

BOOK REVIEW

GORB S.: FUNCTIONAL MORPHOLOGY OF THE HEAD-ARRESTER SYSTEM IN ODONATA. Zoologica, Original Abhandlungen aus dem Gesamtgebiet der Zoologie 148. E. Schweitzerbart'sche Veralbuchhandlung (Nägele u. Obermiller), Stuttgart, 1998, iv + 132 pp. ISBN 3-510-55035-8 / ISSN 0044-5088. Price not stated.

This volume represents an example of a real comparative study based on all the principal taxa of the order desired by both comparative morphologists and taxonomists. It is based on extensive material comprising 227 species of 25 odonate families including rare groups such as *Isostictidae*, *Platystictidae*, *Rimanellidae*, *Dictierastidae* and others. This monograph deals with the highly apomorphic arrester system of the Odonata from several points of view. Naturally, morphological description of the respective structures in individual superfamilies, families and subfamilies (p. 46–64), accompanied by Figs 45–92 (p. 85–132) at the end of the volume, represent the principal part of this study. However, attention has also been paid to neck-head articulation and nomenclature of neck sclerites (chapter 2), skeleton-muscle organisation of the arrester system (chapter 3), inner morphology of the arrester (chapter 4) and flight reflexes connected to the arrester system (chapter 5), sensory equipment of the arrester system (chapter 6), comparative morphology of characters of individual families (chapter 7), and evolution of the arrester system (chapter 8).

The introductory chapter describing cuticular sculptures and their functions within the whole Arthropoda (including e.g. *Cladocera*, *Cirripedia*, and *Decapoda*) is rather disappointing, being far from, however brief, a review of the problem. Examples cited in tables 1–7 are evidently selected by chance, the most important general references concerning some groups are sometimes omitted being replaced by those directed to very particular problems. Cuticular structures are termed in rather arbitrary way (microtrichia, microsculptural processes, hairs, bristles, scales, cuticular plates, spines, micropapillae etc.), generally not distinguishing at least articulated and not articulated structures. Some of them (e.g. “anal appendage of males” in the Ephemeroptera) cannot be determined at all. According to my opinion, the whole chapter can be summarized as noted on p. 3: “Arthropodan fixation systems are diverse according to their origins, constructions, and functions. There are many convergences between different phyla of arthropods.” The same concerns Fig. 1 showing the neck region of the representatives of different orders of insects taken from Crampton, Ross and Shvanvich. Instead of Hemiptera, Coleoptera and Lepidoptera, the situation in apterygote insects, Ephemeroptera and/or some lower “polyneopteran” orders should be illustrated.

Nomenclature of cuticular fine structures is quite unclear. For instance, evidently the same structure is called exocuticle in Fig. 19 and mesocuticle in Fig. 20. I failed to properly determine the structure called “vel” in the latter figure. Cuticular layers are not described and documented except for Figs 18A and 18B. Due to the unusual staining method used in the light microscopy adopted here (methylene blue and hematoxylin instead of e.g. Mallory staining), the layers cannot be identified at all. Author's “vesicles of the epidermis” might represent remnants of ecdysial vesicles or other organelles, not true cytoplasmic structures. The

study of the porous and terminal channels did not contribute to the description of microtrichia function much since in Odonata they do not differ from the general insect structural scheme. On the other hand, the computer model of their twisted ribbon structure is excellent, enabling proper space orientation contrary to purely mechanical models published earlier. As far as I know, this is one of the first attempts to do so and I do not hesitate to recommend this picture to general textbooks of entomology. However, the principal type of arrangement of cuticular lamellae is not mentioned. According to some literature data, Odonata possess (at least at some places of the integument) a highly derived pseudorthogonal type, contrary to the helicoidal type found in numerous insect groups. Judging from Figs 21B and 21D, the arrangement of the layers seems to be helicoidal, despite the fact that the head arrester system undoubtedly requires a highly specialised cuticle arrangement.

The last chapter called “Evolution of the arrester system” seems to be particularly important. There is no doubt that the emergence of specialized arrester system within this group belongs to prominent ordinal apomorphies of the Odonata. However, no relations of these characters to respective and/or homological structures in other Palaeoptera (if they exist) or primitive neopteran orders are discussed here although similar mechanisms in Isoptera and Diptera are briefly mentioned. Although the scheme of possible evolutionary changes of the arrester system is presented (Fig. 44) I miss a true cladistic analysis of the apomorphies found to complete a mere description of anagenetic trends in arrester structure arrangement. There is now a discussion of the contribution of this study to modern systems of higher classification of the order which are based mostly on the characters of wing venation.

Chapters describing methods used and material examined (usually incorporated in the text) are found at the end of the volume in the Appendix. Although all species and families studied are cited here, data concerning the origin of numerous species (e.g., *Polythore ornata*, *Caconeura gomphoides*, and *Zenitoptera americana*) are missing. Fourteen principal collections and collectors of material (some of them not acknowledged) are mentioned but the species list does not enable the actual provenience of most of them to be determined. Moreover, numerous species names are cited incorrectly ignoring their original taxonomic position.

The volume contains 92 figures and photographs and 9 tables. Most of them are technically perfect except for grey background in Figs 45–67. Figs 45–92 (or, more exactly, full-page plates) ought to be incorporated directly in the text instead in the end of the volume, all of them concern the chapter 7 “Comparative morphology of characters of the arrester system”. Abbreviation explanation is missing in some figures (e.g., Fig. 20), and the caddisfly *Phrygaena striata* is assigned to the order Ephemeroptera in Fig. 12B.

As a whole the volume represents much more than a detailed morphological study and this publication will be highly appreciated by morphologists and students alike. Also specialists in the study of the integument structure and function will use this detailed monograph as a basic source of reference.

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