INTERNATIONAL BOARD FOR
PLANT GENETIC RESOURCES

CONSULTATIVE GROUP ON
INTERNATIONAL
AGRICULTURAL RESEARCH

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1985

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The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR was established by the CGIAR in 1974 and its Headquarters is provided by the Food and Agriculture Organization of the United Nations. The basic function of the 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. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

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FOREWORD

1985 marks a turning point for IBPGR. Following an external review of programme and management by the TAC and the CGIAR Secretariat a number of far-reaching changes have been implemented. These have resulted from the growth of the IBPGR programme during its first 10 years and from the need of IBPGR to be able to respond to the changing demands which are made upon it.

Most of the changes refer to the organizational structure of IBPGR. In the first place the Board had transformed itself into a Board of Trustees and has handed over managerial responsibilities to the Director. During the year a new staffing structure was agreed which will be better able to fulfil the work requirements in the forthcoming years.

These work requirements were outlined by the external review. It noted, in particular, that the knowledge base on which genetic resources activities are built is weak in some areas although sufficient in others. As a result IBPGR is asked to involve itself with building up a stronger research capacity. It has decided to do this by commissioning mission-orientated research as appropriate to the needs of the time. At present it is funding work on major topics such as cryopreservation, regeneration methodology, the development of a strategy for evaluation, on wild relatives of crops and on the ecogeographic and genetic patterns of diversity.

Thus the IBPGR programme will have two major components;

(i) The field programme, which has essentially been in place for some time, to help at the field level in promoting the collection, conservation, characterization and documentation of germplasm, as well as in training; and

(ii) A research programme guided by the central research staff for the rapid development of appropriate technology for transfer to field operations.

These structural changes are evolutionary steps necessary for IBPGR to serve its genetic resources community. The latter has, in a very short time, cooperated in putting into place the global network. By 1985, 100 countries collaborated with IBPGR, and a network of seed base collections for the long-term security storage of germplasm had been established. The rapid growth in genebanks—containing either base or active collections, or both—has resulted from the IBPGR's activity as a catalyst, mainly through the provision of funding and advice. Much remains to be done however in completing the global network, in the provision of scientific standards, and in training.

The IBPGR was pleased to note the recognition given to its work not only by the external review but by the first meeting of the FAO Commission on Plant Genetic Resources, an intergovernmental body which is largely concerned with political and legal issues. The IBPGR continues to assert its apolitical nature and its wish and ability to work with all countries on an equal partnership basis.

Whereas the scientific committees and the working groups formed by IBPGR will in future advise the Director of the IBPGR's programme, the Board has established a Programme Committee to guide the management on all aspects of the work and to report to the Board on the balance and contents of subprogrammes. The Programme Committee began its work in 1985 with a review of the whole programme and its re-ordering into a new functional structure.

The programme of IBPGR has now grown to such an extent that it is impossible in an annual report to provide more than a summary of activities but to maximize the amount of information it contains, this report for 1985 provides more data than hitherto in tabular form. Any reader wishing specific details can, at any time, request fuller reports from among the several hundreds available. In addition to the *Annual Report 1985* IBPGR will be issuing in 1986 its first *Research Highlights* which deals in some detail with *in vitro* conservation.

We acknowledge gratefully the support of our donors, the cosponsors of the CGIAR (FAO, World Bank and UNDP) and the scientific community worldwide. It is a pleasure to record the loyalty and dedication of the IBPGR Staff.

J.T. Williams
Director

HIGHLIGHTS OF 1985 ACTIVITIES

IBPGR divides its programme into functions. The following is a summary of activities in 1985.

Six Crop Working Groups met for maize, food legumes and roots and tubers (specifically to consider action in Southeast Asia) and for forages and *Prunus* (in a cooperative European programme) and on forages (for Mediterranean and arid and semi-arid areas). Workshops were held on barley documentation, on characterization and preliminary evaluation of Southeast Asian crops, and on genetic resources of the genepool of the tribe Triticeae.

A total of 48 documents were published in 1985, including 21 descriptor lists, 4 genetic resources crop reports, 8 technical conservation reports, 8 Newsletters, one book on documentation, 5 books on Working Groups and Workshops, and *Annual Report 1985*. A new series of publications on systematic and ecogeographic studies on crop genepools was launched with publication on *Mangifera* species.

- Germplasm acquisition: Over 60 countries were involved in the collecting of germplasm for deposition in genebanks and use in crop improvement programmes. About 17 000 samples of major crop genepools were collected in 60 IBPGR supported missions.

  Far more emphasis than hitherto was accorded to the wider genepools, especially wild species, in order to increase representative variability in germplasm collections. Organization of collecting was also aimed more at specific targets than generalized collecting.

  The following were collected during the year:

  — First priority crops 36 times in 20 countries

  — Second priority crops 121 times in 49 countries

  — Third priority crops 19 times in 15 countries

- Conservation: Meetings were held by Subcommittees of:

  — Advisory Committee on Seed Storage specifically to discuss cost-effective seed stores

  — Advisory Committee on *In Vitro* Storage to design *in vitro* genebanks

  Bench-mark conservation publications were issued in 1985:

  — *Handbooks for Genebanks (Volumes I and II)* aimed at genebank managers

  — *Practical Manuals for Genebanks* aimed at technicians working in genebanks

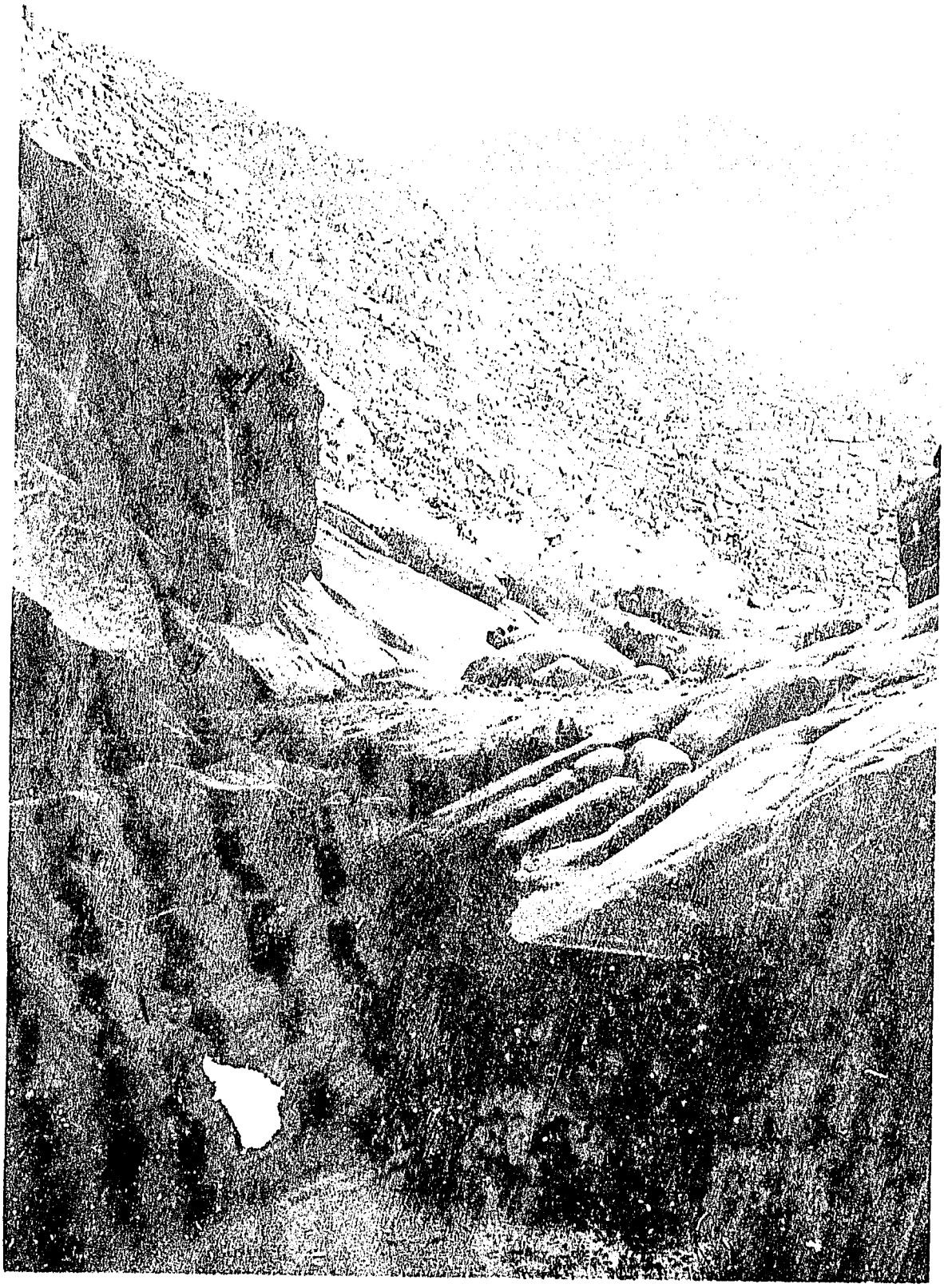
  Three genebanks were evaluated by IPBGR for inclusion in its new register of important germplasm holdings. The base collection network was strengthened in 1985 by the designation of centres to hold important forage material.

  Assistance to upgrade genebank facilities was provided to institutes in Algeria, Botswana, Cuba, Egypt, Fiji, ILCA, Iran, Israel, Peru, Kenya, Senegal, Zambia and Zimbabwe. Other equipment was provided to Bolivia, Brazil, Burundi, China, Cyprus, Ghana, Guatemala, Madagascar, Mauritius, Mauritania, Morocco, Nicaragua, Rwanda, Zaire and Zambia.

  Research on *in vitro* culture was mission-orientated on a range of crops largely of importance in tropical areas. The IBPGR international *in vitro* data base is now being widely used and includes research data from over 60 countries.

- Characterization: IBPGR supported 49 institutes for the characterization of 35 different crops or groups of crops. Research was conducted on diversity of 12 crop genepools and some additional research within the area led IPBGR to field work associated with *in situ* conservation.

- Documentation: IBPGR's global goals on documentation were furthered through (a) support to national programmes (Argentina, Czechoslovakia, Colombia, Ecuador, German Democratic Republic, Pakistan, Poland, Solomon Islands, Uruguay) and at WARDA, and (b) expansion of work on centralized crop data bases for apple, barley, citrus, eggplant, forages, groundnut, maize, oat, okra, *Phaseolus*, *Prunus*, rye, soyabean and sunflower.
- Training: In 1985 IBPGR:
  - — Expanded its intern scheme to accelerate research on priority projects;
  - — Trained 16 nationals of developing countries on one-year postgraduate studies;
  - — Trained 125 nationals of developing countries on short, specializedtraining courses; and
  - — Expanded the use of languages to include in 1985 Chinese.



THE IBPGR

The IBPGR was created by the Consultative Group on International Agricultural Research (CGIAR) towards the end of 1973 and came into being in 1974. It was established to promote an international network of genetic resources centres to further the collecting, conservation, documentation, evaluation and use of plant germplasm.

IBPGR is one of 13 international centres supported by the CGIAR, which is co-sponsored by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the World Bank. Financial support is provided from donors which are members of the CGIAR and others for special projects.

The IBPGR's work includes advising, planning and promoting all types of plant genetic resources activities. It uses Advisory Committees and Working Groups to cull expert advice and thereby establish collecting priorities for different crops and regions, and to provide guidance in identifying gaps in the scientific basis of its work and in funding and monitoring operational and research projects designed to fill these gaps. The research is contracted to centres of appropriate expertise in the different fields. IBPGR provides technical and material support to assist the establishment of genebanks in developing countries; trains individuals in the various skills necessary for plant genetic conservation; organizes and supports a large number of collecting missions; provides advice on data base establishment and management; and publishes many types of scientific reports, genebank directories, technical handbooks, crop catalogues, descriptor lists and newsletters.

IBPGR has identified and established priorities for the conservation of cultivated plants of the world that are most essential to human survival. They include annual food crops, perennial food plants such as fruit trees, the major industrial crops and forages.

In its practical work, IBPGR has evolved from an entity which mainly coordinated and promoted collecting to one which has taken a major leadership role. It has helped expand the scientific knowledge base for future genetic resources activities, raised the standards of management of collections and developed interacting networks of base and active collections. It also stimulates and funds characterization and evaluation and hence promotes the use of genetic resources in plant breeding.

IBPGR works closely with the International Agricultural Research Centres (IARCs) which have mandates for specific crop improvement. Many of these centres have major genebanks and germplasm collections and they form an integral part of the IBPGR global network along with numerous national programmes.

In 1985 a re-definition of IBPGR's role was provided by a series of recommendations made by an External Review of Programme and Management conducted by the CGIAR through its Technical Advisory Committee (TAC) and the CGIAR Secretariat. The Review Panel noted that since its creation IBPGR has achieved an "impressive record" in ensuring that plant breeders of tomorrow will have today's genetic resources for use in their breeding programmes.

The Review Panel found IBPGR to be "a very industrious, productive organization that has grown rapidly over the past decade. It has accomplished a great deal in its various programmes and has much cause for pride in its achievements. However, it stands

Table 1. International Agricultural Research Centres with which IBPGR cooperated in 1985

	Collecting	Characterization	Conservation	Documentation
Institute				
CIAT*	●	●	●	●
CIMMYT			●	
CIP*	●	●	●	●
ICARDA*	●	●	●	●
ICRISAT**	●	●	●	●
IITA		●	●	●
ILCA	●	●	●	●
IRRI*	●	●	●	●
WARDA				●
AVRDC	●	●	●	●

* IBPGR hosted Interns or Collectors
** Secondment of a staff member on sabbatical to IBPGR/FAO

now at a new place in its history, and significant challenges lie ahead. Its most important task will be to improve its intellectual and leadership role in the cooperative efforts in plant genetic resources through an increased involvement and capacity in research."

The Board and Staff of IBPGR received these comments with some satisfaction though mindful of the scale of the tasks which lie ahead. It notes that the shift of direction towards greater scientific activity, which had begun before the External Review, is both supported and emphasized.

NEW EMPHASIS FOR IBPGR

The Review Panel, in its report to the CGIAR, considered that in view of an inadequate world-wide research base for much of the work, IBPGR should as a matter of urgency establish an enhanced research capacity staffed with more senior scientists in such fields as crop taxonomy, population biology, seed physiology, tissue culture and plant pathology. The Review Panel considered this broadened research base to be a prerequisite for improved technical advice to national centres which form the basis of the IBPGR's global network.

The IBPGR, while enthusiastically accepting this greater emphasis on research, came to the conclusion that, since research needs, both within and between scientific disciplines, are likely to change with time and since the scientific front of the research programme will be broad, the most flexible and cost-effective way of achieving its aims would be through contracted-out research rather than through the development of a major in-house research facility.

As a result, in 1985 IBPGR increased its commissioning of research on major topics such as cryopreservation, patterns of diversity in crop genepools, the development of a strategy for evaluation and the study of ecogeographic principles in the distribution patterns of germplasm, particularly of wild ancestral species of crops. In 1985 several projects were initiated or continued in these new areas and preparatory work began in the planning of others, for instance in seed regeneration methodology. Descriptions of these projects will be found in the Germplasm Acquisition, Documentation, Characterization and Conservation sections of this *Annual Report*.

NEW ORGANIZATION OF STAFF

The IBPGR programme has been reordered to address the need for enhanced research and a new staffing structure was defined which will better serve the programme's aims. The staffing structure will have three sections:

(i) **Field Programme.** This is largely established and includes collecting, documentation and characterization, training, monitoring standards, regional coordination and germplasm exchange.

(ii) **Research Programme.**

Strategic (mission-orientated) research in seed physiology; *in vitro* conservation; pathology and germplasm exchange; ecogeographic studies and patterns of variation (including taxonomy of complex genera); DNA technology;

Research on strategic planning of evaluation of germplasm, in seed regeneration and the maintenance of genetic integrity and in the distribution and ecology of major pathogens and their pathotypes.

(iii) **Administration** including publications, finance etc.

The new staff structure will be achieved largely within the existing establishment but the scientific capability to coordinate and contract the new research programme will be upgraded. It is intended that the staff of the research section will provide rapid and up-to-date technology transfer by means of close liaison with their counterparts in the field programme.

The changes in programmes and staff structure are mainly intended to reflect IBPGR's desire to adjust its capabilities so as to be able to respond to recognized needs. They will allow it to function more effectively in its central leadership role in the global network of plant genetic resources activities.

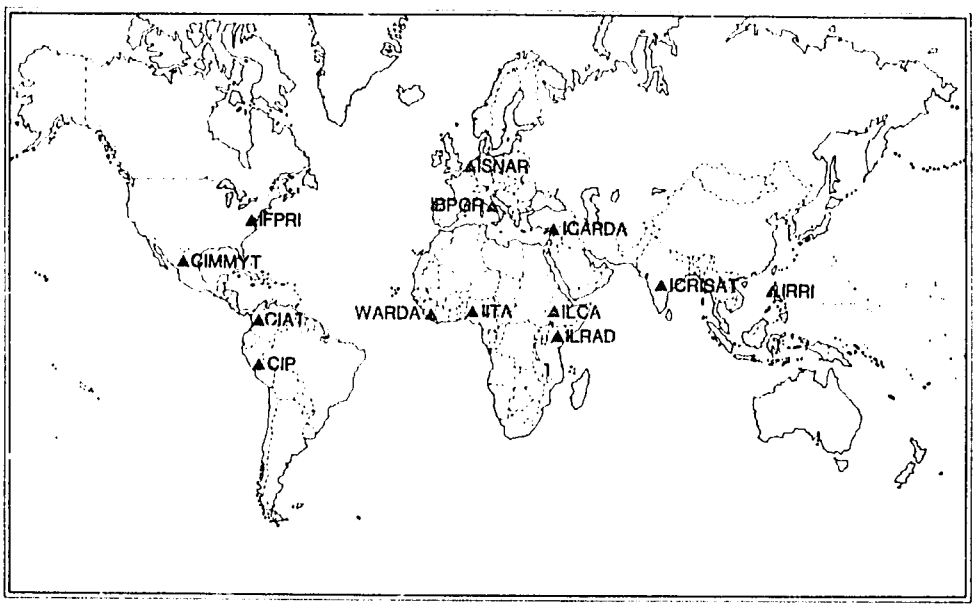


Fig. 1. International Agricultural Research Centres of the CGIAR

Wild *Aegilops* (Israel)

THE GLOBAL NETWORK

IBPGR works with some 600 institutions in more than 100 countries and is concerned with more than 100 crop species or groups of species. Although the institutions are spread through both developing and developed countries, funding assistance is largely directed to the poorer countries. The global network aims, however, to make available to users everywhere germplasm which is at the same time conserved for future use. This arrangement enables IBGPR to generate and transfer speedily the needed technologies to genetic resources programmes which are relatively new or only just emerging in the developing countries. Inherent in its work is the principle of germplasm, especially primitive and wild material, being available to all *bona fide* users.

The figures of collaborating institutes and countries in the tables and text of this *Annual Report* can serve as an indication of the extent to which IBPGR has implemented one of its basic principles—that only a global approach is adequate to safeguard genetic resources for future generations. The global network, as it has evolved through the years, is a somewhat loosely-defined but highly interactive consortium of national, regional and international institutes and organizations which cooperate in the diverse activities of collecting, conserving, documenting and using a major resource of mankind.

In structuring the network, it has been the IBPGR's strategy to involve a broad representation of the world-wide scientific community. In the main, national programmes form the basic unit of the network: IBPGR's task is to provide standards and goals for existing national programmes, thereby strengthening them and to provide guidance and support to see that programmes develop where needed and where there is a justification for expansion of the network. In addition to its Headquarters Staff, IBPGR has posted Field Staff in key locations throughout the world to assist national programmes to meet local short- and long-term needs. Scientific support ranges from advice on methodologies to "hands-on" assistance in carrying out activities and the strengthening of programmes is backed by provision of a variety of training modes.

IBPGR has shifted markedly from its earlier approach of dealing with activities on a regional basis to activities which are largely crop-centred, having found this to be much more effective and a logical evolutionary step. At the same time, its approach has been flexible; where useful in the case of a specific crop, work on a regional basis is found occasionally to be more productive. Similarly, bilateral aid arrangements and existing organizations are used when appropriate and where they accord with the IBPGR's aims in establishing a global network.

Since the most important units in the global network are strong, well managed national genetic resources centres or activities, the fostering of such units has been a major goal of the IBPGR programme. They have been established in many countries, of which some 50 are now guided by a national council or committee and/or are coordinated at the national level.

In Latin America, in 1978, only Mexico and Brazil had coordinated national programmes but by 1985, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Mexico and Nicaragua had established a formal method for coordinating their national activities and are to be joined shortly by Uruguay and Venezuela. Programmes in all these countries, and others, continue their cooperation with IBPGR.

Table 2(a). National programmes of Latin America and the Caribbean which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation
Argentina	●	●	●
Barbados		●	
Bolivia	●	●	●
Brazil	●	●	●
Chile	●		
Colombia	●	●	
Costa Rica	●	●	●
Cuba			●
Dominican Republic	●		
Ecuador	●	●	●
Grand Cayman	●		
Guatemala	●	●	●
Jamaica	●		●
Mexico	●		
Netherland Antilles	●		
Nicaragua			●
Paraguay	●		
Peru	●	●	●
Trinidad	●	●	●
Uruguay	●		
Venezuela	●		

In Africa, south of the Sahara, IBPGR involvement in strengthening national genetic resources programmes had been steadily increasing and by 1985 the activities have been expanded to most of the countries in eastern, western and southern Africa. About half of the countries have set up genetic resources units and undertaken germplasm collection and conservation tasks. With the exception of Ethiopia, all such activities were funded by IBPGR and those which cooperated in 1985 are shown in Table 2(b). Countries which, in addition, cooperated in earlier years include Benin, Central African Republic, Guinea Bissau, Guinea Conakry, Gambia, Malawi, Sierra Leone and Somalia.

Table 2(b). National programmes of Sub-Saharan Africa which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation
Botswana	●	●	●
Burkina Faso	●	●	●
Burundi	●	●	●
Cameroon	●		●
Congo	●		
Côte d'Ivoire		●	●
Ethiopia		●	
Ghana		●	
Kenya	●	●	●
Madagascar	●	●	●
Mali	●		
Mauritania	●		●
Niger	●		
Nigeria		●	●
Rwanda	●		●
Senegal			●
Sudan	●	●	●
Tanzania	●	●	●
Togo	●	●	●
Uganda	●		
Zaire	●		●
Zambia		●	●
Zimbabwe	●	●	●

The countries of South Asia—India, Bangladesh, Bhutan, Burma, Nepal and Sri Lanka—have set up genetic resources units and have undertaken activities either independently or with external funding and by 1985, most of these included long-term seed storage facilities.

In China, IBPGR collaboration with the Chinese Academy of Agricultural Sciences as well as with several of the provincial Academies of Agricultural Science has increased markedly during 1985. Construction of a genebank is nearing completion and 1985 was the first year that an IBPGR-sponsored training course was held in the Chinese language.

Earlier contacts with the Republic of Korea were largely through a maize collecting and evaluation project at the Chung-Nam National University, which is continuing. Plant genetic resources conservation in the Republic of Korea are the responsibility of the Rural Development Administration and links were strengthened through an IBPGR visit in October.

Several other parts of the world which do not comprise major centres of diversity of staple crop species, such as the Pacific and Indian Ocean Islands, received IBPGR help and assistance in an *ad hoc* way in response to expressed needs and collecting priorities.

Table 2(c). National programmes of South Asia, East Asia and Pacific and Indian Ocean Islands which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation
Bangladesh			●
Burma	●		
India	●	●	●
Nepal	●		
Sri Lanka			●
China	●	●	●
Korea, Republic of	●	●	
Fiji			●
Solomon Islands	●	●	●
Mauritius	●		●
Seychelles	●	●	●

Flexibility in administrative approach is a key to effective work by IBPGR. Assistance to national programmes in Southeast Asia is handled formally on a regional basis and activities are coordinated by a Regional Committee for Southeast Asia (RECSEA), composed of Government-nominated members from five countries.

The membership of RECSEA underwent a number of changes during 1985. Dr. N.T. Arasu from Malaysia, who has been a member of RECSEA since its inception and Chairman for the last three years, stepped down in October. Prof. R.L. Lantican from the Philippines was appointed as Chairman and a new member and alternate member joined from Malaysia (members are listed in Appendix III).

RECSEA met in 1985 on the occasion of a second International Symposium on Southeast Asian Plant Genetic Resources held 21-24 August at Jakarta, Indonesia. The first Symposium, held in 1975, acted as a catalyst for genetic resources activities in the region and formed a basis for the subsequent regional approach supported by IBPGR. Although the IBPGR's wish is for the programme to cover Indo-China as well as the five countries formally represented on the Committee, only *ad hoc* links have been made to date.

Since 1984 the emphasis has been placed on crop-specific activities and Working Groups were established to address seven major crops or groups of crops. Three of these Working Groups met in 1985: (participants are listed in Appendix V)

(i) Maize Working Group, 29 April-1 May, Bangkok, Thailand;
(ii) Food Legumes Working Group, 14-16 May, Los Baños, Philippines; and
(iii) Root and Tuber Crops Working Group, 6-8 August, Baybay, Leyte, Philippines.

Other Southeast Asia Working Groups are to be centred around sugarcane, tropical fruits, forages and palms.

Table 2(d). National programmes of Southeast Asia which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation
Indonesia	●	●	●
Malaysia	●		●
Papua New Guinea	●	●	●
Philippines	●		●
Thailand	●	●	●

Just as the regional concept in Southeast Asia is evolving into crop specific activities, parallels can be drawn with past work of IBPGR in the Mediterranean Basin and Southwest and Central Asia. In the former case the northern countries now vigorously participate in a Special Project of IBPGR and United Nations Development Programme (UNDP). Apart from enhancing cooperation north-south and east-west, the Project is largely involved with putting germplasm collections in order and, through crop data bases transcending national boundaries, has enabled rationalization of collections, clearer identification of gaps and enhanced work on characterization.

Table 2(e). National programmes of Europe which collaborated with IBPGR in 1985 for specific tasks of the IBPGR programme

	Collecting	Characterization	Conservation	Documentation
Austria		●		●
Belgium	●	●	●	●
Bulgaria				●
Cyprus				●
Czechoslovakia			●	●
France	●	●		●
Germany, Democratic Republic	●	●	●	●
Germany, Federal Republic		●	●	●
Greece	●	●	●	●
Hungary	●	●	●	●
Ireland		●		●
Israel	●	●	●	●
Italy	●	●	●	●
Netherlands	●	●	●	●
Nordic countries*	●	●	●	●
Poland	●			●
Portugal	●		●	●
Romania	●			●
Spain	●	●	●	●
Switzerland				●
Turkey	●			●
UK	●	●	●	●
USSR			●	
Yugoslavia	●	●		●

* Consisting of Denmark, Finland, Iceland, Norway and Sweden

Table 2(f). National programmes of North Africa and Western Asia which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation
Algeria			●
Egypt	●	●	●
Iran	●		
Jordan	●	●	
Morocco	●	●	
Syria	●		●
Pakistan	●		
Tunisia			●
Turkey *			

* See Table 2(e)

The countries of North Africa have received special attention under a separate programme because their needs are largely for training and the establishment of national units. Since IBPGR was established Algeria, Egypt, Morocco, Libya and Tunisia have all cooperated frequently with IPBGR's programme.

In the western part of Asia IPBGR cooperation has continued to assist countries on an *ad hoc* basis following the demise of a regional programme which could not continue for a number of political reasons. Nonetheless, IBPGR has been active in Afghanistan, Iran, Iraq, Jordan, Pakistan, Syria, Turkey, Yemen (Arab Republic) and Yemen (People's Democratic Republic).

Table 2(g). National programmes of Australia, Japan and North America which collaborated with IBPGR in 1985 for specific tasks

	Collecting	Characterization	Conservation	Documentation
Australia	●	●	●	●
Canada		●	●	●
Japan	●	●	●	●
USA	●	●	●	●

The germplasm programmes of countries such as Australia, Canada, Japan and the USA are major inputs into the global network. As donors to IPBGR's programme they, with other donor countries such as those of Europe, are valuable sources of scientific expertise in areas of strategic research.

The amount of collecting within these countries is perforce limited to very specific materials which are needed by breeders in many parts of the world. However, their outreach agricultural programmes help the IBPGR in many countries, and provide strong support in-kind to IBPGR's world-wide activities.

When IBPGR was created, the number of national programmes was extremely limited, but by 1985 dozens of programmes had reached the stage where work is continuing with national funding and personnel. Many of the programmes are based upon activities originally started with IBPGR's support or advice.

In more than 20 developing countries germplasm activities have greatly increased since IBPGR's initial assistance and advice to establish genetic resources units. Adding to this the more than 50 countries with coordination of activities on a national scale shows how rapidly the network is expanding.

In some cases, the development is given impetus as a result of IBPGR's support for, or organization of, genetic resources symposia. These provide a forum for national scientists to identify needs and plan activities and IBPGR Staff participate whenever possible. For example, in 1985 such participation occurred in Burundi, Colombia, Kenya, Rwanda and Zaire.

LINKAGES WITH THE SCIENTIFIC COMMUNITY

IBPGR looks to the scientific community for data and advice in order that it can formulate policy and implement its programme. Advisory Committees, Working Groups, Workshops and Symposia all help in defining activities. They have input to all aspects

of the programme, and recommendations lead to diverse results ranging from the definition of a collecting strategy for wild relatives of wheat, the production of technical manuals and handbooks on aspects of genebank management, the analyses of problems of data exchange between genebanks to the formulation and review of research projects.

There are two Advisory Committees concerned with scientific aspects of conservation—seed storage and *in vitro* storage.

