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Review of the Neotropical Ciidae (Insecta: Coleoptera) in the *Cis taurus* species-group

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Abstract

The described Neotropical species of *Cis* Latreille, 1796 belonging to the *taurus* group are revised here. We designate lectotypes for the following names: *Malacocis bahiensis* Pic, 1916, *Macrocis bison* Reitter, 1878, *Macrocis diabolicus* Reitter, 1878, *Macrocis grandicornis* Pic, 1917, *Macrocis rufescens* Pic, 1922, *Macrocis testaceimembris* Pic, 1916, *Macrocis testaceus* Pic, 1916 and *Trichapus pubescens* Friedenreich, 1881. We transfer *T. pubescens* to *Cis* and include it in the *taurus* species-group, synonymize *Trichapus* Friedenreich, 1881 with *Cis* and transfer *T. glaber* Friedenreich, 1881 to *Porculus* Lawrence, 1987. We include *C. longipilis* Pic, 1930 in the *taurus* group and propose *Macrocis bison* as a junior synonym of *C. diabolicus* (Reitter, 1878). We redescribe eight Neotropical species: *C. bahiensis* (Pic, 1916), *C. diabolicus* (Reitter, 1878), *C. grandicornis* (Pic, 1917), *C. kawanabei* Lopes-Andrade, 2002, *C. pubescens* (Friedenreich, 1881) **new combination**, *C. rufescens* (Pic, 1922), *C. setifer* (Gorham, 1883) and *C. testaceimembris* (Pic, 1916). We also provide information on their geographic distribution and host fungi. This work solves the major taxonomic problems with the described *taurus* group species and also provides detailed morphological information on them, including that of male abdominal terminalia, allowing accurate identification of these species.

Key words

Polyphaga, Tenebrionoidea, Ciini, male abdominal terminalia, minute tree-fungus beetles.

1. Introduction

Ciidae is a diverse and cosmopolitan family of fungivorous beetles with 43 genera and more than 650 described species (Lawrence & Lopes-Andrade 2008, 2010; Antunes-Carvalho et al. 2012). These small beetles (ca. 1–7 mm body length) live, feed and reproduce inside basidiomes of Polyporales and Hymenochaetales fungi (Pavior-Smith 1960; Epps & Arnold 2010; Lawrence & Lopes-Andrade 2010), building tunnels and feeding on the sterile support tissue of the fungus (Lawrence & Lopes-Andrade 2010), leaving it just to disperse.

Cis Latreille, 1796, is the most speciose ciid genus and comprises approximately 370 species. It is an assemblage of 25 species-groups, which are used today as taxonomic tools to better deal with such a diversified taxon (Lawrence 1971; Lopes-Andrade 2008a). However, not all species of the genus are organized in groups. The few proposed subgenera of *Cis* are currently not used by authors (e.g. Lawrence 1971; Kawanabe 1997; Lopes-Andrade 2008a, 2010; Lopes-Andrade et al. 2009) and the whole genus deserves a careful revision. The genus *Cis*

is defined by a set of characteristics common to several ciid lineages; however, these characteristics can be convergences between distinct lineages or plesiomorphies of Ciinae. The only phylogenetic analysis of the family (Buder et al. 2008) suggests that the genus *Cis* is polyphyletic.

The morphology-based species-group of *Cis* named *taurus* group currently comprises ten species, as follows: *C. bahiensis* (Pic, 1916), *C. bison* (Reitter, 1878), *C. cornelli* Lawrence, 1971, *C. diabolicus* (Reitter, 1878), *C. grandicornis* (Pic, 1917), *C. kawanabei* Lopes-Andrade, 2002, *C. rufescens* (Pic, 1922), *C. setifer* (Gorham, 1883), *C. taurus* (Reitter, 1878) and *C. testaceimembris* (Pic, 1916). Most of them were described in the genus *Macrocis* Reitter, 1878, later synonymized with *Cis* by Lawrence (1971). Species in the *taurus* group can be separated from other *Cis* by the following features: body robust, strongly convex; frontoclypeal ridge usually with a pair of lateral horns in males and two short projections in females; prosternum in front of coxae strongly tumid and carinate at the longitudinal midline; prosternal process comparatively narrower at middle and enlarged at apex; protibial apex with a row of spines and outer apical angle produced into a stout tooth. While these features allow to recognize members of the *taurus* group, the monophyly of the group cannot be demonstrated at present due to the very limited evidence on the phylogeny of the genus *Cis* and other Ciidae. The *taurus* group is possibly the most speciose species-group of *Cis* in the Neotropical region, as based on our own extensive collections, and many additional species seem to exist. However, few species are described and, except for *C. cornelli* and *C. taurus*, the available information in the literature does not allow accurate identifications.

The name-giving species *Cis taurus* has been treated in a recent paper (Oliveira & Lopes-Andrade 2013). The aim of the present paper is to clarify the taxonomy of the remaining *taurus* group with regard to the species so far formally described. This is mainly reached by erecting standardized redescriptions of species based on the study of the type material whenever available (along with designations of lectotypes), plus further material if present. In addition we update information on the geographic distribution and host fungi of the species of the *taurus* group. We also newly include two species in the *taurus* group: one *Cis* that has so far been unassigned to any species-group of the genus and a species originally described in *Trichapus* Friedenreich, 1881, a genus here synonymized with *Cis*.

2. Materials and methods

We examined more than one thousand mounted specimens comprising approximately 80 morphologically distinct units. These correspond to ten described species previously included in the *taurus* group, two described ciid species not assigned to the *taurus* group before, plus a wealth of *taurus* group specimens that are more or less divergent from the described species. For part of the latter group, tentative species assignments are given below albeit they cannot yet be reliably assigned based on the work done herein; other specimens that are too different from previously described species likely represent new species of the *taurus* group and are not further considered herein.

Redescriptions of species are based on their respective lectotypes, designated in the present work, except for *C. diabolicus*, whose redescription was based on the single paralectotype that we had in hands, and *C. setifer*, whose redescription was based on a specimen compared to the type-series and here called plesiotype (sensu Evenhuis 2008). We had type specimens in hands, or examined them in the past, of most of the studied species, except for *C. longipilis*, of which no type material could be located. In the cases of *C. bahiensis*, *C. bison* and *C. kawanabei* we have located only a single type specimen each, designated here as lectotypes. We cannot consider these as holotypes because it is unknown how many specimens were examined for their original descriptions. For *C. cornelli* and *C. diabolicus* we had in hands only paratypes and paralectotypes, respectively, but it shall be noted that the former was described by one of the authors of the present work (see Lawrence 1971) and the second was compared to the lectotype by him. For *C. grandicornis*, *C. rufescens*, *C. pubescens* n. comb. and *C. testaceimembris* we had the lectotype and one or more paralectotypes. We have designated the lectotype of *C. taurus* in a previous work (Oliveira & Lopes-Andrade 2013) and complementary information on the type-series is provided here (see 3.12.).

We dissected lectotypes and compared sclerites of male abdominal terminalia to clarify doubts on species limits of very similar morphospecies, except for *C. diabolicus* (paralectotype dissected), *C. rufescens* and *C. setifer* (a specimen compared to the type was dissected). In case a morphospecies was very similar to any described species, including the ones transferred to the *taurus* group here, we dissected and compared male abdominal terminalia of specimens from each recognized population.

The terminology used here follows Lopes-Andrade & Lawrence (2005, 2011). Frontoclypeal horns with a near-circular or thickly oval cross section are described as "cylindrical" when the transversal diameter is approximately constant up to the apex (process parallel-sided), and "conical" when this diameter decreases towards the apex (process tapering); horns with a strongly flattened cross section and a transversal diameter that is approximately constant up to the apex are categorized as "laminar parallel-sided". What we call tegmen herein is not homologous to what is called tegmen in other cucujiform taxa, which is considered to be a modification of the phallobase. The phallobase in all Ciidae is reduced, articulated with and slightly overlapping the structure al-

most universally called the tegmen by ciid workers. This "tegmen" is usually called the apicale in Tenebrionidae and several other Tenebrionoidea families and consists of the two parameres, which are solidly fused together (Lawrence et al. 2010; Lawrence & Lopes-Andrade 2010; Lawrence & Ślipiński 2013). The term tegmen will be used here, instead of apicale, following most current taxonomic works on Ciidae, including Lawrence (1971, 1987, 1991), Kawanabe (1997, 2001, 2002), Thayer & Lawrence (2002), Lopes-Andrade & Lawrence (2005, 2011), Lopes-Andrade (2007a,b, 2008a,b, 2010, 2011), Antunes-Carvalho & Lopes-Andrade (2011, 2013), Antunes-Carvalho et al. (2012) and Sandoval-Gómez et al. (2011).

Range, mean and standard deviation values for measurements (in millimetres) and ratios are provided in the description and the following abbreviations are used: BW, basal width of scutellum; CL, length of antennal club (measured from base of the eighth to apex of the tenth = terminal antennomere); EL, elytral length (at midline, from base = anterior margin of scutellum to elytral apex); EW, greatest elytral width (including both elytra); FL, length of antennal funicle (measured from base of the third to apex of the seventh antennomere); GD, greatest depth of body (vertically from top of elytra to metaventrite); GW, greatest width of eye; PL, pronotal length along midline; PW, greatest pronotal width; TL, total length (= EL+PL; head not included). The ratio GD/EW was recorded as an indication of degree of convexity; TL/EW indicates degree of body elongation, "elongated" referring to species with higher TL/EW ratio, "rounded" referring to species with lower TL/EW ratio. We measured a maximum of five males and five females from each locality. Differences among specimens are given in the section on "Variation", together with standard measurements and ratios.

We measured specimens and made redescriptions under a Zeiss Stemi 2000-C stereomicroscope, and took digital photographs under a Zeiss Discovery V8. Final images were the result of montaging 25 to 60 image slices at different focal lengths using the extended focus module of Zeiss Axiovision 4.8 software. We followed the protocol described by Lopes-Andrade (2011) for whole mount preparations of male abdominal terminalia and photographed dissected pieces under a Zeiss Axiolab compound microscope equipped with a Zeiss Axiocam ERc 5s digital camera. We created distribution maps using latitude and longitude coordinates estimated by tracking localities in the online database GeoNames (Wick 2010) and plotting them in a map using the software ArcGis 10.1. We do not provide an identification key to *taurus* species because there is a high number of recognized undescribed species in the group. At this moment, a key restricted to the described species would be of no help to anyone working on *taurus* species. A comparative chart of diagnostic features of the presently described species is provided in Table 1.

Specimens examined in this work belong to the following scientific collections (preceded by acronyms used in this paper):

ANIC Australian National Insect Collection, CSIRO Ecosystem Sciences (Canberra, Australia)
FMNH Field Museum of Natural History (Chicago, Illinois, USA)
LAPC Cristiano Lopes-Andrade Private Collection (Viçosa, MG, Brazil)
MNHN Muséum National d'Histoire Naturelle (Paris, France)
MZSP Museu de Zoologia da Universidade de São Paulo (São Paulo, Brazil)
NMNH National Museum of Natural History, Smithsonian Institution (Washington, D.C., USA)

3. Systematics

3.1. *Cis* Latreille, 1796

Cisdygma Reitter, 1885
Eridaulus Thomson, 1859
Macrocis Reitter, 1878
Trichapus Friedenreich, 1881 (in part), **n. syn.**
Xestocis Casey, 1898

Comments. The transfer of *Trichapus pubescens*, type-species of the genus *Trichapus* (see Lawrence 1987) to *Cis* and consequent synonymization of *Trichapus* with *Cis* leaves *Trichapus glaber* Friedenreich, 1881, without genus assignment. We did not locate the type of *T. glaber*. Here we transfer this species to *Porculus* Lawrence, 1987, leading to *P. glaber* (Friedenreich, 1881), **new combination**, a decision based on its original description and on comments by Lawrence (1987).

3.2. *Cis taurus* species-group

Diagnosis. The species of the *taurus* group have the following set of characteristics: body robust, plump and stocky, strongly to moderately convex; frontoclypeal ridge usually with a pair of lateral horns with diverse shapes in males, frontoclypeal ridge in females bearing two short projections in the same position as the males's horns; prosternum in front of coxae strongly tumid and carinate at the longitudinal midline; prosternal process broad and comparatively narrower at middle and enlarged at apex, never laminate; protibial apex with a row of spines and outer apical angle produced into a stout tooth; tegmen (= apicale) subcylindrical, opened ventrally, nearly as long as penis or a bit shorter, with distinctive excavations near the apex; penis subcylindrical, its apical portion usually membranous and wrinkled.

Table 1. Comparative chart showing the main differences between described *Cis taurus* group species. Specimens of *Cis longipilis* were not available for the present study; entries are derived from the original description, and for some characters there is no information. "l–r" = left and right horn of a pair.

	Features							
Species	**Body shape**	**Elytral vestiture**	**Pronotum, surface between punctures**	**Pronotum, lateral margins**	**Elytral punctation**	**Male frontoclypeal pair of horns**	**Sex patch on 1st abdominal ventrite**	**Tegmen**
Cis bahiensis	convex and rounded	long slender yellowish setae; sparse	microreticulated	explanate, not crenulated, visible for their entire lengths from above	single, not seriate	conical, acute apices; l-r parallel	1/4 length of ventrite, located next to its posterior margin	2.6 × as long as wide, 1.6 × shorter than penis
Cis cornelli	convex and elongated	moderately short thick yellow setae; dense	finely granulate	explanate, crenulated, visible for their entire lengths from above	dual, seriate	conical, acute apices; l-r converging	1/4 length of ventrite, located anterad of its centre	2.2 × as long as wide, 1.4 × shorter than penis
Cis diabolicus	convex and elongated	long slender greyish setae; dense	smooth	explanate, crenulated, visible for their entire lengths from above	dual, not seriate	conical, acute apices; l-r parallel	1/5 length of ventrite, located next to its posterior margin	2.5 × as long as wide, as long as penis
Cis grandicornis	strongly convex, rounded and robust	long thick yellowish setae; dense	microreticulated	not explanate, not crenulated, not visible from above	dual, not seriate	laminar parallel-sided, rounded apices; l-r parallel	1/6 length of ventrite, located next to its posterior margin	3 × as long as wide, 1.25 × shorter than penis
Cis kawanabei	convex and strongly elongated	long slender yellowish setae; dense	smooth	explanate, crenulated, barely visible for their entire lengths from above	dual, seriate	conical, acute apices; l-r converging	1/4 length of ventrite, located next to its posterior margin	2 × as long as wide, 1.33 × shorter than penis
Cis longipilis	"oblong"	long greyish setae; sparse	no information	no information	strong punctures, sparse	long and robust	no information	no information
Cis pubescens	convex and elongated	long slender yellowish setae; dense	microreticulated	explanate, weakly crenulated, visible for their entire lengths from above	dual, not seriate	laminar parallel-sided, rounded apices; l-r converging	1/4 length of ventrite, located next to its posterior margin	2 × as long as wide, 1.33 × shorter than penis
Cis rufescens	convex and elongated	subglabrous	microreticulated	weakly explanate, weakly crenulated, visible for their entire lengths from above	dual, seriate	conical, acute apices; l-r barely converging	1/4 length of ventrite, located next to its posterior margin	2 × as long as wide, as long as penis
Cis setifer	convex and rounded	short thick yellowish setae; dense	microreticulated	strongly explanate, not crenulated, visible for their entire lengths from above	dual, subseriate	conical, acute apices; l-r slightly converging	2/5 length of ventrite, located next to its posterior margin	1.7 × as long as wide, 1.5 × shorter than penis
Cis taurus	convex and elongated	subglabrous	microreticulated	explanate, weakly crenulated, visible for their entire lengths from above	dual, subseriate	conical, acute apices; l-r parallel	1/2 length of ventrite, located at its centre	2 × as long as wide, almost as long as penis
Cis testaceimembris	strongly convex and elongated	short thick yellowish setae; dense	microreticulated	weakly explanate, crenulated, barely visible for their entire lengths from above	dual, not seriate	cylindrical, rounded apices; l-r parallel	very small, an inconspicuous mark, located at centre of ventrite	4.4 × as long as wide, 1.25 × shorter than penis

Distribution. Species of the *Cis taurus* group are distributed from the south of the United States (Florida, North and South Carolina) southward to Argentina and possibly to the southernmost areas of South America. A summary of the main distinctive features of the described species is given in Table 1.

Included species. The *taurus* species-group of *Cis* is now constituted by the following species (species redescribed herein preceded by an asterisk):

* *Cis bahiensis* (Pic, 1916)
Cis cornelli Lawrence, 1971
* *Cis diabolicus* (Reitter, 1878)
– *Macrocis bison* Reitter, 1878, **n. syn.**
* *Cis grandicornis* (Pic, 1917)
* *Cis kawanabei* Lopes-Andrade, 2002
Cis longipilis Pic, 1930, doubtfully included
* *Cis pubescens* (Friedenreich, 1881), **n. comb.**
* *Cis rufescens* (Pic, 1922)
* *Cis setifer* (Gorham, 1883)
Cis taurus (Reitter, 1878)
* *Cis testaceimembris* (Pic, 1916)

Redescriptions, lectotype designations and complete historical and taxonomic information are provided below.

Material. Most of this work is based on type specimens, as far as we could locate these. Both by own field collecting and in the natural history collections indicated in Materials & Methods, we found additional specimens and expanded the distributional records for *C. kawanabei*, *C. pubescens* n. comb., *C. rufescens* and *C. setifer*. However, we did not locate additional specimens of *C. bahiensis*, *C. diabolicus*, *C. grandicornis* and *C. testaceimembris*, so these remain known only from their original type-series. *Cis taurus* was recently redescribed, and geographic distribution and other information on it was provided by Oliveira & Lopes-Andrade (2013). *Cis cornelli* is adequately described and thus we do not provide further information on it. We did not locate the type or named specimens of *C. longipilis*. We inferred it belongs to the *taurus* group according to its original description.

