A REVISION OF THE GENUS *DUNAMA* SCHAUS (NOTODONTIDAE)

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Several years ago some moths reared from larvae from Mexico found on importations of *Chamaedorea*, a genus of small palms, were sent to me for identification by Mr. D. R. Johnston, San Antonio, Texas. The adults proved to be a new species of the monobasic genus *Dunama* Schaus of the family Notodontidae. A search of the collections of the Neotropical notodontids in the U.S. National Museum and of the British Museum (Natural History) revealed three other species belonging to the genus. One of the three is another undescribed species from northern South America. Of the three described species, one had been described twice, but the synonymy had not been recognized. The synonyms were described in different genera, and each subsequently had been moved to a different genus. All the generic assignments and transfers, except of the type-species, were incorrect. Five species of the genus *Dunama* are now recognized.

Until recently the only known food plant was a single species of *Chamaedorea*. This plant genus is composed of a large number of species, and some have rather restricted or limited distributions. It is possible, therefore, that other species of *Dunama* may be recognized when some of the other species of *Chamaedorea* are examined for larvae or when collecting at light for adults is accomplished in the vicinity of such plant species. In 1971, *Dunama angulinea* (Schaus) was reared from larvae found feeding on bananas in Panamá by Mr. C. S. Stephens.

Descriptions of the larvae are not included in this paper. They will be described in a separate paper by D. M. Weisman.

Dunama Schaus, 1912

Ann. and Mag. Nat. Hist., ser. 8, vol. 9, p. 52.
Type-species: *D. angulinea* Schaus, monotypy and original designation.

Diagnosis: Small to moderate-sized notodontid moths, length of forewing 10–22 mm; male antennae bipectinate for ¾ length, pectinations of fifth or sixth segment longest, decreasing to simple at apical fourth, female antennae simple, scale tuft of first antennal segment small in both sexes; palpi upcurved to near middle of frons, second segment long, third segment small not more than ⅕ length second segment, slightly decumbent; tongue well developed; ocelli absent. Thorax without prominent tufts, vestiture rather loose; abdomen without tufts. Forewing with slender accessory

cell; M_1 from bottom third of accessory cell; hindwing with Sc from about middle of cell, diverging from Rs, nearly straight; Rs and M_1 connate from upper angle of cell; M_3 and Cu_1 connate from lower angle. Male genitalia distinctive (Figs. 10–14), uncus variable, an ovoid lobe or bifid; socii well developed, sclerotized curved processes; valves with costal margin sclerotized, ventral margin mainly membranous, but sometimes toothed near end of sacculus; juxta scarcely developed, fused with bases of valves when present; aedeagus moderately long, apical half heavily sclerotized and usually somewhat reduced in diameter toward apex, shaft usually with dorsolateral spines and processes or a dorsal plate near middle; eighth sternite with caudal margin produced into heavily sclerotized process, sometimes bifid. Female genitalia (Figs. 15–18), rather reduced; ovipositor lobes and ninth segment sclerotized; some ostial sclerotizations; corpus bursae small, membranous, without signa.

This genus has been placed near *Disphragis* Hübner, but it is doubtful that it belongs to the Heterocampini. I believe it to be a member of the tribe Nystaleini, subfamily Notodontinae. It does not agree completely with the definition of that tribe by Forbes (1948, p. 206), but that definition was based primarily on a few North American genera and species and undoubtedly will need to be modified when the much larger group of Neotropical elements are studied. The present classification of the Neotropical notodontids is very unsatisfactory. Forbes (1948, p. 203), stated: "The classification of the North Temperate fauna is fairly well understood, but the much larger and richer tropical fauna is in complete confusion." The almost complete lack of knowledge of the immature stages of the Neotropical notodontids presents a serious complication to the development of a more satisfactory classification of the family.

