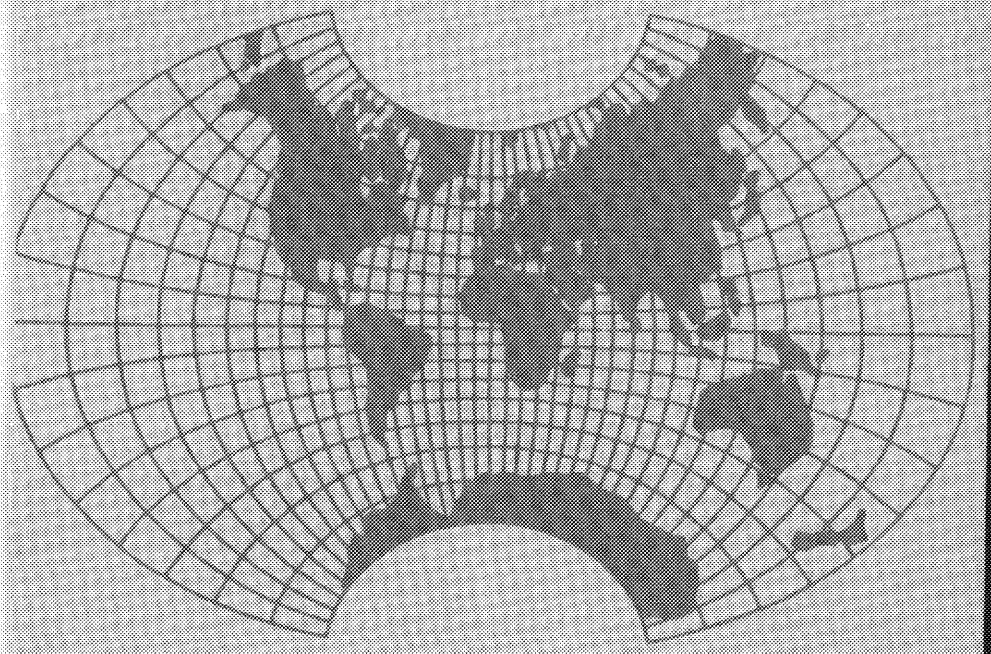
ANNUAL REPORT 1987

IBPGR



INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

Abbreviations used in this report

AAASA	Association for the Advancement of Agricultural Sciences in Africa
AAS	Academy of Agricultural Sciences, China
ARARI	Aegean Regional Agricultural Research Institute, Turkey
ARC	Agricultural Research Centre, Giza, Egypt
ARI	Agricultural Research Institute, Cyprus
ARS	Agriculture Research Service, USA
AVRDC	Asian Vegetable Research and Development Center, Taiwan, China
BARI	Bangladesh Agricultural Research Institute, Bangladesh
BBTV	Banana bunchy top virus
BVRC	Beijing Vegetable Research Centre, China
CAAS	Chinese Academy of Agricultural Sciences, Beijing, China
CAC-USDA	Crop Advisory Committee, United States Department of Agriculture
CARARI	Central Anatolian Regional Agricultural Research Institute, Ulus-Ankara, Turkey
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza, Costa Rica
CEC	Commission of Economic Communities
CENARGEN	Centro Nacional de Recursos Genéticos, Brazil
CGIAR	Consultative Group on International Agricultural Research
CGN	Centre for Genetic Resources, The Netherlands
CIAT	Centro Internacional de Agricultura Tropical – CGIAR
CICA	Centro de Investigacíon en Cultivos Andinos, Peru
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo – CGIAR
CIP	Centro Internacional de la Papa – CGIAR
CNR	Consiglio Nazionale delle Ricerche, Italy
CNRA	Centre National de Recherches Agronomiques, Senegal
CSC	Commonwealth Science Council
CSIRO	Commonwealth Scientific and Industrial Research Organization, Australia
DGRST	Délegation Generale à la Recherche Scientifique, Senegal
EAN	Estaçao Agronomica Nacional, Portugal
EC	European Community
ECP/GR	European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources
ETSIA	Escuela Técnica Superior de Ingenieros Agrónomos, Spain
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuaria, Brazil
EUCARPIA	European Association for Research on Plant Breeding
FAL	Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft, FRG
FAO	Food and Agriculture Organization of the United Nations
FOFIFA	National Centre for Applied Research and Rural Development, Madagascar
FONIAP	Fondo Nacional de Investigaciones Agropecuarias, Venezuela
GRAS	Genetic Resources Assessment Scheme
GRIN	Genetic Resources Information Network, USDA
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit – German Agency for Technical Cooperation, FRG
IARC	International Agricultural Research Center
IAVH	Institut Agronomique et Vétérinaire Hassan II, Morocco
IBTA	Instituto Boliviano de Tecnología Agropecuaria, Bolivia
ICA	Instituto Colombiano Agropecuario, Colombia
ICAR	Indian Council for Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas – CGIAR
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics – CGIAR
ICTA	Instituto de Ciencia y Tecnología Agrícola, Guatemala
IDR	Institut de Développement Rural, Burkina Faso
IFPRI	International Food Policy Research Institute – CGIAR
IFVC	Institute of Field and Vegetable Crops, Yugoslavia
IIHR	Indian Institute of Horticultural Research, India
IITA	International Institute of Tropical Agriculture – CGIAR

Continued on inside back cover

International Board for
Plant Genetic Resources

Annual Report 1987

2 International Agricultural Research Centres of the CGIAR

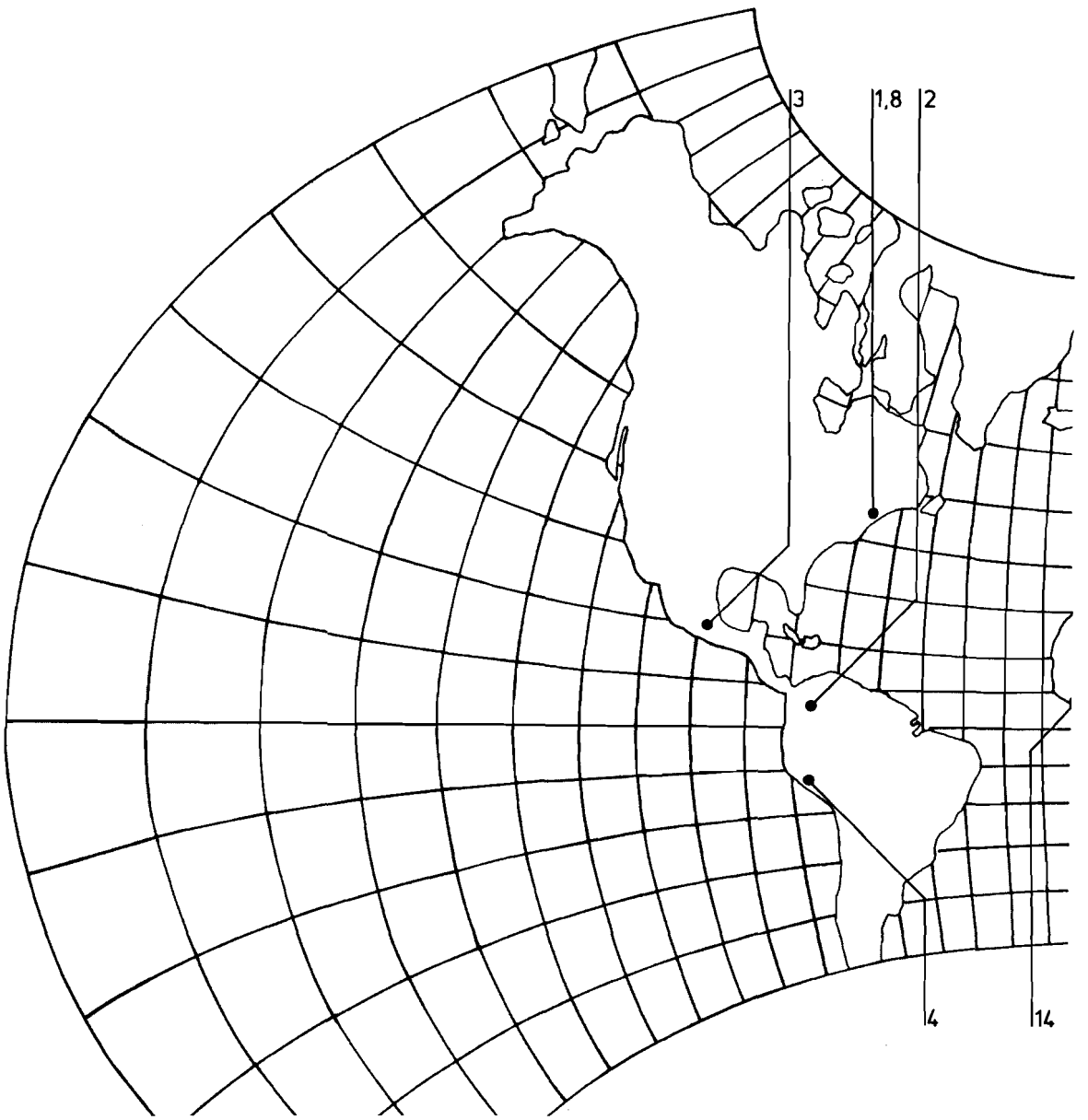
The Consultative Group on International Agricultural Research (CGIAR) was set up in 1971 to help coordinate the efforts of countries, public and private institutions, international and regional organizations and representatives from developing countries to support a network of 13 International Agricultural Research Centers.

CGIAR provides a mechanism for mobilizing financial support for the Centers. Its overall goal is, through international agricultural research and related activities, to develop technology and to cooperate with national research systems in developing countries with the aims of alleviating hunger and poverty, improving the management of natural resources and increasing employment and income, particularly of the lower income groups.

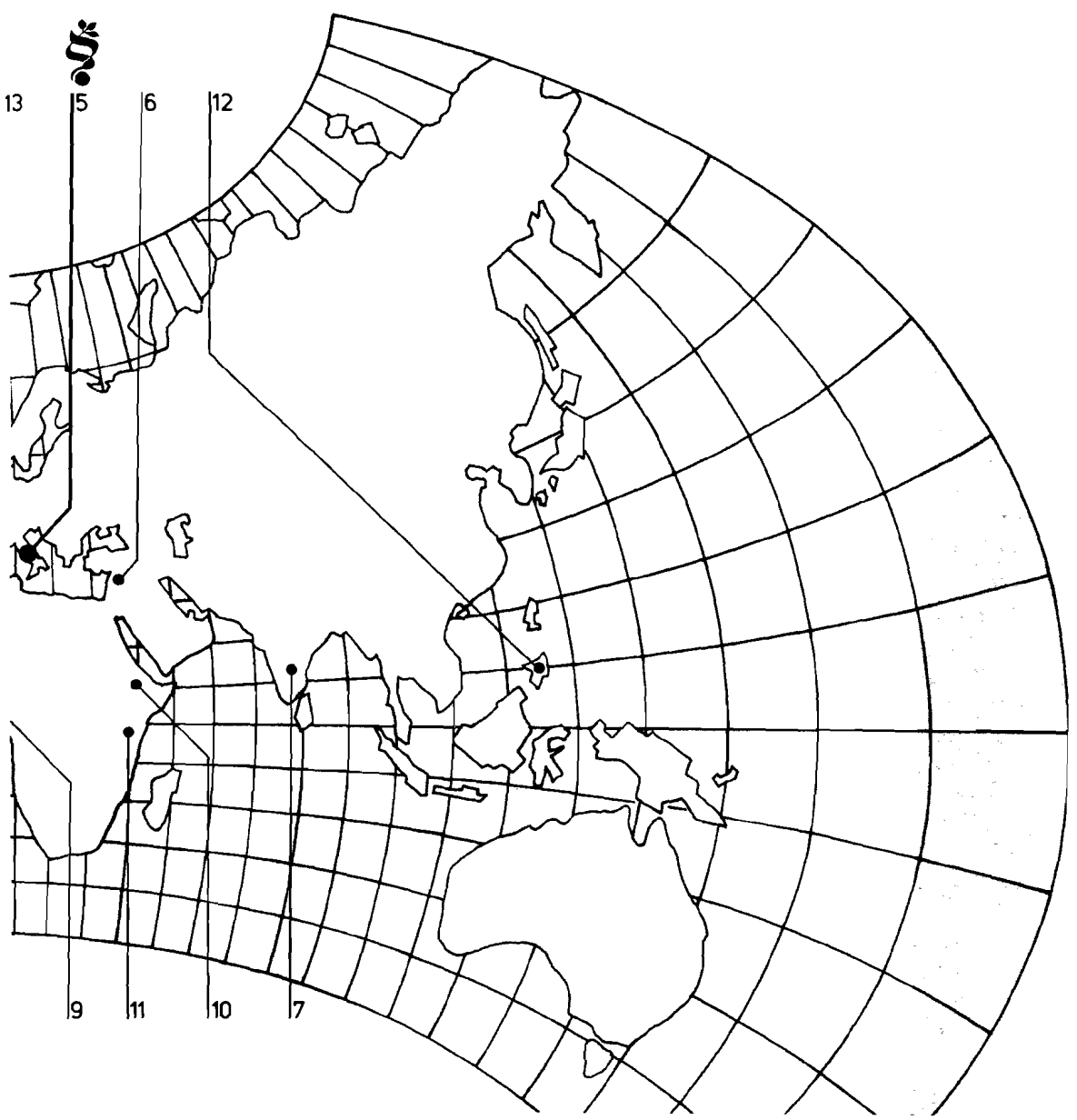
Each Center of CGIAR is autonomous, with its own Board of Trustees or governing body. Each develops its own budget for core funds mobilized by CGIAR.

CGIAR is co-sponsored by the Food and Agriculture Organization (FAO), the United Nations Development Programme and the World Bank. The World Bank provides the CGIAR with its chairman and secretariat, while FAO provides a secretariat for the group's Technical Advisory Committee. This regularly reviews the scientific and technical aspects of all the Centers.

An overview of the work of the CGIAR carried out by the Centers listed here may be found in the CGIAR Annual Report.



1 CGIAR	Consultative Group on International Agricultural Research Washington DC, USA	**8 IFPRI**	International Food Policy Research Institute Washington DC, USA
2 CIAT	Centro Internacional de Agricultura Tropical Cali, Colombia	**9 IITA**	International Institute of Tropical Agriculture Ibadan, Nigeria
3 CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo Mexico City, Mexico	**10 ILCA**	International Livestock Center for Africa Addis Ababa, Ethiopia
4 CIP	Centro Internacional de la Papa Lima, Peru	**11 ILRAD**	International Laboratory for Research on Animal Diseases Nairobi, Kenya
5 IBPGR	International Board for Plant Genetic Resources Rome, Italy	**12 IRRI**	International Rice Research Institute Manila, Philippines
6 ICARDA	International Center for Agricultural Research in the Dry Areas Aleppo, Syria	**13 ISNAR**	International Service for National Agricultural Research The Hague, Netherlands
7 ICRISAT	International Crops Research Institute for the Semi-Arid Tropics Hyderabad, India	**14 WARDA**	West African Rice Development Association Monrovia, Liberia



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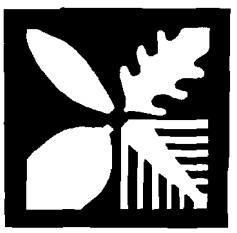
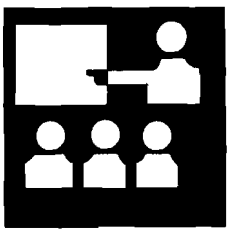
Mandate

The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific centre under the aegis of the Consultative Group on International Agricultural Research (CGIAR). IBPGR was established by the CGIAR in 1974. The basic function of IBPGR is to promote and coordinate 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. Financial support for the core programme is provided by the Governments of Australia, Austria, Belgium, Canada, China, Denmark, France, FRG, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK and the USA, as well as the World Bank. The Food and Agriculture Organization of the United Nations provides the Headquarters.





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IBPGR Headquarters
c/o FAO of the United Nations
Via delle Terme di Caracalla
00100 Rome
Italy

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Foreword

IBPGR's Annual Reports for 1985 and 1986 noted a number of management and operational changes that had become necessary as a result of the growth of its programme. It is expected that the implementation of these changes – which led to the reorganization of the centre in 1987 – will increase IBPGR's effectiveness and ability to respond to the needs of its partners.

IBPGR is a small international organization which, within the limits of its financial and staff resources, aims to catalyze efforts to initiate programmes; to serve as a focal point for information-gathering; and to maintain a current knowledge of the research base for genetic resources work. IBPGR uses a two-pronged approach – through its Field Programme and its Research Programme – to sustain its global activities.

At the time of its creation, IBPGR was charged with establishing a global programme to ensure the collection, conservation, description and use of genetic resources of crops for the benefit of mankind. This charge involves IBPGR in an integral way in the mission of the Consultative Group on International Agricultural Research to contribute to the increase of sustainable food production in developing countries.

IBPGR's partners in genetic resources activities range from national genetic resources programmes to universities and research institutions. Initiating work programmes with these disparate groups and forging the complex linkages between them, has been, and will continue to be, a major focus of IBPGR's work. The establishment of these linkages is particularly important because genetic resources work is, by its very nature, a global task. No national programme can be viable unless it has cooperative relationships with other programmes throughout the world to facilitate the flow of germplasm and its use in breeding.

In 1987, the global network included a large number of national and international centres engaged in diverse activities in over 110 countries. The global network may be divided into additional sub-networks, such as the group of institutions which acts as designated base collections of genetic

resources of crops for long-term security storage. Other sub-networks incorporate nations engaged in cooperative work within specific regions, and those where there are cooperative links between donors and countries to strengthen national activities.

IBPGR is dedicated to the improvement of the scientific standards of its ever expanding activities through mission-oriented research, and the establishment of a framework for the more effective flow of materials between the hundreds of active collections which exchange and evaluate germplasm. Such standards are necessary to ensure the continuation of useful and efficient utilization of one of mankind's most important resources.

IBPGR's staff structure – both at Headquarters and in the Field – was strengthened during 1987. Changes in the staffing of the Field Programme were necessitated by the identification of newer global priorities for action. Since IBPGR is not primarily a funding agency, nor does it have the resources to sustain indefinitely organizational structures, it is necessary for the centre to identify priorities – which are under constant review – for the collection and conservation of crops. Therefore, it has been IBPGR's policy to establish field offices for a period of time sufficient to initiate, foster, and help carry out specific scientific tasks in areas with the greatest need. The responsibility for a project is handed over to the national programmes when they are of sufficient strength, for example, where alumni of IBPGR training programmes are well equipped to continue specific activities. In addition to changes in the Field Programme, IBPGR's Research Programme was strengthened in 1987.

It is, as in previous years, a pleasure to record thanks for the strong support of our donors who are also partners in IBPGR's global activities, the co-sponsors of CGIAR (FAO, UNDP and the World Bank) who facilitate so much of our work, the Trustees and Staff, and the scientists and administrators world-wide with whom we share a common goal.

J.T. Williams
Director

Introduction

In 1987, shocking images of famine and starvation once again captured the attention of the world. It is feared that the recent African crisis will be even more devastating than the famine of 1983-1985, when an estimated one million people died and ten million more fled from their homes in search of food and water. It is likely that millions more would have perished except for the extraordinary outpouring of aid by many nations. But while emergency relief can mean the difference between life and death for many of the victims of famine, it is, at best, a short-term solution. The World Bank has estimated that 500 million people in the poorest countries of Africa, Asia and Latin America suffer from chronic undernourishment.

The solution lies in a combined programme of agricultural and economic development. Yet the most carefully constructed development programmes will nonetheless fail in the struggle against hunger if they ignore the wider biological environments in which agrarian-based societies operate. While the development of high-yielding varieties of food plants over the last few decades has already brought significant gains in the fight against hunger through increased production, the widespread use of genetically superior crop varieties has resulted in a steady loss of the genetic diversity that could provide the source for future crop improvement. At the same time, rapid population growth and widespread land-clearing have destroyed the natural habitats where a wide variety of plant species once flourished. Should deforestation in the Amazon continue at its present rate, for example, it is estimated that about 15 percent of all plant species will be lost by the year 2000.

There is virtually no limit to the potential benefits that could result from exploiting the world's genetic diversity, especially in this era of biotechnology. Wild species related to crop plants are used by more and more breeders to transfer

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Division of Plant Industry
CSIRO
GPO Box 1600
Canberra, ACT 2601
Australia

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FAO
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France

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India

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desirable characteristics, such as disease and pest resistance, into staple food crops. The conservation of primitive crop races and wild species has been a global imperative for decades and the focus of IBPGR's activities since 1974.

The mandate of IBPGR is to further the study, collection, documentation, evaluation, and utilization of the genetic diversity of useful plants for the benefit of people throughout the world. Between 1974, when IBPGR was established as an autonomous centre in the CGIAR family, and 1987, IBPGR was responsible – independently or in collaboration with national or international centres – for adding 170,000 samples to the world's germplasm collections. During these years, emphasis was placed on the collection of threatened germplasm, the establishment of facilities and methods for long- and medium-term conservation, the training of scientists to carry out this work, the identification of research needs, and the initiation of strategic research when necessary.

Based on the findings of a second external programme and management review of IBPGR, which was carried out in 1985-1986, CGIAR approved a broadened mandate that will enable IBPGR to sustain a viable, international genetic resources network and to improve its scientific leadership role in the field of plant genetic resources.

1987 has been a very significant year for IBPGR. The centre has undertaken the development of an integrated and sharply focused research programme and the close examination of policy issues relating to safe conservation and the free flow of germplasm. The year saw a major restructuring of IBPGR. This Annual Report records some important new initiatives. In 1988, as IBPGR approaches the halfway mark in its second decade, its Trustees and staff are eager to meet new challenges which will better enable IBPGR to contribute to the commitment of CGIAR to raise the standard of living of the peoples of the world.

Highlights of 1987

Germplasm acquisition

In 1987, IBPGR organized or assisted in 21 missions to collect crop landraces and primitive cultivars, 14 missions to collect wild species related to crops, and eight missions to collect forages. In all cases, the field work was carried out in cooperation with national programmes or international centres.

IBPGR's germplasm acquisition programme was reviewed in depth in September 1987. Concluding that considerable progress has been made in broad-scale germplasm collecting, the Board's Programme Committee recommended that more attention be paid to priority targets, to planning future collecting missions in greater detail, and to improving follow-up operations by establishing links between collection, grow-out, and documentation procedures. It is expected that such measures, while reducing the overall number of collecting missions undertaken by IBPGR, will result in the more efficient capture of a wider range of diversity. The appointment in August 1987 of a full-time Germplasm Acquisition Officer will facilitate the implementation of IBPGR's shift in direction, which has been pending for some time. Greater emphasis was placed in 1987 on the upgrading of a central database on germplasm acquisition.

Nikolai Ivanovich Vavilov 1887-1943

1987 marked the centennial of the birth of Nikolai Ivanovich Vavilov, outstanding Soviet plant collector, geneticist and biogeographer. Vavilov is perhaps best known for his pioneering work on the centres of origin of cultivated plants. While Vavilov's original concept of centres of origin has been somewhat modified, the centres themselves still constitute important genepools for world food security. The rich biological diversity found in these centres offers important potential sources of genetic protection against the constant threat of diseases, the unforeseen mutations of pests, and other attributes required in crop breeding. IBPGR could pay no greater honour to the memory of Nikolai Vavilov than to renew its commitment to continued research on the rich genetic diversity of crop genepools.

In 1987, IBPGR began to develop guidelines and procedures for the creation of a network of active collections to complement the network of base seed collections which has developed over the past decade. Both forms of collections play an essential role in IBPGR's global network of activities.

IBPGR continued in 1987 to evaluate the scientific standards currently being used in long-term seed conservation. Sixteen genebanks holding designated base collections were monitored for their adherence to scientific and operational standards for seed storage. The results of this survey – which are being entered in a central database – are being discussed with authorities and have already led to substantive improvements.

IBPGR provided appropriate and, whenever possible, low-cost equipment in 1987 to genebanks in 20 developing countries. In addition, IBPGR provided technical advice to governments and authorities in another 25 countries.

During 1987, IBPGR strengthened its support for conservation research, especially in the areas of seed conservation and *in vitro* conservation. In July, the *in vitro* research programme was reviewed in detail. As a result, the Programme Committee recommended that greater attention be paid to a lesser number of major crops, and that more emphasis be placed on development of cryopreservation techniques. A pilot *in vitro* active genebank for cassava – jointly sponsored by IBPGR and CIAT – made substantial progress during the year.

A Headquarters Officer was appointed to coordinate activities in pathology and quarantine research.

IBPGR's catalytic role

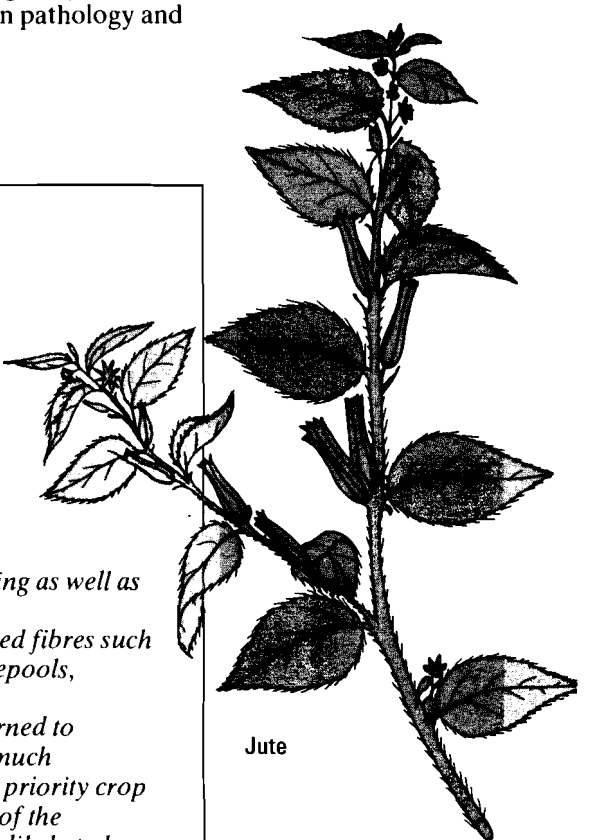
The International Jute Organization (IJO) represents both exporting as well as importing member countries.

One of the objectives of IJO is the improvement of jute (and allied fibres such as kenaf) production through the exploitation of the available genepools, especially with relation to wild Corchorus *and* Hibiscus *species.*

IJO, recognizing that it lacked expertise in genetic resources, turned to IBPGR for advice as early as 1985. IBPGR agreed to provide as much assistance as possible, even though jute is not considered as a high priority crop for IBPGR. First a consultant was found to study the distribution of the different wild species, with emphasis on Africa, and the results are likely to be published jointly by IBPGR and IJO.

A follow-up (September 1987) was provided through IJO organizing the coordination meeting of the IJO germplasm project and a training course for prospective collectors at NBPGR in New Delhi, India, again supported scientifically and technically by IBPGR.

IBPGR also arranged for the agreement and cooperation of the Government of Kenya, for the subsequent collecting missions, where IBPGR makes the official arrangements, but logistic support is also provided by its Field Office in Nairobi.

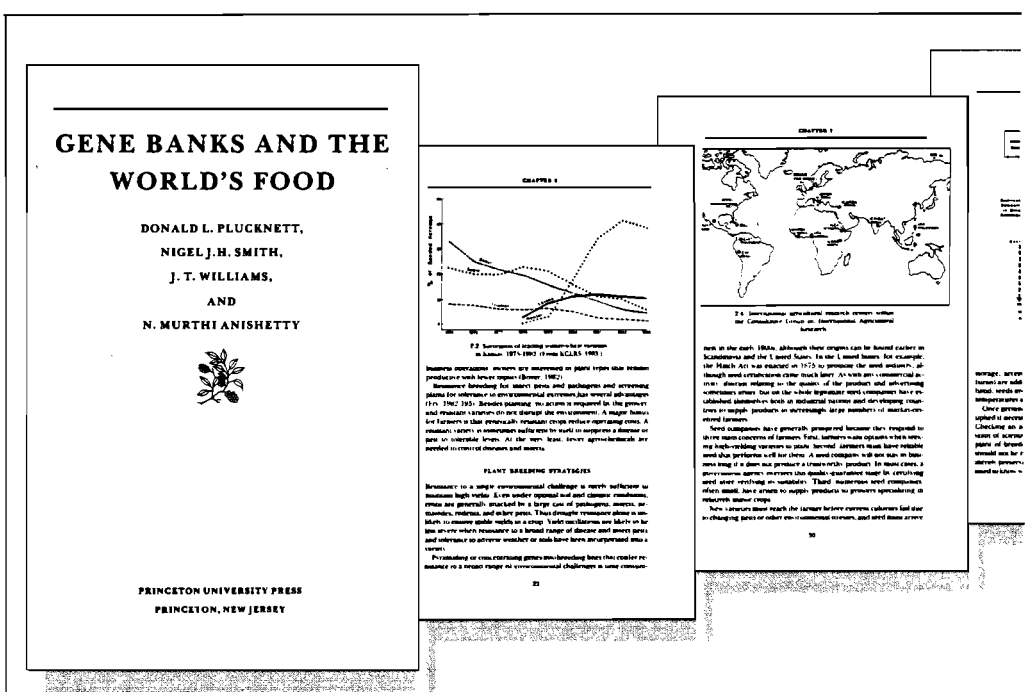


Jute

Documentation

Computer facilities at IBPGR Headquarters were upgraded in 1987, and efforts were underway to equip Field Officers and Collectors with adequate facilities to improve their information services within their areas of the developing world. In addition, IBPGR continued to provide advice to genetic resources centres on the selection and operation of computerized systems, and offered direct support for the purchase of hardware and software to centres in Costa Rica, Egypt and Guatemala, where national programmes have been closely linked to IBPGR work for some time.

As part of its continuing effort to provide coordinated information in a standard format, IBPGR processed 12 new crop descriptor lists, and published three directories and two catalogues of significant germplasm collections.



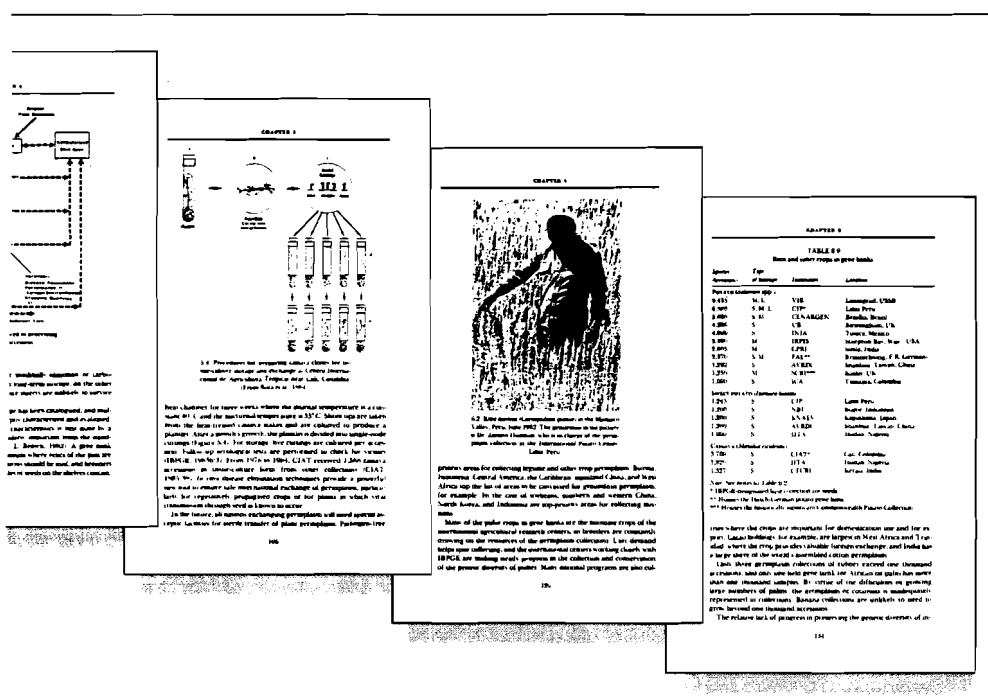
Genebanks and the World's Food
By the year 2000, the world will require an agricultural production 60% greater than 1980's harvest. In Gene Banks and the World's Food, *jointly written in 1987 by IBPGR and the CGIAR Secretariat, four experts point out that we must not take our supply of seeds and other planting material for granted: in the midst of growing public expectations of achievements in genetic engineering, options for the future are being circumscribed by the erosion of the world's*

During 1987, 44 centres characterized priority crop germplasm with support from IBPGR. These programmes reflect IBPGR's continuing interest in the structure of collections and the range of variation under conservation.

Studies were done on the feasibility of producing well-defined subsets of accessions, comprising a range of variation, which could provide a useful starting point to exploitation of the material stored in the genebank. Additional research concerned the testing of an index which could be used as a management tool by curators to assess the 'quality' of their collections.

Extensive work on the theoretical background of regeneration was completed in 1987 and will be translated into policy and strategic research in early 1988.

