



A New Genus for *Tortrix druana* Walsingham, 1914 and a New Species from the Northern Neotropics (Lepidoptera: Tortricidae: Cochylini: Euliina)

Authors: Gilligan, Todd M., and Brown, John W.

Source: The Journal of the Lepidopterists' Society, 70(2) : 139-144

Published By: The Lepidopterists' Society

URL: <https://doi.org/10.18473/lepi.70i2.a9>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

A NEW GENUS FOR *TORTRIX DRUANA* WALSINGHAM, 1914 AND A NEW SPECIES FROM THE NORTHERN NEOTROPICS (LEPIDOPTERA: TORTRICIDAE: COCHYLINI: EULIINA)

TODD M. GILLIGAN

Identification Technology Program, USDA-APHIS-PPQ-S&T, 2301 Research Blvd., Suite 108,
Fort Collins, Colorado 80526, USA; email: todd.m.gilligan@aphis.usda.gov

AND

JOHN W. BROWN

Department of Entomology, National Museum of Natural History, Smithsonian Institution,
Washington, DC 20013, USA; email: tortricidae.jwb@gmail.com

ABSTRACT. *Durangularia*, **gen.n.**, is described and illustrated from the northern Neotropics. As currently defined, the genus includes two species: *D. druana* (Walsingham, 1914), **comb.n.**, from the southwestern U.S. (Arizona, Texas), Mexico, and Guatemala; and *D. giganteana*, **sp.n.**, from Costa Rica. The new genus is assigned to Cochylini (Euliina) on the basis of the presence of non-deciduous cornuti in the phallus of the male genitalia and the absence of a signum in the female genitalia.

Additional key words: “Durangarchips,” *giganteana*, Euliini

The generic name “Durangarchips” first appeared in the Tortricoidea portion of the Atlas of Neotropical Lepidoptera, Checklist: Part 2 (Powell et al. 1995: 148), assigned to the tortricid tribe Archipini. Listed under that genus was the single species *Tortrix druana* Walsingham, 1914, described from Durango, Mexico. Although the authorship of “Durangarchips” is attributed to “Powell 1991,” there is no publication in which the name was described.

Even though it can be argued that a type species was designated by monotypy, the genus name is not available per the ICZN (1999) because it lacks a description and/or diagnosis. Brown (2005: 263) retained the generic status of “Durangarchips,” recognizing that the species *druana* does not fit into any described genus, but he correctly referred to “Durangarchips” as a nomen nudum. Despite being widely cited in internet resources, such usage is no substitution for a formal description/diagnosis.

This was not the first time that *druana* had been assigned to a new generic manuscript name. Obraztsov had examined many Walsingham types in the 1960s with the intent of revising the Nearctic Tortricidae; unfortunately, he died before publishing much of this work. While examining some of his unpublished manuscripts now on loan to the Mississippi Entomological Museum from the American Museum of Natural History, we discovered a paper titled “Genus *Aztecotortrix*, new genus.” The manuscript consists of three typewritten pages and two pages of pencil drawings

describing a new genus with *Tortrix druana* Walsingham, 1914 as the type species. Obraztsov did not specifically assign the genus to a tribe, but he stated that wing venation “separates this genus from the remaining known Epitymbiini genera,” and he compared the genitalia to those of *Pseudeulia* Obraztsov and *Aphelia* Hübner (both Archipni).

Over the past decade, specimens of *druana* and an undescribed species congeneric with *druana* have accumulated in the collection of the National Museum of Natural History, Smithsonian Institution, Washington, DC, and the Instituto Nacional de Biodiversidad, Santa Domingo de Heredia, Costa Rica. From examining genitalic dissections of these specimens, it is clear that they belong to the tribe Cochylini (subtribe Euliina), not Archipini (or Epitymbiini). Here we describe a new genus for *druana* along with one new species so that these congeners can be assigned to an available genus in the correct tribe.

MATERIALS AND METHODS

We examined 55 adult specimens (48 ♂, 7 ♀) together with 14 associated genitalia preparations deposited in the following collections: Colorado State University, Fort Collins, Colorado, U.S.A. (CSU); Essig Museum of Entomology, University of California, Berkeley, California, U.S.A. (EME); Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (INBio); National Museum of Natural History, Washington, D.C.,

U.S.A. (USNM); and Vitor Becker Collection, Reserva Serra Bonita, Bahia, Brazil (VBC).

