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PLANT GENETIC RESOURCES

CONSULTATIVE GROUP ON
INTERNATIONAL
AGRICULTURAL RESEARCH

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1984

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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 Executive Secretariat 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

When the International Board for Plant Genetic Resources (IBPGR) was created by the Consultative Group on International Agricultural Research (CGIAR) in 1974, there was little awareness by the general public, crop scientists or by more than a few governments of the imperative needs for an international programme for genetic resources conservation.

By the time the IBPGR entered 1984, its tenth year of operation, the level of general awareness had been raised markedly. Much of this change has to be attributed to the attempts made by the IBPGR to establish and coordinate a global network of germplasm centres and to collect, conserve and make freely available for all users, significant parts of the genepools of numerous crops. Surprisingly, the conservation movement has only recently played a part in raising the understanding of the general public for conservation of resources of crop plants; and in recent years numerous reports, albeit semi-technical, have drawn attention to the problems. However, perhaps the most significant development has been that governments are becoming aware of their responsibilities in this field and the 1983 FAO Conference requested that an International Undertaking and a Commission on Plant Genetic Resources should be formed. The Commission will meet for the first time in 1985.

The IBPGR is justifiably proud to have acted as an effective catalyst to international action over this period and to have provided assistance — both technical and financial — to hundreds of centres worldwide. The IBPGR has continued to stress the need for conservation procedures to have a firm scientific base and where gaps have been shown to exist it has been active in promoting research and the development of appropriate technologies.

The role of the IBPGR has been, and continues to be, misunderstood in many quarters. Hence, after a decade of work it is opportune to quote an extract from the Board's mandate "while the Board is to recommend overall policies and develop long-range programmes, and to estimate the annual financial requirements of these programmes it is not basically an agency to provide finance itself for those programmes. The major part of the financing of the proposed network will be the responsibility of host countries, and of the donor members of the Consultative Group, not of this Board". The Board has neither the remit nor the resources for institutional building.

In terms of development assistance the IBPGR has had — relatively speaking — trivial amounts of money available. Nevertheless, having used its funds in a catalytic, "pump-priming" way, the achievements measured in terms of germplasm collected and conserved over the past decade can be said to have surpassed all expectations.

The Board looks forward with confidence to continuing to serve the plant genetic resources/plant breeding community worldwide. It is grateful for the strong support of its donors (which now include both developed and developing countries), the cosponsors of the CGIAR (FAO, World Bank and UNDP), and the scientific community worldwide.

J.T. Williams
Executive Secretary

ACRONYMS

AAASA – Association for the Advancement of Agricultural Sciences in Africa
ACCT – Agence de coopération culturelle et technique (France)
ACRI – American Cocoa Research Institute (USA)
ACSAD – Arab Centre for the Study of Arid Zones and Dry Lands (Syria)
AID – Aid for International Development (USA)
AIDA – Asociacion Interprofesional para el Desarrollo Agrario (Spain)
ANAV – Academia Nacional de Agronomia y Veterinaria (Argentina)
ARARI – Aegean Regional Agricultural Research Institute (Turkey)
ARC – Agricultural Research Centre (Libya)
ARC – Agricultural Research Corporation (Sudan)
ARI – Agricultural Research Institute (Cyprus)
ARI – Agricultural Research Institute (Burma)
ARS – Agriculture Research Service (USA)
AVRDC – Asian Vegetable Research and Development Center (China)
BALITAN – Food Crops Research Institute (Indonesia)
BALITRI – Industrial Crops Research Institute (Indonesia)
BARC – Bangladesh Agricultural Research Council (Bangladesh)
BARC – Beltsville Agricultural Research Center (USA)
BARI – Bangladesh Agricultural Research Institute (Bangladesh)
BOSTID – Board on Science and Technology for International Development (USA)
BP_3G – Balai Penelitian Perusahaan Perkebunan Gula (Indonesia)
BRRI – Bangladesh Rice Research Institute
CAAS – Chinese Academy of Agricultural Sciences (China)
CARI – Central Agricultural Research Institute (Sri Lanka)
CATIE – Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)
CEC – Commission of European Communities - EC
CENARGEN – Centro Nacional de Recursos Genéticos (Brazil)
CEPEC – Centro de Pesquisas du Cacau (Brazil)
CEPGL – Communauté économique des pays grands lacs
CFI – Commonwealth Forestry Institute (UK)
CGIAR – Consultative Group on International Agricultural Research
CIAT – Centro Internacional de Agricultura Tropical – CGIAR
CIF – Centro de Investigaciones Fitoecogenéticas (Bolivia)
CIF – Consejo Federal de Inversiones (Argentina)
CIMMYT – Centro Internacional de Mejoramiento de Maiz y Trigo – CGIAR
CIP – Centro Internacional de la Papa – CGIAR
CIPIA – Centro de Informatica para la Investigacion Agricola (Peru)
CNI – Centro Nacional de Investigación (Colombia)
CNPA – Centro Nacional de Pesquisa Algodao (Brazil)
CNPMF – Centro Nacional de Pesquisa de Mandioca e Fruticultura (Brazil)
CNR – Consiglio Nazionale delle Ricerche (Italy)
COGENE – Committee on Genetic Experimentation – ICSU
COMECON – Council for Multual Economic Assistance
CPAC – Centro de Pesquisa Agropecuaria Cerrados (Brazil)
CPATU – Centro de Pesquisa Agropecuaria Tropico Umido (Brazil)
CPCRI – Central Plantation Crops Research Institute (India)
CRI – Crops Research Institute (Ghana)
CRI – Centro Regional de Investigación (Colombia)
CRRI – Central Rice Research Institute (India)
CSIRO – Commonwealth Scientific and Industrial Research Organization (Australia)
CTFT – Centre technique forestier tropical (France)
DANIDA – Danish International Development Agency (Denmark)
DGTA – Direccion General de Tecnicas Agropecuarias (Nicaragua)
DPI – Department of Primary Industry (Papua New Guinea)
EC – European Community
ECP/GR – European Cooperative Programme for Conservation and Echange of Crop Genetic Resources – UNDP/IBPGR
EMBRAPA – Empresa Brasileira de Pesquisa Agropecuaria (Brazil)
EMCAPA – Empresa Capixaba de Pesquisa Agropecuaria (Brazil)
EMGOPA – Empresa Goiana de Pesquisa Agropecuaria (Brazil)
ENSAM – Ecole nationale supérieure agronomique de Montpellier (France)
ETSIA – Escuela Tecnica Superior de Ingenieros Agronomos (Spain)

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
FAU	–	Florida Atlantic University (USA)
FOFIFA	–	National Centre for Applied Research and Rural Development (Madagascar)
GERDAT	–	Groupement d'études et de recherches pour le développement de l'agronomie tropicale (France)
GRIN	–	Genetic Resources Information Network – USDA
GTZ	–	Agency for Technical Cooperation (Germany, Fed. Rep.)
HAES	–	Highlands Agricultural Experimental Station (PNG)
IAC	–	International Agricultural Center (Netherlands)
IAC	–	Instituto Agronomico de Capinas (Brazil)
IADS	–	International Agricultural Development Service (USA)
IAN	–	Instituto Agronomico Nacional (Paraguay)
IARC	–	International Agricultural Research Centre
IARI	–	Indian Agricultural Research Institute
IBM	–	International Business Machines
IBPGR	–	International Board for Plant Genetic Resources – CGIAR
ICA	–	Instituto Colombiano Agropecuario (Colombia)
ICAC		International Cotton Advisory Committee
ICAR		Indian Council of Agricultural Research
ICARDA		International Center for Agricultural Research in the Dry Areas — CGIAR
ICRAF	–	International Council for Research in Agroforestry
ICRISAT	–	International Crops Research Institute for the Semi-Arid Tropics — CGIAR
ICSU	–	International Council of Scientific Unions
ICTA	–	Instituto de Ciencia y Technologia Agricola (Guatemala)
IDESSA	–	Institut des Savannes (Ivory Coast)
IDIAP	–	Instituto de Investigacion Agropecuaria de Panamá
IDRC	–	International Development Research Center (Canada)
IGF	–	International Genetic Federation
IHAR	–	Plant Breeding and Acclimatization Institute (Poland)
IICA	–	Instituto Interamericano de Cooperación para la Agricultura - OAS
IIHR	–	Indian Institute of Horticultural Research
IIPR	–	Institute of Introduction and Plant Resources (Bulgaria)
IIRB	–	Institut international de recherches betteravères
IITA	–	International Institute of Tropical Agriculture – CGIAR
ILCA	–	International Livestock Center for Africa – CGIAR
ILRAD	–	International Laboratory for Research on Animal Diseases
INCAP	–	Instituto de Nutrición de Centro América y Panamá (Guatemala)
INENCO	–	Instituto de Energia no Convencional (Argentina)
INIA	–	Instituto Nacional de Investigaciones Agrarias (Spain)
INIA	–	Instituto Nacional de Investigaciones Agricolas (Mexico)
INIA	–	Instituto Nacional de Investigaciones Agropecuarias (Chile)
INIAER	–	Instituto Nacional de Investgacão Agraria e de Extensão Rural (Portugal)
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)
INRAA	–	Institut national de la recherche agronomique (Algeria)
INRAN	–	Institut national de recherches agronomiques du Niger
INRAT	–	Institut national de la recherche agronomique de Tunisie (Tunisia)
INRST	–	Institut national de la recherche scientifique et technologique de Tunisie (Tunisia)
INTA	–	Instituto Nacional de Tecnologia Agropecuaria (Argentina)
INTSOY	–	International Soybean Program
IOCC	–	International Office of Cocoa and Chocolate
IPB	–	Institute of Plant Breeding (Philippines)
IRAT	–	Institut de recherches agronomiques tropicales et des cultures vivrières (France)
IRAZ	–	Institut de recherche agricole et zootechnique
IRCA	–	Institut de recherches sur le caoutchou (France)
IRCT	–	Institut de recherches du coton et des textiles exotiques (France)
IRFA	–	Institut de recherches sur les fruits et agrumes (France)
IRGC	–	International Rice Germplasm Center (IRRI) – CGIAR
IRGC	–	International Rice Germplasm Center (IRRI)
IRHO	–	Institut de recherche pour les huiles et oléagineux (France)
IRRDB	–	International Rubber Research and Development Board
IRRI	–	International Rice Research Institute
ISHS	–	International Society for Horticultural Sciences
ISNAR	–	International Service for National Agricultural Research – CGIAR

ISSCT – International Society of Sugar Cane Technologists
ISTA – International Seed Testing Association
IUBS – International Union of Biological Sciences
IUCN – International Union for Conservation of Nature and Natural Resources
IVRAZ – Institut voltaique de recherche agricole et zootechnique (Burkina Faso)
IVT – Institute for Horticultural Plant Breeding (Netherlands)
JICA – Japan International Cooperation Agency
KPPNN – National Committee for Germplasm Conservation (Indonesia)
LBN – National Biological Institute (Indonesia)
LCTAP – London Cocoa Trade Amazon Project (UK)
LIPI – Lembaga Ilmu Pengetahuan Indonesia
MARDI – Malaysian Agricultural Research and Development Institute (Malaysia)
MIDINRA – Ministerio de Desarrollo Agropecuario y Reforma Agraria (Nicaragua)
NARC – National Agricultural Research Centre (Pakistan)
NAS – National Academy of Sciences (USA)
NASA – National Aeronautics and Space Administration (USA)
NAU – Nanjing Agricultural University (China)
NBPGR – National Bureau of Plant Genetic Resources (India)
NGB – Nordic Gene Bank
NIAS – National Institute of Agricultural Sciences (Japan)
NIAVT – National Institute for Agrobotany Variety Testing (Hungary)
NIHORT – National Horticultural Research Institute (Nigeria)
NPGRL – National Plant Genetic Resources Laboratory (Philippines)
NRC – National Research Council (Canada)
NSGC – National Small Grains Collections (USA)
NSSL – National Seed Storage Laboratory (USA)
NSTA – National Science and Technology Authority (Philippines)
NVRS – National Vegetable Research Station (UK)
OAU – Organization of African Unity
OGFRC – Organic Gardening and Farming Research Center (USA)
OIS – Office Information Systems
OIV – Office international de la vigne et du vin
ORSTOM – Office de la recherche scientifique et technique d'outre-mer (France)
PARC – Pakistan Agricultural Research Council (Pakistan)
PBI – Plant Breeding Institute (UK)
PCA – Philippine Coconut Authority (Philippines)
PCARRD – Philippine Council for Agricultural and Resources Research and Development
PGR – Plant Gene Resources of Canada
PGRC/E – Plant Genetic Resources Center (Ethiopia)
PHILSUCOM – Philippine Sugar Commission (Philippines)
PORIM – Palm Oil Research Institute of Malaysia
RAPA – Regional Office for Asia and the Pacific (FAO)
RCA – Institute for Plant Production and Qualification (Hungary)
RECSEA – Regional Committee for Southeast Asia (IBPGR)
RTI – Royal Tropical Institute (Netherlands)
SAFGRAD – Semi Arid Food Grain Research and Development (OAU)
SEPASAT – Survey of Economic Plants for the Arid and Semi-Arid Tropics (UK)
SPC – South Pacific Commission (New Caledonia)
SPII – Seed and Plant Improvement Institute (Iran)
SVP – Foundation for Agricultural Plant Breeding (Netherlands)
TAC – Technical Advisory Committee – CGIAR
TAES – Texas Agricultural Experiment Station (USA)
TCC – Technical Consultative Committee (ECP/GR)
TISTR – Thailand Institute of Scientific and Technical Research (Thailand)
UAC – Universidad Austral de Chile
UEPAE – Unidade de Ambito Estadual (Brazil)
UKM – National University of Malaysia
UNA – Universidad Nacional Agraria, La Molina (Peru)
UNDP – United Nations Development Programme
UNEP – United Nations Environment Programme
UPLB – University of the Philippines at Los Baños (Philippines)
UPM – Universiti Pertanian Malaysia
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
WICSCBS – West Indies Central Sugar Cane Breeding Station (Barbados)
WLAC – Western Luzon Agricultural College (Philippines)
WPBS – Welsh Plant Breeding Station (UK)
WWF – World Wildlife Fund
ZIGuK – Zentralinstitut für Genetik und Kulturpflanzenforschung (Ger. Dem. Rep.)

1984 HIGHLIGHTS

- The IBPGR had 10 major and several smaller 10th Anniversary celebrations held in Africa, Asia, Europe and Latin America during 1984. These were, for the most part, locally initiated and organized.
- Programmes for crops continued to make progress in 1984:
  - Germplasm was collected in 82 IBPGR-supported collecting missions in 49 countries
  - A total of over 18 000 samples of major crops were collected:
    First priority crops 111 times from 43 different countries
    Second priority crops 60 times from 26 different countries
    Third priority crops 29 times from 16 different countries
  - Over 2 000 samples of wild species were collected of priority crops. This increase in emphasis for wild species is likely to be noted in future reports.
  - Two international Working Groups met (tropical and subtropical forages and oilpalm) and, in the context of the special project IBPGR/UNDP ECP/GR, Working Groups met on *Allium*, forages, oat and sunflower.
- A total of 38 documents were published during 1984, including:
  - Five 10th Anniversary monographs (dealing with diverse scientific subjects), 4 descriptor lists, 2 directories of germplasm holdings, 4 ECP/GR working group reports, 5 technical conservation documents, 6 technical crop genetic resource reports, 8 newletters, a germplasm catalogue, an ECP/GR publicity booklet, the *IBPGR 2nd Decade Planning Report* and the *1983 Annual Report*.
  - 13 educational posters were printed which illustrate the IBPGR's activities
- Conservation programme
  - New international standards for seed storage were developed in 1984
  - Meetings were held by:
    Advisory Committee on *In Vitro* Storage
    Advisory Committee on Seed Storage
    Task Force on Ecogeographical Survey and *In Situ* Conservation
  - 32 scientists/technicians from developing countries received IBPGR-supported specific training on various aspects of conservation
  - IBPGR worked with research centres and agricultural scientists in almost 100 countries for conservation of germplasm
  - IBPGR had designated 47 genebanks in 33 countries (19 developing and 14 developed) to hold 37 different crop species by January 1985
  - IBPGR provided funds/expertise to improve medium- and long-term storage facilities in China, Fiji, Iran, Malaysia, Morocco, Nigeria, Papua New Guinea, Peru, Portugal, Sudan, Thailand and Tunisia
  - Numerous samples of vegetatively propagated crops were transferred through *in vitro* culture to genebanks
- Information and data management programme
  - Computer hardware and software was supplied to institutes in China, Pakistan, Poland, Spain and Trinidad
  - 10 scientists/technicians received IBPGR-supported specific training for information and data management
  - Data bases for holdings of 24 crops received IBPGR support in 1984: *Allium*, apple, barley, *Capsicum*, Cocoa, *Cucumis*, eggplant, forages (8 genera), groundnut, oat, okra, *Phaseolus*, *Prunus*, rye, soyabean, sunflower and wheat

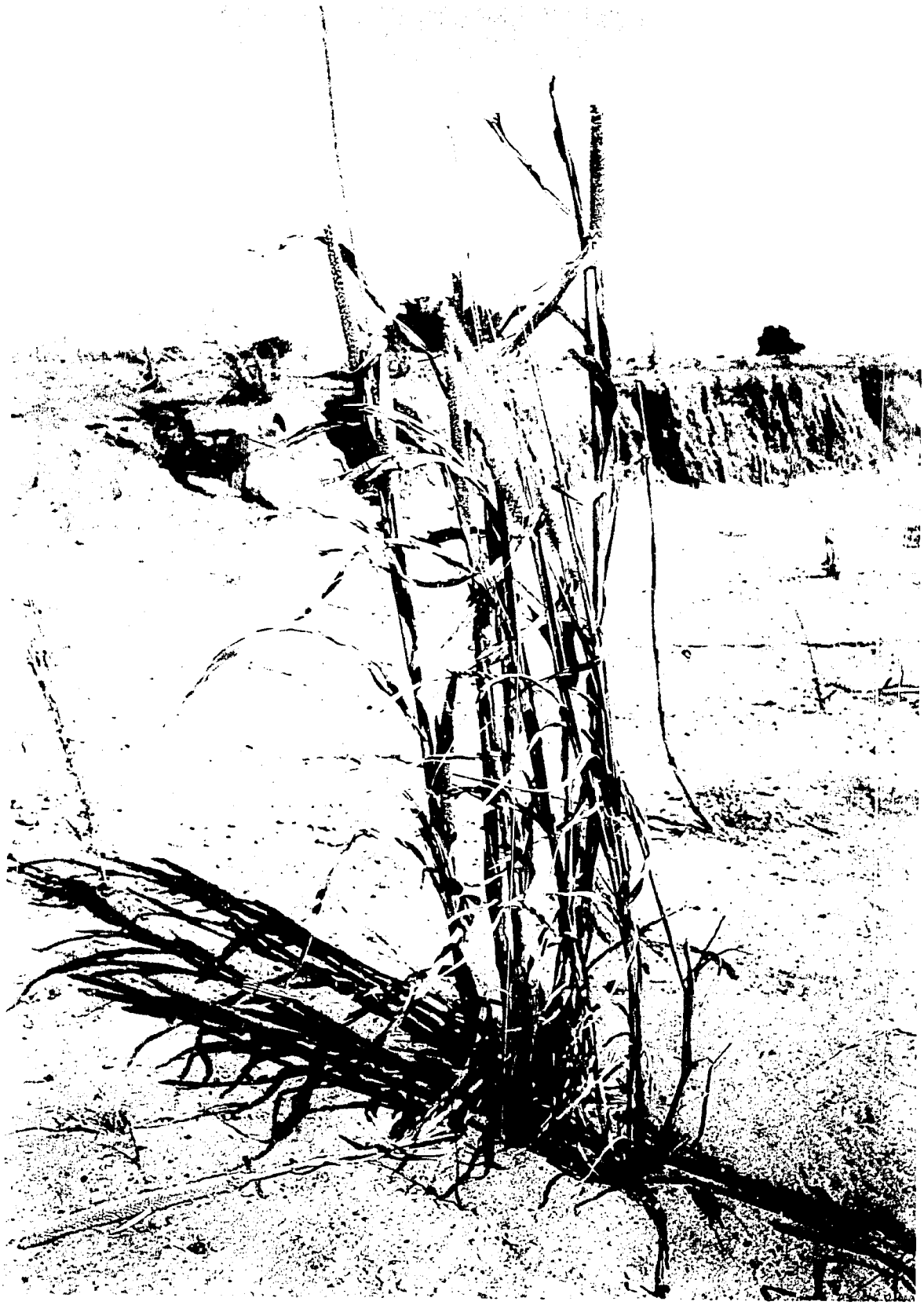
- Training programme
  - 17 students from developing countries were sponsored for post-graduate training
  - 99 students/technicians were given specialized training in short courses
  - 6 interns were located at CIAT, ICARDA, AVRDC, HAES (Papua New Guinea), the Solomon Islands and on an IBPGR banana *in vitro* project in Belgium

TEN YEAR HIGHLIGHTS (1974-84)

- During the IBPGR's first decade of work, over 121 000 samples of germplasm were collected in 582 IBPGR-supported collecting missions in more than 90 countries from every IBPGR priority region

Africa	34 000
Asia, Southwest & Central	6 000
Asia, South	9 000
Asia, Southeast	21 000
Asia, East & the Pacific	5 000
Latin America	27 000
Mediterranean	19 000

- A total of 237 documents (mainly technical reports) was published by IBPGR
- International IBPGR Working Groups and Committees met 51 times during the last decade:
  - 39 times for 22 different priority crops
  - 7 times for conservation of germplasm
  - 5 times for information and data management
  - and an additional 7 regional crop Working Groups met. These Working Groups have provided a knowledge base for speedy action and more advance planning
- New national genetic resources programmes have started in *ca.* 50 countries and national genetic resources committees in 25 countries
- IBPGR has organized inter-governmental meetings in 9 priority regions
- Progress with conservation included:
  - IBPGR has provided funds or assistance to the majority of the more than 300 seed storage facilities (active and base) in public institutes worldwide
  - IBPGR-designated base collections increased to 47, thereby providing security for crop germplasm
  - IBPGR has supported projects to characterize and evaluate germplasm in 108 different institutes in 60 countries
- Progress with information and data management included:
  - Computer hardware and software supplied to 23 public institutes
  - 84 scientists/technicians were trained for information and data management
  - International, regional or national data bases for 29 crops (5 cereals, 3 food legumes, 6 vegetables, 3 fruits, 3 industrial crops, 8 forages and 1 oil crop) have received IBPGR support
- Progress on training included:
  - 192 students (of which 133 are from 45 different developing countries) were trained at the post-graduate level at the University of Birmingham course which is supported by the IBPGR
  - 1 022 scientists/technicians were given specialized training in short courses
  - Numerous scientists have been supported on study tours



CROPS

Introduction

In the *1983 Annual Report* it was stated that larger germplasm collections are now available to breeders than have ever existed in the history of plant breeding. In addition attempts were made by the Board in 1983-84 to identify constraints to collection, conservation and exchange of germplasm, to assess the adequacy of past collecting efforts and through discussion, on a crop basis, to assess all ongoing work. These assessments led the Board in 1984 to consider that a period of consolidation is necessary which, in practical terms, will entail a slowing down in the overall collection on a wide basis and the substitution of a more selective approach with greater effort being directed to the post-collection activities — especially characterization, documentation and the multiplication and duplication of samples in genebanks.

These decisions were reached using the evidence from collaborating scientists and the Crop Advisory Committees (Rice cosponsored by IRRI, Maize cosponsored by CIMMYT, Sorghum and Millets cosponsored by ICRISAT, *Phaseolus* cosponsored by CIAT and Wheat cosponsored by CIMMYT, with the participation of ICARDA).

There have been misunderstandings concerning the changes in policy of the Board mentioned above. These changes do not mean that further collecting is not contemplated but that the collecting will be more closely related to documented evidence of threat in the field to the germplasm and to the improvement in the scientific standards of collecting by initiating ecogeographical surveying.

The improvement, worldwide, of the scientific work in the field will lead to the availability of information and data which will aid:

i) curators to manage their collections in a much more orderly way through analysis of their data bases;

ii) the forging of collaborative links between genebanks based on identification of redundant duplicates and rationalization of collections;

iii) the provision of more detailed information on accessions to breeders and hence better use of genebanks by users; and

iv) the forging of collaborative links for evaluation.

In relation to the samples held by genebanks, the Board cannot over-stress the point that the actual numbers of samples held can be misleading unless information is available on their variability and their uniqueness and redundancy has been sorted out. This can only be done with improved scientific work at the curator level.

During the first decade of work of the IBPGR the basis for action has changed from the regional approach to a focus on the crop as an organizational unit. In many ways this is seen as a natural as well as an evolutionary process. Once national programmes become adequate for genetic resources work, international collaboration proceeds more effectively through crop specialists. This has been exemplified in recent years by the supplanting of regional activities by crop working groups in the Mediterranean and Europe, and Southeast Asia moving in this direction. It is also exemplified by the maize workers in Latin America and the working groups of the IBPGR viewing action plans on a global crop basis rather than through regional inputs.

During 1984 new Working Groups met on Oilpalm and Tropical and Subtropical Forages and, in the context of special project work of ECP/GR, on *Allium*, Forages, Oat, and Sunflower.

Other items were rigorously pursued during the

year particularly through the work of the two conservation committees. The Seed Committee met to revise standards for storage of all crops which are stored as seed and since these include standards for the routine work of genebanks, the Board has agreed to develop an international register of genebanks (see p. 68). The *In Vitro* Committee advised the Board on complementary storage methods for genetic resources of potato, cassava, sweet potato, taro, *Musa, coconut, sugarcane, Citrus* and temperate fruits (including *Vitis*).

In particular, the *In Vitro* Committee pointed out the widespread misunderstanding, particularly with vegetatively propagated species, that breeders' collections are within the scope of the Board's work. In this respect, especially where there is little or no active breeding, the IBPGR becomes by default the supplier of breeding material. This must, however, only be a temporary measure and the IBPGR will continue to draw the attention of other organizations to their responsibilities. Clear examples are banana and coconut.

In 1984, the Board also identified the constraints in documenting germplasm in genebanks. The IBPGR has found it most expeditious to encourage the establishment of crop data bases. The advantages of "central" crop data bases are that they:

- provide a means of assessing the available world collection of samples in respect of geographical representation;
- allow the identification of putative duplicates within and between collections; and
- permit inferences to be drawn on what is not yet in collections,enabling improved targeting of collecting efforts.

Finally in relation to crops the Board issued a book to coincide with its Tenth Anniversary with details, listed crop by crop, of all materials collected under the IBPGR's auspices. The data were incomplete due to the time lag between collecting activities and the filing of final reports but at least 85% of all collecting data are included. Details are provided of countries where missions took place, numbers of samples collected, local institutes where material was deposited and other deposits, e.g. for base storage.

CEREALS

WHEAT

One result of the advanced state of genetic resources work on wheat is that collecting of cultivars has been slowing down as the number of areas considered to be adequately collected increases.

Detailed survey of materials in collections has been carried on for several years by a specially appointed IBPGR officer. It has been extended to include all developing countries where wheat is a major crop. Data show that there are at least 60 000 landrace samples in the various major collections — and probably more since some detailed listings have still to be obtained. Some countries previously considered to be high priority for collecting, now probably do not merit further collecting in the light of more recent information. Some examples highlight this conclusion: both Jordan and Turkey are now considered adequately covered for landraces according to the leaders of recent missions; a visit to SPII, Karaj, Iran by an IBPGR team found that there were over 10 000 native landrace samples in short–term store; and the Republic of Korea now has no landrace material left in the field.

As a result, only two areas appear to require further major collecting: Morocco and the countries of the Arabian peninsula (see Fig. 2, *1983 Annual Report*). There are some other areas, particularly in Southwest Asia, where some collecting would be advantageous but it is currently impossible for political reasons.

The wild species, both close and more distant relatives, are receiving increased attention as sources of genetic variability, particularly for disease and pest resistance. This follows from improvements in the techniques of wide crossing,

and the practical application of cytogenetics to speed the transfer of desirable genes into a wheat background.

A detailed survey of the wild species of *Triticum* and *Aegilops* has shown that there are over 10 000 samples in collections, making wheat one of the best represented crops for wild relatives. The survey did show however, important areas of distribution that have yet to be adequately explored. These include much of southern Europe, southern USSR and North Africa. Over and above this, further collecting in Southwest Asia is desirable. Not only are the majority of the wild species found there, but also all those implicated in the origin and evolution of cultivated wheat. These species are expected to be the easiest to use in breeding programmes and deserve emphasis for genetic conservation. The Secretariat finalized in 1984 a strategy for the collection of wild relatives of wheat.

Attention is being paid to the more distant relatives of wheat in the Triticeae tribe, which are also a germplasm source for barley and some forages. A meeting to develop a coherent strategy is planned for 1985. Further with the wild species, the IBPGR is investigating the need to designate a base collection for the preservation of wild x cultivated amphiploid material, to save breeders the problems of repeating difficult crosses unnecessarily.

Triticum aestivum (compactum) (R.P. Croston)

The routine work of the germplasm curators continues. The National Small Grains Collection of the USA is following a programme of further evaluation, chiefly for disease and pest resistance. The collection of the University of Kyoto, Japan has now been duplicated at NIAS, Tsukuba and the first grow-out for duplicating the collection of wild material of the University of Riverside in California is under way. The collection of the PGRC/E, Addis Ababa, Ethiopia also requires duplication. At CIMMYT data on the germplasm collection is being computerized and the provision of a long-term store being contemplated. Work on the multiplication and evaluation of the collection at ICARDA is proceeding.

Even so the standards of collections remain a major area of concern, particularly as much of the material in them must be considered irreplaceable. As noted in the past the basis of many of these problems is not lack of resources but rather a matter of outlook. (The question of standards in genebanks is discussed in the Conservation section, p. 68).

Collecting in 1984 was somewhat reduced when compared to previous years. Nevertheless, in the first decade of IBPGR work the Board was instrumental in collecting from 20 countries over 11 500 samples of the wheat genepool. Priorities for action must now relate to the characterization and documentation of all of this material, as well as the samples already in collections. For the wild species better ecological information is needed.

During 1984 a substantial collection of *Aegilops* and wild *Triticum* (403 samples of 8 species) was gathered in **Greece** by Dr. Matattia of the Hebrew University of Jerusalem (on sabbatical with the USDA) in association with the Greek Gene Bank and with IBPGR support.

A joint mission of the IBPGR, INRA, (Rabat, Morocco), ICARDA, and the Istituto del Germoplasma (Bari, Italy) in 1984 gathered 26 *Triticum durum* and 27 *T. turgidum* samples in central **Morocco.** In addition a few samples of *Aegilops* were collected. Duplicate samples have been retained at Rabat and also have been deposited in Bari. Further exploration is planned for 1985.

A mission in **Turkey** fielded jointly by the University of Corvallis, Oregon, USA and ARARI, Izmir, collected 214 samples of cultivated wheat including *T. carthlicum* (41). Further, 49 samples of wild *Triticum* were collected and

863 *Aegilops* covering some 13 species. Those samples sent to the USA went to Corvallis to have their identification confirmed, and will then be lodged in the NSGC.

During multi-crop collecting missions with IBPGR support in 1984, INRAA collected 17 samples of *Triticum* in the southern oasis area of **Algeria** in Oct. The Centro Fitoecogenético of Pairumani, with IBPGR support, collected 46 samples of wheat in the Andean zone of **Bolivia.** Japanese scientists collected 61 samples of wheat from the foothills of the Himalayas in Nepal during Nov.-Dec. The University of Niamey collected 27 samples of *Triticum* spp. in **Niger.**

The 202 samples of durum wheat collected in **Jordan** by the University of Yarmouk in 1983 were evaluated for eight descriptors during 1984. During the summer of 1984 the Universities of Saskatchewan and Yarmouk collected durum landraces, *Triticum dicoccoides*, and *Aegilops* spp. from the mountainous region of **Jordan.**

BARLEY

Work on barley genetic resources outside Europe has got off to a slow start. Information is now available, however, on collections from Australia, Japan, and the USA. Data from Canada have been recently received, but not yet analysed.

As with wheat, over half the accessions are landraces. Major portions of these collections come from Ethiopia, Turkey and East and South Asia and there is a large amount of *Hordeum spontaneum* from Israel. In addition a mission to Iran showed that there is an important collection of probably unique material of local landraces (around 450 samples) at the SPII in Karaj. As work outside of Europe continues, it will be coordinated with the European Programme to form a complete global picture.

During 1984 barley germplasm was collected in several missions with IBPGR support. Twenty-three samples were collected in **Algeria** in a mission with INRAA (Algeria). Barley landraces were collected in the mountainous area of **Jordan** by the Universities of Saskatchewan and Yarmouk. In **Morocco** 89 samples of *Hordeum vulgare* were collected during a joint mission with INRA (Rabat, Morocco), CNR (Bari, Italy) and ICARDA. During Nov.-Dec. Japanese scientists gathered 65 samples of barley in the western and eastern hills of **Nepal.** The University of Niamey collected 6 samples in **Niger** and in another multi-crop expedition four samples were gathered in **Pakistan.** A total of 16 samples was collected in **Tunisia** with the Tunisian institutions INRAT and INRST. In **Turkey** a joint mission of ARARI, Izmir and the University of Oregon, Corvallis, USA collected five cultivated and 40 samples of wild species of barley.

An Australian national collection is to be organized from the various institute/university collections and will be housed at Tamworth, together with the existing wheat collection.

In 1982 the European Cooperative Programme for Conservation and Exchange of Crop Gentic Resources (ECP/GR) established a computerized European Barley Inventory at ZIGuK in Gatersleben, Democratic Republic of Germany. By the end of 1984 passport data on about 40 000 accessions had been registered. In 1985, the draft list will be circulated to cooperators in order to sort out putative duplicates and to rationalize the collections and the barley inventory will be published towards the end of 1985.

The Genetic Resources Unit of **ICARDA,** with funding from the IBPGR, has completed

Hooded naked barley, Nepal (J.R. Witcombe)

characterization and evaluation of *ca.* 7 000 accessions for 22 traits and the data are being computerized. In late 1984 ICARDA began multiplying more material for the continuation of characterization and evaluation.

SORGHUM AND MILLETS

Since its inception the IBPGR has given sorghum and millets a high priority for collection and preservation. During its first decade of work, the Board — in close cooperation with ICRISAT — fielded several expeditions in major centres of diversity and assembled in collections significant genetic variation of the crops. During 1983 the IBPGR reviewed the existing collections in order to identify gaps and inadequacies — both in terms of primitive cultivars and wild species — and the study *A World Survey of Sorghum and Millets Germplasm* was published during 1984 as a Tenth Anniversary publication. As a follow-up of the above review the Secretariat initiated another survey in 1984 and prepared a draft on strategy for collection of wild relatives of sorghum and millets. The results will be published during 1985. During 1984 IBPGR/ICRISAT published a *Revised Descriptor List for Sorghum* which supersedes the original list prepared in 1980.

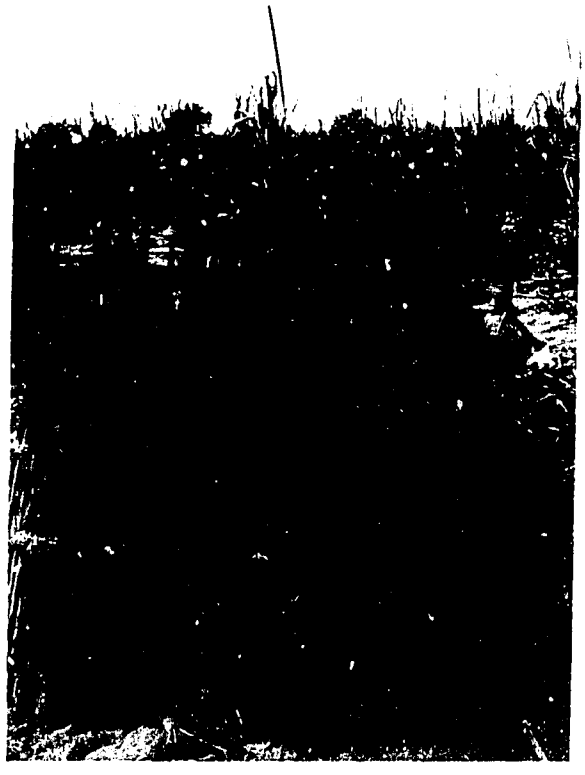
Owing to the substantial progress made in the collection of landrace material, fewer collecting missions were fielded during 1984.

