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Systematic revision of *Anopinella* Powell (Lepidoptera: Tortricidae: Euliini) and phylogenetic analysis of the *Apolychrosis* group of genera

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ABSTRACT

Thirty-five species are recognized in the Neotropical genus *Anopinella* Powell, including 5 previously described, *A. isodelta* (Meyrick), *A. triquetra* (Walsingham), *A. ophiodes* (Walsingham), *A. aurea* (Razowski & Becker), new combination, and *A. perblanda* (Razowski & Becker), new combination, and 30 described as new: *A. albolinea* (TL: Costa Rica), *A. araguana* (TL: Venezuela), *A. arenalana* (TL: Costa Rica), *A. boliviana* (TL: Bolivia), *A. brasiliana* (TL: Brazil), *A. cafrosana* (TL: Costa Rica), *A. cartagoa* (TL: Costa Rica), *A. carabayana* (TL: Peru), *A. choko* (TL: Colombia), *A. cuzco* (TL: Peru), *A. fana* (TL: Venezuela), *A. holandia* (TL: Guatemala), *A. larana* (TL: Venezuela), *A. macrosema* (TL: Costa Rica), *A. mariana* (TL: Guatemala), *A. panamana* (TL: Panama), *A. parambana* (TL: Ecuador), *A. peruvensis* (TL: Peru), *A. phillipsae* (TL: Costa Rica), *A. porrasa* (TL: Costa Rica), *A. powelli* (TL: Costa Rica), *A. rastafariana* (TL: Jamaica), *A. razowskii* (TL: Brazil), *A. rica* (TL: Costa Rica), *A. rigidana* (TL: Costa Rica), *A. styraxivora* (TL: Costa Rica), *A. sympatrica* (TL: Guatemala), *A. tinalandana* (TL: Ecuador), *A. transecta* (TL: Costa Rica), and *A. tucki* (TL: Peru). The genus occurs from Jamaica and southern Mexico to southern

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Brazil, Paraguay, and Bolivia. One species has been reared from the fruit of *Styrax* (Styracaceae), one from a fungus gall on *Inga longispina* (Fabaceae), and one from the stem of *Vernonia* (Asteraceae). We re-examine phylogenetic relationships among *Anopinella* and its putative related genera, *Seticosta* Razowski, *Punctapinella* Brown, *Strophotina* Brown, and *Apolychrosis* Amsel. We synonymize *Ecuadorica* Razowski & Becker, 2000, with *Anopinella*.

Key words. Leafrollers, Neotropical, phylogeny, new species, biodiversity, morphology, genitalia, *Anopinella*, *Seticosta*, *Punctapinella*, *Strophotina*, *Apolychrosis*, *Ecuadorica*, *Chirotes*

RESUMEN

Trenta y cinco especies del género neotropical *Anopinella* Powell son reconozidas, estos incluyen 5 previamente descritas, *A. isodelta* (Meyrick), *A. triquetra* (Walsingham), *A. ophiodes* (Walsingham), *A. aurea* (Razowski & Becker), comb. nov., yi *A. perblanda* (Razowski & Becker), comb. nov., y 30 nuevas descitas aqui: *A. albolinea* (TL: Costa Rica), *A. araguana* (TL: Venezuela), *A. arenalana* (TL: Costa Rica), *A. boliviana* (TL: Bolivia), *A. brasiliana* (TL: Brazil), *A. cafrosana* (TL: Costa Rica), *A. cartagoa* (TL: Costa Rica), *A. carabayana* (TL: Peru), *A. choko* (TL: Colombia), *A. cuzco* (TL: Peru), *A. fana* (TL: Venezuela), *A. holandia* (TL: Guatemala), *A. larana* (TL: Venezuela), *A. macrosema* (TL: Costa Rica), *A. mariana* (TL: Guatemala), *A. panamana* (TL: Panama), *A. parambana* (TL: Ecuador), *A. peruvensis* (TL: Peru), *A. phillipsae* (TL: Costa Rica), *A. porrasa* (TL: Costa Rica), *A. powelli* (TL: Costa Rica), *A. rastafariana* (TL: Jamaica), *A. razowskii* (TL: Brazil), *A. rica* (TL: Costa Rica), *A. rigidana* (TL: Costa Rica), *A. styraxivora* (TL: Costa Rica), *A. sympatrica* (TL: Guatemala), *A. tinalandana* (TL: Ecuador), *A. transecta* (TL: Costa Rica), yi *A. tucki* (TL: Peru). El genero esta presente desde el sur de Mexico y Jamaica hasta Brasil. Una especie ha sido criada sobre el fruto de *Styrax* (Styracaceae), una especie fue criada en agallas de hongos sobre *Inga longispina* (Fabaceae), y una especie fue criada sobre *Vernonia* (Asteraceae). Hemos revisado nuevamente las relaciones filogeneticas entre los generos *Anopinella*, *Seticosta* Razowski, *Punctapinella* Brown, *Strophotina* Brown, y *Apolychrosis* Amsel.

INTRODUCTION

Anopinella was proposed by Powell (1986) for three described species of Neotropical tortricid moths (i.e., *Eulia isodelta* Meyrick, which was designated as the type species, *Tortrix ophiodes* Walsingham, and *Eulia homosacta* Meyrick), one of which (*homosacta*) subsequently was transferred to *Seticosta* Razowski (Razowski 1986). Subsequently, *Tortrix triquetra* Walsingham was added to the genus by Powell et al. (1995). In a preliminary hypothesis of phylogenetic relationships among the genera in the tribe Euliini, Brown and Powell (1991) suggested that *Anopinella*, *Seticosta*, and *Apolychrosis* Amsel together represented a monophyletic group, basal within the tribe. In his subsequent description of *Punctapinella*, Brown (1991) expanded that hypothesis to include the latter, which was suspected to be the sister group of *Seticosta*. Razowski and Becker (1999) revisited relationships among these genera, including their new taxon, *Chirotes* Razowski and Becker (a synonym of *Strophotina* Brown) (Brown 2003). They described several new species of

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Punctapinella and *Seticosta*, and in their phylogeny suggested that *Anopinella* and *Apolychrosis* together represented the sister group to *Seticosta* plus *Punctapinella*, recognizing two species groups in the last that probably represent distinct genera. Most recently Razowski and Becker (2000) described *Ecuadorica* to accommodate two new species from Ecuador; and we suspected that it is synonymous with *Anopinella*. Although the monophyly of each of the genera mentioned above initially appeared well supported by one or more morphological characters, the discovery of new species in each has brought a certain degree of ambiguity to previously proposed relationships and has revealed the need to reevaluate the limits of the genera.

As has been the case with many recent systematic treatments of Neotropical Euliini genera (e.g., Brown and Powell 1991, 2000), when all the specimens of *Anopinella* from major institutional and private collections were assembled, a large number of new species was revealed. The purposes of this paper are to review *Anopinella* and describe its 30 new species, to proposed the synonymy of *Ecuadorica* with *Anopinella*, and to revisit the hypothesized phylogenetic relationships among *Seticosta*, *Punctapinella*, *Strophotina* (=*Chirotes*), and *Anopinella*.

MATERIALS AND METHODS

SPECIMENS. Approximately 168 specimens of pinned adults of *Anopinella* were examined, representing the 35 species defined herein, plus a few specimens that could not be assigned to species because of their poor, damaged, or incomplete condition. Most of the species are rare in collections; 17 (49%) are represented by one sex only, and 12 of these are known from single specimens. Abbreviations for depositories of specimens are as follows:

AMNH, American Museum of Natural History, New York, New York, U.S.A.;
BMNH, The Natural History Museum, London, U.K.;
INBio, Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica;
UCB, Essig Museum of Entomology, University of California, Berkeley, U.S.A.;
UCR, University of Costa Rica, San José, Costa Rica;
USNM, National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.;
VBC, Vitor O. Becker personal collection, Planaltina, Brazil.

DISSECTIONS AND MEASUREMENTS. Genitalic preparations and slides of wings for examining venation were made by the techniques outlined in Brown and Powell (1991). However, in some genitalic preparations, double-staining was used (i.e., eosin-y and chlorozol black).

Forewing length was measured using a transparent millimeter ruler under low power of a dissecting microscope, and estimated to the nearest 0.1 mm. Measurements were

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taken along a straight line from forewing base to apex (including fringe). A representative sample of 10 specimens was measured for each species (there is little or no difference between sexes), or if fewer, all specimens available. Range, mean, and number of specimens (n) measured are indicated throughout the text.

SPECIES DISCRIMINATION. The moths were segregated by collecting locality and then separated by differences in forewing pattern, which frequently were subtle. The resulting groups then were examined for differences and/or similarities in genitalia structure. A single consistent distinguishing genitalic character was considered sufficient to indicate species distinction. Differences in genitalia often were qualitative, i.e., shape or curvature of the valva or spination of gnathos, rather than discrete presence/absence of unique features. Hence, it is possible that some of these differences represent individual variation rather than species distinction. On the other hand, differences in genitalia frequently were corroborated by slight differences in forewing markings. We have adopted a conservative approach, combining species that are similar and/or recorded from the same geographic region that have only subtle differences in genitalia. For species represented by a single sex, differences in forewing pattern and/or significant geographic disjunction from similar species represented only by the opposite sex were considered sufficient to indicate species distinction. Because most species are extremely similar superficially, genitalia dissections are necessary for accurate identifications. The user should be able to identify all of the species treated herein by comparison of dissections with the illustrations of genitalia.

DESCRIPTIONS. All descriptions of facies and genitalia are composite, based on the series available. Drawings of genitalia are of a single representative preparation unless indicated otherwise. In two cases the drawing is based on a reconstruction of disarticulated or broken parts.

Terminology for wing venation and genitalia structure follows Horak (1984); abbreviations are as follows: DC = discal cell of forewing; FW = forewing; HW = hindwing. Slightly modified definitions of the following standard morphological terms are used to refer to specific regions of the valva: sacculus = the ventral edge from the base of the valva to the distal end of the convexly rounded curve, usually representing the basal third or fourth; postsacculus = the ventral edge from the distal end of the convexly rounded curve (sacculus) to the apicoventral angle or lower edge of the cucullus, usually concavely rounded; apicoventral angle = the variably protuberant process situated ca. 6.5-8.0 the distance from the base to the apex of the valva that bears the spine in the Isodelta Species Group; outer margin = the margin of the valva from the apicoventral angle to the apex of the costa; and subbasal curve = the deeply concave area of the costa immediately distad of the broad, triangular base. We use the term phallus for the entire “penis,” referring to the basal portion as the phallobase and the distal portion as the aedeagus. Abbreviations used in the “Specimens Examined” sections are as follows: P.N. = Parque Nacional; ca. = circa (approximately); Fca. = Finca; Est. = Estacion; and r.f. = reared from; months of the year are abbreviated by the first three letters.

For purposes of the phylogenetic analysis, we define several putative monophyletic species groups, which are identified by an upper case first letter and the name without italics (e.g., Isodelta Species Group) to avoid confusion of these groups with species-group names as defined by the International Code of Zoological Nomenclature. We also refer to the entire group of genera treated herein as the Apolychrosis Genus Group.

SYSTEMATICS

ANOPINELLA POWELL

Anopinella Powell 1986: 394; Brown 1991: 7; Brown & Powell 1991: 25; Powell et al. 1995: 142; Razowski & Becker 1999: 416.
Ecuadorica Razowski & Becker 2000: 110. NEW SYNONYMY.
Euadorica; Razowski & Becker 2000: 114. Misspelling in figure legend.

Type species.- *Eulia isodelta* Meyrick, 1912, by original designation.

Redescription. Head: Antennal cilia in male ca. 1.3 X flagellomere diameter; short, unmodified in female. Labial palpus porrect, elongate, all segments combined ca. 3 X horizontal diameter of compound eye; segment II expanded distally by scaling to ca. 1.6 X its basal diameter, slightly curved; segment III ca. 0.4 as long as II, exposed. Frons smooth-scaled, with overhanging tuft of scales from vertex. Chaetosema present. Ocellus small or absent. Maxillary palpus rudimentary, hidden. Proboscis well developed, presumably functional. Thorax: Male foreleg without hairpencil. Forewing (Fig. 90) length 2.3-2.4 X width; DC length 0.55-0.60 X FW length; DC width 0.21-0.23 X DC length; CuA2 extremely weak; CuP absent; chorda present, reduced basally; M-stem absent. Pattern with large dark triangular blotch at middle of costa with a small rounded white dot near vertex; pale subterminal region; costal strigulae present. Hindwing (Fig. 90) with Sc+R and Rs closely approximate; Rs and M_1 closely approximate; M_3 and CuA_1 connate or short-stalked; CuP represented by a trace; M-stem absent. Abdomen: Dorsal pits absent; no modified corethrogyne scaling in female. Male genitalia with uncus usually slender, variably curved or bent, slightly enlarged preapically, sparsely setose dorsally in distal 0.15-0.25. Socius small to moderately large, pendant, usually digitate, sparsely setose; broadly attached to tegumen basally. Gnathos arms usually narrow at base, broadened distally into enlarged, flattened lobes, sometimes spinulose. Transtilla complete, narrow, non-dentate. Valva long, relatively slender (3-4 X longer than wide), with large, triangular or subrectangular, dorsally produced basal process, followed distally by a deep, rounded concavity (= subbasal curve); distal portion of valva densely hairy, cucullus-like, with (Isodelta Species Group) or without (Fana Species Group) a strong spur or spine at apicoventral angle, or with dense cluster of spines near midventer of valva (Syraxivora Species Group). Phallus

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short, moderately stout; frequently a single slender, spine-like cornutus or crease, plus patch(es) of microtrichiae on vesica. Female genitalia with papillae anales narrow, nearly parallel-sided, weakly tapering anterad. Dorsum of eighth tergum frequently with species-specific modification. Apophyses anteriores elongate, narrow, bifurcate posteriorly, one arm fusing with eighth tergum and the other with broadened lamella postvaginalis; apophyses posteriores shorter. Sterigma a narrow, membranous band; ostium displaced anteriorly, located at distal 0.33 of seventh sternum. Ductus bursae narrow, elongate, membranous; frail accessory bursae from narrow ductus, arising 0.50-0.95 along length of ductus bursae. Corpus bursae moderately large, irregularly rounded, variably spiculate; ductus seminalis from near middle of corpus bursae, usually surrounded by patch of spiculae.

Distribution and Biology. *Anopinella* occurs from southern Mexico (a single damaged female representing an undescribed species; AMNH) to Brazil, Paraguay, and Bolivia; it also is known from Jamaica. It appears to reach its greatest species richness in Central America (Table 1), where it nearly always is restricted to cloud forest habitat at high elevations (i.e, 1100-3000 m). One species has been reared from the fruit of *Styrax* species (Styracaceae), a second from a fungus gall on *Inga longispina* (Fabaceae), both in Costa Rica, and a third from the stem of *Vernonia* (Asteraceae) in Brazil. Based on the limited information available, *Anopinella* and relatives may be internal feeders in seeds, galls, and stems - all species of *Apolychrosis* have been reared from cones of Pinaceae (Pogue 1986), and the only species of *Seticosta* reared thus far is a gall maker in the stems of *Rubus* species (Brown & Nishida 2003).

TABLE 1. Geographic distribution of species of *Anopinella* by country.

Country	Species	No. species
Bolivia	*boliviana*	1
Brazil	*brasiliana*, *razowskii*	2
Colombia	*choko*, *isodelta*	2
Costa Rica	*albolinea*, *arenalana*, *cafrosana*, *cartagoa*, *macrosema*, *phillipsae*, *porrasa*, *powelli*, *rica*, *rigidana*, *styraxivora*, *transecta*	12
Ecuador	*aurea*, *parambana*, *perblanda*, *tinalandana*	4
Guatemala	*triquetra*, *ophiodes*, *mariana*, *holandia*, *sympatrica*	5
Jamaica	*rastafariana*	1
Mexico	undescribed species (single in poor condition)	1
Panama	*panamana*	1
Paraguay	*brasiliana*	1
Peru	*carabayana*, *cuzco*, *peruvensis*, *tucki*	4
Venezuela	*araguana*, *fana*, *larana*	3

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Diagnosis. *Anopinella* is superficially and structurally most similar to *Apolychrosis*, *Seticosta*, *Strophotina*, and *Punctapinella* among described genera. It shares with these genera a similar forewing pattern, long porrect labial palpi, long antennal cilia in the male, and elongate apophyses in the female genitalia. It differs from these genera in the presence of a distally enlarged process of the gnathos; the Isodelta Species Group differs from all other genera except *Apolychrosis* in the presence of a spine-like seta at the apicoventral angle of the valva. Species of *Anopinella* are characterized by an elongate, narrow valva, dorsal fusion of the two halves of the tegumen (with loss of the "suture"), loss of the male foreleg hairpencil, and a unique configuration of the bursa copulatrix with a frail accessory bursa arising from the ductus bursae, and the ductus seminalis arising from near the middle of the corpus bursae, typically surrounded by a dense patch of spicules.

Although somewhat divergent from most *Anopinella* in forewing pattern, *Ecuadorica* Razowski & Becker appears to represent a junior synonym of *Anopinella*. Based on features of the male genitalia (e.g., attenuate apex of the valva, distinctively enlarged distal lobes of the gnathos, extremely short socii), *Anopinella aurea* (Razowski & Becker), new combination, belongs to the Fana Species Group (defined below) and is related to *A. phillipsae*, new species, and *A. larana*, new species. The female genitalia of *A. aurea* are reminiscent of those of *A. larana* and *A. brasiliana*, new species. The relationship of *A. perblanda* (Razowski & Becker), new combination, known only from the holotype female, within *Anopinella* is less obvious. Alternatively, *Ecuadorica*, including *A. phillipsae*, *A. larana*, and possibly even *A. brasiliana*, may represent a separate genus distinct from *Anopinella*. However, we suspect that these species form a clade within *Anopinella*.

Species Groups. We divide *Anopinella* into three species groups (Table 2) on the basis of structures of the male and female genitalia. Descriptions of taxa and phylogenetic analyses are based on the species groups identified below.

I. Isodelta Species Group (Figs. 1-16, 34-43). In this group the uncus usually is evenly curved throughout; the distal lobes of the gnathos are flattened laterally and variably spined; the valva is narrow, broadened apically, with the costa nearly straight beyond the subbasal curve; there is a distinct, free, downward-projecting spur or spine at the apicoventral angle of the valva, and small, marginal, spine-like setae are lacking; and the ductus seminalis always originates from a densely spiculate patch near the middle of the corpus bursae.

II. Fana Species Group (Figs. 17-32, 44-54). In this group the uncus usually is strongly bent in the basal one-fourth to one-third; the distal lobes of the gnathos are flattened laterally but not spined; the valva is sightly wider, usually more parallel-sided, with the costa nearly straight or angled dorsad in the distal one-third to one-fourth; there is no spine from the apicoventral angle, but there usually are small marginal spine-like setae; and the ductus seminalis usually originates from a densely spiculate patch near the middle of the corpus bursae, but sometimes on the side opposite of the patch.

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III. Styraxivora Species Group (Figs. 33, 55). In this group the uncus is relatively straight, weakly curved in the distal portion; the distal lobes of the gnathos are flattened dorsoventrally; the valva is long, slender, lanceolate, attenuate apically, with the costa straight; there is a cluster of 6-8 spines from a lobe near the mid-venter of the valva; and the ductus seminalis originates from a densely spiculate patch near the middle of the corpus bursae.

TABLE 2. Taxa used in phylogenetic analysis.

Terminal taxon	**Included species**
Homosacta Species Group (*Seticosta*)	*homosacta* (Meyrick), *sagmatica* (Meyrick), *arachnogramma* (Meyrick), *aeolozona* (Meyrick), *tridens* Razowski, *cerussograpta* Razowski
Tholeraula Species Group (*Seticosta*)	*paranica* Razowski & Becker, *charagma* Razowski & Becker, *tholeraula* (Meyrick), *punctum* Razowski & Becker, *senecta* Razowski & Becker
Strophotina	*chorestis* (Razowski & Becker), *strophota* (Meyrick), *curvidagus* Brown, *niphochondra* (Razowski & Becker)
Apolychrosis	*schwerdfegeri* Amsel, *ferruginus* Pogue, *ambogonium* Pogue, *candidus* Pogue, *synchysis* Pogue
Conchitis Species Group (*Punctapinella*)	*chione* Razowski & Becker, *hysithrona* (Meyrick), *conchitis* (Meyrick)
Niphastra Species Group (*Punctapinella*)	*niphastra* (Meyrick), *chionocarpa* (Meyrick), *braziliana* Brown, *scleroductus* Brown, *theta* Brown, *niphochroa* (Razowski & Becker)
Isodelta Species Group (*Anopinella*)	*isodelta*, *triquetra*, *ophiodes*, *cartagoa*, *transecta*, *araguana*, *razowskii*, *parambana*, *rastafariana*, *arenalana*, *mariana*, *carabayana*, *cafrosana*, *porrasa*, *powelli*, *albolinea*
Styraxivora Species Group (*Anopinella*)	*styraxivora*
Fana Species Group (*Anopinella*)	*fana*, *brasiliana*, *choko*, *cuzco*, *macrosema*, *phillipsae*, *aurea*, *perblanda*, *peruvensis*, *tucki*, *larana*, *holandia*, *tinalandana*, *panamana*, *sympatrica*, *rigidana*, *boliviana*, *rica*

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Isodelta Species Group

Anopinella isodelta (Meyrick, 1912)

Figs. 1, 34, 56

Eulia isodelta Meyrick 1912: 681; Clarke 1958: 131.
Anopinella isodelta; Powell 1986: 395; Powell et al. 1995: 142.

Diagnosis. *Anopinella isodelta* is most similar to *A. triquetra*. It can be distinguished by the broader dorsum of the tegumen, shorter socii, more spinose lateral edge of the distal lobes of the gnathos, more evenly upcurved costa of the valva with a narrower "neck" portion, and slightly more anterior origin of the accessory bursae.

Redescription. Head: Frontoclypeus, vertex, and labial palpus white. Antenna with scape brown intermixed with pale brown; basal 8-10 flagellomeres brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum white intermixed with brown. Forewing (Fig. 56) length 8.2-9.3 mm (n = 3); incomplete basal fascia pale reddish brown intermixed with olive green, or white intermixed with reddish brown and pale brown; costal blotch obtriangular, brown intermixed with dark brown on posterior end; basal fascia and costal blotch separated by a pale, oblique band of white intermixed with pale reddish brown and pale brown demarcating costal blotch, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except on posterior end; ocellus brown or faint; if faint, distal ca. 0.33 nearly white; costal blotch with a small, subcircular, white spot near posterior end; area between CuP and posterior margin pale reddish brown intermixed with pale brown and brown, or white intermixed with pale reddish brown and pale brown; apical and subapical areas white intermixed with brown. Fringe with inner portion brown, outer portion reddish brown. Hindwing grayish white, with several irregular transverse gray bands.

Abdomen: Male genitalia (Fig. 1; drawn from BMNH slide 6315; n = 1) with uncus curved near apical 0.33. Socius short, ca. 0.14 length of gnathos arms, not extending beyond base of gnathos. Gnathos arms enlarged distally forming two laterally flattened lobes, each with an irregularly serrate outer margin; lobes fused dorsally. Valva with a densely setose cucullus and basal ridge; costa nearly straight from subbasal curve, slightly arched dorsally in apical 0.2; ventral margin of valva broadly curved in basal 0.66, slightly recurved at apicoventral angle; outer margin convexly rounded. Phallus short; vesica densely microtrichiate. Female genitalia (Fig. 34, drawn from BMNH slide 23472; n = 2) with sclerotized mesal patch at lamella postvaginalis slightly longer than wide; eighth tergum not modified; ostium broadly U-shaped, less than 0.5 width of seventh sternum at widest point. Ductus bursae long, slender; inception of accessory bursae ca. 0.8 distance from ostium to corpus bursae. Corpus bursae subcircular, densely spiculate on ca. 0.14 side bearing ductus seminalis.

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Lectotype, ♂ (designated by Clarke 1958), Colombia, San Antonio, 5800' [1785 m], Nov 1907, 6/1. Deposited in BMNH.

Paralectotype (1♀). COLOMBIA: San Antonio, 5800' [1785 m], Nov 1907, 6/3 (BMNH) [head missing].

Additional Specimen Examined. COLOMBIA: San Antonio, 5800' [1785 m], Nov 1907 (1♀), 6/6 (BMNH).

Remarks. In his original description, Meyrick (1912) indicated that he had two specimens (1♂, 1♀); Clarke (1958) designated the male as the lectotype. We found a third specimen (♀) in BMNH with identical data as the original pair. Because the lectotype is labeled "6/1," the paralectotype "6/3," and the additional specimen "6/6," there must have been 6 specimens in the Meyrick Collection identified as "*Eulia isodelta*" even though he mentioned only two in his description.

***Anopinella triquetra* (Walsingham, 1914)**
Figs. 2, 35, 57

Tortrix triquetra Walsingham 1914: 291.
Seticosta triquetra; Razowski 1986: 22.
Anopinella triquetra; Powell et al. 1995: 142.

Diagnosis. As discussed above, *A. triquetra* is most similar to *A. isodelta*. The two can be distinguished by the characters described in the diagnosis of *A. isodelta*. Putative autapomorphies for *A. triquetra* include the following: male genitalia with the posteroventral part of the gnathos lobes greatly expanded, and eighth tergum of the female with a weak lateral sinus at middorsum flanked by two oblique flanges, resulting an a shallowly U-shaped ridge (Fig. 35 insert).

Redescription. Head: Frontoclypeus white intermixed with few pale gray scales; vertex pale gray intermixed with reddish brown; labial palpus with outer surface brown intermixed with reddish brown and few white scales, inner surface white. Antenna with scape brown intermixed with some reddish brown and pale brown scales; basal 6-10 flagellomeres reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum pale brownish yellow intermixed with dark brown and reddish brown. Forewing (Fig. 57) length 7.0-9.5 mm (n = 10); incomplete basal fascia and costal blotch brown intermixed with pale brown and few reddish brown and dark brown scales, separated by a pale, oblique band of pale brown intermixed with pale reddish brown scales; some specimens with more white scales demarcating costal blotch, recurved from costa through subapical area to tornus, encircling an elliptical ocellus, except on posterior part; elliptical ocellus usually reduced, absent in some specimens; costal blotch subtriangular, with a small, subrectangular, white spot near posterior end; apical area white intermixed with brown; submarginal area with gray patches separated by thin,

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reddish brown bars. Fringe with outer half brown and/or gray, inner half reddish brown and brownish gray. Hindwing pale brown, gradually darkening to apex, or brown.

Abdomen: Male genitalia (Fig. 2; drawn from USNM slide 68841; n = 1) with uncus curved from base. Socius relatively wide, digitate, ca. 0.65 length of gnathos arms. Gnathos greatly expanded posteroventrally, forming two free, laterally flattened lobes, each with outer margin sparsely serrate. Valva densely setose from cucullus to basal ridge; costa nearly straight from subbasal curve to apex; ventral edge with basal 0.66 weakly, evenly curved, then recurved to apicoventral angle; cucullus elongate, acuminate, gradually widening to mid-length, recurved to lateroventral margin, forming a protuberant apex. Phallus simple; vesica densely microtrichiate. Female genitalia (Fig. 35; drawn from USNM slide 68858; n = 4) with weakly sclerotized, elliptical mesal patch at lamella postvaginalis; eighth tergum with a short lateral median sinus flanked by two small, oblique flanges (Fig. 35 insert); ostium broadly U-shaped, about 0.33 width of seventh sternum, ventral rim narrowly sclerotized. Ductus bursae long, slender; inception of accessory bursa ca. 0.5 distance from ostium to corpus bursae. Corpus bursae large, subspherical, spiculate on 0.25 side bearing ductus seminalis.

Holotype, ♀, Guatemala, Baja Vera Paz, San Geronimo, 1879-80, G. C. Champion [head missing]. Deposited in BMNH.

Additional Specimens Examined. GUATEMALA: Volcan Santa Maria, Jun-Jul [no year] (1♂, 20♀), Schaus and Barnes Collection (USNM).

Remarks. We examined two additional females from Honduras (Morazán, Tegucigalpa, La Tigre, 1800 m, 24 Aug 2000, V. Becker, VBC) in which the genitalia are similar to those of *A. triquetra*, with an inverted U-shaped flange on the eighth tergum. However, the forewing pattern is conspicuously darker in these specimens, without the broad, pale, subterminal area. Hence it is possible that these specimens represent an undescribed species near *A. triquetra*. We also examined two females from Costa Rica (Cartago Province, Paraíso, P.N. Tapantí-Macizo del la Muerte, Est. Quebrada Segundo, 1300 m, Mar 2001, R. Delgado, INBio; and Puntarenas Province, La Amistad, Sector Altamira, Cerro Biolley, A.C. Amistad, 1800 m Jan 1994, R. Delgado, INBio) that are similar to *A. triquetra* but differ slightly in the genitalia from those of the series from Guatemala. Because we are uncertain if they are conspecific with *A. triquetra* we treat them as *A.* nr. *triquetra*.

Anopinella porrasa **Brown and Adamski, new species**
Figs. 36, 71

Diagnosis. *Anopinella porrasa*, which is known only from the holotype female, is most similar to *A. cartagoa* in facies and *A. triquetra* in genitalia. The holotype of *A. porrasa*, which has a broad, pale subterminal region similar to *A. cartago*, can be distinguished from the latter by the absence of the subdorsal ridges and short anterior process character-

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istic of the genitalia of *A. cartagoa*. It can be distinguished from *A. triquetra* by the distinct shape of the dorsal flange (Fig. 36 insert) on the eighth tergum.

Description. Head: Frontoclypeus pale brown; vertex pale brown, brown adjacent to inner margin of base of scape; labial palpus with outer surface of segment I reddish brown intermixed with brown, segment II reddish brown intermixed with brown with few pale brown and white scales to near apex, segment III pale brown intermixed with brown, inner surface mostly white intermixed with pale brown. Antenna with scape pale brown intermixed with few reddish brown scales; basal 8-10 flagellomeres reddish brown; distal flagellomeres pale gray.

Thorax: Tegula and mesonotum pale brown intermixed with white [most scales missing]. Forewing (Fig. 71) length 9.2 mm (n = 1); incomplete basal fascia and costal blotch brown intermixed with dark brown and reddish brown; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with few pale reddish brown scales demarcating basal fascia and costal blotch slightly beyond CuP, band recurved from distal costa through subapical area to tornus, encircling an ill-defined elliptical ocellus; costal blotch with a small white spot near posterior end; area between CuP and posterior margin brown intermixed with reddish brown; apical area brown intermixed with few pale reddish brown scales; submarginal area narrow, with small, pale reddish brown spots demarcated with brown scales. Fringe reddish brown intermixed with brown [most scales missing]. Hindwing pale brown, with slightly darker, irregular transverse bands, gradually darkening to apex.

Abdomen: Male unknown. Female genitalia (Fig. 36; drawn from DA slide 4751; n = 1) with wide, ovoid sclerotized patch at lamella postvaginalis; eighth tergum with a broad, bidentate flange (Fig. 36 insert); ostium shallowly U-shaped, ca. 0.25 width of seventh sternum at widest point. Ductus bursae long, slender; inception of accessory bursae ca. 0.6 distance from ostium to corpus bursae. Corpus bursae large, subspherical, with small stout spicules on inner ca. 0.5 of side bearing ductus seminalis.

Holotype, ♀, Costa Rica, Cartago Province, Paraíso, P.N. Tapantí-Macizo de la Muerte, 300 m S del Puente del Río Porras, Nov 2001, R. Delgado. Deposited in INBio.

Etymology. The specific epithet is derived from the type locality of Río Porras.

***Anopinella ophiodes* (Walsingham, 1914)**
Figs. 3, 58

Tortrix ophiodes Walsingham 1914: 290.
Anopinella ophiodes; Powell 1986: 394; Powell et al. 1995: 142.

Diagnosis. *Anopinella ophiodes* shares a similar shaped valva with *A. cartagoa*, but can be distinguished from the latter by the much shorter uncus; narrower socii; laterally flattened, distal lobes of the gnathos with an irregularly serrate outer margin; and long hair-like

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microtrichiae of the vesica of the aedeagus. *Anopinella ophiodes* lacks the ventral, subapical lobe of the gnathos present in *A. cartagoa*. Putative autapomorphies for *A. ophiodes* include the dorsally narrowed tegumen and the unusual microtrichiae of the vesica.

Redescription. Head: Frontoclypeus and vertex grayish white; labial palpus with outer surface pale gray intermixed with reddish brown, inner surface white. Antenna with scape brown intermixed with pale brown; basal 8-10 flagellomeres brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum with grayish yellow scales, many tipped with reddish brown. Forewing (Fig. 58) length 6.1 mm (n = 1); incomplete basal fascia reddish brown intermixed with grayish brown; costal blotch brown, dark brown on posterior end; basal fascia and costal blotch separated by a yellowish brown oblique band demarcating costal blotch, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except on posterior end; costal blotch subtriangular, with a small, oblong, white spot near posterior end; area between CuP and dorsum pale reddish brown; apical area brown; submarginal band dark brown. Fringe with inner portion brown, outer portion pale brown. Hindwing grayish brown.

Abdomen: Male genitalia (Fig. 3; drawn from BMNH slide 5799; n = 1) with tegumen narrowed dorsally; uncus relatively short, only slightly curved near apical 0.33. Socius moderately long, ca. equal in length to basal portion of gnathos arms. Gnathos with a pair of laterally flattened, distal lobes, with irregularly serrate outer margins; ventral part of lobes narrowly expanded. Valva moderately short, setose from cucullus to ca. 0.65 distoventral margin; costa nearly straight from subbasal curve; ventral margin with basal portion gently curved, distoventral margin slightly recurved to apicoventral angle, forming a broad cucullus; cucullus densely setose submarginally. Phallus simple, vesica densely microtrichiate, with slightly larger spines. Female unknown.

Holotype, ♂, Guatemala, Retalhulea, Las Mercedes, 3000' [923 m], Oct-Nov 1880, G. C. Champion. Deposited in BMNH.

Anopinella cartagoa Brown and Adamski, new species

Figs. 4, 37, 59

Diagnosis. *Anopinella cartagoa* is a moderately large species, superficially most similar to *A. triquetra* and *A. porrasa*. The male genitalia are easily distinguished by the presence of a keel-like process from the venter of the subapical portion of each of the gnathos arms and a long, strong uncus, both of which appear to represent autapomorphies for the species. The female genitalia are distinguished by the anteriorly convergent, sclerotized ridges of the eighth tergum, with a short, mesal, digitate lobe at the anterior edge, and the shape of the ductus bursae: broad at the antrum and gradually tapered anterad.

