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Revision of Neotropical aphrophorine spittlebugs, part 1: Ptyelini (Hemiptera, Cercopoidea)

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Abstract

Cephisus Stål, formerly with only 3 recognized species, is now known from at least 10 species ranging from southwestern USA to Argentina. Eight are keyed and described, including *C. siccifolia* (Walker), the economic species in South America, *C. variolosus* (Walker), the common species in Central America, *C. brevipennis* **sp. nov.** and *C. laticeps* **sp. nov.** from Mexico, plus *C. magnificus* **sp. nov.** from Brazil; two other biological species were identified in the *C. variolosus* species complex from the results of genetic “barcoding.” These are differentiated from *Plinthacrus phaleratus*, *P. mexicanus* and *P. irroratus* (all described by Spinola in 1850) that are new synonyms of *Novaphrophara tasmaniae* Lallemand, 1940 (as *N. phalerata* **comb. nov.**), a species collected recently only in Madagascar. These two genera along with 6 others are placed in the redefined tribe Ptyelini (= Takagiinae **syn. nov.**) as sister-genus to the palaeartic genus *Cnemidanomia* Kusnezov (= *Takagia* Matsumura), suggesting a pre-Oligocene dispersal from the old world to the new. A preliminary key is provided to the families and tribes of Cercopoidea represented in the new world.

Key words: Cercopidae, Aphrophorinae, *Cephisus*, *Novaphrophara*, new species

Introduction

Cercopidae (known in North America as “spittlebugs”) comprise the majority of the included species of new world Cercopoidea or “froghoppers.” The family is traditionally divided into two subfamilies, sometimes accorded family rank. Cercopinae are usually large and brightly colored (Carvalho and Webb 2005), and Aphrophorinae are generally somewhat smaller and brown-hued. Other spittlebug families in the new world are the common but tiny Clastopteridae and the rare, relict Epipygidae that has only four described species (Hamilton 2001) and about 30 others that await description and assignment to genera. The only tribe of new-world Aphrophorinae that has been revised is the Philaenini (Hamilton 1979) which is holarctic in distribution and, in the nearctic, is found from Canada south to the highlands around Mexico City.

The traditional subdivision of Cercopidae is convenient because it splits the world fauna roughly into two nearly equal halves. These subfamilies are, however, very unequally distributed. Cercopinae are dominant in equatorial localities, whereas Aphrophorinae comprise most of the spittlebugs of the holarctic and oceanic regions. Within these regions there are major faunal differences. The cercopoid fauna of New Zealand is composed entirely of 14 species of Aphrophorinae (Hamilton and Morales 1992). By contrast, the comparatively huge area of mainland Australia has only 12 species of Aphrophorinae (Evans 1966) representing 40% of the 30 species of their froghoppers, the remainder being split evenly between Cercopinae and the clastopterid subfamily Machaerotinae. In the new-world, almost all the species in Canada and the USA are Aphrophorinae (Doering 1929, 1930; Hamilton 1982) whereas Cercopinae are hugely diverse in the neotropics from low altitudes in Mexico to Argentina (Carvalho and Webb 2005). The only spittlebugs equally common in both North and South America are Clastopteridae.

Neotropical Aphrophorinae are both depauperate and mostly quite rare, and as a consequence are particularly in need of revision. Only a single neotropical aphrophorine species, *Cephisus siccifolia* (Walker), attains pest status

(Ribeiro *et al.* 2005). The genus to which it belongs was last revised almost 150 years ago (Stål 1866) when it was reduced to only three species differentiated solely on color pattern (“*siccifolius*” Fig. 1A–B, E–G, mottled brown; “*jacobii*,” Fig. 1H, dark brown; “*sanguisuga*” or “*xanthocephala*,” Fig. 1C–D, with bicolored head). The poor quality of these early classifications is indicated by the fact that one species, *Monecphora xanthocephala* Walker, was described in Cercopinae and not transferred to the right subfamily until another century had passed (Fennah 1968). Three still older species, *Plinthacrus phaleratus*, *P. mexicanus* and *P. irroratus* (all described by Spinola in 1850 from Mexico and Brazil) are potentially senior synonyms for the recognized species of *Cephisus*. Furthermore, the tribe Ptyelini to which *Cephisus* is currently assigned (Metcalf and Wade 1962) has never been characterized. *Cephisus* appears to be the only new-world member of Ptyelini. Its status as a single isolated genus needs explanation.

Material and methods

Traditional characters of body form, wing venation and male genitalia (Figs. 1–15) were used to characterize the species of *Cephisus*. Correlation of morphological characters with geographic distribution was used to infer biological species in the absence of host associations or lengthy series. In addition to morphological characters, three examples of *Cephisus* were included in a pilot genetic test by “barcoding” (a 658 base pair segment of mitochondrial DNA of the CO1 gene). These were from a selection of 1,654 specimens representing 146 genera or subgenera and 454 species or subspecies representing all auchenorrhynchous superfamilies and all families and subfamilies of Cercopoidea. Successful results were obtained from 1,039 specimens. The world Cercopoidea were represented by 166 specimens, of which 131 specimens yielded readings of at least 307 base pairs, a sufficient test of the validity of 47 putative species in 20 genera. A complete DNA sequence was recovered from all three specimens of *Cephisus*, even though they were preserved dry since 1979 (or, in one case, 1969). The maximum age of a successfully barcoded auchenorrhynchous specimen in this study was 60 years, and most museum specimens of *Cephisus* examined in this study are older than that.

To define the tribe, easily observed characters were compared in related genera (Figs. 16–19) as well as the male genitalia (Figs. 5–6A, 16–18B). In addition, sensillae of the antennae, first described by Hansen (1890) and found mostly on the third antennal segment or postpedicel (the enlarged base of the arista, Fig. 20) were compared in more than 250 species representing 235 genera and subgenera throughout the superfamily. They were examined randomly in males and females. In taxa where sexual dimorphism was found, antennae of both sexes were compared in representative genera. Photographs of antennae were made using a 2000-era Philips [now FEI-USA] XL30 environmental scanning electron microscope (ESEM) capable of taking photographs without requiring gold coating of the specimens. Terminology of types of antennal sensilla follows Liang (2001). A complete list of antennae examined will be provided when the phylogeny of the superfamily is published.

Types of genera were examined wherever possible. Specimens are from the following collections:

| | |
|------|---|
| AMNH | American Museum of Natural History, New York, NY, USA. |
| BMNH | [British] Museum of Natural History, London, U.K. (including Fowler, Lallemand and Walker collections). |
| CNCI | Canadian National Collection of Insects, Ottawa, Ontario. |
| FMC | Field Museum, Chicago, IL, USA. |
| NYSM | New York State Museum, Albany, NY, USA. |
| SMFT | Senckenberg [formerly Staatliches] Museum für Tierkunde, Dresden, Germany (Jacobi collection). |
| UFRJ | Universidade Federal do Rio de Janeiro, Brazil. |

Systematics

In the context of the world fauna of Cercopoidea, “Aphrophoridae” of authors (e.g., Metcalf and Wade 1962) appears, on the basis of morphological synapomorphies, to be a paraphyletic assembly of genera not easily

assigned to other taxa (Hamilton 2001). Independent genetic testing (Dietrich et al. 2001, Cryan and Svenson 2010, Cryan and Urban 2011) and barcoding (this study) each gave variable results only partly concurring with phylogenetic evidence based on morphology. Thus, for example, Clastopterinae is morphologically similar to Machaerotinae (Hamilton 2001) but appears basal to Machaerotinae + Cercopidae in the earliest of these studies that utilized a single representative of each subfamily. In subsequent genetic studies, Machaerotinae comes out more basally still in the largest DNA study (Cryan and Svenson 2010), or, with a smaller data set (Cryan and Urban 2011), Clastopterinae is placed within the Aphrophorinae next to Ptyelini, while barcoding groups them within the highly dissimilar Aphrophorini! Such ambiguities are probably a result of the comparatively small number of taxa for which genetic evidence is available so far. Experience suggests that the correlation of morphological and genetic evidence in poorly studied taxa such as Cercopoidea and Fulgoroidea improves with the number of connecting taxa examined (Hamilton 2012).

Currently the only morphological character clearly separating true Aphrophorinae from other Cercopoidea is the unique truncate trochantin (Fig. 3B) that contrasts to the bandlike trochantin of other Hemiptera (Fig. 3C) separated from the coxa by a membranous fold permitting rotation of the coxa. This character is more useful to define Aphrophorinae than to identify them; consequently, the following key to new-world families and tribes of Cercopoidea is an artificial one, bypassing the subfamily level. It places all the new-world Cercopinae in the tribe Ischnorhinini, following the subfamily classification of Carvalho and Webb (2005), and includes the tribes of Aphrophorinae as listed by Metcalf and Wade (1962), whether valid or not. Cloviini (including Lepyrniini: Hamilton 1982) is designated with an asterisk (*) as the name is used provisionally. Its currently included genera are heterogenous. It includes several new tribes that will be described in subsequent contributions.