KEYS TO THE SPECIES

MACULATION AND COLORATION

1. Males 2
   –Females 6
2. Vertex of head, thorax and basal part of forewing with conspicuous areas of pale straw yellow; forewing with distinctive, slightly oblique, black bar from basad of reniform spot to near base of inner margin ..... *D. tuna* (Schaus)
   –Head, thorax and base of forewing mostly dark brown; forewing with median part of antemedial band at most a dark triangular spot only slightly longer than wide 3
3. Subterminal transverse shade of forewing absent; forewing with a faint longitudinal pale streak present through cell from base of wing nearly to termen ..... *D. ravistriata*, n. sp.
   –Subterminal transverse shade of forewing present, especially in anterior half of wing; forewing with longitudinal pale streak absent, or present only distad of reniform spot 4
4. Longitudinal pale streak of forewing weak, but present distad of reniform spot ..... *D. angulinea* Schaus
   –Longitudinal pale streak of forewing absent 5
5. Costal area of forewing distad of reniform spot distinctly darker than remainder of distal part of wing; median transverse band immediately distad of antemedial band paler at middle than near inner margin ..... *D. claricentrata* (Dognin)
   –Costal area of forewing distad of reniform spot if darker than remainder of distal part of wing only slightly so; median transverse band immediately distad of antemedial band not especially paler at middle ..... *D. mexicana*, n. sp.
6. Forewing with vague to distinct pale longitudinal streaks distad of reniform spot 7

–Forewing with pale longitudinal streaks absent distad of reniform spot ..... *D. mexicana*, n. sp.

7. An oblique black bar present from reniform spot to near base of forewing ..... *D. tuna* (Schaus)
–Forewing with at most a dark triangular spot, slightly longer than wide, from near middle of antemedial band 8

8. Median part of dorsum of thorax with an oval spot of pale scales ..... *D. angulinea* Schaus
–Median part of dorsum of thorax uniformly dark ..... *D. ravistriata*, n. sp.

ABDOMINAL SCLERITES AND MALE GENITALIA

1. Males 2
–Females 6

2. Sclerotized process of eighth abdominal sternite bifurcate 3
–Sclerotized process of eighth abdominal sternite not bifurcate 4

3. Process of eighth abdominal sternite with toothed lateral flanges at base of bifurcation ..... *D. tuna* (Schaus)
–Process of eighth abdominal sternite without lateral flanges at base of bifurcation ..... *D. angulinea* Schaus

4. Uncus bifid; ventral margin of valves normal 5
–Uncus clavate, the lateral margins more heavily sclerotized than middle; ventral margin of valves heavily sclerotized and irregularly toothed near end of sacculus ..... *D. claricentrata* (Dognin)

5. Uncus Y-shaped, the lobes slender, slightly knobbed at apices; aedeagus with two large elongate, spinelike dorsolateral processes from middle of shaft ..... *D. mexicana*, n. sp.
–Uncus with two stout slightly divergent lobes; aedeagus with one small blunt spinelike process near distal ⅕ of shaft ..... *D. ravistriata*, n. sp.

6. Posterior margin of ninth abdominal tergum irregularly toothed; lateral angles of eighth abdominal sternum produced into flat, sharp-pointed triangular processes ..... *D. mexicana*, n. sp.
–Posterior margin of ninth abdominal tergum and lateral angles of eighth abdominal sternum not so modified 7

7. Posterior margin of eighth sternum V-shaped and slightly to moderately irregularly toothed ..... *D. ravistriata*, n. sp.
–Posterior margin of eighth sternum transverse or slightly convex and slightly emarginate in middle, margin not toothed 8

