



Eleven new species of the genus *Cluzobra* Edwards (Diptera, Mycetophilidae, Sciophilinae) from the Atlantic Forest of Brazil

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Abstract

Eleven new species of the sciophiline genus *Cluzobra* Edwards are described and illustrated – *Cluzobra triocellata*, **sp.n.**, *Cluzobra accola*, **sp.n.**, *Cluzobra claripennis*, **sp.n.**, *Cluzobra papaveroi*, **sp.n.**, *Cluzobra coptolithus*, **sp.n.**, *Cluzobra vockerothi*, **sp.n.**, *Cluzobra sapiranga*, **sp.n.**, *Cluzobra fluminense*, **sp.n.**, *Cluzobra fritzmuelleri*, **sp.n.**, *Cluzobra spinata*, **sp.n.**, *Cluzobra elpidia*, **sp.n.** Additional specimens of *C. fuscipennis* Edwards, *C. plaumanni* Edwards, and *C. binocellaris* (Edwards) have been identified, extending the distribution range of these species. The species were identified and described based on 173 specimens at different latitudes along the Atlantic Forest in eastern Brazil and northern Argentina. The position of the new species in the groups of species proposed for the genus in the literature is considered. Three areas of endemism are identified for the group, one from southern Brazil, northern Argentina and Paraguay northwards to areas at higher altitudes in the States of Minas Gerais and Rio de Janeiro, one from southern Bahia to the extreme north of the Atlantic Forest, in the State of Rio Grande do Norte, and one in west State of São Paulo, extending west and northwards into the states of Mato Grosso do Sul and Goiás. This paper raises the number of known *Cluzobra* to 41 species.

Key words: *Cluzobra*, Diptera, Brazil

Introduction

The family Mycetophilidae in the Neotropical region includes about 50 genera and close to 1000 species (Papavero, 1978, Amorim & Oliveira in prep). In the phylogeny proposed by Amorim & Rindal (2007) the family composes with Lygistorrhinidae the sister group of the Keroplatoidea (including Bolitophilidae, Dito-myiidae, Diadocidiidae and Keroplatidae), the Sciaridae being close to the base of the Mycetophiliformia, differently from other reconstructions (e.g., Hennig 1973, Matile, 1990, Chandler 2002, Hippa & Vilkamaa 2005, 2006). Most recent classifications accept Sciophilinae, Gnoristinae, Mycomyiinae, Leiinae, Manotinae, Allactoneurinae and Mycetophilinae as subfamilies of Mycetophilidae.

The Sciophilinae *sensu* Vockeroth (1981) have been demonstrated to be paraphyletic in relation to the Mycetophilinae (Söli, 1997, Tozoni, 1998). The Sciophilinae *s.s.* include 36 genera, most with macrotrichia on the wing membrane. Within the subfamily, there is a clade showing a gradual loss of M₄. *Megalopelma* Enderlein, *Morganiella* Tonnoir & Edwards, and *Sciophila* Meigen have M₄ interrupted basally, while *Acnemia* Winnertz, *Afrocnemia* Matile, *Cluzobra* Edwards, *Monoclona* Mik, and *Parvicellula* Marshall have M₄ entirely absent, and *Azana* Walker, *Neoaphelomera* Miller, *Neotrizygia* Tonnoir & Edwards, *Paratryzgia* Tonnoir and *Trizygia* Skuse have both the medial and cubital forks incomplete and an isolated vein in between

that most probably is M_4 . Some other features would suggest that this large group of genera composes a monophyletic clade within the subfamily (Amorim *et al.*, 2008). A more inclusive clade, composed of *Afrocnemis*, *Acnemis*, *Cluzobra*, *Monoclona*, *Parvicellula*, *Azana*, *Neoaphelomera*, *Neotrizygia*, *Paratrizygia*, and *Trizygia* was referred to by Matile (1999) as the *Azana*-group, to which *Morganiella* and *Paramorganiella* shall be added.

The species of *Cluzobra* are slender mycetophilids, about 2.5 to 3.5 mm long, and mostly light yellowish brown, sometimes darker. The genus currently includes 30 species, described by Edwards (1934, 1940), John Lane (1956, 1959, 1960), Matile (1996), Coher (1997), and Kurina (2008) distributed from northern Argentina to northern United States. The genus was originally described by Edwards (1940) to include *Acnemis binocellaris* (Edwards), *Cluzobra plaumanni* Edwards, *C. fascipennis* Edwards and *C. fuscipennis* Edwards. The knowledge of the genus benefited from Matile's (1996) revision, who redescribed the genus, all known species at that time, and described twenty new species, as well as proposed a phylogeny for the species of the genus (Figure 1). Matile (1996) proposed six species-groups in the genus that correspond to the major clades in his phylogeny: the *shannoni*-group, *lanei*-group, *aitkeni*-group, *edwardsi*-group, *fascipennis*-group, and *binocellaris*-group. *Cluzobra brunneicauda* Matile is the sister-group to the clade including the *binocellaris* and *fascipennis*-groups and does not belong to any of Matile's groups. *C. antennulata* Coher was described from the Nearctic region, which is obviously a northern extension of a typically Neotropical group. *C. matilei* Kurina, from French Guyana, was proposed to belong to the *lanei*-group by Kurina (2008).

This paper describes eleven new species of *Cluzobra*, collected with Malaise traps in the Atlantic Forest of Brazil. There are other new species belonging to the genus to be described from Colombia, so a new key for the genus will not be proposed here. There are differences in female morphology used to discriminate between different groups of species and between some species, as has been shown by Matile (1996). However, the female morphology of the species within the same species groups is so similar that, with the information at hands, species identification would be doubtful –as discussed by Carvalho *et al.* (2008), taxonomy has a commitment with the proposal of robust hypotheses, what includes species delimitations. Hence, females are not treated in this paper. The limits of the geographic distribution of the species of *Cluzobra* in the Atlantic Forest are considered in order to determine patterns of endemism in the region.

Material and methods

Most specimens examined in this paper were collected using Malaise traps on different forest areas along the Atlantic Forest between 2001 and 2002, preserved in 80% ethanol. For all species at least some of the specimens had one wing and the male terminalia mounted permanent slide Canada balsam preparations after heated solution of KOH and dehydration in alcohol. Photographs were made using a Leica DC 500 camera attached to a Leica MZ16 stereomicroscope or a DM2500 transmission microscope and mounted using the AutoMontage Pro software. Drawings were made firstly using camera lucida and later redrawn using Adobe Illustrator 11.0. Most terms follow Matile (1996) or Vockeroth (1981).

All material, including the primary types, is deposited in the Diptera collection of the Museu de Zoologia da Universidade de São Paulo. There is an additional new species from Pedra Azul, in the north of the State of Minas Gerais, which is in very poor condition, so it is left to be described elsewhere when more material is available. Females are very difficult to associate with males in localities in which more than one species are present, so despite the presence of females in the material, we did not include them in thi study. The species are presented below according to the species group they belong to (*sensu* Matile 1996), in the sequence the groups appear in the phylogeny.

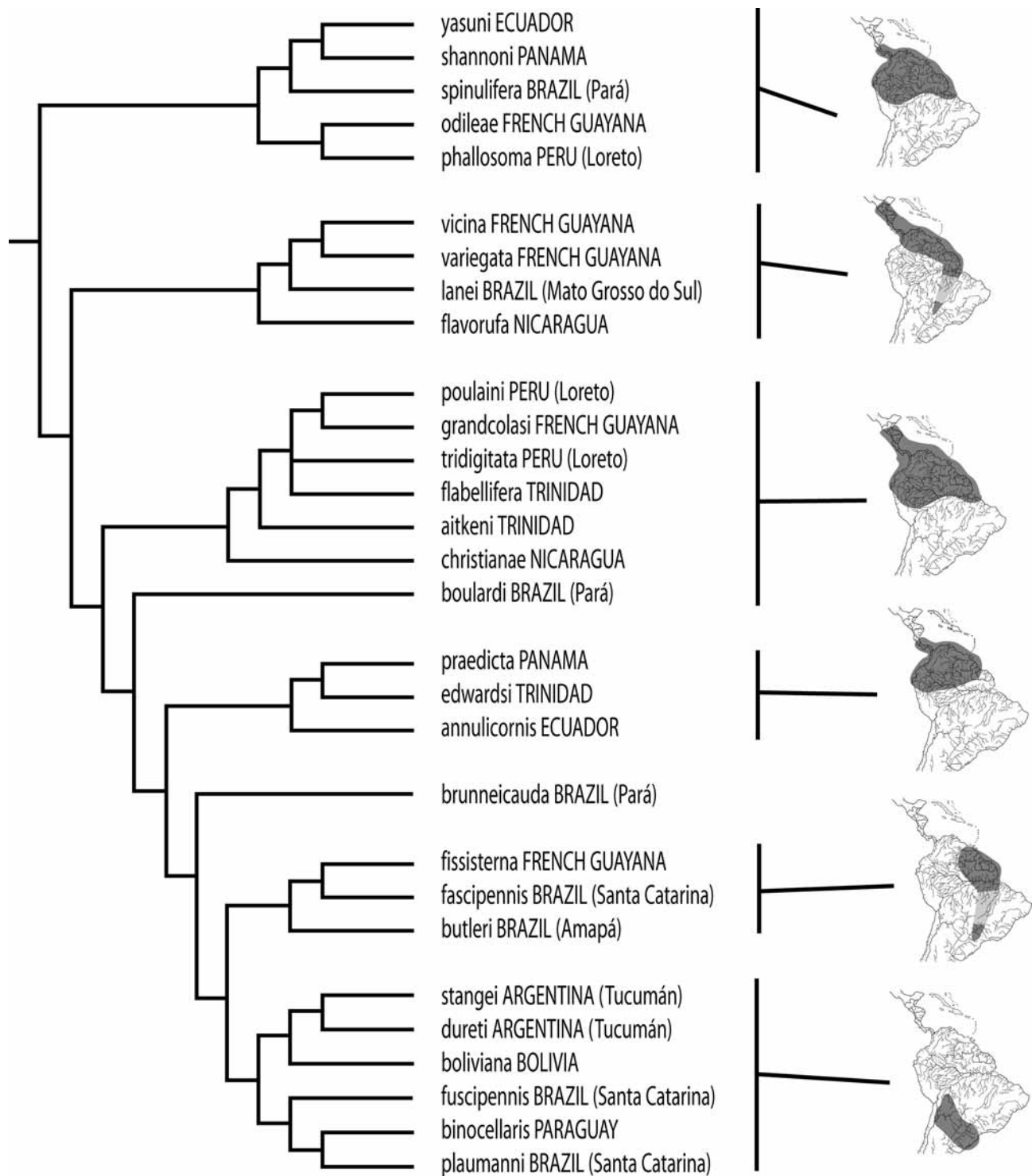


FIGURE 1. Cladogram proposed by Matile (1996) for the phylogenetic relationships between the species of the genus *Cluzobra*. The distribution of each species group in the Neotropical region is given to the right.

Cluzobra Edwards

Cluzobra Edwards, 1940: 463.

Type–species. *Acnemia binocellaris* Edwards (orig. des.).

References. Matile, 1996 (revision, phylogeny).

Diagnosis. General color yellowish brown, two or three ocelli; laterotergite and mediotergite setose (Figure 2), scutum usually with brownish and yellowish brown bands (Figure 3); Sc complete, reaching at most the basal third of wing, sc-r absent, R_4 absent, R_5 ending before apex of M_1 , M_{1+2} short, M_4 entirely absent, and usually a distal brownish band distally on the wing and brownish maculae around base of Rs, r-m, and M_{1+2} ; A_1 very short, present as a sclerotized secondary fold posteriorly on the anal lobe; T8 short and wide, S8 strongly modified, elongated and with a fringe of setae on distal margin (Figure 4); gonocoxites fused to each other mesally forming a syngonocoxite with variable distal extensions, forming a dorsal crypt.

Comments. The genus is well described by Matile (1996) and it is not necessary to redescribe it here. The placement of the new and the already described species in the species-groups created by Matile (1996) is in Table 1.

shannoni-group

Cluzobra triocellata, sp.n.

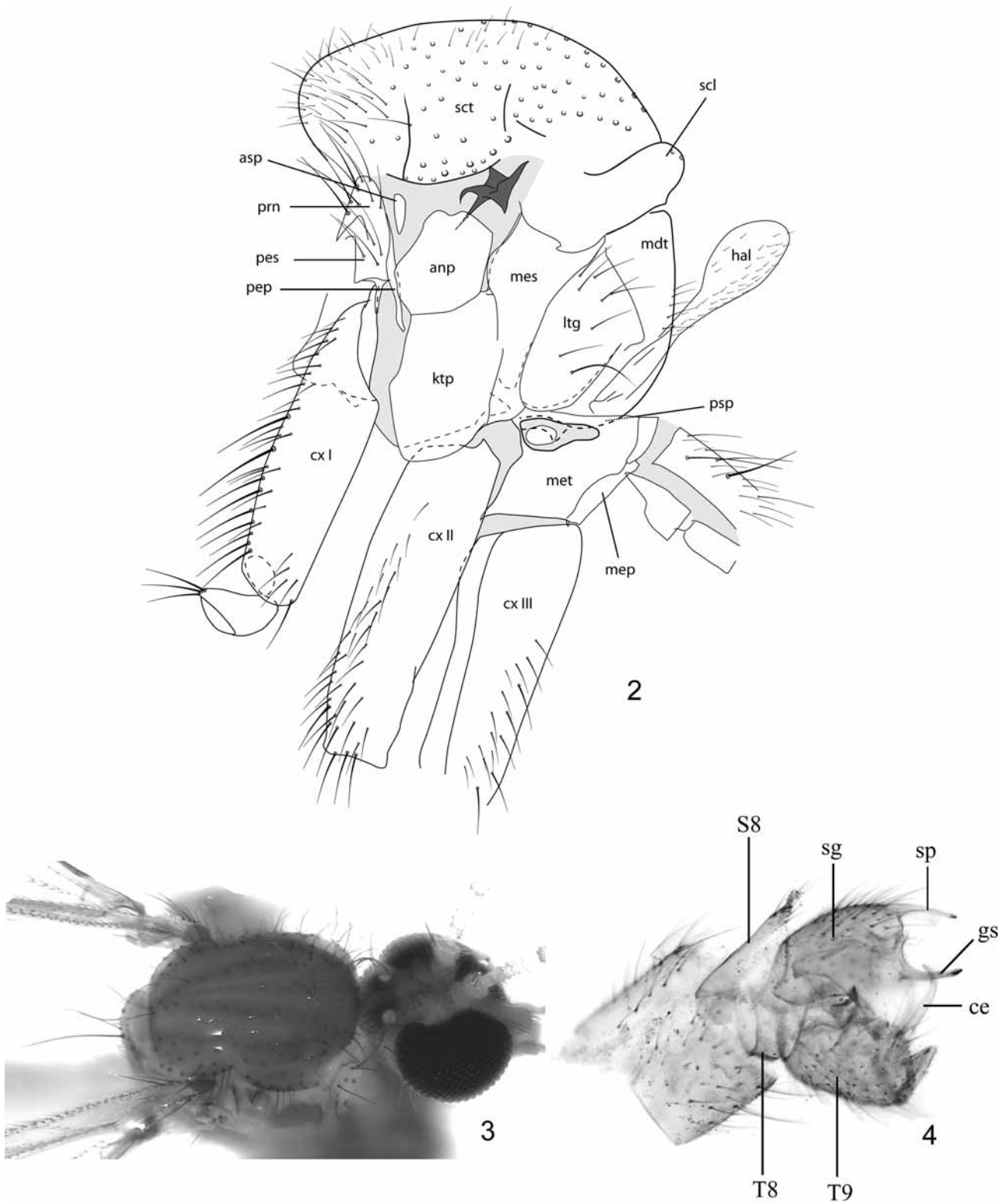
(Figs. 5, 20)

Diagnosis. Three ocelli, antennae brown; wing homogenously brown; Sc ending beyond origin of Rs; male terminalia with a deep mesal notch on the distal margin of the syngonocoxite, with three strong spines at the apex of each side and three additional more lateral spines; gonostyle short, strongly sclerotized.

