

Redescription of *Cerotainia brasiliensis* SCHINER, 1867 (Diptera: Asilidae: Laphriinae)

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Abstract

The Atomosiini species *Cerotainia brasiliensis* SCHINER, 1867 is redescribed and illustrated in detail. The male terminalia are described for the first time and additional external morphological characters of the male, which were not provided in the original description, were included and commented on. A lectotype specimen is herein designated. Distribution records are provided, forming the first distribution map of this species.

Key words. Atomosiini, Brazil, distribution, robber fly, taxonomy, terminalia.

Zusammenfassung

Cerotainia brasiliensis SCHINER, 1867 aus der Tribus Atomosiini wird wiederbeschrieben und detailliert illustriert. Die Terminalia und zusätzliche äußere morphologische Merkmale des Männchens, die in der Originalbeschreibung nicht enthalten waren, werden zum ersten Mal beschrieben und kommentiert. Ein Lectotypus wird designiert. Die Verbreitungsdaten werden in die erste Verbreitungskarte dieser Art aufgenommen.

Introduction

Cerotainia SCHINER, 1866, is a genus of small-sized robber flies (body length 5–10 mm), belonging to the Atomosiini and endemic to the American continent, with 38 valid species; of these, 35 are reported from the Neotropical region and three from the Nearctic region (MARTIN & WILCOX 1965, PAPAVERO 2009). FISHER (2009) noted that at least 15 undescribed species are expected to be found in Central America. In Brazil, only four species are reported (LAMAS & CAMARGO 2024) but several undescribed species can also be predicted.

The genus is mainly characterized by the frons, which is extremely widened with strongly divergent slopes and by the scape, which is about 4–5 times longer than the pedicel (SCHINER 1866, ARTIGAS et al. 1991). According to FISHER (2009), *Cerotainia* species are commonly found perching on tips of bare branches of shrubs and trees, and occasionally on the tips of vine tendrils and pointed leaves. Species usually show distinct preferences for habitat (i.e. forest type, light exposure). SCARBROUGH (1978) provided a study on the ethology of *Cerotainia albipilosa* CURRAN, 1930 from the United States reporting that this species foraged from leaves and stems of sunlit plants that are found along margins and clearings of paths. According to the same author, 67% of the prey items consisted of Diptera and Hemiptera. Unfortunately, the ethology of the South American species is completely unknown.

Despite being a large genus with specimens commonly collected in regional surveys (i.e. FISHER 1985, VIEIRA et al. 2019), the identification of representatives is challenging because the available keys are outdated (FISHER 2009), and most of the old descriptions are often brief and ambiguous, not providing enough information for an assertive identification. In addition, for several species within the genus, not even the type locality is known, thus contributing to the increase in the Linnaean and Wallacean shortfalls. To overcome this situation and to stabilise taxonomy, a detailed, richly illustrated redescription of *Cerotainia brasiliensis* SCHINER, 1867 is provided herein, including the designation of a lectotype specimen. For the first time, the terminalia of the male of this species are described and illustrated and a distribution map is provided. This is the first step towards a revision of the genus in the next years.

Material and methods

The material studied in this work is deposited in the Natural History Museum Vienna (NHMW), Austria, and Museu de Zoologia da Universidade de São Paulo (MZUSP), Brazil. The redescription was performed with the aid of a stereomicroscope Leica M205 using a white light ring LED. Images of the lectotype were taken using a Canon-EOS 6D DSLR with MP-E 65 mm lens mounted on an automatic macro-metric rail (P-51 Camlift) using external flash light. Images of the paralectotype were taken using a Canon-EOS R5 with MP-E 65 mm lens coupled to a manual macro-metric rail and using external white light. Stacked images were combined using Helicon Focus (v8.2.2) applying method C, smoothing 3. Images of the dissected terminalia were taken with a Leica Z16 APOA stereomicroscope coupled to a Leica DFC490 camera using Leica Application Suite (LAS V4.13).

Male terminalia were dissected with the abdomen cut at the beginning of the sixth segment. The dissected parts were macerated with potassium hydroxide (KOH at 10%) and left at room temperature for seven days. Subsequently, the dissected parts were neutralized in baths of tap water for 10 minutes and acetic acid at 10% for 30 minutes. Then, the dissected parts were transferred to an excavated slide containing glycerine for visualization, analyses and imaging of its structures under a stereomicroscope. After being examined, the terminalia pieces were placed in a microvial with glycerine and pinned under the corresponding specimen.

Terminology applied follows CUMMING & WOOD (2017). The term “brush setae” refers to broom-like setae on ventral surfaces of fore and hind tibiae and all tarsi; the term “punctate” was used to denote the minute pits with very fine, appressed setae on the thorax and abdomen. In the descriptions and illustrations, abdominal sclerites are abbreviated with a capital T for tergite and S for sternite.

