

The rediscovery of *Lecteria calopus* (Walker, 1856) in the Brazilian Atlantic Rain Forest (Diptera: Limoniidae)

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Abstract

Lecteria (*Lecteria*) *calopus* (Walker, 1856), previously known only from its female holotype from an unknown locality, is rediscovered and recorded for the Brazilian Atlantic Rain Forest between 22°–23°S and 45°–52°W. The species is richly illustrated, including for the first time photographs of the type specimen and information on the male with details on the morphology of the male genitalia.

Key words: *Lecteria calopus*, redescription, holotype, male genitalia

Introduction

Lecteria includes twenty-two valid species in the Neotropical Region, in two subgenera. The twenty-two Neotropical species are equally divided between the nominotypical subgenus and the subgenus *L.* (*Psaronius*). *Lecteria* (*Lecteria*) also includes eighteen species in the Afrotropical Region. A third subgenus, *L.* (*Neolecteria*), includes a single species from the Oriental Region (Borneo: Sarawak) (Alexander 1969; Oosterbroek 2009). According to the recent phylogenetic study of Ribeiro (2008), *Lecteria* is the sister group of the clade formed by the genera *Clydonodozus* + *Conosia* (for a detailed discussion on the characters supporting these relationships, see Ribeiro 2008: 677–678).

Fabricius (1805) described in the genus *Tipula* the first Neotropical species currently assigned to the subgenus *Lecteria* (*Lecteria*), *L.* (*L.*) *armillaris*. Fifty-one years later, Walker (1856) described another species (originally placed in the genus *Limnobia*), *L.* (*L.*) *calopus* (Walker, 1856). Alexander (1913) added a third species, *L.* (*L.*) *matogrossae*. A revision of these early described taxa, which included the description of the remaining eight species of the subgenus known from the Neotropics and a key to all the taxa, was provided by Alexander (1969).

Lecteria (*Lecteria*) *calopus* was known only by its female holotype, deposited in the Natural History Museum, London. The characterization of the taxon provided by Alexander (1969) was not based on his direct observation of the type specimen, but on a detailed description and illustrations provided by Richard I. Vane-Wright. Vane-Wright's illustrations were then reproduced by Alexander in his paper (Alexander 1969: 325, figs. 2–5).

Precise information on the distribution or even the type locality of *Lecteria* (*Lecteria*) *calopus* was unknown, as the female type is vaguely labeled as coming from “South America”. Alexander (1969) indicated the species *L.* (*L.*) *fuscitarsis* Alexander, from the Brazilian Atlantic Rain Forest, as

its closest relative, but regretted that further comparisons between both taxa were prevented by the lack of information on the male of *L. calopus*.

The pattern of coloration of the Neotropical *Lecteria* provide important characters for the identification of the species, and it seems clear, on the basis of Alexander's (1969) revision, that the identity of *L. calopus* is well established, despite the fact that a single specimen was known for this species. The identification key provided by Alexander (1969), based mostly on differences of coloration, mainly of wings and legs, first distinguishes among those species with white-banded tarsi (most of the Neotropical species) and the two species possessing uniformly darkened tarsi, namely *L. calopus* (Walker) and *L. fuscitarsis* Alexander. Details in the color pattern of the wings provides further basis for the distinction between the two similar species: in *L. calopus*, the costal cell is undarkened except at its posterior portion near the stigmal region; in *L. fuscitarsis*, the costal cell is darkened with brown near its midlength (Alexander 1969). As shown later in this paper, the morphology of the male genitalia provides further characters for the distinction between the two species.

Recent surveys conducted by different Brazilian teams in several locations along the Atlantic Rain Forest in Brazil have led to an enormous amount of crane fly material (belonging to the Museu de Zoologia da Universidade de São Paulo), now under study by the first author. Among hundreds of samples already sorted in the past two years, only two specimens of the genus *Lecteria* have appeared from the samples: one male and one female belonging to *L. calopus* (Walker 1856).

The purpose of this paper is to record the occurrence of *Lecteria* (*Lecteria*) *calopus* (Walker, 1856) in the Brazilian Atlantic Rain Forest (between 22°-23°S and 45°-52°W) and to provide a well illustrated redescription of the taxon, including for the first time photographs of the type specimen and information on the male with details on the morphology of the male genitalia.

