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Notes on the Taxonomy of the Neotropical Ant Genus *Thaumatomyrmex* Mayr (Hymenoptera: Formicidae)

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Abstract

The *T. ferox* group of the Neotropical ant genus *Thaumatomyrmex* Mayr is reviewed. Analysis of metric characters revealed no evidence for species distinctions based on allometric relationships. Two species are recognized: *T. ferox* Mann and *T. atrox* Weber. *T. paludis* Weber is proposed as a synonym of *T. ferox*, and *T. manni* Weber and *T. zeteki* M. R. Smith are proposed as synonyms of *T. atrox*.

Introduction

The Neotropical ant genus *Thaumatomyrmex* is a myrmecologist's delight, being highly distinctive and rare. The mandibles are like pitchforks, each mandible composed of three long tines joined at the base (Fig. 1). Most collections are individuals obtained from Berlese funnels and similar devices that extract insects from leaf litter. New species and keys for workers have accumulated as additional specimens have appeared in collections (Weber 1939, 1942, M. R. Smith 1944, Kempf 1975). The first male of *Thaumatomyrmex* was recognized and described by Kempf (1954) and the larvae were described by G. C. and J. Wheeler (1964).

Kempf (1975) most recently revised the genus, and he estimated that the number of existing specimens in collections "hardly surpass the number of 70." A third of these were specimens of the most well known species, *T. mutilatus* Mayr of southern Brazil, and another third was composed of isolated male specimens. Thus, the taxonomy of the group has been based on very scanty material.

Kempf recognized three species groups based on workers. The *T. mutilatus* group, containing *T. mutilatus* and *T. contumax* Kempf, was characterized by a subopaque, silky surface sculpture, and a pair of closely-spaced setae on the clypeus. The *T. cochlearis* group, contain-

ing only *T. cochlearis* Creighton, was characterized by rugose and punctate surface sculpture, and a high density of setae, particularly on the head. The remaining species were in the *T. ferox* group, characterized by their highly polished appearance, the entire surface being very smooth and shiny. The *T. mutilatus* group is from extra-Amazonian Brazil. *T. cochlearis* is endemic to Cuba. The *T. ferox* group is found in the Amazon basin, northern South America, and Central America.

Kempf placed five species in the *T. ferox* group. Species-level taxonomy was based on very few collections from widely spaced localities. I have examined new material from Costa Rica, Colombia, and Peru which has necessitated a reevaluation of the species-level taxonomy in the *T. ferox* group.

Measurements

The conclusions in this study were based primarily on an analysis of metric characters: head length, head width, mandible length, interfrontal width, scape length, Weber's length, pronotal width, petiolar width, and hind femur length. For these characters I follow the definitions of Kempf (1975:97) which allow comparison of new material with published values. Only results of head length, head width, and mandible length measurements are reported (complete data are available from the author on request). The following definitions are paraphrased from Kempf, 1975.

Head length of workers is the distance between two parallels drawn through the anteriormost point of projecting frontal lobes and the posteriormost point of the occiput or occipital carina, in frontal view.

Head width is the maximum width of head proper *in front* of the eyes, in frontal view.

Mandible length is the chord length of mandibles, not including the basal articular condyle contained in the acetabulum at the anterior corner of the head.

Measurements were made using a Zeiss dissecting microscope with an ocular micrometer at 63x power, accurate to the nearest .01mm. Direct measurements were made on the 12 specimens listed below, and measurements for 7 specimens were extracted from Kempf's work (1975).

Material Examined

Direct examinations were made of 12 specimens from 9 collections:

BELIZE, Caves Branch, S. & J. Peck berlesate (1 worker); COSTA RICA, Prov. Alajuela, 6.5km E Monteverde, 950m, 10°18'N 84°45'W, J. Longino #861-S (2 workers); Prov. Heredia, 18km N Volcan Barba, 800m, 10°17'N 84°05'W, J. Longino #1383-S (1 worker); Prov. Heredia, 3km S Pto. Viejo, 50m, 10°26'N 84°00'W, J. Longino #1386-S (2 workers); Prov. Heredia, La Selva, Talbot & VanDevender FP2308 (1 worker); Prov. Limon, near Siquirres, 10°06'N 83°22'W, A. M. Young (1 worker); Prov. Limon, Res. Biol. Hitoy-Cerere, 200m, 9°40'N 83°02'W, J. Longino #942-S (2 workers); COLOMBIA, Dpto. Magdalena, 4km N San Pedro, 550m, 10°57'N 74°03'W, J. Longino #763-S (1 worker); PERU, Dpto. Huanuco, nr. conf. Rio Pachitea, Rio Lullapichis, C. A. Toft (1 worker).

The Belize specimen is from the Harvard Museum of Comparative Zoology, the Peruvian specimen is from the University of California, Davis collection, a Costa Rican specimen has been retained in the author's collection, and the remainder are in the Los Angeles County Museum of Natural History.

