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Research article

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New species of the cuckoo bee genus *Austrosphecodes* Michener, 1978 (Hymenoptera: Apoidea: Sphecodini) and a key for Brazilian species

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Abstract. The bee genus *Austrosphecodes* Michener, 1978 comprises 29 obligatory cleptoparasitic species distributed from Chile to Mexico. Currently, three species are known to occur in Brazil, *Austrosphecodes brasiliensis* (Schrottky, 1910), *A. inornatus* (Schrottky, 1902), and *A. minarum* (Schrottky, 1910). Here, we describe nine new species, *Austrosphecodes asmodeus* sp. nov., *A. balrog* sp. nov., *A. cerberus* sp. nov., *A. gorgon* sp. nov., *A. jurupari* sp. nov., *A. krampus* sp. nov., *A. lucifer* sp. nov., *A. orcus* sp. nov., and *A. tartarus* sp. nov. An identification key for the 12 known species from Brazil is presented. Specimens of *A. asmodeus* sp. nov. and *A. brasiliensis* were observed near nest aggregations of *Caenohalictus incertus* (Schrottky, 1902) in Curitiba (State of Paraná).

Keywords. Halictidae, Neotropical, *Sphecodes*, new species.

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Introduction

Sphecodini Schenck, 1869 is a clade of obligatorily parasitic Halictinae Thomson, 1869 (Danforth *et al*. 2008), comprising more than 300 species. Currently, the tribe comprises seven genera worldwide (Gonçalves 2021), five of them occurring in Brazil: *Austrosphecodes* Michener, 1978, *Microsphecodes* Eickwort & Stage, 1972, *Melissocleptis* Gonçalves, 2021, *Nesosphecodes* Engel, 2006, and *Ptilocleptis* Michener, 1978. *Austrosphecodes* was considered as a subgenus of *Sphecodes* Latreille, 1804 by Michener (1978) and later a synonym of *Sphecodes* by the same author (Michener 2007). Recently, it was considered as a separate genus and includes 29 species occurring from Chile to Mexico (Gonçalves 2021). The genus comprises several name-bearing types with uncertain whereabouts and many species probably remain to be described. In the only recent study, Gonçalves (2017) provided taxonomic notes on types and species redescriptions of *Austrosphecodes* which are deposited in South American institutions, including the three known

species for Brazil, *Austrosphecodes brasiliensis* (Schrottky, 1910), *A. inornatus* (Schrottky, 1902), and *A. minarum* (Schrottky, 1910). About their natural history, only a few host associations of Chilean species with Colletinae Lepeletier, 1841 and Halictinae Thomson, 1869 species are known (Janvier 1926, 1933).

The objective of this study is to describe nine new species of *Autrosphecodes* from Brazil. The geographic cover of examined material is representative of the Brazilian Southern Region (states of Paraná, Santa Catarina and Rio Grande do Sul), but some specimens from other states were also included (Amazonas, Acre, Bahia, Espírito Santo, Mato Grosso do Sul, Minas Gerais, and São Paulo). An identification key for Brazilian species is presented.

Material and methods

We examined 213 specimens, most of them deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil (DZUP), plus 14 specimens deposited in the Coleção Entomológica "Prof. J. M. F. Camargo", Ribeirão Preto, Brazil (RPSP) and three holotypes deposited in Museu de Zoologia, Universidade de São Paulo, Brazil (MZSP). Other cited depositories are: Kansas University Natural History Museum (KUNHM), Hungarian Natural History Museum (HNHM), Museo de La Plata, La Plata, Argentina (MLP), Muséum national d'histoire naturelle, Paris, France (MNHN), Museo Regionale di Scienze Naturali, Turin, Italy (MSNT), Naturhistorisches Museum Wien, Austria (NMW), and Museum für Naturkunde, Humboldt-Universität zu Berlin, Berlin, Germany (ZMB).

In the material examined sections, the quotation marks surround exact transcriptions of individual labels, while the backslash (\) indicates different lines on the same label. All material is deposited in DZUP, except when indicated. The descriptions were made following the body organization, tagmata, segments, and sclerites, with special attention given to the following: structure (general organization), sculpture (impressions and elevations on surface), color and pubescence. Descriptions were primarily based on holotypes and variation is reported in the diagnosis section. Structure terminology follows Eickwort (1969) and Michener (2007) except here, we refer to the basal area of the propodeum as the metapostnotum. We use the abbreviations T1, T2 etc., to denote the metasomal terga; S1, S2 etc., to denote metasomal sterna; and F1, F2, etc., to denote the flagellomeres. All measurements are in millimeters. Interspaces among punctures (i) are given in relation to the puncture diameter (pd), setae lengths are given in relation to mid ocellus diameter (od). Sculpture terminology follows Harris (1978) with a few modifications. Table 1 summarizes the most used terms herein and their definitions. For microsculpture, visible only at magnifications above 50×, we use the prefix micro-. For pubescence, we use decumbent for setae lying along the surface, not erect; plumose for setae with several branches; and tomentum for lying setae with a pulverulent aspect. The new names are inspired by daemons and other evil creatures, in a non-pejorative reference to their cleptoparasitic habit.

Most examinations were made with an Olympus SZ51 using white LED ring illumination. Measurements were made with Leica Stemi DV4 and a micrometric rule. Photographs were taken with a Nikon D700 with 136 extension tube and a 105 mm Sigma Macro lens using Helicon Remote for controlling image capture and with a Leica DFC 500 camera coupled with a Leica MZ16 stereo microscope using the Leica Las 3D Viewer. Illumination followed the system of Kawada & Buffington (2016). Image stacking was made with Helicon Focus (ver. 6.0.18) render method based on Method C (Pyramid). Final image adjustments (unsharp mask filtering, level control) were made with GIMP 2.8.16 (©The GIMP Team). The distribution maps were created on QGIS (ver. 3.16.4 with GRASS 7.8.5) using the shapefiles of

Table 1. Sculpture terminology used here, modified from Harris (1978). Abbreviations: i = puncture interspaces; pd = puncture diameter.

Class	Term	Description
Microsculpture	polished	smooth, shiny, not microsculptured
	lineolate	longitudinally marked with very fine raised or depressed lines
	imbricate	partly overlapping and appearing like shingles on a roof or scales on a fish
Microsculpture modificators	strong(ly)	dense, giving a dull appearance
	weak(ly)	not dense, sometimes with a polished appearance
Punctures	impunctate	not punctured
	punctate	set with fine, impressed points or punctures appearing as pin-pricks; ordinary, mean sized punctures
	punctulate	smaller punctures (less than 0.5 puncture diameter); finely punctate; with numerous minute and close set punctures
	puncticulate	sparsely punctate with very fine, widely spaced punctures
Puncture modificators	no modificator regarding interspaces	i = pd
	densely	i < pd
	contiguous	without clear interspaces among punctures
	crowded	punctures deformed by contact
	sparsely	i = 2–3 pd
	very sparsely	i several times larger than pd, i > 3 pd
	impressed	well defined, not swallowed
	shallow	weakly impressed, not deep
Ornamentation	[combination of terms with -]	an intergrade of two patterns, with predominant ornamentation first
	areolate	divided into a number of small irregular spaces
	carinate	with narrow longitudinal raised ridges, mostly parallel
	rugose	wrinkled. Wrinkles larger than regular punctures.
	rugulose	minutely rugose; minutely wrinkled. Wrinkles similar in size with regular punctures.
	strigate	with narrow, transverse irregular raised ridges, mostly parallel
	scrobiculate	with short oblong hollows

South America countries and federal units of Brazil. Coordinates of each examined specimen (when not available on labels) were obtained in Google Maps considering the centroid of the informed locality (UTM, 22S, SIRGAS 2000). Here we follow the single-family classification proposed by Melo & Gonçalves (2005).

Results

Keys of Austrosphecodes *from Brazil*

Females of *Austrosphecodes jurupari* sp. nov. and *A. minarum* and males of *A. balrog* sp. nov., *A. krampus* sp. nov. and *A. tartarus* sp. nov. are unknown.

Females

1. T1 almost impunctate, very sparsely punctate or puncticulate (Fig. 1C, red arrow)..... 2
– T1 mostly punctate on disc, also on marginal area (Fig. 6C, red arrow)..... 7

2. Anterior surface of mesoscutum rugulose by crowded punctures (Fig. 2B, red arrow); metapostnotum shape somewhat triangular (Fig. 2C, red arrow); tegulae frequently with light orange markings 3
– Anterior surface of mesoscutum not rugulose, densely or sparsely punctate (Fig. 1B, red arrow); metapostnotum shape somewhat trapezoidal (Fig. 1C, blue arrow); tegulae usually dark 4

3. Body length more than 7 mm; mesoscutum disc sparsely punctate (i > pd), polished (Fig. 2B); frons sparsely punctate, with variable interspaces among punctures (Fig. 2A); metanotum homogeneously rugose; fore wing with two submarginal cells .....***A. balrog*** sp. nov.
– Body length less than 6 mm; mesoscutum disc punctate to densely punctate (i=pd or i<pd); frons densely punctate, become more sparsely near alveoli; metanotum anterior portion somewhat scrobriculate, on posterior margin rugulose; fore wing with three submarginal cells .....***A. brasiliensis*** (Schrottky, 1910)

4. Head larger than the distance between the exterior margins of the tegulae (Fig.3); hind wing with more than 7 hamuli; mesoscutum disc mostly polished among punctures (Fig. 3B); metapostnotum deeply concave..... ***A. cerberus*** sp. nov.
– Head as large as the distance between the exterior margins of the tegulae; hind wing with fewer than 6 hamuli; mesoscutum disc lineolate among punctures; metapostnotum not deeply concave.....5

5. Median line of mesoscutum strongly sulcate, disc with erect setae longer than the mid ocellus diameter (Fig. 9B); tegulae dark; metasoma entirely dark to black (Fig. 9C); propodeum with few or no tomentum ..... ***A. tartarus*** sp. nov.
– Median line of mesoscutum weakly sulcate, disc with erect setae equal or shorter than the mid ocellus diameter; tegulae with amber spot; metasoma reddish from T1 to T3; propodeum weakly covered with tomentum 6

6. Body length more than 7 mm; anterior surface of mesoscutum punctate (Fig. 4B); scutellum with a well-defined longitudinal row of punctures; paraocular area sparsely covered by plumose setae (Fig. 5A), erect setae dark and with few branches; terga lineolate.....***A. gorgon*** sp. nov.
– Body length less than 6 mm; anterior surface of mesoscutum densely punctate (i<pd); scutellum without a well-defined longitudinal row of punctures; paraocular area densely covered with plumose white setae (Fig. 1A); terga mostly polished .....***A. asmodeus*** sp. nov.

7. Scutellum densely punctured, interspaces less than two puncture diameters (Fig. 8B); terga lineolate among punctures ..... ***A. lucifer*** sp. nov.
– Scutellum sparsely punctured, interspaces usually several puncture diameters (Fig. 6B); terga mostly polished among punctures, lineolation inconspicuous among punctures 8

8. Mesoscutum disc punctate to densely punctate, interspaces less than one puncture diameter, surface mostly dull ..... ***A. inornatus*** (Schrottky, 1902)
– Mesoscutum disc sparsely punctate, interspaces more than puncture diameters, surface mostly polished 9

9. Terga punctures well impressed (Fig. 6C) ..... ***A. krampus*** sp. nov.
– Terga punctures fine and shallow (Fig. 8C) ..... ***A. orcus*** sp. nov.

Males

1. T1 almost impunctate, very sparsely punctate or puncticulate 2
– T1 punctate on disc and marginal area 5

2. Anterior surface of mesoscutum rugulose by crowded punctures; metapostnotum mostly triangular in shape (posterior margin narrowed); antennae light brown ..... ***A. brasiliensis*** (Schrottky, 1910)
– Anterior surface of mesoscutum not rugulose, densely or sparsely punctate; metapostnotum mostly trapezoidal in shape (posterior margin wide); antennae mostly black 3

3. Mesoscutum mostly polished among punctures (Fig. 3E); hind wing with more than 7 hamuli; S4–5 without a submarginal row of long setae ..... ***A. cerberus*** sp. nov.
– Mesoscutum microreticulate among punctures (Fig. 3E); hind wing with fewer than 6 hamuli; S4–5 without a submarginal row of long setae 4

4. Body length more than 7 mm; anterior surface of mesoscutum punctate (i=pd); scutellum with a well-defined longitudinal row of punctures; paraocular region with sparse setae; terga lineolate ..... ***A. gorgon*** sp. nov.
– Body length less than 6 mm; anterior surface of mesoscutum punctate (i=pd); scutellum without a well-defined longitudinal row of punctures; paraocular region covered with dense setae; terga mostly polished ..... ***A. asmodeus*** sp. nov.

5. Mesoscutum disc punctate to densely punctate, interspaces less than one puncture diameter, surface mostly dull 6
– Mesoscutum disc sparsely punctate, interspaces more than puncture diameters, surface mostly polished 7

6. Flagellomeres light brown; S3–5 submarginal row setae short (about 1 od) ..... ***A. inornatus*** (Schrottky, 1902)
– Flagellomeres dark brown to black; S3–5 submarginal row setae moderate to long (1–2 od) ..... ***A. lucifer*** sp. nov.

7. Body size about 6 mm; S3–5 submarginal row setae long (2 od) (Fig. 8G) ..... ***A. orcus*** sp. nov.
– Body size about 8 mm; S3–5 submarginal row setae with moderate length (1.5 od) (Fig. 5C) 8

8. Vertex strigate (Fig. 6A, blue arrow); mesoscutum disc sparsely punctate, anterior surface with curved carinations (Fig. 5A, red arrow) ..... ***A. jurupari*** sp. nov.
– Vertex not strigate; mesoscutum disc punctured, anterior surface rugulose by crowded punctures ..... ***A. minarum*** (Schrottky, 1910)

Taxonomy

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Apidae Latreille, 1802
Subfamily Halictinae Thomson, 1869
Tribe Sphecodini Schenck, 1869
Genus *Austrosphecodes* Michener, 1978

Austrosphecodes asmodeus sp. nov.
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Figs 1, 10A

Diagnosis

Females and males are small, body length less than 6 mm, have sparsely punctate terga and coarsely punctate head and mesosoma. Different from the small *A. brasiliensis*, the anterior surface of the mesoscutum is not rugulose, the metapostnotum is trapezoidal, the tegulae and legs are darker and the body is distinctly coarsely sculptured. Different from the coarsely sculptured *A. gorgon* sp. nov., *A. asmodeus* sp. nov. has the anterior surface of the mesoscutum densely punctate (i<pd), scutellum without a well-defined longitudinal row of punctures, and terga not lineolate.

Variation

Some specimens from Minas Gerais (additional material examined) have amber tegulae and legs when compared with the type material from Paraná, but not as light as in *A. brasiliensis*. The sculpturing in these lighter forms is identical with that of the remaining specimens and they are not included in the type material.

Etymology

One of the seven princes of Judeo-Islamic hell, associated with lust. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Paraná** • ♀; "DZUP\411614" "Brasil, Paraná, Curitiba\ Parque Barigui, -25.42156 -49.307803,\ 25.VI.2018, F. W. Pereira"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 411614.

