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New species of the stingless bee genus *Schwarziana* (Hymenoptera, Apidae)

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ABSTRACT

Two new species of the stingless bee genus *Schwarziana* from Brazil are described and illustrated. *Schwarziana bocainensis* sp. nov. is described from Serra da Bocaina, in São Paulo, and *S. chapadensis* sp. nov. is described from Chapada dos Veadeiros, in Goiás. An identification key to workers of the known species of *Schwarziana* is provided.

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Introduction

Schwarziana Moure, 1943 is a small genus of stingless bees restricted to eastern Brazil, Paraguay and bordering regions of northern Argentina. It currently contains two valid species, *S. quadripunctata* (Lepeletier, 1836) and *S. mourei* Melo, 2003, plus two up-to-now undescribed species (Melo, 2003).

Schwarziana is most closely related to *Mourella* Schwarz, 1946, a monotypic genus found in southern Brazil, Paraguay and in Misiones, Argentina. Their sister-group relationship is supported by both morphological (Camargo and Roubik, 2005) and molecular evidence (Rasmussen and Cameron, 2010). Also, these two genera are unusual among other stingless bees for building nests in underground cavities (Camargo, 1974; Camargo and Wittmann, 1989).

This contribution presents the description of the two additional species of *Schwarziana* mentioned by Melo (2003), both from areas of high altitude in central and southeastern Brazil.

Material and methods

The material studied is deposited in the collection of the Departamento de Zoologia, Universidade Federal do Paraná (DZUP), in Curitiba, and in the insect collection of the Universidade de Brasília (UNB), in Brasília, Brazil. In the list of type material, the quotation

marks indicate the different labels for the same specimen, the backslashes (\) indicate different lines on the same label.

The general morphological terminology follows Urban (1967), Silveira et al. (2002) and Michener (2007). Antennal flagellomeres are indicated as F1, F2, etc.; metasomal terga and sterna, respectively, as T1–T7, and S1–S8. The density of punctation and intervals between the punctures are based on relative puncture diameter, pd (e.g. <1 pd: less than 1 × the puncture diameter between the punctures). The color images were obtained on a camera Leica DFC295 associated to a stereomicroscope Leica M125 and processed by the software Zerene Stacker.

Taxonomy

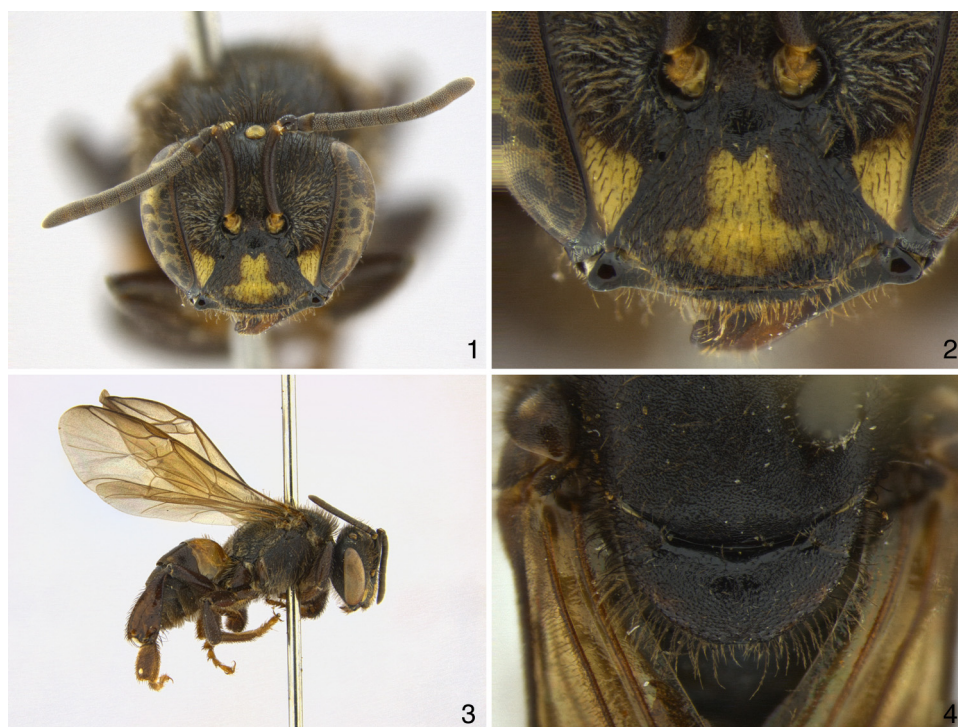
Schwarziana bocainensis sp. nov.