Characters

Allometric relationships between head length, head width, and mandible length were primary characters used by Kempf to differentiate species within the *T. ferox* group. In Figure 2 I have plotted head length versus head width, and head width versus mandible length, for the 12 specimens I examined directly, and the 7 specimens from Kempf (1975). It can be seen that the points fall reasonably well on a straight line, suggesting uniform allometric relationships, and the points do not form distinct clusters. The same was true for any pair of metric characters I examined. Thus, there is as yet no evidence that differences in relative lengths of metric characters reflect species differences in *Thaumatomyrmex*.

Thaumatomyrmex specimens often exhibit an impressed metanotal suture which separates the mesonotum from the propodeum. In Costa Rica, this trait varies in distinctness, from specimens with a clearly raised, separated mesonotum, to specimens with the mesonotum and propodeum essentially continuous, with only a trace of a metanotal suture. Effacement of the metanotal suture is characteristic of the

smallest specimens. Thus, presence of a metanotal suture is probably size related and not an adequate diagnostic character for distinguishing *Thaumatomyrmex* species.

All *Thaumatomyrmex* specimens have mandibles composed of three long prongs, but some specimens also possess a small tooth on the base of the mandible just above the mandibular articulation. This is the single character I have been able to discover with discrete character states. It is apparent from literature accounts and the new material I have examined that the known *Thaumatomyrmex* specimens can be unambiguously partitioned with respect to presence or absence of a basal mandibular tooth.

Species Accounts

Thaumatomyrmex ferox Mann

Thaumatomyrmex ferox Mann, 1922:3-4. Syntype workers, San Juan Pueblo, Honduras.

Thaumatomyrmex paludis Weber, 1942:68-70. Holotype worker, small island near Isla Tortola, Orinoco Delta, Venezuela. Syn. nov.

Thaumatomyrmex sp.; Kempf, 1975:120-121.

Workers are recognized solely by the lack of a basal mandibular tooth. Collections of *T. ferox* thus include the type specimens from Honduras, a single specimen from Belize (described by Kempf, 1975), all the material from Costa Rica, two *paludis* collections from Venezuela and one from near Manaus, Brazil (see Kempf, 1975).

The primary diagnostic characters for *T. paludis* were relatively short mandibles, lack of a metanotal suture, and small size. As described above, none of these can be used to differentiate *Thaumatomyrmex* species.

Thaumatomyrmex atrox Weber

Thaumatomyrmex atrox Weber, 1939:98-99. Holotype worker, junction Mazaruni and Cuyuni Rivers, Guyana; paratype worker, foothills of Tunapuna, Trinidad.

Thaumatomyrmex manni Weber, 1939:99. Holotype worker, Huachi, Beni, Bolivia. Syn. nov.

Thaumatomyrmex zeteki M. R. Smith, 1944:98-99. Holotype and paratype worker, Barro Colorado Island, Panama. Syn. nov.

Workers are recognized solely by the presence of a basal mandibular tooth. Collections of *T. atrox* include the type collections from Guyana and Trinidad, type and subsequent collections of *T. zeteki* from

Barro Colorado Island, a worker from Dpto. Cundinamarca, Colombia (see Kempf, 1975), a worker from Dpto. Magdalena, Colombia (Longino #763-S), the type of *T. manni* from Bolivia, and the one specimen from Dpto. Huanuco, Peru.

The diagnostic characters used to differentiate *T. zeteki* from *T. atrox* were smaller size, stouter antennae, shorter mandibles, and a more quadrate head. *T. manni*, on the other hand, was distinguished from *T. atrox* by its larger size, and relatively wider head and longer mandibles. As discussed above, these allometric characters are not adequate to distinguish *Thaumatomyrmex* species.

Discussion

No cases of sympatry of *Thaumatomyrmex* species are known, including the *T. mutilatus* group and *T. cochlearis*. In areas where multiple collections have been made - *T. ferox* in Costa Rica, *T. atrox* on Barro Colorado Island, and *T. mutilatus* in Brazil - the morphology is fairly uniform. Various possibilities present themselves. The genus *Thaumatomyrmex* could be composed of a single geographically variable species with a continuous distribution, in which case the oldest name, *T. mutilatus*, would best represent the entire group. Alternatively, a set of morphologically differentiated allopatric populations might exist, in which case species distinctions are arbitrary and the utility of separate names for them is questionable. A third possibility is that there is a patchwork of parapatric species or species with narrow regions of sympatry, in which case some nomenclatural resurrection would be required. Further collections, both across regions and intensively within regions, will clarify which of the above, or which combination of the above, best represents the genus *Thaumatomyrmex*.