Paratypes

BRAZIL – **Paraná** • 1 ♀; "DZUP\572447" "Brasil, Paraná, Curitiba\ Parque Barigui, -25.4231 -49.3078, 30.III.2019,\ F. W. Pereira"; DZUP 572447 • 1 ♀; "DZUP\543934" "Brasil, Paraná, Curitiba\ Parque Barigui, -25.42156 -49.307803, 05.XII.2018, F. W. Pereira"; DZUP 543934 • 1 ♀; "DZUP\411654" "Brasil, Paraná, Curitiba\ Parque Barigui, -25.42156\ -49.307803,\ 26.IX.2018, F. W. Pereira" DZUP 411654 • 1 ♀; "DZUP\572432" "Brasil, Paraná, Curitiba\ Parque Barigui,\ -25.4231 -49.3078, 12.II.2019,\ F. W. Pereira"; DZUP 572432 • 1 ♀; "DZUP\411714" "Brasil, Paraná, Curitiba\ Parque Barigui,\ -25.4231 -49.3078, 4.I.2019, F.\ W. Pereira"; DZUP 411714 • 1 ♂; "DZUP\572413" "Brasil, Paraná, Curitiba\ Parque Barigui,\ -25.4231 -49.3078, 24.I.2019, F.\ W. Pereira"; DZUP 572413 • 1 ♀; "DZUP\568611" "Barigui Curitiba\ Paraná x–955\ Michener and Lange"; DZUP 568611 • 1 ♂; "DZUP\566918" "Brasil, Paraná, Curitiba\ Parque Atuba,\ -25.379587, -49.207186,\ 18.V.2018, L. Graf"; DZUP 566918 • 1 ♀; "DZUP\568541" "Brasil, Paraná, Piraquara, Mananciais da Serra\ 25 29S 48 58W,\ 24.iv.2002, G.A.R. Melo"; DZUP 568541 • 1 ♀; "DZUP\568542" "Brasil, Paraná,

Piraquara, Mananciais da Serra\ S25 29 18 W48 58 26,\ 5.i.2008\ A. C. B. Bergamaschi"; DZUP 568542 • 1 ♀; "DZUP\568543" "CAMPO LARGO – PR\ BRASIL – 9/3/1968\ Moure and Laroca"; DZUP 568543 • 1 ♀; "DZUP\568544" "EST. Paraná\ Timoneira\ 12-IV-1957"; DZUP 568544 • 1 ♀; "DZUP\568545" "EST. Paraná\ Timoneira\ 12-IV-1957"; DZUP 568545 • 1 ♀; "DZUP\568546" "CURITIBA\ Paraná BRASIL 1-XI-1955\ Michener e Lange"; DZUP 568546 • 1 ♂; "DZUP\568547" "CURITIBA 900m\ Paraná BRASIL\ 17-IX-1955 Moure,\ Michener e Lange"; DZUP 568547 • 1 ♂; "DZUP\568548" "CURITIBA – PARANÁ\ BRASIL 3-5/I/75\ Telford leg."; DZUP 568548 • 1 ♀; "DZUP\568614" "Brasil, Paraná, Quatro\ Barras, trilha Anhangava\ 25 23S 49 00W,\ 15.x.2007, C. M. Maia leg"; DZUP 568614 • 1 ♀; "DZUP\568615" "Brasil, Paraná, Colombo,\ 910m, Jan. 2013,\ 25.379S 49.131W,\ Savaris and Lampert\ Arm. Malaise"; DZUP 568615 • 1 ♂; "DZUP\568616" with same label; DZUP 568616 • 7 ♀♀; "DZUP\568617", "DZUP\568618", "DZUP\568619", "DZUP\568620", "DZUP\568621", DZUP\568622", DZUP\568623", with the following label "Brasil, Paraná,\ Palmas, REVIS,\ 26.557S 51.542W\ 6.II.2013, A. Pereira-\Rocha, Arm. Malaise"; DZUP 568617–568623 • 2 ♀♀; "DZUP\568624" and "DZUP\568625" with the following label "Brasil, Paraná,\ Palmas, REVIS,\ 26.557S 51.542W\ 24.I.2013, A. Pereira-\Rocha, Arm. Malaise"; DZUP 568624–568625 • 5 ♀♀; "DZUP\568626", "DZUP\568627, "DZUP\568628", "DZUP\568629", "DZUP\568630" with

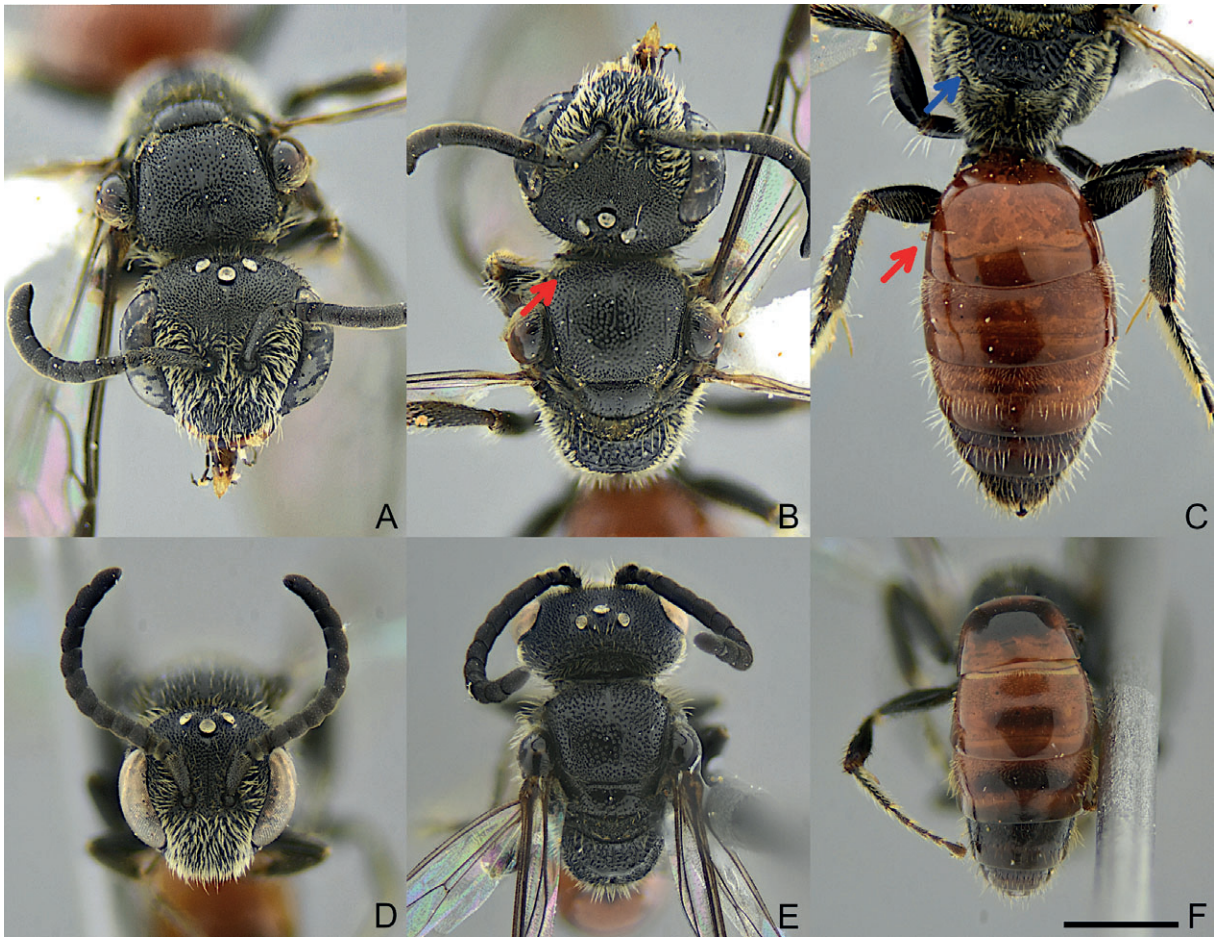

Fig. 1. *Austrosphecodes asmodeus* sp. nov. **A–C**. Holotype, ♀ (DZUP 411614). **D–F**. Paratype, ♂ (DZUP 572413). **A**. Female head. **B**. Female mesosoma, red arrow: punctate anterior margin of mesoscutum. **C**. Female propodeum and metasoma, blue arrow: metapostnotum trapezoidal, red arrow: puncticulate terga. **D**. Male head. **E**. Male mesosoma. **F**. Male metasoma. Scale bar = 1 mm.

the following label "Brasil, Paraná,\ Palmas, REVIS,\ 26.557S 51.542W\ 10.I.2013, A. Pereira-\Rocha, Arm. Malaise"; DZUP 568626–568630 • 2 ♀♀; "DZUP\568631", "DZUP\568632"; DZUP 568631–568632 • 1 ♂; "DZUP\568633" with the following label "Brasil, Paraná,\ Palmas, REVIS,\ 26.557S 51.542W\ 20.XII.2012, A. Pereira-\Rocha, Arm. Malaise"; DZUP 568633.

Additional material

BRAZIL – **Bahia** • 1 ♂; "DZUP\568551" "MARACÁS – BA\ BRASIL IX-65\ F.M. Oliveira"; DZUP 568551 • 1 ♂; "DZUP\568552" "MARACÁS – BA\ BRASIL IX-65\ F.M. Oliveira"; DZUP 568522. – **Minas Gerais** • 1 ♂; "DZUP\568549" "ARAXÁ – Brasil\ MG 5-11-II-65\ C. ELIAS, leg"; DZUP 568549 • 1 ♂; "DZUP\568550" "CARAÇA, MG\ 21-X-1972\ Pe. J.S. Moure"; DZUP 568550 • 2 ♀♀; "DZUP\568634" and "DZUP\568635" with the following label "Brasil, MG, 16 km a SE\ de Itamonte, Pq. Nac.\ Itatiaia, 26.x.2011,\ 22.373S 44.749W, 1850m, G. Melo"; DZUP 568634–568635 • 1 ♀; "DZUP\568553" ""Brasil, Minas Gerais\ Catas Altas, Serra do\ Caraça, 1200m,\ 2.iv.1999, GAR Melo"; DZUP 568553 • 1 ♂; "DZUP\568554" "PASSOS – MG\ BR – 28Xia7-XII-62\ Claudionor Elias leg" DZUP 568554 • 1 ♂; same collection data except "DZUP\568555"; DZUP 568555 • 1 ♂; same collection data except "DZUP\568556"; DZUP 568556 • 1 ♂; same collection data except "DZUP\568557"; DZUP 568557 • 1 ♂; same collection data except "DZUP\568558"; DZUP 568558 • 1 ♂; same collection data except "DZUP\568559"; DZUP 568559 • 1 ♂; "DZUP\568560" "PASSOS– MG\ Brasil I-3 X-62\ Claudionor Elias"; DZUP 568560 • 1 ♂; "DZUP\568561" "PASSOS– MG\ Brasil I-3 X-62\ Claudionor Elias"; DZUP 568561 • 1 ♂; "DZUP\568562" "PASSOS– MG\ Brasil 17-3 IX-62\ Claudionor Elias l"; DZUP 568562 • 1 ♂; "DZUP\568563" "PASSOS– MG\ Brasil 12-17-3 XI-62\ Claudionor Elias"; DZUP 568563 • 1 ♂; "DZUP\568564" "PASSOS– MG\ Brasil 4-10 X-62\ Claudionor Elias"; DZUP 568564 • 1 ♂; "DZUP\568565" "POÇOS DE CALDAS\ MG Brasil XI-61\ Claudionor Elias"; DZUP 568565 • 1 ♂; "DZUP\568566" "POÇOS DE CALDAS\ MG Brasil XI-61\ Claudionor Elias"; DZUP 568566 • 1 ♂; "DZUP\568567" "ARAXÁ – MG – BRASIL\ 22-VII-1965\ C. and T. Elias leg"; DZUP 568567 • 1 ♂; "DZUP\568568" "IBIRACI – MG\ Brasil 15 X 62\ Claudionor Elias"; DZUP 568568 • 1 ♂; "RITAPOLIS, MG, BRASIL\ SF-23,44-21D/19-I-1974" "M. Mazucato, Velthuis\ J.M.F. Camargo"; RPSP. – **São Paulo** • 1 ♂; "TC3" "Ribeirão Preto\ SP BRASIL\ SF-23,48-21d" "21.IX-1978" "A-2008"; RPSP.

Description

Female

Measurements. Head width 1.7 mm, length 1.5 mm; intertegular distance 1.1 mm; body length about 6.0 mm.

Head. Labrum black; arcuate. Mandible amber, darker apex and base; long setae on outer and ventral margins. Clypeus black; sulcate; basal margin arcuate in the middle; punctate (i=pd); with polished interspaces; few long decumbent setae on middle; weakly covered with plumose decumbent setae on lateral apexes. Supraclypeal area black; densely punctate (i<pd); polished interspaces; few long decumbent setae. paraocular area black; densely punctate (i<pd); weakly covered with decumbent whitish plumose setae on middle to bottom; upper densely punctate (i<pd), with punctures almost touching themselves; few short setae. Antennae mostly black, dark brown on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, polished; flagellomeres homogenous covered with short whitish setae. Frons black; densely punctate (i<pd); mostly without setae; weakly depressed above supraclypeal area. Vertex densely punctate to rugose; few short erect setae; coarsely rugose on back of ocelli. Gena with erect whitish setae; lateral view loosely rugose to carinate; not polished; weakly covered with decumbent whitish plumose setae.

Mesosoma. Pronotum rugose; weakly covered with long setae dorsally; few tomentum on lateral view; not polished. Posterior margin of pronotum and anterior margin of mesoscutum weakly covered with

tomentum. Prosternum black. Foreleg mostly dark brown, with lighter tibia and tarsi. Mesoscutum black; anterior border densely punctate to rugose; densely punctate (i < pd), becoming sparsely and polished near apex; densely punctate on apex border; median sulcus weak. Mesepisternum black; coarsely rugose/rugulose; not polished; weakly covered with long whitish setae anteriorly on lateral view; longer plumose setae on middle ventral surface. Mid leg dark brown. Tegula brownish to amber; concentric lineolate; polished in the middle. Fore wing with 1st m–cu reaching 2nd submarginal cell on 2nd rs–m. Scutellum black; mostly polished; some punctures on borders. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum carinate, with strong impressed carinate; becoming rugulose below; covered with tomentum. Hind leg dark brown. Hind wing with five hamuli. Metapostnotum weakly concave; margin trapezoidal; densely areolate. Latero-dorsal surface gently declivitous, weakly scrobiculate. Propodeum rugose; weakly covered with tomentum.

Metasoma. T1 amber; polished. T2 amber; short setae on anterior margin; mostly polished. T3 amber; short setae on anterior margin; longer sparse setae on middle to posterior margin; mostly imbricate. T4 dark brown; long sparse setae; imbricate. T5 dark brown; weakly covered with long setae; more concentrated setae apically; imbricate. S1–6 amber; imbricate; few sparse long erect setae.

Male

Measurements. Head width 1.4 mm, length 1.4 mm; intertegular distance 0.9 mm; body length about 5.0 mm.

As the female except as described.

