

## TYPES OF NEOTROPICAL SPECIES OF SCATOPSIDAE (DIPTERA: PSYCHODOMORPHA). I. EDWARDS' CHILEAN AND SOUTHERN ARGENTINEAN SPECIES

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**Abstract.**—The types of Edwards' species of Chilean and southern Argentinean Scatopsidae are redescribed and illustrated: *Ectaetia cornuta* Edwards, *Scatopse setifera* Edwards, *Scatopse tubifera* Edwards, *Scatopse constricta* Edwards, and *Anapausis fuscinervis* (Edwards). Notes on each type are added, and the generic position of each species is discussed. *Ectaetia cornuta* and *Anapausis fuscinervis* maintain their present generic placements. New combinations are proposed for *Pararhexosa tubifera* (Edwards), n.comb. and *Neorhegmoclemina constricta* (Edwards), n.comb. The holotype of *Scatopse tubifera*, described as a male, is actually a female. A new genus—*Holoclema*, n.gen.—is erected to include *Scatopse setifera* (Edwards). *Holoclema* is considered to be the sister group of the remaining Rhegmoclematini. The Neotropical species *Rhexosa panamensis* (Cook) and *Rhexosa auricularis* (Duda) are transferred to the formerly monotypic genus *Abrhexosa* Freeman, originally described for a single Oriental species. Additional distribution data for some species is supplied. *S. maritima* and *S. costaricana* are considered *incertae sedis* in Scatopsinae until their types can be examined.

**Key words:** Scatopsidae, Neotropical region, types, *Holoclema*, phylogeny.

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The Scatopsidae have 42 described species assigned for the Neotropical region. About 120 other, undescribed species are known for the region. Of the described species, three are cosmopolitan, namely *Scatopse notata* (Linnaeus), *Coboldia fuscipes* (Meigen), and *Holoplagia guamensis* (Johannsen). Another four are considered unrecognizable and their types are probably lost (Cook, 1967)—*Scatopse fulvitaris* Macquart of Lynch Arribálzaga, *Scatopse hyalinata* Phillippi, *Scatopse pallidipes* Lynch Arribálzaga, and *Scatopse transatlantica* Phillippi.

The remaining 35 Neotropical species of Scatopsidae are placed in the Ectaetiinae, Psectrosciariinae and Scatopsinae. Two belong to *Ectaetia*, six to *Psectrosciara*, one to *Anapausis*, one to *Diamphidicus*, one to *Rhegmoclema*, one to *Aldrovandiella*, three to *Rhegmoclemina*, six to *Neorhegmoclemina*, one to *Colobostema*, one to *Holoplagia*, and four to *Swammerdamella*. Four other Neotropical species included by Cook (1967) in *Rhexosa* do not belong to the genus: Cook (1976) erected *Akorhexoza* to include the Neotropical species *Scatopse dampfi* Duda and *Akorhexoza cactivora* Cook. The structure of the male terminalia indicates that *Rhexosa panamensis* Cook should be placed in Freeman's (1985) genus *Abrhexosa*, also probably the best place for *Scatopse auricularis* Duda. Both these species are herein transferred to this genus. *Rhexosa lobata* Cook, 1956 is best allotted to a new genus, with a number of other undescribed Neo-

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tropical species, defined by a considerably modified tergite 9, divided into a pair of longitudinal strips by a mesal incision, and by a mesal perforation on the aedeagus.

Cook's (1967) catalogue of the Neotropical Scatopsidae kept five species in the genus *Scatopse*: *S. notata* (Linnaeus), *Scatopse fuscipes* Meigen, *Scatopse costaricana* Duda, *Scatopse maritima* Duda, and *Scatopse tubifera* Edwards. *Scatopse notata* does comprise a monophyletic group with *S. lapponica*, *S. alpestris*, *S. chinensis*, and *S. globulicaudata*, the small taxon to which *Scatopse* is now restricted. This taxon is typically Holarctic and the presence of the synantropic species *S. notata* in other regions is most probably due to human transportation. *Scatopse fuscipes* Meigen was correctly transferred by Cook (1974) to *Coboldia*, a Swammerdamellini genus. The descriptions of the other three Neotropical species included by Cook (1967) in *Scatopse* strongly suggest that they do not belong to *Scatopse* sensu Cook (1974). However, the original descriptions are insufficient to allow a generic replacement and only the re-examination of the types can solve the problem.

The types of *S. tubifera* were re-examined and are redescribed in this paper. *Scatopse maritima* and *S. costaricana* are best considered *incertae sedis* in the Scatopsinae before the types can be re-examined. This first paper in a series redescribing the Neotropical scatopsids deals with Edwards' (1930) types of Chilean Scatopsidae. The suprageneric, phylogenetic classification of the Scatopsidae of Amorim (1994) is followed. The "group+" artifact is employed to refer to unnamed monophyletic groups in the sequenced classification of the family (Amorim, 1982a). Many of the phylogenetic inferences used here are based on the analysis of the family in Amorim (1982b, MS).