Material and Methods

The type specimen of *Lecteria* (*Lecteria*) *calopus* is deposited in the Natural History Museum, London, UK (BMNH). The newly collected specimens belong to the Museu de Zoologia da Universidade de São Paulo, Brazil (MZSP). The identification of the newly collected specimens was based on the key and descriptions provided in the revision of the subgenus *L. (Lecteria)* by Alexander (1969), followed by a direct comparison with the type.

In the description that follows, the terminology follows mostly McAlpine (1981). Terminology for wing veins accord with the system adopted by Ribeiro (2008), and the terminology for the male gonostylar branches follows Ribeiro (2006).

Dissections of the head, thorax, wing and female terminalia of the non-type specimens were preserved in glycerol without clearing in order to maintain the original color pattern. One male specimen had its thorax and terminalia cleared in warmed KOH and mounted for study in non-permanent slide with glycerol. After study and illustration the dissected structures of each specimen were all kept in the same vial with glycerol. Photographs were taken with a digital camera attached to both compound and stereo microscopes. Illustrations of male terminalia were made with a drawing tube attached to the compound microscope. Measurements were taken with an ocular reticule.

Details on the examined specimens are as follows (label information in *italics*; information of different labels separated by a vertical bar; geographical coordinates of localities within square brackets):

Holotype. Female. *Limnobia calopus* Walker. Det. R. I. Vane-Wright, 1967. Holotype./ "South America", Descr: Ins. Saund. Pt.V, 1856, p. 493./BMNH(E)#24771.

Newly collected material. 1 male. *Brazil, São Paulo, Ribeirão Grande, Parque Estadual Intervales, Malaise, 13-16.xii.2000, M. T. Tavares et al.* [ca. 24°15'S 48°39'W]; 1 female. *Brasil, São Paulo, Estação Biológica Boracéia, 10-xii-2000, at light, H. F. Mendes.* [ca. 23°39'S 45°53'W].

***Lecteria (Lecteria) calopus* (Walker, 1856)**
(Figures 1–24)

Limnobia calopus Walker, 1856: 439.

Lecteria calopus (Walker, 1856). Alexander, 1913: 497 [Erroneously placed as synonym of *Lecteria armillaris* (Fabricius, 1805)]; 1969: 325 [figures 1-5], 326-328 [description]; Alexander and Alexander, 1970: 4.106 [catalogue citation]; Oosterbroek, 2009 [catalogue citation].

