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NEOTROPICAL LANTERNFLIES OF THE GENUS *PHRICTUS* IN THE UNITED STATES NATIONAL MUSEUM,
WITH DESCRIPTIONS OF FOUR NEW SPECIES

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THE Neotropical genus *Phrictus* (Homoptera: Fulgoridae¹) was established by Spinola in 1839² for the unique species *Fulgora diademata* Linnaeus. Since that time various species have been described by Signoret, Distant, Schmidt, Lallemand, and Metcalf; in 1905 Schmidt presented a key to the known species, which was modified by Metcalf in 1938.

For such large and truly spectacular insects the species are relatively little known and their classification is in a confused state, probably because their descriptions have been extremely inadequate and very few have been illustrated. Specific identification has been based largely on color and marking, characters that are often variable in intensity and exactness of pattern, while the structural characters generally emphasized concern the form of the grotesque cephalic process, which in most cases cannot be adequately described. The length of this structure relative to the length of the pronotum has, in the past, served to segregate the species into groups, which in turn have been broken down into the respective species on the basis of color. This method of identification is almost a necessary evil, because the most

¹ Even though *Fulgora* Linnaeus is a synonym of *Laternaria* Linnaeus (Fennah, Proc. Biol. Soc. Washington, vol. 57, pp. 43-44, 1944), in the selection of a family name I follow the principle proposed by C. W. Sabrosky (Verh. VII Int. Kong. Ent., vol. 1, pp. 602-603, 1939).

² Ann. Soc. Ent. France, vol. 8, pp. 216-221, 1839.

pertinent structural characters of both the cephalic process and the genitalia defy description. The median notch in the caudal margin of the pronotum and the furcation of the median carina around this notch also furnish constant specific characters. In final analysis the male aedeagus, first illustrated by Metcalf, is of excellent value for identification purposes, but it must be remembered that the aedeagi in the Fulgoridae are inflatable and that they present a very different appearance when inflated than when deflated. The females possess good genital characters in that parts of the first valvulae are heavily sclerotized and ornate with spurs and ridges. Although these valvulae are not radically differentiated among the species, they are relatively constant within each species, and a comparison of the accompanying drawings will readily demonstrate their specific value.

The purpose of this paper is to present the more pertinent structural characters of the genus, together with characters of color and pattern, in the hope that some of the present confusion may be cleared up and that recognition of the species may be made a much easier task.

Because four undescribed species are added here, and because *notatus* Lallemand is not included in any existing key, a revision of the key is presented here. Unfortunately, *xanthopterus* Schmidt³ and *notatus* Lallemand⁴ are known to the writer by their descriptions only. The order in which the species are discussed follows a tentative phylogenetic arrangement.

ARTIFICIAL KEY TO THE KNOWN SPECIES OF PHRICTUS

1. Cephalic process flattened apically, transversely arcuate, lacking definite apical teeth..... *auromaculatus* Distant
 Cephalic process with 5 apical teeth..... *quinquepartitus* Distant
 Cephalic process with 3 apical teeth..... 2
2. Hind wings with large hyaline apical spots..... *ocellatus* Signoret
 Hind wings without hyaline apical spots, but small pruinose areas sometimes present..... 3
3. Elytra scarlet, continuous broad yellow transverse fasciae present.
tripartitus Metcalf
 Elytra some shade of green or brown, transverse fasciae if present interrupted medianly..... 4
4. Basal area of hind wing yellow, golden, or orange..... 5
 Basal area of hind wings red to scarlet..... 8
5. Black or fuscous area in hind wings covering apical three-fourths; cephalic process longer than pronotum..... *regalis*, new species
 Black or fuscous area in hind wings covering apical one-third or less; cephalic process shorter than pronotum..... 6
6. Basal area of hind wings golden yellow; elytra flecked with yellow and brown..... *xanthopterus* Schmidt
 Basal area of hind wings orange..... 7

³ Ent. Zeit. Stettin, vol. 71, pp. 144-146, 1910 (Ecuador).

⁴ Ent. Tidskr., vol. 52, pp. 188, 1931 (Ecuador).