Description. Head: Frontoclypeus and vertex pale brown intermixed with brown; labial palpus with outer surface of segments I-II brown intermixed with pale brown, seg-

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ment III pale brown, inner surface pale brown. Antenna with scape pale brown intermixed with brown; basal 8-10 flagellomeres reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum pale brown intermixed with brown and dark brown. Forewing (Fig. 59) length 7.7-8.8 mm (n = 10); incomplete basal fascia and costal blotch brown intermixed with reddish brown and dark brown, separated by an oblique, pale band of white intermixed with pale brown and reddish brown demarcating anterior part of basal fascia and costa blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, nearly entirely encircling an elongate ocellus, except for posterior part; ocellus rounded apically, wide, posteriorly narrowed or truncate, pale brown intermixed with pale reddish brown and white; costal blotch with a small subrectangular white spot near posterior end; area between CuP and posterior margin reddish brown intermixed with brown; apical and submarginal areas narrow, brown intermixed with reddish brown. Fringe brown intermixed with reddish brown. Hindwing pale grayish brown.

Abdomen: Male genitalia (Fig. 4; drawn from DA slide 4746; n = 4) with uncus long, large, broadly curved throughout. Socius narrow, digitate, short, ca. 0.17 length of gnathos arms. Gnathos relatively wide, gradually narrowed distally; distal lobes slightly upturned, acuminate, with entire margins, dorsally connected by a wide hood-shaped lobe; ventral margin with a small, semicircular, keel-like, subapical process. Valva gradually widened from subbasal curve, densely setose from inner surface of cucullus to basal ridge; costa slightly arched from subbasal curve; ventral margin broadly rounded, slightly recurved at apicoventral angle; cucullus slightly acuminate, with outer margin nearly straight from ca. 0.33 length to apicoventral angle. Phallus simple; vesica sparsely microtrichiate. Female genitalia (Fig. 37; drawn from DA slide 4560; n = 12) with weakly developed subquadrate sclerotized mesal patch at lamella postvaginalis; eighth tergum with a pair of oblique, sclerotized lines (representing flattened lateral lobes at the anterior end of segment) terminating in a short, mesal, digitate lobe anteriorly (Fig. 37 insert); ostium wide, shallowly U-shaped, ca. 0.33 width of seventh sternum at widest point. Ductus bursae long, moderately broad at antrum, gradually tapered anterad; inception of accessory bursae ca. 0.8 distance from ostium to corpus bursae. Corpus bursae ovoid, spiculate on ca. 0.2 of side bearing ductus seminalis.

Holotype, ♂, Costa Rica, Cartago Province, Paraíso, P.N. Tapantí-Macizo de la Muerte, Al Costado de Casa Adm., 1200 m, Jun 2000, L. Chavarria. Deposited in INBio.

Paratypes (3♂, 14♀). COSTA RICA: Cartago Province: Paraíso, P.N. Tapantí-Macizo de la Muerte, Al Costado de Casa Adm., 1300 m, Jun 2000 (1♂), R. Delgado (INBio). Paraíso, P.N. Tapantí-Macizo de la Muerte, 300 m SE del Puente del Río Porras, 1660 m, Jan 2000 (1♀), Nov 2001 (1♂, 4♀), Aug 2002 (1♀), R. Delgado (INBio, USNM); Paraíso, P.N. Tapantí-Macizo de la Muerte, Estación Quebrada Segundo, 1300 m, Mar 2001 (1♀), Aug 2000 (1♀), R. Delgado (INBio). Tapantí, 1700 m, 10 Jun 1998 (1♀), 1500 m, 30-31 Aug 2000 (1♀), V. O. Becker (VBC). Guanacaste Province: Z. P. Tenorio, Sector Alto Masís, 1100 m, 10-14 Jun 2002 (1♀), J. Jiménez (INBio), 10-14 Jun 2002 (1♀), L. Chavar-

ria (INBio). Heredia Province: 16 km SSE La Virgen, 10°16'N, 84°05'N, 1050-1150 m, 19 Feb 2001 (1♂), D. Wagner & J. Rota (INBio), 19 Apr 2001 (1♀), J. Brown (USNM). Puntarenas Province: Buenos Aires, PILA, Sector Altamira, A.C Amistad, 1150-1400 m, May 1994 (1♀), R. Delgado (INBio).

Etymology. The specific epithet is derived from Cartago Province, Costa Rica.

Remarks. The association of the sexes is based on the series taken at Paraíso in November 2001, which includes both males and females. Although the holotype of *A. porrasa* was collected at the same locality, the latter has a conspicuously longer forewing length.

Anopinella powelli **Brown and Adamski, new species**
Figs. 14, 38, 62

Diagnosis. In forewing pattern and color, *A. powelli* is similar to *A. triquetra*, *A. porrasa*, and *A. cartagoa*, but it is a slightly smaller species. The single known male is assigned to the species provisionally. The most conspicuous autapomorphies for *A. powelli* are the large, deep, rounded antrum and the narrow, sclerotized line across the dorsum of the eighth tergum (Fig. 38).

Description. Head: Frontoclypeus and vertex pale brown or pale brown intermixed with few brown scales; labial palpus with outer surface brown intermixed with pale brown, inner surface pale brown. Antenna with scape brown intermixed with pale brown; basal 8-10 flagellomeres brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum brown intermixed with pale brown. Forewing (Fig. 62) length 6.5-7.9 mm (n = 6); incomplete basal fascia pale brown or brown intermixed with yellowish brown and reddish brown; costal blotch pale brown or brown intermixed with dark brown and reddish brown on posterior half; basal fascia and costal blotch separated by an oblique, pale band of white intermixed with pale brown and/or pale yellowish brown demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP; recurved band wide from distal costa through subapical area to tornus, completely encircling an elongate ocellus; ocellus pale gray or brown, acuminate, widened to posterior end; area between CuP and posterior margin dark brown intermixed with pale brown, or pale reddish brown intermixed with brown; costal blotch with a subrectangular or subcircular white spot near posterior end; apical area brown; submarginal area narrow, with alternating dark brown and reddish brown patches. Fringe alternating reddish brown and gray. Hindwing pale grayish brown.

Abdomen: Male genitalia (Fig. 14; drawn from DA slide 4227; n = 1) with uncus curved at ca. 0.5 length. Socius slightly widened, digitate, ca. 0.75 length of basal portion of gnathos arms. Gnathos arms abruptly widened distally, forming two elongate (as long as basal portion of gnathos arms), semicircular, laterally flattened lobes with sparsely serrate margins. Valva with ventral margin weakly undulate from base to apicoventral angle,

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slightly produced immediately before apicoventral angle; densely setose from cucullus to apicoventral angle and from basal ridge to postsaccular area; costa conspicuously sloped dorsally at cucullus; cucullus slightly rounded apically, outer margin broadly rounded to apicoventral angle. Phallus simple; vesica sparsely microtrichiate. Female genitalia (Fig. 38; drawn from JWB slide 1072; n = 6) with broad, weakly developed sclerotized mesal patch at lamella postvaginalis; eighth tergum with lateral sclerotized line across dorsum (Fig. 38 insert); ostium widely U-shaped, less than 0.5 width of seventh sternum at widest point. Antrum a deep, broadly rounded bowl; ductus bursae long, slender; inception of accessory bursae ca. 0.65 distance from ostium to corpus bursae. Corpus bursae subcircular, densely spiculate on ca. 0.25 side bearing ductus seminalis.

Pupa. Typically tortricinae, without modification of head; no conspicuous sculpturing. Abdominal segments 3-8 with two rows of spines dorsally. Cremaster short, stout, with 6 long hooked setae. Indistinguishable from that of *A. styraxivora* (Figs. 91, 92).

Holotype, ♀, Costa Rica, Puntarenas Province, Monteverde, 1400 m, 29-31 Mar 1992, UV & MV Lights, S. McCarty & J. A. Powell. Deposited in UCB.

Paratypes (1♂, 5♀). COSTA RICA: Guanacaste Province: Est. Cacao, 1000-1400 m, lado SO Volcan Cacao, P.N. Guanacaste, Apr 1991 (1♀), C. Chaves (INBio). Puntarenas Province: Fca. Cafrosa, Est. Las Mellizas, P.N. Amistad, 1300 m, Mar 1991 (1♀), G. Mora (INBio), May 1991 (1♀), G. Mora (INBio). Fca. Cafrosa, Avenida El Pizote, 1.4 km NE de la Tigra, 1300 m, 28-29 Nov 1997 (1♂), A. Picado (INBio). Monteverde, 1400 m, 29-31 Mar 1992 (1♀), UV & MV Lights, S. McCarty & J. A. Powell (UCB); Monteverde, May 1999 (1♀), reared from fungus gall on *Inga longispina*, P. E. Hanson (UCR).

Biology. According to label data, a specimen from Monteverde was reared from a fungus gall on *Inga longispina* (Fabaceae). With one exception, all specimens examined were collected from March through May.

Etymology. The species epithet honors Jerry A. Powell who led the charge of collecting microlepidoptera in Mexico and Costa Rica.

Remarks. As mentioned above, the association of the sexes is equivocal. The forewings of the male specimen are in extremely poor condition, so a comparison of pattern elements is impossible. However, the specimen is about the right size (i.e., forewing length) and was collected at the same locality as two of the female paratypes (i.e., Finca Cafrosa). Below we describe another species from Finca Cafrosa (*A. cafrosana*), but males of that species have a conspicuously shorter, more rounded outer margin of the valva between the apicoventral angle and the apex of the costa (Fig. 14).

Anopinella araguana **Brown and Adamski, new species**
Figs. 5, 39, 61

Anopinella ophiodes; Powell 1986 (not Walsingham): 390 [illustration of male genitalia].

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Diagnosis. *Anopinella araguana* is most similar to *A. razowksii* both in facies and genitalia but has considerably larger distal lobes of the gnathos and shorter socii. Putative autapomorphies for *A. araguana* include the elongate spines along the posterior margin of the distal lobes of the gnathos, the elongate, rod-like sclerite of the vesica, and the quadrate sclerotized mesal patch of the lamella postvaginalis in the female genitalia.

Description. Head: Frontoclyeus and vertex pale brown intermixed with dark brown; labial palpus with outer surface of segments I-II brown intermixed with pale brown, segment III pale brown, inner surface pale brown. Antenna with scape brown intermixed with pale brown; basal 6-10 flagellomeres brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum brown intermixed with pale brown and reddish brown. Forewing (Fig. 61) length 7.0-9.0 mm (mean = 9.5; n = 10); incomplete basal fascia brown intermixed with reddish brown and dark brown; costal blotch dark brown intermixed with reddish brown and brown; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with pale reddish brown and few dark brown scales demarcating basal fascia and costal blotch to near cubitus; band recurved from distal costa through subapical area to tornus, encircling crescent-shaped ocellus, except for posterior part; costal blotch with small, subcircular, white spot near posterior end; area between CuP and posterior margin pale reddish brown intermixed with brown and dark brown; apical area dark brown; submarginal area with gray spots near outer margin of ocellus. Fringe gray intermixed with reddish brown. Hindwing brown.

Abdomen: Male genitalia (Fig. 5; drawn from DA slide 4160; n = 1) with uncus curved throughout. Socius digitate, ca. 0.85 length of basal portion of gnathos arms. Gnathos expanded distally, forming two large, free, laterally flattened, crescent-shaped lobes, each with elongate spines on outer margin. Valva densely setose from inner margin of cucullus to basal ridge; sacculus broadly rounded distally, confluent with postsacculus; postsacculus broadly concave, slightly recurved towards apicoventral angle; apicoventral angle protuberant; cucullus densely setose, with a broadly rounded outer margin from an acuminate apex. Phallus simple; vesica densely microspinulate, with an elongate, slightly curved cornutus. Female genitalia (Fig. 39; drawn from DA slide 4161; n = 6) with weakly sclerotized, quadrate mesal patch at lamella postvaginalis; eighth tergum not modified; ostium broadly U-shaped, ventral rim narrowly sclerotized, ca. 0.5 width of seventh sternum at widest point. Antrum parallel-sided, cup-shaped; ductus bursae long, wide; accessory bursae originating ca. 0.8 distance from ostium to corpus bursae. Corpus bursae large, subspherical, with microspicules on inner ca. 0.17 of side bearing ductus seminalis.

Holotype, ♂, Venezuela, Aragua, Rancho Grande, 1100 m, 24-31 Oct 1966, S. S. & W. D. Duckworth. Deposited in USNM.

Paratypes (2♂, 7♀). VENEZUELA: Aragua: 5 km West of Tovar, 6300', 24 Jan 1978 (1♂), J. B. Heppner (USNM). Rancho Grande, 1100 m, cloud forest, 17-20 Jan 1978 (1♂), J. B. Heppner (USNM), 16-23 Oct 1966 (5♀), 11-15 Jan 1966 (1♀), S. S. Duckworth & W. D. Duckworth (USNM), 1-7 Aug 1967 (1♀), R. Poole (USNM).

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Additional Specimen Examined: VENEZUELA: Merida: Mucuy Fish Hatchery, 7 km E Tabay, 6600' [2300 m], 10-13 Feb (1♂), J. B. Heppner (USNM).

Etymology. The specific epithet is derived from the province, Aragua, Venezuela.

Remarks. The male genitalia of the specimen from Merida are nearly identical to those of other males, but they lack the characteristic rod-like sclerite of the vesica; hence this specimen is excluded from the type series. The difference in elevation of the collecting locations (1100 m vs. 2300 m) also suggests that the two may not be conspecific.

The genitalia illustrated by Powell (1986) as *A. ophiodes* is a USNM specimen from Rancho Grande, Venezuela.

***Anopinella razowskii* Brown and Adamski, new species**
Figs. 7, 40, 63

Diagnosis. *Anopinella razowskii* is superficially most similar to *A. araguana* and can be distinguished by the characters described above in the diagnosis of the latter. It shares with *A. triquetra* a similarly shaped distal lobe of the gnathos. It differs from the latter in the presence of an elongate, subrectangular sclerite in the vesica of the aedeagus. Putative autapomorphies for *A. razowskii* include the sclerite of the vesica and the unique shape of the narrow flange on the eighth tergum of the female.

Description. Head: Frontoclypeus and vertex pale brown intermixed with brown; labial palpus with outer surface brown intermixed with pale brown to near apex of segments I-II, inner surface pale brown. Antenna with scape brown intermixed with pale brown; basal 8-10 flagellomeres reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum brown intermixed with reddish brown and pale brown. Forewing (Fig. 63) length 6.6-8.1 mm (n = 10); incomplete basal fascia and costal blotch brown intermixed with reddish brown, dark brown, and few pale brown and white scales, separated by an oblique pale band of white intermixed with pale reddish brown demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elongate ocellus, except for posterior part; ocellus pale brown intermixed with reddish brown, apically acuminate, wide throughout length, except posterior end; area between CuP and posterior margin reddish brown intermixed with brown and pale brown; costal blotch with a small elliptical white spot near posterior end; apical and submarginal areas wide, with pale brown spots separated by reddish brown. Fringe alternating reddish brown and gray. Hindwing pale grayish brown; some specimens with reddish brown near apex.

Abdomen: Male genitalia (Fig. 7; drawn from DA slide 4518; n = 3) with uncus abruptly curved subapically. Socius digitate, ca. 0.8 length of gnathos arms. Gnathos arms relatively narrow basally, abruptly widening distally into large, laterally flattened, upturned lobes, with serrate margins. Valva nearly parallel-sided, slightly widened at apicoventral angle; densely setose from inner surface of cucullus to basal ridge except near

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postsaccular area; cucullus with slightly truncate apex, gradually widened ventrally to apicoventral angle. Phallus simple; vesica densely microtrichiate. Female genitalia (Fig. 40; drawn from DA slide 4519; n = 4) with lightly sclerotized, semicircular mesal patch at lamella postvaginalis; eighth tergum with a narrow, crescent-shaped, transverse, medial flange on posterior part (Fig. 40 insert); ostium broad, just less than 0.5 width of seventh sternum. Ductus bursae long, slender; inception of accessory bursae ca. 0.6 distance from ostium to corpus bursae. Corpus bursae subspherical, weakly spiculate on side bearing ductus seminalis.

Holotype, ♂, Brazil, Bahía, Camacá, 400-700 m, 13-14 Apr 1992, V. O. Becker. Deposited in VBC.

Paratypes (2♂, 7♀). BRAZIL: Bahía: Camacá, 400-700 m, 13-14 Apr 1992 (5♀), V. O. Becker (USNM, VBC). Paraná: Quatro Barras, 900 m, 31 Jan 1993 (1♂), V. Becker (VBC), 800 m, 5 Jun 1970 (2♀), Becker & Laroca (VBC), 9 May 1970 (1♂), V. Becker (VBC).

Additional Specimens Examined. BRAZIL: Nova Teutonia, 300-500 m, 27°11'S, 52°23'W, F. Plaunman (USNM). Paraná: Quatro Barras, 900 m, 31 Jan 1993 (1♂), V. Becker (VBC), 800 m, 5 Jun 1970 (1♂), Becker & Laroca (VBC).

Etymology. The species name honors Józef Razowski, who first recognized this species as distinct and allowed us to include it in this revision.

Remarks. All of the specimens cited above are indistinguishable in facies, and all of the females are virtually identical in genitalia. However, in the genitalia of the two males listed in “Additional Specimens Examined” the outer margin of the valva is conspicuously shorter and more rounded (Fig. 6). Because these specimens may not be conspecific with the holotype, we have excluded them from the type series. Actually, it is possible that specimens from the states Bahía and Paraná are not conspecific. However, because we are unable to distinguish between the female genitalia, and the genitalia of one of the two males from Paraná is identical to those of the holotype, we provisionally include all under *A. razowskii*.

Anopinella parambana **Brown and Adamski, new species**
Figs. 8, 64

Diagnosis. *Anopinella parambana* can be distinguished from other species in the genus by the considerably longer, more truncate outer margin of the distal lobes of the gnathos and by the nearly triangular cucullus, both of which appear to represent autapomorphies for the species.

Description. Head: Frontoclypeus and vertex pale brown [labial palpi missing]. Antenna with scape pale brown; basal 5 flagellomeres brown; distal flagellomeres pale brown.

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Thorax: Tegula and mesonotum reddish brown intermixed with pale brown and brown. Forewing (Fig. 64) length 7.5 mm (n = 1); incomplete basal fascia and costal blotch brown intermixed with pale brown and pale reddish brown, separated by an oblique pale band of white intermixed with few reddish brown scales demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elongate ocellus, except for posterior part; ocellus brown; costal blotch subtriangular, with a small, oblong, white spot near posterior end; area between CuP and posterior margin brown intermixed with pale reddish brown and pale brown; apical area pale brown; submarginal area narrow. Fringe brown [mostly absent]. Hindwing brown.

Abdomen: Male genitalia (Fig. 8; drawn from BMNH slide 29091; n = 1) with uncus slightly curved subapically. Socius slightly broadened, ca. 0.75 length of gnathos arms. Gnathos gradually widening from ca. 0.33 length, forming two large, laterally flattened, fan-like distal lobes with serrate and truncate margins. Valva densely setose from cucullus to basal ridge; ventral margin broadly concave beyond sacculus, recurved to apicoventral angle; cucullus longer than wide, triangular, narrowly acuminate, outer margin nearly straight from apex to apicoventral margin. Phallus simple; vesica densely microtrichiate. Female unknown.

Holotype, ♂, Ecuador, Paramba, Jan-May 1897, Rothschild Bequest, BM 1939-1. Deposited in BMNH.

Etymology. The specific epithet refers to the collecting locality of Paramba, Ecuador.

Anopinella rastafariana Brown and Adamski, new species

Figs. 9, 41, 66

Diagnosis. The male and female genitalia of *A. rastafariana* are most similar to those of *A. arenalana*, however, the two are not similar in facies. The male genitalia of *A. rastafariana* can be distinguished from those of *A. arenalana* by the bifurcate apical process of the distal lobe of the gnathos. The female genitalia of *A. rastafariana* have a narrower sclerotized patch at the lamella postvaginalis and the antrum is broad posteriorly and gradually narrows anteriorly. Putative autapomorphies for *A. rastafariana* include the peglike seta at the apicoventral angle of the valva; the bidentate apical process of the distal lobe of the gnathos; the large, transverse, flange of the eighth tergum of the female (Fig. 41 insert); and the shape of the antrum.

Description. Head: Frontoclypeus pale yellowish brown, vertex pale yellowish brown intermixed with some yellowish brown scales tipped with reddish brown; labial palpus with outer surface yellowish brown intermixed with reddish brown and brown, inner surface pale brown. Antenna with scape pale brown intermixed with few brown scales; basal 6-10 flagellomeres brown; distal flagellomeres pale brown.

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Thorax: Tegula and mesonotum pale yellowish brown intermixed with reddish brown and brown. Forewing (Fig. 66) length 7.5-8.5 mm (mean = 8.2; n = 5); incomplete basal fascia and costal blotch brown intermixed with reddish brown, dark brown, and grayish brown, separated by a wide, oblique, pale band of white intermixed with few pale reddish brown scales demarcating a subtriangular costal blotch, except on posterior end; band recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except for the posterior end; ocellus pale gray, nearly indistinct; costal blotch with small subrectangular white spot near posterior end; area between CuP and posterior margin pale reddish brown intermixed with few brown and dark brown scales; apical area yellowish brown intermixed with reddish brown and grayish brown; submarginal area reddish brown intermixed with grayish brown. Fringe pale reddish brown. Hindwing pale gray, with irregular mottling, gradually darkening from base to apex.

Abdomen: Male genitalia (Fig. 9; drawn from USNM slide 68565; n = 2) with uncus curved at ca. apical 0.33. Socius digitate, ca. 0.5 length of basal portion of gnathos arms. Gnathos arms long, apically enlarged into a pair of broad, laterally flattened lobes, fused basally, abruptly protuberant apically, forming a distal bidentate process. Valva comparatively broad, densely setose from cucullus to basal ridge; cucullus broadly rounded laterally to apicoventral angle; apicoventral angle bearing a peglike seta; ventral margin gently curved from sacculus to apicoventral angle. Phallus simple, relatively short, phallobase rounded; vesica densely microtrichiate. Female genitalia (Fig. 41; drawn from USNM slide 69504; n = 1) with weakly developed, elliptical sclerotized mesal patch at lamella postvaginalis; eighth tergum with a large, curved, transverse flange at anterior edge (Fig. 41 insert); ostium broadly U-shaped, ca. 0.5 X width of seventh sternum at widest point; antrum broad at ostium, tapered anterad. Ductus bursae long, slender, inception of accessory bursae ca. equidistant from ostium and corpus bursae. Corpus bursae large, subspherical, spiculate on ca. 0.2 of side bearing ductus seminalis.

Holotype, ♂, Jamaica, Portland Parish, 1 mi [1.6 km] N Hardware Gap, 12-20 Nov 1966, E. L. Todd. Deposited in USNM.

Paratypes (2♂, 2♀). JAMAICA: Portland Parish, 1 mi [1.6 km] N Hardware Gap, 12-20 Nov 1966 (1♂, 2♀), E. L. Todd (USNM). St. Catharine's Parish, Mt. Diablo, Hollymount, 2754' [850 m], 21-24 Apr 1973 (1♂), D. & M. Davis (USNM).

Etymology. The specific epithet is derived from Rastafarianism, a popular religious sect in Jamaica.

Anopinella arenalana Brown and Adamski, new species

Figs. 10, 67

Diagnosis. The male genitalia of *A. arenalana* are most similar to those of *A. rastafariana*, especially in the broadly rounded aspect of the distal portion of the valva from the apicoventral angle to the apex of the costa. *Anopinella arenalana* can be distinguished by the

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extremely broad distal process of the gnathos, which appears to represent an autapomorphy for the species; it also is considerably smaller than *A. rastafariana*. The female of *A. arenalana* is unknown.

Description. Head: Frontoclypeus pale yellowish brown, vertex pale yellowish brown intermixed with some yellowish brown scales tipped with reddish brown; labial palpus with outer surface yellowish brown intermixed with reddish brown and brown, inner surface pale brown. Antenna with scape pale brown intermixed with few brown scales; basal 6-10 flagellomeres brown; distal flagellomeres pale brown.

Thorax: Tegula and mesonotum pale yellowish brown intermixed with reddish brown and brown. Forewing (Fig. 67) length 6.5 mm (n = 2) ; incomplete basal fascia and costal blotch brown intermixed with reddish brown, dark brown, and grayish brown, separated by a wide, oblique, pale band of white intermixed with few pale reddish brown scales demarcating an subtriangular costal blotch, except on posterior end; band recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except for the posterior end; ocellus pale gray, nearly indistinct; costal blotch with a small, subrectangular white spot near posterior end; area between CuP and posterior margin pale reddish brown intermixed with few brown and dark brown scales; apical area yellowish brown intermixed with reddish brown and grayish brown; submarginal area reddish brown intermixed with grayish brown. Fringe pale reddish brown. Hindwing pale gray, with irregular mottling, gradually darkening from base to apex.

Abdomen: Male genitalia (Fig. 10; drawn from JWB slide 1073; n = 2) with uncus curved at ca. apical 0.4. Socius digitate, ca. 0.65 length of basal portion of gnathos arms. Gnathos arms long, distal ca. 0.5 greatly enlarged, upturned, mostly non-dentate. Valva comparatively broad, densely setose from cucullus to basal ridge; ventral margin broadly rounded from base to end of sacculus, gently curved from sacculus to apicoventral angle, outer margin broadly curved dorsally from apicoventral angle to apex of costa. Phallus simple, relatively short, basally rounded; vesica densely microtrichiate. Female unknown.

Holotype, ♂, Costa Rica, Puntarenas Province, Arenal Lodge [between Fortuna and Arenal, ca. 6 km NW Volcan Arenal], 29 May 1994, J. Brown. Deposited in UCB.

Paratype. COSTA RICA: [no locality], [no date] (1♂), V. Becker (VBC).

Etymology. The specific epithet is derived from the collecting locality near Volcan Arenal.

Anopinella mariana Brown and Adamski, new species

Figs. 11, 68

Diagnosis. The male genitalia of *A. mariana* are most similar to those of *A. carabayana*; those of *A. mariana* can be distinguished by the shorter socii, the serrate outer edge of the gnathos, the medially fused distal lobes of the gnathos, and the deeply emarginate postsaccular margin. The two species are dissimilar superficially - *A. mariana* is the largest spe-

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cies in the genus (forewing length 10.2 mm), with a rather ill-defined forewing pattern; *A. carabayana* is a medium-sized species, with a well defined forewing pattern. The strongly concave postsaccular region of the valva is the most conspicuous character distinguishing *A. mariana* from its relatives.

Description. Head: Frontoclypeus dark brown intermixed with white; vertex white intermixed with dark brown; labial palpus with outer surface pale yellowish brown intermixed with dark brown, inner surface white. Antenna with scape brown intermixed with white; basal 6 flagellomeres dark brown; distal flagellomeres paler brown.

Thorax: Tegula and mesonotum brown intermixed with few pale brown scales. Forewing (Fig. 68) length 10.2 mm (n = 1); incomplete basal fascia and costal blotch brown intermixed with brownish orange and dark brown, separated by a pale brownish orange band intermixed with pale brown, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except on posterior end; ocellus brown intermixed with reddish brown; costal blotch subtriangular, darker on posterior half, with a small, oblong, white spot near posterior end; area between CuP and posterior margin pale brown intermixed with pale reddish brown and dark brown; apical area mostly brown intermixed with pale brown; submarginal area with pale reddish brown patches separated by dark brown streaks. Fringe dark brown intermixed with few reddish brown and pale yellow scales. Hindwing pale brown, with irregular transverse mottling, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 11; drawn from USNM slide 68569; n = 1) with uncus nearly straight. Socius short, ca. 0.14 length of gnathos arms. Gnathos arms curved dorsoposteriorly and fused medially, forming a recurved band with serrate margin. Valva densely setose from cucullus to sacculus; sacculus sparsely setose, narrowly rounded; postsacculus deeply concave, recurved distally forming a widened apicoventral angle; cucullus acuminate, recurved from 0.5 length to apicoventral angle. Phallus simple; vesica densely microtrichiate. Female unknown.

Holotype, ♂, Guatemala, Volcan Santa Maria, Jul [no year], Schaus and Barnes Coll. Deposited in USNM.

Etymology. The specific epithet refers Volcan Santa Maria, Guatemala, the type locality.

Anopinella carabayana **Brown and Adamski, new species**

Figs. 12, 69

Diagnosis. *Anopinella carabayana* is a medium-sized species with a dark brown hindwing, known only from the holotype male. The genitalia are similar to those of *A. cafrosana* in their nearly parallel-sided valvae. The broad, non-dentate, apical region of the distal lobe of the gnathos may represent an autapomorphy for *A. carabayana*.

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Description. Head: Frontoclypeus and vertex pale brown intermixed with few brown scales; labial paplus with outer surface of segments I-II brown intermixed with white apically, segment III white intermixed with brown medially, inner surface white. Antenna with scape and basal 8-10 flagellomeres brown intermixed with reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum dark brown intermixed with reddish brown and pale brown. Forewing (Fig. 69) length 7.5 mm (n = 1); incomplete basal fascia brown intermixed with reddish brown, separated by an oblique band of mostly white intermixed with pale reddish brown basally, distally pale reddish brown intermixed white demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elongate ocellus, except for a narrow posterior part; ocellus pale brown, with serpentine inner margin; costal blotch dark brown, with a small subtriangular white spot near posterior end; area between CuP and posterior margin pale brown intermixed with pale reddish brown; apical area white intermixed with pale reddish brown; submarginal area narrow. Fringe reddish brown. Hindwing dark brown.

Abdomen: Male genitalia (Fig. 12; drawn from BMNH 29094; n = 1) with uncus long, gradually curved from base. Socius narrow, digitate, short, less than 0.25 length of basal portion of gnathos arms. Gnathos arms wide, slightly broadened in apical 0.25, distally forming two laterally flattened, slightly upturned, broad lobes with entire margins. Valva nearly parallel-sided, only weakly broadened to apicoventral angle, densely setose from inner surface of cucullus to basal ridge; costa gradually curved dorsally from subbasal curve; ventral margin gradually curved dorsally, slightly recurved at apicoventral angle, forming an attenuate base for a stout seta; cucullus subtriangular, apex acuminate, outer margin widest at ca. midlength, recurved along basal 0.5. Phallus simple; vesica densely microtrichiate, with a slightly elongate, laterally flattened cornutus. Female unknown.

Holotype, ♂, Peru, R. Huacamayo, Carabaya, 3100' [954 m], dry season, Jun 1904, G. Ockenden, Rothschild Bequest BM 1939-1 [left forewing missing]. Deposited in BMNH.

Etymology. The specific epithet is derived from Carabaya, Peru.

Anopinella cafrosana Brown and Adamski, new species

Figs. 13, 43, 70

Diagnosis. The male genitalia of *A. cafrosana* are similar to those of *A. carabayana* in the somewhat parallel-sided valva, but can be distinguished from the latter by their smaller distal lobes of the gnathos and slightly longer spine from the apicoventral angle. The narrow, slightly undulate, transverse ridge of the eighth tergum of the female of *A. cafrosana* is similar to that of *A. powelli*, but the latter has a conspicuously larger antrum.

Description. Head: Frontoclypeus white intermixed with brown, vertex pale yellow intermixed with dark gray; labial palpus with outer surface brown intermixed with reddish

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brown, inner surface white. Antenna with scape brown intermixed with dark brown; basal 8-10 flagellomeres reddish brown intermixed with brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum pale reddish brown intermixed with pale yellow and gray. Forewing (Fig. 70) length 5.9-6.2 mm (n = 3); incomplete basal fascia and costal blotch brown intermixed with some orange-brown and dark brown, separated by an oblique pale band of white intermixed with pale reddish brown demarcating a costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except for posterior end; costal blotch subtriangular, with a small, subcircular, white spot near posterior end; area between CuP and posterior margin brown intermixed with reddish brown and white; apical and submarginal areas brown intermixed with orange brown. Fringe mostly white intermixed with some grayish. Hindwing dark gray.

Abdomen: Male genitalia (Fig. 13; drawn from JWB slide 1069; n = 2) with uncus curved near apical 0.33. Socius digitate, ca. 0.5 length of basal portion of gnathos arms. Gnathos arms apically curved dorsoposteriorly, forming a pair of dorsally fused, narrow, elongate lobes with serrate margins. Valva narrow, parallel-sided from subbasal curve, densely setose from outer margin of cucullus to basal ridge; cucullus slightly rounded apically, broadly rounded to apicoventral margin; apicoventral angle slightly protuberant; length of seta at apicoventral angle ca. 0.33 width of valva. Phallus simple; vesica slightly microtrichiate. Female genitalia (Fig. 43; drawn from JWB slide 1070; n = 1) with an weakly developed, elliptical sclerite at lamella postvaginalis; eighth tergum with a narrow, slightly sinuate, transverse ridge (Fig. 43 insert); ostium weakly U-shaped, less than 0.5 width of seventh sternum at widest point. Ductus bursae long, slender; inception of accessory bursa ca. 0.5 distance from ostium to corpus bursae. Corpus bursae large, subspherical, spiculate on 0.33 side bearing ductus seminalis.

Holotype, ♂, Costa Rica, Puntarenas Province, Fca. Cafrosa, Est. Las Mellizas, Parque Internacional La Amistad, 1300 m, Oct 1990, M. Ramirez & G. Mora. Deposited in INBio.

Paratypes (1♂, 1♀). COSTA RICA: Puntarenas Province: Fca. Cafrosa, Est. Las Mellizas, Parque Internacional La Amistad, 1300 m, May 1991 (1♂), M. Ramirez (INBio). Guanacaste Province: Est. Cacao, SW side Volcan Cacao, P.N. Guanacaste, 1000-1400 m, Jun 1991 (1♀), F. A. Quesada (INBio).

Etymology. The species name refers to the type locality of Finca Cafrosa, Costa Rica.

Anopinella transecta Brown and Adamski, new species

Figs. 15, 42, 60

Diagnosis. *Anopinella transecta* is a moderately small species with a well defined forewing pattern. The male genitalia are similar to those of *A. triquetra* with a long angled outer margin of the valva. They can be distinguished from all other congeners by the subapical lateral flanges of the gnathos arms, which appear to represent an autapomorphy for the

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species. The female genitalia likewise are similar to *A. triquetra*, with a pair weakly developed oblique ridges on the dorsum of the eighth tergum.

Description. Head: Frontoclypeus white intermixed with brown, vertex pale yellow intermixed with dark gray; labial palpus with outer surface brown intermixed with reddish brown, inner surface white. Antenna with scape brown intermixed with dark brown; basal 8-10 flagellomeres reddish brown intermixed with brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum pale reddish brown intermixed with pale yellow and gray. Forewing (Fig. 60) length 5.9-6.2 mm (n = 3); incomplete basal fascia and costal blotch brown intermixed with some orange-brown and dark brown, separated by an oblique pale band of white intermixed with pale reddish brown demarcating a costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except for posterior end; costal blotch subtriangular, with a small, subcircular, white spot near posterior end; area between CuP and posterior margin brown intermixed with reddish brown and white; apical and submarginal areas brown intermixed with orange brown. Fringe mostly white intermixed with some grayish. Hindwing dark gray.

