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STATUS OF THE PYRAUSTID MOTHS OF THE GENUS LEUCINODES IN THE NEW WORLD, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES

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A PYRAUSTID species, listed in the literature as *Leucinodes elegantalis* Guenée, has recently attracted considerable attention as a pest of tomatoes in South America, particularly in the states of Paraná and Minas Gerais, Brazil, where severe damage to crops has been reported. In addition to actual damage due to the larvae, further losses have been incurred by the application of regulatory measures by some countries restricting the movement of shipments from areas where the insect is known to occur.

In 1942 adults of *Leucinodes elegantalis* Guenée were reared by inspectors of the Division of Foreign Plant Quarantines, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, from larvae intercepted at Laredo, Tex., in shipments of tomatoes from Tampico, Tamaulipas, Mexico.

Critical examination of the *Leucinodes* material in the collection of the United States National Museum revealed that the series were mixed, often containing several species, and that the characters heretofore used for recognizing the species, such as the relative lengths of second and third segments of labial palpus or slight differences in maculation, were inadequate. This study was undertaken to furnish reliable characters by which *elegantalis* could be separated from the species closely related to it, and also to determine definitely the extent of its distribution.

There has been some confusion in the literature regarding the type of the genus *Leucinodes* Guenée. Hampson, applying his first-species rule, cited *Leucinodes elegantalis* Guenée as its type in his Fauna of British India (Moths) (vol. 4, p. 370, 1896). The citation was repeated in his treatment of the subfamily Pyraustinae in the Proceedings of the Zoological Society of London (1898, p. 756) and was followed by A. Klima in the Junk Lepidopterorum Catalogus (pt. 94, p. 302, 1939). According to the International Rules of Zoological Nomenclature, its use is made invalid by the prior citation of *Leucinodes orbonalis* Guenée as the type by Walker in his Catalogue of Lepidopterous Insects in the British Museum (vol. 17, p. 392, 1859). Therefore, the valid type of *Leucinodes* Guenée is *orbonalis* and not *elegantalis*.

Leucinodes orbonalis is an Old World (Ethiopian and Oriental regions) species and was described from one male ("Inde centrale") and one female (Java). In Ceylon and India it has been reported as a pest of *Solanum melongena* L. (eggplant). It occurs also in South Africa, Burma, Sumatra, China, and the Philippine Islands, but so far as is known it is not established in the New World.

This change of type for the genus requires the reassignment of our American species heretofore placed in *Leucinodes*, since none of them are congeneric with *orbonalis*, which has the frons with a strong conical production; forewing with vein 10 separate from veins 8, 9; uncus with distal spines dorsal; harpe with two strong hooks, one originating from near base of costa, and the other from near middle of lower margin; anellus narrow, acuminate, with two short, oblique, median projections. The American species differ from *orbonalis* in type of frons, venation, genitalia, or a combination of them.

Material other than that at the United States National Museum was made available for study from the collections of Cornell University by W. T. M. Forbes; American Museum of Natural History by C. D. Michener; and Transvaal Museum, Pretoria, South Africa, by A. J. T. Janse.

It is apparent from the material at hand that a natural grouping of the Old World species will require the removal of some from *Leucinodes*. However, since a number of them are not represented in the available material, and their types inaccessible at this time, this treatment is confined to those species occurring in the New World. None of the species occurs in both the Old and the New World. All the American species, except one, are represented in the collection of the United States National Museum.

Since venation is much the same throughout the entire subfamily, with only a few exceptions, and the third segment of the labial palpus different for the sexes, to secure a natural grouping of the species in

the Pyraustinae will require the extensive use of genitalic characters. To avoid needless repetition in generic diagnoses, characters common to those treated here are as follows: Antenna simple, slightly annulate. Maxillary palpus minute. Labial palpus upturned, first segment rather heavily scaled below, fringelike, the scales projected distally; second segment moderately scaled below and with a similar projection; third segment porrect, without such fringe or projection. Forewing (pl. 6, figs. 7, 8) with vein 1a running into vein 1b near middle (often difficult to distinguish except in denuded or cleared material); vein 3 from slightly before angle of cell; veins 4 and 5 separate; vein 7 from cell, slightly curved and approximate to vein 8, 9 for about one-sixth its length; veins 8 and 9 stalked. Hind wing (pl. 6, fig. 7A) with cell long, extending to about middle of wing; vein 3 from slightly before angle of cell; veins 4 and 5 separate; vein 6 from upper angle of cell, often anastomosed with 7 for a short distance; vein 7 anastomosing with vein 8 for some distance beyond the cell. Hind tibia with two pairs of subequal spurs.

KEY TO THE GENERA TREATED

1. Forewing with vein 10 distinctly out of stalk of veins 8 and 9 (pl. 6, fig. 7).
Neoleucinodes, new genus
 Forewing with vein 10 from the cell (in occasional specimens contiguous or partially anastomosed with stalk of veins 8 and 9) (pl. 6, fig. 8)----- 2
2. Frons with conical production conspicuous----- 3
Proleucinodes, new genus
 Frons evenly rounded or only slightly produced; not conically as above.
3. Male genitalia with harpe simple, unarmed-----Euleucinodes, new genus
 Male genitalia armed with clasper-----Leucinodes Guenée

Genus LEUCINODES Guenée

Leucinodes GUENÉE, Histoire naturelle des insectes lépidoptères, deltoïdes et pyralites, p. 221, 1854.—WALKER, List of the lepidopterous insects in the collection of the British Museum, vol. 17, p. 392, 1859.—LEDERER, Wein. Ent. Monatschr., vol. 7, p. 440, 1863.—MOORE, Lepidoptera of Ceylon, vol. 3, p. 288, 1883.—HAMPSON, Fauna of British India (Moths), vol. 4, p. 370, 1896; Proc. Zool Soc. London, 1898, pp. 598, 755.—SHIBUYA, Journ. Fac. Agr. Hokkaido Imp. Univ. Sapporo, vol. 22, pp. 172, 244, 1898.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 302, 1939. (Type: *Leucinodes orbonalis* Guenée, designation by Walker, 1859.)

Remarks.—Old World species (Ethiopian and Oriental regions).

NEOLEUCINODES, new genus

Type.—*Leucinodes elegantalis* Guenée.

With characters noted for the group and in addition: Frons evenly rounded. Forewing with vein 10 distinctly out of stalk of veins 8 and 9 (pl. 6, fig. 7). Male genitalia (pl. 6, fig. 9) with spines of uncus dorsal; gnathos absent; harpe with clasper. Female genitalia (pl. 9, fig. 17) without signum; ductus bursa long and slender.

Remarks.—Easily distinguished from *Leucinodes* Guenée by absence of conical frons and forewing with vein 10 from stalk of veins 8 and 9 (such venation abnormal for the subfamily, vein 10 normally from cell). A New World genus, tropical or subtropical in distribution.

