PROC. BIOL. SOC. WASH.
97(3), 1984, pp. 601–614

A REVIEW OF THE GENUS *PLATYNEUROMUS* (INSECTA: NEUROPTERA: CORYDALIDAE)

Michael J. Glorioso and Oliver S. Flint, Jr.

Abstract.—The genus *Platyneuromus* consists of three species: *soror* (Hagen), *honduranus* Navas, and *reflexus* n.sp. *Doeringia christel* Navas is synonymized with *P. soror,* and *P. auritus* Kimmins with *P. honduranus* for which a neotype is designated. The male genitalia and postocular flanges of all species are figured and described. The flange of *P. soror* and *P. honduranus* varies greatly in size, but analysis shows that the variation is in direct relationship to gross size of the head.

In 1979 the authors met and discussed various problems and projects in the Megaloptera. At that time a single specimen of an undescribed species of *Platyneuromus* in the collection of the junior author served as the focus of an agreement between us to review this genus. Michael Glorioso began his study of the species, investigating characters, making measurements, and writing preliminary descriptions, while I (OSF) borrowed and forwarded material to him. On 17 October 1980, Michael died very suddenly. Dr. C. A. Triplehorn invited me to visit Ohio State University to work with them in sorting-out material and notes. I obtained all Michael's notes and recovered the material of *Platyneuromus.*

Study of these materials revealed considerable progress with this project on the part of the senior author. He had segregated the species, recognized the genitalic differences in the males, prepared many inked drawings of the male genitalia, made many measurements of various head dimensions and worked out the table of relationship between head size and flange width, and prepared preliminary descriptions of the genus and species. I have taken these notes and illustrations and filled them out to produce a uniform treatment of all species.

Systematic Account

Three genera of dobsonflies, *Chloronia, Corydalus,* and *Platyneuromus,* occur in Mexico and Central America. The first is known from northern Mexico to southern Brazil including the Lesser Antilles, and the second is widespread from southern Canada to northern Argentina, but is not known from the West Indies. The genus *Platyneuromus* is, however, totally restricted to middle America, being known from northeastern Mexico as far south as northern Panama.

The genus *Platyneuromus* is readily distinguished by the postocular flange, the flattened lateral margin of the head (Glorioso 1981). The flange is developed to varying degrees depending on the species, sex, and, not surprisingly, the size of the example. The relationship between gross size and development of a sexually correlated structure is paralleled in *Corydalus* by the relationship between body size and length of male mandible in certain species. The very large postocular flange of a large example of *P. soror* (Hagen) led Navas (1925) to describe the example as a new species, genus and tribe—*Doeringia christel,* Doeringiini!

We here describe the new species, and provide descriptions and figures of the male genitalia for all known species, and report on the size relationship of the postocular flange.

Platyneuromus Weele

Platyneuromus Weele, 1909:252; 1910:23.—Lestage, 1927:94.—Penny, 1977:8.—Glorioso, 1981:282 (type-species *Corydalus soror* Hagen, by monotypy).

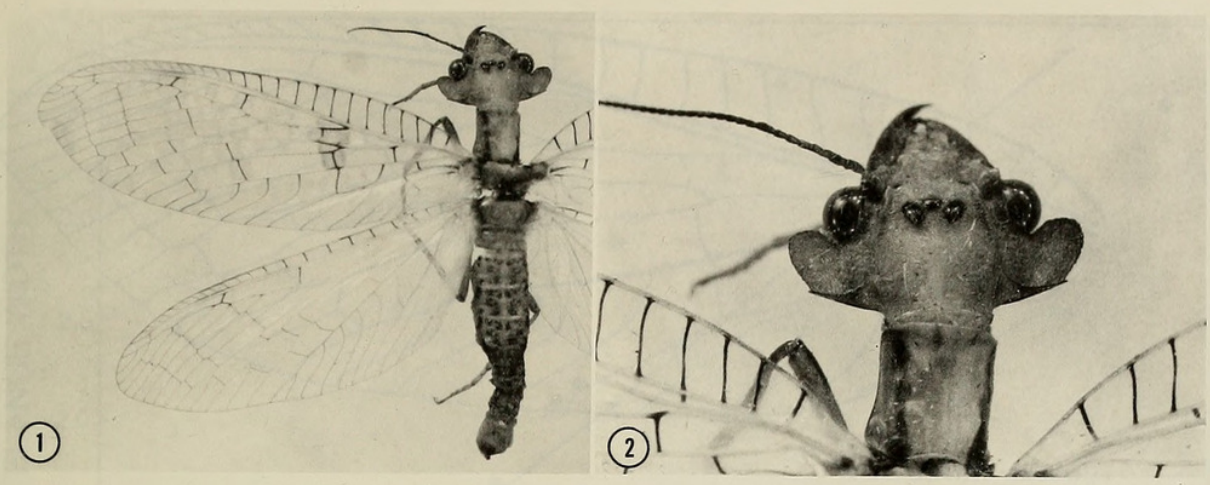
Doeringia Navas, 1925:207.—Lestage, 1927:94.—Penny, 1977:8.—Glorioso, 1981:282 (type-species *Doeringia christel* Navas, by monotypy; synonymized Glorioso, 1981:282).

Diagnosis.—This genus, restricted to Mexico and Central America, is the only Corydalidae with notable flattened lateral margins of the head.

Description.—Size: length 20–55 mm; wingspan 50–140 mm. Coloration: luteus to fulvus; pronotum margined laterally with fuscous to piceus vitta, vitta often on postocular flange; wings fulvus with darker tessellations.

Head: broad, extremely flattened; posterior tentorial pit arcuate; postocular flange at least width of eye; antenna filiform, about length of forebody with 40–55 articles; clypeal margin feebly to moderately incised medially; labrum broadly truncate, rounded at corners; maxilla relatively long and narrow; stipes with indistinct setae; lacinia with three long apical setae; galeal sensory peg well developed; maxillary palp five-segmented, with distinct palpifer; labium with moderately setose ligula, four-segmented labial palp; terminal labial and maxillary palpal segments broadly rounded, with two sensory areas. Prothorax: notum more or less quadrate, prosternum often with 1 pair anterior acuminate spines, more pronounced in male. Wings: radial sector with 6–9 branches, last bifurcate; M_{1+2} and M_{3+4} each with 2 branches; Cu_1 with 4–5 accessories, Cu_2 unbranched; 1A 2 branched; 3 crossveins between R_1 and Rs and between Rs and M; 2 medial crossveins, 4 m-cu's; 1 cubital crossvein, 24–30 costal crossveins; first R_1 cell one to one and a half times length of third. Males: ninth sternite nearly quadrate, broadly rounded or moderately incised posteriorly, membrane behind sternite thickened, bilobate; genital papillae weakly developed or absent; ninth tergite sparsely setose, internal inflection inverted, V-shaped; ninth gonostyli densely setose, clavate or unguiform, with terminal, glabrous, chitinous point; tenth tergites densely setose, clavate, occasionally with crenulate inner margin; tenth sternite broad, glabrous, moderately sclerotized; gonostyli long, digitiform, sparsely setose. Female: semicircular sternal pouch present between sixth and seventh segments; lateral sclerite well sclerotized; gonostylus fused with gonocoxite; bursa saclike, separate from spermathecal duct; accessory glands absent.

Flange width.—A bivariate regression analysis was run in which the flange width was regressed on the interocular distance (as an indication of general body size) for 25 specimens of *P. soror*. Figure 4 shows the scattergram, regression line, regression equation, coefficient of correlation (R), R squared, and significance values. The coefficient of correlation for flange width on interocular distance is very high (.895) and the probability that there is only a random relationship between the measurements is less than 0.00001. The R squared value indicates that 80% of the variance in flange width is explained by the variance in interocular distance. Conclusion: it is almost certain that flange width is merely a function



Figs. 1–2. *Platyneuromus honduranus* (the holotype of *P. auritus*): 1, Habitus; 2, Head and pronotum.

of body size as expressed in interocular distance. The analysis of the flange width in *P. honduranus* is not quite as clear cut (Fig. 5). We suggest that this may be explained by a smaller sample size, in which the measurements are clustered at two extremes. We expect that specimens intermediate in size exist, but they were not available to us. Nevertheless, the results do corroborate the findings with *P. soror,* although at a lower R squared value—75%.

