Phylogeny and revision of the bee genus *Rhinocorynura* Schrottky (Hymenoptera, Apidae, Augochlorini), with comments on its female cephalic polymorphism

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ABSTRACT. Phylogeny and revision of the bee genus *Rhinocorynura* Schrottky (Hymenoptera, Apidae, Augochlorini), with comments on its female cephalic polymorphism. A taxonomic revision and a phylogeny for the species of *Rhinocorynura* are provided. Six species are recognized: *R. briseis*, *R. crotonis*, *R. inflaticeps* and *R. vernoniae* **stat. nov.,** the latter removed from synonymy with *R. inflaticeps*, in addition to two newly described species, *R. brunnea* **sp. nov.** and *R. viridis* **sp. nov.** Lectotypes for *Halictus crotonis* Ducke, 1906 and *Halictus inflaticeps* Ducke, 1906 are hereby designated. Another available name included in *Rhinocorynura*, *Corynuropsis ashmeadi* Schrottky, 1909, is removed from the genus and treated as *species inquerenda* in Augochlorini. *Rhinocorynura* is monophyletic in the phylogenetic analysis and the following relationships were found among its species: (*R. crotonis* (*R. briseis* ((*R. brunnea* **sp. nov.** + *R. viridis* **sp. nov.**) (*R. inflaticeps* + *R. vernoniae*)))). Biogeographic relationships within the genus and comparisons with related taxa are presented. Females of all species exhibit pronounced variation in body size, in two of them, *R. inflaticeps* and *R. vernoniae*, with structural modifications possibly linked to division of labor. Identification key and illustrations for the species are provided.

KEYWORDS. Apoidea; Halictidae; macrocephalic; parasocial.

RESUMO. Filogenia e revisão taxonômica das abelhas do gênero *Rhinocorynura* Schrottky (Hymenoptera, Apidae, Augochlorini), com comentários sobre o poliformismo cefálico das fêmeas. São apresentadas uma revisão taxonômica e filogenia para as espécies de *Rhinocorynura*. Seis espécies são reconhecidas, duas descritas como novas, *R. brunnea* **sp. nov.** e *R. viridis* **sp. nov.**, e quatro com nomes disponíveis, *R. briseis*, *R. crotonis*, *R. inflaticeps* e *R. vernoniae* **stat. nov.**, esta última removida da sinonímia com *R. inflaticeps*. Designam-se aqui lectótipos para *Halictus crotonis* Ducke, 1906 e *Halictus inflaticeps* Ducke, 1906. Outro nome disponível incluído em *Rhinocorynura*, *Corynuropsis ashmeadi* Schrottky, 1909, é removido do gênero e tratado como *species inquerenda* em Augochlorini. O gênero *Rhinocorynura* resultou monofilético nas análises filogenéticas, com as seguintes relações encontradas para suas espécies: (*R. crotonis* (*R. briseis* ((*R. brunnea* **sp. nov.** + *R. viridis* **sp. nov.**) (*R. inflaticeps* + *R. vernoniae*)))). As relações biogeográficas dentro do gênero e comparações com táxons relacionados são apresentadas. Fêmeas de todas as espécies exibem variação pronunciada de tamanho corporal, em duas delas, *R. inflaticeps* e *R. vernoniae*, com modificações estruturais possivelmente relacionadas à divisão de trabalho. São apresentadas chave de identificação e ilustrações para as espécies.

PALAVRAS-CHAVE. Apoidea; Halictidae; macrocefalia; parassocial.

The augochlorine bees are very common elements of the Neotropical bee fauna, but whose taxonomy and biology are understudied when compared with other bee groups (Michener 2007). Augochlorini comprises up to 550 species that are distributed in 32 genera and two subtribes (Engel 2000; Moure 2007). One of the subtribes, Corynurina, has six genera and 43 species (Gonçalves 2010; Moure 2007). The relationships among its genera were recently studied by Gonçalves (2010), who found the following topology for Corynurina: ((*Corynura* Spinola + *Halictillus* Moure) ((*Corynurella* Eickwort + *Paracorynurella* Gonçalves) (*Rhectomia* Moure + *Rhinocorynura* Schrottky))).

Rhinocorynura is remarkable for the cephalic polymorphism reported for females of *R. vernoniae* (Schrottky, 1914). Differences among females of *Rhinocorynura* are so amazing that induced Schrottky to describe the genus twice, as *Rhinocorynura*, based on a 'normal' female (Schrottky 1909), and as *Ctenocorynura* Schrottky, based on a female with a larger head and with clypeal processes (Schrottky 1914). Sakagami & Moure (1965), referring to this species as *R. inflaticeps* (Ducke, 1906), compared and discussed several cases of halictine species possessing females with enlarged vertex and gena, which can also have associated aberrant processes on the mandibles and clypeus. These authors pointed that these cases of polymorphism were related to caste differentiation due to a possible advanced social behavior. Since the original study of Sakagami & Moure (1965), no other study has investigated in detail the cephalic polymorphism and its origin within the genus *Rhinocorynura*.

In spite of this noteworthy aspect, *Rhinocorynura* has not been taxonomically revised. Moure & Hurd (1987) and Moure (2007) included five species in the genus: *R. ashmeadi*

(Schrottky, 1909), *R. briseis* (Smith, 1879), *R. crotonis* (Ducke, 1906), *R. dificillima* (Ducke, 1906) and *R. inflaticeps* (Ducke, 1906). Recently, *Halictus difficillimus* was assigned to *Paracorynurella* Gonçalves in the subtribe Corynurina (Gonçalves 2010). The name *Corynuropsis ashmeadi*, provisionally allocated in *Rhinocorynura* by Moure & Hurd (1987), remains with doubtful identity due to lack of the type material and its dubious original description. For the other three valid species, which undoubtedly belong in the genus, there are eight available names to be considered.

At the genus level, three names are available according to Moure (2007). Michener (2007), however, synonymized a fourth generic name, the monospecific *Gnathalictus* Moure, 2001 under *Rhinocorynura*. *Gnathalictus capitatus* Moure was originally allocated in Halictini as confirmed by Melo (in Silveira *et al.* 2002) due to the presence of pygidial plate in the male tergum 7. *Gnathalictus* was synonymized under *Dialictus* Robertson in Moure (2007), a position followed here.

The objectives of the present study are to revise the species of *Rhinocorynura* and to conduct a cladistic analysis among its species. Notes on the female cephalic polymorphism within the genus, including illustrations, are provided. Also biogeographic relationships within the genus and comparisons with related taxa are presented.

MATERIAL AND METHODS

Listed museums and their respective acronyms: American Museum of Natural History, New York, USA (AMNH), Natural History Museum (formerly British Museum (Natural History)), London, England (BMNH), Carnegie Museum of Natural History, Pennsylvania, USA (CMNH), Departamento de Zoologia da Universidade Federal do Paraná, Curitiba, Brazil (DZUP), Departamento de Zoologia da Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (DZMG), Muséum National d'Histoire Naturelle, Paris, France (MNHP), Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZSP), Departamento de Biologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Coleção João Maria Franco de Camargo, Ribeirão Preto, Brazil (RPSP), Snow Entomological Collection, University of Kansas, Lawrence, USA (SEMK), Universidade Federal de Santa Catarina, Florianópolis, Brazil (UFSC), Coleção Entomológica "Angelo Moreira da Costa Lima", Universidade Federal Rural do Rio de Janeiro, Seropédica, Brazil (URRJ), Museum für Naturkunde, Berlin, Germany (ZMB).

The terminology for the external morphology follows Eickwort (1969) and Michener (2007), except for the "basal area of propodeum", here the metapostnotum, and the scutum, referred as mesoscutum; and the terminology for the male terminalia follows that of Eickwort (1969). The following abbreviations are used: F1–F11 for the flagellomeres; T1–T6, metasomal terga; and S1–S8, metasomal sterna. The term "macrocephalic female" is used for females with a disproportionally enlarged head, often diagnosable by direct comparison with other females. Also, correlated mandibular and clypeal processes are helpful in establishing this distinction (based on criteria used by Sakagami & Moure 1965). The interspaces between punctures (i) are described according to their relation with the puncture diameter (dp), *e.g.* when the space between punctures are two times their respective average diameter, the notation used is "i = 2 dp".

Measurements are given in millimetres and the abbreviations found in the descriptions of females of the newly described species are: maximum mesoscutal width (mmw), maximum mesoscutal lenght (mml), maximum mandible length (mandl), maximum mandible width (mandw), maximum labral width (labw), distance between eye notches (den), maximum clypeal length (clyl), maximum clypeal width (clyw), distance between clypeal apex (at the limit with the labrum) and antennal socket (c-a), distance between antennal socket and lower tangent of mid ocellus (a-o), distance, in frontal view, between lower tangent of mid ocellus and apical vertex margin (o-v), maximum compound eye width (eyew), genal width at the maximum compound eye width (gena).

The information provided between quotation marks in the Additional examined material and Type Material sections is an exact transcription of the labels associated with the specimens. The quotation marks indicate the different labels in the same specimen, the inverted bars (\) indicate different lines in the same label.

Distribution maps were prepared in ARCVIEW GIS 3.2 (ESRI, Redlands, CA) based on locality records taken from the specimen labels. The extension Trazos2004© (Rojas-Parra 2007) was used for drawing individual species tracks.

A cladistic analysis for the species of *Rhinocorynura* is presented. The following species from Corynurina were used as outgroups: *Corynura* (*Corynura*) sp.; *Halictillus loureiroi* (Moure, 1941); *Corynurella harrisoni* (Engel, 1995); *Paracorynurella betoi* Gonçalves, 2010; *Rhectomia liebherri* Engel, 1995; as well as the following representative species of Augochlorina: *Neocorynura aenigma* (Gribodo, 1894); *Paroxystoglossa jocasta* (Schrottky, 1910); and *Thectochlora brachycera* Gonçalves & Melo, 2006. *Caenohalictus incertus* (Schrottky, 1902) (Halictini) was included to root the tree. Voucher specimens are deposited in DZUP and MZSP. The character and character states, with respective codes, employed in the analysis and Fig. 1 are listed below and the complete data matrix is provided in Table I. The matrix and the resulting trees were edited using WinClada (Nixon 1999–2002). The matrix was submitted to Nona version 2.0 (Goloboff 1999) using the following commands: mult*1000; max*; h/20. The parsimony analysis was performed under equal weights.

Characters based upon females (characters not applicable to males marked with an asterisk)

1. Galeal comb: (0) absent; (1) present.
2*. Labral basal elevation, along its median portion: (0) not entirely divided; (1) entirely divided.
3*. Labral basal elevation: (?) inapplicable (for species as-

signed state 0 in character 2); (0) divided in two tubercles; (1) divided in four tubercles.

4*. Macrocephalic female clypeus: (?) inapplicable (for species in which macrocephalic females were not observed); (0) without lateral processes; (1) with two long lateral processes.

5. Epistomal angle (0) slightly acute; (1) obtuse.

6*. Frons: (0) without abundant long pubescence; (1) with abundant long pubescence.

7. Pre-occipital area: (0) without carina; (1) with carina.

8. Pronotum dorsolateral angle, I: (0) rounded; (1) carinate; (2) lamellate.

9. Pronotum dorsolateral angle, II: (0) not reaching the lateral lobe; (1) reaching the lateral lobe.

10. Anterior border of mesoscutum: (0) rounded; (1) strongly produced over pronotum, lamellate.

11. Scutellum: (0) without a longitudinal line; (1) divided medially by a longitudinal line.

12. Metapostnotal pit: (0) opened; (1) closed.

13. Vein 1m-cu: (0) reaching M close to 2rs-m; (1) reaching M at the middle point between Rs and 2rs-m.

14*. Basitibial plate: (0) all borders clearly indicated; (1) inner border not distinctly indicated.

15*. Mid leg tibial spine; (0) on the posterior border of tibia; (1) on outer surface of tibia.

16*. Inner hind tibial spur: (0) serrate; (1) pectinate.

17*. T5 apical margin: (0) fused; (1) notched.

Characters based entirely on males

18. First and second flagellomeres: (0) F2 two times as long as F1; (1) F1 as long as F2.

19. Frons: (0) without long branched hairs; (1) with abundant long branched hairs.

20. Apical margin of proctiger: (0) without microtrichiae; (1) with microtrichiae.

21. S6 transverse gradulus: (0) straight; (1) curved medially toward posterior border of sternum.

22. S7 apex, I: (0) thin; (1) thick.

23. S7 apex, II: (0) straight or slightly curved, but not concave; (1) concave.

24. S7 apical setae: (0) long, longer than one-half the sternum length (Figs. 22 and 23); (1) short, their length less than one-third the sternum length (Figs. 24 and 25).

25. S8 spicule: (0) very thin; (1) thick.

26. Lateral margin of the gonocoxite: (0) straight; (1) concave.

27. Gonocoxite posteromedial margin: (0) without process (Fig. 28); (1) with process (Figs. 27, 27, 29–31).

28. Gonostylus dorsal lobe: (0) undivided (Fig. 26); (1) notched, divided into two lobules (Figs. 27–31).

29. Gonostylus dorsal lobe notch: (?) inapplicable (for species assigned state 0 in character 28); (0) notch between lobules less than one half the gonostylus length; (1) notch length one half the gonostylus length.

30. Gonostylus ventral lobule: (0) as long as the dorsal lobule or shorter; (1) longer than dorsal lobule.

31. Gonostylus, I: (0) inner process absent (Figs. 26 and 28); (1) inner process present (Figs. 27, 29–31).

32. Gonostylus, II: (0) posterior process short (Fig. 26); (1) posterior process long (Figs. 27–31).

33. Volsella: (0) without apical spine; (1) with apical spine.

34. Volsellar spine: (?) inapplicable (for species assigned state 0 in character 33); (1) thin (Figs. 26–38 and 31); (2) thick (Figs. 29 and 30).

