

THE GENUS *PHYLLOGOMPHOIDES* IN MIDDLE AMERICA (ANISOPTERA: GOMPHIDAE)¹

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8 of the 10 spp. of *Phyllogomphoides* occurring north of South America are dealt with; 4 of these are described and illustrated as new, viz. *P. suasillus* sp. n. (♂ holotype: Quebrada San Pedro nr. Santa Rosalía, Zacapa Dept., Guatemala; Aug. 20, 1970), *P. duodentatus* sp. n. (♂ holotype: Salto Eyipantla, 8 km S. of San Andrés Tuxtla, Veracruz, Mexico; Aug. 15, 1976), *P. pugnifer* sp. n. (♂ holotype: 3 km N. of Santiago Tuxtla, Veracruz, Mexico; 13-14 Sept., 1965; ♀ unknown), and *P. insignatus* sp. n. (♂ holotype: 1.7 mi N. of Gamboa, Canal Zone, Panama; 8-15 Aug., 1970). — The characterization of the genus *Phyllogomphoides* is discussed, and the view is advanced that L. K. GLOYD's rejection of *Negomphoides* was correct (1973, *Occ. Pap. Mus. Zool. Univ. Mich.* 668: 1-7), and that the name *Phyllogomphoides* should be applied to the spp. originally placed in *Gomphoides*, except for *infumata*, *praevia*, and *perdiita*, and for those spp. that have been separated into *Phyllocycla* and *Aphylla*.

INTRODUCTORY NOTES

This study treats eight of the 10 species of *Phyllogomphoides* (4 new) occurring north of South America. The North American species *stigmatus* (Say) and *albrighii* (Needham) (which occurs also in eastern Mexico) are not included here as they are not closely related to the other species. The original species *suasus* (SELYS, 1859) was described from a female, with a male described subsequently, and is a homogeneous, wide ranging (northern

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Mexico to Costa Rica) species whose identity apparently has never been in serious doubt. The species *bifasciatus* (Hagen in SELYS, 1878) is also wide ranging (southern Mexico to Costa Rica) and homogeneous, and, although it was described from a female, has presented no problems among subsequent authors. An allotype male is described herein. The species *pacificus* (SELYS, 1873), described as a tentative race of *suasus*, is confined to the Pacific coast of Mexico and is abundantly distinct from that species. Although CALVERT (1899) noted one important structural difference between the two species, he apparently had forgotten this distinction in his more widely cited work (1905), in which he suggested that the two species differed only in color pattern. The species *appendiculatus* (KIRBY, 1899) was described from a single male from central Panama. The male of *bifasciatus* being undescribed, Kirby, and Calvert uncritically after him, suggested that the two species might be synonymous. The species are close, but distinct, with *appendiculatus* confined to Panama and *bifasciatus* occupying a more northern range. An allotype female is here assigned to *appendiculatus*.

Four new species are described in this paper. The new species *insignatus* is found in the Canal Zone. It is closely related to *semicircularis* (Selys), but differs in color pattern and, slightly, in structure. The new species *pugnifer* is found from eastern Mexico to Costa Rica and is most closely related to *lieftincki* (Belle) from South America; it is relatively secretive, and the female has not been taken. The new species *duodentatus* occurs in eastern Mexico and Guatemala. It is not closely related to any other species of the genus, but may be distantly related to *pugnifer*, or to the Brazilian species *annectens* (Selys) or *regularis* (Selys). The new species *suasillus* is known from a single mating pair from eastern Guatemala and appears to be closely related to *suasus*.

The characters which are most immediately useful for separating these species are the male superior appendages and the anterior hamules. From the latter we might draw some very speculative inferences about phylogenetic relationships by noting that the large apical cleft of *pugnifer* and *duodentatus* might have evolved towards the smaller notch of *bifasciatus* and *appendiculatus*, the larger notch of *suasillus*, and, finally, towards the notchless *suasus* or the branched *pacificus*, which are the most distantly positioned species according to this scheme. No useful distinction among the present eight species can be made on the basis of size nor of wing venation. The average number of cells in various spaces are given in Table I; variations from these averages are typical for the order. Thus, larger specimens are more likely to have a larger number of cross veins in various wing spaces, as is almost universally observed in the Odonata.

Females of several species may be characterized by the form of the vulvar lamina. In several species this structure is not very distinctive (*bifasciatus*, *appendiculatus*, *pacificus*, and *suasillus*). In *insignatus* it is complex with

Table I
Average number of cells in some species of *Phyllogomphoides*

Species	Sex	Number	Fore wing triangle	Fore wing subtriangle	Hind wing triangle	Hind wing subtriangle	Anal loop
<i>suasus</i>	m	81	2.87	2.81	2.92	2.38	3.00
	f	51	2.98	3.45	2.99	2.68	3.32
<i>pacificus</i>	m	5	2.80	2.00	2.80	1.80	2.80
<i>bifasciatus</i>	m	13	2.60	2.60	2.46	1.58	2.85
	f	7	2.71	2.21	2.50	2.07	3.00
<i>appendiculatus</i>	m	6	2.76	2.08	2.75	1.75	2.83
<i>duodentatus</i>	m	59	2.68	2.32	2.93	1.86	2.79
	f	14	3.06	3.06	2.97	2.06	3.13
<i>pugnifer</i>	m	22	2.98	2.11	2.89	1.87	2.74

protruding lateral flanges, and in *duodentatus* it has analogous small, flattened lateral spines. In *suasus* there are similar, but smaller, lateral spines positioned so that they can only be viewed laterally; in many cases the ventral part of the sterna must be chipped away to view these spines. The female of the remaining species, *pugnifer*, is unknown.

CHARACTERIZATION OF THE GENUS

The characterization of the genus *Phyllogomphoides* has been the subject of several recent papers (BELLE, 1970; GLOYD, 1973, 1974). MUTTKOWSKI (1910) assigned the original Selysian name *Gomphoides* to those species which were then (and are now) referred to under *Progomphus*, believing that a footnote of Selys comparing the venation of a fossil gomphid to that of a living species constituted a valid generic assignment. The original species named under *Gomphoides* were assigned to a new genus, *Negomphoides*. BELLE (1970) retained this name and split off two species, *audax* (Hagen in SELYS, 1854) and *fuliginosus* (Hagen in SELYS, 1854) into another genus *Phyllogomphoides* with *fuliginosus* the type species. GLOYD (1973) pointed out that Muttkowski's *Negomphoides* was invalid, being a junior synonym of *Gomphoides*. She accepted KIRBY's (1890) designation of *infumata* (Burmeister) as the type species of *Gomphoides*, and she set this species, together with *praevia* (St. Quentin) and *perdita* (Foerster) in a newly restricted *Gomphoides*. Gloyd further questioned the distinction between "*Negomphoides*" and *Phyllogomphoides* of Belle. In addition to Mrs. Gloyd's comments on the generic inseparability of the species *audax* and *fuliginosus* from the remaining species in "*Negomphoides*" of Belle, I might add that BELLE's statement that A2 is generally not forked (in

"*Negomphoides*") applies to only two of the present eight species: *pugnifer* and *insignatus*. Also the anterior hamule of *pacificus* could easily be compared in complexity to those of *audax* and *fuliginosus*. The view advanced in this paper is that Mrs. Gloyd's rejection of *Negomphoides* was correct, that there is no clear distinction between *audax* and *fuliginosus* and the remaining species, and that the name *Phyllogomphoides* must now be applied to the species originally placed in *Gomphoides*, except for the three named above, and, of course, for those species that have been separated into *Phyllocycla* and *Aphylla*.

