

BOOK REVIEW

*The Genus Adelpha: Its Systematics, Biology, and Biogeography (Lepidoptera: Nymphalidae: Limenitidini)*. By Keith R. Willmott. Scientific Publishers, Gainesville, FL. 2003. viii + 322 pp., 15 color plates, 8.5 × 11 inch paperback. \$65.00 (\$45.00 for members of the Association for Tropical Lepidoptera). ISBN: 0-945417-96-9.

The nymphalid genus *Adelpha* is sufficiently speciose and abundant throughout the Neotropical realm, from sea-level to 3000 meters and across a wide range of habitats, ranging from degraded scrubland to primary forest, that not even the most inexperienced ecotourist could fail to notice these striking, orange, white and black butterflies. Anyone who has actually collected Neotropical butterflies can also attest to the bewildering array of wing pattern subtleties exhibited by *Adelpha*, and the enormous difficulty in sorting them to morphospecies, let alone trying to correctly identify them. Indeed, in his treatment of the Costa Rican butterfly fauna, DeVries (1997) echoed earlier authors in saying "the butterflies that compose the genus *Adelpha* . . . are the most difficult and trying taxonomically of all the nymphalids". But help is now at hand, with the first comprehensive revision of the genus since the Seitz volumes nearly 90 years ago (Fruhstorfer 1913-20). At a time when most monographs of aesthetically pleasing Nymphalidae are little more than the lepidopterological equivalent of stamp albums, Keith Willmott's *Adelpha* revision is refreshingly modern and intellectually rigorous, broad and thorough in scope, and well written and illustrated.

The early portion of the book is divided into five chapters, an Introduction, Methods, Systematics, Biology, and Biogeography and Conservation, the last of which is the longest and most detailed. The Methods chapter quickly reveals the magnitude of

the effort that was required to produce this book. Nearly 21,000 *Adelpha* specimens were examined, including all known extant types, from numerous museums and private collections across Europe and the Americas, and nearly two years of field work was conducted across the Neotropics (mainly in Ecuador) to gather precisely labeled material, record ecological observations, and assess the limits of intraspecific variation. The Systematics chapter covers the history of classification of *Adelpha*, and provides diagnoses for the genus and the newly proposed species groups, and a key to all species. It is important to note that an exhaustive study of morphology and character evolution in the genus, with the generation of reasonably well-resolved phylogenetic hypotheses, has been published separately (Willmott 2003). Willmott recognizes 85 species in *Adelpha*, five of which were described as a part of the project, although only one species (and several subspecies) is actually described in the book. His synonymic checklist of 366 described names and 209 taxa includes 127 taxonomic changes, and thus represents a substantially revised classification, built for the first time on clearly elucidated, modern concepts of species and subspecies. In cases where phenotypically similar, closely related taxa occupy allopatric geographic ranges, Willmott almost always lumps them together to create often large polytypic species, dubbed "biogeographical species" in the clearly influential treatment by Tyler et al. (1994) of the American swallowtail butterflies. This approach has had the effect of slightly decreasing the number of *Adelpha* species recognized compared to the arrangements of previous authors. When treating mimetic butterflies, I agree that recognizing subspecies is necessary and useful, for the reasons outlined by the author, but I personally would not have taken quite such a fine-

grained approach to their division, which is here often based on only slight differences in generally non-mimicry related ventral wing pattern elements.

The highlights of the Biology chapter include in-depth discussions on rarity, mate location, and mimicry, which is an all-pervasive underlying theme to the study of *Adelpha* biology and taxonomy. Detailed morphological descriptions of the immature stages are accompanied by two and a half pages of very nice line drawings, and at the end of the color plates is half a page of larval and pupal photographs. The amply illustrated Biogeography chapter, which could undoubtedly have been broken up into several separate papers, is what elevates this revision to the extraordinary. This is the intellectual heart of the book, and covers four main themes: spatial and elevational patterns of species richness, areas of species and subspecies endemism, speciation in montane regions, and conservation. While analyzing his distributional data for *Adelpha* from many different angles, Willmott challenges several biogeographical and ecological hypotheses based on the study of other invertebrate and vertebrate groups, and develops some of his own. Unfortunately, without a very well resolved cladogram, there is no cladistic biogeography here. My only main criticisms of these excellent introductory chapters is that certain sections might have been dealt with a little more succinctly, and a large chunk of the Biogeography chapter is really community ecology that would probably have been better placed in the Biology chapter.

The species accounts, which run to about 180 pages, form the meat of the book. The layout of the species accounts is fairly traditional, and consists of a very detailed listing of synonyms and type data, followed by a lengthy identification, taxonomy and variation section, a concise description of the taxon's range, and detailed sections on the immature stages (if known), and habitat and adult ecology. The taxonomy sections provide an amazing amount of detail, but I did

notice some repetition, with full lectotype label data being repeated in the type section and the body of the text. On this subject, it might have been a good idea to designate lectotypes for taxa described from multiple countries and/or localities. This would have restricted the type locality and removed the need to reproduce reams of syntype label data. I was glad to see that the lists of specimens examined were included in the book rather than placed on a CD rom or an internet website, as both of these increasingly commonly used options can be inaccessible to some at home, and all in the field. Being picky, I would prefer to have seen provinces as well as countries listed in geographic instead of alphabetical order, for the same reasons that we curate collections systematically instead of alphabetically. Also, I do not see the need to have burdened this section with elevational data for certain localities when this information is already summarized in the habitat and adult ecology section.

Fifteen color plates beautifully illustrate both sexes (where known) of all *Adelpha* taxa, largely in the composite half-wing format. The color reproduction is generally very good, although, as explained in an inserted corrigenda, there is some black graininess within the dorsal orange of a few specimens, and some of the plates are also slightly over-cropped. However, the effect of these small printing flaws on the aesthetic and taxonomic value of the plates is negligible. Good quality drawings of both the male and female genitalia (where known) of all species are followed by excellent dot maps for all taxa. The book concludes with a lengthy bibliography, a detailed index, and nine appendices, of which those summarizing the known hostplant and immature stage information are particularly impressive for their level of detail. The most eye-catching and innovative of the appendices is a three page pictorial key. Each key for the four main dorsal wing patterns uses beautifully rendered computer-generated wings, complete with arrows indicat-

ing salient features, to guide the uninitiated through the minefield of *Adelpha* wing pattern subtleties.

Looking back on this review, an inordinate amount of ink seems to have been given over to critical commentary, but I should stress that these criticisms range from the minor to the very minor. Put simply, this book is the best revision of a Neotropical nymphalid genus ever written. When combined with the companion phylogenetics paper, there is no doubt that this is one of the very best treatments to date of any butterfly group. Without any technical or artistic assistance, every word and image is also the author's own. It is extremely gratifying to see the bar for butterfly monographic work continuing to be raised.

#### LITERATURE CITED

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