

FURTHER STUDIES ON SOUTH AMERICAN GOMPHIDAE (ODONATA)

by

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ABSTRACT

The writer reports on new Gomphid material from South America. Among the 27 species recorded, *Aphylla boliviana* sp. n. is represented by females only, while of *Phyllocycla vesta* sp. n. and *Phyllocycla propinqua* sp. n. both sexes are present. The latter was previously considered no more than an eastern form of *Phyllocycla viridipleuris* (Calvert). More individuals of other species, hitherto only known from the types, are recorded. The females of others are described for the first time. The genera *Agriogomphus* Selys and *Cyanogomphus* Selys are briefly re-diagnosed with partly new characters.

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Since the publication of my studies on the South American Gomphidae in 1970, new material from this area was submitted to me for identification. The major part was sent to me by Prof. Dr. Minter J. Westfall, Jr., of the University of Florida. The remaining material came from Dr. D. C. Geijskes, of the Leiden Museum, Dr. Kurt Günther, of the Berlin Museum, Dr. Børge Petersen, of the Copenhagen Museum and Dr. Douglas St. Quentin, of the Vienna Museum. I wish to express my gratitude to the colleagues mentioned.

In the following pages records, descriptions and figures of this new material are presented.

The names of the institutions in which the studied material is preserved are abbreviated as follows.

FSC	—	Florida State Collection of Arthropods, Gainesville.
MZ	—	Museum of Zoology, University of Michigan, Ann Arbor.
MC	—	Universitetets Zoologiske Museum, Copenhagen.
ML	—	Rijksmuseum van Natuurlijke Historie, Leiden.
MNB	—	Museum für Naturkunde der Humboldt-Universität, Berlin
MNHW	—	National Museum of Natural History, Washington, D.C.
NMW	—	Naturhistorisches Museum, Vienna.

Archaeogomphus nanus Needham, 1944

Material. — Surinam: Nickerie River, Blanche Marie-val, 12.II.1971, 1 ♂, D. C. Geijskes (ML).

Agriogomphus jessei (Williamson, 1918)

Fig. 1—4

Material. — Venezuela: State of Táchira, La Fria, 15.IV.1920, 1 ♂, 1 ♀, J. H. and E. B. Williamson and W. H. Ditzler (FSC).

There are some colour differences between the males from Táchira, Venezuela, and the male holotype from Cristalina, Colombia:

1. Rear of head yellowish; in holotype pale grey.
2. Dark antehumeral stripes on dorsum of pterothorax complete; in holotype interrupted in middle (this difference in the colour design is most striking).
3. First pale antehumeral stripe dull blue, other pale stripes of pterothorax green; in holotype pale markings on dorsum of pterothorax and mesepimeron dull blue.
4. Femora dark brown above, for the apical four-fifths on the first, for the apical half on the second, and for the apical one-third on the third; in holotype for the full length on the first, for the apical three-fourths or more on the second, and for the apical half or less on the third.
5. Pale markings of abdomen green; in holotype dull blue or greenish blue.
6. Anterior hamule brown, the edges black; in holotype anterior hamule entirely black.
7. Posterior hamule greenish, the extreme tip black; in holotype greenish with a constricted cross black bar at about one-third its length, the apical fourth black, darkest at apex fading basally.
8. Superior caudal appendages entirely yellowish; in holotype blackish basally fading to yellowish.

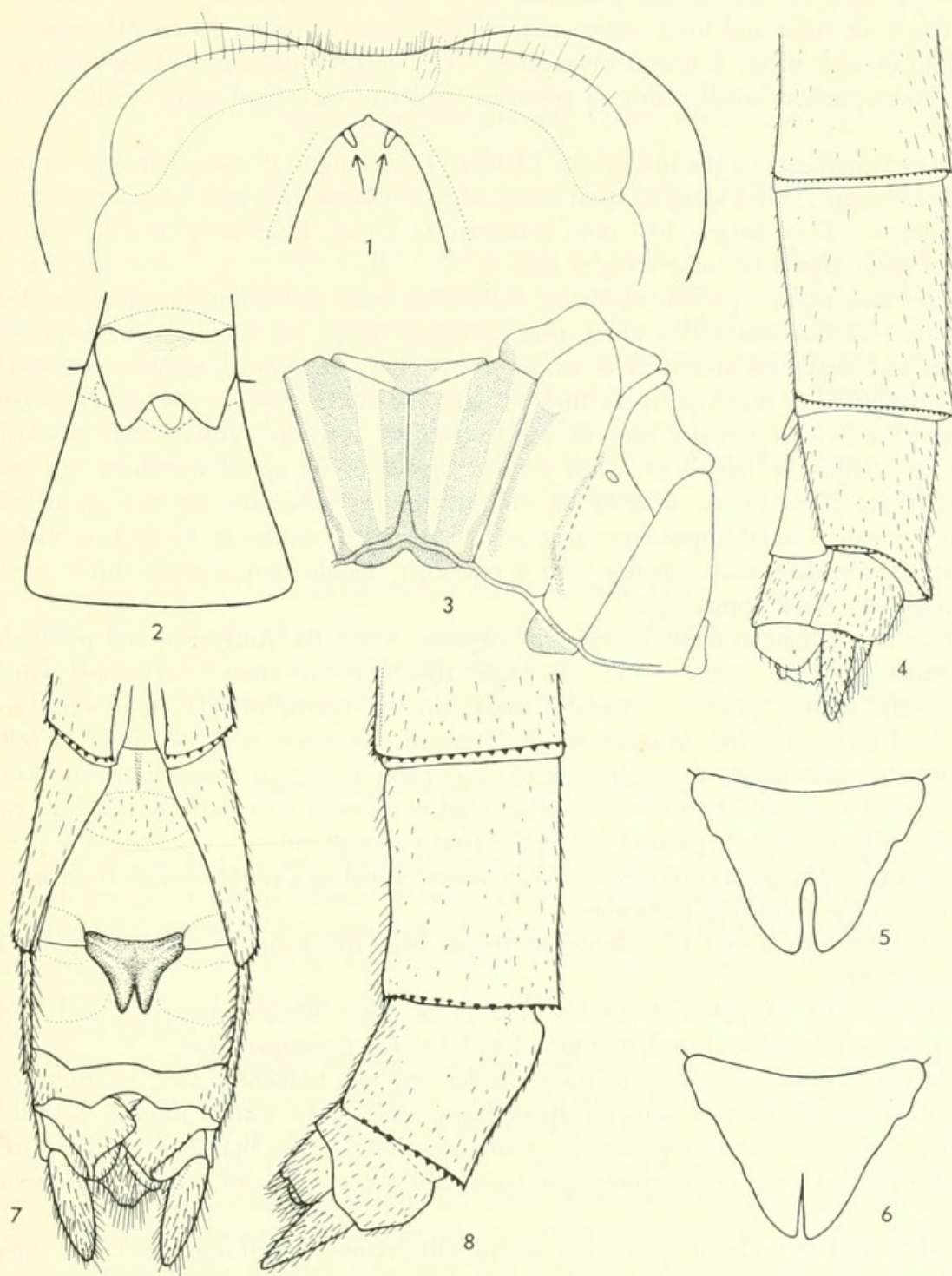


Fig. 1—4. *Agriogomphus jessei* (Williamson), ♀. 1, rear of head, dorsal part, with submedian pair of occipital spines; 2, vulvar scale and 9th sternum, ventral view; 3, diagram of pterothorax; 4, apical segments of abdomen, left lateral view. Fig. 5, 6. *Cyanogomphus uncatus* Fraser. 5, vulvar scale, ♀ of 3.I.1941; 6, the same, ♀ of 7.I.1941. Fig. 7, 8. *Desmogomphus tigrivensis* Williamson, ♀. 7, apical segments of abdomen, ventral view; 8, the same, left lateral view

Some venational features in the wings of the male from Táchira: Pterostigma covering $3\frac{1}{2}$ — $5\frac{1}{2}$ cells. Antenodal and postnodal cross-veins of first series 7: 12—12: 8/8: 10—10: 7, in front and hind wings, respectively. Second primary antenodal cross-vein the fifth in each wing. Trigonal interspaces with two rows of cells. All supratrangles open. Four spines or small plates on posterior border of each hind wing basally to anal angle.

The measurements of the male from Táchira: Total length 40 mm; abdomen 31 mm (incl. caud. app.); hind wing 23 mm; costal edge of pterostigma in front wing 2.8 mm.

Female. — Total length 40.5 mm; abdomen 31.5 mm; hind wing 25.5 mm; costal edge of pterostigma in front wing 3 mm.

Stouter than male, especially abdomen. Coloration most resembling the corresponding male from Táchira but vertex paler, pale middorsal stripe on hind lobe of prothorax broader and first pale antehumeral stripe green. Ninth abdominal segment one and a half times as long middorsally as midventrally (as is the case in the male). Sterna of segments 3 to 9 (except base of third sternum) blackish. Vulvar scale blackish, about two-fifths the length of ninth sternum, bifid in its apical one-third, the two divisions separated by an interval of 90° , their tips subacute, the bottom of the excision round. Caudal appendages pale yellow becoming darker to base, their surface minutely tuberculate, each tubercle with a pale hair. Lamina supra-analis three-fourths the length of caudal appendages.

