

A NEW SPECIES OF *CARGOLIA* (GEOMETRIDAE, ENNOMINAE)  
FROM MEXICO, WITH TRANSFERS OF SPECIES

by CHARLES V. COVELL JR.

Virginia Polytechnic Institute, Blacksburg, Va., U.S.A.

## INTRODUCTION

Druce (1898) described *Amphidasis charon* on the basis of a male and a female from Jalapa, Mexico. These he figured in Plate XCVIII, figs. 23 (♀) and 24 (♂). Rindge (1961) placed the male *A. charon* in synonymy of *Phaeoura cladonia* (C. Felder, R. Felder, & Rogenhofer), and indicated that Druce's female is not conspecific with the male. Rindge selected the male as lectotype for *charon*, leaving the female nameless. Both of Druce's specimens are in the British Museum.

The author found two females labeled "charon" in the U. S. National Museum while working on the revision of *Erilophodes* (Covell, 1963). These appeared identical to the *charon* female of Druce's illustration, and were both from Mexico (Jalapa and Coatepec). A single male from Hidalgo, Mexico, corresponding in maculation to the two females, was found in the American Museum of Natural History.

This species is congeneric with *Cargolia albipuncta* Schaus (1901), also from Mexico (type locality, Jalapa), as are several species of *Neodesmodes* Warren and *Hasodima* Butler from South America. This conclusion is based on comparative studies of wing venation, maculation, and of genitalic features.

*CARGOLIA CARMELITA* Covell, NEW SPECIES

(Fig. 1)

Description. Head with proboscis well developed. Labial palpi upturned, reaching top of eyes in male, half height of eyes in female. Basal palpal segment 2.25 mm (male) and 1.5 mm (female); middle segment 2.0 mm (both sexes); terminal segment 0.9 mm (male) and 0.45 mm (female). Basal segment mostly with black-brown appressed scales, some white, with ventral scales long and hairlike; middle segment dark for basal two-thirds, then white; terminal segment white. Front slightly convex, vested with appressed, flat, white scales. Width between eyes 0.75 mm (male) and 0.8–0.9 mm (females). Eyes subglobose, naked; diameter 3.45 mm (male) and 2.1–2.25 mm (females; ocelli absent. Antennae with scape urceolate, vested with appressed, flat, white scales (female with some dark scales dorsally). Male antennae 8 mm long, bipectinate for four-fifths of length; pectinations setaceous; shaft vested with mixture of white and dark, appressed, flat scales. Female antennae filiform, 10 mm long, with scaling as in male. Vertex of head clothed with appressed, flat, long, white scales, partly covering scape.

Thorax with patagia clothed with long, white scales with edging of black scales ventro-laterally. Tegulae mostly white, with sprinkling of dark scales. Thoracic tergites clothed with appressed, flat, white, scales, except for erect tufts of black scales present on mesothorax and metathorax. Pectus vested with long, white, hair-scales.

Abdomen clothed with appressed, flat, white scales, sprinkled with dark; erect, black tufts on dorsum of segments 1–5.

Legs clothed with mixture of blackish and white patches of appressed, flat scales. Male foreleg with epiphysis; hind tibia with two pairs of spines, but with no other modifications.

Forewing triangular, 17.5 mm long (male) to 22 mm (female). Termen convex to  $Cu_1$ , then very slightly concave to tornus; inner margin straight.  $R_1$  free, from four-fifths of cell;  $R_2$  from just beyond departure of  $R_1$ , free;  $R_3+4+5$  from apex of cell,  $R_5$  departing from  $R_3+4$  halfway from cell to margin;  $R_3+4$  stalked for half of remaining distance.  $M_1$  from apex of cell;  $M_2$  weak, from just above middle of cell;  $M_3$  and  $Cu_1$  from lower angle of cell;  $Cu_2$  from three-fourths of lower margin of cell.

Hindwing rounded; Sc sharply bent in humeral angle, then following Rs for almost half of cell.  $M_1$  from apex of cell;  $M_2$  and  $Cu_1$  dividing at lower angle of cell;  $Cu_2$  from three-fourths of lower margin of cell. Frenulum well developed in both sexes.

Pattern of maculation as in Fig. 1. Both sexes alike except that the markings in the female are less bold and less well defined. Also the dark scaling covers the whole hindwing surface in the female, not merely forming a border as in the male.

Ground concolorous white on all wing surfaces. Basal area red-brown, lighter in female. Basal line of forewing black, broad, extending from C to inner margin, strongly convex outward between Cu and 2d A. Broad area of chocolate shading before black-brown a.m. line, separated from it by partial white line. Median area white, except for black, vertical discal dash and some light brown suffusion along C. P.m. line black, with broad chocolate postmedial shading separated from it by narrow white line. Distal part of postmedial area with black patches centered on  $R_5$  and below  $Cu_2$ , and a large red-brown patch beginning at p.m. line, between  $M_3$  and  $Cu_1$ . Subterminal area light brown, except for whitish apical area and black-brown area between  $M_1$  and  $M_3$ . Terminal area marked with black-brown spots between veins below  $R_5$  and vestigial 1st A. Fringe light brown, checkered with white.