Subcommittees of the two Advisory Committees met in 1985. A Subcommittee of the Advisory Committee on Seed Storage met to discuss the problems of high operating costs in some genebanks and to advise on more cost-effective genebank construction and methods of operation (see p. 44). A Subcommittee of the Advisory Committee on *In Vitro* Storage developed plans on the design and operation of *in vitro* genebanks (p. 46).

Five Crop Advisory Committees which worked in conjunction with respective IARCs had largely completed their tasks by mid-1985. Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) co-sponsored the Maize Advisory Committee and with International Center for Agricultural Research in the Dry Areas (ICARDA) co-sponsored the Wheat Advisory Committee. International Rice Research Institute (IRRI) co-sponsored the Rice Committee, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) the Sorghum and Millets Committee and Centro Internacional de Agricultura Tropical (CIAT) the *Phaseolus* Committee.

Crop Working Groups are convened to devise practical steps to achieve agreed goals. They make assessments of needs and recommendations for action on a particular crop, group of crops or problem area. Their work includes the analyzing of collections to determine gaps, the revision of collecting priorities, the consideration of measures to ensure adequate sampling for variability, and the identification of ways to speed up documentation and characterization of collected materials, and hence their utilization.

Six Working Groups met in 1985. Two of them, on forages and *Prunus*, met under the aegis of European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (ECP/GR) (p. 62), and three met in Southeast Asia on maize, food legumes and roots and tubers. Another Working Group on forages met with specific reference to Mediterranean and adjacent arid and semi-arid areas (p. 33). In addition, three *ad hoc* Workshops were held: on barley in Europe (p. 51), on characterization and preliminary evaluation of crops important to Southeast Asia (p. 62), and on gene resources of the tribe Triticeae (p. 16).

IBPGR FIELD STAFF

IBPGR Regional Coordinators and Collectors provided assistance based on policy decisions, both as advice to and participation in national programmes in 1985. Regional Coordinators also suggest means of implementing, and assess progress in achieving, common objectives amongst the countries of their regions. They learn of local developments and requirements and thus they are able to adequately respond to needs; at the same time, national programmes develop more quickly and link better with other institutes in the global network.

In 1985 Regional Coordinators were in post in Latin America, West Africa, East Africa, North Africa/Southwest Asia, and Southeast Asia; and with Special Project funding in Europe. The extent of their work is partly illustrated in Tables 2(a)-2(g).

Collectors are assigned to implement collecting missions usually for a limited time in a specific area. The examples given below are illustrative of their work in 1985.

Following a visit by a Regional Coordinator for East Africa to Institut de Recherche Agricole et Zootechnique (IRAZ) in 1983 at the request of its Director General, planning was undertaken for a regional plant genetic resources programme in Burundi, Rwanda

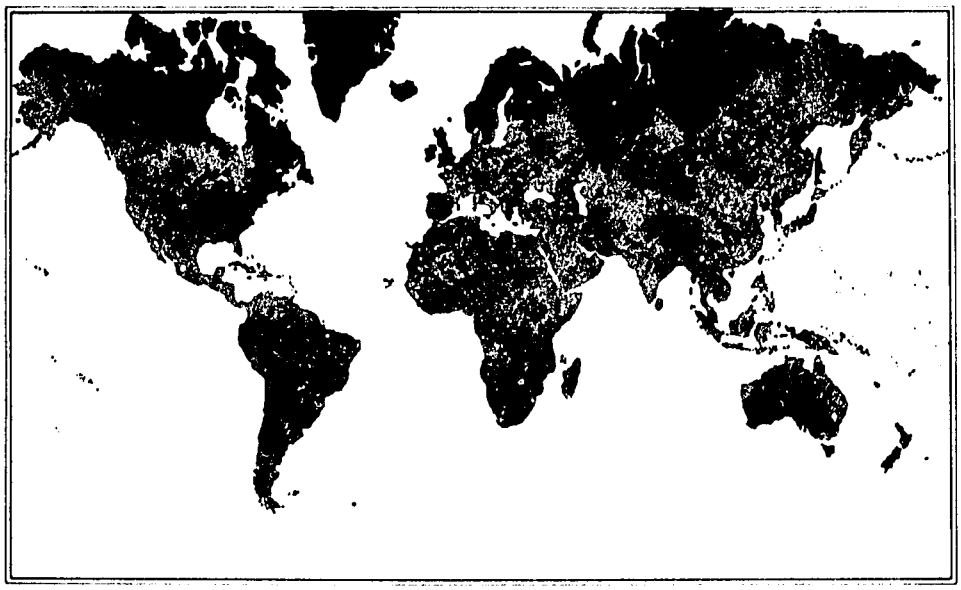


Fig. 2. IBPGR Field Staff are posted in many parts of the world

and Zaire. The programme will come under the aegis of the Communauté Economique des Pays Grands Lacs (CEPGL), a community comprising the three countries. IRAZ is a specialized organization of the CEPGL and it is charged with undertaking research on topics of common interest to its member nations and reinforcing the activities of the national agricultural research institutes.

This year saw the start of the programme's field work. In March, an IBPGR Collector joined the IRAZ project team and, from May to September, five collecting missions were fielded in Burundi, Rwanda and eastern Zaire with counterpart participation from the respective national institutes and financial assistance from IBPGR. Priority for collection was assigned to landraces of the major traditional crops of the region, viz: beans (*Phaseolus vulgaris*), sorghum, cassava and sweet potato.

In addition to the collecting, this first year has seen the emergence within the CEPGL of a network for genetic resources activities in which national units for Burundi, Rwanda and eastern Zaire are to be linked to a regional centre at IRAZ. The units are each at a station of the national agriculture institutes, under the supervision of a nominated coordinator and will shortly receive seed storage equipment. IRAZ already has been provided with equipment so that it can hold the regional base collections and it will coordinate activities within the region.

A team from the Department of Horticulture of Mauritius led by an IBPGR Collector assigned to South Asia collected germplasm of crops in Mauritius and Rodrigues Islands in March. The team explored the nine districts of Mauritius and collected mainly vegetables and fruits. In May the Collector participated in a mission to collect wild *Allium* germplasm in the Ladakh region of India, organized by the University of Kashmir.

Another IBPGR Collector, appointed to Southeast Asia, continued a programme begun in 1984 on ecogeographic surveying and collection of the wide variety of native and introduced forage legumes and grasses on the Indonesian archipelago. Surveys were made and seed and herbarium materials collected in Lombok, Sumbawa, Rote, Timor, Flores and North Sulawesi. The Collector remained based at the National Biological Institute, Bogor, Indonesia and maintained an active liaison with the international work being done on forages at CIAT and Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia, both of which received duplicates of the samples collected. A set

of samples has also been deposited with the Indonesian/Australian Animal Husbandry Project and at Bogor. Collections of species of *Flemingia*, *Rhynchosia* and *Atylosia*, which belong to the *Cajanus* genepool, were also duplicated with ICRISAT.

In South and Southeast Asia an IBPGR/IRRI Rice Germplasm Collector, in collaboration with the countrys' national institutes, organized training seminars for rice germplasm collectors. The seminars will help in accelerating collecting of rice germplasm.

The establishment of an international sweet potato genebank located in the crop's centre of genetic diversity has long been felt to be an urgent need. Centro Internacional de la Papa (CIP) started work on this crop in 1984 and following its commencement of duplication of important collections existing in Peru, IBPGR agreed to fund a full-time sweet potato Collector for a two-year period (1985-1986) to be located at CIP, who will pay special attention to wild species.

An IBPGR assistant stationed at the Programme des Ressources Phytogénétiques in Togo has been assisting with the collecting, characterization and documentation of the centre's collection of crops. The assistant helped with other aspects of germplasm work in West Africa in association with the IBPGR Regional Coordinator. Similar work was also carried out in Papua New Guinea.

Cooperation with Centro Agronomico Tropical de Investigación y Enseñanza (CATIE), Costa Rica was enhanced during 1985 with the agreement to appoint an IBPGR Collector at CATIE headquarters. The collector began the systematic collection of IBPGR priority crops in Meso American countries.

BILATERAL AND MULTILATERAL COOPERATION

Apart from the IARCs of the CGIAR system, the IBPGR has extensive contacts with agricultural research and development agencies throughout the world which field projects in developing countries. Sometimes through these efficient means can be found of directing support for particular tasks by making use of existing cooperative ties.

IBPGR assistance varies from advising bilateral donors on new projects to helping those which are ongoing by building on a genetic resources component. These include the regional genebanks in Ethiopia and Costa Rica, which are assisted by Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation—GTZ), the European Community-funded Cocoa Research Unit, Trinidad and an Australian-funded forage/animal husbandry project in Ciawi, Indonesia.

In Bangladesh, medium- and long-term seed facilities funded by IBPGR and GTZ at the Bangladesh Agricultural Research Institute are nearing completion and will be operational in early 1986.

A genebank at the Chinese Academy of Agricultural Sciences is supported by grants from both Rockefeller Foundation and IBPGR. Some additional support is being sought by IBPGR from other bilateral donors.

IBPGR joined with a UNDP/FAO/South Pacific Commission (New Caledonia) project for strengthening plant protection and root crop development in the South Pacific by providing a genetic resources project which is assembling and describing national root crops collections of the region. IBPGR also collaborated closely with a UNDP/FAO/National Bureau of Genetic Resources, Nigeria project.

The IBPGR's long-standing cooperative ties with Office de la Recherche Scientifique et Technique d'Outre-mer (ORSTOM) involve collecting, conservation and characterization of germplasm by national programmes in Africa. In 1985 joint activities took place in Congo, Côte d'Ivoire and Niger.

Surveying and *in situ* conservation of wild relatives and forages was carried out by IBPGR and International Union for Conservation of Nature and Natural Resources (IUCN) and World Wildlife Fund (WWF) in cooperation with Forêts de la Faune, Ministere de l'Hydraulique et de l'Environnement in Niger and Institut d'Economie Rurale in Mali, and for *Mangifera* species in Indonesia and Malaysia.

IBPGR collaborated closely with ongoing collecting programmes of Australia, German Democratic Republic, Israel, Japan and the United States Department of Agriculture (USDA), since these all related to IBPGR priorities.

GERMPLASM ACQUISITION

CEREALS

Table 3. Numbers of samples of cereals collected in IBPGR missions during 1985

	Triticum and *Aegilops*	*Hordeum*	*Oryza*	*Zea*	*Sorghum* and Millets	Others
Bolivia	—	—	—	15	—	—
Botswana	—	—	—	—	58	—
Brazil	—	—	—	235	—	—
Burkina Faso	—	—	—	—	85	—
Burma	—	—	50	—	—	—
Burundi	—	—	—	—	60	—
Cameroon	—	—	—	—	1385	—
Ecuador	—	—	—	—	—	51
Iran	113	6	—	—	—	—
Kenya	—	—	60	—	—	—
Madagascar	—	—	112	—	—	—
Malaysia	—	—	231	—	—	—
Mali		—	5	—	20	—
Mauritania		—	—	—	71	—
Mauritius		—	—	13	—	—
Morocco	241	170	1	—	—	79
Nepal	150	152	293	171	250	156
Niger	—	—	—	—	31	—
Pakistan	—	—	100	—	—	—
Rwanda	—	—	—	—	84	—
Spain	—	—	—	—	—	78
Turkey	99	5	—	—	—	16
Uganda	—	—	—	—	1164	—
Zaire	—	—	—	—	27	—
Zimbabwe	—	—	—	—	1077	—

WHEAT AND BARLEY

It is conservatively estimated by the CGIAR that one half of the wheat area in developing countries is now planted to semi-dwarf cultivars, resulting in the production of an extra 30 million tonnes of grain per year.

The corollary to this highly encouraging statistic is that the area planted to traditional and highly diverse cultivars and landraces is sharply declining and this shift in the type of material planted makes it necessary to collect representative germplasm before it is lost. In the case of wheat, the success of activities world-wide over the past few years can be recorded. A previous survey (see *Annual Report 1984*) showed that, with some particular exceptions, wheat landraces and primitive cultivars appear to be, in the main, adequately collected.

The same shifts and their consequences apply also to barley where the collecting programme, although

well advanced, has not yet reached the same stage of completion as wheat.

Although a comprehensive survey of the ECP/GR barley data base (see p. 62) has yet to be completed, a picture of the position is emerging. There are over 17 000 landrace accessions in the major collections outside Europe, a total figure that can be viewed with some satisfaction. However, the intensity of sampling on a country basis (i.e. the relationship between the number of collections and the area of the crop) is much more erratic than is the case with wheat. A number of countries where numerous collecting missions have taken place, such as Ethiopia, Nepal and Turkey, are well represented. On the other hand the countries of North Africa and Southwest Asia appear to be under-collected and should be the subject of further collecting missions. The status of two near relatives, *Hordeum spontaneum* and *H. bulbosum* is less clear at present, but the indications are that both are in need of wider collecting.

More familiar aspects of collecting of wheat and barley continues, but the emphasis is shifting towards post-collecting phases. Collecting is proceeding, however, in priority areas.

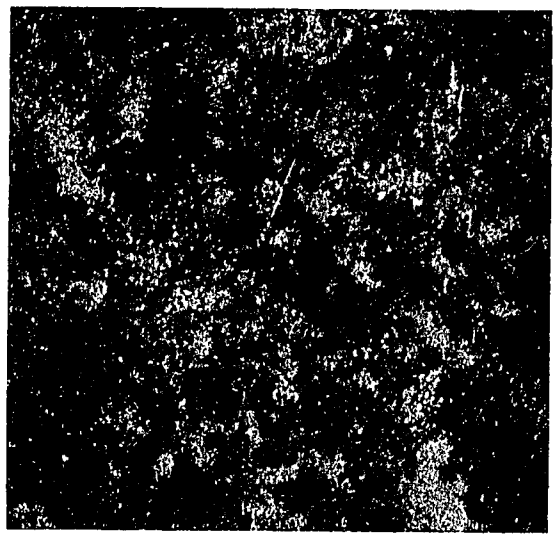
The IBPGR participated in a mission organized by the Seed and Plant Improvement Institute, Karadj, Iran to collect landraces and wild relatives, chiefly *Aegilops* in the Zagros mountains and *Triticum monococcum* and *Hordeum spontaneum* around Shiraz. This is thought to be the furthest south these two species have been reported.

An IBPGR mission to Morocco in cooperation with Institut National de la Recherche Agronomique (INRA) collected bread and durum wheat and barley. Morocco is one of the high priority countries for the collection of these cereals.

The first year of field work of a collecting project in southeast Turkey has been completed. Collaborating on the project were IBPGR, Faculty of Agriculture of the University of Ankara, the USDA and Oregon State University, Corvallis (USA). Among the cultivated material collected were samples of tetraploid and hexaploid wheat, of barley, and of rye. Wild material included species of *Triticum, Hordeum, Secale, Aegilops* and of other members of the Triticeae. The germplasm collections were supplemented by herbarium specimens. Use will be made of advanced computer techniques in handling the data obtained and manipulating them to extract the maximum useful information.

A mission in Greece by the Hellenic Sugar Industry and National Genebank collected *Aegilops, Hordeum, Triticum* and other cereals including *Avena.*

In a mission in Nepal organized jointly by IPBGR and the Japanese International Cooperation Agency (JICA) wheat and barley were collected. Under a special project agreement with IPBGR, Japanese scientists, with participation from cooperators in Nepal, and a scientist from China, explored the central and northeastern hills of Nepal and collected numerous crops.



Hordeum spontaneum (Shiraz, Iran)

WORKSHOP ON THE TRITICEAE

A Workshop on the *Triticeae* was organized by IBPGR in 1985 and this drew on the expertise of a number of scientists, including those from other IARCs. (Participants are listed in Appendix V). The tribe as a whole was reviewed, its use in the breeding of all the crop groups considered, and priorities set for collecting and further work.

The Workshop considered that, broadly, a classification of the tribe based on genomic similarities is the most useful for genetic resources purposes and for breeding. Apart from the direct inputs into conventional forage breeding programmes, the tribe has been of most use in wheat improvement since the crop is the most amenable to wide crossing. The characters most often sought are resistance to pests and diseases and tolerance to physiological stresses. Existing collected material consists of a small number of samples in a few collections and these exist more for the purpose of research rather than as genetic resources conservation collections. Few species can be considered adequately represented. Priorities for collecting are shown in Table 4 and these are based on the potential utility of the various species, and the extent to which each is thought to be endangered by genetic erosion. An extensive programme for this genepool will be developed by IBPGR in 1986.

Table 4. Priorities for collecting species of the Triticeae

Priority 1	**Areas**
Agropyron fragile	central Asia to northern China
A. mongolicum	north and northwest China
Hordeum intercedens	southern California into Mexico
H. arizonicum	Arizona into Mexico
Thinopyrum bessarabicum	Crimea and Black Sea area
T. elongatum (2x)	Mediterranean coast
Aegilops spp. (already covered by IBPGR as near relatives of wheat)	Mediterranean and southwest Asia
Hordeum bulbosum (2x)	western and central Mediterranean
H. roshevitsii	southern Siberia, northern and central China
Priority 2	
Pseudoroegneria libanotica	southwest Asia
Hordeum brachyantherum (6x)	southern California
H. depressum	central and southern California
H. erectifolium	Argentina
H. chilense	Argentina and Chile
H. procerum	Argentina
Thinopyrum sartorii	eastern Mediterranean
T. curvifolium	Spain
T. scirpeum	Mediterranean
T. caespitosum	Crimea and Turkey
T. intermedium	Austria, France and Switzerland
T. ponticum	Iran, Turkey and southern USSR
Elymus spp.	eastern Asia
Leymus lanatus	central Asia
L. angustus	central Asia to western China
L. karelinii	central Asia
L. triticoides	western USA to Canada
Secale montanum	eastern Mediterranean and southwest Asia
Psathyrostachys juncea	central Asia to western China
Priority 3	
Hordeum flexuosum	Colombia, Argentina, South America
H. jubatum	
H. lecheri	Argentina
H. secalinum	northern Europe
H. pubiflorum	Argentina
Thinopyrum junceiforme	northern Europe
T. junceum	Europe and Mediterranean
T. runemarkii	Mediterranean
T. corsicum	Corsica
T. nodosum	Crimea and Black Sea area
T. scythicum	
T. gentryi	Iran
Elymus bakeri	
E. psammophilus	Great Lakes area, USA
E. californicus	California
E. (southwest Asian species)	
Leymus pacificus	California
L. multiflorus	California
L. condensatus	California
Henrardia spp.	southwest Asia
Crithopsis delileana	southwest Asia

Variation in sorghum cultivars in Rwanda

SORGHUM AND MILLETS

Since their inception ICRISAT and IBPGR have been actively involved in the collecting and conservation of the genetic diversity of these crops, especially of traditional cultivars. The collecting of wild and weedy types lags behind, but since 1984, a more intensive effort in surveying and collecting wild relatives of sorghum and millet has been initiated in different parts of Africa. During 1985, numerous exploration missions were funded by IBPGR and field activities were concentrated in Botswana, Burkina Faso, Burundi, Cameroon, Mali, Mauritania, Niger, Rwanda, Uganda, Zaire and Zimbabwe. Besides providing funds to the national programmes in the above countries, IBPGR consultants and field collectors were sent to several of these countries to help the national counterparts in the assembling of germplasm.

The Université d'Ouagadougou in Burkina Faso, with support from IBPGR, began work in 1984 on a project on the collection and evaluation of pearl millet, and this work will continue in 1986-87. The Research Centre in Sebele in Botswana, assisted by an IBPGR consultant, explored the northeast region, Tuteme and Kgatleng districts and collected samples of sorghum, pearl millet and finger millet. In the CEPGL countries, Burundi, Rwanda and Zaire (Kivu region), an IBPGR Collector, in association with IRAZ and national scientists, fielded five collecting missions and material gathered included sorghum, finger millet, pearl millet and wild sorghums.

The IBPGR, in collaboration with IUCN-WWF, ORSTOM and national research organizations in Mali and Niger during November and December surveyed and collected wild species of *Pennisetum* in Mali and Niger. In Mali the team explored the inland delta of the Niger River and the northeast region around Bamako which are rich in wild and weedy populations of *Pennisetum*. In Niger the mission concentrated on the northern half of the Aïr mountains and collected wild species of *Pennisetum*, primarily species with 2n4 and 2n6. Samples of wild sorghum were also collected of which one was tentatively identified as *Sorghum aethiopicum*.

In Mauritania, IBPGR, in cooperation with Direction de la Recherche Agronomique and the Centre Interregional pour la Lutte contre la Secheresse au Sahel/FAO programme, explored the Gorgol region and collected sorghum while in another mission Société Nationale pour le Développement Rural collected sorghum from the Tegant region.

The Serere Research Station in Uganda, with support from IBPGR, continued its exploration mis-

Table 5. Numbers of samples of sorghum and millets collected in IBPGR missions during 1985

	Sorghum		*Pearl millet*		*Finger millet*		Other
	cultivars	wild	cultivars	wild	cultivars	wild	millets*
Botswana	29	—	18	—	6	—	5
Burkina Faso	—	—	85	—	—	—	—
Burundi	51	5	1	—	3	—	—
Cameroon	80	—	1200	90	4	6	5
Mali	—	—	—	18	—	1	1
Mauritania	71	—	—	—	—	—	—
Nepal	28	—	1	—	117	—	104
Niger	1	1	1	23	—	—	5
Rwanda	81	3	—	—	—	—	—
Uganda	581	—	20	—	563	—	—
Zaire	26	1	—	—	—	—	—
Zimbabwe	535	24	301	21	196	—	—

* include *Echinochloa*, *Panicum* and *Setaria* species

sions in the western and eastern regions of the country and sampled a wide range of diversity of sorghum, finger millet and pearl millet. In Zimbabwe an IBPGR consultant fielded missions in cooperation with the Crop Breeding Institute of the Department of Research and Specialist Services in Harare and gathered sorghum, pearl millet and finger millet. Populations of wild species of sorghum and *Pennisetum* were included.

RICE

Several rice collecting missions have been organized by IRRI and IBPGR in areas of diversity since the early 1970s and they have assembled to date more than 70 000 accessions. Field collecting activities were expanded and accelerated following the appointment in 1983 of an IBPGR/IRRI rice germplasm Collector who is based at IRRI's International

Primitive pearl millet in Aïr Mountains (Niger)

Wild rice in Niger

Rice Germplasm Center, Los Baños, Philippines. In addition, IBPGR has provided funds to IRRI to meet the in-country costs for field missions and for the despatch of samples to base collections. Under this collaborative project, a total of 14 614 accessions, including wild rices, was collected in 1983-85 from Bangladesh, Bhutan, Burma, Indonesia, Madagascar, Malaysia, Nepal, Pakistan, Sri Lanka and Thailand (see Table 6).

Assistance from IBPGR and IRRI has led to the completion of broad-based field surveying in Bangladesh, Bhutan, Sri Lanka and in other Asian countries. National centres in the countries were involved in the collecting operations. A few pockets need further field work, especially for wild species. During 1985 the IBPGR/IRRI Collector participated in a field mission in the Sabah state of Malaysia. Traditional cultivars, comprising upland, rainfed, lowland and tidal saline wetland and six irrigated types were collected. In addition, wild populations of *Oryza officinalis* and *O. meyeriana* were also sampled. The Collector also joined a Centre National de la Recherche Applique au Developpement Rurale team in Madagascar and explored and collected in the southern high plateau and east coast region. During a training seminar organized by the Collector on rice collecting and conservation in November traditional cultivars were collected in the Pyinmana and Lewi areas of Burma.

Increased awareness of the importance and urgency of collecting wild species in the genus *Oryza* has been generated in national collecting programmes, helped in part by assistance provided by the Collector in the formulation of national collecting plans. Populations of wild rice have been collected in Bangladesh, Indonesia, Malaysia, Sri Lanka and Thailand in the past six years.

Additionally in 1985, IBPGR sponsored field missions in Nepal, Pakistan and Kenya. In Nepal, JICA and local scientists explored the central and northwestern areas and collected rice cultivars. In Pakistan the Plant Genetic Resources Laboratory of the Pakistan Agricultural Research Council collected rice from the Baluchistan region. During the second phase of a project, the University of Nairobi explored the Tana delta and western Kenya and collected samples of which several are *O. longistaminata* and *O. punctata*.

In another mission fielded by IBPGR in Niger for wild species, samples of *O. barthii* and of *O. punctata* were collected.

Table 6. Rice samples collected under IBPGR/IRRI collaborative arrangements (January 1978-March 1985)

	1978	1979	1980	1981	1982	1983	1984	1985	Total
Bangladesh	276[a]	246	57	—	139	95	103	—	916
Bhutan	—	—	—	—	102	83	66	—	251
Burma	13	183	263	62	—	—	—	2	523
Indonesia	590	688[b]	387	534	—	46	193[c]	49	2434
Madagascar	—	—	—	—	—	—	98	123	98
Malaysia (Sabah)	—	—	—	—	—	—	—	276[c]	276
Nepal	9	16	720	297	—	—	—	—	1042
Pakistan	—	—		—	4	—	—	100	104
Sri Lanka	402	236[d]	145	—	—	—	122[e]	—	905
Thailand	804	121	218	1140	666	1943	2996[f]	—	7888

Including a = 20 wild; b = 16 wild; c = 7 wild; d = 4 wild; e = 14 wild and f = 123 wild

MAIZE

Following systematic efforts by IBPGR over the past few years to collect maize in Latin America, much of the work has been completed with duplicates stored either in CIMMYT or for long-term security in the National Seed Storage Laboratory (NSSL), USA. A few gaps still remain to be filled and for this purpose IBPGR has supported maize orientated or multi-crop collecting missions in which maize has been a component. For example, Centro Nacional de Recursos Genéticos (CENARGEN) and Centro de Investigaciones Fitoecogenéticas (CIF), Bolivia collected landraces of maize with IBPGR support.

The Department of Horticulture of Mauritius with the support of IBPGR, collected samples of traditional cultivars during a multi-crop collecting mission in Mauritius and Rodrigues Islands. In Nepal, the joint Japanese/IBPGR project collected in many parts of the country.

OTHER CEREALS

In the past, IBPGR has been involved in the collection and conservation of the so-called Andean "cereals". In 1985, Instituto Nacional de Investigaciones Agropecuarias (INIAP) collected additional samples of *Chenopodium quinoa* and of *Amaranthus* spp. in Ecuador.

Multi-ear *Zea* (Republic of Korea)

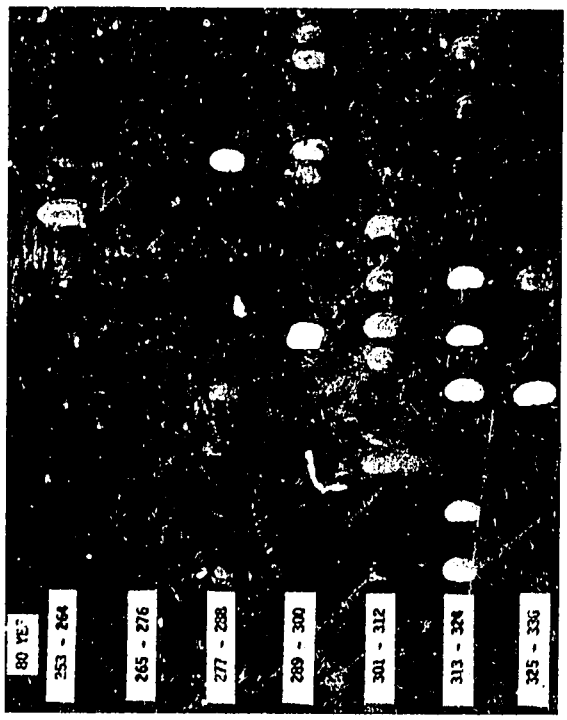
FOOD LEGUMES

Table 7. Numbers of samples of foog legumes collected in IBPGR missions during 1985

	Phaseolus	*Arachis*	*Glycine*	*Lupinus*	*Vigna*
Australia	—	—	12	—	—
Argentina	29	—	—	—	—
Bolivia	—	—	—	8	—
Botswana	—	9	—	—	—
Brazil	—	54	—	—	—
Burundi	35	—	—	—	—
China	—	—	*	—	—
Colombia	154	—	—	—	—
Ecuador	—	—	—	11	—
Greece	33	—	—	—	—
Madagascar	—	—	—	—	6
Mauritius	—	—	—	—	7
Mexico	12	—	—	—	—
Nepal	268	6	152	—	71
Peru	559	35	—	—	—
Rwanda	4	—	—	—	4
Syria	—	—	—	—	8
Togo	—	—	—	—	326
Zaire	47	—	—	—	—
Zimbabwe	—	126	—	—	128

* Details not received at press time

While the collecting of the cereal crops has been intensively pursued over the past few years, pulse crops, on the other hand, have received less attention. However, IBPGR in association with various international and national institutes has been active in assembling primitive cultivars of many leguminous crops. These include groundnut, *Phaseolus* beans, soyabean, chickpea, pigeonpea, cowpea, mung bean, *faba* bean, lentil, lupin, winged bean and various other species. Many of these crops are mandate crops of four IARCs of the CGIAR system (CIAT, ICRISAT, ICARDA and International Institute of Tropical Agriculture—IITA) in addition to Asian Vegetable Research and Development Center (AVRDC).



Variation in beans

PHASEOLUS

An IBPGR study in 1984 determined that much wild *Phaseolus* germplasm in Latin America remains to be collected, and helped to define the geographical distribution of wild species of the genus. During 1985 some of these areas (northwest Argentina, northeast Peru, southern Colombia, northern Gua-

Collecting beans (Burundi)

temala and northeast Mexico) have been explored jointly by IBPGR/CIAT. Samples were collected by an IBPGR Intern posted at CIAT, in cooperation with national agricultural institutes of the countries involved (see Table 8). The work will continue in 1986.

During other collecting missions supported by IBPGR in 1985 additional samples were obtained: in Ecuador (INIAP); in Mexico (the Universidad Nacional Autónoma de Chapingo) including *Phaseolus elegans* and *P. lunatus*; and in Peru (Universidad Nacional Agraria—UNA).