DESCRIPTIONS OF SPECIES

PHYLLOGOMPHOIDES SUASUS (SELYS)

Gomphoides suasu SELYS, 1859, p. 19 (reprint): original description, holotype female, "Veracruz"; — SELYS, 1869, p. 28 (reprint): allotype male, "Tampico"; — SELYS, 1873, p. 59 (reprint): further description of above specimens; — CALVERT, 1899, p. 384: notes on female; Tepic, Mexico; — CALVERT, 1905, p. 158: notes on male and female, additional localities in Veracruz and Guerrero, Mexico, and Escazu, Costa Rica — *Gomphoides suasu* CALVERT, 1919, p. 33: records from Guatemala refer to *P. pugnifer* n. sp. and *P. duodentatus* n. sp. (q.v.); — ST. QUENTIN, 1967, p. 138: notes on male; Cañas, Costa Rica.

This species is the largest and most widespread in the genus from northern Middle America. In addition to the figures provided herein, the following descriptive notes of typical Mexican specimens serve to distinguish this species:

Male. — Head: dark with large lateral spots on labrum, anteclypeus and dorsum of frons gray; pale spots on vertex and in center of occiput. Prothorax: pronotum dark with paired posteromesal and small posterolateral spots. Pterothorax: all lateral stripes present and prominent, the 1st broadly connected with the mesothoracic collar; the 2nd stripe thin and widened above; the 3rd-5th stripes fully developed. Legs: Femora brown, the 1st with a broad, pale inner surface; tibiae black. Abdomen: 1st 2 segments laterally pale, 3 to 6 with detached basal lateral and mesal spots, the 3rd segment with a dorsal dash extending $\frac{3}{4}$ the length; 7 with a basal band extending $\frac{3}{5}$ the length; 8 with a conspicuous and 9 with a very small lateral spot. Appendages: superior appendages semicircular-forcipate, spine at $\frac{3}{5}$ the length, pale, with basal black; inferior sharply cleft, dorsally curved in lateral view. Genitalia of 2nd segment: anterior hamule flattened and rounded, the inner margin neither notched nor excavated, the tip deflected mesally; posterior hamule typical subcylindrical, with small terminal spine; vesical bilobed, extended ventrally, with a small mesal spine. Wings: venation black, stigma 4.5 mm; vein A2 convergent with A3, forked.

Female. — Markings as in male, but 1st thoracic stripe invariably narrow and widely detached from mesothoracic collar. Basal band on segment 7 covering 2/5 the length of the segment. Vulvar lamina with tips truncate in ventral view.

Measurements and variation: A series of 82 males from Mexico (Nuevo León, San Luis Potosí, Veracruz states), Guatemala (Departments of Alta Verapaz, El Progreso, Zacapa, Chiquimula, Escuintla, Suchitepequez), Nicaragua (Matagalpa Department), and Costa Rica (Guanacaste Department) varies from 49.7 mm (abdomen) and 37.6 mm (hind wing) in the northern part of the range to 47.6 mm and 36.4 mm in the south. A series of 51 females from the same localities varies from 49.9 mm (abdomen) and 41.4 mm (hind wing) in the north to 46.8 mm and 39.1 mm in the south.

The basal-ventral spine of the male superior appendage is variable in length, as noted by ST. QUENTIN (1967), with the northern specimens bimodally distributed between short (about 0.1 mm) and long (about 0.25 mm) lengths, and the average 0.18 mm. The specimens from Guatemala, Nicaragua, and Costa Rica rarely show long spines and average 0.07 mm.

The thoracic pattern of the males from western Guatemala show the 2nd and 4th stripes very faint or absent, and, in a few cases, the 1st stripe detached from the collar, so that the pattern would be easily mistaken for that of *bifasciatus*. The Nicaragua and Costa Rica specimens have the 2nd stripe absent or very narrow, but the 4th stripe normal.

In spite of the geographical variations, *suasus* is easily identified by the fully developed thoracic pattern, and by the characteristic form of the male anterior hamule. This species is bold and flies in relatively open spaces, such as along the banks of wide rivers. It is the species encountered most frequently hanging up in vegetation along paths away from water.

PHYLLOGOMPHOIDES SUASIIUS SPEC. NOV.

Material examined: holotype male and allotype female. — Guatemala: Zacapa Dept., Quebrada San Pedro nr. Santa Rosalia, 20 Aug. 1970, T. Donnelly.

This is a small species known from a single pair collected in eastern Guatemala. As the name implies, the species is closest to *suasus*, from which it is distinguished on structural grounds.

Male (holotype). — Dark color dark, reddish brown; pale color yellowish gray to yellow. Head: labrum dark with 2 large lateral spots; mandibles and anteclypeus pale; postclypeus dark with lateral spots; frons pale below and dark above, with a sharp boundary; vertex dark with a large pale spot between the ocelli; occiput pale with dark borders. Prothorax: obscurely pale; pronotum with a dark posterior border carrying a prominent double median pale spot. Pterothorax: dark with 5 complete lateral stripes; mesothoracic

collar incomplete and unconnected to 1st lateral stripes, forming a pair of disjointed "7"s; 2nd and 3rd stripes distinctly expanded at upper end, the 4th less so, and the 5th widened to form a rounded "L"; 4th stripe continuous with broad, pale area of metinfraposternum; pectus obscure. Legs: dark; anterior femora broadly pale ventrally. Abdomen: dark, pale as follows: posterodorsal spot and ventral 1/3 of 1st tergum; dorsal dash, posteriorly narrowed, and broad, pale spots on ventral 1/2 of 2; anterolateral spots varying from 2/5 on 3, 1/5 on 4, 1/7 on 5 and 6, to 1/3 on 7, and 1/3, but very narrow, on 8; anterodorsal dashes on entire length of 3, 4/5 of 4, 1/3 of 5, 1/6 of 6, and on 7 continuous with lateral spot to form basal band (these dashes are completely isolated from lateral spots on 4 to 6 but connected narrowly on 3); maximum width of foliation on segment 8 is 0.3 mm. Superior appendages: pale, basally black, semicircular-forcipate with tips flattened laterally and produced dorsally; spine on inner side at 2/3 length; inferior appendage black, sharply cleft, flat in lateral view. Genitalia of 2nd segment: anterior hamule rounded and flattened, narrowed apically and broadly excavated medially near tip; posterior hamule typical, subcylindrical with medial-apical spine; vesicle produced into prominent bilobed posteroventral process with smaller central flattened spine. Wings: venation and stigma brown, stigma 4.5 mm, vein A2 convergent with A3, forked; fore wing antenodal formula 14/21:20/13; hind wing formula 13/16:15/14; stigma 4.5 mm; A2 convergent with A3 near wing margin, forked; fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 2, hind wing subtriangle 2, fore wing supratriangle 2-3, hind wing supratriangle 3, anal loop 3 cells.

Measurement: abdomen 45 mm; hind wing 33 mm.

Female (allotype). — Markings similar to those of male, but with greater extent of pale colors, especially on abdomen, where 1 and 2 are broadly pale laterally, 3 to 5 have prominent antero-lateral spots not connected with anterodorsal dashes, a basal band (1/6) on 6 and a prominent basal band occupying 1/3 of 7. Appendages pale. Vulvar lamina with rounded median cleft, the tips curved and very slightly deflected ventrally. Wings: vein A2 not forked, fore wing nodal index 13/21:22/13; hind wing index 14/17:16/14; fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 3-4, hind wing subtriangle 3, fore wing supratriangle 3, hind wing supratriangle 3, anal loop 3 (indistinct) and 2 cells. Measurements: abdomen 44 mm; hind wing 35 mm.

