

Morphology of the eyes and sensilla in the antlion larvae (Neuroptera: Myrmeleontidae)

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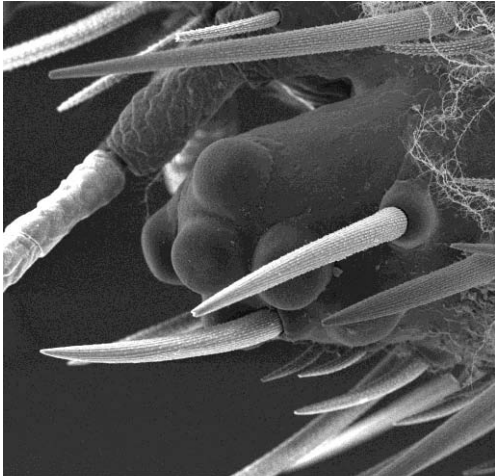
Antlion larvae (Neuroptera: Myrmeleontidae) live in sand or loose soil, and construct conical pitfall traps [1]. The larvae feed on small arthropods that slide into the pit. This specific behaviour and sand-dwelling habit are reflected in antlions' morphology. The aim of the study is to describe cuticular sensilla and the eyes and their possible role in the biology of antlions. SEM studies were performed on larvae of a non-pit-building antlion *Neuroleon microstenus* (McLachlan) and two pit-building antlions, *Myrmeleon formicarius* L. and *Euroleon nostras* (Geoffroy in Fourcroy). Larvae were fixed in 2% glutaraldehyde, dehydrated and coated for electron microscopy using standard procedures, and scanned using a Zeiss digital scanning microscope DSM 950.

Larval eyes or stemmata are positioned on eye tubercles (Fig.1). Each tubercle bears seven stemmata. Non-pit-builders differ from pit builders according to more prominent eye tubercles and that is believed to be an adaptation to non-pit-building conditions.

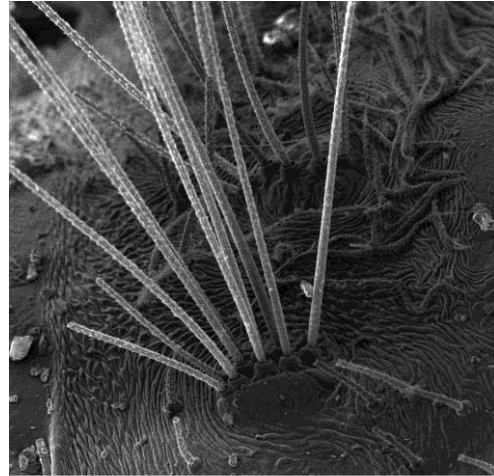
Four types of bristles or hairs could be distinguished: bristles, plumose hairs, dolichasters and digging setae. Bristles are freely movable mechanosensitive hairs widely distributed on the surface of an antlion's body (Figs.1-3). On the scoli, i.e. lateral swellings of the body, bristles occur in tufts (Fig.2). At all species examined, plumose hairs (Fig.3) are scattered on the dorsal and ventral part of the body. Short, club-shaped bristles with a cut off tip, named dolichasters (Fig.4) are found only in *N. microstenus*. On the tip of the abdomen of all species examined digging setae occur (Fig.5). Their form and arrangement are species specific. Campaniform sensilla were noted for the first time in antlions and were found on the legs and on the distal parts of the abdomen. It is presumed that the abdominal campaniform sensilla have role in the control of digging in sand [2].

Two types of chemoreceptors are found: sensilla basiconica and sensilla coeloconica. In all species examined, on the tip of the antennae and labial palps, sensilla basiconica occur. Sensilla coeloconica (Fig.6) are scattered in the whole length of the jaws. In *M. formicarius*, a digitiform sensillum occurs on the distal part of the mandibles. Digitiform sensilla on the mouthparts of larval Coleoptera have been shown to function as mechanoreceptors, responding to vibrations [3]. The sensilla have been also found in a neuropteran family Dilaridae [4].