Images of adults were taken with Canon 100 mm and MP-E 65 mm macro lenses attached to a Canon 7D digital SLR (Canon U.S.A., Inc., Melville, NY). Figs. 7–9 are composite stacks of many individual images created with Zerene Stacker (Zerene Systems, Richland, WA). Images of genitalia were taken with a Nikon DS-Fi1 digital microscope camera attached to a Nikon Labophot-2 compound microscope (Nikon Instruments, Inc., Melville, NY). All images were edited using Photoshop CS6 (Adobe Systems, Inc., San Jose, CA). Forewing length (FWL) is defined as the distance from the base to the apex including the fringe, reported to the nearest one-tenth of a millimeter. Measurements were made with a stereomicroscope equipped with an ocular micrometer or a compound microscope using a slide micrometer. The number of observations supporting a particular statistic is indicated by “n =.” Other abbreviations are as follows: HTP = holotype, PTP = paratype. Dissection methods follow those presented in Brown and Powell (1991), and morphological nomenclature follows Gilligan et al. (2008).

RESULTS AND DISCUSSION

DURANGULARIA, gen.n.

Type species: *Tortrix druana* Walsingham, 1914.

Durangarchips Powell, 1995, in Heppner, Atlas Neotropical Lepid., Checklist 2: 148; nomen nudum.

Durangularia is assigned to Cochylini (Euliina) based on the presence of non-deciduous cornuti in the phallus of the male genitalia and the absence of a signum in the female genitalia. Virtually all Western Hemisphere Archipini have a pair (or more) of deciduous, basally-attached, aciculate cornuti (Anzaldo et al. 2014) and a signum that includes an internal narrow-crescent-shaped spine and an external capitulum (Horak 1984). Although species of *Durangularia* lack the foreleg hairpencil proposed as a synapomorphy for the Euliina (Brown 1990), many euliines have lost this structure secondarily (Brown 1990), and *Durangularia* is consistent with a suite of other euliine characters: M-stem and chorda absent; forewing costal fold absent in male; M_3 and CuA_1

separate; abdominal dorsal pits absent; uncus well-developed; gnathos present, arms joined distally; papillae anales simple, unmodified; and primarily Neotropical (Brown & Powell 1991).

The most convincing morphological character supporting assignment of the genus to Euliina is the presence of non-deciduous cornuti, which represents a putative synapomorphy for a clade within Tortricinae that includes Tortricini, Cnephasiini, and Cochylini (Cochylini and Euliina) (Regier et al. 2012, Anzaldo et al. 2014). The absence of both a brachiola in the male genitalia and upraised scales on the forewing excludes the genus from Tortricini. The absence of a floricomous ovipositor (i.e., with specialized setae) excludes the genus from Cnephasiini. And the presence of a gnathos excludes the genus from Cochylini.

Diagnosis. Superficially, adults of *Durangularia druana* are somewhat reminiscent of a large *Argyrotaenia* Stephens or *Clepsis* Guenée (Archipini); owing to its large size, *D. giganteana* is not similar to any described Archipini. *Durangularia* are easily distinguished from all Archipini by features of the male and female genitalia as described above. Obraztsov (in litt.) suggested a similarity with *Aphelia*, probably based on the lateral lobes of the gnathos arms and the emarginated apex of the uncus; however, many euliine genera show a similar modification of the gnathos (e.g., *Ortognathosia* Razowski, *Oregocerata* Razowski, *Ernocornutia* Razowski, and others). Within Euliina, adults of *Durangularia* are somewhat similar in forewing maculation to some species of *Ernocornutia* and *Proeulia* Clarke, with a nearly uniform ground color with faint remnants of a submedian fascia, but the genitalia of *Durangularia*, with a variably emarginated apex of the uncus and a somewhat rectangular valva, are unlike those of any other euliine genus.

Description. Male. Head: Vertex rough scaled, scales projecting anteriorly over frons; frons smooth scaled; labial palpus ca. 1.8–2.2 times horizontal diameter of compound eye, segment II straight or slightly curved, rough scaled, segment III porrect, smooth scaled; antenna fasciculate-ciliated in male, with sensory setae 0.50–0.75 times flagellomere diameter. **Thorax:** Smooth scaled; legs densely scaled; male foreleg hairpencil absent. Forewing length 6.7–15.2 mm; costa convex, apex rounded, slightly acute, termen slightly concave, torus broadly rounded; all veins separate, m-stem and chorda absent. Hindwing with $Sc + R_1$ and R_s separate, R_s and M_1 closely approximate. **Abdomen:** Uncus spatulate, ca. 1.5–2.0 as long as wide, tapering to tegumen, apically bifid with variable U-shaped emargination; dorsolateral shoulders of tegumen produced; socius fingerlike, projecting ventrolaterally, setose; gnathos V-shaped, arms joined distally, arms with variable dorsolateral and