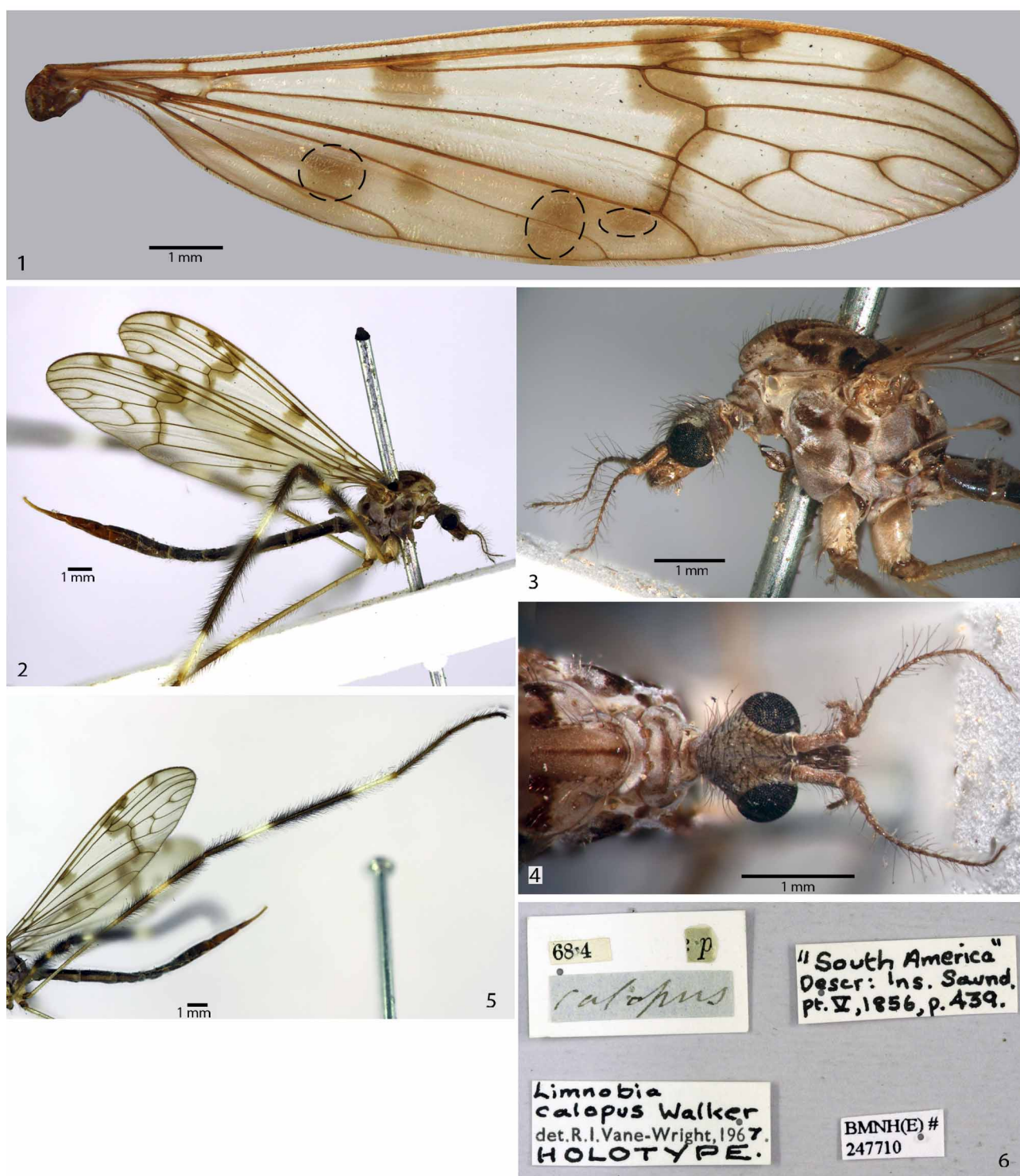
Redescription

Coloration (male and female). Head capsule and scape dark brown; pedicel, flagellum and palpus light brown-yellowish; thorax brown, with several lateral dark brown marks (as shown in detail in figures 3, 4 and 13); distal halves of coxae and trochanters light brown-yellow; femora mostly yellowish, with brown bands at near its midlength and distal part (Figures 2, 5 and 14); base of tibiae dark brown, followed by a white band (Figures 5 and 15), then a long brown region followed by an apical white band, actual apex light brown-yellow (Figure 16); tarsi uniformly dark brown (Figures 5 and 17); tarsal claws dark brown (Figures 18-19); abdomen brown, with tergum darker than pleura and sternum; wing with a pale brown tinge, brown veins and relatively more well defined dark brown spots near the origin of bM, at the origin of Rs and distal part of cell C, along the basal elements of the radial sector and medial veins, at midlength of vein A_1 , and at tip of vein R_2 . More diffuse and lighter brown areas at the level of origin of Rs and distal portion of wing (Figures 1, 11 and 12).

Note on coloration: The dark zones marked with circles in Figure 1 (wing of female holotype) belong to the other wing (cut from the picture), and not to the wing actually being shown.

Dimensions (maximum lengths and widths in mm). **Male.** Head width, 1.12; Wing length, 9.63; Wing width, 2.27; Gonocoxite length, 0.54; Gonocoxite width, 0.32; Lobe of gonostylus length, 0.39; Lobe of gonostylus width, 0.08; Clasper of gonostylus length, 0.43; Clasper of gonostylus width, 0.04. **Female.** Head width, 1.08–1.15 (1.15 in the holotype); Wing length, 11.5–12.8 (12.8 in the holotype); Wing width, 3.2 (3.2 in the holotype).