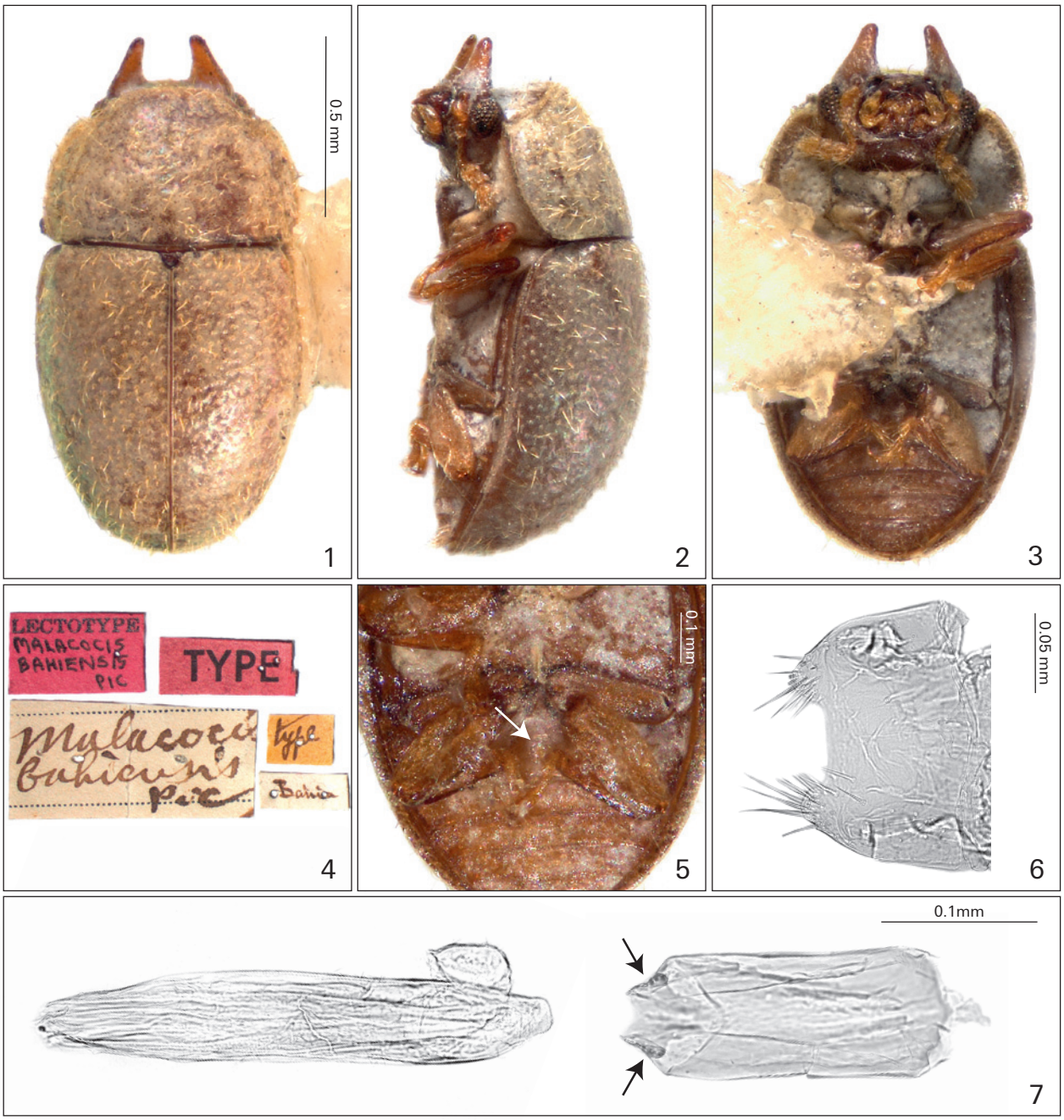
3.3. *Cis bahiensis* (Pic, 1916)

Figs. 1–7

Malacocis bahiensis Pic, 1916: 5; Lopes-Andrade 2002a: 6.
C*is bahiensis;* Lawrence 1971: 505.

Diagnosis. Body convex, rounded with dorsal vestiture consisting of long and slender yellowish setae. Pronotum much wider than long, single punctation and surface between punctures microreticulated; lateral margins explanate, not crenulated and visible for their entire lengths from above. Elytral punctation single and not seriate. Males with frontoclypeal ridge bearing a pair of parallel, conical horns with acute apices and abdominal sex patch of approximately one-fourth the length of the first abdominal ventrite, located next to the posterior margin at midline.

Redescription, male lectotype (Figs. 1–7)**.** Not fully pigmented, possibly a teneral adult with soft cuticle and in relatively bad condition. Measurements (in mm): TL 1.30, PL 0.45, PW 0.73, EL 0.85, EW 0.76, GD 0.63. Ratios: PL/PW 0.62, EL/EW 1.12, EL/PL 1.89, GD/EW 0.83, TL/EW 1.71. Body robust, convex, rounded, yellowish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, with sparse slender setae and sparse fine punctation; frontoclypeal ridge bearing a pair of short and conical horns (length 0.15 mm; width 0.10 mm at base) with acute apices, the pair of horns parallel and separated by a distance of approximately 0.13 mm at base. ***Antennae*** (left antenna measured) with FL 0.13, CL 0.15, CL/FL 1.15, length of antennomeres 1–10 (in mm) as follows: 0.10, 0.08, 0.04, 0.03, 0.02, 0.02, 0.02, 0.05, 0.04, 0.06. ***Eyes*** glabrous, GW 0.10. ***Pronotum*** much wider than long with approximately half the length of elytra length; anterior margin arched outward; anterior angles rounded and produced forward; lateral margins explanate, not crenulated, sub-arched inward and visible for their entire lengths from above; posterior margin sublinear; punctation single and coarse with microreticulated sculpture between punctures, vestiture sparse consisting of slender yellowish setae, each seta as long as the base of scutellum. ***Scutellum*** hemispherical, BW 0.06. ***Elytra*** subquadrate, strongly convex; punctation single, coarse and not seriate with punctures approximately the same size as those on pronotum; vestiture sparse consisting of slender yellowish setae, twice as long as the base of scutellum; humeral calli conspicuous. ***Prosternum*** biconcave, strongly tumid and weakly carinated at the longitudinal midline; vestiture very sparse consisting of short setae; surface granulate; prosternal process narrow at base and abruptly expanded to a blunt and triangular apex. ***Protibia*** with outer apical angle produced into a stout tooth, with a tuft of setae at inner margin above tarsus and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not forming a stout tooth and apex bearing a row of spines. ***Metaventrite*** convex, granulate, with single fine punctation and slender setae. ***Abdominal ventrites*** granulate; punctation single and subseriate, consisting of shallow fine punctures; vestiture of sparse slender setae; length of ventrites 1–5 (in mm, from base to apex at the longitudinal midline): 0.19, 0.06, 0.06, 0.07, 0.10. First abdominal ventrite bearing an oval, not marginated, pubescent sex patch (Fig. 5, arrow) with a transverse diameter of 0.05 mm, located next to the posterior margin at midline. ***Male abdominal terminalia*** (Figs. 6–7) with ***sternite VIII*** (Fig. 6) 1.3 × as wide as long, almost

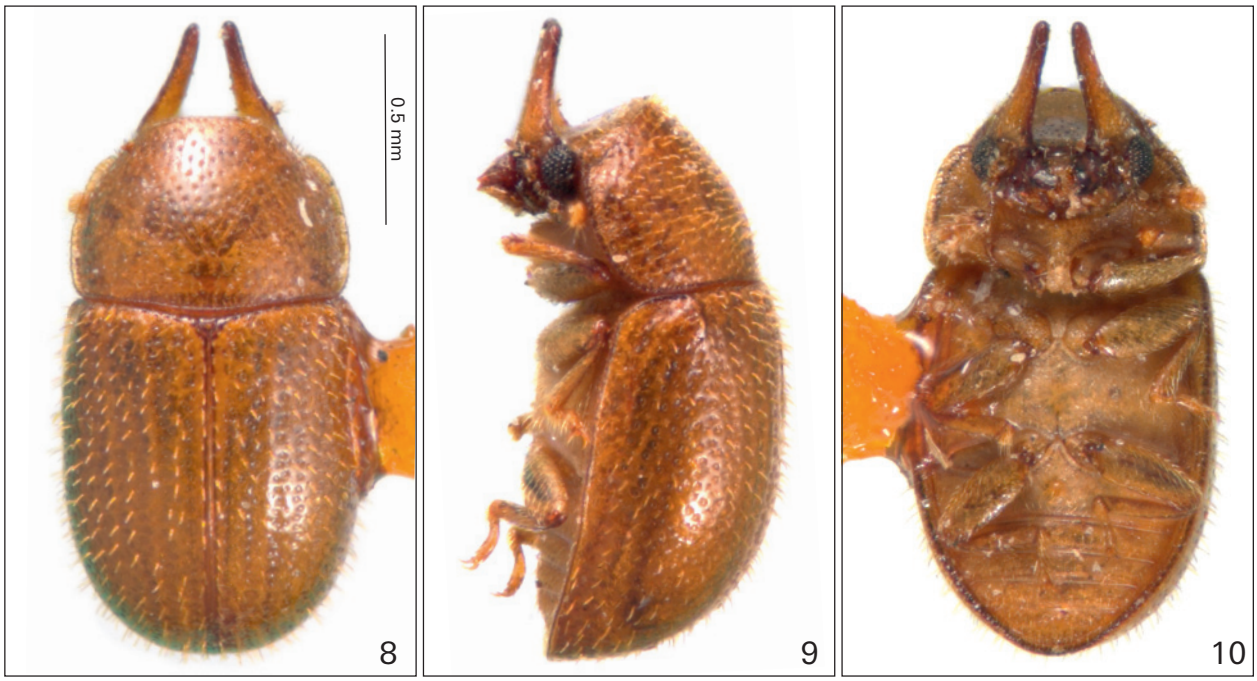


Figs. 1–7. *Cis bahiensis* (Pic, 1916), male lectotype from northeastern Brazil. **1**: Dorsal view. **2**: Lateral view. **3**: Ventral view. **4**: Labels. **5**: Abdominal ventrites, with sex patch on first ventrite (arrow). **6**: Eighth abdominal sternite. **7**: Penis shown at left and tegmen at right; arrows indicate the lateral inflexions near the apex of tegmen.

3 × shorter than penis; posterior margin broadly emarginated to approximately one-fourth the sternite length, forming two lateral lobes rounded at apices, slightly converging and bearing long setae, the margin between lobes being almost straight. ***Tegmen*** (Fig.7, right) subcylindrical, approximately 2.6 × as long as wide, 1.6 × shorter than penis; anterior margin subrounded, bearing an angulated minute projection at its centre; lateral margins sclerotized and subparallel; distal portion bearing basiconic sensilla, apical portion divided by a dorsal fissure into two small lobes, subpyramidal and bearing basiconic sensilla, outer edge of each lobe with an inflexion at base (Fig. 7, arrow). ***Penis*** (Fig. 7, left) subcylindrical, approximately 0.33 mm long, nearly 5.3 × as long as wide; proximal portion narrowed to a sclerotized rectangular tip, apex membranous; lateral margins subparallel; ratio of penis length and body size 0.25.

Females. Unknown.

Type material examined. Brazil: Lectotype here designated, ♂ (MNHN)\Bahia [handwritten]\Malacocis bahiensis Pic [handwritten]\Type [handwritten in yellow paper]\LECTOTYPE [printed] MALACOCIS BAHIENSIS PIC [handwritten] [red paper]\TYPE [printed]\orange circle\♂ dissected 17.i.2013 Lopes-Andrade [handwritten]\ Fig. 4.



Figs. 8–10. *Cis cornelli* (Lawrence, 1971), male from Liberty County (St. Catherines Islands, state of Georgia, USA). **8**: Dorsal view. **9**: Lateral view. **10**: Ventral view.

Comments. Known only from "Bahia", Brazil, which refers to the old state of Bahia, much broader than the state with its current limits. We indicate it in the map as an unknown locality in northeastern Brazil (Fig. 75). Only one (male) type specimen was located. The author did not mention whether he based the description on one or more specimens, therefore we cannot consider this single specimen as being the holotype. Here we designate it as the lectotype, considering the possibility that further specimens of the type-series can be located in the future. Host fungi are unknown. Lawrence (1971) transferred *Malacocis bahiensis* to the genus *Cis* and placed it in the *taurus* group.

3.4. *Cis cornelli* Lawrence, 1971

Figs. 8–10

Cis cornelli Lawrence, 1971: 450; Kawanabe 1997: 328; Lawrence 1982: 2; Oliveira & Lopes-Andrade 2013: 483.

Diagnosis. Body convex and elongated with dorsal vestiture consisting of moderately short and thick yellowish setae. Pronotum with single punctation and surface between punctures finely granulate; lateral margins explanate, crenulated and visible for their entire lengths from above. Elytral punctation dual and seriate. Males with frontoclypeal ridge bearing two converging and conical horns with acute apices and abdominal sex patch of approximately one-fourth the length of the first abdominal ventrite located at midline.

Morphology. Information on the morphology of the species is fully provided in its original description (Lawrence 1971).

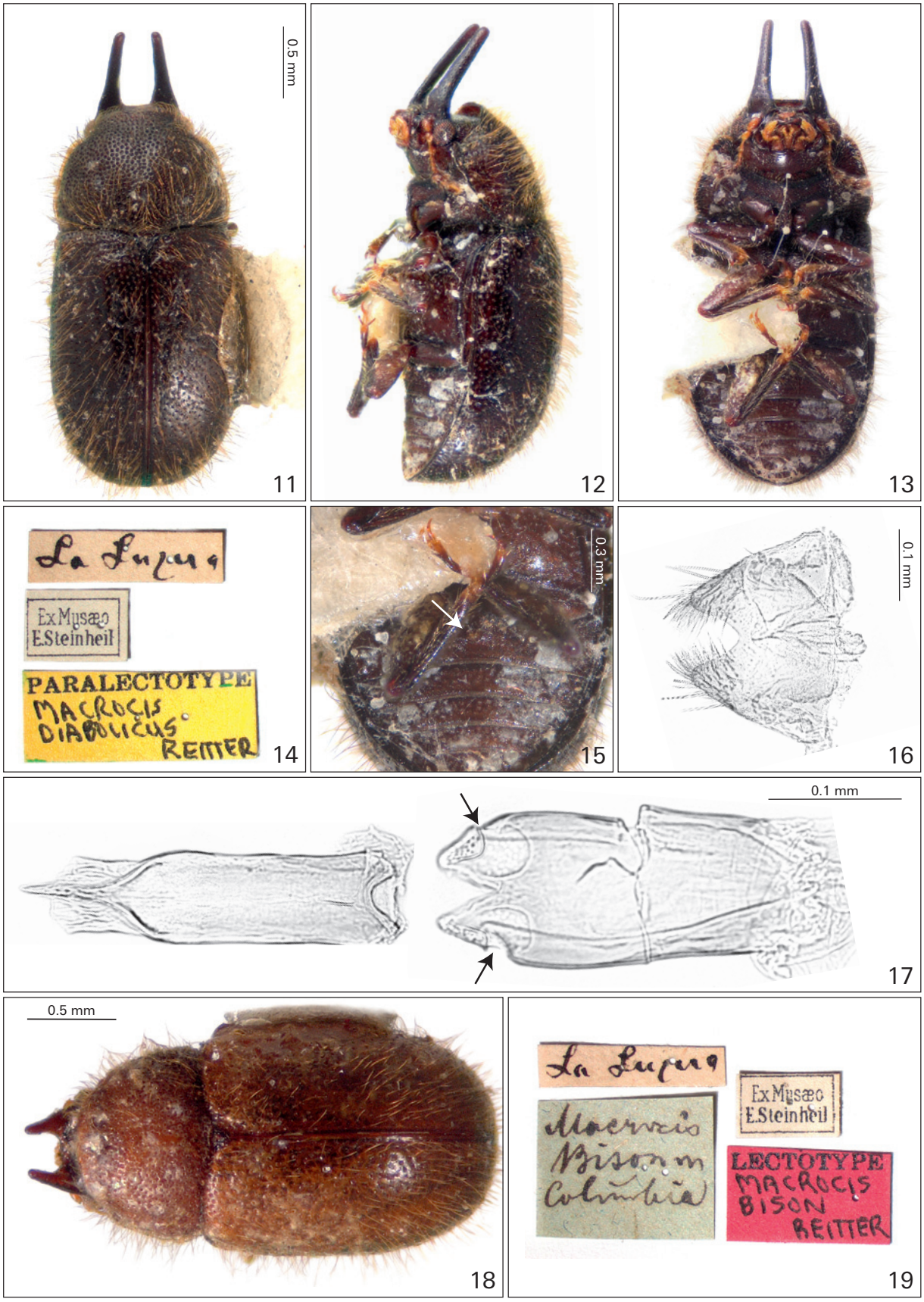
Comments. The species is known from Florida, North and South Carolina (USA), but it is possibly distributed throughout the Southern Coastal Plain (Lawrence 1971). Information on host fungi of the species is provided in Lawrence (1971).

3.5. *Cis diabolicus* (Reitter, 1878)

Figs. 11–19

Macrocis diabolicus Reitter, 1878: 35; Gorham 1883: 220.
Macrocis diabolica; Blackwelder 1945: 549 (incorrect spelling).
Cis diabolicus; Lawrence 1971: 438; Oliveira & Lopes-Andrade 2013: 483.
Macrocis bison Reitter, 1878, **new synonymy**; Gorham 1883: 220; Blackwelder 1945: 549.
Cis bison; Lawrence 1971: 438; Oliveira & Lopes-Andrade 2013: 483.

Diagnosis. Body convex and elongated with dorsal vestiture consisting of long and slender greyish setae. Pronotum with coarse and single punctation, the punctures being very close to each other and pronotum surface between punctures smooth; lateral margins explanate, crenulated and visible for their entire lengths from above. Elytral punctation dual and not seriate. Males with frontoclypeal ridge bearing a pair of parallel and



Figs. 11–19. *Cis diabolicus* (Reitter, 1878). **11–17:** Male paralectotype from La Lucera (department of Caquetá, Colombia). **11**: Dorsal view. **12**: Lateral view. **13**: Ventral view. **14**: Labels. **15**: Abdominal ventrites, with sex patch on first ventrite (arrow). **16**: Eighth abdominal sternite. **17**: Penis shown at left and tegmen at right; arrows indicate the lateral inflexions near the apex of tegmen. **18–19:** Lectotype of *Macrocis bison* Reitter, 1878, **new junior synonym** of *C. diabolicus* (Reitter, 1878), from La Lucera (department of Caquetá, Colombia). **18**: Dorsal view. **19**: Labels.

conical horns with acute apices and abdominal sex patch of approximately one-fifth of the length of the first abdominal ventrite located next to the posterior margin at midline.

