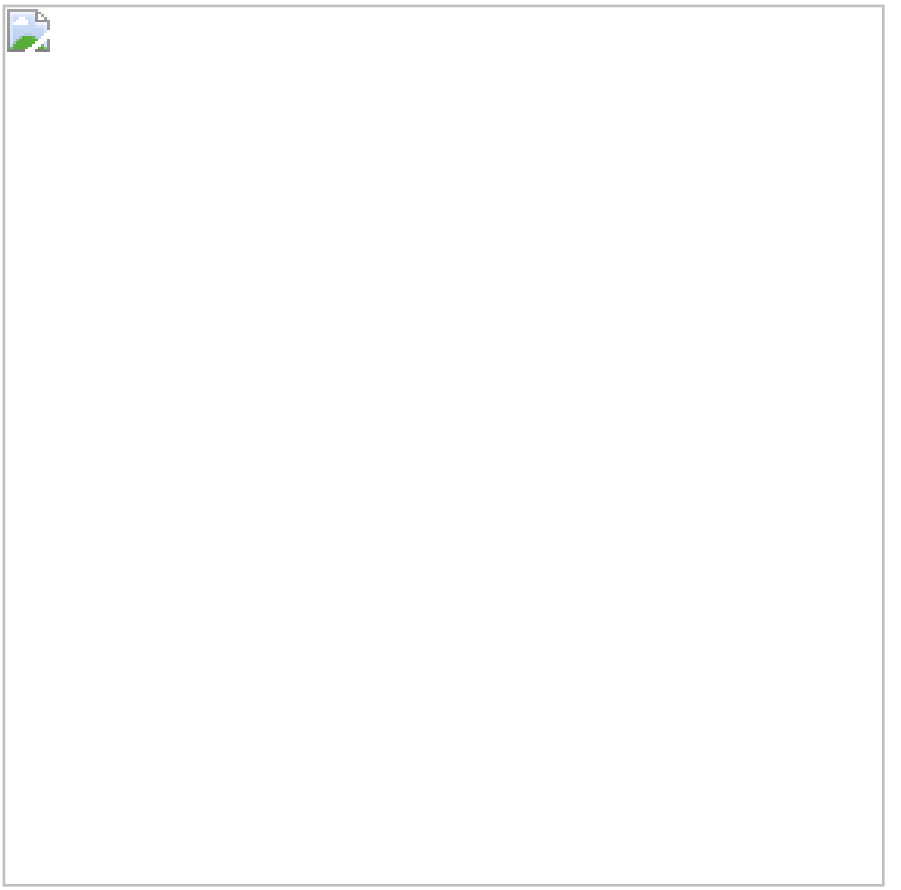

Some Fungus-Growing Ants (Hymenoptera: Formicidae) from Northeastern Mexico

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SOME FUNGUS-GROWING ANTS (HYMENOPTERA: FORMICIDAE) FROM NORTHEASTERN MEXICO

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ABSTRACT

The fungus-growing ants (Hymenoptera: Formicidae: Attini) of northeastern Mexico are poorly known. Herein new distributional records in NE Mexico and habitat observations are provided for the fungus-growing ants *Apterostigma mexicanum* Lattke, *Atta texana* (Buckley), *Cyphomyrmex rimosus* (Spinola), *Mycocepurus smithii* Forel, *Mycetosoritis hartmanni* Wheeler, *Sericomyrmex aztecus* Wheeler, *Trachymyrmex smithi* Buren, and *Trachymyrmex turrifex* Wheeler.

Key Words: fungus, symbiosis, ants, Tamaulipas, attine ants

RESUMEN

Son poco conocidas las hormigas cultivadoras de hongos (Hymenoptera: Formicidae: Attini) presentes en el noreste de México. En el presente trabajo se reportan nuevos datos de distribución y de habitat en el noreste de México, para las hormigas cultivadoras de hongos *Apterostigma mexicanum* Lattke, *Atta texana* (Buckley), *Cyphomyrmex rimosus* (Spinola), *Mycetosoritis hartmannii* Wheeler, *Mycocepurus smithii* Forel, *Sericomyrmex aztecus* Wheeler, *Trachymyrmex smithi* Buren y *Trachymyrmex turrifex* Wheeler.

Translation provided by the author.