KEY TO SPECIES OF NEOLEUCINODES

Males

1. Harpe armed with a single clasper (pl. 6, fig. 9)----- 2
Harpe armed with a clasper and an ampullalike attenuate process (pl. 7, fig. 13)-----5. *imperialis* (Guenée)
2. Harpe with clasper postmedial, nearer to apex than to base (pl. 7, figs. 11, 12)----- 4
Harpe with clasper medial or antemedial (as near or nearer to base of harpe than to apex) (pl. 6, figs. 9, 10)----- 3
3. Aedeagus with cornutus axlike in shape (pl. 6, fig. 10a)---2. *dissolvens* (Dyar)
Aedeagus with cornutus a simple, straight spine-----1. *elegantalis* (Guenée)
4. Aedeagus stout, cornutus a long, slender, curved spine, somewhat expanded basally (pl. 7, fig. 11A)-----3. *prophetica* (Dyar)
Aedeagus slender, armature a short stout hook and a narrow concave sclerotization (pl. 7, fig. 12A)-----4. *torvis*, new species

Females

1. Bursa copulatrix with a narrow saclike appendage (pl. 10, figs. 20, 21)----- 2
Bursa copulatrix simple, without such appendage (pl. 9, figs. 17-19)----- 3
2. Sclerotization along ventral margin of genital opening continuous, with a median fold (pl. 10, fig. 20)-----4. *torvis*, new species
Sclerotization of genital opening discontinuous ventrally, the sclerotization restricted to the sides (pl. 10, fig. 21)-----5. *imperialis* (Guenée)
3. Ventral margin of genital opening with sclerotization strong, a narrow continuous band, and with a membranous pouchlike invagination (pl. 9, fig. 19).
3. *prophetica* (Dyar)
Ventral margin of genital opening membranous, or only slightly sclerotized; without such invagination (pl. 9, figs. 17, 18)----- 4
4. Ductus bursa narrow; expansion of bursa copulatrix anteriorly from junction with ductus bursa evident (pl. 9, fig. 17)-----1. *elegantalis* (Guenée)
Ductus bursa wider; expansion of bursa copulatrix anteriorly from junction with ductus bursa gradual, junction hardly discernible (pl. 9, fig. 18).
2. *dissolvens* (Dyar)

1. NEOLEUCINODES ELEGANTALIS (Guenée)

PLATE 5; PLATE 6, FIGURES 7, 7a, 9, 9a; PLATE 9, FIGURE 17

Leucinodes elegantalis GUENÉE, Histoire naturelle des insectes lépidoptères, deltoids et pyralites, p. 222, pl. 3, fig. 8, 1854.—HAMPSON, Proc. Zool. Soc. London, 1898, p. 756.—DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 278, 1914.—TORRES, Bol. Minist. Agr. Inc. e Comm. (Rio de Janeiro), vol. 12, No. 2, pp. 38-46, 1923.—HAMBELTON, Insect Pest Survey Bull., U. S. Dept. Agr., vol. 12, No. 7, p. 342, 1932; Insect Pest Survey Bull., U. S. Dept. Agr., vol. 13, No. 2, p. 63, 1933.—BALLOU, Insect Pest Survey Bull., U. S. Dept. Agr., vol. 13,

No. 9, p. 222, 1933.—MONTE, Bol. Agr. Zootecn. Vet. Minas Geraes (Belo Horizonte), vol. 6, No. 6, pp. 357-359, 1933.—PINTO DA FONSECA, Arch. Inst. Biol., vol. 5 (São Paulo), pp. 263-289, 1934.—WOLCOTT, Journ. Agr., Univ. Puerto Rico, vol. 20, No. 1, p. 463, 1936.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.—SCHAUS, Scientific survey of Porto Rico and the Virgin Islands, New York Acad. Sci., vol. 12, pt. 3, p. 360, 1940.—LE PAGE, Biológico, vol. 10, No. 2, pp. 42-46, 1944; Rev. Applied Ent., vol. 33, ser. A, pt. 3, p. 94, 1945.

Adult.—Male (pl. 5, fig. 1): Antenna simple, slightly annulate, length of cilia approximately equal to thickness of shaft near base. Labial palpus upturned, cinnamon-brown, occasionally with a few scattered dark fuscous scales; second and third segments scaled below, the first segment rather heavily (fringelike), with scales projected distally; second segment moderately scaled with similar distal projection; third segment porrect, without such scaling below or distal projection; length of third segment one-half or less than one-half that of second segment. Frons evenly rounded, cinnamon brown intermingled with some dark fuscous and occasionally a few white scales. Posterodorsal area of head and also that between the antennae often with the white scales predominant.

Thorax (dorsal view) a mixture of brown, dark fuscous, and white scales, with the white often more abundant on the prothorax and appearing as a white patch; thorax (ventral view) white.

Abdomen (dorsal view) with a conspicuous white band composed of all the first and variable portions of second and third segments, remainder of segments a mixture of cinnamon brown and dark fuscous scales; abdomen (ventral view) with all the first and a greater portion than dorsally of the second and third segments white; other segments paler than on dorsum. Small concolorous lateral tufts present but often difficult to distinguish (lost on worn specimens).

Wings white, somewhat hyaline, with conspicuous squamous areas of cinnamon brown and dark or blackish fuscous as figured. Anterior transverse line of forewing distinctly concave. In flown specimens some of the markings are almost lost (particularly the patch from costa between the transverse anterior line and the reniform), the areas being only faintly indicated by the narrow border of dark fuscous scales.

Alar expanse, 15-33 mm.

Genitalia with harpe slender, elongate, and apex much narrower than base; clasper slender, scalpel-like, and in relation to lower margin of harpe the clasper from near middle or distinctly nearer to base than to apex (pl. 6, fig. 9). Aedeagus (pl. 6, fig. 9A) slender; cornutus a simple spine, not conspicuously expanded at base.

Female: Antenna simple, slightly annulate, length of cilia slightly less than width of shaft near base. Labial palpus as in male except

with third segment longer, its length approximately equal that of second segment. Similar otherwise to male in color and maculation.

Alar expanse, 15–30 mm.

Genitalia (pl. 9, fig. 17) with genital opening broad; ductus bursa long, slender, with a narrow sclerotized collarlike structure slightly anterior to origin of ductus seminalis; membranous or only slightly sclerotized between the collar and genital opening, the sclerotization, if present, stronger anteriorly; bursa copulatrix simple, expansion from junction with ductus bursa evident.

Larva.—Arrangement of body setae is that of typical pyraustid (pl. 5, fig. 6). Prothorax with two setae on the prespiracular shield; group VI bisetose. Meso- and metathorax with group VI unisetose. Abdominal segments 3–6 with seta IV approximate to seta V, under the spiracle. Ninth abdominal segment with paired setae II on same pinaculum; seta I approximate to seta III and on same pinaculum; setae IV and V absent, only seta VI of this group present. Crochets on abdominal prolegs irregular or triordinal in length; often arranged in a complete circle but usually weaker or interrupted outwardly (at least on some of the prolegs).

Mature larva 15–20 mm. long, robust, and conspicuously tapered posteriorly (ninth abdominal and anal segments greatly reduced in size). Body color white or pinkish. Body setae without conspicuous sclerotized, pigmented pinacula at their bases, the pinacula usually concolorous with adjacent body area and slightly raised (blisterlike), particularly on meso- and metathorax. Prothoracic shield pale yellow, markings light brown, without a conspicuous blackish reniform spot posterior to seta Ib. No anal fork. Head a little wider than high; pale yellow, reticulation indistinct (pl. 5, fig. 2); lateral view (pl. 5, fig. 3), slightly rounded and not appreciably flattened; with a short, rather broad dark fuscous pigmentation along incision from hind margin; ocellus II much closer to ocellus I than to ocellus III; a dark fuscous pigmentation along ocellar arc, the intensity of the pigmentation distinctly weaker in area between ocelli II and III; seta O_1 tangent to or anterior to a line joining centers of ocelli II and III. Mandible with lower ventral rib of oral surface smooth, except for a minute toothlike projection from near base of lower tooth.

This combination of characters will serve to distinguish the larvae of *elegantalis* from all other American larvae known to me that are associated with eggplant or tomato. The pale, concolorous, or only slightly pigmented body pinacula of *elegantalis* larvae will distinguish them from those of *orbonalis*, which have the pinacula rather strongly sclerotized and a distinct ochereous or brownish pigmentation. Larvae of *elegantalis* also have seta O_1 tangent to or anterior to a line connecting centers of ocelli II and III while those of *orbonalis* have seta O_1 distinctly posterior to such line.

Pupa.—Color light to dark brown; 12–15 mm. long. Typical pyraustid (pl. 5, fig. 5), with cremaster; dorsum of abdominal segments smooth and without spinelike armature; a prominent hoodlike protuberance above the spiracle on abdominal segments 2 and 3 (pl. 5, fig. 4). Pupation is above ground, the pupa enclosed in a fragile cocoon attached to dried leaves or other debris.

