The LINNEAN SOCIETY of London BOTANICAL Journal of the Linnean Society

Botanical Journal of the Linnean Society, 2013, **171**, 773–779.

Book Reviews

Evolution of Plant-Pollinator Relationships edited by S. Patiny. Cambridge: Cambridge University Press, 2011. 477 pp. Hardback. ISBN 978-0-521-19892-9. £75.00 (US$125.00).

Studies of plant-pollinator relationships are among the most interesting ones in modern biology since they uncover the ways by which the organisms live and interact with each other within natural or agricultural ecosystems. Such studies are also among the most complicated in terms of the techniques and interpretation of the results because most of them imply direct observations in natural habitats; for this reason the observed phenomena are influenced by many internal and external factors, which should be detected and taken into account. Pollination biology, or anthecology, underwent great progress since the commonly appreciated textbook by Faegry and Van der Pijl (1966). Some recent advances and generalizations are presented in the present book.

The book consists of 17 chapters written by 53 contributors. About a half of them present original results and are organized as research papers; the others contain reviews of some significant topics of pollination ecology. Most of the chapters are illustrated with photographs and diagrams; some of them are reproduced in colour at the colour plate section. The last chapter by S. Patiny, the book's editor, summarizes the advances and perspectives of studies of plant-pollinator relationships which are gathered in the book as well as those at worldwide scale.

The authors of the chapters deal with important questions of plant-pollinator coevolution, such as mechanisms of flower diversification, diversity and evolution of floral rewards and signals, advantages and disadvantages of various sexual systems of angiosperms, the ancestral pollination mechanism, evolution of specialized and generalized pollination. Studies of pollination biology require the employment of specialists from various fields, since the aspects of pollination should be viewed both from plant's and pollinator's side. The results presented in this book show good examples of cooperation between botanists, zoologists and evolutionists. The plants (mainly angiosperms) and pollinators (mainly insects) are tightly coherent ecologically and therefore evolve under conditions of interdependency from each other. This leads to the importance of cophylogenetic investigations of these two groups of organisms. Examples of such investigations uncover complex evolutionary patterns which are far away from simple matching of plant and pollinator phylogenies and comprise a lot of homoplasies. Understanding of community structure and network of interactions between the community members also underwent significant progress during recent years. These investigations open new levels of pollination ecology which should embrace and summarize the results of case studies of plant-pollinator interactions and their evolution models. Within this approach the principles of community functioning and evolution are to be developed.

The progress in ecological research is, to a considerable degree, conditioned by application of modern biological methods and instruments. These include studies of fossils, pollen micromorphology, flower volatile compositions, molecular analysis and managing of large data sets. Employment of molecular phylogenetics allows reconstruction of evolution of morphological features and reproductive traits based on morphology-independent phylogenies (Endress, 2003); this is especially useful for investigations of cophylogeny of plants and pollinators. The old questions of pollination syndromes are now studied from a position of genomics and physiology.

This book is a comprehensive reflection of the current state of pollination ecology studies; it shows the diversity of modern directions and methods of research as well as a review of knowledge already obtained and white spots which are still to be filled.

REFERENCES

Endress PK. 2003. Morphology and angiosperm systematics in the molecular era. *Botanical Review* **68:** 545–570.

Faegri K, Van Der Pijl L. 1966. *The principles of pollination ecology*. Oxford: Pergamon Press.

MAXIM S. NURALIEV