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*Figures at the end of the issue.*

## BOOK REVIEW

MONTEITH, J., WEBB, C. (ed.): SOIL WATER AND NITROGEN IN MEDITERRANEAN-TYPE ENVIRONMENTS. Developments in Plant and Soil Science Volume 1. Martinus Nijhoff / Dr. W. Junk Publishers, The Hague—Boston—London 1981. 338 pp., 125 Dfl.

This book is compiled from the selected reviews presented at a workshop, organized by the "International Center for Agricultural Research in the Dry Areas" (ICARDA) with the help of the "United Nations Development Program" (UNDP) at Aleppo (Syria) in January 1980. For increasing the quantity and availability of food in the Mediterranean region, ICARDA is developing a special project on "Increasing the Fixation of Soil Nitrogen and the Efficiency of Soil Water Use in Rainfed Agricultural Systems in the Countries of North Africa and Western Asia", as soil water and nitrogen are considered to be among the main limiting factors to production in this area. In planning and for realization this project, ICARDA has called on the leading scientists from a number of countries to give the benefit of their experience and advice on methods and priorities on which this specific research can be based and conducted. The workshop was organized for the presentation and exchange of information, discussions and recommendations for project guiding. The book contains 11 reviews, each written by a specialist whose remit it was to review his particular area of interest. The first three reviews are devoted to analysis of the agro-climatology of the zone studied (A. H. Kassam), environmental resources and restraints (R.C.G. Smith and H.C. Harris), and to the present farming systems and possibilities of their improving (D. Gibbon). The next two reviews deal with water dynamics in the soil-plant-atmosphere system (J. T. Ritchie) and with plant-water relations and adaptation to stress (N. C. Turner and J. E. Begg). The subsequent two articles describe nitrogen accession, cycles of transformation and its loss in soils of the arid region (P. L. G. Vlek, I. R. P. Fillery and J. R. Burford), and efficiency of nitrogen use in crop systems (R. Novoa and R. S. Loomis). The last group of four chapters covers modelling the interaction of water and nitrogen (H. van Keulen), optimizing the use of water and nitrogen through soil and crop management (F. E. Bolton),optimizing the use of water and nitrogen through breeding of crops (R. A. Fischer) and possibilities for plant improvement for semi-arid rangelands (D. A. Johnson, M. D. Rumbaugh and K. H. Asay). The concluding summarization "Epilogue: themes and variations" (J. L. Monteith) is followed by "Recommendations" which arose from the workshop papers and discussions. A sole index contains subject items, author's and plant names.

The book provides a record of the current state of knowledge of soil, climate, soil water and soil nitrogen availability, fundamental not only for the mentioned regions but also for areas of similar type occurring practically on every continent. It reviews all principles by which soil, water and nitrogen relations can be studied in every environment and thus it provides a very useful general reference book on these subjects.

JARMILA SOLÁROVÁ (*Praha*)

CHRISTIANSEN, M. N., LEWIS, C. F. (ed.): BREEDING PLANTS FOR LESS FAVORABLE ENVIRONMENTS. — John Wiley & Sons, New York—Chichester—Brisbane—Toronto—Singapore 1982. 458 pp., 35.00 £.

Of almost 15 billion hectares of land in the world, only about 9 per cent are classified as non-stressed or good crop land. On additional 20 per cent crop productivity is limited by mineral stress, on 25 per cent by drought, on 11 per cent by excess of water, on 22 per cent by a small thickness of the soil layer and on 13 per cent by permanent freezing. Agriculture must then continually cope with stress. Any increase in productivity will be dependent upon reducing the effect of climatic fluctuations and unfavourable conditions. As more and more marginal-quality land is used for crop production, the stress problems will increase. Reduction of environmental stress effect on plants and their productivity involves alteration of the environment and/or crop plants. Most promising is the genetic modification of crop plants for better adaptation to unfavourable environments or resistant to them. For this purpose it is necessary to have enough information on basic plant-function responses to different stress factors. The book reviewed gives a survey of the present state of knowledge on the genetic variance of plant physiological responses to different types of stress, and shows how this information is used to improve crop environmental resiliency. The first chapter reviews environmental limitations of food and fiber crop production. The next chapter dealing with physiology of temperature effects on plants is followed by a chapter devoted to plant breeding for tolerance to heat and cold. Chapter four on plant response to the mineral element toxicity and deficiency contains information on mineral stress problems throughout the world, on the use of mineral elements and very useful descriptions, pictures and tables on plant responses to mineral element deficiencies and excesses. The topic of chapter five is similar the characterization of the genetic variation for tolerance to edaphic stresses and examples of breeding programs to develop cultivars adapted to important soil stresses. Chapters six and seven are dedicated to plant response to water stress, and to breeding for drought resistance and plant water use efficiency. The next chapter on plant response to light quality and quantity contains very usefull graphs showing the spectral emission of typical light sources used in horticulture, and tables with electrical, photometric, and radiometric characteristics of selected lamps, tables on relative effectiveness of various kinds of light sources, and other tables and figures. Plant response and genetic modification of plants for tolerance to air pollutants is the subject of chapter nine. Chapter ten summarizes some of the properties of waterlogged soils, presents some of the latest findings on the morphological, anatomical, physiological and biochemical responses and adaptations of higher plants to waterlogging and reviews the recent progress in breeding plants for flooding tolerance. Three parts of chapter eleven deal with plant pest interaction with environmental stress and breeding for plant resistance to diseases, insects and nematodes. The last chapter but one lists the germplasms of the more important food producing genera and evaluates their properties. The concluding chapter considers special cases in which genetic engineering has been used to improve the environmental resiliency of crop plants.

It is probably not necessary to add that this book belongs in every institute and laboratory dealing with plant breeding and stress physiology.

JARMILA SOLÁROVÁ (*Praha*)

BOTTINO, P. J.: METHODS IN PLANT TISSUE CULTURE. — Kemtec Educ. Corp., Kensington 1981.

Plant tissue culture represents a useful botanical discipline with many practical applications. These involve plant propagation, preparation of virus-free plant material, genetic modifications of plants and production of secondary plant products. It is not surprising that tissue culture techniques are taught in university courses. This little book represents a useful laboratory manual for such courses and for those who begin to learn different methods of plant-organ, tissue and cell cultures. It contains basic instructions concerning laboratory organization, nutrition of plant cells and preparation of media, and special techniques as establishment of callus, anther and suspension cultures, induction of organogenesis, isolation of protoplast and meristem culture. Readers will find here recipes for preparation of the most frequently used media and information about commercial source of plant-tissue culture media supplies. Techniques are described on simple practical experiments and individual steps are demonstrated by illustrations. The book can be recommended to both teachers for making their courses efficient and interesting and to research workers who begin to use some of these techniques in their research program.

M. KAMÍNEK (*Praha*)