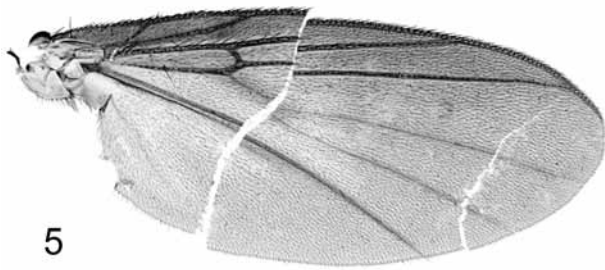
Material examined. Holotype ♂, BRAZIL, State of Pernambuco, Recife, Parque Dois Irmãos, 34° 55' 59" W 08° 00' 00" S, 20–23.vii.2002, S.T.P. Amarante & eq. cols. Paratypes. 1 ♂, same data as holotype, but 17–20.vii.2002.

Description. Male. Head. Occiput yellowish brown, darker at vertex; three ocelli present, aligned, median ocellus relatively well developed, lateral ocelli separated from eye margin by a distance larger than ocellus diameter, ocellar area brown; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, palpomeres increasing in length to apex; labella yellowish, except for the brownish sclerite of basal article. Scape and pedicel rounded, yellowish, setose; flagellomeres brownish, setose. **Thorax.** Pronotum brownish, with some longer and other smaller setae. Scutum light brown, with four yellowish longitudinal bands, intertwined with brown bands, smaller scattered setae with some stronger acrostical and dorsocentral bristles; scutellum yellowish, brown along posterior margin, six stronger scutellar bristles and some smaller setae. Pleural membrane yellowish. Proepisternum light yellowish brown. Pleural sclerites mostly light brown, mediotergite yellowish close to insertion of abdomen. Laterotergite, anepisternum and katepisternum densely setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter with pedicel yellowish and capitulum brownish, with scattered setae. **Legs.** Legs mostly yellowish, coxae and base of femora brownish; tibial spurs 1:2:2, yellowish, front spur more than twice front tibial width at apex. **Wing** (Figure 5). Length, 2.9 mm. Wing mostly brownish, slightly lighter basally. Membrane with macro and microtrichia; humeral cell with abundant macrotrichia; entire basal cell covered with macrotrichia. Sc complete, long, well sclerotized, reaching C beyond origin of Rs; R_1 long, more than six times r-m length, reaching C at distal fourth of wing; R_5 reaching C before apex of M_1 ; C extending about two fifth the distance between R_5 and M_1 ; r-m oblique, shorter than base of Rs; M_{1+2} short; medial fork complete, base of fork slender; M_4 entirely absent; A_1 very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 orange brown. S8 U-shape, T8 wide and short. **Terminalia** (Figure 20). Terminalia orange brown. Syngonocoxite with a mesal notch, a pair of distal extensions bearing three strong spines at apex and a group of three spines more laterally. Gonostyle small, strongly sclerotized, elongated, with no spines or setae, bearing a subapical digitiform projection. T9 with a pair of large lateral projections at anterior margin. Cercus simple.

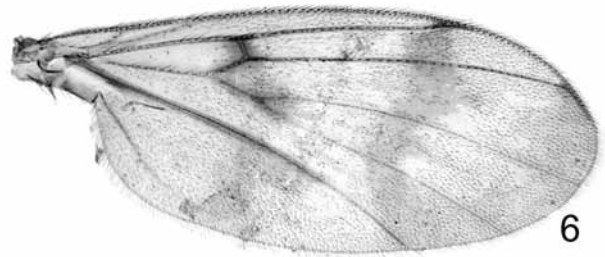
Etymology. The name of this species is feminine and refers to the plesiomorphic presence of three ocelli.



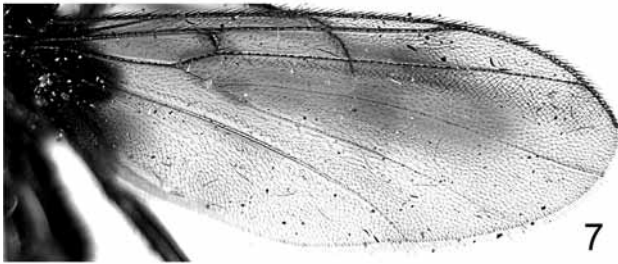
FIGURES 2–4. 2. Lateral view of thorax of *Cluzobra binocellaris* (Edwards). 3. Dorsal view of head and thorax of *Cluzobra spinata*, sp.n.. 4. Lateral view of segment 8 and male terminalia of *Cluzobra binocellaris* (Edwards). Abbreviations: anp, anepisternum; asp, anterior spiracle; ce, cercus; cx I, front coxa; cx II, mid coxa; cx III, hind coxa; gs, gonostyle; hal, haltere; ktp, katepisternum; ltg, laterotergite; mdt, mediotergite; mep, metepimeron; mes, mesepimeron; met, metepisternum; pep, proepimeron; pes, proepisternum; prn, pronotum; psp, postnotal phragma; S8, sternite 8; scl, scutellum; sct, scutum; sg, syngonocoxite; sp, syngonocoxite distal projection; T8, tergite 8; T9, tergite 9.



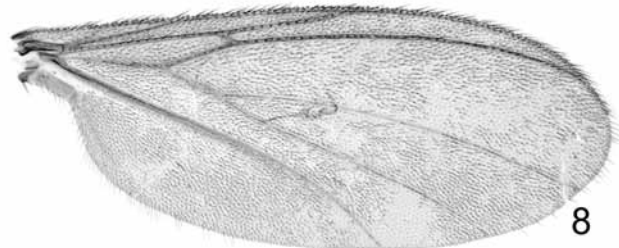
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Cluzobra triocellata, sp.n. - Holotype

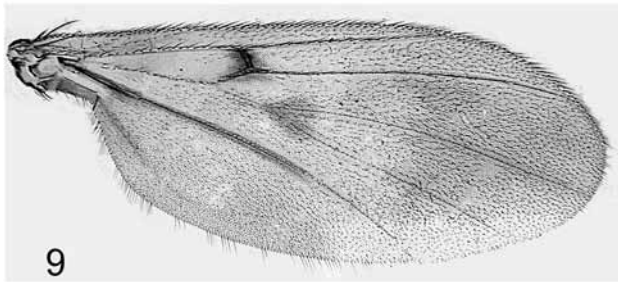
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Cluzobra accola, sp.n. - Holotype

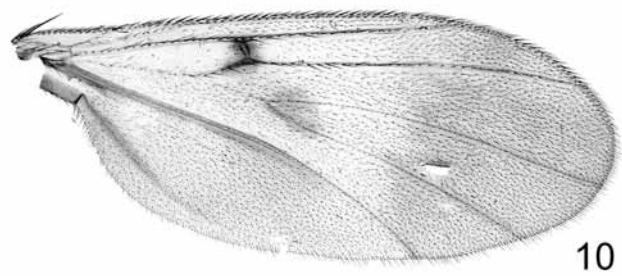
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Cluzobra lanei Edwards

8

Cluzobra claripennis, sp.n. - Holotype

9

Cluzobra papaveroi, sp.n. - Holotype

10

Cluzobra coptolithus, sp.n. - Paratype

FIGURES 5–10. Wings of *Cluzobra* species. **5.** *Cluzobra triocellata*, **sp.n.** **6.** *Cluzobra accola*, **sp.n.** **7.** *Cluzobra lanei* Edwards, specimen from Anastácio, State of São Paulo. **8.** *Cluzobra claripennis*, **sp.n.** **9.** *Cluzobra papaveroi*, **sp.n.** **10.** *Cluzobra coptolithus*, **sp.n.**, paratype from Recife, State of Pernambuco.

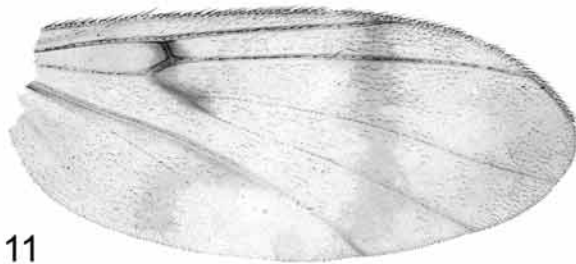
Comments. This species is obviously related to *C. yasuni* Matile. It not only has plesiomorphic and apomorphic features found in the *shannoni*-group (presence of three ocelli and a more or less brownish wing membrane), but also shares some other apomorphies previously known only for *C. yasuni* (brownish color of the flagellomeres and some details of the male terminalia). Even though it is not part of the scope of this paper to make a phylogenetic analysis of the entire genus including the new species, it would not be surprising if *C. triocellata*, **sp.n.** is the closest species to *C. yasuni*. Details of the shape of the gonostyle and of the shape and distribution of spines of the syngonocoxite are clear enough to confer the status of a separate species.

lanei-group

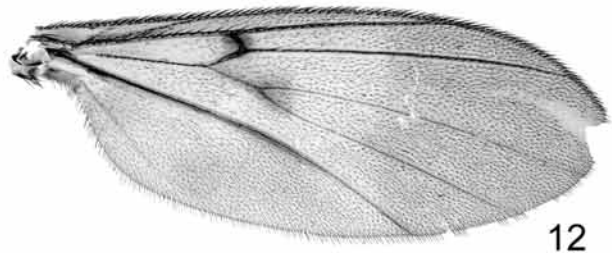
Cluzobra accola, **sp.n.**

(Figs. 6, 21–22)

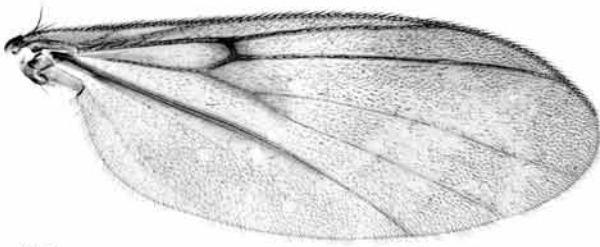
Diagnosis. Male terminalia elongate, syngonocoxite with a mesal suture and a pair of short spines on distal margin; gonostyles strongly sclerotized, triangular, slender towards the apex.



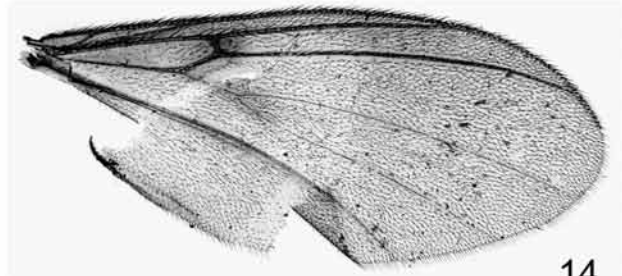
11

Cluzobra vockerothi, sp. n. - Holotype

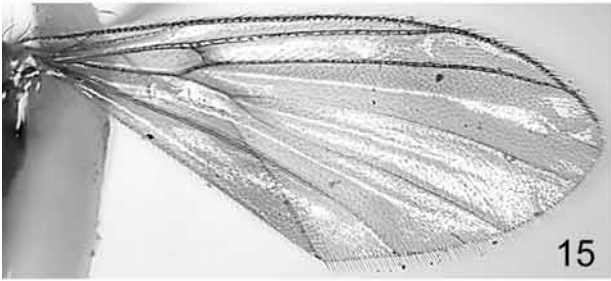
12

Cluzobra sapiranga, sp. n. - Holotype

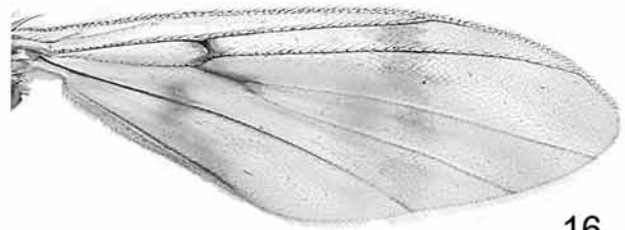
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Cluzobra fluminense, sp. n. - Holotype

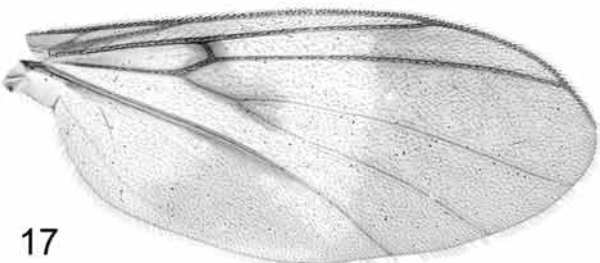
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Cluzobra binocellaris Edwards - PR, Morretes

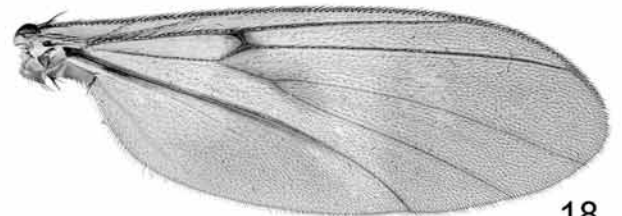
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Cluzobra fuscipennis Edwards

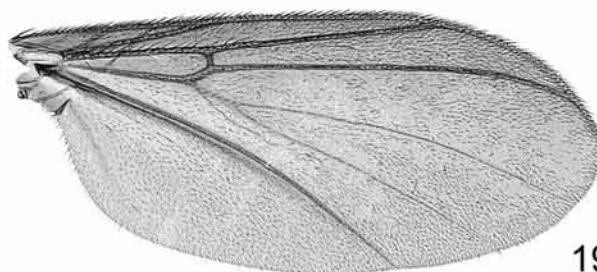
16

Cluzobra plaumanni Edwards

17

Cluzobra fritzmulleri, sp. n. - Holotype

18

Cluzobra spinata, sp. n. - Holotype

19

Cluzobra elpidia, sp. n. - Holotype

FIGURES 11–19. Wings of *Cluzobra* species. **11.** *Cluzobra vockerothi*, **sp.n.** **12.** *Cluzobra sapiranga*, **sp.n.** **13.** *Cluzobra fluminense*, **sp.n.** **14.** *Cluzobra binocellaris* (Edwards). **15.** *Cluzobra fuscipennis* Edwards, specimen from Embu, State of São Paulo. **16.** *Cluzobra plaumanni* Edwards, specimen from Nova Teutônia, State of Santa Catarina. **17.** *Cluzobra fritzmulleri*, **sp.n.** **18.** *Cluzobra spinata*, **sp.n.** **19.** *Cluzobra elpidia*, **sp.n.**

Material examined. Holotype ♂, BRAZIL, State of Alagoas, Quebrangulo, Reserva Biológica Pedra Talhada, 36° 28' 16" W 09° 19' 08" S, 11–14.ix.2002, Penteadó–Dias & eq. cols. Paratype. 1 ♂, same data as holotype, but 08–11.ix.2002.