Upper surface of hindwing in male with irregular blackish border for outer one-fourth. Vertical discal spot centered on cross veins. Triangular blackish patch at about midpoint of C. Basal two-thirds of upper surface covered with long, white hair-scales. Fringe white, with some dark scaling. Upper surface of hindwing in female heavily suffused with dark scales throughout, more concentrated toward outer margin; darker scales also form a vague median line and median spot.



Fig. 1. Habitus of *Cargolia carmelita*, new species  
Holotype male (left); paratype female (right).

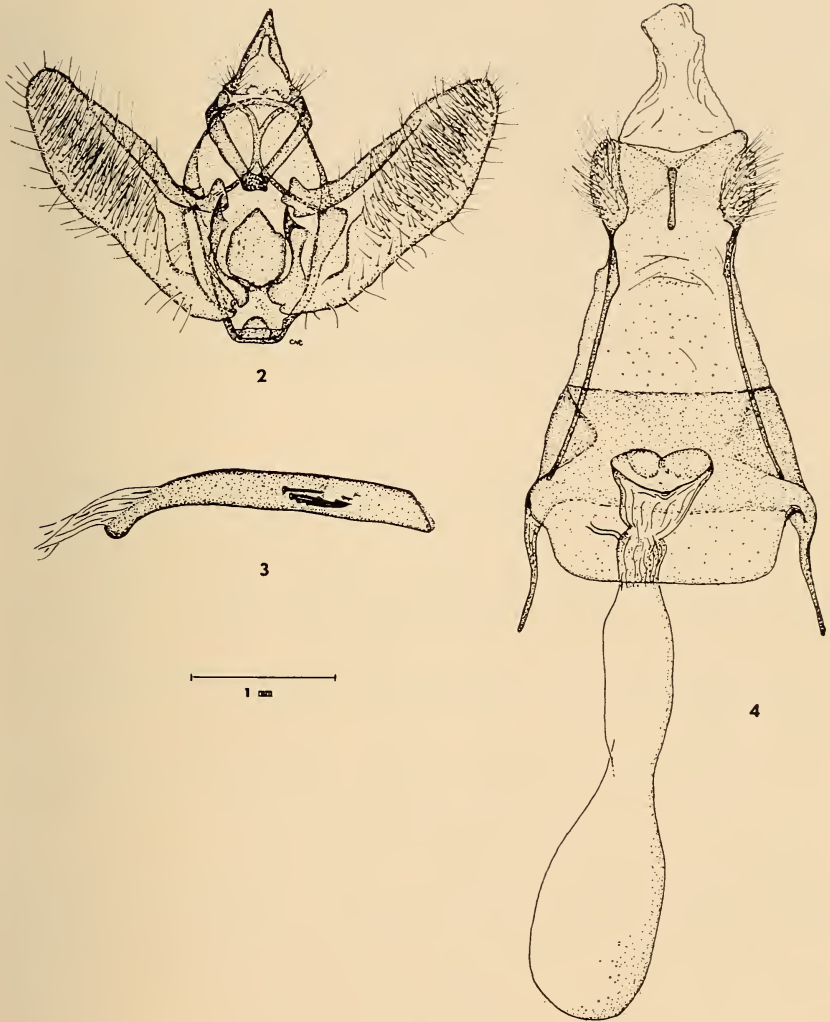


Fig. 2. *C. carmelita*, male genitalia. Fig. 3. *C. carmelita*, male aedeagus.  
Fig. 4. *C. carmelita*, female genitalia.

Lower surfaces of wings with dark areas and markings of upper surface repeated by areas of gray scales (both sexes). Dark suffusion less extensive on lower surface of female.

Male genitalia (Fig. 2) small (2.4 mm from tip of uncus to bottom of vinculum). Valvae simple, flat, membranous, more sclerotized toward costa; apices rounded; inner surface densely hairy to apices; costa ending basally in broad process, broadly pointed caudally. Uncus simple, broad-based, short, rising to rounded point. Gnathos with evenly wide straps meeting centrally in rather heavily sclerotized pad armed with many short spines. Furcae heavily sclerotized, broad-based processes rising dorsally to sharp, upcurved points. Juxta nearly hexagonal, with rather rough margins. Aedeagus (Fig. 3) small (1.45 mm long), narrower anteriorly, and gently

curved in anterior third of length; 8 spinelike cornuti of varying lengths present.

Female genitalia (Fig. 4) 7 mm long. Papillae anales broad, joined dorsally; setose; slender, heavily sclerotized plate longitudinally between lobes ventrally. Apophyses posteriores and apophyses anteriores well developed, the former about twice as long as the latter. Genital plate slightly developed and lightly sclerotized. Ostium wide, narrowing rapidly anteriorly; slight constriction at juncture of ostium and ductus bursae. Ductus seminalis arising from ductus bursae near ostium. Ductus bursae reinforced with heavily sclerotized plates laterally at point of juncture with ostium; otherwise membranous, gradually widening into corpus bursae. Corpus bursae ovoid, membranous; signum absent.