Platyneuromus soror (Hagen)
Figs. 3–4, 6–15

Corydalus soror Hagen, 1861:193
Neuromus soror (Hagen): Davis, 1903:467.
Neuromus (*Chloronia*) *soror* (Hagen): Banks, 1908:30.
Platyneuromus soror (Hagen): Weele, 1909:252; 1910, 23.—Stitz, 1914:199.—Navas, 1928:62.—Penny, 1977:8.—Glorioso, 1981:282.
Doeringia christel Navas, 1925:29 (new synonymy).

Diagnosis.—Male tenth tergites divergent basally, parallel distally; usually larger than *P. honduranus*; postocular flange with dark vitta, especially well developed in females.

Description.—Size: body length 28–55 mm; forewing length males 34–59 mm [ave. 20 Mexican males, 43.9 mm; ave. 6 Costa Rican and Panamanian males 53.3 mm], females 42–63 mm [ave. 17 Mexican females, 50.2 mm; ave. 4 Costa Rican and Panamian females 60.0 mm]. Coloration: luteus to fulvus, fuscous to piceus vitta on lateral margin of pronotum and postocular flange. Postocular flange: in female barely exceeding eye, weakly concave anteriorly, moderately convex laterally, distinct from postocular spine; small males similar to females; flange much broader in large males, obliterating postocular spine. Pretarsus: unguitractor longer than wide; median lobe of pulvillus with 2–4 setae. Male genitalia: ninth sternite broadly rounded posteriorly; genital papilli poorly developed, often apparently absent; ninth gonostyli short, arcuate; tenth tergites diverging proximally, parallel distally; tenth sternite broad, moderately sclerotized, more heavily sclerotized anteriorly, styli long, digitiform, sparsely setose.

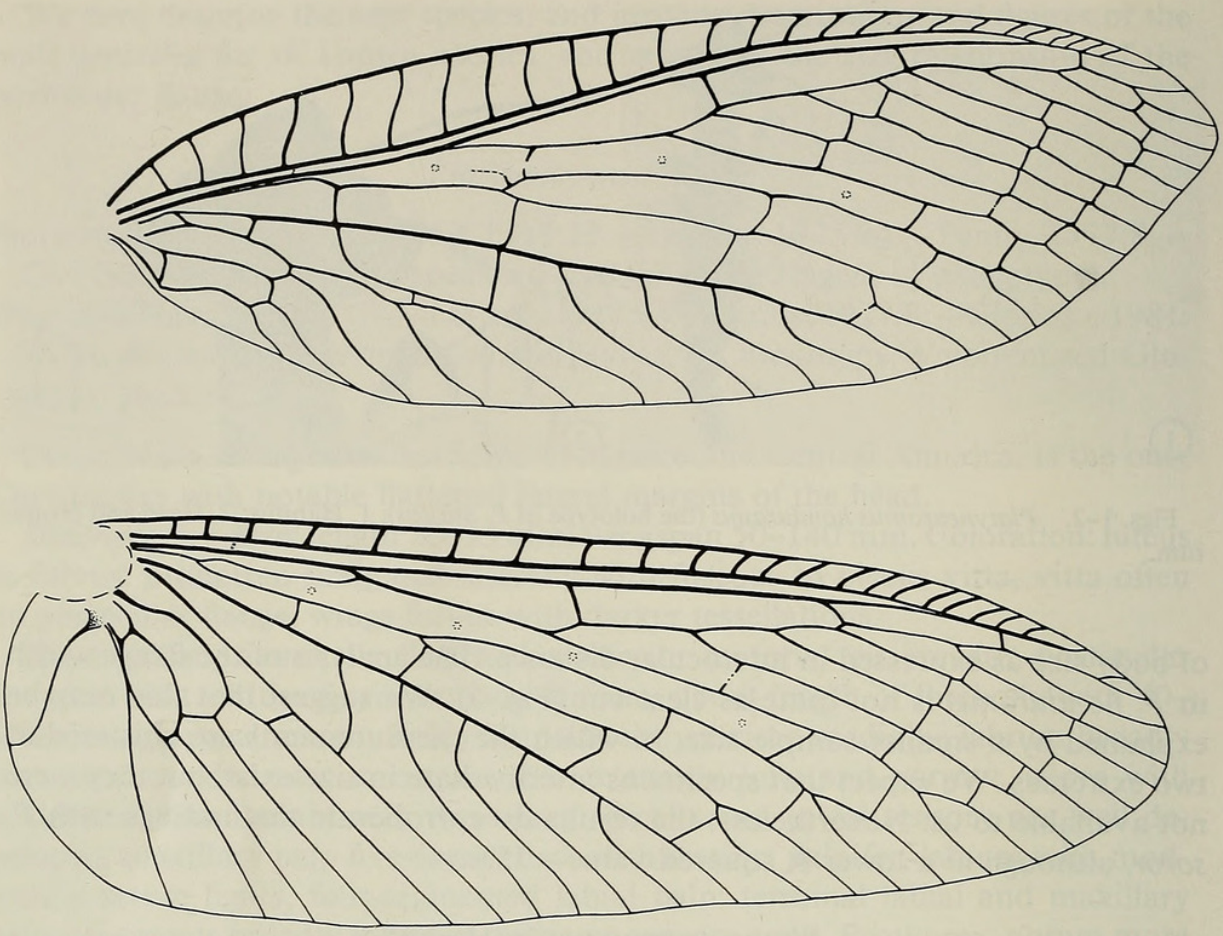


Fig. 3. *Platyneuromus soror,* fore- and hindwings.

Variation.—The development of the postocular flange is relatively constant in females, but varies in males. The flange of small males is similar to that of females, while that of large males may be four times greater than the width of the eyes, with intermediate flange width in intermediate sized males (Figs. 6–9). Occurrence of large males with extremely large postocular flanges is greatest in southern Central America, where the species averages almost 10 mm larger in forewing length, although large-flanged males are infrequently collected at more northern localities.

The dark vitta on the postocular flange may be restricted to half the width of the flange, or may cover the entire flange. Rarely the vitta is faintly developed or obscured by melanized areas on the head.

Distribution.—The species is found from northeastern Mexico through central Mexico south to Chiapas, generally on the eastern coast. Records are then available from central Costa Rica south to northern Panama. It is not known if the lack of records from intermediate localities is an artifact of poor collecting or a true hiatus in the distribution of the species. Adults have been found flying together with those of *P. honduranus* in Chiapas, Mexico. In Mexico the species has been taken from late March to early September, and in southern Central America from late April into July. However, the peak of abundance would seem to fall between May and early July.

Material examined.—Costa Rica, [Pcia. Cartago], Turrialba, May, 900 m, 1 ♂ [DEI, holotype *D. christel,* 58 mm). Pcia. Heredia, Finca La Selva, 21–30 Jul 1976, J. C. Solomon, 1 ♀ [USNM, 62 mm].