Phaseolus spp. were collected in Nepal by a joint Japanese/IBPGR mission and *Phaseolus vulgaris* by the CEPGL Regional Programme in Burundi, Rwanda and eastern Zaire.

A mission to Euboea and central Greece collected samples of *P. vulgaris* and *P. coccineus*.

GROUNDNUT

Since 1976 IBPGR has been active in the collection of *Arachis* germplasm from the major centres of diversity in South America. The material collected includes cultivated groundnut and wild species. Texas A & M University (USA) has been coordinating this project and is also involved in the multiplication, characterization and distribution of samples to base collections for long-term storage. During the period 1982 to 1985, Texas A & M University supplied 252 accessions of wild *Arachis* and 667 accessions of cultivated types to ICRISAT, and landrace material was supplied to CENARGEN, Brazil (317) and Instituto Nacional de Tecnologia Agropecuaria (INTA), Argentina (252). In this project several national programmes have been involved and the material collected is, as a matter of principle, shared with the counterpart national institution. In March under this programme a team explored Lima and the coastal valleys of Peru. *Rhibozium* samples were also collected.

The IBPGR has also funded individual country programmes for groundnut collection in South America. In 1984 and 1985 such support was provided to Brazil and Uruguay; during March 1985, CENARGEN worked in the field in the Maranhão and Piaui states of Brazil and collected cultivated forms and wild species together with *Rhizobia*. The material collected included hitherto undescribed species of section *Arachis* of the genus.

CENARGEN, with the support of IBPGR and in association with scientists from the USA and Argentina, fielded a second collecting mission in the Mato Grosso and Rondonia region of Brazil.

During several other collecting missions, samples of groundnut were also collected in Botswana, Nepal and Zimbabwe.

SOYABEAN

Following an IBPGR Working Group's identification of collecting needs for *Glycine* in 1982 IBPGR has supported collecting of germplasm in its major centres of diversity, for example of annual and cultivated forms in China and Indonesia and wild perennial forms in Australia. In addition to these a few samples of soyabean were also collected in south and southeast Asian countries during other collecting work.

Table 8. IBPGR/CIAT *Phaseolus* collecting in 1985 in Latin America *

Species	Samples collected	Country	National institute(s) involved
Phaseolus anisotrichus	8	Mexico	INIA/Universidad Nuevo León
P. augusti	3	Argentina	INTA
P. lunatus	68	Columbia	ICA
	25	Peru	INIPA
P. pachyrrhizoides	2	Peru	INIPA
P. polyanthus	15	Columbia	ICA
	13	Peru	INIPA
P. scabrellus	?	Mexico	INIA/Universidad Nuevo León
P. vulgaris var. *aborigineus*	26	Argentina	INTA
P. vulgaris weedy types	8	Peru	INIPA
P. vulgaris	54	Colomiba	ICA
var. *vulgaris*	71	Mexico	INIA/Universidad Nuevo León
	511	Peru	INIPA
P. xanthotrichus	4	Mexico	INIA/Universidad Nuevo León
P. natural hybrids *polyanthus* x *coccineus*	16	Colombia	ICA
Phaseolus sp. (new taxon)	2	Mexico	INIA/Universidad Nuevo León

* Duplicates held at the national institutes above being distributed to CIAT and elsewhere for security storage

The Nanjing Agricultural University, China, continued the collection of landrace populations of soybean in 1985.

The CSIRO Division of Plant Industry, Australia, under the sponsorship of IBPGR, explored the Queensland and Kimberley regions for wild species. The material collected included both seeds and vegetative material and this was multiplied during the 1984-85 season and a subsample of the collection was sent to International Soybean Program (INTSOY), USA. In addition, CSIRO has also set up long-term storage for perennial *Glycine* seed samples.

During a mission in 1985 for the collection of *Gossypium* in the Kimberley region, a team also collected samples of *Glycine* and samples were also collected in Nepal on the joint Japan/IBPGR project.

VIGNA

An IBPGR assistant in Togo has been involved in the collection of *Vigna subterranea* and its characterization in Togo. During other IBPGR collecting missions, samples were collected in Botswana, Burundi, Madagascar, Mauritius, Nepal, Rwanda, Syria and Zimbabwe. IITA also undertook collection of bambara groundnut in the Central African Republic and initiated characterization and evaluation of of this crop with support from GTZ. IITA holds a major collection.

LUPIN

A number of collecting missions for *Lupinus* have been carried out in the last few years with IBPGR support in the two centres of diversity of this genus: the Mediterranean Basin and the Andean zone. In 1985, several samples were collected in Latin America during multi-crop collecting missions in Bolivia by CIF (*Lupinus mutabilis*) and in Ecuador by INIAP (*L. mutabilis*) and Peru by Instituto Nacional de Investigación y Promoción Agropecuaria (INIPA) (*Lupinus* sp.).

OTHER LEGUMES

During exploration missions for other crops, a few samples of other grain legumes were collected, including pigeonpea, chickpea, lentil, *Vicia faba*, peas, *Dolichos*, *Lathyrus* and *Trigonella*.

ROOT AND TUBER CROPS

Table 9. Numbers of samples of root and tuber crops collected in IBPGR missions during 1985 by country

	Cassava	*Ipomoea*	Potato	Others
Brazil	226	—	—	—
Burundi	25	16	—	9
Côte d'Ivoire	—	—	—	545
Chile	—	—	—	—
Ecuador	—	113	144	47
Guatemala	22	24	5	—
Mexico	14	—	—	—
Nepal	—	—	—	14
Paraguay	210	—	—	—
Peru	39	732	—	434
Venezuela	—	181	7	—
Zaire	108	24		16

The major root and tuber crops (cassava, potato, sweet potato) are mandate crops of one or more of the IARCs but IBPGR also has a major responsibility for the germplasm conservation programmes on cassava and sweet potato. Other roots and tubers are also covered in the IBPGR programme and support is channelled through interested national and regional programmes.

CASSAVA

CENARGEN, Brazil, is carrying out a three-year (1984-86) cassava collecting project, with IBPGR support.

In collaboration with Instituto Nacional de Investigaciones Agricolas (INIA), Mexico, IBPGR carried out a collecting mission for wild cassava, *Manihot* spp., in Southern Mexico during February. Seed and cuttings of six species, namely *M. aesculifolia*, *M. crassisepala*, *M. foetida*, *M. rhomboidea*, *M. websterae*, and *Manihotoides pausiflora* were collected. An additional five species were obtained from the collection at Iguala and the genebank at Chapingo. A second mission was carried out in northern Mexico during July-August. Seeds and cuttings of the following *Manihot* species were collected: *M. aesculifolia*, *M. angustiloba*, *M. caudata*, *M. chlorostricta*, *M. davisiae*, *M. foetida*, *M. michaelis*, *M. pringlei*, *M. rhomboidea*, *M. rubricaulis* and *M. subspicata*.

Also during 1985, a number of other IBPGR missions collected cassava germplasm in Burundi, Guatemala and eastern Zaire.

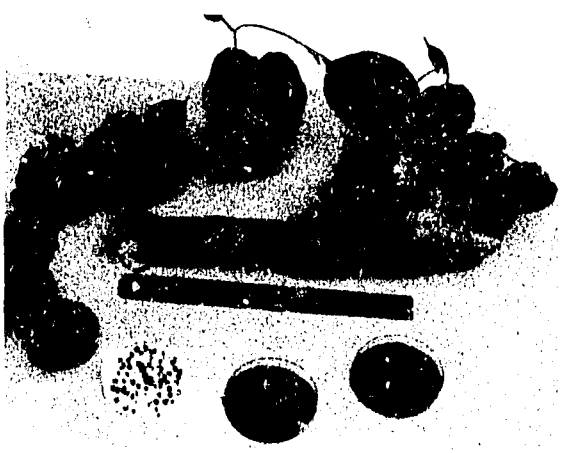
SWEET POTATO

During 1985, IBPGR collecting missions obtained sweet potato germplasm in Burundi, Guatemala and eastern Zaire.

POTATO

Much of the variability in both cultivated and wild tuber-bearing *Solanum* species has been collected and is conserved in major collections including the world collection at CIP.

Limited additional collecting of wild species during 1985 took place in an IBPGR project in Ecuador



Primitive cultivar of sweet potato

in association with INIAP. Samples of *Solanum andigena* and *S. phureja* were collected in the provinces of Carchi and Imbabura. In Guatemala, Instituto de Ciencia y Tecnologià Agricola (ICTA) and the Universidad de San Carlos also collected samples of *Solanum* spp. with IBPGR support.

OTHER ROOTS AND TUBERS

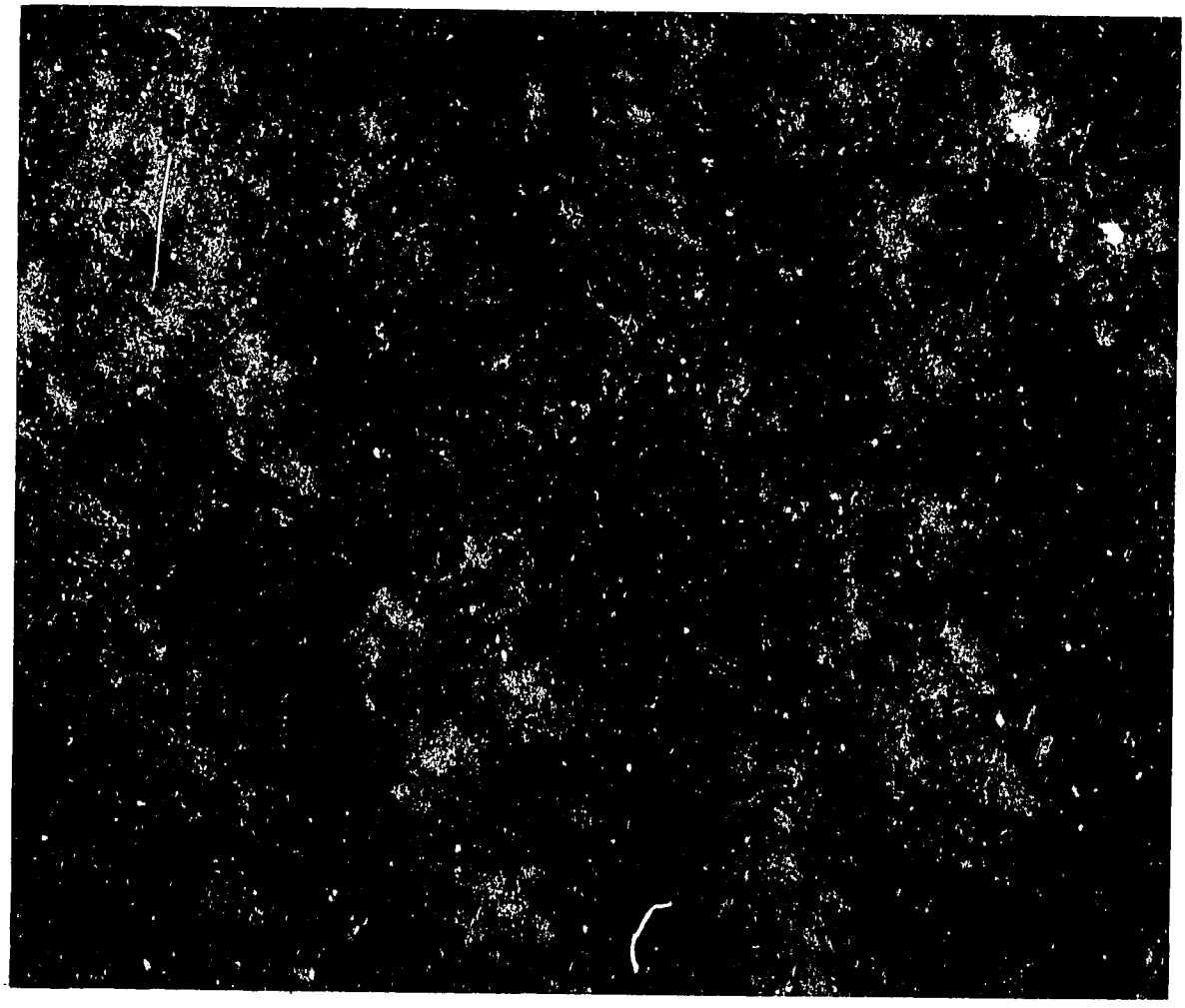
An IBPGR Collector stationed in Burundi and working with the CEPGL Regional Programme, collected *Colocasia esculenta* and *Dioscorea* spp. from Burundi and eastern Zaire.

The IBPGR/INIAP project in Ecuador, collected the following Andean roots and tubers in inter-Andean valleys: *Oxalis tuberosa, Tropaeolum tuberosum* and *Ullucus tuberosus.*

A three-year IBPGR-supported yam collecting project in Côte d'Ivoire by the Université d'Abidjan was completed with the last mission which took place in February. This mission visited eastern Côte d'Ivoire and material of the following species was collected: *Dioscorea alata, D. bulbifera, cayenensis-rotundata* complex, *D. dumentorum* and *D. praehensilis.* The collection now consists of about 1400 accessions.

The Japan/IBPGR project in Nepal collected samples of *Colocasia esculenta* and of *Dioscorea* spp.

An IBPGR project, initiated in 1982, to collect germplasm of sweet potato, cassava and other root and tuber crops in Peru, was carried out by Universidad San Cristobal de Huamanga, Ayacucho, Peru. Samples of the following species were collected in 1985: *Ipomoea batatas, I. squamosa, Ipomoea* spp., *Manihot esculenta, Oxalis tuberosa, Tropaeolum tuberosum* and *Ullucus tuberosus.*



Wild *Cucumis* (Niger)

VEGETABLES

Table 10. Numbers of samples of vegetables collected in IBPGR missions during 1985

	Lycopersicon	*Allium*	*Amaranthus*	*Capsicum*	Cruciferae	Cucurbitaceae	Eggplant	*Abelmoschus*
Bolivia	—	—	17	15	—	17	—	—
Brazil	—	—	—	*	—	—	—	—
Chile	18	—	—	—	—	—	—	—
Ecuador	13	—	27	4	—	—	—	—
Egypt	—	47	—	—	66	83	—	30
France	—	—	—	—	18	—	—	—
Guatemala	8	—	23	32	—	60	—	—
India	—	13	—	—	—	—	—	—
Italy	—	—	—	—	11	—	—	—
Mauritius	10	14	6	24	21	57	27	17
Mexico	—	—	2	7	—	110	—	—
Nepal	12	22	130	31	168	192	18	—
Niger	—	—	—	—	—	—	—	75
Peru	14	—	—	—	—	—	—	—
Spain	238	133	—	198	141	559	33	—
Sudan	13	31	—	10	34	25	3	36
Syria	20	14	—	14	31	51	13	10

* See Table 11 for details

Five major collecting projects were undertaken during 1985 to collect vegetables, in addition to a number of crop-specific and multi-crop missions.

In a three-year IBPGR project on the collection and characterization of vegetable germplasm in Egypt, in collaboration with the Horticultural Research Institute, initiated in 1985, about 250 samples have been collected with the support of an IBPGR consultant. Of these, 114 samples have been planted for multiplication, characterization and evaluation.

A team from the Department of Horticulture of Mauritius led by an IBPGR Collector, assembled vegetable germplasm in Mauritius and Rodrigues Islands during March.

Early in 1984, IBPGR approved a general vegetable collecting project in Spain carried out under the responsibility of the Universidad Politécnica de Valencia in cooperation with Instituto Nacional de Investigaciones Agrarias (INIA), Spain. The project was concluded by mid-1985 and a wide range of vegetable crops was collected.

Two IBPGR missions for horticultural crops were undertaken in the Sudan in 1982 and 1983 by the Horticultural Research Section, Agricultural Research Corporation, Wad Medani. A third, and final, mission in March in the northern region of Sudan collected vegetables in addition to fruits and other species.

In 1985, IBPGR approved a three-year project with the Directorate for Agricultural Research, Douma, Syria, for the collection and characterization of vegetable germplasm. During July-August, with the help of an IBPGR consultant, vegetable germplasm was collected.

TOMATO

Special field work for wild *Lycopersicon* species was undertaken in Chile and Peru during 1985. The project in Chile is carried out by the Instituto de Agronomia, Universidad de Tarapaca, Arica and, of three separate missions planned for 1985 and 1986, the 1985 trip collected *Lycopersicon chilense*, *L. peruvianum*, *Solanum rickii* and *Solanum* spp. The project in Peru, carried out by the Universidad Nacional Agraria, La Molina, Lima, included missions in 1982, 1984 and 1985. During 1985 the Chilca and Cañete Zones of Peru were explored and samples of *L. peruvianum* and *L. pimpinellifolium* were collected.

Tomato germplasm was also obtained by other IBPGR missions in Ecuador, Guatemala, Mauritius and Rodrigues Islands, Nepal, Peru, Spain, Sudan and Syria.

ALLIUM

Collecting of *Allium* in 1985 was mainly con-

cerned with wild species. An IBPGR project for wild *Allium* species in India, in cooperation with the University of Kashmir, started with field work to Ladakh in July with the assistance of an IBPGR Collector. In addition, other collecting missions were carried out in 1984-85, and some material was obtained from the USSR through exchange. The collection now contains 43 accessions of 27 *Allium* species. With financial assistance from FAO, agreement was reached with the Royal Botanic Gardens, Kew, UK for an herbarium study of wild *Allium* species in 1986. Thereafter work is expected to be more clearly defined.

Various missions collected *Allium* germplasm in Egypt (*A. ampeloprasum*, *A. cepa*, *A. sativum* and *Allium* spp.), Mauritius and Rodrigues Islands (*A. cepa* and *A. sativum*), Nepal (*Allium* spp.), Spain (*A. cepa* and *A. sativum* during 1984/85), Sudan (*A. cepa*) and Syria (*A. ampeloprasum*, *A. cepa* and *A. sativum*).

AMARANTH

IBPGR-supported collecting missions obtained germplasm of *Amaranthus* in Bolivia, Burundi, Ecuador, Guatemala, Mauritius and Rodrigues Islands, Mexico, Nepal and Rwanda.

CAPSICUM

IBPGR and CENARGEN jointly agreed to a three-year project to collect wild *Capsicum* species to collect in southern Brazil (1985 and 1986) and in the Amazon Basin (1987). The project is under the leadership of CENARGEN with the assistance of Universidad Federal de Viçosa, Brazil. In addition IBPGR is funding specialist consultants (Prof. A.T. Hunziker and Dr. Barbara Pickersgill) to assist the project. The first mission explored the far south of Brazil during April-May 1985. Details on the material collected are provided in Table 11.

During 1985 *Capsicum* germplasm was also collected in Bolivia, Ecuador, Guatemala, Mauritius and Rodrigues Islands, Mexico, Nepal, Spain, Sudan and Syria.

CRUCIFERAE

A project for the collection of wild species of *Brassica* in the Mediterranean, coordinated by Prof. C. Gómez-Campo (Spain) and Dr. M. Gustafsson (Sweden), continued in 1985 with field work in northwest Italy, France and northeast Spain (for details on locations see Fig. 2, *Annual Report 1984*). The mission was undertaken in cooperation with scientists from the Istituto del Germoplasma, Bari, Italy and from the following institutes in France: Jardin Botanique de Nice, Conservatoire Botanique de Porquerolles, Faculté de Sciences—Toulouse, Ecole National Supérieure Agronomique de Rennes and Conservatoire Botanique du Stangalarc'h. They collected population samples of *Brassica incana*, *B. montana* and *B. oleracea*.

Several other collecting missions obtained local cultivars of Cruciferae in Egypt (*Brassica oleracea* var. *botrytis*, *B. oleracea* var. *capitata*, *B. campestris* subsp. *rapa* and *Raphanus sativus*), Mauritius and Rodrigues Islands (several forms of *Brassica*, *Raphanus sativus*), Nepal (*Brassica* spp., *Lepidium sativum* and *Raphanus sativus*), Spain (*Brassica* spp and *Raphanus sativus* during 1984-85), Sudan (*Eruca sativa*, *Raphanus sativus*), Syria (*B. napus*, *B. oleracea* var. *botrytis*, *B. oleracea* var. *capitata*, *B. oleracea* var. *gongylodes*, *Lepidium sativum* and *Raphanus sativus*).

Table 11. Material of *Capsicum* and the related genus *Aureliana* collected in Brazil

Genus/Species	Number of samples		
	Populations	Individual plants	Herbarium sheets
Capsicum praetermissum	2	4	2
Capsicum flexuosum	10	35	12
Capsicum baccatum	2	6	4
Capsicum sp. 1*	1	1	1
Capsicum sp. 2*	5	32	8
Capsicum sp. 3*	1	1	1
Aureliana spp.**	5	13	7

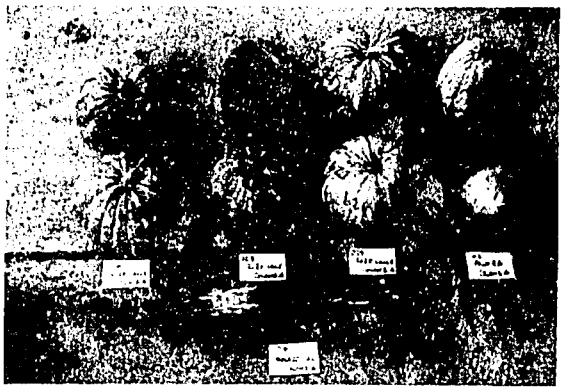
* Taxonomic status of sp. 1, 2 and 3 under study by Prof. A.T. Hunziker, Argentina

** Several species

CUCURBITACEAE

IBPGR field work resulted in the following crops of Cucurbitaceae: Bolivia (*Cucurbita*), Egypt (*Citrullus colocynthis, C. lanatus, Cucumis melo, C. sativus, Cucumis* and *Cucurbita*), Guatemala (*Cucurbita* and *Lagenaria siceraria*), Mauritius and Rodrigues Islands (*Citrullus lanatus, Cucumis sativus, Cucumis, Cucurbita maxima, Lagenaria siceraria, Luffa acutangula, Momordica charantia* and *Trichosanthes cucumerina*), Nepal (*Benincasa hispida, Citrullus lanatus, Cucumis, Cucurbita, Lagenaria siceraria, Luffa, Momordica charantia* and *Trichosanthes*), Spain (*Citrullus lanatus, Cucumis melo, C. sativus* and *Cucurbita*), Sudan (*Citrullus, Cucumis melo, C. sativus* and *Cucurbita*), and Syria (*Citrullus lanatus, Cucumis melo, C. sativus, Cucurbita maxima, C. pepo, Cucurbita* and *Trichosanthes*).

The IBPGR supported the Department of Vegetable Crops, University of California, Davis, USA to collect Cucurbitaceae from the western slope of the Sierra Madre Occidental in Mexico. The mission was carried out in the autumn of 1985 in collaboration with INIA, Mexico and collected material of the following: *Cucurbita ficifolia, C. foetidissima, C. mixta, C. moschata, C. pepo, C. sororita* and samples of other species of Cucurbitaceae.



Variation in *Cucurbita moschata*

African eggplant (Rwanda)

EGGPLANT

IBPGR field work in 1985 resulted in collection of eggplant germplasm in Burundi,, Mauritius and Rodrigues Islands (*S. macrocarpon, S. melongena, S. nigrum* and *S. torvum*), Nepal (*S. melongena*), Spain (*S. melongena*), Sudan (*S. melongena*), Syria and Zaire (*S. melongena*).

OKRA

Okra germplasm was collected by IBPGR in Egypt, Mauritius and Rodrigues Islands, Niger (through ORSTOM), Sudan and Syria.

OTHER VEGETABLES

Other vegetable and spice/aromatic crops collected in 1985 include: *Anethum graveolens* (Sudan); *Carum carvi* (Sudan); *Cichorium intybus* (Syria); *Corchorus olitorius* (Sudan, Syria); *Coriandrum sativum* (Mauritius and Rodrigues, Nepal, Sudan, Syria); *Cuminum cyminum* (Sudan); *Daucus carota* (Mauritius and Rodrigues, Nepal, Syria); *Hibiscus sabdariffa* (Sudan); *Lactuca sativa* (Egypt, Syria); *Lactuca serriola* (Egypt, Syria); *Petroselinum crispum* (Mauritius and Rodrigues Islands, Syria); *Portulaca oleracea* (Sudan, Syria); *Spinacia oleracea* (Nepal, Syria); *Trigonella foenum-graecum* (Nepal, Sudan).

FRUITS AND TREE NUTS

Table 12. Fruits and tree nuts collected in IBPGR missions during 1985 by country

	Musa	*Citrus*	*Mangifera*	Other Tropical Fruits	Temperate Fruits
Ecuador	—	—	—	—	50
Malaysia	*	—	250	716	—
Nepal	—	104	—	—	194
Sudan	—	7	—	11	—
Venezuela	—	—	—	76	—
Yugoslavia	—	—	—	—	64

* Details not received at press time

IBPGR activities on fruits and tree nuts have largely centred on those tropical fruits given high priority by IBPGR (banana and plantain, citrus and mango), although some attention has also been given to other tropical fruits as well as to temperate fruits.

BANANA AND PLANTAIN

Banana germplasm has been collected through an IBPGR-supported project for tropical fruits in Malaysia. Since early 1984, as part of a project on the improvement of high altitude *Musa*, IRAZ has been assembling a collection of local cultivars in Burundi, Rwanda and Zaire. The collection currently consists of 136 accessions and further collecting is scheduled for December 1985-January 1986, with IBPGR funding.

CITRUS

A major IBPGR citrus collecting project is continuing in collaboration with the Fruit Tree Research Station, Japan; details on previous expeditions are provided in the *Annual Reports 1983* and *1984*. A mission was scheduled in Indonesia in 1985, but, considering the fruit ripening time of the wild species, it was postponed to mid-1986.

Other citrus germplasm was collected in 1985 in Nepal and Sudan (*Citrus aurantifolia* and *C. aurantium*).

MANGO

Since most of the variability of cultivated *Mangifera indica* is already conserved in field genebanks, collecting activities are assigned a low priority and during 1985 *M. indica* was collected only in Malaysia.

OTHER TROPICAL FRUITS

An IBPGR-supported project on the collection of tropical fruits and the establishment of field genebanks in Malaysia has been carried out by Malaysian Agricultural Research and Development Institute since 1983. Most of Peninsular Malaysia and some offshore islands have been explored and by July 1985 the following genera had been collected: *Artocarpus, Durio, Lansium* and *Nephelium*. The project is expected to make further collections in Sabah, Sarawak and Brunei.

In Nepal (special joint IBPGR-Japan project) germplasm of the following tropical/subtropical fruits: *Annona* sp., *Carica papaya, Diospyros kaki, Ficus carica* and *Punica granatum* was collected in 1985.

The third phase of an IBPGR-supported horticultural crops collecting mission in the Sudan collected samples of *Phoenix dactylifera* and of *Psidium guajava*.

Due to an emergency situation, an IBPGR project to collect *Ananas comosus* and wild relatives in Venezuela is being carried out jointly by the Universidad Central de Venezuela and the Institut de Recherches sur les Fruits et Agrumes, France. A first mission was carried out in February-March in different ecological zones from the Savanah (Llanos) areas close to the Orinoco River.

TEMPERATE FRUITS

During 1985 IBPGR collecting missions obtained temperate fruit germplasm in the inter-Andean valley of Ecuador (*Prunus capuli*) and in Nepal (*Juglans, Malus, Prunus* and *Pyrus*). An IBPGR-supported project in Yugoslavia was successfully concluded in June and plum cultivars and clones (mainly *Prunus domestica* and *P. insititia*, but also *P. cocomilia* and *P. prostrata*) were collected. The collected materials have been described for 91 characteristics.

INDUSTRIAL CROPS

Table 13. Numbers of samples of industrial crops collected in IBPGR missions during 1985

	Beet	Cocoa	Sunflower	Sugarcane	Cotton
Australia	—	—	—	—	71
Dominican Republic	—	—	—	—	15
Ecuador	—	—	—	—	6
France and Italy	118	—	—	—	—
Grand Cayman	—	—	—	—	8
Greece	32	—	—	—	—
Jamaica	—	—	—	—	30
Mexico	—	*	—	—	—
Nepal	—	—	—	—	9
Netherland Antilles	—	—	—	—	28
Peru	—	—	—	—	6
Philippines	—	—	—	242	—
Syria	10	—	—	—	—
Tobago	—	—	—	—	6
Trinidad	—	—	—	—	67
USA	—	—	90	—	—

* Details not received at press time

BEET

Miss H. Cortessi of the Hellenic Sugar Industry, Greece, who acts as a key scientist for the IBPGR collecting programme in the Mediterranean collected 32 samples of *Beta maritima* and *B. vulgaris* in Euboea and central Greece. The Hellenic Sugar Industry continued to multiply small seed samples collected for and by IBPGR in earlier years.

The USDA supported collection of *B. maritima* in Basilicata and Calabria, Italy, from coastal areas and river valleys, and leaf beets; *B. maritima* in Sardinia, Italy and Corsica, France. Most of the samples were bulk population samples. This mission was discussed at a meeting of the US National Plant Germplasm System Sugarbeet Crop Advisory Committee in December and IBPGR participated. As a result coordinated and joint IBPGR-US missions are expected in 1986.

COCOA

INIA, Mexico, with IBPGR support collected, through the Experimental Statras Rosario Izapa, criollo cocoa in the Yucatan peninsula. Seeds have been germinated and seedlings established. Full details are awaited. Agreement was reached with Instituto Colombiano Agropecuario (ICA), Colombia to collect in the areas of the Atlantic coast and the Departamente de Antiquia and this will take place in 1986.

COTTON

Since 1980, Institut de Recherches du Coton et des Textiles Exotiques (IRCT), France with financial support from IBPGR, has been collecting *Gossypium* germplasm in Latin America and the Caribbean islands. During these missions the main objective has been to collect spontaneous, sub-spontaneous, back-yard, feral and wild *Gossypium* species.