Label data are cited in full with the original spellings and dates. Information presented within square brackets ([]) is complementary data not included on the labels. Data from the same specimen but from different labels are separated by slashes (/). The map was generated with the web software SimpleMappr (SHORTHOUSE 2010). Map data was derived from specimen labels. Image plates were prepared and edited with Adobe Photoshop CS6 software.

Taxonomy

Cerotainia SCHINER, 1866

Cerotainia SCHINER, 1866: 662 (key), 673 (1868: 170, second erection of genus). Type-species: *Laphria xanthoptera* WIEDEMANN, 1828 (original designation).

Ceratotaenia LYNCH-ARRIBÁLZAGA, 1880: 52 (emendation).

Cyphotomyia WILLISTON, 1889: 257. Type-species: *Cyphotomyia lynchii* WILLISTON, 1889 (original designation).

Protichisma HERMANN, 1912: 35. Type species: *Protichisma longimanus* HERMANN, 1912 (original designation).

Cerotainia brasiliensis SCHINER, 1867 (Figs 1–5)

Cerotainia brasiliensis SCHINER, 1867: 379. Type-locality: “Brazil” (Beske), probably Nova Friburgo, Rio de Janeiro (see PAPAVERO 1971: 87–88); WILLISTON 1891: 79 (catalogue); KERTÉSZ 1909: 168 (catalogue); HERMANN 1912: 43 (key), 51 (revision); CURRAN 1930: 12 (key); CURRAN 1934: 3 (key); BROMLEY 1946: 110 (catalogue); CARRERA 1958: 145 (species list from Boracéia); HULL 1962 (1): 395 (synopsis of world fauna); MARTIN & PAPAVERO 1970: 51 (catalogue); ARTIGAS, PAPAVERO & SERRA 1991: 61 (Atomosiini catalogue); PAPAVERO 2009: 90 (catalogue); LAMAS & CAMARGO 2024 (catalogue).

Type material examined. Lectotype (♂, present designation): Beske 848 Brasilien / brasiliensis Alte Sammlung / brasiliensis det. Hermann / NHMW-ZOO-DIP-0001569 [postpedicel missing; scutum broken anteriorly; pleura broken on left side crossed by the pin; T3 glued on T2; T6 removed for dissection and placed in a vial with glycerine pinned under the specimen] (Fig. 1) (NHMW). – Paralectotypes: Beske 848 Brasilien / brasiliensis Alte Sammlung / brasiliensis det. Hermann / NHMW-ZOO-DIP-0001571 [right postpedicel missing; head glued on thorax; right wing missing; abdomen glued on thorax; T4 glued on T3] (Fig. 4) (♀, NHMW); Beske 848 Brasilien / brasiliensis Alte Sammlung / brasiliensis det. Hermann / NHMW-ZOO-DIP-0001570 [teneral specimen; postpedicel missing; head glued on thorax; scutum damaged around the pin and on anterior right side; remains of glue on posterior right side of scutum and on scutellum; right wing damaged on basal third; abdomen glued on thorax and with lateral margins slightly bent] (♀, NHMW); Brasilien / brasiliensis Coll. Winthem / bella det. Hermann / NHMW-ZOO-DIP-0001572 [postpedicel missing] (♀, NHMW).

Additional material examined. Cássia dos Coqueiros [ca. 21°16'56" S, 47°10'12.57" W], Cajuru – SP [São Paulo], Brasil, II-1954, M.P. Barreto col. (1 ♂, 3 ♀♀, MZUSP); BRASIL: SP [São Paulo]: Salesópolis, Reserva Biológica Boracéia [ca. 23°38'10" S, 45°56'47" W], I.XII.2008, G.F.G. Miranda (3 ♂♂, 3 ♀♀ MZUSP); Muri [ca. 22°20'03" S, 42°29'17" W], Nova Friburgo, Rio de Janeiro, Brasil – I – [19]74, J.H. Guimarães col. (5 ♂♂, 5 ♀♀, MZUSP).

Diagnosis. Black species with bluish reflections on lateral sides of vertex, on thorax, abdomen, and femora (Figs 2C, D); face, frons, and vertex densely golden pruinose anteriorly (Figs 2A–C); frons with a tiny (almost inconspicuous) keel in front of ocellar tubercle; pronotum and anterior margin of scutum with short, thin, appressed dark brown setae (Figs 2B, C) (golden yellow in females); wings infusate with dark brown microtrichia (Figs 2E); legs with dense white setose stripe anteroventrally on fore and mid tibiae extending anterodorsally on fore and mid tarsi, hind tibia with a few, sparse white setae on basal third and hind tarsus with white setae forming rings on the tarsomeres basally (Figs 1A, B) (absent in females).