Research continued on patterns of variation in priority crop genepools covering a range of crop types. This research effort is interdisciplinary in approach and reflects an increasing emphasis on molecular techniques.



most precious heritage, the genetic diversity of our crop plants and their wild relatives. **Gene Banks and the World's Food,** ***published by Princeton University Press, was co-authored by Donald L. Plucknett, Scientific Advisor to the CGIAR, Nigel J.H. Smith, Professor of Geography at the University of Florida, J.T. Williams and N. Murthi Anishetty. The book, which is soon to enter its second printing, will be translated into other languages in 1988.***

Training

For the first time, in 1987, IBPGR had a full-time Officer in Headquarters at Rome to coordinate training activities.

During the academic year 1986-1987, 21 students from 12 developing countries received full postgraduate support from IBPGR. Three of these students (from Latin America) received fellowships to attend a course – in Spanish – in Madrid, Spain on plant genetic resources. (IBPGR has sponsored several non-English short courses since 1980.) A total of 45 scientists, representing 34 countries, received support for their participation in a variety of IBPGR-sponsored short technical courses.

In addition to its support for academic courses in 1987, IBPGR organized individual training programmes and study tours at international, national and regional centres for six young researchers. Internships were awarded to seven scientists at the pre- or postdoctoral levels at genetic resources centres associated with the IBPGR network.

IBPGR restructuring

1987 saw the continued restructuring of IBPGR's functions, both at Headquarters and in the field. A number of staff vacancies – previously frozen – were filled, and a Head of Research was appointed. The Government of Niger agreed to the opening of a new Field Office in 1987, and similar agreements with the Governments of India and China paved the way for additional Field Offices – serving South and Southeast, and East Asia – to be opened in 1988.

Participants of the International Workshop on the Crop Genetic Resources of East Asia.
With Special Project Funding from the Government of Japan, a major international workshop on the crop genetic resources of East Asia was held from 10 to 13 November in Tsukuba, Japan. The workshop, which was attended by over 100 scientists, reviewed organizational developments in the countries of East Asia, the utilization of genetic resources for productivity, pest and disease resistance, and stress tolerance, the potential of wild relatives, the collecting and evaluation of indigenous germplasm in East Asia, and advanced methods of evaluation and management of genetic resources. The unused

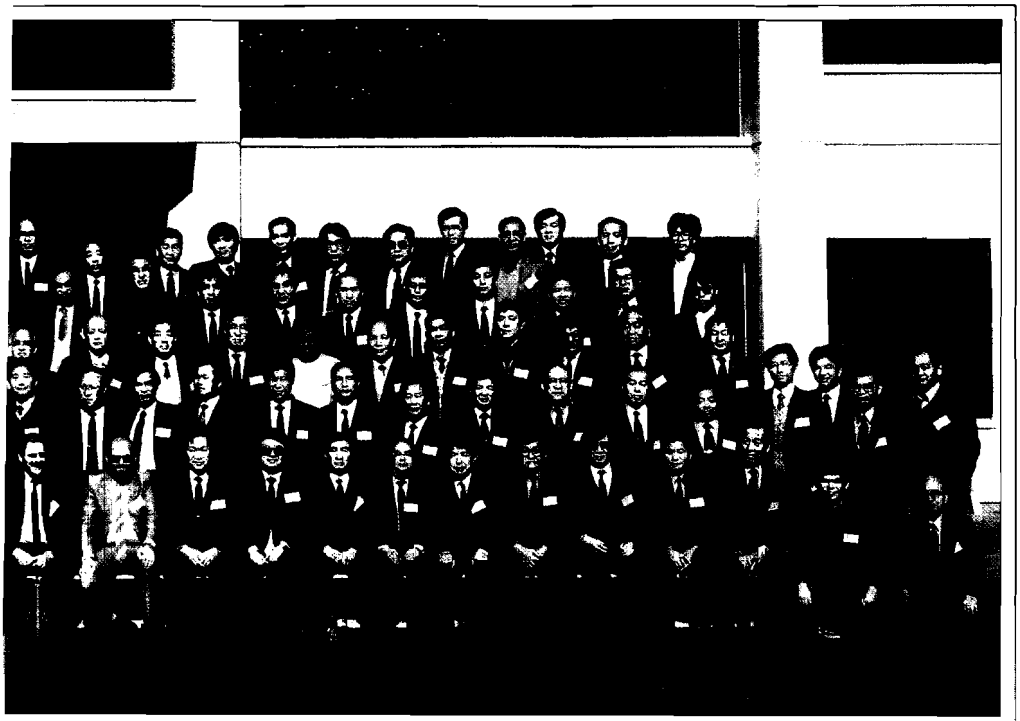
During 1987, two regional meetings – generously supported by special funding from the Government of Japan – were convened to define more clearly IBPGR's partnership role with Asian nations. A special issue of the IBPGR Southeast Asia Newsletter marked 10 years of cooperative work in that region. Issues of two new IBPGR Bulletins were published, one for Sub-Saharan Africa, and the other covering Europe, Southwest Asia and North Africa.

A comprehensive Memorandum of Understanding between the Government of India and IBPGR was formalized in November 1987. Consultations with the countries of the Southern African Development Coordination Conference continued throughout the year.

Phase III of the European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources – a programme organized by and for the countries of Europe – was declared operational by IBPGR in July 1987. By December, 26 countries had either joined Phase III or had given firm commitment for their participation. Significant efforts were made to link Working Group activities to relevant centres in developing countries.

Agreement with FAO

A Memorandum of Understanding, which established a new relationship between IBPGR and FAO, was signed by the two organizations in February 1987. As a result, the Director and some professional staff of IBPGR will no longer serve a dual function as hitherto, and IBPGR will henceforth be recognized as autonomous in its hosting arrangements with FAO.



balance of the Special Project Funds were utilized, with the agreement of the Government of Japan, for a workshop on the plant genetic resources of South and Southeast Asia, held in New Delhi from 23 to 25 November. Just before the opening of the workshop, a Memorandum of Understanding was signed by representatives of IBPGR and ICAR to initiate a period of collaboration between IBPGR and ICAR. An important outcome of the workshop, which drew participants from 17 countries of South and Southeast Asian countries, was a pledge by IBPGR to appoint a scientist from Southeast Asia to coordinate efforts to save crop germplasm in the area.

16 Germplasm acquisition

A number of important events occurred within this programme in 1987. In August, a full-time Germplasm Acquisition Officer was posted at headquarters to coordinate the programme. In addition, the whole acquisition programme since IBPGR's start in 1974 was reviewed. The details of the review were presented to the Programme Committee, which found the programme generally to have been in line with Board policies. In summary, the data examined included all missions since 1974 for which figures are available. Almost 170,000 samples have been collected. The 29 genera which have received the most attention are shown in Figure 1.

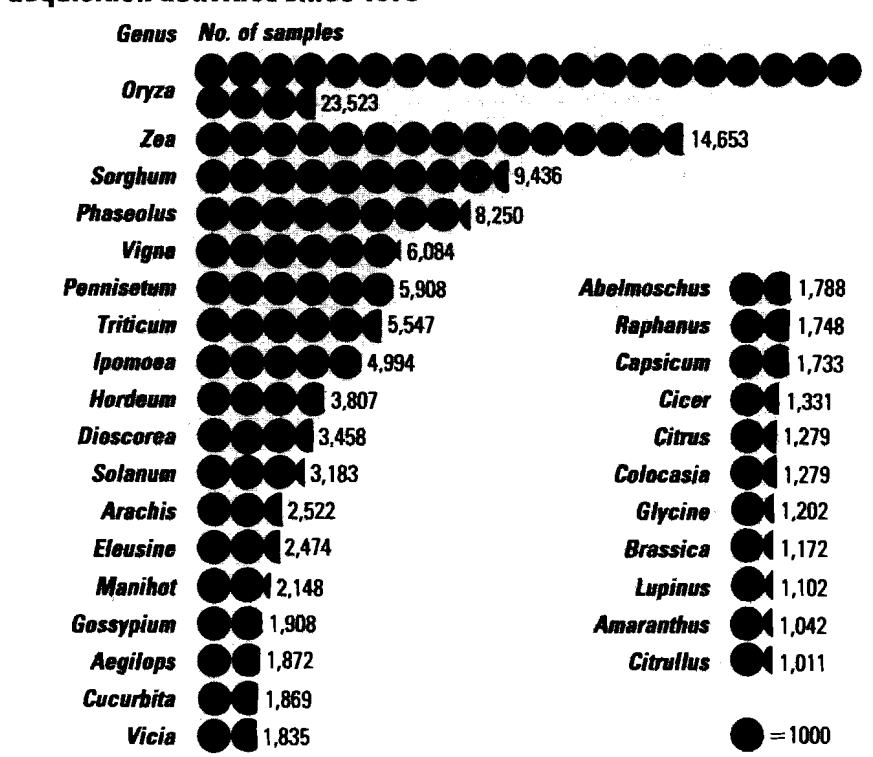
IBPGR's participation in the global network includes work with active and base collections, and assistance for documentation activities; however, IBPGR's most important contribution to the network is through the work of its outposted staff. IBPGR supports the collecting of germplasm through a variety of mechanisms but all in partnership with the national programmes. When there is a high priority for collecting in a particular area or for a particular genepool, IBPGR appoints a number of collectors.

In 1987, IBPGR had five full-time Collectors on staff based in Peru (CIP, sweet potato), Costa Rica (CATIE, Meso-American crops), Zimbabwe (University of Zimbabwe, wild *Vigna* species), Cyprus (ARI, Mediterranean crops and forages), and Niger (IBPGR/ICRISAT, Sahelian material).

IBPGR distribution centres facilitate the rapid processing of collected material and satisfy a need for the maintenance of good scientific standards. Negotiations were concluded in 1987 with the Department of Botany, National University of Singapore to establish there the second IBPGR Seed Handling Unit. The success of the IBPGR Unit at Kew in effecting the rapid transfer of material to base collections bodes well for the future of this second project.

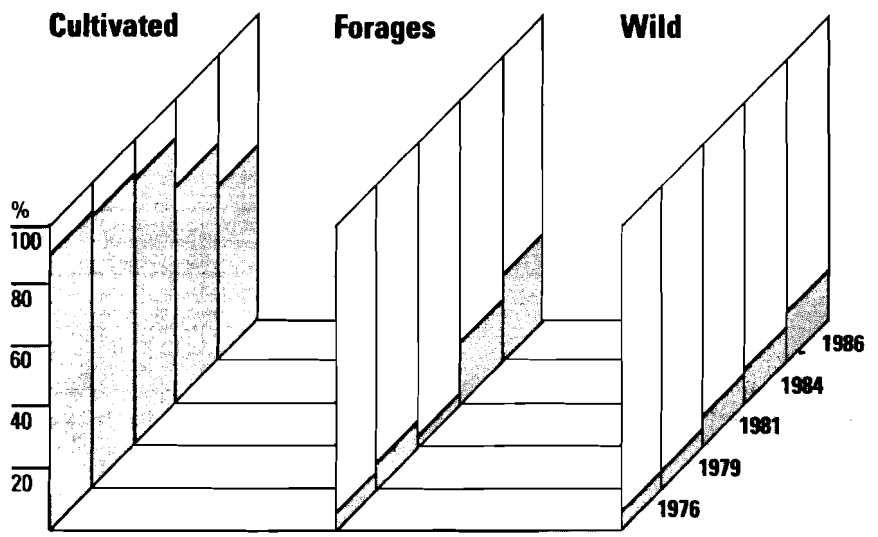
The Unit at Kew continues to serve an essential role while acting as an independent intermediary for IBPGR in the exchange of valuable germplasm between countries. During 1987, 5,302 samples were handled; many of these were distributed to more than one genebank. 30 missions supplied samples from 26 countries.

Figure 1 The genera that received most attention in IBPGR germplasm acquisition activities since 1976



Over the years, IBPGR-supported collecting missions have been active in at least 115 different countries. In the early days, priority was given to collecting landraces and primitive cultivars but in recent years, greater emphasis has been placed on wild material (see Figure 2). 1987 work is summarized here.

Figure 2 Comparison between number of samples collected for cultivated, forage and wild material over the period 1976-1986

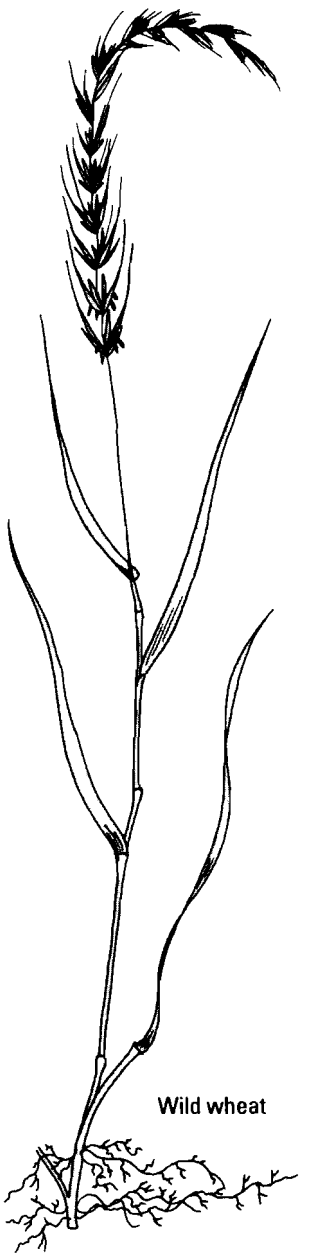


The Arabian Peninsula

Very little collecting of genetic resources has been carried out in the Arabian Peninsula in the past. Prior to this year, IBPGR had fielded only two collecting missions for cultivated species in this region, both to the Yemen Arab Republic in 1980. One mission to collect wild forages went to the People's Democratic Republic of Yemen in 1985. And yet, this is a region where agricultural development in the last fifteen years has been very rapid, and it is therefore understandable that various areas within it have been recently singled out as high priority targets for collecting.

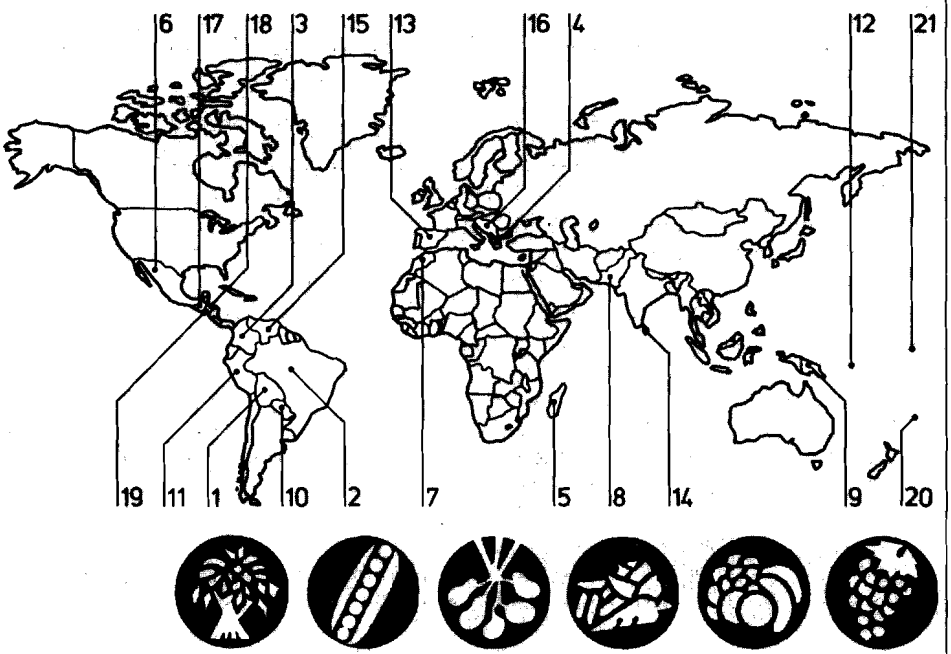
One such area is the Sultanate of Oman. IBPGR has listed the northern Hajar mountains of Oman as important for wheat collecting. The collection of alfalfa from the southern part of the Arabian Peninsula as a whole was seen as a priority by a recent IBPGR Forages Working Group meeting. The Ministry of Agriculture and Fisheries of the Sultanate of Oman is aware of the urgency of collecting plant genetic resources, and initiated a programme to this effect some years ago. IBPGR supported this effort by fielding a collecting mission between April and July this year by the Collector for the Mediterranean and Southwest Asia. The mission was aimed at cultivated species (particularly wheat), the local material of which are under pressure from new, improved varieties. The mission has served at the same time to lay the groundwork for the future collecting of wild species in both the arid northern mountains and the unique, monsoon-affected Dhofar Mountains of the south.

The number of wheat and barley accessions from the Arabian Peninsula in the international germplasm conservation system is probably fewer than 200 for each crop, the bulk of which is material from the Yemen Arab Republic; To this can now be added for the first time material from Oman, amounting to some 72 wheat accessions, mostly hexaploids, and 51 barley accessions. Among the total of 510 samples of 58 species from about 150 sites throughout Oman, are also included 56 samples of sorghum, 49 of cowpea, 10 of mung bean, 23 of maize, and 83 of Medicago.



Wild wheat

Figure 3 Landraces and primitive cultivars collected in 1987



Country	Cereals	Food legumes	Roots and tubers	Vegetables	Fruits	Industrial crops
1 Bolivia					*	Cocoa
2 Brazil		Groundnut				Cotton
3 Colombia			Sweet potato Yams Cassava			Cocoa
4 Greece						Grape
5 Madagascar	Rice	*Vigna*				
6 Mexico				Cucurbitaceae		
7 Morocco	Maize					
8 Pakistan					*	
9 Papua New Guinea			Sweet potato Yams	*	Banana	
10 Paraguay	Maize					
11 Peru	*			*		Cotton
12 Solomon Islands			Sweet potato Yams		Breadfruit	
13 Spain				*		
14 Sri Lanka	*	*		*		
15 Venezuela	Maize					Cocoa
16 Yugoslavia				*Brassica* *Beta*		
17 Guatemala	Maize	*Phaseolus*			*	
18 Honduras	Maize				*	
19 El Salvador	Maize				*	
20 Fiji					Breadfruit	
21 Pacific Islands					Breadfruit	

*The symbol means that a number of species were collected.

In 1987, IBPGR organized, or assisted in the organization of, 22 projects for collecting landraces and primitive cultivars. These are summarized here, and Figure 3 gives an overview of the material collected.

Bolivia

IBTA collected 21 samples of cocoa and 45 samples of tropical fruits and palms in the Departments of La Paz and Beni. These are being evaluated at La Jota Experimental Station.

Brazil

CENARGEN, Texas A&M University (USA) and the Universidad Nacional del Nordeste, Corrientes (Argentina) collected groundnut, including wild *Arachis* species, in the Campo Grande area of Brazil. 81 cultivated and 50 wild accessions were collected, together with 25 *Rhizobium* samples. At least two new species were obtained. CENARGEN is carrying out a number of other IBPGR projects in Brazil to collect landraces and primitive cultivars. Cotton collecting in the states of Goias, Piaui and Rondonia has resulted in the acquisition of 160 accessions.

Colombia

Three projects were finished in Colombia in 1987: 299 samples of cocoa germplasm were collected by ICA along the Atlantic and Pacific coasts; further collecting took place for sweet potato and yam; and the Universidad Nacional de Colombia collected 88 samples of cassava in the eastern 'llanos'.

Egypt

The Horticultural Research Institute at Giza collected a further 115 samples of vegetable landraces from the Egyptian Delta region. The samples consisted primarily of *Allium*, *Brassica* and *Lactuca* species.

Greece

The extensive *Vitis* collecting and conservation programme started by the Vine Institute, Lykovrissi in Athens, continued in 1987. 163 cultivars from 17 departments in Greece have been established this year in the field genebank.

India

Survey and collecting of *Allium* species continued in western India. A further 28 samples were added to the previous collections, all of which are now in the multiplication and evaluation phases.

Madagascar

FOFIFA is collecting a wide range of rice and legume cultivars throughout the country, which are expected to be replaced soon by modern introduced cultivars. A mission to the north and central east of the country collected 280 rice samples and 40 legume samples.

Meso-America

IBPGR, in consultation with CATIE, has based a project in Meso-America to collect wild populations and primitive landraces of *Zea*, *Phaseolus*, *Capsicum*, *Cucurbita*, *Theobroma*, *Gossypium*, and some fruits. Collecting took place during 1987 in Guatemala, Honduras and El Salvador.

Mexico

INIFAP and the University of California, Davis (USA) collected wild and cultivated species of cucurbits from the Sierra Madre Occidental of Mexico. 163 plant samples (seeds, fruits and herbarium specimens) were gathered from 33 sites in the states of Chihuahua, Nayarit, Sinaloa and Sonora. In the Balsas Valley of Michoacan and Guerrero an additional 11 samples were collected.

Morocco

A project in Morocco, to collect and also to evaluate local cultivars of maize in the major regions of traditional cultivation, has been completed, with 40 distinct accessions collected, characterized and evaluated.

Pacific

The Pacific Tropical Botanic Garden in Hawaii and the University of Hawaii have successfully collected breadfruit cultivars throughout the Pacific area. Collection of germplasm and propagating material has been completed, with almost 300 specimens coming from Fiji, Solomon Islands, and French Polynesia, including the Marquesas and Micronesia.

Abelmoschus

Ecogeographical surveys

Some germplasm-collecting missions are also expected to carry out more detailed ecogeographic surveys, which seek to determine the geographical range of a species and its altitudinal range, to survey the habitat, including description of the vegetation types, edaphic preferences, parent rock, etc., and to estimate the population sizes and threats to the local population of the species as a whole. These data are then used in correlations of descriptions following grow-out.

During 1987, an IBPGR consultant prepared detailed surveys of areas and taxa that were about to be collected, or about which information was required to make collecting decisions. The studies included: ecological recommendations for the exploration of plant genetic resources in the Central African Republic (northern part), Mauritania and southern Chad; ecological information on the exploration of the genetic resources of wild Eleusine *in Africa, wild* Pennisetum *in Kenya, wild* Sorghum *in Ethiopia, Kenya and Sudan; the ecology and distribution of wild* Vigna *in Botswana, Malawi, Swaziland, Tanzania, Zaire, Zambia and Zimbabwe.*

The genus Abelmoschus *was studied and reports prepared on the ecology and distribution of the genus in Bangladesh, Bhutan, India, Papua New Guinea, Solomon Islands and Sri Lanka. The distribution of* Avena macrostachya *in Algeria was also studied. A detailed species report on material under threat by the building of dams on the Euphrates River in southeast Turkey was also completed.*

Pakistan

PARC has completed a survey and collecting project on the threatened germplasm of cultivated and wild fruits in the North West Frontier Province and Azad Kashmir. Collecting was carried out in two phases: fruits in the summer and vegetative material in the winter. 205 samples and 216 vegetative samples were obtained from a large area of both provinces, with species of the following genera represented: *Pyrus*, *Punica*, *Prunus*, *Vitis*, *Malus*, *Ficus*, *Juglans*, *Morus*. Further collecting of rice varieties took place in the Sind and North West Frontier Provinces. A total of 204 samples was obtained. Severe genetic erosion in local rice was reported from Sind.

Papua New Guinea

A project – supported through special project funds from the Government of Japan – to explore and collect indigenous plant genetic resources and their wild relatives in root crops and traditional vegetables, was completed in 1987.

Paraguay

A project to collect local varieties of maize in the southeast region started in 1987 under the supervision of Paraguay's Instituto Agronomico Nacional.

Peru

Cotton (*Gossypium barbadense* and *G. raimondii*) collecting by INIPA in association with Texas A&M University, has produced 152 accessions of native cotton from northern Peru. Germplasm was collected between 5 and 2,100 metres; the latter is almost certainly the highest altitude in the world from which a landrace of this cultivar has been collected. INIPA is continuing to collect Andean roots, tubers and cereals. A further 162 samples have been gathered from the mountains of northern Peru.

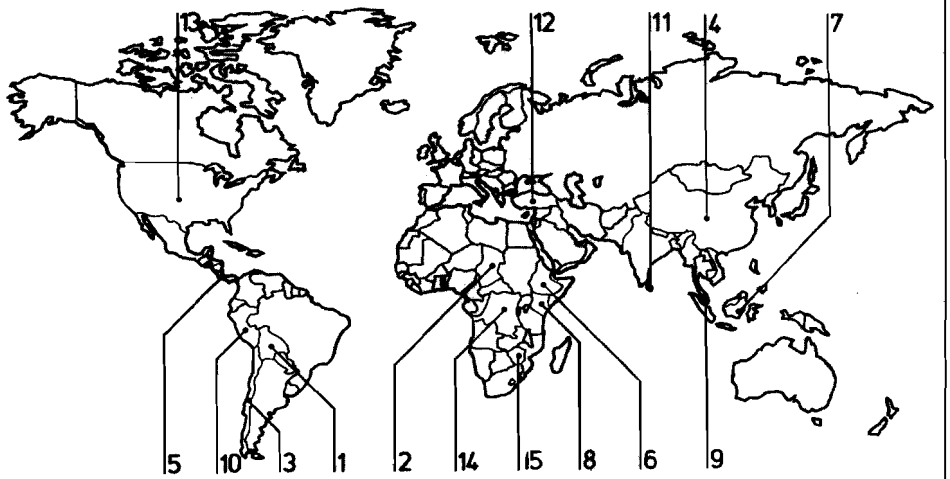
Solomon Islands

An IBPGR Intern is continuing with a programme on the genetic resources of root and tuber crops. Two provinces were visited in 1987 and the following collected: *Amorphophallus* sp., *Abelmoschus manihot*, *Colocasia esculenta*, *Dioscorea alata*, *D. esculenta* and *Ipomoea batatas*.

Spain

Exploration and collecting of vegetable germplasm continued in areas that had not previously been visited. This project is being carried out by the Universidad

Figure 4 Collecting wild species in 1987



Country	Species collected	Country	Species collected
1 **Bolivia**	*Capsicum*	9 **Malaysia**	Mango
2 **Chad**	*Sorghum, Pennisetum, Vigna*	10 **Peru**	*Phaseolus*
3 **Chile**	*Lycopersicon*	11 **Sri Lanka**	*Abelmoschus*
4 **China**	Triticeae	12 **Turkey**	*Triticum, Aegilops, Hordeum*
5 **Costa Rica**	*Phaseolus*	13 **USA**	*Helianthus*
6 **Ethiopia**	*Sorghum*	14 **Zaire**	*Psophocarpus*
7 **Indonesia**	Mango	15 **Zimbabwe**	*Vigna*
8 **Kenya**	*Sorghum*		

Politécnica, Valencia in association with INIA. The 681 samples collected included: *Allium cepa*, *A. sativum*, *Beta vulgaris*, *Capsicum annuum*, *Cucumis* spp., *Citrullus lanatus*, *Cucurbita* spp., *Lycopersicon esculentum*, *Solanum melongena*.

Sri Lanka

An IBPGR project to collect the local germplasm of finger millet, sorghum, sesame and groundnut was expanded to include maize, minor millets, grain legumes and vegetables, since the indigenous germplasm of these crops is under threat. Officers of the Department of Agriculture visited six agro-ecological zones and, with the help of the agricultural extension workers and breeders of the regional agricultural research centres, made valuable collections of 962 samples representing 35 species.

Syria

The Agricultural Research Directorate of Syria continued to collect local vegetable cultivars which are under serious threat due to genetic erosion. 156 samples were obtained, principally of the genera *Allium*, *Beta*, *Brassica* and *Phaseolus*.

Venezuela

In relation to the collecting of wild and cultivated *Theobroma* in the Amazon area, FONIAP is planning to concentrate on obtaining local 'Criollo' varieties grown by native communities in the jungle. Maize landraces along the Orinoco River have been identified by the former IBPGR Maize Advisory Committee as constituting a major gap in existing collections. As well as sampling maize in the river area, FONIAP is collecting cassava and oil palm in the Orinoco Delta.

Yugoslavia

IFVC is running a project to collect and characterize landraces of *Allium*, *Beta* and *Brassica*. Collecting in 1987 centred on Dalmatia for *Allium*.

WILD RELATIVES OF CROPS

IBPGR organized 11 projects in 1987 that dealt primarily with wild species. Figure 4 summarizes the collecting and ecogeographic surveys carried out for wild species, including wild material collected during projects which were predominantly aimed at collecting cultivated material.

***Abelmoschus* – Sri Lanka**

Collecting in association with the Royal Botanic Garden, Peradeniya, January to March 1987, concentrated on: *A. angularis* var. *purpureus*, *A. angularis* var. *grandiflorus*, *A. ficulneus*, *A. moschatus* subsp. *moschatus* var. *moschatus* and *A. esculentus*.

Cereals – Turkey

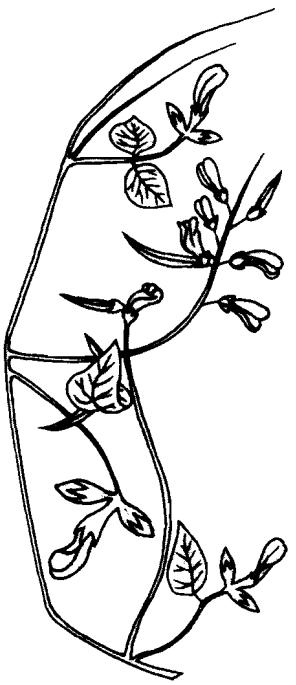
Dam building will flood large areas in southwest Turkey and the habitat in other areas will be influenced by a major irrigation scheme. Collecting of cultivated, and in particular, wild genetic resources of cereals is under way. An IBPGR consultant, and staff from ARARI, Ankara have collected 731 samples. Principal genera collected were *Triticum*, *Aegilops*, *Hordeum* and *Bromus*.

Crops and forages – Chad

In December 1987, IBPGR started a project in central and southern Chad to collect wild populations of related crop (and forage) species. Many previous collections of crop relatives have been lost through civil war. Off season 'berber' sorghum (and late fruiting *Acacia albida*) will also be sought.

Mango – Indonesia and Malaysia

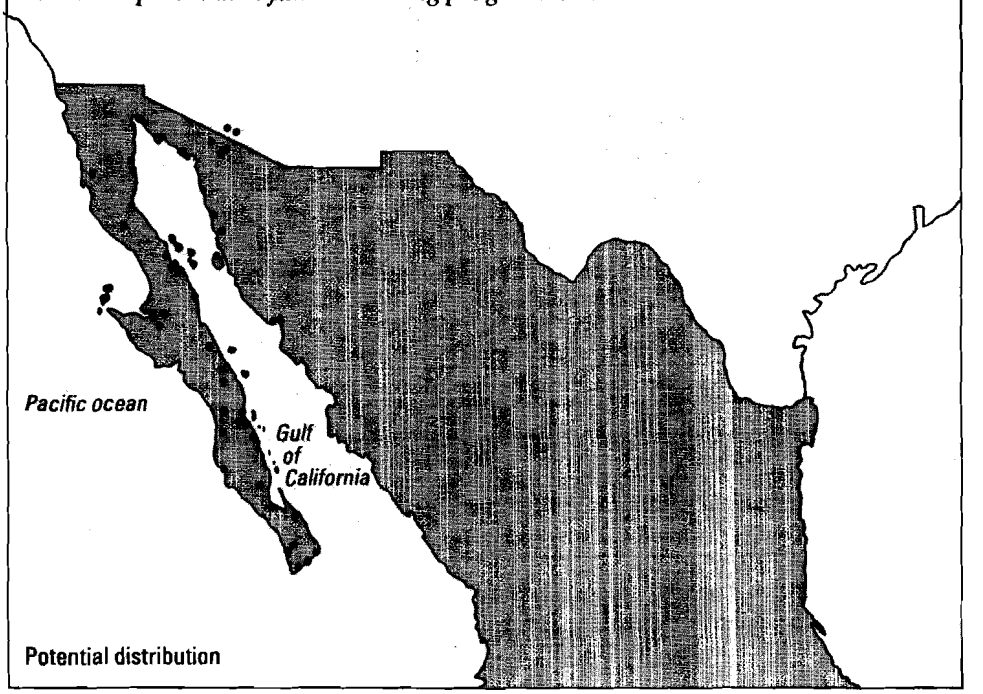
IBPGR, IUCN and WWF are jointly sponsoring field surveys of wild mangoes in Indonesia and Malaysia. The IBPGR collector has been able to penetrate many



Phaseolus filiformis

***Phaseolus filiformis* in western Mexico**

Phaseolus filiformis *is an annual species found growing under extremely arid conditions in western Mexico. It not only tolerates drought but resists several major disease of beans, such as halo blight and anthracnose, and thus has enormous potential in future breeding programmes.*



remote areas of Kalimantan. 21 of the 25 species of *Mangifera* recorded from the province have already been collected. At least four new species are likely to be described. The project will greatly enhance the pool of new germplasm for breeding and selection.

Pepper – Bolivia

A team from IBTA, IBPGR and Miami University, Ohio, USA, collected 270 specimens of germplasm of wild pepper species, especially the relatives of the domesticated species.

