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A NEW SPECIES OF *AURATONOTA* (LEPIDOPTERA: TORTRICIDAE: CHLIDANOTINAE) FORMERLY CONFUSED WITH *A. HYDROGRAMMA* (MEYRICK)

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ABSTRACT. *Auratonota pharata*, new species, is described and illustrated from Costa Rica, Panama, Venezuela, and French Guiana. The species is most similar to *A. hydrogramma* (Meyrick), with which it formerly was confused. It can be distinguished superficially from the latter by the absence of the narrow pale curved band beyond the distal end of the discal cell of the forewing. The male genitalia of the new species differ by a slightly expanded, dorsally convex, and ventrally flattened distal portion of the uncus. The female genitalia possess numerous short curved bands of 5–6 microtrichia around a larger single seta set in a shallow pit on the surface of the middle of the papillae anales compared with the more semicircular bands of microtrichia nearly surrounding the seta in *A. hydrogramma*. A survey of wing coupling in numerous genera of Chlidanotini and Hilarographini revealed that the female frenulum consists of two bristles usually separated throughout their length in all representatives examined in these two tribes; three bristles are present in females of most other Tortricidae. This character state represents an additional putative synapomorphy uniting those two tribes.

RESUMEN. *Auratonota pharata*, especie nueva, es descrita e ilustrada de Costa Rica, Panama, Venezuela y Guyana Francesa. Este especie es mas similar a *A. hydrogramma* (Meyrick), con la cual ha sido con tundida. Puede ser identificada de una manera superficial de esta última por la ausencia de una banda curva fina clara detras de la portedistal de la celda discal de las alas anteriores. La genitalia del macho de la nueva especie puede ser distinguida por la presencia en la partediscal del uncus de una area ligeramente expandida, convexa dorsalmente y plana ventralmente. La genitalia de la hembra puede ser distinguida por la presencia de numerosas bandas curvas cortas de 5–6 espinas pequenas arriba de una sola seta en media superficie de los papillae anales en comparación con bandas más semicirculares de espinas pequeñas casi rodeando la seta en *A. hydrogramma*.

Additional key words: Systematics, genitalia, morphology, Costa Rica, Central America, Venezuela, French Guiana, inventory, Chlidanotini, frenulum

Auratonota Razowski is the largest and most diverse genus in Chlidanotini (Tortricidae: Chlidanotinae) with 30 described species (Razowski & Becker 2000, Brown 2005) and numerous undescribed species present in collections. The genus is restricted to the New World tropics, ranging from Mexico and the Caribbean (Cuba, Dominica) south through Brazil.

A previously undescribed species of *Auratonota* has been concealed in entomological collections for many years under the name *A. hydrogramma* (Meyrick). The similarity of the new species to *A. hydrogramma* in size, forewing pattern, and genitalia, along with their geographic sympatry, have combined to inhibit their recognition. The two species can be separated by a subtle feature of the forewing pattern, but recently discovered features of the male and female genitalia provide convincing evidence that they are indeed distinct and diagnosable. The purpose of this paper is to name, describe, and illustrate the new species. This work was stimulated, in part, by the desire to associate scientific names with morpho-species collected during the NSF-funded ALAS (Arthropods of La Selva, Costa Rica) project in order to more easily discuss differences and similarities among the tortricid faunas of transect sites (at different elevations) sampled over the course of the project (1993–2005).

Dissection methodology followed that presented in Brown and Powell (1991). Images of adults and genitalia were captured using a Microptics digital camera system and enhanced using Adobe Photoshop and Illustrator software. Terminology for genital structures follows Horak (1984). The following institutional abbreviations are used for the deposition of specimens examined: AMNH = American Museum of Natural History, New York, New York, U.S.A.; BMNH = The Natural History Museum, London, United Kingdom; INBio = Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica; UCB = Essig Museum of Entomology, University of California, Berkeley, USA; and USNM = National Museum of Natural History, Washington, D.C., U.S.A.