### Ectaetiinae

#### *Ectaetia cornuta* Edwards

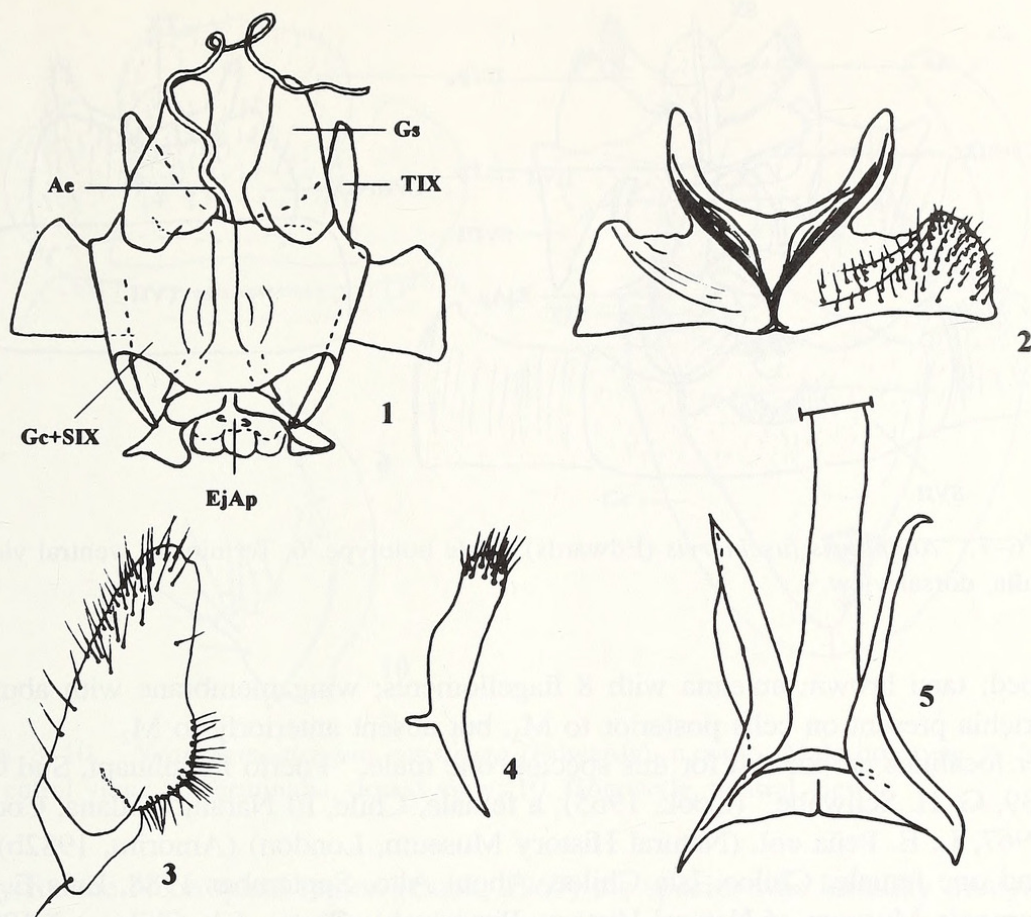
Figs. 1-5

*Ectaetia cornuta* Edwards, 1930: 98, pl. X, figs. 11, 12 (wing, male terminalia). Type-locality: CHILE, Llanquihue, Casa Pangué. Types, male lectotype, one male paralectotype and five female paralectotypes in BMNH; Cook, 1967: 5 (catalogue).

The type series of *Ectaetia cornuta* included seven specimens: a male and a female specimen on the same pin and five other specimens on separate pins. The pin with two specimens presents six levels, here described beginning from the top: (1) a strip with the specimens glued to it; (2) "Casa Pangué/4-10.xii.1926", printed; (3) a plastic strip with the male terminalia dissected in balsam; (4) a rounded red label with "Type" printed; (5) "*Ectaetia cornuta* Edw." handwritten and "F. W. Edwards/det. 1930" printed; (6) "S. CHILE/Llanquihue Prov./F. & M. Edwards/B.M. 1927-63" printed. The only male paratype has labels 2 and 6. The four female paratypes have the label "Castro/20-22.xi.1920", and label 6.

We add here some details to the original description, with drawings of the male terminalia (Figs. 1-5). Flagellum with 10 flagellomeres. Meral setae restricted to the dorsal margin of the sclerite. No strong scutellars. Katepisternum apparently bare. Apex of hind tibia slightly flattened, hind femur with a mesal area less well sclerotized. Wing membrane devoid of macrotrichia. The posterior wing veins translucent; C is considerably short, with R<sub>5</sub> curved.