***Phaseolus* – South America**

In 1987, a former IBPGR Intern collected 46 samples of 11 different taxa in central Costa Rica, in particular *Phaseolus vulgaris*, both as wild and escaped forms, the type of *P.oligospermus* and a new form of the *P. coccineus* complex, *P. striatus*. He also collected 176 samples of four *Phaseolus* species during exploration in Lima, Junin, Apurimac and Cuzco in central and southern Peru. Of particular interest are: *P. vulgaris* as landraces (139), escapes (3) and wild forms (7), and 19 populations of *P. pachyrrhizoides*.

Sorghum – East Africa

Eastern Africa – particularly Ethiopia, Kenya and Sudan – is a priority area of diversity for wild species of *Sorghum*. IBPGR sponsored scientists from the NBPGR, India to collect in these areas during the latter half of 1987.

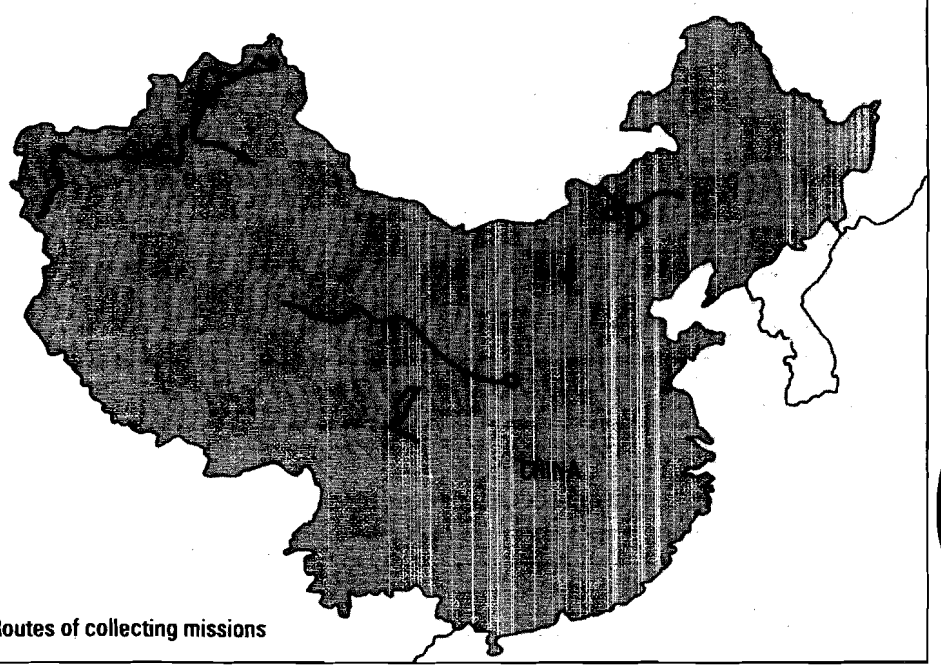
Sunflower – North America

Wild *Helianthus* species are under-represented in existing collections. The CAC-USDA for sunflower and the ECP/GR Sunflower Working Group have agreed on a 4-year collecting programme in North America. In September 1987, collectors from

Triticeae

Collecting Triticeae in China

Valuable Triticeae germplasm for future cereal-breeding projects was collected in northern and western China by CAAS and IBPGR, with assistance from INRA and the Swedish University of Agricultural Sciences.

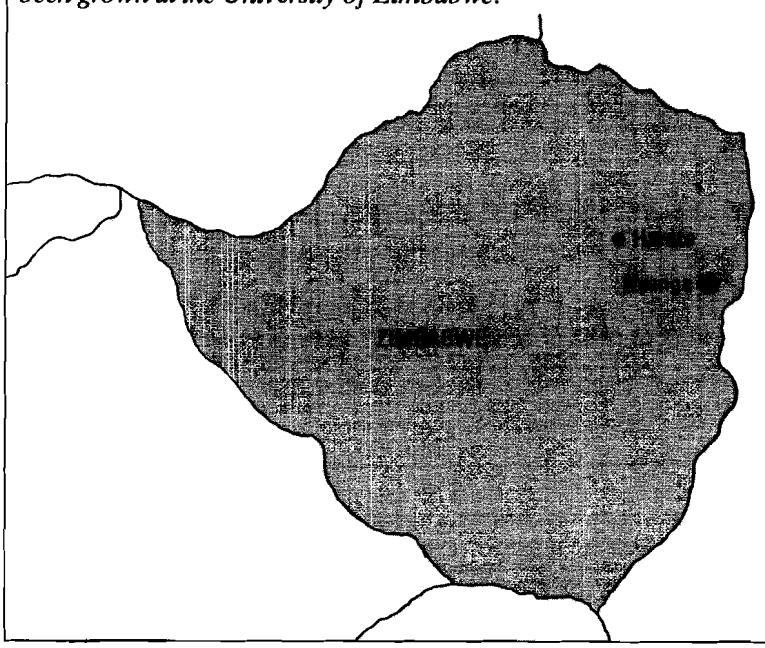


Routes of collecting missions

Vigna nyangensis Mithen

A new *Vigna* species

On a mission in the Eastern Highlands of Zimbabwe, an IBPGR Collector found a plant community at the edge of Udu Dam, Nyanga, containing Vigna oblongifolia *A. Rich. and what appeared to be another* Vigna *species. This second species, while superficially similar, was clearly distinct due to its darker and shorter leaves and the distinctive winged peduncles. The site had to revisited to obtain flowering specimens and ripe seeds. After comparison with herbarium sheets and published descriptions, it became apparent that this was a previously undescribed species belonging to the subgenus* Haydonia*; the species is to be known as* Vigna nyangensis *Mithen. Plants have subsequently been grown at the University of Zimbabwe.*



the Field Crops and Vegetable Growing Institute, Yugoslavia and USDA-ARS mounted the first mission to the northwest Pacific region. A total of 52 samples were obtained.

Tomato – Chile

A third mission to collect wild tomato species in the north of the country found some very rare species of *Lycopersicon*.

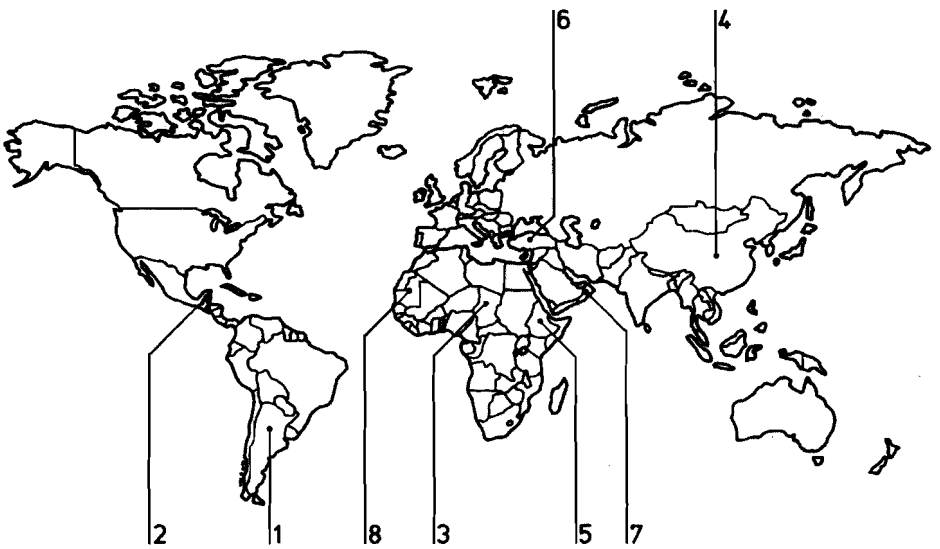
Triticeae – China

A project initiated in 1986 to collect Triticeae reported a successful survey of the grasslands of northern and western China. In Inner Mongolia, the main ecological regions of the Xilingol Grassland were sampled and 55 accessions collected, which represented five genera of 21 species/subspecies of interest in wide crossing of wheat and barley (*Agropyron*, *Roegneria*, *Elymus*, *Aneurolipidium* and *Hordeum*). In western China, 615 seed collections were made of 10 genera of 76 species. A 1987 mission to Xinjiang Province was carried out jointly by scientists from the CAAS and the Swedish University of Agricultural Sciences. This mission collected along the edge of the Gobi Desert and in the Karakorum Mountains up to 3,700 metres above sea level.

***Vigna*– Southern Africa**

The IBPGR Collector in Southern Africa collected 133 samples of 45 species of wild crop relatives or forages in Zimbabwe. In collaboration with a plant collector from IITA, over 400 samples of cultivated plants were gathered. In addition, 172 herbarium specimens have been collected and will be deposited at both the National Herbarium and RBG, Kew. A number of species were reported from Zimbabwe for the first time and a new species has been described.

Figure 5 Collecting forages in 1987



Country	Specific collecting for forages
1 **Argentina**	*Briza, Bromus, Lycium, Pappophorum, Piptochaetium, Poa, Sorgmastrum, Stipa*
2 **Belize**	*Aeschynomene, Centrosema, Desmodium, Leucaena, Macroptilium, Stylosanthes*
3 **Chad**	*Acacia, Pennisetum* (forage forms)
4 **China**	*Agropyron, Elymus, Hordeum, Roegneria, Aneurolepidium*
5 **Ethiopia**	*Cenchrus, Chloris, Digitaria, Stylosanthes, Panicum, Trifolium*
6 **Turkey**	*Vicia, Lathyrus*
7 **Oman**	*Medicago, Cenchrus, Pennisetum, Trigonella*
8 **Mauritania**	*Vigna, Pennisetum, Cenchrus, Andropogon*

Winged bean – East Africa

While world collections of winged bean have representative variability of the cultivated *Psophocarpus tetragonolobus*, they are completely lacking in wild species from Africa. A project to collect this genus in East Africa was conducted throughout 1987. *P. lancifolius* can now be considered either very rare or extinct in Kenya as a result of habitat destruction. In Zaire, accessions were collected in the provinces of Kinshasa, Bas Zaire, Kivu and Shaba: *P. grandiflorus*, *P. lancifolius*, *P. lancifolius* – yellow-seeded form, *P. lecomtei* and *P. scandens*.

FORAGES

Eight specific projects for the collection of forages were undertaken by IBPGR in 1987. Figure 5 provides a summary of the 1987 surveys for forages.

Argentina

Two forage-collecting projects are continuing in Argentina. INTA in San Luis is searching for native forage germplasm, with an emphasis on *Briza*, *Bromus*, *Poa* and *Sorghastrum*. INTA, Rio Negro is collecting forage species native to the desert-like plateau in the province of Rio Negro, in particular *Bromus*, *Lycium*, *Pappophorum*, *Piptochaetium*, *Poa* and *Stipa*.

Belize

In Belize a project is under way to collect both forage and house species from areas not previously collected. Genera that are targeted include *Aeschynomene*, *Centrosema*, *Desmodium*, *Leucaena*, *Macroptiloium* and *Stylosanthes*.

China
The Triticeae project described earlier also includes forages.

Ethiopia
In 1987, the IBPGR Intern based at ILCA carried out his third collecting mission in the area between Addis Ababa and Arsi Negele. Only *Acacia* spp. were collected, the principal species being *A. abyssinica*, *A. albida* and *A. seyal*. A fourth mission was to Sidamo province in the south of the country. Several forage species were collected, including *Cenchrus ciliaris*, *Chloris roxburghiana*, *Digitaria macroblephora*, *Panicum maximum* and *Stylosanthes fruticosa*.

Turkey
An IBPGR-sponsored project to collect Vicieae comprised two collaborating groups, the Vicieae Project Group from Southampton University, UK and ARARI in Menemen, Turkey. In all, 317 *Vicia*, 164 *Lathyrus*, 26 *Pisum* and 31 *Lens* seed accessions, representing 69 taxa, were collected from 66 sites in southwest Turkey. The germplasm included material from three sites of a new *Vicia* species, closely allied to *Vicia faba*, and from one site a new *Lathyrus* species allied to *L. odoratus*. Although not the wild progenitors of the cultivated species, they are undoubtedly important finds.

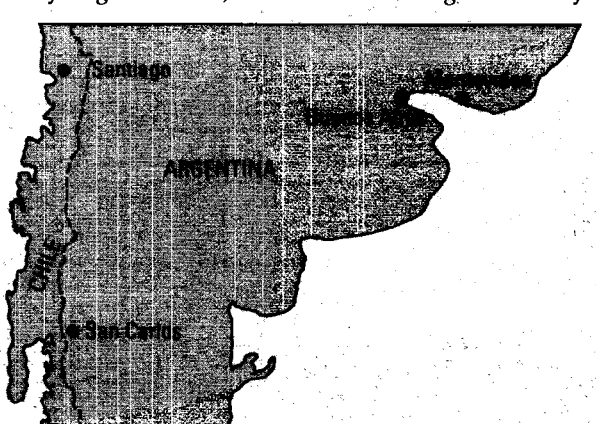
Sahel
An IBPGR Collector newly stationed in the IBPGR Field Office for West Africa will greatly facilitate future collecting missions in the Sahel. The first mission – to the central and southern areas of Mauritania – was particularly aimed at the wild relatives of *Pennisetum* and *Vigna* and forage species. One important part of the Collector's activities will be to assess the genetic diversity of the region and provide data on the genetic erosion that is taking place.

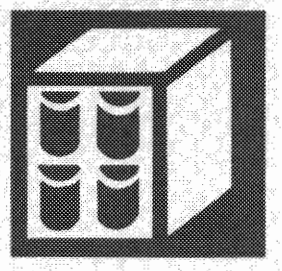
Bromus mango

An ancient *Bromus* rediscovered

The Auracano Indians of Chile and adjacent parts of Argentina selected and grew a biennial cereal known colloquially as 'mango'. During the first year of planting, this species, Bromus mango, *provided high-quality forage for grazing livestock. During the second year the plants were allowed to mature, inflorescences were harvested and threshed, and the grains were toasted and ground into flour. Mango was used to make an unleavened bread called 'cougue' or a Chicha drink. Cultivation was eventually abandoned when wheat introduced from Europe came to be widely grown in temperate South America (Zeven, A.C. and De Wet, J.M.J. 1982. Dictionary of Cultivated Plants and Their Regions of Diversity. Pudoc, Wageningen).*

INTA in Rio Negro, in the course of their exploration to collect indigenous forage material, rediscovered this species, thought to be extinct, near San Carlos de Bariloche. This is an important find, not only because the species is related to important forage cultivars, but also because it grows on infertile acid soils.





Once collected, plant genetic resources must be conserved. This can be done in several ways: *ex situ* or as plants growing in field genebanks; as plants growing in the natural environment *in situ*; or as tissue maintained in *in vitro*; culture.

For long-term storage, seed is kept in base collections at low temperatures and seed moisture contents. Since base collections are for long-term security, materials are not exchanged. For shorter term storage, seed is held in active collections, often under less stringent conditions.

Active collections exchange materials, grow out plants and characterize them and so are not defined by storage conditions alone. These are the collections to which a breeder or scientist applies for samples. Field genebanks contain plants that have seeds whose storage may be problematic or plants that are normally multiplied asexually. These genebanks are also considered active collections.

Tissue is not yet held routinely *in vitro*, in base collections under cryopreservation, although this possibility is being researched.

Wild populations of species can be conserved in their natural habitats, although monitoring and the assurance of their continued well-being can present problems. IBPGR does not pursue research on *in situ* conservation at present but liaises with other organizations that are more concerned with conservation of ecosystems.

Seed conservation

Seed conservation is the most common and the most economical method for conserving plant genetic resources. Seeds of most major field crops, vegetables and forages can remain viable for extended periods if they are dried and kept at low temperatures. Large refrigerated facilities are not always required; in many cases domestic freezer chests along with seed-drying equipment provide low-cost technological solutions.

The newly opened Chinese Genebank in CAAS, Beijing. IBPGR will open a Field Office in Beijing in 1988.

The global network of base seed collections

With the cooperation of international centres, national institutes and universities, a world-wide network of base seed collections has been established. This network, which is continually under review, continues to expand. The requirements for the hosting institutes were detailed in the 1986 IBPGR Annual Report (pp. 27-28). Table 1 lists the crops designated for base collections and the centres which have undertaken an agreement, up to the end of 1987.

A number of national programmes expanded their existing conservation facilities during 1987 and whenever possible these were drawn into the network.

Following completion of new storage facilities in the National Crop Germplasm Centre, CAAS, Beijing, China, the CAAS agreed to maintain the global base collections of *Brassica oleracea* and *Raphanus* spp., and a regional collection of wheat.

After long-term storage rooms had been built in NBPGR, New Delhi, India, base collections of the following crops will be held there:

Vigna mungo (global); *Vigna umbellata* (global); *Capsicum* (Asian); *Raphanus* (Asian); *Brassica campestris* (oil seed) (Asian); *Brassica juncea* (oil seed) (Asian); okra (global); *Cajanus cajan* (global); hyacinth bean (global); safflower (global); and eggplant (global).

CGN in Wageningen, the Netherlands, after a change of crop priorities, asked IBPGR to rearrange the responsibility for maintaining the global base collection of *Capsicum*. Once germination tests for the accessions have been finished, the whole collection will be transferred from CGN to AVRDC.

DATABASE OF GENEBANKS

IBPGR experts have continued to visit the centres designated to hold base collections. The visits allow IBPGR the opportunity to provide advice on meeting acceptable and preferred scientific standards. Most of the genebanks visited do meet the standards, and this is particularly encouraging since many of these are based on very recent developments in seed physiology and technology. Those genebanks that did not meet all standards are immediately taking corrective actions and IBPGR will continue to prompt others to upgrade their facilities.

This survey of genebanks continues to provide valuable information. A database of genebanks and the standards they use has been started and will be maintained by IBPGR.

Developments in seed conservation

In 1987, many new facilities to store genetic resources were established. Below are some of the year's highlights, covering both long-term storage (as base collections) and storage in active collections.

ILCA, Ethiopia: With major financial support from FRG and minor support from IBPGR, new storage facilities have been completed for medium-term storage. These include a cold storage room, seed drying room, seed processing room, laboratory and offices.

Radzikow, Poland: The construction of the seed storage facility that began several years ago was completed in 1987. The collection is in the process of being transferred into the new −18°C storage chamber.

INIA, Spain: This new facility, which includes a seed drying room, cold rooms (−15°C and −2°C), and laboratories, is now fully operational.

NIAR, Japan: The current long-term storage room has reached its capacity. A new facility that can hold 110,000 accessions in both long- and medium-term storage is under construction. A robot system has been designed to transfer seed samples in and out of the long-term storage room. The facility will be completed in 1988.

NBPGR, India: The capacity of the existing long-term storage room has been exceeded. Four prefabricated cold storage rooms are under construction. Two of these were completed in November 1987.

Genebank, Karadj, Iran: The construction of the genebank is essentially complete, although its inauguration has been delayed.

BVRC, Beijing: BVRC received about US$8 million from the Japanese Government to construct seed storage and testing laboratories among other

Table 1 Global network of base collections of seed crops

Crop	Species covered	Scope of collection	Institute
		Global / European / African / Asian / Regional / New World	
Cereals	Barley	●	PGR, Ottawa, Canada
		●	NGB, Lund, Sweden
		●	PGRC/E, Addis Ababa, Ethiopia
		●	NIAR, Tsukuba, Japan
		●	ICARDA
	Maize	●	NPGS, USA
		●	NIAR, Tsukuba, Japan
		●	TISTR, Bangkok, Thailand
		●	VIR, Leningrad, USSR
		Mediterranean	Portuguese Genebank, Braga Portugal
	Millets *Pennisetum*	●	NPGS, USA
	Pennisetum	●	PGR, Ottawa, Canada
	Pennisetum	●	ICRISAT
	Eleusine	●	PGRC/E, Addis Ababa, Ethiopia
	Eleusine	●	ICRISAT
	Minor Indian millets	●	NBPGR, New Delhi, India
	Eragrostis	●	PGRC/E, Addis Ababa, Ethiopia
	Panicum miliaceum	●	ICRISAT
	Setaria italica	●	ICRISAT
	Oats	●	PGR, Ottawa, Canada
		●	NGB, Lund, Sweden
	Rice *Oryza sativa* –		
	indica	●	IRRI
	javanica	●	IRRI
	japonica	●	NIAR, Tsukuba, Japan
		●	IITA, Ibadan, Nigeria
		●	NPGS, USA
	Wild species	●	IRRI
	Rye	●	Polish Genebank, Radzikow
		●	NGB, Lund, Sweden
	Sorghum	●	NPGS, USA
		●	ICRISAT

Crop	Species covered		Scope of collection						Institute
			Global	European	African	Asian	Regional		
Cereals	Wheat	Cultivated species	●						VIR, Leningrad, USSR
			●						CNR, Bari, Italy
			●						NPGS, USA
						●			CAAS, Beijing
		Wild species (*Triticum* and *Aegilops*)	●						Plant Germplasm Institute, University of Kyoto, Japan
Food Legumes	Chickpea		●						ICRISAT
			●						ICARDA
	Faba bean		●						CNR, Bari, Italy
	Groundnut		●						ICRISAT
								South American	INTA, Pergamino, Argentina
	Lentil		●						ICARDA
	Lupin		●						ZIGuK, Gatersleben, GDR
				●					INIA, Madrid, Spain
	Pea		●						NGB, Lund, Sweden
								Mediterranean	CNR, Bari, Italy
								Central and East European	Polish Genebank, Radzikow, Poland
	Phaseolus	Wild species	●						Faculté des Sciences Agron. de l'Etat, Gembloux, Belgium
		Cultivated species	●						CIAT
		Cultivated species	●						NPGS, USA
				●					FAL, Braunschweig, FRG
	Pigeonpea		●						ICRISAT
	Soyabean		●						NIAR, Tsukuba, Japan
			●						NPGS, USA
		Wild perennial	●						CSIRO, Canberra, Australia
	Vigna	Wild species	●						Faculté des Sciences Agron. de l'Etat, Gembloux, Belgium
		V. radiata	●						IPB, Los Baños, Philippines.
			●						AVRDC, Taiwan, China
		V. unguiculata	●						IITA
			●						NPGS, USA
	Winged bean		●						IPB, Los Baños, Philippines
			●						TISTR, Bangkok, Thailand
Root Crops	Cassava (seed)		●						CIAT
	Potato (seed)		●						CIP
	Sweet potato (seed)		●						NPGS, USA
						●			AVRDC, Taiwan, China
			●						NIAR, Tsukuba, Japan

Crop	Species covered	Scope of collection					Institute
		Global	European	African	Asian	Regional	
Vegetables	*Allium*	●					CGN, Wageningen, Netherlands
		●					NVRS, Wellesbourne, UK
		●					NPGS, USA
						South and East European	RCA, Tápiószele, Hungary
					●		NIAR, Tsukuba, Japan
	Amaranthus	●					NPGS, USA
					●		NBPGR, New Delhi, India
	Capsicum	●					CATIE, Turrialba, Costa Rica
		●					CGN, Wageningen, Netherlands
	Cruciferae *Brassica carinata*	●					FAL, Braunschweig, FRG
	B. carinata	●					PGRC/E, Addis Ababa, Ethiopia
	B. oleracae	●					CAAS, Beijing, China
	B. oleracea	●					NVRS, Wellesbourne, UK
	B. oleracea	●					CGN, Wageningen, Netherlands
	Raphanus	●					CAAS, Beijing, China
	Raphanus	●					NVRS, Wellesbourne, UK
	Wild species	●					Universidad Politécnica, Madrid, Spain
		●					Tohoku University, Sendai, Japan
	Oilseeds and green manures:						
	B. campestris, B. juncea	●					PGR, Ottawa, Canada
	B. napus, Sinapis alba	●					FAL, Braunschweig, FRG
	Vegetables and fodders:						
	B. campestris, B. juncea, B. napus	●					NVRS, Wellesbourne, UK
	B. napus	●					FAL, Braunschweig, FRG
	All Cruciferae crops					*East Asian*	NIAR, Tsukuba, Japan
	Okra	●					NPGS, USA
	Tomato	●					CATIE, Turrialba, Costa Rica
		●					ZIGuK, Gatersleben, GDR
		●					NPGS, USA
					●		IPB, Los Baños, Philippines
	Southeast Asian vegetables				●		IPB, Los Baños, Philippines
	Cucurbitaceae *Benincasa, Luffa, Momordica, Trichosanthes*	●					IPB, Los Baños, Philippines
	Cucumis, Citrullus, Cucurbita	●					NPGS, USA

Crop	Species covered		Scope of collection						Institute
			Global	European	African	Asian	Regional		
Vegetables		*Cucumis, Citrullus*	●						INIA, Madrid, Spain
	Eggplant		●						CGN, Wageningen, Netherlands
			●						NPGS, USA
Industrial Crops	Beet		●						FAL, Braunschweig, FRG
			●						NGB, Lund, Sweden
								Mediterranean	Greek Gene Bank, Thessaloniki
	Cotton							*Mediterranean*	Greek Gene Bank, Thessaloniki
	Sugarcane (seed)		●						NIAR, Tsukuba, Japan
			●						NPGS, USA
	Tobacco							*Mediterranean*	Greek Gene Bank, Thessaloniki
Forages	Legumes	*Centrosema*	●						CIAT
			●						CENARGEN, Brazil
		Desmodium	●						CIAT
			●						CSIRO, Brisbane, Australia
		Desmanthus	●						CSIRO, Brisbane, Australia
		Stylosanthes	●						CIAT
			●						CSIRO, Brisbane, Australia
		Leucaena	●						NPGS, USA
		Lotononis	●						ILCA
			●						Seed Bank, RBG, Kew, UK
		Macroptilium	●						CENARGEN, Brazil
			●						CSIRO, Brisbane, Australia
		Neonotonia			●				ILCA
									Seed Bank, RBG, Kew, UK
		Zornia	●						NPGS, USA
									CIAT, Colombia
		Trifolium			●				ILCA
			●						Seed Bank, RBG, Kew, UK
	Grasses	*Cynodon*	●						NPGS, USA
		Cenchrus	●						Seed Bank, RBG, Kew, UK
									ILCA
									CSIRO, Brisbane, Australia
		Digitaria	●						ILCA
									CSIRO, Brisbane, Australia
									Seed Bank, RBG, Kew, UK
		Pennisetum	●						NPGS, USA
		Paspalum	●						NPGS, USA
		Urochloa	●						CSIRO, Brisbane, Australia
Others	Tree species							*(Fuel and environmental stabilization in arid areas)*	Seed Bank, RBG, Kew, UK

facilities. The budget includes training and exchange of scientists between Japan and BVRC. Construction will begin in 1988.

INTA, Argentina: INTA has received financial support from the Italian Government to construct a new storage facility at CIRN at Castelar. The Pergamino centre will serve only as an active collection (earlier, IBPGR had suggested that this might hold base collections). The construction of the new genebank will start in early 1988.

RDA Genebank, Republic of Korea: The Government has allocated US$1.5 million to upgrade its storage facilities. These are now under construction. A UNDP project on training and scientific exchange on germplasm conservation is in the final stages of development.

SADCC Regional Genebank, Africa: Nordic countries have agreed in principle to support financially the establishment of the SADCC regional genebank. IBPGR provided support in formulating the project.

Genebank in Taiwan, China: Several millions of US dollars have been allocated by the government to establish a genebank, probably in Taichung.

CIAT, Colombia: With financial support from the Italian Government, CIAT is currently upgrading its long-term storage facilities.

Genebank in Sri Lanka: With the financial support of the Japanese Government, a new genebank in Sri Lanka is currently being established.

CARARI, Ulus-Ankara, Turkey: With financial support from UNDP, a new facility for medium-term storage of crop germplasm will be established.

IITA, Nigeria: With financial support from the Italian Government, IITA upgraded its medium- and long-term storage facilities. These are now fully operational.

NPGS, USA: Discussions were underway during 1987 to expand the existing facilities of the National Seed Storage Laboratory which holds the base collections for NPGS.

Support for conservation facilities

IBPGR provided funds in 1987 for assistance in the upgrading of existing genebanks and for improving storage facilities in Costa Rica (Fabio Baudrite Experimental Station) and Paraguay (Instituto Agronomico de Caacupe).

Equipment such as dehumidifiers, electric generators, chest freezers, aluminium laminated bags, laminated bag sealers, seed testing equipment and seed cleaners were supplied to a number of countries, as shown in Figure 6.

Technical advice

IBPGR continues to provide technical advice to Governments and genebanks. In 1987 IBPGR staff and experts visited genebanks in Argentina, Belgium, Costa Rica, GDR, Hungary, India, Japan, Netherlands, Peru, Philippines, Portugal, Spain, Uruguay and USSR.

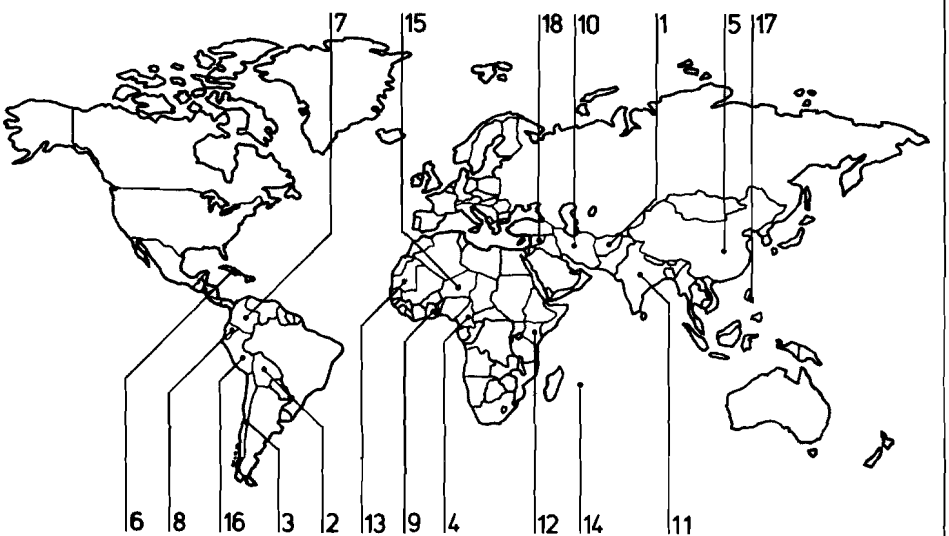
At the request of the Governments, experts also gave advice on the construction of the new storage facilities at BVRC, Beijing, China; SADCC member countries (Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe); MAAR, PDR Yemen and CARARI, Ulus-Ankara, Turkey.

Active collections

Active collections hold material under storage conditions that are usually less stringent than those for base collections, and their materials are made available for research and breeding. These collections act as a complement to base collections. Now that the global network of base collections has been largely established, it is logical to turn efforts towards building up an adequate network of active collections. During 1987, IBPGR began to develop the conceptual framework and policy guidelines and procedures for such a network. Currently, efforts are being made to identify all significant active collections. Ultimately, the two interconnected networks will be integral to the global activities.

The active network will be developed on the basis of individual crops, large collections with wider geographical coverage may require several active collection centres to undertake regeneration, multiplication, characterization and evaluation,

Figure 6 Institutions that IBPGR supplied with conservation equipment in 1987



Country	*Institution*
1 Afghanistan	(Agric. Res. Inst., Kabul)
2 Bolivia	(Centro Inv. Fitogenicas de Pairumani, Cochabamba)
3 Chile	(Universidad Austral, Valdivia)
4 Cameroon	(INRA, Yaoundé)
5 China	(Shaanxi AAS, Wugong; BVRC, Beijing)
6 Cuba	(Inst. de Inv. Fundamentales Agric. Tropicales, Havana; Indio Hautey, Matanzas)
7 Colombia	(Univ. Narino, Pasto)
8 Ecuador	(INIAP, Quito; Univ. Central, Quito; Univ. Cuenca, Cuenca)
9 Ghana	(Crop Res. Inst., Bunso)
10 Iran	(SPII, Karaj)
11 India	(NBPGR, New Delhi)
12 Kenya	(Mugumba Res. Station)
13 Mauritania	(CNRA, Kaedi)
14 Mauritius	(Min. Agr. Nat. Res., Reduit)
15 Niger	(INRAN, Niamey)
16 Peru	(INIAP, Cajamarca; Univ. Nacional San Antonio, Cusco; Univ. Nacional del Altoplano, Puno; Univ. San Cristobal, Huamanga, Ayacucho)
17 Philippines	(NPGR, Los Baños)
18 Syria	(PGRU, Douma)

documentation, and distribution of samples to users. On the other hand, the active collections of crops with a limited number of accessions or more restricted geographical diversity will need fewer centres.

During the second part of 1987, the criteria for centres acting as active collections for seed crops were prepared and are currently under consideration. These include functional aspects, availability of material, scientific standards, management standards and collaborative links.

FIELD GENEBANKS

During 1987, the number of designated active collections of vegetative materials in field genebanks was not increased. (See Table 2 for a detailed list.)

