

SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

New Species of *Tetramorium* Mayr (Hymenoptera: Formicidae) from Puebla State, Mexico

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Introduction

The genus *Tetramorium* Mayr belongs to the tribe Tetramoriini of the Myrmicinae ants and is widespread in the World, currently comprising 459 nominal species (Bolton *et al* 2006) worldwide. There are twelve species recorded in several groups in the New World. Of these, only the five species of the *tortuosum* group are native to the Americas and include: *T. bicolorum* Vásquez-Bolaños, *T. hispidum* (Wheeler), *T. mexicanum* Bolton, *T. placidum* Bolton and *T. spinosum* (Pergande). The remaining seven species are all introduced and belong to different groups. The species of the *tortuosum*-group are distinguished from the all introduced species because they present only eleven antennal segments (Bolton 1979). In Mexico, four

Abstract

Tetramorium notomelanum sp. n. is described from the Tehuacán Valley, state of Puebla, México. Its distribution and relation with other species of the *tortuosum*-group is discussed. The new species of *Tetramorium* is described from workers, and distinguished from others of the group by several characters: i) black coloration of the body; ii) size: *T. notomelanum* sp. n. is smaller than *T. hispidum* (Wheeler), *T. mexicanum* Bolton and *T. spinosum* (Pergande), but larger than *T. bicolorum* Vásquez-Bolaños and *T. placidum* Bolton; iii) length of the hairs of the dorsal of the head are equal to the diameter of eye; iv) the length of the hairs on the scape and tibiae less than the width of the appendage where they are located. This is the second species of the *tortuosum* group of *Tetramorium* found in the State of Puebla, and the fourth recorded in Mexico.

of the five native American species are found: *T. bicolorum* known from Jalisco state, *T. mexicanum* and *T. placidum* recorded in Jalisco and Nayarit states, the three species having Neotropical distribution. *Tetramorium spinosum*, with both Nearctic and Neotropical distribution, has been reported in several Mexican states: Baja California, Coahuila, Durango, Hidalgo, Jalisco, Michoacán, Nayarit, Nuevo León, Puebla, San Luis Potosí, Sonora, Tamaulipas and Zacatecas. Finally, *T. hispidum* has a more Nearctic distribution and is known only in the central southern states of the United States, Texas and Arizona (Vásquez-Bolaños 2007).

In the present work, we report and describe a new species of *Tetramorium* of the *tortuosum*-group from the Tehuacán Valley, Puebla State, in central Mexico.

Material and Methods

The specimens were obtained from a sampling with a series of pitfall traps (Guzmán-Mendoza *et al* 2010) carried out in “Helia Bravo” Botanical Garden, in the Zapotitlán Salinas area at the southwestern border of the Tehuacán Valley (18°11' - 18°25' N, 97°39' - 97°22' W), in Puebla State, Mexico (Fig 1a). The elevation range in the Valley varies between 1280 m and 2720 m. The climate of the region is semiarid type, with two periods of rain (May to June, and September), with average annual precipitation of 400 mm and mean annual temperature ranging from 18°C to 22°C. The dominant vegetation is represented by xerophytic shrub (Rzedowski 1978).

The samples were exclusively composed of workers. After the review of the collected specimens according with the genus revision of Bolton (1979), and comparing with the specimens of *Tetramorium* deposited at the Entomological Collection of the Centro de Estudios en Zoología, Universidad de Guadalajara (CZUG), we concluded that the specimens represented a new species.

We used the following measurements and indices (in mm), according with Bolton (1979): TL- total length, HL - head length in full face view, HW - maximum head width in full face view, SL - maximum straight-line length of antennal scape seen in profile, PNW - maximum width of pronotum from above in full dorsal view, AL - alitrunk length seen in profile, LE - eye length in full face view, and WE - eye width in full face view. Indices used were the cephalic index: $CI = HL / HW \times 100$, and the scape index: $SI = SL / HL \times 100$.

Results

Tetramorium notomelanum sp. n. (Fig 1a-c)

Material examined. All the specimens from Mexico, State of Puebla, Tehuacán Zapotitlán Salinas: **Type series.** Holotype, worker, labeled with the following data, 17 - 21.XII.2003, pitfall tramp 5, sitio El Llano, Jardín Botánico Helia Bravo, Zapotitlán Salinas, Tehuacán, Puebla. Paratypes: three workers, labels with as follow: 17-21.XII.2003, pitfall tramp 5, sitio El Llano, Jardín Botánico Helia Bravo, Zapotitlán Salinas, Tehuacán, Puebla; one worker: VIII 2003, pitfall 5, sitio El Llano, Jardín Botánico Helia Bravo, Zapotitlán Salinas, Tehuacán, Puebla. Holotype and two paratypes deposited at CZUG (Entomological Collection of the Centro de Estudios en Zoología, Universidad de Guadalajara); one paratype deposited in the Ant Collection of the Laboratorio de Ecología y Sistemática de Microartrópodos (LESM), Facultad de Ciencias, Universidad Nacional Autónoma de México, and one paratype deposited in the Collection of William and Emma Mackay Collection (CWEM), University of Texas, El Paso, Texas.