During October 1984 an IBPGR-sponsored mission, in cooperation with INRAA, explored both the eastern and western oases belts of **Algeria** and collected pearl millet (38) and sorghum (19) together with other crop germplasm.

The IBPGR provided funds to the University of Ouagadougou, **Burkina Faso** for the collection and evaluation of pearl millet germplasm. During 1984, 16 samples were collected and the material is being multiplied for evaluation. This work will continue for a further 2-3 years. In another mission ORSTOM collected *Pennisetum pedicellatum*, (6) and *P. violaceum* (9).

The IBPGR, in association with ORSTOM, fielded a mission in **Mauritania** during Oct.-Nov. which collected sorghum (72), pearl millet (32) and wild *Pennisetum* spp. (29) from the region bordering Mali and Senegal.

During a multi-crop collection mission in **Nepal,** scientists from Japan explored the western



Recently harvested pearl millet

and eastern ranges of the Himalayas and collected finger millet (76), sorghum (14), *Setaria italica* (17) and *Panicum* sp. (17).

During multi-crop collection by MIDINRA, with IBPGR support 30 samples of *Sorghum* were collected in **Nicaragua.**

Another IBPGR mission surveyed the remoter parts of **Niger** especially for wild species during Sept.-Dec. and collected *Pennisetum* species including *P. pedicellatum* (19), *P. mollissimum* (26) and *P. americanum stenostachyum* (14). This mission was one of the first of the new-type IBPGR field missions laying stress on ecogeographical principles. In addition the University of Niamey also collected 170 samples of pearl millet and 142 of sorghum in another major multi-crop expedition in **Niger.**

With funds provided by the IBPGR, the Serere Research Station, Soroti, explored the northern region of **Uganda** and collected a total of 675 samples of finger millet (342), sorghum (311) and pearl millet (22). These samples also included a few wild and weedy relatives. The exploration will continue in 1985.

The Gentic Resources Unit of ICRISAT fielded a mission in the **Yemen Arab Republic** during Nov.-Dec. and collected 171 sorghum and 44 pearl millet samples. In a mission to the

Eastern Ghats region of India, ICRISAT collected 109 samples of pearl millet.

The IBPGR Regional Coordinator for East Africa explored the northwestern and southwestern provinces along Lake Kariba in **Zambia** during June–July and collected sorghum (55), pearl millet (23) and finger millet (14).

In **Zimbabwe** an IBPGR consultant initiated systematic multiplication, characterization and documentation of sorghum and millet germplasm collected in 1982. The work will continue in 1985.

RICE

With expansion of the area under cultivation with high-yielding varieties, the landrace materials are becoming scarce in many countries, even in the remoter areas. The numbers of samples collected per mission are decreasing because of the increasing difficulties in finding primitive cultivars.

Since the second IBPGR/IRRI Workshop on Rice Genetic Resources Conservation held at IRRI, Los Baños, Philippines, in April 1983, field collection activity has been accelerated to salvage the existing primitive germplasm and wild and weedy relatives. The Field Collector provided by the IBPGR has assisted the national programmes throughout South and Southeast Asia and Madagascar through the International Rice Germplasm Center (IRGC) at IRRI, Manila, the Philippines. Some financial assistance for field collection activities was also provided to IRRI by the IBPGR to meet in-country costs.

During 1984 the IBPGR/IRRI Collector visited Bangladesh, Bhutan, Madagascar, Sri Lanka and Thailand. In collaboration with scientists from BRRI, 103 accessions were collected from different parts of **Bangladesh.** Between Sept.–Nov. the IBPGR/IRRI Collector explored the Punakha, Shemgang and Chirang districts of **Bhutan** and 66 accessions were collected. An IBPGR-supported mission in **Madagascar,** fielded by FOFIFA, surveyed the central plateau and Lake Alaotra regions during May–June and collected 246 samples which included wild *O. longistaminata.* A second mission in Oct.–Nov. gathered an additional 74 samples of rice from the delta region of Betsiboka and in the Mampikony and Port Berger plains. A scientist from ORSTOM also participated in the exploration in collaboration with IRRI/IBPGR. In *Sri Lanka* during February, 108 traditional Maha varieties and 14 populations of wild *Oryza* species, including *O. rufipogon, O. nivara, O. officinalis* and *O. granulata* were collected.

In addition to the above, the IBPGR funded or supported the collection of rice germplasm in several other countries during 1984.

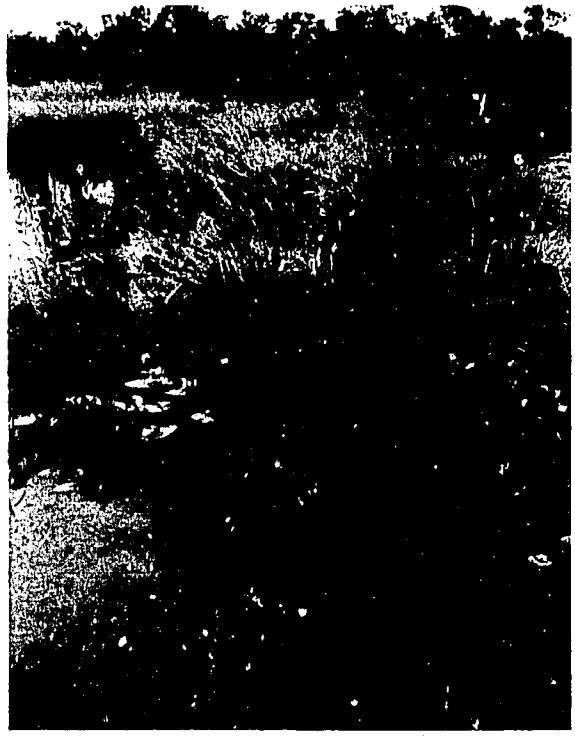
A collecting mission by IVRAZ, with support from the IBPGR, visited several areas of **Burkina Faso** during Nov. 1983 – Feb. 1984. A total of 527 samples of rice, including *O. sativa* (475), *O. glaberrima* (59), and *O. longistaminata* (2) was collected. In another mission to **Burkina Faso,** 14 samples of *O. barthii* were gathered during July 1984.

With funds from the IBPGR, ORSTOM, in collaboration with the CRRI, collected 43 samples of wild species of rice in western India during Sept.–Oct. 1984. The material collected included *O. nivara* (28), *O. officinalis* (2), *O. rufipogon* (4) and *O. sativa* (9).

In **Kenya** the University of Nairobi collected 250 samples, including a few samples of *O. longistaminata.*

During Nov.–Dec. Japanese scientists, fielded a multi-crop expedition in the Himalayan ranges of **Nepal** and collected 273 samples of rice.

In **Pakistan** the National Agricultural Research Centre collected 65 accessions of rice during October from the Northwest Frontier Province.



Wild rice in Niger

During Sept.-Nov. an IBPGR mission in **Niger** gathered *O. barthii* (4), *O. longistaminata* (2) and *O. punctata* (1). During a multi-crop collection mission the University of Niamey, **Niger** also collected 10 samples of rice.

In **Thailand** the Rice Research Station collected a few local samples of wild rice.

MAIZE

In November 1984 a Symposium on Genetic Resources of Maize in Latin America took place in Buenos Aires, Argentina, as part of the IBPGR's Tenth Anniversary celebrations. The Symposium was organized by the Academia Nacional de Agronomia y Veterinaria (ANAV), INTA and the Consejo Federal de Inversiones, and cosponsored by a number of public and private organizations. During the Symposium the work already accomplished on maize germplasm in the region, as well as the major limitations and gaps, was discussed.

- With IBPGR assistance since 1977 most of the collection, multiplication, evaluation and documentation of maize germplasm has been accomplished in the Southern Cone of Latin America through a cooperative programme of the following institutions and countries: UNA (Peru), CENARGEN (Brazil), IAN (Paraguay), INTA and the Universidad de Buenos Aires (Argentina), INIA (Chile), CIF (Bolivia), and the Universidad de la Republica (Uruguay).

- During the first decade of IBPGR work, nearly 6 000 samples were collected in the above seven countries (see Table 1). Approximately 85% of these samples have been classified into 157 races and of these races 78 racial composites have already been made after examining about 60% of the samples. These procedures facilitate the use of the material, while each individual collection remains intact and available. More than two-thirds of the samples have been characterized and evaluated for a number of descriptors. Catalogues for Argentina, Brazil, Bolivia, Chile, Paraguay and Uruguay have already been published and one for Peru is under preparation. These catalogues identify the samples collected and provide available data on their characterization and preliminary evaluation.

- Duplicates of all material collected have been sent for long-term storage to the IBPGR-designated conservation centre at NSSL, Fort Collins, Colorado, USA.

The Symposium also identified gaps in Latin American collections as northern Brazil, the Guyanas, Venezuela and the Orinoco Valley in Colombia. There is a lack of storage facilities in Chile and Uruguay and those in Bolivia and Paraguay must be improved. Full detailed information of this regional programme is provided in Spanish in a paper published in 1984 with IBPGR support by the Maize Co-operative Research Programme of UNA, Lima, Peru. This paper is available from the IBPGR Secretariat.

During 1984 the IBPGR continued collecting activities. Support began to a two-year project to complete collecting in **Brazil** in the northeast, southeast, west central and northern regions of the country. In **Spain** INIA continued collecting activities initiated in 1981 to cover the entire country and a total of 1 743 samples had been collected through 1984. In 1984, 339 samples were collected in Andalucia (69), Santander (110), Asturias (120) and Galicia (40). In **Thailand** the Insitute of Field Crops, Department of Agriculture, concluded a collecting mission begun in 1983. A total of 168 accessions of glutinous maize and 90 accessions of popcorn samples were gathered. The seeds - which will be multiplied and distributed shortly - are now held in the IBPGR-designated genebank at TISTR, Thailand and the Rice Genebank, Rangsit.

Additional samples of maize were also gathered during multi-crop collecting missions supported by the IBPGR in **Algeria** (15), **Bolivia** (56), **Burkina Faso** (127 since 1982), **Mauritius**, **Morroco** (13) **Nicaragua** (25), **Niger** (19), **Pakistan** (45), **Zambia** (66).

During 1984 UNA, **Peru**, supported by IBPGR, continued work started in 1982 to characterize and document Peruvian maize germplasm. The IBPGR also supported **CIMMYT** in Mexico to improve its seed storage facilities for maize germplasm by converting rooms for medium-term storage (0°C) into long-term (-10°C) storage.

Support continued during 1984 for the evaluation of the maize collected in 1981-82 by the Chung-Nam National University, **Rep. of Korea.**

Table 1. Analysis of maize collected by IBPGR from Southern Cone (1977-84)

Country	No. of samples				No. of races*		No. of samples used to make racial composites (%)
	Samples	Classified (%)	Catalogued (%)	Evaluated (%)	Identified (%)	Racial composites (%)	
Argentina	1 746	91	70	69	43	74	1 521 (87)
Bolivia	1 517	89	45	30	42	21	189 (12)
Brazil	687	61	62	54	18	11	387 (56)
Chile	536	91	100	100	23	17	173 (32)
Paraguay	228	100	92	92	11	91	210 (92)
Peru (jungle)	354	74	100	94	10	20	216 (61)
Uruguay	857	86	99	99	10	100	731 (86)
Total	5 925				157		3 427

* No. of descriptors vary for each country and range from 50 in Argentina to 10 in Brazil

OTHER CEREALS

Andean cereals have been collected in Ecuador, Bolivia and Peru since 1977 through national and regional organizations. Many samples of these crops have already been gathered (see previous annual reports). It is known that wild relatives are not satisfactorily represented in the collections. An effort to characterize and document the present material must also now be made. During multi-crop collection in 1984 some samples were collected in **Bolivia** (*Amaranthus caudatus* - 18), **Ecuador** (*Amaranthus* spp. - 8 and *Chenopodium quinoa* - 3) by CIF and INIAP respectively.

During multi-crop collection in 1984 a few samples of rye **(Tunisia)** and oat **(Morocco)** were gathered.

FOOD LEGUMES

Food legumes are potentially the most valuable and yet probably the least developed of the naturally occurring sources of vegetable protein, calories, vitamins and minerals. Some crops such as soyabean and groundnut are also rich in oil. Unlike cereals, pulses have been grown for centuries under marginal conditions of moisture stress and low soil fertility in tropical and subtropical areas. Unfortunately the yield levels of most food legumes remain low and with the advancement of modern agriculture this is leading increasingly to replacement of pulses by high-yielding cereals.

In order to preserve and utilize the genetic variability for the improvement of food legume crops, the IBPGR has, during its first decade of work, given high priority to several legume crops. Initially the Board established an Advisory Committee on *Phaseolus* beans; this is jointly sponsored by the IBPGR and CIAT. Then it supported the collection of a substantial amount of *Arachis* germplasm in its centre of diversity in South America. Later it convened working groups on groundnut, *Vigna* species and soyabean to advise the Board on action programmes for genetic conservation. A training course on food legume germplasm was organized and a directory of food legume germplasm published in 1981 which is being expanded and updated for publication in a second edition during 1985.

Since 1976 the IBPGR organized and/or supported collecting missions for various food

legumes in many parts of the world. In this endeavour the Board has collaborated closely with international centres or programmes especially CIAT (*Phaseolus* beans), ICRISAT (groundnut, chickpea and pigeonpea), ICARDA (*faba* bean and lentils), IITA (cowpea), AVRDC (mung bean and soyabean) and INTSOY (soyabean) and numerous national programmes in Africa, Asia, Australia, Europe and Latin America. These efforts have resulted in the acquisition of several thousand new samples. The IBPGR has also initiated, in association with the collaborating institutes, the establishment of data bases for several food legume crops' germplasm (e.g. *Phaseolus* beans, groundnut, soyabean, cowpea, winged bean, chickpea, etc.); this work is ongoing.

During 1984 the IBPGR continued its efforts in mobilizing the collection, conservation, evaluation and documentation of food legume crops' genetic resources.

PHASEOLUS

The CIAT collection of *Phaseolus* has reached a total of 35 099 accessions of which 88.5% are *P. vulgaris*, 7.2% *P. lunatus*, 3.5% *P. coccineus*, 0.6% *P. acutifolius* and 0.2% wild species. More than half of the total germplasm received so far has been increased and made available for distribution.

During 1984 the IBPGR continued the collection of *phaseolus* germplasm in cooperation with CIAT in Latin America.

IBPGR is also supporting — in association with **CIAT** — an ecogeographical study of the genus *Phaseolus*. This study will place emphasis on geographical distribution, especially for wild *Phaseolus*, with planning to fill gaps in collection in Latin America.

In **Mexico**, experts from the University of Arizona, USA and INIA, Mexico collected 113 samples of 17 species of wild *Phaseolus*.

Other samples have been collected during multi-crop missions carried out during 1984 with IBPGR support in **Bolivia** (13), **Ethiopia** (41), **Greece** (29), **Madagascar** (24), **Nicaragua** (73), **Pakistan** (5) and **Zambia** (28).

In **Kenya** the Plant Quarantine Station of the Kenyan Agricultural Research Institute rejuvenated 2 000 accessions of P. vulgaris during 1984. In **Peru** the National University of Huanuco, supported by IBPGR, started a project for the multiplication, characterization and preliminary evaluation of *Phaseolus* germplasm collected in previous years. The evaluation is being carried out in three different ecological areas.

The Faculté de sciences agronomiques de l'Etat, Gembloux, **Belgium**, continued to analyse and document available plant genetic resources data for *P. vulgaris*, in order to prepare a global status report. This work was initiated in 1982 and is supported by IBPGR.

GROUNDNUT

In 1976 the IBPGR initiated a cooperative project for the collection of *Arachis* germplasm in South America. In this project the IBPGR established close links with several organizations including: ICRISAT; USDA-ARS; Texas A & M University; INTA, Argentina; INIAP, Ecuador; CENARGEN/EMBRAPA, Brazil; Universidad de la Republica, Uruguay; etc. During the IBPGR's first decade of work, exploration missions were fielded in Argentina, Bolivia, Brazil, Ecuador, Paraguay, Peru and Uruguay which collected *ca.* 2 000 accessions of which one-third belong to 50 wild *Arachis* species. Many of these wild species had not been previously collected. Figure 1 illustrates the zones collected.

The samples collected were shared between the host countries and the participating institutions. The Texas A & M University, **USA** has also taken the responsibility to multiply and distribute the samples to IBPGR-designated

Wild *Arachis* sp. (J.F.M. Valls)

base collections and to other interested institutions. *A Catalogue of Arachis Germplasm Collections in South America (1976-83)* was jointly published by TAES and the IBPGR in 1984. The characterization and evaluation activity of TAES, USA which began in 1982 on *Arachis* collected in South America with support from the IBPGR, continued in 1984.

During 1982-83, CENARGEN/EMBRAPA, Brazil, with support from the IBPGR, established an international field collection of perennial *Arachis* species. Maintenance of this collection is very promising and some species produced seeds which are now being conserved in long-term storage. In addition CENARGEN/EMBRAPA, also continued field collection with IBPGR support. During August 1984, the IBPGR, in collaboration with scientists from the USA, explored the Parah, Mato Grosso and Goias states of **Brazil** and collected 27 accessions of wild **Arachis**, 25 cultivated types and 17 nodule samples.

During multi-crop collection by the University of Niamey, with IBPGR support, 18 samples of groundnut were collected in **Niger.**

The Universidad de la Republica, **Uruguay**, with funding from the IBPGR, collected *A. burkartii* (30) and *A. hypogaea* (77) during April.

The Gentic Resources Unit of ICRISAT fielded a multi-crop collection mission in the Eastern Ghats regions of India in which 23 samples of groundnut were collected.

SOYABEAN

In August 1982 the IBPGR sponsored a working group on the genetic resources of *Glycine* species, in conjunction with INTSOY, at the University of Illinois, Urbana, USA and formulated a comprehensive plan integrating various aspects of germplasm identification, priorities for collection, conservation, evaluation and documentation.

Following the working group meeting the Board has initiated action in collaboration with INTSOY and a directory of soyabean germplasm collections has been prepared for publication in 1985. The ongoing INTSOY/IBPGR project has also made some progress in the computerization of soyabean germplasm data. The IBPGR published a descriptor lists for soyabean - both in Chinese and English - in late 1984.

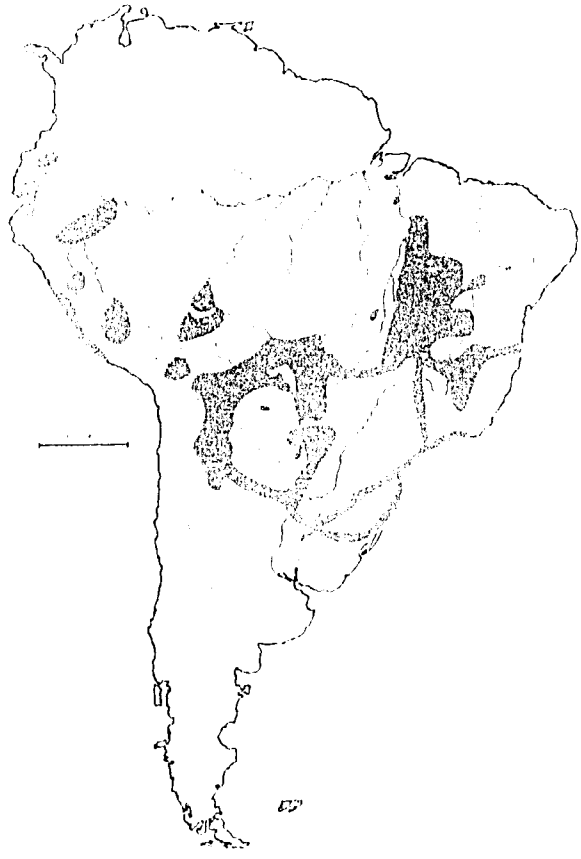


Figure 1. Areas of *Arachis* collection by IBPGR (1976-83)

In 1984 the IBPGR provided assistance for collecting activities in Australia, China and Nepal.

In 1983 CSIRO and USDA explored Cape Yoro peninsula and Queensland province for perennial species of *Glycine*. A second mission explored the northern and western provinces of Australia during 1984 and the collected samples included two undescribed species. With IBPGR funds, **CSIRO** is also multiplying *Glycine* material for deposition in base collections and distribution to all interested scientists.

In 1984 the Nanjing Agricultural University (NAU), **China**, fielded missions in Henan, Shanxi, Hunan, Sichuan, Jiangsu, Zhejiang and Jiangxi Provinces and collected 217 landraces of soyabean (155 accessions of summer planting types and 62 spring types). The collection at NAU comprises 2 232 accessions from 14 provinces and is being systematically characterized and evaluated at different locations. This collection and evaluation work will continue for 3-4 years.

During Nov.-Dec. Japanese scientists explored the western and eastern foothills of the Himalayas

in **Nepal** and collected 95 samples of soyabean.

AVRDC, with a grant from the IBPGR, began systematic multiplication, characterization and evaluation and documentation during 1983. This activity will continue for the next 4-5 years and the materials will be duplicated in IBPGR-designated genebanks.

VIGNA

In September 1981 the IBPGR convened a working group on *Vigna* species so that the Board's activities could be widened to a range of species other than cowpea. Between 1976 and 1980, with some financial assistance from the IBPGR, the Genetic Resources Unit of IITA collected *ca.* 12 000 cowpea and 1 400 Bambara groundnut samples from sub-Saharan countries in Africa. The assembling and conservation of *Vigna* germplasm was also carried out by AVRDC and the national programmes of many countries including Australia, China, India, Japan, Korea and the Philippines.

The largest collections of cowpea (12 000) and mung bean (5 119) are held at IITA and AVRDC respectively. The regional genebank in the Philippines also maintains 5 000 mung bean accessions. The NBPGR, India, holds sizeable collections of various Asiatic *Vigna* species and has published catalogues of these collections. With IBPGR support these collections are being systematically characterized and evaluated and arrangements made for the deposition of duplicate samples in IBPGR-designated base collections. The documentation of information is in progress in all these locations.

During multi-crop collecting with IBPGR support in 1984, samples of *Vigna* germplasm were collected in **Niger** (84), **Pakistan** (13) and **Zambia** (38). Japanese scientists, with special project funding from IBPGR, collected 107 samples of cowpea in **Nepal.**

The IBPGR has finalized descriptor lists which will be published in 1985 for *Vigna radiata* and *V. mungo; V. acontifolia* and *V. trilobata;* and *V. umbellata and V. angularis.*

IITA organized a World Cowpea Research Conference 5-9 November 1984 at its Headquarters in Ibadan, Nigeria. At this meeting the Genetic Resources Unit of IITA celebrated the Tenth Anniversary of the IBPGR. Nearly 150 scientists from throughout the world attended and a group of 15 participants discussed the progress of germplasm collection, conservation and evaluation and agreed upon priorities for action.

WINGED BEAN

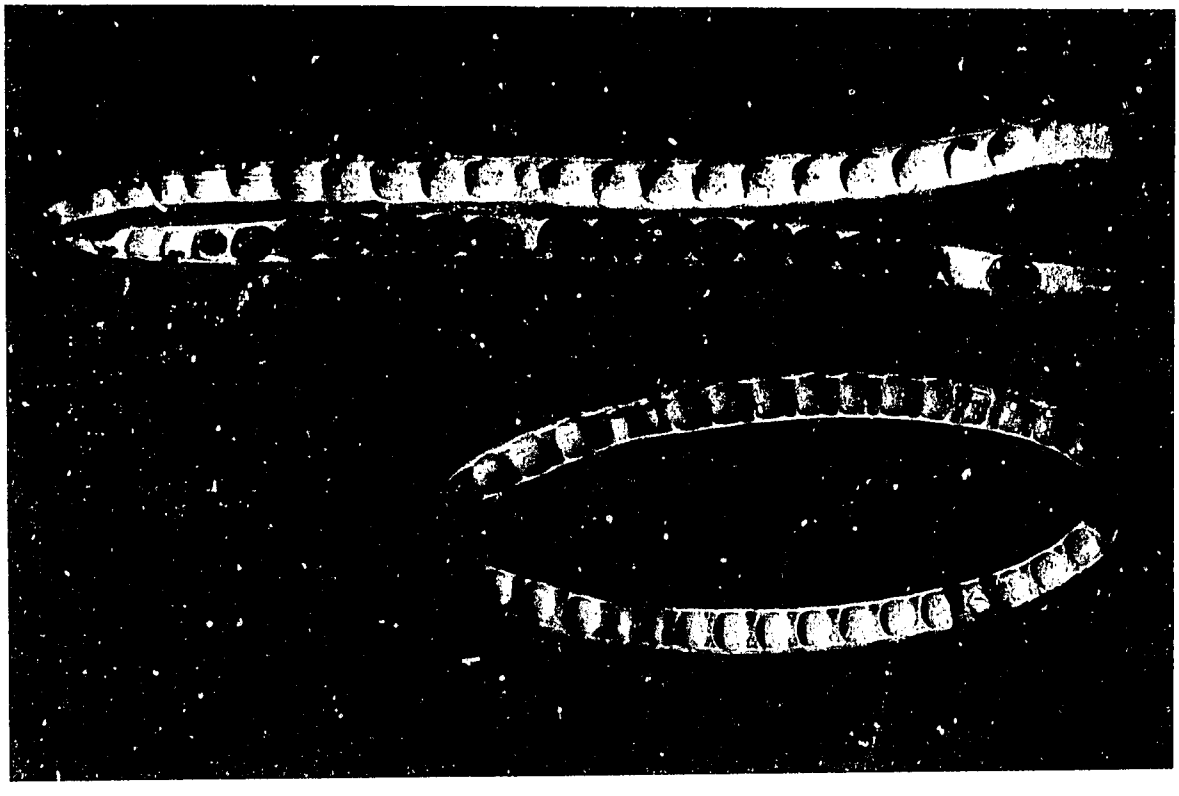
Most of the variability of winged bean *(Psophocarpus tetragonolobus)* cultivars has been collected, with the exception of Burma and China.

The IBPGR is supporting a three-year (1982-85) collecting project in **Malaysia,** operated by the National University of Malaysia. As a result 225 cultivars are now held in a collection and the samples were planted in 1984 for multiplication and characterization.

A 1982 IBPGR survey of winged bean collections worldwide revealed the complete absence of wild related species. During 1982-83 some material was collected in Ghana, Kenya and Uganda (see *1983 Annual Report).* In Jan.-Feb. 1984 the IBPGR attempted to widen the genepool in collections with samples of *Psophocarpus palustris* from West Africa: **Gambia, Guinea-Bissau** and **Sierra Leone.** This mission was undertaken by the Royal Botanic Gardens, Kew, UK in association with TISTR, Thailand.

Emphasis during 1983-84 was placed on multiplication, characterization, and documentation of samples and their deposition in designated base collections in the Philippines (NPGRL/IPB) and **Thailand** (National Genebank, TISTR). Most of the 600 accessions in the Philippines have been multiplied and documented and attempts will be made to duplicate other collections from Asia at NPGRL. Due to severe weather conditions, the 1983 multiplication of 500 accessions maintained by TISTR, Thailand was unsuccessful. In 1984 the IBPGR provided an additional grant for the multiplication of the surviving 299 accessions and sufficient seed is now available for long-term conservation in the Philippines and Thailand.

In addition to the IBPGR-designated base collections, a major world collection is being established at the International Dambala (Winged Bean) Institute in **Sri Lanka.** This Institute, established in 1982, maintains duplicates of collection from Bangladesh, Indonesia, Thailand and other Asian countries and about 250 pure lines have been isolated for further testing by cooperating scientists worldwide.



Seed number per pod, winged bean (G. Shivashankar)

LUPIN

The IBPGR has assigned priority to *Lupinus mutabilis* because of its wide use as food in the Andean zone. Other species (e.g. *L. albus*, *L. angustifolius*, *L. luteus*) are of interest in the Mediterranean region but rate a lower priority for IBPGR support.

During 1984 *L. mutabilis* samples were collected during multi-crop exploration carried out by national organizations and supported by IBPGR in: **Bolivia,** through CIF in Pairumani (13) and in **Ecuador** through INIAP (5).

In the Mediterranean region the Department of Agriculture of Western Australia, in association with the national programme of Greece, collected populations of *L. angustifolius* (70), *L. micranthus* (6), *L. pilosus* (4), *L. albus* (2) *L. luteus* (2) and 25 root nodule samples in **Greece.**

During the Third International Lupin Congress at La Rochelle, France, in June 1984, a working group on genetic resources was attended by more than 50 scientists. During the meeting, the necessity to collect *L. graecus* and *L. mutabilis* germplasm was emphasized as well as the need for a general inventory of germplasm stocks of lupin held in genebanks worldwide.

OTHER LEGUMES

The Genetic Resources Unit of ICRISAT is particularly involved in the collection and assembling of chickpea and pigeonpea germplasm. Most of the collection of landrace material has been completed and the Genetic Resources Unit presently holds *ca.* 14 000 chickpea and 10 000 pigeonpea accessions. During 1984 ICRISAT, in collaboration with PGRC/E, collected 104 samples of chickpea germplasm in Ethiopia.

The Genetic Resources Programme of ICARDA also conserves chickpea - Kabuli types (5 350) - in addition to *faba* bean (3 100), pea (3 100) and lentil (5 500). ICARDA has published catalogues of chickpea and lentil germplasm and during 1984 the *Genetic Resources and Their Exploitation - Chickpeas, Faba Beans and Lentils* was copublished by the IBPGR with ICARDA.

In 1984 a descriptor list for chickpea was fin-

alized and will be published in 1985 as a joint ICRISAT/ICARDA/IBPGR publication. Descriptor lists for *faba* bean and lentil will be finalized and published in 1985.

The Genetic Resources Unit of IITA, in addition to cowpea and Bambara groundnut, also maintains a small collection of Kersting's groundnut, *Canavalia* spp., *Lablab purpureus* and a few other minor legumes.

Other legumes were collected during 1984 in multi-crop missions supported by the IBPGR. In **Bolivia** CIF collected *Vicia faba* (37); in **Cyprus**, ARI collected *Lens culinaris* (19) and *Pisum sativum* (6) during May-July; during July-Oct. the Fodder Crops and Pastures Institute, Larissa collected *Cicer* spp. (35), *Lathyrus* spp. (10), *Lens* spp. (22) and *Vicia* spp. (37) in **Greece.** INRA, the Istituto del Germoplasma, Bari and ICARDA explored **Morocco** during May-June and collected *Lens* spp. (9) and *Vicia* spp. (43). The University of Niamey collected Bambara groundnut (34) in **Niger**.

ROOT AND TUBER CROPS

The IBPGR work on root and tuber crops began with working groups on sweet potato (1980) and cassava (1981 & 1982) which defined collecting priorities and proposed responsibilities for conservation. Since then, activities for these two crops have proceeded in a more systematic manner. In the case of potato, major responsibility for germplasm preservation lies with CIP, and IBPGR has only provided support to fill gaps. Other root and tuber crops have been considered of local importance, and IBPGR support to collect and conserve them has been given to specific national and regional projects on an *ad hoc* basis.

CASSAVA

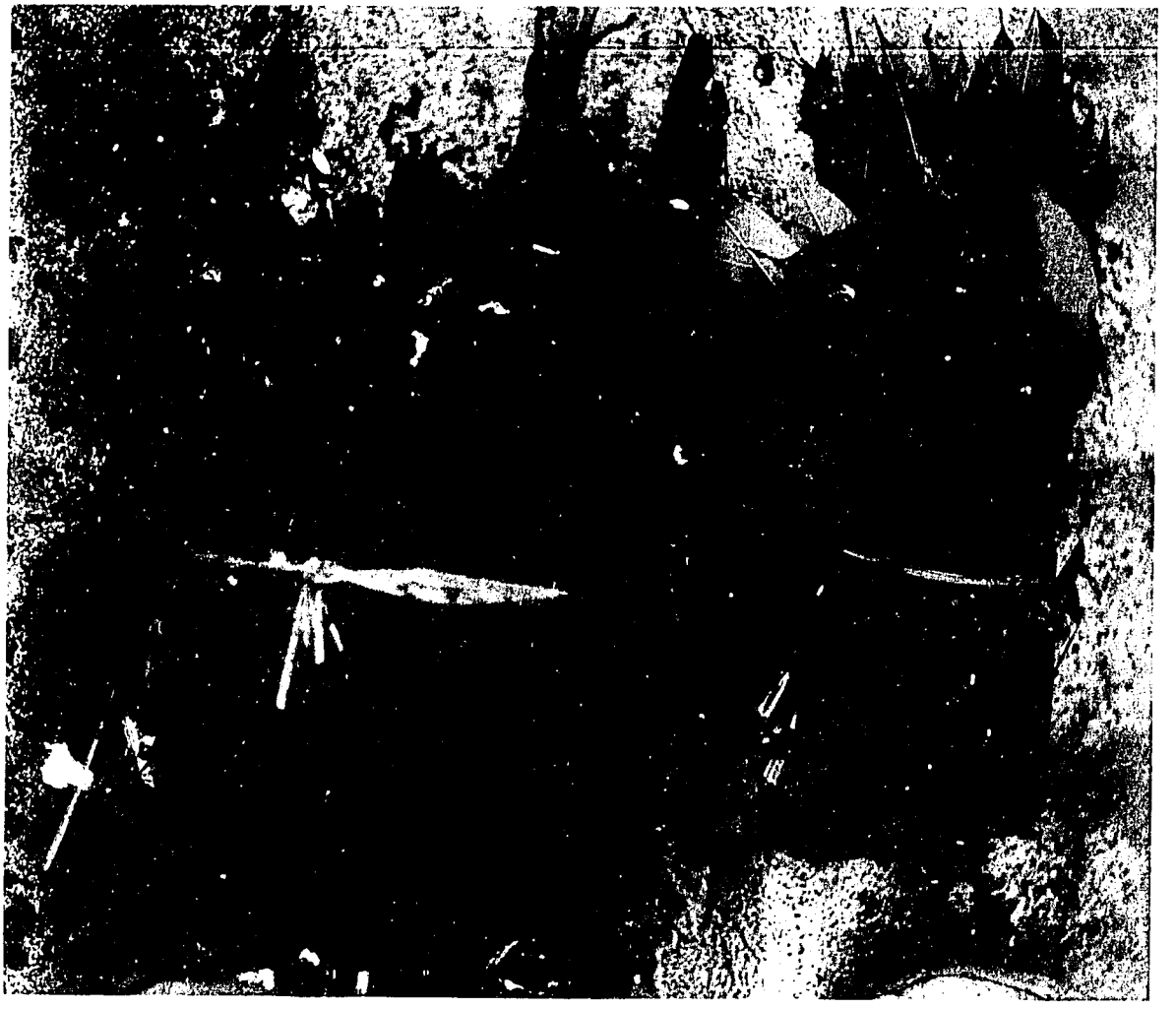
The IBPGR has an ongoing programme of support to **CIAT's** activities on the genetic resources of *Manihot* spp. Until now major emphasis has been on collecting, in association with national institutions in Latin America, and on transfer of duplicates of major collections - through *in vitro* culture - to the CIAT genebank.

During 1984 the IBPGR supported the transfer of 135 samples from CATIE, **Costa Rica** and 23 samples from IDIAP, Rio Hato, **Panama.** A summary of the *in vitro* transfer programme to CIAT during the first decade of work is shown in Table 2. The IBPGR also provided funds to CIAT to continue to collect *Manihot* spp. and in cooperation with IAN, Paraguay, 46 samples were gathered in **Paraguay.**

CENARGEN, Brazil began a three-year project, with IBPGR support, to collect in the east and west-central zones of **Brazil.** In 1984 a total of 99 accessions of *Manihot esculenta* and 32 samples of a number of wild species were

Table 2. Transfer of cassava samples to CIAT as *in vitro* cultures (Aug. '84)

Provenance of germplasm	No. of samples
INIPA, Chiclayo, Peru & Pedro Ruiz Gallo University	153
INIPA, Tarapoto, Peru	80
CNPMF, Bahia, Brazil	240
CENARGEN, Brasilia, Brazil	45
UEPAE, Manaus, Brazil	84
IPAGRO, Rio Grande do Sul, Brazil	82
EMGOPA, Goias, Brazil	121
CPATU, Para, Brazil	74
EMEPA, Paraiba, Brazil	3
Indian Res., Amazon, Brazil	9
Santa Catarina, Brazil	172
CPAC, Brasilia, Brazil	56
IAN, Cacupé, Paraguay	154
Fac. Ciencias Agrarias, Corrientes, Argentina	21
CATIE, Turrialba, Costa Rica	135
IDIAP, Rio Hato, Panama	23
Total	1 452



Cassava

collected in Bahia, Goias, Minas Gerais and Espirito Santo.