Description. Male. Head. Head brownish yellow, darker at vertex; mid ocellus absent, lateral ocelli closer to eye margins than ocellus diameter, ocellar area brown; front and clypeus yellowish, pubescent. Maxillary palpus brownish, palpomeres 1+4, increasing in length to apex; labella yellowish, sclerite of basal article brownish. Scape and pedicel rounded, whitish yellow, pubescent; flagellomeres whitish yellow, except for basal fourth, pubescent. **Thorax.** Pronotum yellowish, with some longer and other smaller setae. Scutum light brown, four longitudinal yellowish bands, intertwined by light brownish bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum light brownish, darker at posterior border, six stronger scutellar bristles and some smaller setae. Pleural sclerites light brownish, anepisternum, laterotergite and mediotergite brown. Anepisternum setose, katepisternum bare, laterotergite setose, mediotergite with a median and a pair of more lateral tufts of setae, lighter close to base of abdomen. Halter yellowish, pubescent. **Legs.** Legs mostly yellowish, brownish on coxae and femora basally; tibial spurs 1:2:2, light brown, spur length more than twice apex of tibiae. **Wing** (Figure 6). Length, 2.8 mm. A more or less continuous brownish maculae around base of Rs, r-m, M₁₊₂ and base of medial fork, and other maculae at apex of anal lobe, at distal eighth of wing (beyond the apex of R₅), and a distinctive transverse band at level of apex of R₁. Membrane with macro and microtrichia; humeral cell bare of macrotrichia; basal cell short, with scarce macrotrichia on membrane, only on distal half. Sc complete, short, reaching C at basal fourth of wing, much before origin of Rs; R₁ long, reaching C at distal third of wing; R₅ reaching C before apex of M₁; C extending two fifth the distance between R₅ and M₁; r-m oblique, slightly longer than base of Rs; M₁₊₂ longer than r-m; medial fork complete; M₄ entirely absent; A₁ very short, scarcely visible. **Abdomen.** Abdominal tergites 1–7 yellowish brown. S8 U-shape, T8 wide and short. **Terminalia** (Figures 21–22). Terminalia elongated, yellowish brown. Syngonocoxite covering the entire ventral face of the terminalia, bearing a mesal suture across the entire plate, a pair of short spines at the distal margin on a small projection at each side, no projection of the gonocoxite ventrad to the insertion of the gonostyle. Gonostyle well sclerotized, triangular, slender to the apex, with no setae. Aedeagus with a pair of elongated anterior arms, distally with a short projection on the outer margin. T9 rectangular, elongated, with no mesal notch at distal margin. Cercus simple, elongated, with fine setae at apex.

Etymology. The name of this species is feminine and, because of its similarity to *C. vicina* Matile (which means neighbour), the Greek name *accola* (having the same meaning) is used in apposition.

Comments. The male terminalia of this species is very similar to that of the *lanei*-group, especially *C. vicina* Matile and *C. variegata* Matile, which have a shallow distal notch mesally on the syngonocoxite, with a single spine at the distal margin on each side. The shape of the gonostyle is sufficiently different from *C. vicina* to justify a separate species rank. Two males in poor condition from Caruaru, State of Pernambuco, belong to this species, but we decided to not to give them paratype status.

Cluzobra lanei Edwards

(Fig. 7)

C. lanei Edwards, 1940: 463, fig. 4 (wing photo). Type-locality: Brazil, State of Mato Grosso, Salobra. Ref. – Matile, 1996: 32, figs. 30 (♂ terminalia), 64 (♀ terminalia). Distr. – Brazil (Mato Grosso, São Paulo). Holotype ♂, NHM.

Material examined. Holotype ♂, BRAZIL, State of Mato Grosso, Salobra, 56° 28' 60" W 20° 12' 60" S. Additional specimens: 1 ♂, BRAZIL, State of São Paulo, Ribeirão Preto, Campus da USP, Malaise, 47° 51' 60" W 21° 26' 60" S, 27.vii–13.ix.2003, H.F. Mendes col.; 1 ♂, BRAZIL, State of São Paulo, Santo Anastá-

cio, 48° 45' 56" W 24° 13' 10" S, P. Forattini, viii.1954.

Comments. Matile (1996) refers to a female from Nicaragua that supposedly corresponds to the description of *C. lanei*. As mentioned elsewhere in this paper, association of males and females in the genus is still difficult and, though correct identification to species group is possible, there are still no grounds for robust hypotheses of conspecificity between males and females from disjunct localities. We would prefer not to extend the distribution of *C. lanei* into Central America until we have males from Nicaragua to confirm the conspecificity. The male specimen we have from the west of the State of São Paulo perfectly agrees with the holotype.

aitkeni-group

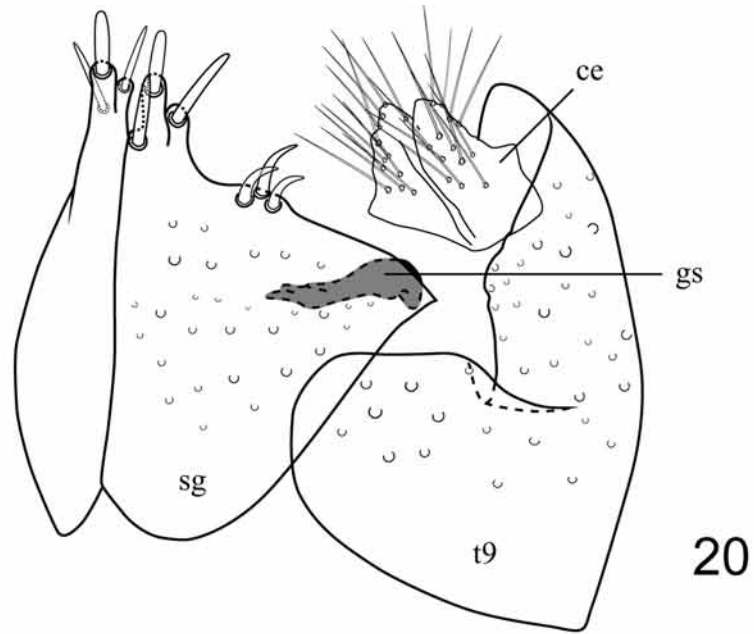
Cluzobra claripennis, sp.n.

(Figs. 8, 23–24)

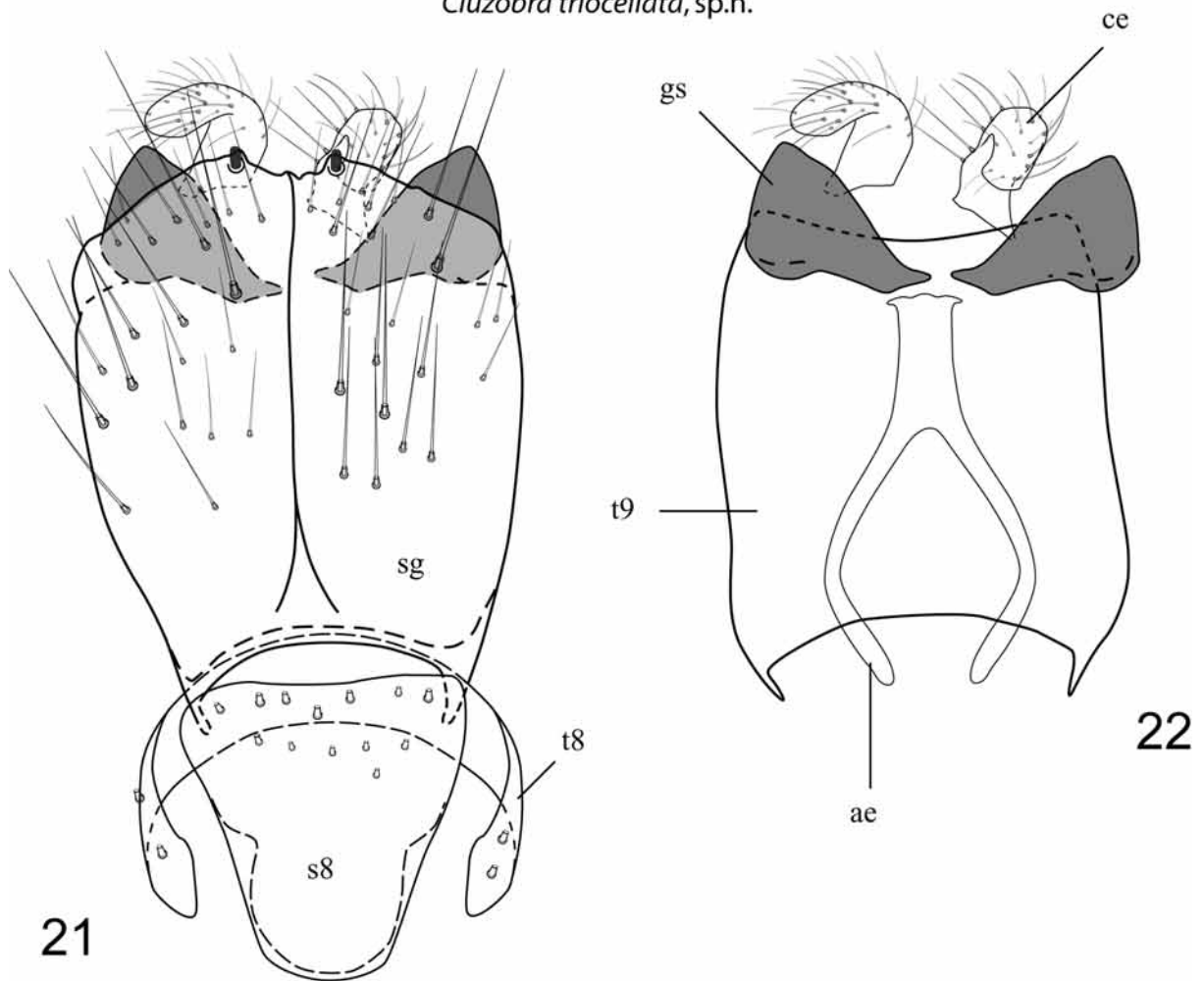
Diagnosis. Three ocelli; wing not maculate, R_5 running typically close to C; r-m long and base of Rs short; syngonocoxite without mesal notch on distal margin; gonostyle sclerotized, with a comb of elongate spines at apex; aedeagus strongly sclerotized, with a distal beak.

Material examined. Holotype ♂, BRAZIL, State of Alagoas, Quebrangulo, Reserva Biológica Pedra Talhada, 36° 28' 16" W 09° 19' 08" S, 08–11.ix.2002, Pentead-Dias & eq. cols. Paratypes. 1 ♂, State of Paraíba, João Pessoa, Campus Universitário, 34° 49' 60" W 07° 07' 60" S, Malaise trap, 15.vi–15.vii.1986, D.S. Amorim col.; 1 ♂, same data, but 15.vii–15.viii.1986; 1 ♂, same data as holotype; 1 ♂, same data as holotype, but 11–14.ix.2002; 3 ♂, State of Bahia, Ilhéus, Mata Esperança, 39° 03' 60" W 14° 46' 60" S, 15–18.v.2002.

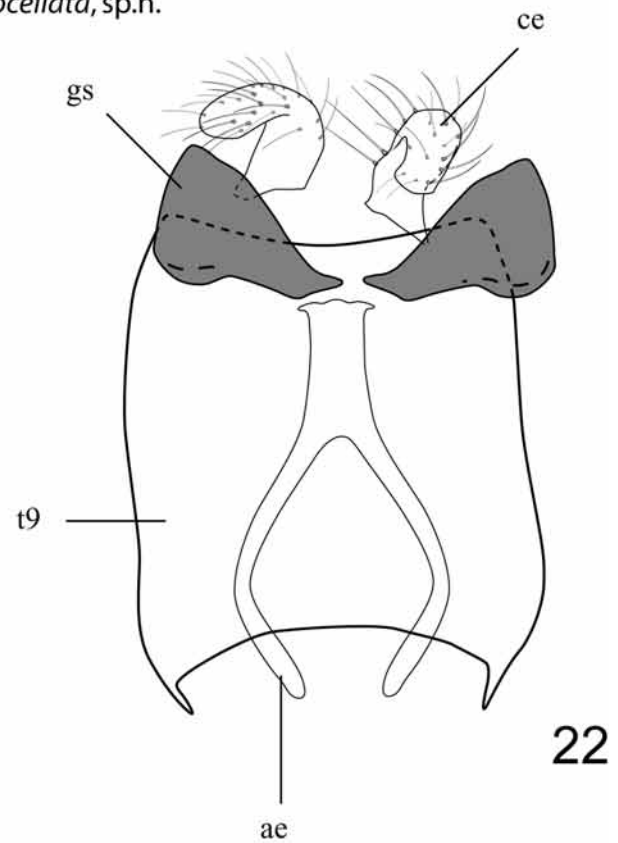
Description. Male. Head. Occiput yellowish, darker at the vertex; three ocelli present, aligned, median ocellus less than half the size of other two, lateral ocellus separated from eye margin by a distance larger than ocellus diameter; front and clypeus yellowish, setose; maxillary palpus yellowish, setose, palpomeres light brown, 1+4 palpomeres, increasing in length to apex; labella yellowish. Scape and pedicel rounded, yellowish, setose; flagellomeres whitish at base, brownish on distal two thirds, setose. **Thorax.** Pronotum light yellowish, with some longer and other smaller setae. Scutum homogeneously yellowish, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum yellowish, slightly darker at posterior margin, four stronger scutellar bristles. Pleural membrane yellowish. Proepisternum light yellowish brown. Pleural sclerites yellowish. Anepisternum setose, katapisternum bare, laterotergite setose, and mediotergite with a mesal and a pair of more lateral tufts of setae. Halter yellowish, setose. **Legs.** Legs homogeneously yellowish; tibial spurs 1:2:2, yellowish, front spur more than twice front tibial width at apex. **Wing** (Figure 8). Length, 2.3–2.7 mm. Wing nearly devoid of brownish maculae, just slightly darker to apex. Membrane with macrotrichia, but bare of microtrichiae; humeral cell with macrotrichia on its entire length; basal cell with macrotrichia covering its entire length; Sc complete, short, reaching C at basal fourth of wing; R_1 short, reaching C just beyond mid of wing; R_5 relatively short, reaching C before apex of M_1 ; C extending nearly half the distance between R_5 and M_1 ; Rs very short; r-m oblique, longer than M_{1+2} ; M_{1+2} short; medial fork complete; M_4 entirely absent; A_1 very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 yellowish. S8 U-shape, T8 wide and short. **Terminalia** (Figures 23–24). Terminalia yellowish. Syngonocoxite extending to distal margin of terminalia, simple, bearing setae, but no spines. Gonostyles well sclerotized, short and curved, with a comb of spines at apex, directed to each other. Parameres weakly sclerotized, elongate and slender, curved over itself. Aedeagus well sclerotized, with a distal beak-like projection ventrally directed. Cercus simple, with few many normal setae and four distinctive curved spines.