This species is closely related to *suasus* but is easily identified by the form of the anterior hamule. The vesicle is more prominent and more deeply lobed than in *suasus*. The 1st thoracic stripe is not connected with the mesothoracic collar, but this character might not prove to be constant. The female differs by having the vulvar lamina tips rounded rather than truncate.

Little is known of the habits of this species. The lone pair was taken in

copula along a small, rocky stream in the partially xerophytic forest of a dry portion of eastern Guatemala.

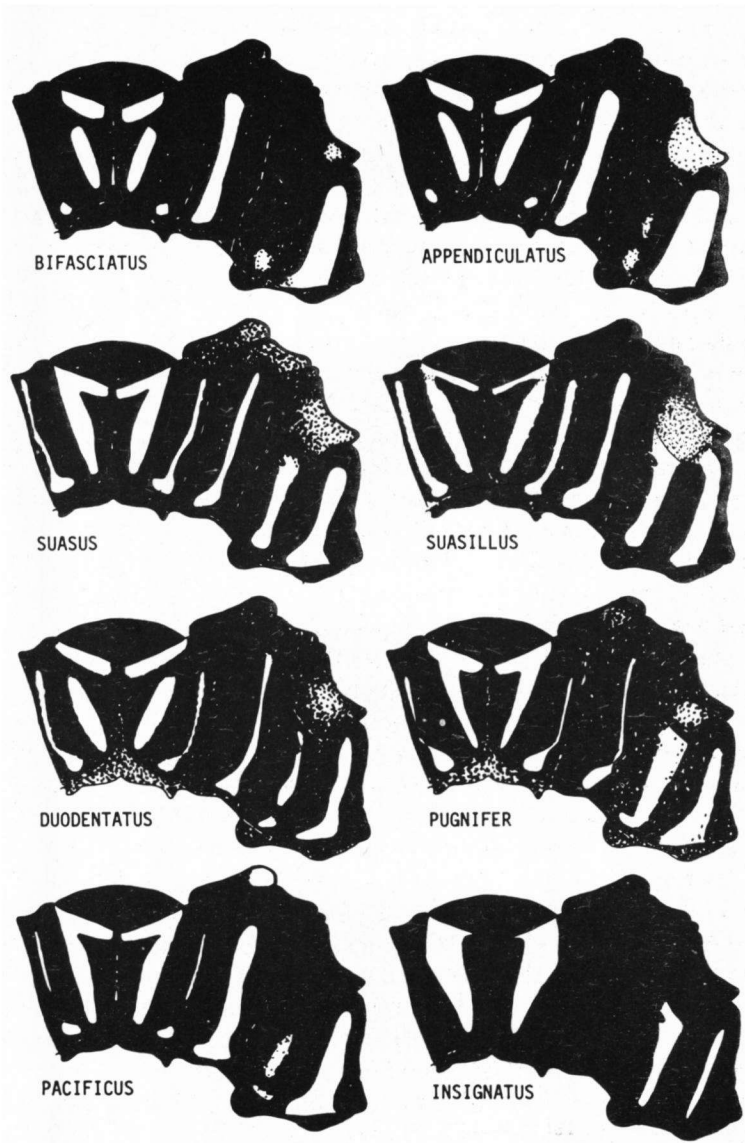


Fig. 1. Thoracic color patterns of males of *Phyllogomphoides bifasciatus* (Hag.), *appendiculatus* (Kirby), *suasus* (Sel.), *suasillus* sp. n., *duodentatus* sp. n., *pugnifer* sp. n., *pacificus* (Sel.), and *insignatus* sp. n.

PHYLLOGOMPHUS PACIFICUS (SELYS)

Gomphoides pacifica SELYS, 1873, p. 60 (reprint): description of holotype male, "race de suasas?"; Putla, Mexico; — CALVERT, 1899, pp. 384: descriptive notes; Tepic, Mexico; — CALVERT, 1905, p. 158. — *Gomphoides suasas*, race *pacifica* CALVERT, 1905, p. 158: descriptive notes; additional localities in Morelos and Guerrero, Mexico; — *Gomphoides pacifica* ST. QUENTIN, 1967, p. 139.

Material examined. — Mexico: Colima State, 24.2 mi S of Colima, elev. 200 ft., 21 Aug. 1965, D.R. Paulson, 2♂; — Jalisco State, 5.9 mi W of Tamazula, elev. 3700 ft., 20 Aug. 1965, D.R. Paulson, 1♂; — Nayarit State, 16 mi NE of San Blas, elev. 300 ft., 26 Aug. 1965, D.R. Paulson, 1♀; — Oaxaca State, nr. El Coyul, km 698, highway 190, elev. 2500 ft., 11 July 1966, O.S. Flint and M.A. Ortiz B., 1♂; — Morelos State, vic. Xochitepec, 12-14 July and 1 Aug. 1965, O.S. Flint and M.A. Ortiz B., 2♂; 1♀; — Chiapas State, 15.4 mi NE of Arriaga, elev. 2300 ft., 24 July 1965, D.R. Paulson, 1♂; — Chiapas State; 8.2 mi NE of Arriaga, elev. 1200 ft., 25 July 1965, D.R. Paulson, 1♂ (mated with female *suasus*).

This species has had an unfortunate history. The original description, noting the yellow costa, pale face, and vestigial humeral stripe, leave no doubt as to its identity. However, although CALVERT (1899) added a very important structural note (the apicalventral angle of the male superior appendage), in his more widely consulted work (1905) he apparently forgot this observation, noting "only slight color differences" between this species and *suasus*, and reducing it to a race of that species. ST. QUENTIN (1967) added no descriptive notes. The following brief description will serve to identify this species:

Male. — Head: face pale yellowish gray with dark markings limited to base and outer margin of labrum, inferior border of postclypeus, and inferior part of frons. Vertex and occiput each dark with central pale spot. Prothorax: pronotum brown with large posteromesal paired spot, anteromesal spot, and posterolateral spots. Pterothorax: 1st stripe broad and connected broadly with mesothoracic collar, forming stout "7"s; 2nd stripe almost lacking reduced to a very narrow, discontinuous line, but broadened into a dorsal spot; 3rd stripe fully developed; 4th stripe weakly developed; 5th stripe fully developed. Legs: femora brown, 1st with broad interior pale stripe, all femora with brown paler proximally and with black spines. Abdomen: marked as in *suasus*, with ventrolateral pale marks on 1 and 2, detached basal lateral spots and dorsal lines (extending the full length of segments 1 to 6, but reduced on 6 to a thin line); basal band on 7 extending 3/4 the length; obscure lateral pale spots on 8; maximum width of foliation on 8 is 0.7 mm. Appendages: superior appendage semicircular-forcinate, the tip having a very distinct apicalventral angle and with a well developed ventrobasal spine; appendage pale above, darker below. Inferior appendage sharply cleft and tightly curved dorsally in lateral view. Genitalia of 2nd segment: anterior hamule bifid, the anterior

branch low and rounded, the posterior hamule of usual shape; vesicle bilobed, and produced mainly ventrally and having a very small medial spine. Wings: venation black, except for yellow interior of costa; stigma 4.5 mm, vein A2 convergent with A3, forked.

F e m a l e. — Markings as in male, except that 1st lateral stripe of thorax is almost straight and widely detached from mesothoracic collar. The 2nd stripe is narrow, the 3rd and 5th stripes fully developed and the 4th stripe a narrow, continuous line. The abdomen has pale markings more extensive on 1 to 6 than in male, and the basal band on 7 less extensive (2/3 length). Legs: femora pale grayish yellow with black spines. Vulvar lamina: broadly cleft, tips curved.

Measurements and variations: 8 males average 46.9 mm (abdomen) and 36.4 mm (hind wing). Two females average 47.5 mm (abdomen) and 40 mm (hind wing). The limited series shows little variation, but the male femora vary from dark to pale brown.

