

BOOK REVIEWS

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A CONTRIBUTION TO RIODINID SYSTEMATICS (LEPIDOPTERA: RIODINIDAE), by Jason P. W. Hall with Keith R. Willmott & Donald J. Harvey, Contributors. 1998. Tropical Lepidoptera. Volume 9, Supplement 11. 42 pp., 7 color plates. Published by The Association for Tropical Lepidoptera (www.troplep.org), P.O. Box 141210, Gainesville, Florida, USA. ISSN 1048-8138, available from the publisher.

A REVISION OF THE GENUS *THEOPE*, ITS SYSTEMATICS AND BIOLOGY (LEPIDOPTERA: RIODINIDAE: NYMPHIDIINI), by Jason P. W. Hall. 1999. Published by Flora & Fauna Books (www.ffbooks.org), Gainesville. 127 pp., 9 color plates. Paperback, 8.5 × 11 in., glossy paper, ISBN 0-945417-95-0, available from the publisher.

As an amateur rather than a professional entomologist, it is easy to wax enthusiastic about these two publications. Those of us interested in riodinid butterflies have seen a steady increase in the quantity and quality of publications regarding this group. Supplement 1 to Volume 9 of Tropical Lepidoptera consists of four papers authored or co-authored by Jason P. W. Hall. The co-authored papers describe a total of 13 new riodinid species from Ecuador. The longer paper is a systematic revision of *Sarota*, including 5 species and 2 subspecies previously not described. A particularly helpful key is provided which will prove invaluable for the worker trying to differentiate these rather small butterflies.

The second publication, "A Revision of the Genus *Theope*," carries the process to an even higher level. For this 125 page tome, the author has personally examined 4253 *Theope* specimens in 23 major collections on three continents, including all but three of the extant primary types. Most *Theope* are rare in collections (with a few notable exceptions), and half the described species are known from 20 or fewer specimens. Nevertheless the paper contains dorsal and ventral photographs of all the recognized species with genitalia illustrations of 70% of the females and all the males save *Theope villai*. Terminal abdominal tergite drawings are also included, which show a remarkable diversity of sizes and shapes. To avoid confusion by future researchers, the author has extensively documented the material examined and figured, including the location for each figured specimen and genitalia dissection. Many lectotypes are also designated.

This revision identifies 68 *Theope* taxa. A binomial key for identification of males is provided, but not females, since many are unknown, especially in the "*foliorum* group." The author has included corrected identifications for specimens figured by Seitz, Godman and Salvin, Barcant, D'Abbrera, DeVries, and others, updating all these works to conform with this revision.

Most interesting is the discussion of *Theope* as an indicator of species diversity in Upper Amazonian areas. The extensive range maps are most helpful and the tables listing perching times for 34 species of *Theope* will provide a basis for correlation of further field observations. I believe this publication could serve as a template for any doctoral thesis in this field, much less any taxonomic revision. To have this much valuable information, so concisely compiled, is an unexpected pleasure.

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THE WESTERN PALEARCTIC ZYGAENIDAE (LEPIDOPTERA), by C. M. Naumann, G. M. Tarmann and W. C. Tremewan, 1999. Published by Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark. 304 pp., 178 line drawings and black and white photographs, 12 color plates. Hardback, 24 × 17 cm, ISBN: 87-88757-15-3. Available from Apollo Books, Price DK 6000.00 (about \$80.00 US) excluding postage, available from the publisher.

Three eminent specialists have combined their expertise to create a book on one of the most striking groups of day-flying moths, the Zygaenidae. In addition, they have compiled the results of many studies by other workers, amateur or professional, over the last 100 years. The foreword by Miriam Rothschild, written in her typical entertaining style, introduces the reader to this book in the context of her own interests such as their extensive variation, complex diapause patterns, behavior, conservation, and toxicity. The purpose of the book, as explained in the authors' foreword, is to provide an up-to-date summary of past and current biochemical, physiological, behavioral, and ecological studies, and to present an overview of the distribution, ecology, and systematics of the zygaenid moths of the western Palearctic. They have certainly succeeded in achieving these aims.