Cluzobra triocellata, sp.n.



Cluzobra accola, sp.n.



22

FIGURES 20–22. Male terminalia of *Cluzobra* species. **20.** *Cluzobra triocellata*, sp.n., lateral view. **21.** *Cluzobra accola*, sp.n., ventral view. **22.** Same, syngonocoxite plate removed. Abbreviations: ae, aedeagus; ce, cercus; sg, syngonocoxite; gs, gonostyle; s8, sternite 8; t8, tergite 8; t9, tergite 9.

Etymology. The name of this species is feminine and refers to the wing membrane without the usual brownish maculae.

Comments. While describing *C. flabellifera*, Matile (1996) refers to the sclerotized structure of the male terminalia as the “peignes apicaux du synsclérite”, i.e., an apical comb that would be a projection of the syngonocoxite. The examination of the specimens of *C. claripennis*, **sp.n.** indicates that this sclerite is most certainly the gonostyle, not articulated to the distal margin of the syngonocoxite. The problem with the homology of this sclerite, however, does not raise any doubt about the very close relationship between these two species, as indicated by the shape of the gonostyle and of the cercus.

***Cluzobra papaveroi*, sp.n.**

(Figs. 9, 25–26)

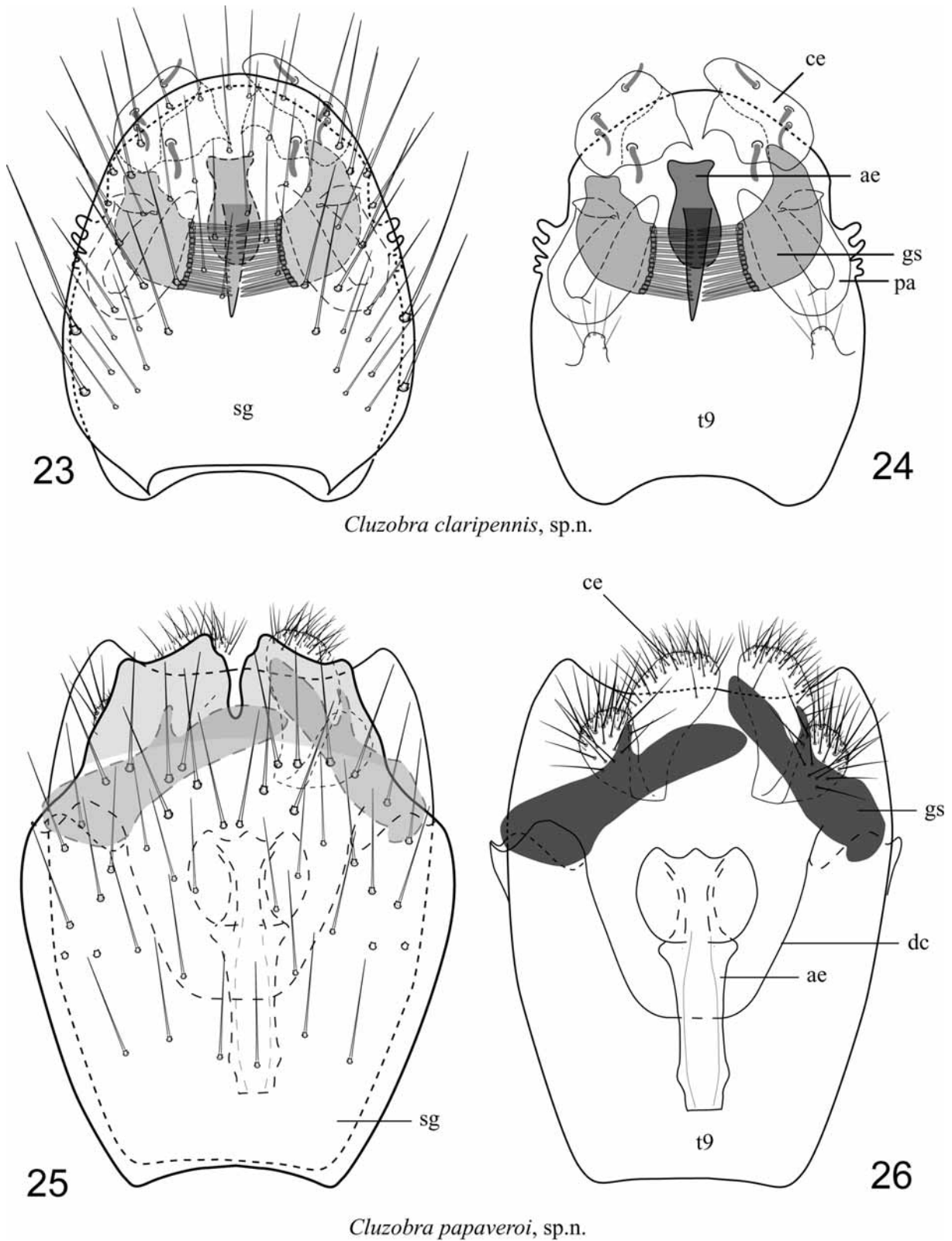
Diagnosis. Syngonocoxite elongate, more sclerotized on distal fifth, with a short mesal notch on distal margin, bearing no spines; gonostyle elongate, strongly sclerotized, with a digitiform projection midway to apex.

Material examined. Holotype ♂, BRAZIL, State of Sergipe, Santa Luzia do Itanhy, Crasto, 11° 22' 32,8" S 37° 25' 00" W, 01–04.viii.2001, M.T. Tavares & eq. cols. Paratypes. 4 ♂, same data as holotype; 8 ♂, same data, but 29.vii–01.viii.2001; 7 ♂, State of Bahia, Mata de São João, Reserva de Sapiranga, 12° 33' 37,4" S 38° 02' 57,2" W, 19–22.vii.2001, M.T. Tavares & eq. cols.; 4 ♂, same data, but 22–25.vii.2001; 1 ♂, State of Bahia, Porto Seguro, Estação Ecológica Pau Brasil, 107 m, 16° 23' 17,6" S 39° 10' 55,6" W, 17.v.2002, C. O. Azevedo & eq. cols.

Description. Male. Head. Occiput yellowish; mid ocellus absent, lateral ocelli separated from eye margin by a distance smaller than ocellus diameter, ocellar region light brown; front and clypeus yellowish, setose. Maxillary palpus brownish yellow, 1+4 palpomeres, palpomere increasing in length to apex. Scape and pedicel rounded, yellowish, bearing scattered setae; flagellomeres longer than wide, whitish, except for basal fourth, brown. **Thorax.** Pronotum yellowish, with some longer and other smaller setae. Scutum light brown, with four lighter, whitish yellow longitudinal bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum yellowish, brownish at posterior margin, four strong scutellar bristles and some smaller setae. Pleural membrane whitish. Proepisternum, anepisternum, katepisternum, mesepimeron and metepisternum light yellowish, laterotergite yellowish, except for brownish dorso–posterior corner, mediotergite brownish, except for the yellowish ventral and lateral margins. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter whitish, with scattered setae on pedicel and on capitulum. **Legs.** Legs mostly yellowish, except for brownish front coxa, apex of mid and hind femora, and front tibia; tibial spurs 1:2:2, light brown, front spur more than twice the width of tibia apex. **Wing** (Figure 9). Length, 2.0 mm. Wing mostly translucent, with a brown macula around base of R_s and $r-m$, and other maculae around base of medial fork, at entire apical third of wing, and distally across anal lobe. Membrane bearing macrotrichia and microtrichiae; humeral cell entirely bare of macrotrichia; basal cell almost entirely devoid of macrotrichia. Sc complete, very short, reaching C at basal fifth of wing; R_1 reaching C around the distal third of wing; R_5 reaching C before apex of M_1 ; C extending to almost half the distance between R_5 and M_1 ; $r-m$ oblique, longer than base of R_s ; M_{1+2} slightly longer than $r-m$, medial fork complete. M_4 entirely absent; A_1 very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites light brownish yellow, with a light distal brownish band on tergites, distal segments darker. S8 U–shape, T8 wide and short. **Terminalia** (Figures 25–26). Terminalia light brownish yellow. Syngonocoxite covering entire ventral face of terminalia, more sclerotized distal margin with a mesal notch that continuous through a medial longitudinal suture; syngonocoxite covered with setae, but with no spines; no projection of gonocoxite ventrad to insertion of gonostyle. Gonostyle well sclerotized, a digitiform process midway to apex. Aedeagus not strongly sclerotized, projected laterally at apex. No parameres apparent. T9 longer than wide, more or less straight along posterior margin, no distal projections toward ventral

margin. Cercus bilobed.

Etymology. This species is named after Prof. Nelson Papavero, who has led dipterology in Brazil since the 1960s and, among other accomplishments, edited the catalogue of the Diptera of the Neotropical region.



FIGURES 23–26. Male terminalia of *Cluzobra* species. **23.** *Cluzobra claripennis*, **sp.n.**, ventral view. **24.** Same, syngonocoxite plate removed. **25.** *Cluzobra papaveroi*, **sp.n.**, ventral view. **26.** Same, syngonocoxite plate removed. Abbreviations: ae, aedeagus; ce, cercus; dc, dorsal crypt of syngonocoxite; pa, paramere; sg, syngonocoxite; gs, gonostyle; t9, tergite 9.

Comments. This species is similar in many features to *C. aitkeni* Lane, as shown by the long syngonocoxite with a shallow notch ventrally and the shape of the strongly sclerotized gonostyle, bearing a digitiform median process. Details of the gonostyle and of the syngonocoxite distally are more than enough to separate them as distinct species.

***Cluzobra coptolithus*, sp.n.**

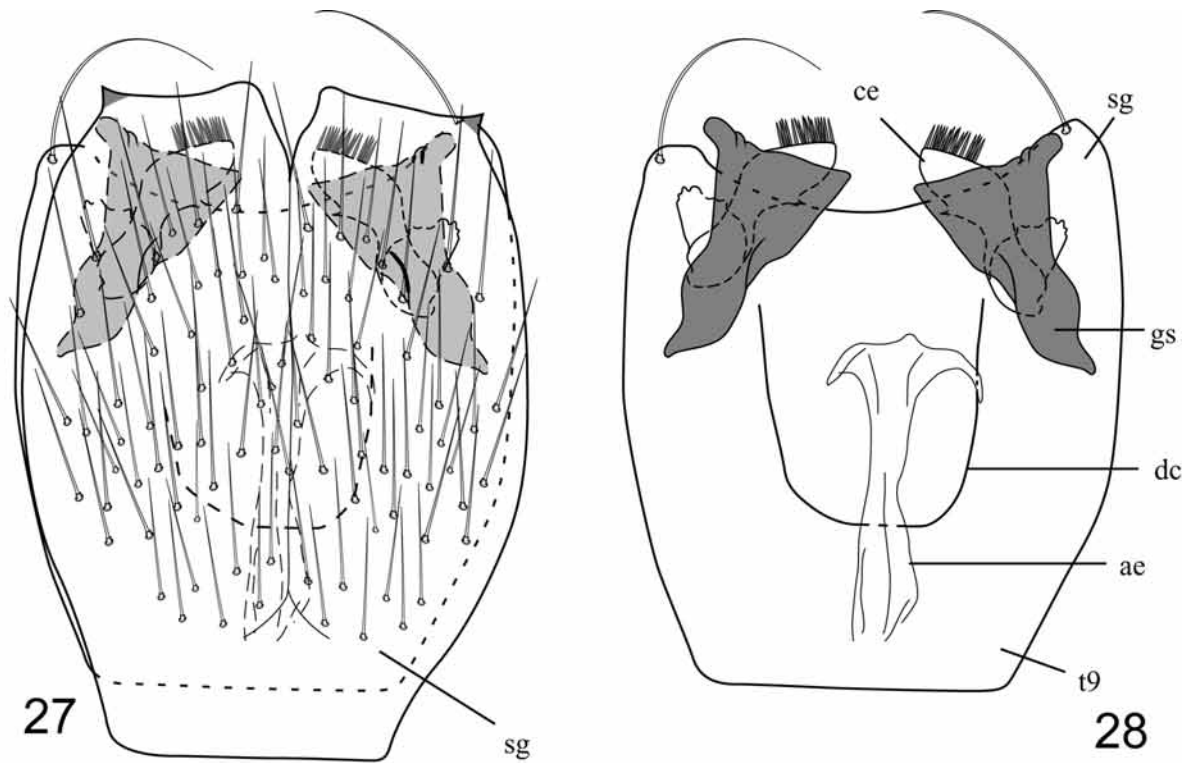
(Figs. 10, 27–28)

Diagnosis. Syngonocoxite elongate, more sclerotized on distal fifth, with a short mesal notch on distal margin, bearing no spines, but with a projection on each latero–distal corner; gonostyle strongly sclerotized, triangular, enlarging to the apex, with some emargination close to apex; cercus typically bearing a group of short spines.

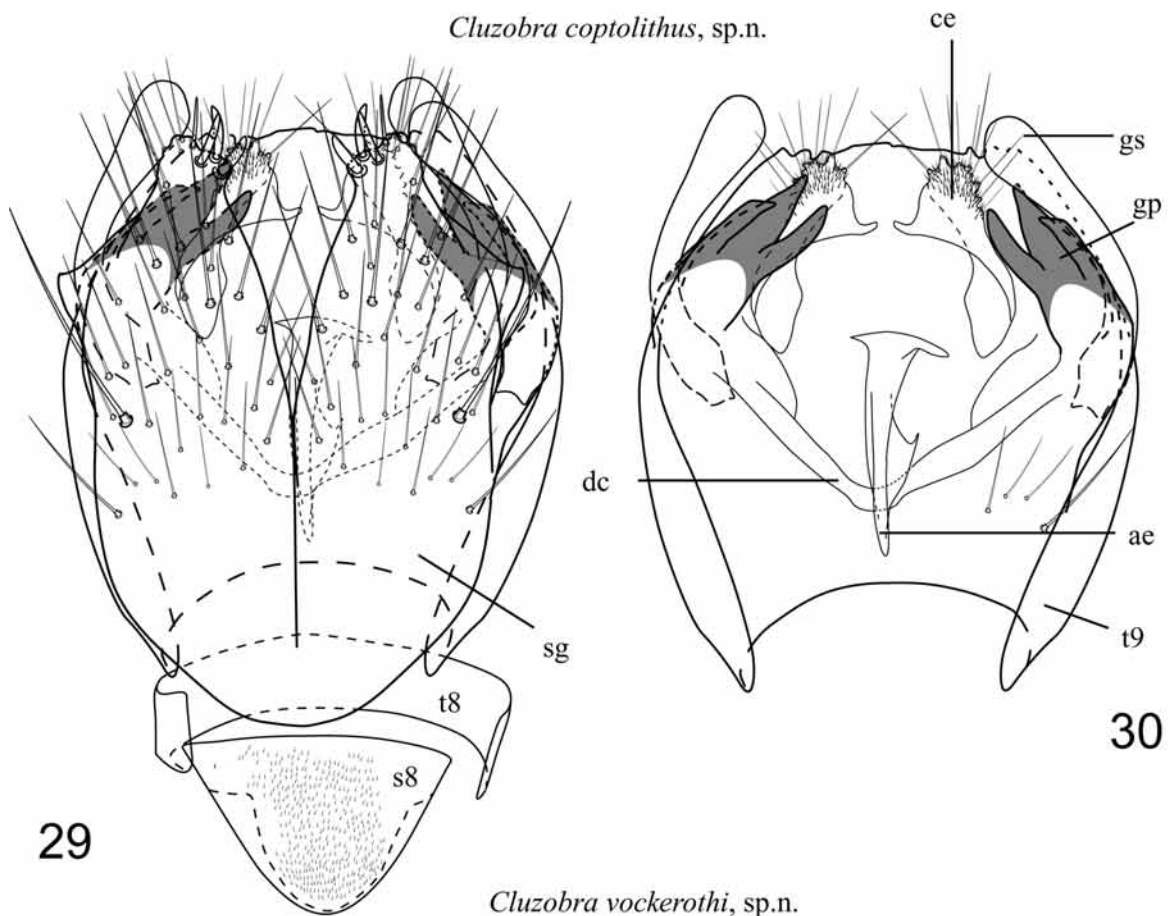
Material examined. Holotype ♂, BRAZIL, State of Alagoas, Quebrangulo, Reserva Biológica Pedra Talhada, 36° 28' 16" W 09° 19' 08" S, 08–11.ix.2002, Penteado–Dias & eq. cols. Paratypes. 5 ♂, State of Paraíba, João Pessoa, Campus Universitário, 34° 49' 60" W 07° 07' 60" S, Malaise trap, 15.vii–15.viii.1986, D.S. Amorim col.; 1 ♂, same data, but 15.vi–15.vii.1986; 2 ♂, State of Paraíba, João Pessoa, Mata do Buraquinho, 34° 51' 60" W 07° 09' 00" S, 28–31.vii.2002, Malaise trap, S.T.P. Amarante col.; 1 ♂, State of Pernambuco, Recife, Parque dos Dois Irmãos, 34° 55' 59" W 08° 00' 00" S, 20–23.vii.2002, S.T.P. Amarante & eq. cols.

