

Book reviews

Butterflies of Britain and Ireland mapped

Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. & Jeffcoate, S. 2001: The Millennium Atlas of Butterflies in Britain and Ireland. — Oxford University Press, Oxford, UK. 433 pages. ISBN 0-19-850565-5. Price: £30.00 (Hardback).

The massive efforts of the Butterflies for the New Millennium project organized by Butterfly Conservation, Biological Records Centre and the Dublin Naturalists' Field Club in Britain and Ireland have produced a unique set of results that have now been published in the form of a book. The data on the distribution of butterflies that is summarized in the book has been collected by an incredible 10 000 people over a relatively short period of five years (1995–1999) and covers almost all of the land surface of Britain and Ireland. The results are presented in a remarkably clear fashion, inviting the reader to explore the book in more detail. There is no doubt in my mind that this book will become a standard work of reference for many years to come.

So what does the book offer? It is organized in 7 chapters, starting with a general chapter on the background of the project and a brief overview of the history of butterfly recording in Britain and Ireland. The second chapter gives information on the major habitats of butterflies with photographs of 22 representative habitats. The second chapter also has several very useful geographical maps of Britain and Ireland, showing the topography, distributions of different soils and bedrock, annual precipitation and temperatures of the islands. It was very instructive to compare these maps against some of the species distributions.

The third and fourth chapters give specific information about how the data were collected and interpreted, respectively. Here we learn that all records of butterflies starting from 1800 (!) have been included in the maps. The results of the

project have been interpreted with due caution, as recording effort is variable across the islands. Indeed towards the end of the survey, areas that had not been covered were identified and targeted to fill in the gaps. The result is that 98.7 % of all 10×10 -km squares in Britain and Ireland have been surveyed for their butterfly fauna — a remarkable achievement! However there is a distinct cline in the recording effort going from south to north, with thousands of records in the southern 10×10 -km squares to only a few records in the most northern 10×10 -km squares. These problems and other biases are duly noted and taken into account when interpreting the results.

The bulk of the book is in the fifth chapter, where each resident and common migrant species is given four pages and the rarer migrants two pages. This chapter is a gold mine of information. In addition to the distribution map of each species based on the Millennium survey, we find information about the general biology of each species (life cycle, host plants, habitat, population structure), the changes in distribution over 200 years, a comparison with what is known about the species on continental Europe and a look forward into the future of each species in Britain and Ireland. Exceedingly useful is also a list of key references for *each* species where one can find more information about an interesting species (something not possible in most European countries!). Each species account usually has two photographs, one of the adult butterfly and one of the egg or larva. The distribution map shows all records of the Millennium survey at the 10×10 -km scale in three classes: 1 record, 2–9 individuals seen and 10+ individuals seen. The maps also show all records prior to 1970 and all records from the previous survey done during 1970–1982 (*see* Heath *et al.* 1984). This allows one to easily see whether there have been any drastic reductions in distribution over the 200-year period. In cases of range increase, there usually is a smaller map or two showing the distribution of the species prior to the Millennium survey.

The final two chapters then go on to discuss the broad implications of changes in butterfly distributions in Britain and Ireland (causes of declines or expansions, etc.) and what must be done to conserve butterflies. Perhaps the most important and at the same time most worrying result of the survey is the undebatable decline in most habitat specialists. These declines are only slightly balanced by increases in distribution of some habitat generalists. The declines are mainly attributed to habitat loss, while increases in distribution (usually northward expansions) are attributed to climate warming. Climate warming takes on a prominent role in many of the species accounts, even to the extent that 24 maps are devoted to showing 4 different predictions of changes in annual temperature and precipitation regimes 20, 50 and 80 years into the future. Given the complexities of the models used to predict the climate of the Earth, these maps are more amusing than informative. The last chapter gives a lot of details about what can be done to conserve butterfly habitat and even restore lost habitat.

Insect populations

Dempster, J. P. & McLean, I. F. G. (eds.) 1998: *Insect Populations in Theory and Practice*. — Kluwer Academic Publishers. 486 pages. ISBN 0-412-832607. Price £136.

The book consists of the papers presented at the 19th Symposium of the Royal Entomological Society held at the University of Newcastle in September 1997. The topic of the symposium was "Insect Populations", the subject of some controversies that have lasted for decades without being solved. The authors have been selected so as to represent the opposing views. Hence, the review describes a series of study fields with more or less consensus but where further research is still needed.