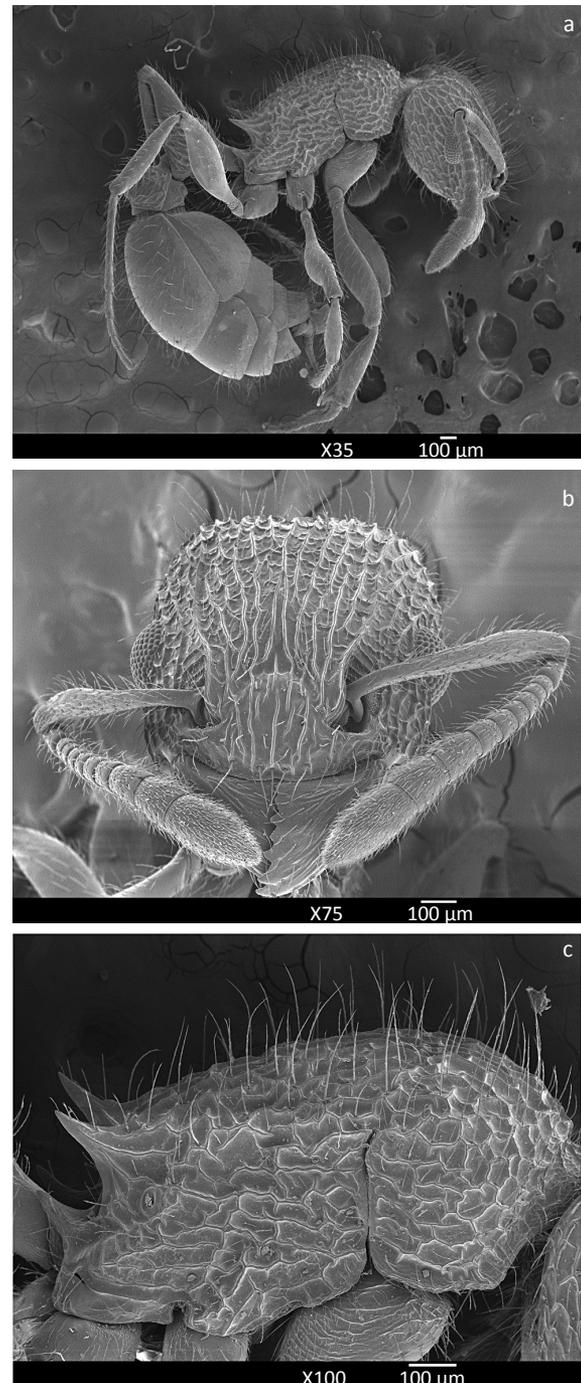


Fig 1 *Tetramorium notomelanum* sp. n. a) General habitus; b) Frontal view of the head; c) Alitrunk reticulation.

Supplementary material. Three specimens were used for scanning electron microscopy observation.

Diagnosis

Workers (Fig 1a-c). Antenna with 11 segments. Mandibles showing longitudinal ridges and seven well defined teeth (Fig 1b). Frontal carinae extending

beyond the upper level of the eyes. Small eyes, about 0.22 mm long. Propodeal spines relatively long and sharp. Dorsal surface of alitrunk and petiole with reticulate sculpturing (Fig 1c). Head and postpetiole with longitudinal ridges. Dorsal pilosity of body straight, length similar to diameter of eyes. Hairs of the tibiae and scape longer than the diameter of the corresponding appendage. Head, alitrunk, petiole, postpetiole, gaster and appendages black.

Measurements (mm) and indices (data for holotype in parenthesis): TL 3.8-4.0 (3.9), HL 0.94-0.98 (0.98), HW 0.84-0.88 (0.88), CI 88.7-91.6 (89.7), SL 0.80 (0.80), SI 81.6-85.1 (81.6), PNW 0.70-0.74 (0.72), AL 1.20-1.26 (1.20).

Queen and males. Unknown.

Derivatio nominis. This species is named by the color of the body according with the Greek roots *notos* that means back, and *melás* that means black.

Distribution and ecology. This species is known only from the type locality, Zapotitlán Salinas, Puebla, México.