Figs. 1–5. *Ectaetia cornuta* Edwards. Male holotype. 1. Terminalia, ventral view; 2. Tergite IX, dorsal view; 3. Gonostyle, ventral view; 4. Paramere, ventral view; 5. Aedeagus, ventral view.

### Psectrosciariinae

#### *Anapausis fuscinervis* (Edwards)

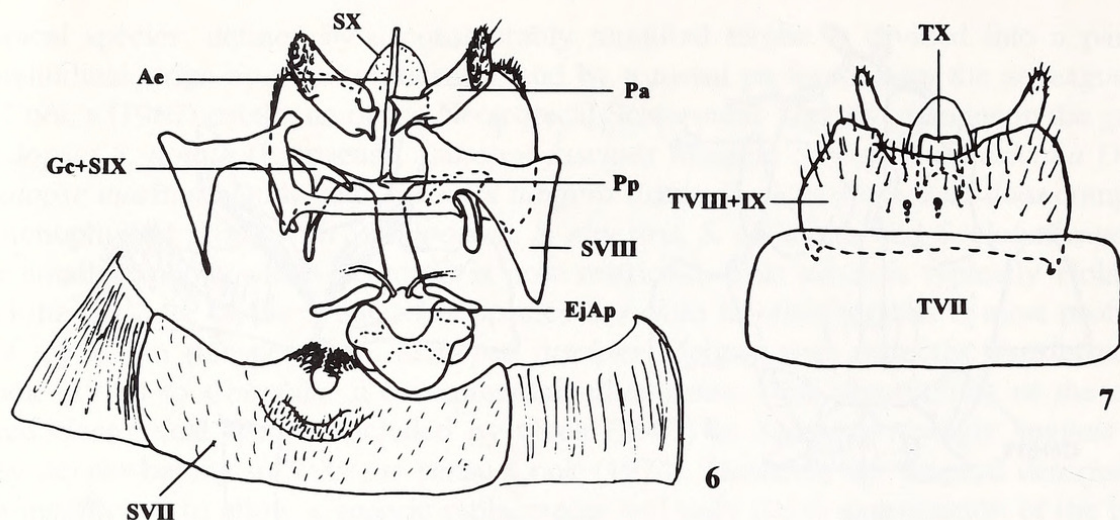
Figs. 6–7

*Psectrosciara fuscinervis* Edwards, 1930:97, pl. X, Figs. 11, 12 (male terminalia, wing).

Type-locality: CHILE, Llanquihue, Casa Pangué; Cook, 1965:16, Figs. 42, 43, 45 (male terminalia, wing); Cook, 1967:5 (catalogue); Amorim, 1982b (mouth parts).

A single male specimen is the only type of this species. The pin with the male holotype has seven labels. Beginning at the top: the specimen glued to a plastic strip; the second with the wing glued to a plastic strip; the third is a printed label written "Casa Pangué/4–10.xii.1926"; the fourth has the terminalia dissected in balsam on a plastic strip; the fifth is a red, round label with "Type" printed; the sixth is a label with "*Psectrosciara fuscinervis* Edw." handwritten and "F. W. Edwards/1930" printed; the last label has "S. CHILE/Llanquihue Prov./F. & M. Edwards/B.M. 1927–63" printed. In some details, neither Edwards' (1930) nor Cook's (1965) drawings are sufficient to allow a correct understanding of the homology of the male terminalia sclerites, although they are sufficient to allow the correct identification of the species. The male terminalia are redrawn here in ventral and dorsal aspect (Figs. 6–7). Some descriptive information may be added: the meron is well separated from episternum III, this latter sclerite well





Figs. 6–7. *Anapausis fuscinervis* (Edwards). Male holotype. 6. Terminalia, ventral view; 7. Terminalia, dorsal view.

developed; tarsi brown; antenna with 8 flagellomeres; wing membrane with abundant macrotrichia present on cells posterior to  $M_2$ , but absent anteriorly to  $M_2$ .

Other localities are known for this species: one male, "Puerto Puyuhuapi, Sud Chile, 14-11-39, G. H. Schwabe" (Cook, 1965); a female, Chile, El Naranjo, Tilana, Coquimbo, x.1967, L. E. Peña col. (Natural History Museum, London) (Amorim, 1982b); one male and one female, Chiloe, Isla Chiloe, Ahoni Alto, September 1988, Luis E. Peña col. (Carnegie Museum of Natural History, Pittsburgh); Castro, Isla Chiloe, xii.1926, R & E Shannon col. (National Museum of Natural History, Washington, D.C.).

### Scatopsinae

#### Rhegmoclematini

#### *Neorhegmoclemina constricta* (Edwards), **new combination**

Figs. 8–12

*Scatopse constricta* Edwards, 1930:96, pl. IX, Figs. 5, 7 (male terminalia, wing).