Wings larger than in male. Pterostigma covering $4\frac{1}{2}$ cells. Antenodal and postnodal cross-veins of first series 8: 11—12: 8/8: 10—9: 8 in front and hind wings, respectively. Second primary antenodal cross-vein the fourth in left front wing and right hind wing, the fifth in other wings. Trigonal interspaces with two rows of cells. All supratrangles open. A single row of cells behind Cu2 in front wing, the same area in hind wing with two rows of cells. Hind wing with four paranal cells and two postanal cells, the fourth paranal cell is the first postanal cell.

Remark: The genus *Agriogomphus* is nearest allied to *Cyanogomphus* from which it differs in the following particulars:

1. Occiput with a pair of submedian spines near foramen; no occipital spines in *Cyanogomphus*.
2. Apical half of posterior genital hamule of male slender, tapering, and bare; stout, more or less sickle-shaped, and tufted with hairs in *Cyanogomphus*.
3. Inferior caudal appendage of male slender, the two branches short, reaching to a point just beyond spurs of superior appendages, and armed with a minute, subapical superior tooth; in *Cyanogomphus* very stout, with long strong branches, reaching to a point far beyond spurs of superior appendages, and not armed with a subapical superior tooth.
4. Male anal triangle in hind wing absent (ill-defined); well-developed and three-celled in *Cyanogomphus*.

Calvert's *tumens* also possesses a pair of occipital spines and for that reason that species can be referred to *Agriogomphus*.

The occipital spines are better developed in the females than in the corresponding males; they are short in *A. sylvicola* and *A. ericae*, well-developed and conspicuous in *A. tumens* and *A. jessei*.

Cyanogomphus conchinus Williamson, 1916

Material. — Surinam: Nickerie River, Stondansi, 18.II.1971, 1 ♂, D. C. Geijskes (ML).

A teneral male, partly crushed.

Cyanogomphus uncatatus Fraser, 1947

Fig. 5, 6

Material. — Brazil: Santa Catarina, Nova Teutonia, 3.I.1941, 1 ♀; 7.I.1941, 1 ♀, Fritz Plaumann (MZ).

The tip of the vulvar scale in the female dated 3.I.1941, is narrowly excised in middle for nearly half the length of the vulvar scale, that in the female dated 7.I.1941, is cleft for only two-fifths of the length of the vulvar scale. Further the frons in these two females is slightly broader than that of the female from Rio Grande do Sul, recorded in my 1970 paper on the South American Gomphidae. Finally, the female from Rio Grande do Sul possesses a small but distinct tubercle below each of the swollen superior portions of the occiput. These occipital tubercles are low in the female from Santa Catarina, collected on 7.I.1941, and practically wanting in the female, collected on 3.I.1941.

Epigomphus llama Calvert, 1903

Material. — Bolivia: Dept. Cochabamba, Prov. Chapare, El Palmar (1600 m), 1 ♀, R. Steinbach; Cristal Mayu (600 m), 1 ♂ (FSC).

The female is teneral and in bad condition, crushed over the entire length of the body.

Desmogomphus tigrivensis Williamson, 1920

Fig. 7, 8

Material. — Guyana: Kaieteur Ravin, 11.IV.1912, 1 ♀, J. M. Geddes (MZ).

The present female is somewhat larger than the corresponding male described from the same country by Williamson, but otherwise agreeing in all respects other than those of sex. The vulvar scale is distinctly shorter than in the female of *Desmogomphus paucinervis* (Selys) and this feature forms the evidence for the specific difference of these two species.

Female. — Total length 45 mm; abdomen 34 mm; hind wing 29 mm; distance on hind wing from nodus to pterostigma 11.5 mm; width of hind wing at level of arculus 8.8 mm; costal edge of pterostigma in front wing 3.1 mm, in hind wing 3.5 mm.

Face predominantly brown but base of mandibles externally, genae, most of labrum (except for free border and base) and lateral sides of postclypeus greenish. Superior surface of frons greenish but dark brown in middle and along base. Vertex dark brown, behind lateral ocelli somewhat bulbous and greenish. Occipital plate brown, low, the breadth about six times the middorsal length, the posterior margin fringed with long, dark brown hairs. Rear of head brownish, becoming yellowish below. Labium and adjacent mouth parts pale yellowish.

Prothorax brown. Pterothorax brown with green stripes, its pattern similar to that of male except for third lateral brown stripe which consists of two isolated brown stripes separated by the metapleural suture.

Legs slender. Femora brownish but first femora darker on dorsal side, and middle

and posterior femora becoming darker towards knees. Tibiae, tarsi and claws dark brown.

Abdomen predominantly dark brown, with lighter spots on sides of segments 8 and 9. Pale colours greenish or yellowish. Segment 1 laterally, middorsum of segment 2 and apical half of middorsum of segment 3 pale. A pale middorsal line on segments 4 to 7, becoming broader at base of segment 5 to 7, pale baso-lateral spots on segments 4 to 7, followed by a pale lateral spot on segments 6 and 7. Anal appendages yellow. Vulvar scale and sterna of segments 8 and 9 brown. Tip of vulvar scale deeply excised for two-fifths the length of scale, the divisions reaching to a point about halfway along ninth sternum.

Wings slightly brownish. Venation brown, including frontal margin of costa. Pterostigma light brown, surmounting 3—4 cells. Basal subcostal cross-vein wanting. Antenodal and postnodal cross-veins of first series 13 : 14—15 : 11/11 : 10—10 : 10 in front and hind wings, respectively. Second primary antenodal cross-vein, the sixth in left front wing, the fifth in other wings. Intermedian cross-veins 5—5/3—3 in front and hind wings, respectively. All supratrangles, subtriangles and triangles open except for triangle in hind wings which is two-celled. Front wing with a single row of cells in anal field proximal to level of triangle and in area posterior to Cu2. Trigonal interspace in front wings starting with two rows of cells from triangle out, seven cells long, in anterior row. Trigonal interspace in hind wings starting with a row of 3 (left) and 4 (right) cells against triangle, followed by two rows of cells, four cells long, in anterior row. Each hind wing with 5 paranal cells and 3 postanal cells, the fifth paranal cell is the first postanal cell. Three rows of cells behind Cu2 in hind wing.

Aphylla boliviana spec. nov.

Fig. 9, 10

Material. — Bolivia : Dept. Santa Cruz, Prov. Ichilo, Rio Dolores, 3 km east of Buena Vista, 23.III.1960, 1 ♀, R. B. Cumming, Quiroga, and R. Rodriguez (holotype); Dept. Cochabamba, Prov. Chapare, Palmar, 30 km from Villa Tunari on road toward Cochabamba, collections at a lake, altitude 1935 ft, 24.X.1959, 1 ♀; Dept. Santa Cruz, Prov. Ichilo, pond stream locality, 18 km west of Buena Vista, 8 km west of San Carlos, 16.III.1960, 1 ♀; 17.III.1960, 2 ♀, all R. B. Cumming (FSC).

The nearest relative of this species is, perhaps, *Aphylla producta* Selys. The female agrees by the completely unexpanded ventro-tergal margins of the abdominal segments 8 and 9, but it differs from all other members of the genus by the conspicuous orange band along the lateral inferior borders of the ninth abdominal segment.

Female (holotype). — Total length 58.5 mm; abdomen 44 mm; hind wing 35 mm; costal edge of pterostigma in front wing 4.5 mm.

Face dark brown, the following green: Base of mandibles externally, a symmetrical pair of oblong spots on labrum, anteclypeus, concave areas and lateral posterior portions of postclypeus. Anterior margin of labrum orange and fringed with orange bristles. Superior surface of frons dark brown at base, green anteriorly, the green band at level of antennae nearly three times as wide as in middle and twice as wide as basal band. Vertex dark brown, greenish on concave area behind postocellar ridges. Occipital plate greenish, its hind margin brown and fringed with brown hairs which are in length about half the middorsal width of the occipital plate. Rear of head dark brown above, greenish on temporae. Labium and adjacent mouth parts greenish.