A number of samples of *Manihot* spp., mainly cultivated *M. esculenta*, were also collected in 1984 during IBPGR multi-crop collecting missions in: **Guatemala** through the Universidad de San Carlos and ICTA (55); **Peru** through the Universidad de San Cristobal de Huamanga (49); **Solomon Islands** (5); and **Uganda** by the Root Crops Improvement Institute.

In **Guatemala** the Universidad de San Carlos and ICTA, with IBPGR support, began the characterization and multiplication of accessions collected in previous years. Twenty-five cultivars from north and northeast Guatemala were characterized during 1984.

CIAT has continued, in association with the IBPGR, to develop *in vitro* culture methods for the propagation and conservation of wild *Manihot* species. The Plant Biotechnology Institute, Saskatoon, **Canada**, also with IBPGR support, continued working on the development of cryopreservation techniques for cassava genetic resources. The Board has also provided assistance to the Universidad Nacional Pedro Ruiz Gallo in Lambayeque, **Peru** to improve techniques in the preparation of *in vitro* culture of cassava and sweet potato.

SWEET POTATO

The IBPGR has been supporting sweet potato collecting since 1980; 11 countries have been explored, resulting in a total of *ca.* 4 500 accessions.

During 1984 collecting activities were only

undertaken through projects already initiated in 1982–83. The Universidad de San Carlos, in cooperation with ICTA, collected 40 sweet potato cultivars in **Guatemala.** A two-year (1983-85) project in **Papua New Guinea** collected during 1984. The collecting project through the Universidad de San Cristobal de Huamanga gathered 262 samples in 1984 in **Peru** and a total of 499 for the entire project (1982-84). The root crop collecting project in the **Solomon Islands** explored in Ysabel Island and 30 sweet potato cultivars were collected. The Chiang Mai University carried out additional collecting missions in the northeastern and central parts of **Thailand** in which a total of 124 samples were obtained. Although the implementation of the two-year (1984-85) IBPGR-funded sweet potato and cassava collecting project in **Uganda** was delayed, collecting activities started in 1984.

It is anticipated that the collecting of sweet potato cultivars will be further reduced. From 1985 onwards more emphasis will be given to the collection of wild *Ipomoea* species and the IBPGR is planning to appoint a full time collector for this purpose.

Increased attention is being given to the characterization and documentation of the collected materials and funds for this purpose have been provided to **Guatemala** and **Thailand.** In order to strengthen this aspect, the IBPGR posted interns in **Papua New Guinea** and the **Solomon Islands,** who commenced their activities in March 1984.

Most of the past collecting efforts have been in Asia and the Pacific and substantial national collections have been established in most countries. In addition to the efforts to characterize and document these collections, the IBPGR, in cooperation with AVRDC, is stimulating the transfer of material to the IBPGR-designated world collections. Most of this will be in the form of true seed obtained from polycrosses, but some selected vegetative material will also be transferred to AVRDC. In order to facilitate the transfer of this vegetative material, the IBPGR initiated a two-year (1984-85) project to provide AVRDC with a post-entry quarantine screenhouse.

The IBPGR-supported two-year (1983-85) project on the preliminary evaluation of morphological and cytological traits of *Ipomoea* collections, made substantial progress during 1984. The project, which is carried out by the Department of Biological Sciences, Florida Atlantic University (FAU), **USA,** continued the literature survey, the collection of data and a preliminary analysis of representative samples of several taxa, and updated the descriptors for evaluation. In addition the *Ipomoea* seed collection at FAU was computerized and cross-referenced for facility of access and data retrieval.

The coordinator of the Florida project also organized the first IBPGR-supported training course on handling of sweet potato germplasm from 13 August to 21 September 1984. The course was held in the following three locations: FAU (systematics, characterization and documentation), USDA Vegetable Laboratory, Charleston, South Carolina (breeding, *in vitro* conservation, polycrosses) and North Carolina State University, Raleigh, North Carolina (collecting, shoot tip culture and virus-indexing). The course was attended by six participants from **Colombia** (1), **Costa Rica** (1), **Dominican Republic** (1), **Guatemala** (1) and **Peru** (2).

The IBPGR-supported research project on *in vitro* conservation of sweet potato germplasm continued during 1984. This project is carried out by Clemson University, South Carolina, USA in association with the USDA Vegetable Laboratory, South Carolina and with the USDA-supported work on disease indexing at North Carolina State University. Substantial progress has been reported and a manual on meristem culture and virus indexing of sweet potatoes is expected to be available in 1985.

POTATO

CIP has the major world responsibility for the conservation, evaluation and documentation of potato germplasm collections. Following the guidelines of each planning conference, CIP has continued during 1984 to support missions to collect, conserve and document germplasm.

The IBPGR continued its support during 1984 to multi-crop collecting missions in which wild *Solanum* species were collected. In **Guatemala,** ICTA and the Universidad de San Carlos collected 16 samples of *Solanum* spp. (a total of 86 samples has been collected since 1982). In **Uruguay** the Universidad de la Republica collected 32 samples of *Solanum commersonii.* In **Colombia,** ICA multiplied and evaluated germplasm of wild potato collected in 1983 with IBPGR support.

Wild yam, TISTR

OTHER ROOTS AND TUBERS

Andean roots and tubers have been collected in Ecuador, Bolivia and Peru since 1977 through national and regional organizations. Much variability of these crops has already been gathered as reported in previous annual reports. A large part of this material still needs to be characterized and documented. During 1984 some samples were collected in **Peru** *(Oxalis tuberosa* 93, *Tropaeolum tuberosum* 22, and *Ullucus tuberosus* 53*)* and **Ecuador** *(Ullucus tuberosus* 10, *Oxalis tuberosa* 11, *Tropaeolum tuberosum* 4*)* in multi-crop collecting missions carried out by the Universidad de San Cristobal de Huamanga and INIAP respectively.

The IBPGR-supported project in **Burkina Faso** — carried out by IVRAZ — gathered a total of 400 samples of *Dioscorea* spp. during 1982-84.

As a follow-up to the 1983 exploratory mission in central and western **Ivory Coast** by the Laboratoire de génétique, Faculté des sciences, Université national, Abidjan, the following *Dioscorea* material was collected in February 1984: 49 *D. alata*, 35 *D. bulbifera*, 39 *D. cayenensis-rotundata* complex, 17 *D. hirtiflora*, 13 *D. mangenotiana*, 28 *D. minutiflora*, 41 *D. praehensilis*, and 22 samples of several other species. The third and final year of the project began with the exploration of eastern Ivory Coast in May-June 1984 in preparation for collecting in early 1985. On completion of this three-year collecting period, the *Dioscorea* collection in Ivory Coast will contain around 1 000 accessions. It is anticipated that further IBPGR support will be provided for the characterization, documentation and sorting of redundant duplication during 1985.

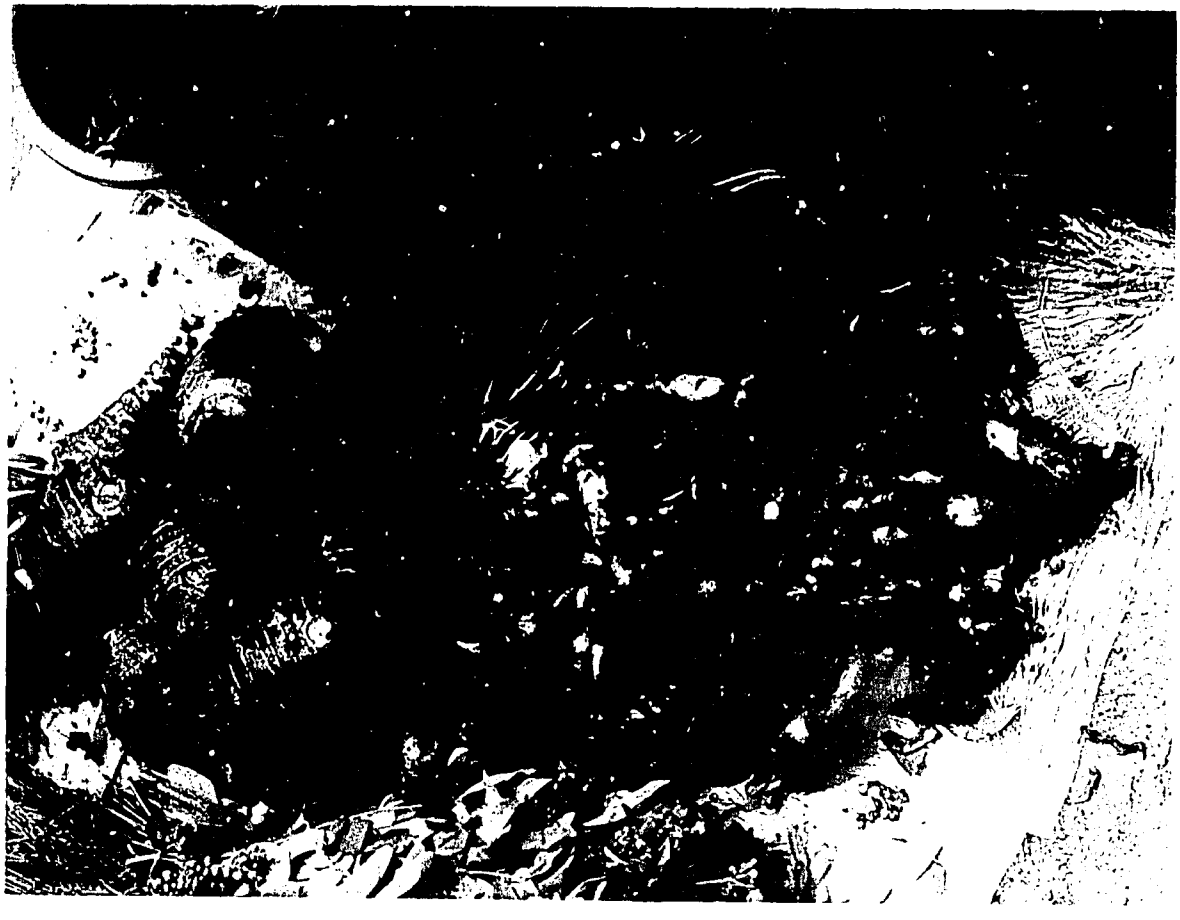
The multi-crop collecting expedition in **Nepal** (special project IBPGR/Japan) obtained the following material of root and tuber crops: *Colocasia esculenta* (26), *Dioscorea* spp. (8) and *Zingiber officinale* (5).

The Universidad San Cristobal de Huamanga collected 11 samples of *Colocasia* in **Peru** during the period 1982-84 as part of its multi-root and tuber crops collecting project.

The **Solomon Islands**, with IBPGR support, has started a three-year (1983-86) project on the collection, evaluation and conservation of native root crops. This project is further supported through the appointment of an IBPGR intern who commenced activities in March 1984. During 1984 a collecting mission was fielded to Ysabel Island and, besides sweet potato and cassava, 15 *Colocasia esculenta*, 4 *Dioscorea alata* and 4 *D. esculenta* samples were collected. Substantial progress has been made on the characterization of the existing root and tuber crops collections. The cassava, sweet potato and taro collections are maintained in the field, but the *Dioscorea* collection is harvested after each growing season and stored in the newly constructed yam-store. The Solomon Islands research officer in charge of this project attended the 1984 IBPGR documentation course and a micro-computer will be provided by the IBPGR early in 1985.

The IBPGR is supporting a root and tuber crops collecting project in **Sri Lanka**, carried out by the Department of Crop Science, Faculty of Agriculture, University of Peradeniya. Up to early 1984 a total of 474 samples had been collected, mainly consisting of *Dioscorea alata*, *D. bulbifera* and *D. esculenta*.

Two major research projects have been initiated on *in vitro* conservation of taro and *Xanthosoma* with IBPGR support. The project on taro is executed by Northeastern University, Boston, **USA** and the one on *Xanthosoma* by the Department of Tropical Crop Science, Agricultural University, Wageningen, **Netherlands** (see p. 72).



VEGETABLES

A major programme on vegetables was initiated by the IBPGR in 1980. During the period 1980-83 more than 8 000 samples of both major and minor vegetable species had been collected through IBPGR missions. In the same period a number of national and regional programmes had increased their collecting activities (e.g. Brazil, China, CATIE — Costa Rica, EC countries, Ethiopia, India, Nigeria, USA, etc.) and at least 10 000 samples have been collected through these programmes. Although the collecting activities slowed down in 1984, it can be expected that by 1985-86 at least 25 000 samples will have been added to the world collections, i.e. nearly a doubling of the collections which were available in 1979.

Most of the above mentioned samples represent cultivated vegetables. The IBPGR will reduce its collecting efforts for these materials, with the exception of missions (i) in very specific areas of high diversity not previously sampled, and (ii) in areas of severe genetic erosion.

For a number of the important vegetable crops the collection of wild relatives has already been initiated, e.g. tomato (1980), eggplant (1981), *Brassica* (1982) and *Allium* (1983). Further emphasis will be given to this activity and the programme will be expanded with the collection of wild relatives of *Capsicum* (starting in 1985), Cucurbitaceae (1985) and okra (1985-86).

During 1984 increased attention was given to the multiplication, characterization, documen-

tation and duplication of vegetable samples in IBPGR-designated genebanks; details are reported in the crop sections below. Central data bases have been, or are in the process of being, established for *Allium* (NVRS and RCA as part of the Special Project ECP/GR), amaranths (USA), *Capsicum* (CATIE/IBPGR), *Cucumis* (Spain/IBPGR), eggplant (University of Birmingham/IBPGR) and okra (ORSTOM/IBPGR).

During the period 1980-84, a number of important genebanks had expanded their vegetable holdings, and some were specifically established for the conservation of vegetable germplasm, e.g. at the Beijing Vegetable Research Center, Beijing, China; at AVRDC, Taiwan, China; at IIHR, Bangalore, India; at NIHORT, Ibadan, Nigeria; at the Horticultural Research Station, ARC, Wad Medani, Sudan and at the NVRS, UK.

TOMATO

Tomato *(Lycopersicon esculentum)* and its wild relatives have been well collected. The only areas which remain to be explored for wild species are southern Peru and northern Chile.

A vegetable germplasm collection mission during Oct.-Nov. in **Peru** by UNA, with IBPGR support, collected 61 samples of **Lycopersicon** spp. Also in 1984 multi-crop collecting missions, some tomato germplasm was collected in **Ecuador** (5), **Guatemala** (7), **Morocco** (2), **Nepal** (9), and **Spain** (215).

ALLIUM

In the context of the ECP/GR, a second meeting of the *Allium* Working Group was held at RCA, Tápiószele, Hungary from 29-31 May 1984 (see p.). The Chairman of this Working Group provided a summary of the agreed workplan to the Third EUCARPIA *Allium* Symposium, Wageningen, Netherlands, 4-6 September 1984 in order to stimulate the interest and participation of *Allium* breeders.

Increased emphasis has been placed on the collection of wild *Allium* species during 1984.

The IBPGR continued to fund a project in Israel, which is carried out by the Faculty of Agriculture, Hebrew University of Jerusalem. During 1983 most of the collected material (see *1983 Annual Report)* was obtained from the southern and central parts of the country. Collecting in 1984 concentrated on northern **Israel** and 61 samples of 17 known *Allium* species were collected. In addition a similar number of samples belonging to previously undescribed *Allium* species were obtained, and these will be identified during the 1985 flowering season. The characterization and evaluation of the entire collection is in progress. Towards the end of 1984, the University of Kashmir, Srinagar, **India**, with IBPGR support, started a three-year (1984-87) project for the collection, multiplication and evaluation of wild and cultivated species of *Allium* in the Himalayan and sub-Himalayan regions of India.

During multi-crop collecting missions supported by the IBPGR in 1984, the following *Allium* germplasm was collected: **Algeria** (14 samples of onion and garlic), **Colombia** (2 *A. fistulosum)*, **Italy** (1 *A. ampeloprasum*, 2 *A. cepa*, 5 *A. commutatum*, 1 *Allium* sp.), **Nepal** (20 *Allium* spp.) and **Spain** (54 *A. cepa* and 41 *A. sativum)*.

Wild *Allium* sp

In 1984 the IBPGR expanded its network of designated base collections and field genebanks for *Allium* with the designation of institutes in Czechoslovakia, Hungary and Israel (see p. 67).

The IBPGR-funded study on the necessity and feasibility of *in vitro* conservation of *Allium* germplasm progressed well during 1984 through a literature survey, detailed questionnaires to over 100 researchers and site visits to selected laboratories in Aug.-Sept. This study is being carried out by the Faculty of Agriculture, Hebrew University of Jerusalem, Israel and the report is expected to be available in 1985 (see p. 70).

AMARANTH

During 1984 multi-crop collecting missions supported by the IBPGR, germplasm of amaranths was collected in: **Bolivia** (18), **Ecuador** (8), **Guatemala** (19), **Nepal** (80) and **Zambia** (3).

The collecting of amaranth germplasm is slowly being phased out and major emphasis directed towards the characterization, multiplication and documentation of the IBPGR-designated world collection in the USA. This work is carried out by the Organic Gardening and Farming Research Center (OGFRC), Pennsylvania and the USDA North Central Regional Plant Introduction Station, Ames, Iowa and the material will eventually be conserved for safety as a base collection at the NSSL, Fort Collins, Colorado. During 1984 characterization and multiplication of amaranths also continued through IBPGR-sponsored projects in **Guatemala** and **Nigeria.**

As already outlined in previous annual reports, the National Academy of Sciences (NAS), USA is providing support to a number of developing countries for research projects on *Amaranthus* (including the collection and screening of germplasm). NAS, together with Rodale Press Inc., also cosponsored the Third Amaranth Conference which was held from 11-13 September 1984 at the Rodale Research Center, Pennsylvania, USA.

CAPSICUM

The two-year (1983-84) IBPGR-funded *Capsicum* collection and evaluation project in

Thailand executed by the Biology Department, Ramkhamhaeng University, continued collection during 1984. The entire collection (50 accessions) is being grown out for multiplication and characterization. In addition a number of multi-crop collecting missions obtained *Capsicum* germplasm in **Bolivia** (49 *Capsicum* spp.), **Colombia** (17 *Capsicum* spp.), **Ecuador** (14 *Capsicum* spp.), **Guatemala** (40 *Capsicum* spp.), **Nepal** (43 *Capsicum* spp.), **Nicaragua** (6 *Capsicum* spp,), **Peru** (45 *Capsicum* spp.), **Spain** (160 *C. annuum)* and **Zambia** (13 *Capsicum* spp.).

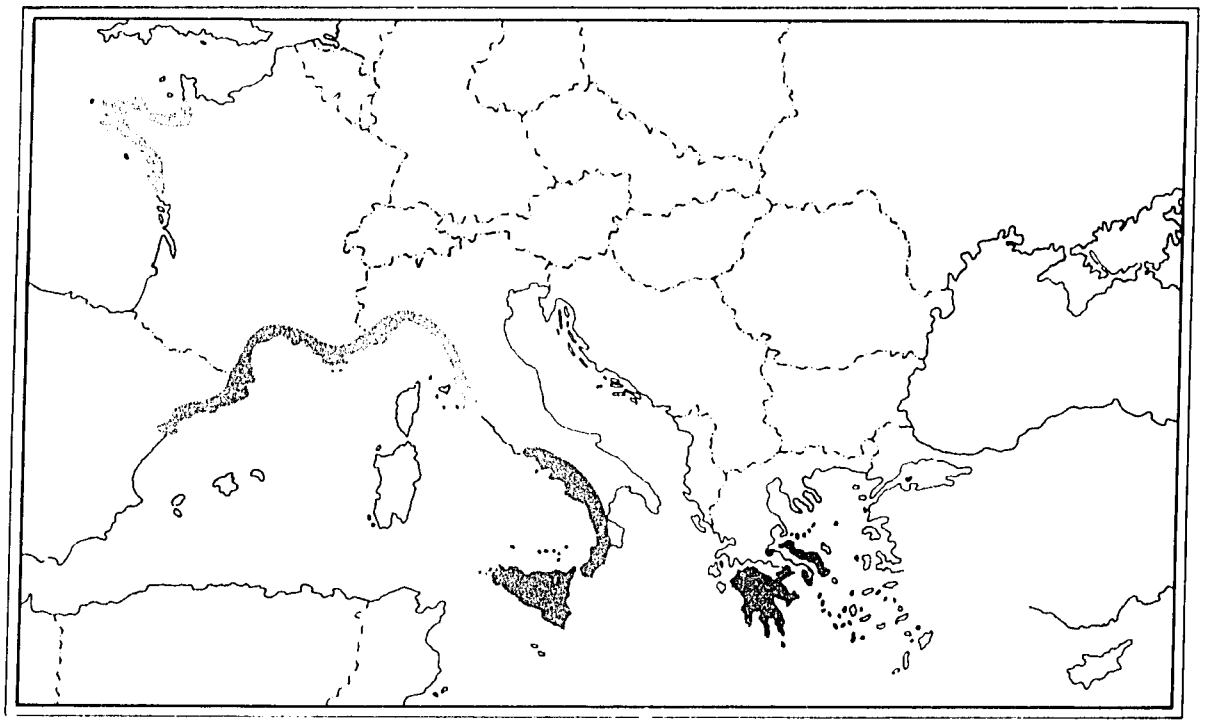
Towards the end of 1984 negotiations were completed with CENARGEN for an IBPGR-sponsored three-year *Capsicum* collecting project in Brazil. Major emphasis will be given to the collection of wild species. Three missions are envisaged, two in the south (1985 and 1986) and one in the Amazon (1987) region.

IBPGR-sponsored *Capsicum* characterization and multiplication projects in **Greece** and **Guatemala** made substantial progress during 1984. In addition the world collection at CATIE, Costa Rica is being characterized and documented and it is envisaged the IBPGR support will be provided early in 1985.

CRUCIFERAE

The IBPGR has a comprehensive five-year project, coordinated by Prof. D.C. Gomez-Campo (Spain) and Dr. M. Gustafsson (Sweden) to collect wild Mediterranean brassicas (see Figure 2 for complete collecting programme). The third mission was undertaken during July 1984 in

(R. Arora/IBPGR)



Area collected in 1982

Area collected in 1983

Area collected in 1984

Collecting area planned for 1985

Figure 2. IBPGR collection programme (1982-85) for wild Mediterranean brassicas

southern **Italy** with the cooperation of the Istituto del Germoplasma, Bari (see Table 3).

The wild brassicas collected in Greece are being multiplied in insect-proof cages provided by the IBPGR at the Greek Gene Bank. All samples obtained through the missions in Greece and Italy are being characterized and multiplied at the Universidad Politécnica Madrid, **Spain**, with IBPGR support. In addition all material is being characterized in Sweden.

During 1984 no specific IBPGR missions were organized to collect landraces, but a number of multi-crop collecting expeditions obtained material in **Nepal** (107 *Brassica* spp., 9 *Lepidium sativum* and 20 *Raphanus sativus*) and **Spain** (85 *Brassica* spp., and 14 *Raphanus sativus*). The first phase of the EC-funded project to collect landraces of cruciferous crops in EC countries was successfully concluded in 1984. A total of about 3 500 samples has been collected from Belgium, Denmark, France, Germany (Federal Republic), Ireland, Italy, Netherlands and UK.

The IBPGR-sponsored project to multiply and characterize *Brassica carinata* was completed in 1984. This project, carried out by SVP, **Nether-**

Table 3. Cruciferae collected in southern Italy (July '84)

Genera/species	No. of samples
Wild Mediterranean brassicas (n = 9)	
Brassica incana	21
B. macrocarpa	3
B. rupestris	11
B. villosa var. *drepanensis*	4
B. villosa var. *tinei*	1
B. villosa var. *villosa*	4
Total	44
Cultivated Cruciferae and their immediate wild relatives	
Brassica campestris	5
B. nigra	3
B. oleracea	10
Eruca vesicaria	1
Raphanus raphanistrum	3
Sinapis alba	1
S. arvensis	3
S. pubescens	2
Total	29
Other wild Cruciferae (*Brassica fruticulosa*, *Diplotaxis* spp., *Moricandia arvensis* etc.)	30

lands, produced over 20 000 seeds for each of the 130 Ethiopian mustard accessions and material will be shipped to the IBPGR-designated genebanks in Ethiopia and the Federal Republic of Germany.

A five-year project for the multiplication of the **AVRDC** Chinese cabbage collection, with emphasis on the open-pollinated cultivars, was initiated in 1982 with IBPGR support. The multiplication is carried out in insect-proof screenhouses with the objective to produce sufficient seed for medium- and short-term storage at AVRDC, China and for long-term conservation at NVRS, UK. (A summary is provided in Table 4.) In addition to financial support, the IBPGR appointed an intern at AVRDC to work on the Chinese cabbage project and also to provide assistance to the AVRDC seed laboratory. The intern commenced her activities in Oct. 1983 and was extended for a second year to Oct. 1985.

CUCURBITACEAE

During 1984 both specific Cucurbitaceae and multi-crop collecting expeditions obtained material from the following countries: **Bolivia** (37 *Cucurbita* spp.), **Colombia** (24 *Cucurbita moschata*), **Guatemala** (50 *Cucurbita* spp., 10 *Lagenaria siceraria*), **Nepal** (54 *Cucumis sativus*, 45 *Cucurbita* spp., 20 *Lagenaria siceraria*, 33 *Momordica charantia* and 11 *Trichosanthes cucumerina*), **Nicaragua** (23 *Cucurbita spp.*), **Spain** (30 *Citrullus lanatus*, 126 *Cucumis melo*, 32 *Cucumis sativus* and 145 *Cucurbita* spp.) and **Zambia** (70 Cucurbitaceae).

The IBPGR provided a grant to the Universidad Autonoma de Chapingo, **Mexico** to collect *Sechium edule* and wild relatives in that country.

Cucurbita maxima, Bolivia

This project, which is carried out in collaboration with the Department of Botany, University of California, Berkeley, USA, collected *S. edule* (225) and wild relatives (9) during Oct.-Dec. 1984.

The IBPGR continued its support to a project at ICA, **Colombia** for the characterization and

Table 4. Work on the AVRDC Chinese cabbage collection (Dec. '84)

Types	No. of accessions	Number of accessions sent to NVRS				Remainder
		1982	1983	1984	1985 (estimate)	
Open pollinated	287	26	47	55	63	96
Open pollinated?	87	40	21	7	7	12
F_1	368	3	–	–	–	365
F_1 ?	7	4	2	1	–	0
F_2	1	–	1	–	–	0
Inbred	72	2	5	–	–	65
Not yet accessioned	14	–	–	–	14	0
Total	836	75	76	63	84	538

multiplication of germplasm collected in that country. In 1984 *Cucurbita* accessions were multiplied and described in cooperation with the IBPGR Regional Coordinator for Latin America. Another IBPGR-supported project in **Guatemala** multiplied and characterized 25 *Cucurbita* accessions during 1984, and a similar project in **Bolivia** is expected to receive IBPGR funding early in 1985.

In 1984, ETSIA, of the Universidad de Valencia, **Spain**, initiated a project for the documentation of *Cucumis* germplasm in cooperation with INIA; Spain. The project, which has received IBPGR support for a one-year period, is expected to document *Cucumis* germplasm and to establish a global data base.

EGGPLANT

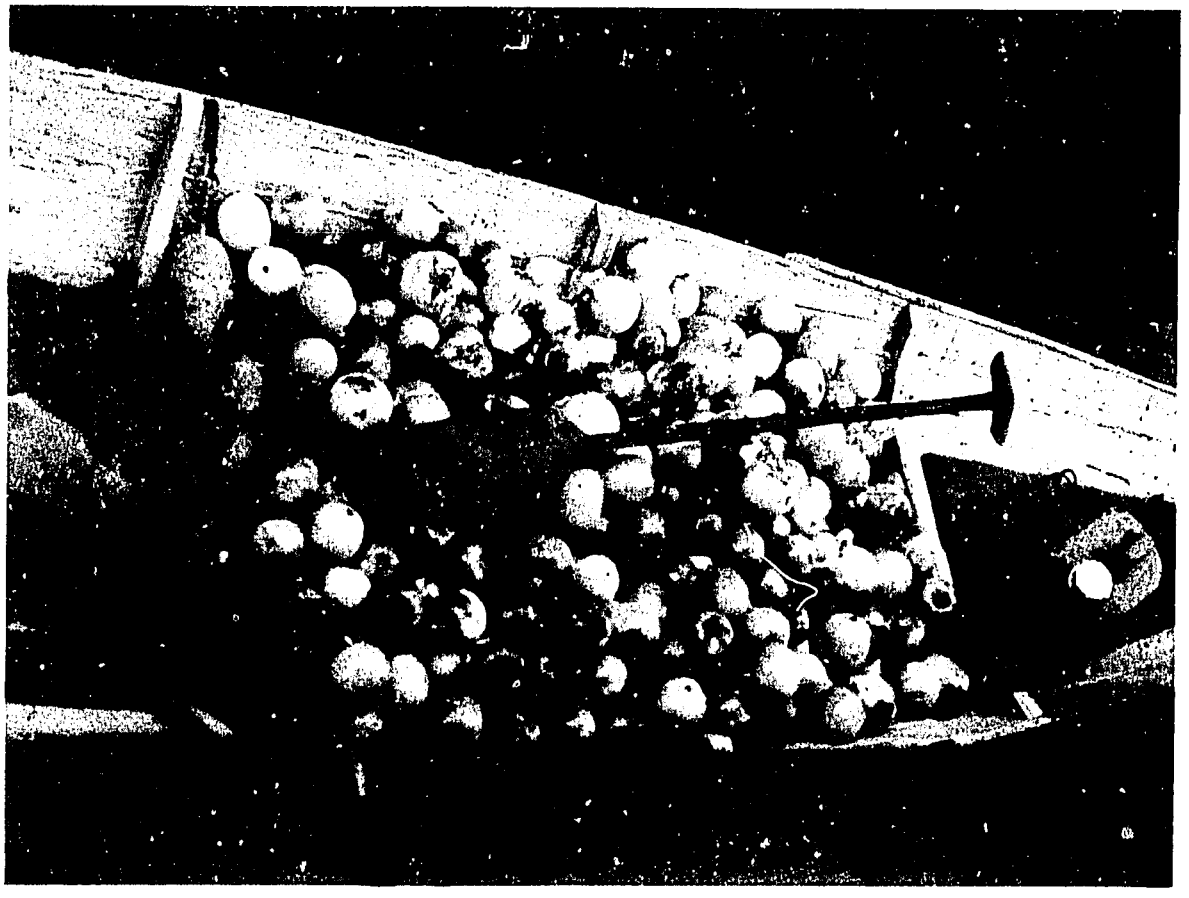
During 1984 samples of eggplant were collected during multi-crop missions in **Nepal** (13 *Solanum* spp.) and **Spain** (25 *S. melongena*).

Major emphasis during 1984 was given to the multiplication and characterization of material collected in Africa in 1981–83 (see Table 5). This work is being carried out in **Burkina Faso, Ghana, Nigeria, Togo** and the **UK**. During 1984 the IBPGR provided funds to the University of Birmingham, UK, to coordinate this work, which includes the establishment of a central data base.

Also during 1984 IBPGR support was provided to the Chiang Mai University, **Thailand** for the multiplication, characterization and preliminary evaluation of eggplant material collected in that country in 1982–83.

OKRA

During 1984 limited okra samples were collected, especially since the planned mission to southern Sudan had to be postponed. Multi-crop collecting expeditions obtained okra germplasm in **Nepal** (20 *Abelmoschus* spp.), **Niger** and **Zambia** (17 *Abelmoschus esculentus*). Further expeditions



Eggplant in boat market, Indonesia

Table 5. African eggplants collected in 1981-83

Country	Number of *Solanum* samples					
	*aethiopicum**	*macrocarpon**	*melongena**	*scabrum**	Other *Solanum* spp.*	Total
Benin	14	17	2	1	1	35
Burkina Faso	60	4	4	1	1	72
Ghana	91	15	6	1	1	114
Ivory Coast	302	57	25	5	–	389
Liberia	19	–	–	–	–	19
Nigeria	34	31	8	1	2	76
Togo	47	47	4	5	2	105
Uganda	12	–	–	–	–	12
Zambia & Zimbabwe	9	13	5	–	3	30
Birmingham Solanaceae collection	31	9	–	–	–	40
Total	619	193	54	14	12	892

* *S. aethiopicum* (also includes *S. anguivi*, *S. gilo* & *S. integrifolium*)
S. macrocarpon (also includes *S. dasyphyllum*)
S. melongena (also includes *S. incanum*)
S. scabrum (also includes *S. americanum* & *S. nigrum*)
Solanum spp (includes *S. erianthum* & *S. torvum*)

for *A. esculentus* are planned for 1985 in Egypt, northern Sudan and Syria.

Towards the end of 1984, the IBPGR commissioned Ir. J.H.H. Vredebregt of the **Netherlands** to undertake an ecogeographical survey of *Abelmoschus* species, initially on the basis of herbarium material. This is an extension of the herbarium survey carried out by ORSTOM, Ivory Coast in 1981 and should provide sufficient details to mount collecting expeditions for wild species in Southeast Asia and the Pacific.

Most of the material collected through IBPGR missions in Africa during 1981-83 has been duplicated at ORSTOM, **Ivory Coast.** With

Table 6. *Abelmoschus* germplasm collected in Africa in 1981-83 and deposited at ORSTOM, Ivory Coast

Country	Number of *Abelmoschus* samples				
	esculentus	*moschatus*	*Abelmoschus* sp. type Guinean	*Abelmoschus* spp. (not yet identified)	Total
Benin	190	14	63	30	297
Burkina Faso	103	–	26	3	132
Cameroon	–	–	23	2	25
Egypt	5	–	–	–	5
Ghana	24	–	23	25	72
Guinea	80	–	92	47	219
Ivory Coast	101	2	355	2	460
Liberia	–	–	6	–	6
Mali	17	–	–	4	21
Niger	3	–	–	–	3
Nigeria	16	–	6	78	100
Sudan	33	–	–	–	33
Togo	182	5	183	56	426
Zaire	–	–	2	–	2
Zambia	7	–	–	–	7
Zimbabwe	58	–	–	13	71
Total	819	21	779	260	1 879

IBPGR support, the entire ORSTOM collection (see Table 6) is being multiplied, characterized and documented for long-term conservation in base collections in the Ivory Coast and the USA.

OTHER VEGETABLES

Other vegetable and spice crops collected during 1984 in multi-crop missions include: *Anethum graveolens* **(Nepal)**; *Corchorus olitorius* **(Zambia)**; *Coriandrum sativum* **(Morocco, Nepal)**; *Cuminum cyminum* **(Morocco, Nepal)**; *Daucus carota* **(Italy, Nepal)**; *Foeniculum vulgare* **(Nepal)**; *Hibiscus sabdariffa* **(Niger, Zambia)**; *Petroselinum crispum* **(Italy)**; *Pimpinella anisum* **(Morocco)**; *Spinacia oleracea* **(Nepal)**; *Trigonella foenum-graecum* **(Italy, Morocco, Nepal)**.

FRUITS AND TREE NUTS

During its first decade, IBPGR collecting efforts centred around Southeast Asia (banana, citrus, mango, durian, mangosteen, *Lansium*, etc.) and Southwest Asia (temperate fruits), while limited collecting was carried out in Africa and Latin America. During 1977–83 over 3 000

Tropical fruits in Bangkok market

samples have been collected. Major efforts are still required for high priority tropical and temperate fruits and details are provided in the sections below.

The IBPGR-funded study on the genetic resources of tropical and subtropical fruits and tree nuts, undertaken by the RTI, **Netherlands**, was completed and will be published in 1985. The National Clonal Germplasm Repository, Corvallis, USA has initiated a similar study for temperate fruits which should be published by late 1986 or early 1987. The IBPGR has offered limited support for this study.

