

**CUDONIGERA: A NEW GENUS FOR MOTHS FORMERLY
ASSIGNED TO *CHORISTONEURA*
HOUSTONANA (TORTRICIDAE)**

JERRY A. POWELL AND N. S. OBRATZSOV¹

Department of Entomological Sciences, University of California,
Berkeley, California 94720

During 1952–1966 Dr. N. S. Obraztsov worked as a Research Fellow at the American Museum of Natural History, New York, on a generic classification of Nearctic Tortricinae. In the process he progressively expanded the scope of his work, both geographically, into the Neotropical fauna, and in the taxonomic level of treatment, which led him to several detailed reviews at the species level. Unfortunately, these studies diluted his concentration on the generic revision, and at the time of his sudden death in 1966, only parts of the comprehensive study had been completed. A summary of Obraztsov's life and varied work on Lepidoptera has been given by Diakonoff (1966).

The generic treatment, which is intended to accompany and augment that of Obraztsov (1954–1957) treating the Palearctic fauna, is being continued by Powell. This has involved incorporation of considerable Mexican Nearctic material accumulated during the past decade, enabling clarification of relationships among North American genera. Particularly in the Cnephasiini, the New World fauna appears to consist of Neotropical elements, with the depauperate Nearctic representation showing little relationship to the Palearctic, and this tribe was developed only preliminarily in Obraztsov's manuscripts. By contrast, the Tortricini and Archipini consist primarily of Holarctic or Nearctic genera which appear to be more clear-cut, and Obraztsov had completed study of most of them.

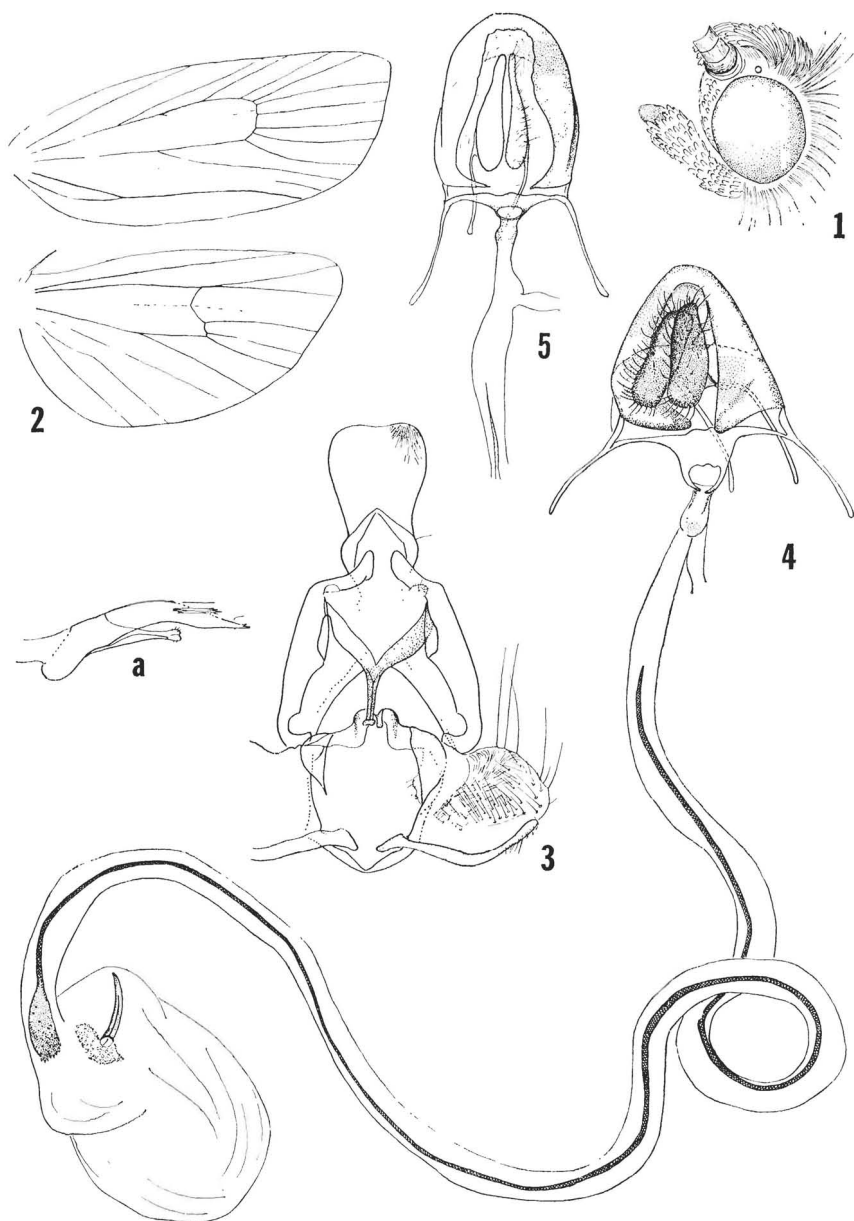
The genus *Cudonigera* was envisioned by Obraztsov as monobasic, related to the Holarctic genus *Choristoneura* Lederer. Current research by Mutuura and Munroe at Ottawa indicates that the populations referred to *C. houstonana* (Grote) should be considered a complex of allopatric species. The genus is proposed to make the name available for use in their studies.