Type.—Originally in the Guenée collection; present location unknown.

Type locality.—Brazil.

Food plants.—*Cyphomandra betacea* Sendt., *Lycopersicon esculentum* Mill. (tomato), *Solanum melongena* L. (eggplant), and *Solanum sisymbriifolium* Lam.

Distribution.—CUBA: Baracoa and Santiago (January). PUERTO RICO: Bayamon and Guayama (March, April). JAMAICA (no date). GRENADA (no date). TRINIDAD (no date). MEXICO: Jalapa, Córdoba, Orizaba, and Tampico in Veracruz; Mante, Tamaulipas; Chapala, Jalisco; Caleras, Colima; Rosario, Sinaloa (October, December, January, February). GUATEMALA: Purulha, Volcán Santa María (no dates). COSTA RICA: San José, Río Segundo, and Saxiola River (March, November). PANAMA: Barro Colorado Island, Cabima, Paraiso, Río Trinidad, Taboga Island (February, March, May, June). PERU: Hullaga (no date). ECUADOR: Loja (March). COLOMBIA: San Antonio (November). VENEZUELA: Aroa San Estaban, Carabobo, Los Tigres (October, December). BRITISH GUIANA: Tumatumari, Potara River (June). FRENCH GUIANA: St. Jean Maroni (no date). BRAZIL: Castro Paraná, Minas Gerais (October). PARAGUAY: Villarica (March, September). ARGENTINA: Concordia, Entre Ríos (July).

Number of specimens examined, 109.

Remarks.—The damage to crops where *elegantalis* occurs ranges from unnoted in such places as Cuba and Puerto Rico, negligible in Mexico (Tamaulipas, 1945–46 season), to as high as 30 or 80 percent in Paraná and Minas Gerais, Brazil. No satisfactory methods have been reported for the control of *elegantalis* where environmental conditions are optimum for its building up and maintaining large populations. The effective application of control is complicated by its larval habits. The larvae are strictly borers, feeding only in the fruits. Soon after hatching, the young larva bores into the young fruit and as the fruit develops the entrance hole is closed. Thus a fruit that looks perfectly normal, even under a hand lens, may contain one or several larvae. It is only when the larva is mature or about mature and has the exit hole complete or nearly complete that there are signs to indicate its presence inside the fruit. The number of larvae per fruit is usually one, two, or three, but as many as 18 have been found in a single fruit.

Further investigations, no doubt, will reveal some parasites which attack it and also additional food plants.

2. NEOLEUCINODES DISSOLVENS (Dyar)

PLATE 6, FIGURES 10, 10a; PLATE 9, FIGURE 18

Leucinodes dissolvens DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 278, 1914.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Male.—Closely resembles *elegantalis* but separable from it by the transverse anterior line of forewing; for *elegantalis* the line is strongly concave (pl. 5, fig. 1) while for *dissolvens* it is straight and outwardly oblique from costa to vein 1b where it is angled inwardly to hind margin of wing (angled portion often indistinct in flown specimens).

Alar expanse, 14–22 mm.

Genitalia similar to those of *elegantalis* but averaging smaller in size and with the harpe relatively stouter (pl. 6, fig. 10), and the cornutus expanded basally, somewhat axlike in shape (pl. 6, fig. 10a).

Female.—Similar to male in color and maculation.

Alar expanse, 20–25 mm.

Genitalia (pl. 10, fig. 18) very much like those of *elegantalis* but with expansion of ductus bursa gradual anteriorly, its juncture with the bursa copulatrix indefinite.

Type.—U.S.N.M. No. 16159.

Type locality.—St. Jean Maroni River, French Guiana.

Food plants.—Unknown.

Immature stages.—Unknown.

Distribution.—ECUADOR: Loja. FRENCH GUIANA: Cayenne, St. Jean Maroni, and St. Laurent du Maroni. DUTCH GUIANA (SURINAM): Moengo Boven, Cottica River (May). BRAZIL: São Paulo do Olovenia Amazonas (November, December).

Fifteen specimens examined.

Remarks.—Dissection of the genitalia shows that the specimen from Aroa, Venezuela (Schaus collection), noted by Dyar when he described the species, is *prophetica* and not *dissolvens*.

3. NEOLEUCINODES PROPHETICA (Dyar), new status

PLATE 7, FIGURE 11, 11a; PLATE 9, FIGURE 19

Leucinodes elegantalis var. *prophetica* DYAR, Proc. U. S. Nat. Mus., vol. 47, p. 278, 1914.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Male.—Maculation similar to that of *dissolvens* but with the oblique transverse anterior line of forewing somewhat slenderer and cilia of antenna a little longer than those of *dissolvens*.

Alar expanse, 14–16 mm.

Genitalia similar to those of *dissolvens* but with clasper closer to apex than base of harpe (pl. 7, fig. 11); cornutus distinctly curved and narrowly, somewhat irregularly expanded at base (pl. 7, fig. 11a).

Female.—Similar to male in color and maculation.

Alar expanse, 15–21 mm.

Genitalia (pl. 9, fig. 19) with sclerotization of ventral margin of genital opening continuous; with a pouchlike membranous invagination.

Type.—U.S.N.M. No. 16158.

Type locality.—Río Trinidad, Panama.

Food plant.—Unknown.

Immature stages.—Unknown.

Distribution.—PUERTO RICO: Adjuntas (June). GUATEMALA: Cacyuga (April), Tequisatl (April, May). COSTA RICA: Avangarez, Carillo, Sixaola River (July, September). PANAMA: Río Trinidad (March, June), Barro Colorado, Canal Zone (February). PERU: Tinguiri, Carabaya. VENEZUELA: Aroa. BRAZIL: Rio de Janeiro (June).

Nineteen specimens examined.

Remarks.—Easily confused with *dissolvens* and some small specimens of *elegantalis*, but a good species and not a variety of *elegantalis*, there being no difficulty in separation by means of genitalia.

4. NEOLEUCINODES TORVIS, new species

PLATE 7, FIGURES 12, 12a; PLATE 10, FIGURE 20

Male.—Antenna simple, slightly annulate, with the cilia very short (pubescentlike), length much less than width of shaft. Palpus, head, thorax, and abdomen whitish or pale ochreous, with some white and light fuscous scales intermingled. Abdomen without conspicuous white band anteriorly. Wings sordid white with maculation similar to that of *elegantalis* but with the markings more obscure and the medial patch on hind margin of forewing narrower, not conspicuously broadened posteriorly. Transverse anterior line of forewing slightly oblique, thin and indistinct; often not discernible on worn specimens.

Alar expanse, 11–15 mm.

Genitalia similar to those of *elegantalis* but with the harpe broader distally and the clasper near to apex than base of harpe (pl. 7, fig. 12); armature of aedeagus a small, narrow, concave sclerotization and a short, stout, hooklike process (pl. 7, fig. 12a).

Female.—Similar to male in color and maculation. Antenna slightly slenderer than that of male.

Alar expanse, 12–18 mm.

Genitalia (pl. 10, fig. 20) with sclerotization along ventral margin of genital opening continuous, with a median fold or crease; bursa copulatrix with a slender saclike extension.

Type.—U.S.N.M. No. 58278.

Type locality.—Santiago, Cuba.

Food plant.—*Solanum torvum* Sw.

Immature stages.—No specimens or data other than food-plant record available.