An *IBPGR Directory of Germplasm Collections of Tropical Fruits* was published in June 1984. The Directory contains information on the following collections:

Crops	No. of collections
Avocado	40
Banana & Plantain	64
Breadfruit & Jackfruit	11
Cashew	19
Citrus	80
Date	6
Fig	16
Mango	70
Papaya	23
Pineapple	30
Other tropical and subtropical fruits & tree nuts	70

from a total of 58 countries. An index with over 500 genera/species names facilitates the use of this Directory. Work on a *Directory of Germplasm Collections of Temperate Fruits* continued during 1984 and publication is expected in 1985.

Towards the end of 1984 an agreement was reached with the Department of Horticulture, Oregon State University, Corvallis, USA, for the preparation of a manual on handling temperate and tropical fruit collections. A first draft of this handbook, which is produced with financial assistance from FAO, will be available for an IBPGR-sponsored training course in July 1985.

In agreement with CAAS, the IBPGR fielded a fruit germplasm mission to China from 29 July to 9 Aug. 1984. The main objectives of the mission were to investigate fruit genetic resources in China (with emphasis on temperate fruits and especially *Prunus* spp.) and provide advice on future collecting and conservation of these resources. During the visit it became apparent that all fruits should be considered (including subtropical and tropical). The report, which will be published early in 1985, describes the distribution of indigenous fruit germplasm, an overview of fruit production in China, an evaluation of the present situation on conservation of fruit germplasm and recommendations for future development. The latter includes IBPGR-supported training and the establishment of three major field genebanks.

BANANA AND PLANTAIN

An excellent overview of the current status of banana germplasm in Southeast Asia is provided in the special issue on banana germplasm of the

IBPGR Southeast Asia Newsletter, published in Oct. 1984. Much of this work in Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand has been supported by the IBPGR. Additional banana germplasm has been collected in Malaysia in 1984 (see p. 60). Wild *Musa* species still need to be collected in the region.

The IBPGR-designated field genebank in Davao, Philippines, maintains the Regional Southeast Asian Banana Collection which currently includes material from Malaysia, the Philippines and Thailand. During 1984, 19 distinct accessions from the major Indonesian collections (10 from the Cibinong Experimental Gardens and 9 from the Purwodadi Botanical Gardens) were transferred to the **Philippines**, with IBPGR support. The material is currently in the IPB post-entry quarantine station in Los Baños and transfer to the collection in Davao is envisaged for 1985. Material from Papua New Guinea is expected to be transferred to the Philippines in 1985.

During 1984 the IBPGR continued support to two major research projects on banana *in vitro* conservation. One project is carried out at the Catholic University of Leuven, **Belgium** for "*In-vitro* conservation of banana meristems" and the other project at the Volcani Center, **Israel**, deals with "Genetic variability in banana plants multiplied via *in vitro* techniques" (see p. 71). An IBPGR-supported research project on the storability of wild banana seed is expected to commence early in 1985 in cooperation with UPM, **Malaysia**.

A substantially revised IBPGR descriptor list for *Musa* spp. was published in April 1984. This list, prepared by Prof. N.W. Simmonds, supersedes the preliminary descriptor list published in 1977.

CITRUS

Major emphasis on the collection of citrus germplasm in the past few years has been given to Southeast Asia. This is reflected in the special issue on citrus germplasm of the *IBPGR Southeast Asia Newsletter*, which was published in July 1984. This special issue was widely distributed at the Fifth International Citrus Congress, São Paulo, Brazil (15-20 July) where the IBPGR also presented a paper on citrus genetic resources.

The Plant Scie[illegible] Department, Faculty of Natural Resources, Prince of Songkla University, in cooperation with the IBPGR Regional Coordinator for Southeast Asia, made a preliminary exploration and collection of pummelo *(Citrus grandis)* in southern **Thailand** in May 1984. Seeds and budwood of 51 samples were collected and the material is now being conserved in the field genebank of the University. Arrangements have also been made to transfer material collected by the Botany Department, Chulalongkorn University during 1981-83 to the newly established field genebank of Prince of Songkla University, Thailand.

As mentioned in the *1983 Annual Report*, the IBPGR is supporting a five-year project organized by the Fruit Tree Research Station in Japan to explore, collect, characterize and document the genetic resources of *Citrus* spp. and related genera/species in East Asia. The first year's (1983) collecting mission was carried out in Thailand where 160 accessions were collected. The 1984 mission was undertaken in northeast **Thailand**, northwest peninsular **Malaysia** and Sabah and Sarawak, and **Brunei** by the two Japanese organizers, one scientist from the University of California at Riverside, USA, in collaboration with national scientists (Prince of Songkla University, the Thai Department of Agriculture, MARDI, UPM University of Malaya, Sabah and Sarawak State Departments of Agriculture). Support was also provided by the IBPGR Regional Coordinator for Southeast Asia and a total of 77 samples was collected (see Table 7). The 1984 mission emphasized collecting wild species, since most of the cultivated species found during the mission had been previously collected. Also during 1984 multi-crop expeditions in **Nepal** collected 110 samples of *Citrus* spp. and 5 samples in **Morocco.**

During 1984 the IBPGR designated field genebanks for citrus in a number of countries and agreements were signed by Spain and the USA. The IBPGR-supported project to provide an insect-proof screenhouse for the conservation of citrus germplasm at INIA, Valencia, **Spain**, was completed in 1984. The entire Spainish citrus collection has now been virus-indexed, treated for virus elimination through shoot-tip grafting and is conserved in the insect-proof screenhouse.

During late 1983, INIA, Valencia, **Spain**, began a research project for preliminary screening of techniques for *in-vitro* conservation of citrus germplasm, with IBPGR support and in 1984 INIA extended this work with a three-year research project using other financial resources.

Table 7. Citrus germplasm collected during 1984 international missions

Genus/species	Number of samples					
	Brunei	NW peninsular Malaysia	Sabah	Sarawak	NE Thailand	Total
Aegle marmelos	–	–	–	–	1	1
Atalantia ceylanica	–	1	–	–	–	1
A. monophylla	–	1	–	–	1	2
Citrus aurantifolia	1	2	–	–	3	6
C. aurantium	–	1	–	–	–	1
C. grandis	–	2	1	3	12	18
C. halimi	–	4	–	–	–	4
C. hystrix	–	–	–	1	2	3
C. ichangensis (hybrid)	–	–	–	–	1	1
C. latifolia	–	–	–	–	1	1
C. macroptera	–	1	–	–	2	3
C. medica	–	1	1	1	2	5
C. reticulata	–	–	2	2	–	4
C. sinensis	–	–	–	1	1	2
Citrus hybrid (unknown origin)	–	1	–	–	–	1
Citrus spp.	–	–	2	1	–	3
Clausena excavata	–	–	3	–	–	3
Feroniella oblata	–	–	–	–	1	1
Fortunella polyandra	–	2	–	–	–	2
Luvunga motleyi	–	–	1	–	–	1
Luvunga sp.	–	–	2	–	–	2
Merrillia caloxylon	–	1	–	–	–	1
Merope angulata	–	–	1	–	–	1
Micromelum minutum	–	–	1	–	–	1
Murraya koenigii	–	–	–	2	–	2
M. paniculata	–	–	–	1	–	1
Paramignya andamanica	–	–	2	–	–	2
Pleiospermium latialatum	–	–	2	–	–	2
Severinia disticha	–	–	1	–	–	1
Triphasia trifolia	–	–	–	1	–	1
Total	1	17	19	13	27	77

MANGO

As indicated in the *1983 Annual Report*, although most of the variability of cultivated *Mangifera indica* appears to be conserved *ex situ* in 70 different field genebanks in 24 countries, these collections do not contain any representative variability of the wild and minor cultivated *Mangifera* species.

In 1984, the IBPGR continued to support an ecogeographical survey of *Mangifera* species carried out by Prof. S.K. Mukherjee. Prof. Mukherjee studied available herbarium material in the Netherlands, France, UK and Switzerland and also visited Unesco and IUCN/WWF. The final report of this desk survey was prepared towards the end of 1984 and will be published early in 1985.

In order to complement this desk study with field surveys in areas of highest diversity, the IBPGR contracted IUCN/WWF to commence this activity in Kalimantan **Indonesia** and Sabah/Sarawak **Malaysia.** The field survey in Kalimantan is expected to be completed by late 1985 and in Sabah/Sarawak by late 1986. World Wildlife Fund (Malaysia) will endeavour to raise additional funds for the survey of peninsular Malaysia.

OTHER TROPICAL FRUITS

An IBPGR-funded collection and conservation programme of Malaysian fruits started late in 1983. The programme, which is carried out by MARDI, **Malaysia** covers both cultivated and wild species of five major Malaysian fruits (durian, langsat, mango, mangosteen and ram-

butan), as well as others such as *Eugenia* spp. and *Artocarpus* spp. Also attempts will be made to conduct some *Musa* expeditions on off-shore islands in peninsular Malaysia to complement the existing collection at MARDI. Up to the end of 1984 a total of 412 samples have been collected (banana 134, durian 82, mango 111, papaya 35, pineapple 50) from peninsular Malaysia. The collected material will be conserved in a 40 ha site at the MARDI Kemaman Station.

The multi-crop expedition in **Nepal** (special IBPGR-Japan project, see p. 57) collected the following tropical fruits: *Annona reticulata (3)*, *Diospyros kaki* (2), *Ficus* spp. (7), *Psidium guajava* (2), *Punica granatum* (6) and *Zizyphus* spp. (13).

The two-year (1982-84) IBPGR-supported project to collect langsat *(Lansium domesticum)* and mangosteen *(Garcinia mangostana)* in **Thailand** was successfully completed in 1984. The project, which was carried out by the Faculty of Natural Resources, Prince of Songkla University, has established a collection of 147 accessions (see Table 8).

The IBPGR is funding a two-year (1984-86) collecting project in **Venezuela** for pineapple *(Ananas comosus)* and related genera/species. This project is carried out by the Universidad Central, Maracay-Aragua, Venezuela in cooperation with IRFA, France.

TEMPERATE FRUITS

IBPGR-supported work on temperate fruits has only recently been initiated with some collecting in Southwest Asia (see p. 60), and the Mediterranean (*Prunus* spp. in Greece and Yugoslavia), the preparation of a Directory of Germplasm Collections (see p. 76), the publication of descriptor lists and the establishment of central data bases for European apple and *Prunus* collections. It is anticipated that the training course in 1985 will accelerate activities.

During 1984 IBPGR supported collecting missions which obtained temperate fruit germplasm in **Ecuador** (39 *Prunus capuli*), **Greece** (23 *Prunus amygdalus*, 9 *P. armeniaca*, 50 *P. avium*, 5 *P. cerasifera*, 5 *P. cerasus*, 38 *P. domestica*, 27 *P. persica* and 4 *Prunus* hybrids), **Nepal** (2 *Castanea* spp., 15 *Juglans* spp., 14 *Malus* spp., 71 *Prunus* spp. and 22 *Pyrus* spp.) and **Yugoslavia** (64 samples of *Prunus domestica* and *P. insititia*).

IBPGR continued to liaise with EUCARPIA and contributed to a special session on temperate fruit genetic resources at the 1984 EUCARPIA/ISHS Conference on Temperate Fruit and Tree Nut Breeding. The IBPGR/EUCARPIA central data base for apple germplasm collections has nearly completed the survey of European collections and it is estimated that there are about 30 000 apple accessions in that continent. Detailed catalogues will be published in 1985. A similar exercise for the European *Prunus* collections is being organized in the framework of the ECP/GR by the NGB (see p. 47).

The IBPGR-supported project in **Canada** to study and assess the availability and current application of *in vitro* techniques to temperate fruits, was completed in 1984 (see p. 70). It appears that emphasis still needs to be given to maintenance of collections in field genebanks and in the form of seed. The latter is often not appreciated by curators of temperate fruit collections and the IBPGR will therefore publish a report on the seed storage behaviour of *Malus*, *Prunus*, *Pyrus* and *Vitis*, based on investigations by the IBPGR-supported project at Reading University, **UK** (see also p. 69).

Table 8. *Lansium* and *Garcinia* collected in southern Thailand (1982-84)

Species	Vernacular name	No. of accessions
Lansium domesticum	Langsat	6
	Langsat Pardi	1
	Langsat Sarvor	1
	Longkong	11
	Duku Praemae	2
	Duku Nam	3
	Duku Kalantan	1
	Duku Palembang	1
	Malaku, Malaka	1
Sub-total		27
Garcinia atroviridis	Som Khaek, Som Mawon	2
G. dulcis	Maphut	4
G. maingayi	Som Khwai	2
G. mangostana	Mangkhut	105
G. prainiana	Cherupu, Kechupu	4
G. speciosa	Phawa, Cha-muang	1
G. xanthochymus	Mada Luang, Mulu	2
Sub-total		120
Grand total		147

Flat peach, China

INDUSTRIAL CROPS

A number of industrial or cash crops of importance for rural development have been given attention by the Board during its first decade of work. Programmes have been developed - after working group meetings - for coconut (1976), coffee (1980), sugarcane (1981), cocoa (1983), cotton (1983), rubber (1983), and oilpalm (1984). Storage methods for coconut, sugarcane and *Vitis* have been discussed by the *In Vitro* Committee and data banks for cocoa, cotton and *Vitis* are now operational.

BEET

Twenty-two samples of beet germplasm were collected by an IBPGR mission in **Tunisia** in association with INRAT during May 1984 and samples included *Beta vulgaris, B. maritima* and *B. macrocarpa* (both coastal and inland). *B. patellaris* was not found in the areas explored. Leaf beets were observed in isolated oases of the southwest and *B. maritima* was found in both coastal areas and inland in the northern and central parts of the country.

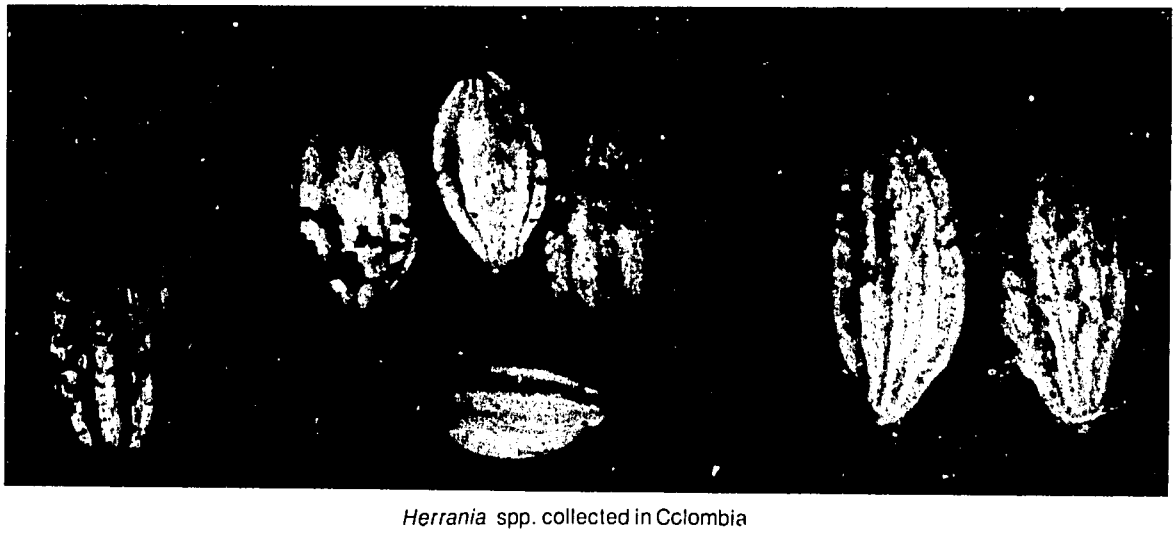
The national programme of Greece continued, with IBPGR support, the collection of primitive cultivars and wild forms in June-July in central **Greece** and Eubea. A wide range of ecological zones were sampled from sea level to mountainous villages. In addition 22 samples of cultivated beet were collected in **Spain** during a vegetable collecting mission and 7 *Beta* samples in **Morocco.**

The Hellenic Sugar Corporation continued to multiply small samples of *Beta* and to deposit adequate sized samples in the IBPGR-designated base collections (see p. 66).

CACAO

After discussion of the report of the Second Working Group at the Board's Meeting in 1984, the *IBPGR Cocoa Working Group* report was published in 1984. The IBPGR-supported research on *in vitro* culture continued (see p. 71).

The IBPGR continued to support the collection of cacao germplasm during 1984. In **Colombia** during Nov. 1983 to February 1984 ICA collected 32 samples of *Theobroma cacao* and 6 samples



Herrania spp. collected in Colombia

of *Theobroma* species. A total of 66 samples of *Theobroma* species was collected in **Mexico** by INIA during 1983-84 collection.

IBPGR has continued to support documentation of the cacao collection in Trinidad (see p. 71).

COCONUT

Details of the IBPGR-funded three-year (1980-83) coconut collecting project in **Indonesia** were provided in the *1983 Annual Report*. Further collecting (1984-85) is being undertaken in Sumatra and Irian Jaya with national finance.

With funds from the IBPGR, MARDI has been collecting coconut germplasm in peninsular **Malaysia.** By the end of 1984, 56 populations had been sampled from 37 collection sites. The collection, which now contains representative variability of Malaysian talls, Malaysian dwarfs and specific variants, is maintained at MARDI's Hilir Perak and Kemaman Stations.

The IBPGR-funded project at PCA, the **Philippines** for the establishment of a coconut genetic resources centre continued during 1984. The collecting procedure followed is described in detail in the *1983 Annual Report*. By the end of 1984 a total of 68 accessions had been collected.

COFFEE

Since a Working Group meeting on coffee in December 1979, limited action has been undertaken. During 1983, ORSTOM, with financial support from the IBPGR, fielded an expedition in Cameroon and collected several wild species of *Coffea*. The Board has also agreed to provide additional funds to ORSTOM to collect coffee germplasm in Congo and Zaire.

In 1984, the Plant Genetic Resources Center, (PGRC/E) Ethiopia, commenced systematic collection of coffee germplasm, particularly wild and semi-wild types. This collection will continue over the next few years. The PGRC/E designated 200 ha of land for field planting of the material. At present, PGRC/E maintains a small living collection near its headquarters in Addis Ababa. In addition conservation areas have been set aside to preserve coffee diversity in Ethiopia.

COTTON

The IBPGR has been supporting the collection conservation and documentation of *Gossypium* germplasm since 1980 through IRCT, France. In the period 1980-83, IRCT explored several Caribbean islands and many Latin American nations for spontaneous and sub-spontaneous *Gossypium* material including primitive landraces of *G. hirsutum* and *G. barbadense*. Over 1 200 samples were collected during these missions and some of the material has been sown for seed increase for characterization and evaluation in Guadeloupe. The genebank at Montpellier, France has computerized the passport data.

In addition to the IRCT/IBPGR missions in Latin America, the Board provided funds to Brazil (1984) and Colombia (1983-84) and collecting took place in both countries. CENARGEN/EMBRAPA fielded expeditions in the Piani and Bahia regions of **Brazil** and collected 96 samples of cotton. ICA collected 250 samples in 1984 in **Colombia** and an additional 6 samples during multi-crop collecting. Four samples of cotton were collected during multi-crop collections by UNA in **Peru** and 11 samples by the University of Niamey in **Niger.** Additionally, the ARS/USDA, in collaboration with INIA, Mexico, explored the Yucatan region of Mexico.

In **Australia** ARS/USDA and CSIRO continued exploration during 1984 — with some support from the IBPGR — in Queensland for related species of *Gossypium*.

During 1984 the Board provided funds to INIPA, Lima, **Peru** for the collection of *G. barbadense* and *G. raimondii* on the northern coast of **Peru.** The exploration will be carried out in 1985. The IBPGR also provided funds in 1984 to the Cotton and Industrial Plant Institute in Thessaloniki, **Greece** for the systematic multiplication, characterization and documentation of the Institute's germplasm.

GRAPE

A major project to establish a germplasm collection of *Vitis* in **Greece** was initiated in 1982 and IBPGR support has been provided for a three-year period (1982-84) covering the exploration and collection phases. During 1984 a total of

439 cultivars were collected out of the 491 cultivars marked during the exploration in 1983. It is envisaged that an additional 100 cultivars will be collected in 1985. All the cultivars collected have been grafted in the nursery of the Vine Institute, Lycovryssi, Athens and early in 1985, 10 plants per accessions will be established in the collection block. Reference cultivars will also be grafted in spring 1985 for further ampelographic studies using the IBPGR descriptor list (published in Dec. 1983).

An FAO-sponsored project with OIV, Paris, France was completed in 1984. The project, which was carried out by the Bundesforschungsanstalt für Rebenzüchtung, Geilweilherhof, Federal Republic of Germany, has resulted in a preliminary catalogue of *Vitis* collections. Additional funds are being sought to finalize this catalogue and to establish a comprehensive central data base.

OILPALM

In recent years the IBPGR has increased its attention to the collection and conservation of germplasm of oil-yielding crops. Most oilseeds have a relatively high priority and oilpalm has been accorded a global second priority by the IBPGR. The Board convened a Working Group on the Genetic Resources of Oilpalm, 19-21 Sept. 1984. The members of the Working Group are listed in Appendix VI.

The Working Group reviewed the existing collections of both *E. guineensis* and *E. oleifera* and suggested the following geographical priorities for future field collecting (see Figure 3). The countries and areas are listed **in order of priority.**

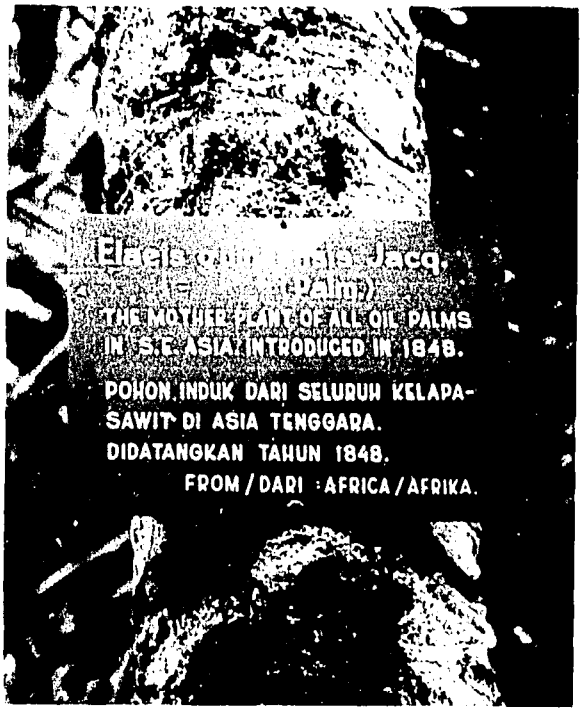
Elaeis guineensis
1 Angola
2 Zaire (central and eastern parts and the Gemena region)
3 Lake Tanganyika region including Tanzania and Burundi
4 Congo and Gabon
5 Parts of Cameroon and the Ivory Coast
6 Brazil (Bahia region)
7 Gambia, Ghana, Guinea, Liberia, Senegal, Sierra Leone and Madagascar

E. oleifera
1 Venezuela
2 Brazil, the Guyanas and Suriname

The Working Group also agreed that an exploratory survey of natural groves of oilpalm must be carried out in West African countries before fielding collecting missions.

The report of the Working Group was discussed by the IBPGR Executive Committee in October 1984. It was agreed that the PORIM collection in Malaysia should be designated as a universal field genebank and that the collections in the Ivory Coast and Brazil should serve as field genebanks to maintain duplicates.

Since 1982 the IBPGR has been associated with the collection of oilpalm germplasm in Latin America and Africa. In 1984, PORIM, in colla-



Bogor Botanic Gardens

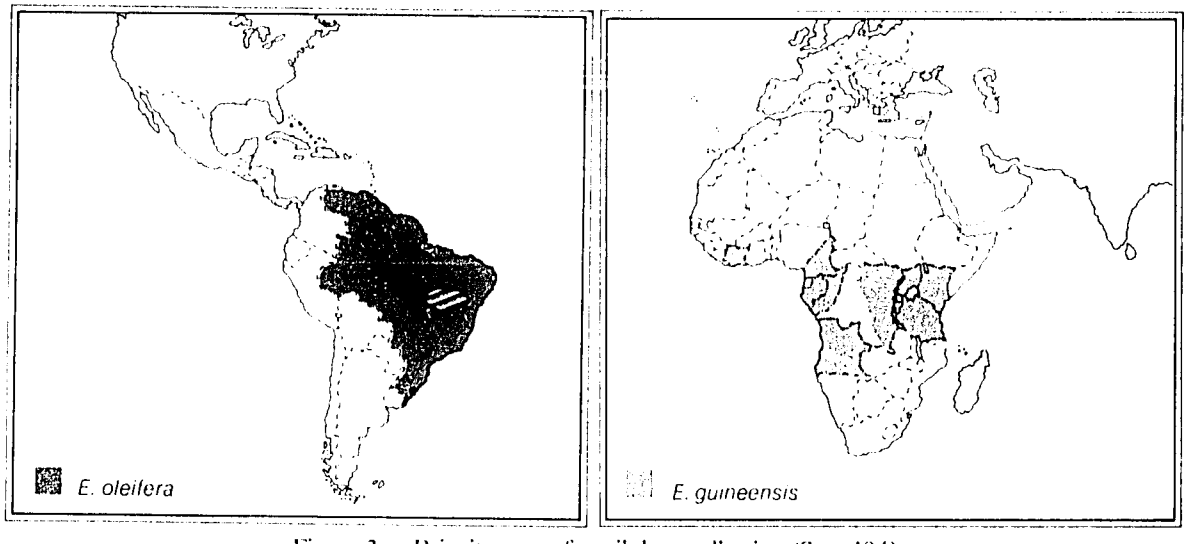


Figure 3. Priority areas for oilplam collecting (Sept.'84)

boration with Unilever, collected oilpalm germplasm in the western and eastern regions of **Cameroon** (96 samples from 36 sites) and in **Zaire** (369 samples from 56 sites).

SUGARCANE

During 1984 the IBPGR supported missions to collect sugarcane germplasm in Indonesia and the Philippines. During June-Aug. the Hawaiian Sugar Planters' Association, LBN and BP_3G collected 133 samples *(Saccharum officinarum* 51, *S. edule* 6, *S. robustum* [domesticated] 3, *S. robustum* [wild] 19, *S. spontaneum* 42, *Ripidium* spp. 8 and *Miscanthus* 4) in **Indonesia.** Between Aug.-Dec. a total of 319 samples was collected from throughout the **Philippines** by PHILSUCOM, Research and Development Office. The material collected included *S. officinarum* (32), *S. spontaneum* (265), *S. robustum* (5), *Miscanthus* spp. (6) and *Erianthus* spp. (10). In multi-crop collecting sugarcane germplasm was gathered by the Horticulture Department of **Mauritius.**

FORAGES

As part of its five-year rolling plan for forages, the IBPGR organized a Working Group of tropical and subtropical forage specialists in June at CSIRO, in Brisbane, Australia. The members of the Working Group are listed in Appendix VI.

Following a review of the present level of collecting and conservation by various institutes, the Working Group concluded that:

- 15 tropical forage legumes *(Aeschynomene, Centrosema, Desmanthus, Desmodium, Lablab, Leucaena, Lotononis, Macroptilium, Macrotyloma, Neonotonia, Pueraria, Stylosanthes, Trifolium, Vigna* and *Zornia)* and 13 grasses *(Andropogon, Axonopus, Bothriochloa, Brachiaria, Cenchrus, Cynodon, Dicanthium, Digitaria, Haemarthria, Panicum, Paspalum, Pennisetum* and *Urochloa)* merited a priority rating on the basis of their potential as forages;

Significant genetic erosion is occurring in the following areas and countries: Indonesia (Java, Bali), Indochina, India, the Sahel, southern and eastern Africa, Mexico and two areas of Brazil (see Fig. 4);

- Collecting is urgently needed in these areas and ways of implementing this either through the new IBPGR forage collector (see below), through various national programmes, or by IBPGR-sponsorship of collecting missions were defined;
- Institutions should be designated to take responsibility for holding base collections (a provisional list was compiled);
- Priority should be given to characterization and evaluation of existing materials held in collections;
- Since most of the major institutes (e.g., CIAT, CSIRO, EMBRAPA, ILCA) involved with forages have computer facilities to register passport and characterization data (some are also producing catalogues for their holdings), a future stage, therefore, will be the analysis of sample descriptors to indicate the range of variability available and computer mapping to enable future collecting areas to be identified more precisely; and
- Since information available on the biology, taxonomy, species relationships, etc., is inadequate for many potentially useful species, the attention of appropriate institutes should be drawn by the IBPGR to the need for further research.

Under the IBPGR five-year plan, another Working Group on forages will meet in early 1985 in Cyprus to consider the other major priority area, the Mediterranean and adjacent semi-arid and arid regions.

The five-year plan was started in 1983; an abstract of it, *A Plan of Action for Forage Genetic Resources*, was published by IBPGR in June, 1984.

Under the ECP/GR Special Project, (see p.47) a Working Group on forages met at Larissa, Greece in February. The group recommended: (a) several alterations to descriptor lists on legumes and grasses, which are being written and published in collaboration with CEC, (b) establishment of European central data bases for species and genera, (c) identification by genera of genetic erosion in Europe and urgent collecting requirements and (d) indication of training needs in European germplasm institutes.

The *Directory of Forage Germplasm Collections: Legumes and Grasses* was published by IBPGR in May 1984. It lists the number of genera/species in known genebank collections and provides information on geographic representation, evaluation, data management and seed storage conditions. The Directory also provides an index for easy reference to the holdings of 315 genera/

Figure 4. Priority areas for tropical and subtropical forage collecting (June ' 84)

for the genera / species listed in the publication.

The IBPGR and the Royal Botanic Gardens, Kew, UK jointly published a book, which was produced by the SEPASAT unit to mark the Tenth Anniversary of IBPGR titled *Forage and Browse Plants for Arid and Semi-Arid Africa.* The book contains the names, brief descriptions, ecology, distribution, uses, information on IBPGR seed collections, general distribution maps and some illustrations of the plants discussed.

A short post-graduate training course in forage genetic resources was held at WPBS 13-20 Oct. Through seminars, demonstration and practical work, students were shown collecting, characterization and regeneration techniques as related to temperate forages. The subjects covered in the course had been identified as an urgent training need by the ECP/GR Forages Working Group.

Collecting continued to be the most important activity and more forages were collected by IBPGR-supported missions in 1984 than in all of the previous years combined. In addition, IBPGR collectors and interns were outposted in order to carry out the tasks more effectively.

An IBPGR collector appointed to Southeast Asia began work in 1984 on ecogeographic surveys and collection of the wide variety of native and introduced forage legumes and grasses on the **Indonesian archipelago.** Surveys were taken and seed and herbarium material collected in Java, Sulawesi (southeast and central), Sumba and Timor. The collector is based at the National Biological Institute (LBN), Bogor, and will liaise with the international work being done on forages at CIAT and CSIRO, both of which received duplicates of the samples collected. A set of samples also has been deposited with LBN and with the Indonesian/Australian Animal Husbandry Project in Indonesia.

A total of 552 legume samples was collected, among them: *Aeschynomene americana* (18), *Alysicarpus vaginalis* (16), *Calopogonium mucunoides* (46), *Cassia* spp. (8), *Centrosema pubescens* (38), *Crotolaria* spp. (11), *Desmodium* spp. (177), *Flemingia* spp. (20), *Indigofera* spp. (18), *Pseudarithria viscida* (21), *Rhynchosia minima* (13), *Taramnus labialis* (14), *Uraria Lagopodoides* (21), and *Vigna* spp. (11). Among the 74 samples of grasses collected were : *Bothriochloa glabra* (19), *Dichanthium annulatum* (5), and *Setaria geniculata* (9). The collection of *Desmodium* will be multiplied and evaluated at Bogor for ecogeographic differentiation and documentation. The data base for forages was provided by CSIRO.

An IBPGR collector operated in **Niger** from Oct.-Dec. and was joined by staff members of ILCA and INRAN, Niamey. An ecogeographic survey of regions of the country was conducted and samples of *Chloris* (5), *Panicum* (7), *Paspalum* (6), *Pennisetum* (40) and *Stylosanthes* (14) and others were gathered.

An IBPGR intern stationed at ICARDA carried out an ecogeographic survey on the nature and distribution of wild legumes in **Syria.** A preliminary survey had been made in 1983 of possible sites for legume collection, and two collecting strategies were followed: (a) under a "germplasm approach" an area of approximately 1 ha was chosen and one or two strip quadrants of about 40 m length selected for detailed survey; in each strip the presence of legume species and degree of ground cover and shadiness were assessed in 6 one-metre square quadrants, and depth of soil in 3 of these quadrants; (b) under an "ecological approach" a much smaller area (about 25 m^2 was sampled more intensively to measure population size and detailed physical and chemical characteristics of the soil: the seeds in 10 quadrants of 1 x 0.25 m were collected and soil samples were taken.

In continuation of a cooperative programme to collect tropical forages in Southeast Asia, a CIAT collector went to **China** (Hainan Island), eastern **Thailand** and **Indonesia** (western Sumatra). Included in the 294 samples collected were *Alysicarpus* spp. (19), *Desmodium* spp. (83), *Pueraria* spp. (26) and *Zornia* spp. (7).

A joint collecting mission supported by the IBPGR was executed by the staff of ILCA and CIAT in **Kenya** in Aug. and Sept. The target species were a wide range of *Brachiaria* ecotypes for CIAT and various legumes and grasses of forage value for ILCA, including *Alysicarpus rugosus* (20), *Alysicarpus* sp. (5), *Cenchrus ciliaris* (15), *Chloris gayana* (20), *Cynodon* sp. (13), *Digitaria* sp. (5), *Eragrostis superba* (6), *Neonotonia wightii* (8), *Panicum* spp. (22), *Paspalum scrobiculatum* (18), *Pennisetum* spp. (13), *Rhynchosia minima* (12), *Sesbania* sp. (10), *Setaria anceps* (17), *Setaria* sp. (8), *Stylosanthes fruticosa* (14), *Tephrosia* sp. (17), *Teramnus* sp. (7), *Urochloa panicoides* (11) and *Vigna* sp. (15). Emphasis was placed on a priority list of species of potential forage value. In all, 462 samples of legumes and grasses were collected, from a range of soil types and from sea level to more than 2000 m above sea level. The *Brachiaria* were collected as vegetative material, and others as seed. Nodules from the legumes were collected whenever possible and soil samples were taken

at every site.

An IBPGR mission, in collaboration with INRST and INRAT, (both in Tunis), collected forages in **Tunisia** during May. Also participating in the mission (largely for *Beta* germplasm) was the Hellenic Sugar Industry (see Industrial Crops section, p. 31). Annual *Medicago* spp. (73) were the principal collected material and other genera included *Cynodon, Hedysarum, Melilotus* and *Trifolium*.

The IBPGR continued its support, begun in 1982, for a forage and food legume collecting mission carried out by the Fodder Crops and Pastures Institute, Larissa, **Greece** in Macedonia and Thrace in June, July and November. A total of 131 forages was collected, including *Dactylis glomerata* (28), *Festuca arundinacea* (11), *Lolium perenne* (20), *Lotus corniculatus* (5), annual *Medicago* spp. (6) and *Trifolium* spp. (60).

Two collecting missions given IBPGR support in **Brazil** were carried out by CENARGEN/EMBRAPA. The first was to collect native forage germplasm in tropical Brazil with emphasis on the genera *Centrosema, Stylosanthes,* and *Zornia* over a 2 ½-year period. The second project will collect, over a three-year period, native subtropical grasses and legumes with potential for forage use. During 1984, 564 accessions of tropical forages were collected in Mato Grosso and Goias, and 100 accessions of temperate forages were collected in Santa Catarina. Genera included: *Aeschynomene, Arachis, Axonopus, Centrosema, Desmodium, Macroptilium, Paspalum, Setaria* and *Vigna*. Collection is considered to be urgent in the southern Brazilian natural grassland area due to the expansion of soyabean cultivation.

The IBPGR financed a forage and pasture legume collection in southern **India** carried out by the Queensland Department of Primary Industries, Australia in collaboration with NBPGR. The material was collected for its potential use on heavy tropical and subtropical clay soils. More than 1 000 samples of wild herbaceous legumes and grasses were collected.