35. Ventral surface of gonapophysis: (0) unmodified; (1) with broad prong.

Phylogeny and Biogeography

As shown by Gonçalves (2010), *Rhinocorynura* belongs to a group of genera containing also *Corynurella*, *Paracorynurella* and *Rhectomia*. The monophyly of this group is strongly supported by many unambiguous morphological character states (see Fig. 1). Beside these characters, the females in these four genera are also remarkable for possessing a well-developed wax-extruding transverse area on their

Table I. Matrix of characters and respective states.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Caenohalictus incertus	0	0	?	?	0	0	0	0	0	0	0	0	?	0	0	1	1	0	0	0	0	0	0	1	?	0	0	0	0	0	0	0	0	?	1
Paroxystoglossa jocasta	0	0	?	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	?	1
Thectochlora brachycera	0	0	?	?	1	0	0	2	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	?	1
Neocorynura aenigma	0	0	?	?	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	?	0
Corynura (*Corynura*) sp.	1	0	?	?	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0
Halictillus loureiroi	1	0	?	?	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0
Corynurella harrisoni	1	0	?	?	1	1	0	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	1	0	0
Paracorynurella betoi	1	0	?	?	1	0	0	1	1	0	0	0	1	0	0	1	0	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	1	0	0
Rhectomia liebherri	1	1	0	?	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	1	1	1	0	?	0	0	0	1	0	0	0	0	1	0	0
Rhinocorynura crotonis	1	1	0	?	0	0	0	2	1	1	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	1	1	0	0
Rhinocorynura briseis	1	1	0	0	0	0	1	2	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	0	0	0	1	0	?	1	0	0	1	0	0
Rhinocorynura brunnea **sp.nov.**	1	1	1	?	0	1	0	2	1	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	1	1	0	0
Rhinocorynura inflaticeps	1	1	1	1	0	0	0	2	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	1	0	0	1	1	0	1	1	1	1	1	0
Rhinocorynura vernoniae	1	1	1	1	0	0	0	2	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	1	0	0	1	1	0	1	1	1	1	1	0
Rhinocorynura viridis **sp.nov.**	1	1	1	0	0	1	0	2	1	0	1	0	1	0	0	1	0	1	1	1	1	1	0	1	0	0	1	1	0	1	1	1	1	0	0

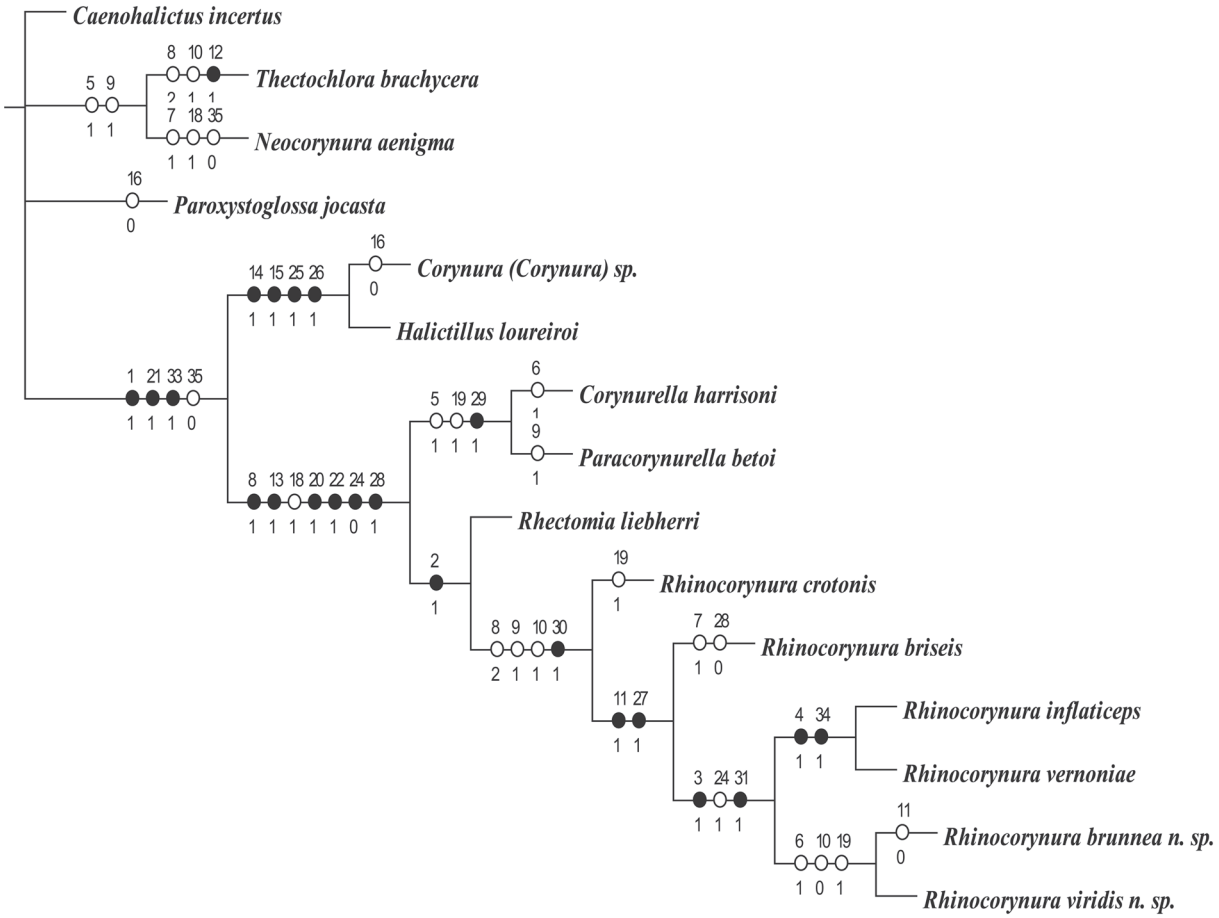


Fig. 1. Single most parsimonious cladogram for the species of *Rhinocorynura* and nine outgroup species (53 steps, Ci 66, Ri 81). Only unambiguous changes are shown. Solid circles represent unique changes, and empty circles, repeated changes along the tree.

tergum 2 (in *Rhinocorynura* also present on T1) (G. A. R. Melo, unpubl. results).

A sister-group relationship of this group with the genera *Corynura* and *Halictillus* was proposed by Engel (2000) based mainly on the possession of a galeal comb. Although other characters also support the group, such as the curved S6 gradulus and the apical spine on male volsella, they must be cautiously considered due to their high levels of homoplasy when other Augochlorini genera are taken into consideration in a broader phylogeny of the tribe (R. B. Gonçalves, unpubl. results).

According to the phylogeny presented in Fig. 1, *Rhinocorynura* is a monophyletic lineage, with three characters supporting it (under unambiguous optimization): the pronotal dorsolateral angle lamellate (character 8 – state 2), anterior border of mesoscutum lamellate (10–1) and gonostylus ventral lobule longer than dorsal lobule (30–1). The species of *Rhinocorynura* have a somewhat heterogeneous external morphology and the gonostylus and processes of the male genitalia vary among the species. Also, the lamellate mesoscutum is not exhibited in the group formed by *R. brunnea* **sp. nov.** and *R. viridis* **sp. nov.** Four groups can be recognized within the genus, two represented by the two basalmost species (both are therefore monotypic), and two other with two species each. *Rhinocorynura crotonis*, the species with the smallest body size, comes out as sister to the remainder of the genus.

The phylogenetic hypothesis also sheds some light in the evolution of female cephalic polymorphism in *Rhinocorynura*. Significant variation in size among females is observed within all species of *Rhinocorynura*, a feature that might have evolved earlier within the clade, since some variation is also exhibited by species of *Corynurella* (Gonçalves 2010). As pointed out in the section 'Variation' of each species, differences in the pattern of female cephalic polymorphisms are observed within the genus. In the two basalmost species and in the clade of *R. brunnea* **sp. nov.** and *R. viridis* **sp. nov.**, there is a continuous variation between the smallest and the largest females, with no qualitative difference between them (Figs. 2, 3, 5, 6). On the other hand, in the clade of *R. inflaticeps* and *R. vernoniae*, the variation is also mostly continuous, but the females differ qualitatively: the larger females have distinct lateral prongs in their clypeus (Figs. 14, 15, 18–21; more noticeable in lateral view in Fig. 15). There is clearly a continuous variation among the larger females in the size of the lateral clypeal projection (Figs. 18–21), but in the small females, the lateral projections are completely lacking.

The biogeographic relationships exhibited by *Rhinocorynura* (Fig. 32) is somewhat similar to that of its closely related genera, *Rhectomia*, *Corynurella* and *Paracorynurella* (see Gonçalves 2010). Most species in these four genera are found in southeastern and central Brazil (associated with inland montane and semideciduous Atlantic forest, as well as with the Cerrado), with some species also being distributed along the forests in the western and northern tributaries of the Amazon River, mainly in Bolivia, Peru, Ecuador, and Colombia. These genera are absent from most of the lowland forests of the Amazon basin and from the dry forests of northeastern Brazil (Caatinga), and of northern Argentina, western Paraguay and southern Bolivia (Chaco). This is an unusual distribution pattern among South American bees and is repeated, to a certain degree, only by a few other unrelated genera in Augochlorini, as *Ceratalictus* (Coelho & Gonçalves 2010) and *Thectochlora* (Gonçalves & Melo 2006).

Most species within *Rhinocorynura* have widely overlapping distributions, with four of them occurring together in southern Minas Gerais and eastern São Paulo. No clear pattern of vicariant divergence is exhibited in the genus, except in the clade formed by *R. viridis* **sp. nov.** and *R. brunnea* **sp. nov.** The former species has been found only in the open grasslands of southern Brazil, in the so called "campos sulinos", from Paraná to Rio Grande do Sul, while the latter seems to be associated mainly to semideciduous forests in the east, and the savannas of central Brazil in the western portion of its distribution.

Although not very evident, the distributions of *R. inflaticeps* and *R. vernoniae* are mostly allopatric, suggesting also a vicariant event involved in their differentiation. *Rhinocorynura inflaticeps* seems to be found mainly in areas with open vegetation (mostly Cerrado and grasslands), while *R. vernoniae* is associated with montane and inland semideciduous forests in southeastern Brazil.

TAXONOMY

Genus *Rhinocorynura* Schrottky, 1909

Corynura (Corynuropsis) Cockerell, 1901: 220. Type species: *Corynura (Corynuropsis) darwini* Cockerell, 1901; by original designation. Junior homonym of *Corynuropsis* Scott, 1894 (Crustacea).

Rhinocorynura Schrottky, 1909: 147. Type species: *Halictus (Corynura) inflaticeps* Ducke, 1906; by original designation.

Ctenocorynura Schrottky, 1914: 628. Type species: *Ctenocorynura vernoniae* Schrottky, 1914; by original designation.

Corynuroides Sandhouse, 1943: 540. Replacement name for *Corynuropsis* Cockerell, 1901.

Among the Augochlorini, *Rhinocorynura* can be recognized by the following combination of features: vertex swollen above ocelli; prementum not narrowed; pronotum lateral angle lamelate; female inner tibial spine pectinate; and trochanter of the middle leg without hook (Eickwort 1969; Engel 2000). Other useful diagnostic characters, especially to distinguish it from the remaining Corynurina, are: labrum with median process entirely divided (also present in *Rhectomia*); face not micro-reticulated; female basitibial plate with all borders well defined; mid tibia without spine; and metapostnotum not striate or carinate.

Identification key

1. Anterior border of mesoscutum without flange, median line strongly impressed anteriorly 2
1'. Anterior border of mesoscutum with flange (Figs. 16, 18, 20), median line not strongly impressed anteriorly 3

2. Body bright metallic green with bluish reflections; body length about 10 mm; mandible with two *or* three teeth; clypeal apex, close to the marginal area, black and strongly depressed in relation to the remainder of clypeus; scutellum with distinct longitudinal medial carina; male F11 shorter than F3–F10 ..... *Rhinocorynura viridis* **sp. nov.**
2'. Body dark olivaceous metallic green without bluish reflections; body length about 8 mm; mandible with two teeth; clypeal apex brown, convex as the remainder of the sclerite; scutellum without longitudinal medial carina; male F11 as long as F3–F10 ..... *Rhinocorynura brunnea* **sp. nov.**

3. Body length less than 7 mm; punctures of mesoscutum very fine, their diameter smaller than that of head punctures ..... *Rhinocorynura crotonis*
3'. Body length more than 7 mm; punctures of mesoscutum strong, their diameter equal or larger than that of head punctures 4

4. Mandibles with two teeth; basal elevation of labrum divided in two tubercles; pre-occipital area carinate; diameter of coarse punctures on mesoscutum, T1 and T2 twice that of punctures on remainder of body, the interspaces very smooth and shinny; basal one-third of T1 without dense long pale yellow pubescence ..... *Rhinocorynura briseis*
4'. Mandibles with three teeth (Figs. 12, 14, 20, 21); basal elevation of labrum divided in four tubercles; pre-occipital area rounded; diameter of punctures on mesoscutum, T1 and T2 subequal to that of punctures on remainder of body, the interspaces dull; basal one-third of T1 with dense long pale yellow pubescence 5

5. Punctures on lateral surface of propodeum dense (i <dp) and present near the limit with the metapostnotum; pubescence on apical margin of terga white; female clypeal disc with a impunctate area above the median process (Fig. 9); clypeus of macrocephalic female with only two pointed and upward directed lateral processes (Figs. 11–12); male F4–F10 about as long as wide ..... *Rhinocorynura inflaticeps*
5'. Punctures on lateral surface of propodeum sparse (i >dp) and not present near the limit with the metapostnotum; pubescence on apical margin of terga pale yellow; female clypeal disc entirely punctate (Figs. 13–16); clypeus of macrocephalic female with four processes, the most lateral ones with rounded apex and directed downward (Figs. 17 and 18); male F4–F10 slightly longer (about 1.2x) than wider ..... *Rhinocorynura vernoniae*

Rhinocorynura briseis (Smith, 1879)

(Figs. 2, 3, 4, 22, 26)

Augochlora briseis Smith, 1879: 46. Holotype female, Brazil, Amazonas, São Paulo de Olivença (BMNH 17A.1021), not directly examined.

Corynura (Corynuropsis) darwini Cockerell, 1901: 220. Syntypes male and female, Brazil, Mato Grosso, Chapada dos Guimarães (CMNH), not examined.

Corynura (Corynuropsis) sublata Cockerell, 1901: 221. Holotype female, Brazil, Mato Grosso, Chapada dos Guimarães (CMNH 373), not examined.