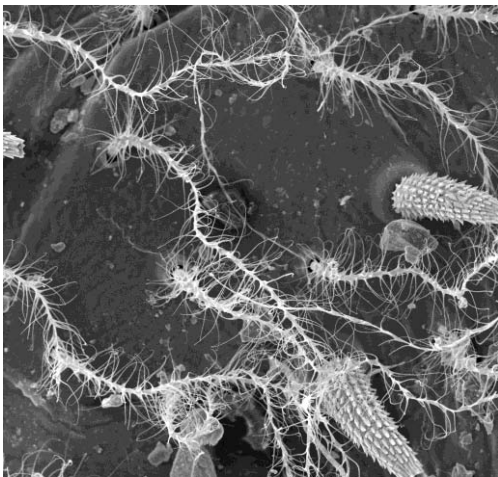
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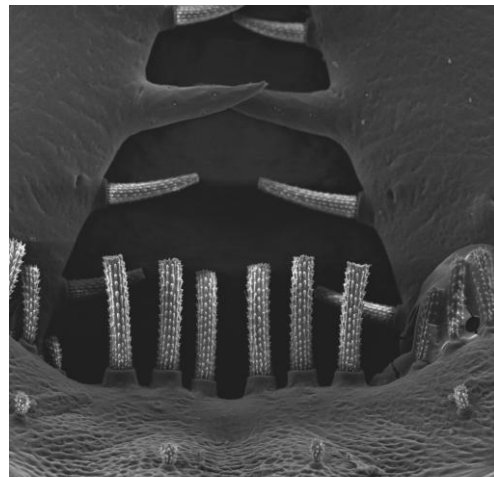
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Figure 1. Left eye tubercle with stemmata and bristles of *M. formicarius*.



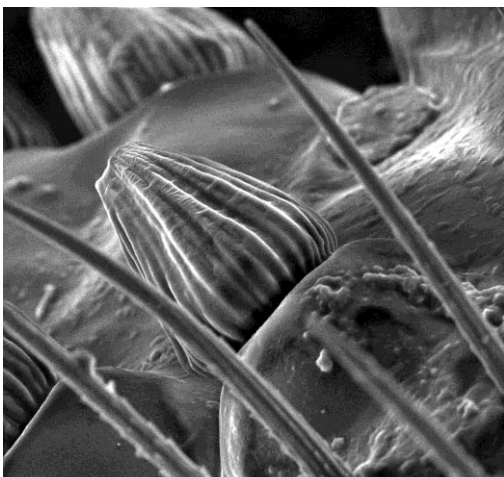
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Figure 2. Bristles on the scolus arranger in a tuft in *M. formicarius*.



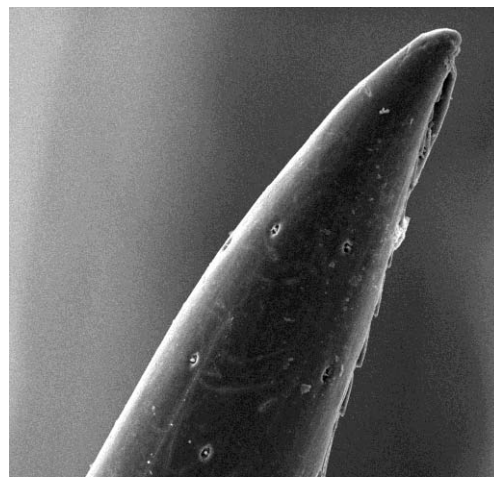
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Figure 3. Plumose hairs and bristles on the abdomen of *E. nostras*.



200x, 296x
Figure 4. Dolichasters on the frontal margin of the head of *N. microstenus*.



1000x, 1480x
Figure 5. The digging seta on the distal end of the abdomen of *M. formicarius*.



500x, 741x
Figure 6. Sensilla coeloconica on the tip of the jaws of *M. formicarius*.