Distribution.—CUBA: Baracoa, Santiago de las Vegas, Habana (June, November). PUERTO RICO: Coama Springs (April), Bayamon (May), San Germán (September), Lares (August), Río Piedras (August), and Utado. JAMAICA, GRENADA (June), DOMINICA (June), VIRGIN ISLANDS, ST. CROIX (October, November). MEXICO: Córdoba, Veracruz (April), La Gloria Cordel, Veracruz (January). GUATEMALA: Cayuga, Quirigua (November). COSTA RICA: Carillo (March). PANAMA: Corozal (November), Carro Saddle (May), Paraiso (February), Porto Bello (April, May, November), Río Trinidad (March), Taboga Island (March), and Tabernilla. PERU: Bonita, Pura(?) (July). BRAZIL: Viscosa, Minas Gerais (October). BRITISH GUIANA: Bartica (June), Mackenzie, Demarara River (June). DUTCH GUIANA: Moengo Boven, Cottica River (May). FRENCH GUIANA: St. Jean Maroni.

Number of specimens examined, 139.

Remarks.—Well-marked specimens resemble small examples of *elegantalis*, *dissolvens*, and *prophetica* but are easily separated from them by the very short pubescentlike cilia of antenna. Rubbed specimens also easily confused with *imperialis*, the species that follows, which has similar antenna but which has a distinct white anterior abdominal band not possessed by *torvis*.

Paratypes in collections of the American Museum of Natural History, Cornell University, Transvaal Museum (Pretoria, South Africa), and British Museum.

5. NEOLEUCINODES IMPERIALIS (Guenée)

PLATE 7, FIGURES 13, 13a; PLATE 10, FIGURE 21

Leucinodes imperialis GUENÉE, Histoire naturelle des insectes lépidoptères, deltoids et pyralites, p. 223, 1854.—HAMPSON, Proc. Zool. Soc. London, 1898, p. 756.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Leucinodes (?) *discerptalis* WALKER, List of lepidopterous insects in the collection of the British Museum, vol. 34, p. 1313, 1865.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Leucinodes discerptalis Walker, HAMPSON, Proc. Zool. Soc. London, 1898, p. 756.

Male.—Strongly marked specimens resembling small specimens of *elegantalis* but with the wings more immaculate and the rather large brown, medial patch from hind margin of forewing absent or hardly discernible. Transverse anterior line of forewing brown, rather than blackish fuscous. Abdomen, thorax, and brownish markings of wings paler than *elegantalis*, with little if any intermingling of dark

fuscous scales. Abdomen with a whitish anterior band. Antenna with cilia very short (pubescentlike); length much less than width of shaft.

Alar expanse, 16–18 mm.

Genitalia (pl. 7, fig. 13) with the harpe rather short; clasper short and slender, near lower margin and about one-fifth length of harpe from apex; a rather stout attenuate sclerotized process originating from costa of harpe. Aedeagus with two opposed attenuate processes (pl. 7, fig. 13a).

Female.—Similar to male in color and maculation.

Alar expanse, 14–20 mm.

Genitalia (pl. 10, fig. 21) resemble those of *torvis* but stouter; genital opening with sclerotization along lateral margins, the sclerotization interrupted ventrally. Bursa copulatrix with a saclike extension.

Types.—Originally in Guenée collection; present location unknown (*imperialis*). In British Museum (*discerptalis*).

Type localities.—Haiti (*imperialis*); Limas, Honduras (*discerptalis*).

Food plant.—Unknown.

Immature stages.—Unknown.

Distribution.—COSTA RICA: Carillo (March), Juan Vinas (June), Tuis (May, September). PANAMA: Cabima (August), La Chorrera (May), Porto Bello (May), Tabernilla (no date), Río Trinidad (March, June). BRAZIL: Paraná (no date), Viscosa, Minas Gerais (October), Rio de Janeiro (no date).

Number of specimens examined, 33.

Remarks.—Sometimes confused with worn specimens of *elegantalis*, *dissolvens*, *prophetica*, and *torvis*. The very short (pubescentlike) cilia of the antenna will separate it from all these but the latter, from which it may be distinguished by the whitish anterior abdominal band.

PROLEUCINODES, new genus

Type.—*Leucinodes melanoleuca* Hampson.

With characters common to the group and in addition: Frons evenly rounded, or if produced, only moderately so, not strongly conical. Forewing with vein 10 from cell, closely approximate to, contiguous, or partially anastomosed with stalk of veins 8 and 9. Male genitalia (pl. 8, fig. 15) with spines of uncus ventral; gnathos absent; harpe without clasper.

Remarks.—Members of this genus readily separated from those of *Neoleucinodes* by vein 10 of forewing, and from *Leucinodes* by the simple unarmed harpe.

KEY TO SPECIES OF PROLEUCINODES

Males

1. Anellus slightly constricted near middle; distal half crinkled, deeply incised medially (pl. 8, fig. 15). Aedeagus expanded distally, cornutus a strong, curved hook (pl. 8, fig. 15a)-----6. *melanoleuca* (Hampson)
 Anellus narrowly constricted near middle, without such median incision (broadly concave distally) (pl. 8, fig. 16). Aedeagus narrowed distally, cornutus absent (pl. 8, fig. 16a)-----7. *xylopastalis* (Schaus)

1. PROLEUCINODES MELANOLEUCA (Hampson)

PLATE 8, FIGURES 15, 15a

Leucinodes melanoleuca HAMPSON, Ann. Mag. Nat. Hist., ser. 8, vol. 11, p. 323, 1913.—KLIMA, in Junk, Lepidopterorum catalogus pt. 94, p. 304, 1939.

Male.—Resembles large specimens of *elegantalis* but with the wings a little broader, apex of forewing less produced and excavation of margin between apex and vein 4 shallower. Dorsum of head and thorax white, irrorated with a few fuscous scales. Palpus dorsally and laterally brownish fuscous; ventrally near base whitish irrorated with brown and fuscous. Frons white and fuscous, the fuscous predominant. Abdomen with a white band anteriorly; the white scales overlaid with brown and fuscous posteriorly. Forewing (except marginal areas) more hyaline, without a large conspicuous brownish median patch from hind margin, such area being absent or but faintly indicated by a few scattered brownish-fuscous scales; area bordering excavation whitish with a few dark scales. In *elegantalis* this area a conspicuous cinnamon-brown patch. Discocellulars of hind wing enclosed by a narrow fuscous line forming an irregularly shaped figure 8 instead of a simple, narrow, elongate patch.

Alar expanse, 32–34 mm.

Genitalia (pl. 8, fig. 15) stout; uncus ventrally spined; gnathos absent; harpe simple, without a clasper; vinculum attenuate; anellus broad, slightly constricted, medially incised and with the distal half crinkled. Aedeagus with cornutus a strong hook (pl. 8, fig. 15a).

Three specimens examined.

Type.—In British Museum.

Type locality.—Cerro de Pasco, Huancabamba, Peru.

Food plant.—Unknown.

Immature stages.—Unknown.

Distribution.—PERU: Huancabamba (6,800 feet alt.).

Remarks.—Female unknown.

2. PROLEUCINODES XYLOPASTALIS (Schaus)

PLATE 8, FIGURES 16, 16a

Leucinodes xylopastalis SCHAUS, Ann. Mag. Nat. Hist., ser. 8, vol. 9, p. 305, 1912.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Male.—Antenna simple, slightly annulate, length of cilia approximately equal to width of shaft near base. Resembles *melanoleuca* in habitus but with general appearance dull buff instead of white and with maculation less conspicuous, lacking dark fuscous patches of scales. Forewing with outer margin whitish with a narrow border of buff and a slightly darker subparallel subterminal line. Hind wing with outer margin ochreous white with a narrow border of buff and a postmedial line subparallel from costa to about midway between veins 3 and 2 where it is bent sharply inward toward cell to slightly below outer angle of cell and then continuing unevenly to hind margin.

Genitalia somewhat broader than *melanoleuca* (pl. 8, fig. 16); uncus spines ventral; gnathos absent; harpe simple, without clasper; vinculum broad, not conspicuously attenuate; anellus broad basally, without transverse crinkles or median incision; aedeagus simple, without cornutus (pl. 8, fig. 16a).

Four specimens examined.

Type.—U. S. N. M. No. 17584.

Type locality.—Volcano Turrialba, Costa Rica.

Food plant.—Unknown.