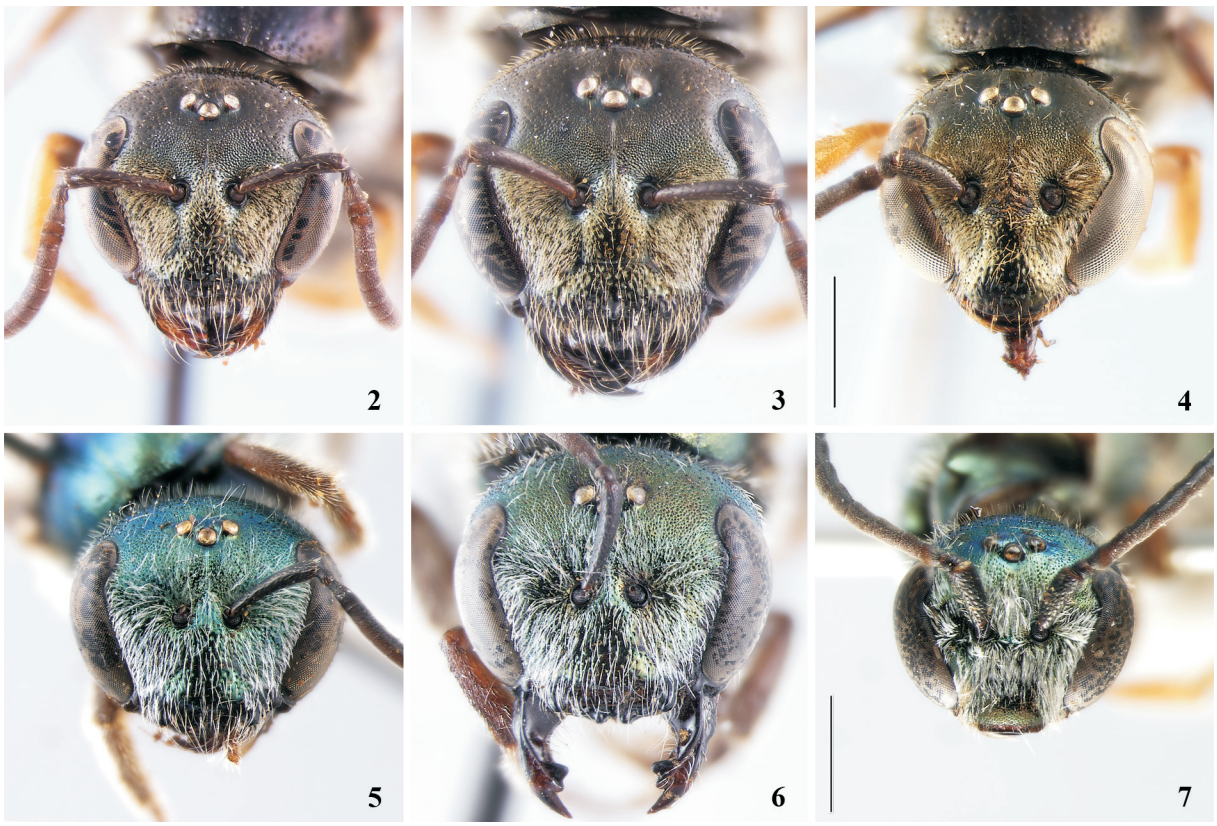
Diagnosis. *Rhinocorynura briseis* can be distinguished from other species by the following combination of features: body length more than 7 mm; mandibles with two teeth; labral basal elevation with two tubercles; anterior border of mesoscutum with flange, median line not strongly impressed anteriorly; and basal one-third of T1 without dense long pale yellow pubescence. Two unequivocal characteristics are the pre-occipital area carinate and presence of coarse punctures on mesoscutum, T1 and T2, their diameter conspicuously larger than those from the remainder of the body. Male S7 has a produced median margin (Fig. 22) and the S8 has the apical setae longer and thicker on the lateral portion (Fig. 22). The genitalia are very distinctive due to undivided dorsal lobe of gonostylus (Fig. 26).

Variation. There is a considerably variation in overall body size (7.5 to 9 mm in females) and in head measurements, for example the maximum mesoscutal width varies from 1.44 to 1.88 mm among the females. In the head, there is variation in the degree of the projection of middle clypeal process, and in the depth of apical punctures, which can sometimes be confluent. Among the larger, macrocephalic females, no discrete character is found in the clypeus that could indicate a discontinuous variation.

In addition to variation apparently related to female cephalic polymorphisms, there is also some geographic color variation: the specimens from southeastern Brazil, in general, are darker than those from the western portion of the species distribution. Also, there is some variation in the punctation of the T2: in larger females the coarse punctures tend to be more confluent and have a transverse shape compared to the more rounded and evenly spaced punctures in the smaller females.

Comments. The type of *Augochlora briseis* was examined through Automontage photographs provided by the facilities of BMNH. The available names listed above were synonymized by Moure and Hurd (1987) based on examination of types and this synonymy has been followed by subsequent authors. Here we decided to maintain the interpretation and decisions taken by Moure and Hurd (1987) in spite of the relatively large variation observed among the studied material. The types of *Corynura darwini* and *C. sublata* were not made available by the depositary institution; the interpretation of their identity was based on the original descriptions, on Moure's notes on type specimens, and through the examination of specimens from the type locality.

Examined material. BOLIVIA. *Beni*: one female (SEMK), "BOLIVIA – Beni, Rur-\renabaque, 175 mts.\5 October 1956\(L. Peña)" "G. C. Eickwort\slide no.\G7-0222-5". *Cochabamba*: one female (DZUP) and three females (SEMK), "Cristal Mayu,\Chapare, Cochab-\amba. Bol. 200m.\XII-5-49 L. E. Pena"; one female (SEMK), with same data, plus, "G. C. Eickwort\slide no.\G7-0109-3". *La Paz*: five females (AMNH), "BOLIVIA, La Paz:\Alto Río Beni, south\of Río Inicua, 1100\January 15-18, 1976\Luis E. Peña"; one female (AMNH), "BOLIVIA, La Paz:\Alto Río Beni, south\of Río Inicua, 1100\Jan. 16, 1976\Luis E. Peña". *Santa Cruz*: one female (AMNH), "BOLIVIA: Rio Pirai\N Santa Cruz\11 January 1991\Carpenter & Wenzel"; two females (AMNH), "BOLIVIA: Paila\Rio Grande\Dpto. Santa Cruz\7 January 1991\Carpenter & Wenzel"; one female (DZUP), "SANTA CRUZ-S.C.\BOLIVIA – 10/11\1970-Fritz leg". *Unspecified locality*: one female (ZMB), "Bolivia" "Corynuropsis\ briseis (Sm.)\C. Schrottky det. 1910" "Typus" "Coll.\Friese". BRAZIL, *Amazonas*: one macrocephalic female (RPSP), "GENÉTICA\F. M. R. PRETO" "Acanga – Barcelos, R. Negro\AM. Brasil – 6,8-VIII-1980\SA-20, 62°43'W, 1°7'S\Camargo, Mazucato *leg.*". *Bahia*: one male (DZMG), "BRAZIL: BA\Camacam, Serra Bonita\House: Wedelia triloba\A. Raw 5.3.2004". *Minas Gerais*: one male (DZUP), "PERDIZES – MG\Brasil 8.IV 65\C. ELIAS leg"; one macrocephalic female (DZUP), "IBIRACI – MG\Brasil 15 X 62\Claudionor Elias"; one macrocephalic female (DZUP), "1353/1/78" "Brasil, Minas Gerais\Viçosa, Mata do\Paraíso, 07.xii. 1995,\Gabriel A. R. Melo", one macrocephalic female (DZUP), "Brasil, Minas Gerais\Viçosa, Mata do\Paraíso, 09.xii.1995,\Gabriel A. R. Melo", one female (DZUP), with same data except "...12.ii.1989...lambendo suor."; one macrocephalic female (DZUP), "Brasil, Minas Gerais\Viçosa M. do Paraíso\5.i.1995, G. A. R. Melo"; two macrocephalic females (DZUP), "Viçosa – MG\BRASIL 12/11/92\G. A. R. Melo"; one male (DZUP), "Viçosa MG\Brasil 09/04/1987\G. Melo & M. A. Costa"; one macrocephalic female (DZUP), "Barbacena\19.11.1905\Ducke" "Brazil\Estado de\Minas Ger."; one macrocephalic female (ZMB), "Barbacena\22.10.1905\Ducke" "Halict. (Corynuropsis)\Darwini Cock.\det. A. Ducke 1906" "Rhopalictus\darwini\Ckll.\det. J. D. Alfken 1928"; one macrocephalic female (ZMB), with same data (but lacking Alfen's label) plus "Halictus\Darwini\1909 Friese det.\Cockll." "Coll.\Friese"; one macrocephalic female (ZMB), "Barbacena\23.10. 1905\Ducke" "Halictus\(Corynuropsis)\darwini Cock.\det. A. Ducke 1907" "31634"; one female (DZMG), "Abelhas da Zona\Metalúrgica MG\COPASA/Barreiro\4150-11870" "Belo Horizonte MG\BRASIL 21/ 01/1999\J.C. Moreira. *Mato Grosso*: one female (DZUP), "Chapada" "Jan." "briseis Sm.\Det. J. S. Moure 1957" [underside of label: "Br. M. N. Hist.\C[ompared]. W[ith]. T[ype].\17.a.1021"]; one female (DZUP), "Chapada" "Jan." "darwini\Ckll.\Det. J. S. Moure 1957" [underside of label: "Carnegie M\C W T\372"]; three females (SEMK), "Chapada\Brazil\ Acc. No. 2966" "Dec."; three females (SEMK), with same data except "Jan.". *Paraná*: one male (DZUP), "Brasil, Paraná,\Tijucas do Sul\11.ii.2006, Aguiar\Gonçalves & Faria Jr.\Emergido 28.ii.2006"; one male, seven females, two of them macrocephalic (DZUP),"Brasil, Paraná,\Tijucas do Sul\11.ii.2006, Aguiar\Gonçalves & Faria Jr."; two females (DZUP), one of them macrocephalic, with the same data except "...\Ninho 1"; one female (DZUP), with same data except "...\Ninho 2"; one female (DZUP), with the same data except "...\Voando ninho 3"; one macrocephalic female (DZUP), with same data except "...\Voando prox. Ninho 2"; one female (DZUP), "Brasil, Paraná\10 Km ao S de Cerro\Azul, Rio Ponta Grossa,\24º55'03"S, 49º16'19"N [W]\14.xii.2002, G. Melo"; one male (DZUP), "Brasil, Paraná, 10 km ao\sul de Cerro Azul,\ 24°55'03"S 49°16'19"W,\15.xii.2002, G. Melo"; one macrocephalic female (DZUP), "PEC\122" "Brasil, Paraná, Parque\Estadual de Campinhos,\25º02'S 49º05'W,\23.xi.2003, R. Gonçalves\& F. Fernandes"; one female (DZUP), "DZUP\168712" "Brasil, Paraná,\Tunas do Paraná, Parque\Estadual de Campinhos\25°02'S 49°05'W, Alt.\860 m, 23.xii.2007\ G. Weiss & F. B. Matos"; one macrocephalic female (DZUP), "11-44\P. Grossa\Pedreira."; one female (DZUP), "HARMONIA – Tibagí\Paraná-Brasil\XII-1951\Moure & Lange l."; two females (DZUP), "Brasil, Paraná\Terra Boa,\16.xi.1975, \Rosado & Mielke". *Rio de Janeiro*: one male (DZUP), "Itatiaya 600\14.II.1942\E. Rio – Brasil" "Rhinocorynura\ briseis (Sm.)\Pe. J. S. Moure 1962"; one female (ZMB), "Itatiaya\ 21.Dez.1926\A. Seitz *leg.*"; one female (ZMB), with same data except



Figs. 2–7. Head of species of *Rhinocorynura*, in frontal view. Figs. 2–4, *R. briseis*. (2) Female from Viçosa, Brazil; (3) Macrocephalic female from Viçosa, Brazil; (4) Male from Viçosa, Brazil. Scale bar 1 mm. Figs. 5–7, *R. viridis* **sp. nov.** (5) Female from Palmeira, Brazil; (6) Macrocephalic female from Curitiba, Brazil; (7) Holotype male. Scale bar 1 mm.

"…2.Jan.27…" "Rhopalictus\briseus\F. S. Smith\Alfken det. 1927"; one male (ZMB), with same data except "…4.-8.Jan.27…"; one male (DZUP), "Petropolis\16-3-1913\Ducke"; one macrocephalic female (DZUP), "SUMARÉ\D. FEDERAL\BR-II-1955\M. ALVARENGA". *São Paulo*: one female (DZUP), "BATATAIS – SP\BRASIL 12/1967\Pe. J. Moure lg"; one female (DZUP), "BARUERI – BRASIL\SP – Março/1958\Karol Lenko leg"; three females (MZSP), one of them macrocephalic, "Barueri\S. Paulo – Brasil 13.XII.1959\K. Lenko col."; one macrocephalic female (MZSP), with same data except "...7-IV-1961..."; one female (MZSP), with same data except "...17.II.1962..."; one female (MZSP), with same data except "...3.II.1968..."; one male (MZSP), "Barueri\SP, Brasil\II.1962\K. Lenko col."; one male (MZSP), "BARUERI\S. Paulo BRASIL\2.III.1964\K. Lenko *leg.*"; one male (MZSP), "Barueri,\São Paulo, Brasil 6.XII.1965\K. Lenko col."; one male (MZSP), with same data except "...25.II.66..."; one male (MZSP), with same data except "...25.I.66..."; one male (MZSP), with same data except "...23.I.66...", one female (DZUP), "Cajuru – SP\I/1986\J. S. Moure"; 14 females (DZUP), "Cajuru – SP\30/XII/85\Moure & Camargo"; one female (DZUP), "Brasil, São Paulo, Cajuru\Faz. Rio Grande, 21º12'S,\47º09'W, 28.x-17.xi\1999, Melo & Nascimento,\Malaise preta"; four females (DZUP), "Brasil, São Paulo,\Cotia, 22.xii.2009\Ramos & Kanamura"; two females (MZSP), "15779\SÃO PAULO\Franca"; one female (DZUP), "15771\SÃO PAULO\Franca"; one male and two females (DZUP), "SÃO PAULO\Guarulhos\II-1940"; one female (DZUP), "Guarulhos\5-II-1940" "briseis"; one female (DZUP), "F. do Bonito\S. da Bocaina\15-30-I-913" "Estado de\São Paulo"; one female (DZUP), "MOGI MIRIM\SP\3-III-1965\Pe. J. S. Moure"; one female (MZSP), "Monte Alegre\Fazenda St.a Maria\Alt. 1.100 ms.\24-30.XI.1949\Zoppel & D'Amico"; one female (DZUP), "São Paulo\Onda Verde\Faz. São João\Jan., 1946\F. Lane col."; one female (RPSP), "Sta Rita do\Passa Quatro\U. Vassununga\28-X-1989\E. Camillo\890307"; one female (RPSP), with same data except "...890308"; one female (RPSP), with same data except "...890309"; one female (MZSP), "BRASIL: SP: SÃO CARLOS\CAMPUS U. F. S. CARLOS\ARM. MOERICKE 26/I/1989\M. T. TAVARES COL."; one female (DZUP), "Vila Ema-SP\XII-1943\R. Barbiellini" "briseis Sm.\Det. J. S. Moure 1957" [underside of label: "Br. M. N. Hist.\C. W. T. (Notas)\17.a.1021"]. COLOMBIA, *Amazonas*: one female (SEMK), "COLOMBIA: Amazonas\Puerto Nariño\caserio de Zaragoza\20 september 1988\Fernando Fernández". PERU, *Cuzco*: one macrocephalic female (DZUP), "Quincemil – Cusco\PERU – 20 VIII 62\LUIS E. PENA"; one female (AMNH), "PERU, Quincemil,\on braneh [branch?] R. Manu\Madre de Dios Prov.\VIII-14-31-1962" "L. E Peña\Collector". *Madre de Dios*: one female (AMNH), "Iberia, Madre\de Dios, Peru\Apr. 28, 1947\Alt. 500 ft." "J. C. Pallister\Coll. Donor\Frank Johnson". *Pasco*: one male (SEMK), "PERU: Pasco Dept.\Oxapampa-Puzuzo Rd.\1300m, 10°10'42"S, 75°34'18"W\20 OCT 1999, R. Brooks\PERU 1B99 080, ex: bees attracted\to wet sand near stream". *Tingo Maria*: three females and two males (SEMK), "PERU:\Monson Valley\Tingo Maria\XI-29-1954" "E. I. Schlinger\& E. S. Ross\collectors"; one female (SEMK), with same data except "... X-12-1954"; one female (SEMK), with same data except "... XII-11-1954"; one female (SEMK), with same data except "... 29-XI-1954"; one female (SEMK), with same data except "... XII-2-1954"; one male (SEMK), with same data except "... X-20-1954"; two males (SEMK), with same data except "... XI-20-1954"; one male (SEMK), with same data except "... X-19-1954"; one male (SEMK), with same data except "... X-26-1954"; one male (SEMK), with same data except "... XI-16-1954" "G. C. Eickwort\slide no.\G7-0213-24" "G. C. Eickwort\slide no.\G7-0222-6" [already dissected]; two females (SEMK), with same data except "... XI-21-1954"; one male (SEMK), with same data plus "G. C. Eickwort\slide no.\G7-0213-25" [already dissected]; one male (SEMK), with same data except "G. C. Eickwort\slide no.\G7-0213-26" [already dissected].