Table 2 Global network of field collections (active collections for vegetative material)

Crop	Species covered	Geographical representation			Institute
		Global	African	Asian	
Roots and Tubers	Cassava	●			CIAT
				Central American	INIA, Mexico
			●		IITA
	Sweet potato			*Asian and Pacific*	AVRDC, Taiwan, China
		●			IITA
Fruits	Banana	●			Banana Board, Jamaica
				Southeast Asian	PCARRD, Philippines
			●		DGRST, Cameroon
	Citrus			*East Asian*	Fruit Tree Research Station, Tsukuba, Japan
				Mediterranean	INIA, Valencia, Spain
				Mediterranean and African	IRFA, Corsica, France
				North American	USDA
				Latin American	CENARGEN, Brazil
				South Asian	IIHR, India*
				Subfamily Aurantioideae	University of Malaya, Kuala Lumpur, Malaysia
Industrial Crops	Cocoa	●			University of the West Indies, Trinidad and Tobago
		●			CATIE, Costa Rica
	Sugarcane	●			Sugarcane Breeding Institute, Coimbatore, India*
		●			USDA, Florida, USA
Perennial Species	*Allium*			*Short-day species*	Hebrew University of Jerusalem, Israel*
				Long-day species	Research Institute for Vegetable Growing and Breeding, Olomouc, Czechoslovakia
	Arachis			*Wild perennials*	CENARGEN, Brazil
	Glycine			*Wild perennials*	CSIRO, Australia

*Under discussion or awaiting formal agreement.

Research

During 1987, IBPGR has continued to increase its involvement in research. This involvement was strengthened by the appointment of an Officer in charge of pathology and quarantine. In early 1988, an Officer will be appointed to supervise *in vitro* research. IBPGR's research activities are focused on two areas; seed conservation and *in vitro* conservation.

IN VITRO CONSERVATION RESEARCH

Tissue culture has great potential as a method to conserve germplasm, particularly in the case of vegetatively propagated crops. IBPGR has played a pioneering role in research on techniques and is promoting the use of *in vitro* culture for genetic resources conservation. For many crops, further research is required to develop methods for the medium- or long-term storage of cultures that will avoid undue somaclonal variation and ensure an acceptable level of genetic stability when the cultures are regenerated.

IBPGR has allocated funds to establish a joint IBPGR/CIAT model *in vitro* active cassava genebank for a 3-year period to assess the strengths and weaknesses of current approaches to this method of conservation. A field genebank associated with the *in vitro* active genebank has been established to provide culture source material, controls for morphological and isozyme characterization and to receive material sampled from culture for monitoring at appropriate intervals. To date, 60% of the 100 genotypes selected to represent maximum diversity have been introduced into culture via disease indexing, therapy and morphological/isozyme characterization. They are now ready for bulking up to provide replicates for storage. A first round of disease indexing and characterization from culture is underway.

IBPGR also sponsors research, on an individual crop basis, to devise techniques for conservation of cultures as active collections, e.g. by slowing growth, and as base collections through cryopreservation of tissues. Much of this research is breaking completely new ground. Below are some short reports of progress to date.

Slow growth

Vegetatively propagated crops can be stored for the medium term *in vitro* by inducing slow growth and thereby prolonging the time between transfers to fresh media. Research on *in vitro* conservation of tropical aroids is being carried out at the Agricultural University, Wageningen, the Netherlands. *Colocasia esculenta* cultures can now be stored for up to 42 months in the dark at 9°C with survival rates of 100%. Cultures of *Xanthosoma* sp. do not survive storage at this temperature, but at 13°C they were successfully stored for one year. Research is continuing.

At Clemson University, in South Carolina, USA, sweet potato cultures have been maintained at normal culture temperatures for more than 12 months by adding mannitol to the culture medium.

At the Hebrew University, Rehovot, Israel, research on the development of tissue culture techniques for the conservation of the *Allium* genepool is being funded by IBPGR. In the first stage of the project, *Allium* material (especially sterile species) has been multiplied. This material is now being subjected to low temperatures in medium-term storage. Possible differences in behaviour in tissue culture will be assessed.

In 1987, IBPGR initiated research at ILCA in Ethiopia on the development of tissue culture for forage genetic resources. The tissue culture laboratory has been installed, and meristem tip and axillary bud cultures of *Cynodon*, *Digitaria* and *Brachiaria* have been successfully established. The effect of different environmental conditions will be investigated to determine suitable conditions for slow growth.

In Vitro collecting

Collecting vegetatively propagated crops, crops with recalcitrant seeds, or forages not bearing seeds due to overgrazing is often difficult in remote areas. IBPGR has initiated research on *in vitro* collecting of some of these species to address such problems.

In collaboration with IRHO in Paris, IBPGR has funded research in Côte

d'Ivoire on the development of an *in vitro* collecting technique for coconut zygotic embryos. Two very successful methods have been selected from the different approaches that have been tested: direct *in vitro* culturing in the collecting area, and storage of solid endosperm cylinders for subsequent inoculation in a laboratory. The first method is ideal when collecting has to be done at a great distance from a tissue culture laboratory and when the mission is likely to last longer than a week. Contamination rates may be as low as 10%, which is remarkable under field conditions. The second method, which is simple and quick, is convenient if collecting sites are near the *in vitro* laboratory, but it does not allow for storage over longer periods. Further research is being conducted into means of extending the technique to immature embryos and improving the regeneration rates when plantlets are transferred to natural growing conditions.

In Vitro movement of collections

Duplication of collections of vegetatively propagated crops maintained in field collections is of primary importance, given the high risk of losing this material to diseases, pests and climatic conditions. A project co-funded by IBPGR and carried out at AVRDC, Taiwan has introduced 94 accessions of sweet potato from the Chiang Mai germplasm collection in Thailand. These accessions have gone through meristem-tip culture and are being indexed for the absence of viruses in a screenhouse provided by IBPGR. They will be maintained as an *in vitro* active collection.

A project on *in vitro* sweet potato introductions from national collections in Latin America and the Caribbean was started in 1987 in collaboration with CIP in Peru. To start the project, training on *in vitro* techniques was provided to scientists from 11 countries of the region. During the first six months, about 100 accessions of sweet potato have already been sent to CIP.

Cryopreservation

Cryopreservation is the target method for long-term *in vitro* conservation of both vegetatively propagated crops and those bearing recalcitrant seeds. In 1987, IBPGR funded three research projects in this area.

At the University of Saskatchewan, Canada, the interaction of *in vitro* technology and cryopreservation of dormant buds of *Prunus* species has been studied. Acclimatization of the material from which the explants are derived plays an important role in the success of cryopreservation. This acclimatization appears to depend on the induction of non-lethal dehydration of tissue explants. This research will hopefully provide further guidelines for acclimatization of non-hardy tree species to enhance survival following cryopreservation.

At Clemson University, USA, studies on cryopreservation of sweet potato have revealed that there are problems at temperatures below −24°C. Different pretreatments are currently being tested to optimize survival after freezing.

At the Agricultural University of Wageningen, the Netherlands, a series of experiments on cryopreservation of embryoids of *Xanthosoma* has been carried out. Survival to −30°C has been achieved. Further experiments will attempt to achieve survival at liquid nitrogen temperatures (−196°C).

Genetic variability after storage

Genetic instability has often been reported and sometimes exploited (somaclonal variation) but very little information is available on stability after storage of organized tissues. IBPGR is funding several projects in this field.

The Agricultural Research Organization, Ministry of Agriculture, Israel, studied the genetic variability in banana plants propagated by conventional and *in vitro* techniques. It appears that the majority of variants (or mutants) from *in vitro* propagation are of the same type as the variants observed in conventionally propagated plants but occur at higher rates. It also appears that the rate of variation is associated with the initial explant source and it is therefore important to be able to detect mutants as early as possible in the *in vitro* culture procedures.

An investigation into the genetic stability of plants of different species recovered

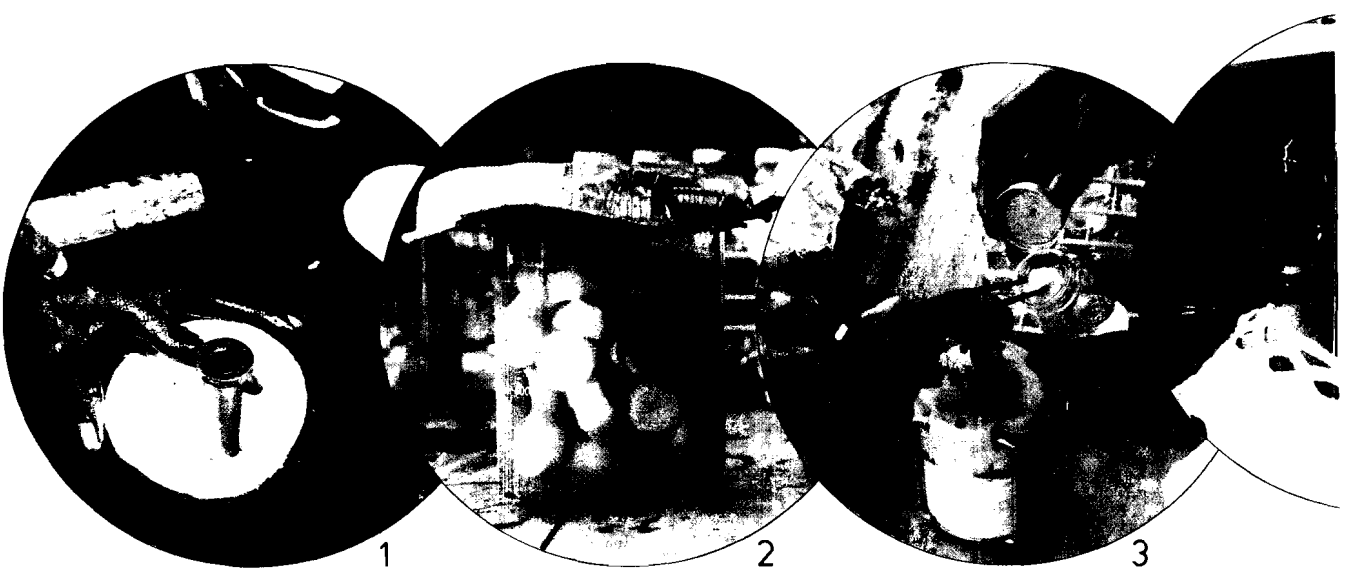
from *in vitro* storage was initiated in 1986 at the University of Nottingham, UK. Parental material from which cultures will be derived have been analyzed at the phenotypic and biochemical level. Slow growth has been initiated with potato and *Allium* cultures and the potato cultures cryopreserved to use in the research.

A third project, carried out at the University of Western Ontario, Canada, is assessing genetic stability in a range of maize tissues, including embryos recovered from storage conditions including cryopreservation.

Disease indexing

The development of suitable disease indexing and therapy methods is a prerequisite for the safe exchange of germplasm of vegetatively propagated crops. In August 1987, a subcommittee of the IBPGR Advisory Committee on *In Vitro* Storage met at North Carolina State University, Raleigh, USA, to assess the status of disease indexing and associated procedures for crops which are primarily propagated vegetatively. Some important new concepts emerged during this meeting. One was the development of an *in vitro* therapy and disease indexing system by which the complete sanitation process is carried out in a totally contained system. Another was the acceptance of the maintenance and movement of pathogen-untested and pathogen-tested positive *in vitro* collections under conditions excluding misuse of such materials. The report of this meeting will be published in 1988.

Also in the field of disease indexing, research on indexing *Musa* for BBTV was begun at the end of 1986 at the Queensland Department of Primary Industries, Australia. The objective of this project is the production of a nucleic acid



In vitro collecting for coconut

Stage 1. A solid cylinder of endosperm containing the embryo is cut out of the freshly split nut (**1**). The cylinders are surface sterilized (**2**), then transferred into glass jars for storage and transport (**3**).

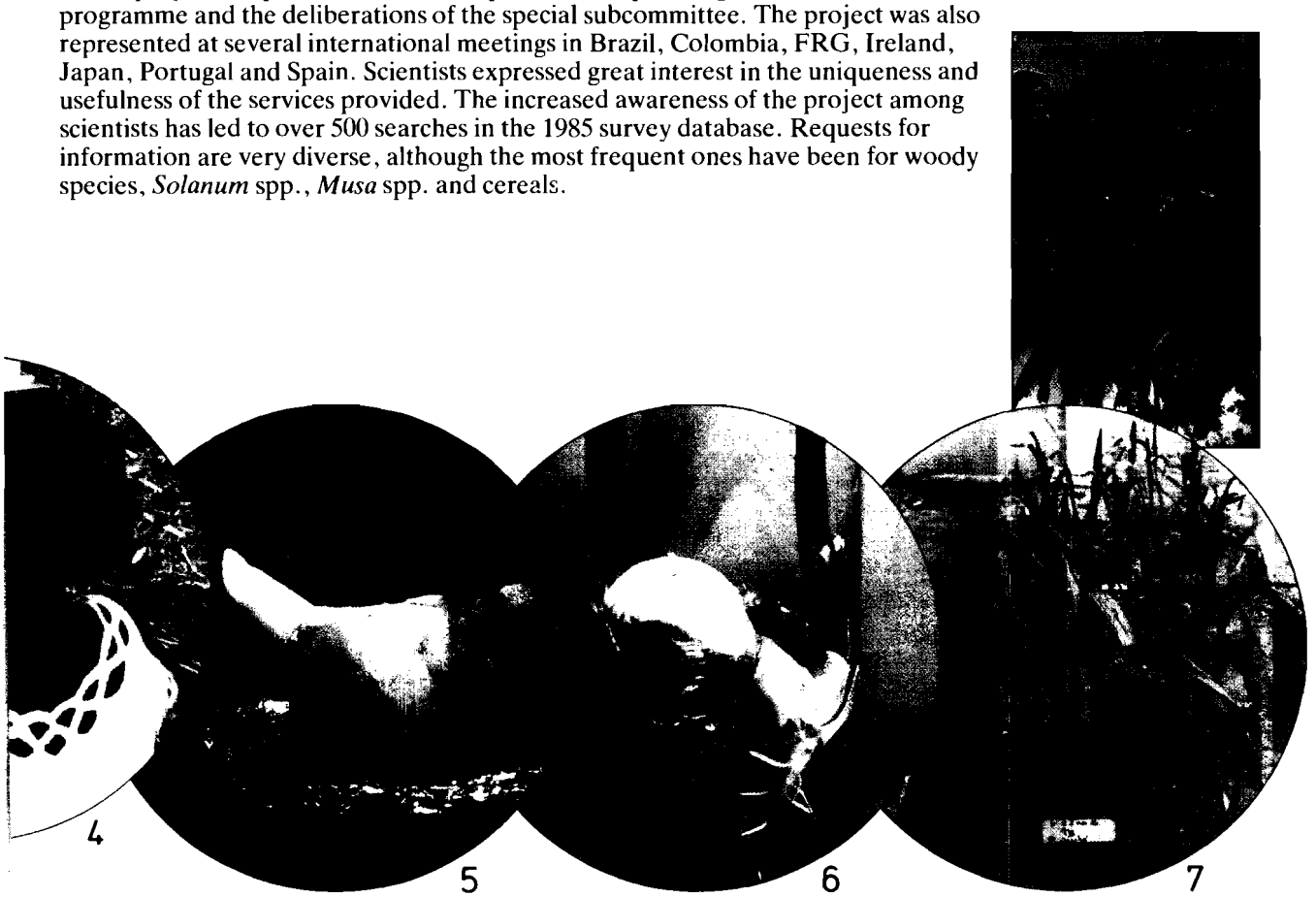
Stage 2. Within the shelter of a simple packing case, the embryos are dissected from the sterilized cylinders and inoculated directly into culture in tubes (**4**), which are then packed into the case itself for

hybridization test for the detection of BBTV. Considerable progress was made in 1987. Two promising 'clones' specific to BBTV were identified, and it is anticipated that a sensitive probe will be available by the end of the second year of the project. This research was necessary since IBPGR has targeted the collecting of diploid *Musa* in Papua New Guinea, and assurances of the non-movement of diseases are essential.

In Vitro conservation research database

The IBPGR *in vitro* conservation information project, which began in 1980, entered its fourth phase during 1987. A new revised questionnaire was issued to 2,500 scientists worldwide. By mid-November 1987, 950 completed questionnaires had been returned to be entered as contributions to the latest research database. These are now being analyzed and computerized; the resulting database will be available for consultation early in 1988.

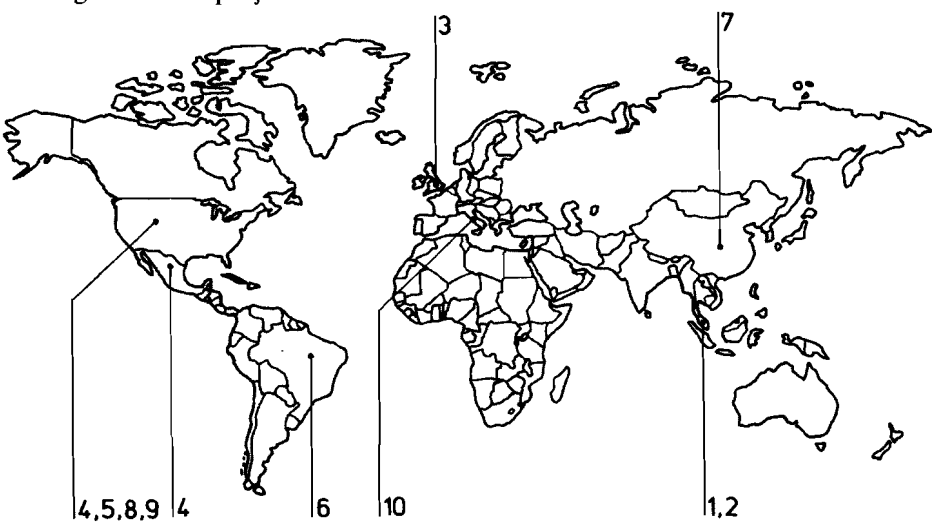
The project has provided valuable inputs into the planning of the IBPGR *in vitro* programme and the deliberations of the special subcommittee. The project was also represented at several international meetings in Brazil, Colombia, FRG, Ireland, Japan, Portugal and Spain. Scientists expressed great interest in the uniqueness and usefulness of the services provided. The increased awareness of the project among scientists has led to over 500 searches in the 1985 survey database. Requests for information are very diverse, although the most frequent ones have been for woody species, *Solanum* spp., *Musa* spp. and cereals.



tranpsort. The gemmule emerges after two months (**5**). The haustorium develops after 3 months (**6**), and after 4-6 months, 79% of the plantlets can be expected to survive after transplantation into sand (**7**). (See Assy Bah et al. 1987. FAO/IBPGR Plant Genetic Resources Newsletter, 71: 4-10.) Photo of coconut palm by S. Bunnag, FAO; other photographs by B Assy Bah.

SEED CONSERVATION RESEARCH

Although seed conservation is practicable and widely used, in some ways it is still poorly understood. IBPGR has supported research on aspects of seed physiology that relate to the development of safe and cost-effective techniques for the storage of seed. This research has produced important conceptual and technical recommendations for genebank curators. In 1987, IBPGR financed a number of strategic research projects:



1 **Dehydration and preservation techniques of recalcitrant seeds** (Universiti Pertanian Malaysia, Selangor)
This research is evaluating dehydration techniques and storage methods, including excised embryo storage and cryogenic temperatures for long-term storage. Results so far indicate that the moisture contents of various seed parts and embryos from individual recalcitrant seeds vary greatly. Therefore, batch drying to obtain the required moisture content of whole seeds or excised embryos is not possible. Each seed or excised embryo has to be handled individually to reach the required desiccation level. The study using excised embryos as storage material has shown promising results. Investigations will be continued in 1988.

2 **Storage of banana seeds** (Universiti Pertanian Malaysia, Selangor)
The effects of temperature, seed moisture content and ultra-low temperature on the storage of seeds of wild species of banana are being investigated. Results indicate that banana seeds are clearly orthodox and they can be stored at below freezing temperatures. However, liquid nitrogen storage induces a high number of albino seedlings.

3 **Seed storage at ultra-low moisture contents** (University of Reading, UK)
Research is being conducted into the storage of ultra-dry seeds with a moisture content of less than 5%. In lettuce, as viability falls, the proportion of aberrant cells for any given loss of germination increases with the decrease in moisture content over the range 5.5-13.0%. At lower seed moisture content, e.g. 3.3%, however, the proportion of aberrations is no greater than at 5.5% moisture content. Therefore, storing seeds at low moisture contents is worth considering. Other results indicate that a humidification treatment following long-term seed storage could reverse some of the damage from ageing.

4 **Estimation of genetic stability in seeds during storage** (Boyce Thompson Institute, Cornell University, USA and the National University of Mexico)
This research uses various advanced techniques, e.g. contour-clamped pulsed gradient gel electrophoresis and isoenzymatic polymorphisms, to detect and evaluate DNA damage induced by dry storage conditions. This was a new area of research initiated in 1987.

5 **Identification of genomic alternation in plant tissue after long-term storage of seeds** (Ohio State University, Columbus, USA)
This research uses molecular probes and RFLPs to investigate DNA degradation and alternation in sequence composition in dry legume seeds following long-term storage.

6 **Seed dormancy in tropical forage species** (CENARGEN, Brasilia, Brazil)
Tropical forage species often have seeds that are dormant and so present difficulties when germination tests are conducted. Current research investigates seed dormancy and aims to develop germination methods to better monitor seed viability.

7 **Seed dormancy in *Brassica*** (JAAS, Nanjing, China)
This project involves the study of dormancy characteristics of six species of *Brassica* and the factors affecting dormancy. Success in the project could lead to the development of methods to induce seed dormancy for long-term storage and to break seed dormancy for viability monitoring tests.

8 **Measurement of genetic diversity in pea accessions collected near the center of diversity of domesticated pea** (New York Agricultural Experiment Station, Geneva, New York State, USA)
In this research, reliable markers will be established to identify each accession, to avoid mislabelling and contamination and also to monitor shifts in the genetic constitution of polymorphic accession. During the first six months of investigation, although the data on allozyme variability have not been fully analyzed, clear indications of the geographical location of alleles have been observed and several new polymorphic loci have been identified.

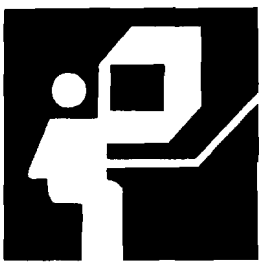
9 **Determination of genetic integrity following accession regeneration** (Ohio State University, Columbus, USA)
The aim of this research is to determine the degree of genetic shift occurring in rejuvenated bean accessions using techniques of electrophoresis and restriction fragment enzyme digestion of DNA.

10 **Methods of regeneration of cultivars** (IBPGR Headquarters, Rome, Italy)
During the process of regeneration, plant material is vulnerable to a number of processes, such as drift, selection and contamination, which may alter its genetic composition. IBPGR has commissioned a major research report on the theoretical aspects of this problem.

Preliminary findings stress that it is the integrity of the genetic complement of an accession that should be conserved, rather than its component genes. In this way, any traits that result from the interaction of a number of genes will be preserved. The significance of this finding is that it argues against the practice of bulking accessions to reduce numbers as this must break up adaptive associations of genes.

Perhaps the most important suggestion of the report is its consideration of integrating the work of base and active collections, and an 'elite seed' policy to allow accessions to be kept as few generations removed as possible from the original collection. Such a programme also allows a more relaxed regeneration standard for material going on to distribution, since changes due to drift and selection will not be compounded over several generations. The resources thus saved can be devoted to material being cycled within the long-term collection for which stringent standards are required. IBPGR will consider the policy implications of these conclusions early in 1988 and will initiate strategic research where justified.

Documentation and data management



Effective management and use of collections of genetic resources depends on the availability of extensive information on the material. Detailed and reliable data on the available samples of a crop allow curators, plant collectors and breeders to work together efficiently. This extends to the interdisciplinary and international levels. IBPGR actively promotes such cooperation.

Flexible data-management systems are essential to deal with the amount of information that is steadily accumulating on germplasm accessions, together with growing demands for processing and dissemination of these data.

IBPGR's documentation programme allows integrated information processing throughout the network. It has several components: development of crop descriptor lists; assistance to centres in establishing or upgrading computerized documentation systems; promotion of information exchange between centres; publication of directories of germplasm collections and catalogues of individual collections; and development of centralized databases for crops, as well as for related areas, e.g. collecting, herbaria surveys, *in vitro* research, training, etc.

The centralized databases of IBPGR have a significant impact on the whole programme. Crop data systems, for instance, are indispensable in analyzing past collecting work to provide direction for future field work. The database on germplasm collected through IBPGR support and direct input is in demand by national and international programmes. It has also proved to be a valuable source of data for the internal review of the IBPGR's germplasm acquisition programme conducted in 1987.

Computer equipment is continually being added and upgraded to improve IBPGR's information processing capabilities. Four Wang microcomputers were installed in Headquarters at the end of 1987, allowing all the databases to be kept

Table 3 Descriptor lists processed by IBPGR in 1987

Crop/species	Comments
Bambara groundnut	In cooperation with IITA and GTZ; published and distributed
Brassica* and *Raphanus	In cooperation with Crucifer CAC of the NPGS, USA and with CEC. To be printed early in *1988*
Chinese cabbage	In cooperation with AVRDC; published and distributed
Citrus	Finalized; to be printed early in *1988*
Eggplant	English version finalized; French in preparation. Bilingual booklet to be published early *1988*
Maize	Revision of the 1980 list; scheduled for publication in *1988*
Mango	Expert comments collated and list finalized
Oil palm	In cooperation with the Palm Oil Research Institute of Malaysia; expert comments collated
Papaya	To be finalized early *1988*
Potato	Revision of the 1977 list in cooperation with CIP. It will complement the 'Potato Variety Descriptors' published in 1985 by CEC/IBPGR
Sweet potato	Revision of the 1981 list in cooperation with AVRDC, CIP and IITA
Xanthosoma	Expert comments collated; to be published early *1988*

on line. (One system will also be used for desktop publishing.)

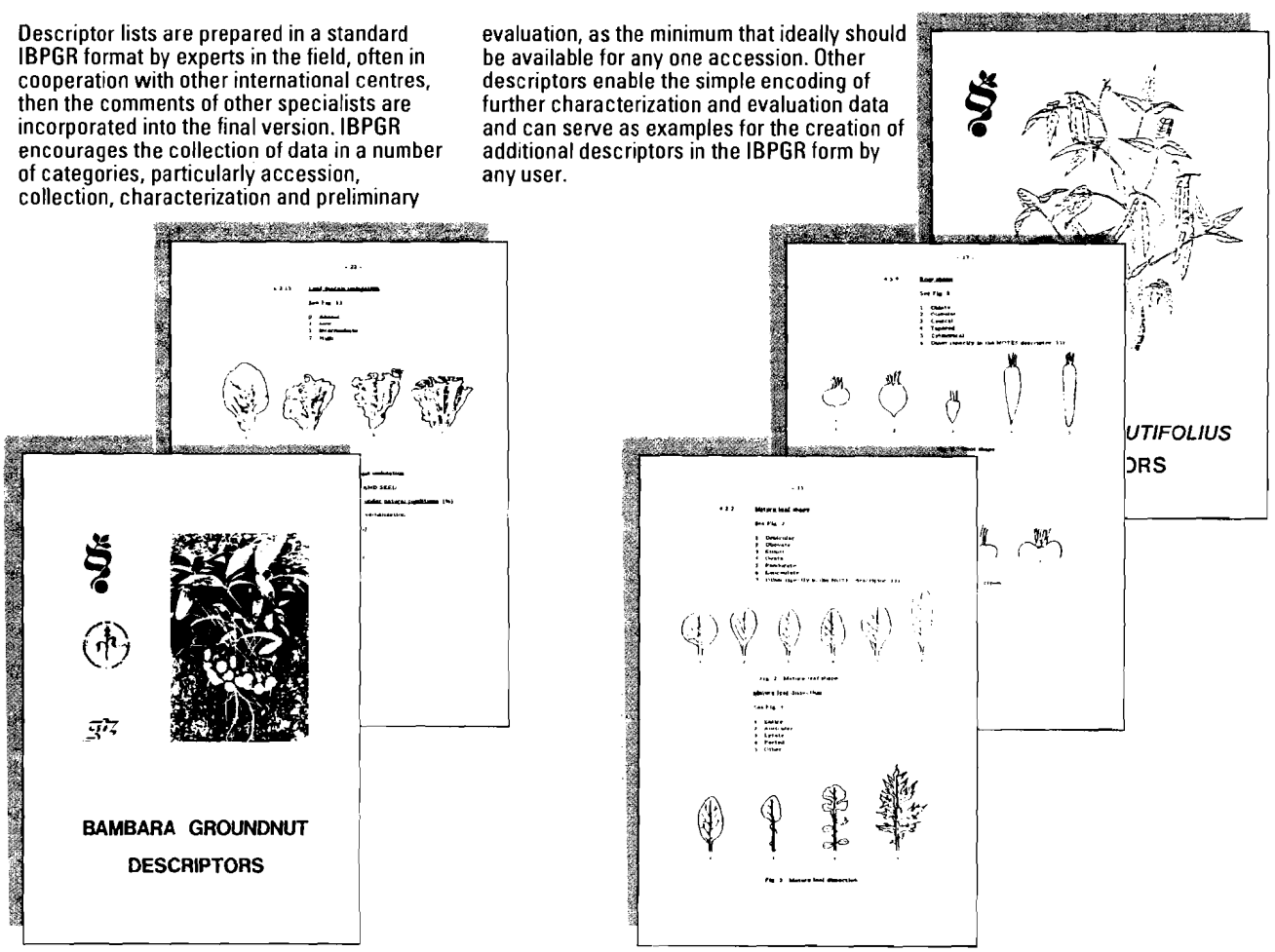
Following the decision that IBPGR Field Offices should actively participate in the development of databases, a microcomputer was installed in the Field Office in Niamey. The Field Office for Eastern and Southern Africa in Nairobi, Kenya has also started operating databases. Efforts are underway to equip other Field Offices, IBPGR Collectors and Interns with facilities in 1988 to improve their information service within the regions. Additionally, IBPGR aims to computerize the passport data obtained during all current and future collecting missions so that computer data files can be despatched to genebanks, along with the germplasm, for deposition.

Communication within the global network can be a very slow process as a result of the physical distances between collaborators. To overcome this constraint, IBPGR has been extensively using CGIAR's electronic mail system (CGNET). Five new 'electronic mail boxes' were opened in 1987 for outposted staff and Trustees.

Crop descriptor lists

A coordinated documentation system requires information on germplasm to be presented in a standardized format. IBPGR is continuing to publish crop descriptor lists prepared in close cooperation with genebank curators, experts on the particular crop, and relevant international organizations. Over 60 descriptor lists have been published, covering all the major, and a number of the minor crops. These lists are widely distributed, and are used either as written, or as the basis for formulating the genebank's own list. Table 3 shows the descriptor lists under preparation during 1987.

Descriptor lists are prepared in a standard IBPGR format by experts in the field, often in cooperation with other international centres, then the comments of other specialists are incorporated into the final version. IBPGR encourages the collection of data in a number of categories, particularly accession, collection, characterization and preliminary evaluation, as the minimum that ideally should be available for any one accession. Other descriptors enable the simple encoding of further characterization and evaluation data and can serve as examples for the creation of additional descriptors in the IBPGR form by any user.



Directories of germplasm collections

The compilation and publication of directories of germplasm collections – a continuing activity of IBPGR – aims to inform a widely scattered community of crop breeders and agricultural researchers of existing germplasm collections. Each directory entry contains information regarding the composition of a collection, its maintenance, quarantine regulations for import and export of material, availability, degree of characterization, evaluation and documentation, and the name and address of the person in charge. For the purpose of assembling the directories, collections are defined widely and are not limited to purely conservation collections.