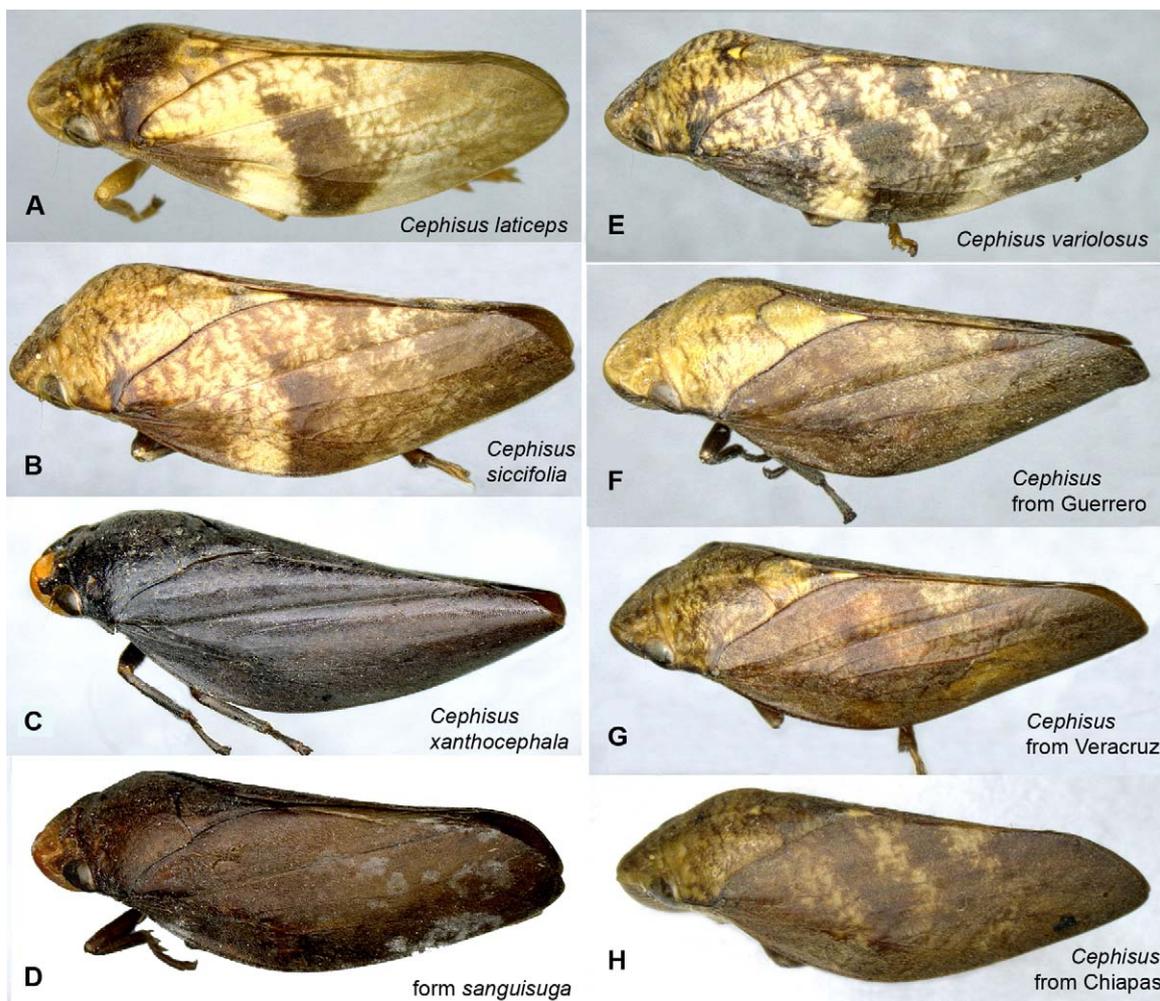


FIGURE 1. Habitus of *Cephisus* spp. A. *C. laticeps*; B-E. *C. siccifolia*; C. *C. xanthocephala*; D. *C. sanguisuga* from Amazonian basin; E-H. *C. variolosus* complex (E. “typical” *variolosus*, specimen #CNCHB 1904–11, from Oaxaca; F. specimen near *C. brevipennis* from Guerrero; G. specimen #CNCHB 1906–11 from Veracruz; H. specimen #CNCHB 1905–11 from Chiapas).

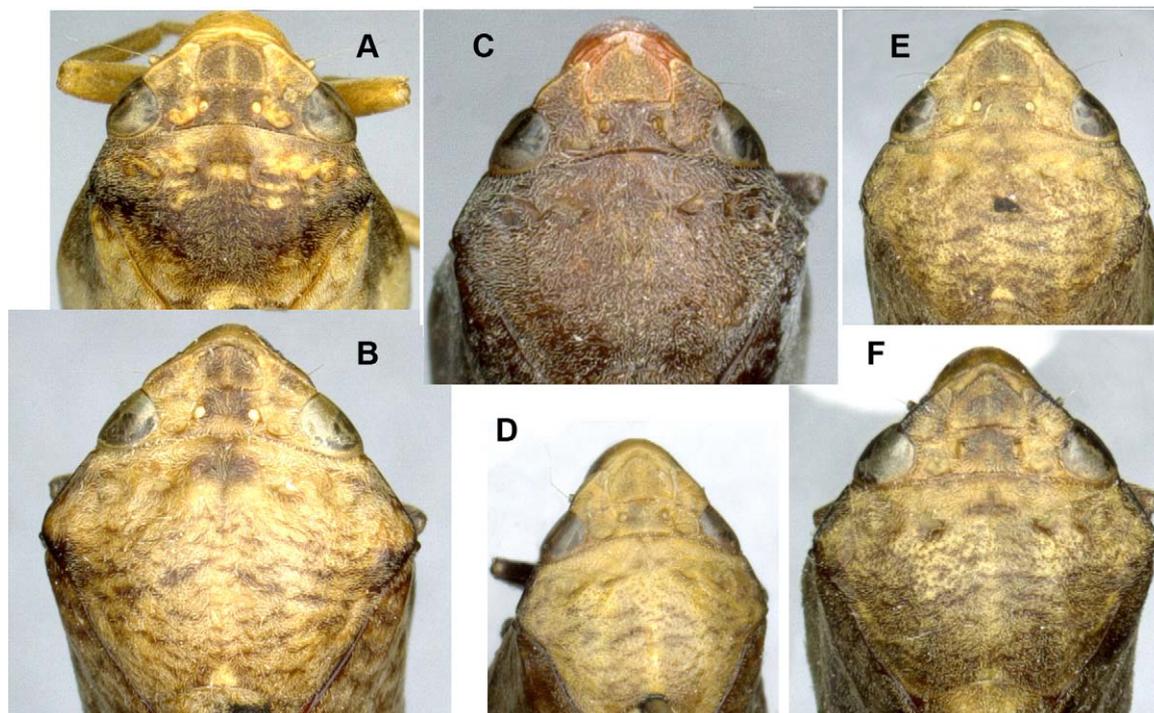


FIGURE 2. Head and pronotum, dorsolateral (perpendicular) aspect. A. *C. laticeps*, holotype; B. *C. siccifolia*; C. *C. sanguisuga* from Amazonian basin; D-F. *C. variolosus* complex (D. specimen near *C. brevipennis* from Guerrero; E. specimen #CNCHB 1905–11 from Chiapas; F. specimen #CNCHB 1906–11 from Veracruz).

Key to new-world families and tribes of Cercopoidea

1. Tegmen with broad, folded appendix; antenna inserted in deep pit on face **Clastopteridae**
- 1' Tegmen lacking appendix, or this is narrow and not folded; antenna inserted under transverse antennal ledge (Fig. 3B) 2
2. Tegmina seemingly inserted behind eye **Epipygidae**
- 2' Tegmina separated from eye by sides of prothorax **Cercopidae** ...3
3. Ocelli present, very close-set, separated by not more than 3 diameters (as in Fig. 16A) 4
- 3' Ocelli, when present, set almost as far apart as their distance from the compound eyes (Figs (17–19)A); absent in wingless forms) 5
4. Tegmina prominently pitted, each pit with a tiny seta; eyes transverse (as in Cicadellidae) Aphrophorini (Chile and Nearctic)
- 4' Tegmina smooth to hirsute (obscuring surface sculpturing), if prominently pitted, then eyes globose (as in Cicadidae) Ischnorhinini
5. Antennal ledge bicarinate Philaenini (Nearctic; revised by Hamilton 1979)
- 5' Antennal ledge bulbous or unicarinate 6
6. Face medially carinate (Figs 3A–B) Ptyelini (southwestern USA to Argentina)
- 6' Face flat or bulbous 7
7. Hind wing absent, or with deep fold extending at least to midlength. Orthoraphini (Neotropical)
- 7' Hind wing present, entire or with small fold at margin *Cloviini (widespread)

PTYELINI Fowler

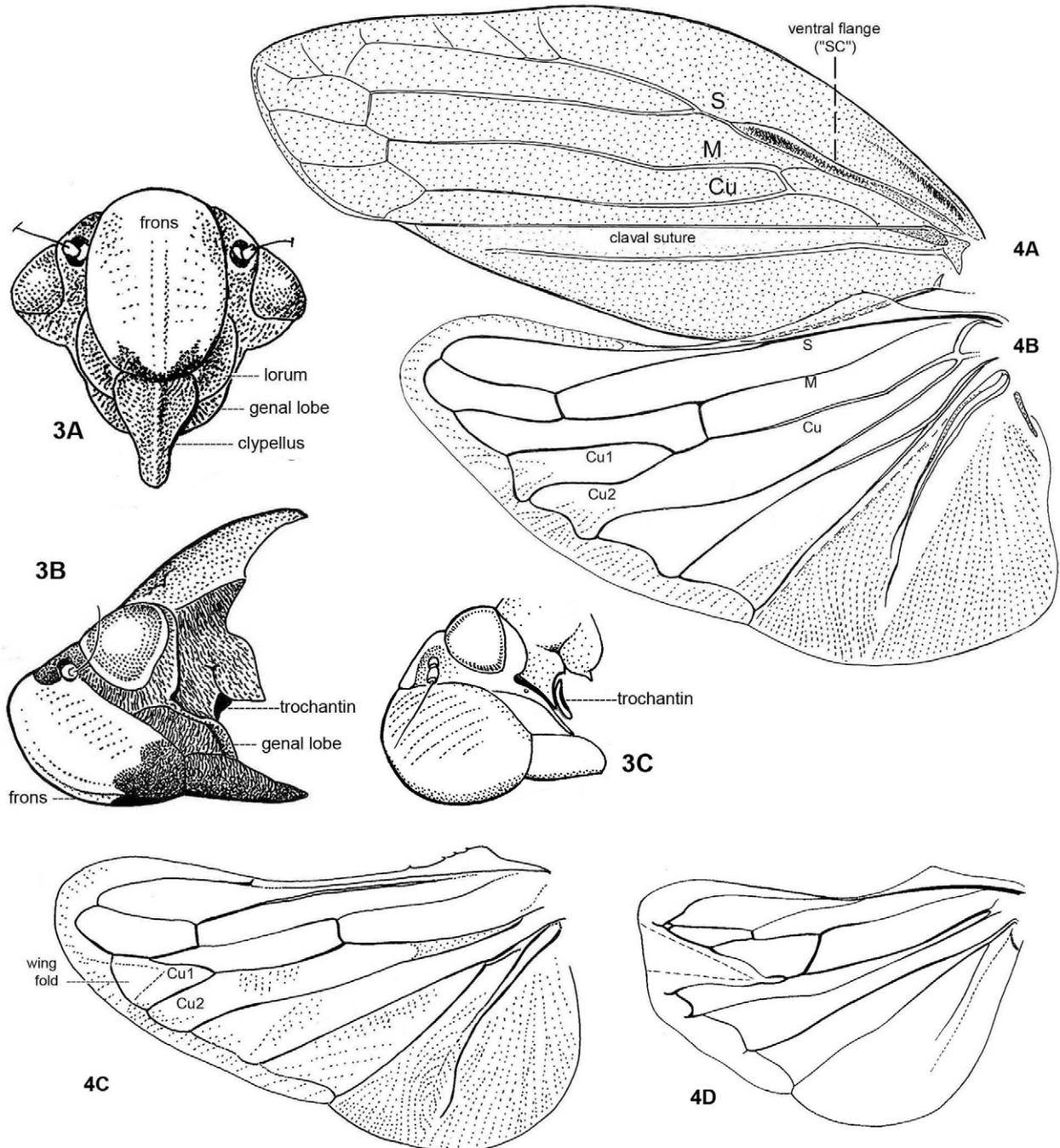
Ptyelinae Fowler, 1897:174.

