
BOOK REVIEWS

Drought Resistance in Crops with Emphasis on Rice (International Rice Research Institute, Los Banos, Laguna, Philippines, P.B. No. 933, Manila), 1983, pp. 415, Price not given.

Maximum production is a major objective in any crop improvement program. This is sought to be realised either through horizontal expansion or vertical increase or through both, wherever such possibilities exist. In any developing country, when competitive claims are put forth, priorities are fixed for the expected progress. A similar situation exists in rice production scenario of the world in general and India in particular.

Rice is grown under diverse situations and under varying management conditions. The very divergent situations contain within itself series of constraints to increase productivity. Such constraints commonly mentioned that limit productivity in rice are, susceptibility to diseases and insect pests, lodging habit, adaptability to specific conditions, vulnerability to drought, etc. Among these, drought is a major unfavourable condition encountered in all rice growing ecosystems which affects the crop to a considerable degree and consequently the productivity.

Tolerance to drought is a complex characteristic dependent on a multiplicity of factors. Nature of drought, period of stress and the stage at which drought is encountered are the independent variables by themselves, but combined in any combination, their adverse effect on productivity is significant.

To provide greater insight into the various factors influencing drought tolerance in rice under different growing conditions, the International Rice Research Institute organised an international symposium on "Drought tolerance in crops with emphasis on rice", in 1981 and the present publication contains the articles presented at the symposium. A compilation of this nature, besides providing all available information on the topic, can be expected to generate a greater degree of interaction among the disciplines thus enabling formulations of programs to mitigate the adverse effects of drought.

The book has four lead papers and twenty articles included in three broad headings. Ten papers are included in "Components of drought resistance"; five deal with breeding and selection approaches for drought prone areas with special reference to rice and

five are devoted to other crops *viz* wheat, sorghum, maize and pearl millet.

The lead papers covering agroclimatic pursuits, variability of rice production in tropical areas, the soil-plant continuum in relation to drought and the evidences for the genetic variability in drought resistance, have highlighted the importance of the problems and set a trend for a detailed consideration on the possible future manipulations in the genetic variability in the components of drought tolerance. In the context of year to year variability in production and the oftspoken weather linked production trends, a broad consideration of the systems approach has validity. Mechanisms of drought tolerance are outlined and the factors in the soil-plant-atmosphere continuum influencing biomass production and yield are dealt with in detail. The emphasis on source size and intensity rather than on sink size during water stress regime has significance.

The chapter on "Components of drought resistance..." highlights the role of root and shoot systems in drought resistance, soil physical properties, significance of metabolism to growth and development and importance of the presence of abscissic acid and other osmotic adjustments in providing adaptive mechanism to drought tolerance. This could facilitate a more purposeful forward planning in the conduct of experiments to provide information that could bridge the existing gap in our understanding of mechanism of drought. It is interesting to note the conclusion that low tillering capacity of the plants should not be a limiting factor in the restriction of yields of the order of 3-4 ton/ha in an environment where drought is a cause for crop failure. Emphasis is indirectly on crop management—a factor to be recognised. These papers emphasise that (a) drought is a complex character; (b) variability exists in the components of drought tolerance; (c) these characters are heritable; and (d) root systems deserve serious consideration along with the other characters. The relative importance of the various adaptive characteristics in relation to the diversity in drought conditions is brought to focus providing the scientists with methods and means for a proper planning for appropriate manipulation in the plant architecture for higher yields in an adverse environment.

From theoretical consideration, the discussion switches on to practical application. The results of

research and work carried out by several workers in the field of variety improvement in drought prone environment are summarised in the next chapter consisting of 10 papers, 5 relating to rice and the others to wheat, sorghum, maize and pearl millet. While efforts have resulted in the identification of donors, the approaches to variety development have been debated. Choice has been between the analytical approach (physiological approach) and empirical approach (performance approach). Apparently, the plant type or ideotype visualised possesses combinations of characters reflecting the complexity of drought environment. This naturally suggests situation oriented approach by a multidisciplinary team of scientists for a rapid advance in the realisation of the objective.

A broad canvas on drought tolerance is thus covered through a series of papers. While the different characters are considered in detail, it has none the less shown the need for an indepth analysis into these various characters, their interrelationships and their interactions. Drought environment as well as plant mechanisms for drought tolerance are complex and hence difficult for an easy comprehension. The dry farmer placed in such a situation has, in fact, long been playing a gamble with weather. May be, perhaps intelligently through past experience! However, the wealth of information available in the publication should enable rapid progress in scientists' attempts to develop suitable varieties for the different situations and practices that could minimise the farmer's risk.

The International Rice Research Institute can, with full justification, take credit in organising the first-ever international symposium on drought resistance and bringing out this volume containing valuable information from different sources and on different crops dealt with by different workers with different background. It is, in short, a synthesis of results of considerable research and practical approach for a laudable purpose. The IRRI has to be congratulated for this noteworthy effort. Equally deserving of congratulations are the authors of the articles who have given us wealth of information for indirect or direct use.

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Water Pollution and Management Reviews by C. K. Varshney, published by South Asian Publishers Pvt. Ltd, N. S. B. Marg, New Delhi 110 002, 1982, pp. x + 170, Price Rs. 100/-

These reviews are, as indicated by the Editor, intended to provide up to date information on topics of current interest.

This Volume of Reviews contains eight articles: (1) Ecological aspects of stream regulation: Responses in downstream lotic reaches by James V. Ward; (2) Effects of water pollution in freshwater submerged macrophytes by Elly P. H. Best; (3) The use of aquatic macrophytes for the evaluation of phytotoxicity by S. J. Klaine and C. H. Ward; (4) Strategies for the control of macrophytes in hydroelectric impoundments by I. M. Johnstone; (5) Optimisation models in regional water quality management for riverine systems by B. N. Lohani and P. M. Modak; (6) Groundwater resources of India with special reference to their salinity and pollution hazards by A. B. Biswas and A. K. Saha; (7) Australian estuaries and estuarine modelling by Tom Beer; and (8) Marine pollution studies in India by S. Z. Qasim and R. Sen Gupta.

The first article deals with the practice of stream regulation which has ecological implications. The second article is concerned with the effect of water pollution on freshwater submerged macrophytes. The third article is on the use of aquatic macrophytes for evaluating aquatic phytotoxicity being developed for routine screening of chemicals and their products. The fourth article is about the nature and magnitude of aquatic weed problem. The fifth article examines the usefulness of optimization models in regional water quality in relation to the management of riverine systems. The sixth article evaluates the groundwater sources of India in quantitative terms. The seventh article considers the modelling of estuarine environment. The eighth article describes the problems of marine pollution in India which has a coastline extending over 6000 km.

The evidence presented in the different articles should have been critically assessed, which would have enhanced the value of the reviews. It may, however, be hoped that the information given in the articles will be found useful by those interested in the topics covered in this volume.

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