

Research Article

Geographic Spread of *Gnamptogenys triangularis* (Hymenoptera: Formicidae: Ectatomminae)

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Gnamptogenys triangularis (Mayr), native to the forests of South and Central America, is a predatory ant that feeds on millipedes. In its native range, this species is known from Buenos Aires, Argentina (38.1°S) in the south to Costa Rica (10.4°N) in the north, with records from eight countries in South America (all except Chile, French Guiana, and Paraguay), and the two southernmost countries of Central America (Panama and Costa Rica). The first records of *G. triangularis* outside its native range came from Florida beginning in 1985 (six sites: 25.5°–30.4°N) and Alabama in 1996 (one site: 30.4°N). Here we present the first records of *G. triangularis* from Mississippi, dating from 2002–2010 (five sites: 30.5°–31.2°N). Based on its South American range, it appears that *G. triangularis* has the potential to spread to forests throughout much of the southeastern USA. There are no documented impacts of *G. triangularis*, and it seems unlikely that this species will ever become a major pest.

1. Introduction

Gnamptogenys triangularis (Mayr), native to the forests of South and Central America, is a predatory ant that feeds on millipedes [1, 2]. Kusnezov [3] wrote that in Tucuman, Argentina, *G. triangularis* occurred by streams in the subtropical cloud forest areas. In Surinam, Kempf [4] recorded *G. triangularis* from a primary forest and a “marshy wood.” Lattke et al. [5] wrote that *G. triangularis* nests in trees and broken branches lying on the forest floor in wet primary and secondary forests, from sea level to elevations >1,000 m. L. R. Davis collected specimens in Harrison County, Mississippi, nesting in a rotten pine limb in leaf litter beneath grape vines (from Mississippi Entomological Museum specimen label data). Other collections of this species in Mississippi were in deciduous forests. Lattke [1] reported that *G. triangularis* colonies typically have only 80–120 workers, up to a probable maximum of 150 workers.

The first records of *G. triangularis* outside its native range came from Miami-Dade County, Florida, beginning in 1985 [6, 7]. Deyrup [8] reported *G. triangularis* from two additional counties in Florida (Broward and Escambia).

MacGown and Forster [9] were the first to report this ant from Alabama (Mobile County). Here, we report the first records of *G. triangularis* from Mississippi and evaluate its potential spread based on its known native range.

2. Taxonomy and Identification

Ectatomma triangulare (*G. triangularis*) was originally described in Uruguay in 1887 [10]. Junior synonyms include *Ectatomma triangulare richteri* Forel, described in 1913 in Argentina [11] and *Ectatomma aculeaticoxae* Santschi, described from “Haute Carsevenne, French Guiana” in 1921 [12] (now Alto Rio Calçoene, Brazil) [2].

Gnamptogenys triangularis and *Gnamptogenys hartmani* (Wheeler) are the only two members of the subfamily Ectatomminae known to occur in the southeastern USA. These very distinctive ants can be recognized immediately by the deep horizontal grooves covering the entire head and body. *Gnamptogenys triangularis* workers are ~5.0 mm in length and dark brown (Figure 1(a)). Females are similar in appearance to workers, but are slightly larger (~5.5 mm in length) and have brownish gray colored wings (Figure 1(b)).



FIGURE 1: Profile views of *Gnamptogenys triangularis*: (a) worker, (b) alate female, and (c) alate male. Scale bar equals 1.0 mm.

Males (Figure 1(c)) are approximately the same length as females (~5.5 mm), but are wasp-like in appearance and differ considerably from workers and females. The deep horizontal grooves characteristic of the genus are mostly absent except on the face and first gastral tergite. Sides of head, pronotum, much of the mesonotum, and gaster have reduced sculpture and are shiny, and the remainder of mesosoma and petiole are rugoreticulate. Males are bicolored with the head and mesosoma dark reddish black to black, petiole dark reddish brown, and gaster reddish orange. The legs, antennal scape, and first segment of funiculus are orangish red, the remainder of funiculus is gray, and the wings are dusky gray. In comparison, *Gnamptogenys hartmani* workers are 3.5–4.0 mm and pale reddish brown. Females are ~5 mm and similar in appearance to workers. Males are approximately the same size as females, but horizontal grooves are greatly reduced, and overall they are shinier in appearance. The entire body is reddish brown, legs and scapes are yellowish brown, and the funiculus is dark colored.

3. Methods

Using published and unpublished records, we documented the native and exotic range of *G. triangularis*. We obtained unpublished site records from museum specimens in the collections of the Museum of Comparative Zoology (MCZ, identified by S. Cover) and the Smithsonian Institution (SI, identified by M. Smith). In addition, we used online databases with collection information on specimens by Antweb (<http://www.antweb.org/>) and the Global Biodiversity Information Facility (<http://www.gbif.org/>).