Abdomen: Male genitalia (Fig. 15; drawn from DA slide 4745; n = 1) with uncus curved near apical 0.33. Socius digitate, ca. 0.5 length of basal portion of gnathos arms. Gnathos arms with a broad lateral flange subdistally, arms curved apically, forming a pair of dorsally fused, narrow lobes with a weakly serrate margin. Valva narrow, gradually expanded subdistally, densely setose from outer margin of cucullus to basal ridge; outer margin nearly straight in ventral 0.6, then curved to apex of valva; apicoventral angle slightly protuberant. Phallus simple, relatively short, stout; vesica slightly microtrichiate. Female genitalia (Fig. 42; drawn from DA slide 4562; n = 2) with a weakly developed, rectangular sclerite at lamella postvaginalis; eighth tergum with a pair of weak oblique ridges converging posteriorly (Fig. 42 insert); ostium weakly U-shaped, less than 0.5 width of seventh sternum at widest point. Ductus bursae long, slender; inception of accessory bursa ca. 0.8 distance from ostium to corpus bursae. Corpus bursae large, subspherical, spiculate on 0.33 side bearing ductus seminalis.

Holotype, ♂, Costa Rica, Heredia Province, 16 km SSE La Virgen, INBio-OET-ALAS transect, 1050-1150 m, 13 Apr 2001, D. Davis. Deposited in INBio.

Paratypes (2♀). COSTA RICA: Cartago Province: Tapantí, 1700 m, 10 Jun 1998 (1♀), V. Becker (VBC). Paraíso, P.N. Tapantí-Macizo de la Muerte, Est. Quebrada Segundo, 1200 m, 14 Aug 2000 (1♀), R. Delgado (INBio).

Etymology. The species name refers to the ALAS transect at ca. 1070 m where the holotype was collected. ALAS is the acronym of the NSF-funded project known as the Arthropods of La Selva.

Remarks. The association of the sexes is equivocal since females were collected a considerable distance form the type locality, and is based primarily on forewing length and pattern.

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Anopinella albolinea **Brown and Adamski, new species**
Figs. 16, 65

Diagnosis. *Anopinella albolinea* is a moderate-sized species with the forewing veins lightly marked in white and with a long, slender white dash in the dark triangular costal blotch of the forewing replacing the typical small rounded or ovoid white spot characteristic of nearly all other species. The male genitalia can be distinguished from all other species by the presence of two pairs of broad, non-dentate flanges from each arm of the gnathos.

Description. Head: Frontoclypeus white intermixed with pale orange, vertex pale yellow; labial palpus with outer surface pale brown intermixed with reddish brown and pale yellow, inner surface white. Antenna with scape brown intermixed with dark brown; basal 8-10 flagellomeres reddish brown intermixed with brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum pale yellow. Forewing (Fig. 65) length 8.0 mm (n = 1); basal one-sixth, costal blotch, and subterminal crescent-shaped band all concolorous, brown intermixed with dark olive; each area delimited by an oblique pale band of white with orange-brown overscaling extending from costa, ca. 0.25 distance from base to apex, toward dorsum, abruptly angled near dorsum, extending to costa ca. 0.75 distance from base to apex, then extending through subterminal region to dorsum, encircling a crescent-shaped subterminal band; forewing veins lightly marked in white; costal blotch subtriangular, with slender white dash near the vertex replacing typical white spot; area between CuP and posterior margin brown intermixed with reddish brown and white; apical and submarginal areas brown intermixed with orange brown. Fringe mostly white intermixed with some grayish. Hindwing dark gray.

Abdomen: Male genitalia (Fig. 16; drawn from USNM slide 94070; n = 1) with uncus curved near apical middle, slightly attenuate distally. Socius digitate, ca. 0.33 length of basal portion of gnathos arms. Gnathos arms non-dentate, pendant, each with a distally free, weakly incurved, sclerotized flange; a second narrow triangular flange from posterior edge near middle of each arm. Valva narrow, slightly expanded from subbasal curve, densely setose from outer margin of cucullus to basal ridge; outer margin weakly rounded; apicoventral angle slightly rounded. Phallus simple; vesica microtrichiate. Female unknown.

Holotype, ♂, Costa Rica, Puntarenas Province, Alturas de Cotón, 1500 m, 15 Sep 1999, V. Becker. Deposited in VBC.

Etymology. The species name refers to the white line in the discal cell of the forewing.

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Fana Species Group

***Anopinella fana* Brown and Adamski, new species**
Figs. 17, 44, 73

Diagnosis. *Anopinella fana* is most similar to *A. brasiliana*; the two can be distinguished by differences in the shape of the uncus and cucullus. The female genitalia of *A. fana* are characterized by the corpus bursae bearing hair-like spicules on ca. 0.65 of the side opposite the inception of the ductus bursae, and the accessory bursae originating at the junction of the corpus bursae and the ductus bursae. The most conspicuous autapomorphy for *A. fana* is the distally enlarged uncus.

Description. Head: Frontoclypeus and vertex pale brown intermixed with dark brown; labial palpus with outer surface brown intermixed with dark brown, inner surface white. Antenna with scape pale brown intermixed with dark brown; flagellomeres pale brown.

Thorax: Tegula and mesonotum pale brown intermixed with reddish brown and dark brown. Forewing (Fig. 73) length 7.9-8.9 mm (mean = 8.2; n = 4); incomplete basal fascia brown intermixed with reddish brown and dark brown; costal blotch dark brown intermixed with reddish brown and pale brown; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with pale red scales demarcating basal fascia and costal blotch slightly beyond CuP; band recurved from distal costa through subapical area to tornus, encircling a wide crescent-shaped ocellus, except for posterior part; costal blotch with a small white spot near posterior end; area between CuP and posterior margin pale brown intermixed with pale reddish brown; apical area reddish brown intermixed with brown; submarginal area narrow, alternating brown and dark brown. Fringe with inner portion brown, outer portion pale reddish brown. Hindwing brown.

Abdomen: Male genitalia (Fig. 17; drawn DA slide 4158; n = 2) with uncus acutely curved near base, with an enlarged and ventrally keeled apical end. Socius digitate, ca. 0.5 length of gnathos arms. Gnathos arms slender basally, dilated distally, each arm forming a laterally flattened, slender foot-shaped apical lobe with an entire outer margin; lobes connected dorsally by a thin, hood-like band. Valva densely setose from cucullus to basal ridge; ventral margin evenly and shallowly concave from subbasal area to apicoventral region; outer margin rounded. Phallus simple, phallobase slightly swollen, rounded; vesica sparsely microtrichiate. Female genitalia (Fig. 44; drawn from USNM slide 82074; n = 2) with an weakly developed, elongate sclerotized patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus; ostium compactly U-shaped, ca. 0.33 width of seventh sternum at widest point. Ductus bursae long, slender; inception of accessory bursae at anterior end of ductus bursae. Corpus bursae large, subspherical, with hair-like spicules on 0.65 of side opposite of ductus seminalis.

Holotype, ♂, Venezuela, Aragua, Rancho Grande, 1100 m, 16-19 Jan 1966, S. S. and W. D. Duckworth. Deposited in USNM.

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Paratypes (1♂, 2♀): VENEZUELA: Aragua: Rancho Grande, 1100 m, 8-14 Aug 1967 (1♂), R.W. Poole (USNM), 10-21 Feb 1969 (1♀), Duckworth and Dietz (USNM), 11-15 Jan 1966 (1♀), S. S. and W. D. Duckworth (USNM).

Etymology. The specific epithet is borrowed from the pattern of species names used by William Kearfott.

***Anopinella cuzco* Brown and Adamski, new species**
Figs. 19, 77

Diagnosis. *Anopinella cuzco* is nearly identical to *A. choko* in facies and male genitalia. Both possess an unmodified, strongly bent uncus; moderately long socii; a gnathos typical of the Fana Species Group; and short spines along the venter of the valva in the vicinity of the apicoventral angle (Figs. 19-20). The two can be distinguished by the phallus - broader in *A. cuzco*, with three distal sclerotized plates in the vesica. It is possible that the two are conspecific, and that the latter feature merely represents variation or an artifact of the slide mounted preparations. However, the geographic distance between collecting localities (i.e., *A. choko* is known only from Colombia and *A. cuzco* only from Peru) adds support to the hypothesis that the two are distinct.

Description. Head: Frontoclypeus and vertex pale brown intermixed with brown [labial palpus missing]. Antenna with scape and 8-9 basal flagellomeres brown intermixed with pale brown; distal flagellomeres pale gray.

Thorax: Tegula and mesonotum brown intermixed with pale brown and reddish brown. Forewing (Fig. 77) length 7.9 mm (n = 1); basal fascia incomplete, brown intermixed with pale brown and reddish brown; costal blotch mostly dark brown posteriorly; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with few reddish brown and brown scales demarcating anterior part of basal fascia and costal blotch to CuP; a crenulate band recurved from distal costa through subapical area to tornus encircling an elongate ocellus, except posterior part; ocellus with outer margin crenulate; costal blotch with a small, white, subtriangular spot near posterior end; apical area gray; submarginal area dark brown intermixed with reddish brown. Fringe with inner portion gray, outer portion pale brown. Hindwing brown.

Abdomen: Male genitalia (Fig. 19; drawn from BMNH slide 29093; n = 1) with uncus bent at basal 0.33. Socius digitate, ca. 0.5 length of basal portion of gnathos arms. Basal portion of gnathos arms wide, mesal portion gradually narrowed, distal portion bearing protuberant upcurved lobes with entire margins; lobes connected dorsally by a hood-shaped arch. Valva long, densely setose from inner surface of cucullus to near basal ridge; costa straight from subbasal curve to upturned apex; sacculus slightly rounded; postsaccular margin broadly emarginate, distally recurved; apicoventral area elongate, forming an elongate cucullus; cucullus truncate apically. Phallus simple; vesica densely microtrichiate, with three plate-like cornuti. Female unknown.

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Holotype, ♂, Peru, Cuzco, Pilcopata, 1000 m, 11-13 Aug 1982. Deposited in BMNH.

Etymology. The specific epithet, a noun in apposition, refers to the type locality, Cuzco, Peru.

***Anopinella choko* Brown and Adamski, new species**
Figs. 20, 74

Diagnosis. As discussed above in the diagnosis of *A. cuzco*, *A. choko* is most similar to the latter among the species treated herein, and it is possible that the two are conspecific. We treat them as distinct based on differences in the phallus and the considerable distance between type localities.

Description. Head: Frontoclypeus and vertex pale brown; labial palpus with outer surface of segment I and basal half of segment II pale brown; distal half of segments II-III mostly brown intermixed with pale brown, inner surface pale brown intermixed with brown. Antenna with scape and 8-9 basal flagellomeres pale brown intermixed with reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum brown intermixed with pale brown. Forewing (Fig. 74) length 7.7 mm (n = 3); basal fascia incomplete, brown intermixed with pale brown and brownish yellow; costal blotch mostly brown, darker posterior to cubitus; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with pale gray and pale reddish brown demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, narrow, recurved from distal costa through subapical area to tornus encircling an elongate ocellus, except posterior part; ocellus brown, wide from middle to base; area between CuP and posterior margin reddish brown intermixed with brown posteriorly; costal blotch with a small, subquadrate, white spot near posterior end; apical area brown; submarginal area narrow, reddish brown intermixed with brown. Fringe gray. Hindwing brown.

Abdomen: Male genitalia (Fig. 20; drawn from BMNH slide 29095; n = 2) with uncus bent at basal 0.33. Socius digitate, ca. 0.5 length of basal portion of gnathos arms. Gnathos arms wide, gradually narrowed at middle, with protuberant upcurved distal lobes connected dorsally by a hood-shaped arch; margins of lobes entire. Valva densely setose from inner surface of cucullus to postsacculus; basal ridge sparsely setose; costa straight from subbasal curve, slightly recurved apically; sacculus slightly rounded; postsacculus broadly emarginate, forming a rounded cucullus that is apically recurved towards tegumen. Phallus simple, short; vesica sparsely microtrichiate with a pair of elongate plates. Female unknown.

Holotype, ♂, Colombia, Choko Province, Condoto, H.G.P.S. Spurrell, 1914-501 [right hindwing missing]. Deposited in BMNH.

Paratypes (1♂, 1♀). COLOMBIA: Choko Province: Condoto, H.G.P.S. Spurrell, 1914-501 [female lacking metathorax and abdomen] (BMNH).

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Etymology. The species epithet, a noun in apposition, refers to Choko Province, Colombia.

***Anopinella brasiliana* Brown and Adamski, new species**
Figs. 21-23, 45-46, 75-76

Diagnosis. The male gentialia of *A. brasiliana* are similar to those of *A. cuzco* and *A. choko* in the possession of an unmodified, strongly bent uncus; moderately long socii; a gnathos typical of the Fana Species Group; and short spines along the venter of the valva in the vicinity of the apicoventral angle. They can be distinguished by the single slender, distal, plate-like cornutus in the vesica. The female genitalia of *A. brasiliana* are similar to those of *A. fana* and *A. boliviana* in the origin of the accessory bursa near the junction of the ductus bursae and corpus bursae. In *A. brasiliana*, the spicules of the corpus bursae are more extensive than in almost all other species, extending posteriorly into the ductus bursae. The material included under *A. brasiliana* below represents a fairly wide geographic area covering at least five Brazilian states (Rio de Janeiro, São Paulo, Minas Gerais, Distirto Federal, and Paraná) and Paraguay. However, the uniformity in phenotype and features of the genitalia suggest that all are conspecific.

Description. Head: Frontoclypeus and vertex pale brown or pale brown intermixed with few brown scales; labial palpus with outer surface brown intermixed with pale brown to near apical area of segments II-III, inner surface of segments I-II pale brown intermixed with few brown scales, segment III brown intermixed with pale brown. Antenna with scape pale brown intermixed with few brown scales; basal 8-10 flagellomeres reddish brown or brown; distal flagellomeres pale gray or gray.

Thorax: Tegula and mesonotum brown intermixed with reddish brown and pale brown. Forewing (Figs. 75-76) length 8.1-10.1 mm (n = 10); basal fascia incomplete, brown intermixed with pale brown and reddish brown, or pale brown intermixed with few brown and reddish brown scales; costal blotch brown, dark brown on posterior end; basal fascia and costal blotch separated by an oblique band of pale brown intermixed with pale reddish brown and few white and dark brown scales demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elongate ocellus, except on posterior end; ocellus pale brown intermixed with brown scales, anterior half narrowed, posterior half widened; costal blotch with a small subcircular or oblique, subrectangular white spot; apical area brown intermixed with pale brown; submarginal area dark brown or brown intermixed with pale brown. Fringe gray and brown, apically underlaid by slightly visible white scales. Hindwing brown or pale brown, with irregular, brown, transverse bands, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 21-23; drawn from BMNH slide 29086, DA slide 4168, DA slide 4176; n = 6) with uncus bent at basal 0.25. Socius digitate, 0.50-0.65

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length of basal portion of gnathos arms. Gnathos arms relatively wide basally, narrowed mesally, enlarged distally, each bearing a protuberant upcurved lobe with entire margins; distal lobes connected dorsally by a hood-shaped arch. Valva with cucullus densely setose; postsacculus and basal ridge sparsely setose; costa nearly straight from subbasal curve, with slight upturn at apex; sacculus slightly rounded; postsacculus broadly emarginate; outer margin broadly rounded. Phallus simple, aedeagus slightly dilated ventromedially; vesica sparsely microtrichiate, with a long, slender, plate-like, distal cornutus. Female genitalia (Fig. 45-46; drawn from DA slides 4202, 4203; n = 9) with weakly developed, elongate sclerotized mesal patch at lamella postvaginalis; eighth tergum with a mid-dorsal longitudinal sinus (Fig. 46 insert); ostium compactly U-shaped, with parallel lateral edges, ca. 0.35 width of seventh sternum at widest point. Ductus bursae long, slender, inception of accessory bursae near junction of ductus bursae and corpus bursae. Corpus bursae large, subspherical, with patch of dense spicules extending from base of accessory bursae to corpus bursae, gradually becoming sparse on side opposite of inception of ductus seminalis.

Holotype, ♂, Brazil, Minas Gerais, Sete Lagoas, 720 m, 28 Mar 1974, V. O. Becker, 10707, em caule de assa-peixe [in stem of *Vernonia*, Asteraceae]. Deposited in VBC.

Paratypes (11♂, 13♀). BRAZIL: Distrito Federal: Planaltina, 15°35'S, 47°42'W, 1000 m, 1 Feb 1983 (1♀), V. O. Becker (VBC). Minas Gerais: Sete Lagoas, 720 m, 29 Mar 1974 (2♀), V. O. Becker (VBC). Nova Lima, 850 m, 1-3 Apr 1983 (1♂), V. O. Becker (VBC). Paraná: Banhado, Quatro Barras, 800 m, 1 Aug 1970 (1♂), Becker & Larcoa (VBC), 6 Jun 1970 (1♀), V. Becker (VBC). Rio de Janeiro: Petropolis, 1881 (5♂), Doer 68240 and 68095 (BMNH). [No further data] Saunders' Collection, 94-68 (1♀) (BMNH). Lagune de Sacuaresma, P. Germain, Aout Sept 1884 (1♀), Paravicini Coll., BM 1937-383 (BMNH). São Paulo, [no date] (1♀), E. D. Jones (BMNH), Mar 1913 (1♀), 1913-385 (BMNH), Mar 1913 (1♀), 1912-534, [left forewing and right hindwing missing] (BMNH), Jones 1889 (1♀), No. 8762 (BMNH). São Paulo: São Paulo, 1889 (1♂), Jones, No. 8760 [head missing] (BMNH). Altoda Serra, Sep 1927 (1♂), R. Spitz, Rothschild Bequest, BM 1939-1 (BMNH). Bertioga, 5 m, 5 Nov 1995 (1♀), V. O. Becker (VBC). [Brazil?] "Cartana Gn., Bris. (1♂), Paravicini Coll., BM 1937-383" (BMNH). PARAGUAY: Sapucay, Oct-Nov 1903 (1♂, 2♀), W. Foster, 1905-17 [one female lacking abdomen] (BMNH).

Biology. The label on the holotype bears the phrase "em caule de assa-peixe." Assa-peixe is the common name for several species in the genus *Vernonia* (Asteraceae). Hence, we assume that this species was reared from the stem of *Vernonia*.

Etymology. The specific epithet refers to the country, Brazil.

Anopinella macrosema Brown and Adamski, new species
Figs. 24, 47, 82

Diagnosis. *Anopinella macrosema* is one of the largest species in the genus; the male genitalia are somewhat similar to those of *A. phillipsae* and *A. peruvensis* in the possession of

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minute, highly reduced socii. *Anopinella phillipsae* has a much smaller forewing length, patches of shiny, apically recurved scales on the basal ca. 0.65 of the forewing (lacking in *A. macrosema*), and a broader, more apically recurved cucullus (Fig. 24, 25). *Anopinella peruvensis* has a unique attenuate, upcurved apex of the valva (Fig. 27). *Anopinella macrosema* can be distinguished from other *Anopinella* by the combination of the following: large size, pale forewing ground color, minute socius, slightly apically recurved costa of the valva, broadly rounded apicoventral angle of the cucullus, and sparse hair-like spicules of the corpus bursae on the side opposite of ductus seminalis.

Description. Head: Frontoclypeus white, or white with dark brown on lateral marginal, vertex white intermixed with few dark brown scales; labial palpus with outer surface brown intermixed with white basally, inner surface white. Antenna with scape white; flagellomeres pale brown intermixed with few brown scales.

Thorax: Tegula and mesonotum white. Forewing (Fig. 82) length 9.9-12.0 mm (mean = 11.2; n = 10); basal fascia yellowish brown intermixed with few brown and reddish-brown scales; costal blotch yellowish brown intermixed with brown, reddish brown, and dark brown; basal fascia and costa blotch separated by a pale band of white intermixed with few yellowish-brown scales demarcating costal blotch, recurved from distal costa to tornus, encircling elliptical ocellus, except posterior end; costal blotch with a small white oblong spot near posterior end; area between CuP and posterior margin pale reddish brown intermixed with few brown scales; apical area reddish brown intermixed with brown; submarginal area reddish brown intermixed with brown. Fringe with inner portion gray, outer portion pale gray. Hindwing pale gray, with faint irregular transverse bands, gradually darkening from base to apex.

Abdomen: Male genitalia (Fig. 24; drawn from JWB slide 1067; n = 4) with uncus strongly curved at basal 0.33. Socius minute. Gnathos arms slender, with laterally flattened, uptunred apical lobes connected dorsally by an acutely arched flange. Valva with costa upturned at apex; sparse piliform setae on basal ridge; sacculus slightly rounded; postsacculus broadly emarginate, divergent from costa, forming an elongate, broadly rounded cucullus; cucullus moderately setose. Phallus weakly curved near middle; vesica densely microtrichiate. Female genitalia (Fig. 47; drawn from JWB slides 1068, 1190; n = 3) with weakly developed, subtriangular sclerotized patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus; ostium U-shaped, slightly narrowed, ca. 0.25 width of seventh sternum at widest point. Ductus bursae moderately long; inception of accessory bursae ca. equidistant between ostium and corpus bursae. Corpus bursae large, subspherical, with sparse hair-like spicules on side opposite of ductus seminalis.

Holotype, ♂, Costa Rica, Cartago Province, Villa Mills, 3100 m, 9 Jul 1993, E. Phillips. Deposited in INBio.

Paratypes (3♂, 6♀). COSTA RICA: Cartago Province: Villa Mills, 3100 m, 9 Jul 1993 (1♂), E. Phillips (INBio). Río Macho, Est. Ojo de Agua, Sendero al Torre 47, 2960 m, 26 Mar 1998 (1♂), E. Alfaro, B. Gamboa & A. Picado (INBio). Guarco, Est. La Esperanza,

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2600 m, Jul 2001 (1♀), R. Delgado (INBio). El Guarco, R.F. Río Macho, 500 m E Est. La Esperanza, 2600 m, 13-14 May 2002 (1♀), J. Jiménez & E. Phillips (INBio). Cerro de la Muerte, 3100 m, 17 Sep 1998 (1♀), V. O. Becker (VBC). Macizo de la Muerte, Pension la Georgina, 3000 m, Cerro de Muerte, S border Cartago Province, 23-25 May 1985 (1♂), blacklight, J. Powell & P. A. Opler (UCB). Puntarenas Province: Est. La Casona, 1520 m, 4-23 Aug 1994 (1♀), K. L. Martinez (INBio). San José Province: Est. Cuericí, Sendero al Mirador, 4.6 km E Villa Mills, 2640 m, 20-22 Jan 1996 (1♀), B. Gamboa (INBio), 2600 m, 21-26 Sep 1995 (1♀), B. Gamboa (INBio).

Etymology. The specific epithet is derived from "macro," referring to the relatively large size of this species, and "sema" or seed.

Anopinella phillipsae **Brown and Adamski, new species**
Figs. 25, 48, 78

Diagnosis. *Anopinella phillipsae* is most similar to *A. larana* in facies and genitalia. Both have bronzy, recurved scales that diminish the definition of the triangular costal blotch, although our specimens of *A. larana* are rubbed so this feature is not particularly conspicuous. Both species have the large, bent, unmodified uncus; a gnathos typical of the Fana Species Group; extremely short socii; and comparatively long, narrow, apically attenuate valvae with a costa that is slightly upturned at its apex. The elongate-oval sclerotized mesal patch at the lamella postvaginalis in the female genitalia is also similar between *A. phillipsae* and *A. larana*. The conspicuous patches of shiny recurved scales in the basal ca. 0.65 of the forewing of *A. phillipsae* may represent an autapomorphy for this species, although these may be present in *A. larana* as well.

Description. Head: Frontoclypeus and vertex pale brown; labial palpus with outer surface of segments I-II brown intermixed with few dark brown and pale brown scales, segment III pale brown, inner surface pale brown. Antenna with scape pale brown; basal 8-10 flagellomeres reddish brown; distal flagellomeres gray.

Thorax: Tegula brown basally, pale brown distally, mesonotum pale brown. Forewing (Fig. 78) length 6.9-8.0 mm (n = 8); incomplete basal fascia and costal blotch olive-green intermixed with reddish brown and brown scales, merging posteriorly near cubitus; basal fascia and costal blotch separated anteriorly by an incomplete oblique pale band of pale brown intermixed with pale olive-green and pale reddish brown; basal ca. 0.65 with most scales slightly upturned apically, reflecting bright yellow-bronze, with several reddish brown and gray patches; costal blotch with a small subrectangular white spot near posterior end; area of wing between DC and submargin white or pale brown encircling a suffused brown ocellus; apical area brown intermixed with white and reddish brown; submarginal area dark brown intermixed with dark reddish brown. Fringe alternating reddish brown and gray. Hindwing pale grayish brown.

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Abdomen: Male genitalia (Fig. 25; drawn from DA slide 4563; n = 2) with uncus bent at basal 0.25. Socius short, digitate, ca. 0.14 length of gnathos arms. Gnathos arms slightly widened basally, distally enlarged forming two elongate, decumbent lobes with entire margins; lobes connected dorsally by a hood-shaped flange. Valva sparsely setose from cucullus to basal ridge; costa nearly straight in basal two-thirds, slightly angled dorsad in distal one-third, ending in a pointed apex; sacculus nearly straight; postsacculus nearly straight, with a broadly rounded apicoventral angle. Phallus simple, long; vesica densely microtrichiate. Female genitalia (Fig. 48; drawn from JWB slide 1196; n = 6) with elongate sclerotized mesal patch at lamella postvaginalis; eighth tergum with a deeply invaginated crescent-shaped flange (Fig. 48 insert); ostium narrow, shallowly U-shaped, ca. 0.33 width of seventh sternum at widest point. Antrum slightly elongate, parallel-sided; ductus bursae long, slender, gradually widening anteriorly, with sparse spicules on anterior 0.33 of side bearing accessory bursae; inception of accessory bursae ca. 0.75 distance from ostium to corpus bursae. Corpus bursae subspherical, sparsely spiculate on ca. 0.33 of side opposite ductus seminalis.

Holotype, ♂, Costa Rica, Cartago Province, Paraíso, P.N. Tapantí-Macizo de la Muerte, 300 m SE del Río Porras, 1660 m, 1 May 2000, R. Delgado. Deposited in INBio.

Paratypes (1♂, 6♀). COSTA RICA: Cartago Province: Paraíso, P.N. Tapantí-Macizo de la Muerte, 300 m SE del Río Porras, 1660 m, Jan 2000 (2♀), R. Delgado (INBio, USNM), Nov 2001 (1♀), R. Delgado (INBio). Paraíso, P.N. Tapantí-Macizo de la Muerte, R. Grande de Orosi desde Admin. hasta Sendero la Pava, Nov 1995, (1♀), G. Mora (INBio). Paraíso, P.N. Tapantí-Macizo de la Muerte, 300 m N del Mirador, 1830 m, Jul 2000 (1♂), R. Delgado (USNM). Ref. Nac. Fauna Silv. Tapantí, 1250 m, Aug 1991 (1♀), G. Mora (INBio). Tapantí, 1200-1700 m, 20 Aug-15 Sep 1999 (1♀), V. Becker (VBC).

Etymology. The species name honors Eugenie Phillips, our colleague in Costa Rica who has facilitated visits to that country and the study of material deposited in Instituto Nacional de Biodiversidad.

Anopinella larana Brown and Adamski, new species

Figs. 26, 49, 79

Diagnosis. As discussed above, *A. larana* is most similar to *A. phillipsae* both in facies and genitalia. Although it is possible that the two are conspecific, *A. larana* may be distinguished by the more widely separated arms of the gnathos; however, this is based on exceedingly few preparations. It would be surprising to find a species known only from Cartago Province, Costa Rica (*A. phillipsae*) also to be present in Venezuela.

Description. Head: Frontoclypeus and vertex white; labial palpus with outer surface yellowish brown intermixed with brown, inner surface white. Antenna with scape, pedicel, and flagellomeres pale yellowish.

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Thorax: Tegula and mesonotum pale yellowish brown. Forewing (Fig. 79) length 7.0-7.8 mm (n = 2); basal fascia and costal blotch pale olive-gold intermixed with brown and reddish brown, separated by a band of pale brown intermixed with some white scales demarcating a subtriangular costal blotch, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except on posterior end; costal blotch with small oblong white spot near posterior end; area between CuP and posterior margin pale yellowish brown intermixed with white scales; apical area yellowish brown intermixed with brown and white. Fringe alternating brownish gray and reddish brown. Hindwing pale brown, with faint irregular brown transverse bands, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 26; drawn from USNM slide 69285; n = 1) with uncus bent in basal 0.33. Tegumen broadly rounded dorsolaterally. Socius somewhat digitate, ca. 0.33 length of basal portion of gnathos arms. Distal lobes of gnathos laterally flattened, attached medially by narrow, arch-like, dorsal flange. Valva relatively narrow, somewhat parallel-sided in basal 0.75; setose from cucullus to basal ridge; costa slightly upturned apically; postsaccular margin shallowly emarginate, forming an elongate cucullus; cucullus acuminate, lacking setae apically, broadly rounded to apicoventral angle. Phallus abruptly curved basidistally; vescia sparsely microtrichiate. Female genitalia (Fig. 49; drawn from USNM slide 83027; n = 1) with short sclerotized patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus; ostium broadly U-shaped, ca. 0.25 width of seventh sternum at widest point; seventh sternum trapezoidal, with posterolateral margins juxtaposed to ostium. Ductus bursae long, slender, spiculate in anterior 0.2; inception of accessory bursae ca. 0.8 distance from ostium to corpus bursae. Corpus bursae large, subspherical, with hair-like spicules on 0.33 of side opposite ductus seminalis.

Holotype, ♂, Venezuela, Aragua, Lara, Yacambu National Park, 13 km SE Sanare, cloud forest, 4800' [1477 m], 4-7 Mar 1978, blacklight, J. B. Heppner. Deposited in USNM.

Paratype (1♀). VENEZUELA: Aragua: Lara, Yacambu National Park, 13 km SE Sanare, cloud forest, 4800' [1477 m], 4-7 Mar 1978, blacklight, J. B. Heppner (USNM).

Additional Specimens Examined. ECUADOR: Napo Province: Via Santa Barbara-La Bonita, km 23, 2400 m, 7-9 Apr 1986 (1♀), S. McKamey (UCB). Zamora-Chinchipe: 30 km E Loja, 2000 m, 23 Sep 1980 (1♂), O. Flint (USNM).

Etymology. The specific epithet is derived from the type locality of Lara, Venezuela.

Remarks. The two specimens listed above from Ecuador are virtually indistinguishable from *A. larana* in genitalia. However, both are rubbed, obscuring the forewing pattern. Although the collecting locality of Ecuador suggests that they are not conspecific with *A. larana*, we could find no diagnostic characters to separate these specimens from *A. larana*.

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***Anopinella aurea* (Razowski & Becker), new combination**
No Figs.

Ecuadorica aurea Razowski & Becker 2000: 110.

Diagnosis. *Anopinella aurea* is superficially most similar to *A. phillipsae*, with a pale subterminal line; however, it has a considerably greater forewing length and a much lighter ground color. The subbasally bent uncus, enlarged distal lobes of the gnathos, and distally attenuate valva are similar to several other species in the Fana Species Group (e.g., *A. phillipsae*, *A. larana*). The densely spiculate corpus bursae, with spiculae extending posterad into the ductus bursae, also is characteristic of several species in the Fana Species Group (e.g., *A. larana*, *A. brasiliana*). A complete description, illustrations of the male and female genitalia, and a color illustration of the adult can be found in Razowski and Becker (2000).

Holotype, ♂, Ecuador, Carchi, Maldonado, 2200 m, 9-11 Jan 1993, V. Becker. Deposited in VBC.

Paratypes (2♀). ECUADOR: Carchi, Maldonado, 2200 m, 9-11 Jan 1993 (2♀), V. Becker (VBC).

***Anopinella perblanda* (Razowski & Becker), new combination**
No Figs.

Ecuadorica perblanda Razowski & Becker 2000: 110.

Diagnosis. The forewing pattern of *A. perblanda* is divergent from that of other species of *Anopinella*, and its placement in the Fana Species Group is equivocal, based on its putative relationship to *A. aurea* as defined by Razowski and Becker (2000), i.e., as members of *Ecuadorica*. The possession of a densely spiculate corpus bursae and an accessory bursae, and the origin of the ductus seminalis from the middle of the corpus bursae are characteristic of nearly all species of *Anopinella*. A complete description, an illustration of the female genitalia, and a color illustration of the adult can be found in Razowski and Becker (2000).

Holotype, ♀, Ecuador, Carchi, Maldonado, 2200 m, 9-11 Jan 1993, V. Becker. Deposited in VBC.

***Anopinella boliviana* Brown and Adamski, new species**
Figs. 50, 88

Diagnosis. The female genitalia of *A. boliviana* are most similar to those of *A. brasiliana*. They can be distinguished from those of the latter by the denser spicules of the corpus bur-

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sae on the side opposite the ductus seminalis and the general shape of the sclerotized mesal patch at the lamella postvaginalis.

Description. Head: Frontoclypeus and vertex brown intermixed with pale brown; labial palpus with outer surface pale brown intermixed with few dark brown scales, inner surface pale brown. Antenna with scape and basal 8-10 flagellomeres reddish brown; distal flagellomeres gray.

Thorax: Tegula and mesonotum brown intermixed with pale brown. Forewing (Fig. 88) length 9.5 mm (n = 1); basal fascia incomplete, pale brown intermixed with reddish brown and brown; costal blotch brown intermixed with brown and reddish brown; basal fascia and costal blotch separated by an oblique pale band of white intermixed with pale brown and pale reddish brown demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, encircling an elongate ocellus, except for posterior part; ocellus pale brown intermixed with reddish brown and brown; area between CuP and posterior margin reddish brown intermixed with pale brown and brown; costal blotch with small subrectangular white spot near posterior end; apical area brown intermixed with dark brown; submarginal area pale brown, intermixed with reddish brown. Fringe alternating dark brown and reddish brown. Hindwing pale grayish brown.

Abdomen: Male unknown. Female genitalia (Fig. 50; drawn from BMNH slide 30117; n = 1) with narrow sclerotized patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus (Fig. 50 insert); ostium narrowly U-shaped, ca. 0.25 width of seventh sternum at widest point. Ductus bursae long, gradually broadening to corpus bursae, anterior 0.33 densely spiculate; accessory bursae originating ca. 0.9 length from ostium to corpus bursae. Corpus bursae subspherical, densely spiculate nearly throughout, with inception of ductus seminalis near anterior edge of spicules.

Holotype, ♀, Bolivia, Yungas de la Paz, 1908, Seebold, Rebel, 16562, Walsingham Collection BM 1910-427. Deposited in BMNH.

Etymology. The specific epithet refers to the country, Bolivia.

Anopinella peruvensis Brown and Adamski, new species

Figs. 27, 51, 80

Diagnosis. *Anopinella peruvensis* is most similar to *A. tucki*, and it is possible that the two are conspecific. The male genitalia share an unmodified, bent uncus; short socii; a gnathos typical of the Fana Species Group; the absence of spines from the venter of the valva in the vicinity of the apicoventral angle; and a similar upturned apex of the valva. The genitalia of the holotype of *A. peruvensis* have a slightly more evenly rounded cucullus, a more pointed apex of the valva, and a distally broader phallus.