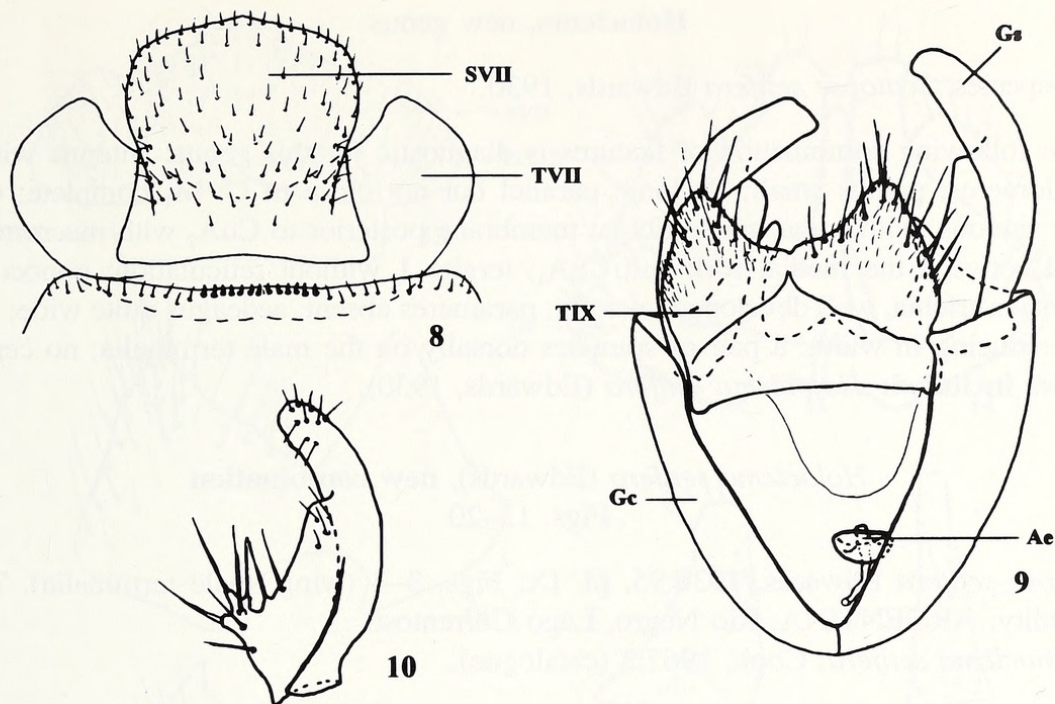
Type-locality: Chile, Llanquihue, Peulla.

*Rhegmoclemina* (*Neorhegmoclemina*) *constricta*; Cook, 1967:3 (catalogue); Amorim, 1982b (palpus, thorax, wing, male terminalia).

Edwards (1930) described *N. constricta* based on ten specimens from the same locality. The male holotype pin has seven layers of labels: (1) the highest one is a plastic strip with some broken parts of the body; (2) a label with handwritten "in log with/termites"; (3) a label "Peulla/12–13.xii.1926", printed; (4) a plastic strip with the terminalia dissected in balsam; (5) a round, red label with "Type" printed; (6) "*Scatopse/constricta* Edw." handwritten on a label with "F. W. Edwards/det. 1930" printed; (7) a label with "S. CHILE/Llanquihue Prov./F. & M. Edwards/B.M. 1927–63" printed. The type series also includes one female with labels 1–4 and 7, one male with labels 1–3 and 7, and seven males with labels 1, 3 and 7.

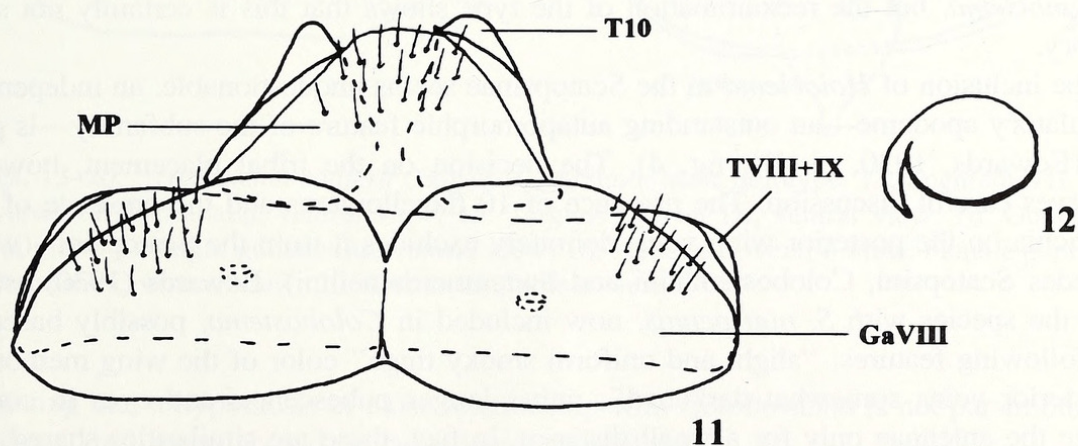
Cook (1955) only stated that it was probable that *Scatopse constricta* Edwards belongs to *Rhegmoclemina*, without formally including it in the genus. In the catalogue of the





