BIBLIOGRAPHIC DATA SHEET	1. CONTROL NUMBER	2. SUBJECT CLASSIFICATION (695)
	PN-AAJ-234	AF30-0000-0000

3. TITLE AND SUBTITLE (240)

Annual report, 1979

4. PERSONAL AUTHORS (100)

5. CORPORATE AUTHORS (101)

Int. Board for Plant Genetic Resources

6. DOCUMENT DATE (110)	7. NUMBER OF PAGES (120)	8. ARC NUMBER (170)
1978	110p.	631.52.I61a -1979

9. REFERENCE ORGANIZATION (150)

IBPGR

10. SUPPLEMENTARY NOTES (500)

11. ABSTRACT (950)

12. DESCRIPTORS (920)

Plant genetics
Seed production
Agricultural products
Conservation
Plant breeding
Agricultural training

13. PROJECT NUMBER (150)

931005600

14. CONTRACT NO.(140)

AID/DSAN-G-0084

15. CONTRACT TYPE (140)

16. TYPE OF DOCUMENT (105)

52

AID 590-1 (10-79)

Annual Report 1979

International Board for Plant Genetic Resources

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

Consultative Group on International Agricultural Research

ANNUAL REPORT 1979

Rome

IBPGR Executive Secretariat
Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
Via delle Terme di Caracalla, Rome 00100, Italy

AGP:IBPGR/80/5
May, 1980

The International Board for Plant Genetic Resources (IBPGR) is an autonomous, international, scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR, which was established by the CGIAR in 1974, is composed of 15 members from 13 countries (see Appendix I); its Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR, as defined by the Consultative Group, is to promote an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

The International Board for Plant Genetic Resources received major financial support and pledges in 1979 from the following governments and agencies

Australia
Belgium
Canada
Federal Republic of Germany
France
Italy
Japan
Netherlands
Norway
Sweden
UK
UNEP
USA
World Bank

CONTENTS

ACRONYMS USED IN REPORT

ACSAD	-	Arab Centre for the Studies of Arid Zones and Dry Lands
ARARI	-	Aegean Regional Agricultural Research Institute (Turkey)
AVRDC	-	Asian Vegetable Research and Development Center (Taiwan)
BARI	-	Bangladesh Agricultural Research Institute
BIOTROP	-	Southeast Asia Ministries of Education Organization: Regional Center for Tropical Biology
CATIE	-	Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)
CENARGEN	-	Centro Nacional de Recursos Genéticos (Brasil)
CGIAR	-	Consultative Group on International Agricultural Research
CIAT	-	Centro Internacional de Agricultura Tropical
CIFC	-	Centre for Investigation of Coffee Rust (Portugal)
CIMMYT	-	Centro Internacional de Mejoramiento de Maiz y Trigo
CINICAFE	-	Centro Nacional de Investigaciones de Café (Colombia)
CIP	-	Centro Internacional de la Papa
CMEA	-	Council for Mutual Economic Assistance
CNR	-	National Research Council (Italy)
CRRI	-	Central Rice Research Institute (India)
CSIRO	-	Commonwealth Scientific and Industrial Research Organization (Australia)
EMASAR	-	Ecological Management of Arid and Semi-Arid Regions
EMBRAPA	-	Brasilian Enterprise for Agricultural Research
EUCARPIA	-	European Association for Research on Plant Breeding
EXIR	-	Executive Information Retrieval
FAL	-	Federal Agricultural Research Centre (F.R. Germany)
FAO	-	Food and Agriculture Organization of the United Nations
FONAIAP	-	Fondo Nacional de Investigaciones Agropecuarias (Venezuela)
GTZ	-	German Agency for Technical Cooperation (F.R. Germany)
IARI	-	Indian Agricultural Research Institute
IARC	-	International Agricultural Research Centre
IBP	-	Institute of Plant Breeding (Philippines)
IBTA	-	Instituto Boliviano de Tecnología Agropecuaria
IBPGR	-	International Board for Plant Genetic Resources
ICAR	-	Indian Council of Agricultural Research
ICARDA	-	International Center for Agricultural Research in Dry Areas

ACRONYMS (Cont.)

ICRISAT	-	International Crops Research Institute for the Semi-Arid Tropics
ICTA	-	Instituto de Ciencia y Tecnologia Agrícolas (Guatemala)
IFCC	-	Institut Français du Café du Cacao et autres plantes stimulantes (France)
IICA	-	Instituto Interamericano de Ciencias Agrícolas
IIRB	-	Institut International de Recherches Betteraves
IITA	-	International Institute for Tropical Agriculture
INIA	-	Instituto Nacional de Investigaciones Agrarias (Spain)
INIA	-	Instituto Nacional de Investigaciones Agrícolas (Mexico)
INRA	-	Institut National de la Recherche Agronomique (France)
INTA	-	Instituto Nacional de Technología Agropecuaria (Argentina)
IRAT	-	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (France)
IRCT	-	Institut de Recherches du Coton et des Textiles exotiques (France)
IRHO	-	Institut de Recherches pour les Huiles et Oléagineux (France)
IRRI	-	International Rice Research Institute
IS/GR	-	Information Sciences/Genetic Resources Program
ISRA	-	Institut Senegalais de Recherches Agricoles
ISRC	-	International Society for Root Crops
ISTA	-	International Seed Testing Association
IVT	-	Institute for Horticultural Plant Breeding (Netherlands)
LPPP	-	Central Research Institute for Agriculture (Indonesia)
MARDI	-	Malaysian Agricultural Research and Development Institute
NBPGR	-	National Bureau of Plant Genetic Resources (India)
NIAS	-	National Institute of Agricultural Sciences (Japan)
NSSL	-	National Seed Storage Laboratory (USA)
NVRS	-	National Vegetable Research Station (UK)
ODA	-	Overseas Development Administration (UK)
OIV	-	Office International de la Vigne et du Vin (France)
ORSTOM	-	Office de la Recherche Scientifique et Technique Outre-Mer (France)
PCARR	-	Philippine Council for Agriculture and Resources Research
RTI	-	Royal Tropical Institute (Netherlands)
SIDA	-	Swedish International Development Authority
TAC	-	Technical Advisory Committee

ACRONYMS (Cont.)

TISTR	-	Thailand Institute of Scientific and Technological Research
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environment Programme
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
USDA	-	United States Department of Agriculture
VIR	-	N.I. Vavilov Institute of Plant Industry (USSR)
WARDA	-	West African Rice Development Association

FOREWORD

In June 1974 when the International Board for Plant Genetic Resources first met, it was described as having "an historic task" because it was taking on global responsibility for action which would ultimately improve the world's crops and advance knowledge of crop evolution. Now, after the Board's fifth full year of work in 1979, it can be fairly said that the Board has made a significant start in its efforts to achieve that task. Through the Board's work there has been a growing awareness all over the world that the variation of economic plants in the more primitive agricultural regions of the world provide breeders with a vital resource of great potential. The message had been spelt out clearly - this resource must be collected, conserved and understood before time runs out and it disappears forever.

The main aim of the Board - to safeguard for mankind, through a global network of genetic resources centres, the genetic variation of cultivated plants of major economic importance, and to ensure their better and speedier availability to breeders - seemed far from reality a few years ago. But the progress made this year indicates that, while there is still much to be done, the goal is not unattainable.

Perhaps the most important achievement of the year was the large increase in the number of national centres in many different regions of the world cooperating as part of the IBPGR global network. 1979 also witnessed a substantial increase in the collection of priority crops. The Board recognizes the urgent need for new collections and financial support was given to help cooperating institutions in a number of developing countries carry out collection work.

Furthermore, there has been heartening progress in the development of cooperative activities in regions which the Board considers of priority. Effective programmes in the various regions, covering all aspects of genetic resources work, are a crucial part of the emerging international network.

As collections of germplasm are evaluated and new samples are discovered to be resistant to particular pests or soil toxicities or to have other useful genetic characteristics, institutions are coming to realize that large collections of stocks are needed to provide sufficient material with useful genes for breeding. The Board appreciates that many existing collections are imperfectly understood, inadequately documented and need putting in order.

Accordingly, assistance on genetic resources documentation continues to enjoy a high priority in the Board's programme. As a part of these activities, the Board seeks to assure that, at the collecting stage in the field, material is properly described and the maximum feasible information obtained on the environment of the samples.

With the expansion of the world network, more trained personnel is needed, and the Board has continued to try to help meet this need by organizing and/or supporting short, practical training courses dealing with the collection, conservation and documentation of genetic resources, and also by helping the University of Birmingham, U.K., to expand graduate training in this field for students from developing countries.

The participants in the earlier training courses came from a number of developing countries, particularly those involved with the IBPGR's regional activities. These young scientists were full of enthusiasm for the courses, as well as for the opportunity of getting to know others working on topics of mutual interest and of discussing cooperation between their own institutions and others working in the same field. Such contacts form the basis of the cooperative efforts needed in the world network.

The International Agricultural Research Centers (IARCs) supported by the CGIAR have continued to cooperate with the IBPGR by co-sponsoring its five Crop Germplasm Advisory

Committees and by helping to forge links with breeders, collectors and storage centres. The IARCs have also agreed to hold the world's base collections of germplasm for most of their mandate crops. National and regional genetic resources centres have similarly accepted responsibility for holding base collections of other crops, especially crops of primarily local importance.

★★★

HIGHLIGHTS OF THE YEAR

HIGHLIGHTS OF THE YEAR

- The five Crop Advisory Committees, (for wheat, maize, rice, sorghum and millets and *Phaseolus* beans) operating in cooperation with the appropriate IARC serve as a bridge between the Board and the global community of scientists working on each crop. In 1979 they advised the Board on proposals for collecting missions: in addition the Sorghum and Millets Committee met and made recommendations on work to be undertaken on minor millets.

- Significant progress was made in 1979 in compiling lists of accessions at the principal genetic resources centres for the major crops, leading to the publication in 1980 of comprehensive directories of holdings.

- In 1979 a number of expert Working Groups and Consultations were formed to advise the Board on global action for tropical vegetables, forages, beet, groundnut and coffee. Plans of action recommended by the Working Groups were approved by the Board and implementation initiated.

- Expert Working Groups, and Crop Advisory Committees have previously agreed on minimum lists of descriptors for: rice, potatoes, maize, wheat, *Phaseolus* beans, banana and coconut. In 1979 lists were produced for sorghum, grape, tropical fruits, beet, cotton, coffee, winged bean, yam, taro and apricot.

- The Board supported and organized a series of collections in the Mediterranean region, particularly of cereals, forages and other crops. Algeria, Cyprus, Greece, Italy, Libya, Portugal, Spain and Tunisia are participants cooperating in this programme.

- The Board has revised its original plans to accelerate collection and conservation activities in Southwest Asia (Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey), where important genetic diversity is threatened. In 1979 an IBPGR technical advisor provided assistance for the expansion and implementation of the national genetic resources programmes of participating countries and a senior officer provided regional coordination, preparing for a closer linkage between this programme and ICARDA in 1980. A regional meeting was held in Rome to elaborate collection and conservation strategies.

- The countries of Southeast Asia, under the sponsorship and with the help of the Board, have formulated a regional plan of action and an organizational framework to assure its implementation. The governments of Indonesia, Malaysia, Papua New Guinea, Philippines and Thailand approved this plan and work started in 1977. In 1979 the Board stationed an officer in the region to assist the participating governments in carrying out the programme.

- Following an IBPGR-sponsored meeting in 1978 of governmental representatives from the countries of South Asia (Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka), the Board acted in 1979 to provide training for scientists and other genetic resources workers from these countries.

- Board support for collection activities not undertaken within the framework of regional programmes was intensified, specifically in order to collect: sorghum and millets in the Sahelian zone; rice and tuber crops and legumes in various parts of Africa; and groundnut, maize and forages in several countries of South America. These are examples of major missions which took place in 1979; in addition, a wide range of other crops was collected in many parts of the world at the instigation or with the support of the Board.

- The Board has designated, in consultation with the centres concerned, a network of institutions responsible for maintaining the world's major base collections of seeds of the principal food crops. This network was expanded in 1979.

- The Board assisted in the development and installation of appropriate documentation systems in several countries for the storage and retrieval of information concerning major crop genetic resources holdings.

- In 1979 the Board continued to assess the gaps in the conservation network and supported training in seed conservation technology for genebank personnel. The Board supported the expansion of training programmes designed to provide adequate numbers of personnel in the developing world trained for genetic resources work, organized several short courses and provided fellowships for training.

CROPS

INTRODUCTION

During its initial years of operation, the IBPGR identified priorities for action on crops and has continued to use these as guidelines in its support and initiation of programmes. In the first instance attention was focused on the major food crops. These crops will, of course, continue to receive the Board's attention but in addition, pursuant to the policy decision taken in 1979, the Board intends to add three or four new crops to its workload each year.

Among the major food crops, priority areas for collecting were identified in earlier years for wheat, sorghum, Pennisetum millet, rice, Phaseolus beans, potato, bananas and coconuts on the basis of gaps in existing collections and known genetic erosion in the field. In 1979, similar agreement was reached on priority areas for collection of beet, groundnut, grape, several species of vegetables, coffee and cotton. It is the task of the IBPGR to stimulate or organize, and where necessary to help support, collecting mission for all this germplasm. In addition, it is proposed that Working Groups will, in the next few years, identify priority areas for collecting barley, chickpea, soyabean, cowpea, Asiatic Vigna sp., cassava, sweet potato, sugar cane, rubber, cocoa and others.

Of necessity, the IBPGR has paid, and intends to continue to pay, less attention to crops with low global priorities, i.e., those given priority ratings 3 and 4 in the Board's "Priorities among Crops and Regions" paper - (AGPE:IBPGR/76/8). Nevertheless collecting of some of these crops will be done on an ad hoc basis because some of them are of importance in a regional context, as, for example, tropical fruits in Southeast Asia. Efforts will be made to assign priorities to crops or groups of crops to which the IBPGR has not yet assigned any rating, so that the collection of those which are important can be initiated. At the same time, the IBPGR will remain ready to respond in whatever way possible to emergency situations.

The approach to plant exploration will continue to be:

1. The assignment of priorities on a global and regional basis;
2. The convening, where necessary, of ad hoc Working Groups or Advisory Committees to identify areas for collecting of crops in the existing germplasm collections;
3. Exploration and collection, as far as possible by local personnel, to obtain representative genetic variability, followed by conservation, preliminary evaluation and documentation, so that materials collected may be widely and freely available to the community of breeders.

In 1979, the IBPGR drew up an indicative global plan for collection to be supported over the succeeding five years. This plan will remain flexible and will be revised annually. It presents collection requirements both by crop species and also by geographic regions of diversity. In addition, there are several groups of crops which have not yet received detailed study, e.g., many tropical fruit and nut trees, many of global importance; medicinal plants, spices; and tree species of interest for fuel wood, timber and environmental stabilization. On the latter, in 1979, the Board commissioned the Forestry Department of FAO to undertake a preliminary survey and to report at the end of the year on action which would be taken and how it could best be carried out.

The Board has for several years sponsored five Crop Germplasm Advisory Committees, in cooperation with the appropriate

International Agricultural Research Centre (IARC) to advise on the major food crops. They consist of a Rice Committee, co-sponsored by IRRI; a Maize Committee, co-sponsored by CIMMYT; a Sorghum and Millets Committee, co-sponsored by ICRISAT; a Phaseolus bean Committee, co-sponsored by CIAT; and a Wheat Committee, co-sponsored by CIMMYT since 1978, with ICARDA participation. Each of these Crop Advisory Committees held its first meeting in 1976 and each has already had a second meeting. The Sorghum and Millets Committee held its third meeting at ICRISAT in September 1979 and the others will meet again as necessary. These Crop Committees are an invaluable aid to the IBPGR in obtaining the views of the scientific community working on each of the major crops concerning necessary action to collect, conserve and make available for use the genetic diversity of these crops. The IARCs have all been extremely collaborative with the IBPGR and continue to play major roles in crop germplasm work.

During 1979 the Board was particularly active in organizing and/or supporting the collection of crop germplasm in many parts of the world. These activities are reported upon in the following sections. The organization of collecting missions involves the negotiation of collaborative arrangements with institutes and governments, the mobilization of local manpower and, in many cases, obtaining the assistance of specialists from other parts of the world. In order to facilitate collecting in Africa, the Secretariat convened a meeting in May 1979 to plan collaborative action in countries south of the Sahara. Scientists from ICRISAT, IITA, IRAT and ORSTOM discussed the logistics of collecting and asked the IBPGR Secretariat to help in avoiding duplication and in obtaining government permits and clearances.

In addition to collecting, the Board has been concerned with promoting the documentation of important collections. The accessions in many of these collections have been inadequately described and hence have not been effectively utilized. A basic step in the documentation process is the recording of information according to internationally agreed lists of descriptors and their descriptor states. The Board's Crop Advisory Committees and Working Groups have played an important role in formulating and obtaining agreement on such lists.

A major gap in the information network has been the lack of readily available data concerning the existing collections of crop germplasm. The Board decided, early in 1979, to assemble all available information about these collections and to publish it in the form of genebank directories. This work was largely completed during the year and the first directories, covering collections held in the form of seed, will be available in early 1980.

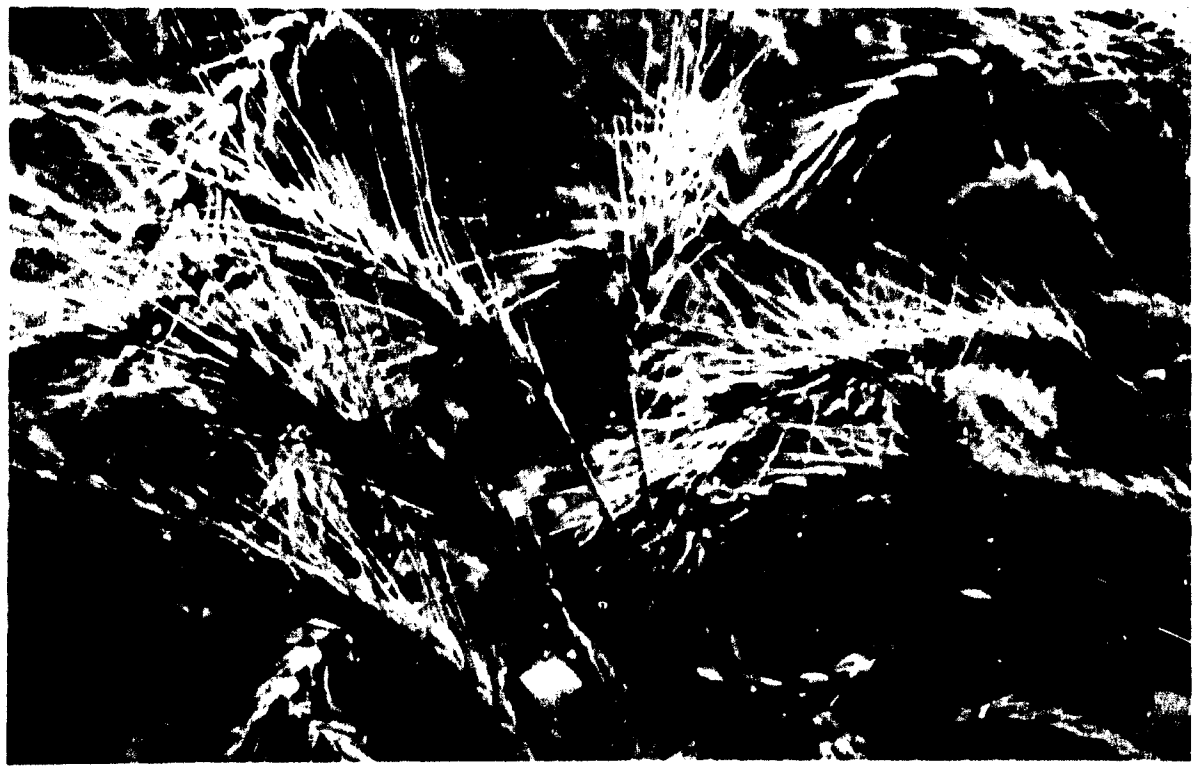
In addition to the crops whose germplasm can be readily conserved in the form of seed, the tropical regions possess many plants of economic importance, the seeds of which are short-lived, cannot be dried beyond certain limits without damage, and are therefore difficult to store under conventional cold storage conditions. At present such crops are being maintained as collections of vegetatively propagated material. In the past, the conservation of representative variability of vegetatively propagated crops had been somewhat neglected in favour of the cereals, legumes and other crops, the seeds of which can be conserved in cold storage. In 1979, a detailed survey was initiated on collections of some of these vegetatively propagated crops, viz. cassava, sweet potato, Dioscorea, potato and aroids; bananas, pineapple, Citrus, avocado and mango; and coconut, rubber, sugar cane, cocoa, black pepper (Piper) and tea.

While some data exist concerning the accessions in existing genebanks, many of these accessions have never been properly evaluated. Moreover, even where evaluation has been done, the information derived therefrom has often not been included, or effectively included, in the data bank

relating to the accessions because of the absence of internationally agreed lists of standard descriptors. The result has been to limit the availability of information about the materials themselves. The IBPGR has been working actively to fill this gap. To date, it has finalized standard descriptor lists for several major crops, including wheat, rice, maize, banana, coconut, tropical fruits, potatoes and Phaseolus beans. In 1979, the descriptors for yams, taro, beet, apricot, grape, winged bean, sorghum, cotton and coffee were finalized and these will be published shortly. This work on descriptors will continue to be vigorously pursued.