Description. Head: Frontoclypeus and vertex pale reddish brown intermixed with pale brown; labial palpus with outer surface brown, inner surface pale reddish brown. Antenna with scape and basal 8-10 flagellomeres pale reddish brown; distal flagellomeres gray.

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Thorax: Tegula and mesonotum brown intermixed with reddish brown and dark brown. Forewing (Fig. 80) length 9.1-10.0 mm (n = 2); incomplete basal fascia and costal blotch brown intermixed with reddish brown, separated by an oblique pale reddish brown band demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP; distal wing pale reddish brown intermixed with brown (band and ocellus indistinct), costal blotch with a subtriangular white spot near posterior end; area between CuP and posterior margin reddish brown intermixed with brown. Fringe alternating reddish brown and brown. Hindwing pale grayish brown.

Abdomen: Male genitalia (Fig. 27; drawn from BMNH slide 29068; n = 1) with uncus bent at basal 0.2. Socius short, ca. 0.12 length of gnathos arms. Gnathos arms uniform in width in basal portion, abruptly widened distally into large, laterally flattened, semicircular lobes with entire margins; lobes connected by a narrow, dorsally arched flange. Valva densely setose submarginally from cucullus to basal ridge; costa broadly arched medially, recurved subapically forming an acuminate, falcate apex; sacculus slightly rounded; postsacculus slightly emarginate forming a broadly rounded apicoventral angle. Phallus simple; vesica sparsely microtrichiate. Female genitalia (Fig. 51; drawn from BMNH slide 29069; n = 1) with anteriorly rounded sclerotized patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus; ostium deeply U-shaped, ca. 0.5 width of seventh sternum. Ductus bursae long, very slender; inception of accessory bursae near junction of ductus bursae and corpus bursae. Corpus bursae large, subspherical, densely spiculate on 0.5 side bearing ductus seminalis.

Holotype, ♂, S.E. Peru, La Oroya, R. Inambari, 3100' [954 m], wet season, Oct 1904, G. Ockenden, Rothschild Bequest, B.M. 1939-1. Deposited in BMNH.

Paratype (1♀). S.E. Peru, La Oroya, R. Inambari, 3100' [954 m], dry season, Sep 1904 (BMNH).

Etymology. The specific epithet is derived from the country, Peru.

Anopinella tucki Brown and Adamski, new species

Figs. 28, 81

Diagnosis. As indicated above, *A. tucki* is most similar to *A. peruvensis* but has a less acuminate apex of the valva. The subapically indented outer margin of the cucullus and the slightly protuberant shape of the apex of the valva appear to represent autapomorphies for this species; however, this hypothesis is based on a single preparation. The overall similarity of *A. tucki* to *A. peruvensis* in facies and genitalia, coupled with the fact that both are known only from Peru, suggests that the two may be conspecific. However, owing to the subtle differences in the male genitalia and the dramatic differences in elevation of collecting localities (954 m vs 2150 m), we opt to treat the two as separate species.

Description. Head: Frontoclypeus and vertex pale brown intermixed with brown [labial palpi missing]. Antenna with scape, pedicel, and flagellomeres pale brown [many scales missing].

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Thorax: Tegula and mesonotum pale brown intermixed with brown [many scales missing]. Forewing (Fig. 81) length 10.0 mm (n = 1); incomplete basal fascia and costal blotch brown intermixed with some reddish-brown scales, separated by an oblique pale band of reddish brown intermixed with white and pale brown demarcating anterior part of basal fascia and costal blotch to slightly beyond CuP; distal wing pale reddish brown intermixed with few brown scales (band and ocellus indistinct); costal blotch with a small, subrectangular, white spot near posterior end; area between CuP and posterior margin reddish brown intermixed with pale brown [many scales missing]. Fringe alternating reddish brown and gray. Hindwing pale grayish brown.

Abdomen: Male genitalia (Fig. 28; drawn from BMNH slide 30276; n = 1) with uncus strongly bent at basal 0.2. Socius short, digitate, ca. 0.33 length of basal portion of gnathos arms. Gnathos arms narrow basally, abruptly expanded distally into laterally flattened lobes with entire margins; lobes connected dorsally by an arched flange. Valva sparsely setose along submarginal areas of cucullus and postsacculus, setae extending to basal ridge; costa shallowly arched dorsally between base and cucullus, recurved subapically and weakly indented on outer margin subapically, with a slightly protuberant apex; sacculus and postsacculus nearly straight; apicoventral angle broadly rounded. Phallus simple; vesica sparsely microtrichiate. Female unknown.

Holotype, ♂, Peru, Oconeque, Carabaya, 7000' [2154 m], dry season, Jul 1904, G. Ockenden, Rothschild Bequest B.M. 1939-1. Deposited in BMNH.

Etymology. This species is named in honor of Kevin Tuck of The Natural History Museum, London, who has provided assistance to tortricid workers for over three decades.

Anopinella holandia Brown and Adamski, new species

Figs. 29, 83

Diagnosis. *Anopinella holandia* is a medium-sized species with forewing maculation somewhat similar to that of *A. macrosema*. It can be distinguished from all congeners by the unique shape of the valva; the large, evenly curved uncus (similar to that of *A. panamana*); the short, sclerotized socii; and the dorsoventrally bifurcate apical lobes of the gnathos arms.

Description. Head: Frontoclypeus and vertex pale brown; labial palpus with outer surface brown intermixed with pale brown; inner surface pale brown. Antenna with scape and basal 8-10 flagellomeres brown intermixed with pale brown; distal flagellomeres gray.

Thorax: Tegula brown intermixed with reddish brown and pale brown; mesonotum pale brown intermixed with brown laterally. Forewing (Fig. 83) length 9.1 mm (n =1); basal fascia incomplete, pale brown intermixed with brown and reddish brown; costal blotch brown intermixed with reddish brown and dark brown, mostly on posterior end; basal fascia and costal blotch separated by an oblique pale band of white intermixed with pale reddish brown and pale brown demarcating anterior part of basal fascia and costal

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blotch to slightly beyond CuP, recurved from distal costa through subapical area to tornus, completely encircling an elongate ocellus; ocellus with anterior part acuminate and inwardly curved, posterior part wide, rounded, brown intermixed with reddish brown; costal blotch with a subrectangular white spot near posterior end; area between CuP and posterior margin reddish brown intermixed with brown and pale brown; apical area pale brown intermixed with brown; submarginal area narrow. Fringe grayish brown [mostly missing]. Hindwing pale brown, with irregular, faint brown transverse bands, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 29; drawn from USNM slide 69502; n = 1) with uncus broadly curved from base to apex; apex weakly notched. Socius digitate, short, somewhat sclerotized, mostly attached to base of gnathos arms. Gnathos arms abruptly widened ca. 0.5 length, distal lobes laterally flattened with a dorsoventrally bifurcate apex. Valva gradually broadened and dorsally upcurved from base, with costa and ventral margin somewhat parallel-sided; densely setose from inner surface of cucullus to slightly beyond apicoventral angle; cucullus narrowly rounded along apical margin. Phallus simple, slightly narrowed medially; vesica densely microtrichiate. Female unknown.

Holotype, ♂, Guatemala, Departmento Alto V.P., Fca. Holandia, near Santa Cruz, 23-24 Jun 1966, Flint & Ortiz. Deposited in USNM.

Etymology. The species name is derived from the type locality, Finca Holandia.

Anopinella tinalandana Brown and Adamski, new species

Figs. 18, 52, 84

Diagnosis. *Anopinella tinalandana* is one of the smallest species in the genus. The male genitalia are most similar to those of *A. choko*, *A. cuzco*, and *A. brasiliana* in the possession of a large, bent uncus; moderately long socii; a gnathos typical of the Fana Species Group; and small spines from the venter of the valva in the vicinity of the apicoventral angle. The female genitalia differ from those of *A. brasiliana* in the origin of the accessory bursa near the middle of the ductus bursae rather than near the junction of the corpus bursae and ductus bursae, as is the case in the latter. Female genitalia are not known for either *A. choko* or *A. cuzco*. Putative autapomorphies for *A. tinalandana* include the outer margin of the cucullus broadly rounded from the apicoventral angle to the apex of the costa, forming a diagonally elongate cucullus; and the broadly cup-shaped antrum.

Description. Head: Frontoclypeus white, vertex white intermixed with brown; labial palpus with outer surface white intermixed with brown, inner surface white. Antenna with scape brown or reddish brown intermixed with pale brown; flagellomeres grayish brown.

Thorax: Tegula and mesonotum pale yellowish brown, intermixed with reddish brown. Forewing (Fig. 84) length 6.0-7.5 mm (mean = 6.8 mm; n = 4); basal fascia and costal blotch brown, intermixed with reddish brown and grayish brown, separated by a pale band of white, intermixed with some reddish brown scales demarcating a subtriangular costal

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blotch, recurved from distal costa through subapical area to tornus, encircling an elliptical ocellus, except posterior end; band narrowed proximodistally; costal blotch with a small white spot near posterior end; area between CuP and posterior margin brown intermixed with gray, pale reddish brown, and white; apical and submarginal areas brown intermixed with reddish brown. Fringe gray or reddish brown, inner portion with scales tipped with white in some specimens. Hindwing pale gray, slightly darkening to apex.

Abdomen: Male genitalia (Fig. 18; drawn from USNM slide 82077; n = 1) with uncus bent at ca. 0.33 distance from base, slightly upcurved in distal portion. Socius digitate, ca. 0.33 length of gnathos arms. Gnathos arms free distally, each arm dorsally expanded forming a large rounded lobe; lobes narrowed distally into a dorsoventrally flattened, digitate process. Valva comparatively short, setose from cucullus to basal ridge; costa arched dorsally from subbasal curve to apex; sacculus and postsacculus nearly straight, with only faint concavity at postsacculus; outer margin of cucullus broadly rounded from apicoventral angle to apex, forming a diagonally elongate cucullus. Phallobase slightly broadened basally; vesica densely microtrichiate. Female genitalia (Fig. 52; drawn from DA slide 4217; n = 2) with vase-shaped sclerotized mesal patch at lamella postvaginalis; eighth tergum not modified; ostium broadly U-shaped, ca. 0.5 width of seventh sternum at widest point. Antrum cup-shaped; ductus bursae long, slender; inception of accessory bursa ca. 0.6 distance from ostium to corpus. Corpus bursae large, subspherical, spiculate on 0.17 side bearing ductus seminalis.

Holotype, ♀, Ecuador, Pichinga Province, Tinalandia, 980 m, 18-22 April 1990, MV & UV lights, J. Brown. Deposited in UCB.

Paratypes (1♂, 2♀). ECUADOR: Pichinga Province: Tinalandia, 980 m, 18-22 April 1990 (2♀), MV & UV lights, J. Brown (UCB). Rio Umachaca, 1250 m, Forest Station Maquipucuna, ca. 5 km E Nanegal, 4-5 Sep 1980 (1♀, lacking abdomen), O. Flint (USNM). Pastaza Province: Puyo, 8-11 Feb 1976 (1♂), Spangler et al. (USNM).

Etymology. The species name is derived from the type locality, Tinalandia, Ecuador.

Remarks. Although we would have preferred to designate the male paratype as the holotype, its association with the small series of females from Tinalandia is equivocal, and the unspread specimen is in considerably poorer condition than the holotype female.

Anopinella panamana Brown and Adamski, new species

Figs. 30, 85

Diagnosis. *Anopinella panamana* is a moderately small, yellowish brown species with a forewing pattern that is somewhat dissimilar to other species in the genus. It can be distinguished by the male genitalia which possess a long, evenly curved uncus; extremely short socii; dorsally protuberant distal lobes of the gnathos arms; and only a few spines from the ventral margin of the valva in the vicinity of the apicoventral angle.

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Description. Head: Frontoclypeus white intermixed with yellowish brown and brownish orange; vertex yellowish brown intermixed with yellowish brown scales tipped with brown; labial palpus with outer surface yellowish brown intermixed with some brown scales, inner surface white with yellowish brown. Antenna with scape white intermixed with pale reddish brown; basal 6-7 flagellomeres reddish brown; distal flagellomeres yellowish brown.

Thorax: Tegula and mesonotum brown intermixed with white and yellowish brown. Forewing (Fig. 85) length 5.1-6.2 mm (mean = 5.7; n = 4); basal fascia and costal blotch brown intermixed with dark brown, reddish brown, and white, separated by a pale band of white intermixed with pale brown and reddish brown demarcating entire basal fascia and costal blotch, except for posterior end; band recurved from distal costa through subapical area to tornus, encircling an irregularly cresent-shaped ocellus, except for posterior end; costal blotch with small white spot near posterior end; area between CuP and posterior margin pale brown intermixed with pale reddish brown and dark brown; apical area white intermixed with brown and reddish brown. Fringe with inner portion gray and reddish brown, outer portion pale gray. Hindwing grayish brown.

Abdomen: Male genitalia (Fig. 30; drawn from USNM slide 69218; n = 3) with uncus comparative long, evenly curved throughout. Socius digitate, short, ca. 0.25 length of basal portion of gnathos arms. Gnathos arms slender, free distally, enlarged and abruptly curved dorsally in distal portion, forming a pair of laterally flattened, elongate lobes; apical margin of lobe ventrally protuberant. Valva subrectangular, gradually expanded from subbasal curve, costa nearly straight from subbasal curve to apex; valva setose from cucullus to basal ridge; cucullus with slightly rounded apex, outer margin broadly rounded from apicoventral angle to apex. Phallus simple, short; vesica densely microtrichiate. Female unknown.

Holotype, ♂, Panama, Río Trinidad, Mar 1912, A. Busck. Deposited in USNM.

Paratypes (3♂). PANAMA: Río Trinidad, Mar 1912 (2♂), May 1912 (1♂), A. Busck (USNM).

Etymology. The specific epithet is derived from the country, Panama.

Anopinella rigidana Brown and Adamski, new species

Figs. 31, 87

Diagnosis. *Anopinella rigidana* is known only from the male holotype. The genitalia are similar to those of *A. sympatrica* in several features: both have a large, curved uncus; long, slender, strongly sclerotized socii; long, slender gnathos arms with a short, blunt lobe from near the middle of the posterior edge (more distal in *A. sympatrica*); and valvae with a comparatively large subbasal lobe (= short sacculus). The two can be separated by the unique shapes of the gnathos arms, the broader dorsolateral portion of the tegumen in *A. rigidana*, and the more squarish apicoventral angle of the valva of *A. sympatrica* (Figs. 31, 32).

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Description. Head: Frontoclypeus pale yellowish brown; vertex yellowish brown intermixed with pale yellow scales tipped with brown; labial palpus with outer surface brown, inner surface pale yellowish brown. Antenna with scape brown; basal 6-8 flagellomeres brown or reddish brown; distal flagellomeres pale brown.

Thorax: Tegula and mesonotum pale brown. Forewing (Fig. 87) length 10.2 mm (n = 1); basal fascia and costal blotch brown, intermixed with dark brown, separated by a band of pale brown intermixed with brown, reddish brown, and dark brown demarcating a subtriangular costal blotch, recurved from distal costa through subapical area to tornus, encircling an elongate, brown or pale brown ocellus, except on posterior part; posterior part of ocellus contiguous with dorsum; costal blotch with dark brown scales mostly on posterior half, and with small white spot near posterior end; apical forewing brown intermixed with pale brown; area between CuP and posterior margin brown intermixed with reddish brown. Fringe gray on inner half, reddish brown on outer portion. Hindwing pale brown, with irregular, grayish brown transverse bands, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 31; drawn from USNM slide 94086; n = 1) with uncus strongly curved posteriorly near middle. Tegumen broadly rounded dorsolaterally, broadest dorsally. Socii elongate, slender, strongly sclerotized, ca. 0.75 length of basal portion of gnathos arms. Gnathos arms smooth, with short, blunt lobe near middle of posterior edge. Valva with costa slightly upcurved from subbasal curve to apex; ventral margin expanded subbasally at cucullus (more exaggerated than shown in Fig. 31); postsaccular region weakly concave to apicoventral angle; valva with fine hair-like setae along margin in vicinity of apicoventral angle; outer margin rounded. Phallus broad; vesica microtrichiate. Female unknown.

Holotype, ♂, Costa Rica, Cartago Province, Tapantí, 1200-1700 m, 20 Aug-15 Sep 2000, V. Becker. Deposited in VBC.

Etymology. The species name refers to the rigid socii in the male genitalia.

Anopinella sympatrica Brown and Adamski, new species

Figs. 32, 53, 86

Diagnosis. *Anopinella sympatrica* is a comparatively large species with a darker forewing pattern than that of most congeners. As discussed above, the male genitalia are most similar to those of *A. rigidana*, from which they can be distinguished by the overall shape of the valva and the shape and position of the processes of the gnathos arms.

Description. Head: Frontoclypeus pale yellowish brown; vertex yellowish brown intermixed with pale yellow scales tipped with brown; labial palpus with outer surface brown, inner surface pale yellowish brown. Antenna with scape brown; basal 6-8 flagellomeres brown or reddish brown; distal flagellomeres pale brown.

Thorax: Tegula and mesonotum pale brown. Forewing (Fig. 86) length 8.2-12.0 mm (n = 3); basal fascia and costal blotch brown, intermixed with dark brown, separated by a

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band of pale brown intermixed with brown, reddish brown, and dark brown demarcating an subtriangular costal blotch, recurved from distal costa through subapical area to tornus, encircling an elongate, brown or pale brown ocellus, except on posterior part; posterior part of ocellus contiguous with dorsum; costal blotch with dark brown scales mostly on posterior half, and with small white spot near posterior end; apical forewing brown intermixed with pale brown; area between CuP and posterior margin brown intermixed with reddish brown. Fringe gray on inner half, reddish brown on outer portion. Hindwing pale brown, with irregular, grayish brown transverse bands, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 32; drawn from USNM slide 68840; n = 1) with uncus curved throughout. Tegumen broadly rounded dorsolaterally. Socii elongate, rigid, slender, gradually narrowed distally, ca. 0.75 length of basal portion of gnathos arms. Gnathos arms smooth, connected medially at ca. 0.65 length by an arched flange, distally bifurcate forming two divergent, flattened lobes, dorsal lobe smaller than ventral lobe. Valva with costa slightly curved from subbasal curve; ventral margin with distal termination of sacculus abruptly rounded; postsaccular region moderately concave, recurved to apicoventral angle; valva setose from cucullus to basal ridge; cucullus broadly rounded apically, basal 0.65 of outer margin straight, apicoventral angle acute. Phallus slightly narrowed; vesica sparsely microtrichiate. Female genitalia (Fig. 53; drawn from USNM slide 68566; n = 2) with weakly sclerotized, elongate, hourglass-shaped mesal patch at lamella postvaginalis; eighth tergum with a median T-shaped process (Fig. 53 insert); ductus bursae long, slender; inception of accessory bursae near junction of ductus bursae and corpus bursae. Corpus bursae moderately large, subspherical, weakly spiculate on 0.12 side bearing ductus seminalis.

Holotype, ♂, Guatemala, Volcan Santa Maria, Jul [no year], W. Schaus & W. Barnes. Deposited in USNM.

Paratypes (2♀): Guatemala, Volcan Santa Maria, Nov [no year] (1♀), W. Schaus & W. Barnes (USNM), Jul [no year] (1♀) (USNM).

Etymology. The specific epithet refers to the fact that this species occurs at the same locality as *A. mariana*.

Anopinella rica **Brown and Adamski, new species**

Figs. 54, 89

Diagnosis. *Anopinella rica* is known only from females. It is a relatively small species, superficially similar to *A. triquetra*. It can be distinguished from all other congeners for which females are known by the unusual configuration of the eighth tergum, with two subtriangular flanges separated by a deep median longitudinal cleft, which may represent an autapomorphy for *A. rica*.

Description. Head: Frontoclypeus and vertex white; labial palpus with outer surface white with few brown scales, inner surface white. Antenna with scape white with few brown scales; basal 6-8 flagellomeres reddish brown; distal flagellomeres grayish brown.

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Thorax: Tegula and mesonotum white intermixed with reddish brown and brown laterally. Forewing (Fig. 89) length 7.0-8.1 mm (mean = 7.7; n = 3); basal fascia pale brown intermixed with reddish brown and white, costal blotch dark reddish brown, intermixed with brown and reddish brown; basal fascia and costal blotch separated by a pale band of white intermixed with few pale brown and pale reddish brown scales, slightly widened at costa, gradually narrowing to posterior part of costal blotch; band wide distally, recurved from distal costa through subapical area to tornus, entirely encircling an elliptical ocellus, except for posterior end; ocellus pale gray; costal blotch with small white spot near posterior end; area between CuP and posterior margin reddish brown or yellowish brown; apical forewing white intermixed with few brown scales; submarginal area reddish brown alternating with gray. Fringe alternating reddish brown and gray. Hindwing brownish gray.

Abdomen: Male unknown. Female genitalia (Fig. 54; drawn from USNM slide 69241; n = 3) with elliptical sclerotized patch at lamella postvaginalis; eighth tergum with two subtriangular lobes separated by a median longitudinal cleft; ostium U-shaped, ca. 0.33 width of seventh sternum at widest point. Ductus bursae long, slender, inception of accessory bursa ca. 0.6 distance from ostium to corpus bursae. Corpus bursae large, subspherical, with dense patch of spicules on inner 0.25 surrounding inception of ductus seminalis.

Holotype, ♀, Costa Rica, Cartago Province, Juan Viñas, Aug [no year], W. Schaus. Deposited in USNM.

Paratypes (2♀). COSTA RICA: Cartago Province: Juan Viñas, May [no year] (1♀), (USNM). EL SALVADOR: 3.6 mi W Santa Tecia, 30 Jun 1966 (1♀), Flint & Ortiz (USNM).

Etymology. The specific epithet is derived from the country, Costa Rica.

Styraxivora Species Group

Anopinella styraxivora Brown and Adamski, new species

Figs. 33, 55, 72

Diagnosis. The male genitalia of *A. styraxivora* are unlike those of all other species of *Anopinella*, with the distal lobes of the gnathos medially fused, forming a dorsoventrally flattened, spinose plate, and the valva narrow and lanceolate, with a large postsaccular lobe bearing a cluster of large spinelike setae. Autapomorphies for the species include these unique features of the male genitalia, plus the shiny forewing scaling. The highly divergent morphology of this species suggests that separate generic status may be justified if and when additional species are discovered to validate these synapomorphies.

Description. Head: Frontoclypeus and vertex white; labial palpus with outer surface white intermixed with few brown scales, inner surface white. Antenna with scape white intermixed with few brown scales; basal 6-8 flagellomeres brown; distal flagellomeres brownish gray.

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Thorax: Tegula and mesonotum white intermixed with pale yellowish brown and some brown scales. Forewing (Fig. 72) length 6.0-8.1 mm (n = 2); incomplete basal fascia and costal blotch grayish brown intermixed with brown, reddish brown, and white; separated by a pale narrow white band demarcating costal blotch; costal blotch subtriangular, extending to distal costa, with typical small white spot near posterior end absent; area between CuP and posterior margin pale gray intermixed with few reddish brown scales; area beyond costal blotch pale gray intermixed with white. Fringe with inner portion reddish brown, outer portion gray. Hindwing pale brown basally, gradually darkening to apex.

Abdomen: Male genitalia (Fig. 33; drawn from JWB slide 557; n = 1) with uncus curved at ca. mid-length. Socius digitate, short, ca. 0.16 length of basal portion of gnathos arms. Gnathos arms fused distally, forming a multispinose, horizontal plate. Valva widest basally, gradually narrowed toward apex; costa straight throughout length, densely setose apically; postsaccular margin abruptly rounded distally forming an subtriangular lobe bearing a dense cluster of stout setae; cucullus elongate, knife-like. Phallus slightly curved medially; vesica densely microtrichiate, with two elongate cornuti. Female genitalia (Fig. 55; drawn from JWB slide 558; n =1) with broadened sclerotized mesal patch at lamella postvaginalis; eighth tergum with a median longitudinal sinus; ostium wide, ca. 0.33 width of seventh sternum at widest point; ductus bursae long, slender, gradually widened anteriorly; inception of accessory bursae ca. halfway between ostium and corpus bursae. Corpus bursae large, subspherical, weakly spiculate on 0.65 side bearing ductus seminalis.

Pupa (Figs. 91, 92). Typically tortricinae, without modification of head; no conspicuous sculpturing. Abdominal segments 3-8 with two rows of spines dorsally. Cremaster short, stout, with 6 long hooked setae. Indistinguishable from that of *A. powelli*.

Holotype, ♂, Costa Rica, Heredia Province, Uvita de San Rafael, 1700 m, 10 Mar 1991, P. Hansen, r.f. *Styrax* fruit [pupal exuvium pinned with specimen]. Deposited in UCB.

Paratype (1♀). COSTA RICA: Heredia Province: Uvita de San Rafael, 1700 m, 10 Mar 1991, P. Hansen, r.f. *Styrax* fruit. Deposited in USNM.

Biology. According to label data, both the holotype and paratype were reared from the fruit of *Styrax* (Styracaceae).

Etymology. The specific epithet is derived from the host plant genus *Styrax*, combined with the Latin “ivora.”

PHYLOGENETICS OF THE APOLYCHROSIS GENUS GROUP

Methods of analysis

We conducted a phylogenetic analysis of 9 putative monophyletic groups, i.e., *Apolychrosis*, *Strophotina*, two species groups of *Punctapinella* (i.e., Conchitis Species Group and Niphastra Species Group), three species groups of *Anopinella* (Isodelta Species Group,

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Styraxivora Species Group, Fana Species Group), and two species groups of *Seticosta* (Homosacta Species Group, Tholeraula Species Group), plus two out-groups - *Quasieulia* Powell and *Eubetia* Brown. *Quasieulia* was chosen based on its similarity in facies and female genitalia to those of the Apolychrosis Genus Group. *Eubetia* was chosen because of the presence of a cucullus-like outer portion of the valva, a character shared with *Anopinella* of the in-group, and a forewing pattern somewhat reminiscent of the in-group (Brown 1999). The species included in each of the in-group taxa are listed in Table 2. The entire in-group hereafter is referred to as the Apolychrosis Genus Group.

We identified 25 morphological characters, 19 binary and 6 multi-state, that vary among the groups and exhibit shared, derived states. Among the 25 characters, 20 are phylogenetically informative and 5 represent autapomorphies. Although they provide no evidence of relationship, autapomorphies were included to demonstrate or confirm the monophyly of each of the included groups. Character state polarity was determined using the out-group method. All characters were coded and subjected to parsimony analysis using the Hennig86 version 1.5 (Lipscomb 1994). We used the "mhennig*" command that constructs several trees, each by a single pass through the data, by adding the taxa in a different sequence each time, and then applies branch-swapping to each of the trees. In the analysis, differences between any two states are of equal weight, whether the character is binary or multi-state. For larger and more complicated data sets, the "mhennig*" command may find more equally parsimonious trees than produced by the "hennig" or "hennig*" commands.

Each of the 25 morphological characters used in the phylogenetic analysis is listed below, followed by its putative plesiomorphic and apomorphic state(s). In the discussion of character data, 0 indicates the plesiomorphic condition and 1, 2, and 3 represent derived states. For most characters a brief explanation of the character state polarity is provided. The data matrix illustrating the distribution of the characters among the taxa is given in Table 3. Included are 2 characters of the head, 4 characters of the thorax (including wings), and 19 characters of the abdomen (including 15 characters of the male genitalia and 4 characters of the female genitalia).

TABLE 3. Data matrix for phylogenetic analysis.

Apolychrosis	11101	10000	00112	00010	01101
Strophotina	11121	10100	01000	10220	01111
Conchitis Group	11021	10000	00120	00110	11111
Niphastra Group	?1?31	1????	?????	?????	?1111
Isodelta Group	11121	10001	00121	00000	11112
Fana Group	11121	10001	00120	00000	11112
Styraxivora Group	11121	10002	00120	00000	11112
Homosacta Group	11021	12010	10120	00111	01111
Tholeraula Group	11021	11010	10120	01110	01111
Quasieulia	00110	00000	00000	00010	00000
Eubetia	00010	00000	00110	00010	00000

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Character 1. Male antenna: (0) cilia short, < 1.2 X width of flagellomere; (1) cilia elongate, >1.5 X width of the flagellomere. All members of the Apolychrosis Genus Group have long antennal cilia in the male, extremely long in some species. Because the advanced character state (long cilia) occurs in some out-group genera in Euliini, homology of the long cilia is not unequivocal within the in-group taxa.

Character 2. Labial palpus: (0) second segment weakly upturned, all segments combined 1.0-2.0 X horizontal diameter of compound eye; (1) second segment mostly porrect, all segments combined 2.5-3.0 X the horizontal diameter of the compound eye. All members of the Apolychrosis Genus Group have extremely long labial palpi in both sexes (i.e., not sexually dimorphic). Although long palpi occur in a few other Euliini (e.g., *Dimorphopalpa* Brown), this character state is suspected to represent a synapomorphy for the Apolychrosis Genus Group.

Character 3. Male foreleg hairpencil: (0) present; (1) absent. The presence of a male foreleg hairpencil is assumed to represent the groundplan condition in Euliini (Brown 1990), hence its loss is considered the derived state. However, because male secondary structures are evolutionarily more labile than most other morphological features, loss of the hairpencil probably represents independent events.

Character 4. Forewing pattern: (0) with complete median fascia; (1) with small dark costal triangle; (2) with large dark costal triangle; (3) mostly dark, with large white spots. Although forewing pattern must be used with caution in a phylogenetic context because it is more likely to be influenced by environmental and/or ecological factors, most monophyletic groups of Tortricidae exhibit similar forewing patterns (Horak 1984). The small triangular costal patch of *Anopina* Obraztsov, *Chileulia* Powell, and others may or may not be homologous among these genera. However, the distinctive large costal blotch of members of the Apolychrosis Genus Group (lacking in *Apolychrosis*), usually with a small white dot near its apex, is almost certainly homologous throughout the genera evaluated here. The dark over-scaling of members of the Niphastra Species Group is assumed to represent an autapomorphic modification of the costal blotch.

Character 5. Forewing pattern: (0) without costal strigulae; (1) with costal strigulae. The presence of costal strigulae is shared by all members of the Apolychrosis Genus Group.

Character 6. Forewing vein CuP: (0) present; (1) absent. All members of the Apolychrosis Genus Group lack forewing vein CuP (at a minimum, the vein is extremely reduced).

Character 7. Uncus: (0) rodlike, moderately uniform in width; (1) somewhat broadened distally; (2) emarginate/lobed distally, somewhat trifurcate. A typical rodlike uncus is characteristic of most Euliini. In the Tholeraula Species Group and in *Eubetia*, the uncus is somewhat enlarged in the apical half; and in the Homosacta Species Group, the uncus is emarginate subdistally, and somewhat trifucate in appearance.

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Character 8. Socius: (0) moderate in length, digitate, not extending beyond gnathos; (1) extremely elongate, extending well beyond gnathos. The extremely slender, elongate socius of *Strophotina* is assumed to represent an autapomorphy for the genus. Similar structures are present in *Galomecalpa* Razowski, and these may be homologous with those of *Strophotina*.

Character 9. Gnathos: (0) well-developed, V-shaped; (1) reduced, extremely slender or membranous, usually broadly U-shaped. The gnathos in *Seticosta* are greatly reduced, extremely slender, membranous, and rounded distally at their junction rather than joined into a pointed terminal process.

Character 10. Gnathos: (0) simple, without expanded distal lobes; (1) with broad, laterally compressed distal lobes, usually with spiny-dentate margin; (2) with broad, dorsoventrally compressed distal lobes, with feathery-dentate margin. In all members of *Anopinella*, the distal lobes of the joined arms of the gnathos are extremely broadened and flattened, and usually have a spinose outer margin. In the Styraxivora Species Group, they are flattened dorsoventrally and bear dense feathery spines.

Character 11. Transtilla: (0) a simple, non-dentate band; (1) a densely spined, variably bilobed band. In all *Seticosta* the transtilla is densely covered with extremely short spines, reminiscent of some Sparganothini, and is variably bilobed from weak (e.g., Homosacta Species Group) to strongly bilobed or narrowed mesally (Tholeraula Species Group).

Character 12. Transtilla: (0) without subbasal processes; (1) with a pair of slender, extremely elongate, subbasal processes. The extremely long, slender subbasal process of the transtilla of *Strophotina* is interpreted as an autapomorphy for that genus.

Character 13. Valva: (0) relatively short, broad (3.5-4.5 times as long as wide); (1) relatively long, narrow (6-7 times as long as wide). A short, broad valva with an upturned costa is interpreted as the plesiomorphic condition, with the long, slender valva of the majority of the Apolychrosis Genus Group considered the derived state. However, it is possible that the short valva of *Strophotina* represent an autapomorphy for the genus rather than the plesiomorphic state.

Character 14. Valva: (0) unmodified, nearly parallel-sided, without distal cucullus; (1) constricted subbasally or mesally, resulting in a broad basal portion, a narrowed "neck," and a distal weakly developed cucullus, with sparse micro-setae; (2) cucullus well developed, densely covered with micro-setae. A cucullus is weakly developed in *Apolychrosis* and the out-group genus *Eubetia*. A well developed cucullus (= region of dense micro-setae in the distal portion of the valva) is considered a synapomorphy *Seticosta*, *Anopinella*, and the Conchitis Species Group.

Character 15. Valva: (0) without spine at lower edge; (1) with stout spine (pollex of Razowski & Becker 1999) subdistally from lower edge; (2) with two stout spines subdistally from lower edge. A single spine at the ventral edge of the valva about 0.65 the distance from the base to the apex appears to represent a synapomorphy for the Isodelta Species Group and *Apolychrosis*. Alternatively, the structure may represent a synapomor-

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phy for all *Anopinella* and *Apolychrosis*, but secondarily lost in the Fana Species Group. The presence of a second spine in *Apolychrosis* is considered a secondary modification.

Character 16. Valva: (0) sacculus without distal process; (1) sacculus with small distal triangular process. The small somewhat triangular process at the termination of the sacculus is considered an autapomorphy for *Strophotina*.

Character 17. Valva: (0) without conspicuous pilvinus; (1) with rounded, densely hairy protuberance in the basal portion (= pulvinus). The presence of a rounded pulvinus at the base of the valva is considered a synapomorphy for the Tholeraula Species Group.

Character 18. Valva: (0) costa lacking strong setae; (1) costa with small patch of long spinelike setae; (2) costa with dense patch of spinelike setae. The presence of a patch of long, strong setae from a modified basal portion of the costa of the valva is shared by *Punctapinella*, *Seticosta*, and *Strophotina*. In *Strophotina*, the setae are shorter and the patch extends farther toward the apex.