Support was provided for collecting by ORSTOM in **Burkina Faso** in July-Aug. A total of 148 seed samples, including: *Aeschynomene indica* (7), *Alysicarpus ovalifolius* (7), *Andropogon gayanus* (8), *Aristida* sp. (6), *Cenchrus biflorus* (18), *C. prieuri* (6), *Chloris* sp. (7), *Dactyloctenium aegyptium* (11), *Echinochloa colona* (8), *Eragrostis* sp. (14), *Panicum laetum* (6), *Pennisetum pedicellatum*. (9) and *Schoenfeldia gracilis* (10). An additional 107 vegetative forms, mainly of *Andropogon gayanus* (59) and *Panicum subalbidum* (20), were also collected.

Support has been given to INTA, **Argentina** for a forage seed collecting project in the desert-like plateau of Rio Negro, Argentina which INTA will carry out over a four-year period. The first stage will include a search and survey

Forage collecting, Greece

of homogeneous areas and recording phenological data of the target species.

A collecting mission by INIA, **Chile**, was conducted from Nov. 1983 to March 1984 in the southern part of the country. A total of 96 seed samples was collected, including *Agropyron fuegianum* (5), *Deschampsia flexuosa* (5), *Festuca gracillima* (18), *Hordeum comosum* (7), *Poa pratensis* (7), *Rytidosperma virescens* (7), *Trifolium repens* (8) and *Trisetum spicatum* (13). Samples collected in vegetative form (1-4 plants) were: *Acaena pinnatifida*, *Adesmia pumila*, *Agropyron fuegianum*, *Agrostis* sp., *Poa pratensis*, *Armeria maritima* subsp. *andina*, *Carex* sp., *Cerastium arvense*, *Cotula scariosa*, *Festuca gracillima*, *Geranium sessiliflorum*, *Hypochoeris incana*, *Luzula alopercurus*, *Phleum alpinum*, *Poa ligularis*, *Primula magellanica*, *Rytidosperma virescens*, *Satureja darwinii*, *Stipa humilis*, *Trisetum spicatum* and *Valeriana carnosa*. The seed samples were treated and stored at Estacion Experimental Kampenaike; the vegetative samples were planted at the station and duplicates sent to the Departamento de Botanica del Instituto de la Patagonia.

A multi crop mission involving some collection of forages was organized in **Cyprus** by ARI, Nicosia from May to July. The mission was sponsored jointly by ARI, IBPGR and ICARDA. Among the forages collected were: *Cicer arietinum* (28), *Lathyrus sativus* (19), *L. ochrus* (12), *Vicia ervilia* (15) and *V. sativa* (67).

Collecting missions were undertaken by the University of Southampton, UK in northern Portugal during the year. Of interest were sites rich in herbaceous legumes, particularly of *Lathyrus* and *Vicia*. The samples will be distributed to Estacão Agronomica Nacional, Portugal; ZIGuK, German Democratic Republic; CNR, Italy and ICARDA for evaluation.

TREES

The IBPGR and UNEP are supporting a project, coordinated and executed by the FAO Forestry Department, to collect, conserve and evaluate the genera *Acacia*, *Atriplex*, *Prosopis* and *Eucalyptus* in arid and semi-arid areas.

Emphasis has been laid on fuelwood species in low rainfall zones because the scarcity of wood to burn for cooking is often a leading cause of hunger and hardship in target areas.

A principal aim of the project is to create a self-supporting network amongst the cooperating countries: **Chile, India, Mexico, Pakistan, Peru, Senegal, Sudan** and the **Peoples Democratic Republic of Yemen.** The national research institutes or forest services of the participating countries are carrying out the exploration, collection and evaluation work. In addition, the following institutes have collected and distributed seed for evaluation trials in these countries: CSIRO, Australia (mainly *Acacia aneura* and *Eucalyptus microtheca*); CTFT, France (for West African *Acacia* species); and CFI, UK (for Central and South American *Acacia* and *Prosopis* species). Seed has also been collected and evaluated by Israel in connection with the project (*A. raddiana*, *A. tortilis* and *A. albida*).

A total of 161 provenances were collected from 1981 to March 1984 and 96 supplementary and new provenances were added during the remainder of 1984. Seeds are documented in standard format, initially cleaned and then sent for further cleaning and treatment to the Tree Seed Centre, DANIDA, Denmark, and are then distributed to cooperating countries in accordance with instructions from FAO. Duplicate seed samples are also sent for long-term storage to the Royal Botanic Gardens, Kew, UK — the IBPGR-designated base collection centre. The number of provenances by country are summarized in Table 9

Following initial collecting in 1981-83, field planting for evaluation/characterization and for conservation purposes began in 1983 and continued in 1984 with distribution of requested seedlots to cooperating countries. Seed distribution up to December 1984 is summarized in Table 10.

Table 9. Forest project seed collection

Countries	Collection 1981 – March 1984	Collection April – December 1984	
		Provenances	
		Supplementary	New
Chile	19	4	5
India	48	9	15
Israel	4	1	–
Mexico	23	9	11
Pakistan	17	3	5
Peru	10	–	9
Senegal	20	18	5
Sudan	16	2	2
Yemen, PDR	4	–	–
Subtotals		44	52
Total number of accessions	161	96	

The evaluation/characterization trials aim at revealing potentially useful genetic variation, degree of adaptability to a range of environmental conditions and economic or social value of the species/provenances included.

Table 10. Forest project seed distribution (Dec. '84)

Countries	Seed lots received	Test sites
Chile	52	1-4
India	90	2-10
Israel	7	2
Mexico	20	4
Pakistan	62	4
Peru	32	2-4
Senegal	33	1-2
Sudan	49	3
Yemen, PDR	31	1-3
Total	376	

It is expected that by the end of 1985, the cooperating countries will have established tight links with each other and with the cooperating institutes; this will help ensure continuing and expanding activities on genetic resources in the areas concerned. Progress will remain largely dependent on the efforts of individual countries and national research institutes. International coordination is necessary as most species occur in a number of countries and as exploration, collecting and conservation activities consequently cannot be confined within national borders.

In order to be self-supporting, the centres need trained personnel. Assistance in training within the project has consisted of study tours by technical staff directly involved in the project to other countries with similar ecological conditions and problems and the organization of national seminars, workshops, courses and meetings on specific, practical matters. In addition, equipment and material for collecting, testing and storing seed and for evaluation have been provided to the countries.

As species in the genera *Acacia* and *Prosopis* have not in the past received much attention, little information and experience were available at the start of the project on taxonomy and seed collecting, storage and treatment. A series of handbooks was, therefore, prepared in English, French and Spanish; they are intended mainly for professional staff involved in field operations (see Appendix X for titles).

In addition to the eight countries which have formally joined the project, several others, including Algeria, Argentina, Brazil, Cape Verde Islands, Kenya and Zimbabwe, have expressed an interest in the project. Seedlots for testing will be forwarded to these countries in 1985.

REGIONAL ACTIVITIES

AFRICA

Several important crops domesticated in Africa have spread over many regions of the world and have contributed significantly to international agriculture; these include sorghum, pearl millet, coffee and cowpea. Collection and conservation of indigenous germplasm was initiated many years ago in Africa, particularly in Ethiopia, and these activities were intensified especially after the establishment of the IBPGR.

The Board, in close collaboration with various national, regional and international institutions such as ICRISAT, IITA, IRRI, ILCA, WARDA, UNEP, AAASA, ACCT, ICRAF, IRAT, ORSTOM, GERDAT, PGRC/E and others, has promoted, organized and funded numerous exploration and collection missions in Africa since 1975.

In the African continent during the past decade, over 34 000 samples of indigenous major crops were collected, including sorghum, millets, cowpea, rice, okra and also secondary diversity in wheat, barley and groundnut. Arrangements have been made for the safe deposition of all collected samples in long-term storage.

With a view to providing assistance to national institutions to strengthen their activities in germplasm collection and conservation, as well as promoting IBPGR's overall objectives, the Board has two regional coordinators in Africa: a West African office was established in Ouagadougou, Burkina Faso in 1981 and in 1982 an East African office was established at ILRAD headquarters in Nairobi, Kenya. In addition to the regional coordinators, the IBPGR has provided numerous consultants to different national programmes to assist in developing practical programmes for plant genetic resources conservation.

In July 1984, at the suggestion of the Board, Dr. Djbril Sene, Vice Chairman, undertook a mission to six African countries (Niger, Ivory Coast, Nigeria, Burundi, Kenya and Zimbabwe). The prime purposes of the mission were to promote greater awareness of conservation of plant genetic resources and to strengthen IBPGR links with national programmes. Dr. Sene was accompanied by Dr. Anishetty — Assistant Executive Secretary — to Niger, the Ivory Coast and Nigeria, by Mr. Horn — Regional Coordinator for West Africa — to Ivory Coast, and by Mr. Attere, — Regional Coordinator for East Africa — to Burundi, Kenya and Zimbabwe. Dr. Sene also participated in the IBPGR's Tenth Anniversary celebrations 21–22 October at Ouagadougou where he emphasized the establishment of stronger national programmes.

During 1984 the regional coordinators in Africa coordinated and participated in a number of activities in their mandated regions. Collecting was undertaken in Burkina Faso, Cameroon, Ethiopia, Ivory Coast, Kenya, Madagascar, Mauritania, Mauritius, Niger, Nigeria, Uganda, Zambia and Zaire. Table 11 provides a list of the collecting missions supported by the IBPGR in Africa during 1984.

The IBPGR continued to aid African scientists in specialized training and during 1984 eleven scientists were enrolled in post-graduate training and 14 others participated in short training courses (see p.81).

The Regional Coordinator for West Africa liaises with several regional and international organizations located in Burkina Faso: ICRISAT, IITA, OAU-SAFGRAD, the Institute du Sahel and GERDAT institutes.

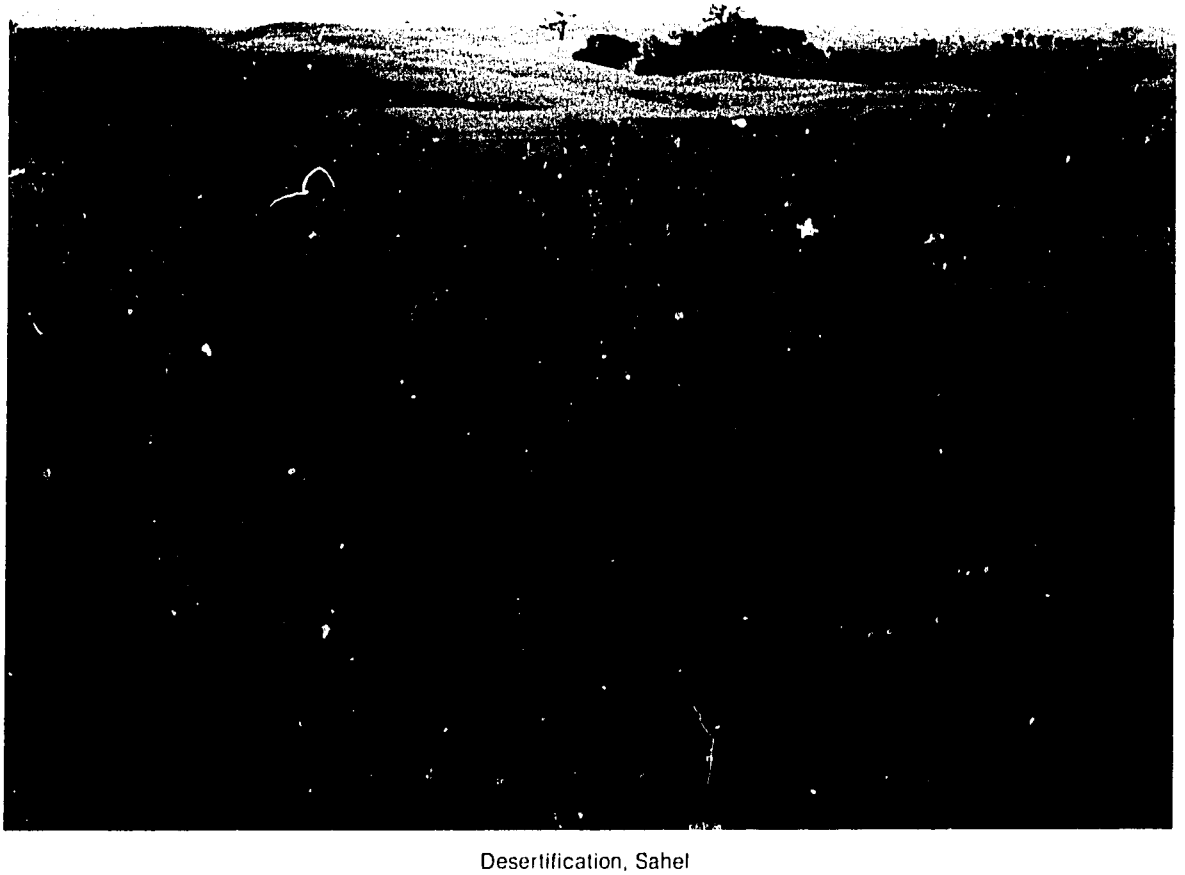
Table 11. Collecting missions supported by the IBPGR in Africa during 1984

Country	Period	Participating institute/country	Crop(s)	No. of samples
Burkina Faso	July-Aug.	ORSTOM/IBPGR	Forages:	
			Seed samples	148
			Vegetative samples	107
Burkina Faso	1982-84	Dept. of Agriculture	Sorghum	192
			Pearl millet	78
			Maize	127
			Fonio	27
			Okra	68
			Cowpea	76
			Bambara groundnut	56
			Others	17
Burkina Faso	1982-84	IVRAZ	*Dioscorea* spp.	400
Burkina Faso	Nov. '83-Feb. '84	IVRAZ	*Oryza sativa*	475
			O. glaberrima	50
Burkina Faso	Sept.-Oct.	University of Ouagadougou	Pearl millet	16
Cameroon	June-July	PORIM	Oilpalm	95
Ivory Coast	Feb.	University of Abidjan	*Dioscorea* spp.	244
Kenya	1984	University of Nairobi	Rice	250
Kenya	August	ILCA & CIAT	Forage legumes & grasses	462
Madagascar	Jan.-May, June-Oct., Nov.	FOFIFA/IRRI/ORSTOM	Rice	320
			Phaseolus	22
Mauritania	Oct.-Dec.	ORSTOM	Sorghum	72
			Pearl millet	32
			Pennisetum spp.	29
Mauritius	1984	Horticulture Dept.	Horticulture crops	-
			Maize	-
			Sugarcane	-
Niger	1984	University of Niamey	*Hordeum*	6
			Rice	10
			Pearl millet	170
			Sorghum	142
			Triticum spp.	27
			Maize	19
			Groundnut	18
			Vigna unguiculata	84
			Bambara groundnut	34
			Sesamum indicum	7
			Gossypium spp.	11
			Hibiscus sabdarifa	8
			Others	24
Niger	Oct.-Dec.	IBPGR & ILCA	*Oryza* spp.	7
			Pennisetum (wild)	59
			Stylosanthes	14
			Bambara groundnut	20
			Paspalum	6
			Panicum	7
			Chloris	5
			Other forages	13
Togo	Nov.	IBPGR	*Acacia* spp.	9
Uganda	Oct.-Nov.	IBPGR & Sere Agricultural Research Station	Sorghum	311
			Finger millet	342
			Pearl millet	22
Uganda	1984	Root Crops Improvement Institute	Sweet potato	-
			Cassava	-

Zaire	May-June	PORIM & Unilever	Oilpalm	369
Zambia	June	IBPGR & Dept of Agriculture & Water Development	Sorghum	58
			Maize	66
			Millets	37
			Cowpea	38
			Cucurbitaceae	70
			Phaseolus	28
			Okra	17
			Capsicum	13
			Sesamum	13
			Others	67

The IBPGR Regional Coordinator for East Africa maintains close links with various national institutions throughout eastern Africa and provides guidance for setting up national programmes on germplasm.

The Plant Genetic Resources Center, Ethiopia (PGRC/E) enlarged its storage facility in 1984. During 1984 a 100 m^3 storage unit at -20°C was installed under a bilateral arrangement with the Federal Republic of Germany. The centre has currently a room of 50 m^3 (at +4°C and 35% RH) and rooms of 75 m^3 and 100 m^3 (both at -20°C) for medium- and long-term conservation respectively. The centre has also taken charge of conservation of coffee germplasm in field genebanks at PGRC/E's Choche field station and planted approximately 40 000 seedlings



Desertification, Sahel

of *ca.* 1 200 accessions. Although primarily breeders' lines, a few original collections are also included.

In January 1984 the PGRC/E explored south-western parts of Ethiopia and collected samples of minor crops. Later, another mission was fielded to the Konso area. The PGRC/E — in collaboration with ICRISAT — fielded a joint mission for chickpea and collected 104 samples.

During 1982-83 the Department of Agriculture, Gaborone, Botswana, with funding from USAID, collected 600 samples of cowpea and a catalogue was published in 1984. Over 50 percent of the samples have been characterized and evaluated for 53 descriptors including several agronomic traits. The work will continue in 1985 with IBPGR support.

The ORSTOM centre in the Ivory Coast received all the okra germplasm collected during 1981-83 in numerous countries of Africa (see p. 24) and this material is being multiplied, characterized and documented and duplicates deposited In IBPGR-designated centres for long-term storage.

In February 1984 the University of Abidjan collected 244 samples of various *Dioscorea* spp. (see p. 16). The University has also planted previously collected material for characterization and documentation. This work will continue in 1985.

In association with the IBPGR, the Kenya Agricultural Research Institute renovated the cold storage facilities at its Mugugha Plant Quarantine Station rendering them operational in 1984. In addition to assisting the upgrading of the storage facilities, the IBPGR also donated some aluminium foil packets. The Station also established a field genebank for cassava, sweet potato, banana, citrus, etc. Some storage equipment was also donated to the National Agricultural Research Station at Kitale by the IBPGR.

With funding from the IBPGR, the Horticulture Department fielded expeditions in Mauritius and Rodrigues for horticultural crops, sugarcane and maize; this work will be continued. The Board also provided the Ministry of Agriculture with two deep freeze chests and other equipment for storage of germplasm.

The University of Niamey, Niger — with support from the IBPGR — collected germplasm from the numerous village markets in Agadez, Tahou, Dosso, Niamey and Maradi provinces. The material gathered includes sorghum, pearl millet, rice, maize, fonio, cowpea, groundnut, Bambara groundnut, sesame, cotton and okra.

The Genetic Resources Unit of IITA continued its work on multiplication, characterization and evaluation and deposition of duplicate samples of cowpea with IBPGR support. During 1984 IITA received special project funds from GTZ for exploration, collection, conservation and evaluation of Bambara groundnut germplasm and from the Italian government for reinforcement of cowpea germplasm work as well as for additional storage facilities. In December 1984 IITA organized a World Cowpea Research Conference and on this occasion IITA celebrated the Tenth Anniversary of the IBPGR in recognition of the Board's work for genetic conservation.

The National Horticultural Research Institute (NIHORT) continued its work on the multiplication, characterization, evaluation and documentation of the existing vegetable and fruit germplasm. The IBPGR provided some equipment for the establishment of a long-term storage facility at NIHORT and the facility is expected to be operational during 1985. The Nigerian government is proposing to set up a coordinated national programme for plant genetic resources based on the work at NIHORT.

The IBPGR supplied deep-freeze cabinets, a drying unit and other equipment to the Horticultural Research Station, ARC, Wad Medani, Sudan, to set up a vegetable genebank. The storage facility became operational towards the end of 1984. The ARC finalized plans for fielding an exploration mission in 1985 for vegetables and fruits in the northern part of the country as a follow-up to earlier missions in 1982 and 1983.

During 1984 an IBPGR assistant was located at the Direction de la recherche agronomique, Lome, Togo. Since then assistance has been provided for upgrading the storage facility at Cacaveli, processing of existing germplasm and planting of materials for systematic multiplication and characterization; translation of some descriptors into French, documentation of passport and characterization data and collection of Bambara groundnut germplasm. The eggplant germplasm collected in different countries of West Africa is also being characterized and evaluated using the IBPGR descriptor list. This work will continue during 1985-1986.

The Board has selected a Collector to work in Burundi, Rwanda and Zaire who will begin work in early 1985. The IBPGR plans to supply storage equipment to Burundi, Rwanda, and Zaire during 1985.

EAST ASIA AND THE PACIFIC

Following an IBPGR mission to China in 1983, the closer relations developed between the IBPGR and CAAS have been reflected by increased activities in 1984. The assistance of IBPGR Board Member Dr. Xu Yuntian has contributed a great deal to this development.

A large genebank with a capacity for storing three hundred thousand accessions is under construction in Beijing and is expected to be completed in 1985. Funds have been provided by the Rockefeller Foundation, but, in order to meet inflationary costs, both the Chinese Government and the IBPGR agreed to provide additional funding.

CIAT organized a forage collecting mission in Hainan Island during 1984 (see p. 37). The Board provided funds to the Nanjing Agricultural University (NAU) to initiate a major programme for the collection, conservation, documentation and use of soyabean germplasm in China. In order to facilitate the characterization and documentation of soyabean germplasm in China, the IBPGR *Soyabean Descriptor List* was published in Chinese at the end of 1984.

In 1984 the CAAS and three Provincial Academies of Agricultural Sciences were visited by the IBPGR Secretariat. Most of the valuable germplasm collections are stored in cotton bags at room temperature, and many accessions require rejuvenation every three years. Additional support from the IBPGR and other agencies will be required for the establishment of medium-term storage facilities throughout the country.

A senior IBPGR consultant delivered a series of lectures on plant genetic resources in Beijing during September 1984. In addition the IBPGR Conservation Officer lectured on germplasm conservation and the development of new techniques to hundreds of scientists during his visit to China.

From 29 July to 9 August 1984, the IBPGR, in agreement with CAAS, organized a mission to China to discuss future cooperation on fruit germplasm (for details see p. 26). Immediately following this mission, four Chinese scientists undertook a study tour in Japan to visit fruit tree research stations and to become familiar with procedures for fruit tree germplasm conservation.

Japanese scientists continuously assisted the work of the Board in 1984 through the participation in IBPGR committees and working groups, through effective collaboration in the IBPGR network of conservation centres and, last but not least, through the organization of major germplasm collecting missions. A special word of thanks is due to Prof. M. Iizuka, who, during his six years of Board membership (1979-84), has been a stimulating force in plant genetic resources activities in this region as well as in Southeast and South Asia.

Work continued on the IBPGR-sponsored citrus collecting, conservation and documentation project. Material from the 1983 collecting mission in Thailand has been cleaned of viruses at the Fruit Tree Research Station, Tsukuba and additional collecting was carried out in Brunei, northwest peninsular Malaysia, Sabah, Sarawak and northeast Thailand during Nov.-Dec. 1984 (see p. 27).

In order to commemorate the Tenth Anniversary of the IBPGR, the Japanese Government agreed to provide Special Project funds for a major collecting mission in Nepal. The mission was undertaken in Nov.-Dec. 1984 and a total of 1 953 samples was collected (see p. 57). Also during 1984 JICA provided funds for the

Staff of Guang Xi Academy of Agricultural Sciences during IBPGR visit

Yam, Vanuatu (T. O'Brien/IBPGR)

organization of a training course on plant genetic resources for students from East and Southeast Asia.

During 1984 support continued for the work initiated by the Chung-Nam National University, Republic of Korea to evaluate the maize collected in 1981-82.

Three students from East Asia and the Pacific were provided training in specialized short courses by the IBPGR during 1984. One student was enrolled in the 1983-84 M. Sc. course at the University of Birmingham.

The IBPGR further strengthened its links with AVRDC. The two walk-in storage units (total capacity 57 m^3, 3 C, (40-45% RH) provided by the IBPGR became operational in 1984. The IBPGR-supported project on the multiplication and characterization of the AVRDC Chinese cabbage collection continued through 1984 with additional assistance from the IBPGR intern (see p. 22). In 1984 similar projects were funded by the IBPGR for the AVRDC mung bean and soyabean collection (see p. 11). Also during 1984, the IBPGR initiated a project to provide AVRDC with a post-entry quarantine screenhouse for the introduction of sweet potato germplasm (see p. 15).

In the Pacific, the Board continued an important programme for the collection, evaluation and conservation of root and tuber crops in the Solomon Islands and an IBPGR intern was appointed in March 1984 to further strengthen this project. During 1984 a collecting mission was organized to Ysabel Island and 58 samples of five root and tuber crops were collected. Characterization and conservation efforts were strengthened during 1984, and a research officer from the Solomon Islands attended the 1984 IBPGR documentation course (see p. 83).

From 29 October to 2 November 1984 the UNDP/FAO/SPC project for strengthening plant protection and root crop development in the South Pacific organized a workshop on root crop breeding and germplasm. The IBPGR sponsored the attendance of the two IBPGR interns stationed in Papua New Guinea and the Solomon Islands and also provided background documentation and computer software.

A cold store was recently built at the Koronivia Research Station, Fiji. Following a visit by the IBPGR Conservation Officer, IBPGR will provide training as well as additional equipment during 1985.

EUROPE

The purpose and goals of the European Co-operative Programme for Conservation and Exchange of Crop Genetic Resources (ECP/GR) were defined during a series of meetings from 1977-79 between UNDP, FAO and EUCARPIA Gene Bank Committee. The ECP/GR, Phase I, became operational in 1980. Towards the end of Phase I it was generally recognized that the ECP/GR had moved from a preparatory phase to one requiring a greater technical input

and the participating governments requested that Phase II of the programme be put under the aegis of IBPGR.

Phase II of the ECP/GR was formally declared operational by the UNDP in July 1984 after all of the countries — except Romania — which had declared their intention in 1983 to join effectively did so. Additionally, during 1984 Ireland joined the Programme bringing the total of participating countries to 26. Membership is shown in Appendix IV. This project is operated as the major Special Project of IBPGR.

Activities for Barley and *Prunus* as recommended by the two respective working groups which met in 1983, continued, while the four other ECP/GR Working Groups — *Allium*, Forages, Oat and Sunflower — began their activities in 1984. The membership of the working groups is provided in Appendix VI. The main achievements or objectives for these six crop working groups, which form the core of the Programme's activities, are mentioned below.

Barley: By the end of 1984 passport data on *ca.* 40 000 accessions had been registered in a central data base at ZIGuK, Gatersleben. This work was assisted by ECP/GR Consultant Dr. S. Blixt. Consequently, a first draft of a European Barley List will be circulated in early 1985 to all curators of barley collections for checking and completion. It is planned that the first European Barley List — with identification of putative duplicates — will be published by late 1985 at which time further action for the identification of real duplicates, the rationalization of collections and the promotion of characterization can then be promoted.

Prunus: The Secretariat and the *Prunus* Crop Coordinators both circulated questionnaires requesting information on *Prunus*, after which a draft European Cherry List, including around 2 400 accessions and 21 countries, was computerized by IHAR, Poland. The information received on almond, apricot, peach, plum and other *Prunus* species was collated by respective crop coordinators and forwarded to the central data base at NGB by the end of 1984. After computerizing by NGB, all draft European *Prunus* lists will then be circulated to *Prunus* collections in early 1985 for checking and completion. After publication of final lists (scheduled for mid-1985), the registration of full available data will proceed.

The Second Meeting of the Technical Consultative Committee (TCC) recognized that much of the diversity of *Prunus* populations was not represented in *ex situ* collections and requested the Secretariat to take diverse measures, *inter alia* to record the state of knowledge on such material already in nature reserves (see p. 29).

The *Prunus* Working Group recommended urgent collecting missions, of which one was conducted in 1984 in Yugoslavia (for hexaploids *P. insititia* and *P. domestica* and one in Greece (for all *Prunus* spp.). These two missions were supported by IBPGR core funds (see p. 29).

The descriptor lists for apricot, cherry, peach and plum were finalized and will be published jointly by IBPGR/CEC in the Spring of 1985. The IBPGR descriptor list for almond was also revised.

Forages: The Working Group on Forages (grasses and legumes) met at the Fooder Crops and Pastures Institute, Larissa, Greece 7-9 February 1984. It recommended a list of institutions/genebanks to accept responsibility for the registration and processing of data of eight basic passport descriptors considered necessary for the publication of European forages lists. It further expressed the hope that the same institutions will continue the registration of more detailed data. By Aug. 1984 nine institutions had agreed to initiate data bases for a species or a group of species (see Table 12) and the forage collections were requested to send basic passport data on their accessions to each respective data base. An assessment made in Nov. 1984 showed that many countries had still not supplied data to the central data bases. It is however expected that the draft lists will be circulated before Spring 1985 for checking and completion, in order that further registration of other passport data may begin.

The Working Group identified training needs as well as possible host insitutes. Subsequently, in Oct. 1984 the Welsh Plant Breeding Station, Aberystwyth, UK organized, with limited financial support from ECP/GR, a training course on collection, characterization and utilization of forage genetic resources for 14 participants.

Urgent collecting missions were also recommeded by the Working Group. It is hoped that countries concerned will undertake these missions in 1985 as input-in-kind to the programme.

Allium: The *Allium* Working Group met at RCA, Tápiószele, Hungary 29-31 May 1984. Following its recommendations, the NVRS, UK and RCA accepted designation to initiate European *Allium* data bases (NVRS for magnetic tape and

Table 12. ECP/GR European data bases

Crop	Institute
Allium	National Vegetable Research Station, Wellesbourne, UK Research Centre for Agrobotany, Institute for Plant Production and Qualification, Tappioszele, Hungary
Barley	Zentralinstitut fur Genetik und Kulturpflanzenforschung, Gatersleben, German Dem. Republic
Forages	
Bromus	Research Centre for Agrobotany, Institute for Plant Production and Qualification, Tapioszele, Hungary
Dactylis and *Festuca*	Plant Breeding and Acclimatization Institute, Radzikow, Poland
Lolium (annual species), *Phalaris* and *Vicia*	Istituto del Germoplasma, Consiglio Nazionale delle Ricerche, Bari, Italy
Lolium multiflorum, *L. perenne* and *Trifolium repens*	Welsh Plant Breeding Station, Aberystwyth, Wales, UK
Medicago (perennial species)	Institut national de la recherche agronomique, La Minière, Guyancourt, France
Phleum	Nordic Gene Bank, Lund, Sweden
Poa	Institut fur Pflanzenbau und Pflanzenzuchtung der Bundesforschungsanstalt fur Landwirtschaft, Braunschweig-Volkenrode, Fed. Republic of Germany
Trifolium pratense	Federal Agricultural Research Station, Changins, Switzerland
Trifolium subterraneum, and *Medicago* (annual species)	Instituto Nacional de Investigaciones Agrarias, Badajoz, Spain
Oat	Institut fur Pflanzenbau und Pflanzenzuchtung der Bundesforschungsanstalt fur Landwirtschaft, Braunschweig-Volkenrode, Fed. Republic of Germany
Prunus	Nordic Gene Bank, Lund, Sweden
Rye	Plant Breeding and Acclimatization Institute, Radzikow, Poland
Sunflower (cultivated forms)	Cereal Research Institute, Szeged, Hungary
(wild species)	Institute of Field and Vegetable Crops, Novi Sad, Yugoslavia

final sorting of accessions; RCA for microcomputer and manual form). Requests for data on 16 basic passport descriptors per accession, were sent by the Secretariat to *Allium* collections through Country Coordinators. Draft European lists will be circulated by mid-1985 for checking and completion.

As recommended by the Working Group, RCA accepted designation by the IBPGR as a base collection for *A. ampeloprasum* and *A. cepa* for southern and eastern Europe and the Research and Breeding Institute for Vegetables, Olomouc, Czechoslovakia, accepted designation as a field genebank for vegetatively propagated material.

The Working Group has identified the needs for future collecting missions.

Sunflower: The Working Group met at the Institute of Field and Vegetable Crops, Novi-Sad, Yugoslavia 23-25 July 1984. The Institute of Field and Vegetable Crops and the Cereal Research Institute, Szeged, Hungary have agreed to develop European data bases, the former for wild species of sunflower and the latter for cultivated sunflower.

The Working Group selected, as a first step, 20 basic passport descriptors for registration in the data bases and this information was requested by the Secretariat from institutes holding collections.

A draft descriptor list was agreed during the Working Group and has been subsequently circulated worldwide to sunflower specialists for their comments and suggestions. The publication of this descriptor list is scheduled for mid-1985.

The Working Group noted that with the exception of *Helianthus annuus* all wild species were poorly represented in most collections and recommended further collecting.

Oat: The Oat Working Group met at ARARI, Izmir, Turkey 25-27 Sept. 1984. Following the Working Group recommendation, FAL accepted to initiate a European oat data base. As a first step FAL is registering data on ten basic passport descriptors agreed by the Working Group.

The meeting also produced a provisional list of descriptors, which is now under worldwide circulation for comments and suggestions before publication scheduled for the Summer of 1985.

The Working Group reviewed in detail up-to-date information on distribution of ranges and patterns of wild and weedy forms of oat and recommended that *Avena prostrata*, *A. maroccana*, *A. murphyi*, *A. canariensis*, *A. damascena* and *A. macrostachya* be collected urgently. The IBPGR is organizing a collection mission for 1985 in Spain and Morocco for the first four species mentioned above.

IBPGR Chairman speaking to participants at Tenth Anniversary celebrations, Leuven, Belgium

WORKSHOP ON EXCHANGE OF INFORMATION

As a result of ECP/GR working group discussions the Secretariat convened a Workshop to consider the constraints which limit the ready exchange of machine-readable data. This Workshop was held in IHAR, Radzikow, Poland 25-27 Oct. 1984 and IHAR accommodated the participants as an input-in-kind to the ECP/GR. The Workshop agreed on various measures which will facilitate the exchange of data between different institutes and also the integration of data into the data bases. For example a format for exchange of data in computerized form was defined; file transfer centres were nominated; and the definition of basic passport descriptors requested by the working groups was made more precise for greater compatibility (see p. 78).

TECHNICAL CONSULTATIVE COMMITTEE

The Second Meeting of the TCC was held at the National Institute for Agriculture, Oeiras, Portugal 3-5 Dec. 1984. It reviewed the progress of the programme and provided detailed advice and guidelines for future activities. It requested the Secretariat to determine the extent of existing *in situ* conservation measures for *Prunus*, *Allium* and major species of forage grasses and legumes in relation to the ecogeographical range of these species in Europe.

Finally, considering the limited time remaining in Phase II of the Programme and the rate of progress in achieving the objectives defined by the Working Groups, the TCC requested greater inputs-in-kind from participating governments and for more interaction between the Secretariat and country coordinators/institutes.

MEDITERRANEAN

Since its inception in 1974, the IBPGR has paid special attention to the Mediterranean region in its endeavour to promote and coordinate a network of genetic resources centres capable of collecting; conserving; documenting and utilizing crop germplasm. This region has been rated high priority for IBPGR operations owing to its status as a gene centre for many crop plants and their wild-weedy relatives e.g. *Triticum* spp., *Hordeum* spp., *Vicia faba*, *Cicer arietinum*, *Allium sativum*, *Allium cepa*, *Medicago* spp., *Lens culinaris* and *Pisum sativum*, and a centre of origin of several other species, e.g. *Avena* spp., *Beta* spp., *Brassica oleracea*, *B. napus*, *Cynara scolymus*, *Linum usitatissimum*, *Lolium* spp., *Lupinus* spp., *Olea europea*, *Raphanus sativus*, *Trifolium* spp. and *Vitis vinifera*.

Initially, the IBPGR Mediterranean programme concentrated its efforts on the exploration and collection of the high priority crop germplasm most threatened with genetic erosion, with particular emphasis on cereals and grain legumes. During the IBPGR's first decade of work, through IBPGR-funded expeditions organized in close collaboration with national programmes, a total of 20 000 samples of diverse crops were

Forage collecting, Evros, Greece

collected from 12 countries: Algeria Cyprus, Egypt, France, Greece, Italy, Libya, Morocco, Portugal, Spain, Tunisia, and Yugoslavia.

The year 1984 represented a stage forward in the evolution and development of an efficient network of national centres involved in the collection, maintenance and utilization of crop germplasm in the Mediterranean. Following the 1983 recommendations of the IBPGR Mediterranean programme review mission, the Board has focussed its scientific and technical input on countries of North Africa. Thus, 1984 has been a particularly eventful year for national crop germplasm programmes in several countries of North Africa in respect to collecting, training and seed conservation operations. This report concentrates on these aspects although collecting in other Mediterranean countries is shown in Table 13 and other items are reported under the Europe regional section.