Rhinocorynura brunnea sp. nov.

(Figs. 8, 9, 27)

Diagnosis. This species has the anterior border of mesoscutum without flange and the mesoscutum median line is strongly impressed anteriorly. *Rhinocorynura brunnea* **sp. nov.** is distinguished from its sister species, *R. viridis* **sp. nov.**, by the olivaceous metallic green integument, without bluish reflections; body length about 8 mm; mandible with two teeth; labral basal elevation with four tubercles; clypeus apex brown and convex as the remainder of the sclerite; scutellum without longitudinal medial line; male F11 with same length of flagellomeres 3–10; sternum 7 with a broad rounded anterior margin; sternum 8 with a well marked median emargination, setae very short except for two lateral patches (as in Fig. 25); medioapical depression of gonostylus not well marked, inner process not finger-like (Fig. 27).

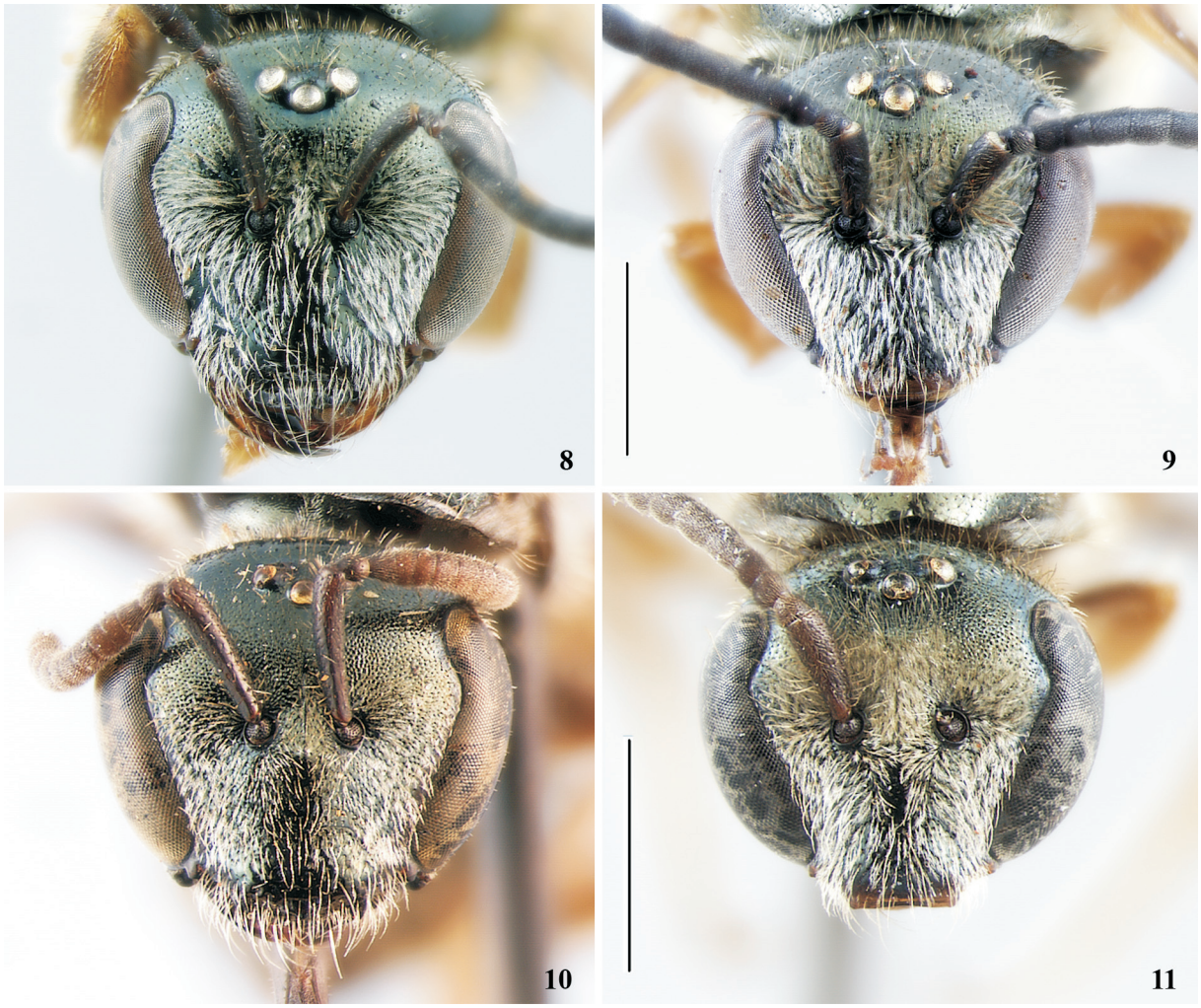
Variation. The macrocephalic females of this species are not qualitatively different from the other females; there is no allometric variation in the clypeal structures among the females, only a body size gradation (8 to 9 mm in length).

Description. Male. Head. (1) Face. Covered with a very dense pubescence, decumbent setae varying from white to pale yellow, erect setae yellow; flattened in lateral view. (2) Parocular area. Surface between punctures without microreticulations on upper portion. (3) Vertex. In frontal view, projecting above compound eyes less than length of antennal scape; rounded posteriorly, without preoccipital carina; with long erect hairs. (4) Antennae. First and second flagellomeres approximately equal in length and smaller than remaining flagellomeres; last flagellomere approximately as long as preceding one. Mesosoma. (5) Mesoscutum. Anterior border not lamellate; median line strongly impressed; disc very shiny and without conspicuous microreticulation; punctures with similar diameters. (6) Scutellum. Median line not well defined; diameter of punctation variable and coarser than those on mesoscutum; without longitudinal carina. (7) Metanotum. Surface declivitous toward metapostnotum; pubescence more abundant than in scutellum, with abundant tomentose and erect pubescence. (8) Metapostnotum. Median concavity not well marked; with a polished aspect, microreticulation inconspicuous; with an almost imperceptible transverse depression. (9) Propodeum. Lateral surface with abundant decumbent pubescence; punctures on posterior surface with same diameter as those on remainder of mesosoma. (10) Forewing. On second submarginal cell, veins 2rs-m and Rs paralell; 1m-cu joining M closer to 2rs-m than Rs. Metasoma. (11) Terga. Punctures on T1–T2 with same diameter as those on remainder of body. (12) First tergum. Anterior surface without decumbent pubescence, erect pubescence with short branches and sparse, punctation sparser than on dorsal surface. (13) Sterna. Erect pubescence abundant, on S4–S6 setae directed posteriorly; S7 and S8 as Fig. 25. (14) Genitalia. Gonobasis sides convergent, as Fig. 27. (15) Body color. Integument olivaceous metallic green, with mandible and labrum yellow, legs and tegulae reddish brown; body pubescence mainly pale yellow.

Female. Head. (1) Labrum. Basal elevation elliptical, divided in four tubercles, all of them subequal in size. (2) Clypeus. Apical one-third declivitous, its punctures not contiguous, without tubercles; punctures evenly distributed and of uniform diameter. (3) Clypeus and supraclypeal area. Not elevated in relation to lower parocular area. (4) Face. Decumbent pubescence mainly on lower parocular area and frons; erect setae short, shorter than 1.5x the ocellar diameter. (5) Vertex. In frontal view, projecting above compound eyes less than one half of length of antennal scape; rounded posteriorly, without preoccipital carina. Mesosoma. (6) Mesoscutum. Anterior border rounded, not lamellate; median line well marked, its anterior portion furrowed; disc surface with sparse punctures especially in the middle; punctures of uniform diameter. (7) Scutellum. Without a median line; punctation as on mesoscutum; microreticulation inconspicuous. (8) Metanotum. Surface declivitous toward metapostnotum; pubescence more abundant than in scutellum, with abundant tomentose and erect pubescence. (9) Metapostnotum. Shiny, microreticulation conspicuous; transverse concavity only weakly indicated. (10) Propodeum. Lateral surface with fine and relatively sparse decumbent pubescence; erect setae relatively abundant and finely plumose; posterior surface flat, only with erecte setae, punctures coarser than those on remainder of mesosoma. (11) Forewing. On second submarginal cell, vein 1m-cu joining M closer to 2rs-m than Rs. Metasoma. (12) Terga. Punctures on T1 and T2 approximately of same diameter as those on remainder of body; basal one third of T2 and T3 without well-defined lateral patches of tomentose pubescence. (13) First tergum. Finely punctured, posterior margin punctured; anterior surface without decumbent pubescence, erect pubescence with mostly barbed setae and relatively sparse. (14) Body color. Integument olivaceous metallic green with bluish reflections; mandibles, labrum, legs and tegulae dark brown. (15) Measurements. Mmw: 1.81–2.2; mml: 1.5–1.94; mandl: 1.19–1.44; labw: 0.56–0.88; den: 2.06–2.41; clyl: 1.25–1.44; clyw: 0.56–0.63; c-a: 0.41–0.56; a-o: 0.84–0.94; o-v: 0.56–0.75; eyew: 0.56–0.69; gena: 0.63–0.81.

Type material. Male holotype (DZUP), "DZUP\025854", "Brasil, Mato Grosso do Sul\rodovia MS384, 18 km W\de Antonio João\22º10'S 56º07'W, 370m\26.ii.2004, Melo & Aguiar". Paratypes. *Mato Grosso do Sul:* one female (DZUP), "DZUP\025810" "Brasil, Mato Grosso do Sul\rodovia MS384, 18 km W\de Antonio João\22º10'S 56º07'W, 370m\26.ii.2004, Melo & Aguiar", one female (DZUP), with same data except "DZUP\025802"; one female (DZUP), with same data except "DZUP\025865"; one female (DZUP), with same data except "DZUP\025806"; one male (DZUP), with same data except "DZUP\025866" [dissected].

Additional examined material. BOLIVIA, *Santa Cruz*: one male (SEMK), "BOLIVIA Santa\Cruz, Santiago\November 1959"; one male (SEMK), with same data plus additional label "G. C. Eickwort\slide no.\G7 0708-3" [already dissected]. BRASIL, *Bahia*: one female (DZUP), "Maracas 970m\Bahia Brasil\VI-1961\F. M. Oliveira"; one female (DZUP), "Brasil, Bahia,\4 km ao S. de Anagé, 10.iv.1976, 12-15h,\C. Elias & E. Elias\beira de rio"; one female (DZUP), "Cruz das Almas\BA- 15/11/90\C. A. L. de Carvalho"; two females (DZUP), "Brasil, Bahia,\Feira de Santana,\2.i.2010, K. Ramos\& V. Kanamura". *Espirito Santo*: two males (DZUP), "Linhares\ES I-1962\C. Elias"; one female (DZUP), "JACARAIPE – E. SANTO\Brasil 11-18/II/67\C. & C. T. Elias *leg.*"; one female (DZUP),



Figs. 8–11. Head of species of *Rhinocorynura*, in frontal view. Figs. 8–9, *R. brunnea* **sp. nov.** (8) Female "DZUP\025806"; (9) Male "DZUP\025854". Figs. 10–11, *R. crotonis*. (10) Lectotype female; (10) Male from Passos, Brazil. Scale bar 1 mm.

"B. Guandú-ES Brasil\02-07.III.1970\Tadeu & C. Elias col"; three females (DZUP), "Baixo Guandú – ES\23-31/XII.1970\C. Elias col."; one female (DZUP), "ITAGUASSU – E. SANTO\BRASIL 25/IV/70\C. & C. T. Elias *leg.*"; two females (DZUP), "Serra – N. Almeida\ES- Brasil – 25/267\C. Elias-C.T. Elias"; one male (DZUP), "NOVA ALMEIDA – ES\BRASIL 20/2-3/62\C. & T. Elias leg"; one male (DZUP), "SERRA – N. Almeida\ES-BRASIL 25/2/67\C. Elias-C. T. Elias". *Goiás*: one female (RPSP), "Aragarças\GO BRASIL\10-24.I.1971\Col. Camargo"; one female (DZUP), "Brasil, Goiás,\Corumbaira [sic; Corumbaíba],\8.iv.1993\G. A. R. Melo"; one female (DZUP), "Caldas Novas – Goias\Brasil 10/02/1986\G. Melo & L. Brandão"; one male (DZUP), "Caldas Novas – Goias\Brasil 10/02/1986\G. Melo, A. Soares". *Mato Grosso*: one female (DZUP), "Cáceres, MT\9/IX/1984\C. Elias *leg.*\POLONOROESTE"; one male (DZUP) with same data except, "... 5.XII.1984..."; one male (DZUP) with same data except, "... 11.XII.1984..."; one male (DZUP) with same data except, "... 9-I-1985..."; one female (RPSP), "Sto Antonio do\Leverger – MT\Brasil 25-I-1997\Mazucato leg\15°46'S, 56°02'W\970096". *Mato Grosso do Sul*: two females (DZUP), "Brasil, Mato Grosso do\Sul, Porto Murtinho\Estr. Pirizal 21°37'32"S\57°49'12"W, 27-29.i.2008\J. C. Almeida, col.". *Minas Gerais*: one male (DZUP), "Belo Vale MG\Brasil 25/2/1986\G. A. Melo"; one male (DZUP), "Igarapé MG\Brasil 20/12/1987\G. A. R. Melo", one female (DZUP), "Passos – MG\Brasil 3 XI – 62\Claudionor Elias"; one female (DZUP), "Brasil, MG, 16 km ao S\de Ponto dos Volantes,\16°53'S 41°29'W, 640m,\11.ii.2010, G. Melo,\D. Parizotto & P. Grossi"; one male (DZUP), same data except "...16°54'S 41°31'W..."; one female (DZUP), "Viçosa MG\11/4/1987\G. A. de Melo" "10961/1/61". *Paraná*: one female (DZUP), "M. Regina\23-03.84\Cosmos [underlined]\UEM.MGA [Maringá].PR [Paraná]". *São Paulo*: two females (DZUP), "Rio Claro (S. P.)\V.1939"; one male and one female on the same pin (DZUP) with the same label; one male and one female on the same pin (SEMK) with the same label; one female (RPSP), "54" "RIBEIRÃO PRETO\SP, SF-23, 48-21d" "BRASIL – 5-IV-1972\P. S. Morais *leg.*"; one female (RPSP), "M A 79" "Ribeirão Preto\SP BRASIL\SF – 23, 48-21d\12-X-1972\M. Mazucato leg" " A-2674"; one female (RPSP), "M A 79" "Ribeirão Preto\SP BRASIL\SF – 23, 48-21d\5-III-1973\M. Mazucato leg" " A-6416"; one female (RPSP), "M C 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "12.x.1972\M. Mazucato *leg.*" "A-2673" "Rhinocorynura inflaticeps Ducke, 1906\Det. Moure 1976"; one female (RPSP), "M A 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "13.XII.1972\M. Mazucato *leg.*" "A-4082" "Rhinocorynura inflaticeps (Ducke, 1906)\Det. Moure 1976"; one female (RPSP), "M C 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "30.X.1973\M. Mazucato *leg.*" "A-5136" "Rhinocorynura inflaticeps (Ducke, 1906)\Det. Moure 1976"; one female (RPSP), "M A 8" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "19.III.1973\M. Mazucato *leg.*" "A-6733" "Rhinocorynura inflaticeps (Ducke, 1906)\Det. Moure 1976"; one female (RPSP), "M A 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "2.IV.1973\M. Mazucato *leg.*" "A-6917" "Rhinocorynura inflaticeps (Ducke, 1906)\Det. Moure 1976".