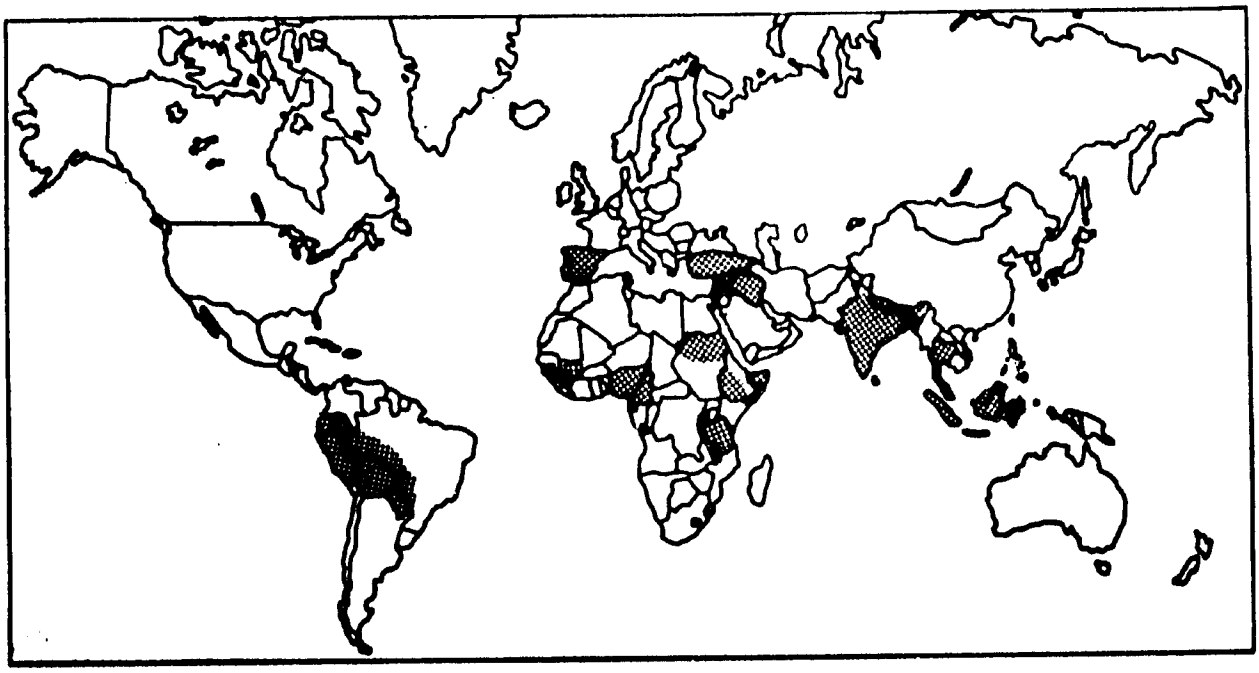
The Board has only recently begun to consider the extent of its responsibilities in connection with the evaluation of collected materials and how they might best be discharged. The Board recognizes that, in the main, evaluation is an open-ended task, depending largely on current breeding strategy, and that it is for the most part a task for which breeders, and not the Board, are responsible, Nonetheless, the Board regards it as part of its mandate to assure to the greatest extent possible, that genetic resource collections are properly evaluated and that appropriate links are created between the curators of the collections and the breeders undertaking the evaluation so that the evaluation results are fed back to the curators for inclusion in their data banks and thus made available to potential future users.

The report which follows emphasizes collecting activities. These have been and will continue to be a primary interest of the IBPGR due to the urgent nature of much of the collecting. However, the Board recognizes that collection and conservation are inseparably related and must move forward in step. This is likely to mean that, in future years, more resources than in the past will have to be devoted to proper maintenance and effective distribution of the germplasm collected.



CEREALS

REGIONS WHERE THE IBPGR ORGANIZED OR COLLABORATED IN ORGANIZING COLLECTING MISSIONS IN 1979



Wheat and barley	Rice	Maize	Sorghum and millets	Andean cereals
Ethiopia	Bangladesh	Brazil	Cameroon	Bolivia
India	Cameroon	Paraguay	India	Ecuador
Iraq	Guinea	Peru	Malawi	Peru
Nepal	Indonesia	Portugal	Somalia	
Spain	Malaysia		Sudan	
Syria	Mali		Tanzania	
Turkey	Nigeria			
	Sri Lanka			
	Sudan			
	Tanzania			
	Thailand			

For most of the world, cereals are the most important staple food and they provide more than half the total protein and energy intake in developing countries. In view of the rapid spread of new agricultural technologies developed largely by IRRI and CIMMYT, it is not surprising that genetic erosion had reached crisis proportions by the early 1970s for several of the major cereals, especially wheat, rice and barley. The Rockefeller Foundation had carried out an extensive programme for the collection and conservation of maize germplasm from 1945-1952, which later formed the basis for much of the maize improvement work undertaken by CIMMYT, but the decimation of a large part of the United States maize crop in 1970 by an epidemic of maize leaf blight focused attention on the danger of crop uniformity and the need for wider genetic variability to avoid such vulnerability. At the same time, the widespread use of the new high-yielding cereal varieties, which constituted the core of the green revolution, posed a serious threat to the continued availability of those traditional cereal varieties which, over the years, had demonstrated the most effective adaptation to local soil conditions and the greatest resistance to pests and diseases. Moreover, environmental hazards, such as the severe drought in the Sahelian zone, threatened to wipe out traditional varieties of sorghum and millets which contain genetic characteristics of great potential importance for the future development of those crops.

Against this background, the IBPGR from the outset has laid heavy stress on the major cereals: wheat, rice, maize, sorghum and millets; and in view of the virtual extinction of the endemic genetic diversity of these crops in some regions of the world, has continued to mobilize collecting missions in critical problem areas. For all these major cereals, the Board's Crop Committees have advised on priorities. The Board has received considerable help from many institutions around the world so that it could respond effectively to a global need for action.

Wheat

Loss of primitive cultivars and related wild species has been acute from the Mediterranean basin eastwards throughout the Near East to India and Nepal, as

Recording data during a wheat collecting mission in Nepal in 1979

well as in Ethiopia. Much of world wheat agriculture is presently based on two wheats - bread wheat (the species *Triticum aestivum*) and durum wheat (the subspecies *T. durum*) - the evolution of the crop has been such that there are several independent wild races for several other cultivated species, and a range of variation which are not adequately represented in the major wheat collections of the world.

Despite intensified work by a number of agencies, the IBPGR Wheat Advisory Committee, in reviewing in 1978 the priority areas for collection, still listed 25 countries where it considered there was an urgent need for further collecting (see Annual Report, 1978). The priorities assigned in the 1978 review were based on the information concerning the existing collections then available to the breeders, which was known to be inadequate. At the request of the Wheat Committee, the Secretariat started in 1979 a detailed

analysis of the different taxa in the existing collections and of the regions where the samples were collected. This analysis has already revealed some startling facts which indicate that, when the work is completed in 1980, the priorities for wheat collection will have to be re-examined. For instance, the maximum holding in any one collection of the sphaerococcum forms of wheat, useful in breeding other bread wheats, consists of only 10 accessions and frequently their origin is unknown.

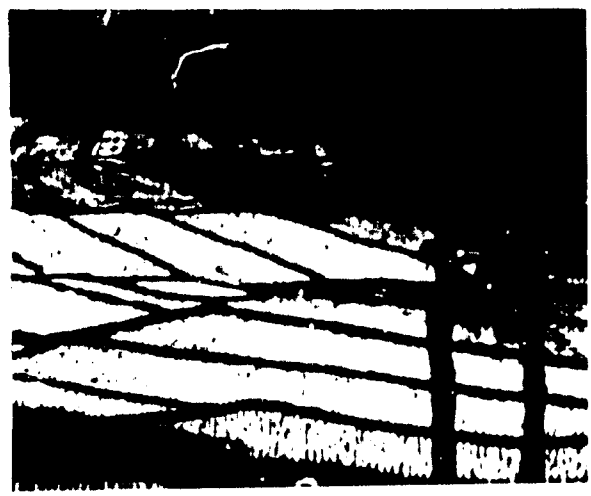
In view of the global importance of wheat, the Board continued to promote and participate in collecting in various parts of the world during 1979. In Nepal, IBPGR-financed expeditions explored the Western mid-hills at altitudes between 700 and 2,400 m where genetic erosion was found to be advancing rapidly. An international expedition hosted by INIA (Spain) collected wheat and Aegilops in Spain; scientists from Japan and Italy participated. Further activities took place in Iraq, where interesting wild species were found over huge areas in the north, often in dense stands. In Afghanistan, materials collected in 1977 and 1978 were multiplied for long-term storage in a designated base collection. Collecting missions organized by the national programmes were also carried out in India, northeast Syria and eastern Turkey, all in priority areas designated by the Wheat Committee.

In order to continue the momentum of these activities, the Secretariat has planned three collecting missions for 1980, to Egypt (as part of the IBPGR Mediterranean programme), Yemen Arab Republic, and Jebel Marra in the Sudan. These areas were also designated by the Wheat Committee as having high priority.

Rice

The intensification of rice culture in the tropics and sub-tropics and the widespread adoption, particularly in irrigated cultivation, of new high-yielding rice varieties such as the semi-dwarfs, have made collection of the genetic resources of this crop more important than ever. For instance, crosses of diverse parents in large numbers, followed by testing and selection, are used to obtain the right adaptive mechanisms, particularly for various moisture-edaphic conditions. Similarly, genetic resistance to pests, which presents a great challenge to rice breeders, is sought by screening diverse germplasm to select resistant material.

The breeding of rice at IRRI is backed by a Genetic Evaluation and Utilization



Paddy rice cultivation

(GEU) Programme, whose work has had a marked impact. The GEU Programme, through its close links with rice workers all over the world, has played a central role in assuring that germplasm of traditional, unimproved varieties and wild relatives of Oryza sativa and O. glaberrima are collected and conserved.

As reported in the IBPGR Annual Report for 1977, a five-year plan to collect, conserve and rejuvenate rice seed-stocks was formulated under the leadership of IRRI, in collaboration with a large number of national, regional and other international organizations. This collaborative plan is considered by the IBPGR as a model of its kind. The work is coordinated by IRRI, which has itself organized an accelerated field collecting programme in the countries

of South and Southeast Asia, in cooperation with institutes in Bangladesh, Bhutan, India, Indonesia, Iran, Nepal, the Philippines and Thailand. The IBPGR has provided, through IRRI, some financial support for the work being undertaken by the national institutes.

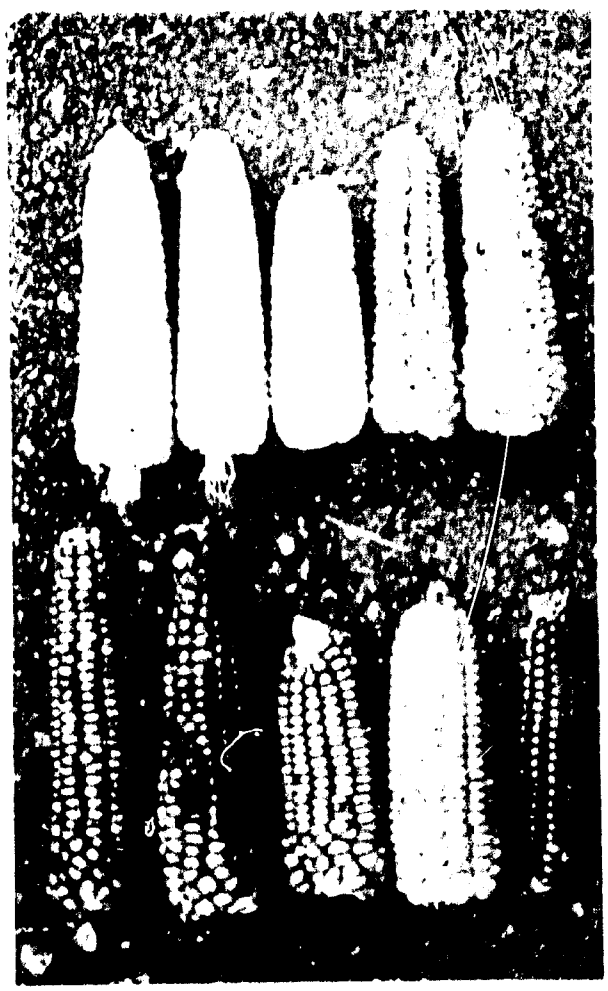
During 1979, IRRI mounted cooperative projects for rice germplasm collection in Bangladesh, Indonesia, Sri Lanka and Thailand. IRRI's genebank, which is housed in a new, well-equipped facility, now contains some 48,000 accessions, and IRRI has accepted responsibility for maintaining in its genebank the global base collection.

Financial assistance was provided by the IBPGR to IRAT and ORSTOM to collect rice in Guinea Bissau, Senegal and Zambia in 1978 and in Guinea during 1979. Whereas IRRI coordinates the rice work in Asia, IITA plays a central role in Africa. Rice is collected by IITA's Genetic Resources Unit whenever it has collection missions in the field, and the seed is stored and evaluated at IITA headquarters in Nigeria. In 1979 specifically, IITA continued to collect O. sativa, O. glaberrima and wild relatives of the longistaminata - glaberrima complex and other wild species from Tanzania, Nigeria, northeast Sudan and northern Cameroon. It also finished the evaluation of 1,200 O. glaberrima accessions. During 1979, in collaboration with the National Bureau of Plant Genetic Resources (NBPGR), India, WARDA collected in Nigeria and Mali as a continuation of its 1978 activities.

The documentation of rice germplasm is well advanced through the development at IRRI of a computerized information system for the IRRI genebank. Information on morpho-agronomic and genetic evaluation traits is recorded for each accession. Similarly, IITA is documenting the African material. The IBPGR Advisory Committee on Rice Genetic Resources, co-sponsored by IRRI, finalized a list of descriptors for rice cultivars at its second meeting at Beltsville, Md., USA, in December 1978. The list was issued by the IBPGR in a preliminary format in 1979 and a more definitive list, with greater detail, will be published shortly by IRRI.

Maize

The IBPGR has allocated more resources for the collection of maize than for the collection of any other cereal. This has been due to the rapid diffusion of improved varieties and hybrids with the resultant loss of many pre-existing ecotypes. In addition, many collections made in the 1950s had not been well maintained and a number of race complexes were poorly represented in the existing genebanks. Under the guidance of its Maize Advisory



Variation in maize collected in 1979

Committee, co-sponsored by CIMMYT, the IBPGR has supported the collection of germplasm in a number of priority areas, especially in Latin America. The material has been made available to interested national programmes and to CIMMYT. Several national collections have also received Board support for either maintenance and regeneration (Colombia and Peru) or documentation (Argentina, Mexico and Peru).

CIMMYT has continued to plant newly arrived material in observation nurseries and the best samples are moved into corresponding back-up pools. The genebank at CIMMYT maintains over 13,000 samples stored at 0°C. The collection is being deposited for long-term storage in the U.S. National Seed Storage Laboratory (NSSL) at Fort Collins, Colorado, the centre designated by IBPGR for base storage of New World maize, and approximately half the collection has been sent.

During 1979, the IBPGR assisted three national programmes in Latin America:

Brazil:

Financial assistance was given to CENARGEN/EMBRAPA to collect primitive maize cultivars as a continuation of work started in 1977. Areas visited included the southern regions near to the borders of Argentina and Paraguay, northern Minas and southern Bahia.

Paraguay:

The Instituto Agronomico Nacional was helped to collect local maize germplasm near the Brazilian borders and in the northern, central and southern Oriental regions.

Peru:

IBPGR supported the Universidad Nacional Agraria to collect maize in the jungle regions. In previous years, the University had collected in the coastal areas of Peru with Board support.

In October 1979 a meeting was convened by IBPGR for maize scientists from the Southern Cone countries (Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay). This was hosted by INTA at Pergamino, Argentina, and existing collections and activities related to maize germplasm in the participating countries were reviewed. Some gaps in collections were identified for Argentina, Chile and the Amazonian region. Discussions also covered the needs for multiplication and evaluation on a cooperative basis.

Board support for the collection of maize germplasm in other continents has been provided in the context of regional programmes, especially in the Mediterranean. Funds were provided to Spain and collection continued in Portugal in 1979. The IBPGR had also provided funds for the equipment of a genebank in Portugal, which has agreed to accept regional responsibility for conserving Mediterranean maize germplasm.

Work on maize in other parts of the world has not been so intensive, although the Indian national programme had been collecting in the northeastern Himalayas. Because it is unlikely that most of the genetic variability of this crop is already represented in existing collections, the Maize Advisory Committee is reviewing the situation in order to identify any important remaining gaps.

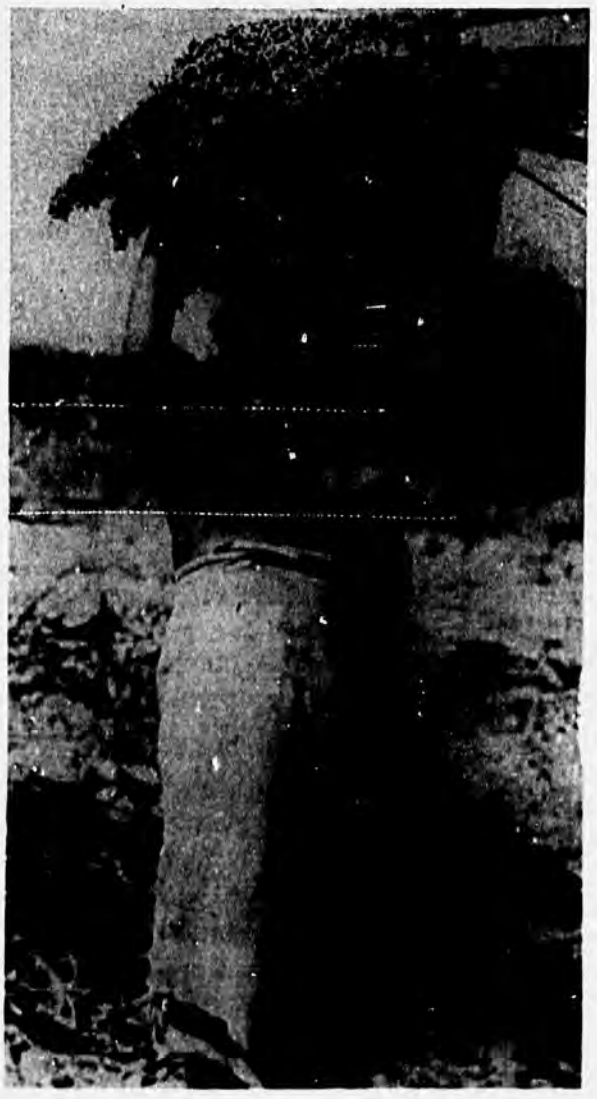
Sorghum and Millets

Sorghum is the fourth most important world cereal, widely grown in the tropics and subtropics, although the genepool is clearly African. In Africa the diversity is vast due to the hybridization patterns, not only in the cultivars but with wild species. Pearl millet also originated in Africa. Pearl millet is extremely drought-resistant and has traditionally been an

important food crop in the Sahelian countries as well as in some of the drier areas of India and Pakistan.

Due to the emergency situation in the Sahelian zone caused by drought, and the lack of comprehensive collections, FAO started to organize collecting in Africa some years ago with the help of UNEP financing; most of the actual collecting work was subcontracted to ORSTOM. After the IBPGR was established, the Board undertook the responsibility previously entrusted to FAO, with the collecting work similarly subcontracted to ORSTOM and IRAT. About the same time ICRISAT was created, with sorghum and millet as two of its principal mandate crops. The various interest

The pearl millet harvest in East Africa



The sorghum harvest in East Africa

areas were considered by the Committee to have high priority for future work:

Africa:	Botswana	Mozambique
	Burundi/Rwanda	Sierra Leone
	Congo	S.E. Sudan
	Ethiopia	S. Tanzania
	Ghana	Zambia
	Ivory Coast	
Asia:	China	
	India (especially Andhra Pradesh, Tamil Nadu, Orissa, West Bengal, Uttar Pradesh, Himachal Pradesh)	
	Nepal	
	Yemen Arab Republic	

The descriptors for sorghum were finalized in 1979. In addition, a preliminary list of descriptors for pearl millet was proposed by ICRISAT. It has been agreed that the IBPGR will convene a Working Group early in 1980 to review the preliminary pearl millet list and to seek agreement on a definitive list.

Minor Millets

There are a number of minor millets grown in the tropics, sub-tropics, and temperate regions which frequently tolerate poor soils and are important over wide areas as either staple or famine reserve foods. For the time being, the IBPGR has asked ICRISAT to hold the collections of the following speci

Eleusine coracana:	finger millet, ragi
Panicum miliaceum:	proso millet or common millet
Setaria italica:	foxtail millet

Similarly, the Plant Genetic Resources Center of Ethiopia has been requested to hold material of Eragrostis species and the NPBGR, New Delhi, to hold the minor Indian millets.