Clypeus. Supraclypeal area and lower paraocular area densely plumose; vertex coarsely punctate.

Sterna 4–5. With long setae (1.5 od).

Host and flight activity

We found females entering nests of *Caenohalictus incertus* (Schrottky, 1902) in a series of roadside banks in Curitiba, Paraná, Brazil (25.4231° S, 49.3078° W). Females and males were found from June 2018 to March 2019.

Austrosphecodes balrog sp. nov.
urn:lsid:zoobank.org:act:CF0AD167-C63B-4241-8391-E38D0340A26F
Figs 2, 10A

Diagnosis

The frons sparsely punctate, with variable interspaces among coarse punctures, is a distinctive character for this species; on other examined *Austrosphecodes* the frons is densely punctate, except near antennal alveoli. The two known females have only two submarginal cells, with a vestige of 1 r-m in the holotype left fore wing. Its females have the T1 mostly impunctate and the anterior surface of the mesoscutum rugulose by crowded punctures, a combination only otherwise found in *A. brasiliensis*. The body length of more than 7 mm, the mesoscutum disc sparsely punctate and polished, and the scutellum homogeneously rugose easily separate *A. balrog* sp. nov. from *A. brasiliensis*. Males not known.

Etymology

A tall and menacing being who can shroud itself in fire, darkness, and shadow, created by J.R.R. Tolkien. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Paraná** • ♀; "DZUP\ 568513" "Brasil, Paraná, 10Km N de\ Bocaiúva do Sul, Santana\ 25 06 S, 49 06W, 900m,\ 12.x.2002, GMelo, L.Zanette\ and AJAguiar"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568513.

Paratype

BRAZIL – **Paraná** • 1 ♀; "DZUP\568514" "Brasil, Paraná,\ Rio Capivari, 670m, 25 05S, 48 48W, 22.i.2004, G. Melo"; DZUP 568514.

Description

Female

Measurements. Head width 2.1 mm, length 1.7 mm; intertegular distance 1.3 mm; body length about 5.0 mm.

Head. Labrum dark amber to black. Mandible dark amber, darker apex; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin arcuate in the middle; loosely punctate to rugose; sparse long decumbent setae on middle; small concentration of long decumbent setae on lateral apexes. Supraclypeal area black; densely punctate (i < pd); dull interspaces; plumose decumbent setae absent in the middle, present on middle of antennae insertions and below antennae. Paraocular area black; densely punctate; dull interspaces; weakly covered with whitish decumbent plumose setae on middle to bottom; upper densely punctate (i < pd) to rugose, punctures almost touching

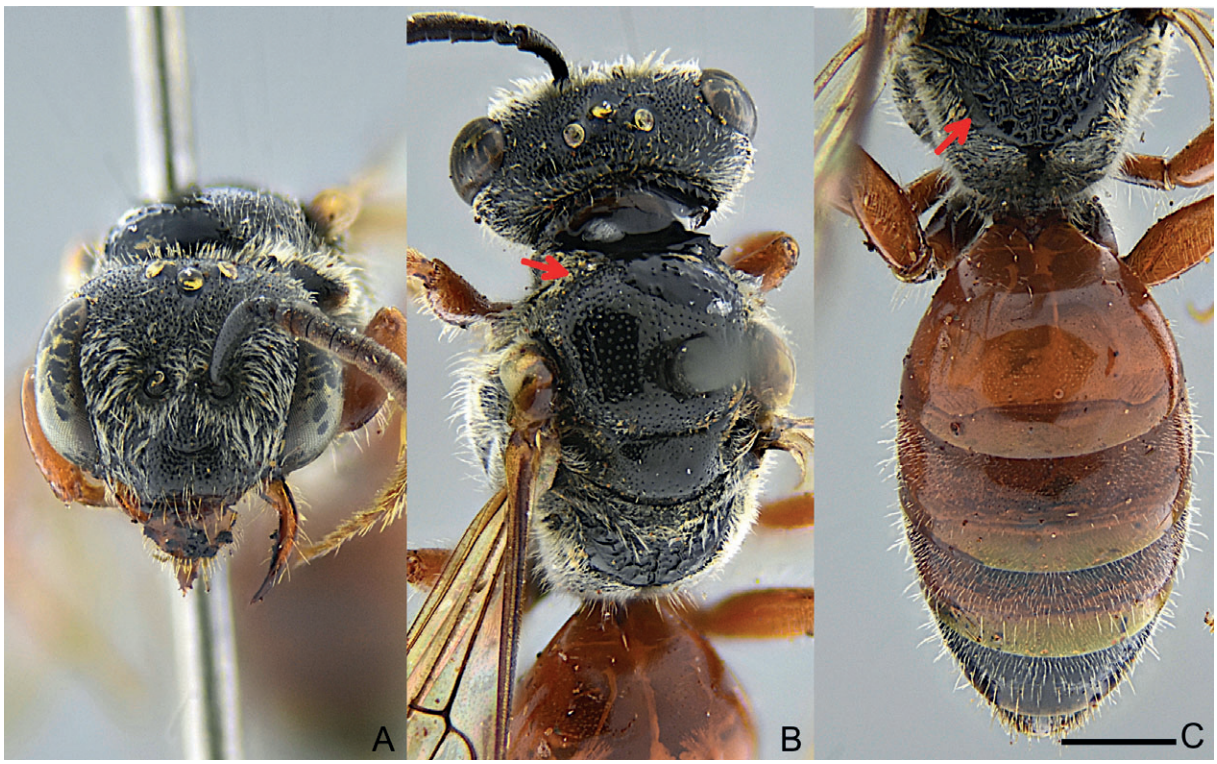

Fig. 2. *Austrosphecodes balrog* sp. nov., holotype ♀ (DZUP 568513). **A**. Head. **B**. Mesosoma, red arrow: crowded punctures on anterior margin of mesoscutum. **C**. Propodeum and metasoma, red arrow: metapostnotum triangular. Scale bar = 1 mm.

themselves; few short erect setae. Antennae mostly black; brownish on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, mostly polished; flagellomeres homogeneous covered with short whitish setae. Frons black; densely punctate (i < pd); dull interspaces; sparse long erect setae; weakly depressed above supraclypeal area. Vertex punctate to rugose, rugose-carinate on back of ocelli. Gena imbricate; loosely rugose on lateral view, imbricate; weakly covered with decumbent whitish setae.

Mesosoma. Pronotum rugose; covered with long whitish setae dorsally; weakly covered with tomentum as seen as lateral view; imbricate near pronotal lobe. Posterior margin of pronotum covered with tomentum. Prosternum black; imbricate; weakly covered with tomentum in the middle. Fore coxa black; dull; imbricate; covered with whitish long setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black; anterior border rugose; disc punctate (i = pd), polished; median sulcus weak. Mesepisternum black; coarsely rugose, not polished; sparse whitish long setae on lateral view; weakly covered with whitish setae on ventral surface. Mid coxa black; dull; imbricate; covered with whitish long setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; one simple tibial spur. Tegula dark amber; concentric lineolate; polished in the middle. Fore wing with 2 submarginal cells. Scutellum black; polished; few sparse punctures on disc. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum rugose and dull; more carinate near tegula; weakly covered with tomentum. Hind coxa black to dark amber; dull; imbricate; presence of long whitish setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber. Hind wing with five hamuli. Metapostnotum weakly concave; margin rounded; areolate. Latero-dorsal surface gently declivitous, scrobiculate. Propodeum densely covered with tomentum.

Metasoma. T1 amber; puncticulate only in the middle disc, polished on apex and imbricate on base. T2 dark amber; puncticulate on anterior margin to middle; short setae on anterior margin; posterior margin mostly polished. T3 dark amber; imbricate; setae on anterior margin to middle; longer sparse setae on middle; T4 black; imbricate; setae on anterior margin to middle; longer sparse setae on middle. T5 black; mostly imbricate; weakly covered with long setae. S1–S3 amber; imbricate; few sparse setae. S4 black on posterior margin; imbricate; sparse setae. S5–S6 black; imbricate; few sparse long erect setae.

Male

Unknown.

Austrosphecodes brasiliensis (Schrottky, 1910)

Fig. 10A

Sphecodes brasiliensis Schrottky, 1910: 63.

Diagnosis

Females and males are small, body length less than 6 mm, and have sparsely punctate terga. From *A. asmodeus* sp. nov. it can be separated by the rugulose, crowded punctured anterior margin of the mesoscutum, by the lighter tegulae and legs, the triangular shape of the metapostnotum, and head and mesosoma not coarsely sculptured. The species was redescribed and illustrated by Gonçalves (2017).

Variation

Variation in size and ornamentation has been found in specimens from Curitiba, with larger females (6.0 mm) more sculptured than smaller ones (5.0 mm), some intermediate females indicate that this can

be considered a variation. Size variation is also known for *A. inornatus*.

Material examined

Holotype

BRAZIL **Minas Gerais** • ♀; Caxambu; MZSP.

Other material

BRAZIL – **Bahia**. • 1 ♂; "DZUP\568596" "ITAPETINGA – BAHIA\ BRASIL 25/7/1967\ C. T. and C. Elias leg."; DZUP • 1 ♂; same collection data as for preceding; DZUP 568597 • 1 ♂; same collection data as for preceding; DZUP 568598• 1 ♂; same collection data as for preceding; DZUP 568599 • 1 ♂; same collection data as for preceding; DZUP 568600 • 1 ♂; same collection data as for preceding; DZUP 568601 • 1 ♂; same collection data as for preceding; DZUP 568602. – **Espírito Santo** • 1 ♂; "DZUP\568581" "Sta. TERESA – ES\ Brasil 27-V-64\ C. ELIAS leg"; DZUP 568581 • 1 ♂; "DZUP\568582" Sta. TERESA – ES\ Brasil 27-V-64\ C. ELIAS leg"; DZUP 568582 • 1 ♂; "DZUP\568583" "STA. TERESA – ES\ BRASIL 10-IX-64\ C. Elias leg."; DZUP 568583 • 1 ♂; "DZUP\568584" "SANTA TERESA – ES\ BRASIL 4/6/1967\ C.T. and C. Elias leg"; DZUP 568584 • 1 ♂; "DZUP\568585" "STA. TERESA – ES\ BRASIL 22-IV-67\ C. and C. T. Elias leg."; DZUP • 1 ♂; "DZUP\568586" "SANTA TERESA – ES\ BRASIL 5/11/1967\ C. T. and C. Elias"; DZUP • 1 ♂; "DZUP\568587" "STA. TERESA – ES\ BRASIL 24-31/IV/67\ C. and C. T. Elias leg."; DZUP • 1 ♂; "DZUP\568588" "CARIACICA – BRASIL\ ES 10a 15/4/67"\ Claudionor Elias"; DZUP • 1 ♂; same collection data as for preceding; DZUP 568589 • 1 ♂; same collection data as for preceding; DZUP 568590 • 1 ♂; "DZUP\568591" "CARIACICA – BRASIL\ ES 2 a 8/5/67″\ C. Elias C. T. Elias"; DZUP 568591 • 1 ♂; same collection data as for preceding; DZUP 568592 • 1 ♂; same collection data as for preceding; DZUP 568593 • 1 ♂; same collection data as for preceding; DZUP 568594 • 1 ♂; same collection data as for preceding; DZUP 568595. – **Minas Gerais** • 1 ♀; "DZUP\568570" "BRAZOPOLIS – MG\ Brasil XII-61\ Claudionor Elias"; DZUP • 1 ♂; "DZUP\568571" "PASSOS – MG\ BR – 19-24-III-62\ Claudionor Elias"; DZUP • 1 ♀; "DZUP\568572" "PASSOS– MG\ Brasil 8-10 XI-61\ C. Elias leg" • 1 ♀; same collection data as for preceding; DZUP 568573 • 1 ♂; "DZUP\568574" "PASSOS– MG\ Brasil 1-7 IX-62\ Claudionor Elias l."; DZUP • 1 ♀; "DZUP\568575" "Local Viçosa –MG\ Data 23/11/85\ Col. G. Melo"; DZUP • 1 ♀; "DZUP\568576" "Local Viçosa –MG\ Data 24/11/85\ Col. G. Melo"; DZUP • 1 ♂; same collection data as for preceding; DZUP 568577 • 1 ♀; "DZUP\568578" "Viçosa – MG\ 28/09/1988\ G.A.R. Melo"; DZUP • 1 ♂; "DZUP\568579""IBIÁ – M. Gerais\ BRASIL 18/VI/65\ C. Elias leg"; DZUP • 1 ♂; "DZUP\568580" "PATOS DE MINAS – MG\ BRASIL – 23/11/965\ Claudionor Elias"; DZUP. – **Paraná** • 1 ♀; "DZUP\568603" "CURITIBA\ Paraná BRASIL\ 1-XI-1955\ Michener e Lange"; DZUP • 1 ♀; same collection data as for preceding; DZUP 568604 • 1 ♀; "DZUP\568605" "Barigui Curitiba\ Paraná x-955\ Michener and Lange"; DZUP • 1 ♀; "DZUP\568606""CURITIBA Paraná\ Brasil\ VIII-1954\ Pe. J.S. Moure leg."; DZUP • 1 ♂; "DZUP\568607"; same collection data as for preceding; DZUP • 1 ♂; "DZUP\568608" "CURITIBA – PR\ Brasil IV 61\ SAKAGAMI leg"; DZUP • 1 ♂; same collection data as for preceding; DZUP 568609 • 1 ♀; "DZUP\568610" "Brasil, Paraná, Campo\ Largo, Rio Verde, 900m, 25 25S 49 27W\ 09.x.2006, G. Melo"; DZUP • 1 ♂; "DZUP\546807" "Brasil, Paraná, Curitiba,\ Cemit. Parque Iguaçu,\ -25.4193448, -49.310204,\ 06.II.23018, L. Graf"; DZUP • 1 ♀; "DZUP\572448" "Brasil, Paraná, Curitiba,\ Parque Barigui, -25.4231 -49.3078, 30.IV.2019, F. W. Pereira"; DZUP • 1 ♂; same collection data as for preceding; DZUP 572449 • 1 ♀; "DZUP\572445"; same collection data as for preceding; 1 ♀; same collection data as for preceding; DZUP 411663 • 1 ♀; "DZUP\411665"; same collection data as for preceding; DZUP • 1 ♀; same collection data as for preceding; DZUP 411682 • 1 ♀; same collection data as for preceding; DZUP 411692 • 1 ♀; same collection data as for preceding; DZUP 572454 • 1 ♀; same collection data as for preceding; DZUP 572443 • 1 ♂; same collection data as for preceding; DZUP 411715 • 1 ♂; same collection data as for preceding; DZUP 572431 • 1 ♂; same collection data as for preceding; DZUP 411613 • 1 ♂; same collection data as for preceding; DZUP 572433 • 1 ♂; same collection data as for preceding; DZUP 572430 • 1 ♂; same collection data as for preceding; DZUP 411701 • 1 ♂; same collection data as for preceding; DZUP 411702. – **São Paulo** • 1 ♂; "0236\RPSP\ Fenolog. Livre" "Brasil,

SP, Est. Ecol. Itrapina\ 22o13′27.9′S 47o54′05.9′W\ 26-28.xi.2016, Almeida, Porto,\ Lucena, Gibran and Yoshida"; RPSP.