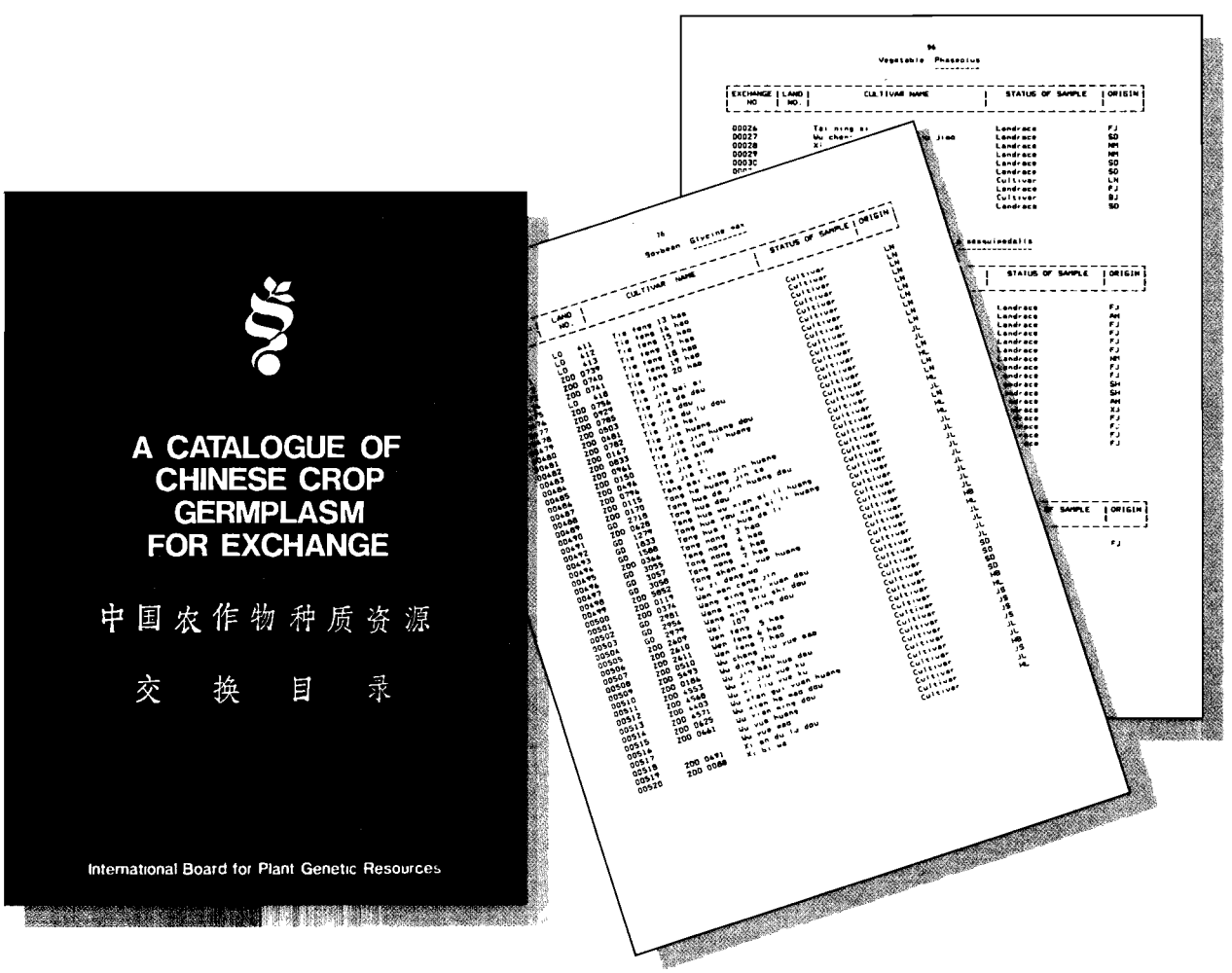
In 1987 the following three directories were finalized:

Food legumes, with the following sections: *Arachis*; *Cajanus*, *Cicer* and *Lens*; *Lupinus* and *Vicia*; *Phaseolus*; *Pisum*; *Psophocarpus*; and *Vigna*. This is a revision of a 1980 directory; soyabean collections are listed in a separate volume that was published in 1986.

Temperate fruits and tree nuts, with the following sections: *Actinidia*, *Amelanchier*, *Carya*, *Castanea*, *Corylus*, *Cydonia*, *Diospyros*, *Fragaria*, *Juglans*, *Malus*, *Mespilus*, *Morus*, *Olea*, *Pistacia*, *Prunus*, *Punica*, *Pyrus*, *Rubus*, *Sambucus*, *Sorbus*, *Vaccinium*.

Industrial crops, with sections covering beet, coffee, cotton, oil palm and rubber. This is the second volume; the first, published in 1981, covered cacao, coconut, pepper, sugarcane and tea.

A computerized database, containing selected information from all published directories for all crops, is being developed by IBPGR. The system records the storage conditions in the genebank and the provenance of species maintained there, with an indication of the geographical coverage of the conserved material.



Catalogues

Dissemination of information on significant collections through catalogues remains an important mechanism facilitating international exchange of crop genetic resources. In 1987, two such catalogues were published:

A Catalogue of Chinese Crop Germplasm for Exchange, compiled by the Institute of Crop Germplasm Resources, CAAS, China. This publication covers 4,400 varieties of 10 crops (rice, barley, wheat, maize, sorghum, foxtail millet, cotton, soyabean, rape and vegetables) and it is the first such from China; others may be issued in the future.

A Catalogue of Sorghum, Pearl Millet and Finger Millet Germplasm in Zimbabwe. This publication provides both passport and evaluation data for germplasm collected in Zimbabwe in 1982 with support from IBPGR and in cooperation with ICRISAT.

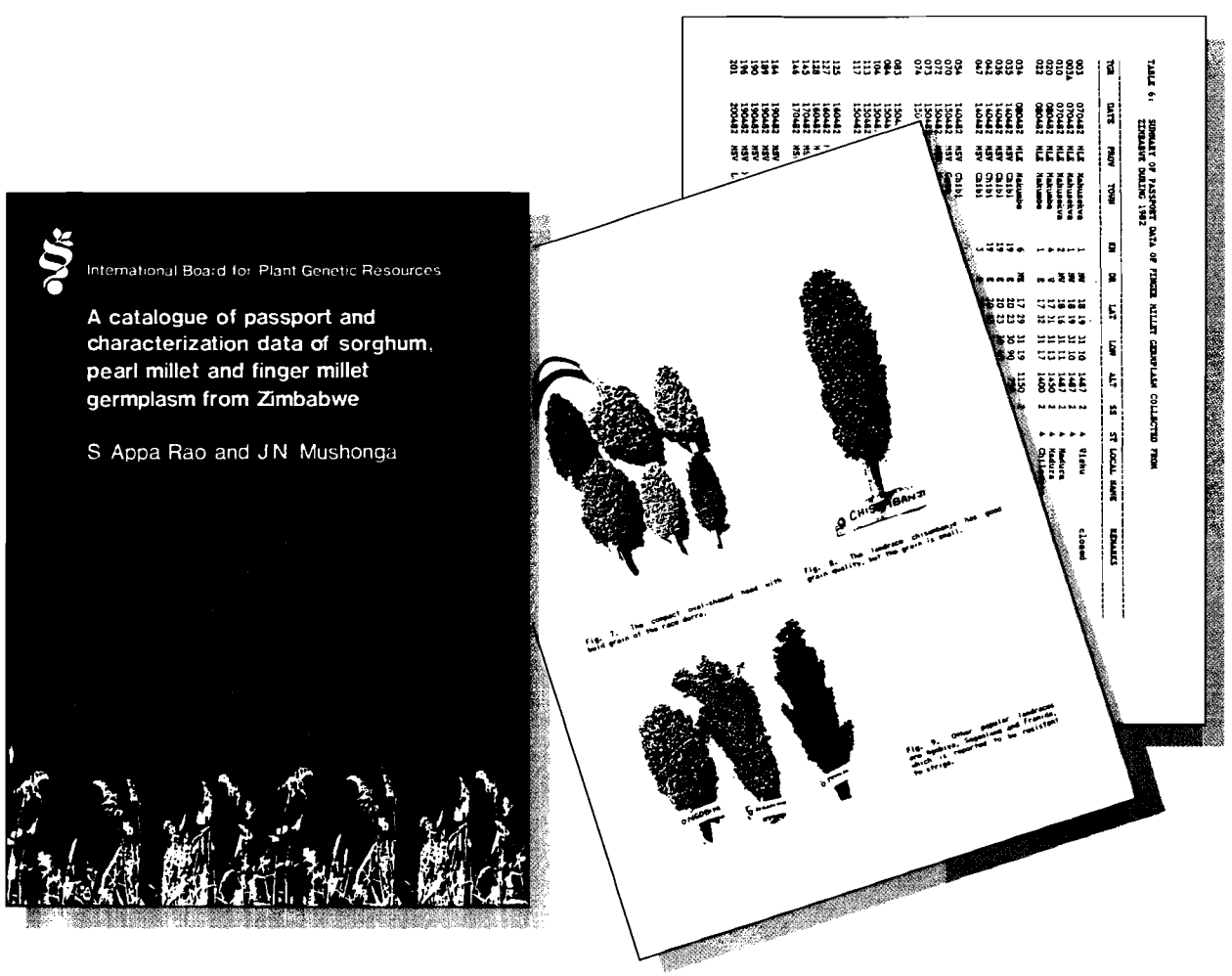
Hardware and software assistance

The advent of the low-cost personal or minicomputer means that a computerized system is within the reach of most genetic resources centres. IBPGR is continuing to act as a focal point for advice on the selection and operation of systems, and also for direct support in the purchase of hardware and software.

In 1987, the University of Costa Rica and Universidad de San Carlos, Guatemala received assistance in acquiring computing facilities.

The Field Crop Research Institute, ARC, Egypt installed and started operating an IBPGR-supplied minicomputer. Efforts are also underway to acquire suitable equipment for the Iranian genebank in Karadj.

A number of other centres were assisted with their documentation systems. At the request of the Canadian authorities, the IBPGR-USDA Liaison Officer for Documentation spent some time at the PGR, Ottawa, Canada assessing the



information system. Both the hardware and software needed upgrading; in particular a new, fully relational database package was recommended.

Keeping abreast of rapidly moving computer technology is a time-consuming but necessary element of the IBPGR information programme, so that rational hardware and software recommendations can be made. The IBPGR Liaison Office in Beltsville provides a research base which is continually testing different systems. Recent advances being examined for potential use within the network include hand-held electronic data-collection devices that may be used on germplasm-collecting missions, lap-top computers, and barcode technology that could aid curators in the day-to-day management of germplasm.

Databases

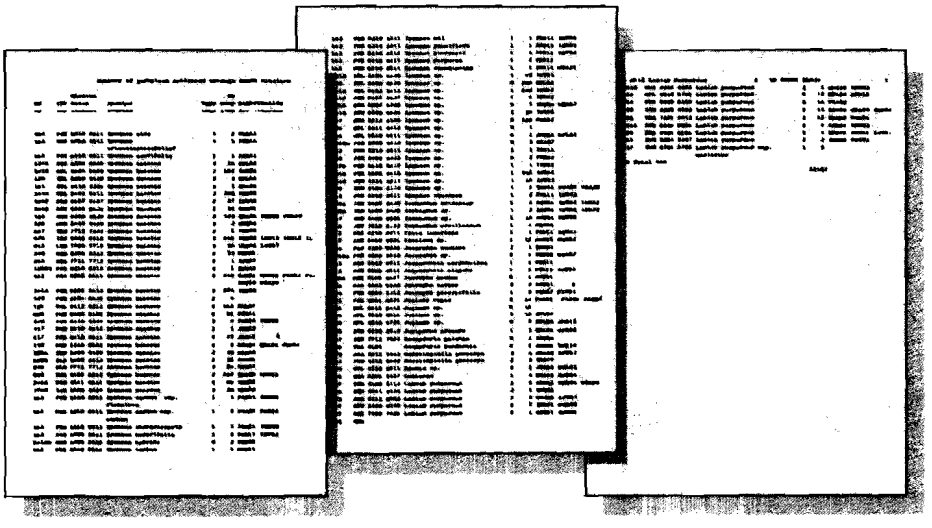
In 1987 the database on germplasm collected with IBPGR support was further updated and reorganized. This system stores information on species collected and on the distribution of samples to genebanks. Associated files hold information on the conservation and documentation status of germplasm. Out of 166,720 samples registered, about 30% of the material in the genebanks has been traced and the accession numbers recorded. To update the information in the system further – particularly on documentation of materials – the database has been distributed to IBPGR Field Offices in Cali, Nairobi and Niamey, and to the Liaison Office in Beltsville.

A database on Mediterranean forage species conserved in genebanks has also been established in Headquarters. This includes the passport data of 21,400 accessions from centres holding international-type material in Australia, Cyprus, Ethiopia, France, FRG, Greece, Israel, Italy, Morocco, Poland, Portugal, Spain, Syria, UK and USA. The forage databases of the ECP/GR Programme also contributed its files. The data, mostly received on magnetic media, were transformed to the standard IBPGR descriptor scheme. The system currently covers 60 descriptors. In addition to the database, a literature survey was carried out, and distribution maps were produced to the province level of 60 priority species. The next steps, to be taken in 1988, will involve:

- completing the database with information from genetic resources centres that have not yet provided their files;
- making a survey of herbaria for selected genera, with computerization of herbaria records (this will add precision to species-distribution maps); and
- producing maps showing areas already covered by collecting missions. (These will be computer generated.) However, much time-consuming work is needed to identify and record the geographical coordinates of collection sites based on the names of locations, since about 50% of the records lack latitude or longitude.

Ipomoea batatas

Ipomoea germplasm collected through IBPGR missions

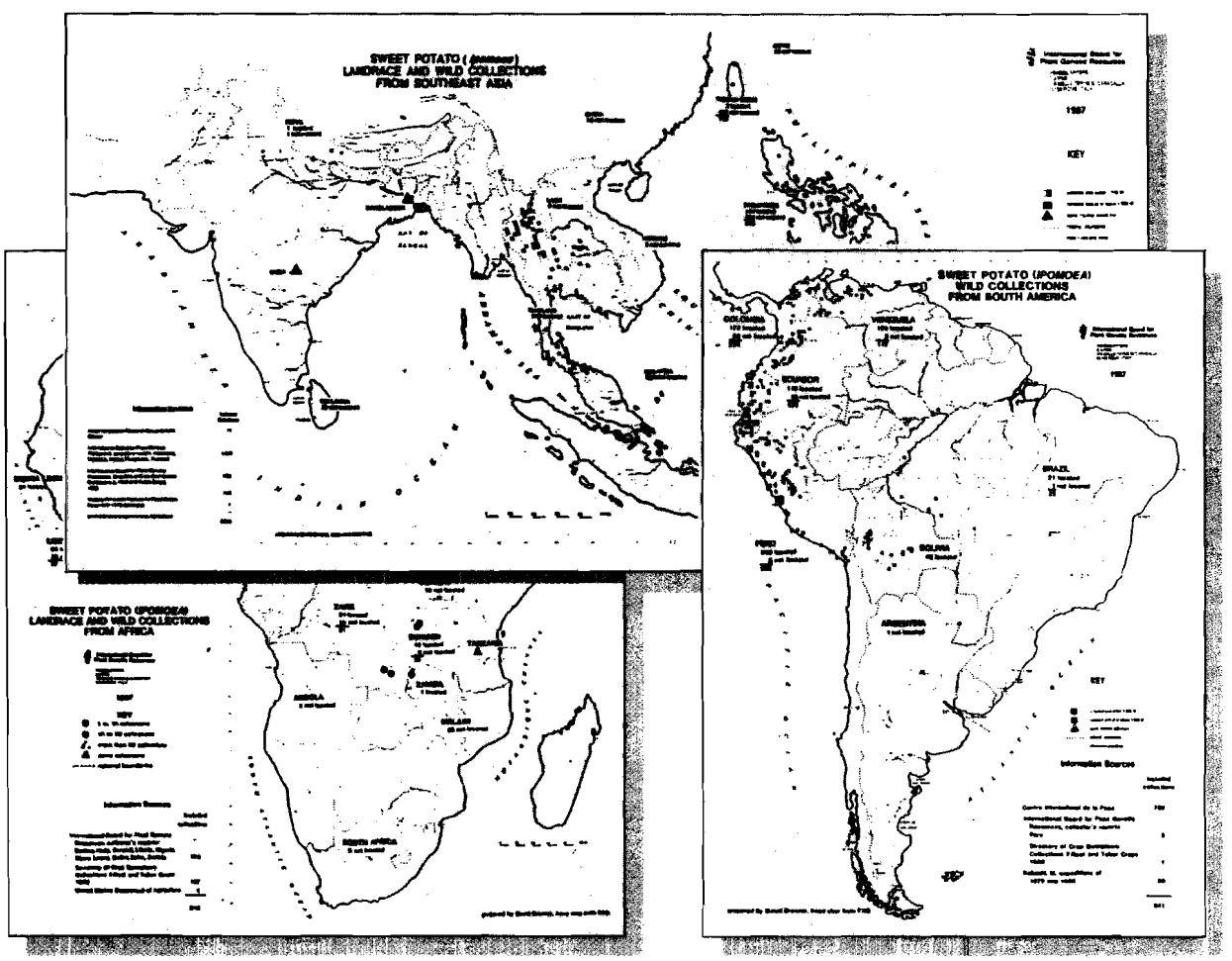


Mapping work will receive high priority in the coming years, as part of the planning for the germplasm acquisition programme. In 1987, a pilot project mapped previous collecting sites of cultivated and wild sweet potato germplasm. Maps were prepared manually because a significant part of the information came from reports and publications, and no suitable computer hardware or software was available. At the same time, files for barley, groundnut and African rice were collated from major genebanks.

Computer mapping is being further investigated as a means of improving the efficiency of future projects. Apart from the techniques themselves, a major bottleneck in comprehensive mapping is the need to fill in gaps in the passport data.

A study of the distribution of *Citrus* and its wild relatives in Southeast Asia was conducted at the University of Malaya in Malaysia, following the 1981 recommendation of an IBPGR Working Group on the Genetic Resources of *Citrus*. The resulting database contains information on specimens from 22 herbaria in Europe, Southeast Asia and the USA. The data are grouped into eight broad categories (internal management information, herbarium accession data, plant name, plant identification qualifiers, source information, collection information, label information and conservation status), and are organized into 26 fields. Analysis of the database will allow a plan for further action to be developed.

A study of African and Asian *Vigna* genepools, carried out by IBPGR in 1986 and 1987, included computerization and analysis of herbaria data. Part of the database concerning cultivated and wild species of *Vigna* in Asia is completed. Field keys for collectors were computer-generated using a software package developed in the British Museum (Natural History), London, which built on the package DELTA developed in Australia.



Results of 1987 pilot project mapping previous collecting sites of cultivated and wild sweet potato germaplasm.

Crop database projects

Active projects on crop databases in 1987 were as follows:

- A project on the Andean crops data system is under development at UNA, La Molina, Peru.
- A number of European crop databases are being developed by the ECP/GR special project, details of which are given later.
- A wild *Brassica* species database is being developed for germplasm collected in the Mediterranean since 1982. This is a joint project between IBPGR and Universidad Politecnica, Madrid, Spain, initiated in 1987.
- A *Cucumis* database has been under development since 1984 at ETSIA, Valencia, Spain. The system was significantly updated in 1987 for the passport and characterization data on germplasm maintained in base collection at INIA, Spain.
- A database for *Citrus* spp. is being developed in East Asia. This was initiated at the Fruit Tree Research Station, Tsukuba, Japan as a follow-up to a collecting project.
- A project documenting the wild relatives of cultivated plants grown in natural habitats in Israel and establishing a computerized database at the Hebrew University of Jerusalem, Israel has been completed. The genera covered are: *Avena*, *Brassica*, *Cicer*, *Cucumis*, *Lens*, *Lupinus*, *Pisum*, *Pyrus*, *Vicia* and *Vigna*. The information system established has three databases: plant accessions, bibliography and plant characters in populations, and herbaria.

A pilot information system for *in vitro* collections

IBPGR and CIAT jointly initiated an information system for their pilot *in vitro* active genebank. The special requirements of and operations undertaken with *in vitro* material call for a nonconventional system to analyze data and aid decision-making. This work will continue in 1988.

IBPGR is continuously involved in supporting the characterization of collections of priority crops (Figure 7). The projects are long-term and are frequently combined with the duplication of germplasm for deposition in designated base collections. Emphasis is placed on material collected through IBPGR-supported missions.

Currently, efforts in characterization and evaluation are directed to three areas: the structure of collections, statistics, and the genetic basis of characters. In the future, IBPGR's orientation will also include the support of research work that will have implications outside the material immediately under investigation.

Collection structure

Many germplasm collections of major crops are too large to be readily described in depth. As a collection increases in size, it faces the law of diminishing returns. Much of the variation required can be found in a minority of the accessions. This is the reason for establishing 'core collections', which comprise perhaps 10% of the whole, and concentrating work on these, while the remainder is kept as a reserve.

Judicious selection, based on available passport and evaluation data, could yield a far more diverse core than one chosen at random. Research based on published data sets have shown that while selection on the basis of taxa may be advantageous, selection on the basis of some passport data is not. The Programme Committee, which has kept this work under close review, has concluded that, while broad generalizations are not possible, in practice the ecogeographic background of crop diversity will enable pragmatic selection of cores.

The genetic basis of characters

Most evaluation work describes the physical characters of the plant. IBPGR has been formulating more meaningful approaches to the symbolic description of the genetic makeup of the plant. The first approach considers relating symbols to existing descriptors, drawing on information in the gene catalogues that exist for many major crops. The second approach uses molecular markers such as isozymes and restriction fragment length polymorphisms (RFLP) to track quantitative trait loci (QTL), several of which may govern characters like height, seed number or protein percentage.

Variation patterns in crop genepools

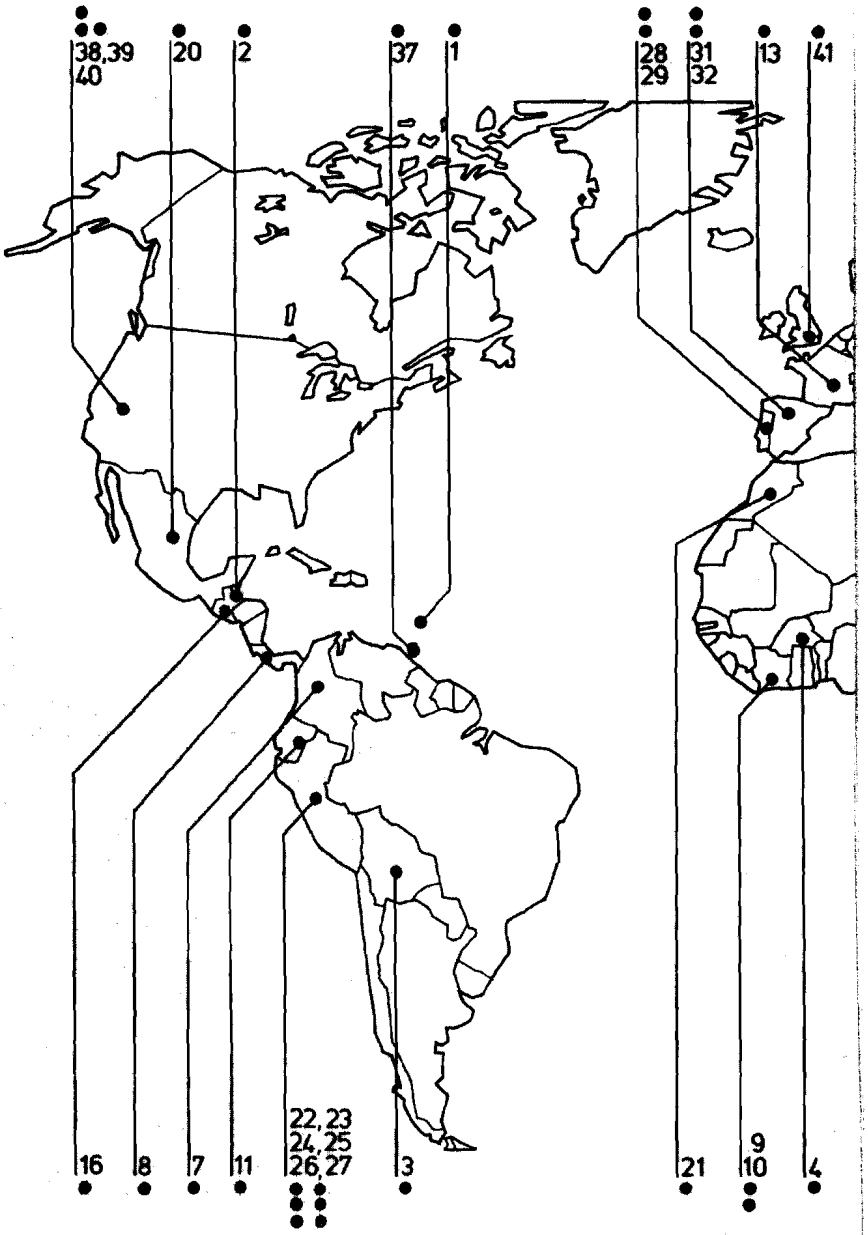
With a heightened emphasis in recent years on collecting wild species related to crops, it has become apparent that a better understanding of the origin, evolution and variation patterns of crop genepools is needed. In the past, field work initiated by IBPGR has provided a number of institutions with materials for use in evolutionary studies. These studies are an important means of obtaining better data on the distribution of wild species and their ecogeographic relations. This in turn enables the germplasm acquisition programme to be more effective in determining more exact targets. It is also important in ensuring that a range of variation is available and described in the collections.

Patterns of variation in species complexes can be assessed using traditional taxonomic research methods or the more recent biochemical/molecular methods. IBPGR research in this area has been biased particularly towards analyzing passport and characterization data and the utility of primitive forms in breeding. However, in 1987, several research projects were in progress on wider aspects of genetic diversity.

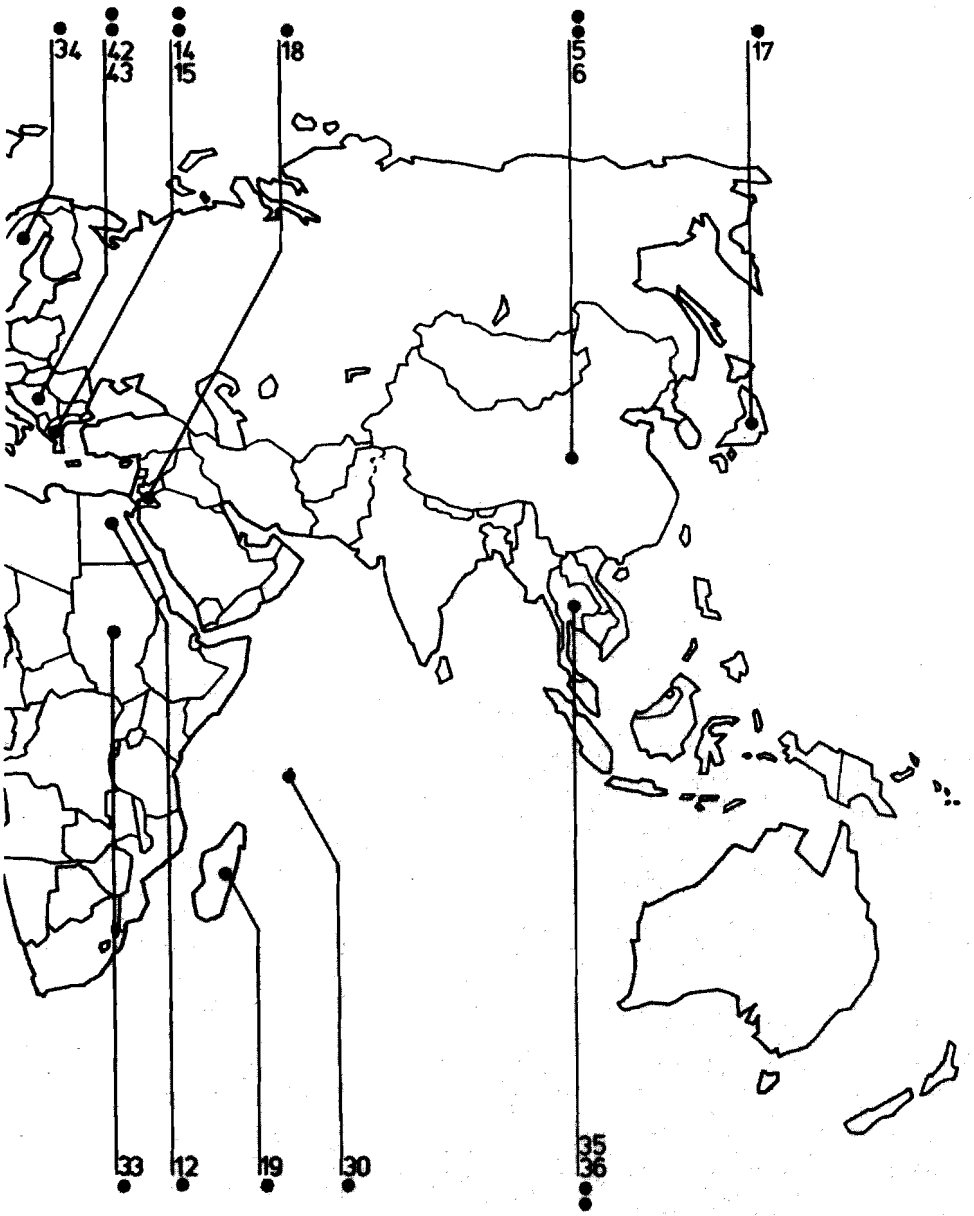
The taxonomy, cytology and characterization of the genepool of wild oat species from the Mediterranean were studied in association with WPBS, UK and the Plant Breeding Institute, Sweden. Following field work in 1986-1987 in Spain, and in Morocco in 1985, the following species were erased: *Avena canariensis*, *A. prostrata*, *A. murphyi*, *A. maroccana*, *A. atlantica* and *A. agadiriana*. Cytological investigations permitted targeted interspecific crossing to other tetraploid wild species and to the hexaploid cultigen.

Following a 1985 survey, a number of national programmes initiated field work to assess patterns of variation. *Prunus brigantiaca* was under intensive study by Station de Recherches Fruitières Méditerranéennes, INRA and Parc National des Ecrins as an input in kind to ECP/GR. Populations were surveyed and their breeding potential assessed during 1987. The University of Torino, Italy, is expected to expand this collaborative research in 1988 so that the whole endemic

Figure 7 Characterization work supported by IBPGR in 1987



	Institute/Country	Crop	Remarks
1	**West Indies Central Sugar Cane Breeding Station, Barbados**	Sugarcane germplasm of Caribbean collections	Minimum number of characters which suffice to discriminate accessions is to be determined. Project includes isozyme studies
2	**Belize Forage Legume and Pasture Research Programme, Belize**	Forage legumes and browse species native to Belize	



	Institute/Country	Crop	Remarks
3	**IBTA, Bolivia**	Bolivian collection of *Cucurbita*, collected 1972-1984	Includes multivariate analyses of the data
4	**IDR, Burkina Faso**	Eggplant collected 1980-1983	
		Millets collected 1984-1985	Evaluation of millet collected in 1984 has been completed
5	**Institute of Crop Germplasm Resources, CAAS, China**	Barley	About 2,000 accessions are under study
		Wheat	About 2,000 accessions are under study

	Institute/Country	Crop	Remarks
6	**JAAS, China**	Soyabean from northern China	Includes reactions to diseases, insects, drought stress and a range of agronomic traits
7	**ICA, Colombia**	Maize	
		Material collected in Colombia 1983-87	Project covers cotton, cocoa, cassava, *Solanum*, etc.
8	**CATIE, Costa Rica**	*Capsicum*	Accessions (about 1,100) originating from Central America are being characterized
		Cucurbita	
9	**ORSTOM, Côte d'Ivoire**	Okra	Includes wild species
10	**Université d'Abidjan, Côte d'Ivoire**	*Dioscorea* collected in Côte d'Ivoire 1983-1984	An illustrated catalogue of cultivar groups was prepared in 1986. Catalogues of wild species and with details on each accession are in preparation
11	**INIAP, Ecuador**	Andean roots and tubers	Materials were collected in different regions of Ecuador
		Amaranthus and *Chenopodium quinoa* collected 1982-1984	
12	**Field Crop Research Institute and Horticultural Research Institute of ARC, Egypt**	Vegetables collected in Egypt 1985-1986	
13	**Bureau de Ressources Génétiques, France**	French barley landraces	
14	**Fodder Crops and Pasture Institute, Greece**	Forages	
15	**Cotton and Industrial Plant Institute, Greece**	Cotton landraces from Greece	
16	**Universidad de San Carlos, Guatemala**	Vegetables and root crops collected in Guatemala	Project is also carried out by ICTA, Guatemala
17	**Fruit Tree Research Station, Tsukuba, Japan**	Citrus germplasm collected in East Asia	Regional database is to be established
18	**Yarmouk University, Jordan**	*Triticum dicoccoides*, *Hordeum* and *Aegilops* collected in Jordan	Includes screening for disease, salt and drought tolerance as well as isozyme studies
19	**FOFIFA, Madagascar**	Rice and food legumes collected 1985-1986	
20	**INIAP, Mexico**	*Phaseolus coccineus*	Project carries research component on methodology of regeneration
21	**IAVH, Morocco**	Maize collected in Morocco 1985-1986	
22	**Proyecto Algodon Nativo, INIAP, Peru**	Cotton collected in Peru 1985-1986	About 250 landraces are involved. Universidad Nacional 'Pedro Ruiz Gallo' and Museo Historia Natural in Peru are cooperating
23	**CICA, Peru**	*Lupinus mutabilis*	About 1,300 accessions are involved
24	**Estación Experimental, Cajamarca, Peru**	*Phaseolus* from northern Peru	600 accessions are involved. Data processing will be completed in INIPA, Peru, and files transferred to CIAT

	Institute/Country	Crop	Remarks
25	**Universidad Nacional de Huanuco, Peru**	*Phaseolus* collected in Peru 1982-1983	About 1,200 accessions are involved
26	**UNA, Peru**	Maize	
27	**Universidad San Crisbol, Peru**	Root crops collected 1982-1984	
28	**Estaçao Nacional de Melhoramento de Plantas, Portugal**	Forage germplasm collected in Portugal	
		Cereals of Portuguese origin	
29	**Núcleo de Melharamento de Milho, Portugal**	Mediterranean maize	
30	**Grand Ause Experimental Centre, Seychelles**	Mango	
31	**INIA, Spain**	Grasses and forages	A catalogue will be produced
32	**Universidad Politécnica, Spain**	Wild *Brassica* collected in the Mediterranean	Characterization work also carried out at Svalöv, Sweden
33	**Agricultural Research Corporation, Sudan**	Horticultural germplasm collected in Sudan 1982-1984	Many species of horticultural crops are involved
34	**Swedish University of Agricultural Sciences, Sweden**	Wild *Hordeum* and Triticeae	Includes Triticeae germplasm collected in China
35	**Chiang Mai University, Thailand**	Sweet potato collected in Thailand 1981-1982	Also includes isozyme study, evaluation and production of true seeds through polycrosses
		Eggplant collected in north and northeast Thailand	Includes work on susceptibility to bacterial wilt
36	**Botany and Weed Science Division, Thailand**	Sugarcane collected in Thailand since 1982	
37	**University of the West Indies, Trinidad**	Cocoa	Includes studies on validity of descriptors
38	**Virginia Polytechnic Institute and State University, USA**	*Eleusine* collected in Kenya	
39	**University of California (Davis), USA**	Lupin	Germplasm will be deposited in GDR, Greece, Portugal and Spain
		Durum wheat	Multivariate analyses are included
40	**Texas A&M University, USA**	*Arachis* collected in South America 1983-1986	Germplasm collected 1977-1982 has already been characterized and a catalogue published
41	**University of Birmingham, UK**	African eggplant germplasm collected 1980-1983	Database is to be established
42	**Institute for Small Grains, Yugoslavia**	Barley, oat and wheat	Yugoslavian landraces are dealt with
43	**IFVC, Yugoslavia**	*Allium* and *Brassica* ecotypes collected in Yugoslavia	

area of the species is covered. A project is expected to start in 1988 in Yugoslavia to survey other endemic *Prunus* species.