The list of the contributors is impressive, including 29 scientists from the USA, Europe and Japan. I find it really convenient that their addresses are also given.

The stabilization of populations and the role of density-dependent processes in it have so far

In sum, this book is The Bible for anybody involved in organizing surveys of butterflies anywhere in the world. In addition to all of the above, the appendices show how recording sheets should be designed to gather maximal information. Also for others interested in butterflies, this book gives precise information about each species occurring in Britain and Ireland (too bad there are only 59 resident species in the islands!). The reference section is also very comprehensive, making this book the first place to start when delving into a particular species. What more can I say? This is the way things should be done, and hopefully will be done, in the rest of the world!

References

Heath, J., Pollard, E. & Thomas, J. A. 1984: *Atlas of Butterflies in Britain and Ireland*. — Viking, Harmondsworth.

Niklas Wahlberg

remained more or less unsolved questions. There has been a discrepancy in the terminology and its interpretation. Therefore, the organizers tried to reach an agreement concerning the definitions of the important terms by contacting the contributors, who thus had an opportunity to discuss these definitions. As a result of this, the first few pages of the book contain a list of the definitions of eleven basic terms pertaining to the field covered by "Insect Populations".

The articles in "Insect Populations" have been grouped into two sections. The first section contains papers concentrating more on theoretical questions, while the second is composed of case studies illuminating these questions in practice. It is noteworthy that the authors in the first part of the book have also often included their own results.

In chapter 1, Ilkka Hanski discusses the importance of scale in insect population dynamics. The main hypotheses to explain the observed relative stability are covered in chapters 2, 3 and 4 by Mike Hassell, Piuet den Boer and Jack Dempster, respectively. Alternative methods in detecting density dependence in population data are dis-

cussed in chapter 5 by Peter Rothery. In chapters 6 and 7, Charles Godfray and C. B. Müller, as well as William W. Murdoch, Cheryl J. Briggs and Timothy R. Collier, deal specifically with the top-down and bottom-up effects of natural enemies on their prey populations. The topic of density-dependent changes in the quality of individuals is covered in chapter 8 by Simon Leather and Caroline Awmack.

The second part of the book is grouped around three main themes. The first postulates the extent to which we can generalize about the population dynamics of closely related taxa. In chapter 9, Tony Dixon and Pavel Kindlmann discuss the population dynamics of aphididae based on a reanalysis of data for tree-living species. Nigel Straw and Jeremy Thomas, R. T. Clarke, G. W. Elmes and M. E. Hochberg review the population studies on Tephritidae and the genus *Maculinea* (Lepidoptera), respectively, in chapters 10 and 11.

The next two chapters compare the dynamics of the populations of two well-analyzed species in different geographical locations, namely the cinabar moth *Tyria jacobaeae* (Eddy van der Meijden, Roger Nisbet and Mick Crawley, chapter 12), and the winter moth *Operophtera brumata* (Jens Roland, chapter 13). These are followed by four contributions covering the population dynamics of less well-known groups of insects. Peter W. Price, Timothy P. Craig and Mark D. Hunter

describe their long-term studies of gall-forming sawflies in chapter 14, and Jan McLean reports on research on a gall-forming psyllid (chapter 15). Takayuki Ohgushi describes his long-term study of a herbivorous ladybird (Coccinellidae) (chapter 16). Finally, there is the only case study of a generalist predator, namely Ola Fincke's description of her work on a dragonfly community (chapter 17).

In the end, the editors summarize all the articles. As a final remark, they stress the meaning of immigration and emigration and point out that the next Symposium of the Royal Entomological Society will focus on insect dispersal. They close with a general point that we need to be constantly on the lookout for techniques developed in other disciplines that might help us to test some of the ideas that have been presented in this volume.

The reference list covers over 50 pages and is followed by species and subject indexes.

This huge package of knowledge must surely be read thoroughly more than once in order to digest everything. On the other hand, every reader can pick the articles that they find most interesting. I can warmly recommend the book as a basic textbook for university students as well as to professors and other lecturers and all scientists dealing with these topics.

Juhani Itämies

Danish Grasshoppers

Ole Fogh Nielsen 2000: De danske græshopper Danmarks Dyreliv, Bind 9 [Danish Grasshoppers. Animal Life of Denmark, vol. 9]. — Apollo Books, Stenstrup, Denmark. 192 pages, 125 colour photographs [Text in Danish]. ISBN 87-88757-50-1. Price DKK 300 excluding postage (Hardback).