Redescription, male paralectotype (Figs. 11–17)**.** Fully pigmented and in good condition. Measurements (in mm): TL 2.6, PL 0.83, PW 1.24, EL 1.77, EW 1.38, GD 1.11. Ratios: PL/PW 0.67, EL/EW 1.28, EL/PL 2.13, GD/EW 0.80, TL/EW 1.88. Body robust, convex, elongate, shiny black; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, with sparse vestiture of slender setae; punctation deep, coarse and single; frontoclypeal ridge bearing a pair of long and fine conical horns (length 0.73 mm; width at base 0.25 mm) with acute apices, fine punctures and short slender setae, the pair of horns parallel and separated by 0.19 mm at base. ***Antennae*** (left antenna measured) with FL 0.22, CL 0.26, CL/FL 1.18, length of antennomeres 1–10 (in mm) as follows: 0.12, 0.08, 0.08, 0.05, 0.04, 0.02, 0.03, 0.08, 0.06, 0.12. ***Eyes*** glabrous, GW 0.19 mm. ***Pronotum*** with anterior margin arched outwards, anterior angles rounded and very prominent forwards; lateral margins explanate, crenulated, sub-arched inwards and visible for their entire lengths from above; posterior margin sublinear, slightly arched near the scutellum; punctation dense, single, coarse, punctures deep separated from each other by less than one puncture-width (the punctures are almost side by side); pronotum surface between punctures smooth; vestiture dense consisting of slender grayish setae, each seta longer than base of scutellum. ***Scutellum*** subtriangular, with deep and coarse punctures, bearing setae; BW 0.18 mm. ***Elytra*** approximately twice as long as pronotum, convex, elongate; punctation dual, not seriate, the large punctures similar in size to those of pronotum and the small ones with approximately two-thirds the diameter of the largest; distance between punctures approximately twice a large puncture-width or less; vestiture dense consisting of slender grayish setae, each seta as long as those of pronotum; humeral calli conspicuous. ***Prosternum*** biconcave, tumid and weakly carinated at the longitudinal midline; vestiture very sparse consisting of slender short setae; surface granulate; prosternal process wide and subretangular. ***Protibia*** with outer apical angle produced into a stout tooth, inner margin with thick setae and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not forming a stout tooth, inner margin bearing thick setae and apex bearing a row of spines. ***Metaventrite*** convex, with granulate surface and sparse slender setae. ***Abdominal ventrites*** with granulate surface, shallow punctures and sparse slender setae; length of ventrites 1–5 (in mm, from base to apex of each ventrite at the longitudinal midline): 0.30, 0.15, 0.11, 0.10, 0.18. First abdominal ventrite bearing a circular, marginated, pubescent sex patch (Fig. 15, arrow) with a transverse diameter of 0.06 mm, located next to the posterior margin at midline. ***Male abdominal terminalia*** (Figs. 16–17) with ***sternite VIII*** (Fig. 16) 1.3 × as wide as long, a bit shorter than penis; posterior margin with a V-shaped emargination at middle approximately one-third of the sternite's length, forming two pyramidal lateral lobes bearing long setae at margins; lateral margins converging; anterior margin membranous, sublinear and devoid of strut. ***Tegmen*** (Fig. 17, right) subcylindrical, approximately 2.5 × as long as wide, as long as the penis; anterior margin slightly rounded; lateral margins sclerotized diverging to apical portion; one sixth of the apical portion separated by a dorsal fissure into two sclerotized lobes bearing basiconic sensilla and narrowed by an inflexion (Fig. 17, arrows). ***Penis*** (Fig. 17, left) subcylindrical, approximately 0.27 mm long, approximately 4.3 × as long as wide; anterior margin slightly sinuous; lateral margins subparallel until two-thirds of their lengths, then converging and forming a sclerotized triangular apex ventrally and a wrinkled membranous lobe dorsally; ratio of the length of penis and body size 0.10.

Females. Known and examined by JFL in 1965, but not re-examined for the present work.

Variation. ***Males*** (n = 2: paralectotype of *Cis diabolicus* and lectotype of *Cis bison*): TL 2.34–2.60 (2.47±0.18); PL 0.75–0.83 (0.79±0.06); PW 1.09–1.24 (1.17±0.11); EL 1.59–1.77 (1.68±0.13); EW 1.32–1.38 (1.35±0.04); GD 1.11–1.14 (1.13±0.02); PL/PW 0.67–0.69 (0.68±0.01); EL/EW 1.20–1.28 (1.24±0.06); EL/PL 2.12–2.13 (2.13±0.01); GD/EW 0.80–0.86 (0.83±0.04); TL/EW 1.77–1.88 (1.83±0.08).

The lectotype of *Cis diabolicus* is a male in the same condition and possessing the same morphology as the male paralectotype described above. The lectotype of *Cis bison* (Figs. 18–19) is a teneral male of *C. diabolicus*, bearing all the characteristics described above but with shorter horns (typical intraspecific variation of male ciids) and lighter surface color (proper of teneral adult ciids). Reitter (1878) wrote about the very similar morphology of *Cis diabolicus* and *Cis bison*, but he decided that some variant characteristics were fundamental to separate them into two species, as color, horns' size and differences in dorsal punctation. We consider these as intraspecific variation. The difference in dorsal punctation is an artefact of teneral specimens and the horns' size is a variable characteristic in males of all species in the *taurus* group. We did not dissect the terminalia of the lectotype of *Macrocis bison*, because terminalia of teneral adults are weakly sclerotized and rarely lead to informative slide preparations.

Type material examined. **Colombia:** *Macrocis diabolicus*, **lectotype here designated**, ♂ (MNHN)\La Luzera [handwritten]\Ex. Musæo E.Steinheil [printed, black border]\LECTOTYPE [printed] MACROCIS DIABOLICUS REITTER [handwritten] [red paper]\. *Macrocis diabolicus*, 2 ♂♂ and 3 ♀♀ **paralectotypes** (MNHN)\La Luzera [handwritten] \ Ex. Musæo E.Steinheil [printed, in black border]\PARALECTOTYPE [printed] MACROCIS DIABOLICUS REITTER [handwritten] [yellow paper]\, the ♂ used for the redescription additionally labelled \dissected 16.i.2013 Lopes-An-

drade [handwritten]\. *Macrocis bison*, **lectotype here designated**, ♂ (MNHN) \La Luzera [handwritten]\Macrocis Bison m Colombia [handwritten in light green paper]\Ex. Musæo E.Steinheil [printed, in black border]\LECTOTYPUS [printed] MACROCIS BISON REITTER [handwritten] [in red paper]*Cis diabolicus* (Reitter, 1878) det. E.H. Oliveira [printed]\.

Comments. The lectotype of *C. diabolicus* was examined in the MNHN and carefully compared to the paralectotype loaned by us, the latter dissected and used here for the redescription. They have the same labels and no evident morphological difference. The names *Macrocis diabolicus* and *Macrocis bison* were proposed in the same paper (Reitter 1878) and have the same type-locality, somewhere near La Lucera stream (called "La Luzera" by Reitter 1878), currently in the department of Caquetá (Colombia) (Fig. 77). It's plausible to suppose that the type specimens of both were collected together. *Cis diabolicus* is known only from the type-locality and has no host fungus record. A remarkable characteristic is its small male abdominal terminalia relative to their large body size, in comparison to other species of the group: the ratio of penis length to TL is 0.10, while in other examined *taurus* species it ranges from 0.15 to 0.32, except for *C. rufescens*, in which this ratio is also approximately 0.10.

3.6. *Cis grandicornis* (Pic, 1917)

Figs. 20–26

Macrocis grandicornis Pic, 1917: 4; Blackwelder 1945: 549.
Cis grandicornis; Lawrence 1971: 438; Kawanabe 1997: 328; Oliveira & Lopes-Andrade 2013: 483.

Diagnosis. Body strongly convex, rounded and strongly robust with dorsal vestiture consisting of long and thick yellowish setae. Pronotum with punctation single and surface between punctures with a hexagonal microreticulated sculpture; lateral margins not explanate, not crenulated and not visible from above. Elytral punctation dual and not seriate. Males with frontoclypeal ridge bearing a pair of parallel, broadly laminar and parallel-sided horns with rounded apices and abdominal sex patch of approximately one-sixth the length of the first abdominal ventrite, located next to the posterior margin at midline.

Redescription, male lectotype (Figs. 20–26)**.** Fully pigmented and in good condition. Measurements (in mm): TL 2.07, PL 0.69, PW 1.12, EL 1.38, EW 1.21, GD 1.03. Ratios: PL/PW 0.62, EL/EW 1.14, EL/PL 2.00, GD/EW 0.85, TL/EW 1.71. Body strongly robust, strongly convex, rounded, shiny yellowish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, granulate, subglabrous; punctation fine, single and sparse; frontoclypeal ridge bearing a pair of long, broadly laminate and parallel-sided horns (length 0.53 mm; width at base 0.19 mm) with rounded apices, granulate with fine punctation, the pair of horns parallel and separated by a distance of approximately 0.2 mm at base. ***Antennae*** (left antenna measured) with FL 0.15, CL 0.18, CL/FL 1.2, length of antennomeres 1–10 (in mm) as follows: 0.08, 0.05, 0.04, 0.03, 0.03, 0.02, 0.03, 0.05, 0.05, 0.08. ***Eyes*** glabrous, GW 0.18 mm. ***Pronotum*** much wider than long; anterior margin arched outwards, anterior angles rounded and not prominent; lateral margins not explanate, not crenulated, arched inwards and not visible from above; posterior margin sublinear and slightly arched near the scutellum; punctation single, deep, separated by approximately one puncture-width or less at disc, coarse microreticulated hexagonal sculpture between punctures; vestiture dense consisting of thick yellowish setae as long as scutellum base. ***Scutellum*** semitriangular, BW 0.07 mm. ***Elytra*** convex, compact; punctation dual, coarse, not seriate at the disc; large punctures a little bit smaller than the pronotal ones and small punctures of approximately half size of big ones, distance between punctures approximately one puncture-width or less; vestiture dense, consisting of thick yellowish setae as long as the pronotal ones; humeral calli conspicuous. ***Prosternum*** biconcave, strongly tumid and weakly carinate at longitudinal midline; very sparse vestiture consisting of short slender setae, granulate; single and fine punctures; prosternal process wide and semi-rectangular. ***Protibia*** with outer apical angle acute and produced into a stout tooth, inner apical angle bearing a tuft of setae and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not forming a distinct tooth, inner angle bearing a tuft of setae and apex bearing a row of spines. ***Metaventrite*** convex, granulate with fine punctures and sparse slender setae. ***Abdominal ventrites*** with shallow punctures, surface granulate and vestiture consisting of sparse setae, length of ventrites 1–5 (in mm): 0.27, 0.08, 0.08, 0.08, 0.14. First ventrite bearing a circular, marginated, pubescent sex patch (Fig. 24, arrow) with a transverse diameter of 0.04 mm, located next to the posterior margin at midline. ***Male abdominal terminalia*** (Figs. 25–26) with ***sternite VIII*** (Fig. 25) 1.6 × as wide as long, twice shorter than penis; posterior margin widely emarginated at middle approximately one-third deep the sternite's length, forming two lateral lobes slightly convergent, with rounded apices and bearing long setae; margin between lobes broadly curved inward and bearing short setae; lateral margins subparallel at basal half, then inflexed and converging; anterior margin membranous, almost straight and devoid of median strut. ***Tegmen*** (Fig. 26, right) subcylindrical, 3 × as long as wide and four-fifths the length of penis; anterior with a minute angulated projection at middle; lateral margins sclerotized and subparallel; distal portion divided into two lobes by a dorsal fissure, each lobe with an inflexion at base (Fig.26, arrows), sclerotized and bearing basiconic sensilla. ***Penis*** (Fig. 26, left) subcylindrical, approximately 0.39 mm long, 5 × as long as wide; anterior portion subtriangular; lateral margins sclerotized and subparallel; distal third

Figs. 20–26. *Cis grandicornis* (Pic, 1917), male lectotype from Saint-Laurent du Marroni (French Guiana). **20**: Dorsal view. **21**: Lateral view. **22**: Ventral view. **23**: Labels. **24**: Abdominal ventrites, with sex patch on first ventrite (arrow). **25**: Eighth abdominal sternite. **26**: Penis shown at left and tegmen at right; arrows indicate the lateral inflexions near the apex of tegmen.

consisting of two pairs of a set of wrinkled membranes dorsally and a barely sclerotized triangular apex ventrally; ratio of the length of penis and body size of 0.19.

Females. Known and examined by JFL in 1965, but not re-examined for the present work.

Type material examined. French Guiana: Lectotype here designated, ♂ (MNHN)\GUYANE SAINT-LAURENT DU MARONI [printed]\DÉCEMBRE [printed]\Macrocis grandicornis [handwritten]\type [handwritten in old yellow paper]\LECTOTYPE [printed] MACROCIS GRANDICORNIS [handwritten] [red paper]\TYPE [printed, red paper]\ ♂ dissected 16.i.2013 Lopes-Andrade [handwritten]\. 1 ♂ and 1 ♀ **paralectotypes** (MNHN) \GUYANE SAINT-LAURENT DU MARONI [printed]\ NOVEMBRE [printed]\Macrocis grandicornis [handwritten]\type [handwritten in old yellow paper]\PARALECTOTYPE [printed] MACROCIS GRANDICORNIS [handwritten] [yellow paper]\.

Comments. Known only from the type-locality (Fig. 77), without host fungus record. It is morphologically very similar to *C. pubescens* **new combination**, the latter widespread in tropical and subtropical forests of eastern Brazil. Additional information in chapter 4.

3.7. *Cis kawanabei* Lopes-Andrade, 2002

Figs. 27–42

Macrocis testaceus Pic, 1916: 5.
Macrocis testacea; BLACKWELDER 1945: 549 (incorrect spelling).
Cis testaceus (not *Cis testaceus* Fåhraeus, 1871); LAWRENCE 1971: 438; KAWANABE 1997: 328.
Cis kawanabei Lopes-Andrade, 2002b: 54; GRAF-PETERS et al. 2011: 556 (incorrect identification); OLIVEIRA & LOPES-ANDRADE 2013: 483.

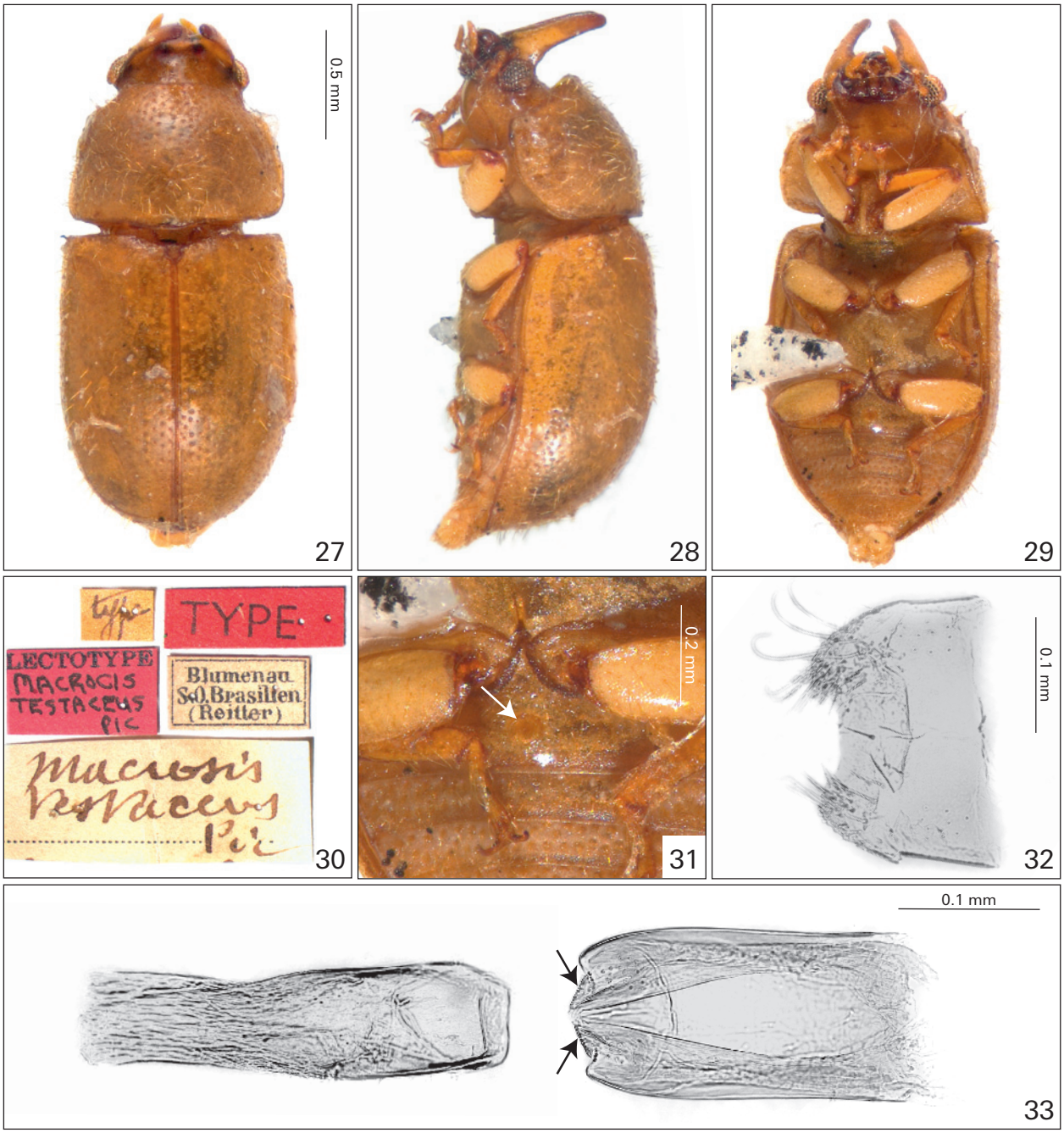
Diagnosis. Body convex and strongly elongated with dorsal vestiture consisting of long slender yellowish setae. Pronotum with simple punctation and surface between punctures smooth; lateral margins explanate, crenulated and barely visible from above. Elytral punctation dual and seriate. Males with frontoclypeal ridge bearing a pair of converging and conical horns with acute apices and abdominal sex patch of approximately one-fourth the length of the first abdominal ventrite, located next to the posterior margin at midline.