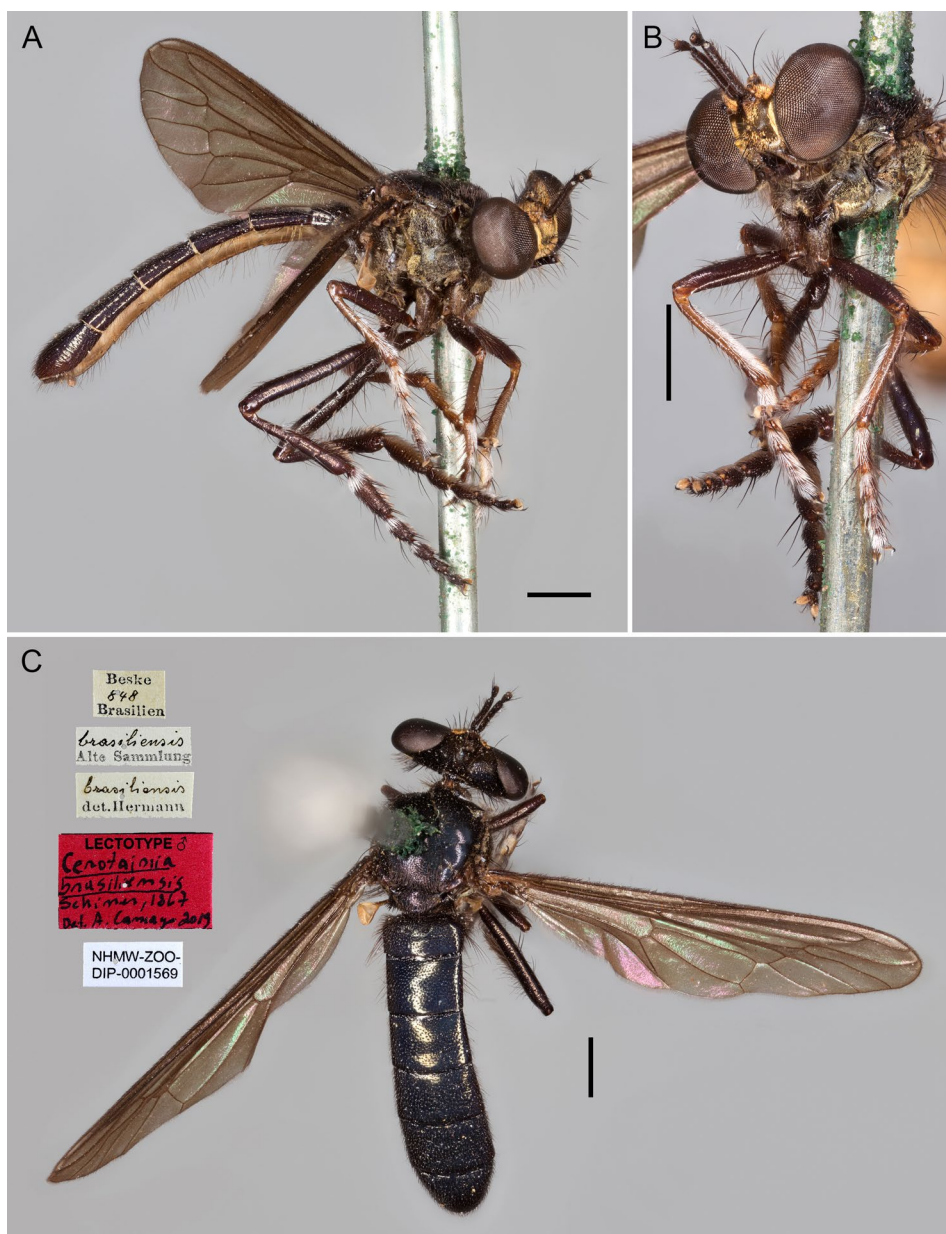


Fig. 1. *Cerotainia brasiliensis*, lectotype, male. Habitus, lateral (A), frontal (B), and dorsal (C), respectively [insert: labels, not to scale]. Scale bars: 1 mm.

