

Dafni, A., Hesse, M., Pacini, E. (ed.): **Pollen and Pollination**. (Special Edition of Plant Systematics and Evolution **222**, No. 1-4, 2000). - Springer-Verlag, Wien - New York 2000. 336 pp. Hardcover DEM 268.00. ISBN 3-211-83514-8.

Sixteen review articles of the book present a comprehensive interdisciplinary text on pollination biology written by specialists in plant physiology, cytology, botany, ecology, zoology and entomology. The content of the papers could be classified into several main themes: pollen and anther maturation; pollen presentation and dispersing units; pollen constituents, morphology and viability; pollen evolutionary ecology; mechanisms of pollen dispersal; and biotic and abiotic pollen vectors. Many papers are concerned with more than one theme and several somewhat overlap.

Last steps of pollen maturation are characterized by dehydration and by accumulation and transformation of carbohydrates involved in the control of osmotic pressure during pollen exposure and dispersal. Anther dehydration and opening depends on a number of internal mechanisms and environmental parameters and pollen presentation and types of dispersing units exhibit various structural and ecological features (E. Pacini). Special class of pollen dispersal units are pollinaria of orchids. Their structural and functional diversity and related outcrossing mechanisms are described by S.D. Johnson and T.J. Edwards. Pollen packaging units together with other factors such as pollen-ovule ratios, stigma morphology and receptivity, breeding systems and pollen vectors are possible selective forces that affect the number of pollen grains produced (R.W. Cruden). Reviews on pollen constituents are focused on methods and results of cytochemical pollen analysis with special reference to wall and reserve material (M. Nepi, G.G. Franchi) and on literature concerning digestion and nutrient content of pollen (T.H. Roulston, J.H. Cane). Some cytochemically detectable constituents can indicate pollen viability. Germination and cytochemical tests for assessment pollen viability are critically viewed and possible ecological and evolutionary implications of pollen viability and longevity are discussed (A. Dafni, D. Firmage). Pollen morphological features show a wide variability and there are

examples of associations of stratification and the microtopography of pollen grain wall with the nature of pollen vectors (M. Hesse). A significant role in pollination ecology in angiosperms can be played by thread-forming structures derived from the anthers, mainly as pollen-connecting threads or as structures involved in pollen presentation (M. Hesse *et al.*). In biotic systems of pollination flower-pollinator interactions can be also correlated to pollen odor evolved under selective pressure to attract pollinating insects (H.E.M. Dobson, G. Bergström) and with visual signals produced by pollen and pollen-producing organs (K. Lunau). Pollen volatiles comprise chemically diverse compounds that may also play a role of defense against non-pollinator pollen-feeding insects and pathogens. Specific evolutionary relationships and adaptations between flowers and pollinators are described on examples of bat-pollinated species (A. Stroo), beetle-pollinated angiosperms (P. Bernhardt) and of orchids pollinated by Meliponini bees (D.W. Roubik). Various structural and behavioral mechanisms to pollen collection evolved in bees (R.W. Thorp). Widely distributed are strong functional adaptations of plant morphology and of pollen physical characteristics to abiotic modes of pollination (J.D. Ackerman). Recent studies confirmed an involvement of electrostatic phenomena in pollination processes depending mostly on the geometry of the flowers, and there are possibilities to use electrostatic forces as the basis of a method of pollen supplementation in agriculture (Y. Vaknin *et al.*).

For a more information about the topics the reader is referred to the respective literature list of each article. A detailed subject index makes an orientation in the book easy and 33 informative tables and 67 partly coloured Figures complement the text. The book is a valuable source of information suitable for universities and especially for researches in the field.

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