Redescription, male lectotype (Figs. 27–33)**.** Not fully pigmented, in relatively good condition but with head and pronotum stuck to the abdomen. Measurements (in mm): TL 2.05, PL 0.64, PW 0.96, EL 1.41, EW 1.08, GD 0.92. Ratios: PL/PW 0.67, EL/EW 1.31, EL/PL 2.20, GD/EW 0.85, TL/EW 1.90. Body robust, convex, strongly elongate, elytra length approximately twice the length of pronotum, shiny yellowish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, granulate, subglabrous with sparse slender setae; frontoclypeal ridge bearing a pair of long and conical horns (length 0.46 mm; width at base 0.18 mm) with acute apices, granulate with fine punctation and minute setae, pair of horns converging and separated at a distance of 0.20 mm at base. ***Antennae*** (right antenna measured) with FL 0.12, CL 0.21, CL/FL 1.75, length of antennomeres 1–10 (in mm) as follows: 0.10, 0.05, 0.03, 0.03, 0.02, 0.02, 0.02, 0.07, 0.05, 0.09. ***Eyes*** glabrous, GW 0.18. ***Pronotum*** with anterior margin arched outward; anterior angles rounded and barely produced; lateral margins explanate, crenulated (barely crenulated possibly due to the age of the lectotype; in other specimens the crenulation is more conspicuous), arched inwards and barely visible for their entire lengths from above; posterior margin sublinear and slightly arched near the scutellum; punctation single, distance between punctures approximately one puncture-width, pronotum surface between punctures smooth; vestiture dense, consisting of slender yellowish setae as long as the base of scutellum. ***Scutellum*** with punctation, BW 0.09. ***Elytra*** strongly convex; punctation dual, coarse and seriate at disc, size of the larger punctures similar to size of punctures of the pronotum, small ones being a little smaller than the larger ones; distance between punctures approximately two puncture-widths, each small puncture bearing a yellowish setae as long as the pronotal ones; humeral calli conspicuous. ***Prosternum*** biconcave, granulate, tumid and weakly carinated at longitudinal midline, with slender sparse setae; prosternal process barely narrowest at its base and gradually expanded to a bit wider apex. ***Protibia*** with and outer apical angle produced into a stout tooth and apex bearing a row of small spines. ***Meso- and metatibia*** with outer apical angle acute but not produced into a stout tooth and apex bearing a row of small spines. ***Metaventrite*** convex, granulate with sparse slender setae. ***Abdominal ventrites*** with coarse, single and seriate punctures, long slender setae, surface granulate, length of ventrites 1–5 (in mm, from base to apex of each ventrite at longitudinal midline): 0.25, 0.09, 0.08, 0.09, 0.14. First abdominal ventrite bearing a circular, marginated, pubescent sex patch (Fig. 31, arrow) with a transverse diameter of 0.07, located next the posterior margin at midline. ***Male abdominal terminalia*** (Figs. 32–33) with ***sternite VIII*** (Fig. 32) 1.4 × as wide as long, 2 × shorter than the penis; anterior margin linear; lateral margins subparallel; posterior margin slightly emarginated at middle approximately one-sixth of the sternite length resulting in two lateral lobes rounded, subparallel and bearing long setae, margin between lobes almost linear. ***Tegmen*** (Fig. 33, right) subcylindrical; approximately twice as long as wide, three-fourths of penis length; anterior margin rounded; lateral margins subparallel; apex divided in two short, central and subpyramidal lobes (Fig. 33, arrow) of one-seventh of the length of the tegmen bearing basiconic sensilla. ***Penis*** (Fig. 33, left) subcylindrical, approximately 0.31 mm long; 4 × as long as wide; anterior margin linear; lateral margin converging; apical third consisting of membranous and filamentous lamellae; ratio of length of penis to body length 0.15.

Females (Figs. 34–35)**.** Similar to males except in the following features: sex patch on first abdominal ventrite absent; head convex and bearing densely placed long yellowish setae; frontoclypeal projections short with curved distal edge, not lengthened into horns.

Variation. ***Males*** (Figs. 36–42) (n = 22, including the lectotype): TL 1.63–2.20 (1.91±0.15); PL 0.43–0.70 (0.58±0.08); PW 0.75–1.08 (0.92±0.06); EL 1.13–1.60 (1.33±0.11); EW 0.80–1.13 (1.02±0.08); GD 0.38–0.95 (0.82±0.13); PL/PW 0.46–0.75 (0.63±0.07); EL/EW 1.13–1.53 (1.30±0.09); EL/PL 1.92–3.59 (2.34±0.39); GD/EW 0.38–0.95 (0.80±0.11); TL/EW 1.63–2.06 (1.87±0.10). ***Females*** (n = 14): TL 1.63–2.18 (1.88±0.16); PL 0.43–0.68 (0.56±0.06); PW 0.78–1.03 (0.86±0.08); EL 1.08–1.50 (1.33±0.14); EW 0.83–1.18 (0.97±0.10); GD 0.58–0.88 (0.79±0.09); PL/PW 0.53–0.74 (0.64±0.07); EL/EW 1.16–1.58 (1.37±0.12); 1.95–3.53 (2.42±0.41); GD/EW 0.62–0.92 (0.82±0.09); TL/EW 1.76–2.11 (1.95±0.12).

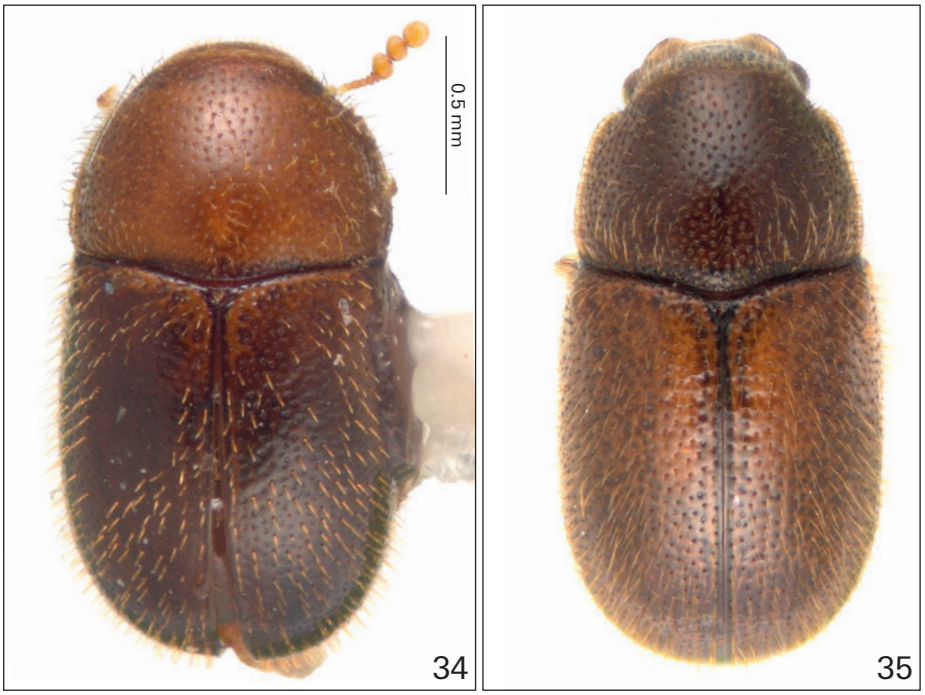
Pronotal surface is smooth (completely devoid of lines or microreticulated sculpture) or weakly striated (with



Figs. 27–33. *Cis kawanabei* Lopes-Andrade, 2002, male lectotype from Blumenau (state of Santa Catarina, southern Brazil). **27**: Dorsal view. **28**: Lateral view. **29**: Ventral view. **30**: Labels. **31**: Abdominal ventrites, with sex patch on first ventrite (arrow). **32**: Eighth abdominal sternite. **33**: Penis shown at left and tegmen at right; arrows indicate the subpyramidal lobes near the apex of tegmen.

minute and fine transverse lines) and can have sparse minute punctures (Fig. 41, arrows) between the usual punctures in some specimens. Sometimes these minute punctures are numerous and very dense in parts of the pronotum (Fig. 42, arrow). Sometimes minute punctures are discernible on elytra too (Fig. 42, arrow). The dual elytral punctation is not clear in some specimens, and the minute punctures can be comparatively larger in some specimens. Color is not a reliable characteristic; teneral adults show a light yellow to yellowish brown coloration, while fully-pigmented ones are reddish-brown. Male frontoclypeal horns vary from short (minimum of 0.28 mm) to long (maximum of 0.46 mm), and they may be convergent to subparallel, almost straight to slightly curved inward. The population of Colombia has finer setae and not so seriate elytral punctation. We observed slight differences in male abdominal terminalia between specimens, but we considered them as intraspecific variation and they are not sufficiently consistent to separate different species.

Type material examined. Brazil: Lectotype here designated, ♂ (MNHN)\Blumenau S.O.Brasilien (Reitter) [printed in black border]\Macrocis testaceus [handwritten]\Type [printed in red

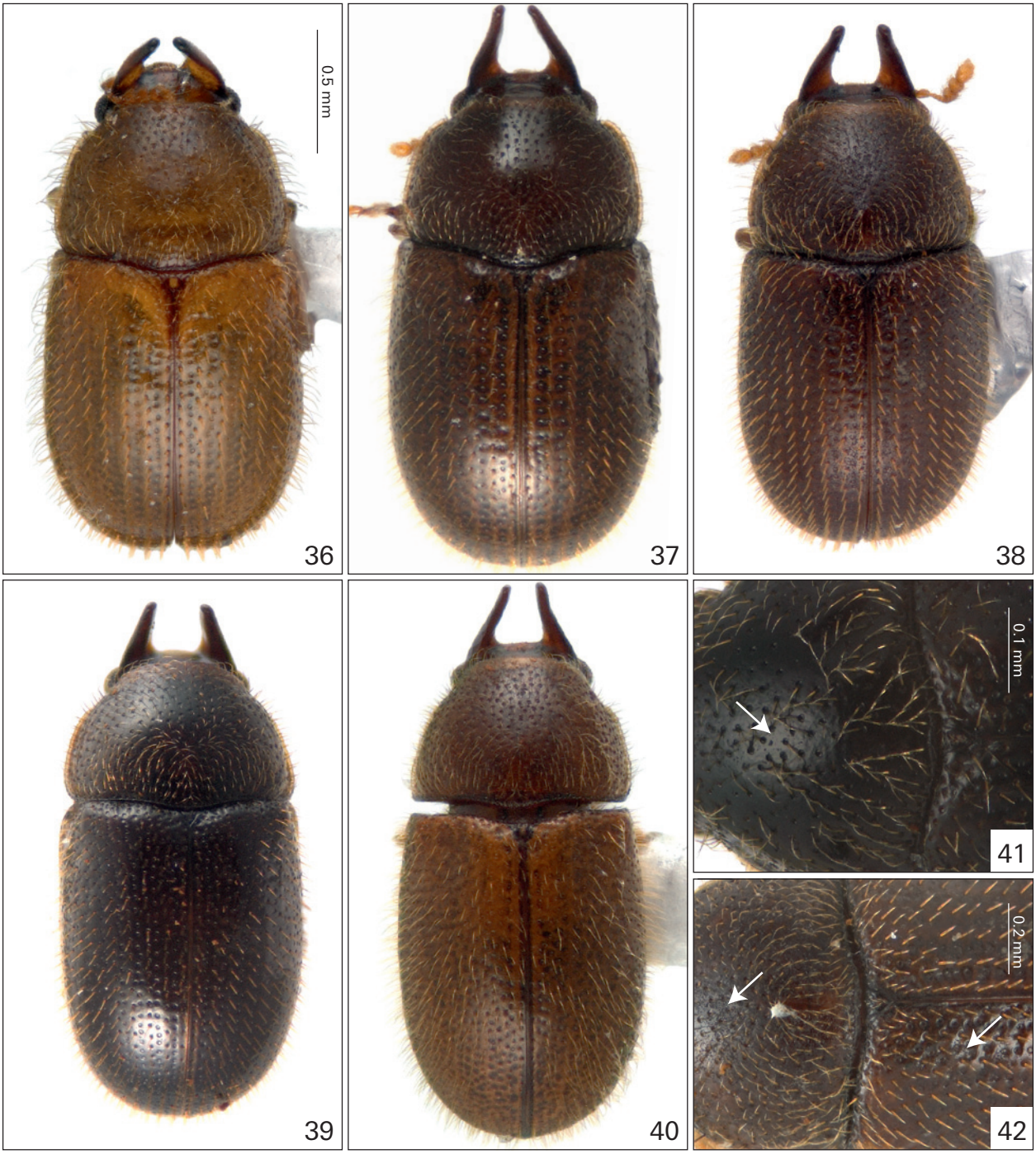


Figs. 34–35. *Cis kawanabei* Lopes-Andrade, 2002, dorsal view of females from **34**: Viçosa (state of Minas Gerais, southeastern Brazil) and **35**: Popayan (Cauca, Colombia).

paper]\LECTOTYPE [printed] MACROCIS TESTACEUS PIC [handwritten]\ ♂ dissected 18.i.2013 Lopes-Andrade [handwritten]\.

Complementary material. Brazil: State of Rio de Janeiro: 1 ♂ and 1 ♀ (LAPC) \BRASIL: RJ Itatiaia, "Parque Nacional de Itatiaia"; 09.XI.2011 leg. L. S. Araújo [printed]\Código: Trans.: [printed] 1 [handwritten] Parcela: [printed] E [handwritten] Fungo [printed] 2 [handwritten]\, 1 ♂ (LAPC) \BRASIL: RJ Teresópolis, "P N Serra dos Órgãos";14.XI.2011 leg. L. S. Araújo [printed]\Código: Trans.: [printed] 1 [handwritten] Parcela: [printed] A [handwritten] Fungo [printed] 1 [handwritten]\, 1 ♀ (LAPC)\BRASIL: RJ Teresópolis, "P N Serra dos Órgãos";14.XI.2011 leg. L. S. Araújo [printed]\Código: Trans.: [printed] 2 [handwritten] Parcela: [printed] E [handwritten] Fungo [printed] 1 [handwritten]\. **State of Espírito Santo**: 1 ♂ and 1 ♀ (LAPC) \BRASIL: ES Santa Teresa, "Estação Ecológica de Santa Lúcia" 27.XI.2011 leg. L. S. Araújo [printed]\Código: Trans.: [printed] 2 [handwritten] Parcela: [printed] E [handwritten] Fungo [printed] 4 [handwritten]\, 1 ♂ (LAPC)\BRASIL: ES Domingos Martins; "Parque Estadual da Pedra Azul" 04.ix.2003 legs. K.S. Furieri & F.C.C. Barreto [printed]\, 1 ♂ (LAPC)\BRASIL: ES Domingos Martins; "Parque Estadual da Pedra Azul" 04.ix.2003 legs. K.S. Furieri & F.C.C. Barreto [printed]\ ♂ dissected 09.i.2013 Oliveira, E.H. [handwritten]\, 1 ♂ (LAPC)\BRASIL: ES DOMINGOS MARTINS; "P.E Pedra Azul" 17-18/I/2000 leg. C. Lopes-Andrade [printed]\. **State of Minas Gerais**: 2 ♂♂ and 1 ♀ (LAPC) \BRASIL: MG: Araponga, "Parque Estadual Serra do Brigadeiro" 13.XII.2011 leg. L. S. Araújo [printed]\Código: Trans.: [printed] 3 [handwritten] Parcela: [printed] D [handwritten] Fungo [printed] 1 [handwritten]\, 1 ♂ (LAPC) \BRASIL: MG: Viçosa, "Mata do Paraíso"; 28.IX.2011 leg L. S. Araújo [printed]\Código: Trans.: [printed] 3 [handwritten] Parcela: [printed] A [handwritten] Fungo [printed] 2 [handwritten]\, 1 ♀ (LAPC)\BRASIL: MG: Viçosa, "Mata do Paraíso"; 28.IX.2011 leg L. S. Araújo [printed]\Código: Trans.: [printed] 3 [handwritten] Parcela: [printed] B [handwritten] Fungo [printed] 1 [handwritten]\, 1 ♀ (LAPC) \BRASIL: MG: Viçosa, "Mata do Paraíso"; 28.IX.2011 leg L. S. Araújo [printed]\Código: Trans.: [printed] 3 [handwritten] Parcela: [printed] A [handwritten] Fungo [printed] 1 [handwritten]\, 1 ♀ (LAPC) \BRASIL: MG: Viçosa, "Mata do Paraíso"; 28.IX.2011 leg L. S. Araújo [printed]\Código: Trans.: [printed] 3 [handwritten] Parcela: [printed] C [handwritten] Fungo [printed] 1 [handwritten]\, 2 ♂♂ and 3 ♀♀ (LAPC)\BR: MG: Viçosa, "Mata da Biologia" 05.vii.2012. Madalena et al Leg. [printed]\, 1 ♂ (LAPC) \BRASIL: MG: VIÇOSA. "Mata da Biologia", 20/1/2002 leg. C. Lopes-Andrade [printed]\Fungo #25 [handwritten]\, 1 ♂ (LAPC) \BRASIL: MG: VIÇOSA. "Mata da Biologia", 20/1/2002 leg. C. Lopes-Andrade [printed]\Fungo #09 [handwritten]\, 1 ♂ and 2 ♀ (LAPC)\BRASIL: MG Viçosa; "Belvedere" 17/IX/2000 leg. C. Lopes-Andrade & F. Gumier-Costa [printed]\, 1 ♂ (LAPC)\BRASIL: MG Viçosa; "Belvedere" 17/IX/2000 leg. C. Lopes-Andrade & F. Gumier-Costa [printed]\ ♂ dissected 07.1.2013 Oliveira, E.H. [handwritten]\, 1 ♂ (LAPC) \BRASIL: MG Viçosa; "Belvedere" 17/IX/2000 leg. C. Lopes-Andrade & F. Gumier-Costa [printed]\citogenética [handwritten]\, 1 ♂ (LAPC) \BRASIL: MG Ingaí, "Res. Biol. Boqueirão" 28.viii.2002 legs. S.E. Guimarães, J.M. Oliveira & C. Lopes-Andrade [printed]\, 1 ♂ (LAPC) \BRASIL: MG Ingaí, "Res. Biol. Boqueirão" 28.vii.2002 legs. S.E. Guimarães, J.M. Oliveira & C. Lopes-Andrade [printed]\ ♂ dissected 09.i.2013 Oliveira, E.H.\.

Material doubtfully included. Colombia: 4 ♂♂ and 2 ♀♀ (LAPC)\COLÔMBIA: Cauca Popayan Vda Rio Blanco, Fca San Millán, Bosque de Roble. 23.vii.2009 Sandovál-Gómez, V.E. leg. Em *Phellinus gilvus*\, 1 ♂ (LAPC)\COLOMBIA: Cauca Popayan Vda Rio Blanco, Fca San Millán, Bosque de Roble. 23.vii.2009



Figs. 36–42. *Cis kawanabei* Lopes-Andrade, 2002, examples of variation. **36–40:** Dorsal view of males from **36**: Viçosa (state of Minas Gerais, Brazil), **37**: Araponga (state of Minas Gerais, Brazil), **38**: Itatiaia (state of Rio de Janeiro, Brazil), **39**: Santa Teresa (state of Espírito Santo, Brazil) and **40**: Popayan (Cauca, Colombia). **41–42:** Dorsal punctation. **41**: Pronotum of female from Araponga showing minute punctures between the usual punctures (arrow). **42**: Detail of pronotal and elytral disc showing agglomerated minute punctures between the usual punctures in a male from Itatiaia (arrows).