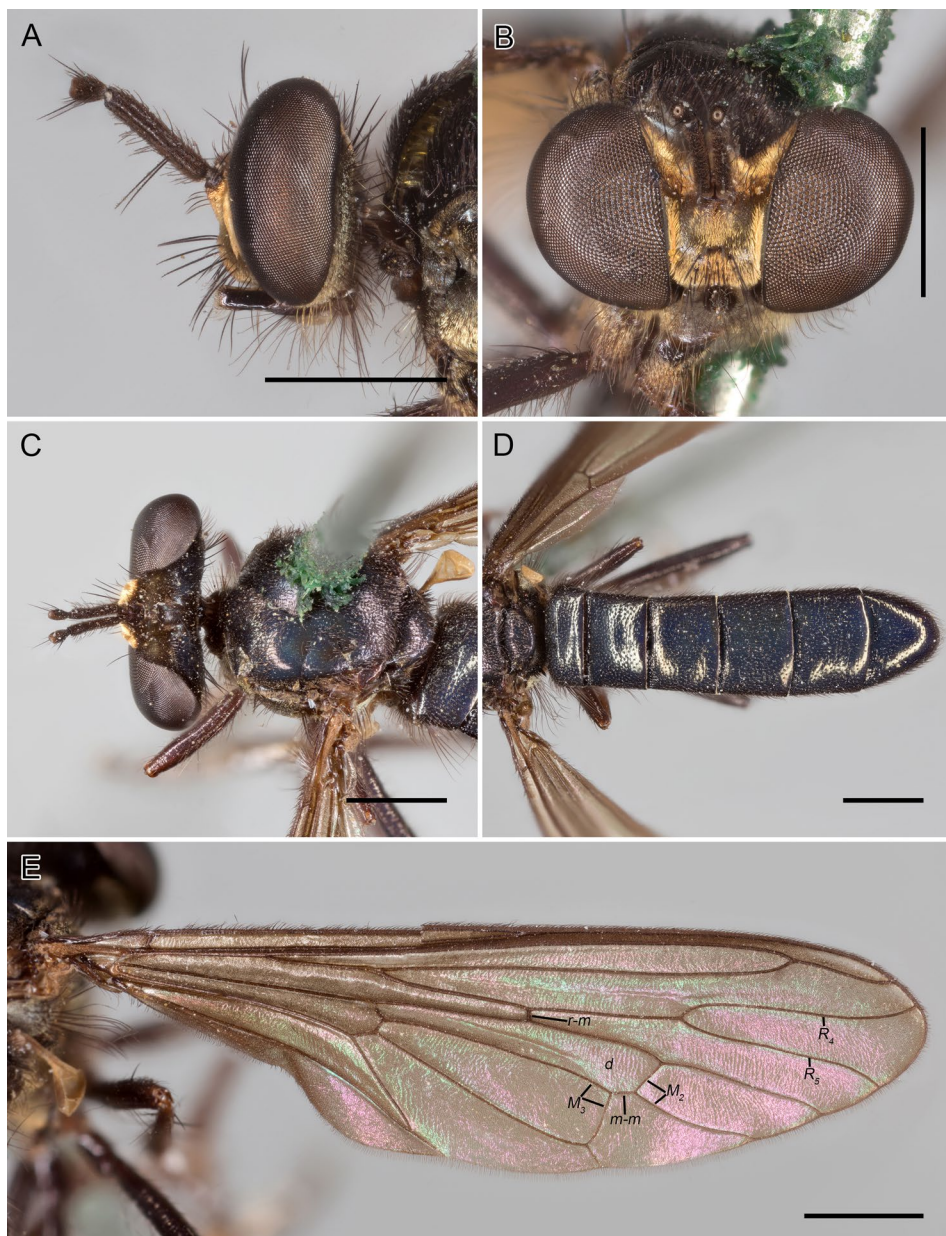


Fig. 2. *Cerotainia brasiliensis*, lectotype, male. Head, lateral (A) and frontal (B), respectively. (C) Head and thorax, dorsal. (D) Abdomen, dorsal. (E) Right wing, dorsal. Abbreviations: *d*: discal cell; *M*: medial veins; *m-m*: medial-medial crossvein; *R*: radial veins; *r-m*: radial-medial crossvein. Scale bars: 1 mm.