Takaginae [sic] Matsumura, 1942:101, **syn. nov.**

Distribution. Most Ptyelini are restricted to the old world tropics; there is only one exclusively new world genus, *Cephisus* Stål.

Diagnosis. This tribe is most clearly defined by the attenuate clypellus tip (Fig. 3A) that is abruptly narrowed between fore coxae, extending at least as far as coxal tips, and accompanied by greatly expanded tips to the genal

lobes (Fig. 3B). Ptyelini share with Orthoraphini a retracted postpedicel (base of arista) and basiconic sensilla on the antenna that are peglike (Figs 20A–G). By contrast, the postpedicel is not retracted in other tribes (Figs 20K–M). Furthermore, in Aphrophorini the stout, projecting sensilla are replaced by placoid sensilla (Fig. 20L) and Philaenini have spiniform sensilla (Fig. 20M).

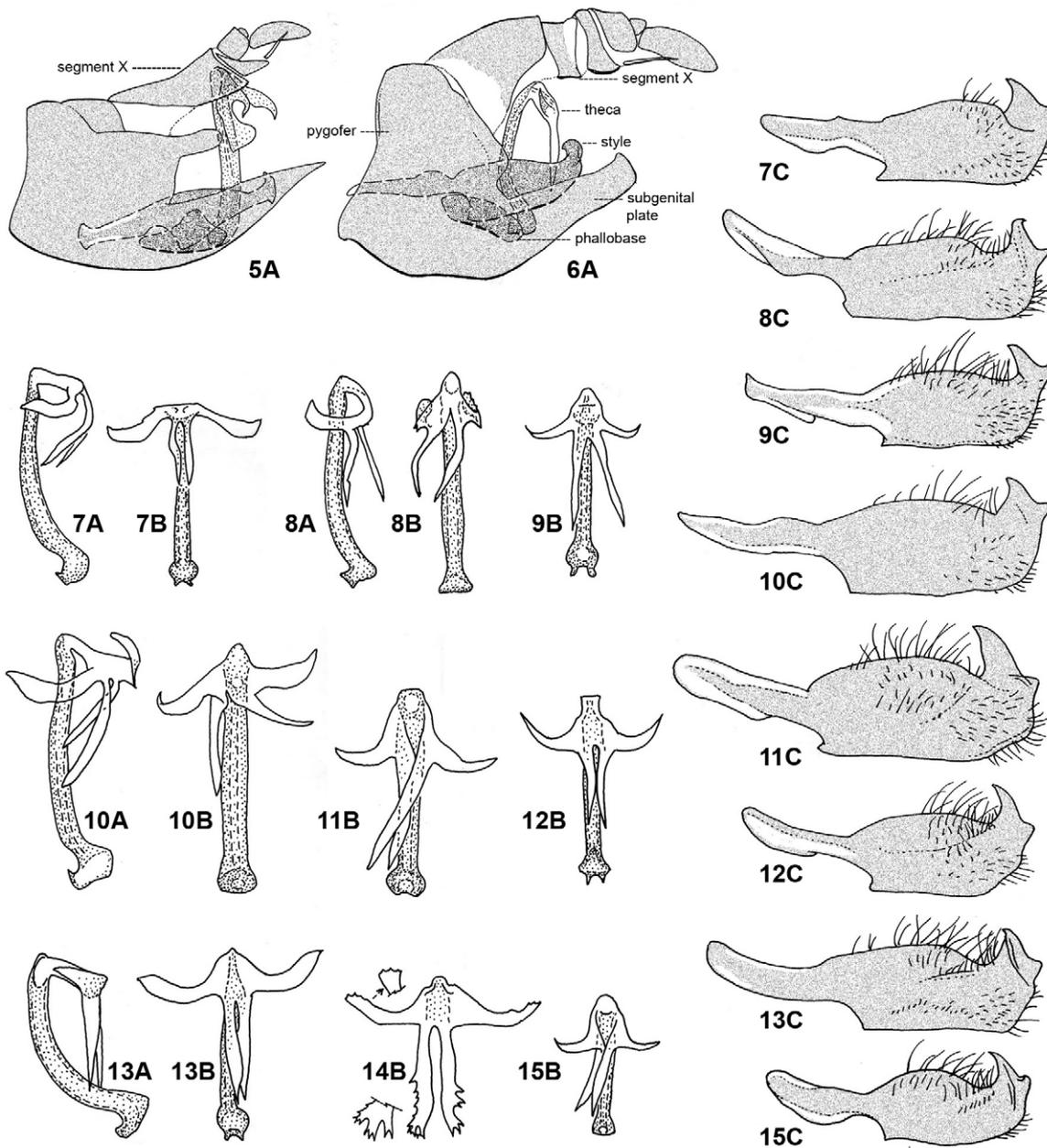


FIGURES 3–4. Morphology of head (3) and wings (4) of Ptyelini. 3A. face of *Cephisis sanguisuga*, holotype; 3B. head and pronotum, ventrolateral aspect, of *C. xanthocephala*, holotype; 3C. head and propleuron of unidentified Cercopinae; 4A. tegmen of *C. siccifolia*, ventral aspect showing ventral flange (“Sc” of authors); 4B. hindwing of same; 4C. same, of *Ptyelus* sp.; 4D. same, of *Eulepyronia grossa* Schmidt, holotype.

Included taxa. At least 24 species in 8 genera: *Cephisis*, *Cnemidanomia* Kusnezov (= *Takagia* Matsumura), *Eulepyronia* Schmidt, *Gallicana* Lallemand, *Hymettus* Stål, *Novaphrophara* Lallemand, *Mandesa* Distant and *Ptyelus* LePeletier & Serville (= *Plinthacrus* Spinola). The distinctive facial characters of Ptyelini show that the placement of *Mandesa* in Aphrophorini (Metcalf and Wade 1962), probably based on the close-set ocelli, is incorrect.

Poophilus Stål is doubtfully included because the elongate clypellus is not constricted between the coxae and has a continuous profile with the frons. Furthermore, the basiconic sensilla are uniquely laterally compressed (Fig. 20H) with a footprint similar to the placoid sensilla of Aphrophorini. The male genitalia and sensilla of *Hemiapterus Jacobi* and *Hemipoophilus Jacobi* are unknown, but are probably similar to *Poophilus* with which they share the same head shape.

Examination of the type-species of *Plinthacrus phaleratus*, *P. mexicanus* and *P. irroratus* (all described by Spinola in 1850) showed that they are misassociated with the neotropics, being synonyms of the only known species of *Novaphrophara* which is now known to be endemic to Madagascar. For their original descriptions, synonymy and comments, see the Appendix.



FIGURES 5–15. Male genitalia of Ptyelini in lateral aspect (A), caudal aspect of theca (B) and widest aspect of style (C). 5. genital capsule of *Ptyelus*; 6. same, of *Cephisus*; 7. syntype male of *C. sanguisuga*; 8. *C. diminutus*, holotype; 9. *C. laticeps*, holotype; 10. *C. xanthocephala*; 11. *C. magnificus*, holotype; 12. *C. variolosus*; 13. *C. siccifolia*; 14. *C. jacobii*; 15. *C. brevipennis*, holotype.

Remarks. “Ptyelinae” of Fowler was a substitute name for Aphrophorinae at a time when the type-species of *Aphrophora* Germar was uncertain. The name Ptielini [sic] was first applied to a specified subgroup of Aphrophorinae by Lallemand (1924) for two species that are now placed as junior synonyms in *Novophilaenus* Lallemand (Hamilton 1981), a Pacific island genus similar to Cloviini. Metcalf and Wade (1962) first grouped most of the presently recognized Ptyelini (*Cephisus*, *Hemipterus*, *Hemipoophilus*, *Hymettus*, *Poophilus* and *Ptyelus*) but with a few Cloviini (*Amarusa* Walker, *Betaclovia* Matsumura) and Philaenini (*Mesoptyelus* Matsumura, *Philaronia* Ball); *Eulepyronia* was grouped with *Lepyronia* Amyot & Serville. The inclusion of *Beesoniella* Lallemand, *Patriziana* Lallemand, *Sepullia* Stål and *Tremapterus* Spinola, none of which bear any resemblance to *Ptyelus*, may have been an accidental product of Wade’s cataloguing from Metcalf’s notes after his death, as all four genera are related but belong to Clastopteridae (Hamilton 2001). Because the boundaries between Ptyelini and Cloviini were not clearly drawn, many species placed by Metcalf in *Ptyelus* actually belong to other genera, including *Cnemidanomia* (Nast (1972) listed *Ptyelus colonus* Jacobi as a junior synonym of *C. lugubris*).

Cephisus Stål

Cephisus Stål, 1866:67. Validation by inclusion of species: Stål 1866:384. Type-species by monotypy: *Aphrophora siccifolia* Walker, 1851.

