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Nota Científica

THE CURRENT STATUS OF PROCOXAL CAVITIES IN MORDELLIDAE (COLEOPTERA)

Resumen: Por muchos años se pensó que una de las características taxonómicas para distinguir a la familia Mordellidae, era la presencia de procoxas abiertas posteriormente. Sin embargo, aunque éstas internamente están abiertas, externamente se presentan cerradas; situación que se ha prestado a confusión en muchas de las claves a familia. En esta nota se describe el prosterno incluyendo las cavidades coxales y se ilustra con fotografías.

For many years it has been thought that procoxal cavities are opened behind in Mordellidae. However, we discovered although the cavities are open internally, externally are closed behind; this is a very valuable character in Taxonomy. The first author is Professor of Taxonomy of Insects, and each time that he taught there was a problem using the key to identify Mordellidae. So he conferred with the second author, currently Professor of Insect Morphology. We decided to describe the structure of the procoxal cavities.

The text books on insect morphology such as Snodgrass (1935. *Principles of Insect Morphology*) and Weber (1933. *Lehrbuch der Entomologie*), do not describe the prothoracic sternum in Coleoptera. According to Matsuda (1970. *Morphology and evolution of the insect thorax*) the prosternum in *Chauliognathus* consists of a short basisternum which is continuous with the furcasternum bearing simple, paired furcae. In *Gyrinus* and *Carabus* the basisternal area is almost completely absent and the precoxal bridge reaches the base of each furca. In the prothorax the furcal bases are separated and the furca has no association with the pleural arm, which is absent. The prothoracic spina has been found in several Adephaga and Meloidae, and in the larvae of *Tenebrio*, *Riolus*, *Peltodytes* and *Sphaeridium*.

Borror *et al*. (1989. *An introduction to the study of insects*) mentioned that many Coleoptera have prosternal sutures that divide the prothoracic sternum from the rest of the segment. They described briefly the anterior margin of the sternum and the prosternal process, and use the term "closed coxal cavity" when the prothoracic sclerites expand behind the coxae, and "open coxal cavity" when the sclerite that closes behind the prothoracic coxal cavity is the mesothorax.

Crowson (1981. *The Biology of Coleoptera)* states that the prosternum is always a median undivided sclerite, with lateral wings in front, abutting on the pleura or on the hypomeron, and narrowed between the coxa to form the prosternal process. Sometimes the apex of the prosternal process may be widened behind the front coxae to form part of a posterior closure of the coxal cavities. Commonly, and probably primitively, the coxae

have a more or less distinct mesal articulation in a socket of the prosternal process. With the development of large and projecting front coxae, the prosternal process may be very much narrowed to become carinate, as in Chrysomelidae-Galerucinae, or even disappear altogether, as in many Cantharoidea.

The form of the front coxal cavities varies considerably, and provides important taxonomic characters in most groups of Coleoptera. In the primitive types (e.g. Cupedidae) they are transverse, with the trochantins exposed, and open behind. In such cases the anterior spiracles are more or less exposed. An external posterior closure of the coxal cavities may be produced by extensions of the pleura, as in many Adephaga, or of the hypomera, as in numerous Polyphaga (Bell 1967. *Ann. Ent. Soc. Am.* 60: 101-107).

The coxal cavities of Mordellidae

For the present study we used specimens of *Mordellistena* sp.; however, the nature of the procoxal cavities is the same for the entire family. We examined the following species: *Conalia helva* (LeConte), *Hoshihananomia octopunctata* (Fabricius), *Isotrilophus erraticus* (Smith), *Mordella atrata* Melsheimer, *M. marginata* Melsheimer, *M. serval* (Say), and *Paramordellaria carinata* (Smith).

The prothoracic sternum is very small; it is formed by a triangular sclerotized basisternum which extends from the anterior ventral edge of the segment, being narrow behind, to fuse at the base of the prosternal process (Fig. 1). The almost circular edge of the coxal

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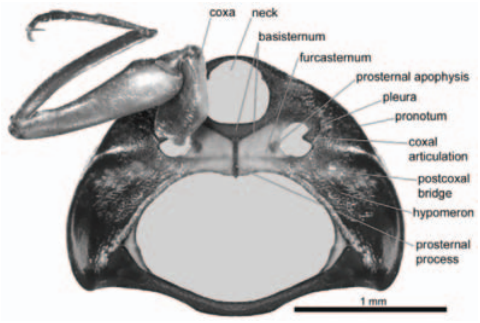

Figures 1-2
1.- Prosternum, 2.- Structures of prosternum of *Mordellistena* sp.

cavities is interrupted in the lateral margin by a condyle, where the coxa is articulated with the pleuron. The remainder of the prothoracic sternum, formed of clear and thin cuticle, is delimited in front by the sclerotized basisternum, laterally by the coxal cavities, and behind by the posterior edge of the prothorax, and it is divided in half by the prosternal process. In this plate there are, near the coxal cavities, the bases of sternal apophysis, which extend vertically inside the prothorax almost to the pronotum. The apophysis is independent and those do not form a furca. The external apophysis position indicates the morphological limits between sternites. In this way, the basisternum reaches the apophysis, whereas the apophysis base and cuticle that keep them attached to postcoxal sclerite, must be interpreted as furcasternum (Fig. 2). We did not see a spinasternum. There is a wide postcoxal bridge, which is formed by an extension of the hypomeron, reaching the prosternal process. The sclerotized basisternal area, from the pleuron to the prosternal process, is what has been known in books as "prothoracic sternum".

With this new information we need to actualize all the family keys in regard to coxal cavities.

To observe the coxal cavities in pinned specimens we recommend to relax them, such as by heating in 70 percent ethanol for 4 to 8 min. Once relaxed, holds the specimen with fine forceps and with another pair slightly separate the head from prothorax and mesothorax.

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