HOLOTYPE: male, "Guerrero Mill., Hidalgo, Mexico, 9,000 ft.", collected by Mann and Skewes, no date; E. L. Todd Genitalia Slide 1434; American Museum of Natural History. PARATYPES: Two females in U. S. National Museum, one labeled "Coatepec, Mexico", other labeled "Jalapa, Mexico"; both from the Wm. Schaus Collection.

*Immature stages:* Unknown.

#### DISCUSSION

Of the two Mexican species, *albipuncta* is smaller than *carmelita*, and is completely black or black-brown, with white or light-brown areas in the median area and apical area of the forewing. The maculation of the forewing of *carmelita* is similar to that of most of South America species; however, it can be distinguished by the presence of the whitish apical area of the forewing above, unmarked by black as in the other species; also, the a.m. and p.m. lines below  $Cu_2$  in *carmelita* are nearly parallel, whereas they are obliquely divergent in the South American species.

The male genitalia of *carmelita* are very similar to those of *albipuncta*, the two differing most markedly in that the base of the juxta in *carmelita* is separated from the bases of the valvae by a distinct, irregular fracture; in *albipuncta* the base of the juxta is continuous with the bases of the valvae. These two Mexican species can best be separated from the males of the South American species in having a rather short, broad-based, almost triangular uncus; the South American species have the uncus produced into a longer, more narrow lobe.

The female genitalia of *carmelita* differ from the South American species in the apparent lack of a signum. No comparisons can be made with *albipuncta*, as its female is yet unknown.

#### TRANSFERS OF SPECIES

Following are the species now included in the genus *Cargolia* Schaus:

1. *C. albipuncta* Schaus, 1901, *Trans. Amer. ent. soc.* 27: 249-50. Mexico. Type species.
2. *C. carmelita* Covell, new species. Mexico.
3. *C. semialbata* (Warren), NEW COMBINATION. Peru, Bolivia.  
*Neodesmodes semialbata* Warren, 1905, *Nov. zool.* 12: 361.  
*Eriolophodes marmorinata* Bastelberger, 1908, *Jahrb. Nassauischen*

*Ver. Naturkunde* 61: 79 - 80. (Placed in synonymy of *N. semialbata* by Covell, 1963.)

4. *C. salapia* (Druce), NEW COMBINATION. Colombia.  
*Hasodima salapia* Druce, 1900, *Annals & mag. nat. hist.*, ser. 7, vol.5: 522.
5. *C. arana* (Dognin), NEW COMBINATION. Colombia, Peru, Bolivia, Argentina.  
*Caripeta arana* Dognin, 1896, *Ann. soc. ent. Belgique* 39: 117.  
*Eriophodes arana* (Dognin), Warren, 1909, *Nov. zool.* 16: 109.  
*Neodesmodes arana* (Dognin), Covell, 1963.
6. *C. muscosa* (Dognin), NEW COMBINATION. Colombia.  
*Neodesmodes muscosa* Dognin, 1911, *Hétérocères nouv. Amér. Sud*, fasc.III: 38.
7. *C. pruna* (Dognin), NEW COMBINATION. Colombia, Ecuador, Peru, Bolivia.  
*Bryoptera pruna* Dognin, 1892, *Le Naturaliste*, 1 March 1892: p.59.  
*Hasodima puta* Druce, 1900, *Annals & mag. nat. hist.*, ser. 7, vol.5: 522. NEW SYNONYMY.
8. *C. dardania* (Druce), NEW COMBINATION. Colombia.  
*Hasodima dardania* Druce, 1900, *Annals & mag. nat. hist.*, ser. 7, vol.5: 521.

In addition to these species, others from Latin America may belong in *Cargolia*. The author hopes to carry on more detailed investigation of this genus and others closely related to it, studying the biology and ecology of species as well as morphology.

---

#### ACKNOWLEDGEMENTS

The author is very grateful to Dr. E. L. Todd, A.R.S., U.S.D.A., for his advice during the course of this study. For the loan of material for study, the author wishes to thank Dr. J. F. G. Clarke (U. S. National Museum), Dr. F. H. Rindge (American Museum of Natural History), Mr. D. S. Fletcher (British Museum), Dr. J. G. Franclemont (Cornell University), Dr. C. D. MacNeill (California Academy of Science), and Mr. H. K. Clench (Carnegie Museum).

---

#### References Cited

- Covell, C. V. Jr., 1963. A revision of the Neotropical genus *Eriophodes* (Lepidoptera: Geometridae). *Annals entomol. soc. Amer.* 56: 835-844.  
Druce, H., 1898. *Biologia Centrali Americana*, suppl., vol.2: 533; vol.3: pl. XCVIII, figs. 23-24.  
Rindge, F. H., 1961. A revision of the Nacophorini (Lepidoptera, Geometridae). *Bull. Amer. mus. nat. hist.* 123: 113.  
Schaus, W., 1901. New species of Geometridae from tropical America, part II. *Trans. Amer. ent. soc.* 27: 249-250.

---

#### CORRIGENDA FOR VOLUMES 16 AND 17

Vol. 16:

- p. 106, left column — words in last two boxes should be reversed; thus, the lower left box should be "Habitat preference".