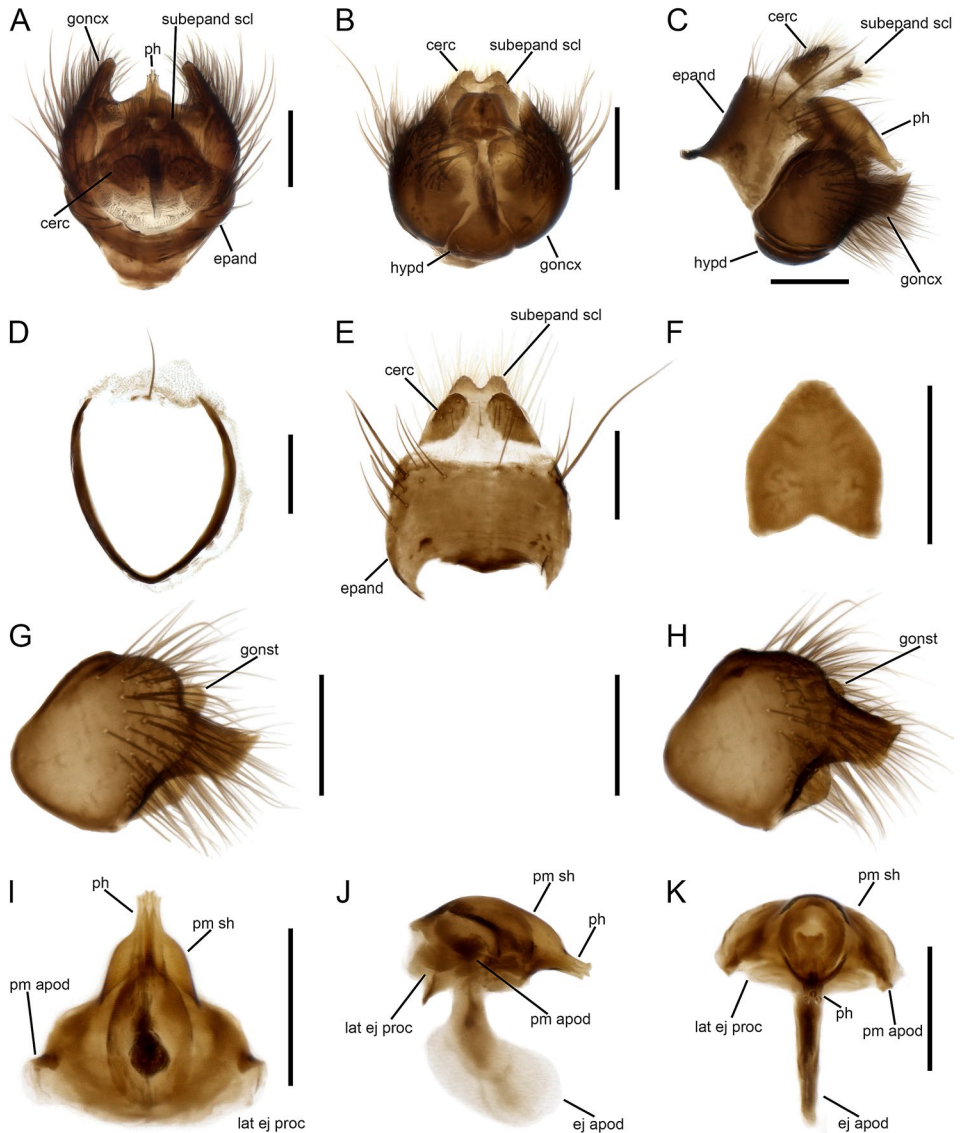


Fig. 3. *Cerotainia brasiliensis*, lectotype, male. (A–C) Terminalia, dorsal (A), ventral (B), and lateral (C), respectively. (D) Tergite 8 and sternite 8. (E) Epandrium, dorsal. (F) Hypandrium, ventral. (G–H) Gonopods, lateral internal (G) and external (H), respectively. (I–K) Phallus, dorsal (I), lateral (J), and posterior (K), respectively. Abbreviations: cerc: cercus; ej apod: ejaculatory apodeme; epand: epandrium; goncx: gonocoxite; gonst: gonostylus; hypd: hypandrium; lat ej proc: lateral ejaculatory process; ph: phallus; pm apod: parameral apodeme; pm sh: parameral sheath; subepand scl: subepandrial sclerite. Scale bars: 0.2 mm.

