

## Review

Kim, K. C. & McPherson, B. A. 1993: Evolution of insect pests. Patterns of variation. — John Wiley & Sons, Inc., New York. 479 pp. ISBN 0-471-60077-6. Price GBP 74.

The volume is a collection of 23 articles, grouped in five sections in such a way that the first section gives a broad general theoretical background, and the sections following bring the reader gradually closer to pest control practice. The first section, "Genetic variation and evolution", starts with a review of insect pest evolution, and deals mainly with immigrant species turned noxious in the USA or elsewhere in North America. This chapter, written by the first editor, K. C. Kim, indicates what the rest of the book will be: predominantly an account of American case studies and of theoretical background developed in the USA. There are two obvious reasons for this: the USA is by far the leading country in this field, and all the authors of the volume work in American universities or research institutes.

The concept and purpose of the book is to provide "... an excellent opportunity for an in-depth look at various aspects of infraspecific variation.". Within the limits set by the choice of material, the book can be said to come close to fulfilling this ambitious goal. Altogether three chapters of the first section, and the first three chapters of the next section, "The nature of genetic variation" serve as a basis for the chapters following but also offer solid material about general population genetics topics such as gene-environment relationships and genetic versus environmental determinants of spatial variation. The fourth and last chapter of the second section deals with habitat patterns and pesticide resistance, and turns the focus of the book towards problems arising from pest invasions or pest population explosions. Case histories of pesticide resistance cover the non-insects spider mites and phytoseiids, and insect species from the biologically rather diverse groups psyllid Homoptera and tortricid Lepidoptera.

The third section, "Ecology of invading populations" comprises five predominantly descrip-

tive chapters presenting case histories of invasions or introductions of insect pests into the USA, Canada or Japan. Immigrant insects sufficiently dynamic and aggressive to become pests display a number of attributes common to the majority of species, but the number of nonconformist species is too large to allow strict generalisations or predictions. As stated in the chapter by M. W. Brown on population dynamics, one of the reasons for this dilemma is the fact that it is very difficult to collect information on a population at the initial stages of invasion, when density is low. Related problems arise when instead of pests, one investigates their natural enemies, while these are still at the stage of forming stands, or aggregates, dense enough to reduce their prey populations substantially. M. Andersen and P. M. Kareiva use coccinellid-aphid interactions for theoretizing upon mass release of predators for biological control of insect pests.

The last chapter of the third section is purely theoretical account of physiological or behavioural generalists versus specialists in relation to plant-host parameters such as toxicity ("viability") or abundance. The writer, D. Rausher, successfully avoids mentioning any names of insect species or groups in his article.

The fourth section is a compilation of case studies. Three of the examples are drawn from the Coleoptera, three from the Lepidoptera and one each from the Homoptera and Diptera. The nine authors of the eight chapters presenting case studies treat their subjects in various ways. The authors' personal attitudes reflect the research traditions attached to the pests in question. These, of course, originate from differential dispersal capacities, variable host-pest situations, life-history parameters such as voltinism, and other characteristics of a pest species. W. B. Showers suggests that voltinism is the key factor which regulates the dispersal of populations of the pyralid

moth, the European corn borer. D. P. Pashley and J. R. Bradley, Jr. in their articles deal with the fall armyworm and bollworm, respectively, attempting to evaluate the significance of choice of habitat or food plant for the success of these Noctuidae moths. Pashley presents a flowchart giving the prerequisites for bifurcations which lead to polyphenism, genetic polymorphism or sibling species formation. T. H. Hsiao concludes his review on the alfalfa weevil (Coleoptera, Curculionidae) by stating that "...the genetic variability of pest biotypes should be evaluated as a part of a comprehensive biological control program." Margaret E. Saks argues that temporal variation in the nutritional quality of the common bean strongly influences Mexican bean beetle behaviour and evolution. James L. Krysan outlines directions of research on the differential responses of two corn rootworm species (Coleoptera, Chrysomelidae) to variable cropping practices. L. M. Hanks and R. F. Denno treat rules governing adaptation of scale insects (Homoptera) to different host plant species. W. J. Tabachnick attempts to reveal the key genetic factors basic to population ecology of the yellow fever mosquito (Diptera).

The fifth and last section of the book comprises two chapters. G. G. Kennedy offers a broad

review of the significance of genetic and non-genetic intraspecific variation for pest management strategies. In a rather dissimilar manner, K. C Kim and B. A. McPherson write about parallel problems. They prefer to use the term *infra*-specific variation for the same polymorphisms. The very last subchapter of the book, "Future perspectives and strategies", calls for "consistent biological definition and delimitation of *infra*-specific variation for major economic pests and vectors". Genetically conditioned variability discussed in the book ranges from DNA or protein polymorphism to biological characteristics such as voltinism. But how to tell the essential, most significant polymorphisms apart from "noise" polymorphisms which are neutral with regard to integrated pest management? No wonder that the book does not solve this problem, which in its general form is a perpetual enigma of ecological genetics. In short, the authors go as far as possible within the framework of present knowledge and place a good, solid package of information and ideas at the disposal of biologists interested in polymorphisms, speciation and evolution.

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