Distribution. New world tropics north to southern Texas and Arizona.

Diagnosis. The only aphrophorine spittlebug in the new world with a median carina on the face. Crown declivous; face more or less carinate on midline, at least on lower half of frons; head much narrower than pronotum; antennal ledges finely unicarinate; frons with low, rounded median ridge; clypellus tip narrow, extending between fore coxae; lora discoid; genae strongly constricted next to widest part of lora, broad below; rostrum extending to mesocoxae, or to mesotrochanters in *C. siccifolia* (Walker). Pronotum with shallow to prominent median fossa near fore border. Tegmina strongly narrowed to obliquely truncate tips. Hind wings with circumambient vein sinuate at end of each cell between Cu_1 and vannal fold (Fig. 4B). Hind tibiae each with a double pecten of 14–15 black-tipped spines; basal tarsomeres each with 1 pecten row of 6–7 such spines; 2nd tarsomeres each with 7–9 tiny spines set in deeply V-notched border. Male anal tube surmounted by hoodlike articulated base (Fig. 6A); segment X very short; subgenital plates truncate; styles very large, with long setae on inner faces, apices with tiny process on caudal margin and large dorsal process hooked mesad (Figs 7–15C); theca long, curved caudad, armed with 2 long spines, mesal pair retrorse, lateral pair divergent or curled around shaft (Figs (6–15)A–B).

Remarks. Similar to the Old World genus *Cnemidanomia*, but face medially carinate, body broader, with pronotum distinctly wider than head (Fig. 2), hump-backed, usually with long lateral margins of pronotum, and male anal tube with hoodlike articulated base (Fig. 6A) probably homologous with basal half of segment X in *Cnemidanomia* (Fig. 17B).

Key to species of *Cephisus*

1. Black to dark brown with frons and tylus yellow to orange (Figs 1C–D); frons inflated, lacking coronal margin (Fig. 2C) *xanthocephala* (Walker)
- 1' Brown, usually mottled without paler frons (Figs 1E–H); frons not inflated, with angled coronal margin (Figs 2D–F). 2
2. Head small, 0.75x as wide as pronotum 7
- 2' Head larger, 0.80–0.85x as wide as pronotum 3
3. Males 9
- 3' Females 4
4. Head 0.85x as wide as pronotum; coast of Gulf of California *laticeps* **sp. nov.**
- 4' Head 0.80x as wide as pronotum; highlands of Mexico and southwestern USA to Brazil 5
5. Range: Venezuela to Brazil *diminutus* (Walker)
- 5' Range: Central America to USA 6
6. Length 12.7–13.5 mm; tegmina 8.0–10.5 mm long; lowlands of the southern end of the Gulf of Mexico . . *brevipennis* **sp. nov.**
- 6' Length 13.5–18 mm; tegmina 11–15 mm long; Central America north in highlands of Mexico to USA *variolosus* (Walker), complex

7. Entirely dark brown; crown coplanar with front of pronotum in lateral aspect; ventral processes of theca tip serrate (Fig. 14B) *jacobii* Lallemand
- 7' Distinctly mottled with pale brown, at least on pronotum; crown with at least apical half at a distinctly shallower angle than that of front of pronotum (as in Fig. 3 B); ventral processes of theca tip unarmed (Fig. 13B) 8
8. Female longer than 18 mm; male 17.4 mm *magnificus* sp. nov.
- 8' Female not more than 17.6 mm, male not more than 12 mm *siccifolia* (Walker)
9. Lateral processes of theca blunt-tipped, apically serrate (Figs 8A–B) *diminutus* (Walker)
- 9' Lateral processes of theca with tips tapered, pointed (Figs 9–13B) 10
10. Lateral processes of theca broad almost to tip (Fig. 13B), in posterior aspect usually viewed edge-on; South America *siccifolia* (Walker)
- 10' Lateral processes of theca in posterior aspect evenly tapered to tip (Fig. 12B); Central America to southern USA 11
11. Head 0.80x as wide as pronotum; lateral margin of pronotum 3/4 as long as eye, or longer; central America north to the highlands of Mexico and southwestern USA *variolosus* (Walker), complex
- 11' Head 0.85x as wide as pronotum; lateral margin of pronotum less than 3/4 as long as eye; lowlands of coastal Mexico ... 12
12. Pronotum with blackish transverse band between humeral angles; ventral processes of theca tip 2.0x as long as lateral processes (Fig. 9B); west coast of Mexico *laticeps* sp. nov.
- 12' Pronotum marked only with blackish wrinkles, or a blackish transverse band broadly interrupted at middle; ventral processes of theca tip 1.5x as long as lateral processes (Fig. 15B); east coast of Mexico *brevipennis* sp. nov.

***Cephisus brevipennis* sp. nov.**

(Fig. 15B)

Type locality. Ciudad Valles, San Luis Potosi, Mexico.

Diagnosis. The short tegmina, scarcely more than 2x as long as the pronotal width and only 8.0–10.5 mm long, give these insects a robust appearance. Head of male 0.85x as wide as pronotum (lateral margins of pronotum thus shorter than 3/4 length of eye), in female 0.80x as wide; crown weakly sloping, not coplanar with front part of pronotum. Tawny, tegmina brown, dark brown on clypellus, lower fifth of frons, lower parts of pleura and terminal segment of rostrum; pronotum sometimes with widely interrupted transverse black band; corium with two dark bands across middle and sometimes tips also dark brown. Style apically constricted, with small but prominent apical process and narrow, weakly hooked dorsal process on inner edge (Fig. 15C); theca shaft short, slender, recurved, armed with a pair of short, curved, tapered lateral processes, and a pair of ventral processes 1.5x as long as lateral pair, extending beyond midlength of shaft (Fig. 15B). Length: male 10.1–11.0 mm, female 12.7–13.5 mm.

Types. Holotype male, **MEXICO:** *S.L.P.*—[Ciudad] Valles, 18 May 1952 (M. Cazier, W. Gertsch & R. Schrammel). Paratypes: **MEXICO:** 7 males, 2 females, same data as holotype; 1 male, *Tabasco*—Teapa; 29 June. All types in AMNH.

Remarks. The constricted style apex and short, tapered lateral processes of the theca show this to be a sister-species of *C. laticeps*, from which it may be distinguished by the shorter theca shaft and ventral processes.

Distribution. Apparently confined to the west coast of the Gulf of Mexico, from just west of Tampico (just south of the Tropic of Cancer) to just south of Villahermosa near the Yucatán Peninsula.

Etymology. *Brevi-*, short; *pennis* (n), wing.

***Cephisus diminutus* (Walker), reinstated**

(Figs 8A–C)

Aphrophora diminuta Walker, 1851: 699.

Aphrophora occidentis Walker, 1851: 699. **Syn. nov.**

Sphodroscarta diminuta: Stål 1869:18 (as synonym of *A. siccifolius* [sic] Walker).

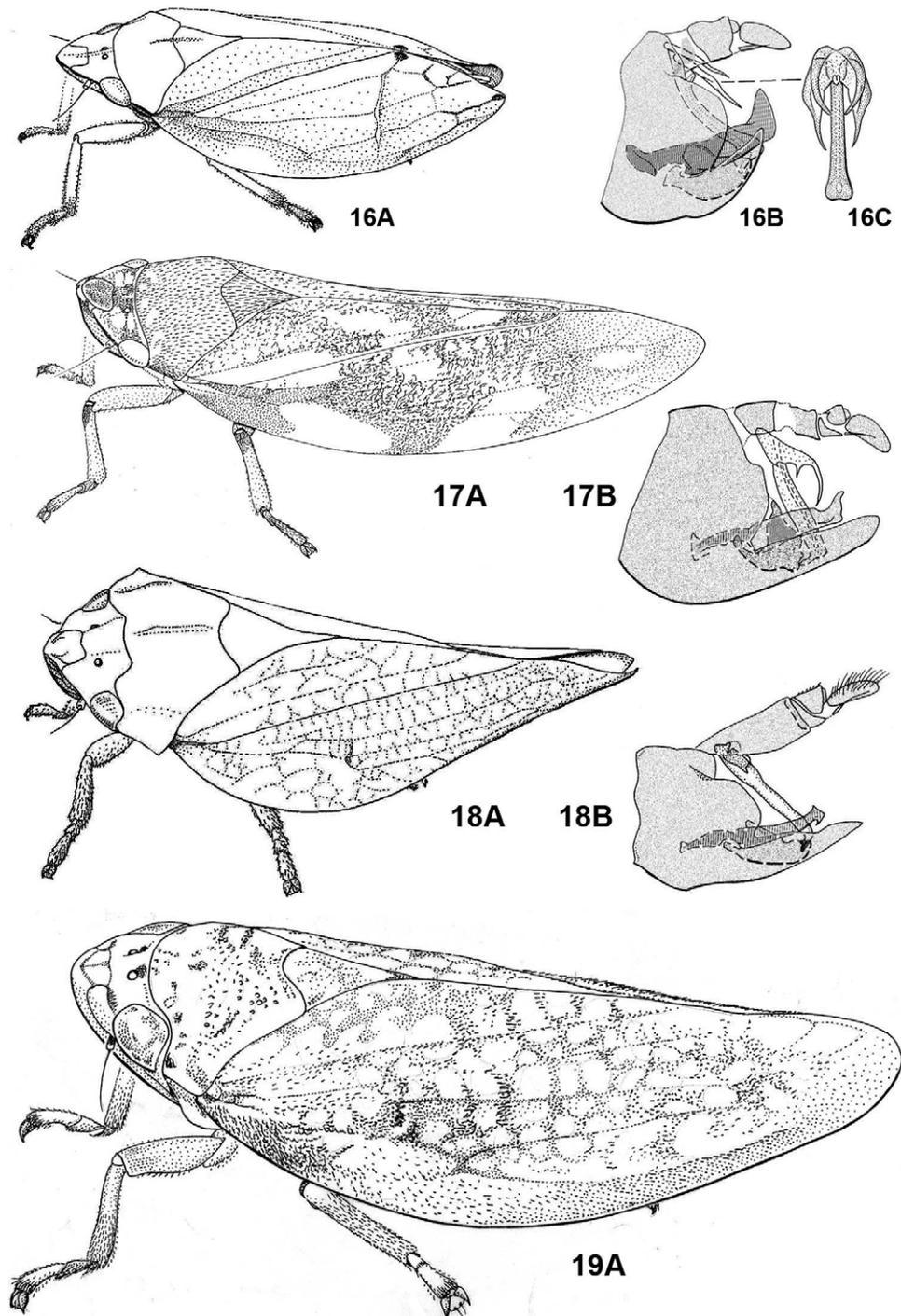
Cephisus diminuta: Dallas 1870:495 (as synonym of *A. siccifolius* [sic] Walker).