The book is divided in two parts. In the "General Part" the systematics and phylogeny of the Zygaenidae are briefly discussed, followed by a description of life cycles and their peculiarities. The morphology of the immature and imaginal stages, with frequent references to their phylogenetic implications, is briefly, but comprehensively, described and illustrated in the section "Structures and functions" that includes a discussion on "Senses and orientation" and "Nutrition." "Genetics and individual variation" deals with wing patterns and coloration, including color mutants and other aberrations, of some *Zygaena* species. In "Zoogeography" the geographical variation in *Zygaena* moths, hybrid belts, littoral and montane melanism, and geographical variation in color and size of larvae is discussed. The distribution patterns in the western Palearctic are assigned to a Mediterranean, Syro-Anatolian, Iranian, Transcaucasian or Euro-Siberian type, which but for the latter, reflect and include Pleistocene refugia and survivors of the last glaciation. Fossil zygaenids are briefly mentioned. "Ecology and behavior" deals extensively with their diverse habitat preferences. A discussion on the food plants leads to a highly informative section on cyanogenesis, cuticular secretion of defensive compounds by larvae and imagoes as a defensive strategy. The strong attraction of adults to certain flowers is ascribed to compounds related to sex attractants of some *Zygaena* species. Two independent mate-locating systems, the early morning (optical cue) strategy and the pheromone induced matings, are described. The toxicity and aposematic coloration of zygaenids is related to mimicry, behavior, and predation. Diapause in these insects reveal complex patterns which regulate phases of growth and dormancy. Parasites of larvae and pupae include wasps and tachinid flies. In "Zygaenids as indicator species" their importance as such is emphasized. Conservation should concentrate on the protection of habitats. "Breeding" and "Collecting techniques" is followed by an "History of research on the Zygaenidae" highlighting the contributions made in taxonomy, collecting expeditions, biology, genetics, biochemistry, ecology and behavior, reproductive biology, and bibliography by past and present researchers and naturalists. The first part ends with a list of vernacular names as used in the western Palearctic. "Selected references" introduces the reader to more details of zygaenid biology and systematics.

The "Systematic Part" starts with a check list of the 116 species found in the western Palearctic. This list is divided into the three

subfamilies, the Procrinae, Chalcosiinae and Zygaeninae, each with their constituent taxa and currently accepted names. The diagnosis of the family is followed by a dichotomous key to the three subfamilies of the western palaeartic Zygaenidae. Under Procrinae there is a list of the constituent genera and characters that separate the procrinids from other subfamilies; these general characters and their variation are then described in more detail. A dichotomous key to the genera of the Procrinae is presented. Each genus and subgenus, where applicable, is described in terms of diagnostic characters, followed by a detailed standardized description of the constituent species. The pertinent details of each species include a reference to the imago by referring to plate number, length of fore wing, brief description of both sexes, including descriptions and drawings of their genitalia, similar species, individual geographical and ecological variation, and its distribution, including a range map for every species. Where known, details of the immature stages, including food plants, are also given. Every species is illustrated in color. Dichotomous keys to species, sometimes between sexes, are presented. The treatment of Chalcosiinae is as for Procrinae. The Zygaeninae are introduced by a diagnostic overview of the subfamily and the genus *Zygaena*, followed by a dichotomous key to the species of the western Palaeartic. Descriptions of the various species are then presented. An "Appendix" provides information on the recently described *Jordanita (J.) fazekasi*. A comprehensive "Index" concludes the text.

The overall design of the book is excellent. The book is well bound with a quality decorative cover. The text, text figures, and photographs are on glossy paper and provide excellent detail. The text is

in an easy, well-organized reading style. The 178 text figures consist of an array of diagrams, drawings and photographs; for every species a distribution map is also given. The color reproduction of the plates is of the highest quality, accurate, and shadow-free. Plates 1–6 illustrate 318 set specimens, often more than one exemplar of a species, at life size with facing pages giving the species or subspecies, sex, locality and reference page number. Plates 7–8 show imagoes resting, *in copula* or feeding; various aspects of behavior are shown on plate 9. Plate 10 is devoted to larvae. Plates 11–12, depicting various habitats, will put shame to any tourist brochure! The book has been well proofed and I could spot only smaller errors (misspelling of Somabrachyidae (p. 14), alkaloids (p. 15) and food plants (p. 16)). The only distraction is that the entry for the last species ends in mid-sentence (p. 262), interrupted by the plates, to continue on p. 288; the plates could have been bound following p. 290.

