

methods of programmes in different countries. Zimnoch-Guzowska and Dziewonska provide an honest review of the trials and tribulations of diploid breeding. "The optimistic picture of advantages coming from diploid potato breeding is spoiled by difficulties . . . due to the characteristics of diploids and . . . the barriers of interspecific crossability."

Potato breeding continues to fascinate and infuriate all those involved and this is a useful collection of papers covering most of the currently active avenues of research.

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**Genetic resources of *Phaseolus* beans.** P. Gepts (ed.). Kluwer Academic Publishers, Dordrecht, Boston and London. 1988. Pp. xiii+613. Price £76.50. ISBN 90 247 3685 4.

The importance of *Phaseolus* beans lies in their contribution to human diets in terms of their protein content. They are ancient cultigens of the Americas, and are today represented by four principal species, namely the common bean (*Phaseolus vulgaris*), the runner bean (*P. coccineus*), the lima bean (*P. lunatus*) and the tepary bean (*P. acutifolius*), and one or two minor cultivated species. However, *P. vulgaris* is by far the most important species world wide, and this is reflected in the 11 chapters (out of 23) which are devoted to this species in this book.

The editor has compiled a series of up-to-date reviews on the genetic resources of *Phaseolus* beans. Twenty-nine authors have contributed chapters which are divided in five sections; I. *Phaseolus* germplasm exploration and maintenance (six chapters); II. Domestication and evolution of *Phaseolus* spp. with special reference to *P. vulgaris* (five chapters); III. Genetics of *P. vulgaris* (four chapters); IV. Genetic resources, domestication and evolution of other *Phaseolus* species (three chapters); and V. utilization of *Phaseolus* genetic resources (five chapters).

In the first section, the chapter by D. G. Debouck is particularly interesting since it combines both theoretical and practical aspects of collecting *Phaseolus* beans, often based on the author's own experiences in Mexico and Central America. The second chapter by E. E. Roos outlines seed storage methodologies appropriate for beans, but much of the information is not new. Since bean seeds are orthodox, they can be stored for long periods at low temperatures and low moisture content, but may be subject to imbibition damage. In terms of genetic conservation the genetic consequences of seed regeneration following storage would merit much more attention, since this aspect is rarely discussed in any detail.

Data management of bean genetic resources, the organization of the world collection of *Phaseolus* at the International Center for Tropical Agriculture (CIAT) in Colombia, the germplasm collection of wild species and

forms in the tribe Phaseolae Sub-tribe Phaseolinae, which is held at Gembloux in Belgium, and the international *Phaseolus* germplasm network, are the subjects of the other chapters in this section. In the chapter on a bean germplasm network, Judith Lyman-Snow states that amongst the advantages of the network are the rapid dissemination of research results through informal contacts and publications, and the flexibility to meet current research needs without major additional investments.

The first chapter in Section II is a review by L. Kaplan and L. N. Kaplan of the history of bean cultivation in the Americas, which goes back at least 5000 years. They also give an interesting comparative account of the domestication and early agriculture of *Phaseolus* beans and maize in the New World and those of legumes and cereals in the Old World. A comprehensive discussion by J. Smarrt of the morphological, physiological and biochemical changes in *Phaseolus* beans under domestication indicates why these species have been so successful as crop plants, especially *P. vulgaris*. There are also two chapters on the wild ancestors of *P. vulgaris* in Meso-America and in South America.

In an interesting chapter, Gepts has reviewed the use of phaseolin, the major seed storage protein, as a marker to show that *P. vulgaris* was domesticated repeatedly throughout the range of its wild relative, and such studies have also provided a basis for the understanding of the dissemination of *Phaseolus* from Mexico and from the Andes around the world.

The first chapter of Section III by C. L. A. Leakey is the longest in the book, and reviews the extensive data concerning traits controlled by major genes, as genotypic and phenotypic markers in the common bean. In another chapter, by M. J. Bassett, linkage mapping of marker genes is described in common bean, which is still in a rudimentary state compared to maize, tomato and pea amongst other crops, and only 31 genes have been quantitatively mapped. Evidence on other linkage groups needs further verification. The genetic structure of bean landraces in Malawi, Meso-America and the Andes is described in two further chapters using multivariate analyses of morphological and phaseolin data.

The three chapters of Section IV are concerned with the genetic resources of *P. lunatus* (lima bean), *P. acutifolius* (teparty bean) and *P. coccineus* (runner bean), each of which has only limited importance in agriculture compared with the common bean. Nevertheless, these species deserve attention through exploitation in their own right, as well as sources of genetic diversity for the improvement of the common bean.

Utilization of genetic resources must be one of the principal justifications for their collection and conservation. The five chapters of Section V cover the utilization of *Phaseolus* genetic resources in general, and more specifically bean breeding in Brazil, wide crossing between *P. vulgaris* and *P. acutifolius*, selection methods in common bean breeding, the transfer of quantitative traits in wide crosses with *P. vulgaris*, and finally the utilization of genetic resources for commercial bean cultivars in the U.S.A. In terms of wide crossing, there are many problems between *Phaseolus* species, although

some success has been achieved. However, *P. lunatus* continues to present difficult problems for bean breeders because of its isolation from the other species. G. Fouilloux and H. Bannerot provide an excellent comparative account of different breeding schemes for *Phaseolus* beans, and these are illustrated diagrammatically in a clear and concise way.

This is undoubtedly a major book on *Phaseolus* beans and it will have a useful life for several years to come. Each chapter has a substantial list of recent references, and the text is suitably complemented by tabular data as well as maps and diagrams. The reproduction of some of the half-tone photographs is poor, since they were taken from colour photographs. However, these are reproduced as colour plates at the end of the book. On the negative side, there are several aspects which can be criticized. Since there is no general index, nor an index to each chapter, browsing is almost impossible. This appears to be the publisher's decision since a companion volume on cool season food legumes (an equally weighty

volume) also does not have an index. There are idiosyncracies in the use of English by the various authors, which should have been corrected by the editor. The book has been published using camera-ready copy, and a variety of typefaces, which this reviewer dislikes, but accepts as a justification for attempting to keep publication costs low and also to speed publication. However, this decision has apparently limited editorial freedom. There seem to be few typographical errors, yet in some cases where they do occur, the authors have attempted to overtype, leaving a rather messy final product! Nevertheless, these criticisms are minor compared to the unquestioned value of this book in which one can find such a wealth of information on *Phaseolus* beans.

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