Immature stages.—Unknown.

Distribution.—COSTA RICA: Volcano Turrialba (August). GUATEMALA: Volcano Sta. María (June, July). MEXICO: Chiapas (June).

Remarks.—Female unknown.

3. PROLEUCINODES LUCEALIS (Felder and Rogenhofer)

PLATE 10, FIGURE 22

Leucinodes lucealis FELDER and ROGENHOFER, *Reise Novara*, Lepid. Het., p. 13, pl. 135, fig. 3, 1874.—HAMPSON, Proc. Zool. Soc. London, 1898, p. 756.—KLIMA, in Junk, *Lepidopterorum catalogus*, pt. 94, p. 304, 1939.

Female.—Antenna simple, slightly annulate; cilia very short (pubescentlike), length of cilia much less than width of shaft near base. Palpus scaled with a mixture of white, brown, and a few fuscous scales, the brown predominant dorsally. Abdomen brown with an anterior white band. Similar to *elegantalis* in habitus but with conspicuous differences in maculation, viz: The hyalinate area of wings with a slight ochreous tinge. Forewing with brownish area bordering excavation between apex and vein 4 broader near costa, slightly constricted near middle, the border continuous to hind margin; a rather large brown patch adjacent to but separated from it by a narrow white line, the area extending from vein 5 to hind margin with a short, dark fuscous, concave line between it and the median patch on hind margin; a small conspicuous blackish or dark fuscous patch or spots on outer margin in lower half of the excavation. Hind wing with the cinnamon-brown outer band extending from apex to

vein 3, darker and broader, the inner margin of band with a narrow fuscous border; an adjacent short subparallel dark fuscous line extending from costa to vein 5; a small elliptical brown patch with narrow fuscous border on the discocellulars and one or two similiar but irregularly shaped patches on inner margin, one slightly antemedial and the other, if present, near outer angle of wing.

Alar expanse, 22–25 mm.

Genitalia (pl. 10, fig. 22) with margin of genital opening membranous; without a distinct sclerotized collarlike structure near origin of ductus seminalis; bursa copulatrix simple, bulbous; signum absent; ductus bursa short, narrowly constricted.

Six specimens examined.

Type.—In Tring Museum.

Type locality.—"Amazonas."

Food plant.—Unknown.

Immature stages.—Unknown.

Distribution.—FRENCH GULANA: St. Laurent du Maroni, St. Jean Maroni. BRAZIL: Rio Iça-Putumayo (August).

Remarks.—No male specimens available for examination.

EULEUCINODES, new genus

Type.—*Euleucinodes conifrons*, new species.

With characters noted for the group and in addition: Frons conically produced. Forewing with vein 10 from cell, not from stalk of veins 8 and 9. Male genitalia with spines of uncus dorsal; gnathos absent; harpe unarmed, without clasper.

Remarks.—Easily separated from *Leucinodes* by the unarmed harpe, from *Neoleucinodes* by vein 10 of forewing from cell and the unarmed harpe, and from *Proleucinodes* by the dorsal spining of uncus.

EULEUCINODES CONIFRONS, new species

PLATE 6, FIGURE 8; PLATE 8, FIGURES 14, 14a

Male.—Antenna simple, slightly annulate; cilia short, length much less than width of shaft near base. Frons strongly produced, conical. Palpus, head, and thorax white irrorated with brown and fuscous. Abdomen with anterior white band; fuscous and brown predominant posteriorly. Wings white with conspicuous brown and fuscous squamous markings. In general appearance resembles large specimens of *elegantalis* but with several notable differences, viz.: Forewing with brownish area bordering excavation between apex and vein 4 less conspicuous, paler and smaller with a considerable intermixture of white scales; brown median patch on hing margin broad, extending to transverse anterior line and toward cell to anal fold,

the patch not conspicuously attenuate anteriorly; transverse anterior line blackish, rather broad and sharply angled outwardly to slightly before middle of vein 2 and then angled sharply inward, reaching hind margin of wing at a point almost directly posterior to point of origin on costa.

Alar expanse, 28 mm.

Genitalia (pl. 8, fig. 14) stout; gnathos absent; uncus with spines dorsal; harpe without clasper; anellus simple, broad, ovate; vinculum broad, not produced. Aedeagus with numerous small scobinations distally and a cluster of short, stout, cornuti (pl. 8, fig. 14a).

Type.—In American Museum of Natural History.

Type locality.—Río Morona, Peru.

Food plant.—Unknown.

Immature stages.—Unknown.

Remarks.—Described from a single specimen in material loaned by the American Museum of Natural History and labeled: "Río Morona, Peru 13.I.25, F 6199," "H. Bassler Collection, Acc. 33591." Since this is the only one of the closely related New World genera with a conical frons, there should be no difficulty in recognizing the female when encountered. To date representation of the insect fauna of Peru is very meager in our collections. It is likely that additional species will be added as more material becomes available from this region.

SPECIES WITH GENERIC PLACEMENT UNCERTAIN

Leucinodes impuralis (Felder and Rogenhofer) HAMPSON, Proc. Zool. Soc. London, 1898, p. 756.—KLIMA, in Junk, Lepidopterorum catalogus, pt. 94, p. 304, 1939.

Glyphodes (?) *impuralis* FELDER and ROGENHOFER, Reise Novara, Lepid. Het., p. 10, pl. 135, fig. 2, 1874.

Type.—In Tring Museum.

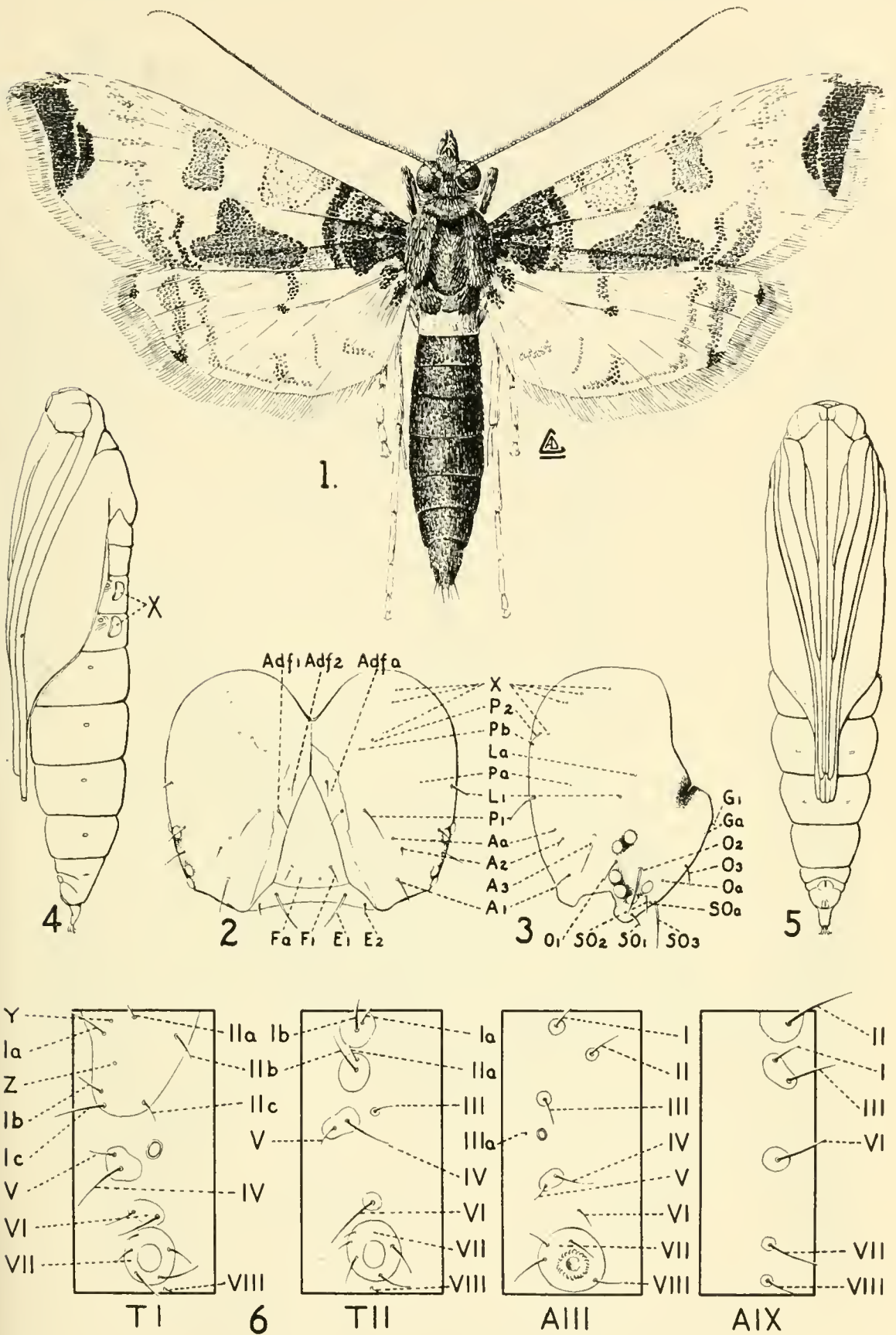
Type locality.—Santo Domingo, West Indies.

