

# The Geometroidea (Lepidoptera) from Cuba described by Herrich-Schäffer in the Gundlach collection, Havana

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**ABSTRACT.** The taxonomic status of 35 nominal species of Geometroidea from Cuba described by Herrich-Schäffer is discussed. Type material of 33 nominal species preserved in Coll. Gundlach, Instituto de Ecología y Sistemática, Havana, is evaluated. Thirty four species names are recognized, 11 species names are synonymized, six new combinations, six reinstated synonymies and four species recalled from synonymy are established, and one new species is proposed.

**KEY WORDS.** Geometroidea, Taxonomy, Cuba, Herrich-Schäffer, Gundlach

HERRICH-SCHÄFFER (1870) described 35 species of Geometroidea from Cuban material sent to him by Gundlach.

During the course of two collecting trips to Cuba (1989, 1990), the author had the opportunity to examine the moth material in the Coll. Gundlach, currently housed in the Instituto de Ecología y Sistemática, Havana. More information about the history of this material and on the methodology followed in this article can be found in a previous work (BECKER 2002) covering the Noctuoidea housed in Coll. Gundlach.

Abbreviations used in this work: (BMNH) The Natural History Museum, London; (CU) Cornell University, Ithaca, New York; (IES) Instituto de Ecología y Sistemática, Havana; (USNM) The National Museum of Natural History, Washington, DC.

## NOMENCLATURAL SUMMARY

### Epiplemidae

*Nedusia* Hübner, 1818

*fimbriata* Herrich-Schäffer

### Geometridae

#### Ennominae

*Bagodares* Druce, 1893

*rectisignaria* (Herrich-Schäffer, 1870), **comb. n.**

*trilva* (Schaus, 1901), **comb.n., syn. n.**

*Iridopsis* Warren, 1894

*idonearia* (Walker, 1860)

*abjectaria* (Herrich-Schäffer, 1870), **syn. rev.**

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- Macaria* Curtis, 1826  
*centrosignata* Herrich-Schäffer, 1870, **sp. rev.**
- Numia* Guenée, 1857  
*terebintharia* Guenée, 1857  
*heterochloriaria* (Herrich-Schäffer, 1870)
- Pero* Herrich-Schäffer, 1855  
*zalissaria* (Walker, 1860)  
*curvistrigaria* (Herrich-Schäffer, 1870), **syn. n.**
- Phyllo-donta* Warren, 1894  
*decisaria* (Herrich-Schäffer, 1870)
- Prochoerodes* Grote, 1883  
*exiliata* (Herrich-Schäffer, 1870)  
*gundlachi* **sp. n.**
- Semiothisa* Hübner, 1818  
*cellulata* (Herrich-Schäffer, 1870)  
*trientata* (Herrich-Schäffer, 1870)
- Sphacelodes* Guenée, 1857  
*fusilineata* (Walker, 1860), **sp. rev.**  
*griseocostaria* (Herrich-Schäffer, 1870), **syn. n.**  
*brunnetata* Warren, 1907, **syn. n.**
- Thysanopyga auctorum* [not Herrich-Schäffer]  
*subpusaria* (Herrich-Schäffer, 1870)
- Thyrinteina* Möschler, 1890  
*arnobia* (Stoll, 1782)  
*quadricostaria* (Herrich-Schäffer, 1870)
- Geometrinae
- Chlorochlamys* Hulst, 1896  
*chloroleucaria* (Guenée, 1857)  
*desolataria* (Herrich-Schäffer, 1870)
- Eueana* Prout, 1912  
*niveociliaria* (Herrich-Schäffer, 1870)
- Phrudocentra* Warren, 1895  
*centrifugaria* (Herrich-Schäffer, 1870)  
*protractaria* (Herrich-Schäffer, 1870)
- Synchlora* Guenée, 1857  
*frondaria* (Guenée, 1857)  
*albicostaria* (Herrich-Schäffer, 1870)  
*merlinaria* (Schaus, 1940), **syn. n.**  
*herbaria* (Fabricius, 1794)  
*croceofimbriata* (Herrich-Schäffer, 1870)

## Larentiinae

*Disclisioprocta* Wallengren, 1861

*stellata* (Guenée, 1857)

*baliata* (Herrich-Schäffer, 1870), **comb. n., syn. n.**

*balteolata* (Herrich-Schäffer, 1870)

*Obila* Walker, 1869

*pannosata* (Guenée, [1858])

*decertaria* (Herrich-Schäffer, 1870), **comb. n., syn. n.**

*Pterocypha* Herrich-Schäffer, [1855]

*defensata* Walker, 1862

*anguinata* (Herrich-Schäffer, 1870), **syn. rev.**

*aristata* (Herrich-Schäffer, 1870), **syn. rev.**

*artificata* (Herrich-Schäffer, 1870), **syn. rev.**

*subgaliata* (Herrich-Schäffer, 1870), **syn. rev.**

*Triphosa* Stephens, 1829

*affirmata* (Guenée, 1857)

*subcertaria* (Herrich-Schäffer, 1870)

## Sterrhinae

*Cyclophora* Hübner, 1822

*nanaria* (Walker, 1861)

*nanularia* (Herrich-Schäffer, 1870)

*Leptostales* Möschler, 1890

*nigrofasciaria* (Herrich-Schäffer, 1870), **comb. n.**

*angulata* (Schaus, 1912), **comb. n., syn. n.**

*phorcaria* (Guenée, 1857)

*subroseata* (Herrich-Schäffer, 1870), **syn. n.**

*pappasaria* Dyar, 1913, **syn. n.**

*Pleuroprucha* Möschler, 1890

*rudimentaria* (Guenée, 1857)

*extranearia* (Herrich-Schäffer, 1870)

*Scopula* Schrank, 1802

*apparitaria* (Walker, 1861)

*floccularia* (Herrich-Schäffer, 1870), **syn. n.**

*canularia* (Herrich-Schäffer, 1870)

*chionaeata* (Herrich-Schäffer, 1870), **sp. rev.**

*Semaeopus* Herrich-Schäffer, [1855]

*caecarius* (Hübner, 1823)

*occipitarius* (Herrich-Schäffer, 1870)

## ALPHABETIC CATALOGUE

The species are listed in alphabetical order by species name. The numbers in “( )” are the numbers referred to in the original description and in GUNDLACH (1881).

***abjectaria* Herrich-Schäffer (Figs 1, 17, 18)**

*Boarmia abjectaria* Herrich-Schäffer, 1870: 188.

Material examined. One male, 1 female, syntypes “(295)”.

Remarks. In terrible condition; faded and partially destroyed by museum pests; female with abdomen missing; male abdomen preserved and now dissected (Figs 17, 18). There is a series of 5 males and two females from Cuba in VOB (71736, 72353, 73051, 73669) (Fig. 1). Two males were dissected and the genitalia match those of Gundlach's specimen. Synonymized by SCHAUS (1940: 323) with *B. idonearia* Walker, and reinstated as a valid species in SCOBLE (1999: 515). One of the males mentioned above was sent to Ms. L. Pitkin (BMNH) who compared it with the type of *B. idonearia* and confirmed the identification.

Identity. *Iridopsis abjectaria* (Herrich-Schäffer, 1870), **syn. rev.**, a junior subjective synonym of *I. idonearia* (Walker, 1860) (Geometridae, Ennominae).

***albicostaria* Herrich-Schäffer**

*Eucrostis albicostaria* Herrich-Schäffer, 1870: 181.

Material examined. One female type, “(289)”.

Remarks. In very bad condition, faded, partially destroyed by museum pests, thorax molded, abdomen missing; externally unrecognizable. The description in GUNDLACH (1881: 384) “De un bonito verde. El vértice, la parte superior de las antenas y el borde anterior de las alas anteriores blancos; sobre las alas pasan 2 líneas muy flexuosas blancas.”, leave no doubt about its identity. FERGUSON (1985: 85-87, figs 22c, d, 23I, pl. 3, figs 67-72), correctly synonymized it with *S. frondaria* (Guenée). The holotype deposited in CU, and a paratype in the USNM, of *S. merlinaria* (Schaus, 1940), **syn. n.**, were also examined.

Identity. *Synchlora albicostaria* (Herrich-Schäffer, 1870), a junior subjective synonym of *S. frondaria* (Guenée, 1858) (Geometridae, Geometrinae).