Auratonota pharata Brown, **new species**
(Figs. 2, 4, 5)

Diagnosis. Among described species of *Auratonota*, *A. pharata* is most similar to *A. hydrogramma* in forewing pattern, size, and genitalia. However, the latter is superficially distinguishable from all described congeners, including *A. pharata*, by the presence of a slender, pale, arched fascia in the subterminal region of the forewing that roughly parallels the apical half of the termen, intersecting the costa subapically (Fig. 1); the fascia is lacking in *A. pharata* (Fig. 2). The male genitalia of *A. pharata* can be distinguished from those of *A. hydrogramma* by the shape of the distal one-fourth of the uncus: attenuate and apically pointed in *A.*

hydrogramma (Fig. 3); slightly broadened, convex dorsally, and flattened ventrally in *A. pharata* (Fig. 4). The female genitalia are extremely similar in both but can be distinguished by a subtle feature of the papillae anales. In *A. pharata* microtrichia on the internal, middle portion of the papillae anales are arranged in short, slightly curved bands of 5–6 immediately dorso-posterad of a small, pale-colored pit from which arises a single larger seta (Fig. 5). In *A. hydrogramma* microtrichia are arranged in circular or semicircular bands of 8–9 nearly surrounding a more rounded pit (Fig. 6). *Auratonota pharata* also is similar superficially to *A. aporema* (Dognin), described from Colombia, but has a considerably smaller forewing length (mean 11.9 mm for *pharata* vs. 15.9 for *aporema*) and lacks the yellow-gold scaling of the forewing pattern elements of *A. aporema*; the latter feature is more characteristic of members of *Pseudocomotis* Brown (Chlidanotini), with which *A. aporema* is more similar superficially.

Description. *Head*: Vertex rough scaled, mostly pale cream with a few pale cream-brown scales; frons smooth scaled, pale cream white; labial paplus relatively slender, short, length (all segments combined) ca. 1.2 times horizontal diameter of compound eye, brown externally, pale cream on inner surface; antenna thickened, with setae extremely short, inconspicuous (typical of Chlidanotini). *Thorax*: Dorsum clothed in reddish-brown scales, anterior and posterior regions with considerable scattered white and pale brown scales; tegula pale brown, with variably expanded patch of long scales posteriorly, frequently expressed as an erect scale patch in both sexes. Legs unmodified; no hairpencil or secondary scale patches in male. Forewing length 11.5–12.9 mm ($\bar{x}$ = 11.9; n = 10) in male, 12.2–14.1 mm ($\bar{x}$ = 13.1; n = 2) in female; costa nearly straight, apex obtuse, termen slightly convex, rather oblique; ground color ferruginous, with light silvery-gray reticulations formed by irregular interrupted streaks on veins and a series of indistinct transverse fascia crossing them, scattered with iridescent green scales in interspaces (the green scales inconspicuous on flight worn specimens); basal portion from near base to ca. 0.66 distance to apex largely suffused with blackish brown between the reticulations; a small, ill-defined, irregularly-shaped, ferruginous spot near distal end of discal cell bordered basally by a narrow bluish silvery-gray line; termen uniform red-brown; fringe olive-ferruginous [lacking in most specimens examined]. Hindwing uniform dark brown, fringe concolorous; female frenulum with two bristles separated throughout their length. *Abdomen*: Dark brown. Male genitalia (Fig. 4; image of JWB slide 806, Costa Rica; n = 6) with uncus strong, long, mostly rod-shaped, slightly broader at base, curved near middle, slightly expanded in distal 0.25 with dorsum convex and venter flattened or weakly concave; socius moderately short, broad, subrectangular, clothed in long, fine scales; hami long, ca. 0.75 times length of uncus, weakly attenuate from base to tip, distal 0.1 bent dorsally; gnathos extremely reduced, lateral arms membranous, mesal portion inconspicuous; valva large, broad, expanding distally, distal 0.75 covered with fine, long setae, costa sclerotized; transtilla a simple, narrow band; juxta a broad, shield-like plate; saccus well developed, narrow, attenuate distally; aedeagus short, stout, mostly straight, slightly curved at phallobase, a tiny scobinate patch of small setae on each side near distal end, vesica with small linear patch of sclerotization. Female genitalia (Fig. 5; image of USNM slide 95264, Panama; n = 3) with papillae anales large, bearing numerous tiny, weakly curved lateral bands of spines in middle portion, which are situated immediately dorso-posterad of a small pale-colored pit from which a single seta arises; perimeter and basal portions of papillae anales with much larger setae arising from elongate, warty bases; sterigma simple, weakly sclerotized, ventral posterior edge of ostium with narrow row of 5–6 long setae on each side; ductus bursae broadest at ostium, narrowed at about 0.2 distance from ostium to corpus bursae, then nearly uniform in width to junction with corpus bursae; corpus bursae, large, pear-shaped sac, junction with ductus bursae slightly anterior of posteriormost end, signum a patch of 30–35 slender, slightly curved spines originating from sclerotized plate near middle of corpus; ductus seminalis from posteriormost end of corpus bursae near junction of corpus bursae and ductus bursae; a frail accessory bursae from a long, slender ductus originating just anterad of signum.