Sandovál-Gómez, V.E. leg. Em *Phellinus gilvus*. [printed]\ ♂ dissected 07.iii.2013 Oliveira, E.H. C. kawanabei [handwritten]\, 2 ♂♂ and 6 ♀♀ (LAPC)\COLOMBIA Cauca Popayan Corr. Las Piedras Vda. Clarete Fca. San Millán 02°30′14″N 76°33′13″W 1750m Bosque de Quercus sp. 23.vii.2009 V.E. Sandovál-Gómez leg. [printed]\, 1 ♂ (LAPC)\COLOMBIA Cauca Popayan Corr. Las Piedras Vda. Clarete Fca. San Millán 02°30′14″N 76°33′13″W 1750m Bosque de Quercus sp. 23.vii.2009 V.E. Sandovál-Gómez leg. [printed]\ ♂ dissected 08.iii.2013 Oliveira, E.H. [handwritten] \ C. kawanabei [handwritten]\.

Comments. Only one (male) type specimen was located. The author did not mention whether he based the description on one or more specimens, and therefore we cannot consider this single specimen as being the holotype. Here we designate it as the lectotype, considering the pos-

sibility that further specimens of the type-series can be located in the future. This species inhabits remnants of the Atlantic Forest and subtropical rainforests of southeastern and southern Brazil (Fig. 75). In Colombia it was collected in Popayan in the Cauca department occurring in *Phellinus gilvus* (Schwein.) Pat. growing on *Quercus* sp., the only record of host fungus we have so far.

3.8. *Cis longipilis* Pic, 1930

Cis longipilis Pic, 1930: 176.
Cis longispilis; BLACKWELDER 1945: 549 (incorrect spelling).

Comments. Species reported only from Tucuman, Argentina, and provisionally included here in the *taurus* group. Type material was not located in the MNHN by JFL in 1965, and it was not located in a recent attempt (2011) by collection managers of the museum.

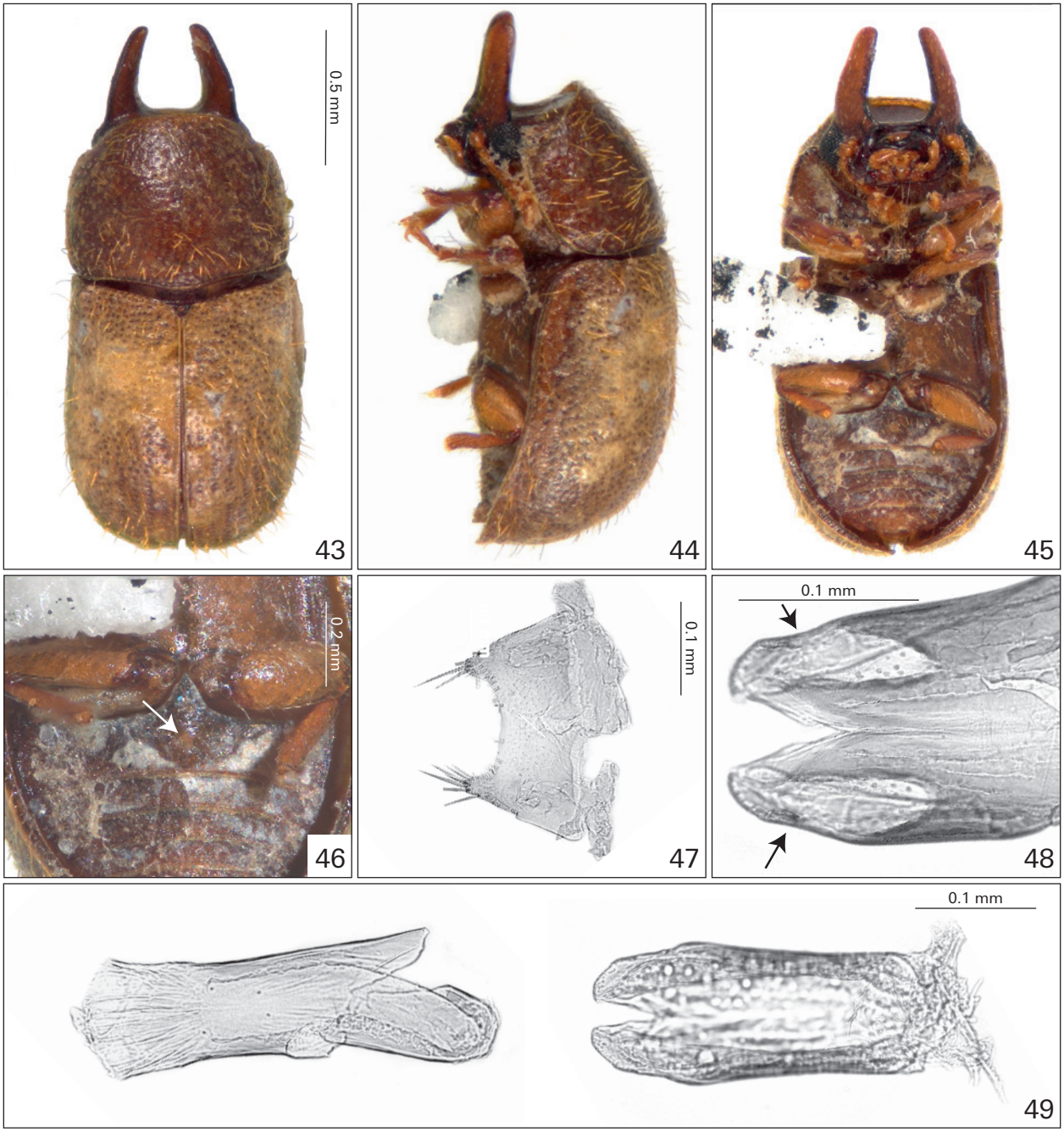
3.9. *Cis pubescens* (Friedenreich, 1881), new combination

Figs. 43–52

Trichapus pubescens Friedenreich, 1881; LAWRENCE 1987: 41; COSTA-LIMA 1953: 209.

Diagnosis. Body convex and elongated with dorsal vestiture consisting of long and slender yellowish setae. Pronotum with single punctation and surface between punctures with hexagonal microreticulated sculpture; lateral margins explanate, weakly crenulated and visible for their entire lengths from above. Elytral punctation dual and not seriate. Males with frontoclypeal ridge bearing a pair of converging, broadly laminar and parallel-sided horns with rounded apices, their outer margins angulated at one-third the basal length; and abdominal sex patch of approximately one-fourth of the length of the first abdominal ventrite and located next to its posterior margin at midline.

Redescription, male lectotype (Figs. 43–49)**.** Fully pigmented but with cuticle partially eroded. Measurements (in mm): TL 1.60, PL 0.66, PW 0.83, EL 0.94, EW 0.89, GD 0.75. Ratios: PL/PW 0.80, EL/EW 1.06, EL/PL 1.42, GD/EW 0.84, TL/EW 1.80. Body robust, convex, elongate and shiny reddish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, subglabrous, granulate; frontoclypeal ridge bearing a pair of long, broadly laminar and parallel-sided horns (length 0.42 mm, width at base 0.15 mm) with rounded apices, their outer margins angulated at one-third from base (this is very distinctive in this species), granulate with fine punctation and short slender setae, pair of horns converging and separate by a distance of approximately 0.21 mm at base. ***Antennae*** (right antenna measured) with FL 0.16, CL 0.17, CL/FL 0.94, length of antennomeres 1–10 (in mm) as follows: 0.07, 0.06, 0.05, 0.03, 0.03, 0,03, 0.02, 0.06, 0.04, 0.07. ***Eyes*** glabrous, GW 0.14 mm. ***Pronotum*** with anterior margin arched outwards, anterior angles rounded and barely produced, lateral margins explanate, weakly crenulated, arched inwards and visible for their entire lengths from above; posterior margin sublinear and slightly arched near the scutellum; punctation coarse and single; punctures separate at a distance of approximately one puncture-width, coarse hexagonal microreticulated sculpture between punctures; vestiture dense, consisting of slender and yellowish setae as long as the base of the scutellum. ***Scutellum*** subtriangular with few punctures, BW 0.09. ***Elytra*** convex; punctation not seriate at disc, dual with large punctures a bit smaller than the punctures of pronotum and small punctures approximately two-thirds of diameter of the large ones, each small puncture bearing a seta; distance between punctures approximately one puncture-width; vestiture dense, consisting of slender and yellowish setae as long as the pronotal ones; humeral calli conspicuous and prominent. ***Prosternum*** biconcave, strongly tumid and weakly carinated at longitudinal midline, surface granulate, vestiture of very sparse slender setae; prosternal process barely narrowest at its base and gradually expanded to a slightly wider apex. ***Protibia*** with outer apical angle produced into a stout tooth and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not forming a stout tooth and apex bearing a row of spines. ***Metaventrite*** convex, granulate with sparse slender setae. ***Abdominal ventrites*** with fine punctures, surface granulate and with sparse short setae; length of ventrites 1–5 (in mm, from base to apex of each ventrite at longitudinal midline): 0.24, 0.07, 0.06, 0.06, 0.10. First abdominal ventrite bearing a circular, marginated, pubescent sex patch (Fig. 46, arrow) with a transversal diameter of 0.06 mm, located next to posterior margin of the ventrite at midline. ***Male abdominal terminalia*** (Figs. 47–49) with ***sternite VIII*** (Fig. 47) 2 × as wide as long, 3.6 × shorter than the penis; anterior margin membranous and devoid of strut; lateral margin slightly converging; posterior margin emarginated at middle approximately one-fourth of the sternite's length resulting in two produced and barely converging lateral lobes each one bearing long setae, margin between lateral lobes slightly arched. ***Tegmen*** (Figs. 48–49, right) subcylindrical, 2 × as long as wide, three quarters of penis length; anterior margin sublinear forming an angulated minute projection at the centre of the margin; lateral margins subparallel; posterior portion divided in two lobes by a dorsal fissure of approximately one-fifth of the tegmen length, each lobe bearing basiconic sensilla and a lateral excavation (Fig. 48, arrow) at base. ***Penis*** (Fig. 49, left) subcylindrical, approximately 0.35 mm long, approximately 4 × as long as wide, anterior margin sub-



Figs. 43–49. *Cis pubescens* (Friedenreich, 1881) **new combination**. **43–48:** Male lectotype possibly from Blumenau (state of Santa Catarina, southern Brazil). **43**: Dorsal view. **44**: Lateral view. **45**: Ventral view. **46**: Abdominal ventrites, with sex patch on first ventrite (arrow). **47**: Eighth abdominal sternite. **48**: Detail of the apical portion of tegmen of the lectotype; arrows indicating the lateral excavations near its apex. **49**: Part of aedeagus of a specimen from Ubá (state of Minas Gerais, Brazil), with penis shown at left (damaged in apical portion) and tegmen at right.

rounded; lateral margin subparallel; the third distal portion consisting of a membranous portion dorsally and a ventral narrowed portion; ratio of length of penis to body length 0.22.

Females (Fig. 50)**.** Similar to males except in the following features: sex patch on first abdominal ventrite absent; head convex and bearing densely placed long yellowish setae; frontoclypeal projections short with curved distal edge, not lengthened into horns**.**

Variation. ***Males*** (Figs. 51–52) (n = 51 including the lectotype): TL 1.40–2.15 (1.76 ± 0.17); PL 0.50–1.40 (0.65 ± 0.15); PW 0.68–1.05 (0.88 ± 0.09); EL 0.80–1.40 (1.14 ± 0.13); EW 0.73–1.25 (0.96 ± 0.11); GD 0.23–0.95 (0.76 ± 0.12); PL/PW 0.57–1.33 (0.73 ± 0.12); EL/EW 0.92–1.47 (1.20 ± 0.11); EL/PL 1.00–2.50 (1.81 ± 0.27); GD/EW 0.25–0.91 (0.79 ± 0.11); TL/EW 1.50–2.14 (1.85 ± 0.13). ***Females*** (n = 42): TL 1.45–2.25 (1.81 ± 0.16); PL 0.50–0.88 (0.62 ± 0.08); PW 0.68–1.15 (0.88 ± 0.10); EL 0.93–1.38 (1.18 ± 0.12); EW 0.70–1.15 (0.94

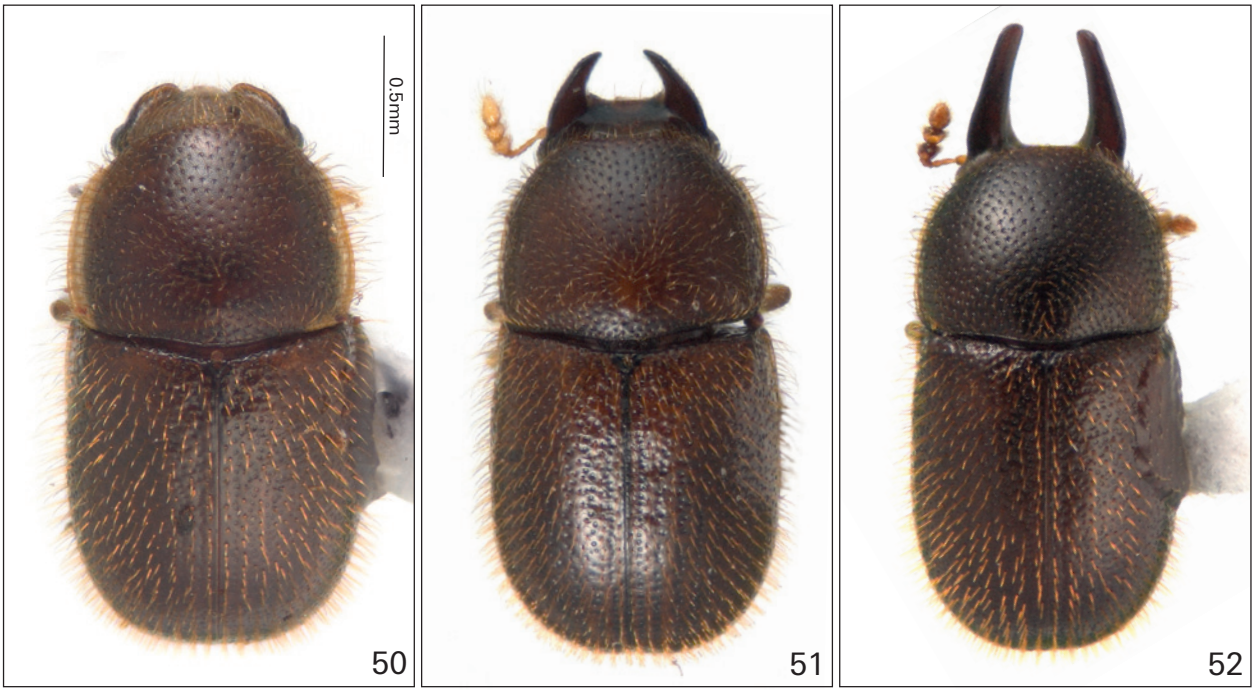
± 0.10); GD 0.55–0.95 (0.77 ± 0.08); PL/PW 0.57–0.95 (0.71 ± 0.09); EL/EW 0.93–1.68 (1.26 ± 0.11); EL/PL 1.39–2.38 (1.92 ± 0.24; GD/EW 0.67–1.12 (0.82 ± 0.07); TL/EW 1.50–2.43 (1.93 ± 0.15).

The specimens vary substantially in size and coloration; the fully pigmented ones display a reddish-brown color while the teneral individuals are light yellowish to yellowish-brown. Frontoclypeal horns vary from short (minimum of 0.1 mm, as short as females projections) to long (maximum of 0.55 mm). The typical angulation of the third proximal portion of horns is absent in males with very short horns, and barely discernible to conspicuous in some males with medium-sized to long horns. In some cases, these horns are more convergent. Individuals of some populations can have sparse minute punctures between the usual pronotal punctures. The majority of specimens of *C. pubescens* have a conspicuously convex body (mainly when seen in lateral view) and pronotum wider in its posterior portion.

Type material examined. BRAZIL: Lectotype here designated, ♂ (MZSP)\Solenopus pubescens Fried. i.l. Brasilien [handwritten]\LECTOTYPE Oliveira & Lopes-Andrade det. [printed in red paper]\ ♂ dissected 17.i.2013 Lopes-Andrade\. 1 ♀ **paralectotype** (MZSP)\Solenopus pubescens Fried. i.l. Brasilien [handwritten]\.

