursae heavily sclerotized, and the posterior margin of the eighth sternum with a pair of lateral lobes.

Genital characters indicate that *flavocostella* and *fistuca* are very closely related, whereas characters of the habitus ally *flavocostella* with *aleatrix* and *fistuca* with *inserrata.*

Dichomeris flavocostella (Clemens)

PL. 1, FIG. 24. TEXT FIG. 19 *a–d* (RWH 2295).

Gelechia? *flavocostella* Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 162.
Type locality: Brunswick, Maine. [ANSP]

Upper surface as figured. Head with maxillary palpus pale yellow tinged with yellowish gray distally; haustellum grayish brown; outer surface of first and second segments of labial palpus light orange on ventral margin, some light orange to off-white on dorsal tuft, a broad orange-gray band running from base of first segment almost to apex of second, second segment tufted dorsally, inner surface of first and second segments pale yellow to yellowish white, paler (almost white) on first and base of second segments, gradually darkening, third segment light orange, apex brown; frons pale orange, area in front of eye between base of antenna and haustellum grayish brown; vertex and occiput with metallic gray brown medially, scales above eye pale orange, bases of these scales almost white, a row of brown scales behind eyes; ventral surface of scape of antenna yellowish white, anterior margin slightly darker, dorsal surface grayish brown, yellowish white and pale yellow continued on ventral surface of shaft and gradually darkening toward apex, dorsal surface with light orange on first or second segments, then dark olive brown to gray brown for rest of length, sensory areas in male broad, covering ventral surface of ½ segments, each area separated by a row of scales on alternate ½ segments, cilia equal to approximately ⅔ depth of segment at base, sensory areas in female much restricted on anteroventral margin, each almost triangular in shape, cilia very short. Thorax with pro- and mesothorax dark grayish brown medially, extreme lateral margin of mesothorax and most of tegula pale yellowish white, base of tegula brown. Foreleg dark grayish brown becoming darker distally; coxa somewhat mottled grayish brown, inner margin pale yellowish gray; femur and tibia darker gray brown, margin of epiphysis yellowish gray; apexes of tarsal segments yellowish white. Midleg with coxa yellowish gray and pale gray, mottled basally; femur and tibia mainly gray brown; tarsus dark gray brown, apexes of segments yellowish white. Hindleg with coxa mottled pale yellowish white and yellowish gray; femur yellowish gray; ventral surface of tibia yellowish gray, tibial spurs somewhat darker, dorsal surface of tibia and tuft pale yellowish gray; apexes of tarsal segments yellowish white, dorsal surface of first segment yellowish white to white, becoming somewhat darker on distal ⅖. Abdomen shining yellowish gray and grayish brown with violet and yellow reflections dorsally, scales associated with genital capsule yellowish white; ventral surface mottled yellowish gray and gray brown, much darker than dorsal surface. Wing length 6.5–8.1 mm. Forewing with costal margin mainly yellowish white, extreme costa gray from base to ¼ length of wing, then costa lightly suffused with yellowish gray, dark margins mainly brown blotched with grayish brown, light marks on outer fringe yellowish white or pale yellow; ventral surface mainly gray brown, area dorsad of fold paler. Hindwing yellowish gray, cubital pecten absent; ventral surface much the same, costal ⅓ of wing darker than rest of wing. Male genitalia as illustrated; vinculum slightly longer than length of tegumen plus uncus, lateral arms relatively slender, either relatively straight or gently curved in saccal region, a pair of asymmetrical, very broad ventral lobes from distal ½ of arms, right lobe longer than left one; aedoeagus relatively broad, with a long, stout cornutus, right margin beyond zone with a heavily sclerotized band, becoming a free lobe at apex (apex of this lobe extending beyond membranous portion of aedoeagus); lobes of juxta joined at base, lightly sclerotized, asymmetrical, right lobe longer than left one; base of setose patch between base of tegumen and vinculum rounded, hemispherical; valva almost attaining apex of uncus; culcitula spinose with a folded ridge in middle; caudal margin of uncus rounded, lateral margins slightly excavated beyond base, numerous setae on ventral surface in a pair of lateral patches, a pair of relatively long setae on dorsal

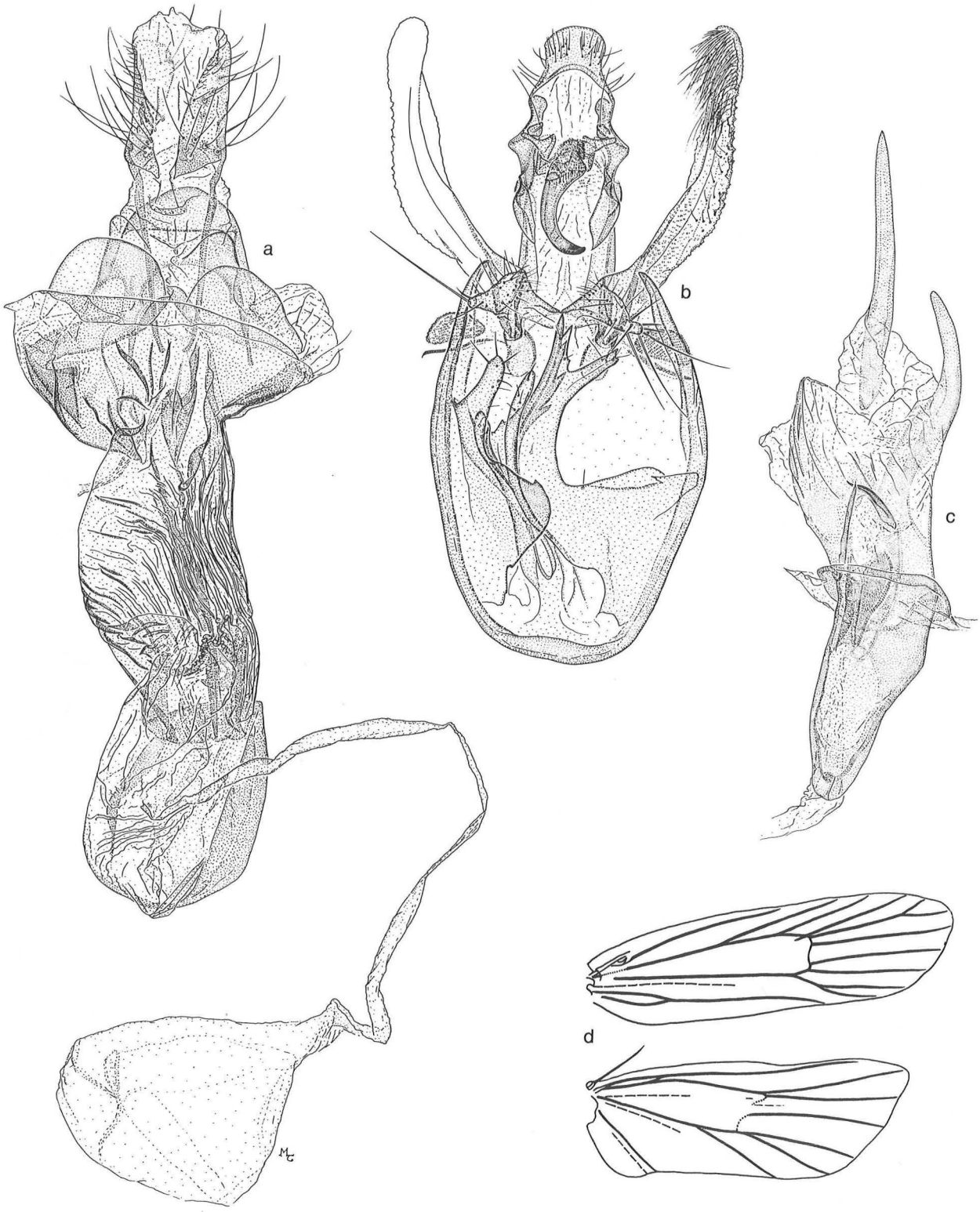

FIGURE 19: GENITALIA AND VENATION OF *DICHOMERIS FLAVOCOSTELLA*

a. Female genitalia (USNM 9336). *b.* Male genital capsule (USNM 9338). *c.* Aedoeagus (USNM 9338). *d.* Venation (USNM 9335).

surface near caudal margin. Female genitalia as illustrated; antrum with a pair of slightly asymmetrical lobes on caudal margin; antrum, ductus bursae, and corpus bursae not separable as discrete units, heavily sclerotized, part between antrum and anterior ⅓ of corpus bursae with numerous striae; anterior part of corpus bursae with heavily sclerotized dorsal wall, ventral walls less heavily sclerotized; accessory bursae arising from near anterior margin of corpus bursae with a slender duct leading to bursa; an incurved, spiculose lobe on ventral wall of antrum; eighth sternite emarginate medially; eighth tergite rounded.

The larva is a leaf tier on goldenrod (*Solidago* species) and aster (*Aster* species).

Adults from the northern part of the range often have a suffusion of gray to grayish-brown scales on the yellow costal area. Those from the southern coastal plain tend to have the yellow on the forewings more intense than elsewhere. In the male genitalia the lobes of the vinculum may terminate in a varying number of points, and the left lobe varies in basal width. Adults are very similar to those of *aleatrix* and *fistuca* but can be distinguished as indicated in the keys. Normally, the posterior margin of the yellow mark on the forewing is evenly curved as contrasted with the series of arcs of *aleatrix* and *fistuca*.

Flavocostella occurs from southern Quebec and Ontario west to Winnipeg, Manitoba and south to Arkansas and Florida. In the north it is univoltine with adults present in June, July, and August. It may be bivoltine in the southern part of its range. A questionable record is a specimen labelled Victoria, British Columbia.

Dichomeris fistuca Hodges, NEW SPECIES
PL. 1, FIG. 25; PL. B, FIGS. 7, 8; PL. T, FIG. 1.

Dichomeris fistuca Hodges.
Type locality: Wedge Plantation, McClellanville, Charleston County, South Carolina. [USNM]

Upper surface as figured. Head with maxillary palpus yellowish white; base of haustellum yellowish gray, yellowish-white scales laterally, becoming very pale yellowish gray distally; outer surface of first segment of labial palpus yellowish gray, second segment orange to orange gray on ventral margin and outer surface, mottled with orange gray and yellowish white dorsally, inner surface of first and second segments light orange on ventral margin, becoming pale yellowish white dorsally, second segment slightly tufted dorsally, third segment light orange, slightly paler on posterior surface, a few brown scales toward apex on anterior surface; frons yellowish white, a row of dark-brown scales in front of eye between base of antenna and haustellum; vertex and occiput shining yellowish gray medially, yellowish white immediately above eye, becoming light orange before gray area, a row of brown scales behind eye; scape of antenna with a few dark-brown scales on anterior margin at base, ventral surface and anterior margin pale yellow to yellowish white, a few gray scales on dorsal surface, basal one or two segments of shaft with yellowish white, then shining dark brown to apex, sensory areas in male and female broad, covering most of ventral surface, separated by a row of scales on alternate half segments, cilia equal to or slightly longer than depth of segment at base in male and approximately equal to ½ depth of segment at base in female. Thorax dark grayish brown, almost black, scales with pale bases, particularly at apex of mesothorax, a narrow band of yellowish white on lateral margin of mesothorax; tegula light orange, extreme base brown. Forewing with costal margin light orange, becoming yellowish white just before dark area, extreme costa at base gray brown, dark area immediately posterad of costal light zone black, then becoming mottled gray and darker gray with purple reflections, pale scales at base of fringe yellowish white; ventral surface pale yellow on costal margin, mottled yellowish gray and slightly darker grayish brown on rest of surface. Hindwing yellowish gray, some veins slightly darker. Foreleg mottled grayish brown with pale scale bases, apex of coxa and base of femur pale yellowish gray, apex of tiba and inner surface of epiphysis yellowish white, apexes of tarsal segments yellowish white. Midleg much as for foreleg, apexes of tibial spurs yellowish white, ventral surface of tarsal segments two, three, and four mottled yellowish white and gray. Hindleg with coxa shining yellowish gray, off-white, and gray brown, an admixture of white to off-white scales laterally; femur mainly grayish brown with some paler scales; tibia gray brown on ventral surface, yellowish gray dorsally, apexes of tibial spurs yellowish white, apex of segment yellowish white; tarsal segments gray brown ventrally, mottled gray brown and yellowish white dorsally, apexes of all segments yellowish white. Abdomen with dorsal surface shining yellowish gray and grayish brown, scales associated with genital capsule in male mot-

tled yellowish white and yellowish orange; ventral surface shining yellowish gray mottled with paler scales. Wing length 5.4–6.5 mm. Male genitalia as illustrated; vinculum about equal to length of tegumen plus uncus, arms of vinculum relatively narrow, broadly rounded in saccal region, a pair of asymmetrical, very broad lobes extending ventrally from lateral arms; lobes of juxta not connected basally, short, about ⅓–⅖ length of vinculum; aedoeagus with a stout, broad-based cornutus, right margin beyond zone heavily sclerotized with an extension to a slender lobe; base of setose patch between tegumen and vinculum small, elliptical; valva attaining apex of uncus; culcitula spinose, rounded; caudal margin of uncus broadly rounded, lateral margins slightly incurved near base, a pair of lateral setal patches on ventral surface, setae relatively short, a pair of long setae on dorsal surface. Female genitalia as illustrated; antrum, ductus bursae, and corpus bursae heavily sclerotized, scarcely differentiated; antrum tapering slightly anteriorly, caudal margin of antrum a pair of broadly rounded lobes; a series of deep striae on middle region of corpus bursae, anterior part of corpus bursae with dorsal wall more heavily sclerotized than ventral wall; an incurved, spiculose lobe from ventral wall of antrum; caudal margin of eighth sternite emarginate; caudal margin of eighth tergite rounded.

The immature stages are unknown.

TYPES. Holotype: ♂. USA: S. CAR. Charleston Co., McClellanville, Wedge Plantation; 27 Apr. 1981; at light; Ronald W. Hodges. USNM. Paratypes, 12 ♂, 4 ♀. Same locality as for holotype; 27 Apr., 5 May (2 ♂, 1 ♀). Same data as for holotype, except Fairfield Plantation; 5 May 1981 (1 ♂). Archbold Biological Station, Highlands Co., Florida; 24 March, 2 April 1963; S. W. Frost (1 ♂, 1 ♀). Same locality; 28, 31 March 1959; R. W. Hodges (3 ♂). Cassadaga, Florida; 21 May 1962; S. V. Fuller (1 ♀). Gainesville, Alachua Co., Florida; 2 April–3 May (3 ♂). Pensacola, Florida; 23 May 1962; Shirley Hills (1 ♀). Siesta Key, Sarasota Co., Florida; 13 June 1957; C. P. Kimball (1 ♂). Maxton, North Carolina; 2 June 1944; A. B. Klots (1 ♂). AMNH, CU, FSCA, USNM.

Fistuca is extremely similar to *inserrata* in maculation but differs by having the black scales posterad of the yellow-orange costal zone intensely black and followed by scales that are gray with purple reflections to the posterior margin. In *inserrata* the black scales have paler bases, and the dark-gray zone lacks purple reflections. The genitalia ally *fistuca* with *flavocostella.*

inversella GROUP

Dichomeris inversella, kimballi, and an undescribed species from Texas (represented by a worn, female specimen) comprise the *inversella* group in America north of Mexico. Other, undescribed species are known from Mexico and Costa Rica. Characters of the group are ocellus absent or *very* weak; juxta a single lobe; a broad, sclerotized lobe arising from distal ½ of lateral arm of vinculum; aphophyses anteriores short; ductus bursae defined; bursa copulatrix without sclerotized ridges; and very long, slender spicules in the wall of the corpus bursae.

Dichomeris inversella (Zeller), REVISED COMBINATION

PL. 1, FIGS. 26–29. TEXT FIGS. 4 *c*; 20 *a–d* (RWH 2310).

Epicorthylis inversella Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 248, pl. 3, fig. 13a, b.

Type locality: (Dallas County), Texas. [MCZ]

NOTE—Zeller (1872: 449) said that specimens received for study from the Museum in Cambridge (MCZ) and collected by Boll were from Dallas County, Texas. The holotype bears a label "Texas, Boll." Thus, Dallas County is given as the type locality.

Upper surface as figured. Head with maxillary palpus and base of haustellum mottled brown and pale gray brown; outer surface of first and second segments of labial palpus brown, scale bases off-white, extreme base of second segment darkest, strong dorsal tuft on distal ½ of second segment, apexes of scales on apical margin of second segment off-white, inner surface of first and second segments much the same as for outer surface, third segment relatively short, appearing to arise from ventral part of second segment, basal ½ to ⅔ white, an incomplete, brown ring at ⅔ length, extreme apex white; frons, vertex, and occiput mottled grayish brown and pale gray, medial part of these surfaces paler than surrounding area, bases of scales immediately above eye pale, a row of brown scales behind eye; scape of antenna dark gray brown, shaft dark gray brown, becoming slightly paler distally, sensory areas in male broad, covering ventral surface of ½ segments, alternating with rows of scales, cilia approximately ⅓ depth of segment at base, sensory areas in female somewhat more restricted than in male, covering much of ven-

FIGURE 20: GENITALIA AND VENATION OF *DICHOMERIS INVERSELLA*

a. Aedoeagus (USNM 9451). *b.* Venation (USNM 9453).
c. Male genital capsule (USNM 9451). *d.* Female genitalia (USNM 9450).

tral surface, areas separated by a row of scales on alternate ½ segments. Thorax mottled gray brown and pale gray, apexes of scales at apex of tegula pale gray. Forewing mottled brown, grayish brown, and pale yellowish gray, this combination of colors comprising the pattern; undersurface mainly grayish brown, a few pale streaks on margin of wing, area dorsad of fold paler than rest of wing. Hindwing yellowish gray, pecten strong on basal ½–⅔ of cubitus. Foreleg dark brown, scale bases very pale, giving mottled effect, apex of tibia and some tarsal segments with a few yellowish-white or grayish-white scales. Midleg with coxa mainly very pale gray on lateral surface, grayish brown medially; femur, tibia, and tarsus dark brown with pale scale bases; apexes of tibial spurs pale gray; apexes of tarsal segments 1, 2, and 5 with pale scales. Hindleg with coxa mainly pale yellowish gray to yellowish white; femur mottled pale gray and darker gray; ventral surface of tibia mainly medium gray with scales pale tipped, dorsal surface mainly yellowish gray, a moderately long scale tuft on dorsal surface, apexes of spurs and segment pale off-white to white; tarsus mottled brown and off-white, apexes of segments yellowish white to white. Abdomen with dorsal surface mottled pale gray and darker gray, lateral margins paler and darker gray; ventral surface mainly darker grayish brown, scale bases and apexes pale. Wing length 5.1–7.1 mm. Male genitalia as illustrated; vinculum and length of tegumen plus uncus subequal, anterior part of vinculum almost at right angles with lateral arms, slightly excavated in saccal region, a fracture zone at middle, a pair of symmetrical lobes arising from ½ length to near the anterior margin of the arms, the inner margin of these lobes finely dentate, a second pair of lateral lobes arising just before ½ length of lateral arms; aedoeagus stout, lacking a cornutus, a heavily sclerotized band on right part of distal section approaching right margin distally; juxta a single, medial lobe, lateral margins with series of short teeth from beyond ½ length of apex; base of setose patch between tegumen and vinculum very broad, short; valva approximately attaining apex of uncus; dorsal margin of culcitula flattened; uncus short, broader than long, a pair of patches of short setae on ventral surface, a series of short setae on dorsal surface, a pair of longer setae arising submedially near dorsal margin. Female genitalia as illustrated; antrum heavily sclerotized, tapering from base to juncture with corpus bursae, series of involuted plates on ventral surface; ductus bursae not defined; corpus bursae lightly sclerotized, finely spiculose on ventral wall; an accessory bursa arising from near anterior margin of corpus bursae, longer than main part of corpus bursae; eighth sternite almost divided medially, incurved from lateral margins to middle; eighth tergite broadly rounded.

The larval food plant may be species of hickory (*Carya*) based on a specimen labeled "pecan" in the National Museum of Natural History and collected by R. Barnes in Edgecomb County, North Carolina. The specimen is worn, and the label does not indicate whether the moth was reared from pecan. Species of hickory occur throughout the range of *inversella.*

Inversella occurs from Connecticut, New York, and Ohio west to Missouri and eastern Oklahoma and south to Florida and eastern Texas. Most adults have been collected at light in July, but records are extant from early May to the end of August. In northwest Arkansas I observed that adults came to black light abundantly from 2130–2200 Eastern Daylight Time and were absent at the sheets during the rest of the night.

Variation in the relative amounts of light or dark parts of scales yields specimens that are nearly uniformly dark to very pale with blotches of dark gray.

Inversella can be separated from *kimballi* as indicated in the keys and under *kimballi.*

Dichomeris kimballi Hodges, NEW SPECIES PL. 1, FIG. 30; PL. C, FIGS. 1, 2; PL. T, FIG. 2.

Dichomeris kimballi Hodges.
Type locality: Archbold Biological Station, Lake Placid, Florida. [CU]

Upper surface as figured. Head with base of haustellum dark gray brown, some scales with pale-gray apexes; maxillary palpus pale gray, apex darker gray; first and second segments of labial palpus mainly dark brown, many scales with pale-gray bases and apexes, dorsal tuft on second segment with off-white to white-tipped scales, third segment with dark brown near base and before apex, separated by uniformly pale-gray area; frons mainly dark brown near eye, becoming gray medially, many scales with pale apexes; vertex and occiput mainly pale gray, many scales with yellowish-gray zone medially, a row of dark-brown scales behind eye; scape of antenna dark brown dorsally, some scales with pale-gray bases, ventral surface mottled pale and dark yellowish gray, dorsal surface of shaft with alternating pale-gray and dark gray-brown rows of scales, ventral surface in male with sensory areas covering entire surface from base to ⅖ length, sensory setae about ⅗ depth of

basal segment, sensory areas separated by a row of pale-gray scales on alternate ½ segments to apex, sensory areas in female more restricted basally than on distal ½ of shaft, sensory setae very short; ocellus absent, or if present very small. Thorax mainly very pale gray, many scales with darker gray medial zone, apex of tegula uniformly pale gray. Foreleg nearly uniformly dark brown, many scales with pale bases; scales at apexes of tibial and tarsal segments white. Midleg much as for foreleg but slightly paler; tibia with a faint transverse, off-white fascia at ⅗ length; apexes of tarsal segments one, two, three, and five white. Hindleg similar to midleg, but all segments paler; dorsal scale tuft on tibia pale gray; apexes of all tarsal segments with white scales, dorsal surface of tarsus off-white to white. Forewing shades of dark brown, pale gray, and white; undersurface mainly dark gray; first row of scales in fringe at termen off-white basally, dark brown distally, following rows darker brown, area between fold and posterior margin uniformly pale gray. Hindwing mainly yellowish gray; fringe darker, base of first row of scales in fringe pale yellowish gray; pecten developed on basal ⅖ of cubitus; undersurface mainly pale yellowish gray, many brown-tipped scales near costa, particularly toward apex. Abdomen mainly pale gray dorsally, shining pale gray on first segment, scales paler on lateral margins, genital capsule tinged with pale yellow; ventral surface pale yellowish gray on second segment; other segments mottled brown and pale gray. Wing length 5.0–6.2 mm. Male genitalia as illustrated; vinculum with two broad-based lobes from lateral arms, excavated in saccal area and with a distinct break in the sclerotization; juxta a single, heavily sclerotized lobe with a few setae on distal ½ laterally; aedoeagus cylindrical, without cornutus, a strong, sclerotized band in wall from zone to apex, zone without lobes; culcitula rounded; uncus with lateral patches of setae on dorsal and ventral surfaces; support structure on tegumen for gnathos bearing 1–3 long setae. Female genitalia as illustrated; antrum broad, a pair of heavily sclerotized L-shaped bands extending through ductus bursae to base of corpus bursae; ductus bursae terminating in pair of heavily sclerotized lobes at base of corpus bursae; ductus seminalis arising from base of corpus bursae; accessory pouch arising from ventral wall of corpus bursae medially; wall of corpus bursae with many, fine spicules.

The immature stages are unknown; however, species of hickory or oak would be logical first choices of plants to offer larvae, if any are obtained.

TYPES. Holotype: ♂. Lake Placid, Fla., Archbold Bio. Sta.; 28 March 1959; R. W. Hodges. CU. Paratypes: 42 ♂, 10 ♀. Same data as for holotype; 28 March–3 April 1959 (13 ♂, 5 ♀). Oneco, Manatee Co., Florida; 26 March 1957; J. G. Franclemont (1 ♂). Same locality; 2 May 1953; Paula Dillman (1 ♂). Siesta Key, Sarasota Co., Florida; 26 March–18 April 1960; C. P. Kimball (10 ♂, 1 ♀). Homestead, Florida; 27 August 1963; D. O. Wolfenbarger (1 ♂). Pensacola, Florida; 15 May 1962; Shirley Hills (1 ♂). University Reserve, Welaka, Putnam Co., Florida; 3, 22 April; D. C. Ferguson (2 ♂). Baton Rouge, East Baton Rouge Par., Louisiana; 10, 14 April, 20 July, 6 August 1971; G. Strickland (3 ♂, 1 ♀). Schriever, Terrebonne Par., Louisiana; 10 July 1970; G. Strickland (1 ♀). Wedge Plantation, McClellanville, Charleston Co., South Carolina; 4 May 1981; R. W. Hodges (1 ♀). Fairfield Plantation, McClellanville, Charleston Co., South Carolina; 5, 8 May 1981; R. W. Hodges (2 ♂, 1 ♀). Greenville, South Carolina; 6 June 1977; R. S. Piegler (1 ♂). Camp Strake, Montgomery Co., Texas; 4 April 1976; A. & M. E. Blanchard (1 ♂). Dismal Swamp, Lake Drummond, Nansemond Co., Virginia; 8–9 June 1974; D. & M. Davis (1 ♂). Cape Henry Seashore State Park, Nansemond Co., Virginia; 1–10 June; D. & M. Davis (3 ♂). CU, FSCA, LACM, MCZ, G. Strickland, and USNM.

Kimballi is very similar to *inversella* and was confused with it in collections. Structural and pattern differences are given in the keys. *Kimballi* appears to be restricted to the coastal plain and is sympatric with *inversella* throughout this area. Specimens of *kimballi* appear more washed out than do those of *inversella.* Variation mainly is expressed in relative amounts of pale and dark-gray parts of scales.

ventrella GROUP

Dichomeris ventrella, georgiella, vacciniella, and *bipunctella* comprise the *ventrella* group in America north of Mexico. *Dichomeris atomogypsa* (Meyrick), NEW COMBINATION, from Japan is a member of the species-group as is *D. sparsella* (Christoph), NEW COMBINATION. The male of *sparsella* has a pair of lobes arising from near the base of the vinculum; the female genitalia are typical of the group. *Dichomeris tostella* Stringer has female genitalia like those of this species-group, but the male genitalia differ. An undescribed species from Taiwan (USNM genital slide 11561) has similar facies but differs in some genital characters. Also, an undescribed species from Venezuela (USNM genital

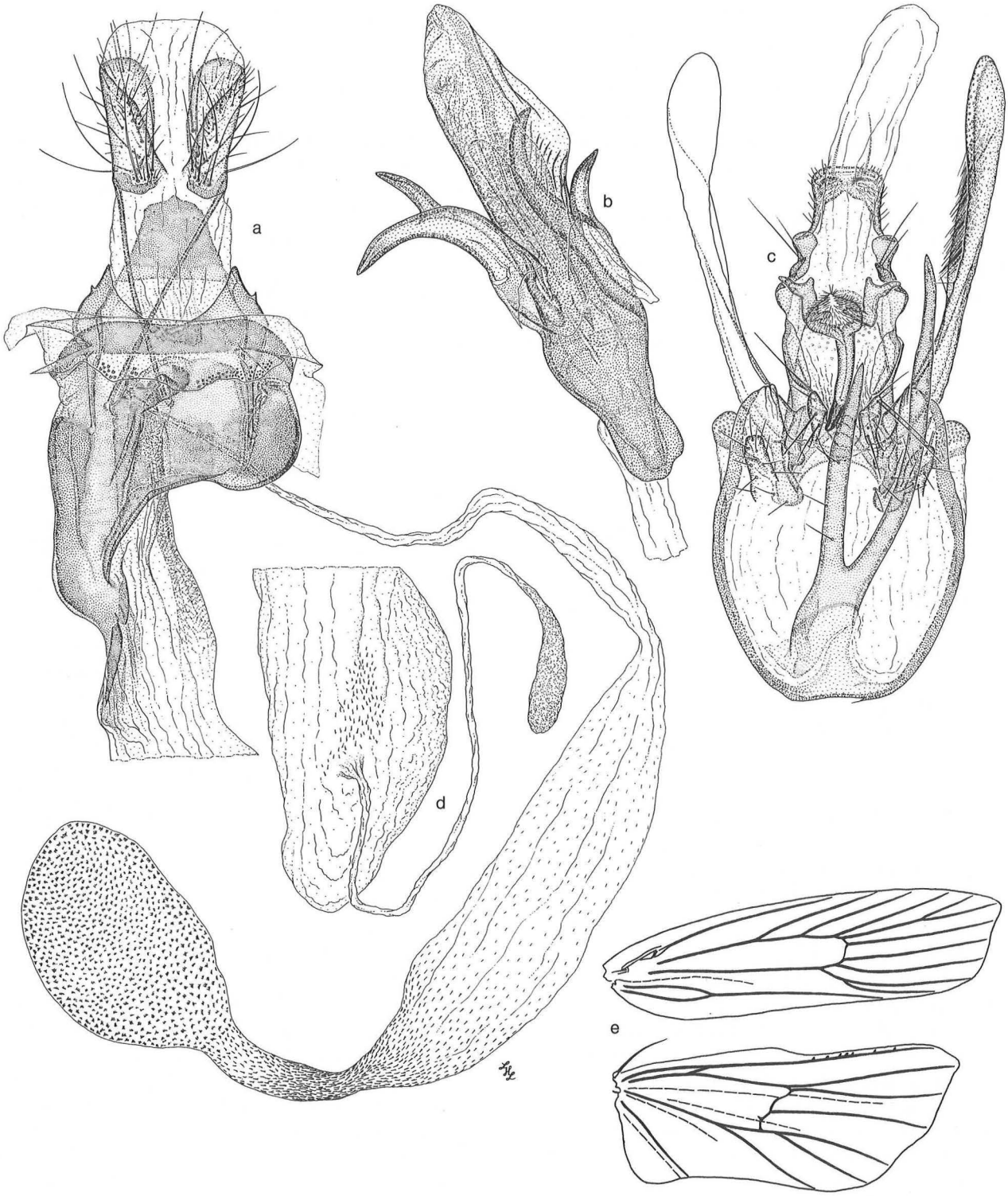

FIGURE 21: GENITALIA AND VENATION OF *DICHOMERIS VENTRELLA*

a, d. Female genitalia (USNM 9512). *b.* Aedoeagus (USNM 9524).
c. Male genital capsule (USNM 9524). *e.* Venation (USNM 9092).

slides 11485, 11486) appears to be near this species-group but differs in male genital characters. All the species are relatively broad winged; the second segment of the labial palpus has a strong dorsal and ventral scale tuft; an ocellus is present; the antenna lacks a notch in the male; the mesothoracic anepisternum lacks a scale tuft in the male; the hindwing lacks a cubital pecten; the aedoeagus is ankylosed with the juxta; the base of the bursa copulatrix is very broad and heavily sclerotized and broadly lobed anteriorly; the ductus seminalis has many inwardly directed spinules and is larger or more prominent than in most other species-groups; and the posterior margin of the eighth abdominal tergum is produced medially and has a well-defined, sclerotized margin.

Dichomeris ventrella (Fitch)
PL. 1, FIGS. 31–36. TEXT FIG. 21 *a–e* (RWH 2287).

Chaetochilus ventrellus Fitch, 1854, *Trans. N.Y. State Agricultural Soc.,* **13**: 234, 1854.
Type locality: New York. [USNM]

Ypsolophus unicipunctellus Clemens, 1863, *Proc. Ent. Soc. Philadelphia,* **2**: 123.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Ypsolophus querciella Chambers, 1872, *Can. Ent.,* **4**: 223.
Type locality: Kentucky. [lost]

NOTE—A false type is in the Museum of Comparative Zoology. It bears the manuscript name *Ypsolophus quercicoella* var. *pometella* and is a specimen of *Dichomeris ligulella.* The specimen does not match the description of *querciella.*

Ypsolophus roseocostellus Walsingham, 1882, *Trans. Amer. Ent. Soc.,* **10**: 185.
Type locality: St. Louis, Missouri. [BMNH]

NOTE—The lectotype, ♂, present designation, bears the following labels: 1. "Type, H.T."; 2. "12′ in M.S., T. Murtfeldt. xii.78"; 3. "10." 4. "121. June/76"; 5. "Walsingham Collection, 1910–427."; 6. "*Ypsolophus georgiellus* Wkr., Named by Busck"; 7. "*Ypsolophus roseocostellus* Wlsm. Tr. Am. Ent. Soc. 10. p. 185 (1882), Type ♂"; 8. "*Ypsolophus roseocostellus* Wlsm. TYPE Murtfeldt, St. Louis."; 9. "B.M. ♂, Genitalia slide No. 9327."

Nothris trinotella Coquillett, 1883, *Papilio,* **3**: 81.
Type locality: Illinois. [USNM]

Upper surface as figured. Head with maxillary palpus and base of haustellum brown, some scale bases yellowish gray, haustellum becoming yellowish gray a short distance beyond base; frons pale grayish orange, a broad band of brown scales in front of eye between base of antenna and base of haustellum; vertex and occiput mainly grayish orange, becoming slightly darker medially, scale bases immediately above eye white, a row of dark-brown scales behind eye; outer surface of first and most of second segment of labial palpus dark brown with some scale bases pale, ventral tuft as long as segment, scales of tuft more gray brown than those of rest of segment, apex of segment from dorsal margin to beginning of tuft off-white, apex of tuft pale grayish orange, inner surface of first and second segments pale grayish orange to yellowish gray dorsally, becoming grayish brown ventrally, apex changing from pale yellowish white dorsally to pale orange gray ventrally, third segment mainly brown on anterior surface, posterior surface off-white at base, becoming pale orange gray distally; scape of antenna with a few dark-brown scales on anterior and posterior margins at base, ventral surface pale yellowish white, dorsal surface gray brown, shaft mottled grayish brown and darker grayish brown, scale bases of alternate ½ segments pale, ventral surface mainly pale yellowish gray, sensory areas of both sexes restricted, cilia short, not extending beyond scales of ventral surface. Mesothorax mainly grayish orange, scales immediately behind eye and at extreme base of tegula dark brown. Forewing mainly grayish orange, dotted with brown, pale grayish orange, and white; ventral surface mainly darker grayish brown blotched, particularly on outer ¼ of wing, with yellowish gray, area posterad of fold pale yellowish gray. Hindwing rather dark yellowish gray, scales on posterior margin paler than on membrane, cubital pecten absent. Foreleg mainly dark brown, apex of coxa with some pale yellowish-gray scales, a few yellowish-gray to off-white scales at apex of tibia and tarsal segments one, two, three, and five. Midleg streaked very pale yellowish gray, grayish brown, and dark brown, paler on lateral surface; trochanter streaked pale yellowish gray and yellowish brown; femur mainly dark grayish brown, dorsal surface pale; tibia very dark brown, apex of inner tibial spur pale; tarsus dark brown, apexes of segments one, two, three, and five yellowish white to white, ventral surface of last two segments with orange scales. Hindleg shining, coxa mottled yellowish white, brown, and yellowish gray, reflecting yellow, violet, and blue; trochanter streaked gray brown and yel-

lowish white; femur pale yellowish white on dorsal margin, mottled dark gray brown and yellowish white ventrally, apex shining, reflecting deep violet; tibia grayish brown ventrally, pale yellowish gray dorsally, spurs dark grayish brown, apexes with few pale scales; tarsus mainly dark yellowish gray, apexes of segments with a very small number of pale scales. Abdomen shining yellowish gray and pale yellowish gray, paler on lateral margins, scales associated with genital capsule streaked yellowish white and yellowish gray dorsally; ventral surface mottled pale yellow and dark brown, yellow medially, a dark-brown patch at apex of segments three, four, and six. Wing length 7.1–10.3 mm. Male genitalia as illustrated; vinculum and length of tegumen plus uncus subequal, arms of vinculum narrow, slightly indented in saccal region, lacking ventrally projecting lobes; distal part of aedoeagus with some lightly sclerotized plates and membranous areas, two pairs of asymmetrical, heavily sclerotized lobes arising from zone and extending to varying lengths, right lobe bifurcate, dorsal arm much longer than ventral one, somewhat twisted, left lobe bifurcate, each lobe strongly twisted and ankylosed to juxta, a flange around anterior margin of opening for ductus ejaculatorius; lobes of juxta arising from a common base; asymmetrical, right lobe longer than left one, juxta as long or slightly longer than vinculum; a pair of nearly membranous lobes in diaphragma laterad of aedoeagus; base of setose patch between tegumen and vinculum conical, approximately as high as broad; culcitula flattened; apex of uncus slightly rounded, lateral part becoming narrower from base to middle, then parallel sided to apex, a series of short setae on ventral surface in a pair of lateral patches, a pair of long setae on dorsal surface near margin. Female genitalia as illustrated; caudal part of antrum very broad, ventral lobe heavily sclerotized with a series of more heavily sclerotized areas, dorsal wall lightly sclerotized, left side extending farther anteriorly than right side; corpus bursae membranous, a broad tube leading to ductus seminalis arising from ventral surface at the base, end of this tube with a heavily sclerotized ring; eighth sternite incurved on caudal margin; eighth tergite strongly produced medially, caudal margin somewhat irregular.

Busck (1903: 924) described the larva based on notes by C. V. Riley. It is a leaf roller on birch (*Betula* species); *Carpinus* sp.; Chestnut (*Castanea dentata* (Marshall) Borkhausen); filbert (*Corylus* species); hickory, including pecan (*Carya* species); and oaks (*Quercus* species) based on published records and reared specimens that I have examined. *Ventrella* and *georgiella* have been misidentified frequently; thus, I have not cited rearing records from the literature because voucher specimens are not present. *Ventrella* is univoltine; adults emerge in early to midsummer and are present until late spring or early summer the following year. Eggs probably are laid in spring. Larvae in leaf rolls are present in late spring and early summer. Pupation occurs in the leaf roll and lasts about two weeks.

Ventrella has been collected in southern Quebec, Ontario, and Manitoba south to central Florida and southern Texas. Adults come commonly to black light and to bait.

Adults of *ventrella* can be confused with those of *georgiella* and sometimes with those of *vacciniella.* In addition to the characters cited in the keys, and in the East where *ventrella* and *georgiella* are sympatric, *georgiella* usually has pale yellowish-gray scales on the fold of the forewing and has the dorsal surface of the prothoracic tarsus blotched, pale yellowish gray on the first two or three segments. *Ventrella* lacks pale scales on the fold, has the first three segments of the tarsus dark brown, and the apexes are off-white.

Adults are highly variable in coloration and pattern as illustrated. In the male genitalia the length of the lobes of the juxta relative to the length of the vinculum and the curvature of the lobes of the aedoeagus vary. In females the left margin of the antrum may have two, rounded lobes or it may be straight, and the medial fold on the antrum tends to be near the middle, not at a specific point.

Dichomeris georgiella (Walker)
PL. 1, FIGS. 37–40; PL. 2, FIG. 1; PL. C, FIGS. 3, 4; PL. U, FIG. 1 (RWH 2277).

Depressaria georgiella Walker, 1866, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **35:** 1827.
Type locality: Georgia. [BMNH]

Nothris? *bimaculella* Chambers, 1877, *Bull. U. S. Geol. Geog. Surv. Terr.,* **3**: 122.
Type locality: Edgerton, Colorado. [MCZ]

Dichomeris mollis Barnes & Busck, 1920, *Contrib. Nat. Hist. Lep. N. Am.,* **4**: 230.
Type locality: Redington, Arizona. [USNM]

Upper surface as figured. Head with maxillary palpus mottled pale yellowish gray and dark grayish brown; base of haustellum dark grayish brown followed by very pale yellowish white; frons, vertex,

and occiput pale grayish orange, scales tipped with paler shade, scales above eye very pale orange white, a band of dark grayish-brown scales in front of eye from base of antenna to base of haustellum, scales behind eye dark grayish brown; outer surface of first and second segments of labial palpus mainly dark grayish brown, some scale bases pale, distal margin of second segment pale yellowish to orange gray on tuft, some scales tipped with white at end of segment, inner surface of first and second segments mainly dark yellowish gray, paler dorsally and becoming darker ventrally, third segment mainly brown on anterior surface becoming pale yellowish white to white on posterior surface (particularly at base); scape of antenna gray brown dorsally, anterior margin pale yellowish gray, ventral surface with a short dark-brown band from base to ⅓ length, dorsal surface of shaft alternating scale rows of pale yellowish gray and darker orange gray to brown, antenna becoming darker distally, sensory areas in both sexes restricted to anterior part of ventral surface, sensory cilia very short. Thorax mainly grayish orange, extreme anterior margin of tegula very dark brown, apex of mesothorax with a few dark-brown and paler scales. Forewing mainly grayish orange, mottled with dark-brown and paler scales; a small dark-brown spot in cell at ¾ length of cell, one at end of cell, and one on fold at ½ length of fold, some white scales associated with each spot; outer fringe pale at base, darker gray brown distally. Hindwing pale gray. Foreleg mainly dark brown; apex of coxa and tibia and base of tarsus pale yellowish gray. Midleg much as for foreleg but generally with more dark scales. Hindleg generally uniformly mottled gray brown and pale yellowish gray, dorsal surface of tibia with pale yellowish-gray scales. Abdomen with dorsal surface mainly pale yellowish gray to purplish gray, caudal margins of each segment paler than rest of segment and with purplish reflections; ventral surface mainly gray brown with a pair of ventrolateral pale-yellow bands running from third to sixth segments. Wing length 8.0–10.7 mm. Male genitalia as illustrated; length of tegumen plus uncus slightly longer than that of vinculum; arms of vinculum narrow, lacking ventral projections near posterior end; lobes of juxta arising from a common base, curved and directed to right, left lobe longer and slightly more slender than right lobe; aedoeagus with two pairs of heavily sclerotized lobes extending from zone, each pair relatively straight, apexes slightly bent; base of setose patch between tegumen and vinculum rounded, wider than high; culcitula flattened; uncus moderately short, caudal margin somewhat flattened. Female genitalia as illustrated; antrum heavily sclerotized, appearing as two broad pouches with small patches more heavily sclerotized; ductus bursae with a heavily sclerotized band on ventral margin, spiculose; a heavily sclerotized ring at juncture between ductus bursae and ductus seminalis; corpus bursae with a small, accessory bursa arising from anterior part, walls spiculose; caudal margin of eighth tergite slightly indented medially.

Georgiella probably has not been reared. Weiss (1917: 219) reported it as feeding on blueberry (*Vaccinium* species); however, voucher material is not extant to confirm the identification. Darlington (1952: 51) noted that he had never found *georgiella* (considered a synonym of *ventrella*) on blueberry. Forbes (1923: 286) said that it fed on oak, but his source was material from Missouri that formed the type series of *roseocostella.* Oak occurs where *georgiella* has been collected and may well be a host.

Georgiella occurs from Massachusetts and New York, south to North Carolina (southern Appalachian Mts.), and west to Illinois, Missouri, Oklahoma and Texas, and Arizona. It has been unevenly collected over most of its range. Most specimens are from southern Arizona. The adults of *georgiella* overwinter and may be found at bait and light during the fall, winter, and spring. Adults of the succeeding generation emerge in mid-July in North Carolina and early August in southern Arizona.

Differences between *georgiella* and *ventrella* are given under *ventrella.* In *georgiella* both markings and coloration vary. The forewing may be grayish brown without distinct marks; or the forewing may be paler, and the three dots are prominent. In most eastern specimens the forewing has a row of pale-yellow scales on the fold; western specimens usually lack these pale-yellow scales. The outer surface of the scale tuft on the second segment of the labial palpus varies in amount and hue of red, reddish-orange, or yellowish scales. Usually, the forewing does not have a blotchy appearance as that of *ventrella* often does.

Dichomeris vacciniella Busck

PL. 2, FIGS. 2–4; PL. C, FIGS. 5, 6; PL. U, FIG. 2 (RWH 2286).

Dichomeris vacciniella Busck, 1915, *Proc. Ent. Soc. Washington,* **17**: 83.

Type locality: Pemberton, New Jersey. [USNM]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "Bred specimen 7-9-14"; 2.

"Pemberton NJ 6-2-14"; 3. "Quaintance No 11934"; 4. "H B Scammell Collector"; 5. "*Dichomeris vacciniella* type slide Busck"; 6. "LECTOTYPE *Dichomeris vacciniella* Bsk. By R. W. Hodges." Busck (1915: 83) cited Pemberton, New Jersey as the only locality from which the specimens that he examined originated. However, he labelled a specimen from New Egypt, New Jersey with the USNM type number 19229 and wrote "type" on the identification label. Because this specimen is not mentioned in the original description, it cannot be either a holotype or lectotype. The wings of two specimens from Pemberton have been put on a slide. Of these, the uppermost forewing is that of the lectotype female.

Nothris nephanthes Meyrick, 1929, *Exotic Microlepidoptera,* **3**: 497.
Type locality: Muskoka, Ontario [Canada]. [BMNH]

Upper surface as figured. Head with maxillary palpus and base of haustellum dark gray brown, scale bases pale, haustellum becoming off-white shortly after base; frons, vertex, and occiput mainly dark brownish gray, apexes of scales narrowly tipped with pale gray, scales immediately in front of eye and behind eye dark brown, scales on frons often somewhat paler than those of vertex and occiput; outer surface of first and second segments of labial palpus mainly dark brownish gray with scale bases pale, apexes of scales at apex of second segment ranging from white to reddish brown, third segment dark brownish gray on anterior margin with an expansion of this color to inner surface at ⅓ length, base of third segment white on posterior surface, rest of posterior surface pale orange with some darker blotches; scape of antenna mainly dark brownish gray, ventral surface yellowish white, alternating half segments of shaft pale brown and dark brown, sensory areas on ventral surface limited to anterior half, very narrow, sensory setae very short. Thorax mainly brownish orange, base of tegula brownish gray, apex of mesothorax and of metathorax gray brown. Forewing reddish brown and dark brown; a dark-brown spot at ⅔ length of cell, one at end of cell, and one at ½ length of fold; wing flecked with dark brown and pale yellow. Hindwing gray, central area paler than margins, fringe approximately same shade as adjacent membrane. Foreleg with coxa dark brownish gray at base, becoming pale yellowish white at ½ length; trochanter nearly white; femur mainly dark brownish gray with pale scale bases; tibia dark brownish gray with several white scale bases, apex white, a row of white-tipped scales at base of epiphysis; tarsus mainly dark brownish gray, apexes of segments one through three and part of fourth white. Midleg with coxa mainly off-white with some dark brownish-gray scales at base; trochanter mainly off-white with mottling of darker scales; femur mottled dark brownish gray and white, a uniformly dark patch at base; tibia and tarsus much as for foreleg. Hindleg much as for midleg with dorsal scales on tibia pale yellowish gray. Abdomen shining yellowish gray with purple reflections, mottled with darker yellow-gray scales, caudal margins of segments paler than rest of segments; ventral surface mainly pale yellowish white, a pair of interrupted lateral bands from third through seventh segments, these bands becoming narrow caudally. Wing length 7.0–8.8 mm. Male genitalia as illustrated; length of vinculum approximately ¾ that of combined length of tegumen plus uncus, arms of vinculum narrow, anterior margin broadly rounded, lacking ventrally directed projections from posterior ends of arms; aedoeagus lacking cornutus, with a pair of long, slender, heavily sclerotized projections from zone, each slightly curved and undivided; juxta arising from common base, bilobed, apex of right lobe twisted and directed to right, apex of left lobe slightly bent to right; base of setose patch between tegumen and vinculum approximately as high as wide; saccular margin of valva heavily sclerotized, ending in spinelike structure just before apex of valva; culcitula relatively low, broadly rounded; uncus slightly broader than long, setae on ventral surface separated medially by a nonsetose area. Female genitalia as illustrated; antrum broad, heavily sclerotized, developed as a large lobe on left side; ductus bursae and corpus bursae not distinctly separate, ductus bursae with a sclerotized ring at base of ductus seminalis; accessory bursa arising from anterior end of corpus bursae; eighth tergite more or less evenly margined, somewhat rounded on caudal margin.

Darlington (1952: 50) indicates that the type series was reared from blueberry, *Vaccinium* species, not cranberry, *Vaccincium oxycoccos* L. He described the larva and habits as "larva: green, often turning pink; head and first segment black, first pair of legs black; six long setae on anal segment and three setae on each anal proleg; feeding in a cylindrically folded leaf, or between two cupped leaves, the top of the cylinder or cup remaining slightly open as an egress to the feeding area and also serving as a means of escape. Caged larvae pupate between leaves, in the trash, or under any protection; in the field pupation is always in a cluster of dead leaves, generally around the base of the plant where the leaves collect." *Vacciniella* is univoltine. Adults

emerge in June and July (midsummer) and are present until spring of the following year. Eggs may be laid on new vegetation in the spring.

Vacciniella is closest to *bipunctella* on genital characters, but it is nearest *ventrella* and *georgiella* in color pattern. It may be separated from the latter two species by having a pair of dark-brown streaks on the forewing: the first running from near the base on the posterior margin toward the costal margin; the second running from the posterior margin at ¾ its length toward the costal margin and directed basally. Usually, the head of *vacciniella* is dark and contrasts in shade with the thorax, whereas the head of *ventrella* and *georgiella* do not contrast so markedly with the thorax. Worn specimens can be difficult to recognize; then, genital characters should be studied.

Some specimens are nearly an even, dark reddish brown with little maculation; others are pale, almost dark yellowish gray with two prominent streaks of the forewing. The forewing may be flecked with dark brownish-gray marks that are not arranged in a specific manner.

Vacciniella occurs from Nova Scotia, southern Quebec and Ontario, and Michigan south to central Florida and west to Missouri and western Arkansas. It is most abundant in midsummer but has been collected during the fall and late winter on suitable nights. Apparently, adults do not come to light readily. Most specimens have been reared. Although the range is wide, *vacciniella* has not been collected in many states.

Dichomeris bipunctella (Walsingham)
PL. 2, FIGS. 5, 6; PL. D, FIGS. 1, 2; PL. S, FIG. 4 (RWH 2274).

Ypsolophus bipunctellus Walsingham, 1882, *Trans. Amer. Ent. Soc.*, **10**: 186.
Type locality: Orono, Maine. [BMNH]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "Type"; 2. "Apr."; 3. "161"; 4. "55"; 5. "Walsingham Collection, 1910–427."; 6. "*Ypsolophus bipunctella* Wlsm. Tr. Am. Ent. Soc. 10 p. 186 (1882) TYPE ♂"; 7. "*Ypsolophus bipunctellus* Wlsm. Fernald: 1882 Maine"; 8. "B. M. ♂ Genitalia slide No 9328."

Upper surface as figured. Head with maxillary palpus pale yellowish gray at base becoming dark gray brown on distal half; base of haustellum dark gray brown becoming pale yellowish white at ¼ length; frons, vertex, and occiput mainly pale yellowish gray, apexes of scales broadly tipped with very pale gray, scales above eye nearly white, a broad band of dark-brown scales in front of eye between base of antenna and base of haustellum, scales behind eye dark brown, outer surface of first and second segments of labial palpus dark grayish brown, scale bases pale, apex of second segment mainly off-white from dorsal margin to about ½ length, becoming pale yellowish white on ventral part of tuft, inner surface of first and second segments yellowish gray to gray brown, somewhat paler dorsally, becoming darker ventrally, anterior margin of third segment brown, posterior margin nearly uniformly pale yellowish white; dorsal surface of scape of antenna dark brown, ventral surface pale yellowish white, shaft with alternating half segments pale yellowish gray and darker gray brown, sensory areas of both sexes restricted to anterior part of segments, sensory cilia very short. Thorax mainly pale grayish orange, extreme base of tegula with dark-brown patch, apex of mesothorax tipped with brown. Forewing mainly pale grayish orange marked with dark-brown dots and streaks, a small dark-brown spot at ⅔ length of cell and one at end of cell, each dot followed by a few white scales. Hindwing mainly pale yellowish gray, cell paler and more translucent than surrounding membrane. Abdomen with dorsal surface shining pale yellowish gray, anterior parts of many segments more intensely yellow to yellow orange, scales on caudal margins of segments pale yellowish white; ventral surface of second segment pale yellow, remaining segments mottled pale yellow and yellowish gray and with a pair of lateral, brown bands. Foreleg mainly gray brown, scale bases pale, apex of coxa becoming pale yellowish white. Mid- and hindlegs much as for foreleg except that each successive leg is paler, tibial spurs of hindleg dark gray brown, contrasting with pale scales on dorsal surface of tibia. Wing length 6.5–9.0 mm. Male genitalia as illustrated; vinculum and length of tegumen plus uncus subequal, arms of vinculum slender, anterior margin broadly rounded, lacking ventrally projecting lobes; aedeagus short, relatively stubby, a strong cornutus present, zone with a pair of asymmetrical, heavily sclerotized lobes, left lobe bifurcate and terminating in a pair of skewed cones, right lobe relatively slender and straight; lobes of juxta arising from a common base, asymmetrical, right lobe relatively slender, left lobe longer than right one and terminating in two or three points; base of setose patch between tegumen and vinculum rounded, slightly wider than high; valva with a heavily scler-

otized sacculus terminating in a strong, ventrally projecting point at ⅔ length of valva; culcitula somewhat produced medially; uncus with setae relatively numerous and separated by a narrow, nonsetose area. Female genitalia as illustrated; antrum heavily sclerotized, appearing as two, broad subquadrate lobes, right one very heavily sclerotized on anterior margin; corpus bursae narrower than maximum width of ductus bursae; a sclerotized ring at base of ductus seminalis; accessory bursa arising from anterior end of corpus bursae; posterior margin of eighth sternite strongly produced, somewhat irregular.

Darlington (1945: 91) reported rearing *bipunctella* as a leaf tier on littleleaf sweetfern, *Myrica asplenifolia* L. I have studied specimens reared from *Myrica gale* Linnaeus and *M. pensylvanica* Loiseleur by C. R. Ely, D. C. Ferguson, and J. McDunnough. Although the species has not been reared in the South, I expect that larvae will feed on other *Myrica* species such as *cerifera* L. and *pusilla* Rafinesque.

Specimens from Prince Edward Island and Nova Scotia often have nearly uniformly brown forewings and lack the gray-brown streak that runs from the base to apex. In contrast, specimens from South Carolina, Florida, and Louisiana have yellowish-gray forewings and have a well-developed, dark gray-brown streak.

Bipunctella is unique in forewing color pattern and should not be confused with other species of *Dichomeris*. Superficially, it is similar to *Limnaecia phragmitella* Stainton in the Cosmopterigidae but is readily separable by wing shape and tufted second segment of the labial palpus.

Dichomeris bipunctella occurs along the coast of eastern North America from Prince Edward Island south to central Florida and west to Louisiana. Dietz collected it at Hazleton, Pennsylvania; the farthest inland site on record. *Bipunctella* is univoltine with adults emerging in July and August in the North, April and May in Florida.

setosella GROUP

Forty species (*setosella, vindex, mulsa, mica, aglaia, delotella, gleba, alphito, laetitia, stipendiaria, bilobella, aleatrix, copa, scrutaria, furia, purpureofusca, nonstrigella, ochripalpella, achne, inserrata, pelta, bolize, legnotoa, illusio, mimesis, serrativittella, xanthoa, isa, simulata, imitata, barnesiella, simpliciella, baxa, gnoma, washingtoniella, levisella, leuconotella, mercatrix, euprepes, juncidella*) comprise the *setosella* group in America north of Mexico. Most of the species occur within the eastern deciduous forest, and a suprising number are found along the Canada-U.S. border from Nova Scotia to western Ontario and Minnesota. Several species are in the Neotropical Region; some are in the eastern Palearctic Region in Japan and Taiwan; others are in India, Australia, and Subsaharan Africa.

The group is defined by a free aedoeagus that has a well-developed cornutus. Important characters and character states are the following. Second segment of labial palpus with scale tufts lacking, present ventrally, present dorsally, or both; antenna rarely with enlarged segments on mesial part of shaft; ocellus present and well developed; forewing with R_4 and R_5 stalked, rarely fused; hindwing with or without pecten on base of CuA; male with or without scale tuft on mesothoracic anepisternum; vinculum usually sclerotized in saccal region; aedoeagus free, with strong cornutus, zone with or without heavily sclerotized lobes, with a short flange at base; pair of sclerotized lobes arising from basal part of vinculum, none from the distal part; uncus well developed, posterior margin rounded or slightly angled distolaterally, lateral margins excavated in one species; setae on ventral surface of uncus short, stout, rarely large and spinelike; juxta well developed as pair of nearly symmetrical lobes, sometimes asymmetric and multilobed; apophyses anteriores shorter than apophyses posteriores, both relatively short; ductus bursae not defined, basal part of bursa copulatrix very broad and usually heavily sclerotized; bursa copulatrix with heavily sclerotized, longitudinal ridges and usually with spinules on one wall near the anterior end.

Dichomeris setosella (Clemens), REVISED COMBINATION

PL. 2, FIGS. 7, 8. TEXT FIGS. 3, 5, 22 *a–d* (RWH 2302).

Trichotaphe setosella Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 166.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Begoe costolutella Chambers, 1872, *Can. Ent.,* **4**: 209.
Type locality: Kentucky. [lost]

NOTE—Chambers' description of *costolutella* seems to apply to *D. flavocostella* rather than *eupatoriella.* However, Chambers (1877: 24) treated *costolutella* as a junior synonym of *setosella*; therefore, I see no

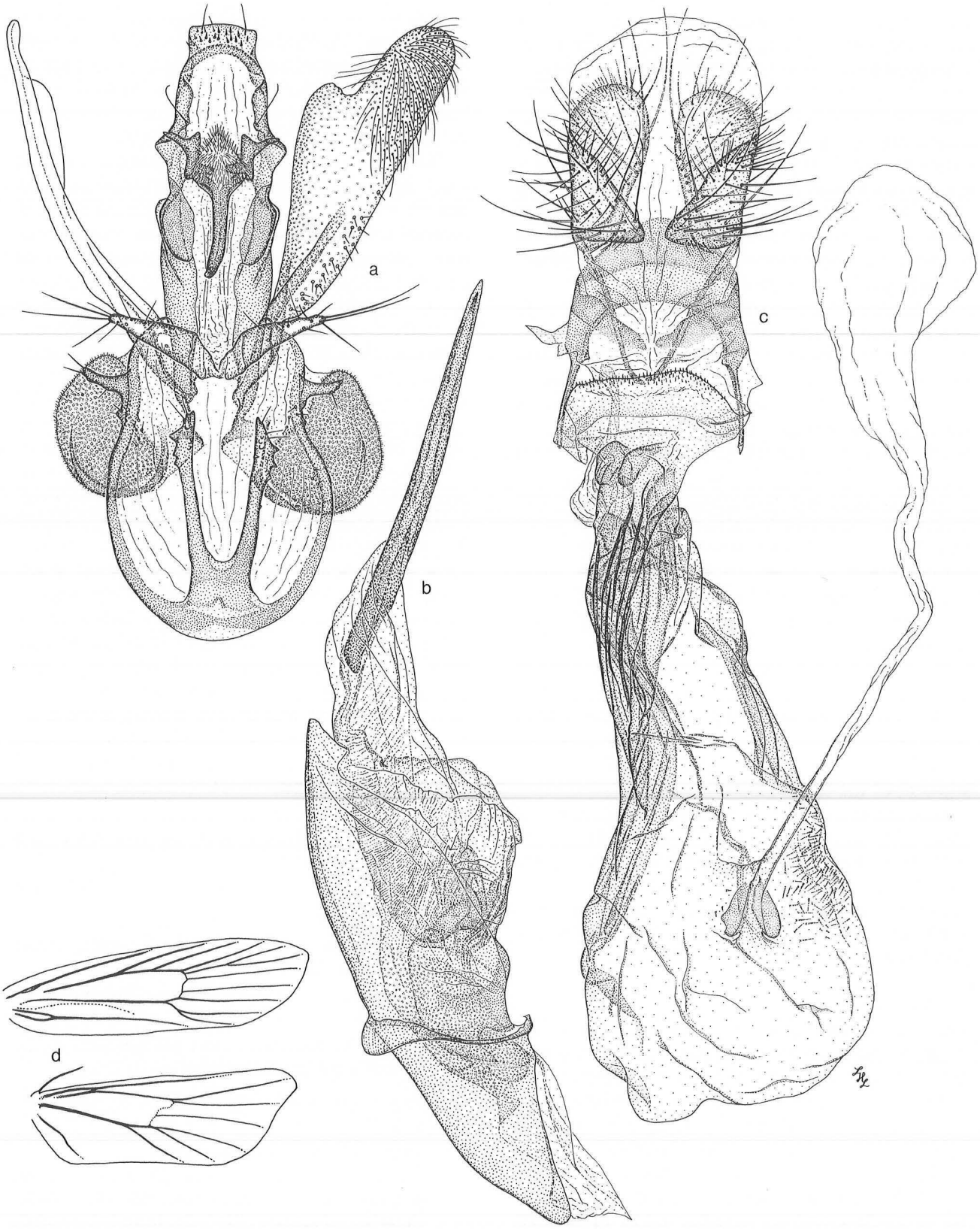

FIGURE 22: GENITALIA AND VENATION OF *DICHOMERIS SETOSELLA*

a. Male genital capsule (USNM 8849). *b.* Aedoeagus (USNM 8862). *c.* Female genitalia (USNM 8863). *d.* Venation (USNM 8847).

