

Hemiptera are usually grouped at the tip of the labium and they monitor only the outer surface of the host. Our study concerns all sensillary structures occurring on the apical segment of the labium in different genera of Peiratinae. The number, distribution, and types of sensilla were analysed using a scanning microscope. In representatives of the subfamily, several morphologically distinct types of sensilla were identified. A few new types of sensillary structures are described, as well as two arrangement types of newly described sensilla are presented in this work.

A new interpretation of homologies of the head of Auchenorrhyncha (Hemiptera) based on nymphal morphology

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The generalised head of Auchenorrhyncha is divided by sutures into several sclerites. One of the most important boundaries for understanding relations among taxa is the transverse epistomal suture continued as the subgenal suture on the sides of the face. The epistomal suture is always connected with the anterior tentorial arms and marked externally by the anterior tentorial pits, which are positioned close to the bases of the antennae in leafhoppers, and much lower in Fulgoroidea. The medial portion of the head below the epistomal suture is the clypeus, divided by the transverse clypeal suture into a smaller lower portion, the anteclypeus, and an upper larger portion, the postclypeus. Below the clypeus, the head is extended into the rostrum (labium) covered basally by the labrum. On each side, the clypeus is bordered by the lorum. The lateral portion of the face, delimited by the lorum medially and by the subgenal suture dorsally is the maxillary plate. The lateral portion of the face above the subgenal suture and bearing the antenna is the gena. The antenna in its primitive condition is segmented, but became annulated in Fulgoroidea and most Membracoidea. The gena is delimited dorsally by the antennal ledge. A small triangular area above the epistomal suture is the frons. The area above frons is the postfrons. The postfrons is delimited laterally by the postfrontal suture or ecdysial line. The large dorsal portion of the head, delimited anteriorly by the antennal ledges and ecdysial line, is the vertex. The vertex is divided medially by the coronal suture, reaching the frons anteriorly. It bears two ocelli. During moulting, the cuticle of the head brakes forming a Y-shaped split along the coronal suture and ecdysial line. In adults the ecdysial line is usually not visible.

In general, all sutures dividing the head sclerites are more pronounced in nymphs than in adults. The most important changes of the head relate to modification of the proportions of its main sclerites and these provide characters that distinguish the main lineages of Auchenorrhyncha. In Fulgoroidea, the head is similar to the ground plan. It has a greatly enlarged postfrons, while the small clypeus occupies the lower portion of the face; the epistomal suture is usually distinct; the frons and median ocellus is often reduced; the ecdysial line is on the dorsum of the head. In contrast to Fulgoroidea, the postfrons in Cicadoidea, Cercopoidea, and Membracoidea is a small sclerite. In Cicadoidea the strongly enlarged and inflated postclypeus pushed the epistomal suture and the frons to the dorsum of the head; the frons and postfrons are distinct. The head of Cercopoidea nymphs is very similar to that of Cicadoidea: the postclypeus is greatly enlarged and extends to the dorsum, the epistomal suture is distinct; the frontal suture is vestigial, and the median ocellus is absent. The head of Cercopoidea usually transforms significantly after moulting into the imago. From rounded, the crown-face transition becomes carinate. The rudimentary anterior carina is often traceable as a pale line on the dorsal part of the

postclypeus in nymphs. After moulting, a portion of the postclypeus restricted anteriorly by the anterior carina becomes embedded into the crown as a distinct plate. In Membracoidea nymphs, the epistomal suture and the frons are reduced, but in many groups they are still traceable by paler pigmentation. In two groups, Hylicinae and Proconiini (Cicadellinae), the frons is often extended into a long process, which may be absent in adults. In Membracoidea, the epistomal suture is always on the face. The postclypeus occupies a large portion of the face and, excepting Hylicinae and Proconiini, is fused with the frons and postfrons to form the frontoclypeus. The ecdysial line and ocelli may be on the face or on the crown.

Coloration in *Graphosoma lineatum* (Hemiptera: Heteroptera: Pentatomidae): cryptic or warning function?

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The adult pentatomid *Graphosoma lineatum* (GL) with black longitudinal stripes on red to yellow ground is regarded as exemplary aposematic. This notion is simplified: the function could be either warning or cryptic. The change in antipredatory strategy of GL depends on its annual colour change corresponding with alternating colour of plant environment. GL feeds on seeds of Apiaceae and is univoltine to bivoltine in N and C Europe. The adults leaving hibernacula in spring are brightly red while all (Sweden) or most (Bohemia) late summer individuals of the new generation are pale (beige to brownish), the ground colour of these individuals will turn red during hibernation. GL is thus conspicuous on freshly green spring vegetation while it is largely cryptic on the late summer withering and predominantly yellowish to brown vegetation.

The adaptive value of the two different colour forms of GL has been tested in experiments with the great tit, *Parus major*, as insectivorous predator. We used wild-caught birds foraging in the semi-natural environment to test the detectability of the two forms on summer dry vegetation. The birds were pre-trained to eat baits made by replacing the abdomen of dry GL specimens with the sunflower seeds and subjected then to the task of finding five baits of either red or pale form of GL. Birds took considerably longer time to find pale GL baits than the red ones. Consequently, the pale form of adults appears more cryptic for the bird predators on the dry summer vegetation.

Aposematic function of the two colour forms of adults and of fifth instar larvae (L5) have been tested using naive hand-reared birds. The birds were trained to avoid one of the three prey types in a sequence of trials on day 1 and then it was tested with either the same or different prey type on day 2. The aposematic coloration of both the adult colour forms had the same effect. The birds did not hesitate longer to attack either of the forms; they learned to avoid both of them at the same rate, remembered them equally well and generalized between them symmetrically. On the contrary, the birds killed and ate majority of L5 offered during the training instead of learning to avoid them. However, the mortality of L5 was substantially decreased by the birds' previous experience with adults of any colour form. Moreover, the experience of birds with L5 increased the mortality of subsequently encountered adults over that caused by naive birds.