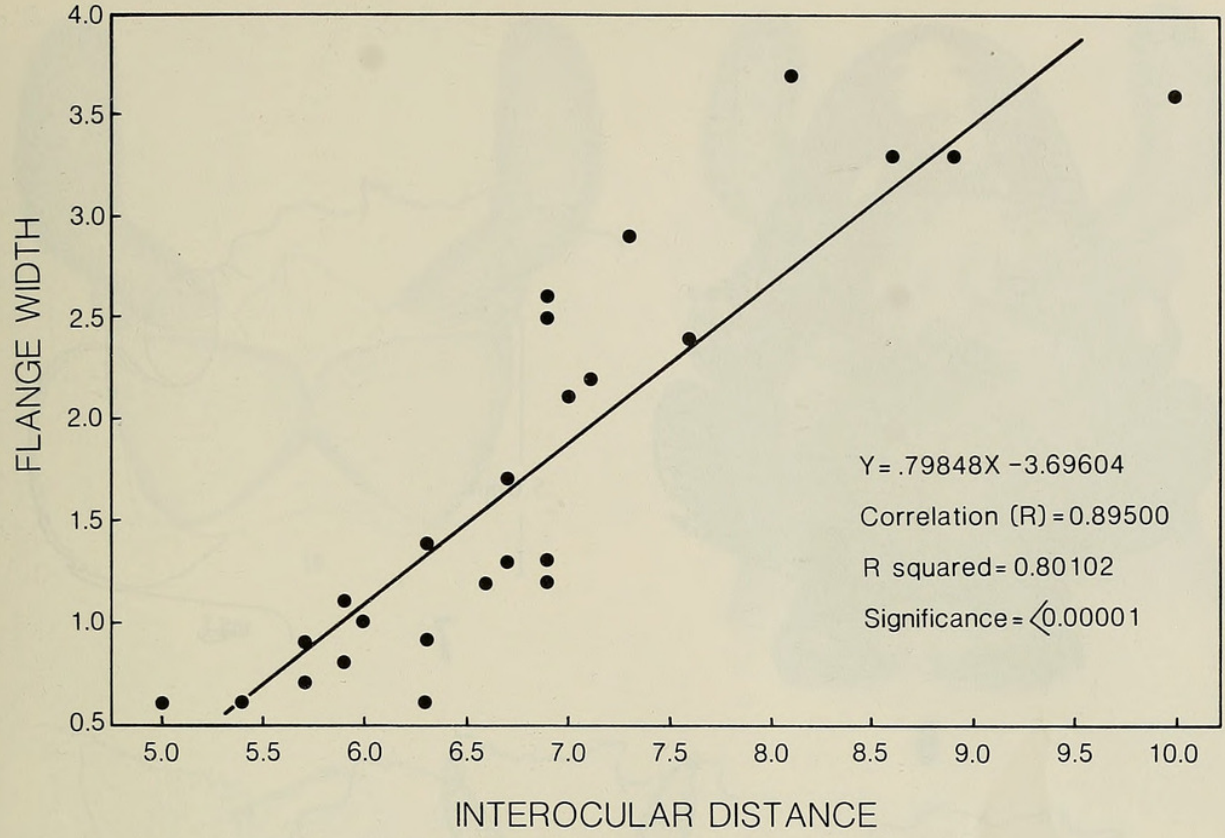


Fig. 4. *Platyneuromus soror,* regression of flange width on interocular distance.

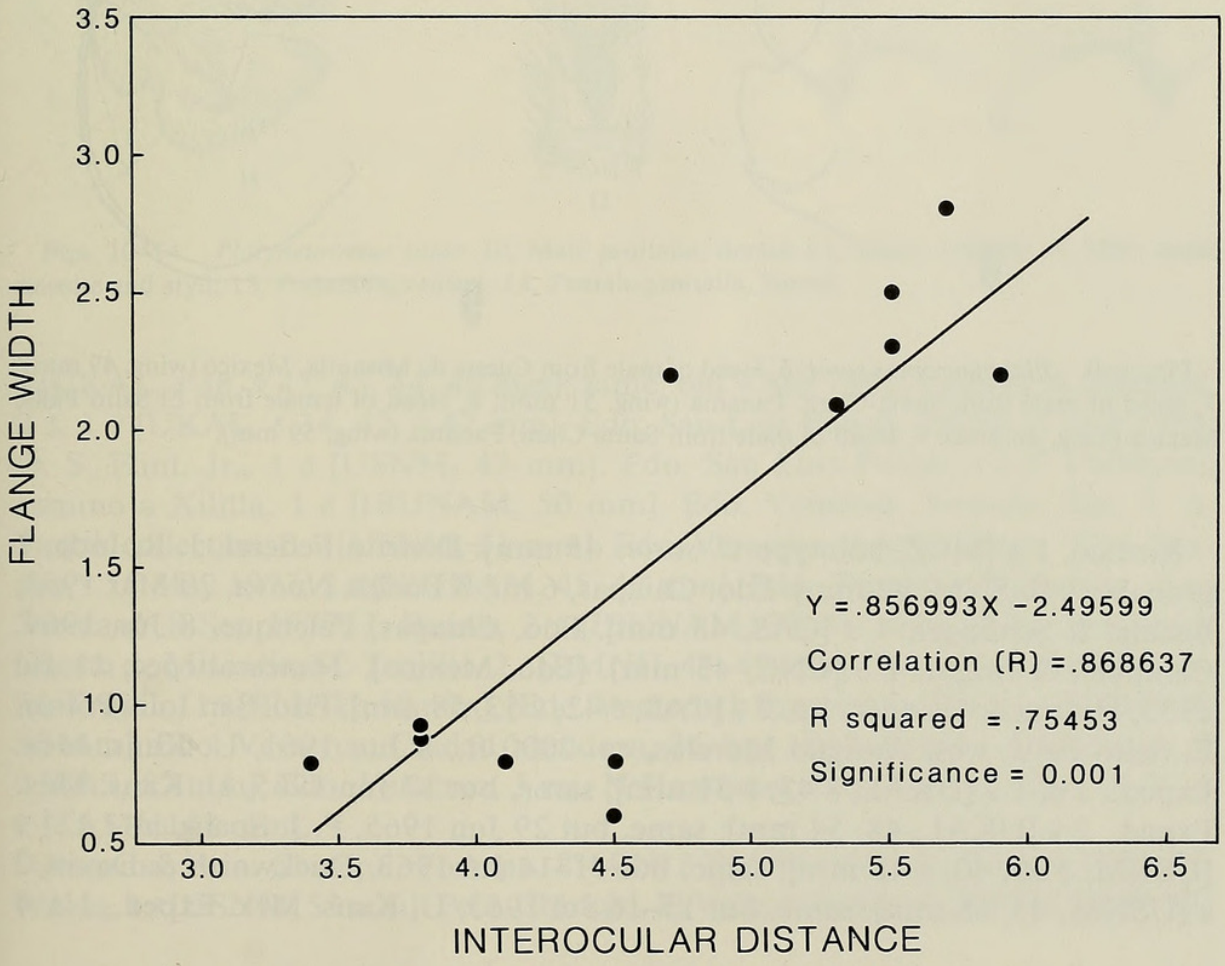
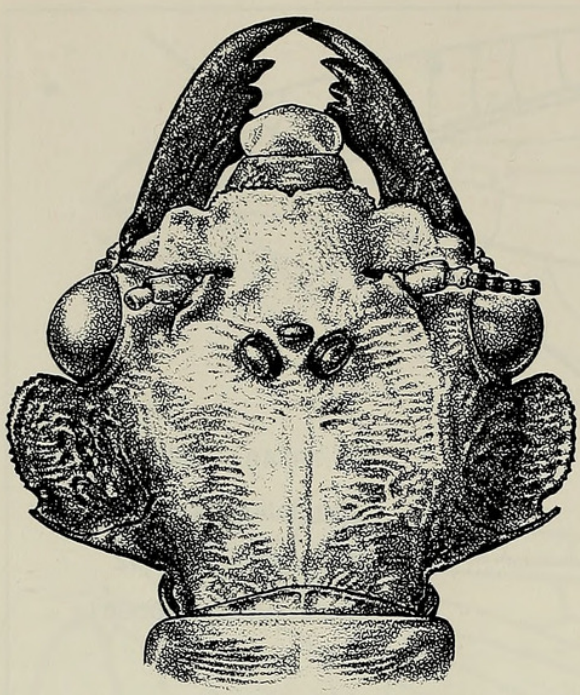
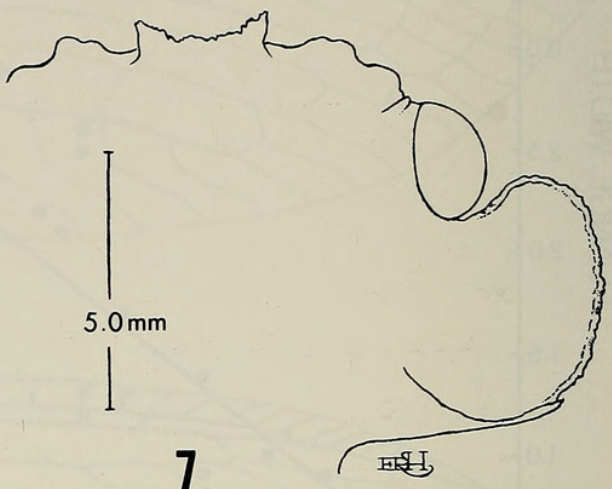


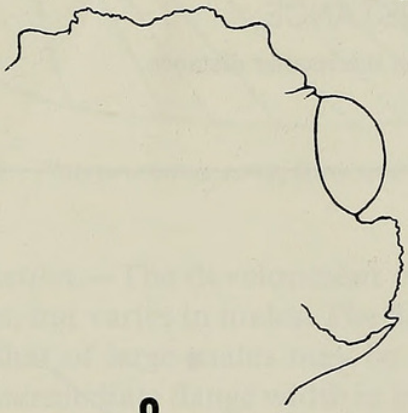
Fig. 5. *Platyneuromus honduranus,* regression of flange width on interocular distance.