Fungus-growing ants of the tribe Attini are important model systems in studies on behavioral ecology, coevolution, mutualism, parasitism and biogeography (Currie et al. 2003; Munkacsi et al. 2004; Mikheyev et al. 2007). Attine ants are a predominantly Neotropical group with few successful extensions into the Nearctic ecozone (Weber 1972). Species of *Cyphomyrmex*, *Atta texana* (Buckley) and particularly *Trachymyrmex septentrionalis* (McCook) are the northernmost distributed of all attine ants (Weber 1972). Northeastern (NE) Mexico (states of Coahuila, Nuevo León, San Luis Potosí, and Tamaulipas) includes the distribution limits of several attines; this region, and particularly the state of Tamaulipas encompasses the contact of the Nearctic and Neotropical realms. The attines of NE Mexico are poorly known. Along the Gulf of Mexico coastal plain, the northernmost colonies of the Mexican leaf-cutting ant, *Atta mexicana* (Smith) have been reported in Tamaulipas, in San Fernando, and in the state of Nuevo León at Sabinas Hidalgo and Cerralvo, at the piedmont of the Sierra Madre Oriental (Sánchez-Peña 2005). In Tamaulipas state, Flores-Maldonado et al. (1999) reported *Apterostigma pilosum* Mayr and *Trachymyrmex turrifex* Wheeler in Cañón del Novillo, near Ciudad Victoria. *Trachymyrmex saussurei* (Forel) a neotropical species, exists in Gómez Farías, Tamaulipas (Rabeling et al. 2007). The present paper includes distribution records and habitat observations for attine species, some of which were not expected to occur or are not frequently reported in NE Mexico.

MATERIALS AND METHODS

With the exception of some specimens of *Cyphomyrmex rimosus* Spinola from Matamoros caught with pitfall traps, all specimens were collected by hand by the author during directed searches for workers. Descriptions used for identification are listed with each species. Records are reported by state (uppercase) and municipality (municipio); more specific localities are mentioned when pertinent. Voucher specimens are deposited at the Entomological Collection of Universidad Autónoma Agraria Antonio Narro, (UAAAN), Saltillo, Coahuila, Mexico. Specimens of taxa marked with an asterisk (*) have been deposited at the Bohart Museum of Entomology, University of California at Davis (UCDC).

RESULTS AND DISCUSSION

Table 1 is a summary of collected attine ants. These are detailed below.

Apterostigma mexicanum Lattke (*). SAN LUIS POTOSI: Municipio of Aquismón. 11.IV.2008. N 21°35'59", W 99°06'12", 980 masl (meters above sea level). About 200 m above the Sótano de las Golondrinas (Pit of Swallows). *Apterostigma* includes the most basal extant attines along with *Myrmicocrypta* and *Mycocepurus* (Currie et al. 2003). Workers of *A. mexi-*

TABLE 1. ATTINE ANTS COLLECTED IN NORTHEASTERN MEXICO, THEIR LOCALITIES AND GENERAL HABITATS.

Ant species	Locality/State	Habitat
Apterostigma mexicanum	200 m above Pit of Swallows/ San Luis Potosí	Clearing, former tropical rainforest
Atta texana	Jiménez/ Coahuila	Temperate gallery forest of *Taxodium*, *Platanus*, *Salix*
	Múzquiz/ Coahuila	
Cyphomyrmex rimosus	Many localities/ Tamaulipas and Nuevo León	Springs, temperate gallery forest, mesic habitats
Mycetosoritis hartmanni	Escape, Cadereyta/Nuevo León	Under cover crop of organic farm
	El Encino, Llera/Tamaulipas	Tropical gallery forest with *Taxodium*, *Ficus* and *Inga*
Mycocepurus smithii	Guadalupe/Nuevo León	Temperate gallery forest of *Platanus* and *Juglans*
Sericomyrmex aztecus	Tamul/San Luis Potosí	Tropical gallery forest
	Taninul, Valles/San Luis Potosí	Medium height tropical forest with *Bursera* and *Ficus*
Trachymyrmex smithi	Zapalinamé, Saltillo/Coahuila	Xerophilous temperate oak forest
Trachymyrmex turrifex	Santa María, Pesquería/Nuevo León	Garden; desert scrub area with *Parkinsonia texana*
	García/Nuevo León	Desert scrub with *P. texana*
	Matamoros/Tamaulipas	Garden in urban area

canum were collected on soil in extensive clearing in medium-tall rainforest that included the trees *Brosimum alicastrum* Sw. (ojite, ramón), *Bursera simaruba* (L.) Sarg. (chaká, gumbo-limbo), *Ficus cotinifolia* H.B.K. (higuerón, strangler fig) near the transition to cloud forest. Apparently previously known from 5 specimens, all from tropical forest in Veracruz state, near Córdoba (Lattke 1997).

