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THE GENUS NOTOGRAMMA LOEW

(DIPTERA ACALYPTRATAE, OTITIDAE)

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The genus *Notogramma* was founded by Loew in 1867 with the sole included species *N. cimiciformis*¹ Loew. In 1873 Loew synonymized his species with *N. stigma* (Fabricius, 1798). Curran in 1934 pointed out that the two species were abundantly distinct, but meanwhile Cole in 1923 had described another species, *N. purpuratum*, which is very much like *N. stigma*. There has been much confusion of these three species. It is hoped that this review of the genus, which occurs in tropical and subtropical parts of the New World and in one species, *N. cimiciforme*, on several Pacific Islands as well, will correct misunderstandings of long duration and broaden our knowledge of the group. A new species from Peru in the collections of the U. S. National Museum is also described in a new subgenus as *Notogramma (Euacaina) cactipcodes*, sp. nov.

In 1961, I published a figure of the postabdomen of the male of *N. cimiciforme* and pointed out characters which align the genus with the Otitinae rather than with the Ulidiinae, where it had previously been placed. The characters of the new species, *N. (E.) cactipcodes*, still more definitely than those of the previously described species, show relationships with the Otitinae and indicate that the generic distinctions in the "Ulidiinae," especially between the genera *Notogramma* Loew, *Acrosticta* Loew, *Euxesta* Loew, *Ocdopa* Loew, *Parocdopa* Coquillett, *Stictomyia* Bigot, etc., should be reviewed. *Notogramma* has many of the characters of the more typical Otitinae, such as the genera *Tetanops* Fallen, *Curranops* Harriot, and *Tujunga* Steyskal.

Genus *Notogramma* Loew

1867, Berlin. Entomol. Z. 11: 289, type by monotypy, *N. cimiciforme* Loew; 1873, Smithsn. Inst. Misc. Collect. 256: 148; Aldrich, 1905, Smithsn. Inst. Misc. Collect. 46: 594; Williston, 1908, Man. N.

¹The generic name is obviously a Greek compound of neuter gender. The specific name should therefore be spelled *cimiciforme*.

Am. Dipt., 3d ed.: 278; Heudel, 1910, Gen. Ins., fasc. 106: 58; Curran, 1934, Fam. Gen. N. Am. Dipt.: 275; 1934, Bull. Am. Mus. Nat. Hist. 66 (3): 429; Steyskal, 1952, Occas. Papers Bishop Mus. 20 (15): 278; 1961, Ann. Entomol. Soc. Am. 54: 404.

KEY TO KNOWN SPECIES OF NOTOGRAMMA LOEW

- 1 (6). Vertex and tip of scutellum acute in profile; pattern of disc of mesonotum tending to longitudinal stripes.....Subgenus **Notogramma** s.s.
- 2 (3). Mesopleura pale pruinose with pattern of dark dots; brown costal border of wing not interrupted; *male*: aedeagus with a few small teeth in midsection; aedeagal apodeme simple, without apical arms or anterior shelf.....**N. cimiciforme** Loew
- 3 (2). Mesopleura unpatterned, with pale pruinosity thin or absent; brown costal border of wing interrupted beyond tip of R_1 ; *male*: aedeagus with very small teeth in midsection; aedeagal apodeme forked apically and with anterior shelf.
- 4 (5). Interantennal area sloping on each side down to antennal sockets, bright white pruinosity narrow (fig. 2a); *male*: apical arms of aedeagal apodeme pointed, lance-like; projections of epandrium simple, pointed (fig. 2).....**N. stigma** (Fabr.)
- 5 (4). Interantennal area broader, with rectangular lateral margins, white pruinosity divided medially by duller gray to brownish portion when viewed anteriorly (fig. 1a); *male*: apical arms of aedeagal apodeme expanded, blunt; projections of epandrium blunt, appearing two-toothed in anterior view (fig. 1).....**N. purpuratum** Cole
- 6 (1). Vertex and tip of scutellum rounded in profile; disc of mesonotum with pattern of spots which do not coalesce to form stripes; *male*: aedeagus with several long and strong retrorse teeth in midsection; aedeagal apodeme euneiform, without apical arms or anterior shelf (fig. 3).....

..... Subgenus **Euacaina** nov.; **N. (E.) cactipeodes**, sp. nov.
 Subgenus **Notogramma** s. s.