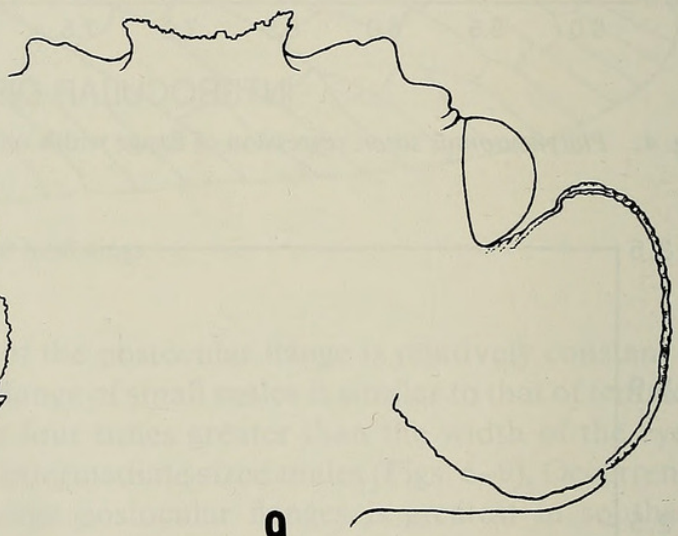


6

7



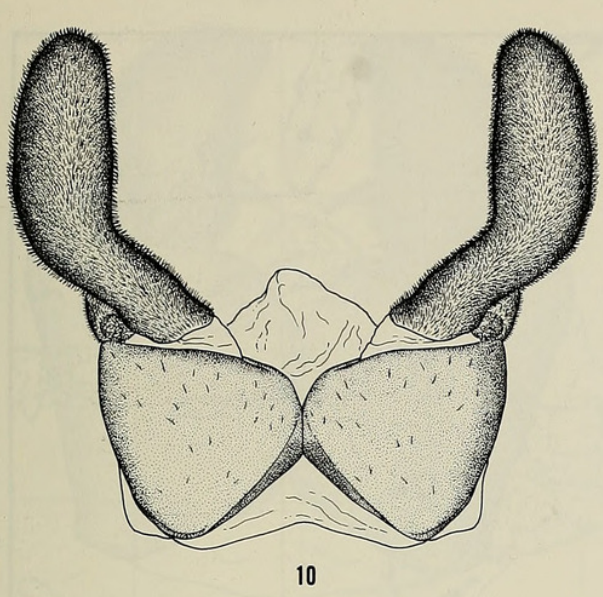
8

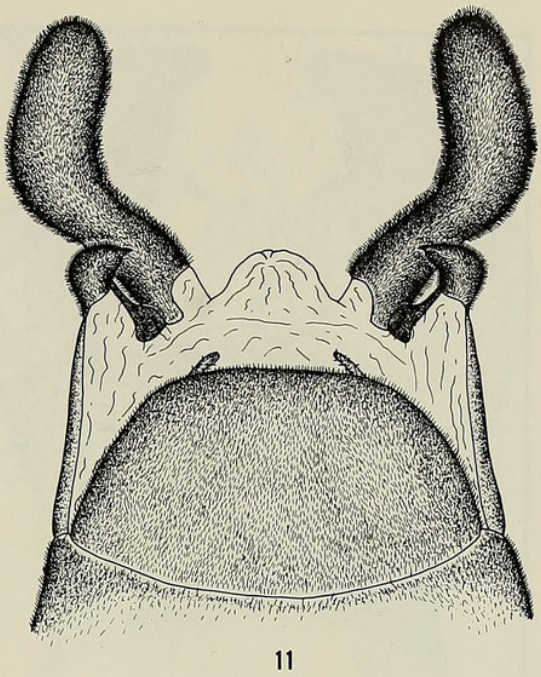


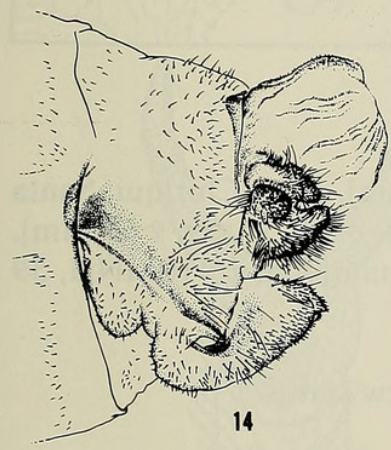
9

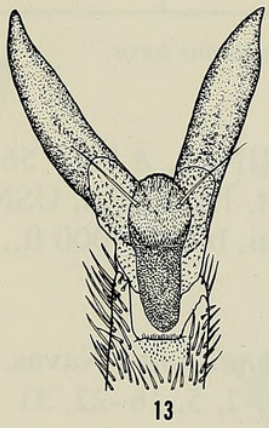
Figs. 6–9. *Platyneuromus soror*: 6, Head of male from Cuesta de Misantla, Mexico (wing, 49 mm); 7, Head of male from Santa Clara, Panama (wing, 51 mm); 8, Head of female from El Salto Falls, Mexico (wing, 48 mm); 9, Head of male from Santa Clara, Panama (wing, 59 mm).

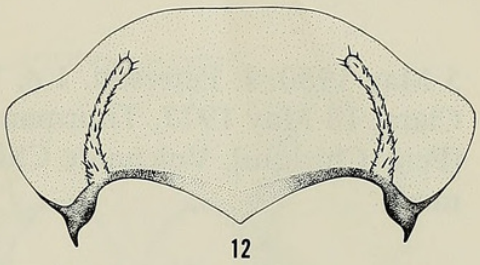
Mexico, 1 ♂ [MCZ, holotype *C. soror,* 45 mm]. Distrito Federal, J. R. Inda, 1 probably ♀ [USNM, 62 mm]. Edo. Chiapas, 6 mi. S Puebla Nueva, 20 Mar 1953, Bechtel & Schlinger, 1 ♂ [CAS, 48 mm]. Edo. Chiapas, Palenque, 8 Jun 1969, Campbell & Bright, 1 ♂ [CNC, 45 mm]. [Edo. Mexico], Temescaltepec, 11 Jul 1933, Hinton & Usinger, 1 ♂, 2 ♀ [CAS, ♂ 42, ♀ 53, 58 mm]. Edo. San Luis Potosi, El Salto Falls, west Antiguo Morelos, ca. 2000 ft., 8 Jun 1961, U. Kans. Mex. Exped., 1 ♂, 1 ♀ [UKAL, ♂ 43, ♀ 51 mm]; same, but 17 Jun 1965, U. Kans. Mex. Exped., 2 ♀ [UKAL, 48, 54 mm]; same, but 29 Jun 1965, P. J. Spangler, 2 ♂, 1 ♀ [USNM, ♂ 39, 40, ♀ 45 mm]; same, but 11–14 Jul 1963, Duckworth & Davis, 2 ♀ [USNM, 43, 48 mm]; same, but 15–16 Jul 1963, U. Kans. Mex. Exped., 1 ♂, 4











Figs. 10–14. *Platyneuromus soror*: 10, Male genitalia; dorsal; 11, Same, ventral; 12, Male tenth sternite and styli; 13, Pretarsus, ventral; 14, Female genitalia, lateral.