In May-June, two separate germplasm collecting expeditions were fielded by the IBPGR in collaboration with INRA and INRST/INRAT in Morocco and Tunisia respectively. The former was the first crop germplasm collecting expedition ever launched by the IBPGR in Morocco. Scientists from the Istituto del Germoplasma, Bari, Italy and ICARDA, also participated in this mission in the middle and high Atlas mountain range. In Tunisia, the IBPGR/INRST/INRAT team explored the northeast, southern and central regions and successfully collected samples of wild beets, forage legumes and other species.

In October, a millet collecting expedition was fielded by IBPGR in cooperation with INRAA to the Algerian Oases belt in the south of the country. In addition to *Pennisetum* millets other crops were also collected.

In 1984 IBPGR approved funds for the provision of basic conservation equipment to upgrade seed storage facilities in national programmes of Morocco (INRA, Rabat) and Tunisia (INRST, Tunis). This will significantly help the national programmes of these countries in their efforts to safeguard the considerable collections held at present and to increase storage capacity for material to be collected in the near future.

The year also witnessed a vigorous training input by IBPGR to the region (see p. 81). A total of nine researchers -- representing Algeria (3), Libya (1), Morocco (2) and Tunisia (3) — attended IBPGR-funded short technical training courses on various aspects of plant genetic resources. Five of these scientists — two from Algeria and one each from Libya, Morocco and Tunisia — participated in the short training course given in Arabic at ICARDA/ACSAD. The IBPGR-funded course on seed conservation and genebank management organized by the Kew Seed Bank, UK was attended by trainees from Morocco (1) and Tunisia (1). The Board also provided grants for two trainees (from Algeria [1] and Tunisia [1]) to participate in a two-month training course Oct.-Dec. on germplasm conservation for African genebanks at the Gembloux genebank, Belgium.

LATIN AMERICA

In Latin America some countries such as Argentina, Brazil, Colombia, Costa Rica, Cuba, Ecuador, Guatemala and Nicaragua have already established coordinated national programmes. Bolivia, Chile, Uruguay and Venezuela are in the process of establishing programmes. In Honduras, Jamaica, Panama, Paraguay, Trinidad and Tobago, etc. genetic resources activities are based on initiatives taken by individual institutions or experts. In all cases, the IBPGR continues to play a catalytic role.

A short training course for middle-level technicians in the region working on genetic resources has been supported through UNA, Lima, Peru. The training course was held in September 1984 and attended by 26 students (p. 83).

During 1984 one Latin America student attended the IBPGR-supported M. Sc. course, an intern was posted at CIAT to work on *Phaseolus* germplasm, and a total of 38 South American students attended specialized training

Table 13. Collecting missions supported by the IBPGR in the Mediterranean during 1984

Country	Period	Participating institute	Crops	No. of samples
Algeria	Oct.	INRAA & IBPGR	*Allium*	14
			Hordeum	23
			Pennisetum	38
			Sorghum	19
			Maize	15
			Legumes, various	30
Cyprus	May-July	ARI	*Cicer arietinum*	28
			Lathyrus ochrus	12
			L. sativus	19
			Lens culinaris	19
			Pisum sativum	6
			Vicia ervilia	15
			V. sativa	67
Greece	July-Sept.	Greek Gene Bank	*Prunus amygdalus*	23
			P. armeniaca	9
			P. avium	50
			P. cerasifera	5
			P. cerasus	5
			P. domestica	38
			P. persica	27
Greece	July-Oct.	Institute of Fodder Crops & Pastures	*Cicer*	35
			Nicotiana	110
			Lathyrus spp.	10
			Lens	22
			Vicia spp.	37
Greece	1984	Vine Institute & Greek Gene Bank	*Vitis* spp.	439
Greece	1984	USDA & Greek Gene Bank	*Aegilops* & *Triticum*	403
Greece	1984	Dept. of Agriculture, Western Australia	*Lupinus*	84
			Ornithopus	99
Italy	July	Istituto del Germoplasma, Bari	Wild Mediterranean brassicas	44
			Cultivated Cruciferae & immediate wild relatives	29
			Other wild Cruciferae	30
			Allium	9
Morocco	May-June	Istituto del Germoplasma, Bari, ICARDA, INRA & IBPGR	Beet	7
			Citrus	5
			Hordeum	89
			Lathyrus	9
			Lens	9
			Medicago	12
			Triticum	53
			Vicia	43
			Maize	13
			Others	41
Spain	1984	Universidad Polytecnica, Valencia with INIA	*Allium*	95
			Beet	22
			Brassica	85
			Capsicum	160
			Citrullus	30
			Cucumis	158
			Cucurbita	145
			Raphanus	14
			Solanum	25
Spain	1984	INIA	Maize	339
Tunisia	May	IBPGR, Hellenic Sugar Industry, INRST & INRAT	*Medicago*	73
			Beet	22
			Hordeum	16
			Others	29

courses with IBPGR support.

During the first decade of work, the IBPGR assisted in promoting training throughout Latin America. The IBPGR provided some assistance to training initiatives to a number of national, international and private institutions such as CATIE, IBM, UNA, INTA, CIAT and CENARGEN. Over the last decade six courses (of duration from 1-4 months) have covered genetic resources concepts and – in keeping with the recent shift in training emphasis to subject-specific topics – the last two short courses have been provided on information management and collection techniques.

Some of the basic benefits from these courses are: that training material in Portuguese and Spanish is now available and many non-graduate technicians who directly handle material in genebanks have been provided with practical experience.

During 1984, the IBPGR continued its close cooperation with CIMMYT (for maize and wheat), CIP (for potatoes) and CIAT (for *Phaseolus*, forages and cassava). Specific projects carried out through these centres are detailed in the crop section of this report.

During 1984, two symposia were held in Latin America in conjunction with the Tenth Anniversary celebrations of the IBPGR. One took place in Argentina, organized by IBPGR and ANAV (Academia Nacional de Agronomia y Veterinaria), INTA (Instituto Nacional de Tecnologiá Agropecuaria) and CIF (Consejo Federal de Inversiones) and reviewed the maize germplasm programme in the region, identifying gaps and needs (see p. 7). A second symposium took place in Chile and was organized by the Universidad Austral and cosponsored by a number of national and private institutions. All aspects of national genetic resources activities were covered and discussed by the participants during the meeting. A plan was presented to the government to establish a national coordinated structure for genetic resources with the following components: a national advisory committee, an executive genetic resources unit and a national genebank for long-term storage.

Collecting missions supported by IBPGR during 1984 are listed in Table 14. Details of these missions are provided in the respective crop sections.

During 1984, the IBPGR also increased its support to multiplication, characterization and preliminary evaluation activities. This type of work, supported by the Board, continued to be carried out in: Argentina *(Arachis)*, Bolivia and Colombia (mainly horticultural crops), Guatemala *(Capsicum, Ipomoea, Manihot, Cucurbita*

IBPGR Tenth Anniversary celebrations, Chile

Table 14. Collecting missions supported by the IBPGR in Latin America during 1984

Country	Project began	Participating institute(s)	Crop(s)	No. of samples*	Genebank(s) receiving material/remarks
Bolivia	April 1982	CIF, Pairumani, Bolivia	*Capsicum*	49	● CIF Pairumani, Bolivia
			Cucurbita	37	For *Capsicum* and *Cucurbita:*
			Phaseolus	13	● CATIE, Turrialba, Costa Rica
			Lupinus mutabilis	13	For *Phaseolus:*
			Amaranthus	18	● CIAT, Cali, Colombia
			Vicia faba	37	For *Lupinus:*
			Maize	56	● Univ. San Antonio Abad, Cuzco, Peru
			Wheat	46	
Brazil	July 1984	CENARGEN & EMBRAPA	Native tropical forages	564	● CIAT ● CENARGEN, Brasilia, Brazil ● CSIRO, Queensland, Australia
Brazil	June 1984	CENARGEN & EMBRAPA	Native subtropical forages	100	● CENARGEN
Brazil	May 1984	CENARGEN & EMBRAPA	*Manihot esculenta*	99	● CNPMF, Cruz das Almas, Brazil,
			Manihot spp.	32	● CIAT ● CENARGEN ● EMCAPA, Espirito Santo, Brazil
Brazil	May 1984	CENARGEN & EMBRAPA	Cotton	96	● CENARGEN ● CNPA, EMBRAPA, Brazil ● IAC, Campinas, Brazil
Brazil	July 1984	CENARGEN & EMBRAPA	*Arachis hypogaea*	27	● GENARGEN
			Arachis spp.	25	● ICRISAT, Andhra Pradesh, India ● Texas A & M University, USA ● INTA Manfredi, Argentina
Chile	Nov. 1983	INIA, Est. Exp. de Kampenaike	*Festuca gracillima*	18	Seeds and vegetatively propagated material
			Trisetum spicatum	13	● INIA Kampenaike, Punta Arenas, Magallanes, Chile
			Trifolium repens	8	● CIAT
			Rytidosperma virescens	7	
			Poa pratensis	7	
			Hordeum comosum	7	
			Agropyron fuegianum	5	
			Deschampsia flexuosa	5	
			Agrostis sp.	4	
			Stipa humilis	4	
			Other species	39	
Colombia	Nov. 1983	ICA	*Theobroma cacao*	32	● CRI Tulenapa & CNI Palmira, Colombia
			Theobroma spp.	6	● Cocoa Research Unit, University of the West Indies, Trinidad
			Gossypium	6	● CATIE
			Others	11	
Colombia	1983	ICA	*Gossypium*	250	● ICA, Colombia
Colombia	June 1984	IBPGR & ICA	*Cucurbita moschata*	24	● ICA, Palmira, Colombia
			Capsicum	17	● ICA, Tibaitata, Colombia
			Others	6	
Ecuador	1982	INIAP	*Prunus capuli*	127	For all crops:
			Capsicum	14	● INIAP, Sta. Catalina, Ecuador
			Oxalis tuberosa	65	For Lupinus:
			Ullucus tuberosus	110	● ZIGuK, Gatersleben, DDR
			Amaranthus	244	For *Lycopersicon* and *Capsicum:*
			Lycopersicon	5	● CATIE
			Lupinus mutabilis	62	
			Tropaeolum tuberosum	55	
			Chenopodium quinoa	409	
			Arracacia xanthorrhiza	32	
			Others	10	
Guatemala	1982	ICTA & Universidad de San Carlos	*Cucurbita*	235	● ICTA, Guatemala
			Capsicum	194	● Universidad de San Carlos, Guatemala
			Manihot	150	For *Manihot* spp.:
			Ipomoea	127	

			Solanum	86	• CIAT
			Amaranthus	66	For *Capsicum, Cucurbita,*
			Lycopersicon	43	*Lycopersicon*, local Central
			Colocasia	19	American crops and others:
			Dioscorea	18	• CATIE
			Xanthosoma	17	For *Ipomoea* spp.:
			Physalis	11	• NSSL, Colorado, USA
			Lagenaria	11	
			Mormordica	8	
			Others	22	
Mexico	1984	INIA & University of Arizona	Wild *Phaseolus* (17 species)	113	• INIA, Mexico • University of Arizona, Tucson, USA • CIAT • Univ. of Gembloux, Belgium • NSSL
Mexico	1983	INIA	*Theobroma*	66	• INIA, Mexico • CATIE
Mexico	Oct. 1984	Univ. Autonoma de Chapingo	*Sechium edule* *Sechium* wild relatives	225 9	• INIA, Veracruz, Mexico • CATIE • CENARGEN
Nicaragua	1983	MIDINRA	*Phaseolus vulgaris* *Zea mays* *Cucurbita* Sorghum *Capsicum* Total 1984	 300	• DGTA/MIDINRA, Nicaragua • Univ. Nacional Autonoma de Nicaragua For *Phaseolus:* • CIAT • NSSL, Colorado, USA For *Capsicum:* • CATIE • IVT, Wageningen, Netherlands For Maize and *Cucurbita:* • NSSL, Colorado, USA • VIR, Leningrad, URSS
Paraguay	March 1984	CIAT & IAN	*Manihot*	46	• IAN, Caucupé, Paraguay • CIAT
Peru	Oct. 1984	UNA	*Lycopersicon* *Capsicum* *Gossypium* Others	61 45 4 8	• UNA, Lima, Peru For *Lycopersicon* : • Tomato Genetic Stock Center, University of Calif., Davis, USA
Peru	1982	Universidad de San Cristobal de Huamanga	*Arracacia zanthorrhiza* *Canna edulis* *Colocasia esculenta* *Ipomoea* *Lepidium meyenii* *Manihot* *Oxalis tuberosa* *Polymnia sonchifolia* *Tropaeolum tuberosum* *Ullucus tuberosus*	36 11 11 499 6 78 152 12 48 111	For Sweet Potato: • Univ. de S. Cristobal de Huamanga, Ayacucho, Peru • UNA For Cassava: • Univ. de la Amazonia, Iquitos, Peru • CIAT For others: • Univ. de S. Cristobal de Huamanga, Ayacucho, Peru
Uruguay	1984	Universidad de La Republica	*Arachis burkartii* *A. hypogaea* *Solanum commersonii*	30 77 32	• Facultad de Agronomia, Univ. dela Republica, Montevideo, Uruguay For *Arachis:* • NSSL • INTA Pergamino, Argentina • CENARGEN • ICRISAT For *Solanum commersonii:* • CIP, Lima, Peru • IVT, Netherlands

* Number of samples are from beginning of project through 1984 except for Bolivian & Nicaraguan listings which represents totals for 1984 alone.

and *Amaranthus)* and Peru *(Zea mays)*; and initiated in: Barbados *(Saccharum)*, Bolivia *(Capsicum, Phaseolus, Lupinus* and *Cucurbita)*, Peru *(Phaseolus)* and Uruguay *(Arachis)*. Texas A & M University, USA, with the assistance of the IBPGR, continued a project during 1984 to complete the evaluation of the *Arachis hypogaea* materials collected in South America.

The IBPGR provided support to some Latin American nations in 1984 for conservation. INTA Argentina and UNA, Peru were aided in upgrading their seed storage facilities. Assistance on vegetatively propagated material was provided to CENARGEN, Brazil to continue its work for the establishment and conservation of a field genebank of wild *Arachis;* to CIAT to improve procedures for *in vitro* conservation of *Manihot* species; and to the "Pedro Ruiz Gallo" National University, Peru to facilitate conservation work and transfer of cassava and sweet potato germplasm through *in vitro* meristem culture.

Efforts to document genetic resources in Latin America continued during 1984. With IBPGR support in 1984 the *Catalogue of Maize Genetic Resources in South America* dealing with Chile was issued; the Argeatine, Bolivian, Paraguayan and Uruguayan catalogues were published in 1983 and the Brazilian and Peruvian catalogues are under preparation. The Texas A & M University, with IBPGR assistance, published during 1984 the *Catalogue of Arachis Germplasm Collections in South America, 1976-1983*. The IBPGR also provided support to the Cocoa Research Unit, Saint Augustine, Trinidad, for a computer-aided compilation of cocoa characterization data.

SOUTH ASIA

For a number of years the IBPGR has been encouraging the establishment of genetic resources programmes in the region; has assisted in exploration and collection of germplasm and provided fellowships to increase trained manpower. However, the IBPGR has had comparatively limited impact in the region compared to neighbouring Southeast Asia, which has an active cooperative regional programme. Owing to the difficulty in establishing a regional structure for South Asia the Board has agreed to assist individual countries directly. India has had a long history of genetic resources activities in the region and has a centralized national institute (NBPGR) to coordinate its activities. Recently, Bangladesh established a genetic resources programme.

In Nov.-Dec. 1983, Board missions visited Bangladesh, Burma, India, Nepal and Sri Lanka. The recommendations of the mission were reported in the *1983 Annual Report*. In 1984 the IBPGR attempted to appoint a field collector to be located in Bhutan but this was not possible.

In 1980 the IBPGR provided funds to Bangladesh for a medium-term storage facility. This facility is expected to be operational in early 1985. The Board has also provided funds for the collection of pulse germplasm in the country. The IRRI/IBPGR collector, in cooperation with BRRI, collected rice germplasm in 1984 (Table 15). The Jute Research Institute, with funding from the Asian Development Bank, established a long-term storage facility in 1983 and BRRI is also establishing a storage facility for rice with support from Japan.

The IBPGR provided a fellowship to a participant from Bangladesh to attend post-experience courses during the 1983-84 session of the Birmingham M. Sc. course.

In cooperation with the Department of Agriculture, Bhutan, the IBPGR (in 1981), and IRRI/IBPGR (in 1983 and 1984) fielded exploration missions in Bhutan. The first mission was a multicrop collection and the latter two missions were especially for rice germplasm. During Sept.-Nov. 1984 the Punakha, Shemgang and Chirang districts were explored and 66 samples of rice were collected. Some areas require further collection but it is anticipated that local extension workers will continue the work.

The Agricultural Research Institute at Yezin, Burma, maintains about 2 000 accessions of rice which have been collected in cooperation with IRRI. A few accessions of food legumes, vegetable and oil crops are also maintained and used in

Table 15. Collecting missions supported by the IBPGR in South Asia during 1984

Country	Period	Participating institute/country	Crop(s)	No. of samples
Bangladesh	August	IRRI, IBPGR & BRRI	Rice	103
Bhutan	Sept.-Nov.	IRRI & IBPGR	Rice	66
India	Sept.-Dec.	Queensland Dept. of Primary Industry Australia, NBPGR & IBPGR	Forages	1 000
India	Sept.-Oct.	ORSTOM & CRRI	Rice	43
Nepal	Nov.-Dec.	Japan	Rice	273
			Wheat	61
			Barley	64
			Maize	105
			Finger millet	76
			Sorghum	18
			Other millets	35
			Buckwheat	55
			Amaranthus	80
			Soyabean	95
			Cowpea	107
			Phaseolus	103
			Other legumes	91
			Spices/condiments	29
			Citrus	110
			Peach	65
			Pear	22
			Other temperate fruits	37
			Tropical fruits	33
			Cruciferae	136
			Eggplant	13
			Capsicum spp	43
			Allium spp	20
			Okra	20
			Cucurbitaceae	168
			Other vegetables	17
			Taro	26
			Other roots & tubers	14
			Other crops	66
Sri Lanka	Feb.	IRRI, IBPGR & CARI	Rice	108
			Oryza spp	14

breeding programmes. The IBPGR has tried unsuccessfully to provide assistance. With funding from the IBPGR, the IRRI/IBPGR collector is expected to visit Burma in 1985 both to collect and to provide practical training for scientists.

The National Bureau of Plant Genetic Resources (NBPGR) has organized numerous exploration missions in India and other countries. In addition, the national crop-based institutions are also involved in germplasm activities. In 1983, the NBPGR, with financial support from the IBPGR, published a monograph on *Plant Genetic Resources of India — their Diversity and Conservation*. This publication outlines the diversity in crops, species related to crops, past collection activities, future plans of action and provides a directory of existing collections. The NBPGR also published an IBPGR Tenth Anniversary monograph in 1984 on *Wild Relatives of Crop Plants in India*. The IBPGR provided assistance to the CPCRI, Kasaragod for collection of coconut germplasm in the Pacific region. The collection is being maintained at Port Blair in the Andaman and Nicobar Islands with assistance from the Board. The NBPGR also organized short training courses on plant exploration techniques in 1979, 1980 and 1982 and during 1984 an Indian student was provided specialized training through an IBPGR-supported training course.

During 1983-84 the IBPGR provided some equipment to the NBPGR and a few other

institutes in India for germplasm conservation. In Sept.-Dec. the Queensland Department of Primary Industry, Australia — in close cooperation with NBPGR — explored the central and southern parts of India and collected over 1 000 samples of forage legumes and grasses. In Sept.-Oct. 1984 a scientist from ORSTOM, in collaboration with CRRI, collected wild species of *Oryza* in western India with funds from the IBPGR. In 1984, the Board also provided funds to the University of Kashmir to collect *Allium* germplasm.

The Genetic Resources Unit of ICRISAT was also active in India during 1984. On a mission to the Eastern Ghats region, pearl millet (104) and groundnut (23) samples were collected from tribal areas.

Since 1977, the IBPGR has collaborated actively in Nepal. In 1983 the Department of Agriculture, with assistance from IADS, set up a medium-term storage facility. The IBPGR and other IARCs have fielded several missions in Nepal and collected cereals and food legumes. In Nov.-Dec. 1984 Japanese scientists, under a special IBPGR Tenth Anniversary project of the Japanese government, explored the western and eastern foothills of Nepal and collected a total of 1 953 samples of cereals, food legumes, oil crops, vegetables, fruit trees, root crops, spices and condiments, fibre crops and others. The IBPGR also intends to locate an intern in Nepal to carry out further work funded by Japan.

The Departments of Agriculture and Minor Export Crops, and the University of Peradeniya are focal points for germplasm work in Sri Lanka. During Feb. 1984 the IRRI/IBPGR collector gathered rice (including wild species) from different parts of the country. The Department of Agriculture also fielded missions for millets, grain legumes and oil crops with support from the IBPGR and this will continue into 1985. During the last 5-6 years, the Department of Minor Export Crops has collected several spices and maintains field genebanks of *Piper*, cinnamon and other spices and essential oils.

Tubers collected in the Maldives (R. Arora/IBPGR)

In 1983 the University of Peradeniya initiated the collection of *Dioscorea* and other root crop germplasm in the country. This work is continuing with IBPGR support.

SOUTHEAST ASIA

In 1975, under the leadership of Dr. Setijati Sastrapradja (Director of the National Biological Institute, Bogor, Indonesia and one of the founding members of the IBPGR) a Symposium on Southeast Asian Plant Genetic Resources was held at Bogor, Indonesia. The recommendations of this Symposium led subsequently to the establishment of a regional cooperative programme. A second Symposium on Southeast Asian Plant Genetic Resources is planned for 21-24 Aug. 1985, Jakarta, Indonesia with sponsorship from LIPI, KPPNN and the IBPGR.

The activities in this region are coordinated by the IBPGR Regional Committee for Southeast Asia (RECSEA) and served by an IBPGR Regional Coordinator. RECSEA currently comprises government-designated members from Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand (see Appendix III for membership). After a visit by the RECSEA Chairman and the Regional Coordinator in March 1984, Brunei indicated its intention to join the Regional Programme and an official response is expected early in 1985.

Following a Board mission to the region in July-Aug. 1983, the Regional Coordinator prepared a draft five-year plan of action. *A Co-operative Regional Programme in Southeast Asia: Five-Year Plan of Action 1985-89* was published after being discussed by the IBPGR at its 1984 meeting and subsequently finalized by RECSEA at its sixth meeting, Bangkok, Thailand, 13-15 March 1984. Major emphasis in the coming five years (1985-89) will be given to the coordination of activities through crop specific working groups following the model adopted by the ECP/GR in Europe. Seven working groups will be established: maize, food legumes, root and tuber crops, sugarcane, tropical fruits, forages and palms and the first meetings will be convened in 1985.

All countries in Southeast Asia continued collecting activities in 1984, partly with IBPGR support. Information on these missions is summarized in Table 16, while details are provided in the relevant crop sections.

Most of the collecting projects in Southeast Asia include a component on growing out collected samples, characterization and documentation. This work is sometimes carried out utilizing IBPGR funds, or, in most cases, by using national funds. During 1984 special IBPGR grants were provided for this purpose to Thailand for eggplant and sweet potato.

Early in 1984 IBPGR funds were provided to Malaysia for medium-term storage facilities and to Papua New Guinea for deep freezers. Adequate seed conservation facilities now exist in all countries in the region. In August 1984 an IBPGR consultant visited Thailand to provide on-the-job training for personnel of the existing storage facilities at the National Genebank of Thailand and the Rangsit rice genebank.

The IBPGR, in agreement with the government of Papua New Guinea, appointed an IBPGR intern at the HAES Aiyura. Dr. H. Takagi commenced her activities in March 1984 and is assisting the national programme of Papua New Guinea with the collection, characterization, documentation and conservation of sweet potato.

The IBPGR is also funding two full-time collectors in the region, namely for rice (stationed at IRRI, see p. 6) and for forages (stationed at LBN, Bogor, Indonesia, see p. 37).

Two IBPGR Tenth Anniversary celebrations were held in the region during 1984. A special convocation and press conference was held 17 Sept. at IRRI headquarters. This celebration was jointly organized by the Philippines Ministry of Agriculture and Food, NSTA, UPLB, PCARRD and IRRI. Another IBPGR Tenth Anniversary commemoration was held in Bangkok, Thailand on 11 Oct. during the Second National Seminar on Plant Genetic Resources. The seminar was sponsored by the Thai National Plant Genetic Resources Coordinating Subcommittee. HE Prof. Sanya Thammasak, Chairman of the Privy Council of Thailand, on behalf of the Thai Ministry of Science, Technology and Energy, presented an Award of Merit to the Board and a Certificate of Honour to the IBPGR's Executive Secretary.

SOUTHWEST AND CENTRAL ASIA

Following the Board's decision to terminate the regional programme at the end of 1983, the IBPGR concentrated its efforts through national programmes in 1984.

In Pakistan, the plant genetic resources laboratory, NARC, Islamabad organized with IBPGR funding a rice germplasm collecting expedition in the North Western Frontier Province in Oct. This collecting mission was fielded to meet specific recommendations made by the IRRI/IBPGR Rice Germplasm Conservation Workshop in 1983 (see *1983 Annual Report*). A

Table 16. Collecting missions supported by the IBPGR in Southeast Asia during 1984

Country	Period	Participating institute(s)	Crop(s)	No. of samples[1]	Genebank(s) receiving material/remarks
Brunei	Dec. 1984	Fruit Tree Research Station, Japan; University of California, Riverside; MARDI; University of Malaya & IBPGR	Citrus	1	Fruit Tree Research Station, Japan & MARDI
Indonesia	March-Dec. 1984	LBN & IBPGR	Forage legumes Forage grasses	552 74	LBN; partly duplicated at CIAT; & CSIRO, Australia
Indonesia	June-Aug 1984	Hawaiian Sugar Planters' Association, in association with LBN, Bogor & Balai Penelitian Perusahaan Perkebunan Gula (BP_3G), Pasuruan	Sugarcane	133	BP_3G, Pasuruan. Duplicates introduced into the USA for post-entry quarantine and eventual distribution to the world collections in India and the USA
Malaysia (peninsular)	1981-84	MARDI & Department of Agriculture, Malaysia	Coconut	56	MARDI Hilir Perak Station & MARDI Kemaman Station
Malaysia	1982-86	MARDI, Dept. of Agriculture, Malaysia, Sabah and Sarawak, Forest Research Institute & University of Malaysia	Malaysian fruits	412	MARDI, Serdang, Selangor
Malaysia	1982-85	UKM	Winged bean	225	UKM
Malaysia (peninsular)	Nov. 1984	Fruit Tree Research Station, Japan; University of California, Riverside with Prince of Songkla University, Thailand; MARDI; UPM & IBPGR	Citrus	17	Fruit Tree Research Station, Japan, MARDI, UPM & Prince of Songkla University
Malaysia (Sabah)	Dec 1984	Fruit Tree Research Station, Japan; University of California Riverside with MARDI; University of Malaya, Sabah Depts. of Agriculture and Forestry & IBPGR	Citrus	19	Fruit Tree Research Station, Japan & MARDI
Malaysia (Sarawak)	Dec. 1984	Fruit Tree Research Station, Japan; University of California Riverside with MARDI; University of Malaya, Sarawak Dept. of Agriculture & IBPGR	Citrus	13	Fruit Tree Research Station, Japan & MARDI
Papua New Guinea	1983-85	DPI (HAES Aiyura and Laloki Horticultural Experiment Station)	Sweet Potato	84	HAES, Aiyura
Philippines	1981-84	NPGRL, IPB & UPLB	Forage legumes	397	NPGRL/IPB
Philippines	1981-84	PCA & Agricultural Resources Centre, UPLB	Coconut	68	PCA - Zamboanga Research Center; partially duplicated at PCA — Davao Research Center & PCA — Albay Research Center
Philippines	1983-85	PHILSUCOM	Sugarcane	319	PHILSUCOM
Thailand	1982-84	Prince of Songkla University	*Garcinia* & *Lansium*	147	Prince of Songkla University
Thailand	1983-84	Ramkhamhaeng University	*Capsicum*	50	National Genebank of Thailand
Thailand	1983-84	Department of Agriculture	Maize *Coix lacryma-jobi*	176 6	National Genebank of Thailand & Rice Genebank at Rangsit
Thailand	1983-85	TISTR	Pigeonpea	320	National Genebank of Thailand

Thailand	1984	Chiang Mai University	Sweet potato	124	Chiang Mai University
Thailand	April 1984	CIAT and TISTR	Forage legumes	154	CIAT and National Genebank of Thailand
Thailand	May 1984	Prince of Songkla University & IBPGR	Pummelo	51	Prince of Songkla University
Thailand	Dec. 1984	Fruit Tree Research Station, Japan, University of California, Riverside with Prince of Songkla University, Dept. of Agriculture, Thailand; UPM, MARDI & IBPGR	Citrus	27	Fruit Tree Research Station, Japan, Prince of Songkla University, Dept. of Agriculture, Thailand UPM & MARDI, Malaysia

1 A substantial number of the collecting projects in Southeast Asia have a duration longer than one year. The figures in the column "no. of samples" represents the total number collected from the initiation of the project up to the end of 1984.

total of 65 seed samples of rice (and several other crops) were collected in 54 sites (see Table 17).

The national programme of Syria, centred on the Plant Genetic Resources Unit of the Directorate of Agricultural Research, Douma, continued collecting. Crop samples collected included *Cicer* (13); *Hordeum* (10); *Lathyrus* (4); *Lens* (12); *Sorghum* (5); *Triticum* (73); *Vicia* (8); maize (8) and various vegetable species (9).

In the Yemen Arab Republic, a sorghum collecting mission was launched by the genetic resources unit of ICRISAT in Nov.-Dec. During the same period, an IBPGR/ACSAD forage/browse collecting mission was fielded in collaboration with the El-Kod Agricultural Research Centre in PDR Yemen. A total of 19 species were sampled.

Collecting activities in the region also included Jordan where the University of Yarmouk in association with the University of Saskatchewan, Canada — and with IBPGR support — collected a total of 202 samples of cereals.

The Board has provided a consultant to Iran to advise on the construction/technical plans of a new national seed storage facility (medium- and long-term stores) at the Seed and Plant Improvement Institute (SPII) in Karaj. In addition, IBPGR officers and consultants visited SPII to assess the present status of the existing collections and to make recommendations regarding putting the collections in order and future collecting targets in Iran for the national programme (specifically for wheat and forages).

It is understood that the national programme in Turkey continued its coordinated work but no report was received. More than 1 000 samples of cereals were collected in Turkey by ARARI and the University of Corvallis, USA — with IBPGR support — during June-July and Nov.-Dec. and IBPGR lent support to the development of a pro-

Table 17. Collecting missions supported by the IBPGR in Southwest and Central Asia during 1984

Country	Period	Participating institute(s)	Crop(s)	No. of samples
Jordan	Summer	Universities of Yarmouk, (Jordan) & Saskatchewan (Canada)	Durum and Barley landraces, *Triticum dicoccoides*, *Hordeum spontaneum*, *Aegiliops*	202
Pakistan	Oct.	NARC, Islamabad	Rice	65
			Maize	45
			Vigna	13
			Phaseolus	5
			Others	15
Turkey	June-July, Nov.-Dec.	ARARI & University of Corvallis, USA	Wheat	214
			Wheat (wild)	49
			Aegilops	863
			Barley (wild)	40
Yemen, PDR	Dec.	ACSAD & El Kod Agricultural Research Station, PDR Yemen	*Acacia*	19
			Others, largely grasses	29

gramme for ecogeographical survey to be carried out by the University of Ankara and USDA in 1985 in eastern Turkey.

The first training course in Arabic on plant genetic resources — cosponsored and coorganized by IBPGR, ICARDA and ACSAD — was held in Syria (April-May). This course concentrated on genetic resources of economic plant species of the Arab countries especially those which grow in arid- and semi-arid areas and therefore addressed specific technical problems pertinent to the region. Nine researchers attended the course from this region: Jordan (1); Iraq (2); Qatar (1); Syria (3); Yemen AR (1) and PDR Yemen (1).

During 1984 the IBPGR provided a varied programme of training for the region: an intern continued to be located to work on forages at ICARDA; two students from the region were sponsored on the M. Sc. programme at Birmingham; and a total of 10 scientists/technicians from the region received specific training through short courses.

CONSERVATION

SEED CONSERVATION

The most common and economical method for conservation is to preserve genetic resources as seed. In the mid-nineteen-seventies there were only eight seed storage facilities in the world available for adequate genetic resources conservation. Since that time the Board has provided funds for, or acted as a catalyst in, the establishment of many of the more than 300 seed storage facilities (which hold active or base collections) in public institutes throughout the world.

In addition to the increase in the number of seed storage facilities to safeguard genetic resources, research supported by the Board during the past years has resulted in both conceptual and technical changes for seed conservation. Following are some examples:

— **A new concept for seed drying:** Seed drying techniques were adapted from the commercial seed industry, where seeds are dried at 35-40°C before being placed in storage. Under such high temperatures, seed viability in the longer-term was affected. Some seeds, such as sugarcane, could not be stored satisfactorily after drying. A new concept of drying seeds at a lower temperature (15°C) and lower relative humidity (15%) has been developed. Seeds, including sugarcane, dried at 15°C and 15% RH are most suitable for long-term storage.

— **Use of low temperature for long-term storage:** Prior to the recommendation of the IBPGR Advisory Committee on Seed Storage (see Appendix V for membership), very few genebanks were storing seeds at -20°C for long-term storage. By 1985 most of the designated genebanks were using -10 to -20°C for long-term storage.

— **Use of hermetically sealed laminated bags to overcome humidity problems during storage:** Controlling relative humidity in the storage room can be expensive and has been a problem, especially for many genebanks in developing countries. The use of hermetically sealed laminated bags for seed storage can easily overcome this problem.

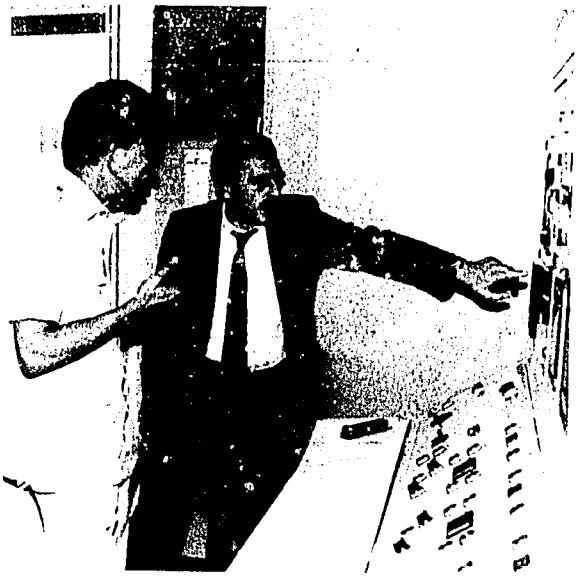
— **Modifying the equation quantifying seed deterioration:** with support from the IBPGR, a modified equation to quantify seed deterioration was developed in 1982 at Reading University by Prof. Roberts and Dr. Ellis. Under given storage conditions, the modified equation predicts seed viability after a given period of storage and hence estimates the storage life of seeds. Furthermore, if both the initial seed quality are known, and final desired viability, proper storage conditions, such as temperature and relative humidity, can also be calculated.

— **Saving valuable germplasm samples through use of sequential tests:** Seed viability monitoring tests are routine practices within genebanks. The use of sequential tests recommended by the IBPGR (See *FAO/IBPGR Plant Genetic Resources Newsletter* 44) can save seeds for germination tests in many cases with no decrease in accuracy.

Below are summaries of the different aspects of seed conservation in which the Board was engaged in 1984. The IBPGR's conservation work was enhanced in 1984 through the addition of a seed conservation officer who is a specialist in seed physiology.

THE WORLD NETWORK OF BASE COLLECTIONS

The IBPGR has formally requested both international and national centres to serve as conservation centres to hold base collections of major food crops. The designated genebanks accept responsibility to serve as **world** or **regional** depositories of specific crops. During the past decade of IBPGR work the network of designated seed genebanks has grown to 33 (5 international



Control room, Thai National Genebank, TISTR

and 28 national centres). With the addition of designated field genebanks, the number increases to 47 genebanks (Fig. 5). It has been estimated that about 50 base collections will form a reasonably complete network covering about 40 major crops and it is predicted that the designation will be completed by 1986. The current IBPGR network of base centres for seed crops is presented in Table 18 and the network of field collections in Table 19.