***anguinata* Herrich-Schäffer (Fig. 7)**

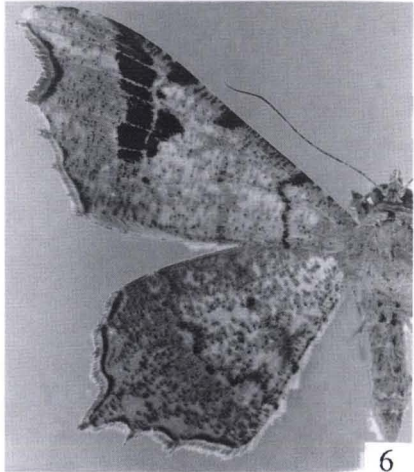
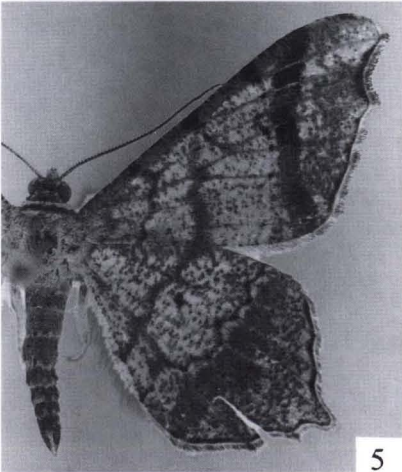
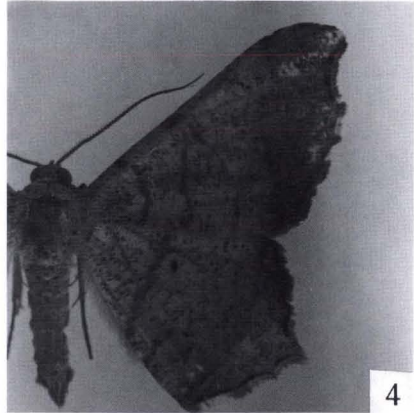
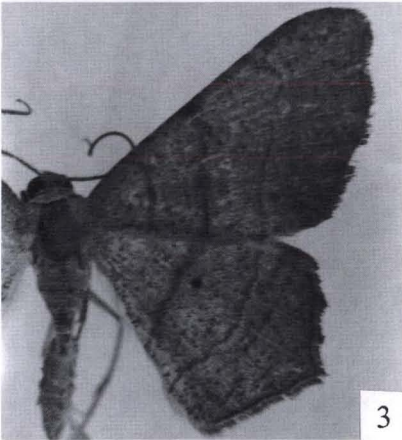
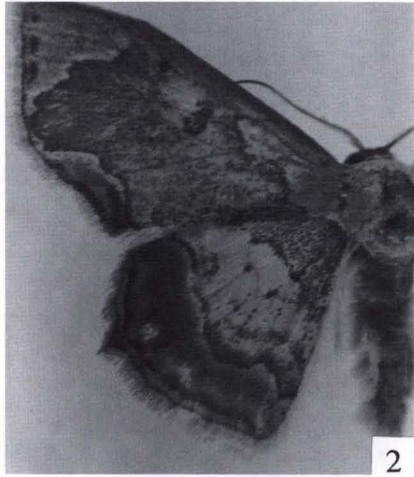
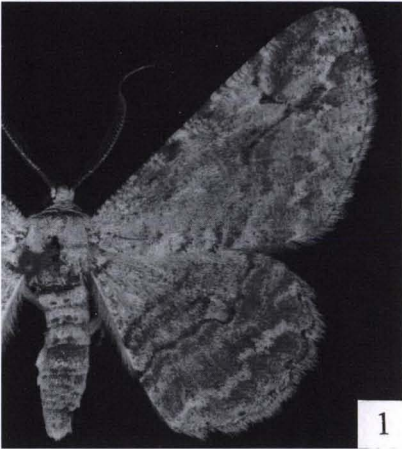
*Larentia anguinata* Herrich-Schäffer, 1870: 189.

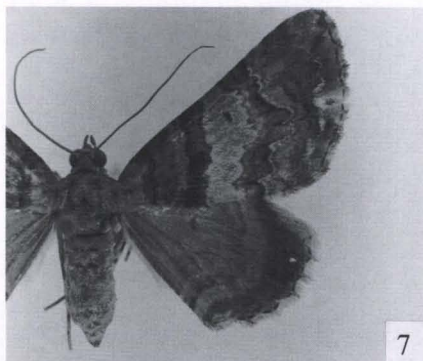
Material examined. Three females syntypes “(389)”.

Remarks. In bad condition; faded and partially destroyed by museum pests; one of them recognizable. One female from Cuba (VOB 71289) (Fig. 7) was compared with, and matches, Gundlach's specimen. *L. anguinata* is only a form of a highly variable species; in VOB there is a long series of specimens from the British Virgin Islands, Puerto Rico and Cuba, one of them, (VOB 66628) was compared

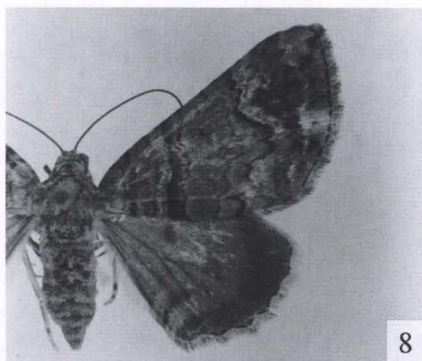
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Figs 1-6. Geometridae from Cuba. (1) *Iridopsis idonearia*, male; (2) *Leptostales nigrofasciaria*, male; (3) *S. cellulata*, male; (4) *Semiothisa trientata*, male; (5-6) *Macaria centrosignata*: (5) male; (6) female.

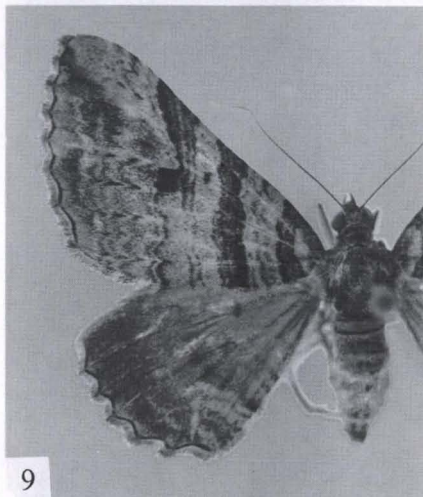




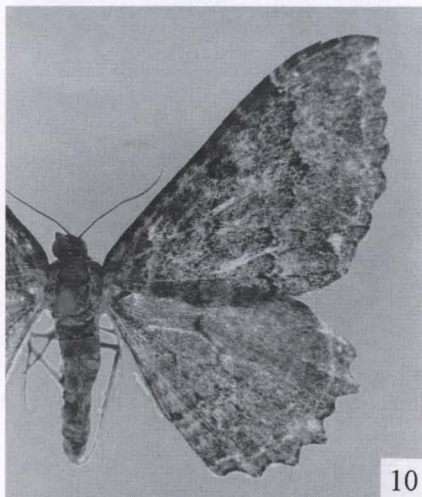
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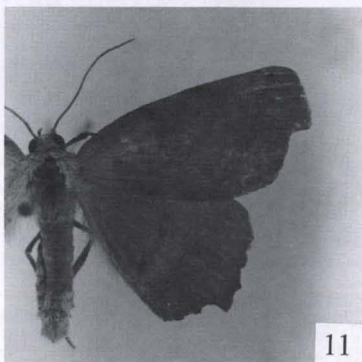
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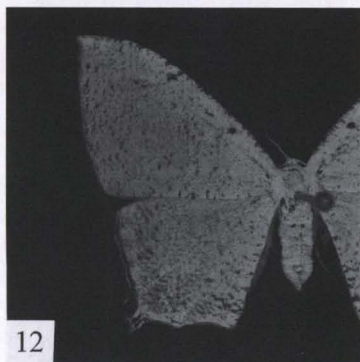
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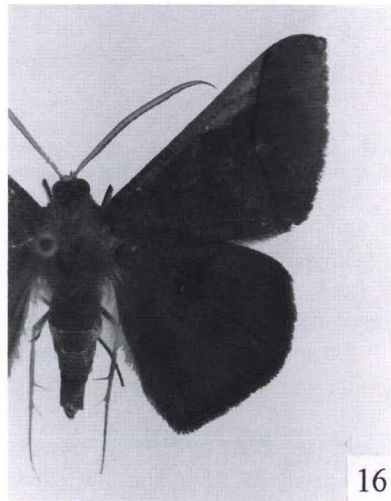
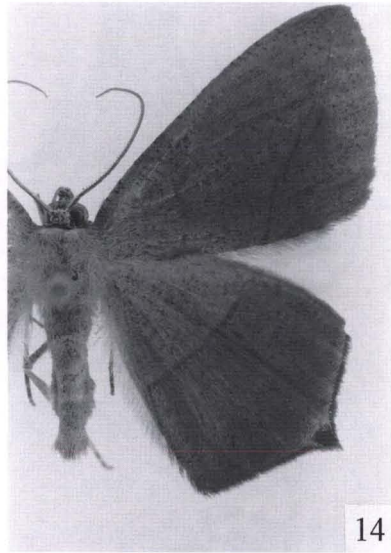
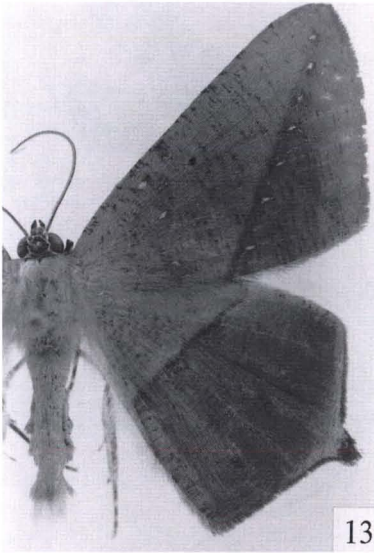


