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BUTTERFLIES OF EUROPE, Vol. 8, *Aspects of the Conservation of Butterflies in Europe,* Otakar Kudrna, Ed. (and author). 1986. AULA-Verlag, Wiesbaden 1, West Germany. 323 pp. Order from: E. J. Brill, P.O. Box 9000, 2300 PA Leiden, Netherlands. $129.50 (series subscription price $111.25).

Although Vol. 8 is last in the *Butterflies of Europe* series, it is the second volume published. The title belies the contents, which are broader than butterfly conservation. This book consists of a Preface, 6 chapters, and a 14-page Bibliography. There is no index, but there is a detailed table of contents. Chap. 1 is a 4-page introduction to the aims, scope, materials, and methods related to this treatise. Chap. 2 is also short (18 pp.) and makes a case for using native butterflies as environmental health indicator species. Several species-specific examples are presented. There is a discussion of the order Insecta, followed by description of the six main European biomes cited in the book.

Chap. 3 (81 pp.) treats the material of the book's title. Starting with a biogeographic history of European butterflies during the Holocene, the author progresses to anthropogenic factors harmful to butterflies. The latter subject is treated in detail, and discussion is liberally illustrated with colored photographs of habitats. Kudrna has identified 11 anthropogenic (introduced by man) and 4 natural factors that comprise the pressures on any butterfly species. Among the former are air pollution, agricultural activities, urbanization, and overcollecting; among the latter, climatic conditions, parasitoids, competition, and predators. Each factor is discussed with appropriate photographs and recognition of sensitive species. Causes and effects are examined with suggestions for protection measures. The author's treatment appears well balanced; he does not come across as a zealot in any sense. A few traditional conservationists may be offended by some of Kudrna's comments, but I believe he has researched his subject carefully and thoroughly. He has addressed butterfly collecting in great detail from the aspects of scientific collecting, hobby collecting, and commercial collecting. The treatment is fair and covers pros and cons equally. The author points out the value of scientific collecting for demographic and taxonomic research; that destructive effects of overcollecting are not directly comparable to the repercussions of habitat destruction; and that in Germany (as an example) each species threatened by overcollecting is more seriously threatened by man-made pressures. These pressures are usually the main cause of decline in butterfly numbers, not collecting *per se*. He points out that rare butterflies are sought because of their rarity, and that commercial collecting may pose a threat to some.

Kudrna is critical of "Red Data Books" and other lists of rare, threatened, or endangered species. He presents cogent and documented arguments to support his position. He also points out that even in Europe, where butterflies have probably been studied more intensively than anywhere else, there are vast gaps in the knowledge of geographic distributions of many species. He demonstrates that considerable misinformation regarding geographic distributions has been promulgated from author to author. The consequence is that butterflies have been listed as endangered in some areas where, in fact, there are no valid records that they ever occurred. He calls for objectivity and use of accurate data, rather than emotion and conjecture. This stance will be unpopular with some readers, but it is valid and the point needs to be made. The last portion of Chap. 3 evaluates the present state of knowledge of European butterflies. Kudrna concludes that much has yet to be learned concerning ecology, faunistics, distribution, and early stages, a situation certainly not unique to Europe.

Chap. 4 (103 pp.) is entitled "Applied taxonomy of European butterflies". Nearly half of this chapter is devoted to interpretation and explanation of the Code of Zoological Nomenclature published by the International Commission on Zoological Nomenclature. This treatment is informative and useful, but one questions its inclusion in a volume dealing with butterfly conservation. The Code discussion is followed by a 14-page glossary of taxonomic terms. Again the information provided is useful, but out of place. It would be more appropriate for the yet-to-be published Vol. 2, *Introduction to Lepidopterology.* The remainder of Chap. 4 consists of an annotated checklist of European butterflies, a provisional synonymic checklist, and a 2-page summary of "priority tasks in taxonomic

research". Thus all of Chap. 4 would seem to belong in Vol. 2, although the chapter is certainly valuable and well presented.

Chap. 5 (69 pp.) returns to conservation and is devoted to applied biogeography of European butterflies. Following a short prefatory section, it is composed primarily of maps and tabular data. The author first defines biogeography in a broad sense, as opposed to zoogeography and faunistics. The area of concern to the author is conservation of the natural environment using butterflies as a representative animal group. Butterfly colonies across Europe are surveyed, with tabular distributional data for all species. In addition to qualitative data, Kudrna develops a Chorological Index (CI) for each nominal species based on the sum of numerical values for size, composition, and affinity of range (as defined in the text). The smaller the CI value, the more successful the species. Large CI values indicate endemic species in limited areas. Evaluations of the "health" at the species level of all European butterflies are tabulated. Health factors include population declines, habitat vulnerability, and species vulnerability. These factors are assigned numerical values, and Vulnerability Indices (VI) from 1 to 6 are calculated (6 indicating most vulnerable). The latter portion of Chap. 5, well illustrated by color photographs, discusses butterfly ecology and habitats.

The final chapter (22 pp.) outlines a comprehensive program to conserve European butterflies. Certain sensitive species are identified and discussed, and color photographs of their typical habitats included.

This book is clearly written and the author amassed and digested a formidable amount of data. He has attempted to quantify data related to biogeography and species vulnerability, thus removing much of the conjecture associated with typical conservation treatises. Data are presented, conclusions drawn, and positive recommendations are made. As indicated by numerous photographs, the author visited and studied many regions in Europe and has first-hand information.

Like its predecessor, this book is in English, is well manufactured and attractively produced. I noted a few typographical errors and lapses into German (such as *ist* for *is*). The only deficiency is the absence of a glossary of ecological terms. There is liberal use of arcane terms such as "nemoral", "eurychoric", "eurytopic", "xerothermophils", "ubiquists", etc., which will not be familiar to the general reader. Other terms appear to be literal translations of German compound words. Perhaps a glossary can be included in a future volume.

Although restricted to European species, this book belongs on the shelf of any serious lepidopterist. It contains a wealth of information and procedures. The treatment is well balanced and well researched. A serious attempt was made to quantify information. It is a scientific approach, and I suspect may well serve as a model for subsequent books on invertebrate conservation in regions other than Europe.

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