Etymology. Latin feminine adjective that means brown, based on manuscript name proposed by Pe. Moure.

Rhinocorynura crotonis (Ducke, 1906)

(Figs. 10, 11, 23, 28)

Halictus (Corynuropsis) crotonis Ducke 1906: 399. Lectotype female, presently designated, Brazil, Minas Gerais, Barbacena (MNHP), examined.
Corynuroides zikani Moure, 1943: 452. Holotype male, Brazil, Rio de Janeiro, Itatiaia (DZUP), examined.

Diagnosis. *Rhinocorynura crotonis* has an isolated position within the genus and can be distinguished for its relatively small body size, shorter than 7 mm; anterior border of mesoscutum with flange, its median line weakly impressed anteriorly; punctures on mesoscutum very fine, their diameter smaller than those on head; male frons without long branched setae. The male hidden sterna are as in Fig. 23; the male gonostyli have very short lobules and lack the inner process (Fig. 28).

Variation. In spite of some variation in body size among the females, no signs of cephalic polymorphisms were observed in *R. crotonis*.

Type material. Lectotype female of *Halictus crotonis* (MHNP), with the labels "Barbacena\29.10.1905\Ducke" "BRAZIL\Estado de\Minas Ger." "MUSEUM PARIS\BRÉSIL\A. Ducke 1911" "Halictus [female symbol]\ crotonis Ducke\type" "MUSEUM PARIS\EY0000001542", is here designated to stabilize the taxonomy of the species. The specimen is in good condition, except for lacking the tarsomeres of left mid and hind legs. Three paralectotypes deposited at ZMB were also examined, one complete female "Barbacena\5.10.1905\Ducke" "Halictus (Corynuropsis)\crotonis Ducke [female symbol]\typ." "Typus" "Rhopalictus [female symbol]\ crotonis\Ducke\det. J. D. Alfken 1928", one headless female "Barbacena\ 20.11.1905\Ducke" "Halictus (Corynuropsis)\crotonis Ducke [female symbol]\typ." "Typus" "Halictus\crotonis\1910 Friese det.\[female symbol] Ducke" "Coll.\Friese", and one complete female "Barbacena\29-10-1905\Ducke" "Brazil\Estado de\Minas Ger." "Halictus\Corynuropsis)\ crotonis Ducke" "Halictus\(Corynuropsis)\crotonis\t. H. Friese 19\[female symbol] Ducke" "Typus" "Coll.\Friese".

Additional examined material. BOLIVIA, *Santa Cruz*: one female (SEMK), "BOLIVIA, Santa\Cruz, Santiago\December 1959" "G. C. Eickwort\slide no.\G7-0308-2". BRAZIL, *Distrito Federal*: one female and one male (DZUP), "BRASILIA\Universidade\23.II.1977\coll. A. Raw". *Goiás*: two females (DZUP), "JATAÍ Goiás\BRASIL I-1955\F. Pereira"; two females (DZUP), "Brasil, Goiás, 2 Km W de\Teresina de Goiás,\Fazenda Santa Tereza,\13º47'43"S 47º17'39"W,\800m, 02.iv.2003, Melo,\Aguiar, Marchi & Gonçalves"; one female (DZUP), "S. Domingos – Goiaz\VII-VIII-950\R. G. Ferracioli"; three females (MZSP), "BRASIL: GO: Campinaçu,\Serra da Mesa, 13º52'S\48º23'W, 18.ii-2.iii.1996,\Silvestre, Brandão & Yamamoto cols.". *Mato Grosso*: one female (SEMK), "Chapada\Brazil\Acc. No. 2966"; one male (DZUP), "Chap. Guimarães-MT\28.III-IV.1983\Exc. Dep. Zool-UFPR\(Polonoroeste)"; one female (DZUP), "MT-Chap Guimaraes\Est. Estac. Rast. Satelite\12-x-1990\Andréa Netto"; one female (DZUP), "Cáceres, MT\7-II-1985\C. ELIAS *LEG.*\POLONOROESTE"; one female (DZUP) with same data except, "... 27.XII.1984..."; two females (DZUP) with same data except, "... 9.I.1985..."; one female (DZUP) with same data except, "... 27-III-1985..."; one female (DZUP) with same data except, "... 13.XI.1984\Buzzi, Mielke, Elias\Casagrande *leg.*\PROJ. POLONOROESTE"; one female (DZUP), "Br MT S. Araras\col R\26.IV"; one female (DZUP), "MT – S. Araras\28-IV.87\Cerrado – vol\Viana"; one female (DZUP), "UFMT\BR-MT-B. Bugres\R. E. S. Araras\Cerrado\18.II.1987\Y. O. Willis". *Minas Gerais*: one female and one male (DZUP), "BARBACENA – MG\Brasil 14-16-II-62\M. Alvarenta Leg"; one female (RPSP), "941019" "Cach. da Chapada\Ouro Preto, MG, BR.\19, 20, 21-II.1993. Faria-Mucci *leg.*"; eight females (RPSP), same data, except numbers "941020" to "941027"; two females (DZUP), "Brasil, Minas Gerais,\Corinto, 16-31.viii.1979,\C. Elias leg"; one female (DZUP), "Brasil, Minas Gerais,\Ibiraci, 14.X.1961,\C. Elias *leg.*"; two females (DZUP), "IBIÁ- BRASIL\MG – 10/12/1965\C. Elias *leg.*"; one female (DZUP), "IBIÁ MG BRASIL\11-18-III-1955\C. Elias, leg"; one female (DZUP), "Buritis\(Ribeirão Confins)\MG – 29-31.X.1964\Exp. Dep. Zool."; one female (DZUP), "Brasil, Minas Gerais,\Uberlândia, Est. Ecol.\Panga 13.v.1993,\Gabriel A. R. Melo"; seven males (DZUP), "ARAXÁ – MG – BRASIL\15-V-1965\C. & T. Elias leg"; one female (DZUP), "ARAXA – MG\Brasil 28-iv 65\C. Elias leg"; one female and one male (DZUP) with same data except, "...15-iv 65..."; one female and four males (DZUP), "ARAXA – MG\Brasil 5-V-65\C. ELIAS leg"; one female (DZUP), "ARAXÁ – MG – BRASIL\III/1965\C. & T. Elias leg"; one male (DZUP), "PASSOS – BRASIL\MG 2-7-XII-63\CLAUDIONOR ELIAS"; three males (DZUP), "PASSOS – MG\Brasil 17-23 IV-63\Claudionor Elias"; two females (DZUP), "PASSOS – MG\Brasil 25-27 II-63\Claudionor Elias"; one female (DZUP), "PASSOS – MG\Brasil 24-31 XII-62\Claudionor Elias"; one female (DZUP), "PASSOS – MG\Brasil 1-3 XI-63\Claudionor Elias"; one female (DZUP) with same data except, "...7a12-X-63..."; one female (DZUP), "PASSOS – BRASIL\MG 4-9-XII-63\CLAUDIONOR ELIAS"; one female (DZUP), "PASSOS-MG\Brasil IV-62\C. Elias leg"; one female (DZUP), "PASSOS MG Brasil\6-10-XI-1961\C. Elias *leg.*"; one female (DZUP) with same data except, "…IX 1961…"; one female (DZUP), "SACRAMENTO – MG\BRASIL 26-III-65\C. & T. Elias *leg.*"; one female (RPSP), "PASSOS MG\Brasil IV-62\C. Elias *leg.*"; one female (RPSP), "Posses – MG-Brasil\SE23-42°49'W, 17°0'S\31-V-1997\Mazucato *leg.*\973290"; one female (RPSP), "RITAPOLIS – MG, BRASIL\SF-23, 44-21d/19-I-1974" "M. Mazucato, Velthuis\J. M. F. Camargo *leg.*"; one female (SEMK), "BRAZIL Minas Gerais\Varginha Jan. 1960\(Alvarenga & Seabra)".; one male (DZMG), "Abelhas da Zona\Metalúrgica MG\Clube A. Scharlé\0063-0275" "Sabará MG\BRASIL 14/01/1996\G. A. R. Melo", one female with same data except (DZMG) "...0063-0276...", one female with same data except (DZMG), "...0063-0277...", one female (DZMG), "Monitoramento\Vochysia rufa\Faz. Brejão\7306-21632" "Brasilândia de Minas MG\BRASIL 18/05/2001\J. Damasceno"; one female (DZMG), "Abelhas da Zona\Metalúrgica MG\COPASA/Barreiro\4147-11861" "Belo Horizonte MG\Brasil 21/01/1999\J.C. Moreira", one female with same data except (DZMG), "...4147-11859..."; one female (DZMG), "Pq. E. Serra das\Araras\8327-25426" "Serra das Araras MG\BRASIL 05/03/2003\A. A. Azevedo". *Piauí*: one female (DZUP), "Brasil, Piauí, Ribeiro\Gonçalves, Estação\Ecológica Urucuí-\una, 17-23.v.1964,\V. Graf, malaise,\cerrado". *Rio de Janeiro:* one female (DZUP), "Itatiaia\14-3-1942" "Zikani\P.Moure"; one female (ZMB), "Itatiaya\4.-8.Febr.27\A. Seitz *leg.*" "Rhopalictus [female symbol]\crotonis\ Ducke\det. J. D. Alfken 1928"; two males (ZMB), same data, except "9.Febr.27" and male symbol in the identification label. *São Paulo*: two females and one male (MZSP), "Barueri,\São Paulo, Brasil\6.XII.1965\K. Lenko col."; two females (DZUP), "Pedregulho – SP\BRASIL 8-XI-62\Claudionor Elias"; one female (RPSP), "Faz. Baguaçu, Pedregulho\SP, Brasil 26-27.I.2005\20°09', 47°34'W\Camargo & Garcia leg"; one female (RPSP), "RPSP\030602" "Fazenda Baguassu\Pedregulho – SP,\Brasil 08.VI.2003" "20°09'S, 47°34'W\Camargo, Pedro,\Tavares, Carvalho"; one female (DZUP), "BARUERI – BRASIL\SP – MARÇO/1958\Karol Lenko leg"; one female (DZUP), "BARUERI\S. Paulo BRASIL\junho 1957\K. Lenko *leg.*"; one female (RPSP), "M A 79" "Ribeirão Preto\SP BRASIL\SF-23, 48-21d" "6-II-1973\M. Mazucato leg" "A-5300"; one female (RPSP), "T A 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "15.I.1973\M. Mazucato *leg.*" "A-4887" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976"; one female (RPSP), "T A 6" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "3.X.1972\M. Mazucato *leg.*" "A-2265" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976"; one female (RPSP), "T B 110" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "2.II.1973\M. Mazucato *leg.*" "A-5240" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976"; one female (RPSP), "M A 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "16.IV.1973\

M. Mazucato *leg.*" "A-7213" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976"; one female (RPSP), "M B 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "23.III.1973\M. Mazucato *leg.*" "A-6789" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976"; one female (RPSP), "M A 79" " Ribeirão Preto\SP Brasil\SF-23, 48-21d" "16.IV.1973\M. Mazucato *leg.*" "A-7210" "Rhinocorynura crotonis Ducke, 1906\Det. Moure 1976". PARAGUAI, *San Pedro*: one female (DZUP), "Yuirá Pindo\Paraguay\ Bridarolli\7.II.1946" [probably 'Ycuá Pindó', a rural company near the town of Itacurubí del Rosario, in the municipality of General Elizardo Aquino].

Rhinocorynura inflaticeps (Ducke, 1906)

(Figs. 12, 13, 14, 15, 29)

Halictus (Corynura vel *Corynuropsis) inflaticeps* Ducke, 1906: 397. Lectotype female, presently designated, Brazil, Minas Gerais, Barbacena (ZMB), examined.

Diagnosis. Since its proposal by Ducke (1906), this species has not been properly recognized. It is very similar to *R. vernoniae* and these two species have been confused by Sakagami & Moure (1965), who established their current synonymy. Ducke's (1907) description, however, is clear enough to permit proper recognition of its species: (1) body covered by gray hairs (only yellow and black pubescence in *R. vernoniae*); (2) clypeus smooth and unpunctured along its mid portion (Fig. 12); (3) labrum "bipointed" (in both species the labral basal elevation have four subdivisions, the four tubercles being subequal in size in *R. vernoniae*, while in *R. inflaticeps* the median tubercles are more evident); (4) propodeum punctured posteriorly, its sides finely rugose and dull; (5) wings heavily tarnished (the pattern of wing coloration are similar in both species but in *R. inflaticeps* the darkened basis and anterior portion contrast more with the lighter apex and posterior margin than in *R. vernoniae*).

Rhinocorynura inflaticeps and *R. vernoniae* can be separated from the other congeneric species for their anterior border of mesoscutum with flange, median line weakly impressed anteriorly; pre-occipital area rounded; diameter of punctures on mesoscutum, T1 and T2 subequal to that of remainder of body, their interspaces dull; and basal one-third of T1 with dense long pubescence. Another important distinguishing feature is the basal elevation of labrum divided in four tubercles. *R. inflaticeps* can be distinguished from *R. vernoniae* for the female clypeus with a impunctate area on disc, above the median process; punctures of lateral surface of propodeum dense (i <dp) and reaching the metapostnotum; marginal zone of terga 2–5 dark brown and covered with whitish pubescence; clypeus of macrocephalic females with only two lateral processes pointed and upward directed; mandible of macrocephalic females with ventral surface inflated and with basal portion of outer ridge not differentiated from remainder of ridge; male flagellomeres 4–10 about as long as wide. The male genitalia is very similar to that of *R. vernoniae* except for the size and the less marked incision between the lobules (Fig. 29).