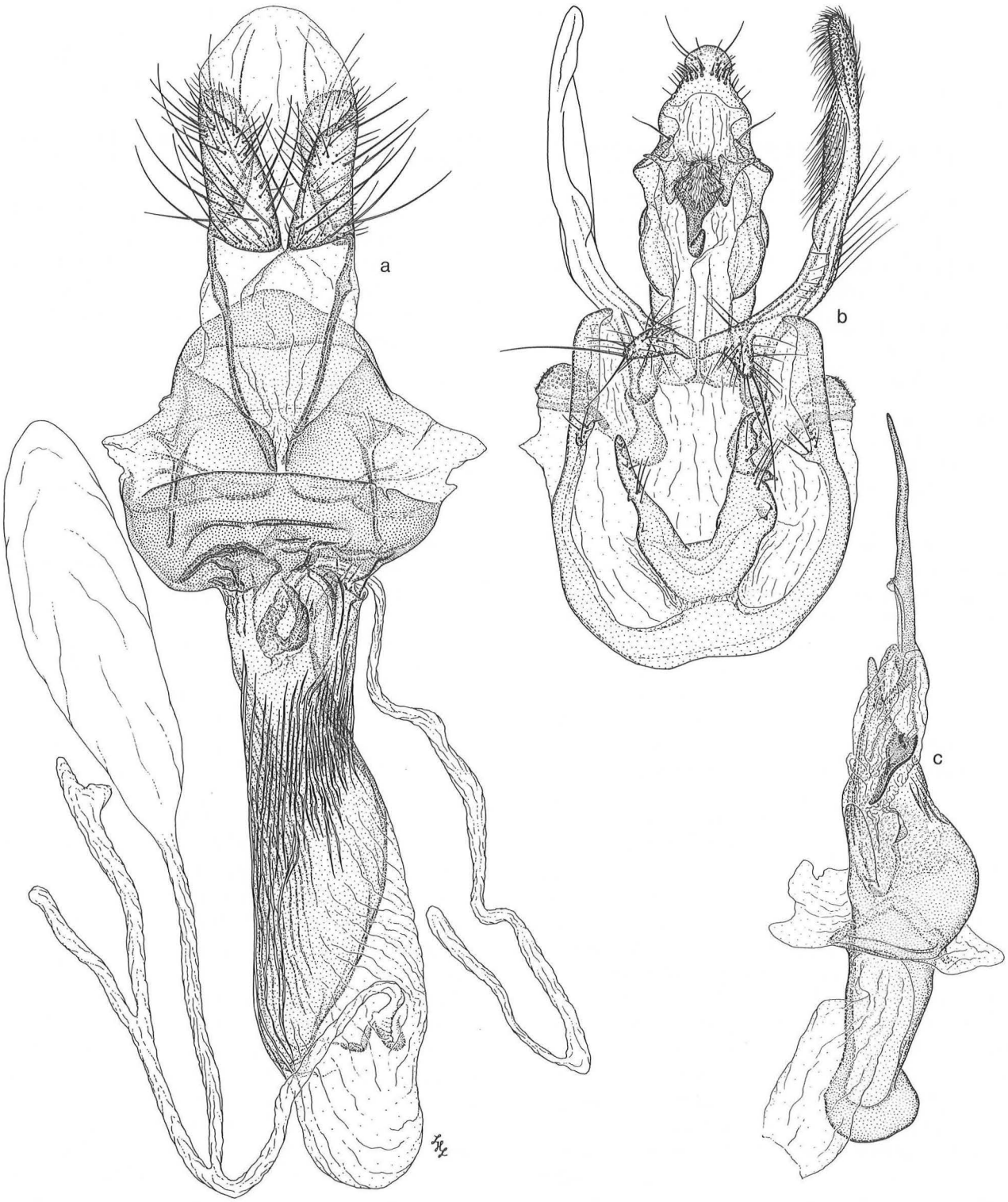

FIGURE 23: GENITALIA OF *DICHOMERIS OCHRIPALPELLA*
a. Female genitalia (USNM 9428). *b.* Male genital capsule (USNM 9427). *c.* Aedoeagus (USNM 9425).

reason to upset this long-standing synonymy, particularly when no type material exists.

Ypsolophus eupatoriella Chambers, 1872, *Can. Ent.,* **4**: 221.
Type locality: Kentucky. [MCZ]

NOTE—Chambers did not state the number of specimens that he studied, but there are four specimens from his collection in the MCZ. I designate one of them lectotype. It bears the following labels: 1. "Type 1531"; 2. "Kentucky. Chambers."; 3. "*Ypsolophus eupatoriella* Cham"; 4. "Lectotype R. W. Hodges"; 5. "♂ genitalia slide 3294 Ronald W. Hodges."

Nothris dolabella Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 288, fig. 30.
Type locality: Texas. [BMNH]

Upper surface as figured. Haustellum medium gray at base and on lateral surfaces distally, pale yellowish gray medially beyond base; maxillary palpus mottled dark brown and pale gray; second segment of labial palpus with strong dorsal and ventral scale tufts at apex, outer surface of first and second segments dark gray, individual scale bases slightly paler, apex of second segment pale gray, inner surface yellowish gray becoming darker ventrally, a broad, pale-gray band on dorsal surface from base toward apex, third segment yellowish gray, apex dark brown; frons mainly gray, a row of dark-brown scales in front of eye; vertex pale gray; scales on occiput pale yellowish gray above eye, darker medially, a row of dark-brown scales behind eye; ocellus present; antenna mainly dark gray brown, scales on dorsal surface of scape pale gray, ventral surface of scape and first three or four segments of shaft pale gray, sensory setae in male approximately equal to depth of segments basally, separated by scales on alternate half segments, in female sensory setae very short and restricted to small area on alternate half segments basally. Thorax with tegula dark brown anteriorly, yellowish gray dorsally, mesothorax mottled dark brown, yellowish gray, and gray brown. Foreleg mainly shining dark gray brown with yellow, gold, and purple reflections; apex of coxa with pale-gray scales; tibia with white scales at apex and ⅗ length; base and apex of first tarsal segment and apexes of remaining segments white. Midleg much as for foreleg but coxa with numerous pale scales, tibial spurs dark brownish gray with dorsal surface white on distal ⅗. Hindleg coxa and femur mainly pale yellowish gray with some darker gray scales, trochanter mainly pale yellowish gray, tibia mainly gray ventrally, dorsal scale tuft yellowish gray with some darker gray scales intermixed, spurs dark gray ventrally, yellowish white dorsally; pale areas of tarsal segments larger than on preceding segments. Male with long scale tuft from mesothoracic anepisternum, scales pale yellow becoming slightly darker yellowish brown distally, tuft held between meso- and metathorax in repose. Ventral surface of forewing mainly shining yellowish gray, costal margin pale yellowish gray on medial ½, area behind anal veins uniformly pale yellowish gray, fringe gray with series of pale-yellow streaks extending from end of veins around apex. Hindwing with well-developed pecten on basal ½ of cubitus, ventral surface pale yellowish gray basally becoming slightly darker at apex. Thorax grayish brown dorsally with yellow, gold, and purple reflections, posterior margins of segments pale gray; ventral surface pale gray medially becoming darker brown laterally, scales with shining reflections. Wing length 4.9–7.5 mm. Male genitalia as illustrated; vinculum noticeably sinuous laterally, lobe from near base of lateral margin usually very slender on distal ½; lobes of juxta nearly symmetrical; aedoeagus without lateral lobes from zone; base of setose patch between tegumen and vinculum very large, costal flange of valva usually emarginate at apex; margin of uncus usually angulate posterolaterally. Female genitalia as illustrated; spiculose patch on corpus bursae small (note illustration and that of *vindex,* plate V, figure 1).

Larvae fold leaves and have been reared from species of *Eupatorium,* by A. Busck and A. F. Braun; *Pluchea,* by A. F. Braun; *Verbesina virginica* Linnaeus, by A. Busck; and *Vernonia,* by M. Murtfeldt, in the Compositae. Busck (1903: 925) said that there are two generations in the Washington, D.C., area. Prentice (1965: 760) reported rearing larvae from *Thuja occidentalis* Linnaeus and *Pinus strobus* Linnaeus. I have not seen voucher specimens for the records and question these plants as hosts for *setosella.*

Setosella occurs from Rochester, New York, south to southern Florida, and west to Manitoba, eastern Kansas, central Oklahoma, and Brownsville, Texas. In the north adults are present from May to September or October; in Florida from March to November; in southern Texas perhaps throughout the year. It has been taken in southwestern Manitoba in June and July and in the Mexican states Nuevo Leon, Tamaulipas, and Sinaloa. From collecting records and condition of specimens, I judge that *setosella* does not overwinter as an adult. Specimens collected in May in Maryland and New York appear fresh.

Specimens vary in amount of dark-brown scales

on haustellum, third segment of labial palpus, frons, thorax, and legs; size; amount of pale yellow on the upper surface of the forewings. Moths from Kansas and Oklahoma are distinctly paler than from elsewhere.

Setosella likely will be confused with *vindex* and *bilobella.* In addition to the characters given in the keys, the pale-yellow transverse line at ⅔ the wing length usually is slightly waved medially and angled slightly toward the base on the costal margin. In *vindex* this line is straight medially and angled toward the apex on the costal margin. In *bilobella* the line is waved medially and angled toward the apex on the costal margin.

Dichomeris vindex Hodges, NEW SPECIES
PL. 2, FIGS. 9, 10; PL. D, FIGS. 4, 5; PL. V, FIG. 1.

Dichomeris vindex Hodges.
Type locality: Putnam County, Illinois. [USNM]

Upper surface as figured. Color pattern, ocellus, cubital pecten of hindwing as for *setosella.* Wing length 6.2–8.3 mm. Male genitalia as illustrated; vinculum nearly straight on lateral margin, posterior lobe arising from near base slender apically becoming broader gradually to vinculum; lobes of juxta asymmetrical, left lobe longer than right lobe; costal lobe of valva curved distally. Female genitalia as illustrated.

Braun (manuscript notes) reared the larva on *Helianthus hirsutus* Rafinesque, a composite. The larva was collected on 3 October 1945, and the adult emerged on 22 April 1946. "Smaller leaves rolled, with lower surface in. Larva: head and first segment dark brown; second segment very narrowly white at anterior margin; rest of body purplish gray, with tubercles black, encircled with whitish; irregular longitudinally placed dashes form irregular stripes; the dorsal of these wider and more continuous (one each side of middorsal line); the lateral broken stripes are more continuous on second and third thoracic segments."

TYPES. Holotype: ♂. Putnam Co., Illinois; 18 May 1967; M. O. Glenn. USNM. Paratypes: 26 ♂, 5 ♀. Same data as for holotype; 2 May–27 August 1949–1970 (17 ♂, 4 ♀). Hessville, Indiana; 13 June 1905; A. Kwiat (1 ♂). Same locality; 30 May 1909; Emil Beer (1 ♂). Clack Mt., Rowan Co., Kentucky; iss. 22 April 1946; A. F. Braun (1 ♂). Grand Mere Dunes, T5S, R19W, Sec. 29; Berrien Co., Michigan; 13, 28 May 1967, 68; J. P. Donahue (2 ♂). 4 mi NW of Warsaw on Missouri State UU, Benton Co., Missouri; 10 July 1971; J. R. Heitzman (1 ♂). Coolie Lake, Clay Co., Missouri; 4 May 1972; J. R. Heitzman (1 ♂). Fort Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska; 11 June 1983; R. W. Hodges (2 ♂). Tenkiller Lake, 3 mi W Blackgum, Sequoyah Co., Oklahoma; 6–9 July 1979; D. & M. Davis (1 ♀). FMNH, JRH, MSU, USNM.

Vindex is very similar to *setosella* and has been consistently misidentified as *setosella.* Differences are given in the keys and under *setosella.* The species are broadly sympatric from Kentucky to Oklahoma; however, *vindex* has been collected commonly only in central Illinois. This probably reflects collecting, not abundance. There are no records of *vindex* east of the Appalachian Mountains.

Variation is much as for *setosella.* The type series appears generally more uniformly gray than does the material of *setosella* that I have examined.

Dichomeris mulsa Hodges, NEW SPECIES
PL. 2, FIGS. 11, 12; PL. D, FIGS. 3, 6; PL. V, FIG. 2.

Dichomeris mulsa Hodges.
Type locality: Madera Canyon, Santa Rita Mountains, 5,600′, Santa Cruz Co., Arizona. [USNM]

Upper surface as figured. Head with haustellum dark brown at base becoming mixed gray and brown by ⅙ length; maxillary palpus dark brown; outer surface of first and second segments of labial palpus mainly dark brown, scales individually pale at base and apex, anterior margin of scale tuft pale gray, second segment with a very strong ventral scale tuft and a strong dorsal scale tuft, apex of ventral tuft truncated, inner surface of first and second segments mottled brown and gray, dorsal surface nearly uniformly pale gray, third segment pale yellowish gray, apex mainly dark brown, many brown scales on anterior surface; frons yellowish gray and brown, scales in front of eye dark brown; scales of vertex and occiput very pale gray above eye, individual scales becoming medium to dark gray then narrowly margined with pale gray at apex, medial scales with metallic purple and yellow-green reflections; row of scales behind eye dark brown except for dorsal two or three pale-gray ones; antenna slender, dorsal surface nearly uniformly dark brown, ventral surface of scape and parts of first three or four segments of shaft pale gray, sensory setae slightly shorter than depth of segments at base, becoming much shorter

by ½ length, in female ventral surface pale yellowish gray, sensory areas restricted on alternate half segments and sensory setae very short; ocellus present. Thorax with tegula brown on anterior margin, pale yellow dorsally; most scales on medial part of thorax dark brown, pale yellowish brown beneath tegula. Male with tuft of scales from mesothoracic anepisternum. Foreleg mainly dark brown, individual scale bases pale; apex of coxa with pale gray scales; apex of tibia with some pale-gray scales; apexes of tarsal segments one, two, three, and five pale yellowish white on dorsal surface, fourth segment with a few pale scales on ventral surface. Midleg much as for foreleg, apexes of tarsal segments with some pale scales dorsally and ventrally on first segment, ventrally on second, third, and fourth. Hindleg generally paler than preceding segments, scale tuft on tibia mottled pale yellowish gray and darker gray, tibial spurs mottled pale yellowish gray and dark brown, tarsus mottled grayish brown and yellowish gray. Anepisternum of mesothorax with pale-yellow scale tuft in male. Hindwing with pecten on basal ½–⅔ of cubitus. Abdomen dark gray brown dorsally, posterior margin of segments pale gray with yellow and purple reflections; ventral surface similar but generally darker. Wing length 8.2–9.7 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Madera Canyon, Santa Rita Mts., 5,600′, Santa Cruz Co., Arizona; 28 June 1973; J. G. Franclemont. USNM. Paratypes: 40 ♂, 4 ♀. Same data as for holotype (5 ♂). Madera Canyon, Santa Rita Mts., 4,880–5,800′; 10 June–21 July 1959, 60, 63; J. G. Franclemont, R. W. Hodges (29 ♂, 2 ♀). Same locality, 5,800′, 23 June 1955; R. J. Ford (1 ♂). Same locality, 5,000′; 23 July 1971; Donahue, Martin, Watson (1 ♂). Rustler Park, Chiricahua Mts., 8,500′; Cochise Co., Arizona; 12 July 1972; J. Powell (1 ♂, 1 ♀). Cave Creek, 2 mi SW Portal, Cochise Co., Arizona; 20/23 August 1972; Veirs & Powell (2 ♂). West Fork 6,500′, 16 mi SW Flagstaff, Coconino Co., Arizona; 8, 15 July 1961; R. W. Hodges (1 ♂, 1 ♀). LACM, UCB, USNM.

Dichomeris mulsa is easily recognized by the combination of size, scale tufts on the labial palpus, and forewing color pattern. It is nearest *mica* in color pattern and genital characters; differences are given in the keys. *Dichomeris leucostena* Walsingham from Guerrero, Mexico superficially is similar to *mulsa*; but the lobes of the juxta in *mulsa* are broadly expanded before the apex; those of *leucostena* are not. The female of *leucostena* is unknown.

Mulsa appears to have a restricted distribution from western central New Mexico to central Arizona from the Mogollon Rim to the mountains in the south. It is single brooded and occurs at elevations of 4,800 feet and above. Extensive collecting during two seasons in Madera Canyon at 4,400 feet was negative for *mulsa*; it came to light at 4,880 feet and above during the same seasons.

Dichomeris mica Hodges, NEW SPECIES
PL. 2, FIG. 13; PL. E, FIGS. 1, 2; PL. W, FIG. 2.

Dichomeris mica Hodges.
Type locality: Texas, Brewster County, Chisos Mts., Panther Pass, 6,000′. [USNM]

Upper surface as figured. Head with haustellum dark brown on basal ⅓, becoming yellowish gray mottled with brown distally; maxillary palpus dark brown with pale yellowish-gray or gray scale bases; first and second segments of labial palpus dark brown, individual scales pale gray basally and apically, inner surface much paler with a yellow-gray cast, dorsal surface very pale gray, strong ventral and dorsal scale tufts on second segment, apex of ventral tuft acute, posterior margin of tuft pale gray, third segment pale yellow, apex brown and mottled with brown on anterior surface; scales of frons, vertex, and occiput mainly dark brown, apexes narrowly margined with pale gray, scales above eye pale gray; antenna mainly dark brown in male, sensory areas large on alternate ½ segments, setae about equal to depth of segments at base, becoming shorter by ⅓ length of antenna, ventral surface of scape and basal segments of shaft yellowish gray, in female antenna paler yellowish gray brown, ventral surface of scape and basal segments of shaft off-white, sensory setae short, restricted to small areas on alternate half segments; row of scales behind eye dark brown except upper two or three scales pale gray; ocellus present. Anterior margin of tegula dark brown, tegula becoming pale yellow on dorsal surface; mesothorax mainly dark brown medially, pale yellow underneath tegula. Legs dark brown, individual scale bases pale gray; apex of foretibia and tarsal segments one, two, three, and five pale yellowish gray; midleg with off-white scales at apex of tibia and first, second, and third tarsal segments, apex of tibial spurs yellowish gray; hindleg somewhat paler, scale tuft on dorsal surface of tibia pale yellowish gray, apexes

of tibial spurs pale yellowish gray, base and apex of first tarsal segment and apexes of remaining segments with white or off-white scales. Mesothoracic anepisternum of male with pale-yellow scale tuft. Hindwing with weak pecten on basal ⅓–½ of cubitus. Abdomen with dorsal surface mainly shining yellowish gray; ventral surface mainly mottled dark brown and gray, posterior margins of segments pale gray; all scales with metallic reflections. Wing length 6.1–8.2 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Texas, Brewster Co., Chisos Mts., Panther Pass, 6,000′; 2 June 1973; R. W. Hodges. USNM. Paratypes: 16 ♂, 2 ♀. Same locality as for holotype; 2, 6 June 1973 (6 ♂, 1 ♀). Texas, Brewster Co., Chisos Mts., Green Gulch, 5,500′; 6 June 1973; R. W. Hodges (2 ♂). Texas, Culberson Co., Guadalupe Mts., Smith Canyon, 5,750′; 22 May 1973; R. W. Hodges (2 ♂). Texas, Culberson Co., Sierra Diablo, 20 mi. NNW Van Horn, 6,000′; 30 May 1973; R. W. Hodges (1 ♂). Texas, Big Bend Nat. Park, Gov. Spring; 27 March 1971; A. & M. E. Blanchard (1 ♂). Texas, Brewster Co., Alpine, 5,000–7,000′; 1–7 April–1–7 May 1926; O. C. Poling (2 ♂, 1 ♀). White[s] City, Eddy Co., New Mexico; 17 May 1950; E. C. Johnston (1 ♂). Mexico, Chihuahua, Hidalgo Del Parral, 25 mi W, 6,800′; 15 July 1964; Chemsak & Powell (1 ♂). CNC, UCB, USNM.

Dichomeris mica is most closely related to *mulsa* on genital characters and can be separated from it as indicated in the keys. The dark mark on the forewing of *mica* is indented on the anterior margin; it is nearly straight in *mulsa.* The scale tuft on the second segment of the labial palpus is acute in *mica,* blunt in *mulsa.*

Mica occurs in the southern Rocky Mountains from the vicinity of Carlsbad, New Mexico and western Texas and on the east side of the Sierra Madre Oriental in Mexico. Specimens have been collected at elevations of 5,000–6,800 feet. The species may be univoltine. The specimen collected on 15 July is worn. *Mica* and *mulsa* are a species pair that are separated by the Rio Grande in the United States.

Dichomeris aglaia Hodges, NEW SPECIES
PL. 2, FIGS. 14, 15; PL. E, FIGS. 3, 4; PL. W, FIG. 1.

Dichomeris aglaia Hodges.
Type locality: Lake Placid, Florida, Archbold Biological Station. [USNM]

Upper surface as figured. Haustellum dark brown at base becoming pale yellowish gray mottled with brown by ⅙ length; maxillary palpus dark brown, some scales tipped with pale gray; outer surface of first and second segments of labial palpus dark brown, many scale bases pale, second segment with strong ventral and dorsal scale tufts, apex of tuft pale gray, inner surface of segments mainly gray brown becoming paler yellowish gray on dorsal surface, third segment dingy yellow with some brown scales on anterior surface; frons brown in front of eye, scales on medial part brown becoming pale gray apically; vertex and occiput pale yellowish gray above eye becoming brown medially, individual scales pale gray apically, all with shining yellow and purple reflections; antenna brown dorsally, yellowish gray ventrally, sensory areas in male broad and separated by an incomplete row of scales on alternate half segments basally, complete rows distally, sensory setae longer than depth of segments basally becoming shorter distally, in female sensory areas restricted to anteroventral surface of alternate half segments basally, sensory setae very short; ocelli present; a row of dark-brown scales behind eye. Tegula brown on anterior surface becoming pale yellowish brown on dorsal surface; mesothorax yellowish brown dorsally with an indistinct brown line medially. Foreleg mainly dark brown, many scale bases pale; trochanter yellowish gray; tibia white at apex and along inner margin of epiphysis; apexes of tarsal segments white. Midleg with coxa pale gray to yellowish gray, rest of leg mainly dark brown, apex of tibia and apexes of tarsal segments white. Hindleg much as for midleg but generally paler, tibia grayish brown ventrally, pale yellow to yellowish gray dorsally, spurs dark brown basally with white or yellowish gray at apexes; tarsal segments gray brown at base, off-white at apex. Male with a scale tuft from mesothoracic anepisternum. Hindwing with pecten on base of cubitus. Abdomen mottled pale yellow and pale brown, first sternum uniformly pale yellow, some scales with shining reflections. Wing length 5.2–7.0 mm. Genitalia as illustrated.

The larva is a leaf tier on *Eupatorium capillifolium* (Lamarck) Small. Pupation occurs in the leaf roll. D. H. Habeck reared *aglaia* from larvae found in Alachua County, Florida. The pupal stage is very short, from 9–21 days in June and July. *Aglaia* is multivoltine.

TYPES. Holotype: ♂. Lake Placid, Archbold Bio. Sta. [Highlands Co.], Florida; 4 April 1959; R. W. Hodges. USNM. Paratypes: 18 ♂, 19 ♀. Same information as for holotype; 28 March–4 April 1959 (2 ♂, 4 ♀). Same locality, 16–22 May 1964; R. W. Hodges (1 ♀). Parker Is., Highlands Co., Florida; 26–29 May 1964; R. W. Hodges (1 ♀). Lakeland; March 1913; C. N. Ainslie (1 ♀). Pensacola, Florida; 12 April 1962; S. Hills (1 ♂). Edgecliff, Alachua Co., Florida; collected 30 May–2 July 1982, emerged 12 June–21 July 1982; *Eupatorium capillifolium*; D. H. Habeck, J. Gillmore (8 ♂, 5 ♀). Siesta Key, Sarasota Co., Florida; 1 February 1954; C. P. Kimball (1 ♂). Florida City, Dade Co., Florida; 2 May 1947; O. Buchholz (1 ♀). Gainesville, Florida; 27 July; J. S. Rogers; traplight (1 ♂). Gainesville, Alachua Co., Florida; 24 April 1974; malaise trap; W. H. Pierce (1 ♂). Archer Road Lab., 3 mi SW Gainesville, Alachua Co., Florida; 13 June 1975; J. B. Heppner (1 ♀). Alexander Spgs. Campground, 6 mi S Astor Park, Lake Co., Florida; 21 April 1975; J. B. Heppner (1 ♀). 6 mi SE Lake Placid, Highlands Co., Florida; 5 May 1975; J. B. Heppner (1 ♀). Baton Rouge, East Baton Rouge Par., Louisiana; 21 May–26 September 1970, 71; G. Strickland (1 ♂, 3 ♀). Frisco, Dare Co., North Carolina; 24 March 1975; D. C. Ferguson (1 ♂). Wedge Plantation, McClellanville, Charleston Co., South Carolina; 4 May 1981; R. W. Hodges (1 ♂). McClellanville, Charleston, South Carolina; 28 August 1973; R. B. Dominick (1 ♂). ANSP, CU, JBH, USNM, WPC.

Dichomeris aglaia can be distinguished by the characters given in the keys. It is closely related to *setosella, vindex, mica, mulsa, delotella,* and *gleba* by the presence of a strong ventral and dorsal scale tuft on the second segment of the labial palpus, a cubital pecten on the hindwing, and a scale tuft from the mesothoracic anepisternum in the males. The conformation of the apical part of the juxta associates *aglaia* with *delotella* and *gleba. Aglaia* should be recognized easily by its drab, diffuse color pattern, size, and labial palpus scale tufts. All surfaces vary in the relative amounts of pale and dark scales. Several specimens are excluded from the type series because they are too worn. The geographic range is from coastal North Carolina to central Florida and west along the Gulf Coast to Montgomery County, Texas. In Florida *aglaia* probably flies throughout the year. Elsewhere it probably flies in the warmer months.

Dichomeris delotella Busck

PL. 2, FIGS. 16, 17; PL. E, FIGS. 5, 6; PL. W, FIG. 3 (RWH 2294).

Dichomeris delotella Busck, 1909, *Proc. Ent. Soc. Washington,* **11**:90.
Type locality: Baboquivari Mountains, Arizona. [USNM]

NOTE—In the original description Busck did not indicate which specimen was the type. However, he labelled a female from the Baboquiveri (*sic*) Mts., Ariz. as type. The remaining seven specimens were labelled "cotype."

Dichomeris mexicana Walsingham, 1911, *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 96.
Type locality: Sonora, Mexico. [BMNH]

Upper surface as figured. Haustellum dark brown basally becoming mottled pale yellow and brown by 1/6 the length, scale bases pale gray; maxillary palpus mottled pale gray and dark brown; first and second segments of labial palpus dark brown laterally, nearly all scale bases pale, strong dorsal and ventral scale tufts, ventral tuft terminating in pale yellowish-gray tipped scales, dorsal tuft terminating in pale-gray tipped scales, inner surface of first and second segments paler than outer surface, becoming mainly pale yellowish gray dorsally, third segment off-white basally becoming pale yellow, apex dark brown, a few dark-brown scales on inner and anterior surfaces; frons mottled dark brown and pale gray in front of eye and on ventral margin, scales on medial surface pale yellowish brown, individual scales tipped pale gray; vertex and occiput pale yellowish gray above eye, scales becoming dark gray to gray brown apically, medial area dark gray brown, all scales tipped with yellowish gray; antenna mainly dark yellowish brown, ventral surface of scape and first segment of shaft white, rest of ventral surface of shaft yellowish brown, in male sensory setae 2/3–3/4 depth of segment at base becoming shorter by 1/6 length of shaft, sensory areas broad on alternate half segments, in female sensory setae about 1/4 depth of segment at base, sensory areas somewhat smaller than in male; ocelli present; row of scales behind eye mainly dark brown, every sixth or seventh scale pale gray. Tegula dark brown on anterior margin, pale yellowish brown dorsally. Pro- and mesothorax medium brown medially, pale yellowish brown on anterior margin and laterally. Legs dark brown with bases of individual scales pale gray to off-white. Foreleg with white scales at 2/3 length and apex of

tibia, base and apex of first tarsal segment, and apexes of second, third, and fifth tarsal segments. Midleg similar, coxa mainly pale yellow with some gray to gray-brown scales, tibial spurs pale gray apically and dorsally. Hindleg paler than midleg; tibia mottled gray brown and pale yellow on ventral half, pale yellow on dorsal half; tarsal segments mainly pale yellowish gray to off-white with some brown scales on each segment. Mesothoracic anepisternum with scale tuft in male. Abdomen mottled yellowish gray and darker yellowish gray brown, most scale bases pale, first three terga with shining reflections; ventral surface similar but mainly darker, pale-yellow scales prominent medially. Hindwing with pecten on base of cubitus. Wing length 6.2–8.3 mm. Genitalia as illustrated.

The immature stages are unknown. *Eupatorium* and *Solidago* species may be larval hosts.

Dichomeris delotella is nearest *gleba* and *alphito.* A useful recognition character is the presence of black scales on the fold and near the apex of the brown triangular mark on the forewing.

Delotella occurs in Arizona south of the Mogollon Rim and in California from Santa Cruz Island southward. In Arizona specimens have been collected from mid-March to 1 December. Fresh specimens were collected in May in the Santa Rita Mountains.

Dichomeris gleba Hodges, NEW SPECIES
PL. 2, FIGS. 18–20; PL. F, FIGS. 1, 2; PL. X, FIG. 1.

Dichomeris gleba Hodges.
Type locality: Putnam County, Illinois. [USNM]

Upper surface as illustrated. Haustellum dark brown basally becoming pale yellowish gray by ⅓ length, some gray-brown scales laterally on distal part; maxillary palpus dark gray brown, some scale bases pale gray; outer surface of first and second segments of labial palpus dark brown, many scale bases pale gray, second segment with a strong dorsal and ventral scale tuft, apex of tufts pale gray, inner surface yellowish brown, a nearly uniformly pale yellowish-gray band near dorsal margin, third segment brown on anterior margin and at apex, rest pale yellow to yellowish white; frons dark brown in front of eye, pale yellowish gray medially, each scale tipped with very pale gray; vertex and occiput dark yellowish gray, individual scales tipped with pale gray, those immediately above eye pale yellowish gray, all scales with shining reflections; scape of antenna mainly brown, pale yellowish gray on anterodistal margin and distal part of ventral surface, dorsal surface of shaft brown and yellowish brown, in male sensory setae longer than depth of segment at base becoming shorter by ¼ length, sensory areas broad basally, separated by scales on alternate half segments but this latter row narrowly interrupted by sensory area basally, in female sensory setae very short, sensory areas small on alternate half segments; ocelli present; a row of dark-brown scales behind eye. Tegula brown anteriorly, orange dorsally; prothorax brown laterally, yellowish orange medially; mesothorax mainly orange brown, an indistinct, slightly darker brown band medially becoming darker posteriorly. Foreleg dark brown, individual scales with pale bases; trochanter mottled with pale-gray to off-white scales; apex of tibia and all tarsal segments with white scales, fourth tarsal segment with fewest white scales. Midleg similar; coxa mainly pale yellowish gray and off-white with shining reflections; apex of tibia and of each tarsal segment with white scales, ventral surface of tarsus pale orange; tibial spurs grayish brown ventrally, yellowish gray to yellowish white dorsally. Hindleg: coxa and trochanter off-white with shining yellow and purple reflections; femur slightly darker, with overlay of whitish scales; tibia mainly gray brown ventrally becoming pale yellowish gray dorsally, spurs gray brown ventrally, mainly pale yellowish gray dorsally; tarsus gray brown, base and apex of first segment and apexes of remaining segments yellowish white. Male with scale tuft on anepisternum of mesothorax. Abdomen mainly shining yellowish gray and brown dorsally, shining white laterally and on posterior margins of several segments; ventral surface mottled brown and pale yellow. Hindwing with pecten on base of cubitus. Wing length 5.9–7.4 mm. Genitalia as illustrated.

The immature stages are unknown, but the larva may feed on *Eupatorium* or *Solidago* in the Compositae, guessing from its allies.

TYPES. Holotype: ♀. Putnam County, Illinois; 31 July 1972; M. O. Glenn. USNM. Paratypes: 4 ♂, 21 ♀. Same data as for holotype; 20 May–18 August 1962–1976 (3 ♂, 19 ♀). Devil's Den State Park, Washington Co., Arkansas; 23 July 1966; R. W. Hodges (1 ♀). Blue Springs Campground, South Arm of Beaver Lake, Madison Co., Missouri; 3 May 1969; J. R. Heitzman (1 ♂). Johnson's Shut-Ins State Park, Reynolds Co., Missouri; 21 August 1979; J. R. Heitzman (1 ♀). JRH, USNM.

The type series from the Midwest is relatively uniform in size; specimens vary in relative proportion of dark and pale scales. In some the orange-brown area on the base of the forewing is overlain with many dark-gray scales.

I have excluded from the type series specimens from western Texas, central Colorado, New Mexico, and Arizona. The male and female genitalia of these specimens are inseparable from those of the type series. The only apparent difference is size: wing length of eastern *gleba* is 6.7 mm (5.9–7.4 mm, $n = 27$), of western *gleba* is 7.9 mm (7.2–8.6 mm, $n = 24$).

East of the Great Plains *gleba* should be confused with no other species of *Dichomeris*. In the West it can be confused with *delotella* and *alphito*. It differs from *delotella* by the orange base of the forewing and the dark, triangular mark on the forewing being black with brown reflections; in *delotella* the base of the forewing is yellowish gray, and the triangular mark is brown with two black areas. *Alphito* has the base of the forewing concolorous with the area beyond the dark mark, the dorsal surface of the tegula gray brown, and the dorsal surface of the thorax mainly gray brown.

Gleba may be bivoltine in Illinois, judging from the condition of collected specimens. Those collected in late May are fresh as are those collected in late July.

Dichomeris alphito Hodges, NEW SPECIES
PL. 2, FIG. 21; PL. S, FIG. 5.

Dichomeris alphito Hodges.
Type locality: Madera Canyon, 4,880′, Santa Rita Mtns., Arizona. [CU]

Upper surface as figured. Haustellum gray brown basally, shining pale yellowish white laterally at base and generally by ⅓ length, a row of gray-brown scales on lateral surface distally; maxillary palpus yellowish white at base, gray brown distally; outer surface of first and second segments of labial palpus dark gray brown, scale bases pale gray, second segment with a strong dorsal scale tuft and a weak ventral scale tuft, apex of tuft pale gray, inner surface of first and second segments mainly pale yellowish gray, third segment yellowish gray brown, darker on anterior surface and at apex, nearly uniformly pale yellow posteriorly; frons dark brown in front of eye, pale yellowish gray with yellow and purple reflections medially; vertex and occiput pale yellowish gray above eye, shining gray brown medially, apexes of scales pale gray; antenna gray brown and yellowish gray dorsally, ventral surface of scape mainly pale yellowish white, in female sensory setae about half depth of segment at base becoming shorter distally, sensory areas broad, separated by a row of scales on alternate half segments, male unknown; ocelli present; a row of brown scales behind eye. Tegula gray brown, slightly paler dorsally, some partially orange scales toward apex. Thorax shining orange gray brown. Foreleg: coxa shining pale yellowish gray, apex and trochanter off-white; femur slightly darker, most scales with pale bases; tibia and tarsus dark gray brown, apex of tibia, base and apex of first tarsal segment, and apexes of other tarsal segments off-white to yellowish gray, ventral surface of tarsal segments pale yellowish orange. Mid- and hindlegs with similar color pattern but each segment progressively paler, tibial spurs dark gray ventrally, yellowish white dorsally and at apexes. Presence of scale tuft on mesothoracic anepisternum in male unknown. Abdomen not observed before dissections were made. Hindwing with pecten on base of cubitus. Wing length 6.3–6.5 mm. Female genitalia as illustrated; accessory pouch from corpus bursae arising as an anteriorly directed duct and heavily sclerotized on one side.

The immature stages are unknown.

TYPES. Holotype: ♀. Madera Canyon, Santa Rita Mtns., 4,880′, Arizona; 15 September 1959; R. W. Hodges. CU. Paratypes: 2 ♀. Same locality but elevations 4,880′ and 5,600′; 16, 23 September 1959 (2 ♀). USNM.

Dichomeris alphito can be separated from its similar appearing allies, *delotella* and *gleba,* by the combination of forewing with black, triangular mark near the base having brown reflections; second segment of the labial palpus with a short, weak ventral scale tuft; and tegula nearly uniformly gray brown.

The three specimens are in poor condition. They were collected in the upper part of Madera Canyon and may be restricted to elevations above 4,500 feet. Because the species has not been collected elsewhere in the United States, I suspect it reaches its northern limit of distribution in southern Arizona and that is occurs farther south in Mexico.

Dichomeris laetitia Hodges, NEW SPECIES
PL. 2, FIG. 22; PL. F, FIGS. 3, 4; PL. X, FIG. 2.

Dichomeris laetitia Hodges.
Type locality: Putnam County, Illinois. [USNM]

Upper surface as figured. Head with maxillary pal-

pus and base of haustellum dark brown, haustellum becoming pale brownish gray by ½ length and with some darker brown scales on distal ⅓; first and second segments of labial palpus mainly dark brown, dorsal surface mainly pale yellowish gray, strong scale tuft on dorsal surface of second segment, apex of scale tuft narrowly off-white, third segment pale yellowish gray with some irregularly dispersed pale-brown tipped scales; frons with dark-brown scales in front of eye, pale-gray scales medially; vertex and occiput pale gray with shining reflections, a group of yellow-gray scales arising just dorsad of ocellus; antenna mainly yellowish gray, base of scape with dark-brown scales, sensory setae in male longer than depth of segment basally covering most of ventral surface of segments, then with a row of scales of alternate half segments, in female antenna pale yellow to yellowish gray, sensory setae short, sensory areas narrow quadrangles; a row of dark-brown scales behind eye; ocellus present. Tegula mainly pale yellow, dark-brown scales at base; mesothorax pale yellowish gray, somewhat darker medially. Foreleg dark brown with shining reflections, base and apex of first tarsal segment and apexes of other tarsal segments with some pale yellowish-gray scales. Midleg much as for foreleg, femur with pale-gray scales on dorsal and ventral margins, each tarsal segment with some pale scales, mesothoracic anepisternum without scale tuft in male. Hindleg: coxa mainly pale yellowish gray to off-white, scales with pale-lavender reflections; trochanter gray to grayish brown with lavender reflections; femur darker gray with metallic reflections; tibia dark gray to gray brown on ventral margin, spurs dark gray tipped with pale gray, rest of segment and dorsal scale tuft pale yellow; tarsus shining gray and pale yellow, second–fifth segments gray at base. Abdomen shining pale gray, dorsal surface slightly darker gray medially. Hindwing without cubital pecten. Wing length 5.8–7.2 mm. Genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Putnam Co., Illinois; 7 June 1962; M. O. Glenn. USNM. Paratypes: 4 ♂, 4 ♀. Same locality as for holotype; 18, 22 June 1939, 1964 (1 ♂, 1 ♀). Washington Co., Arkansas; 9 August 1966; R. L. Brown (1 ♂). Plummers I. [Montgomery Co.], Maryland; July 1903; A. Busck (1 ♀). Camp Springs, Prince George's Co., Maryland; 2 September 1979; G. F. Hevel (1 ♀). Noxubee Ref., Oktibbeha Co., Mississippi; 14 May 1981; R. L. Brown (2 ♂). Rocky Spgs., Claiborne Co., Mississippi; 10 May 1970 (1 ♀). BM, MSU (Starkville), UAF, USNM.

Dichomeris laetitia can be separated from its allies as indicated in the keys. The combination of characters: lack of ventral scale tuft on second segment of the labial palpus; yellowish-gray forewing with a strong, black mark; and gray area on outer margin of forewing narrow are diagnostic for *laetitia.*

Most specimens are worn and appear faded. The dates of collection are so scattered that the species may have more than one brood.

Dichomeris stipendiaria (Braun), NEW COMBINATION

PL. 2, FIGS. 23, 24; PL. F, FIGS. 5, 6; PL. X, FIG. 3 (RWH 2304).

Trichotaphe stipendiaria Braun, 1925, *Trans. Amer. Ent. Soc.,* **51**: 196.
Type locality: Logan Canyon, near Logan, Utah. [ANSP]

Upper surface as figured. Head: haustellum and maxillary palpus mottled yellowish gray and grayish brown, haustellum paler on distal ⅔; outer surface of first and second segments of labial palpus mainly dark brown, individual scale bases pale gray, second segment with strong dorsal scale tuft, apex of tuft narrowly pale gray to nearly white, inner surface of first and second segments and all of third segment pale yellow; frons shining pale yellow medially, a row of brown scales in front of eye; vertex and occiput with pale-yellow scales above eye becoming medium gray at apexes, shining gray medially with purple and yellow reflections; antenna in male dark brown dorsally, scape and first segment of shaft with pale yellowish-gray scales, ventral surface of shaft pale yellowish gray, sensory setae slightly longer than depth of segments basally gradually becoming shorter distally, sensory areas broad, covering ventral surface on basal ⅓–½ of shaft then separated by narrow row of scales on alternate half segments; in female sensory setae short, restricted in area on alternate half segments on anteroventral part of segment; a row of dark-brown scales behind eye; ocellus present. Tegula dark brown anteriorly, mainly yellowish brown and pale yellowish gray elsewhere. Mesothorax mottled dark brown and yellowish brown, some paler scales near anterior margin. Foreleg dark brown with pale yellowish-gray scale bases, apex of coxa and trochanter yellowish gray, apexes of tarsal segments off-white. Midleg with coxa shining pale yellow, rest of leg much as for foreleg.

Hindleg: coxa shining pale yellow; trochanter with brown scales basally, pale-yellow and off-white scales distally; femur mottled brown and pale yellowish gray, reflecting lavender; tibia mottled brown and pale yellow ventrally, pale yellow dorsally, spurs gray brown anteriorly, pale yellow distally; tarsus pale yellowish gray. Mesothoracic anepisternum in male lacking scale tuft. Abdomen mottled gray brown, gray, and pale yellowish gray with shining yellow, purple, and lavender reflections; ventral surface mainly brown with shining yellow and purple reflections. Wing length 6.0–8.8 mm. Genitalia as illustrated.

Larvae make leaf rolls on *Solidago* (Braun, 1925), *Aster eatonii* (Gray) T. Howell (Clarke, 1934), and *Erigeron* species (specimens in USNM). In northern Utah and eastern Washington larvae were collected in mid- to late June; they emerged as adults from 2 to 14 July. Pupation occurred in the leaf roll.

Specimens from Utah have a more diffuse, or less well-defined, color pattern on the forewing as contrasted with those from eastern Washington and northeastern California. They also have the anterior margin of the distal dark-brown mark less strongly angled and with fewer yellow-orange scales on the basal margin.

Dichomeris stipendiaria occurs from southern British Columbia to the southern Wasatch Mountains in central Utah, west to Modoc County, California, and Douglas County, Oregon. It appears to be univoltine; adults have been collected from 9 June to 10 August. Intensive collecting in the Flagstaff, Arizona area over two seasons produced no specimens.

Within its range *stipendiaria* should not be confused with other *Dichomeris* species. It is nearest *bilobella* in appearance and genital characters but can be separated as indicated in the keys.

Dichomeris bilobella (Zeller), REVISED COMBINATION

PL. 2, FIGS. 25, 26; PL. G, FIGS. 1, 2; PL. Y, FIG. 1 (RWH 2291).

Gelechia (*Malacotricha*) *bilobella* Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 280, fig. 28.

Type locality: Vicinity of Washington, D.C. [BMNH]

NOTE—The lectotype ♂, present designation, selected by Klaus Sattler bears the following labels: 1. "Lectotype"; 2. "N. Americ. Sacken 65"; 3. "*Gelechia* (*Malacotricha*) *bilobella* Z"; 4. "Zeller Coll. Walsingham Collection, 1910-427."; 5. "*Gelechia* (*Malacotricha*) *bilobella* Zell. Verh. Z b Ges Wien. 23 p. 280 Type (1873)."

Upper surface as figured. Head: haustellum dark gray brown with a few paler scales on medial half; maxillary palpus gray brown with some pale-gray based scales; labial palpus with strong scale tuft on dorsal surface of second segment, outer surface of first and second segments mainly gray brown, apex of second segment pale yellow and yellowish white, inner surface mainly brown with overlay of yellowish brown, scale tuft yellowish gray, third segment pale yellow with dark-brown scales at apex; frons with dark-brown scales before eye, yellowish-gray scales with shining reflections medially; vertex and occiput pale yellowish gray above eye, becoming darker gray with shining reflections medially; antenna of male with base of scape and most of dorsal surface of shaft brown, rest of scape and ventral surface of first four or five segments of shaft yellow, ventral surface of shaft yellowish gray, sensory setae approximately equal to depth of segments at base becoming shorter by ¼ length of shaft, sensory areas broad and separated by row of scales on alternate half segments, sensory setae very short and sensory areas very small in female; row of scales behind eye dark brown; ocellus present. Tegula with dark-brown anterior margin, yellowish gray and yellowish brown on dorsal surface; mesothorax mainly gray brown overlain by yellowish-brown scales. Legs dark brown with shining reflections, apexes of tarsal segments with white scales. Midleg similar, yellowish-white scales at apex of tibia and apexes of tibial spurs, tarsal segments with white at apex. Hindleg: coxa mottled brown and yellowish gray; tibia gray brown on ventral half, shining yellowish gray dorsally, spurs shining gray with white or off-white apexes; tarsus medium gray, apexes of segments white. Mesothoracic anepisternum in male without scale tuft. Abdomen shining yellowish gray with white cast on first three tergites, other tergites slightly darker, lacking white cast; ventral surface mottled brown and gray brown, many scales streaked with yellowish gray or yellowish white. Wing length 5.4–8.3 mm. Hindwing without cubital pecten. Genitalia as illustrated.

Bilobella is highly variable in size and shading and hue on the head, labial palpus, forewings, and legs. Specimens with dark forewings tend to have other surfaces with more brown or gray-brown scales than described above. A series of reared specimens from New Jersey shows nearly the full range of variation in color.

The larva is a leaf roller on species of *Solidago*

and *Aster*. Braun (manuscript notes) reared it from *Solidago flexicaulis* L. in Kentucky. The edge of a leaf was rolled to the upper surface, and the larva fed from either end of the roll. It was collected on 9 May, and the adult emerged on 10 June. McDunnough (data associated with specimens) reared it from *Solidago* in Nova Scotia and Illinois, and Loeffler (data associated with specimens) reared it from four species of *Solidago* and *Aster* species in New York and Pennsylvania.

Dichomeris bilobella occurs from Nova Scotia and southern Quebec and Ontario, south to Maryland, and west to Minnesota, Missouri, and eastern Kansas. Adults fly from mid-May until late August.

Bilobella has been treated as a synonym of *setosella* by most authors following Busck (1903: 911, 912), who interpreted Clemens' description of the labial palpus as lacking a ventral scale tuft. Clemens (1860: 166) stated "Middle joint of labial palpi much flattened; hairy above and below, with diverging hairs." Although the holotype of *setosella* lacks the labial palpi, it does match the color pattern of the forewing of the species herein treated under the name. Because of this confusion, the names *setosella, eupatoriella,* and *bilobella* usually have been misapplied to the two species *setosella* and *bilobella.* The diagnostic characters of *bilobella* are color pattern of the forewing, second segment of the labial palpus with a dorsal scale tuft only, the male without a scale tuft from the mesothoracic anepisternum, and the hindwing without a cubital pecten.

Dichomeris aleatrix Hodges, NEW SPECIES PL. 2, FIG. 27; PL. G, FIGS. 3, 6; PL. Y, FIG. 2.

Dichomeris aleatrix Hodges.
Type locality: Putnam Country, Illinois. [USNM]

Upper surface as figured. Haustellum and maxillary palpus pale orange to orange white; outer surface of first and second segments of labial palpus light orange ventrally, grayish brown dorsally and on dorsal scale tuft, apex of scale tuft orange white, inner surface of first and second segments similar but generally paler, third segment pale orange with very few brown scales on anterior margin at apex; frons orange white, brown scales in front of eye; vertex mainly orange white with some pale orange-gray scales medially; occiput orange white above eye, dark gray medially and with shining yellow and purple reflections; antenna orange white on scape and first one or two segments of shaft dorsally and on basal ⅕ of shaft ventrally, in male sensory setae about equal to depth of segment at base becoming shorter and equal to ½ depth of segment at apex, sensory areas broad and separated by row of scales on alternate half segments, in female some orange-white scales extending on ventral surface nearly to apex, sensory areas very restricted at base becoming broader and covering most of ventral surface on alternate half segments by apex, sensory setae very short throughout; ocellus present; a row of brown scales behind eye. Tegula dark brown anteriorly, pale yellowish orange dorsally and with shining reflections. Dorsal surface of thorax dark brown with shining yellow and purple reflections. Foreleg dark brown with some pale scale bases on tibia and tarsus, apexes of tarsal segments off-white. Midleg similar but coxa shining yellowish white with shining yellow and lavender reflections. Hindleg similar to midleg, dorsal scale tuft on tibia pale yellowish orange, apex of tibia yellowish white, apexes of tarsal segments off-white. Abdomen shining yellowish white on first segment and lateral and posterior margins dorsally, tergites pale brown basally, last segment slightly darker and without shining reflections; ventral surface mainly gray brown, most scales with yellowish-gray or pale-gray bases. Wing length 6.8–7.4 mm. Male and female genitalia as illustrated.

Larvae have been reared from *Helianthus* species, *H. hirsutus* Rafinesque, *H. rigidus* (Cassini) Desfontaines, and *Solidago* species in the Compositae.

TYPES. Holotype: ♂. Putnam Co., Illinois; 15 June 1944; M. O. Glenn; Genitalia slide USNM 9314. USNM. Paratypes: 6 ♂, 8 ♀. Arlington Hts., Ill.; 2 July 1935; A. L. McElhose (1 ♂). Beverly H's, Ill.; 27 June 1908; W. J. Gerhard (4 ♀). Edgebrook [Illinois?, Indiana? no state indicated]; 27 June 1914; A. Kwait (1 ♂). Urbana, Ill.; 13 June 1886; bred from *Helianthus rigidus* (1 ♀). Hessville, Ind.; 17 June 1905; A. Kwait (1 ♂). Clack Mt., Rowan Co., Ky.; iss. 6 June 1942; A. F. Braun; on *Helianthus* (1 ♀). Massachusetts (1 ♀). St. Anthony Park, Minnesota; leaf tier *Helianthus* (1 ♂). Monroe Co., N. Y.; 15 July 1948; C. P. Kimball (1 ♂). Islington, Ontario, Canada; July 1935; H. S. Parish (1 ♂). Ottawa, Ont. [Canada]; 20 June 1955; M. R. McKay; *Solidago* (1 ♀). ANSP, CNC, FMNH, INHS, USNM.

Dichomeris aleatrix varies in the amount and proportions of light-orange and orange-brown scales on the head and the amount of dark scales on the head and legs. The lobes of the juxta differ from specimen to specimen in the relative length of the long medial lobes, presence and degree of development of a small

third lobe on the right lobe, and the curvature of the lobes. The paired sclerotized processes from the base of the vinculum vary in width, shape of the margin, and length. The posterior margin of the eighth tergite in the female may be rounded or slightly indented medially.

Aleatrix can be confused with *flavocostella, fistuca,* and *inserrata* in appearance. The costal margin of the forewing has a distinct dark-gray band from slightly before ½ the wing length to ¾ the wing length; the posterior margin of the yellow costal area of the forewing is nearly straight then abruptly rounded or curved. *Flavocostella* has the posterior margin of the yellow costal area more evenly graded from the base to the indentation. The posterior margin of the yellow costal area is similar to those of *fistuca* and *inserrata. Aleatrix* occurs from southern Canada to Massachusetts, Kentucky, and Illinois; *fistuca* occurs in the Southeast from South Carolina to Florida. *Aleatrix* and *inserrata* are sympatric. *Inserrata* normally lacks the dark-gray band on the costa of the forewing. The highly asymmetrical, well-developed lobes of the juxta immediately separate *aleatrix* from all other species of *Dichomeris.* The genitalia should be studied in any questionable identification.

Dichomeris copa Hodges, NEW SPECIES
PL. 2, FIG. 28; PL. G, FIGS. 4, 5; PL. X, FIG. 4.

Dichomeris copa Hodges.
Type locality: Snyder Heights 1,100′, Ithaca, New York. [USNM]

Upper surface as figured. Haustellum and maxillary palpus mottled dark brown and dark yellowish gray; outer surface of first and second segments of labial palpus dark brown with several brownish-orange scales, apex of second segment pale yellow or orange white, apexes of scales of dorsal tuft pale gray or yellowish gray, inner surface of first and second segments mottled dark gray and orange or yellowish gray ventrally, nearly uniformly yellowish white on dorsal surface at base of second segment, scale tuft pale orange white, third segment yellowish orange to orange white with gray tinges on many scales; frons dark brown in front of eye, shining yellow to orange gray medially; vertex and occiput brownish orange above eye, shading to dark gray brown medially; antenna dark brown dorsally, yellowish or orange gray ventrally, in male sensory areas broad and narrowly contiguous on basal five or six segments then separated by a row of scales on alternate half segments, sensory setae about equal to depth of segments from base to apex, in female sensory areas small and restricted at base becoming larger by ⅔ length, separated by row of scales on alternate half segments, sensory setae very short at base, nearly ½ depth of segment at apex; a row of brown scales behind eye. Tegula dark brown anteriorly, mottled brownish orange and gray on dorsal surface. Mesothorax mainly dark brown medially, brownish orange anteriorly and laterally with some pale yellowish-orange or orange-white streaking on scales. Male with scale tuft from anepisternum of mesothorax. Foreleg mainly shining dark brown, apex of tibia with some slightly paler scales and apexes of tarsal segments pale yellowish white. Midleg similar to foreleg but coxa shining yellowish white and dark yellowish gray. Hindleg similar to midleg, segments generally with more light scales, tibial scale tuft hoary with grayish-red scales, apex slightly grayish red and not contrasting strongly with ventral part of tibia. Abdomen shining dark brown and yellowish white, pale scales concentrated on posterior margins of segments. Wing length: 6.9–8.0 mm. Hindwing without pecten on base of cubitus. Male genitalia as illustrated; juxta slightly asymmetrical, lobes very stout and heavily sclerotized; vinculum slightly emarginate and less heavily sclerotized in saccal area than in adjacent areas; aedoeagus with well-developed ventrolateral lobes from zone, right lobe longer than left lobe. Female genitalia as illustrated; base of bursa copulatrix heavily sclerotized, broad, with a pair of invaginations from ventral surface; left side of bursa copulatrix with heavily sclerotized ridges to apex.

A larva was reared from *Solidago* species in Nova Scotia by McDunnough.

TYPES. Holotype: ♂. Snyder Heights 1,100′, Ithaca, New York; 16 July 1975; J. G. Franclemont. USNM. Paratypes: 15 ♂, 12 ♀. Six Mile Creek, Ithaca, New York; 22 June 1957; J. G. Franclemont (1 ♀). Monroe Co., New York; 11 June, 1, 3, 28 August 1949; C. P. Kimball (4 ♂). Chicago, Illinois (1 ♀). Chicago, Illinois; 5 July 1907, 1 September 1904; W. J. Gerhard (2 ♀). Beverly H's., Illinois; 27 June 1908; W. J. Gerhard (1 ♀). Decatur, Ill.; 24–30 May (1 ♀). Oconee, Ill.; 1–7 August (1 ♂). Barnstable, Massachusetts; 28 July 1950; C. P. Kimball (1 ♀). Argyle, Yarmouth Co., Nova Scotia; 5 August 1957; D. C. Ferguson (1 ♂). Armdale, Halifax Co., Nova Scotia; 2 July 1960; D. C. Ferguson (2 ♂). Brooklyn, Hants Co., Nova Scotia; 18 July 1968; B. Wright (1 ♂, 1 ♀). Gilbert Cove, Digby Co., Nova Scotia; 3 August

1967; D. C. Ferguson (1 ♀). Parrsboro, Nova Scotia; 12 July 1914; J. McDunnough (1 ♂). Smiley Brook, near Brooklyn, Hants Co., Nova Scotia; 18 July 1968; D. C. Ferguson (2 ♀). White Pt. Beach, Queens Co., Nova Scotia; 13 August 1934, 11 August 1935, 19 August, 2 September 1956; J. McDunnough; one specimen reared from *Solidago* (3 ♂, 1 ♀). Bell's Corner near Ottawa; 5 August 1965; K. Sattler (1 ♂). Chatham Lab. [Ontario]; 1931 (1 ♂). BMNH, CNC, FMNH, NSMS, USNM.

Copa varies mainly in coloration with different amounts, shades, and hues of brownish orange, brownish yellow, grayish orange, etc. The pale spot at the end of the cell on the forewing usually is preceded costally and followed posteriorly by black scales but sometimes partially surrounds black scales.

Dichomeris copa is extremely similar to *costarufoella* in appearance, and many specimens cannot be separated with certainty on external characters. The mainly eastern distribution (west to Illinois) of *copa* contrasted with western distribution (Missouri and west) of *costarufoella* may prove useful, but in any questionable case the genitalia should be examined. Both species occur in the Riding Mountains of southern Manitoba. *Copa* and *costarufoella* are in different species-groups. Obvious differences are the presence of a strong cornutus and well-developed ventrolateral lobes from the zone of the aedoeagus and a very broad, heavily sclerotized basal part of the bursa copulatrix in *copa*. Contrasting character states occur in *costarufoella*.

Dichomeris copa is associated with *scrutaria* and *furia* because of the ventrolateral lobes on the aedoeagus and the broad-based, heavily sclerotized bursa copulatrix.

Dichomeris scrutaria Hodges, NEW SPECIES
PL. 2, FIG. 29; PL. H, FIGS. 1, 2.

Dichomeris scrutaria Hodges.
Type locality: 4.2 mi. NE Abita Springs, St. Tamany Parish, Louisiana. [USNM]

Upper surface as figured. Haustellum gray brown at base becoming pale gray with some pale-gray scales by ¼ length; maxillary palpus yellowish gray with some darker yellowish-gray scales on medial surface; frons shining yellowish gray medially, yellowish brown in front of eye; vertex and occiput pale yellowish gray above eye, darker gray medially, most scales with shining reflections; scape of antenna pale yellow or yellowish gray on anterior and ventral surfaces, gray brown posterodorsally, colors extending onto first two segments of shaft; outer surface of first and second segments of labial palpus mainly gray brown, second segment with a slight dorsal scale tuft, none ventrally, apex pale yellowish gray to white, inner surface of first and second segments and all of third segment pale yellow; ocellus present; row of scales behind eye brown. Tegula brown on anterior surface, mottled yellowish gray and pale brown elsewhere; pro- and mesothorax mainly brown mottled with pale yellowish gray. Foreleg coxa shining dark brown, apex of coxa and each tarsal segment with yellowish-gray scales. Midleg with coxa pale yellowish gray and off-white; trochanter yellowish gray to gray brown; femur, tibia, and tarsus mainly shining brown, apex of tibia and of tarsal segments with off-white or yellowish-gray scales. Hindleg similar to midleg but generally paler, tibia with pale-yellow scales dorsally. Mesothoracic anepisternum without scale tuft in male. Dorsal surface of abdomen shining yellowish gray on first two segments, shining pale gray on rest of segments; ventral surface mainly yellowish gray and gray brown. Hindwing lacking a cubital pecten. Wing length 6.3–7.8 mm. Male genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Louisiana, St. Tam. Par., 4.2 mi NE Abita Springs, sec. 24, T6. SR 12E; 15 September 1983; V. A. Brou. USNM. Paratypes: 6 ♂. Same data as for holotype; 30 June 1983, 20–25 September 1983, 84. USNM, VAB.

Four specimens are excluded from the type series: three are from the type locality and were collected on 6 July, 16 September, and 2 October; the fourth was collected at Dennysville, Maine on 31 July. These specimens are in very poor condition.

Color pattern and male genitalia ally *scrutaria* with *stipendiaria* and *bilobella*. It differs from them by: the lobes from the zone of the aedoeagus are extremely long, and the expanded part of the lobes of the juxta has nearly a straight lateral margin and is approximately ⅓ the length of the lobe.

Dichomeris furia Hodges, NEW SPECIES
PL. 2, FIG. 30; PL. H, FIGS. 3, 4; PL. Z, FIG. 1.

Dichomeris furia Hodges.
Type locality: Putnam County, Illinois. [USNM]

Upper surface as illustrated. Haustellum medium gray basally becoming mottled pale gray and yel-

lowish white, scales with shining reflections; maxillary palpus mottled yellowish white and gray; labial palpus yellow orange on outer surface of first and second segments, some medium-gray scales medially, scale tuft on second segment pale yellowish white apically, inner surface of first and second segments pale yellowish white, third segment pale yellow with some medium-gray scales at apex; frons pale brown or orange brown in front of eye, pale gray to grayish white with shining yellow and purple reflections medially; vertex and occiput pale yellowish gray above eye becoming slightly darker medially, scales with shining reflections; scape of antenna pale yellowish white ventrally and anteriorly, color extending onto first four or five segments of shaft, scape orange gray dorsally, most of shaft medium to dark gray with occasional pale-gray scales on alternate half segments, sensory setae in male slightly shorter than depth of segment basally becoming much shorter by ⅓ length of shaft, sensory areas very broad on basal segments but separated by a few scales on alternate half segments, these scales very prominent distally, in female sensory setae very short, sensory areas very small on basal ⅓ of shaft becoming broader on distal ⅔ of shaft; a row of gray-brown scales behind eye; ocellus present. Tegula brown with shining reflections on anterior margin, orange gray brown dorsally; pro- and mesothorax gray brown and orange brown with a few pale-gray scales. Foreleg mainly dark gray brown, femur with many scales having a whitish cast, apexes of tibia and tarsal segments with off-white scales. Midleg: coxa shining yellowish white with yellow, lavender, or purple reflections; trochanter pale gray with shining reflections; femur slightly darker; tibia and tarsus mainly dark gray with pale scales at apexes of segments, spurs pale yellowish gray apically. Hindleg: coxa mainly shining pale yellowish white; trochanter gray to yellowish gray; femur medium gray with many off-white scales; tibia pale yellowish gray ventrally, pale yellow dorsally, spurs pale to medium gray, slightly paler apically; tarsal segments mainly pale gray with yellowish-white scales at apexes. Mesothoracic anepisternum without scale tuft in male. Abdomen pale grayish white to off-white basally, becoming medium to dark gray distally, scales with shining yellow, lavender, and purple reflections; ventral surface similar but posterior segments with yellow cast. Wing length 5.8–7.2 mm. Hindwing lacking cubital pecten. Genitalia as illustrated.