Remarks.—No specimens of this species available for examination. Judged from the figure illustrating the species, it may or may not belong in one of the genera treated here, but it certainly is not a *Leucinodes*.

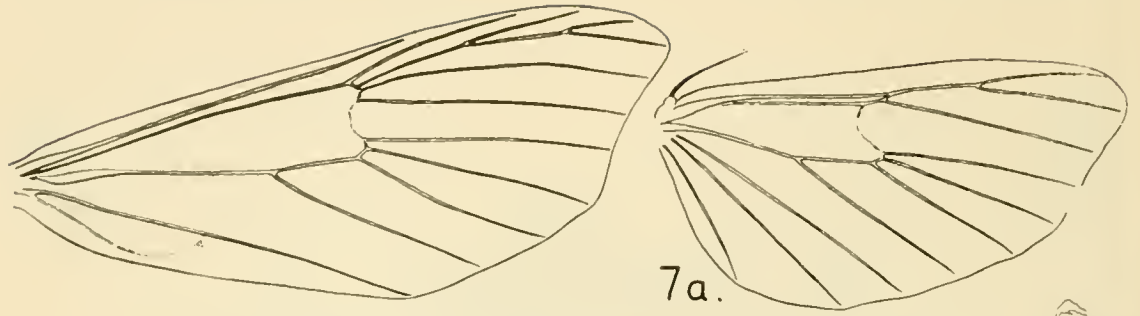
NOTE

The drawings for the plates were made by Arthur D. Cushman, scientific illustrator of the U. S. Bureau of Entomology and Plant Quarantine. All the drawings are from ventral view. Male genitalia have the aedeagus removed, and since they are symmetrical the left harpe has been left incomplete or omitted. In some cases only the right harpe and aedeagus are figured.

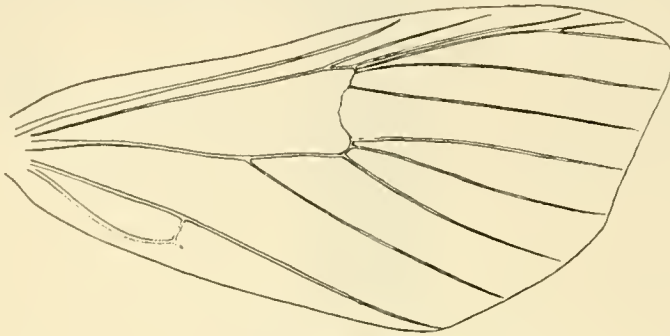




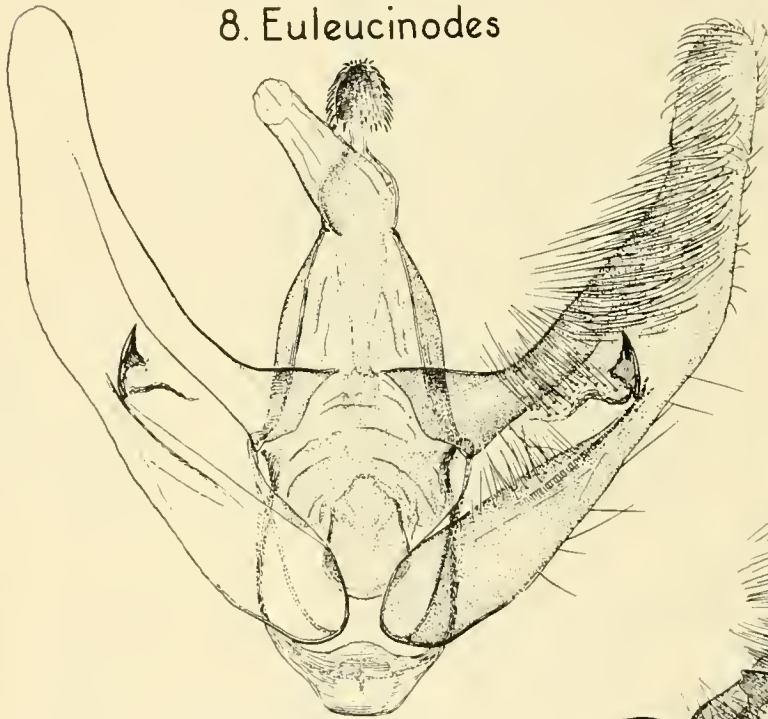
Neoleucinodes elegantalis (Guenée): 1, Adult male, dorsal view; 2, head capsule of larva showing chaetotaxy, front view; 3, same, lateral view; 4, pupa, indicating hoodlike protuberances (X) on abdominal segments 2 and 3; 5, pupa, ventral view; 6, semi-diagrammatic setal map of prothorax, metathorax, third and ninth abdominal segments.



7. *Neoleucinodes*



8. *Euleucinodes*

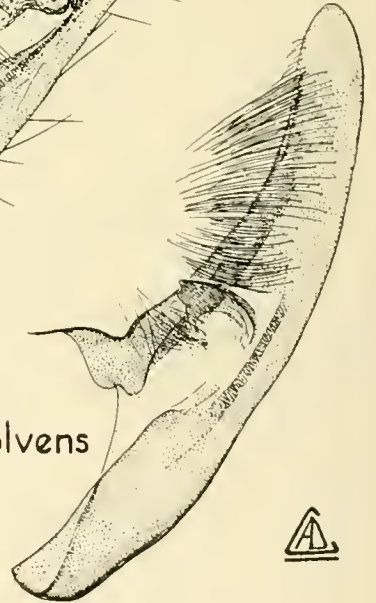


9. *N. elegantalis*

9a.



10. *N. dissolvens*



10a.



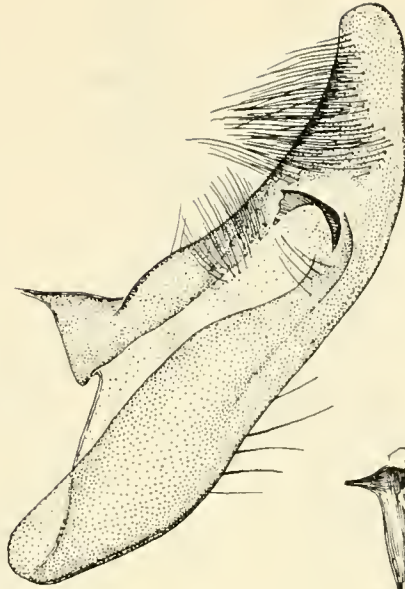
7, 9, *Neoleucinodes elegantalis* (Guenée): 7, 7a, Venation of fore and hind wings; 9, male genitalia; 9a, aedeagus.