Variation. This species shows a pattern of female polymorphism very similar with that found in *R. vernoniae* (Sakagami & Moure 1965; misidentified as *R. inflaticeps*), with body length varying from about 9.5 to 12 mm. Besides their larger overall body size, the macrocephalic females have differentiated mandibular and clypeal structures. The mandibles have the ridges produced and the ventral surface, close to the insertion, inflated. The clypeus has the median process apically placed and the lateral carinae apically developed into lateral processes. The clypeal punctation is also different as illustrated in Fig. 12. Among the macrocephalic females, there is a variation in the length of the lateral processes. No differences were observed among the non macrocephalic females.

Type material. There are two female syntypes in the ZMB collection, one of them smaller and lacking the metasoma. The larger and complete female, with labels "Barbacena\9.11.1905\Ducke" "Halictus (Corynura?) [female symbol]\inflaticeps Ducke\typ." "Typus", is here designated lectotype. The paralectotype female bears the labels "Barbacena\23.10. 1905\Ducke" "Halictus (Corynura?)\inflaticeps Ducke\typ. [female symbol]" "Coll.\Friese".

Additional examined material. BRAZIL, *Distrito Federal*: one female (DZUP), "BRASIL: DF,\Brasília, 1000 m\Roncador\A. Raw col 28.9.66"; one female (DZUP), "Brasilia\Pena Norte\7-12-75"; one female, "BRASILIA\Água Limpa\11.10.1976". *Goiás*: one female (DZUP), "Brasil, Goiás\Ch. Veadeiros\30/9-2/10 – 1996\Raw & Boaventura"; one female (DZUP), "JATAÍ Goiás\BRASIL I-1955\F. Pereira". *Minas Gerais*: one macrocephalic female (DZUP), "BARBACENA – M. GERAIS\BRASIL 8/X/73\Pe. Moure, Mielke *leg.*". *Paraná*: one male (DZUP), "PEVV\2597" "Brasil, Paraná, Parque\Estadual de Vila Velha, 25º14'S 49º59'W,\28.iii. 2004, G. Melo &\R. Gonçalves"; one female (DZUP), "PEVV\0669" "Brasil, Paraná, Parque\Estadual de Vila Velha, 25º14'S 49º59'W,\18.i.2003, A. Aguiar &\R. Gonçalves"; one female (DZUP), "PEVV\2647" "Brasil, Paraná, Parque\Estadual de Vila Velha, 25º14'S 49º59'W,\29.iv.2004, G. Melo &\R. Gonçalves"; one female (DZUP), "PEVV\1852" "Brasil, Paraná, Parque\Estadual de Vila Velha, 25º14'S 49º59'W,\15.xi.2003, G. A. R. Melo &\R. B. Gonçalves"; one macrocephalic female and two males (DZUP), "Brasil, Paraná, Parque\Estadual de Vila Velha, 25º14'S 49º59'W,\3.iii.2001, G. A. R. Melo". *São Paulo*: one female (ZMB), "Brasil\Campinas\15.3. 1904" "Halictus\inflaticeps Ducke\(Rhynocurinura [sic]" "Halictus (Cor\inflaticeps\1910 Friese det.\[female symbol] Ducke" "Typus". PARAGUAI, *Amambay*: three females, one of them macrocephalic (DZUP), "Paraguay, Amambay,\Parque Nacional Cerro\Corá, 280 m, 12.ii.2007\ 22º39'50"S 55º59'18"W\M. G. Hermes coll."; one female (DZUP), "Paraguay, Amambay,\Pq. Nac. Cerro Cora,\campo-cerrado en la\zona del Cerro Muralia,\22º39'S 55º59'W, 280m\12.ii.2007, B. Garcete"; one female (DZUP), "Paraguay, Amambay,\Pq. Nac. Cerro Cora,\zona del Cerro Muralia,\22º39'S 55º59'W,\280-337m,\4.ii.2007, B. Garcete,\daytime". *San Pedro*: two females, one of them macrocephalic, and one male (AMNH), "PARAGUAY – XII-79\Río Ypané\Cororó – Fritz"; two females, one of them macrocephalic (AMNH), PARAG. – CORORO\RIO YPANE\SAN PEDRO\Fritz – XI.79".

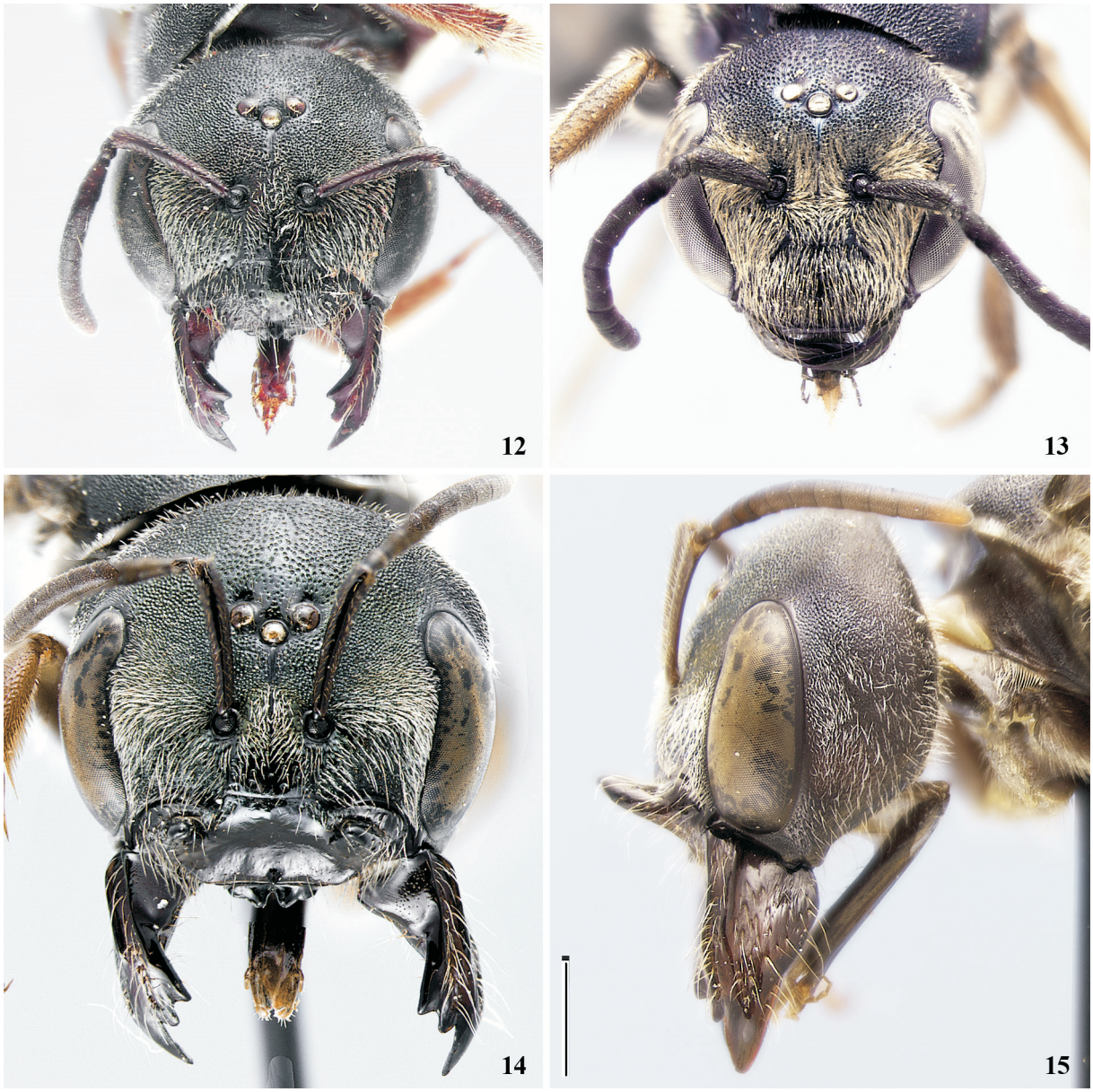
Rhinocorynura vernoniae (Schrottky, 1914), new status

(Figs. 16, 17, 18, 19, 20, 21, 24, 30)

Ctenocorynura vernoniae Schrottky, 1914: 628. Holotype female, Paraguay, Puerto Bertoni (whereabouts unknown).

Rhinocorynura terribilis Moure, 1950: 322. Holotype female, Brazil, São Paulo, Cantareira (whereabouts unknown).

Diagnosis. As discussed above, *R. vernoniae* is very similar to *R. inflaticeps*, being distinguished by the female clypeus entirely punctured (Fig. 19); punctures on lateral surface of propodeum sparse (i >dp), subdorsal surface near the metapostnotum lacking punctures; marginal zone of terga 2–5 reddish brown and covered with pale yellow pu-

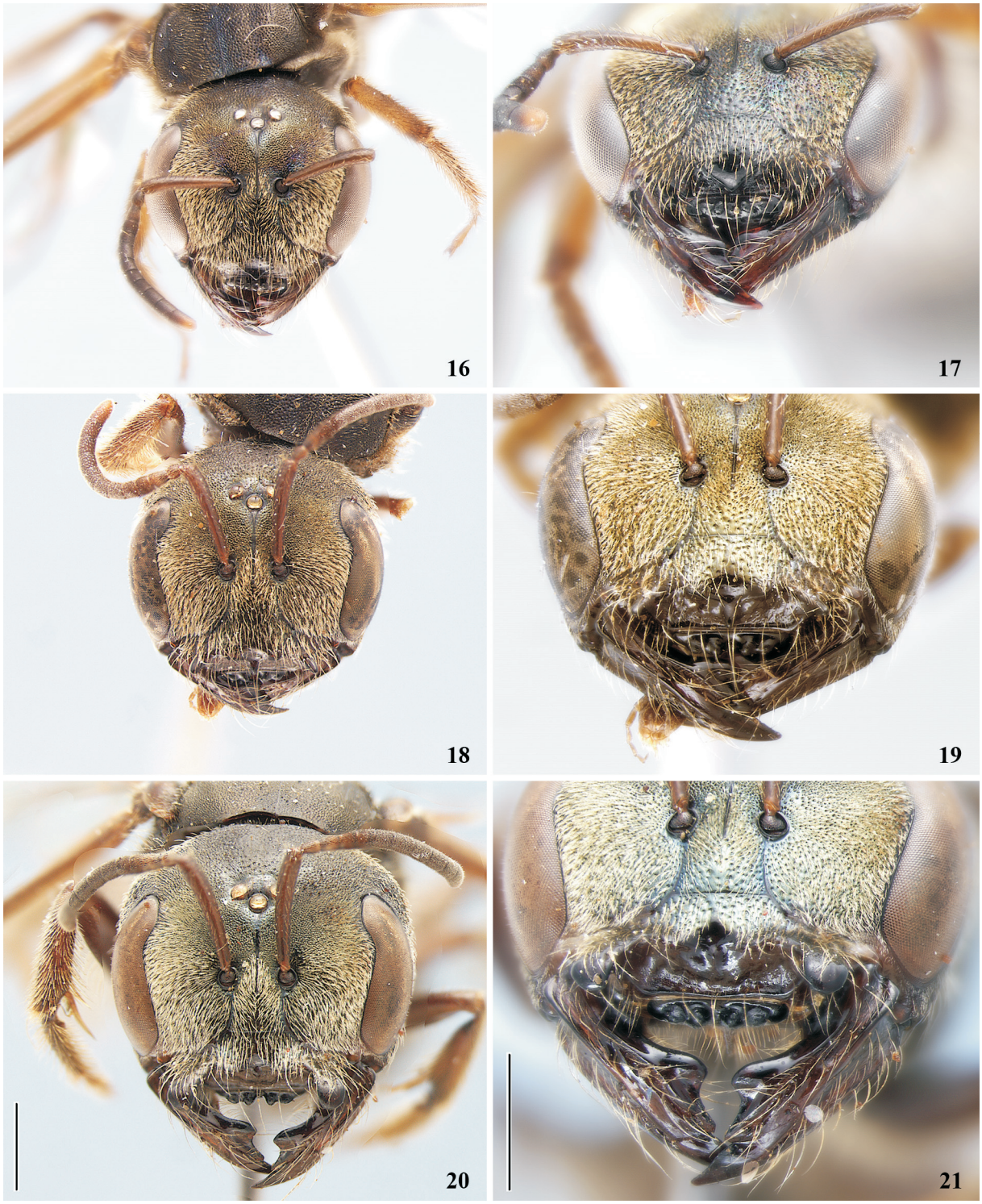


Figs. 12–15. *Rhinocorynura inflaticeps* head. (12) Female from Rio Yapane, Paraguay; (13) Male from Ponta Grossa (Vila Velha), Brazil; (14) Macrocephalic female from São Paulo, Brazil; (15) Same, lateral view. Scale bar 1 mm.

bescence; clypeus of macrocephalic females with four processes, the lateral ones directed downward (Fig. 21); mandible of macrocephalic females with ventral surface not inflated and with basal portion of outer ridge strongly developed; male flagellomeres 4–10 longer than wide; male genitalia smaller and with well marked incision between the lobules (Fig. 30).

Variation. This species was already studied in some degree by Sakagami & Moure (1965; under the name *R. inflaticeps*). They call special attention to the clypeus of macrocephalic females, describing it as possessing 'complicated notches and a pair of lateral processes'. The specimens studied by them were from four Brazilian localities and no variation other than this was noted. Here the study of additional material revealed further variation in the clypeal structures, illustrated in Figs. 16–21. The smaller macrocephalic females have the clypeus with only a median triangular process (Fig. 17). Intermediate females shown this median process narrowed apically and small processes on its laterals, a lateral carina is present from the apical portion, close to lateral limit of labrum and to the median portion of clypeus disc (Fig. 19). Finally the greater females, has the median process very reduced, the lateral small process well developed, and the lateral carina projected to strong lateral process (Fig. 21). Body length varied from about 9 to 12 mm among females.