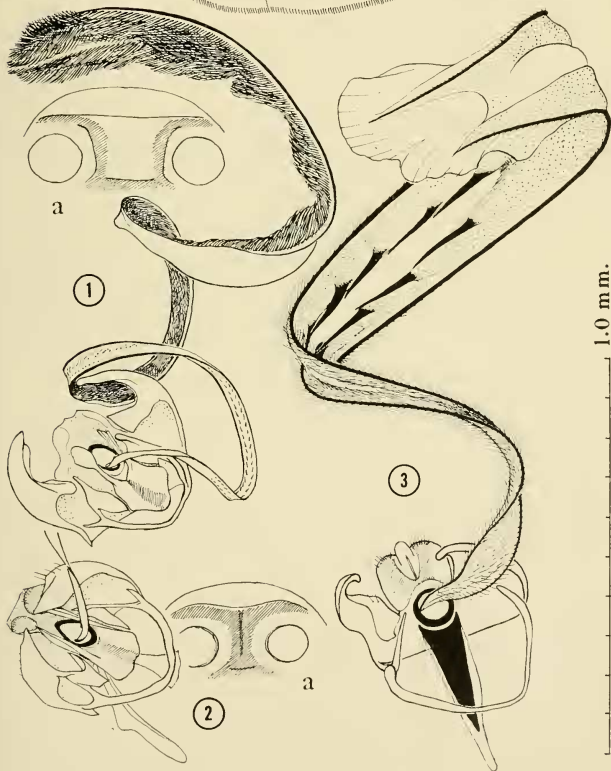
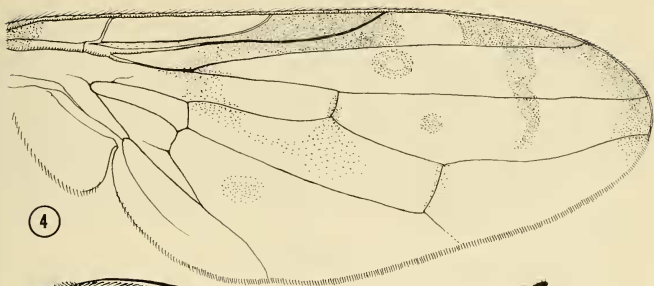
N. (N.) cimiciforme Loew

1867, Berlin. Entomol. Z. 11: 289; Steyskal, 1961, Ann. Entomol. Soc. Am. 54: 409.

N. stigma auctt. pro parte, nec Fabr.: Loew, 1873, Smithsn. Inst. Misc. Collect. 256: 148; Aldrich, 1905, Smithsn. Inst. Misc. Collect. 46: 595; Severin and Hartung, 1912, J. Econ. Entomol. 5: 448; Swezey, 1913, Proc. Hawaiian Entomol. Soc. 3: 4; Knab, 1916, Bull. Brooklyn Entomol. Soc. 11: 41; Johnson, 1919, Bull. Am. Mus. Nat. Hist. 41: 444; Gowdey, 1927, Cat. Ins. Jamaica: 86; Swezey, 1946, Bishop Mus. Bull. 189: 199; Bohart and Gressitt, 1951, Bishop. Mus. Bull. 204: 104; Steyskal, 1952, Occas. Papers Bishop Mus. 20 (15): 283; Joyee, 1953, Proc. Hawaiian Entomol. Soc. 15: 374.

The characters cited in the preceding key and my figure of the male postabdomen (Steyskal, 1961, p. 409, fig. 16) should make this species

Fig. 1. **Notogramma purpuratum** Cole, Saguaro Natl. Mon., Ariz.—oblique anteroventral view of andrium; *a*—interantennal area. Fig. 2. **N. stigma** (Fabr.), Santiago, Cuba—oblique anteroventral view of andrium, less most of aedeagus; *a*—interantennal area. Figs. 3, 4. **N. (Euacaina) cactipeodes** Steyskal, sp. nov., Santa Eulalia, Peru—3, anteroventral view of andrium; 4, right wing.