The immature stages are unknown; however, it is likely that the larva is a leaf roller on composites and may be found in spring and early summer.

TYPES. Holotype: ♂. Putnam Co., Illinois; 11 July 1968; M. O. Glenn. USNM. Paratypes: 10 ♂, 4 ♀. East River, Connecticut; 25, 30 July 1910; C. R. Ely (1 ♂, 2 ♀). Putnam, Windham Co., Connecticut; 22 July–30 August; A. B. Klots (4 ♂). South Shore, Killingly P[on]d, between Connecticut and Rhode Island; 1 September 1930; A. B. Klots (1 ♀). Black Mtn. State Park, nr. Mountain City, Rabun Co., Georgia; 3 July 1958; Hanson and Flint (1 ♂). 3 mi NE Booneville, Owsley Co., Kentucky; 5 July 1980; L. D. Gibson (1 ♂). Massachusetts (1 ♀). City limits of Sarcoxie, Jasper Co., Missouri (1 ♂). Monroe Co., New York; 21 July 1947; C. P. Kimball (1 ♂). Six Mile Creek, Ithaca, New York; 26 July 1957; J. G. Franclemont (1 ♂). AMNH, CU, JRH, LACM, ULK, USNM.

Furia is most similar to *stipendiaria* and *bilobella* in maculation, but it can be recognized as indicated in the keys. The extremely long, nearly symmetrical lobes of the juxta are diagnostic as are the paired, symmetrical lobes of the lamella vaginalis. *Furia* has been consistently misidentified as *bilobella* or *setosella.* Very few specimens have been collected, but they indicate that it has a relatively wide distribution from Connecticut and upstate New York, south (perhaps along the Appalachians) to northeastern Georgia, and west to southwestern Missouri. Adults should be expected in July and early August, larvae probably in late spring or early summer.

Dichomeris purpureofusca (Walsingham), NEW COMBINATION

PL. 2, FIG. 31; PL. H, FIGS. 5, 6; PL. Z, FIG. 2 (RWH 2308)

Gelechia (*Trichotaphe*) *purpureofusca* Walsingham, 1882, *Trans. Amer. Ent. Soc.,* **10**: 184. Type locality: none given [Orono, Maine]. USNM.

NOTE—In the original description Walsingham indicated that he had more than one specimen, but he did not indicate which was the type. I have selected the syntype that he studied and to which he added a blue label with "208" on it. The lectotype ♀, present designation, bears the following labels: 1. "6.23 81"; 2. "208"; 3. "*Gelechia Purpureo-fusca* Type Wals'm O"; 4. "*Gelechia* (*Trichotaphe*) *purpureofusca* Wlsm Type."; 5. "Fernald collection"; 6. "Genitalia Slide by RWH ♀ USNM 9246"; 7. "LECTOTYPE *Gelechia* (*Trichotaphe*) *purpureofusca* Wlsm. By R. W.

Hodges." The lectotype is from C. H. Fernald who worked at the University of Maine, Orono, Maine. The second label on the lectotype has an "O" on it that probably refers to Orono, Maine.

Upper surface as figured. Haustellum and maxillary palpus light orange; first and second segments of labial palpus dark orange, a few dark-brown or gray-black scales on inner surface of second segment, third segment light orange; frons dark bluish brown in front of eye, dark gray and yellowish gray medially, all scales with shining yellow and purple reflections; vertex and occiput shining dark gray brown; antenna shining dark gray brown dorsally, pale orange on ventral surface of scape and first and second segments of shaft, in male sensory setae slightly less than depth of segment at base, equal to about ⅔ depth of segment at apex, sensory areas broad and contiguous on basal ¼–⅓ of shaft, then separated by row of scales on alternate half segments, in female sensory areas small and separate on base of shaft becoming broader and longer to apex, always separated by row of scales on alternate half segments, sensory setae very short at base, about ⅓ depth of segment at apex; ocellus present; a row of dark gray to black scales behind eye. Tegula and dorsal surface of mesothorax dark gray to nearly black with shining yellow and purple reflections. Male without tuft of scales from mesothoracic anepisternum. Legs nearly uniformly dark gray brown with yellow and purple reflections. Abdomen dark gray with shining reflections at base becoming darker gray toward apex, ventral surface nearly uniformly dark gray to black with shining reflections. Wing length 6.8–10.1 mm. Male and female genitalia as figured.

The food plant is unknown, or unrecorded, although a specimen was reared at Aylmer, Quebec, and is accompanied with the cast pupal skin.

Dichomeris purpureofusca varies little in habitus. Some specimens lack the dark scales on the second segment of the labial palpus. Females are much smaller than males. Only five females are known out of nearly 80 specimens studied.

Purpureofusca should be confused with no other species of *Dichomeris*. Superficially, it is most similar to *nonstrigella* but differs in lacking the thickened antennal segments and having broader wings. Genital characters ally *purpureofusca* with *nonstrigella*. Each has a highly modified, multilobed juxta and the female genitalia are heavily sclerotized, ridged, and have a pair of circular ridges basally.

Purpureofusca occurs from Nova Scotia south to New Jersey and west to Indian Head, Northwest Territories, Waterton Lakes, Alberta, and the Black Hills, South Dakota. Adults have been collected from 31 May to 13 July.

Dichomeris nonstrigella (Chambers), NEW COMBINATION
PL. 2, FIG. 32; PL. I, FIGS. 1, 2; PL. Z, FIG. 3 (RWH 2307).

Dasycera nonstrigella Chambers, 1878, *Bull. U. S. Geol. Geog. Surv. Terr.*, **4**: 92.
Type locality: Kentucky. [MCZ]

Upper surface as figured. Base of haustellum pale to light orange, distal part becoming paler to apex; maxillary palpus pale orange; first and second segments of labial palpus shining dark orange, second segment slightly thickened but without scale tufts, third segment light orange laterally, slightly paler on posterior surface, anterior and inner surfaces with many dark-brown scales; frons shining pale orange above haustellum, brown scales in front of eye, rest of frons and vertex and occiput shining dark brown with yellow and purple reflections; antenna shining dark brown on dorsal surface from base to ¾ length, distal ¼ shining dark yellowish gray, segments of shaft enlarged and largest at middle, densely covered with long scales on dorsal and posterior surfaces on middle half, in male sensory setae equal to about half depth of segments from base to apex, sensory areas relatively broad, narrowly separated by row of scales on alternate half segments at base, in female sensory areas very small, sensory setae very short; ocellus present, a row of brown scales behind eye. Tegula and mesothorax shining dark brown with yellow and purple reflections. Male without tuft of scales from mesothoracic anepisternum. Legs similarly colored: coxa medium yellow brown with shining yellow and lavender reflections, some pale-orange or orange-white scales at base; tibia and tarsus shining dark brown. Abdomen shining dark yellowish gray brown. Wing length 5.6–7.2 mm. Male and female genitalia as illustrated.

Braun (1909: 428) reared *nonstrigella* from *Aster shortii* Lindley near Cincinnati, Ohio. Late instar larvae were found tieing the terminal leaves of growing shoots from mid-April to early May. Pupation occurred in a fold at the edge of a leaf. Adults emerged from 20 May and were present until early July. She described the larva as "Larva when mature about 14 mm. long. Head shining blackish; next three segments plum colored, thoracic shield blackish; seg-

ments 3 and 4 each ornamented with a pair of elongate, shining black tubercles; on dorsum at the posterior end of segment 3, a pair of grayish white spots and a similar smaller pair at the anterior end of segment 4. The remaining segments and the posterior end of segment 4 grayish white, longitudinally marked with 7 plum colored stripes, one median and three lateral, of the same width as the ground color between them; a few scattered hairis (sic) arsing (sic) from small black tubercles [.] Legs black."

Nonstrigella varies in intensity of orange scales wherever they occur, perhaps based on wear. The number of brown scales on the third segment of the labial palpus is highly variable. Veins R_4 and R_5 in the forewing may be stalked or fused.

Structurally and superficially *nonstrigella* is most similar to *purpureofusca* but can be recognized by the thickened antenna, the pale apex of the antenna, and the shape of the lobes of the juxta.

Dichomeris nonstrigella occurs from Nova Scotia, south to Maryland, and west to Michigan, Kansas, and Arkansas. Adults have been collected from 14 May to 21 July.

Dichomeris ochripalpella (Zeller)
PL. 2, FIG. 33. TEXT FIG. 23 *a–c* (RWH 2289).

Trichotaphe alacella Clemens, 1862, *Proc. Ent. Soc. Philadelphia,* **1**: 132.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—*Trichotaphe alacella* Clemens, 1862, is a junior, subjective homonym of *Gelechia alacella* Zeller, 1839. See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Gelechia (*Trichotaphe*) *ochripalpella* Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 279.

NOTE–*Gelechia* (*Trichotaphe*) *ochripalpella* Zeller is a replacement name for *Trichotaphe alacella* Clemens, 1862.

Gelechia goodellella Chambers, 1881, *Jour. Cincinnati Soc. Nat. Hist.,* **3**: 289.
Type locality: Amherst, Massachusetts. [USNM]

Upper surface as figured. Head with maxillary palpus light orange; haustellum orange white at base becoming pale yellowish white distally; first and second segments of labial palpus light orange, second segment becoming grayish orange at apex, lacking a tuft; third segment grayish brown, somewhat paler on posterior surface; lower part of frons shining pale orange; vertex and occiput shining gray brown with violet and purple reflections, bases of scales above eye paler than those at middle of head, a row of brown scales behind eye; scape of antenna yellowish white ventrally, gray brown dorsally, shaft mainly gray brown, ventral surface pale orange at base, becoming grayish brown distally, sensory areas in male broad, covering most of ventral surface at base, areas separated by a row of scales on alternate ½ segments shortly beyond bases, cilia approximately equal to ½ depth of segment at base, sensory areas of female much restricted on anteroventral part of shaft, cilia very short, one or two visible on each segment. Thorax shining bluish gray with scintillations of blue, yellow, and red brown. Forewing with costal area shining bluish gray with scintillations of blue, violet, and yellow; a light-yellow spot at ⅔ length on costal margin; very dark areas intense brown, shining with reddish brown at certain angles of light incidence; undersurface mainly yellowish gray, some pale yellow on costa at ¾ length and on outer margin. Hindwing yellowish gray to gray brown, cubital pecten absent; undersurface similar, but anal area pale yellow. Male without scale tuft from mesothoracic anepisternum. Foreleg with coxa and femur yellowish gray, apex of coxa and base of femur paler than rest of segment; tibia and tarsus dark grayish brown, apexes of tarsal segments and tibia and outer margin of epiphysis slightly paler, sometimes with a few pale yellowish-white scales. Midleg with coxa shining yellowish white; trochanter, femur, tibia, and tarsus yellowish gray, each segment darker than the preceding one, apexes of first four tarsal segments with a few pale scales, apex and ventral surface of fifth tarsal segment yellowish white. Hindleg with coxa shining yellowish white; trochanter yellowish gray with yellowish-white margins; femur shining yellowish white dorsally, bluish gray on ventral margin; tibia yellowish gray on ventral surface, yellowish white on dorsal surface, apex and a few scales before first pair of spurs yellowish white, dorsal surface of first segment with many yellowish-white scales, apexes of all segments yellowish white. Abdomen with dorsal surface shining yellowish gray, numerous yellowish-white scales laterally, scales associated with genital capsule light yellowish gray; ventral surface pale yellow at base becoming yellowish gray distally. Wing length 5.4–6.5 mm. Male genitalia as illustrated; vinculum and length of tegumen plus uncus subequal, a pair of ventrally directed, slender lobes extending from near middle of lateral arms, base of each lobe extending from base to ½ length of vinculum, saccal margin broadly

rounded; aedoeagus almost bulbous beyond zone on left side, a single, long cornutus, ventral wall beyond zone lightly sclerotized, terminating in a narrow triangle; juxta a pair of asymmetrical lobes, joined at base, right lobe with a series of lateral teeth, left lobe with a series of ventral teeth, each lobe with a few setae at ½ length on ventral surface; base of setose area between tegumen and vinculum hemispherical; culcitula slightly longer than broad; apex of uncus broadly rounded, lateral margins incurved, numerous setae in two patches on ventral surface, anterior ones stouter than those along caudal margin, a pair of relatively long setae on dorsal surface near margin. Female genitalia as illustrated; antrum broad, caudal margin straight in middle, then directed slightly anteriorly to lateral margin, lateral margins curving inwardly; ductus bursae not defined, a spiculose lobe extending from corpus bursae near base; corpus bursae slender, heavily sclerotized, numerous striae, zone of striae progressing anteriorly from right side at base to left side at apex; an accessory bursa from near anterior margin of corpus bursae; ductus seminalis arising from spiculose lobe; eighth sternite a pair of lobes, caudal margin incurved to middle; caudal margin of eighth tergite rounded, apex slightly flattened.

Putman (1943: 223) found larvae in folded leaf edges of *Aster* and *Solidago* species at Vineland Station, Ontario, and Braun (data with specimen) reared a specimen from *Solidago* species. The hosts are composites.

Ochripalpella is immediately recognizable by the metallic, bluish-gray scales on the costal margin of the forewing and the pale-orange labial palpus.

Adults occur in June, July, and August; most records are for July. *Ochripalpella* occurs from southern Quebec and Ontario south to New Jersey, the mountains of North Carolina, and northwestern Arkansas.

Dichomeris achne Hodges, NEW SPECIES
PL. 2, FIG. 34; PL. 1, FIGS. 3, 4.

Dichomeris achne Hodges.
Type locality: Parker Is., Highlands County, Florida. [USNM]

Upper surface as figured. Head with maxillary palpus and base of haustellum light orange, haustellum becoming grayish yellow to grayish orange distally; labial palpus orange, third segment with orange-gray to grayish-orange scales on anterior surface; frons shining pale grayish orange to light orange medially, brown scales before eye between base of antenna and haustellum; vertex and occiput shining yellowish gray to yellowish orange, scales above eye light orange, a row of brownish-orange scales behind eye; scape of antenna light orange on ventral surface, dark brown on dorsal surface, shaft dark brown dorsally, ventral surface pale yellow with alternating bands of brown, sensory areas of male broad covering most of ventral surface, areas separated by a row of scales on alternate ½ segments, cilia equal to about ½ depth of segment at base. Thorax with parts of pro- and mesothorax shining grayish brown with bluish-gray reflections; tegula grayish orange to light orange for most of surface, grayish brown on anterior margin. Forewing with costal margin mainly shining orange, extreme costa gray brown from base to about ⅓ wing length; dark areas deep brown with reddish-brown reflections; an area of shining bluish-gray scales just before outer margin of wing and one just above fold at ⅔ wing length; ventral surface mainly grayish brown, costal margin darker. Hindwing grayish brown; ventral surface much the same, area behind fold pale yellowish white. Male without scale tuft from mesothoracic episternum. Foreleg dark brown, apex of coxa slightly paler, margin of epiphysis and apexes of tarsal segments with some slightly pale scales. Midleg with coxa shining pale yellowish white, rest of leg dark brown, some scale bases paler, apex of tibia and tibial spurs and tarsal segments with slightly paler scales. Hindleg with coxa shining yellowish white; trochanter and femur dark grayish brown, some scales streaked with pale yellowish gray; tibia grayish brown on ventral surface, yellowish white streaked with slightly darker scales dorsally, apexes of tibial spurs and segment pale gray; tarsus grayish brown, apexes of segments yellowish white to off-white. Abdomen mainly yellowish gray, paler on lateral margins of first and second segments, scales associated with genital capsule grayish orange; ventral surface pale yellow mottled with gray brown, darker gray brown distally, eighth segment and lateral margins of preceding segments mainly gray brown. Wing length 5.7–6.0 mm. Male genitalia as illustrated; vinculum approximately ¾ length of tegumen plus uncus, broadly rounded in saccal region, a pair of ventrally directed lobes from distal ½ of lateral arms, each lobe a slender spine distally; aedoeagus with a broad expansion immediately beyond zone, a single cornutus present, ventromedial margin beyond zone with a more heavily sclerotized region, extending to apex as a narrow spine, zone very heavily sclerotized (almost a free flange); juxta a pair of asymmetrical lobes, joined at base, lateral margin of right lobe with a

series of teeth, ventral margin of left lobe with a series of shorter teeth, a small number of setae arising from middle of each lobe ventrally; valva approximately attaining apex of uncus; culcitula broadly rounded, slightly longer than wide; apex of uncus rounded, lateral margins incurved toward base, ventral surface with two lateral patches of setae near middle, a few small setae on caudal margin, a pair of long setae on dorsal surface near margin. Female genitalia: no specimens available.

The immature stages are unknown.

TYPES. Holotype: ♂. Florida, Parker Is., Highlands Co.; 26–29 May 1964; R. W. Hodges; USNM genital slide 9422. USNM. Paratypes: 3 ♂. Archbold Biol. Sta., Lake Placid, Florida; 15–31 July 1948; A. B. Klots (2 ♂). Florida; 1 May 1882 (1 ♂). AMNH, USNM.

Achne is most nearly related to *ochripalpella* on genital characters and maculation; however, the metallic blue-gray scales on the costa of the forewing of the latter are replaced by shining orange scales in *achne*. *Achne* can be separated from the other species of *Dichomeris* with a yellow costal margin on the forewing as indicated in the key.

The few specimens of *achne* are similar and vary notably only in wing length. The species may be multivoltine; three of the known specimens are fresh, and the dates of collection are 1 May–31 July.

Dichomeris inserrata (Walsingham), NEW COMBINATION

PL. 2, FIG. 35; PL. 1, FIGS. 5, 6; PL. AA, FIG. 1 (RWH 2297).

Gelechia (*Trichotaphe*?) *inserrata* Walsingham, 1882, *Trans. Amer. Ent. Soc.*, **10**: 184.

Type locality: unknown (North America). [lost]

NOTE—A syntype of *inserrata* should be in the USNM. The name and an indication that it was a type were included in the list of specimens purchased from H. T. Fernald that comprised the C. H. Fernald collection in 1920. Busck (1903: 908) said that he had compared specimens with the type while it was with C. H. Fernald. Study of Walsingham's manuscript notes and search through the BMNH collection in 1963 led me to conclude that it is not there. I suggest that the type locality is St. Louis or Kirkwood, Missouri. On circumstantial evidence *inserrata* does not occur in Maine or at least is extremely uncommon there. Among the specimens sent to Walsingham by Fernald were two boxes with material from Miss Murtfeldt (Walsingham, 1882: 165). There are two specimens from Murtfeldt determined as *inserrata* by Walsingham in the British Museum (N.H.) collection. I surmise that Walsingham requested additional specimens of the species that he had described from the person who had collected the type.

Upper surface as figured. Haustellum mottled dark yellowish gray and paler yellowish gray; maxillary palpus pale yellowish gray; outer surface of first segment of labial palpus dark gray, outer surface of second segment dark yellowish gray on dorsal half from base to ¾ length, ventral margin light orange, dorsal scale tuft yellowish white, inner surface of palpus mainly pale to light orange or yellowish white, second segment slightly darker on ventral margin; frons mainly pale orange with shining reflections, some brown scales in front of eye; vertex and occiput light yellowish orange above eye, dark yellowish gray to brown medially, scales with shining yellow and lavender or purple reflections; antenna pale yellow or yellowish orange dorsally on scape and first one or two segments of shaft then mainly dark gray brown, ventral surface pale yellow from base to about ⅓ length, in male sensory areas broad and contiguous on first five or six segments then becoming separated by row of scales on alternate half segments, sensory setae nearly as long as depth of segment at base and ⅔ as long as depth of segment at apex, female sensory areas relatively broad and contiguous on basal three or four segments and then separated by row of scales on alternate half segments, sensory setae very short at base, slightly longer at apex; ocellus present; a row of brown scales behind eye. Tegula dark brown on anterior margin, pale yellow dorsally. Mesothorax dark gray brown with some metallic luster dorsally. Male without scale tuft from mesothoracic anepisternum. Foreleg mainly dark gray brown, most scales with pale yellowish-gray bases, apexes of first three tarsal segments prominently white, apexes of fourth and fifth segments grayish white. Midleg similar to foreleg, coxa mottled shining yellowish white and gray. Hindleg similar to midleg; tibia dark gray on ventral half, yellowish white on scale tuft; tibial spurs shining gray, becoming pale yellowish white at apexes; tarsus dark gray, apexes of segments off-white. Abdomen dark yellowish gray. Wing length 5.4–8.3 mm. Male and female genitalia as figured.

Larvae feed in the growing tips of *Solidago* (notes on specimens) and in the immature fruit of *Solidago* (Forbes, 1923: 281). Busck (1903: 908) cited *Solidago* as the food plant without indicating the larval habits.

Dichomeris inserrata varies in intensity of the yel-

low and orange marks. Some specimens have nearly a uniformly pale-yellow or yellowish-orange haustellum. Genital characters appear relatively stable. The serrations on the lateral margins of the juxta vary in number and placement.

Inserrata can be confused with *flavocostella, fistuca,* and *aleatrix.* A trivial, but apparently consistent, difference is that the posterior margin of the yellow part of the forewing does not extend toward the tornus in *inserrata*; it does in the other species. Genital characters show that *inserrata* is very distinct from these closely similar appearing species.

Inserrata occurs from Blackburn, Ontario and Massachusetts south to South Carolina, Mississippi, Louisiana, and Houston, Texas and west to eastern Missouri. I have seen an isolated western specimen from north central Nebraska. In the northern part of the range adults have been collected from mid-June to mid-August. In Mississippi worn specimens were collected as early as 9 April and as late as 20 August.

Dichomeris pelta Hodges, NEW SPECIES
PL. 2, FIG. 36; PL. J, FIGS. 1, 2; PL. AA, FIG. 2.

Dichomeris pelta Hodges.
Type locality: Wedge Plantation, McClellanville, Charleston County, South Carolina. [USNM]

Upper surface as figured. Head: haustellum mottled brown and pale yellow; maxillary palpus dark brown with some pale-yellow scale bases; outer surface of first and second segments of labial palpus dark brown, many scale bases pale yellow, second segment with strong dorsal scale tuft, apex of tuft pale yellow to nearly white, inner surface of first and second segments similar but nearly all of scale tuft pale yellow, third segment pale yellow basally becoming dingy brown and yellow at apex; frons mottled dark brown and pale yellow in front of eye and ventrally, pale yellow with some gray-brown scales medially, scales with shining yellow and lavender reflections; vertex and occiput pale yellowish white above eye, gray brown medially; antenna pale yellow on scape and first two or three segments of shaft then becoming dark gray to gray brown, sensory areas in male broad covering most of ventral surface, sensory cilia as long as depth of segments basally, gradually becoming shorter distally, in female sensory areas broad and nearly contiguous, narrowly separated by row of scales on alternate half segments, sensory cilia short; ocellus present; a row of dark-brown scales behind eye. Tegula dark brown anteriorly, mainly pale yellow with some yellowish-brown scales dorsally. Meso- and metathorax mainly brown with some pale-yellow scales. Male without scale tuft from mesothoracic anepisternum. Foreleg mainly dark brown with shining yellow and purple reflections, tarsus mottled with yellowish-gray scale bases. Midleg similar to foreleg but slightly paler, pale-yellow to off-white scales at apex of tibia and of tarsal segments. Hindleg: coxa shining pale yellow and yellowish gray, reflections yellow and purple; trochanter mottled with gray-brown scales; femur mainly brown lateroventrally, scale bases pale yellow; tibia mainly pale yellow, many scales with yellowish-gray apexes on ventral margin, outer tibial spurs dark gray brown, inner spurs mottled gray brown and pale yellow, dorsal scale tuft pale yellow; tarsus mottled pale yellow and yellowish gray, apex of each segment slightly pale. Abdomen: dorsal surface pale yellow on first segment. becoming yellowish gray and gray on distal segments; ventral surface brown laterally, pale yellow mottled with yellowish gray medially. Wing length 5.3–7.0 mm. Hindwing lacking cubital pecten. Genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♀. USA: S. CAR. Charleston Co., McClellanville, Wedge Plantation; 28 April 1981; at light; Ronald W. Hodges. USNM. Paratypes: 10 ♂, 1 ♀. Same data as for holotype; 30 April 1981 (1 ♀). Oneco, Manatee Co., Florida; 11 May 1953; Paula Dillman (1 ♂), Siesta Key, Sarasota Co., Florida; 25 February, 10 March, 24 December; C. P. Kimball (3 ♂). Sarasota Co., Florida; 9, 14 May 1946; C. P. Kimball (2 ♂). Homestead, Florida; 31 January, 31 March, 28 April, 29 October; D. O. Wolfenbarger (4 ♂). Royal Palm State Park, Florida; 26 January 1930; F. M. Jones (1 ♂). USNM.

Dichomeris pelta has been confused and misidentified as *serrativitella*; however, the dark-brown scales on the first and second segments of the labial palpus immediately distinguish it from the latter in which these segments are uniformly pale yellow, or tinged with yellowish brown. *Pelta* is nearest *bolize, legnotoa,* and *illusio* in habitus. The posterior margin of the yellow costal mark on the forewing meeting the wing margin at the apex and the small black spot in the yellow area near the base of the forewing appear to be diagnostic for *pelta.*

Dichomeris bolize Hodges, NEW SPECIES
PL. 2, FIG. 37; PL. J, FIGS. 3, 4; PL. BB, FIG. 1.

Dichomeris bolize Hodges.
Type locality: Hackberry Lake, Valentine National Wildlife Refuge, Cherry County, Nebraska. [USNM]

Upper surface as illustrated. Head: haustellum dark gray, most scales with slightly paler bases; maxillary palpus yellowish gray; first segment of labial palpus dark gray, outer surface of second segment dark gray, red brown ventrally, apex pale yellow, dorsal scale tuft nearly white, inner surface with comparable pattern but generally paler, dorsal surface yellowish white, third segment pale yellow; antenna pale yellow on scape and first two or three segments of shaft, rest of shaft dark gray brown, sensory setae in male equal to depth of segment at base, becoming shorter distally, sensory areas broad, separated by a row of scales on alternate half segments, in female sensory areas smaller at base than apex, sensory setae shorter at base than at apex; frons with dark-brown scales in front of eye, pale yellow with shining yellow and lavender reflections medially; vertex and occiput mainly pale yellow, pale yellowish gray medially and with shining reflections; ocellus present; a row of dark-brown scales behind eye. Tegula dark brown on anterior margin, dorsal surface pale yellow to yellow brown. Meso- and metathorax dark gray brown medially, pale yellow to yellowish brown on anterior margin. Male without tuft on mesothoracic anepisternum. Foreleg dark gray brown, scale bases pale. Midleg similar but coxa mainly shining pale yellowish gray with yellow and purple reflections. Hindleg similar to midleg; dorsal half of tibia, including scale tuft, yellowish gray, tibial spurs dark gray; tarsus dark gray, first segment yellowish gray dorsally. Abdomen generally yellowish gray, mainly dark, most surfaces with shining reflections. Wing length 5.5–7.4 mm. Hindwing without cubital pecten. Genitalia as illustrated.

A larva was found on flowers of *Brassica* species in New York City on 21 May. The adult emerged on 5 June.

TYPES. Holotype: ♂. Nebraska, Cherry Co., Valentine NWR, Hackberry Lake; 15 June 1983; USNM genital slide 12299; R. W. Hodges. USNM. Paratypes: 23 ♂, 21 ♀. Same locality as for holotype; 20, 21 June 1983 (2 ♂, 1 ♀). Hamden, New Haven Co., Connecticut; 3 September 1967; D. C. Ferguson (1 ♂). Archbold Biol. Sta., Lake Placid, Florida; 8–15 May 1964; R. W. Hodges (1 ♂). Washington, D. C.; June 1901; A. Busck (1 ♂, 1 ♀). Powder Mill Estates, Prince George's Co., Maryland; 22 July 1971; G. F. Hevel (1 ♀). Barnstable, Massachusetts; 19–22 July; C. P. Kimball (1 ♂, 2 ♀). E. Wareham Agr. Expt. Sta., Plymouth Co., Massachusetts; 19 June 1978; W. E. Tomlinson (1 ♂). Taborville Wildlife Area, Clair Co., Missouri; 25 July 1981; J. R. Heitzman (1 ♀). Bergenfield, New Jersey; June, 16 August; F. M. Schott (3 ♀). Holly Beach, New Jersey; 2 August 1906; F. Haimbach (1 ♀). Dayton, New Jersey; July; G. D. Hulst (1 ♂). Anglesea, New Jersey; 28 May 1905; W. D. Kearfott; USNM Slide 9417 (wing) (1 ♂). Whitesbog, New Jersey; 24 June, 29 July 1939; E. P. Darlington (1♂, 1 ♀). Yonkers, New York; 12, 19 June; A. B. Klots (4 ♀). Monroe Co., New York; 23 June 1948, 29 July 1949; C. P. Kimball (1 ♂). Ithaca, New York; August '44 (2 ♂). Orient, New York; 5, 17 October 1935; R. Latham (2 ♂). Six Mile Creek, Ithaca, New York; 21 June, 14 August; J. G. Franclemont (1 ♂, 1 ♀). McLean Bogs Reserve, Tompkins Co., New York; 15 June 1957; J. G. Franclemont (1 ♀). Penniquid Barrens, Coram, L. I., New York; 4 September 1920; G. P. Engelhardt (1 ♂, 1 ♀). Pelham Bay Park, N. Y. City, New York; larva 21 May 1961, adult 5 June 1961; L. Niedermann (1 ♀). Leland, Brunswick Co., North Carolina; 14, 17 June; O. Bucholz (2 ♂). Fairfield Plantation, McClellanville, Charleston Co., South Carolina; 11 May 1981; R. W. Hodges (1 ♂). Padre Island Nat. Seashore, Texas; 17 May 1976; A. & M. E. Blanchard (1 ♂, 1 ♀). AMNH, ANSP, CU, LACM, USNM.

Dichomeris bolize has been misidentified as *serrativittella* but usually can be distinguished by the dark-brown and red-brown scales on the outer surface of the second segment of the labial palpus. When present, these scales are diagnostic for *bolize. Bolize* differs from its superficially similar allies, *pelta, illusio,* and *legnotoa,* as indicated in the keys. Reference should be made to the genitalia in all questionable cases.

Most specimens of *bolize* are in poor condition; thus, it is difficult to assess differences in maculation or intensity of color pattern. The inner surface of the second segment of the labial palpus lacks dark-colored scales in some specimens, and the dorsal surface of the hindtibia and tarsus may be as dark as the ventral surface. The first four tarsal segments of the foreleg may be unicolorous gray brown or the apexes may be pale gray to off-white. In the male genitalia the apex of each lobe of the juxta may be blunt and rounded or acute. Two specimens with

the latter state differ in the color characters of the foretarsus and the second segment of the labial palpus.

Several specimens were excluded from the type series because they were too poor to show many of the characters.

Dichomeris legnotoa Hodges, NEW SPECIES
PL. 4, FIG. 10; PL. BB, FIG. 2.

Dichomeris legnotoa Hodges.
Type locality: Largo, Pinellas County, Florida. [USNM]

Upper surface as figured. Characters as for *bolize* except that outer surface of second segment of labial palpus lacks brown or red-brown scales and inner surface is uniformly yellowish white. Wing length 5.0–5.3 mm. Male genitalia: no specimens known. Female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♀. Pinellas Co., FLA Largo; E. Knudson; Genitalia slide SAB 312. USNM. Paratypes: 2 ♀. Florida: Alachua Co., Austin Carey Forest, 10 mi NE Gainesville; 19–26 August 1975; Malaise trap; T. E. Rogers (1 ♀). Glenwood Springs, Colorado (1 ♀). J. B. Heppner, USNM.

Dichomeris legnotoa is most similar to *bolize* and *illusio* and can be separated from them as indicated in the keys. In doubtful cases the genitalia should be studied for positive identification. The female genitalia are extremely close to those of *bolize* but differ in the very short apophyses anteriores and the smaller size of the genitalia relative to the abdomen.

The specimen from western Colorado seems anomalous, but the gap in distribution probably reflects inadequate collecting.

Dichomeris illusio Hodges, NEW SPECIES
PL. 2, FIG. 38; PL. BB, FIG. 3.

Dichomeris illusio, Hodges.
Type locality: Hastings, Florida. [USNM]

Upper surface as figured. Characters as for *bolize* except that second segment of labial palpus lacks red-brown scales and the apexes of the first four segments of the foretarsus are pale gray to off-white. Wing length 5.5 mm. Male genitalia: no specimens known. Female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♀. Hastings, Florida; VI.8; Genitalia slide USNM 12203. USNM. Paratype: 1 ♀. Same data as for holotype. USNM.

Dichomeris illusio cannot be separated with certainty from all specimens of *bolize* by external characters. It was discovered by accident while studying genital preparations of the *serrativittella* species complex. The female genitalia are highly distinctive with the heavily sclerotized base of the bursa copulatrix and the heavily sclerotized, ridged part of the bursa copulatrix extending nearly to the anterior margin.

Dichomeris mimesis Hodges, NEW SPECIES
PL. 2, FIG. 39; PL. CC, FIG. 1.

Dichomeris mimesis Hodges.
Type locality: Salmon, Anderson County, Texas. [USNM]

Upper surface as figured. Characters as for *bolize* except medial part of vertex and occiput dark gray, scales with pale-gray apexes. Wing length 6.2–6.3 mm. Costal margin of forewing dark gray brown from base to ⅘ wing length; posterior margin of yellow area deeply incised at half wing length followed by posteriorly directed projection. Male genitalia: no specimens known. Female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♀. Texas, Anderson Co., Salmon; 22 July/2 August 74; H. R. Burke; collected by Malaise trap; ♀ genitalia slide 5042 R. W. Hodges. USNM. Paratype: 1 ♀. Same data as for holotype. JBH.

Dichomeris mimesis is nearest *pelta, bolize, illusio,* and *legnotoa* in maculation. The female genitalia differ as indicated in the key. It is possible that the combination of the dark costal margin of the forewing and the shape of the posterior margin of the yellow of the forewing is diagnostic for *mimesis,* but too few specimens are known to be certain.

Dichomeris serrativittella (Zeller), NEW COMBINATION
PL. 3, FIG. 1; PL. J, FIGS. 5, 6; PL. CC, FIG. 2 (RWH 2301).

Gelechia (*Trichotaphe*?) *serrativittella* Zeller, 1873, *Verh. K.-K. Zool.-Bot. Ges. Wien,* **23**: 280, fig. 27.
Type locality: Bosque County, Texas. [BMNH]

NOTE—The lectotype ♀, present designation, was se-

lected by K. Sattler. It bears the following labels: 1. "Lectotype"; 2. "Type H.T."; 3. "'28/7."; 4. "Texas, Lw. 71."; 5. "*Gelechia* (*Trichotaphe*?) *serrativittella* Z., Texas Lw. 71."; 6. "Bosque Co., TEXAS, 28. VII.1876, Belfrage" ["1876" crossed out]; 7. "Zeller Coll., Walsingham Collection, 1910–427."; 8. "Lectotype ♀, *Gelechia* (*Trichotaphe*) *serrativittella* Z., teste K. Sattler, 1961"; 9. "Abdomen Missing." Although the lectotype lacks an abdomen and thus cannot be definitely associated with any of four species, I have restricted the species' concept to apply to the one that occurs most commonly in Texas. The paralectotype ♀ in the Museum of Comparative Zoology was collected by Boll and is from Dallas, Texas. The genitalia (MCZ slide 894) confirm the identity of *serrativittella.*

Gelechia plutella Chambers, 1874, *Can. Ent.*, **6**: 238.
Type locality: Texas. [lost]

NOTE—Treatment of *plutella* as a synonym of *serrativittella* (Busck, 1903: 909) is continued. Two false types are in the Museum of Comparative Zoology. Neither matches the description of *plutella*; and both are from Kentucky, not Texas as stated in the original description. They bear an MCZ type number 1429.

Upper surface as figured. Haustellum pale gray and yellowish white; maxillary palpus pale yellowish white; labial palpus pale yellowish white, second segment with slight dorsal scale tuft, variously overlain ventrally with pale orange or yellow-orange scales, particularly toward apex; frons yellowish white, brown scales immediately in front of eye; vertex and occiput pale yellowish white above eye, gray with shining yellow reflections medially; antenna dark brown, in male anteroventral part of scape and first two or three segments of shaft pale yellow, sensory areas broad, narrowly separated by row of scales on alternate half segments, sensory setae as long as depth of segment basally becoming about ⅛ depth of segment apically, in female anterior and ventral surface of scape and first two or three segments of shaft pale yellow, sensory areas small and narrow, separated by row of scales on alternate half segments, sensory setae about ⅓ depth of segment at base becoming much shorter at apex; ocellus present; a row of brown scales behind eye. Tegula gray brown on anterior surface, pale yellowish white dorsally, scales with shining yellow reflections. Mesothorax nearly uniformly dark gray with shining reflections. Male without tuft of scales from mesothoracic anepisternum. Foreleg dark gray brown. Midleg similar but coxa with shining pale-yellow scales. Hindleg similar, tibial scale tuft medium yellowish gray, apex yellowish gray; apexes of tarsal segments with some yellowish-white scales dorsally. Wing length 5.2–6.8 mm. Hindwing lacking pecten on base of cubitus. Male and female genitalia as figured.

The immature stages are unknown.

Serrativittella is inseparable from *xanthoa, isa, simulata,* and *imitata* on external characters. The genital characters, as indicated in the keys, must be studied for identification. All specimens of these species were dissected to distinguish among them, including 112 specimens of *serrativittella. Serrativittella* varies in the shape of the posterior margin of the yellow part of the forewing, presence and amount of intense yellow-orange or orange scales on the second segment of the labial palpus, intensity and extent of dark-gray scales on the frons and vertex, relative amounts of light and dark scales on the tibiae and tarsi. Genital characters also vary; the shape of the juxta, the shape of the pair of sclerotized lobes from the anterior part of the vinculum, the length of the cornutus relative to the length of the aedoeagus, the development of the flange at the base of the aedoeagus, and the shape of the posterior margin of the uncus. Three or four males have the flange much longer than normal.

Dichomeris serrativittella has been collected in Florida, Mississippi, and Illinois east of the Mississippi; and from Iowa and southern South Dakota south to Louisiana and southern Texas plus New Mexico and Utah. It has been collected most frequently in the Great Plains. Records are March, April, and August in Florida; September in Illinois and Mississippi; May–September in the Great Plains; and early February to mid-November at Brownsville, Texas.

Dichomeris xanthoa Hodges, NEW SPECIES PL. 3, FIG. 2; PL. K, FIGS. 1, 2; PL. DD, FIG. 1.

Dichomeris xanthoa Hodges.
Type locality: Ft. Niobrara National Wildlife Refuge, Cherry County, Nebraska. [USNM]

Upper surface as figured. External characters as for *serrativittella.* Wing length 5.5–6.6 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Ft. Niobrara NWR, Cherry Co., Nebraska; 19 June 1983; R. W. Hodges; USNM genitalia slide 12112. USNM. Paratypes: 17 ♂, 3 ♀. Lake Placid, Archbold Bio. Sta., Florida; 3 April

1959, 8–15 May 1964; R. W. Hodges (1 ♂, 1 ♀). Gainesville, Florida; 8 August 1927; J. Speed Rogers (2 ♂). Gainesville, Florida; 4 April 1968, 9 September 1968; F. W. Mead (2 ♂). Gainesville, Fla.; 1 mi SE jct. St. Rd. 23 & 121; E. C. Knudson (1 ♂). Homestead, Florida; 26 August 1958; D. O. Wolfenbarger (1 ♂). Orlando, Florida; 23 February–March; C. G. Ainslie (8 ♂). Quincy, Gadsden Co., Florida; W. B. Tappen (1 ♀). Starkville, Oktibbeha Co., Mississippi; 23 June 1982; R. L. Brown (1 ♀). Aweme, Manitoba, Canada; 8 July 1921, 26 July 1907; N. Criddle (2 ♂). CNC, CU, FSCA, MSU (Starkville), USNM.

Dichomeris xanthoa is inseparable from *serrativittella, isa, simulata,* and *imitata* on external characters. The genital characters indicated in the keys must be studied for identification. The proportion of dark-gray scales on the vertex and occiput varies among specimens.

Although *xanthoa* occurs from southern Manitoba to southern Florida and Mississippi, it has been collected sparingly outside Florida. The holotype is the best specimen of the species; it is not geographically representative of most specimens.

Dichomeris isa Hodges, NEW SPECIES
PL. 3, FIG. 3; PL. K, FIGS. 3, 4; PL. DD, FIG. 3.

Dichomeris isa Hodges.
Type locality: Tenkiller Lake, 3 miles W Blackgum, Sequoyah County, Oklahoma. [USNM]

Upper surface as figured. External characters as for *serrativittella.* Wing length 4.6–6.4 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Tenkiller Lake, 3 mi W Blackgum, Sequo. Co., Oklahoma; 6–9 July 1979; D. & M. Davis; USNM genitalia slide 12214. USNM. Paratypes: 27 ♂, 19 ♀. Same locality as for holotype; 11–14 June 1981, 6–9 July 1979, 25–29 August 1982; D. & M. Davis (3 ♂, 2 ♀). Devil's Den St. Pk., Washington Co., Arkansas; 28 June, 6 July 1966; R. W. Hodges (2 ♀). Washington Co., Arkansas; 18 August 1966; R. L. Brown (1 ♀). Gainesville, Alachua Co., Florida; 24 August 1966; September 1968; L. O'Berry (2 ♀). Macon, Georgia; July 1944 (1 ♂). Arlington Hts., Illinois; 19 August 1931; A. L. McElhose (1 ♀). Bernheim Forest, Bullitt Co., Kentucky; 1–6 June 1976 (1 ♂). 3 mi NE Booneville, Owsley Co., Kentucky; 22–23 May 1981; L. D. Gibson (1 ♂). Valley Station, Waverly Park; 17 May 1975; A. J. Brownell (1 ♂). Washington, D.C.; June 1902 (1 ♀). Barnstable, Massachusetts; 9 July 1950; C. P. Kimball (1 ♂). Martha's Vineyard, Massachusetts; August 1939; F. M. Jones (1 ♂). Camp Shelby, Forrest Co., Mississippi; June 1944; C. D. Michener (1 ♂). K[irkwoo]d, Missouri; 27 July 1907, 12 September 1899; [Murtfeldt] (1 ♂, 1 ♀). St. Louis, Missouri; 20 August 1905; McElhose (1 ♂). St. Louis, Missouri; 21 July 1935; E. P. Meiners (1 ♀). Essex Co. Park, New Jersey; 24 September 1906; W. D. Kearfott (1 ♂). Montclair, New Jersey; 2 August; W. D. Kearfott (1 ♀). New Lisbon, N. J.; 2 July 1942; E. P. Darlington (1 ♂). Oakland, N. J.; 12 August 1948; C. P. Kimball (1 ♂). Whitesbog, N. J.; 23 May 1939; E. P. Darlington (1 ♂). Cornell Campus, Ithaca, New York; 16 June 1957; D. R. Davis (1 ♀). E. Marion, Long Island, New York; 4 July 1946; R. Latham (1 ♂). Monroe Co., New York; 12, 16 June, 11 August, 7 September; C. P. Kimball (2 ♂, 2 ♀). Rochester, N. Y.; 3–8 July 1932, 31 July 1933; A. B. Klots (2 ♀). Orient, Long Island, N. Y.; 10 May 1945; R. Latham (1 ♂). Maxton, North Carolina; 22 September 1944; A. B. Klots (1 ♂). Cincinnati, Ohio; 26 July 1913, 3 September 1907; A. F. Braun (2 ♂). Homebrook, L. Merion Tp., Pennsylvania; 10 May 1921 (1 ♂). Roxborough, Pennsylvania; 1 June 1913; F. Haimbach (1 ♂). Tennessee Colony, Anderson Co., Texas; 15 April 1968, 1 May 1970; A. & M. E. Blanchard (2 ♂). Lexington, Virginia; 11 September 1921; J. C. Bradley (1 ♀). Chatham Lab., Ontario, Canada; 8 June 1939 (1 ♀). AMNH, CU, FMNH, JBH, JRH, LACM, UAF, ULK, USNM.

Two specimens are excluded from the type series; they were collected by W. S. Wright at San Diego, California. I have identified them as *isa* based on conformity of genital characters with other specimens; however, they are geographically far removed from the nearest collection sites in central Oklahoma and eastern Texas.

Dichomeris isa is inseparable from *serrativittella, xanthoa, simulata,* and *imitata* on external characters. The genital characters indicated in the keys must be studied for identification. Often, *isa* has medium-gray scales on the outer surface of the first segment and extreme base of the second segment of the labial palpus. The forewing usually has a faint, black transverse band running from the posterodistal angle of the yellow costal mark nearly to the posterior margin of the wing. Although these two characters often are present, they may be absent, and other species in the *serrativittella* complex may have them.

Dichomeris simulata Hodges, NEW SPECIES
PL. 3, FIG. 4; PL. K, FIGS. 5, 6.

Dichomeris simulata Hodges.
Type locality: Canadian, Hemphill County, Texas. [USNM]

Upper surface as figured. External characters as for *serrativittella.* Second segment of labial palpus with yellow-orange or orange-brown tipped scales ventroapically. Wing length 5.2–6.0 mm. Male genitalia as illustrated. Female genitalia: no specimens known.

The immature stages are unknown.

TYPES. Holotype: ♂. Canadian, Hemphill Co., Texas; 28 May 1970; A. & M. E. Blanchard; USNM genitalia slide 12309. USNM. Paratypes: 3 ♂. Lake Brownwood, Brown Co., Texas; 31 July 1983; E. Knudson (1 ♂). Laguna Park, Bosque Co., Texas; 28 March 1981 (1 ♂). Lake Placid, Archbold Bio. Sta., Florida; 30 March 1959; R. W. Hodges (1 ♂). E. Knudson, USNM.

Dichomeris simulata is inseparable from *serrativittella, isa, xanthoa,* and *imitata* on external characters. The genital characters indicated in the key must be studied for identification. The aedoeagus is nearest that of *serrativittella,* but the greater length of the basal flange, the posterior margin of the slight expansion at the zone, and the longer opening at the base of the cornutus appear to be diagnostic for *simulata.* Any specimen with contrasting yellow-orange or orange-brown tipped scales at the apex of the second segment of the labial palpus may prove to be *simulata.*

Dichomeris imitata Hodges, NEW SPECIES
PL. 3, FIG. 5; PL. L, FIGS. 1, 2.

Dichomeris imitata Hodges
Type locality: Devers, Texas. [CU]

Upper surface as figured. External characters as for *serrativittella.* Wing length 5.3 mm. Male genitalia as illustrated. Female genitalia: no specimens known.

The immature stages are unknown.

TYPE. Holotype: ♂. Devers, Texas; 21 June 1917; Genitalia slide by SAB 265. CU.

Dichomeris imitata is inseparable from *serrativittella, isa, xanthoa,* and *simulata* on external characters. The genital characters indicated in the key must be studied for identification. The cornutus is the most slender of any in the *serrativittella* complex, and the lobes of the juxta are smooth margined. These lobes have irregular margins with many sharp projections in the other species of the complex.

Dichomeris barnesiella (Busck), NEW COMBINATION
PL. 3, FIG. 6; PL. L, FIGS. 3, 7; PL. AA, FIG. 3 (RWH 2290).

Trichotaphe barnesiella Busck, 1907, *Proc. Ent. Soc. Washington,* **8**: 92.
Type locality: Redington, Arizona. [USNM]

Upper surface as figured. Head with haustellum and maxillary palpus dark brown; first and second segments of labial palpus dark brown, many scale bases paler, individual scales, particularly on dorsal scale tuft, pale gray, third segment about half length of second segment and mainly pale yellow, some brown scales at base; frons mainly dark brown and gray with shining lavender and yellow reflections, pale-yellow scales above eye; a row of dark-brown scales behind eye; antenna nearly uniformly dark brown, ventral surface of scape and anteroventral margin of first two segments of shaft pale yellow, in male sensory area large, separated by row of scales on alternate half segments by ⅕ length, sensory setae about ¾ depth of segment at base, becoming shorter toward apex, in female sensory areas broad, sensory setae very short; ocellus present. Tegula dark brown on anterior margin, pale yellow dorsally. Dorsal surface of mesothorax mainly dark brown with purple and yellow luster, apexes of individual scales pale. Male without scale tuft from mesothoracic anepisternum. Foreleg dark brown, individual scales pale yellowish brown at base, some pale scales at apex of femur and of tarsal segments. Mid- and hindlegs much as for foreleg, coxa mainly pale yellow to yellowish white with shining yellow and lavender reflections. Abdomen yellowish gray dorsally and darker yellowish gray ventrally. Wing length 7.3–8.5 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

Dichomeris barnesiella is very similar to species in the *serrativittella* and *bolize* species complexes but can be separated by the dark-brown first and second segments of the labial palpus and the second segment being nearly twice the length of the third segment.

Barnesiella has been collected in Arizona from Yavapai County south to Cochise and Santa Cruz Counties and in Mexico. Collection dates are from 1 May through 7 October. Based on the condition

of specimens and their dates of collection, *barnesiella* probably emerges in early August and overwinters as an adult.

Dichomeris simpliciella (Busck), NEW COMBINATION
PL. 3, FIGS. 7–9; PL. L, FIGS. 4–6, 8; PL. AA, FIG. 4 (RWH 2303).

Trichotaphe simpliciella Busck, 1904, *Proc. U. S. Natl. Mus.*, **27**: 761.
Type locality: Pullman, Washington. [USNM]

Trichotaphe hemiclina Meyrick, 1929, *Exotic Microlepidoptera*, **3**: 512.
Type locality: Fort Davis, Texas, 5,000′. [BMNH]

NOTE—Clarke (1969: 508) selected a lectotype for *hemiclina*.

Upper surface as figured. Haustellum and maxillary palpus pale yellow; first and second segments of labial palpus yellowish gray mixed with pale-yellow scales, particularly on inner surface, a slight dorsal scale tuft, third segment pale yellow with some yellowish-gray tipped scales; frons pale yellow to yellowish gray medially, medium brown in front of eye; vertex and occiput mainly gray to gray brown with some yellowish-gray scales above eye, all scales tipped with pale yellowish gray; antenna mainly brown dorsally, ventral surface and anterior margin of scape and anterior margin of first two or three segments of shaft pale yellow to yellowish gray, in male sensory setae longer than depth of segments at base, sensory areas nearly contiguous, in female yellow area more extensive, sensory setae very short, sensory areas very narrow basally becoming broader toward apex and incompletely separated by scales on alternate half segments; ocellus present; a row of yellowish-gray to yellowish-brown scales behind eye. Tegula pale brown anteriorly, mottled pale yellowish gray and yellowish brown dorsally. Mesothorax brown and yellowish brown, darker medially. Male without tuft of scales from mesothoracic anepisternum. Foreleg medium brown, apexes of tibia and tarsal segments white. Midleg much as for foreleg but coxa mainly pale yellow and yellowish orange. Hindleg much as for midleg but all segments somewhat paler, dorsal scale tuft on tibia pale yellow to yellowish orange, tarsus yellowish gray. Abdomen dark gray with yellowish cast dorsally, similar ventrally but apex of each segment with yellowish-gray scales. Wing length 5.2–10.2 mm. Male and female genitalia as illustrated.

The immature stages are unknown; however, the larva of *baxa*, a closely related species, has been reared from *Corethrogyne* in the Compositae.

Dichomeris simpliciella is extremely variable in the amount of pale-yellow, yellowish-white, yellowish-orange, or yellowish-brown scales on the haustellum, labial palpus, head, forewing, and legs. Generally, specimens with pale-yellow costal margin on the forewing have more pale scales than do those with a darker costal margin. Some genital characters, particularly the aedoeagus, the shape of the lobes of the juxta, and the lobes from the base of the vinculum are highly variable. The length and width of the cornutus relative to the length of the aedoeagus from the base to the zone varies, and the heavily sclerotized process on the right side of the aedoeagus varies in shape and length. Specimens from the Rocky Mountain region tend to be larger (wing length 8.1–10.2 mm; average: 9.08 mm, n = 35) contrasted with specimens from the mountains of southern Arizona (wing length 5.3–7.5 mm; average: 6.38 mm, n = 25).

Simpliciella is very closely allied with *gnoma* and *baxa*. The three are allopatric and may prove to be subspecies of a single species; however, qualitative differences exist in the male and female genitalia of the three species and are used in the keys to discriminate among them.

Simpliciella occurs from southern Alberta to southern Texas (one record from Preston, Mississippi), west to eastern Washington and southeastern Nevada, and south to southern Arizona and northern Mexico. Adults have been collected in most months of the year in the southern part of the Arizona where it appears that they emerge in July and August and overwinter. Fresh specimens were collected in July in central Colorado.

Dichomeris baxa Hodges, NEW SPECIES
PL. 3, FIG. 10; PL. M, FIGS. 1, 2; PL. AA, FIG. 5.

Dichomeris baxa Hodges.
Type locality: Presidio of Monterey [Monterey], California. [USNM]

Upper surface as figured. Haustellum slightly mottled very pale yellow and yellowish gray; maxillary palpus yellowish gray; outer surface of first and second segments of labial palpus mottled pale yellow and reddish brown, most scale bases pale, second segment with slight dorsal scale tuft, inner surface of second segment pale yellow at base becoming

reddish brown ventro-apically, third segment mottled brown and pale yellow; frons medium brown in front of eye, pale yellow to yellowish gray medially; vertex and occiput gray brown, scales tipped with pale gray; row of scales behind eye medium to dark brown; antenna nearly uniformly brown on dorsal surface, ventral surface pale yellow or yellowish gray, in male sensory setae longer than depth of segment at base becoming very short at apex, sensory areas broad and contiguous on most of ventral surface but nearly separated by row of scales on alternate half segments by ⅔ length, in female sensory setae short, sensory areas very restricted on first three segments of shaft then much broader and contiguous to apex but partially separated by row of scales on alternate half segments; ocellus present. Tegula mottled brown, orange brown, and pale yellow; apexes of individual scales pale gray. Thorax mainly brown, individual scales streaked with paler colors, apexes of individual scales pale. Male without tuft of scales from mesothoracic anepisternum. Foreleg medium brown, most scales individually pale at bases; femur and tibia with some pale yellowish-gray scales at apexes; apexes of tarsal segments white. Midleg similar, coxa mainly yellowish gray and off-white, apexes of tibial spurs pale gray to off-white. Hindleg similar to midleg, scales of tibia with noticeably pale-gray to off-white bases, dorsal scale tuft on tibia pale yellow to yellowish white. Abdomen mottled brown, yellowish gray, and off-white; apexes of segments tend to be yellowish gray. Wing length 5.8–8.3 mm. Male and female genitalia as illustrated.

Larvae have been reared from *Corethrogyne californica* Candolle and *C. filaginifolia* (Hooker & Arnott) Nuttall in the Compositae.

TYPES. Holotype: ♀. California, Presidio of Monterey; iss. 18 April 1944; J. F. G. Clarke; reared from *Corethrogyne filaginifolia*; Genitalia slide by RWH, ♀, USNM 9387. USNM. Paratypes (all from California) 15 ♂, 13 ♀. Same data as for holotype; iss. 22, 27 April (2 ♀). Hayfork Ranger Station, Trinity Co.; 18–21 May 1973; Chemsak, Chemsak and Powell, and Powell (4 ♂, 1 ♀). San Bruno Mts., San Mateo Co.; 20 April 1963; R. M. Brown (1 ♂). Carmel; June; A. H. Vachell (1 ♀). Dune Lakes, 3 mi S Oceano, San Luis Obispo Co.; 2 May 1974; J. Powell (1 ♂). Morro Bay St. Park, SW end Morro Bay, San Luis Obispo Co.; 21 March 1974, iss. 10, 14 April 1974; Doyen & Powell; reared from *Corethrogyne californica* (2 ♀). Kernville, Kern Co.; 28 April 1964; J. Powell (1 ♂). Upper Santa Ana River, San Bernardino Co.; 26 June 1947; G. H. & J. L. Sperry (1 ♀). Topanga, 1,500 ft.; 28 June, 1, 30 July 1958; H. Notman (1 ♂, 2 ♀). Playala [sic] del Rey, Los Angeles Co.; iss. 31 May 1939; W. D. Pierce; larva on *Corethrogyne filaginifolia* (1 ♂). Camp Baldy; 16–23 July (1 ♂, 2 ♀). San Diego; April; Ricksecker (2 ♂). San Diego, San Diego Co.; 3–11, 6–3, 1911; W. S. Wright (2 ♂, 1 ♀). Cuyamaca Mts., San Diego Co.; 20 June 1943; J. A. Comstock (1 ♂, 1 ♀). CAS, LACM, SDNH, UCB, USNM.

Specimens vary in the color of the costal margin of the forewing from pale yellow to red or orange brown. Those with pale or light-colored costal margins tend to have more numerous light scales on the head and legs. The description based on the holotype is from a relatively dark specimen of *baxa*. Genital characters are relatively stable, but the shape of the distal part of the lobes of the juxta varies somewhat.

Dichomeris baxa is very closely allied to *simpliciella* and *gnoma* but can be separated as indicated in the keys. In males the slender cornutus that is about 1⅔ the length of the aedoeagus from the base to the zone and the process on the right side of the aedoeagus that is straight or slightly twisted and tapers abruptly to an acute apex are distinctive. In females the presence of heavily sclerotized ridges on the dorsal and ventral surfaces of the entire length of the bursa copulatrix and the slender bursa copulatrix that tapers gradually to the anterior end are distinctive.

Dichomeris gnoma Hodges, NEW SPECIES
PL. 3, FIG. 11; PL. M, FIGS. 3, 4; PL. EE, FIG. 1.

Dichomeris gnoma Hodges.
Type locality: Shingle Creek Road, Keremeos, British Columbia, Canada. [CNC]

Upper surface as figured. Haustellum and maxillary palpus pale yellow; first and second segments of labial palpus pale yellow, second segment with many orange-brown tipped scales toward apex, slight dorsal scale tuft uniformly yellowish white, third segment pale yellow with some light-brown tipped scales; frons brown in front of eye, pale yellow medially; vertex and occiput pale yellow above eye, medium gray brown dorsally, individual scales tipped with pale gray; antenna brown dorsally, anterior and ventral surfaces of scape and first two or three segments of shaft pale yellow, in male sensory setae slightly longer than depth of segment at base,

sensory areas broad and contiguous from base to apex, separated laterally by a row of scales on alternate half segments, in female ventral surface yellow on basal ⅓, sensory setae very short, sensory areas very small on basal two or three segments of shaft then somewhat larger but remaining relatively narrow to apex, very narrowly contiguous medially; a row of medium-brown scales behind eye; ocellus present. Tegula brown anteriorly, pale yellow dorsally. Dorsal surface of mesothorax mainly dark brown. Mesothorax of male without tuft of scales from anepisternum. Foreleg with coxa mainly medium to dark brown but with pale-yellow scales at base and yellowish-gray scales at apex; rest of leg becoming darker brown to tarsus; apex of tibia yellowish gray; apexes of tarsal segments white. Midleg similar but generally paler; coxa pale yellow laterally, many scales with gray apexes medially; tibial spurs gray brown or brown at base becoming white or yellowish white at apex. Hindleg mottled pale yellow and brown; tibia with many white scales, dorsal scale tuft with pale-yellow or white scales; segments of tarsus mottled gray brown and off-white on first segment becoming more uniformly dark brown on successive segments, apex of each segment white. Abdomen mottled pale yellow and yellowish gray. Wing length 7.2–8.7 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Shingle Creek Rd., Keremeos, B. C.; 15 July 1935; A. N. Gartrell; Genitalia slide by SBA, USNM 9393. CNC. Paratypes: 4 ♂, 2 ♀. Same data as for holotype; 17 August 1934 (1 ♀). Osoyoos, B. C.; 21 May 1938; J. K. Jacob (1 ♀). Satus Creek, Yakima Co., Washington; 29 May, 19, 22 August 1949; E. C. Johnston (4 ♂). CNC, USNM.

Dichomeris gnoma is closely related to *simpliciella* and *baxa* but can be separated from them as indicated in the keys. It may prove to be allopatric with them. In males the twisted distal part of the process on the right side of the aedoeagus is diagnostic. In females the combination of paired hemispherical projections on the ventral surface of the base of the bursa copulatrix, the heavily sclerotized flange on the dorsal surface of the base of the bursa copulatrix, the heavily sclerotized ridges extending the entire length of the bursa copulatrix on the dorsal surface and for the basal half on the ventral surface, and the bursa copulatrix being broadest at ⅔–¾ the length are diagnostic.

Specimens in the type series are relatively poor; thus, it is difficult to assess variation in color. The genital characters appear to be relatively stable.

Dichomeris washingtoniella (Busck), NEW COMBINATION

PL. 3, FIG. 12; PL. M, FIGS. 5, 6; PL. DD, FIG. 2 (RWH 2306).

Trichotaphe washingtoniella Busck, 1906, *Can. Ent.*, **38**: 121.

