

Long, S. P., Woodward, F. I. (ed.): Plants and Temperature. (Symposia of the Society for Experimental Biology Number XXXXII.) – Society for Experimental Biology, Cambridge 1988. 415 + X pp., US \$ 77. –

This volume, of proceedings of the symposium held at the University of Essex in September 1987, presents 19 papers from disciplines ranging from molecular biology and membrane physiology to crop physiology and plant ecology. They reviewed the current knowledge of the effects of temperature on plants at three levels of organization: the population, whole plant and the cell, highlighted current advances, questions and directions of future research. Unfortunately, abstracts of 60 poster contributions and summaries of discussions are not included.

The introductory chapter deals with physical backgrounds controlling the temperature and energy balance of plants with examples from research carried out on agave and cacti (P. S. Nobel). The following chapters describe plant performance in cold climate (C. Körner and W. Larcher), mechanisms by which temperature influences the distribution of species and vegetation (F. I. Woodward), interactions of temperature with other environmental variables in determining ecological patterns of distribution of plants with C₃ and C₄ photosynthesis and Crassulacean acid metabolism (J. A. Teeri), and limitation of plant productivity by low temperature at northern latitudes (J. Grace).

The next five chapters deal with temperature effect on whole plant level. They are focused on temperature dependence of seed germination and related physiological processes (E. H. Roberts), interaction of temperature with other environmental variables in controlling plant development (J. R. Porter and R. Delecolle), effects of low temperature on plant growth (C. J. Pollock and C. F. Eagles), dependence of cell cycle and its components on temperature (D. Francis and P. W. Barlow) and partitioning of carbon within sources and sinks and its transport between them in relation to temperature (J. F. Farrar).

The last group of chapters brings a review of recent progress in understanding temperature effect on plant at the cell and molecular levels. It involves contribution on temperature effects on plant cell membranes (P. J. Quin), heat shock proteins in plant (H. J. Ougham and C. J. Howarth), temperature dependent factors influencing nutrient uptake and acclimatory changes at the membrane level (D. T. Clarkson *et al.*), low (H. G. Krause *et al.*) and high temperature stress effect on photosynthesis and quantum yield (N. R. Baker *et al.*). The last two chapters deal with the effect of lowering the temperature on the respiratory carbohydrate metabolism by plant cells (T. ap Rees *et al.*) and to models as a useful tools for relating short-term subcellular effects of temperature to affects at the whole leaf (G. D. Farquhar). The concluding chapter draws together the results, key questions raised from the symposium and proposes for future (H. W. Woolhouse).

The book is clearly arranged, contains good quality illustrations and Subject Index. It can be recommended as a source of information for research workers in plant physiology, ecology and related branches.

Jarmila Solárová (*Praha*)

Amthor, J. S.: Respiration and Crop Productivity. – Springer-Verlag, New York – Berlin – Heidelberg – London – Paris – Tokyo 1989. 215 pp.

There are several books dealing with biochemistry and physiology of plant respiration, but specialized book focused on relation between plant respiration and crop productivity is missing. The aim of this specialized monograph is to bridge this gap in world literature.

