

You have to admire anyone who decides to dive headlong into the bottomless pit that is the systematics of the Noctuidae. But, to purposely delve into the documentation and identification of the immature forms borders on insanity. I am assured by George Godfrey in his Forward to the English-language Edition that the author, Olga Ivanovna Merzhhevskaya, was a well respected teacher and researcher and definitely in full charge of her considerable faculties. In fact, this study on the biology and morphology of larvae of 144 species of Noctuidae from Belorussia is a testament to her patience, perseverance, and detailed observations.

The author was able to compile information on each larval instar of a given species so that she could describe the changes in morphology and patterning during growth and development. This adds much to the knowledge of immature noctuids.

Also of note are the brief descriptions of the eggs, plus data on where and how they were deposited. How useful it would have been if scanning electron micrographs were provided for visual comparisons. Based on the attention to detail that characterizes her work, S.E.M. technology must not have been available to her.

Godfrey indicated—and I concur—that a weakness is inherent in the identification keys because of their reliance on color patterns. Although the author used a fixative made of ethyl alcohol, salicylic acid, common salt, and water to maintain color in preserved specimens longer (up to six months for the more labile pigments; over five years for melanic patterns), the keys require last instar larvae that have been recently preserved. Still, I have yet to try this fixative but definitely intend to do so.

This book was originally published six years prior to Godfrey's thorough study of the larvae of the noctuid subfamily Hadeninae (1972). Had Godfrey's study been available to Merzhhevskaya, she may not have decided to disregard the characters of the hypopharyngeal complex, which she considered not useful for taxonomic purposes.

Overall, the study has far more positives than negatives. Additionally, the English translation of the work is excellent. There is nothing left to be deciphered or reinterpreted that I could find. This publication is certainly a worthwhile contribution to the slowly growing body of knowledge on juvenile stages of Lepidoptera. It should be on the shelf of all serious students of the biosystematics of Lepidoptera and of those interested in the taxonomy of larval insects. The host plant information, life histories, and biological data are useful to an even broader audience.

Only a few who have ventured into this realm are still so engaged. These bold scientists are to be both admired and pitied. But don't let me dissuade any aspiring student. On the contrary, jump in and get wet; there's a lot of water; it's sort of calm, and it's plenty deep.

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DISCOVER BUTTERFLIES! AN ACTIVITY BOOK FOR FAMILIES, STUDENTS, AND TEACHERS, edited by LuAnn Craghton, Project Coordinator. 1991. Callaway Gardens, Ida Cason Callaway Foundation, Pine Mountain, Georgia 31822. iv + 61 pp., color covers, black & white illustrations, tables, and diagrams. Softcover, 22.0 × 28.0 cm, no ISBN; \$7.95.

Since its opening in 1988, the living butterfly displays and museum exhibits at the Day Butterfly Center in the Callaway Gardens of western Georgia have educated hundreds of thousands of visitors about the wonderful fascination of butterflies. Now the Education Department of the Ida Cason Callaway Foundation, under the direction of Lepidopterists' Society member LuAnn Craghton as Project Coordinator, has produced this exciting activity book on the world of butterflies. The book is accompanied by a "Butterflies" videotape (available separately at \$19.99, or as a package of activity book and video for

\$24.95). The combination package will be of interest to every lepidopterist who wants to interest other members of his or her family, friends, students, and associates about butterflies. The book and video set should also become a very popular and useful resource in schools, summer camps, and similar educational programs.

The book includes six chapters focusing on the biologically important aspects of butterflies, especially their life history, ecology, conservation, and behavior. Chapter 1, "Butterfly Basics," covers butterfly classification, very basic anatomy, the structure and purpose of colors on wings, and suggested activities on these subjects (such as butterfly family flash cards, building your own butterfly, and determining whether you have a butterfly or a moth at hand).

Chapter 2, "Metamorphosis," describes the life history of butterflies. Activities include building an insect cage, rearing your own butterflies, and acting out the life cycle of a butterfly.

Chapter 3, "Butterfly Behavior," includes discussion of courtship and mating, basking, flight, roosting, feeding, and puddling. Activity instructions range from writing poetry about butterfly behavior to timing the flight speed of adult butterflies.

Chapter 4, "Butterfly Conservation," conveys effectively a number of concepts on the ecological importance of butterflies, facts on the distribution and biodiversity of butterflies, and even a pitch for saving the world's rainforests. Activities in this chapter include working on understanding food webs and other important concepts in ecology.

Chapter 5, "Marvelous Monarchs," is a more concentrated look at a single species, the monarch butterfly. Activities here even include tagging monarchs to study the migratory habits of monarchs through a capture, tag, and release program. It also includes an activity to help make the monarch our national insect by writing letters to senators and representatives.

Chapter 6, "Butterfly Watching," includes not only suggestions on how to watch and collect butterflies but also a discussion of careers as entomologists, the drives to name state butterflies, and some of the uses of references in studying butterflies. One of the fine activities described in this chapter is how to plant your own butterfly garden, including choices of plants, locations, and design, and how to use biological controls and insecticidal soaps for pest management.

The book ends with a comprehensive list of popular resources and references, including most of the current butterfly and moth field guides, butterfly gardening resources, biological supply companies, children's books, and organizations (including the Lepidopterists' Society and its address). Living butterfly exhibits listed include the Day Butterfly Center, Butterfly World (Coconut Creek, Florida), and Marine World Africa U.S.A. (Vallejo, California). Bound in the center of the book is a folded removable poster that depicts butterfly anatomy on one side and the life cycle of the Zebra Longwing (*Heliconius charitonius*) in color on the other.

Although the field of lepidopterology has long enjoyed a plethora of technical books and other publications on butterflies and moths, and some coloring books that introduce young children to the diversity and distribution of butterflies in the United States and Europe, *Discover Butterflies!* makes an important contribution toward providing an integrated package for young novices, families, students, and teachers to learn more about butterflies. In combination with the colorful and stimulating 15-minute video, this book will indeed achieve the Callaway Foundation's purpose: to give people an increased respect for our natural world, and a heightened awareness of man's responsibilities to the world around us. It is exciting indeed to see butterflies used so effectively in this video/workbook learning package, and I predict it will be widely adopted. I recommend it as a gift to families with young children, and also as an appropriate gift to teachers at local elementary and middle schools, or to naturalist staffs at summer camps and nature centers, to encourage the incorporation of butterfly study materials in children's curricula.

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