The Advisory Committee at its third meeting identified the following as the priority areas for the further collection of millets:

Eleusine corocana:

China, Ethiopia, India, Kenya, Sri Lanka, Sudan, Tanzania, Uganda, Zimbabwe-Rhodesia

Setaria italica:

China, India, Iran, Japan, Korea (Democratic Republic of), USSR

Panicum miliaceum:

Afghanistan, China, European countries, India, Mongolia, USA, USSR

Echinochloa crusgalli:

China, India, Japan, USA

Paspalum scrobiculatum:

India

Panicum miliare:

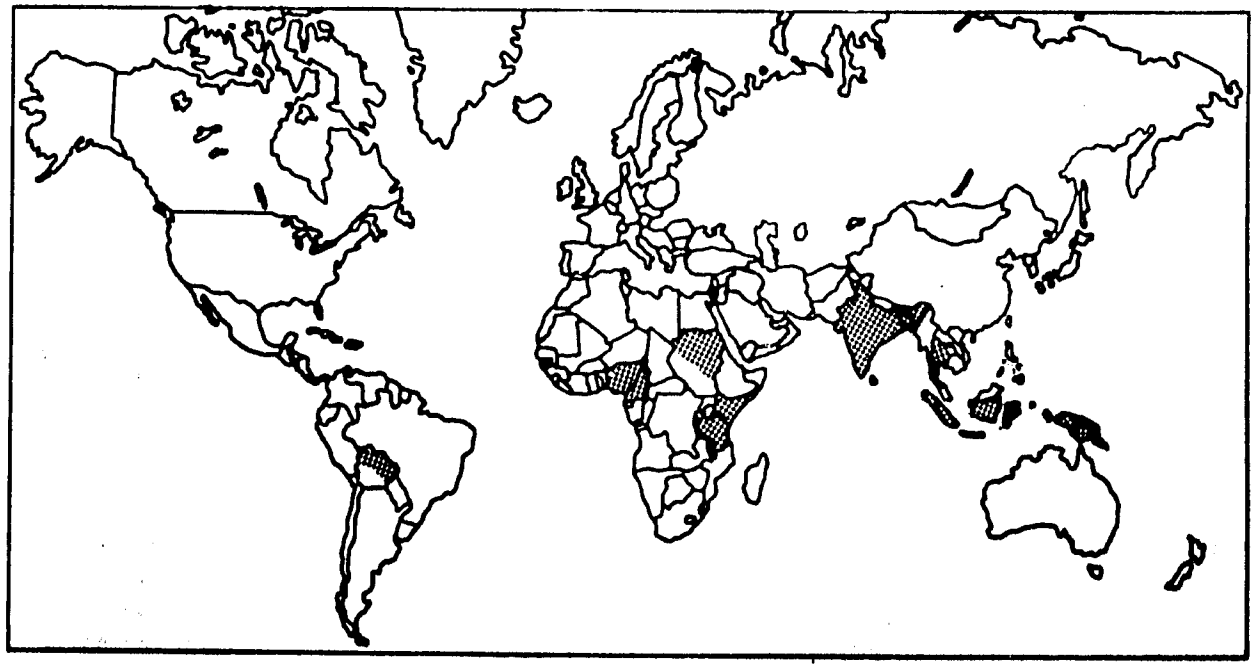
China, India

Andean Cereal Crops (other than maize)

The IBPGR continued its support for the collection of Andean crops in Bolivia, Ecuador, and Peru in 1979 (see p.47). The Andean crops include the following used as cereals: quinoa (Chenopodium quinoa) widely cultivated in the Andes; canihua (C. pallidicaule cultivated in the Altiplano of Peru and Bolivia as a minor grain; and Inca wheat or coimi (Amaranthus caudatus) cultivated as a grain in Peru, Bolivia and northeastern Argentina. The material is currently being maintained in Peru, at the Universities of Cuzco and Puno, and in Bolivia at IBTA, Belen and Patacamaya.

FOOD LEGUMES

REGIONS WHERE THE IBPGR ORGANIZED OR COLLABORATED IN ORGANIZING COLLECTING MISSIONS IN 1979



Bangladesh
Bolivia
Cameroon
India
Indonesia
Kenya
Nigeria
Papua New Guinea
Sudan
Tanzania
Thailand

The IBPGR has taken action on several food legume crops: first, on Phaseolus beans, under the guidance of an Advisory Committee jointly sponsored by CIAT; second on winged bean, through the IBPGR Southeast Asia Regional Programme; and third, on groundnut, by supporting collecting in the centre of variability in South America and by convening a Working Group in 1979 hosted by ICRISAT. In 1980, the Board intends to initiate action on cowpea and mung bean.

Four of the IARCs have a cooperative agreement for collecting and sharing germplasm of chickpea, pigeonpea, groundnut, lentil, cowpea, Phaseolus beans, Vicia beans, soyabean and winged bean. At a meeting hosted by ICRISAT in early 1978, CIAT, ICARDA, ICRISAT and IITA agreed that, when any of them field an exploration mission, it will not only collect the crops in which the sponsoring centre is interested, but also material for the other centres. The centres also agreed to provide logistic support for personnel from other centres who collect in their region and to welcome the participation of such personnel from other centres in their own explorations.

The IBPGR has continued to work in close collaboration with the IARCs and their collection programmes. In 1979 ICRISAT, in association with the national

programmes, collected pulse germplasm in northern and eastern areas of Bangladesh, central and eastern Nepal, and parts of Bundelkhand and Himachal Pradesh, India. The Germplasm Unit of IITA collected food legumes from Cameroon, Kenya, Nigeria, and Tanzania.

ICARDA intends to develop and maintain world collections of lentils and Vicia beans, and a duplicate set of the ICRISAT collection of chickpea. A working collection of "Kabuli" type and a collection of Middle Eastern "Desi" type chickpeas are also being assembled at ICARDA. With the siting of an IBPGR Technical Officer for Southwest Asia at ICARDA in early 1980, collaboration with the national programmes of the region will increase and joint field collecting expeditions may be mounted in the region. The ICARDA screening of germplasm collections in Syria and Lebanon may stimulate national programmes to participate in this work.

Phaseolus

The IBPGR provided CIAT with funds during 1978 and 1979 to organize and coordinate the collection of Phaseolus germplasm in Latin America, in association with national scientists in the countries concerned. This will be extended in the future to secondary centres of diversity in Turkey, the Balkans and East Africa. Emphasis is being given to P. vulgaris, P. lunatus, P. acutifolius and P. coccineus but wild species are being collected whenever possible.

Collections have been made recently in Mexico and Guatemala and the exploration is to be extended to include Argentina, Brazil, Honduras and Peru. National institutions in each of these countries have been closely involved in the planning of the missions, in the collecting work, and in the documentation of the materials collected. The IBPGR funds provided to CIAT have been used to help defray the costs to the national programmes for their participation in this work.

The Chairman of the Phaseolus Committee has been in the process of finalizing the descriptor states of the descriptors agreed by the Committee. In addition, since collecting is needed in eastern Africa as well as in Latin America, the Chairman, in 1979, assessed for the IBPGR the current state of collections of Phaseolus vulgaris in the following countries: Burundi, Cameroon, Egypt, Ethiopia, Kenya, Lesotho, Malawi, Rwanda, Sudan, Tanzania, Uganda, Zaire and Zambia. From this it was concluded that the only comprehensive local collection now available is in Malawi and that there is a need for systematic collecting to be carried out, at first in Kenya and Tanzania. Arrangements will be made for Phaseolus samples collected in Africa to be deposited in the world collection at CIAT as soon as possible.

Groundnut

Since 1976 the IBPGR has funded the collection of wild and cultivated groundnuts in South America and material has been acquired from the following areas: the Gran Pantanal in Western Mato Grosso and Southern Pantanal in Brazil; the areas around Santa Cruz and Trinidad, Bolivia; parts of northwestern Argentina; and Paraguay. Samples included living plant specimens, seeds and herbarium material; Rhizobia nodules were also collected. The representative herbarium specimens of the wild Arachis material have been deposited at Corrientes, Argentina and the living plant specimens at Campinas, São Paulo, Brazil; Corrientes, Argentina; and Santa Cruz, Bolivia. Seeds have been distributed to ICRISAT and to Argentina, Bolivia, Brazil, and the USA.

During 1979 the IBPGR designated the base storage centres for groundnut germplasm. ICRISAT has agreed to hold a major world base collection and INTA, Pergamino, Argentina, has been requested to accept the responsibility for holding a second base collection.

In addition, at the request of the IBPGR, ICRISAT hosted an ad hoc Working Group on Groundnut Germplasm in September 1979. The Working Group recommended that for base storage the sample size should consist of 3,000 seeds per accession, and that regeneration should take place when viability has fallen to 85% or after 15 years of storage. Procedures for seed

Groundnuts are widely grown but more germplasm is required to breed crops such as those shown above

distribution, accession numbering, quarantine and evaluation were discussed. The Group was of the view that there was a strong need for Rhizobium base collections to be established, possibly at ICRISAT and North Carolina State University, USA.

The Working Group reviewed the IBPGR collecting programme and the following areas were identified for priority action:

Priority 1	Burma
	Indonesia
	Mexico
	Central America
	Caribbean Islands
Priority 2	West Africa
Priority 3	Mozambique
	Paraguay
	Spain
	Portugal

The Working Group considered whether the collection of Arachis in southern Latin America should be continued and recommended that the programme underway, which is being supported by the IBPGR, should be completed. In 1980, this programme will concentrate on the Andean zone.

Winged bean

Winged bean is a crop of potentially great global importance because of its high yield and high protein content. The collection of winged bean germplasm has been assigned high priority by the Southeast Asian Regional Programme for Papua New Guinea and Thailand. In 1979 the IBPGR supported Kasetsart University in Thailand to collect winged bean and other legumes in the northern and central areas of the country. The samples are being stored, multiplied and evaluated at Kasetsart.

Also in 1979, the Board supported the collection of winged bean and food legumes by the Bangladesh Agricultural Research Institute (BARI) between January and March 1979 in the northern and eastern parts of Bangladesh. The team collected more than 200 samples of winged bean. Duplicate samples have been supplied to the Southeast Asia Regional Genebank at Los Baños, Philippines, and to the Thailand national programme. This work will continue in 1980 and 1981.

The descriptors for winged bean drawn up by an IBPGR Working Group for the Southeast Asian Regional Committee were published in 1979 and have been made widely available by the Secretariat.

VEGETABLES

After the publication of the IBPGR report on tropical vegetables and their genetic resources in 1977, the Board concluded that more information was required on exactly what to collect and how any germplasm collected would be used, before an action plan could be formulated. The Board therefore convened an Expert Consultation in January 1979 to propose recommendations for action on those vegetable species of priority for production in the tropics. The Consultation succeeded in agreeing on a priority list for locally and globally important species, and cooperative programmes among research institutes were proposed. The priorities were defined as follows:

First Priority Species:

Lycopersicon esculentum	(Tomato)
Allium spp.	(Onions)
Amaranthus spp.	(Amaranths)
Brassica oleracea B. pekinensis B. juncea B. carinata	(Brassicas)
Capsicum spp.	(Chilli)
Cucurbita and related species	(Cucurbits)
Momordica charantia and related species	(Bitter gourd)
Solanum melongena and related species	(Eggplant)
Abelmoschus esculentus	(Okra)

Second Priority Species:

Basella alba	(Indian or Ceylon spinach)
Celosia argentea	(Sokoyokoto)
Citrullus lanatus	(Watermelon)
Cnidoscolus chayamansa	(Chaya)
Cucumis melo	(Musk melon, Canteloupe)
Cucumis sativus	(Cucumber, Gherkin)
Colocasia and Alocasia	(Taro)
Corchorus olitorius	(Jute mallow)
Daucus carota	(Carrot)
Dioscorea	(Yam)
Dolichos lablab	(Lablab)
Ipomoea aquatica	(Kangkong)
I. batatas	(Sweet potato)
Lactuca sativa	(Lettuce)
Lagenaria	(Bottle gourd)
Manihot esculenta	(Cassava)
Pisum sativum	(Pea)
Psophocarpus tetragonolobus	(Winged bean)
Raphanus sativus	(Radish)
Sechium edule	(Chayote)
Telfairia	(Fluted pumpkin)
Vicia faba	(Broad bean)
Vigna radiata	(Mung, Greengram)
V. unguiculata subsp. sesquipedalis	(Yardlong bean)

Although tomato rated as the overall first priority for global action, the Consultation agreed that the species seems to be well covered by existing collections. Thus it is not included in the immediate programme of action. However, the Secretariat will gather information on the existing collections to help identify any gaps in them.

The Consultation did not include the green pods of Phaseolus and Cowpea in its priority list, but it noted that CIAT and IITA are working with these species as grain crops and suggested that they might include the vegetable types as well in their collections.

For top priority species, the recommendations of the Consultation are being implemented. Specifically, the IBPGR has adopted a two-year plan for 1979-80 to produce action programmes for the following groups of species:

Abelmoschus esculentus

ORSTOM has been invited to develop a coordinated plan of action for okra and related species. In developing this plan, ORSTOM has been asked to seek the advice of experts working in the Ivory Coast, at the National Bureau of Plant Genetic Resources in India, and at the University of Ghana at Legon.

Amaranthus

At the request of the IBPGR, the Royal Tropical Institute in Amsterdam, Netherlands, produced a report on amaranths in 1979 which contains a recommended plan of action.

Allium

The National Vegetable Research Station in the U.K. has been invited to organize and coordinate a plan of action on genetic resources of **Allium** species in close cooperation with the Institute for Horticultural Plant Breeding, Wageningen, Netherlands, and onion breeders in Egypt, France, Japan, Nigeria, USA and USSR.

Brassica

AVRDC has agreed to take a leading role in preparing a cooperative plan of action for the species **B. oleracea**, **B. pekinensis**, **B. juncea** and **B. carinata**, with the cooperation of the Vegetable and Ornamental Crops Research Station, Japan, and the National Vegetable Research Station, U.K. For this purpose AVRDC is convening a working group of experts during an International Symposium on Chinese Cabbage, to be held in Japan in March 1980, and the plan of action will be finalized by this working group.

Capsicum

CATIE has agreed to take a leading role in formulating a cooperative plan of action for **Capsicum**, with the cooperation of INIA in Mexico, the Chilli Research Station, India and EUCARPIA. The recommendations to the IBPGR will be ready by May 1980.

Cucurbita

Dr. T.W. Whittaker and Dr.F.W. Martin, both from the USDA, have accepted responsibility to prepare a plan of action for these species. CATIE, Costa Rica, which developed a descriptor list for **Cucurbita** in 1979, will also be involved in this work. The report will be ready for consideration by the IBPGR in 1980.

Momordica

Following discussion by the IBPGR Southeast Asia Committee, the University of Kasetsart in Thailand will be asked to coordinate action.

Solanum melongena

Dr. B. Choudhury from the Department of Vegetable Crops in IARI, India, has agreed to contact key workers on this species and to produce a report and plan of action by June 1980. Contacts will be made with INRA, France and other institutions in Japan and Africa.

Okra in Mali

During 1979 the IBPGR Secretariat made arrangements for the diverse activities listed above. When the reports are ready, the Board should have available for its consideration:

1) proposed detailed plans for collecting germplasm;

2) proposed sites for long-term and medium-term storage;

3) information on the current state of existing collections, and recommendations on how the data available can be assembled and put into machine-readable form; and

4) proposals for evaluation of the materials, using standard descriptors to record the results.

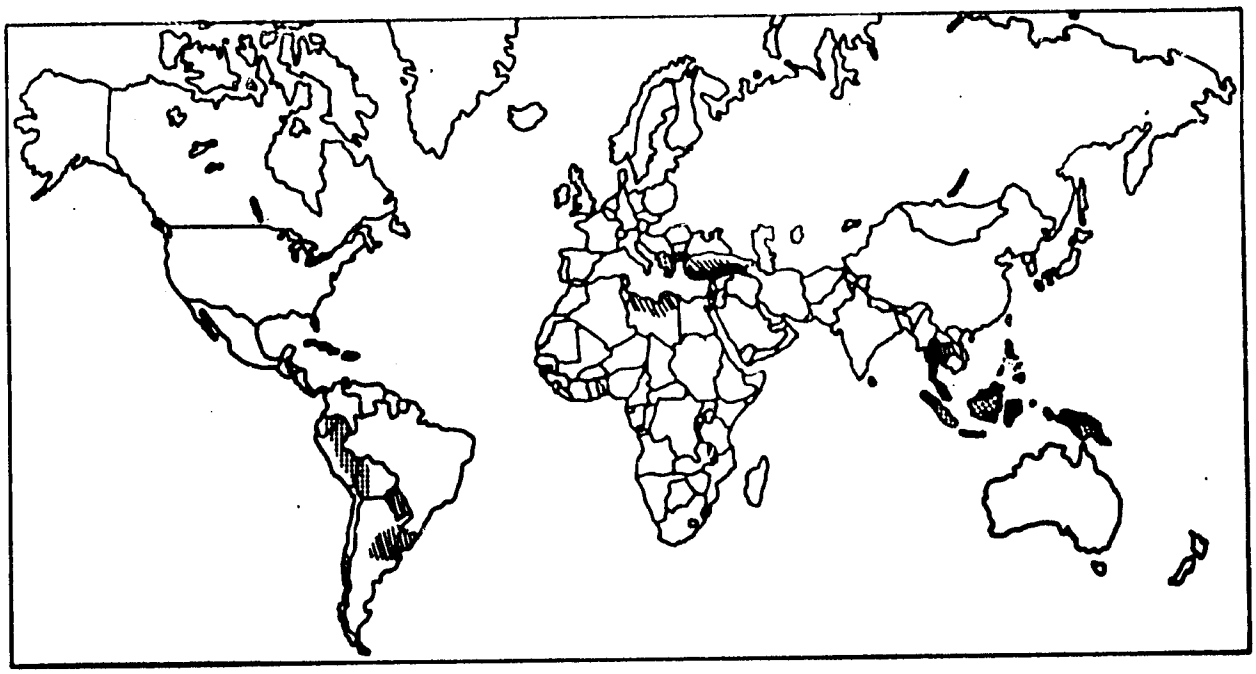
At present there is no world centre adequately equipped to store tropical vegetable seeds. The Board intends to examine how the need for such conservation can best be met, presumably through some new or improved facility in a developing country. In the meantime, the Board is considering transitional arrangements for storing tropical vegetable germplasm in appropriate seed stores in the developed world.

As mentioned above, the report on amaranths was finalized in 1979 and it will be considered in detail by the IBPGR in early 1980. The RTI, Amsterdam, which produced the report, took advantage of the second Amaranth Conference (which met in the USA in September 1979 at Kutztown) to discuss the collection, preservation and exchange of vegetable amaranth germplasm with world experts. It was agreed that the separation of cereal, vegetable and forage amaranths is artificial because taxonomic distinctions are not clear.

The germplasm collections of amaranths appear to be scattered and incomplete. However, genetic erosion appears to be occurring only in Central and South American grain types, and in vegetable amaranths in India and Africa. The RTI report suggests that agreements might be made with NBPGR, India, and the National Horticultural Research Institute, Nigeria, for coordinating collection, evaluation and maintenance of germplasm in Asia and Africa respectively, and that the descriptors should be finalized. It is estimated that a representative collection covering the genetic variability would consist of 1,000-2,000 accessions.

Evaluation of Amaranths

REGIONS WHERE THE IBPGR ORGANIZED OR COLLABORATED IN ORGANIZING COLLECTING MISSIONS IN 1979: FRUITS, ROOTS AND TUBERS, FORAGES



Fruits

Indonesia
Malaysia
Philippines
Thailand
Turkey

Roots and Tubers

Bolivia
Chile
Ecuador
Greece
Indonesia
Papua New Guinea
Peru

Forages

Argentina
Libya
Paraguay
Thailand
Turkey

FRUITS

Most of the IBPGR activities on fruits have been in the context of support to regional activities. Meetings of scientists convened by the IBPGR for Southeast Asia, Southwest Asia and in Mexico, Central America and Caribbean regions, as well as a meeting of African scientists in 1978, all listed specific tropical fruits as having a high regional priority. However, because fruits must generally be conserved in plantations, rather than as seed, the development of collections has been slow, although it is expected that the work will be accelerated in the forthcoming years. Details of activities in 1979 are to be found for Southeast Asia on p. 42; and mention is also made in other regional reports.

In December 1979 a member of the Secretariat visited the Netherlands for discussions on tropical fruits with the Department of Tropical Agriculture at the

Agricultural University in Wageningen, the Institute for Horticultural Plant Breeding (IVT), also in Wageningen, and the Royal Tropical Institute, Amsterdam. The Secretariat is considering the desirability of commissioning a consultant report in 1980 on the genetic resources of important tropical fruits and nuts, following the publication by the IBPGR of a survey of existing collections of banana, mango, pineapple, citrus and avocado (see p.52).

Bananas

An IBPGR Working Group submitted a report on the genetic resources of bananas and plantains in 1977 and, since that time, the Board has supported a substantial amount of work on this material because of its global importance.

During 1979, the IBPGR supported collection missions for exploration of banana genetic resources in Thailand. Bananas are one of Thailand's most important crops and there is considerable diversity amongst local cultivars and wild species. Between February and June, 105 accessions (including 84 cultivars) were collected from nine provinces. All samples were collected as suckers and are kept as part of the national living banana collection at Pak Chong where they are being evaluated.