In 1984 the IBPGR published *Institutes Conserving Crop Germplasm: The IBPGR Global Network of Genebanks*. This publication not only provides a list of genebanks but also specifies storage conditions in each genebank. Furthermore, standards for seed storage are also discussed briefly. The importance of forming a world network of active collections, to supplement the base collection network, has become evident. A first urgent task is to identify significant active collections already in existence.

SUPPORT FOR CONSERVATION FACILITIES

Due to the satisfactory state of the network, the Board has agreed to discontinue funding for the construction of new long-term seed stores (except in exceptional cases), but to continue to upgrade existing ones. In 1984, funds were provided for improving the medium- and/or long-term seed storage facilities in Malaysia (MARDI, Kuala Lumpur); Nigeria (NIHORT); Papua New Guinea (DPI, Konedobu); Peru (UNA, La Molina, Lima); and Portugal (Estação Agronomica Nacional, Oeiras). Funds were also provided to AVRDC (Taiwan, China) for the setting up of a post-entry quarantine screenhouse.

Packing equipment, including laminated aluminium bags and heat sealers, were provided to Bangladesh (BARI, Dacca); Bolivia (CIF, Cochabamba); Burma (ARI, Yazin); Burundi (IRAZ, Citega); India (Central Institute of Cotton Research, Tamil Nadu and University of Agricultural Sciences, Bangalore); Nepal (Dept. of Agriculture, Kathmandu); Nigeria (NIHORT, Ibadan); Syria (Agricultural Research Centre, Douma); and Uruguay (University of Uruguay, Montevideo).

The lack of adequate conservation centres in Africa has been of concern for some time and as a result special attention has been paid to the African countries. Complete sets of genebank equipment (including a dehumidifying seed drying unit, deep freezers, seed packaging, and seed moisture determination equipment) were provided in 1984 to Mauritius (Ministry of Agriculture, Fisheries and National Resources, Reduit); Morocco (INRA, Rabat); Tunisia (Genetic Laboratory, Belvedere); and Sudan (ARC, Wad Medani). In addition, cooling equipment and spare parts were provided to Kenya (Kari) to make the cold store functional.

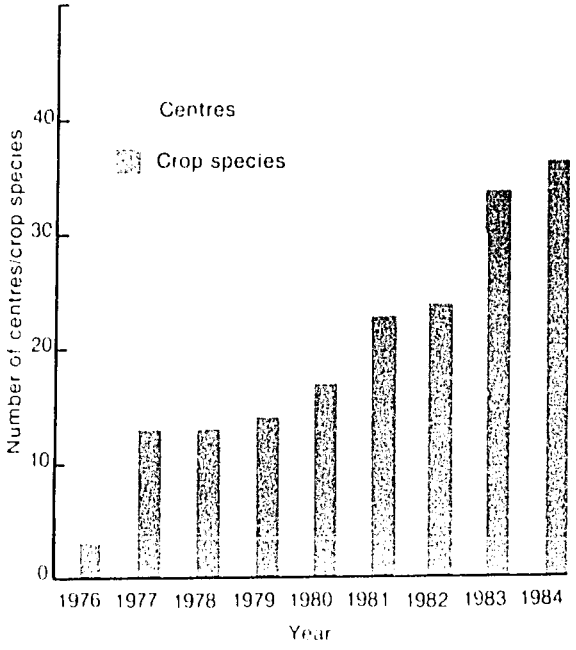


Figure 5. IBPGR global network of base collections

Table 18. Current IBPGR network of base centres for seed crops (March '85)[1]

Crop	Representation[2]	Institute
	CEREALS	
Barley		PGR, Ottawa, Canada
	European	NGB, Lund, Sweden
	African	PGRC/E, Addis Ababa, Ethiopia
	Asian	NIAS, Tsukuba, Japan
Maize	New World	NSSL, Fort Collins, USA
	Asian	NIAS, Tsukuba, Japan
	Asian	TISTR, Bangkok, Thailand
	European	VIR, Leningrad, USSR
	Southern European	Portuguese Genebank, Braga
Millets	*Pennisetum* spp.	NSSL, Fort Collin, USA PGR, Ottawa, Canada ICRISAT, Hyderabad, India
	Eleusine spp.	PGRC/E, Addis Ababa, Ethiopia ICRISAT, Hyderabad, India
	Minor Indian millets	NBPGR, New Delhi, India
	Eragrostis spp.	PGRC/E, Addis Ababa, Ethiopia
	Panicum miliaceum	ICRISAT, Hyderabad, India
	Setaria italica	ICRISAT, Hyderabad, India
Oat		PGR, Ottawa, Canada NGB, Lund, Sweden
Rice	*Oryza sativa* - *indica*	IRRI, Los Baños, Philippines
	javanica	IRRI, Los Baños, Philippines
	japonica	NIAS, Tsukuba, Japan
	African	IITA, Ibadan, Nigeria
	Mediterranean, temperate and intermediate forms from the USA	NSSL, Fort Collins, USA
	Wild species	IRRI, Los Baños, Philippines
Rye		Polish Genebank, Radzikow NGB, Lund, Sweden
Sorghum		NSSL, Fort Collins, USA ICRISAT, Hyderabad, India
Wheat	Cultivated species	VIR, Leningrad, USSR CNR, Bari, Italy NSSL, Fort Collins, USA
	Wild species of *Triticum* and *Aegilops*	Plant Germplasm Institute, University of Kyoto, Japan
	FOOD LEGUMES	
Chickpea		ICRISAT, Hyderabad, India
Faba bean		CNR, Bari, Italy
Groundnut		ICRISAT, Hyderabad, India
	South American	INTA, Pergamino, Argentina
	Wild perennial species	CENARGEN/EMBRAPA, Brazil
Lupin		ZIGuK, Gatersleben, GDR
	European	INIA, Madrid, Spain
Pea		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, Cali, Colombia NSSL, Fort Collins, USA

1 Many other genebanks are being designated, particularly in developing parts of the world, but do not feature in the table due to protracted negotiations.

2 Institutions with no specification are designated for global collections.

	European	FAL, Braunschweig, Germany, F.R.
Pigeonpea		ICRISAT, Hyderbad, India
Soyabean		NSSL, Fort Collins, USA
	Wild perennial	CSIRO, Canberra, Australia
Vigna spp.	Wild species	Faculté des sciences agronomiques de l'Etat, Gembloux, Belgium
	Vigna radiata	IPB, Los Baños, Philippines AVRDC, Tainan, China
	Vigna unguiculata	IITA, Ibadan, Nigeria NSSL, Fort Collins, USA
Winged bean		IPB, Los Baños, Philippines TISTR, Bangkok, Thailand

ROOT CROPS

Cassava		CIAT, Cali, Colombia
Potato		CIP, Lima, Peru
Sweet Potato		NSSL, Fort Collins, USA
	Asian	AVRDC, Tainan, China NIAS, Tsukuba, Japan

VEGETABLES

Allium		NVRS, Wellesbourne, UK NSSL, Fort Collins, USA
	South and East European	RCA, Tápiószele, Hungary
	Asian	NIAS, Tsukuba, Japan
Amaranthus		NSSL, Fort Collins, USA
	Asian	NBPGR, New Delhi, India
Capsicum		CATIE, Turrialba, Costa Rica IVT, Wageningen, Netherlands
Crucifers	*Brassica carinata*	FAL, Braunschweig, Germany, F.R. PGRC/E, Addis Ababa, Ethiopia
	B. oleracea	NVRS, Wellesbourne, UK IVT, Wageningen, Netherlands
	Raphanus spp.	NVRS, Wellesbourne, UK
	Wild spp.	Universidad Politénica, Madrid, Spain Tohoku University, Sendai, Japan
	Oilseeds and green manures:	
	B. campestris, B. juncea, B. napus, Sinapis alba	PGR, Ottawa, Canada FAL, Braunschweig, Germany, F.R.
	Vegetables and fodders:	
	B. campestris, B. juncea, B. napus	NVRS, Wellesbourne, UK
	B. napus	FAL, Braunschweig, Germany, F.R.
	All cruciferous crops	NIAS, Tsukuba, Japan
Cucurbits	Species of *Benincasa, Luffa, Momordica* and *Trichosanthes*	IPB, Los Baños, Philippines
	Species of *Cucumis* and *Citrullus*	NSSL, Fort Collins, USA INIA, Madrid, Spain
	Cucurbita spp.	NSSL, Fort Collins, USA
Eggplant		IVT, Wageningen, Netherlands NSSL, Fort Collins, USA
Okra		NSSL, Fort Collins, USA
Tomato		CATIE, Turrialba, Costa Rica ZIGuK, Gatersleben, GDR NSSL, Fort Collins, USA
	Asian	IPB, Los Baños, Philippines
Southeast Asian vegetables		IPB, Los Baños, Philippines

INDUSTRIAL CROPS

Beet		FAL, Braunschweig, Germany, F.R. 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
	OTHERS	
Tree spp.	(Fuel and environmental stabilization in arid areas)	Royal Botanic Gardens, Kew, UK

Table 19. The IBPGR network of field genebanks (March '85)

Crop	Representation	Institute
	ROOTS AND TUBERS	
Cassava	Global	CIAT, Colombia
	Latin American	CENARGEN, Brazil*
	Central American	INIA, Mexico
	African	IITA, Nigeria*
Sweet potato	Asian and Pacific	AVRDC, China
	FRUITS	
Banana	Global	Banana Board, Jamaica*
	Southeast Asian	PCARRD, Philippines
	African	Delegation generale à la recherche scientifique et technique, Cameroon
Citrus	East Asian	Fruit Tree Research Station, Tsukuba, Japan*
	Mediterranean	INIA, Valencia, Spain
	Mediterranean and African	IRFA, Corsica, France*
	North American	USDA**
	Latin American	CENARGEN, Brazil*
	South Asian	IIHR, India*
	INDUSTRIAL CROPS	
Cocoa	Global	University of the West Indies, Trinidad and Tobago
	Global	Cocoa Project, CATIE, Costa Rica
Sugarcane	Global	Sugarcane Breeding Institute, Coimbatore, India*
	Global	USDA, Florida, USA
	PERENNIAL SPECIES	
Allium	Short day material	Hebrew University, 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

Rice being regenerated, Tsukuba, Japan

ADVISORY COMMITTEE ON SEED STORAGE

The Advisory Committee on Seed Storage (see Appendix V for membership) met for the third time on 4-6 April 1984. The Committee informed the Board that from a scientific standpoint there is considerable justification for the development of an international register of genebanks and the periodic monitoring by the IBPGR of the standards. The Committee agrees that there should be two standards :

1) **acceptable** — in many cases minimal but adequate for storage; and
2) **preferred** — as a higher standard to be aimed for.

The standards for an international register of genebanks have been developed by the Committee and have been submitted to the Board for approval.

The Committee recognizes that seed quality may deteriorate before seeds arrive at the genebank. A report, "Maintaining Viability during Collecting Expeditions" by R.D. Smith, was endorsed by the Committee.

The Committee understands the importance of the identification of exactly which species produce seeds with recalcitrant behaviour. An updated list for the classification of recalcitrant and orthodox seeds was published (see *Plant Genetic Resources Newsletter*, No. 58, 1984) and this updated list will be published in a revised edition of *The Design of Seed Storage Facilities for Genetic Conservation* in early 1985.

During the year *Seed Management Techniques for Genebanks*, the proceedings of a Workshop held in 1982 at the Royal Botanic Gardens, Kew, UK, was published.

INVESTIGATIONS ON SEED PHYSIOLOGY

IBPGR support continued in 1984 for a project which started in 1977 at the University of Reading,

UK. The project attempts to quantify seed deterioration under a known storage environment and thus, enable curators to determine optimal viability monitoring intervals and regeneration periods. It has been found that data from all species so far investigated can be applied to a single equation. However, the four constants involved in the equation have to be determined for each species. Although the constants for five species (barley, soyabean, cowpea, chickpea and onion) have now been determined, many other species remain to be studied. In this project, a large amount of data has been accumulated, including 11 000 germination tests on nearly three million seeds. After a thorough analysis, specific advice and species constants for the storage equation will be generated for wheat (bread and durum), rice (*Oryza sativa* and *O. glaberrima*), maize, sorghum, pearl millet, finger millet, kodo millet, sugar beet, sugarcane and potato.

Recent evidence suggests that two of the four species' constants quantifying the effects of the storage temperature on seed longevity can be considered as a single temperature coefficient and that this value may be very similar, if not identical, in all species. A third constant quantifying the effect of seed moisture content on longevity differs markedly between species, but analysis suggests that if the percentage of moisture content was transformed to unit of water activity (or water potential), the value of this coefficient would then become very similar between species and major differences arise because of the effects that oil content has on water activity at a given moisture content (which can be calculated). If all of these tentative findings are confirmed it should be possible for each of these constants to adopt values common for all species.

Early annual reports of the IBPGR have indicated that the Board's support to the seed physiology investigation will be incorporated into an advisory manual on seed testing for genebanks. Such a manual concerning the findings on germination of dormant and non-dormant seeds was in an advanced stage of preparation by the end of 1984 and will be published in 1985. This manual will provide not only relevant information in one document to assist genebank staff on appropriate germination test regimes, but also a guide to many facets of seed testing which are particularly relevant to genebanks. The manual is divided into four sections.

- Section A, techniques and seed physiology relevant to genebank operation;
- Section B, practical information on how to remove dormancy and promote germination of viable seeds;
- Section C, additional information to aid the operation of long- and medium-term genebanks; and
- Section D, literature review which may be of use to those testing seeds in genebanks.

TECHNICAL ADVICE FOR CONSERVATION

In view of the wishes of many governments or institutes conserving genetic resources, the Board continues to provide technical advice for genebanks. In 1984, experts on seed conservation have visited genebanks in China, Fiji, Morocco, Sudan, Thailand, and Tunisia to assess the situation and to provide technical assistance. As requested by the government, an expert was sent to design the genebank at Karaj, Iran. This genebank is currently under construction.

Visiting genebanks is only one method to provide technical advice; another common way is through correspondence. During 1984 technical advice has been provided in this manner to Cyprus (ARI, Nicosia); Belgium (National Botanical Gardens, Meise); ICARDA; Mexico (INIA); and India (Central Insitute for Cotton Research, New Ramdespeth).

IBPGR SUPPORT TO *IN VITRO* CULTURE RESEARCH

Following the report of the IBPGR Advisory Committee on *In Vitro* Storage (1983) a number of concepts were clarified, especially the definitions of *in vitro* active and base genebanks. Although most tissue culture collections which exist at present are active collections the IBPGR has taken major responsibility to develop cryopreservation techniques for a number of important vegetatively propagated crops. At the same time research is being supported on *in vitro* techniques so that protocols and culture media can be developed for a wide range of genotypes.

During 1984 the Board continued to support research on cassava, cacao, banana, *Citrus*,

Colocasia, sweet potato and initiated new work on *Xanthosoma*. The work is guided by a refereeing sub-committee comprising Prof. E.A.L. de Langhe (Chairman, *In Vitro* Committee), Dr. L.A. Withers (Technical Secretary, *In Vitro* Committee) and Dr. J.T. Williams (Executive Secretary, IBPGR and member *In Vitro* Committee). During 1984 several projects were reviewed.

The Committee held its second meeting in Sept. 1984 (see Appendix V for membership) at which two important status reports were considered.

— **a report on stability.** It was noted by Dr. W.R. Scowcroft, the author, that tissue culture instability and somaclonal variation is ubiquitous. Although this variation may be beneficial to breeding it is a disadvantage for *in vitro* conservation (and exchange). Genetic instability and somaclonal variation has been recorded at all tissue culture levels and instability results in variation in ploidy levels and chromosome structure, morphological and biochemical traits and changes at the nucleotide level. The report titled *Genetic Variability in Tissue Culture: Impact on Germplasm Conservation and Utilization* (1984) also provides information on the inheritance of somaclonal mutants; situations where somaclonal variation is more likely to be enhanced and which explants in culture are more prone to instability. Since most existing germplasm storage uses slow growth techniques — rather than cryopreservation — the Committee agreed to commission a special research study using a model system to assess the risks to germplasm integrity at various stages of culturing.

— **a status report on temperate fruits** by Dr. C. Stushnoff and Dr. C.D. Fear to the University of Saskatchewan, Saskatoon, Canada. In summary *in vitro* techniques have been developed largely for clonal propagation, elimination of viruses, embryo culture to rescue immature embryos and for generation of variability for breeding. However, on the use of *in vitro* techniques for genetic conservation there has been relatively little appropriate work and virtually no reports which adequately address genetic stability. Although techniques for minimum growth are available or in the pipe-line, cryopreservation has not been adequately researched (except for cryopreservation of dormant apple buds) and no down-stream checking has been carried out. The Committee concluded that breeders of temperate fruits put too much attention on the conservation of clones whereas the primary conservation method of this material should be by seed. However, there may be justification for supplemental methods whereby a limited number of clones need to be preserved. These clones will have to be chosen on the basis of specific attributes e.g. parthenocarpy, seedlessness, or special attributes. (In this respect, it is noted that breeders will wish to maintain a larger number of clones and these will fall outside the framework of genetic conservation. The responsibility for their maintenance lies with the breeders. The Committee points out that the only way these collections should be established is through the widespread collecting of clones, followed by their description and rationalization.) For the specially identified clones there may, in certain cases, be a justification for parallel field and *in vitro* genebanks.

Two other status reports will be considered in more detail in 1985:

i) a review of the applicability of *in vitro* methods to the conservation of *Allium* germplasm;
ii) the use of isozyme analysis in the characterization of materials.

The subject of pollen storage was discussed in detail by the *In Vitro* Committee and although this cannot be a primary method of conservation, it offers a possibility of simplifying regeneration of tree species from seeds in store by permitting the pollination of existing mother trees. Larger seed samples must then be returned to storage in order to represent variability adequately. The use of this method is limited to one cycle of regeneration during the long-term storage of seeds.

THE IBPGR INTERNATIONAL COMPUTERIZED DATA BASE ON *IN VITRO* CONSERVATION

By the end of 1984 research data had been entered from 58 countries representing the work of over 300 scientists. Certain crops, particularly

ornamentals, the Solanaceae, and woody species in general, are receiving considerable attention whilst others are relatively neglected. The neglected categories include crops identified by the IBPGR as those whose conservation would benefit from an *in vitro* approach. Apparent reasons for this neglect include poor performance *in vitro*, and shortage of funds, equipment, personnel and plant material. In addition, a computerized literature data base is also being compiled. 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 cryopreservation
- Exchange of cultures

Additional information can be obtained from the Executive Secretariat or Dr. L.A. Withers, University of Nottingham, UK.

RESEARCH

Specific research supported is listed below on a crop-by-crop basis.

Cassava

Through CIAT, funds were provided for the *in vitro* transfer of samples. In 1984, 158 accessions were transferred from Costa Rica and Panama to the CIAT collection (see p. 13). At CIAT they are being characterized biochemically, evaluated and made available to all countries. Problems are experienced in seed quantity, seed viability and hence stakes are normally used but the latter pose quarantine problems and their establishment is also poor. Following the decision of an IBPGR subcommittee CIAT is developing an *in vitro* collecting technique.

In association with CIAT the Plant Biotechnology Institute, Saskatoon, Canada is investigating the cryopreservation of cassava. IBPGR support started at the end of 1982. During 1983 some difficulties were experienced due to the poor quality of the living material from which explants were taken. The IBPGR arranged to get a better range of material from CIAT in 1984.

Citrus

The Tissue Culture Unit of INIA, Valencia, Spain is investigating the conservation of *Citrus* germplasm using *in vitro* techniques. Although initially mostly funded by INIA, the IBPGR has provided some financial support beginning in August 1983 to develop preliminary screening of techniques. The work will be associated with the establishment by the IBPGR of a Mediterranean *Citrus* germplasm bank (and the elimination of viruses from stocks). Although the development of techniques applicable to a wide range of genotypes is a major part of the project, the survival of Citrus cultures after freezing is being attempted. Preliminary results are disappointing.

Cacao

The IBPGR-funded project at Nottingham, UK continued to work on clonal propagation and conservation methodology using growth limitation and attempted cryopreservation. The storage methods eventually adopted must be compatible with clonal propagation. In 1984, cryopreservation of dormant buds excised directly from the plant and then recovered either *in vitro* or by grafting were examined. An attack on a broad front developed by this project resulted in a novel *in vitro* collecting technique which was tested in the Amazon in 1984.

Banana

In 1982 the Board initiated a project at the Catholic University of Leuven, Belgium on banana meristem culture and research on medium-term storage by growth retardation and long-term storage techniques. This has been combined with a training exercise. Emphasis is being put on different cooling methods. In 1984 biochemical disease indexing was initiated since this is a high priority for the international movement of germplasm.

An additional project on genetic variability in banana plants multiplied via *in vitro* techniques is supported by the IBPGR at the Agricultural Research Organization, Division of Subtropical Horticulture, Volcani Centre, Israel. This project compares characterization of phenotypes with biochemical characterization using two dimensional gel electrophoresis. In parallel, observations and measurements were carried out in the field with conventional and *in vitro* propagated plants.

Colocasia

In 1984, the Board continued support to the Northeastern University, Boston, USA for

cryopreservation and biochemical characterization and its use for downstream checking in a wide range of genotypes of taro. Good progress has been made on biochemical characterization but slower progress on germplasm storage. Efforts are being made to devise pre-treatment protocols for storage of cultures at reduced temperatures.

Sweet Potato

The IBPGR project at Clemson University, South Carolina, USA (in association with Dr. A. Jones, Chairman IBPGR Working Group on Sweet Potato and with USDA-supported work on disease indexing) is attempting to develop techniques applicable to the widest range of genotypes. It was found that the standard technique is not satisfactory for all lines of sweet potato tested and modifications to the techniques are under development. In addition a training manual will be issued on 'Meristem Culture and Virus Indexing of Sweet Potatoes'.

Xanthosoma

During 1984 support for development of *in vitro* culture methods for a wide range of cultivars of *X. brasiliense* and *X. sagittifolium* was initiated at the Agricultural University, Wageningen, Netherlands. Progress was delayed since materials were only received from Latin America in Sept. and there were difficulties in receiving adequate African samples.

In 1985 the IBPGR expects to be in a better position to report on *in vitro* collecting techniques (see *1983 Annual Report*).

IN SITU CONSERVATION

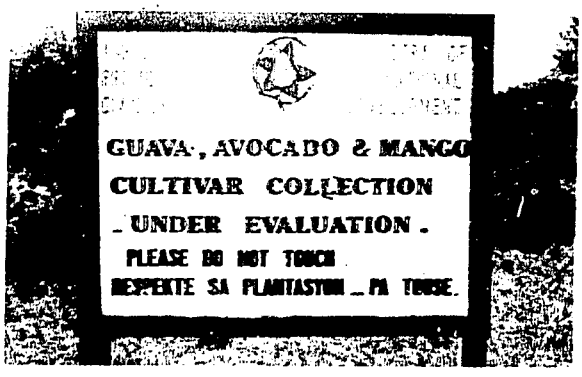
In numerous discussions in the past the Board has stressed the need for *ex situ* conservation for seed crops but designation of *in situ* reserves for conservation of many tropical species is also required as a complementary method, expecially fruits, rubber, cocoa and others. The Board also recognizes the need for much more detailed field work than has been carried out in the past. Many protected areas do not have a plant inventory; most lack details on population variability.

Through collaboration with IUCN and WWF and the Plants Campaign launched in 1984, the Board jointly established a mango project with IUCN to look at the distribution of related wild species in Kalimantan (1985), Sabah and Sarawak (1986) and the adequacy of existing reserve areas in conserving representative variability. This project might be used as a model for future work of this kind.

At the 12th Board Meeting in February 1985, the Board agreed to a policy statement on *in situ* conservation of wild crop relatives (see *Plant Genetic Resources Newsletter* 59). This statement points out that:

- Taxonomy of most wild crop relatives must be clarified and genetic variability within populations must be ascertained.
- Ecogeographical surveys of occurrences and determination of biological requirements of individual species are vital, and too often deficient components, of *in situ* programmes.
- Conservation objectives for individual species and populations must be ascertained scientifically, on a site-specific basis, and integrated into overall regional land use and resource development planning. This will require considerably more basic research and technical innovation than is presently occurring.
- There should be greater assessment and monitoring of the populations of wild crop relatives that are already conserved on an *in situ* basis and data should be standardized and freely available.

The IBPGR wishes to work with other international and national organizations to ensure that the development of *in situ* conservation techniques is based on the best scientific principles so that efforts are successful and contribute to overall conservation of genetic resources.



Seychelles

In August 1984 a task force was held to discuss the principles of ecogeographical surveying and *in situ* conservation (see Appendix for membership). This will be discussed in detail early in 1985 but a first list of priorities for action is shown in Table 20.

Table 20. Priorities for *in situ* conservation

Highest priority	
Groundnut:	perennial species
Oil palm:	entire genepool
Banana:	wild diploid species
Rubber:	entire genepool
Coffee:	*Coffea arabica*
Cocao:	entire genepool
Onion:	some wild species
Citrus:	wild species
Mango:	wild species
Prunus, Malus & Pyrus:	wild species
Lower priority	
Maize:	*Zea diploperannis* and other perennial species
Soyabean:	wild perennial species
Cassava:	wild species
Sweet potato:	wild species
Olive:	*Olea laperrinei*
Avocado:	wild species
Durian:	wild species
Rambutan:	wild species
Futher study	
Phaseolus & Sorgum:	the wider genepool
Rice:	wild perennials
Cowpea:	forage forms of wild species

INFORMATION AND DATA MANAGEMENT

Genetic resources can only be successfully utilized if detailed and reliable data on the collections are available to genebank users: breeders and research workers of different disciplines. The documentation of plant genetic resources is a complex and continuous process which reflects a cooperative effort on the part of a large number of institutes and scientists in the collection, preservation, characterization and evaluation of plant material. The quantity and complexity of the information involved, as well as the diversity of the information services to be provided by the genebanks (both internally and externally), require comprehensive and efficient data management systems.

Since its inception the IBPGR has laid emphasis on installation and development of data management systems in the network of collections. Data management training, technical assistance, organization/sponsorship of workshops and meetings on documentation of germplasm, defining and promoting the standardization and making this information about germplasm widely available are activities which continuously receive high priority from the IBPGR. These efforts have been complemented and amplified by numerous international and national programmes. As a result, documentation systems have been implemented in a large number of genetic resources centres throughout the world. Electronic data processing technology offers efficiency in data handling and provides for easy data transfer between systems. This has always been given preference and consequently most documentation systems in use are computerized.

One of the most important aspects of germplasm documentation work is wide availability of information held in different genebanks. Several different complementary approaches have been adopted by the IBPGR to achieve this goal. The formulation of standard crop descriptor lists and the promotion of their use is the cornerstone. These lists are frameworks/guidelines to the description of the most important genetic characteristics of the accessions in germplasm collections. Standardization of data prevents duplication of efforts in characterizing germplasm and eliminates cost and difficulty to implement transformations of data during exchange. During the past ten years, 48 IBPGR descriptor lists have been published; they cover most of the major, and a number of minor, crops.

Another important element of the Board's documentation strategy is the publication of information about the location and general contents of the major germplasm collections. The work on directories of germplasm collections was begun in 1979 and has received considerable interest among the user community.

A more recent approach to improve the dissemination of information is the establishment of international crop data bases containing the data on each accession whenever it is available. Collating and maintaining the detailed data on the crops is advantageous for:

i) assessment of geographical representation of samples in the collections;
ii) identification of putative duplicates within and between collections; and
iii) assessment of gaps in collections to enable targeting of collecting efforts.

The IBPGR — as the coordinating organization for a large network of crop genetic resources activities — has a commitment to provide an information service concerning the activities within the network. Adequate data processing facilities are essential for this, and in 1983 the Secretariat installed a Wang Office Information System (OIS) computer, in addition to operating two microcomputers. In 1984 work was completed on the following data bases:

i) mailing list (more than 3 000 entries);
ii) germplasm collected by the IBPGR during the period 1974-84; the data lists what, where and by whom germplasm was collected and provides the locations where it has been deposited; and
iii) centres conserving germplasm. This worldwide data base contains information about the seed genebanks within the network on storage conditions, genera and species held and duplication of samples.

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STANDARDIZATION OF DATA: CROP DESCRIPTOR LISTS

Standardization of germplasm documentation aims at facilitating the screening of plant material for characteristics even when collections are maintained in different locations. The basis on which information on accessions can be generated in a standard way by all people working on a particular crop are formulated in descriptor lists. In order to facilitate the use of these lists by all workers, a new standard format was adopted by the IBPGR in 1982. Three out of four categories in the lists (passport, characterization and preliminary evaluation data) are recorded by germplasm curators and the fourth comprises traits described by plant breeders.

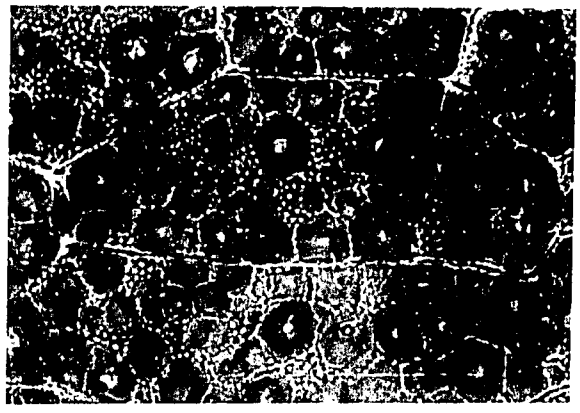
During 1984 the following descriptor lists were published: grape (in cooperation with OIV and UPOV); banana (revised); sorghum (revised, joint ICRISAT/IBPGR); forage legumes (joint CEC/IBPGR); and soyabean (in English and Chinese). Lists for almond (revised), apricot (revised), cherry, chickpea, *Panicum miliaceum* and *P. sumatrense*, peach, plum, *Setaria italica* and *S. pumila* and *Vigna acontifolia* and *V. tribulata* were under preparation and will be published in 1985. In addition, work continued on descriptor lists for *Colocasia* (revised), finger millet, oat, wild *Phaseolus* species, sunflower (in cooperation with CEC), *Vigna mungo* and *V. radiata*, *V. umbellata* and *V. angularis* and yam (revised). These lists are scheduled for publication in 1985.

DIRECTORIES OF GERMPLASM

In order to disseminate the information of what germplasm is held where, the IBPGR publishes directories containing summary information on all known major holdings of high priority crops. The directories serve as a reference for breeders and scientists involved with genetic resources work to identify collections where material and/or further information can be obtained. For each crop the directories provide essential data in summary form on the types of samples held at each centre, their geographical representation, characterization and evaluation activities, method of documentation of the data, storage conditions and the location of duplicates.

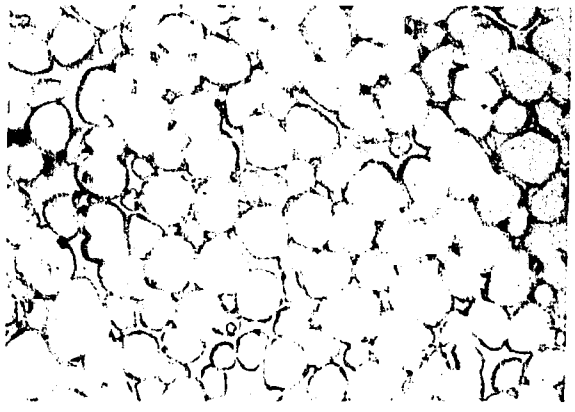
Directories were published in 1984 for *Forages (Grasses and Legumes)* and *Tropical and Subtropical Fruits and Tree Nuts*. Information is being compiled for the publication of the following directories in 1985: *Industrial Crops (beet, coffee, cotton, oil palm and rubber); Temperate Fruits and Tree Nuts; Food Legumes* (revision); and *Root and Tuber Crops* (revision). In addition a *Soyabean Directory* was prepared by INTSOY and will be published by IBPGR in 1985.

The data for these directories are computerized in the Secretariat. This will facilitate updating as additional information becomes available. Efforts are being made to obtain more complete details about characterization and evaluation work carried out in the major collections.



(Above) Maize, normal kernels showing many protein bodies

(Below) Maize, opaque kernels not showing any protein bodies



DESCRIPTION OF SAMPLES: INTERNATIONAL DATA BASES

The potential of germplasm maintained in genebanks can be better realized and exploited when the material is well characterized, evaluated and the data are readily available for retrieval and processing. The experience of the last decade, however, has indicated that many genebanks lack data concerning their own collections or the data are not accessible to the international community. Therefore, in parallel to providing technical assistance for many centres to characterize, evaluate and document the germplasm, the IBPGR has initiated or encouraged the establishment of computerized central data bases for a number of crops. Since this work requires specific know-how and powerful computer facilities as well as scientific back-up from highly qualified crop experts, the Board is promoting the establishment of such crop data bases at recognized centres of excellence. The first project on maize collections from South America began in 1980 and resulted in the publication of a series of catalogues that include evaluation data from Argentina, Bolivia, Chile, Paraguay and Uruguay. Catalogues of maize germplasm in Brazil and Peru are in preparation.

Since 1982 the work on central data bases and inventories of major crops has been accelerated. Selected projects are described below; others are reported in the respective section on crops (for *Capsicum*, *Cucumis*, eggplant, okra and wheat) and in the section for Europe.

Groundnut: The data base for *Arachis* germplasm (wild and cultivated) collected in South America (1976–83) during 17 expeditions has been established at the Texas A & M University, USA and the catalogue was published jointly with the IBPGR in 1984.

Phaseolus: The collaborative project of IBPGR and the Faculty at Gembloux, Belgium, initiated in 1982 to establish the global data base for common bean progressed significantly in 1984. Apart from the objective to produce a global report on the state of conservation of *P. vulgaris*, available variability, duplication, gaps in collections, etc., the project also aims at the identification of the most appropriate statistical methods for analysis of evaluation data to guide breeders to select required germplasm. By the end of 1984, passport and evaluation data from 16 major genetic resources centres had been collated and most of the data entered into the data bank. The number of accessions registered now exceeds 45 000 and a few additional centres are expected to provide their data in 1985. Because of heterogenity of descriptor systems used in those genebanks which provided the data, loading of the data base was difficult. Attempts to transform the input data into one standard form were made, however, for many descriptors the standardization of data was not possible without significant loss of information or precision. Those data were entered in the data bank in their original form. Gembloux's experience demonstrates that a relational type of data base can accommodate non-standardized data with little effect on management and retrieval aspects of the system.

As planned, several data analyses were performed in 1984 on the accumulated data. In particular, a range of multivariate statistical methods was applied to classify the small number of accessions of wild *P. vulgaris* into groups with particular associations of characters. Full assessment of the usefulness of these methods will be made in 1985 after investigation of a larger set of evaluation results for accessions grown in different environments.

Apple: The joint project of the IBPGR and EUCARPIA Fruit Section for the establishment of a European inventory of apple resources continued in 1984. The data base has been set up at the East Malling Research Station, UK. The information gathered indicates that there are about 30 000 apple accessions held at numerous sites throughout Europe. It is also evident that while the most common apple types are held at many sites, a high proportion of rare types exist at only one site.

Cocoa: The IBPGR has an ongoing project for the systematic description of the substantial collection of genotypes of cocoa *(Theobroma cacao)* maintained at the Cocoa Research Unit, University of the West Indies, Trinidad. The bulk of the germplasm comes from the centre of diversity of the genes *Theobroma* — the upper Amazon basin of Peru and Ecuador. The material is being scored according to the IBPGR descriptor list.

Soyabean: The INTSOY/IBPGR project initiated in 1983 to produce a computerized inventory of samples in major collections continued in 1984. Efforts concentrated on gathering the data from institutes maintaining substantial collections and assisting USDA in preparation of a comprehensive inventory of soyabeans

introduced into the US since 1900. This inventory will serve as the base for comparison of seed lists from other countries.