Type locality. "West coast of America" is probably incorrect.

Diagnosis. Similar to *C. variolosus*, but from South America, and with lateral thecal processes recurved and blunt-tipped. Head 0.8x as wide as pronotum (lateral margins of pronotum thus longer than 3/4 length of eye); rather robust; crown weakly sloping, not coplanar with front part of pronotum. Chocolate brown, slightly darker on

midline of crown; clypellus and lower fifth of frons blackish brown; paler areas (when present) forming indefinite lineations on pronotum, 3 crescent-shaped oblique bands across middle of each corium, and pale clavus with darker band across middle. Style with small but prominent apical process and straight, narrow, truncate dorsal process on inner edge (Fig. 8C); theca shaft slender, recurved, armed with a pair of short, strongly curved, apically blunt lateral processes wrapped around shaft tip (these unfold after some time in glycerin), and a pair of ventral processes 1.5x as long as lateral pair, extending beyond midlength of shaft (Figs 6A–B). Length of male: 11.4–13.4 mm. Width of male across head: 2.9–3.0 mm; across pronotum: 3.5–3.6 mm.

Types. Holotype male of *diminutus* and female of *occidentis*; in BMNH.



FIGURES 16–19. Habitus of genera of Ptyelini (A), male genitalic capsule in lateral aspect (B) and male theca (C) in caudal aspect. 16. *Mandesa*; 17. *Cnemidanomia*; 18. *Novaphrophara*; 19. *Hymettus*.

Additional material. **BRAZIL:** 1 male, *Santa Catharina*—Rio Natal, Dec. 1945 (F. Johnson); **BRITISH GUIANA [GUYANA]:** 1 male, Essequibo R. [at] Moraballi Creek, 14 Oct. 1929, (Oxf. Univ. Exp.) dark forest; **VENEZUELA:** 1 male, Las Adjuntas, 959 m, 13 July 1926 (H.E. Box); in AMNH and BMNH.

One unassociated female, same size as holotype of *occidentis* (15.4 mm) from **VENEZUELA:** Caripito, 27 July 1942; in AMNH.

Distribution. Rare; records are from coastal regions of South America, from southern Brazil to Venezuela. The superficially similar species, *C. variolosus* appears confined to Central America and adjacent U.S.A.

Remarks. Most specimens of this species are almost unmarked chocolate-brown and thus resemble *C. jacobii* Lallemand. In shape, however, they have the less robust body and less sloping crown of *C. variolosus*.

***Cephisus jacobii* Lallemand**

(Fig 14B)

Cephisus jacobii Lallemand, 1912: 39.

Type locality. French Guiana.

Diagnosis. The darkest species in the genus, chocolate brown, darker ventrally, unmarked or with a few indefinite pale maculations on tegmina, and with uniquely serrated thecal processes. Head 0.75x as wide as pronotum (lateral margins of pronotum thus much longer than 3/4 length of eye); robust; crown steeply sloping, about 45° to plane of scutellum, coplanar with front part of pronotum. Male genitalia as in *C. diminutus*, but lateral processes of theca directed outwards, ventral processes intricately serrate (Fig. 14B). Length: male 12.6 mm, female 15.2 [type]–18.5 mm. Width across head: female 4.5 mm; across pronotum: female 6.0 mm.

Type. Lectotype female of *jacobii*, here designated: Cayenne [**FRENCH GUIANA**]; in BMNH.

Additional material. **PERU:** 1 male, Rio Tapiche 6,154' [3000 m ASL], 26 July 1923 (H. Bassler) Acc. 33591; in AMNH. **BRITISH GUIANA [GUYANA]:** 1 female, New River 750' [150 m ASL], 26 Mar.–2 April 1938 (C.A. Hudson); in BMNH.

Distribution. Rare; localities in northern South America are from the Caribbean coast and the upper reaches of the Amazon Basin in Peru.

Remarks. This species has the same blunt and minutely serrate tips of the lateral theca processes as *C. diminutus* and is probably its sister-species. It is darker and more robust, with a steeper slope to the crown. The coarsely serrate margin of each ventral theca process is peculiar to this species.

***Cephisus laticeps* sp. nov.**

(Figs 1A, 2A, 9B–C)

Type locality. 21 km east of Concordia, Sinaloa, Mexico.

Diagnosis. The broadest head relative to the thorax, 0.85x as wide as pronotum (lateral margins of pronotum thus slightly shorter than 3/4 length of eye); rather slender; crown steeply sloping, about 45° to plane of scutellum, coplanar with front part of pronotum. Pale straw coloured with bold dark markings on lower half of face, and forming a blackish transverse band across pronotum, triangular wedge at base of corium, spot near apex of clavus and crescent-shaped oblique bands across middle of each tegmen; tegminal tips more or less embrowned; apical segment of rostrum black. Style apically constricted, with narrow, furcate end (Fig. 9C); theca shaft slender, recurved, armed with a pair of short, recurved lateroapical processes and a pair of apical processes 2x as long as lateral pair, extending to base of shaft (Fig. 9B). Female unknown. Length: male 10.0–10.9 mm.

Type. Holotype male, **MEXICO:** *Sin.*—13 mi E Concordia 800' [250 m ASL], 5 Aug. 1964 (L.A. Kelton); No. 15843 in CNCI. Paratypes: **MEXICO:** 2 males, *Nay.*—Tepic, 28 July 1953 (C. & P. Vaurie) Rockefeller Exp.; in AMNH.

Distribution. Reported from a limited part of the east coast of the Gulf of California just south of the Tropic of Cancer, from Mazatlán to Tepic, a distance of approximately 200 km. This is north of the range of *C. variolosus* at low elevation.

Remarks. The width of the head and shortness of pronotal margins ally this species to *C. brevipennis*, which occurs on the lowlands of the opposite side of Mexico, and from which it is distinguished by the slender form, body markings and length of theca.

Etymology. *Lata-*, broad; *ceps* (n), head.

***Cephisus magnificus* sp. nov.**

(Figs 11B–C)

Type locality. Rio de Janeiro, Brazil.

Diagnosis. The largest adults in the genus. Head 0.75× as wide as pronotum (lateral margins of pronotum thus much longer than 3/4 length of eye); robust; crown steeply sloping, not coplanar with front part of pronotum which is 45° or more to plane of scutellum. Tan, in male heavily overlaid with brown, especially on transverse rugae of pronotum and tegmina, in female forming 2 dark bands across base of tegmina. Style with low, rounded apical process and long, straight, slightly retrorse dorsal process on inner edge (Fig. 11C); theca shaft slender, recurved, armed with a pair of short, curved, tapered lateral processes, and a pair of ventral processes 1.5× longer than lateral pair, extending beyond midlength of shaft (Fig. 11B). Length: male 16.5 mm, female 18.4 mm. Width across head: 3.7 mm; across pronotum: 5.2 mm.

Types. Holotype male, **BRAZIL:** *Federal Dist.*—Rio de Janeiro, Corcovado Forest, 1958 (H.B.D. Kettlewell) BM 1958–273; in BMNH. Paratype female, **BRAZIL:** *Santa Catalina*—Corupa (Hansa Humbolt), Oct. 1944 (A. Maller); in AMNH.

Distribution. Hill forests of coastal Brazil.

Remarks. This is the largest member of the genus. The male resembles *C. variolus* (e.g., in shape of thecal processes) but is more robust, with longer ventral theca processes and a much larger apical process of the style; the female differs from *C. siccifolia* in both size and steepness of the pronotum, which in this specimen exceeds 45°.

Etymology. *Magnificus* (adj.), eminent.

***Cephisus siccifolia* (Walker), redefined**

(Figs 1B, 2B, 13A–C, 21)

Aphrophora siccifolia Walker, 1851: 698.

Cephisus siccifolius [sic]: Stål, 1866: 384.

Sphodroscarta siccifolia: Stål, 1869: 18.

Type locality. Unknown. A syntype from “western Africa” is probably mislabelled.

Diagnosis. Distinguished from *C. variolosus* by its robust form, from *C. magnificus* by its smaller size and rather low pronotal declivity, and from both by the thecal processes that are broad almost to the tip, as in *C. xanthocephala*. Head 0.75× as wide as pronotum, in male often as much as 0.80× as wide (lateral margins of pronotum thus much longer than 3/4 length of eye); rather robust; crown weakly sloping, not coplanar with front part of pronotum. Tan, heavily overlaid with brown, darker on midline of crown and transverse rugae of pronotum; clypellus and lower fifth of frons often blackish brown; paler areas of tegmina (when present) forming 3 crescent-shaped oblique bands across middle, sometimes confluent. Style with low apical process and weakly curved, tapered dorsal process on inner edge (Fig. 13C); theca shaft robust, strongly recurved, armed with a pair of short, weakly curved, tapered lateral processes, and a pair of ventroapical processes slightly longer than lateral pair, extending nearly to base of shaft (Fig. 13A–B). Length: male 10.6–11.7 mm, female 13.4–17.6 mm. Width across head: male 3.3–3.4 mm, female 3.7–4.0 mm; across pronotum: male 4.5–4.9 mm, female 4.6–5.3 mm.

Types. Lectotype female of *siccifolia*, here designated: 44/38 [locality unknown]; in BMNH.