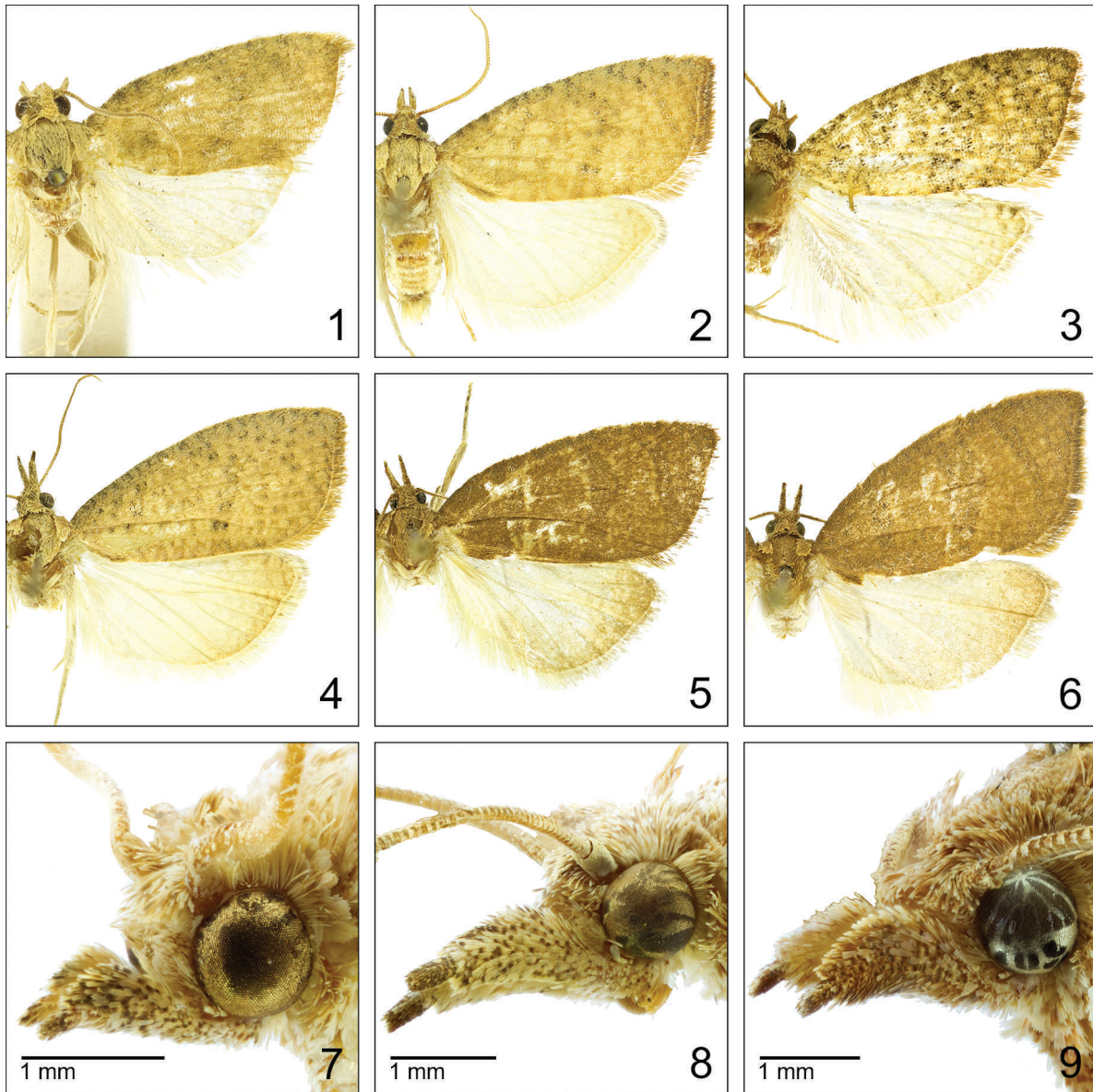
ventrolateral lobes; transtilla weakly sclerotized; valva rhomboid or rectangular; cucullus sclerotized along costal margin, setose in distal 0.5, anal angle rounded; sacculus well sclerotized, consisting of a basal setose lobe, a medial subtriangular process, and a free distal lobe; juxta a pentagonal plate; phallus ca. as long as valva, strongly curved in distal 0.5, phallobase with a pair of lateral, flattened, membranous lobes; vesica with two large basal non-deciduous cornuti.