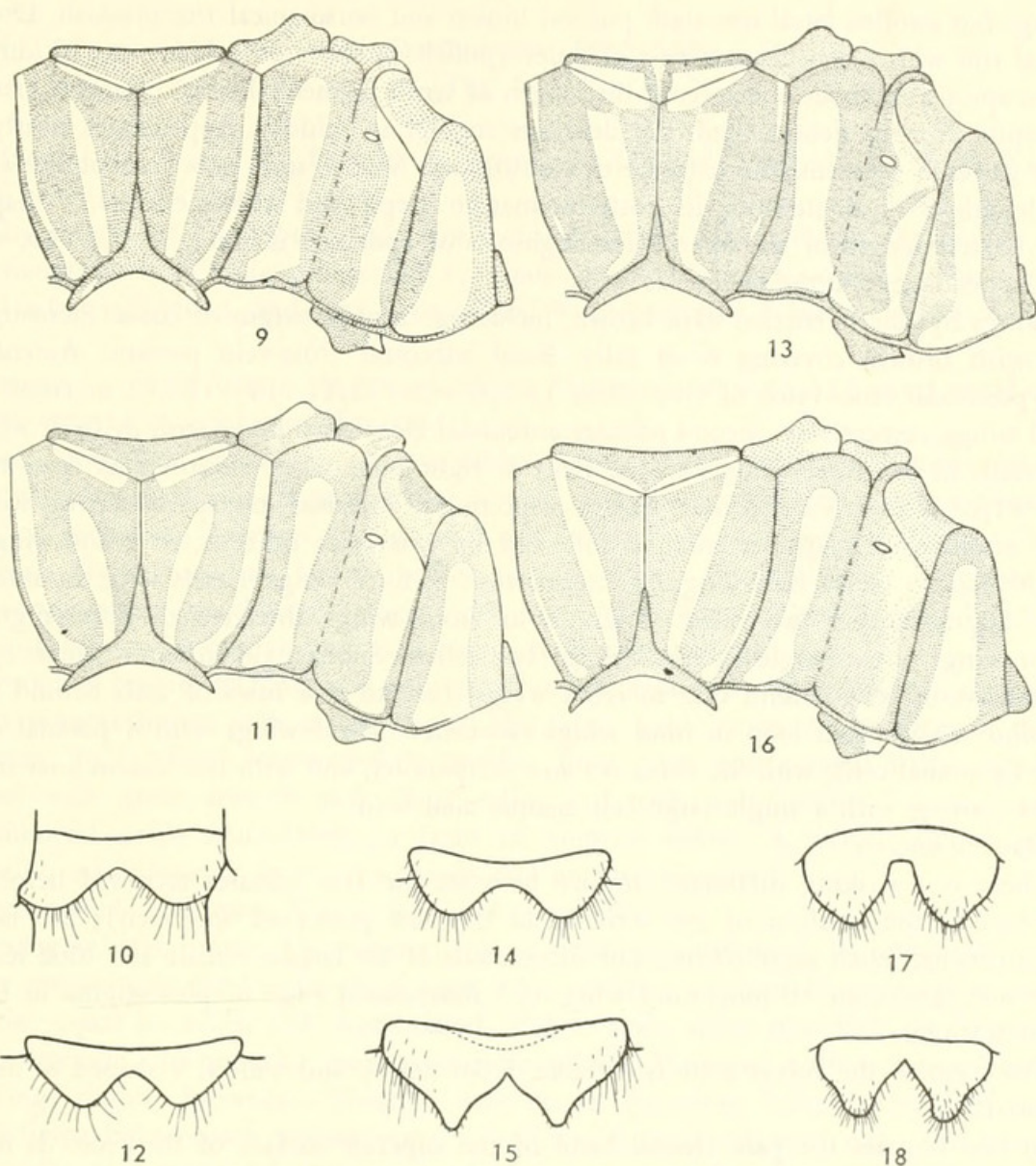


Fig. 9, 10. *Aphylla boliviana* spec. nov., ♀ holotype. 9, diagram of pterothorax; 10, vulvar scale. Fig. 11, 12. *Aphylla molossus* Selys, ♀. 11, diagram of pterothorax; 12, vulvar scale. Fig. 13, 14. *Aphylla distinguenda* (Campion), ♀. 13, diagram of pterothorax, Posadas; 14, vulvar scale, San Fernando. Fig. 15. *Aphylla dentata* Selys. Vulvar scale of allotype. Fig. 16. *Aphylla theodorina* (Navás), ♂. Diagram of pterothorax, Minas Gerais. Fig. 17, 18. *Phyllocycla anduzei* (Needham). 17, vulvar scale, ♀ of 12.III.1960; 18, the same, ♀ of 23.III.1960

Prothorax brown, middle lobe with a green spot on dorsum and a green spot on each side.

Pterothorax dark brown with green stripes; its markings shaped as shown in Fig. 9. Middorsal carina brown, posterior part of metepimeron and metapostepimeron less obscure than other dark stripes of pterothorax. Posterior margin of metaparapecteron more acute than is normally the case in *Aphylla* (in *Phyllocycla* more or less undulate).

Femora reddish brown, the inner side of anterior pair green. Tibiae, tarsi and claws blackish. Posterior tarsi two-thirds the length of posterior tibia.

Abdomen predominantly reddish brown. Sides of ninth segment with an orange band along lateral borders, this band regularly widening to base of segment. Tenth segment

orange but swollen basal one-sixth portion brown and dorso-apical rim blackish. Dorso-apical rim with a conspicuous pair of paler (polished) spots on middorsum. Width of dorso-apical rim about one-seventh the length of tenth segment. Dorsal posterior margin of tenth segment denticulated, the denticles smaller in middle. Appendages nearly as long as tenth segment, the extreme tips outcurved. Vulvar scale short, about one-sixth the length of ninth sternum, its posterior margin deeply and widely excised, V-shaped. The relative length of the three apical segments of abdomen is about 18 : 13 : 10, with anal appendages 9 at the same scale.

Wings hyaline. Venation dark brown, including frontal margin of costa. Pterostigma yellowish brown, covering 6—8 cells. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 11 : 20—21 : 11/11 : 15—13 : 12 in front and hind wings, respectively. Second primary antenodal cross-vein the seventh in front wings, the sixth in left hind wing, and the fifth in right hind wing. Intermedian cross-veins 11—11/6—6 in front and hind wings, respectively. Trigonal interspace starting with a row of three cells against triangle followed by two rows of cells, in front wings 6 (right) and 8 (left) cells long, in anterior row, in hind wings 4 cells long, in anterior row. Supratrangles two-celled. Triangle in front wings three-celled. Subtriangle in front wings and triangle in hind wings two-celled. Subtriangle in hind wings open. Four rows of cells behind Cu2 in front wings, four to five rows of cells behind Cu2 in hind wings. Anal loop in hind wings two-celled. Hind wings with 4 paranal cells and 4 postanal cells, with the veins A3 and A2 parallel, and with the second anal interspace starting with a single large cell against anal vein.

Male unknown.

There is a striking difference in size between the five females recorded here; the holotype is the smallest of the series (but the best preserved specimen); the larger specimens are much more robust. The dimensions of the largest female are: total length 66.5 mm; abdomen 50 mm; hind wing 41.5 mm; costal edge of pterostigma in front wing 5.5 mm.

The form of the vulvar scale is variable, from deeply and widely V-shaped to nearly semicircular.

In two females the pale frontal band of the superior surface of the frons is much broader than in the others.

Some venational features in the wings of the four paratypes are as follows. Front wings: four supratrangles three-celled, other two-celled; all triangles three-celled; two subtriangles three-celled, others two-celled. Hind wings: all supratrangles two-celled; one triangle three-celled, others two-celled; all subtriangles open; in two hind wings the second anal interspace starts with a single cell against the anal vein, in others with two cells.

Aphylla albinensis Belle, 1970

Material. — French Guiana: Saint Laurent, 1 ♀, A. Kricheldorf (MNB). A teneral specimen with the abdomen crushed over its entire length.

Saint Laurent is a town at the Marowijne River, opposite Albina, from where the species was described.

Aphylla dentata Selys, 1859

Material. — Surinam: 2 ♂, 1 ♀ (MNB).

The female lacks the sixth abdominal segment.

Aphylla molossus Selys, 1869

Fig. 11, 12

Material. — Brazil: Rio Purus, Arima, 22.XI.19??, 1 ♂, 1 ♀, S. M. Klages (FSC).

The female of this species has not been described. The present female has the subtriangle in front wing three-celled (in male recorded here, two-celled), that in right hind wing two-celled, and that in left hind wing possesses a partly developed cross-vein.

Female. — Total length 59 mm; abdomen 45 mm; hind wing 35.5 mm; costal edge of pterostigma in front wing 4.5 mm.

Face brown but genae, base of mandibles externally and anteclypeus green, labrum with a symmetrical pair of green oblong spots, and postclypeus with a green posterior spot on each side. Superior surface of frons brown at base, green anteriorly. Vertex blackish brown, reddish brown behind lateral ocelli. Occipital plate greenish, its posterior margin straight and fringed with short hairs. Rear of head brown, becoming greenish below. Labium and adjacent mouth parts pale greenish.

Prothorax brown, its hind lobe with green central spot and a green spot on each side.

Pterothorax brown with green stripes. Middorsal carina green. Green anterior mesothoracic "half collar" interrupted in middle. First green antehumeral stripe not connected with green mesothoracic "half collar" and with well-developed second green antehumeral stripe immediately in front of humeral suture. A well-developed green stripe on mesepimeron, on metepisternum and on metepimeron.

Femora reddish brown. Tibiae, tarsi and claws blackish.

Abdomen dark brown. Dorso-apical rim of tenth segment paler, its middorsal width about one-seventh the length of segment 10. Lateral expansions of segments 8 and 9 narrow, equal in width and denticulated. Vulvar scale about one-sixth the length of ninth sternum, its posterior median excision widely V-shaped with a round bottom.

Wings slightly brownish. Venation dark brown including frontal margin of costa. Pterostigma light brown, surmounting 7—9½ cells. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 17 : 25—23 : 17/19 : 18—20 : 19 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth in left hind wing, the eighth in left front wing, and the seventh in right wings. Inter-median cross-veins 13—14/8—8 in front and hind wings, respectively. Supratriangle in left front wing three-celled, in other wings two-celled. Triangle and subtriangle in front wings three-celled. Triangle in left hind wing three-celled, in right hind wing two-celled. Subtriangle in left hind wing open but with an undeveloped cross-vein, in right hind wing two-celled. Trigonal interspace in front wings starting with a row of three cells against triangle followed by three rows of cells, here and there interrupted by two cells, one cell enlarged. Trigonal interspace in hind wings starting with a row of three cells against triangle followed by two cells (right), or a row of two cells (left), two cells long. Five paranal cells and five postanal cells in each hind wing. Five rows of cells behind Cu2 in hind wings.

Remark: The pale spots on the labrum and the postero-lateral pale spots on the postclypeus are weakly developed in the male. In the holotype male the spots on the labrum are obviously obliterated owing to postmortem changes.