Type-locality: Washington, D.C. [USNM]

NOTE—Busck did not designate a type specimen in the original description. A lectotype ♂, present designation, is selected to ensure stability of the name. It is the specimen that had been separated as a type in the type collection of the U. S. National Museum of Natural History. It bears the following labels: 1. "Aug Busck Collector"; 2. "On *Eupatorium* Wash. D.C. iss. June 1, 1902"; 3. "*Trichotaphe washingtoniella* B. MS. Named by AB over M.S. name given to Durrant who has spec. from Clem' Coll. unnamed"; 4. "*Trichotaphe washingtoniella* Type Busck"; 5. "Type No. 4793. U.S.N.M."; 6. "Lectotype ♂ *Trichotaphe washingtoniella* Bsk. by R. W. Hodges."

Upper surface as figured. Haustellum dark gray brown; maxillary palpus pale yellow; outer surface of first and second segments of labial palpus dark brown, inner surface of first and second segments dark brown ventrally, dorsal scale tuft pale yellowish gray, third segment mainly pale yellow or yellowish orange with many dark-brown scales on anterior margin; frons dark yellowish gray medially, dark brown in front of eye, scales with shining yellow reflections; vertex and occiput dark yellowish gray with shining reflections; antenna dark brown, sensory setae in male approximately equal to depth of segment at base, sensory areas broad and separated by row of scales on alternate half segments, sensory setae very short in female, sensory areas restricted on base of shaft becoming larger to apex of shaft and separated by row of scales on alternate half segments; ocellus present; a row of brown scales behind eye. Tegula and dorsal surface of thorax dark bluish with gray with shining yellow reflections. Male without tuft of scales from mesothoracic anepisternum. Fore- and midlegs mainly dark bluish gray to gray brown, apexes of tarsal segments off-white. Hindleg with coxa pale yellow at base, mottled dark yellowish gray and pale yellow on most of segment; trochanter and femur mottled dark yellowish gray or bluish gray and pale yellow; tibia dark gray brown

ventrally, dorsal scale tuft pale yellow, spurs dark gray narrowly tipped with off-white; tarsus mottled dark gray brown or bluish gray and off-white, apexes of segments off-white to white. Abdomen shining yellowish gray and bluish gray, darker yellowish gray ventrally. Wing length 6.1–8.0 mm. Male and female genitalia as illustrated.

Adults of *washingtoniella* have been reared from larvae on *Ambrosia artemisifolia* Linnaeus, by Murtfeldt; *Eupatorium* species, by Busck; and *Vernonia missurica* Rafinesque, by Glenn, in the Compositae and *Epilobium* species in the Onagraceae. Busck (1906: 122) noted that the larva feeds in a narrow fold on the edge of a leaf of *Eupatorium* and pupates in a similar fold.

Dichomeris washingtoniella is most similar to *levisella* and *leuconotella*. The angulate black mark on the basal half of the forewing can be difficult to discern; thus, any questionable specimens should be dissected to study the genitalia for positive identification. *Washingtoniella* and *levisella* usually have prominent yellow-tipped scales on the forewing; *leuconotella* lacks them. Genital characters ally *washingtoniella* most closely with *levisella* and these two with the *simpliciella* complex. Each has a well-developed cornutus and a heavily sclerotized lobe from the zone on the right side of the aedoeagus.

Washingtoniella occurs from Connecticut and southern Ontario (Ottawa region) south to Washington, D.C., and west through Kentucky and Ohio to eastern Kansas and Oklahoma. Nearly all specimens are worn. Adults probably emerge in early summer and continue to fly until August or early September.

Dichomeris levisella (Fyles), NEW COMBINATION

PL. 3, FIG. 13; PL. N, FIGS. 1, 4; PL. AA, FIG. 6 (RWH 2300).

Trichotaphe levisella Fyles, 1904, *Can. Ent.*, **36**: 211.

Type locality: Levis, Quebec. [USNM]

NOTE—Fyles did not indicate that he had selected a holotype, only that types were sent to the U.S. National Museum. The lectotype ♂ (without abdomen), present designation, bears the following labels: 1. "Type No. 6813 U.S.N.M."; 2. "*Trichotaphe levisella* Levis, Quebec, July 10/02 Thomas W. Fyles."; 3. "Lectotype *Trichotaphe levisella* ♂ Fyles by R. W. Hodges."

Upper surface as figured. Haustellum mottled dark gray and pale yellow basally becoming pale yellow by half length; maxillary palpus mottled pale yellow and dark gray; outer surface on first and second segments of labial palpus dark brown, some red-brown scales on ventral margin of second segment, inner surface much paler, mainly yellow to yellowish white on first segment and base of second and all of dorsal scale tuft, third segment pale yellow posteriorly, heavily marked with dark brown anteriorly; frons dark brown in front of eye, shining medium to dark gray medially; vertex and occiput mainly dark gray with yellow and lavender reflections; dorsal surface of antenna dark gray brown, ventral surface mainly pale yellow to yellowish gray, in male sensory setae about ¾ depth of segment at base becoming shorter toward apex, sensory areas broad and nearly contiguous on basal five or six segments then incompletely separated by a row of scales on alternate half segments, in female sensory setae very short and sensory areas very narrow and restricted on basal 10 or 11 segments becoming slightly broader but consistently separated by a row of scales on alternate half segments; ocellus present; a row of dark-brown scales behind eye. Tegula dark brown, individual scales with slight streaking of pale yellowish gray on dorsal surface. Dorsal surface of mesothorax dark brown. Male without tuft of scales from mesothoracic anepisternum. Foreleg mainly dark grayish brown, scale bases pale yellow to yellowish gray; apex of coxa with several yellowish-gray scales; apex of femur with a few white-tipped scales; apex of tibia and tarsal segments white. Midleg similar but coxa shining pale yellowish white with yellow and purple reflections. Hindleg similar to midleg; trochanter yellow to yellowish white on distal margin; femur pale yellow and medium to dark gray with shining yellow and purple reflections; tibia dark gray brown on ventral half, scale tuft pale yellow to yellowish white, apex pale yellow; apexes of spurs yellowish white; tarsus gray brown, apexes of segments yellowish white. Abdomen shining medium gray brown dorsally with yellow and purple reflections, apexes of segments with many pale yellow-gray scales; ventral surface darker gray brown, many individual pale yellowish-gray scales, particularly on apexes of segments. Wing length 6.5–9.8 mm. Male and female genitalia as illustrated.

Adults have been reared from larvae feeding on *Aster* species, including *A. macrophyllus* Linnaeus (Fyles, 1904), *A. cordifolius* Linnaeus and *A. simplex* Willdenow (Putman, 1943: 223); *Hieracium aurantiacum* Linnaeus, by Batra; and *Solidago* by McDunnough. According to Fyles (1904: 211) the larva folds together the large ground leaves of bigleaf aster,

and the folded leaf appears crinkled. Pupation occurs in a cocoon spun in a separate folded leaf.

It is difficult to assess variation in maculation because most specimens are worn or faded. The number of yellow to yellowish-orange scales on the forewing varies as does the proportion of pale-yellow and brown scales on many surfaces. Females usually have distinctly orange scales on the ventral surface of the distal three segments of the tarsi.

Levisella can be confused with *washingtoniella* and *leuconotella* but can be separated as indicated in the keys. The forewing of *levisella* is distinctly dark yellowish gray brown as contrasted with dark purplish gray brown for *washingtoniella.* However, worn specimens may have lost this character.

Dichomeris levisella occurs from Nova Scotia and southern Quebec west to Waterton Lakes, Alberta and south to New Jersey, Kentucky, Michigan, and Minnesota. Adults have been collected on 12 June in Kentucky and 21 June to 30 September in Quebec.

Dichomeris leuconotella (Busck), NEW COMBINATION
PL. 3, FIG. 14; PL. N, FIGS. 2, 3; PL. EE, FIG. 2 (RWH 2299).

Trichotaphe leuconotella Busck, 1904, *Proc. U.S. Natl. Mus.,* **27**: 762.
Type locality: Pullman, Washington. [USNM]

Upper surface as figured. Haustellum and maxillary palpus mottled dark gray and pale yellowish gray; outer surface of labial palpus dark gray and yellowish gray brown, ventral surface of second segment with orange-brown cast, inner surface paler, dorsal surface of second segment and scale tuft pale yellowish gray, posterior surface of third segment nearly uniformly pale yellow; frons with row of brown scales in front of eye, lower part pale gray to off-white becoming dark gray on upper part; vertex and occiput dark gray; scales on head with shining yellow, lavender, and purple reflections; antenna dark brown dorsally, ventral surface pale yellow to yellowish white on scape and base of shaft, shaft becoming darker distally, in male sensory setae about ⅔ depth of segment at base becoming ½ depth of segment at apex, sensory areas broad and separated by a row of scales on alternate half segments, in female sensory setae very short at base becoming nearly equal to depth of segment at apex, sensory areas very small on basal segments becoming broader to apex and separated by row of scales on alternate half segments; ocellus present; a row of brown scales behind eye. Tegula and dorsal surface of mesothorax brown with shining yellow and purple reflections. Male without tuft of scales from mesothoracic anepisternum. Foreleg brown, becoming somewhat darker on tibia and tarsus, tibia with a few pale yellowish-white scales at ⅗ length and at apex, apexes of tarsal segments white. Midleg similar to foreleg but coxa with shining yellow and yellowish-gray scales; femur with shining yellow scales on margin, mainly dark gray medially; tibia and tarsus dark, apex of tibia and apexes of first three tarsal segments white to off-white. Hindleg shining yellow mottled with some gray scales on coxa and femur; tibia with dark yellowish-gray scales on ventral half, pale yellowish white dorsally and on scale tuft, spurs dark gray and tipped with pale yellow or yellowish white; tarsus dark brown, base and apex of first segment and apexes of other segments with white to yellowish-white scales. Dorsal surface of abdomen shining dark yellowish gray, ventral surface mainly brown, scales streaked with a paler color, slightly shining at some angles. Wing length 5.0–8.6 mm. Male and female genitalia as illustrated.

The larvae roll leaves of *Solidago uliginosa* Nuttall, *Solidago* species, *Helianthus grosseserratus* M. Martens, and *Aster* species in the Compositae (based on unpublished rearings by Freeman, McDunnough, and Minor).

Dichomeris leuconotella varies in background color of the forewings from dark bluish gray to dark yellowish brown. The type specimen is unique in having a well-defined off-white spot at the end of the cell. Examination of 130+ specimens shows that a few have pale-yellow or intense yellow-orange scales preceding and succeeding the dark mark at the end of the cell; most have no pale scales at the end of the cell. The proportion of pale scales to dark scales on the head and legs varies. In males the lobes of the juxta vary from nearly parallel to one another to lyre shaped; the lateral serrations may extend to the base or stop asymmetrically some distance from the base; the roughly symmetrical lobes from the zone of the aedoeagus may have two or three projections. The overall shape of the bursa copulatrix varies from specimen to specimen, and the posterior margin of the eighth tergite may be slightly indented medially or convex. None of this variation is associated with other characters or distribution.

Leuconotella is most closely related to *washingtoniella* and *levisella.* It differs by the more diffuse pattern of dark-brown scales on the base of the forewing than either of the others have. The shape of the juxta and structure of the lobes of the aedoeagus

and the narrowly elliptical sclerite at the base of the bursa copulatrix are diagnostic for the species. Until one develops an impression of the appearance of *leuconotella,* specimens should be dissected to confirm or to make an identification. The larval hosts of the three species overlap in part, so caution must be exercised in using food plants for identification purposes.

Leuconotella occurs from Nova Scotia south to the mountains of western Maryland and west along the Canadian–United States border to eastern Washington. Isolated records are from Denver, Colorado; Dickinson County, Iowa; and Hessville, Indiana. Most specimens have been collected in July, but the known range is 14 June to 13 August.

Dichomeris mercatrix Hodges, NEW SPECIES
PL. 3, FIG. 15; PL. EE, FIG. 3.

Dichomeris mercatrix Hodges.
Type locality: McLean Bogs Reserve, Tompkins County, New York. [USNM]

Upper surface as figured. Color pattern as for *leuconotella* except as follows. Second segment of labial palpus with pale yellowish-gray scales on ventral margin, inner surface of first and second segments of labial palpus pale yellowish gray becoming dark brown by ⅔ length, third segment pale yellow with many dark-brown scales on anterior and anterolateral surfaces; frons shining pale yellow or yellowish gray medially. Legs generally paler than for *leuconotella,* hindleg with tarsus shining pale yellow or yellowish orange, apexes of segments slightly paler than rest of segments. Wing length 7.2–7.6 mm. Female genitalia as illustrated.

A specimen was reared from a larva, but the host was not recorded.

TYPES. Holotype: ♀. McLean Bogs Reserve, Tompkins Co., N.Y.; 18 July 1963; J. G. Franclemont. USNM. Paratypes: 3 ♀. Sardinia, N.Y.; 11 July 1949; L. R. Rupert (1 ♀). Armdale, Nova Scotia; 15 July 1951; D. C. Ferguson (1 ♀). Pt. Pelee, Ont; F. P. Ide; ex; [larva] 13 July 1927 (1 ♀). CNC, CU, NSMS.

The few specimens show little variation except for the amount of pale and dark scales on the haustellum, labial palpus, and legs.

Dichomeris mercatrix is extremely similar to *leuconotella,* but the differences noted in the keys appear to be consistent. The genitalia should be examined for identification to species. The male remains to be discovered.

Dichomeris euprepes Hodges, NEW SPECIES
PL. 4, FIG. 11; PL. AA, FIG. 7.

Dichomeris euprepes Hodges.
Type locality: Big Black Mountain, Letcher County, Kentucky. [ANSP]

Upper surface as figured. Haustellum mottled pale yellow and medium to dark gray; maxillary palpus orange gray; labial palpus pale orange on first and second segments, dorsal scale tuft weak, third segment pale yellow with many dark-brown scales on anterior surface; frons pale orange to orange gray medially, a few brown scales in front of eye; vertex and occiput shining dark grayish brown, slightly paler above eye; antenna dark brown dorsally, pale yellow or yellowish gray ventrally, in female sensory areas very small on basal ⅓ becoming somewhat larger and separated by a row of scales on alternate half segments, sensory setae very short; a row of yellowish-brown scales behind eye. Tegula and dorsal surface of mesothorax dark brown. Legs mainly dark grayish brown, most scales with pale bases. Foreleg with apexes of tibia and tarsal segments one, two, three, and five white to off-white. Midleg similar to foreleg, coxa shining pale yellow, apexes of tibal spurs pale gray to off-white. Hindleg similar to midleg but slightly paler, dorsal scale tuft on tibia pale yellowish gray. Wing length 4.9 mm. Hindwing lacking pecten on base of cubitus. Male genitalia: no specimens available. Female genitalia as illustrated; walls of bursa copulatrix with heavily sclerotized plates, many ridges or folds in membranous part extending from base to ¾ length.

Braun (manuscript notes) reared *euprepes* on *Solidago flexicaulis* Linnaeus. The larva rolls an edge of a leaf onto an upper surface and feeds from either end of the roll.

TYPE. Holotype: ♀. Big Black Mt., Letcher Co., Ky.; iss. 16 June 1937; A. F. Braun. ANSP.

Dichomeris euprepes is very closely related to *leuconotella* and *mercatrix* in genital characters. The color pattern is similar to that of *leuconotella* but is distinct because the dark-brown area at ⅓ the wing length appears like a spot, and the subterminal band is broad and nearly straight. *Euprepes* can be separated from these species as indicated in the keys.

Dichomeris juncidella (Clemens), NEW COMBINATION
PL. 3, FIG. 16; PL. N, FIGS. 5, 6; PL. AA, FIG. 8 (RWH 2298).

Trichotaphe juncidella Clemens, 1860, *Proc. Acad. Nat. Sci. Philadelphia,* **1860**: 166.
Type locality: not given [Easton, Pennsylvania]. [ANSP]

NOTE—See statement under *pauciguttellus* (p. 36) for restriction of type locality.

Gelechia pallipalpis Walker, 1864, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,* **29**: 596.
Type locality: North America (from Carter). [BMNH]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "Type"; 2. "N. Amer. 1)2 85"; 3. "*Gelechia pallipalpis* Wkr Cat. Lep. BM. 29.596 sp. 238 (1864) a. North America (Carter) 1862: 85 TYPE ♂ descr."; 4. "238. *Gelechia pallipalpis.*"

Depressaria? *dubitella* Chambers, 1872, *Can. Ent.,* **4**: 92.
Type locality: Kentucky. [MCZ]

NOTE—The lectotype ♂, present designation, bears the following labels: 1. "Type 1529"; 2. "Kentucky"; 3. "Peab. Acad."; 4. "13"; 5. "Lectotype R W Hodges"; 6. "RWH 3295."

Upper surface as figured. Haustellum and maxillary palpus shining yellowish white; outer surface of first and second segments of labial palpus light orange, inner surface of first and second segments mainly pale orange but yellowish white to off-white on dorsal surface of second segment, second segment with slight dorsal scale tuft, third segment pale orange with many brown scales on anterior and inner surfaces; most of frons shining orange white, a few brown scales in front of eye; vertex and occiput shining dark gray with yellow and lavender reflections; antenna shining dark gray dorsally, pale yellowish gray ventrally, in male sensory setae slightly shorter than depth of segments from base to apex, sensory areas narrowly contiguous on basal three or four segments then separated by a row of scales on alternate half segments, in female sensory setae very short at base, about ½ or ⅔ depth of segment at apex, sensory areas very small and restricted basally, becoming much broader to apex; ocellus present; a row of dark-brown scales behind eye. Tegula and dorsal surface of mesothorax shining dark gray with yellow, gold, and purple reflections. Male without tuft of scales from mesothoracic anepisternum. Foreleg coxa, trochanter, and femur dark yellowish gray with shining yellow and lavender reflections; tibia and tarsus shining dark brown, scale bases paler, apex of tibia and of tarsal segments with white scales. Midleg similar to foreleg, coxa shining yellowish white and medium to dark gray; trochanter and femur shining dark yellowish gray; tibia and tarsus dark gray brown, apex of tibia with very few pale scales, apexes of tarsal segments one, two, and five with white or off-white scales, apexes of segments three and four sometimes with pale scales. Hindleg similar to midleg, tibia and tarsus paler, dorsal scale tuft on tibia slightly paler than ventral half of segment, apexes of spurs pale gray. Abdomen shining dark gray with yellow and lavender reflections dorsally, ventral surface slightly darker. Wing length 5.6–7.2 mm. Male and female genitalia as illustrated.

Murtfeldt (1874: 221) described the larval habits of *juncidella* as *dubitella* Chambers. Larvae were found in July and August folding the lobes of the leaves of *Ambrosia artemisiifolia* Linnaeus. Pupation occurred within the folded leaf. Busck (1903: 911) recorded *Artemisia trifida* Linnaeus, *Solidago* species, and *Aster* species as hosts of *juncidella* and said that there are at least two generations per year in the Washington, D.C. area. Additional hosts (data from specimens studied) are *Helianthus tuberosus* Linnaeus, *Aralia spinosa* Linnaeus, and strawberry.

Adults vary in the intensity of orange or yellow scales on the palpi, haustellum, and frons and the development of pale-orange spots on the forewing. Maximally, specimens have a light mark on the costal margin at ¾ the wing length, a few pale scales on the fold at ⅔ the length of the fold, a spot at the end of the cell, and one at ⅔ the length of the cell. Genital characters are relatively stable. Main variation is the shape of the distal ⅓ of the lobes of the juxta.

Juncidella is most similar to *agonia* (replacement name for *trinotella* (Busck)) but differs as indicated in the keys. The labial palpi of *agonia* are yellowish gray and have brown and red-brown scales on the outer surface of the second segment; the vertex and occiput are yellowish gray; and the spot at the end of the cell is prominent and usually pale yellow or yellowish gray. The shape of the uncus and the four spines on its ventral surface are unique among North American *Dichomeris.* The hook on the gnathos is relatively short and stout and similar to the condition for species of the *costarufoella* group.

Juncidella occurs from Nova Scotia, southern Quebec, and Ontario west to north central Nebraska near the Niobrara River (but not the Prairie Provinces) and south to Florida and Texas. Adults have been collected from late spring (April or May) to fall (September or October).

glenni GROUP

Dichomeris glenni is the only species of this group in America north of Mexico and may be the only one in the world. *Dichomeris acrochlora* (Meyrick, 1905), NEW COMBINATION, from Ceylon has very similar male genitalia and a comparably modified labial palpus, but it lacks the pecten on the base of the cubitus on the hindwing, and veins R_4 and R_5 and CuA_1 and CuA_2 are long stalked in the forewing. These differences may be significant at the species-group level. The species-group is characterized by a well-developed dorsal scale tuft and a weak ventral scale tuft on the second segment of the labial palpus, a well-developed pecten on the cubitus on the hindwing, a relatively broad forewing with apical angle slightly more than 100 degrees; male genitalia with lobes of the juxta widely separated basally, vinculum with posterior projections near the base and beyond ½ the length, aedoeagus free, lacking cornutus and lobes from the zone; corpus bursae lacking series of parallel, sclerotized ridges, distal ⅔ of corpus bursae membranous, basal ⅓ heavily sclerotized.

Dichomeris glenni Clarke

PL. 3, FIG. 17. TEXT FIG. 24 *a–d* (RWH 2298).

Dichomeris glenni Clarke, 1947, *Proc. Ent. Soc. Washington,* **49**: 187.

Type locality: Putnam County, Illinois. [USNM]

Upper surface as figured. Base of haustellum mottled dark brown and pale yellowish gray becoming mottled pale yellowish gray and darker yellowish gray; maxillary palpus mainly dark brown with some pale scale bases; outer surface of first and second segments of labial palpus dark brown, many scale bases pale gray, dorsal surface with scale tuft, margin of tuft pale gray, inner surface of first and second segments medium to dark gray ventrally, pale yellow to yellowish orange from base of second segment extending on scale tuft, most of scale tuft pale off-white, apexes of scales at apex of segment off-white, third segment pale yellow, apex dark brown; frons dark brown in front of eye, yellowish gray medially; vertex and occiput yellowish gray to off-white above eye, medium to dark gray medially, apexes of most scales pale gray; antenna dark gray brown on dorsal surface, pale yellowish gray ventrally, in male sensory setae slightly longer than depth of segment at base becoming about as long as depth of segment at apex, sensory areas very broad, separated by row of scales on alternate half segments, in female sensory areas relatively broad, sensory setae about ⅔ depth of segments from base to apex; ocellus reduced, very small; a row of dark-brown scales behind eye. Tegula mottled dark gray and pale yellowish gray. Dorsal surface of mesothorax similar to tegula, three dark-brown spots on posterior margin: on apex and just before apex. Mesothoracic anepisternum in male with strong scale tuft. Foreleg mainly dark brown, many scale bases pale yellowish gray, apex of trochanter with several yellowish-gray scales, apex of tibia and apexes of tarsal segments white to off-white, scales on tarsus with prominent pale bases. Midleg similar to foreleg but coxa with shining off-white and yellowish-gray scales, dorsal surface of tibial spurs pale yellowish gray. Hindleg similar to midleg but generally paler, tibial scale tuft pale yellow and pale orange, tibial spurs dark gray ventrally, yellowish gray dorsally, first tarsal segment mainly pale yellow, rest of segments dark gray to gray brown and scales with pale bases, apex of each segment pale yellowish gray to off-white. Abdomen mottled dark gray and yellowish gray with shining reflections, caudal margin of each segment often nearly uniformly pale off-white; ventral surface similar but with more dark scales on basal segments and nearly uniformly pale distally. Wing length 7.1–11.0 mm. Males usually are smaller than females. Hindwing with well-developed pecten on base of cubitus. Male genitalia as illustrated; aedoeagus free, lacking cornutus and lobes from zone, lacking flange at base; vinculum with pair of lobes arising from near base, lacking similar lobes from anterior part (or these lobes present but arising distant from the vinculum; juxta asymmetrical, short paired lobes that are separated basally, apex of each lobe bifid; hook of gnathos relatively long. Female genitalia as illustrated; apophyses anteriores shorter than apophyses posteriores; wall ventrad of ostium bursae with numerous spicules; base of bursa copulatrix with some heavily sclerotized folds.

The food plant and immature stages are unknown.

Dichomeris glenni varies in the proportions of light and dark scales where there is pattern; the dark-brown spot in the cell of the forewing varies in size and shape; the lobes of the juxta differ in size and shape. *Glenni* should be confused with no other North American species of *Dichomeris.*

Glenni is known from scattered localities in Michigan, Ohio, Illinois, Kansas, Missouri, Mississippi, and Florida. Adults have been collected in June and July in the north; March, April, August, September, and October in Florida.

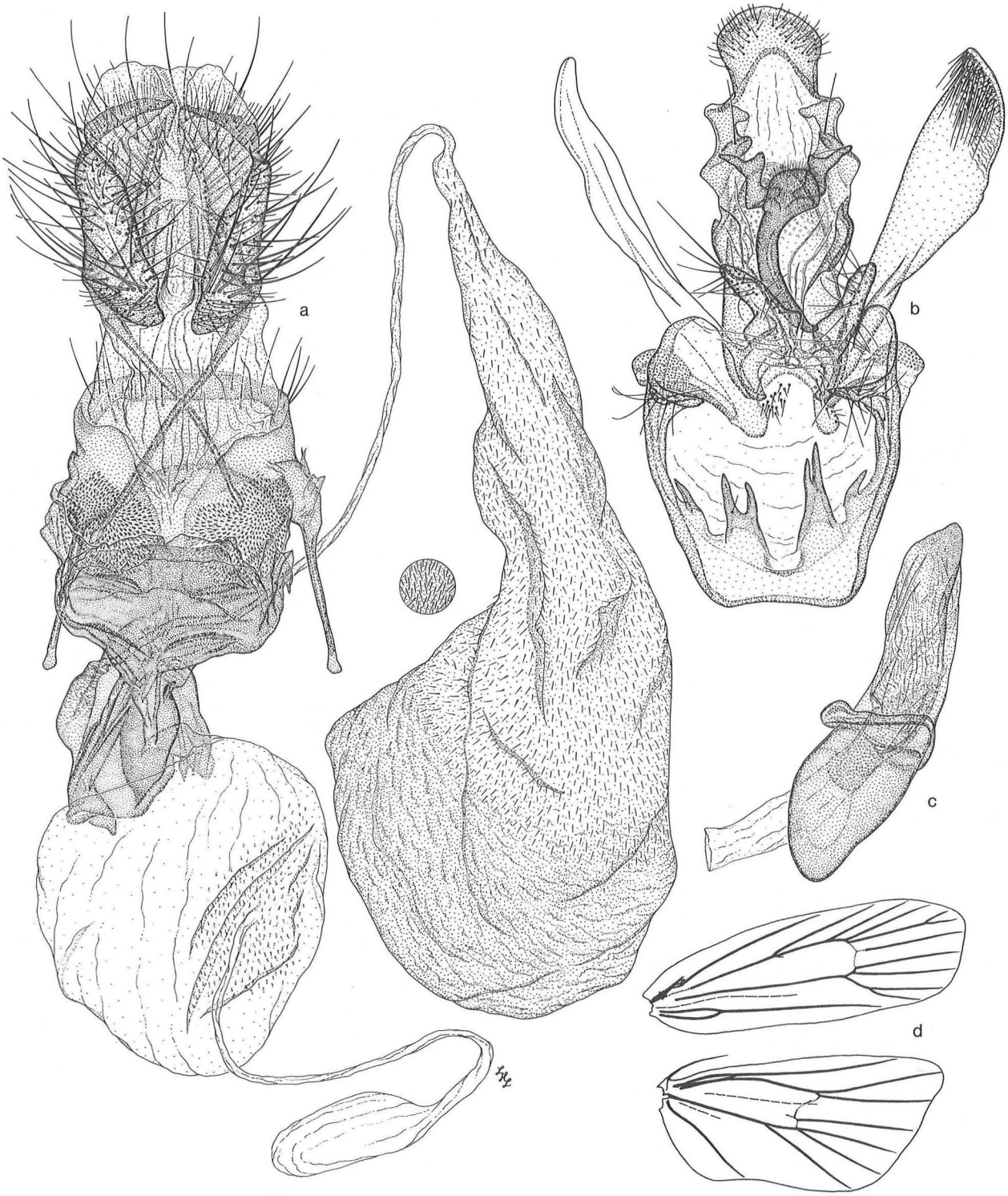

FIGURE 24: GENITALIA AND VENATION OF *DICHOMERIS GLENNI*

a. Female genitalia (USNM 9165). *b.* Male genital capsule (USNM 9172). *c.* Aedoeagus (USNM 9172). *d.* Venation (USNM 9168).

costarufoella GROUP

Dichomeris costarufoella, agonia, offula, and *crepida* comprise the *costarufoella* group in America north of Mexico. Elsewhere the species-group is well represented in the Neotropical Region and includes many species described in *Plocamosaris, Pachysaris, Ilingiotis, Prophoraula, Taphrosaris, Semiomeris, Brochometis,* and *Sirogenes. Dichomeris melanophylla* (Turner, 1919), NEW COMBINATION, appears to be a member of this species-group based on the male genitalia, and species described in *Epicharta* and *Leuropalpa* from Rhodesia (now named Zimbabwe) and South Africa are very similar to those in this group. Character states exhibited by our species are: second segment of the labial palpus either smooth scaled or with a slight dorsal scale tuft, ocellus present, male without scale tuft from mesothoracic anepisternum, hindwing without pecten on cubitus, vinculum with a pair of posteriorly directed lobes arising from ⅓ the length, vinculum nearly evenly sclerotized in the saccal region, lobes of juxta paired and arising from a common base, aedoeagus free, without cornutus, without heavily sclerotized lobes from the zone, and with sclerotized band(s) distad of the zone, uncus with posterior margin evenly rounded or excavated laterally, ductus bursae distinct, basal half of corpus bursae with series of parallel ridges, distal half of corpus bursae nearly membranous and with patch of well-developed inwardly directed projections near the base of the accessory bursa. Some striking developments are fusion of R_4 and R_5 in the forewing, CuA_2 arising at ½ the length of the cell in the hindwing, differential enlargement of segments of the labial palpus, labial palpus porrect, and the posterior margin of the uncus rounded or excavated laterally.

Dichomeris costarufoella (Chambers), NEW COMBINATION

PL. 3, FIG. 18; PL. 4, FIGS. 12, 13. TEXT FIG. 25 *a–d* (RWH 2293).

Gelechia costa-rufoella Chambers, 1874, *Can. Ent.,* **6**: 240.

Type locality: Waco, Texas. [MCZ]

NOTE—The lectotype (abdomen missing), present designation, bears the following labels: 1) "Type 1527"; 2) "Chambers Tex."; 3) "*Gelechia costaruffella* Cham."; 4) "Lectotype R W Hodges."

Trichotaphe costirufella Meyrick, 1925, *Genera Insectorum,* **184**: 196.

NOTE—Meyrick proposed *costirufella* as an emendation of *costarufoella.*

Upper surface as figured. Base of haustellum gray becoming shining pale yellow by ¼ length; maxillary palpus mottled gray and yellow; outer surface of first and second segments of labial palpus mainly reddish orange, pale orange on ventral margin and yellowish orange at apex, inner surface of first and second segments mainly pale yellow becoming grayish orange on anteroventral margin, third segment pale yellowish orange with some gray-brown scales on anteromedial margin; frons orange gray with some shining reflections, scales in front of eye light brown; vertex and occiput light orange above eye becoming medium gray with some shining reflections medially; antenna dark gray brown dorsally, pale yellow or yellowish orange on ventral surface of scape and first two or three segments of shaft in male, rest of shaft darker yellowish gray, in male sensory areas broad and contiguous on basal four or five segments then remaining broad but separated by row of scales on alternate half segments, sensory setae slightly more than ½ depth of segments from base to apex, in female dorsal surface of antenna slightly paler, ventral surface pale yellow from base to apex, sensory areas very small at base becoming broader by ⅕ length, sensory setae very short at base becoming less than half depth of segment at apex; a row of light-brown scales behind eye. Tegula brown on anterior margin, light grayish orange dorsally. Dorsal surface of mesothorax mainly light orange gray, dark brown at apex. Male lacking tuft of scales from mesothoracic anepisternum. Foreleg gray brown on coxa becoming darker brown on successive segments, bases of individual scales pale yellowish gray, apexes of tibia and tarsal segments with off-white scales. Midleg similar to foreleg but coxa shining yellowish white and gray. Hindleg similar to midleg but generally paler, dorsal scale tuft of tibia pale yellowish gray to yellowish orange, apexes of tibial spurs yellowish white. Abdomen somewhat shining yellowish gray with yellow and lavender reflections, ventral surface with fewer shining reflections. Wing length 4.8–6.0 mm. Male and female genitalia as illustrated.

McDunnough reared *costarufoella* from *Rudbeckia* species (black-eyed Susan) (Compositae) in Riding Mountain Park, Manitoba. Adults emerged in late June and early July. (Data are from specimens examined.)

Costarufoella varies in size. Two series of specimens from north west Arkansas and eastern Oklahoma are in the size range given above. Five specimens from Riding Mountain, Manitoba have a wing length of 4.9–6.5 mm, and a specimen from Cowles,

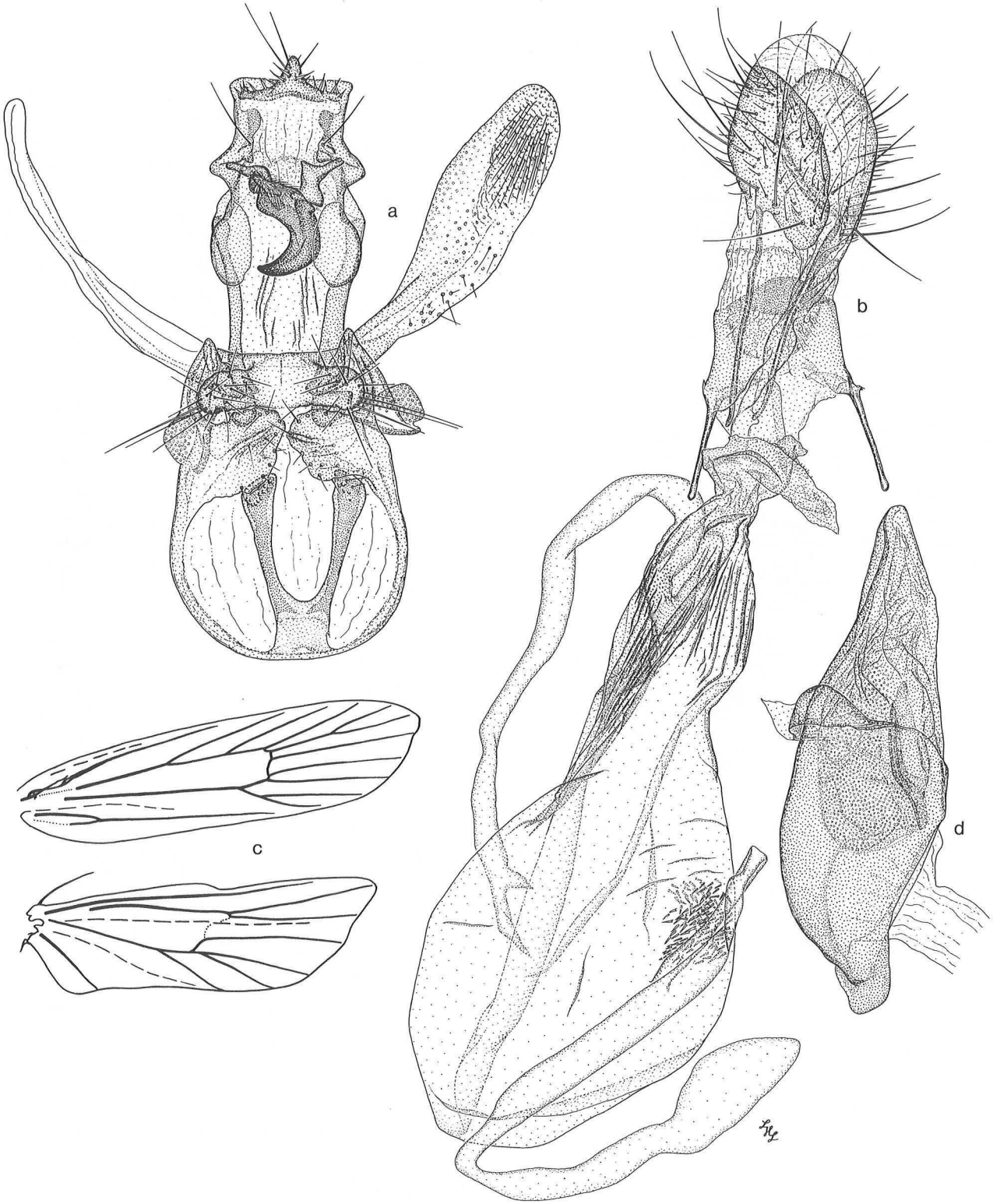

FIGURE 25: GENITALIA AND VENATION OF *DICHOMERIS COSTARUFOELLA*

a. Male genital capsule (USNM 9144, right valva USNM 9495). *b.* Female genitalia (USNM 9145). *c.* Venation (USNM 9146). *d.* Aedoeagus (USNM 9495).

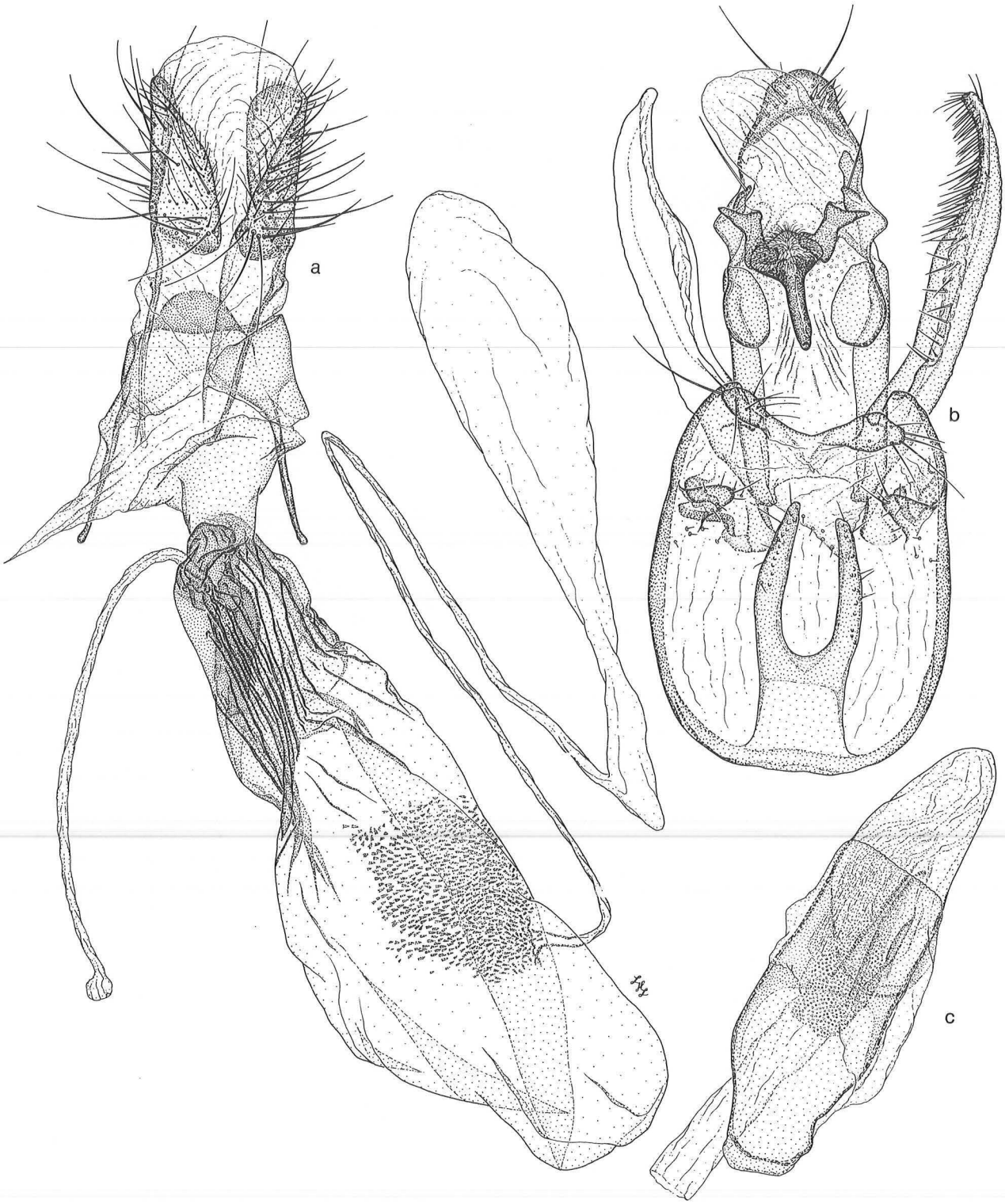

FIGURE 26: GENITALIA OF *DICHOMERIS AGONIA*
a. Female genitalia (USNM 9078). *b.* Male genital capsule (USNM 9079). *c.* Aedoeagus (USNM 9079).

New Mexico, has a wing length of 7.5 mm. The amount and proportions of reddish orange and yellowish orange on the head, thorax, and forewings vary. The sclerotized base of the juxta varies in length and width.

Costarufoella can be confused with *copa* but can be separated as indicated in the keys. They appear to be allopatric for most of their ranges, but they are sympatric in Riding Mountain Park, Manitoba. *Copa* is a more somberly colored species and has the brownish orange on the forewings far less extensively developed than does *costarufoella.*

Costarufoella occurs from Illinois and Louisiana west to north central Nebraska, eastern Oklahoma, and eastern Texas. Isolated records are Cowles, New Mexico and Riding Mountain Park, Manitoba. Adults have been collected from 23 May to 22 September in Missouri; early and late records in Texas are 5 March and 6 October.

Dichomeris agonia Hodges, NEW NAME
PL. 3, FIGS. 19, 20. TEXT FIG. 26 *a–c*
(RWH 2305).

Trichotaphe trinotella Busck, 1906, *Can. Ent.*, **32**: 122.
Type locality: Pittsburg, Pennsylvania. [USNM]
NOTE—*Dichomeris trinotella* (Busck), NEW COMBINATION, is a junior, secondary homonym of *Dichomeris trinotella* (Coquillett, 1883) and requires a replacement name.

Upper surface as figured. Base of haustellum dark gray becoming yellowish white by ¼ length; maxillary palpus pale yellow; outer surface of labial palpus yellowish orange, first and second segments heavily dusted with gray brown, inner surface yellow or orange white to ⅔ length of second segment then becoming light orange to apex of second segment, third segment with dark-brown tipped scales at apex; frons pale grayish orange, brown scales immediately before eye; vertex and occiput pale orange above eye becoming slightly shining dark gray medially, apexes of scales tipped with pale gray; antenna dark gray brown dorsally, pale yellow or yellowish orange ventrally, in male sensory areas broad and separated by row of scales on alternate half segments, sensory setae about ⅔ depth of segments, in female sensory areas restricted on basal four or five segments then slightly broader and separated by a row of scales on alternate half segments, a row of brown scales behind eye. Tegula and dorsal surface of mesothorax dark brown with slate gray cast. Male lacking scale tuft from mesothoracic anepisternum. Legs dark brown, individual scale bases pale yellowish gray, apexes of tibia and tarsal segments off-white on foreleg. Midleg similar to foreleg, coxa with shining yellow and gray scales, apexes of tibial spurs off-white, tarsal segments mottled off-white and dark brown. Abdomen slightly shining dark yellowish gray and paler yellowish gray, apexes of segments more nearly uniformly yellowish gray. Wing length 5.7–7.5 mm. Male and female genitalia as illustrated.

Forbes (1923: 282) reported a rearing from *Oenothera* (Onagraceae) in Missouri with reservation. I have studied the specimen reared by Murtfeldt and verify the record. She also reared *agonia* from *Aster* species and *Solidago* species.

Major variation in *agonia* is in the amount and intensity of yellowish- and orangish-hued scales on the head.

Agonia should not be confused with other species of *Dichomeris.* The dark-brown with slate-gray overlay (as seen with the aid of a microscope) of the forewings and thorax in combination with the pale-colored labial palpi and frons are distinctive.

Agonia has been collected from Port Colburn, Ontario, Massachusetts, and Illinois south to Florida, Louisiana, and Arkansas. In the north adults have been taken at light from early July to early September; in the south from late February to mid-October.

Dichomeris offula Hodges, NEW SPECIES
PL. 3, FIG. 21; PL. O, FIGS. 1, 3; PL. FF, FIG. 1.

Dichomeris offula Hodges.
Type locality: Ithaca, New York. [USNM]

Upper surface as figured. Base of haustellum mottled gray and pale yellowish gray becoming mainly yellowish gray by ⅓ length; maxillary palpus pale yellow; outer surface of first segment and extreme base of second segment of labial palpus mainly dark gray, rest of labial palpus pale yellow, inner surface of second segment and particularly dorsal scale tuft yellowish white, third segment with dark-brown scales just before apex and some on inner surface; frons shining grayish orange, a narrow row of brown scales in front of eye; vertex and occiput darker grayish orange above eye, medium gray medially and with shining yellow and lavender reflections; antenna dark brown dorsally, yellowish gray ventrally, ventral surface of scape pale yellow, sensory areas in male narrowly contiguous at base then separated by a row of scales on alternate half segments, sensory setae about ¾ depth of segment at base, less than ½ depth of segment at apex, in female sensory

areas restricted at base becoming broader and separated by a row of scales on alternate half segments to apex, apex of antenna mainly pale yellow to orange gray; a row of light-brown scales behind eye. Tegula and dorsal surface of mesothorax dark brown. Foreleg dark brown, apex of coxa yellowish gray, apexes of tibia and tarsal segments white. Midleg similar to foreleg, coxa with shining pale yellow and gray scales, femur shining yellowish gray, apexes of tibial spurs off-white to white. Hindleg similar to midleg, dorsal scale tuft on tibia yellowish white, first tarsal segment off-white dorsally. Wing length 7.0–7.9 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. Ithaca, N.Y.; 19 June 1937; J. G. Franclemont; USNM genitalia slide 9280. USNM. Paratypes: 25 ♂, 4 ♀. Same data as for holotype; 16 June, 13 September 1939 (2 ♂). Red River Gorge, Menifee Co., KY; 13 May 1981; L. D. Gibson (2 ♂). Edgard, St. John Par., Louisiana; 27 February, 4–27 March, 4 June 1982; V. A. Brou (4 ♂, 1 ♀). Lincoln, Maine; 8 July (1 ♂). Woodland, Maine; 9 July (1 ♂). Ocqueoc Lake, Cheboygan Co., Michigan; 29 July 1974; E. & R. Hodges (1 ♂). Duluth, Min. (1 ♂). New Market, N. J.; 4 June 1966 (1 ♂). Canim Lake, British Columbia; 23 June 1937; G. S. Walley (1 ♂). Pikwitonei, Manitoba; 2 August 1949; J. B. Wallis (1 ♂). Baddeck, N. S.; 4 August 1950; D. C. Ferguson (1 ♂). Brighton, N. S.; 1 August 1959; P. H. H. Gray (1 ♂). Round Hill, N. S.; 5 July 1931, 26 July 1939; H. Stultz (2 ♂). Constance Bay, Ontario; 18 July 1934; W. J. B. (1 ♂). Geraldton, Ont.; 14, 19 July 1955; A. B. Klots (1 ♂, 1 ♀). Mer Bleue near Ottawa, Ont., Canada; 10 July 1965; K. Sattler (1 ♂). Trenton, Ont., Can.; 24 June 1908; Evans (1 ♀). Kazubazua, Que.; 18 July 1955; F. A. Urquhart (1 ♂). Meach Lake, Que.; 28 June 1903; C. H. Young (1 ♂). Same locality; 25 June 1941; G. A. Hobbs (1 ♀). St. Hilaire, Q.; 7 July 1907; A. F. Winn (1 ♂). AMNH, BMNH, CNC, NSMS, ULK, USNM, VAB.

The amount of brownish-orange or red-brown scales on the forewings varies in extent and hue.

Dichomeris offula is most similar to *crepida,* but *crepida* has the light-colored scales on the forewing extending from the base of the wing nearly to the apex in a streaked pattern; *offula* has these scales confined to the area between ½ and ¾ the wing length.

Dichomeris crepida Hodges, NEW SPECIES
PL. 3, FIG. 22; PL. O, FIGS. 2, 4; PL. FF, FIG. 2.

Dichomeris crepida Hodges.
Type locality: McClellanville, South Carolina. [USNM]

Upper surface as figured. Haustellum and maxillary palpus mainly dark gray, individual scale bases paler yellowish gray; first and second segments of labial palpus mainly dark gray brown, many scales on ventral half light grayish orange, dorsal surface of scale tuft on second segment white, distal margin of second segment white, third segment uniformly pale yellow; frons mainly brownish orange, some individual scales paler, scales immediately in front of eye dark brown; vertex and occiput pale grayish orange above eye, darker gray brown medially, individual scales with pale apexes; antenna dark brown dorsally, pale yellow to yellowish gray ventrally, in male sensory areas broadly contiguous on first few segments then narrowly contiguous and finally separated by a row of scales on alternate half segments by ⅓ length, sensory setae slightly shorter than depth of segment from base to apex, in female antenna slightly lighter colored, sensory area small at base becoming broader by ½ length of antenna and separated by a row of scales on alternate half segments, sensory setae very short throughout; a row of light-brown scales behind eye. Tegula dark brown anteriorly, streaked with grayish orange and grayish brown dorsally. Dorsal surface of mesothorax dark brown along margins, streaked with grayish orange medially. Foreleg dark brown, apexes of tibia and tarsal segments white. Midleg similar to foreleg, coxa shining yellowish white and gray, apexes of tibial spurs pale yellowish gray, tibia and tarsus dark gray brown. Hindleg similar to midleg but generally paler; tibia mainly pale yellow with some gray scales, spurs contrasting shining dark gray; tarsus mottled dark gray and off-white, apexes of segments noticeably white. Abdomen shining pale yellow and yellowish gray on first three or four segments then darker yellowish gray, posterior margins of segments nearly uniformly pale yellowish gray; ventral surface mainly yellowish gray medially, darker gray laterally. Wing length 4.8–7.8 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

TYPES. Holotype: ♂. McClellanville, South Carolina; 20 March 1974; R. B. Dominick; at light.

USNM. Paratypes: 20 ♂, 9 ♀. Homestead, Fla.; 15 February 1967; D. O. Wolfenbarger (1 ♂). Royal Palm State Park, Florida; 18 January 1930; F. M. Jones (1 ♂). Same locality; 14 March 1938; E. P. Darlington (1 ♀). Edgard, St. John Par., Louisiana; 7 December 1975, 24 July, 12 September, 25 October 1981, 7 April, 19 August–9 September 1982; V. A. Brou (18 ♂, 7 ♀). Napoleonville, Assumption Par., La.; 18 June 1971; G. Strickland (1 ♀). ANSP, USNM, VAB.

In addition to variation in wing length specimens vary in the hue and quantity of pale scales on the head, forewings, and legs.

Dichomeris crepida is very closely allied with *offula* on genital characters; but the two species are abundantly distinct in habitus, as indicated in the key.

picrocarpa GROUP

Dichomeris picrocarpa is the only species in the group, and it is native to northern India, China, Korea, and Japan. It has been introduced into the northeastern United States. Adults lack an ocellus; males have a tuft of scales from the mesothoracic anepisternum; a pecten is well developed on the base of the cubitus of the hindwing; the vinculum has a distinct break in the saccal region and bears a pair of long lobes extending posteriorly from about the middle of the lateral arms; the juxta is a pair of lobes that arise from a lightly sclerotized base; the aedoeagus is free, lacks a cornutus, and has heavily sclerotized lobes from the zone; the base of corpus bursae is heavily sclerotized and lobed; a heavily sclerotized ring is at base of ductus seminalis; the anterior half of bursa copulatrix is nearly membranous with spiculose walls; anterior margin of sclerotized part of eighth tergite is deeply emarginate; the apophyses anteriores are very short and stout.

Dichomeris picrocarpa (Meyrick), NEW COMBINATION

PL. 3, FIG. 23. TEXT. FIG. 27 *a–d* (RWH 2309).

Carbatina picrocarpa Meyrick, 1913, *Jour. Bombay Nat. Hist. Soc.*, **22**: 182.
Type locality: Khasi Hills, Assam. [BMNH]

NOTE—The lectotype lacks an abdomen, and I have seen no additional specimens of *picrocarpa* from near the type locality. My identification of the species is based on specimens from Japan.

Trichotaphe iothalles Forbes, 1939, *Jour. New York Ent. Soc.*, **47**: 159.
Type locality: New Brunswick, New Jersey. [USNM]

Upper surface as figured. Haustellum dark gray brown on basal ⅗ becoming yellowish gray and dark gray to apex; lateral surface of maxillary palpus pale yellow, dark gray dorsally; outer surface of first segment of labial palpus dark brown, outer surface of second segment dark brown and dark orange or reddish orange, ventral margin mainly deep orange, inner surface of first and second segments pale orange dorsally, darker orange ventrally, slight dorsal scale tuft, third segment mainly dark brown, apex yellowish white or white; frons mainly dark brown, scales on mesial surface yellowish gray with shining reflections; vertex and occiput grayish orange above eye, gray brown medially, all with shining yellow and lavender reflections; antenna with dark-brown scape, alternating half rows of yellowish-gray and dark-gray scales on shaft, ventral surface uniformly pale grayish orange, in males sensory areas broad and broadly contiguous at base, narrowly contiguous to apex, sensory setae equal to depth of segment at base becoming shorter and equal to ⅔ segment at apex, in female sensory areas small and separate at base becoming broader by ⅓ length of antenna and yet broader and narrowly contiguous by ¾ length, sensory setae longer at apex than at base; ocellus absent; a row of dark-brown scales behind eye. Anterior margin of tegula dark brown, dorsal surface pale grayish orange. Dorsal surface of mesothorax pale orange laterally, dark brown medially, all with shining reflections. Male with tuft of yellowish-white scales from mesothoracic anepisternum. Foreleg dark gray brown, some pale-yellowish scales at apex of epiphysis; apexes of tarsal segments one, two, three, and five with scattered white or off-white scales. Midleg similar to foreleg but coxa shining yellowish white with yellow and lavender reflections; tibial spurs pale yellow dorsally, gray ventrally; apexes of all tarsal segments with white or off-white scales. Hindleg similar to midleg; dorsal half of tibia pale yellow, apexes of spurs white; first tarsal segment mottled dark gray brown and pale gray, apex of each segment white. Abdomen dark yellowish gray, posterior margin of segments on ventral surface pale yellowish gray. Wing length 6.9–8.8 mm. Male genitalia as figured; aedoeagus free, lacking cornutus, with well-developed lobes from zone; juxta with each lobe bifid apically; a pair of long, sclerotized lobes extending

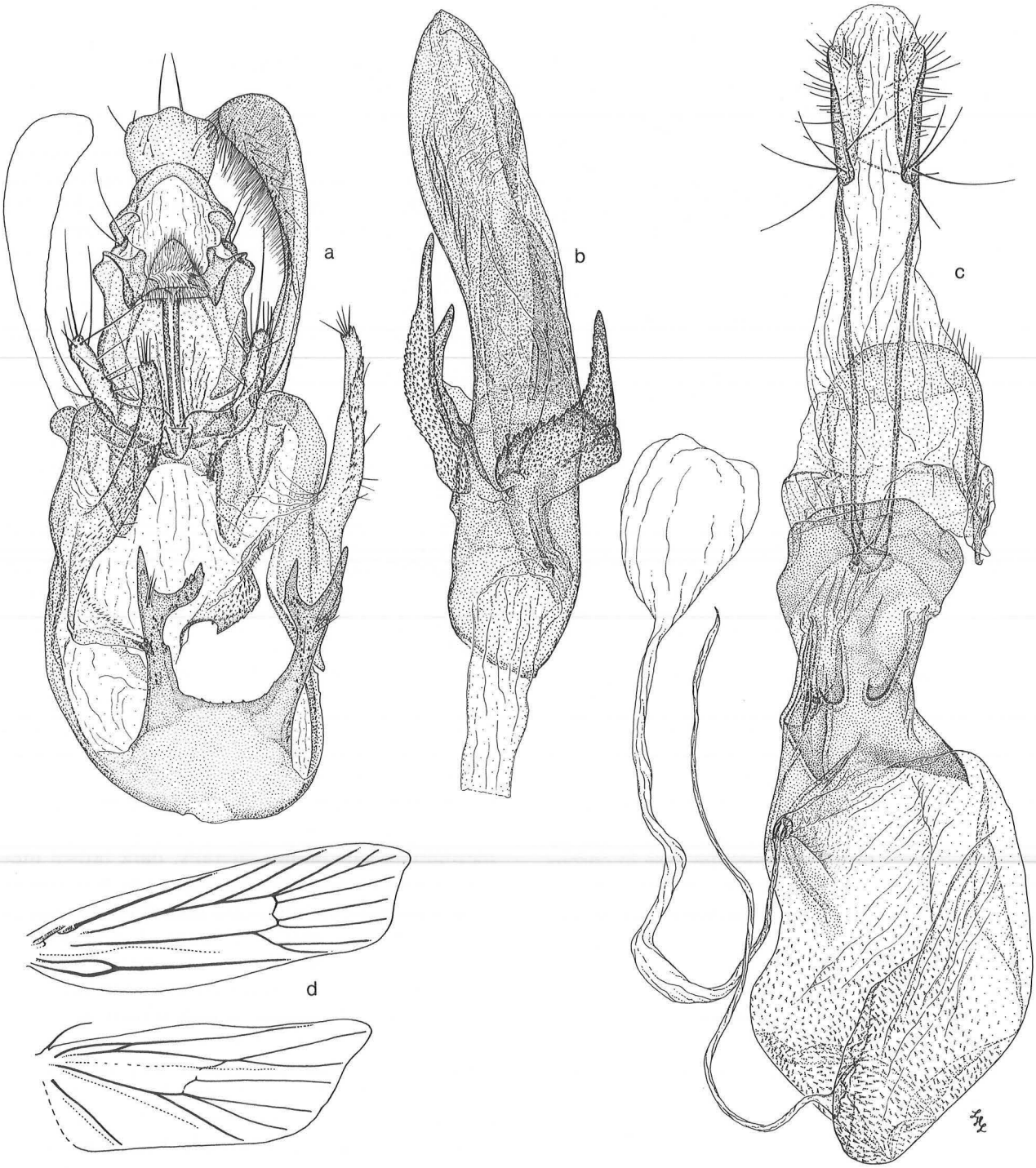

FIGURE 27: GENITALIA AND VENATION OF *DICHOMERIS PICROCARPA*

a. Male genital capsule (USNM 9257). *b.* Aedoeagus (USNM 9257).
c. Female genitalia (USNM 9258). *d.* Venation (USNM 9256).

posteriorly from middle part of vinculum; hook of gnathos long and relatively slender. Female genitalia as figured, antrum broad, basal part of corpus bursae heavily sclerotized, lacking sclerotized ridges, with many inwardly directed spinules on wall near origin of accessory bursa.

Fletcher (1932: 53) reported the larva feeding on peach in Japan. Okamoto (1941) said that it was a pest of peach in Korea. He presented a detailed life history and illustrated the larval chaetotaxy, pupa, and adult. Saito (1969: 111) gave a colored photograph of the larva and adult. In North America *picrocarpa* has been reared from cherry (by Colburn), red oak (by Latham), and white pine (by Englehardt); the last two records seem anomalous. A generalized life history is the adults emerge in early summer, eggs are laid on the stems or leaves, larvae hatch in late summer and enter diapause, larvae emerge from diapause the following spring, feed, and pupate.

Specimens vary in intensity of parts of the pattern but always are readily recognizable.

Dichomeris picrocarpa was introduced into North America (New York or New Jersey) probably from Japan in the late 1920's or early 1930's. The earliest records I have seen are from 1932 at New Brunswick, New Jersey. Subsequently, it has spread to Martha's Vineyard and Barnstable, Massachusetts; Ithaca, New York; and south to Montgomery and Prince George's counties, Maryland. The first records for suburban Washington are 1971.

sybilla GROUP

Dichomeris sybilla is the only species of the group, and it occurs in southern Arizona. It may prove to be a member of another group, but without males several important characters and character states cannot be observed. The second segment of the labial palpus is slightly thickened ventrally, and the dorsal surface has a slight scale tuft; the ocellus is present; a weak pecten is present on the base of the cubitus of the hindwing; the basal part of the bursa copulatrix is heavily sclerotized and has two or three major lobes; sclerotized ridges are absent; the distal part of the bursa copulatrix is lightly sclerotized; the bursa copulatrix lacks inwardly directed spinules; the eighth abdominal tergite has the anterior margin deeply emarginate and the posterior margin with medial, conical lobe; the apophyses anteriores are very short.

Dichomeris sybilla Hodges, NEW SPECIES
PL. 3, FIG. 24; PL. GG, FIG. 1.

Dichomeris sybilla Hodges.
Type locality: Madera Canyon, 4,880′, Santa Rita Mtns., Arizona. [CU]

Upper surface as figured. Base of haustellum dark grayish brown gradually becoming yellowish white; maxillary palpus dark grayish brown with a few off-white scales; first and second segments of labial palpus mainly dark brownish gray, apex of second segment off-white, second segment slightly tufted dorsally, third segment mottled brownish gray on anterior surface, pale yellowish white to yellowish gray on posterior surface, becoming darker apically; frons, vertex, and occiput mainly shining yellowish gray, apexes of scales tipped with a paler shade, scales above eye yellowish white to off-white, a broad band of brown scales in front of eye between base of antenna and haustellum; scape of antenna yellowish gray dorsally, a short patch of brown scales at base on anterior margin, ventral surface pale yellowish gray, shaft mainly yellowish gray and darker yellowish gray, alternate half segments dark and pale on distal half, sensory areas restricted to anterior part of alternate half segments in female, sensory cilia short; ocellus present; a row of brown scales behind eye. Tegula shining yellowish gray. Dorsal surface of mesothorax pale yellowish gray. Foreleg mainly shining yellowish gray, apexes of coxa, tibia, and first two tarsal segments slightly paler. Midleg similar to foreleg but coxa and femur paler. Hindleg with coxa shining yellowish white, rest of leg mainly shining yellowish gray. Wing length 5.8 mm. Hindwing with pecten on base of cubitus. Male genitalia: no specimens available. Female genitalia as figured; antrum heavily sclerotized with several parts of outer margin even more heavily sclerotized; a broad, digitate process extending toward posterior end of antrum; ductus bursae with two heavily sclerotized bands; posterior wall of antrum with two semicircular indentations; caudal margin of eighth tergum developed medially as a broadly rounded triangle.