Holotype. Male: Costa Rica, Estacion Biologica La Selva, Puerto Viejo de Sarapiqui, 50–150 m, 10°26'N, 84°01W, 7 Feb 2002, Wagner, Rota & Kawahara (INBio).

Paratypes (24♂, 3♀). BRITISH GUIANA: Potaro River, Anundubaru, 2000', Jan 1928 (1♂) (AMNH). COSTA RICA: Heredia Province: Estacion Biologica La Selva, 10°26'N, 84°01'W, 50–150 m, Jan 1998 (1♀), INBio-OET, J. Powell (UCB), 8–25 Mar 1999 (1♂), 22–31 Mar 2001 (1♀), Wagner & Rota, 7 Feb 2002 (1♂), Wagner, Rota & Kawahara (INBio); Ciebo, 11 km ESE La Virgen, 250–350 m, 10°21'N, 84°01'W, 18 Mar 2004 (1♂) (INBio); 10 km SE La Virgen, 450–550 m, 10 20N, 84 05W, 17 Mar 2003 (2♂), 19 Mar 2003 (1♂), 22 Mar 2003 (1♂), INBio-OET-ALAS transect (INBio). Limón Province: Cerro Tortuguero, P.N. Tortuguero, 0–120 m, Oct 1989 (1♂), J. Solano (INBio), Jul 1991 (1♂), J. Solano (INBio), Jul 1993 (1♂), R. Delgado (INBio); Sector Cerro Cocori, Finca de E. Rojas, 150 m, Aug 1991 (2♂), E. Rojas (INBio). Unknown Province: Carchi [possibly Sarchi, Alajuela Province], [no date] (1♂), Wm. Schaus (USNM). FRENCH GUIANA: St. Jean, Maroni, [no date] (2♂), Wm. Schaus (USNM); Rio Maroni, [no date] (1♂), Le M[oult] (USNM). PANAMA: Canal Zone, Barro Colorado Island, 17 Sep 1941 (1♀), J. Zetek (USNM). VENEZUELA: Aragua: Rancho Grande, 1100 m, 16–23 Oct 1966 (3♂), 24–31 Oct 1966 (1♂), 1–5 Nov 1966 (1♂), S. S. & W. D. Duckworth (USNM), 15–21 Jun 1967 (1♂), 22–31 Aug 1967 (1♂), R. W. Poole (USNM).

Distribution and Biology. *Auratonota pharata* is recorded from Costa Rica, Panama, Venezuela, British Guiana, and French Guiana. Although it appears to be a species of the lowlands (i.e., below 500 m), it has been recorded on several occasions at Rancho Grande, Venezuela, at 1100 m and once in British Guiana from 660 m. During a multi-year survey in Costa Rica along an elevation transect, specimens were collected at 50–150 m (n = 4), 250–350 m (n = 1), and 450–550 m (n = 4), with none recorded from 1000, 1500, or 2000 m. Adults have been recorded in January through March, and June through November.

A female collected by J. Powell in January 1998 at La Selva, Costa Rica was confined in a plastic vial where it laid several huge, bulky eggs, 3.3 × 2.8 mm, ca. 10 times the size of comparable-sized tortricine females (J. Powell, pers. comm.). First instars likewise were large, 2.8–3.0 mm in length. Various leaves, synthetic diet, and raw carrot were offered to the larva; the last has been used successfully with other "borers" such as Hepialidae. The only feeding was by one larva on the carrot, and it ceased to feed before reaching second instar.

Etymology. The specific epithet is from the word "pharate," meaning cloaked or hidden.

