Book Reviews

Crop pollination by bees. By K.S. Delaplane and D.F. Mayer (Wallingford, CABI Publishing, 2000). 360 pp. Hard cover £60.00 (US$ 100.00). ISBN 0 85199 448 2.

If a crop performs poorly because of drought, the grower irrigates. If it yields poorly because of a shortage of suitable pollinators, the problem often goes unrecognized and unremedied. As the authors point out, two excellent books (McGregor, 1976 and Free, 1993) are available for research workers; but there is a need for a less detailed treatment more accessible to growers, bee-keepers, agricultural consultants, extension specialists, conservationists, and others concerned with practical crop pollination. In meeting that need, this book takes an admirably even-handed view. Instead of simply listing the numbers of honeybee hives needed per unit area of crop, and the timing of hive introduction, it draws attention to the many different types of bees, managed and unmanaged, exotic and native, that contribute to pollination in field and glasshouse. This is particularly timely because honey bees have suffered a serious decline in many parts of the world due to the *Varroa* mite and other causes. Thus this volume deals with habitat management for the conservation and enhancement of native bee populations on the farm, as well as with techniques of management and use of both well-known and lesser-known pollinating bee species for which management techniques have yet to be perfected.

After introductory chapters on the benefits and nature of bee pollination, an overview of bee biology, and bee conservation, the book deals with the biology, role as pollinators and management of various bee species (honey bees, bumble bees, alkali bees, other soil nesting bees, alfalfa leafcutting bees, orchard mason bees, carpenter bees), and bees and pesticides, before treating an alphabetical sequence of 36 crops from alfalfa and almond to tomato and watermelon. A final chapter considers priorities in technology development, research and education. Three appendices list sources of bees, bee-keeping books and supplies, give a sample pollination agreement between bee-keeper and grower, and tabulate the toxicity of various pesticides to honey bees, alfalfa leafcutting bees and alkali bees.

Though written from an American perspective, the book will be useful throughout the developed temperate world. It deals with the major bee-pollinated crops of temperate regions, and gives correspondingly wide geographical coverage of the major bee species managed as pollinators. Appendix 1 lists bee-keeping suppliers in Australia and New Zealand, Europe and South Africa as well as the USA and Canada.

The text is straightforward and readable, and technical terms are avoided or explained. By integrating material from the academic and applied literature the authors have succeeded admirably in condensing a complex and dynamic research field into a useful introduction to the practical management of pollination, packed with sensible recommendations.

This book should be on the shelves of growers and agricultural advisers, as well as research workers, in temperate countries throughout the world – and perhaps also in the tropics, where its discerning treatment of general principles will be valued even though tropical crops are not included. At a time when the decline of honey bees threatens a pollination crisis in many countries, this book will meet a need that is finding increasing recognition. It will stimulate and support practical pollination management and by highlighting gaps in our knowledge it will also help to focus research productively. When a book synthesizes a field of study and stimulates research in this way, it drives itself out of date. I hope an updated second edition will soon be needed.

References

Free, J.B. (1993) *Insect pollination of crops*. 2nd edn. 684 pp. London, Academic Press.

McGregor, S.E. (1976) *Insect pollination of cultivated crop plants*. 411 pp. US Department of Agriculture, Agriculture Handbook 496.

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Pheromones of non-lepidopteran insects associated with agricultural plants. Edited by J. Hardie and A.K. Minks. (Wallingford: CABI Publishing, 1999). 480 pp. Hard cover £75.00 (US$140.00). ISBN 0 85199 345 1.

Just as oranges are not the only fruit, moths are not the only important agricultural insect pests. Yet while the potential uses of insect pheromones have been extensively studied in moths since the first insect pheromone, of a silk moth, was identified some 40 years ago, the pheromone biology of the many other important insect groups has not received the attention it deserves. This excellent volume thus fills an important gap as it covers the pheromones and biology of the many important insect groups such as aphids, sawflies, and Heteroptera that are usually mentioned only in passing in most books on insect pheromones. There are also chapters on the pheromone biology of other important pests including fruit flies, gall midges, scarab beetles, sap beetles, forest beetles, stored-product beetles, scale insects, grasshoppers and locusts, and termites. A particularly welcome feature is the inclusion of four chapters on beneficial insects such as bees, parasitoids and predators. Many of the chapters offer the best reviews currently available of pheromones in their group.

While the chapters vary in emphasis, a major strength of

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the book is the inclusion of wider biological and evolutionary background in most chapters. For example, the chapter on predators includes an account of eavesdropping by predatory beetles on the pheromone signals of bark beetles and the consequences of such selection pressure on this communication channel. Evolutionary explanations are explored for the presence of aggregation pheromones in stored product beetles. Speciation and mating barriers form a theme in the chapter on scarab beetle pheromones.

The chapters offer a stimulating combination of basic biology and a description of the ways pheromones have been used in the control or manipulation of that insect group. Most chapters include a prospectus of what is likely to be important in the years to come and an assessment of the important questions that remain unanswered.

The volume is well edited and well illustrated. The placing of references after each chapter is welcome. The text is complemented by full taxonomic and subject indexes.

There has only been a limited take-up of pheromones for pest control or behaviour modification outside the Lepidoptera. This timely book will do much to stimulate further work on these important insect taxa.

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