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 Book reviews
 

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**McIvor, J.G.; Bray, R.A. (eds.): Genetic Resources of Forage Plants.** Melbourne: CSIRO 1983. x + 337 pp., several figs and tabs.

Forage plants in the sense of this book are only grasses and legumes. A symposium concerning subjects of these species was held by scientists mainly from Australia and New Zealand. In the book, a review and overview of the acquired knowledge is presented in eight parts: the problems, the resources, adaption, collection, evaluation, breeding, analysis and storage of data, information management systems for forage plant genetic resources, and the future.

Each part contains a lot of information, mostly in the text, sometimes in the form of tables. Therefore, this book seems to be not only a symposium report, but also a training and handbook, in which all factors are demonstrated which are important in handling and using forage plants. From this point of view, the book should be a requisite for the libraries of grassland institutes as well as in the education of grassland specialists.

However, it must be read critically. Grassland research started in Australia in the nineteen fifties', much later than in regions of the old world. Nevertheless, only very few non-English literature sources are cited. It is not surprising, therefore, that the first discovered symbiosis of grasses with N-fixing microorganisms is dated 1956 and the Russian publications from the nineteen thirties' are neglected, or when *Poa*'s are not mentioned as pasture species. Being critical, the book is a valuable source of information, mainly to those who also know the non-English literature. I hope it will be disseminated broadly.

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**International Atomic Energy Agency: Selection in Mutation Breeding. Proceedings of a Consultants Meeting, Vienna, 21–25 June 1982. Organized by the Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development.** Vienna: International Atomic Energy Agency 1984. 180 pp., several figs. and tabs. Soft bound Austrian Sh. 360,-.

Mutation breeding is a well developed branch of modern plant breeding which has led to more than 500 officially released varieties of many different crops. Experimental mutagenesis could, however, become essentially more effective if better selection methods for discerning specific groups of mutants were available. This holds particularly true for very rare mutants in large populations and for genotypes with positively altered storage substances such as proteins, among

others. Biochemical quick methods for analysing tens or hundreds of thousands of  $M_2$ - to  $M_4$ -plants quantitatively and qualitatively are scarcely available. Thus, it is only in exceptional cases possible to select these valuable mutants when they are present in the segregating families following mutagenic treatments.

These problems have been discussed in the symposium mentioned above. Details of the proceedings of the meeting are given in 11 papers. The experiences in many crops demonstrate that the range of mutant characters, which can be used agronomically, is relatively narrow although thousands of mutants of distinct crops are available in the collections. Moreover, mutants of agronomic interest do not only appear in  $M_2$ - and  $M_3$ -generations in which they are expected, but they have been found considerably later in the background of other mutants or in cross-breeding programmes in which mutants have been used as parents. These facts are not yet understood but the selection methods available are obviously not suited for seizing the entire genotypic variation induced by the mutagens.

The difficulties of selecting mutants with complex quantitative characters are especially emphasized, including the necessity to consider specific environmental factors. Moreover, the possibilities for improving the photosynthetic capacity of plants by means of mutations and the selection for nitrogen fixation associative characters are discussed. A problem of increasing importance in plant breeding is tolerance to environmental stresses such as salinity, drought, heat, freezing and other environmental influences. Screening techniques for selecting mutants of these categories are available but the whole field is still in an early stage of development. Further contributions of the book deal with selection procedures in perennial vegetatively propagated crops using tree fruit as an example. Moreover, the selection of mutants by analysing distinct enzymes, whole isozyme systems, storage proteins, starch, oils, physiological reactions and cellular structures is discussed, enabling the discovery of very specific genotypes of agronomic value. The modern methods of increasing the genetic variability by using plant tissue culture techniques are briefly mentioned but they could have been discussed more in detail. At the end of the book, recommendations on the various aspects of the performance of selection procedures are given.

The book represents a necessary supplementation of the international literature on the application of experimental mutagenesis in plant breeding.

Werner Gottschalk, Bonn