Character 19. Phallus: (0) relatively short and stout (0.4-0.5 times length of valva); (1) relatively long (0.6-0.7 times length of valva) and stout, usually bent near middle; (2) long (0.8-1.0 times length of valva), slender, arched. The relatively short, stout phallus of *Anopinella* is considered the plesiomorphic condition. The more slender, elongate phallus of *Apolychrosis*, *Punctapinella* and *Seticosta* is considered the derived condition. And the extremely elongate, arched phallus of *Strophotina* is considered the next advanced state.

Character 20. Aedeagus: (0) no modification at ductus ejaculatoris; (1) dorsoproximal lobe at the opening of the ductus ejaculatoris. The development of a swollen lobe of horn-shaped sclerite immediately distad of the ductus ejaculatoris is considered an autapomorphy for the Homosacta Species Group.

Character 21. Vesica: (0) with a single small subtriangular cornutus; (1) with a single large, slender, spine-like cornutus. The presence of a single small cornutus, such as that present in *Strophotina*, is assumed to represent the plesiomorphic condition, with the large cornutus of the Conchitis Species Group as the derived state.

Character 22. Sterigma: (0) simple; (1) membranous. Razowski and Becker (1999) recognized the membranous sterigma as a synapomorphy for the Apolychrosis Genus Group.

Character 23. Ostium: (0) situated immediately posterad of seventh sternum; (1) displaced anterad into seventh sternum. In most Euliini the ostium is situated immediately posterad of the seventh sternum; however, in the Apolychrosis Genus Group it is displaced anterad onto the seventh sternum.

Character 24. Accessory bursa: (0) absent; (1) present. Although widespread in Tortricidae, the homology of the accessory bursa is uncertain. For this analysis we consider the presence of an accessory bursa as the derived condition.

Character 25. Ductus seminalis: (0) originating from ductus bursae; (1) originating from corpus bursae near junction with ductus bursae; (2) originating from near middle of corpus bursae. In most Euliini, including the out-groups, the ductus seminalis originates

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from the ductus bursae. In the Apolychrosis Genus Group it originates from the corpus bursae.

Results of phylogenetic analysis

Based on the characters identified above, the phylogenetic analysis resulted in 7 equally parsimonious trees; two representative examples are illustrated in Figs. 93-94. The trees had a length of 41, a consistency index of 0.82, and a retention index of 0.80. Autapomorphies were kept in the matrix as evidence of the monophyly of the lineages they support. All trees shared the following features: the out-group taxa were basal to the in-group; *Apolychrosis* was portrayed as the most basal member of the in-group; the two species groups of *Seticosta* were sister groups; the species groups of *Punctapinella* were never sister groups; and the three species groups of *Anopinella* were a monophyletic lineage. The trees differ primarily in the relationship of the Niphastra Species Group, which occupied various positions as the sister group to nearly every other in-group taxon, twice as the sister to *Anopinella*. This uncertainty in placement is not surprising owing to the large amount of missing data (i.e., no males known).

The trees exhibit two major patterns. In four of the six trees (e.g., Fig. 94), *Anopinella* was portrayed as the most derived lineage, suggesting that the spine on the lower edge of the valva, characteristic of the Isodelta Species Group, is independently derived and not homologous with that of *Apolychrosis*, contrary to what we had assumed, and that the strong setae of the costa of the valva have been lost secondarily in this genus. We had assumed that the absence of the setae represented the plesiomorphic condition, not a secondary loss. In the second major pattern (e.g., Fig. 93), *Anopinella* occurs more basally. Although this position still suggests that the spine on the lower edge of the valva is not homologous with that of *Apolychrosis*, in this hypothesis the strong setae of the costa of the valva have arisen only once and have not been lost secondarily. This configuration appears in two of the six trees, and this character state change seems more logical; hence we believe that this tree (Fig. 93) represents the best working hypothesis of the group.

The monophyly of the Apolychrosis Genus Group is supported by the long antennal cilia in the male (character 1), the elongate labial palpi (character 2), the presence of forewing costal strigulae (character 5), the loss of forewing vein CuP (character 6), the membranous sterigma (character 22), the anterior position of the ostium on the seventh sternum (character 23), and the origin of the ductus seminalis from the corpus bursae (character 25).

Apolychrosis undoubtedly represents a monophyletic group. Illustrations and descriptions presented by Pogue (1986) show a homogeneous assemblage of species, all of which have a similar forewing pattern, two spines from the ventral edge of the valva, and an extremely similar configuration of the female genitalia. The basal position of *Apolychrosis* is based on two putatively plesiomorphic conditions: the absence of strong setae from the

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costa of the valva and the position of the ductus seminalis from near the junction of the corpus bursae and ductus bursae.

Anopinella is portrayed as monophyletic in all seven trees. The most convincing synapomorphies for the genus are the distally expanded, flattened lobes of the gnathos (character 10) and the ductus seminalis originating near the middle of the corpus bursae (character 25), typically surrounded by a dense patch of spiculae. The highly divergent *A. styraxivora* may represent the sister-group to the remainder of the genus and may represent a separate genus.

Strophotina shares with *Seticosta* and the Conchitis Species Group a row of strong spines from the costa on the valva (character 18), which are modified (broader row of shorter spines) in *Strophotina*. *Strophotina* shares the presence of an accessory bursa (character 24) with *Seticosta*, the Conchitis Species Group, the Niphastra Species Group, and *Anopinella*. The shape of the valva in *Strophotina*, which is considerably divergent from that of other members of the Apolychrosis Genus Group, is considered an autapomorphy for the genus. The extremely elongate socius, elongate mesal process of the transtilla, and slender gnathos arms also are considered autapomorphies for *Strophotina*. Our interpretation of the genus differs slightly from that presented by Razowski and Becker (1999). We suspect that *S. niphochondra* may represent a different, undescribed genus closely related to *Strophotina*. We have examined two males from Chile that are congeneric with *niphochondra*. All these males (including the type of *niphochondra*) have short, more attenuate valvae, a broad, stout aedeagus that is quite different from that of *Strophotina strophota* (Meyrick) and *S. curvidagus* Brown, a unique tonguelike mesal portion of the transtilla, and lack the dense row of spines from the costa of the valva.

Seticosta is defined by the enlarged uncus (character 7) (highly modified in the Homosacta Species Group), the reduced, membranous gnathos (character 9), and the spiny, bilobed transtilla (character 11). Among the Apolychrosis Genus Group, the male foreleg hairpencil (character 3) is retained only in *Seticosta*.

Punctapinella is para- or polyphyletic as current defined - its monophyly was not supported in a single tree. It can be distinguished from *Seticosta* by its well developed gnathos, which is greatly reduced in *Seticosta*; its unmodified trantilla, which is spiny and bilobed in *Seticosta*; and its long, strong, unmodified uncus. The Conchitis Species Group was portrayed as the sister to *Seticosta* in three trees, and as mentioned above, the Niphastra Species Group was portrayed as the sister to *Anopinella* in two trees. The uncertain position of the two groups can be attributed to at least three factors: (1) no males are known of the Niphastra Species Group; (2) the female of only one species is known in the Conchitis Species Group; and (3) and no single apomorphy of the males unites the three species in the Conchitis Species Group. Razowski and Becker (1999) identified the two species groups treated herein, and we agree that the two are unlikely to be congeneric. However, while the Niphastra Species Group can be defined on the basis of its unique forewing pattern (not a particularly reliable phylogenetic character but extremely consis-

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tent with homogeneous female genital morphology), the Conchitis Species Group is still characterized primarily by symplesiomorphies and may not be monophyletic. Potential actions that would result in putatively monophyletic genera include (1) proposing a new genus for the Niphastra Species Group, based on the unusual forewing pattern; (2) proposing a new genus for *chione* and *hysithrona*, distinguished from *Seticosta* by the presence of a well developed gnathos and the unmodified transtilla (spined in *Seticosta*); and (3) leaving *Punctapinella* as monotypic (i.e., *P. conchitis*), characterized by the long fused arms of the gnathos and an extremely long cornutus (nearly as long as the phallus). In the absence of compelling evidence (i.e., lack of both sexes for nearly all species), we opt for a conservative approach and provisionally leave all species in *Punctapinella*.

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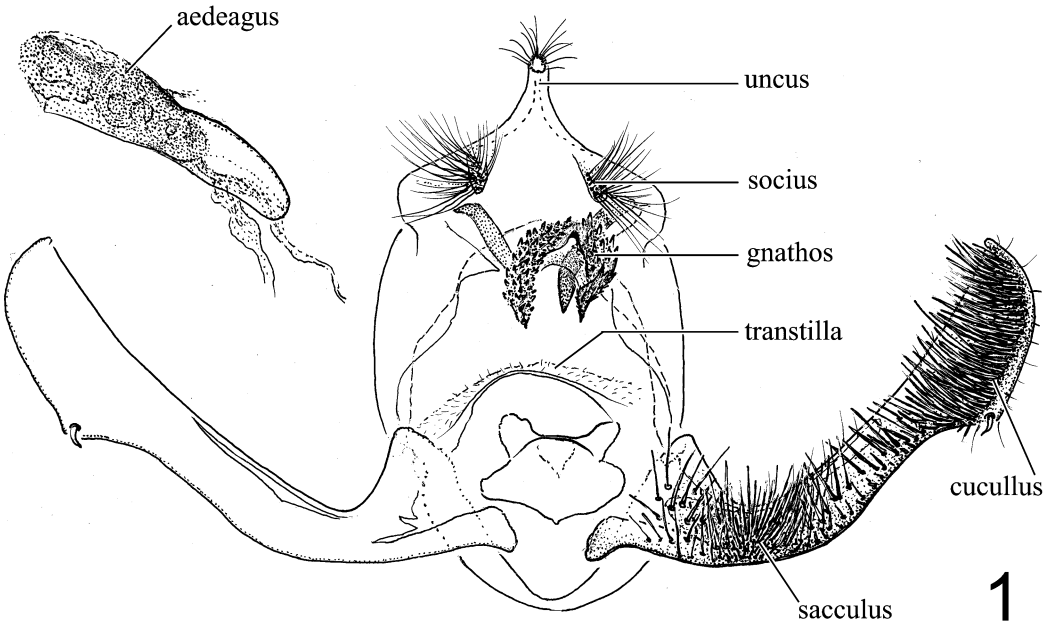
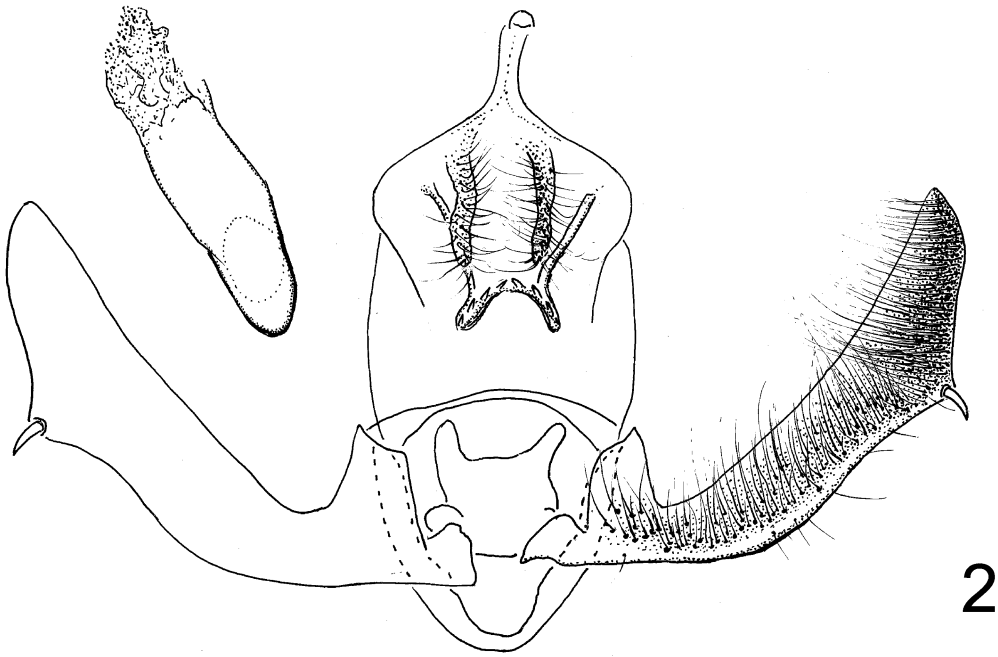
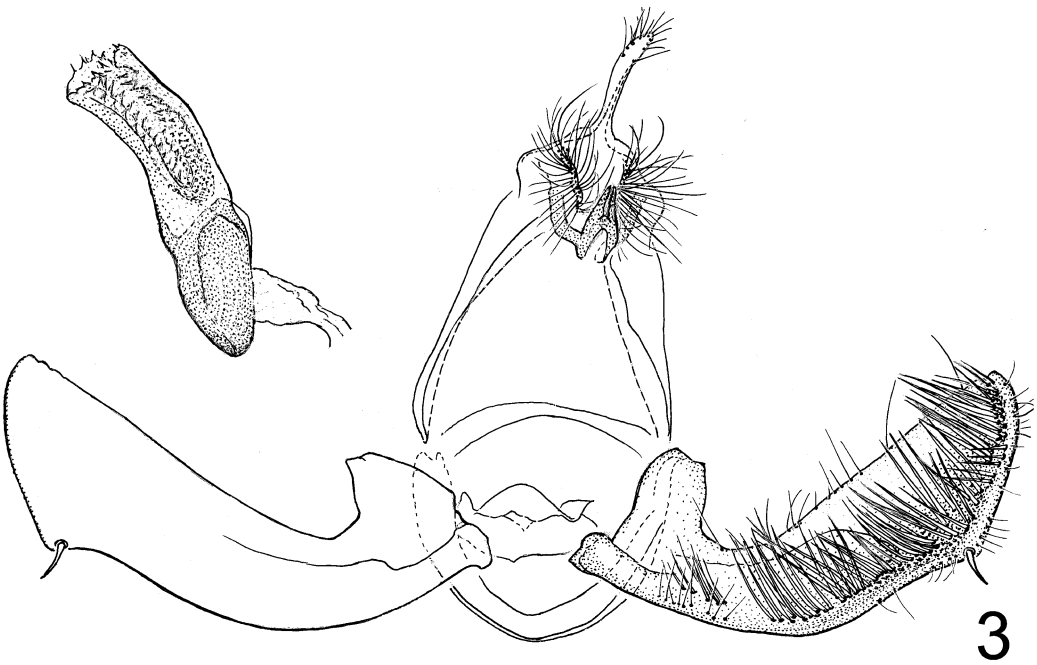




FIGURES 1-2. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 1, *A. isodelta*; 2, *A. triquetra*.



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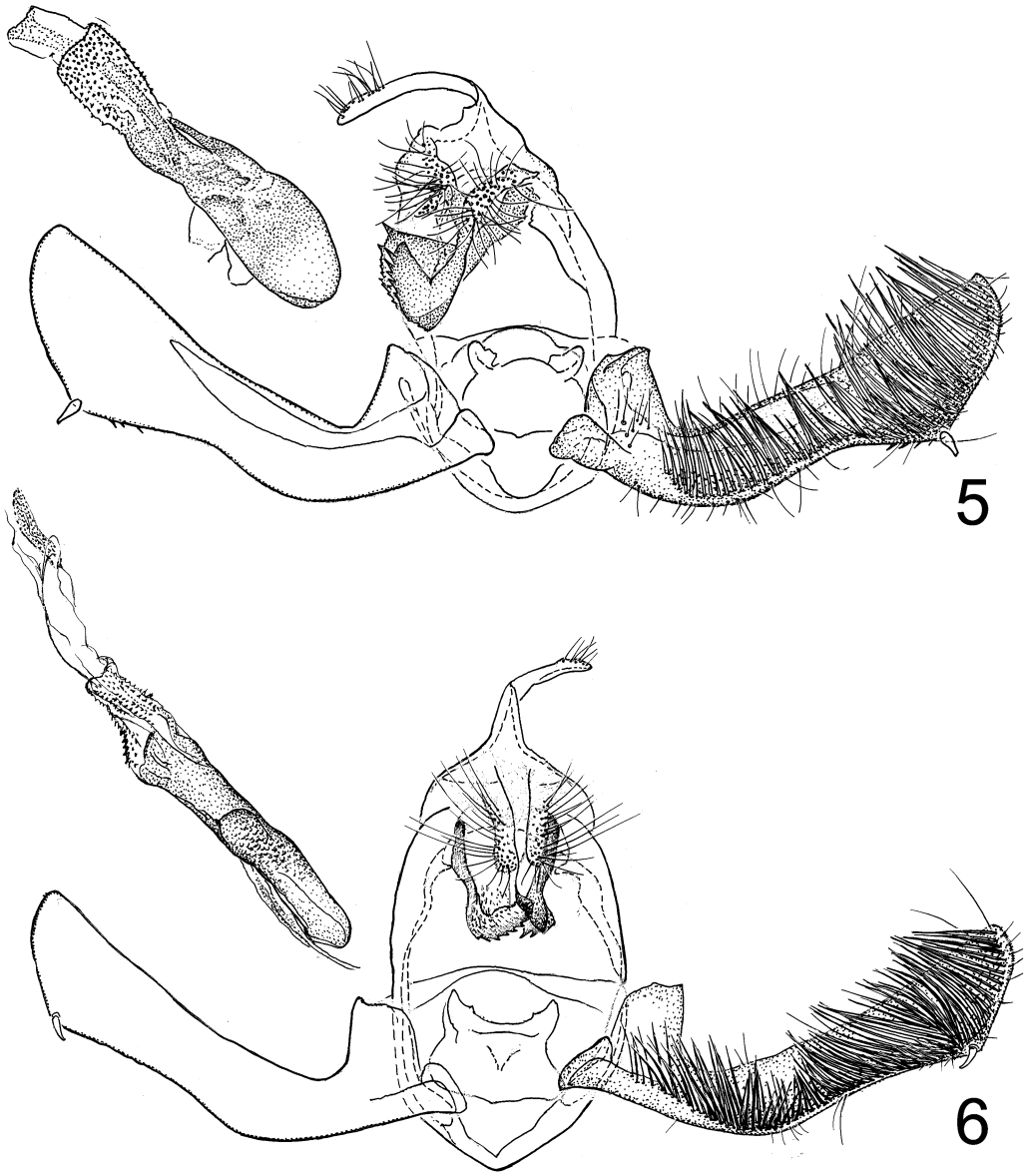

FIGURES 5-6. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 5, *A. araguana*; 6, *A.* nr. *razowksii*.

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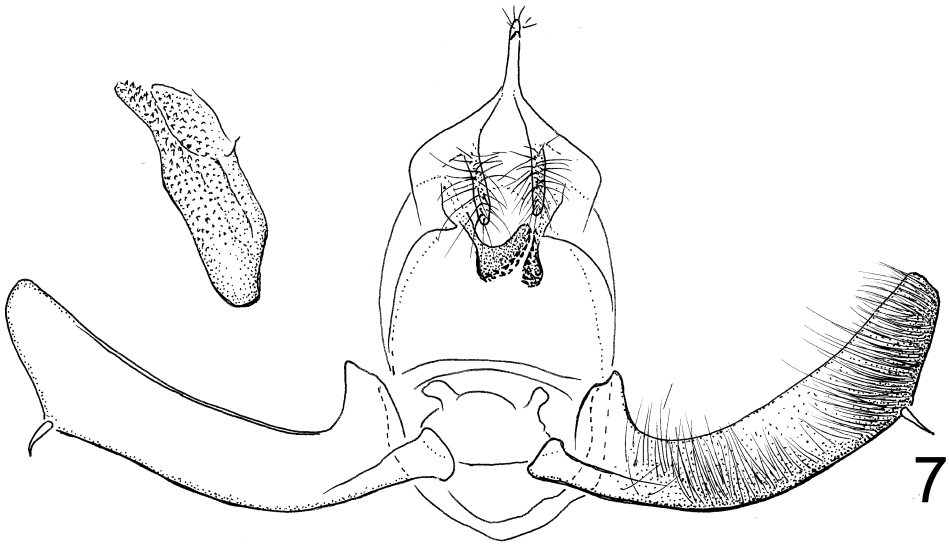

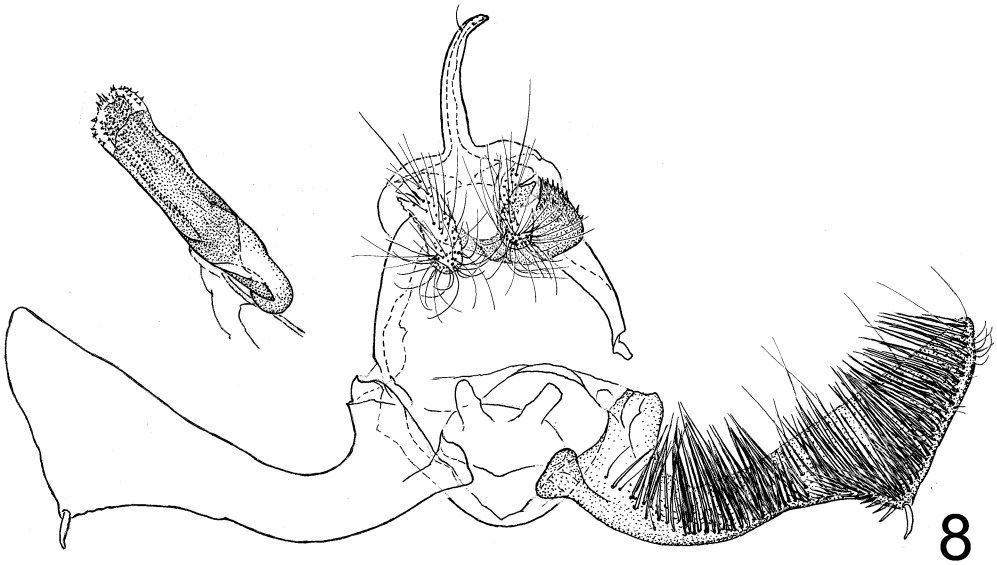

FIGURES 7-8. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 7, *A. razowskii*; 8, *A. parambana*.

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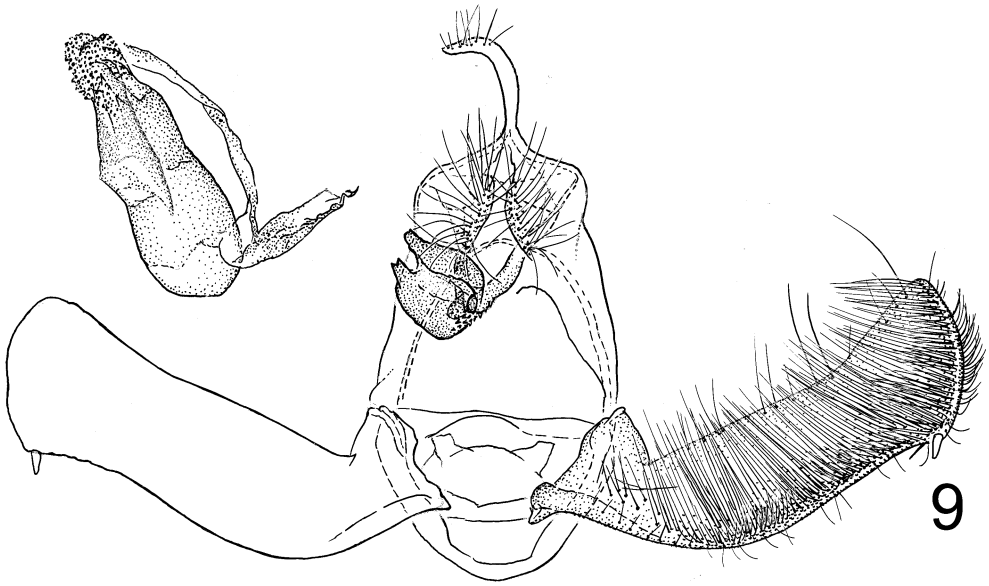

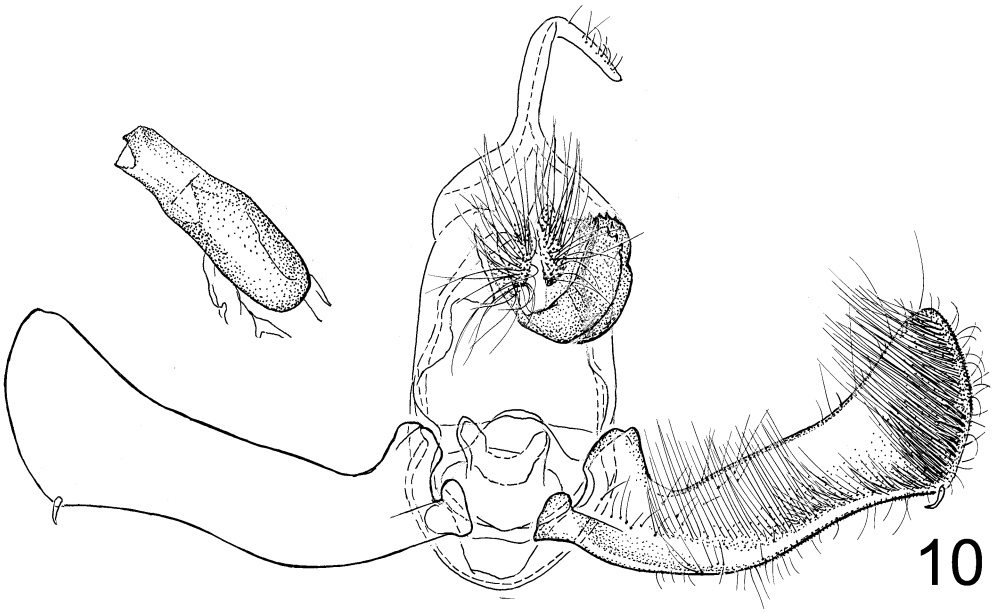

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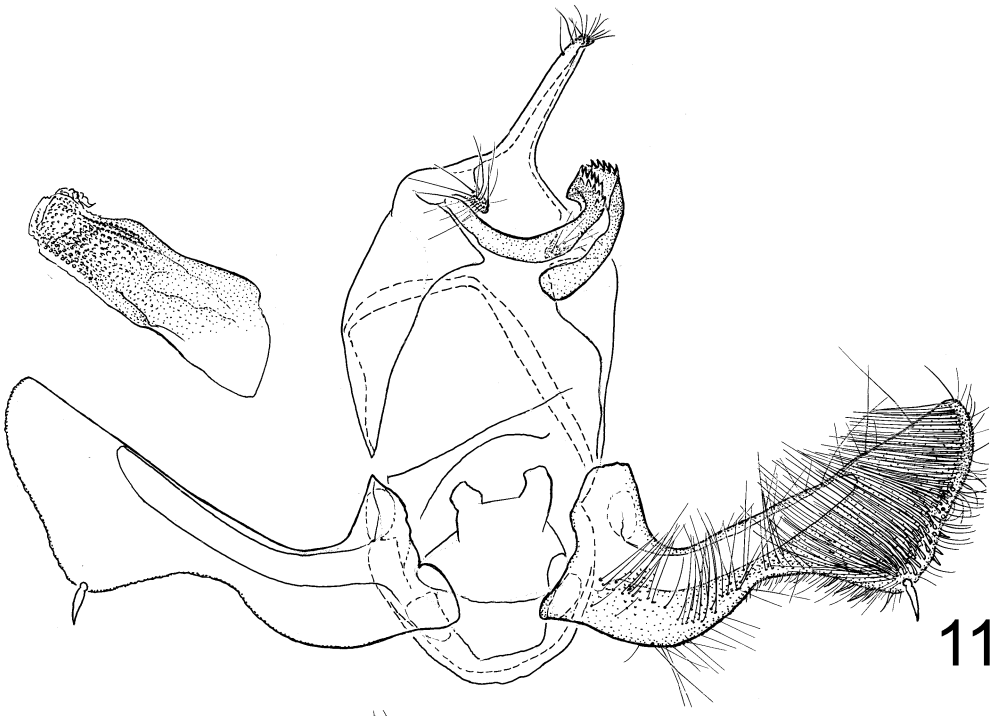

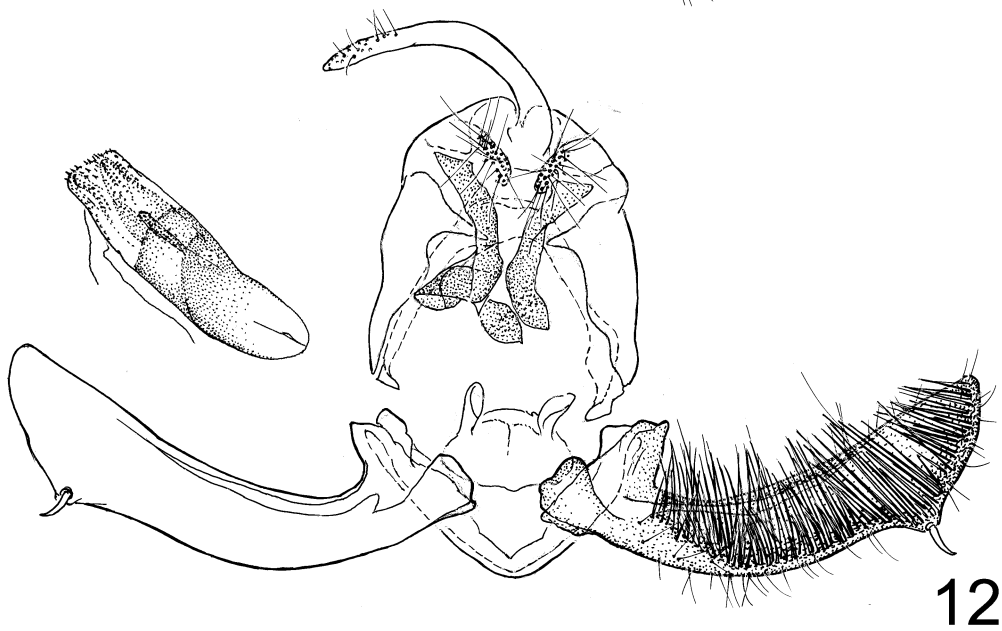

FIGURES 11-12. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 11, *A. mariana*; 12, *A. carabayana*.

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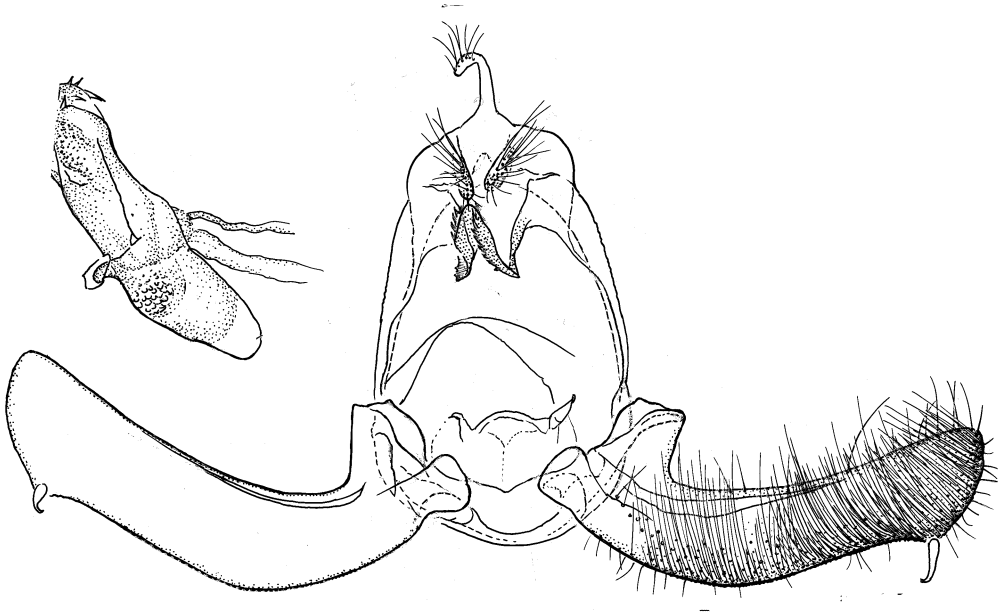

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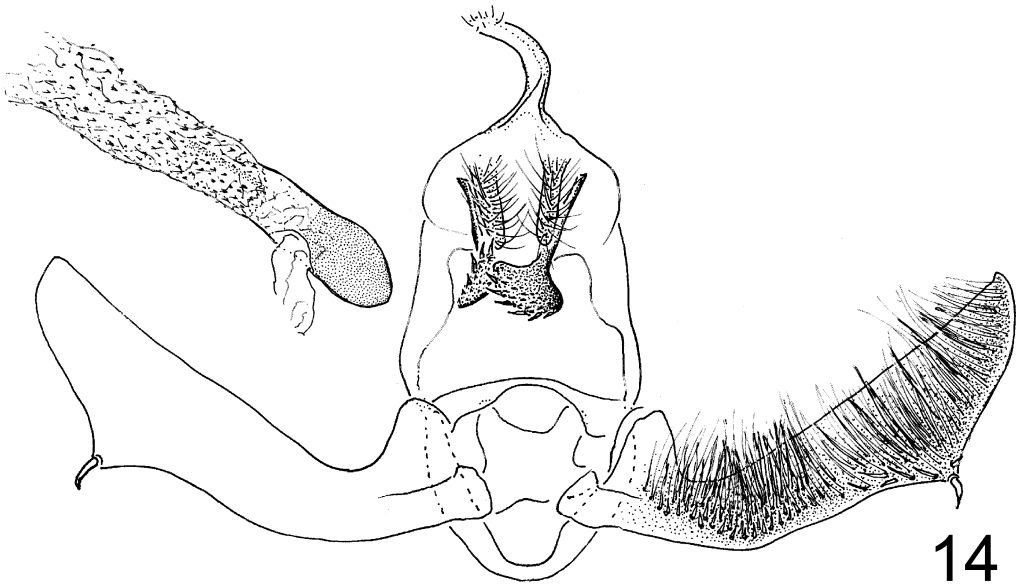

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FIGURES 13-14. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 13, *A. cafrosana*; 14, *A. powelli*.