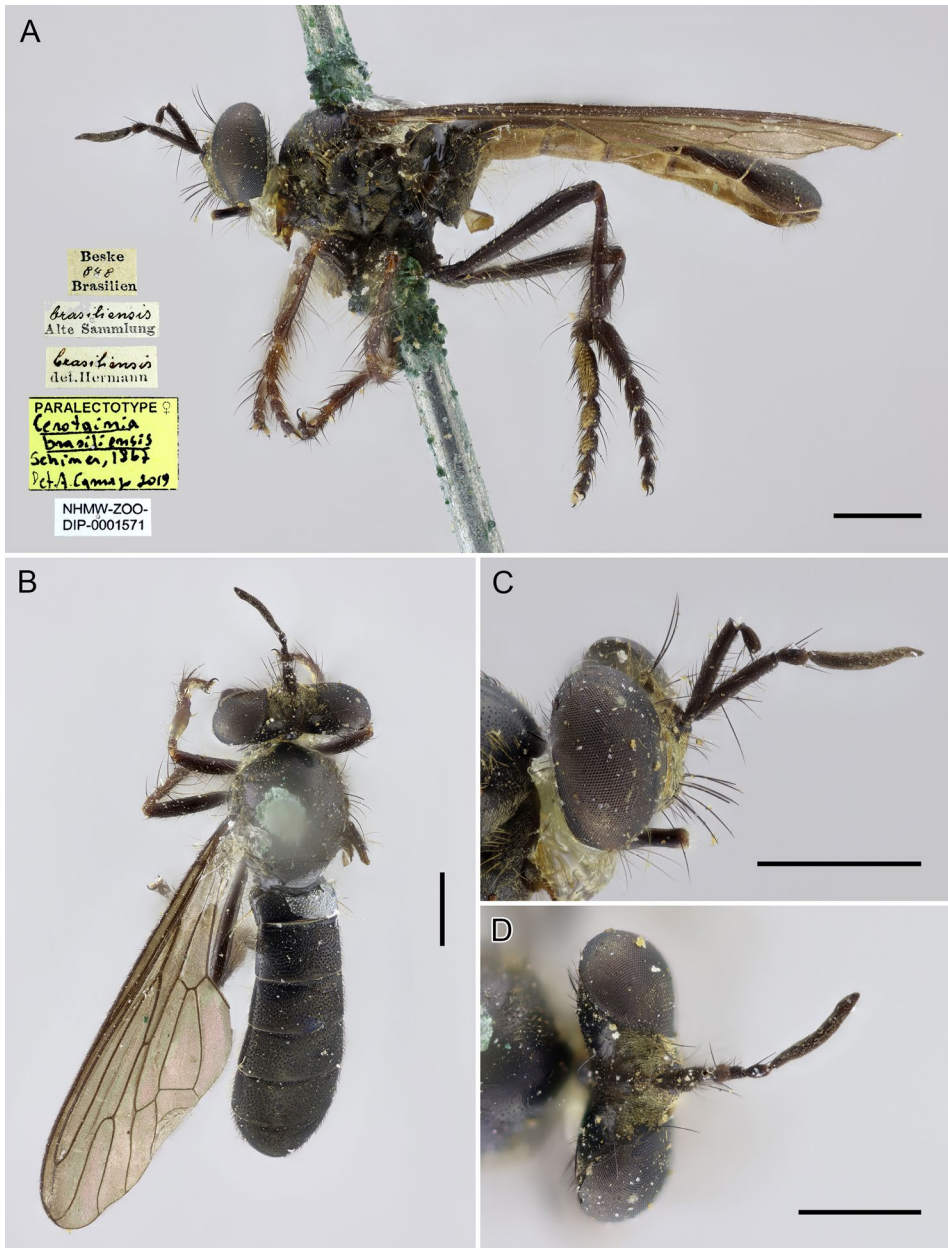


Fig. 4. *Cerotainia brasiliensis*, paralectotype, female. (A–B) Habitus, lateral (A) and dorsal (B), respectively [inserted labels, not to scale]; (C–D) Head, lateral (C) and dorsal (D), respectively. Scale bars: 1 mm.

Redescription of lectotype male. Head (Figs 1A, B, 2A–C). Black, densely golden pruinose (Figs 2A, B), except for a rounded, apruinose spot with bluish reflections on sides of vertex (Fig. 2C), and occiput golden brown pruinose dorsally, whitish laterally and yellowish at lower occipital margin; eyes dark brown; mystax with short black setae medially surrounded by five pairs of stout and long black macrosetae; face, below antennal socket with two pairs of short black setae; parafacial and subvibrissal setae black (Fig. 2A, B); frons sparsely black setose, with a tiny (almost inconspicuous) keel in front of ocellar tubercle as high as antennal socket, orbital setae black; ocellar tubercle prominent (as high as pedicel length) with two divergent black macrosetae anteriorly and two short black setae posteriorly, ocelli whitish; vertex with a few short black setae; 11–12 black postocular macrosetae, other occipital setae black with dark reddish brown tips; lower occipital setae yellowish; postgena with black setae; palpus extremely short, dark reddish brown with setae of same colour; proboscis shining black, basal half dark reddish brown, proboscial setae dark reddish brown, labial setae yellowish. Antennae: black, sparsely golden brown pruinose; scape approximately four times the length of pedicel, with short, sparse black setae and one long ventral black macroseta near base; pedicel with short black setae and two longer black macrosetae, one dorsally and one ventrally (Figs 2A–C); postpedicel black, almost the same length of scape and pedicel combined, and sparsely brown pruinose; apex of postpedicel acute distally with apex rounded (Figs 4C, D) [postpedicel redescribed based on paralectotype female].

Thorax (Figs 1A–C, 2C). Black, with bluish reflections; postpronotal lobe posteriorly with a very small reddish spot; postalar callus and postalar wall dark reddish brown; postpronotal lobe, scutum at anterior corners and lateral margins, scutellar lateral margins anteriorly, and mesopostnotum golden dark brown pruinose; proepisternum, antepronotum laterally, postpronotum and pleuron, golden yellow pruinose. Chaetotaxy: antepronotum with yellowish macrosetae; one notopleural, one supra-alar, and one postalar black macroseta; postalar wall anteriorly with short black setae; punctations on scutum and scutellum with short, sparse, appressed black setae; 2–3 posterior anepisternal black macrosetae; katatergite with long fan-like black macrosetae (most ventral ones light-brown); anatergite with short, stout, spiniform black macrosetae; remaining pleuron with a few, thin, sparse, light-brown to almost black setae.

Wing (Fig. 2E). Dark brown infusate, with concolor microtrichia slightly decreasing through apex and posterior margin; wing cells green or pink iridescent under stereomicroscope (depending on the light angle); veins dark brown, slightly lighter at base, apex, and posterior margin; cells m_3 and *cup* closed and petiolate; bifurcation of veins R_4 and R_5 at a distance of one crossvein *m-m* after end of discal cell; crossvein *r-m* shortly after the middle of discal cell (almost its length after middle); veins M_2 and M_3 disjunct by crossvein *m-m*, not forming a straight line. Halter dark pale yellow.