Figs. 8–10. *Neorhegmoclemina constricta* (Edwards), n.comb. Male holotype. 8. Segment VII, ventral view; 9. Terminalia, dorsal view; 10. Gonostyle, ventral view.

family for the Neotropical region (Cook, 1967) the species was formally transferred to *R.* (*Neorhegmoclemina*). Amorim (1994) raised *Neorhegmoclemina* and *Austroclemina* to genera and the species is here formally transferred to *Neorhegmoclemina*. Amorim (1982b) studied four additional males belonging to this species, from Chile (Chepu, Chiloe, 42°S, 20.x.1958, Royal Society Chilean Expedition [Natural History Museum]), and two other undescribed species of *Neorhegmoclemina* from Chile (one in the Museu de Zoologia, São Paulo, the other in the Canada National Collection). The male terminalia of the holotype is redrawn here (Fig. 8–10) to avoid any doubt on the identification of the species. The terminalia of the female paratype is figured for the first time (Figs. 11–12).



Figs. 11–12. *Neorhegmoclemina constricta* (Edwards), n. comb. Female paratype. 11. Terminalia, ventral view; 12. Spermatheca.



### **Holoclema**, new genus

Type-species, *Scatopse setifera* Edwards, 1930.

The following combination of features is diagnostic for this genus: antenna with 10 flagellomeres; palpus small;  $R_5$  long, parallel but not close to C;  $M_1$  complete;  $CuA_2$  rather sinuous, with some macrotrichia; membrane posterior to  $CuA_2$  with macrotrichia; a fold between the medial fork and  $CuA_1$ ; tergite 1 without reticulation; gonocoxites with macrotrichia, well developed laterally; parameres absent; aedeagus quite wide; gradually reducing in width; a pair of spiracles dorsally on the male terminalia; no cerci.

**Species included:** *Holoclema setifera* (Edwards, 1930).

#### *Holoclema setifera* (Edwards), new combination

Figs. 13–20

*Scatopse setifera* Edwards, 1930:95, pl. IX, Figs. 3–4 (wing, male terminalia). Type-locality: ARGENTINA, Rio Negro, Lago Correntoso.

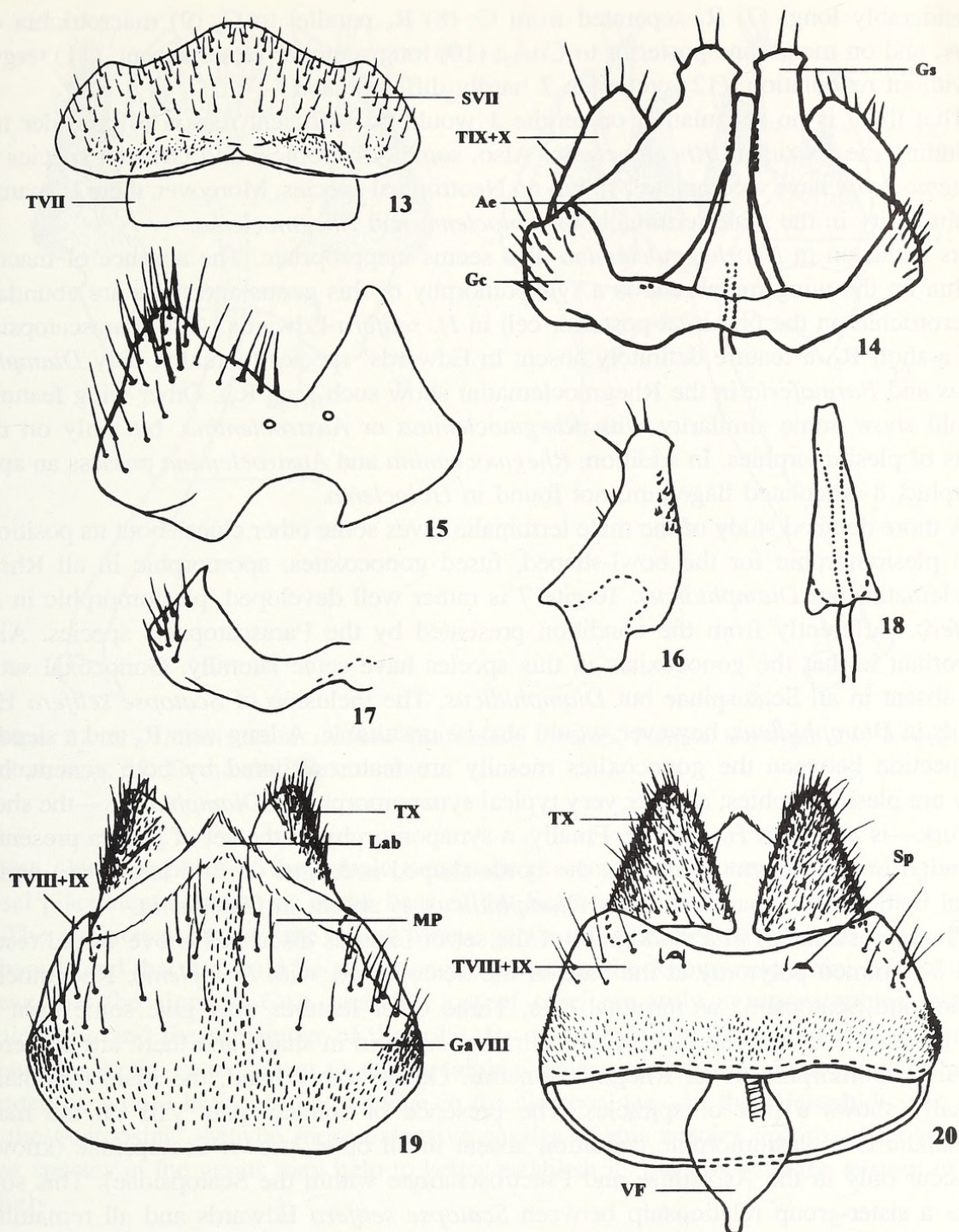
*Rhegmoclema setifera*; Cook, 1967:3 (catalogue).

