



Baldanders konstantinovi
Chamorro and Schoeller

Morphology of the head and associated structures in New World Cryptocephalini (Coleoptera: Chrysomelidae: Cryptocephalinae)

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Introduction

Cryptocephalini are an uncommon group of beetles which are more commonly referred to as the case-bearing leaf beetles. These small (2-7 mm) beetles are phytophagous specialist feeders, meaning they feed on a single species or group of plants. Due to this nature they can potentially be economically important either as potential pest species or as a means of biocontrol. This group is distributed worldwide, with fourteen genera currently described from the New World. Despite this wide distribution, their taxonomy is understudied and poorly understood. Currently Cryptocephalini is broken up into three subtribes: Cryptocephalina, Monachulina, and Pachybrachina. The morphological characteristics described in this study may aid in revising the classifications of these taxa.

Materials and Methods

The specimens for this study were obtained from the chrysomelid collection in the National Museum of Natural History (NMNH), Smithsonian Institution. Representative species were chosen from each New World genus, with the exception of *Sternoglossus Suffrian* due to its rarity. Samples were prepared by carefully removing the relaxed heads from their bodies under a dissecting microscope and mounting on a metal stub. In some specimens all mouthparts were also removed and mounted. All specimens were coated with a heavy metal and imaged using a Zeiss Evo MA15 scanning electron microscope for analysis.

Results and Discussion

Through this study morphological characteristics have been discovered which can potentially aid in the study of phylogenetic relationships among the Cryptocephalini. In addition to supporting generic groupings of species, a number of traits were discovered which support the combination of the subtribes Cryptocephalina and Monachulina into a single taxa, as suggested by Chamorro and Konstantinov 2004.

The first segment of the antenna, or scape, is more elongate in the subtribes Cryptocephalina and Monachulina than in Pachybrachina. If the antennal condyle (the ball like process where the antenna is inserted into the head) is ignored and the antenna is viewed either dorsally or ventrally in Pachybrachina the length is typically no more than twice the longest width (Fig. 2). In Cryptocephalina and Monachulina the length is always significantly longer than twice the greatest width (Fig. 1).

In many of the beetles specialized setae are present along the upper margin of the eyes. We are defining specialized setae to refer to those which are present in an abscess with the area directly around the seta raised, possibly due to housing an unidentified gland or sensory organ. Multiple of these setae are present along the margin of each eye of Pachybrachina (Fig. 4). In Cryptocephalina and Monachulina these are either absent (Fig. 3) or present as a single pair of heavily modified setae located towards the inner margin of each eye (Figs. 5-6).

The location and lengths of the setae present on the palpi of both the maxillae and labium are different between the two groupings of Cryptocephalini. In Cryptocephalina and Monachulina each palpomere has long setae present only around the apex, with any additional setae being significantly shorter in length (Fig. 7). The palpomeres in Pachybrachina are much more setose, and have long setae present across nearly their entire length (Fig. 8).

In Pachybrachina there is a setose sulcus present on the gular area towards the opening of the mouth. The relatively dense setae form a brush angled towards the mouthparts (Fig. 10). Cryptocephalina and Monachulina often have a few scattered setae present in this general area, but there is never a complete sulcus and the setae are never arranged into a brush (Fig. 9).

In this study the presence of tentorial pits were discovered to be present on all Cryptocephalini (Figs. 11-12). These punctures mark the area in which the anterior arms of the tentorium, an internal membrane of the head, attach to the exoskeleton. The point at which these attach has been defined as the posterior margin of the clypeus, making them useful in analyzing the anatomy of heads in which the frontoclypeal suture is absent. Previously authors such as Medvedev have interpreted the entire frontal area below the antennae. However, the low position of the tentoria pits show that this is incorrect, and that most of this area is actually the frons, with only a small lower portion being clypeus.

The genus *Mylassa* is an unusual group of Cryptocephalini which entomologists have had a difficult time placing taxonomically. In their 2010 study of the immature stages of *Mylassa crassicolis* Jerez and Briones proposed that they be placed in Pachybrachina due to similarities in their eggs and first instar larvae. All four of the head morphological characteristics from this study which were found to separate the two subfamilies support the placement of *Mylassa* within the Pachybrachina.

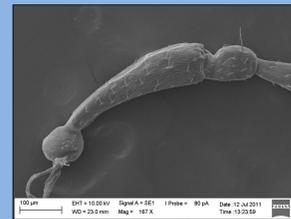


Fig. 1. *Heptarthrus longimanus*

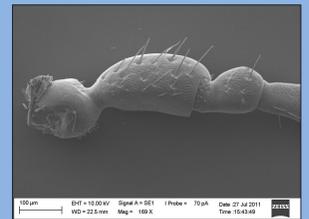


Fig. 2. *Metallactus albopictus*

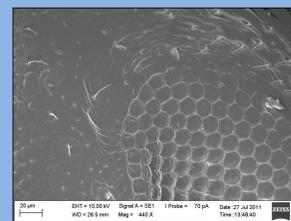


Fig. 3. *Lexiphanes coenobita*

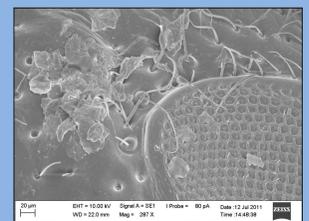


Fig. 4. *Pachybrachis gayi*

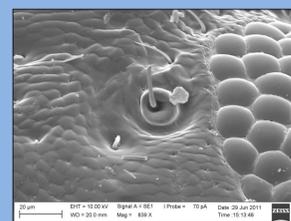


Fig. 5. *Bassareus clathratus*



Fig. 6. *Bassareus clathratus*

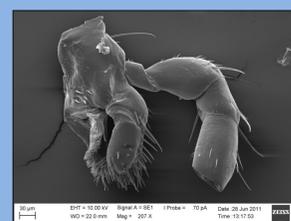


Fig. 7. *Bassareus mammifer*



Fig. 8. *Griburius scutellaris*

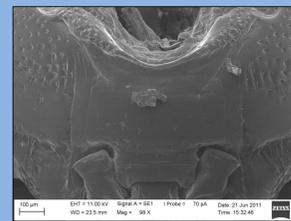


Fig. 9. *Cryptocephalus aulicus*

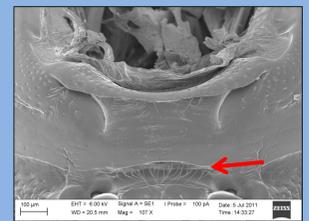


Fig. 10. *Griburius scutellaris*

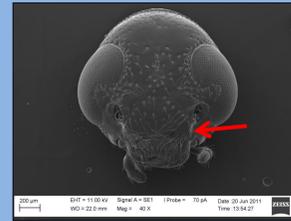


Fig. 11. *Metallactus albopictus*

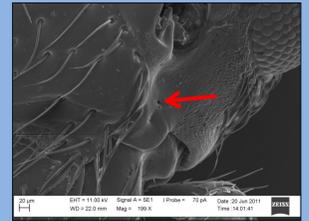


Fig. 12. *Metallactus albopictus*

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