7. Elytra yellowish, irregularly maculate over all with brown; hind wings not maculate..... *sordidus*, new species
 Elytra brown, maculate in basal two-thirds with small round orange spots; hind wings maculate with brown *notatus* Lallemaud
- 8 (4). Elytra green in basal two-thirds, with a few small round red or orange maculae; apical third with large brown maculae..... 9
 Elytra brown or reddish brown..... 10
9. Teeth in apex of cephalic process obtuse, somewhat deflected caudad; median carina of pronotum definitely forked caudad..... *moebiusi* Schmidt
 Teeth in apex slender, not deflected caudad; pronotal carina not definitely furcate..... *hoffmannsi* Schmidt
10. Elytra some shade of reddish brown, with pink calloused areas present, especially basally; cephalic process toothed on ventral surface.
diadema (Linnaeus)
 Elytra brown, maculate with yellow; cephalic process smooth beneath... 11
11. Combined length of cephalic process and head as long as pronotum; expanse of trifurcate apex equal to distance between ocular spines.
minutacanthis, new species
 Combined length of cephalic process and head longer than pronotum; expanse of apex much greater than distance between ocular spines.
punctatus, new species

PHRICTUS AUROMACULATUS Distant

PLATE 7, FIGURES 6, 24; PLATE 8, FIGURES 4, 12; PLATE 9; PLATE 10

Phrictus auromaculatus DISTANT, Ann. Mag. Nat. Hist., vol. 16, ser. 7, pp. 672-673, 1905.

There may be some doubt regarding the identity of this species, because Distant makes no definite statement as to whether the apex of the cephalic process is trifurcate or flattened. He does mention the carinate anterior margin and states that the process is shorter than in previously described species. In the specimens studied not only is the process very short but also the apex is flattened and transverse. The color of the hind wings is golden and not bright yellow; otherwise the description matches the specimens. Length over all, male 33 mm., female 36 mm.; elytra, male 26 mm., female 29 mm.

Male bearing the data: "Tumupasa, Bolivia, Dec., Mulford Biol. Expl., 1921-1922 (W. M. Mann)"; female, "Ixiamas, Bolivia, Mulford Biol. Expl., 1921-22 (M. R. Lopez)."

Type locality: Bolivia.

PHRICTUS OCELLATUS Signoret

PLATE 7, FIGURES 9, 21; PLATE 8, FIGURE 3

Phrictus ocellatus SIGNORET, Bull. Soc. Ent. France, vol. 3, ser. 3, p. v, 1855.

As yet this is the only known species with large hyaline areas within the dark area of the hind wings. The cephalic process is longer than the pronotum. The caudal margin of the pronotum is deeply notched

at the middle with the lateral margins of the notch sharply elevated and acute caudad. Length over all approximately 41 mm.; elytra 32 mm.

One badly damaged female from "Colom." [Colombia?], Baker collection.

Type locality: Venezuela.

PHRICTUS SORDIDUS, new species

PLATE 7, FIGURES 3, 20; PLATE 8, FIGURES 1, 13; PLATE 9

Allied to *ocellatus* in general pattern of elytra but lacking ocellate spots in the hind wings. Length, male 40 mm., female 46 mm.; elytra, male 30 mm., female 37 mm.

Dorsum of cephalic process, vertex, clypeus, and median stripe of pronotum light gray. Lateral and ventral margins of process dull cinnamon. Lateral areas of pronotum chocolate-brown. Elytra brown on basal two-thirds, irregularly maculate with dull yellow; broad transverse fascia present at base of reticulate area, broadly interrupted in center by a conspicuous brown dash. Apical third light yellow, maculate with large, irregular brown spots. Hind wings dull faded orange in basal two-thirds, apical third fumate.

Cephalic process shorter than pronotum; trifurcate apex with very obtuse teeth, especially laterally; median tooth somewhat deflexed caudad. Posterior margin of pronotum broadly notched; median carina ending at base of notch. First valvulae in female not trifurcate apically.

Male holotype, U.S.N.M. No. 57224, Ecuador (Goodfellow), Goding collection. Female allotype, Quevedo, Ecuador (F. Campos R.), and one headless female, Ecuador, Goding collection.