Apollo Books continues with its series of fine books about Danish animals. Now, a new book has been published about grasshoppers. On the first few pages, the author Ole Fogh Nielsen tells his readers that the book is the result of ten years of research on Danish grasshoppers. The persons who have helped him in many ways are also listed

here and warmly thanked. The author especially points out the fascinating world of the sounds of these peculiar insects. To make the reader more familiar with the sounds, there is a CD included, and this is also hoped to open the ears of the readers (unless you are too old to hear them anymore, like me, for instance!).

In the Introduction, the author gives a short review about the research history in Denmark. He points out that grasshoppers belong to the summer, although they do not possess such bright colours as butterflies and are not such excellent fliers as Dragonflies. Nevertheless, they have a special role on sunny summer days — through their stridulation. The chirping sound is a good tool in identifying species. Finally, he points out that 30 years have elapsed since the publication

of the previous grasshopper book in Denmark.

The next chapter "Life cycle and systematics" starts by underlining the fact that grasshoppers are one of the oldest known insect orders, dating back as far as the Carboniferous more than 300 million years ago. Even in Denmark, fossils from 54 million years ago have been found. The systematic position of grasshoppers has been uncertain and continues to be so to some extent. At present, these insects are grouped into two suborders, Ensifera and Caelifera, which, according to some specialists, should be ranked as separate orders. About 20 000 species of Saltatoria are known in the whole world, while 800 species are known in Europe and 32 in Denmark, which indicates that grasshoppers thrive in warm areas. In this book, Danish names for all the species occurring in Denmark are used in the species accounts, but not to worry, the Latin names are given in the headings of each species.

The chapter titled "Life cycle" is long and thorough. Under several subheadings (e.g. "Adults", "Food", "Copulation", "Egg-laying" and "Nymph") the author describes all the phases in good order and with several drawings and photographs. The basic terminology is also presented here. The food of grasshoppers is variable, and even animal diet is used by many species, especially by the bigger ones. There are only a few species that are exclusively herbivorous! In the northern countries, we do not have the kind of difficulties with swarms of grasshoppers that are common at the more southern latitudes. Most of the Danish grasshoppers stridulate and use this to find individuals of the opposite sex. The voice is made in various ways: by the wings, by the legs, by flying, and so on. Usually only males stridulate. If the sound at one spot does not attract any females, the male usually moves to a new site and starts again its stridulation. Both sexes of mark (ground?) grasshoppers stridulate. Eggs are laid in various places, depending on the species in question, mostly singly either in the ground or among litter. The number of eggs varies from 50 to 200 (300), depending on the species. Some species lay egg capsules with as many as 100 eggs.

Under the heading "Habitats", the most typical sites for all the species are listed briefly. Next, there are some descriptions of the enemies of grasshoppers. The chapter titled "Sounds of grass-

hoppers" contains a more thorough description of the ways in which the chirping sound is produced. Different types of sounds are named, and they are also included on the CD, so that everybody has a possibility to test these things in practice. This part of the book concludes by presenting many interesting facts about the research on grasshoppers, how to record their sounds, how to photograph them, and how to keep them in breeding boxes. It is quite useful to be able to use the same detector that is used to follow bats at night also to localize and detect grasshoppers and to tell apart the species by their sounds! There is another short chapter about the status and distribution of species in Denmark before the presentation of individual species.

The largest part (pages 37–168) of the book "Danish Grasshoppers" is composed of the descriptions of all the species. For all of them, there are descriptions of the habitus, the habitats, the life cycle and food, the distribution in Denmark and the sounds. All this is illustrated by excellent colour photographs of the species, usually both males and females and often also of nymphs. Similarly, there are demonstrative habitat figures. One can learn a lot of details and facts about the species, which surely helps in the efforts to find a certain grasshopper.

In the end, there is a systematic list of Danish species. I had been waiting to see some synonymies there, because I can hardly imagine that there would not be any! The text part ends in a key to adult grasshoppers. It is provided with illustrative drawings that make it much easier to use. On the last pages, there is a list of the sound samples on the CD and the sound diagrams of the different species, a reference list and an index of the Latin and Danish names of the grasshopper species. The book has been written in Danish, but at least people in northern countries can read it more or less fluently (even Finns). I wish to express my sincere congratulations to the author and the publisher about this excellent book, which makes a remarkable addition to the previous book about Danish dragonflies published in the same series. Danish Grasshoppers can be warmly recommended to all entomologists and especially to those dealing with this small but fascinating group.

Juhani Itämiies