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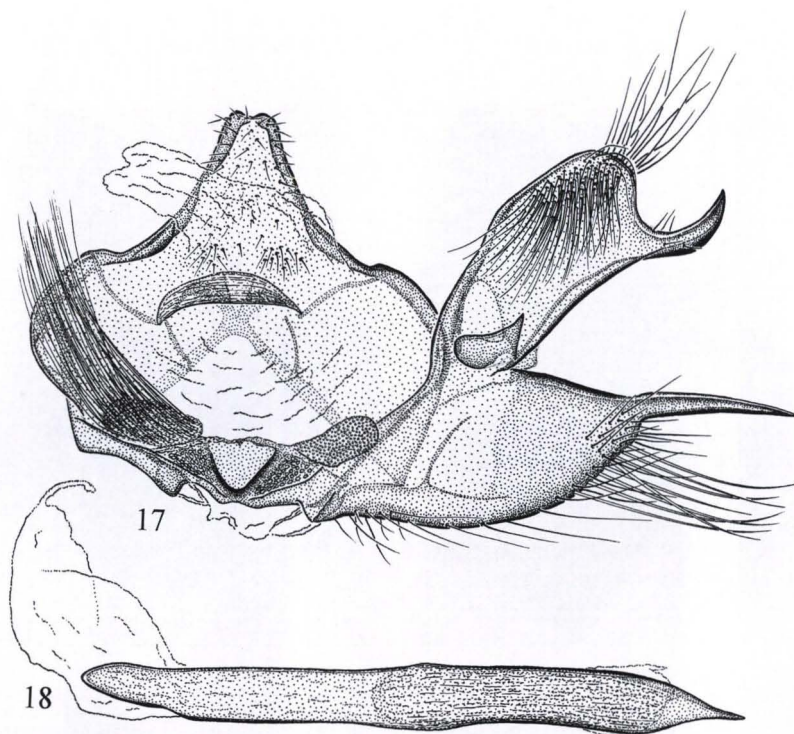


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Figs 7-12. Geometridae (7-11) and Epiplemidæ (12) from Cuba. (7-8) *Pterocypha defensata*, females: (7) [= *anguinata*], (8) [= *aristata*]; (9) *Obila pannosata* [= *decertaria*], female; (10) *Triphosa affirmata*, male [= *subcertaria*]; (11) *Phyllodonta decisaria*, male; (12) *Nedusia fimbriata*, female.



Figs 13-16. Geometridae from Cuba. (13) *Prochoerodes exiliata*, male; (14) *P. gundlachi*, male, holotype; (15) *Bagodares rectisignaria*, male; (16) *Sphacelodes fusilineata*, male [= *griseocostaria*].



Figs 17-18. *Iridopsis idonearia*, male genitalia [= *abjectaria*]. (17) ventral view, left valva and aedeagus removed; (18) aedeagus, ventral view.

with, and matches, the type of *Pterocypha defensata* Walker in BMNH. Correctly synonymized by SCHAUS (1940: 326). FERGUSON (1983: 103) and SCOBLE (1999: 807) used, with no reason, *P. floridata* (Walker, [1863]), a junior subjective synonym of *P. defensata* Walker, as the valid name.

Identity. *Pterocypha anguinata* (Herrich-Schäffer, 1870), **syn. rev.**, a junior subjective synonym of *P. defensata* Walker, 1862, **sp. rev.** (Geometridae, Larentiinae).

#### ***aristata* Herrich-Schäffer (Fig. 8)**

*Larentia aristata* Herrich-Schäffer, 1870: 190.

Material examined. Four females syntypes, "(396)".

Remarks. In bad condition: faded and partially destroyed by museum pests; the best one still recognizable. One female from Cuba (VOB 71289) (Fig. 8) was compared with, and matches, Gundlach's specimen. This is only a form of a highly variable species. Correctly synonymized with *Pterocypha defensata* Walker by SCHAUS (1940: 326) [see *anguinata*].

Identity. *Pterocypha aristata* (Herrich-Schäffer, 1870), **syn. rev.**, a junior subjective synonym of *P. defensata* Walker, 1862 (Geometridae, Larentiinae).



**artificata Herrich-Schäffer**

*Larentia artificata* Herrich-Schäffer, 1870: 190.

Material examined. Two males syntypes, “(745)”.

Remarks. In terrible condition; unrecognizable. According to GUNDALCH'S (1881: 408) description there is no doubt that this is only another form of *Pterocypha defensata* Walker, an extremely variable species, as correctly synonymized by SCHAUS (1940: 326).

Identity. *Pterocypha artificata* (Herrich-Schäffer, 1870), **syn. rev.**, a junior subjective synonym of *P. defensata* Walker, 1862 (Geometridae, Larentiinae).

**baliata Herrich-Schäffer**

*Larentia baliata* Herrich-Schäffer, 1870: 190.

Material examined. One female type, “(675)”.

Remarks. In very bad condition; almost totally destroyed by museum pests, however, what is preserved allows its identification. A series from Cuba (VOB 70494, 71292, 71752, 72168, 73765) was compared with, and match, Gundlach's specimen. One specimen from Brazil (VOB 58713) was compared with, and matches, the type of *Dysclisioprocta stellata* (Guenée) in BMNH. Incorrectly synonymized with *P. defensata* Walker, 1862, by SCHAUS (1940: 326).

Identity. *Disclisioprocta baliata* (Herrich-Schäffer, 1870), **comb. n., syn. n.**, a junior subjective synonym of *D. stellata* (Guenée, 1857) (Geometridae, Larentiinae).

**balteolata Herrich-Schäffer**

*Larentia balteolata* Herrich-Schäffer, 1870: 190.

Material examined. One male, 1 female, syntypes, “(636)”.

Remarks. Faded, partially destroyed by museum pests; recognizable. A series from Cuba [see *baliata*] was compared with, and matches, Gundlach's specimen. Correctly synonymized with *D. stellata* Guenée by SCHAUS (1940: 327).

Identity. *Disclisioprocta balteolata* (Herrich-Schäffer, 1870), a junior subjective synonym of *D. stellata* (Guenée, 1857) (Geometridae, Larentiinae).

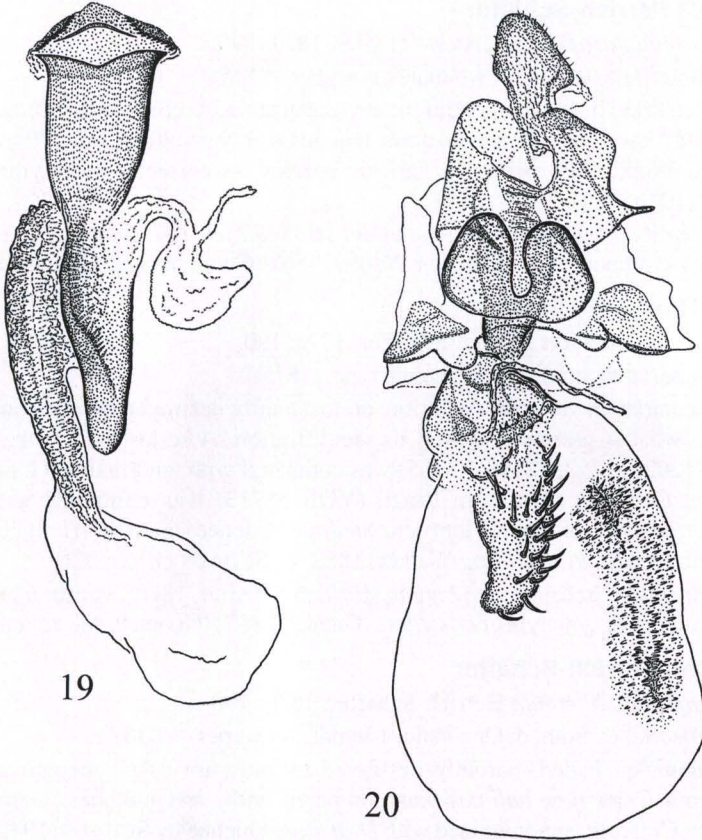
**canularia Herrich-Schäffer (Fig. 19)**

*Acidalia canularia* Herrich-Schäffer, 1870: 181.

Material examined. One female type, “(1030)”.

Remarks. In bad condition; partially destroyed by museum pests; externally unrecognizable. Abdomen partially eaten by museum pests but part of the genitalia (Fig. 19) still preserved. A long series of specimens in VOB that matches Gundlach's description were dissected but none of their genitalia match those of Gundlach's specimen. According to GUNDLACH (1881: 382) “Ella es apenas mayor que la precedente [*chioneata*], parduzco-blanca, con las mismas líneas como la *chioneata*, de la cual acaso no difiere, solamente que está más marcada. Tiene también los puntos negros centrales. Entre las alas 18 mil.”. PROUT (1934: 242) transferred it to *Scopula* Schrank, 1802.

Identity. *Scopula canularia* (Herrich-Schäffer, 1870) (Geometridae, Sterrhinae).



Figs 19-20. Geometridae from Cuba, female genitalia, ventral view. (19) *Scopula canularia*, "Type"; (20) *Semaepopus caecarius*, ["Type" of *S. occipitarius*].

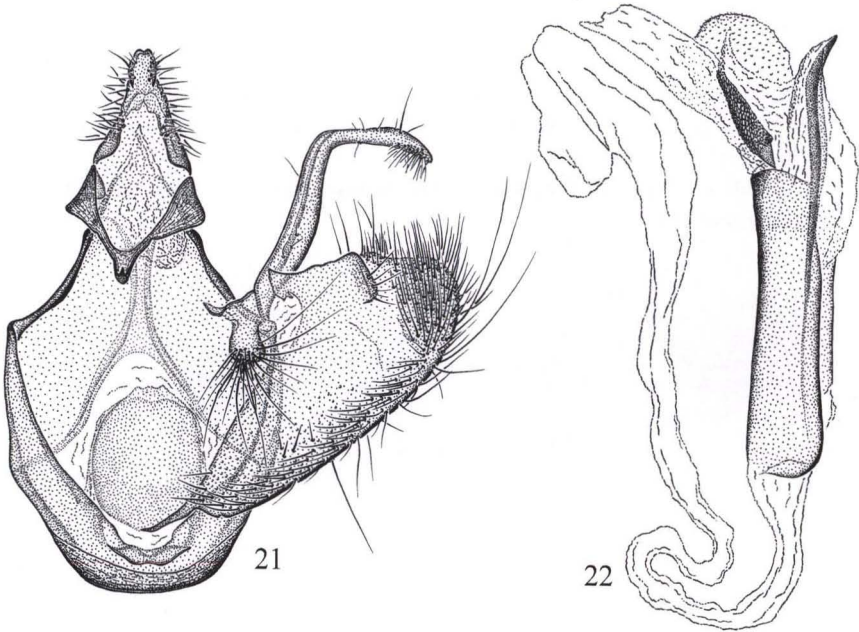
**cellulata Herrich-Schäffer** (Figs 3, 21, 22)

*Macaria cellulata* Herrich-Schäffer, 1870: 184.