These specimens appear very faded, and it is unknown whether the color is natural or the result of immersion in preserving fluid. With regard to color they resemble the species figured and described by Metcalf as *diadema*; however, the cephalic process is distinctly shorter than the pronotum and therefore they cannot be that species.

PHRICTUS MINUTACANTHIS, new species

PLATE 7, FIGURES 2, 16; PLATE 8, FIGURE 2; PLATE 9

Resembles *ocellatus* in color and marking but differs from it in lacking the ocellate areas in the hind wings and having darker brown elytra. It is much smaller and more brightly colored than *sordidus*. Length, female 37 mm., elytra 30 mm.

Entire venter, clypeus and face, lateral area of cephalic process, and dorsum of prothorax except median stripe dark brown. Dorsum of head, cephalic process, and median stripe of pronotum dark gray with apex of cephalic process rose to red. Elytra brown, fairly evenly

maculate with dull yellow, transverse fascia at base of reticulations irregular and imperfect. Hind wings light red in basal two-thirds, apical third fuscous.

Cephalic process slender, shorter than pronotum; trifid apex very small, especially the median tooth. Caudal margin of pronotum with broad median notch, outer angles of notch abruptly acute and greatly elevated; median carina of pronotum apparently not forked around notch. First valvulae in female short, broad; apices more sharply angled than in *ocellatus*.

Female holotype, U.S.N.M. No. 57225, from Chaquimayo, Peru, February 15, 1918 (C. H. T. Townsend).

PHRICTUS PUNCTATUS, new species

PLATE 7, FIGURES 12, 23; PLATE 8, FIGURE 6; PLATE 9

Similar to *minutacanthis* but much larger and with more brightly colored elytra. The cephalic process is longer, with the apical teeth more acute. Length, female 44 mm., elytra 32 mm.

Clypeus very light brown. Face and lateral margins of cephalic process cinnamon-brown. Vertex, dorsum of cephalic process, and median stripe on pronotum dull yellow. Elytra brown with bright-yellow maculae grouped toward the transverse fascia; claval area dull yellow; costal margin with two conspicuous yellow spots before reticulate area; transverse fascia bright yellow, narrow, interrupted in middle by a dark-brown dash more or less surrounded by yellow maculae. Maculae in right elytron tending to form an oblique strip between the dark-brown dash and center of clavus. Hind wings hyaline-carmine in basal two-thirds, apical third light fuscous.

Cephalic process equal in length to pronotum; trifid apex slender, with broader expanse than width of head including eyes. Caudal margin of pronotum broadly concave, with a small notch in middle of concavity. Median carina definitely forked caudally around notch, with surface of pronotum on each side elevated above the forked carina. First valvulae in female with apices broadly concave on outer margins.

Female holotype, U.S.N.M. No. 57226, bearing the following data: "Bugaba, Panama, collection Wm. Schaus." One female paratype from El Volcán, Panama, March 17, 1943, is in the collection of the American Museum of Natural History.

PHRICTUS HOFFMANNSI Schmidt

PLATE 7, FIGURES 10, 18; PLATE 8, FIGURE 9; PLATE 10

Phrictus hoffmannsi SCHMIDT, Ent. Zelt. Stuttgart, vol. 66, pp. 338-340, 1905.

This species most clearly resembles *moebiusi* Schmidt but is distinguished from it by a narrower cephalic process, with the apical

teeth slender and lying in the same place. It also resembles *notatus* Lallemand in having the elytra sometimes brownish and maculate, with small, round orange spots, but is separated from *notatus* by having the basal areas in the hind wings red and immaculate instead of orange and maculate with brown.

Length, male 37 mm., female 46 mm.; elytra, male 28 mm., female 37 mm. Unfortunately, pests have destroyed the internal male genitalia.

Represented in the collection by one male with no accompanying data other than "Goding Collection," one female from below Macas, Ecuador (E. W. Rorer), and one female from Baños, Ecuador, altitude 1,800 meters (F. Campos R.).

Type locality: Peru.