Aphylla distinguenda (Campion, 1920)

Fig. 13, 14

Material. — *Argentina*: Posadas, 6.III.1909, 1 ♀ (MC); Prov. Buenos Aires, Dique Lujan, 31.XII.1957, 1 ♂, 1 ♀, Hellmut G. Gloger (FSC); San Fernando, I, II, III.1967, 1 ♂, 2 ♀, J. Daguerre; Tigre, 17.II.1968, 2 ♂, O. S. Flint, Jr. (MNHW).

The female of this species has been described under *Aphylla dentata* by Ris in 1904 and a diagram of its pterothorax was published by him in 1913. The female described below is from the Copenhagen Museum.

Female. — Total length 58 mm; abdomen 44.5 mm; hind wing 34.5 mm; costal edge of pterostigma in front wing 5 mm.

Similar to male as regards stature and general coloration. Colour design of pterothorax slightly differing from that of holotype, male, and shaped as shown by Fig. 13. The brown on dorsum of pterothorax obscure but distinctly paler between first green antehumeral stripes which are vaguely connected below for inner half of width with green mesothoracic "half collar". Middorsal carina green. Second green antehumeral stripe immediately in front of humeral suture weakly developed and represented only by two narrow green spots, one anterior (below) and one near mid-height.

Ventro-tergal margin of abdominal segments 8 and 9 very narrowly expanded and denticulated at apex. Hind dorsal margin of segment 10 with denticles, those in middle smaller. Caudal appendages a trifle shorter than segment 10, conical with the tips slightly curved outward. Dorso-apical rim of tenth abdominal segment one-eighth the length of segment. Vulvar scale one-sixth the length of ninth sternum, its posterior margin deeply and widely excised, V-shaped.

Frontal margin of costa yellow. Antenodal and postnodal cross-veins of first series 10 : 20—19 : 12/13 : 13—14 : 14 in front and hind wings, respectively. Second primary antenodal cross-vein the seventh in front wings, the sixth in hind wings. Triangle in front wings three-celled, the dividing cross-veins tri-radiate from centre. Triangle in hind wings and subtriangle in front wings two-celled. Subtriangle in hind wings open. Anal loop in hind wings two-celled. Hind wings with five (right) and four (left) paranal cells. Four postanal cells in each hind wing.

In the other specimens the second pale antehumeral stripe is also weakly developed and its upper portion is not or hardly perceivable.

In the female from San Fernando the triangle in the right hind wing is open, the subtriangle in the left front wing is also open but possesses a partly developed cross-vein, the excision of the vulvar scale is perfectly semicircular, and the green markings are better developed than in the other specimens and this applies particularly to the sides of the pterothorax.

Aphylla theodorina (Navás, 1933)

Fig. 16

Material. — *Brazil*: Rio Grande do Sul, Pelotas, 2.II.1955, 1 ♂, C. Biezanko (FSC); Minas Gerais, XII, 1967, 1 ♂, V. da Cajoa and S. do Cipo (NMW).

The two males have the dorsal posterior margin of the tenth abdominal segment armed with denticles at level of bases of superior appendages. The male from Rio

Grande do Sul is teneral. The one of Minas Gerais has the pale colours greenish and the pterothorax with reduced pale markings, the second pale antehumeral stripe immediately in front of the humeral suture developed for its dorsal half only, the second pale lateral stripe (on the metepisternum) weakly developed, the metapostepimeron entirely dark brown, etc. Also in the male from Minas Gerais the posterior margin of the metaparapteron is nearly straight, in the specimens from Rio Grande do Sul pointed, as is normally the case in *Aphylla*.

Phyllocycla modesta Belle, 1970

Material. — Surinam: Nickerie River, Lombokval, 8.II.1971, 1 ♀, D. C. Geijskes (ML).

An old specimen, as clearly appears from the very brown wings.

Phyllocycla anduzei (Needham, 1943)

Fig. 17, 18

Material. — Venezuela: 2 ♂ (MNB); 1 ♂ (coll. of author), all F. Kummerow. — Bolivia: Dept. Santa Cruz, Prov. Ichilo, Rio Dolores, 3 km east of Buena Vista, 12.III.1960, 1 ♀, R. B. Cumming, Quiroga, and R. Rodriguez; 23.III.1960, 1 ♀, R. B. Cumming (FSC).

The two females from Bolivia may belong to *Phyllocycla anduzei* recorded from that country by me in 1970. The vulvar scale of these two specimens differs from that of the allotype female from Venezuela. In the allotype the interval between the lobes of the posterior excision is 90°, in the two females recorded here, 60°. But between the two females from Bolivia differences exist also in the shape of the excision. It is V-shaped with a flat bottom in the female of March 12 and sharply V-shaped in the female of March 23.

In the males from Venezuela and Bolivia differences exist also in the form of the ventro-tergal margin of the seventh abdominal segment.

Phyllocycla titschacki (Schmidt, 1952)

Material. — Bolivia: Dept. La Paz, Prov. Nor Yungas, 1 km north of Caranavi (rapid mountain stream), 13.IV.1960, 2 ♂, R. B. Cumming (coll. of author).

Phyllocycla vesta spec. nov.

Fig. 19—25

Material. — Argentina: Prov. Buenos Aires, San Fernando, I, II, III.1967, 27 ♂, 20 ♀, J. Daguerre (holotype male, allotype female, and paratypes); Punta Chica, San Fernando, 15.II.1968, 2 ♂, 1 ♀, O. S. Flint, Jr. (paratypes, MNHW).

Closely related to *Phyllocycla gladiata* (Hagen in Selys) from Pernambuco, Brazil, but larger and paler, with a quite different colour design of the pterothorax and abdomen (the first pale antehumeral stripes broader, etc.). No other congeneric species has the exfoliations of the eighth abdominal segment better developed, in the male they resemble greatly those of *Ph. gladiata*, but the apical portions are broader. Also the

male genitalia on the second abdominal segment approach those of *Ph. gladiata*. The superior caudal appendages of the male are larger and stouter, and the subapical in-turned rim of the upper margin of these appendages is much better developed than in *Ph. gladiata*.

The vestigial inferior caudal appendage of the male is relatively long, and its slender tip is distinctly excised, V-shaped.

Male (holotype). — Total length 55 mm; abdomen 42 mm (incl. caud. app.); hind wing 30 mm; costal edge of pterostigma in front wing 4.4 mm.

A greenish specimen marked with dark brown stripes and spots, but with the apical portion of the abdomen, including the lamellate expansions and caudal appendages, yellow.

Face pale greenish but vertical part of frons somewhat obscure in middle and along postclypeus. Superior surface of frons largely pale greenish, brownish along base. Vertex brown, the concave area behind and between postocellar ridges yellow. Occipital plate yellow, its hind margin blackish brown, nearly straight and fringed with rather short pale hairs. Rear of head yellow behind occipital plate, dark brown on top behind compound eyes, brownish yellow on temporae. Labium and adjacent mouth parts pale yellow.

Prothorax brownish, the sides and posterior dorsal part of middle lobe greenish.

Pterothorax greenish with dark brown stripes; its pattern shaped as shown in Fig. 20. Middorsal carina greenish.

Femora yellowish, becoming dark brown towards knees. Ventral (inner) sides of anterior and middle pair of femora greenish. Seven spines on distal half of antero-inferior row of posterior femur, the longest spines nearly one-third the diameter of femur. Tibiae, tarsi and claws blackish.

Abdominal segments 1 and 2 greenish below, including auricles, dark brown above level of auricles, but middorsum of segments greenish again. Segments 3 to 6 and basal half of segment 7 greenish, apical half of segment 7 and segments 8, 9 and 10, including lamellate expansions and caudal appendages, yellow. A dark brown stripe on each side of apical half on segment 3, and from near the base to apex on segments 4, 5 and 6. Dorsum of segments 3 to 8 with a pair of dark brown spots near apex. A middorsal stripe on segments 3 to 7, isolated and confined to middle portion of segment 3, extending to apex of segment and touching the apical spots on 4 and 7, broadly confluent with these spots and forming with these a lance-shaped middorsal spot, from base to apex on 5 and 6. Segment 9 with a brown marking on each side. Segment 10 dark brown along dorsal posterior margin and on middorsum of base. Articulations between segments 3—4, 4—5, 5—6, 6—7 and nodulus between segments 7—8, 8—9, 9—10 dark brown. Dorso-apical rim of tenth abdominal segment about one-fourth the length of segment on middorsum, about one-third the length of segment on sides. Genitalia on second abdominal segment shaped as shown by the accompanying figures. Tip of posterior hamule distinctly stouter than in *Ph. gladiata*. Posterior excavation of hood of penial peduncle with a distinct tooth on bottom.