Female. *Head:* Labial palpus ca. 2.7 times horizontal diameter of compound eye; other characters as in male. *Thorax:* As in male. *Abdomen:* Papillae anales simple, unmodified; apophyses anteriores ca. as long as apophyses posteriores; lamella antevaginalis a weakly sclerotized microtrichiate extension of sternum VII covering the ostium; lamella postvaginalis a sclerotized concavity nearly as wide as the apophyses anteriores; ductus bursae ca. 0.5 times length of

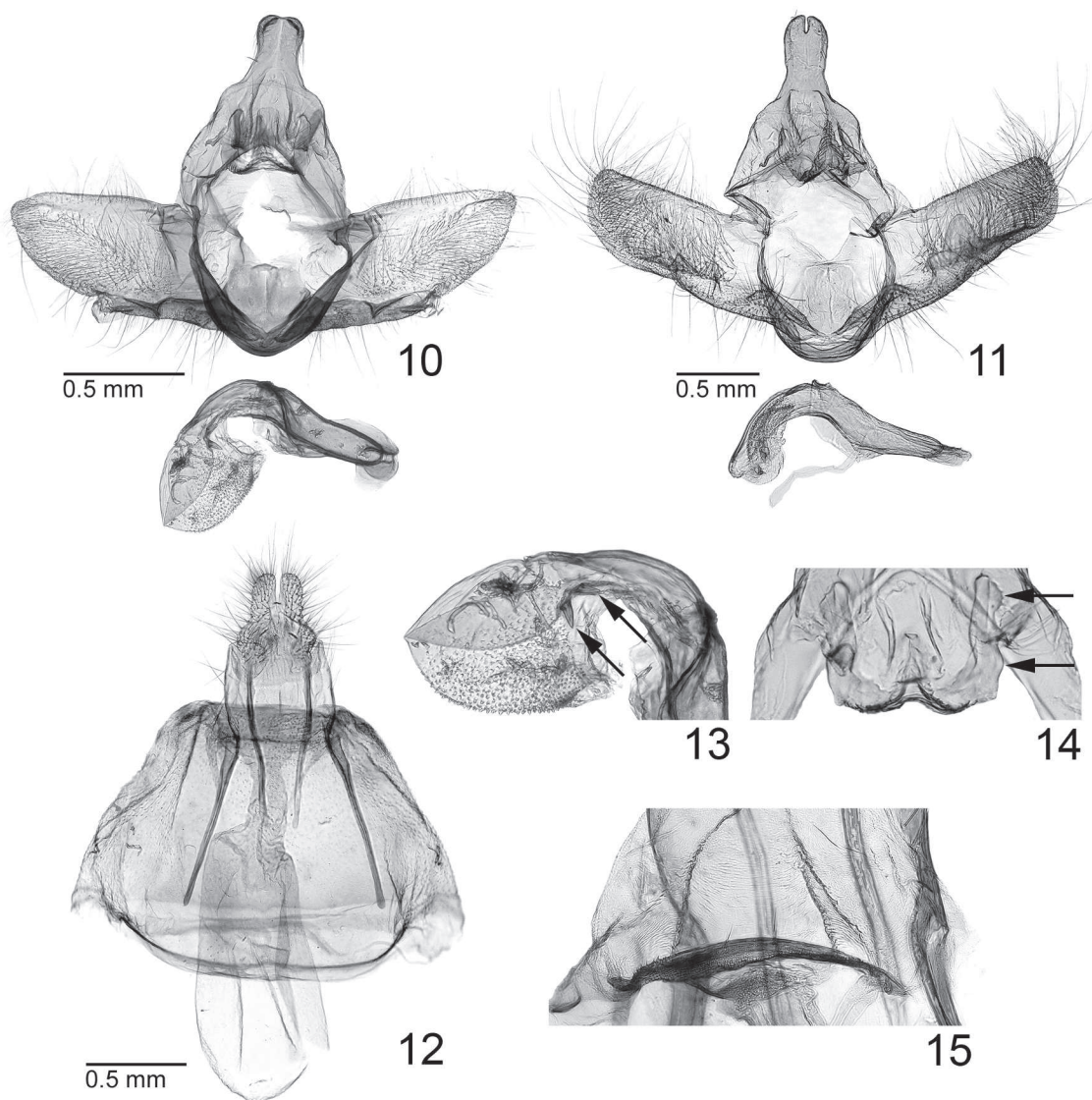
corpus bursae; corpus bursae elongate, rounded anteriorly; ductus seminalis arises from corpus bursae just anterior to junction with ductus; signum absent.