Host and flight activity

We found females entering nests of *Caenohalictus incertus* in a series of roadside banks in Curitiba, Paraná, Brazil (-25.4231 -49.3078). Females and males were found from June 2018 to March 2019.

Austrosphecodes cerberus sp. nov.
urn:lsid:zoobank.org:act:EC61FF7A-8D4A-41F5-9436-67633B311328
Figs 3, 10B

Diagnosis

Females of this species can be distinguished from other studied *Austrosphecodes* by the head, which is larger than the distance between the margins of tegula, and by the presence of 7 to 8 hamuli on the hind wing. Additional features are the T1 mostly impunctate, anterior surface of the mesoscutum sparsely punctate, metapostnotum trapezoidal and deeply concave, and mesoscutum mostly polished among punctures on disc. Males are also distinguished by the same features, except for the not enlarged head.

Etymology

From Greek mythology, the hound of Hades, a multi-headed dog that guards the gates of the Underworld to prevent the dead from leaving. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Paraná** • ♀; "DZUP\543269" "Brasil, Paraná, Curitiba,\ Quartel 5 GAC AP,\ -25.508002, -49.240690,\ 30.VIII.2017, L. Graf"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 543269.

Paratypes

BRAZIL – **Paraná** • 1 ♀; same collection data as for holotype; DZU543268 • 1 ♂; same collection data as for holotype; DZUP 543276 • 1 ♂; same collection data as for holotype; DZUP 543289 • 1 ♀; "DZUP\543147" "Brasil, Paraná, Curitiba,\ Quartel PQ Reg Man 5,\ -25.396612, -49.226759,\ 29.VIII.2017, L. Graf"; DZUP 543147 • 1 ♀; "DZUP\568518", "S. José Pinhais – PR\ Brasil (Br277–Km54)\ 22-29.X.1984\ C.I.I.F. (Malaise)"; DZUP 568518 • 1 ♂; "DZUP\568526" "CURITIBA 900m\ Paraná BRASIL\ 27-IX-1955 Moure,\ Michener and Lange"; DZUP 568526.

Description

Female

Measurements. Head width 2.3 mm, length 1.7 mm; intertegular distance 1.2 mm; body length about 9.0 mm.

Head. Labrum black. Mandible base and apex dark amber to black, middle amber; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin weakly arcuate in the middle; punctate (i = pd); dense long erect setae on apex, except in the middle (few erect setae). Supraclypeal area black; punctate (i = pd) to sparsely punctate (i>pd) on middle, densely punctate (i < pd) on lateral margins; imbricate interspaces; dull; sparse long erect setae. Paraocular area black; punctate (i = pd) to densely punctate (i < pd); imbricate interspaces; dull; few short erect setae, more concentrated on middle to bottom. Antennae mostly black; brownish on ventral surface of flagellomeres; scape long, reaching mid ocellus; long erect setae, especially on basal area; punctate; polished as seen as frontal

view, imbricate as seen as lateral view; F1 as long as F2; flagellomeres homogeneous covered with short whitish setae. Frons black; punctate (i = pd); imbricate to reticulate interspaces; dull; few sparse erect setae; not depressed above supraclypeal area. Vertex punctate (i < pd) to densely punctate (i < pd); carinate on back of ocelli; three strong carinae directed to mid ocellus; imbricate interspaces; dull; few punctures, imbricate and dull on back of ocelli and between back of ocelli. Gena imbricate; dull; loosely rugose on lateral view, more imbricate than wrinkles; presence of whitish setae (not covered).

Mesosoma. Pronotum rugose; imbricate, especially on lateral lobe; lateral lobe black; tomentum restricted to margin of lateral lobe. Posterior margin of pronotum without tomentum. Prosternum black; imbricate. Fore leg. Coxa black; imbricate; weakly covered with whitish long setae; trochanter

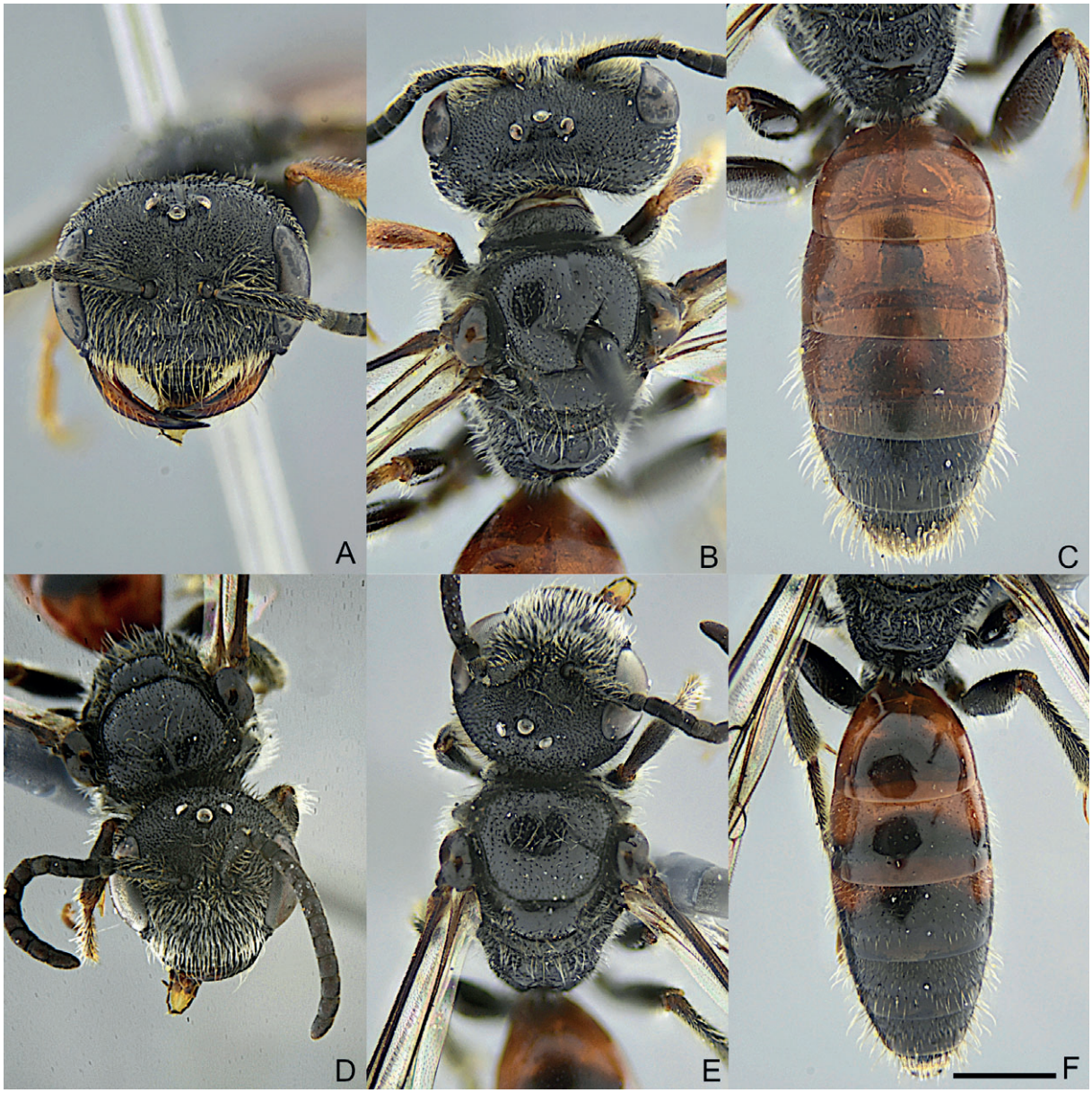

Fig. 3. *Austrosphecodes cerberus* sp. nov. **A–C**. Holotype, ♀ (DZUP 543269). **D–F**. Paratype, ♂ (DZUP 543276). **A**. Female head. **B**. Female mesosoma. **C**. Female propodeum and metasoma. **D**. Male head. **E**. Male mesosoma. **F**. Male propodeum and metasoma. Scale bar = 1 mm.

black; as long as femur; imbricate; presence of long whitish setae; femur black, dark brown on apex; imbricate; sparse erect setae; tibia amber; presence of whitish setae, not covered; tibial spur with one sharp tooth. Mesoscutum black; anterior border punctate (i = pd), not rugose; disc sparse punctate (i > pd); polished interspaces; median sulcus weak. Mesepisternum black. rugose; dull; sparse long setae on lateral view; weakly covered with long whitish setae on ventral surface. Mid leg, coxa black to dark amber; trochanter black; imbricate; presence of long setae (not covered); femur dark brown, imbricate ventrally; few setae; tibia amber; weakly covered with whitish setae; one simple tibial spur, amber. Tegula dark amber; concentric lineolate; polished in the middle. Fore wing with 1st m–cu reaching 2nd submarginal cell on 2nd rs–m or reaching 3rd submarginal cell. Scutellum black; mostly polished; few sparse punctures. Metanotum black; dull; rugulose; not covered with tomentum; presence of long erect setae. Metepisternum mostly rugulose, with strong impressed carinae on top. Hind leg, coxa black; dull; weakly covered with long whitish setae; trochanter dark brown; imbricate; few setae; femur dark brown; lighter on apex; imbricate; few setae; tibia amber; weakly covered with whitish setae; darker dorsally; two tibial spurs, amber. Hind wing with 7–8 hamuli. Metapostnotum strongly concave; margin trapezoidal; areolate-rugulose, unsculptured on posterior margin. Latero-dorsal surface gently declivitous, scrobiculate with long hollows. Propodeum rugose; few tomentum.

Metasoma. T1 amber; disc mostly polished; few sparse punctures on disc; marginal zone dull; imbricate near base. T2 amber; imbricate; dull; few sparse short setae. T3 dark amber; dull; imbricate; few sparse punctures on disc; few sparse setae; row of longer setae near posterior margin. T4 black; imbricate; dull; few sparse punctures on disc; sparse long setae. T5 black; imbricate; covered with long whitish setae, more dense apically, fimbriate. Pygidial plate black; imbricate; broad; rounded apically. S1 amber; black on base; imbricate; sparse erect setae. S2–S4 amber; imbricate; rows of long erect setae near posterior margins of each sterna. S5–S6 black; imbricate; erect setae on posterior margins.

Male

Measurements. Head width 1.8 mm, length 1.7 mm; intertegular distance 1.1 mm; body length about 8.0 mm. As the female except as described. Clypeus, supraclypeal area and lower particular with scattered plumose setae; vertex coarsely punctate, strongly lineolate. Sterna 4–5 without row of setae, with sublateral patches of long and fine setae.

Austrosphecodes gorgon sp. nov.

urn:lsid:zoobank.org:act:8ED55ADF-2AC3-4F4C-BB17-18F680DFF38D

Figs 4, 10B

Diagnosis

This species has the T1 mostly impunctate, the anterior surface of the mesoscutum not rugulose, and the metapostnotum trapezoidal. It is similar in size to *A. cerberus* sp. nov. and *A. tartarus* sp. nov. but the head is not enlarged and the mesoscutum is not sulcate. Differently from *A. asmodeus* sp. nov. the body length is more than 7 mm, the anterior surface of the mesoscutum is sparsely punctate (i = pd), the scutellum has a well-defined longitudinal row of punctures, and the terga are lineolate.

Variation

Variation in body size was found in females, from 7.0 mm to 8.5 mm (the holotype).

Etymology

From Greek mythology, grim, dreadful creature. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Paraná** • ♀; "DZUP\568520" "CURITIBA\ Paraná BRASIL 1–XI–1955\ Michener e Lange"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568520.

Paratypes

BRAZIL – **Paraná** • ♂; "DZUP\568521" "Curitiba–Pr.\V-1955\ R. Lange leg."; DZUP 568521 • 1 ♀; "DZUP\568522" "Curitiba–Pr.\VI-1956\ R. Lange leg." "Obs. No. 152\ R. Lange" "EX–COLEÇÃO\ R.B. LANGE"; DZUP 568522 • 1 ♂; "DZUP\568523" "Curitiba–Pr.\V-1956\ R. Lange leg." "Obs. No. 162\ R. Lange" "EX–COLEÇÃO\ R.B. LANGE"; DZUP 568523 • 1 ♂; "DZUP\568524" "Curitiba–Pr.\V-1956\ R. Lange leg." "Obs. No. 162\ R. Lange" "EX–COLEÇÃO\ R.B. LANGE"; DZUP 568524 • 1 ♀; "DZUP\568612" "Barigui Curitiba\ PR XI-955\ R. Lange leg"; DZUP 568612 • 1 ♂; "DZUP\568525" "Brasil, Paraná, Curitiba\ Parque São Lourenço\ março, 2019\ Lepeco, A."; DZUP 568525.

Additional material

BRAZIL – **Minas Gerais** • 1 ♂; "DZUP\568636" "Brasil, MG, 16 km a SE\ de Itamonte, Pq. Nac.\ Itatiaia, 25.x.2011,\ 22.372S 44.704W, 2400m, G. Melo"; DZUP 568636.

Description

Female

Measurements. Head width 2.0 mm, length 1.7 mm; intertegular distance 1.4 mm; body length about 8.5 mm.

Head. Labrum black; Mandible black on base to middle; dark amber on middle to apex; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin weakly arcuate in the middle; punctate to densely punctate (i < pd); polished interspaces; sparse setae on middle; row of long plumose whitish setae on apex, more abundant on corners. Supraclypeal area black; densely punctate (i < pd) on corners and few punctate on middle; polished. Paraocular area black; contiguously punctate to rugose; microreticulate; weakly covered with long whitish setae, more abundant near antennae. Antennae mostly black; brownish of ventral surface of flagellomeres; F2–F10 homogeneously covered with whitish pubescence on ventral surface; F1 with less pubescence; scape long, reaching mid ocellus; few long erect setae; punctate; imbricate, more polished apically. Frons black; contiguously punctate to rugose; dull; sparse erect setae; weakly depressed above supraclypeal area. Vertex loosely rugose; dull; rugose-carinate on back of ocelli; sparse erect setae; area between ocelli rugose; dull. Gena weakly covered with long whitish setae on dorsal view; loosely rugose on lateral view; weakly covered with short whitish setae on lateral view.