Wings clear, venation brown but frontal margin of costa yellow. Pterostigma yellowish brown, surmounting 5—6 cells. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 9 : 13—15 : 9/11 : 11—12 : 9 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth in right front wing, the fifth in other wings. Intermedian cross-veins 9—9/6—6 in front and hind

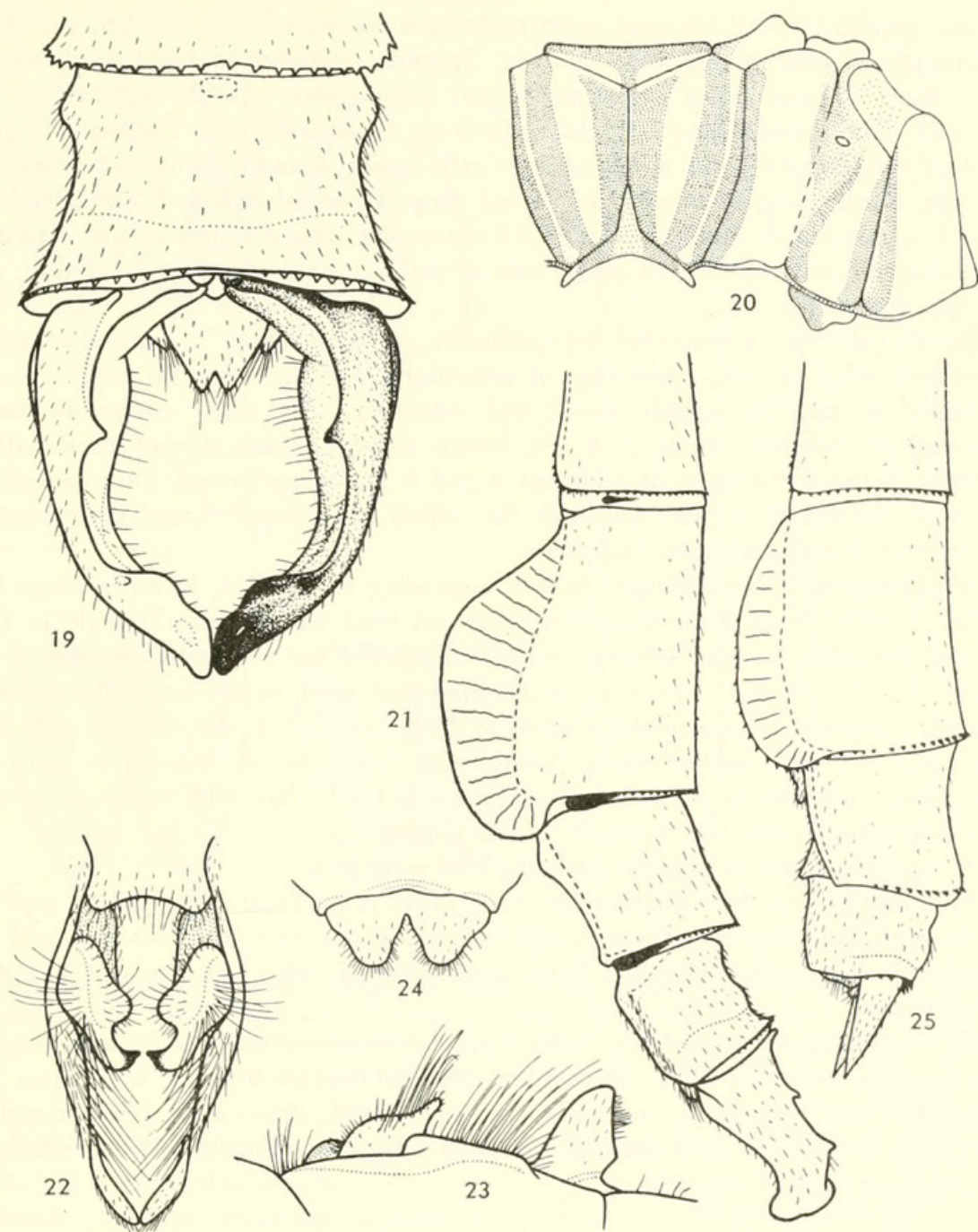


Fig. 19—25. *Phyllocycla vesta* spec. nov., holotype and allotype. 19, 10th abdominal segment and caudal appendages of ♂, dorsal view; 20, diagram of pterothorax, ♂; 21, apical segments of abdomen and caudal appendages of ♂, left lateral view; 22, genitalia on second abdominal segment, ventral view; 23, the same, right lateral view; 24, vulvar scale, ventral view; 25, apical segments of abdomen and caudal appendages of ♀, left lateral view

wings, respectively. All triangles, subtriangles and supratrangles two-celled except for subtriangle in hind wings, which is open. Trigonal interspace in front wings starting with a row of two (left) and three (right) cells against triangle followed by two rows of cells, 6 (left) and 8 (right) cells long, in anterior row. Trigonal interspace in hind wings starting with a row of three cells against triangle, followed by two rows of cells, 6 cells long, in anterior row. Hind wing: 4 paranal cells and 5 postanal cells; anal loop two-celled; distal portion of A2 convergent with A3; second anal interspace (between A2 and A3) with a single row of cells; 4 rows of cells behind Cu2; anal triangle four-celled.

Female (allotype; a somewhat old specimen). — Total length 54 mm; abdomen 41 mm; hind wing 32 mm; costal edge of pterostigma in front wing 4.6 mm.

Similar to male as regards stature and coloration. The slight colour differences confined to abdomen. There is a dark brown stripe on each side of basal half of segment 7 and the dorsum of segments 8 and 9 is obscure brown. Dorso-apical rim of tenth abdominal segment one-fifth the length of segment. Lamellate expansions of segment 8 well-developed and yellow.

Wings brownish. Supratriangle in left front wing three-celled, in other wings two-celled. Subtriangle in front wings two-celled, in hind wings open. Triangle in front wings three-celled, in hind wings two-celled. Antenodal and postanal cross-veins of first series 10 : 16—17 : 9/11 : 13—11 : 10 in front and hind wings, respectively. Second primary antenodal cross-vein the seventh in right front wing, the fifth in right hind wing and the sixth in left wings. Intermedian cross-veins 8—9/6—7 in front and hind wings, respectively. Second anal interspace in hind wings with two rows of cells. Five paranal cells and five postanal cells in hind wings.

All specimens have the subtriangle in the hind wing open.

All 29 males have the supratrangles, the triangles in the front wings and the anal loop in the hind wings two-celled, except one male which has the triangle and the anal loop in the right hind wing one-celled, but it seems that this wing was damaged during the larval stage.

The venational features of the 21 females were tabulated with the following results: supratriangle two-celled 95%, three-celled 5%; subtriangle in front wing open 2%, two-celled 98%; triangle in front wing two-celled 69%, three-celled 31%; triangle in hind wing two-celled 100%; anal loop in hind wing two-celled 91%, three-celled 2%, no anal loop in hind wing 7%.

Phyllocycla argentina (Hagen *in* Selys, 1878)

Fig. 26—29

Material. — *Argentina*: Córdoba, 1 ♀ (lectotype by present designation, MCZ No. 12382); Prov. Buenos Aires, San Fernando, I, II, III.1967, 2 ♂, 3 ♀, J. Daguerre; Punta Chica, San Fernando, 15.II.1968, 3 ♂, 1 ♀, O. S. Flint, Jr.; Tigre, 17.II.1968, 1 ♀, O. S. Flint, Jr. (MNHW); Rosaria de Sta Fé, 1 ♂, Hubrich (MNB); Corrientes, 3.III.1909, 1 ♂, Esben-Peterson (MC). — *Brazil*: Porto Alegre, 1 ♀, Hensel (MNB).

Described from a single pair from Córdoba, Argentina, both individuals incomplete, lacking the apical segments of the abdomen. The holotype, a very teneral male, could not be located in the Hagen collection at Cambridge; it is probably lost. For that reason the female allotype is designated lectotype. The female type bears the pin labels