The species *pacificus* is instantly recognizable by the extent of pale color on the face, legs and costa, by the male superior appendages, and by the anterior hamule. The thoracic stripes differ from those of typical *suasus* in eastern Mexico, but a few *suasus* males from western Guatemala show a reduction in the 2nd and 4th thoracic stripes which is similar to that of *pacificus*. The female of *pacificus* is most easily recognized by the largely yellow femora and by the shorter and rounder vulvar lamina. Complicating the identification of the female is the discovery of a mated pair of male *pacificus* and female *suasus* among specimens from western Mexico loaned to me by D. Paulson.

PHYLLOGOMPHOIDES BIFASCIATUS (HAGEN)

Gomphoides bifasciata Hagen in SELYS, 1878, p. 71 (reprint): description of holotype female: Isthmus of Tehuantepec, Mexico: — CALVERT 1905, p. 159: supposition that *G. appendiculatus* KIRBY (q.v.) is the male of this species. — *Gomphoides bifasciatus* NEEDHAM 1940 p. 369: description of nymph by supposition from Panama: almost certainly not this species; — NEEDHAM 1943 p. 205: reared specimens from Guatemala; descriptive notes on venation; — ST. QUENTIN 1967 p. 138.

Material examined. — **Allotype male:** — **G u a t e m a l a:** Izabal Dept., Lago Izabal, 2 June 1978, T. Donnelly. — **M e x i c o:** Oaxaca State, Puente Tlacotepec, nr. Tehuantepec, 10 July 1966, O.S. Flint and M.A. Ortiz B., 1♂, 1♀; — Oaxaca State, 24.7 mi WNW of Tehuantepec, elev. 500 ft., 3 Aug. 1965, D.R. Paulson, 1♂. — **G u a t e m a l a:** San Marcos Dept., Puente Ixben, 15 June 1966, O.S. Flint and M.R. Ortiz B., 1♂; — El Progreso Dept., Estancia de la Virgen, 9 Sept. 1964, T. Donnelly, 1♀; — Zacapa Dept., Juan de Paz, 24 Aug. 1976, T. Donnelly, 1♂; — Zacapa Dept., Teculután, 31 Aug. 1969, T. Donnelly, 1♀; — Chiquimula Dept., Veguitas, 10 July 1962, T. Donnelly, 1♀; — Chiquimula Dept., Santa Elena, 12 July 1962, T. Donnelly, 1♀; — Izabal Dept., El Rico, 8 June 1977, T. Donnelly, 1♂; — Izabal Dept., Lago Izabal, 2 June 1978, T. Donnelly, 4♂. — **E l S a l v a d o r:** Santa Ana Dept., Lago de Coatepeque, 2 Sept. 1964, F.C. Thompson, 1♂. — **N i c a r a g u a:** Nandaime, 21-22 June 1962, T. Donnelly, 3♂, 1♀; —

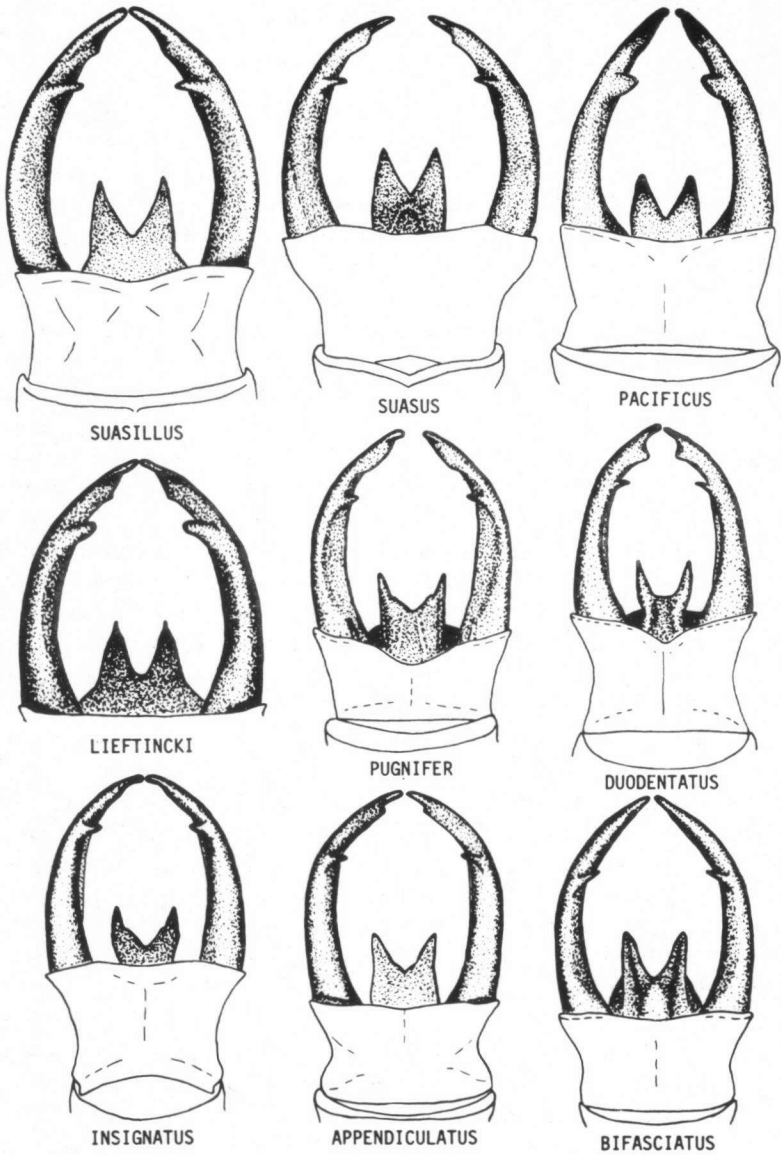


Fig. 2. Dorsal views of male superior appendages and inferior appendages of *Phyllogomphoides suasillus* sp. n., *suasus* (Sel.), *pacificus* (Sel.), *lieftincki* (Belle), *pugnifer* sp. n., *duodentatus* sp. n., *insignatus* sp. n., *appendiculatus* (Kirby), and *bifasciatus* (Hag.).

Matagalpa Dept., 38 mi SSE of Dario, 23 Aug. 1964, F.G. Thompson, 1♂; — Matagalpa Dept., 4.8 mi NW of Sebaco, 25 Aug. 1964, F.G. Thompson, 1♂; — Estelí Dept., 14.1 mi N of Estelí, elev. 2200 ft., 27 June 1966, D.R. Paulson, 1 pair in cop. — Costa Rica: Guanacaste Dept., Taboga, 25-26 July 1967, O.S. Flint and M.A. Ortiz B., 1♂.

The male of this species has not been described. CALVERT (1905) assumed that the male holotype of *G. appendiculatus* was this species. The only males which seem to have been recorded are 2 reared males mentioned by NEEDHAM (1943). This species is a fairly common insect ranging from southern Mexico to northern Costa Rica. It is very closely related to the Panamanian species *appendiculatus*. A male from Lago Izabal, Guatemala, has been selected as the allotype.