Material examined. One female type "(492)".

Remarks. In very bad condition: faded, wings partially destroyed by museum pests, abdomen missing; unrecognizable. A series from Cuba in VOB matches Gundalch's description, and one of the males (Fig. 3), and the genitalia (Figs 21, 22) are illustrated. In USNM there is a specimen from Cuba, belonging to this species, labeled "*cubanaria* Schaus" "Type". No reference to this name has been found in the literature. Dr. D. Ferguson (per. comm.) (USNM) informed that this name was never published.

Identity. *Semiothisa cellulata* (Herrich-Schäffer, 1870) (Geometridae, Ennominae).



Figs 21-22. *Semiothisa cellulata*, male genitalia. (21) ventral view, left valva and aedeagus removed; (22) aedeagus, lateral view.

### ***centrifugaria* Herrich-Schäffer**

*Geometra centrifugaria* Herrich-Schäffer, 1870: 182.

Material examined. Three females syntypes, "(453)".

Remarks. In very bad condition, faded and partially destroyed by museum pests; one with abdomen missing; externally unrecognizable. The two females with abdomen were dissected and the genitalia match those illustrated in FERGUSON (1985: 49, fig. 18d). This is a highly variable species, the reason why it has been described several times, twice by Herrich-Schäffer (FERGUSON 1985: 70) [see *protractaria*].

Identity. *Phrudocentra centrifugaria* (Herrich-Schäffer, 1870) (Geometridae, Geometrinae).

### ***centrosignata* Herrich-Schäffer** (Figs 5, 6, 23, 24)

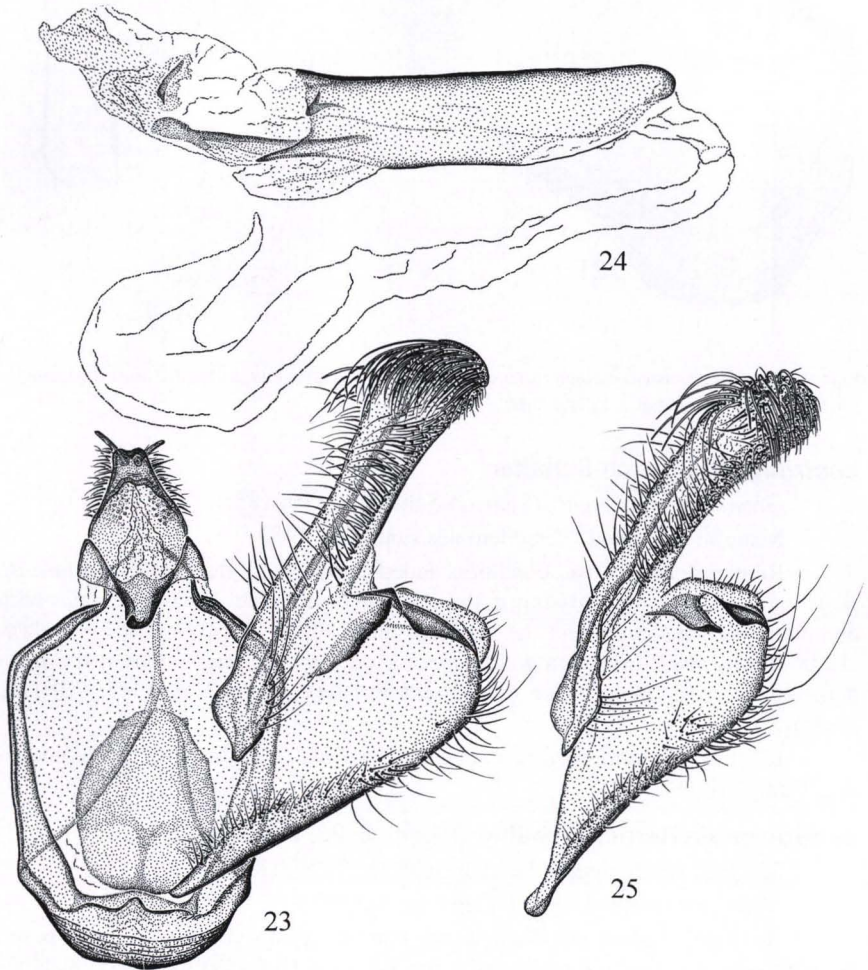
*Macaria centrosignata* Herrich-Schäffer, 1870: 184.

Material examined. One female type, "(290)".

Remarks. Faded; left hand wings partially destroyed by museum pests; recognizable. A series of 6 males and 8 females from Cuba (VOB 73453) matches Gundlach's specimen. A pair (Figs 5, 6) and their genitalia (Figs 23, 24) are illustrated here. SCHAUS (1940: 310) synonymized this species with *M. regulata* (Fabricius, 1775). In reality both species are very similar but *M. centrosignata* is larger, as stated by Herrich-Schäffer: "grosser als *notata* [= *regulata*]" and by GUNDLACH (1881: 391) "Entre las alas 37 mm" [the largest *M. regulata* specimen

in the series in VOB is roughly 30 mm]. Their genitalia are also similar but different, especially in the shape of ampulla. In *M. centrosignata* it is in the shape of a wide shallow lobe, minutely serrate along the edge (Fig. 23), whereas in *M. regulata* it is formed by a long, narrow, flat process (Fig. 25).

Identity. *Macaria centrosignata* Herrich-Schäffer, 1870, **sp. rev.** (Geometridae, Ennominae).



Figs 23-25. *Macaria* spp., male genitalia. (23-24) *M. centrosignata*: (23) ventral view, left valva and aedeagus removed; (24) aedeagus, lateral view; (25) *M. regulata*, right valva, ventral view.

***chionaeata* Herrich-Schäffer**

*Acidalia chionaeata* Herrich-Schäffer, 1870: 181.

Material examined. One male type “(1007)”.

Remarks. In bad condition, faded, partially destroyed by museum pests; unrecognizable. According to the description given by GUNDLACH (1881: 382) “El colorido es muy blanco, con algunos átomos pardos, que se reunen formando 3 líneas transversales poco visibles; el mismo borde tiene líneas oscuras y el centro de las 4 alas [con] puntico negro”, this species belongs to the *eburneata* complex of the genus *Scopula* Schrank. Synonymized with *S. eburneata* (Guenée, [1858]) by PROUT (1934: 218), reinstated as a valid species by SCHAUS (1940: 299), and listed again as a synonym of *S. eburneata* by SCOBLE (1999: 847). In USNM there are series, identified by Schaus, as *S. eburneata* and as *chionaeata*. A pair from both series, from French Guiana and from Cuba respectively, was dissected and shown to belong to two different but closely related species. Long series from different localities in Cuba should be studied to verify the presence of one or more species on the island. In case that there is only one, the name *chionaeata* could be safely applied, if not, an arbitrary decision has to be made.

Identity. *Scopula chionaeata* (Herrich-Schäffer, 1870), **sp. rev.** (Geometridae, Sterrhinae).

***croceofimbriata* Herrich-Schäffer**

*Geometra croceofimbriata* Herrich-Schäffer, 1870.

Material examined. One female type “(662)”.

Remarks. In very bad condition, faded; externally unrecognizable. Abdomen preserved and genitalia match those of a specimen from Cuba (VOB 73833) identified as *Synchlora herbaria* (Fabricius) by comparison with material in USNM, as well as the illustration in FERGUSON (1985: 93, fig. 23h). Correctly synonymized by PROUT (1932: 40).

Identity. *Synchlora croceofimbriata* (Herrich-Schäffer, 1870), a junior subjective synonym of *S. herbaria* (Fabricius, 1794) (Geometridae, Geometrinae).

***curvistrigaria* Herrich-Schäffer (Fig. 35)**

*Pero curvistrigaria* Herrich-Schäffer, 1870: 184.

Material examined. One female type “(998)”.

Remarks. Faded; hind wings partially destroyed by museum pests; recognizable. POOLE (1987: 44) synonymized this species with *P. nerisaria* (Walker, 1860). However, Gundlach's specimen does not match the females of *P. nerisaria* collected in Cuba in VOB, but matches a specimen of *P. zalissaria* (Walker) from Florida kindly presented by D. Ferguson (USNM). Its genitalia (Fig. 35) are also distinct from those of *P. nerisaria* but are identical to those of the specimen of *P. zalissaria* referred to above. *P. zalissaria* is illustrated in POOLE (1987: fig. 20).

Identity. *Pero curvistrigaria* (Herrich-Schäffer, 1870), **syn. n.**, a junior subjective synonym of *P. zalissaria* (Walker, 1860) (Geometridae, Ennominae).

**decertaria** Herrich-Schäffer (Fig. 9)

*Larentia decertaria* Herrich-Schäffer, 1870: 189.

Material examined. One female type, "(390)".