Complementary material. BRAZIL: State of Santa Catarina: 1 ♂ and 1 ♀ (ANIC)\Nova Teutônia Santa Catarina BRAZIL [printed] XI-64 [handwritten] Fritz Plaumann [printed]\, 1 ♂ and 2 ♀♀ (ANIC)\Brasilien Nova Teutonia 27°11′B. 52°23′L. Fritz Plaumann [printed] v. [handwritten] 196[printed]0[handwritten] 300. 500m [printed]\, 3 ♂♂ and 8 ♀♀ (ANIC)\Nova Teutonia Sta. Catarina BRAZIL I-1964 FritzPlaumann [printed]\, 1 ♂ (ANIC)\ Brasilien Nova Teutonia 27°11′B, 52°23′L. Fritz Plaumann [printed] ix.1965 [handwritten] 300 a 500 m [printed]\, 8 ♂♂ and 3 ♀♀ (FMNH)\Nova Teutonia, Sta Catarina, BRAZ. [printed] V:-:1941 [handwritten] Fritz Plaumann leg. [printed]\Orange circle\. **State of São Paulo**: 7 ♂♂ and 2 ♀♀ (LAPC)\BRASIL: SP; Peruíbe, Juréia, Trilha Cachoeira Perequê. 11.vii.2011. Oliveira, E.H. leg. [DC/E1-2-2011]. Mata Atlântica [printed]\, 1 ♂ (LAPC) \BRASIL: SP; Peruíbe, Juréia, Trilha Cachoeira Perequê. 11.vii.2011. Oliveira, E.H. leg. [DC/E1-2-2011]. Mata Atlântica [printed]\ ♂ dissected 05.i.2013 Oliveira, E.H. [handwritten]\, 16 ♂♂ and 9 ♀♀ (LAPC)\BRASIL: SP Piracicaba VIII/2000 leg. P.Milano [printed]\, 1 ♂ (LAPC)\BRASIL: SP Piracicaba VIII/2000 leg. P.Milano [printed]\ ♂ dissected 10.i.2013 Oliveira, E.H. [handwritten\. **State of Rio de Janeiro**: 10 ♂♂ and 3 ♀♀ (LAPC)\BR: RJ: Nova Friburgo, X.2004. Grossi, E.J. Leg [printed]\, 7 ♂♂ and 2 ♀♀ (LAPC)\BRASIL: RJ Nova Friburgo x.2004 leg. E.J. Grossi [printed]\, 3 ♂♂ (LAPC)\BRASIL: RJ Nova Friburgo x.2004 leg. E.J. Grossi [printed]\ dissected 19.x.2012 Oliveira, E.H. [handwritten]\. **State of Minas Gerais**: 1 ♂ and 3 ♀♀ (LAPC) \BRASIL: MG UBÁ VIII/2001 leg. C. Lopes-Andrade & F. Gumier-Costa [printed]\, 1 ♂ (LAPC) \BRASIL: MG UBÁ VIII/2001 leg. C. Lopes-Andrade & F. Gumier-Costa [printed]\ ♂ dissected 10.i.2013 Oliveira, E.H. [handwritten]\, 2 ♂♂ (LAPC)\BRASIL: MG Florestal 08.xi.2003 leg. D.J. de Souza [printed]\, 2 ♂♂ (LAPC)\BRASIL: MG; Viçosa "Vila Gianetti" 02.vi.2006 leg. C.B. Oliveira [printed]\, 10 ♂♂ and 6 ♀♀ (LAPC)\BRASIL: MG Viçosa "próx. do prédio da Reitoria" 13/V/2002 leg. A.A.Zacaro [printed]\, 1 ♂ (LAPC)\BRASIL: MG Viçosa "próx. do prédio da Reitoria" 13/V/2002 leg. A.A.Zacaro [printed]\dissected 01.i.2013 Oliveira, E.H. [handwritten]\, 1 ♂ and 1 ♀ (LAPC)\BRASIL: MG Viçosa, "Mata do Paraíso"; 28.IX.2011 leg. L.S. Araújo [printed]\Código transc.:[printed] 1[handwritten] Parcela: [printed] B [handwritten] Fungo [printed] 4 [handwritten]\, 1 ♂ (LAPC)\BRASIL: MG Viçosa, "Mata do Paraíso"; 28.IX.2011 leg. L.S. Araujo [printed]\Código transc.:[printed] 2 [handwritten] Parcela: [printed] C [handwritten] Fungo [printed] 3 [handwritten]\, 1 ♂ (LAPC)\BRASIL: MG Viçosa, "Mata do Paraíso"; 28.IX.2011 leg. L.S. Araujo [printed]\ Código transc.:[printed] 1[handwritten] Parcela: [printed] C [handwritten] Fungo [printed] 4 [handwritten]\, 1 ♀ (LAPC) \BRASIL: MG Viçosa 29.xi.2000 leg. C.Lopes-Andrade [printed]\, 1 ♂ and 2 ♀♀ (LAPC) \BRASIL: MG Rio Paranaíba 05.I.2012 leg. N.F. Resende [printed]\cerrado E.S-(CE 12) [printed]\, 5 ♂♂ and 3 ♀♀ (LAPC)\BRASIL: MG Rio Paranaíba 05.I.2012 leg. N.F. Resende [printed]\campo limpo [printed]\, 1 ♂ (LAPC)\BRASIL: MG Rio Paranaíba 05.I.2012 leg. N.F. Resende [printed]\cerrado ES-(CE 11) [printed]\. **State of Espírito Santo**: 2 ♂♂ and 1 ♀ (LAPC)\ BRASIL: ES: Ibiraçu, Sítio Sto Antônio. 18.iii.2008. Furieri & K.S.Furieri leg. [printed]\, 1 ♂ (LAPC) \BRASIL: ES: Ibiraçu, Sítio Sto Antônio. 18.iii.2008. Furieri & K.S.Furieri leg. [printed]\ ♂ dissected 05.1.2013 Oliveira, E.H. [handwritten]\, 7 ♂♂ and 1 ♀ (LAPC) \BRASIL: ES St. Teresa; 'ESBL trilha Rio Timbuí' 09.iv.2003; legs. K.S. Furieri, G.R. Loiola [printed]\Ex. Ganoderma [printed]\, 1 ♂ (LAPC) \BRASIL: ES St. Teresa; 'ESBL trilha Rio Timbuí' 09.iv.2003; legs. K.S. Furieri, G.R. Loiola [printed]\ Ex. Ganoderma [printed]\ ♂ dissected 03.i.2013 Oliveira, E.H [handwritten]\, 1 ♂ (LAPC) \BRASIL: ES Linhares 11–21.x.2004 P.C. Grossi leg.**State of Bahia**: 1 ♂ and 6 ♀♀ (LAPC)\BRASIL: BA Jussari; "RPPN Serra do Teimoso"; 23.iii a 17.iv.2005 leg. K.S. Furieri [printed]\, 1 ♂ (LAPC) \BRASIL: BA Jussari; "RPPN Serra do Teimoso"; 23.iii a 17.iv.2005 leg. K.S. Furieri [printed]\dissected 23.i.2013 Oliveira, E.H. [handwritten]\. **State of Pará**: 1 ♂ and 4 ♀♀ (LAPC) \BRASIL: PA Marabá; "Reserva Biológica de Tapirapé; Amazônia Legal" 20.xi.2003 leg. F.Gumier-Costa [printed]\AMOSTRA N°25 Mata 2°, Divino 20.xi.2003 [printed] 25 [handwritten]\, 1 ♂ (LAPC) \BRASIL: PA Marabá; "Reserva Biológica de Tapirapé; Amazônia Legal" 20.xi.2003 leg. F.Gumier-Costa [printed]\AMOSTRA N°25 Mata 2°, Divino 20.xi.2003 [printed] 25 [handwritten]\ ♂ dissected 03.i.2013 Oliveira, E.H. [handwritten]\, 3 ♂♂ and 3 ♀♀ (LAPC)\BRASIL: PA Marabá; "Reserva Biológica de Tapirapé; Amazônia Legal" 19.xi.2003 leg. F.Gumier-Costa [printed]\AMOSTRA N°19 Parcelas REF. 19.xi.2003 [printed] 19 [handwritten]\. **COLOMBIA:** 1 ♂ (LAPC) \Colômbia: Meta Vista. Hermosa,Vda La Reforma, PNN La Macarena, 2–3.iv.2010 Contreiras, J.L. leg. [printed]\ ♂ dissected 07.iii.2013 Oliveira, E.H. C. pubescens [handwritten]\. **PANAMA:** 1 ♂ (ANIC) \Barro Colorado Is. CANAL ZONE Feb. 24. 1968\J.F.Lawence Lot. [printed] 2484 [handwritten]\ex. Polyporus hydnoides\. **MEXICO:** 1 ♂ (ANIC)\11 mi.N.Cordoba Ver. Mexico VII-2-1962 [printed]\ ♂ dissected 16.iii.2013 Oliveira, E.H. Cis pubescens [handwritten]\.

Comments. LAWRENCE (1987) designated *Trichapus pubescens* as the type-species of *Trichapus* and was the first to suggest it could belong to the *taurus* group. The second species of the genus, *T. glaber*, we transfer here



Figs. 50–52. *Cis pubescens* (Friedenreich, 1881) **new combination**. **50**: Dorsal view of female from Santa Teresa (state of Espírito Santo, Southeast Brazil). **51**: Male with short horns from Vista Hermosa (department of Meta, Colombia). **52**: Male with long horns from Peruíbe (state of São Paulo, southeastern Brazil).

to *Porculus* Lawrence, 1987. We located *C. pubescens* specimens of the original Friedenreich collection deposited at MZSP. Some historical facts shall be mentioned here, which are arguments to sustain our proposition that a few of these specimens constitute the type-series of *T. pubescens*. The author Karl Wilhelm Friedenreich (who assumed the Portuguese name Carlos Guilherme Friedenreich) was one of the nineteenth century pioneer German immigrants of the Blumenau province, founded by Hermann Bruno Otto Blumenau in the state of Santa Catarina (formerly Santa Catharina), southern Brazil, in 1850. As far as we could trace, he was a veterinary and physician, and constructed the first lodging-house of Blumenau, being involved in several other initiatives and activities important for the development and history of the settlement. He was a volunteer soldier in the Paraguayan War (1864–1870), joining the Brazilian army in 1865. His political opinions diverged from those of other immigrants of Blumenau, as for instance Fritz Mueller. However, we could not evaluate whether or not this fact led him to leave Blumenau. In October 22nd 1881 he assumed a position of "travelling naturalist" of the Museu Nacional do Rio de Janeiro. By that time, other famous naturalists shared the same position in that museum, as Ernesto Ule, Fritz Mueller, Gustavo Rumbelsperger and Hermann von Ihering. It is interesting to note that in the end of the 1930's, two thirds of the Coleoptera of the Museu Nacional were specimens collected by Karl Friedenreich (Mello Leitão 1937). In 1891 he became an assistant naturalist of the Museu Sertório in the state of São Paulo, together with Alexandre Hummel. He had possibly permanently moved to the municipality of São Paulo with his family, because in 1892 his grandson Arthur Friedenreich, one of the most famous Brazilian soccer players in history, was born there. In 1894, the Museu Sertório gave rise to the Museu Paulista. In 1939, the entomological collection of the Museu Paulista was transferred to the Departamento de Zoologia da Secretaria de Agricultura de São Paulo, which later gave rise to what is nowadays the Museu de Zoologia da Universidade de São Paulo (MZSP). We did not locate specimens labelled as belonging to the Friedenreich collection in the Museu Nacional do Rio de Janeiro, but we found some in MZSP. Three specimens were labelled "*Solenopus pubescens* Fried. i.l. [= in litteris] Friedenreich Brasilien", which means that they were labelled before publishing the description. By that time the name "*Solenopus*" was already attributed to three genera: *Solenopus* Schoenherr, 1825 (Coleoptera Curculionidae), *Solenopus* Sars, 1868 and *Solenopus* Koren & Danielssen, 1877 (Mollusca). We believe that, after sending his work for publication, Friedenreich noted or was advised of these homonyms, changing the genus' name to *Trichapus*. However, he did not change specimens' labels. Therefore, three arguments are the strongest to sustain our proposition that these are the type specimens: (i) The last employment of Karl Friedenreich was at the Museu Paulista (currently MZSP), where the specimens are deposited; (ii) The specimens are labelled "i.l." (= in litteris); (iii) The labels indicate a generic name used before publishing the description. We designate the male specimen which fits the original description as the lectotype. The single female of the series we consider to represent the same species, and we labelled it as a para-

lectotype. The third specimen is a male of a completely different species and does not fit the original description. The recognition of this lectotype is important to stabilize the nomenclature, mainly because it is a name for a species widespread in Brazil that was sometimes erroneously identified as *C. testaceimembris*, of which the type-locality is also Blumenau. *Cis pubescens* **new combination** has tetramerous tarsi, and not trimerous ones as supposed by Friedenreich (1881). Therefore, only one ciid species is still believed to be trimerous, *Paratrichapus sechellarum* Scott, 1926. All other ciids considered trimerous proved to be cases in which authors did not see the first minute tarsomere of the legs (Lopes-Andrade 2007a, 2008b).

Cis pubescens was already collected in Cerrado (Brazilian savanna) sensu stricto, occurring in *Ganoderma* sp. and *Pycnoporus sanguineus* (L.) Murrill; in a Cerrado's phytophysionomy called "Campo Limpo", occurring in *Trametes villosa* (Sw.) Kreisel and *Hexagonia hydnoides* (Sw.) M. Fidalgo; and it was collected in Barro Colorado (Panama), occurring in *Hexagonia hydnoides* too, besides several other unidentified host fungi in other Neotropical biomes (Fig. 78).

3.10. *Cis rufescens* (Pic, 1922)

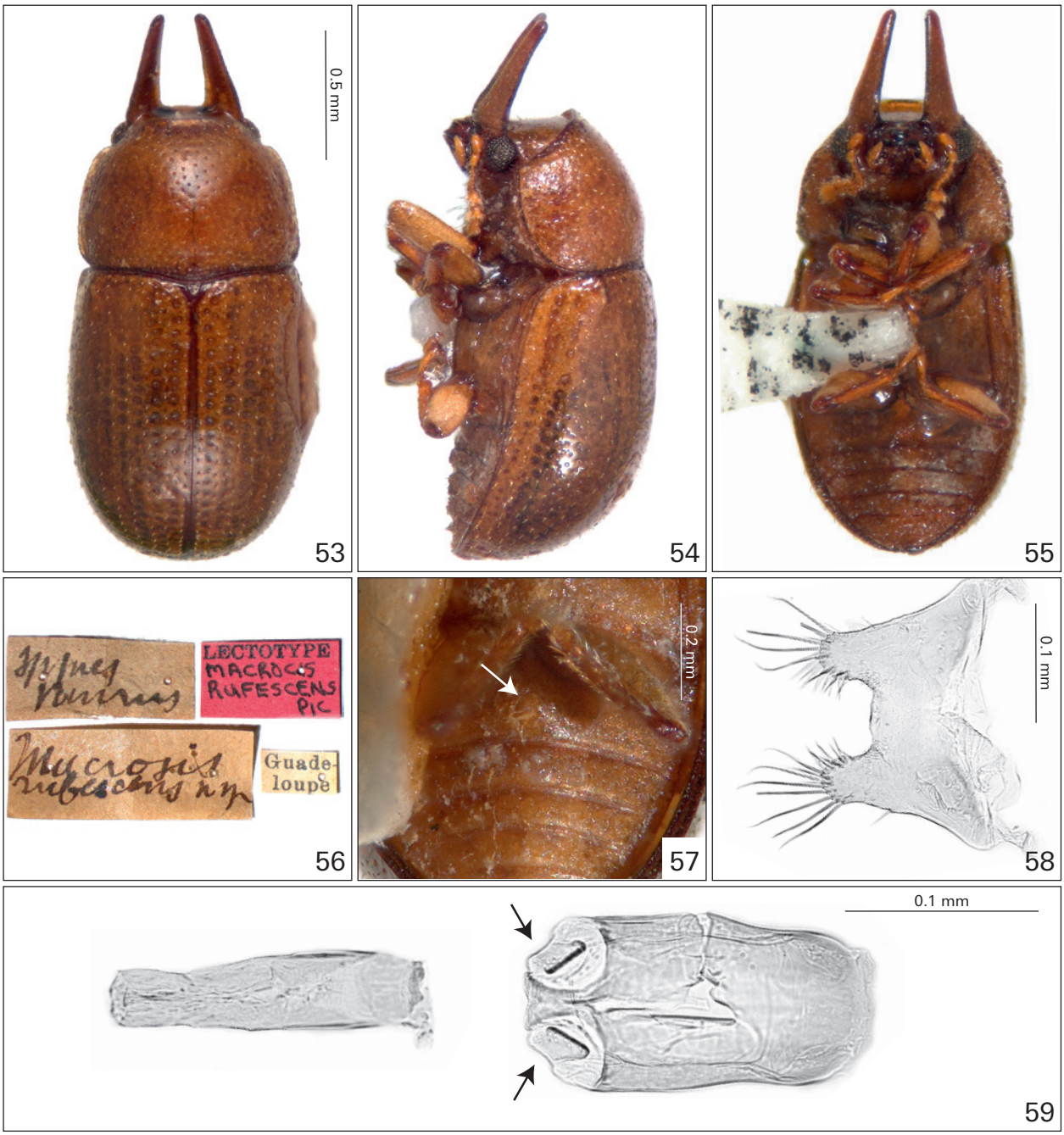
Figs. 53–59

Macrocis rufescens Pic, 1922; Blackwelder 1945: 549.
Cis rufescens; Oliveira & Lopes-Andrade 2013: 483.

Diagnosis. Body convex, elongated, subglabrous and reddish. Pronotum with punctation single and surface between punctures with hexagonal microreticulated sculpture; lateral margins weakly explanate, weakly crenulated and visible for their entire lengths from above. Elytral punctation dual and seriate. Males with frontoclypeal ridge bearing a pair of barely converging and conical horns with acute apices and abdominal sex patch of approximately one-fourth of the length of the first abdominal ventrite, located next to the posterior margin at midline.

Redescription, male lectotype (Figs. 53–56)**.** Fully pigmented and in good condition. Measurements (in mm): TL 1.67, PL 0.59, PW 0.83, EL 1.08, EW 0.90, GD 0.79. Ratios: PL/PW 0.71, EL/EW 1.20, EL/PL 1.83, GD/EW 0.88, TL/EW 1.86. Body robust, convex, elongated, subglabrous dorsally and ventrally, reddish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, subglabrous; punctation fine and sparse; frontoclypeal ridge bearing a pair of long, fine and conical horns (length 0.46 mm, width at base 0,15 mm) with rounded apices, granulate with fine punctation, pair of horns barely converging and separated at a distance of 0.15 mm at base. ***Antennae*** (left antenna measured) with FL 0.10, CL 0.16, CL/FL 1.60, length of antennomeres 1–10 (in mm) as follows: 0.07, 0.06, 0.03, 0.02, 0.02, 0.01, 0.02, 0.04, 0.04, 0.08. ***Eyes*** glabrous, GW 0.14 mm. ***Pronotum*** shiny; anterior margin arched outwards, anterior angles rounded and not so prominent, lateral margins weakly explanate, weakly crenulated, arched inwards and visible for their entire lengths from above; posterior margins sublinear and rounded near the scutellum; punctation single and coarse with hexagonal microreticulated sculpture between punctures; punctures separated by a distance of approximately two puncture-widths or more at disc and each puncture bearing a barely visible minute seta. ***Scutellum*** subtriangular, bearing few punctures, BW 0.06. ***Elytra*** convex, punctation dual with small ones of approximately a half of the diameter of the large ones; large ones similar in size to the punctures of pronotum; punctation seriate at disc, distance between punctures of approximately two large-puncture-widths or more, vestiture consisting of barely visible minute setae; humeral calli conspicuous and prominent. ***Prosternum*** biconcave, glabrous, granulate, tumid and weakly carinated at the longitudinal midline; prosternal process wide and sub-rectangular. ***Protibia*** with outer apical angle produced into a stout tooth, inner margin bearing thick setae and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not forming a stout tooth, inner margin devoid of thick setae and apex bearing a row of spines. ***Metaventrite*** convex, glabrous and granulate. ***Abdominal ventrites*** with granulate surface, punctures deep and coarse, glabrous, length of ventrites 1–5 (in mm, from base to apex of each ventrite at the longitudinal midline): 0.22, 0.08, 0.08, 0.09, 0.13. First abdominal ventrite bearing a circular, marginated sex patch (Fig. 57, arrow; the presence of pubescence could not be clearly observed) with a transversal diameter of 0.06 mm, located next to the posterior margin at midline. ***Male abdominal terminalia*** (in a specimen compared with the type, Figs. 58–59) with ***sternite VIII*** (Fig. 58) 1.5 × as wide as long; as long as four-fifths of penis length; anterior margin linear, membranous and devoid of strut; lateral margins converging; posterior margin strongly emarginated at middle to approximately the half of the sternite's length, giving rise to two lateral, parallel and produced lobes, bearing long setae; margin between lobes almost linear but slightly convex in the distal direction. ***Tegmen*** (Fig. 59, right) subcylindrical, 2 × as long as wide, same size as penis; anterior margin rounded; lateral margins sclerotized and subparallel; apical third with two lateral (one in each corner) lobes (Fig. 59, arrow) bearing basiconic sensilla, apical middle portion sclerotized. ***Penis*** (Fig. 59, left) subcylindrical, approximately 0.17 mm long, 4 × as long as wide; anterior margin lineal; lateral margins barely converging; apical third consisting of membranous and filamentous lamellae; ratio of length of penis to body length 0.10.