Male (allotype). — Dark color velvety dark brown; pale color gray (head, legs) to yellow (thorax, abdomen). Head: face dark, pale as follows: mandibles, anteclypeus, dorsum of frons, rear of vertex behind ocelli, occiput, except for posterior border. Prothorax: color pattern of pronotum obscure, pale on anterior margin, posterior margin, and a large sub-posterior dorsal spot. Pterothorax: 1st stripe parallel sided, slightly oval, divergent, widely separated from mesothoracic half collar, forming a pair of discontinuous "7"s; 2nd stripe absent except for a round dorsal spot; 3rd stripe wide, straight; 4th stripe absent, except for a faint dorsal spot; 5th stripe wide, slightly widened dorsally; metinfrapisternum obscurely pale; pectus dark. Legs: dark, pale on proximal 3/4 of 1st femora. Abdomen: dark, 1 with a broad lateral pale spot and a dorsal spot; 2 with dorsal line, spot on auricles, and a ventrolateral spot, dark on ventral margin of tergum; 3 to 6 with detached dorsal lines (segments 3 and 4) or thin dashes (segments 5 and 6) and lateral basal spots from 1/4 (segment 3) to 1/7 (segment 6) the segment length; 7 with basal band extending 3/5 the segment length; 8 with a discontinuous basal ring and laterobasal dash extending 1/2 the segment length. Maximum foliation on 8 is 0.28 mm. 10 with a discontinuous laterally elongate, basal mark with obscure borders. Appendages: dark, superior appendage dorsally pale in basal half, semicircular-forcipate, with tips produced dorsally, spine at 3/5 length; inferior appendages dark with pale dorsal spots, sharply cleft, mildly curved dorsally in lateral view. Genitalia of 2nd segment: anterior hamule erect, rounded, flattened, with a small apical, interior notch, posterior hamule typical subcylindrical, with a tiny apical spine; vesicle medially infolded so as to be pseudobilobed, produced ventrally. Wings: venation black, costa yellow internally, stigma 4 mm, vein A2 convergent with A3, forked; fore wing nodal index 13/22:21/13; hind wing nodal index 13/14:16/13.

Measurements: abdomen 44 mm; hind wing 32.5 mm; fore wing triangle with 2-3, hind wing triangle 3, fore wing subtriangle 2, hind wing subtriangle 2, and anal loop 2-3 cells.

Female. — Markings as in male, but pale color more extensive, especially in abdominal segments 3 to 6, where the basal lateral spots extend to 1/3 the length of each segment. Vulvar lamina broadly cleft, with rounded, slightly truncate tips.

Measurements and variations: 16 males average 43.3 mm (abdomen) and 32.8 mm (hind wing). 9 females average 43.0 mm (abdomen) and 35.1 mm (hind wing).

This species is homogeneous over a wide range, except that a few Mexican specimens show slightly more pale color. It is easily recognizable by its thoracic pattern (except that some *P. suasus* males from western Guatemala have similar patterns). The form of the anterior hamule, with its small apical notch, is also distinctive. The female is recognized by the color pattern and by the absence of a lateral projection on the vulvar lamina. The only species with which *bifasciatus* can be confused is *appendiculatus*, which is discussed below.

The distinction between *bifasciatus* and *appendiculatus* is based dominantly on the structure of the male abdominal appendages and on the form of the anterior hamule.

This species is almost as widespread and conspicuous as *P. suasus*. Its habitats range from small streams in semi-forested areas to larger streams and small rivers. It is especially common on the shores of Lago Izabal, especially where there are small sandy beaches interspersed with groves of trees at water's edge. It is often encountered along paths away from water.

PHYLLOGOMPHOIDES APPENDICULATUS (KIRBY)

Gomphoides appendiculatus KIRBY, 1899 p. 368, description of holotype male
La Chorrera, Panama. — *Gomphoides bifasciata* CALVERT, 1905, p. 159.

Material examined. — Allotype female: Panama: Canal Zone, Río Agua Salud, 8-13 July 1967, O.S. Flint and M.A. Ortiz B. — Additional specimens: Canal Zone, Barro Colorado Island, 29 May, 1970, E.S. Morton, 2♂; — same loc., 1 July 1967, R.C. Beard (at UV light), 1♂; — Canal Zone, Pipeline Road, 4.8 mi NW of Gamboa, 8-15 Aug. 1970, T. Donnelly and E.S. Morton, 1♂; — Canal Zone, Albrook Field, 21 July 1937, R. Bliss, 1♂; — Chiriquí, David, 13 Aug. 1922, D.E. Harrower, 1♂. — Costa Rica: Puntarenas Dept., vic. Rincón de Osa 13 Nov. 1966, D.R. Paulson, 2♂.

This little known species was assigned to synonymy with *bifasciatus* by CALVERT (1905) without examination of specimens. No later authors record observations of any specimens. Although the species *appendiculatus* and *bifasciatus* are closely related, they appear to be distinct, with specimens from Panama being assigned to the former species. The following descriptive notes are arranged to enable a comparison with *bifasciatus* (differences from Kirby's original description are placed in parentheses).

Male. — Dark color reddish brown; pale color yellow. Head: labrum

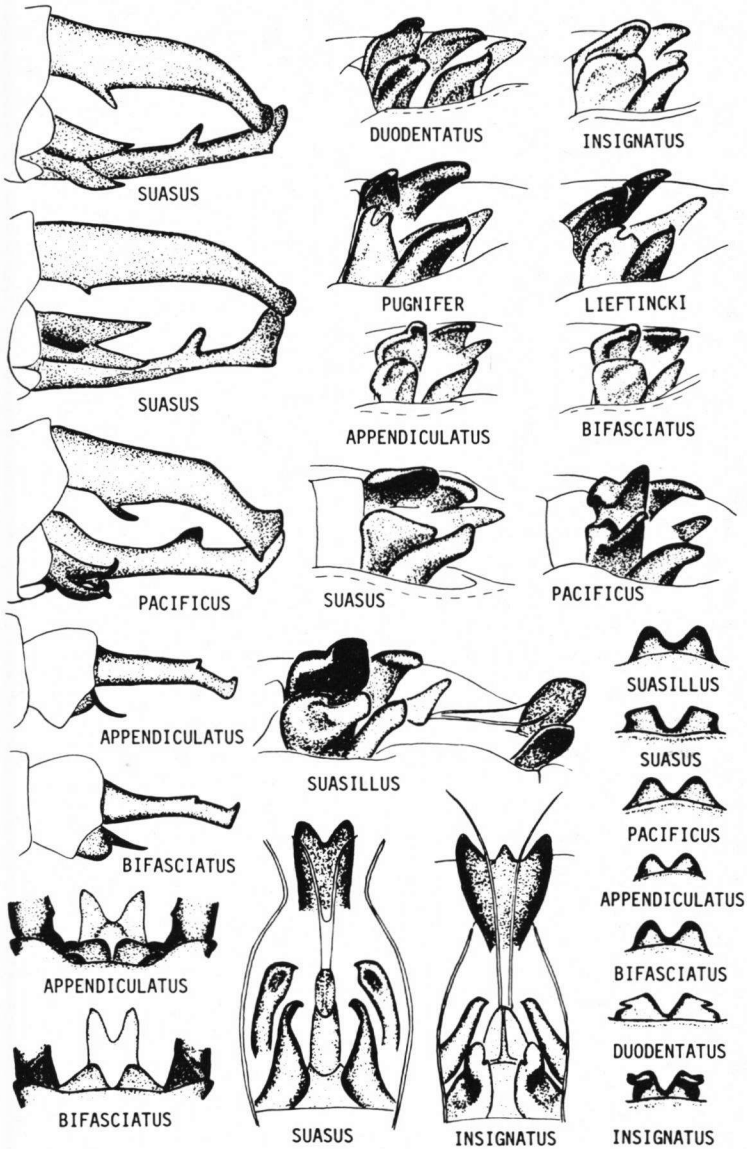


Fig. 3. Inclined lateral views of male appendages of *Phyllogomphoides suasus* (Sel.) (long and short-spined forms) and *pacificus* (Sel.); — lateral views of male appendages of *P. appendiculatus* (Kirby) and *bifasciatus* (Hag.); — inclined ventral views of hamules of *P. duodentatus* sp. n., *insignatus* sp. n., *pugnifer* sp. n., *lieftincki* (Belle), *appendiculatus* (Kirby), *bifasciatus* (Hag.), *suasus* (Sel.), *pacificus* (Sel.), and *suasillus* sp. n.; — ventral views of vulvar laminae of *P. suasillus* sp. n., *suasus* (Sel.), *pacificus* (Sel.), *appendiculatus* (Kirby), *bifasciatus* (Hag.), *duodentatus* sp. n., and *insignatus* sp. n.