Diagnosis and comments

In a first glance, *S. bocainensis* sp. nov. seems just a variant form of the widespread *S. quadripunctata*. It differs from *S. quadripunctata* mostly in the details of the pubescence, with a longer erect pilosity on the mesoscutum and a glabrous metapostnotum. The metasoma of the new species is also distinctly shaped, being more compact and with a cordiform shape in dorsal view (Figs. 1–4).

S. bocainensis sp. nov. is currently known only from the upper lands of the Serra da Bocaina, São Paulo, in southeastern Brazil. The only six specimens known were collected in consecutive years at the second half of the 1960s. Two short collecting trips carried out by the author and colleagues in April 2010 and in October 2011 at this region were unsuccessful in retrieving new material. The area

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Figs. 1–4. *Schwarziana bocainensis* sp. nov., holotype, worker. (1) Head, frontal view. (2) Detail of lower frons and clypeus. (3) Habitus, lateral view. (4) Detail of scutellum, dorsal view.

above 1500–1600 m of altitude in the Serra da Bocaina is covered mostly by natural grasslands, with mixed *Araucaria* forests occupying the bottom of the valleys and along streams. In the 2010 trip, 11 nests of *Schwarziana* were found, all of them belonging to *S. quadripunctata*.

Description

Holotype worker. Approximate body length: 6.5 mm; maximum head width: 2.65 mm; length of forewing: 6.8 mm; maximum width of T2: 2.67 mm. **Color:** head and mesosoma predominantly dark brown to black, with the following yellow maculae: a broad triangle occupying the lower parocular area; a broad inverted T on the clypeus; a very faint spot on the supraclypeal area; a spot on the lower gena, adjacent to the mandible basis; a narrow band on each side of the pronotal collar; a pair of small spots on the posterior margin of scutellum. Apical half of mandible and pronotal lobe, dark reddish brown. Tarsi reddish brown; hind tibia reddish to dark brown. Wing veins and pterostigma brown; wing membrane light brown infumated. Metasoma almost entirely dark brown to black; lateral portion of T1 and a contiguous broad area on dorsal part of the sclerite, reddish brown. **Pubescence:** predominantly brown on entire body. Clypeus with abundant pubescence, erect setae relatively long, longest ones about 0.1 mm in length; frons and vertex with abundant long erect pilosity, longest setae on vertex about 0.38–0.40 mm in length; erect setae on scape short, slightly shorter than half of scape width. Erect pilosity on mesoscutum abundant and relatively long, longest setae about as long as those on vertex; those on scutellum with about 0.48–0.52 mm in length. Lateral pilosity of mesepisternum relatively long and dense, but leaving the integument clearly visible, longest setae about as long as those on mesoscutum, slightly longer than maximum width of fore tibia. Metapostnotum entirely glabrous. Terga with very short pubescence; conspicuous erect pubescence restricted to vertical anterior portion and anterior margin of dorsal portion of T1; short pubescence restricted mostly to marginal zone of

T2–T5; erect setae on lateral portion of T2 with about 0.08 mm in length; those on T3–T5 becoming gradually longer; longest erect setae on T6 with about 0.2 mm in length. **Integumental surface:** lower parocular area finely reticulate and dull; remainder of face, mesoscutum, scutellum and mesepisternum finely rugulose and dull. Metapostnotum with conspicuous reticulation and somewhat dull. **Structure** (measurements in mm): head about 1.2× wider than long (2.65:2.20); inner orbits slightly converging below (upper to lower interorbital distance, 1.63:1.45); clypeus 1.9× wider than long (1.30:0.73); F2 about as long as wide (0.19:0.18), F3 about 1.2× longer than wide (0.22:0.18); minimum distance between clypeus and eye about as long as width of F2 (0.18:0.18); malar space shorter than F2 width (0.10:0.18); eye about 2.6× longer than its maximum width (1.75:0.68), in lateral view about 1.1× wider than gena (0.53:0.48). Intertergular distance equal to mesoscutum length (1.80:1.80); scutellum about 2.3× wider than long (1.23:0.53). Corbicular depression occupying over three-fifths of hind tibia, anterior border of apex of tibia distinctly and abruptly elevated in relation to remainder of surface; anterior margin of hind tibia basically following a straight line in outer view.