Remarks. Faded; hind wings partially destroyed by museum pests; recognizable. Two females from Cuba (VOB 71287) (Fig. 9) were compared with and match, Gundlach's specimen. A series from Mexico was compared with and match the series in USNM identified as *Obila pannosata* (Guenée). A third female (VOB 72892) has the fuscous of median fascia replaced by white. It has been wrongly synonymized with *P. floridata* (Walker, [1863]) (FERGUSON 1983: 103; SCOBLE 1999: 807), a junior subjective synonym of *P. defensata* Walker, 1862 [see *anguinata* Herrich-Schäffer].

Identity. *Obila decertaria* (Herrich-Schäffer, 1870), **comb. n., syn. n.**, a junior subjective synonym of *Obila pannosata* (Guenée, [1858]) (Geometridae, Larentiinae).

**decisaria** Herrich-Schäffer (Fig. 11)

*Azelina decisaria* Herrich-Schäffer, 1870.

Material examined. One female type "(392)".

Remarks. In bad condition, faded; abdomen destroyed by museum pests, however, the shape of wing margins leave no doubt about its identity. One specimen from Cuba (VOB 70169) (Fig. 11) matches Gundlach's specimen.

Identity. *Phyllodonta decisaria* (Herrich-Schäffer, 1870) (Geometridae, Ennominae).

*desolataria* Herrich-Schäffer

*Geometra desolataria* Herrich-Schäffer, 1870: 182.

Material examined. One female "(394)".

Remarks. In bad condition, faded and partially destroyed by museum pests; externally unrecognizable. Abdomen partially destroyed by pests, but the genitalia, now dissected, are preserved and match the illustration in FERGUSON (1985: 114, fig. 29a), who correctly synonymized it with *Chloroclamys chloroleucaria* (Guenée).

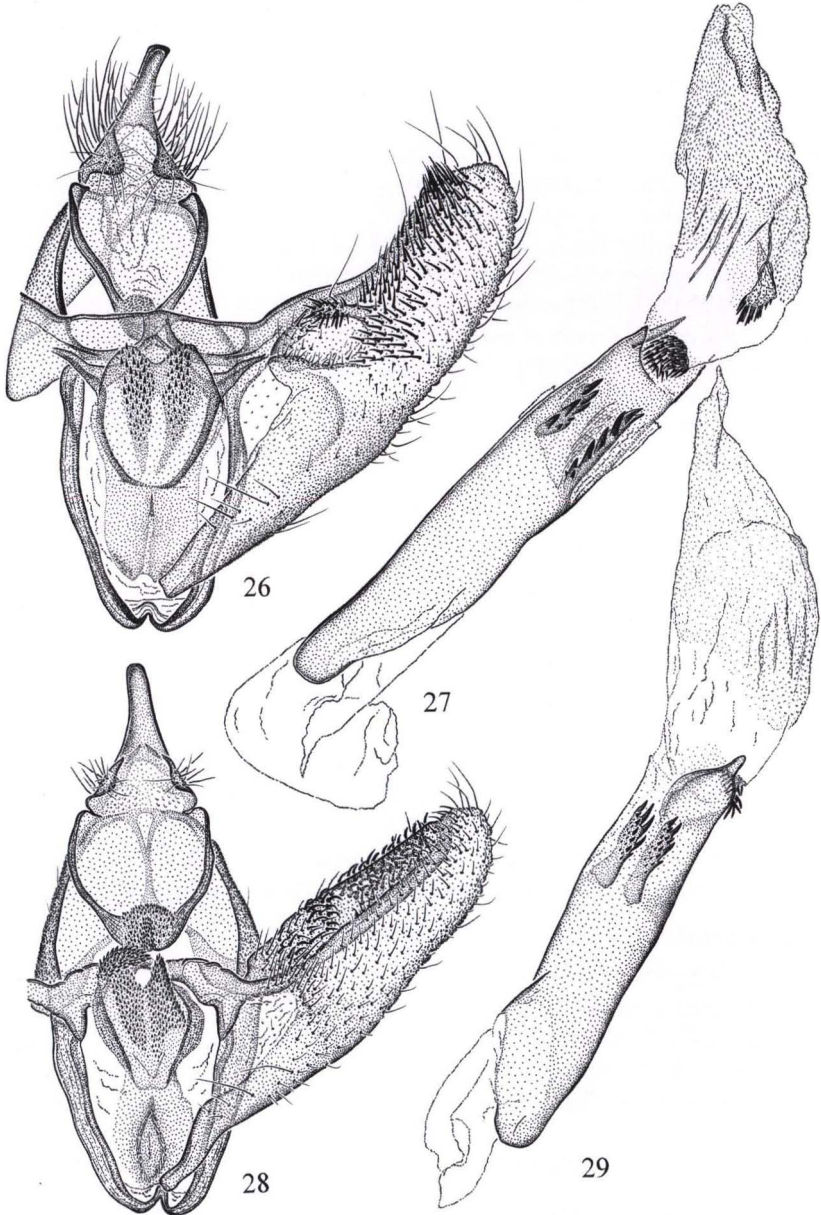
Identity. *Chloroclamys desolataria* (Herrich-Schäffer, 1870), a junior subjective synonym of *C. chloroleucaria* (Guenée, 1857) (Geometridae, Geometrinae).

**exiliata** Herrich-Schäffer (Figs 13, 26, 27)

*Choerodes exiliata* Herrich-Schäffer, 1870.

Material examined. One female type "(586)".

Remarks. In very bad condition; faded, left forewing missing, the others and abdomen eaten by museum pests; unrecognizable. The description in GUNDLACH (1881: 395): "Las alas posteriores tienen una colita en el medio del borde exterior. El colorido es parduzco; en las alas anteriores se extiende, del borde anterior cerca del ápice, una línea parduzca hasta el medio del borde interior de las alas posteriores. La parte entre esta línea y el borde es algo más oscura. Entre las alas 37 mil." leave no doubt that this is the species identified in IES as *Prochoerodes transversata*



Figs 26-29. *Prochoerodes* spp., male genitalia. (26-27) *P. exiliata*: (26) ventral view, left valva and aedeagus removed; (27) aedeagus, lateral view; (28-29) *P. gundlachi*: (28) ventral view, left valva and aedeagus removed; (29) aedeagus, lateral view.

(Drury, 1773, hom.) [= *lineola* (Goeze, 1781)]. There is a series of five specimens from Cuba (VOB 71238, 71722, 73239) (Fig. 13) in VOB. This series was compared with the large series of *P. lineola* in USNM. They are not conspecific, also no specimen of *P. lineola* was collected by the author in Cuba and none was found in the USNM from any of the Antillean islands. There is another similar species of the genus in Cuba, smaller (30-32 mm wingspan), with pattern less contrasting and brown ground color, identified as *P. exiliata* in IES (Fig. 14) [in *P. exiliata* the ground color is more olivaceous, the area distad of postmedian fascia darker than the area basad to this fascia, and has rows of white dots following fasciae on fore wings]. This species was also collected by the author in Cuba. One of them was compared with the USNM collection and did not match any of the described species, and is hereby named *Prochoerodes gundlachi* sp. n., in honor of J. Gundlach. Their genitalia are also distinct (Fig. 28, 29) from those of *P. exiliata* (Figs 26, 27). [Holotype male, CUBA: Pinar del Rio, Sierra de Rosário, 400 m, 5-15.VI.1990 (Becker, 71239) (IES). Paratypes: 2 males, 1 female, same data as holotype (VOB, USNM); 1 male, same locality as holotype, 4-6.X.1989 (VOB, 70472); 1 male, Holguín, Pin.[ares de] Mayarí, 640m, VII.1990 (Becker, 71723) (VOB)].

Identity. *Prochoerodes exiliata* (Herrich-Schäffer, 1870), (Geometridae, Ennominae).

### ***extranearia* Herrich-Schäffer**

*Zonosoma extranearia* Herrich-Schäffer, 1870: 181.

Material examined. One male type, "(374)".

Remarks. In very bad condition, faded, thorax molded, abdomen missing; unrecognizable. According to the description presented by GUNDLACH (1881: 382) "Especie muy chica, rojizo-ochracea, con átomos oscuros... Entre las alas 21 mil." it seems that PROUT (1934: 442) was correct synonymizing it with *Pleuoprucha rudimentaria* (Guenée). This name is not listed in SCOBLE (1999).

Identity. *Pleuoprucha extranearia* (Herrich-Schäffer, 1870), a junior subjective synonym of *P. rudimentaria* (Guenée, 1857) (Geometridae, Sterrhinae).

### ***fimbriata* Herrich-Schäffer** (Fig. 12)

*Nedusia fimbriata* Herrich-Schäffer, 1870.

Material examined. One male type, "(361)".

Remarks. Faded, right hind wing partially destroyed by museum pests; recognizable. A series from Cuba (VOB 70508, 71294, 71776, 73237) matches Gundlach's specimen. The species, not included in GAEDE (1936), is illustrated here (Fig. 12).

Identity. *Nedusia fimbriata* Herrich-Schäffer, 1870 (Epiplemidae).

### ***floccularia* Herrich-Schäffer**

*Acidalia floccularia* Herrich-Schäffer, 1870: 181.

Material examined. Two females syntypes "(589)".