Auratonota hydrogramma (Meyrick, 1912)

(Figs. 1, 3, 6)

Cnephasia hydrogramma Meyrick, 1912: 683.
Eulia hydrogramma: Clarke, 1958: 128.
Auratonota hydrogramma: Razowski, 1987: 62; Brown, 1990: 156; Powell *et al.* 1995: 151; Razowski & Becker, 2000: 1151; Brown, 2005: 144.

Auratonota hydrogramma was described from a single specimen from Dutch Guiana (= Surinam) (BMNH). The adult and male genitalia of the holotype are figured by Clarke (1958); Razowski & Becker (2000) provided a color illustration of an adult and line drawings of the male and female genitalia. Based on material in several museum collections (AMNH, BMNH, INBio, USNM), it has been recorded from Costa Rica, Panama, Colombia, French Guiana, British Guiana, and Ecuador and at many of the same localities as *A. pharata* (e.g., Costa Rica, Estacion Biologica La Selva; Panama, Barro Colorado Island; French Guiana, St. Jean, Rio Maroni). Razowski & Becker (2000) reported it from Brazil. As is the case in *A. pharata*, *A. hydrogramma* appears to be a species of the lowlands, rarely collected above 600 m. During the multiple-year transect surveys of the ALAS project in Costa Rica (1993–2005), *A. hydrogramma* was collected only at the 50–150 m elevation site.

Auratonota hydrogramma can be distinguished superficially from all other congeners by the presence of a narrow, curved, pale fascia in the apical region of the forewing. The male genitalia (Fig. 3, image of USNM slide 84889, Panama; n = 6) are slightly smaller and have a slightly broader base of the saccus than those of *A. pharata*; but the most conspicuous feature that distinguishes the two species is the pointed tip of the uncus of *A. hydrogramma*. The papillae anales (Fig. 6, image of JWB slide 745, Costa Rica; n = 2) of *A. hydrogramma* also have the tiny curved bands of microtrichia described above for *A. pharata*, but in *A. hydrogramma* the bands are more semicircular and nearly surround a rounded, pale-colored pit. Even though only two females of each species were examined, these differences appear to be consistent.

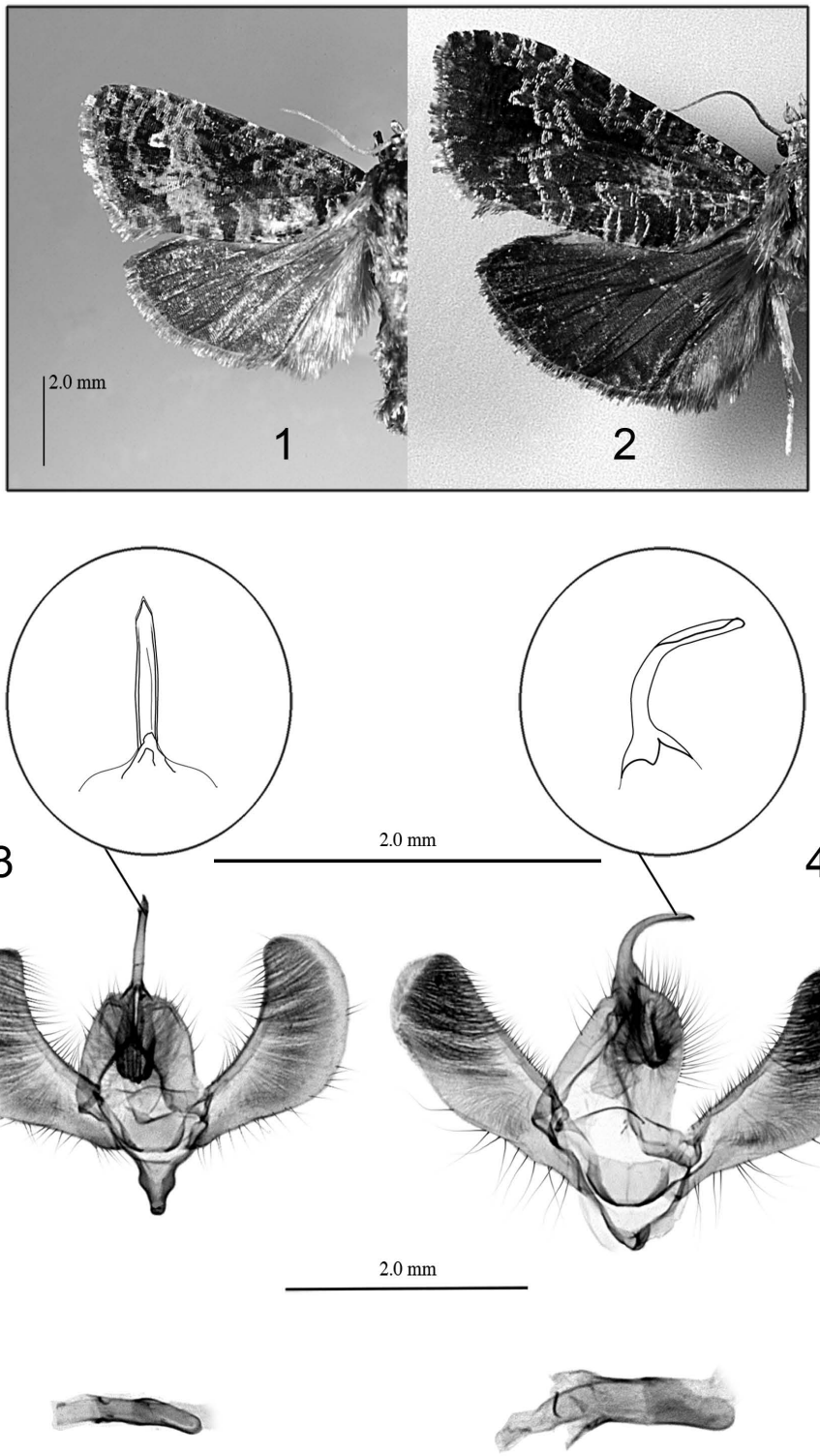
Holotype ♂, Dutch Guiana [Surinam], Paramaribo, Aug 1892 (BMNH).