***Cudonigera* Obraztsov and Powell, new genus**

Type species: *Tortrix houstonana* Grote, 1873.

Tortrix (*in part*); Grote, 1873, Bull. Buffalo Soc. Nat. Sci. 1: 15. Fernald, 1882,

¹ Deceased in 1966. This study was in part conducted through support from National Science Foundation grants to Obraztsov, in 1959–1965.



Figs. 1-5, *Cudonigera houstonana* (Grote): 1, head, lateral aspect; 2, wing venation; 3, male genitalia, ventral aspect, aedeagus removed, *a* aedeagus lateral aspect; 4, 5, female genitalia with structures of VIII-X segments in venterolateral aspect in 4, ventral aspect in 5, showing lateral rotation of papillae anales.

- Trans. Amer. Ent. Soc. 10: 17. Grote, 1882, New check list of North Amer. moths: 58. Fernald, "1902"/1903/, Bull. U.S. Natl. Mus. 52: 482.
- Lozotaenia* (*in part*); Walsingham, 1879, Illustr. typical specimens of Lepid. Heterocera 4: 13.
- Cacoecia* (*in part*); Meyrick, 1912, *in* Wagner, Lepid. Catalogus 10: 21; 1913, *in* Wytzman, Genera Insectorum, fasc. 149: 25. Barnes & McDunnough, 1917, Check list Lepid. Boreal Amer.: 177.
- Archips* (*in part*); McDunnough, 1939, Mem. Southern Calif. Acad. Sci. 2(1): 56.
- Choristoneura* (*in part*); Freeman, 1958, Can. Ent. 90, suppl. 7: 38. Powell, 1964, U. Calif. Publ. Ent. 32: 185.

Adult: Head (Fig. 1) densely appressed scaled, face smoother. Antennae in male shortly ciliated and with setae; in female only with setae. Labial palpi ascending, densely appressed scaled; second segment length about 0.8 eye diameter, slightly dilated apicad; third segment about 0.3 as long as second, blunt, exposed.

Forewing (Fig. 2) elongate-rectangular, moderately broad; costa gently arched; apex obtuse; termen rather straight, sometimes slightly convex, tornus broadly rotundate; dorsum gently convex, more curved basad. No costal fold in male. Twelve veins, all separate; Sc slightly curved, almost straight; R_1 from just before middle of discal cell; R_2 twice as near to R_3 as to R_1 ; R_3 and R_4 slightly diverging costad; R_4 to costa, R_5 to termen; upper internal vein rudimentary, from between R_1 and R_2 ; M_2 nearer to M_3 than M_3 to Cu_1 ; Cu_1 from lower angle of discal cell; Cu_2 from shortly before two-thirds; A_1 vestigial, distinct tornad; basal fork of A_{2+3} slightly longer than one-third of entire vein.

Hindwing (Fig. 2) rotundate-subtrapezoidal; costa slightly sinuate, convex at middle; apex rotundate; termen flat or slightly concave below apex; tornus and dorsum forming a strongly convex arch. Eight veins; S almost straight; R and M_1 connate or short stalked; M_2 gently bent downward basad, remote from M_3 ; M_3 close to Cu_1 , separate; Cu_1 from lower angle of discal cell; Cu_2 from two-thirds. No cubital pecten.

Male genitalia (Fig. 3): Mensis ventralis represented by two narrow, sclerotized folds of intersegmental membrane. Tegumen strong, wide, with broad, flat shoulders; pedunculi broad, narrowed basad, and bent inward at extreme base; saccus rotundate. Gnathos strong, with a long, narrow middle process. Socii minute, rudimentary. Valvae weak, short, rotundate; costa not sclerotized; sacculus moderately broad, slightly longer than lower edge of valva, with a free tip; valvula finely striated; pulvinus soft, interior; no processus basales. Uncus broad, spatulate, dilated apicad, concave at caudal margin. Fultura superior a slightly arched, transverse bar between upper internal angles of valvae, with a short, blunt projection at middle. Fultura inferior subcordate, haired laterad at upper margin; caulis short, joined to aedeagus slightly before its middle. Aedeagus slightly curved; cornuti few, rather short and thick, deciduous.

Female genitalia (Figs. 4, 5): Papillae anales rotated 90° outward, forming a blade-like ovipositor, hidden below eighth abdominal tergite which is enlarged, strongly sclerotized, forming a helmet-shaped cover that extends caudad beyond genitalic opening. Sinus vaginalis wide; sterigma represented by lamella post-vaginalis only, broad in middle, narrowed laterad. Antrum elongate, slightly sclerotized, rotundate cephalad, with two lateral colliculi caudad. Ductus bursae coincident with antrum. Bursa copulatrix with corpus ovate and cervix bursae long; cestum narrow, longitudinal, band-like, dilated at corpus bursae, not reaching antrum. Ductus seminalis opening into antrum. Signum a strong, curved thorn; its basal sclerotization formed as a serrate, scobinate plate; no capitulum.