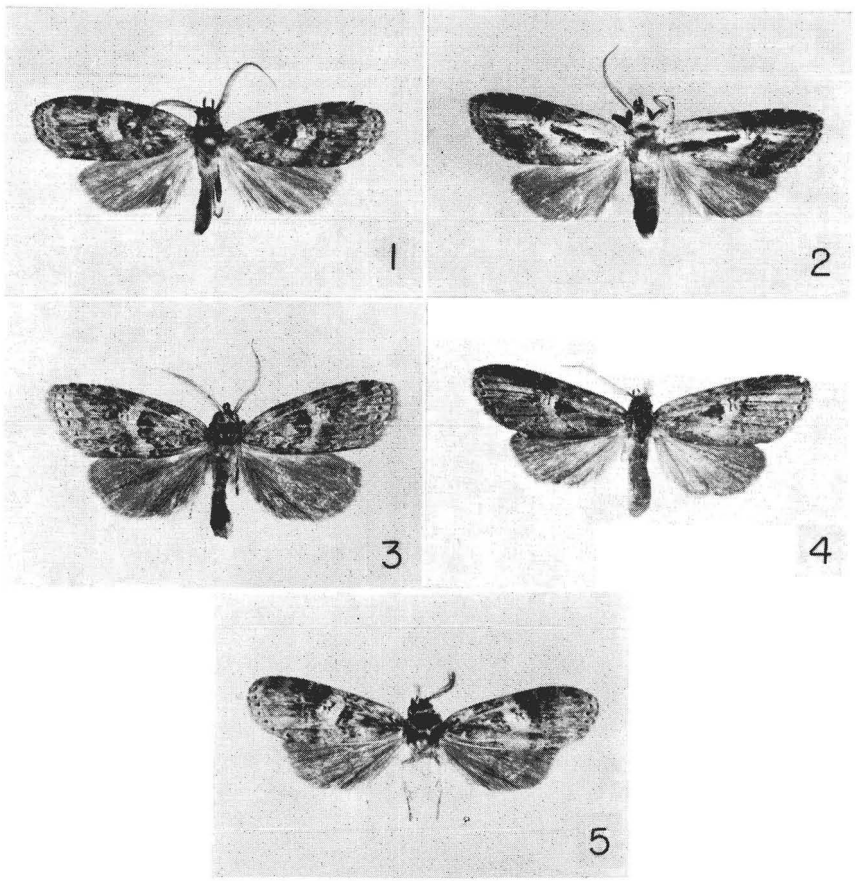
8. Sternum of ninth abdominal segment a broad sclerotized band nearly uniform in length basad of ovipositor lobes ..... *D. tuna* (Schaus)
–Sternum of ninth abdominal segment membranous at middle third basad of ovipositor lobes ..... *D. angulinea* Schaus

Dunama angulinea Schaus

Figs. 1, 7, 10, 15

Dunama angulinea Schaus, 1912, p. 52. Draudt, 1932, p. 981. Gaede, 1934, p. 263.

Diagnosis: Size, forewing length, ♂ 10–13 mm, ♀ 12–15 mm. The pattern of maculation (Fig. 1) is similar to that of *Dunama claricentrata* (Dognin) and *D. mexicana*, n. sp. in the males. Females are not so contrastingly marked and resemble that sex of *D. mexicana* and *D. ravistriata*, n. sp., but the disc of the thorax has a tuft of pale scales not found in *D. mexicana* and the basal area of the forewing does not have a longitudinal ray of pale scales as in *D. ravistriata*. Both sexes are somewhat variable in the pattern of maculation. The most reliable characters for species identification are shape of the eighth abdominal sternite of the male



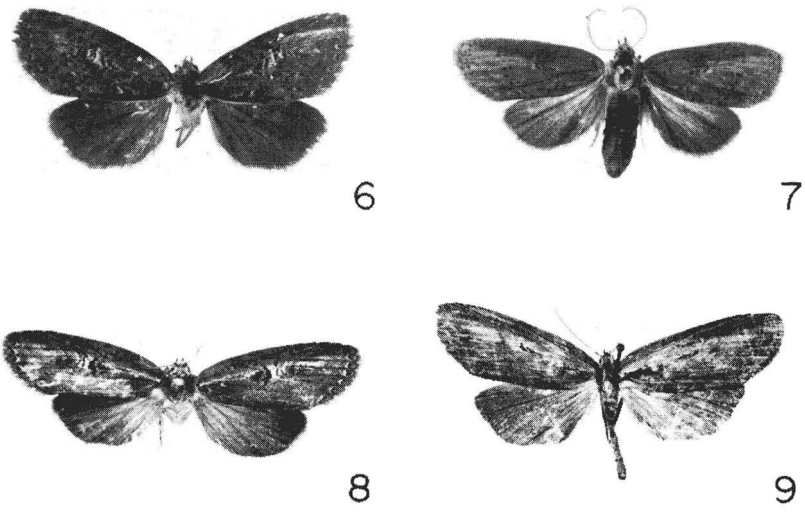
Figs. 1–5. Dorsal view of adult males of *Dunama* species: 1, *angulinea*, holotype male, Guápiles, Costa Rica; 2, *tuna*, holotype male, Colombia; 3, *mexicana*, holotype male, México; 4, *ravistriata*, paratype male, Teffé, Amazonas, Brazil; 5, *claricentrata*, holotype male, French Guiana.