Additional specimens examined: BRITISH GUIANA: Bartica District, Kartabo, 2 Apr 1926 (1♂) (AMNH). COLOMBIA: Dept. Valle, Anchicaya, 600 m, 76° 53'W, 3° 33'N, 20–24 Jan 1992 (1♂), J. B. Sullivan (USNM). COSTA RICA: Cartago Province: Turrialba, 13–17 Mar 1965 (1♀), S. S. & W. D. Duckworth (USNM). Heredia Province: Finca La Selva, Puerto Viejo de Sarapiqui, 50 m, 6–9 Mar 1985 (1♂), D. Janzen & W. Hallwachs (USNM); La Selva Biological Station, 10º26'N, 84º01'W, Jan 1998, INBio-OET, J. Powell (UCB),18 Feb 2003 (1♀), 27 Feb 2003 (1♂), 28 Feb 2003 (1♂), D. Wagner (INBio); Estacion Magassay, P.N. Braulio Carrillo, 200 m, Feb 1991 (1♀), M. Barrelier. Limón Province: Rio Sardinas, R.N.F.S. Barra del Colorado, 18–29 Feb 1993 (1♂), F. Araya; 30 km N Cariari, Sector Cocori, 100 m, Dec 1993 (1♂), Nov 1993 (1♂), E. Rojas; Finca de E. Rojas, Sector Cerro Cocori, 150 m, Sep 1993 (1♂), Apr 1991 (1♂), Aug 1991 (1♂), E. Rojas; Cerro Tortuguero, P.N. Tortuguero, 100 m, Apr 1989 (1♂), R. Aguilar & J. Solano, Jan 1993 (1♂), R. Delgado. Puntarenas Province: Estacion Esquinas, Peninsula de Oso, 0–200 m, Feb 1993 (4♂), Sep 1993 (2♂), Oct 1993 (1♂), Aug 1993 (1♂, 1♀), May 1993 (1♂), J. Quesada, Feb 1993 (2♂), Mar 1994 (1♂), 1 Apr 1993 (1♂) M. Segura, Jan 1993 (1♂), G. Fonseca; Est. Esquinas, Peninsula de Osa, 200 m, Aug 1993 (1♂), J. Quesada (INBio); Bosque Esquinas, Peninsula de Oso, 200 m, Jan 1993 (1♂), Apr 1993 (2♂), J. Quesada, Mar 1994 (1♂), M. Segura; Albergue Cerro de Oro, 150 m, 30 Aug 1995 (1♂), L. Angulo; Estacion Sirena, P.N. Corcovado, 0–100 m, Jan 1993 (1♂), Nov 1989 (1♂), Jul 1991 (1♂), Jun 1990 (1♂), Jun 1993 (1♂), G. Fonseca, 1–19 Aug 1980 (1♂), 10–12 Aug 1980 (2♂), 5–11 Jan 1981 (1♂), D. Janzen & W. Hallwachs, Aug 1991 (2♂), J. C. Saborio; Golfito, R.V.S. Golfito, Sector El Tajo, 15 May 2002 (1♂), M. Moraga; Rancho Quemado, Peninsula de Oso, 200 m, Oct 1991 (1♂), Oct 1991 (1♂), Nov 1990 (1♂), F. Quesada; Cerro de Oro, 200 m, 26–30 May 1995 (1♂), E. Phillips (all INBio). Unknown Province: Sixola River, [no date] (1♂) (USNM). ECUADOR: Pichincha, Tinalandia, 16 km E Santo Domingo de los Colorados, 600 m, 5–11 May 1990 (1♂), R. Leuschner (USNM). FRENCH GUIANA: St. Jean, Maroni, [no date] (4♂), Wm. Schaus (USNM), [no month] 1926 (♂, paralectotype), LeM[oult] (USNM); Piste de la Montagne des Singes, km 10, 5º05'N, 52º42'W, 8 Jan 1985 (1♂), J.-F. Landry (USNM); Godebert-Maroni, [no date] (1♂), Collection Le Moult (USNM); Saint-Jean du Maroni, [no date] (1♀), Janvier (USNM). PANAMA: Canal Zone: Barro Colorado Island, 1–9 May 1964 (5♂), 25–28 Mar 1965 (2♂), W. D. & S. S. Duckworth (USNM), 11 Mar 1941 (1♂), J. Zetek, [no date] (♂), J. Zetek (USNM), 21 Mar 1933 (1♂) (AMNH), 19–22 Jul 1951 (1♂), R. M. Laughlin (AMNH), 14 Feb 1936 (1♂) (AMNH); Navy Res. nr. Gamboa, 29 Mar 1965 (1♂), S. S. & W. D. Duckworth (USNM).