Distribution and Biology. *Durangularia* has been recorded from the southwestern U.S. (Arizona and Texas), Mexico, Guatemala, and Costa Rica. Collection sites range in elevation from 1,800–3,100 m (5,900–10,170 ft). The type species was reared from cynipid galls on *Quercus* (Fagaceae), an association that subsequently was confirmed by J. Powell (in litt.). Adult captures range from March to November.

Remarks. The apparent shape of the uncus varies in slide-mounted genitalia preparations. The U-shaped emargination of the uncus (Fig. 11) is formed by two dorsolateral projections. If these projections are not flattened on the slide, the uncus will appear as in Fig. 10. There are no significant differences in the structure of the uncus for the two species described here.



FIGS. 1–9. Adults of *Durangularia*. **1.** *Durangularia druana* (male, HTP). **2.** *D. druana* (male). **3.** *D. druana* (male). **4.** *D. druana* (female). **5.** *D. giganteana* (male, HTP). **6.** *D. giganteana* (male, PTP). **7.** *D. druana* (head, male). **8.** *D. druana* (head, female). **9.** *D. giganteana* (head, male, HTP).



FIGS. 10–15. Genitalia of *Durangularia*. **10.** *Durangularia druana* (male, phallus below). **11.** *D. giganteana* (male, HTP, phallus below). **12.** *D. druana* (female). **13.** *D. druana* (male vesica, arrows denote two large basal non-deciduous cornuti). **14.** *D. druana* (male gnathos, arrows denote dorsolateral and ventrolateral lobes). **15.** *D. druana* (female sterigma detail). (Figs. 13–15 not to scale).

Durangularia druana (Walsingham, 1914),
comb.n.

Figs. 1–4, 7–8, 10, 12–16

Tortrix druana Walsingham 1914: 288.

Durangarchips druana: Powell, 1995, in Heppner: 148; Brown, 2005: 263.

Diagnosis. *Durangularia druana* is separated from *D. giganteana* by its smaller size (FWL 6.2–11.5 mm in *druana*, 13.3–15.2 mm in *giganteana*) and forewing color (tan to light brown in *druana* vs. reddish brown in *giganteana*). Males

of the two species can be distinguished by the shape of the valva (rhomboid in *D. druana*, rectangular in *D. giganteana*).

Description. Male (Figs. 1–3, 10, 13–14). **Head** (Fig. 7): Vertex tan to orange-brown, with some scales banded apically with brownish gray; frons scaling tan; labial palpus ca. 1.8 times horizontal diameter of compound eye, segment II straight, enlarged apically, rough scaled, tan to brown, some scales banded with dark brownish gray or orange, segment III smooth scaled with dark brown; antenna brown with tan scales, sensory setae 0.5 times flagellomere diameter. **Thorax:** Dorsum tan, some scales banded with orange-brown; legs tan, densely scaled, pro- and mesothoracic legs mottled with dark orange-brown. **Forewing** (Figs. 1–3, 16) length 6.7–11.5 mm (mean 8.7 mm; n = 24); ground color tan to light brown, some scales banded apically with orange; wing markings (costal strigulae, fasciae)

expressed with scales banded apically with dark brown to black; costal strigulae well expressed in most individuals from base to apex; media fascia expressed in many individuals from costa along distal margin of the discal cell to dorsum with conspicuous dark patch between CuA_2 and A_{1+2} ; postmedian and preterminal fasciae expressed in some individuals as mottling in apical half of wing; fringe scales tipped with grayish brown at apex, becoming solid brown at tornus. Hindwing (Fig. 16) pale yellowish brown, mottled with brown to dark brown apically in some individuals; fringe scales pale yellowish brown, banded with brown near apex, becoming solid pale yellow at anal angle. **Abdomen:** Pale yellowish brown. Genitalia (Figs. 10, 13–14) with uncus spatulate, ca. 1.5 times as long as wide, tapering to tegumen, apically bifid with U-shaped invagination; dorsolateral shoulders of tegumen produced; socius as long as uncus, fingerlike, projecting ventrolaterally, setose along basal 0.75; gnathos V-shaped, arms joined distally with variable dorsolateral and ventrolateral lobes (Fig. 14); transtilla a sinuate band, weakly sclerotized medially; valva rhomboid; cucullus sclerotized along costal margin, apex acute, moderately setose in distal 0.5 and along costal margin, anal angle broadly rounded; sacculus well sclerotized, consisting of a basal setose lobe, a medial subtriangular process, and a free distal lobe; juxta a pentagonal plate; phallus ca. as long as valva, curved in distal 0.5; vesica with two large basal non-deciduous cornuti (Fig. 13), ventral surface microtrichiate.

