

## NEW STATE-WIDE RECORDS OF ANT SPECIES COLLECTED IN TIZATLAN BOTANICAL GARDEN, TLAXCALA, TLAXCALA, MEXICO

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Ants (Hymenoptera: Formicidae) are one of the most abundant and diverse insect groups in the majority of terrestrial ecosystems (Vásquez-Bolaños 2011). Worldwide, the group is composed of 25 subfamilies and over 15,000 species and/or subspecies (AntWeb 2014). In Mexico, Ríos-Casanova (2013) reported 973 species, belonging to 12 subfamilies and 94 genera. This author reported the greatest numbers of species in the states of Chiapas (387), Veracruz (310) and Hidalgo (229) and the lowest in Aguascalientes (9) and Tlaxcala (3). She suggested that the richest states have greater area and ecosystem diversities, wide altitudinal ranges and their fauna and ecology have been more extensively studied.

In this study, a rapid assessment was performed of the myrmecofauna in Tizatlán Botanical Garden (TBG) in Tlaxcala de Xicotencatl, Tlaxcala state, Mexico. The climate is temperate humid with rains in summer, average temperatures range between 12 and 24 °C and the hottest season occur extends from March through May. Annual rainfall varies between 800 and 1,000 mm, with the rainy season beginning in June and ending in September. Frosts occur on 40 to 60 days per year and the prevailing wind direction is from north to south (INAFED 2010). This territory is mostly flat and forms part of geographic valley of Puebla-Tlaxcala where the volcanic soils are fluvisols and have been recently deposited with insufficient time to form horizons (Segura-Castruita et al. 2005).

The Tizatlán Botanical Garden is located between the parallels N 19° 19' 44" and N 19° 19' 57" and the meridians W 98° 13' 13" and W 98° 12' 49" with an elevation ranging from 2,244 to 2,250 m asl. This 8 ha site is considered a natural area under state protection, and since 30 Sep 1998, it has been subdivided into 6 sections: arboretum, xerophyllous scrubland, useful plants (medicinal, fruit, miscellaneous use), ornamental plants, nursery and greenhouse tropical vegetation. We worked only in the arboretum, ornamental plants,

xerophyllous scrubland and greenhouse tropical vegetation sections during the period of greatest precipitation (Sep 2013). Within each section, 5 sampling points separated by a minimum distance of 10 m were selected. Within a 5-m radius around each point, 2 trap types were placed for 10 h, and direct collections were performed for 10 min each. Sampling of ants was performed with pitfall traps (500 mL plastic containers baited with tuna buried at the soil surface) and honey traps (plastic bottles with 20 mL of honey as bait placed in the low shrub-tree stratum at 2 m above ground level). For a detailed description of these traps, see Quiroz-Robledo & Valenzuela-González (1995).

Ant species determination was initially conducted by the first and second authors, using keys for genera (Bolton 1994) and species (Snelling 1995; Wild 2007; Longino 2010; MacGown 2013; Wilson 2003) and following the classification of Agosti & Johnson (2005). Subsequently, ant species were compared with specimens deposited in the Entomological Collection of the Instituto de Ecología, A.C. in Xalapa, Veracruz, Mexico (IEXA; Reg. SEMARNAT: Ver. IN.048.0198) and verified by the Mexican myrmecologists L. N. Quiroz-Robledo and J. E. Valenzuela-González. Voucher specimens were deposited in the Arthropod Section of the Zoological Collections Department of the Facultad de Ciencias Biológicas y Agropecuarias of the Universidad Veracruzana in Amatlán de los Reyes, Veracruz, Mexico and in the IEXA Entomological Collection.

A total of 279 worker ants were collected, belonging to 17 species, 14 genera, 10 tribes and 5 subfamilies (Table 1). From the sampling carried out, widespread common low species richness was reported. Most of the species can be assumed to be in Tlaxcala simply based on their widespread distribution. A similar result was found by Rodríguez-Fernández et al. (2010) in the Ignacio Rodríguez de Alconedo Botanical Garden, located 36 km from the TBG in the same geographic valley.

TABLE 1. PRELIMINARY INVENTORY OF ANT SPECIES COLLECTED IN THE URBAN TIZATLÁN BOTANICAL GARDEN IN TLAXCALA DE XICOTENCATL, TLAXCALA, MEXICO.