8, *Euleucinodes conifrons*, new species: Venation of forewing.

10, *Neoleucinodes dissolvens* (Dyar): 10, Right harpe; 10a, aedeagus.



11a.



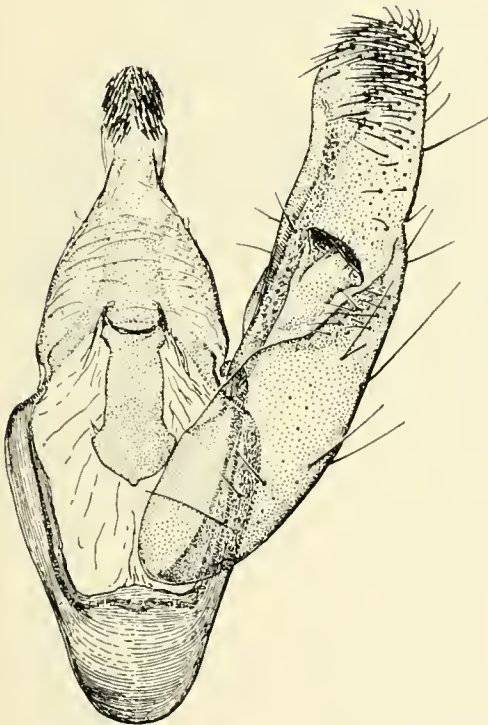
11. *N. prophetica*



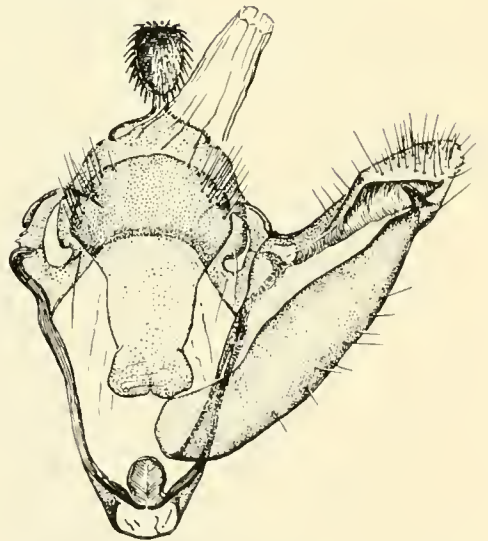
12a.



13a.



12. *N. torvis*



13. *N. imperialis*



11, *Neoleucinodes prophetica* (Dyar): 11, Right harpe; 11a, aedeagus.

12, *Neoleucinodes torvis*, new species: 12, Male genitalia; 12a, aedeagus.

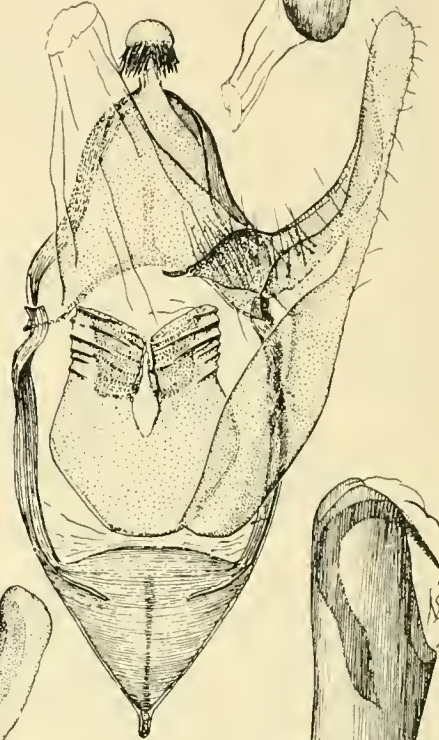
13, *Neoleucinodes imperialis* (Guenée): 13, Male genitalia; 13a, aedeagus.



14. *E. conifrons*



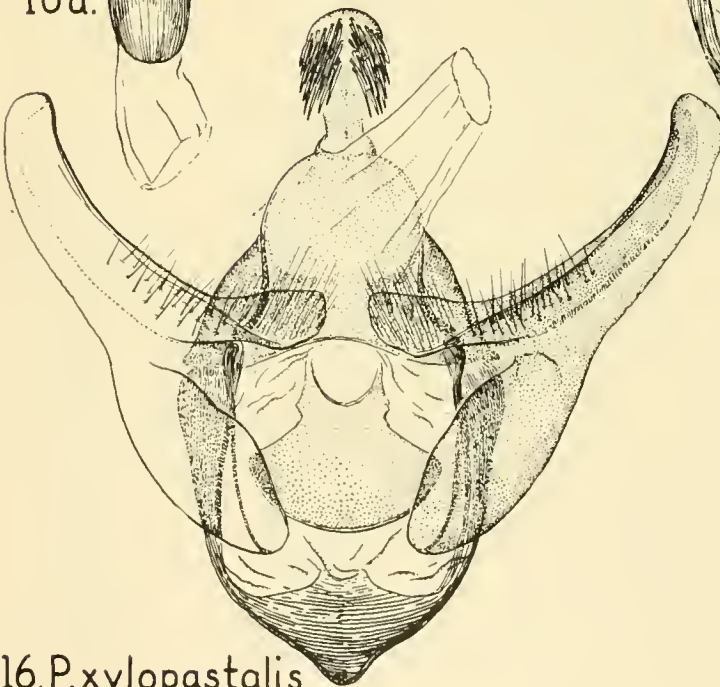
14a.



15. *P. melanoleuca*



16a.