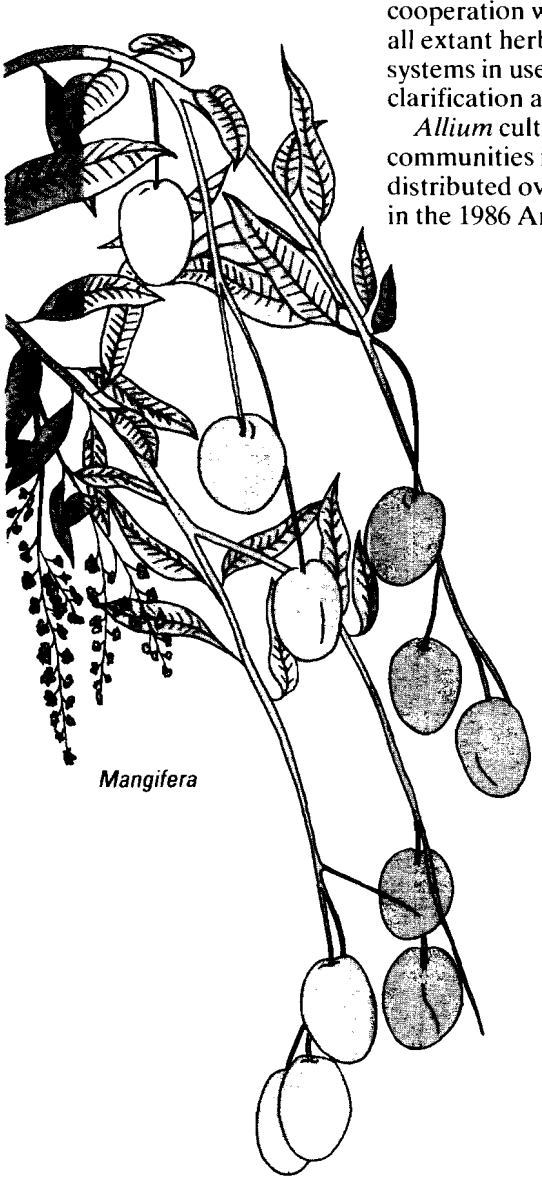
Patterns of variation of *Abelmoschus* species have been under study since 1985. In 1987, special attention was paid to the part of the genepool found in Southeast Asia, and the data from herbarium material collated for a definitive report to be produced in 1988.

1987 saw major attention given to the cytology and variation patterns of wild *Pennisetum* collected in the Sahel. A full-time research Intern was appointed at the Coastal Plain Experiment Station (USDA) in Georgia, USA. This was backed by intensive collecting by the IBPGR Collector based at Niamey. Research has emphasized isozyme analysis as well as albumins in the primary, secondary and tertiary genepools.

The research on the *Mangifera* genepool in the forests of Southeast Asia was intensified by the appointment of a full-time research Intern. Field work concentrated on Kalimantan in Indonesia, and the Malaysian peninsula, in areas known to be rich in mango species. Specimens were collected and details of the ecological characteristics and distribution were recorded. The horticultural potential of the wild species is significant in that many of them fruit more abundantly than *M. indica* does in Java, and in others their ready adaptability to tidal soils may present new opportunities for commercial fruit production.

A major new programme on *Citrus* relatives of the Aurantioideae, in cooperation with the University of Malaya, produced a comprehensive database of all extant herbarium data worldwide. Currently there are at least two taxonomic systems in use, neither of which are satisfactory. The research is aimed at clarification and a better identity of the species more closely related to cultivars.

Allium cultivars are of high priority to IBPGR because of their value to rural communities in poor countries. The genus contains many hundreds of species distributed over a large part of the globe. The herbarium survey on *Allium*, noted in the 1986 Annual Report, was completed in 1987. The survey concluded that



Mangifera

some of the wild onion species in the *Cepa* group appear to be insufficiently distinct to warrant separate specific status. A full revision, including detailed experimental data for defining species limits, is needed to determine which strains are sufficiently close to the cultivated onions to be used for cross-breeding.

The African genepool of wild *Gossypium* species is of great interest, but collecting targets over vast terrains are almost impossible to determine without better data. Accordingly, an IBPGR research Intern, based at Texas A&M University, consolidated information from the literature and herbaria and prepared a report which was finalized in late 1987. Regions with the highest concentration of species diversity have now been identified. Extremely high correlation was found between species distribution and vegetation types.

IJO collaborated throughout 1987 with IBPGR in projects based on its interest in widening the genepools of *Corchorus* and *Hibiscus* for breeding. IBPGR was instrumental in mobilizing a study of the wild species of jute (which are largely African) and conducted a herbarium survey.

Two major tropical crops, sweet potato and banana, received high priority from IBPGR and research was initiated during the year on DNA analyses to expand the knowledge of patterns of variation. Other biochemical and genetic work was initiated on the pea genepool, using accessions collected near the centre of diversity of domesticated pea. Reliable means are to be established to identify each accession, and to monitor shifts in genetic constitution of polymorphic accession. Using isozyme data, clear indications of the geographical location of alleles have been observed and several new polymorphic loci have been identified at the New York Agricultural Experiment Station, Geneva, USA.

Research on the Triticeae is complex, due to the large number of genera and species and in view of their diverse utilization in the breeding of wheat, barley or forages. In 1987, IBPGR remained closely in touch with research on *Hordeum sensu lato* at the Swedish University of Agricultural Sciences, Svalof; on Chinese material at INRA, Versailles, France (where IBPGR placed an Intern) and on

The genetic resources assessment scheme

Most collections of genetic resources contain thousands of accessions that must be evaluated and documented. Assigning priorities for specific tasks requires an objective assessment of the status of this work. IBPGR is developing a Genetic Resources Assessment Scheme (GRAS) that will compare the status of a collection with a set of recognized standards and goals. GRAS is a modular scheme which currently addresses three areas of a collection: passport data, conservation and evaluation. Each module is broken down into items for each accession which are scored on the presence and/or quality of the data. The scores can be weighted and summarized to highlight aspects of work where there are problems or action is needed. Scoring against recognized standards may aid curators in arguing for additional resources necessary for their work. The first development scheme has been for orthodox seed collections, but later it will be extended to other materials, e.g. in vitro ***collections. This preliminary scheme is being tested in a number of collections. The comments of the collection managers will be used to adjust the scoring system.***

Thinopyrum at the University of Utah, USA. Preparations started on the production of a field guide to the species of *Hordeum* and this will be published in 1988.

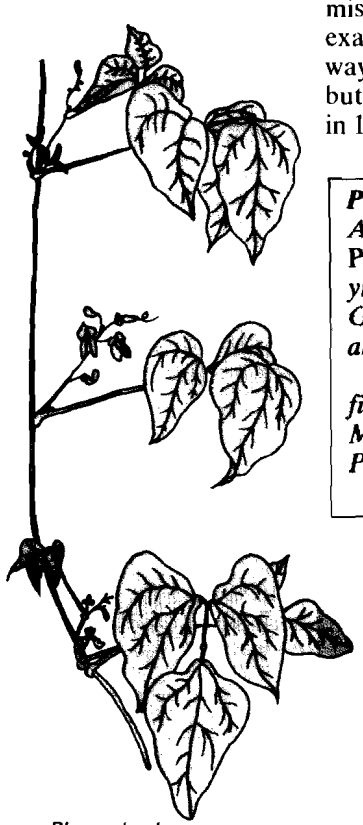
IBPGR initiated a major research programme on the genus *Vigna* in 1987. This has resulted in detailed surveys of the wild species by continent (Africa and Asia), and the IBPGR Collector located in Zimbabwe has started biosystematic work on previously collected samples. Species of *Vigna* are of major interest to improving a number of pulses and for forage development.

Research on patterns of diversity in wild *Brassica*, *Arachis*, *Glycine* and *Capsicum*, reported in earlier Annual Reports, continued through 1987 in collaboration with institutes in Argentina, Australia, Brazil, Spain, Sweden and the USA.

Research on the genepools of *Phaseolus* has been continuing for some time in association with CIAT, the Faculty at Gembloux, Belgium, and the University of California at Davis, USA. In 1988 the emphasis has been laid on phaseolin and cyanid contents in the primary and secondary genepools of *Phaseolus lunatus*.

In November 1987, the Programme Committee discussed the role of DNA technology in genetic resources research. It is possible to conserve plant genetic diversity either as crude extracted DNA, or as plasmids or chromosomes in bacteria, virus or yeast carriers. However, the long-term stability of the DNA held in this way is uncertain. There appears to be no case at present where conservation as DNA is as yet warranted. There is, however, a major role for RFLP analysis in assessing genetic diversity, as a means of determining relationships in crop genepools, and the clarification of confused taxonomy. This approach promises to be more flexible than traditional morphological work, or even isozymes, since it addresses the DNA directly. Careful choice of variants will allow the most useful level of genetic resolution to be considered.

A special role of this technology may well be its utility in surveying variation of the wild relatives of tree crops with recalcitrant seeds or that may fruit irregularly. Rather than collecting vegetative material that is vulnerable during an extended mission, growing shoots would be chemically fixed and preserved – in alcohol for example – so that DNA extraction and RFLP analysis could be done later. In this way, the most interesting stands of trees could be identified and targeted for limited but rapid *in vitro* collecting. This promising area of research will receive attention in 1988.

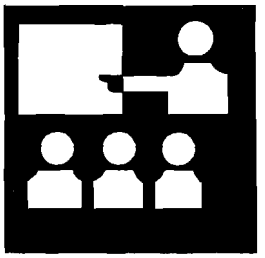


Phaseolus lunatus

Phaseolus for future crop breeding

A collaborative project between IBPGR and CIAT to collect and characterize Phaseolus *germplasm has been in place for some time. Field missions have yielded 1,961 new accessions of more than 45 different* Phaseolus *species. Germplasm was obtained for the first time of 17 species, and seven accessions are considered as possible new species.*

Of particular interest for future breeding and crop evolution studies was the finding of wild P. vulgaris *(a form different from* P. aborigeneus*) in eastern Mexico, in Costa Rica and in Peru. A new wild lima bean was encountered in Peru, and an ancestor of* P. polyanthus *found in Guatemala.*



The goal of IBPGR's training programme is to provide a means to increase the numbers of qualified personnel from developing countries involved in the conservation and use of plant genetic resources and to provide special training in specific skills.

The growth of the global network of scientific institutions conserving germplasm has meant a continuing need for well-trained, specialized manpower. In 1987, IBPGR had, for the first time, a full-time Training Officer in Headquarters overseeing this programme, which is organized at four operational levels: post-graduate courses, specialized short technical courses, individual hands-on training and study tours, and IBPGR Intern fellowships. Figure 9 details the countries from which IBPGR supported trainees in 1987.

Post-graduate training courses

MSC DEGREE COURSE

IBPGR offers, in collaboration with the University of Birmingham, UK, a 12-month MSc course on 'conservation and utilisation of plant genetic resources' to young researchers from the national programmes of developing countries. During the academic year 1986-87, 10 researchers, eight of whom were supported by IBPGR, successfully completed this course. 13 trainees started the 1987-88 course; IBPGR provided fellowships to seven of these (see Figure 8).

POST-GRADUATE COURSE FOR SPANISH-SPEAKING RESEARCHERS

ETSIA of the Universidad Politecnica, Madrid, Spain, offers a 5-month training course on plant genetic resources for Spanish-speaking researchers from developing countries. In the academic year 1987, IBPGR provided fellowships to three scientists from Argentina, Chile and Colombia, who successfully completed the course. Previously IBPGR had supported postgraduate training in French in Gembloux, Belgium. Negotiations are under way for a new course in France.

Figure 8 Country of origin of IBPGR-supported trainees attending the University of Birmingham MSc course

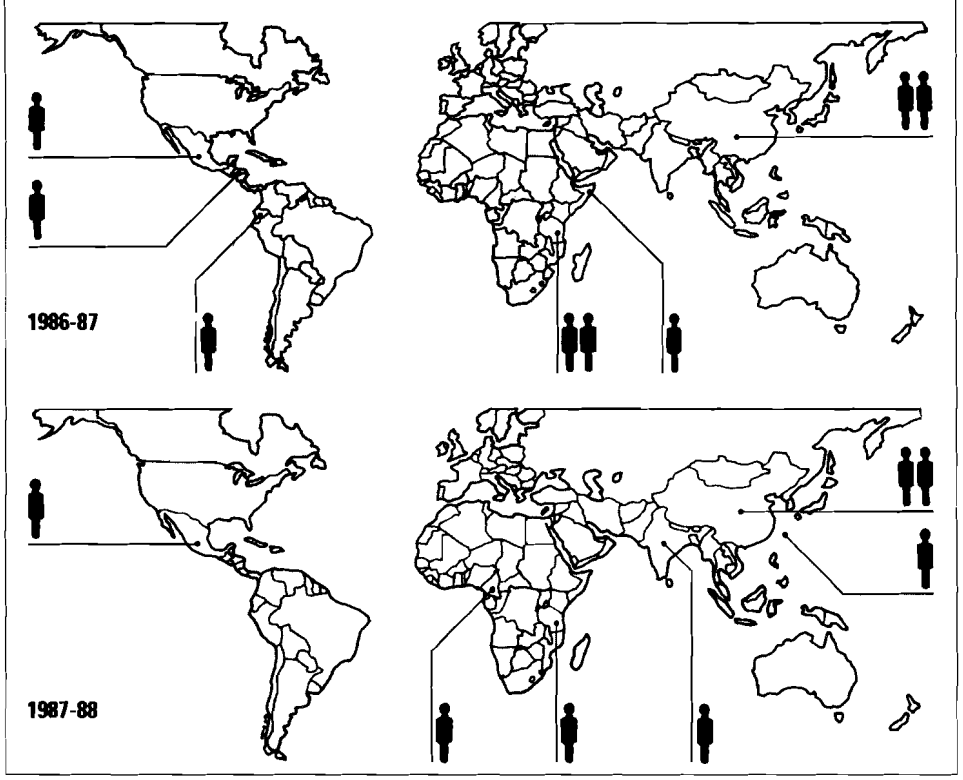
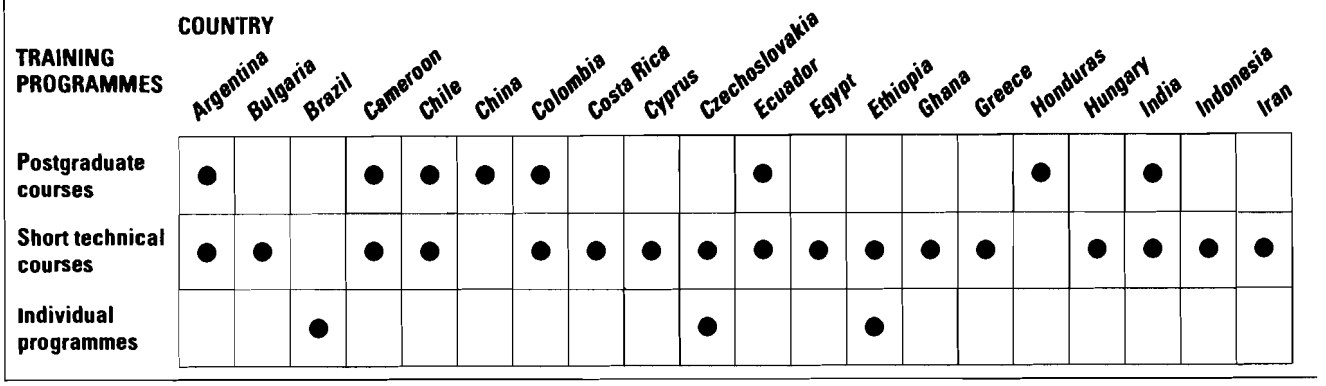


Figure 9 Countries supported through the IBPGR training programme in 1987



Short technical courses

Specialist international training courses

In 1987, three trainees from Egypt, India and Malawi received IBPGR fellowships to attend a 3-month short course on evaluation/utilization and documentation (January-March 1987), at the University of Birmingham, UK. Six researchers, from the national programmes of Ethiopia, Iran, Malawi and Cameroon, began a short course on conservation in the same university.

Training course on oat germplasm

In collaboration with FAL in the FRG, IBPGR's ECP/GR Programme organized a 10-day training course on 'multiplication, regeneration, characterization and utilization of *Avena* germplasm' in Braunschweig, FRG. IBPGR supported 13 cereal germplasm researchers from Cyprus, Jordan, Greece, Poland, Portugal, Czechoslovakia, Syria, Tunisia, Spain, Turkey and Yugoslavia to attend this course.

IBPGR/UNEP/USSR training course on plant genetic resources

IBPGR, with UNEP funding, organized a 3-week training course on 'collection, conservation and evaluation of plant genetic resources' with VIR in Leningrad during June 1987. Five trainees, from Argentina, Cuba, Egypt, Morocco and Venezuela, attended.

Scientific management of genebanks

In August 1987, a 3-week IBPGR training course on 'scientific management of genebanks' was held at the Crop Science Department, University of North Carolina, USA. One trainee attended from each of the national programmes of Bulgaria, Chile, Colombia, Costa Rica, Czechoslovakia, Ecuador, Hungary, Indonesia, Mexico, Peru, Philippines, Sierra Leone, Uruguay and Yugoslavia. The participants, as a result of this course, were able to develop 5-year plans of operation for the priority crops of their national programmes.

International diploma course for technicians in herbarium techniques

Recognizing the need for technical skills in collecting wild genepools of crops, IBPGR funded four technicians from national programmes of Ghana, Indonesia, Kenya and Zimbabwe to participate in the 8-week international diploma course on herbarium techniques organized by RBG, Kew, UK, at the request of the CSC of the Commonwealth Secretariat.

Individual training programmes

IBPGR organizes individual hands-on training programmes and study tours at international, regional and national centres to strengthen technical capabilities and upgrade standards of operation. In 1987, IBPGR organized visits for six researchers from Brazil, Czechoslovakia, Ethiopia, Paraguay, Turkey and Yugoslavia. Topics for these programmes included: conservation and evaluation of tropical forage germplasm, documentation and data management systems, cryopreservation of fruit germplasm, and genebank management and organization.

Jordan	Kenya	Malawi	Mexico	Morocco	Paraguay	Peru	Philippines	Poland	Portugal	Sierra Leone	Somalia	Spain	Syria	Taiwan, China	Tanzania	Tunisia	Turkey	Uruguay	Venezuela	Yugoslavia	Zimbabwe
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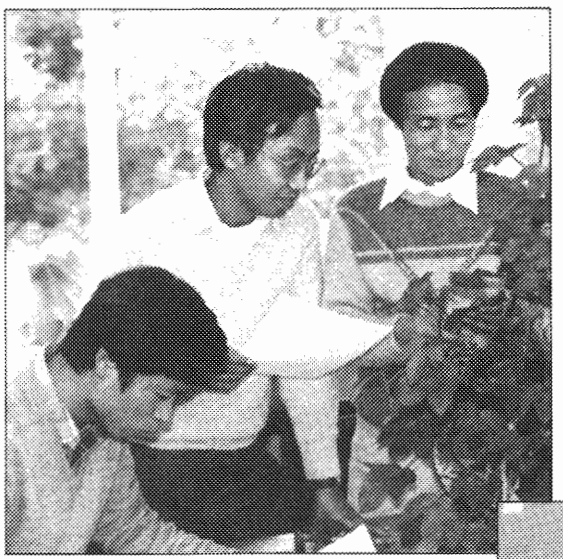
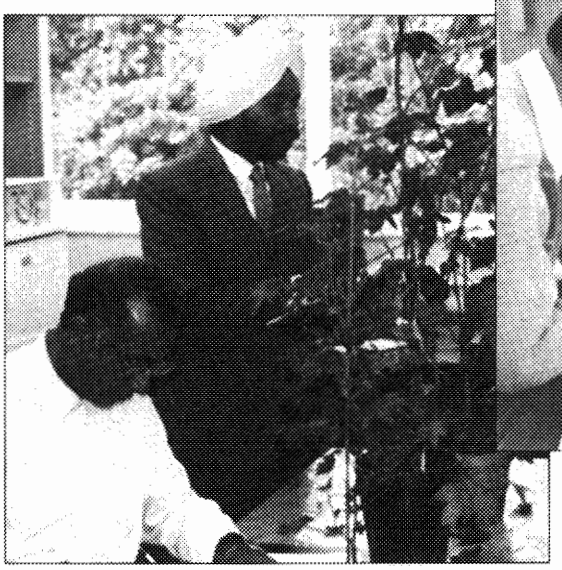
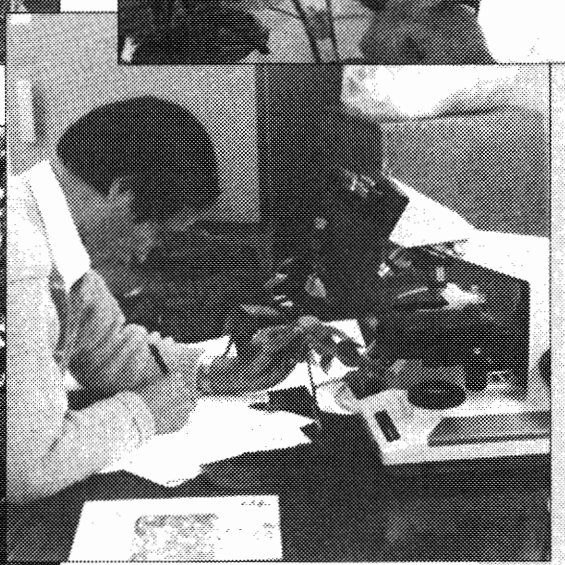






Trainees on the International course at the University of Birmingham, UK.

Internships

In 1987, the IBPGR Internships programme – initiated in 1985 to impart scientific research skills to young researchers at pre- or postdoctoral level – continued to grow. Seven Interns were active in the programme during 1987. Specific details of their activities are given elsewhere in this section.

Long-distance learning module on seed conservation

IBPGR initiated in 1987 a new project on the feasibility of long-distance training modules, and started the first one on methods of seed storage for conservation. The objective of this project, housed in the Department of Plant Biology, University of Birmingham, UK, which since 1969 has played a major international role in genetic resources training, is to open up a new avenue for imparting technical skills to technicians/researchers of national programmes in developing countries. This self-training module teaches cheap but effective techniques of seed storage for small germplasm collections. It is expected to increase IBPGR's capabilities of reaching out to diverse categories of workers in agricultural experimental research stations, universities/colleges of agriculture and/or science, extension offices in provinces, etc. who could maintain their germplasm collections better given a suitable form of training.

Training by centres and institutes other than IBPGR

During the year, several national, regional and international institutes around the world took the initiative of holding training courses on plant germplasm conservation and use. Here are just a few of these courses.

JICA organized its sixth international group training course in plant genetic resources during 27 April – 5 July 1987. This course, at NIAR at Tsukuba, was aimed at reinforcing manpower skills of national germplasm programmes, particularly in Southeast Asia and the Pacific regions. There were 11 participants, and IBPGR – who encouraged the Japanese Government to initiate this training programme in 1981 – provided technical support through the travel and lecturing services of a senior Officer.

During May 1987, the cereal improvement and genetic resources programmes of ICARDA conducted a short training course on 'germplasm evaluation: cereal

IBPGR Interns

IBPGR Interns are young researchers pursuing essential scientific work. Because of their links to IBPGR and to national programmes they can be seen as 'bridge builders'. Even those located in a specific centre of expertise far from the field are travelling and establishing links with colleagues in national programmes.

***Jean Marie Bompard** is French and has been working on a joint IBPGR-IUCN/WWF project on an ecogeographic survey of wild* Mangifera *species in Southwest Asia. This research will lead to a better understanding of the evolutionary relationships of species, and also provide IUCN with detailed information on which they can base plans for* in situ *conservation.*

***Dilberto Ferraren**, an MSc alumnus of IBPGR, from the Philippines is working at Dodo Creek Research Station in the Solomon Islands on collecting, sorting and describing the patterns of variation in root crops of the Pacific. This is a follow-up to IBPGR field work and the activities of national programmes in the Pacific.*

***Johnson Hakiza**, another MSc alumnus of IBPGR, from Uganda has been working on the genetic resources of African forages at ILCA in Ethiopia. His research has been linked to a programme of ILCA which IBPGR helped to initiate and with which IBPGR still keeps close links.*

***Vojtech Holubec** is from Czechoslovakia and has been researching, in Texas A&M University (where there is considerable expertise on cotton taxonomy and breeding), the distribution of wild* Gossypium *species in Africa to determine priority collecting sites and identify areas in the continent which would be first targets. The work included herbarium surveys and the*

landraces and wild relatives' in Aleppo, Syria. The aim of this course was to upgrade the knowledge of trainees on the methodology of characterization and evaluation of landraces and wild genepool collections, based on ICARDA's regional crop-improvement experience. 11 trainees participated, from Jordan, Algeria, Ethiopia, India, Iran, Morocco, Pakistan, Syria and Tunisia.

A short training workshop on 'seed science and technology' was held during May 1987 for Chinese researchers by the Zhongshan (Su Yatsen) University, Guangzhou, China. This training programme included, among other subjects, lectures and practical work concerned with conservation aspects of seed physiology.

In Poland, a 5-day training course on 'methods of plant genetic resources' was held at the National Department of Plant Genetic Resources, Institute of Plant Breeding and Acclimatization, Radzików, Poland. The course was designed to update national expertise in the crop germplasm field and was attended by 40 trainees, both researchers and technicians. Experience at the national level revealed the need for further training on specific problem areas of research/field operations.

In June 1987, the forage legume agronomy group of ILCA held a short training course for technicians and forage agronomists on 'forage germplasm collection and initial evaluation' at the Ethiopian Ministry of Agriculture training centre near Soddo, Wolaita, Ethiopia. A more practical-based training course was held by the same centre in October 1987 for the Eastern/Southern African national programmes.

Survey of past trainees

A major survey of past trainees, who now total over 900, has been initiated in HQ in Rome. It is important to know how many alumni are still actively engaged in genetic resources work to be able to target limited funds effectively. In the case of postgraduate training the evidence seems to point to a relatively low rate of attrition.

establishment of a relevant database.
***Evans Lagudah**, who comes from Ghana, is based in the USDA/ARS Coastal Plains Experimental Station in Georgia, USA. His work in the Sahel region is a follow up to IBPGR field work in Africa. He has expanded his studies of endosperm proteins to clarify relationships between species within the genepool of cultivated* Pennisetum. *Two major groups of albumins proved to be uniform within all species tested and therefore useful as markers for identifying the genus but not as indicators for distinguishing between species. However, banding patterns of monomorphic esterase in the primary and secondary genepools and in* P. squamulatum *(tertiary genepool) were found to be species specific. Lagudah's observations imply that* P. squamulatum *possesses genomic regions homologous to both primary and secondary genepools. They corroborate the findings of researchers from the University of Florida using mitochondrial and nuclear DNA analysis.*
***Suzanne Sharrock**, from the UK, is working from a base provided by the Queensland Department of Primary Industries in Australia to collect wild diploid* Musa *germplasm in Papua New Guinea. This material is to be transferred as seed and in tissue culture for disease indexing. Once this novel application of well-known processes is completed, the plant tissue is to be sent to the Philippines for conservation at the regional* Musa *genebank.*
***Seji Yanagihara** of Japan worked between 1985 and 1987 in Nepal (hosted by the Department of Medicinal Plants) on collecting and characterizing indigenous crop germplasm to fill gaps after major IBPGR collecting missions funded by the Government of Japan in 1984-85.*

Administration

IBPGR Trustees

The Annual Report for 1986 reported on the decisions of CGIAR which necessitated a freeze in changes in the IBPGR Trustees (and which stopped the filling of staff vacancies) in the period 1985-86. This limitation was lifted from 1 January 1987.

New Trustees from the beginning of the year were: Dr. A. Papasolomontos (Cyprus) and Prof. W.E. Tossell (Canada), both elected by CGIAR; and Mme. Y. Cauderon (France), Prof. H.F. Chin (Malaysia), Prof. V.L. Chopra (India), Dr. J.H.W. Holden (UK), Prof. D.R. Marshall (Australia) and Dr. C.F. Murphy (USA). These five were elected by IBPGR and endorsed by CGIAR.

The IBPGR Trustees held their annual meeting in Rome 25-27 February 1987 and elected the statutory Executive, Programme and Nominations Committees. The Executive Committee met in Rome on 24 February and in Washington DC on 2 November 1987. The Programme Committee met in Rome 23-24 February and 25-27 May, and in Washington DC 3-5 November 1987. The Chairman of the Board acts as Chairman of the Executive Committee; Prof. G. Fischbeck was elected Chairman of the Programme Committee and Prof. W.E. Tossell was elected Chairman of the Nominations Committee.

The Nominations Committee met during the Board meeting in February and continued its work by correspondence to solicit and assess nominations for new members to fill vacancies that would be created by the retirement of Prof. G. Fischbeck (FRG) and Dr. D.C. Giacometti (Brazil) on 31 December 1987.

It is accepted practice that donors may attend any of the open parts of the meetigs of the Trustees or the Committee meetings. In 1987, observers from Canada, France, FRG and the USA attended meetings.

Selected list of meetings with which IBPGR was associated in 1987

8-9 January	ILDIS Meeting, Kew, UK
12-15 January	Planning Meeting SADCC Regional Genetic Resources Project, Sweden/Denmark
4-6 March	Biological Diversity – A Challenge to Science, the Economy and Society, Dublin, Eire, conference organized by CEC
16-20 March	Second Session, FAO Commission on Plant Genetic Resources, Rome
25-27 March	CEC Meeting on Collection, Evaluation and Conservation of Germplasm of Cruciferous Crops, Brussels, Belgium
4-7 April	Commonwealth Science Council, Commonwealth Secretariat, International Workshop on Maintenance of Life Support Species, New Delhi, India
22-26 April	Regional Conference of North Africa for the Conservation of Nature and Utilization of Plant Genetic Resources, Rabat, Morocco, organized by IUCN
16-22 May	CSC Regional Workshop on Genetic Resources Conservation in Africa, Lusaka, Zambia
25 May-2 June	Workshop on Plant Genetic Resources for Africa, Addis Ababa, Ethiopia (AAASA, PGRC/E, Rural Advancement Fund International)
1-4 June	Coordinating Committee Meeting of the CEC Cruciferae Programme, Oeiras, Portugal
2-5 June	INIBAP Workshop on Documentation of Genetic Resources of *Musa*, Montpellier, France
19-24 June	ICARDA International Workshop on Genetic Resources of Cool Season Pasture, Forage and Food Legumes for Semi-arid Temperate Environments, Cairo, Egypt
23-24 June	EUCARPIA Workshop on Evaluation of Genetic Resources for Industrial Purposes, Braunschweig, FRG
24 June	EUCARPIA Genebank Committee, FAL, Braunschweig, FRG

Chairman, Vice Chairman and Director

Dr. W.J. Peacock became Chairman of the Trustees on 1 January 1987 and Dr. A. Papasolomontos was elected as Vice Chairman. The Chair of IBPGR was represented at meetings of the CGIAR Committee of Center Board Chairs by Dr. Papasolomontos in March 1987 and by Dr. Peacock in October 1987.

The Board at its February 1987 meeting formally elected Prof. J.T. Williams as Director. Previously this had been by agreement between FAO – the host organization – and the Board. In 1987, Prof. Williams attended meetings of the CGIAR Committee of Center Directors in June in Nairobi, which he chaired in the absence of the current Chairman, and also in October in Washington DC.

Headquarters agreement

On 28 February 1987 a formal Memorandum of Undertaking was signed between the Office of the Director-General of FAO and the Chairman of the Board which clarified a number of issues relating to the hosting and servicing of IBPGR by FAO. Agreement was reached that all professional staff of IBPGR should be paid through CGIAR funds rather than as previously, when some were provided by FAO. In April 1987, IBPGR Headquarters moved into different office accommodation within FAO Headquarters. This provided additional space and enabled IBPGR to fill a number of vacancies.