Also during 1979, Dr. R.V. Valmayor of the Philippines reported on the status of banana germplasm resources in Thailand, Burma and Malaysia. In addition, in September, Dr. E. de Langhe, a member of the IBPGR, visited collections in Malaysia, Indonesia, and the Philippines on behalf of the Board to stimulate proposals to the IBPGR. From the surveys it appears that there is genuine interest in the maintenance and evaluation of the germplasm in the region, particularly local cultivars. The Malaysian collection of MARDI is almost intact and Thailand has developed a relatively new but important germplasm collection. Indonesia has also started collecting and has established collection gardens.

According to the reports of Drs. Valmayor and de Langhe, there is a need to revise, in the next year or so, the desriptor list tentatively issued by the IBPGR Working Group on Bananas and Plantains, and the synonyms for local cultivars need to be clarified to simplify identification and exchange of material. These consultants also recommended that PCARR and MARDI accelerate the exchange of material, and that exchanges between the Southeast Asia Regional Banana Germplasm Centre in the Philippines and the collections of Thailand and Indonesia start as scheduled in 1980.

Bananas in the traditional floating market in Bangkok

ROOTS AND TUBERS

Data on the major root and tuber collections have been included in the survey of existing collections of vegetatively propagated crops started by the Board in 1979. This includes the following crops: cassava, yam, potato and sweet potato. Following completion of the survey, the Board proposes to convene Working Groups to advise on practicable action on the genetic resources of cassava and sweet potato. These Working Groups will also finalize the list of descriptors for the crops. Descriptors for yam and taro were finalized in 1979 in association with the IBPGR Southeast Asia Programme and will be issued early in 1980.

During 1979 the Board continued to take note of tissue culture research in relation to the conservation and rapid propagation of roots and tubers, particularly at CIP (potato), CIAT (cassava), IITA (yam, sweet potato and cocoyam), the University of Birmingham, UK (potato), and at Wageningen, Netherlands (aroids). This work is also of great interest as a promising method for overcoming the strict quarantine constraints against the movement of vegetative materials so as to avoid the possibility of spreading diseases, e.g., viruses in potato, yam and aroids and the mosaic and bacterial blight of cassava. The Board will consider the potentialities of tissue culture for genetic conservation during 1980.

Potato

The IBPGR has not had the need to convene an Advisory Committee on potato genetic resources because of the work of CIP in this field. CIP convened a planning conference in October 1979 to review plans and policies for potato germplasm exploration. Recommendations were made for specific taxonomic studies, maintenance of collections and their documentation, data management and plant health and quarantine. According to the conference, the up-dated priorities for future collecting, bearing in mind the work already accomplished, are:

1)	Emergency and high priority:	North Peru
2)	High priority:	Mexico
3)	High to medium priority:	Bolivia Central America Colombia South Peru
4)	**Medium priority:**	Brazil Guatemala Paraguay Central Peru USA Venezuela
5)	**Medium to low priority:**	Argentina Chile Ecuador
6)	Low priority:	Uruguay

The IBPGR has indicated to CIP its willingness to help with the collection programmes.

The IBPGR has provided some funds to supplement the germplasm work of CIP. In 1978 it supported INTA, Balcarce, Argentina to construct a screen house and this was completed in 1979. The Solanum collection at Balcarce is now being multiplied by true seed. This centre works closely with CIP, with the Potato Introduction Center, Sturgeon Bay, USA, and with the world community of potato breeders.

In addition, the collection of potato germplasm in southern Chile continued in 1979 with IBPGR support. This was carried out by the Universidad Austral de Chile

and CIP. The collecting has concentrated on wild and semi-cultivated ecotypes of tuber-bearing species, particularly **Solanum tuberosum** growing under long day conditions. The project includes the preliminary evaluation of the material.

Other Roots and Tubers

The Southeast Asia Programme collected a range of other root and tuber species in 1979, particularly in Indonesia. One project collected indigenous roots and tubers in the southeast region of Sumatra; these included species used for food and flavouring of the following genera: **Dioscorea**, **Colocasia**, and **Amorphophallus**. There is a great range of variability yet to be collected in Java, Sumatra, Sulawesi, Maleku and in other areas. Similarly, the aroids are distributed throughout Southeast Asia and their cultivation is widespread and in parts extensive. In addition, some genera of the family Zingiberaceae, such as **Curcuma** (turmeric and arrowroot) and **Zingiber** (gingers) are also used as root crops. Several species of these genera are widely used as medicinal plants or spices, and some species of **Curcuma** are potential starch resources. Collection of all these plants will be undertaken as part of the Southeast Asia programme.

In South America during 1979, IBPGR supported the collection of indigenous tuber bearing crops in the Andean zone of Bolivia, Ecuador and Peru. The most important of these crops in the region are: Oca (**Oxalis tuberosa**), Ulloco (**Ullucus tuberosus**) and Ysano (**Tropaeolum tuberosum**). The collection, by IICA, started in 1979.

Local cultivars of sweet potato on their way to market in W. Java

FORAGES

With CSIRO, Australia, the IBPGR co-sponsored an International Symposium on the Genetic Resources of Forage Plants. This was held at the James Cook University of North Queensland, Townsville, in May 1979. The Symposium discussed the following subjects: the nature and distribution of forage resources, adaptation in forage plants, identification of genera/species, co-evolution of forage plants with grazing animals, plant collection and maintenance, evaluation, exploitation, data handling and future research and development. During the discussions it was apparent that more needs to be known about existing collections and their origins, and that the IBPGR could play a major role in filling this gap.

Immediately following the Symposium the IBPGR, with the assistance of CSIRO's Division of Tropical Crops and Pastures, convened a Working Group of scientists attending the Symposium, with a request that they seek to formulate a practical plan of action for the collection and conservation of the genetic resources of forage plants. The Working Group produced the following list of priorities for collection, designed primarily to minimize the risks of genetic erosion.

A. HERBACEOUS LEGUMES

1. For Tropical and Sub-Tropical Climate Regions

Region for Collection	Priority	Principal Taxa
Tropical South America	1	Stylosanthes, Macroptilium, Aeschynomene, Desmodium Centrosema, Phaseolus, Arachis, Leucaena
Mexico and Central America	1	Phaseolus, Macroptilium, Desmanthus, Desmodium, Stylosanthes, Centrosema, Leucaena
Africa (East)	2	Glycine, Clitoria, Lablab Vigna, Lotononis, Trifolium semipilosum, Dolichos
Tropical Asia	2	Pueraria, Desmodium, Vigna, Stylosanthes, Glycine, Alysicarpus
Australia	3	Glycine, Vigna, Trigonella, Desmodium

2. For Mediterranean Climate Region

Mediterranean	1	Medicago, Trifolium, Vicia, Melilotus, Ornithopus, Onobrychis

Southwest Asia	1	Medicago, Trifolium, Vicia, Onobrychis
Australia (Southern)	2	Trifolium subterraneum and annual Medicago spp. - local ecotypes

3. For Temperate Climate Regions

Europe	1	Trifolium, Medicago, Lotus, Melilotus, Onobrychis, Vicia
Southwest Asia	1	Medicago, Trifolium, Vicia, Onobrychis
Mediterranean	2	Medicago, Trifolium

B. GRASSES

1. For Tropical and Sub-Tropical Climate Region

Africa	1	Setaria, Panicum, Cenchrus, Chloris, Eragrostis, Cynodon, Brachiaria, Digitaria, Andropogon, Pennisetum, Urochloa
Asia	2	Cynodon, Cenchrus, Bothriochloa, Panicum, Pennisetum, Setaria
South America	2	Paspalum, Axonopus, Tripsacum, Eriochloa
Mexico and Central America	3	Axonopus, Tripsacum, Eriochloa

2. For Mediterranean Climate Regions

Mediterranean	2	Lolium, Festuca, Phalaris, Bromus, Agropyron, Cynodon

3. For Temperate Climate Regions

Europe	2	Lolium, Dactylis, Festuca, Bromus, Phleum
Temperate South America	2	Paspalum, Bromus, Poa

C. FODDER SHRUBS AND OTHER FORAGES

Although a number of species are known to be important, there is insufficient knowledge available to provide a firm basis for determining priorities in forage plants other than herbaceous legumes and grasses. Among the important taxa identified were Atriplex, non-thorny Acacias, Leucaena, Prosopis and Codariocalyx.

The IBPGR Consultation for Southwest Asia (see p. 40) also laid high priority on future work on forages in the region. The Board will continue to maintain close liaison with ICARDA on any action on forages in this region. In addition, as part of the IBPGR Mediterranean programme, an FAO/IBPGR/EMASAR/Libyan mission collected desert and semi-desert species in April 1979 in various parts of Libya. This was follow-up to work supported in 1978. There were, however, problems in collecting seed due to ripening being three to four weeks later than in 1978, with the result that little mature seed was available. A further problem with some species (e.g., Lotus pusillus, Argyrolobium uniflorum) was that because the time between pod ripening and seed dispersal is short, often only a few ripe pods were harvestable. Furthermore, severe winter grazing had produced small plants, making harvesting harder. It is against this background that a total of 72 collections were made from 98 sites, with the bulk of the samples including Medicago spp., Argyrolobium uniflorum, Lotus pusillus, Astragalus spp., Hippocrepis spp. and Plantago albicans.

The IBPGR funded two forage projects in Latin America during 1979. In Argentina, INTA was assisted to collect and conserve native sub-tropical forage grasses and legumes - mainly Centrosema virginianum and Phaseolus adenanthus. Similar assistance was provided to the Faculty of Agriculture at the University of the Republic of Uruguay, also for the collection of native forage grasses and legumes. The collecting will continue into 1980.

The IBPGR Secretariat also maintained close links with forage work in the following institutes:

CIAT: The forage germplasm collection specializes in material from acid, infertile, savannah and jungle soils. The germplasm in the collection of Andropogon gayanus, Zornia, Stylosanthes capitata and Desmodium heterocarpon/ovalifolium is considered to be unique. By 1979 the total of accessions was more than 5,000 of which 1,458 came from collecting missions undertaken in 1978. These were in Panama (Banco Nacional de Panamá), Venezuela (FONAIAP) and Brazil (EMBRAPA/CENARGEN). In 1979 efforts were made to continue to multiply the germplasm and provide sufficient seed or planting material for conservation, preliminary evaluation and distribution. Of note was the preliminary evaluation of Zornia, Centrosema, Aeschynomene, Macroptolium, and Vigna species. The IBPGR also assisted Dr. Schulz-Kraft of CIAT to collect Desmodium in Thailand. In 1978 it became evident that D. ovalifolium had potential as a legume for pasture improvement in CIAT's Tropical Pastures Programme in regions of infertile soils in South America. However, the only germplasm of this Southeast Asian species available to pasture research workers was limited to two genotypes: a late flowering commercial variety frequently used as a cover plant in Malaysian rubber plantations, and a less vigorous, early flowering D. ovalifolium. D. ovalifolium accessions in the various collections seemed to be duplicates of these genotypes. Thus, on the basis of a list of collection sites of Kew herbarium specimens of Thai origin, a collecting mission was carried out in Thailand in May/June 1979. A second collection expedition explored the region of the Colombian Llanos Orientalis, to collect Zornia and Centrosema germplasm in particular.

Kenya: An FAO project financed by Norway, at Kitale, Kenya, continued to collect, evaluate and store grasses, legumes and shrubs in different ecological zones. Recently, more than 2,000 ecotypes have been added to the collection of 4,000 cultivars.

TREES

The IBPGR funded in 1979 a forest genetic resources fact-finding survey organized and carried out by the FAO Forestry Department. The aim of this exploratory work was to survey the status of the genetic resources of a few species important for the improvement of rural living in arid and semi-arid areas of Latin America, Africa, India and Southwest Asia - particularly species which provide fuel for cooking, timber for shelter, or which can be used to stabilize marginal environments.

The first part of the survey consisted of consultant visits to eight countries, in which 13 competent institutes expressed interest in participating in a project to collect and conserve genetic resources of tree species useful for the indicated purposes. These institutes are in Chile, India, Israel, Mexico, Peru, Senegal, Sudan and People's Democratic Republic of Yemen. A review of their facilities and main interests was made and preliminary indications show substantial support for the project. The survey suggested that initial priority should be given to the exploration and collection of **Acacia nilotica**, **A. senegal**, **A. tortilis** and **Prosopis cineraria**. Additionally, representatives of the genera **Atriplex**, **Capparis**, **Euphorbia**, **Quillaja** and **Simmondsia** will be important in Latin American collections.

In situ and **ex situ** conservation measures have been initiated in a few countries, particularly India, but all are at a very early stage of development. Test sites for growth evaluation have been identified for the recommended species. Periodic regional coordination may well be required to ensure that progress is in phase with plans for seed exchange and species trial assessments. Possible financing assistance (which might be required over four years) will be discussed by the Board at its 1980 meeting.

Collections of **Eucalyptus microtheca** and **Acacia aneura** have been made by CSIRO, Australia, with financial assistance from the FAO Forestry Programme, and seed of **E. microtheca** has been made available. Both these species are of high priority within the guidelines developed by the IBPGR.

A tree helping in environmental stabilization

INDUSTRIAL CROPS

Several industrial crops were included in the survey of holdings of vegetatively propagated crops carried out by the Secretariat in 1979. These were cocoa, coconuts, black pepper (Piper), rubber, sugarcane, coffee and tea. During the year, specific action was taken on beet, grape, coffee and cotton and reports are provided below:

Beet

Beet has been rated as a high priority crop by the IBPGR. In June-July 1979 a collecting mission to the Greek Aegean islands provided samples of wild and primitive forms, the latter consisting mostly of garden beets. It was observed that the developing beet seed programme in Greece (as in other countries in the centre of diversity) is leading to the rapid loss of primitive forms as farmers are encouraged to grow higher-yielding varieties. Collections were made in: Rhodes, Syni, Teftloussa, Kos, Kalymos, Leros, Samos, Patnos, Samipoula, Ikaria, Chios, Psara, Mytilini, Limnos, Thassos and Samothraki. During 1980 multiplication and preliminary evaluation of the materials collected will be organized by the Greek Sugar Company and seed samples will be deposited in the genebank at Braunschweig-Volkenröde (FRG), the IBPGR-designated base collection.

At the suggestion of the Breeding and Genetics Group of the Institut International de Recherches Betteraves (IIRB), the IBPGR agreed to hold a joint meeting in September 1979 on the genetic resources of beet. The meeting concluded that there are no good collections of beet germplasm in genebanks at present and that many of the primitive landraces which should be conserved are held by plant breeders. It was recognized that these should be gathered together and that wild material should also be collected. The priorities for collection are as follows:

Primitive landraces:

1) Multigerm sugar and fodder beet varieties from all of Europe;

2) Swiss chard, spinach and red beets from Europe, Asiatic USSR, parts of South America, and elsewhere;

3) Wild species and hybrids between wild and cultivated types. For these, attention should be given only to the following areas where wild populations are in immediate danger of genetic erosion:

Priority 1

Central and East Mediterranean:

Cyprus, Greece, and Sicily for wild and weedy forms.

Priority 2

West Mediterranean:

Algeria for wild and weedy forms and Yugoslavia especially for hybrid fodder beets. Bulgaria and Romania have many old cultivars but further information is required on previous collections before positively assigning priority to these countries.

Priority 3

Atlantic Islands:

The section Patellares is of potential value for nematode resistance (especially B. webbiana and B. patellaris).

In addition, the status of B. nana and its degree of genetic erosion in the

region of Mount Parnassus and Mount Olympus in Greece needs investigation, as does the current status of section Corollinae which has potential value in breeding for areas of marginal cultivation.

The meeting also agreed upon a tentative minimal list of descriptors and there were discussions about the practicalities of holding beet germplasm in genebanks.

Grape

At the invitation of the IBPGR, a Working Group on Descriptors of Grapes met in Rome in early September 1979. The Group took the opportunity of discussing other matters relating to grape germplasm and the following conclusions were drawn:

i) There is significant genetic erosion of primitive cultivars and wild species. Accordingly, there is an urgent need to make collections more comprehensive and to obtain more information about the distribution and variability of wild populations;

ii) Collections should be made in the following countries and areas, listed in descending order of priority;

1. P.R. of China, North India, Nepal
2. USSR
3. Afghanistan, Pakistan
4. Turkey, Iraq, Iran
5. Lebanon, Syria, Jordan
6. Algeria, Morocco, Tunisia, Libya
7. Caribbean
8. Yemen, Ethiopia, Egypt
9. Mexico, and Texas, USA
10. Aegean Islands and Greece

iii) Maintaining grape as vegetatively propagated material is very expensive. Research into alternative storage methods should therefore be accelerated;

iv) There is a need for more suitably trained personnel to work with grape germplasm;

v) Information about the contents of existing collections needs to be collated;

vi) There is need for greater cooperation among institutes in order to safeguard material. Specified institutes could assume certain regional responsibilities and this would result in accelerating the exchange of germplasm;

vii) The importance of the grape crop may increase in the future, since grapes can be easily converted into fuel alcohol.

The descriptor list agreed upon by the Working Group took account of the earlier work of the International Office of the Vine and Wine (OIV). The Working Group emphasized that the descriptor system should be flexible enough to include the full range of variation found in the centres of diversity, especially the variation of uncollected wild species.

Coffee

Following a survey of coffee collections by FAO, the IBPGR convened a Working Group on Coffee Genetic Resources which met in December 1979. It was agreed that the main gaps in the existing coffee germplasm collections are:

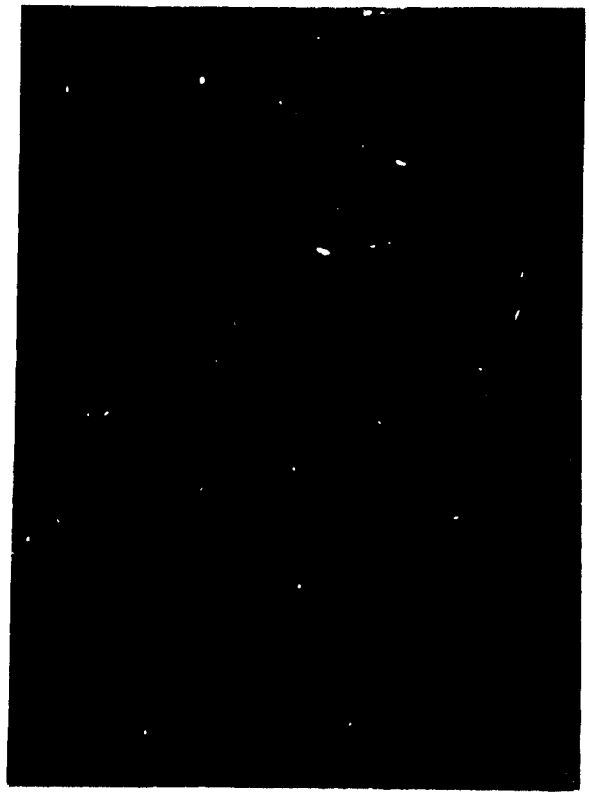
a) Ethiopian types, particularly coming from "semi-wild" habitats. Collecting expeditions have covered only a small fraction of the geographic distribution and there are a limited number of this type in the few collections that keep the material;

b) There is also poor representation in major collections of Coffea canephora and C. liberica, which are of importance in future breeding of C. arabica. Moreover, in most collections, these species are represented by heterogenous populations;

c) With relatively few exceptions, the Mascarocoffea section is not represented. These may be a potential source of low caffeine material;

d) The Indian cultivars are poorly represented, even through some of them present special types of resistance and agronomic characteristics which are unique.

The Consultation also noted that (i) in most collections there is a redundancy of cultivars as the result of interchange arising from old established



Coffee in Madagascar

collections; (ii) the names given to the species in most of the surveys and lists available to the Consultation were not in accordance with the present nomenclature of the genus Coffea and hence cause confusion; and (iii) many cultivar names are improperly used. The Consultation concluded that standardization of international agreement on the nomenclature to be used is urgently required.

The Working Group further agreed that the following areas for exploration require special attention.

a) Ethiopia, areas in Southern Sudan, the Yemen Arab Republic and the People's Democratic Republic of Yemen, for Coffea arabica;

b) West/Central Africa, particularly in the mountains of Zaire, for C. canephora.

c) Madagascar and neighbouring islands for the Mascarocoffea section; and

d) East Africa for Mozambicoffea, which may be considered as transitional between Eucoffea and Mascarocoffea.

In the past, the organization of germplasm collecting missions from abroad was considered an effective way to collect coffee germplasm, particularly in Ethiopia and Madagascar, but the Working Group recognized the urgent need to organize national services to collect and conserve germplasm. For example, most of the Ethiopian collections have been made in areas accessible from main roads, yet there are many other areas where collections should be made and which could be reached more easily by locally-based collectors, or, if necessary, by helicopter.

Under the conditions in which coffee grows in Africa, the Working Group suggested that no systematic sampling method can be adopted. Sampling should be mainly by individual trees wherever possible. Depending on the aims of the collection, a sample of 50 fruits per accession, hopefully to give 50 usable seedlings, should be sufficient.