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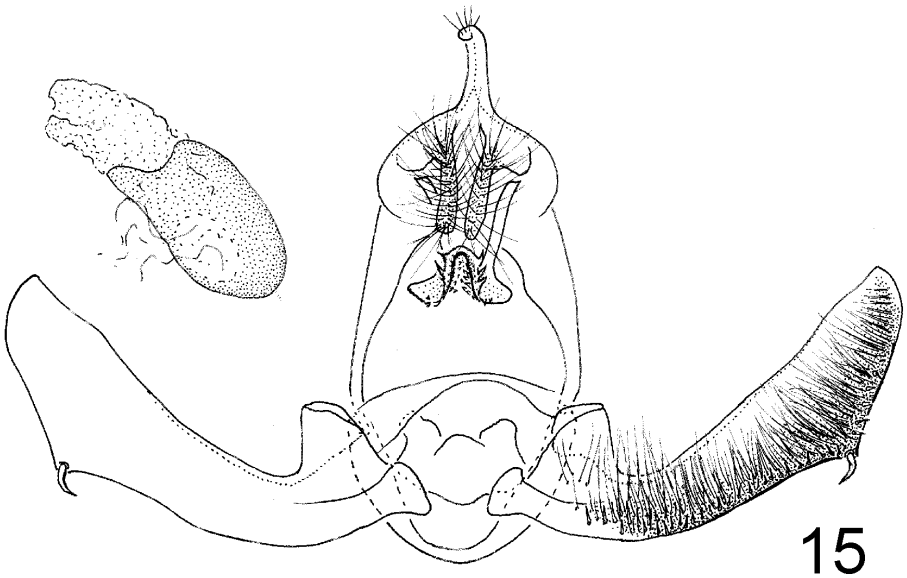

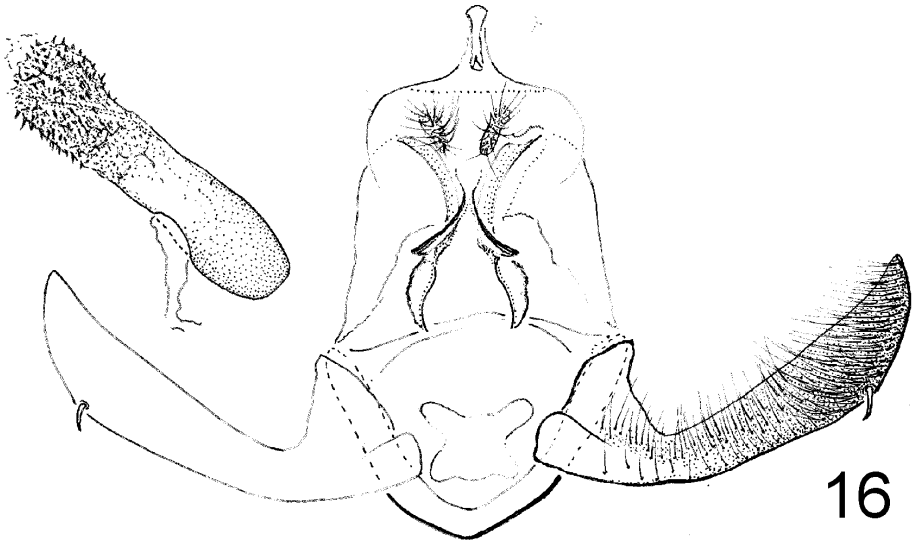

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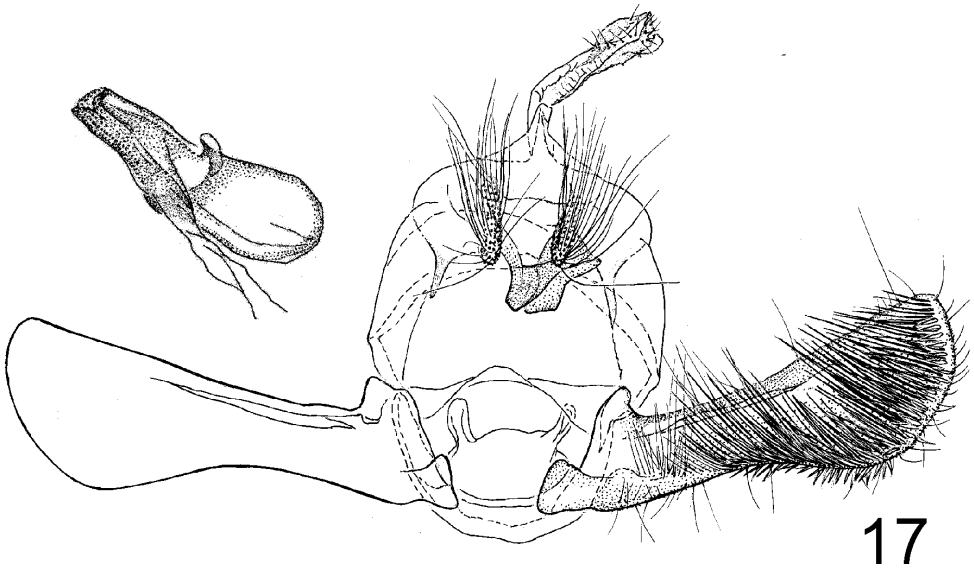

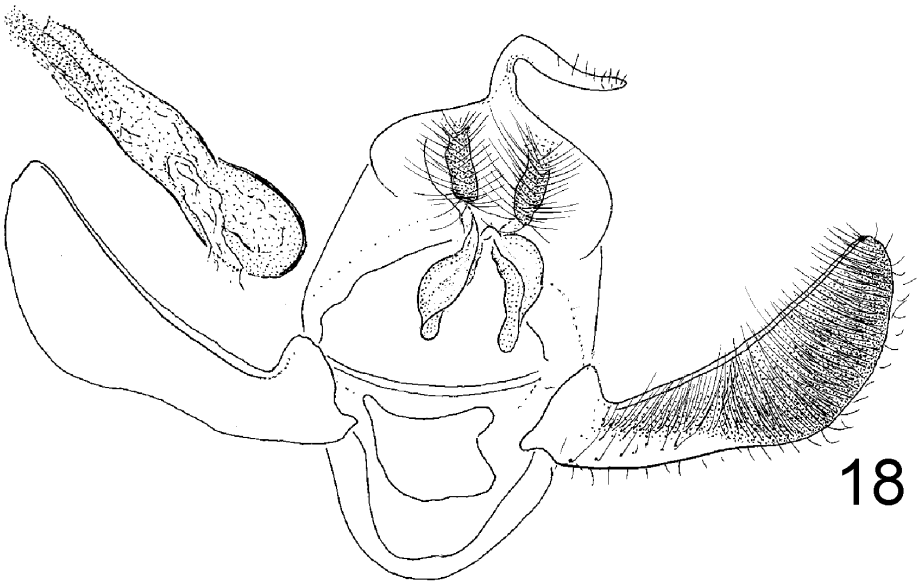

FIGURES 17-18. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 17, *A. fana*; 18, *A. tinalandana*.

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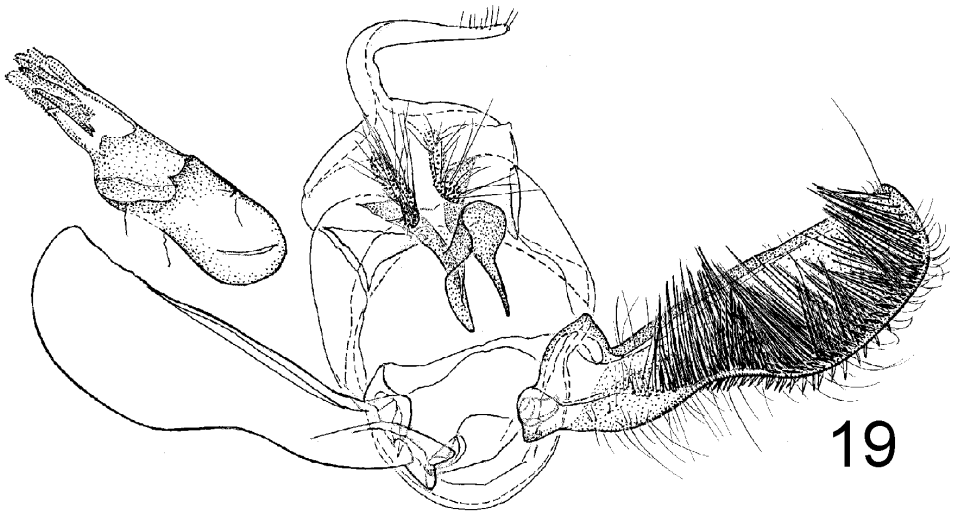

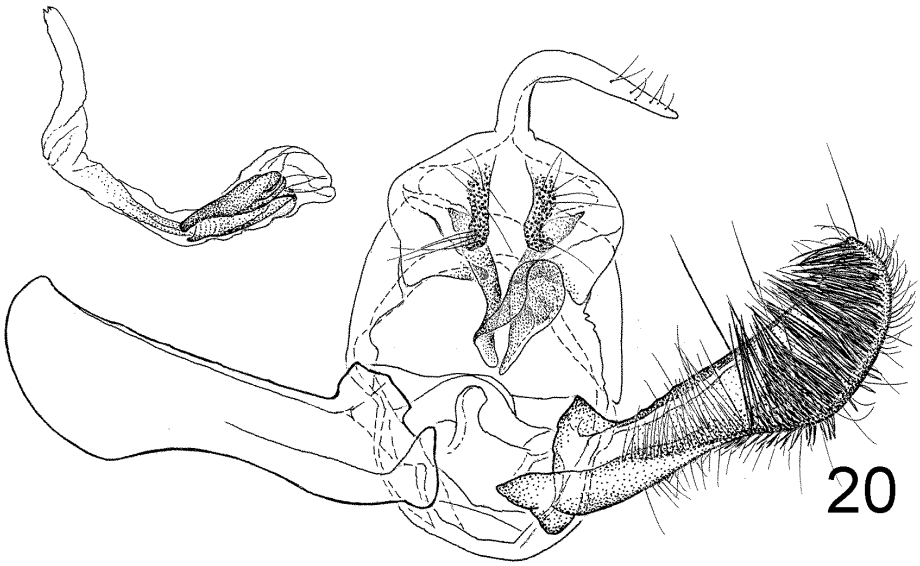

FIGURES 19-20. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 19, *A. cuzco*; 20, *A. choko*.

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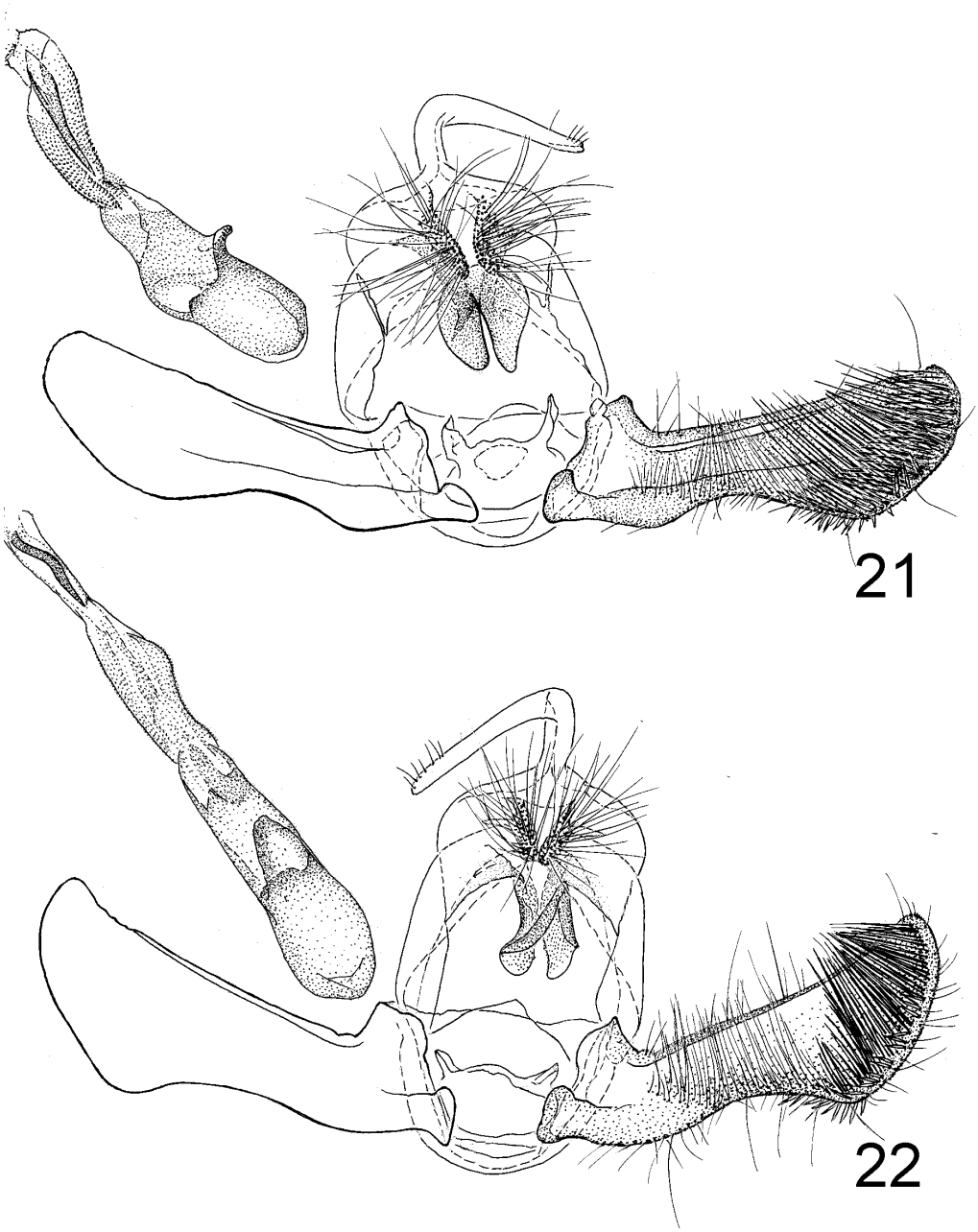

FIGURES 21-22. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 21, *A. brasiliana*; 22, *A. brasiliana*.

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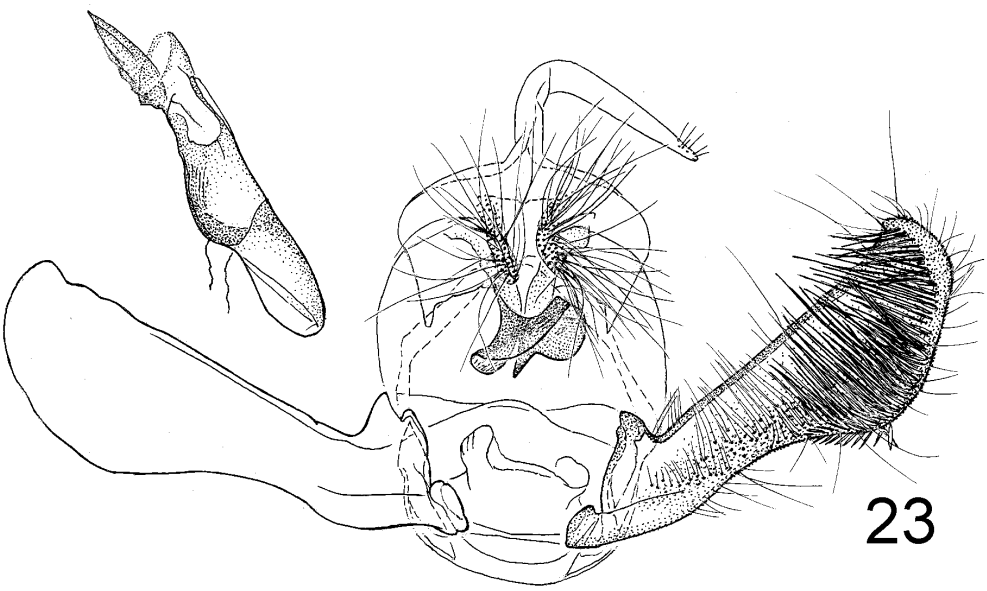

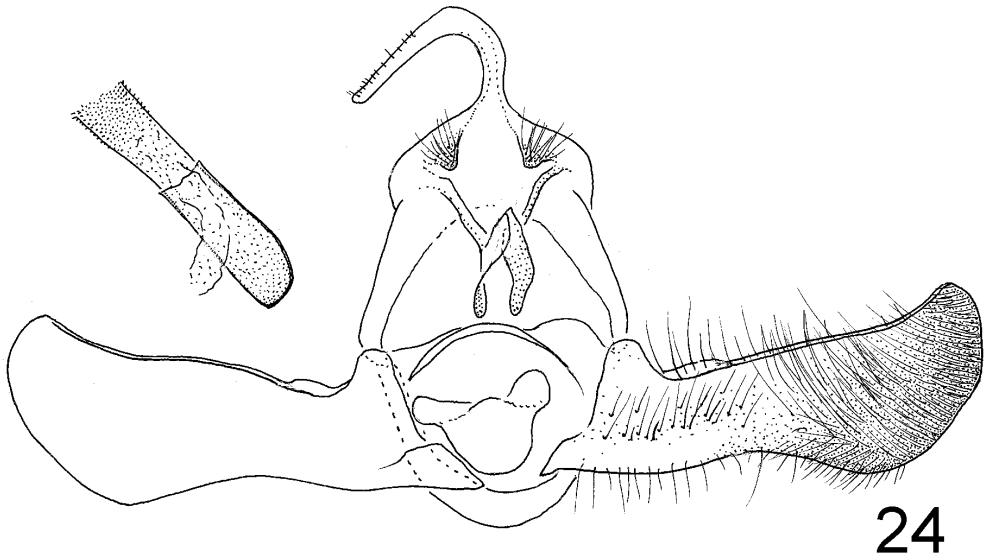

FIGURES 23-24. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 23, *A. brasiliana*; 24, *A. macrosema*.

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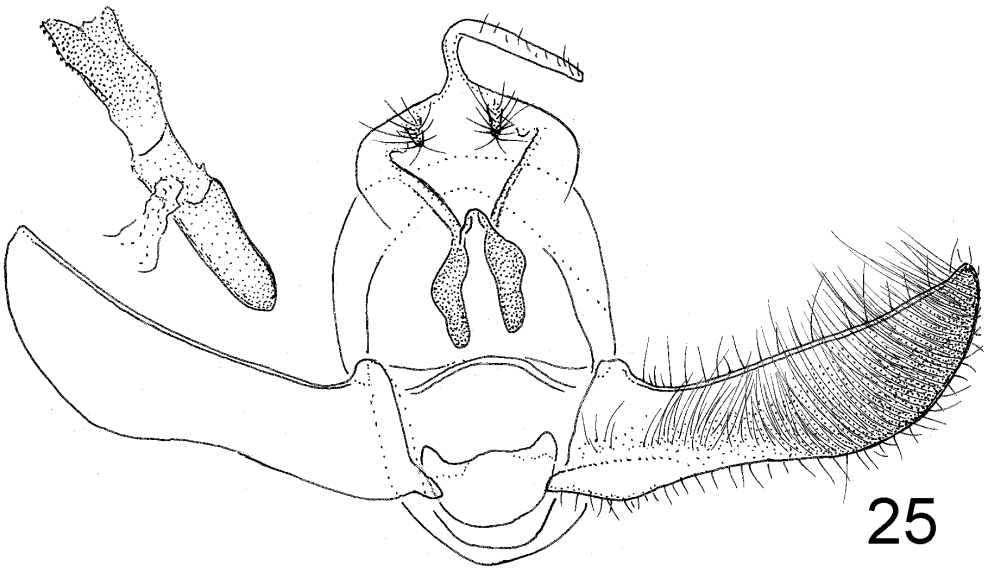

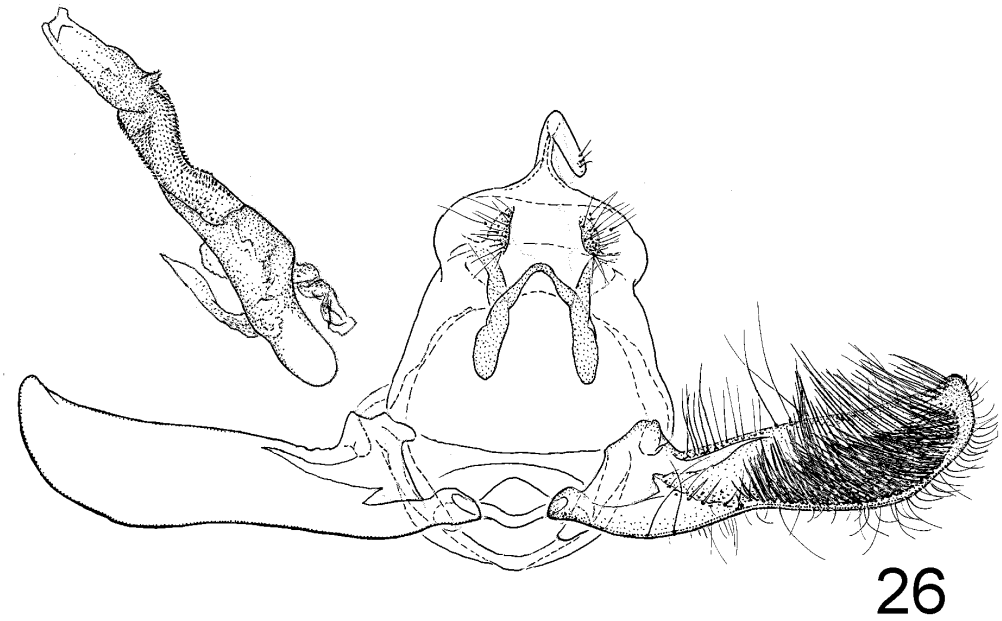

FIGURES 25-26. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 25, *A. phillipsae*; 26, *A. larana*.

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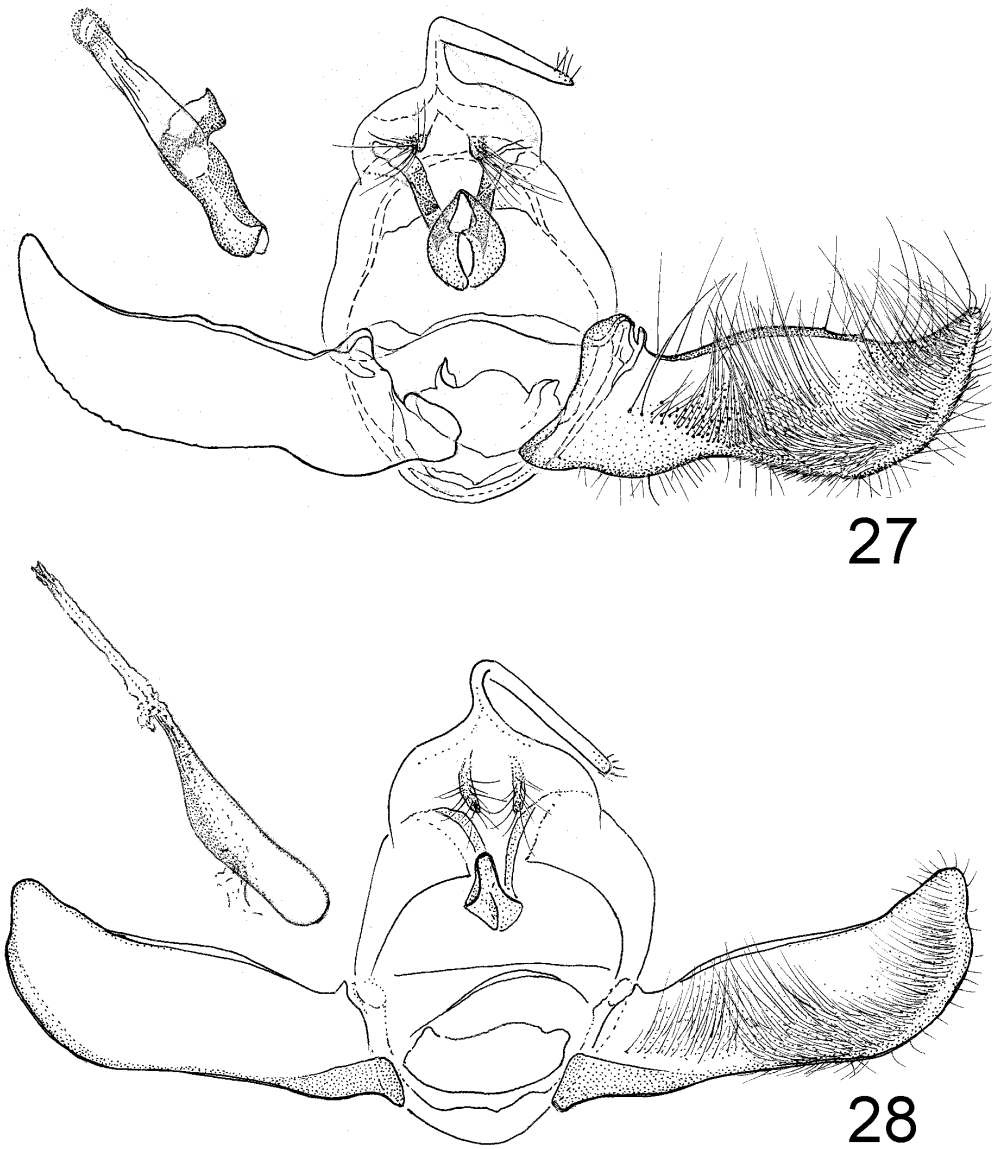

FIGURES 27-28. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 27, *A. peruvensis*; 28, *A. tucki*.

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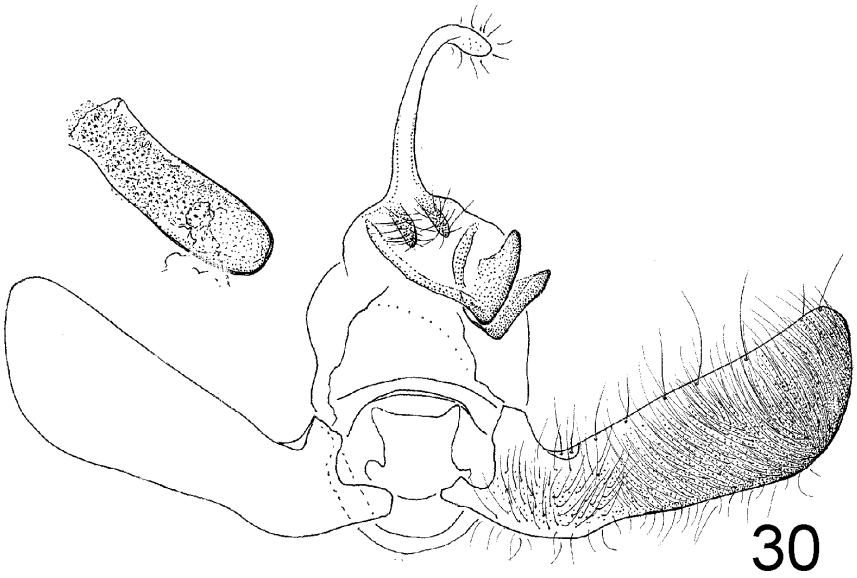
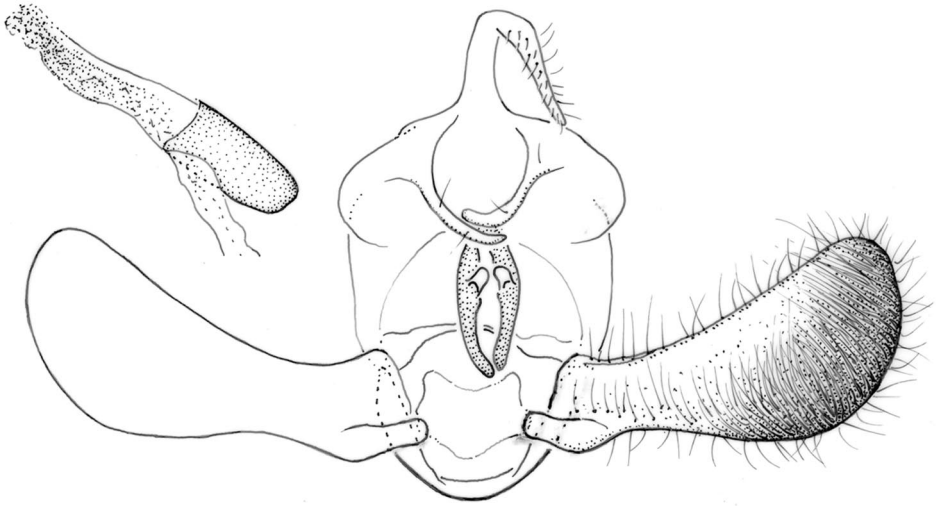
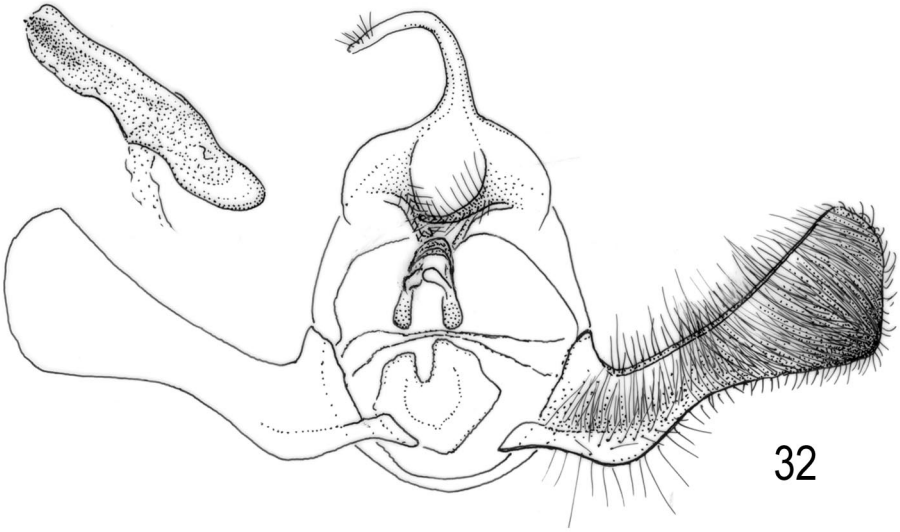


FIGURES 29-30. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 29, *A. holandia*; 30, *A. panamana*.





FIGURES 31-32. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 31, *A. rigidana*; 32, *A. sympatrica*.

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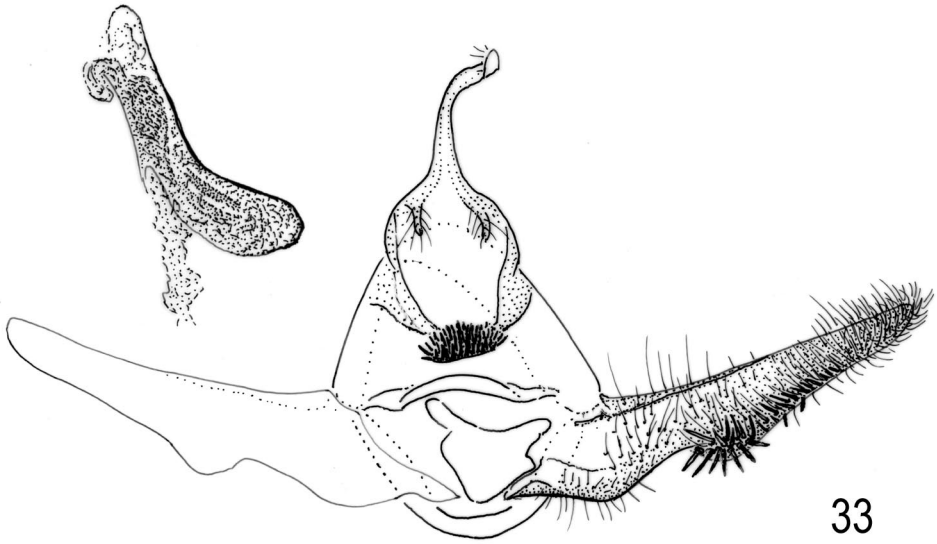
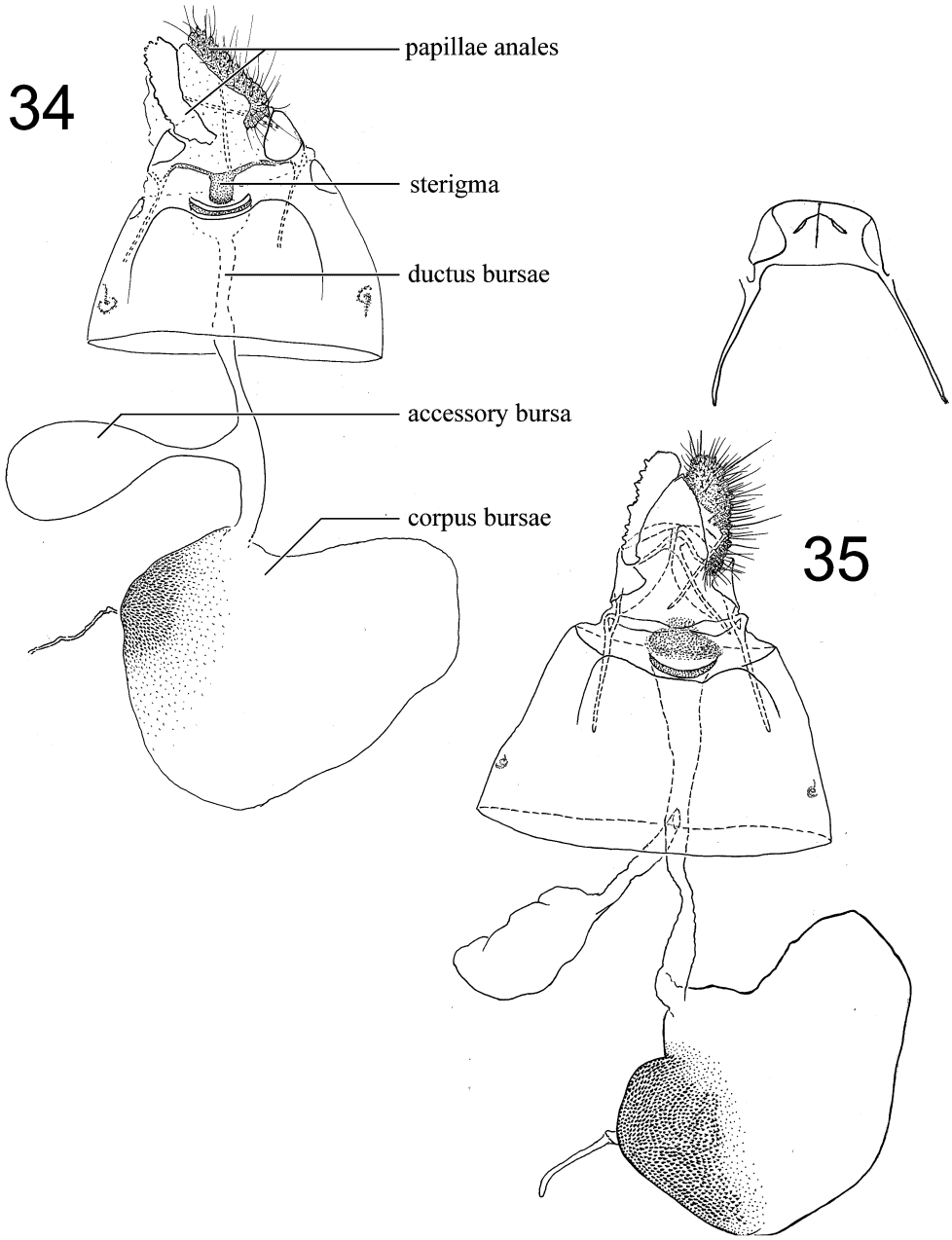


FIGURES 33. Male genitalia of *Anopinella*, valvae spread, aedeagus removed. 33, *A. styraxivora*.



FIGURES 34-35. Female genitalia of *Anopinella*, posterior end up. 34, *A. isodelta*; 35, *A. triquetra*, with insert of tergum eight.