The immature stages are unknown.

TYPE. Holotype: ♀. Madera Canyon, 4,880′, Santa Rita Mtns., Arizona; 30 July 1959; R. W. Hodges; USNM genitalia slide 9191. CU.

Sybilla might be confused with a dark specimen of *punctidiscella,* but the lack of a ventral scale tuft on the second segment of the labial palpus is distinctive for *sybilla.* The combination of the lack of a ventral scale tuft on the second segment of the labial palpus and presence of a poorly developed

tuft dorsally, the presence of a cubital pecten, the produced eighth tergum in the female, and the heavily sclerotized antrum separate *sybilla* from other North American *Dichomeris* species. Knowledge of characters of the male should be helpful to associate *sybilla* with other species.

GENUS

Helcystogramma Zeller

Ceratophora Heinemann, 1870, *Die Schmetterlinge Deutschlands und der Schweiz,* part 2, **2**(1): 325.

Type species: *Recurvaria rufescens* Haworth, 1828. Designated by Walsingham (1911), *Biologia Centrali-Americana. Insecta. Lepidoptera-Heterocera,* **4**: 84.

NOTE—*Ceratophora* Heinemann, 1870 is a junior homonym of *Ceratophora* Gray [1835] in the Reptilia.

Helcystogramma Zeller, 1877, *Horae Soc. Ent. Rossicae,* **13**: 369. REVISED STATUS.

Type species: *Gelechia* (*Helcystogramma*) *obseratella* Zeller, 1877, now considered to be a junior synonym of *Gelechia hibisci* Stainton, 1859. Designated by Meyrick, 1910, *Ent. Mo. Mag.,* **46**: 282.

NOTE—*Helcystogramma* has been treated as a junior subjective synonym of *Onebala* Walker, 1864, following Meyrick (1925: 137). The type species of the two genera, *hibisci* and *blandiella* Walker, 1864, are extremely similar in characters other than the genitalia and abdominal support structure. Examination of the type specimen of *Onebala blandiella* by K. Sattler (in litt.) revealed that it is a lecithocerine. Thus, the genus *Onebala* is transferred to the Lecithocerinae. The following list of world species of *Helcystogramma* will enable a better understanding of the genus and its distribution.

abortivum (Walsingham), NEW COMBINATION. (*Dichomeris abortiva* Walsingham, 1911: 98). Guatemala.

adaequatum Meyrick, REVISED COMBINATION. (*Helcystogramma adaequata* Meyrick, 1914: 271). British Guiana.

archigraphum (Meyrick), NEW COMBINATION. (*Onebala archigrapha* Meyrick, 1929: 508). Colombia.

armatum (Meyrick), REVISED COMBINATION. (*Strobisia armata* Meyrick, 1911: 728). Assam.

arotraeum (Meyrick), NEW COMBINATION. (*Cladodes arotraea* Meyrick, 1894: 15). Burma.

aruritis (Meyrick), NEW COMBINATION. (*Brachmia aruritis* Meyrick, 1911: 723). Ceylon.

balteatum (Meyrick), NEW COMBINATION. (*Strobisia balteata* Meyrick, 1911: 732). Khasis, India.

brabylitis (Meyrick), REVISED COMBINATION. (*Strobisia brabylitis* Meyrick, 1911: 729). N. Coorg, India.

brunneotinctum (Janse), NEW COMBINATION. (*Onebala brunneotincta* Janse, 1954: 393). S. Africa.

carycastis Meyrick, REVISED COMBINATION. (*Helcystogramma carycastis* Meyrick, 1922: 104). Brazil.

cerinura (Meyrick), NEW COMBINATION. (*Brachmia cerinura* Meyrick, 1923: 47). Brazil.

chalyburgum Meyrick, REVISED COMBINATION. (*Helcystogramma chalyburga* Meyrick, 1922: 103). Brazil.

conturbatum (Meyrick), NEW COMBINATION. (*Brachmia conturbata* Meyrick, 1933: 359). Sierra Leone.

craticulum (Meyrick), NEW COMBINATION. (*Brachmia craticula* Meyrick, 1921: 90). East Africa.

cricopum (Meyrick), NEW COMBINATION. (*Brachmia cricopa* Meyrick, 1911: 274). Seychelles.

crypsinomum (Meyrick), NEW COMBINATION. (*Brachmia crypsinoma* Meyrick, 1929: 527). Thailand.

delocosma (Meyrick), NEW COMBINATION. (*Onebala delocosma* Meyrick, 1936: 46). Java.

deltophorum (Janse), NEW COMBINATION. (*Zalithia deltophora* Janse, 1954: 397). S. Africa.

digitatum (Meyrick), NEW COMBINATION. (*Onebala digitata* Meyrick, 1914: 200). Nyasaland.

engraptum (Meyrick), NEW COMBINATION. (*Brachmia engrapta* Meyrick, 1918: 114). India.

fiscinatum (Meyrick), NEW COMBINATION. (*Brachmia fiscinata* Meyrick, 1918: 26). S. Africa.

graphicodes (Meyrick), NEW COMBINATION. (*Brachmia graphicodes* Meyrick, 1914: 194). S. Africa.

hapalyntis (Meyrick), NEW COMBINATION. (*Brachmia hapalyntis* Meyrick, 1911: 724). Ceylon.

hemiopum (Meyrick), NEW COMBINATION. (*Brachmia hemiopa* Meyrick, 1921: 90). Rhodesia.

hoplophorum Meyrick, REVISED COMBINATION. (*Helcystogramma hoplophora* Meyrick, 1916: 577). Burma.

idiastis (Meyrick), NEW COMBINATION. (*Brachmia idiastis* Meyrick, 1916: 577). India.

ineruditum (Meyrick), NEW COMBINATION. (*Brachmia inerudita* Meyrick, 1926: 290). E. Siberia.

infibulatum Meyrick, REVISED COMBINATION. (*Helcystogramma infibulata* Meyrick, 1916: 577). Ceylon.

juventellus (Walsingham), NEW COMBINATION.

(*Ypsolophus juventellus* Walsingham, 1897: 86). Jamaica.

leucoplectum (Meyrick), NEW COMBINATION. (*Strobisia leucoplecta* Meyrick, 1911: 729). Ceylon.

leucopleurum (Meyrick), NEW COMBINATION. (*Teuchophanes leucopleura* Meyrick, 1914: 274). Br. Guiana.

lineolella (Zeller), NEW COMBINATION. (*Gelechia lineolella* Zeller, 1839: 197). Europe.

lithostrotum Meyrick, REVISED COMBINATION. (*Helcystogramma lithostrotum* Meyrick, 1916: 578). Perak.

lochistis (Meyrick), NEW COMBINATION. (*Brachmia lochistis* Meyrick, 1911: 723). Ceylon.

luminosum (Busck), NEW COMBINATION. (*Dichomeris luminosum* Busck, 1914: 19). Panama.

lutatella (Herrich-Schäffer), NEW COMBINATION. (*Anacampsis lutatella* Herrich-Shäffer, 1854: 201). Europe.

lyrella (Walsingham), NEW COMBINATION. (*Dichomeris lyrella* Walshingham, 1911: 101). Guatemala.

macroscopum (Meyrick), NEW COMBINATION. (*Brachmia macroscopa* Meyrick, 1932: 206). Japan.

malacogrammum (Meyrick), NEW COMBINATION. (*Brachmia malacogramma* Meyrick, 1910: 14). Transvaal.

meconitis (Meyrick), NEW COMBINATION. (*Trichotaphe meconitis* Meyrick, 1913: 176). Argentina.

melissium (Walsingham), NEW COMBINATION. (*Dichomeris melissia* Walsingham, 1911: 97). Panama.

metallicum (Walsingham), NEW COMBINATION. (*Strobisia metallica* Walsingham, 1891: 97). Gambia.

microsemum (Meyrick), NEW COMBINATION. (*Brachmia microsema* Meyrick, 1911: 274). Seychelles.

musicopum (Meyrick), NEW COMBINATION. (*Brachmia musicopa* Meyrick, 1908: 727). Transvaal.

nesidias (Meyrick), NEW COMBINATION. (*Brachmia nesidias* Meyrick, 1911: 273). Seychelles.

neurograptum (Meyrick), NEW COMBINATION. (*Brachmia neurograpta* Meyrick, 1921: 91). Rhodesia.

obfuscatum (Meyrick), NEW COMBINATION. (*Brachmia obfuscata* Meyrick, 1921: 436). Queensland, Australia.

obscuratum (Meyrick), REVISED COMBINATION. (*Strobisia armata* var. *obscurata* Meyrick, 1911: 728). Khasis, India.

obsoletum (Janse), NEW COMBINATION. (*Onebala obsoleta* Janse, 1954: 392). S. Africa.

octophorum (Meyrick), NEW COMBINATION. (*Brachmia octophora* Meyrick, 1918: 25). Natal.

pantheropum (Meyrick), NEW COMBINATION. (*Brachmia pantherhopa* Meyrick, 1913: 296). S. Africa.

philomusum (Meyrick), NEW COMBINATION. (*Brachmia philomusa* Meyrick, 1918: 114). Ceylon.

phryganitis (Meyrick), NEW COMBINATION. (*Brachmia phryganitis* Meyrick, 1911: 722). Ceylon.

rufescens (Haworth), NEW COMBINATION. (*Recurvaria rufescens* Haworth, 1828: 555). Britain.

septella (Zeller), NEW COMBINATION. (*Gelechia* (*Nothris*) *septella* Zeller, 1852: 108). Natal.

sertigerum Meyrick, REVISED COMBINATION. (*Helcystogramma sertigera* Meyrick, 1923: 27). Peru.

simplex (Walsingham), NEW COMBINATION. (*Onebala simplex* Walsingham, 1900: 2). Sokotra.

spilopis (Meyrick), NEW COMBINATION. (*Brachmia spilopis* Meyrick, 1927: 356). Rhodesia.

symbolicum Meyrick, REVISED COMBINATION. (*Helcystogramma symbolica* Meyrick, 1914: 270). British Guiana.

tegulella (Walsingham), NEW COMBINATION. (*Trichotaphe tegulella* Walsingham, 1897: 83). Grenada.

thesmiopa (Meyrick), NEW COMBINATION. (*Dichomeris thesmiopa* Meyrick, 1922: 114). Brazil.

trianulella (Herrich-Schäffer), NEW COMBINATION. (*Anacampsis trianulella* Herrich-Schäffer, 1854: 201). Europe.

trichocyma (Meyrick), NEW COMBINATION. (*Brachmia trichocyma* Meyrick, 1923: 47). Brazil.

trigonellum (Walsingham), NEW COMBINATION. (*Trichotaphe trigonella* Walsingham, 1892: 523). St. Vincent.

verberata (Meyrick), NEW COMBINATION. (*Brachmia verberata* Meyrick, 1912: 68). S. Africa.

virescens (Walsingham), NEW COMBINATION. (*Brachmia virescens* Walsingham, 1911: 84). Mexico.

xerastis (Meyrick), NEW COMBINATION. (*Torodora xerastis* Meyrick, 1905: 599). Punjab, India.

zulu (Walsingham), NEW COMBINATION. (*Gelechia zulu* Walsingham, 1881: 261). Africa.

Teuchophanes Meyrick, 1914, *Trans. Ent. Soc. London,* **1914**: 274. NEW SYNONYMY.
Type species: *Teuchophanes leucopleura* Meyrick, 1914, now considered to be a junior synonym of *Dichomeris luminosa* Busck, 1914. Monotypy.

Psamathoscopa Meyrick, 1937, *Exotic Microlepidoptera,* **5**: 96. NEW SYNONYMY.

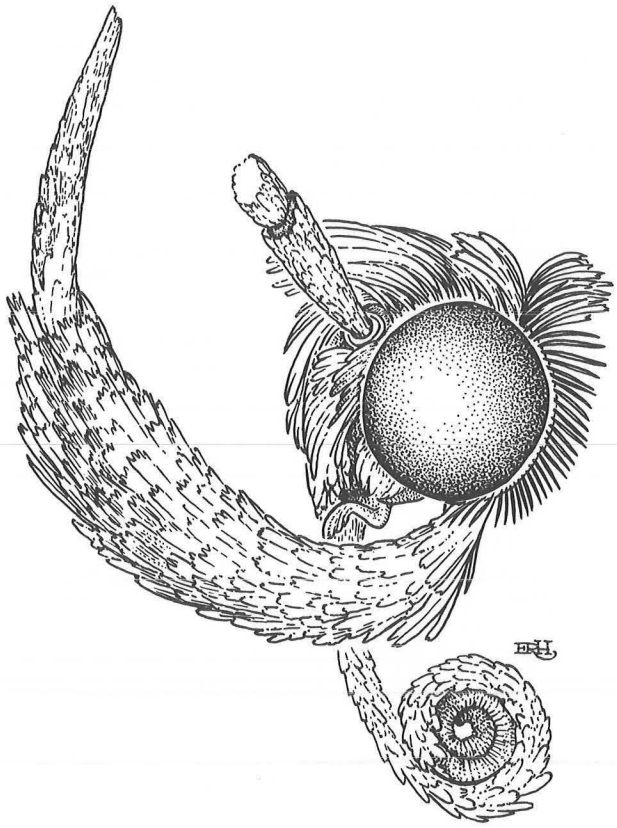

FIGURE 28: LATERAL VIEW OF HEAD OF *HELCYSTOGRAMMA FERNALDELLA*

Type species: *Onebala simplex* Walsingham, 1900. Original designation.

Helcystogramma is a large genus with at least 75 species; nine species occur in America north of Mexico. The ranges of most species are not well known; however, *badium* occurs on the West Coast, *chambersella* from Washington, D.C. to coastal California, *cascum* in the northern and central Rocky Mountains, *ectopon* in the northern great plains, *melantherella* in the Southeast, *melanocarpum* from Nova Scotia and South Carolina to Texas, *hystricella* from Kentucky to Missouri and Arkansas, and *fernaldella* from Nova Scotia to the Rocky Mountains and then north to Alaska. Elsewhere, species are generally distributed, but none is known from New Zealand or Hawaii.

In North America species of *Helcystogramma* can be recognized by the combination of stalked, or connate, and downcurved CuA_1 and CuA_2 in the forewing, lack of ocellus, labial palpus sickle shaped and second segment without well-developed scale tufts, and male with a secondary radial retinaculum. *Helcystogramma* is most closely allied with *Brachmia,* and many of the species have been described or subsequently placed in *Brachmia.* Janse (1954: 307) noted differences between the type species of *Brachmia* and the South African species that he treated as *Brachmia* and concluded "it may well be that there are no true *Brachmia* in South Africa . . . ."

The three species of *Brachmia* (*dimidiella* (Denis & Schiffermüller), *inornatella* (Douglas), and *blandella* (Fabricius)) are found in the Palearctic Region. Major differences between the two genera are the presence of a subradial retinaculum and absence of a juxta in males of *Helcystogramma*; *Brachmia* males lack the secondary retinaculum and have a well-developed juxta. Females of *Helcystogramma* have paired, often pointed sclerites in the dorsal wall of the antrum; these are lacking in *Brachmia.*

Characters of *Helcystogramma* are labial palpus sickle shaped, second segment without prominent scale tufts; ocellus absent; male without scale tuft from mesothoracic anepisternum, sometimes with scale tuft from metathoracic anepisternum; hindtibia with weak dorsal scale tuft; forewing with R_3 separate or stalked with R_{4+5}; male with secondary radial retinaculum; hindwing without pecten on cubitus; vinculum nearly acute in saccal area, with broad-based paired lobes arising from lateral arms, apex of each lobe heavily sclerotized and directed mesially, inner margin of each lobe heart shaped; aedoeagus free, usually without cornuti; valva with lobe extending from mesial surface at base; gnathos a strong, relatively long hook; uncus broad based, usually becoming narrow and then broadening to rounded or truncated apex; appendix appendicular often with tuft of very long scales; tegumen and vinculum not articulating but connected by appendix appendicular; apophyses relatively short, apophyses anteriores shorter than apophyses posteriores; eighth sternite usually without sclerotized plates; dorsal wall of antrum with paired sclerites terminating anteriorly as points, surface with short spicules; slightly anterad in ductus bursae a pair of short, lightly sclerotized plates; ductus bursae defined; corpus bursae with accessory bursa, wall usually with patches of spicules that sometimes define a signum. Males may have secondary sex scales on the undersurface of the forewing at the base and on the second abdominal sternum.

Helcystogramma larvae are leaf rollers and tiers on Gramineae, Convolvulaceae, and Compositae.

All the species are variable in color pattern. Genital characters do not appear to support recognition of some species, but other characters do. *Fernaldella*

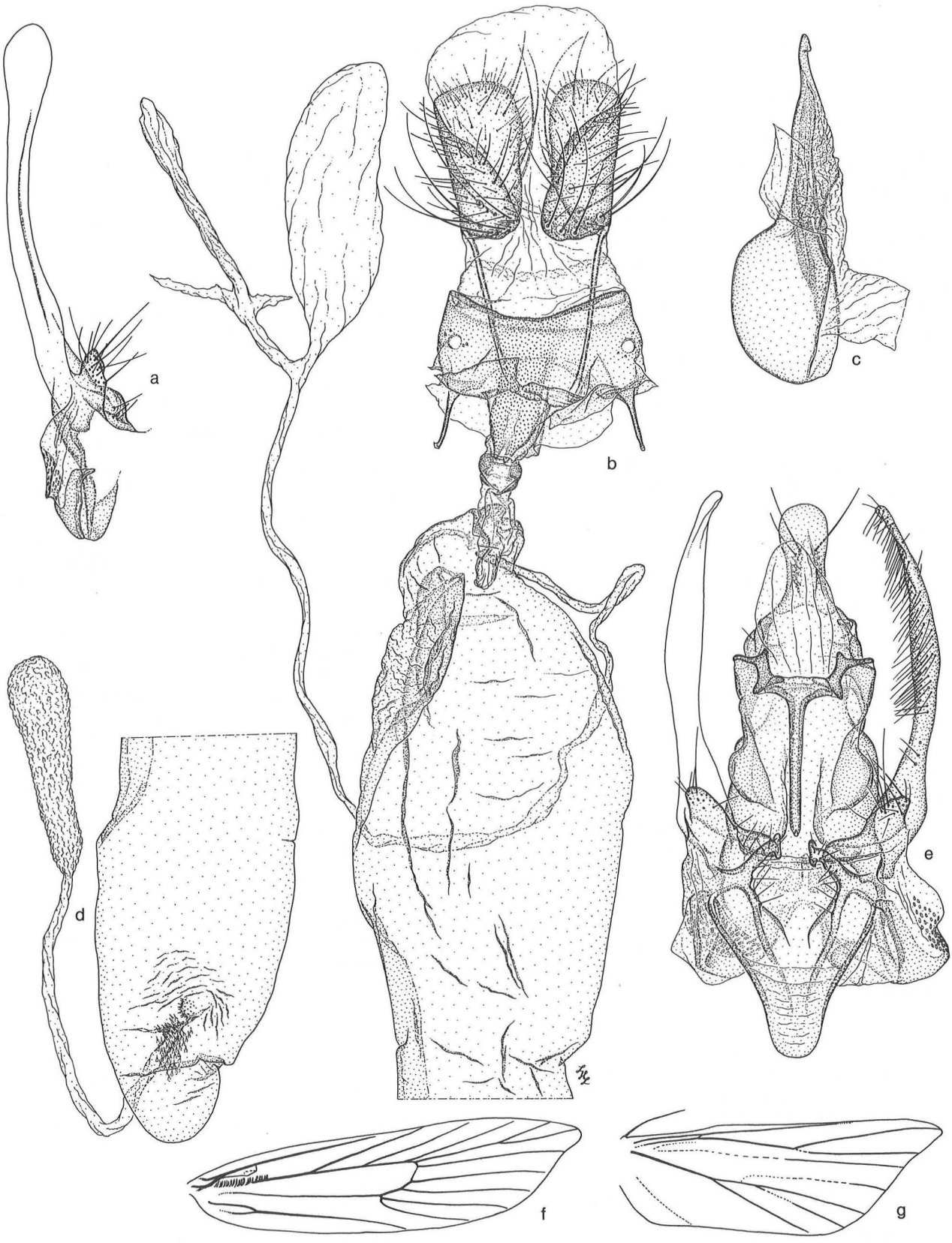

FIGURE 29: GENITALIA AND VENATION OF *HELCYSTOGRAMMA*

a–e. Helcystogramma melantherella, a. Left valva (USNM 10607); *b, d.* Female genitalia (USNM 10963); *c.* Aedoeagus (USNM 10962); *e.* Male genital capsule (USNM 10962). *f, g. Helcystogramma fernaldella* venation (USNM 12387).

and *cascum* are a species' pair that appear to be inseparable on genital characters.

I have been unable to recognize *Gelechia discoanulella* Chambers (1875: 254). Meyrick (1925: 249) placed it in *Brachmia,* and subsequent authors have done the same. In the original description Chambers indicated, "Basal half of the antennae thick, apical half narrowing rapidly to the apex, the basal half with large joints, those of the apical half short and closely set." These character states are unknown for any *Helcystogramma* or other North American Gelechiidae to date. For this reason I transfer *discoanulella* Chambers to *Gelechia* as an unrecognized species with the anticipation that some gelechiid will be found to have such an antenna and that the name then can be applied.

KEY TO SPECIES OF *HELCYSTOGRAMMA*

1. Forewing dark colored, usually brown; pattern without streaks paralleling veins 2
— Forewing pale colored, white, gray, yellowish, or orange, pattern usually with streaks paralleling veins 4

2. Tegula with a white line extending from middle of anterior margin toward mesial margin ... . *convolvuli* p. 133
— Tegula without a white line 3

3. Forewing with brownish-orange spots (one at end of cell, one at ⅔ length of cell, one on fold at ¾ length of fold), male with scale tuft from metathoracic anepisternum, Nebraska in Niobrara River gallery forest ..... *ectopon* p. 131
— Forewing with three dark-brown spots, male without scale tuft from metathoracic anepisternum, southeastern US ..... *melantherella* p. 128

4. Forewing streaked reddish orange, brownish orange, and pale yellow; bases of scales in fringe of outer margin pale yellow, contrasting with dark-brown-tipped scales on outer margin .. .. *hystricella* p. 129
— Lacking this combination of characters 5

5. Wing length 3.6–4.8 mm; spot at end of cell present but faint; forewing with white, or pale-gray, and dark-brown streaks paralleling veins, a row of dark-brown-tipped scales on outer margin followed by white-based scales on fringe ..... *chambersella* p. 131
— Not this combination of characters, wing length nearly always greater 6

6. Forewing light grayish orange or grayish red (nearly orange gray or reddish gray) with three prominent dark-brown spots (largest one at end of cell, one just beyond ½ length of cell, and one at ⅔ length of fold), and with about eight dark-brown spots around outer margin of wing, Nova Scotia and coastal South Carolina west to Texas ..... *melanocarpum* p. 130
— Lacking this combination of characters 7

7. Forewing pale orange to grayish orange, with three faint-brown spots (one at end of cell, one beyond middle of cell, and one at ⅔ length of fold); southern British Columbia south to central Utah and southern California ..... *badium* p. 128
— Not this combination of characters; forewing, head, and thorax white or gray 8

8. Forewing gray, faintly streaked with gray brown and off-white; third segment of labial palpus nearly as long as second segment, scales on anterodorsal margin of second segment terminating at end of segment; Newfoundland and New York west to the Black Hills, South Dakota, western Alberta, and College, Alaska .. .. *fernaldella* this page
— Forewing appearing white or white lightly streaked with gray (pale-yellow streaks visible under magnification); third segment of labial palpus about ⅔ length of second segment, second segment with slight anterodorsal scale tuft extending beyond base of third segment; southern British Columbia south to central Colorado, northern Utah, and central Oregon (one record from Saskatoon, Saskatchewan) .... *cascum* p. 127

Helcystogramma fernaldella (Busck), NEW COMBINATION
PL. 3, FIGS. 25–27; PL. O, FIG. 5; PL. GG, FIG. 2. TEXT FIG. 29 *f, g* (RWH 2267).

Trichotaphe fernaldella Busck, 1903, *Proc. U. S. Natl. Mus.,* **25**: 915.
Type locality: Orono, Maine. [USNM]

Upper surface as figured. Haustellum very pale yellowish gray; maxillary palpus white; outer surface

of labial palpus mainly white dorsally and posteriorly, mottled white and yellowish gray ventrally and anteriorly, inner surface nearly uniformly white, some scales tinged darker yellowish gray, anterior surface of third segment and anteroventral margin of second segment white, third segment nearly as long as second segment; frons, vertex, and occiput white, some slightly darker based scales in front of eye; scape of antenna white on anterior and ventral surfaces, gray dorsally, shaft mainly gray, in male sensory setae about half depth of segments, sensory areas broad and very narrowly contiguous from base to apex, partially separated by row of scales on alternate half segments, in female sensory setae very short at base, becoming longer to apex, sensory areas very small on basal three segments, becoming larger and finally narrowly contiguous on distal ⅕ of shaft. Tegula mottled gray brown and off-white, paler on posterior part. Mesothorax mainly white with some gray-brown scales medially. Foreleg mainly dark gray; coxa, femur, and tibia with pale-based scales, anterior and posterior margins narrowly off-white; tarsal segments gray brown, dorsal surface of tibia and first two tarsal segments white, white sometimes extending to fifth segment. Midleg similar to foreleg, generally paler, coxa white. Hindleg coxa white; femur yellowish white with some gray-tipped scales; tibia pale yellowish gray with darker tipped scales, spurs mainly gray laterally; tarsal segments mainly pale yellowish gray with some darker tipped scales. Metathorax in male without tuft of scales from anepisternum. Abdomen dingy yellowish gray, posterior margins of segments uniformly colored, posterolateral margin of first tergite without scales. Wing length 6.7–8.8 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

Helcystogramma fernaldella varies from pale to dark gray; some specimens from Nova Scotia are nearly uniformly dark gray, and the hindwings are darker than the forewings. The three spots on the forewing sometimes are very prominent, sometimes only the one at the end of the cell is visible. In the female the rounded, inwardly directed sclerites that comprise the signum may be posterad of the origin of the accessory bursa or surround it.

Fernaldella is very similar to some specimens of *cascum,* particularly those that have streaking on the forewings. Normally, *fernaldella* appears gray streaked with white; *cascum* appears white streaked with pale gray. *Cascum* has pale-yellow streaks; *fernaldella* has gray streaks when viewed through the microscope. Characters of the labial palpus given in the key appear to be diagnostic for the species. Genital characters have not been found to differentiate between them.

Fernaldella occurs from southwestern Newfoundland across Canada and the northern United States to the Black Hills, South Dakota and Rocky Mountains in Canada. One specimen is from Dawson, Yukon; and one is from College, Alaska. Adults have been collected from early May to late July; they appear to be most common during the last half of May and in June.

Helcystogramma cascum (Braun), NEW COMBINATION

PL. 3, FIGS. 28, 29; PL. O, FIG. 6 (RWH 2264).

Brachmia casca Braun, 1925, *Trans. Amer. Ent. Soc.,* **51**: 196.

Type locality: Logan Canyon near Cottonwood Canyon [Cache County], Utah. [ANSP]

Upper surface as figured. Haustellum, maxillary palpus, labial palpus, and head white, some scales with dingy yellowish-gray cast, particularly on outer surface of labial palpus; labial palpus evenly curved on ventral and anterior surface; second segment with slight dorsomesial scale tuft, scales parallel with segment and extending slightly beyond apex of segment, third segment about ⅔ length of second segment; antenna mainly white, dorsal surface of scape with some yellow-tipped scales, in male sensory setae about ½ depth of segments, sensory areas broad and very narrowly contiguous from base to apex, in female sensory setae very short, slightly longer at apex, sensory areas very narrow and small on basal three or four segments, becoming broader until very broad and narrowly contiguous on distal ¼ of shaft. Tegula and mesothorax white. Legs very pale grayish yellow. Male without scale tuft from metathoracic anepisternum. Abdomen pale yellow, slightly darker on ventral surface; ventrolateral margin of first tergite naked. Wing length 8.0–9.0 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

Helcystogramma cascum varies in color from pure white with very pale yellow streaking to grayish yellow with darker streaking between the veins.

Cascum and *fernaldella* are separable as indicated in the key and under *fernaldella.*

Cascum has been collected in southern Saskatchewan and British Columbia and south along the Rocky Mountains to Colorado and northern Utah and in Oregon. Adults have been collected from 27

June to 2 August. The largest series of specimens was collected in central Colorado at elevations of 7,000–8,700 feet from 2–15 July.

Helcystogramma badium (Braun), NEW COMBINATION
PL. 3, FIG. 30; PL. HH, FIG. 2 (RWH 2263).

Brachmia badia Braun, 1921, *Ent. News,* **32**: 12.
Type locality: Fredalba [San Bernardino Co.], California. [ANSP]

Upper surface as figured. Haustellum light brown, many scale bases pale orange; maxillary palpus pale yellow to yellowish orange; labial palpus light brown, most scale bases paler, a white line on ventral margin of second segment and anterior margin of third segment, dorsomesial surface of second segment with a slight scale tuft, scales slightly exceeding apex of segment; frons pale grayish orange; vertex and occiput grayish orange; scape of antenna white on anterior margin and ventrally, brown on dorsal surface and between white areas ventrally, shaft alternating pale orange and darker gray orange, in male sensory setae about ⅔ depth of basal segment, becoming shorter to apex, sensory areas very broad basally and narrowly separated by row of scales on first three segments then separated by row of scales on alternate half segments to apex, in female sensory setae very short, sensory areas very small on basal three segments, becoming larger and finally very narrowly contiguous at apex, each area separated by a row of scales on alternate half segments. Tegula and mesothorax mainly grayish orange, apex of mesothorax paler. Foreleg mainly grayish brown, most scale bases paler; dorsal surface of femur, tibia, and tarsus white. Midleg coxa pale yellow; femur, tibia, and tarsus grayish brown to light brown; apexes of tarsal segments off-white. Hindleg similar to midleg but much paler; outer surface of tibial spurs gray brown; tarsal segments with some gray-brown scales on dorsal surface of second, third, and fourth segments. Male without tuft of scales from metathoracic anepisternum. Abdomen pale yellow to pale orange, somewhat blotched and darker colored ventrally. Wing length 5.8–7.6 mm. Male and female genitalia as illustrated.

The immature stages are unknown.

Badium varies in intensity and hue from yellowish orange or pale orange to grayish orange. The two basal spots on the forewing may be very faint, and the series of dark-brown spots on the outer margin may be well defined or nearly absent.

The color and female genitalia immediately separate *badium* from the other species of *Helcystogramma.* Busck misidentified *badium* as *Trichotaphe trimaculella* (Chambers, 1874) according to his identification label of 1904. This has caused some confusion because Braun was unaware of the misidentification and did not clarify the situation when she described *badium.* Specimens of *badium* most often have been identified as *trimaculella* if they were identified.

Badium occurs from southern British Columbia (particularly southern Vancouver Island) to San Diego, California and in the Wasatch Mountains of central Utah. Adults have been collected from 1 June to 6 September with the peak in July and August. It was a common species at light in Ephraim Canyon of the Wasatch Mts. between 7,000 and 8,850 feet elevation in July.

Helcystogramma melantherella (Busck), NEW COMBINATION
PL. 3, FIGS. 31, 32. TEXT FIG. 29 *a–e* (RWH 2270).

Trichotaphe melantherella Busck, 1900, *Proc. U. S. Natl. Mus.,* **23**: 232, pl. 1, fig. 7.
Type locality: Palm Beach, Florida. [USNM]
NOTE—The lectotype ♂, present designation, bears the following labels: 1. "877 Fla iss Mar 13. 1900"; 2. "Palm Beach Fla"; 3. "Type No. 4939 U.S.N.M."; 4. "*Trichotaphe melantherella* Type Busck"; 5. "Genitalia Slide By RWH ♂ USNM 10,549"; 6. "♂ genitalia slide 4794 R W Hodges"; 7. "LECTOTYPE ♂ *Trichotaphe melantherella* Busck by R. W. Hodges."

Upper surface as figured. Haustellum and maxillary palpus mottled orange white and brown; labial palpus with slight scale tuft on dorsomesal surface of second segment, first and second segments mainly mottled orange white and brown, dorsal surface paler, third segment nearly uniformly dark brown, some orange-white tipped scales at apex, a row of orange-white scales on anterior margin; frons grayish orange medially, slightly darker immediately in front of eye; vertex and occiput grayish brown, apexes of scales pale orange; scape of antenna brown dorsally, orange gray ventrally, shaft alternating parts of scale rows orange gray and darker grayish brown, in male ventral surface light orange, sensory setae about ⅓ depth of segments, sensory areas broad, separated by row of scales on alternate half segments, in female sensory setae very short, sensory areas very small at base, somewhat wider at apex. Tegula and dorsal surface of mesothorax light brown, apexes of scales

light orange, particularly posteriorly. Legs mainly mottled off-white and brown, appearing dark. Foreleg with apex of tibia off-white; apexes of first, second, fourth, and fifth tarsal segments off-white, most of first and second segments and nearly all of fifth segment with frosting of white scales. Midleg tibia with oblique band of white-tipped scales at ⅔ length and at apex; apexes of tarsal segments one, two, four, and five off-white. Hindleg slightly paler than preceding legs, dorsal scale tuft on tibia pale orange or yellowish white, apexes of all tarsal segments with pale scales. Male without tuft of scales from metathoracic anepisternum. Abdomen mottled orange white and darker orange gray; ventral surface with paired, lateral areas of gray-brown tipped scales. Wing length 4.7–7.0 mm. Male genitalia as illustrated, saccal region of vinculum rounded, uncus slender before rounded apex. Female genitalia as illustrated; anterior margin of eighth tergite broadly indented medially; ductus bursae short; corpus bursae long, slender; ductus seminalis arising near inception of ductus bursae; accessory bursa arising near anterior end of corpus bursae.

Larvae fold leaves of the composites, *Calyptocarpus vialis* Lessing, *Cynara scolymnus* Linnaeus, *Melanthera nivea* (Linnaeus) Small (Busck, 1900: 232), and *Xanthium strumarium* Linnaeus (Brown and Allen, 1974: 169), and the legume *Arachis hypogaea* Linnaeus. Busck (1900: 232) described the larva, "Front of head light brown, posteriorly black. Next 5 joints rich brown, thoracic shield lighter brown, edged with black, first and second abdominal segments (the last two brown ones) with large transverse dorsal velvety black spot. Remaining segments green; segments 7 and 8 (head counted as the first) with black semicircular line across pointing backward and reaching down to abdominal legs; also a short transverse black dorsal line behind the curved one; segment 9 all black above; rest of segments with the black predominating in streaks and dots. All legs black."

Adults of *melantherella* are variable to the point of confusion. Genital characters are very uniform. The labial palpus varies in length relative to the head, second and third segments may have a well-developed line on the anteroventral margin; some specimens are nearly uniformly grayish brown and the dark-brown spots on the outer margin are poorly defined, others have many grayish-red or light-orange scales in a blotchy pattern on the forewings and the dark-brown spots on the outer margin are well defined. The very small specimens were reared and may reflect partial starvation of the larvae.

The long, slender corpus bursae, points of origin of the ductus seminalis and accessory bursa, and the rounded uncus relate *melantherella* to *fernaldella* and *cascum*. *Melantherella* is distinct in color as indicated in the key.

Melantherella occurs from North Carolina to Florida and west around the Gulf to Brownsville, Texas and north to Dumas, Arkansas. It may have more than one brood per year; adults have emerged in March, June, and August. It overwinters as an adult and has been found in houses in Mississippi commencing in September and Louisiana in March.

Helcystogramma hystricella (Braun), NEW COMBINATION

PL. 3, FIG. 33; PL. HH, FIG. 1 (RWH 2268).

Brachmia hystricella Braun, 1921, *Ent. News* **32**: 11.

Type locality: Cincinnati, Ohio. [ANSP]

Upper surface as figured. Haustellum pale orange white; maxillary palpus slightly paler than haustellum; labial palpus mainly pale orange to grayish orange, many scale bases paler, a yellowish-white line on anterior surface of third segment and anteroventral surface of second segment; frons pale orange white; vertex and occiput orange brown; antenna dark gray dorsally, a yellowish-white line on anteroventral surface from base to about ⅔ length, in male sensory setae about ⅔ depth of segment at base becoming ½ depth of segment to apex, sensory areas broad and narrowly contiguous on basal four or five segments, then separated by row of scales on alternate half segments, in female sensory setae very short, sensory areas very narrow but narrowly contiguous on basal five or six segments, becoming slightly larger to apex. Tegula and dorsal surface of mesothorax orange brown, lateral margin of tegula with a few orange-white scales at base, a few orange-white scales along meson of mesothorax. Foreleg orange brown on outer surface; tarsus slightly paler, outer surface white to yellowish white. Midleg coxa white; femur white or orangish white, orange-gray-tipped scales at apex; tibia orange brown dorsally, orange white ventrally, spurs slightly darker at apexes; tarsus mainly orange gray with darker tipped scales on last three segments. Hindleg similar to midleg but much paler. Male without tuft of scales from metathoracic anepisternum. Abdomen orange white, ventral surface with a submesial and lateral row of brown-tipped scales. Wing length 5.0–7.5 mm. Male genitalia with saccal area of vinculum broadly rounded; uncus relatively broad, apex

slightly rounded. Female genitalia with anterior margin of eighth tergite slightly invaginated medially, posterior margin with sclerotized medial extension; ductus bursae short, relatively broad; ductus seminalis arising from base of corpus bursae in a lightly sclerotized area; origin of accessory bursa about ⅔ length of corpus bursae.

According to Braun (1921: 12) the larvae roll the leaves of *Hystrix patula* Moench (Gramineae). There are several generations per year, and the larvae overwinter in the rolled leaves. She described the larva as, "Larva with head brownish ocherous, lateral margins dark reddish brown, the dark brown continuing on the whitish first thoracic segment as two posteriorly converging lines, next four segments dark reddish brown, anterior margins of second and third thoracic segments whitish, remaining abdominal segments whitish, with subdorsal brown line an oblique brown bar extending from subdorsal line at anterior margin of each segment posteriorly and ventrally."

Specimens vary in hue and shade but are recognizable by the pale and dark streaking that follows the veins. *Hystricella* should be confused with no other North American *Helcystogramma* species. It is most similar in appearance to *arotraeum* from Taiwan and Japan but differs by having the apex of the lobe from the vinculum much broader and not extending posteriorly to a sharp point and that the appendix appendiculare is nearly as long as the vinculum. The origin of the accessory bursa in *arotraeum* is at the middle of the bursa copulatrix. The mesothorax of *arotraeum* has a brown band mesally and laterally, and the tegula is pale orange white on the mesal margin. In North America *hystricella* appears to be nearest *melanocarpum* on genital characters but differs as indicated in the key.

Helcystogramma hystricella has been collected in Ohio, Kentucky, Illinois, Missouri, and Arkansas from 30 April to 15 September.

Helcystogramma melanocarpum (Meyrick, 1929), NEW COMBINATION
PL. 3, FIG. 34 (RWH 2269, 2271).

Gelechia trimaculella Chambers, 1874, *Can. Ent.*, **6**: 238. NEW COMBINATION, NEW SYNONYMY.
Type locality: Waco, Texas. [USNM]

NOTE—The lectotype ♂, bears the following labels: 1. "5/9." 2. "*Gelechia trimaculella* Cham. Texas."; 3. "71"; 4. "Genitalia Slide By SAB ♂ USNM 12, 396"; 5. "LECTOTYPE *Gelechia trimaculella* Chambers by R. W. Hodges." Of the four syntypes, three in the Museum of Comparative Zoology, one in the U.S. National Museum of Natural History, the specimen in the USNM is in the best condition and has an abdomen. *Gelechia trimaculella* Chambers, 1874 is a junior primary homonym of *Gelechia trimaculella* Packard, 1867. The latter is considered to be a junior synonym of *Chionodes continuella* (Zeller, 1839).

Brachmia melanocarpa Meyrick, 1929, *Exotic Microlepidoptera*, **3**: 527.
Type locality: Forestburg, Texas. [BMNH]

Upper surface as figured. Haustellum grayish orange, some scales almost yellowish white; maxillary palpus mainly yellowish white; first and second segments of labial palpus grayish orange, many much paler scales dorsally, particularly on inner surface, third segment very pale orange white and with darker tipped scales on outer surface, an orange-white line on anterior margin of third segment and ventral margin of second segment; frons grayish orange to grayish brown in front of eye, very pale orange white medially; vertex and occiput grayish orange above eye, orange white medially; scape of antenna gray brown dorsally, white or off-white ventrally, white continuing on first segment of shaft, dorsal surface of shaft mottled grayish orange and pale grayish orange, in male sensory setae about ⅔ depth of basal segment, becoming shorter to apex, sensory areas broad and contiguous at base, then separated by row of scales on alternate half segments to apex, in female sensory setae very short, sensory areas very narrow and separate on basal four or five segments, becoming larger and narrowly contiguous by ¾ length. Tegula and dorsal surface of mesothorax mainly gray brown, some scales grayish orange at apexes. Foreleg: anterior surface of coxa, femur, and tibia brown to orange brown, dorsal surface white, white continuing on tarsus, fifth and part of fourth tarsal segments shining grayish orange. Midleg similar to foreleg but paler and lacking prominent white band on tibia and tarsus, tarsus mainly pale grayish orange. Hindleg mainly grayish orange, many gray-tipped scales on trochanter, femur, ventral surface of tibia, and tibial spurs. Male without scale tuft from metathoracic anepisternum. Abdomen gray to grayish brown on second, third, and fourth segments; caudal margins of most segments pale orange white; ventral surface mainly orange white with submesial and sublateral gray-brown bands. Wing length 4.8–6.9 mm. Male genitalia with saccal region of vinculum slightly acute; uncus very broad and slightly constricted beyond base, apex rounded. Female genitalia with anterior margin of eighth tergite

evenly rounded; ductus bursae about ¼ length of corpus bursae; corpus bursae with slight basal lobe from which ductus seminalis arises, accessory bursa from ⅔ length of corpus bursae and surrounded by small, sclerotized invaginations arranged in concentric rings.

The immature stages are unknown.

Adults vary in relative colors of the fore- and hindwings; the latter may be gray or yellowish white. The dark-brown spots on the forewing vary in size and shape; the one at the end of the cell can be a streak; each is narrowly surrounded by a row of white-tipped scales. Genital characters seem to ally *melanocarpum* with *hystricella,* but the two species are separable by the color pattern as indicated in the key.

Melanocarpum has been collected from Nova Scotia and New Brunswick to coastal South Carolina and west to Forestburg, Texas from 26 March to 28 August.

Helcystogramma ectopon Hodges, NEW SPECIES

PL. 3, FIG. 35; PL. O, FIG. 7; PL. P, FIG. 1.

Helcystogramma ectopon Hodges.
Type locality: Fort Niobrara National Wildlife Refuge, Cherry County, Nebraska. [USNM]

Upper surface as figured. Haustellum and maxillary palpus mainly orange white, mottled with some gray-tipped scales; labial palpus mottled orange white, pale orange, and brown, inner surface of second segment with more pale scales than elsewhere, a pale orange-white line on anterior margin of third segment and continuing somewhat less prominently on second segment nearly to base; frons mainly gray brown in front of eye, orange white medially, many scales with darker bases; vertex and occiput mainly grayish orange, scales tipped paler, some orange-white scales above eye; antenna dark gray brown dorsally, ventral surface of scape and first half segment of shaft pale orange, in male sensory setae slightly less than half depth of segments, sensory areas very broad and contiguous on basal half of shaft, becoming narrowly contiguous to apex. Foreleg mainly gray brown on coxa, femur, and tibia; tarsal segments pale orange white; outer surface of tibia and tarsus yellowish white with a few gray-tipped scales. Midleg coxa orange white with shining yellow and lavender reflections; femur mottled dark gray and orange white with shining reflections; tibia mainly pale orange ventrally, dorsally with yellowish-orange scales from base to ⅔ length and a few at apex, spurs dark gray; tarsal segments with gray-brown-tipped scales forming basal saddles, apexes of segments white to yellowish white. Hindleg coxa shining yellowish white with yellow and lavender reflections; femur and tibia mainly pale yellowish orange, ventral margin of tibia with some slightly darker scales, basal ⅘ of spurs with brown-tipped scales; first tarsal segment mottled pale orange and grayish orange, remaining segments with dark-brown saddles, apexes and ventral margin orange white. Male with white scale tuft from metathoracic anepisternum. Wing length 5.7, 5.9 mm. Male genitalia with vinculum broadly rounded in saccal area; aedoeagus heavily sclerotized on distal half; uncus relatively broad, rounded apically. Second abdominal sternite with paired zones of modified scales and a slight posterior pouch.

The immature stages are unknown.

TYPES. Holotype: ♂. USA, Nebr. Cherry Co. Ft. Niobrara NWR; 29 June 1983; Ronald W. Hodges; Genitalia Slide by RWH ♂ USNM 12111. USNM. Paratype: 1 ♂. Same data as for holotype. USNM.

The male of *ectopon* is immediately distinguished from other *Helcystogramma* species by the presence of white scale tufts arising from the metathoracic anepisternum. The color pattern also is distinctive as indicated in the key. The broad saccal area of the vinculum and shape of the uncus may relate *ectopon* with *chambersella.*

Helcystogramma chambersella (Murtfeldt), NEW COMBINATION

PL. 4, FIGS. 14, 15; PL. GG, FIG. 3 (RWH 2265).

Gelechia chambersella Murtfeldt, 1874, *Can. Ent.,* **6**: 222.
Type locality: Kirkwood, Missouri. [lost]

NOTE—I have been unable to locate type specimens for the names *chambersella, subalbusella, parvipulvella,* and *inaequepulvella.* Murtfeldt described *chambersella* on the basis of larvae. Subsequently, she stated (1881: 242), "The description was indefinitely delayed by a vexatious accident by which I lost all my perfect [adult?] specimens. For several succeeding years I searched in vain for the larvae, and as the moth is not attracted by lamplight, I began to despair of ever replacing the lost specimens. During the past summer, however, I was successful in taking several of the larvae, from which I obtained three imagines, and am thereby enabled to prepare the history of the insect for publication." Busck (1903: 913) noted, "It appears from correspondence I have

had with Miss Murtfeldt that she sent the first specimen bred by her to Chambers for determination; that he pronounced it a new species and agreed that Miss Murtfeldt should name it after him; that he thereafter, on the single specimen received from Miss Murtfeldt, made a new species, *inaequepulvella,* forgetting or mistaking the identity of the specimen in such a degree that he, on the very next page, mentions having received such a specimen and compares it with his *ambrosiaeella.*

"This single original type specimen is still found in Cambridge in poor but recognizable condition, labeled by Chambers *inaequepulvella,* and proving beyond a doubt that it really is Miss Murtfeldt's species.

"In Amherst, in Professor Fernald's collection, I have examined Miss Murtfeldt's type, and I have also received identical authenticated specimens from Miss Murtfeldt." The specimen in Fernald's collection would have been a false type based on the 1881 redescription of *chambersella.* It was not in the Fernald collection that was purchased by the U.S. National Museum in 1924. I have not been able to find the type of *inaequepulvella* in the Museum of Comparative Zoology; however, it may be extant but overlooked. Hagen (1884: 99) noted that the type *inaequipulvella* [sic] was in the MCZ, but he made no indication that the types of *subalbusella* or *parvipulvella* were there. I was unable to find them and believe that they are lost. A subsequent specimen of *chambersella* reared and determined by Murtfeldt is in the USNM.

Meyrick (1925: 249) synonymized *parvipulvella, inaequepulvella,* and *chambersella* with *subalbusella* (as *subalbella*), and McDunnough (1939: 76) followed the treatment. Meyrick was incorrect to ignore Murtfeldt's 1874 description of *chambersella,* but his conclusion on the synonymy is correct. Chambers' descriptions of *parvipulvella* and *subalbusella* are extremely brief. He did state (1874: 242) that *parvipulvella* possibly was a variety of *subalbusella* and (1875: 239) that *parvipulvella* is very near *inaequepulvella.* For each of these species he gave ⅜ inches as the alar expanse. In the absence of evidence to the contrary I treat *subalbusella, parvipulvella,* and *inaequepulvella* as junior synonyms of *chambersella.*

Gelechia subalbusella Chambers, 1874, *Can. Ent.,* **6**: 242. NEW COMBINATION.
Type locality: Waco, Texas. [lost]

Gelechia parvipulvella Chambers, 1874, *Can. Ent.,* **6**: 242. NEW COMBINATION.
Type locality: Waco, Texas. [lost]

Gelechia inaequepulvella Chambers, 1875, *Cincinnati Quart. Jour. Sci.,* **2**: 239. NEW COMBINATION.
Type locality: [Kirkwood], Missouri. [lost? MCZ]

Brachmia subalbella Meyrick, 1925, *Genera Insectorum,* **184**: 249. NEW COMBINATION.
NOTE—*Brachmia subalbella* Meyrick, 1925 is an invalid emendation of *Gelechia subalbusella* Chambers, 1874.

Upper surface as figured. Haustellum and maxillary palpus yellowish white, with very few brown-tipped scales; labial palpus mainly white to off-white with scattered brown-tipped scales; frons orange white to grayish orange white, most scales paler apically than basally; vertex and occiput mottled very pale grayish orange and orange white; antenna orange white with brown-tipped scales on anterior surface, ventral surface of scape white, in male sensory setae about ½ depth of segments, sensory areas very broad, very narrowly contiguous from base to apex, in female sensory setae very short, sensory areas small at base but narrowly contiguous, becoming broader to apex. Tegula and dorsal surface of mesothorax mottled pale orange white, grayish brown, and dark brown. Foreleg mainly brown on coxa, and femur, and tibia with white or yellowish-white scales at apex of femur and coxa and along lateral margin of tibia; tarsus mainly off-white with brown-tipped scales on third through fifth segments. Midleg similar to foreleg. Hindleg generally paler off-white with orange-white scales predominating. Male with orange-white scale tuft from metathoracic anepisternum, tuft held between metathorax and abdomen in repose. Abdomen shining grayish orange and orange white. Wing length 3.6–4.8 mm. Male genitalia with vinculum very broad in saccal region; uncus relatively narrow, lateral margins slightly concave, apex rounded. Female genitalia with anterior margin of eighth tergite indented medially; ductus bursae about ½ length of corpus bursae; ductus seminalis arising from base of corpus bursae; accessory bursa arising from ½ length of corpus bursae.

Murtfeldt (1881: 243) described the larva and habits as, "The larva inhabits a fusiform case formed by webbing together the slender divisions of the leaf, from which it eats the parenchyma of the upper surface, the latter being folded inside. Its average length is 0.35 inch; slender, cylindrical, sub-moniliform. Head small, polished, dark brown. The arrangement of colors on the body is striking and characteristic. First segment narrow, dark brown with small, transversely oblong, yellowish shield. Second and third and sixth and seventh segments velvety black or very dark brown, with conspicuous milk-

white fold on posterior edge. Fourth and fifth segments uniform velvety black. Remaining segments similar with the addition of an oblique lateral white band on each anterior edge. Hairs fine, short and black. The larva makes several cases in the course of growth and changes to pupa within the last, enclosed in a slight cocoon." *Ambrosia artemisiifolia* Linnaeus (common ragweed) (Murtfeldt, 1881: 242), *A. confertifolia* Decandolle (Goeden and Ricker, 1975: 303), and *A. ptilostachya* Decandolle (western ragweed) (Goeden and Ricker, 1976: 1172) are the known hosts.

Adults vary in hue and relative amounts of light- and dark-colored scales on all surfaces but can be recognized as indicated in the key.

Chambersella occurs from Pennsylvania south to Florida and west through Oklahoma, Texas, and Arizona to California. In the north adults have been collected from June through August; in Florida from April through September; and in California from late March to early October.

Helcystogramma convolvuli (Walsingham), NEW COMBINATION
PL. 4, FIGS. 16, 17; PL. P, FIGS. 2, 3; PL. HH, FIG. 3.

Trichotaphe convolvuli Walsingham, 1908, *Proc. Zool. Soc. London,* **1907**: 944, pl. 51, fig. 16.
Type locality: Santa Cruz, Tenerife, Canaries. [BMNH]

Brachmia crypsilychna Meyrick, 1914, *Jour. Bombay Nat. Hist. Soc.,* **22**: 773. NEW COMBINATION.
Type locality: Bassein Fort, Bombay, India. [BMNH]

Lecithocera effera Meyrick, 1918, *Exotic Microlepidoptera,* **2**: 104. NEW COMBINATION.
Type locality: Coimbatore, S. India. [BMNH]

Lecithocera emigrans Meyrick, 1921, *Exotic Microlepidoptera,* **2**: 435. NEW COMBINATION.
Type locality: Barbados. [BMNH]

Upper surface as figured. Haustellum orange white, some gray-brown scales laterally; maxillary palpus pale orange; first and second segments of labial palpus mainly grayish orange, many scales tipped slightly paler grayish orange, second segment with a slight scale tuft on dorsomesial surface, third segment mainly dark brown, an irregular row of pale yellowish-white scales on anterior surface and some off-white scales at apex and irregularly on distal half; frons dark gray orange in front of eye, grayish orange medially; vertex and occiput mainly gray brown, scales tipped paler grayish orange; dorsal surface of shaft dark brown, ventral surface pale orange, becoming darker toward apex, in male sensory setae about ⅔ depth of segment at base becoming much shorter to apex, sensory areas broad and narrowly contiguous on basal ⅓ of shaft, completely separated by row of scales on alternate half segments to apex, in female sensory setae very short, sensory areas very small on basal ⅘ of shaft, then slightly larger to apex. Tegula mainly brown to dark brown, an irregular band of white and pale-orange scales from middle of anterior margin toward apex. Mesothorax orange brown with pale-orange to orange-white scales on lateral margin. Foreleg coxa and femur dark gray brown with shining yellow reflections; tibia mainly brown with frosting of off-white scales; tarsus mainly orange white, some segments with gray-tipped scales. Midleg coxa shining pale orange and orange gray; femur, tibia, and tarsus mainly gray; femur with dusting of off-white scales; apexes of tibia and tarsal segments with off-white scales, fifth tarsal segment mainly off-white. Hindleg similar to midleg, tibia with broad, oblique, off-white band at base of first pair of spurs and white at apex; tarsus mainly shining dark gray, apex of each segment white to off-white, most of fifth segment white. Male with pale-orange scale tuft from metathoracic anepisternum. Abdomen mainly shining grayish orange streaked with many pale-orange scales. Wing length 5.3–5.8 mm. Male with pale yellowish-orange sex scales at base of fore- and hindwings on the undersurface. Male genitalia with vinculum relatively short, broadly rounded in saccal region, apex of lobe from lateral margin very broad, unsclerotized medial area small; scales from appendix appendicular strongly adherent; gnathos slightly curved at ⅔ length; uncus relatively broad at base, tapering to ⅗ length, then broader to truncated apex. Female genitalia with anterior margin of eighth tergite with short, broad medial indentation; ductus bursae short, about ⅙ length of corpus bursae; ductus seminalis arising from a lobe at base of corpus bursae; accessory bursa arising before ½ length of corpus bursae; corpus bursae lightly sclerotized on basal ⅙.

Walsingham (1908: 944) and Fletcher (1921: 202; 1932: 56) described the mature larva. Larvae roll or tie the leaves of *Ipomoea batatas* (Linnaeus) Lamarck (sweet potato) and other species of *Ipomoea* (Convolvulaceae). Pupation occurs in the rolled leaf; no cocoon is formed.

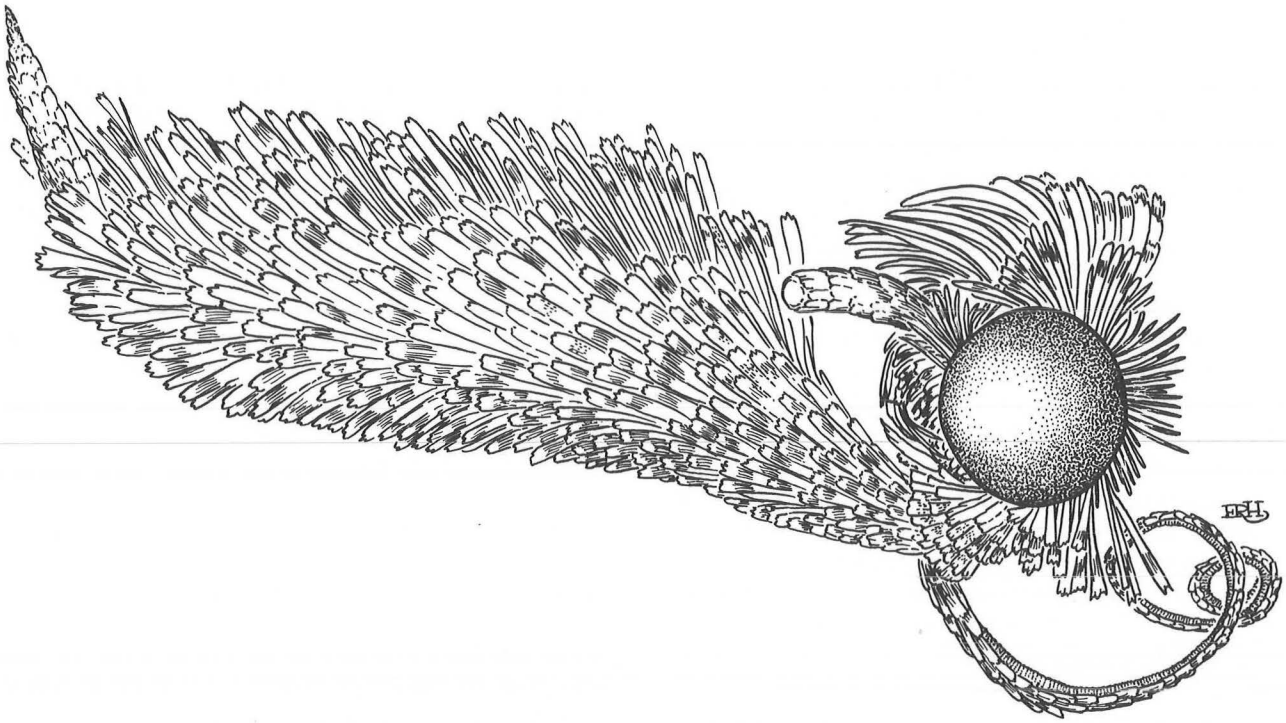

FIGURE 30: LATERAL VIEW OF HEAD OF *SCODES DEFLECTA*

The specimens of *convolvuli* are poor, but it appears that the marks on the forewing vary in development. The species is immediately recognizable by the characters given in the key.

Convolvuli probably was introduced to Florida; specimens from Stuart were sent to Carl Heinrich for identification. They were reared from sweet potato. Larvae were collected on 15 December 1943, and adults emerged on 3 and 16 January 1944. One other specimen was reared from wild morning glory at Tavernier, Florida on 16 March 1945. I know of no other specimens. Kimball (1965: 282) reported *convolvuli* under the misidentification *Brachmia melissia* (Walsingham). *Helcystogramma melissium* is a distinct species; additional specimens in the USNM determined as *melissium* proved to be two undescribed species of *Helcystogramma.*

GENUS

Scodes Hodges, NEW GENUS

Gender: feminine.

Type species: *Dichomeris deflecta* Busck, 1909.

Scodes is a monobasic genus whose sole species occurs in the mountains of southern Arizona. It is most closely related to *Acompsia* Hübner of the Palearctic Region.

Characters of the genus are second segment of the labial palpus very long and swollen, third segment slightly upturned and about ⅓ length of second segment; sensory areas on ventral surface of antenna not strongly dimorphic sexually; ocellus absent; male without scale tufts from meso- or metathorax; legs without special modifications; forewing with CuA_1 and CuA_2 stalked or connate and sharply downcurved from end of cell, R_4 and R_5 stalked with R_5 to costa; hindwing without pecten on cubitus; undersurface of forewing and upper and undersurfaces of hindwing with sex scales in male (scales opaque and more intensely colored than in female); male without secondary retinaculum; vinculum with distinct break in saccal area, extending to half length of tegumen, lobe arising from base of lateral arm more heavily sclerotized mesially than at base; aedoeagus free, without cornuti; appendix appendicular long; valvae heavily sclerotized, anterior and posterior margins roughly parallel; gnathos a heavily sclerotized hook; margin of uncus broadly rounded, base about ⅗ maximum width; apophyses anteriores about ½ length of apophyses posteriores; antrum heavily sclerotized on dorsal wall, cylindrical; ductus bursae short, membranous; corpus bursa variably sclerotized and spiculose; ductus seminalis arising from base of corpus bursae; accessory bursa arising from ⅓ length of corpus bursae.

