Mouthpart Morphology of the Ant *Aneuretus simoni*[1,2]

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ABSTRACT

The mouthparts of the minor workers of *Aneuretus simoni* Emery (Hymenoptera: Formicidae) are examined morphologically and compared with the mouthparts of representative species from each of the presently recognized formicid subfamilies. While the labrum and mandible are relatively typical in design for a large number of ant species, the stipes resembles that of several species of Ponerinae and Dolichoderinae, and the galea and lacinia closely conform to the types found in the Dolichoderinae. The lacinia is also similar to that of *Myrmecia auriventris* Mayr. The labium is dolichoderine in nature. These morphological similarities between *A. simoni* and the Ponerinae, Myrmeciinae, and Dolichoderinae confirm previous observations on various aspects of aneuretine morphology.

Aneuretus simoni Emery is the only living species of the tribe Aneuretini and is known only from Ceylon. Until 1955 only a few specimens could be found in museum collections. During that year, 20 nests were collected by Dr. E. O. Wilson (Wilson et al. 1956). This species is of particular phylogenetic interest because of its supposed position ancestral to the Dolichoderinae. Wheeler (1928) reported that the dolichoderines probably arose from the Ponerinae through the genus *Aneuretus,* and while Brown (1954) and Wilson et al. (1956) have likewise recognized the ancestral relationship of *Aneuretus* to the dolichoderines, they have emphasized that *Aneuretus* is more likely a descendent from *Nothomyrmecia*-like stock. The genera of Aneuretini (3 of which were described from fossil material) also resemble the newly described Mesozoic ant, *Sphecomyrma freyi* Wilson & Brown (Wilson et al. 1967).

While *A. simoni* shares many characters in common with the Dolichoderinae, it is most notably different from species in this subfamily in its possession of a well-developed exsertile sting. Based on anatomical evidence, Wilson et al. (1956) elevated the tribe Aneuretini to subfamily status. Additional aspects of aneuretine morphology have been investigated by Eisner (1957) and Hermann (1968). Although the mouthparts of ants have recently been examined in detail (Gotwald 1969), those of *A. simoni* were not included in the study.

MATERIALS AND METHODS

The mouthparts of a minor worker were examined (it should be noted that the worker caste is dimorphic). The specimen used came from the Museum of Comparative Zoology, Harvard University, and was collected at Ratnapura, Ceylon, in July 1955 by E. O. Wilson. The mouthparts were removed from the head capsule after the specimen was relaxed, and were dissected into component parts, stained, and mounted in Canada balsam on microscope slides. These preparation methods and the terminology used in the descriptions of the mouthparts are those

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previously described and defined (Gotwald 1969). The drawings were done with the aid of a Bausch and Lomb VH-type microprojector.

DESCRIPTION OF THE MOUTHPARTS

Labrum (Fig. 1).—Distal margin emarginate and cleft medially, forming 2 smoothly rounded lobes; lateral margins abruptly emarginate; hemocoel consisting of 2 arms, united proximally, 1 arm in each lobe; numerous small setae inserted along the distal margin, several long setae inserted behind the distal margin along the distal and lateral borders of the hemocoel, intermediate sized setae placed in the middle area of the extensor surface; labral tubercles absent.

Mandible (Fig. 3).—Mandible triangular with distinct masticatory and basal margins; masticatory margin provided with a large apical tooth followed by 2 smaller subapicals, a series of truncated denticles (6 in specimen examined), a rounded subapical, a short series of truncated denticles (2 in specimen examined), and 2 toothlike eminences prior to the beginning of the basal margin; trulleum and mandalus present.

Maxilla (Fig. 2).—Maxillary palpus 3-segmented. Stipes subrectangular, lacking a definite lateral shoulder; distally the cuticle of the external surface ends in a sharply pointed projection; several setae inserted on the proximal external face. Galea typically formicoid with a well-developed maxillary comb; galeal crown flattened and bearing numerous long, thin setae, in addition to a series of shorter, stouter setae; several setae inserted so as to approximate a galeal comb, but these setae lack the specialized shape as seen in the Dorylinae (Ecitonini), where this comb is well developed (see Gotwald 1969). Lacinia subquadrate with well-defined gonia and apex; lacinial comb reduced, continuous, and restricted to the median section of the distal margin.

Labium (Fig. 4).—Labial palpus 3-segmented (see Discussion); premental shield lightly sclerotized and bearing numerous long setae; epimental sclerites poorly defined, particularly at their distal ends; subglossal brushes moderately developed, the setae mostly short and pointed; however, each brush contains 2 long, stout setae that are truncated apically; paraglossae and paraglossal sensory pegs absent.