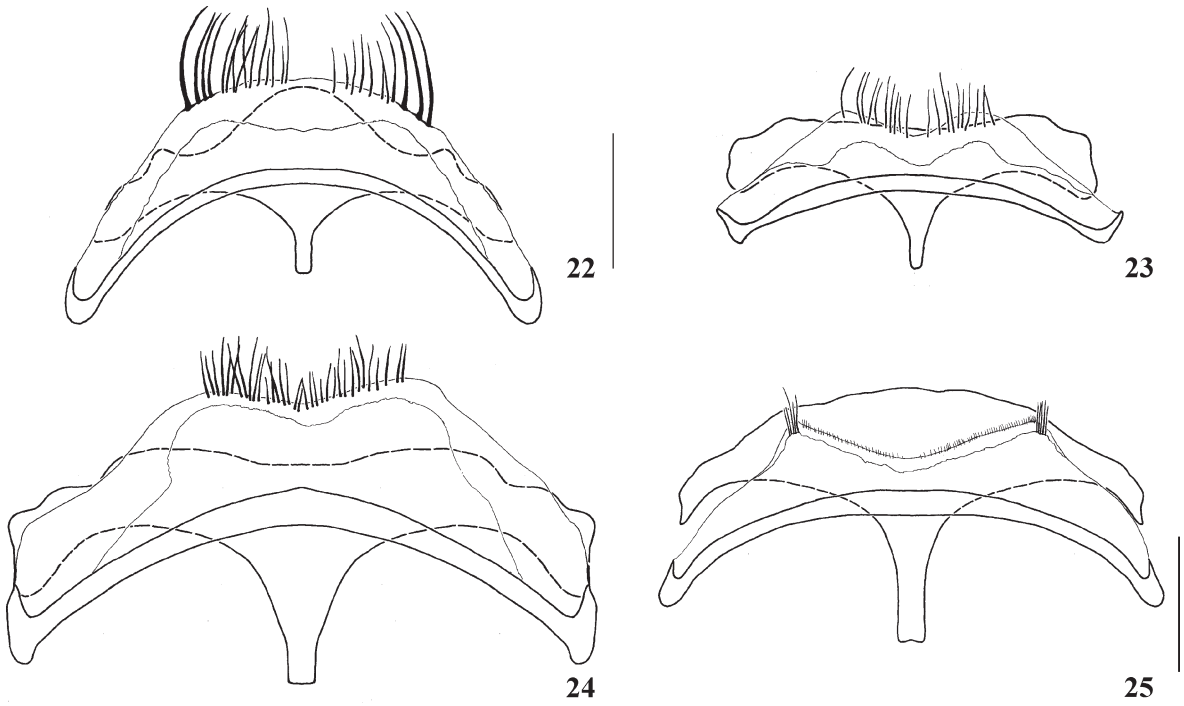
Comments. According to Moure and Hurd (1987) and Moure (2007) the type of *Ctenocorynura vernoniae* was deposited in the Instituto Oswaldo Cruz but it was not located.



Figs. 16–21. *Rhinocorynura vernoniae* head. (16) Female from Rio Capivari, Brazil; (17) Same, detail of clypeus; (18) Female from Itatiaia, Brazil; (19) Same, detail of clypeus; (20) Macrocephalic female from Barueri, Brazil; (21) Same, detail of clypeus. Figs 16, 18 and 20; and 17, 19 and 21, respectively, at same scale. Scale bar 1 mm.

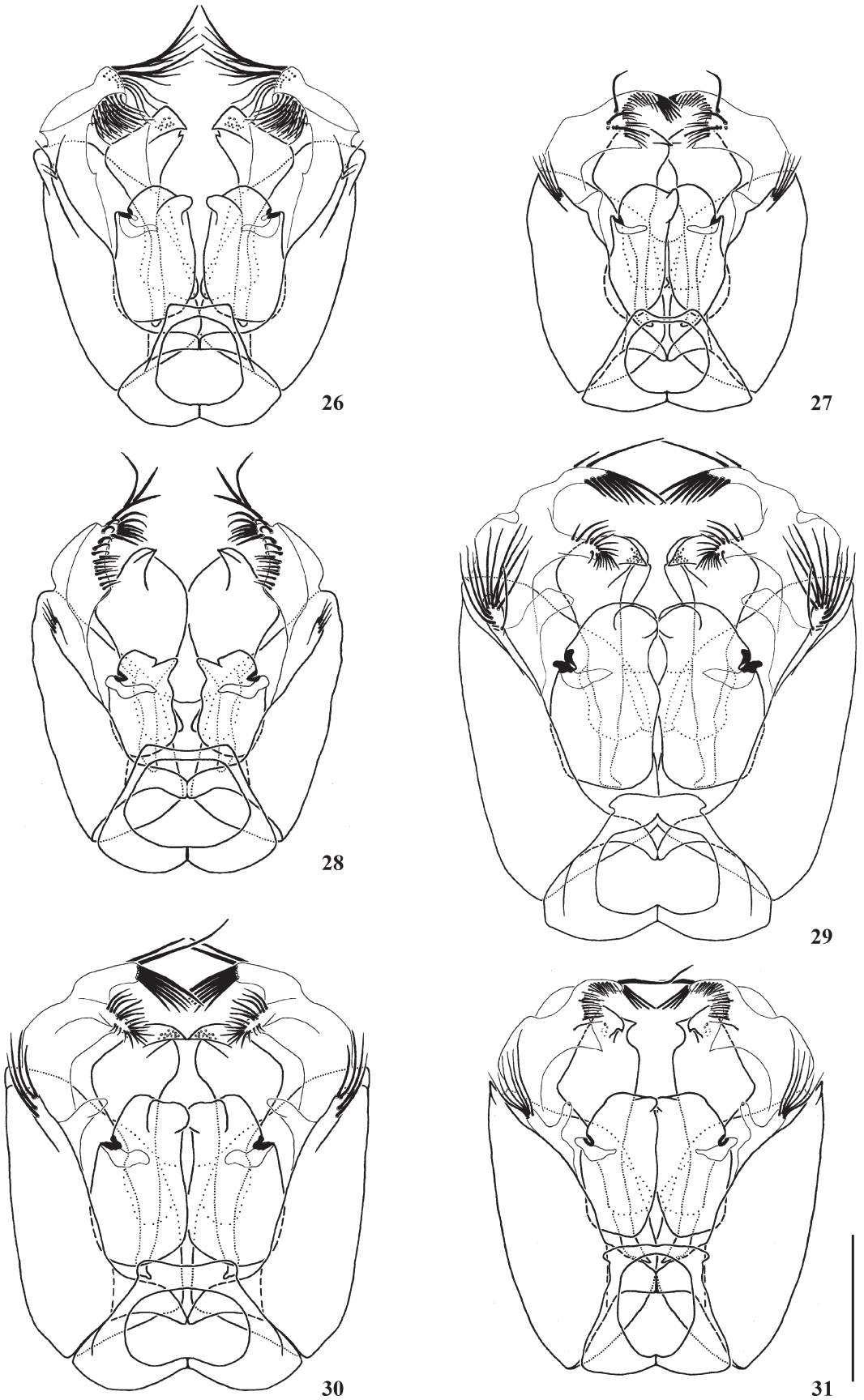
The description of this species provides a good basis to identify it. According to Schrottky (1914) the type has four clypeal processes, clearly being a macrocephalic female. The type of *R. terribilis* was not encountered in URRJ (according to Moure 2007).

Examined material. ARGENTINA, *Misiones*: two females (AMNH), "ARG.-MISIONES\Puerto Esperanza\Fritz – 12.76"; one female (AMNH), "ARG.-MISIONES\Puerto Esperanza\Fritz – x.78"; (AMNH), "ARG.-MISIONES\Puerto Esperanza\Fritz – XII.76". BRAZIL, *Minas Gerais*: two females (DZUP), "P. de Caldas – MG\Brasil XI-61\Claudionor Elias l."; one macrocephalic female (DZMG), "Abelhas da Zona\Metalúrgica\EPDA



Figs. 22–25. Male hidden sterna. (22) *R. briseis*; (23) *R. crotonis*; (24) *R. vernoniae*; (25) *R. viridis* **sp. nov.** Scale bar 0.5 mm.

de Peti\6176-17246" "S. Gonçalo Rio Abaixo MG\BRASIL 01/04/2000\F. Silveira & L. Dias" "Rhinocorynura\cf. inflaticeps\(Ducke, 1906)\F. A. Silveira, det. 2000", one female (DZMG), "Reinventário\EPDA de Peti\8945-26825" "São Gonçalo do Rio Abaixo MG\BRASIL 10/03/2003\C. F. Cardoso", one female with same data except (DZMG), "...8945-26827...", one female with same data except (DZMG), "...8976-26872", one female with same data except (DZMG), "...8980-26877", one female with same data except (DZMG), "...8990-268888", one female with same data except (DZMG), "...8995-26893", one female with same data except (DZMG), "...8996-26894", one female with same data except (DZMG), "...8997-26895", one female with same data except (DZMG), "...9002-26903", one female with same data except (DZMG), "...9012-26920"; one female and one male (DZUP), "Brasil, Minas Gerais,\São Thomé das Letras,\21°43' S 44°58' W\12.i.2010, K. Ramos\& V. Kanamura". *Paraná*: four females (DZUP), "Brasil, Paraná, 10 km ao\sul de Cerro Azul,\24°55'03"S 49°16'19"W,\15.xii.2002, G. Melo"; one female (DZUP), "Brasil, Paraná, Foz do\Jordão, Posto Florestal\Salto Segredo,\6-10.x.2004, E. Soares,\ malaise"; one female (DZUP), "Brasil, Paraná,\Tijucas do Sul\11.ii.2006, Aguiar\Gonçalves & Faria Jr."; one male (DZUP), "VOSSOROCA, PR\TIJUCAS DO SUL\BRASIL 7-OV-71\Moure Mielke"; one male (DZUP), "Brasil, Paraná, Estrada\dos Castelhanos, 400m,\25º49'S 48º55'W\09.ii.2003, G. Melo"; one female (DZUP), "Clevelandia – PR\XI.1978\Moure & Sakakibara"; three females (DZUP), "Brasil, Paraná\10 Km ao S de Cerro\Azul, Rio Ponta Grossa,\24º55'03"S, 49º16'19"N [W]\14.xii.2002, G. Melo"; one female, "Brasil, Paraná\ Jaguatirica, Rio Capivari, 25º04'S, 48º47'W 640m,\01.iii.2003, G. A. R. Melo"; one female, "Brasil, Paraná 10KM N de\Bocaiúva do Sul, Santana\25º06'S, 49º06'W, 900m,\12.x.2002, GMelo, I.Zanette\& AJAguiar"; one female (DZUP), "TIJUCAS DO SUL – PR\BRASIL VOSSOROCA\21/4/1970 – Moure"; one female and one male (DZUP), "FOZ DO IGUAÇU – PR\BRASIL 29/31-1-71\Laroca & Jensen"; one female (DZUP), "PEC\127" "Brasil, Paraná, Parque\Estadual de Campinhos,\ 25º02'S 49º05'W,\23.xi.2003, R. Gonçalves\& F. Fernandes"; one female and one male (DZUP), "Nest A" "Curitiba, PR\26.XI 62\Moure & Sakagami"; one male (DZUP), "inflaticeps" "Tamandaré, Curitiba\PR 26.XI.61\Moure – Sakagami\reared from Nest"; one male (DZUP), "Tamandaré – PR\26.XI.1961\Moure & Sakagami\reared from Nest"; one male (DZUP), "DZUP\168782" "Brasil, Paraná,\Tunas do Paraná, Parque\Estadual de Campinhos\25°02'S 49°05'W, Alt.\860 m, 23.xii.2007\ G. Weiss & F. B. Matos", one male (DZUP) with same data except, "DZUP\169011" "...22.iv.2008, G. Weiss...", one male (DZUP) with same data except, "DZUP\169057" "...17.v.2008, G. Weiss...", one male (DZUP) with same data except, "DZUP\1689821" "...16.iv.2008, G. Weiss...", one male (DZUP) with same data except, "DZUP\168884" "...20.iii.2008, G. Weiss &\J.C. Almeida"; one male (PARIZOTTO), "Brasil, PR, Guaratuba,\ Pontal do Itararé, 700m,\04-III-2007 Grossi &\Parizotto cols."; one female (PARIZOTTO), "Brasil, PR, Guaratuba,\Pontal do Itararé, Morro dos\Perdidos 04-III-2007\Grossi & Parizotto cols."; one female (PARIZOTTO), "Brasil, PR, Castro\Fazenda\16.XII.2006\Grossi & Parizotto col."; one female (UFSC), "Brasil, PR, São Mateus\do Sul\29.I.2009\Rafael Kamke *leg.*"; one male (UFSC), "Brasil, PR, São Mateus\do Sul\26.I.2009\Rafael Kamke *leg.*". *Rio de Janeiro*: one female (DZUP), "Itatiaya 900\15-V-1944\E. Rio – Brasil", one female (DZUP), with same data except "...816\21-V-1940", one macrocephalic female (DZUP), "ITATIAYA 700\Estado Rio"; one female (ZMB), "Itatiaya\30.Jan. 27\A. Seitz *leg.*" "Rhopalictus [female symbol]\inflaticeps\Ducke\Alfken det. 1927"; one female (ZMB), "Itatiaya\30.Jan.27\A. Seitz *leg.*"; one female (MUZSP), "Mury, Nova Friburg\Rio de Janeiro – Br.\12.XI.1970\Gred & Guimarães col.". *Santa Catarin***a**: one female (DZUP), "Santa Catarina, Nova Teutonia,\Brazil XI-1951\L. E. Plaummann". *São Paulo*: one female (MZSP), "Barueri\São Paulo – Brasil\17.III.1962\K. Lenko col."; one female (MZSP) com os mesmos dados exceto "...1.X.1960"; one female (MZSP), "Barueri\SP Brasil\3.II.1968\K. Lenko col."; one female (MZSP), "BARUERI\Est. S. Paulo Brasil\12.III.1967\K. Lenko *leg.*", um macho com os mesmos dados exceto, "...27.I.1962..."; one female (MZSP), "Est. Biol. Boracéia\Salesópolis, SP\W. Wilms col.\5.1.1993"; two females (MZSP), "SP – Eug. Lefevre: 1200m\C. Jordão – 24.JAN.1963\J. Guimarães, Medeiros\L. Silva, A. Rocha e L. T. F."; one female (DZUP), "SÃO PAULO\CAPITAL"; two females (DZUP), "BARUERI\S. Paulo BRASIL\ III.1955\K.Lenko leg"; one female (DZUP), "Barueri\São Paulo – Brasil\8-IV-61\K. Lenko col."; one female (DZUP), "Brasil, São Paulo, São Paulo, Campus USP, 22.XII.1998\I. Alves Santos *leg.*"; one male (DZUP), "17.III.1961\Agua Funda, S. Paulo, K. Lenko – col". PARAGUAY, *Alto Paraná*: one female (ZMB), "Pto. Bertoni\Paraguay\Coll. Bertoni"



Figs. 26–31. Male genitalia, ventral view. (26) *R. briseis*; (27) *R. brunnea* **sp. nov.** (28) *R. crotonis*; (29) *R. inflaticeps*; (30) *R. vernoniae*; (31) *R. viridis* **sp. nov.** Scale bar 0.5 mm.

"Rhinocorinu [sic]\ra\inflaticeps\Dcke"; one female (ZMB), "Puerto Bertoni\Alto Paraná\Paraguay\XII.16 1908" "Corynura\inflaticeps\1909 Friese det.\[female symbol] Ducke" "Typus".

Rhinocorynura viridis sp. nov.