One specimen has data, "bred from *Thurberia*

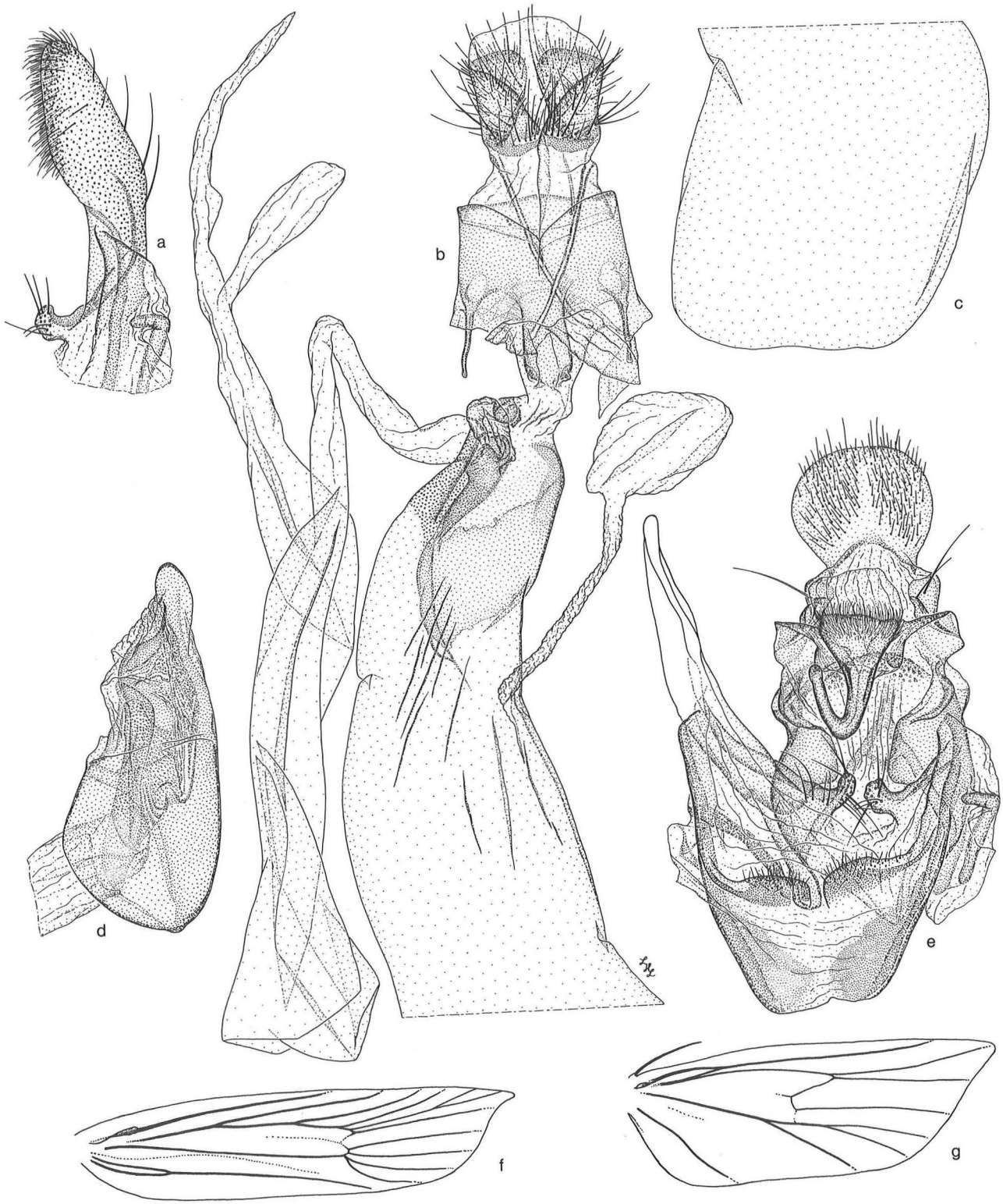

FIGURE 31: GENITALIA AND VENATION OF *SCODES DEFLECTA*

a. Right valva (USNM 10627). *b, c.* Female genitalia (USNM 9153). *d.* Aedoeagus (USNM 9149). *e.* Male genital capsule (USNM 10627). *f, g.* Venation (USNM 9151).

thespesioides" (=*Gossypium thurberi* Todaro) and has a rolled leaf with a partially emerged pupal case attached to the pin. The larva probably rolls or ties the leaves.

In North America *Scodes* is nearest *Helcystogramma* from which it differs by the long, straight, swollen second segment of the labial palpus. Other characters are in the keys. *Scodes* is most closely related to *Acompsia* and may be a species-group within the genus but *Scodes* has CuA_1 and CuA_2 connate or stalked and downcurved from the end of the cell in the forewing and has the second segment of the labial palpus porrect, long, and swollen. *Acompsia* has CuA_1 and CuA_2 separate and only CuA_2 somewhat downcurved from the end of the cell, and the second segment of the labial palpus is curved, not noticeably swollen, and about the length of the third segment. The uncus of *Scodes* is broadly rounded; it is nearly parallel margined with rounded apex in *Acompsia.* The ductus seminalis arises at the base of the corpus bursae in *Scodes*; it arises from a slight sclerotized projection at the anterior end of the corpus bursae in *Acompsia.*

Scodes deflecta Busck, NEW COMBINATION PL. 3, FIG. 36. TEXT FIGS. 30, 31 *a–g* (RWH 2276).

Dichomeris deflecta Busck, 1909, *Proc. Ent. Soc. Washington,* **11**: 91.

Type locality: Redington, Arizona. [USNM]

NOTE—Lloyd Martin, personal communication, concluded that the "Redington" label was inaccurate. Specimens probably were collected on the north slope of the Santa Catalina Mountains on the road to Redington from Tucson at much higher elevation than that at Redington.

Upper surface as figured. Haustellum mottled pale brown and pale yellowish gray; maxillary palpus off-white with a few brown-tipped scales at apex; first segment of labial palpus mainly pale grayish orange or pale orange, second segment grayish orange and grayish brown at base, becoming paler on ventral scale tuft toward apex, dorsal scale tuft with many white scales dorsally and some brown-spotted scales, inner surface slightly paler and lacking grayish-brown scales, third segment off-white to very pale orange white, apex brown; frons, vertex, and occiput mainly pale orange, some brown scales in front of eye, some white scales above eye; scape of antenna mottled brown and off-white dorsally, orange white ventrally, shaft mottled pale and dark gray brown dorsally, sensory setae about ⅔ depth of segments from base to apex, sensory areas very broad and contiguous on basal ⅓, then becoming narrowly contiguous to apex; a row of pale-orange scales behind eye. Tegula and dorsal surface of mesothorax mottled brown and off-white, apex of mesothorax with few pale scales. Foreleg coxa mainly brown, many scale bases pale orange to grayish orange; femur, tibia, and tarsus darker brown, femur heavily dusted with off-white scales anteriorly. Midleg coxa mottled pale orange and white; trochanter mainly brown; femur mottled yellowish white and gray brown; tibia becoming darker toward apex; tarsus mainly brown with orange-gray scales at apex of each segment. Hindleg similar to midleg but generally paler, tibia and tarsus mainly orange white. Wing length 9.2–11.6 mm. Undersurface of forewing in male with some intensely pale-orange colored scales at base. Dorsal and ventral surface of hindwing with many such scales. In female these areas shades of gray and yellowish gray. Abdomen mainly pale orange mottled with some darker shades, ventral surface with gray-brown scales. Male and female genitalia as illustrated.

Busck (1914: 30) reported Pierce's rearing *deflecta* from *Gossypium thurberi* Todaro (Malvaceae). The larva is a leaf folder; the adult emerged on 24 August. He described the larva as "Head and first thoracic segment dark reddish brown; eyes and mouth parts black; anal plate large, black, with long black bristles. Remainder of the body white, with four straight, longitudinal rows of large, round, black tubercles, two dorsal and two lateral. There are two such tubercles on each segment in each row, and on account of their size, they are nearly confluent longitudinally. Between these rows of tubercles run a central and two lateral, thin, purplish, longitudinal lines. Below the lateral rows of tubercles each abdominal segment has two more, smaller, oval, brown tubercles, set obliquely. Each tubercle bears a single lone, light colored hair. Thoracic feet black, prolegs white, each with an anterior and a posterior row of long brown hooks."

All the specimens of *deflecta* are worn, so it is difficult to assess variation in color or pattern. *Deflecta* should be confused with no other North America dichomeridine because it has a distinctive color pattern, the outer margin of the forewing is excavated behind the apex, and the second segment of the labial palpus is porrect and about 3× the length of the third segment.

Scodes deflecta has been collected in the Baboquivari, Santa Catalina, and Santa Rita Mountains in southern Arizona from 15 July to 30 September.

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MONOCHROME PLATES

PLATE A: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris gausapa* Hodges, paratype, genital capsule; Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 8820;
2. Aedoeagus, RWH 3323. (p. 37).
3. *Dichomeris nenia* Hodges, paratype, genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 9308;
4. Aedoeagus. (p. 40).
5. *Dichomeris blanchardorum* Hodges, paratype, genital capsule; Laguna Atascosa, Cameron Co., Texas; USNM 11878;
6. Aedoeagus. (p. 43).
7. *Dichomeris diva* Hodges, holotype, genital capsule; Patagonia, Santa Cruz Co., Arizona; USNM 9114;
8. Aedoeagus. (p. 57).
9. *Dichomeris sylphe* Hodges, paratype, genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 9128;
10. Aedoeagus. (p. 58).

PLATE B: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris empusa* Hodges, holotype, genital capsule; 16 mi SW Flagstaff, Coconino Co., Arizona; USNM 9125;
2. Aedoeagus. (p. 59).
3. *Dichomeris hirculella* (Busck), genital capsule; East River, New Haven Co., Connecticut; USNM 9141;
4. Aedoeagus, USNM 9143. (p. 60).
5. *Dichomeris ardelia* Hodges, holotype, genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 9138;
6. Aedoeagus. (p. 62).
7. *Dichomeris fistuca* Hodges, paratype, genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 9331;
8. Aedoeagus, USNM 9329. p. (68).

PLATE C: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris kimballi* Hodges, paratype, genital capsule; Siesta Key, Sarasota Co., Florida; USNM 11657;
2. Aedoeagus. (p. 71).
3. *Dichomeris georgiella* (Walker), genital capsule; Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 9185;
4. Aedoeagus. (p. 75).
5. *Dichomeris vacciniella* Busck, genital capsule; Blanden Co., North Carolina; USNM 9325;
6. Aedoeagus; Devil's Den State Park, Washington Co., Arkansas; USNM 9324. (p. 76).

PLATE D: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris bipunctella* (Walsingham), genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 10634;
2. Aedoeagus. (p. 78).
3. *Dichomeris mulsa* Hodges, paratype, genital capsule; 16 mi SW Flagstaff, Coconino Co., Arizona; USNM 9260;
6. Aedoeagus. (p. 83).
4. *Dichomeris vindex* Hodges, paratype, genital capsule; Putnam Co., Illinois; USNM 9460;
5. Aedoeagus. (p. 83).

PLATE E: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris mica* Hodges, genital capsule; 25 mi. W Hidalgo del Parral, Chihuahua, Mexico; USNM 9265;
2. Aedoeagus. (p. 84).
3. *Dichomeris aglaia* Hodges, paratype, genital capsule; Archbold Biological Station, Highlands Co., Florida; USNM 9282;
4. Aedoeagus. (p. 85).
5. *Dichomeris delotella* Busck, genital capsule; Baboquivari Mts., Pima Co., Arizona; USNM 9267;
6. Aedoeagus. (p. 86).

PLATE F: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris gleba* Hodges, paratype, genital capsule; Putnam Co., Illinois; USNM 9275;
2. Aedoeagus. (p. 87).
3. *Dichomeris laetitia* Hodges, holotype, genital capsule; Putnam Co., Illinois; USNM 9285;
4. Aedoeagus. (p. 88).
5. *Dichomeris stipendiaria* (Braun), genital capsule; Pullman, Whitman Co., Washington; USNM 9289;
6. Aedoeagus. (p. 89).

PLATE G: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris bilobella* (Zeller), genital capsule; Mt. Uniacke, Nova Scotia; USNM 8867;
2. Aedoeagus. (p. 90).
3. *Dichomeris aleatrix* Hodges, holotype, aedoeagus; Putnam Co., Illinois; USNM 9314;
6. Genital capsule. (p. 91).
4. *Dichomeris copa* Hodges, paratype, genital capsule; Aweme, Manitoba; USNM 5048;
5. Aedoeagus. (p. 92).

PLATE H: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris scrutaria* Hodges, paratype, genital capsule; Abita Springs, St. Tamany Parish, Louisiana; USNM 14459;
2. Aedoeagus. (p. 93).
3. *Dichomeris furia* Hodges, paratype, genital capsule; Black Mt. State Park, Rabun Co., Georgia; USNM 9253;
4. Aedoeagus. (p. 93).
5. *Dichomeris purpureofusca* (Walsingham), genital capsule; Spearfish Creek, 12 mi SW Lead, Lawrence Co., South Dakota; USNM 9249;
6. Aedoeagus. (p. 94).

PLATE I: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris nonstrigella* (Chambers), genital capsule; Devil's Den State Park, Washington Co., Arkansas; USNM 9252;
2. Aedoeagus. (p. 95).
3. *Dichomeris achne* Hodges, holotype, genital capsule; Parker Islands, Highlands Co., Florida; USNM 9422;
4. Aedoeagus. (p. 97).
5. *Dichomeris inserrata* (Walsingham), genital capsule; Missouri; USNM 9411;
6. Aedoeagus. (p. 98).

PLATE J: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris pelta* Hodges, paratype, genital capsule; Homestead, Dade Co., Florida; USNM 9406;
2. Aedoeagus. (p. 99).
3. *Dichomeris bolize* Hodges, paratype, genital capsule; Monroe Co., New York; USNM 9419;
4. Aedoeagus. (p. 100).
5. *Dichomeris serrativittella* (Zeller), genital capsule; Valentine National Wildlife Refuge, Cherry Co., Nebraska; USNM 12206;
6. Aedoeagus. (p. 101).

PLATE K: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris xanthoa* Hodges, paratype, genital capsule; Orlando, Orange Co., Florida; USNM 9413;
2. Aedoeagus. (p. 102).
3. *Dichomeris isa* Hodges, paratype, genital capsule; 3 mi W. Blackgum, Sequoyah Co., Oklahoma; USNM 12218;
4. Aedoeagus. (p. 103).
5. *Dichomeris simulata* Hodges, holotype, genital capsule; Canadian, Hemphill Co., Texas; USNM 12309;
6. Aedoeagus. (p. 104).

PLATE L: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris imitata* Hodges, holotype, genital capsule; Devers, Liberty Co., Texas; SAB 265;
2. Aedoeagus. (p. 104).
3. *Dichomeris barnesiella* (Busck), genital capsule; Paradise, Cochise Co., Arizona; USNM 10811;
7. Aedoeagus. (p. 104).
4. *Dichomeris simpliciella* (Busck), genital capsule; Kershaw Ryan State Park, near Caliente, Lincoln Co., Nevada; USNM 9368;
8. Aedoeagus.
5. Genital capsule; Spearfish Creek, 12 mi SW Lead, Lawrence Co., South Dakota; USNM 9370;
6. Aedoeagus. (p. 105).

PLATE M: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris baxa* Hodges, paratype, genital capsule; San Bruno Mts., San Mateo Co., California; USNM 9373;
2. Aedoeagus. (p. 105).
3. *Dichomeris gnoma* Hodges, holotype, aedoeagus; Keremeos, British Columbia; USNM 9393;
4. Genital capsule. (p. 106).
5. *Dichomeris washingtoniella* (Busck), genital capsule; Devil's Den State Park, Washington Co., Arkansas; USNM 9202;
6. Aedoeagus. (p. 107).

PLATE N: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris levisella* (Fyles), aedoeagus; Eagles Nest, St. Louis Co., Minnesota; USNM 9209;
4. Genital capsule. (p. 108).
2. *Dichomeris leuconotella* (Busck), genital capsule; White Point Beach, Queens Co., Nova Scotia; USNM 9213;
3. Aedoeagus. (p. 109).
5. *Dichomeris juncidella* (Clemens), genital capsule; Plummers Island, Montgomery Co., Maryland; USNM 9435;
6. Aedoeagus. (p. 110).

PLATE O: MALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris offula* Hodges, holotype, genital capsule; Ithaca, Thompkins Co., New York; USNM 9280;
3. Aedoeagus. (p. 117).
2. *Dichomeris crepida* Hodges, paratype, genital capsule; Royal Palm State Park, Collier Co., Florida; USNM 9398;
4. Aedoeagus. (p. 118).
5. *Helcystogramma fernaldella* (Busck), genital capsule; Fort Niobrara National Wildlife Refuge, Cherry Co., Nebraska; USNM 12394. (p. 126).

6. *Helcystogramma cascum* (Braun), aedoeagus; 4 mi SW Buena Vista, Chaffee Co., Colorado; USNM 12370. (p. 127).
7. *Helcystogramma ectopon* Hodges, holotype, genital capsule; Fort Niobrara National Wildlife Refuge, Cherry Co., Nebraska; USNM 12111. (p. 131).

PLATE P: MALE AND FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Helcystogramma ectopon* Hodges, holotype, aedoeagus; Fort Niobrara National Wildlife Refuge, Cherry Co., Nebraska; USNM 12111. (p. 131).
2. *Helcystogramma convolvuli* (Walsingham), genital capsule; Stuart, Martin Co., Florida; USNM 12376;
3. Aedoeagus. (p. 133).
4. *Dichomeris gausapa* Hodges, paratype, female; Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 8821. (p. 37).

PLATE Q: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris nenia* Hodges, paratype; Homestead, Dade Co., Florida; USNM 9311. (p. 40).
2. *Dichomeris blanchardorum* Hodges, paratype; Laguna Atascosa, Cameron Co., Texas; USNM 11879. (p. 43).

PLATE R: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris diva* Hodges, paratype; Peña Blanca Canyon, Santa Cruz Co., Arizona; USNM 9113. (p. 57).
2. *Dichomeris sylphe* Hodges, paratype; Archbold Biological Station, Highlands Co., Florida; USNM 9129. (p. 58).

PLATE S: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris empusa* Hodges, paratype; 16 mi SW Flagstaff, Coconino Co., Arizona; USNM 10629. (p. 59).
2. *Dichomeris hirculella* Busck, lectotype; East River, New Haven Co., Connecticut; USNM 10684. (p. 60).
3. *Dichomeris ardelia* Hodges, paratype; Palmdale, Glades Co., Florida; USNM 9139. (p. 62).
4. *Dichomeris bipunctella* (Walsingham); Archbold Biological Station, Highlands Co., Florida; USNM 10628. (p. 78).
5. *Dichomeris alphito* Hodges, holotype; Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 12172. (p. 88).

PLATE T: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris fistuca* Hodges, paratype; Archbold Biological Station, Highlands Co., Florida; USNM 9332. (p. 68).
2. *Dichomeris kimballi* Hodges, paratype; Ocean View, Norfolk Co., Virginia; USNM 11709. (p. 71).

PLATE U: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris georgiella* (Walker); Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 9190. (p. 75).
2. *Dichomeris vacciniella* Busck; Blanden Co., North Carolina; USNM 9328. (p. 76).

PLATE V: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris vindex* Hodges, paratype; 3 mi W. Blackgum, Sequoyah Co., Oklahoma; USNM 12165. (p. 83).
2. *Dichomeris mulsa* Hodges, paratype; 16 mi SW Flagstaff, Coconino Co., Arizona; USNM 9261. (p. 83).

PLATE W: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris aglaia* Hodges, paratype; Palmdale, Glades Co., Florida; USNM 9287. (p. 85).
2. *Dichomeris mica* Hodges, paratype; Alpine, Brewster Co., Texas; USNM 11470. (p. 84).
3. *Dichomeris delotella* Busck; Ajo, Pima Co., Arizona; USNM 14513. (p. 86).

PLATE X: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris gleba* Hodges, paratype; Putnam Co., Illinois; USNM 9273. (p. 87).
2. *Dichomeris laetitia* Hodges, paratype; Putnam Co., Illinois; USNM 10953. (p. 88).
3. *Dichomeris stipendiaria* (Braun); Warner Mts., Modoc Co., California; USNM 9290. (p. 89).
4. *Dichomeris copa* Hodges, paratype; Decatur, Macon Co., Illinois; USNM 10597. (p. 92).

PLATE Y: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris bilobella* (Zeller); [New Jersey]; USNM 9480. (p. 90).
2. *Dichomeris aleatrix* Hodges, paratype; Beverly H's., Illinois; USNM 9319. (p. 91).

PLATE Z: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris furia* Hodges, paratype; Massachusetts; USNM 9255. (p. 93).
2. *Dichomeris purpureofusca* (Walsingham), lectotype; Orono, Penobscot Co., Maine; USNM 9246. (p. 94).
3. *Dichomeris nonstrigella* (Chambers); New Brighton, Beaver Co., Pennsylvania; USNM 9251. (p. 95).

PLATE AA: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris inserrata* (Walsingham); Arlington Co., Virginia; USNM 9414. (p. 98).
2. *Dichomeris pelta* Hodges, paratype; Sarasota Co., Florida; USNM 9407. (p. 99).
3. *Dichomeris barnesiella* (Busck); Redington, Pima Co., Arizona; USNM 9343. (p. 104).

4. *Dichomeris simpliciella* (Busck); Peña Blanca Canyon, Santa Cruz Co., Arizona; USNM 9362. (p. 105).
5. *Dichomeris baxa* Hodges, holotype; Monterey, Monterey Co., California; USNM 9387. (p. 105).
6. *Dichomeris levisella* (Fyles); Monroe Co., New York; USNM 9204. (p. 108).
7. *Dichomeris euprepes* Hodges, holotype; Big Black Mountain, Letcher Co., Kentucky; SAB 236. (p. 110).
8. *Dichomeris juncidella* (Clemens); Bull Run Park, Fairfax Co., Virginia; USNM 9436. (p. 110).

PLATE BB: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris bolize* Hodges, paratype; Penniquid Barrens, Coram, Suffolk Co., New York; USNM 9420. (p. 100).
2. *Dichomeris legnotoa* Hodges, holotype; Largo, Pinellas Co., Florida; USNM 14662. (p. 101).
3. *Dichomeris illusio* Hodges, holotype; Hastings, St. Johns Co., Florida; USNM 12203. (p. 101).

PLATE CC: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris mimesis* Hodges, holotype; Salmon, Anderson Co., Texas; RWH 5042. (p. 101).
2. *Dichomeris serrativittella* (Zeller); Brownsville, Cameron Co., Texas; USNM 12220. (p. 101).

PLATE DD: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris xanthoa* Hodges, paratype; Archbold Biological Station, Highlands Co., Florida; USNM 12225. (p. 102).
2. *Dichomeris washingtoniella* (Busck); Oconee, Shelby Co., Illinois; USNM 12345. (p. 107).
3. *Dichomeris isa* Hodges, paratype; Ithaca, Tompkins Co., New York; USNM 12224. (p. 103).

PLATE EE: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris gnoma* Hodges, paratype; Osoyoos, British Columbia; USNM 9396. (p. 106).
2. *Dichomeris leuconotella* (Busck); Halifax, Nova Scotia; USNM 9214. (p. 109).
3. *Dichomeris mercatrix* Hodges, holotype; McLean Bogs Reserve, Tompkins Co., New York; USNM 12352. (p. 110).

PLATE FF: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris offula* Hodges, paratype; Trenton, Ontario; USNM 9482. (p. 117).
2. *Dichomeris crepida* Hodges, paratype; Royal Palm Park, Collier Co., Florida; USNM 9399. (p. 118).

PLATE GG: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Dichomeris sybilla* Hodges, holotype; Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona; USNM 9191. (p. 121).
2. *Helcystogramma fernaldella* (Busck); Fargo, Cass Co., North Dakota; USNM 12384. (p. 126).
3. *Helcystogramma chambersella* (Murtfeldt); San Diego, San Diego Co., California; USNM 12354. (p. 131).

PLATE HH: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

1. *Helcystogramma hystricella* (Braun); Putnam Co., Illinois; USNM 12380. (p. 129).
2. *Helcystogramma badium* (Braun); Ephraim Canyon, 7,000′, Sanpete Co., Utah, USNM 12381. (p. 128).
3. *Helcystogramma convolvuli* (Walsingham); Stuart, Martin Co., Florida; USNM 12377. (p. 133).

PLATE A: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

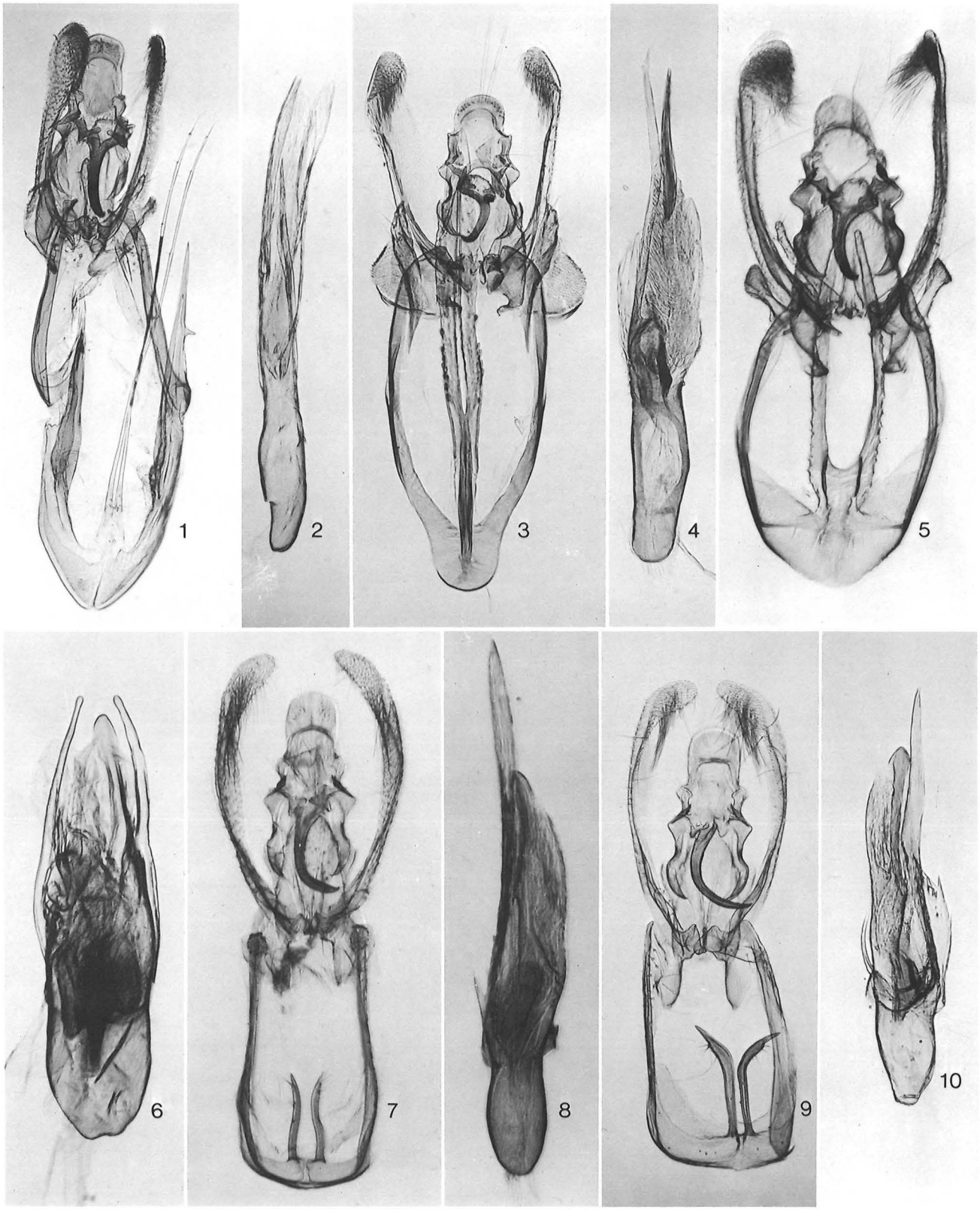


PLATE B: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

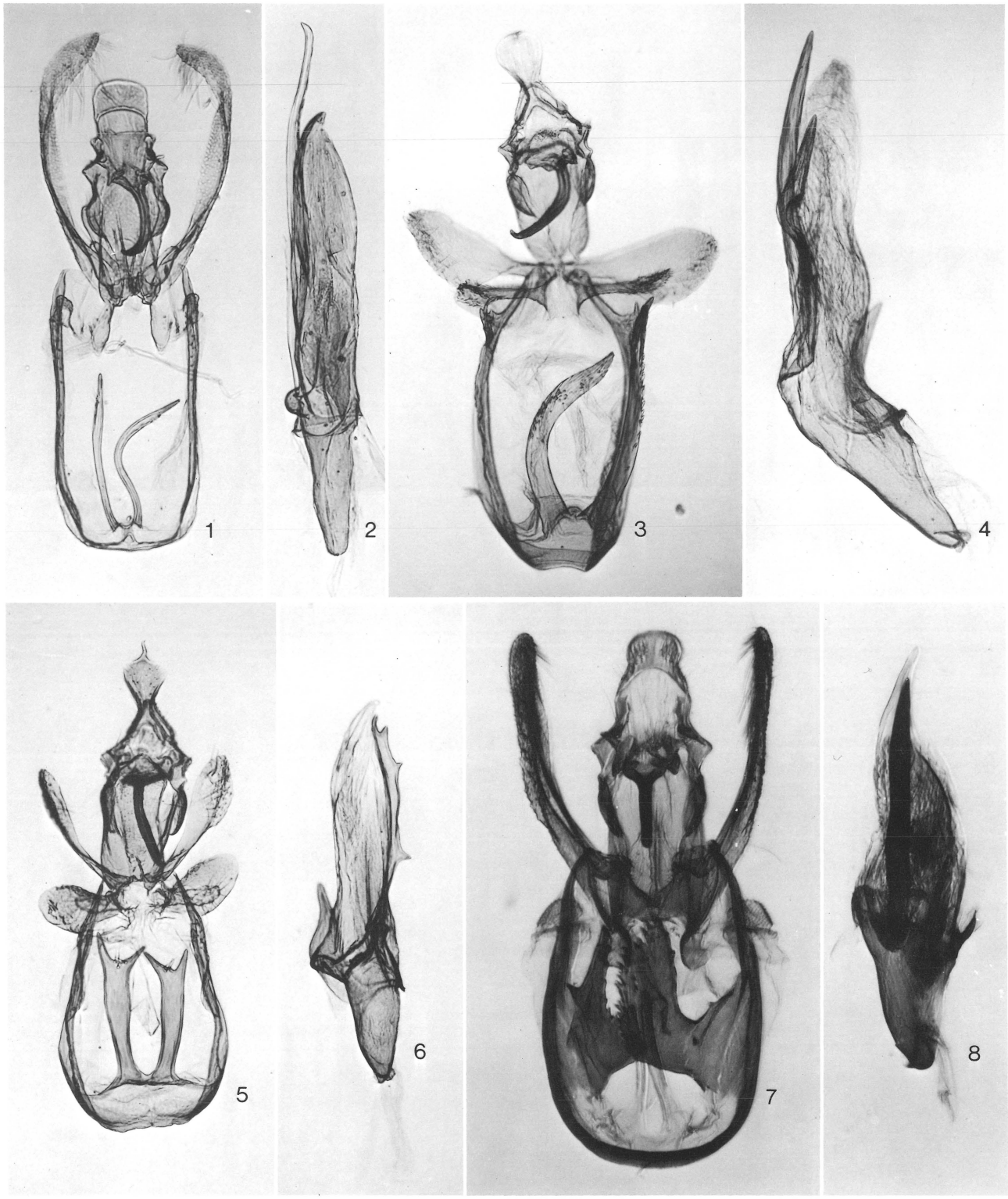
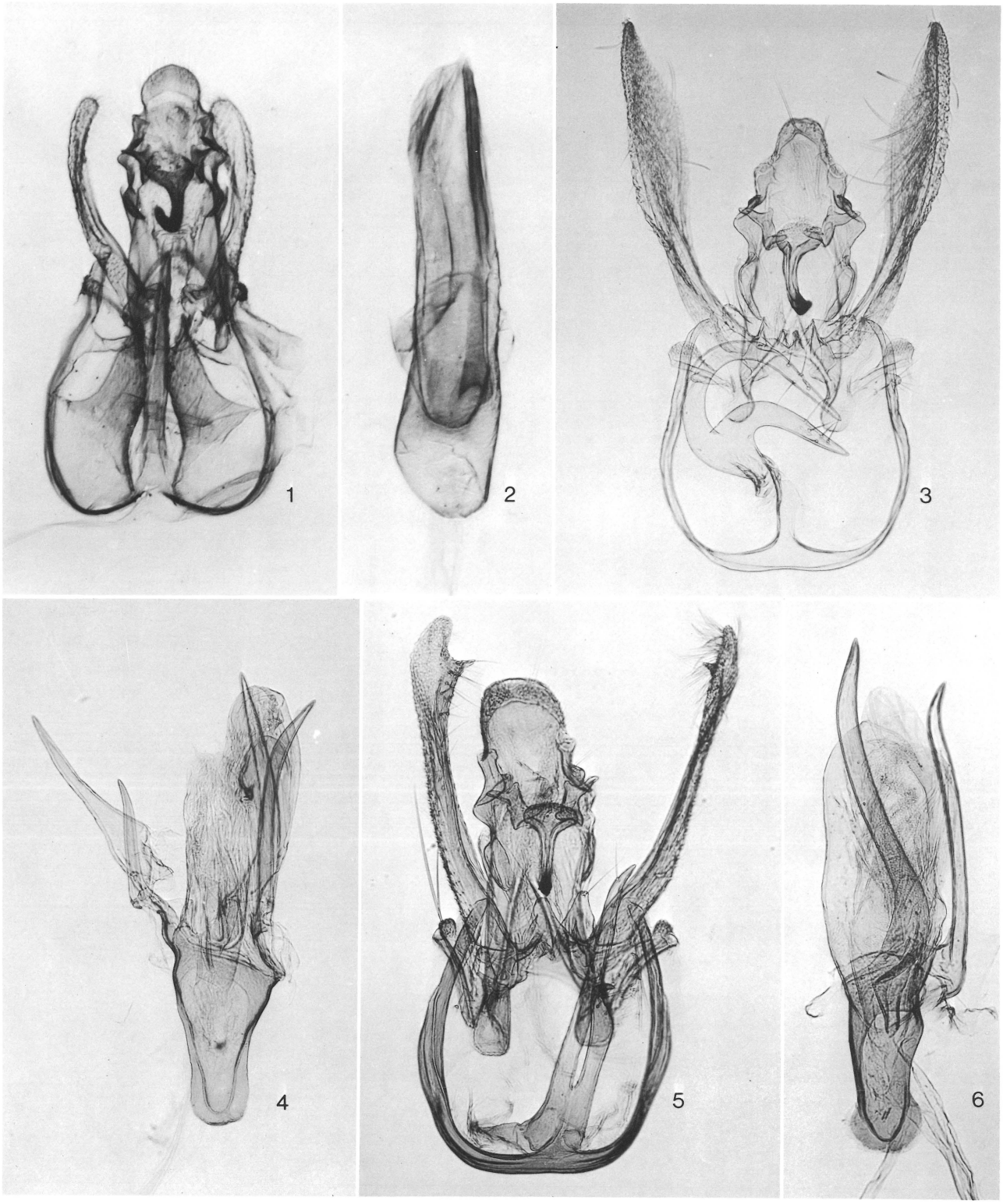


PLATE C: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8



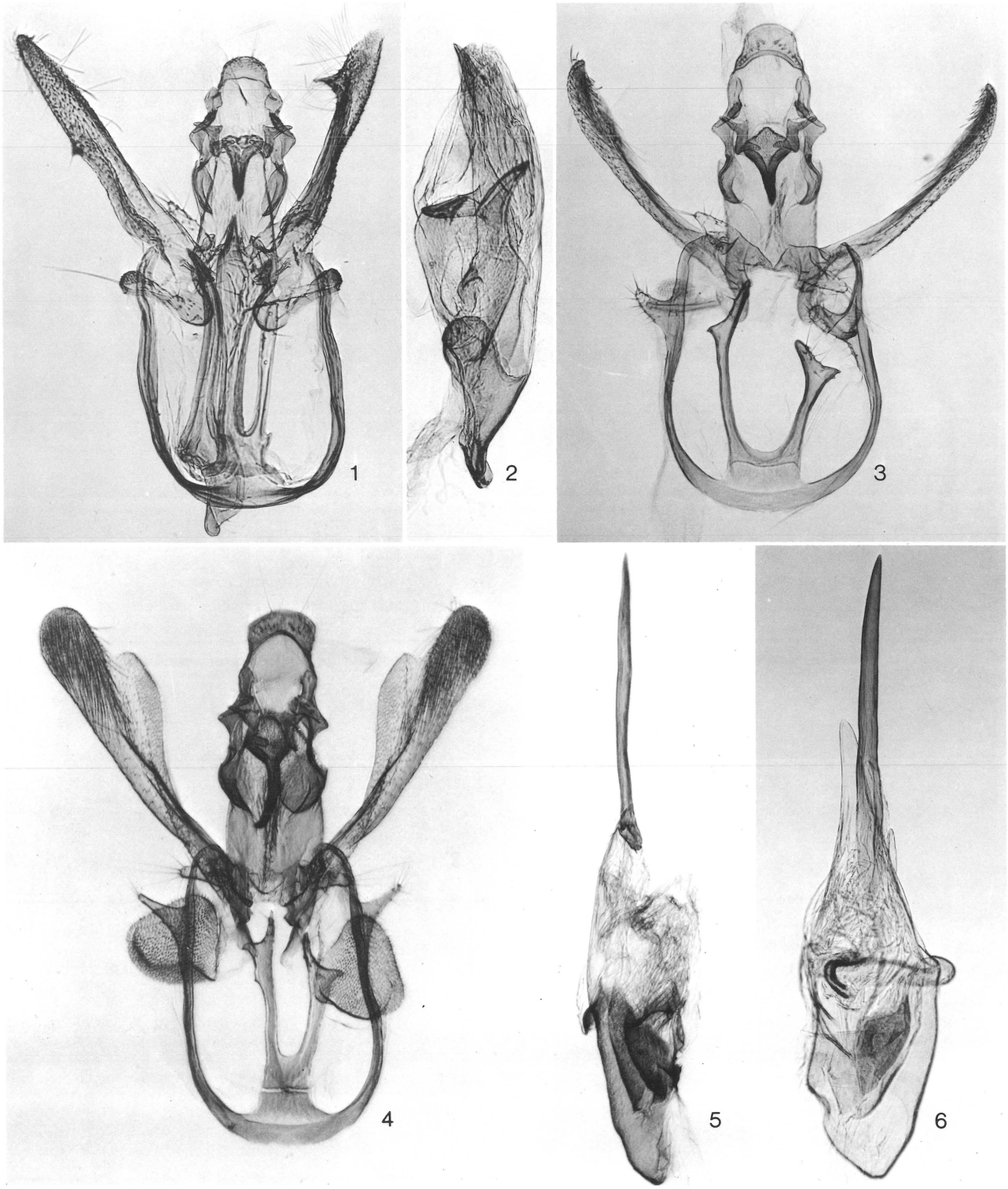

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PLATE E: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

