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BOOK REVIEW

GATES, D. M., SCHMERL, R. B. (ed.): **Perspectives of Biophysical Ecology.** Ecological Studies Vol. 12. — Springer-Verlag, Berlin—Heidelberg—New York 1975. 609 pp., DM 85.30.

Interactions between organisms and environment explained in details by means of analytical approaches which involve the physical, chemical and mathematical laws, are the research subjects of the so-called biophysical ecology. In this twelfth volume of the Ecological Studies (Jacobs, J. et al. — ed.), some of these approaches as characterizing both plant and animal responses to abiotic conditions are introduced.

The book includes 38 contributions which were presented at the symposium held at the University of Michigan in August 1973: 14 of them — covering three comprehensive parts of the book — are devoted to the mass transfer and energy exchange between plants and their environment. In the first part "Analytical models of plant", the photosynthetic model (by P. W. Lommen et al.), mesophyll resistances (by C. Yocum and P. W. Lommen), the model of leaf photosynthesis and respiration (by A. E. Hall and O. Björkman), the optimal leaf form (by S. E. Taylor) and aspects of predicting gross photosynthesis for an energy-metabolic balance in the plant (by R. S. Alberte et al.) are discussed, accepting the limitations imposed to model and submodel inputs by the conventional biological variability of plant responses to moderate environment. Mathematical solutions of model analyses are rooted in usual computer operations and confirmed by exact experiments. The interactions between plants and variable components of extreme environments are described in the second part "Extreme climate and plant productivity", which provides information of gas exchange strategies in desert plants (by H. B. Johnson), photosynthesis of desert plants as influenced by internal and external factors (by O. L. Lange et al.), field measurements of CO_2 exchange in some woody perennials (by B. R. Strain) and environmental stresses and inherent limitations affecting CO_2 exchange in evergreen sclerophylls in Mediterranean climates (by E. L. Dunn). In the third part "Water transport and environmental control of diffusion", attention is paid to regulations of water transport in the soil-plant-atmosphere continuum (by A. E. Hall and M. R. Kaufmann), the environmental influence of total water consumption by whole plants (by J. W. O'Leary), the light intensity and leaf temperature as determining factors in diffusion resistance (by J. D. Tenhunen and D. M. Gates), the photosynthesis in developing plant canopies (by R. G. Alderfer) and the energy exchange and plant survival on disturbed lands (by R. Lee et al.).

All these studies could be considered as characteristic for the yet developing conception of the biophysical ecology. They demonstrate that the ultimate resolution of many fundamental ecological problems concerning plants could be achieved when they are combined with biochemical and biophysical mechanisms and theoretical models on different levels of plant organisation. Evidently, the prosperity and perspectives of biophysical ecology as the self-contained scientific discipline consist in 1) the well-balanced contributions of physics, chemistry, mathematics and biology with regard to the relationships between the dominant factors and the hierarchy of factors of different orders, 2) the assertion of a system analysis which respects the autecology of each individual assemblage — *i.e.* the cell, tissue, organ, organism and community, and 3) not only in the exertion of complex theoretical models which characterize the appropriate responses of organisms to changing environmental factors but also in the exact verifications of each particular simulation.

The book is fully in keeping with the scientific and editorial standards of the Ecological Studies. It is well printed and arranged and supplied with a detailed subject index.

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