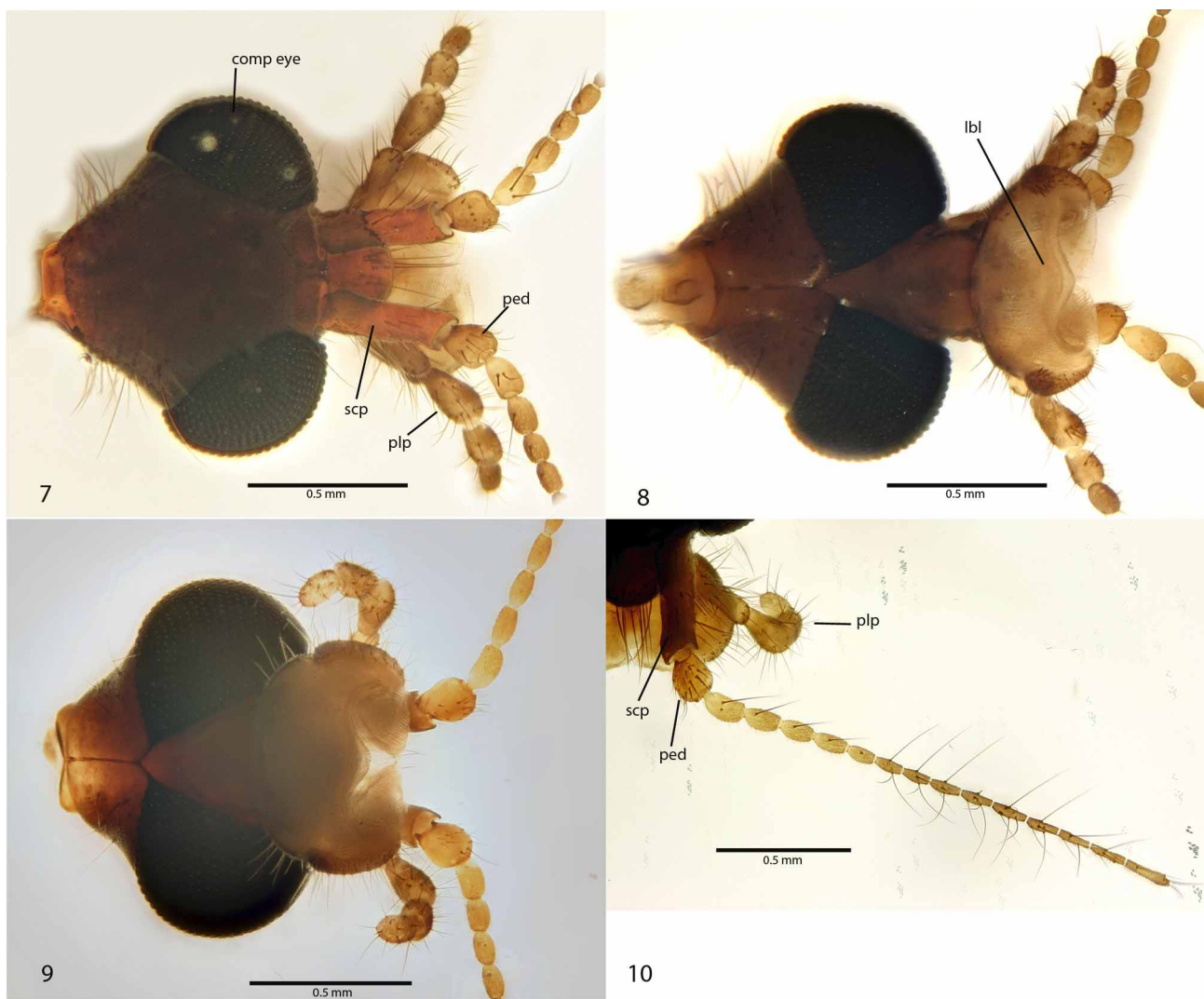
Morphology. Head (Figures 4, 7-10). Flagellum 14-segmented; first five flagellomeres ovoid, each bearing one long and stout verticil; remaining flagellomeres more conical, each bearing three to four long verticils; scape ca. 3.4 x longer than wide and ca. 2.54 x longer than pedicel; palpus 4-segmented; palpomeres ovoid, decreasing gradually in length toward tip, in average longer and wider than flagellomeres; eyes separated dorsally by a distance virtually equal to the length of scape, and ventrally by a much narrower space; labella ca. 1.6 to 1.9 x wider than long. Wing (Figures 1, 11 and 12). Vein h situated closer to the point of bifurcation than to the origin of M+Cu; tips of veins Sc and R_1 reaching C well beyond bifurcations of Rs, with midpoint between the endings of Sc and R_1 at the same level of point of contact between r-r and R_2 ; R_{2+3} very short, ca. 0.5x the length of r-r; Rs three branched; Rs virtually straight between its origin and first bifurcation; R_2 and R_3 abruptly diverging from each other after running more or less in parallel, mostly due to an abrupt bending of R_2 ; R_3 virtually aligned with Rs, reaching wing margin almost in parallel with R_{4+5} ; discal cell ca. 1.87x longer than wide; r-m and m-m similar in length; point of attachment of m-cu to M_{3+4} variable;