In 1985 IRCT, in collaboration with USDA, explored the following islands: Aruba, Bonair, Curacao, Dominican Republic, Grand Cayman, Jamaica, Trinidad and Tobago, and as well as southern Florida and Puerto Rico (USA). Among the material collected was wild *G. hirsutum*; back-yard and subspontaneous types and *G. barbadense*.

In another IBPGR-funded mission CSIRO, Australia and USDA explored and collected wild Kimberley cottons--the group of *Gossypium* species which were previously least known--from the arid zone of central Australia. Samples belonging to 12 *Gossypium* species and a few undefined variant specimens were collected. The material collected includes both seeds and root stocks and arrangements have been made for the samples to be multiplied.

In addition to the above, IBPGR provided funds to INIPA, Peru for the collection of *G. raimondii* and from the northern coast of the country.

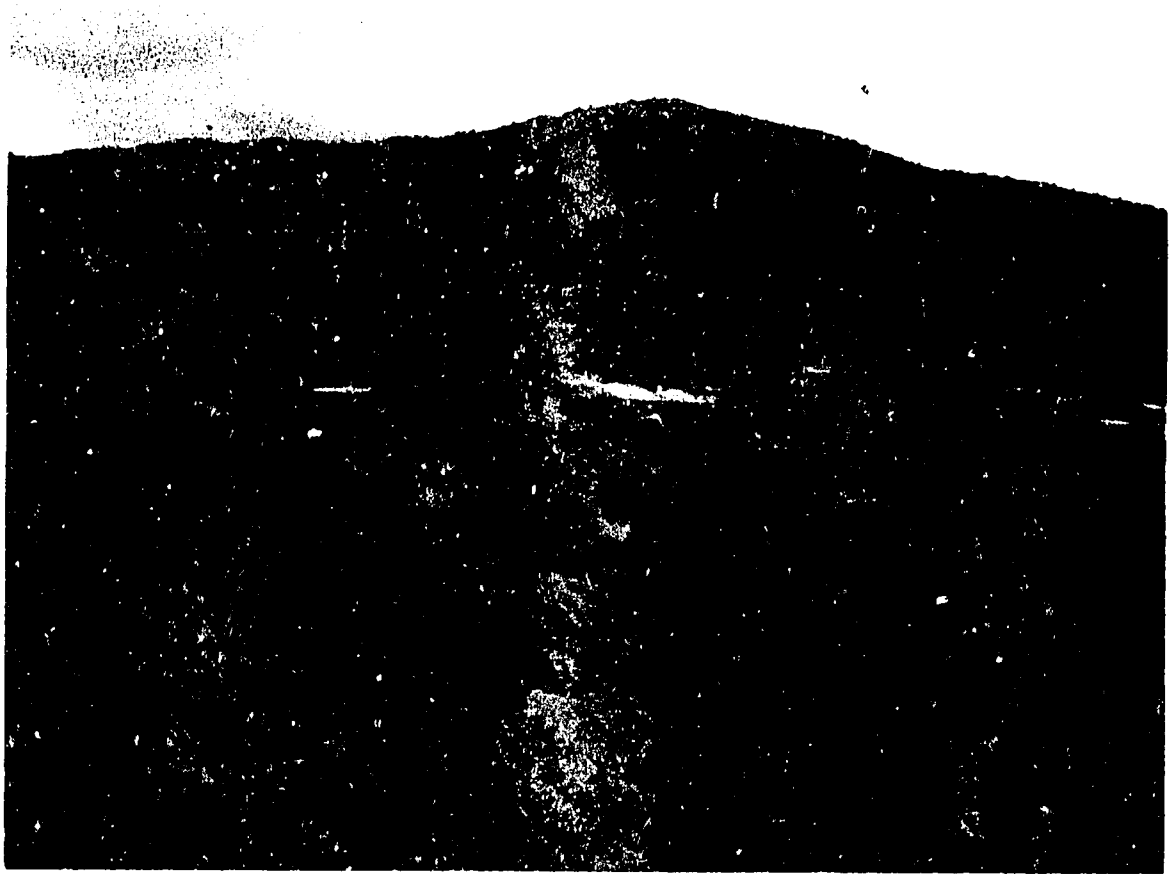
During other collection missions samples of *Gossypium* were collected in Ecuador and Nepal.

SUGARCANE

Collection of sugarcane in the Philippines by Philippine Sugar Commission was continued in 1985, with IBPGR support. A second field mission covered Luzon and Mindanao highlands, Samar, Leyte, Mindoro, Cebu and Palawan. *Saccharum officinarum* and *S. spontaneum* made up the majority of samples but *S. robustum*, *Miscanthus* and *Erianthus* were also collected.

SUNFLOWER

IBPGR's work on sunflower in southern Europe had highlighted the need to collect more diversity of certain wild sunflower species in the USA. Since USDA had organized a domestic mission October-November, IBPGR attached to it a scientist from Yugoslavia. Population samples were collected from nine eastern states and material is being deposited in Ames, Iowa, USA and in Novi Sad, Yugoslavia.



Chloris guyana (Tanzania)

FORAGES

A specialist Working Group on forages for Mediterranean and adjacent arid and semi-arid areas was convened at Limassol, Cyprus, 24-26 April. A programme of action on forage germplasm in southern Europe, Southwest Asia and North Africa was presented to and later approved by IBPGR as part of its global forage plan of action initiated in 1984.

The Working Group reviewed holdings in forage centres' collections. There are three large collections, viz. in Australian institutions at Adelaide, South Australia and Perth, Western Australia and at ICARDA in addition to a number of smaller ones. Progress with storage facilities was monitored and recommendations made on the location of base and active collections. Priority taxa were listed (see Table 14) on the basis of the extent of genetic erosion and their potential value. The legume list included 13 annual and three perennial *Medicago* spp., 16 annual and three perennial *Trifolium* and eight other genera plus 11 grass genera.

The Working Group endorsed the importance of appropriate *Rhizobium* collections and welcomed a proposal from ICARDA to build up a collection for the region. The importance of unified descriptors was emphasized and specimens of the IBPGR/CEC Grass and Forage Legumes descriptor lists served as the basis for discussions. Passport data as outlined should have a general application and it is desirable to have detailed information on environmental parameters to provide a sound scientific basis for ecogeographic studies. Information needs to be stored in data bases and, although progress is being made, it has been uneven. There is no urgent need to develop central data bases but workers with common interests are to be encouraged to exchange data.

The Working Group considered that more information is needed on the biology and distribution of priority species and this should be linked with IBPGR's data files on wild relatives of crop plants. An action programme to collect priority species was drawn up. The importance of "hands-on" training in genetic resources work was stressed and a list made of institutes likely to provide such training.

Numerous missions to collect forages took place in 1985.

Two IBPGR funded missions explored various parts of Tanzania during July-August to collect forage legumes and grasses. A team from International Livestock Centre for Africa (ILCA) and CIAT in cooperation with the Tanzania Livestock Research Organization collected mainly *Trifolium* spp.and *Brachiaria* spp. in the southern highlands, the central region and the coastal area. The second mission was carried out by ILCA and explored the northern and western parts of the country and the Kilimanjaro Mountain area. A total of 200 legumes and 131 grasses was collected.

A series of collecting missions were conducted in Zimbabwe from March through June in the area between Chitedze in the south and Mutoko in the north. During February-March an IBPGR/ILCA mission surveyed the northern, central and eastern districts of the country and collected 340 samples of forage grasses and 48 samples of forage legumes. These were mainly *Andropogon* spp. (27), *Brachiaria* spp. (203), *Panicum* spp. (29), and *Stylosanthes* spp. (12).

In April and May, as part of a forage collecting programme in Africa, a CIAT collector, supported by IBPGR, explored Burundi and Rwanda, in collaboration with the national institutes. The collection resulted in 164 grass and 38 legume samples from Burundi and 78 grass and 10 legume samples from Rwanda. The major part of the collection was of *Brachiaria* spp. (87 in Burundi and 69 in Rwanda). In addition, due to an absence of seeds, 128 vegetative samples of mainly *Brachiaria* spp. were collected. These were transferred into shoot-tip culture for forwarding to CIAT. The collector also explored Sumatra, Indonesia in September. A total of 172

Trifolium wentzelianum in mountainous areas of East Africa

Table 14. List of priority species with indication of genetic erosion and potential (? = lack of information)

	Extent of genetic erosion	*Potential*	*Comments*
LEGUMES			
Medicago			
Perennial			
M. sativa	High	High	
M. falcata	Medium	Medium	
M. arborea	Medium	Medium	
Annual			
M. littoralis	High	High	
M. murex	High	High	
M. polymorpha	Low	High	
M. radiata	High	High	
M. rugosa	High	High	
M. scutellata	High	High	
M. tornata	High	High	
M. truncatula	High	High	
M. turbinata	High	High	
M. aculeata	High	High	Especially for
M. noeana	High	High	high altitude
M. rigidula	High	High	continental
M. rotata	High	High	climates
Trifolium			
Perennial			
T. ambiguum	Low	Low	
T. fragiferum	?	High	
T. hybridum	Low	Low	
T. radicosum	High	Medium	
T. repens	High	High	
Annual			
T. alexandrinum	?	High	
T. balansae	?	High	
T. campestre	Low elevation	High	350-400mm rainfall-high
T. canescens	Low	Medium	Above timberline
T. cherleri	?	High	
T. glomeratum	?	Low	
T. hirtum	?	High	
T. israeliticum	High	Low	
T. isthmocarpum	?	Low	
T. nigrescens	?	Medium	
T. purpureum	?	High	
T. resupinatum	Medium	High	Saline alkaline, 150mm rainfall
T. scutatum	?	Low	
T. stellatum	?	Low	
T. subterraneum subsp. *yanninicum*	?	Low	
T. vesiculosum	?	High	
Vicia dasycarpa	High	High	Cold resistant
V. ervilia	High	High	
V. narbonensis	High	High	Especially arid Southwest Asia
V. sativa	High	High	
V. villosa	?	High	Especially North Africa and Southwest Asia

Astragalus siliquosus	Medium	High	
Coronilla varia	Medium	Medium	
Hedysarum coronarium	High/Medium	Medium	Western Mediterranean
Lathyrus sp.	High	Low	
Lotus corniculatus	?		400mm area Iran/USSR border
Onobychis melanotricha	Medium	Medium	
O. radiata	High	High	Can self-seed
O. viciifolia (sativa)	Low	High	
Ornithopus sp.	?	High	On acid soil; recolonizer under- utilized
Pisum sativum (forage form)	High	High	
GRASSES			
Agropyron cristatum	High	High	Especially for western Asia
A. elongatum	Low	High	Western Asia
A. intermedium	Low	High	(*trichophorum, aucheri*)
Avena forage types	High	High	
Bromus persicus	Low	Medium	
B. tomentellus	Low	High	Perennial grazing resistant, Middle East
Cenchrus ciliaris	High	High	
Dactylis glomerata	Medium	High	subsp. *hispanica*, under-utilized
Eragrostis spp.	Low	Medium	
Festuca arundinacea	Medium	High	
F. ovina	Low	High	For high elevations
Hordeum fragile	Low	Medium	Good for land conservation
Lolium rigidum	Low	Medium	
L. temulentum	Low	Medium	
Phalaris aquatica (=*tuberosa*)	Medium	High	Few collections available
Secale montanum	High	Medium	Upland dry areas
Stipa tenacissima	Low	Medium	

samples was collected, which included 77 samples of 9 *Desmodium* species.

An IBPGR Collector appointed to Indonesia, who began work in 1984, continued a programme of eco-geographic surveying and collecting a wide range of native and introduced forage legumes and grasses in the Indonesian archipelago. Surveys were made and seed and herbarium materials collected in Lombok, Sumbawa, Rote, Timor, Flores and north Sulawesi. A total of 621 legume samples were collected, among them: *Aeschynomene americana* (11), *Alysicarpus* spp. (43), *Arylosia scarabaeoides* (22), *Colopogonium mucunoides* (8), *Centrosema pubescens* (35), *Desmodium* spp. and related genepool (239), *Flemingia* spp. (8), *Indigofera* spp. (21), *Psuedarthria viscida* (45), *Pueraria phaseoloides* (29), *Rhynchosia* spp. (9), *Tephrosia* spp. (9), *Uraria lagopodoides* (56) and *Vigna* spp. (34). Among the 58 samples of grasses collected were *Bothriochloa glavra* (17), *Heterocarpon contortus* (31) and *Cenchrus* spp. (4).

A project carried out by the Fodder Crops and Pastures Institute, Larissa, Greece, which began in 1982, collected a total of 200 forages during 1985 in Peloponnesus and central-west Greece. Among the forages collected were *Dactylis glomerata* (34), *Lolium perenne* (23), *Medicago orbicularis* (17), *Medicago* spp. (24), *Trifolium alexandrium* (19), *T. praetense* (11), *T. repens* (13) and *Trifolium* spp. (30). Material will be characterized in the Fodder Crops and Pastures Institute, and will be placed in the Greek Gene Bank in Thessaloniki for long-term conservation.

In 1985, IBPGR missions to Mali (with Institut d'Economie Rurale) and to Niger (with Ministere de l'Hydraulique et de l'Environnement) surveyed and sampled wild plants. A number of Sahelian forage species were sampled and phenotypic, ecological and environmental data was recorded. The mission was undertaken in cooperation with IUCN field projects which have expanded components of *in situ* conservation.

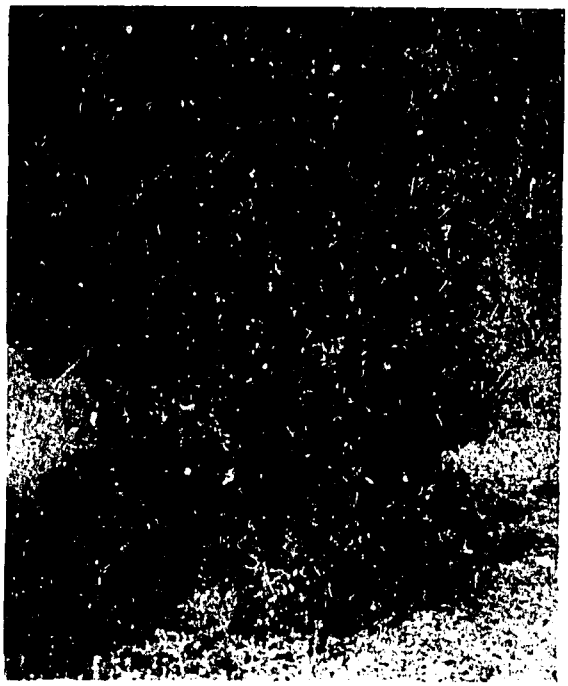
Wild forage material in the Rio Negro Plateau, Argentina, was collected by Estación Experimental Regional Agropecuaria Altro Valle de Rio Negro of INTA and funded by IBPGR. During 1985 a number of exploration missions were undertaken. Material included: *Bromus brevis, Pappophorum subbul-*

bosum, Piptochaetium napostaense, Stipa clarazii, S. neaei and *S. tenuis*.

An ICARDA team, in collaboration with scientists from the Desert Institute of Cairo, Egypt collected a total of 140 seed samples of annual legumes (*Medicago, Trifolium* and *Vicia*) from rainfed areas of northeast Sinai and coastal regions northwest of Alexandria during May.

In Iran in July IBPGR Staff took part in a mission organized by Seed and Plant Improvement Institute in conjunction with the Forest, Pasture and Rangeland Research Institute. Considerable climatic variability was found at sampling sites which varied from sea level near the Caspian sea to 2400 m in the Alburz Mountains. Collections of *Lolium perenne, Lotus corniculatus, Medicago arabica, M. coronata, M. minima M. orbicularis,* and *M. truncatula, Trifolium fragiferum, T. pratense, T. repens* were made.

In IBPGR collecting missions made in northern Portugal 1983-85, a total of 170 accessions were collected, including 17 species of *Vicia* and 10 species of *Lathyrus*. The missions were jointly carried out by Instituto Botanico Arcos do Jardim and the University of Southampton, UK.



Collecting *Medicago* (Iran)

TREES

Since 1979 IBPGR has been supporting a project on the genetic resources of arboreal species for the improvement of rural living in arid and semi-arid areas. IBPGR support terminated in 1985. This project has been coordinated and executed by the Forestry Department of FAO and partial financial support is provided by United Nations Environment Programme (UNEP). Eight countries (Chile, India, Mexico, Pakistan, Peru, Senegal, Sudan and P.D.R. Yemen) have participated in the project. In addition, some institutions in Australia, Denmark, France, Israel and the UK have also cooperated, especially in the collection, distribution and storage of the provenance of species.

During 1981-85 the participating countries collected provenances of *Acacia nilotica* (63), *A. senegal* (24), *A. tortilis* (17), *A. albida* (6), *A. cavenia* (4), *A. raddiana* (5), *A. berlandieri* (7), *A farnesiana* (14), *Prosopis cineraria* (20), *P. tamarugo* (7), *P. glandulosa* (13), *P. chilensis* (6), *P. juliflora* (1), *Atriplex repanda* (7), *Balanites aegyptiaca* (2), *Cercidium microphyllum* (1) and *C. praecox* (1).

The University of Hawaii, USA in cooperation with Universidad Autónoma de Mexico, Instituto Nacional de Investigaciones Recursos Bióticos and Universidad Autónoma de Nuevo León explored the highlands of Mexico, especially northeast Mexico, eastern and western coasts of Mexico and the Baja region, and in the USA in southern Texas. About 100 accessions of multi-purpose *Leucaena* were collected, representing the following species: *L. diversifolia* (2n), *L. diversifolia* (4n), *L. esculenta, L. greggii, L. lanceolata, L. leucocephala, L. macrophylla, L. pallida* and *L. pulverulenta*.

In addition, species hybrids which were of great interest were also collected. These were mostly *L. diversifolia* (2x) x *L. leucocephala*; and *L. diversifolia* (4x) x *L. leucephala*. A few samples of unknown species were also gathered. A few samples of *Rhizobium* were also collected, together with the planting material.

CONSERVATION

When IBPGR initiated its field programme it was largely concerned with collecting in all parts of the world in order to rescue material under serious threat of genetic erosion but also to build up substantial collections of germplasm for immediate and future use. Up to about 1980 emphasis had been on seed producing species and efforts were made to expand and improve the very small numbers of seed genebanks to develop a safe conservation network to store collected material. When suitable seed stores were available IBPGR was able to turn to the organization of a planned network of base collections for the secure long-term storage of germplasm.

By 1980 IBPGR was able to give more attention to the conservation of vegetatively propagated species through the establishment of field genebanks, collections of living trees and woody shrubs and to look to the scientific possibilities of *in vitro* genebanks in the case of some species where disease problems or excessive cost militates against field genebanks.

As a result the conservation network will finally include:

1) Seed genebanks, of two kinds, containing collections of dried seeds:
   (i) **Base collections** for long-term safe storage only (usually at -18°C but at least below 0°C) and
   (ii) **Active collections** whose function is to multiply, characterize and distribute seed (and with less stringent storage but with temperatures usually less than 5°C).
2) Field genebanks for active maintenance of clonally reproduced materials or plantation type crops (such as cocoa or coconut).
3) *In vitro* genebanks which, when established, should be regarded as **base** and **active** collections. The inherent limitations and characteristics of the current methods—the need for regular subculturing and the probability of induced genetic changes—introduce an element of instability which is incompatible with the purpose and functions of genetic conservation.
4) *In situ* conservation for wild populations which, with associated habitats, form important parts of general conservation strategies and complement *ex situ* collections. Comprehensive field surveys of wild populations involving taxonomic studies and the collection of data are necessary before designating such genetic reserves.

Interaction between and within these categories will create a functional conservation network.

SEED CONSERVATION

Storage conditions and genebank management expertise vary to a great extent and IBPGR recognizes that some genebanks need help in raising standards of operation. Lacking authoritative definitions of necessary procedures it was difficult for many genebanks to make precise funding requests to their respective Governments for the upgrading of facilities. The IBPGR convened a meeting of its Advisory Committee on Seed Storage (members are listed in Appendix II) to establish scientific and operational standards which are appropriate for genebanks operating within the international network. The standards were published in 1985 in *Advisory Committee on Seed Storage: Report of the Third Meeting* and distributed to genebanks throughout the global network. Recommendations are given in the form of *preferred* and, at a less stringent level, *acceptable* standards for genebanks.

REGISTER OF GENEBANKS

Following the publication of its standards for genebanks, IBPGR agreed to establish a register of genebanks which have achieved, or intend to achieve the defined acceptable standards of conservation for particular crop collections. The IBPGR designated base collections (and other genebanks) are being invited to participate in the register. Upon receipt by IBPGR of a request, the designated genebank will be evaluated against the standards for genebanks by an expert and a report concerning the evaluation will be submitted to the Board. If acceptable, those institutes will receive a certificate as an IBPGR registered conservation collection for one or more specific crops. Should a genebank fail to be recognized as a registered genebank at the present, constructive suggestions will be made to help improve standards.

The purpose in developing a register of genebanks, is not to discriminate against genebanks with poor storage conditions, but to serve as a stimulus

Fig. 3. IBPGR research projects

to improvement by identifying deficiencies in equipment or management and to provide independent evidence of the need for support to curators from their own Governments, or from other agencies, in rectifying the deficiencies. It is also recognized that there may be practical constraints to the immediate implementation of all the standards. Thus IBPGR Staff, in consultation with individual genebanks and the IBPGR Advisory Committee on Seed Storage, will advise the Board on the extent to which it is possible for any genebank to meet acceptable standards, and therefore whether, taking all factors into account, a genebank is operating or intends in the immediate future to be operating within the spirit of these standards.

In 1985, three designated genebanks, namely AVRDC, IRRI and National Genebank of Thailand, were evaluated by IBPGR and decisions on registration will be made by the Board in early 1986.

In 1985, and in accordance with the policy of raising standards of conservation, a practical manual was published entitled *Procedures for Handling Seeds in Genebanks*. This manual is the first in a series of practical guides. It has been prepared specifically for those genebank technicians and staff involved in day-to-day seed handling.

A report, entitled *Long-term Seed Storage of Major Temperate Fruits*, was published in 1985. It is hoped that this report will play a significant part in establishing a more objective view, in the genetic resources community, of the possibilities of seed storage in temperate fruits and in dispelling current misunderstandings that dry seed storage is not possible. It shows that seeds of most temperate fruits have orthodox behaviour and IBPGR is stimulating the conservation of genepools of temperate fruits through seed storage at low temperatures. The report reviews the available information on *Malus*, *Prunus*, *Pyrus* and *Vitis*.

Another report, *Handbook on Genebank Management for Temperate and Tropical Fruits and Tree Nuts* is a conservation reference guide and is under preparation. It will be published in 1986.

THE WORLD NETWORK OF BASE SEED COLLECTIONS

International regional and national centres, through formal agreement with IBPGR, are designated as conservation centres to hold base collections of major crops. Designated genebanks accept responsibility to act as either **world** or **regional** depositories of specific crops. In order to expand the coverage of crops, in 1985 IBPGR initiated negotiations with eight genebanks to be designated as base collections for 20 genera of tropical and subtropical forage germplasm. The network of designated base collections for seed crops, as it stands in 1985, is listed in Table 15.

Table 15. Current IBPGR network of designated base collections of seed crops (December 1985)[1]

Crop	Species covered	Geographical representation	Institute
Cereals			
Barley		Global	PGR, Ottawa, Canada
		European	NGB, Lund, Sweden
		African	PGRC/E, Addis Ababa, Ethiopia
		Asian	NIAR, Tsukuba, Japan
Maize		New World	NSSL, Fort Collins, USA
		Asian	NIAR, Tsukuba, Japan
		Asian	TISTR, Bangkok, Thailand
		European	VIR, Leningrad, USSR
		South European	Portuguese Genebank, Braga
Millets	*Pennisetum*		NSSL, Fort Collins, USA
	Pennisetum		PGR, Ottawa, Canada
	Pennisetum		ICRISAT
	Eleusine		PGRC/E, Addis Ababa, Ethiopia
	Eleusine		ICRISAT
	Minor Indian millets		NBPGR, New Delhi, India
	Eragrositis		PGRC/E, Addis Ababa, Ethiopia
	Panicum miliaceum		ICRISAT
	Setaria italica		ICRISAT
Oats		Global	PGR, Ottawa, Canada
			NGB, Lund, Sweden
Rice	*Oryza sativa—indica*		IRRI
	javonica		IRRI
	japonica		NIAR, Tsukuba, Japan
		African	IITA, Ibadan, Nigeria
		Mediterranean, temperate and intermediate forms from the USA	NSSL, Fort Collins, USA
	Wild species		IRRI
Rye		Global	Polish Genebank, Radzikow
		Global	NGB, Lund, Sweden
Sorghum		Global	NSSL, Fort Collins, USA
		Global	ICRISAT
Wheat	Cultivated species		VIR, Leningrad, USSR
		Global	CNR, Bari, Italy
		Global	NSSL, Fort Collins, USA
	Wild species (*Triticum* and *Aegilops*)		Plant Germplasm Institute, University of Kyoto, Japan
Food Legumes			
Chickpea		Global	ICRISAT
Faba bean		Global	CNR, Bari, Italy
Groundnut		Global	ICRISAT
		South American	INTA, Pergamino, Argentina
	Wild perennial species		CENARGEN, Brazil
Lupin		Global	ZIGuK, Gatersleben, German Democratic Republic
		European	INIA, Madrid, Spain

[1]Other base collections are being designated, particularly in developing parts of the world, but are not featured in the table due to protracted negotiations

Crop	Species covered	Geographical representation	Institute
Pea		Global	NGB, Lund, Sweden
		Mediterranean	CNR, Bari, Italy
		Central and East European	Polish Genebank, Radzikow
Phaseolus	Wild species		Faculté des Sciences Agronomiques de l'Etat, Gembloux, Belgium
	Cultivated species		CIAT
	Cultivated species		NSSL, Fort Collins, USA
		European	FAL, Braunschweig, Federal Republic of Germany
Pigeonpea		Global	ICRISAT
Soyabean		Global	NSSL, Fort Collins, USA
	Wild perennial		CSIRO, Canberra, Australia
Vigna	Wild species		Faculté des Sciences Agronomiques de l'Etat, Gembloux, Belgium
	Vigna radiata		IBP, Los Baños, Philippines
			AVRDC, Taiwan, China
	V. unguiculata	Global	IITA
	V. unguiculata		NSSL, Fort Collins, USA
Winged bean		Global	IBP, Los Baños, Philippines
		Global	TISTR, Bangkok, Thailand
Root Crops			
Cassava (seed)		Global	CIAT
Potato (seed)		Global	CIP
Sweet Potato (seed)		Global	NSSL, Fort Collins, USA
		Asian	AVRDC, Taiwan, China
		Global	NIAR, Tsukuba, Japan
Vegetables			
Allium		Global	NVRS, Wellesbourne, UK
			NSSL, Fort Collins, USA
		Global	RCA, Tápiószele, Hungary
		South and East European	NIAR, Tsukuba, Japan
		Asian	
Amaranthus		Global	NSSL, Fort Collins, USA
		Asian	NBPGR, New Delhi, India
Capsicum		Global	CATIE, Turrialba, Costa Rica
		Global	IVT, Wageningen, Netherlands
Cruciferae	*Brassica carinata*		FAL, Braunschweig, Federal Republic of Germany
	B. carinata		PGRC/E, Addis Ababa, Ethiopia
	B. oleracea		NVRS, Wellesbourne, UK
	B. oleracea		IVT, Wageningen, Netherlands
	Raphanus		NVRS, Wellesbourne, UK
	Wild species		Universidad Politécnica, Madrid
		Global	Spain
		Global	Tohoku University, Sendai, Japan
	Oilseeds and green manures:		
	B. campestris, B. juncea		PGR, Ottawa, Canada
	B. napus, Sinapis alba		FAL, Braunschweig, Federal Republic of Germany

Crop	Species covered	Geographical representation	Institute
	Vegetables and fodders.		
	B. campestris, B. juncea, B. napus		NVRS, Wellesbourne, UK
	B. napus		FAL, Braunschweig, Federal Republic of Germany
	All Cruciferae crops		NIAR, Tsukuba, Japan
Cucurbita	*Benincasa, Luffa, Momordica, Trichosanthes*		IPB, Los Baños, Philippines
	Cucumis, Citrullus		NSSL, Fort Collins, USA
	Cucumis, Citrullus		INIA, Madrid, Spain
	Cucurbita		NSSL, Fort Collins, USA
Eggplant		Global	IVT, Wageningen, Netherlands
		Global	NSSL, Fort Collins, USA
Okra		Global	NSSL, Fort Collins, USA
Tomato		Global	CATIE, Turrialba, Costa Rica
		Global	ZIGuK, Gatersleben, German Democratic Republic
		Global	NSSL, Fort Collins, USA
		Asian	IPB, Los Baños, Philippines
Southeast Asian Vegetables			IPB, Los Baños, Philippines
Industrial Crops			
Beet		Global	FAL, Braunschweig, Federal Republic of Germany
		Global	NGB, Lund, Sweden
		Mediterranean	Greek Gene Bank, Thessaloniki
Cotton		Mediterranean	Greek Gene Bank, Thessaloniki
Sugarcane (seed)			NSSL, Fort Collins, USA
Tobacco		Mediterranean	Greek Gene Bank, Thessaloniki
Forages			
Legumes:			
Centrosema		Global	CIAT
Desmodium		Global	CIAT
Stylosanthes		Global	CIAT
Leucaena		Global	NSSL, Fort Collins, USA
Lotononis		Global	ILCA
		Global	Seed Bank, RBG, Kew, UK
Neonotonia		African	ILCA
Zornia		Global	NSSL, Fort Collins, USA
Trifolium		African	ILCA
		Global	Seed Bank, RBG, Kew, UK
Grasses:			
Cynodon		Global	NSSL, Fort Collins, USA
Cenchrus		Global	Seed Bank, RBG, Kew, UK
			ILCA
Digitaria		Global	ILCA
Pennisetum		Global	NSSL, Fort Collins, USA
Paspalum		Global	NSSL, Fort Collins, USA
		Global	
Others			
Tree species		(Fuel and environmental stabilization in arid areas)	Seed Bank, RBG, Kew, UK

FIELD GENEBANKS

To date IBPGR has designated a number of active collections as field genebanks. This network is still only embryonic and will be expanded in the future along with the development of active seed genebanks (Table 16).