with 2 lateral pale spots (genae pale, not dark); pale color on top of vertex commonly a spot with a dark lateral border. Prothorax and pterothorax similar to *bifasciatus*, except for ground color. Legs: interior pale stripe extending length of 1st femora; 3rd femora with pale basal dashes. Abdomen: lateral dashes diminishing from $2/5$ to $1/5$ the length of the segment on 3 to 6, on 6 confluent with the dorsal dash; dorsal lines on 3 to 6 well developed, the full length of segment 3 and 4, $3/4$ the length of 5 and 6; 8 to 10 with extensive pale markings (ground color black, not dull yellow), as follows: basal $2/3$ of 8, pale color extends laterally to full length in narrow prolongations; 2 large triangular dorsolateral spots on apical $1/2$ of 9, 2 large lateral and a dorsal spot on 10, maximum width of foliation on 8 is 0.23 mm. Appendages: superior appendage yellow, black on tip, semicircular-forcinate, distinguished from *bifasciatus* by being more sharply angulated in apical half; interior appendage pale, shorter than that of *bifasciatus*, more broadly cleft, and more dorsally curved in lateral view. Genitalia of 2nd segment: anterior hamule erect with a small apical notch; the vesicle is pseudo-bilobed as in *bifasciatus*. Wings: venation black, interior of costa yellow, stigma 4 mm, vein A2 convergent with A3, forked.

Female (allotype). — Color and markings similar to those of male. Abdomen: large lateral spot on segment 8 and smaller lateral spot on 9. Basal band on segment 7 extending $1/3$ length of segment. Legs: 3rd femora pale brown externally, 1st femora with pale internal stripe. Vein A2 not forked. Vulvar lamina: broadly cleft, tips rounded, as in *bifasciatus*.

Measurements and variations: 8 males average 42.0 mm (abdomen) and 32.2 mm (hind wing). The allotype female has abdomen 41 mm, and hind wing 32.5 mm.

The western specimens are darker than the typical Canal Zone specimens described above. The Chiriquí and two Costa Rican males lack the pale labral spots and have the pale color at the rear of the abdomen reduced to small spots on 8 and smaller pale areas on 9 and 10 (Chiriquí) or absent (Costa Rica). Thus, in color alone the species *appendiculatus* may be said to intergrade into *bifasciatus*.

This species is distinguished from *bifasciatus* by the greater degree of angulation of the male superior appendage in dorsal view and by the shorter and more shallowly cleft inferior appendage. The genitalia of the second segment is close in structure but the anterior hamule of *appendiculatus* is more tapered and less expanded and truncated apically. The one female examined of *appendiculatus* is inadequate as the basis for a specific diagnosis of this sex. In spite of the intergrading of the color patterns, the two species seem constantly separable, and the relatively short distance separating their ranges (200 km) suggests that structural intergrades are improbable.

PHYLLOGOMPHOIDES DUODENTATUS SPEC. NOV.

Material examined. — Holotype male: Mexico: Veracruz State, Salto Eyipantla, 8 km S of San Andrés Tuxtla at highway 180, R.W. and J.A. Garrison, 15 Aug. 1976; — allotype female: Veracruz State, Rio Otopa, 8 km S of La Tinaja, R.W. and J.A. Garrison, 20 Aug. 1976. — Paratypes: same data as holotype, 2♂; — same data as allotype, 20♂, 6♀; — same data as allotype, but date 13 Aug. 1976, 24♂, 4♀; — Veracruz State, Lago Catemaco, elev. 340 m, R.W. and J.A. Garrison, 18 Aug. 1976, 1♂; — same loc., P. Hubbell, 4 July 1969, 1♂; — Veracruz State, Rio Coyolucán, 8.6 mi S of La Tinaja, D.R. Paulson, 14 Aug. 1965, 1♂; — Veracruz State, 8 km S.E. of San Andrés Tuxtla, T.W. and A.J. Donnelly, 12 Sept. 1965, 1♂; — Veracruz State, Colonial Apachital, 16 km S. and 10 km E. of Tierra Blanca, T.W. and A.J. Donnelly, 10 Sept. 1965, 2♂, 2♀; — Veracruz State, Puente Nacional, O.S. Flint, Jr. and M.A. Ortiz B., 24-31 July 1966, 1♂, 2♀; — Chiapas State, Tuxtla Gutierrez, elev. 1800 ft., D.R. Paulson, 12 July 1965, 1♂. — Guatemala: El Progreso Dept., Finca la Cajeta, nr. Estancia de la Virgen, elev. 700 m, T. Donnelly, 27 Aug. 1964, 1♂; — Alta Verapaz Dept., Pancajche, elev. 200 m, T. Donnelly, 4 Sept. 1964, 1♂; — Zacapa Dept., Teculután, T. Donnelly, 17 Aug. 1969, 2♂. — Honduras: Cortez Dept., 2.2 mi N of Rio Lindo, elev. 2000 ft., Fred G. Thompson, 29 Aug. 1964, 1♂.

An additional male from Cayuga, Guatemala, was listed as *Gomphoides suasa* by CALVERT (1919).

This is a small, relatively pale species, which occurs from Veracruz, Mexico, to northwestern Honduras. It is distinguished by the form of the superior appendages of the male and of the vulvar laminar in the female.

Male (holotype). — Dark color dark reddish brown, pale color grayish yellow. Head: labrum dark, with obscure lateral pale spots; mandible and anteclypeus pale; postclypeus dark with obscurely bordered lateral pale spots; frons pale above, dark below, without distinct border; vertex dark with central pale spot; occiput pale. Prothorax: color pattern obscure, pronotum with paired medial pale spots on posterior margin, pale anterior margin, and pale posterolateral spots, Pterothorax: dark, pale as follows: 1st thoracic stripe prominent, divergent, parallel sided, isolated from mesothoracic collar, which is not continuous medially; 2nd stripe narrow, continuous, with upper end expanded; 3rd stripe broader, continuous, slightly expanded at upper end; 4th stripe of variable width, nearly divided into 4 segments, of which the 2nd from upper end is twice the length of the others; 5th stripe prominent, expanded at upper end, occupying most of ventral 1/2 of metepimeron; metinfrapisternum with pale spot; pectus obscure. Legs: black, anterior femore with pale ventral stripe. Abdomen: dark, pale as follows: ventral 1/2 of segment 1; auricles and ventral-posterior spot on 2; anterolateral spots and dorsobasal dash on 3 to 6, diminishing from 1/3 (anterolateral spots) and 3/4 (dorsal dash) on 3 to 1/5 (spots) and 1/4 (dash) on 6; basal 1/2 of 7; obscure ventrobasal dash on 8; obscure pale on lateral margins of 9. Maximum width of foliation on 8, 0.4 mm. Superior appendages: pale, basally black, semicircular-forcipate, with tips flattened laterally and produced dorsally; internal spine at more than 2/3 length, small, sharp, dark; subapical shelf on inner surface produced into a rounded triangular process suggesting a second,

larger spine; inferior appendage black, very broadly cleft, slightly curved dorsally in lateral view. Genitalia of 2nd segment: anterior hamule rounded, subcylindrical, flattened, expanded apically, with prominent apical notch visible in lateral view; posterior hamule typical, subcylindrical, with apical spine; flagella bifurcate, 1 mm long; vesicle produced into a broadly bilobed posteroventral process, very slightly apically emarginate. Wings: venation and stigma very dark brown, stigma 4.5 mm, vein A2 convergent with A3, forked. Fore-wing antenodal and postnodal formula 15/20:20/13; hind-wing formula 13/16:14/14; stigma 4.3 mm; A2 convergent with A3 near wing margin, forked; fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 2, hind wing subtriangle 2, fore wing supratriangle 3, hind wing supratriangle 3, anal loop 2 cells.