Female (Figs. 4, 12, 15). **Head** (Fig. 8): Vertex and frons as in male; labial palpus ca. 2.7 times horizontal diameter of compound eye, segment II slightly curved, rough scaled with some scales banded apically with dark brownish gray, segment III dark brown; antenna simple, brown with tan scales. **Thorax:** Dorsum and legs as in male. Forewing (Fig. 4) as in male except length 9.8–12.0 mm (mean 10.7 mm; $n = 7$); hindwing as in male. **Abdomen:** Pale yellowish brown. Genitalia (Fig. 12, 15) with papillae anales simple, unmodified, moderately setose; apophyses anteriores ca. as long as apophyses posteriores; sterigma (Fig. 15) a sclerotized concavity nearly as wide as the apophyses anteriores covered by a microtrichiate extension of sternum VII; ductus bursae 0.5 times length of corpus bursae; corpus bursae elongate, rounded anteriorly; signum absent.

Holotype (Fig. 1) ♂, “7360, from cynipid gall, on *Quercus* sp., Durango. Mex.[ico], iss[ued] Febr[uary] 11. [18]97; 6002, WLSM. 1908; ♂ genitalia on, slide 18. xi 1958, J. F. G. C. 10748; Genitalia slide, by JFGC ♂, USNM 68309; *Tortrix druidana*, Wlsm., ♂ TYPE desc., figd” (USNM).

Additional specimens examined. GUATEMALA: Chimaltenango, Tecpan, [ca. 2286 m], 14°15'N, 90°58'W, 30 Jul 2000 (5 ♂ VBC). MEXICO: Chihuahua: 5 mi W Buenaventura, 7,200 ft, 5 Jul 1986, P. M. Jump, Acc. #1042 (1 ♂ EME). Chiapas: San Cristobal L. C., 6–8 Aug 1965, Flint & Ortiz (2 ♂ USNM, slide USNM 68498). Durango: 30 mi W Durango, 8,000 ft, 3–7 Aug 1972, J. Powell, D. Veirs & C. D. MacNeill (2 ♂ EME), 8,500 ft, 31 Jul 1964, J. Powell (1 ♂ EME, slide JAP2913); 3 mi E Revolcaderos, 11 Aug 1972, J. Powell (1 ♂ EME, slide JAP3912). Oaxaca: Cerezal, Ixtepeji, 2300 m, 7 Nov 1980, E. Welling (1 ♀ EME, slide JAP5534); Matalan, 2 mi S Oaxaca, 28 Jun 1957, J. A. Chemsak & B. J. Rannells (1 ♂ EME, slide JAP2915). Sinaloa: 8 mi W El Palmito, 6,400 ft, 8–12 Aug 1972, J. Powell, D. Veirs & C. D. MacNeill (1 ♂ EME). Sonora: 20 km NW Yecora, 3200 m, 5 Sep 1998 (3 ♂ VBC). Nuevo Leon: Cerro Potosí, 2800 m, 26 Jun 1997 (1 ♂ VBC); Santiago, 1760 m, 25 21'N, 100 18'W, 25–30 May 2000 (1 ♂ VBC). Veracruz: Cofre de Perote, 3300 m, 4 Jun 1997 (12 ♂ VBC). UNITED STATES: Arizona: Cochise County: Copper Canyon, 6,000 ft, 15 Apr 1986, J. Powell, JAP 86D49 (1 ♂ 1 ♀ EME); Huachuca Mountains, Ash Canyon, 5,800 ft, 13 Apr 1986, Powell & Wagner, JAP 86D47, 86D49 (2 ♀ EME, slide JAP6239); Coronado Nat. Forest, Chiricahuas, Upper Pinery Canyon Campground, 30 Jul–2 Aug 1999, P. A. Opler & E. Buckner, BOLD Proc. ID:LNAUS2436-13 (1 ♂ CSU), 6,800 ft, 4 Sep

1992, R. Leuschner (1 ♂ USNM, slide TMG662); Paradise, 16–23 Aug (1 ♂ USNM); Miller Canyon, Huachuca Mountains, 5,800ft, 14 Apr 1986, Powell & Wagner, emgd. 15 Jun 1986, JAP 86D49, reared from cynipid gall on *Quercus* (1 ♂ EME), 12 Apr 1988, J. A. Powell (1 ♂ EME). Texas: Jeff Davis County: Davis Mountains Resort, 5,800 ft, 3 Apr 2004, D. G. Marqua, BOLD Proc. ID:LNAUS2434-13 (1 ♂ USNM); Davis Mountains, Mt. Locke, 6,700 ft, 10 Jun 1969, A. & M. E. Blanchard (2 ♀ USNM, slide USNM 97904), 30 Aug 1969 (1 ♂ 1 ♀ USNM, slide USNM 144866), 21 Oct 1973 (5 ♂ USNM, dissection TMG650, slide USNM 144865); Davis Mountains, 5 mi SE Livermore, 6,000 ft, 4 Oct 1969, A. & M. E. Blanchard (1 ♂ USNM, slide USNM 97905).