In 1985 the IBPGR-designated field genebank at Davao, Philippines, which maintains the Regional Southeast Asia Banana Collection, received additional IBPGR support. Material obtained from Indonesia was transferred from the post-quarantine station to Davao and the collection now maintains representative cultivar variability from Indonesia, Malaysia, Philippines and Thailand. The other IBPGR-designated field genebank for *Musa* spp. is located in the Institut de la Recherche Agronomique centres

IUCN/IBPGR Sahel project

in Ekona and Njombe in Cameroon, and these are largely conserving plantain cultivars.

For two major *Musa* collections (in Honduras and Jamaica) negotiations are pending with regard to the acceptance of the IBPGR-designation for maintaining field genebanks of bananas and plantains. In order to safeguard the collection of the Banana Board of Jamaica, IBPGR funds were provided, and during 1982-1985 the entire collection of 362 accessions was replanted and properly labelled. The IBPGR contribution was used to install appropriate irrigation equipment for the newly planted collection.

Table 15. The IBPGR network of field genebanks (Dec. 1985) (active collections for vegetative material)

Crop	Representation	Institute
Roots and Tubers		
Cassava	Global	CIAT
	Latin American	CENARGEN, Brazil*
	Central American	INIA, Mexico
	African	IITA*
Sweet Potato	Asian and Pacific	AVRDC, Taiwan, China
Fruits		
Banana	Global	Banana Board, Jamaica*
	Southeast Asian	PCARRD, Philippines
	African	Delegation Generale de la Recherche Scientific et Technique, Cameroon
Citrus	East Asian	Fruit Tree Research Station, Tsukuba, Japan
	Mediterranean	INIA, Valencia, Spain
	Mediterranean and African	IRFA, Corsica, France*
	Northern American	USDA**
	Latin American	CENARGEN, Brazil*
	South Asian	IIHR, India*
Industrial Crops		
Cocoa	Global	University of the West Indies, Trinidad and Tobago
	Global	CATIE, Costa Rica
Sugarcane	Global	Sugarcane Breeding Institute, Coimbatore, India*
	Global	USDA, Florida, USA
Perennial Species		
Allium	Short-day material	Hebrew University, of Jeruselum, Israel*
	Long-day material	Research Institute for Vegetable Growing and Breeding, Olomouc, Czechoslovakia
Groundnut	Wild perennials	CENARGEN, Brazil
Soyabean	Wild perennials	CSIRO, Australia

* Under discussion or awaiting formal agreement
** Location being agreed

SUPPORT FOR CONSERVATION FACILITIES

The IBPGR continued to provide funds in 1985 for assistance in the upgrading of existing genebanks. Funds were provided for improving the medium- and long-term seed storage facilities in the following:

Botswana (Sebele Research Centre)
Cuba (Academia de Ciencias de Cuba Habana Vieja)
Egypt (Field Crops Research Institute)
Fiji (Koronivia Research Station)
ILCA
Israel (Ben-Gurion University)
Peru (Instituto Nacional de Investigacion y Promoción Agropecuaria)
Kenya (National Plant Breeding Station)
Senegal (Institut Senegalais de Recherches Agricolesisra)
Zambia (Mount Makulu Research Station)
Zimbabwe (Crop Breeding Station, Harare)

Funds were also provided to AVRDC for the establishment of a post-entry quarantine screenhouse to allow the safe introduction and maintenance of sweet potato germplasm. Since 1981, IBPGR has developed strong links with AVRDC and has played a major catalytic role in the creation of its modern genebank facility. The construction of a germplasm centre, including a building and its equipment for short-, medium- and long-term storage in AVRDC was completed in 1985.

Other equipment such as freezers, seed drying units, air conditioners and/or seed testing equipment were supplied to:

Brazil (CENARGEN)
Burundi (IRAZ)
China (Jiangsu and Jilin Academies of Agricultural Sciences)
Ghana (Crops Research Institute)
Guatemala (Universidad de San Carlo)
Mauritania (Direction de la Recherche Agronomique)
Mauritius (Horticulture Department of Ministry of Agriculture)
Rwanda (Institut des Sciences Agronomiques du Rwanda)
Zaire (Institut National pour l'Etude et Recherche Agronomique)

Seed packaging equipment was provided to the following countries:

Bolivia (Centro de Investigaciones Fitotecnico)
Burundi (IRAZ and Institut des Sciences Agronomiques du Burundi)
China (BVRC; Guang-xi, Jiangsu and Jilin Academies of Agricultural Science)
Cyprus (Agricultural Research Institute)
Fiji (Koronivia Research Station)
Ghana (Crops Research Institute)
Guatemala (Universidad de San Carlo)
Iran (Seed and Plant Improvement Institute)
Madagascar (Centre National de la Recherche Applique au Developpement Rurale)
Morocco (Institut National de la Recherche Agronomique)
Nicaragua (Ministerio de Desarrollo Agropecuario y Reforma Agraria)
Zambia (Mount Makalu Research Station).

ADVISORY COMMITTEE ON SEED STORAGE

The IBPGR has been concerned that some genebanks have reported very high running costs in the operation of cold stores, and that some projected genebanks have had high capital costs. For these reasons, a Subcommittee of the Advisory Committee on Seed Storage met in 1985 and considered and reported on cost-effective measures for long-term seed storage with specific emphasis on the following: up-to-date estimates of costs of a basic genebank and ancillary facilities; use of nonconventional energy sources; back-up storage in permafrost; use of caves; application of physiological principles to seed drying and their hermetical storage at ambient temperatures.

From this study a report entitled *Cost-effective Long-term Seed Storage* was prepared and published in 1985. It is expected that this will be a major reference source. The following is a brief summary:

1. The Subcommittee recognized that there is a profligate waste of funds in the construction of many genebanks and that the routine running costs are often potentially too high for some developing countries. However, the "preferred" standards of storage conditions recommended by IBPGR for long-term storage of seeds for genetic conservation can be achieved without excessive capital or running costs, providing that the store is designed for the purpose.
2. For many collections—particularly those of small-seeded species—the most suitable and economic method is to dry the seeds, seal in hermetic containers and store in deep-freezers.

Lower cost storage (such as seeds stored without refrigeration) can also be achieved to acceptable standards for some species through careful attention by genebank personnel to recommended procedures for drying and sealing. Regeneration intervals may be shorter than when refrigeration is used, yet still be acceptable.

3. The merits of using various alternative energy sources were considered. It is clear that *in most circumstances the use of alternative energy sources is undesirable* for reasons of economy or reliability.
4. The location of genebanks in natural environments, such as in permafrost and caves or at high elevations was analyzed in depth. The number of suitable sites was thought to be very limited. The permafrost store used by the Nordic Gene Bank does provide a satisfactory alternative but the number of countries with ready access to permafrost is low and most if not all developing countries are, for geographical reasons, unable to exploit that possibility.
5. If liquid nitrogen storage of seeds proves to have no adverse effects, this method could be cost-effective. Results of investigations are awaited before recommendations can be made.

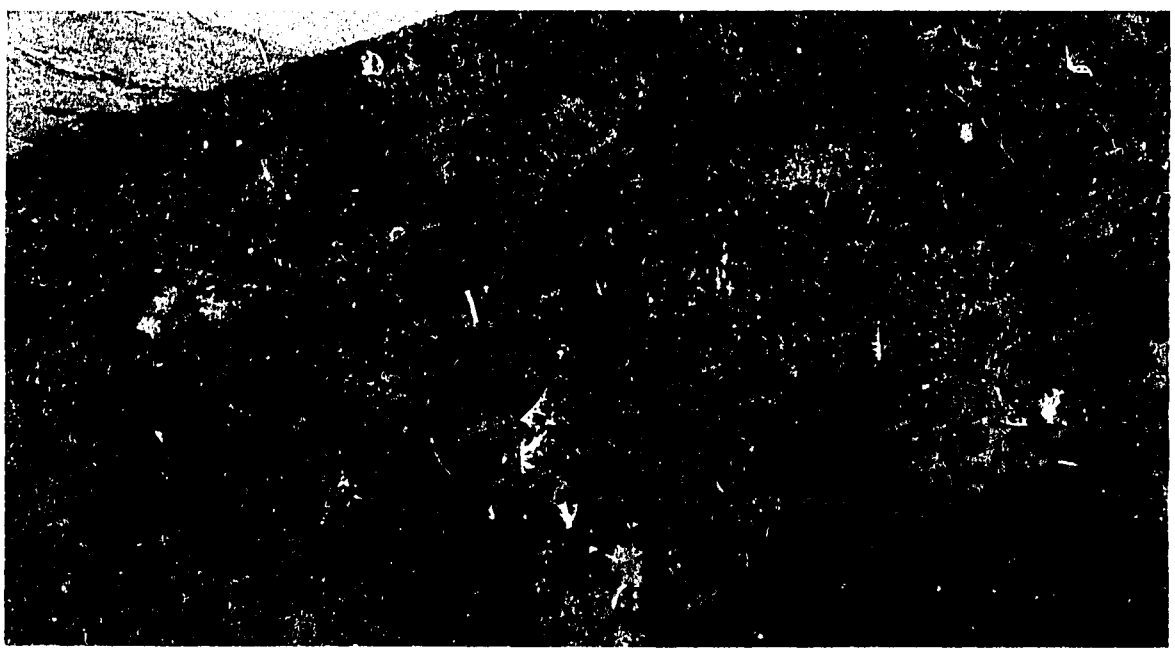
TECHNICAL ADVICE

In view of the wishes of many Governments or institutes conserving plant genetic resources, IBPGR continued to provide technical advice to genebanks. In 1985, IBPGR experts on seed conservation visited genebanks in Argentina, China, Republic of Korea, Philippines and Poland to assess conditions and to provide technical assistance. At the request of the respective Governments, experts also went to Iran to advise on construction aspects of the new genebank at the Seed and Plant Improvement Institute and to Algeria to advise on genebank design.

Technical advice is regularly provided to institutes through direct correspondence. During 1985 technical advice was given to Argentina (INTA), Belgium (National Botanical Garden), Burundi (IRAZ), China (Nanjing Agricultural University), France (Bureau des Ressources Génétiques), Fiji (Kononivia Research Station) and Tunisia (Institut National de la Recherche Scientifique et Technologique de Tunisie).

SEED PHYSIOLOGY RESEARCH

A joint IBPGR/University of Reading, UK project to quantify seed deterioration under known storage environments made substantial progress in 1985. The experimental work is now completed and a report will be prepared following analyses and interpretation of 11 000 germination tests. Results of earlier IBPGR research on seed physiology were published in 1985 as a two-volume *Handbook of Seed Tech-*



Over-grazed and protected forage areas (Iran)

nology for Genebanks. The first volume is subtitled *Principles and Methodology* and the second *Compendium of Specific Germination Information and Test Recommendations*. These bench-mark publications join the first handbook in the series, published in 1982, entitled *Design of Seed Storage Facilities for Genetic Conservation*. This set of handbooks is intended to serve as reference guides in genebank management and their distribution will generally be restricted to genebanks and libraries.

Early in 1985 IBPGR started a project on the storability of banana seeds. This project is carried out by the University Pertanian Malaysia, Serdang, Selangor, Malaysia. Wild banana seeds are considered as orthodox and storage experiments are now being carried out at varying levels of seed moisture content and at various storage temperatures. In addition experiments in cryogenic storage will also be made. The project is concentrating on the seed storage behaviour of *Musa acuminata* and *M. balbisiana*.

IN VITRO CONSERVATION

IBPGR's Advisory Committee on *In Vitro* Storage has served the Board in developing a conceptual framework for genetic conservation using *in vitro* techniques and in stimulating research on methodology and culture protocols for specific crops. In 1985 a Subcommittee met (members are listed in Appendix II) to discuss the design, planning and operation of *in vitro* genebanks. This was considered timely because few centres appreciate the scale of the undertaking implicit in establishment of such genebanks. The Subcommittee provided estimates of the manpower requirements and of other resources needed in order to establish and operate *in vitro* collections. A report on the Subcommittee's findings will be published in early 1986.

It is apparent that there are widespread misconceptions regarding *in vitro* genebanks. For instance, many culture collections already in existence, either for breeders' use—to maintain specific genotypes or to meet short-term needs—or for propagation or cleaning up from diseases, are often described as conservation collections when in fact they are not. IBPGR is concerned with the conservation of wide genetic diversity in particular crop genepools including related wild and weedy relatives, and with conservation for the long-term needs of breeders. Such conservation in many species which economically are vegetatively propagated can be attained through storage of seed. The fact that seed samples are often genetically heterogeneous does not conflict with the principles of germplasm conservation although it can conflict with breeders' immediate requirements.

The principles of base and active storage of tissues have been laid down by IBPGR, the latter using slow growth methods and the former under conditions of cryopreservation. As yet there are very few *in vitro* active genebanks (IVAG) and no *in vitro* base genebanks (IVBG) in existence and this situation will probably remain until the technology has been refined. Progress is dependent on the development of satisfactory freezing/thawing protocols. Nonetheless the relationships between them and the maintenance of materials in field genebanks can be anticipated as shown in Fig. 4.

The IVAG and the IVBG are linked through multiplication cycles which involve subculturing and monitoring for genetic stability. The whole scheme is inter-connected through characterization, evaluation and documentation.

The IBPGR Advisory Committee on *In Vitro* Storage has emphasized the need for stability in cultures because, as stated in a specialist report commissioned by IBPGR on this subject and published at the end of 1984 (*Genetic Variability in Tissue Culture: Impact on Germplasm Conservation and Utilization*), culture-induced mutants (somaclonal variants) are clearly undesirable in a conservation system. Nonetheless if wide genetic conservation is the aim, induced variation, if random, need not be a matter for great concern providing the procedures used do not unconsciously or by faulty routines select for this. Rearrangements of genes could be acceptable. This led the Subcommittee to consider the sample numbers and the subculturing regimes in IVAGs and it strongly recommended that original replicates of an accession should follow through the subculturing process as family lines and that subculturing should not be at random, as is the current practice in some *in vitro* collections. This enables monitoring for stability and prevents selective subculturing from vigorous cultures. The number of cultures, however, must remain relatively large until there are clear scientific data indicating genetic stability. The number of cultures would necessarily be much larger if the original sample was of a heterogeneous population rather than if it was a clone. In IVBGs the subculturing is reduced although numbers of cultures must accommodate the need to monitor 10% at intervals for stability either biochemically and/or through regeneration of plants.

The design of the IVAGs and IVBGs should be based on existing tissue culture facilities but additionally would require facilities for monitoring stability and for disease indexing. In addition facilities are required—associated field genebanks—for the growing and examination of regenerated plants. Staffing requirements will depend on the estimated numbers of samples and whether these are largely from clones or populations or both. The requirements are likely to be much higher than most centres

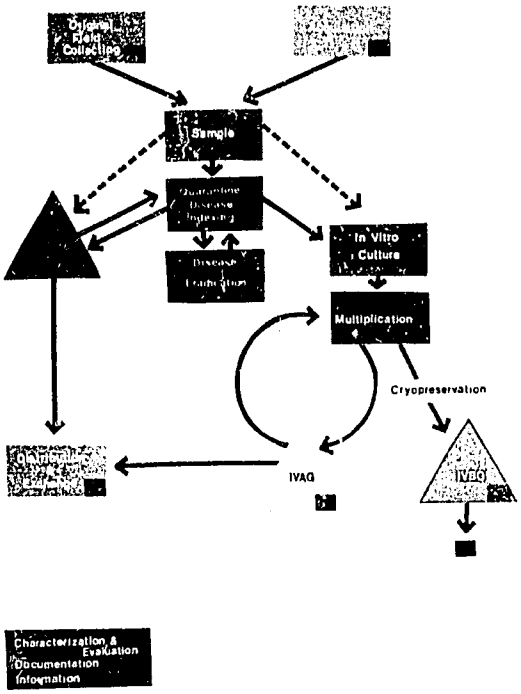


Fig. 4. Relationships between *in vitro* genebanks and the field genebank

at present realize. As a result IBPGR will, in 1986, establish a pilot IVAG to test the IBPGR design and cost estimates, and gather research data on the flow-through of cultures and on their stability.

A report on *The Potential Use of In Vitro Storage for Temperate Fruit Germplasm* was published in 1985. It was prepared by the Department of Horticulture, University of Saskatchewan, Saskatoon, Canada and includes information derived from visits to major laboratories in North America, Japan and western Europe.

CIAT is carrying out an IBPGR-supported programme for the transfer as *in vitro* cultures of cassava samples from national collections to the CIAT collection. CIAT has agreed to take responsibility for their characterization and evaluation and their availability for distribution. A summary of material transferred in the last 10 years was provided in Table 2 of the *Annual Report 1984*; during 1985 material was transferred from Paraguay (120 clones including seven wild species) and Peru (28 clones). Special IBPGR support has been provided to the Universidad Nacional Pedro Ruiz Gallo, Peru, for the transfer *in vitro* of cassava and sweet potato germplasm.

CIP now has a larger international responsibility with regard to sweet potato germplasm and IBPGR has developed links with CIP's activities. It is expected that such ties will become of increasing importance as IBPGR's international movement of germplasm will rely to a greater degree on tissue culture.

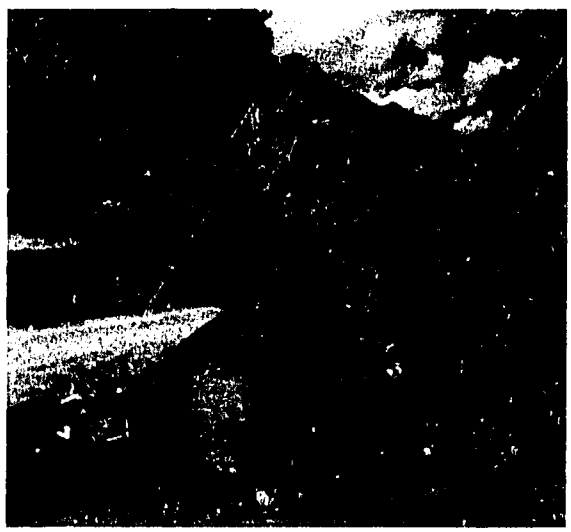
Late in 1985, the Board advertised for proposals from competent laboratories to undertake research on the genetic stability of *in vitro* cultures in storage under both slow growth and cyropreservation. It is expected that this research will utilize species with short generation times and known genetic markers.

IN VITRO RESEARCH

Over the past three years IBPGR has supported a number of projects in laboratories scattered throughout the world (Fig. 3). These have been designed to address a broad range of specific technical problems identified by the Advisory Committee on *In Vitro* Storage.

Two research reports provided information on specific aspects of *in vitro* work and these were finalized in 1985:

i) A review of the applicability of *in vitro* methods to the conservation of *Allium* germplasm was made by Dr. A. Altman and Dr. H.D. Rabinowitch of the Faculty of Agriculture, Hebrew University of Jerusalem at Rehovot, Israel. *In vitro* storage of *Allium* is



Allium stoliczki (Ladkh, Kashmir)

currently available only in four laboratories, specifically for garlic shoot tips and leek. Cryogenic storage has not been investigated so far. Only in garlic have virus-free stocks been established. Basic research is therefore needed before *in vitro* genebanks are feasible for *Allium* species and this should be in addition to, but linked with, techniques for rapid multiplication. The report *Actual Need and Possible Techniques for In Vitro Storage of the Allium Genepool*, will be considered by the IBPGR Advisory Committee on *In Vitro* Storage for comment and advice on follow-up action.

ii) The use of isozyme analysis in the characterization of materials has been studied by Dr. M. Simpson and Dr. L.A. Withers, University of Nottingham, UK. This report resulted from the insistence by the Committee that *in vitro* collections must be monitored for stability through successive subculturing regimes. The report also considers the usefulness and limitations of isozyme analysis for characterization of whole-plant accessions. The report will be printed early in 1986.

Examples of support to specific *in vitro* research are listed below, on a crop basis.

CASSAVA

The Plant Biotechnology Institute, Saskatoon, Canada, in association with CIAT, completed a project on the cyropreservation of cassava. Four methods of cryopreserving cassava meristems were investigated. The procedure which gave the greatest success had a freezing solution of 1% sorbitol, 9% sucrose and 5% DMSO in OMS liquid medium. More research is needed before a reliable technique can be recommended for routine cryopreservation. Although cassava shoot tips are very sensitive to the freezing and thawing process, freezing survival has been obtained and improvement in survival resulted from manipulation of the media. It is expected that more information on the physiological condition of the donor plants and the use of appropriate pretreatments will improve freezing survival, while the amount of callusing after freezing needs to be reduced.

CITRUS

IBPGR has supported a preliminary assessment of methods for the *in vitro* conservation of citrus germplasm by the Instituto Valenciano de Investigaciones Agrarias, Spain. The results indicate that, at present, conservation is possible using only slow growth techniques, while experiments on storage in liquid nitrogen have not been successful so far. Additional aims are the freeing of stocks of pathogens and the developments of methods for multiplication, and as storage—in the medium-term—for as wide a range of genotypes as possible. The project is now funded nationally and further IBPGR input is not required.

COCONUT

Since the collecting of coconut presents major practical problems, *in vitro* techniques may prove of value. Accordingly, IBPGR has not in recent years supported conventional field collecting until a suitable *in vitro* technique has been developed. It has finalized a research contract with Institut de Recherche pour les Huiles et Oléagineux (IRHO), France to develop an *in vitro* technique to collect zygotic embryos and to carry out associated work on the transfer and handling of embryos for the establishment of a coconut genebank. The project is carried out in France and the Côte d'Ivoire at the Coconut Research Centre, Port Boiret and the *in vitro* laboratory of the La Mé Oil Palm Research Centre, Bingerville. IRHO has already developed a technique for culturing zygotic embryos taken from ripe nuts and this is being tested on a wider range of genotypes.

MUSA

From 1982 to 1985, IBPGR has supported research at the Catholic University of Leuven, Belgium. This was combined with a training exercise and was concerned with banana meristem culture, and on slow growth storage and cryopreservation. Cultures responded very poorly to a range of freezing methods and protocols. The most promising may prove to be a droplet freezing method and whereas experiments attempting true cyropreservation did not yield positive results, reduced temperature storage, to as low as -20°C resulted in high survival.

The project produced a tissue culture technique for the rapid propagation and storage of a range of cultivars with genomes AAA, AAB and ABB, under minimal growth conditions and the results were published in 1985. The Advisory Committee on *In Vitro* storage, will discuss in 1986 the application of these

results and the early establishment of true IVAGs.

Another project on genetic variability in banana plants multiplied by means of *in vitro* techniques was continued at the Agricultural Research Organization, Division of Subtropical Horticulture, Volcani Center, Israel. Since off-types occur in plants propagated by *in vitro* methods opportunities exist to study the incidence of genetic changes and it is intended that morphological variants shall be compared with biochemically identifiable variants. After the identification of three types of mutants, experiments showed that these were explant-type dependent and not on media composition. Further investigations to develop a simple bioassay suitable for large scale analysis early in the *in vitro* propagation cycle will be based on DNA probes or protein analysis by electrophoresis.

COCOA

An IBPGR-funded project at the University of Nottingham, UK concluded in 1984. This project, however, raised a number of questions over the broad front of the project's objective—which was basically to develop sound propagation and conservation methodology—and these led to two developments which assisted IBPGR's work:

(i) The development of a novel *in vitro* collecting technique tested in collaboration with the London Cocoa Trade Amazon Project. This technique is expected to be applicable to a number of crops collected as vegetative material.

(ii) The characterization of genotypes by the use of isozymes. A project supported at University of Nottingham by the Ghana Cocoa Growers Alliance, enabled IBPGR to fund a scientist from Ghana and attach him to the Cocoa Research Unit in Trinidad to accelerate the description of the material in its collection.

SWEET POTATO

The IBPGR project at Clemson University, South Carolina, USA (in association with Dr. A. Jones, Chairman of IBPGR Working Group on Sweet Potato, and with USDA-supported work on disease indexing) developed a training manual on tissue culture techniques for slow growth in this crop. The manual was circulated to a small group of experts, particularly in CGIAR centres, for comment and will be published in 1986. The project was extended to start investigations on cyropreservation.

COLOCASIA AND *XANTHOSOMA*

An IBPGR project at Northeastern University, Boston, USA for biochemical characterization and the development of a culture technique applicable to a wide range of *Colocasia* genotypes, reported in the *Annual Report 1984*, terminated during the year.

The development of *in vitro* culture methods for a wide range of cultivars of *Colocasia, Xanthosoma brasiliense* and *X. sagittifolium* continued at the Agricultural University, Wageningen, Netherlands. This research included the development of *in vitro* culture methods for a wide range of *Xanthosoma* cultivars, the maintenance of aroids *in vitro* under minimal growth conditions and attempts to cryopreserve *X. brasiliense*. The first conclusions seem to suggest that maintenance under minimal growth conditions is possible (8-13.5 months under standard culture conditions and 17.5-21 months for *Colocasia esculenta* with culture temperature reduced to 9°C). So far none of the experiments on cryopreserving *X. brasiliense* have been successful.

IBPGR INTERNATIONAL COMPUTERIZED DATA BASE ON *IN VITRO* CONSERVATION

Since the *in vitro* data base was established (at the University of Nottingham, UK) nearly 200 searches have been carried out for individual scientists world-wide. By the end of 1985, research data had been entered from over 60 countries representing over 500 citations.

Data can be retrieved from a number of fields:

— Species name
— Name and address of scientist
— Accession number
— Comments on *in vitro* propagation
— Problems encountered
— Characterization of cultures
— Disease indexing
— Culture storage under normal or growth limiting conditions
— Culture storage by cyropreservation
— Exchange of cultures

In 1985 a literature data base was incorporated. This will include references on all areas of relevance but specifically from specialist searches and reports initiated by IBPGR. An article describing the purpose and capabilities of the data base was published in the FAO/IBPGR Plant Genetic Resources Newsletter 60. Additional information can be obtained from IBPGR Headquarters or from Dr. L.A. Withers, University of Nottingham.

IN SITU CONSERVATION

The IBPGR's priorities on *in situ* conservation were prepared by a task force in 1984 and IBPGR agreed to assist organizations on scientific surveys. In its advisory work on *in situ* conservation, IBPGR is guided by the following principles.

1. Protected areas offer major opportunities for the conservation of germplasm of wild plant populations.
2. The taxonomic identification, monitoring, sampling and protection of wild populations and their associated habitats can be an important component of broader conservation strategies and a valuable adjunct to *ex situ* collections.
3. The identification of additional protected areas should follow the completion of comprehensive field surveys of wild populations involving taxonomic studies and the collection of phenotypic, ecological and environmental data.
4. The surveying of selected populations within existing protected areas can lay the basis for effective *in situ* conservation management.

Recognizing the need to collaborate with other organizations active in this field IBPGR took part in an *Ad Hoc* Working Group on *In Situ* Conservation of Plant Genetic Resources together with FAO, IUCN, Man and Biosphere Programme of UNESCO, and UNEP. This group advised the Ecosystem Conservation Group, which coordinates the habitat protection programmes of the major international agencies. It sought to identify areas of cooperation and emphasized the need for efforts on the conservation of plant genetic resources and on their more effective integration into wider biological conservation.

In 1985, IBPGR initiated, participated in and/or supported a number of projects involving protected areas. A survey of wild mango in Kalimantan, Indonesia which is implemented by IUCN, continued to receive support from IBPGR. The ECP/GR, which is partially funded by UNDP, initiated a survey of the distribution of species of wild *Malus*, *Prunus* and *Allium* and of some forage species existing in protected areas in Europe. The project received technical assistance from the Conservation Monitoring Centre of IUCN and from MAB. An ecogeographical survey of wild plants with crop and forage potential in the Sahel was continued in Niger and extended into Mali. The field work was assisted by two IUCN field projects involved in overall biological conservation. Two large protected areas are involved: Parc National "W" in the south and in the Aïr Mountains in the north. In the latter, forages form a key element in efforts to control desertification and encourage sustainable development for local people, the majority of whom are nomadic.

The IBPGR also assisted in 1985 with a project being developed by the USDA/Oregon State University, Corvallis, USA and the Faculty of Agriculture at the University of Ankara, Turkey, for the ecogeographic surveying of wild relatives of wheat. Among the objectives are the identification of areas most important for *in situ* conservation, and the improvement of evaluation and utilization by drawing on ecological and cultivation data collected in the field.

CHARACTERIZATION AND EVALUATION

The description of accessions in collections is a prerequisite to their proper maintenance and their potential exploitation. While the acquisition of passport data essentially takes place during the collecting mission, the data on the characteristics of samples are obtained, or verified, after the accessions have entered the collection. IBPGR is continuously involved in supporting characterization and in 1985 numerous projects were either initiated or continued, especially those which led to characterization of materials collected with IBPGR support. At the same time multiplication was ensured so that adequate samples could be deposited in base collections.

Table 17 summarizes IBPGR projects in 1985. The data generated by these projects will enter the documentation systems and their dissemination can follow either in the form of listings, catalogues or magnetic media.

WORKSHOP

A Workshop on Problems and Prospects of Characterization and Preliminary Evaluation of Crop Genetic Resources was held on 27 November in Bangkok, Thailand, in conjunction with the Fifth SABRAO Congress. It was organized by an IBPGR Regional Coordinator and was attended by 73 participants from 14 countries and six IARCs. The Proceedings of the Workshop will be published by IBPGR in 1986.