Remarks. In bad condition, faded and destroyed by museum pests; externally unrecognizable. Abdomen, now dissected, partially destroyed by museum



pests; ostium, corpus bursae and bursa copulatrix preserved and match the figure of *Scopula apparitaria* (Walker) in COVELL (1970: 210). One male (VOB 71268) that matches the description in GUNDLACH (1881: 383) has genitalia that also match the figure of *S. apparitaria* in COVELL (1970: 202). Incorrectly synonymized with *S. subquadrata* (Guenée, [1858]) by PROUT (1934: 63). Not listed in SCOBLE (1999).

Identity. *Scopula floccularia* (Herrich-Schäffer, 1870), **syn. n.**, a junior subjective synonym of *S. apparitaria* (Walker, 1861) (Geometridae, Sterrhinae).

### ***griseocostaria* Herrich-Schäffer (Fig. 16)**

*Drepanodes griseocostaria* Herrich-Schäffer, 1870: 186.

Material examined. None traced.

Remarks. The description in GUNDLACH (1881: 397): “En las alas anteriores es el borde anterior blancuzco, empezando fino, y en las tres cuartas partes del borde es más ancho, y cortado oblicuamente” and size “36 mil.” can be applied only to the males of the species previously described as *Brotis fusilineata* Walker. In VOB there is a large series of specimens from the British Virgin Islands and Cuba (Fig. 16). One of the males from the BVI (VOB 66874) was compared with, and matches, the type of both *B. fusilineata* and *Sphacelodes brunneata* Warren, 1907, **syn. n.** in BMNH. Both *B. fusilineata* and *S. brunneata* have been wrongly synonymized with *S. vulneraria* (Hübner, 1823) by PROUT (1910: 301) and by FERGUSON (1983: 95). Both represent different species easily recognized, among other features, by the colour of the antennae and the costal margins of forewings in males. In *S. vulneraria* they are reddish brown, as figured in HOLLAND (1968: pl. XLII, fig. 20) whilst in *S. fusilineata* (Fig. 16) they are whitish gray. Ms. L. Pitkin (BMNH) (pers. comm.) compared a couple of specimens from VOB with the types of *S. fusilineata* and *S. brunneata* and confirmed the identification. It is very likely that the form “5221, 1 S. Sp.” in KIMBALL (1965: 192) also belongs to *S. fusilineata*.

Identity. *Sphacelodes griseocostaria* (Herrich-Schäffer, 1870), **syn. n.**, a junior subjective synonym of *S. fusilineata* (Walker, 1860), **sp. rev.** (Geometridae, Ennominae).

### ***heterochloriaria* Herrich-Schäffer**

*Apicia heterochloriaria* Herrich-Schäffer, 1870: 187.

Material examined. One male, 1 female, syntypes, “(657)”.

Remarks. In very bad condition; partially destroyed by museum pests; male with abdomen missing; externally unrecognizable. The female abdomen, now dissected, was preserved and the genitalia, slightly damaged, match those of a female from Puerto Rico (VOB 67772) compared with, and matches, the type of *Numia terebintharia* Guenée in BMNH. This is a variable species, the reason why it was described several times (FERGUSON 1983: 93). Correctly synonymized by SCHAUS (1940: 313).

Identity. *Numia heterochloriaria* (Herrich-Schäffer, 1870), a junior subjective synonym of *N. terebintharia* Guenée, 1857 (Geometridae, Ennominae).

***nanularia* Herrich-Schäffer**

*Zanosoma nanularia* Herrich-Schäffer, 1870.

Material examined. One male without label, 1 female type, "(1042)".

Remarks. In very bad condition, nearly totally destroyed by museum pests; male with abdomen missing; externally unrecognizable. Female abdomen, now dissected, molded and partially destroyed by museum pests; fragments of the genitalia still preserved. One female from Cuba (VOB 72372) that matches the figure of *Cyclophora obscura* (Druce) (1898: 536, pl. 99, fig. 6) [= *C. nanaria* (Walker)] has genitalia identical to those of Gundlach's specimen. Correctly synonymized by PROUT (1934: 98).

Identity. *Cyclophora nanularia* (Herrich-Schäffer, 1870), a junior subjective synonym of *C. nanaria* (Walker, 1861) (Geometridae, Sterrhinae).

***nigrofasciaria* Herrich-Schäffer** (Figs 2, 30-32)

*Asellodes nigrofasciaria* Herrich-Schäffer, 1870: 183.

Material examined. One female type "(670)".

Remarks. In bad condition, wings almost totally destroyed by museum pests; right forewing loose, on the bottom of the unit tray; left hind wing missing; externally unrecognizable. The abdomen is damaged but the genitalia (Fig. 32), still preserved, match those of a female specimen of *Leptostales angulata* (Schaus, 1912), **comb. n.**, **syn. n.** from Guatemala in USNM. The genitalia of males from Cuba, in VOB (71262), and Panama (Figs 30, 31), in USNM are also identical. One male from Cuba is illustrated here (Fig. 2).

Identity. *Leptostales nigrofasciaria* (Herrich-Schäffer, 1870), **comb. n.** (Geometridae, Sterrhinae).

***niveociliaria* Herrich-Schäffer**

*Eucrostis niveociliaria* Herrich-Schäffer, 1870: 182.

Material examined. One male type "(808)".

Remarks. Almost totally destroyed by museum pests; externally unrecognizable. Abdomen preserved and genitalia match the illustration in FERGUSON (1985: 99, fig. 25b).

Identity. *Eueana niveociliaria* (Herrich-Schäffer, 1870) (Geometridae, Geometrinae).

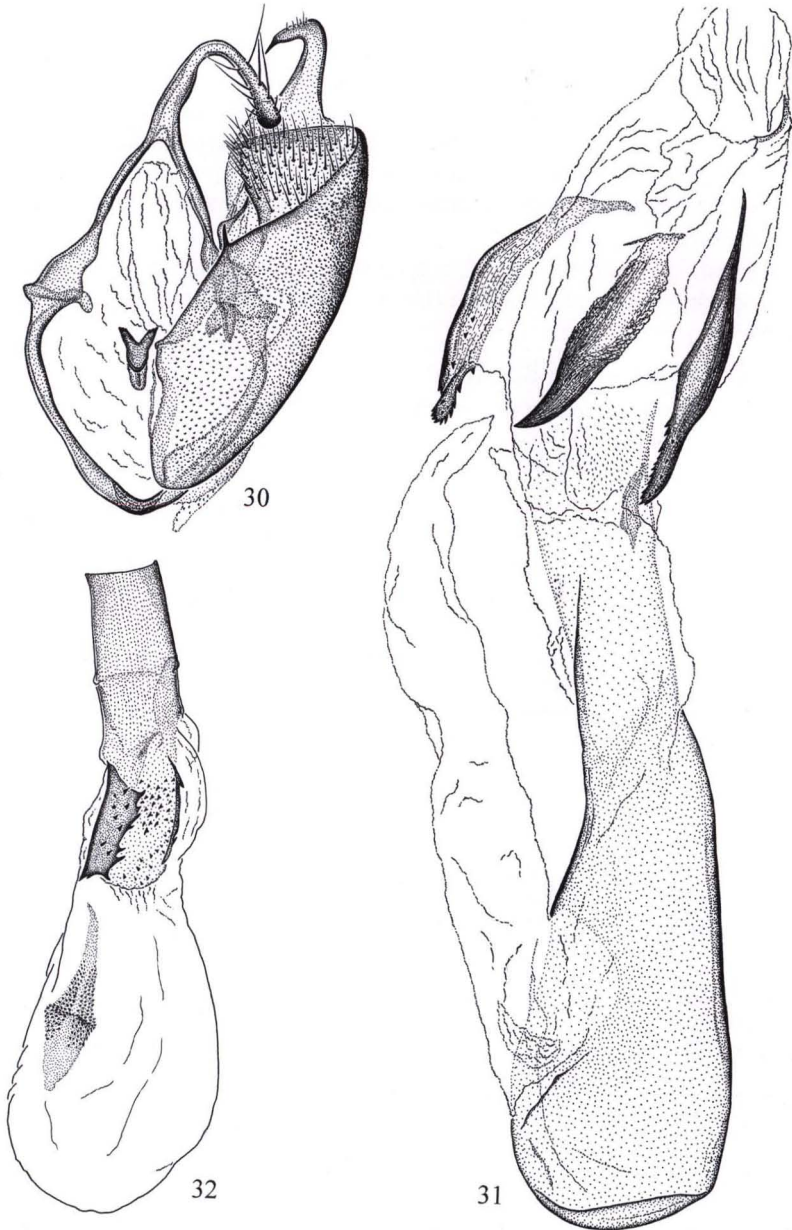
***occipitaria* Herrich-Schäffer** (Fig. 20)

*Zanosoma occipitaria* Herrich-Schäffer, 1870: 180.

Material examined. One female type, "(997)".

Remarks. Faded, partially destroyed by museum pests, thorax molded; externally unrecognizable. The abdomen, now dissected, was preserved and the genitalia (Fig. 20) match those of a female from Brazil (VOB 77111) belonging to a series identified as *Semaepus secarius* (Hübner) by comparison with material in BMNH. PROUT (1934: 36) correctly synonymized *S. occipitarius* with *S. caecarius* and illustrated it in colour (1935: 80, pl. 10c).

Identity. *Semaepus occipitarius* (Herrich-Schäffer, 1870), a junior subjective synonym of *S. caecarius* (Hübner, 1823) (Geometridae, Sterrhinae).



Figs 30-32. *Leptostales nigrofasciaria*, genitalia. (30-31) male: (30) ventral view, left valva and aedeagus removed; (31) aedeagus, lateral view [both same scale!]; (32) female, "Type", ventral view, papillae anales destroyed.