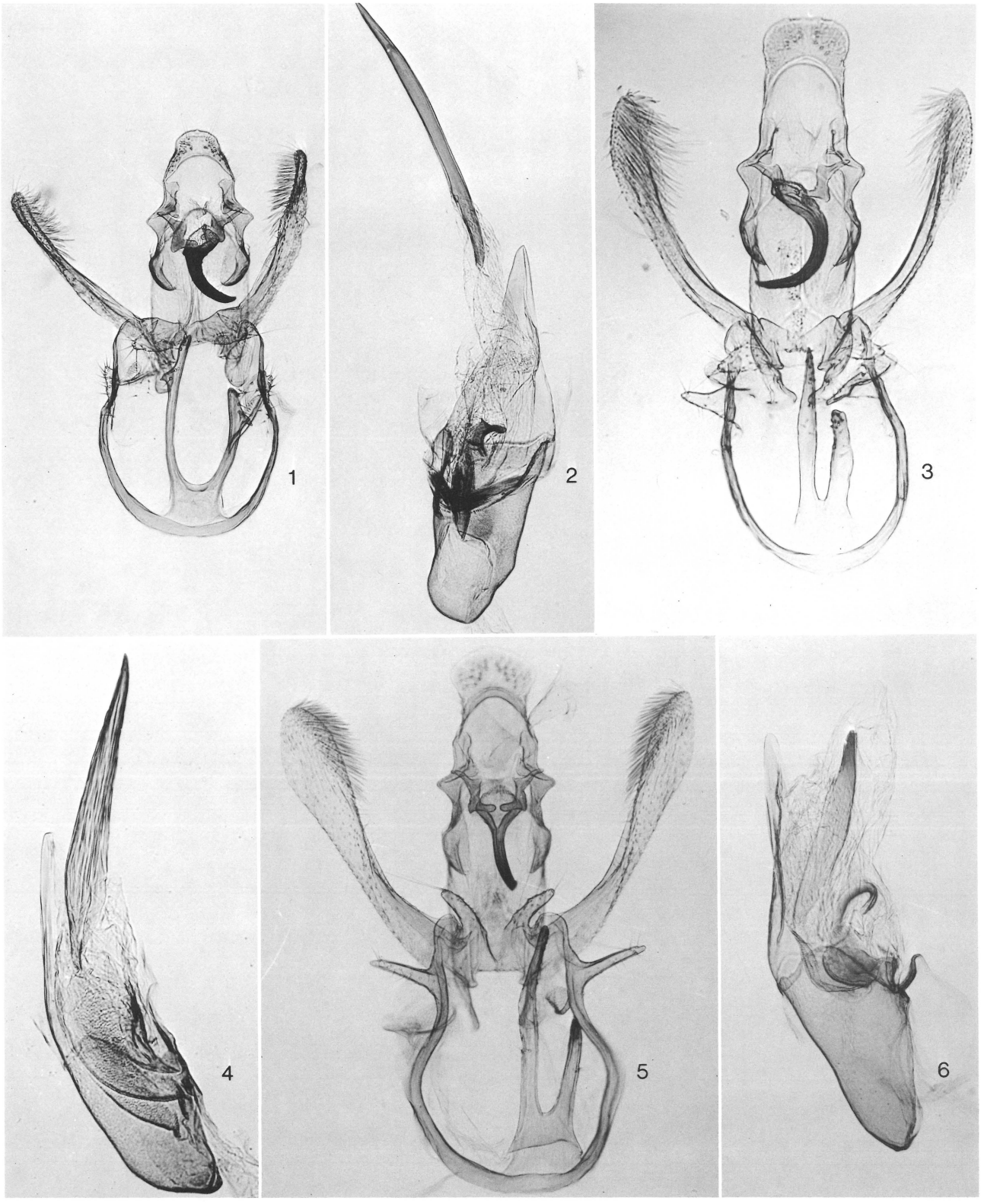


PLATE F: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

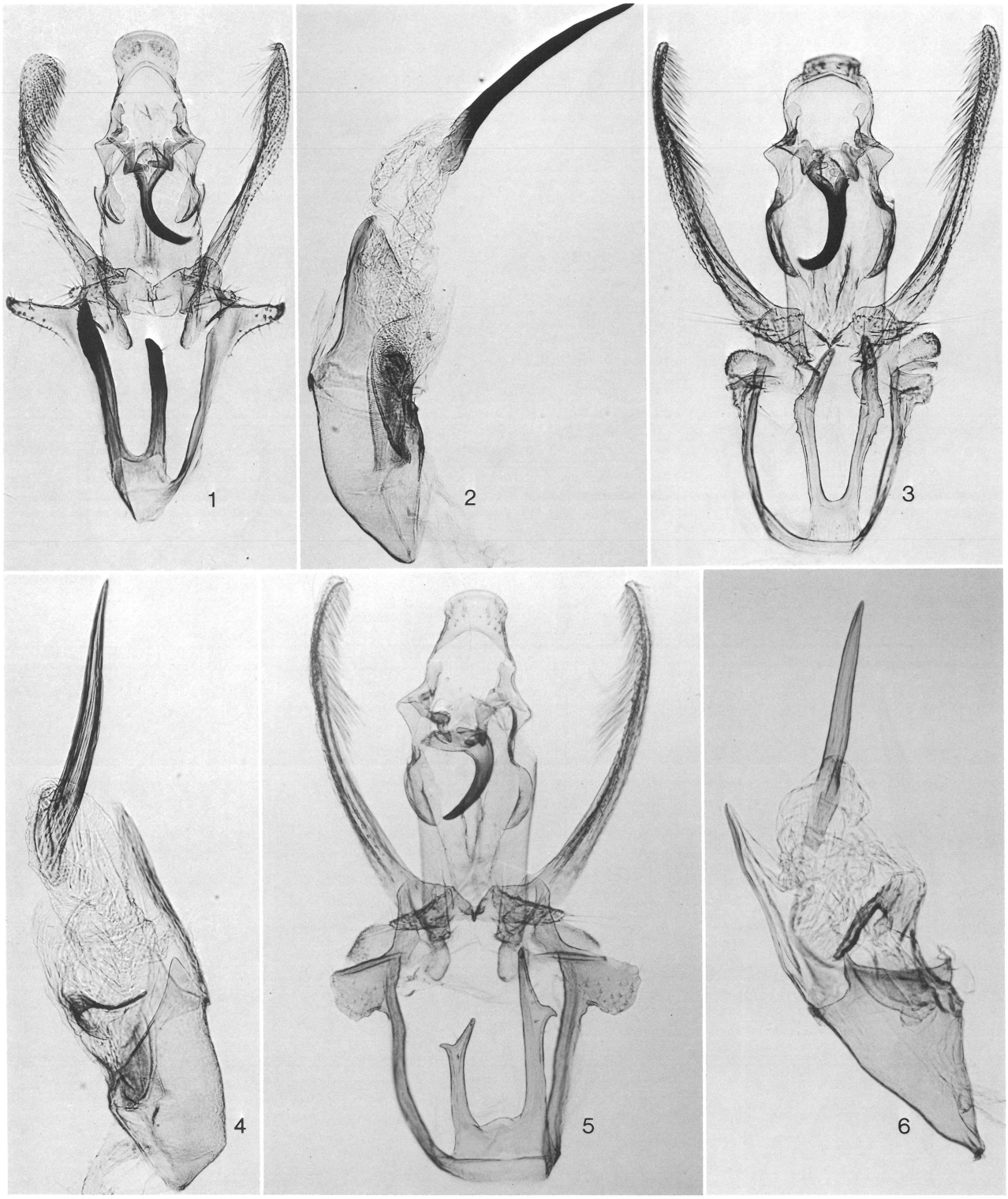


PLATE G: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

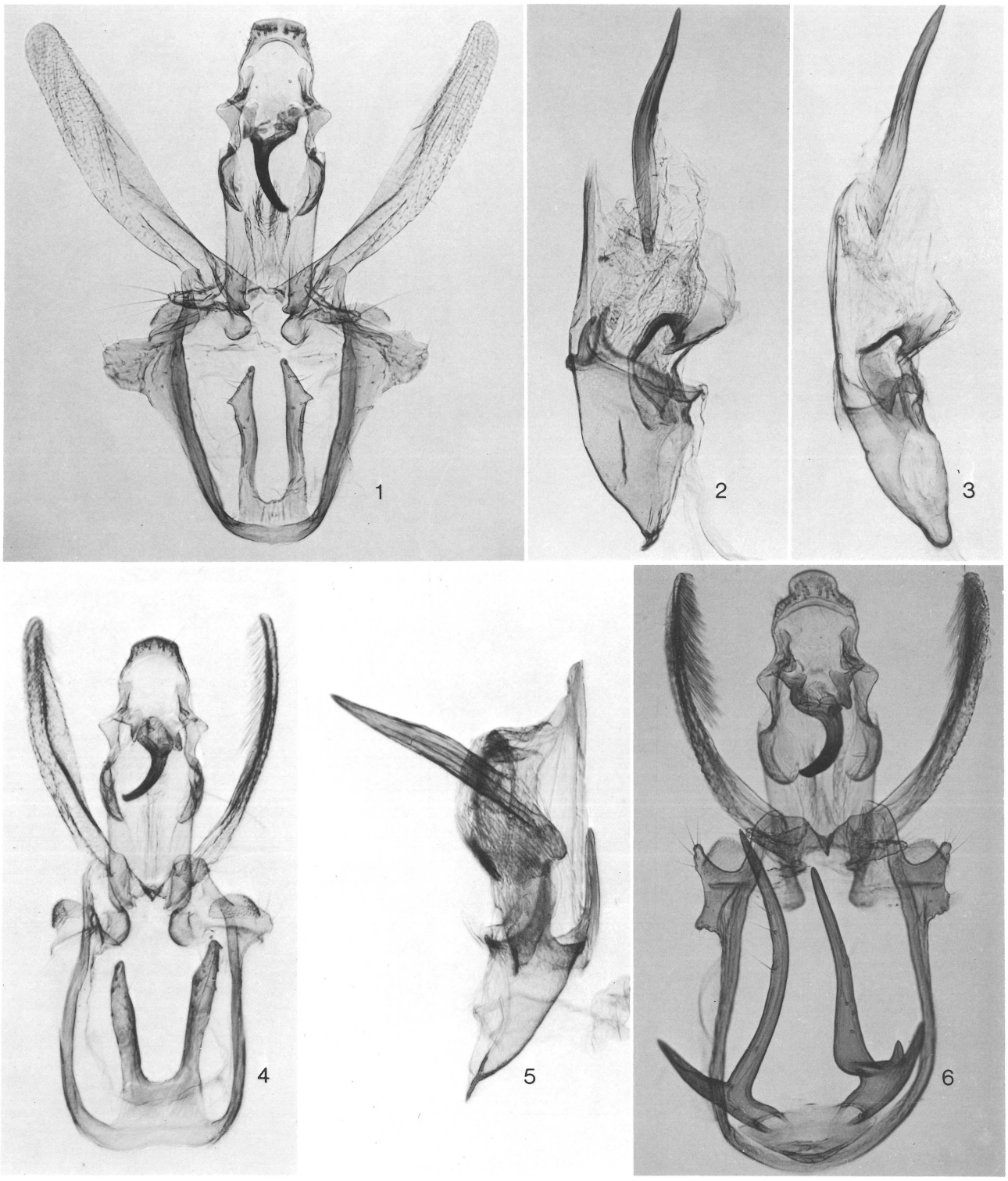


PLATE H: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

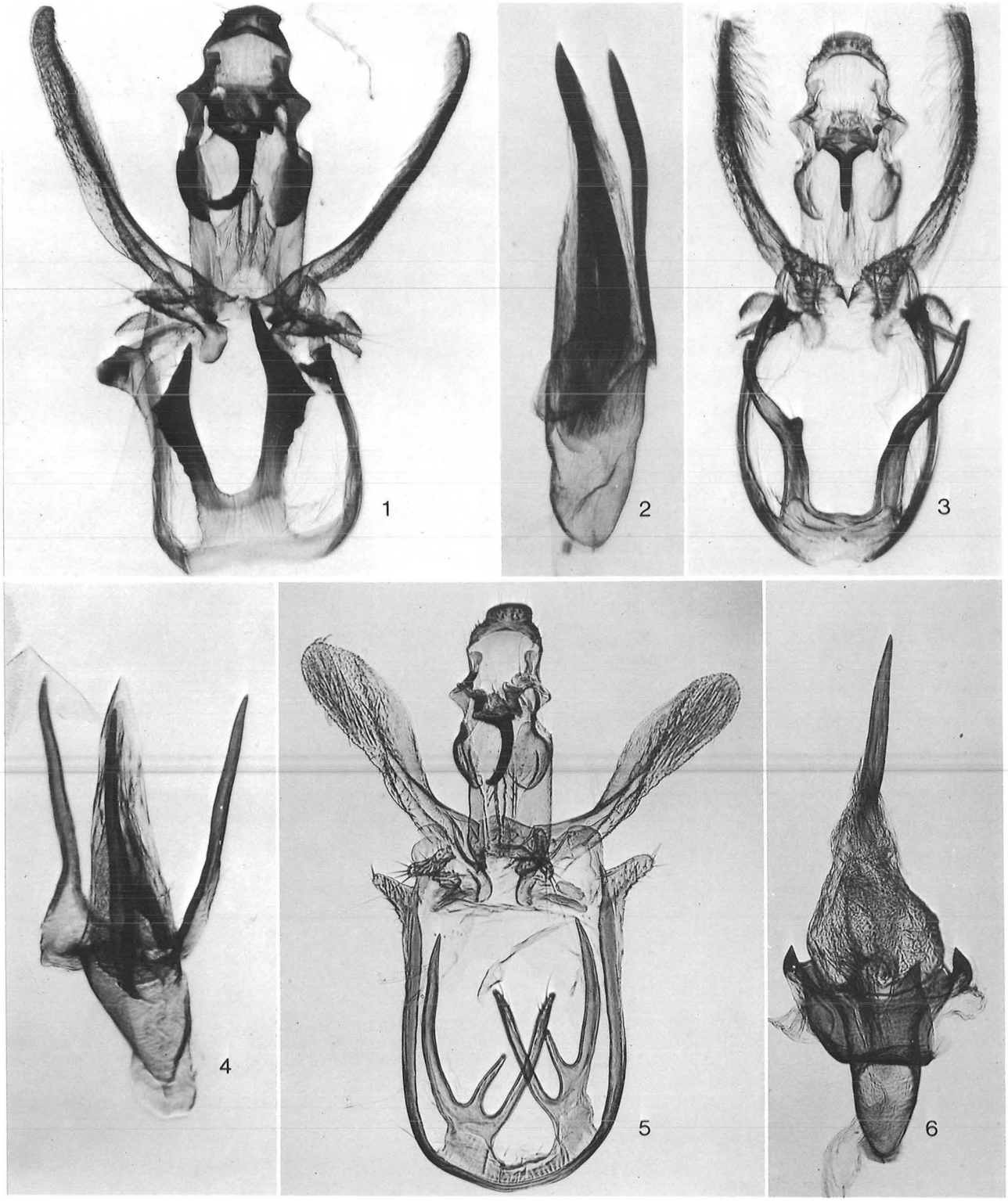


PLATE I: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

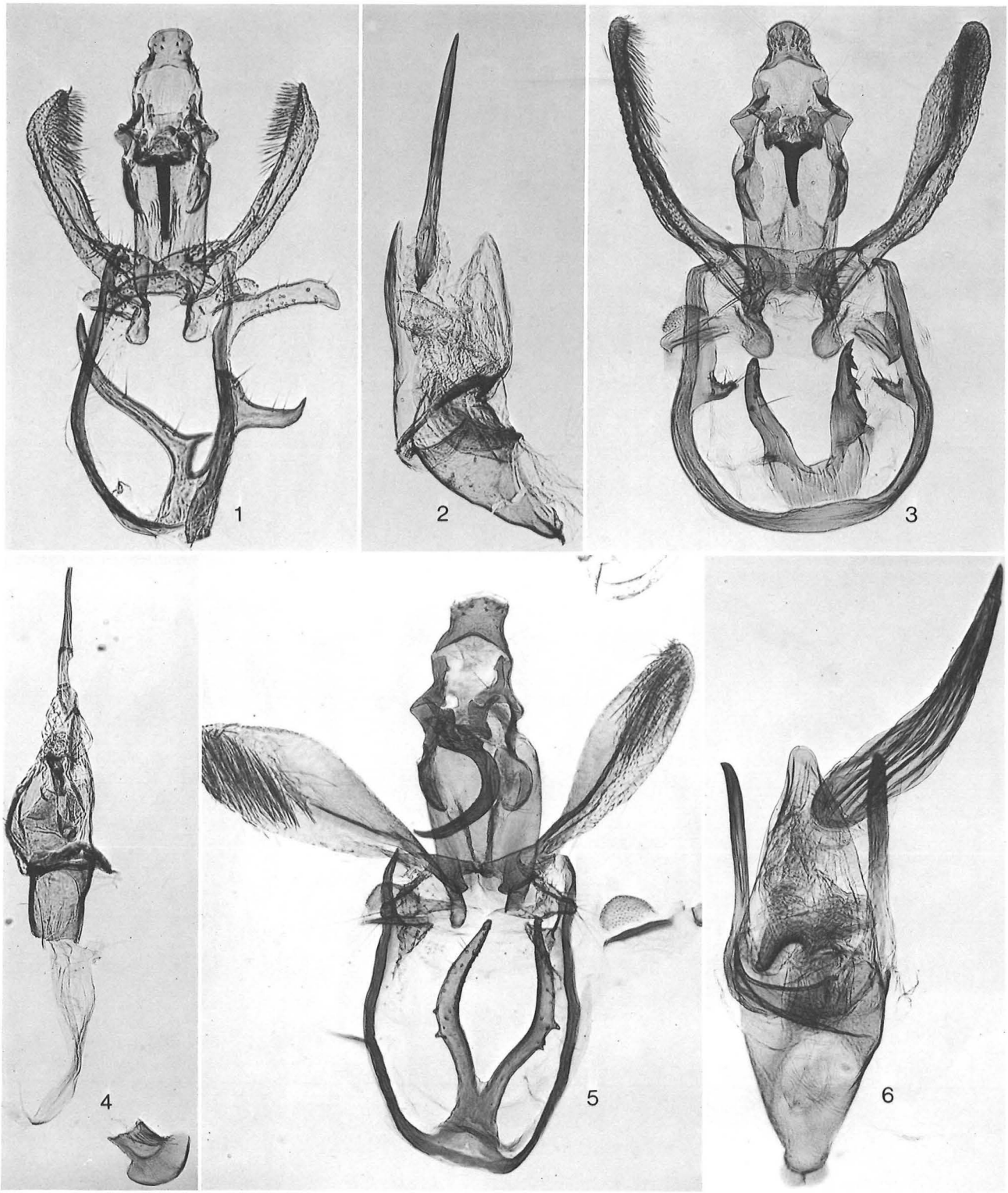


PLATE J: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

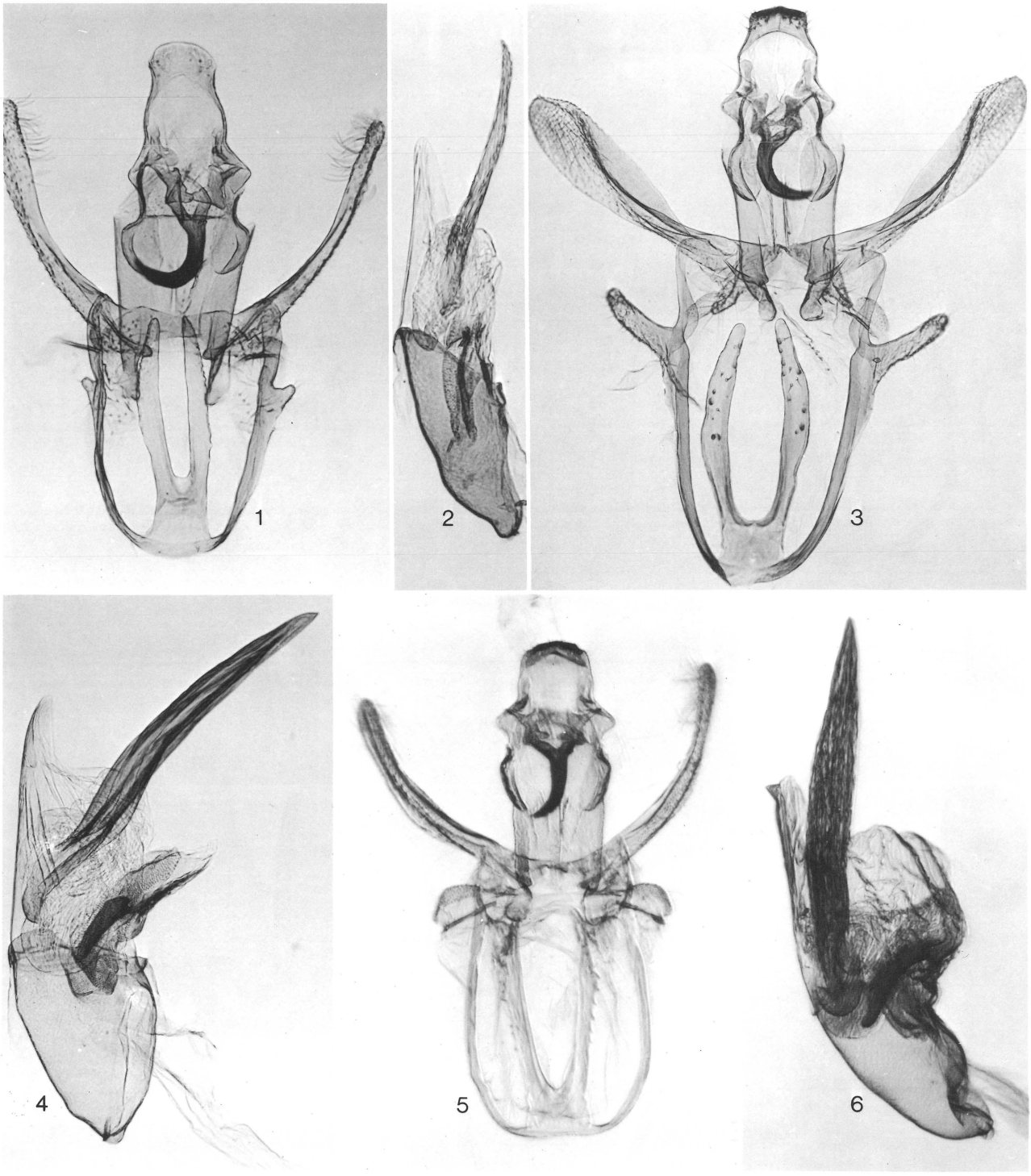


PLATE K: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

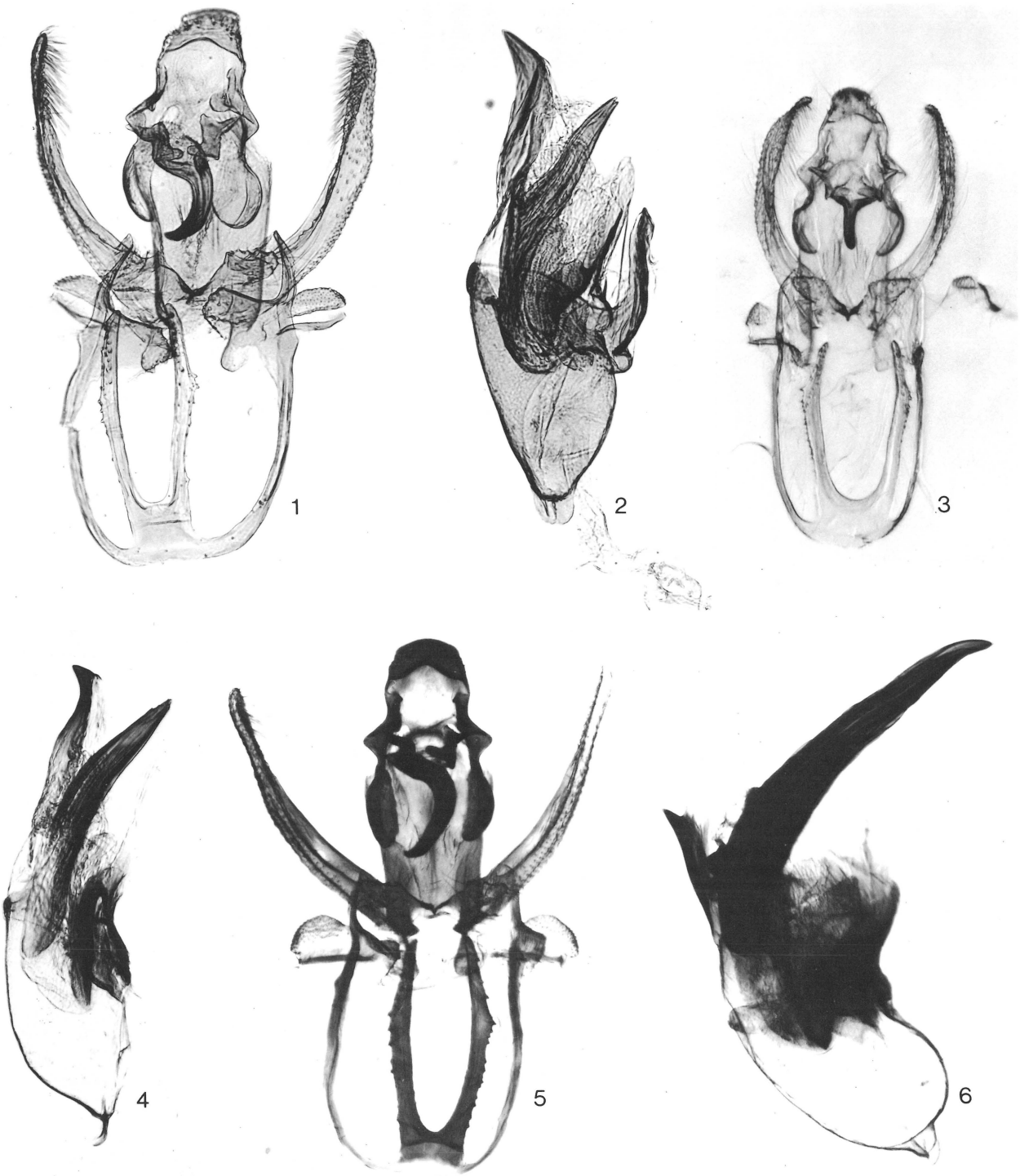


PLATE L: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

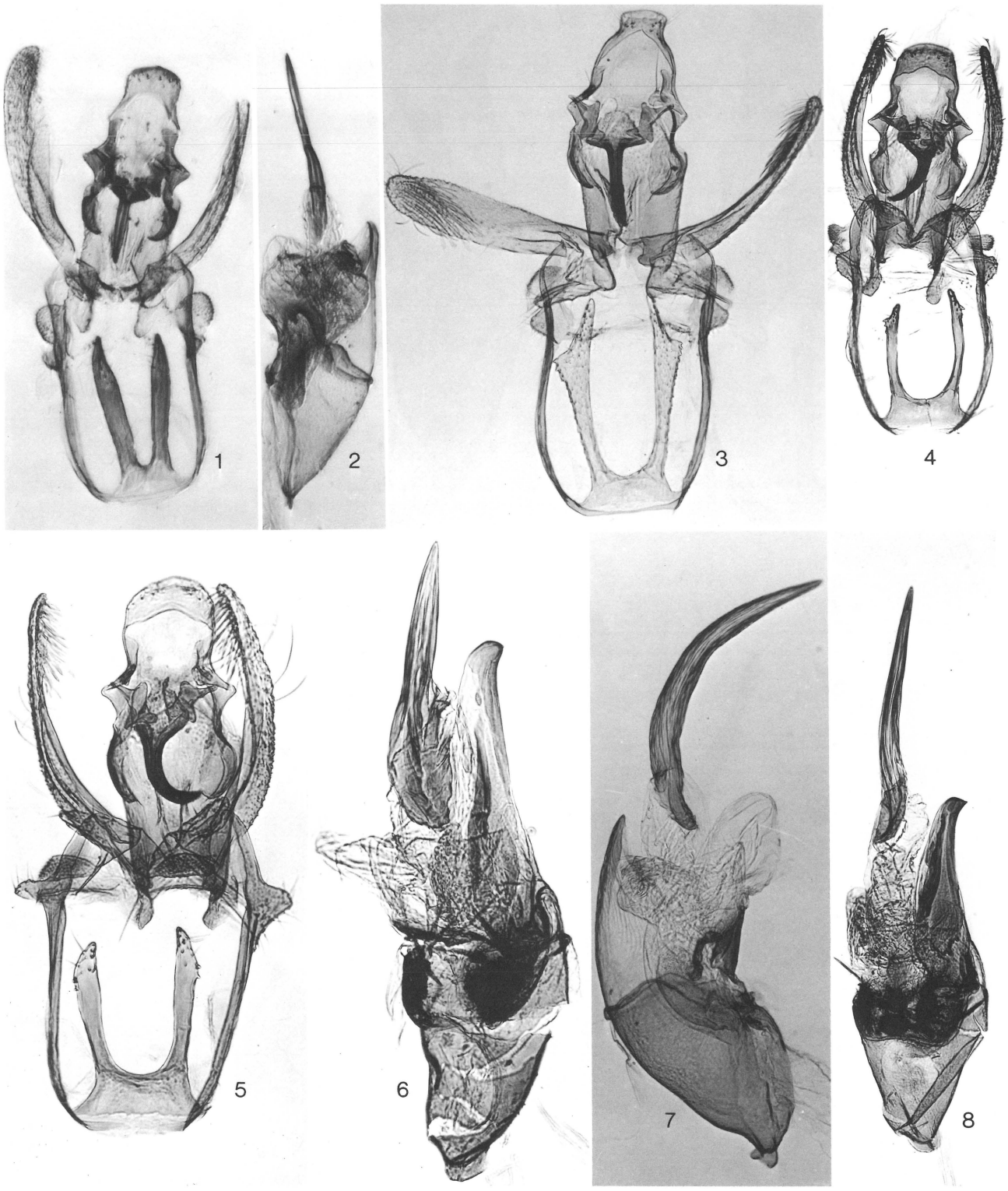


PLATE M: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

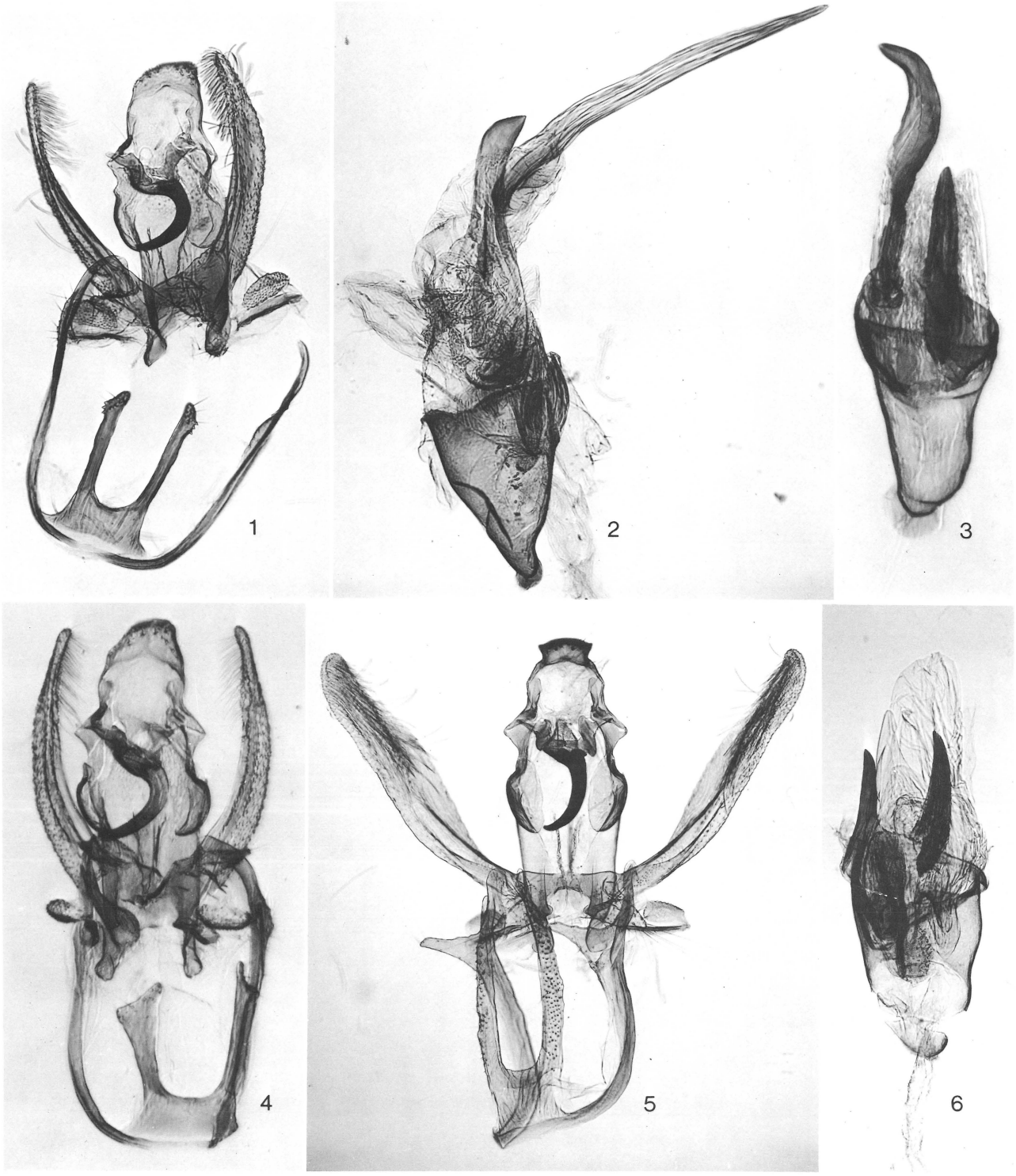


PLATE N: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

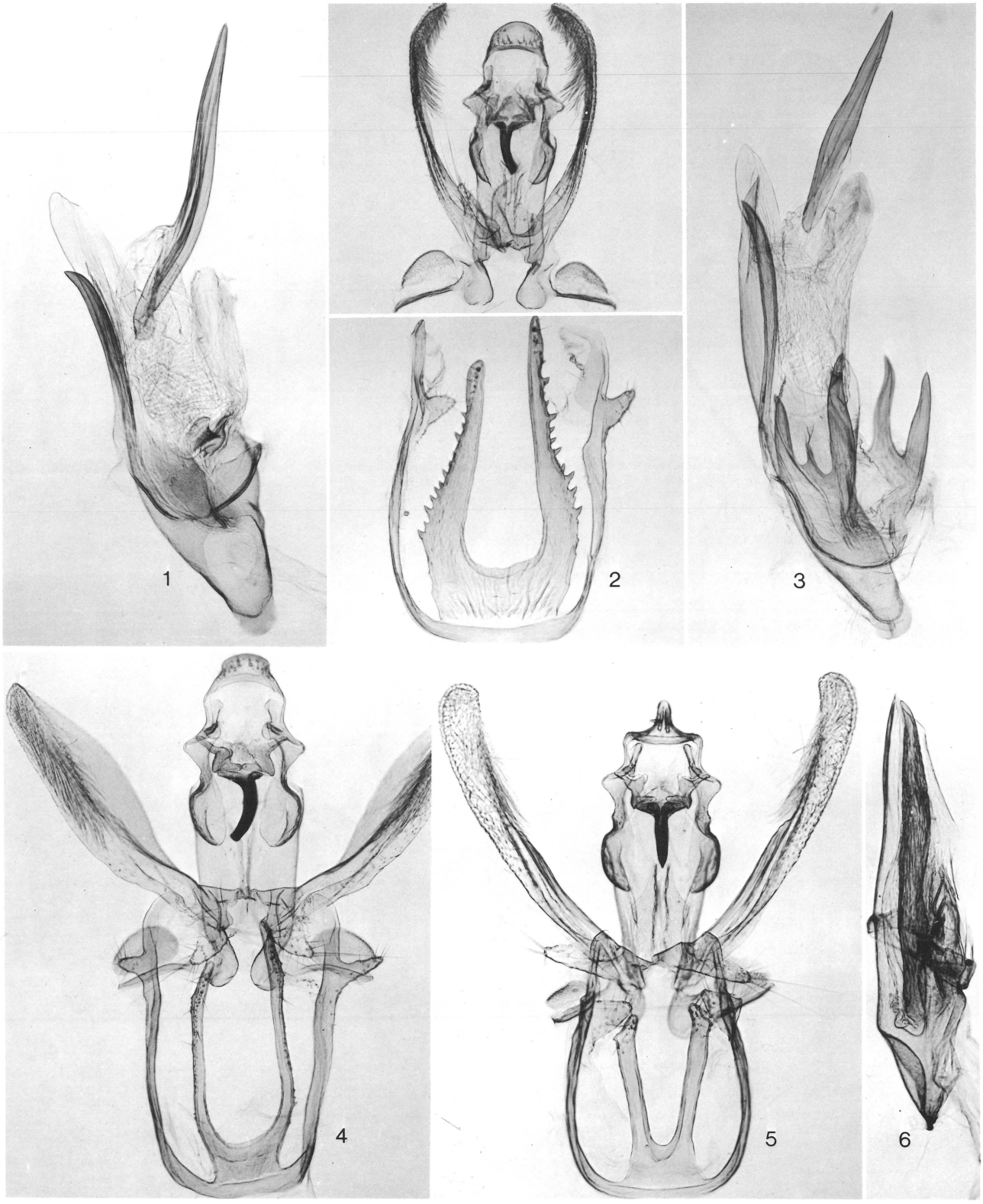


PLATE O: MALE GENITALIA OF DICHOMERIDINAE SPECIES GELECHIOIDEA, PART 8

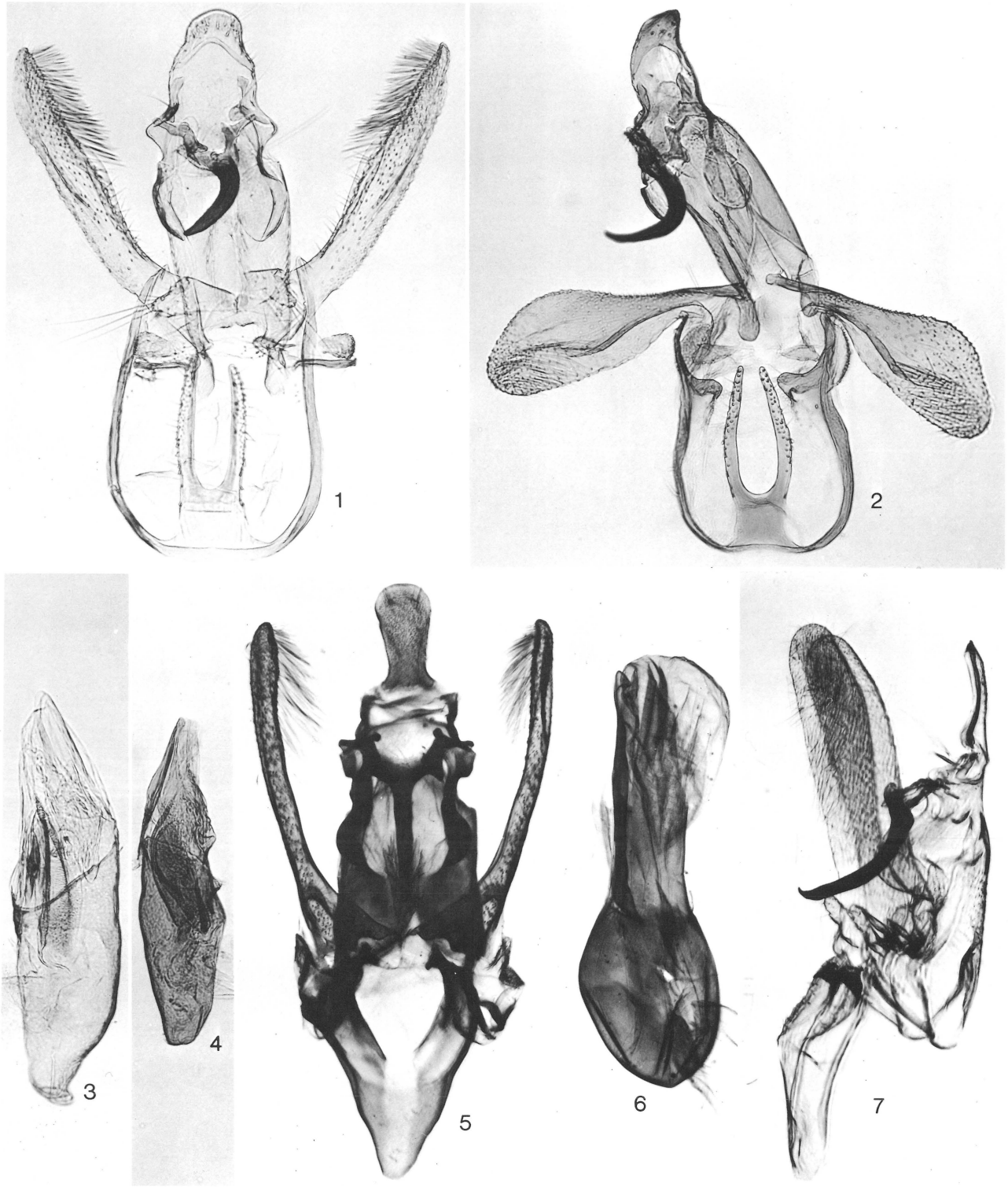


PLATE P: MALE AND FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

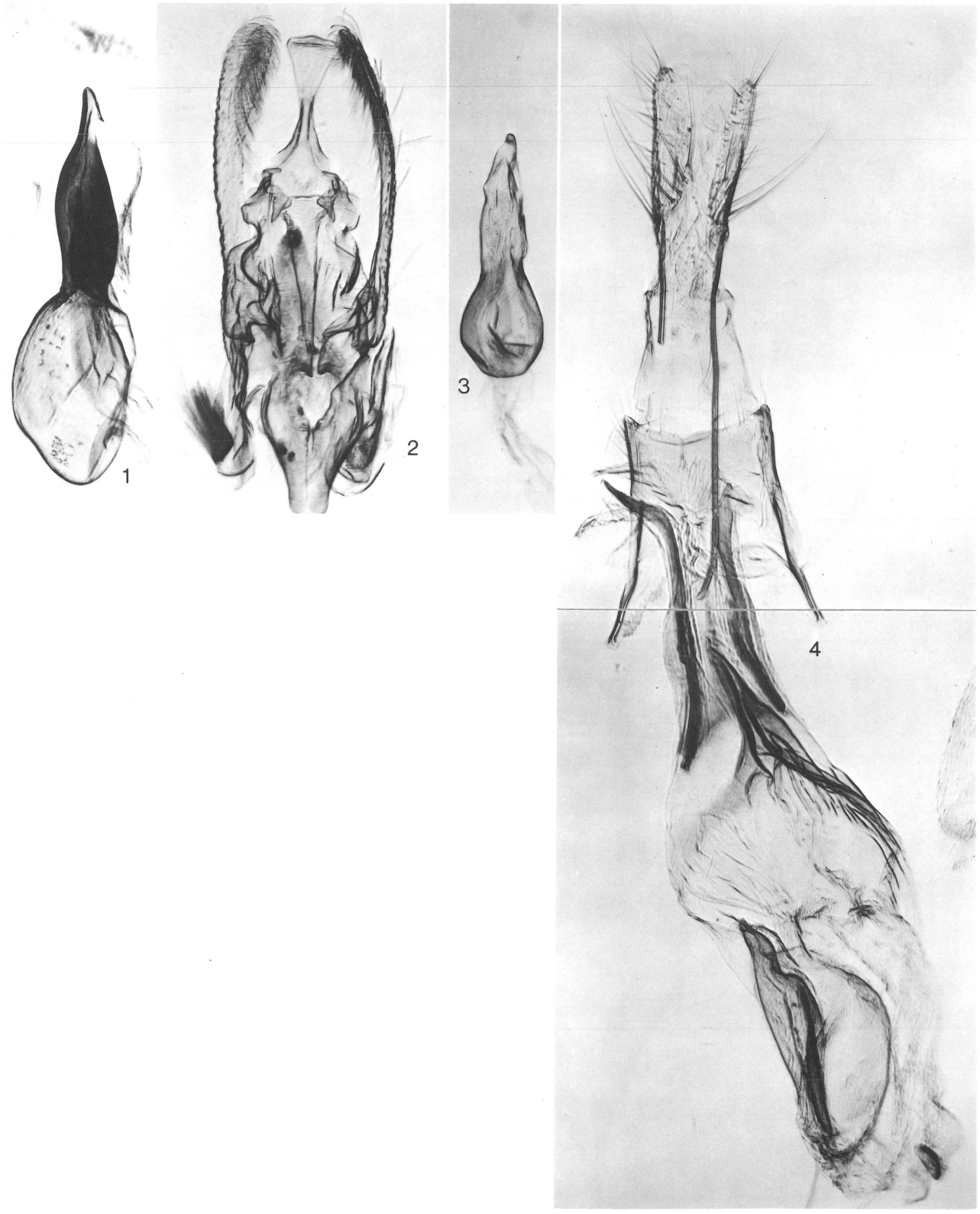


PLATE Q: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

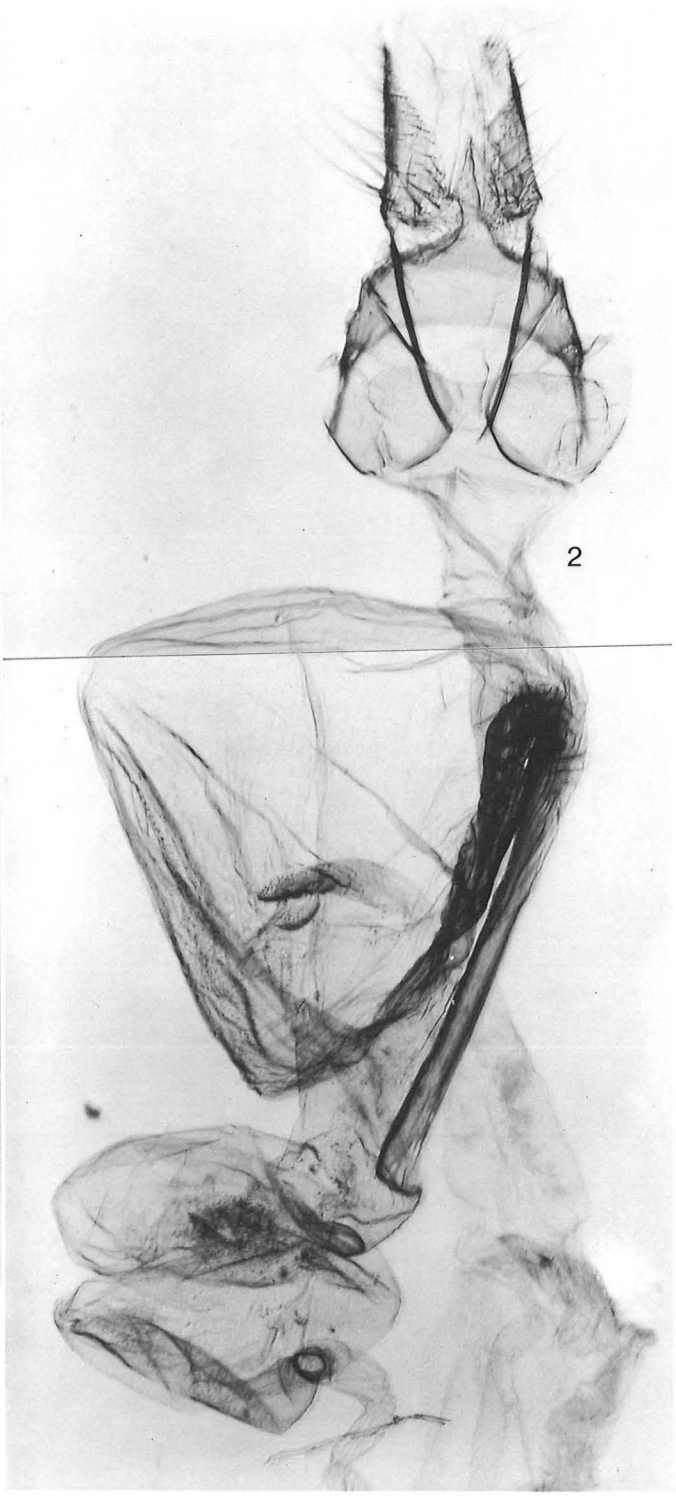


PLATE R: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

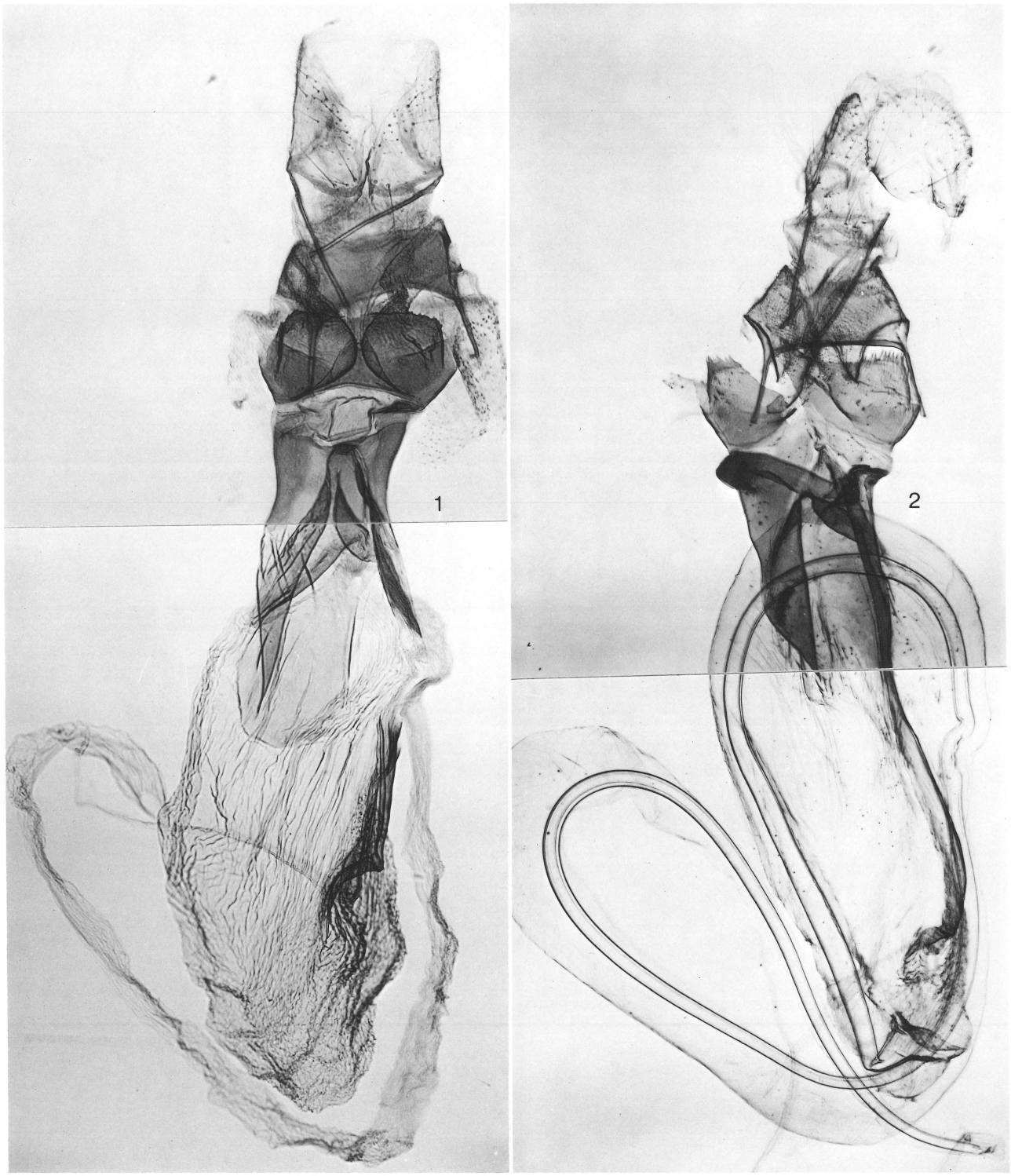
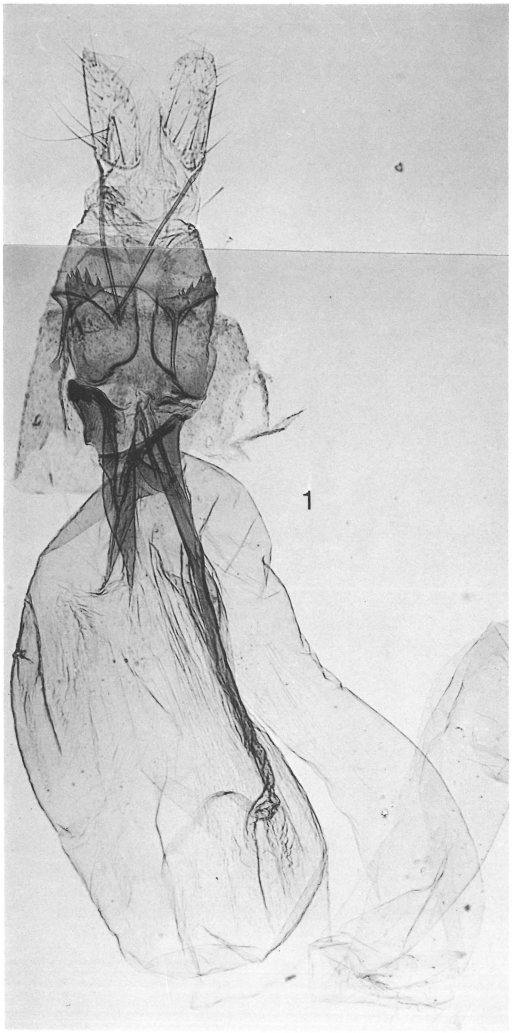
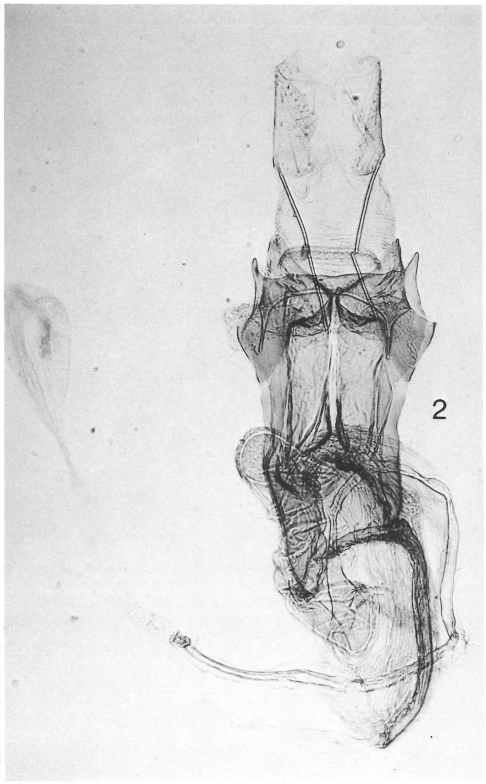
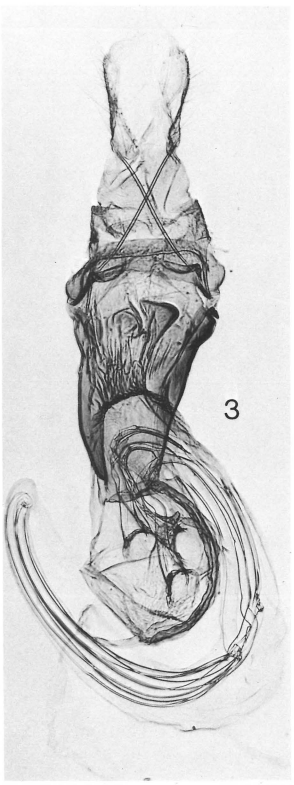
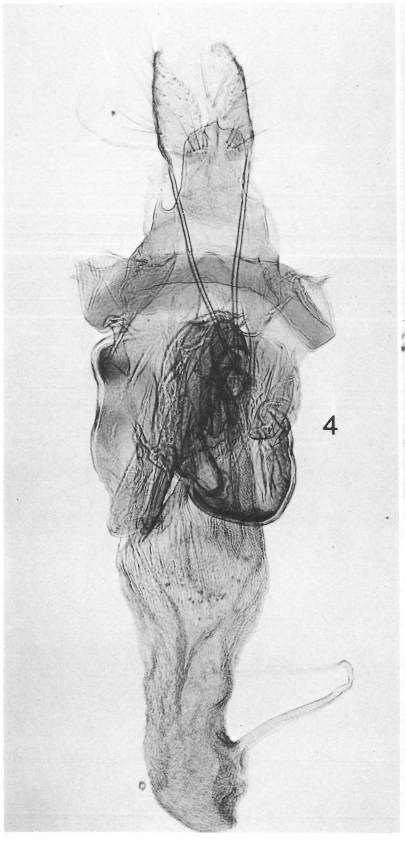