UTILIZATION

Characterization data, along with passport data, enables genebank curators to obtain a better insight into the range of diversity of collections. Where utilization of the materials is considered, evaluation is necessary but this remains largely within the realm of plant breeding, which is outside the IBPGR mandate.

However, during 1984-85 IBPGR Staff were especially concerned to see that collected materials, in practice, are used. There is a consensus of opinion that genebanks are not being used very extensively by breeders and certainly not nearly as much as they could be in relation to their potential value.

(i) There is a low level of interest by breeders in the genebank collections as they are presently managed.

(ii) The use of genebanks is far higher when linked closely to major breeding programmes.

(iii) The newer, small, multi-crop collections which have been amassed in recent years (often in the form of a national genebank) have attracted very little interest from the international community of breeders.

(iv) There is, as expected, in developed countries a negative correlation of requests for samples with the importance of the crop.

(v) The bulk of requests are for improved materials; rarely do they relate to landraces and almost never to wild species.

Despite this grey area, utilization in breeding is the ultimate justification for crop genetic resources work. There is evidence that genebank material is finding its way into breeding programmes. At ICARDA, for example, breeders and researchers are making very active use of landraces and wild material in their cereal programmes. This is providing examples of tolerance to a number of stress conditions common in the region, leading to increased dry matter production. In wheat and barley breeding in many countries, genebank samples are widely screened for pest and disease resistance whilst a wide crossing programme at CIMMYT is introducing genes from more distant genera. In 1985 there were noteworthy programmes in Ethiopia on screening of barley in Egypt and at Yarmouk University, Jordan on barley and wheat. In recent years there has been an increasing use of collections, not only by IARCs but numerous national programmes.

An objective assessment of the contribution of genetic resources to breeding is difficult, but a review of recent *Annual Wheat Newsletters* suggests they are used in 10-15% of all crosses. Landraces may be used for a variety of reasons, but for wild material pest and disease resistances are most often sought. Simply inherited characters which can be easily

Table 17. Characterization projects which received IBPGR support in 1985

Institute/country	Project
INTA Pergamino Argentina	Multiplication and evaluation of maize collected in Argentina 1977-78
West Indies Central Sugar Cane Breeding Station Barbados	Characterization of sugarcane
IBTA Bolivia	Multiplication and characterization of Bolivian collection of *Cucurbita* collected 1972-1984
ISP Burkina Faso	Characterization of millet collection
AVRDC Taiwan, China	Characterization of world soyabean collection Characterization of mung bean collection Multiplication and characterization of Chinese cabbage
Nanjing Agricultural University China	Characterization of soyabean from southern China
Jilin Academy of Agricultural Sciences China	Characterization of soyabean from northern China
ICA Colombia	Characterization of *Cucurbita* Multiplication and characterization of local maize
CATIE Costa Rica	Characterization of *Capsicum*
ORSTOM Côte d'Ivoire	Characterization of okra
Université d'Abidjan Côte d'Ivoire	Characterization and preliminary evaluation of *Dioscorea*
INIAP Ecuador	Multiplication and characterization of *Amaranthus* and *Chenopodium quinoa* Multiplication and characterization of Andean roots and tubers
Horticultural Research Institute Egypt	Multiplication and characterization of vegetable germplasm
FAO	Characterization of fuelwood trees
Greek Gene Bank Greece	Multiplication and characterization of cotton germplasm Multiplication and characterization of *Capsicum*
Universidad de San Carlo Guatemala	Characterization of vegetables and root crops collected in Guatemala 1982-1984
ICRISAT	Characterization and preliminary evaluation of minor millets
University of Kashmir India	Characterization of wild species of *Allium* collected from Himalayan and sub-Himalayan regions
National Biological Institute Indonesia	Characterization and preliminary evaluation of *Desmodium*
Hebrew University of Jerusalem Israel	Characterization and preliminary evaluation of wild *Allium*
Fruit Tree Research Station Tsukuba Japan	Characterization and documentation of *Citrus* in East Asia
Yarmouk University Jordan	Characterization of *Triticum dicoccoides*, *Hordeum* and *Aegilops* collected in Jordan
University of Nairobi Kenya	Characterization and preliminary evaluation of rice collected in Kenya 1984

Institute/country	Project
Kenya Agriculture Research Institute Kenya	Characterization of cereals and legumes from East Africa
FOFIFA Madagascar	Characterization of rice and legumes collected 1984-1985
IITA	Multiplication and characterization of cowpea collection
Highlands Agricultural Experiment Station Papua New Guinea	Characterization of sweet potato collection
Universidad San Cristobal Peru	Characterization and preliminary evaluation of root crops and Andean roots and tubers
Universidad Nacional de Huanuco Peru	Multiplication and characterization of local of *Phaseolus*
UNA Peru	Multiplication and characterization of maize
Grand Ause Experimental Centre Seychelles	Characterization and preliminary evaluation of mango collection
Dodo Creek Research Station Solomon Islands	Characterization of Pacific root crops
Universidad Politéchnica Spain	Multiplication and characterization of wild *Brassica* collected in the Mediterranean
University of Peradeníya Sri Lanka	Characterization of yams and aroids
Swedish University of Agricultural Sciences Sweden	Multiplication and characterization of wild *Hordeum*
ICARDA	Characterization of the barley collection at ICARDA
Botany and Weed Science Division Thailand	Multiplication and characterization of sugarcane germplasm collected in Thailand since 1982
TISTR Thailand	Characterization of *Capsicum* collected in Thailand 1983-1985 Characterization of the winged bean collection
Chiang Mai University Thailand	Characterization and preliminary evaluation of eggplant collected in north and northeast Thailand Characterization and supplementary evaluation of sweet potato collected in Thailand 1981-1982
ORSTOM/DRA Togo	Multiplication and characterization of sorghum, millet, rice, maize and legumes
DRA Togo	Characterization and preliminary evaluation of African eggplant
University of Birmingham UK	Multiplication and characterization of African eggplant germplasm collected 1980-1983
University of California (Davis) USA	Characterization of durum wheat Multiplication and characterization of lupin
University of Illinois USA	Characterization of millet germplasm
Texas A & M University USA	Characterization and preliminary evaluation of *Arachis* collected in South America 1976-1983
University of the West Indies	Characterization of cocoa

Institute/country	Project
University of 'Svetozar Markovic' Yugoslavia	Characterization of hexaploid species of *Prunus* collected in Yugoslavia
DRSS Zimbabwe	Characterization of sorghum and millets

screened are the most likely to be used.

Associated with analyses of passport and characterization data are specific studies on diversity. IBPGR-supported research during 1985 was conducted on the following:

(i) Cytology, taxonomy and characterization of wild oat samples from the Mediterranean (in association with WPBS, UK and Plant Breeding Institute, Sweden);

(ii) Cytology and variation patterns of *Ipomoea* species (in association with Florida Atlanta University, USA);

(iii) Cytology and variation patterns of wild *Pennisetum* collected in Niger (in association with USDA, Coastal Plain Experiment Station, Georgia, USA)

(iv) Distribution patterns of wild *Mangifera* species (carried out by an IPBGR consultant) and associated with field work

(v) Distribution and patterns of variation of *Abelmoschus* species (in association with ORSTOM, Côte d'Ivoire and the Agricultural University, Wageningen, Netherlands);

(vi) Distribution patterns of the wild *Brassica* genepool in the Mediterranean (in association with the Universidad Politécnica, Spain and Swedish University of Agricultural Sciences, Sweden;

(vii) Taxonomy, cytology and variation patterns of the *Arachis* genepool (in association with Texas A & M University, USA; CENARGEN, Brazil and the Instituto de Botanica del Nordeste, Corrientes, Argentina);

(viii) Taxonomy, distribution and variation patterns of wild perennial *Glycine* species (in association with CSIRO Division of Plant Industry, Canberra, Australia)

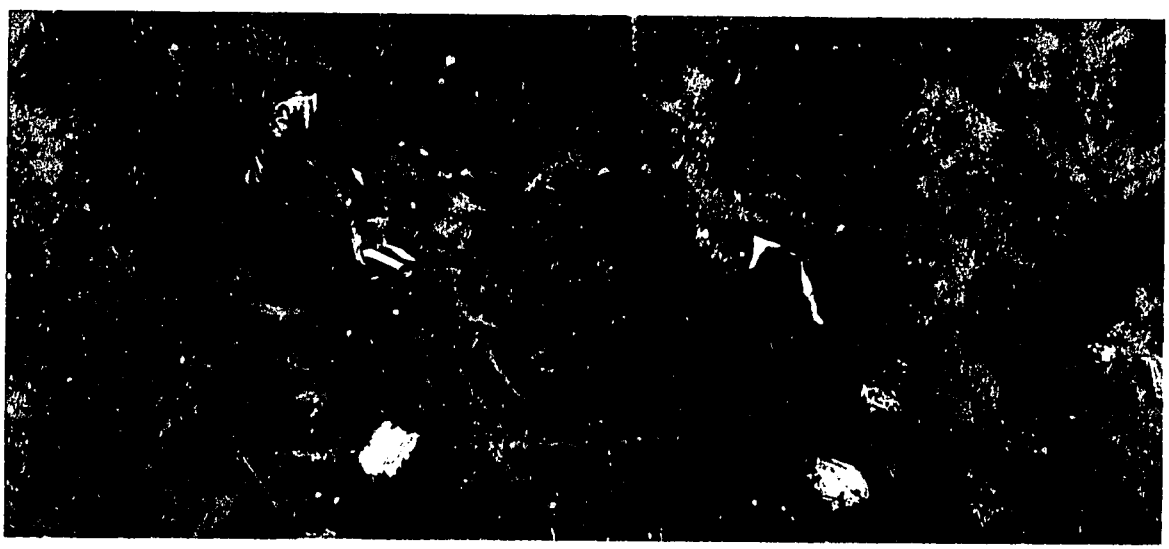
(ix) Taxonomy of wild *Capsicum* species (in association with CENARGEN, Brazil)

(x) Taxonomy and variation patterns of wild and cultivated African *Solanum* species (in association with University of Birmingham, UK; DRA, Togo; Université de Côte d'Ivoire and Plant Introduction Station, Ghana.

(xi) Variation patterns of wild *Phaseolus* species (IBPGR Intern located at CIAT, Colombia)

(xii) Distribution patterns of *Cucumis* species (IBPGR)

IBPGR has initiated a new series of publications which deal with research results on diversity and the first dealing with wild mango species was published in 1985.



Regeneration of *Allium* (University of Kashmir)

DOCUMENTATION AND DATA MANAGEMENT

An effective documentation system is essential to the conservation, evaluation and also to the utilization of plant genetic resources. The complexity of tasks which variously obtain, register, process and retrieve the data as well as meeting the many expectations and requirements of users have led IBPGR to build up a multidimensional programme with the following major components:

(i) Development and promotion of use of standardized data formats (crop descriptor lists);
(ii) Dissemination of summarized information on crop germplasm collections (directories of germplasm collections);
(iii) Provision of training in germplasm documentation in general and data management techniques in particular;
(iv) Assistance to genebanks in the establishment of documentation systems, especially computerized ones;
(v) Development of centralized data bases dedicated to either specific genetic resources activities, such as collecting, seed storage, *in vitro* work, etc. or to documentation of data on a single crop or group of crops.

The above programme components have different impacts on the documentation work within the network of centres and summaries of the major activities in 1985 are provided below.

The ultimate objective of the documentation programme is the ready availability of data on existing collections, ongoing activities in conservation, characterization, regeneration and evaluation of samples and the flow of material between genebanks and from genebanks to breeders and research workers. In this context, the rapid exchange of information is a key factor in the global network and in strengthening cooperation between genetic resources centres.

The sheer magnitude of information dealt with by IBPGR Staff in implementing the Board's programme means that the use of electronic data processing facilities is essential for speedy processing. As reported in previous Annual Reports a Wang Office Information System (OIS), installed in 1983, is used primarily for handling internal data bases (germplasm collected by IBPGR sponsored missions, mailing lists, etc.) and for facilitating preparation of most documents. In 1985, the OIS software was further upgraded and now handles documents in languages other than English. In addition, as a follow-up to the recommendation of the External Management Review of IBPGR, a computerized accounting system was developed on a Wang PC microcomputer in order to facilitate the management of projects.

Following changes in the structure and functions of IBPGR Staff made in response to the recommendations of the External Review and modifications of the field programme, it became apparent that IBPGR field offices will require computing facilities to strengthen their operational capabilities and to link with Headquarters. The installation of suitable hardware and software will take place [illegible]. The IBPGR will also enter fully the CGIAR's electronic mail system (CGNET) and whenever feasible IBPGR field offices will be linked to this network.

Wheat characterization (Karadj, Iran)

CROP DESCRIPTOR LISTS

The production and publication of internationally agreed crop descriptor lists has continued to receive high priority. They are essential to the systematic and compatible description of accessions in collections and have been widely distributed in the global network. The experience gained during characterization and evaluation of germplasm in numerous IBPGR sponsored projects, as well as comments reported to the IBPGR Staff by curators and scientists involved in genetic resources work, call for revision of some descriptor lists, especially those developed in the early years of IBPGR. In 1982 IBPGR adopted a standard format for descriptor lists and all earlier lists are being transformed to it.

During 1985 the following descriptor lists were published:

- Almond (revision of 1980 list)
- Apricot (revision of 1979 list)[1]
- Cherry[1]
- Chickpea[2,3]
- Cotton (revision of 1980 list)
- Faba bean[2]
- Finger millet[3]
- Forage grass[1]
- Forage legumes[1]
- Groundnut (revision of 1980 list)
- Lentil[2]
- Oat
- *Panicum miliaceum* and *P. sumatrense*
- Peach[1]
- *Phaseolus acutifolius*[4]
- Plum[1]
- Rye and triticale
- *Setaria italica* and *S. pumila*
- Sunflower
- *Vigna aconitifolia* and *V. trilobata*
- *Vigna mungo* and *V. radiata* (revised list of 1980 for mung bean)
- Wheat (revision of 1981 list)

Lists for bambara groundnut (joint IITA/GTZ/IBPGR), cashew, *Citrus*, *Colocasia* (revised), eggplant, maize (revised), mango, papaya, potato (joint CEC/IBPGR), sesame (revised), sweet potato (revised), *Vigna umbellata* and *V. angularis* and yam (revised) were at different stages of preparation and they will be published in 1986.

The data in documentation systems of many genebanks are organized according to the IBPGR descriptor schemes but it is recognized that a significant number of germplasm centres use non-compatible descriptors. This may adversely affect exchange of information; as a result in 1985 a study was initiated to compare existing descriptor lists and to explore the possibility of developing conversion routines. Initially, barley descriptor lists of IBPGR, COMECON, UPOV and USDA are being dealt with by the IBPGR Information Liaison Office at BARC, USA and a relevant descriptor data base is being developed. Expansion of this project to cover descriptors for other major crops will be subject to appraisal of the success of the pilot study for barley.

[1] In cooperation with CEC
[2] In cooperation with ICARDA
[3] In cooperation with ICRISAT
[4] In cooperation with CIAT

DIRECTORIES OF GERMPLASM COLLECTIONS

The first level of the IBPGR information service to users of genetic resources consists of the compilation and publication as directories of summary information on the contents of major collections. The directories are organized on a crop basis and provide essential information on the numbers of samples of each species, the geographical representation of the collection, methods of maintenance of samples, quarantine regulations governing the movement of material, characterization and evaluation activities, and the documentation system in use.

The IBPGR has been developing directories since 1979-80 and those already published are:

- Wheat
- Maize
- Rice
- Sorghum and millets
- Barley
- Food legumes
- Root crops
- Vegetables
- Tropical and subtropical fruits and tree nuts
- Forages
- Industrial crops

The extremely positive reception of these publications by the germplasm community encouraged IBPGR to continue work on new directories and to up-date existing ones. More attention was paid in 1985 to standardization of format and all revisions in the future will follow it. New and revised directories using the new format were under preparation in 1985 and consist of the following:

- Industrial crops (beet, coffee, cotton, oil palm and rubber)
- Root crops (aroids, cassava, potato, sweet potato, yam)

Temperate fruits and tree nuts
Food legumes (except soyabean)
Soyabean (prepared by INTSOY)

Directories are kept under continuous review and the computerization of records at IBPGR facilitates the updating as new information becomes available.

ASSISTANCE WITH HARDWARE/ SOFTWARE

The provision of advice and assistance to genebanks in computerization of data continued to receive high priority in 1985. In order to further documentation of germplasm and to enhance ready availability of data throughout the network, IBPGR assistance was channeled both to centres which have had no computing facilities hitherto and to genebanks which had reported constraints with existing systems. The provision of computing facilities included hardware, software and, when necessary, the training of staff specifically working on documentation.

The following centres were assisted in the establishment of new systems:

— Research Institute of Plant Production, Prague-Ruzyne, Czechoslovakia
— ICA, Colombia
— INIAP, Ecuador
— Dodo Creek Station, Solomon Islands
— WARDA

The advances in computer technology (including software) and the growing demands on computer resources for data bases often merit IBPGR assistance in the upgrading of documentation systems. In this respect, IBPGR held a meeting at IIPGR, Sadovo, Bulgaria attended by eight documentation specialists from six European genebanks (in Bulgaria, Czechoslovakia, Cyprus, Greece, Poland and Portugal) which had received the same type of microcomputer from IBPGR in 1981-84. During the meeting, up-to-date software packages for handling data bases, statistical processing of the data and transfer of data between computers were demonstrated and a course on their installation and use was given.

Further assistance was also provided to the following centres:

a) Pakistan Agricultural Research Council, Pakistan—to overcome technical difficulties in the operation of an IPBGR-donated microcomputer and to help start-up the documentation of germplasm;
b) Zentralinstitut für Genetik und Kulturpflanzenforschung (ZIGuK), German Democratic Republic—lending of a more powerful microcomputer to speed-up the establishment of a European barley data base (to which Plant Genetic Resources Center (Ethiopia) and ICARDA will be linked);
c) Plant Breeding and Acclimatization Institute (IHAR), Poland—provision of additional internal memory to increase throughput of the information system;
d) Laboratorio de Agrostologia, Facultad de Agronomia, Montevideo, Uruguay—provision of a modern data base management package for a microcomputer; and
e) Instituto Nacional de Tecnologia Agropecuaria (INTA), Argentina—provision of modern data base management package for a microcomputer.

Weedy sorghum (Burundi)

In 1985, a final catalogue of the Peruvian maize germplasm collection was completed by the Universidad Nacional Agronomia, La Molina, Peru. It is the seventh in a series of catalogues printed by the South American Cooperative Maize Programme and supported by IBPGR. The catalogues provide both passport and evaluation data for maize germplasm collected in South America with IBPGR sup-

port. Previous catalogues have dealt with material from Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay.

Further progress has been made on documenting both cultivated and wild *Arachis* germplasm collected during 17 IBPGR field missions in South America 1976-83. This project, coordinated on behalf of IBPGR by Texas A & M University, USA has resulted in the preparation of a second catalogue which provides essential characterization data obtained according to the IBPGR descriptor list.

A catalogue due for publication in 1986 relates to sorghum, pearl millet and finger millet germplasm collected in Zimbabwe in 1982. This joint IBPGR and Department of Research and Specialist Services, Harare, Zimbabwe publication will contain passport and evaluation data gathered from experiments conducted at the Variety Testing Centre, Gwebi, Zimbabwe in collaboration with the ICRISAT/South African Development Coordination Conferences Sorghum and Millet Improvement Programme. FAO and IBPGR provided a sabbatical to an Indian scientist from ICRISAT to carry out the work.

An IBPGR project for the analysis of collections of apple genetic resources carried out by the European Association for Research on Plant Breeding (EUCARPIA) fruit section has resulted in the production of a *European Apple Inventory*, which provides preliminary listings from 10 countries.

Since 1982 IBPGR has encouraged and supported the establishment of central data bases for specific crops in a number of centres with appropriate expertise. Although no new central data bases were initiated in 1985, significant progress was made in the implementation of many ongoing projects. In particular, the data bases of the ECP/GR Special Project reached the stage where the assessment of germplasm conservation in Europe can begin, after which more precise guidelines for the further development of centralized data banks can be drawn. These issues are being guided by Working Groups of the ECP/GR.

Okra characterization (Zimbabwe)

Work continued on a *Phaseolus vulgaris* data base located at Gembloux, Belgium. This IBPGR project has as its objective the analysis of data accumulated in a central data base in order to demonstrate the potential of such a centralized data bank to users. In this connection, various statistical methods have been tested on data provided from major germplasm collections.

An IBPGR soyabean data base project, carried out by INTSOY, USA on the other hand, is directed initially towards reviewing inventory lists obtained from major soyabean germplasm collections. The first result, as mentioned above, has been the production of a soyabean directory.

The experience gained to date has revealed several constraints concerning both the establishment of crop data bases and their further operation:

(i) Slow provision of data from genebanks and hence slow input into the data base;
(ii) Slow integration of received information into a single system due to the need to transform source data to fit the adopted descriptor system, and the coding and registration of data received on non-magnetic media; and
(iii) Need for continuing adjustment of data base design to achieve satisfactory performance of the system.

The establishment of centralized data banks is therefore a time consuming process and it is essential that long-term commitments to operate and maintain the data bases are obtained from the host centres.

OTHER DATA BASES

There is much information pertinent to different aspects of genetic resources work available from reports, scientific papers, theses and personal communications. If this information is not organized in a systematic way, the risk of overlooking important findings and of consequent duplication of effort is high. The areas of specific importance for IBPGR's programme are collecting, conservation (including *in vitro* techniques), ecogeographical studies and distribution of species. Therefore, several computerized 'subject' information bases have been developing since 1982: data bases on germplasm collected during missions organized or sponsored by IBPGR; seed storage facilities and the standards used in the network; wild relatives of cultivated plants; and ongoing *in vitro* research pertinent to plant genetic conservation (outlined in the *Annual Reports 1983* and *1984*). Updating and further enhancements of systems (e.g. changes in structure of files, upgrading of software, etc.) took place in 1985.

Table 18. IBPGR Crop Data Bases

Crop:	Barley
Institute:	ZIGuK (Gatersleben, German Democratic Republic)
Year initiated:	1983
Funding:	Special Project
Scope:	Europe (but collection is wider in contents)
Current status:	90% of European collections provided the passport data. In addition, Ethiopian material is included. Identification of duplicates was initiated.
Crop:	Maize
Institute:	Latin American Cooperative Programme
Year initiated:	1980
Funding:	Core
Scope:	Latin America
Current status:	Complete inventories (passport and evaluation data) of germplasm in Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay produced and published. Data from the first five countries computerized at INTA Pergamino, Argentina. Brazil and Peru maintain their own data bases.
Crop:	Oat
Institute:	BGRC, Braunschweig, Federal Republic of Germany
Year initiated:	1984
Funding:	Special Project
Scope:	Europe (but collection is wider in contents)
Current status:	50% of European collections covered. Acquisition of further data in progress.

Crop:	Rye
Institute:	IHAR, Radzikow, Poland
Year initiated:	1982
Funding:	Special Project
Scope:	Europe (but collection is wider in contents)
Current status.	Completed for passport data. Putative duplicates identified and European inventory published.
Crop:	*Phaseolus*
Institute:	Faculté des Sciences Agronomiques de l'Etat, Gembloux, Belgium
Year initiated:	1983
Funding:	Core
Scope:	Global
Current status:	17 collections (all major such as at CIAT; USDA, Pullman, USA; University of Cambridge, UK) included; in total there are 4900 accessions. Covers both passport and evaluation descriptors but the rate of missing data is high. Work concentrated on analysis of characterization/evaluation data accumulated in the data base in order to demonstrate the potential of such a centralized data bank to breeders.
Crop:	Groundnut
Institute:	Texas A & M University, USA
Year initiated:	1983
Funding:	Core
Scope:	South America
Current status:	Covers the germplasm material collected in South America during 1976-1983. Accessions are well documented for passport (catalogue published) and characterization descriptors (catalogue in preparation).
Crop:	Soyabean
Institute:	INTSOY, USA
Year initiated:	1982
Funding:	Core
Scope:	Global
Current status:	Project in the stage of obtaining inventories of collections. Verification of cultivar lists from several collections in progress. Directory of collections produced and will be published in 1986.
Crop:	Sunflower (wild species)
Institute:	Institute of Food and Vegetable Crops, Novi Sad, Yugoslavia
Year initiated:	1984
Funding:	Special Project
Scope:	Europe (potentially global)
Current status:	Collation of passport data is nearly completed. Collaboration established with USDA/ARS; VIR USSR; Fundulea, Romania. Work is in progress.
Crop:	Sunflower (cultivated)
Institute:	CRI, Hungary
Year initiated:	1984
Funding:	Special Project
Scope:	Europe (but collection is wider in contents)
Current status:	Collation of passport data is nearly completed.
Crop:	Citrus
Institute:	Fruit Tree Research Station, Tsukuba, Japan
Year initiated:	1983
Funding:	Core
Scope:	East Asia
Current status:	East Asian inventory of genetic resources of *Citrus* spp. and related genera/species is a component of a five-year project which also includes collection and characterization of material. Emphasis so far has been given to collecting and data base development is expected to start 1986.

Crop:	Apple
Institute:	EUCARPIA (Fruit Section). Data are computerized at East Malling Research Station, UK.
Year initiated:	1982
Funding:	Core
Scope:	Global
Current status:	Data base has been partly completed for Europe and 10-volume catalogue published.

Crop:	*Prunus*
Institute:	Nordic Gene Bank, Sweden
Year initiated:	1983
Funding:	Special Project
Scope:	Europe (but collection is wider in contents)
Current status:	Work nearly completed for passport data (9000 accessions). Crops covered are almond, apricot, cherry, plum and peach. Basic characterization data are being compiled.

Crop:	Eggplant (African species)
Institute:	University of Birmingham, UK
Year initiated:	1984
Funding:	Core
Scope:	Africa
Current status:	Apart from passport data, the results of characterization work conducted in Burkina Faso, Ghana, Nigeria, Togo and UK are being recorded.

Crop:	Okra
Institute:	ORSTOM, Côte d'Ivoire
Year initiated:	1983
Funding:	Core
Scope:	Global
Current status:	Completed for passport and characterization data of ORSTOM's collection (global collection designated by IBPGR).

Crop:	Forages
Institute:	RCA, Hungary (*Bromus*) IHAR, Poland (*Dactylis*) IHAR, Poland (*Festuca*) CNR, Bari, Italy (annual *Lolium*) WPBS, UK (*Lolium multiflorum*, L. *perenne*) INIA Badajoz, Spain (annual *Medicago*) INRA, France (perennial *Medicago*) BGRC, (*Poa*) Federal Republic of Germany NGB, Sweden (*Phleum*) Station Fédérale de Recherches de Changins, Switzerland (*Trifolium pratense*) WPBS, UK (*Trifolium repens*)
Year initiated:	1984
Funding:	Special Project
Scope:	Europe
Current status:	Data bases are nearly completed for selected passport descriptors. Preliminary catalogues prepared. Work continues on collation of additional passport data (related to ecology of collection sites) and selected management descriptors concerning regeneration.

SPECIAL PROJECTS

In 1985 IBPGR operated two Special Projects which involved specifically-directed funding. The two projects have widely varying goals. The first consists of a series of collecting missions in Nepal and is reported upon in the section of this annual report dealing with germplasm acquisition. The second is a Europe-wide programme for six crops or groups of crops, described below.

EUROPEAN COOPERATIVE PROGRAMME FOR THE CONSERVATION AND EXCHANGE OF CROP GENETIC RESOURCES (ECP/GR)

The continued operation of the ECP/GR by IBGPR appears at first sight to be at variance with the declared policy of moving away from a regional approach in the organization of its work. However, two points should be borne in mind. IBPGR was asked in 1983 to take over the running of this project by UNDP and the member countries until its completion, and functionally it operates as six independent crop Working Groups with IBPGR playing a central coordinating role.

The first meetings of each of the six Working Groups (for *Allium*, barley, forages, oats, *Prunus*, and sunflower) of Phase II of the project had been held in 1983 and 1984. Each of the Working Groups had agreed upon a set of objectives, especially for registration of passport data in European data bases, which had to be fulfilled before the end of Phase II in 1986.

Advances made in implementing the programmes of the Working Group for *Prunus* and forages were such that, a second meeting of each was convened in 1985 to review progress and make proposals for activities in Phase III. The Forages Working Group met 8-10 October at Carlow, Ireland and the *Prunus* Working Group on 22-24 October in Florence, Italy. Additionally, a special workshop on barley was held 19-20 November in Gatersleben, German Democratic Republic to advise on practical work which is ongoing. Work continued in 1985 on the programmes defined by the Working Groups for *Allium*, barley, oats and sunflower and these will meet again in the first half of 1986.

BARLEY

A data base at ZIGuK, German Democratic Republic, of accessions held in European collections became fully operational in June, following the IBPGR loan of more powerful computer facilities. By November, 19 767 accessions from collections located in 22 different European countries were included in the European Barley List. Of these accessions, 22 952 are "cultivars" (including collected populations, selected lines from landrace populations, etc). Among the 22 952 "cultivars", 11 561 have been shown to exist as replicates in 2681 different replicate groups each containing 2 or more accessions. Data contained in the European Barley List were circulated to collaborating collections by the data base in 1985, for correction and comment and a first edition will be available by spring 1986 in the form of magnetic tapes.

A survey of the information needs of barley breeders was made by questionnaire and was sent to more than 150 European barley breeders in July. Results of this survey were presented to a Workshop on Barley convened at the data base on 19-20 November. From the replies received, the Workshop was able to assign priorities to descriptors which will be used in the registration of additional data in the data base.

PRUNUS

A first edition of the list of *Prunus* accessions held in European collections (almond, apricot, peach, plum, hybrids, rootstocks and related wild species) was prepared by the European *Prunus* data base (at the Nordic Gene Bank) in September. It contains 7147 accessions from 46 collections in 20 countries and on the basis of cultivar names, 1148 possible duplicates (16% of the total) have been identified. The first edition of the European cherry list, con-

sisting of 2300 accessions from 54 collections, was published by the Plant Breeding and Acclimatization Institute, Poland. This list will be later combined with the European *Prunus* list.