4. Results

In South and Central America, *G. triangularis* has been recorded from 12 countries (Table 1) from central Argentina to Costa Rica (Figure 2). References to this species occurring in French Guiana appear to be the type locale of *G. aculeaticoxae* (*G. triangularis*), now in Brazil (see Section 1).

TABLE 1: Earliest known records for *Gnamptogenys triangularis* from South and Central America. MCZ: Museum of Comparative Zoology.

	Earliest record
Uruguay	≤1887 [10]
Bolivia	≤1893 [13]
Argentina	1898 [14]
Brazil	1898 (as <i>E. aculeaticoxae</i>) [12]
Guyana	1922 (as <i>G. aculeaticoxae</i>) [15]
Panama	1941 (as <i>G. aculeaticoxae</i>) [15]
Costa Rica	1949 (L. Garling, MCZ): La Selva
Surinam	1959 (as <i>G. aculeaticoxae</i>) [4]
Peru	1967 (W. L. Brown and W. Sherbrooke, MCZ): Tingo Maria
Colombia	1972 (M. Corn, MCZ): near Puerto Asis
Ecuador	1975 [16]
Venezuela	1982 (as <i>G. aculeaticoxae</i>) [1]

Published records of *G. triangularis* outside its native range come from Florida beginning in 1985 (four sites: 25.5°–30.4°N) and Alabama in 1996 (one site: 30.4°N).

Based on specimens in the Mississippi Entomological Museum (identified by JAM), we report records of *G. triangularis* from five sites in four Mississippi counties: Forrest Co., 10 mi S Hattiesburg at diner near Camp Shelby (one male; 31.188°N, 89.251°W; 12 Nov 2010, leg. D. C. Cross), Stone Co., DeSoto National Forest (one gyne; 30.869°N, 89.001°W; 7–13 June 2002, Malaise sample, leg. T. L. Schiefer and J. Schonewitz), Pearl River Co., White Sand (16 gynes and 32 males; 30.794°N, 89.659°W; 24 May–13 July 2002: five different weekly Malaise samples, leg. T. L. Schiefer and L. Thomas), Harrison Co., 1 mi. NE Wortham (one worker; 30.570°N, 89.129°W; 21 July–7 Aug 2006, Lindgren funnel), and Harrison Co., Wool Market (nine workers; 30.484°N, 88.963°W; 27 June 2004, leg. L. R. Davis).

A collection by L. R. Davis from Alabama represents the northernmost record in the United States: Monroe Co., Frisco City, along rt. 21; 2 miles South of jct. rt. 84, (31.453°N, 87.374°W; 4 May 2005; L. R. Davis, Jr., pers. comm.). In addition, two unpublished records from Florida on Antweb represent a new county record: Marion Co., Ocala; 5454 SW 84th St. (29.101°N, 82.210°W; 7 May 2004; leg. M. Jones, Archbold Biological Station) and Marion Co., Ocala, 6455 SW Hwy 200 (29.111°N, 82.227°W; 21 Jul 2004, leg. J. Mangold, California Academy of Sciences).

5. Discussion

Records of *G. triangularis* come from eight countries in South America (all except Chile, French Guiana, and Paraguay), and the two southernmost countries of Central America (Panama and Costa Rica) (Figure 2, Table 1). Because there are no discernable geographic barriers, it seems very likely that the native range of *G. triangularis* also extends into forest habitats in French Guiana, Paraguay, and farther



FIGURE 2: Map showing the known records of *Gnamptogenys triangularis*.

TABLE 2: Earliest known records for *Gnamptogenys triangularis* from the USA. +: no previously published records. LRD: L. R. Davis collection. MEM: Mississippi Entomological Museum.

	Earliest record
Florida	1985 [7]
Alabama	1996 (L. R. Davis, LRD): Mobile [9]
+Mississippi	2002 (T. L. Schiefer and L. Thomas, MEM): White Sand

north in Central America, but has not yet been recorded in these areas due to its rarity.

In its exotic range, *G. triangularis* is now known from four counties in Florida (six sites: 25.5°–30.4°N), two in Alabama, and four in Mississippi (five sites: 30.5°–31.2°N) (Figure 2, Table 2). Based on its South American range, extending to 38.1°S, it is possible that *G. triangularis* could spread to forests throughout much of the southeastern USA, perhaps as far north as Richmond, Virginia (37.5°N) and Lexington, Kentucky (38.0°N).

Many of the Mississippi records are based on specimens collected in Malaise traps. These traps and other flight interception traps may be useful methods for monitoring the movements of exotic species, especially alate males and females.

In both its native and exotic ranges, *G. triangularis* inhabits forests and preys on millipedes [2, 3, 8]. There are no known impacts of *G. triangularis*, even though if this species was having a localized impact on millipede populations, it seems unlikely that this would have been detected. Nonetheless, it seems unlikely that this species will ever become a major pest.

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