PHRICTUS MOEBIUSI Schmidt

PLATE 7, FIGURES 11, 15; PLATE 8, FIGURE 5; PLATE 10

Phrictus moebiusi SCHMIDT, Ent. Zeit. Stettin, vol. 66, pp. 340-342, 1905.

Resembles *hoffmannsi* in general appearance but differs in having apical teeth of the cephalic process more obtuse, with the median tooth deflexed caudad, elytra possibly lighter green, and with maculae fewer in number but brighter, and apices of first valvulae of female very acute. Hind wings differ from those of *notatus* in that the colored areas are red and scarcely maculate.

One female bearing the following data: "Medellin, Vy. and Porce" (F. L. Gallego M.). Probable locality: Medellín, Colombia.

Type locality: Colombia.

PHRICTUS DIADEMA (Linnaeus)

PLATE 7, FIGURES 1, 4, 13, 14; PLATE 8, FIGURES 11, 14; PLATE 10

Fulgora diadema LINNAEUS, Systema naturae, ed. 12, vol 1, p. 703, 1767.

Although *diadema* is one of the more common species in the genus, its exact status is evidently still confusing. It was first figured by Stoll,⁵ but either the figure is erroneous or *diadema* is unknown today. The hind wing in the figure is unlike that of any known species, and the black color includes a much larger area than in typical *diadema*. The figure by Drury⁶ (as *armata*) shows a much more typical pattern, while the photographic reproduction by Costa Lima⁷ is *diadema* as accepted by most workers today.

The general color of the elytra varies from light buff to dark shades of brown and sometimes even appears greenish; however, in all this

⁵ Representation exactement coloriée d'après nature des Cigales et des Punaises * * * (Cigales), pl. 5, fig. 22, 1780.

⁶ Illustrations of natural history, vol. 3, pl. 50, fig. 4, 1782.

⁷ Insetos do Brasil, vol. 3, p. 45, fig. 40, 1942.

variation pinkish calloused areas are always present in the basal portions. The trifurcate apex of the cephalic process exhibits much variation as to size, deflection, and form of the teeth. The shape of the internal male genitalia is constant and best shown by the illustration (pl. 8, fig. 14). The apices of the first valvulae in the female are bluntly trifurcate. Five females range in length from 48 to 52 mm. and four males from 41 to 46 mm.

Records indicate that this species ranges through the Guianas into Brazil; also it has been recorded as a minor pest of cacao in Bahia, Brazil. In a letter to the writer, Pedrito Silva states that his reference to *quinquepartitus* Distant appearing in Tropical Agriculture⁸ is in error, as the pest on the cacao tree is *diadema* (Linnaeus) and not *quinquepartitus*.

Type locality: "Indien" (probably Brazil).

PHRICTUS REGALIS, new species

PLATE 7, FIGURES 7, 19; PLATE 8, FIGURE 8; PLATE 10

Greatly resembling *diadema* when the elytra are closed but with only the basal fourth of the hind wings yellow. Length 54 mm., elytra 36 mm.

Median stripe on pronotum, vertex, and dorsum of cephalic process gray; apical teeth red. Venter of cephalic process brown, becoming fuscous toward clypeus; clypeus light yellowish. Elytra deep olivaceous, with calloused areas and transverse fascia light red; costal and apical margin lightly washed with black. Hind wings with basal fourth yellow, remainder black, with two or three large red spots present halfway to apex and three or four large yellow spots present in the black area near the basal fourth.

Cephalic process stout, longer than pronotum, length and vertical height about equal; trifurcate apex with long acute teeth. Caudal margin of pronotum scarcely indented medianly; median carina appearing deeply bifurcate. (Unfortunately, most of this area is obliterated by a large pinhole.) Trifurcate apices of first female valvulae with apical and outer teeth acute, inner teeth blunt in lateral aspect.

Female holotype, U.S.N.M. No. 57227, from Maroni River, French Guiana, vicinity of Duserre (G. Moberg).

PHRICTUS QUINQUEPARTITUS Distant

PLATE 7, FIGURES 8, 17; PLATE 8, FIGURES 10, 15; PLATE 9

PhRICTUS quinquepartitus DISTANT, Biologia Centrali-Americana, Homoptera, vol. 1, p. 24, pl. 4, fig. 8, 1883.