Additional material. **BRAZIL:** 6 males, 8 females from Caviuna, Corupa, Do Rio, Pelotas, Teffe; **PANAMA:** 1 male, 2 females from Barro Colorado I; **PARAGUAY:** 15 males, 8 females from *Itapua*—17 km W Enacranacion, 17 km N Hohenau; *Parana*—6 km W Pto. Pres. Stroessner; **PERU:** 4 male, 6 females from *Hu.*—Pto. Inca Lullapichis 800 m [ASL], Tingo Maria; *Ju.*—1–3 km SW Mina Pichita 2100 m [ASL]; *Lo.*—Yarinacocha 150 m [ASL]; *Md.*—Z.R. Tambopata; **URUGUAY:** 1 male from *Calonia*—Estanzuela; 18 Jan.–

4 Feb., 23 March, 8 April, 24 May, 21 June, 9–17 July, 23 Aug., 10–25 Oct., 9, 22 Nov., 7, 26–31 Dec.; in AMNH, CNCI, FMC, UFRJ and USNM.

Unassociated: 22 females from **BRAZIL**: Angra-Jussaral, Boraceia Salesopolis, Cauna, M[atto] Grosso, Mirapinima, Rio de Janeiro, Rio Vermelho, Santa Cruz, Serra dos Orgaos N. Pk., Uypiranga, Venda Nova Teresopolis, Vila Vera; **GUYANA**: Kuyuwini R.; **PANAMA**: Barro Colorado Is.; **PARAGUAY**: *Cordillera*—Caacupé; *Italia*—Colonia Nueva; **URUGUAY**: 15 km S Paysandu; 25 March, 23–27 April, in AMNH, CNCI, FMC and UFRJ.

Distribution. Widely distributed in the lowlands of South America, from Uruguay to Panama, where its range abuts that of *C. variolosus*. This species is probably correctly recorded from Argentina (Berg 1879). No records from Central America to the southern USA could be verified. These records refer to the next species, *C. variolosus*.

Biology. Nymphs of this species (Figs 21A–D) resemble those of *Aphrophora* Germar but have a white abdomen (Ribeiro *et al.* 2005). The same authors report an average of 22 nymphs per colony on *Eucalyptus* in Brazil and note that they “prefer to attack arboreal plants and it has been observed on *Acacia melanoxylon*, *Erythrina galli*, *Robinia hispida*, *Robinia pseudacacia*, *Schnus molle*, *Wistevia sinensis* and *Prosopis algarrobila* ... In Brazil, *C. siccifolius* was reported in arboreal plants such as *Acacia* sp., *Cassia* sp., *Cassia javanica*, *Caesalpinia ferrea* and *Phytolacea dioica* ... and they were also found on *Caesalpinia peltophoroides* (Leguminosae: Caesalpinioideae) in Cotia, State of São Paulo, with their young stages and [molting?] adults wrapped by a white foam on branches”.

Remarks. The syntype of *siccifolia* from “western Africa” could not be located. The lectotype has dusky wing tips and is probably Walker’s “var. β ”.

The trivial name *siccifolia* (“dry leaves”) probably refers to the appearance of the spread wings of Walker’s specimens, not to the damage caused by their feeding. The name is a noun in apposition and does not change its termination in a masculine genus.

***Cephisus variolosus* (Walker), reinstated**

(Figs 1E–F, 2D–F)

Ptyelus variolosus Walker, 1858: 188.

Cephisus siccifolius [sic]: Stål, 1866: 384 (incorrect synonymy).

?*Cephisus siccifolius cubanus* Metcalf & Bruner, 1944: 112.

Type locality. Unknown locality in Mexico.

Diagnosis. The common species in Central America, variable in size and color, probably a species complex. Head 0.8x as wide as pronotum (lateral margins of pronotum thus longer than 3/4 length of eye); robust to rather slender, tegmina 11–15 mm long. Tawny to brown, darker on midline of crown; clypellus and lower fifth of frons blackish brown; usually with paler areas forming indefinite lineations on pronotum, and 3 crescent-shaped oblique bands across middle of each tegmen; sometimes entire dorsum tawny, contrasting with tegmina. Style with short, broadly rounded apical process and slender, strongly hooked dorsal process on inner edge (Fig. 12C); theca shaft slender, recurved, armed with a pair of short, recurved lateral processes and a pair of ventroapical processes 1.5x as long as lateral pair, extending nearly to base of shaft (Fig. 12B). Length: male 11.5–14.5 mm, female 13.5–18.5 mm. Width across head: male 3.3 mm, female 4.0 mm; across pronotum: male 4.2 mm, female 5.0 mm.

Types. Holotype female of *variolosus*, **MEXICO**; in BMNH. Holotype male of *cubanus*, **CUBA**: Las Animas 1500' [500 m ASL], 15 June 1935 (F. de Zayas); 5 paratypes from same locality; types in NCSU. Types of *cubanus* not examined; identity based on original description and illustrations as specimens are too old to be successfully barcoded.

Additional material. **BELIZE**: 1 male, Indian Church; **COSTA RICA**: 2 males, 1 female from *Puntarenas*—San Luis at U of GA ecolodge, N10 16.957' W84 47.927', 22–24 July 2003 (N.H. Nazdrowicz); 1 male from *Guanacaste*—9 km S Santa Cecilia 700 m ASL; 1 male, *San José*—San Antonio de Escazú 1300 m ASL; **GUATEMALA**: 5 males, 1 female from *Sac.*—Capetillo 5000' [1600 m ASL]; **MEXICO**: 24 males, 28 females from *Chis.*—Palenque, 17 mi SE Teopisca, 4 km N Tuxtla Gutiérrez; *Guer.*—20 mi N Iguala, 4 mi S Taxco 4800' [1600 m ASL]; *Jal.*—Guadalajara, 20 mi SW Tepatitlan 5000–6000' [1600–1900 m ASL]; *Mex.*—Ixtapan 5500' [1800 m ASL]; *Mich.*—Mazamitla; *Mor.*—Cocoyac; *N.L.*—5 mi S Monterrey; *S.L.P.*—Tamazunchale;

Sin.—13 mi E Concordia 800' [250 m ASL], El Palmito, Portrerillos, Santa Lucia; *Ver.*—Catemaco, Lk. Catemaco, Puente Nacional; **PANAMA**: 6 males, 3 females from Barro Colorado Is., El Volcan; **TRINIDAD**: 2 males, 6 females from Arima Valley; 7–27 Feb. and 2 May–Sept.; in AMNH, BMNH, CNCI, FMC and NYSM.

Unassociated females: **COSTA RICA**: 3 from San José, Turrialba; **ECUADOR**: 2 from Rio Panlenque, Estacion Biologica; **GUATEMALA**: 1 from San Jeronimo B.V.P. 3000' [950 m ASL]; **JAMAICA**: 1 from Montego Bay; **MEXICO**: 12 from *Jal.*—Lk. Chapala, La Quemada; *Mich.*—Cojumatlan; *Nay.*—Mecatan, Tepic; *S.L.P.*—Tamazunchale; *Ver.*—Cerro Gordo, Lk. Catemaco, Presidio; **PANAMA**: 5 from Barro Colorado I.; **U.S.A.**: 3 from AZ—Douglas, Sierra Vista; TX—Sinton; 6 Feb.–17 Mar. and 20 May–15 Aug. and Sept.; in AMNH, BMNH, CNCI and FMC.

Distribution. Mountains of Central America, from Panama to Mexico; entering the southern USA in subtropical regions of Arizona and Texas.

Remarks. This species is very variable in color (Figs. 1E–H), size, robustness and angularity of crown (Figs. 2D–F) and apparently represents a biological species complex. Three specimens (#CNCHB 1904–11, from 5 km N Oaxaca, 20 June 1979; #CNCHB 1905–11 from 17 mi SE Teopisca, Chiapas, 3–4 June 1969, and #CNCHB 1906–11 from Lake Catemaco, Veracruz, 1 May 1969) were barcoded and found to be separated by 3.5–6% divergence with the specimen from Oaxaca showing the greatest individual divergence. By contrast, other Cercopidae have a maximum 1.5% genetic divergence within a species. It will probably require biological studies to separate these species; and even then, the identity of the type of *variolosus* may remain in doubt. The female holotype of *variolosus* is 16.0 mm long, 5.1 mm across the humeral angles and has a right-angled crown (as in Fig. 2F), which is as slender and even longer in the crown than in Metcalf's illustration of *cubanus*.

A strikingly bicoloured form from Mexico, with the dorsum and upper half of frons ochre-yellow, contrasting with unmarked dark brown tegmina (Figs. 1F, 2D) and blackish venter, is represented by the single male from Cocoyac (AMNH) and the female from 20 mi N Iguala (CNCI). This may represent yet another unnamed species, but until more recent material suitable for barcoding, or an unmixed series is found, it is regarded as just another variant of a variable species. Another contrastingly marked form, with tawny dorsum and blackish tegminal bands, is known from 2 rather small females (13.6–14.5 mm) from Ecuador: Rio Panlenque, 30 July–10 Aug. 1974 (J. Dryan) in FMC. The discovery of males may show that this is an additional species. The specimens taken in Cuba might be still another unrecognized species, but there is a distinct possibility that these represent an introduction of some mainland form.

Cephisus xanthocephala (Walker)

(Figs 1C–D, 2C, 3A–B)

Monephora xanthocephala Walker, 1858: 176.

Cephisus sanguisuga Jacobi, 1908: 201 (synonymy by Fennah 1968).

Tomaspis xanthocephala: Lallemand, 1912: 98.

Cephisus xanthocephalus [sic]: Fennah, 1968: 170.

Type locality. Amazon basin in Ecuador.

Diagnosis. Black with contrasting yellow-orange frons including tylus, its base black as far as lowest muscle arc. Head 0.8x as wide as pronotum; rather slender, width across pronotum in male 4.0–4.2 mm, in female 5.0–5.3 mm; crown set at a much lower slope than front of pronotum. Style with small, rounded or pointed apical lobe and broad, weakly curved dorsal process on inner edge (Fig. 10C); theca shaft slender, nearly straight, armed with a pair of large, membranous, divergent lateral processes and a pair of ventroapical processes scarcely longer than lateral pair, extending to midlength of shaft (Figs 10A–B). Length: male 12.3–13.6 mm, female 17.0–18.1 mm. Width across head: male 3.0–3.2 mm. Width across head: 3.2 mm, female 3.5–3.8 mm; across pronotum: male 3.8–4.4 mm, female 4.8–5.3 mm.