(Fig. 10) and the genital structures of the female (Fig. 15). The bifurcate process of the eighth abdominal sternite of the male lacks toothed, lateral flanges as in *D. tuna* (Schaus). The female genitalia are similar to those of *D. tuna*, but the ninth abdominal sternite is membranous at middle basad of ovipositor lobes, not sclerotized as in *D. tuna*.

Type: The male holotype is in the U.S. National Museum. It was collected at Guápiles, Costa Rica.

Distribution: Twenty-nine examples, 14 ♂ and 15 ♀, have been studied. They are from the following localities: MÉXICO: Teapa, Tabasco. GUATEMALA: Cayuga; Quirigua. COSTA RICA: Guápiles; Sixaola River. PANAMÁ: Changuinola; Paraiso, C. Z.

Food plant: This species has recently been reared from bananas in Panamá, but it does not seem likely that the banana plant is the normal host. If that were so,



Figs. 6–9. Dorsal view of adult females of *Dunama* species: 6, *mexicana*, paratype female, México; 7, *angulinea*, female, Changuinola, Panamá; 8, *ravistriata*, paratype female, Pará, Brazil; 9, *tuna*, female, paralectotype of *sagittula*, Río Toche, Colombia.

considering the attention given to insects on that crop, surely larvae would have been discovered long ago.

Dunama tuna (Schaus), n. comb.

Figs. 2, 9, 11, 18

Heterocampa tuna Schaus, 1901, p. 304.
Disphragis tuna (Schaus), Draudt, 1932, p. 972. Gaede, 1934, p. 261.
Naduna sagittula Dognin, 1914, p. 22. [New synonymy.]
Tachuda sagittula (Dognin), Draudt, 1932, p. 929. Gaede, 1934, p. 222.

Diagnosis: Size, forewing length, ♂ 12–19 mm, ♀ 22 mm. This is the largest species of the genus. The presence of areas of pale straw yellow scaling on the head, thorax and basal halves of the forewings is characteristic of this species. A prominent black, slightly oblique bar is located between the base of the reniform spot and the base of the inner margin of the forewing in both sexes. The male genitalia are quite similar to those of *D. angulinea*, but the eighth abdominal sternite bears toothed, lateral flanges at the bases of the distal bifurcation, and the aedeagus is slightly less armed with sharp-pointed processes on the apical half of the shaft. The female genitalia are most like those of *D. angulinea* (see Figs. 15 & 18), but *D. tuna* has a broad sclerotized platelike ninth abdominal sternum. The middle of the ninth abdominal sternum of *D. angulinea* is mostly membranous with only some small subtriangular sclerotizations.

Types: The holotype male of *D. tuna* from Colombia and the two syntypes of *Naduna sagittula* Dognin are in the collections of the U.S. National Museum. The syntype of the latter labeled: "Naduna sagittula Dgn. Type ♂"; "Dognin Collec-

tion"; "Canon del Tolima, Colomb., Cent. Cord., 1,700 m, Coll. Fassl"; "♂ genitalia on slide 2153, Mar. 1966, ELT." has been selected, labeled and is now designated the lectotype of that nominal species.

Distribution: Only five specimens of this species have been examined. Three are from localities in Colombia, the other two, both males, are from Sixaola River, Costa Rica, and Porto Bello, Panamá.

Food plant: Unknown.