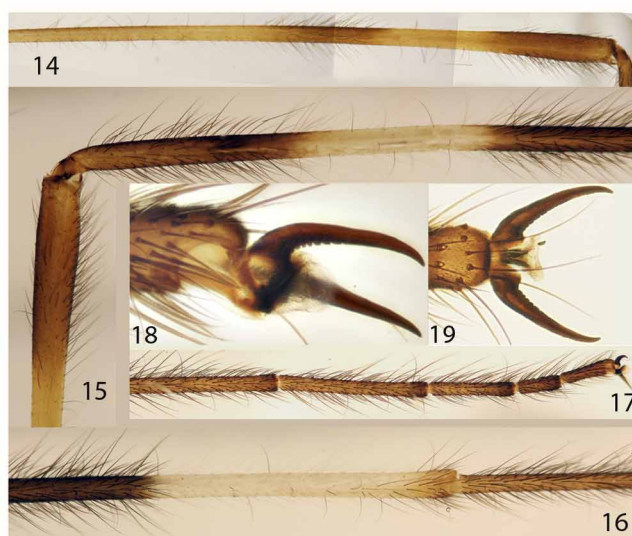
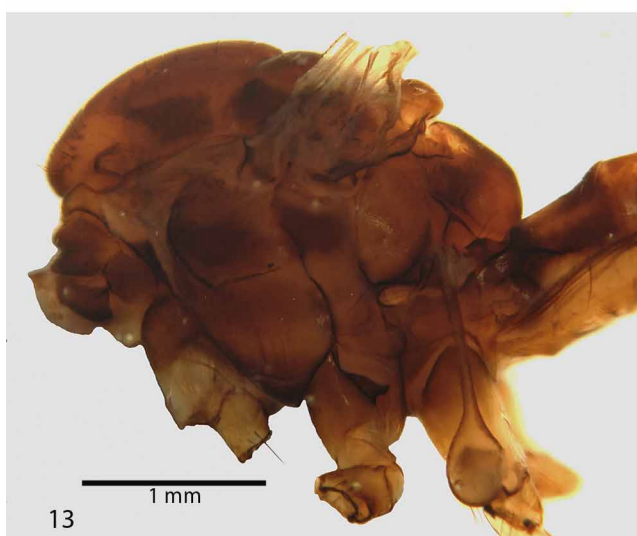
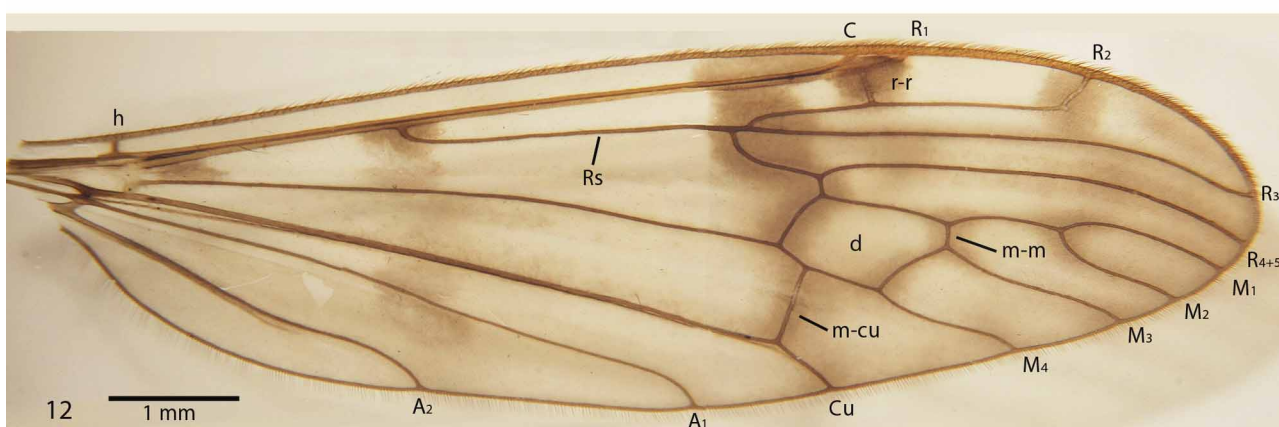
FIGURES 1–6. *Lecteria (Lecteria) calopus*. Female holotype. 1- Wing. The dark zones marked with circles belong to the other wing (cut from the picture), and not to the wing actually being shown. 2- Habitus. 3- Head and thorax, lateral view. 4- Head and anterior portion of thorax, dorsal view. 5- View showing color pattern of hind leg. 6- Labels. Photographs by Vladimir Blagoderov.