Type. Holotype male, ECUADOR: 51/70 [Napo River]; in BMNH. Syntypes of *sanguisuga*: male and 2 females, PERU: [Junín-] Chanchomayo [Province], 1907 (Rosenberg & Kauf); 1 female, [Cusco-] Sicuani, [Garlepp]. Additional syntypes of *sanguisuga* examined by Christian Schmidt (pers. comm.), 1 male, 4 females, Madre de Dios, 1911 (Garlepp); 1 female, ECUADOR: Pastaza [Province], 1909. All syntypes in SMFT.

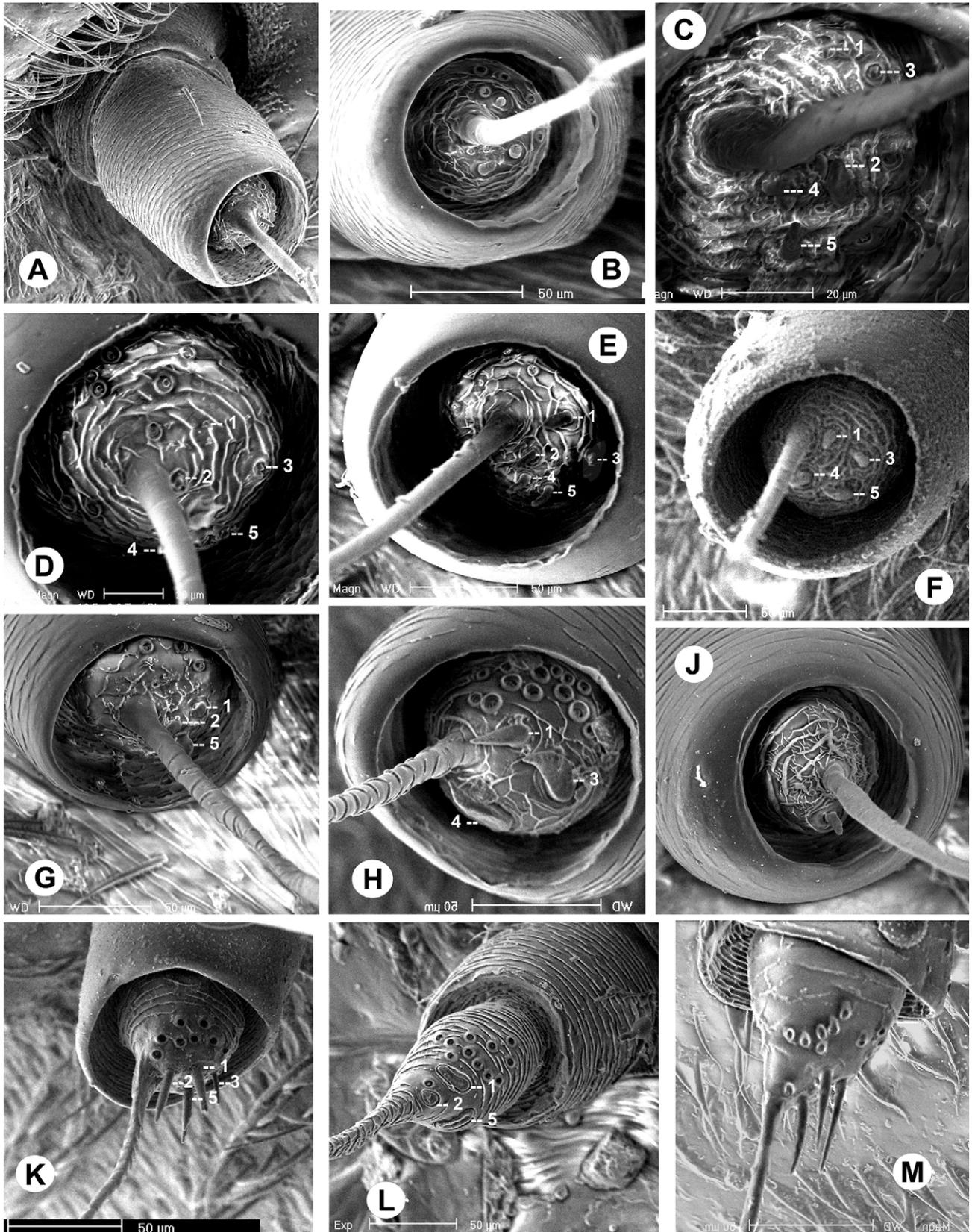


FIGURE 20. Antennae of Ptyelini (A–J) compared to those of Cloviini (K), Aphrophorini (L) and Philaenini (M). A. antenna of *Cephus*, showing peglike sensillae; B. same. showing coeloconic sensillae; C. same, of *Eulepyronia*; D. same, of *Ptyelus*, with peglike sensillae numbered; E. same, of *Hymettus*; F. same, of *Novaphrophara*; G. same, of *Gallicana*; H. same, of *Poophilus*; J. same, of *Mandesa*; K. same, of *Lepyronia angulifera*; L. same, of *Aphrophora* subgenus *Plesiommata*; M. same, of *Neophilaenus*.

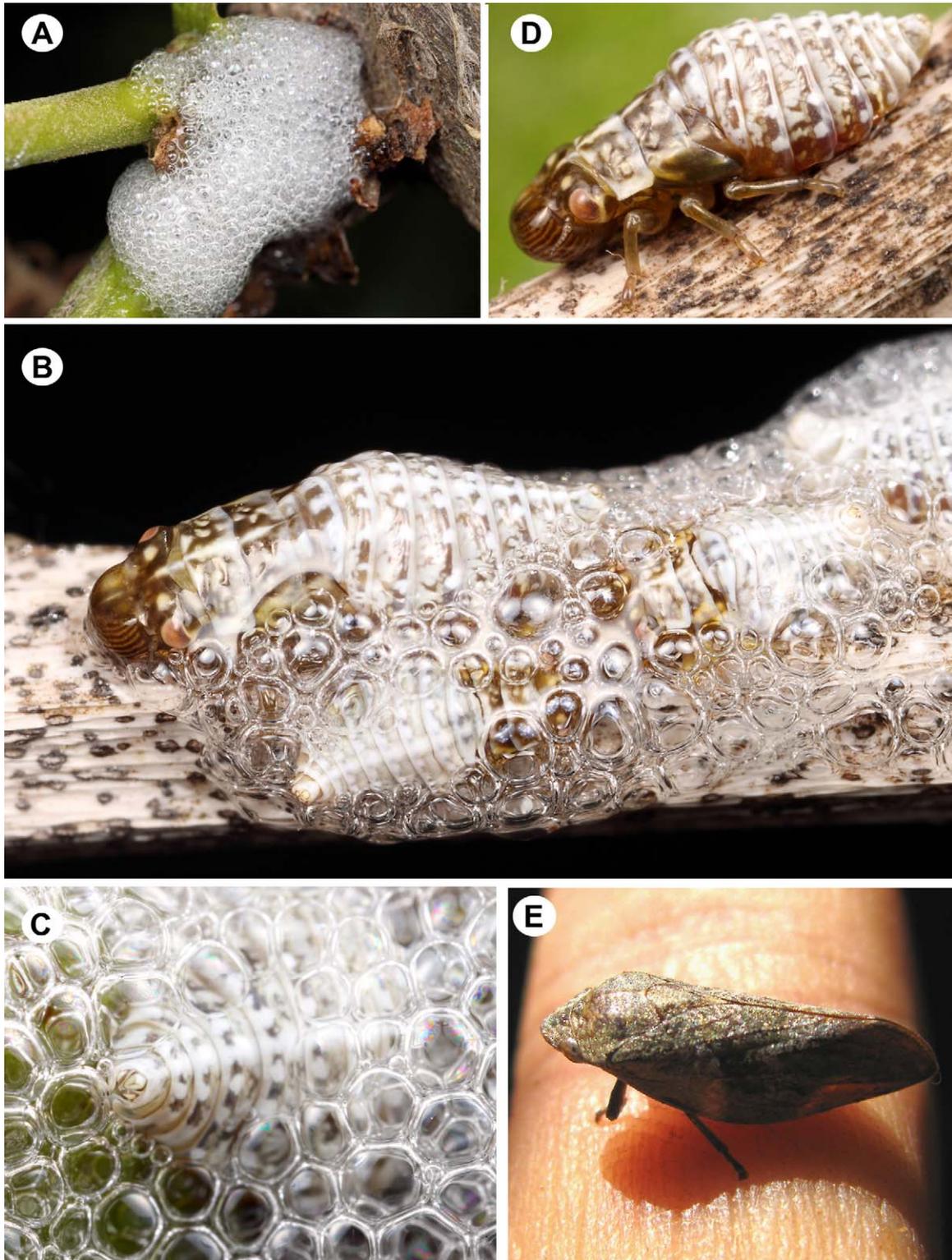


FIGURE 21. Live specimens of *Cephisus*, nymphs (A–D) and adult (E). A. spittle mass; B. three nymphs of various stadia exposed when froth is partially removed; C, nymph producing bubbles by extending tip of abdomen outside spittle mass to siphon air into channel under abdomen; D, exposed third instar nymph; E, adult. Photos A–D taken at Argentina, Buenos Aires, La Reserva Ecologica Costanera Sur, 13 November 2011 by Ted MacRae, used by permission; E. photo by Pier Cacciali.

Additional material. ECUADOR: 1 male, Tena, 3 March 1923 (F.X. Williams); in BMNH. PERU: *Jauja*—1 male, Satipo, Mar. 1944 (P. Paprzycki); [*Loreto*]—1 male, lower Rio Huallaga, 10 Dec. 1925 (H. Bassler); both in AMNH.

Distribution. The upper reaches of the Amazon Basin from Peru to Ecuador.