Description. Male. Head. Occiput light yellowish brown, darker at vertex; mid ocellus absent, lateral ocelli closer from eye margins than ocellus diameter, ocellar area brown; front and clypeus yellowish, setose; maxillary palpus brownish yellow, 1+4 palpomeres, increasing in length to apex; labella yellowish. Scape and pedicel rounded, yellowish, setose; flagellomeres yellowish, elongated, basal third brownish, with scattered setae. **Thorax.** Pronotum yellowish, with some longer setae. Scutum light brown, with three light yellow, longitudinal bands (brownish band over the acrostical line absent), scattered smaller setae and some stronger acrostical and dorsocentral bristles; scutellum yellowish, six stronger scutellar bristles and some smaller setae. Pleural membrane yellowish. Proepisternum light yellowish brown. Pleural sclerites whitish yellow, mediotergite light brown, yellowish close to insertion of abdomen. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter yellow, setose. **Legs.** Legs mostly yellowish, brownish at apex of coxae and base of femora, front tibia darker; tibial spurs 1:2:2, brownish yellow, front spur more than twice front tibial width at apex. **Wing** (Figure 10). Length, 2.8 mm. Wing mostly translucent, a darker brownish macula around base of Rs and r–m, and lighter maculae around base of medial fork, close to apex of anal lobe and at distal third of wing. Membrane bearing macrotrichia and microtrichiae; humeral cell bare; basal cell elongated, with some few macrotrichia on distal half. Sc complete, short, reaching C at basal fourth of wing; R₁ long, reaching C at distal third of wing; R₅ relatively short, reaching C before apex of M₁; C extending halfway between R₅ and M₁; r–m oblique, longer than r–m, but shorter than M₁₊₂; medial fork complete; M₄ entirely absent; A₁ very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 yellowish. S8 U–shape, T8 wide and short. **Terminalia** (Figures 27–28). Terminalia yellowish. Syngonocoxites extending to distal end of terminalia, a mesal notch on distal margin extending through a mesal suture to the anterior fourth of the terminalia. Gonostyle well sclerotized, triangular–shaped, enlarging to apex. Parameres not apparent. Aedeagus weakly sclerotized, expanded laterally at apex. T9 long, not projected ventrally at distal margin. Cercus simple, elongated, with a bunch of short spines along distal end.

Etymology. The name comes from the translation to Greek of the name of the type–locality, “Pedra Talhada”, which means “carved rock”.



Cluzobra coptolithus, sp.n.



Cluzobra vockerothi, sp.n.

FIGURES 27–30. Male terminalia of *Cluzobra* species. **27.** *Cluzobra coptolithus*, **sp.n.**, ventral view. **28.** Same, syngonocoxite plate removed. **29.** *Cluzobra vockerothi*, **sp.n.**, ventral view. **30.** Same, syngonocoxite plate removed. Abbreviations: ae, aedeagus; ce, cercus; dc, dorsal crypt of syngonocoxite; gp, gonocoxite projection ventrad to gonostyle insertion; gs, gonostyle; s8, sternite 8; sg, syngonocoxite; t8, tergite 8; t9, tergite 9.

Comments. The male terminalia of this species is very similar to *C. aitkeni* Lane. The syngonocoxite is projected to the distal end of the terminalia, with a shallow mesal notch, and the gonostyle has a triangular shape, enlarging to the apex. In his revision of the genus, Matile (1996) represented the gonostyle of the holotype of *C. aitkeni* and of two supposedly conspecific specimens from Brazil, and one specimen from the French Guayanne. He called attention to the variation in the shape of the gonostyle, but inferred that the differences did not seem to have specific value. The study of the specimens examined here points to the opposite conclusion, indicating that the holotype, from Trinidad, will probably belong to a different species from those represented in his drawings. These will be formally described elsewhere. The shape of the gonostyle of this species differs from all those illustrated by Matile (1996).

fascipennis-group

Cluzobra vockerothi, sp.n.

(Figs. 11, 29–30)

Diagnosis. Wing maculate only on distal fifth of the wing, a darker macula at base of Rs, and a transverse macula at level of apex of R₁. Syngonocoxite with a deep distal mesal notch, with three strong spines at apex, a sclerotized projection ventrad to the insertion of the gonostyle, with three strong teeth; gonostyle spatular, curved, weakly sclerotized.

Material examined. Holotype ♂, BRAZIL, State of Paraná, Morretes, Parque Estadual do Pau Oco, 25° 34' 27,9" S 48° 53' 46,7" W, 10–13.iv.2002, M.T. Tavares & eq. cols. Paratypes. 1 ♂, same data as holotype; 1 ♂, State of Minas Gerais, Botelhos, Córrego da Onça, 21° 40' 90" S 46° 22' 05" W, 21.ii–30.iii.2007, João Basso col.; 3 ♂, State of Rio de Janeiro, Nova Iguaçu, Reserva Biológica do Tinguá, 22° 34' 37" S 43° 26' 06,6" W, 08–11.iii.2002, S.T.P. Amarante & eq. cols.; 1 ♂, State of São Paulo, Ribeirão Grande, Parque Estadual Intervales, 24° 15' S 48° 10' W, 10–13.xii.2000, M.T. Tavares & eq. cols.; 1 ♂, same data, but 13–16.xii.2000; 1 ♂, State of São Paulo, Peruíbe, Estação Ecológica Juréia–Itatins, 24° 31' 06,5" S 47° 12' 06" W, 6.v.2002, N. W. Perioto & eq. cols.

Description. Male. Head. Occiput light yellowish brown, darker at apex; mid ocellus absent, lateral ocelli closer to eye margin than ocellus diameter, ocellar area slightly darker; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, setose, palpomeres increasing in length to apex; labella yellowish. Scape and pedicel rounded, yellowish, with scattered setae; flagellomeres yellowish, elongated, basal half brownish, setose. **Thorax.** Pronotum yellowish, with some longer and other smaller setae. Scutum light brown, anterior and posterior margins yellowish, with four lighter, yellowish longitudinal bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum light brown, darker at posterior margin, six stronger scutellar bristles and some smaller setae. Pleural membrane yellowish. Proepisternum light yellowish brown, with some stronger setae. Anepisternum, katepisternum, and laterotergite light brown, mesepimeron light yellowish brown, laterotergite brownish, metepisternum whitish yellow, mediotergite brown, yellowish close to insertion of abdomen. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae with a mesal and a pair of more lateral tufts of setae. Halter yellowish, setose. **Legs.** Legs mostly yellowish, coxae brownish laterally and at distal half, and femora basally; tibial spurs 1:2:2, yellowish brown, front spur more than twice front tibial width at apex. **Wing** (Figure 11). Length, 2.4 mm. Wing mostly translucent, a continuous brownish macula around base of Rs, r–m, M₁₊₂ and base of medial fork, and other maculae at apex of anal lobe, at distal eighth of wing and transversely at level of apex of R₁. Membrane with macro and microtrichia; humeral cell bare of macrotrichia; basal cell with some few macrotrichia near to apex. Sc complete, short, reaching C at basal fourth of wing; R₁ long, reaching C at distal third of wing; R₅ reaching C before apex of

M₁; C extending a third the distance between R₅ and M₁ r–m oblique, longer than base of Rs; M₁₊₂ longer than r–m; medial fork complete; M₄ entirely absent; A₁ very short, scarcely visible. **Abdomen.** Tergites and sternites 1–7 yellowish. S8 U–shape, bare of setae, T8 wide and short, setose. **Terminalia** (Figures 29–30). Terminalia yellowish brown, setose. Syngonocoxites elongated, with a deep mesal notch reaching its basal third, distal projections with three to four spines, and an additional strongly sclerotized projection laterally, with three strong teeth, just ventrad to the insertion of the gonostyle. Gonostyle long, spatula–like, without setae or spines. Aedeagus elongated, with a distal expansion. T9 elongated, with setae but not spines, without large lateral projections on distal margin. Cercus simple.

Etymology. This species is named in honor of J.R Vockeroth, eminent Canadian dipterist, with an extensive contribution to the knowledge of the Mycetophilidae.

Comments. The maculation of the wing is quite distinctive, though similar to that of *C. fascipennis* Edwards. As well, *C. fascipennis* and *C. fissionista* Matile have a deep notch mesally on the syngonocoxite, the gonocoxite at each side with a sclerotized projection just ventrad to the insertion of a long, spatula shaped gonostyle. In *C. fascipennis*, particularly, this projection is strongly sclerotized. In *C. vockerothi*, **sp.n.** these three features are present, and when added to the similarity in the shape of the wing suggests that this species belongs to the *fascipennis*–group. The shape of the gonocoxal projection with three strong teeth is a unique apomorphy, and clearly delimits a separate species.

Cluzobra fascipennis Edwards

C. fascipennis Edwards, 1940: 464. Type–locality: BRAZIL, Santa Catarina, Nova Teutônia. Distr. – Brazil (Santa Catarina), Argentina (Misiones). Ref. – Lane, 1948: 254, figs. 14–15 (♂ terminalia); Matile, 1996: 24, figs. 51 (♂ terminalia), 59 (♀ terminalia). Holotype ♀, NHM.

Material examined. Holotype. Additional specimens: “Neallotype”, ♂ BRAZIL, State of Goiás, Corumbá, 52° 23' 60" W 27° 03' 00" S, ix.1945, M. Pereira Barreto col. (cf., Matile, 1996: 25); 1 ?, ARGENTINA, Misiones, Los Helechos, 55° 05' 00" W 27° 33' 00" S., 10.v.1949, J.P. Duret col.

Comments. The collection locality of the specimen used by Matile (1999) to describe the putative male (“neallotype”) of *C. fascipennis*, in Corumbá, State of Goiás, central Brazil, is very distant from the type–locality of the species, which is Nova Teutônia, in the State of Santa Catarina, southern Brazil. No males of *C. fascipennis* have been described from near the type–locality, and it is questionable whether the male from the state of Goiás is conspecific with the female holotype. We should therefore avoid, for the time being, extending the distribution of *C. fascipennis* to central Brazil.

binocellaris–group

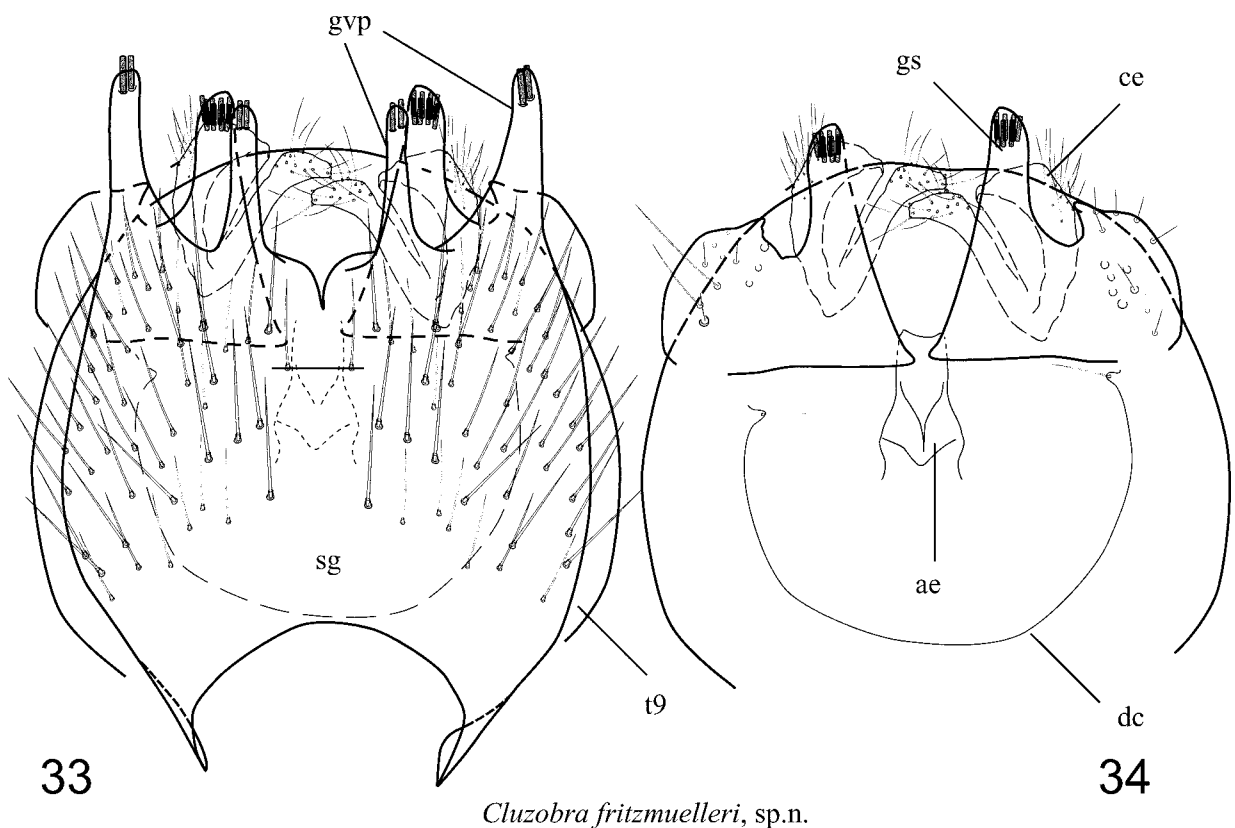
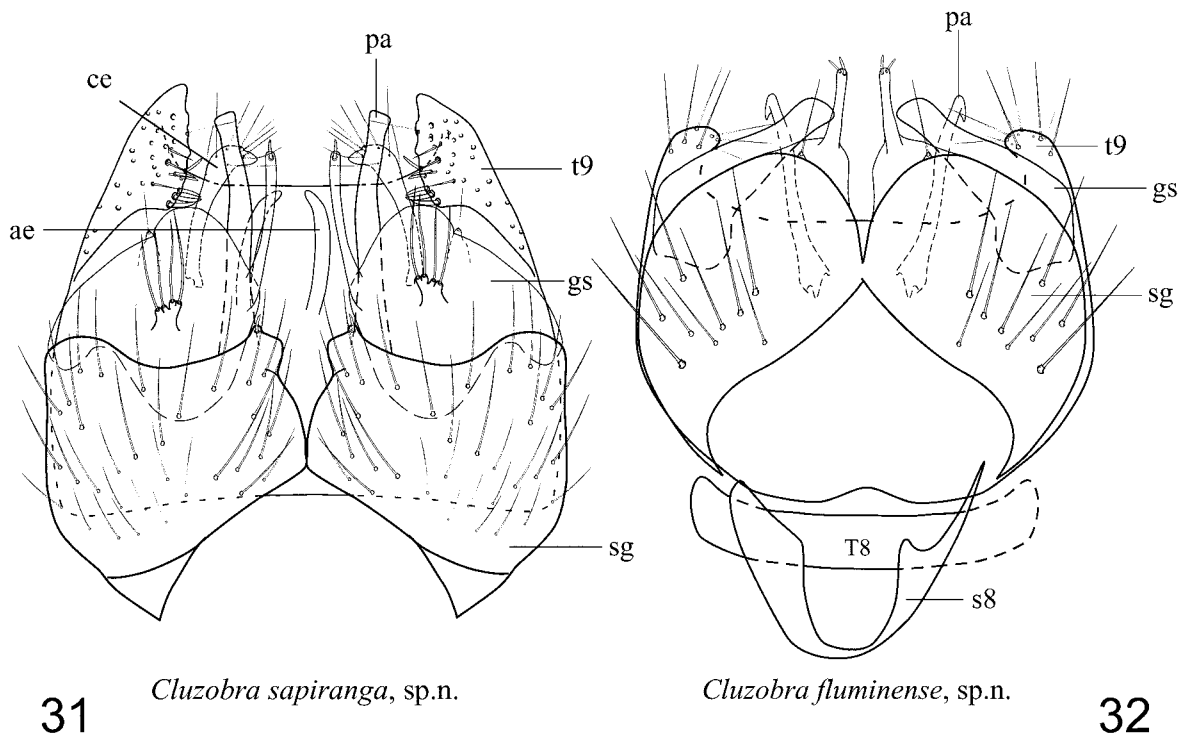
Cluzobra sapiranga, **sp.n.**