	Section	Collecting techniques	Individuals
Dolichoderinae Forel			
Leptomymecini Emery			
<i>Dorymyrmex bicolor</i> Wheeler**	ornamental	pitfall trap	21
<i>Dorymyrmex</i> aff. <i>insanus</i> (Buckley)**	arboretum	pitfall trap	35
<i>Linepithema dispertitum</i> (Forel)**	greenhouse	honey trap	22
Tapinomini Emery			
<i>Tapinoma melanocephalum</i> (Fabricius)*	ornamental	honey trap	67
Ecitoninae Forel			
Ecitonini Forel			
<i>Labidus coecus</i> (Latreille)**	arboretum	pitfall trap	8
Ectatomminae Emery			
Ectatommini Emery			
<i>Gnamptogenys strigata</i> (Norton)	greenhouse	pitfall trap	6
Formicinae Latreille			
Camponotini Forel			
<i>Camponotus atriceps</i> (Smith)**	ornamental	honey trap	3
Plagiolepidini Forel			
<i>Brachymyrmex</i> aff. <i>depilis</i> Emery**	greenhouse	honey trap	7
<i>Nylanderia</i> aff. <i>austroccidua</i> (Trager)	greenhouse	honey trap	3
<i>Paratrechina longicornis</i> (Latreille)*	ornamental	honey trap	4
Myrmicinae Lepeletier			
Attini Smith			
<i>Atta mexicana</i> (Smith)**	scrubland	direct collection	1
Crematogastrini Forel			
<i>Crematogaster</i> aff. <i>patei</i> Buren	scrubland	honey trap	2
Pheidolini Emery			
<i>Pheidole hirtula</i> Forel	arboretum	direct collection	19
<i>Pheidole</i> aff. <i>obtusospinosa</i> Pergande	scrubland	direct collection	6
Solenopsidini Forel			
<i>Monomorium ebeninum</i> Forel	greenhouse	honey trap	5
<i>Monomorium</i> aff. <i>minimum</i> (Buckley)**	ornamental	honey trap	18
<i>Solenopsis geminata</i> (Fabricius)**	scrubland	pitfall trap	54

\* = Old World exotic. \*\* = Widespread distribution in Mexico. Species with no \* means that they have a limited distribution in Mexico.

While these authors invested a sampling effort 10 times greater than that of this study, they reported only 11 widespread common species. These results suggest that, in this urban botanical garden featuring remnants of native and introduced vegetation, native species are replaced by non-native species thus reducing local diversity.

Despite the fact that ants comprise a taxonomically complex insect group that has been little studied in Mexico (Rojas 2001), various faunistic lists have been published in recent years that reported new records of species (Ríos-Casanova 2013; García-Martínez et al. 2013). This type of publication has contributed to the knowledge regarding the myrmecofauna of much of Mexico; however, there are still under-sampled regions. Although the results of this study are based on isolated sampling in the Tizatlán botanical garden, they provide a valuable contribution to the

sparse knowledge of the myrmecofauna of Tlaxcala state. With the information provided by Rojas (2001), Vásquez-Bolaños (2011), Ríos-Casanova (2013) and the present study, the number of species recorded in the state of Tlaxcala has increased to 20, the number of genera has increased to 17, tribes to 12 and subfamilies to 5. These results demonstrate the scarcity of even preliminary knowledge regarding the myrmecofauna of Tlaxcala state, and it is therefore recommended that systematic sampling is conducted in order to further understand the species-richness of this region of Mexico.

#### SUMMARY

With the goal of increasing the known myrmecofauna of the state of Tlaxcala, Mexico, speci-

mens were collected in soil and shrub vegetation using different collecting techniques. Seventeen species belonging to 14 genera, 10 tribes and 5 subfamilies are reported for the first time increasing the total number of species known to occur in Tlaxcala to 20, genera to 17, and tribes to 12. These results demonstrate the scarcity of knowledge regarding the myrmecofauna of Tlaxcala state. Systematic sampling is recommended to further the knowledge of species inhabiting this region of Mexico.

Key Words: faunistic studies, myrmecofauna, Puebla-Tlaxcala valley, common species

#### RESUMEN

Con el objetivo de aumentar la mirmecofauna conocida del estado de Tlaxcala, México, se recolectaron muestras en el suelo y la vegetación arbustiva con diferentes técnicas de captura. Se reportan por primera vez 17 especies pertenecientes a 14 géneros, 10 tribus y cinco subfamilias aumentando el número de especies conocidas en Tlaxcala a 20, a 17 el de géneros y el de tribus a 12. Estos resultados muestran la escasez de conocimientos sobre la mirmecofauna del estado de Tlaxcala y se recomienda un muestreo sistemático para incrementar el conocimiento de las especies que habitan en esta región de México.

Palabras Clave: estudios faunísticos, mirmecofauna, valle Puebla-Tlaxcala, especies comunes

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