DISCUSSION

The mouthparts of *A. simoni* were compared with those of 104 other species of ants representing all of the presently recognized subfamilies. There are no characters in the mouthparts of *A. simoni* that define clearly its phylogenetic affinities. However, certain general morphological tendencies in one direction or another can be discerned.

The labrum with its lateral emarginations is relatively unique in shape, but its overall rectangular configuration is typical of a large number of species in various subfamilies. The mandible is broad and triangular with a dolichoderinelike dentition. It is similar to the mandible of *Dolichoderus attelaboides* (F.), although the truncated denticles are

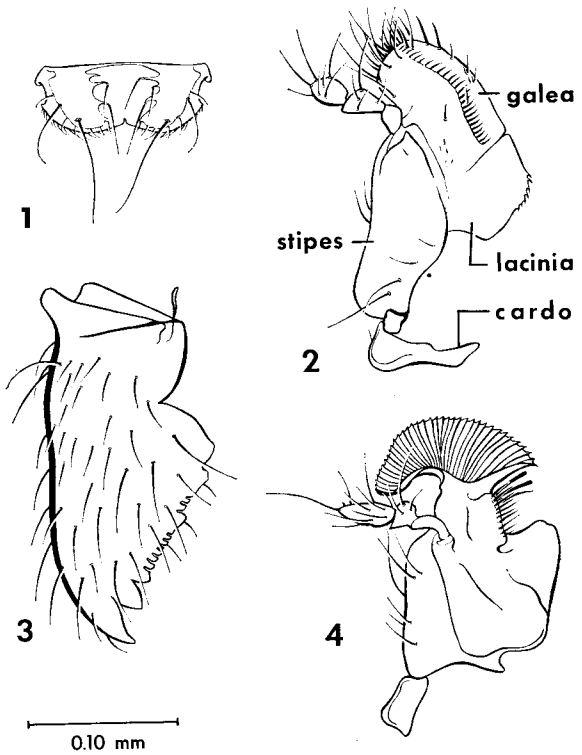

FIG. 1-4.—Mouthparts of *A. simoni*, minor worker. 1, Labrum, external view; 2, left maxilla, external view; the maxillary comb is drawn as seen through the transparent galea; 3, right mandible, dorsal view; 4, labium, lateral view.

somewhat unique. Wilson et al. (1956) reported that these small median teeth represent a specialization not shared with any of the living dolichoderines. The stipes is simple in design with little sculpturing. In this respect, *A. simoni* resembles closely several species of Ponerinae (e.g., *Hypoponera opacior* (Forel)) and Dolichoderinae (e.g., *D. attelaboides*). A distal stipital projection similar to that of *A. simoni* can be seen in *Odontomachus rixosus* Fr. Smith. The galea and lacinia resemble closely those of the dolichoderines, particularly *D. attelaboides*. This resemblance is especially strong in the construction and location of the lacinial comb. The comb is restricted in distribution to the median section of the distal margin, and the included setae are reduced and frequently inconspicuous. The conditions are found in *D. attelaboides, Forelius foetidus* (Buckley), and the odorous house ant, *Tapinoma sessile* (Say), and are evident also among the Formicinae (e.g., *Camponotus noveboracensis* (Fitch), *Gigantiops destructor* (F.), and *Prenolepis imparis* (Say)). The shape of the lacinia and the placement of the comb are also similar to those of *Myrmecia auriventris* Mayr, although the comb in the latter species extends almost to the lacinial apex. The general form of the labium resembles closely that of the dolichoderines in which there is usually a reduction in the number of setae in the subglossal brushes (this re-

duction is not evident in *D. attelaboides*). Some difficulty was encountered in counting the labial palpus segments. Only 3 could be defined clearly in the preparation examined. Wilson et al. (1956) recorded the worker palpus as being 4-segmented. The nature of the articulation of the proximal segment was obscured, and it appeared as a cylindrical, nonarticulated evagination of the prementum.

CONCLUSIONS

The mouthparts of *A. simoni* resemble closely the mouthparts of several dolichoderine species. However, in several respects they are also similar to the mouthparts of many ponerines, and in the condition of the lacinia they resemble *M. auriventris*. Hermann (1968) reported that the poison apparatus of *A. simoni* most closely resembles the apparatus found in the Dolichoderinae. Wilson et al. (1956) found that some characters in both larval and adult morphology of *A. simoni* are shared exclusively with the Dolichoderinae, while in other characters the aneuretines are so generalized as to be closer to the Myrmeciinae and Ponerinae. An examination of the mouthparts confirms these observations.

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