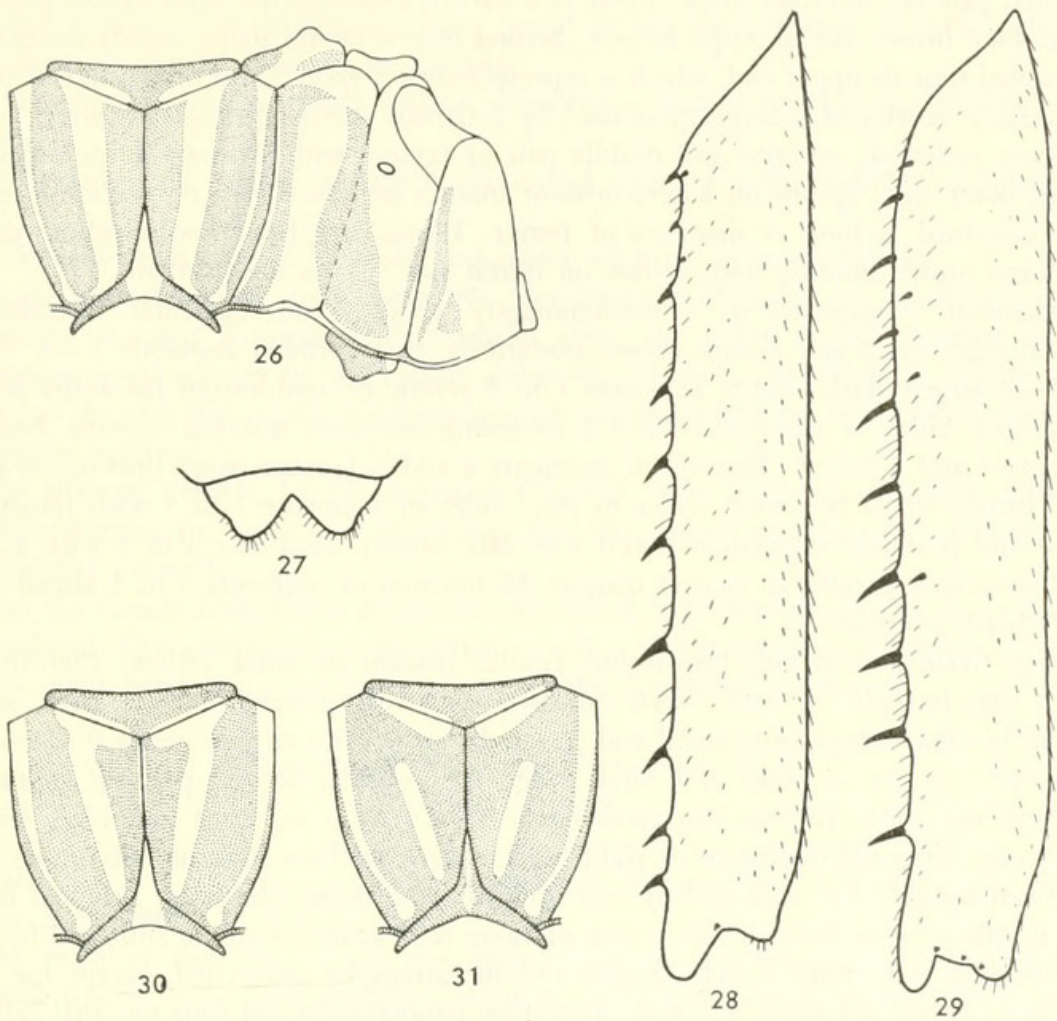


Fig. 26—29. *Phyllocycla argentina* (Hagen in Selys), ♀. 26, diagram of pterothorax, Porto Alegre; 27, vulvar scale, Porto Alegre; 28, left posterior femur, left lateral view, Porto Alegre; 29, the same, lectotype. Fig. 30, 31. *Negomphoides lieftincki* Belle, ♂. 30, diagram of dorsum of pterothorax, Prov. Nor Yungas; 31, the same, Prov. Ichilo

"Argentina", "Cordova Argent.", "Cyclophylla argentina Hag.", "MCZ", and "Type 12382". It is redescribed below.

Female (lectotype; abdominal segments 6—10 lost). — Abdominal segments one to five 21.5 mm; hind wing 33.5 mm; costal edge of pterostigma in front wing 5.2 mm.

Face pale yellow. Superior surface of frons becoming brownish at extreme base. Scape yellow, pedicel brown, rest of antennae blackish. Vertex pale brownish-yellow. Occipital plate yellow. Posterior margin of occiput nearly straight, with the slightest trace of a median excision, fringed with brown hairs which are about three-fourths as long as the middorsal width of occipital plate. Rear of head brownish-yellow, becoming somewhat more obscure above. Labium and adjacent mouth parts yellow.

Prothorax yellow, the hind lobe slightly brownish.

Pterothorax predominantly yellow, with brown markings. Dorsum brown with yellow stripes. Middorsal carina yellow. First pale antehumeral stripe rather broad, more or less parallel-sided, conjoined below with pale anterior mesothoracic "half collar", the latter interrupted in middle. Second pale antehumeral stripe well-developed, not joined

with first pale antehumeral stripe. There is a narrow yellow stripe covering the humeral suture. First brown lateral stripe narrow. Second brown lateral stripe weakly developed, interrupted near its upper end, which is represented by a spot. Third brown lateral stripe very weakly developed, being represented by a narrow metepimeral stripe only.

Femora yellowish, anterior and middle pair of femora with a brown stripe on distal half of outer side. Spines on antero-inferior margin on distal side of posterior femur about one-third as long as diameter of femur. Tibiae dark brown with yellow dorsal side. Tarsi brown, middle joint yellow on dorsal side. Claws dark brown.

Abdominal segments 1 to 5 predominantly yellow. Intersegmental articulations between segments 2 and 3 dark brown posteriorly, that between segments 3—4, 4—5, and 5—6 largely dark brown. Segments 1 to 3 yellow on middorsum for entire length of segment. Sides of segments 1 and 2 becoming brownish towards dorsum. Base of segments 4 and 5 yellow. Dorsum of segments 4 and 5 (except base) brown, the mid-dorsal brown stripe becoming wider to rear. Sides of segments 3 to 5 with transverse furrow and posterior submedian dorsal scar dark brown. Segments 4 to 5 with a long dark brown spot parallel to ventral margin. Middorsum of segments 3 to 5 armed with minute black denticles.

Wings hyaline. Venation brown but frontal margin of costa yellow. Pterostigma yellow, covering $5\frac{1}{2}$ —7 cells. Basal subcostal cross-vein present in right front wing, wanting in other wings. Antenodal and postnodal cross-veins of first series 9 : 16—18 : 11/11 : 14—13 : 11 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth. Intermedian cross-veins 10—10/7—6 in front and hind wings, respectively. Trigonal interspace of right hind wing with three rows of cells, three cells long from triangle out, followed by two rows of cells, three cells long. Trigonal interspace in other wings starting with a row of three cells against triangle followed by two rows of cells. All triangles, subtriangles and supratrangles two-celled, except for subtriangle in right hind wing, which is open. Five paranal cells and four postanal cells in each hind wing.

In my 1970 paper, on the Navás types of Neotropical gomphines, it was stated that the specimens of *Ph. argentina* in the eastern parts of Argentina and the southern parts of Brazil are distinguished from the nominotypical form from Córdoba in having the tibiae and tarsi entirely black, and in having the brown lateral stripes of the pterothorax better developed, the second brown lateral stripe complete, the third brown lateral stripe represented by two isolated stripes (separated by the metapleural suture), and with an additional brown spot just above the mid-height of the metepimeron.

Since I have been able to study the good series of this species from Buenos Aires, I can state that, with regard to the pattern of the pterothorax, the specimens of the eastern form are not uniformly coloured. In one specimen the second brown lateral stripe is very weakly developed, and in several other specimens the third brown lateral stripe is represented or practically represented by the narrow metepimeral stripe only. Of all specimens taken in Buenos Aires, however, the tibiae and tarsi are entirely black.

Also, in the specimens from the type locality Córdoba, the pterostigma is longer. In the males recorded here the costal edge of the pterostigma in the front wing ranges from 3.9 to 4.4 mm, in the females recorded here (except the lectotype) from 4.2 to 4.6 mm.

It is not improbable that, when the species is better known from Córdoba, the eastern form will prove to be a subspecies of *Ph. argentina*.

The lectotype female lacks the apical segments of the abdomen. In the other females recorded here some variability has been found in the denticulation of these segments. This denticulation is normally as follows:

1. Tenth abdominal segment without denticles in middle portion of dorsal posterior margin.
2. Ventro-tergal margin of eighth abdominal segment with denticles in apical half only.
3. Ventro-tergal margin of ninth abdominal segment without denticles.

In the teneral female from Corrientes (Senckenberg Museum, no. 14484) the tenth abdominal segment is armed with denticles along the entire dorsal posterior margin, the ventro-tergal margin of the eighth abdominal segment has denticles on the apical three-fourths and that of the ninth abdominal segment possesses denticles on the basal submedian portion.

The allotype, female, of *Ph. eugeniae* (Navás) from Sierra de Córdoba, which is possibly conspecific with *Ph. argentina*, has the apical segments of the abdomen denticulated normally.

Also the female from Porto Alegre has the apical segments of the abdomen normally denticulated. The subtriangle in the left hind wing of this female is two-celled and that in the right hind wing possesses a not wholly developed cross-vein.

Phyllocycla viridipleuris (Calvert, 1909)

Fig. 32—34

Material. — Paraguay : Dept. of Guaira, Villarrica, 15.XII.1938, 1 ♀ ; Paso-Yobay, 20.I.1939, 1 ♂ (FSC).

The male of this species has the apical inferior angles of the tenth abdominal segment folded under and applied against the sternum. In the present male the first pale antehumeral stripe is much broader than in the holotype and the upper end of this stripe is confluent with the second pale antehumeral stripe, immediately in front of the humeral suture.

The female recorded here and hitherto unknown from the type locality, Paraguay, is described below.

Female. — Total length 50 mm; abdomen 38.5 mm; hind wing 31.5 mm; costal edge of pterostigma in front wing 4.1 mm.

Similar to the male holotype with regard to the stature and general coloration, but face paler. Bases of mandibles externally, genae and postclypeus pale yellow. Labrum, anteclypeus and frons pale greenish. Vertex and occipital plate brown. Prothorax entirely green. Pterothorax, as in holotype, largely yellowish green, with dark brown markings. Legs as in holotype with outer sides of tibiae yellowish.

Abdomen predominantly dark brown but middorsum and sides of segments 1 and 2, and middorsum of base of segment 3, yellowish. Ventro-tergal margins of segment 8 denticulated on apical half, slightly expanded, being twice as wide as those of segment 9. Dorso-apical rim of tenth segment one-sixth the length of segment. Stylets nearly as long as tenth segment. Vulvar scale brown, about two-fifths the length of ninth sternum, its posterior margin widely and deeply excised for three-fourths the length of the vulvar scale.