Legs (Figs 1A, B). Coxae black, golden yellow to brown pruinose; fore and mid trochanters reddish, hind trochanter dark reddish; femora slender, dark reddish brown to almost black with blue reflections, basal and apical joints dark reddish; fore and mid tibiae dark yellow to dark reddish brown, hind tibia dark reddish brown to almost black with bluish reflections; fore and mid tarsi dark yellow to dark reddish brown, except fifth tarsomeres dark reddish brown to almost black, hind tarsus entirely dark brown to almost black. Chaetotaxy: coxae and trochanters with thin dark yellow to dark brown setae, hind trochanter with one anterior and two posteroventral long, dark brown setae; fore femur with 4–5 ventral dark yellow macrosetae, and two dorsal and three posterodorsal black macrosetae; mid femur with 8–10 ventral dark yellow macrosetae, one anterior and one dorsal black

macroseta; hind femur with 4–5 anteroventral, two posterodorsal, and one ventral black macroseta; fore and mid femora with anterior and ventral short dark yellow setae, and dorsal and posterior short dark brown to black setae, hind femur with short dark brown to black setae; tibiae with long dark reddish brown to black macrosetae and short dark yellow to dark reddish-brown setae, except for a white setose stripe anteroventrally, restricted to a few sparse setae on basal third of hind tibia; tarsi with dark reddish brown to black macrosetae and short dark reddish-brown setae, except for an anterodorsal white setose stripe, restricted to basal third of tarsomeres on hind tarsus, forming basal rings; brush setae golden yellow with whitish tips; pulvilli and empodium pale yellow; claws black.

Abdomen (Figs 1A, C, 2D). Black with bluish reflections; apex of T6 and T7 slightly dark reddish; membranous incision of tergites golden yellow pruinose; T1 with eight black lateral marginal macrosetae; T2 with 2–3 lateral macrosetae; punctations with short, thin, regularly distributed, and appressed black setae, becoming slightly longer and golden yellow laterally; sternites pale yellow with brown membranous incisions, S1–4 sparsely yellowish setose and S5–7 sparsely dark brown to black setose.

Terminalia (Fig. 3). Mostly rounded basally in dorsal and ventral views (Figs 3A, B); dark reddish brown with cerci and subepandrial sclerite dark yellow and gonostylus yellow; epandrium and gonocoxite dark brown to black setose with cerci and subepandrial sclerite dark yellow setose; T8 narrow, reduced to a thin half-moon remaining sclerite and S8 membranous with a pair of macrosetae (Fig. 3D [one macroseta broken off during dissection]); epandrium C-concave at anterior margin and straight at posterior margin, setose only laterally and on the posterior corners with one macroseta at each posterior corner (Fig. 3E); cerci rounded at posterior margin and short setose dorsally and at posterior margin (Fig. 3E); subepandrial sclerite with a pair of conic projections at posterior margin and mid posterior margin U-shaped, short and densely setose on the conic projections (Fig. 3E); gonocoxite rounded at anterior margin and asetose, sharply indented dorsally and ventrally at mid-length, becoming densely setose and continuing into a straight and densely setose posterior projection ending in a pointed tip slightly pointed upwards, gonocoxal posterior projection straight dorsally and blade-like ventrally (Fig. 3G); gonostylus forming a lamellate expansion internally on the gonocoxite, rounded dorsally and slightly concave at posterior margin and roundly angulated at ventral corner (Fig. 3H); hypandrium sagittate (Fig. 3F); phallus ending in three short prongs with the medial prong dorsal in relation to the lateral prongs; parameral sheath with rounded posterior corners slightly resembling a trapezium in dorsal view, tapering towards the prongs (Fig. 3I), and slightly humped in lateral view (Fig. 3J); parameral apodeme rounded and short, slightly curved downwards and anteriorly; ejaculatory apodeme clubhead-shaped (Fig. 3J); lateral ejaculatory process directed laterally, resembling a little cupped hand (Fig. 3K).

Length. Body: 8 mm; wings: 7.5 mm.

Redescription of paralectotype female (Fig. 4). Similar to male, except subvibrissal setae yellow, frons with yellow setae, mid-dorsal keel in front of ocellar tubercle more indistinct than male; vertex with mid-dorsal pruinosity brownish; pronotum and anterior margin of scutum with short, thin, appressed golden yellow setae (Fig. 4); katatergite with yellow setae, except by a few brownish setae dorsally; hind femur with yellow anteroventral and posteroventral macrosetae; tibiae and tarsi without white setose stripes anteroventrally and anterodorsally, except on fore tibia with a white anteroventral setose stripe in front of the brush setae and slightly mixed with the golden yellow brush setae; brush setae golden yellow; abdominal lateral marginal macrosetae yellow; posterior margins of T6–T8, and cercus, slightly dark reddish; cercus with yellow setae.