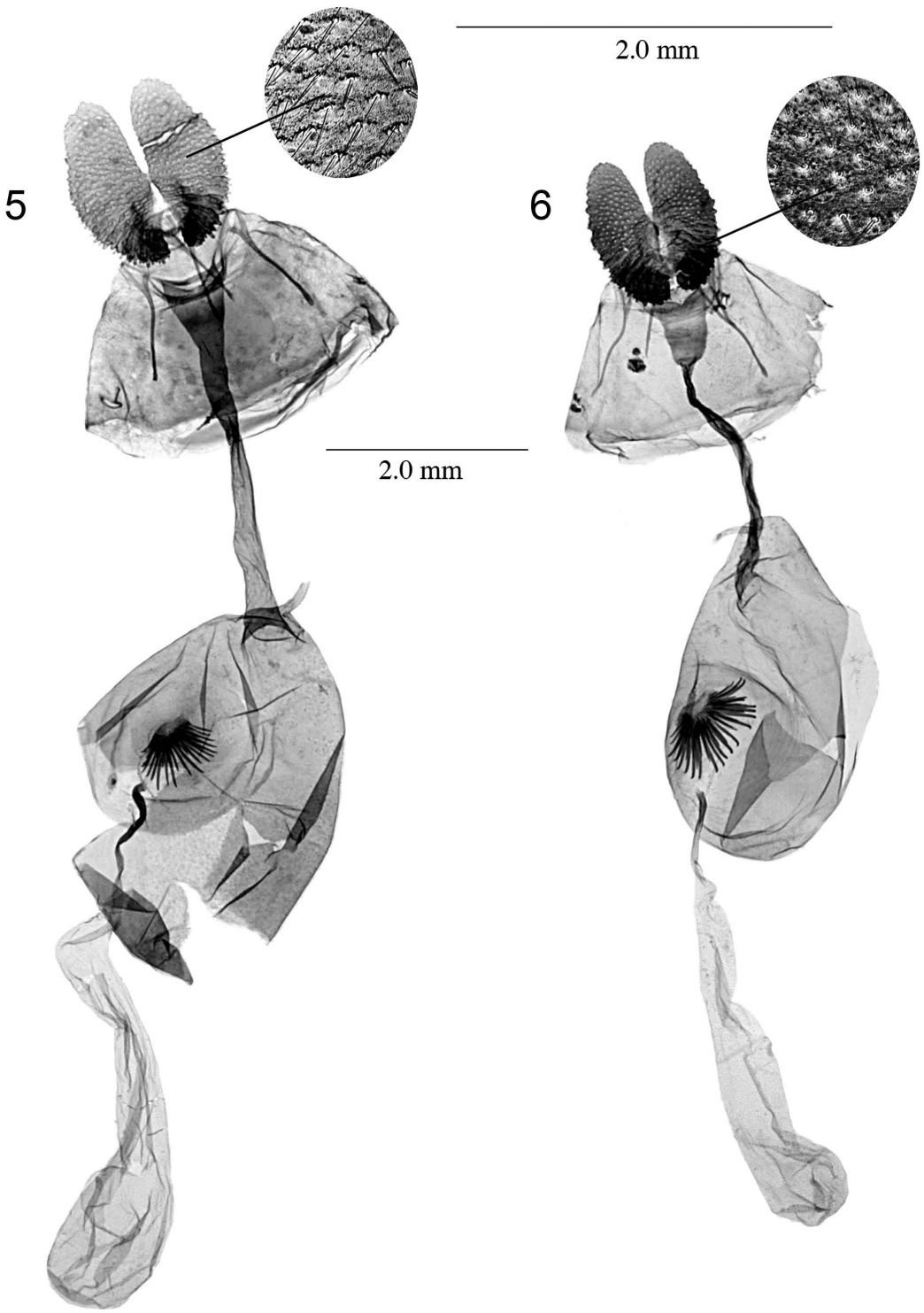
DISCUSSION

In most tortricids, the setae of the papillae anales arise from variably sized, papillose protuberances. In *A. hydrogramma* and *A. pharata* these protuberances are present only around the perimeter of the papillae anales, with most of the papillae anales bearing short, thin setae from weakly depressed pits bordered by a straight or curved row of microtrichia. This unusual arrangement of setae also is present in *A. petalocrossa* and is suspected to occur in *A. aporema*—these four species are all similar in size, forewing markings, and structures of the male genitalia. These features are easily observed using a dissecting microscope because of the large size of the moths. In *Auratonota dominica* Brown there is a similar configuration of setae but at a much smaller scale, requiring observation using a compound scope. Similar arrangements of setae appear to be lacking in other Chlidanotini genera examined, leading to the possibility that it is a feature unique to *Auratonota*.

The structure of the frenulum in the female of *A. pharata*, with two distinct bristles clearly separated at their base, is somewhat unusual in Tortricidae where the female frenulum typically consists of three bristles, usually coalesced basally. A two-bristled frenulum was hypothesized by Komai (1999) to represent a syanpomorphy for *Strophedra* Herrich-Schäffer and



