## BOOK REVIEWS

CHVALA, M. 1983. The Empidoidea (Diptera) of Fennoscandia and Denmark. II. General part. The families Hybotidae, Atelestidae and Microphoridae. Fauna Entomologica Scandinavica, Volume 12. 279 pages containing 639 figures. Scandinavian Science Press Ltd., Langåsen 4, Ganløse, DK - 2760 Målov, Denmark. Ordinary price 200 D. kr. (discount prices: 140 D. kr. to subscribers for the whole series, and 180 D. kr. to subscribers for Diptera-volumes).

This work presents a long overdue breakdown of the paraphyletic "Empididae" of recent authors into its component taxa, as well as treatments of Scandinavian genera and species now referred to the new or revised family concepts Hybotidae, Atelestidae and Microphoridae. The treatment of the Hybotidae excludes the subfamily Tachydromiinae, which the author already revised in 1975 in Volume 3 of this series. His revision of the Scandinavian true Empididae, which he restricts to the subfamilies Oreogetoninae, Empidinae, Brachystomatinae, Hemerodromiinae and Clinocerinae, is stated to be in preparation and planned to appear in three future volumes. Chvála's concept of Empidoidea agrees with the concept of Orthogenya Brauer (1883), including also the family Dolichopodidae in addition to the families just stated. I prefer the use of Brauer's name, since the ranking of this group as a superfamily (as implied by the -oidea suffix) entails incongruence with the ranking of the subgroups of Cyclorrhapha.

Most of the 52 species described in this work belong to the Hybotidae. Two new species are included, *Oedalea ringdahli* and *O. freyi*. Only 3 and 4 species (respectively) of the relict Atelestidae and Microphoridae are reported for Scandinavia. All described Mesozoic fossils are reviewed and integrated into the phylogenetic analysis. Chvála's descriptions are detailed and well illustrated. His work will no doubt meet with the approval of all specialists working on Orthogenya. But this work is not only of interest to specialists. Chvála has included 60 pages of morphological and systematic discussion, in which he presents much new data contributing to our understanding of the morphological evolution and family-level systematics of the Orthogenya (Empidoidea) and Cyclorrhapha. Of particular interest to me are his conclusions regarding the homologies of the male terminalia, a controversial subject which has generated some extraordinarily misleading literature over the past decade. All students who have been indoctrinated with the still prevalent theory that the clasping organs of male Orthogenya and Cyclorrhapha differ from those of all other insects in being of tergal origin will be well advised to study Chvála's general discussion. In my opinion this theory can no longer be seriously maintained.

Particularly important for understanding the evolution of the male terminalia is Chvála's finding that a reduced true epandrium (9th tergite) is retained in the Empididae in his new restricted sense. He interprets the structure of *Hormopeza* (Figs. 87-89) as indicative of the groundplan condition in this respect, a view with which I concur. Thus I was not correct in stating in my 1972 book that the epandrium was "either lost or fused with cerci" in the groundplan of the Eremoneura (the group inclusive of Orthogenya and Cyclorrhapha). However, this correction need not give comfort to those who maintain that the clasping organs are of tergal origin (as assumed, for instance, in the 1981 Manual of Nearctic Diptera), since *Hormopeza* illustrates exactly the intermediate condition needed to verify my interpretation of the structure of the Cyclorrhapha and of other families of Orthogenya (reduction of the epandrium and dorsal expansion of the gonocoxites, a condition precursory to the elimination of the epandrium and fusion of the gonocoxites across the dorsum which I postulated). The

biarticled gonopods in *Hormopeza* are obviously homologous with those of other Diptera, and Chvála's data indicate that there is no basis in comparative morphology for assuming the replacement of these clasping organs with others of tergal origin. And if the replacement (tergal origin) hypothesis is demonstrably wrong for Orthogenya, then it is highly unparsimonious to assume it for the closely related Cyclorrhapha.