The holotype of this species has six levels of labels on the pin: (1) the specimen double-mounted on a plastic strip; (2) a label printed “L. Correntoso/18–25.xi.1926”; (3) a plastic strip with the male terminalia dissected in balsam; (4) a round, red label printed “Type”; (5) a label with “*Scatopselsetifera* Edw.” handwritten and “F. W. Edwards/det. 1930” printed; (6) “ARGENTINA/Terr. Rio Negro/F. & M. Edwards/B.M. 1927–63” printed on a label. Edwards (1930:95) refers to 12 paratypes. All they come from the type locality and show labels 1, 2, 5 and 6. The type series includes 5 males, 5 females, a wing remaining from a lost specimen, plus an empidid specimen, what would be unexpected for Edwards’ type series. Segment 7 of the holotype is drawn here for the first time (Fig. 13) and the male terminalia are redrawn (Figs. 14–18). Terminalia of the dissected female paratype are also illustrated (Figs. 19–20).

**Discussion:** The question of the phylogenetic position of *Holoclema setifera* is quite difficult. Edwards (1930) rejected most of Enderlein’s (1912) genera and this species was maintained in the genus *Scatopse*, as most of his Scatopsinae species. In the Neotropical catalogue of the Scatopsidae, Cook (1967) placed the species in the genus *Rhegmoclema*, but the reexamination of the type shows that this is certainly not satisfactory.

The inclusion of *Holoclema* in the Scatopsinae seems unquestionable: an independent ejaculatory apodeme—an outstanding autapomorphic feature of the subfamily—is present (Edwards, 1930, pl. IX, fig. 4). The decision on the tribal placement, however, deserves careful discussion. The presence of 10 flagellomeres and the presence of macrotrichia on the posterior wing veins definitely excludes it from the Scatopsini<sup>+</sup> (which includes Scatopsini, Colobostematini and Swammerdamellini). Edwards (1930) associated the species with *S. nigripennis*, now included in *Colobostema*, possibly based on the following features: “slight and uniform smoky tinge” color of the wing membrane, “posterior veins somewhat darkened”, rather longer pubescence, and eyes in contact above the antennae only for a small distance. In fact, these are similarities shared with some Colobostematini, but *Holoclema* is plesiomorphic for a number of synapomorphies of the Scatopsini<sup>+</sup>, of the Colobostematini<sup>+</sup> and of the Colobostematini themselves,





Figs. 13–20. *Holoclema setifera* (Edwards), n.comb. Male holotype. 13. Segment VII, ventral view; 14. Terminalia, ventral view; 15. Tergites VIII + IX, ventral view; 16. Gonostyle, ventral view; 17. Right gonocoxite, ventral view; 18. Aedeagus, ventral view. Female paratype; 19. Terminalia, ventral view; 20. Terminalia, dorsal view.

suggesting that a hypothesis of close relationship with *Colobostema* is not parsimonious, and these similarities should be considered homoplastic.

Other features are relevant in the taxonomic discussion: (1) 10 flagellomeres; (2) flagellum long; (3) body pubescence long; (4)  $M_1$  complete; (5) fork of M long; (6) C



considerably long; (7)  $R_5$  separated from C; (8)  $R_5$  parallel to C; (9) macrotrichia on  $CuA_2$  and on membrane posterior to  $CuA_2$ ; (10) long scutellar setae present; (11) tergite 1 without reticulation; (12) pretergite 2 hardly differentiated.