easy to recognize. The type was from Cuba. I have seen material from Texas (Harlingen; Brownsville), Cuba (El Gabriel; Havana), Jamaica, Mexico (Piactla, Sin.; Quintana Roo; Sta. Engracia, Tam.); Honduras (Tegucigalpa), Costa Rica, Panama (Canal Zone; Jaque R.; Darien Prov.; La Jolla; Panama), Venezuela (Carapito), Colombia (Cali District), Ecuador, Peru (Iquitos), Brazil (Campinas, São Paulo; nr. Pará; Manaos) Hawaii, Marianas Is. (Guam; Saipan; Tinian), Palau Is. (Arakabesan I.), and Wake I. Some of the records in the literature may refer to *N. stigma* (West Indies) and *N. purpuratum* (Texas). The species has been reared from rotting tomatoes, immature coconuts, bananas, liver, wild tuber, *Solanum* fruits, and fruits of *Attalea* palms.

N. (N.) purpuratum Cole

(Fig. 1)

1923, Proc. Calif. Acad. Sci. 12: 474.

? *N. stigma* (F.) Hunter, Pratt, and Mitchell, 1912, U. S. Dept. Agr. Bur. Entomol. Tech. Bull. 113: 53.

The type was from Monserrate Island, Baja California. I have seen many specimens from Texas (Dallas; Beeville; Starr Co.), Arizona (Lowell Ranger Sta. and Saguaro Natl. Mon., both in Pima Co.), California (Loma Linda, San Bernardino Co.; 5 mi. s. Loma Linda, Riverside Co.; Los Angeles), Mexico (54 mi. n. San Luis Potosi; San Geronimo, Oax.; San Jose del Cabo, Baja Calif.). Ryckman (unpublished data) has reared the species from several genera of cacti.

The characters cited in the key are the only reliable ones I have found to separate *N. purpuratum* from *N. stigma*. Both have the same type of aedeagus. The spots on the wing and the body color are quite variable.

N. (N.) stigma (Fabricius)

(Fig. 2)

Musca stigma, 1798, Ent. Syst., suppl.: 593; 1805, Syst. Antl.: 303.

Dacus obtusus Fabricius, 1805, Syst. Antl.: 278; Wiedemann, 1830, Auss. Zweifl.: 565.

Ulidia stigma (F.) Wiedemann, 1830, Auss. Zweifl.: 565.

Notogramma stigma (F.) Loew, 1873, Smithsn. Inst. Misc. Collect. 256: 148, pro parte; Hendel, 1910, Gen. Inst., fasc. 106: pl. 3, fig. 75, pro parte; Curran, 1928, Sci. Surv. Porto Rico (N. Y. Acad. Sci.) 11 (1): 78; Wolcott, 1936, J. Agr. Puerto Rico 20 (1): 374.

N. purpurata (Cole) Foote, 1960, J. N. Y. Entomol. Soc. 68: 99, *misidentification*.

Most citations subsequent to those of Fabricius are doubtful and have been cited under *N. cimiciforme*. Even Hendel's figure of the wing in Genera Insectorum (1910) looks much like an attempt to show the hyaline costal mark of *N. stigma* on a wing of *N. cimiciforme*.

The type was collected "in Americae Insulis." A note in J. M. Aldrich's card catalogue in the U. S. National Museum indicates that the type could not be found in Copenhagen in 1929. The lack of men-

tion of spots on the pleura, together with the statement in the Fabrician description "alae albae punctis quinque fuscis costaque fusca puncto distincto hyalino," is sufficient to identify the species in the West Indies. No specimen of *N. purpuratum* has been seen from "American Islands" east of Mexico. I have seen 34 specimens of *N. stigma*, all from the West Indies: one each from Santiago, Cuba, and Ensenada, Puerto Rico; 6 from Virgin Is. (Desecheo Id.; Mona Id.); 3 from the Bahamas (San Salvador Id.; Exuma Cays; St. Inagua Id.); 5 from Jamaica; and 18 from Antigua.

Subgenus **Euacaina** Steyskal, nov.

The most conspicuous structural characters of *Notogramma*, the acute vertex and tip of scutellum, are not developed here, the front is only moderately pitted, and the cheek wrinkles are not strong, but all other external characters of shape, color, type of wing pattern and venation are those of *Notogramma*. The male postabdomen has a simple aedeagal apodeme, lacking either fork or anterior shelf, and the aedeagus bears a double row of 4 or 5 strong retrorse spines in the middle part and many hairs in the basal three-fourths or more. Type of subgenus, the following species.