For the purposes of comprehensive comparative morphology Chvála's treatment of the male genitalia may be criticized for certain omissions. He does not discuss the homology of the paired "hypandrial" apodemes and the bridge joining them, nor does he clarify the origin of what I have called the intergonopodal (formerly interparameral) sclerites, nor does he discuss the groundplan condition and modifications of the gonites (paraphyses). The interpretion of all these structures has been disputed, and certain relevant arguments published by Hennig in 1976 need to be addressed. These omissions are no doubt due to a need for brevity within the present format, rather than to lack of interpretations. I hope that Chvála will be able to supplement his present account with a more detailed morphological paper.

Clarification of the structure of the tip of the female abdomen is also needed. Chvála's interpretation that the tergite and sternite of the 9th segment are well developed in some female Orthogenya seems to me difficult to reconcile with the interpretation of female Cyclorrhapha. In Cyclorrhapha we know (through ontogenetic evidence and the structure of intersexes) that the sclerites of the 9th segment are lacking in females, but the sclerites of the proctiger (10th tergite, 10th sternite and paired cerci) are normally retained. Since the structure of the abdominal tip in females of primitive Empididae, such as *Hormopeza*, resembles that in Cyclorrhapha, I think it probable that the sclerites of the 9th segment were already lost in the groundplan of female Eremoneura and that all sclerites interpreted by Chvála as belonging to the 9th segment in females really belong to the 10th segment. The phylogenetic conclusions drawn by Chvála (for instance, regarding the invalidity of the view that the presence of acanthophorites groups the Empidoidea within the Asilomorpha) would not be affected by such a change of interpretation.

I have to decide how to break down the Orthogenya (Empidoidea) for the Flies of the Nearctic Region, since contributions on parts of this group are presently under discussion. I am in general satisfied with the validity of Chvála's family concepts, and will follow them with one modification. It is clear that his concept of Microphoridae is paraphyletic, since one of its subordinate taxa (Parathalassiini) is demonstrated to be more closely related to the Dolichopodidae. In a strictly cladistic arrangement of monophyletic groups this situation can be handled either by raising the Parathalassiini to family rank or by including them in an expanded concept of Dolichopodidae. In either case the Microphoridae should be restricted to the group called Microphorini by Chvála. The question whether the group Orthogenya (Empidoidea) is monophyletic also requires consideration. Chvála regards the Atelestidae as a "monophyletic group of flies very probably sharing a common ancestor with the Cyclorrhapha" (p. 70) in agreement with a suggestion in my 1972 book. If this view is correct, then the Orthogenya are not monophyletic and several new groupings at a high taxonomic level (the phalanx group of my 1972 book) will need to be named, as will be clear from Chvála's phylogeny diagram (Fig. 140). However, there is some ambiguity in the evidence. For instance, Chandler (1980. Acta Zool. Acad. Sci. Hung. 27: 110) has stated that there is only a single spermatheca in the female of *Atelestus*, an apparent synapomorphy with the true Empididae and other families of Orthogenya not with the Cyclorrhapha (which retain the primitive complement of three spermathecae in their groundplan). The attachment of the paired

apodemes of the male genital segment to the hypandrium is another possible synapomorphy of the Atelestidae with other Orthogenya lacking in the Cyclorrhapha (in which these apodemes are fused, forming the unpaired "aedeagal apodeme"). Until further studies have resolved such apparent conflicts of evidence, it appears prudent to retain the concept of Orthogenya (Empidoidea) as the sister-group of Cyclorrhapha, as Chvála does in his formal nomenclature.

In conclusion, I wish to congratulate Dr. Chvála for having made such excellent progress with his studies of the Orthogenya. His morphological and systematic treatment provides a sound basis for further studies of this hitherto neglected group. His future contributions to this field are awaited with interest. Particularly important will be his treatment of the primitive true empidids included in the Oreogetoninae. North American students of Orthogenya and Cyclorrhapha are all strongly advised to read Chvála's general discussion, as it refutes certain interpretations contained in the 1981 Manual of Nearctic Diptera.

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