That there is no reticulation on tergite 1 would be sufficient reason to consider not including the species in *Rhegmoclema*. Also, some Afrotropical and Oriental species of *Rhegmoclema* have a complete  $M_1$ , but no Neotropical species. Moreover, there is scarcely similarity in the male terminalia of *Holoclema* and *Rhegmoclema*.

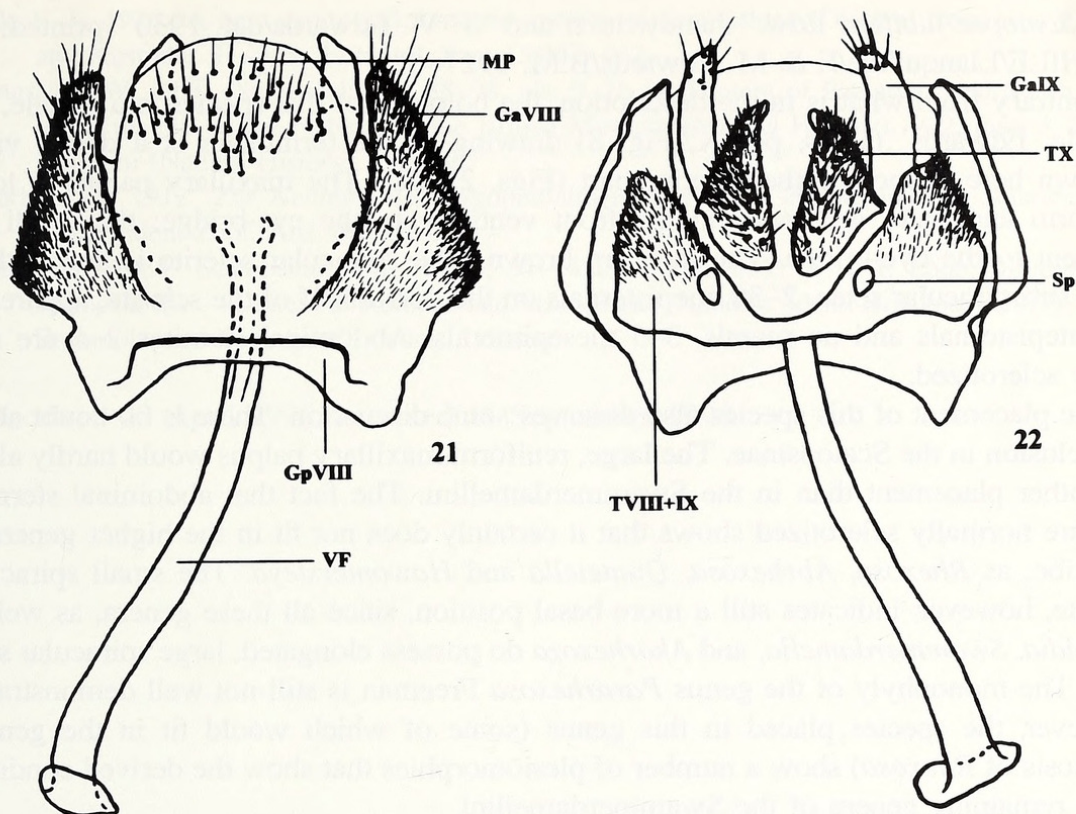
Its inclusion in *Neorhegmoclemina* also seems inappropriate. The absence of macrotrichia on the wing membrane is a synapomorphy of this genus and there are abundant macrotrichia on the proximal-posterior cell in *H. setifera* Edwards. Also, Parascatopsina has a short  $R_5$ , a feature definitely absent in Edwards' species (actually, only *Diamphidicus* and *Parmaferia* in the Rhegmoclematini show such long  $R_5$ ). Other wing features would show some similarity with *Rhegmoclemina* or *Austroclemina*, but only on the basis of plesiomorphies. In addition, *Rhegmoclemina* and *Austroclemina* possess an apomorphic, 8-articulated flagellum, not found in *Holoclema*.

A more detailed study of the male terminalia gives some other clues about its position: it is plesiomorphic for the bowl-shaped, fused gonocoxites, apomorphic in all Rhegmoclematini but *Diamphidicus*. Tergite 7 is rather well developed, plesiomorphic in *H. setifera*, differently from the condition presented by the Parascatopsina species. Also important is that the gonocoxites in this species have setae laterally. Gonocoxal setae are absent in all Scatopsinae but *Diamphidicus*. The inclusion of *Scatopse setifera* Edwards in *Diamphidicus*, however, would also be unsuitable. A long vein  $R_5$  and a slender connection between the gonocoxites mesally are features shared by both genera, but they are plesiomorphies; another very typical synapomorphy of *Diamphidicus*—the short M fork—is absent in *H. setifera*. Finally, a synapomorphy of the set of genera presently included in the Rhegmoclematini, the bottle-shaped aedeagus (with a large base and a distal bottle-neck), shared even by *Diamphidicus*, is absent in *Holoclema*.