Mesosoma. Pronotum imbricate; weakly covered with tomentum; pronotal lobe more polished; black to dark amber; border of pronotal lobe densely covered with tomentum. Posterior margin of pronotum weakly covered with tomentum. Prosternum black; dull; strigate-rugose. Fore leg: coxa black; dark amber on apex; imbricate; few sparse setae; trochanter black do dark brown; imbricate on base, more polished apically; sparse erect setae; femur dark brown; imbricate; few erect setae on outer surface; tibia dark amber, lighter on base and apex; imbricate; tibial spur serrate on apex, with one sharp tooth; tarsi dark brown/dark amber. Mesoscutum black; punctate (i = pd) on middle; anterior border densely punctate; polished; posterior margin densely punctate; anterior border contiguously punctate to rugose; microreticulate; median sulcus weak. Mesepisternum black; coarsely rugose; sparse setae. Mid leg,coxa dark brown; imbricate; weakly covered with whitish setae, more concentrated on apex; trochanter dark brown; lighter on apex; mostly polished; few erect setae; femur dark brown; lighter on apex; mostly polished; few sparse setae; tibia dark brown; weakly covered with whitish setae;

imbricate; one simple tibial spur, dark amber; tarsi dark brown. Tegula dark amber; concentric lineolate; polished in the middle. Fore wing with 1st m–cu reaching 2nd submarginal cell on 2nd rs–m. Scutellum black; with a well-defined longitudinal row of punctures; mostly polished; imbricate on posterior margin. Metanotum black; rugulose; covered with tomentum. Metepisternum rugose, with impressed carinae near top; weakly covered with tomentum. Hind leg. Coxa black, apex dark amber; imbricate near base, more polished apically; weakly covered with long erect setae; trochanter dark brown; sparse setae; femur dark brown to dark amber; lighter on base and apex; imbricate; sparse setae; tibia dark brown; weakly covered with whitish setae; two simple tibial spurs, serrate; amber; tarsi dark brown. Hind wing with 5 hamuli. Metapostnotum weakly concave; margin trapezoidal; areolate-rugulose. Latero-dorsal surface gently declivitous, scrobiculate with long hollows. Propodeum rugose; weakly

Fig. 4. *Austrosphecodes gorgon* sp. nov. **A–C**. Holotype, ♀ (DZUP 568520). **D–F**. Paratype, ♂ (DZUP 568521). **A**. Female head. **B**. Female mesosoma. **C**. Female propodeum and metasoma. **D**. Male head. **E**. Male mesosoma. **F**. Male propodeum and metasoma. Scale bar = 1 mm.

covered with tomentum.

Metasoma. T1 amber; mostly polished. T2 dark amber; imbricate; short setae on anterior margin. T3 dark amber; imbricate; few short setae on anterior margin; sparse long setae. T4 dark amber to black; dark amber on posterior margin; imbricate; sparse long setae. T5 black; imbricate; long setae concentrated on posterior margin. Pygidial plate black; dull; rounded apically. S1 mostly black; imbricate. S2–S4 dark amber with irregular black blots; S5–S6 mostly black; S1–S6 imbricate; sparse long setae; rows of long setae on posterior margins.

Male

Measurements: Head width 2.1 mm, length 1.9 mm; intertegular distance 1.5 mm; body length about 8.5 mm. As the female except as described. Clypeus, supraclypeal area and lower parocular area with scattered plumose setae; vertex very coarsely punctate. Sterna 4–5 with a submarginal row long setae (2 od).

Austrosphecodes inornatus (Schrottky, 1902)

Fig. 10B

Sphecodes inornatus Schrottky, 1902: 351.

Diagnosis

Both sexes of *Austrosphecoes inornatus* can be distinguished by the combination of T1 punctate (but not strongly impressed as in *A. lucifer* sp. nov. and *A. krampus* sp. nov.) and the mesoscutum disc punctate to densely punctate, with interspaces less than a puncture diameter and surface mostly dull. Males have submarginal rows of setae on S4 and S5, but these are short and not curved as in the similar *A. orcus* sp. nov. The species was redescribed and illustrated by Gonçalves (2017).

Material examined

Holotype

BRAZIL • 1 ♂; São Paulo, Botucatu, Vitoriana ('Victoria'); MZSP 17614

Other material

BRAZIL – **Minas Gerais** • 1 ♀; "DZUP\568637" "ARAXÁ – MG\ BRASIL 14/XI/65\ C. ELIAS leg"; DZUP 568637 • 1 ♂; "DZUP\568638" "UBERABA – MG\ BRASIL 13/8/65\ C. Elias leg."; DZUP 568638 • 1 ♂; "DZUP\568639" "BRAZOPOLIS – MG\ Brasil XII-61\ Claudionor Elias"; DZUP 568639 • 1 ♂; "DZUP\568640" "POÇOS DE CALDAS\ MG Brasil XI-61\ Claudionor Elias"; DZUP 568640 • 1 ♂; "DZUP\568641" "SÃO GOTARDO\ MG–BRASIL\ 11/VI/1965\ C. Elias leg"; DZUP 568641 • 1 ♂; same collection data as for preceding; DZUP 568642 • 1 ♂; same collection data as for preceding; DZUP 568643 • 1 ♂; "DZUP\568644" "Sta. JULIANA\ MG – BRASIL\ 4/VI/1965\ C. Elias leg"; DZUP 568644 • 1 ♂; "DZUP\568645" "IBIRACI – MG\ Brasil 15 X 62\ Claudionor Elias"; DZUP 568645 • 1 ♂; "DZUP\568646" "PASSOS – MG\ Brasil 7a12-X-63\ Claudionor Elias"; DZUP 568646 • 1 ♂; "DZUP\568647" "PASSOS – MG\ Brasil 27-IX-62\ Claudionor Elias"; DZUP 568647 • 1 ♂; "DZUP\568648" "PASSOS – MG\ Brasil 8-15 IX 62\ Claudionor Elias"; DZUP 568648 • 1 ♂; same collection data as for preceding; DZUP 568649 • 1 ♀; "DZUP\568650" "PASSOS – MG\ Brasil 4-10 X 62\ Claudionor Elias"; DZUP 568650 • 1 ♀; "DZUP\568651" "PASSOS – MG\ BR 28 XII a 7-XII-62\ Claudionor Elias leg"; DZUP 568651 • 1 ♂; same collection data as for preceding; DZUP 568652 • 1 ♂; same collection data as for preceding; DZUP 568653 • 1 ♂; same collection data as for preceding; DZUP 568654 • 1 ♂; "DZUP\568655" "PASSOS – MG\ BRASIL 21-XIII-64\ C. Elias leg."; DZUP 568655 • 1 ♀; "DZUP\568656" "PATROCÍNIO – MG\ BRASIL– 5/10/1965\ Claudionor Elias"; DZUP 568656

• 1 ♂; "DZUP\568657" "PATOS DE MINAS – MG\ BRASIL – 20-29/XI/965\ C. Elias leg."; DZUP 568657 • 1 ♂; "DZUP\568658" "PATOS DE MINAS – MG\ BRASIL – 23/11/965\ Claudionor Elias"; DZUP 568658 • 1 ♂; same collection data as for preceding; DZUP 568659 • 1 ♂; same collection data as for preceding; DZUP\568660 • 1 ♂; same collection data as for preceding; DZUP 568661 • 1 ♂; same collection data as for preceding; DZUP 568662 • 1 ♂; same collection data as for preceding"; DZUP 568663 • 1 ♂; same collection data as for preceding; DZUP 568664. – **Paraná** • 1 ♀; "DZUP\568665" "Curitiba – Xaxim\ Paraná – 20-XI-55\ R. Lange"; DZUP 568665 • 1 ♂; "DZUP\568667" "CURITIBA, Paraná\ BRASIL\ VIII-1954\ Pe. J. S. Moure leg"; DZUP 568667 • 1 ♀; "DZUP\568668" "S. LUIS do PURUNÃ\ Paraná–BRASIL\ I-1956 Lange,\ Michener and Moure"; DZUP 568668 • 1 ♂; same collection data as for preceding; DZUP 568669 • 1 ♀; same collection data as for preceding; DZUP 568670 • 1 ♂; "DZUP\568671" "CASTRO – PR\ Brasil – XII-64\ F. Giacomel"; DZUP 568671 • 1 ♀; "DZUP\1647" "Brasil, Paraná, Parque\ Estadual de Vila Velha\25 14S 49 59W\ 04.x.2003, G.A.R Melo\ R. B. Gonçalves"; DZUP 1647 • 1 ♀; same collection data as for preceding; DZUP 1648 • 1 ♀; same collection data as for preceding; DZUP 2664 • 1 ♀; same collection data as for preceding; DZUP 2865 • 1 ♀; same collection data as for preceding; DZUP 0160 • 1 ♀; same collection data as for preceding ; DZUP 6086 • 1 ♂; same collection data as for preceding; DZUP 1142 • 1 ♂; same collection data as for preceding; DZUP 1150 • 1 ♂; same collection data as for preceding; DZUP 433 • 1 ♀; "DZUP\171874" "Brasil, PR, Ponta Grossa,\ Pq. Est. Vila Velha,\ 25.238S 49.999W\ 900m, 09.viii.2012\ L. P. Amaral-Neto"; DZUP 171874 • 1 ♀; same collection data as for preceding; DZUP 171875 • 1 ♂; same collection data as for preceding; DZUP 171812. – **Santa Catarina** • 1 ♂; "DZUP\568672" "N. Teutonia, S. C.\ II/V 1948\ Fritz Plaumann"; DZUP 568672.

Variation

Variation in size and ornamentation has been found in a series from Parque Estadual de Vila Velha (Paraná), with large females (10 mm) more sculptured than smaller ones (8 mm), some intermediate females were also observed. Size variation is also known for *A. brasiliensis*.

Austrosphecodes jurupari sp. nov.

urn:lsid:zoobank.org:act:679BDD53-688E-4E0D-979F-C6BC4C85FC7A

Figs 5, 10C

Diagnosis

This species has the terga densely punctate and is similar to *A. minarum* in size (9 mm) and the rows of long (1.2 od) submarginal setae on S4 and S5. From this species it can be separated by the strigate vertex, the sparsely punctate mesoscutum disc (both punctate in *A. minarum*), and by the shorter and less rugulose metapostnotum. Females are not known.

Etymology

Named after Jurupari, a South American god of darkness and evil, who visits people in their dreams with nightmares and presages, and preventing them from screaming by asphyxiation. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Amazonas** • ♂; "B.A.B.A - Purus\ AM - Brasil\ 12,13 - II - 1986\ 862242" "SB. 20. 62°53'W - 4°52'S\ Camargo – Mazucato"; deposited in the Coleção Entomológica "Prof. J. M. F. Camargo", Ribeirão Preto, Brazil; RPSP.

Paratype

BRAZIL – **Acre** • 1 ♂; "DZUP\568674" "R. Branco Acre\ BR 15-20-XI 61\ F. M. Oliveira"; DZUP 568674.

Description

Male

Measurements. Head width 2.2 mm, length 1.9 mm; intertegular distance 1.5 mm; body length about 8.0 mm.

Head. Labrum dark amber to black. Mandible dark amber; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin arcuate in the middle; densely punctate (i<pd); sparse long decumbent setae on middle; small concentration of long decumbent setae on lateral apexes. Supraclypeal area black; densely punctate (i<pd); dull interspaces; plumose decumbent setae absent in the middle, present on middle of antennae insertions and below antennae. Paraocular area black; densely punctate; dull interspaces; densely covered with yellowish decumbent plumose setae on middle to bottom; upper densely punctate (i<pd) to rugose, punctures almost touching themselves; few short erect setae. Antennae (paratype) light brown anteriorly; brownish on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, mostly polished; flagellomeres homogeneous covered with short whitish setae. Frons black; densely punctate (i<pd); dull interspaces; sparse long erect setae; weakly depressed above supraclypeal area. Vertex punctate to rugose, carinate on posterior margin, few short erect setae. Gena rugose-carinate; imbricate; loosely rugose as seen

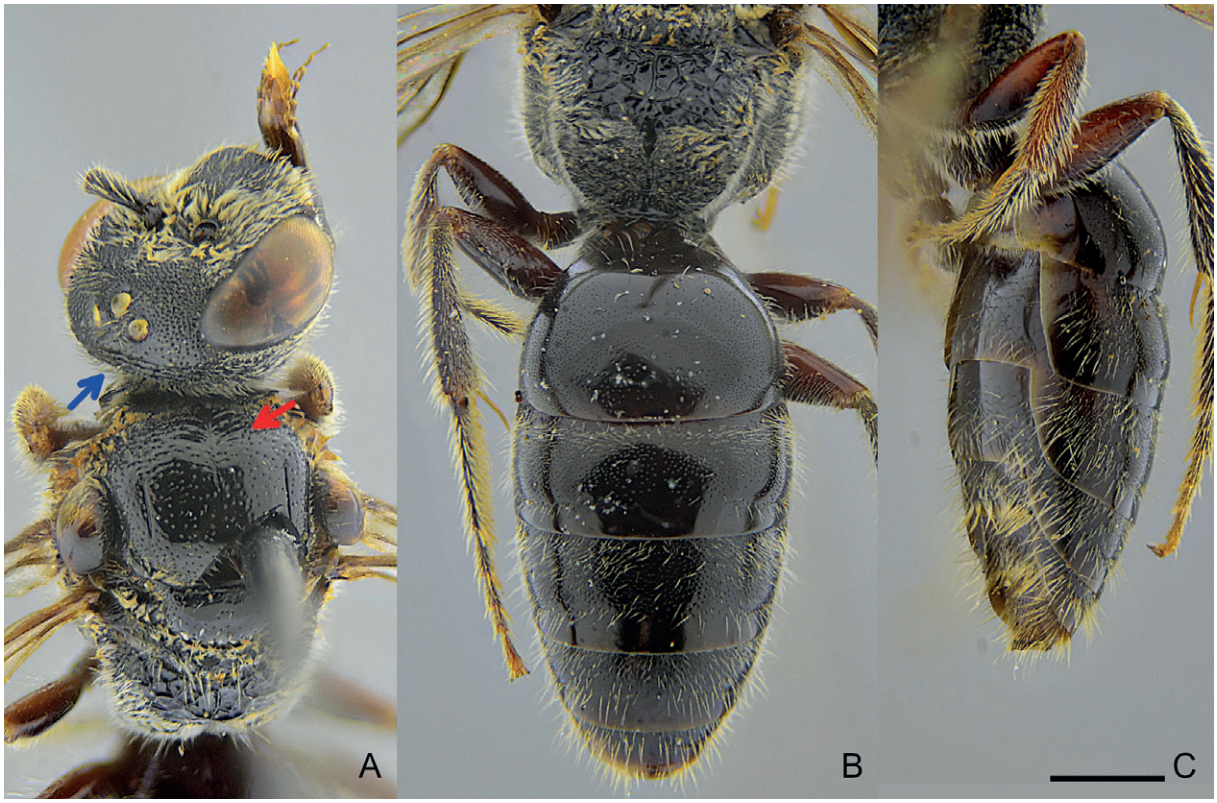

Fig. 5. *Austrosphecodes jurupari* sp. nov., holotype ♂ (RPSP). **A**. Head and mesosoma, blue arrow: strigate vertex, red arrow: carinate anterior margin of mesoscutum. **B**. Propodeum and metasoma. **C**. Metasomal sterna. Scale bar = 1 mm.

on on lateral view, imbricate; densely covered with decumbent whitish setae.