M four branched; petiole of cell m1 similar to vein M_1 in length; length of m-cu similar to the width of discal cell; M_2 , M_3 and M_4 slightly sinuous in a similar way; A_1 reaching C at the level of

midlength of wing; A_2 reaching C at the level of origin of Rs. Thorax and appendages (Figures 3 and 13). Thorax almost as long as high; tibial spurs lacking; tarsal claws with basal portion of posterior margin of serrated. Male genitalia (Figures 20–22 and 24). Gonocoxite cone-shaped, ca. 2x longer than broad; gonostylus terminal; gonostylar branches sub-equal in length; clasper of gonostylus blade-like, bearing minute hairs, with distal lightly expanded but constricted abruptly at apex, forming an apical hook; interbase blade-like, with posterior margin produced into two small lobes; interbase not connected to either parameres or gonocoxite apodemes; aedeagus long, reaching beyond posterior margin of gonocoxite; apex of aedeagus bifid. Female ovipositor (Figure 23). Cercus curved upwards at midlength; apex of hypogynial valve extending little beyond midlength of cercus.



FIGURES 7–10. *Lacteria (Lacteria) calopus*. 7- Head, male, dorsal view. 8- Head, male, ventral view. 9-Head, female, ventral view. 10- Antenna, female, dorsal view. Abbreviations: comp eye, compound eye; lbl, labella; ped, pedicel; plp, maxillary palpus; scp, scape. Photographs by Guilherme C. Ribeiro.