France, Italy, Romania, Spain and Turkey organized collecting missions in 1985 according to recommendations made at the first meeting of the Working Group for urgent collecting needs.

The second meeting of the *Prunus* Working Group met at the Istituto di Coltivazione Arboree, Florence, Italy 22-24 October. The key role played by Crop Coordinators, which had been established at the first meeting of the Working Group, for registration of data in each participating country was reemphasized. It was also agreed that the nomination of a fruit germplasm liaison officer on a country basis was of primary importance.

Table 19. Member countries of the ECP/GR (Phase II)

Austria	Ireland
Belgium	Iceland
Bulgaria	Israel
Cyprus	Italy
Czechoslovakia	Netherlands
Denmark	Norway
Finland	Poland
France	Portugal
German Democratic	Spain
Republic	Sweden
Germany, Federal	Switzerland
Republic	Turkey
Greece	United Kingdom
Hungary	Yugoslavia

FORAGES

All European forage data bases were able to produce drafts of European forage lists for *Bromus, Dactylis, Festuca*, annual *Lolium*, perennial *Lolium*, annual *Medicago*, perennial *Medicago, Phalaris* spp., *Phleum* spp., *Poa* spp., *Trifolium repens, T. pratense, T. subterraneum* and *Vicia* spp. by September. Attempts were made to identify duplicates.

Belgium, Greece (funded by IBPGR), Netherlands, the Nordic countries and the UK have organized collecting missions in 1985 to rescue specific forage species in danger of genetic erosion, as recommended at the first meeting of the Working Group. IBPGR also supported forage collecting missions for *Vicia* spp. in Portugal and for *Trifolium alexandrinum* and *T. subterraneum* in Israel, Greece and Egypt.

The second meeting of the Forages Working Group met in Oak Park Research Centre, Carlow, Ireland, 22-24 October. It was proposed that the Biology Department of the University of Southampton, UK and the Université de Pau, France, act together as a European *Lathyrus* data base, and that the Hebrew University of Jerusalem be a European data base for *Trifolium alexandrinum, T. resupinatum* and wild related taxa and that the Istituto del Germoplasma, Bari, Italy add *Hedysarum* spp. to the species for which it is responsible.

The Working Group also proposed additional projects, which should contribute to enhanced use of genetic resources, e.g. preparation of a status report for a certain number of species based essentially on information accumulated in data bases. It was also stressed that urgent collecting should continue and the importance of regeneration of collections should be recognized. The latter is anticipated to be a formidable task for the national programmes over the next few years.

ALLIUM

A draft list of *Allium* germplasm held in European genebanks was completed towards the end of 1985. The data base, the National Vegetable Research Station, Wellesbourne, UK, with assistance from the Research Centre for Agrobotany, Tápiózele, Hungary, is responsible for the final processing of data. The draft *Allium* European List will be presented at the second meeting of the ECP/GR *Allium* Working Group, which will be held in the Research Institute for Vegetable Growing and Breeding, Olomouc, Czechoslovakia, in January 1986.

Hungary, the Nordic Countries, Poland and Turkey have organized *Allium* collecting missions as recommended at the first meeting of the *Allium* Working Group in 1984.

A survey on the information needs of *Allium* breeders from national and international data bases was made in 1985. Results will help the Working Group define a long-term strategy for registration of data into genebanks and the European *Allium* data base, which will better address users' needs.

SUNFLOWER

The European data bases for cultivated and wild sunflower (respectively at the Cereal Research Institute, Szeged, Hungary and at the Institute for Field and Vegetable Crops, Novi Sad, Yugoslavia) pro-

vided draft European lists by October, which after verification will be published by 1986.

A descriptor list, which had been agreed in draft form by the Sunflower Working Group, was circulated for comment and finalized in 1985 and published by IBPGR.

OAT

The oat data base at the Institute für Pflanzenbau und Pflanzenzuchtung, Braunschweig, Federal Republic of Germany undertook circulation of a draft European list in October and an updated first edition will be published in the beginning of 1986.

A draft descriptor list, prepared at the first meeting of the Working Group, had been circulated widely among oat experts for comment. It was revised in the light of these comments and was published in December by IBPGR.

Following recommendations of the Working Group, IPBGR organized collecting of *Avena prostrata*, *A. maroccana*, *A. murphyi* and *A. canariensis* in Canary Islands, southern Spain and in Morocco in May-June. More than 150 populations were collected, from which four new morphological types were identified. Characterization and identification of the collected material is being carried out by WPBS, UK while the Plant Breeding Institute, Sweden has undertaken evaluation of grain protein contents.

FUTURE OF THE PROJECT

Phase II of the Project is due to end in June 1986, although UNDP is expected to agree to extension at no extra cost to the end of the year. A Technical Consultative Committee (members are listed in Appendix IV) met in Reykjavik, Iceland in December 1985 to review progress in the six crops or group of crops and to define proposals to be submitted to participating countries for the implementation of a Phase III, which is to be funded wholly by the countries and operated under IBPGR auspices.

In accordance with the requirements of UNDP, a panel was nominated from among members of the Technical Consultative Committee to evaluate the work of Phase II in relation to the aims and objectives set out in the project document. The report of this evaluation panel expressed general satisfaction with progress and achievements and the Technical Consultative Committee and, subsequently UNDP and IBPGR, endorsed it. There was an unanimous recommendation that the project should continue in Phase III.

TRAINING

Adequately trained personnel are a prerequisite to properly run genetic resources centres and associated programmes, which make up a strong global network. Technicians and scientists are needed to sample accessions during collecting missions, to characterize material in collections, to operate genebanks and to document what is held.

Since effective handling of germplasm is critical for its effective utilization by plant breeders, a weakness in several areas of genetic resources work can significantly endanger the collected germplasm. IBPGR has found that the lack of trained personnel is one of the most serious drawbacks to the functioning of a viable network despite its major efforts in this field for over a decade.

IBPGR supports training in a variety of ways:

(1) *Training courses*. IBPGR funds and/or helps to organize courses and gives support to individual participants from developing countries. They are held in institutes throughout the world recognized as centres of expertise.

Courses are of two kinds:

a) One-year postgraduate (courses in English, French and Spanish;

b) Specialized courses of short duration which increasingly focus on specific topics. These have been conducted in a variety of languages. In 1985 for the first time an IBPGR course was given in Chinese.

(2) *Study tours*. These are arranged on an individual basis to enable scientists to visit centres to see ongoing work and to enable them to return to their own centre and put into practice what they have seen. During 1985 IBPGR provided numerous such study tours for scientists of developing countries.

(3) *Intern programme*. Interns are individuals having appropriate educational backgrounds in botany, genetics or plant breeding usually postdoctoral but sometimes post-masters equivalent, who are assigned to a specific project essential to IBPGR's programme for a one-year period (renewable for up to one further year). They are supervised by an IBPGR Staff member and a local scientist. Recognizing that internships are an effective way of providing potential recruits to a cadre of trained scientists, IBPGR intends to expand the coverage of its Intern programme in 1986. Work of interns is summarized in relevant sections in this *Annual Report*.

TRAINING COURSES

University of Birmingham, UK

A total of nine full-time students enrolled in the 1984-85 session of the international postgraduate M.Sc. training course *Conservation and Utilisation of Plant Genetic Resources* at the University of Birmingham, UK. Of the nine, six were provided fellowships by IBPGR; they were from Angola, China, Ethiopia, Ghana, Iran, Nepal and Sudan. Three students, also funded by IBPGR, attended a short course in evaluation and documentation at the University and one of them gained further "hands-on" experience in genebank work at the Seed Bank, Royal Botanic Gardens, Wakehurst Place. They were from Brazil, Ghana and Uruguay

During the 1985-86 academic year, there were 11 participants in the course. IBPGR provided fellowships for six of these, from Costa Rica, Ethiopia, Sri Lanka, PDR Yemen and Zambia (2). Additionally, six students supported during this session attended specialist short courses in collecting and conservation at Birmingham. They were from Egypt, Guatemala, India, Somalia, Sri Lanka and Venezuela.

Faculté des Sciences Agronomiques de l'Etat, Gembloux, Belgium

At a one-year postgraduate certificate programme at Faculté des Sciences Agronomiques de l'Etat, Gembloux, Belgium, for French-speaking scientists, IBPGR supported the participation of four students from Benin, Burundi (2) and Côte d'Ivoire.

International Rice Research Institute

IRRI, in cooperation with the University of the Philippines at Los Baños and the Philippine Council for Agricultural Resources and Research Development, initiated a one-year training course on genetic resources, which includes field work in the home countries of the trainees and lectures/practicals at Los Baños. Nine participants are funded by grants from the Italian Government, two by IBPGR and one by IRRI.

IBPGR Training Course on Temperate Fruit Genetic Resources, University of California, Davis, USA, 7-27 July

This course was organized by IBPGR, USDA/ Clonal Germplasm Repository and the University and it involved collecting, conservation and maintenance of germplasm, including *in vitro* conservation; exchange of germplasm, including cleaning up from viruses; use of descriptors, evaluation methodology and propagation; and *in situ* preservation. Participants were from Bulgaria, China (2), Czechoslovakia, Greece, Hungary, Nepal (2), Poland, Syria, Turkey, and Yugoslavia.

IBPGR Training Course on Seed Handling and Seed Physiology in Genebanks, Cornell University, USA, 9-24 August

A total of 17 students took part in the course; of these, IBPGR supported participants from China (3), Colombia, Czechoslovakia, Ecuador, Egypt, Guatemala, Malaysia, Mauritius, Pakistan, Poland and Yugoslavia. All aspects of seed handling were dealt with along with the theoretical background to procedures.

IBPGR-ECP/GR Training Course on Documentation, Institute of Introduction and Plant Genetic Resources, Sadovo, Bulgaria, 23-25 September

Five participants were supported by IBPGR at a course on aspects of germplasm documentation from Cyprus, Czechoslovakia, Greece, Poland and Portugal.

Curso Internacional para Postgraduados sobre Recursos Fitogenéticos Vegetales, Universidad de Buenos Aires, Argentina, 14 October-8 November

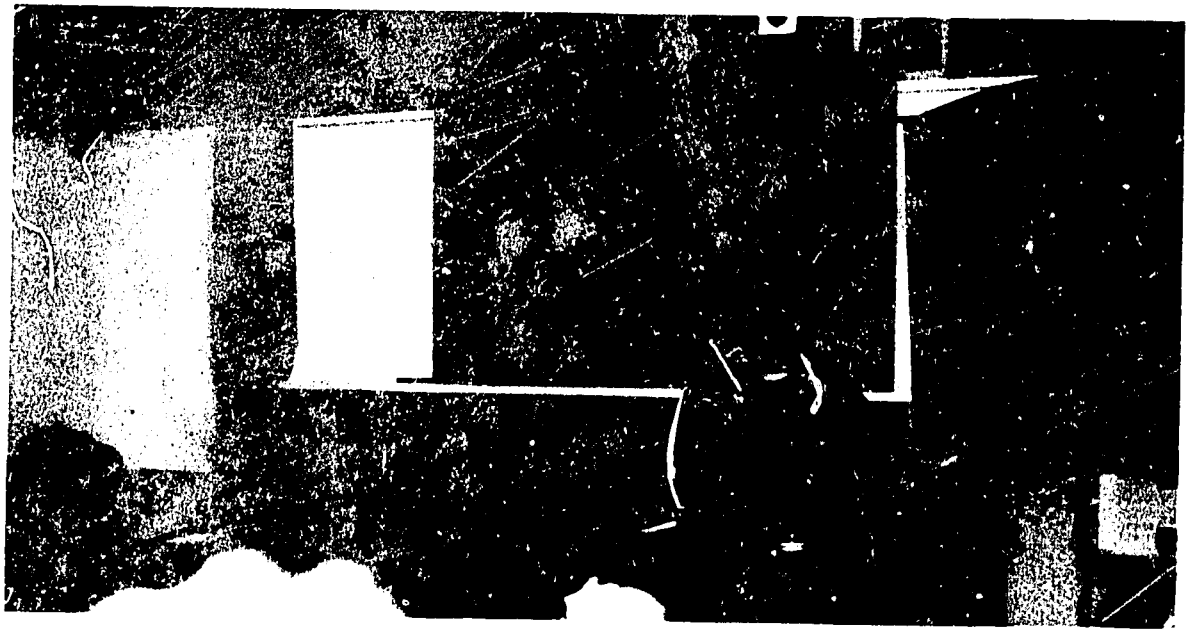
The IBPGR supported the University of Buenos Aires, Argentina for a training course (in Spanish) on plant genetic resources. Seventeen postgraduate students participated, from Argentina (10), Bolivia, Colombia, Costa Rica (2), Ecuador, Honduras and Uruguay.

IBPGR Training Course on Genebank Management and Seed Storage, Chinese Academy of Agricultural Sciences, Beijing, China, 10-30 October

This was the first IBPGR-supported course in Chinese. A total of 59 participants from several institutes throughout China took part. Students were provided with study materials on seed physiology and storage, seed drying, seed testing, documentation, viability monitoring, and genebank management.

Training by IBPGR/IRRI Collector

Under the IBPGR/IRRI collaborative project the Rice Germplasm Collector was also involved in organizing short training courses for potential field collectors with the aim of strengthening the capacity of national collecting programmes. Training courses on rice collecting and conservation for local workers were held in Thailand (31 trainees), Indonesia (30 trainees), Burma (43 in 1980, 51 in 1985), and Viet Nam (42 trainees). These courses included seminar sessions and discussions on the theoretical and practical aspects of collecting in the field.



IBPGR REVIEW OF TRAINING

The content and organization of the training courses at the University of Birmingham, UK were reviewed for the Board in 1985. The major findings of the review team are as follows:

(1) The course contents involve lectures and seminars on all aspects of collecting, conservation and utilization of plant genetic resources. In recent years more emphasis has been placed on data management, documentation, evaluation, on novel methods of *in vitro* conservation and disease indexing. Since the inception of the course in 1969, over 200 students had attended the M.Sc. course of which 68% had come from 47 developing countries;

(2) About 60% of the past students are currently engaged in plant genetic resources work and many are closely involved in IBPGR programmes;

(3) The course is cost-effective with more than 50% of costs met from UK Government sources.

The Review team identified the following areas where more emphasis on the course should be made; these are in accordance with IPBGR priorities:

(i) Tropical/subtropical and arid zone forages;

(ii) Widening of the genepools available for breeding, particularly the use of related wild species;

(iii) The handling of clonal crops, such as sweet potato, cassava, banana (including *in vitro* techniques);

(iv) Understanding of the ecological background of variation through ecogeographical surveys, and planning for *in situ* conservation, including such topics as assessment of minimal population size and selection of target populations.

With regard to the training course at Faculté des Sciences Agronomiques de l'Etat at Gembloux, IBPGR plans a similar review in late 1986.

OTHER TRAINING COURSES

IBPGR acts whenever possible to stimulate the initiation of new courses. In 1985 an Ecosystem Conservation Group of FAO, UNEP, UNESCO and IUCN to which IBPGR is an observer advised that training in *in situ* conservation was necessary. IBPGR was responsible for speedy action by the University of Birmingham, UK to establish a new tailor-made special short course to meet this need.

The IBPGR is also pleased to note training courses wholly organized and funded by collaborating centres in the network. Noteworthy was the continuation of previous courses by JICA, Japan; in 1985 a training course in Japan on plant genetic resources took place for students from Asian and Latin American countries.

ADMINISTRATION

MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1985 is shown as p. iv. During 1985 the Board welcomed Dr. L. Brader as the ex-officio member, FAO. At the end of the year Prof. J.P. Cooper and Dr. Q. Jones completed their terms for membership. Dr. S.A. Qureshi and Dr. Xu Yun-tian completed a first term of three years. The CGIAR, however, proposed that new elections for Board membership should not take place for 1986, pending a decision by the CGIAR on the future of the IBPGR and that the membership of IBPGR in 1985 should remain in being through 1986.

The full Board met in Rome 11-14 February and the Executive Committee met on 9 February and 27-30 May in Rome. The Executive Committee met again in Washington, D.C. 4-6 November.

Elected members of the Board serve in their individual capacities. Although in some cases members may report to donors, the Board has a policy that any donor may, if desired, send an observer who is an expert in the subject, to meetings of the Board or its Executive Committee. During 1985 observers from Australia, Canada, France, Spain, Switzerland and USA attended meetings.

Several donors have nominated individual scientists who maintain liaison with the IBPGR. These include the Federal Republic of Germany, Netherlands and USA. A number of donor countries involved with special project funding have also appointed country coordinators to liaise with IBPGR as have some recipient countries.

REPRESENTATION AT INTERNATIONAL MEETINGS

Apart from the IBPGR meetings mentioned in other sections of this report and regular meetings of TAC, CGIAR Center Directors, CGIAR Center Chairpersons and meetings of the CGIAR, the Board was represented at the following international or regional events:

— TAC study team meeting with training officers of CGIAR Centers, Rome, Italy 6-8 March
— FAO First Meeting of Commission on Plant Genetic Resources, Rome, Italy 11-15 March
— ISOPB Workshop on Oil Palm Germplasm and Utilization, Malaysia, 25-26 March
— EUCARPIA Gene Bank Committee and International Symposium on Evaluation and Better Use of Genetic Resources, Prague, Czechoslovakia, 26-29 March
— CGIAR Inter-Center Seminar on Women and Agricultural Technology, Bellagio, Italy, 25-29 March
— Systematics Association/IAPT/ISHS Committee on Nomenclature of Cultivated Plants, Reading, UK, 10 April
— FAO/UNEP/UNESCO/IUCN Ecosystem Conservation Group, Committee on Genetic Resources, Gland, Switzerland, 10-12 April
— Second Information Symposium on Mango, Bangalore, India, 20-24 May
— International Oat Symposium, Aberystwyth, UK, 14-17 July
— International Symposium on South East Asian Plant Genetic Resources, Jakarta, Indonesia, 27-30 August
— 15th International Grassland Congress, Kyoto, Japan, 24-31 August
— Second Symposium on Plant Life of South West Asia, Edinburgh, UK, 16-21 September
— Launch of the International Legume DataBase and Information Service, Southampton, UK, 24-25 September
— Arid Zone Conference, Tucson, Arizona, USA 21-25 October
— 5th SABRAO Congress, Bangkok, Thailand, 25-29 November
— ANL International Symposium on Origin and Domestication of Cultivated Plants, Rome, 25-27 November
— IUCN/WWF International Symposium on Botanic Gardens and the World Conservation Strategy, Las Palmas de Gran Canaria, Spain, 26-30 November
— International Colloquium to mark the 15-year

anniversary of the Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft, Braunschweig, Federal Republic of Germany, 2-6 December

In addition there was representation at numerous national seminars on genetic resources

CGIAR SERVICE

Prof. Williams, IBPGR Executive Secretary acted as Chairman of the Directors General of the CGIAR to the end of October 1985. Prof. Kåhre, IBPGR Chairman served as Vice-Chairman of the CGIAR Center Chairs until the end of October and then took up office as Chairman 1985-86.

COMMITTEES

Following agreement in principle by the Board in February, the Executive Committee in May established a Programme Committee and a Board Nominations Committee. The Programme Committee met in Washington DC, 7-8 November. The Executive Committee in November also established a Staffing Committee.

In accordance with the recommendation of the External Review, the Board agreed that the number of standing advisory committees should be reduced; the crop committees were therefore formally disbanded during the year on the understanding that IBPGR could call on their expertise on an *ad hoc* basis.

The Board agreed that in view of ongoing work the Seed Storage and the *In Vitro* Storage Committees should remain in being. Subcommittees of the former met in April and the latter during August (Appendix II).

A Working Group met on Mediterranean and adjacent arid zone forages in April, and a specialist Workshop was held on the Triticeae in August. Working Groups within the framework of the Southeast Asian programme met on maize (April), food legumes (May) and roots and tubers (August) (Appendix V).

The Southeast Asian regional programme also held a Workshop on Characterization and Evaluation in November. The Regional Committee for Southeast Asia (Appendix III) met in August.

A Technical Consultative Committee for the ECP/GR met in Iceland in December (Appendix IV) and two Working Groups met in Ireland and Italy (Appendix V) and a Workshop met in German Democratic Republic during the year.

IBPGR/SEAP Workshop on characterization

STAFF

The list of Staff of IBPGR is shown in Appendix I. The Executive Secretary, (retitled Director from the end of the year) of the Board also heads the FAO Crop Genetic Resources Centre as Chief. The FAO regular programme staff of the Centre serve the Board's programme.

Up to 1985 the Staff have been either headquarters based or outposted in a number of priority regions. Following the external review, the Executive Committee meeting in May approved a new staffing structure which will be implemented as soon as final decisions have been taken by the CGIAR on the future of IBPGR. The CGIAR was informed of the Board's decision at its mid-term meeting in Tokyo in June.

In essence the staffing structure will greatly improve the management of the programme through the introduction of a normal hierarchy of responsibility. There will be three sections:

Field Programme;

Research Programme:

(A) Strategic (mission-orientated) research

(B) Evaluation research;

Administration including publications, finance etc.

The staffing needs will be met, partly by redefinition of responsibilities of existing staff and partly by new appointments of scientists of sufficient stature to devise, coordinate and contract-out the research programme. It is not expected that the total number of staff will increase.

The staff of the research section will provide material for rapid and up-to-date technology transfer through their counterparts in the field programme.

An in-house staff review was held in September to assess the strengths and weaknesses of the existing field programme. A comprehensive report was produced for the Programme Committee which met in November. The Programme Committee will make in 1986 recommendations to the Board for any modifications which may be necessary to ensure greater effectiveness of the programme and its ability to meet the changing needs of collaborating countries.

During 1985 an IBGPR Collector for sweet potato was appointed at CIP; and another was positioned in Burundi, Rwanda and Zaire; the IBPGR Collector position for rice, located at IRRI was taken over by IRRI at the end of 1985, as a core responsibility. Also at the end of 1985, the Collector for South Asia and the Indian Ocean terminated his task. Regional Coordinators were in place in Southeast Asia, North Africa and Southwest Asia, East Africa, West Africa and Latin America. Assistants were also in place at the request of governments in Papua New Guinea, Solomon Islands and Togo.

The Executive Secretary and the Executive Committee were greatly assisted by a senior adviser Dr. J.H.W. Holden for a number of policy issues and for programme development. Dr. J.L. Creech and Prof. M. Iizuka also acted as Senior Advisers to the Executive Secretary on specific issues.

The Executive Secretary continued to act as Executive Secretary of the Special Project ECP/GR.

IBPGR PUBLICATIONS

The IBPGR programme for publications involves a wide range of scientific reports which cover various aspects of genetic resources activities. A total of 48 documents were published in 1985, including 21 descriptor lists, five genetic resources crop reports, eight technical conservation reports, eight Newsletters, one book on documentation, five books on Working Groups and Workshops, and the *Annual Report 1984*. A new series of publications on systematic and ecogeographic studies on crop genepools was initiated with publication on *Manihot* species, following herbarium and literature surveys on distribution of the species. A similar study on the distribution of wild *Abelmoschus* species was completed towards the end of 1985. In order to verify these data, an exploration mission is scheduled for early 1986 in South and Southeast Asia. Thereafter the final report will be published in this new IBPGR series.

Several other bench-mark publications were issued in 1985, including *Handbooks for Genebanks (Volumes I and II)* which are authoritative conservation guides aimed at genebank managers and a new series of *Practical Manuals for Genebanks*. The first in the series is called *Procedures for Handling Seeds in Genebanks* and is aimed at technicians working in genebanks.

APPENDICES

APPENDIX I

IBPGR Staff in 1985

Prof. J.T. Williams[1]
Executive Secretary

Headquarters Staff

Officers

Dr. N. Murthi Anishetty
Assistant Executive Secretary

Dr. C.G.D. Chapman[2]
(Wheat and Barley)

Mr. W. Ellis Davies[2]
(Forages

Dr. J.T. Esquinas Alcazar

Mr. J. Konopka
(Documentation)

Ir. D.H. van Sloten
(Horticulture)

Dr. Kar-Ling Tao
(Seed Conservation)

Mr. J.M. Watts (part-time)
(Scientific Writer/Editorial)

Support Staff

Ms. C. Gorelli
Programme Assistant

Mr. B.T. McLean[3]
Editorial Assistant

Mr. G. Sayour
Research Assistant

Secretaries

Miss R. Andarias (from Oct.)
Miss C. Dunne
Mrs. F. Farzad[2]
Mrs. M. McArthur-Giannini
Miss R. Oñate[3]
Miss L. Parry-Bruton
Miss D.E. Quaye
Miss A.M. Ruffini (from April)
Mr. A. Vaid

Clerks

Ms. M. Bonomi
Ms. C. Buttafuoco (from July)
Ms. M. Mantovani[3]
Ms. A. Vittorini

Field Staff

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c/o ILRAD, Nairobi, Kenya

Miss Jane Toll
IBPGR Collector
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BP 1250, Bujumbura, Burundi

South Asia Programme

Dr. A.B. Damania
Collector for South Asia &
Indian Ocean, c/o Headquarters

Europe (ECP/GR)

Dipl. Ing. P.M. Perret
Regional Coordinator
c/o Headquarters

IBPGR/IRRI Rice Collector

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IBPGR/CIP Sweet Potato Collector

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Assistant (Togo)

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Southeast Asia Programme

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Bangkok, Thailand

Ms. S. Savigamin
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Dr. H. Takagi
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IBPGR Collector for Forages
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Pacific

Dr. M.S. Prana[3]
Assistant

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[3]Left during the year

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[1] ECP/GR Secretariat was represented by Ing. Dipl. P.M. Perret and IBPGR by Ir. D.H. van Sloten

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WORKING GROUP ON FORAGES FOR MEDITERRANEAN AND ADJACENT ARID AND SEMI-ARID AREAS

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CONTRIBUTIONS TO IBPGR (1985)

(US$ equivalents)

Donor	Core	Special Projects[1]
Australia	125 883	
Austria	63 516	9 586
Belgium		
Canada	295 250	
China	99 985	
Denmark	68 027	9 586
Finland		2 961
France	110 705[2]	12 938
Germany (F.R.)	116 438	
Iceland		916
India	99 824[3]	
Ireland		2 961
Israel		4 793
Italy	144 945	28 615
Japan	628 668	59 984
Netherlands	287 008	9 586
Norway	90 432	1 832
Spain	149 971	5 915
Sweden	177 111	
Switzerland	217 316[4]	3 664
United Kingdom	467 456[5]	14 805
USA	900 000	
World Bank	249 985[6]	
	4 292 520	168 142

[1]European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (Phase II) and collection of Plant Genetic Resources in Nepal (Japan)
[2]Includes $30 502 of 1984 pledge received in 1985
[3]Includes $49 824 of 1984 pledge received in 1985
[4]Includes $127 529 of 1986 pledge received in 1985
[5]Includes $126 350 additional pledge for 1985
[6]Includes $49 985 received under stabilization mechanism

STATEMENT OF ACCOUNTS FOR 1985

(US$ equivalents)

RECEIPTS		
Balance as at 1 January 1985		1 215 347[1]
Various Government contributions		4 292 520
Special projects		168 142[2]
Interest credited in 1985		90 489
		5 766 498
DEDUCT		
Cash expenditure		
Core Programme		
Personnel services	867 843	
Official duty travel	455 021	
Contractual services	1 700 838	
General operating expenses	172 162	
Supplies and materials	126 355	
Furniture and equipments	12 561	
Fellowships	224 317	
	3 559 088	
Special projects	238 991	
Project servicing costs[3]	1 291	
External Programme Review	97 609	
Payment of obligations carried forward from previous years	671 523	
	4 568 502	
Commitments		
Incurred in 1985[4]	602 779	
Unliquidated obligations from previous years	391 198	
	5 562 479	
		5 562 479
BALANCE AT 31 DECEMBER 1985		204 019

[1]Unobligated cash balance and unliquidated obligations (1984 and previous years)
[2]European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (Phase II) and Collection of Plant Genetic Resources in Nepal (Japan)
[3]13% on TF 9202 (REM 031)
[4]Including commitments for special projects ($6 726)

1985 EXPENDITURE BY FUNCTIONS

(US$ equivalents)

	Total
Administration[1]	419 637
Technical Services[1]	229 010
Global Genetic Resources Network[2]	805 244
Germplasm Acquisition	649 520
Characterization and evaluation	557 335
Training	607 726
In Vitro Culture Research	260 896
Genetic Diversity Research	371 731
Seed Conservation Research	255 333
Special Projects	245 717
External Review	97 609

[1]Includes programme coordination
[2]Includes regional coordination

APPENDIX VIII

IBPGR PUBLICATIONS IN 1985

The IBPGR has a large number of mimeographed reports which deal with specific topics of the programme. These are freely available on request. However, requests should be as specific as possible.