Mesosoma. Pronotum rugose; covered with long whitish setae dorsally; weakly covered with tomentum as seen on lateral view; imbricate near pronotal lobe. Posterior margin of pronotum covered with tomentum. Prosternum black, imbricate, weakly covered with tomentum on the middle. Fore leg. Coxa black, dull, imbricate, covered with whitish long setae; trochanter black, imbricate, few setae; femur black on base and brown on apex, imbricate, sparse erect setae; tibia amber; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black, anterior border with semicircular carination; disc sparsely punctate (i > pd), polished, median sulcus weak. Mesepisternum black, coarsely rugose, not polished, sparse whitish long setae on lateral view, weakly covered with whitish setae on ventral surface. Mid leg. Coxa black, dull, imbricate, covered with whitish long setae; trochanter dark amber, imbricate, few setae; femur dark brown on base and lighter on apex; imbricate, sparse erect setae; tibia dark amber, one simple tibial spur. Tegula dark amber, concentric lineolate, polished in the middle. Fore wing with 3 submarginal cells. Scutellum black, polished, few sparse punctures on disc. Metanotum black, rugulose, mostly covered with tomentum. Metepisternum rugose and dull, more carinate near tegula, weakly covered with tomentum. Hind leg. Coxa black to dark amber, dull, imbricate, presence of long whitish setae; trochanter dark amber, imbricate, few setae; femur dark brown on base and lighter on apex, imbricate, sparse erect setae; tibia amber. Hind wing with 5 hamuli. Metapostnotum weakly concave, margin rounded, areolate. Latero-dorsal surface gently declivitous, scrobiculate. Propodeum densely covered with tomentum.

Metasoma. T1 black, densely punctate. T2 black, punctulate, short setae on anterior margin, posterior margin mostly polished. T3 black, punctate, imbricate, setae on anterior margin to middle, longer sparse setae on middle; T4 black, punctate, setae on anterior margin to middle, longer sparse setae on middle. T5 black, mostly imbricate, weakly covered with long setae. Pygidial plate black, dull, without setae. S1–S2 black, imbricate, few sparse setae. S3–5 black on posterior margin, imbricate, with long marginal setae. S6 black, imbricate, few sparse long erect setae.

Variation

The paratype from Acre has some amber portions on the metasoma, lighter legs and less plumose head pubescence. However, the remaining features agree with the holotype from Amazonas, especially the ornamentation of head and mesosoma and the pubescence on S3–5.

Austrosphecodes krampus sp. nov.
urn:lsid:zoobank.org:act:92DBC026-E28E-4984-837A-5541925AF20B
Figs 6, 10C

Diagnosis

This species has the terga densely and coarsely punctate. It is similar to *A. lucifer* sp. nov., but differs by the sparsely punctate scutellum (interspaces usually as long as several puncture diameters) and by the terga mostly polished among punctures (lineolation inconspicuous). Differs from *A. inornatus* by the mesoscutum disc sparsely punctate with mostly polished surfaces. Differs from *A. orcus* sp. nov. by the strongly impressed terga punctures. Body length about 7 mm. Males are not known.

Etymology

Named after Krampus, a horned, anthropomorphic figure described as half-goat, half-demon, who, during the Christmas season, punishes children who have misbehaved. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Santa Catarina** • ♀; "DZUP\568515" "Brasil, Santa Catarina\ 9 Km a E de Araranguá,\ 28 57S 49 25N,\ 17.xi.2002, G. Melo,\ área de dunas"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568515.

Paratype

BRAZIL – **Santa Catarina** • 1 ♀; same collection data as for holotype; DZUP 568516.

Description

Female

Measurements. Head width 1.8 mm, length 1.4 mm; intertegular distance 1.1 mm; body length about 8.0 mm.

Head. Labrum dark amber to black. Mandible dark amber; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin arcuate in the middle; loosely punctate; sparse long decumbent setae on middle; small concentration of long decumbent setae on lateral apexes. Supraclypeal area black; densely punctate (i < pd); dull interspaces; plumose decumbent setae absent in the middle, present on middle of antennae insertions and below antennae. Paraocular area black; densely punctate; dull interspaces; densely covered with whitish decumbent plumose setae on middle to bottom; upper densely punctate (i < pd) to rugose, punctures almost touching themselves; few short erect setae. Antennae mostly black; brownish on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, mostly polished; flagellomeres homogeneous covered with short whitish setae. Frons black; densely punctate (i < pd);

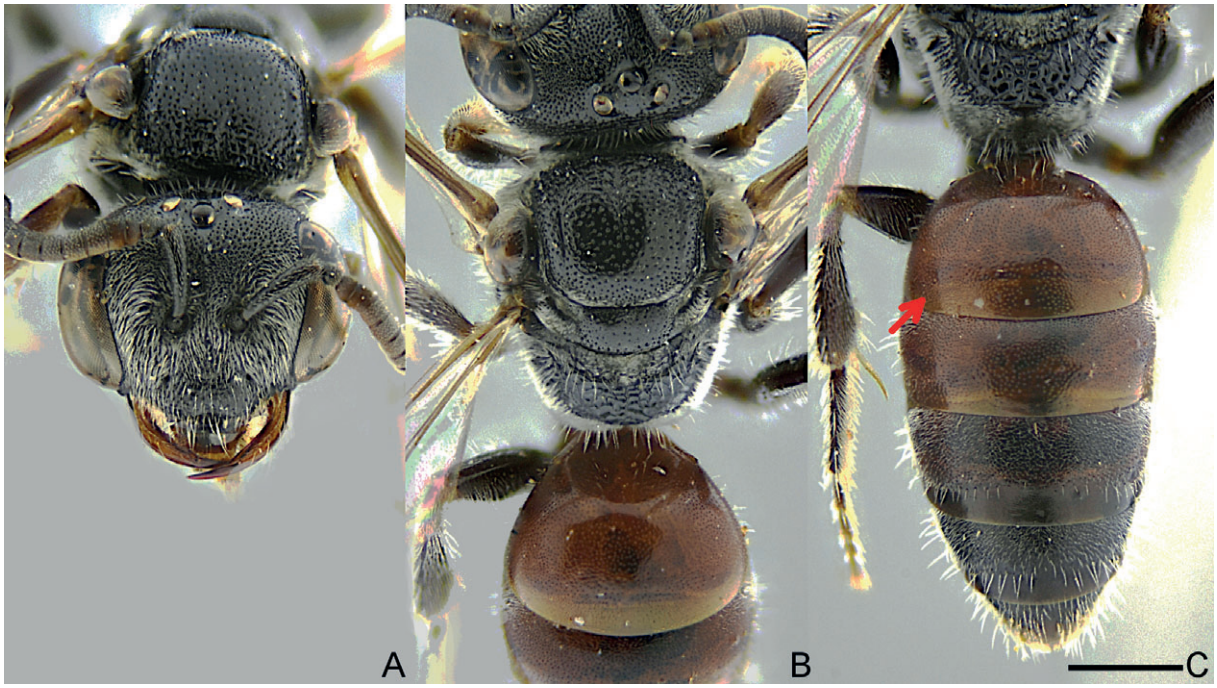

Fig. 6. *Austrosphecodes krampus* sp. nov., holotype, ♀ (DZUP 568515). **A**. Head. **B**. Mesosoma. **C**. Propodeum and metasoma, red arrow: punctate terga. Scale bar = 1 mm.

dull interspaces; sparse long erect setae; weakly depressed above supraclypeal area. Vertex punctate to rugose, lineolate on posterior margin, less punctate and more polished near gena; few short erect setae. Gena rugose-carinate; imbricate, loosely rugose as seen on lateral view, imbricate, densely covered with decumbent whitish setae.

Mesosoma. Pronotum rugose; covered with long whitish setae dorsally; weakly covered with tomentum as seen on lateral view; imbricate near pronotal lobe. Posterior margin of pronotum covered with tomentum. Prosternum black; imbricate, weakly covered with tomentum on the middle. Fore leg. Coxa black; dull; imbricate, covered with whitish long setae; trochanter black, imbricate, few setae; femur black on base and brown on apex; imbricate; sparse erect setae; tibia amber; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black; anterior border rugose; disc punctate to sparsely punctate (i>pd), polished; median sulcus weak. Mesepisternum black; coarsely rugose, not polished; sparse whitish long setae on lateral view; weakly covered with whitish setae on ventral surface. Mid leg. Coxa black; dull; imbricate; covered with whitish long setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; one simple tibial spur. Tegula amber; concentric lineolate; polished in the middle. Fore wing with 3 submarginal cells. Scutellum black; polished; few sparse punctures on disc. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum rugose and dull; more carinate near tegula; weakly covered with tomentum. Hind leg. Coxa black to dark amber; dull; imbricate; presence of long whitish setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; two simple spurs. Hind wing with 5 hamuli. Metapostnotum weakly concave; margin rounded; areolate. Latero-dorsal surface gently declivitous, scrobiculate. Propodeum densely covered with tomentum.

Metasoma. T1 dark amber; densely punctuate. T2 dark amber; punctulate; short setae on anterior margin; posterior margin mostly polished. T3 dark amber; punctulate, imbricate; setae on anterior margin to middle; longer sparse setae on middle; T4 black; imbricate; setae on anterior margin to middle; longer sparse setae on middle. T5 black; mostly imbricate; weakly covered with long setae. Pygidial plate black; dull; without setae. S1–S3 amber; imbricate; few sparse setae. S4 black on posterior margin; imbricate; sparse setae. S5–S6 black; imbricate; few sparse long erect setae.

Austrosphecodes lucifer sp. nov.
urn:lsid:zoobank.org:act:334ED3D5-7B87-4695-9AC5-D9A880AA408A
Figs 7, 10C

Diagnosis

This species differs from the majority of other species by the densely punctate metasoma, similar to *A. krampus* sp. nov, but it can be distinguished by its densely punctate mesoscutum, rugulose anteriorly, punctate scutellum, and the lineolate terga. The only known female has a body length about 10 mm. Males are densely sculptured as the female, have dark flagellomeres and submarginal rows of setae (1.5 od) on S3–5 .

Etymology

A mythological and religious figure associated with the planet Venus, the morning star; a common devil's name. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Rio Grande do Sul** • ♀; “DZUP/568517” “Brasil, Rio Grande do Sul,\ 10 km a ESE de

Terra de\ Areia, 29 36S 49 58W,\ 17.xi.2002, G. A. R. Melo"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568517.

Paratypes

BRAZIL – **Rio Grande do Sul** • 2 ♂♂; "Brasil, RS, Osório, 05.xi.2017\ 29 55 32S 50 13 19W,\ E. Almeida and D. Lucena, leg."; RPSP .

Description

Female

Measurements. Head width 2.2 mm, length 1.8 mm; intertegular distance 1.5 mm; body length about 10.0 mm.

Head. Labrum black. Mandible dark amber with brown apex; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin arcuate in the middle; loosely punctate; sparse long decumbent setae on middle; small concentration of long decumbent setae on lateral margins. Supraclypeal area black; densely punctate (i < pd); dull interspaces; plumose decumbent setae absent in the middle, present on middle of antennae insertions and below antennae. Paraocular area black; densely punctate; dull interspaces; densely covered with whitish decumbent plumose setae on middle to bottom; upper densely punctate (i < pd) to rugose, punctures almost touching themselves; few short erect setae. Antennae mostly black; brownish on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, mostly polished; flagellomeres homogeneous covered with short whitish setae. Frons black; densely punctate (i < pd); dull interspaces; sparse long erect setae; weakly depressed above supraclypeal area. Vertex punctate to rugose, less punctate and more polished near gena; few short erect setae. Gena rugose-carinate; imbricate; loosely rugose on lateral view, imbricate; densely covered with decumbent whitish setae.

Mesosoma. Pronotum rugose; covered with long whitish setae dorsally; weakly covered with tomentum on lateral view; imbricate near pronotal lobe. Posterior margin of pronotum covered with tomentum. Prosternum black; imbricate; weakly covered with tomentum in the middle. Fore leg. Coxa black; dull; imbricate; covered with whitish long setae; trochanter black; imbricate; few setae; femur black on base and brown on apex; imbricate; sparse erect setae; tibia amber; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black; anterior border rugose; disc densely punctate (i < pd), dull; median sulcus weak. Mesepisternum black; coarsely rugose, not polished; sparse whitish long setae on lateral view; weakly covered with whitish setae on ventral surface. Mid leg. Coxa black; dull; imbricate; covered with whitish long setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; one simple tibial spur. Tegula amber; concentric lineolate; polished in the middle. Fore wing with 3 submarginal cells. Scutellum black; dull; densely on disc. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum rugose and dull; more carinate near tegula; weakly covered with tomentum. Hind leg. Coxa black to dark amber; dull; imbricate; presence of long whitish setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber. Hind wing with 7 hamuli. Metapostnotum weakly concave; margin rounded; densely areolate. Latero-dorsal surface gently declivitous, scrobiculate. Propodeum densely covered with tomentum.

Metasoma. T1 dark amber; densely punctuate. T2 dark amber; punctulate; short setae on anterior margin; posterior margin mostly polished. T3 dark amber; punctulate, imbricate; setae on anterior margin to middle; longer sparse setae on middle; T4 black; imbricate; setae on anterior margin to middle; longer sparse setae on middle. T5 black; mostly imbricate; weakly covered with long setae. Pygidial plate

black; dull; without setae. S1–S3 amber; imbricate; few sparse setae. S4 black on posterior margin; imbricate; sparse setae. S5–S6 black; imbricate; few sparse long erect setae.

Male

Measurements: head width 1.8 mm, length 1.8 mm; intertegular distance 1.3 mm; body length about 7.0 mm. As the female except as described. Clypeus, supraclypeal area and lower particular with scattered plumose setae; antennae dark brown, scape not reaching mid ocellus; vertex coarsely punctate. Sterna 3–5 with a submarginal row of long setae (1.5 od).

Fig. 7. *Austrosphecodes lucifer* sp. nov. **A–C**. Holotype, ♀ (DZUP 568517). **D–F**. Paratype, ♂. **A**. Female head. **B**. Female mesosoma. **C**. Female propodeum and metasoma. **D**. Male head. **E**. Male mesosoma. **F**. Male metasoma. Scale bar = 1 mm.

Austrosphecodes minarum (Schrottky, 1910)
Fig. 10D

Sphecodes minarum Schrottky, 1910: 63.

Comments

This species was described for a male and the female remains unknown. Besides the holotype, a second specimen studied was considered to be *A. minarum*, for the size, overall body sculpture and pubescence of sterna 3–5. The species is similar to *A. jurupari* sp. nov., but can be distinguished by the punctate vertex and mesoscutum.

Material examined

Holotype
BRAZIL • 1 ♂; Minas Gerais, Caxambu; MZSP 2533.

Other material
BRAZIL – **Minas Gerais** • 1 ♂; "DZUP\568673" "Ouro Preto\ MG– Brasil 25/01/86\ Melo, Soares, Morato"; DZUP 568673.

Austrosphecodes orcus sp. nov.
urn:lsid:zoobank.org:act:851C93ED-46F4-45F0-8C94-B1534A4727FB
Figs 8, 10D

Diagnosis

Females of this species are very similar to those of *A. inornatus*, with T1 punctate but punctures not strongly impressed. It differs from *A. inornatus* by the mesoscutum disc sparsely punctate, interspaces more than puncture diameters, surface mostly polished. Males are easily recognized by the submarginal rows of long (= 2od) recurved setae on S4–5 (Fig. 8G).

Etymology

A god of the underworld, punisher of broken oaths in Italic and Roman mythology. Orcus was portrayed in paintings in Etruscan tombs as a hairy, bearded giant. The name is used as a proper noun in apposition.

Material examined

Holotype
BRAZIL – **Minas Gerais** • ♀; "DZUP\568538" "Uberlândia – MG\ BRASIL 23.IV.93\ G.A.R. MELO"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568538.