Variation

The spot on the supraclypeal area is slightly more evident in one of the paratypes and the pair of spots on the scutellum is lacking in the paratypes.

Type material

Holotype worker (DZUP), “Sa. BOCAINA-1500 m\S.J. BARREIRO – SP\BRASIL 4-XI-1965\F. M. Oliveira leg”. Paratypes: 2 workers (DZUP), same data as holotype; 1 worker (DZUP), “Brasil, São Paulo,\São José do Barreiro,\Serra da Bocaina,\1650 m, xi.1968,\Alvarenga & Seabra”; 2 workers (DZUP), “Brasil, São paulo,\Serra da Bocaina,\S. J. Barreiro, 1600 m,\xi.1967, F. M. Oliveira”.



Figs. 5–8. *Schwarziana chapadensis* sp. nov., paratype, worker. (5) Head, frontal view. (6) Detail of lower frons and clypeus. (7) Habitus, lateral view. (8) Detail of scutellum, dorsal view.

Etymology

The species is named in reference to its type locality, the Serra da Bocaina.

Schwarziana chapadensis sp. nov.

Diagnosis and comments

This new species is unusual among other species of *Schwarziana* for the wide malar space and for the distance between the clypeus and the eye, which gives the workers' head an elongate aspect (Fig. 5), and for the relatively short pilosity on the mesepisternum. It is currently known only from the upper lands of the Chapada dos Veadeiros, Goiás, in central Brazil (Figs. 5–8).

Description

Holotype worker. Approximate body length: 6.5 mm; maximum head width: 2.58 mm; length of forewing: 6.3 mm; maximum width of T2: 2.38 mm. **Color:** head and mesosoma predominantly dark brown to black, with the following yellow maculae: a broad triangle occupying the lower parocular area; an ill-defined longitudinal spot on the upper clypeus and a transverse band on the supraclypeal area; a spot on the lower gena, adjacent to the mandible basis; a narrow band on each side of the pronotal collar; entire dorsal portion of axilla; an ill-defined band along each side of the posterior margin of scutellum. Anterior surface of flagella reddish brown; apical margin of mandible, pronotal lobe and metanotum, dark reddish brown. Wing veins and pterostigma light brown; wing membrane very lightly yellow infumated. Metasoma almost entirely reddish brown; anterior portion of T1 with central concavity dark brown; disk of T4 and T5 with transverse irregularly shaped dark brown band, on T4 band not reaching lateral portions of sclerite; central portion of sterna brown; last segment entirely dark brown. **Pubescence:** predominantly pale brown to white on head; tibiae and tarsi with dark brown setae; erect pilosity relatively short compared to that of other species of *Schwarziana*. Clypeus densely covered with decumbent pubescence, erect setae