Distribution and Biology. This species has been recorded from Guatemala; the states of Chihuahua, Chiapas, Durango, Oaxaca, Sinaloa, Sonora, and Veracruz in Mexico; and Arizona and Texas in the U.S. Most collection sites are between 1,800–3,300 m (5,900–10,826 ft). The type and one specimen collected in the Huachuca Mountains, Arizona by J. Powell were reared from cynipid galls on *Quercus*. Adults have been captured from April to November.

Remarks. The “TYPE” label affixed to the holotype by Walsingham suggests that he originally intended to name this species “*Tortrix druidana*.”

Durangularia giganteana, sp.n.

Figs. 5–6, 9, 11

Diagnosis. *Durangularia giganteana* is separated from *D. druana* by its larger size (FWL 13.3–15.2 mm in *giganteana*, 6.2–11.5 mm in *druana*) and forewing color (reddish brown in *giganteana*, tan to light brown in *druana*). Male genitalia of the two species can be distinguished by the shape of the valva (rectangular in *giganteana*, more attenuate distally in *druana*). The female of *D. giganteana* is unknown.

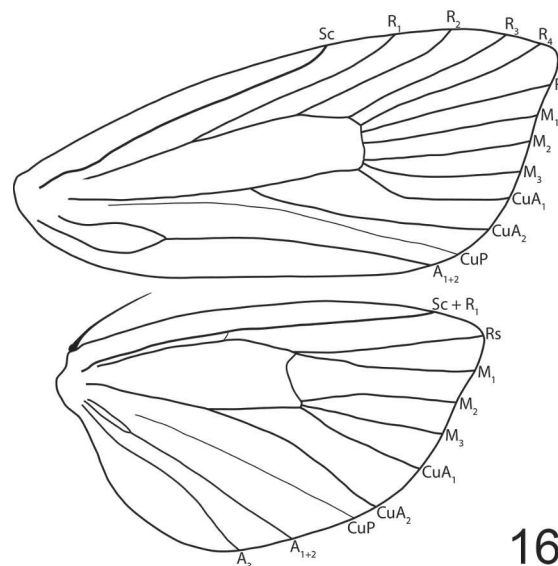


FIG. 16. Wing venation of *D. druana*.

Description. Male (Figs. 5–6, 9, 11). *Head* (Fig. 9): Vertex scales mixed brown and brownish tan; labial palpus ca. 2.2 times horizontal diameter of compound eye, segment II slightly curved, enlarged medially, rough scaled with tan to reddish brown, some scales banded with dark brownish gray, segment III smooth scaled with reddish brown; antenna brown with tan and reddish-brown scales, fasciculate-ciliated, sensory setae 0.75 times flagellomere diameter in male. *Thorax*: Dorsum scales brown and brownish tan, some banded with red-brown; legs tan, densely scaled, pro- and mesothoracic legs mottled with reddish brown. Forewing (Figs. 5–6) length 13.3–15.2 mm (mean 14.3 mm; n = 2); forewing ground color reddish brown; wing markings (costal strigulae, fasciae) gray to pale dark brown; costal strigulae weakly expressed as gray scales along costa; subbasal and median fasciae weakly expressed as rows of gray scales running from costa to dorsum; postmedian and preterminal fasciae expressed as weak mottling in the apical half of the wing; fringe scales gray to pale dark brown basally, tan apically. Hindwing pale yellowish brown, mottled with brown along the apex and outer margin; fringe scales pale yellowish brown, becoming darker and banded with brown near apex. *Abdomen*: Genitalia (Fig. 11) with uncus spatulate, ca. 2 times as long as wide, tapering to tegumen, apically bifid with deep U-shaped invagination; dorsolateral shoulders of tegumen slightly produced; socius fingerlike, projecting ventrolaterally, with long setae from base until before apex; gnathos V-shaped, arms joined distally forming numerous ridges; transtilla a weakly sclerotized sinuate band; valva rectangular, parallel-sided; cucullus sclerotized along costal margin, apex 90°, densely setose in distal 0.5, anal angle slightly rounded; sacculus well sclerotized, consisting of a basal setose lobe, a medial subtriangular process, and a large free distal lobe; juxta a pentagonal plate; phallus ca. as long as valve, curved in distal 0.5; vesica with two large basal non-deciduous cornuti, ventral surface microtrichiate.