Paratypes
BRAZIL – **Bahia** • 1 ♂; "951908" "Santo Antonio\ Cocos BA, Brasil\ 44 40′W, 14 8′S" 22,27-VII-1995\ Mazucato, leg."; RPSP. – **Espírito Santo** • 1 ♂; "DZUP\568569" "CARIACICA – E. SANTO\ BRASIL 2-8/V/57\ C. and C. T. Elias leg."; DZUP 568569. – **Mato Grosso do Sul** • 1 ♂; "Campo Grande\ MS, Brasil\ 28-II-1990\ M. Mazucato\ 900204"; RPSP. – **Minas Gerais**: 1 ♀; "DZUP\568530" "PASSOS – MG\ Brasil 7a12-X-63\ Claudionor Elias"; DZUP 568530 • 1 ♀; "DZUP\568531" "PASSOS – BRASIL\ MG 4-5-X-63\ CLAUDIONOR ELIAS"; DZUP 568531 • 1 ♂; "DZUP\568532" "PASSOS – MG\ BR 28Xia7XII; DZUP-X-62\ Claudionor Elias"; DZUP 568532 • 1 ♂; "DZUP\568533" "ARAXÁ – MG\ Brasil 22-IV 63\ C. Elias leg"; DZUP 568533 • 1 ♂; "DZUP\568534" "ARAXÁ – MG\ Brasil 22-IV 63\ C. Elias leg"; DZUP 568534 • 1 ♂; "DZUP\568535" "IBIÁ – M. Gerais\ BRASIL 18/VI/65\ C. Elias leg"; DZUP 568535 • 1 ♂; "DZUP\568536" "Brasil, Minas Gerais\ Catas Altas, Serra do\ Caraça, 1200m,\ 1.iv.1999,

GAR Melo"; DZUP 568536 • 1 ♂; "DZUP\568537" "Sta. JULIANA\ MG – BRASIL\ 4/VI/1965\ C. Elias leg"; DZUP 568537 • 1 ♂; "DZUP\568539" "SÃO GOTARDO\ MG–BRASIL\ 11/VI/1965\ C. Elias leg"; DZUP 568539 • 1 ♂; "DZUP\568540" "IBIÁ – M. Gerais\ BRASIL 17/12/65\ C. Elias leg"; DZUP 568540. – **São Paulo** • 1 ♀; "DZUP\568527" "Brasil, São Paulo,\ Luis Antonio, Est.\ Ecol. de Jataí, 16.x\1999, G. A. R. Melo"; DZUP 568527 • 1 ♀; "DZUP\568528" "Brasil, São Paulo,\ Ribeirão Preto,\ Campus da USP\ 01.IX.1998, Melo"; DZUP 568528 • 1 ♂; "DZUP\568529" "BARUERI – SP\ Brasil V 1957\ K. Lenko, leg"; DZUP 568529 • 1 ♀; "M 8 77" "Ribeirão Preto\ SP BRASIL\ SF-23, 48 - 21d" "10-III-1977\M. Mazucato Leg."; RPSP • 1 ♀; same collection data as for preceding; "12-II-1977"; RPSP • 4 ♂♂; same collection data as for preceding; "23-V-1975", "22-V-1975", "28-V-1976" and "28-V-1975"; RPSP • 1 ♂; "GENETICA\ F.M. R. PRETO" "Ribeirão Preto\ SP BRASIL\ SF-23, 48 - 21d\ 1-VI-1972\M. Mazucato Leg."; RPSP • 1 ♂; "Brasil, SP, ES. Ecol. Itirapina\ 22 12'27.9"S 47 54'05.9"W"\ 26-28.V.2017 Tavares, Porto,\ Lucena, Gibran and Yoshida"; RPSP • 1 ♂; same collection data as for preceding; "21-23.IV.2017"; RPSP • 1 ♂; same collection data as for preceding; "28-21.I.2017"; RPSP • 2 ♂♂; same collection data as for preceding; "24-26.II.2017 Tavares, Porto,\ Lucena, Stefanello and Quinteiro"; RPSP.

Fig. 8. *Austrosphecodes orcus* sp. nov. **A–C**. Paratype (DZUP 568527). **D–F**. Holotype, ♂ (DZUP 568538). **A**. Female head. **B**. Female mesosoma. **C**. Female propodeum and metasoma. **D**. Male head. **E**. Male mesosoma. **F**. Male propodeum and metasoma. **G**. Male metasomal sterna. Scale bar = 1 mm.

Description

Female

Measurements. Head width 1.8 mm, length 1.4 mm; intertegular distance 1.0 mm; body length about 6.0 mm.

Head. Labrum dark amber to black. Mandible dark amber; long setae on outer and ventral margin, more concentrated on base. Clypeus black; sulcate; basal margin arcuate in the middle; loosely punctate; sparse long decumbent setae on middle; small concentration of long decumbent setae on lateral apexes. Supraclypeal area black; densely punctate (i<pd); dull interspaces; plumose decumbent setae absent in the middle, present on middle of antennae insertions and below antennae. Paraocular area black; densely punctate; dull interspaces; densely covered with whitish decumbent plumose setae on middle to bottom; upper densely punctate (i<pd) to rugose, punctures almost touching themselves; few short erect setae. Antennae mostly black; brownish on ventral surfaces of flagellomeres; scape long, almost reaching mid ocellus; few erect setae on scape; scape punctate to sparsely punctate, mostly polished; flagellomeres homogeneous covered with short whitish setae. Frons black; densely punctate (i<pd); dull interspaces; sparse long erect setae; weakly depressed above supraclypeal area. Vertex punctate to rugose, lineolate on posterior margin, less punctate and more polished near gena; few short erect setae. Gena rugose-carinate; imbricate; loosely rugose as seen as on on lateral view, imbricate; densely covered with decumbent whitish setae.

Mesosoma. Pronotum rugose; covered with long whitish setae dorsally; weakly covered with tomentum as seen as on lateral view; imbricate near pronotal lobe. Posterior margin of pronotum covered with tomentum. Prosternum black; imbricate; weakly covered with tomentum on the middle. Fore leg. Coxa black; dull; imbricate; covered with whitish long setae; trochanter black; imbricate; few setae; femur black on base and brown on apex; imbricate; sparse erect setae; tibia amber; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black; anterior border rugose; disc punctate to sparsely punctate (i>pd), polished; median sulcus weak. Mesepisternum black; coarsely rugose, not polished; sparse whitish long setae on lateral view; weakly covered with whitish setae on ventral surface. Mid leg. Coxa black; dull; imbricate; covered with whitish long setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber; one simple tibial spur. Tegula amber; concentric lineolate; polished in the middle. Fore wing with 3 submarginal cells. Scutellum black; polished; few sparse punctures on disc. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum rugose and dull; more carinate near tegula; weakly covered with tomentum. Hind leg. Coxa black to dark amber; dull; imbricate; presence of long whitish setae; trochanter dark amber; imbricate; few setae; femur dark brown on base and lighter on apex; imbricate; sparse erect setae; tibia amber. Hind wing with 5 hamuli. Metapostnotum weakly concave; margin rounded; areolate. Latero-dorsal surface scrobiculate. Propodeum densely covered with tomentum.

Metasoma. T1 dark amber; densely punctuate, punctures weakly impressed. T2 dark amber; punctulate; short setae on anterior margin; posterior margin mostly polished. T3 dark amber; punctulate, imbricate; setae on anterior margin to middle; longer sparse setae on middle; T4 black; imbricate; setae on anterior margin to middle; longer sparse setae on middle. T5 black; mostly imbricate; weakly covered with long setae. Pygidial plate black; dull; without setae. S1–S3 amber; imbricate; few sparse setae. S4 black on posterior margin; imbricate; sparse setae. S5–S6 black; imbricate; few sparse long erect setae.

Male

Measurements. Head width 1.7 mm, length 1.5 mm; intertegular distance 1.1 mm; body length about 6.0 mm. As the female except as described.

Clypeus. Supraclypeal area and lower particular with scattered plumose setae; antennae light brown, scape not reaching mid ocellus, vertex very coarsely punctate.

Sterna. 3–5 with a submarginal row of long setae (2 od), recurved on S4–5.

Genitalia. Illustrated in Fig. 2A of Gonçalves (2021)

Austrosphecodes tartarus sp. nov.
urn:lsid:zoobank.org:act:BF540E2E-C673-48AA-BBFA-CCCEA88B687D
Figs 9, 10D

Diagnosis

This species can be distinguished by the mesoscutum with a strong median sulcus (deeper than half the median ocellus diameter), and also covered with erect setae longer than the mid ocellus diameter. The only female has a black metasoma and tegulae dark amber, different from other species that have red and orange tints. The vertex has irregular carinae directed to the mid ocellus. Males are not known.

Etymology

According to Greek mythology, Tartarus is the deep abyss that is used as a dungeon of torment and suffering for the wicked and as the prison for the Titans. The name is used as a proper noun in apposition.

Material examined

Holotype

BRAZIL – **Paraná** • ♀; "DZUP\568519" "Brasil, PR, S. José dos\ Pinhais, 880m,\ 25.605º S 49.193ºW,\ 1-30.x.2016, A. C.\ Domahovski, Malaise"; deposited in the Coleção Entomológica Pe. Jesus Santiago Moure, Curitiba, Brazil; DZUP 568519.

Description

Female

Measurements. Head width 1.9 mm, length 1.5 mm; intertegular distance 1.3 mm; body length about 8.0 mm.

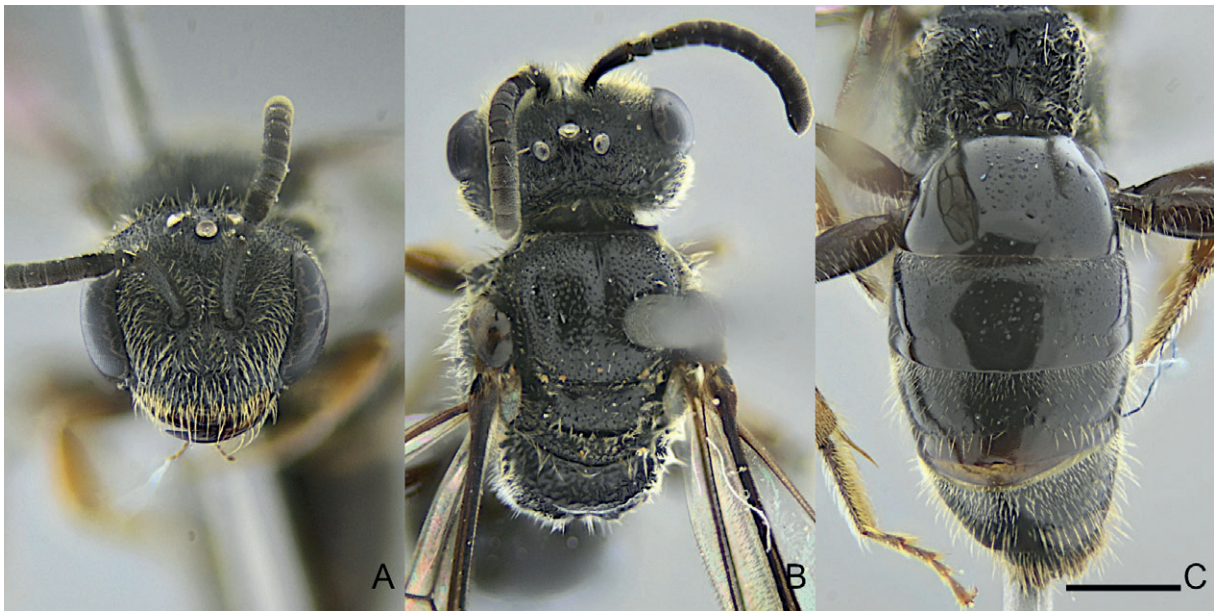

Fig. 9. *Austrosphecodes tartarus* sp. nov., holotype, ♀ (DZUP 568519). **A**. Head. **B**. Mesosoma. **C**. Propodeum and metasoma. Scale bar = 1 mm.

Head. Labrum brown. Mandible mostly brown, as labrum; dark amber on apex; long setae on outer and ventral margins. Clypeus black; sulcate; basal margin arcuate in the middle; punctate to densely punctate (i<pd); surface strongly microreticulate; few sparse erect setae on middle; more concentrated yellowish long setae on lateral apex. Supraclypeal area black; dull; microrugulose in the middle; densely punctate (i<pd) near margins. Paraocular area black; dull; punctate to rugose; presence of yellowish setae, more concentrated at bottom; few setae on upper paraocular area. Antennae black; scape long, almost reaching mid ocellus; few erect setae on base; imbricate, with polished area; flagellomeres homogeneously covered with short whitish setae on ventral surface. Frons black; contiguously punctate to rugose; few sparse erect setae; not depressed above supraclypeal area. Vertex punctate near eye (i=pd), and densely punctate near ocelli (i<pd); dull interspaces; few short erect setae; rugose to carinate on back of ocelli, with irregular carinae directed to mid ocellus. Gena with erect yellowish setae; lateral view loosely rugose; dull; weakly covered with yellowish setae.

Mesosoma. Pronotum black; dull; loosely rugose to strigate; few tomentum; lobe of pronotum black. Posterior margin of pronotum covered with tomentum. Prosternum black; dull; strigate-rugose. Fore leg. Coxa black; imbricate; few sparse setae; trochanter dark brown; longer setae on apex; femur dark brown on base, amber on apex; imbricate; darker on outer surface; mostly without setae on ventral surface; presence of erect setae on dorsal surface; tibia amber and tarsi amber; weakly covered with setae; tibial spur serrate on apex, with one sharp tooth. Mesoscutum black; punctate (i=pd) on middle; anterior border densely punctate; posterior margin sparsely punctate; polished interspaces; median sulcus strong defined; strigate-rugose near sulcus. Mesepisternum black; coarsely rugose; not polished; sparse long setae. Mid leg. Coxa and trochanter black to dark brown; imbricate; presence of whitish setae; femur dark brown to amber on apex of ventral surface; dark brown on outer surface, with presence of sparse setae; imbricate ventrally; tibia and tarsi amber, weakly covered with whitish setae; one simple tibial spur, amber. Tegula dark brown; concentric lineolate; polished in middle. Fore wing with 3 submarginal cells; 1st m–cu reaching 2nd submarginal cell on 2nd rs–m. Scutellum black; more polished in the middle; imbricate near posterior margin; sparsely punctate. Metanotum black; rugulose; mostly covered with tomentum. Metepisternum rugose, with impressed carinae near top; weakly covered with tomentum. Hind leg. Coxa black to dark brown; imbricate; presence of long setae; trochanter and femur dark brown; imbricate; sparse setae; tibia dark amber on ventral surface, dark brown on outer surface weakly covered with whitish setae; tarsi dark brown; weakly covered with whitish setae; two simple tibial spurs, serrate, amber. Hind wing with 5 hamuli. Metapostnotum concave; margin trapezoidal, defined by a weak elevation; areolate-rugulose. Latero-dorsal surface gently declivitous, scrobiculate with long hollows. Latero-dorsal of propodeum weakly defined. Propodeum rugose; few tomentum.