Representation at international meetings

Apart from IBPGR meetings itemized elsewhere in this report and the regularly scheduled meetings of CGIAR and its Technical Advisory Committee, IBPGR participated in a number of international or regional events during 1987.

7-8 July	Second Symposium on Origin of Cultivated Plants and Maintenance of Natural Abundance of Forms, Linz, Austria, organized by Landwirtschaftlich-chemische Bundesanstalt
24 July-1 August	XIV International Botanical Congress, Berlin, FRG
28-31 July	Consultation of FAO Cooperative Network on Sunflower, Szeged, Hungary
31 July	Board Meeting of ILDIS, Berlin, FRG
20-21 August	Planning Meeting for Regional Genetic Resources Project in SADCC countries, Copenhagen, Denmark (Nordic Council)
3-11 September	Sugarcane Varietal Improvement – Present Status and Future Options, Sugarcane Breeding Institute, Coimbatore, India
22-24 September	Third International Congress and Exhibition of Biotechnology, Hanover, FRG
22-24 September	Description of the Natural Variability and Management of Genetic Resources and Breeding for Adaptation to the Natural Environment, EUCARPIA Fodder Crops Section, Lusignan, France
22-25 September	International Symposium on New Crops for Food and Industry, Southampton, UK
12-14 October	CGIAR Meeting of Genetic Resources Units of Centers Working in Plant Genetic Resources, CIMMYT, Mexico
16-21 November	The Second International Symposium on Mungbean, AVRDC, Bangkok, Thailand
24-27 November	100 Years of N.I. Vavilov, Joint Session, USSR Academy of Sciences/Lenin All-Union Academy of Agricultural Sciences, Moscow, USSR, followed by Symposium in Honour of N.I. Vavilov, VIR, Leningrad
5 December	Meeting honouring N.I. Vavilov, Institute of Archaeology/ Linnean Society, London, UK
8-10 December	Symposium honouring N.I. Vavilov, Academy of Agricultural Sciences of the GDR, Gatersleben, GDR

Committees and groups to advise the Director

A subcommittee of the IBPGR Advisory Committee on *In Vitro* Storage met 17-20 August at North Carolina State University, Raleigh, USA to review disease indexing, germplasm exchange and quarantine for clonally propagated crops and to make proposals for more effective strategies using *in vitro* techniques. This was chaired by Prof. J. Moyer. The report was provided to the Programme Committee in November 1987 for comment and the Committee considered the proposals in the report to represent promising new directions for scientific work.

In the context of the Special Project, ECP/GR, of which, on behalf of the member governments, the Director acts as Executive Secretary, a number of Working Groups met during 1987: on sunflower, 29 July at Szeged, Hungary; on forages, 24 September at Lusignan, France; and on beet, 18-20 November at Wageningen, Netherlands. These Working Groups report both to IBPGR and to the member governments.

The governments of five Southeast Asian countries and IBPGR have a joint Regional Committee for that region chaired by Prof. R.M. Lantican of the Philippines. The Committee was invited to meet during the IBPGR Workshop for South and Southeast Asia, held in New Delhi, India, 23-25 November. In addition, a Working Group on palms of the Southeast Asian countries met 27-29 January at Zamboanga in the Philippines.

Within IBPGR Headquarters, the Director established an informal staff committee on public affairs which met at frequent intervals to advise the Director and to prepare for the 1987 In-house Review on Public Affairs that was due to take place in December 1987 but was postponed to January 1988.

Staffing

1987 saw a major restructuring of staff within IBPGR.

FIELD PROGRAMME

For the Field Programme, the Headquarters staff was strengthened by the addition of an Officer to coordinate Germplasm Acquisition and an Officer to coordinate Training. In addition, following an earlier review by the Programme Committee and decisions by the Trustees, it was agreed that the Field Office in Bangkok should be closed so that previous efforts serving only five Southeast Asian countries could be merged with a major new effort to serve countries of both South and Southeast Asia. Considering the gaps remaining to be filled, and research priorities, agreement was reached for the Field Office to be located in NBPGR, New Delhi and it is expected to be opened early in 1988. In addition, China agreed during 1987 for IBPGR to open a Field Office in CAAS, Beijing in 1988.

A similar restructuring of IBPGR'S Field Offices is expected for Latin America and the Caribbean in 1988.

In Africa, 1987 saw a reorganization of IBPGR's activities. There are two Field Offices, one located in Nairobi as before to serve Eastern and Southern Africa, and a new office at the ICRISAT Sahelian Center in Niamey, Niger for a Sahelian programme (replacing the previous West Africa programme). Ms. J. Toll, previously involved with support to Burundi, Zaire and Rwanda, took over as Field Officer for the Sahelian programme.

The Field Office for Southwest Asia, North Africa and Southern Europe was moved to IBPGR headquarters in 1987 to enable maximum complementarity with ECP/GR. The previous Field Office in Cyprus was retained for an IBPGR Collector.

1987 therefore showed major changes in the Field Programme and work continued worldwide, despite a number of vacancies and delays in recruitment. The restructuring is expect to be on target in early 1988.

The Field Offices were supplemented in 1987 with IBPGR Collectors located in Peru at CIP (for wild sweet potato species), at CATIE, Costa Rica for collecting in Meso-America, in Zimbabwe at the University in Harare for wild *Vigna* species, in Niger at ICRISAT for wild relatives of crops in the Sahel and in Cyprus at ARI for crops of the Mediterranean and Southwest Asia.

RESEARCH PROGRAMME

1987 saw the appointment of the Head of the Research Programme, Dr. Alison McCusker. In addition, posts were filled for Pathology/Quarantine and agreement reached on an *In Vitro* post to supplement existing staff dealing with Seed Conservation and Evaluation/Regeneration. A post for a Genetic Diversity Research Officer was kept vacant to allow consideration of the interdisciplinary skills available in existing and new staff. This post will be reconsidered in 1988.

DIRECTOR'S OFFICE

To supplement the existing administrative and publications staff, a Public Affairs Officer was appointed in 1987 to the Director's Office. In addition, a Special Programme was agreed in 1987 to deal with the conceptual framework of an active collections network, and Dr. N. Murthi Anishetty, previously Board Secretary, was transferred to this new work. The tasks of the Board Secretary will be shared with the Heads of Programmes until such time as the Administrative section of IBPGR is strengthened in 1989.

In areas where staff strength has been insufficient, the Director has relied on the services of former Trustees, Prof. M. Iizuka (Japan) and Dr. J.L. Creech (USA) to assist as Senior Advisers on programme development in East Asia. Other areas were covered in the normal way through consultancies, and one of special note is a major study on regeneration carried out in 1987 by Dr. L. Breese in association with the Programme Committee, the Director, research staff and USDA.

Publications

IBPGR sees itself as a major source of information. In view of the global nature of its programme, all of its publications are free. In order for developing countries to benefit mostly from this policy, distribution to developed countries is limited as far as possible to libraries, etc.

IBPGR issues a wide range of publications and views this as one way of keeping scientists and others in the global network in touch with new developments and ongoing activities. Publications range from those dealing with scientific standards and results of research to practical guides. In addition, a quarterly newsletter issued jointly by FAO and IBPGR is distributed to over 4,200 recipients, who also receive the Annual Report.

General

IBPGR Programme Structure
IBPGR 1986 Annual Report

Newsletters/Bulletins

FAO/IBPGR Plant Genetic Resources Newsletters, Nos. 68-70
IBPGR Regional Committee for Southeast Asia Newsletter, Vol. 11, No. 2
IBPGR Regional Committee for Southeast Asia Newsletter, June 1987. Tenth Anniversary of IBPGR/SEAN. Special Issue. Proceedings of a Workshop on Problems and Prospects of Characterization and Preliminary Evaluation of Crop Genetic Resources, Bangkok, Thailand (in association with 5th SABRAO Conference)
African Plant Genetic Resources Bulletin (of IBPGR Sub-Saharan Field Offices), No. 1, August 1987
IBPGR Bulletin for Europe, Southwest Asia and North Africa, No. 1, November 1987

Conservation

Genebank Management and Seed Storage (in Chinese). IBPGR/CAAS
IBPGR Advisory Committee on *In Vitro* Storage. Report of the Third Meeting
Practical Manuals for Handling Crop Germplasm *In Vitro:* 1. Meristem-tip Culture and Virus Indexing of Sweet Potatoes. S. L. Love, B. B. Rhodes and J. W. Moyer

During 1987, a policy decision was taken to issue regularly additional newsletters/bulletins to serve the interests of scientists in particular areas. The first two of these were for sub-Saharan Africa, and Europe, Southwest Asia and North Africa. In 1988, two more will be produced for Latin America, and South, Southeast and East Asia. These will provide a steady flow of news about genetic resources to the many institutions holding some type of collection of plant material, with the aim of fostering cooperative links between programmes and scientists.

Crops

Systematic and Ecogeographic Studies on Crop Genepools: 2. El Teocintle en Mexico. J. Jesús Sánchez G. and L. Ordaz S.

Recursos Fitogeneticas, Anales del Simposio. A. Contreras and J. Esquinas-Alcázar (editors). Universidad Austral de Chile/IBPGR

Documentation

Bambara Groundnut Descriptors, IBPGR/IITA/GTZ

Descriptors for *Brassica campestris L.*, IBPGR/AVRDC

A Catalogue of Chinese Crop Germplasm for Exchange. IBPGR/Institute of Crop Germplasm Resources, CAAS

European Barley List, Vols. I and II, compiled by H. Knüpffer. IBPGR/ECP/GR

A Catalogue of Passport and Characterization Data of Sorghum, Pearl Millet and Finger Millet Germplasm from Zimbabwe. S. Appa Rao and J. N. Mushonga.

Training

IBPGR Training Courses: Lecture Series I. Collection, Characterization and Utilization of Genetic Resources of Temperate Forage Grass and Clover

IBPGR staff in 1987

Office of the Director

Prof. J. T. Williams[1]
Director

Research programme

Dr. A. McCusker[2]
Head

Mrs. L. Dalton
Secretary

Dr. C. G. D. Chapman
Evaluation and regeneration

Field programme

Headquarters

Ir. D. H. van Sloten
Head

Mrs. M. McArthur-Giannini
Secretary

Dr. W. G. Ayad
Training

Miss N. Vannuccini
Secretary

Field offices

Eastern and Southern Africa

Mr. A. F. Y. Attere
Field Officer

Mr. H. Kamau[2]
Assistant
c/o ILRAD
Nairobi
Kenya

Dr. R. Mithen
Collector
Department of Biological Science
Harare
Zimbabwe

Sahel/Western Africa

Mr. M. Horn[3]
Field Officer
c/o FAO
Ouagadougou
Burkina Faso

Ms J. Toll[2]
Field Officer
c/o ICRISAT Centre Sahélien
Niamey
Niger

[1] Executive Secretary, UNDP-IBPGR ECP/GR
[2] Joined during the year
[3] Left during the year

Miss D. E. Quaye
Secretary to the Director

Mrs. C. Gorelli
Programme Assistant

Mrs. M. Fabri[2]
Clerk

Publications
Position vacant but filled by
Mr. P. Stapleton[2] *on a consultancy basis*

Ms R. Raymond[2]
Public Affairs

Miss C. Buttafuoco
Clerk

Librarian
Position vacant

Special programme on active collections
Dr. N. Murthi Anishetty

Mrs. G. El Belghami Sijelmassi
Secretary

Ir. E. Frison
Pathology and quarantine

Dr. Kar-Ling Tao
Seed conservation

Miss A. M. Ruffini
Secretary

Genetic diversity
Position vacant

In Vitro Conservation
Position vacant

Mr. J. Konopka
Documentation

Mr. R. Reid[2]
Germplasm acquisition

Mr. A. Vaid
Secretary

Mrs. M. Bonomi
Computer Clerk

Special Project
Dipl. Ing. P. M. Perret
Officer for ECP/GR

Miss R. Andarias de Prado
Secretary

Ms V. Watt
Collector
c/o ICRISAT Centre Sahélien

Latin America

Dr. M. Holle
Field Officer
c/o CIAT
Cali
Colombia

Dr. F. de la Puente
IBPGR/CIP Collector for sweet potato
c/o CIP
Lima, Peru

Dr. J. D. Salazar Diaz
CATIE/IBPGR Collector for Meso-America
CATIE
Turrialba
Costa Rica

Southwest Asia, North Africa and Southern Europe

Field Officer
Position vacant

Mr. L. Guarino[2]
Collector
c/o Agricultural Research Institute
Ministry of Agriculture and Natural Resources
Nicosia
Cyprus

South and Southeast Asia

Dr. N. Chomchalow[3]
Field Officer
c/o FAO Regional Office
Bangkok, Thailand

Field Officer for South and Southeast Asia
NBPGR, New Delhi, India
Position vacant

CONTRIBUTIONS TO IBPGR (1987)

US$ equivalents

Donor	Core	Special Projects
Australia	152 160	
Austria	[1]	5 922[2]
Belgium	131 510	5 922[2]
Canada	374 140	
China	99 970[3]	
Cyprus		1 481[2]
Czechoslovakia		2 961[2]
Denmark	132 681	
Finland		2 961[2]
France	179 780	44 415[2]
FRG	449 857[4]	55 040[5]
Greece		2 961[2]
India	98 708[3]	
Ireland		2 961[2]
Israel		2 961[2]
Italy	[1]	
Japan	1 144 438	86 628[6]
Netherlands	347 969	
Norway	116 077	2 961[2]
Poland		2 961[2]
Spain	49 939	
Sweden	342 821	11 844[2]
Switzerland	219 762	5 922[2]
UK	808 954	
USA	750 000	
	5 398 766	237 901

[1] To be received in 1988

[2] Phase III of ECP/GR

[3] Includes 1986 contribution received in 1987

[4] Includes part of 1988 contribution received in 1987

[5] Support to the Genebank in CATIE, Costa Rica (FRG)

[6] Collecting in Papua New Guinea (Japan)

STATEMENT OF ACCOUNTS FOR 1987

US$ equivalents

RECEIPTS		
Balance as at 1 January 1987		1 814 596[1]
Various Governments' contributions		5 398 766
Special projects		237 901[2]
Interest credited in 1987		100 684
Transfer		(50 000)[3]
		7 501 947
DEDUCT		
Cash expenditure		
Core Programme		
Personnel services	1 472 079	
Official duty travel	579 240	
Contractual services	1 875 918	
General operating expenses	200 636	
Supplies and materials	129 384	
Furniture and equipment	54 492	
Fellowships	220 533	
	4 532 282	
Special Projects	214 989	
Payment of obligations carried forward from previous years	575 434	
	5 322 705	
Commitments		
Incurred in 1987	901 851	
Unliquidated obligations carried forward from previous years	884 061	
	7 108 617	7 108 617
BALANCE AT 31 DECEMBER 1987		393 330

[1] Unobligated cash balance and unliquidated obligations (1986 and previous years)

[2] Phase III of ECP/GR, collecting plant genetic resources in Papua New Guinea (Government of Japan) and support to Genebank at CATIE, Costa Rica (FRG)

[3] Refund to USA of overpayment received in 1986

1987 EXPENDITURE BY FUNCTIONS

US$ equivalents

Administration [1]	678 062
Technical Services [1]	327 055
Global Genetic Resources Network [2]	843 428
Germplasm Acquisition	472 202
Characterization and Evaluation	600 886
Training	785 774
In Vitro Culture Research	830 509
Genetic Diversity Research	476 205
Seed Conservation Research	410 610
Special Projects	224 391

[1] Includes programme coordination

[2] Includes regional coordination

Acontecimientos del año 1987

Adquisición de germoplasma

En 1987, el IBPGR organizó, o colaboró en su organización, 21 misiones para recoger variedades locales y cultivares primitivos de plantas, 14 misiones para recoger especies silvestres relacionadas con los cultivos y ocho misiones para recoger plantas forrajeras. En todos los casos la actividad de campo se llevó a cabo en cooperación con programas nacionales o centros internacionales.

En septiembre de 1987 se efectuó un examen a fondo del programa de adquisición de germoplasma del IBPGR. El Comité del Programa del Consejo llegó a la conclusión de que se han realizado progresos considerables en la recolección de germoplasma en gran escala y recomendó que se prestara mayor atención al establecimiento de objetivos prioritarios, una planificación más detallada de las misiones de recolección futuras y la mejora de las actividades complementarias mediante el establecimiento de vínculos entre los procedimientos de recolección, multiplicación y documentación. Se espera que, aunque se reduzca el número total de misiones de recolección llevadas a cabo por el IBPGR, tales medidas permitan obtener con mayor eficiencia una gama mayor de diversidad. La contratación en agosto de 1987 de un oficial de adquisición de germoplasma de dedicación completa facilitará el cambio de orientación del IBPGR, que llevaba algún tiemo pendiente. En 1987 se concedió gran importancia al mejoramiento de una base de datos central sobre la adquisición de germoplasma.

Conservación

En 1987, el IBPGR comenzó a preparar las directrices y procedimientos para la creación de una red de colecciones activas como complemento de la red de colecciones base de semillas que se ha formado a lo largo del decenio pasado. Ambos tipos de colecciones desempeñan una función esencial en la red mundial de actividades del IBPGR.

El IBPGR continuó evaluando en 1987 las normas científicas que se están aplicando en la actualidad a la conservación de semillas a largo plazo. Se supervisaron 16 bancos de genes con colecciones base designadas para establecer si cumplían las normas científicas y operativas para el almacenamiento de semillas. Los resultados de esta encuesta – que se están introduciendo en una base de datos central – se están examinando con las autoridades competentes y ya han permitido conseguir mejoras importantes.

El IBPGR proporcionó en 1987 equipo apropiado y, en la medida de lo posible, de bajo costo a bancos de genes de 20 países en desarrollo. Además, el IBPGR proporcionó asesoramiento técnico a los gobiernos y autoridades de otros 25 países.

Durante 1987, el IBPGR intensificó su apoyo a la investigación en materia de conservación, especialmente en los sectores de la conservación de semillas y la conservación *in vitro*. En julio se examinó detenidamente el programa de investigación *in vitro*. Como consecuencia de ese examen, el Comité de Programas recomendó que se prestara mayor atención a un número menor de cultivos importantes y que se concediera más importancia al perfeccionamiento de las técnicas de crioconservación.

Durante el año se realizaron grandes avances en el establecimiento de un banco de genes activo *in vitro* de tipo piloto para la yuca, patrocinado conjuntamente por el IBPGR y el CIAT. También se nombró a un funcionario de la sede para coordinar las actividades de investigación en materia de patología y cuarentena.

Documentación

En 1987 se ampliaron los servicios de ordenadores en la sede del IBPGR y se realizaron esfuerzos para dotar a los oficiales de campo y a los recolectores de los medios adecuados para mejorar sus servicios de información en sus zonas correspondientes del mundo en desarrollo. Por otra parte, el IBPGR continuó proporcionando a los centros de recursos genéticos asesoramiento sobre la selección y funcionamiento de sistemas computadorizados, y ofreció ayuda directa para la compra de equipo y de programas a centros de Guatemala, Costa Rica y Egipto, donde los programas nacionales han estado estrechamente vinculados a la actividad del IBPGR durante algún tiempo.

Como parte de su constante esfuerzo para proporcionar información coordinada y normalizada, el IBPGR elaboró 12 nuevas listas de descriptores de cultivos y publicó tres directorios y dos católogos de colecciones importantes de germoplasma.

Diversidad de acervos génicos de plantas cultivadas

Durante 1987, 44 centros caracterizaron germoplasma de cultivos prioritarios con apoyo del IBPGR. Esos programas ponen de manifiesto el constante interés del IBPGR por la estructura de las colecciones y la gama de variación sometida a conservación.

Se realizaron estudios sobre la posibilidad de producir subconjuntos de muestras bien definidas, con una amplia gama de variación, que pudieran constituir un punto de partida útil para el aprovechamiento del material almacenado en el banco de genes. Otras investigaciones se referían al ensayo de un índice que pudieran utilizar los encargados como instrumento para evaluar la "calidad" de sus colecciones.

En 1987 se concluyó una amplia investigación sobre la base teórica de la regeneración, y a primeros de 1988 los resultados obtenidos se traducirán en directrices para políticas e investigaciones estratégicas.

Se continuaron investigando los modelos de variación en acervos de genes de cultivos prioritarios con diversos tipos de cultivos. Esta actividad de investigación tiene un enfoque interdisciplinario y pone de manifiesto el creciente interés por las técnicas moleculares.

Capacitación

Durante el año académico de 1986-87, 21 estudiantes de 12 países en desarrollo recibieron del IBPGR becas de postgrado. Tres de esos estudiantes siguieron un curso en español – en Madrid, España. (El IBPGR ha patrocinado varios cursillos en lengua no inglesa desde 1980). Un total de 45 científicos, pertenecientes a 34 países, recibieron ayuda para participar en diversos cursillos técnicos patrocinados por el IBPGR.

Además de su apoyo a cursos académicos en 1987, el IBPGR organizó programas independientes de capacitación y viajes de estudios en centros internacionales, nacionales y regionales para seis invetigadores jóvenes. Se concedieron becas de internado a siete científicos para estudios pre o postdoctorales en centros de recursos genéticos asociados con la red del IBPGR.

En 1987, el IBPGR contó por primera vez con un funcionario de dedicación completa en la sede de Roma para coordinar las actividades de capacitación.

Reestructuración del IBPGR

En 1987 se continuó reestructurando las funciones del IBPGR, tanto en la sede como en el campo. Se cubrieron varios puestos vacantes, antes congelados, y se nombró un Jefe de investigación. El Gobierno del Níger acordó abrir una nueva oficina de campo en 1987, y mediante acuerdos análogos con los Gobiernos de China y la India se preparó el terreno para abrir en 1988 nuevas oficinas de campo para el este de Asia y el sur y sudeste de Asia respectivamente.

La red mundial

Durante 1987 se convocaron dos reuniones regionales – generosamente financiadas por fondos especiales del Gobierno del Japón – para definir con mayor claridad la función de la participación del IBPGR en actividades de los países asiáticos. El boletín del IBPGR para el sudeste de Asia conmemoró los 10 años de cooperación en esa región con un número especial. Se inició la publicación de dos nuevos boletines del IBPGR, uno para el Africa subsahariana y el otro para Europa, Asia sudoccidental y Africa del Norte.

En noviembre de 1987 se firmó un amplio Memorando de Acuerdo entre el Gobierno de la India y el IBPGR. A lo largo del año prosiguieron las consultas con los países de la Conferencia de Coordinación del Desarrollo de Africa Meridional.

En julio de 1987, el IBPGR declaró operativa la fase III del Programa europeo de cooperación en conservación e intercambio de recursos fitogenéticos, organizado por los países de Europa y para ellos. En diciembre se habían incorporado a la fase III o se habían comprometido firmemente a participar en ella 26 países. Se realizaron grandes esfuerzos para vincular esta actividad con los centros pertinentes de los países en desarrollo.

Acuerdo con la FAO

En febrero de 1987, el IBPGR y la FAO firmaron un Memorando de Acuerdo, que establecía una nueva relación entre las dos organizaciones. En consecuencia, el Director y parte del personal profesional del IBPGR no seguirá desempeñando la doble función que tenían hasta este momento, y de ahorá en adelante se reconocerá la autonomía del IBPGR en sus relaciones como huésped de la FAO.

1987: Evènements marquants

En 1987, l'IBPGR a organisé, ou aidé à organiser 21 missions de collecte de populations de pays et variétés anciennes, et 8 missions de collecte d'espèces fourragères. Toutes ces missions ont été effectuées en collaboration avec des programmes nationaux ou des centres internationaux.

Acquisition de souches génétiques

En septembre 1987, le programme d'acquisition de souches génétiques de l'IBPGR a été examiné en détail. Etant donné les progrès considérables effectués dans la collecte à grande échelle de souches génétiques, le Comité de Programme de l'IBPGR a recommandé de centrer davantage l'attention sur les objectifs prioritaires, de préparer les futures missions de collecte d'une façon plus approfondie et d'améliorer le suivi de ces missions en établissant des liens entre les méthodes de collecte, de régéneration et de documentation. On espère que ces mesures, tout en réduisant le nombre total de missions de collecte de l'IBPGR, permettront de recueillir plus efficacement un plus large éventail de diversité génétique. Le recrutement en août 1987 d'un responsable de l'acquisition des ressources génétiques, poste vacant depuis quelque temps déjà, permettra de mettre en oeuvre l'évolution de l'orientation des activites de l'IBPGR. En 1987, priorité a été accordée à l'amélioration de la base de données centrale sur l'acquisition des souches génétiques.

Conservation

L'IBPGR a commencé de développer des directives et des procédures pour la création d'un réseau de collections actives complétant le réseau de collections de base que l'on constitue depuis une dizaine d'années. Ces deux types de collections ont un rôle essentiel dans le réseau global d'activités de l'IBPGR.

L'IBPGR a poursuivi son évaluation des procédures actuellement utilisées pour la conservation à long terme des semences. Seize banques de gènes détenant des collections de base reconnues, ont été contrôlées pour s'assurer de la manière dont elles respectent les normes scientifiques et opérationnelles d'entreposage des semences. Les résultats de cette enquête, que l'on introduit actuellement dans une base de données centrale, sont étudiés avec les autorités responsables et ont déjà permis d'apporter des améliorations considérables.

L'IBPGR a fourni des équipements appropriés et autant que possible à faible coût d'utilisation à des banques de gènes dans 20 pays en voie de développement. Il a donné en outre des avis techniques aux gouvernements et aux autorités compétentes dans 25 autres pays.

L'IBPGR a accru son soutien aux recherches sur la conservation, surtout la conservation des semences et la conservation *in vitro*. En juillet, le programme de recherche *in vitro* a été examiné en détail et le Comité de programme a recommandé de centrer l'attention sur un plus petit nombre de plantes cultivées importantes et de mettre davantage l'accent sur la mise au point de techniques de cryopréservation. Une banque de gènes active, *in vitro* pour le manioc – coparrainée en tant que projet pilote par l'IBPGR et le CIAT – a fait de grands progrès pendant l'année.

Un fonctionnaire a été nommé au Siège afin de coordonner les activités de recherche en matière de pathologie et de controle phytosanitaire.

Documentation

En 1987, l'IBPGR a modernisé son matériel informatique au Siège et s'est efforcé de mettre à la disposition de son personnel de terrain, un équipement approprié pour améliorer leurs services d'information dans les zones des pays en développement où ils opérent. De plus, l'IBPGR a continué à donner des conseils aux centres de ressources génétiques, sur le choix et le fonctionnement des systèmes informatiques, il a offert son soutien direct pour l'achat de matériel et de logiciel, à des centres au Guatemala, à Costa Rica et en Egypte, dont les programmes nationaux sont étroitement liés aux travaux de l'IBPGR depuis quelques temps.

L'IBPGR, qui s'efforce de fournir des informations coordonées sous une forme standard, a mis au point douze nouvelles listes de descripteurs des plantes cultivées et publié trois répertoires et deux catalogues des collections de souches génétiques importantes.

Diversité des pools de gènes

En 1987, dans 44 centres, des souches génétiques de cultures prioritaires ont été caractérisés et leur évaluation préliminaire a été effectuée avec l'aide de l'IBPGR. Ces programmes traduisent l'intérêt constant de l'IBPGR pour la structure des collections et la gamme de diversité des souches conservées.

On a effectué des études de faisabilité sur la partition de sous-groupes de spécimens bien définis, comprenant une large gamme de diversité, qui pourraient fournir un bon point de départ pour l'exploitation du matériel stocké dans la banque de gènes. On a en outre expérimenté un index qui pourrait être utilisé par les responsables de collection pour évaluer la "qualité" des collections.

Les résultats de vastes recherches théoriques sur la régénération, qui se sont achevées en 1987, seront traduits dans la politique générale de l'IBPGR et déboucheront sur des recherches stratégiques, début 1988.

Des recherches couvrant toute une série de types de plantes se sont poursuivies sur le mode de variation dans les pools de gènes de plantes cultivées prioritaires. Il s'agit de recherches interdisciplinaires qui font de plus en plus appel aux techniques moléculaires.

Formation

Pour la première fois en 1987 l'IBPGR dispose au siège de Rome d'un fonctionnaire à plein temps chargé de coordonner les activités de formation.

Pendant l'année scolaire 1986-87, l'IBPGR a pris totalement à sa charge la formation universitaire de 21 étudiants de 12 pays en développement. Trois d'entre eux (Amérique latine) ont bénéficié de bourses pour suivre un cours donné en espagnol à Madrid (Espagne), sur les ressources génétiques végétales. (Depuis 1980 l'IBPGR a organisé plusieurs brefs stages dans des langues autres que l'anglais). Au total, 45 scientifiques, représentant 34 pays, ont reçu une aide pour pouvoir participer à toute une série de brefs stages techniques parrainés par l'IBPGR.

Outre le soutien apporté pour ces cours universitaires, l'IBPGR a organisé en 1987 des programmes de formation et des voyages d'étude individuels dans des centres internationaux, nationaux et régionaux, à l'intention de six jeunes chercheurs. Sept scientifiques, de niveau pré ou post-doctorat, ont recu des bourses d'internat dans des centres de ressources génétiques associés au réseau de l'IBPGR.

Restructuration de l'IBPGR

La restructuration de l'IBPGR s'est poursuivie tant à Rome que sur le terrain. Des postes vacants qui étaient bloqués ont été pourvus et un responsable du programme de recherche a été nommé. Le Gouvernement nigérien a approuvé l'installation d'un nouveau bureau de terrain et des accords semblables ont été pris avec les Gouvernements chinois et indien, en vue de l'ouverture, en 1988, de bureaux de terrain supplémentaires couvrant l'Asie du Sud, du Sud-Est et de l'Est.

Réseau mondial

En 1987, deux réunions régionales, qui ont bénéficié d'une contribution financière spéciale du Gouvernement japonais, ont défini plus clairement le rôle de l'IBPGR vis à vis des pays asiatiques. Un numèro spécial de la "IBPGR South East Asia Newsletter" a marqué dix ans de coopération dans cette région. Deux nouveaux bulletins de l'IBPGR ont été publiés, un pour l'Afrique subsaharienne et l'autre pour l'Europe, l'Asie du Sud-Ouest et l'Afrique du Nord.

En novembre, le Gouvernement indien et l'IBPGR ont signé un protocole d'entente détaillé. Les consultations se sont poursuivies toute l'année avec les pays de la Conférence de coordination du développement de l'Afrique australe.

En juillet, l'IBPGR a déclaré opérationelle la Phase III du Programme coopératif européen pour la conservation et l'échange des ressources phytogénétiques. En décembre 25 pays participaient déjà à cette troisième phase, ou avaient fait connaître leur ferme intention de le faire. Les activités des groupes de travail de ce Programme ont été reliées autant que possible avec celles des pays en voie de développement. On s'est efforcé d'effectuer ces travaux en liaison avec les centres concernés dans les pays en développement.

Accord avec la FAO

En février, l'IBPGR et la FAO ont signé un protocole d'accord établissant de nouveaux liens entre les deux organisations. Dorénavant, le Directeur et certains fonctionnaires du cadre organique de l'IBPGR n'auront plus une double fonction et l'IBPGR est devenu un organisme autonome hébergé par la FAO.