Atta texana (Buckley) (*). COAHUILA: Municipio of Jiménez, town of Jiménez. 22.IX.2006. 29°03'04"N, 100°40'11"W, 240 masl. Municipio of Múzquiz, town of Múzquiz, Sabinas River. 5.VII.2008. 27°58'09", W 101°34'53", 490 masl. At Jiménez town, the Texas leaf-cutting ant was collected within 200 m from the Rio Grande (Rio Bravo) river, and also 15 km to the south, down the river. In both sites *A. texana* lives on the deeper soil flats ("vegas") along the river, in woods and clearings with pecans [(*Carya illinoinensis* (Wangenh.) K. Koch)], walnut (*Juglans* sp.), and huisache, (*Acacia farnesiana* (L.) Willd.). Mature colonies form nest mounds 5-10 m in diameter. At Múzquiz, *A. texana* was in a riparian forest of baldcypress (*Taxodium* cf. *mucronatum* Ten.), willow (*Salix nigra* Marshall) and sycamore (*Platanus* sp.). The Múzquiz locality is near the southwestern distribution limit for *A. texana*. There are few reports of this ant in Mexico, and no recent records of the reported populations of *A. texana* along the Gulf of Mexico, in the states of Tamaulipas, Veracruz, and Tabasco (Smith 1963). There is an unexpected, extremely disjunct record from Tehuacán, central Mexico (Ríos-Casanova et al. 2004). Coronado-Padilla et al. (1972) reported it from Allende, Coahuila (about 100 km NE from Múzquiz). The distribution of *Atta* spp. is quite fragmented in Northeastern Mexico; the factors responsible are possibly lack of moisture and soil type.

Cyphomyrmex rimosus (Spinola). Widespread morphospecies, known from Texas (San Marcos) and southern USA to Argentina (Wheeler 1907; Longino 2008) thus coordinates are not given here. Collected in mesic microhabitats, mainly springs and streams between 10 and 500 masl. NUEVO LEON: municipios of Cerralvo, at the spring; Guadalupe: La Pastora State Park, 10.VII.2006; Montemorelos: Rancho Marrufo, km 6 Montemorelos-General Terán highway, in wooded area along fencerow, 8.XII.2007; Pesquería: Santa María la Floreña, along tree-covered irrigation channel from Río Pesquería, 24.VIII.2008; Sabinas Hidalgo, at the spring, 18.VII.2006. TAMAULIPAS: municipios of Gómez Farías, San Pedrito town, in garden, 25.VIII.2008; Matamoros, Ejido (community) El Longoreño, gallery forest and grassy areas near the Rio Grande and ponds, 31.VIII.2007.

Mycetosoritis hartmanni Wheeler. NUEVO LEON: Municipio of Cadereyta, Rancho El Escape, Ejido Jerónimo Treviño. 8.XII.2007. N 25°32'25", W 99°54'17"', 504 masl. TAMAULIPAS: Municipio of Llera, El Encino-La Libertad road, near Sabinas River (Río Sabinas), 23.IX.2006. N 23°08'09", W 99°08'53", 110 masl. The Nuevo León locality is an irrigated, organic vegetable farm at a semiarid site, on alluvial soils

near the Santa Catarina river. There, several small plots (<1 ha) were grown to cover crops (Fabaceae), providing full shade. *Mycetosoritis hartmanni* workers were foraging under the cover crop, at the northern edge of one plot, at noon. The Tamaulipas location is disturbed tropical gallery forest with the trees *T. mucronatum*, *Ficus* sp., and *Inga vera* Willd., about 20 km north of Gómez Farías. *Mycetosoritis hartmanni* is an infrequently collected species (Mackay 1998; Longino 2009). In Mexico, this ant is known from the humid, medium-height tropical forest at Gómez Farías, Tamaulipas (Jusino-Atresino & Phillips 1992). The type locality is warm-temperate (Austin, Texas) (Wheeler 1907). Longino (2009) lists *M. hartmanni* from south Texas (Laguna Atascosa Wildlife Refuge) in coastal, low shrubby vegetation. *Mycetosoritis hartmanii* has not been reported living in the ephemeral habitat of annual agricultural crops.

