Taxonomic Implications of Doryline Worker Ant Morphology: *Cheliomyrmex morosus* (Hymenoptera: Formicidae)[1]

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ABSTRACT

The external and internal morphology of the worker caste of the doryline ant *C. morosus* (F. Smith) is described, and the taxonomic implications of this morphology for the tribes that compose the subfamily Dorylinae are discussed. Doryline worker ant characteristics of value to phylogenetic and taxonomic interpretation include thoracic suturing, mouthpart morphology and sting apparatus anatomy. Condition of the central nervous system, in particular the number of ganglia present, may also prove useful. Other characteristics such as head configuration, general habitus, Malpighian tubule numbers, and ovarian structure are correlated with worker ant size and difficult to interpret when comparing polymorphic species. A comparative analysis of the characteristics determined to be important as phylogenetic indicators point to a triphyletic origin for the Dorylinae. The tribes Ecitonini and Cheliomyrmecini comprise one lineage, the Dorylini a second, and the Aenictini a third.

The subfamily Dorylinae, or army ants, is currently divided into four tribes. The Aenictini (composed of a single genus, *Aenictus*) and Dorylini (the genus *Dorylus* with its 6 subgenera) are distributed throughout Africa and tropical Asia, and the Ecitonini (including the genera *Eciton, Labidus, Neivamyrmex,* and *Nomamyrex*) and Cheliomyrmecini (containing the single genus, *Cheliomyrmex*) throughout the New World tropics and subtropics. Monophylogeny for these ants is implied in their placement in a single subfamily, but a polyphyletic origin has been hypothesized (Brown 1954, Gotwald 1969). Comparative morphological studies of the dorylines include those of the thorax (Reid 1941), poison apparatus (Hermann and Blum 1967, Hermann 1969), and mouthparts (Bugion 1930, Gotwald 1969). Other studies of doryline morphology are those by Cohic (1948), Hollingsworth (1960), and Mukerjee (1926, 1933) for the genus *Dorylus;* by Whelden (1963) and Hagan (1954a, b, c) for the genus *Eciton;* and by Gotwald (1971) for the genus *Cheliomyrmex.* Most behavioral observations have been amassed by Schneirla (1971), Rettenmeyer (1963), Topoff (1971, 1972), and Watkins (1964) for New World species and by Cohic (1948), Raignier and van Boven (1955), and Schneirla (1971) for Old World forms. Still, additional comparative morphological and behavioral studies are needed before the polyphyletic hypothesis of doryline origins is securely verified or refuted.

Of the four doryline tribes, the Cheliomyrmecini may be more closely related to the Ecitonini than to the Dorylini and Aenictini (Reid 1941, Borgmeier 1955, Hermann 1969, Gotwald 1969, 1971). In fact, Gotwald (1969) noted that the tribes Dorylini, Aenictini, and Ecitonini form distinctly separate, morphologically homogeneous groups, and that the Ecitonini and Cheliomyrmecini together form a closely related New World group.

It is the purpose of this paper to describe the morphology and histology of the *Cheliomyrmex morosus* (F. Smith) worker and to compare this species with others in the subfamily. The Neotropical genus *Cheliomyrmex* was chosen because little is known about it and because it represents a monogeneric tribe.

METHODS

Specimens were collected in August 1965 from beneath a decayed log in a pasture near the Fortin de las Flores–Huatusco road at km 38, Vera Cruz, Mexico (Gotwald 1971). All specimens were preserved in Bouin's fluid. Gross dissections were made of numerous workers and soldiers, and measurements were made of 57 workers. These measurements are provided at appropriate points in the paper and represent the size range within the collected series for the structures selected.

Sectioned specimens were prepared with a modified methylsalicylate-parlodin embedding technique and stained with one of three preparations: (1) Delafield hematoxylin I (progressive method); (2) cresyl violet for Nissl substance; and (3) modified Gomoni paraldehyde-fuchsin stain (Lappano-Colletta et al. 1965). All sections were mounted in Permount.

RESULTS

External Morphology.—The workers of *C. morosus* are polymorphic and range in total length from 3.45 to 7.57 mm in the series examined. The habitus is as shown in Fig. 1. The size frequency distribution for the workers was not calculated because the sample was not regarded as random. Morphological discontinuities are not evident when the workers are arranged in a continuous series from the smallest to the largest.

Head.—length 0.72–1.53 mm, width 0.68–1.71 mm, cephalic index (HW/HL × 100) 88–115. Head color ranges from yellowish-brown in the smallest workers to reddish-brown in the largest workers or soldiers. Soldiers or major workers possess cylindrical, falcate mandibles, each with 1 apical and 2 subapical teeth. The worker mandible is typically flattened, somewhat triangular, usually with 1 apical and 2 subapical teeth and a series of denticles (Fig. 2). However, the mandibles of *C. morosus* workers can be arranged in

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