Wings slightly brownish-yellow at base. Venation brown but frontal margin of costa

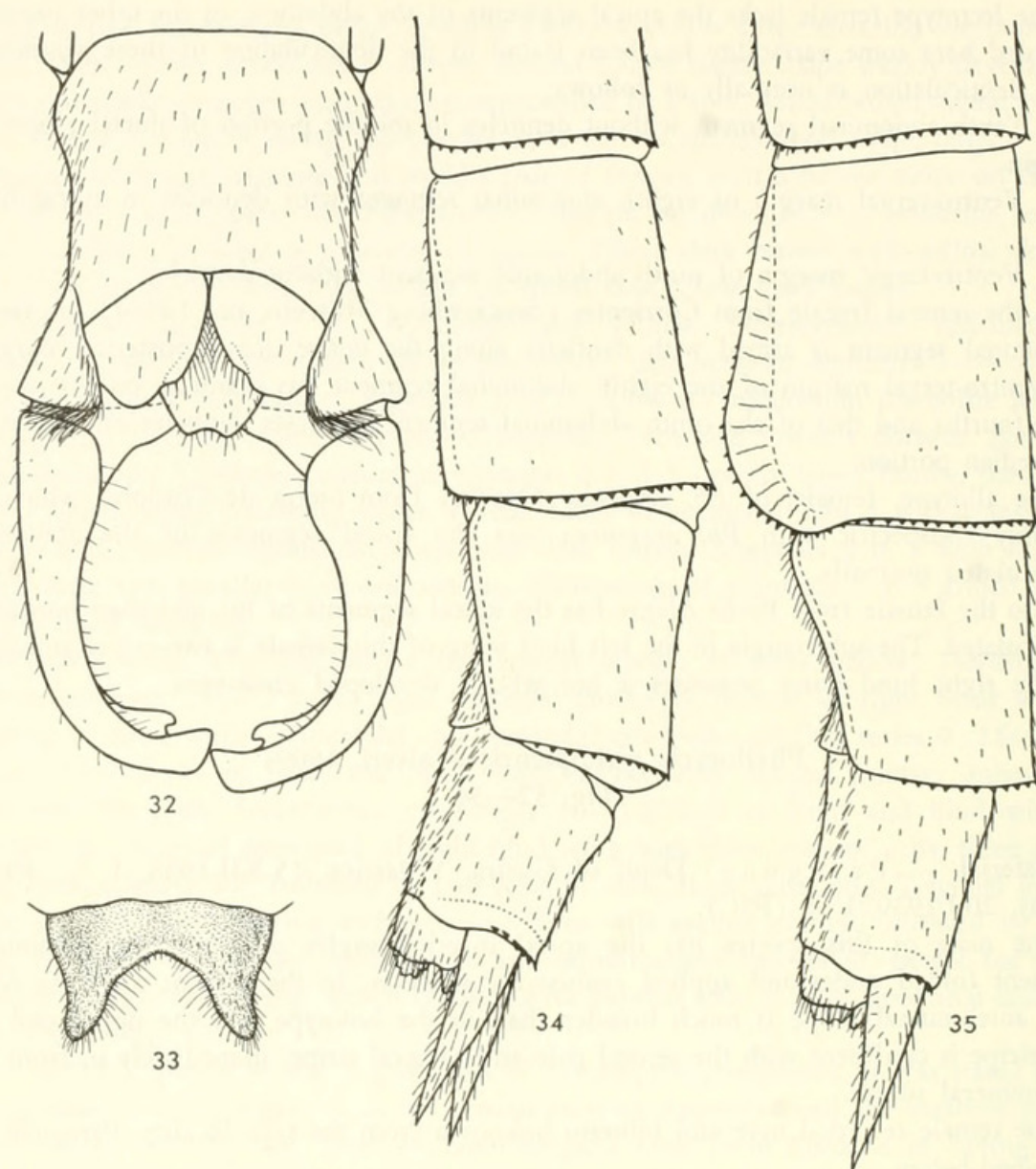


Fig. 32—34. *Phyllocycla viridipleuris* (Calvert). — 32, 10th abdominal segment and caudal appendages, ♂, ventral view; 33, vulvar scale; 34, apical segments of abdomen, ♀, left lateral view. Fig. 35. *Phyllocycla propinqua* spec. nov. — Apical segments of abdomen, ♀ allotype, left lateral view.

yellow. Pterostigma yellow, covering 6—7 cells. Two basal subcostal cross-veins in left front wing, one in other wings. Antenodal and postnodal cross-veins of first series 10 : 17—18 : 10/12 : 13—14 : 11 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth. Trigonal interspaces starting with a row of three cells against triangle followed by two rows of cells, seven cells long, in anterior row, in front wing, five cells long, in anterior row, in hind wing. Front wing with 4 rows of cells behind Cu2, hind wing with 5 rows of cells in the same area. Anal loop in hind wings two-celled. Hind wings with 5 paranal cells. Three postanal cells in right hind wing, four in left hind wing. Second anal interspace of hind wing starting with a row of two (paranal) cells against anal vein.

Phyllocycla propinqua spec. nov.

Fig. 35

Material. — Brazil: Santa Catarina, Nova Teutonia, 13.I.1949, 1 ♂; 20.XI.1950, 1 ♀ (holotype and allotype, respectively), (ML); Theresopolis, 1 ♂, J. Michaelis; 1 ♂ (paratypes, MNB); 1 ♂ (paratype, coll. of author).

In my 1970 paper on the South American Gomphidae this Brazilian species was considered no more than an eastern form of *Ph. viridipleuris* (Calvert). Since the female of *Ph. viridipleuris* is known from the type locality, Paraguay, I would consider the eastern form as a distinct species, closely related to *Ph. viridipleuris*, but readily recognizable from it by the following features:

1. Second lateral brown stripe of pterothorax partly developed and always represented by a distinct brown marking near subalar carina and at level of spiracle; third lateral brown stripe very weakly developed and on metepimeron generally represented by an ill-defined brownish stripe along femoral suture. In *Ph. viridipleuris* these stripes not developed at all.

2. Tibiae entirely blackish. In *Ph. viridipleuris* outer side of tibiae yellow.

3. Superior caudal appendages of male more slender and more acute at tip than in *Ph. viridipleuris*, and at about half length the inner surface nearer the upper edge there is only a low hump, marking the place of the small tubercle which is present in *Ph. viridipleuris*.

4. Lamellate expansion of ventro-tergal margins of eighth abdominal segment of female distinctly developed and much wider than that of the ninth abdominal segment. In *Ph. viridipleuris* very narrow and at most twice as wide as that of ninth abdominal segment.

Male (holotype). — Total length 52.5 mm; abdomen 40 mm (incl. caud. app.); hind wing 30.5 mm; costal edge of pterostigma in front wing 3.8 mm.

Wings slightly brownish yellow at base. Venation dark brown but costa with an inconspicuous narrow yellow line on frontal margin. Pterostigma light brown, covering $4\frac{1}{2}$ — $5\frac{1}{2}$ cells. Basal subcostal cross-vein present. Antenodal and postnodal cross-veins of first series 10 : 17—16 : 10/10 : 11—11 : 10 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth in left front wing, the fifth in other wings. All supratrangles, subtriangles and triangles two-celled, but subtriangle in hind wings open. Wings with 3 (front) and 4 (hind) rows of cells behind Cu2. Anal loop in left hind wing two-celled, in right hind wing one-celled. Five paranal cells and four postanal cells in each hind wing. Anal triangle in hind wing four-celled.

Female (allotype). — Total length 49 mm; abdomen 37.5 mm; hind wing 30.5 mm; costal edge of pterostigma in front wing 3.6 mm.

Venation of wings dark brown, including frontal margin of costa. Antenodal and postnodal cross-veins of first series 9 : 18—16 : 10/9 : 14—13 : 11 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth in right wings, the seventh in left wings. All supratrangles, subtriangles and triangles two-celled, but subtriangle in hind wings open. Wings with 3 (front) and 5 (hind) rows of cells behind Cu2. Anal loop in hind wings two-celled. Hind wings with 4 paranal cells and 4 postanal cells. Second anal interspace in hind wings starting with a single large (paranal) cell against anal vein, followed by two rows of cells.

Remark: All other specimens from Brazil referred to *Ph. viridipleuris* in my

1970 paper on the South American Gomphidae should also be considered paratypes of *Ph. propinqua* spec. nov.

Phyllocycla pallida Belle, 1970

Material. — U r u g u a y : Lagas, source area, 1 ♂, Fruhstorfer (MNB).

An old specimen, as clearly appears from the brownish wing membrane, differing from male holotype by the more obscure pale brown markings and more extensive darker markings. Face pale brownish but anteclypeus pale green. Antero-superior surface of the frons pale yellow. There is no distinct pale twin-spot on the prothorax. Inferior lateral angles of abdominal segment 10 somewhat produced inward. Anal loop two-celled in right hind wing and three-celled in the left. Anal triangle five-celled in both hind wings.

Negomphoides undulatus (Needham, 1944)

Material. — B r a z i l : State of Pará, Upper Rocana River, VI or VII.1918, 6 ♂, S. M. Klages (FSC).

Negomphoides lieftincki Belle, 1970

Fig. 30, 31

Material. — B o l i v i a : Dept. Santa Cruz, Prov. Ichilo, pond stream locality, 18 km west of Buena Vista, 8 km west of San Carolos, 15.III.1960, 1 ♀; 17.III.1960, 1 ♂; 20.III.1960, 1 ♀; Rio San Miguelito, 14 km east of Buena Vista, 22.III.1960, 1 ♂; Dept. La Paz, Prov. Nor Yungas, Canada, Naranjacada, a stream which crosses the road 4 km north of Caranavi, 11.IV.1960, 1 ♂; 12.IV.1960, 1 ♂; Dept. La Paz, Prov. Nor Yungas, 1 km north of Caranavi, rapid mountain stream, 13.IV.1960, 2 ♂, all R. B. Cumming; El Cairo, 18.III.1960, 1 ♀; no locality, 12.V.1960, 1 ♂, 1 ♀; 15.V.1960, 6 ♂, 1 ♀; Dept. Cochabamba, Prov. Chapare (1600 m), El Palmar, no date, 1 ♀; Dept. Santa Cruz, Prov. Ichilo (400 m), Buena Vista, no date, 1 ♂; 10.III.1960, 1 ♂, all R. Steinbach (FSC); Prov. Sara (600 m), no date, 1 ♀; no locality data, 1 ♂, both R. Steinbach (MNB).