The Working Group noted that the major germplasm collections of coffee are held at present at the following institutes:

- Institute of Agricultural Research, Jimma, Ethiopia — C. arabica
- Coffee Research Station, Lyamungu, Tanzania — C. arabica
- Institut Français du Café et du Cacao (IFCC), Ivory Coast — C. canephora

- Central Coffee Research Institute, Chikamagalur, India — C. canephora
- Centro Agronómico Tropical de Enseñanza e Investigaciones, Turrialba, Costa Rica — C. arabica
- Institute for Industrial Crops, Bogor, Indonesia — C. canephora

A network for the maintenance and exchange of coffee germplasm already exists in the Western Hemisphere. this embraces Colombia, Brazil and Costa Rica.

The Working Group noted the special importance of the Centro de Investigação des Ferrugens do Cafeerio (CIFC), at Oeiras in Portugal, as a centre for the evaluation of resistance to coffee rust, and of the USDA station at Glenn Dale, Maryland, as an important intermediate quarantine centre.

Cotton

Early in 1979, an IBPGR consultant visited Northern Nigeria, Malawi, Tanzania and Zambia to try to gather together the cotton germplasm left in those countries by the now defunct Cotton Development Corporation. Most of the countries agreed in principle to provide samples to the IBPGR.

In October 1979, the IBPGR convened a Working Group to finalize a minimum list of descriptors for cotton to recommend to collectors and curators of collections. The list will be published by IBPGR in 1980. The Group also discussed other points concerning cotton germplasm and the following were highlighted: (i) there are inadequate cold storage facilities for collections. particularly in Asia and Africa, and there are problems with regeneration, particularly in relation to climatic requirements; (ii) only a few species are well represented in collections and there is need for the organization of comprehensive and systematic collection missions; (iii) up-to-date catalogues of collections should be assembled and made available; and (iv) there is an urgent need to rescue some materials, particularly the remaining sea island cotton in Antigua and Montserrat, cottons along ancient trade routes in Somalia, and old living collections held in the Sudan. Discussions are already underway between Institut de Recherches du Coton et des Textiles Exotiques (IRCT) and IBPGR with respect to collections in the Antilles, but this work needs to be completed.

Picking a primitive cultivar of cotton in Sudan

REGIONAL ACTIVITIES

MEDITERRANEAN

A Mediterranean germplasm programme has been in operation since 1975. With UNEP funding originally, and subsequently with IBPGR funds, the programme concentrated in the initial phases on the exploration and collection of priority crops in the region that were threatened by genetic erosion. Recently, increasing attention has been paid to the need on the one hand to create trained manpower, and on the other hand to conserve and evaluate collected germplasm.

The Mediterranean region is extremely important as a centre of origin and genetic diversity of many groups of cultivated plants. The most important of these are cereals and grain legumes and special attention has been devoted to the collection of these crops. The region is also important, however, for such other crops as beet, flax, olive and many species of vegetables, although, to date, little action on these has been taken. In addition, there are extremely important resources of forage legumes in the semi-desert areas of North Africa.

Since the beginning of the Mediterranean programme, 19 collecting expeditions have been organized and more than 5,000 population samples, mainly of cereals and grain legumes, have been collected.

In addition, the IBPGR has assisted in the construction of genebanks in Spain (near Madrid) and in northern Portugal (at Braga). These genebanks will assume regional responsibility for grain legumes and maize respectively. Together with the Germplasm Laboratory at Bari, Italy, they should provide adequate conservation facilities for the region.

On 5-7 March 1979 a regional meeting took place in Rome. It was attended by representatives from nine countries (Algeria, Cyprus, Egypt, Greece, Italy, Portugal, Spain, Tunisia and Yugoslavia), as well as from the IBPGR Southwest Asia programme, the Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD), the Aegean Regional Agricultural Research Institute (ARARI, Izmir, Turkey), EUCARPIA and UNDP. The meeting discussed technical and cooperative aspects of germplasm exploration and collection, evaluation and data exchange, and conservation and seed exchange. The group made the following recommendations:

i) In each participating country where this has not already been done, a coordinator should be nominated who should function as the contact point for that country on all matters relating to genetic resources.

ii) An appropriate institute, or institutes, should be nominated in each country as having central responsibility for genetic resources matters.

iii) The Germplasm Laboratory at Bari, which at present is the only genetic resources institute in the Mediterranean region fully equipped for electronic data handling, should regularly supply data on Mediterranean germplasm collections to each national coordinator and each national institute concerned.

iv) As genetic resources activities in the region develop, and as institutes in cooperating countries acquire the necessary resources for the task, other centres should be designated to assume regional or subregional responsibility for specific crops or groups of crops; these would in turn be integrated into the overall regional programme.

v) A coordinating committee, composed of the national coordinators, should eventually be established to assist in the guidance of activities in response to the particular needs of the region, taking into account its possible future links with other regions.

Four major collecting missions were organized in 1979 for the Mediterranean region as follows:

Forages: During April 1979 a mission was organized by FAO/IBPGR and EMASAR to collect desert and semi-desert species of forage plants in Libya. This expedition was a follow-up of 1978 activities (see p.29).

Maize: As a follow-up of the 1978 collecting mission in Portugal, samples of maize were collected from granaries during the winter and deposited in the genebank at Braga.

Beet: A mission to the Aegean Islands in June-July collected samples of wild beets and primitive garden forms (see p.31).

Wheat: In July a joint Spanish-Italian-Japanese collecting team collected samples of wheat and Aegilops from the Asturias region north of the Duero.

Preliminary phenotypic characterization at the CNR Laboratory, Bari, Italy

Trainees under the Mediterranean programme in 1979 included two students, one from Cyprus and one from Greece (UNEP/IBPGR Fellowship), who participated in the post-graduate course at the University of Birmingham, U.K. In addition, three students, one each from Algeria, Greece and Libya, attended short technical courses at Birmingham.

EUROPE

In Europe, since 1966, genetic conservation has been promoted by EUCARPIA (European Association for Research on Plant Breeding). Some years ago, the EUCARPIA Gene Bank Committee formulated a concept of regional genebanks for the major agro-ecological zones of Europe. In this concept some already existing national genebanks (Leningrad, USSR; Izmir, Turkey; Gatersleben, DDR) and some new national genebanks to be established (at Bari, Italy and at Braunschweig, FRG) would assume regional responsibilities. The Bari genebank, in particular, has developed strong regional activities in close cooperation with the IBPGR Mediterranean programme. More recently, a genebank for the five Nordic countries of Europe was established at Lund (Sweden). In the meantime other European countries also initiated or developed national genetic resources programmes.

The EUCARPIA Gene Bank Committee has for some time been working to establish collaborative relations among all these various activities. Four regional groupings have emerged, all different in origin, composition and organization. The most tightly-knit grouping is that of the Scandinavian countries, which have to a large extent integrated their genetic conservation activities through the Nordic Genebank. In eastern Europe, where genetic conservation is an object of priority attention by Government ministries, seven countries work together in a network of the Council for Mutual Economic Assistance (CMEA). In the Mediterranean, the IBPGR programme includes ten participating countries, of which six are European. Finally, the nine countries of the European Community have started a joint programme on disease-resistance breeding and better conservation and utilization of plant genetic resources for this purpose.

The importance of these activities is indicated by the fact that more than two-thirds of the world's collected seed samples of plant genetic resources are

maintained by European institutions. Thus, improvement in the cooperation among these institutions with respect to the exchange of germplasm is likely to lead to improvements in plant breeding with resulting benefits not only to the European nations but to developing countries as well.

Parallel to the foregoing developments sponsored by EUCARPIA, UNDP has been promoting the same objective by selecting the conservation and exchange of genetic resources for plant breeding in Europe as the subject of one of a number of European Cooperative Programmes which it proposes to support. During 1978 and 1979, under preparatory assistance financing, UNDP arranged for the preparation of an inventory of all European institutes, personnel and programmes involved in genetic conservation. A Government Consultation was convened, in March 1979, to finalize plans for cooperation in this area, and following the preparation of a draft project document, a second Consultation was held 17-19 December 1979 in Geneva. This Consultation gave unanimous approval to the programme proposed. Under this programme, the IBPGR's Executive Secretariat will provide technical backstopping for the European Programme, including the appointment of an Executive Secretary to coordinate the programme. Thus close links will exist from the beginning between the institutions participating in the European Programme and those in the developing world which are part of the IBPGR's network.

SOUTHWEST ASIA

The IBPGR assumed financial responsibility in 1976 for a regional project on plant genetic resources in Southwest Asia, which had theretofore been supported by UNDP/FAO and SIDA. However, the IBPGR was of the view that a regional approach in this area was not practicable and decided, instead, to support the individual national genetic resources programmes of the six participating countries (Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey).

Pursuant to this decision, direct support has been provided to each of the national programmes, with the work coordinated by a senior officer working out of FAO Headquarters. Two genetic resources advisers were appointed in 1978 and stationed at Karaj, Iran, with instructions to collaborate in the development of the Iranian programme and, upon request, to provide similar help to the other countries of the region. Under the supervision of the senior officer at FAO headquarters, they provided assistance in 1978-79 to Iran, Afghanistan and Iraq. In early 1979, as a result of political developments in Iran, it was found necessary to withdraw the field officers from Karaj. One returned to his home country and the other was relocated at Baghdad and continued to provide help and advice to the other programmes. In 1979, he assisted the Iraq national programme to collect wheat and its wild relatives around Mosul in northern Iraq.

The senior officer has continued to pay special attention to Turkey and to discussions with officials in Pakistan. Turkey therefore requests help from the project only for special technical aspects of genetic resources activities; in 1979 this was provided for data processing and for the acquisition of certain equipment.

During 1979 two considerations led the IBPGR to consider further changes in the organization of the programme. First, it became apparent that collections must be made in countries of the region which have not, to date, participated in the regional project; and second, discussions with ICARDA have shown that closer links between ICARDA and the IBPGR could be mutually beneficial. As a result of the discussions with ICARDA, an agreement has been reached whereby the IBPGR's technical field officer will be relocated from Baghdad to Aleppo in early 1980. The second field officer's post will not be filled but consultants will be used to mount exploration missions wherever necessary and feasible. For instance, collabora-

tive arrangements worked out in 1979 with an FAO project in the Yemen Arab Republic will enable the Board to organize two missions in that country in 1980 to collect wheat, barley and sorghum, all priority crops.

In order to advise the Board on the planning of its future work in the region, the Secretariat convened a Consultation (8-10 October 1979) of the officers responsible for the national programmes in all six countries. All delegates expressed the goodwill of their governments for the ongoing crop genetic resources activities. However, a series of shortcomings in the different programmes were highlighted as follows:

a) Although collecting missions take place from time to time, these have not been in the field every year.

b) Although medium-term cold stores are now available in all the countries, these are not always working; there are difficulties in operating them satisfactorily in some countries owing to variable electric power supply.

c) Existing collections have not always been well maintained and resources have had to be diverted to cleaning up samples and putting them into storage.

d) The national genebanks have not yet fully adopted [illegible] routine genebank practices, as, for example, germination testing.

Much of the work in the region over the past decade had related to the collection of wheat, barley and some pulses. There is, however, a long list of important crops in the region which show significant variation; many of these crops originated in the region and show important secondary diversity. They include, in addition to cereals and grain legumes, important fruit and nut species, vegetables and forage plants.

Figs, a priority in Turkey

Participants at the consultation agreed to finalize a list of the highest crop priorities, realizing that the criteria for determining them would vary from country to country depending on factors such as the level of plant breeding. Nevertheless, it was agreed that the severe genetic erosion in the region must be the overriding criterion in reaching decisions on priorities.

It was not possible to detail all the regional priorities due to differences in agricultural practices and the diversity of ecological zones within the region. But the following crops continue to rate an overall high priority throughout the region: wheat, and its relatives, barley, chickpea, lentil, apples, pears and their relatives, onion, brassicas, carrot, spinach, radish and melon. In addition, in the eastern part of the region, i.e. Afghanistan and Pakistan, rice, watermelon and cumin are of high priority sub-regionally, as are dates in Iraq and Iran.

High priority is also given to forage species because a high percentage of the land in the region is used for forage, and there is degradation to such an extent that ecotypes of many forage species are facing extinction.

Following the awarding of fellowships by SIDA and more lately by IBPGR, two fellows from each country in the region have been provided with graduate training in genetic resources collection and conservation at the University of Birmingham,

U.K. Although there has been some wastage, Birmingham-trained officers have formed the core of the national genetic resources units. By 1979, there were sufficient trained people available for genetic resources work in Afghanistan, Iran, Pakistan and Turkey. Iraq is expected to be in the same position in early 1980, following the addition of two new staff members.

SOUTH ASIA

Following the recommendation of an IBPGR/Government of India Workshop on Plant Genetic Resources of the South Asia Region held in May 1978, the IBPGR requested the governments of the region to designate liaison officers to coordinate genetic resources activities within their countries and to maintain links with similar work elsewhere.

India: The Government of India has had a strong national programme on crop genetic resources for many years. In 1976, the National Bureau of Plant Genetic Resources (NBPGR) was created to provide a centralized collection - introduction - storage - distribution system for all crops on an all-India basis. It maintains seven regional stations and a network of contacts with the 24 agricultural universities and the several crop research programmes of the Indian Council of Agricultural Research (ICAR). The IBPGR has established excellent cooperation with NBPGR and its Director acts as India's liaison officer with the IBPGR. By the end of 1979, the NBPGR had carried out the following explorations in India:

- Survey and collection of grasses and legumes in the hill areas of Uttar Pradesh and Western Ghats.

- Exploration in northeastern hills for local land races, primitive cultivars and wild relations of crop plants. Over 4,500 accessions of various crops have been collected from Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Tripura.

- Exploration in tribal areas of Andhara Pradesh, Bihar and Orissa which had provided samples of sorghum, millets, legumes, oil seeds, vegetables and kenaf.

- Collection in the cold arid tracts of Himachal Pradesh for wheat, barley, amaranth and other crops. Some collections of high altitude maize and rice were made in the valley zones at altitudes of 4,000 m.

- Collection of wheat, barley, sorghum, millets, legumes, oil seeds and cucubits from Rajasthan, Gujarat and Madyha Pradesh.

- Jute and cotton collection from northeast India.

The Central Rice Research Institute (CRRI) at Cuttack had collected rice germplasm from Orissa and is coordinating exploration of rice by 24 other units in various regions of the country, as part of the national programme. The explorers received one week of training at NBPGR.

India is host country of ICRISAT with which the IBPGR maintains close links. Early in 1979, ICRISAT established a Genetic Resources Unit to coordinate work on the germplasm of its mandate crops: sorghum, millet, pigeonpea, groundnut and chickpea. On behalf of the IBPGR, ICRISAT hosted in September 1979 the third meeting of the Sorghum and Millets Advisory Committee and also an *ad hoc* Working Group on Groundnut Genetic Resources. The IBPGR and ICRISAT jointly organized collection missions for sorghum and millets in Eastern Africa and IBPGR also supported ICRISAT's participation in the collections of groundnut germplasm in Latin America.

The Indian Council of Agricultural Research hosted a training course for the IBPGR on Plant Exploration Techniques for scientists from the South Asian region. This was organized by the NBPGR, 10 September-7 October 1979, in New Delhi. Thirteen scientists from Bangladesh, Bhutan, Burma, India and Nepal participated.

Bangladesh: In 1979, with assistance from the IBPGR, the Bangladesh Agricultural Research Institute (BARI) collected winged bean and germplasm of other food legumes from Sylhet, Comilla, Mymensingh and Chittagong tracts. This collecting will continue in 1980. ICRISAT, in association with the national programme, is also collecting various pulses and their wild relatives in Bangladesh.

Nepal: The IBPGR organized a mission to collect wheat and barley germplasm from the trans-Himalayan hills in Western Nepal in May-June 1979 in association with the Government of Nepal and FAO. The collecting was continued in the high hills by FAO in September-October 1979.

During 1979, the IBPGR awarded fellowships on behalf of UNEP to nominees from the governments of Bhutan, India and Nepal for postgraduate training at the University of Birmingham, U.K. and in addition a Nepalese officer attended a short course at Birmingham on crop diversity and collecting.

SOUTHEAST ASIA

The IBPGR considers the Southeast Asia Programme to be a model of its kind for cooperation within a region. Each project, is structured to stimulate collection, conservation, documentation and the exchange of materials and information, but each follows a pattern of organization suitable to the requirements of the country concerned. All projects assisted by IBPGR funds must be approved by the Regional Committee.

The Regional Programme now has a base seed storage facility in the Philippines, which is in the final stages of construction, and a medium-term seed storage facility built in 1979 in Indonesia. The Board also agreed in 1979 to fund equipment for a small medium-term seed storage facility in Thailand. Along with the national storage facilities in the Philippines and Malaysia these will ensure the safe conservation of seed material.

A regional collection of bananas has been established in Davao, Philippines, and the Regional Committee has undertaken to clarify the responsibilities of the various participating countries and institutions for other collections of vegetatively propagated material.

During 1979, Prof. R.B. Singh took up his post as the IBPGR Genetic Resources Regional Officer, with headquarters in the FAO Regional Office in Bangkok, Thailand. Dr. Setijati Sastrapradja of Indonesia, one of the original members of the IBPGR and the founder Chairman of the Regional Committee, resigned her chairmanship in 1979 and Dr. Narong Chomchalow of Thailand, a present member of the IBPGR, took over as Chairman. The Committee held its second meeting at Sanur, Indonesia, 12-14 July 1979.

The Committee reviewed the priorities which had been assigned to various crops in the region at an earlier meeting in Manila in 1976. Recognizing the need to keep priorities under continuing review in the light of changing circumstances, the Committee agreed on the following revised list of high priority action:

- High altitude rainfed rice in Thailand
- Durian in Indonesia, Malaysia and the Philippines
- Rambutan in Indonesia, Malaysia and the Philippines
- Soyabean in Indonesia
- Coconut in all countries
- Mango in Malaysia and the Philippines
- Banana in Indonesia, Malaysia, the Philippines and Thailand
- The following vegetables in all countries except Papua New Guinea: Amaranth (*Amaranthus* sp.), Bitter gourd, (*Momordica charantia*), Eggplant (*Solanum melongena*) and related species, *Ipomoea aquatica* and Yardlong bean (*Vigna unguiculata*). (The Committee previously considered all *Vigna* species to be of priority, but now considers only the Yardlong bean to be a specific target for exploration.)

- Indigenous leafy vegetables in Papua New Guinea
- Tuber crops, especially:
  (i) throughout the region: Cassava, Sweet potato, Dioscoreaceae and Araceae;
  (ii) Zingiberaceae in Indonesia, Malaysia and Thailand
- Winged bean in Papua New Guinea: a great deal of collecting has already been done in the region, hence this crop no longer rates a high regional priority except in Papua New Guinea.

In addition to the foregoing crops listed as having the highest priority, the Regional Committee noted that the following crops have great economic importance in the region: rubber, oil palm, coffee, tea, cocoa, sugar cane, pepper, Citrus, pineapple, maize, tomato and cabbage. Of these only sugar cane, pepper and Citrus originated in the Southeast Asia region; all others have been introduced. However, the germplasm of these crops is important to the countries and it needs to be collected, maintained and made available.

Other plants which the Regional Committee advised countries to keep under review include orchids, rattans and medicinal plants.

To date, little attention has been paid to tropical pasture legumes and the Regional Officer was asked to prepare a background report for consideration at the next meeting of the Regional Committee. Descriptors for these species are available in Australia and close links will be established with the Australian programme.

A number of exploration missions were fielded by several Southeast Asian institutes during 1979 and received assistance from the IBPGR. The following countries were explored for the crops listed.

Indonesia: Wild and cultivated bananas, coconut, rice

Malaysia: Bananas

Thailand: Wild and cultivated bananas, rice, food legumes, rambutan, mango, durian, Desmodium ovalifolium.

At its first meeting, the Regional Committee recommended that a data management system for the region should be installed in the Philippines, in conjunction with the regional base seed storage facility being established there. This facility, however, will take some time to become fully operational.

The Committee decided in 1979 that there is no immediate urgency for a computerized data bank, and that emphasis should be placed instead on the assembly of information about existing collections.

In order to increase the dissemination of information about collections, the IBPGR Regional Officer will obtain detailed lists of holdings and information on their size, scope and representation.

A Working Group to decide on the descriptors for taro and yams met on the occasion of a meeting of the International Society for Root Crops (ISRC), in September 1979 in the Philippines. Arrangements have been made for another Working Group to meet early in 1980 to agree on mung bean descriptors.

The National Biological Institute, Indonesia, has trained a large number of personnel from various countries of the region in collection techniques, and a short technical course on this subject was again held in Indonesia in 1979. For 1980, the Regional Committee has agreed that a specialized short-term training course on the collection, evaluation and conservation of perennial crops should be held in Thailand.

Three students, from Indonesia, the Philippines and Thailand, successfully completed post-graduate training in genetic resources at the University of Birmingham in 1979.

AFRICA

During 1979, the Board continued to maintain close links with the work being undertaken in Africa by the IARCs, by regional organizations and by national programmes for the collection and conservation of crop germplasm. In May, the IBPGR Secretariat convened a meeting in Rome to plan collaborative action in Africa South of the Sahara. Delegates from ICRISAT, IITA, IRAT, and ORSTOM attended. They saw the need for a bigger administrative role for the IBPGR Secretariat in coordinating collecting missions; in particular, when plans have been drawn up, the IBPGR, through FAO, will seek all necessary Government clearances and will advise of any shortfalls in manpower and on the availability of vehicles, etc. This arrangement was considered necessary following the failure of some organizations to obtain clearances, and also to avoid confusion in the minds of government officials when permission is requested for several collecting missions in the same country.