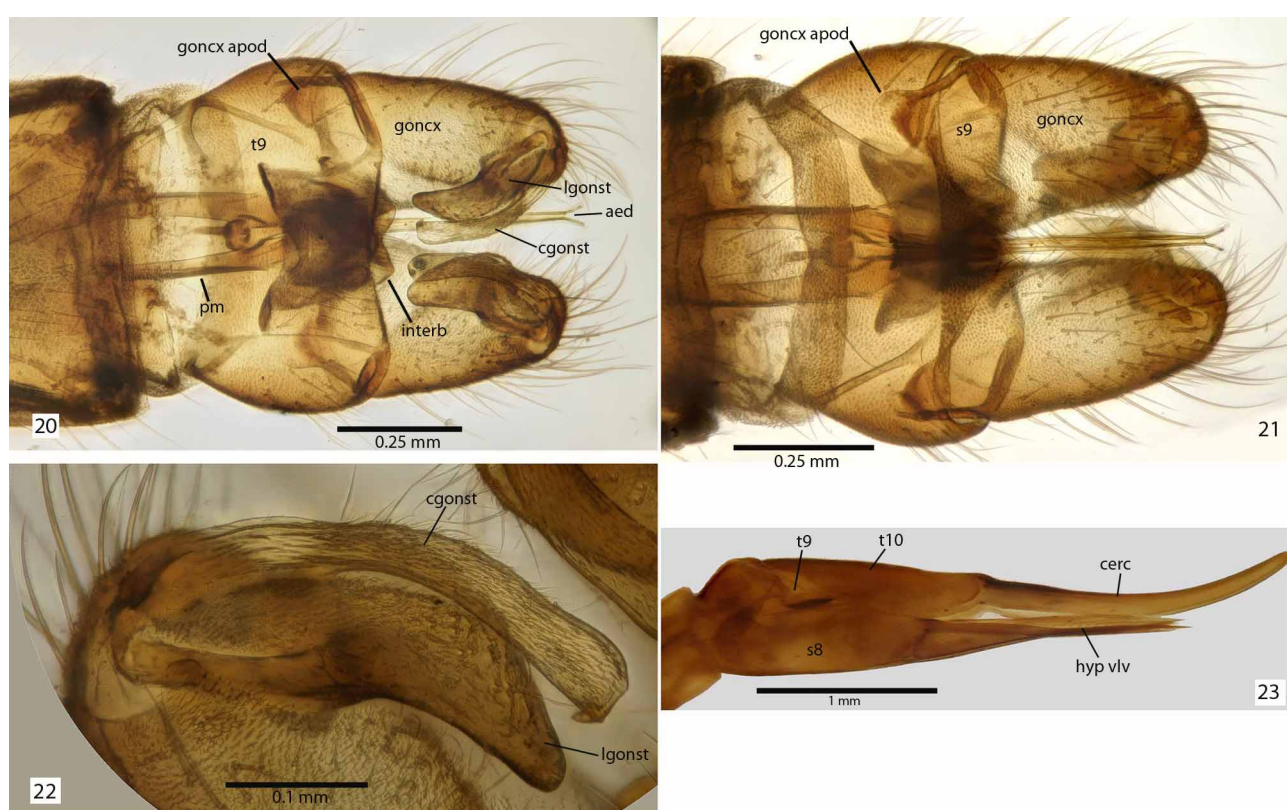
FIGURES 11–16. *Lecteria (Lecteria) calopus*. 11- Wing, female. 12- Wing, male. 13- Thorax, female, lateral view. 14- Hind femur, female. 15- Distal portion of hind femur and basal portion of tibia, female. 16- Distal portion of hind tibia and basal portion of tarsus, female. 17- Distal portion of hind tarsus, female. 18- Hind tarsal claw, female, lateral view. 19- Hind tarsal claw, female, dorsal view. Figures 14-19 are in different scales. Photographs by Guilherme C. Ribeiro.

Remarks

Alexander (1969: 337) remarked that *Lecteria calopus* (Walker, 1856) was the most similar species to *Lecteria fuscitarsis* Alexander, 1969. Both species differ from all other Neotropical species of the subgenus *L. (Lecteria)* by having the tarsi uniformly darkened or virtually so. The

basis for the distinction between the two species comes from details in the color pattern of the wings. In *L. calopus*, the costal cell is undarkened except at its posterior portion near the stigmal region while in *L. fuscitarsis*, the costal cell is darkened with brown at near its midlength (Alexander 1969). According to Alexander (1969), *L. calopus* also differs from its closely related species by possessing the very apex of the tibia white (actually, the very apex of the tibia is light brown-yellow), as opposed to dark brown in *L. fuscitarsis*.

The morphology of the male genitalia also suggests a closer proximity between the two taxa, compared with other neotropical species, but provides additional basis for distinguishing among them. In both *L. calopus* and *L. fuscitarsis* (Alexander, 1969: 335, Figure 12), the aedeagus is long and bifid apically and extends beyond the apex of the gonocoxite. In *L. calopus*, the gonostylar branches are sub-equal in length, but in *L. fuscitarsis*, the lobe of gonostylus is relatively shorter compared with the clasper of gonostylus. The clasper of gonostylus in *L. fuscitarsis* narrows more gradually towards tip; in *L. calopus*, the clasper is more expanded at its apex.



FIGURES 20–23. *Lacteria (Lacteria) calopus*. 20-Male terminalia, dorsal view. 21- Male terminalia, ventral view. 22- Gonostylus, dorsal view. 23- Ovipositor, lateral view. Abbreviations: aed, aedeagus; cerc, cercus; cgonst, clasper of gonostylus; goncx, gonocoxite; goncx apod, gonocoxite apodeme; hyp vlv, hypogynial valve; interb, interbase; lgonst, lobe of gonostylus; pm, paramere; s8, eighth sternite; t9, ninth tergite; t10, tenth tergite. Photographs by Guilherme C. Ribeiro.

