Plant Genetic Resources

An Introduction to their Conservation and Use

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Preface

Undoubtedly the continuing challenge of the present decade and of those to come, is the demand upon agriculturalists, economists and politicians to feed an ever increasing population. In order to further this objective, plant breeders must develop crops which are capable of yielding well in a variety of environments, and which are resistant to pests and diseases and can grow with reduced fertilizer and pesticide inputs. Sources of genetic diversity thus become increasingly important, and the loss of this diversity in the form of plant genetic resources, is of major international concern.

It is quite clear that the conservation of plant genetic resources, particularly in situ, should be viewed as an integral part of any global plan for the conservation of natural resources and ecosystems. However, unlike non-resources, the primary justification for their conservation, provided in this text, lies in their importance in breeding or selecting better varieties and strains of crops for food, fuels and even medicines throughout the world.

We have attempted to show how different sampling and conservation strategies should be applied to different crops. Furthermore, we have aimed at justifying such activities by considering how conserved plant genes have been, and can be, utilized to considerable effect. We have also speculated on how the application of novel biotechnology may enhance the usefulness of plant genetic resources in the future. It has not been possible to include all crops, so we have restricted our discussions principally to the major food crops. However, we have included a discussion on forest genetic resources and other economic and medicinal plants.

International efforts aimed at the exploration and conservation of plant genetic resources have been coordinated since 1974 by the International Board for Plant Genetic Resources. In the past 15 years several specialist books on genetic conservation have been published. We have been strongly influenced by such activities and publications, but most particularly by our close association with Professor Jack Hawkes, one of the pioneers in this area of work, and the instigator of the only postgraduate course on genetic resources, offered by the University of Birmingham, UK. Our own teaching and research in this field, as well as our experience in collecting and evaluating plant genetic resources in different parts of the world have provided us with a useful practical background.

We have been motivated to write this book because of our stimulating
association with IBPGR and Birmingham over the past decade or so, and the general need for a text which would serve as an introduction to the field of plant genetic resources, not only for students, but also for scientists and laymen alike, who are perhaps working in other, but related, disciplines.

We are grateful to all colleagues, and their publishers, for permission to include data and figures in this book, which we hope will assist our readers in readily appreciating the importance and complexity of plant genetic resources.

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Acronyms used in the text

AVRDC  Asian Vegetable Research and Development Centre, Taiwan
CGIAR  Consultative Group on International Agricultural Research
CIAT  Centro Internacional de Agricultura Tropical, Cali, Colombia
       (International Centre for Tropical Agriculture)
CIMMYT  Centro Internacional de Mejoramiento de Maíz y Trigo, Mexico
         City, Mexico (International Centre for the Improvement of
         Maize and Wheat)
CIP  Centro Internacional de la Papa, Lima, Peru (International Potato
      Centre)
FAO  Food and Agriculture Organization of the United Nations
IARC  International Agricultural Research Centre
IBP  International Biological Programme
IBPGR  International Board for Plant Genetic Resources, Rome, Italy
ICARDA  International Centre for Agricultural Research in the Dry Areas,
         Aleppo, Syria
ICRISAT  International Crops Research Institute for the Semi-Arid Tropics,
         Hyderabad, India
IITA  International Institute of Tropical Agriculture, Ibadan, Nigeria
IRRI  International Rice Research Institute, Los Baños, The Philippines
IUCN  International Union for Conservation of Nature and Natural
       Resources
TAC  Technical Advisory Committee
UNDP  United Nations Development Programme
USDA  United States Department of Agriculture
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