Dunama mexicana Todd, **new species**

Figs. 3, 6, 13, 17

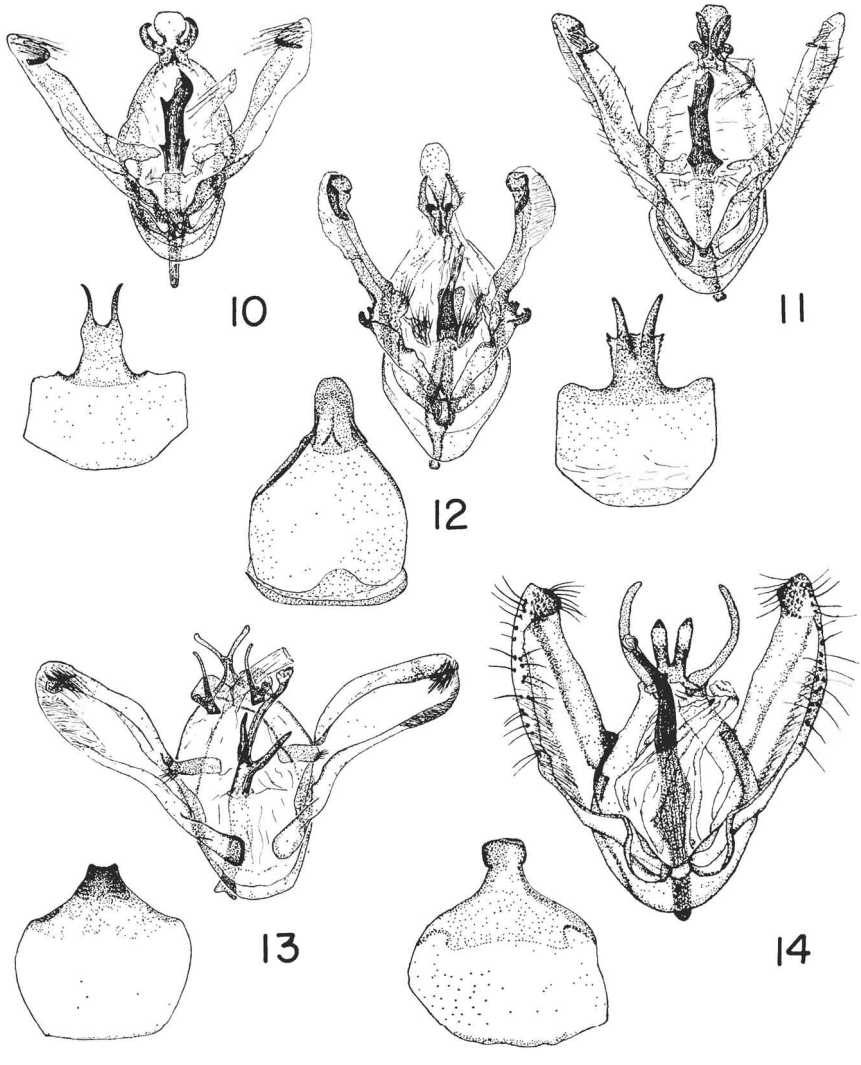
Description: Head with proboscis well developed; labial palpi slightly upcurved to near middle of frons, third segment very small, slightly porrect, second segment about 5 times as long and 2 times as wide, vestiture of short, loose, reddish-brown scales and a few scattered gray scales; frons flat, vestiture loose, scales directed mesoventrad from each side; eyes large, hemispherical, slightly wider than frons in male, subequal to frons in female; antennae of male bipectinate, the pectinations slender, longest at middle of antenna, about 3 times as long as width of article, antennae of female simple. Vestiture of patagia, tegulae and thorax of elongate scales and hairlike setae; patagia with dark brown scales medially, straw yellow scales basally and distally; tegulae nearly uniformly brown; thorax variegated with mixture of reddish-brown and yellowish-brown scales. Abdomen dark brown dorsally, yellowish brown ventrally; dorsal tufts absent. Pectus clothed with long, sparse, yellowish-brown, hairlike setae. Legs of male pale yellowish-brown except trochanter of forelegs dark reddish brown, a dark brown band or apical patch at distal third of tibiae of all legs, and tarsal segments mostly dark brown, each with narrow pale ring at apex. Legs of female usually more uniformly dark brown. Pattern of maculation of dorsal surfaces of wings as illustrated (Figs. 3 & 6); males grayish brown, transverse median band of forewing paler, spots basad of band and in reniform spot dark brown, nearly black; females less maculate and considerably darker brown; ventral surface of wings essentially immaculate in both sexes except some small yellowish-brown, oblique marks on apical half of costal margin of forewing. Length of forewing: male, 11–15 mm, female, 12–17 mm.