Females. Unknown.



Figs. 53–59. *Cis rufescens* (Pic, 1922). **53–55:** Male lectotype from Guadeloupe. **53**: Dorsal view. **54**: Lateral view. **55**: Ventral view. **56**: Labels. **57–59:** Male abdominal ventrites and male abdominal terminalia of a specimen from Trinidad, which was compared to the type. **57**: Male abdominal ventrites, with sex patch on first ventrite (arrow). **58**: Eighth abdominal sternite. **59**: Penis shown at left and tegmen at right; arrows indicate the lateral lobes of tegmen.

Variation. ***Males*** (n = 2, including the lectotype): TL 1.67–1.88 (1.77±0.14); PL 0.59–0.63 (0.61±0.02); PW 0.80–0.83 (0.82±0.02); EL 1.08–1.25 (1.17±0.12); EW 0.90–1.00 (0.95±0.07); GD 0.68–0.79 (0.73±0.08); PL/PW 0.71–0.78 (0.75±0.05); EL/EW 1.20–1,25 (1.23±0.04); EL/PL 1.83–2.00 (1.92±0.12); 0.68–0.88 (0.78±0.14); TL/EW 1.86–1.88 (1.87±0.01).

Type material examined. Guadeloupe: Lectotype here designated, ♂ (MNHN)\Guadeloupe [printed]\Macrocis rufescens [handwritten]\LECTOTYPE [printed] MACROCIS RUFESCENS [handwritten][redpaper]\.1♂**paralectotype**(MNHN)\Guadeloupe[printed]\Macrocis rufescens [handwritten]\PARALECTOTYPE [printed] ? MACROCIS RUFESCENS [handwritten] [yellow paper]\.

Complementary material. Trinidad and Tobago: 1 ♂ (NMNH)\Trinidad PofSpain [printed] xi.24.35 [handwritten]\Sta [printed] 94 [handwritten] Blackwelder [printed]\Green circle\ ♂ dissected 18.i.2013 Lopes-Andrade [handwritten]\.

Comments. Known only from the Lesser Antilles, recorded from the islands of Trinidad and Guadeloupe

(type-series) (Fig. 76), without data on host fungus. As *C. diabolicus*, the species shows small male abdominal terminalia when compared to its body size.

3.11. *Cis setifer* (Gorham, 1883)

Figs. 60–68

Macrocis setifer Gorham, 1883: 220; Blackwelder 1945: 549.
Cis setifer; Lawrence 1971: 438; Navarrete-Heredia 1997: 380; Navarrete-Heredia & Burgos-Solorio 2000: 414; Oliveira & Lopes-Andrade 2013: 483.

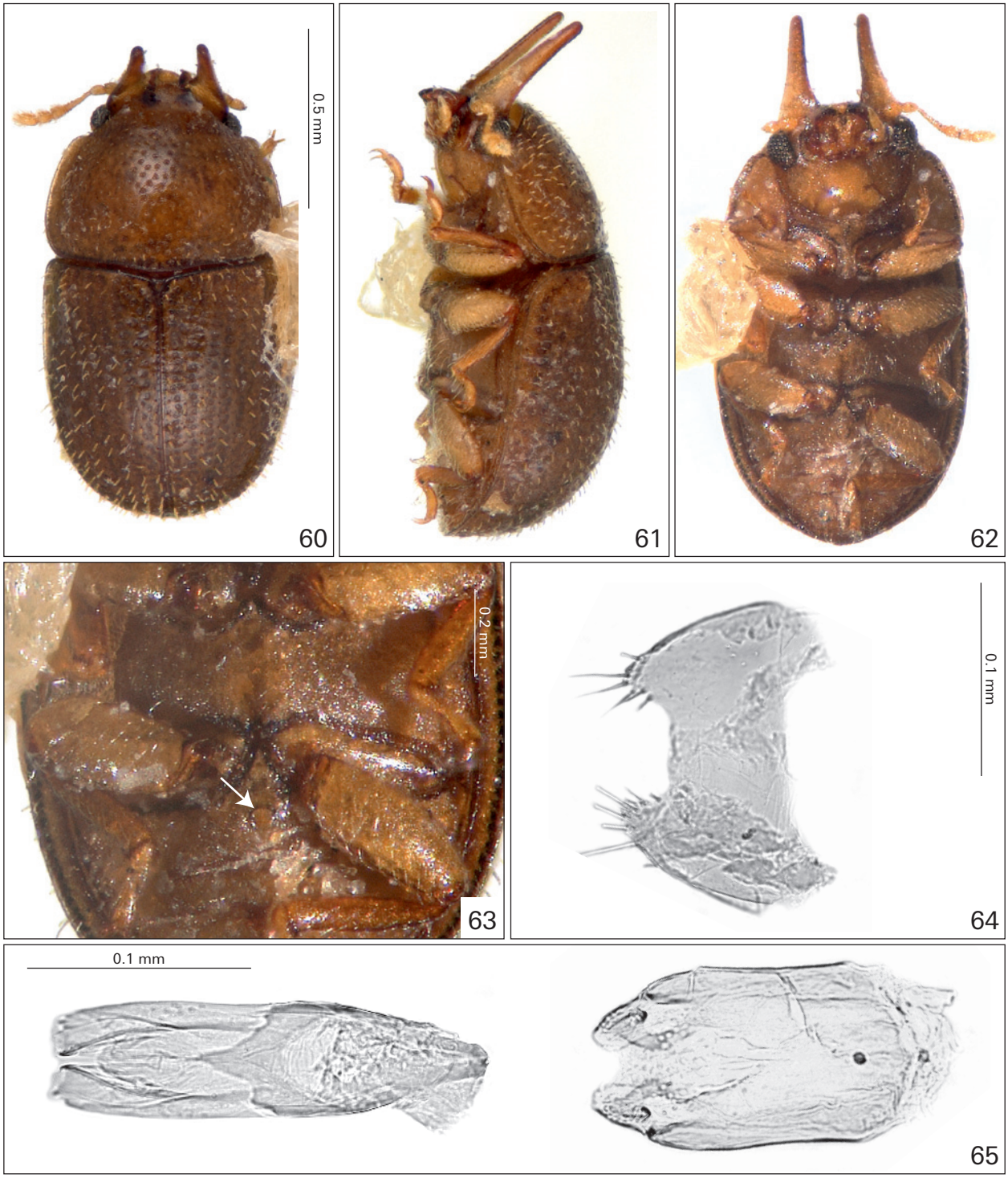
Diagnosis. Body convex, rounded and compact with dorsal vestiture of short and thick yellowish setae. Pronotum with single punctation and surface between punctures with hexagonal microreticulated sculpture; lateral margins strongly explanate, not crenulated and visible for their entire lengths from above. Elytral punctation subseriate and dual. Males with frontoclypeal ridge bearing a pair of slightly convergent, fine and conical horns with acute apex and abdominal sex patch of approximately two-fifths of the length of the first abdominal ventrite and located next to its posterior margin at midline.

Redescription, male plesiotype (Figs. 60–63)**.** Fully pigmented, good condition. Measurements (in mm): TL 1.20, PL 0.40, PW 0.67, EL 0.80, EW 0.75, GD 0.52. Ratios: PL/PW 0.60, EL/EW 1.07, EL/PL 2.00, GD/EW 0.69, TL/EW 1.60. Body robust, compact, rounded, convex, shiny reddish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, subglabrous and granulate; frontoclypeal ridge bearing a pair of long, fine and conical horns (length 0.24 mm; width at base 0.11 mm) with acute apices, granulate, pair of horns slightly convergent and separated of approximately 0.11 mm at base. ***Antennae*** (right antenna measured) with FL 0.08, CL 0.13, CL/FL 1.62, length of antennomeres 1–10 (in mm) as follows: 0.06, 0.04, 0.03, 0.02, 0.01, 0.01, 0.01, 0.03, 0.04, 0.06. ***Eyes*** glabrous, GW 0.11 mm. ***Pronotum*** with anterior margin arched outwards, anterior angles rounded and produced, lateral margins strongly explanate, not crenulated, arched inwards and visible for their entire lengths from above; posterior margin barely arched, mainly near the scutellum; punctation coarse and single, pronotum surface with hexagonal microreticulated sculpture, distance between punctures approximately one puncture-width, vestiture consisting of short and thick yellowish setae almost as long as a half of the length of base of scutellum. ***Scutellum*** U-shaped, with fine punctures, BW 0.04. ***Elytra*** compact (almost as wide as long) and convex; punctation coarse, subseriate and dual with large punctures of the same diameter as punctures of the pronotum and small punctures approximately one-fourth of diameter of the large ones, each small puncture bearing a short and thick yellowish seta as long as the pronotal ones; humeral calli conspicuous. ***Prosternum*** biconcave, tumid, slightly carinated and granulate; prosternal process wide and subrectangular. ***Protibia*** with outer apical angle bearing a stout tooth, inner margin bearing small setae and apex bearing a row of spines. ***Meso- and metatibia*** with outer apical angle acute but not produced into a tooth and apex bearing a row of spines. ***Metaventrite*** convex, granulate with sparse slender setae. ***Abdominal ventrites*** granulate with sparse slender setae, length of ventrites 1–5 (in mm, from base to apex of each ventrite at longitudinal midline): 0.16, 0.05, 0.05, 0.05, 0.07. First abdominal ventrite bearing a circular, marginated, not pubescent sex patch (Fig. 63, arrow) with a transversal diameter of 0.06 mm, located next to the posterior margin of ventrite at midline. ***Male abdominal terminalia*** (in a specimen compared with the plesiotype, Figs. 64–65) with ***sternite VIII*** (Fig. 64) almost as wide as long, three-fourths of penis length; anterior margin membranous, linear and devoid of median strut; lateral margins subparallel or slightly converging posteriorly; posterior margin slightly emarginated at middle approximately a third of the sternite's length and lateral corners bearing long setae; margin between corners linear. ***Tegmen*** (Fig. 65, right) subcylindrical, 1.7 × as long as wide, as long as two-thirds of penis length; anterior margin subrounded; lateral margins subparallel; distal portion bearing two small lobes (distal at approximately one-fifth of the tegmen length), bearing basiconic sensilla. ***Penis*** (Fig. 65, left) subcylindrical, approximately 0.18 mm long, 3.6 × as long as wide; anterior margin produced into a tip; lateral margins subparallel; apical region forming two small protuberances; ratio of length of penis to body length 0.16.

Females (Fig. 66)**.** Similar to males except in the following features: sex patch on first abdominal ventrite absent; head convex and bearing densely placed short yellowish setae; frontoclypeal projections short with curved distal edge, not lengthened into horns**.**

Variation. ***Males*** (Figs. 67–68) (n = 11, including the lectotype): TL 1.20–1.45 (1.31±0.09); PL 0.35–0.45 (0.41±0.03); PW 0.63–0.73 (0.67±0.03); EL 0.80–1.00 (0.90±0.07); EW 0.65–0.85 (0.75±0.06); GD 0.50–0.83 (0.57±0.09); PL/PW 0.54–0.68 (0.62±0.04); EL/EW 1.07–1.31 (1.21±0.07); EL/PL 1.83–2.44 (2.18±0.19); GD/EW 0.65–1.06 (0.76±0.11); TL/EW 1.60–1.86 (1.76±0.09). ***Females*** (n = 7): TL 1.25–1.33 (1.29±0.03); PL 0.43–0.50 (0.45±0.03); PW 0.63–0.73 (0.68±0.03); EL 0.75–0.88 (0.84±0.05); EW 0.70–0.75 (0.74±0.02); GD 0.50–0.63 (0.55±0.05); PL/PW 0.62–0.80 (0.67±0.06); EL/EW 1.07–1.21 (1.13±0.05); EL/PL 1.50–2.06 (1.86±0.2); GD/EW 0.67–0.83 (0.74±0.07); TL/EW 1.67–1.83 (1.75±0.05).

Size does not seem to fluctuate much among *C. setifer* specimens. Coloration can vary in fully-pigmented individuals from yellowish-brown to brown, while teneral individuals are yellowish. Horns can range from



Figs. 60–65. *Cis setifer* (Gorham, 1883). **60–63:** Male lectotype from Barro Colorado (Panama). **60**: Dorsal view. **61**: Lateral view. **62**: Ventral view. **63**: Abdominal ventrites, with sex patch on first ventrite (arrow). **64–65:** Abdominal terminalia of a male from Barro Colorado (Panama) compared to the type. **64**: Eighth abdominal sternite. **65**: Penis shown at left and tegmen at right.

short (minimum of 0.14 mm) to long (maximum of 0.44 mm).

Material examined. Panama: Plesiotype ♂ (ANIC) \Barro Colorado Is. CANAL ZONE Feb. 10. 1968 [printed]\J.F. Lawrence Lot. [printed] 2378\J.F. Lawrence collector\Trametes corrugate\PLESIOTYPUS Oliveira & Lopes-Andrade det.\, 2 ♂♂ and 1 ♀ (ANIC)\Barro Colorado Is. CANAL ZONE July [printed] 2 [handwritten] 1969 [printed]\J.F. Lawrence Lot. [printed] 2738\Rigidoporus sp.\, 1 ♂ (ANIC)\Barro Colorado Is. CANAL ZONE July [printed] 2 [handwritten] 1969 [printed]\J.F. Lawrence Lot. [printed] 2738\Rigidoporus sp.\ ♂ dissected 09.i.2013 Oliveira, E.H.\, 3 ♂♂ and 1 ♀ (ANIC)\Barro Colorado Is. CANAL ZONE July [printed] 3 [handwritten] 1969 [printed]\J.F. Lawrence Lot. [printed] 2750\Ganoderma sp.\, 1 ♂ (ANIC)\Barro Colorado Is. CANAL ZONE July [printed] 31 [handwritten] 1969 [printed]\J.F.

Figs. 66–68. *Cis setifer* (Gorham, 1883). **66**: Female from Barro Colorado (Panama). **67**: Small male from El Fortin (Mexico). **68**: Large male from Barro Colorado (Panama).

Lawrence Lot. [printed] 2983\Polyporus lignosus\, 1 ♂ and 1 ♀ (ANIC)\Barro Colorado Is. CANAL ZONE Aug. [printed] 2 [handwritten] 1969 [printed]\J.F. Lawrence Lot. [printed] 2996\ Trametes corrugata\, 1 ♂ and 1 ♀ (ANIC)\Barro Colorado Is. CANAL ZONE Feb. 10. 1968 [printed]\J.F. Lawrence Lot. [printed] 2378\Trametes corrugata\, 2 ♂♂ (ANIC)\Barro Colorado Is. CANAL ZONE Feb. 12, 1968 [printed]\J.F. Lawrence Lot. [printed] 2387\Ganoderma sp.\, 1 ♂ (ANIC)\Barro Colorado Is. CANAL ZONE Feb. 12, 1968 [printed]\J.F. Lawrence Lot. [printed] 2387\ Ganoderma sp.\ ♂ dissected 17.i.2013 Lopes-Andrade [handwritten]\, 1 ♂ and 1 ♀ (ANIC)\Barro Colorado Is. CANAL ZONE Feb. 12, 1968 [printed]\J.F. Lawrence Lot. [printed] 2389\Polyporus concrescens\, 1 ♀ (ANIC) \Barro Colorado Is. CANAL ZONE July [printed] 25 [handwritten] 1969 [printed]\J.F. Lawrence Lot. [printed] 2957\Polyporus hydnoides\, 1 ♂ and 1 ♀ (ANIC)\Cerro Campana Panama, PANAMA Aug. 9, 1969 [printed]\J.F.Lawrence Lot [printed] 3023 [handwritten]\Rigidoporus sp. [printed]\, 1 ♂ (FMNH)\R. PANAMA: Almirante 1959 H.S.Dybas FMNH(HD) # 59–157 Polyporus zonalis [printed]\. **Mexico:** 1 ♂ (LAPC)\MÉXICO: Veracruz, Banderilla La Martinica [printed] 31.V.2001 Em Polyporus sp. [handwritten] Alt. 1550 m, L. Delgado col. [printed]\Cis setifer (Gorham) 1883 L.Delgado det.2004 [handwritten]\♂ 17.i.2007 [handwritten]\, 2 ♂♂ (ANIC) \Canyon R. Metlac Fortin, Veracruz MEXICO Aug.5, 1969 [printed]\J.F. Lawrence Lot. [printed] 3091 [handwritten]\ S. & J. Peck Collectors [printed]\Rigidoporus sp. [printed]\, 1 ♀ (ANIC)\MEXICO Veracruz Dos Amates 28/22 1987 polypore 0114 J.Navarrete [printed]\.

Comments. Restricted to Central America, occurring in Guatemala (type-series), Mexico and Panama (Fig. 76). It occurs from the mountainous parts of Veracruz in Mexico to the Caribbean coast of Panama and the Barro Colorado Island at the Canal Zone. The type-series comprises one male and two females, but we did not have them in hands for the present work. The recorded host fungi are: *Ganoderma* sp., *Hexagonia hydnoides* (Sw.) M. Fidalgo, *Rigidoporus* sp., *Rigidoporus microporus* (Sw.) Overeem, *Rigidoporus lineatus* (Pers.) Ryvarden and *Earliella scabrosa* (Pers.) Gilb. & Ryvarden.

3.12. *Cis taurus* (Reitter, 1878)

Macrocis taurus Reitter, 1878; Gorham 1883: 219; Blackwelder 1945: 549.

Cis taurus; Lawrence, 1971: 438; Navarrete-Heredia & Burgos-Solorio 2000: 418; Oliveira & Lopes-Andrade 2013: 484.