Biology. The specimens were collected in an area with sparse vegetation and low floral diversity. Solitary foraging ants were observed in search of seeds and waste plant tissues of leguminous plants (*Prosopis laevigata*, *Cercidium praecox* and *Mimosa luisana*), which represent an important resource in this area and especially during the dry season. The collection area also has been subject to anthropogenic and natural disturbance, suggesting that this is an early colonizer species because it was not found in undisturbed areas within the Botanical Garden.

Key to the species of genus Tetramorium tortuosum-group from the New World (modified from Vásquez-Bolaños 2007)

1. Hairs length of antennal scape and external surface of metatibia distinctly longer than maximal diameter of corresponding appendage. Scape Index (SI) 94-99 (Mexico: Jalisco and Nayarit) *T. mexicanum* Bolton
- Hairs length of antennal scape and external surface of metatibia distinctly shorter than maximal diameter of corresponding appendage. Scape Index (SI) 79-90 ... 2
2. Petiolar dorsal surface without sculpture. Small ants, range of head width (HW range 0.66-0.72 mm; México: Jalisco and Nayarit) *T. placidum* Bolton
- Petiolar dorsal surface with sculpture. Large ants, head width (HW) between 0.77 mm and 1.0 mm 3
3. Large eyes, maximal diameter greater than a quarter of the head width. Hairs length on pronotal dorsal surface and frontal carinae, shorter than maximal eye diameter; small and erected hairs (USA: Arizona and

- Texas) *T. hispidum* (Wheeler)
- Small eyes, maximal diameter less than a quarter of the head width. Hairs length on pronotal dorsal surface and frontal carinae equal or greater than maximal eye diameter; longer hairs, fine and curved 4
4. Dorsum of body with longitudinal ridges (Mexico: Baja California, Coahuila, Durango, Hidalgo, Jalisco, Michoacán, Nayarit, Nuevo León, Puebla, San Luis Potosí, Sonora, Tamaulipas and Zacatecas) *T. spinosum* (Pergande)
- Dorsum of body reticulated 5
5. Postpetiole dorsum without ridges. Total length from 3.4 mm to 3.8 mm (Mexico: Jalisco) *T. bicolorum* Vásquez-Bolaños
- Postpetiole dorsum with ridges. Total length from 3.8 mm to 4.0 mm (Mexico: Puebla) *T. notomelanum* sp. n.

Discussion

The species described here clearly belongs to the *tortuosum*-group. In common with described species, the antennae have 11 segments, the petiole is sculptured and nodiform, the propodeum is armed with spines, the mandibles are striate and the gaster unsculptured (Bolton 1977). This species is easily recognized from others of the genus *Tetramorium* by its coloration pattern. *Tetramorium bicolorum* is bicolored: dark brown on head while gaster is lighter brownish on alitrunk, petiole and postpetiole; the remaining species of the group (*T. hispidum*, *T. mexicanum*, *T. placidum* and *T. spinosum*) show pale to dark brown homogeneous coloration all over the body, while *T. notomelanum* sp. n. is completely dark black. Also, *T. notomelanum* sp. n. is smaller than *T. hispidum*, *T. mexicanum* and *T. spinosum*, but larger than *T. bicolorum* and *T. placidum*. The length of the hairs of the head and pronotum is equal or smaller to the maximal diameter of the eye, a character shared with *T. bicolorum* and *T. spinosum*. Other diagnostic characters of *T. notomelanum* sp. n. are the reticulated body sculpture and the acuminate propodeal spines relatively longer than that of the other species of the group.

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References

- Bolton B (1977) The ant tribe Tetramoriini (Hymenoptera: Formicidae). The genus *Tetramorium* Mayr in the Oriental and Indo-Australian regions, and in Australia. Bull British Mus (Nat Hist), Entomol Series 36: 67-151.
- Bolton B (1979) The ant tribe Tetramoriini (Hymenoptera: Formicidae). The genus *Tetramorium* Mayr in the Malagasy region and in the New World. Bull British Mus (Nat Hist), Entomol series 38: 129-181.
- Bolton B, Alpert G, Ward PS, Naskrecki P (2006) Bolton's catalogue of ants of the World: 1758-2005. Harvard University Press, Cambridge, Massachusetts, CD-Rom.
- Guzmán-Mendoza R, Castaño-Meneses G, Herrera-Fuentes MC (2010) Variación espacial y temporal de la diversidad de hormigas en el Jardín Botánico del valle de Zapotitlán de las Salinas, Puebla. Rev Mex Biodiv 81: 427-435.
- Rzedowski J (1978) La vegetación de México. México, Limusa, 432p.
- Vásquez-Bolaños M (2007) Una especie nueva del género *Tetramorium* Mayr (Hymenoptera: Formicidae) de Mascota, Jalisco, México. Dugesiana 14: 93-97.
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