The markings on the dorsum of the pterothorax vary greatly in this species. All Bolivian representatives have a well-developed second pale antehumeral stripe immediately in front of the humeral suture. In the females the first pale antehumeral stripe is short and not connected with the pale area of the anterior mesothoracic "half collar"; in the males this stripe is longer and confluent with the pale area of the mesothoracic "half collar".

Zonophora batesi Selys, 1869

Material. — B r a z i l : Para, Maranhao Aldeia Yavaruhu, Araçu, 50 km east of Caninde, 11—25.II.1966, 2 ♂, B. Malkin and José Celio Pinheiro. — S u r i n a m : Maratakka (upper part), 5.III.1971, 1 ♂, D. C. Geijskes (ML).

Zonophora calippus Selys, 1869

Fig. 39

Material. — Brazil: Para, Maranhao Aldeia Yavaruhu, Araçu, 50 km east of Caninde, 11-25.II.1966, 2 ♂, B. Malkin and José Celio Pinheiro. — Venezuela: District Anzoategui, between San Diego de Cabrutica and St. Cruz, 21.V.1936, 1 ♀. — Surinam: Kaboerikreek (upper part), 26.III.1971, 2 ♂; 1.IV.1971, 1 ♂, D. C. Geijskes (ML).

Zonophora spectabilis Campion, 1920

Fig. 36—38

Material. — Bolivia: Dept. Santa Cruz, Prov. Ichilo, Buena Vista (400 m), 1 ♀ (FSC).

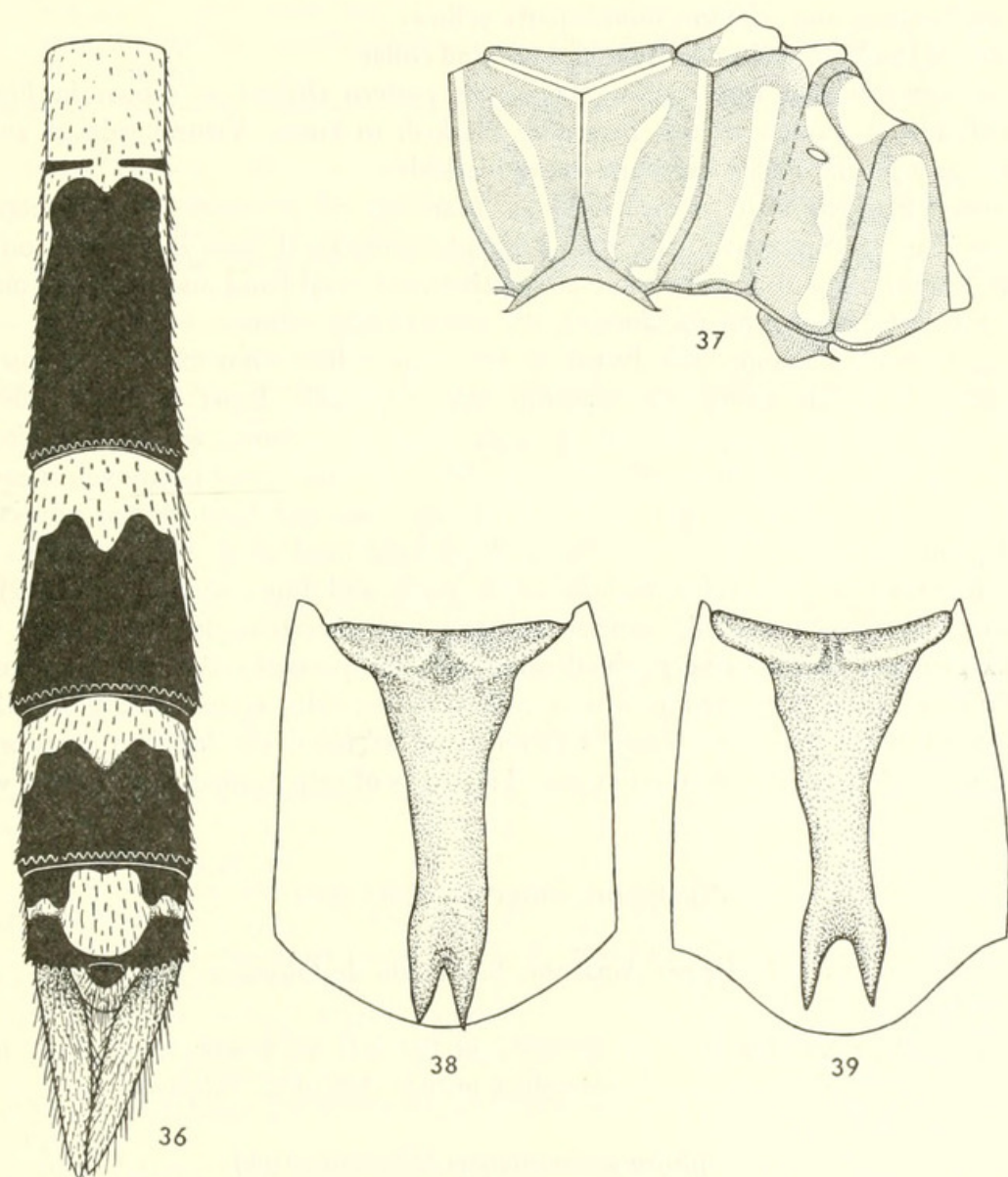


Fig. 36—38. *Zonophora spectabilis* Campion, ♀. 36, apical segments of abdomen, dorsal view, showing colour design; 37, diagram of pterothorax; 38, vulvar scale and ninth sternum, ventral view. Fig. 39. *Zonophora calippus* Selys, ♀. Vulvar scale and ninth sternum, ventral view

The female of this species differs greatly from *Z. calippus*, regarding the coloration of the abdominal segments 8 to 10, but the morphological differences of the vulvar scale are slight.

Schmidt (1941) considered *Z. spectabilis* no more than a subspecies of *Z. calippus*. *Z. spectabilis* was described from Sapucay, Paraguay.

Female. — Total length 50.5 mm; abdomen 37 mm (incl. caud. app. 2.8 mm); hind wing 38 mm; costal edge of pterostigma in front wing 4.7 mm, in hind wing 5 mm.

Face predominantly yellow but free border of labrum blackish, depressed areas of postclypeus brownish, and vertical part of frons brownish above, becoming blackish in middle. Superior surface of frons yellow with a broad, blackish median band, which is connected with the blackish basal band. Vertex blackish, the depressed area behind and between the projecting postocellar ridges yellow. Occipital plate largely yellow, the lateral borders blackish. Rear of head brown but yellow behind occipital plate and on tempora. Labium and adjacent mouth parts yellow.

Prothorax blackish, yellow on sides and on hind collar.

Pterothorax blackish with yellow stripes, its pattern shaped as shown in Fig. 37.

Dorsal side of femora yellow, becoming blackish to knees. Ventral side of anterior femur largely green. Tibiae, tarsi and claws blackish.

Abdomen blackish with yellow markings. Markings of segments 7 to 10 shaped as shown in Fig. 36. Segment 3 to 6 with a broad yellow basal band interrupted on mid-dorsum. Segment 3 with a yellow lateral spot between basal band and posterior margin. Segment 1 and 2 yellow on middorsum, the sides largely yellow.

Wings hyaline. Venation pale brownish but costa yellow from base to pterostigma. Pterostigma brownish yellow, surmounting $5\frac{1}{2}$ — $6\frac{1}{2}$ cells. Basal subcostal cross-vein wanting in right hind wing, present in other wings. Each wing with two cubito-anal cross-veins in addition to inner side of subtriangle. Antenodal and postnodal cross-veins of first series 14 : 19—20 : 14/12 : 15—15 : 12 in front and hind wings, respectively. Second primary antenodal cross-vein the sixth in right hind wing, the seventh in other wings. Intermedian cross-veins 7— $8\frac{1}{4}$ —4 in front and hind wings, respectively. In each wing triangle two-celled, subtriangle open and supratriangle open. Hind wings with six paranal cells and five postanal cells, the sixth paranal cell is the first postanal cell. Trigonal interspace starting with a row of three cells against triangle, followed by two rows of cells, in front wings 1 (right) and 8 (left) cells long, in anterior row, in hind wings 3 cells long, in anterior row. Five rows of cells behind Cu2 in hind wings.

Zonophora klugi Schmidt, 1941

Material. — Brazil : Upper Amazone, São Paulo de Olivença, I.1923, 1 ♀, S. M. Klages (FSC).

The present female has the supratriangle in the left hind wing two-celled, in the other wings open. The vulvar scale resembles greatly that of *Z. calippus*.

Zonophora surinamensis Needham, 1944

Material. — Surinam : Tafelberg (foot), Geijskeskreek, 7.IX.1944, 1 ♂, L. Schmidt (ML).

This is a new record for Surinam. The species was described from a single male taken in Brazil at Mapaoni, near the southern border of Surinam.

The present male lacks abdominal segments 4 to 10.

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