The first of nine chapters presents terminology and an introduction to the topic. The next chapter presents description of a functional approach to studying and predicting respiration. The purpose for presentation of models given at the very beginning of the book is to have it available as a framework for evaluating crop plant respiration and the relationships among various respiratory processes and crop productivity in later chapters. Chapter three deals with fundamentals of biochemical pathways and respiratory cycles in plants. Biochemical knowledge is given for understanding the functional relationships between respiration, growth and yield. Highly useful is the last section “Quantitative biochemistry” that outlines methods of calculating the efficiency of biosynthesis in plants as well as performance of the respiration required to synthesize phytomass. This part is not obvious in standard book on plant biochemistry and metabolism. Physiology of respiration is discussed in Chapter 4. This chapter discusses the influence of temperature on respiration rate, the effects of tissue protein content, respiratory substrate level, and effect of previous photosynthesis and light levels on respiration rate. It deals also with respiration of different part of plant and with respiration in relation to various internal and external factors. In chapter five characteristics of the components of the functional model are presented and the actual magnitude of growth and maintenance respiration in crop plants is extensively reviewed. Chapter six is focussed on rate of respiration of major crop species (barley, maize, pea, rice, soybean, wheat, alfalfa, cotton, potato and ryegrass) in relation to growth and individual growth characteristics. Attention of chapter seven is paid to effects of a important stress factors (water deficit, salinity, sulphur dioxide, ozone, diseases, insects and nematodes) on respiration. In chapter eight the relationships between respiration rate and crop productivity are discussed with an emphasis placed on perennial ryegrass. Concluding chapter summarizes current knowledge about crop plant respiration. Particular attention is focussed on functional model since it can be used to integrate information from several levels of organization i.e. from cellular biochemistry to CO₂ efflux rates of an entire canopy in field.

The book is complemented by very useful appendices: Physical constants and variables, Expression of respiration and growth rates, Conversion of growth and maintenance coefficients, List of species, List of enzymes, References and Index.

The medium size, well written book can be recommended as a source of information on plant respiration in relation to crop productivity for advanced students and researchers in crop physiology, ecology, plant breeding and botany.

Jarmila Solárová (*Praha*)

Lebedev, G. V. : Defitsit Vody i Sel'skokhozyaistvennoe Proizvodstvo. [Water Deficit and Agriculture]. – Khimiya, Leningrad 1990. 317 pp., in Russ.

The very existence of the human kind on this Earth depends upon good management of natural resources to produce food and fiber. This production is to a great extent limited by a lack of water. The prerequisite for reaching the maximal yield from irrigated land and the efficient use of water is good practical knowledge of irrigation technology combined with good theoretical knowledge of plant physiology and ecology. Therefore it is important that also this book is well balanced containing both the theoretical and the practical data. The first part gives the basic informations concerning plant-water relations. The main attention is paid to the state of water in plant cells, the water transport on the cell and the tissue level, the water absorption by roots, the leaching of different substances, the regulation of physiological processes on the whole plant level and the effect of microclimate. These questions are partially solved on the basis of author's own results, especially with D₂O. The detailed description of these special methods is included. The practically oriented second part deals with different irrigation methods (from which the sprinkler-irrigation technique is recommended) and with their effects on growth and yields of individual crops and fruit trees. The text is accompanied with 47 tables and 182 figures. It is pity that the English abstract as well as indexes are not included.

Jana Pospíšilová (*Praha*)

Campbell, A., Baker, B. B., Jones, E. W.(ed.): Annual Review of Genetics. Vol. 24. – Annual Reviews Inc., Palo Alto 1990. 718 pp. USA and Canada \$ 40.00, elsewhere \$ 45.00

The 24th Volume of Review of Genetics is dedicated to G. W. Beadle (1903–1989), known for his outstanding work on genetics of *Neurospora*. The following topics are reviewed: *Aspergillus* development genetics, polyketide genetics, genetics of protein secretion by gram-positive bacteria, yeast mitochondrial gene expression, genetics of slow viruses, LDL receptor mutations, genetics of arteriosclerosis, frameshift mutations, protein export in *E. coli*, bacterial cell division, plant gene expression, somatic mutations in humans, comparative radiation genetics, bacteriophage intrans, early neurogenesis in *Drosophila*, diversity in retroviruses, gene-for-gene complementary in plant-pathogen interactions, P4-helper phage interactions, retrotransposons and retroviruses, mRNA stability, *Drosophila* P element transposition, premeiotic instability in *Neurospora*, tumor suppressor genes, and genetics of circadian rhythms. All articles are well written and include extensive bibliographies. The fact that the material in the Annual Reviews is normally scattered through a variety of sources argues persuasively for the value of the publication.

T. Gichner (*Praha*)