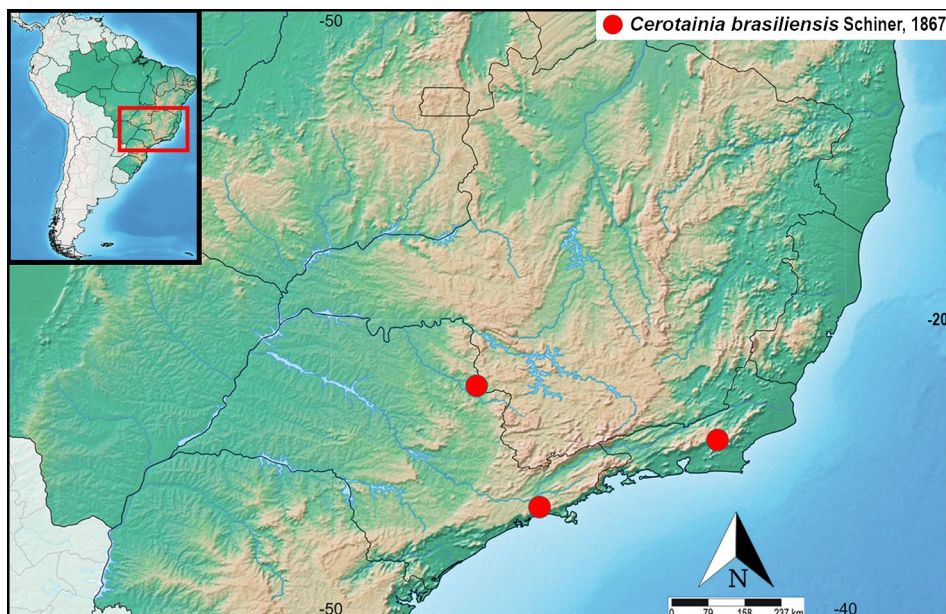


Fig. 5. Distribution map of *Cerotainia brasiliensis*.

Distribution. Brazil (São Paulo and Rio de Janeiro) (Fig. 5).

Phenology. Specimens were collected in December, January and February coinciding with late spring and early summer seasons in the southern hemisphere.

Taxonomic discussion. SCHINER (1867) did not provide any information regarding sexual dimorphism for this species in the original description. The males have a characteristic white setose stripe on fore and mid tibiae and tarsi, and rings of white setae at the base of the hind tarsomeres (Figs 1A, B), while such setose composition is absent in females (Fig. 4A). Additionally, the short, appressed setae at the anterior margin of the scutum are dark brown to black in males (Figs 2B, C), while golden yellow in females (Fig. 4). Furthermore, SCHINER (1867) mentions in his original description to have examined “two pairs” of specimens. From these four specimens, the single male was selected for redescription and herein designated as lectotype (Fig. 1).

In the keys of HERMANN (1912: couplet 7) and CURRAN (1930: couplet 10) only female specimens of *Cerotainia brasiliensis* would continue to the next steps while the males would be misidentified. The referenced couplets say: “scutum partly yellow setose” – a character only present in female specimens (as explained above). The key of CURRAN (1934) will also lead to an erroneous identification because couplet 21 says: “scutellum with at most a few yellow setae basally”. In *Cerotainia brasiliensis*, both sexes possess only dark brown to black setae on the scutellum basally.

Additional useful characters to readily identify this species are as follows: body black (Figs 1, 2), thorax, and abdomen with blue reflections under stereomicroscope (Figs 2C, D); postpedicel as long as scape and pedicel combined; face densely golden yellow pruinose; mystax with 5 pairs of black macrosetae and a mid-group of shorter black setae (Figs 2A, B); anterior margin of scutum with short, appressed, dark brown to black setae in males

(Figs 2B, C), and golden yellow setae in females (Fig. 4); thoracic (including scutellum) and abdominal punctations with short, appressed, dark brown to black setae (Figs 2C, D); wings entirely infuscate (Fig. 2E); legs black, except fore and mid tibiae and tarsomeres 1–4 dark yellow to dark reddish brown; males with a characteristic white setose stripe on fore and mid tibiae and tarsi, and rings of white setae at the base of the hind tarsomeres (Figs 1A, B); and abdomen about four times as long as the thorax (Figs 1A, C, 2D).

HERMANN (1912) commented that he had a specimen from Bolivia in his private collection. Since this material was not available for this study, this record was not included in the distribution range. The same is true for the records from Ponta Grossa (Paraná) and Nova Teutônia (Santa Catarina) in Brazil mentioned by CARRERA (1958) as this material was not found at the MZUSP. It is also worth mentioning that the type material was collected by Beske, who according to PAPAVERO (1971: 87–88) was an active collector who lived in the city of Nova Friburgo, Rio de Janeiro, probably the type-locality of *Cerotainia brasiliensis*. Additional material has also been collected in Nova Friburgo (see material examined), corroborating this assumption.

Acknowledgements

MMMS thanks Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) by the post-doctoral fellowship grant number (2023/17951-0).

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