Remarks. The distinctive colour pattern, with almost the entire frons yellow, contrasting with the black body (or orange, less contrasting with dark brown body, in the Amazon basin), distinguishes this species from its congeners and associates the sexes despite the great discrepancy in body size. The holotype has the tip of the theca broken off and the left style is abnormal. The trivial name *xanthocephala* (“yellow head”) from the Greek *kephale* (f) is a noun in apposition, and does not change its termination in a masculine genus. Similarly, the trivial name *sanguisuga* (“bloodsucker”) is a noun in apposition, and does not match the gender of the genus name. That name is particularly appropriate for the form found in the Amazon basin, which has a redder frons than the montane form but is not represented in the syntype series.

Evolution and dispersal

Cephisus is the only new-world genus of Ptyelini, despite its successful colonization of all tropical and subtropical mainland parts of the new-world. Most of the genera of Ptyelini are African, and the closeness of this continent to South America would suggest that the Ptyelini were dispersed across the Atlantic at the time that Gondwanaland rifted at the end of the Cretaceous era. In that case, why is there not a greater diversity of genera in the new world?

The African genera *Ptyelus*, *Gallicana* and *Novaphrophara* (Fig. 19A) are united by a striking synapomorphy: the hind wings have a deep fold crossing the marginal vein that causes the tip of M to fuse with Cu (Fig. 4C). This character is shared with *Hymettus* (Fig. 19A) in the Philippines, but not with *Cephisus* (Fig. 4B). Also in the African fauna, *Hemipterus*, *Hemipoophilus* and *Poophilus* have a flat face with greatly elongated and thickened clypellus that is likewise not shared with *Cephisus* (Figs. 3A–B).

The only genus from southeast Asia, *Mandesa*, is atypical in having close-set ocelli (Fig. 16A) as in Aphrophorini, a single peglike antennal sensillum and no coeloconic sensilla on the postpedicel (Fig. 20J), and folded hindwings like those of *Lepyronia*. Again, none of these characters are shared with *Cephisus*.

The male genitalia of *Eulepyronia* are unknown, but its antennal characters (Fig. 20C) suggests a close relationship to *Ptyelus* and *Hymettus* (Figs. 20D–E). The very different hind wing venation suggests a sister lineage relationship to those genera, with the African *Eulepyronia* a sister-genus to the autapomorphous *Mandesa* with which it shares the same hind wing venation characterized by vein tips protruding into the appendix (Fig. 4D).

The arrangement of antennal sensillae also supports these relationships. *Eulepyronia*, *Hymettus* and *Ptyelus* have the largest number of peglike sensilla (Figs. 20C–E) with the related *Gallicana* having lost the 4th sensillae and *Poophilus* also the 3rd one (Figs. 20G–H). By contrast, *Cephisus* and the eastern Palaearctic genus *Cnemidanomia* have lost the 2nd and 3rd ones (Fig. 20C). *Mandesa* is autapomorphous in having only a single peglike sensilla, the 4th one directly below the arista (Fig. 20J).

Cephisus shares with *Cnemidanomia* (Fig. 17A) a divided segment X of the male abdomen (the basal part of the “anal tube”) composed of a large basal portion and a smaller, ringlike apical portion, and furcate retrorse processes on the male theca (Figs. 6A, 17B). The relationship between *Cephisus* and *Cnemidanomia* suggests that the intercontinental dispersal occurred across the Bering Strait at a much later date, probably before world temperatures began to decline in the Oligocene and isolated the Madrotertiary flora in southwestern North America. By that time there would have been a well-established spittlebug fauna in the neotropics and competition with this late arriver would have limited its evolutionary opportunities.

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Appendix

Novaphrophara phalerata (Spinola), **comb. nov.**

(Figs 18A–B)

Plinthacrus phaleratus Spinola, 1850: 156.

Plinthacrus mexicanus Spinola, 1850: 155. **Syn. nov.**

Plinthacrus irroratus Spinola, 1850: 156. **Syn. nov.**

Novaphrophara tasmaniae Lallemand, 1940: 151. **Syn. nov.**

Diagnosis (Spinola 1850), with italicized text as in original:

5. **Plin[thacrus] mexicanus**, m[ihi]—Pubescens, niger, capite prothoraceque flavo-viridibus nigro maculatis. Long. totius corporis, 12 millim.—Lat. maxima ante originem alarum, 5 millim.

Praecedentis [*Ptyelus* sp. from Africa] longitudinis, ut videtur, sed latior. *Pars anterior verticis* plus duplo latior quam longior, *pentagonalis*, lateribus omnibus rectis, exterioribus brevioribus parallelis, angula anteriore aperto. Corpus supra puberulum et sub pube nitidum, pube e pilis parvulis rarioribus ac brevioribus. Tibiarum posteriorum spinae laterales inter se et ab extremitatibus oppositis aequè distantibus, primâ minimâ vix conspicuâ. Antennae pedesque nigri. Caput flavum, maxillâ genarumque maculâ mediâ punctiformi nigris. Prothorax itidem flatus, dorso virescente ante medium maculis duobus nigris notato, pleuris dilutioribus nigro unipunctatis. Pectus et abdomen nigra. Alae superiores nigrae albo transversim bifasciatae, fasciis inaequalibus et irreulariter laciniatis a latere interno prodeuntibus et non longè a margine exteriori abruptè terminatis, anteriore intûs lateriore et extûs sensim coarctatâ, posteriore costis longitudinalibus interruptâ.

Due femine del Messico, avute dal Sig. Deyrolle.

6. **Plin[thacrus] irroratus**, m[ihi]—Magnitudo et statura praecedentium. Corpus densius pubescens, fronte minus convexâ, vertice utrinque abruptius terminato, prothoracis dorso minimè convexo, quibus faciei characteribus a cospeciebus satis distinguitur. Flavo-testaceus, vertice prothoracisque medietate anteriore nigro punctatis, hujus in medio dorsi maculis quatuor majoribus brunneo-nigrescentibus, exterioribus marginalibus triangularibus anticè emarginatis, interioribus longitudinalibus obovatis. Maxilla inferior testacea, articulo ultimo nigro. Venter rubidus. Alae superiores opacae brunneae albo irroratae, maculis duabus majoribus in margine exteriori, primâ flavo-rubidâ, secundâ albo-hyalinâ: interiores basi fusciscentes apice dilutiores, nervis nigropiceis. Pectus flavo-virescens. Antennae, articulo primo testaceo, secundo nigro, (alii desunt). Pedes rufo-testacei, tibiae apice tarsali nigro, tarsis primi et secundi paris prorsûs nigris, iisdem tertii paris testaceis, articulorum apicibus spinulosis nigris.

Due femine e un maschio del Brasile, avuti dal Sig. Buquet.

7. **Plin[thacrus] phaleratus**, m[ihi]—Forma et magnitudo praecedentium, *Verticis parte anticâ* quam in reliquis cospeciebus magis porrectâ et *capitis apicem attingente*, quadrangulari, angulis posterioribus rectis, lateribus exterioribus brevibus rectis parallelis, margine anteriore paulò incrassato valdè arcuato semicirculari. Oculi adproximati. Frons mediocriter convexa, in paginâ inferiore tota decurrens. Corpus subtûs nitidum oculo nudo glabrum, supra opacum laevissimè pubescens, pube deciduâ in nonnullis deficiente. Prothorax uniformiter convexus, confusim punctatus, regosiusculus, punctis creberrimis difformibus confluentibus et strigulas transversales efficientibus. Alarum superiorum nervi longitudinales elevato-costati et marginem extimum attingentes, radio crassiore. *Tibiarum posteriorum spinis lateralibus aequalibus et conformibus*. Corpus subtûs nigrum, antennis maxillâque concoloribus, supra brunneo purpureum: capitis limbo anteriore, strigis duabus longitudinalibus ab angulis posterioribus frontis prodeuntibus et angulis posterioribus frontis prodeuntibus et angulos posteriores prothoracis attingentibus, alterâ mediâ a basi partis anticae verticis dorsum prothoracis rectâ percurrente et supra scutellum plus minusve prolongatâ, aliis duabus exterioribus ponè oculos incipientibus et ad latera postero-externa prothoracis pervenientibus, flavis. Alae superiores brunneae, albo quadri-maculatae, maculis hyalinis, anterioribus duabus majoribus medium versûs et ferè sub eâdem lineâ transversali, exteriori latiore transverso-quadratâ in regione discoidali, altera arcuatâ in regione internâ 3.^{ic} et 4.^{ia} parculis punctiformibus, ambobus in regione posteriore, alterâ sub-marginali, alterâ sub-apicali.

Un maschio e una femina del Brasile, avuti dal Sig. Buquet. Un' altra femina, della stessa provenienza, differisce alquanto dal tipo nella distribuzione dei colori.—Alarum superiorum maculae posteriores obsoletae, anteriores coalitae et fasciam transveram angustiorefformantes.

Remarks. The Spinola types were examined, and these agreed with the original description in being similar to *Ptyelus* “but wider ... before the wing bases [i.e., across the pronotum], 5 mm.” They differ from each other only in minor ways and all are similar to a recently labeled specimen of *Novaphrophara* in the BMNH and likewise to a still more recent series in the California Academy of Science, San Francisco, USA, all of which were collected in Madagascar. Evidently the people who donated the specimens to Spinola were under the impression that the insects were the common Brazilian and Mexican species of *Cephisus*, to which *Novaphrophara* bears a superficial resemblance (Fig. 18A); but why Spinola thought so too is a mystery, as one of the specimens of “*mexicanus*” is clearly labeled as coming from Madagascar. The size given by Spinola is also incorrect, as the actual specimens are 17 mm long (which may be simply a mistranscription of the “7” as a “2”). To further complicate the issue, Lallemand (1940) described *Novaphrophara* (from a specimen of unknown date and provenance) as being from Tasmania. This specimen Evans (1966: 321) notes does not correspond to any known tasmanian spittlebug. He incorrectly refers to it as being “brick-red” which is apparently a mistranslation from the French “brique claire” or biscuit-colored. None of these specimens is recent enough to give us any hope of verifying their identities by reference to barcoding.

I have selected as the senior synonym for this species the “Brazilian” specimens most closely resembling authenticated specimens from Madagascar. *P. irroratus* almost certainly represents additional specimens of *phaleratus*, having been collected by the same person and probably from a single series. The specimens of *mexicanus* are more doubtfully associated but, until additional species of this genus might be found in Madagascar, their status does not appear to require clarification.