

## The trunk integument of zeuglopteran larvae : One of the most aberrant arthropod cuticles known (Insecta, Lepidoptera)\*

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The integument of the dorsal/dorsolateral surfaces of micropterigid larvae (Lepidoptera, suborder Zeugloptera) has a strikingly specialized, non-solid, cuticle which seems unparalleled in the phylum Arthropoda. The functional significance of this design is unknown, but it is straightforward to assume that it is somehow related to maintaining the water balance of the larvae in cases of temporary drying of their litter/periphyton habitats.

The main features of the dorsal trunk cuticle are visible in Fig. 1. The sclerotized, lamellate exocuticle has a honeycomb structure: Each chamber of the "comb" apparently corresponds to a single epidermal cell, and the cuticle of the lateral chamber walls hence is secreted along the boundaries of the epidermal cells. The cells are fluid-filled, and they may be very much (up to some 15 times) higher than the epidermis. The bottom layer of the exocuticle has a group of small pores in each chamber, and it is separated from the "loose-packed" (non-lamellate) endocuticle by a fluid-filled space. Small electron-dense domes are abundant on the outer surface of the endocuticle; they may serve as spacers where the two cuticles are closely appressed.

The trunk surface is loosely overlaid by a curious pellicle (to which bacteria, algae and coarser foreign bodies often adhere), which closely matches the relief of the exocuticular surface. The origin of this pellicle remains to be clarified.

The ventral/ventrolateral trunk cuticle is simpler, but has not yet been studied in detail.

Overall similar cuticle modifications occur in larvae of the genera *Sabatinka* WALKER, 1863 and *Micropterix* HÜBNER, 1825, which, according to the current interpretation, represent the two clades that originated in the basic splitting event within the Micropterigidae. Hence they can undoubtedly be ascribed (as a powerful autapomorphy) to the ground plan of the family/suborder.

A more detailed (SEM and TEM) study of the zeuglopteran integument is now being undertaken by R. M. KRISTENSEN and the author.

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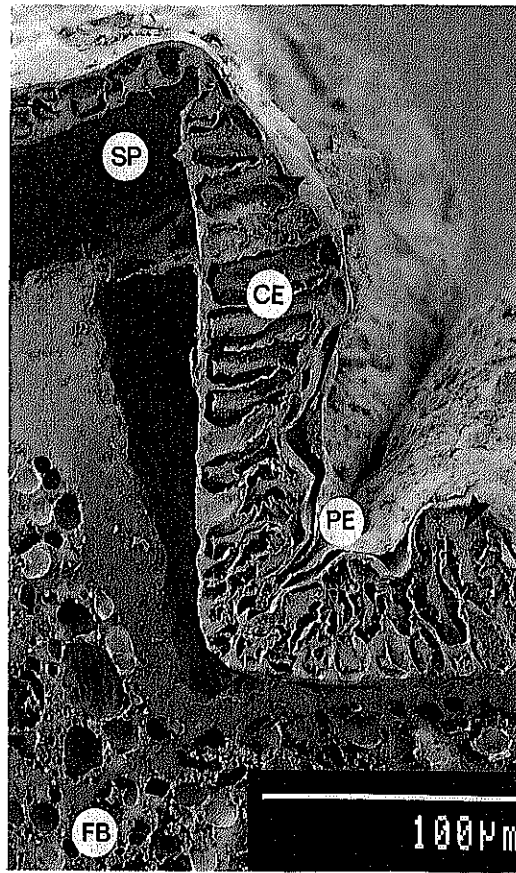


Fig. 1. *Sabatinca chalcophanes* (MEYRICK, 1885). Dorsal trunk integument. Scanning electron micrograph of microtome sectioned preparation after dissolution of paraplast block in benzol, and freeze drying. The epidermal cells are not, after this preparation technique and at this magnification, distinctly separable from the underlying fat body cells. CE: chambered exocuticle, FB: fat body, PE: external pellicle, SP: space between endocuticle and chambered exocuticle. Arrows point to masses of coagulated fluid in exocuticular chambers.