FIGS. 1-2. Adults of *Auratonota*. 1, *A. hydrogramma*, 2, *A. pharata*.
FIGS. 3-4. Male genitalia of *Auratonota*, with valve spread and aedeagus remove (inset of uncus). 3, *A. hydrogramma*, 4, *A. pharata*.



Figs. 5-6. Female genitalia of *Auratonota*, with inset of details of papillae anales. 5, *A. pharata*, 6, *A. hydrogramma*.

Andrioplecta Obraztsov (Grapholitini), and more recently Brown and Baixeras (2006) discussed its distribution among species of several genera of Grapholitini. However, to my knowledge it previously has not been reported in Chlidanotinae. A survey of various (but not all) genera within that subfamily revealed that all Hilarographini and Chlidanotini examined have a female frenulum that consists of two bristles, potentially representing an additional synapomorphy for that putative sister-group pair. Its distribution is less consistent within Polyorthini where females of *Polyortha* Dognin, *Ardeutica* Meyrick, *Lopharcha* Diakonoff, and *Cnephasitis* Razowski have two bristles and those of *Isotrias* Meyrick, *Olindia* Guenée, *Chlorortha* Razowski, *Ebodina* Diakonoff, and *Lypothora* Razowski have three; it is variable among females of *Histura* Razowski.

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