Smith, J.A.C., Griffiths, H. (ed.): **Water Deficits. Plant Responses from Cell to Community** (Environmental Plant Biology Series). - Bios Scientific Publishers, Oxford 1993. 346 pp. £ 43.00, US $ 86.00.

Plant growth and productivity is limited in many regions of the world by water deficits. In the face of population pressure, these limitations will be of increasing severity for world agriculture in the decades ahead. This book arose from a meeting organized by the Society for Experimental Biology at the University of Lancaster in April 1992. As with previous volumes in the Environmental Plant Biology series, this book provides a comprehensive, up-to-date review of a subject area rather than a report of a meeting. It integrates different approaches to this problem and combines discussion of cell water relations with the larger scale of whole plants and plant communities.

The first part of this book forms a detailed assessment of the pressure probe, focusing on the principles behind the technique (Chapter 2), its application to study cell growth and expansion as influenced by water deficits (Chapters 3 and 4), as well as methods for determining transpirational water loss from individual cells (Chapter 5). The conversion of the cell pressure probe to an entirely water-filled system has allowed its application to the long-standing problem of measuring negative pressures in the xylem (Chapter 6). Because of the tensions under which it operates, the xylem is potentially very sensitive to water deficit and the danger of cavitation (Chapter 7). Transport through the xylem is likely to be involved in long-distance signalling within the plant via chemical messengers, especially abscisic acid would play a vital role in transducing the water stress signal from roots to shoots (Chapters 8 and 9). Transfer resistances between soil and roots can be very important in desert environments in restricting reverse water flow out of the roots into drying soil (Chapter 10). The modelling can be valuable tool in assessing the relative importance of flow resistances and tissue storage capacitances in whole-plant water relations (Chapter 11). Further chapters are focused to description and classification of drought tolerance mechanisms. Chapter 12 deals with the water use efficiency and the ability of stomata to maximize CO_2 uptake per unit water available. The multitude interactions between water relations and nutrient acquisition and allocation are the main items of Chapter 13. When water deficit limits the supply of CO_2 for photosynthesis, the photoinhibition can occur and the Chapter 14 describes the mechanisms of down-regulation of efficiency of excitation energy transfer to photosystem 2. It is important to study the water relations of specific plant communities in natural environments that experience seasonal water deficits *e.g.* in Mediterranean-type climates (Chapter 15). In the agronomic context, selection of drought tolerant cultivars may consider timing of leaf area development in response to water availability (Chapter 16). Carbon isotope discrimination can serve for the estimation of intercellular CO_2 concentration and as a marker for drought tolerance (Chapter 17). Other approaches such as mass-balance techniques, micro-meteorological methods, and measurement of liquid flow and vapour fluxes can be used as a basis for determination of evapotranspiration on the level of canopies and stands of vegetation (Chapter 18). The overview of some recent general circulation models and of limitations of their applications is presented in Chapter 19.

The book is well produced and printed. The text of each chapter is richly illustrated and accompanied by a comprehensive list of references.

As this book provides an in-depth review of recent progress in plant water relations and the implications for plant growth and productivity, it can be recommended to all researchers and postgraduate students of plant physiology, ecology, agronomy or forestry.

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