The meeting considered the priorities for action in connection with the germplasm of rice, sorghum, millet, grain legumes and root crops, and listed practicable targets for the period 1979-81.

The following work was accomplished in 1979:

Malawi. The IBPGR/UNEP funded a mission (IBPGR/ICRISAT) in March and April 1979, in association with the Ministry of Agriculture, to collect sorghum and millets. The collection of sorghum was thought to be reasonably comprehensive but more samples of finger millet are needed from the north.

Somalia. A Joint IBPGR/ICRISAT mission collected sorghum in August-September 1979, in collaboration with the Ministry of Agriculture, from the regions of Upper Juba and Hiran. Funds for the mission were provided by UNEP/IBPGR.

Tanzania. ICRISAT collected in June-July, 1979 in Tanzania, mainly for sorghum and millets in the regions of Morogoro, Iringa, Dodoma and Singida. In addition, a joint IRAT/ORSTOM mission with IBPGR funding collected rice in April-May.

Sudan. ICRISAT collected sorghum germplasm during November in eastern and southern areas with IBPGR support.

Guinea. IRAT/ORSTOM collected rice during December 1979 with funding from UNEP/IBPGR.

Mali and Nigeria. WARDA collected local land races of rice in association with colleagues from NBPGR, New Delhi, and ORSTOM collected sorghum and millets in Mali with IBPGR support.

Ethiopia. The IBPGR Secretariat collaborated closely with the Genetic Resources Center in Addis Ababa. During 1979, personnel from the centre explored the areas of Bale, Arsi and Shoa for cereals, food legumes and oil seed crops. Towards the end of the year, discussions were held between the Director of the centre and representatives of IBPGR and of GTZ (FRG), resulting in agreement on the need for accelerated collecting in Ethiopia in 1980, with more active IBPGR participation.

Senegal. An IBPGR consultant visited Senegal in December 1978 in connection with an examination of the state of the West African sorghum and millets. Discussions with scientists from ISRA, ICRISAT, ORSTOM and local extension workers revealed the pattern of genetic diversity of the material growing in Senegal. A number of introduced hybrids and populations are being grown in trials in various research stations. However, many of the hybrids of both sorghum and millet are genetically vulnerable as they incorporate common cytoplasmic male sterility derived from the limited utilization of available genotypes. Although important millet material has been collected from Upper Volta, Chad, Niger, Mali and Senegal by ORSTOM, only limited amounts of material have been multiplied

and there is the danger of losing collected material due to the lack of storage facilities in West Africa.

Other activities in Africa: IITA continued its work in African countries and collections, particularly of rice, were made in Cameroon and Kenya; and also Abelmoschus in Nigeria and Benin. In addition, Dr. Alice Evans, Chairman of the Phaseolus Committee, reported in 1979 on the current state of collections of Phaseolus vulgaris in East Africa. Thirteen countries were included in the survey but the only comprehensive local collection was found in Malawi. There is thus need for systematic collection to be made in Africa and the Phaseolus Committee will discuss how this can best be done at its meeting in 1980.

The UNEP/IBPGR supported a young scientist from Sierra Leone to receive post-graduate training in genetic conservation at the University of Birmingham in 1979. He has since returned to work with WARDA. Plans were made in 1979 for IITA, with IBPGR funding, to host a short technical training course for African technicians in February-March 1980.

LATIN AMERICA

Two of the eight major world centres of origin of cultivated plants, as defined by Vavilov, are in Latin America, the first one in Mexico/Central America, and the second in the Andean Zone. In addition, two important Vavilov sub-centres are in the region, one in Chiloe Island and its continental neighbourhood, and the other in Brazil/Paraguay. Many of the most important crops in the world (maize, beans, potatoes, cotton, rubber, tomatoes, peppers, etc.) originated and have their maximum genetic diversity in these areas. Many other crops, which are almost unknown outside the continent, are of major importance for the Indian population in the region and have a large potential for other regions in the world (quinoa, tarwi, oca, olluco, pejibaye). There is still another group of plants in the American tropics and in the Amazon region which have only local importance at present but are of potential future importance elsewhere (e.g. agro-energetic crops).

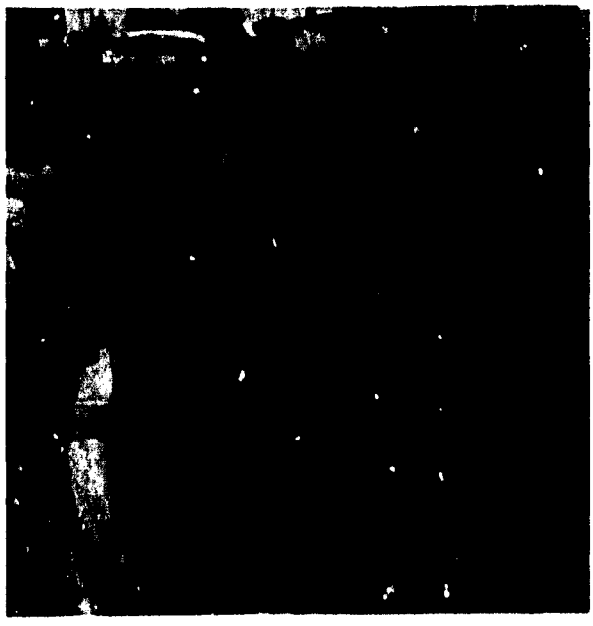
Much genetic erosion has taken place since the colonization of America by European settlers, due to the replacement of local, traditional crops by old world ones to meet not only the needs of the colonisers but also the changing tastes of Indians influenced by the new European culture. In areas with a large and concentrated Indian population, however, the Indian communities have tended to adhere to their traditional crops and varieties; this is true for parts of Mexico and part of the Andean region.

A real concern for genetic resources, and active programmes to preserve them, have begun only very recently in Latin America and then only in some countries (Argentina, Brazil, Costa Rica, Mexico). In Costa Rica a regional centre for genetic resources is already very active; in Brazil and Mexico, official national centres for genetic resources have recently been created; but in many other cases, the concern and enthusiasm shown at a technical and scientific level have not yet had the necessary official support.

The degree of collaboration among the Latin American countries on genetic resources matters varies greatly, depending to a large extent upon the crops and countries involved. Large differences in local ecological, social, economic and political conditions make systematic cooperation across borders difficult. Cooperative activities are usually initiated by breeders for specific economically important crops, with the goal of creating new varieties better adapted to the ecological conditions.

Since the early 1970s, FAO and IBPGR have provided assistance to active national institutions within the region to carry out discrete genetic resources activities, whether in connection with collection, conservation, or training. At a meeting held

in December, the IBPGR Executive Committee decided that the Secretariat should formulate the guidelines of a coordinated regional approach, in order to enable the Board to discharge its responsibilities in Latin America in a more systematic fashion. For this purpose, Latin America has been divided into four regions: Mexico, Central America and the Caribbean; the Andean Zone; the countries of the Southern Cone; and the Amazon Zone. This division has taken into consideration developmental, ecological and agricultural factors, as well as political, social and cultural links.



Some of the Andean crops

Meetings

In association with the Genetic Resources Center, CATIE, Costa Rica, funded bilaterally by the Federal Republic of Germany, the IBPGR held a Consultation during August 1979 on Genetic Resources Activities in Meso-America. However, this Consultation was not fully representative and the lack of information on certain areas of the region, particularly the Caribbean islands, limited the scope of the discussion.

The following issues were taken up at the meeting:

- Existing collecting activities and programmes related to plant genetic resources;
- Regional priorities for crops and areas;
- Proposals for collection, conservation, documentation and exchange of data and materials; and
- Regional training needs.

The Consultation agreed that the first priority crops in the Mexican, Central American and Caribbean regions are as follows:

Annona sp.	Soursop and relatives
Bactris gasipaes	Pejibaye
Capsicum sp.	Chilli
Cucurbita sp.	Cucurbits
Gossypium hirsutum	Upland cotton
Ipomoea batatas	Sweet potato
Lycopersicon esculentum	Tomato
Manihot esculenta	Cassava
Manilkara sp.	Sapodilla
Persea sp.	Avocado
Phaseolus sp.	Beans
Pouteria sp.	
Sechium edule	Chayote
Theobroma sp.	Cacao
Zea mays	Maize

and the following forages:

Desmodium sp.

Macroptilium sp.

Stylosanthes sp.

Future activities in the region, which IBPGR will assist, include a Consultation on the situation of genetic resources of Pejibaye (Bactris gasipaes) to be arranged

by CATIE in 1980, and an IBPGR/IICA meeting on Genetic Resources in the Caribbean Islands which will follow an IICA/INRA seminar on Caribbean agriculture in May 1980.

A regional meeting on maize germplasm in the countries of the Southern Cone of South America, hosted by INTA, Argentina and co-sponsored by IBPGR, took place in early October. Its purpose was to review existing collections, and programmes and activities related to maize germplasm in this region. The meeting concluded that no further collections were needed in Bolivia, Paraguay, Peru or Uruguay. However, a major gap was identified for the Amazon region of Brazil and collections were found to be needed in Chile, where no collections have been made to date, and in some parts of Argentina.

The IBPGR funded a number of collecting missions and other activities during 1979 in the following countries:

Argentina:

INTA (Salta) collected **Phaseolus adenanthus** and other subtropical legumes, while INTA (Corrientes) collected native forages.

Bolivia, Ecuador and Peru:

Andean crops (roots and tubers, lupins and quinoa) were collected by IICA. IBTA (Bolivia) improved its storage facilities for this material.

Brazil:

Maize in the Amazon region was collected by CENARGEN.

Chile:

The work of the Universidad Austral to rejuvenate and add new local material to the potato collection neared completion.

Peru:

Maize was collected by the Universidad Nacional Agraria, La Molina.

Uruguay:

Native grasses and legumes were collected by the Facultad de Agronomia, Universidad de la Republica, Montevideo.

Finally, CIAT coordinated the collection of **Phaseolus** germplasm from several Latin American countries.

Documentation: The Information Sciences Genetic Resources Program (IS/GR) of the University of Colorado, under contract from the IBPGR, provided extensive assistance to INTA (Argentina) and INIA (Mexico) in putting into order and into machine-readable form the documentation about their important germplasm collections. Assistance on documentation was also extended to CATIE in Costa Rica.

Training: One student from Argentina and one from Peru completed the M.Sc. course in Genetic Resources at the University of Birmingham in 1979, the one from Argentina with UNEP funds provided through the IBPGR.

In June 1979 CATIE offered a short training course on Genetic Resources with students from six countries participating. CATIE will also give this course in 1980.

Other activities in South America have involved collecting missions for various crops mounted by several institutes from outside the region. This included the collection of wheat in Chile, vegetables in Mexico, **Lupinus mutabilis** in Peru, potatoes in Bolivia and barley in Argentina. Also during 1979, CENARGEN held two regional meetings within Brazil to discuss genetic erosion, conservation and the methodology of collection.

Quinoa in Peru

INFORMATION

Since the use made of accessions in germplasm collections depends upon the information which is available about them, the Board has from its inception supported a range of activities designed to facilitate the acquisition, storage, management, retrieval and exchange of information about such collections.

(a) ACTIVITIES OF THE IS/GR PROGRAM

From 1975 through October 1978, most of the Board's work on information was performed under contract by the Information Sciences/Genetic Resources (IS/GR) Program of the University of Colorado at Boulder. The contract called upon the IS/GR basically to develop a genetic resources communication, information and documentation system to serve the emerging network being developed by the Board. Following the establishment of priorities for crops and regions by the IBPGR, IS/GR was directed to assist the genetic resources community. During this period the IS/GR Program created, on behalf of the Board, a worldwide awareness among collectors, curators and breeders of the need for effective data handling procedures. This was partly done by working with several IARCs and the USDA so that methodology could be tested and thereafter specific contributions could be made to national institutions.

As reported in the 1978 Annual Report, following the move of many of the IS/GR staff from Boulder to Colorado State University at Fort Collins to work on the USDA programme, an IBPGR review group assessed the situation and recommended a major change in the work of the Boulder group. Essentially, the IS/GR Program was requested to change the emphasis of its activities from the development of a computerized genetic resources information programme designed for global use to the provision of technical assistance on documentation to several specified centres in developing countries which held important germplasm collections and which both needed and desired help in organizing the information about their collections.

During 1979, IS/GR staff addressed specific information problems of three national agricultural research centres in Latin America and one in Turkey and also provided some assistance on information matters to CATIE in Costa Rica. Emphasis was placed on intensive on-site assistance. Members of IS/GR's staff worked closely with centre personnel for extended periods of time to provide them with the guidance essential to realizing self-sufficiency in data management, including creating machine-readable genetic resources data which were accessed by each centre's computing facility. Following a preliminary site visit to determine overall needs and requirements at each centre, a detailed systems analysis of the data management environment peculiar to that centre was made. Based upon that analysis, IS/GR helped the centre's personnel to organize and prepare the data for machine interpretation.

The technical assistance included help to the following centres:

ARARI, Izmir, Turkey

In January 1979, two members of IS/GR commenced work on data conversion in collaboration with ARARI personnel at Menemen. A detailed systems analysis of both material and data flow was also conducted to determine where data management techniques could best be employed to promote self-sufficiency in data management operations. The EXIR information storage and retrieval programme was installed on the IBM 370-138 machine at Ege University in Bornova to analyze the data after it had been cleaned up and put into machine-readable form. This was a formidable task due to the large number of accessions held at ARARI.

INTA, Argentina

During March, IS/GR visited Pergamino and

Castellar and began helping personnel at those centres in data conversion work. By the end of 1979 the maize data were in computerized form and a catalogue was available.

INIA, Mexico

Analysis of the data flows between and within the research centres and the headquarters of INIA in Mexico City constituted an important part of the technical assistance. Data conversion of INIA's maize and Phaseolus collections was done at Chapingo and Mexico City under the guidance of IS/GR personnel.

EMBRAPA/CENARGEN, Brazil

A formal agreement to begin work in Brazil with EMBRAPA/CENARGEN personnel was delayed due to personnel changes within the EMBRAPA administration.

CATIE, Costa Rica

IS/GR gave assistance to convert and enter data into CATIE's new information handling system.

Following the review in 1978 of the information programme, the Board assigned central responsibility for information work to the Secretariat. An information officer was appointed during 1979 on a consultancy basis. In June 1979 the Executive Committee of the Board convened an extraordinary meeting with a panel of international experts to discuss what sort of information programme the Board should undertake and how it might best carry out such a programme. An important input into the Committee's discussion was the report of the TAC mission to Boulder, which held a review of the Board's information work as part of the TAC quinquennial review of the IBPGR. The outcome of the Executive Committee's deliberations was a decision that the Board's objective should not be the creation of an automated information system for its global network, but rather (i) the organization of the data about each major collection into manageable, and preferably machine-readable, form, (ii) the development of an agreed list of descriptors for all major crops, (iii) the compilation and dissemination of directories of the major collections, and (iv) the provision of technical assistance on the documentation of collections when requested.

The cost of maintaining the IS/GR Program at Boulder, and the undesirability of concentrating so much of the Board's information work in a single institution, continued to be a matter of discussion within the Board during 1979. As a result of decisions taken at the extraordinary meeting of the Executive Committee in June 1979, the special relationship with the IS/GR Program was terminated at the end of the year.

(b) ACTIVITIES OF THE SECRETARIAT

In 1979, the following progress was made:

Training. The Secretariat, in cooperation with the Southeast Asia Programme, organized a regional training course on documentation techniques, hosted by PCARR, Philippines (see p. 66).

Directories of collections. The Secretariat gathered data on substantial seed collections held in both base and active storage and a first comprehensive directory will be published early in 1980. In addition, a special exercise was initiated to obtain information on collections of vegetatively propagated crops, particularly tropical species. During the year, data were collected for:

Roots and tubers

Cassava, Sweet potato, Dioscorea, Potato and Aroids

Fruits:

Banana, Pineapple, Citrus, Avocado and Mango

Industrial crops:

Coconut, Rubber, Sugar cane, Cocoa, Black pepper and Tea

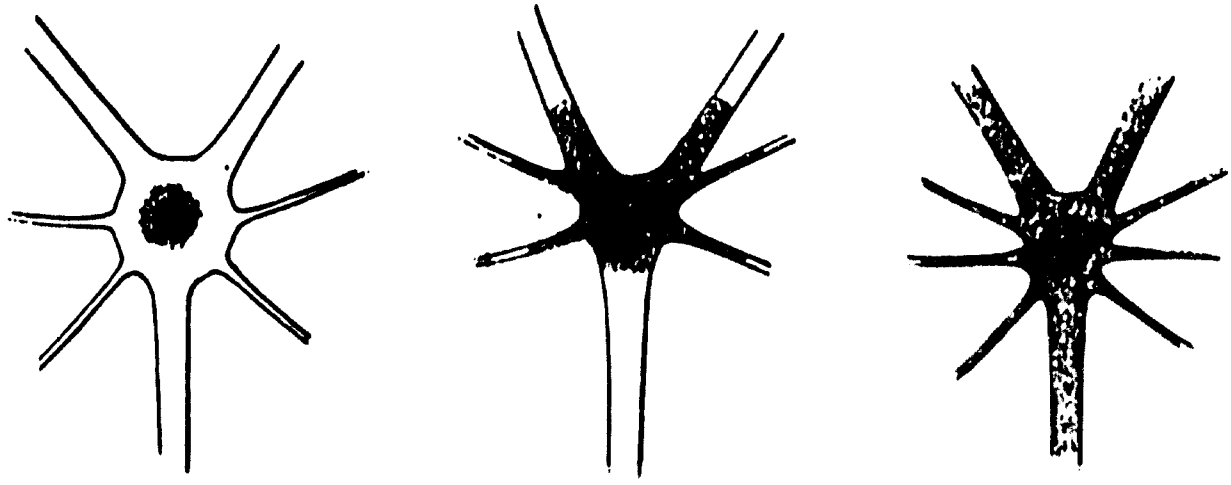
A report on these crops will be published in 1980 and further work initiated on other crops.

Sample data of major crops. Following the recommendation of the Wheat Committee, an analysis of the major wheat collections of the world was started in 1979. In view of the numbers of samples in many collections around the world, this work will not be completed until some time in 1980. In addition, the Secretariat arranged for the documentation concerning the extensive collection of wheat held at Kyoto University, Japan, to be translated into English.

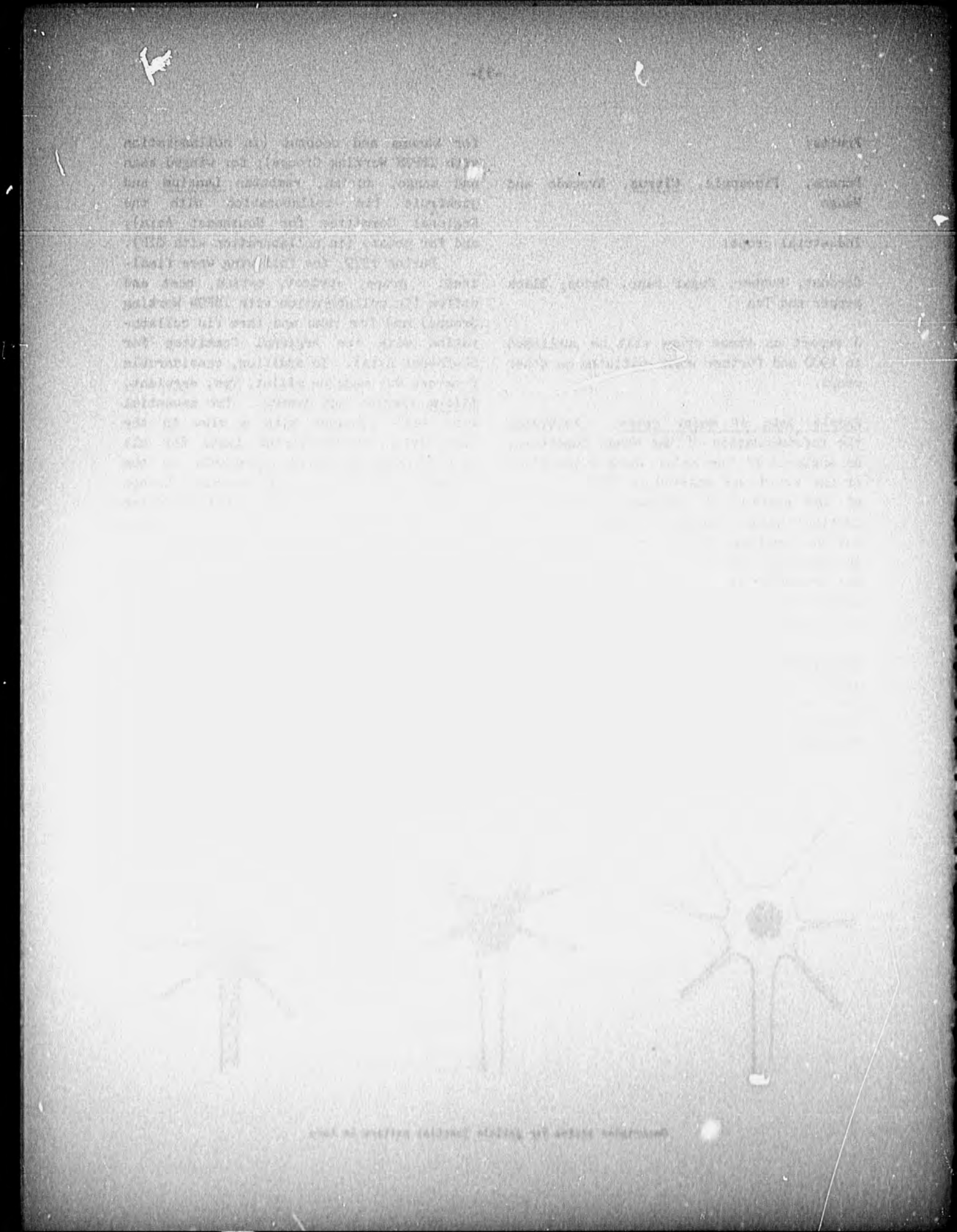
Descriptors. Up to the end of 1978 lists of descriptors had been finalized for rice, sorghum, maize and Phaseolus (in collaboration with the Crop Committee and the IARC concerned); for wheat and Aegilops; for banana and coconut (in collaboration with IBPGR Working Groups); for winged bean and mango, durian, rambutan Lansium and jackfruit (in collaboration with the Regional Committee for Southeast Asia); and for potato (in collaboration with CIP).