***protractaria* Herrich-Schäffer**

*Geometra protractaria* Herrich-Schäffer, 1870: 182.

Material examined. One male type, "(1081)".

Remarks. In bad condition, faded and partially destroyed by museum pests; externally unrecognizable. Gundlach's description leaves no doubt that this is a form of *Phrudocentra centrifugaria* (Herrich-Schäffer), a highly variable species, as it has been considered by several authors, including FERGUSON (1985: 70) [see *centrifugaria*].

Identity. *Phrudocentra protractaria* (Herrich-Schäffer, 1870), a junior subjective synonym of *P. centrifugaria* (Herrich-Schäffer, 1870) (Geometridae, Geometrinae).

***quadricostaria* Herrich-Schäffer**

*Boarmia quadricostaria* Herrich-Schäffer, 1870: 188.

Material examined. One male, 2 females, syntypes "(671)".

Remarks. In terrible condition; faded and almost totally destroyed by museum pests; male with abdomen missing; one female still recognizable. Correctly synonymized with *Thyrintheina arnobia* (Stoll) by PROUT (1910: 343) and redescribed and illustrated by RINDGE (1961: 133-137, figs 25, 41; pl. 20, fig. 6; pl. 22, figs 1-5).

Identity. *Thyrintheina quadricostaria* (Herrich-Schäffer, 1870), a junior subjective synonym of *T. arnobia* (Stoll, 1782) (Geometridae, Ennominae).

***rectisignaria* Herrich-Schäffer (Figs 15, 33, 34)**

*Apicia rectisignaria* Herrich-Schäffer, 1870: 186.

Material examined. One male type "(454)".

Remarks. In bad condition, faded, wings partially destroyed by museum pests; recognizable. One male from Cuba (VOB 71253) (Fig. 15) was compared with, and matches, Gundlach's specimen and the type of *Bagodares trilva* (Schaus, 1901), **comb. n.**, **syn. n.** The genitalia of this Cuban specimen (Figs 33, 34) match those of a male of *B. trilva* from Guatemala. The series of specimens in USNM range from Mexico to Venezuela, including Cuba, and in VOB there is a series from Brazil. Not listed in SCOBLE (1999).

Identity. *Bagodares rectisignaria* (Herrich-Schäffer, 1870), **comb. n.** (Geometridae, Ennominae).

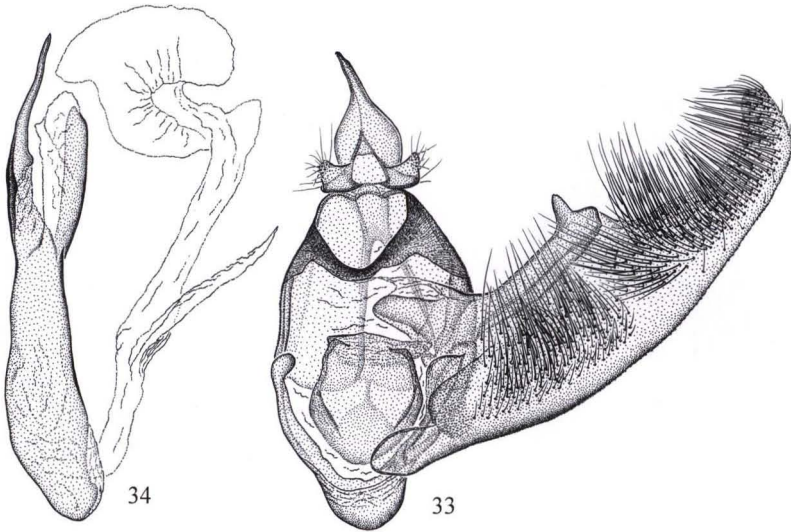
***subcertaria* Herrich-Schäffer (Fig. 10)**

*Larentia subcertaria* Herrich-Schäffer, 1870: 189.

Material examined. One female type, "(769)".

Remarks. Faded, base of wings partially destroyed by museum pests; recognizable. One female from Cuba (VOB 73470) (Fig. 10) was compared with, and matches, Gundlach's specimens, and the series of *Triphosa affirmata* (Guenée) in USNM. Correctly synonymized by PROUT (1910: 265).

Identity. *Triphosa subcertaria* (Herrich-Schäffer, 1870), a junior subjective synonym of *T. affirmata* (Guenée, [1858]) (Geometridae, Larentiinae).



Figs 33-34. *Bagodares rectisignaria*, male genitalia. (33) ventral view, left valva and aedeagus removed; (34) aedeagus, lateral view.

### ***subgaliata* Herrich-Schäffer**

*Larentia subgaliata* Herrich-Schäffer, 1870: 189.

Material examined. One female type, "(296)".

Remarks. In bad condition; faded, partially destroyed by museum pests; recognizable. One female from Cuba (VOB 71289) was compared with, and matches, Gundlach's specimen. This is another form of a highly variable species. Correctly synonymized by SCHAUS (1940): 326), but listed as a valid species of *Larentia* Treitschke, 1825 in SCOBLE (1999: 534) [see *anguinata*].

Identity. *Pterocypha subgaliata* (Herrich-Schäffer, 1870), **syn. rev.**, a junior subjective synonym of *P. defensata* Walker, 1862 (Geometridae, Larentiinae).

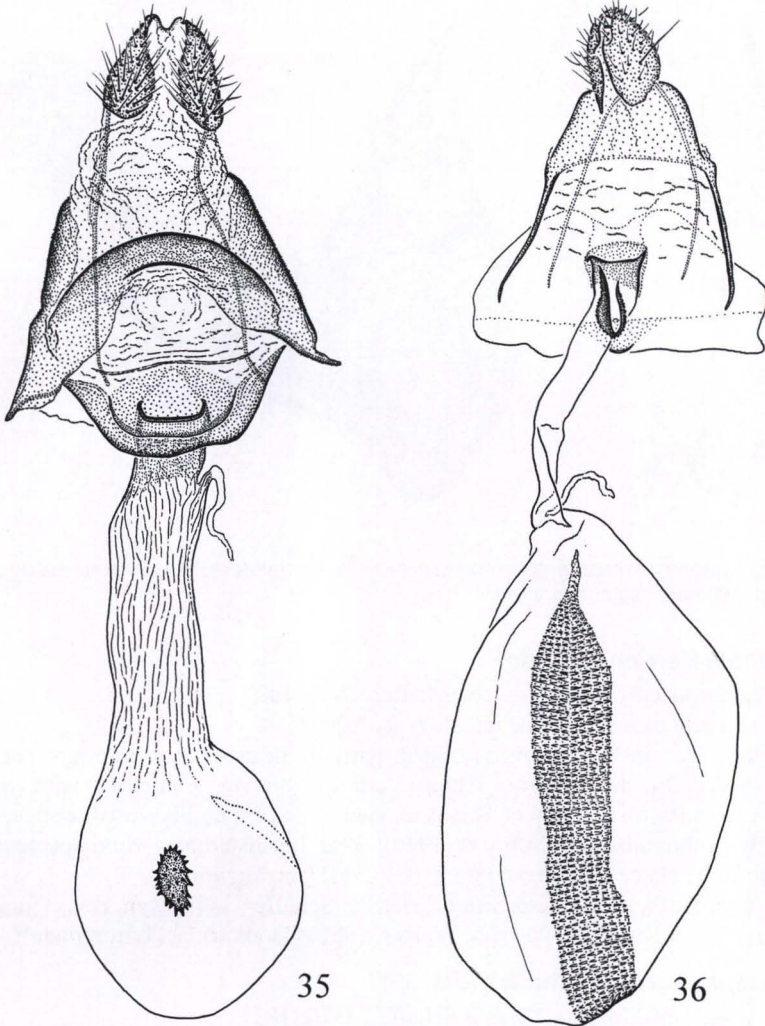
### ***subroseata* Herrich-Schäffer** (Fig. 35)

*Acidalia subroseata* Herrich-Schäffer, 1870: 181.

Material examined. One female type "(832)".

Remarks. In bad condition, faded; externally unrecognizable. The Abdomen, now dissected, was preserved and the genitalia (Fig. 35) match those of a female from Cuba (VOB 71760), compared with, and matches, the types of *L. phorcaria* (Guenée), and of its synonym *L. concessata* (Walker). *A. subroseata* Herrich-Schäffer is a homonym of *A. subroseata* Guenée, 1857. PROUT (1934: 146) correctly synonymized *L. pappasaria* (Dyar, 1913) with *L. subroseata* Herrich-Schäffer and used the latter as a replacement name [therefore *L. pappasaria* (Dyar), **syn. n.**, is another junior subjective synonym of *L. phorcaria* (Guenée)].

Identity. *Leptostales subroseata* (Herrich-Schäffer, 1870), **syn. n.**, a junior subjective synonym of *L. phorcaria* (Guenée, 1857) (Geometridae, Sterrhinae).



