

**Steiner, R., G. Hermann & J. Settele 2007. Ökologie einer aussterbenden Population des Segelfalters *Iphiclides podalirius* (Linnaeus, 1758).** – Ecology of an almost extinct population of the scarce swallowtail *Iphiclides podalirius* (Linnaeus, 1758). – Invertebrate Ecology and Conservation Monographs, Vol. 1. – Pensoft Publishers. Sofia-Moscow. 171 pp. ISBN 978-954-642-289-7. 60.00 €. (in German with English summary)

This book is the first volume of the new series “Invertebrate Ecology and Conservation Monographs” dedicated to the publication of extensive studies addressing the ecology and conservation of invertebrates.

The topic of this volume is the population biology and dynamics of the scarce swallowtail (*Iphiclides podalirius*), mainly based on the observation of immature stages in the Heckengäu area, located in the German federal state of Baden-Württemberg (South-west Germany). The text is based on Roland Steiner’s diploma thesis with only a few modifications. The field data were gathered between 1992 and 1996. More distribution data for 1997–2004 were obtained by Gabriel Hermann and are discussed in the epilogue.

In the first half of the last century, the scarce swallowtail was a characteristic species of the limestone areas of South-west Germany. Ever since, it has strongly declined, and in several regions the species is nowadays extinct.

After a brief introduction, the volume continues with an extensive literature review of the biology, distribution and ecology of the scarce swallowtail. In the following two chapters the study area and materials/methods are presented in an appropriate way. The results address the (i) distribution of the species (including larval habitats) in the study area, (ii) the habitat requirements (both for the immature and adult stages), (iii) the development, phenology and ethology of all stages and (iv) the distribution of the species in other parts of Baden-Württemberg. The discussion focuses on population dynamics, factors that limit colonisation, and causes of loss and threat. Another chapter gives detailed recommendations for the conservation of the species. In an epilogue, the population dynamics after the main study period (1992–1996) and reasons for the changes are given.

The data presented by Steiner *et al.* are impressive. During the main study period, about 1,200 eggs, caterpillars or pupae of the scarce swallowtail were studied in the field. All chapters are well written and nicely illustrated. The excellent photos of Roland Steiner are especially helpful in providing an impression of the habitats.

The number of occupied patches decreased from 16 in 1992/1993 to 3 in 1995, corresponding with a decrease of the occupied area from 140 km<sup>2</sup> to 14 km<sup>2</sup>. Since 2000, the species has been extinct in the study area.

Ovipositing females predominantly used branches of low growing blackthorns (*Prunus spinosa*) that obtained much solar irradiation and grew above open stones or gravel on south-facing slopes. Survival rates in the immature stages were low. Usually, only one out of 60 eggs successfully completed its development to the adult stage.

In the study area the main threat to the species was a decrease in the disturbance intensity of the open landscape. The area of potential oviposition and larval habitats declined due to a relaxation of grazing and the abandonment of hedge coppicing. The recommended management activities came probably too late to stop the decline of the species.

The aim of the series to publish extensive scientific studies (e.g. diploma/master theses and dissertations) is generally to be appreciated. Often, those studies are not available to a wide audience (“grey literature”), although they have high scientific relevance. This volume is a case in point. Therefore, it is a forgivable sin that the book covers the relevant literature only until 1996 (the completion year of the thesis). However, the language (German) and the price (60 euros) of the book will limit its readership.

On the whole, it is an impressive and substantial volume on population and larval biology of the scarce swallowtail. The study demonstrates in a brilliant way how important the knowledge of larval biology and ecology is in order to understand the factors that influence population dynamics in butterflies. I recommend the book to anybody interested in swallowtail butterflies and butterfly larval biology.

THOMAS FARTMANN

**Fartmann, T. & G. Hermann (eds.) 2006. Larvalökologie von Tagfaltern und Widderchen in Mitteleuropa.** – Abhandlungen aus dem Westfälischen Museum für Naturkunde **68** (3/4): 1–361. ISBN 3-924590-87-7. ISSN 0175-3495. Hardcover 24.80 €, Softcover 19.80 €. [in German].