Mycocepurus smithii Forel. NUEVO LEON: Municipio of Guadalupe, La Pastora State Park.10.VII.2006 and 28.XII.2006. N 25°39'53", W 100°15'15", 500 masl. This 200-ha park includes a remnant patch of old forest with interior live oaks (*Quercus fusiformis* Small) and anacua (*Erethia anacua* (Terán & Berland.) I. M. Johnst.) and gallery forest of sycamores (*Platanus* sp.), walnut (*Juglans* sp.) and bald cypress (*T. mucronatum*), on intermittent creeks running into the La Silla river. This park has been engulfed by the metropolitan area of Monterrey since at least 20 years ago. An aggregation of nest entrances of *Mycocepurus* colonies were in the gallery forest, on the flat surface of sandy banks along shallow dry creeks. Workers were observed at 5:00 PM on 10.VII.2006 at 30 m from the dry creek, foraging in the forest litter. Workers of *C. rimosus* were present also. On 28.XII.2006, foraging was observed at 13:00 h, after night temperatures of 5-10°C; the species apparently does not become inactive in winter here, as the attine *Trachymyrmex septentrionalis* does further north (Weber 1972). Local *Mycocepurus* appears to be mainly riparian, foraging in the same areas (moist microhabitats) as the ponerine ants *Pachycondyla villosa* (F.) and *Odontomachus* cf. *laticeps* Roger. Ants of open and disturbed habitats (*Pogonomyrmex barbatus* (Smith), *Solenopsis geminata* (Fabricius) and *Dorymyrmex* sp.) nested within 20 meters of *M. smithii*, in clearings. Rosas-Mejía et al. (2008) reported *Mycocepurus* sp. as an urban ant in Ciudad Victoria, 300 km south of Monterrey. Jusino-Atresino & Phillips (1992) collected *M. smithii* from the subdeciduous tropical forest of Gómez Farías, Tamaulipas, about 400 km south of Monterrey. Also reported from more distant tropical sites in Mexico to the south (states of Jalisco, Nayarit, San Luis Potosí, Tabasco, and Veracruz) (Mackay et al. 2004; Vázquez-Bolaños 2007), in deciduous and subdeciduous tropical forests, oak-pine forest, and secondary vegetation in urban areas (Vázquez-Bolaños 2007). The report herein is the northernmost for the species; it is in the Nearctic ecozone at almost the same latitude of Brownsville, Texas, and in the Rio Grande Basin as well. This locality is apparently the most xeric (annual average precipitation 551 mm) and temperate (SAGARPA 2002) known for *Mycocepurus* in most of its range. Ants of the genera *Mycetosoritis* and *Mycocepurus* are small, cryptic, and infrequently collected (Mackay 1998).

Sericomyrmex aztecus Forel (*). SAN LUIS POTOSI: Municipio of Aquismón. 10.IV.2008. N 21°48'09", W 99°10'49", 200 m masl. Rio Santa María, Tamul. Undercover of tropical gallery forest including trees of *B. simaruba* and *F. cotinifolia*. Municipio of Ciudad Valles, N 21°56'11", W 98°53'23", 100 masl. Near gardens of hotel at Taninul. This is a mesic microhabitat in secondary low and medium-height tropical forest with *B. simaruba* and *F. cotinifolia*. The northernmost species of *Sericomyrmex* is *S. aztecus* from Mexico. Longino (2008) collected *S. aztecus* in Chiapas, near the Guatemala border. The Taninul, Ciudad Valles location reported herein, about 40 km from the state of Tamaulipas, is probably the northernmost record for the genus. Both Wheeler (1925) and Longino (2008) consider that Mesoamerican (or most) species of *Sericomyrmex* are very similar, and probably describe intraspecific variation.

Trachymyrmex smithi Buren. COAHUILA: Municipio and city of Saltillo. 19.VII.2005. N 25°21'36", W 100°58'42", 1680 masl. Lomas de Lourdes, Sierra de Zapalinamé. Workers foraging after summer rains on reddish-soil hills, above SE Saltillo. The habitat is temperate, an ecotone of xerophilous brush and forest with oaks (*Quercus laeta* Liebm. and the endemic *Q. saltillensis* Trel.), madrone (*Arbutus xalapensis* Kunth), and pistache (*Pistacia mexicana* H.B.K.). The type locality for *T. smithi* is La Rosa, General Cepeda, Coahuila, about 50 km W, in rocky Chihuahuan desert habitats (Buren 1944). Mackay & Mackay (2002) list it from Chihuahua state, Mexico. From the records, this species appears to occur in high, temperate deserts where summer temperatures are usually below 33ºC.

Trachymyrmex turrifex Wheeler. NUEVO LEON: Municipio of Pesquería, town of Santa María la Floreña, 24.VIII.2008. N 25°44'06", W 99°49'44", 320 masl. Nest in shaded sandy soil in garden; natural vegetation is thorny brush with honey mesquite (*Prosopis glandulosa* Torr.), huisache, palo verde (*Parkinsonia texana* (A. Gray) Watson), and desert hackberry (*Celtis pallida* Torr.). Municipio of García. 17.IX.2009. N 25°42'38", W 100°32'53", 840 masl. On sandy soil in thorny brush as above. TAMAULIPAS: Municipio of Matamoros. N 25°51'25", W 97°30'31", 10 masl. 22.VII.2009. Under trees in urban garden

in sandy soil; nest aggregations (6 nests/10 m^2). Known from matorral at Vallecillo, Nuevo León (40 km S of Laredo, Texas) (Buren (1944). This is possibly the most common *Trachymyrmex* species in the lower, hotter arid areas of NE Mexico.

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