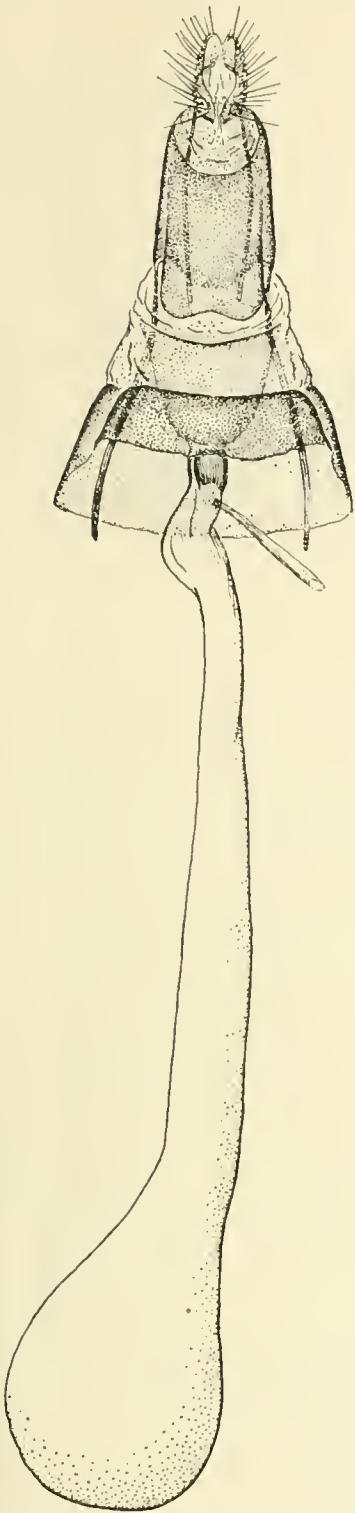


16. *P. xylopastalis*

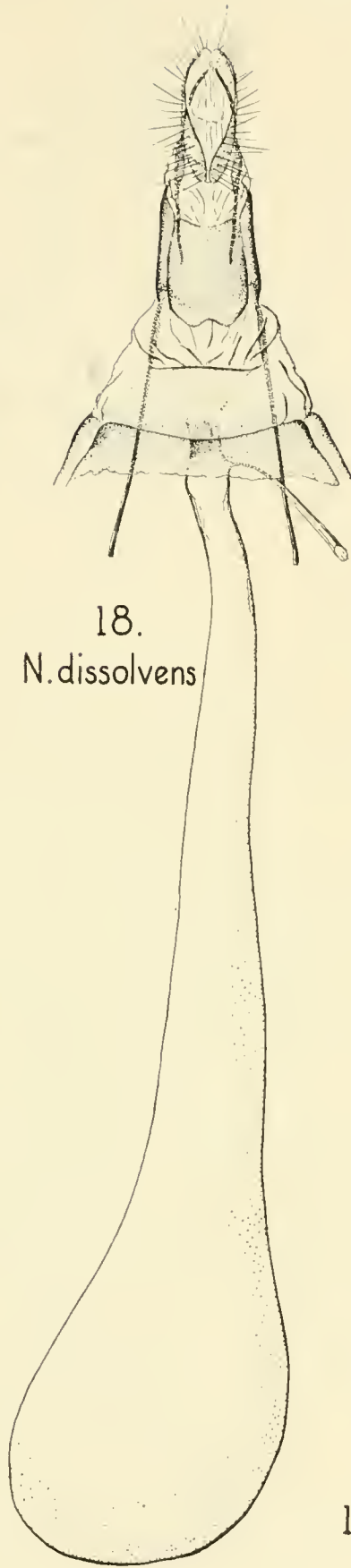


15a.

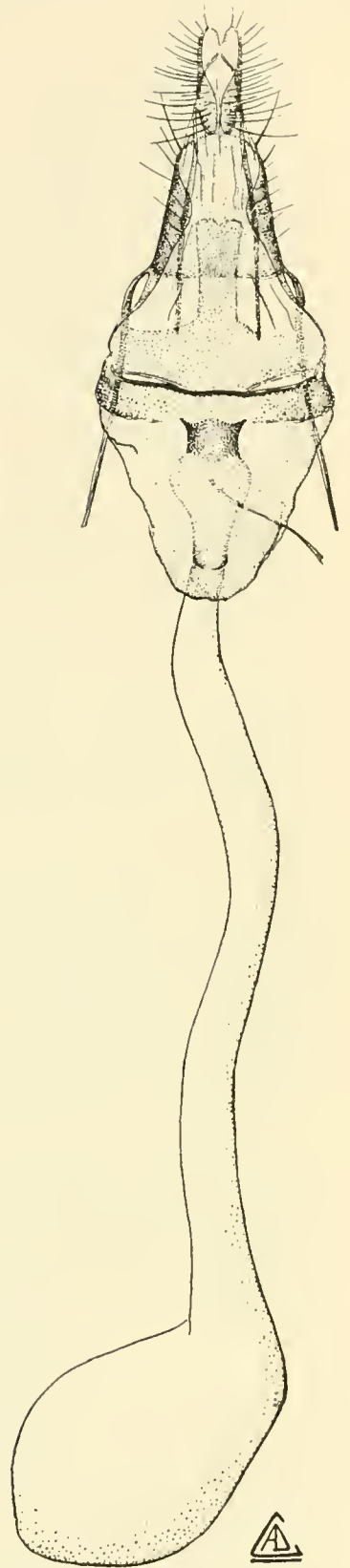
14, *Euleucinodes conifrons*, new species: 14, Male genitalia; 14a, aedeagus.
15, *Proleucinodes melanoleuca* (Hampson): 15, Male genitalia; 15a, aedeagus.
16, *Proleucinodes xylopastalis* (Schaus): 16, Male genitalia; 16a, aedeagus.



17. *N. elegantalis*

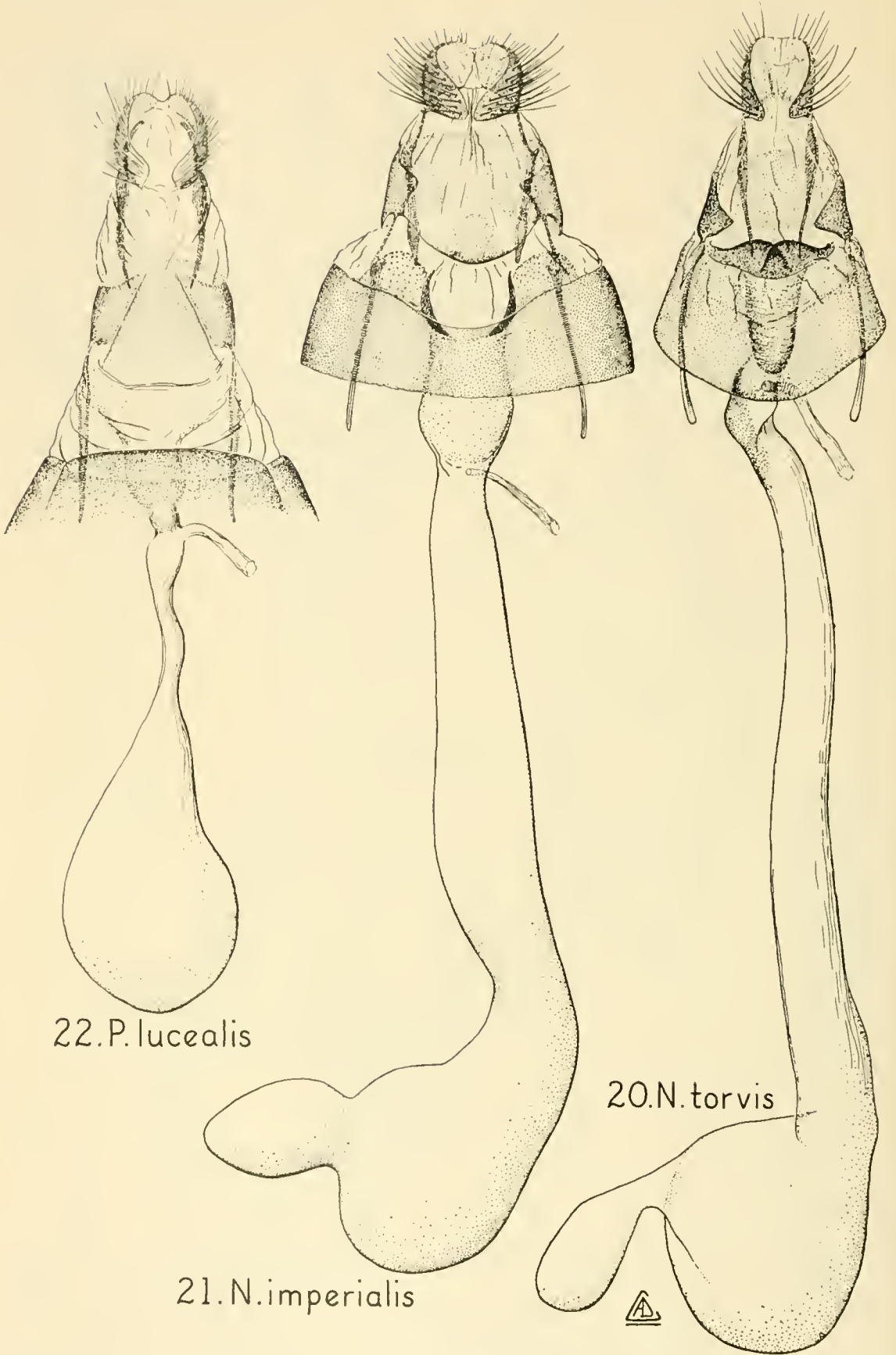


18.
N. dissolvens



19. *N. prophetica*

- 17, *Neoleucinodes elegantalis* (Guenée): Female genitalia.
18, *Neoleucinodes dissolvens* (Dyar): Female genitalia.
19, *Neoleucinodes prophetica* (Dyar): Female genitalia.



22. *P. lucealis*

21. *N. imperialis*

20. *N. torvis*

20, *Neoleucinodes torvis*, new species: Female genitalia.
21, *Neoleucinodes imperialis* (Guenée): Female genitalia.
22, *Proleucinodes lucealis* (Felder and Rogenhofer): Female genitalia.