This book is beautifully produced and reasonably priced. Its comprehensive treatment resulting from the combination of authoritative authorship and editorial care guarantee that this work will be the standard reference on the zygaenid fauna of the western Palaeartic for many decades to come. This book should not only be on the bookshelf of lepidopterists, but it will also be of interest to students of biogeography and evolutionary history of Lepidoptera and other insects from a highly interesting faunistic region. I recommend this book enthusiastically.

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FORESTER MOTHS, by K. A. Efetov and G. M. Tarmann. 1999. Apollo Books, 192 pp., 12 color plates with 241 illustrations, 174 line drawings, 24 × 17 cm. Available from Apollo Books, price: 460 Danish Kroner, excl. postage (hardback).

As a worker on the other half of the superfamily Zygaenoidea (i.e., the limacodid group), the publication of two books on Zygaenidae at roughly the same time is like meeting your lost relatives. For those of us that have large quantities of unsorted palaeartic zygaenids, this is a welcome event indeed. It is also a major benefit for those interested in the biologies and life histories of these beautiful diurnal creatures and makes literature more accessible to the English-speaking lepidopterist.

The scope of the two books on western palaeartic Zygaenidae overlap in part, which at first glance is a bit confusing. "Forester Moths" by Efetov & Tarmann is solely about the subfamily Procrinae (also known as foresters), and its four genera and 63 species from the western palaeartic. "The Western Palaeartic Zygaenidae" (1999, C. M. Naumann, G. M. Tarmann and W. G. Tremewan, Apollo Books) covers the same 4 genera, but only 44 species of Procrinae, in addition to the Zygaeninae and Chalcosiinae. In fact, one might question why the two books could not have been combined because of the overlap of the Procrinae and in genitalia drawings, checklist, and keys.

"Forester Moths" by Efetov & Tarmann, perhaps the last book of the two to be published in 1999, mentions the other as a complementary text in its introduction. Indeed the focus on the Procrinae by Efetov & Tarmann provides more detailed information about this subfamily, including citations of misspelling and all known synonymies and homonymies. It should be noted that there is a lack of agreement between the checklists of the Procrinae regarding format

and inclusion of taxa. Efetov & Tarmann separate the subgenera into species groups and have subspecies, whereas Naumann et al. does not. The discrepancy between the procrinid species included (63 in Efetov & Tarmann and 44 in Naumann et al.) between the two books is in part due to the covered region and primarily concerns the genus *Adscita* Retzius. Naumann et al. only contains species from the Iberian Peninsula and North Africa to the Urals, including Turkey, Transcaucasia and Caucasus, but Efetov & Tarmann, in addition, include species from northern Iran and some countries east of the Caspian Sea of "the western and central parts of Asia (i.e., the western and central Palaearticis)."

"Forester Moths" begins with a concise introduction and definition of the Procrinae. This is followed by an intriguing chapter (III) on the characters of the subfamily including a chart and associated illustrations that review the broad variation of dorsal and subdorsal setae on the first abdominal segment in first instar larvae. This is reminiscent of the broad variation found within the entire limacodid group (Epstein, M. E. 1996. Revision and phylogeny of the limacodid-group families, with evolutionary studies on slug caterpillars (Lepidoptera: Zygaenoidea), Smithsonian Contributions to Zoology, 582). Next is a review of the chromosomal numbers in the subgenera. The final part Chapter III includes a novel character combination diagram and table, which divides the forester genera or subgenera into groups based on shared characters of adult and immature stages. These include biological (e.g., host plants, diapause stage) and chromosomal information, in addition to morphological data. There is also a similar table for genera and host plant families. These tables serve as a concise way to organize information on these genera, although do not necessarily reflect the relationships between the