

Fine structural analysis of leafhopper egg cell¹

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Mature egg cells of the small leafhopper *Euscelidius variegatus* (KBM.) were analysed with the help of composite electron micrographs of longitudinal and cross sections. To the best of our knowledge, these are the first investigations carried out on such a large, centrolecithal egg of the telotrophic, meroistic ovariole type, which is extremely poor in plasm. The egg architecture is described with emphasis on the qualitative and quantitative distribution of the egg structures studied. There are four significantly different regions in the leafhopper egg according to the distribution of ribosomes, vacuoles, endoplasmic reticulum, mitochondria, microbody-like structures and reserve substances. These regions are the periplasmic anterior pole, periplasmic posterior pole, other periplasm and the central region. The posterior pole region is of particular importance and differs from the anterior pole region in that it contains the symbiotic ball and a greater number of glycogen-ooplasm-complexes.

The ribosome-rich, granulated glycogen-ooplasm-complexes are considered to be a special form of fermenting ooplasm. These complexes are spread out over a small area and increase in frequency in the direction of the posterior pole. They are possibly identical with the fermentative gradient which was postulated in an earlier working hypothesis. Microbody-like structures which are specific to the egg are discussed as possible organelles for the degradation of various reserve substances, i. e. lipids, protein and glycogen.

¹ SCHWEMMLER, W. & G. KEMNER. 1983. *Fine structural analysis of the egg cell of Euscelidius sp. (Homoptera, Cicadina)*. Cytobios 37: 7-20

New concepts in the taxonomy of Afrotropical Pentastirini

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Since the second half of the past century about 170 Cixiidae were described from the African continent south of the Sahara, in thirteen genera. About 100 taxa were referred to the composite genus *Oliarus* STÅL. A taxonomic revision of the genus was undertaken, giving a redescription of all the species, based primarily on the structure of the male and female genitalia.

The tribe Pentastirini was erected by EMELJANOV (1971) to accommodate eight genera with, except for the genus *Oliarus*, a predominantly Palearctic distribution. The following diagnostic characters were used: mesonotum with five carinae (i), ovipositor reduced (ii), valvulae 1 not corrugated (iii) and valvulae 2 not fused together (iv). The selection of these characters was based mainly on a study of the Palearctic fauna, and some of these are not applicable to tropical Pentastirini.

The question whether the African *Oliarus*-species are congeneric with the type-species of the genus, namely *Cixius walkeri* STÅL, cannot be solved with a geographically limited study; a more detailed revision of the Oriental fauna will be needed to elucidate this problem. Nevertheless, the genus *Oliarus*, as it is defined in the present literature, is polyphyletic. We were able to recognise nine new genera among the African species; the Palearctic genera *Pseudoliarus* HAUPT and *Pentastiridius* KIRSCHBAUM were recognised as well. For scientific reasons, new names cannot be used in this paper and we will confine ourselves to a brief discussion of the characters used.

Characters of the head such as the proportions of the vertex and face, the structure of the subapical keels on the vertex, the presence or absence of maculae (round, oval) and fenestrae (see FENNAH, 1958), and to a lesser extent color, are useful to distinguish species-groups. Sometimes the postclypeus is swollen and enlarged at the expense of the frons. In this case the median carina and the median ocellus are reduced or even totally absent. In some species-groups the characters mentioned above are useful as a diagnostic character, in others to a lesser extent by the presence of intermediates, which makes them less applicable in keys.

Most *Oliarus*-species bear five longitudinal carinae on the mesonotum; some southern African species however have only three keels, the two submedian ones being reduced or totally absent. This feature, which is most frequently used for the recognition of Pentastirini, thus has to be treated with caution.

The wings and especially the tegmina bear some characteristics which are constant at the specific level but which can vary considerably within species groups. Granulation of the veins - granules regularly spread along the costal margin or confined to the proximal fourth or fifth - is constant within a species but difficult to describe. The tegmina can either be fully developed or reduced. In two species from the Cape Province (South-Africa) the second pair of wings is lacking.