(Figs. 12, 31)

Diagnosis. Syngonocoxite short, with a mesal notch at distal margin entirely dividing the plate, a pair of short projections with a short spine at apex; gonostyle large, weakly sclerotized, with a digitiform projection at inner margin bearing a spine at apex, and an additional mesal short projection with a group of four elongated setae; parameres strongly sclerotized; tergite 9 developed at distal ventral corner, with some spines; cercus elongate.

Material examined. Holotype ♂, BRAZIL, State of Bahia, Mata de São João, Reserva de Sapiranga, 38° 02' 57" W 12° 33' 37" S, 22–25.vii.2001, M.T. Tavares & eq. cols. Paratypes. 1 ♂, State of Paraíba, João Pessoa, Campus Universitário, 34° 49' 60" W 07° 07' 60" S, Malaise trap, 15.vi–15.vii.1986, D.S. Amorim

col.; 1 ♂, State of Paraíba, João Pessoa, Mata do Buraquinho, 34° 51' 60" W 07° 09' 00" S, 28–31.vii.2002, Malaise trap, S.T.P. Amarante col.; 5 ♂, State of Pernambuco, Recife, Parque dos Dois Irmãos, 34° 55' 59" W 08° 00' 00" S, 17–20.vii.2002, S.T.P. Amarante & eq. cols.; 2 ♂, same data as holotype, but 19–22.vii.2001.



FIGURES 31–34. Male terminalia of *Cluzobra* species. **31.** *Cluzobra sapiranga*, **sp.n.**, ventral view. **32.** *Cluzobra fluminense*, **sp.n.**, ventral view. **33.** *Cluzobra fritzmuelleri*, **sp.n.**, ventral view. **34.** Same, syngonocoxite plate removed. Abbreviations: ae, aedeagus; ce, cercus; dc, dorsal crypt of syngonocoxite; gvp, gonocoxal ventro-distal projections; gs, gonostyle; pa, paramere; s8, sternite 8; sg, syngonocoxite; t8, tergite 8; t9, tergite 9.

Description. Male. Head. Occiput yellow, setose; mid ocellus absent, lateral ocelli separated from eye

margin by a distance smaller than ocellus diameter; ocellar area light brown; front and clypeus yellowish, setose; maxillary palpus light brown, setose, 1+4 palpomeres, increasing in length to apex; labella yellowish, basal article light brownish. Scape and pedicel rounded, yellowish, setose; flagellomeres elongated, basal third brownish, yellowish distally, with scattered setae. **Thorax.** Pronotum dark yellowish, with some longer and other smaller setae. Scutum mostly brown, with four lighter bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum yellowish, with six stronger scutellar bristles and some smaller setae. Pleural membrane light brown; proepisternum, anepisternum and katepisternum light brown, mesepimeron and metepisternum yellowish brown, with darker areas, laterotergite light brown, mediotergite light brown, except ventrally, close to insertion of the abdomen, yellowish brown. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter whitish, with scattered setae on pedicel and capitulum. **Legs.** Fore and mid legs light brown, hind coxa light brown, yellowish basally, hind femur yellowish, with brownish base and apex; tibial spurs 1:2:2, yellowish brown, front spur more than twice the tibia apex. **Wing** (Figure 12). Length, 2.4–2.6 mm. Wing mostly translucent, brownish maculae similar to *C. papaveroi*, **sp.n.**, but a continuous macula connecting base of Rs, base of medial fork and r-m, and a light macula over entire distal third of wing. Membrane with macro and microtrichiae; humeral cell bare of macrotrichia; basal cell with macrotrichia at distal half. Sc complete, short, reaching C at basal fourth of wing; R₁ long, reaching C around distal third of wing; R₅ reaching C before apex of M₁; C reaching a third the distance between R₅ and M₁; r-m oblique, longer than base of Rs; M₁₊₂ longer than r-m; medial fork complete, M₄ entirely absent; A₁ very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 yellowish brown. S8 U-shape, T8 wide and short. **Terminalia** (Figure 31). Terminalia light brown. Syngonocoxite short, covering anterior half of terminalia, with a pair of short median projections each bearing a short spine. Gonostyle wide, weakly sclerotized, with a long, inner projection with a spine at apex, and a short, lobed projection with some long setae. Parameres present as a pair of long, blade-like, dark sclerites. Aedeagus long, without lateral distal expansions. T9 projected laterally at distal margin, with a number of spiny setae on inner margin of each projection. Cerci simple, elongated.

Etymology. The name of this species is feminine and refers to the type-locality in apposition.

Comments. There is a group of species including *C. binocellaris* (Edwards), *C. plaumanni* Edwards, and *C. fuscipennis* Edwards, all from the southern range of the Atlantic Forest (including areas in Paraguay and Argentina) to which this species seems to belong. This is shown by the flat, weakly sclerotized gonostyle and the shape of the synsternogonocoxite, with a pair of projections with some slender spines at their apex. *C. sapiranga*, **sp.n.** and *C. fluminense*, **sp.n.** also belong to this group. The shape of the syngonocoxite and of the gonostyle are unique in this species.

Cluzobra fluminense, **sp.n.**

(Figs. 13, 32)

Diagnosis. Syngonocoxite short, entirely divided by a mesal notch on distal margin, bearing a digitiform projection with a pair of short spines at the apex; gonostyle weakly sclerotized, with no spines or projections; parameres well sclerotized; tergite 9 projected ventrally at distal margin, but with no spines.

Material examined. Holotype ♂, BRAZIL, State of Rio de Janeiro, Nova Iguaçu, Reserva Biológica do Tinguá, 22° 34' 37" S 43° 26' 05" W, 05–08.iii.2002, S.T.P. Amarante & eq. cols.

Description. Male. Head. Occiput light yellowish brown, setose; mid ocellus absent, lateral ocelli closer from eye margins than diameter of ocellus, ocellar area brown; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, increasing in length to apex, setose; labella yellowish, except for the brownish sclerite of basal article. Scape and pedicel rounded, yellowish, setose; flagellomeres yellowish, elongated, basal half brownish, setose. **Thorax.** Pronotum yellowish, with some longer and other smaller setae. Scutum brown, with four longitudinal yellowish bands intertwined with brownish bands, smaller setae scattered and

some stronger acrostical and dorsocentral bristles; scutellum yellowish brown, with brown posterior margin, six stronger scutellar bristles and some smaller setae. Pleural membrane yellowish. Proepisternum light yellowish brown. Anepisternum and katepisternum yellowish brown, mesepimeron yellowish, laterotergite brownish, mediotergite brownish. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter yellowish, setose. **Legs.** Coxae light brown, hind coxae lighter basally, fore and mid femora light brown, hind femur yellowish, with base and apex brownish, tibiae and tarsi yellowish brown, base of hind tibia darker; tibial spurs 1:2:2, yellowish, front spur more than twice front tibial width at apex. **Wing** (Figure 13). Length, 2.6 mm. Maculation pattern similar to *C. sapiranga*, **sp.n.** Membrane with macro and microtrichia; humeral cell bare of macrotrichia; basal cell with macrotrichia on distal half. Sc complete, reaching C at basal third of wing; R_1 long, reaching C at distal third of wing; R_5 reaching C before apex of M_1 ; C extending about a third the distance between R_5 and M_1 ; r-m oblique, longer than base of R_s ; M_{1+2} longer than r-m; medial fork complete; M_4 entirely absent; A_1 very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 brown. S8 U–shape, T8 wide and short. **Terminalia** (Figure 32). Terminalia yellowish brown. Similar to *C. sapiranga*, **sp.n.**, but gonostyle smaller, and latero–posterior projections of T9 smaller, setose, but without spines. Gonocoxite bearing a digitiform projection with a pair of short spines at the apex.

Etymology. The name of this species is feminine and refers to those born in the State of Rio de Janeiro.

Comments. As commented above, this species seems to fit into a clade with *C. fuscipennis*, *C. plaumanni* and *C. binocellaris*. The shape of the gonostyle, the lack of spines on T9 and the shape of the parameres allow the differentiation of *C. fluminense* from the species of the *binocellaris*–group and from *C. sapiranga*, **sp.n.**

Cluzobra binocellaris (Edwards)

(Fig. 2, 4, 14)

C. binocellaris (Edwards), 1934: 362. Type–locality: Paraguay, La Cordillera, San Bernardino. Distr. – Paraguay, Argentina (Chaco), Brazil (Santa Catarina, Paraná, São Paulo). Ref. – Matile, 1996: 14, figs. 1–4 (σ terminalia). Holotype σ , NHM.

Material examined. Holotype. Additional specimens examined: 1 σ , BRAZIL, State of São Paulo, Itaporanga, 49° 29' 00" W 23° 42' 60" S, i.1946, M. Barreto col.; 6 σ , State of São Paulo, Peruíbe, Estação Ecológica Juréia–Itatins, 24° 31' 06,5" S 47° 12' 06" W, 3.v.2002, N. W. Perioto & eq. cols.; 4 σ , same data, but 6.v.2002; 1 σ , State of Paraná, Telêmaco Borba, 50° 32' 60" W 24° 18' 60" S, Res. Samuel Klabin, Malaise trap, 20.x.1986, PROFAUPAR; 2 σ , State of Paraná, Guarapuava, Águas de Santa Clara, 51° 25' 51,9" W 25° 23' 60" S, Malaise trap, 08.ix.1986, PROFAUPAR; 1 σ , State of Paraná, Ponta Grossa, Vila Velha, Reserva IAPAR, 50° 09' 60" W 25° 00' 60" S, Malaise trap, 08.xii.1986, PROFAUPAR; 1 σ , same data, but 29.ix.1986; 1 σ , same data, but 29.xii.1986; 3 σ , State of Paraná, São José dos Pinhais, BR 277, Km 34, Torre Telepar, 49° 12' 60" W 25° 31' 60" S, Malaise trap, vii.1984, J.A. Rafael col.; 1 σ , State of Paraná, Jundiá do Sul, Fazenda Monte Verde, 50° 15' 00" W 23° 25' 60" S, Malaise trap, 11.vii.1986, PROFAUPAR; 1 σ , State of Paraná, Morretes, Parque Estadual do Pau Oco, 25° 34' 27,9" S 48° 53' 46,7" W, 10–13.iv.2002, M.T. Tavares & eq. cols.; 3 σ , State of Santa Catarina, São Francisco do Sul, 48° 36' 00" W 26° 15' 60" S, 17–20.x.2002; 7 σ , State of Santa Catarina, Nova Teutônia 52° 23' 60W 27° 03' 00" S, different dates 1970 and 1971; 1 σ , ARGENTINA, Chaco, Cerro Petizo, 30.xi.1949, J.P. Duret col.

Cluzobra fuscipennis Edwards

(Fig. 15)

C. fuscipennis Edwards, 1940: 464. Type–locality: BRAZIL, Santa Catarina, Nova Teutônia. Distr. – Brazil (Santa Catarina, Paraná, São Paulo). Ref. – Lane, 1948: 254, figs. 14–15 (σ terminalia); Matile, 1996: 29, figs. 7–8 (σ terminalia), 61–62 (φ terminalia). Holotype σ , NHM.

Material examined. Holotype. Additional specimens examined: 1 ♂, BRAZIL, State of São Paulo, Ubatuba, 44° 49' 22" W 23° 21' 43" S, Malaise trap, 24.i.2002; 1 ♂, State of São Paulo, Barueri, 46° 51' 60" W 23° 30' 60" S, 22.v.1958, K. Lenko col.; 1 ♂, State of São Paulo, Embu 46° 48' 60" W 23° 49' 60" S, v.1955, J. Lane col.; 1 ♂, State of Paraná, Curitiba, Capão da Imbuia, 49° 17' 60" W 25° 34' 60" S, Malaise trap, 27.v–30.vi.1979, A.F. Yamamoto col.; 2 ♂, State of Paraná, Jundiá do Sul, Fazenda Monte Verde, 50° 15' 00" W 23° 25' 60" S, Malaise trap, 11.vii.1986, PROFAUPAR; 2 ♂, State of Santa Catarina, São Bento do Sul, 49° 22' 43" W 26° 15' 01" S; 31 ♂, State of Santa Catarina, Nova Teutônia 52° 23' 60W 27° 03' 00" S, different dates between vi.1970 and vii.1972.