Measurements: abdomen 44 mm, hind wing 34 mm.

Female (allotype). — Similar to male in markings, but with a greater extent of pale color. Head: labral spots large, prominent; postclypeus mainly pale. Prothorax: pronotum mainly pale. Pterothorax: 2nd and 4th stripes broader, all thoracic stripes subequal in width. Legs: pale ventral dash on middle femora; hind femora mainly pale. Abdomen: ventral 1/2 of segment 1, most of 2 pale; basal and dorsal spots on 3 to 6 confluent, pale lines on ventral margins of terga; 7, basal half pale, with dorsal line nearly to end of segment; 8 with distinct laterobasal spots; 10 with obscure pale lateral spots; appendages pale. Vulvar lamina; median cleft sharp, sides produced ventrally, with lateroapical corner modified into a distinctive laterally extended flat spine. Wings: fore wing nodal index 15/20:21/13; hind wing index 16/15:16/13; A2 not forked; fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 2, hind wing subtriangle 2, fore wing supratriangle 3, hind wing supratriangle 3, anal loop 3 cells.

Measurements: abdomen 43 mm, hind wing 35 mm.

Variations among paratypic series: of 59 males, 2 lack the labral spots. The remainder have these spots obscure or distinct, but all small. One male has the 2nd thoracic stripe, and 3 have the 4th stripe interrupted. One male has the 4th stripe reduced to small spots. Four males have A2 not forked. The abdomen varies from 43.5 to 48 mm, the hind wing from 31.5 to 38 mm.

Of 14 females, only one has A2 forked, and two have the 4th thoracic stripe reduced to incipient interruption. The abdomen varies from 41 to 46 mm, the hind wing from 33.5 to 39.5 mm. There is no consistent gradation in any character with geographic location in the sample available.

This species is apparently closest to *pugnifer* and *lieftincki*, with a similar anterior hamule. The shape of the superior appendage of the male and of the vulvar lamina of the female sets it completely apart from any other species in the genus, many of which, however, have a tiny sharp prominence or shelf at this location on the superior appendage or a sharply squared corner of the vulvar lamina.

The Brazilian species *P. annectens* (Selys) and *P. regularis* (Selys) resemble *duodentatus* in the presence of an apical internal swelling of the superior appendage and in the wide cleft in the inferior appendage, but have quite different anterior hamules, according to the description of BELLE (1970)

The habits of this species are not known to be distinctive in any way. It has been taken at small streams in relatively open locations rather than in forested regions.

The name is for the distinctive two-spined appearance of the male superior appendage in dorsal view.

PHYLLOGOMPHOIDES PUGNIFER SPEC. NOV.

Material examined. — Holotype male: Mexico: Veracruz State, 3 km N of Santiago Tuxtla, T. Donnelly, 13-14 Sept. 1965. — Paratypes: 14 ♂, same data as holotype; — Veracruz State, 28 km N of Huatusco, elev. 900 m, R. Garrison, 11 Aug. 1976, 1 ♂; — Chiapas State, 20.1 mi N of Ocozocoautla, elev. 2000 ft., D.R. and M.L. Paulson, 25 Aug. 1967, 3 ♂; — Chiapas State, 21.4 mi N of Ocozocoautla, elev. 2000 ft., D.R. Paulson, 20 July 1965, 2 ♂. — Guatemala: Izabal Dept., 3 km N of Juan de Paz, T. Donnelly, 4 June 1977, 1 ♂; — Alta Verapaz Dept., Minas de Oxec, 10 km E of Cahabón, elev. 200 m, T. Donnelly, 5 June 1978, 1 ♂. — Costa Rica: Heredia Dept., Finca la Selva, 1.5 mi S of Puerto Viejo, elev. 200 ft., A.M. Young, 21 Aug. 1969, 1 ♂.

An additional male from Quiriguá, Guatemala, was listed as *Gomphoides suasa* by CALVERT (1919).

A medium sized species of typical aspect for the genus, occurring from east-central Mexico to Costa Rica, and most closely related to *P. lieftincki* (Belle) from Ecuador and Bolivia. This species lives in smaller streams. The male is distinguished most easily by the form of the anterior hamule. The female is unknown.

Male (holotype). — Dark colors dark, reddish brown, pale colors yellow (young) to greenish yellow and greenish gray (older specimens). Head: labrum dark, mandibles completely pale, anteclypeus pale, postclypeus dark with pale lateral spots, frons pale with broad dark lower border, vertex dark with pale central spot, occiput pale with dark lateral margins. Prothorax: dark with pale anterodorsal margin, small paired mesal spots on posterodorsal margin, and obscure pale spots on posterolateral corner of pronotum. Pterothorax: dark, pale as follows: 1st thoracic stripe parallel sided, barely joined to mesothoracic collar, which is interrupted in middle to yield a well-formed "7"; 2nd and 3rd stripes narrow complete, expanded at upper end; 4th stripe complete, broader; 5th stripe occupies most of the lower part of metepimeron, expanded dorsally; metinfrapisternum with obscure pale spot. Pectus obscure, without markings. Legs: dark, obscurely pale on venter of anterior femur. Abdomen: dark, pale as follows: segment 1, lower 1/2 of tergum; 2, lateroventral edging, auricles, dorsal dash; 3-6, laterobasal spots and isolated dorsobasal dash, spots occupying 1/6 and dash 1/3 of 3,

both decreased to 1/8 and 1/10 of 6; 7, with basal ring to transverse carina, lateral edge of tergum extending 4/5 of segment; 8, small lateral spot; 9, very small lateral spot; 10 unmarked. Maximum width of foliation on 8, 0.35 mm. Superior appendages: yellow, basally black, semicircular-forcinate, with tip laterally flattened and produced dorsally, spine on inner surface at less than 2/3 length, sharp; each appendage flattened subapically to form a rounded, dorsal shelf. Inferior appendage black, broadly notched forming an approximate right angle, flat in lateral view. Wings: venation and stigma dark, stigma 4.5 mm, vein A2 convergent with A3, not forked; fore wing nodal formula 15/21:22/16; hind wing 17/16:17/16. Fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 2, hind wing subtriangle 1-2, fore wing supratriangle 3, hind wing supratriangle 3, and anal loop 2 cells. Stigma 4.5 mm. A2 not forked, convergent with A3.

Measurements: abdomen 45.5 mm, hind wing 36.5 mm.

Variations among paratypic series: several of the 23 specimens have obscure pale spots on the labrum. The dorsum of the thorax is variably marked, with 18% having the 1st stripe broadly joined to the collar, 45% (including the holotype) narrowly joined, and 36% isolated. Excluding the Costa Rican specimen, the abdomen varies from 43 to 46.5 mm; the hind wing from 34 to 38.5 mm. The lone Costa Rican male is larger with abdomen 49 mm, hind wing 38 mm, with anal loop 2 cells, hind wing triangle 3, subtriangle 2, supratriangle 4-5 cells, fore wing triangle 3-4, subtriangle 3-4, supratriangle 4 cells.