The chaetotaxy of the hind tarsi has proved to be a very good diagnostic character. Some genera, like *Pentastiridius*, bear a double row of apical teeth, variable in number within a species, and described by FENNAH (1958) as "scale like teeth". The greater part of the species bear one apical row of a constant number of black teeth along the first and second segment of the hind-tarsi, f. i. seven (first tarsite) and five (second) in the genus *Pseudoliarus* or *Cixius walkeri*, or seven/seven in f. i. *Oliarus runingensis* SYNAVE. Aberrations however on one leg of a specimen may occur and its usefulness in a cladistic analysis is limited because it probably evolved several times during the course of evolution.

The male and female genitalia provide the most useful characters in the taxonomy and phylogeny of Afrotropical Pentastirini. The external parts of the male genitalia, more particularly the anal segment, the pygofer and the genital styles enclose the aedeagus. The latter consists of a sclerotised basal part, the periandrium, and an articulating, mostly membraneous part, usually called the flagellum. The aedeagus is connected to both sides of the pygofer by means of the left and right tip of the basal part of the periandrium. This condition is present in all Afrotropical Pentastirini and it may serve as a good synapomorphic character for the tribe. Some more species of other realms have to be examined to affirm this statement. The character was not used by EMELJANOV in his definition of the tribe, but it was present in all palearctic species examined by the author.

The (unmovable) spines on the periandrium, as well as the (movable) spines on the flagellum, their proportions and implantation proved to be the most reliable features for species recognition. The shape of the pygofer, anal segment and genital styles proved to be very helpful as well, but different species sometimes share the same kind of processes (convergence?). Although the form of the aedeagus can differ strongly from species to species, lock-key mechanisms could never be proved with parallel differences in the female genitalia, as described for *Cixius* species from the Azores by REMANE & ASCHE (1979).

Finally, the external female genitalia also bear good taxonomic characters. Differences were found in the shape of the anal segment, the form and the length of the valvulae, and the shape of the pregenital sternite. These results enable us to provide a better redescription of species which are only known from female material. Nevertheless, only in a few cases female genitalia could be used for the purpose of species identification, but it showed to be a very reliable character for the recognition of species groups and genera.

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- REMANE, R. & ASCHE, M. 1979. *Evolution und Speziation der Gattung Cixius LATREILLE 1804 (Homoptera Auchenorrhyncha Fulgoromorpha, Cixiidae) auf den Azorischen Inseln*. Marb. Ent. Publ. 1 (2): 1-264.

“Wax area” in cicadellids and its connection with brochosomes from Malpighian tubules¹

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Our unpublished data on origin, structure and function of the so-called “wax area” of Cicadellids have been accumulated since 1956. Basic orientation points for our investigations were papers of several authors, who worked on *Cicadulina mbila* (NAUDÉ) (STOREY, H. H. & NICHOLS, R. F. W. 1937. Proc. R. ent. Soc. Lond. 12: 149-150), heterogeneous insect species but chiefly leafhoppers (TULLOCH, G. S. *et al.* 1952. Bull. Brooklyn ent. Soc. 47: 41-42; TULLOCH, G. S. & SHAPIRO, J. E. 1953. Bull. Brooklyn ent. Soc. 48: 57-63; TULLOCH, G. S. 1954. Science 120: 232; WILDE, W. H. A. & COCHRANE, G. W. 1957. Proc. ent. Soc. Br. Colomb. 53: 19), *Orosius argentatus* (EVANS), *Cicadulina bimaculata* EVANS, *Austroagallia torrida* EVANS, *Eurymeloides* sp. (DAY, M. F. & BRIGGS, M. 1958. J. Ultrastruct. Res. 2: 239-244), and *Macrosteles fascifrons* STÅL (SMITH, D. S. & LITTAU, V. C. 1960. J. biophys. biochem. Cytol. 8: 103-133). Later, papers concerning brochosomes were selectively reviewed and synthesized (WIGGLESWORTH, V. B. 1972. The principles of Insect Physiology. London, Chapman & Hall, 7th ed.).

According to the results of our researches, we are induced to specify that:

- “wax area” or “aire cireuse”, well known for Typhlocybids (RIBAUT, H. 1936.

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