***Cluzobra plaumanni* Edwards**

(Fig. 16)

C. plaumanni Edwards, 1940: 463. Type–locality: BRAZIL, Santa Catarina, Nova Teutônia. Distr. – Brazil (Santa Catarina). Ref. – Matile, 1996: 34, figs. 5–6 (♂ terminalia), 67 (♀ terminalia). Lectotype ♂, NHM.

Material examined. Lectotype. Additional specimens examined: 2 ♂, BRAZIL, State of Santa Catarina, São Bento do Sul, 49° 22' 43" W 26° 15' 01" S, 13–16.x.2001; 1 ♂, State of Santa Catarina, Nova Teutônia, 52° 23' 60W 27° 03' 00" S, Fritz Plaumann col., 01.iv.1937; 23 ♂, same data, but different dates between vi.1970 and xii.1972.

***Cluzobra fritzmuelleri*, sp.n.**

(Figs. 17, 33–34)

Diagnosis. Terminalia with three pairs of digitiform processes bearing modified spines at the apex, two pairs belonging to the gonocoxite distal margin, and one pair belonging to the gonostyle. Syngonocoxal sclerite with a shallow mesal distal notch. Cerci bifid.

Material examined. Holotype ♂, BRAZIL, State of Santa Catarina, São Bento do Sul, 49° 22' 43" W 26° 15' 01" S, Rugendal, 13–16.x.2001.

Description. Male. Head. Occiput yellowish, darker at vertex, setose; mid ocellus absent, lateral ocelli closer to the eye margin by a distance smaller than ocellus diameter, ocellar region dark brown; scape and pedicel whitish, flagellomeres almost twice as long as wide, whitish, except for brown basal fourth; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, setose, palpomeres increasing in length to apex; labella yellowish, except for sclerite of basal article, brownish. Scape and pedicel round, yellowish, setose; flagellomeres yellowish, elongated, with basal half brown. **Thorax.** Pronotum yellowish brown, with some longer and other smaller setae. Scutum mostly light brown, with four lighter, yellowish longitudinal bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum yellowish brownish at posterior margin, four scutellar stronger setae and some smaller setae. Pleural membrane light yellow brown, pleural sclerites light brown, except for metepisternum whitish yellow, and brownish laterotergite and mediotergite. Anepisternum and katepisternum bare, laterotergite setose, mediotergite with a mesal and a pair of more lateral tufts of setae. Halter yellowish, setose. **Legs.** Mostly yellowish legs, except for femora brownish basally; tibial spurs 1:2:2, brownish, front spur about than twice longer than width of tibia. **Wing** (Figure 17). Length, 2.8 mm. Maculation pattern similar to *C. sapiranga*, sp.n. Membrane with macro and microtrichia; humeral cell bare of macrotrichia; basal cell with macrotrichia on distal half. Sc complete, reaching C at basal third of wing, before origin of Rs; R₁ long, reaching C beyond distal third of wing; R₅ reaching C at level of apex of M₁; C extending to nearly half the distance between R₅ and M₁; r–m oblique, longer than base of Rs; M₁₊₂ longer than r–m; medial fork complete; M₄ entirely absent; A₁ very short and weakly sclerotized. **Abdomen.** Abdominal tergites and sternites 1–7 yellowish, segments 5

and 6 brownish. S8 U-shape, T8 wide and short. **Terminalia** (Figure 33–34). Terminalia yellowish, darker ventrally. Syngonocoxite covering the entire ventral face of the terminalia, a mesal shallow notch on the distal margin, and two pairs of projections on distal margin, each with a pair of modified spines. Gonostylus not strongly sclerotized, but with a distal projection with 8–9 modified spines, that adds to the terminalia a third pair of projections with modified spines at the apex. Aedeagus sclerotized, with a ventral projection. T9 rounded at distal margin without a mesal notch or a ventral projection laterally. Cercus bifid, with a ventral extension with fine, but elongated setae at the apex.

Etymology. This species is named after the German naturalist Fritz Müller (1822–1897), for his important contributions to entomology and evolutionary thought. He lived in southern Brazil after 1852, sent specimens to a number of European entomologists, and had frequent correspondence with Charles F. Darwin.

Comments. The male terminalia of *C. fritzmuelleri*, **sp.n.** resemble those of the other species of the *binocellaris*-group, particularly the digitiform distal projections with short spines at the apex and the cercus bifid, with a ventral extension of one of the stems. However, in *C. sapiranga*, **sp.n.** and *C. fluminense*, **sp.n.**, tergite 9 has no ventral projections laterally. *Cluzobra binocellaris*, *C. plaumanni*, *C. dureti*, and *C. stangei*, on the other hand, have a single pair of digitiform projections at the distal margin of the syngonocoxite and the digitiform projection of the gonostyle bearing modified spines, while *C. fritzmuelleri*, **sp.n.** has two pairs of syngonocoxites projections and a pair of gonostylar projections. *C. fuscipennis* also has a pair of syngonocoxite projections, but the gonostyles are not modified at the apex. Therefore, *C. fritzmuelleri*, **sp.n.** is the only species in which three pairs of distal projections with spines are seen in the terminalia.

Species with doubtful group placement

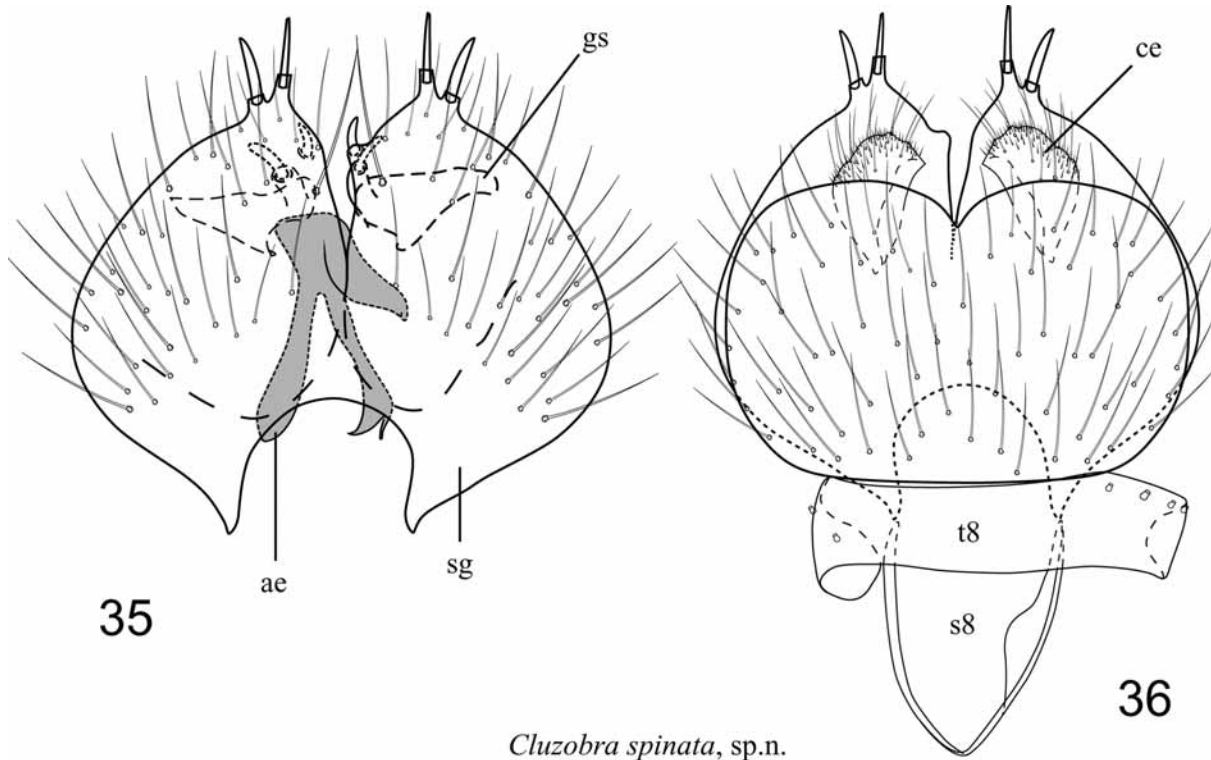
Cluzobra spinata, **sp.n.**

(Figs. 3, 18, 35–36)

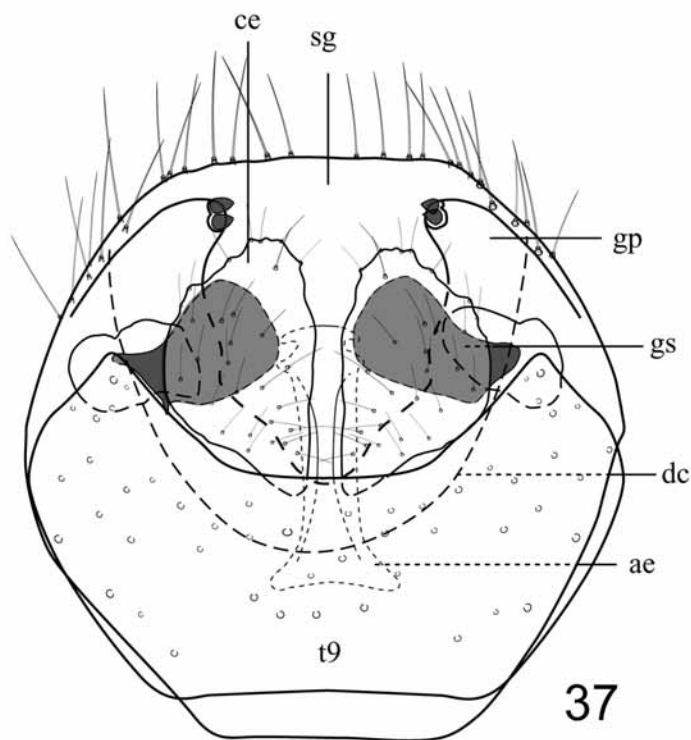
Diagnosis. Syngonocoxite with a deep mesal notch at distal margin, bearing two strong spines at distal margin; gonostyle short, weakly sclerotized, with a pair of strong, apical spines; aedeagus strongly sclerotized, with a ventral beak like distal projection.

Material examined. Holotype ♂, BRAZIL, State of Pernambuco, Recife, Parque dos Dois Irmãos, 34° 55' 59" W 08° 00' 00" S, 17–20.vii.2002, S.T.P. Amarante & eq. cols. Paratypes. 2 ♂, State of Paraíba, João Pessoa, Campus Universitário, 34° 49' 60" W 07° 07' 60" S, Malaise trap, 15.viii–15.ix.1986, D.S. Amorim col.; 1 ♂, same data as holotype, but 20–23.vii.2002; 1 ♂, State of Alagoas, Quebrangulo, Reserva Biológica Pedra Talhada, 36° 28' 16" W 09° 19' 08" S, 08–11.ix.2002, Penteadó–Dias & eq. cols.; 1 ♂, State of Bahia, Porto Seguro, Estação Ecológica Pau Brasil, 107 m, 16° 23' 17,6" S 39° 10' 55,6" W, 17.v.2002, C. O. Azevedo & eq. cols.; 2 ♂, same data, but 20.v.2002.

Description. Male. Head. Occiput light yellowish brown ventrally, vertex brown; mid ocellus absent, lateral ocelli closer to the eye margin by a distance smaller than ocellus diameter, ocellar region dark brown; scape and pedicel whitish, flagellomeres almost twice as long as wide, whitish, except for brown basal fourth; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, setose, palpomeres increasing in length to apex; labella yellowish, except for sclerite of basal article, brownish. Scape and pedicel round, yellowish, setose; flagellomeres yellowish, elongated, with basal half brown. **Thorax.** Pronotum yellowish brown, with some longer and other smaller setae. Scutum mostly light brown, with four lighter, yellowish longitudinal bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorso-central bristles; scutellum yellowish brownish at posterior margin, four scutellar stronger setae and some smaller setae. Pleural membrane light yellow brown, pleural sclerites light brown, except for metepisternum whitish yellow, and brownish mediotergite. Anepisternum and katepisternum bare, laterotergite setose,



Cluzobra spinata, sp.n.



Cluzobra elpidia, sp.n.

FIGURES 35–37. Male terminalia of *Cluzobra* species. **35.** *Cluzobra spinata*, **sp.n.**, ventral view. **36.** Same, dorsal view. **37.** *Cluzobra elpidia*, **sp.n.**, dorsal view. Abbreviations: ae, aedeagus; ce, cercus; dc, dorsal crypt of syngonocoxite; gp, gonocoxite projection ventrad to gonostyle insertion; gs, gonostyle; s8, sternite 8; sg, syngonocoxite; t8, tergite 8; t9, tergite 9.

mediotergite with a mesal and a pair of more lateral tufts of setae. Halter yellowish, setose. **Legs.** Yellowish legs, except anterior part of front coxa, femur and tibia brownish, anterior part of mid coxa and femur brownish, tibiae and tarsi lighter; tarsi lighter, hind coxa and base of femur brown, rest of femur, tibia, and tarsus brownish yellow; tibial spurs 1:2:2, brownish, front spur about than twice longer than width of tibia. **Wing** (Figure 18). Length, 2.6 mm, maculation pattern similar to that of *C. sapiranga*. Macro and microtrichia covering the wing membrane; humeral cell entirely bare of macrotrichia; basal cell with macrotrichia scarce, restricted to apical half. Sc complete, reaching C just before origin of Rs; R₁ long, reaching C at distal third of wing length; R₅ reaching C before apex of M₁; C extending a third the distance between R₅ and M₁; r-m oblique, longer than base of Rs; M₁₊₂ longer than r-m; medial fork complete; M₄ entirely absent; A₁ very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 yellowish, darker at apical segments. S8 U-shape, T8 wide and short. **Terminalia** (Figures 35–36). Terminalia yellowish. Syngonocoxite with a deep mesal notch almost reaching anterior third of terminalia, two pairs of spines on short projections along distal margin and two strong spines on longer projections on inner face of the syngonocoxite, directed inwards in the terminalia; syngonocoxite extending laterally to reach T9. Gonostylus triangular shaped, weakly sclerotized. Aedeagus strongly sclerotized, with a pair of anterior apodemes and a ventral projection with a beak-like ending. Cercus with a single lobe, with no spines.

Etymology. The name of this species is feminine and refers to the single spine found at the distal border of the gonocoxite in the male terminalia.

Comments. This species does not fit very comfortably into any of the groups described by Matile (1996). The shape of the syngonocoxite is similar to that of the species of the group *shannoni*, but the absence of the mid ocellus, the wing pattern, and other details obviously exclude it from the group. In the key, it would run close to *C. binocellaris* and related species, but the male terminalia morphology is clearly distinctive from that found in the *binocellaris*-group. The presence of a projection of the gonocoxites ventrad to the insertion of the gonostyle is seen, in *C. fascipennis* and *C. vockerothi*, **sp.n.**, but with a very different shape. For the time being, it has been placed doubtfully in the *shannoni*-group. There is a male in poor condition from the Caruaru, State of Pernambuco, that belongs to this species, but we decided to not attribute paratype status to the specimen. There is some apparent intraspecific variation of the size and position of the spines at the distal margin of the syngonocoxite. The specimens at the northern end of the distribution of the species have two additional stronger setae together with the distal spines. Only additional material from the distribution range could confirm whether there is geographic limitation of the character, suggestion two separate species.