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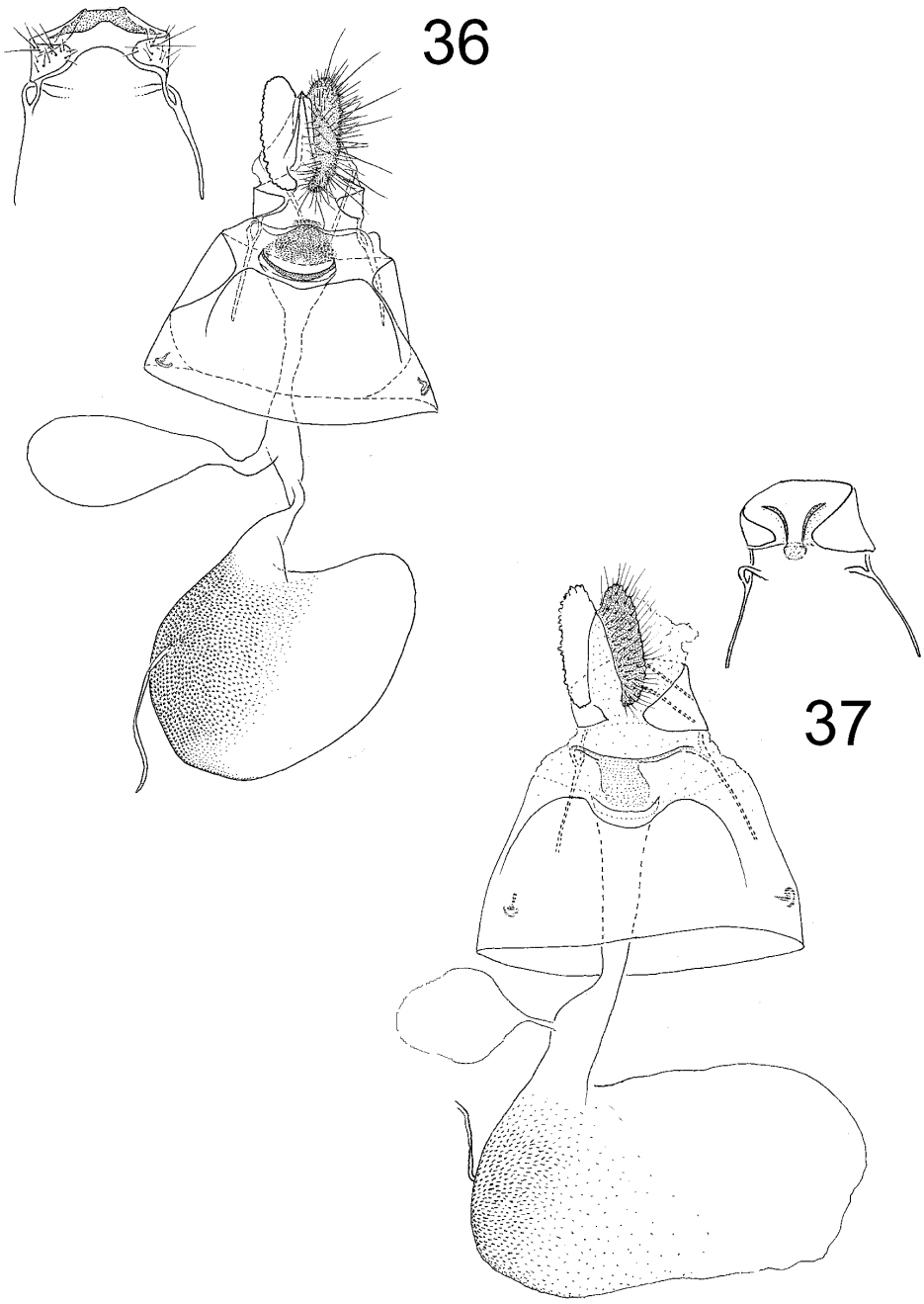
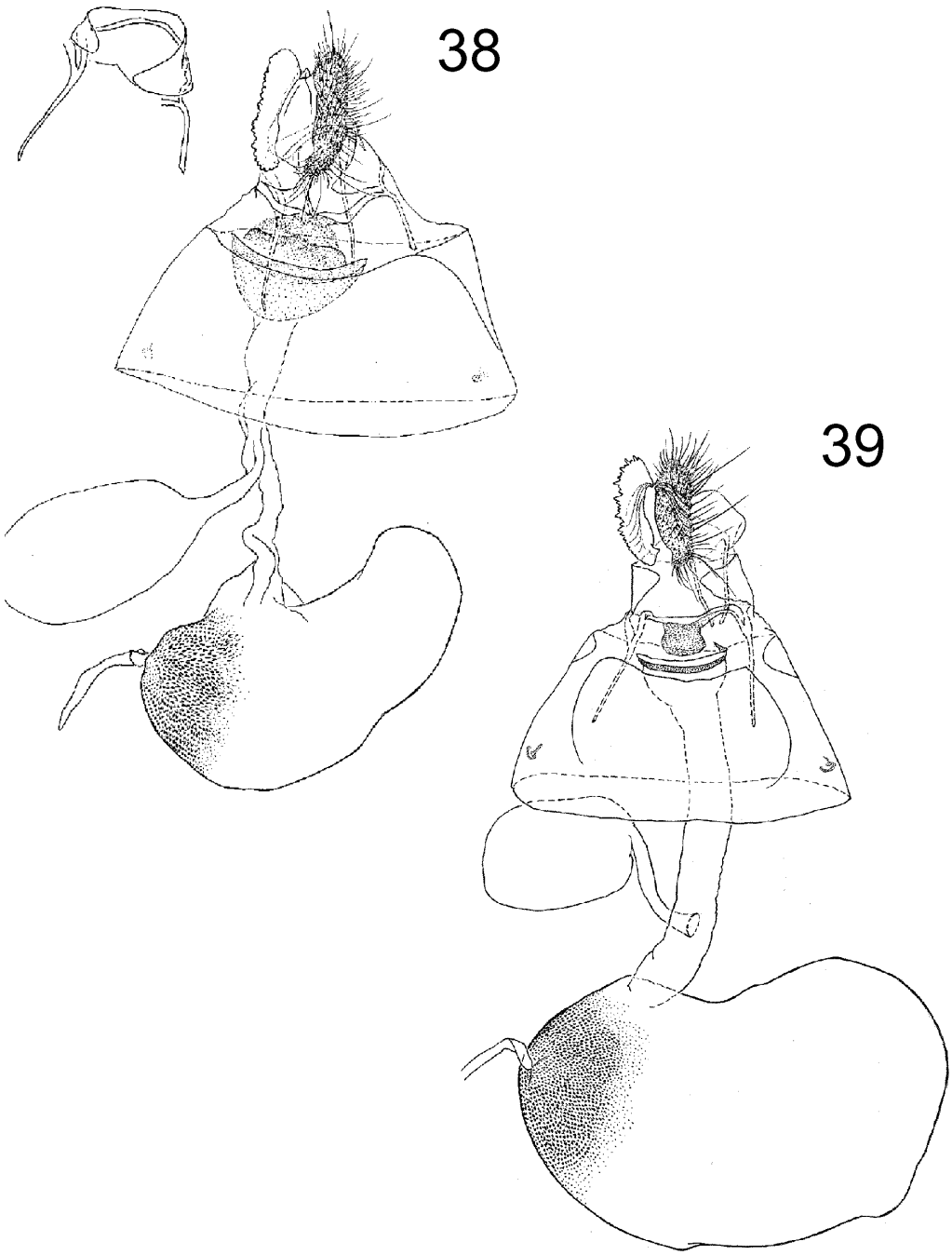


FIGURES 36-37. Female genitalia of *Anopinella*, posterior end up. 36, *A. porrasa*, with insert of tergum eigth; 37, *A. cartagoa*, with insert of tergum eight.



FIGURES 38-39. Female genitalia of *Anopinella*, posterior end up. 38, *A. powelli*, with insert of tergum eight; 39, *A. araguana*.

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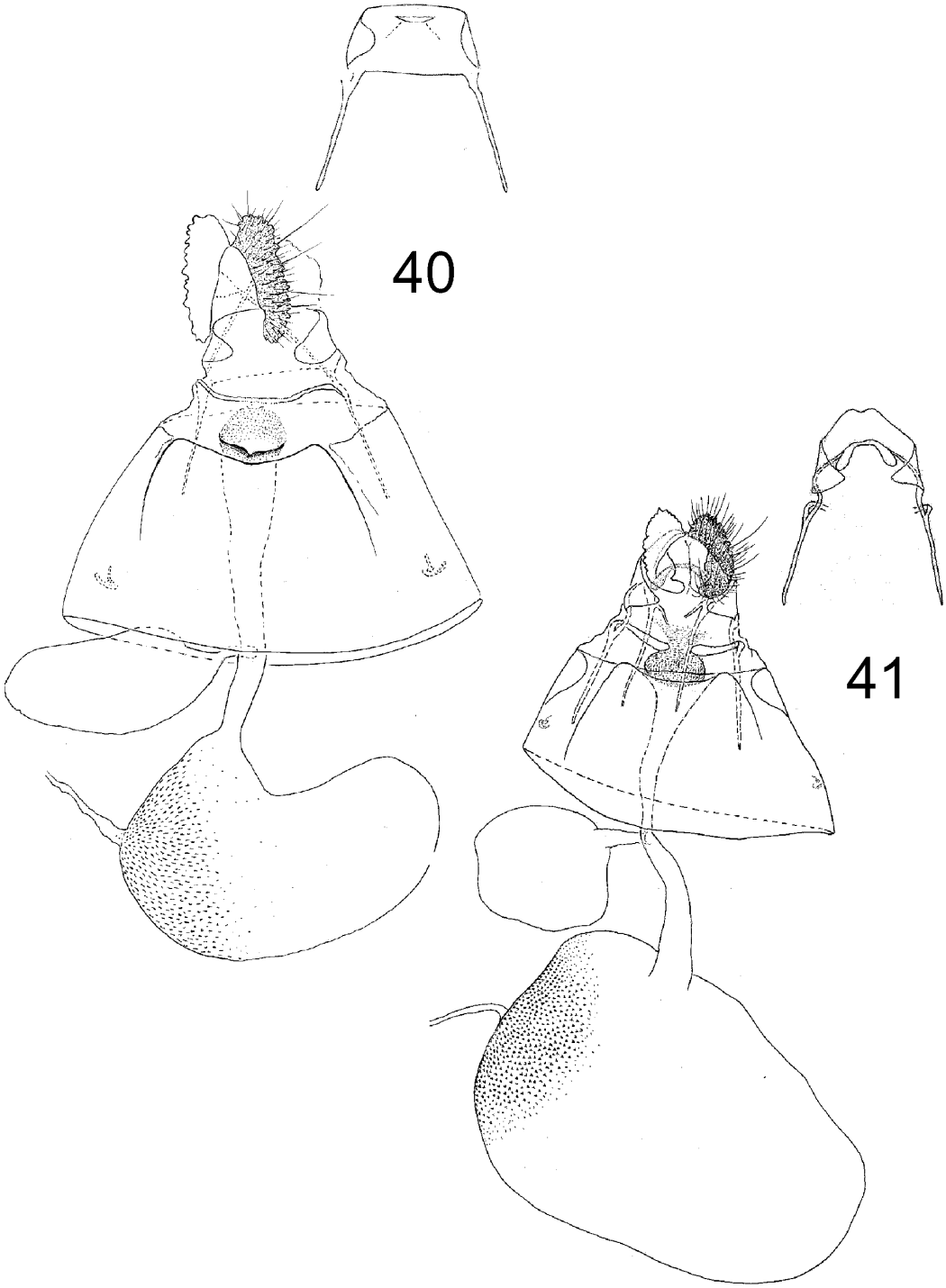

FIGURES 40-41. Female genitalia of *Anopinella*, posterior end up. 40, *A. razowskii*, with insert of tergum eight; 41, *A. rastafariana*, with insert of tergum eight.

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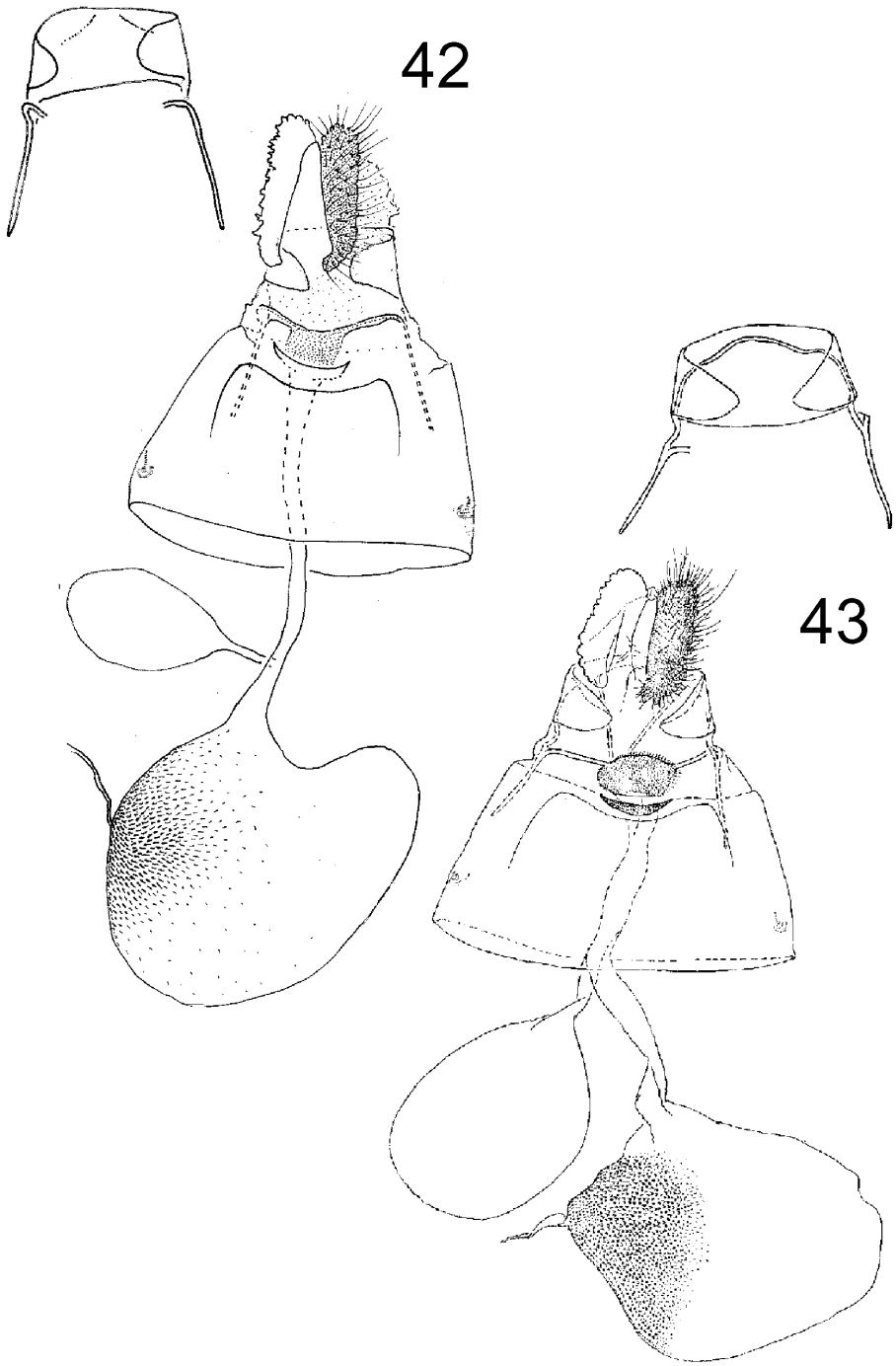

FIGURES 42-43. Female genitalia of *Anopinella*, posterior end up. 42, *A. transecta*, with insert of tergum eight; 43, *A. cafrosana*, with insert of tergum eight.

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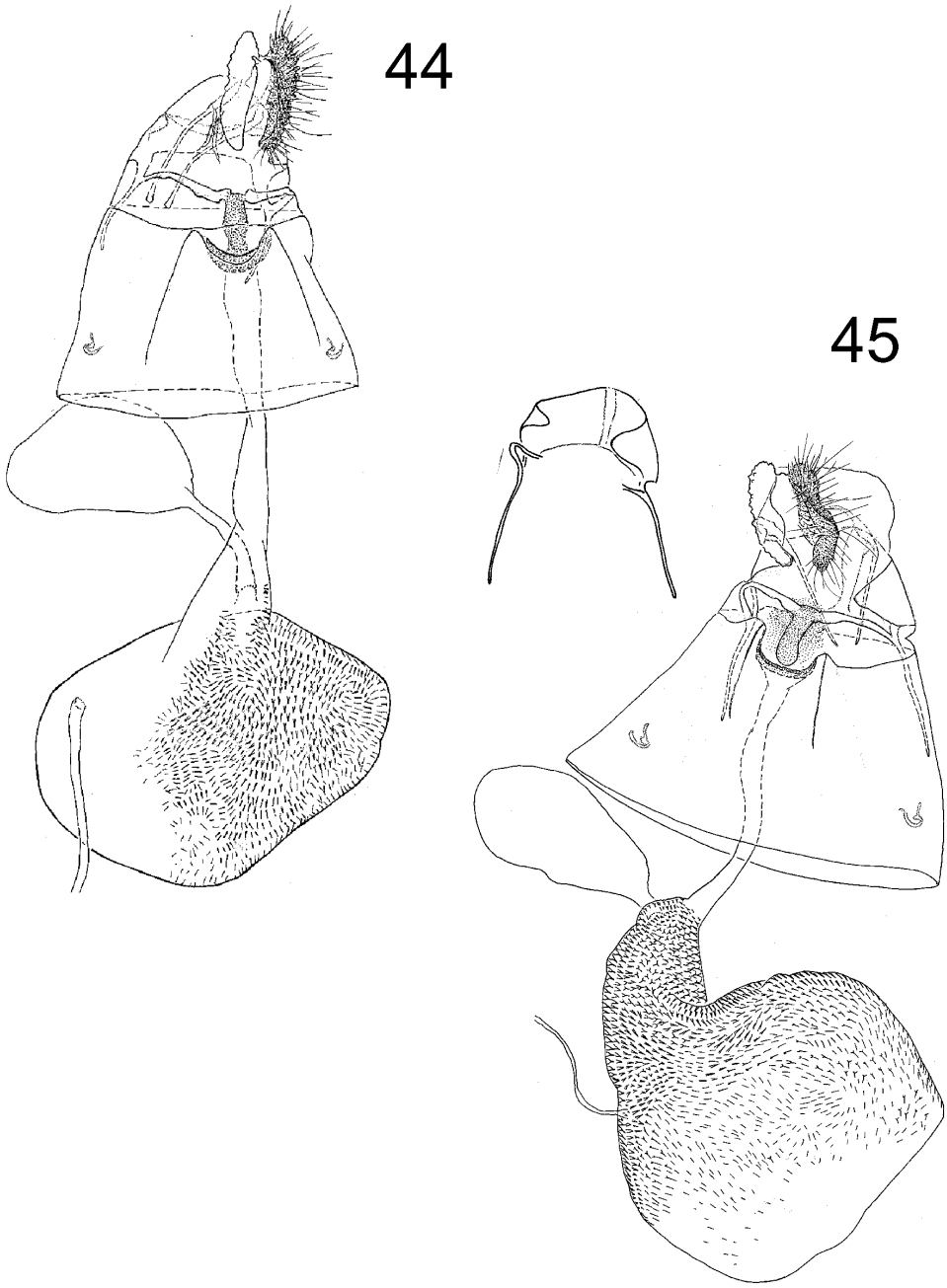

FIGURES 44-45. Female genitalia of *Anopinella*, posterior end up. 44, *A. fana*; 45, *A. brasiliana*, with insert of tergum eight.

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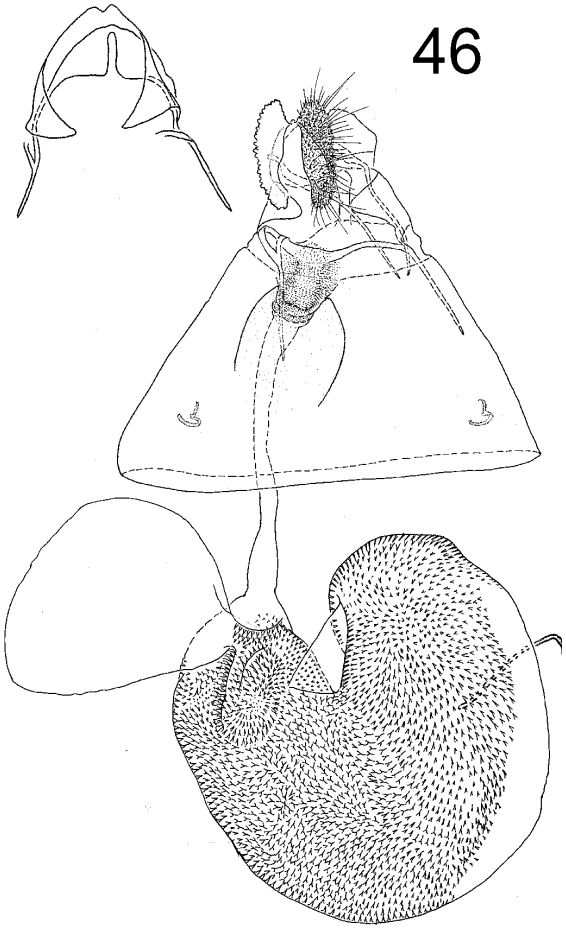

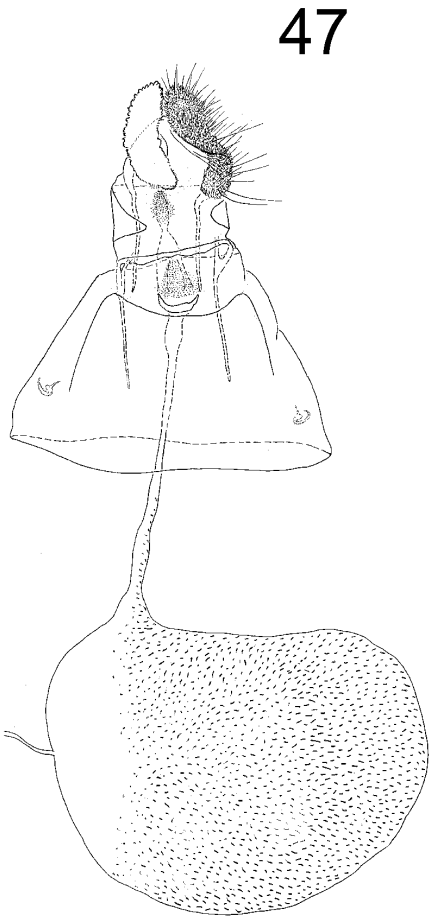

FIGURES 46-47. Female genitalia of *Anopinella*, posterior end up. 46, *A. brasiliana*, with insert of tergum eight; 47, *A. macrosema*.

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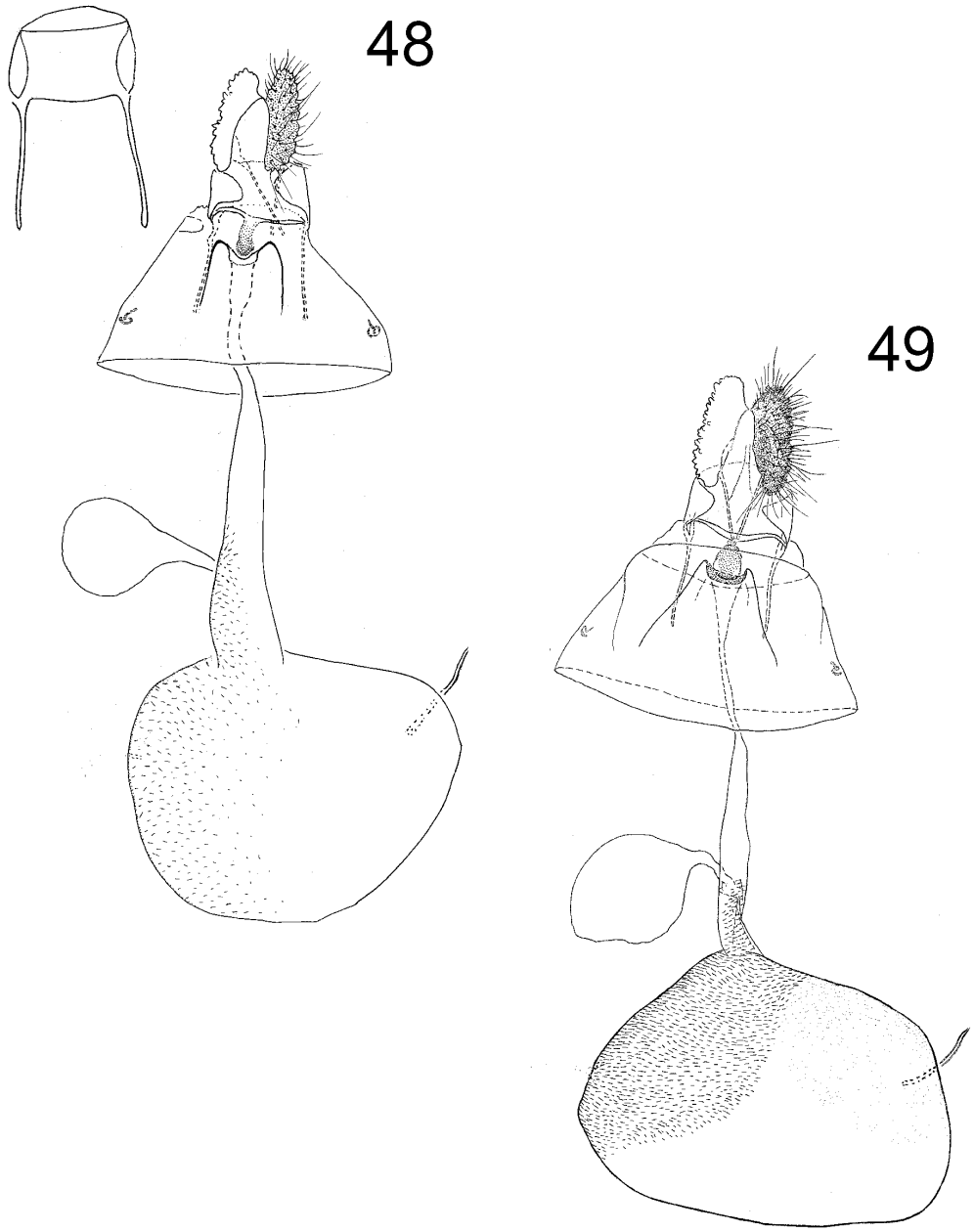

FIGURES 48-49. Female genitalia of *Anopinella*, posterior end up. 48, *A. phillipsae*, with insert of tergum eight; 49, *A. larana*.

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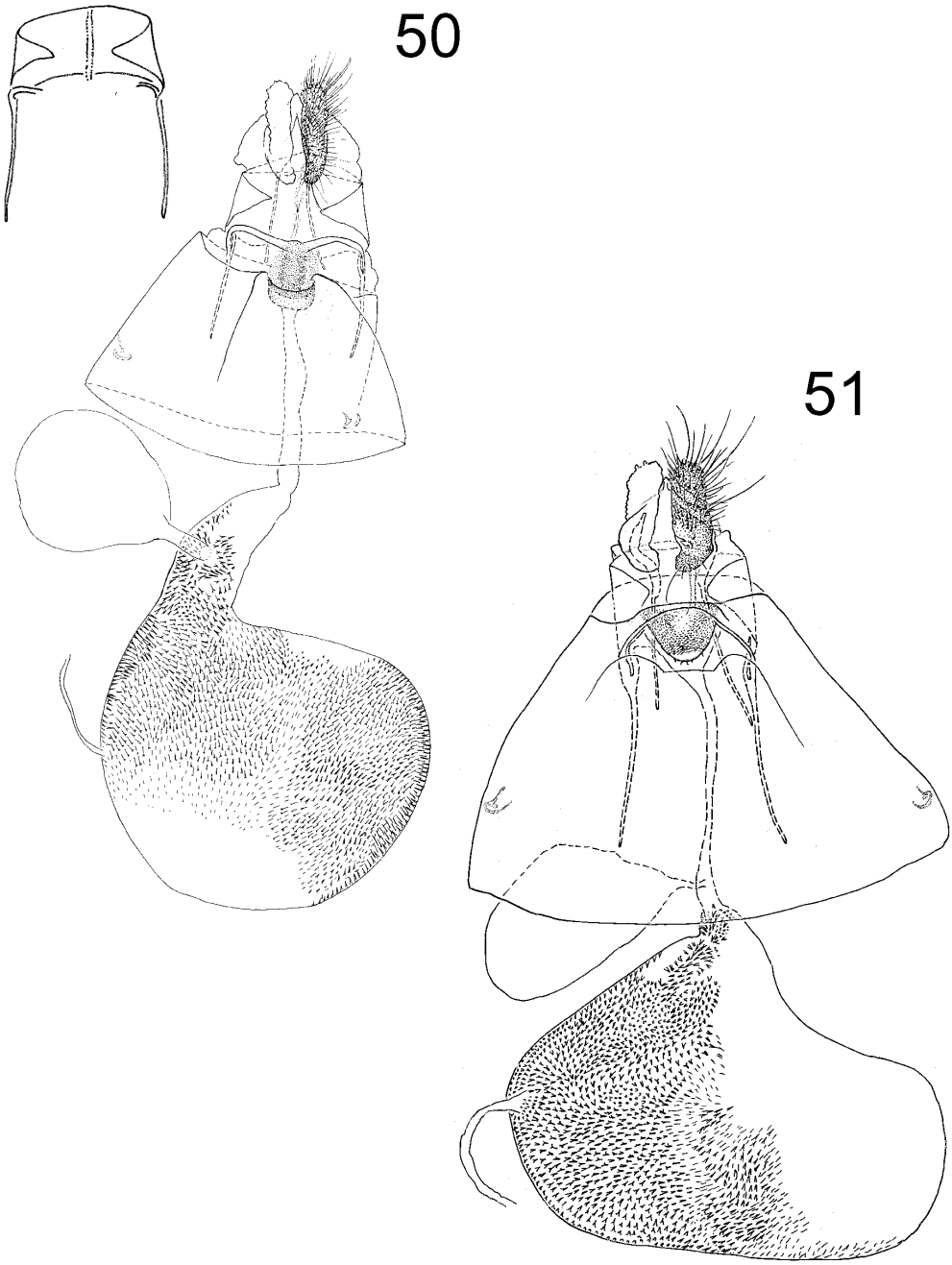

FIGURES 50-51. Female genitalia of *Anopinella*, posterior end up. 50, *A. boliviana*, with insert of tergum eight; 51, *A. peruvensis*.

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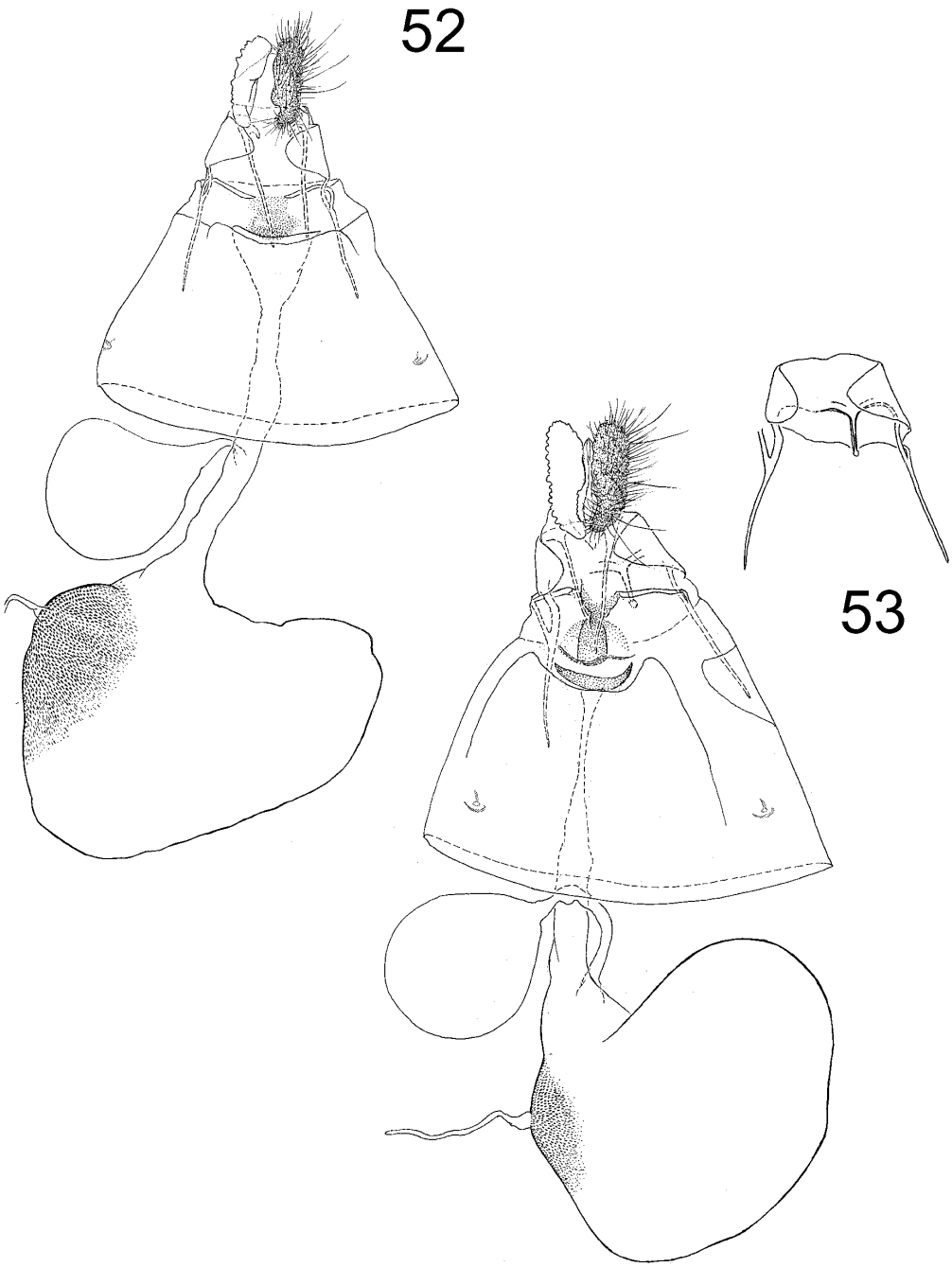

FIGURES 52-53. Female genitalia of *Anopinella*, posterior end up. 52, *A. tinalandana*; 53, *A. sympatrica*, with insert of tergum eight.