A final comment may be needed on some differences between the female holotype of *Lacteria calopus* and the two specimens being here considered as conspecific with it. In the female holotype, the verticils of the first flagellomeres are longer than in both the newly found male and female specimens. Other less marked differences may be found in the shape of the wings or wing markings. A full understanding of the variations within any species is only possible after the study of a long series of specimens. Also, the best diagnostic features refer to the characters of the male genitalia.

This imposes limits for the accuracy of the identification of the newly found specimens as *L. calopus*, even after a direct comparison with the female holotype. Assuming a non-typological approach and acknowledging the existence of variations between the studied specimens, based on the body of information available and the diagnostic features of the species provided in the latest revision of the group by Alexander (1969), we defend the claim on the rediscovery of *Lecteria calopus* (Walker, 1856) as a well justified one.

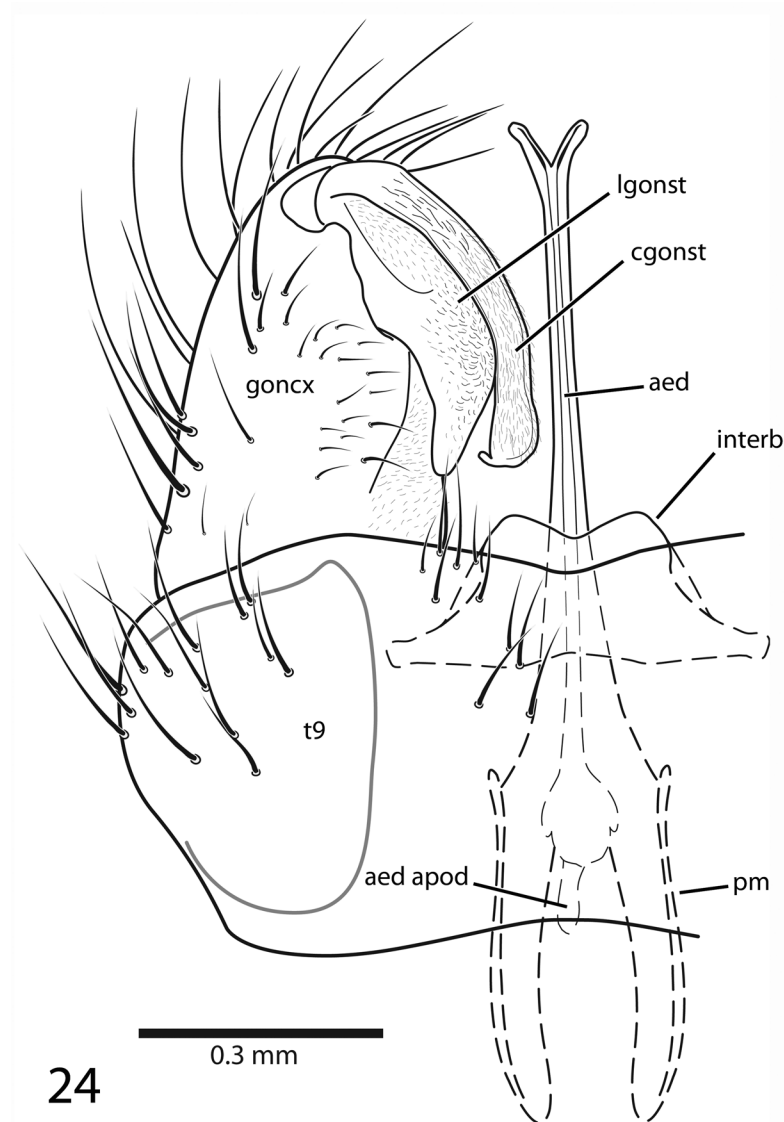


FIGURE 24. *Lecteria (Lecteria) calopus*. Male terminalia, dorsal view. Abbreviations: aed, aedeagus; aed apod, aedeagus apodeme; cgonst, clasper of gonostylus; goncx, gonocoxite; interb, interbase; lgonst, lobe of gonostylus; pm, paramere; t9, ninth tergite. Illustration by Guilherme C. Ribeiro.

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