During 1979, the following were finalized: grape, apricot, cotton, beet and coffee (in collaboration with IBPGR Working Groups) and for yams and taro (in collaboration with the Regional Committee for Southeast Asia). In addition, considerable progress was made on millet, rye, eggplant, Allium species and tomato. The essential work will continue with a view to the publication of descriptor lists for all major crops generally acceptable to the breeders concerned. All Working Groups hereafter convened by the Board to advise on the genetic resources of specific crops will be requested to address this matter.

Contact was made during the year with the appropriate officials in Thailand and India with a view to arranging for any IBPGR assistance which they might need to put into manageable form the documentation of their important germplasm collections. In Thailand, this would involve collections of legumes and tropical fruits; in India, it would involve collections of wheat, rice, maize and other crops.



Descriptor states for petiole junction pattern in taro



CONSERVATION

In 1978, the Board surveyed the availability and adequacy of seed storage facilities for long-term conservation at genetic resources centres throughout the world and a report was issued early in 1979. Although it is important that facilities for adequate seed storage be available at centres near to where the seed is collected, because such facilities are best suited for evaluation and for the necessary periodic regeneration and increase of seed stocks, long-term storage of duplicate samples of material can be undertaken satisfactorily far from the original sources of the material.

During 1979, the Board was unable to provide support for seed storage facilities except in Thailand, since assurances of continued maintenance were not forthcoming for the other proposals received. However, following agreement on standards for seed storage and on the engineering, design and cost aspects of long-term seed storage facilities, the Board has continued to encourage the upgrading of storage facilities where necessary.

The seed store at Bari, Italy

Seed storage is, of course, not the full answer to the maintenance and conservation of genetic stocks. Many crops must be maintained as living collections in plantations or in short-term stores as roots and tubers. This is because such plants produce what are called 'recalcitrant' seeds which do not survive drying and the freezing temperatures which are standard for the storage of 'orthodox' seeds. In tropical areas, such species present problems which have not been solved. In addition, the longevity of different orthodox seeds in cold stores remains uncertain. Accordingly, the Board continued, in 1979, to support the investigations on seed physiology being carried out for it at the University of Reading, U.K., under the supervision of Professor E.H. Roberts.

The Board has also supported the establishment of a living collection of bananas in the Philippines as a regional collection for Southeast Asia and an important part of the world collection.

Packaging seeds prior to storage

The IBPGR has requested certain important conservation centres to accept responsibility to serve as "world" or "regional" repositories for major base collections of specific crops. Five international centres - CIAT, CIP, ICRISAT, IITA and IRRI - and 11 national or regional centres have accepted such designations up to the end of 1979, but the list is continually kept under review and will be expanded when necessary. The following list gives the position at the end of 1979.

CEREALS

Rice	**Oryza sativa** - **indica**	IRRI, Los Baños, Philippines
	javanica	IRRI, Los Baños, Philippines
	japonica	NIAS, Japan
	Mediterranean forms, temperate South American forms and intermediate types from the USA	NSSL, Fort Collins, USA
	Wild species	IRRI, Los Baños, Philippines
	African forms	IITA, Ibadan, Nigeria
Wheat	Cultivated species	VIR, Leningrad, USSR; CNR Germplasm Laboratory, Bari, Italy; NSSL, Fort Collins, USA (each institute's collection duplicated at one of the others)
	Wild species of Triticum and Aegilops	Plant Germplasm Institute, University of Kyoto, Japan (duplicated in one of the above institutions)
Maize	New World material	NSSL, Fort Collins, USA
	Asiatic material	NIAS, Japan
	European material	VIR, USSR and another centre to be designated
Sorghum	Cultivated and wild	NSSL, Fort Collins, USA
Millets	Cultivated and wild **Pennisetum** spp. (pearl millets)	NSSL, Fort Collins, USA Canadian Genebank, Ottawa
	Eleusine spp.	ICRISAT, Hyderabad, India
	Minor Indian millets	Indian Council for Agricultural Research, New Delhi, India
	Eragrostis spp.	Plant Genetic Resources Center, Addis Ababa, Ethiopia
	Panicum miliaceum	ICRISAT, Hyderabad, India
	Setaria italica	ICRISAT, Hyderabad, India
Oats	Cultivated and wild	Canadian Genebank, Ottawa

LEGUMES		
Phaseolus	New World material All species, but emphasis on P. vulgaris, P. coccineus, P. lunatus and P. acutifolius	CIAT, Cali, Colombia (duplicated in NSSL, Fort collins, USA)
	European material	Genebank, FAL, Braunschweig-Völkenrode, FRG
	Wild species	University of Gembloux, Belgium
Pigeon pea		ICRISAT, Hyderabad, India
Groundnut		ICRISAT, Hyderabad, India INTA, Pergamino, Argentina
Chickpea		ICRISAT, Hyderabad, India
Cowpea		IITA, Ibadan, Nigeria
Pea		Nordic Genebank, Lund, Sweden
VEGETABLES		
	Southeast Asian species	IBP, Los Baños, Philippines
INDUSTRIAL CROPS		
Sugar beet		Genebank, FAL, Braunschweig-Völkenrode, FRG

INVESTIGATIONS ON SEED PHYSIOLOGY

In 1979 three projects, all undertaken by the University of Reading, U.K., under the supervision of Professor E.H. Roberts, were supported by the IBPGR. The first was a literature survey on recalcitrant seeds. The seeds of a number of important crop species show very short viability periods before they are killed by dessication. For such seeds, conventional storage methods cannot be used. There are a number of approaches which could be tried: (1) further investigation of controlled drying techniques; (2) modification of cryogenic techniques successfully used for other organisms of high moisture content; and (3) the development of imbibed storage techniques which have been shown to be feasible for some seeds which respond to dessication and low temperatures. In order to provide the necessary background for studies of these different approaches and for assessment of which may be the most promising, a literature survey was undertaken. In addition, numerous personal communications provided unpublished manuscripts and current opinions on various

aspects of recalcitrant seeds storage. The review has been completed and published by the IBPGR and it contains proposals outlining the most promising lines for future investigation.

One outcome of the review was the preparation of a table which brings together all the more reliable reports concerning almost 70 species with recalcitrant seeds representing 30 different plant families. Maximum periods of longevity, for example, vary from a few weeks in durian (**Durio zibethinus**) to five years in coffee (**Coffea arabica**); while the majority of species show maximum viability periods of only a few months. This table should be particularly helpful for collecting expeditions.

The second project which has been supported by the IBPGR since 1977 is concerned with determining the longevity of many major crop species under the recommended long-term storage conditions, i.e. at about -20° C and at a seed moisture content of 5-7%. To avoid the accumulation of genetic damage, the Board has recommended that accessions in genebanks should be regenerated as soon as there is a significant fall in viability. Thus the germination capacity of seed stocks needs monitoring at regular intervals. Such intervals must not be too frequent, or else the stocks will become depleted, but must be frequent enough to assure the early detection of loss of viability. So that the Board can recommend the frequency of such checks, it is necessary to be able to predict fairly accurately the probable longevity of various seeds under good storage conditions.

The work at Reading had until recently concentrated on the high priority non-leguminous species, but legumes were included in 1979. Some delays were encountered because of unforeseen difficulties in obtaining suitable supplies of seed; however, considerable progress has been made especially in two important respects. First, it is now possible to estimate differences in storage potential between different seed lots which result from genotypic differences, pre-storage environmental conditions, and their interactions. This can be done by relatively simple germination tests. The original viability equations have been modified to account for such accessional differences, and also to cover an extremely wide range of storage conditions, including all those normally used. It will soon be possible to predict for a number of species the length of time for any accession to fall to any given percentage viability, after storage under any specific conditions of temperature and moisture content.

Secondly, progress has been made on methods of carrying out germination tests to monitor the loss of viability. A new method has been devised that uses half the number of seeds used by a method based on ISTA tests and is at the same time slightly more reliable.

It should be possible to produce recommendations for **Triticum aestivum**, **T. durum**, **Beta vulgaris**, **Glycine max**, **Vigna unguiculata** and **Cicer arietinum** by the end of 1980 and for **Zea mays**, **Sorghum vulgare**, **Oryza sativa** and **O. glaberrima** in 1981. Results for the other species under test will be available by 1982.

The third project, initiated in 1979, involves the start of experimental investigations into the storage of recalcitrant seeds. Easily available material has been used, including **Citrus**, **Quercus**, **Theobroma**, **Aesculus** and **Elaeis**. This work has had three main approaches:

1. Determination of whether a species is truly recalcitrant or not. Certain seeds generally regarded as recalcitrant have in fact proved not to be when properly conserved. Truly recalcitrant seed cannot be dried to a low moisture content without irreparable damage.

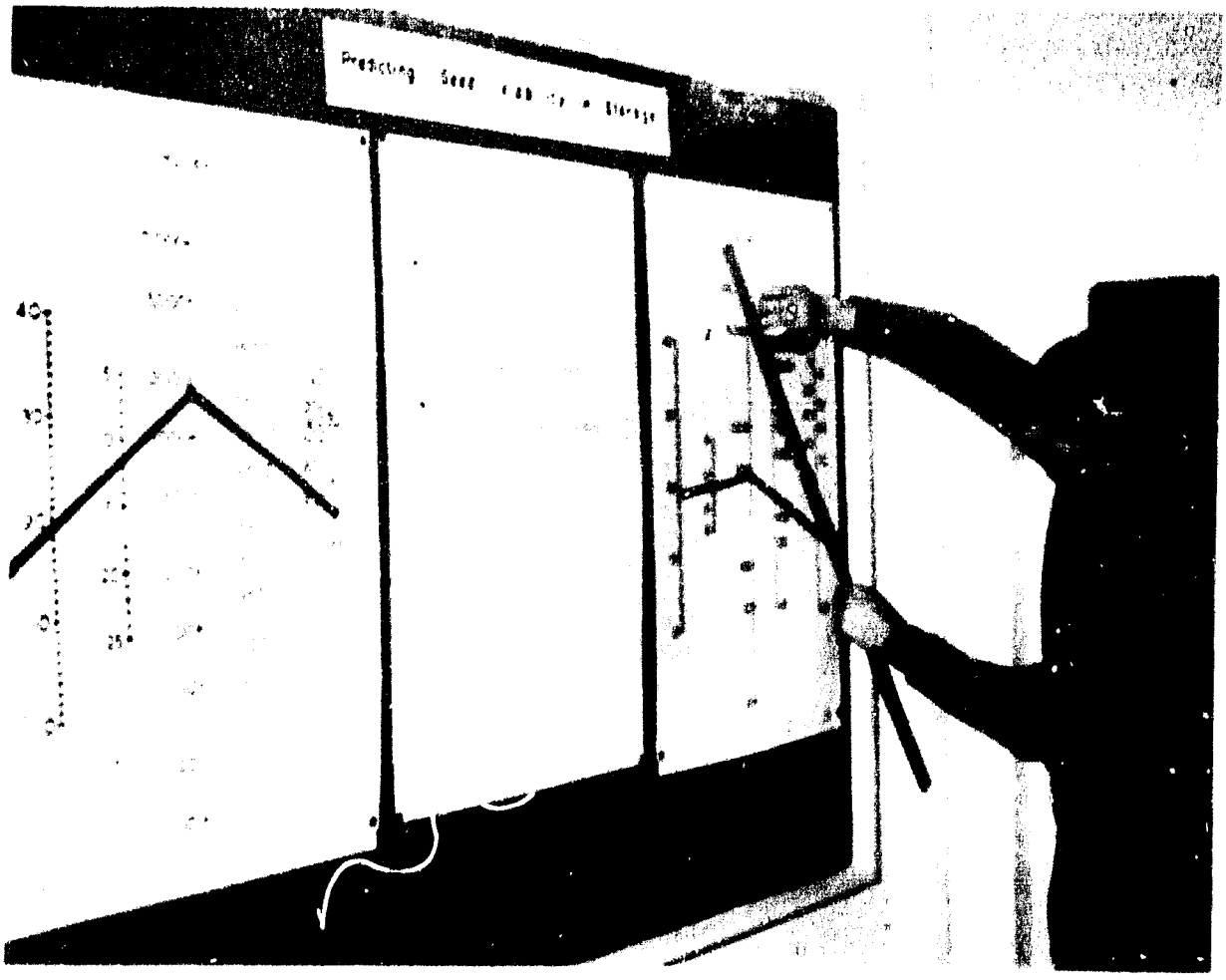
2. Investigation into the possibilities of storing moist recalcitrant seeds at the temperature of liquid nitrogen. This involves an examination of whether damage can be avoided by care-

ful control of cooling and thawing rates, and the use of cryoprotectants.

3. Investigation into whether wet storage at ambient or sub-ambient temperatures may be improved by preventing germination during storage, preventing microbial growth, and by careful control of the gaseous environment.

To date, the amount of research worldwide on recalcitrant seeds is small, but the Board has been in touch, either directly or through Reading, with work on this matter being undertaken by the following centres:

- The National Biological Institute, Bogor, Indonesia
- Agronomy Dept., University Pertanian Malaysia, Selangor, Malaysia
- Centro Agrónomico Tropical de Investigación y Enseñanza, Turrialba, Costa Rica
- Coffee Research Station, Ruiru, Kenya
- Royal Botanic Gardens, Kew, U.K.
- Department of Plant Biology, Birmingham University, U.K.



Predicting storage life

TRAINING

SUPPORT TO UNIVERSITY COURSES

The IBPGR/UNEP have continued to support the International Training Course on Conservation and Utilization of Plant Genetic Resources at the University of Birmingham, U.K., to enable more students from developing countries to participate. During the academic year 1978-79, nine of the 14 students in this one-year M.Sc. course came from developing countries. Financial support for these students was provided by various sources, including UNEP, ODA (U.K.) and other organizations. Countries represented during the 1978-79 session were: Argentina, Cyprus, Greece, Indonesia, Iraq, Peru, Philippines, Sierra Leone, Thailand and U.K.

For the session starting in September 1979, students from the following countries were represented: Bangladesh, Bhutan, France, Greece, India, Indonesia, Kenya, Nepal, Nigeria, Peru, Philippines, Uganda, U.K. and Zimbabwe-Rhodesia.

The continued close collaboration with the University of Birmingham has proved to be of great value and students trained there have become active in genetic resources programmes in all parts of the world. The University, following discussions with the Secretariat, had recognized for some time that it is not always possible for young scientists to be released by their institutes for a full year, and hence has decided to offer a series of short specialist courses lasting from 5 to 13 weeks. These commenced in 1979 and the first course was attended by students from Algeria, Greece and Libya. Each course offers lectures, seminars, practical laboratory classes, and project work. Four such courses are now available:

1. Crop plant diversity;
2. Genetic exploration and conservation;
3. Documentation and information management;
4. Evaluation and utilization.

SHORT COURSES

The IBPGR Secretariat, in association with regional and national programmes, organized the following short technical training courses:

Project work during the International Training Course at Birmingham

1. 14-25 May: Southeast Asia Training Course on Genetic Resources Documentation at the Institute of Plant Breeding, Los Baños, Philippines.

2. 10 September-7 October: South Asia Regional Training Course on Exploration and Collection Techniques, at the National Bureau of Plant Genetic Resources, New Delhi, India.

3. 11 September-5 October 1979: Southeast Asia Regional Training Course on Exploration Techniques, at the National Biological Institute, Bogor, Indonesia.

The first of these courses complemented the regular short course held at Bogor, Indonesia, and was a useful addition to the training available for genetic resource workers in the region. All member countries of the Southeast Asia Regional Programme were represented among the 16 participants. Lectures were given on: evaluation procedures, computers, data handling and the preparation of descriptor lists. The lecturers came from the University of the Philippines at Los Baños, IRRI, and the Agricultural Resource Center Inc. of the Philippines. The course was supported by the Institute of Plant Breeding of the University of the Philippines at Los Baños, the IBPGR and the Philippine Council for Agriculture and Resources Research.

The second of the above listed courses, which was co-sponsored by ICAR and the IBPGR, had 13 participants from Bangladesh, Bhutan, India and Nepal. Emphasis was placed on the practical aspects of genepool sampling, documentation, exchange and quarantine control of material.

The third short course listed above had 16 participants from four countries. the course aimed at providing practical field and laboratory training for junior scientists and graduate technicians. Some of the teaching was provided by staff from the University of Birmingham, U.K., with funding from the ODA.

The technical training of collectors in Southeast Asia has had a substantial impact within the region. The first course was held in 1975 with support from UNEP, BIOTROP, and the National Biological Institute. Since then, UNESCO, the U.K. and the IBPGR have continued to support the endeavour.

A fourth short course was scheduled to be held November/December at INTA, Argentina, and was to have been a Latin American regional training course on exploration techniques. However, in order to coincide better with harvest-time, INTA postponed this course until April 1980.

In addition to regional courses in 1979, the IBPGR supported for the second year in a row, a short technical training course of Seed Technology for Genebank Workers, the University of Edinburgh, U.K. Lecturers were provided by the University, the Department of Agriculture and Fisheries for Scotland, the Scottish Seed Testing and Plant Breeding Station, the Royal Botanic Garden, Edinburgh, the Royal Botanic Garden, Kew, and the Universities of Stirling and Reading. The course was designed to provide additional practical training to those students from developing countries who had attended the M.Sc. course at the University of Birmingham.

TRAINING IN 1980

The International Institute of Tropical Agriculture, in collaboration with the IBPGR, will in 1980 hold a six-week training course for Africans on crop genetic resources work at the national level within Africa.

The course will cover all major practical aspects of crop genetic resources conservation. Introductory lectures and demonstrations will define genetic diversity and explain its importance in future agricultural development. The course will emphasize practical training in field techniques, as well as genebank activities.

ADMINISTRATION

MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1979 is shown in Appendix I. On the recommendation of the Board, the CGIAR elected three new members for three-year terms commencing 1 January, 1980. Dr. E. Alvarez Luna (Mexico), Dr. Q. Jones (USA), and HE D. Sene (Senegal). In addition, Dr. M. Dokuzoguz was re-elected for a second three-year term.

The Board met in Rome 20-23 February 1979 and the Executive Committee also met in Rome on 19 February, 18-20 June, 8-9 November and 4-5 December. Two of these meetings were extraordinary ones: the meeting in June to review the Board's information programme, and the meeting in December to consult with the TAC Quinquennial Review Panel. During 1979, Dr. L. Kåhre joined the Executive Committee in place of Prof. A.H. Bunting whose membership on the Board terminated at the end of 1978.

Elected members of the IBPGR serve in their personal capacities. Although in some cases members report to donors, the Board has agreed that any donor may, if it so desires, send an observer to attend Board meetings. The Board has expressed the hope that donors will designate as observers persons having a professional interest in the work of the IBPGR. At the sixth meeting of the Board in February 1979, observers from Australia, Canada, France and the USA participated.

SECRETARIAT

In past years the IBPGR has not had a substantial scientific staff of its own and members of the Board were therefore frequently requested to undertake operational assignments. The need for this has been greatly reduced as a result of a substantial strengthening of the Secretariat in 1978 and particularly in 1979. The Secretariat will reach a complement of six headquarters officers, three administrative assistants, four secretaries and one clerk in 1980. The composition of the Secretariat is shown in Appendix II.

The Secretariat has been supplemented at various times by consultants and temporary secretarial help to cope with the increasing workload of the Board. In addition, field staff have been appointed to help some regional programmes.

COMMITTEES

The Crop Advisory Committees of the Board were appointed to serve, in the first instance, for a three-year period which expired in 1979. At its meeting in 1979, the Board reviewed and revised the composition of the committees with a view to ensuring wide representation of the breeding communities concerned and to introduce some rotation of membership. The present composition of the Crop Committees is shown in Appendix III.

The first Regional Committee recognized by the Board is that approved by the governments participating in the regional programme for Southeast Asia; its membership is shown in Appendix IV.