Male genitalia distinctive (Fig. 13). Uncus bifid, slender, Y-shaped; aedeagus with two large, spinelike processes from dorsal surface at apical third; ventral margin of valva simple, membranous; posterior margin of eighth abdominal sternite heavily sclerotized and produced medially, upcurved, apex concave. Female genitalia as illustrated (Fig. 17). Posterior margin of ninth abdominal tergum sclerotized and irregularly toothed; ninth abdominal sternite well developed, a deep U-shaped emargination at middle; lateral angles of eighth abdominal sternite flat, sharp-pointed, triangular processes.

Types: Holotype (USNM type no. 64649) male, 6 ♂ and 2 ♀ paratypes, México, reared from "*Chamaedorea elegans*"; 3 ♂ and 2 ♀ paratypes, Tuxapán, V. C., México, reared from "*Chamaedorea elegans*," March 1959, in the U.S. National Museum. One ♂ and 1 ♀ paratype, same data as holotype, in the British Museum (Natural History).

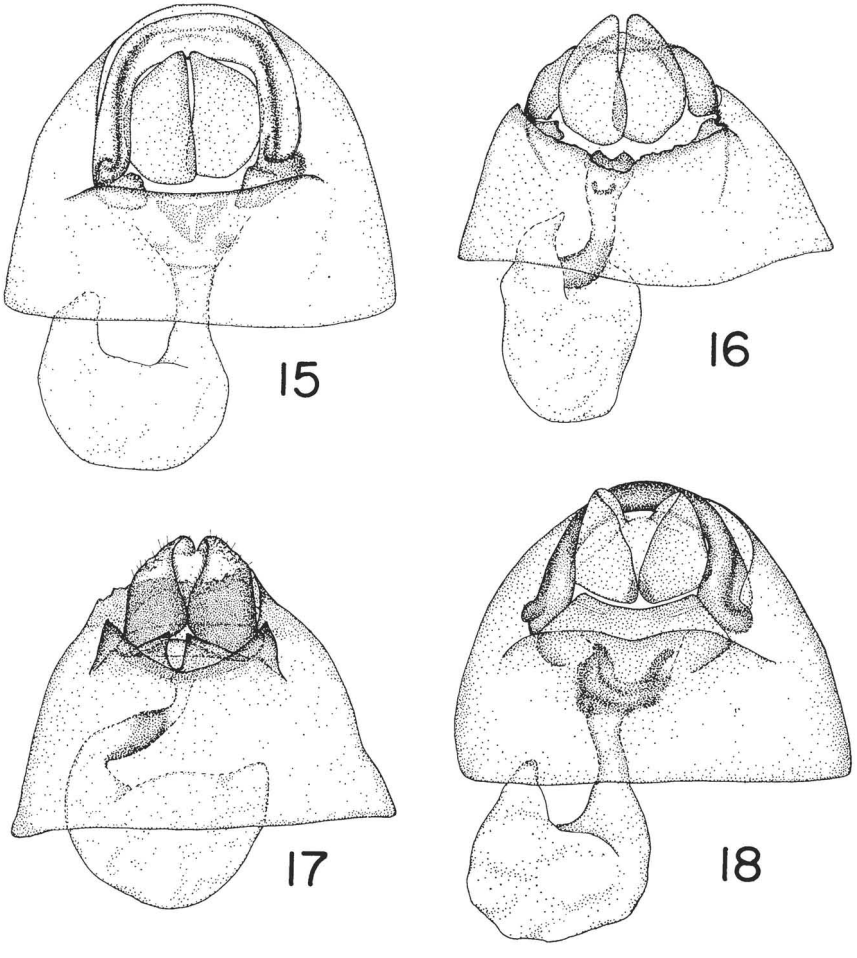
Food plant: Larvae were reared from plants imported by florists as "*Chamaedorea elegans*." There is some question as to the correctness of the identification of the plant, and the original plant material is no longer available for study. Accordingly, the food plant should be listed as *Chamaedorea* sp.