PLATE S: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES









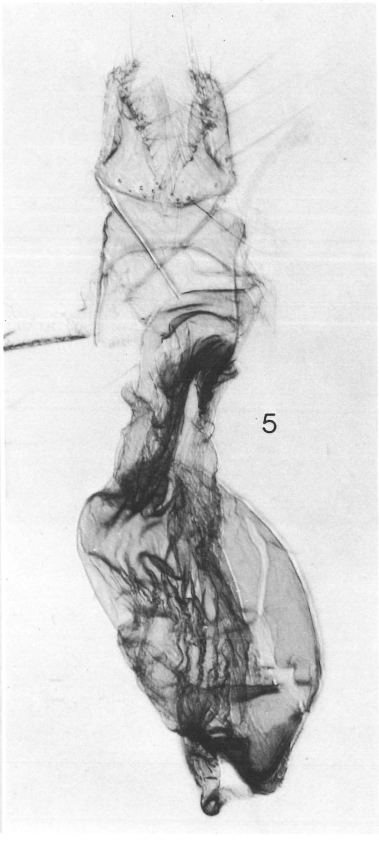


PLATE T: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

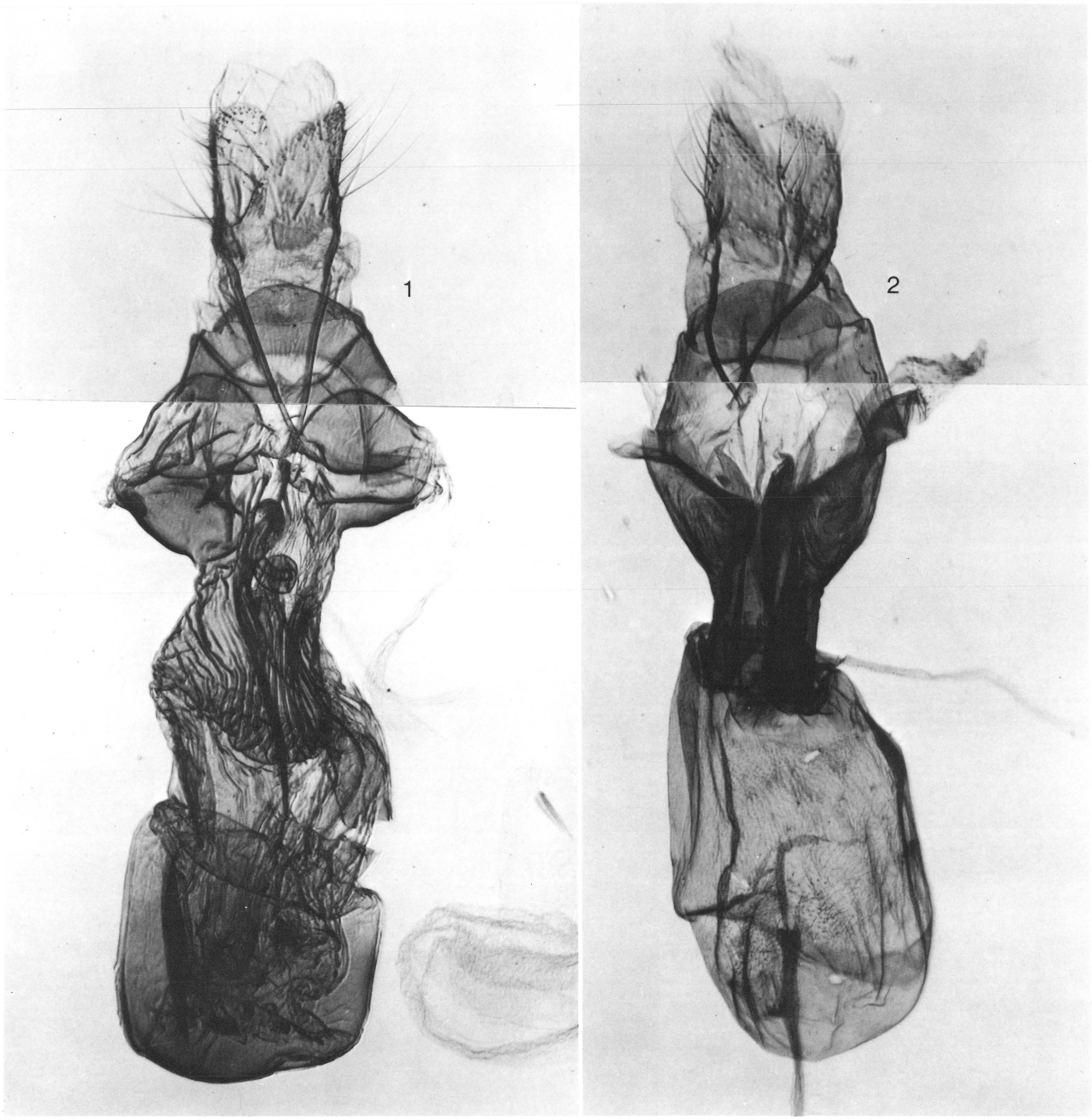


PLATE U: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

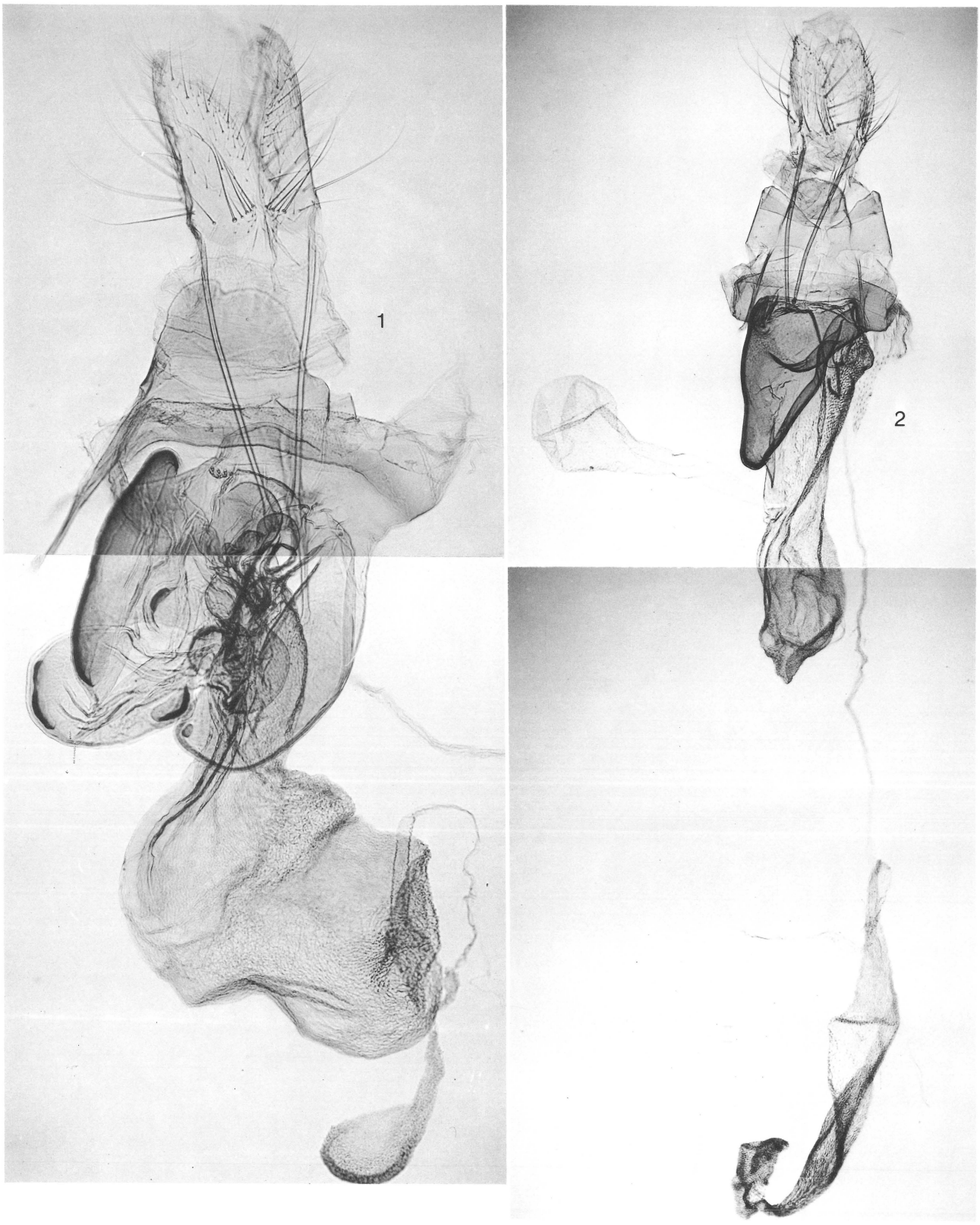


PLATE V: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

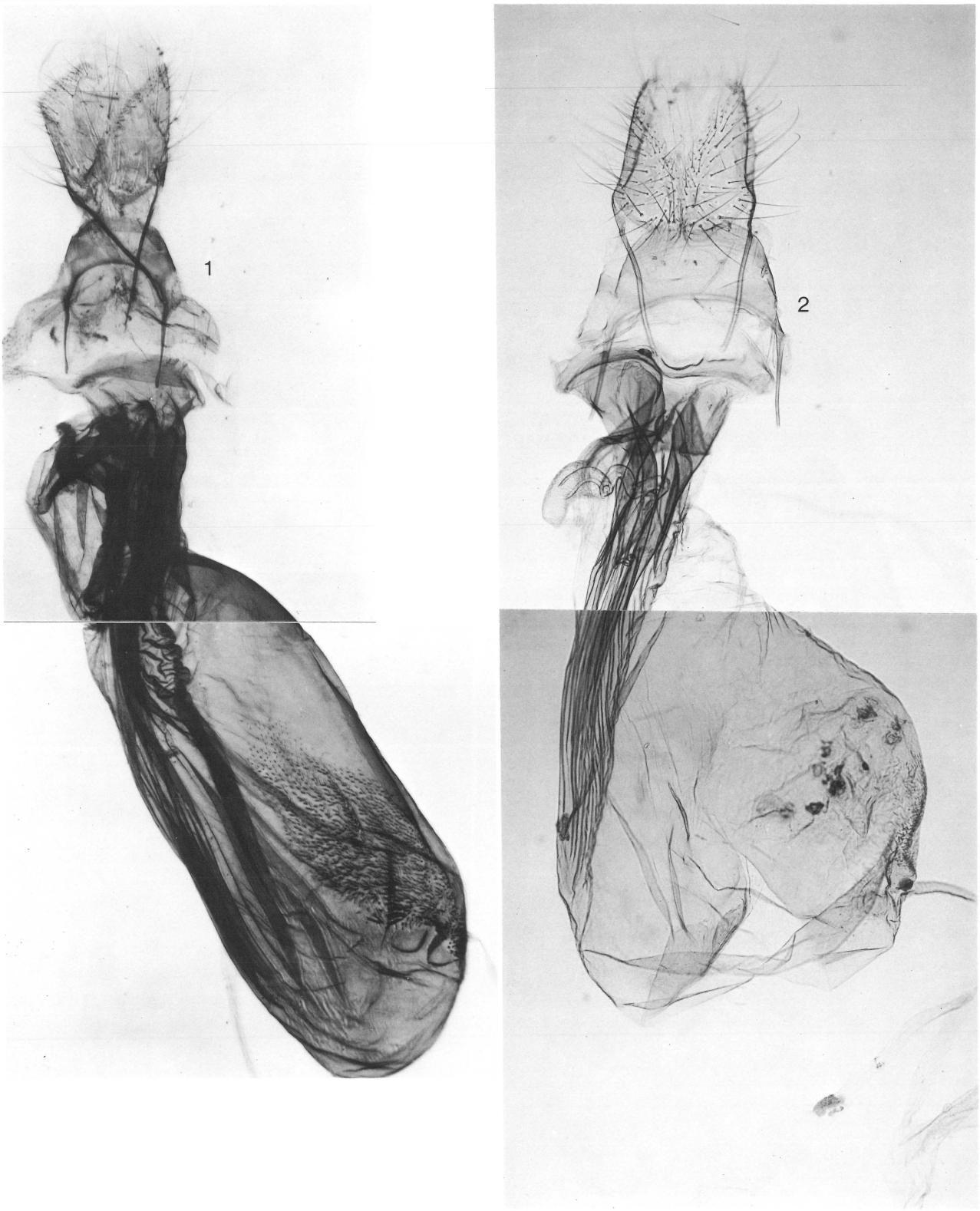


PLATE W: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

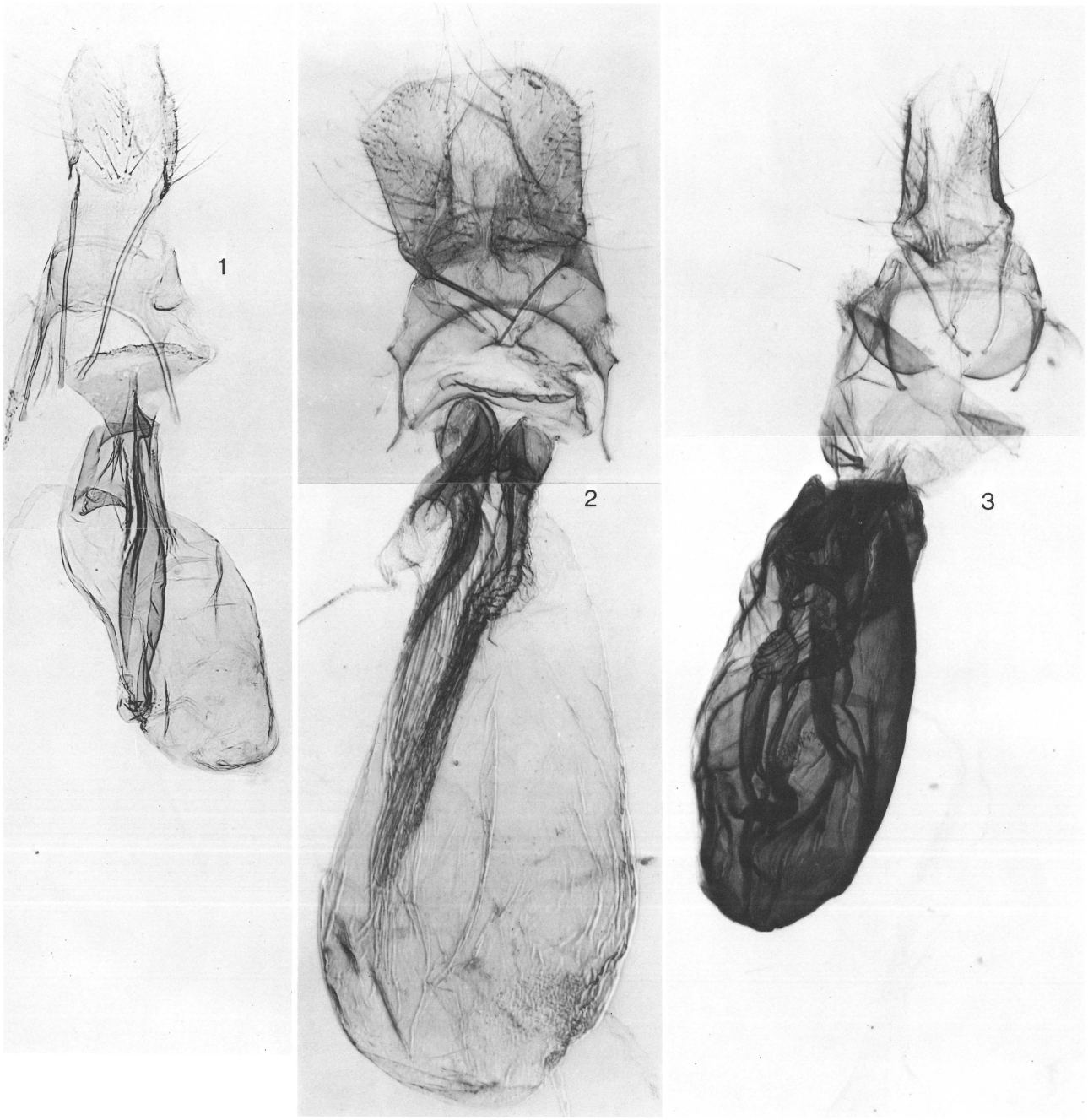


PLATE X: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

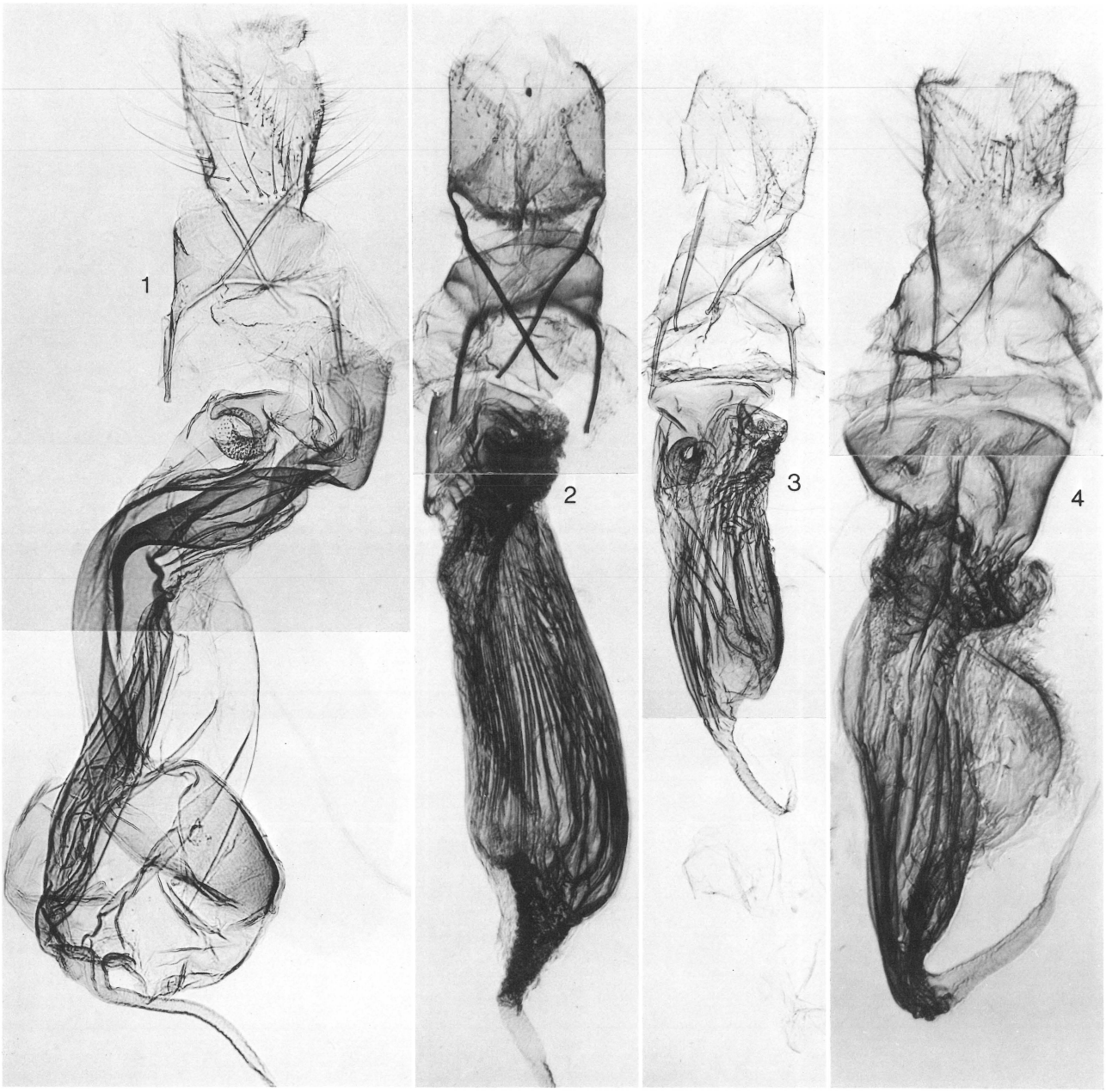


PLATE Y: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

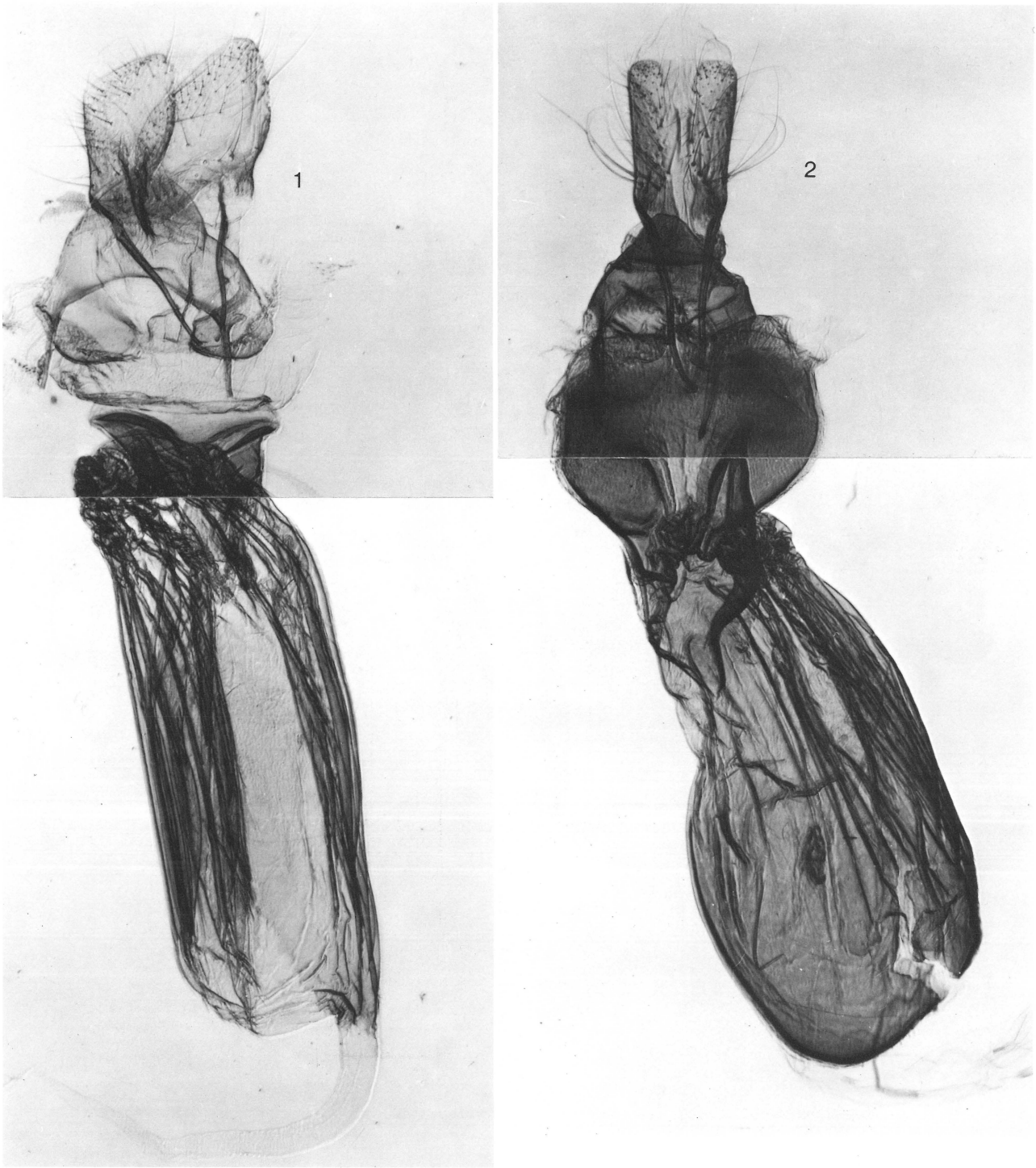


PLATE Z: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

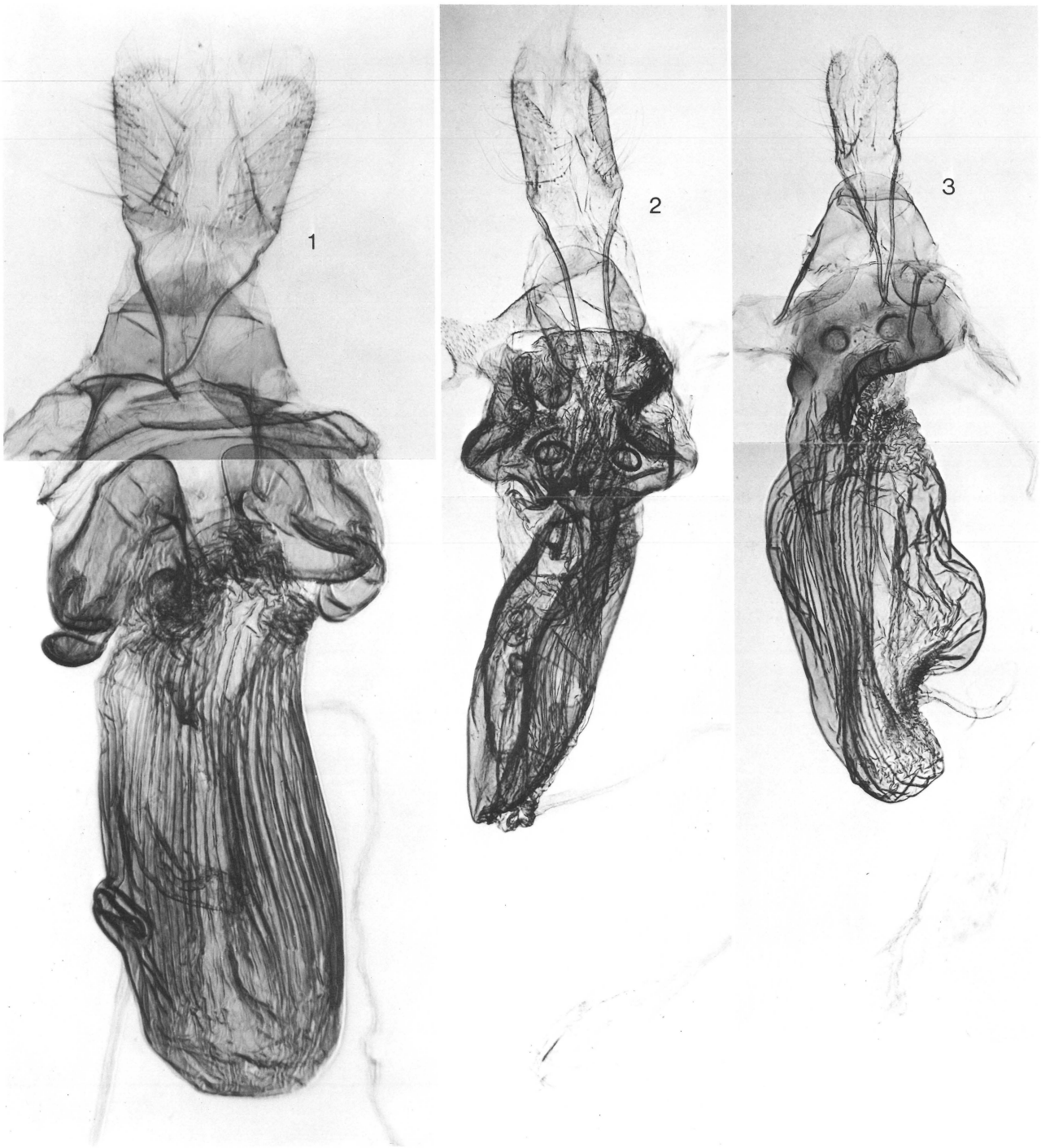


PLATE AA: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

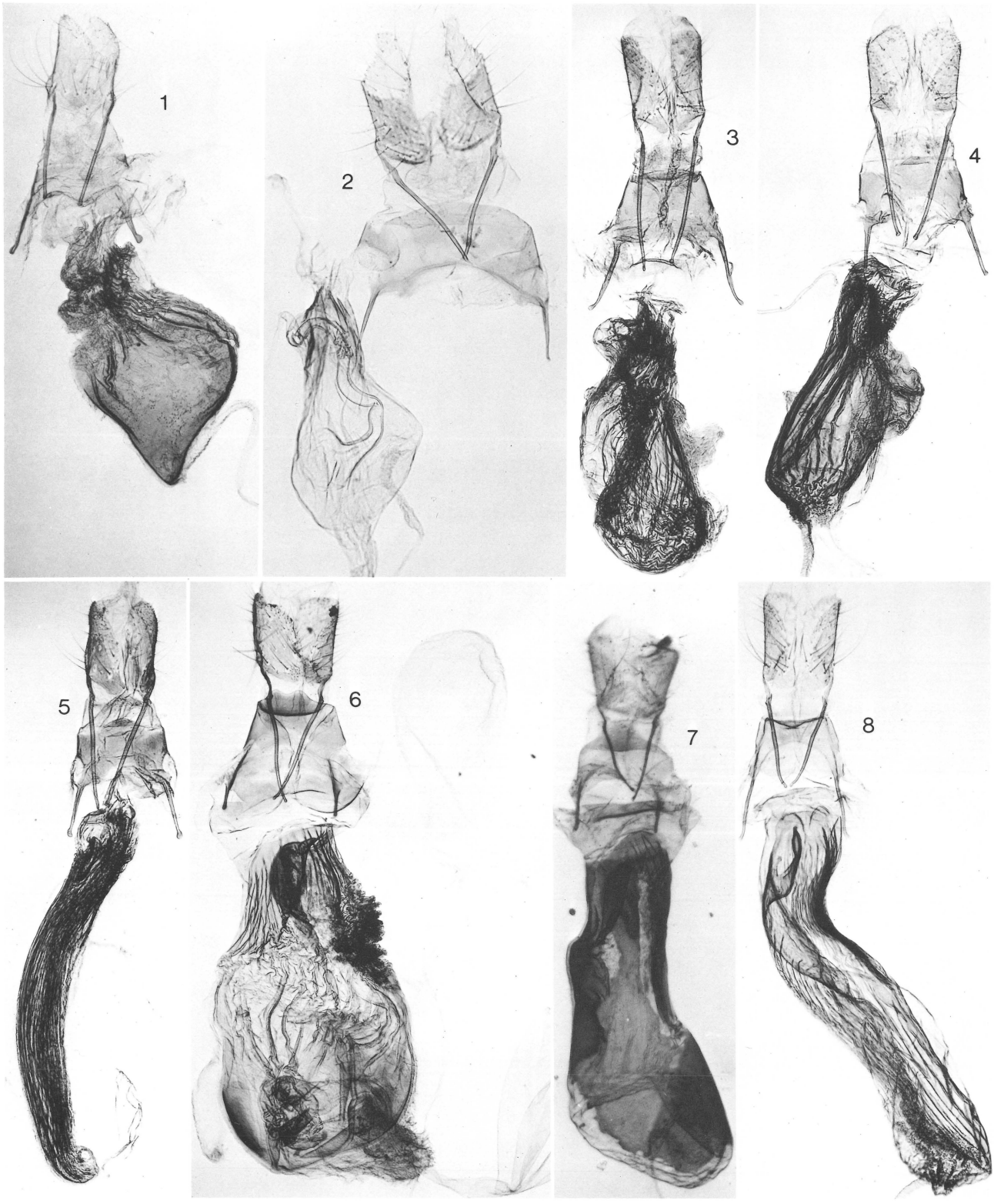


PLATE BB: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

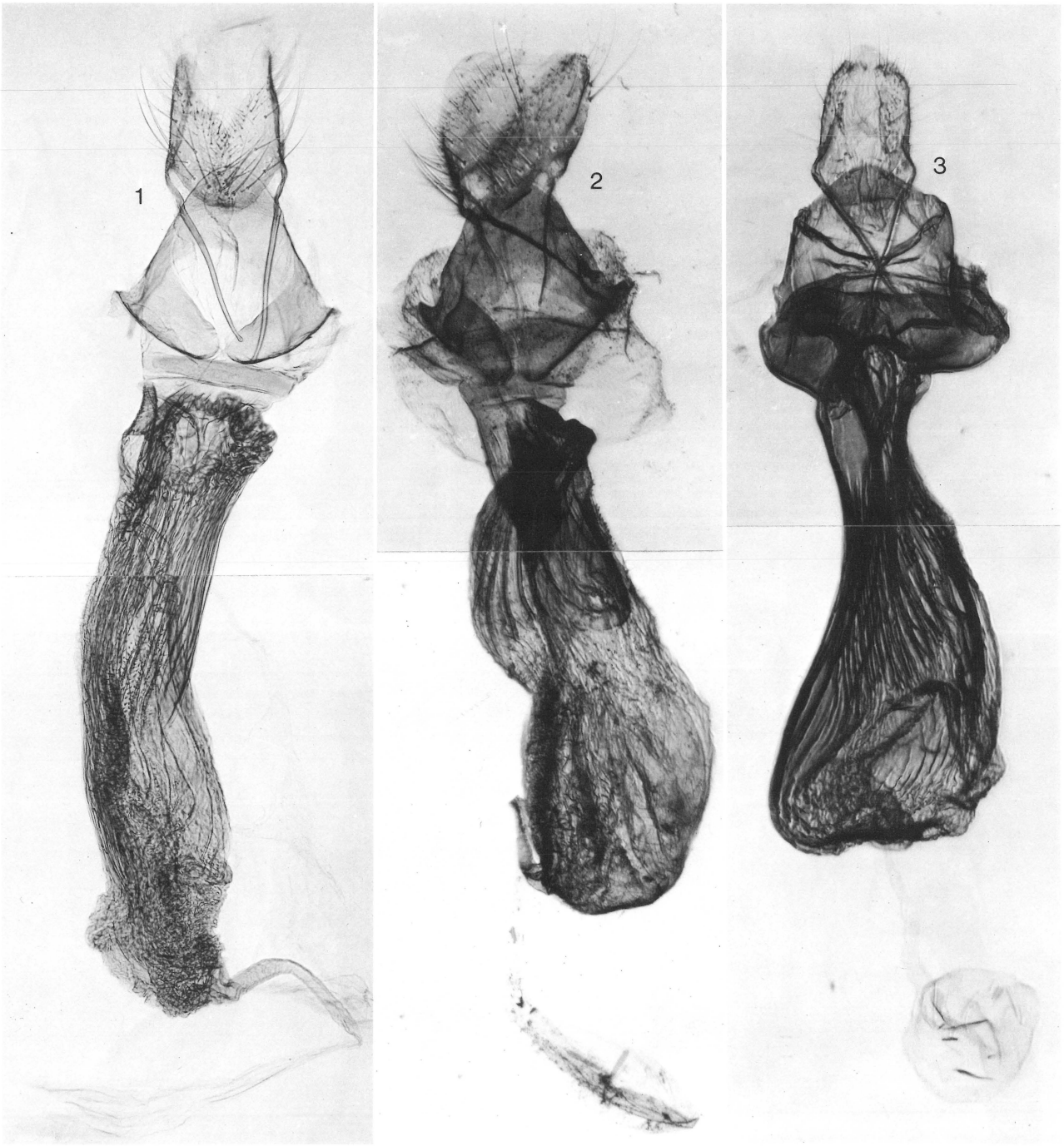


PLATE CC: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

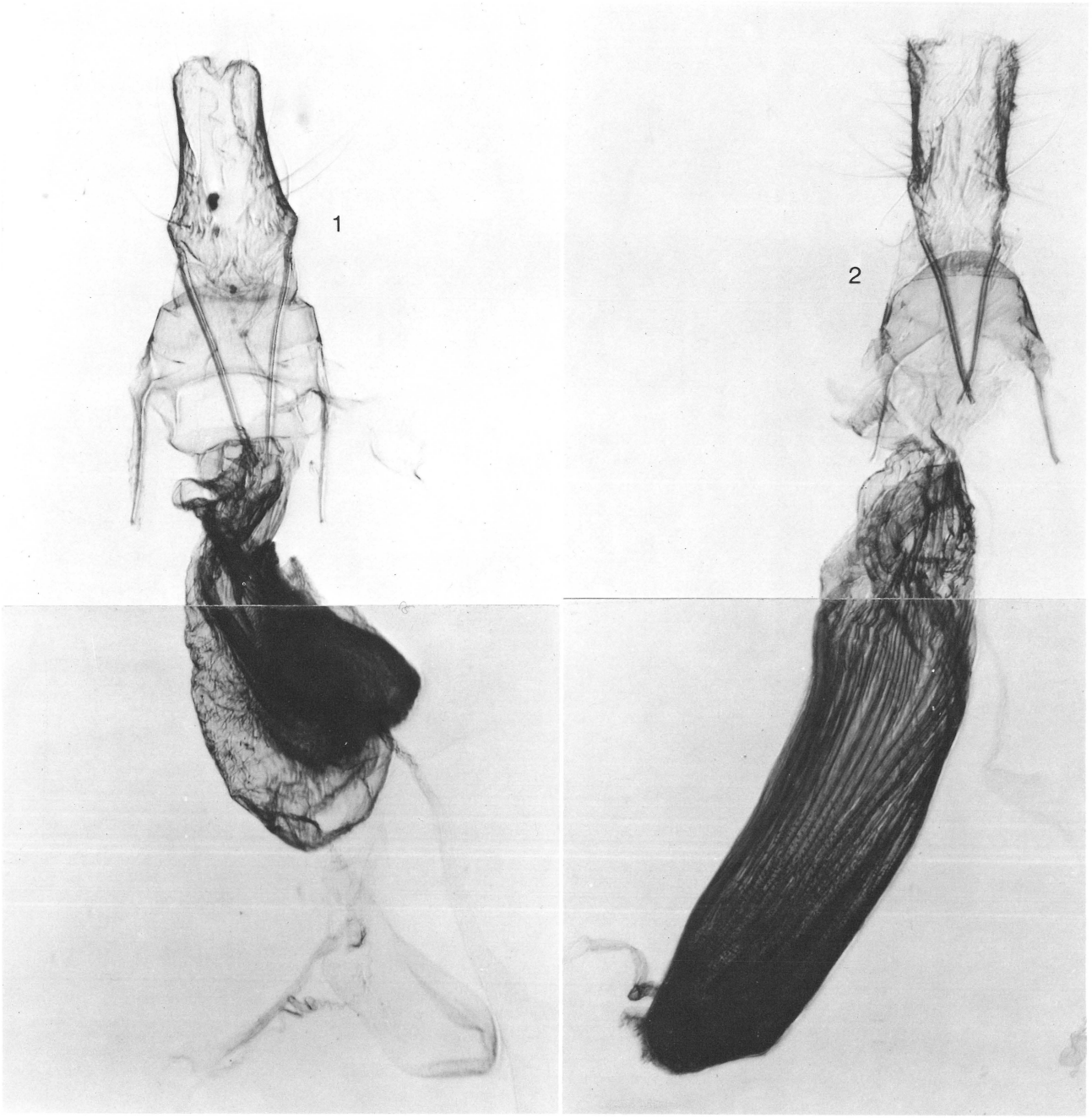


PLATE DD: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

PLATE EE: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

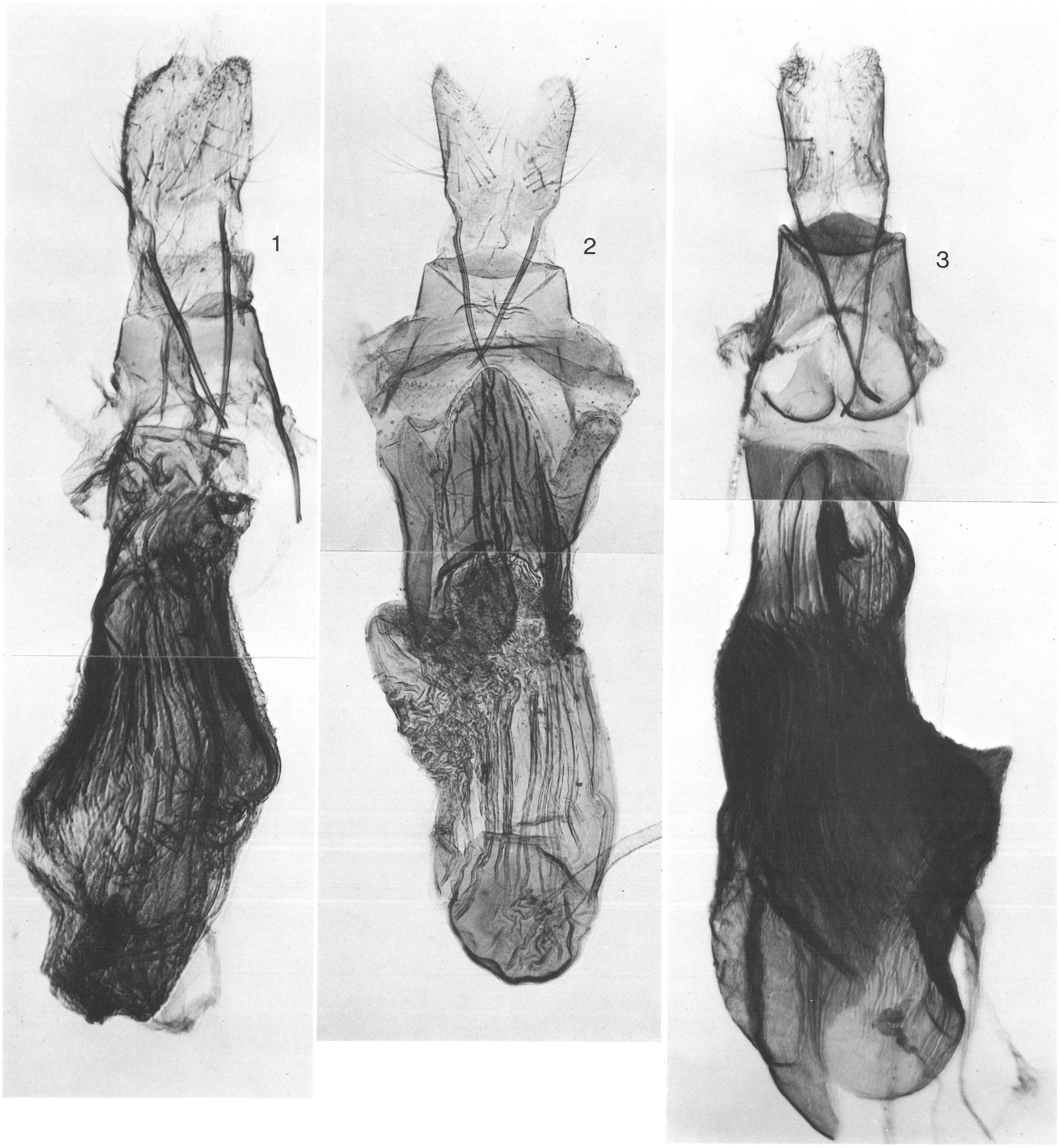


PLATE FF: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

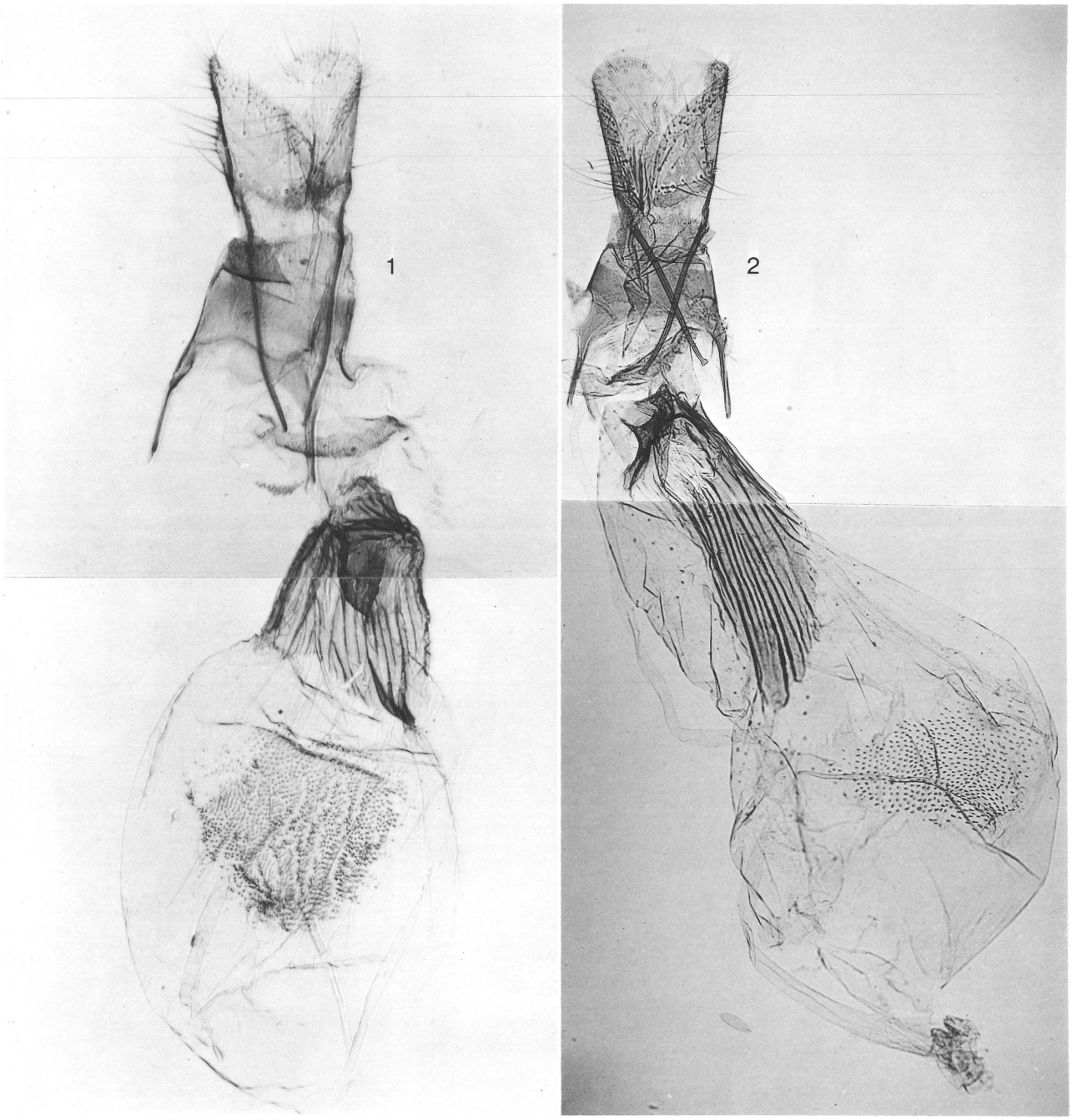


PLATE GG: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8

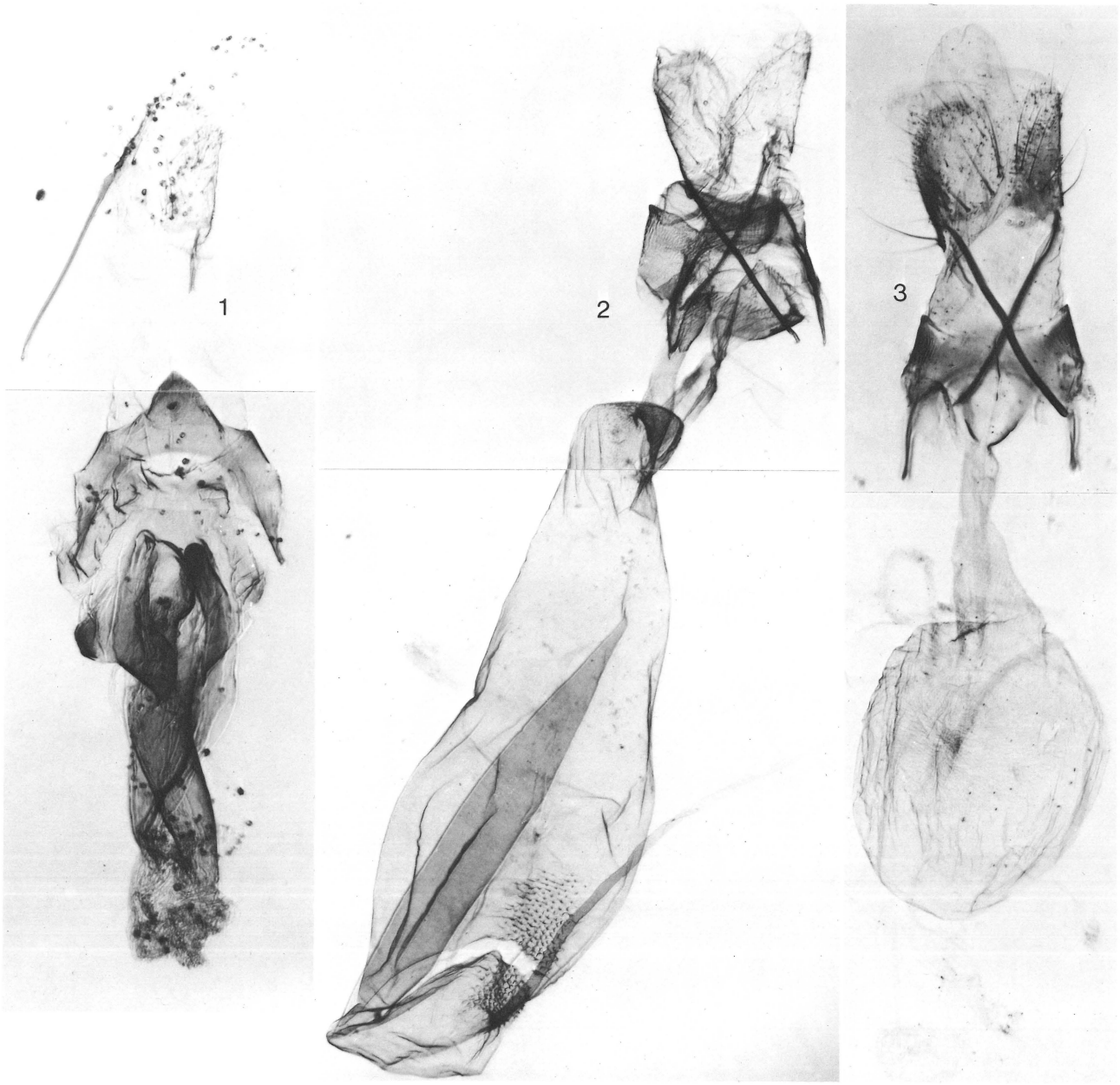
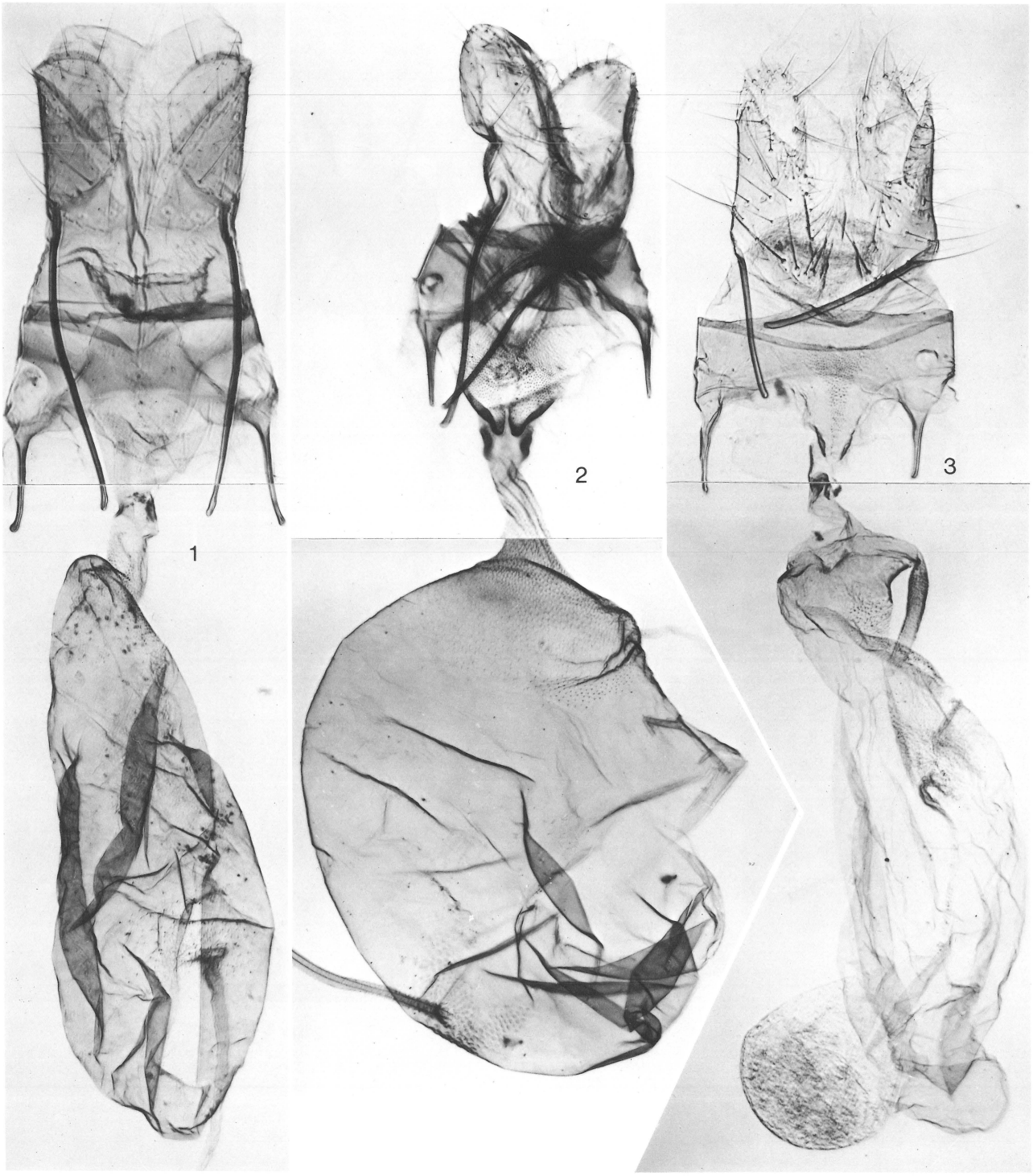


PLATE HH: FEMALE GENITALIA OF DICHOMERIDINAE SPECIES

GELECHIOIDEA, PART 8



COLOR PLATES

Gelechioidea

PLATE 1

Gelechioidea

GELECHIIDAE

figs. 1–40

TWICE NATURAL SIZE 2:1

1. *Dichomeris ligulella* Hbn., ♀. Cherry Hill Recrtn. Area–Rte. 107, 2,000′, Oconee Co., South Carolina, 7 September 1958, R. W. Hodges (USNM). (p. 33).
2. *Dichomeris ligulella* Hbn., ♀. Fairfield Plantation, McClellanville, Charleston Co., South Carolina, 1 May 1981, Ronald W. Hodges (USNM). (p. 33).
3. *Dichomeris ligulella* Hbn., ♀. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 9 May 1981, Ronald W. Hodges (USNM). (p. 33).
4. *Dichomeris ligulella* Hbn., ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 5 July 1966, R. W. Hodges (USNM). (p. 33).
5. *Dichomeris ligulella* Hbn., ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 22 July 1966, R. W. Hodges (USNM). (p. 33).
6. *Dichomeris ligulella* Hbn., ♂. Tenkiller Lake, 3 mi W Blackgum, Sequo. Co., Oklahoma, 6–9 July 1979, D. & M. Davis (USNM). (p. 33).
7. *Dichomeris ligulella* Hbn., ♀. Snyder Heights 1,100′, Ithaca, New York, 15 August 1975, J. G. Franclemont (USNM). (p. 33).
8. *Dichomeris gausapa* Hodges, ♂. Holotype. Madera Canyon 4,880′, Santa Rita Mts., Arizona, 6 August 1959, R. W. Hodges (CU). (p. 37).
9. *Dichomeris condaliavorella* Bsk., ♀. 1 mi SW Islamorada, Upper Matecumbe Key, Monroe Co., Florida, 21 June 1974, J. B. Heppner (JBH). (p. 41).
10. *Dichomeris blanchardorum* Hodges, ♂. Paratype. Laguna Atascosa, Cameron Co., Texas, 6 March 1978, A & ME Blanchard (USNM). (p. 43).
11. *Dichomeris blanchardorum* Hodges, ♂. Holotype. Laguna Atascosa, Cameron Co., Texas, 22 November 1973, A & ME Blanchard (USNM). (p. 43).
12. *Dichomeris citrifoliella* (Cham.), ♂. Clermont Co., Ohio, iss. 15 August 1913, Annette F. Braun (USNM). (p. 45).
13. *Dichomeris citrifoliella* (Cham.), ♂. Key Largo Key, Monroe Co., Florida, 15 July 1967, Mrs. Spencer Kemp (USNM). (p. 45).
14. *Dichomeris marginella* (F.), ♂. Lansing, Michigan, 14 June 1961, R. W. Hodges (USNM). (p. 46).
15. *Dichomeris solatrix* Hodges, ♀. Holotype. Peña Blanca Canyon, Santa Cruz Co., Arizona, 11 August 1959, R. W. Hodges (CU). (p. 48).
16. *Dichomeris hypochloa* Wlsm., ♀. Brown's Canyon 5,000′, Baboquivari Mts., Pima Co., Arizona, 15–30 May 1923, O. C. Poling (USNM). (p. 50).
17. *Dichomeris punctidiscella* (Clem.), ♂. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 30 April 1981, Ronald W. Hodges (USNM). (p. 54).
18. *Dichomeris punctidiscella* (Clem.), ♂. Lakehurst, New Jersey, 1 June 1962, R. W. Hodges (USNM). (p. 54).
19. *Dichomeris punctidiscella* (Clem.), ♂. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 9 May 1981, Ronald W. Hodges (USNM). (p. 54).
20. *Dichomeris punctidiscella* (Clem.), ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 29 May 1966, R. W. Hodges (USNM). (p. 54).
21. *Dichomeris diva* Hodges, ♀. Paratype. Peña Blanca Canyon, Santa Cruz Co., Arizona, 1 September 1959, R. W. Hodges (USNM). (p. 57).
22. *Dichomeris sylphe* Hodges, ♀. Paratype. Archbold Bio. Sta., Lake Placid, Florida, 1 April 1959, R. W. Hodges (USNM). (p. 58).
23. *Dichomeris empusa* Hodges, ♂. Paratype. West Fork 6,500′, 16 mi SW Flagstaff, Coconino Co., Arizona, 4 July 1961, Ronald W. Hodges (USNM). (p. 59).
24. *Dichomeris flavocostella* (Clem.), ♂. Six Mile Creek, Ithaca, New York, 11 July 1954, J. G. Franclemont (USNM). (p. 66).
25. *Dichomeris fistuca* Hodges, ♂. Holotype. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 27 April 1981, Ronald W. Hodges (USNM). (p. 68).
26. *Dichomeris inversella* (Zell.), ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 20 July 1966, R. W. Hodges (USNM). (p. 69).
27. *Dichomeris inversella* (Zell.), ♀. Devil's Den St. Pk., Wash. Co., Arkansas, 22 July 1966, R. W. Hodges (USNM). (p. 69).
28. *Dichomeris inversella* (Zell.), ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 18 July 1966, R. W. Hodges (USNM). (p. 69).
29. *Dichomeris inversella* (Zell.), ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 16 July 1966, R. W. Hodges (USNM). (p. 69).
30. *Dichomeris kimballi* Hodges, ♂. Paratype. Seashore St. Pk., Nansemond Co., Virginia, 1–4 June 1975, D. & M. Davis (USNM). (p. 71).
31. *Dichomeris ventrella* (Fitch), ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 10 July 1966, R. W. Hodges (USNM). (p. 74).
32. *Dichomeris ventrella* (Fitch), ♀. Devil's Den St. Pk., Wash. Co., Arkansas, 24 June 1966, R. W. Hodges (USNM). (p. 74).
33. *Dichomeris ventrella* (Fitch), ♀. Archbold Bio. Sta., Lake Placid, Florida, 8–15 May 1964, R. W. Hodges (USNM). (p. 74).
34. *Dichomeris ventrella* (Fitch), ♀. Devil's Den St. Pk., Wash. Co., Arkansas, 28 June 1966, R. W. Hodges (USNM). (p. 74).
35. *Dichomeris ventrella* (Fitch), ♂. Hartford, Sebastian Co., Arkansas, 8 June 1966, R. W. Hodges (USNM). (p. 74).
36. *Dichomeris ventrella* (Fitch), ♀. Archbold Bio. Sta., Lake Placid, Florida, 1–7 May 1964, R. W. Hodges (USNM). (p. 74).
37. *Dichomeris georgiella* (Wlk.), ♀. Madera Canyon 4,880′, Santa Rita Mts., Arizona, 16 August 1959, R. W. Hodges (USNM). (p. 75).
38. *Dichomeris georgiella* (Wlk.), ♂. Hartford, Sebastian Co., Arkansas, 8 June 1966, R. W. Hodges (USNM). (p. 75).
39. *Dichomeris georgiella* (Wlk.), ♂. Green Gulch 5,500′, Chisos Mts., Brewster Co., Texas, 6 June 1973, R. W. Hodges (USNM). (p. 75).
40. *Dichomeris georgiella* (Wlk.), ♂. Hartford, Sebastian Co., Arkansas, 8 June 1966, R. W. Hodges (USNM). (p. 75).

GELECHIOIDEA, PART 8: PLATE 1

PLATE 2

Gelechioidea

GELECHIIDAE

figs. 1–39

TWICE NATURAL SIZE 2:1

1. *Dichomeris georgiella* (Wlk.), ♂. Highlands 3,865′, Macon Co., North Carolina, 4 August 1958, J. G. Franclemont (USNM). (p. 75).
2. *Dichomeris vacciniella* Bsk., ♂. New Lisbon, New Jersey, emerged 19 July 1944, E. P. Darlington (USNM). (p. 76).
3. *Dichomeris vacciniella* Bsk., ♂. The Wedge, McClellanville, South Carolina, 21 March 1968, R. W. Hodges (USNM). (p. 76).
4. *Dichomeris vacciniella* Bsk., ♂. Devil's Den St. Pk., Wash. Co., Arkansas, 18 June 1966, R. W. Hodges (USNM). (p. 76).
5. *Dichomeris bipunctella* (Wlsm.), ♀. Archbold Bio. Sta., Lake Placid, Florida, 1–7 May 1964, R. W. Hodges (USNM). (p. 78).
6. *Dichomeris bipunctella* (Wlsm.), ♀. Archbold Bio. Sta., Lake Placid, Florida, 1–7 May 1964, R. W. Hodges (USNM). (p. 78).
7. *Dichomeris setosella* (Clem.), ♂. Bull Run Park, Fairfax Co., Virginia, 20 May 1960, R. W. Hodges (USNM). (p. 79).
8. *Dichomeris setosella* (Clem.), ♂. Cincinnati, Ohio, 9 May 1927, Annette F. Braun (USNM). (p. 79).
9. *Dichomeris vindex* Hodges, ♂. Paratype. Ft. Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska, 11 June 1983, Ronald W. Hodges (USNM). (p. 83).
10. *Dichomeris vindex* Hodges, ♂. Paratype. Putnam Co., Illinois, 30 July 1962, M. O. Glenn (USNM). (p. 83).
11. *Dichomeris mulsa* Hodges, ♂. Holotype. Madera Canyon 5,600′, Santa Rita Mts., Santa Cruz Co., Arizona, 28 June 1963, J. G. Franclemont (USNM). (p. 83).
12. *Dichomeris mulsa* Hodges, ♂. Paratype. Madera Canyon 4,800′, Santa Rita Mts., Santa Cruz Co., Arizona, 17 June 1963, J. G. Franclemont (USNM). (p. 83).
13. *Dichomeris mica* Hodges, ♂. Paratype. Panther Pass 6,000′, Chisos Mts., Brewster Co., Texas, 2 June 1973, R. W. Hodges (USNM). (p. 84).
14. *Dichomeris aglaia* Hodges, ♀. Paratype. Archbold Bio. Sta., Lake Placid, Florida, 30 March 1959, R. W. Hodges (USNM). (p. 85).
15. *Dichomeris aglaia* Hodges, ♂. Paratype. Edgard, St. John Par., Louisiana, 30 July 1982, V. A. Brou (USNM). (p. 85).
16. *Dichomeris delotella* (Bsk.), ♂. Madera Canyon 4,880′, Santa Rita Mts., Santa Cruz Co., Arizona, 8 April 1963, J. G. Franclemont (USNM). (p. 86).
17. *Dichomeris delotella* (Bsk.), ♀. Madera Canyon 4,880′, Santa Rita Mts., Santa Cruz Co., Arizona, 18 May 1963, J. G. Franclemont (USNM). (p. 86).
18. *Dichomeris gleba* Hodges, ♀. Paratype. Putnam Co., Illinois, 26 May 1967, M. O. Glenn (USNM). (p. 87).
19. *Dichomeris gleba* Hodges, ♂. 1 mi S Poncha Springs 7,000′, Colorado, 6 July 1982, Ronald W. Hodges (USNM). (p. 87).
20. *Dichomeris gleba* Hodges, ♂. West Fork 6,500′, 16 mi SW Flagstaff, Coconino Co., Arizona, 19 July 1961, Ronald W. Hodges (USNM). (p. 87).
21. *Dichomeris alphito* Hodges, ♀. Holotype. Madera Canyon 4,880′, Santa Rita Mts., Arizona, 15 September 1959, R. W. Hodges (CU). (p. 88).
22. *Dichomeris laetitia* Hodges, ♂. Holotype. Putnam Co., Illinois, 7 June 1962, M. O. Glenn (USNM). (p. 88).
23. *Dichomeris stipendiaria* (Braun), ♂. Pullman, Washington, iss. 14 July 1933, J. F. Clarke (USNM). (p. 89).
24. *Dichomeris stipendiaria* (Braun), ♀. Willow Cr. Road, Ephraim Can. 7,500′, Sanpete Co., Utah, 29 July 1981, Ronald W. Hodges (USNM). (p. 89).
25. *Dichomeris bilobella* (Zell.), ♀. Six Mile Creek, Ithaca, New York, 6 July 1957, J. G. Franclemont (USNM). (p. 90).
26. *Dichomeris bilobella* (Zell.), ♀. Six Mile Creek, Ithaca, New York, 6 July 1957, J. G. Franclemont (USNM). (p. 90).
27. *Dichomeris aleatrix* Hodges, ♀. Paratype. Massachusetts (USNM). (p. 91).
28. *Dichomeris copa* Hodges, ♂. Holotype. Snyder Heights 1,100′, Ithaca, New York, 16 July 1975, J. G. Franclemont (USNM). (p. 92).
29. *Dichomeris scrutaria* Hodges, ♂. Holotype. 4.2 mi NE Abita Springs, St. Tam. Par., Louisiana, 15 September 1983, V. A. Brou (USNM). (p. 93).
30. *Dichomeris furia* Hodges, ♂. Holotype. Putnam Co., Illinois, 11 July 1968, M. O. Glenn (USNM). (p. 93).
31. *Dichomeris purpureofusca* (Wlsm.), ♂. Spearfish Cr. [Lawrence Co.], T3N, R1E, S6, South Dakota, 7 July 1965, R. W. Hodges (USNM). (p. 94).
32. *Dichomeris nonstrigella* (Cham.), ♀. Cincinnati, Ohio, 20 May 1906, Annette F. Braun (USNM). (p. 95).
33. *Dichomeris ochripalpella* (Zell.), ♂. Snyder Heights 1,100′, Ithaca, New York, 24 July 1976, J. G. Franclemont (USNM). (p. 96).
34. *Dichomeris achne* Hodges, ♂. Holotype. Parker Is., Highlands Co., Florida, 26–29 May 1964, R. W. Hodges (USNM). (p. 97).
35. *Dichomeris inserrata* (Wlsm.), ♀. Ft. Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska, 25 June 1983, Ronald W. Hodges (USNM). (p. 98).
36. *Dichomeris pelta* Hodges, ♂. Holotype. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 28 April 1981, Ronald W. Hodges (USNM). (p. 99).
37. *Dichomeris bolize* Hodges, ♂. Holotype. Hackberry Lake, Valentine Natl. Wildlife Refuge, Cherry Co., Nebraska, 15 June 1983, Ronald W. Hodges (USNM). (p. 100).
38. *Dichomeris illusio* Hodges, ♀. Holotype. Hastings, Florida, 8 June (USNM). (p. 101).
39. *Dichomeris mimesis* Hodges, ♀. Holotype. Salmon, Anderson Co., Texas, 22 July–2 August 1974, malaise trap, H. R. Burke (USNM). (p. 101).


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PLATE 3

Gelechioidea

GELECHIIDAE

figs. 1–36

TWICE NATURAL SIZE 2:1

1. *Dichomeris serrativittella* (Zell.), ♀. Hackberry Lake, Valentine Natl. Wildlife Refuge, Cherry Co., Nebraska, 25 June 1983, Ronald W. Hodges (USNM). (p. 101).
2. *Dichomeris xanthoa* Hodges, ♂. Holotype. Ft. Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska, 19 June 1983, Ronald W. Hodges (USNM). (p. 102).
3. *Dichomeris isa* Hodges, ♂. Holotype. Tenkiller Lake, 3 mi W Blackgum, Sequo, Co., Oklahoma, 6–9 July 1979, D. & M. Davis (USNM). (p. 103).
4. *Dichomeris simulata* Hodges, ♂. Holotype. Canadian, Hemphill Co., Texas, 28 May 1970, A. & M. E. Blanchard (USNM). (p. 104).
5. *Dichomeris imitata* Hodges, ♂. Holotype. Devers, Texas, 21 June 1917 (CU). (p. 104).
6. *Dichomeris barnesiella* (Bsk.), ♂. Peña Blanca Canyon, Santa Cruz Co., Arizona, 11 August 1959, R. W. Hodges (USNM). (p. 104).
7. *Dichomeris simpliciella* (Bsk.), ♂. 7¾ mi N Big Timber near Big Timber Creek, Sweet Grass Co., Montana, 17 August 1969, John G. Franclemont (USNM). (p. 105).
8. *Dichomeris simpliciella* (Bsk.), ♂. 4 mi. SW Buena Vista 8,700′, Chaffee Co., Colorado, 15 July 1982, Ronald W. Hodges (USNM). (p. 105).
9. *Dichomeris simpliciella* (Bsk.), ♂. Sierra Diablo, 20 mi NNW Van Horn 6,000′, Culberson Co., Texas, 29 May 1973, R. W. Hodges (USNM). (p. 105).
10. *Dichomeris baxa* Hodges, ♀. Holotype. Presidio of Monterey, California, iss. 18 April 1944, J. F. G. Clarke (USNM). (p. 105).
11. *Dichomeris gnoma* Hodges, ♂. Holotype. Shingle Cr. Road, Keremeos, British Columbia, 15 July 1935, A. N. Gartrell (USNM). (p. 106).
12. *Dichomeris washingtoniella* (Bsk.), ♂. Putnam Co., Illinois, iss. 27 July 1949, M. O. Glenn (USNM). (p. 107).
13. *Dichomeris levisella* (Fyles), ♀. [K650], iss. July 17 (USNM). (p. 108).
14. *Dichomeris leuconotella* (Bsk.), ♂. Six Mile Creek. Ithaca. New York, 22 June 1957, J. G. Franclemont (USNM). (p. 109).
15. *Dichomeris mercatrix* Hodges, ♀. Holotype. McLean Bogs Reserve, Tompkins Co., New York, 18 July 1963, J. G. Franclemont (USNM). (p. 110).
16. *Dichomeris juncidella* (Clem.), ♂. Halifax, Nova Scotia, 16 July 1972, D. C. Ferguson (USNM). (p. 110).
17. *Dichomeris glenni* Clarke, ♀. Oneco, Manatee County. Florida, 3 April 1954, J. G. Franclemont (USNM). (p. 112).
18. *Dichomeris costarufoella* (Cham.), ♂. Riding Mt. Pk., Manitoba, iss. 27 June 1938, J. McDunnough (CNC). (p. 114).
19. *Dichomeris agonia* Hodges, ♀. Hamden, New Haven Co., Connecticut, 8 June 1965, D. C. Ferguson (USNM). (p. 117).
20. *Dichomeris agonia* Hodges, ♂. Putnam Co., Illinois, 28 August 1964, M. O. Glenn (USNM). (p. 117).
21. *Dichomeris offula* Hodges, ♂. Paratype. Ithaca, New York, 16 June 1939, J. G. Franclemont (USNM). (p. 117).
22. *Dichomeris crepida* Hodges, ♂. Holotype. McClellanville, South Carolina, 20 March 1974, R. B. Dominick (USNM). (p. 118).
23. *Dichomeris picrocarpa* (Meyr.), ♀. Biglerville, Pennsylvania, iss. 9 June 1975, R. H. Colburn (USNM). (p. 119).
24. *Dichomeris sybilla* Hodges, ♀. Holotype. Madera Canyon 4,880′, Santa Rita Mts., Arizona, 30 July 1959, R. W. Hodges (CU). (p. 121).
25. *Helcystogramma fernaldella* (Bsk.), ♂. Hardy Work Center [Lawrence Co.], T3N, R1E, S30, South Dakota, 30 June 1965, R. W. Hodges (USNM). (p. 126).
26. *Helcystogramma fernaldella* (Bsk.), ♂. Ft. Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska. 6 June 1983, Ronald W. Hodges (USNM). (p. 126).
27. *Helcystogramma fernaldella* (Bsk.), ♂. Hackberry Lake, Valentine Natl. Wildlife Refuge, Cherry Co., Nebraska, 9 June 1983, Ronald W. Hodges (USNM). (p. 126).
28. *Helcystogramma cascum* (Braun), ♂. Castles, 8 mi E Buena Vista 8,800′, Chaffee Co., Colorado, 8 July 1982, Ronald W. Hodges (USNM). (p. 127).
29. *Helcystogramma cascum* (Braun), ♂. 4 mi SW Buena Vista 8,700′, Chaffee Co., Colorado, 2 July 1982, Ronald W. Hodges (USNM). (p. 127).
30. *Helcystogramma badium* (Braun), ♂. Great Basin Expt. Sta., Ephraim Can 8,850′, Sanpete Co., Utah, 1–6 August 1981, Ronald W. Hodges (USNM). (p. 128).
31. *Helcystogramma melantherella* (Bsk.), ♂. Starkville, Oktibbeha Co., Mississippi, 30 September 1982, in house, B. R. Norment (USNM). (p. 128).
32. *Helcystogramma melantherella* (Bsk.), ♂. Ebony Hill Research Station, Bexar Co., Texas, iss. 14 August 1979, R. O. & C. A. Kendall (USNM). (p. 128).
33. *Helcystogramma hystricella* (Braun), ♀. Putnam Co., Illinois, 31 May 1955, M. O. Glenn (USNM). (p. 129).
34. *Helcystogramma melanocarpum* (Meyr.), ♂. Wedge Plantation, South Santee River, Charleston Co., South Carolina, 26 March 1967, Douglas C. Ferguson (USNM). (p. 130).
35. *Helcystogramma ectopon* Hodges, ♂. Holotype. Ft. Niobrara Natl. Wildlife Refuge, Cherry Co., Nebraska, 29 June 1983, R. W. Hodges (USNM). (p. 131).
36. *Scodes deflecta* (Bsk.), ♀. Zapilote Canyon 550 m, 8 km S Mezcala, Guerrero, Mexico, iss 22 September 1982 (UCB). (p. 136).

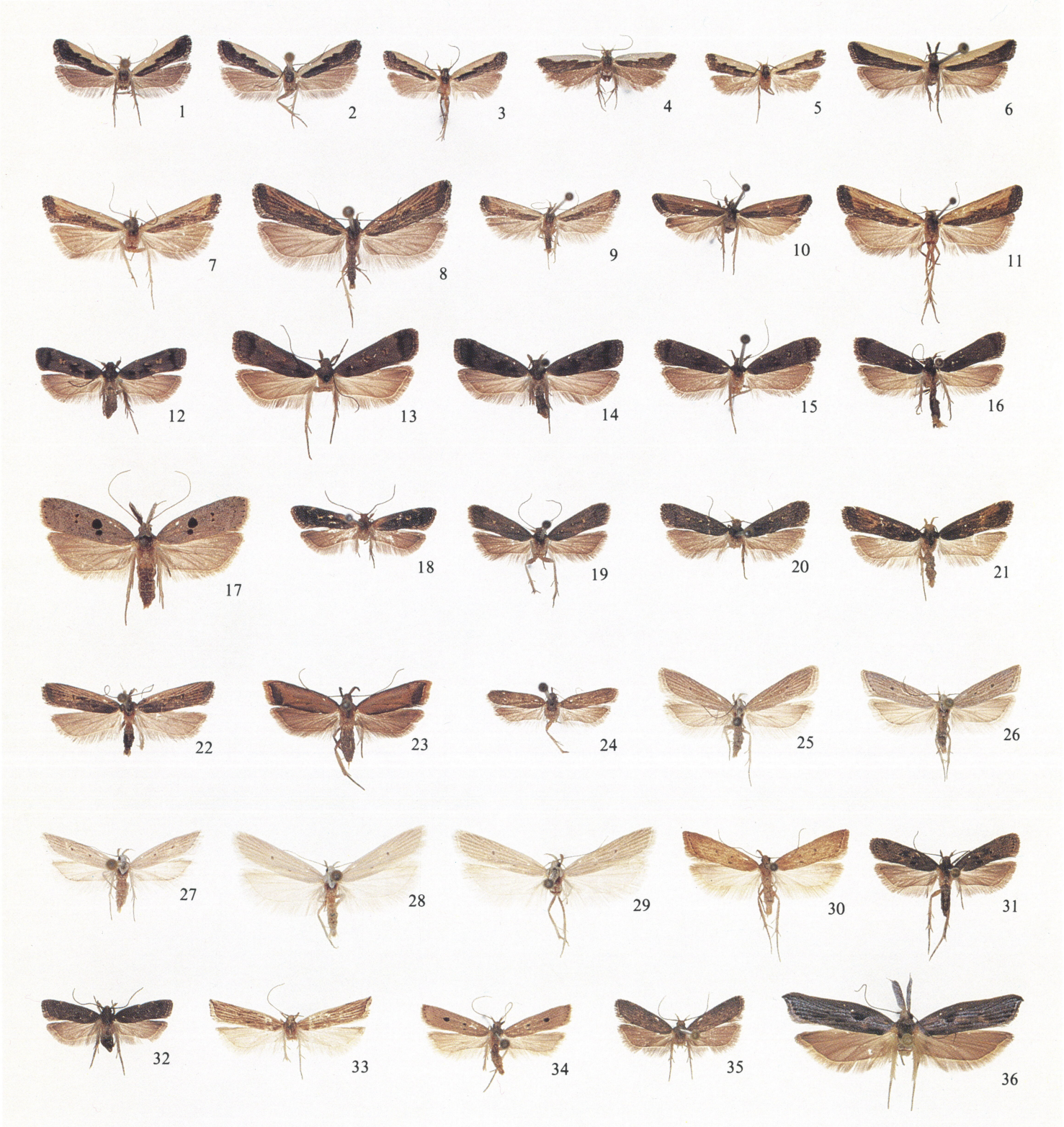
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PLATE 4

Gelechioidea

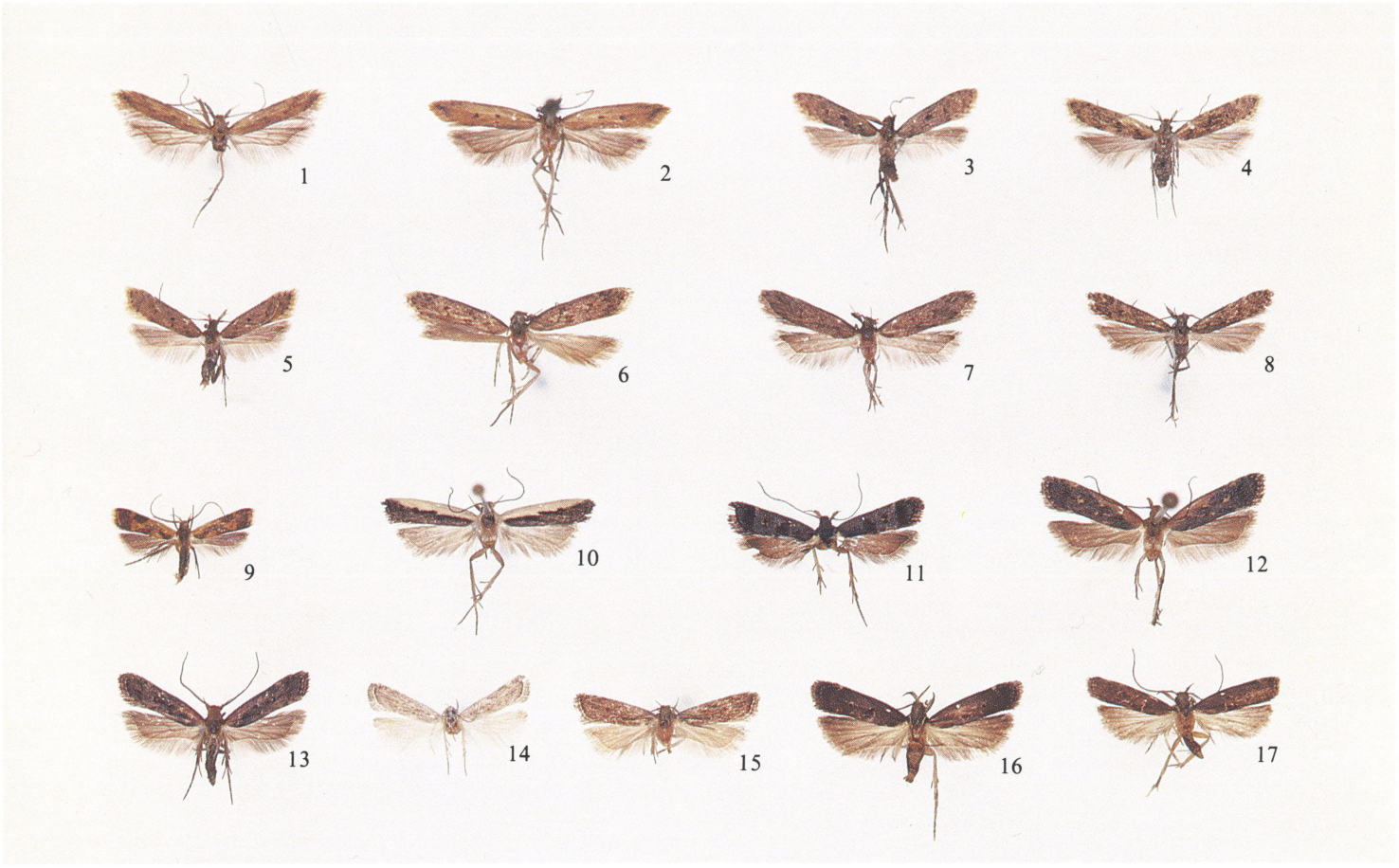
GELECHIIDAE

figs. 1–17

THREE TIMES NATURAL SIZE 3:1

1. *Dichomeris acuminata* (Stgr.), ♀. Archbold Bio. Sta., Lake Placid, Florida, 1–7 May 1964, R. W. Hodges (USNM). (p. 38).
2. *Dichomeris nenia* Hodges, ♂. Paratype. Archbold Bio. Sta., Lake Placid, Florida, 31 March 1959, R. W. Hodges (USNM). (p. 40).
3. *Dichomeris punctipennella* (Clem.), ♂. Parker Is., Highlands Co., Florida, 4–7 June 1964, R. W. Hodges (USNM). (p. 53).
4. *Dichomeris punctipennella* (Clem.), ♀. Wedge Plantation, McClellanville, Charleston Co., South Carolina, 30 April 1981, Ronald W. Hodges (USNM). (p. 53).
5. *Dichomeris punctipennella* (Clem.), ♀. Parker Is., Highlands Co., Florida, 4–7 June 1964, R. W. Hodges (USNM). (p. 53).
6. *Dichomeris hirculella* Bsk., ♂. Paralectotype. East River, Connecticut, 23 July 1908, Chas. R. Ely (USNM). (p. 60).
7. *Dichomeris caia* Hodges, ♀. Paratype. Highlands 3,865′, Macon Co., North Carolina, 15 July 1958, R. W. Hodges (USNM). (p. 62).
8. *Dichomeris ardelia* Hodges, ♂. Holotype. Archbold Bio. Sta., Lake Placid, Florida, 1–7 May 1964, R. W. Hodges (USNM). (p. 62).
9. *Dichomeris siren* Hodges, ♂. Holotype. Henson Creek, Oxon Hill, Maryland, 7 August 1978, D. R. Davis (USNM). (p. 64).
10. *Dichomeris legnotoa* Hodges, ♀. Holotype. Largo, Pinellas Co., Florida, 9 July 1982, E. Knudson (USNM). (p. 101).
11. *Dichomeris euprepes* Hodges, ♀. Holotype. Big Black Mt., Letcher Co., Kentucky, iss. 16 June 1937, [A. F. Braun] (ANSP). (p. 110).
12. *Dichomeris costarufoella* (Cham.), ♀. Devil's Den St. Pk., Wash. Co., Arkansas, 19 July 1966, R. W. Hodges (USNM). (p. 114).
13. *Dichomeris costarufoella* (Cham.), ♂. Fluker, Tangipahoa Par., Louisiana, 18 September 1971, G. Strickland (USNM). (p. 114).
14. *Helcystogramma chambersella* (Murtf.), ♂. Panther Pass 6,000′, Chisos Mts., Brewster Co., Texas, 4 June 1973, R. W. Hodges (USNM). (p. 131).
15. *Helcystogramma chambersella* (Murtf.), ♂. Pittsburgh, Pennsylvania, 20 August 1906, Henry Engel (USNM). (p. 131).
16. *Helcystogramma convolvuli* (Wlsm.), ♂. Clarke Hall, Dominica, 14 January 1965, J. F. G. & T. M. Clarke (USNM). (p. 133).
17. *Helcystogramma convolvuli* (Wlsm.), ♂. Clarke Hall, Dominica, 14 January 1965, J. F. G. & T. M. Clarke (USNM). (p. 133).

GELECHIOIDEA, PART 8: PLATE 4



NOTES

1. ABBREVIATIONS FOR COLLECTORS AND COLLECTIONS

ABK	Alexander B. Klots
AEB	A. E. Brower
AMNH	American Museum of Natural History, New York
ANSP	Academy of Natural Sciences. Philadelphia
BM	Bryant Mather
BMNH	British Museum (Natural History), London
CAS	California Academy of Sciences, San Francisco
CM	Carnegie Museum, Pittsburgh
CNC	Canadian National Collection, Ottawa
CU	Cornell University, Ithaca
FMNH	Field Museum of Natural History, Chicago
FSCA	Florida State Collection of Arthropods, Gainesville
GS	Gayle Strickland
HUMB	Museum Alexander Humboldt, Berlin
INHS	Illinois Natural History Survey, Champaign
JBH	John B. Heppner
JGF	John G. Franclemont
JN	John Newman
JRH	J. Richard Heitzman
KWP	K. W. Philip
LACM	Los Angeles County Museum of Natural History
LEM	Lyman Entomological Museum, Montreal
MCZ	Museum of Comparative Zoology, Cambridge
MNSA	Museu Argentino de Ciencias Naturales "Bernardino Rivadavia," Buenos Aires
MSU	Michigan State University, East Lansing
MSUS	Mississippi State University, Starkville
NHMV	Naturhistorisches Museum, Vienna
NCSU	North Carolina State University, Raleigh
NSM	Nova Scotia Museum, Halifax
PMBC	Provincial Museum of British Columbia, Victoria
RHL	Ronald H. Leuschner
ROK	Roy O. Kendall
ROM	Royal Ontario Museum, Toronto
SDNH	San Diego Natural History Museum
SIUC	Southern Illinois University. Carbondale
UA	University of Alberta, Edmonton
UAF	University of Arkansas, Fayetteville
UBC	University of British Columbia, Vancouver
UCB	University of California, Berkeley
UCD	University of California, Davis
ULK	University of Louisville, Kentucky
UM	University of Michigan, Ann Arbor
UMC	University of Missouri, Columbia
UMO	University Museum, Oxford
UWM	University of Wisconsin, Madison
USNM	National Museum of Natural History, Washington
VAB	Vernon A. Brou
WEM	William E. Miller
WPC	Wedge Plantation Collection, McClellanville
YPM	Yale Peabody Museum, New Haven
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich

2. COMMON NAMES

The use of an asterisk "*" in the text denotes a name listed in *Common Names of Insects & Related Organisms 1982* published by the Entomological Society of America.

French-language common names have been taken from Auclair, J. L., et al., 1964, *French Names of Insects of Canada,* 3rd edition, published for the Quebec Society for the Protection of Plants by Department of Agriculture and Colonization, Quebec. The abbreviation "m." after a name indicates that it is masculine, "f." that it is feminine.

3. CITATIONS OF AUTHORITIES

Authors' names without parentheses indicate that the specific name is associated with the genus in which it was described.

Authors' names in parentheses indicate that the specific name has been transferred from the genus in which it was described to another genus.

4. WING LENGTH

Wing length is the measurement in millimeters from the base to the apex of the forewing.

5. LOCATION OF TYPE SPECIMEN

The current location of the type specimen is given by the appropriate abbreviation in square brackets immediately following the type locality. The words "type lost" indicate that it no longer exists. If no information is given, a type may exist; but its present location was not determined.

6. NOMENCLATURE FOR LARVAL SETAE

Hinton's 1946 terminology is used to refer to larval setae.

INDEX TO ANIMAL NAMES

Principal entries are given in bold face
Plate references are given as (1:5)

Generic names cited only in combination with specific names, whether in synonymy or text, are not given in the index. Look for such entries under the specific name. For example, *Dichomeris ligulella* will be found under *ligulella,* but not under *Dichomeris.*

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INDEX TO PLANT NAMES