(Figs. 5, 6, 7, 25, 31)

Diagnosis. This species can be distinguished from other *Rhinocorynura* by the following combination of features: rounded anterior border of mesoscutum; predominantly bright metallic green integument, with bluish reflections; body length about 10 mm; mandible with two or three teeth; clypeal apex, close to the marginal area, black and strongly depressed in relation of the remainder of clypeus; scutellum with distinct longitudinal medial carina; male F11 shorter than flagellomeres 3–10.

Variation. This species also exhibits marked polymorphism, especially in size (females varying from about 8 to 10 mm in length; see also additional female measurements below). Structural differences are mostly restricted to the clypeal apex that has a marked depression in large, macrocephalic females, with a flat apical strip separate from the remainder of clypeus, while in smaller females the apical margin is not flat and is somewhat continuous with the remainder of the clypeus.

Description. Male. Head. (1) Face. Covered with a very dense decumbent pubescence, decumbent and erect setae white; flattened in lateral view. (2) Parocular area. Surface between punctures with microreticulations on upper portion. (3) Vertex. In frontal view, projecting above compound eyes less than length of antennal scape; rounded posteriorly, without preocciptal carina; with long erect hairs. (4) Antennae. First and second flagellomeres approximatly equal in length and smaller than remaining flagellomeres; last flagellomere smaller than F3–F10. Mesosoma. (5) Mesoscutum. Anterior border not lamellate; median line strongly impressed anteriorly; disc shiny and mostly polished, very weak fine microreticulation perceptible on anterior one-third of sclerite; punctures with variable diameters. (6) Scutellum. Median line well defined, with a weak longitudinal carina; diameter of punctation diameter variable, coarser among the median line and posterior margin. (7) Metanotum. Surface declivitous toward metapostnotum; pubescence very sparse as in scutellum, almost without decumbent, plumose hairs. (8) Metapostnotum. Median concavity not well marked; with a polished aspect, microreticulation very fine, weakly indicated; with an almost imperceptible transverse depression. (9) Propodeum. Lateral surfaces with fine and scarce decumbent pubescence; punctures on posterior surface with same diameter as those on remainder of mesosoma. (10) Forewing. On second submarginal cell, veins 2rs-m and Rs paralell; 1m-cu joining M closer to 2rs-m than Rs. Metasoma. (11) Terga. Punctures on T1–T2 with same diameter as those on remainder of body. (12) First tergum. Anterior surface without decumbent pubescence, erect pubescence with short branches and sparse, punctation sparser than on dorsal surface. (13) Sterna. Erect pubescence scarce, on S4–S6 setae directed posteriorly; S7 and S8 as Fig. 25. (14) Genitalia. Gonobasis with sides subparallel, as Fig. 31. (15) Body color. Integument bright metallic green with bluish reflections; mandible yellow; labrum light brown; legs, tegulae and wings reddish brown; body pubescence mainly white.

Female. Head. (1) Labrum. Basal elevation elliptical, divided in four tubercles, the two median ones wider apart and larger than the lateral ones. (2) Clypeus. Apical one-third declivitous with a concave, darkened stripe along the apical margin, with a conspicuous tuberble on each side; punctures evenly distributed and of uniform diameter. (3) Clypeus and supraclypeal area. Not elevated in relation to the lower parocular area. (4) Face. Decumbent pubescence relatively sparse, most abundant on lower parocular area and lower half of frons; erect setae long and conspicuous; face weakly convex, with a flat aspect. (5) Vertex. In frontal view, projecting above compound eyes less one half of length of antennal scape; rounded posteriorly, without preoccipital carina. Mesosoma. (6) Mesoscutum. Anterior border not lamellate; median line well marked, its anterior portion strongly furrowed; disc surface with abundant punctures, including mid portion of sclerite; punctures with variable diameters. (7) Scutellum. Median line well marked and with a longitudinal carina; punctures as on mesoscutum; microreticulation more conspicuous than on mesoscutum. (8) Metanotum. Surface declivitous toward metapostnotum; pubescence very sparse as in the scutellum, decumbent pubescence very short, fine and restricted to anterior one-quarter of sclerite. (9) Metapostnotum. Shiny and entirely microreticulated; transverse concavity only weakly indicated. (10) Propodeum. Lateral surface with fine and relatively sparse decumbent pubescence, erect setae relatively abundant and mostly simple; posterior surface flat, only with erecte setae, punctures coarser and larger than those on remainder of mesosoma. (11) Forewing. On second submarginal cell, vein 1m-cu joining M closer to 2rs-m than Rs. Metasoma. (12) Terga. Punctures on T1 and T2 approximately of same diameter as those on remainder of metasoma; basal one third of T2 and T3 without conspicuous lateral patches of tomentose pubescence; erect hairs on T4–T6 white. (13) First tergum. Anterior surface without decumbent pubescence, erect pubescence mostly simple and relatively sparse. (14) Body color. Integument brith metallic green with bluish reflections; mandible, labrum, legs and tegulae dark brown. (15) Measurements. Mmw: 2–2.13; mml: 1.75–1.88; mandl: 1.25–1.44; mandw: 0.56–0.63; labw: 0.88–1; den: 2.38–2.56; clyl: 1.31–1.72; clyw: 0.5–0.63; c-a: 0.47–0.5; a-o: 0.94–1.06; o-v: 0.63–0.75; eyew: 0.56–0.63; gena: 0.69–0.81.

Macrocephalic female. As the female described except for: (1) Mandibles. Notch on basal one-third of outer margin more developed; subapical tooth expanded on apical border, forming a large weakly bidentate tooth. (2) Clypeus. Anterior depression more developed, forming continuous flat marginal stripe, in a plane clearly separated from the clypeal disc. (3) Measurements. Mmw: 2.19–2.56; mml: 1.88–2.13; mandl: 1.38–1.94; mandw: 0.75–0.94; labw: 0.88–1.13; den: 2.56–3.13; clyl: 1.56–1.94; clyw: 0.63–0.75; c-a: 0.47–0.56; a-o: 1.06–1.13; o-v: 0.88–1.13; eyew: 0.56–0.75; gena: 0.81–1.13.

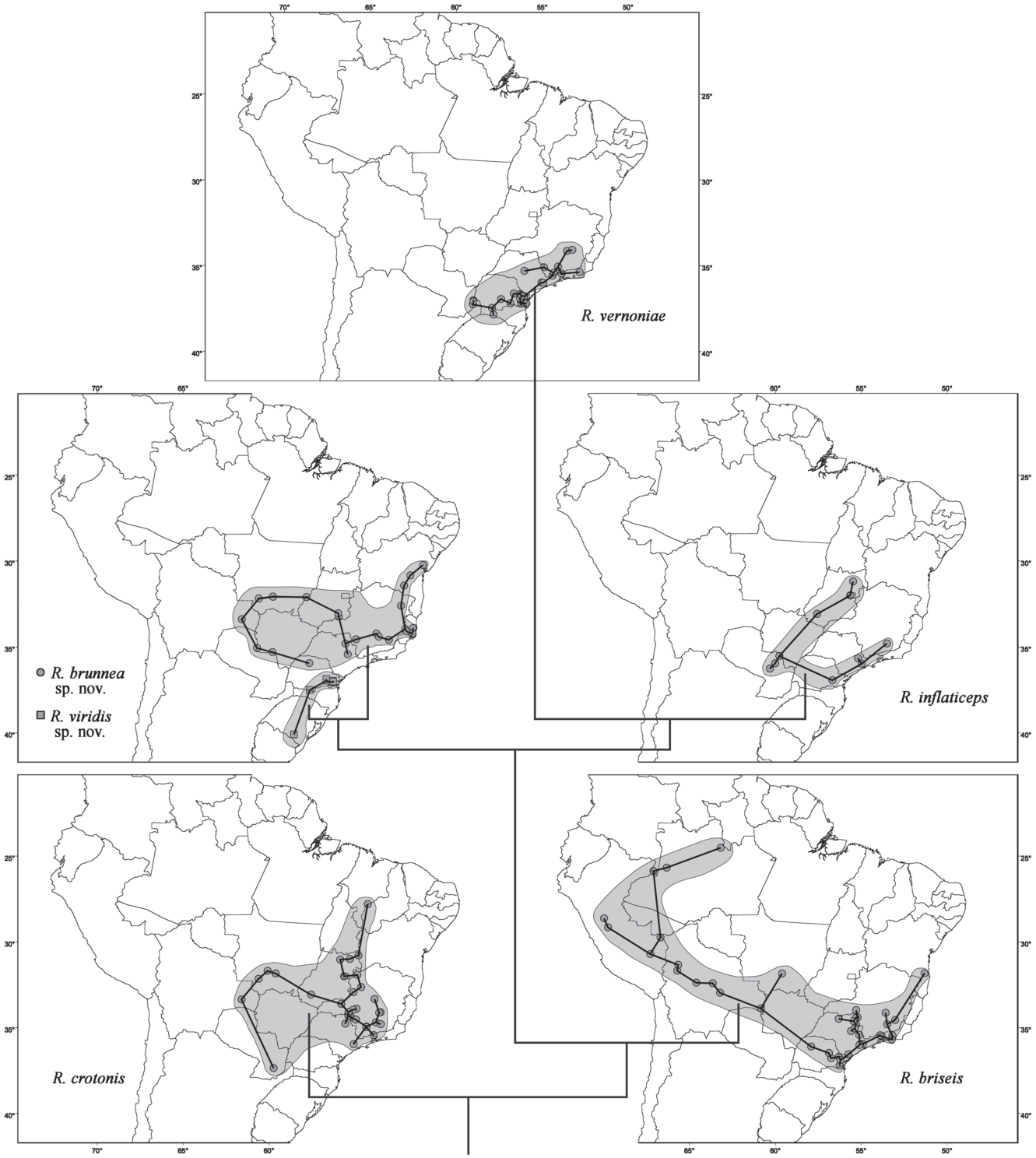


Fig. 32. Distribution maps for the species of *Rhinocorynura*. Locality records were united by individual tracks. Shaded areas represent expected distributions based on occurrence of main vegetation physiognomy occupied by the species.

Type material. Male holotype (DZUP), from BRAZIL, *Paraná*, "PALMEIRAS [Palmeira municipality]– PR\BR 20/1/68\Pe. Moure -\F. Giacomel" [dissected]. Paratypes. BRAZIL, *Paraná*: one female (SEMK), "BRASIL: Paraná, Arau-\caria. 12 Jun. 1955\(Moure & Michener); one macrocephalic female (SEMK), "BRAZIL – Paraná\Araucaria\17 Jan. 1956\(C. D. Michener)" "G. C. Eickwort\slide no.\G7-0426-4"; one female (DZUP), "Curityba-Paraná\I-1939"; one female (DZUP), "Curityba-Paraná\26-XI-1958\P. J. Moure"; one macrocephalic female (DZUP), "Curityba-Paraná\16-XII-1937\P. J. Moure"; three macrocephalic females (DZUP), "Curityba-Paraná\16-XII-1937"; one macrocephalic female (DZUP),"Curityba-Paraná\XII-1940"; one macrocephalic female (DZUP), "CURITIBA\Paraná BRASIL\14.XII.1955\Michener & Lange"; one macrocephalic female (SEMK), "Curityba – Paraná\X-1944"; two macrocephalic females (SEMK), "Curityba – Paraná\16-XII-1937"; one macrocephalic

female (SEMK): "BRAZIL Paraná\Curitiba\14 Dec 1955\(Michener &\Lange)"; one male (SEMK), "BRAZIL Paraná\Curitiba\14 Dec 1955\(Michener &\Lange)" " G. C. Eickwort\slide no.\G7-0222-17" [already dissected]; one macrocephalic female (SEMK), "BRAZIL Paraná\Curitiba\14 Dec 1955\(Michener &\Lange)" "G. C. Eickwort\slide no.\G7-0426-5" " G. C. Eickwort\slide no.\G7-0512-17"; one male (DZUP), "CURITIBA-PR\Brail [sic] III-59\P. D. HURD"; one female (DZUP), "Brasil, Paraná, 12 km a\E de Palmas, 1040m,\26º29'S 51º52'W,\19.xi.2009, G. Melo,\K. Ramos & V. Kanamura"; two females (DZUP), "PALMEIRA – PR\BRASIL 20/1/1968\Moure & Giacomel"; two males (DZUP), "S. J. PINHAIS – PR\Br. 20-III-62\Sakagami & Laroca" "2-p8"; one macrocephalic female (DZUP), "DZUP\024143" "SJP\1088" "Brasil, Paraná\São José dos Pinhais,\Aeroporto Afonso Pena,\KF, 25º31'S 49º11'W,\13.xi.2004, A. Martins\& A. Aguiar"; one female (DZUP), "VILA VELHA – PR\Brasil 15 X-1966\Moure, Marinoni". *Rio Grande do Sul*: one female (DZUP), "Candiota, RS\Chácara da HORTEC\18.I. 2001\Lunardi, M.col." "*Eryngium horridum*\Maime\Área 6 Hora: 11:00"; one female (DZUP), "Candiota, RS\Chácara da HORTEC\20.xI. 2000\Lunardi, M.col." "*Eryngium sanguisorba*\Cham. &. Schlecht.\Área 6 Hora: 15:40".

Etymology. Latin adjective that means fresh, green, based on manuscript name proposed by Pe. Moure.

Species inquirenda in Augochlorini

Corynuropsis ashmeadi Schrottky, 1909

Corynuropsis ashmeadi Schrottky, 1909: 146. Holotype male, Paraguay, Puerto Bertoni (whereabouts unknown)
Corynuroides ashmeadi; Moure (1944)
Rhinocorynura ashmeadi; Moure & Hurd (1987)
Rhinocorynura ashmeadi; Moure (2007)

Comments. Schrottky (1909) included the species in *Corynuropsis* probably due to its similarity with *R. crotonis*. It is plausible then that this species can be a *Neocorynura* as the preceding described species in his work. Moure & Hurd (1987) "provisionally" attributed this species to *Rhinocorynura* due to synonymy of *Corynuropsis*. However, the original description mentions details of the metapostnotum and propodeum that suggest that it does not belong in *Rhinocorynura*. A striate metapostnotum and a densely punctate propodeum combined with a polished mesoscutum (not microsculptured) are not found in any of the species here placed in *Rhinocorynura* or in the closely related genera. Moure (1944) already pointed out that this species could not be a *Rhinocorynura* due to the lack of a mesoscutum projecting over the pronotum. In fact, *R. brunnea* **sp. nov.** and *R. viridis* **sp. nov.** have an unmodified mesoscutum, but the structure of their metapostnotum does not differ from that in other *Rhinocorynura*.

ACKNOWLEDGEMENTS

We are in debt to the late Pe. Jesus Moure for earlier recognition of the new species; Prof. Silvio Nihei for making available the Automontage system; the curators of the above cited collections; Prof. Carlos Roberto Brandão for advisoring the first author; FAPESP – Fundação de Amparo à Pesquisa do Estado de São Paulo for the Ph.D. scholarship to RBG (process number 07/01296–0), and CNPq for a research fellowship (PQ-2) to GARM. Two anonymous reviewers also helped improve the manuscript.

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