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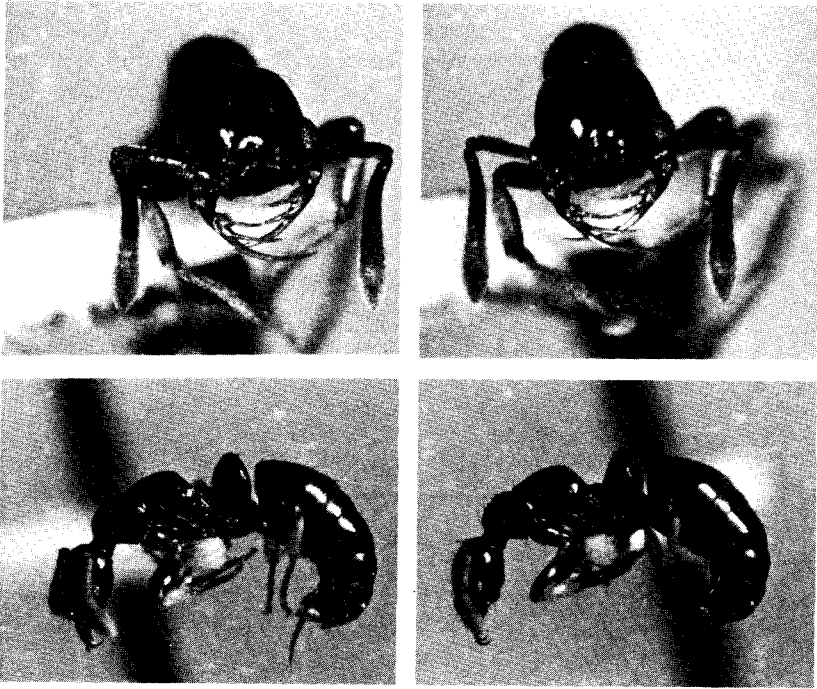


Figure 1. Stereoscopic images of *Thaumatomyrmex ferox*. Three-dimensional images can be created by using a stereo viewer or by unaided viewing. One recommended method is to hold the figure up, focus on a distant object, lower your eyes to the figure, and refocus on the overlapping middle image. Photographs were taken with a camera mounted on a Nikon dissecting microscope. A. Full face view of Costa Rican specimen, Longino #861-S, head width 0.81mm, Weber's length (from anterodorsal border of pronotum to posteroventral margin of mesosoma, posterior to metapleural gland opening) 1.19mm.

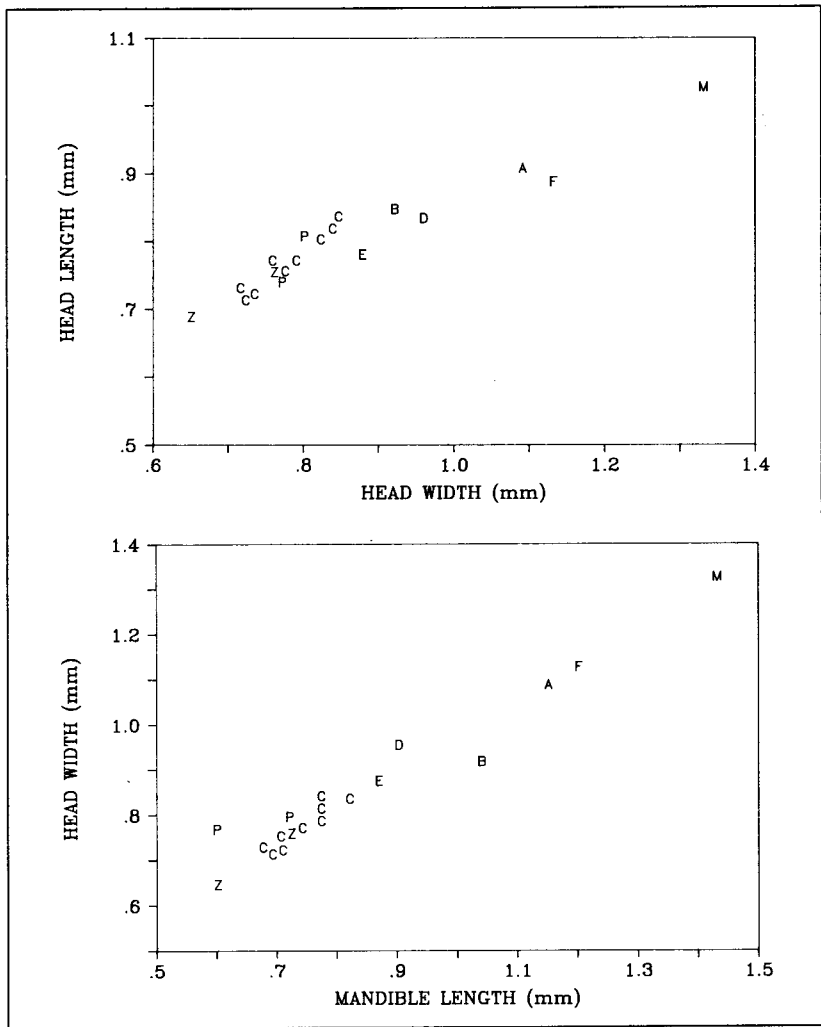


Figure 2. Relationships between metric characters in *Thaumatomyrmex*. A: paratype of *T. atrox*. B: *T. ferox* specimen from Belize, described in Kempf, 1975. C: *T. ferox* specimens from Costa Rica. D: *T. atrox* specimen from Colombia, Longino #763-S. E: *T. atrox* specimen from Peru, UCD collection. F: lectotype of *T. ferox*. M: holotype of *T. manni*. P: *T. paludis*, smaller specimen is holotype. Z: *T. zeteki*, smaller specimen is paratype.