This unusual species closely resembles *tripartitus* Metcalf in color and marking but is distinguished from it by the apex of the cephalic

⁸ Trop. Agr., vol. 21, p. 12, 1944.

process bearing five teeth. In the 15 specimens examined the apical teeth vary from acute to obtuse, and sometimes the intermediate teeth are much reduced in size. The longitudinal veins in the elytra are not so green as in Distant's illustration, and the bluish-white pruinose spots in the dark apical area on the hind wings are sometimes absent. In addition, the red areas in the hind wings are often less maculate apically with black. The shape of the internal male genitalia appears to be very close to that figured by Metcalf for *tripartitus*; however, the expansion of the inflatable sacs is much less, and the writer believes that these two species are distinct. As in *diadema* the two sexes vary considerably in length, the males ranging between 43 and 45 mm. and the females between 47 and 49 mm.

All specimens are from Panama and the Canal Zone.

Type locality: Panama.

PHRICTUS TRIPARTITUS Metcalf

PLATE 7, FIGURES 5, 22; PLATE 8, FIGURE 7; PLATE 9

Phrictus tripartitus METCALF, Bull. Mus. Comp. Zool., vol. 82, p. 365, pls. 20, 21, 1938.

Metcalf believes that this species may be the unnamed variety of *diadema* described by Walker⁹ and figured in the *Biologia*.¹⁰ In general color, pattern, and size it approximates specimens of male *quinquepartitus* in the collection. Although the aedeagus of the male is of the same general form in both species, it is much more inflatable in *quinquepartitus*; in the female there are differences in the first valvulae.

In the specimen believed to be *tripartitus* the teeth in the trifurcate apex of the cephalic process are very obtuse but between the median and right-hand tooth is a definite bump that may be construed as a vestigial tooth; on the other side of the median tooth the margin is crenulate. This specimen, measuring 51 mm., is longer than any specimen of *quinquepartitus*. The difference in total length is probably accounted for by the longer cephalic process possessed by *tripartitus*.

Female plesiotype from Virginia, Guatemala, November 1915 (Wm. Schaus).

Type locality: British Honduras.

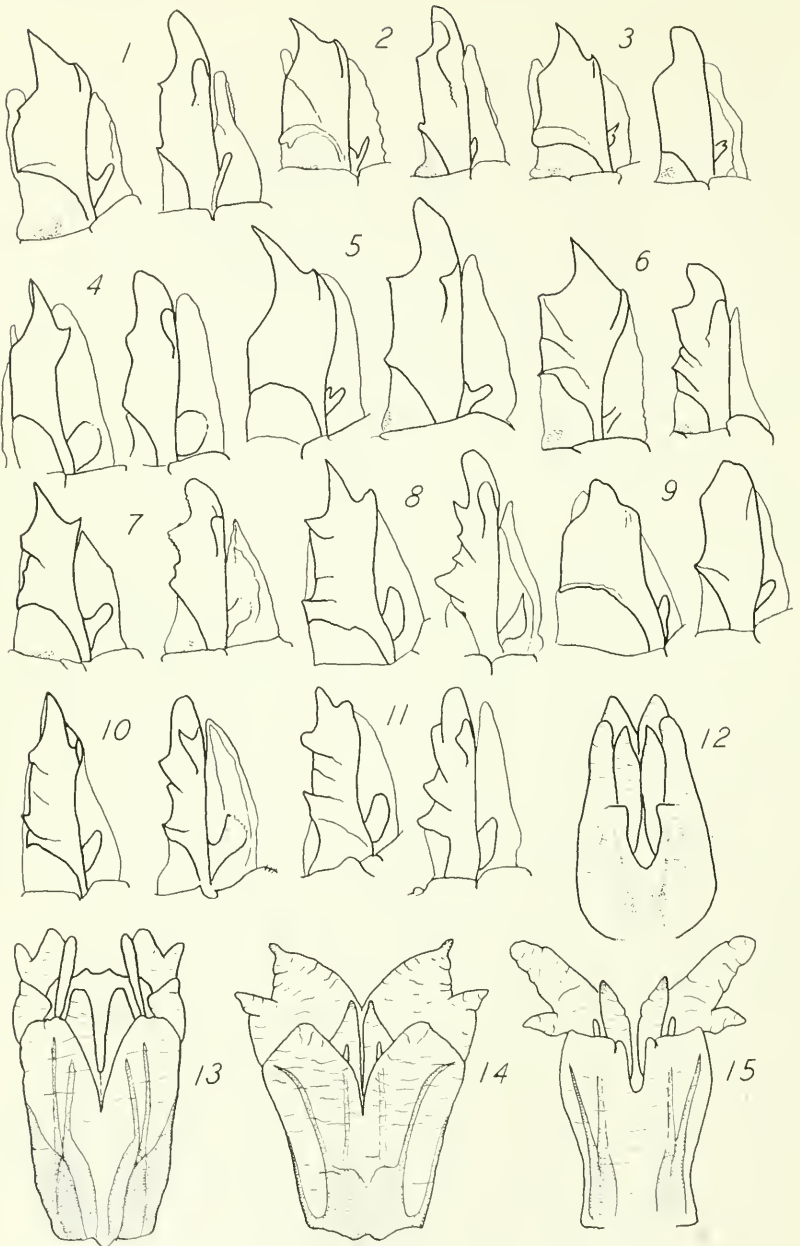
⁹ List of homopterous insects in the collection of the British Museum, p. 264, 1851.