Discussion: The characters given in the key based on maculation and coloration probably will separate most examples from the similar species, *D. angulinea* and *D. claricentrata*, but the genitalia, male or female should be examined for positive identification. There is some question as to the actual area of origin of the plant



Figs. 10–14. Males, genitalia and ninth abdominal sternites of *Dunama* species: 10, *angulinea*, Quirigua, Guatemala; 11, *tuna*, Porto Bello, Panamá; 12, *claricentrata*, holotype, French Guiana; 13, *mexicana*, paratype, México; 14, *ravistriata*, holotype, French Guiana.

material in México. These plants have rather restricted distributions and the collectors of the plants tend to keep their source secret. After several inquiries in an attempt to determine a type locality, I was informed only that the plants came from northern Veracruz. Later specimens stated to be from Tuxapán, Veracruz were received, but it is not possible to state with certainty that either statement is reliable.



Figs. 15–18. Females, genitalia of *Dunama* species: 15, *angulinea*, female, Paraiso, C. Z., Panamá; 16, *ravistriata*, paratype female, Pará, Brazil; 17, *mexicana*, paratype female, México; 18, *tuna*, female, paralectotype of *sagittula*, Río Toche, Colombia.

Dunama ravistriata Todd, **new species**

Figs. 4, 8, 14, 16

Description: Very much like *D. mexicana* except: vestiture of head and thorax generally darker; frons yellowish-brown; patagia pale at base only; medial band of male forewing conspicuous only at base of cell; a pale longitudinal streak present in both sexes from base of forewing through reniform spot toward termen; legs of male darker than in *D. mexicana*. Length of forewing: male, 14–15 mm, female, 14–17 mm.

Male genitalia distinctive (Fig. 14). Uncus bifid, bifurcations stout, only slightly divergent; socii longer than uncus, stouter than in *D. mexicana*; aedeagus with only

one small, thornlike dorsal process at apical fifth; sclerotized caudal process of eighth abdominal sternite with knob-shaped apex. Female genitalia as illustrated (Fig. 16). Posterior margin of eighth abdominal sternite broadly V-shaped and slightly irregularly toothed.

Types: Holotype male, French Guiana, Bar [collector], ♂ genitalia on slide 2120 E. L. Todd, Jan. 1966 (BMNH Notod. 313); 1 ♂ and 4 ♀ paratypes, same locality and collector; 1 ♂ and 9 ♀ paratypes, Pará, Brazil, A. M. Moss; and 1 ♂ paratype, Teffé, Amaz., Brazil, M. de Mathan, in the British Museum (Natural History). One male and 1 ♀ paratypes, Pará [Brazil], A. M. Moss, and 1 ♀ paratype, Goedebert, Maroni, French Guiana, Collection Le Moult, in the U.S. National Museum.

Food plant: Unknown. If a palm, it must be other than the chamaedoreoid group as they do not occur in the area from which the moth is known to occur.

Dunama claricentrata (Dognin), n. comb.

Figs. 5, 12

? *Eunotela claricentrata* Dognin, 1916, p. 13.

Diagnosis: Size, ♂, length of forewing 13 mm. Pattern of maculation as illustrated, similar to that of *D. angulinea* and *D. mexicana*. Some differences in maculation have been noted and utilized in the key to species. It must be pointed out that *D. angulinea* and *D. mexicana* are both somewhat variable in maculation and that *D. claricentrata* may easily prove as variable when specimens other than the holotype are available for study. The male genitalia (Fig. 12) are very distinctive and easily permit the identification of the species. The simple action of brushing the hair and scales from the venter of the distal segments of the abdominal sternum and the valves of the genitalia, if slightly produced, would enable one to view the characters of significance. The uncus is spatulate, but more elongated and more membranous medially and distally than that structure in *D. angulinea* and *D. tuna*; the ventral plate of the abdominal sternite is similar to that structure in *D. mexicana* and *D. ravistriata*, not bifurcate as in the other two species; the strongly toothed ventral margin of the valve and the slightly bilobed, flat dorsal process of the aedeagus are not found in any other *Dunama* species.

Type: The holotype male from Nouveau Chantier, French Guiana is in the collection of the U.S. National Museum.

Food plant: Unknown.

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