♀ [UKAL, ♂ 38, ♀ 42, 43, 44, 45 mm]; same, but 4 Sep 1962, Ordway & Marston, 2 ♂, 1 ♀ [UKAL, ♂ 34, 42, ♀ 42 mm]. Edo. San Luis Potosi, Palitla, 3 Aug 1966, O. S. Flint, Jr., 1 ♂ [USNM, 43 mm]. Edo. San Luis Potosi, La (? Candiela), camino a Xilitla, 1 ♂ [IBUNAM, 50 mm]. Edo. Veracruz, Teocelo, Sep, E. A. Smyth collection, 1 ♀ [USNM, 61 mm]. Edo. Veracruz, Arroyo Claro, "Los Tuxtlas," 15 May 1977, 2 ♂ [IBUNAM, 45, 47 mm]. Edo. Veracruz, Balzapote, "Los Tuxtlas," 8 Sep 1977, J. Bueno, 2 ♂ [IBUNAM, 38, 40 mm]. [Edo. Veracruz], Cuesta de Misantla, M. Trujillo, 2 ♂ [BMNH, 47, 49 mm]. [Edo. Veracruz], Jalapa, M. Trujillo, 1 ♀ [BMNH, 58 mm]. [Edo. Veracruz], Rinconada, Sharis, 1 ♂ [BMNH, 55 mm]. Edo. Veracruz, Ciudad Mendoza, 24 Apr 1953, Bechtel & Schlinger, 1 ♀ [CAS, 57 mm]. Edo. Veracruz, 5 mi. N Huatusco, 29 Jun 1971, Clark *et al.*, 1 ♂ [TAMU, 48 mm].

Panama, Pcia. Chiriqui, Fortuna, 8°44′N: 82°15′W, 1050 m, 29 Apr 1978, H. Wolda, 1 ♂ [USNM, 53 mm]. Pcia. Chiriqui, El Valle de la Sierpe, 8°45′N: 82°15′W,

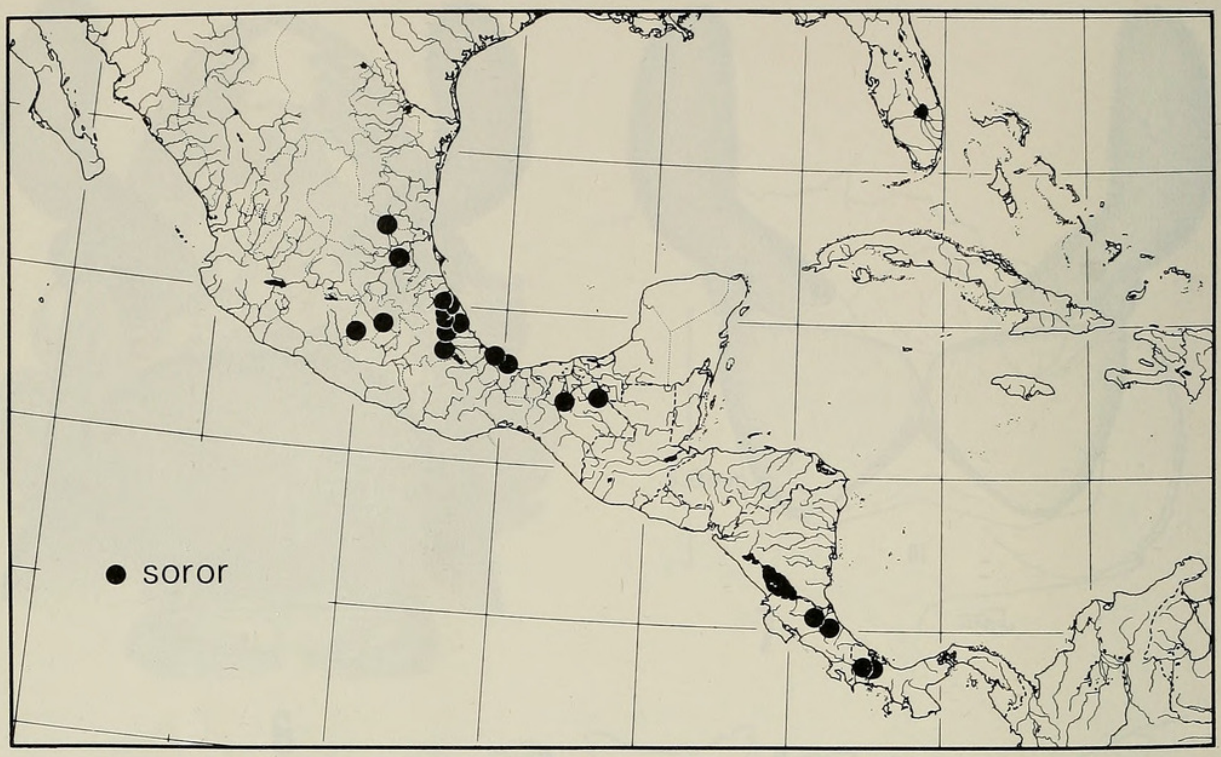


Fig. 15. Known distribution of *Platyneuromus soror.*

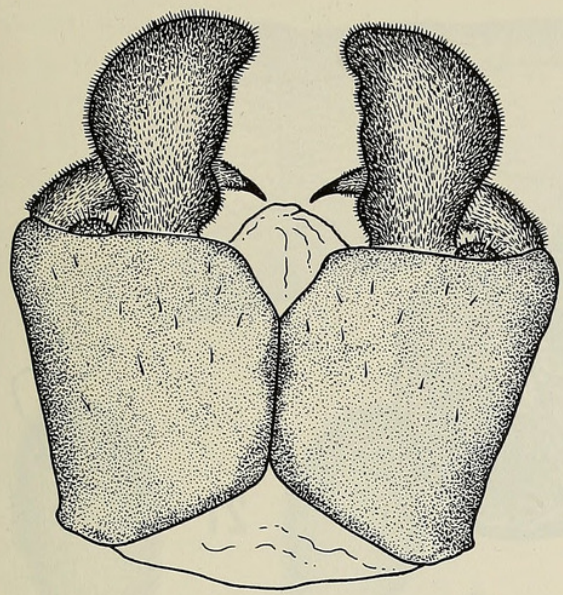
5 May 1980, J. Peterson, 1 ♂, 1 ♀ [INPA, ♂ 50, ♀ 56 mm]. Pcia. Chiriqui, Santa Clara, 18 May 1977, Thurman, 3 ♂, 1 ♀ [INPA, USNM, ♂ 49, 51, 59, ♀ 63 mm]. [Pcia. Chiriqui], Volcan de Chiriqui, below 4000 ft., Champion, 1 ♀ [BMNH, 59 mm].

Platyneuromus honduranus Navas, new status
Fig. 1–2, 5, 16–22, 31

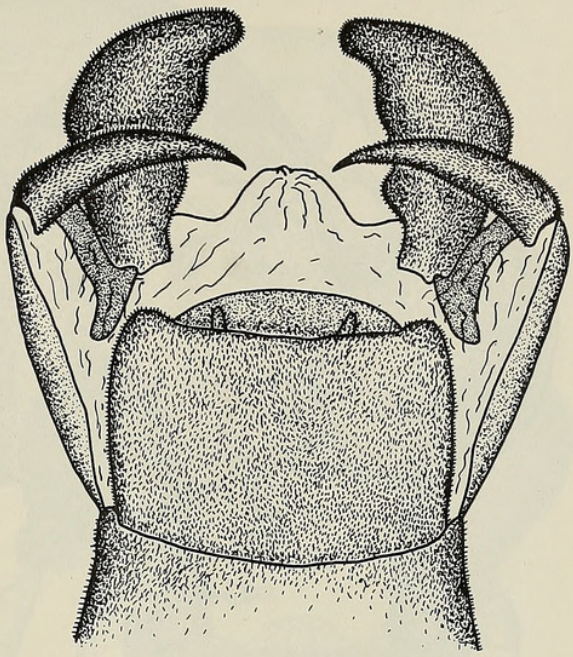
Platyneuromus soror hondurana Navas, 1928:63.
Platyneuromus auritus Kimmins, 1928:369 (new synonymy).