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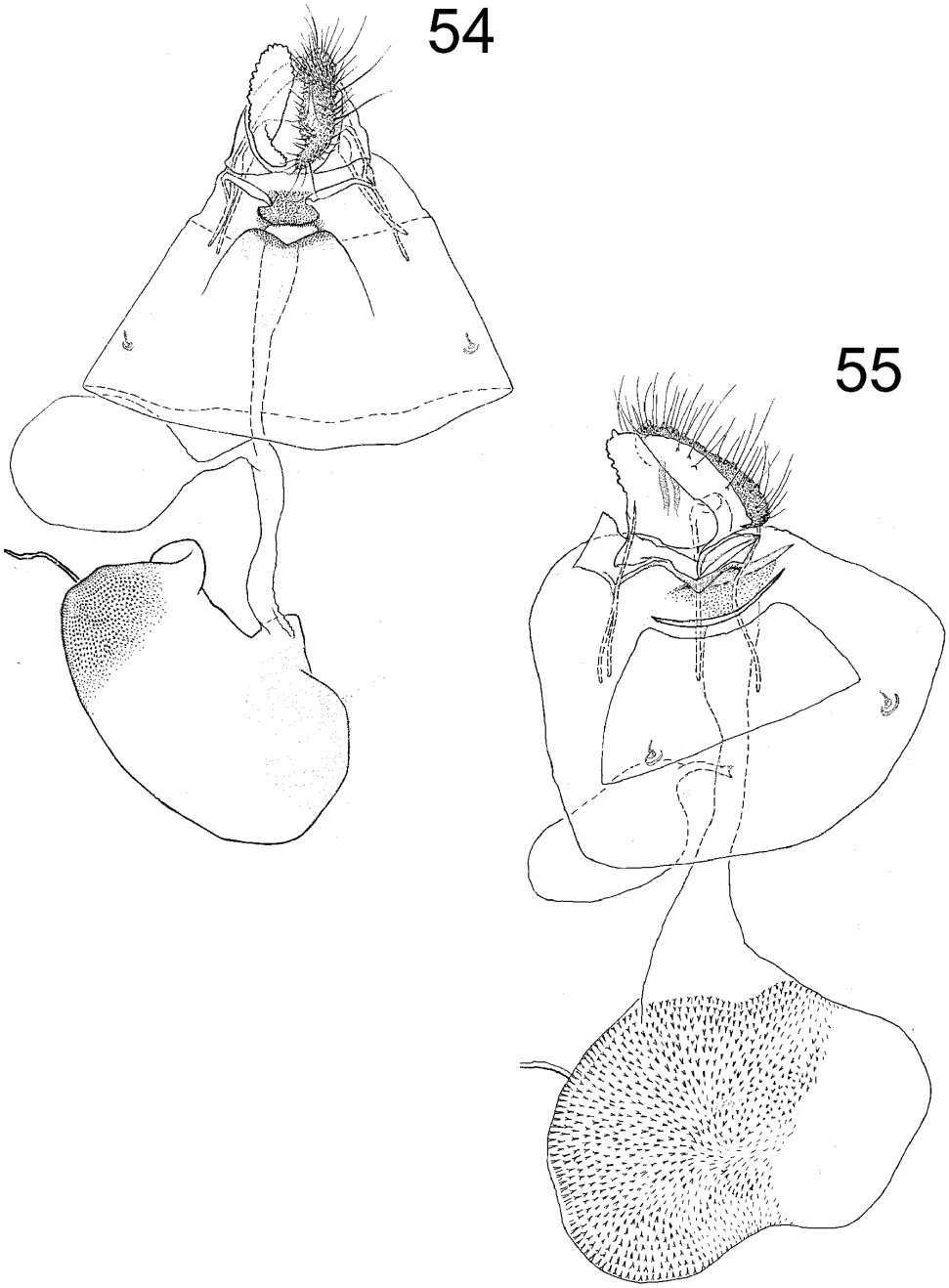

FIGURES 54-55. Female genitalia of *Anopinella*, posterior end up. 54, *A. rica*; 55, *A. styraxivora*.

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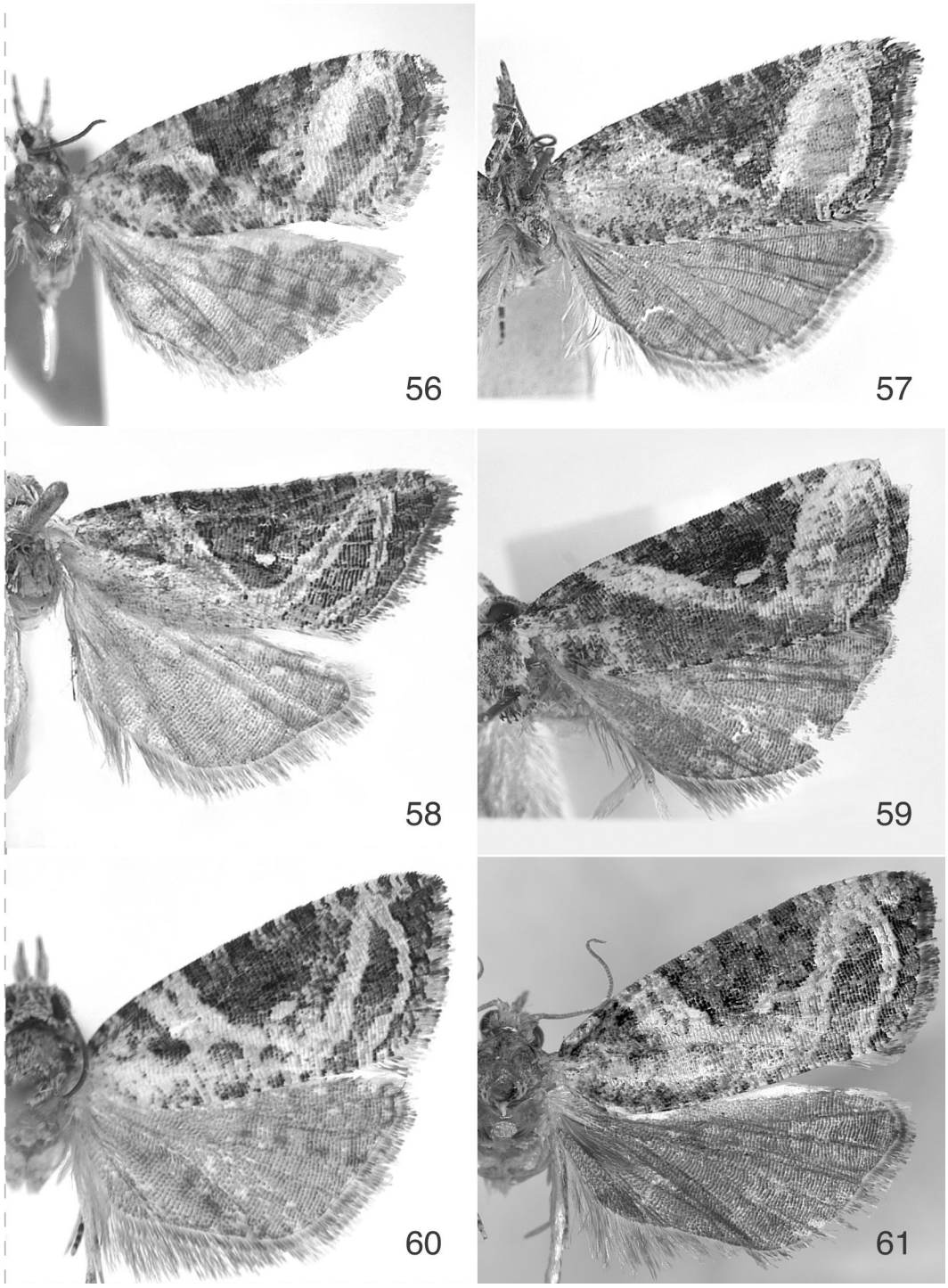

FIGURES 56-61. Adults of *Anopinella*. 56, *A. isodelta*; 57, *A. triquetra*; 58, *A. ophiodes*; 59, *A. cartagoa*; 60, *A. transecta*; 61, *A. araguana*.

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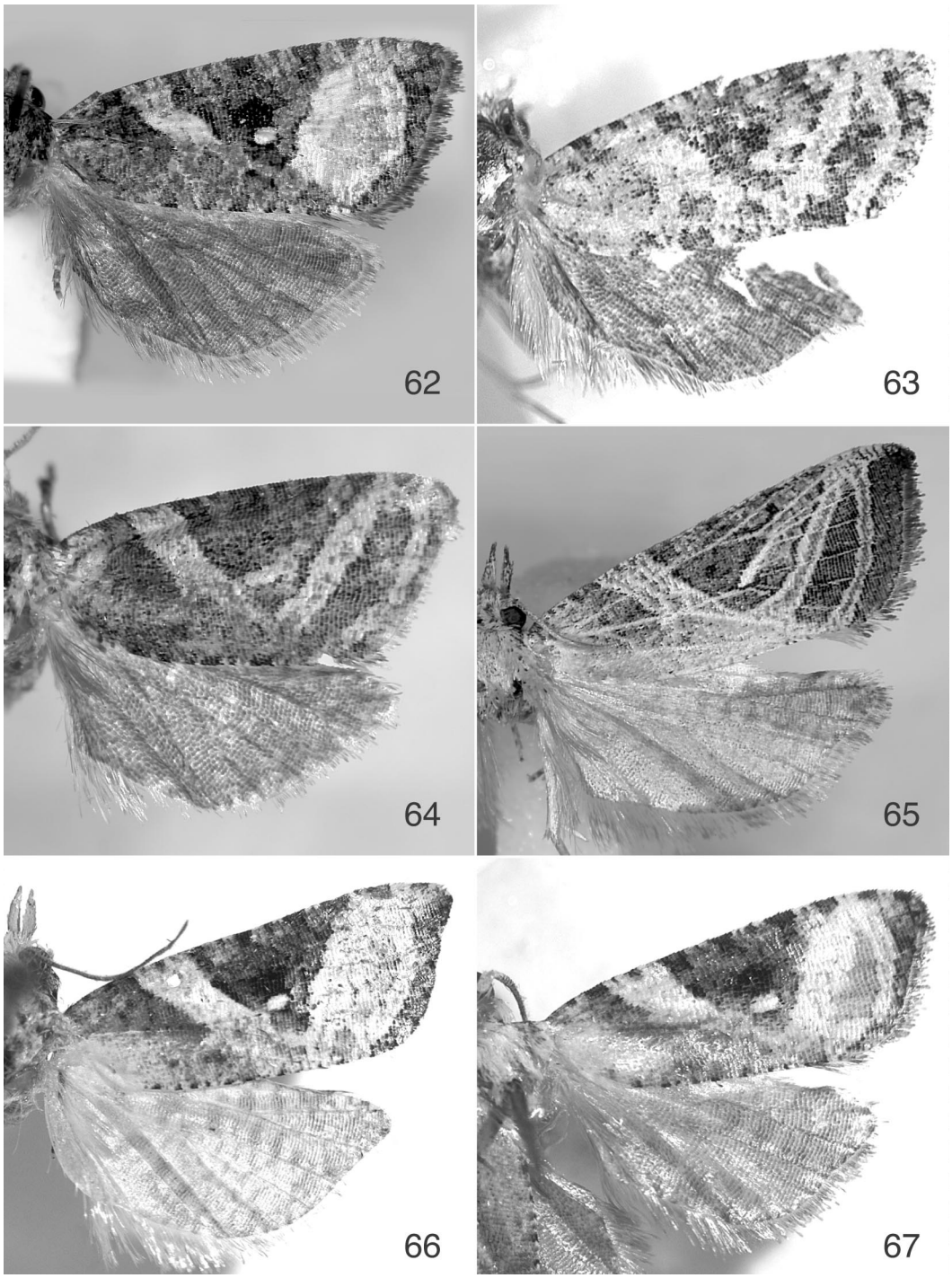

FIGURES 62-67. Adults of *Anopinella*. 62, *A. powelli*; 63, *A. razowskii*; 64, *A. parambana*; 65, *A. albolinea*; 66, *A. rastafariana*; 67, *A. arenalana*.

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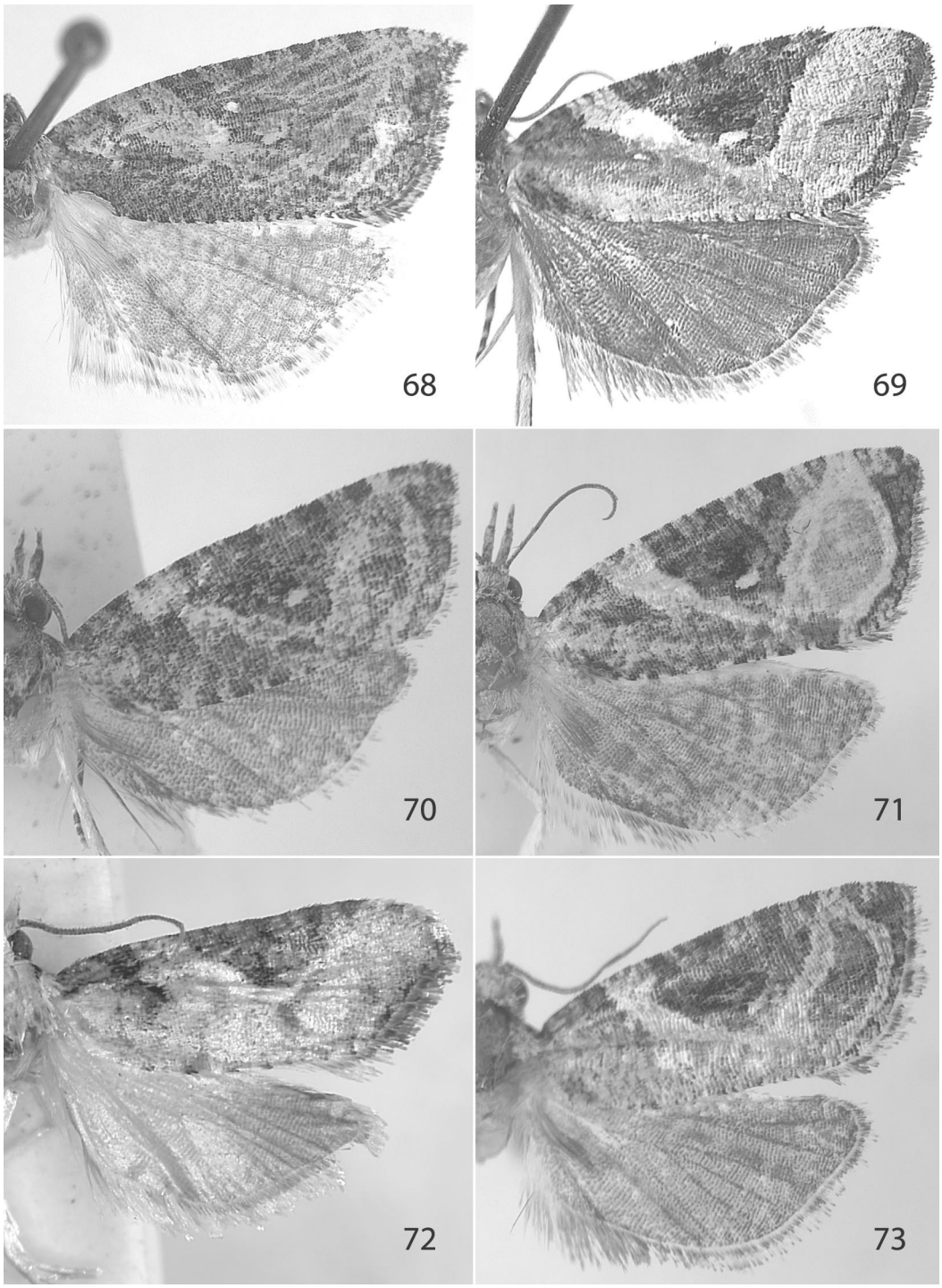

FIGURES 68-73. Adults of *Anopinella*. 68, *A. mariana*; 69, *A. carabayana*; 70, *A. cafrosana*; 71, *A. porrasa*; 72, *A. styraxivora*, 73, *A. fana*.

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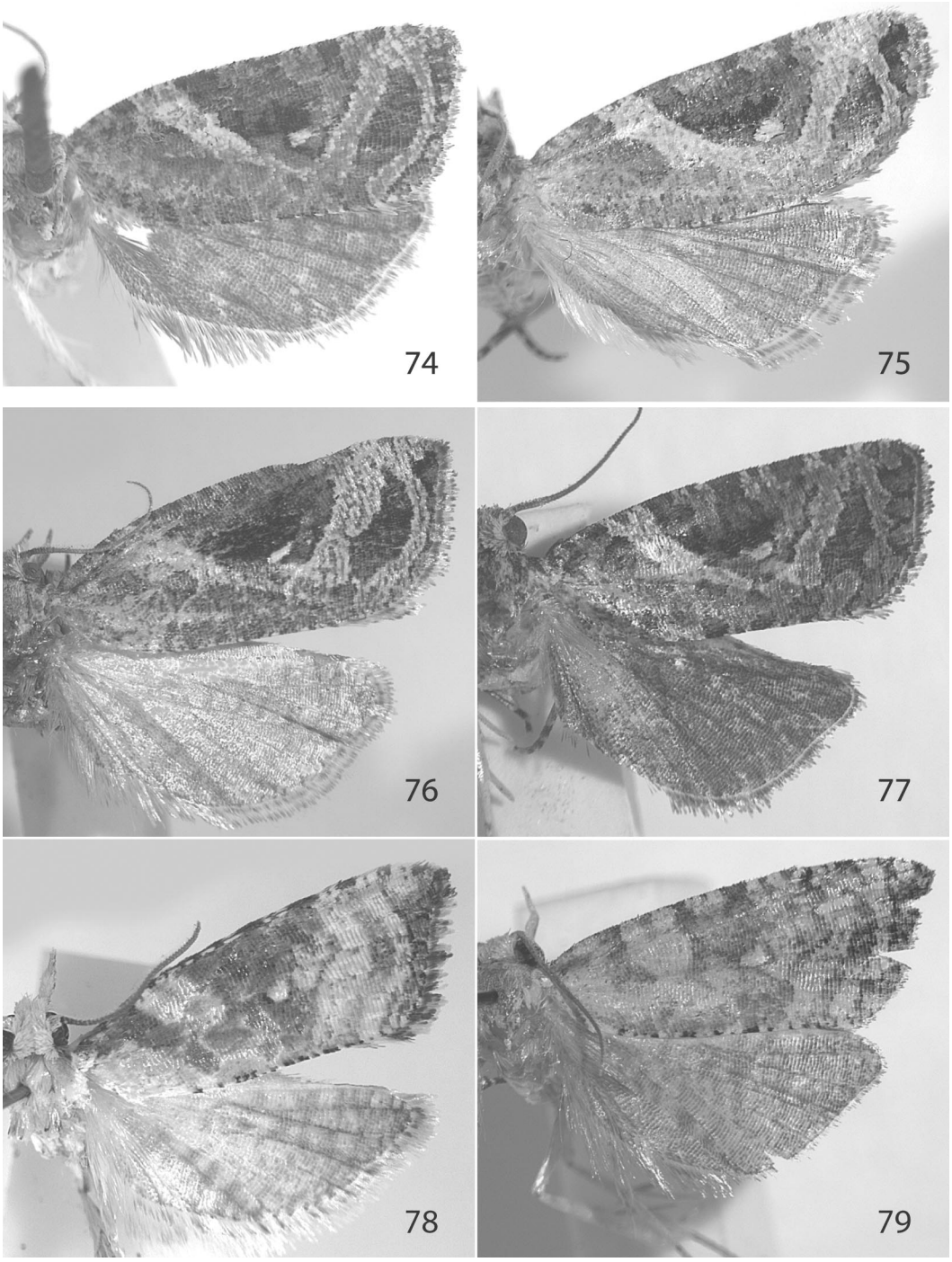

FIGURES 74-79. Adults of *Anopinella*. 74, *A. choko*; 75, *A. brasiliana*; 76, *A. brasiliana*, 77, *A. cuzco*, 78, *A. phillipsae*; 79, *A. larana*.

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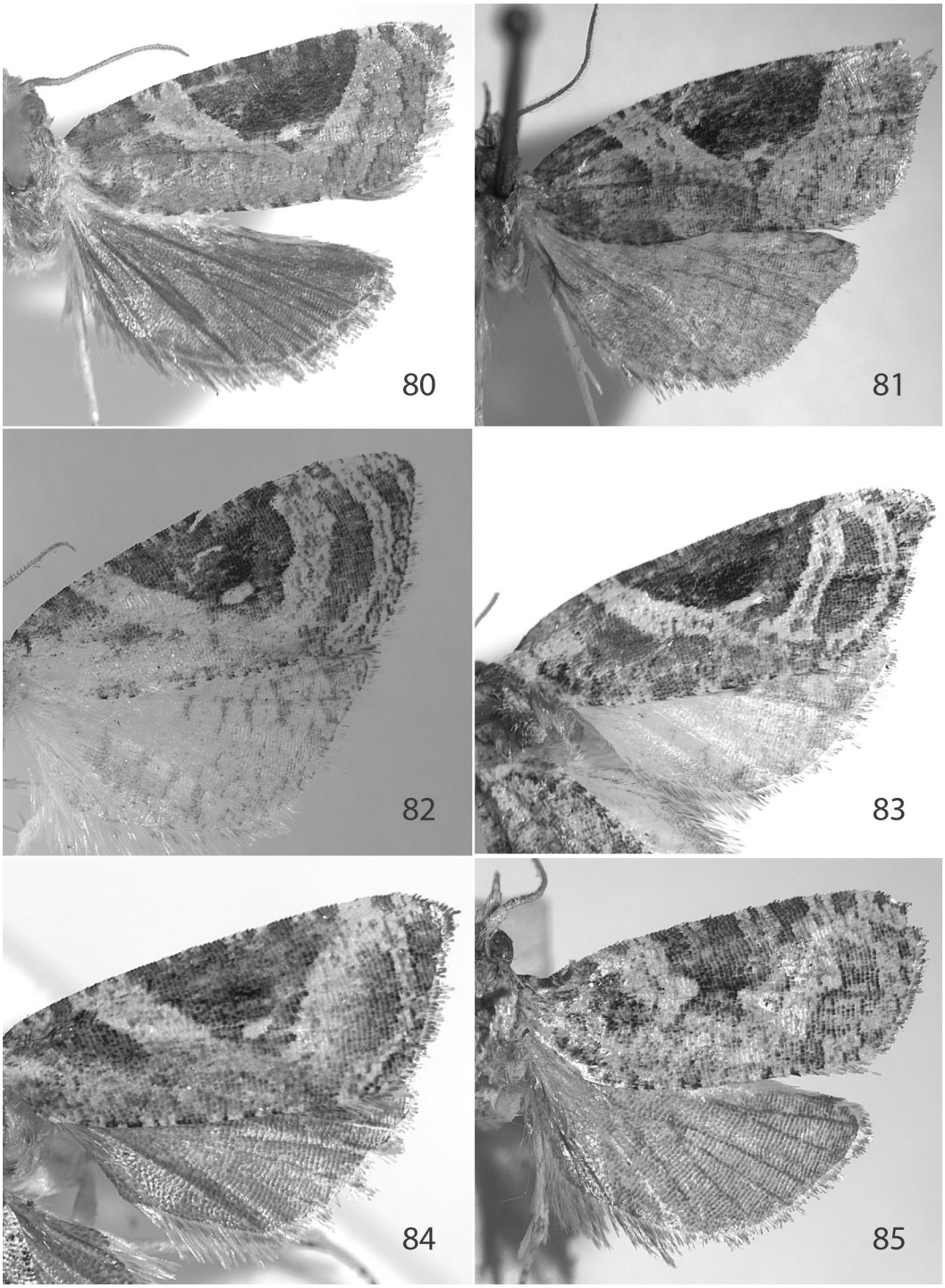

FIGURES 80-85. Adults of *Anopinella*. 80, *A. peruvensis*; 81, *A. tucki*; 82, *A. macrosema*; 83, *A. holandia*; 84, *A. tinalandia*; 85, *A. panamana*.

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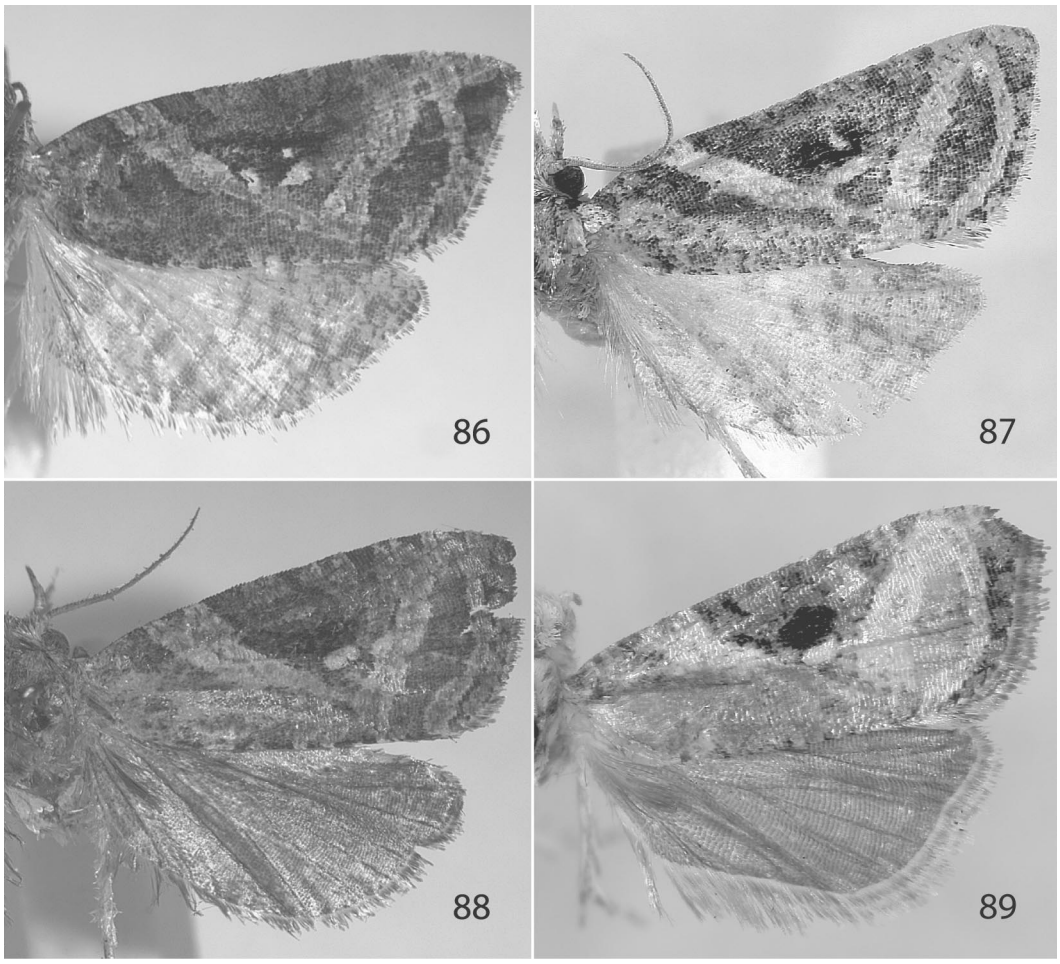

FIGURES 86-89. Adults of *Anopinella*. 86, *A. sympatrica*; 87, *A. rigidana*; 88, *A. boliviana*; 89, *A. rica*.

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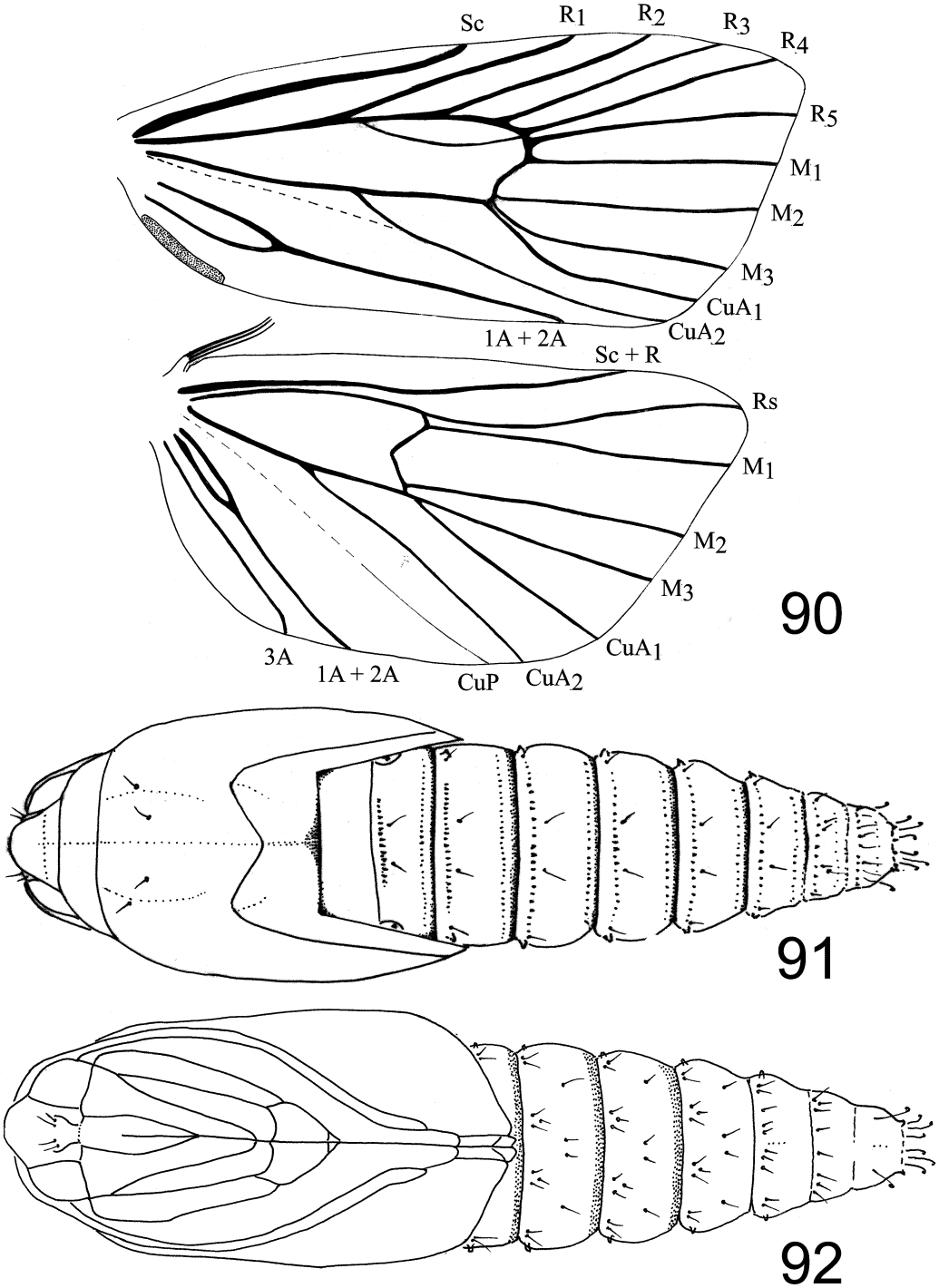
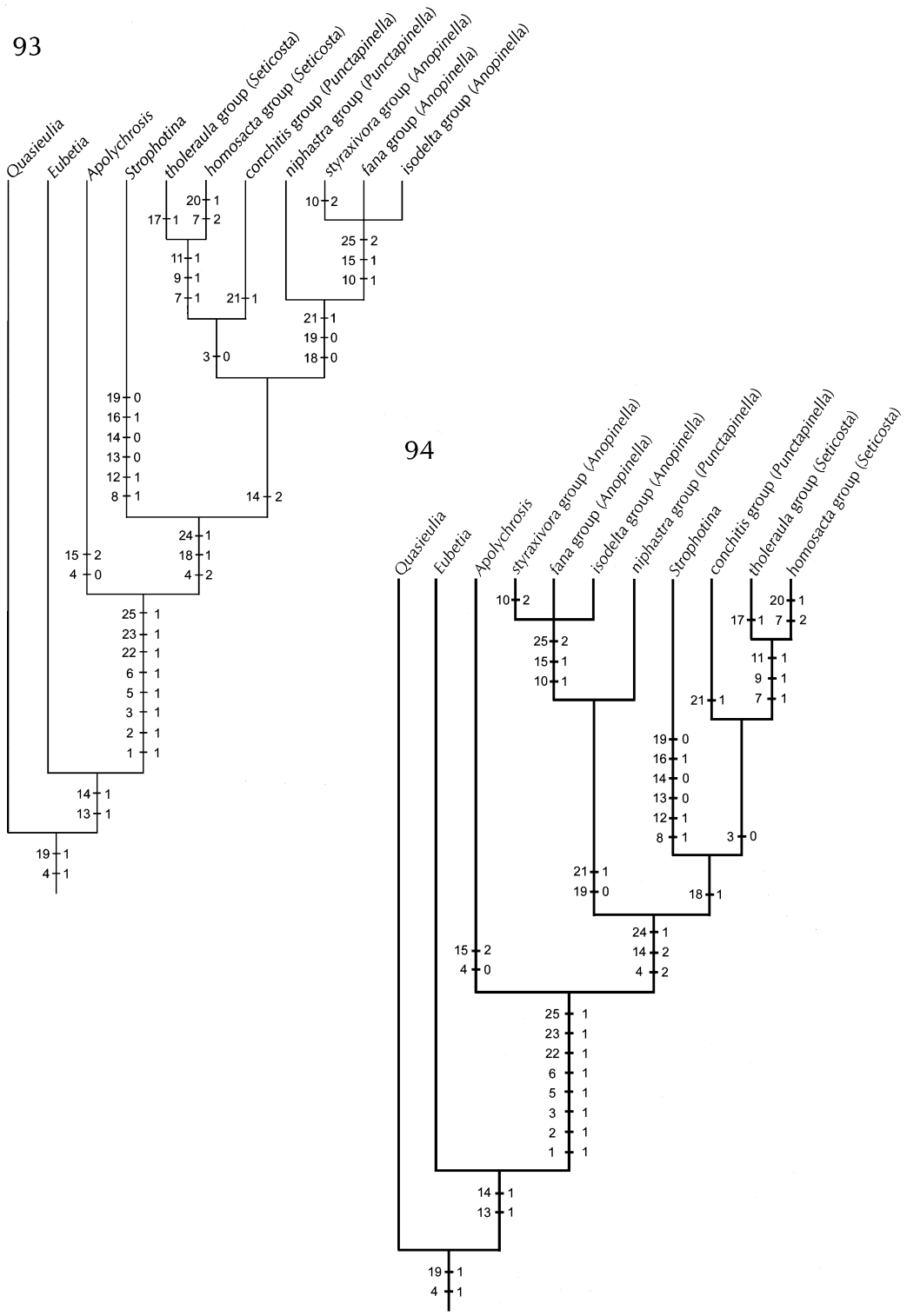


FIGURES 90-92. Wing venation of *Anopinella triquetra* (90); pupa of *A. styraxivora*, dorsum (91) and venter (92).



FIGURES 93-94. Hypotheses of phylogenetic relationships among the taxa.

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