品种资源采集

1987 年，国际植物遗传资源委员会组织或协助组织 21 个小组采集作物当地品种和原始栽培品种，14 个小组采集与作物有关的野生品种，8 个小组采集饲料作物品种。在所有的情况下，实地工作都是与国家计划或国际中心合作进行的。

1987 年 9 月深入回顾了国际植物遗传资源委员会的品种资源采集计划，结论是大规模的品种资源采集工作取得了很大的成绩。国际植物遗传资源委员会的计划委员会由此建议：要更加重视重点目标，更详细地制定今后的品种采集小组的活动计划，通过加强采集、种植和性状描述各项工作之间的联系来改进后续活动。预计这些措施可使国际植物遗传委员会减少派出的采集小组的总数，同时将更有效地取得较广泛的多样性遗传资源。1987 年任命了一名全职的负责品种资源采集工作的官员，这将有利于实行本委员会已拖延了一些时候的活动方向的转移。1987 年更加重视改进有关品种资源收集的中央数据库。

资源保护

1987 年，国际植物遗传资源委员会开始为创建一个有关活性采集品的网络，制定指导方针和程序，该网络作为在过去 10 年中形成的基础种子采集品网络的补充。这两种形式的采集品在国际植物遗传资源委员会的全球活动网络中都发挥着重要的作用。

1987 年国际植物遗传资源委员会继续对在长期的种子保存中目前应用的科学标准进行评价。对于 16 个保存指定的基础采集品的基因库进行了视察，以检查它们是否遵守种子储存的科学标准和管理标准。这项调查的结果正存入一个中央数据库，并与有关部门进行讨论而且已导致工作的重大改进。

国际植物遗传资源委员会在 1987 年向 20 个发展中国家的基因库提供了适当的且在可能的情况下价格低廉的设备。此外，国际植物遗传资源委员会向另外 25 个国家的政府和部门提供了技术咨询。

在 1987 年期间，国际植物遗传资源委员会加强对资源保护研究的支持，特别是在种子保护和离体保护的领域。7 月，对离体研究计划进行了详细的审议。结果，计划委员会建议把注意力更多地放在数目更少的主要作物上，并建议更加重视低温保存技术。

由国际植物遗传资源委员会和国际热带农业中心共同发起的木薯小型活性离体基因库在这一年取得了重大的发展。任命了一名总部的官员负责协调病理学和检疫研究方面的活动。

文献工作

国际植物遗传资源委员会总部在 1987 年改进了电子计算机设备，正作出努力为实地官员和品种资源采集人员装配适宜的设备，以在他们工作的发展中国家的地区改进信息服务。此外，国际植物遗传资源委员会继续就电子计算机系统的选择和管理向各遗传资源中心提供咨询，为设在哥斯达黎加、埃及和危地马拉各中心购买硬件和软件提供直接的支持，这些中心所在的国家的计划在一定时期内与国际植物遗传委员会的工作紧密相联。

为了不断努力以标准的形式提供协调一致的资料，国际植物遗传资源委员会编制了 12 份新的作物描述表格，发表了有关大量品种资源采集品的三种指南和两种编目。

作物基因库的多样性

在 1977 年期间，有 44 个中心在国际植物遗传资源委员会的帮助下对重点作物遗传品种进行性状描述。这些计划反映了国际植物遗传资源委员会继续关心采集品的组成结构和保护遗传变异的范围。

对于编制明确的分类存取的可能性正进行研究，这种存取包含范围很广的遗传变异品种，可作为利用基因库中储存的材料的一个有意义的起点。还进行了有关一种指标的测试工作的研究，这种指标可被管理员作为评价其采集品的“质量”的一种管理手段。

1987 年完成了有关再生的理论基础的大量工作，并将于 1988 年初进行具体的政策和战略性研究。

继续进行有关重要作物基因库中涉及大量作物类型的变异型的研究。这种研究工作是采取跨学科的形式，并反映出加强对分子技术的重视。

培　训

1987 年，国际植物遗传资源委员会第一次于罗马总部任命了一个全职的官员，负责协调培训活动。

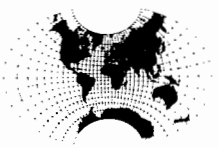
在*1986－1987* 年度，来自*12* 个发展中国家的*21* 名学员得到了国际植物遗传资源委员会全部的研究生资助。其中有三名学员（拉丁美洲）得到了进修金，参加在西班牙马德里以西班牙语举办的有关植物遗传资源的培训（国际植物遗传资源委员会自*1980* 年以来举办了几期非英语的短训班）。总共有*45* 名科技人员（代表*34* 个国家）获得资助参加由国际植物遗传资源委员会主办的各种技术短训班。

除了在*1987* 年对学术性的培训进行支持以外，国际植物遗传资源委员会还为*6* 名年青的研究人员组织了在国际、国家和区域中心的培训和参观。向*7* 名博士前或博士后的科学人员提供进修金，在与国际植物遗传资源委员会网络有关的遗传资源中心实习进修。

国际植物遗传资源委员会的重新调整

1987 年继续在总部和实地对国际植物遗传资源委员会的职能进行调整。一些原先冻结的空缺职位已被填补，任命了一名研究负责人。尼日尔政府在*1987* 年同意设立一个新的驻地办事处，与中国和印度政府也达成了类似的安排，这为在*1988* 年开设新的驻地办事处为南亚、东南亚和东亚服务奠定了基础。

全球性网络



1987 年，在日本政府提供特别基金的慷慨支助下召开了两次区域会议，以更明确地确定国际植物遗传资源委员会与亚洲国家的合作关系。国际植物遗传资源委员会为纪念在该地区合作工作的*10* 周年而发行了《东南亚简讯》的专刊。还出版了两期新的《国际植物遗传资源简讯》，一期是有关非洲撒哈拉以南地区，另一期包括欧洲、西南亚和北非地区。

印度政府和国际植物遗传资源委员会在*1987* 年*11* 月正式签署了一份全面的谅解备忘录。在这一年继续与南部非洲发展协调会议的各成员国进行磋商。

1987 年*7* 月国际植物遗传资源委员会宣布实施欧洲作物遗传资源保护和交流合作计划的第三期活动，这一计划是由欧洲国家组织并为这些国家服务的。到*12* 月，已有*26* 个国家加入第三期计划活动或对其参加作出了明确的许诺。进行了大量的工作，使各工作小组的活动与发展中国家有关中心的工作联系起来。

与粮农组织的协议

1987 年*2* 月两组织签署了一份谅解备忘录，规定国际植物遗传资源委员会与粮农组织的新关系。这样一来，国际植物遗传资源委员会主任和一些专业任职人员将不再像目前一样兼职，从今以后国际植物遗传资源委员会将作为一个独立机构，以其与粮农组织的主办安排发生工作关系。

الحصول على المواد الوراثية

فى عام ١٩٨٧، اضطلع المجلس الدولى للموارد الوراثية النباتية بتنظيم ٢١ بعثة لجمع السلالات البدائية والأجناس الأرضية لعدة محاصيل، و ١٤ بعثة لجمع الأنواع البرية القريبة للمحاصيل الزراعية و ٨ بعثات لجمع الأنواع العلفية. وقد نفذ العمل الحقلى فى كل هذه البعثات بالتعاون مع البرامج الوطنية أو المراكز الدولية.

وفى سبتمبر ١٩٨٧ أجريت مراجعة شاملة لبرنامج الحصول على المواد الوراثية، وقد أظهرت هذه المراجعة أن تقدما ملموسا قد أحرز فى مجال الجمع إلعام (متعدد المحاصيل للبعثة الواحدة) للموارد الوراثية النباتية. وقد أصدرت لجنة البرنامج التابعة للمجلس – بناء على نتائج هذه المراجعة – عدة توصيات من أهمها: زيادة العناية باختيار أولويات المحاصيل/الأنواع النباتية ومناطق الجمع، التخطيط الأدق لبعثات الجمع وتحسين عملية المتابعة عن طريق ربط كل من عمليات التوصيف الحقلى والتوثيق بعملية الجمع. من المتوقع – اذا اتبعت مثل هذه الاجراءات – أن يؤدى ذلك الى تحسين كفاءة عملية الجمع للحصول على مدى أكبر من التباين الوراثى النباتى. اضافة الى ذلك، سيؤدى تعيين مسؤول متخصص فى جمع المواد الوراثية (أغسطس ١٩٨٧) الى تسهيل عمل المجلس فى تطبيق هذا التغيير فى الاتجاه الذى كان موءجلا لفترة من الوقت – فى هذا الصدد يجدر أيضا التنويه بأنه فى عام ١٩٨٧ تم التركيز على تطوير قاعدة البيانات الأساسية الخاصة ببرنامج جمع المواد الوراثية.

برامج الحفظ

شرع المجلس الدولى للموارد الوراثية النباتية – فى عام ١٩٨٧ – فى تحديد المعالم الرئيسية لشبكة المجموعات العاملة المزمع اقامتها لاستكمال شبكة المجموعات الأساسية لحفظ البذور التى تم ارساؤها على مدى الحقبة الماضية. يؤدى كل من نوعى المجموعات (العاملة والأساسية) دورا حيويا فى الشبكة العالمية لنشاطات المجلس.

خلال عام ١٩٨٧، استمر المجلس فى تقويم المعايير العلمية المستخدمة حاليا فى برامج الحفظ على المدى الطويل.

فقد تمت مراجعة ١٦ من بنوك الجينات التى عينها المجلس لتحفظ المجموعات الأساسية من حيث التزامها بالمعايير العلمية والعملية لحفظ البذور. وقد أدت نتائج هذه المراجعة – والتى يجرى الآن مناقشتها مع البرامج الوطنية وادخالها فى قاعدة مركزية للبيانات – الى تحسن ملموس فى أداء العديد من بنوك الجينات فى جميع أنحاء العالم.

أمد المجلس، أثناء عام ١٩٨٧، ٢٠ دولة نامية بمعدات ملائمة وقليلة التكاليف لحفظ البذور فى بنوك الجينات. اضافة الى ذلك، قام المجلس بتقديم المشورة العلمية فى مجال حفظ البذور لحكومات ومؤسسات ٢٥ دولة أخرى.

فى عام ١٩٨٧، قام المجلس بدعم برنامج بحوث الحفظ الوراثى خاصة فى مجالى الحفظ فى المختبر وحفظ البذور. وفى يوليو من نفس العام تمت المراجعة الشاملة لبرنامج بحوث الحفظ فى المختبر. وقد أوصت لجنة البرنامج التابعة للمجلس – بناء على نتائج هذه المراجعة – بوجوب التركيز على عدد أقل من المحاصيل مع تطوير تقنيات الحفظ بالتجميد. حقق البنك النموذجى للحفظ فى المختبر للمجموعات العاملة لمحصول الكاسافا – والذى أقامه المجلس بالاشتراك مع المركز الدولى للزراعة الاستوائية بكولومبيا – تقدما ملحوظا أثناء العام. وفى هذا المضمار يجدر الاشارة الى تعيين مسؤول لتنسيق بحوث وعمليات الحجر الزراعى وأمراض النبات فى المركز الرئيسى للمجلس أثناء عام ١٩٨٧.

<u>التوثيق</u>

تم تحديث مرافق التوثيق فى المركز الرئيسى للمجلس فى عام ١٩٨٧. ويجرى الآن العمل على امداد مكاتب الموظفين الحقليين والمجمعين بالوسائل التقنية اللازمة لتحسين خدمات المعلومات لهذه المكاتب فى مناطق عملها بالعالم النامى. علاوة على ذلك، استمر المجلس فى تقديم المشورة لمراكز الموارد الوراثية بالنسبة الى اختيار وتشغيل أنظمة الحاسب الآلى وتقديم الدعم المباشر لشراء معدات وبرامج الحاسب الآلى لمراكز غواتيمالا وكوستاريكا ومصر حيث يجرى التعاون الوثيق مع هذه المراكز منذ عدة سنوات.

استمرارا لمجهودات المجلس فى تنسيق وتشجيع تبادل المعلومات، تم فى عام ١٩٨٧ اصدار قوائم وصفية لمجموعات ١٢ محصول جديد و ٣ أدلة للمجموعات وسجلين لمجموعات وراثية هامة.

التباين الوراثى للمجاميع النوعية للمحاصيل

أثناء عام ١٩٨٧، قام ٤٤ مركزا للحفظ الوراثى بتوصيف موارد وراثية لمحاصيل ذات أولوية بدعم من المجلس الدولى للموارد الوراثية النباتية. يعكس هذا العمل مدى أهتمام المجلس الدائم لدراسة تركيب المجموعات المحفوظة ومدى التباين الوراثى الموجود بها.

أجريت دراسات جدوى لتشكيل مجموعات فرعية – أصغر عددا وأكثر تحديدا من حيث توصيفها – تشتمل على مدى معين من التباين الوراثى وذلك كخطوة عملية لتسهيل عملية استغلال الموارد الوراثية المحفوظة ببنوك الجينات. تم أيضا البدء فى اجراء بحوث اضافية لقياس فاعلية معيار معين من البيانات، يمكن استخدامه بواسطة أمناء المجموعة المحفوظة حتى يمكنهم تقييم جودة الحفظ.

استكمل اجراء بحث تفصيلى على الأساس النظرى لعملية اكثار المجموعات المحفوظة بغرض تحديد حيوية البذور وسيتم ترجمة هذا البحث الى سياسة واستراتيجية بحثية فى بداية عام ١٩٨٨.

استمر العمل فى بحوث أشكال التباين الوراثى للمجموعات النوعية لطرز معينة من المحاصيل ذات الأولوية فى عمل المجلس. ويعتبر هذا العمل البحثى شامل لعدة مذاهب علمية تخصصية ويعكس التركيز المتنامى على استخدام التقنيات الوراثية الجزيئية.

التدريب

خلال العام الأكاديمى ١٩٨٦–١٩٨٧، حصل ٢١ متدربا من ١٢ دولة نامية على منح دراسية على مستوى الدراسات العليا. وتلقى ٣ من هؤلاء المتدربين (من أمريكا اللاتينية) منحا دراسية لحضور دورة تدريبية باللغة الأسبانية فى جامعة مدريد

التقنية بأسبانيا على الموارد الوراثية النباتية (دعم المجلس العديد من الدورات الدراسية القصيرة بلغات دولية أخرى بالاضافة الى الانجليزية منذ عام ١٩٨٠). أما على مستوى الدورات الدراسية القصيرة التى نظمها أو دعمها المجلس فقد تلقى ٤٥ باحثا من ٣٤ دولة من جميع أنحاء العالم منحا دراسية للتدريب على عمليات حفظ وجمع الموارد الوراثية.

بالاضافة الى دعم الدورات الدراسية الأكاديمية فى عام ١٩٨٧، نظم المجلس عدة برامج تدريبية فردية وجولات دراسية فى مراكز دولية واقليمية ووطنية لستة باحثين شباب. وتم منح ٧ علماء على مستوى ما قبل أو ما بعد الدكتوراه منح تفرغ للبحوث (برنامج تفرغ الباحثين الشباب) فى مراكز موارد وراثية مرتبطة بشبكة المجلس الدولى للموارد الوراثية النباتية. وفى عام ١٩٨٧، عين مسؤول متفرغ لأول مرة لتنسيق عمليات التدريب من المركز الرئيسى.

اعادة بناء المجلس الدولى للموارد الوراثية

شهد عام ١٩٨٧ اعادة شاملة لتشكيل وظائف المجلس فى كل من المركز الرئيسى والمكاتب الحقلية. وتم ملء عدد من الوظائف الشاغرة التى سبق تجميدها خصوصا تعيين رئيسا لبرنامج البحوث. ووافقت حكومة جمهورية النيجر على فتح مكتب جديد للمجلس فى النيجر خلال عام ١٩٨٧. كذلك عقدت اتفاقيات مماثلة مع حكومات الهند والصين لفتح مكاتب حقلية أخرى ينتظر العمل بها قريبا لخدمة مناطق جنوب وجنوب شرقى آسيا.

الشبكة العالمية

عقد اجتماعان اقليميان فى عام ١٩٨٧ – بدعم خاص من الحكومة اليابانية – بغرض تحديد دور أكثر فاعلية للمجلس فى التعاون مع الدول الآسيوية. أصدرت طبعة خاصة لدورية المجلس لمنطقة جنوب شرقى آسيا احتفالا بمناسبة مرور١٠ سنوات على بدء العمل التعاونى فى هذه المنطقة. تم اصدار طبعات مماثلة لنشرات المجلس: واحدة خاصة بأفريقيا جنوب الصحراء والأخرى لشمال أفريقيا وجنوب غرب آسيا وأوروبا.

تم توقيع "مذكرة التفاهم" بين المجلس وحكومة الهند فى نوفمبر ١٩٨٧. استمرت المشاورات بين دول منظمة موءتمر جنوب أفريقيا للتنمية خلال العام.

فى يوليو ١٩٨٧، تم اعلان المرحلة الثالثة للبرنامج التعاونى الأوروبى لحفظ وتبادل الموارد الوراثية النباتية (وهو برنامج نظمته الدول الأوروبية لخدمة القارة الأوروبية). وفى شهر ديسمبر من نفس العام أعلنت ٢٦ دولة أوروبية اشتراكها أو الالتزام باشتراكها فى هذه المرحلة. أمدت مجموعة العمل العلمية التابعة لهذا البرنامج - والتى يتم تدعيمها بواسطة حكومات الدول المشتركة - الدول الأعضاء بالمشورة العلمية بخصوص جمع وتسجيل البيانات كخطوة نحو ادخال قواعد البيانات فى المعاهد البحثية الأوروبية المختصة بالموارد الوراثية للمحاصيل. بذلت مجهودات ملموسة لربط هذا العمل بمراكز مماثلة فى الدول النامية.

الاتفاق مع المنظمة الدولية للأغذية والزراعة

تم فى عام ١٩٨٧ توقيع مذكرة تفاهم لارساء علاقة جديدة بين المجلس والمنظمة الدولية للأغذية والزراعة. نتيجة لذلك، لن يكون من الضرورى لمدير المجلس وبعض من المسؤولين العلميين أن يؤدوا مهام مزدوجة كما كان من قبل. وبذلك يمكن اعتبار المجلس ذا صفة اعتبارية فى علاقاته مع المنظمة المضيفة.

European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources (a special project)

ECP/GR coordinates genetic resources activities in Europe for six crops or groups of crops. Phase I of the project was started in 1981 by UNDP/FAO. Phase II started in 1983, under the responsibility of UNDP/IBPGR, and ended in 1986. Phase III, a reinforcement of the activities of Phase II, began in 1987. The goal of the programme is the development of self-sustaining networks through the operation of the European crop databases.

The main emphasis of ECP/GR has been on documentation activities. This will allow the analysis and rationalization of collections and the exploitation of data, e.g. computer mapping of systematic samples. The rationalization of the barley, oat and sunflower collections should be completed by the end of Phase III. Mapping of collected samples should be achieved as well, at least for most important forage species.

Working sessions of the Sunflower and Forage Working Groups were held during the year. The six ECP/GR Crop Working Groups will meet in 1988-1989 to revise their programmes. With the aid of the European databases (Figure 1A), Working Groups will then be faced with the exciting challenge of proposing further collaborative research to achieve a better understanding of the range of germplasm variation available both *ex situ* and in some cases *in situ* (e.g. *Prunus*). They will also have to consider the development of new approaches to more cost-effective conservation of genetic resources and their better exploitation in breeding programmes.

Phase III of the ECP/GR was declared operational by IBPGR in July 1987, once adequate cash commitments had been made. By December 1987, 19 countries had formally joined Phase III, and seven additional countries had given firm commitments for their participation (Figure 2A).

In accordance with the recommendations of the last meeting of the Technical Consultative Committee (December 1985), collaboration on an *ad hoc* basis should be enhanced for *Beta*, *Brassica*, *Pisum* and *Vitis*. A *Beta* Workshop was held in CGN, Wageningen, the Netherlands in November 1987. ECP/GR staff attended the CEC Crucifer meetings in Brussels, March 1987, and Oeiras, Portugal, June 1987.

Avena

Since the publication of the second edition of the European catalogue of *Avena*, the number of documented accessions (for passport data) has increased by 56% to a total of 14,900 accessions in the FAL database in the FRG.

Identified nominal duplicates have increased from 36% to 55%. Lists of potential duplicates and unique accessions have been distributed to specialists for checking and comment. When this process has been completed, the effective rationalization of collections will begin, probably in late 1988. Characterization/evaluation data are expected by the European database in the first half of 1988 from many countries. Poland was the only country able to provide such data in 1987.

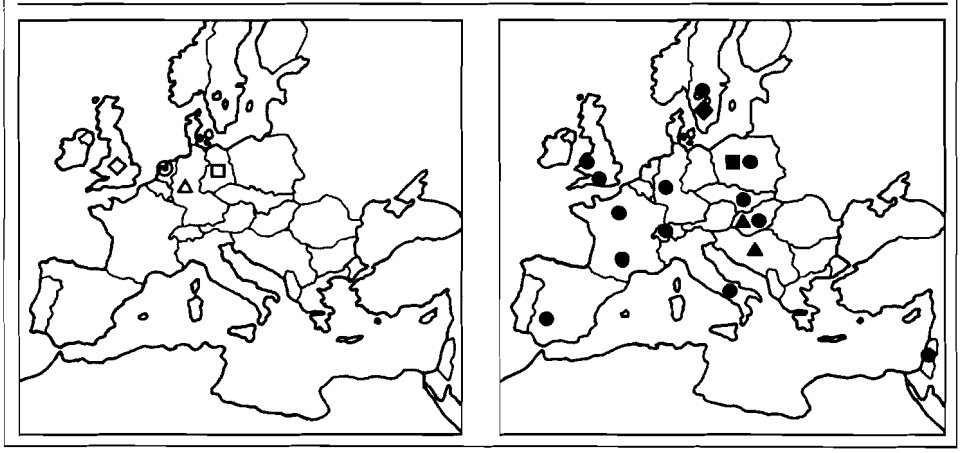
An *Avena* training course on characterization, evaluation, multiplication and utilization of *Avena* genetic resources was organized in the Braunschweig Genetic Resources Centre of FAL.

Allium

A second edition of the *Allium* European list will be published at the end of January 1988 and will include 3,600 accessions. Accessions have been classified according to the standardized nomenclature list agreed by the Working Group. Only Bulgaria and the Nordic countries have sent the characterization/evaluation data which were recommended by the Working Groups in 1987. More progress is hoped for in 1988. *Allium* collecting missions have been undertaken during 1987 in Bulgaria, Czechoslovakia, Hungary and the Nordic countries, as a means of providing input to the programme, as well as in Yugoslavia and Spain with IBPGR support. The European *Allium* field genebanks received around 50 vegetative samples for duplication; the whole vegetative collection was put into meristem culture in 1987.

Figure 1A List of European databases

Crop/species		Institute
◇ *Allium*		NVRS, UK
△ *Avena*		FAL, FRG
□ Barley		ZIGuK, GDR
○ *Beta*		CGN, the Netherlands
◆ *Prunus*		NGB, Sweden
▲ Sunflower	cultivated spp.	Cereal Research Institute, Szeged, Hungary
	wild species	IFVC, Yugoslavia
■ Rye		PBAI, Poland
● Forages	*Trisetum flavescens, Arrhenaterum elatius*	Research Station of Grasses, Roznov, Czechoslovakia
	Poa spp.	FAL, FRG
	Lathyrus latifolius, L. sylvestris, L. heterophyllus and *L. tuberosus*	Institut de Biocénotique Experimentale des Agrosystèmes, Université de Pau et des Pays de l'Adour, France
	Medicago – perennial species	Groupe d'Etude et de Contrôle des Varietés et des Semences, INRA, La Minière, Guyancourt, France
	Bromus spp.	RCA, Hungary
	Trifolium alexandrinum, T. resupinatum and wild related taxa	Field Crops Department, Faculty of Agriculture, Hebrew University of Jerusalem, Rehovot, Israel
	Lolium – annual species, *Phalaris* spp., *Vicia* spp. and *Hedysarum*	Laboratorio del Germoplasma, CNR Bari, Italy
	Dactylis spp., and *Festuca* spp.	PBAI, Poland
	Trifolium subterraneum, annual species	INIA, Spain
	Phleum spp.	NGB, Sweden
	Trifolium pratense	Federal Agricultural Research Station, Changins, Switzerland
	Lolium multiflorum, L. perenne and *Trifolium repens*	WPBS, Aberystwyth, Wales
	Other *Lathyrus* spp.	Department of Biology, University of Southampton, UK



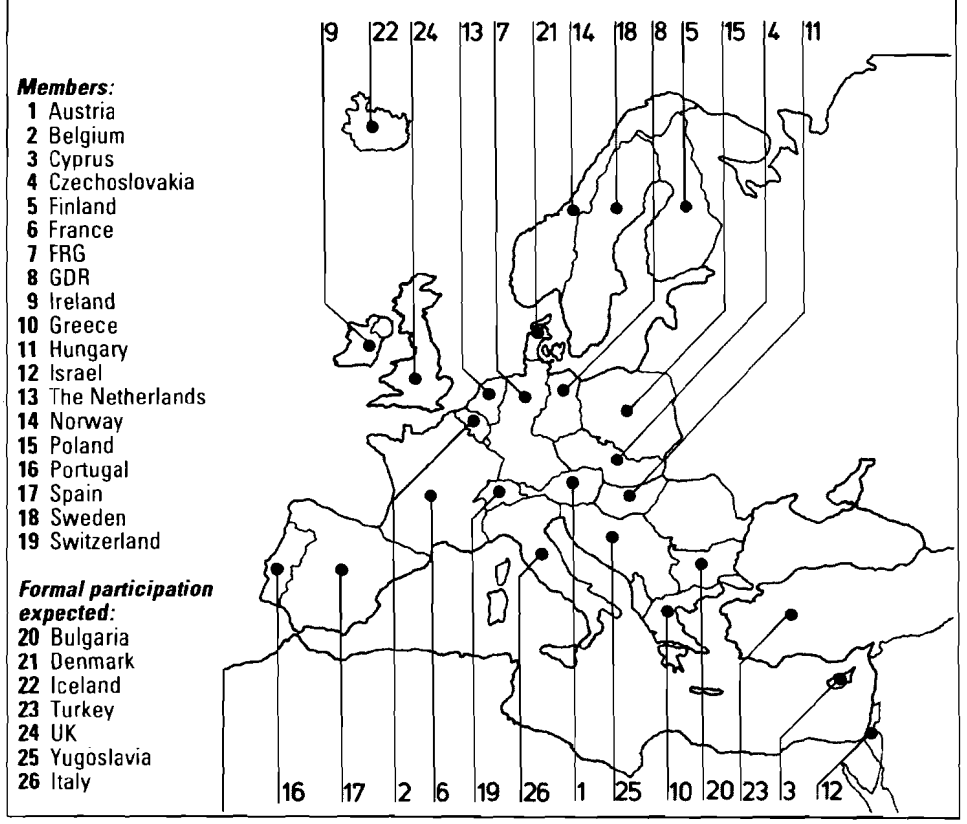
The highlight of the year was the publication of the second edition of the European barley list. This list includes 55,369 accessions from 35 collections: 42% are named accessions (recent and old bred varieties, breeders lines, mutants, special genetic resources); 53% are unnamed accessions (material collected in the field, especially old landraces); and 5% are wild *Hordeum* species and species hybrids. This list is published in two volumes: the first volume contains an alphabetical index of the accession names which appear in Volume 2, and several tables providing summary information on the frequency of specific descriptor states in the databases; the second volume contains named and unnamed accessions. These data are available on IBM-compatible diskettes from the NGB, which is acting as the file transfer centre for ZIGuK.

Forage grasses and legumes

A standardized format for the European forage catalogues was agreed to early in 1987 by all European forages databases. Consequently the National Department of Genetic Resources, Radzikow, Poland, published second editions of *Dactylis* and *Festuca* catalogues in May 1987. INRA/GEVES, France published a second edition of the European catalogue of *Medicago* (perennial species) in September 1987, WPBS, UK one each for *Lolium perenne*, *L. multiflorum* and *Trifolium repens* in December 1987 and RCA, Hungary, the second edition of the *Bromus* list. Other temporary lists, edited in 1987 but not yet standardized, are those covering *Trifolium subterraneum* and annual *Medicago*, and *Trifolium alexandrinum*, *T. resupinatum* and wild related taxa.

A Working Session of the Forage Working Group was held at Station d'Amélioration des Plantes Fourrages, INRA, Lusignan, in September 1987. Participants recognized that few additional passport data, as requested by the

Figure 2A Member countries of Phase III of ECP/GR, as at 31 December 1987



Members:
1 Austria
2 Belgium
3 Cyprus
4 Czechoslovakia
5 Finland
6 France
7 FRG
8 GDR
9 Ireland
10 Greece
11 Hungary
12 Israel
13 The Netherlands
14 Norway
15 Poland
16 Portugal
17 Spain
18 Sweden
19 Switzerland

Formal participation expected:
20 Bulgaria
21 Denmark
22 Iceland
23 Turkey
24 UK
25 Yugoslavia
26 Italy

Forages Working Group, had been received by European databases. Despite clear constraints, an appeal was launched for forage databases and collections not to lose momentum: the problems of regeneration and maintenance of forage genetic resources are acute. There was a general consensus that the Forage Working Group in its next meeting should address the development of suitable procedures for the regeneration of outcrossing species and the development of a general policy on multiplication for distribution.

A list of the standard varieties of forage legumes in the Mediterranean zone was finalized in 1986; the list of standard varieties for northern and central Europe (grasses and legumes) was finalized during the 1987 working session. The wide use of standard varieties, when evaluating forage genetic resources, will allow more meaningful comparison of data between programmes and countries.

Prunus

The first European *Prunus* crop catalogue, scheduled for publication in 1987, was delayed, but is expected to be ready in 1988 in time for the November Workshop on the global network of *Prunus* collections.

Sunflower

A working session of the Sunflower Working Group was held on 29 July at the Cereal Research Institute, Szeged, Hungary. The programme was reviewed and members agreed to send all available characterization and evaluation data by spring 1988 for identification of duplicates. The next Working Group meeting, planned for November 1988, will be in a position to issue detailed guidelines for the rationalization of collections.

IFVC in Novi Sad, Yugoslavia (European database for wild sunflower), which serves as a repository for relevant literature and other information on the maintenance of wild species, received around 200 references in 1987. A list of these references will be distributed by IFVC early 1988.

A scientist from Novi Sad collaborated, with IBPGR support and as a representative of the ECP/GR network, on a USDA collecting mission in the northern Pacific region of USA in September 1987.

Beta

CGN has special responsibilities for *Beta* within the framework of the Dutch-German programme on genetic resources, and agreed to act as a European *Beta* database in early 1987. CGN, which at the time of the *Beta* Workshop in November, had collated passport data on 4,000 accessions, then agreed to act as the International Database for *Beta* and to register evaluation data, under the condition that these follow IBPGR descriptors for *Beta* (these will be slightly revised in 1988). The Workshop considered that the acute need for regeneration of wild forms, landraces and open-pollinated varieties could be solved within the framework of a USDA-Europe public and private cooperative network that would share both seeds and responsibility for the work. The outlines were agreed for the Database to formulate concrete proposals on the basis of passport data. Recommendations were issued for the collecting of wild forms and landraces.

Brassica

The CEC Working Group 0890 on Cruciferae, which was active in the early 1980s in collecting germplasm, has recently had a new start. The Group held a meeting in March 1987, and a coordinating committee subsequently met in EAN, Oeiras, Portugal in June 1987. A 5-year plan (1988-92) including collecting, regeneration/multiplication, characterization and screening for some diseases was prepared for submission to the EC. The ECP/GR Secretariat was invited as an observer to ensure a harmonious collaboration on any future Cruciferae programme between EC and non-EC countries in Europe.

ILCA	International Livestock Center for Africa – CGIAR
ILDIS	International Legume Database and Information Service, UK
ILRAD	International Laboratory for Research on Animal Diseases – CGIAR
INIA	Instituto Nacional de Investigaciones, Spain
INIAP	Instituto Nacional de Investigaciones Agropecuarias, Ecuador – also INIAP, Mexico
INIBAP	International Network for the Improvement of Banana and Plantain
INIFAP	Instituto Nacional de Investigaciones Forestales y Agrícolas Pecuarias, Mexico
INIPA	Institución Nacional de Investigación y Promoción Agropecuaria, Peru
INRA	Institut National de la Recherche Agronomique, France (also INRA – Morocco)
INRAN	Institut National de Recherches Agronomiques du Niger, Niger
INTA	Instituto Nacional de Tecnología Agropecuaria, Argentina
IPB	Institute of Plant Breeding, Philippines
IRCT	Institut de Recherches du Coton et des Textiles Exotiques, France
IRFA	Institut de Recherches sur les Fruits et Agrumes, France
IRHO	Institut de Recherche pour les Huiles et Oléagineux, France
IRRI	International Rice Research Institute – CGIAR
IUCN	International Union for Conservation of Nature and Natural Resources, Switzerland
JAAS	Jilin Academy of Agricultural Sciences, China
JICA	Japan International Cooperation Agency
MAAR	Ministry of Agriculture and Agrarian Reform, PDR Yemen
NPGRL	National Plant Genetic Resources Laboratory, Philippines
NBPGR	National Bureau of Plant Genetic Resources, India
NGB	Nordic Gene Bank
NIAR	National Institute of Agricultural Research, Japan
NPGS	National Plant Germplasm System, USA
NVRS	National Vegetable Research Station, UK
ORSTOM	Institut Français de Recherche Scientifique pour le Développement en Coopération, France
PARC	Pakistan Agricultural Research Council, Pakistan
PBAI	Plant Breeding and Acclimatization Institute, Poland
PBI	Plant Breeding Institute (Cambridge University), UK
PCARRD	Philippine Council for Agricultural and Resources Research and Development
PGR	Plant Gene Resources Office, Canada Agriculture
PGRC/E	Plant Genetic Resources Center, Ethiopia
PGRU	Plant Genetic Resources Unit (Crops Research Institute), Ghana
QTL	Quantitative trait loci
RBG	Royal Botanic Gardens, UK
RCA	Research Centre for Agrobotany, Institute for Plant Production and Qualification, Hungary
RDA	Rural Development Association, Republic of Korea
RFLP	Restriction fragment length polymorphism
SADCC	Southern African Development Coordination Conference
SEAP	Southeast Asia Programme – IBPGR
SPII	Seed and Plant Improvement Institute, Iran
TISTR	Thailand Institute of Scientific and Technical Research, Thailand
UNA	Universidad Nacional Agraria, Peru
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAC	Universidad de San Carlos, Guatemala
USDA	United States Department of Agriculture, USA
VIR	N.I. Vavilov Institute of Plant Industry, USSR
WPBS	Welsh Plant Breeding Station, UK
WWF	World Wildlife Fund, Switzerland
ZIGuK	Zentralinstitut für Genetik und Kulturpflanzenforschung, GDR