Diagnosis. Body convex, elongated and subglabrous. Pronotum with single punctation and microreticulate sculpture between punctures, lateral margins explanate, weakly crenulated and visible for their entire lengths from above. Elytral punctation dual and subseriate. Males with frontoclypeal ridge bearing a pair of parallel and conical horns with acute apices and abdominal sex patch approximately one-half of the length of the first abdominal ventrite at the longitudinal midline at the centre of the ventrite (Oliveira & Lopes-Andrade 2013; the contents of the diagnosis can be maintained unchanged despite the many new morphological data assembled for the *taurus* species-group herein).

Additional type material examined. Mexico: 1 ♂ **paralectotype** (MNHN)\Mexico. Bilimek [handwriten]\Macrocis taurus m.

[handwritten] [green paper] \ Taurus m. Mexico [handwritten] [green paper] \ LECTOTYPE [printed] MACROCIS TAURUS [handwritten] [red paper] \. It was labelled as lectotype in 1965 but not designated in the literature. Another specimen, from the Hungarian Natural History Museum, was designated as lecotype (see Oliveira & Lopes-Andrade 2013 for information on it). Therefore, this specimen is a paralectotype. 2 ♂♂ and 3 ♀♀ **paralectotypes** (MNHN) \ Mexico. Bilimek [handwriten] \ Macrocis taurus m. [handwritten] [green paper] \ taurus m. Mexico [handwritten] [green paper] \ PARALECTOTYPE [printed] MACROCIS TAURUS [handwritten] [yellow paper] \. 1 ♂ and 1 ♀ **paralectotypes** (MNHN) \ Typ. Reitter \ PARALECTOTYPE [printed] MACROCIS TAURUS [handwritten] [yellow paper] \. 6 **paralectotypes** (unknow sex) (MNHN) \ ex Coll. Reitter \ PARALECTOTYPE [printed] MACROCIS TAURUS [handwritten] [yellow paper] \. 1 ♂ **paralectotype** (MNHN) \ Mexique \ ex Coll. Reitter \ PARALECTOTYPE [printed] MACROCIS TAURUS [handwritten] [yellow paper] \.

Comments. Species recently redescribed by Oliveira & Lopes-Andrade (2013), who provided new data on its external morphology, geographic distribution and host fungi, and designated a lectotype.

3.13. *Cis testaceimembris* (Pic, 1916)

Figs. 69 – 74

Macrocis testaceimembris Pic, 1916: 6; Blackwelder 1945: 549.
Cis testaceimembris; Lawrence 1971: 451; Kawanabe 1997: 328; Graf-Peters 2011: 558 (incorrect identification); Oliveira & Lopes-Andrade 2013: 483.
Cis testaceimembrius; Lopes-Andrade 2002a: 7 (incorrect spelling).

Diagnosis. Body strongly convex and elongated with dense dorsal vestiture of short and thick yellowish setae. Pronotum with single punctation and surface between punctures with hexagonal microreticulated sculpture; lateral margins weakly explanate, crenulated and barely visible for their entire lengths from above. Elytral punctation dual and not seriate. Males with frontoclypeal ridge bearing a pair of parallel, cylindrical and a bit flattened horns with rounded apices and very small abdominal sex patch, being an inconspicuous mark at the centre of the ventrite at midline.

Redescription, male lectotype (Figs. 69 – 73)**.** Fully pigmented, in good condition. Measurements (in mm): TL 1.7, PL 0.59, PW 0.84, EL 1.11, EW 0.96, GD 0.84. Ratios: PL/PW 0.70, EL/EW 1.16, EL/PL 1.88, GD/EW 0.88, TL/EW 1.77. Body robust, strongly convex, elongated, shiny, reddish brown; mouthparts, tarsi and antennae goldish yellow. ***Head*** with dorsal surface between and immediately above the horn bases concave, subtriangular, subglabrous, punctation fine; frontoclypeal ridge bearing a pair of long, cylindrical and a bit flattened horns (length 0.34 mm, width at base 0.14 mm) with rounded apices, punctation fine and sparse, pair of horns parallel and separated by a distance of approximately 0.18 mm at base. ***Antennae*** (in the paralectotype, left antenna measured) with CL 0.22, FL 0.12, CL/FL 1.83; length of antennomeres 1 – 10 (in mm) as follows: 0.08, 0.05, 0.04, 0.02, 0.02, 0.02, 0.02, 0.05, 0.07, 0.10. ***Eyes*** glabrous, GW 0.14. ***Pronotum*** with anterior margins arched; anterior angles rounded and prominent; lateral margins weakly explanate, crenulated, arched inwards and barely visible for their entire lengths from above; posterior margin slightly arched near scutellum; punctation single, deep, coarse, with coarse hexagonal microreticulated sculpture between punctures, punctures separated by a distance of approximately two puncture-widths at disc; vestiture dense, consisting of thick yellowish setae as long as half the length of base of scutellum. ***Scutellum*** subtriangular and bearing setae, BW 0.10. ***Elytra*** elongate, strongly convex; punctation coarse, not seriate at disc, dual with large punctures of the same size as pronotal punctures and the small ones with approximately half the size of the big ones, distance between punctures of approximately one puncture-width, each small puncture bearing a thick yellowish seta as long as the pronotal ones; humeral calli conspicuous. ***Prosternum*** biconcave, tumid, weakly carinated at the longitudinal midline, surface granulate and glabrous; prosternal process narrow at apical portion and gradually expanded to a blunt apex. ***Protibia*** with outer apical angle produced into a stout tooth, inner margin of tibia with long and numerous setae and apical margin bearing a row of small spines. ***Meso- and metatibia*** with outer apical angle not produced into a stout tooth, inner margin with setae and apical margin bearing a row of spines. ***Metaventrite*** convex, granulate, with sparse minute setae. ***Abdominal ventrites*** elongate with shallow and punctation; surface granulated, subglabrous; length of ventrites 1 – 5 (in mm, from base to apex at the longitudinal midline): 0.23, 0.1, 0.1, 0.1, 0.17. First abdominal ventrite bearing a minute reduced sex patch at the centre of ventrite at midline (Fig. 73, arrow; no pubescence could be seen by stereomicroscopy). ***Male abdominal terminalia*** (in the paralectotype, Fig. 74) with ***sternite VIII*** 1.3 × as wide as long, 3 × shorter than the penis; anterior margin membranous, linear and devoid of median strut; lateral margins subparallel, slightly convergent; posterior margin slightly emarginated (almost linear) bearing long setae at the lateral corners, lateral corners rounded and subparallel. ***Tegmen*** (Fig. 74, right) subcylindrical, approximately 4.4 × as long as wide, as long as four-fifths of penis length; proximal half with more membranous margins and distal half with sclerotized margins; anterior margin rounded; lateral margins subparallel; distal third separated in two lateral lobes divided by a dorsal fissure of approximately one-third of the tegmen length, each lobe bearing an excavation (Fig. 74, arrow) in half of its length separating a more membranous region from a more sclerotized region full of basiconic sensilla. ***Penis*** (Fig.74, left) subcylindrical, approximately 0.54 mm long, very sclerotized, approximately 10 × as long as wide; anterior margin produced into a tip; lateral mar-

Figs. 69–74. *Cis testaceimembris* (Pic, 1916). **69–73:** Male lectotype from Blumenau (state of Santa Catarina, southern Brazil). **69**: Dorsal view. **70**: Lateral view. **71**: Ventral view. **72**: Labels. **73**: Abdominal ventrites, with minute sex patch on first ventrite. **74**: Part of aedeagus of the male paralectotype, showing penis at left (lateral view) and tegmen at right; arrows indicate the lateral excavations near the apex of tegmen.

gins subparallel; posterior portion ventrally tapering to a sclerotized hook curved backwards and dorsally bearing a membranous region consisting of lamellar filaments; ratio of length of penis to body length 0.32.

Females. Unknown.

Type material examined. BRAZIL: Lectotype here designated, ♂ (MNHN) \Blumenau S.O.Brasilien (Reitter) [printed in black border]\Macrocis testaceimembris Pic [handwritten]\Type [handwritten in old yellow paper]\LECTOTYPE [printed] MACROCIS TESTACEIMEMBRIS PIC [handwritten] [red paper]\TYPE [printed in red paper]\. 1 ♂ **paralectotype** (MNHN)\Blumenau S.O.Brasilien (Reitter) [handwritten in black border]\Malacocis

[handwritten]\PARALECTOTYPE [printed] MACROCIS TESTACEIMEMBRIS PIC [handwritten] [yellow paper]\ ♂ dissected 16.1.2013 Lopes-Andrade [handwritten]\.

Comments. Besides the above mentioned specimens, no other type material was located. Known only from its type-series from Blumenau (Fig. 75), in the state of Santa Catarina (Brazil), with no host fungus record. We did not find any other specimen, despite intense collecting efforts in southern Brazil and access to museum material collected there. The sclerotized hook at the apex of penis is unique among all ciids with known morphology of male genitalia. It is so unique that we decided to dissect both the lectotype and the paralectotype to confirm its morphology, and they are exactly the same. The species identified as *C. testaceimembris* in Graf-Peters et al. (2011) is indeed a very similar undescribed species, in which the penis has clearly a membranous apex without sclerotized hook, among other minor differences.

4. Discussion

4.1. Phylogeny and diversity

There is no phylogenetic analysis available testing whether the *taurus* group is monophyletic or not. However, the diagnostic features of the group (see 3.2.) occur together only in its species and separate them from the remaining *Cis*. These diagnostic features occur in all observed described and undescribed species of the group and some may be apomorphies.

The affinities of the *taurus* group within the genus *Cis* are barely understood, and even its placement in this genus is still uncertain. Possible affinities of the *taurus* group are with the *tricornis* and the *castaneus* groups (the latter previously called *nitidus* group; see Jelinek 2007) of *Cis*. The *tricornis* group is mostly Neotropical, with a single Nearctic species, and shares characteristics with the genus *Grossicis* Antunes-Carvalho et al. The *castaneus* group is Holarctic, but with undescribed Neotropical species. Species of *Grossicis*, and those of the *castaneus*, *taurus* and *tricornis* groups all have dual elytral punctation, carinate prosternum, protibial apex with a row of spines and outer apical angle of protibia acute or produced into a stout tooth. They also share similarities in the morphology of male genitalia, in which the tegmen usually bears distinctive excavations near or at its apex and the penis is subcylindrical, with apical portion usually membranous and wrinkled. It is important to emphasize that *castaneus* and *taurus* species comprised separate genera in the past (see Lawrence 1965, 1971), and that *tricornis* species share more features with *Grossicis* than with *Cis*. However, before proposing more changes in the classification of *Cis*, it is necessary to conduct a robust phylogenetic analysis and solve the greatest problems with its limits. In case the *taurus* group regains the status of genus, the name *Macrocis* Reitter, 1878, is available (Lawrence 1971).

The *taurus* group is possibly the most speciose Ciidae group in the Neotropics. The number of species, mostly undescribed, is astonishing, as verified by our efforts in locating and collecting species that culminated in more than 80 morphospecies, and surely will increase even more with the growing sampling effort in the region. The knowledge and description of these species, as well as their phylogenetic analysis and study of basic habits and biology are fundamental to succeed in understanding the evolution and ecology of fungivorous beetles in the Neotropics. We intend to contribute to this enterprise by describing and bringing new information on species already recognized by us in the near future, evaluating the position of the *taurus* group within the family and assessing phylogenetic relationships within the group.

4.2. Biogeography and distribution

The distribution of the *taurus* group is primarily Neotropical, with only *Cis cornelli* categorized as a Nearctic species (Lawrence 1971). *Cis cornelli* was collected in Florida, South and North Carolina (USA). However, in works on the biogeography of the American continent, Florida was already interpreted as part of the Neotropical region according to the animal taxa studied (Morrone 2002, 2006). The Neotropical region comprises most of South America, Central America, southern Mexico and the West Indies, expanding eastwardly at the Gulf of Mexico and part of the Atlantic Coast and reaching Florida (Morrone 2006). The distribution of species of the *Cis taurus* group seems also to support this delimitation of the Neotropical region. South and North Carolina can be interpreted as a transitional zone between the Neotropical and Nearctic regions, and therefore *C. cornelli* is not exactly a Nearctic species. *Cis taurus* properly is recorded from the Mexican Transitional Zone (Oliveira & Lopes-Andrade 2013), an area composed by a mix of Neotropical and Nearctic species (Morrone 2006; Oliveira & Lopes-Andrade 2013). We can suppose that the *taurus* group had its origin in the Neotropical region and reached the Mexican Transitional Zone. However, more detailed studies on distribution and phylogeography are necessary to evaluate the origin of the group and its subsequent radiation.

Cis pubescens is morphologically similar to *C. grandicornis*, the latter only known from the type-series collected in French Guiana (Fig. 77). Both species have good diagnostic characteristics, but the similar body morphology and the most remarkably similar appearance of male abdominal terminalia show that they may be closely related. While *C. grandicornis* seems to be restricted to Amazonia, *C. pubescens* has a large distri-

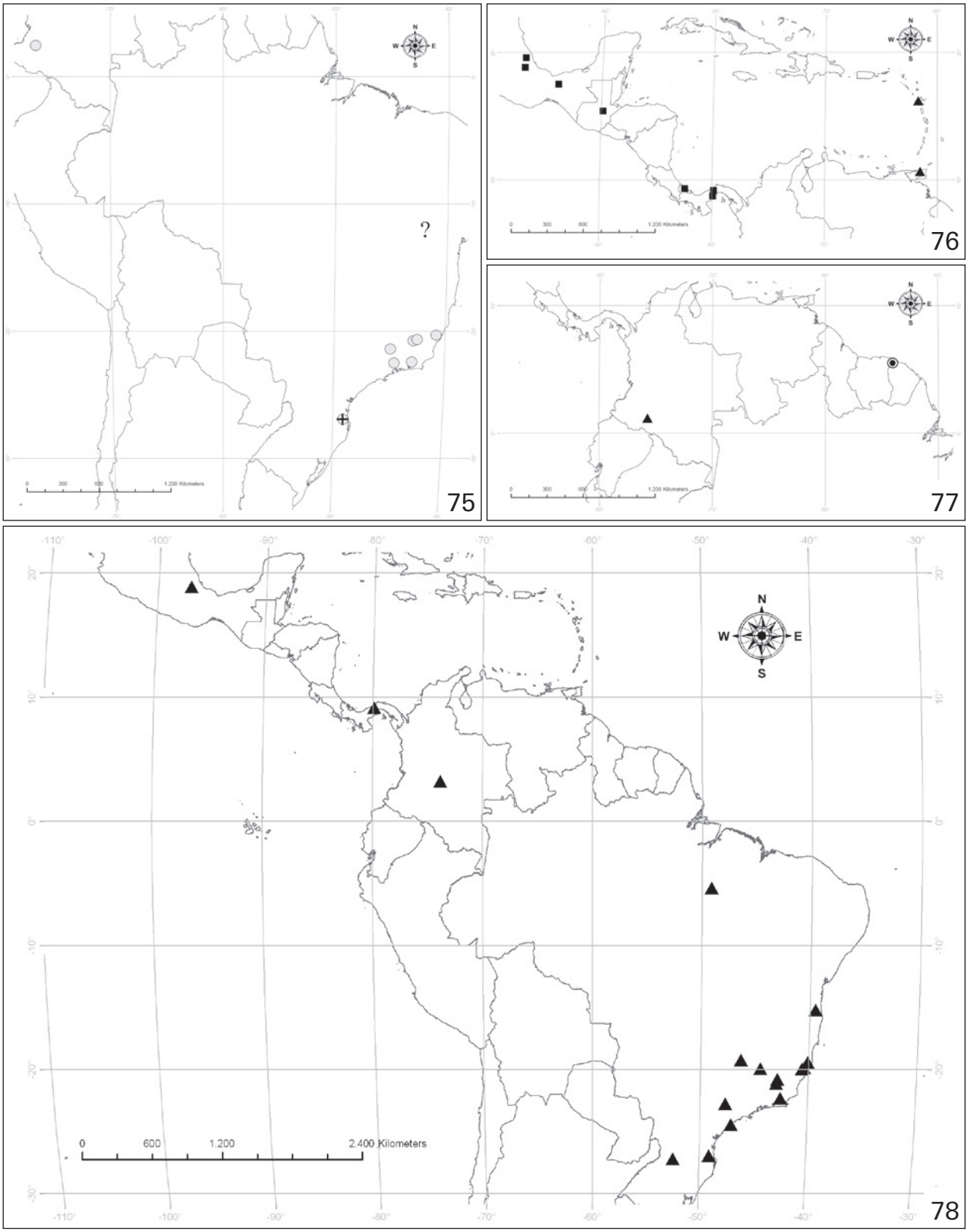


Fig. 75–78. Distribution maps for species of the *taurus* group treated in the present work. **75**: *Cis bahiensis* (Pic, 1916), without specific locality (**?**), *C. kawanabei* Lopes-Andrade, 2002 (○) and *C. testaceimembris* (Pic, 1916) (**+**). **76**: *Cis setifer* (Gorham, 1883) (■) and *C. rufescens* (Pic, 1922) (▲). **77**: *Cis grandicornis* (Pic, 1917) (◉) and *C. diabolicus* (Reitter, 1878) (▲). **78**: *Cis pubescens* (Friedenreich, 1881), **new combination** (▲).

bution along Latin America and reaches places as Colombia and northern Brazil in the state of Pará, which are part of the Amazonian subregion, so it could co-occur with *C. grandicornis* in some extension. *Cis pubescens* is recorded from subtropical Atlantic Forest in south and southeast Brazil (Fig. 78), extending west to the Cerra-

do biome of the state of Minas Gerais and reaching the Amazonian Forest in Pará, where it was collected in undisturbed fragments and in fragments in regeneration. It can be collected even in anthropized environments as the gardens of Federal University of Viçosa. *Cis pubescens* is also known to occur in Vista Hermosa (Colombia), where the climate is sub-humid and tropical forests predominate, in tropical forests of Barro Colorado Island, Panama, and of Cordoba, Mexico. Further study is needed to evaluate whether it is polyphagous, which is plausible for a so widely distributed species, with the greatest plasticity and capacity for living in a variety of biomes among all examined *taurus* group species.

4.3. Ecology

Species of the *taurus* group are usually collected together with species of other *Cis* species-groups and other Ciidae genera. We registered *taurus* species co-occurring with *Xylographus* Mellié, *Grossicis*, *Ceracis* Mellié, *Strigocis* Dury and *Porculus*. It is common to observe two or more *taurus* species, even morphologically similar ones, inhabiting the same basidiome. It is not clear if there is any kind of niche partition, either temporal or spatial, between ciid species co-occurring in a basidiome. It is still vastly unclear how the ecological community of ciids functions and which kind of interactions exist between these species, between Ciidae and members of other families of Coleoptera or between all the arthropod species coexisting in a fungus basidiome.

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