Cluzobra elpidia, sp.n.

(Figs. 19, 37)

Diagnosis. Wing brownish, nearly devoid of maculae, Sc long reaching C at level of origin of Rs; syngonocoxite without mesal notch at distal margin, a conical projection ventrad to insertion of gonostyle, bearing a pair of strong, short spines at apex; gonostyle strongly sclerotized, short.

Material examined. Holotype ♂, BRAZIL, State of Bahia, Ilhéus, Mata Esperança, 39° 03' 60" W 14° 46' 60" S, 15–18.v.2002.

Description. Male. Head. Occiput light brown, darker at apex; mid ocellus absent, lateral ocelli separated from eye margins by a distance larger than ocellus diameter, ocellar area brown; front and clypeus yellowish, setose; maxillary palpus brown, 1+4 palpomeres, setose, palpomeres increasing in length to apex; labella yellowish, except for the brownish sclerite of basal article. Scape and pedicel rounded, yellowish, setose; flagellomeres brownish, setose. **Thorax.** Pronotum light brown, with some longer and other smaller setae. Scutum brown, with four yellowish brown bands intertwined with brown bands, smaller setae scattered and some stronger acrostical and dorsocentral bristles; scutellum yellowish with a brown mid band, six stronger

scutellar bristles and some smaller setae. Mediotergite yellowish brown, with a mesal and a pair of more lateral tufts of setae. Pleural membrane yellowish. Proepisternum light yellowish brown. Pleural sclerites light brown. Laterotergite setose; anepisternum and katepisternum bare. Halter yellowish, setose. **Legs.** Coxae light brown, hind coxa lighter at base, femora brown, mid femur darker, tibiae and tarsi light brown; tibial spurs 1:2:2, yellowish, front spur more than twice front tibial width at apex. **Wing** (Figure 19). Length, 2.6 mm, with no transverse maculae, membrane brown, slightly lighter at base of cell cuA. Sc complete, well sclerotized, short, reaching C at level of origin of Rs; R_1 long, more than five times r-m length, reaching C at distal third of wing; r-m short, slightly longer than base of Rs; R_5 long, reaching C close to wing apex; C extending two fifth the distance between R_5 and M_1 ; r-m oblique; M_{1+2} short, slightly longer than r-m; medial fork complete; M_4 entirely absent; A_1 very short, scarcely visible. **Abdomen.** Abdominal tergites and sternites 1–7 light brown. S8 U-shape, T8 wide and short. **Terminalia** (Figure 37). Terminalia yellowish. Syngonocoxites covering the entire ventral face of the terminalia, with a conical projection laterally just before the insertion of the gonostyle bearing two short and strong spines. Gonostyle with the shape of a short, wide spoon, relatively well sclerotized. Aedeagus weakly sclerotized, with apodemes laterally projected, expanded at apex. T9 wider than long, with no projections or spines laterally at distal margin. Cercus simple, large, but weakly sclerotized and without setae.

Etymology. The name of this species is feminine and comes from the Greek name *elpis*, that means hope, as a reference to the biological reserve of the type locality, Mata Esperança, meaning “good hope”.

Comments. This species does not properly fits into any of the groups of species described by Matile (1996). The species has an apparently unique combination of features, not seen in any other of the groups of species of *Cluzobra* – a quite homogeneous brownish wing membrane, loss of mid ocellus, long Sc, brownish legs and abdomen, and the shape of the male terminalia, with a simple syngonocoxite covering the entire ventral face and a projection just ventrad to the insertion of the gonostyle, bearing a pair of short and strong spines, and the unique shape of the gonostyle. The gonocoxal projection ventrad to the gonostyle insertion is also seen in species of the *fascipennis*-group, such as *C. vockerothi* sp.n., but in many other details the species does not fit in that group. In Matile’s (1996) key, it would run into couplet 28, but it differs significantly from both species.

Geographic distribution of the species of *Cluzobra* in the Atlantic Forest

The distribution of *Cluzobra* species along the Atlantic Forest (Figure 38) was mapped based on material from 26 different localities along the Atlantic Forest in Brazil, northern Argentina, and Paraguay. It is worth noting that there were no prior records for *Cluzobra* on the eastern coast of Brazil north of the State of São Paulo. Hence, this paper brings a considerable increase in our understanding of the taxonomy and biogeography of the genus in this part of South America. The fact that there are some species known from only a few specimens may be seen as evidence that there is still some level of hidden diversity. However, most species are known from different localities, indicating that we begin to have a realistic picture of species distribution limits in the genus.

A formal, numerical analysis of endemism patterns of dipterans in the Atlantic Forest will be performed in a subsequent paper, but some patterns are clear in *Cluzobra*. None of the species found in southern Brazil are found north of the State of Rio de Janeiro, and none of the species found in northeastern Brazil are found south of the State of Bahia. Therefore, the State of Espírito Santo is a natural limit for species distribution in the genus. Forests in Espírito Santo could either correspond to: (1) the southern extension of an area of endemism of a more northern distribution; (2) the northern limit of an area of endemism in southern Brazil; or (3) a third, independent area of endemism between these former two areas. Information from other groups of animals show that indeed the area south from Rio Doce and north from Rio Paraíba do Sul corresponds to a sep-

arate area of endemism. A more complex pattern is also conceivable, with the division of the Espírito Santo into areas at different altitudes. We found a single female specimen from the state of Espírito Santo in the material analyzed, but it cannot not be positively associated to any particular species, even though it seems to belong to the *binocellaris*-group.

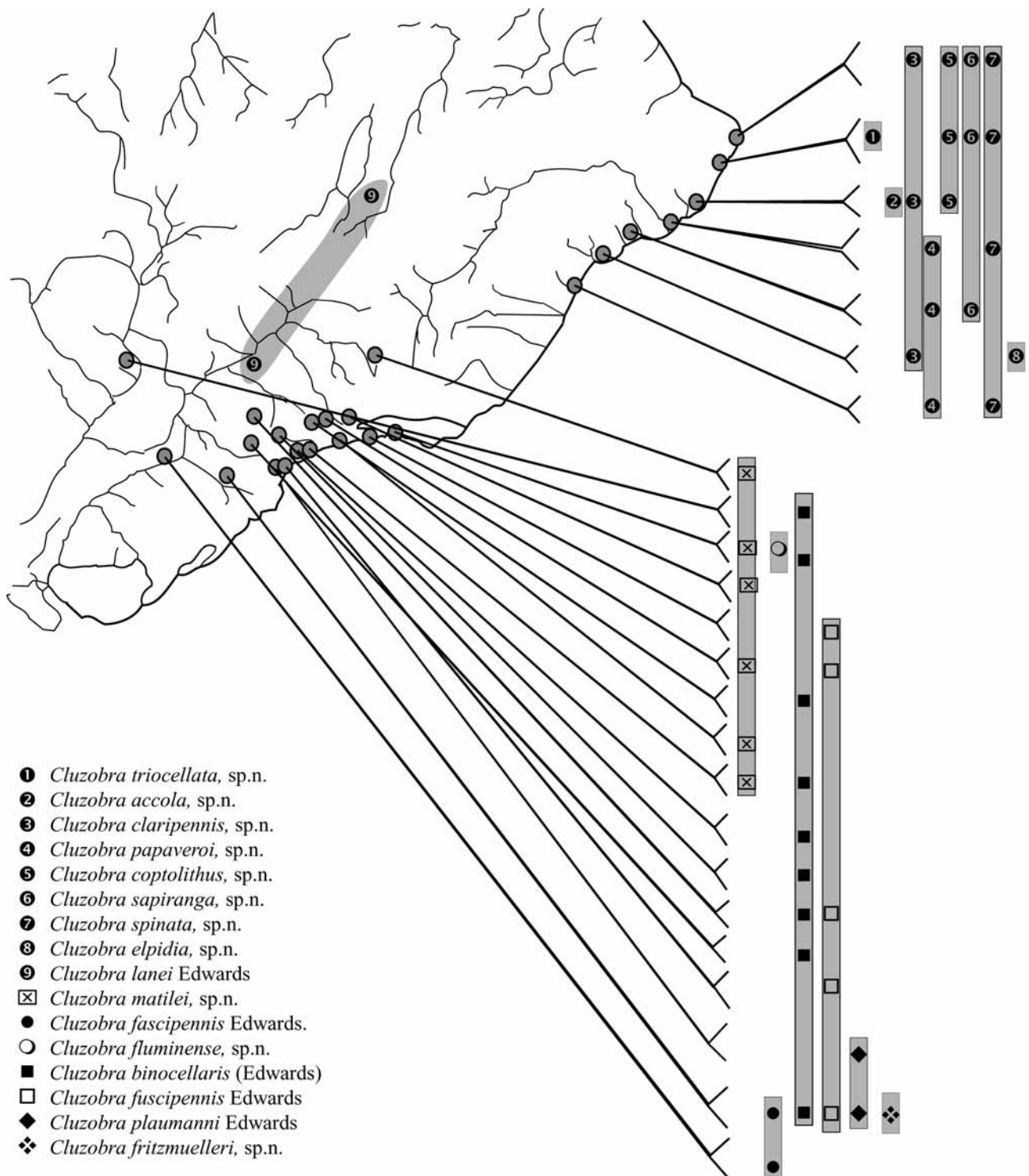


FIGURE 38. Distribution of the species of *Cluzobra* in eastern Brazil, in which there are two obvious areas of endemism, plus a third, still weakly corroborated one in central Brazil. There is no overlap between species of each of the two areas. The northern most occurrence of *C. vockerothi*, **sp.n.** corresponds to an area of higher altitude in the State of Minas Gerais, in which most components of the fauna are pretty much like those of the State of Santa Catarina.

TABLE 1. Distribution of species of *Cluzobra*, including the ones described here, in the group of species as proposed by Matile (1996). Coher (1997) indicated that *C. antenullata* Coher would be closely related to *C. brunneicauda*, but this does not seem very clear from his drawings of the male terminalia and a reexamination of the types would be necessary. *C. elpidia*, **sp.n.** can not presently be fit into any of the species groups. The placement of *C. spinata*, **sp.n.** is tentative.

<i>shannoni</i> –group	<i>C. yasuni</i> Matile	<i>C. phallosoma</i> Matile
	<i>C. shannoni</i> (Lane)	<i>C. triocellata</i> , sp.n.
	<i>C. spinulifera</i> Matile	<i>C. spinata</i> , sp.n. (?)
	<i>C. odilae</i> Matile	
<i>lanei</i> –group	<i>C. vicina</i> Matile	<i>C. flavorufa</i> Matile
	<i>C. variegata</i> Matile	<i>C. accola</i> , sp.n.
	<i>C. lanei</i> Edwards	<i>C. matilei</i> Kurina
<i>aitkeni</i> –group	<i>C. poulaini</i> Matile	<i>C. christiane</i> Matile
	<i>C. grandcolasi</i> Matile	<i>C. bouldardi</i> Matile
	<i>C. tridigitata</i> Matile	<i>C. papaveroi</i> , sp.n.
	<i>C. flabellifera</i> Matile	<i>C. coptolithus</i> , sp.n.
	<i>C. aitkeni</i> Lane	<i>C. claripennis</i> , sp.n.
<i>edwardsi</i> –group	<i>C. praedicta</i> Matile	<i>C. annulicornis</i> Matile
	<i>C. edwardsi</i> Lane	
<i>brunneicauda</i> –group	<i>C. brunneicauda</i> Matile	<i>C. antenulata</i> Coher (?)
<i>fascipennis</i> –group	<i>C. fissisterna</i> Matile	<i>C. butleri</i> Lane
	<i>C. fascipennis</i> Edwards	<i>C. vockerothi</i> , sp.n.
<i>binocellaris</i> –group	<i>C. stangei</i> Matile	<i>C. plaumanni</i> Edwards
	<i>C. dureti</i> Matile	<i>C. fluminense</i> , sp.n.
	<i>C. boliviana</i> Matile	<i>C. fritzmulleri</i> , sp.n.
	<i>C. fuscipennis</i> Edwards	<i>C. sapiranga</i> , sp.n.
	<i>C. binocellaris</i> (Edwards)	

Evidence of subdivision of the area of endemism in northeastern Brazil found elsewhere in the literature (see, e.g., references in Amorim & Pires, 1996) – whose limit would be in the Recôncavo Bahiano, around the city of Salvador – is not corroborated with the data found here. The specimens found in the southern State of Bahia are similar, from a morphological point of view, to those in the northern extreme of the Atlantic Forest, in the States of Pernambuco and Bahia.

Even though a southern area of endemism in the Atlantic Forest is clear, its limits are still uncertain. The species of *Cluzobra* in southern Brazilian states are shared with northern Argentina (e.g., Misiones) and Paraguay. To the north, areas in higher altitudes (e.g., >800 m) in the states of São Paulo, Rio de Janeiro, and Minas Gerais share species with Santa Catarina. This is not entirely surprising. The geographic distribution of these species seems closely related to that of *Araucaria angustifolia* (Bertoloni) Otto Kuntze in southern Brazil, which extends its distribution in areas of higher altitudes in southeastern Brazil. But it is not clear how far north it goes in Minas Gerais, towards central Brazil, and in the Atlantic Forest, where it may include areas of higher altitude in Espírito Santo, where species, e.g., of the temperate sciophiline genus *Allocotocera* Mik are found.

The fact that *C. lanei* Edwards is found in central Brazil and in the western extreme of the State of São Paulo suggests an additional area of endemism in Central Brazil separated from those along the coast. A similar pattern is known, for *Bibionellus barrettoi* Lane & Forattini (Pinto & Amorim, 1997), but the pattern needs further corroboration.

The mapping of *Rhynchosciara* Rübsaamen species (Amorim & Pires, 1996) shows additional patterns that could not be shown here. It is possible that the species in more temperate latitudes or higher altitudes are not the same as those in lower altitudes or latitudes, e.g., in the States of São Paulo and Rio de Janeiro. The

fact that most Malaise traps from which the material in this study comes from were placed at higher altitudes would suggest this may be the case. In this sense, some localities with intermediate altitudes in the State of São Paulo, such as Salesópolis, may show a marginal overlap between two different areas of endemism, one more temperate (to the south or higher altitudes to the north) and one more tropical (to lower altitudes to the south and to the north).

Final comments

Brown (2005) estimated that for some dipteran families the actual diversity in the Neotropical region may be ten times higher than what is presently known. High numbers of new species compared with those already described can already be seen in studies of particular groups of Mycetophilidae, such as *Aphrastomyia* Coher & Lane (Jaschhof & Kallweit, 2004) and *Manota* Williston (Jaschhof & Hippa, 2005), with a huge diversity in Central America. The Diptera collections examined in this work corresponds to a considerably large sampling of the Atlantic Forest. It is predictable, however, that there are still species to be discovered in the areas collected in the distribution range of the Atlantic Forest. An even larger undescribed fauna, however, is expected to exist in the Brazilian Amazonia, Bolivia, and Peru, and in the Colombian tropical forests. This confirms that the actual diversity of the genus could reach more than the 100 species, as predicted by Matile (1996). The description of species from Amazonia could justify an overall reanalysis of the phylogenetic relationships within the genus. Also, collecting in areas along the Atlantic Forest not covered in this study would allow a much more precise delimitation of the areas of endemism.

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