PUBLICATIONS

A list of current IBPGR publications is contained in Appendix VI. Of these, the joint FAO/IBPGR Newsletter has received an enthusiastic reception and has already established itself as a means of widely disseminating notes and news of crop genetic resources activities all over the world.

QUINQUENNIAL REVIEW

The TAC organized a quinquennial review of the IBPGR during 1979. This consisted of a series of visits (i) to the IS/GR Program in April; (ii) to the Mediterranean and Southwest Asia (Germplasm Laboratory, Bari; ARARI, Izmir, Turkey, and ICARDA, Aleppo, Syria) 30 September-8 October; (iii) to South and Southeast Asia (NBPGR, New Delhi; ICRISAT and the All-India coordinated projects near

Hyderabad; the National Biological Institute and Central Crops Research Institute, Bogor, Indonesia; IRRI and PCARR, Los Baños Philippines) 9-22 October; and (iv) to Latin America (CIP and National Agrarian University in Peru; CATIE in Costa Rica; and CIMMYT and INIA in Mexico) 4-18 November. A member of the Latin America review group also visited the NSSL in Fort Collins, Colorado, USA. The Review Panel met in Rome 3-8 December to hold discussions with the IBPGR Executive Committee and Secretariat and with FAO officials, and to finalize its conclusions.

APPENDICES

MEMBERS OF THE BOARD IN 1979

APPENDIX I

Chairman:

Mr. R.H. Demuth[1/]
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1/ Members of Executive Committee

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International Board for Plant
Genetic Resources
Plant Production and Protection
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Assistant Executive Secretary

Ms. E. Bennett
Agricultural Officer
Genetic Resources

Dr. J.T. Esquinas-Alcazar
Agricultural Officer
Genetic Resources

Mrs. A.L. Zaniboni
Programme Assistant
(on leave of absence from 1/9/79)

Mrs. C. Gorelli
Programme Assistant
(as from 1/9/79)

Mrs. J. Buccini
Secretary

Miss D. Quaye
Secretary

Mrs. S. Saint-Rossi
Secretary

Miss M. Bonomi
Clerk

Field staff

Dr. K. S. Dodds
Senior Consultant
Southwest Asia Programme

Dr. P. Perrino
Technical Officer
Southwest Asia Programme
(until 31/5/80)

Dr. J.R. Witcombe
Technical Officer
Southwest Asia Programme

Dr. W.F. Kugler
Senior Consultant
Latin America

Prof. R.B. Singh
Regional Officer
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APPENDIX III

CROP ADVISORY COMMITTEES

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APPENDIX III
(Continued)

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SORGHUM AND MILLETS

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APPENDIX III
Continued)

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Vice-Chairman IBPGR

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APPENDIX V
(Continued)

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APPENDIX VI

IBPGR PUBLICATIONS

1. Available on request from the Secretariat in Rome by writing to the Executive Secretary, IBPGR Secretary, FAO, 00100 Rome, Italy.

Report of the first meeting IBPGR, Rome, June 1974

Annual Reports for 1974, 1975, 1976, 1977, 1978

The Conservation of Crop Genetic Resources, edited by Eleanor Lawrence (1975)

A Bibliography of Plant Genetic Resources by J.G. Hawkes, J.T. Williams, J. Hanson (1976)

A Bibliography of Wheat Genetic Resources - Supplement by J.T. Williams (1976)

Priorities among Crops and Regions (1976)

Report of a Working Group on Engineering, Design and Cost Aspects of Long-term Seed Storage Facilities (1977)

A Cooperative Regional Programme in Southeast Asia (1977)

Report of the First Meeting of the IBPGR Regional Committee for Southeast Asia (1978)

Report of the Second Meeting of the IBPGR Regional Committee for Southeast Asia (1979)

Report of the IBPGR Regional Meeting on the Mediterranean Germplasm Programme (1976)

Report of IBPGR Workshop on South Asian Plant Genetic Resources (1978)

FAO/IBPGR Plant Genetic Resources Newsletters Nos. 33, 34, 35 (1978); 36, 37, 38, 39, 40 (1979)

Tropical Vegetables and their Genetic Resources by G.J.H. Grubben and edited by H.D. Tindall and J.T. Williams (1977)

Descriptors for the Cultivated Potato (1977)

Descriptors for Wheat and Aegilops (1978)

Descriptors for Winged Beans (1979)

Descriptors for Tropical Fruits (1979)

Descriptors for Sorghum (1980)

Descriptors for Colocasia (1980)

Descriptors for Yams (1980)

The Storage of Recalcitrant Seeds - Achievements and Possible Approaches by M.W. King and E.H. Roberts (1979)

Seed Technology for Genebanks (1979)

English/Arabic Glossary of Plant Genetic Resources Terms by W.G. Ayad (1979)

APPENDIX VI
(Continued)

IBPGR PUBLICATIONS (Cont.)

Genetic Resources of Bananas and Plantains (1976)

IBPGR Consultation on Coconut Genetic Resources (1978)

Seed Stores for Crop Genetic Conservation (1978)

A Review of Policies and Activities 1974-78 and of the Prospects for the Future (1979)

2. Available from the National Biological Institute, Bogor, Indonesia (this publication was partly sponsored by IBPGR)

Plant Genetic Resources of Southeast Asia, edited by J.T. Williams, Ch. Lamoureux and Wulijarni-Soetjipto (1975)

3. Available from the N.I. Vavilov Institute of Plant Industry, Leningrad, USSR (this publication was sponsored by the IBPGR and the V.I. Lenin Academy of Agricultural Sciences).

Wheat Genetic Resources: Proceedings of an International Symposium held 14-22 July 1975 (1976)

4. Available from the Philippine Council for Agriculture and Resources Research, Los Baños, Laguna, Philippines.

Proceedings of Southeast Asian Workshop on Genetic Resources (1977)

5. Available from CRC Press Inc., 2255 Palm Beach Lakes Blvd., West Palm Beach, Florida 33409 (USA)

Treatise on Plant Health and Quarantine in International Transfer of Genetic Resources, edited by W.B. Hewitt and L. Chiarappa

APPENDIX VII

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

STATEMENT OF ACCOUNT FOR 1979

(expressed in US dollar equivalents)

Receipts		
Balance as at 1 January 1979		212,480.44
Various Government contributions	2,463,644.14	
Interest credited in 1979	35,707.90	
		2,499,352.04
		2,711,832.48
Deduct:		
Cash expenditure 1979		
Personal services	392,812.77	
Official duty travel	254,650.83	
Contractual services	1,008,754.48	
General operating expenses	33,194.98	
Supplies and materials	16,600.45	
Furniture and equipment	44,198.68	
Acquisitions and improvement of premises	-	
Fellowships, grants and contributions	86,842.90	
	1,837,055.09	
Project servicing costs		
14% on US $179,395.41	25,310.55	
Commitments		
Incurred prior to 15/12/1979 payable against 1979 budget	506,850.36	
		2,369,216.00
Balance at 31 December 1979		342,616.48

APPENDIX VIII

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

1979 CONTRIBUTIONS RECEIVED[1/]
(as at 31 December 1979)

	In US dollar equivalents
Australia	78,911.00
Canada	129,109.50
France	49,933.75
Germany	273,068.00
Japan	300,000.00
Netherlands	150,000.00
Norway	111,874.39
Sweden	166,570.00
United Kingdom	351,130.00
United Nations Evironment Programme	148,000.00[2/]
United States of America	500,000.00
World Bank (IDA)	204,987.50
	2,463,644.14

1/ Contributions pledged but not received from Belgium and Italy

2/ Includes $55,000 for 1978 pledge

APPENDIX IX

IBPGR GRANTS

(Funds committed in 1979)

For collecting and related activities	Total Commitment (US dollars)
Argentina: Estación Experimental Agropecuaria (INTA), Mercedes (Collection and conservation of forage legumes)	5,000
Argentina: Instituto Nacional de Tecnología Agropecuaria (INTA), Salta (Collection and conservation of forage plants, Phaseolus and other species	5,000
Bangladesh: Bangladesh Agricultural Research Council, Dacca (Collection of food legumes)	7,500
Bolivia: Instituto Interamericano de Ciencias Agricolas, La Paz (Collection of Andean grain and tuber crops)	17,400
Brazil: CENARGEN-EMBRAPA, Brasilia (Collection of maize germplasm in the Amazon region)	25,000
Colombia: Centro Internacional de Agricultura Tropical (CIAT), Cali (Continuation of support for the coordinated collection of Phaseolus in Latin America)	27,900
Costa Rica: Centro Agronómico Tropical de Investigaciónes y Enseñanza (CATIE), Turrialba (Report and Plan of Action on Genetic Resources of Capsicum)	10,000
France: Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT), Paris (Collection of rice in Tanzania)	19,100
France: Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT), Paris (Collection of rice in Guinea)	22,700
France: Institut de Recherches du Coton et de Textiles Exotiques (IRCT), Paris (Collection of cotton germplasm in the Antilles)	14,614
India: International Crops Research Institute for the Semi-arid Tropics (ICRISAT), Hyderabad (Collection of sorghum and millets in East Africa)	14,025

APPENDIX IX
(Continued)

IBPGR GRANTS (Cont.)

For collecting and related activities (Cont.)	Total Commitment (US dollars)
Indonesia: National Biological Institute, Bogor (Survey and collection of coconut germplasm in remote areas of Indonesia)	13,500
Indonesia: National Biological Institute, Bogor (Collection of wild and cultivated banana in Sumatra and Eastern Indonesia)	10,000
Italy: Germplasm Laboratory, Bari (Collection of wheat and grain legumes in the mounts of North Peloponnesos)	24,000
Netherlands: Royal Tropical Institute, Amsterdam (Global plan of action on the genetic resources of leafy amaranths)	8,173
Paraguay: Instituto Agronómico Nacional, Caacupe (Collection of maize germplasm)	17,100
Peru: Universidad Nacional Agraria, La Molina (Collection of maize germplasm in Selva Region)	23,100
Philippines: Philippine Council for Agriculture and Resources Research (PCARR), Los Baños (Collection of banana germplasm in Malaysia)	4,200
Philippines: Institute of Plant Breeding, Los Baños (Collection of regional priority fruits and fruits of high national priority)	22,000
Spain: Instituto Nacional de Investigaciones Agrarias (INIA), Madrid (Collection of *Triticum* and *Aegilops*)	7,970
Thailand: Kasetsart University, Bangkok (Collection of *Momordica*)	10,000
Training	
Argentina: Instituto Nacional de Tecnología Agropecuaria (INTA), Pergamino (Training course on collecting techniques; deferred to 1980)	27,078
India: National Bureau of Plant Genetic Resources, New Delhi (Training course on plant genetic resources exploration)	19,000

APPENDIX IX
(Continued)

IBPGR GRANTS (Cont.)

	Total Commitment (US dollars)
Training (Cont.)	
Indonesia: National Biological Institute, Bogor (Training course on plant genetic resources)	20,000
Nigeria: International Institute of Tropical Agriculture (IITA), Ibadan (Training course on crop genetic resources conservation for African workers and technicians in 1980)	25,000
Philippines: Philippine Council for Agriculture and Resources Research (PCARR), Los Baños (Training course on genetic resources documentation)	12,870
UK: University of Edinburgh, Scotland (Training course on practical seed technology for gene-bank personnel)	7,335
UK: University of Birmingham (Allocation to International Training Course on Conservation and Utilization of Plant Genetic Resources to enable participation of students from developing countries)	48,697
Conservation	
Bolivia: Instituto Boliviano de Tecnología Agropecuaria (IBTA), La Paz (Improvement of seed storage facilities)	5,000
Philippines: Philippine Council for Agriculture and Resources Research (PCARR), Los Baños (Maintenance of the Southeast Asian Banana Germplasm Centre)	10,000
Thailand: Thailand Institute of Scientific and Technological Research (TISTR), Bangkok (Medium-term seed storage facilities)	40,000
UK: University of Reading ([1] Determination of regeneration intervals in orthodox seeds, and [2] literature survey on recalcitrant seeds)	45,636
UK: University of Reading (Investigations into the long-term storage of recalcitrant seeds)	5,340

APPENDIX IX
(Continued)

IBPGR GRANTS (Cont.)

	Total Commitment (US dollars)
Conservation (Cont.)	
UK: University of Reading (continuation in 1980 of work on (1) Determination of regeneration intervals in orthodox seeds, and (2) Investigations into the long-term storage of recalcitrant seeds	71,768

RESUME

Les cinq comités consultatifs - blé, maïs, riz, sorgho et mil, et haricot - qui travaillent en coopération avec les centres internationaux de recherche agricole (IARC) compétents assurent un lien entre le Conseil et l'ensemble de la communauté scientifique qui s'intéresse à chacune de ces cultures. En 1979, ces comités ont donné au Conseil des avis sur des missions de collecte proposées: en outre, le Comité qui s'occupe du sorgho et du mil s'est réuni et a formulé des recommandations concernant les travaux à entreprendre sue les millets.

Des progrès considérables ont été accomplis en 1979 dans l'établissement des listes d'acquisitions dans les principaux centres qui s'occupent des ressources génétiques de cultures importantes, ce qui permettra de publier en 1980 des répertoires complets des collections.

En 1979, un certain nombre de groupes de travail et de consultations d'experts se sont réunis afin d'orienter le Conseil pour ce qui est de l'action à l'échelle mondiale concernant les légumes tropicaux, les betteraves, les arachides et le café. Les plans d'action recommandés par les groupes de travail ont été approuvés par le Conseil et leur exécution a déjà commencé.

Les groupes de travail, groupes d'experts et comités consultatifs s'occupant des cultures avaient déjà adopté des listes minimum de descripteurs pour le riz, les pommes de terre, le maïs, le blé , le haricot, la banane et la noix de coco. En 1979, des listes ont été établies pour le sorgho, le raisin, les fruits tropicaux, la betterave, le coton, le café, le pois carré, l'igname et le taro.

Le Conseil a soutenu et organisé une série de collections dans la région méditerranéenne, notamment de céréales, de plantes fourragères et d'autres plantes cultivées. L'Algérie, Chypre, la Grèce, l'Italie, la Libye, le Portugal, l'Espagne et la Tunisie participent à ce programme.

Le Conseil a révisé ses plans d'origine afin d'accélérer la collecte et la conservation de matériel végétal en Asie du Sud-Ouest (Afghanistan, Iran, Irak, Pakistan, Syrie et Turquie), où une importante diversité génétique est menacée de disparition. En 1979, un conseiller technique du IBPGR a aidé à l'expansion et à la mise en oeuvre des programmes nationaux en matière de ressources génétiques des pays participants et un fonctionnaire de niveau supérieur a assuré la coordination régionale, préparant ainsi un rapprochement entre ces programmes et l'ICARDA en 1980. Une réunion régionale a été organisée à Rome pour élaborer des stratégies de collecte et de conservation.

Les pays d'Asie du Sud-Est, avec l'aide du conseil et sous ses auspices, ont formulé un plan d'action régional et un cadre général dans lequel sera organisée son exécution. Les Gouvernements d'Indonésie, de Malaisie, de Papouasie Nouvelle-Guinée, des Philippines et de Thaïlande ont approuvé ce plan et les travaux ont débuté en 1977. En 1979, le Conseil a détaché un fonctionnaire dans la région pour aider les gouvernements participants à exécuter ce programme.

A la suite d'une réunion de représentants des Gouvernements des pays d'Asie du Sud-Est (Bangladesh, Bhoutan, Birmanie, Inde, Népal et Sri Lanka) tenue en 1978 sous ses auspices, l'IBPGR s'est occupé en 1979 de la formation de ressortissants de ces pays aux professions scientifiques et autres ayant trait aux ressources génétiques.

Le Conseil a accru son soutien aux activités de collecte entreprises en dehors des programmes régionaux, notamment lorsqu'il s'agissait de la collecte de variétés de sorgho et de mil dans la zone sahélienne, de riz, de tubercules et de légumineuses dans diverses régions d'Afrique, et d'arachides, de maïs et de fourrages dans plusieurs pays d'Amérique du Sud. Ce sont là quelques unes des principales missions de 1979, en outre, une large gamme d'autres végétaux cultivés a fait l'objet de collectes dans de nombreuses parties du monde à l'instigation ou avec le soutien, du Conseil.

Le Conseil a désigné, en accord avec les centres intéressés, un réseau d'institutions responsables d'entretenir les principales collections de base mondiales de semences des grandes cultures vivrières. Ce réseau a été agrandi en 1979.

Le Conseil a contribué au développement et à l'installation dans plusieurs pays de systèmes de documentation appropriés en vue du stockage et de la restitution des informations concernant les grandes collections de ressources génétiques de végétaux cultivés.

En 1979, le Conseil a continué à évaluer les lacunes du réseau de conservation et a soutenu la formation technique du personnel des banques de gènes en matière de conservation des semences. Le Conseil a soutenu l'expansion des programmes de formation visant à fournir au monde en développement des effectifs adéquats de personnel formé aux travaux ayant trait aux ressources génétiques et également organisé plusieurs cours de courte durée et donné des bourses de formation.

RESUMEN

Los cinco comités asesores agrícolas (para el trigo, el maíz, el arroz, el sorgo y el mijo, y los fríjoles Phaseolus) que cooperan con el correspondiente IARC sirven de puente entre el Consejo y el grupo de científicos dedicados a cada cultivo. En 1979 asesoraron al Consejo sobre las propuestas relativas a misiones de recogida de muestras: además, se reunió el Comité sobre el Sorgo y el Mijo, e hizo recomendaciones sobre los trabajos que hay que emprender respecto a los mijos menores.

En 1979 se hicieron notables progresos en la compilación de listas de entrada a los principales centros de recursos genéticos para los cultivos más importantes, lo que permitió la publicación, en 1980, de repertorios generales de colecciones.

En 1979 se constituyeron varios grupos de trabajo y consultas de expertos para asesorar al Consejo sobre las medidas globales relativas a las hortalizas tropicales, la remolacha, el cacahuete y el café. El Consejo aprobó los planes de acción recomendados por los grupos de trabajo, que empezaron a aplicarse.

Los grupos de expertos y los comités asesores agrícolas se pusieron previamente de acuerdo sobre las listas mínimas de descriptores para los siguientes productos: arroz, patatas, maíz, trigo, fríjoles Phaseolus, banana y coco. En 1979 se hicieron listas para el sorgo, la uva, los frutos tropicales, la remolacha, el algodón, el café, el frijol el ñame y el taro.

El Consejo apoyó y organizó una serie de recogidas de muestras en la región mediterránea, especialmente de cereales, forrajes y otros cultivos. Argelia, Chipre, España, Grecia, Italia, Libia, Portugal y Túnez son los países participantes que cooperan en este programa.

El Consejo ha examinado sus planes originales para acelerar las actividades de recogida y conservación en el sudoeste asiático (Afganistán, Irak, Pakistán, Siria y Turquía), donde está amenazada una importante diversidad genética. En 1979, un asesor técnico del IBPGR ayudó a la expansión y ejecución de los programas de recursos genéticos nacionales de los países participantes, y un oficial superior se encargó de los países participantes, y un oficial superior se encargó de la coordinación regional, preparando una relación más estrecha entre este programa y el ICARDA, en 1980. En Roma se celebró una reunión regional para establecer los procedimientos de recogida y conservación de muestras.

Los países del sudeste asiático, bajo el patrocinio del Consejo y con su ayuda, han formulado un plan de acción regional y una organización que asegure su ejecución. Los gobiernos de Indonesia, Malasia, Papúa Nueva Guinea, Filipinas y Tailandia aprobaron el plan, y el trabajo comenzó en 1977. En 1979, el Consejo destinó un oficial a la Región para que ayude a los gobiernos participantes en la ejecución del programa.

Después de una reunión, patrocinada por el IBPGR, en 1978, de representantes gubernamentales de los países del sur de Asia (Bangladesh, Bhutan, Birmania, India, Nepal y Sri Lanka), el Consejo dispuso, en 1979, la capacitación de los científicos y otros investigadores de recursos genéticos de estos países.

Se intensificó el apoyo del Consejo a las actividades de recogida de muestras no previstas en los programas regionales, específicamente con el fin de recoger: sorgo y mijo en la zona del Sahel; arroz, tubérculos y leguminosas en diversas partes de Africa; y cacahuete, maíz y forrajes en países de América del Sur. Estos son ejemplos de misiones importantes realizadas en 1979; además, una gran variedad de otros cultivos fueron recogidos en muchos países a instancia o con el apoyo del Consejo.

En consulta con los centros interesados, el Consejo ha creado una red de institu-

ciones que se encargará de la conservación de las principales colecciones de semillas de los cultivos alimentarios más importantes del mundo. Esta red se amplió en 1979.

El Consejo ayudó a la preparación e instalación de sistemas apropiados de documentación en diversos países, para el archivo y recuperación de informaciones sobre las colecciones más importantes de recursos genéticos agrícolas.

En 1979, el Consejo siguió asesorando sobre las insuficiencias de la red de conservación, y se mostró partidario de que se capacitara el personal de los bancos de genes en las técnicas de conservación de semillas. El Consejo apoyó la ampliación de los programas de capacitación destinados a proporcionar a los países en desarrollo el suficiente personal capacitado en trabajos sobre recursos genéticos: organizó varios cursos breves y concedió becas para capacitación.