This species differs from *lieftincki* in several characters: it is larger and has half pale superior appendages. The interior spine of the superior appendage is sharp, not blunt, and there is a subapical dorsal shelf, which is represented in *lieftincki* by a small sharp projection. The inferior appendage is more broadly cleft than in *lieftincki*. The anterior hamule of *pugnifer* is about twice the size of *lieftincki* and has a notch about 0.2 mm deep, compared with a notch 0.1 mm deep. The lateral lobes of the penial vesicle are larger in *pugnifer* (0.6 vs 0.3 mm in lateral view).

Little is known of the habits of this species. The long series near Santiago Tuxtla was collected at a shaded forest stream, but one Guatemalan male was taken in hilly, open country. The Costa Rican male was taken foraging at dusk in a clearing between forest and river. Other specimens were found in very small shaded forest streams in hilly country.

The name refers to the form of the anterior hamule, which is reminiscent of a small, clenched fist (albeit a two-fingered one).

PHYLOGOMPHOIDES INSIGNATUS SPEC. NOV.

Material examined. — All Panama: Canal Zone. Holotype male: Pipeline Road, 1.7 mi NW of Gamboa, T.W. Donnelly and E.S. Morton, 8-15 Aug. 1970. — Allotype female: Barro

Colorado Island, O.S. Flint, Jr. and M.A. Ortiz B., 10 July 1967. — Paratypes males: — same data as holotype, 1♂; — Barro Colorado Island, R.C. Beard, 2 July 1967, at light, 1♀; — Barro Colorado Island, M. Perrone, 18 June 1972, at light, 1♀; — Barro Colorado Island, M.L. May, 11 July 1974, at light, 1♂; — reared, nymphs collected Rio Frijoles, by M.L. May, 22 Jan. 1977, emerged 11 May, 25 July and unknown date, 1977, 1♂, 2♀. — Five additional reared specimens are here not designated as paratypes: Rio Frijoles, as above, emerged May, and 30 June, 1977, 2♂, 2♀; — Quebrada Juan Grande, nymph coll. by M.L. May, 24 Jan. 1975, emerged 1976, 1♀.

This species is presently known only from Panama in the immediate vicinity of the Canal Zone. It is most closely related to *P. semicircularis* Selys, whose locality is unknown and which is represented by a single male (BELLE, 1970). The present species differs from *semicircularis* mainly in its thoracic color pattern, which is of unusual form for representatives of this genus in Central America and western South America.

Male (holotype). — Dark colors very dark, somewhat reddish brown; pale colors gray (face), and yellow-green gray (thorax and abdomen). Head: dark, pale as follows: spot on mandible, frons, narrow line at base of labrum (visible only with ultraviolet light). Prothorax: completely dark. Pterothorax: dark, pale as follows: 1st thoracic stripe very distinctive, tapering from upper end to 1.4 mm width at middle, thence parallel sided to confluence with collar, which extends medially only a very short distance, producing a barely recognizable "7"; 2nd stripe absent; 3rd stripe represented by a very small spot on upper end of mesepimeron; 4th stripe 0.6 mm wide, constricted at upper end to produce a barely isolated spot, confined to metepisternum; 5th stripe 0.4 mm wide, barely visible, parallel sided, on metepimeron. Pectus dusky, unmarked. Legs completely dark. Abdomen: dark, pale as follows: segment 1 is pale on ventral 1/2 of tergum, 2 similarly marked, pale color produced narrowly to meet on dorsum, dark on ventral margin; 4 with laterobasal spots meeting dorsally, not extending ventrally to margin of sternum; 5 with small isolated laterobasal spots; 6 with very thin pale basal dashes on ventral edge of sternum; 7 with a complete band in the basal 1/2; 3, 8, 9, and 10 dark. Maximum width of foliation on 8, 0.2 mm. Abdominal appendages: superior basally dark, apically yellow, semicircular-forcipate, with tip laterally flattened and produced dorsally, spine on inner surface at 2/3 length. Inferior appendage black, extending 1/3 length of superior, curved upwards in lateral view, broadly forked. Wings: venation and stigma very dark brown, stigma 4 mm; vein A2 convergent with A3, not forked. Fore wing antenodal and postnodal index 13/23:22/15, hind wing index 16/16:16/17. Stigma 5 mm. Fore wing triangle with 2-3, hind wing triangle 3, fore wing subtriangle 2-3, hind wing subtriangle 2, fore wing supratriangle 3, hind wing supratriangle 3, and anal loop 2 cells. Genitalia of 2nd segment: anterior hamule prominent, rounded, flattened, with small notch near apex. Posterior hamule as for genus, cylindrical, with median apical small spine. Flagella bifurcate, 2 mm long, vesicle apically trilobate, with lateral rounded and flattened elongate

lobes, and a medial blunt spine.

Measurements: abdomen 41 mm, hind wing 33 mm.

Female (allotype). — Similar to male, differs as follows: pale spot on mandible broader with only the lateral margin dark. No collar distinguishable on thorax. Spot of 3rd thoracic stripe not visible; 5th stripe nearly invisible. Abdominal markings relatively more prominent than for male. Vulvar lamina bilobate, produced ventrally and twisted, with a thickened outer rim right angled at ventromedial corner and with a short, blunt spine at latero-apical corner. Venation: vein A2 not forked, fore wing nodal index 17/26:26/17; hind wing index 17/21:20/17. Fore wing triangle with 3, hind wing triangle 3, fore wing subtriangle 3, hind wing subtriangle 2, fore wing supratriangle 3, hind wing supratriangle 3, and anal loop 3 cells. Stigma 4 mm. A2 not forked, convergent with A3.

Measurements: abdomen 39.5 mm, hind wing 33 mm.

Variations among paratypic series: the 4 males and 5 females vary as follows: male abdomen 41–42 mm, hind wing 33–34 mm; female abdomen 37–43 mm, hind wing 33–37.5 mm.

This species differs from *semicircularis* (SELYS, 1854, as described by BELLE, 1970) as follows: the labrum and face is dark brown, not olive. The thoracic stripes are quite different, with only the 1st and 4th well represented (5 is barely visible, and 3 is a tiny spot, absent on several specimens entirely). The 1st stripe is not cuneiform, and its appearance and junction with the collar differs strikingly from the figure of *semicircularis* provided by Belle. The latter species had all 5 thoracic stripes typically developed for the genus. *P. insignatus* has totally dark legs, lacking the pale interiors of the anterior femora. Structural differences are minimal. The anterior hamule of *semicircularis* as figured by Belle has its notch more proximally located, and the penial vesicle with more reduced lateral lobes. Of these differences, the thoracic striping is probably the most prominent diagnostic feature; the constancy of this pattern in the series and its unusual form for the genus probably establish this species as valid, and not as part of a variation that would eventually be found to encompass the lone specimen of *semicircularis*.

Two males that were taken as imagoes were flying slowly over a deeply shaded tiny stream in the forest near the Panama Canal. A third male and two females were taken at night at lights, an unusual proportion. The remaining specimens were reared from nymphs collected by Michael May.

The name refers to the distinctive thoracic markings.

DEPOSITION OF TYPE SPECIMENS

The holotype males of *P. suasillus*, *duodentatus*, *pugnifer*, and *insignatus*, the allotype male of *bifasciatus*, and the allotype female of *suasillus* are deposited in the Florida State Collection of Arthropods, Gainesville, Florida. The allotype females of *P. appendiculatus* and *insignatus* are

deposited in the (United States) National Museum of Natural History collection. Additional paratype material is deposited in these collections, as well as the collections of J. Belle, D. Paulson, R. Garrison, and the collection of the University of Michigan Museum of Zoology.

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