

Faune Fr. 31) and believed originated from a secretion of a wax area gland (OSSIANNILSSON, F. 1978. Fauna ent. scand. 7, 1), is due to accumulation or storing of brochosomes (Gr. βρόχος = mesh of a net, σῶμα = body) produced by Malpighian tubules cells;

- brochosomes, also named "Kügelchen" or "spherules" (GÜNTHART, H. 1977. Mitt. Schweiz. Ent. Ges. 50: 189-201; GÜNTHART, H. & GÜNTHART, M. 1983. Mitt. Schweiz. Ent. Ges. 56: 33-44), flow from the anus within droplets which are collected by the tibiae of the hind legs and transferred on the fore wing "wax area" or spread on the body surface;
- the medial side of the hind tibiae is provided with a comb of setae used both to store the droplets on the fore wings and to distribute brochosomes over great part of the body;
- the medio-ventral part of the fore tibiae is also provided with a comb of setae that is used to distribute brochosomes on the anterior part of the body;
- the "wax area" is more or less well differentiated in almost all Typhlocybinae;
- brochosomes are present in almost all Cicadellidae, adults and nymphs;
- brochosomes were not found only on Ledrinae and Ulopinae.

Our further investigations on several aspects of brochosomes are progressing.

Acoustic isolation in the genus *Javesella*?

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Reproductive isolation of different species belonging to the delphacid genus *Javesella* is amply substantiated for Dutch populations by their differentiation in hostplant relations and acoustic behaviour, as well as by their inability to produce fertile hybrids in experimental crossings (DE VRIJER, P. W. F., 1981. Acta Entomol. Fennica 38: 50-51). Since "calling-signals" are thought to be primarily responsible for the initial recognition of suitable mating partners, these signals potentially might form the basis for an acoustic isolation mechanism between different species.

In an experimental study on species recognition in *J. pellucida* (FAB.) (DE VRIJER, P. W. F., Neth. J. Zool.: in press) it was found that temperature-induced variation in male calling-signals did not seriously reduce the responsivity of females in play-back experiments, in spite of the drastic effects temperature was shown to have on certain parameters of the male calling-signal, such as strophe duration and pulse repetition rate. It was concluded that such parameters apparently are not of primary relevance to species recognition and that their differentiation therefore may not be expected to effectively ensure acoustic isolation between closely related species.

At present it is not known for any planthopper species which features of the acoustic signals actually serve as cues for species recognition, nor how different these should be from those of other species to lead to acoustic isolation. Therefore, conclusions on the function of acoustic signals in reproductive isolation of

closely related species require further experimental analysis, e.g. by means of play-back experiments. Table 1 presents some preliminary results of such experiments, which elsewhere will be reported on in more detail. At this stage it cannot be decided whether these results, which remarkably differ not only between different pairs of species but also between reciprocal combinations of the same pair of species, may be considered to reflect the actual significance of calling-signals in species isolation. Finally it should be emphasized that calling behaviour represents only the initial stage of mating behaviour in planthoppers and that more definite conclusions on possible acoustic isolation mechanisms require a complete analysis of courtship and mating behaviour.

Table 1: Mean levels of responsivity shown by females to play-back of male calling-signals of different species at 20°C. (For details on methodology see DE VRIJER, P. W. F., Neth. J. Zool.: in press)

| Female species (n = 20) | Male species | | |
|-----------------------------|-----------------|----------------------|---------------------|
| | <i>J. dubia</i> | <i>J. obscurella</i> | <i>J. pellucida</i> |
| <i>J. dubia</i> (KBM) | 96% | 8% | 18% |
| <i>J. obscurella</i> (BOH.) | 22% | 99% | 44% |
| <i>J. pellucida</i> (FAB.) | 30% | 10% | 98% |

Flight in grassland and arboreal Auchenorrhyncha

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Except in some major pest species, flight in Auchenorrhyncha has been insufficiently studied. Simple tests, e.g. releasing individuals from a height of 5.5 m, indicated that some species are primarily “flyers”, others “flitters” or “jumpers”. A comparative study of the flight apparatus should be rewarding.

Flight ability was also gauged by catches in a series of aerial suction traps, in which a third of all the species of British Auchenorrhyncha were recorded. For 10 years two identical traps were operated side by side at 1.2 and 9.1 m above ground level. More individuals of the arboreal species were caught in the higher trap, while the reverse was true of dwellers on low vegetation. Probably it is not migratory, but trivial flight that leads to this aerial stratification of species.

Alary polymorphism is common in Auchenorrhyncha, but in many taxa of the Hemiptera it is absent in the arboreal species. Thus all tree-dwelling cicadellids are fully winged and so are all Psyllidae and Aleyrodiade among the Sternorrhyncha and most of them live on woody Angiosperms. Again, most phytophagous, arboreal Heteroptera are macropterous and monomorphic (Table 1). Retention of wings by tree-dwellers may be related to the architectural complexity of trees and the wider spacing of their leaves and branches than in habitats of low vegetation. In complex and essentially three-dimensional arboreal habitats ability to fly may be more advantageous than the “option of brachyptery” with its possible increase in fecundity.

Fifth Auchenorrhyncha meeting in Davos, Switzerland August 28-31, 1984

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