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Book Review - The Caddisfly Family Phryganeidae (Trichoptera)

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The caddisfly family Phryganeidae (Trichoptera). Glenn B. Wiggins. ISBN 0-8020-4241-4. University of Toronto Press, 5201 Dufferin Street, North York, Ontario, Canada M3H 5T8. 1998. 306 pp. US\$120.00 (cloth).

Years ago, it was common practice for a natural history scholar to spend a lifetime preparing a monograph on some particular group of plants or animals, compiling, and synthesizing and interpreting all that was known about the group. In this volume, Glenn Wiggins continues that scholarly tradition, bringing together essentially all that is known about the group with which he began his professional career, the caddisfly family Phryganeidae. Although through his career he has contributed significantly to the advancement of knowledge for other groups, especially of other caddisflies, Wiggins provided in this work the results of a persistent accumulation of valuable information about phryganeids through >45 y. The work is not only a "taxonomic monograph", as stated in the Abstract, covering the usual taxonomic concerns of morphology and classification, but an integration of knowledge about behavior and habitats and other aspects of the biology of these fascinating creatures, with an interpretation of their phylogeny and historical biogeography. The volume is dedicated "to natural history museums for their work to explore and document the biological diversity of the planet".

The book is divided into a *General section* and

a *Systematic section*. The *General section* provides an *Introduction* and covers *Materials and methods*, *General features of the Phryganeidae*, and *Evolution of the Phryganeidae*. In the *Introduction*, the Phryganeidae are put in context with other caddisflies, the goals of the book are outlined, and a narrative history of the principal works concerning phryganeids is provided. Data sources and their means of presentation are outlined in *Materials and methods*.

The *General features* of the Phryganeidae discussions include well-illustrated reviews of the morphology of phryganeid adults, pupae, and larvae; overviews of fascinating case-making, pupation, flight, and oviposition behaviors; and various aspects of ecology. These discussions include interesting theories about the role of striking color patterns as forms of crypsis in the larvae and as examples of aposematism in the adults, a theory about the correlated evolution of a lack of a closing membrane on the pupal cases and vestigial mandibles in some phryganeid genera, and a puzzling question about why larvae tend to abandon their cases so readily.

The part on *Evolution of the Phryganeidae* represents the 1st comprehensive phylogenetic treatment for genera of the family. Despite 5 possible synapomorphies, the evidence for monophyly of the family remains ambiguous. One wonders if the presence of larval coxal combs may be an additional synapomorphy supporting the monophyly of the family. Seventeen informative synapomorphies, several with multiple transformation forms, are inferred for the 15 genera, resulting in 28 equally parsimonious trees; a majority rule consensus tree, with 1 qualification, provided a phylogeny with 13 dichotomous nodes and 2 trichotomous nodes. The most puzzling of these is the basal trichotomy in subfamily Phryganeinae, with the affinity of genus *Phryganea* unresolved with respect to the ring case-makers on the one hand and *Trichostegia* and the spiral case-makers on the other. Biogeographic interpretation of this phylogeny is problematic; Wiggins attributed this difficulty to ecological constraints, such as the general intolerance of Phryganeidae for warmer waters. This part concludes with an *Evolutionary epilogue* arguing for a primitive position for Phryganeidae among the families of suborder Integripalpia and providing evidence from some interesting female variants that speciation in at least some phryganeids may begin

1st with behavioral or pheromonal premating barriers before genitalic differentiation occurs.

The Systematic section includes a set of *Diagnoses and keys* for the family and 2 subfamilies and 15 genera, followed by individual chapters for each of those genera. In this major part of the work, 9 new synonyms are recognized, 3 new species described, and lectotypes for 2 species designated, bringing the number of species recognized for the family to 74. Each generic chapter begins with a short summary about the genus, followed by the synonymy of the genus and any needed explanation; an etymology for the genus name; descriptions of the adults, immature stages, and biology; distributional notes; a phylogeny of included species; a key to species of adults of the genus; and treatments of the individual species. In each of the species discussions, one finds a synonym; some summary comments; detailed descriptions of the adults, immature stages, and biology; and a description of its range. The text is accompanied by excellent line drawings prepared by Wiggins and artists in the Royal Ontario Museum: A. Odum, K. S. Pogany, C. N. Storwick, and P. L. Stephens-Bourgeault. Black-and-white photographs of many of the beautifully patterned adults of the family enhance not only the diagnostic value of the work, but also the discussion regarding aposematism. The section concludes with a *Classification of the Phryganeidae* based on the earlier phylogenetic treatment; *Acknowledgments*; *Literature cited*; dot distribution maps for North

American species; an appendix of material examined, other records, and abbreviations for institutions from which those specimens were borrowed; and a combined taxonomic and subject Index.

The quality of the paper, printing, and binding of the work deserves special mention. The weight of the paper and the strength of the binding makes obvious that this book is intended to last a long time, even with frequent use. Indeed, the appearance is of such high caliber that, when considered with the exemplary illustrations, the volume is deceptive, giving an initial impression that it is intended as a coffee table accessory for an elegant home.

Do not be so beguiled! This 1st-rate scientific treatise will be valuable on the laboratory bench not only as a wealth of synthesized information for freshwater and caddisfly biologists, but also as a model for those seeking inspiration for preparing monographs in their own specialty groups. Dr. Wiggins has won prestigious awards for some of his earlier writings; this wonderful monograph is deserving of awards at least as distinguished. Probably its greatest honor, however, will come from its status as a standard desk reference for hydrobiologists throughout the world for many, many years to come.

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