Stings of Ants of the Tribe Ectatommini (Formicidae: Ponerinae)

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Abstract

The sting apparatus anatomy is described and compared for 24 species in six of the 9 extant genera of Ectatommini: *Paraponera*, *Acanthoponera*, *Gnamptogenys*, *Ectatomma*, *Proceratium*, and *Discothyrea*. Phylogenetic analysis sorts 15 species of *Gnamptogenys* into four species groups. Phylogenetic analyses on the six ectatommine genera suggest that: 1) *Gnamptogenys* and *Ectatomma* are sister genera, 2) *Proceratium* and *Discothyrea* are sister genera, 3) *Acanthoponera* may be more related to *Gnamptogenys* and *Ectatomma* than to the others, and 4) *Paraponera* may not belong with the other five genera.

Introduction

The sting apparatus is a complex set of sclerites derived from abdominal segments 8, 9, and 10 and enclosed in a chamber formed by the 7th tergum (pygidium) and sternum (hypopygium). Because these sclerites have been internalized, they have not been used in taxonomic or phylogenetic studies until relatively recently. Studies on the Myrmicinae, Myrmeciinae and *Nothomyrmecia* (Kugler 1978a, 1978b, 1980, 1986) have shown that the sting apparatus has many characters that vary at different taxonomic levels and thus can be used to infer relationships between genera.

In this paper I turn my attention to the ponerines. The tribe Ectatommini as presently constituted (Brown, 1958; Hölldobler and Wilson, 1990) contains nine extant genera. Here I describe and compare the sting apparatuses, pygidium and hypopygium of six genera: five species of *Ectatomma*, 15 species of *Gnamptogenys*, and one species each of *Paraponera*, *Proceratium*, *Discothyrea*, and *Acanthoponera*. Phylogenetic analysis is employed to infer relationships between these genera and between the 15 species of *Gnamptogenys*. The resulting dendrograms are compared with other classifications.

Methods

Sting apparatuses were dissected from the ants, cleared in hot lactophenol solution, and usually dissected further into two halves and a separate sting. The stings were mounted in glycerin jelly for ease of precise positioning and repositioning for different views. The other sclerites were usually mounted in Canada balsam. Occasionally whole apparatuses were mounted in glycerin jelly if specimens were few and very fragile.

Voucher specimens identified with the label "Kugler 1990 Dissection voucher" are deposited in the Kugler collection.

Most preparations were drawn and measured using a Zeiss KF-2 phase contrast microscope with an ocular grid. Accuracy is estimated at ± 0.001mm at 400X magnification. The very large *Paraponera* apparatus was measured and drawn with a Zeiss dissection microscope and ocular grid; estimated accuracy ± 0.025mm at 50X magnification.

Measurements of the sting are shown in Figure 6. The boundary between the sting shaft and the valve chamber is the point where the inner wall of the sting shaft touches the outer sting wall at the anterior end of the sting shaft. In some *Gnamptogenys* species where the inner wall is displaced ventrad (Figs. 20, 24, 26, 29, 31), the boundary is the midpoint of the upper curve in the sigmoid shape of the inner wall. The boundary between the valve chamber and the sting bulb is the point where the inner and outer walls of the sting separate. **StingL** is the sum of the lengths of the