N. (Euacaina) cactipeodes Steyskal, sp. nov.

(Figs. 3, 4)

Male. Length of wing, 4.1 to 4.7 mm. Color mostly pitchy dark brown to black, with moderate bluish-green metallic reflections and four longitudinal purplish metallic stripes on mesonotum. Reddish: front, except ocellar triangle and vertical plates; parafacials; cheeks; anterior face of humerus; lower basal part of third antennal segment; basal $\frac{3}{4}$ of swollen basal part of arista. Yellowish: anterior basitarsi, basal two segments of middle and hind legs. Nearly whole body covered with whitish pruinosity, which is definitely absent only on sides of 4th and all of 5th abdominal tergites and on anterior cheeks, very thin on mesopleura, face, clypeus, and scutellum, and quite dense on anterior coxae, propleura, central mesonotum (where it is of yellowish cast and broken by shining spots at bases of hairs and bristles), stripe from lower posterior orbits to oral margin, and dorsum of abdominal segments 1 to 4. All hairs and bristles black, except those of labellae, fore and hind basitarsal brushes, which are yellowish, and squamal cilia, which are white.

Head with front moderately pitted, parallel-sided, 0.34 of total width of head; ocelli in triangle almost twice as long as wide, with a pair of small divergent ocellars placed midway between anterior and posterior ocelli; fronto-orbitals 2, the anterior of which is approximately $\frac{2}{3}$ as long as the posterior and placed a little farther anterad of anterior ocellus than the ocellars are placed posterad therefrom; frontal hairs coarse, in 8 irregular longitudinal rows in anterior part of front. Parafacials at narrowest part half as wide as third antennal segment. Cheeks 0.6 as high as eye, anteriorly with a few shallow wrinkles running vertically and posteriorly with strong hairs but without distinct bristles. Face strongly broadened below and deeply arcuate, so that lower margin of clypeus is a little higher than lower lateral edges of face, in profile concave, interantennal space 0.4 as wide as front, subshining, wrinkled. Antennae extending to upper margin

of clypeus, third segment ovate, 1.8 times as long as wide; arista bare, 2.5 times as long as third antennal segment, swollen basal part 0.12 of total length. Palpi flat and broad, dull black with narrow apical yellow border.

Thorax quadrate, a little narrower than head; scutellum convex, smooth, 0.6 as long as wide. Chaetotaxy: 1 *h*; 2 *utpl*; 1 *sa*; 2 *pa*; 2 *dc* (anterior half as long as posterior); 1 *prsc* in line with posterior *dc*; 2 *sc*; 1 fine *ppl*, 1 strong and 2 or 3 weak *mspl*, 1 posterior *stpl*. Intradorsocentral hairs anteriorly in 8 irregular rows; posternum haired laterally; propleura with a few black hairs; mesopleura with coarse scattered hairs; scutellum with 2 or 3 coarse laterodorsal hairs on each side.

Legs of shape and length normal in *Notogramma*, *Acrosticta*, and *Euxesta*; middle basitarsi with short spinules below.

Wings as in figure 4, hyaline, with dark-brown pattern in which there is a tendency for central part of spots to be pale; veins brown, yellowish at root of wing.

Abdomen flattened, approximately as long as thorax and of same width as length; fifth tergite lightly transversely wrinkled; tergite 2 three-fourths as long as 3, 4 of the same length as 3, 5 half again as long as 4; all segments with scattered short hairs. Postabdomen as in figure 3, in repose completely withdrawn into segment 5.

Female. Length of wing, 4.5 to 4.8 mm. Similar to male, except in sexual characters; dorsum of preabdomen wholly densely pruinose, whitish marginally and pale brownish centrally; ovipositor nearly shining black, basal segment approximately as long as wide, tip very slender.

Holotype (male), allotype, and 28 paratypes (14 of each sex), PERU, Santa Eulalia, em.(erged) XI-25-36, bred from rotten *Cereus* (cactus), no. 335-36 (Dr. J. E. Wille), in U. S. National Museum (Type No. 66419), except one pair of paratypes in American Museum of Natural History. The locality is northwest of Chosica, in the Department of Lima.

I wish to thank Dr. Paul Arnaud, Jr., and the authorities of the American Museum of Natural History for the loan of an important series of specimens.

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