Diagnosis.—Male tenth tergites with crenulate inner margins; ninth gonostyli unguiform; generally smaller than *R. soror*; vitta across postocular flange obscure or absent especially in females.

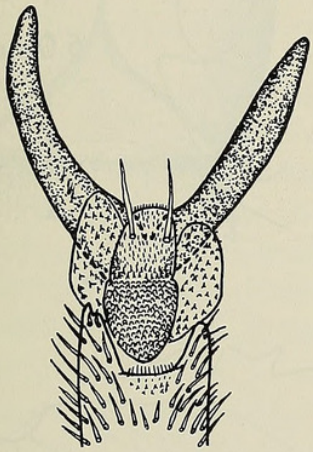
Description.—Size: body length 20–28 mm; forewing length males 26–36 mm [ave. 14 ♂, 31.0 mm], females 32–40 mm [ave. 13 ♀, 35.8 mm]. Coloration: luteus to fulvous, fuscus to piceus vitta on lateral margin of pronotum; vitta on postocular flange obscure or absent, especially in females. Postocular flange: in females, barely exceeding eye, concave anteriorly, moderately convex laterally, distinct from postocular spine; small males similar to females, flange much broader in large males, obliterating postocular spine. Pretarsus: unguitractor as wide as long, median lobe of pulvillus with 2 setae. Male genitalia: ninth sternite broadly and weakly incised posteriorly; genital papilli poorly developed, often apparently absent; ninth gonostyli long, unguiform, directed medially; tenth tergites nearly parallel, with crenulate inner margins; tenth sternite broad, moderately sclerotized, more heavily sclerotized anteriorly, styli long, digitiform, sparsely setose.



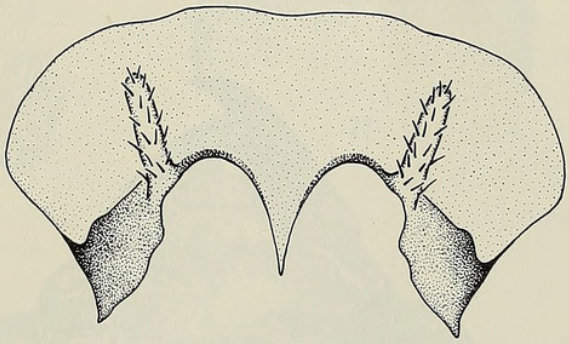
16



17



19



18

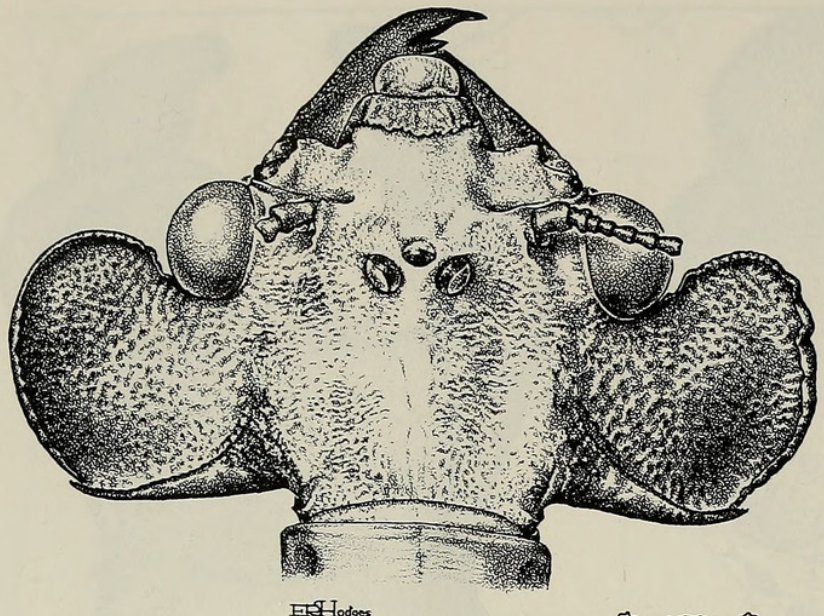
Figs. 16–19. *Platyneuromus honduranus*: 16, Male genitalia, lateral; 17, Same, ventral; 18, Male tenth sternite and styli; 19, Pretarsus, ventral.

Variation.—Development of postocular flange varies with size as in *P. soror,* although the clinal pattern seen in *P. soror* is not evident.

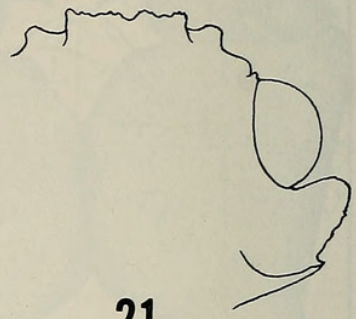
Distribution.—The species is only known from southern Mexico through Guatemala to northwestern Honduras. In Chiapas, Mexico it has been taken flying together *P. soror* or *P. reflexus,* but not yet with both at the same time. Collection dates range from the end of February to late May.

Material examined.—Neotype, male, Honduras [Depto. Cortes], La Lima, 23 Feb 1965, C. Evers Q. [USNM 101511, 32 mm].

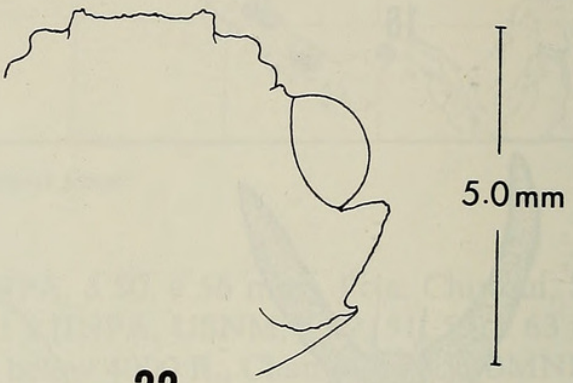
Guatemala, 1915, Wm. Schaus, 1 ♂ [USNM, 28 mm]. [Depto. Alta Verapaz], Panzos, Apr 1918, 1 ♀ [USNM, 37 mm]. [Depto. Izabal], Quirigua, Mar 1915,