Metasoma. T1 dark brown; very sparsely puncticulate. T2 black; mostly polished; row of short whitish setae on anterior margin. T3 black to dark amber on posterior margin; imbricate; short whitish setae on anterior margin; sparse long setae on middle to posterior margin. T4 black/dark brown; imbricate; weakly covered with whitish setae from anterior margin to middle. T5 black; imbricate; weakly covered with whitish setae; fimbriate on apex. Pygidial plate black/dark brown; imbricate; rounded apically. S1–S6 dark brown; imbricate; sparse long erect setae.

Discussion

The taxonomy of *Austrosphecodes* is very incipient: from the 38 valid names only one half has currently been studied. Table 2 summarizes the species allocated in this genus following Gonçalves' classification (2021). Still, an additional 11 names placed in *Sphecodes* s. str. by Moure & Hurd (1987) with type localities in the Neotropical region (Moure 2007) should also be checked for correct generic placement (Gonçalves 2021). Despite all these uncertainties, we had the opportunity to study determined and undetermined specimens from Argentina, Bolivia, Chile, Ecuador, Peru, Colombia and Costa Rica

deposited in the DZUP and RPSP collections, and these bees did not correspond to any species described here. This observation indicates to us a great diversity of species to be addressed for the genus.

Two species groups for the Brazilian species can be recognized based on the tergal punctation. The first group has the terga punctate, with punctures well impressed or shallow: *Austrosphecodes inornatus*, *A. minarum*, *A. lucifer* sp. nov., *A. jurupari* sp. nov., *A. krampus* sp. nov., and *A. orcus* sp. nov. Other examined species from Argentina (*A. andinus*, *A. bruchi* (Schrottky, 1906), *A. convergens* (Michener, 1978), *A. cordillerensis* (Jörgensen, 1912), *A. lunaris* (Vachal, 1904), *A. mendoncinus* (Jöergensen, 1912), and *A. melanopus* (Schrottky, 1906) and Chile (*A. granulosus* (Sichel, 1865) and *A. rugulosus* (Sichel, 1865)), as well as undetermined species from other South American countries, also have a punctate pattern, probably the most common for *Austrosphecodes*. Two new species, *A. lucifer* sp. nov. and *A. krampus* sp. nov., have the terga punctation strongly impressed, an uncommon feature among examined species. *Austrosphecodes orcus* sp. nov. is remarkable for the long curved setae on male S4–5 (2 od), especially useful to separate this species from *A. inornatus*, males of which have short setae. The submarginal rows of setae are found in most species (except in *A. cerberus* sp. nov.), and these setae are quite variable in length, thickness and curvature – an important taxonomic character.

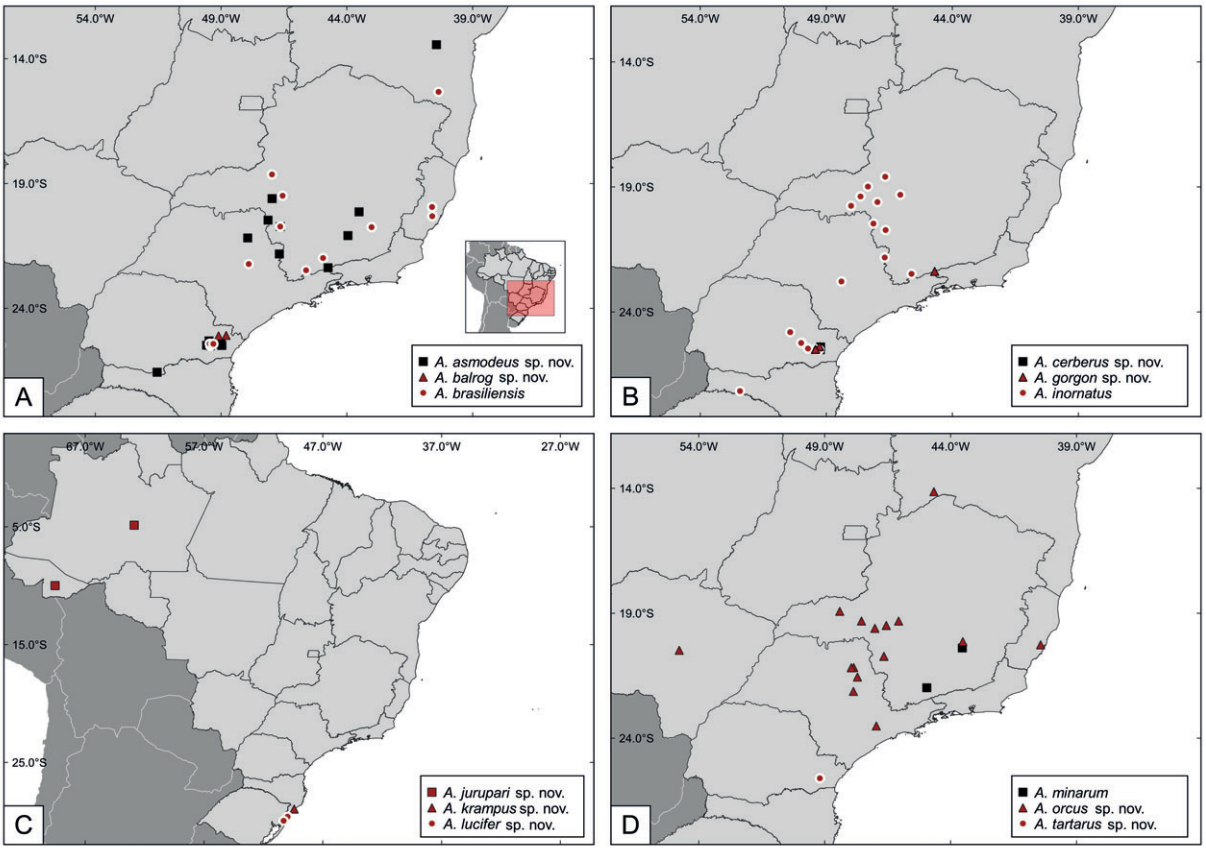

Fig. 10. Geographic records map. **A**. *Austrosphecodes asmodeus* sp. nov., *A. balrog* sp. nov., *A. brasiliensis* (Schrottky, 1910). **B**. *A. cerberus* sp. nov., *A gorgon* sp. nov., *A. inornatus* (Schrottky, 1902). **C**. *A. jurupari* sp. nov., *A. krampus* sp. nov., *A. lucifer* sp. nov. **D**. *A. minarum* (Schrottky, 1910), *A. orcus* sp. nov., *A. tartarus* sp. nov.

A relevant characteristic for males of *Austrosphecodes inornatus*, *A. brasiliensis*, *A. lucifer* sp. nov. *A. minarum*, *A. jurupari* sp. nov., and *A. orcus* sp. nov. is the short scape on males, not reaching the mid ocellus. Also, the antennae are light brown in these species, except for dark brown in *A. lucifer* sp. nov. The short scape is found in females of *Melissocleptis*, but not in females of *Austrosphecodes* (Gonçalves 2021). On the other hand, males of *A. asmodeus* sp. nov., *A. cerberus* sp. nov., *A. gorgon* sp. nov., and *A. tartarus* sp. nov. have black antennae, and the scape reaches the mid ocellus, as in females of the genus. The size of flagellomeres and the presence of large patches of sensilla placodea are important to distinghish species of *Sphecodes* (Agren & Svensson 1982; Bogusch & Straka 2012; Astafurova & Proschchalykin 2015) but we find only subtle differences in flagellomeres length and no differences in sensilla distribution among the examined species.

The remaining new species and *A. brasiliensis* have T1 almost impunctate. In this group we recognized small species of less than 6 mm (*A. asmodeus* sp. nov. and *A. brasiliensis)* which superficially resembles species of *Melissocleptis*. A remarkable feature in some species with sparsely punctate terga is the relatively short and depressed metapostnotum found in *A. cerberus* sp. nov., *A. gorgon* sp. nov., and *A. tartarus* sp. nov. The coarse body punctation on *A. asmodeus* sp. nov. and *A. gorgon* sp. nov. is also noticeable, although not so coarse as in the Argentinean *A. bruchi*. *Austrosphecodes cerberus* sp. nov. is the most distinctive species examined here. While most examined species have few hamuli, *A. cerberus* sp. nov. and two large undetermined species from Bolivia have seven hamuli. The number of hamuli is also variable in species of *Sphecodes*, as noticed by Bogusch & Straka (2012) for Central European species.

More bizarre is the enlarged head of *A. cerberus* sp. nov. A possible function of the robust head can be derived from the fact that known females of *Sphecodes* destroy the host eggs to replace with their own (Michener 2007), and a robust head could be used for this purpose. At first sight the females of the new species are reminiscent of the macrocephalic halictines because the modification is not merely towards a wider head. However, the reported cases of cephalic polymorphism are linked to the use of head and mandibles in social behavior (e.g., Gonçalves & Melo 2012; Lepeco & Gonçalves 2018), not expected for cleptoparasites a priori. Cleptoparasites can interact with hosts by chemical and physical communication (Polidori *et al*. 2020), and a robust head and body could be advantageous to antagonistic encounters. In this context the modification of *A. cerberus* sp. nov. could be useful in prolonged interactions with hosts, including in social parasitism relationships. Janvier (1926) already observed in *A. chilensis* and *A. granulosus* multiple females living together in "good harmony" with their hosts. More detailed was the observation made by Eickwort & Eickwort (1972) of *Microsphecodes kathleenae* (Eickwort, 1972) coexisting with their hosts in the nests of *Dialictus umbripennis* (Ellis, 1913). The limits of cleptoparasitism and social parasitism are unclear in sphecodines and should be investigated.

We sampled *A. asmodeus* sp. nov. and *A. brasiliensis* near nest aggregations of *Caenohalictus incertus* in Curitiba (Paraná) during one year (Pereira *et al*. 2021), but no refined observations were carried out. Other host associations for *Austrosphecodes* are known for Chilean species (Janvier 1926, 1933): *A. chilensis* was recorded in nests of *Halictus spinolae* Friese, 1916 (currently a synonym of *Corynura lepida* Alfken, 1926, but the original nest drawing is suggestive of a *Dialictus* Robertson), *A. friesei* was observed breeding in nests of *Lonchopria zonalis* (Reed, 1892) (identified by Janvier as *Lonchopria marginata* Spinola), *A. granulosus* and *A. rugulosus* on *Caenohalictus dolator* (identified by Janvier as *Halictus rostraticeps* Friese, 1916) and *Callistochlora chloris* (Spinola, 1851). This fragmentary information indicates that species are generalists at the genus level on Colletinae and Halictinae.

It is very premature to analyze the distribution of the 12 Brazilian species (Fig. 10). Most of the examined material came from extensive sampling from western Minas Gerais and from the surroundings of Curitiba (state of Paraná). As cleptoparasitic species are rare on flowers, the sampling effort should be near host nest aggregations. Some species (*A. asmodeus* sp. nov., *A. brasiliensis*, *A. inornatus* and *A. orcus*

Table 2. Species of *Austrosphecodes* Michener, 1978, depositories, type localities and recent descriptions/redescriptions.

	Species	Depository	Type locality	Recent studies
1	*A. andinus* (Schrottky, 1906)	MLP	Argentina, Catamarca	Gonçalves (2017)
2	*A. arequipae* (Meyer, 1925)	NMW	Peru	
3	*A. argentinus* (Schrottky, 1906)	unknown	Argentina, Catamarca	
4	*A. asmodeus* sp. nov.	DZUP	Brazil, Paraná	this study
5	*A. balrog* sp. nov.	DZUP	Brazil, Paraná	this study
6	*A. bogotensis* (Meyer, 1922)	ZMB	Colombia	
7	*A. bonaerensis* (Holmberg, 1886)	type lost	Argentina, Buenos Aires	
8	*A. brasiliensis* (Schrottky, 1910)	MZSP	Brazil	Gonçalves (2017)
19	*A. bruchi* (Schrottky, 1906)	MLP	Argentina, Catamarca	Gonçalves (2017)
10	*A. cerberus* sp. nov.	DZUP	Brazil, Paraná	this study
11	*A. chilensis* (Spinola, 1851)	MSNT	Chile	
12	*A. convergens* (Michener, 1978)	KUNHM	Argentina, Neuquén	Gonçalves (2017)
13	*A. cordillerensis* (Jörgensen, 1912)	MLP	Argentina, Mendoza	Gonçalves (2017)
14	*A. costaricensis* (Friese, 1916)	ZMB	Costa Rica	
15	*A. equator* (Vachal, 1904)	MNHP	Ecuador	
16	*A. friesei* (Herbst, 1908)	unknown	Chile	
17	*A. gorgon* sp. nov.	DZUP	Brazil, Paraná	this study
18	*A. granulosus* (Sichel, 1865)	MNHP	Chile	
19	*A. kampus* sp. nov.	DZUP	Brazil, Santa Catarina	this study
20	*A. inornatus* (Schrottky, 1902)	MZSP	Brazil, São Paulo	Gonçalves (2017)
21	*A. joergenseni* (Meyer, 1920)	MHNP	Argentina, Mendoza	Gonçalves (2017)
22	*A. jurupari* sp. nov.	DZUP	Brazil, Amazonas	this study
23	*A. laetus* (Meyer, 1922)	ZMB	Argentina, Tucuman	
24	*A. lucifer* sp. nov.	DZUP	Brazil, Rio Grande do Sul	this study
25	*A. lunaris* (Vachal, 1904)	MNHP	Argentina, Tucuman	this study
26	*A. melanopus* (Schrottky, 1906)	MLP	Argentina, Río Negro-Neuquén	Gonçalves (2017)
27	*A. mendocinus* (Jöergensen, 1912)	MLP	Argentina, Mendoza	Gonçalves (2017)
28	*A. minarum* (Schrottky, 1910)	MZSP	Brazil, Minas Gerais	Gonçalves (2017)
39	*A. mutillaeformis* (Schrottky, 1906)	unknown	Argentina, Catamarca	
30	*A. orcus* sp. nov.	DZUP	Brazil, Minas Gerais	this study
31	*A. pallitarsis* (Vachal, 1909)	MNHP	Bolivia	
32	*A. paraguayensis* (Schrottky, 1906)	unknown	Paraguay, Villa Encarnación	
33	*A. patagonicus* (Schrottky, 1906)	unknown	Argentina	
34	*A. peruensis* (Meyer, 1925)	HNHM	Peru	
35	*A. rufiscapis* (Vachal, 1909)	MNHP	Peru	
36	*A. rugulosus* (Sichel, 1865)	MNHP	Chile	
37	*A. tartarus* sp. nov.	DZUP	Brazil, Paraná	this study
38	*A. vachali* (Meyer, 1925)	HNHM	Peru	

sp. nov.) have broad and sympatric distributions, with most records from South and Southeastern Brazil. For these species there is a great prevalence of males in DZUP and RPSP collections. *Austrosphecodes jurupari* sp. nov. is the only species we studied from the Amazon forest (Fig. 10C) and are unique records for this region to date. As the possible hosts are not particularly abundant in the Amazon (Colletinae and Halictinae), the genus may not have a great diversity there. *Austrosphecodes asmodeus* sp. nov. and *A. cerberus* sp. nov. have large series collected at urbanized sites in Curitiba by the authors, indicating that those parasites could persist with their hosts in hostile environments.

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