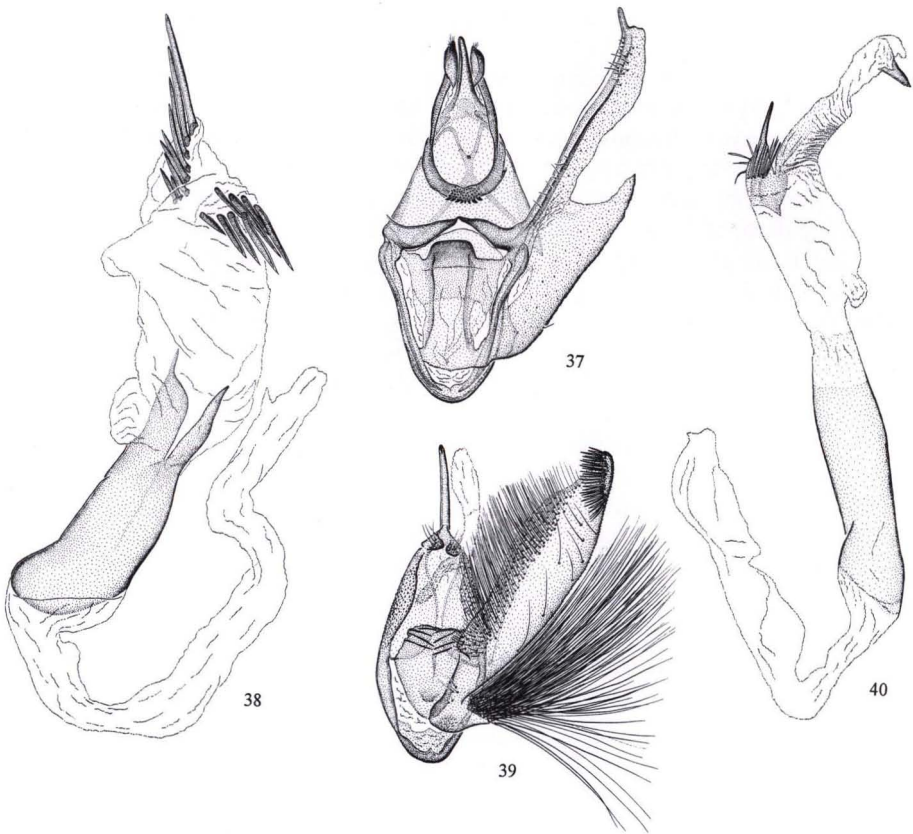
Figs 35-36. Geometridae from Cuba, female genitalia, ventral view. (35) *Pero zalissaria* ["Type" of *P. curvistrigaria*]; (35) *Leptostales phorcaria* ["Type" of *L. subroseata*].

***subpusaria* Herrich-Schäffer** (Figs 37-40)

*Terpnomicta subpusaria* Herrich-Schäffer, 1870: 187.

Material examined. One male, 3 females, syntypes "(669)", 1 male syntype, "(69)" [sic!]

Remarks. The label "(69)" is certainly a mistake caused by the missing of one "6" as the other specimens numbered "69" are the syntypes of *Echeta albipennis*



Figs 37-40. "*Thysanopyga*" *subpusaria*, male genitalia. (37-38) "Syntype 669": (37) ventral view, left valva and aedeagus removed [tip of valvae destroyed]; (38) aedeagus, lateral view; (39-40) "Syntype 69": (39) ventral view, left valva and aedeagus removed; (40) aedeagus, lateral view.

Herrich-Schäffer, 1866, a whitish Ctenuchinae (Arctiidae) that cannot be confused with any geometrid species. Therefore it is very likely that this specimen also belongs to the type series, as GUNDLACH (1881: 401) probably had a large series "La he cogido en toda la isla". All specimens are in very bad condition, partially destroyed by museum pests; females with abdomen missing; externally unrecognizable. According to the description in GUNDLACH (401) "Es una especie fea, pajiza, con átomos finísimos parduercos y 3 líneas transversales, de las cuales las 2 primeras

son rectas, y la tercera ondulada. Entre las rectas hay un grueso punto central negro. Antenas pectinadas en el macho. Entre las alas 22-26 mil." this species belongs to the "*Thysanopyga*" *nicetaria* (Guenée, [1858]) complex. SCHAUS (1940: 320) reached the same conclusion and synonymized *T. subpusaria*, and several others, with *T. nicetaria*, a decision that was reverted by KRÜGER & SCOBLE (1992: 79) who removed them from this synonymy. The species belonging to this complex are very similar externally, and some, like *T. nicetaria* and *T. proditata* (Walker, 1861), can only be distinguished by the characters of their genitalia. Unfortunately the genitalia of both male specimens represent two different species, none of them matching those of *T. nicetaria* and *T. proditata*. Those of the male "69" (Figs 39, 40) match the genitalia of a specimen from Mexico in VOB (69524), that was compared, and matches, the type of *T. fractimacula* Warren, 1908, in USNM. Those of the male "(669)" (Figs 37, 38) do not match any of those of several Cuban species dissected. As it is very likely that more material belonging to the type series is deposited in MNHU, a decision about the identity of *T. subpusaria* should wait until such material is studied.

The species belonging to the *T. nicetaria* complex are not congeneric with the species currently included in *Thysanopyga* Herrich-Schäffer, 1855 (KRÜGER & SCOBLE 1992) and is being revised by FERGUSON (in prep.).

Identity. "*Thysanopyga*" *subpusaria* (Herrich-Schäffer, 1870) (Geometridae, Ennominae).

#### ***trientata* Herrich-Schäffer (Fig. 4)**

*Macaria trientata* Herrich-Schäffer, 1870: 184.

Material examined. One male type, "(479)".

Remarks. In bad condition; faded and wings partially destroyed by museum pests; recognizable. One male from Cuba (VOB 71254) (Fig. 4) was compared with, and matches, Gundalch's specimen.

Identity. *Semiothisa trientata* (Herrich-Schäffer, 1870) (Geometridae, Ennominae).

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## REFERENCES

- BECKER, V.O. 2002. The Noctuoidea (Lepidoptera) from Cuba described by Herrich-Schäffer and Gundlach in the Gundlach Collection, Havana. **Revta bras. Zool.** **19** (2): 349-391.
- COVELL, C.V. 1970. A revision of the North American species of the genus *Scopula* (Lepidoptera, Geometridae). **Trans. Amer. ent. Soc.** **96**: 101-221.
- . 1983. Sterrhinae, p. 99-101. *In*: R.W. HODGES; T. DOMINICK; D.R. DAVIS; D.C. FERGUSON; J.G. FRANCLEMONT; E.G. MUNROE & J.A. POWELL (Eds). **Check list of the Lepidoptera of America North of Mexico**. London, Classey & Wedge Entomological Research Foundation, 284p.
- DRUCE, H. 1891-1900. Insecta. Lepidoptera-Heterocera. *In*: F.D. GODMAN & O. SALVIN (Eds). **Biol. Centr.-Amer.** **2**, p. 1-622.
- FERGUSON, D.C. 1969. A revision of the moths of the subfamily Geometrinae of America North of Mexico. **Bull. Peabody Mus. nat. Hist.** **29**: 1-251.
- . 1983. Geometridae, p. 88-106. *In*: R.W. HODGES; T. DOMINICK; D.R. DAVIS; D.C. FERGUSON; J.G. FRANCLEMONT; E.G. MUNROE & J.A. POWELL (Eds). **Check list of the Lepidoptera of America North of Mexico**. London, Classey & Wedge Entomological Research Foundation, 284p.
- . 1985. Geometroidea, Geometridae (Part), p. 1-131. *In*: R.B. DOMINICK; T. DOMINICK, T.; D.R. DAVIS; D.C. FERGUSON; J.G. FRANCLEMONT; R.W. HODGES; E.G. MUNROE & J.A. POWELL (Eds). **The moths of America North of Mexico. 18.1**. Washington, DC, Wedge Entomological Research Foundation, 131p.
- GAEDE, M., 1936. Epiplemidae, p. 1141-1170. *In*: A. SEITZ (Ed.). **Die Gross-Schmetterlinger der Erde.** **6**. Stuttgart, Alfred Kernen, 1452p.
- GUNDLACH, J.C. 1881. **Contribución a la Entomología Cubana**. Habana, G. Montiel, 445p.
- HERRICH-SCHÄFFER, G.A.W. 1870. Die Schmetterlinge der Insel Cuba. **CorrespBl. zool.-min. Ver. Regensburg** **24**: 180-190.
- HOLLAND, W.J. 1968. **The moths book**. New York, Dover, 479p.
- KIMBALL, C.P. 1965. **Arthropods of Florida I. Lepidoptera**. Gainesville, Florida Department of Agriculture, 363p.
- KRÜGER, M. & M.J. SCOBLE. 1992. Neotropical red-brown Ennominae in the genera *Thysanopyga* Herrich-Schäffer and *Perissopteryx* Warren (Lepidoptera: Geometridae). **Bull. Br. Mus. nat. Hist. Entomology** **61**: 77-148.
- POOLE, R.W. 1987. A taxonomic revision of the New World moth genus *Pero* (Lepidoptera: Geometridae). **Tech. Bull. U.S. Dep. Agric.** **1698**: 1-257.
- PROUT, L.B. 1910. On the Geometridae of the Argentine Republic. **Trans. ent. Soc. Lond.** **1910**: 204-345.
- . 1932-1933. Hemitheinae, p. 20-71. *In*: A. SEITZ (Ed.). **Die Gross-Schmetterlinge der Erde**. Stuttgart, Alfred Kernen.
- . 1933-1935. Sterrhinae. *In*: A. SEITZ (Ed.). **Die Gross-Schmetterlinge der Erde**. Stuttgart, Alfred Kernen, pp. 72-? [never completed].
- RINDGE, F.H. 1961. A revision of the Nacophorini (Lepidoptera, Geometridae). **Bull. Amer. Mus. nat. Hist.** **123**: 91-153.
- SCHAUS, W. 1940. Geometridae and Pyralidae. **Scient. Surv. P. Rico** **12**: 291-417.
- SCOBLE, M.J. 1999. **Geometrid moths of the World**. Collingwood, CSIRO, 1016p.