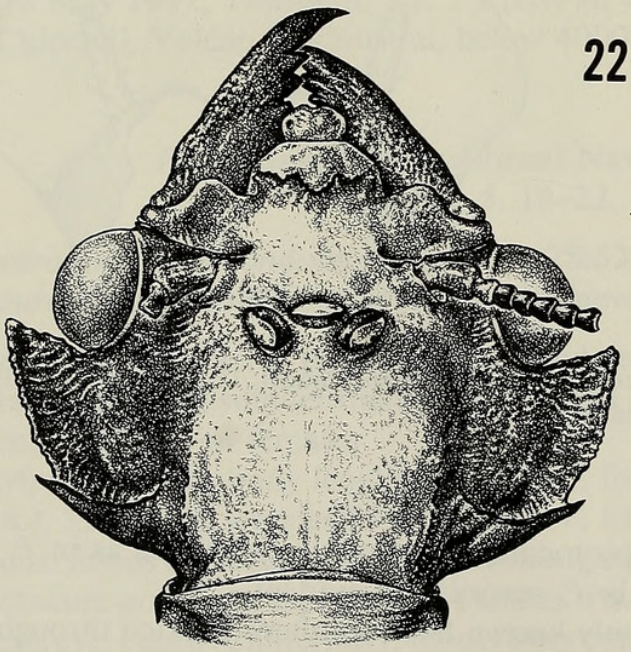
20



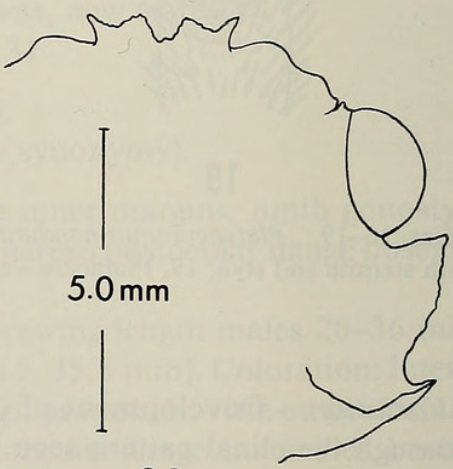
21



22

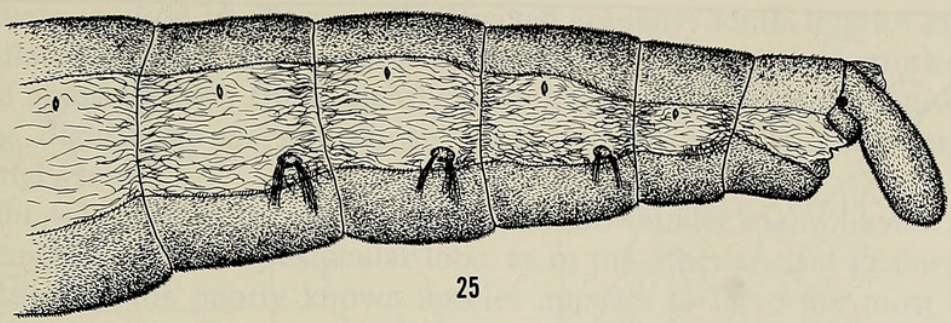


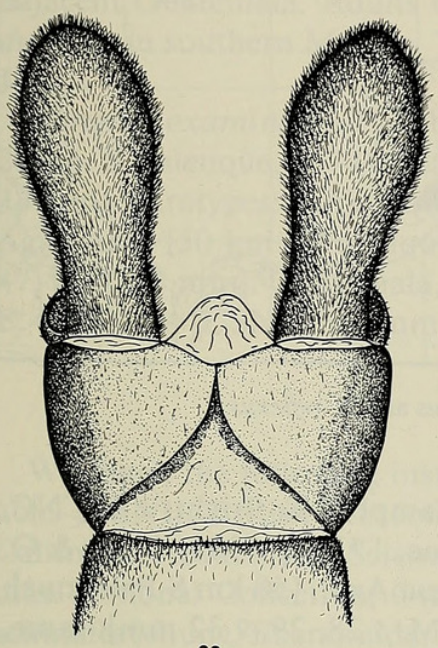
23

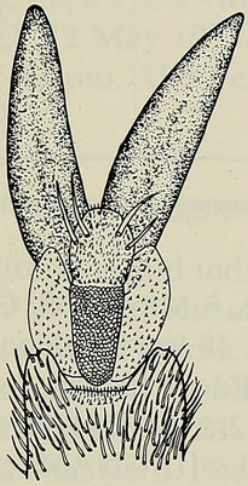


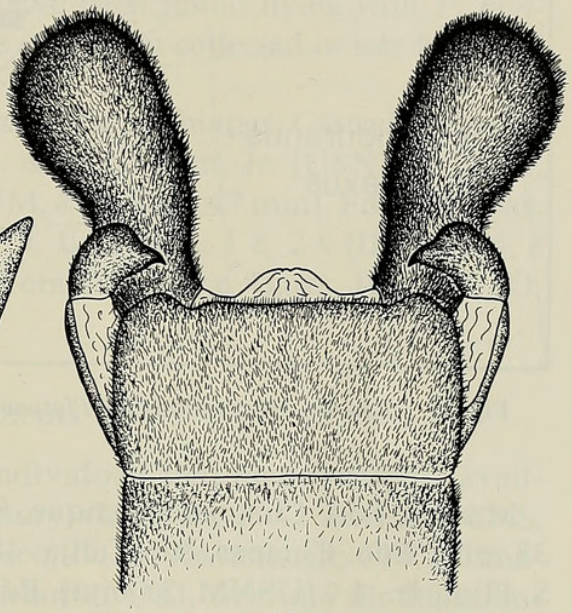
24

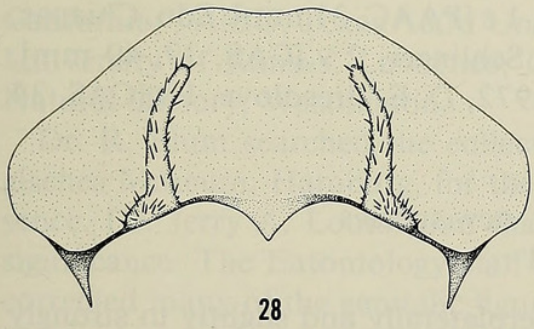
Figs. 20–24. *Platyneuromus honduranus*: 20, Head of male from Agua Azul, Mexico (wing, 33 mm); 21, Head of male from Bonampak, Mexico (wing, 27 mm); 22, Head of female from Rio Tulija, Mexico (wing, 35 mm). *Platyneuromus reflexus*: 23, Head of male from Cascada Misolja, Mexico (wing, 40 mm); 24, Head of female from same locality (wing, 42 mm).

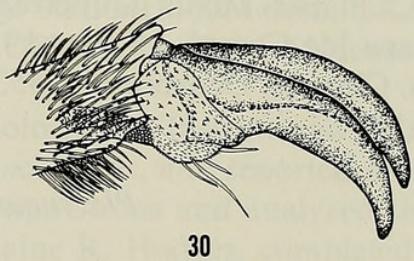












Figs. 25–30. *Platyneuromus reflexus*: 25, Male abdomen, lateral; 26, Male genitalia, dorsal; 27, Same, ventral; 28, Male tenth sternite and styli; 29, Pretarsus, ventral; 30, Same, lateral.

Wm. Schaus, 2 ♀ [USNM, 34, 36 mm]. [Depto. Izabal], Cayuga, Mar, Schaus & Barnes, 1 ♂ [USNM, 36 mm].

Honduras, 2 ♂, 1 ♀ [BMNH accesion number 1921-503, ♂ holotype *P. auritus,* second ♂ with replacement abdomen from another order, ♂ 32, 36, ♀ 39 mm]. [Depto. Atlantida], Lombardia, Wm. Mann, 1 ♀ [USNM, 37 mm].

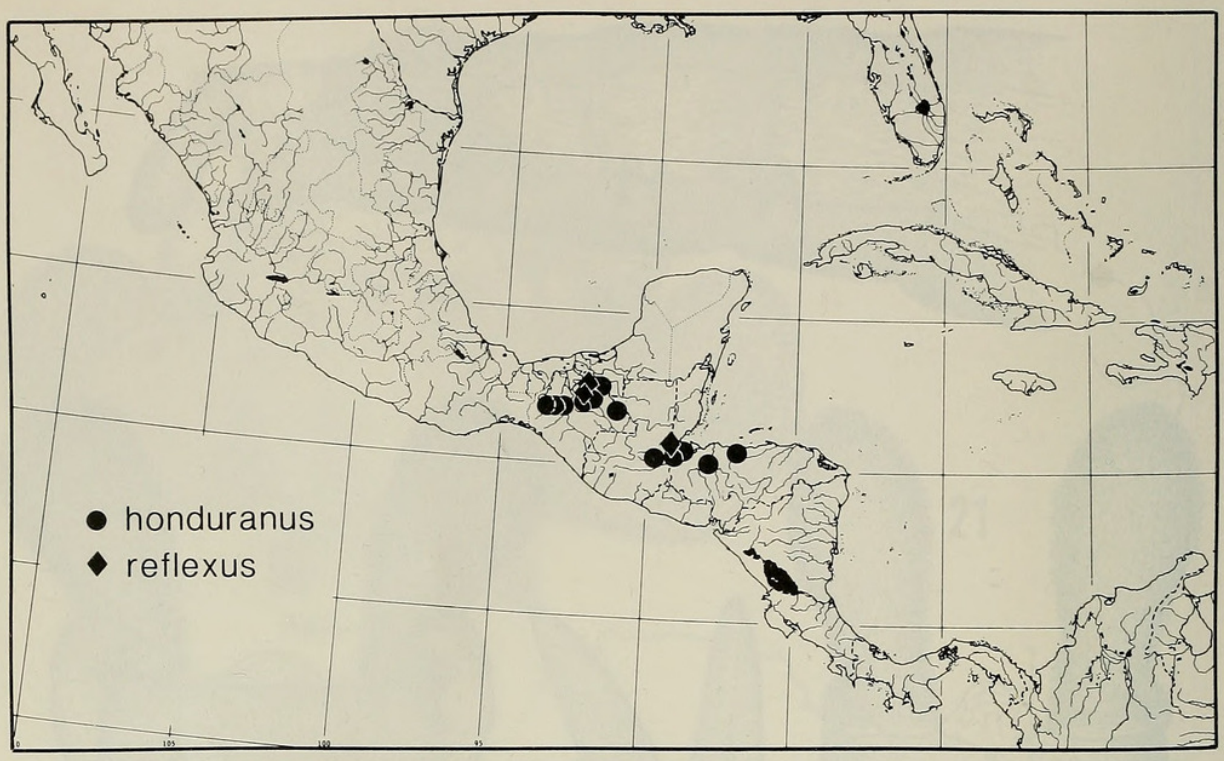


Fig. 31. Known distributions for *Platyneuromus honduranus* and *P. reflexus*.