Female. Unknown.

Holotype (Fig. 5) ♂, “Est. Cuerici, Sendero al Mirador, 4.6 Km al E. de Villa Mills, San Jose, Costa Rica, 2640 m, 17–22 Mar 1996, A. Picado, de Luz, L_S_389700_499600 #7026; Costa Rica INBIO CR1002, 431190; genitalia ♂, MCC-4; Genitalia slide, by MCC ♂, USNM 137,144” (INBio).

Paratype. COSTA RICA: Cartago Province: 1 km NE Cerro Asuncion, Cerro de la Muerte, 3100 m, 8 Apr 1984, D. H. Janzen & W. Hallwachs (1 ♂ INBio, slide USNM 137145).

Distribution and Biology. This species has been recorded from the provinces of Cartago and San José in Costa Rica at elevations of 3,100 and 2,640 m (10,170 and 8,660 ft), respectively. Adults were captured in March and April. Larval hosts are unknown.

Submitted for publication 4 September 2015; revised and accepted 21 January 2016.

ACKNOWLEDGEMENTS

We thank the following for providing access to specimens in their care: Peter Oboyski (EME), Eugenia Phillips-Rodriguez (INBio), Paul Opler (CSU), and Vitor Becker (VBC). Richard Brown, Mississippi Entomological Museum, provided access to Obraztsov's unpublished manuscripts. Jerry Powell (EME) provided useful discussion on *D. druana* and valuable review comments. Jason Dombroskie, Cornell University Insect Collection, also provided valuable review comments.

LITERATURE CITED

- ANZALDO, S., J. DOMBROSKIE AND J. W. BROWN. 2014. Morphological variation, taxonomic distribution, and phylogenetic significance of cornuti in Tortricinae (Lepidoptera: Tortricidae). *Proc. Entomol. Soc. Wash.* 116: 1–31.
- BROWN, J. W. 1990. Taxonomic distribution and phylogenetic significance of the male foreleg hairpencil in the Tortricinae (Lepidoptera: Tortricidae). *Entomol. News* 101: 109–116.
- BROWN, J. W. 2005. World catalogue of insects: Tortricidae (Lepidoptera), Vol. 5. Apollo Books, Stenstrup, Denmark. 741 pp.
- BROWN, J. W. AND J. A. POWELL. 1991. Systematics of the *Chrysoxena* group of genera (Lepidoptera: Tortricidae: Euliini). *Univ. Calif. Pub. Entomol.* 111, 87 pp.
- GILLIGAN, T. M., D. J. WRIGHT AND L. D. GIBSON. 2008. Olethreutine moths of the Midwestern United States. An Identification Guide. *Ohio Bio. Survey Bull. New Series.* Vol. XVI, No. 2. 334 pp.
- HORAK, M. 1984. Assessment of taxonomically significant structures in Tortricinae (Lep., Tortricidae). *Mitt. Schweiz. Entomol. Ges.* 57: 3–64.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (ICZN). 1999. International Code of Zoological Nomenclature, 4th edition. The International Trust for Zoological Nomenclature, London, United Kingdom, 306 pp.
- POWELL, J. A., J. RAZOWSKI AND J. W. BROWN. 1995. Tortricodea: Tortricidae, pp. 138–157. *In* J. B. Heppner (ed.). Atlas of Neotropical Lepidoptera. Checklist: Part 2. Hyblaeoidea-Pyraloidea-Tortricodea. Assoc. Trop. Lepid., Sci. Publ., Gainesville.
- REGIER, J., J. BROWN, C. MITTER, J. BAIXERAS, S. CHO, M. CUMMINGS, AND A. ZWICK. 2012. A molecular phylogeny for the leaf-roller moths (Lepidoptera: Tortricidae) and its implications for classification and life history evolution. *PLoS ONE*, 7, e35574.
- WALSINGHAM, LORD T. DE GREY (1914) [1909–1915] *Insecta*. Lepidoptera-Heterocera, Vol. IV., pp. 1–482. *In* F. D. Godman and O. Salvin (eds.). *Tineina, Pterophorina, Orneodina, and Pyralidina and Hepialina* (part). *Biologia Centrali-Americana*. R. H. Porter, London.