General

Annual Report for 1984

Crops

Genetic Resources of *Abelmoschus* (English version)
Genetic Resources of Wheat
Les Mils Penicillaires de l'Afrique de l'Ouest
Systematic and Ecogeographic Studies on Crop Genepools: 1. *Mangifera*
Working Group on Forages for Mediterranean and Adjacent Arid and Semi-Arid Areas

Descriptors

Almond
Apricot
Cherry
Chickpea
Cotton
Faba Bean
Finger Millet
Forage Grass
Groundnut
Lentil
Oat
Panicum miliaceum and *P. sumatuense*
Peach
Phaseolus acutifolius
Plum
Rye and Triticale
Setaria italica and *S. pumila*
Sunflower
Vigna aconitifolia and *V. trilobata*
Vigna mungo and *V. radiata*
Wheat

Conservation

Cost-effective Long-term Seed Storage
*Handbook of Seed Technology for Genebanks Vol.I Principles and Methodology
*Handbook of Seed Technology for Genebanks Vol.II Compendium of Specific Germination Information and Text Recommendations
IBPGR Advisory Committee on Seed Storage: Report of the Third Meeting
IBPGR Advisory Committee on *In Vitro* Storage: Report of the Second Meeting
Long-term Seed Storage of Major Temperate Fruits
Practical Manuals for Genebanks No. 1. Procedures for Handling Seeds in Genebanks
The Potential Use of *In Vitro* Storage for Temperate Fruit Germplasm

Documentation

Documentation of Genetic Resources: Information Handling Systems for Genebank Management

ECP/GR

Report of a Working Group on Barley (Second meeting)
Report of a Working Group on Oat (Second meeting)
Report of a Working Group on *Prunus* (Second meeting)
Report of a Working Group on Forages (Second meeting)

Newsletters

FAO/IBPGR Plant Genetic Resources Newsletter (61-64)
IBPGR Regional Committee for Southeast Asia Newsletter (Vol. IX. Nos. 1-4)

*These Handbooks have a limited distribution and are intended primarily for libraries and genebank managers. Requests for these publications should be addressed to the IBPGR on Institute-headed letters specifying the position of the requestor (librarian or genebank manager).

LE POINT DES ACTIVITES EN 1985

Le IBPGR divise son activité en secteurs. Le resumé de ces activités en 1985 est presenté ci-dessous.

Six groupes de travail se sont réunis, respectivement pour le maïs, les légumineuses alimentaires, les racines et tubercules (spécialement pour l'Asie du Sud-Est), les légumineuses et graminées fourragères (dans le cadre du programme coopératif Européen) et les plantes fourragères (pour la Mediterranée et les aires arides et semi-arides). Des ateliers ont eté tenus au sujet de la documentation de l'orge, de la caracterisation et évaluation préliminaire des cultures d'Asie du Sud-Est et des ressources génetiques du pool de genes de la tribu des Triticeae.

Un total de 48 documents furent publiés en 1985, dont 21 listes de descripteurs, 4 rapports sur les ressources génétiques de certaines cultures, 8 rapports techniques traitant de la conservation, 8 bulletins, un livre au sujet de la documentation, 5 rapports de groupes de travail ou d'ateliers et le *Rapport Annuel 1984*. Une nouvelle série de publications d'études écogéographiques sur les pool geniques de certaines cultures a été inaugurée avec la parution du rapport des espèces *Mangifera*.

- **Acquisition de souches génétiques:** plus de 60 pays ont participé à la collecte de souches génétiques pour conservation dans les banques de gènes et exploitation dans les programmes de sélection. Environ 17 000 échantillons provenants des pools géniques des cultures les plus importantes ont eté collectés lors de 60 missions bénéficants de l'appui du IBPGR.

Une plus grande emphase a été accordée à la collecte des espèces sauvages afin d'augmenter la variabilité representeé dans les collections.

Les cultures suivantes ont été collectées dans l'anneé:

— Cultures de première priorité 36 fois dans 20 pays

— Cultures de seconde priorité 121 fois dans 49 pays

— Cultures de troisième priorité 19 fois dans 15 pays

- **Conservation:** Les sous-comités suivnts ont été convoqués les sous-comités:

— du Comité Consultatif pour la Conservation des Semences specialement pour discuter des coûts des chambres de conservation

— du Comité Consultatif pour la Conservation *In Vitro* pour le plan des banques de gènes *in vitro*.

Deux documents importants au sujet de la conservation ont paru en 1985:

— *Manuel pour les Banques de Gènes* (Volumes I et II) destinés aux responsables de ces institutions

— *Guide pratique pour les Banques de Gènes* destinés aux techniciens.

Trois banques de gènes fûrent évaluées par l'IBPGR pour inclusion dans son nouveau registre de collections de souches génétiques les plus importantes.

Une assistance pour améliorer les équipements de conservation fût accordée à des instituts en Algérie, Bostwana, Cuba, Egypte, Fiji, ILCA, Iran, Israel, Perou, Kenya, Sénégal, Tanzanie, Zambie et Zimbabwe. D'autres équipments fûrent accordés à la Bolivie, Brézil, Burundi, Mauritanie, Maroc, Nicaragua, Rwanda, Zaire et Zambie.

La recherche sur la culture *in vitro* a été orientée vers des cultures importantes dans les tropiques. Le base de données internationale *in vitro* du l'IBPGR est actuellement largement interrogée et uts des données de recheches provenant de plus de 60 pays.

- **Caractérisation:** l'IBPGR a aidé 49 instituts pour la caractérisation de 35 cultures ou groupes de cultures différentes. Des recherches ont été effectuées sur 12 pools géniques et certaines ont amené le IBPGR a des études sur le terrain associée avec la conservation *in situ*.

- **Documentation:** les objectifs generaux du l'IBPGR pour la documentation furent accomplis (a) par l'intermédiare d un appui aux programmes nationaux (Argentine, Czechoslovakie, Colombie, Ecuador, République Démocratique de l'Allemagne, Pakistan, Pologne, Iles Salomon and Uruguay) et WARDA et (b) par l'expansion du travail des bases de données pour les pommiers, l'orge, *Citrus*, aubergine, cultures fourragères, arachide, maïs, avoine, gombo, *Phaseolus*, *Prunus*, seigle, soja et tournesol.

- **Formation:** en 1985 l IBPGR·
  - -- Elargi son réseau d'internes pour accélérer la recherche sur les projets prioritaires
  - — A supporté 16 nationaux de pays en voie de développement lors d'études de niveaux universitaires d'une durée année
  - — Formé 115 nationaux de pays en voie de développement lors de cours specialisés et de courte durée et
  - — Supporté pour la première fois un cours de formation en chinois.

ASPECTOS SOBRESALIENTES DEL ANO 1985

El siguiente texto es un resumen de las actividades del IBPGR durante 1985.

Se reunieron seis grupos de trabajo: los de maíz, leguminosas, granos y raices y tubérculos, con el objetivo de estudiar las acciones llevadas a cabo en el sudeste asiático, los de plantas forrajeras y *Prunus* del programa cooperativo europeo, y finalmente el de plantas forrajeras para las áreas mediterráneas, áridas y semiáridas. También se organizaron reuniones sobre documentación de germoplasma de cebada, caracterización y evaluación preliminar de los cultivos del sudeste asiático y sobre la riqueza del acerbo genético de la tribu Triticeae.

En 1985 se publicaron un total de 48 documentos, incluyendo 21 listas de descriptores, 4 informes sobre cursos genéticos de cultivos específicos, 8 informes técnicos sobre conservación de germoplasma, 8 números de la publicación periódica "Noticiario de Recursos Genéticos Vegetales", un libro sobre documentación de germoplasma, 5 informes de reunions de los grupos de trabajo y el informe anual de 1984. También se inició una nueva serie de publicaciones sobre estudios de sistemática y ecogeografía de los acerbos genéticos vegetales, con la publicación de un numero sobre las especies de *Mangifera*.

- **Adquisición de germoplasma:** Cerca de 60 países participaron en la recolección de germoplasma para su almacenamiento en bancos de germoplasma y use en programas de mejora genética de cultivos. Se recolectaron cerca de 17 000 muestras en 60 misiones apoyadas por el IPBGR.

  Durante este año se incrementó el énfasis para amliar los acerbos genéticos, especialmente de las especies silvestres, con el fin de que la variabilidad genética existente en las colecciones de germoplasma adquiera una mayor representatividad. También la organización de las recolecciones tuvo como meta objetivos más específicos que en años anteriores.

  Durante 1985 se recolectaron:
  - — Cultivos de prioridad uno en 36 expediciones distribuidas en 20 países.
  - — Cultivos de prioridad dos en 121 expediciones distribuidas en 29 países.
  - — Cultivos de prioridad tres en 19 expediciones distribuidas en 15 países.
- **Conservación:** Se reunieron los subcomités de los siguientes comités:
  - — Comité Asesor sobre Conservación de Semillas, para discutir el costo efectivo de los almacenes de semillas
  - — Comité Asesor sobre Conservación *In Vitro*, para designar bancos de germoplasma *in vitro*.

  Se publicaron los siguientes manuales:
  - — *Manuales para bancos de germoplasma* (Volúmenes I y II) destinados a los directores de bancos de germoplasma.
  - — *Manuales prácticos para bancos de germoplasma* destinados a los técnicos que trabajan en bancos de germoplasma

El IBPGR evaluó tres bancos de germoplasma para ser incluidos en el nuevo registro de centros que mantienen importantes colecciones. La red de colecciones base fue reforzada en 1985 con la designación de centros que asumen responsabilidad para especies forrajeras.

Se proporcionó asistencia a Institutos de Algeria, Bolivia, Botswana, Brasil, Burundi, Cuba, China, Chipre, Egipto, Ghana, Guatemala, Fiji, Irán, Israel, Kenia, Madagascar, Islas Mauricio, Mauritania, Marruecos, Nicaragua, Perú, Rwanda, Senegal, Zaire, Zambia y Zimbabwe y a ILCA para mejorar sus instalaciones de conservación.

La investigación en cultivo de tejidos *in vitro* estuvo orientada a una amplia gama de cultivos inportantes en las zonas tropicales. La base internacional de datos de cultivos *in vitro* del IBPGR está siendo ampliamente utilizada, e incluye datos de investigación procedentes de unos 60 países.

- **Caracterización:** El IBPGR apoyó 49 institutos para la caracterización de 35 cultivos o grupos de cultivos. Se realizaron investigaciones sobre la diversidad existente en los acerbos genéticos de 12 cultivos. También se realizó investigación adicional sobre el trabajo de campo asociado con la conservación *in situ* de germoplasma.

- **Documentación:** Los objetivos globale: del IBPGR sobre documentación fueron llevados a cabo a través de: (a) su apoyo a los programas nacionales de Argentina, Checoslovaquia, Colombia, Ecuador, República Democrática Alemana, Pakistán, Polonia, Islas Salomón, Uruguay y el programa de WARDA; y (b) la expansión de bases centralizadas de datos sobre germoplasma de manzana, cebada, berenjena, plantas forrajeras, maní, maíz, avena, haba, *Phaseolus*, *Prunus*, centeno, soja y girasol.

- **Formación de personal:**
  - — Aumentó el número de becas concedidos por el IBPGR para realizar investigación, con el fin de aceleara determinados proyectos prioritarios.
  - — 16 estudiantes postgraduatos procedentes de países en vias de desarrollo disfrutaron de beca para la realización de cursos de capacitación de un año de duración.
  - — 115 estudiantes procedentes de países en vías de desarrollo asistieron a cursos cortos sobre temas específicos relacionados con recursos genéticos. Un curso de esta naturaleza fue organizado por primera vez para estudiantes chinos en su propio país y en su propia lengua.

1985 年主要工作

国际植物遗传资源委员会将其计划按照职能进行划分 *1985* 年的工作情况如下：

六个工作组举行了会议，讨论玉米、食用豆类、块根块茎（特别研究了东南亚的工作）、饲草、樱桃类（在欧洲合作计划项下进行）和（在地中海和干旱及半干旱地区种植的）饲草的问题。分别就大麦文献的整理形成、东南亚作物的性状描述和初步评价、小麦原生地区的遗传资源等专题举办了讲习班。

1985 年共出版了 *48* 份文件，其中包括 *21* 份描述符目录、*4* 份作物遗传资源报告、*8* 份保存技术报告、*8* 份简报、*7* 本关于文献编制的书、*5* 本关于工作组和讲习班的书及 *1985* 年年度报告。又发行了关于苹果属原生地区的书，这是一套关于作物原生地区的生态地理系统的研究的新丛书的第一本。

o 种质资源的获得：有 *60* 多个国家参加了种质资源的收集工作，以供存入基因库进行保存和供作物改良计划使用。国际植物遗传资源委员会支持的 *60* 个工作组从作物资源原生境区收集了大约 *1.7* 万份样品。

为了扩大种质资源收集品所代表的变异性，现在比以往任何时候都更加重视范围更广泛的植物资源的原生境区，特别是野生种。组织收集的目的也更多的是放在具体目标上，而不是一般性的收集。

1985 年收集了以下方面的样品：

- 在 *20* 个国家收集了第一类优先作物的样品，共 *36* 次
- 在 *49* 个国家收集了第二类优先作物的样品，共 *121* 次
- 在 *15* 个国家收集了第三类优先作物的样品，共 *19* 次

o 保存工作：下述小组委员会召开了会议：

- 种子贮藏咨询委员会，特别讨论了种子贮藏的经济效益问题；
- 离体保存咨询委员会，筹划了离体基因库问题。

1985年发行的关于标准保存工作的出版物如下：

- 基因库工作手册（第Ⅰ、Ⅱ册），发行对象是基因库管理人员
- 基因库实用手册，发行对象是在基因库工作的技术人员

国际植物遗传资源委员会对三个基因库进行了评价，以便把重要的种质库予以新的注册。通过指定一些中心保存重要的饲草材料，基础收集品库网络在1985年得到了加强。

为了改进基因库设施，向下列国家的研究机构提供了援助：阿尔及利亚、博茨瓦纳、古巴、埃及、斐济、伊朗、以色列、秘鲁、肯尼亚、塞内加尔、赞比亚和津巴布韦。接受援助的还有非洲国际畜牧中心。向下列国家提供了设备：玻利维亚、巴西、布隆迪、中国、塞浦路斯、加纳、危地马拉、马达加斯加、毛里求斯、毛里塔尼亚、摩洛哥、尼加拉瓜、卢旺达、扎伊尔和赞比亚。

对一批在热带地区具有重要性的作物进行了离体培养的专题研究。国际植物遗传资源委员会的国际离体资料库得到广泛的利用。它收集有60多个国家提供的研究资料。

o 性状描述工作：国际植物遗传资源委员会支持了49个研究机构对35种不同作物或不同类别的作物进行的性状描述工作。对12个作物原生境区的多样性进行了研究，在这方面的其他一些研究工作导致国际植物遗传资源委员会开展了在原生境进行保存的实地工作。

o 文献：通过(1)支持国家计划（阿根廷、捷克斯洛伐克、哥伦比亚、厄瓜多尔、德意志民主共和国、巴基斯坦、波兰、所罗门群岛、乌拉圭）和支持西非水稻发展协会，(2)发展下列作物中心资料库的工作：苹果、大麦、甘蓝类、茄子、饲草、花生、玉米、燕麦、秋葵、芸豆类、棉花类、黑麦、大豆和向日葵，使国际植物遗传资源委员会关于文献工作的全球目标得到进一步实现。

o 培训：1985年国际植物遗传资源委员会：

- 扩大了内部计划以加快优先项目的研究工作；
- 16名发展中国家的学员接受了为期一年的研究生培训；
- 125名发展中国家学员接受了短期专业培训；
- 扩大所使用语言的范围，1985年增加中文。

أهم أحداث عام ١٩٨٥

قام المجلس الدولي للموارد الوراثية النباتية برنامجه الى مهام ، وفيما يلي موجز عن أعماله في عام ١٩٨٥ .

اجتمعت ست مجموعات عمل خاصة بمحاصيل الذرة ، والبقول الغذائية ، والحشائش ، والدرنيات (للبطاطا بصفة خاصة في المناطق المتجمدة في جنوب شرقي آسيا) ، وبالأعلاف والبهروبين (في أحد برامج التعاون الأوروبي) والأعلاف (لمناطق البحر المتوسط والمناطق الجافة وشبه الجافة) . وعقدت حلقات عملية عن بوتقة الشعير ، وتحديد خصائص المحاصيل في جنوب شرقي آسيا وإعداد برنامج أولي عنها ، وكذلك عن الموارد الوراثية للحشائش الخاصة بعشيرة Triticeae .

وصدرت ٤٨ وثيقة في عام ١٩٨٥ ، منها ٢١ قائمة وصفية ، و ٤ تقارير عن محاصيل الموارد الوراثية ، و٨ تقارير عن أساليب الحفظ العلني ، و٨ رسائل اخبارية ، وكتاب عن التوثيق ، و٥ كتب عن جماعات العمل وحلقات العمل ، والتقرير السنوي لعام ١٩٨٥ . وبدأ العمل في اعداد مجموعة جديدة من المطبوعات عن الدراسات المبسطة والدراسات الايكولوجية – الجغرافية الخاصة بالمحاصيل المحصولية ، مع مطبوع عن أصناف المانجو Mangifera .

* الحصول على المواد الوراثية : شارك أكثر من ٦٠ بلدا في عمليات تجميع المواد الوراثية لاستدامتها في بنوك الجينات واستخدامها في البرامج الخاصة بتحسين المحاصيل . وقد أمكن جمع زهاء ١٧ ٠٠٠ عينة من جينات المحاصيل الرئيسية خلال ٦٠ بعثة من البعثات التي يدعمها المجلس الدولي للموارد الوراثية النباتية .

وقد عمل التركيز بدرجة أكبر مما عمل حتى الآن على موارد الجينات واسعة النطاق، خصوصا الأصناف البرية منها ، من أجل زيادة التنوع التعشائي لمجموعات المواد الوراثية . كما كان تنظيم التجميع يهدف الى التركيز على أصناف بؤرية محددة بدلا من التجميع العشوائي للأصناف .

وقد أمكن ، خلال ١٩٨٥ ، تجميع ما يلي :

- ٣٦ محصولا من المحاصيل ذات الأولوية الأولى من ٢٠ بلدا ،
- ١٣١ محصولا من المحاصيل ذات الأولوية الثانية من ٤٩ بلدا ،
- ١٩ محصولا من المحاصيل ذات الأولوية الثالثة من ١٥ بلدا .

برامج الحفظ : عقدت اللجان الفرعية التالية اجتماعاتها :

- اللجنة الاستشارية لتخزين البذور لتناقش بصفة خاصة مردودية تكاليف مخازن البذور ،
- اللجنة الاستشارية للتخزين في المختبر لتصميم بنوك الجينات في المختبر .

صدرت في ١٩٨٥ مطبوعات عن مدى التقدم في مجال الحفظ هي :

- كتيبات عن بنوك الجينات (الجزء الأول والثاني) خاصة بمديري بنوك الجينات ،

- كتيبات عملية عن بنوك الجينات خاصة بالقيمين العاملين في بنوك الجينات .

وقام المجلس الدولي للموارد الوراثية النباتية بتقديم ثلاثة بنوك للجينات باد راجها في سجله الجديد لمجموعته الهامة من المواد الوراثية . وتم في ١٩٨٥ تعزيز شبكة المجموعة القاعدية بتعيين مراكز تحتفظ بالمواد الحافظة الهامة .

وقدمت المساعدة لتطوير مرافق بنوك الجينات الى المعاهد في الجزائر ، وبوتسوانا ، وكوبا ، ومصر ، وفجي ، والمركز الدولي للثروة الحيوانية في افريقيا ، وايران ، واسرائيل ، وسيرو ، وكينيا ، والمكسيك ، وزامبيا ، وزمبابوي . كما قدمت معدات أخرى الى بولندا ، البرازيل ، وبوروندي ، والصين ، وفيرجي ، وغانا ، وغواتيمالا ، ومدغشقر ، وموريشيوس ، وموريتانيا ، والمغرب ، وشكاراغوا ، ورواندا ، وزائير ، وزامبيا .

وركزت البحوث الخاصة بالترسبة داخل المجتبرات على تنظيم البعثات بشأن مجموعة المحاصيل ذات الأهمية الكبيرة وبصورة عامة في المناطق الاستوائية . ويجري الآن استخدام قاعدة البيانات المجتبرية التابعة للمجلس الدولي المذكور على نطاق واسع ، وهي تضم بيانات البحوث من أكثر من ٦٠ بلدا .

* التوصيف: قدم المجلس الدعم الى ٤٩ معهدا بهدف توصيف ٣٥ محصولا أو مجموعة من المحاصيل المختلفة ، وأنجزت البحوث في مجال ١٢ وحدة من وحدات الجينات المحصولية المتنوعة ، وهناك بعض البحوث الاضافية ضمن المجال نفسه دفعت المجلس الى القيام بأعمال مساندة مرتبطة بالحفظ في الموقع .

* التوثيق: أعكس تعزيز الأهداف العالمية للمجلس في مجال التوثيق عن طريق (أ) دعم البرامج القطرية (في الأردن ، وتشيكوسلوفاكيا ، وكولومبيا ، واكوادور ، وجمهورية المانيا الديمقراطية ، وباكستان ، وبولندا ، وجزر سليمان ، وأوروغواي) ، وبرامج رابطة غرب افريقيا لتنمية الأرز ، و (ب) توسيع الأعمال الخاصة بالمواد المركزية لبيانات محاصيل التفاح ، والشعير ، والحمضيات ، والباذنجان ، والاعلاف ، والفول السوداني ، والذرة ، والشوفان ، والأكرا (البامية) ، والفاصولياء ، والبرقوق ، والراي ، وفول الصويا ، وعباد الشمس .

* التدريب: قام المجلس الدولي للموارد الوراثية النباتية في عام ١٩٨٥ بما يلي :

- توسيع خطته الداخلية لزيادة البحوث الخاصة بالمشروعات ذات الأولوية ،

- تدريب ١٦ مواطنا من أبناء البلدان النامية لفترة سنة في الدراسات الجامعية العليا ،

- تدريب ١٢٥ مواطنا من أبناء البلدان النامية في دورات تدريبية متخصصة وقصيرة ،

- توسيع استخدام اللغات في عام ١٩٨٥ لتشمل اللغة الصينية .

A LIST OF TERMS USED IN THIS REPORT

Accession: An individual sample of either seed, or a plant or plants entered into a genebank or germplasm collection.

Active collection: A collection of accessions used for characterization and multiplication purposes and for supply of material to breeders and researchers.

Base collection: A collection which maintains duplicated accessions under long-term storage conditions, as security for the active collections, and which therefore is not intended for everyday use.

Characterization: The description of morphological characteristics which are not strongly influenced by the environment in their expression (See also Evaluation)

Clonal repository: A collection of clonally (or asexually) propagated plants (= Field Genebank).

Core collection: A subset of the whole collection selected so as to represent the range of genetic diversity present in the whole collection.

Descriptor list: A list of agreed descriptors and descriptor states in a standard format which can be used to define an accession in terms of its origin and characteristics.

Directory of germplasm collections: A list and description of institutes by crop or group of crops holding collections of particular species, with a basic description of these collections.

Documentation: The recording of information relating to accessions. This is now usually done in a computer data base to facilitate data processing and data use.

Ecogeographic: The interrelationship between ecological and geographical factors, usually in relation to species distribution.

Evaluation: As compared to characterization, evaluation is the assessment in a given environment or under a given set of conditions of traits which are environmentally sensitive in their expression.

***Ex Situ* conservation:** Conservation out of the original or natural environment, e.g. in a genebank.

Field genebank: An *ex situ* collection of plants, maintained either *in situ* or *ex situ* under field or nursery conditions for conservation purposes. Generally such genebanks are used for material which otherwise would be difficult to maintain as seed or when it is desired to maintain particular genotypes e.g. in *Citrus* or *Vitis*.

Genebank: A general term used to refer to a centre or institute conserving plant material (most often as seed).

Genetic diversity: The range of genetic variation in a crop or species or in a related group of crops or taxa.

Germplasm: A general term used to encompass the genetic resources of plant material.

***In Situ* conservation:** Conservation in the area of natural occurrence and under natural conditions.

***In Vitro* conservation:** Conservation *ex situ* and under artificial conditions of culture or preservation "in the glass".

Landrace: An old cultivated form of a crop resulting usually from a combination of natural and artificial selection but not from purposive, controlled hybridization.

Multiplication (or regeneration): The process of multiplying germplasm for conservation or utilization purposes.

Passport data: All the data relating to the origin of the material. Should include extensive site data for material collected from the wild.

Rationalization of collections: The process of making collections more manageable by determining what material is unnecessarily replicated either within a collection or between collections in a collaborating network.

Utilization: The exploitation of the genetic diversity of a collection for breeding improved varieties.

Weedy: A spontaneous and often prolific form of a species, intermediate between wild and cultivated material which often intercrosses spontaneously with them.

Wild: The natural and most primitive ancestor of crops which is self-perpetuating in its natural habitat. In contrast to weedy forms it is not dependent on human intervention for its survival.

SOME ACRONYMS USED IN THIS REPORT

ARARI	— Aegean Regional Agricultural Research Institute (Turkey)
ARI	— Agricultural Research Institute (Cyprus)
ARS	— Agriculture Research Service (USA)
AVRDC	— Asian Vegetable Research and Development Center (China)
BARC	— Beltsville Agricultural Research Center (USA)
BGRC	— Braunschweig Genetic Resources Centre (of FAL) (Germany, Fed. Rep.)
CATIE	— Centro Agronomico Tropical de Investigación y Ensenanza (Costa Rica)
CEC	— Commission of European Communities—EC
CENARGEN	— Centro Nacional de Recursos Genéticos (Brazil)
CEPGL	— Communauté Economique des Pays Grands Lacs
CGIAR	— Consultative Group on International Agricultural Research
CIAT	— Centro Internacional de Agricultura Tropical—CGIAR
CIF	— Centro de Investigaciones Fitoecogenéticas (Bolivia)
CIMMYT	— Centro Internacional de Mejoramiento de Maiz y Trigo—CGIAR
CIP	— Centro Internacional de la Papa—CGIAR
CNR	— Consiglio Nazionale delle Ricerche (Italy)
COMECON	— Council for Mutual Economic Assistance
CRI	— Crops Research Institute (Ghana)
CRT	— Cereal Research Institute (Hungary)
CSIRO	— Commonwealth Scientific and Industrial Research Organization (Australia)
DRA	— Direction de la Recherche Agronomique (Togo)
DRSS	— Department of Research and Specialist Services (Zimbabwe)
ECP/GR	— European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources—UNDP/IBPGR
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 (Germany, Fed. Rep.)
FAO	— Food and Agriculture Organization of the United Nations
FOFIFA	— National Centre for Applied Research and Rural Development (Madagascar)
GTZ	— Deutsche Geselischaft für Technische Zusammenarbeit (Germany, Fed. Rep.)
HAES	— Highlands Agricultural Experimental Station (PNG)
IAPT	— International Society of Plant Taxonomists
IARC	— International Agricultural Research Centre
IBPGR	— International Board for Plant Genetic Resources—CGIAR
ICA	— Instituto Colombiano Agropecuario (Colombia)
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 Tecnologia Agricola (Guatemala)
IHAR	— Plant Breeding and Acclimatization Institute (Poland)
IIHR	— Indian Institute of Horticultural Research
IIPGR	— Institute of Introduction and Plant Genetic Resources (Bulgaria)
IITA	— International Institute of Tropical Agriculture—CGIAR
ILCA	— International Livestock Center for Africa—CGIAR
ILRAD	— International Laboratory for Research on Animal Diseases
INIA	— Instituto Nacional de Investigaciones Agrarias (Spain)
INIA	— Instituto Nacional de Investigaciones Agricolas (Mexico)
INIA	— Instituto Nacional de Investigaciones Agropecuarias (Chile)
INIAP	— Instituto Nacional de Investigaciones Agropecuarias (Ecuador)
INIPA	— Instituto Nacional de Investigación y Promoción Agropecuaria (Peru)
INRA	— Institut National de la Recherche Agronomique (France)
INRA	— Institut National de la Recherche Agronomique (Morocco)
INTA	— Instituto Nacional de Tecnologia Agropecuaria (Argentina)
INTSOY	— International Soybean Program (USA)
IPB	— Institute of Plant Breeding (Philippines)
IRAZ	— Institut de Recherche Agricole et Zootechnique
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
ISHS	— International Society for Horticultural Sciences
ISNAR	— International Service for National Agricultural Research—CGIAR

ISP	— Institut Superieur Polytechnique (Burkina Faso)
ISOPB	— International Society of Oil Palm Breeders
IUCN	— International Union for Conservation of Nature and Natural Resources
IVT	— Institute for Horticultural Plant Breeding (Netherlands)
JICA	— Japan International Cooperation Agency
LBN	— National Biological Institute (Indonesia)
NPBGR	— National Bureau of Plant Genetic Resources (India)
NGB	— Nordic Gene Bank
NIAR	— National Institute of Agricultural Research (Japan)
NVRS	— National Vegetable Research Station (UK)
NSSL	— National Seed Storage Laboratory (USA)
ORSTOM	— Office de la Recherche Scientifique et Technique d'Outre-mer (France)
PARC	— Pakistan Agricultural Research Council (Pakistan)
PBI	— Plant Breeding Institute (UK)
PCARRD	— Philippine Council for Agricultural and Resources Research and Development
PGR	— Plant Gene Resoources of Canada (Canada)
PGRC/E	— Plant Genetic Resources Center (Ethiopia)
RBG	— Royal Botanic Gardens
RCA	— Institute for Plant Production and Qualification (Hungary)
RECSEA	— Regional Committee for Southeast Asia (IBPGR)
SABRAO	— Society for the Advancement of Breeding Researches in Asia and Oceania
SEAP	— Southeast Asia Programme (IBPGR)
SVP	— Foundation for Agricultural Plant Breeding (Netherlands)
TAC	— Technical Advisory Committee—CGIAR
TCC	— Technical Consultative Committee (ECP/GR)
TISTR	— Thailand Institute of Scientific and Technical Research (Thailand)
UNA	— Universidad Nacional Agraria, La Molina (Peru)
UNDP	— United Nations Development Programme
UNEP	— United Nations Environment Programme
UPOV	— International Union for the Protection of New Varieties of Plants
USDA	— United States Department of Agriculture (USA)
UNESCO	— United Nations Educational, Scientific and Cultural Organization
VIR	— N.I. Vavilov Institute of Plant Industry (USSR)
WARDA	— West African Rice Development Association—CGIAR
WPBS	— Welsh Plant Breeding Station (UK)
WWF	— World Wildlife Fund
ZIGuK	— Zentralinstitut für Genetik und Kulturpflanzenforschung (German Dem. Rep.)