Since the 1990s, the interest on larval ecology of butterflies and burnets in Central Europe has been steadily growing. However, a summary of the accumulated knowledge has not been available so far, though this information is of significant importance for the identification of lepidopteran habitats, their management, and conservation. Thus, a meeting on larval ecology of butterflies and burnets in Central Europe took place in Münster, Germany, in February 2005. Nearly 100 specialists from Germany and neighbouring countries discussed the current knowledge on larval ecology, methods for monitoring preimaginal stages, and consequences for research and conservation. The results are summarised in a proceedings volume edited by Thomas Fartmann and Gabriel Herrmann. The book is written in German, with an English abstract for each contribution. It is divided into four chapters: (1) Introduction into the larval ecology of butterflies and burnets, (2) larval biotopes, (3) monitoring preimaginal stages, and (4) larval ecology and conservation. These chapters altogether comprise 17 original contributions or reviews. The volume closes with an index to the names of the lepidopteran species mentioned.

In the introductory chapter, Thomas Fartmann & Gabriel Hermann provide an overview of the historical development of the research on larval ecology and discuss the following main properties of larval habitats: microclimate, host plants (according to phenological stage), food availability, food quality, type of land use or disturbance, competition, predation and/or parasitoid pressure, and, for myrmecophilous species, necessary density of the specific host ant. The authors stress that knowledge of host plant use is only occasionally sufficiently known and that host plant use varies regionally. In addition, for 19% of the species treated, no data are currently available on the egg-laying substratum. Huge gaps exist on the impact of parasitoids, global climate change, the use of preimaginal stages for monitoring, and the impact of land use on immatures. The chapter closes with a comprehensive bibliography on larval ecology.

Chapter two, devoted to larval habitats and ecology, contains contributions on *Erebia aethiops*, *Lycaena hippothoe*, *L. alciphron*, *L. helle*, *Maculinea alcon*, and the Central-European species of the genera *Pyrgus* and *Zygaena*. The contribution by Wolfgang Wagner on *Pyrgus* in Central Europe is taken here just to provide an example of the valuable information given in this chapter. The author describes in detail the habitats, host plants, and life cycles of the larvae of the Central European *Pyrgus* species. Among them are *P. serratulae* and the sibling species *P. andromedae* – *P. cacialiae*, *P. malvae* – *P. malvoides*, *P. cirsii* – *P. carlinae*, *P. armoricanus* – *P. onopordii*, *P. alveus* – *P. bellieri* – *P. warrenensis*, *P. carthami* – *P. sidae*. A key is given for the identification of the last instar larvae, and colour photos of the larvae and pupae are provided. Thus, comprehensive information is provided to identify these taxonomically difficult groups, to record and study these species in nature, and to monitor their populations for conservation purposes.

Chapter three focuses on the detection of preimaginal stages of butterflies, for which Gabriel Hermann provides an overview. Detecting preimaginal stages has been a standardised method for a long time. The method is largely independent of the weather conditions and can provide excellent results in analyses of species' large scale distribution or metapopulation structure. According to current knowledge, the method can be applied to more than 60% of the butterfly species of Germany north of the Alps. The relevant literature is cited. The contribution by Steffen Caspari applies this method for *Neozephyrus quercus*, of which the adults are rarely observed because their activity is largely confined to the canopy of oaks. However, searching for eggs of this species revealed that *N. quercus* occurs nearly everywhere in the Saarland, where the investigations took place, and it is concluded that this species might be the most common butterfly species of all. The third contribution of this chapter, by Holger Loritz & Josef Settele, provides recommendations for an effective search for larval stages of *Lycaena dispar*, a species listed in the Habitats Directive of the European Union.

The fourth chapter on larval ecology and conservation contains six contributions. Thomas Fartmann discusses the impact of habitat disturbances for butterflies and burnets. The author shows that land use changed after World War II: it increased in fertile soils, but decreased in marginal soils (e.g. poor, sandy or wet soils). Both extremes coincide with a decreased butterfly diversity. However, intermediate sites with high butterfly diversity became rare. Thus, the authors recommend a more dynamic disturbance regime in certain habitats in order to maintain the diversity in Central European landscapes. More contributions of this chapter are dedicated to the importance of larval ecology for species conservation, the importance of available data on species records and quality of larval habitats for estimating conservation status, and detailed examples are provided for *Melitaea cinxia*, *Jordanita globulariae*, *J. notata*, and *Euphydryas aurinia*.

Altogether, the book provides much valuable information for anybody interested in butterfly recording and conservation. It can be used as a detailed introduction into this subject, provides the state of the art, and a comprehensive bibliography. It can be recommended to all lepidopterists working on butterflies, but also to those working on heterocerous Lepidoptera, for which those methods can be applied in general as well.

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