very short and sparse, their length barely surpassing that of decumbent hairs; upper frons and vertex with brown erect pilosity, longest setae on vertex about 0.42–0.46 mm in length; erect setae on scape extremely short. Erect pilosity on mesoscutum sparse and relatively short, longest setae about 0.18–0.22 mm in length; on scutellum, about twice as long as those on mesoscutum. Lateral pilosity of mesepisternum relatively short and not very dense, leaving the integument clearly visible, longest setae about 0.25–0.30 mm in length, distinctly shorter than maximum width of fore tibia. Metapostnotum entirely glabrous. Terga with very short pubescence; conspicuous erect pubescence restricted to vertical anterior portion and anterior margin of dorsal portion of T1; short pubescence on T2 restricted mostly to its posterior half, lateral portions with pale brown erect setae, their length about 0.06 mm; erect setae becoming gradually darker and longer on T3–T5; longest erect setae on T6 with about 0.2 mm in length. **Integumental surface:** clypeus finely punctured, punctures spaced by 0.5–1 pd; surface between punctures smooth on disk and becoming gradually reticulated laterally and toward upper portion of clypeus. Lower parocular area smooth and shiny, except for fine piligerous punctures. Frons, mesoscutum and mesepisternum very finely rugulose and dull. Interspaces between punctures on dorsal surface of scutellum mostly smooth and shiny, posteriorly becoming gradually reticulated and dull. Metapostnotum with conspicuous reticulation, but shiny. **Structure** (measurements in mm): head about 1.1× wider than long (2.58:2.35); inner orbits slightly converging below (upper to lower interorbital distance, 1.63:1.45); clypeus 1.5× wider than long (1.20:0.80); F2 as long as wide (0.18:0.18), F3 about 1.1× longer than wide (0.20:0.18); minimum distance between clypeus and eye about 1.3× the width of F2 (0.24:0.18); malar space about as long as F2 width (0.18:0.18); eye about 2.6× longer than its maximum width (1.78:0.68), in lateral view about as wide as gena (0.50:0.50). Intertergular distance subequal to mesoscutum length (1.85:1.73); scutellum about 2.3× wider than long (1.25:0.55). Corbicular depression occupying over three-fifths of hind tibia, anterior border of apex of tibia distinctly

and abruptly elevated in relation to remainder of surface; anterior margin of hind tibia basically following a straight line in outer view.

Variation

The color of the metasoma is variable (as in *Schwarziana quadripunctata* and in other genera of stingless bees), being entirely dark brown or mostly reddish brown. The yellow marks on the clypeus and supraclypeal area can be entirely lacking.

Type material

Holotype worker (DZUP), “Brasil, Goiás, Chapada dos Veadeiros, Vale Dourado, 14°11'S 47°37'W, 1100 m, 01.iv.2003, Melo, Aguiar, Marchi & Gonçalves”. Paratypes: 12 workers (10 DZUP, 2 UNB), same data as holotype; 4 workers (DZUP), same except “31.iii.2003”; 5 workers (DZUP), same except “02.iv.2003”; 1 worker (DZUP), “Brasil: GO\Ch. Veadeiros\15.04.97\Boaventura, MC”.

Etymology

The species is named in reference to its type locality, the Chapada dos Veadeiros. The word “chapada” in Brazil is used for inland plateaus and tablelands.

Key to the species of *Schwarziana* (workers)

1. Minimum distance between clypeus and eye about 1.3× flagellum width. Lateral pilosity of mesepisternum relatively short and not very dense, longest setae shorter than maximum width of fore tibia, integument clearly visible through pilosity. Erect setae on disk of mesoscutum short, about as long as half the length of those on vertex *S. chapadensis* **sp. nov.**
- Minimum distance between clypeus and eye at most as long as flagellum width. Lateral pilosity of mesepisternum long and usually dense, longest setae at least as long as maximum width of fore tibia, pilosity frequently obscuring the integument under it. Length of erect setae on disk of mesoscutum variable, usually much longer than half the length of those on vertex 2
2. Axilla and scutellum entirely yellow, except for a dark brown triangle at the base of scutellum. Tarsi testaceous to light reddish brown. Corbicular depression restricted to apical third of hind tibia, anterior border of apex of tibia not abruptly raised in relation to remainder of surface *S. mourei*
- Color of axilla and scutellum variable, scutellum at most with posterior half yellow. Tarsi reddish brown to dark brown. Corbicular depression extending beyond apical half of hind tibia, anterior border of apex of tibia distinctly and abruptly elevated in relation to remainder of surface 3

3. Axilla and scutellum entirely black, at most with a pair of small faint yellow spots on the posterior side of scutellum. Pilosity of mesoscutum as long as that on vertex. Metapostnotum entirely glabrous. Metasoma more compact, with a cordiform shape in dorsal view, tergum 2 about as wide as maximum head width *S. bocainensis* **sp. nov.**
- Axilla and scutellum usually with some yellow, only rarely without any yellow spots. Pilosity of mesoscutum distinctly shorter than that on vertex. Metapostnotum always with some pubescence. Metasoma elongated, tergum 2 narrower than maximum head width *S. quadripunctata*

Conflicts of interest

The author declares no conflicts of interest.

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