The representation in a cladogram of the set of features discussed above would result in a 3-stemmed polytomy at the base of the Scatopsinae, with *Holoclema*, Rhegmoclematini and Scatopsini<sup>+</sup> as terminal taxa. Three other features may give some light to this problem. On the one hand,  $CuA_2$  is rather sigmoid in shape and there are no cerci, features apomorphic in all Rhegmoclematini. On the other hand, the male terminalia dorsally shows a pair of spiracles. The presence of spiracle pair VIII on the male terminalia is a plesiomorphic condition absent in all other known Scatopsinae (known to occur only in the Aspistinae and Psectrosciarinae within the Scatopsidae). This suggests a sister-group relationship between *Scatopse setifera* Edwards and all remaining Scatopsinae.

The female terminalia gives some additional features that corroborate some of the previous inferences. The absence of a pair of gonapophysis VIII laterally to a mesal projection of sternite VIII—an apomorphic feature shared by the Rhegmoclematina and the Parascatopsina—is absent in *Holoclema*. This apomorphic condition of the female terminalia, however, is absent in Edwards' species. The pair of lobes dorso-posteriorly on the terminalia, derived from tergite X (referred to by Cook as the cerci), is not fused to tergite VIII + IX, and again excludes the species from the Rhegmoclematina or from *Diamphidicus* (see Cook, 1971), which apomorphically possess this feature. The large, plesiomorphic tergite VIII + IX, on the other hand, excludes it from the Parascatopsina.





Figs. 21–22. *Pararhexosa tubifera* (Edwards), n.comb. Female holotype. 21. Terminalia, ventral view; 22. Terminalia, dorsal view.

These plesiomorphies of the female terminalia presented by *H. setifera* again suggest a basal placement somewhere at the base of the Scatopsinae.

The position assumed here is that a new genus must be erected for *Scatopse setifera* Edwards and that it should be provisionally placed in the Rhegmoclematini. This would mean that the sigmoid  $CuA_2$  and the lost of cerci are truly synapomorphies uniting *Holoclema* and the remainder of the tribe. Its position in the Rhegmoclematini, hence, would be as the sister group to the remaining genera of the tribe. The spiracles, consequently, would have been lost twice in the Scatopsinae—in the Diamphidicina<sup>+</sup> and in the Scatopsini<sup>+</sup>. Maybe more extensive studies of this species and the discovery of new species in the genus may help to better establish its placement in the system of the family.

#### Swammerdamellini

#### *Pararhexosa tubifera* (Edwards), **new combination**

Figs. 21–22

*Scatopse tubifera* Edwards, 1930:95, pl. IX, Figs. 6, 8 (wing, male terminalia). Type-locality: Chile, Llanquihue, Casa Pangue; Cook, 1967:2 (catalogue).

The holotype of this species has six levels of labels: (1) a plastic strip with the specimen double mounted; (2) a label with “Casa Pangue/4–10.xii.1926” printed; (3) a plastic strip with the terminalia mounted; (4) a red, round label with “Type” printed;



(5) "*Scatopse tubifera* Edw." handwritten and "F. W. Edwards/det. 1930" printed; (6) S. CHILE/Llanquihue/F. & M. Edwards/B.M. 1927-63".

Contrary from what is in the description, the holotype of this species is a female, not a male. Edwards' (1930, pl. IX, Fig. 8) drawing of the terminalia is a dorsal view, redrawn here to include the anterior part (Figs. 21-22). The maxillary palpus is long, reniform and there are setae on the front ventrally to the eye-bridge; the ocelli are adjacent to the eye-bridge. The tarsi are brown. The spiracular sclerite is small; there are 5 subspiracular setae, 2-30 anepisternals on the dorsal half of the sclerite, apparently no katepisternals and no merals, 3-5 mesepimerals. Abdominal sternites 2-6 are normally sclerotized.

The placement of this species also deserves some discussion. There is no doubt about its inclusion in the Scatopsinae. The large, reniform maxillary palpus would hardly allow any other placement than in the Swammerdamellini. The fact that abdominal sternites 2-6 are normally sclerotized shows that it certainly does not fit in the higher genera of the tribe, as *Rhexosa*, *Abrhexosa*, *Quateiella* and *Hawomersleya*. The small spiracular sclerite, however, indicates still a more basal position, since all these genera, as well as *Coboldia*, *Swammerdamella*, and *Akorhexoza* do possess elongated, large spiracular sclerites. The monophyly of the genus *Pararhexosa* Freeman is still not well demonstrated. However, the species placed in this genus (some of which would fit in the generic diagnosis of *Rhexosa*) show a number of plesiomorphies that show the derived condition in all remaining genera of the Swammerdamellini.

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