Mexico, Edo. Chiapas, Palenque, 8 May 1969, Campbell & Bright, 1 ♀ [CNC, 38 mm]. Edo. Chiapas, Rio Tulija, 48 km S Palenque, 17 May 1981, C. M. & O. S. Flint, Jr., 1 ♀ [USNM, 35 mm]. Edo. Chiapas, Agua Azul, [50 km S Palenque], 1 May 1978, C. R. Beutelspacher, 2 ♂, 1 ♀ [IBUNAM, ♂ 28, 29, ♀ 32 mm]; same, but 22 May 1979, L. Rivera, 1 ♂, 1 ♀ [IBUNAM, ♂ 33, ♀ 33 mm]. Edo. Chiapas, Bonampak, 2–4 May 1978, C. R. Beutelspacher, 5 ♂ [IBUNAM, USNM, 26, 27, 30, 31, 35 mm]; same, but 20–25 May 1980, J. Bueno S., 1 ♀ [IBUNAM, 32 mm]. Edo. Chiapas, Tuxtla [Gutierrez], 7 May 1947, 1 ♂ [PAAC, 31 mm]. Edo. Chiapas, Chiapa [de Corzo], 13 Mar 1953, Bechtel & Schlinger, 2 ♀ [CAS, 39, 40 mm]. Edo. Chiapas, Ocozocautla, 853 m, 17 May 1972, D. E. Breedlove, 1 ♀ [CAS, 34 mm].

Platyneuromus reflexus, new species
Figs. 23–31

Diagnosis.—Postocular flanges pointed anterolaterally and slightly to strongly reflexed; male abdomen bearing setose tubercles laterally on segments 5, 6, 7; male tenth tergites gradually divergent.

Description.—Size: body length 27–38 mm; forewing length males 38–47 mm [ave. 4 ♂, 42.8 mm], females 41–48 mm [ave. 4 ♀, 45.0 mm]. Coloration: luteus to fulvous, fuscous to piceus vitta on lateral margin of head and pronotum. Postocular flange: in females width barely exceeding that of eye, anterolateral angle pointed and directed slightly anteriad, lateral margin almost straight; males with flange broad and more strongly reflexed dorsad. Pretarsus: unguitractor longer than wide; median lobe of pulvillus with 4 setae. Male genitalia: ninth sternite broad, posterior margin broadly and slightly rounded; genital papillae strongly developed, often projecting as large, rounded, membranous lobes; ninth gonostyli

short, arcuate, ending in sharp spine directed mesally; tenth tergites elongate, slightly inflated and slightly divergent apicad; tenth sternite broad, more heavily sclerotized anteriad, with small, lightly sclerotized anteromesal projection, gonostyli long, digitiform, sparsely setose, bases with distinct, lateral enlargement more strongly setose.

Variation.—The series is quite uniform, but the smaller males have a slightly narrower and less reflexed postocular lobe, as in the other species of the genus.

Distribution.—This poorly known species appears to have the most limited distribution of any in the genus, being known only from Chiapas, Mexico, and adjacent Guatemala. Adults of the species have been found flying with *P. honduranus* in southern Mexico. The species has only been collected in late May and June.

Material examined.—Holotype, male, Mexico, Edo. Chiapas, Cascada Misolja, 20 km S Palenque, 17–18 May 1981, C. M. & O. S. Flint, Jr. [USNM 101510, 38 mm]. Paratypes: Same, data, 1 ♂, 2 ♀ [USNM, ♂ 40, ♀ 41, 47 mm]. Edo. Chiapas, Agua Azul [50 km S Palenque], 22 May 1979, L. Rivera, 1 ♂, 2 ♀ [IBUNAM, ♂ 47, ♀ 44, 48 mm]. Guatemala, [Depto. Alta Verapaz], Trece Aguas, Jun 1907, O. F. Cook, 1 ♂ [USNM, 46 mm].

Acknowledgments

We thank the following institutions and individuals that made material available: BMNH, British Museum (Natural History), London, P. C. Barnard; CAS, California Academy of Sciences, San Francisco, D. H. Kavanaugh; CNC, Canadian National Collection, Ottawa, J. E. H. Martin; DEI, Institute für Pflanzenschutzforschung, Eberswalde, L. Diekman; IBUNAM, Instituto de Biologia, Universidad Nacional Autonoma de Mexico, J. Bueno Soria; INPA, Instituto Nacional de Pesquisas da Amazonia, Manaus, N. D. Penny; MCZ, Museum of Comparative Zoology, Cambridge, M. Pearce & M. Thayer; PAAC, Philip A. Adams, Fullerton, California; TAMU, Texas A&M University, College Station, S. J. Merritt; UKAL, University of Kansas, Lawrence, G. W. Byers; USNM, National Museum of Natural History, Washington.

Dr. R. Blum searched the collection of the Zoologisches Institüt und Zoologisches Museum, Hamburg, for the type of *P. honduranus,* and reported its absence. Dr. Jerry A. Louton ran the statistical computations and analyzed their significance. The Entomology staff artist, Mrs. Elaine R. Hodges, completed or corrected many of the genitalic figures and the wings, and executed the exquisite illustrations of the head. Mr. Victor E. Krantz photographed the type of *P. auritus.*

Literature Cited

Banks, N. 1908. On the classification of the Corydalinae, with descriptions of new species.—Proceedings of the Entomological Society of Washington 10:27–30.

Davis, K. C. 1903. Sialidae of North and South America.—New York State Museum Bulletin 68: 441–487.

Glorioso, M. J. 1981. Systematics of the dobsonfly subfamily Corydalinae (Megaloptera: Corydalidae).—Systematic Entomology 6:253–290.

Hagen, H. A. 1861. Synopsis of the Neuroptera of North America.—Smithsonian Miscellaneous Collections 4(1):xx + 1–347.

Kimmins, D. E. 1928. New and little known Neuroptera of Central America.—Eos 4:363–370.

Lestage, J. A. 1927. La faune entomologique indo-chinoise, 2; les Mégaloptères, deuxième parte.—Bulletin et Annales de la Société Entomologique de Belgique 67:93–119.

Navas, L. 1925. Neuropteren, Megalopteren, Plecopteren und Trichopteren aus dem Deutschen Entomologischen Institüt (Berlin-Dahlem). I serie.—Entomologische Mitteilungen 14:205–212.

———. 1928. Insectos del Museo de Hamburgo. Primera serie.—Boletin de la Sociedad Entomologica de Espana 11:59–67.

Penny, N. D. 1977. Lista de Megaloptera, Neuroptera e Raphidioptera de Mexico, America Central, ilhas Caraibas e America do Sul.—Acta Amazonica 7(4, supplement):1–61.

Stitz, H. 1914. Sialiden der Sammlung des Berliner Museums. Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin 1914:191–205.

Weele, H. W. van der. 1909. New genera and species of Megaloptera Latr.—Notes from the Leyden Museum 30:249–264.

———. 1910. Megaloptera (Latreille), monographic revision.—*In* Collections zoologiques du Baron Edm. de Selys Longchamps 5(1):1–93.

(OSF) Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.