PSYCHE.

ANTENNAL STRUCTURE OF CERTAIN DIPLOSIDS.

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The antenna of the male *Diplosis* is commonly said to possess twice the number of segments as does that of the female, excluding the two basal segments in each sex. At least such has been the accepted number until within a few years. According to Kieffer,* we owe the discovery that these segments in the male are compound and composed of two enlargements to Laboulbène, this, of course, doing away with the disparity in number of antennal segments between the sexes. In this same paper Kieffer describes some novel structures found upon the antennae of the male, which he terms *filets arqués* and which perhaps may be translated as *arched filaments*.

The arched filaments differ widely from ordinary setae, though they occur in whorls in the same manner. They arise from pits in the chitine in much the same way as do the setae, but, instead of remaining single and tapering to a point, they divide near the base into two equal branches which diverge to the middle of their length where they recurve, sharply as a rule, and turn to unite with the base of the adjoining filaments in the whorl (Fig.

1). Thus by means of the anastomosises these arched filaments, which from their designation one would expect to be free from each other, are in reality continuous and form a looped thread around the segment with anchoring branches at regular intervals. This structure is well brought out in a preparation of the male antennae of *Diplosis pyrixora* Riley. In this instance a number of the arched filaments accidentally became loosened from their attachments, but the anastomosises, where each arch is joined to the base of the next, remained unbroken and distinct. In this preparation the components of some of the arches may be seen diverging at very various angles—another strong fact in favor of their being no connecting membrane. The whorls of arched filaments occur on both enlargements of the antennal segments; in some species one on the basal and two on the medial enlargement. The ordinary setae occur in whorls in close proximity to the arched filaments, though usually nearer the base of the segment, unless there be two sets of filaments on one enlargement. The arched filaments have a uniform diameter throughout their course, though the anchoring branches are a little stouter; but there is no

* *Bull. séances Soc. entomol. Fr.*, 1895, p. CXCII.

indication of tapering as in the setae. The arched filaments are frequently as long as the setae, and in some instances longer; their length appears to be governed by the same conditions which determine that of the setae. In *Diplosis cucumeris* Lintn. the arched filaments on the dorsal side of the antennae are prolonged to nearly twice the length of a segment, while on the other sides they are less than half that length; the setae exhibit the same variation in length. In *Diplosis setigera* Lintn. and *D. pyrivora* there is no such dorsal elongation of the setae and the same is true of the arched filaments; they are about equally developed. The outlines described by the arched filaments are quite variable; they may be short with a broadly rounded apex or they may be excessively elongated and with a quite acute apex, or they may be more fanciful and describe a spatulate form. All of these variations may be seen in *D. cucumeris*.

Dr. Enzo Reuter in a paper on "Zwei neue Cecidomyinen"* questions the accuracy of the description of the arched filaments given by Kieffler and claims that they are but thickened borders of membranous lamellae or processes, and in his figures so represents them. If the figures are accurate, it is quite safe to conclude that Dr. Reuter was looking at very different structures from those described

by Kieffler; he has certainly failed to represent the peculiar origin of the arched filaments, though he has apparently figured the pits from which they arise. In a later paper M. Kieffler and M. Janet † have given in detail reasons why these structures cannot be regarded as the thickened borders of lamellae. They found it was impossible to demonstrate the presence of a membrane by histological methods; no trace of a connecting line between the bases of adjoining filaments could be seen; the arched filaments changed their form with great facility and in one instance a seta was observed to pass through a loop formed by a filament, which would be unlikely to occur if a membrane existed.

In the latter article referred to above, M. Janet has figured in detail the peculiar insertion of the arched filaments and he presents a theory of how they are developed. In short he suggests that they may have arisen as hypodermic lamellae and that the edges may have become thickened and chitinized while the inner membranous portion gradually shrank from the outlining edges and disappeared. He holds the opinion that the chitinization of the thickened edges and shrinking of the membrane at the apical portions of the lamellae would, in all probability, begin before they had attained their full length. This is perhaps as good a theory as can be advanced and agrees closely with the

* *Acta Soc. pro fauna et flora fennica*, xi, No. 8, 1895, pp. 11-12.

† *Bull. des séances Soc. entomol. Fr.*, 1896, pp. 37, 183-185.

facts, but it seems as though if true, there should be remnants of the membrane observable in some of the species. The insertion of the arched filaments being so similar to that of setae renders this theory not easy to accept, though no better one can be advanced. It is worthy of note in this connection that M. Kiefler has described some small hyaline lamellae on the female antennae of the genus *Monardia*.*

At this time it may also be well to call attention to certain structures in the female antennae of at least one species of *Diplosis* that appear to have been undescribed. On the enlarged portion of the segment there is, as in the male, a number of large setae and the whole of the enlargement is thickly clothed with a very short, minute pubescence. In the female of *Diplosis setigera* Lintn. this pubescence is absent along several longitudinal lines which extend from the basal third of the enlargement to near its apex; at the basal third these lines join a transverse line of similar character, and at the apex they are continued as diverging oblique lines over the edges of the segment. These lines are studded with large, transparent spots which in outline show themselves to be tubercles. They are disposed along these cleared lines at regular intervals, and some are found scattered irregularly beside the longitudinal lines. In spite of the few

irregular ones, the others give a marked appearance to the segment; it would seem as though these tubercles must be some special sense organ. Similar tubercles are found in *D. pyricivora*, but they are larger and exhibit but traces of the regularity of arrangement seen in *D. setigera*, while nothing of the kind occurs in *D. cucumeris*, at least with such striking distinctness, and it is doubtful if they are present. It may be that they are nothing more than the pellucid spots seen on other antennae which in *D. setigera* have reached an extraordinary degree of development and have been disposed with more than usual regularity.

The structures described above are illustrated in the figures of plate 1, which have been reproduced from the eleventh Report of the New York State Entomologist. Figure 1 represents the arrangement of setae (*s*), and arched filaments (*a*) in the male of *Diplosis setigera*. In figure 4, the same structures are shown on a segment of *Diplosis cucumeris*; *a*, *b* represent the basal portions of the much elongated dorsal setae of the two bulbs; *c*, *d*, the basal portions of the similarly elongated dorsal arched filaments; *e*, *f*, *g*, the shorter arched filaments of the three whorls. Figure 2 represents the peculiar arrangement of structures on the antennal segment of the female of *D. setigera*; two of which are shown in outline at *y*, *y*. There is no figure 3.

* *loc. cit.*, cccxix, 1895.