Final instar larva: Sharing Archipini characters as defined by MacKay (1962: 29). Head: adfrontal sutures sinuate and adfrontals not attenuated posteriorly. Thorax: meso- and metathorax with SV group bearing one seta; dorsal pinacula not elongated posteriorly; SD_2 dorsal to SD_1 rather than anterodorsal. Abdomen:

D₂ pinacula on anterior segments with mesal margin below lateral margin of D₁ pinacula; SV groups on segments 1, 2, 7, 8, 9 with 3, 3, 2, 2, 2 setae; D₁'s on anal shield distinctly closer to corresponding SD₁'s than to each other; crotchets variably biordinal, 34–44 on abdominal, 28–36 on anal proleg; anal fork well developed, 3–8 tines. (Based on examination of larvae from California and the description given by Heinrichs (1971) of Kansas specimens.)

Remarks: This genus evidently is a New World derivative of *Choristoneura* Lederer, from which it differs in having a smoother scaled head, the antennae not serrated in male, shorter, broader labial palpi, and a slightly longer basal fork of the forewing vein A₂₊₃. The male genitalia of *Cudonigera* have a broader tegumen with large shoulders; the uncus is shorter and broader than in all known *Choristoneura* species. The gnathos is differently shaped; its lateral arms are shorter and broader, with the middle process narrower and longer. The valvae are shorter than in *Choristoneura*. The female genitalia are unique, with a hypertrophic development of the eighth abdominal tergite which forms a kind of helmet-shaped cover over coriaceous papillae anales (*cudo*, a helmet made of skin; *-gera*, bearing).

The distinctive features, particularly the rudimentary socii, elongate-narrow joined portion of the gnathos, and blade-like ovipositor situated beneath the hood-like development of the tergite, are characters shared by no species of *Choristoneura*. The short valvae and the larval characters suggest a relationship with Group I of MacKay (1962: 36), including *C. conflictana* (Wlk.) and *C. fractivittana* (Clem.), rather than with the conifer-feeding *Choristoneura* (*fumiferana* and related species).

Cudonigera houstonana (Grote), new combination

- Tortrix houstonana* Grote, 1873, Bull. Buffalo Soc. Nat. Sci.: 15. Fernald, 1882, Trans. Amer. Ent. Soc. 10: 17. Grote, 1882, New check list of North Amer. moths: 58. Fernald, "1902"/1903/, Bull. U.S. Natl. Mus. 52: 482.
- Cacoecia houstonana*; Meyrick, 1912, in Wagner, Lepid. Catalogus 10: 21; 1913, in Wytzman, Genera Insectorum, fasc. 149: 25. Barnes & McDunnough, 1917, Check list Lepid. Boreal Amer.: 177.
- Archips houstonana*; McDunnough, 1939, Mem. Southern Calif. Acad. Sci. 2: 56.
- Choristoneura houstonana*; Freeman, 1958, Can. Ent., 90, suppl. 7: 38. Powell, 1964, U. Calif. Publ. Ent. 32: 185 (biol.). Heinrichs & Thompson, 1968, Can. Ent. 100: 750 (biol.).
- Lozotaenia retana* Walsingham, 1879, Illustr. typical specimens Lepid. Heterocera 4: 13.
- Tortrix retana*; Grote, 1881, Papilio 1: 9 (synonymy).

Types: of *houstonana*, Texas; location of type specimen unknown; of *retana*, male, Bosque County, Texas, October 5, 1874 (Belfrage), in British Museum (Natural History).

Taxonomic discussion: Aspects of the geographical variation have been discussed elsewhere (Powell, 1964: 186). Populations referred to

the name *houstonana* occur in Massachusetts, Kansas and are widely scattered in the western United States, associated with the island-like distribution of the larval foodplant, *Juniperus*. As noted, considerable diversity in size, forewing pattern and hindwing color exists, in part represented by samples in collections that are too fragmentary to permit adequate assessment. Presumably the color variation is related to cryptic resemblance of the resting moths on their coniferous hosts, but degrees of reproductive isolation may have been attained among some populations. Morphological differences were not observed during our investigations (genitalia preparations examined; 9 ♂, Calif., Colo., Texas, Mass.; 4 ♀, Calif., Texas).

LITERATURE CITED

- DIAKONOFF, A. 1966. Nicholas Sergeevich Obraztsov, 1906-1966. J. Lepid. Soc. 20: 255-266.
- HEINRICH, E. A. 1971. External morphology of larvae of *Choristoneura houstonana* (Lepidoptera: Tortricidae). Can. Ent. 103: 12-17.
- MACKEY, M. R. 1962. Larvae of the North American Tortricinae (Lepidoptera: Tortricidae). Can. Ent. Suppl. 28, 177 p.
- OBRAZTSOV, N. S. 1954-1957. Die Gattungen der Palaearktischen Tortricidae I. Unterfamilien Tortricinae und Sparganothinae. Tijd. voor Ent. 97: 141-231; 98: 147-228; 99: 107-154; 100: 309-347.
- POWELL, J. A. 1964. Biological and taxonomic studies on Tortricine moths, with reference to the species in California. U. Calif. Publ. Ent. 32: 1-317.