¹⁰ *Biologia Centrali-Americana, Homoptera*, vol. 1, pl. 4, fig. 5, 1883.



CEPHALIC PROCESS IN PHRICTUS.

Frontal profile of right half: 1, *diadema* (female); 2, *minutacanthus* (male); 3, *sordidus* (male); 4, *diadema* (male); 5, *tripartitus* (entire profile, female); 6, *auramaculatus* (female); 7, *regalis* (female); 8, *quinquepartitus* (male); 9, *ocellatus* (female, imperfect); 10, *hoffmanni* (female); 11, *moebiusi* (female); 12, *punctatus* (female).
 Lateral profile: 13, *diadema* (male); 14, *diadema* (female); 15, *moebiusi* (female); 16, *minutacanthus* (male); 17, *quinquepartitus* (male); 18, *hoffmanni* (male); 19, *regalis* (female); 20, *sordidus* (female); 21, *ocellatus* (female, imperfect); 22, *tripartitus* (female); 23, *punctatus* (female); 24, *auramaculatus* (female).
 Owing to their large size, *regalis*, *diadema*, *quinquepartitus*, and *tripartitus* are drawn approximately one-half scale.



VALVULA AND GENITALIA IN PHRICTUS.

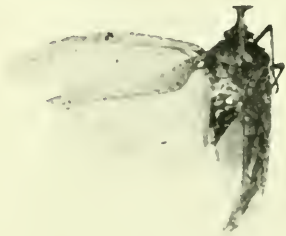
Lateral and ventral profile of first female valvula (left): 1, *sordidus*; 2, *minutacanthis*; 3, *ocellatus*; 4, *auromaculatus*; 5, *moebiusi*; 6, *punctatus*; 7, *tripartitus*; 8, *regalis*; 9, *hoffmannsi*; 10, *quinquepartitus*; 11, *diadema*.
 Ventral aspect of male aedeagus: 12, *auromaculatus*; 13, *sordidus*; 14, *diadema*; 15, *quinquepartitus*.



AUROMACULATUS



PUNCTATUS



MINUTACANTHIS



SORDIDUS



TRIPARTITUS



QUINQUEPARTITUS

SPECIES OF PHRICTUS DORSAL ASPECT

aurromaculatus, female; *punctatus*, female holotype; *minutacanthus*, female holotype;
sordidus, female allotype; *tripartitus*, female; *quinquepartitus*, male.



REGALIS



DIADEMA



HOFFMANNSI



MOEBIUSI



AUROMAGULATUS



DIADEMA

SPECIES OF PHRICTUS: DORSAL ASPECT.

regalis, female holotype; *diadema*, female; *hoffmannsi*, female; *moebiusi*, female; *auro-maculatus*, male; *diadema*, male.