Comprehensive data bases are being established within the US National Plant Germplasm System. Data on most plant accessions held in the US collections enter Genetic Resources Information Network (GRIN) — a central system which provides information services for both germplasm curators and users. Through its liaison office in ARC-Beltsville (established in 1982), the IBPGR maintains a close link between the developing IBPGR information network and GRIN. The office assists in the development of GRIN and entering data, particularly the documentation of germplasm from IBPGR-sponsored collections that are maintained in US cold storages. Other activities of this office in 1984 included the establishment of a global inventory of wheat collections for the IBPGR Wheat Programme. It was found that out of 100 000 accessions registered only 70 000 were 'unique'. The work to locate other putative duplicates continues.

TRAINING AND WORKSHOPS

Training on documentation of germplasm and systems for data storage, retrieval and exchange is an essential element of the Board's information programme. In the past eight years (1977-84) more than 100 persons have received such training and beginning in 1982 the organization and instruction has been increasingly provided by the Secretariat's staff.

In 1984 a second training course on documentation and data management was held at Beltsville, USA, 6-24 August. Participants came from Barbados, Bolivia, Canada, Czechoslovakia, Hungary, Solomon Islands and Spain. In addition, two IBPGR regional coordinators attended in order to learn how to improve back-up support on documentation to plant genetic resources workers in their own regions.

Just as the first 1982 Beltsville training course, the 1984 course was designed especially for training personnel involved with practical aspects of documentation of genetic resources: manipulation of data and data base management techniques. One-third of the time was spent on lectures and practicals concerning the basic principles for securing useful information on germplasm and two-thirds on intensive hands-on use of microcomputer systems through practise of software packages relevant to genebank work. An oportunity was taken to demonstrate the US National Plant Germplasm System's GRIN to the trainees.

An ECP/GR workshop on information exchange was held at IHAR, Radzikow, Poland in October. The problems associated with the establishment and maintenance of crop data bases, namely computer-to-computer data transfer, integration of 'foreign' data and development of European crop lists, were addressed. The workshop noted that off-line exchange of data on magnetic tapes and soft dises remains the main method of international communication although telecommunication links between computers do exist in some European countries.

Review of computer facilities in European genebanks showed that data transfer between systems with dissimilar input-output facilities can be realized indirectly by copying magnetic media on intermediate computers. Two centres, the Polish Genebank at IHAR, Radzikow, Poland and NGB, Alnarp, Sweden were nominated to act as file transfer centres between systems with magnetic tapes and microcomputers, Apple IIs and NGB-IRS-83s respectively. The format for exchange of computerized data has been agreed upon and the need for using standard, clearly defined descriptors by the central data bases was emphasized. It was felt that the basic passport descriptors selected by the working groups were not suitably defined for full compatibility. Accordingly, the workshop provided more exact definitions of basic passport descriptors and recommended that these be followed by genebanks when data transfer to the central data bases occurs.

The IBPGR workshop held at the NGB, Alnarp, Sweden in November took the theme of information handling systems for genebank management. Development and implementation of such systems in genebanks should facilitate seed handling procedures and thereby raise standards of genebank management. The workshop emphasized the fact that maintenance of management data was necessary to allow rapid accessioning of new samples, to monitor the quality and quantity of samples in store, handle regeneration and distribution. It was noted that management data should be an integral part of germplasm documentation and that the information system must provide the means to relate management data files to files with passport, characterization and evaluation data. A minimum

list of management descriptors of prime importance for germplasm curators was developed.

TECHNICAL ASSISTANCE FOR HARDWARE

One of the aspects of the IBPGR technical assistance programme in documentation at genebanks is to advise, supply and install computing facilities, both hardware and software. This accelerates the recording of data in machine-readable form, thereby making the information available to the national and international community of genebank users. Computer hardware assistance over the period 1980-84 as well as support envisaged in 1985 is shown in Table 21.

The secretariat makes always sure that the supplied systems are used immediately after installation. To this end, the personnel responsible for data processing are trained either by the specialist installing the equipment or on training courses commencing shortly before or after delivery of the computer.

Table 21. Computer hardware/software provided by IBPGR (March '85)

Year	Genebank, country
1980	INTA, Argentina CENARGEN, Brazil INIA, Mexico
1981	Cereals Institute, Greece ICARDA, Syria INIAP, Ecuador
1982	IIPR, Bulgaria ARI, Cyprus EUCARPIA (Fruit Section) Estação Agronomica National, Portugal ARARI, Turkey
1983	EUCARPIA (Fruit Section) Tápiószele, Hungary LBN, Indonesia Maize Institute, Yugoslavia ZIGuK, GDR
1984	ARC, Pakistan IHAR, Poland INIA, Spain International Cocoa Genebank, Trinidad CAAS, China
1985	Research Inst. of Plant Production, Czechoslovakia ICA, Colombia IHAR, Poland Dodo Creek Station, Solomon Islands WARDA, Sierra Leone

OTHER DATA BASES

Parallel to the establishment of central crop data bases (whether global or regional), the Board is developing data banks with concise information concerning important aspects of genetic resources work, e.g. collecting, conservation, literature. These information bases are maintained by the Secretariat or sub-contracted to competent institutions. In 1984 two data banks have been heavily used. The data base for material collected through the IBPGR programme furnished the information for the publication *Collection of Crop Germplasm: The First Ten Years (1974-84)* and the data base for seed storage facilities in genebanks provided the data for *Institutes Conserving Crop Germplasm: The IBPGR Global Network of Genebanks.*

Other data bases were :

a) **Application of *in vitro* techniques to plant genetic conservation.** This computerized data base has been developed by the University of Nottingham, UK in order to locate and assess the development of *in vitro* methodology relevant to genetic conservation. Based on surveys conducted in 1980 and 1983 the research data from 58 countries representing the work of over 300 scientists have been entered into the data bank. Information covers the following areas: species under investigation, fields of interest, culture initiation and *in vitro* propagation, problems encountered, characterization of cultures, disease indexing, storage and exchange of culture.

   In addition, in 1984 a computerized literature data base was also compiled. It currently contains approximately 600 references to publications (journals, symposia, books, and reports) relevant to *in vitro* research.

b) **Wild relatives of cultivated plants.** Computerization of available information on the distribution of plant characters in natural populations and on their environments is conducted by the Hebrew University of Jerusalem, Israel. The data base handles the information from researchers, published and unpublished documents including theses, herbarium labels, etc. Complex relation-

ships between different entities of information, necessity to maintain and handle synonym data as well as upgrading computing facilities at the University required re-arrangements of data in files to be done in 1984 in order to achieve satisfactory performance of the database. Now, the data base system runs on C.D.C. cyber 180/855 computer; to facilitate using of the data bank a *Directory for the User* is being prepared.

TRAINING

The training of scientists and technicians working in genetic resources centres has consistently been given a high priority by the IBPGR. The lack of trained personnel has been a serious drawback to improving genetic resources work, particularly in the centres in developing countries.

The IBPGR supports training through the organization and financing of training courses and through an intern programme in cooperation with agricultural institutes throughout the world. The courses sponsored by the IBPGR have involved all aspects of genetic resources work: collecting, conservation, multiplication, evaluation, exchange and documentation. The courses are provided as one-year post-graduate (M. Sc.) level training and as short specialized courses on specific topics held at institutes recognized as centres of expertise. These latter courses are intended as in-service training for scientists and are also aimed at technicians currently working in genebanks.

During 1984, the IBPGR expanded its intern programme, through which sponsorship is provided to a limited number of individuals for extended periods (from one year). Six interns were supported by the IBPGR during 1984 at AVRDC, CIAT, ICARDA, Catholic University of Leuven, Belgium, in Papua New Guinea and the Solomon Islands; all at institutes which take part in the IBPGR global network of activities.

In 1984, the IBPGR carried out a survey of training in plant genetic resources, with the aim of improving the IBPGR's effectiveness in its support to training courses (see Table 22).

Evaluation of the post-graduate (M. Sc.) course in plant genetic resources at the University of Birmingham, UK, has shown that about 60% of the graduates are currently working in the field of genetic resources. They have found work at the IARCs (e.g. IRRI, CIP, CIMMYT, IITA, WARDA), at regional centres (e.g. CATIE), and at a variety of other large coordinated national programmes (such as in Brazil, Ethiopia, India and Turkey). Graduates have acted as junior consultants to the IBPGR Secretariat and some have also taken up IBPGR posts, such as collectors or regional coordinators in the field.

Support for the University of Birmingham course on "Conservation and Utilisation of Plant Genetic Resources," has been provided by the IBPGR since 1975. Additionally, the IBPGR (independently and with funds from UNEP) provides grants to students from developing countries to participate in the course. The survey indicated that three or more students from each of the following 21 countries have received IBPGR support: Afghanistan, Bangladesh, Brazil, Cyprus, Ethiopia, Ghana, Greece, India, Indonesia, Iran, Iraq, Kenya, Malaysia, Nepal, Nigeria, Pakistan, Peru, Philippines, Sri Lanka, Turkey and Uganda. An additional six countries (Colombia, Mexico, Sierra Leone, Somalia, Syria and Thailand) have sent two IBPGR-supported students. Eighteen other countries have sent one student each.

Table 22. IBPGR-supported training course participants (Dec. '84)

Type of training	Number of participants
Post-graduate courses	
— M. Sc. degree support	192
— Short training courses	58
General genetic resources training courses	
— (Exploration, characterization, conservation, evaluation and utilization)	298
More specialized training courses	
— Training for specific crops: wheat, maize, forages, legumes, root and tuber crops, and aroid germplasm	155
— Seed physiology and seed technology	108
— Documentation and genetic information systems	84
— Genebank management	21
— Plant tissue culture	22
— Training courses for extension workers	20
— Use of wild germplasm	25
Study tours	39
Total	1 022

The survey also noted that continued support to the University of Birmingham course is vital to fill much-needed mid-level management positions in germplasm institutes. In addition to theoretical concepts, it recommended that emphasis on practical experience be strengthened in the course. Towards the end of 1984 the IBPGR conducted an external review of the Birmingham course and this will be considered in detail by the twelfth meeting of the Board in February 1985.

Additional M. Sc. courses have begun to emerge at other institutions, among them at UNA, La Molina, Peru and at the University of Los Baños, Philippines; the former would be the first such post-graduate course taught in Spanish. The IBPGR was also instrumental in initiating discussions at the Faculty of Sciences, Gembloux, Belgium for training in French.

The survey, endorsed by the IBPGR in 1984, also recommended that short training courses of a general nature be phased out and replaced by more specialized courses which feature practical 'hands-on' training. The Board wishes to see the following areas of training promoted:

- Field collecting, including skills required for collecting wild species of crops;
- Characterization, including theoretical concepts of germplasm variation with links to gene identification and the use of gene symbols;
- Seed physiology;
- Genebank management, including data bank management; and
- Maintenance and multiplication of vegetatively propagated material.

POST–GRADUATE COURSE

University of Birmingham, UK

Seventeen students undertook study in the one-year M. Sc. course at Birmingham for the 1983-84 session. Of the 17, eight were supported by IBPGR/FAO (from Ethiopia, Greece, Pakistan, Sierra Leone, Somalia, Uganda [2] and Zaire) and another three were supported by IBPGR/FAO/UNEP (from Burkina Faso, Somalia, and Uruguay). In addition to the visits and work experience obtained at NVRS, WPBS and the Commonwealth Forestry Institute in Oxford, most students also optionally attended a genetic resources short course at the Hebrew University of Jeruselum, Israel and a seed technology short course at the University of Edinburgh, UK. One student (from Bangladesh) attended the post-experience course during the first-term; he also attended the second post-experience course, together with two other participants (from Czechoslovakia and Iran).

During the 1984-85 academic year, 10 students were enrolled on the M. Sc. course. The IBPGR provided support to six of these students (from China, Ethiopia, Ghana, Iran, Nepal and Sudan) for this session.

SHORT COURSES

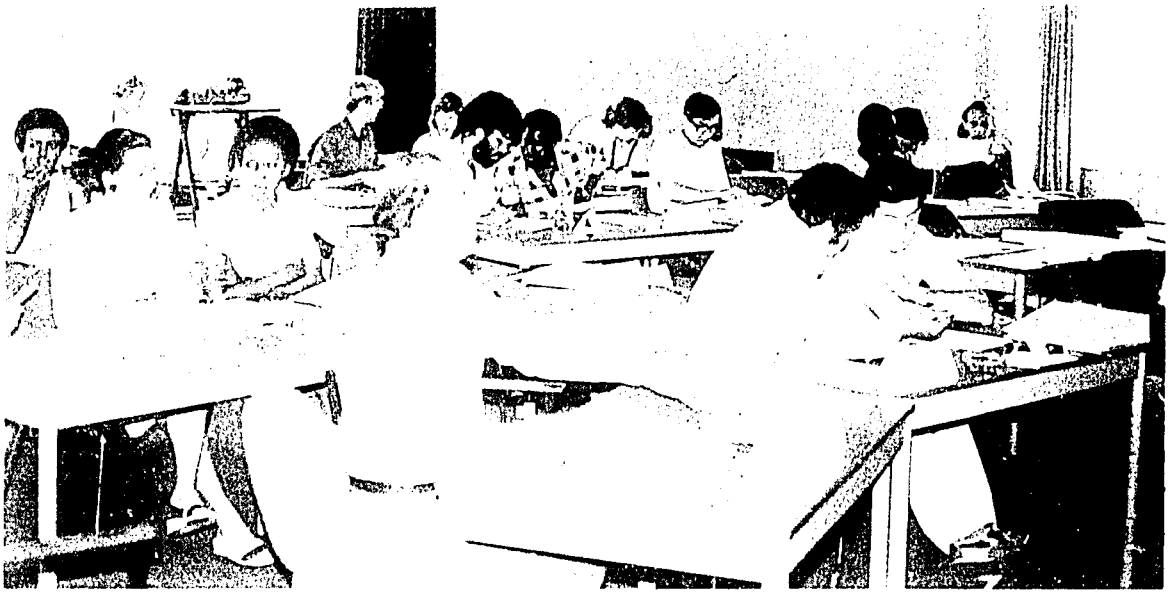
The following short training courses were supported in whole or part by the IBPGR during 1984:

Hebrew Univerity of Jeruselum, Rehovot, Israel 25 March – 5 April

A course on description and utilization of wild germplasm resources was organized with the aim of helping to introduce wild germplasm to plant breeders, botanists and crop specialists. The organizers brought together specialists from several research institutes in Israel to assist in the teaching. The course was held during the time that plants were flowering and at early seed-setting and when plant pathogens are active. The 25 students participating were from Bulgaria, Burkina Faso, Ethiopia (2), Greece (2), Israel (6), Italy, Kenya, Mexico, Sierra Leone, UK (3), USA, Uganda (2), Uruguay and Zaire.

ICARDA & ACSAD, Syria 10 April – 7 May

The first course taught in Arabic was held at ICARDA and at ACSAD. A total of 14 trainees from 11 Arab countries — Algeria (2), Iraq (2), Jordan, Lebanon, Libya, Morocco, Qatar, Syria (2), Tunisia, Democratic Republic of Yemen and Yemen Arab Republic — participated. Two IBPGR staff members taught portions of the course, which covered important economic plants in the drier areas of Arab countries, including cereals, food legumes, fruit trees and forages. In addition, field trips were conducted to different parts of Syria.



Royal Botanic Gardens, Kew, UK 22 July - 11 August

A training course on seed physiology for genebanks was conducted at the Royal Botanic Gardens, Kew, UK. The course dealt, firstly, with a background understanding of seed physiology and, secondly, with the integration of the background theory into day to day genebank practice particularly with a view to maximizing seed longevity. A total of 16 participants took part from the following countries: Algeria, Australia, China, Colombia, Ethiopia, Ghana, India, Mexico, Morocco, Mozambique, Poland, Spain, Sudan, Syria, Tanzania and Tunisia. An IBPGR staff member participated in the instruction.

USDA, Beltsville, USA 6 - 24 August

A short course on documentation and data management was held at USDA Beltsville, Md., USA 6 - 24 August. The 9 participants were from Barbados, Bolivia, Canada, China, Czechoslovakia, Hungary, Solomon Islands and Spain. The purpose of the course was to demonstrate practical aspects of documentation with emphasis on use of micro computer systems, and also the systems used by the US National Plant Germplasm System's GRIN. Three IBPGR staff members participated in the instruction given to the students.

EAU, USDA Vegetable Laboratory & North Carolina State University, USA 13 August - 21 September

Six students from Latin America participated in a training course on handling of sweet potato germplasm at the above three institutions. The course, which was partially conducted in Spanish, involved classroom and computer work. The instruction was provided at all three sponsoring institutions. The students were from Colombia, Costa Rica, Dominican Republic, Guatemala and Peru (2).

Universidad Nacional Agraria, La Molina, Peru 3 - 28 September

A course entitled "Entrenamiento en Técnicas de Colección, Evaluación y Conservación" aimed primarily at the level of genebank technician was held at UNA. A total of 26 students participated in the course, which is conducted annually. For the first time, nine of the students were from countries in Central America; the remainder were from Andean countries [Argentina (2), Bolivia, Colombia, Costa Rica, Ecuador (2), Guatemala, Paraguay, Peru (15) and Venezuela (2)]. The course was held at the UNA campus, with visits to CIP and CIPEA, the latter for documentation studies.

Edinburgh School of Agriculture, UK 4 – 14 September 1984

Student in the M. Sc. post-graduate course at the University of Birmingham, UK participated in a training course on practical seed technology for genebank personnel at the University of Edinburgh, UK. The 14 students were given lectures and laboratory work on aspects of seed technology relevant to genebank management.

Welsh Plant Breeding Station, Aberystwyth, UK, 15 – 19 October

A total of 15 students, of whom 12 received IBPGR support through the ECP/GR Special Project, participated in the course, "Collection, Characterisation and Utilisation of Forage Genetic Resources". The course covered a wide range of relevant topics but emphasis was put on characterization and evaluation. A major purpose of the course was to promote an awareness of new techniques in order to stimulate students into evaluating their own programmes so that in-depth study could be followed on an individual basis.

Faculté des sciences agronomiques de l'Etat, Belgium Oct. – Dec.

A practical training course in germplasm conservation was held for genebank technicians from French-speaking countries in Africa. The course emphasized 'hand-on' training, in addition to formal and informal lectures covering the principles of seed physiology and seed handling in genebanks. Two students participated, both from West Africa.

ADMINISTRATION

MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1984 is shown on p. 91. At the end of the year Prof. E.A.L. de Langhe (Belgium), Dr. D.C. Giacometti (Brazil), Dr. M. Iizuka (Japan) and Dr. W.J. Peacock (Australia) completed their terms for membership. On the recommendations of The Board, the CGIAR re-elected Dr. Giacometti and Dr. Peacock for a second three-year period. In addition, Dr. K. Kikuchi (Japan) and Dr G. Fischbeck (Federal Republic of Germany) were elected to serve for three-year terms commencing 1 January 1985.

Dr. O. Brauer (*ex-officio* member, FAO) retired from FAO at the end of 1984 and FAO will designate a member to replace him. At its tenth meeting the Board co-opted Dr. A.B. Joshi (India) during the leave of absence of Dr. H.K. Jain (India) at ISNAR.

The full Board met in Rome, 21-24 February 1984 and the Executive Committee met on 20 February 1984 and 21-23 May 1984 in Rome. The Executive Committee held an extraordinary meeting in Leuven, Belgium 11-12 September to prepare the Board's position for a forthcoming External Review. The Executive Committee met again in Washington, D.C., 29-31 October 1984.

Elected members of the Board serve in their personal capacities. Although in some cases members may report to donors, the Board has agreed that any donor may, if desired, send an observer to attend Board and Executive Committee meetings. At the eleventh meeting of the Board in February 1984, observers from Australia, France, Netherlands, Spain, Sweden, Switzerland and USA attended.

The Executive Committee also held a special meeting with the donors in May. This was attended by representatives from Australia, Canada, France, Federal Republic of Germany, Japan, Netherlands, Sweden, UK, USA, CGIAR and TAC Secretariats, the Chairman of TAC, and FAO. The meeting was at the request of a number of donors to clarify the IBPGR's role vis-a-vis activities in IARCs and the need for the CGIAR to ensure funding for germplasm work across all centres of the CGIAR. This led to the donors requesting the TAC to carry out a survey.

Several donors have nominated scientists who maintain liaison with the IBPGR. These include the Federal Republic of Germany, the Netherlands and the USA. Several recipient countries have also formally designated liaison officers in the context of regional programmes.

REPRESENTATION AT INTERNATIONAL MEETINGS

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

- CGIAR Inter-Center Workshop on Nutrition and International Agriculture, Addis Ababa, Ethiopia, 28 Feb.–3 March
- Regional Workshop on Plant Communities, Nairobi, Kenya, 3–6 March
- WWF/IUCN Plants Campaign Launch, Kew, Richmond, UK, 21 March
- CGIAR Inter-Center Seminar on IARCs and Biotechnology, IRRI, Los Baños, Philippines, 23–27 April
- EUCARPIA Gene Bank Committee and Symposium on Medicinal Plants, Portugal, 9–11 May
- EUCARPIA Conference on Fruit Trees, Rome, Italy, 16–18 May
- EUCARPIA *Allium* Symposium, Netherlands, 4–6 Sept.
- International Citrus Congress, Brasilia, Brazil, 15–20 July

— Systematics Association Infraspecific Classification Symposium, Oxford, UK, 26-28 Sept.
— 1984 Annual Meetings of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Las Vegas, USA, 25-30 Nov.
— Second International Conference on Indian Ocean Studies, Perth, Australia, 5-12 December
— Second East African Regional Root Crops Workshop, Uganda, 10-15 Dec.

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

SECRETARIAT

The composition of the Secretariat is shown in Appendix I. The Executive Secretary of the Board also heads the FAO Crop Genetic Resources Centre as Chief. The staff of the Centre serve the Board's programme.

In 1984 the headquarters staff included seven scientists, three administrative/technical assistants, six secretaries, three clerks and a part-time scientific writer. In addition, two professional officers are out-posted to the FAO Office in Washington, D.C., USA.

The work of the Secretariat was supplemented by numerous consultants and temporary secretarial, clerical and graphic assistance to cope with the expanding work of the Board.

Outside headquarters, field staff serve the following regions: Southeast Asia, North Africa and Southwest Asia, Eastern Africa, Western Africa and Latin America. Following the recommendations of a Planning Committee's Report, the Board has appointed collectors for certain field work. During 1984 the post of collector for North Africa and Southwest Asia was changed to Regional Coordinator and in addition to the rice collector already stationed at IRRI, collectors for forage germplasm in Indonesia and for South Asia/Indian Ocean islands were appointed. Assistants were also in place at the request of governments to help certain national programmes.

The Executive Secretary was also greatly assisted by a Senior Adviser, Dr. J.H.W. Holden for a number of policy issues and in programme planning. Dr. J.L. Creech also helped as a Senior Adviser during 1984. The Executive Secretary of the Board continued to act as Executive Secretary of the Special Project ECP/GR.

COMMITTEES

During 1984 both Advisory Committees on Conservation were active. The Seed Storage and the *In Vitro* Storage Committees held meetings in April and September 1984 respectively (Appendix V). A Task Force on Ecogeographical Survey and *In Situ* Conservation met in the summer (Appendix VII).

The Crop Advisory Committees (Appendix II) continued to provide advice during the year and assisted in refereeing proposals.

Tenth Anniversary celebrations at 28th Symposium of German Society for Plant Husbandry

The Regional Committee for Southeast Asia held its sixth meeting in Bangkok, Thailand (see Appendix III for membership) and the Technical Consultative Committee of the ECP/GR held its annual meeting in Lisbon, Portugal in December.

CGIAR SERVICE

The Executive Secretary of the Board has been elected to serve as Chairman of the Directors General of the CGIAR for 1984-85 and the Chairman of the IBPGR was elected as Vice-Chairperson of the CGIAR Center Chairpersons for 1984-85.

TENTH ANNIVERSARY CELEBRATIONS

The IBPGR marked its Tenth Anniversary of international work in the latter part of 1984. It was decided that just as the IBPGR's network is diffuse so should its anniversary celebrations; consequently national, regional and international institutes which form part of the network were encouraged to include commemorative activities for the IBPGR during regular work. Following is a list of 10 major commemorations.

12 **September Leuven, Belgium** Publication, poster and scientific exhibition and press conference by invitation of the Rector of the University of Leuven. All collaborating institutes in Northern Europe were asked to provide scientific exhibits. These were of a high quality and in addition to international organizations (ILCA, WWF, EUCARPIA) institutes from Belgium, Germany (Dem. Rep.), Germany (Fed. Rep.), Netherlands, Nordic Gene Bank (serving Denmark, Finland, Iceland, Norway and Sweden), Poland and UK exhibited. The IBPGR took the opportunity to hold, at the same time, a meeting of the Executive Committee and the second meeting of the *In Vitro* Committee. The members of the *In Vitro* Committee also provided exhibits.

17 **September IRRI, Philippines** Special convocation with press conference organized by the Philippines Ministry of Agriculture and Food, National Science and Technology Authority (NSTA), University of the Philippines at Los Baños (UPLB), Philippine Council for Agricultural and Resources Research Development (PCARRD) and IRRI.

4 **October Kiel, Federal Republic of Germany** Poster and publication display and keynote address presented by IBPGR Chairman at the 28th Symposium of the German Society for Plant Husbandry.

11-12 **October Bangkok, Thailand** IBPGR poster and publication display. An award of merit was conferred on the Board and a certificate of honour on the Executive Secretary during the Tenth Anniversary Commemoration at the 2nd National Seminar on Plant Genetic Resources by Thai Ministry of Science, Technology and Energy and Thai National Plant Genetic Resources Subcommittee.

13 **October Kyoto, Japan** A special symposium entitled "Genetic Resources in the 21st Century" was held during the 66th Conference of the Japanese Society of Plant Breeding and the Executive Secretary spoke on research needs for the future.

22-23 **October Ouagadougou, Burkina Faso** Press conference and poster and publication exhibition for representatives of West African governments, universities, international agencies and centres and regional institutions organized by the IBPGR Regional Coordinator.

5-9 **November IITA, Nigeria** The IBPGR's Tenth Anniversary was celebrated during the World Cowpea Research Conference sponsored by IITA

7-8 **November Buenos Aires, Argentina** Poster and publication display at a Workshop on Germplasm of Maize in Latin America held under the auspices of the IBPGR and INTA, Academia Nacional de Agronomia y Veterinaria, Secretaria de Agricultura y Ganaderia, Universidades Nacionales de Buenos Aires y La Plata.

20-22 **November Universidad Austral de Chile, Valdivia** Poster and publication display at a Syposium on Crop Genetic Resources sponsored by UAC, the Society of Genetics of Chile and the Ministry of Agriculture.

26-27 **November Nordic Council of Ministers, Oslo, Norway** Press conference for representatives of Scandinavian countries and release of documentary films.

IBPGR Tenth Anniversary poster and publication exhibit, Leuven, Belgium

The IBPGR received many congratulatory statements from the international scientific community. Following are just a few made by scientists in key institutes in the IBPGR international network.

"The NBPGR benefitted immensely by the training of ten scientists in IBPGR-sponsored international training programs in genetic resources collection, documentation and conservation. NBPGR expertise has been utilized by IBPGR in high level meetings and in collection missions and surveys in Malawi, Zambia and Maldives. IBPGR also funded NBPGR publications on genetic resources. IBPGR has successfully operated genetic resources programmes on a global basis, particularly for developing countries, and generated awareness on the collection, documentation and conservation of plant genetic wealth, now being implemented on a sound basis" **(Dr. R. K. Arora, Director, NBPGR, India).**

"The southern cone of South America is one of the most important regions for maize germplasm richness. Agricultural advances, while increasing productivity, are also endangering the maize genetic variability. In the last years, the IBPGR has sponsored missions to seven countries to save that rich germplasm from extinction. More than five thousand seed samples have been collected and stored in special buildings to which IBPGR has contributed. Catalogs have been published with IBPGR support on the germplasm of the seven countries" **(Ricardo Sevilla, Maize Improvement Specialist, IICA, Paraguay).**

"I wish to accredit IBPGR among others for pioneer work on the establishment of a genetic resource center in Ethiopia. The center has certainly benefited from IBPGR support to develop national capabilities. The Board's efforts to establish international standards relating to genebank management problems and its active role in coordinating genetic resources activities at the global level are highly appreciated." **(Melaku Worede, PGRC/E, Ethiopia).**

"As a representative of the United States Department of Agriculture and as Chairman of our National Plant Genetic Resources Board, I would like to express congratulations and best wishes to the IBPGR on the occasion of its Tenth Anniversary. The positive impact the IBPGR has had in such a short time is a credit to your Board, to Dr. Williams and his Secretariat Staff, and to the donors who support this effort. We look forward to continued cooperation with the IBPGR and anticipate much success as you work to further develop the International Plant Germplasm System" **(Orville C. Bentley, Assistant Secretary, Science and Education, USDA).**

PUBLICATION PROGRAMME

The development of IBPGR Regional Offices with full-time Coordinators has become one of the most significant links in the international network. During 1984 the Executive Secretariat has moved forward in aiding the Regional Offices in Southeast Asia, Latin America, North America, East and West Africa to become more functional by becoming regional distribution centres for IBPGR publications and training material. The Executive Secretariat has shipped more than 20 000 copies of IBPGR publications from Headquarters to permit the Regional Offices to directly answer requests for publications in their respective zones as well as independently organize publication/poster displays at important national/regional/international meetings. The Regional Offices also have complete copies of all IBPGR-numbered documents on microfiche for quick reference.

A number of Tenth Anniversary books or monographs were published during 1984 as one of the many varied commemorative activities.

- *Crop Genetic Resources: Conservation & Evaluation*
- *A World Survey of Sorghum and Millets Germplasm*
- *Forage and Browse Plants for Arid and Semi-Arid Africa* (copublished with Royal Botanic Gardens, Kew)
- *Collection of Crop Germplasm: The First Ten Years 1974–84*
- *Wild Relatives of Crop Plants in India* (copublished by NBPGR)

In addition to the monographs, during 1984 the Board also published 5 descriptor lists, 2 directories of germplasm holdings, 4 EP/GR working group reports, 5 technical conservation documents, 6 technical genetic resource reports on crops, a germplasm catalogue, an ECP/GR publicity booklet and the quarterly *FAO/IBPGR Plant Genetic Resources Newsletter* and *Southeast Asia Regional Newsletter*. A full list of IBPGR publications in print is contained in Appendix X.

A second initiative of the Board for the Tenth Anniversary Celebrations was the preparation of a five poster series illustrating IBPGR activities, i.e.: (1) IBPGR programme, (2) collection, (3) seed storage, (4) *in vitro* storage and (5) documentation. The ECP/GR programme prepared a two-poster series to illustrate its activities. In addition to printing and distributing all of these posters, the Southeast Asian Coordinator also prepared a three-poster series of important crops for the region, i.e. rice, citrus, banana and the Indonesian national programme printed a commemorative poster.

Another Tenth Anniversary programme was the filming of a documentary on genetic resources in association with the Nordic Gene Bank. This film will be distributed to educational establishments in early 1985.

Indicative of the growing collaboration between China and the Board is the publication by the IBPGR for the first time in Chinese of a technical document: *Descriptors for Soyabean*.

The IBPGR continued to publicize its work through participation at selected book fairs. During the year the Board displayed its publications at the New Delhi Book Fair (4–14 February) and the Frankfurt Book Fair (2–7) in which joint IARC displays were organized by ICRISAT and IRRI/GTZ respectively. IBPGR publications/posters were also displayed at the Tenth Anniversary celebrations.

The 1984 edition of *Publications on International Agricultural Research and Development* catalogue was prepared by IRRI for use at the 1984 Frankfurt Book Fair. The catalogue contains information on the publications of the IARCs, both within and outside the CGIAR system, as well as GTZ, BOSTID and the NAS.

Other initiatives in the publication programme were:

IBPGR Tenth Anniversary celebrations, Bangkok, Thailand

— Libraries within the international network were offered microfiche copies of the widely read FAO/IBPGR Newsletter (Nos. 41-58);
— Distribution of the four different language editions of the slidepack with text booklets to institutions within the international network. These booklets are available in 9 different languages and are ideal training aids.

APPENDIXES

APPENDIX I

THE IBPGR SECRETARIAT IN 1984

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

Headquarters

Officers

Dr. N. Murthi Anishetty
Assistant Executive Secretary

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

Mr. W. Ellis Davies[2]
(Forages)

Dr. J.T. Esquinas Alcazar

Mr. J. Konopka (from Feb.)
(Documentation)

Ir. D.H. van Sloten
(Horticulture)

Dr. Kar-Ling Tao
(Seed Conservation)

Mr. J. Watts (part-time)
(Scientific Writer)

Support Staff

Ms C. Gorelli
Programme Assistant

Mr. B.T. McLean
Editorial Assistant

Mr. G. Sayour
Research Assistant

Secretaries

Ms J. Buccini (until Sept.)
Miss C. Dunne (from May)
Ms F. Farzad[2]
Mrs. M. McArthur-Giannini
Miss R. Onate (from Oct.)
Miss D.E. Quaye
Mrs.A. Taylor-Russo (from Oct.)
Mr. A. Vaid

Clerks

Ms M. Bonomi

Ms M. Mantovani (from Aug.)

Ms A. Vittorini

Regions

East Africa Programme

Mr. A.F. Attere
Regional Coordinator
c/o ILRAD, Nairobi, Kenya

West Africa Programme

Mr. M. Horn
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B.P. 575, Ouagadougou,
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Mr. G. Mergeal
Assistant (Togo)

Latin America Programme

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Mediterranean & Southwest Asia Programme

Dr. W.G. Ayad
Regional Coordinator - North Africa & Southwest Asia
c/o ARI, Nicosia, Cyprus

Southeast Asia Programme

Dr. N. Chomchalow
Regional Coordinator
c/o FAO Regional Office, Bangkok
Thailand

Ms S. Savigamin
Secretary

Dr. H. Takagi (from March)
Assistant (Papua New Guinea)

Dr. K.L. Mehra (from March)
IBPGR Collector for Forages
c/o LBN, Bogor, Indonesia

Pacific

Dr. M.S. Prana (from March)
Assistant

South Asia Programme

Dr. A.B. Damania (from June)
Collector for South Asia & Indian Ocean
c/o Headquarters Secretariat

Europe (ECP/GR)

Dipl. Ing. P.M. Perret
Regional Officer
c/o Headquarters Secretariat

IBPGR/IRRI Rice Collector

Mr. I.R. Denton
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---

1 Also Chief, FAO Crop Genetic Resources Centre and Executive Secretary, UNDP/IBPGR ECP/GR
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USDA-ARS-SR
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Co-chairman:

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Délégué général à la recherche scientifigue et technique de Sénégal
Bambey
Senegal

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WHEAT

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APPENDIX III

MEMBERSHIP OF THE REGIONAL COMMITTEE FOR SOUTHEAST ASIA[1]

Member:	Alternate:
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MALAYSIA	
Mr. N.T. Arasu[2] Malaysian Agricultural Research and Development Institute P.O. Box 202 Serdang, Selangor	**Ms. Phang Cheng Imm** Commodity Development Branch Department of Agriculture Kuala Lumpur
PAPUA NEW GUINEA	
Mrs. Rosa Kambuou Bubia Agricultural Research Centre P.O. Box 348 Lae	**Mr. Fred Dori** Crop Research Department of Primary Industry P.O. Box 417 Konedobu
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Prof. R.M. Lantican University of the Philippines at Los Baños College, Laguna 3720	
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Dr. Ampol Senanarong Department of Agriculture Bangkhen, Bangkok	**Dr. Praphas Weerapat** Pathum Thani Rice Research Centre Rice Research Institute Department of Agriculture Rangsit, Pathum Thani

1 As of 31 December 1984
2 Chairman

APPENDIX IV

MEMBERSHIP OF PHASE II OF THE EUROPEAN COOPERATIVE PROGRAMME FOR GENETIC RESOURCES (ECP/GR)

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

APPENDIX V

CONSERVATION ADVISORY COMMITTEES

ADVISORY COMMITTEE ON SEED STORAGE

Chairman:

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APPENDIX VI

MEMBERSHIP OF CROP WORKING GROUPS HELD IN 1984

OIL PALM WORKING GROUP[1]

Members:

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St. Martins Industrial Estate
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Dr. J. Meunier
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Groupement d'études et de recherches pour le développement de l'agronomie tropicale
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1 Drs. N.M. Anishetty and J.T. Williams also attended as resource persons.

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Dr. R. Schultze-Kraft
Tropical Pastures Program
Centro Internacional de Agricultura Tropical
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Cali, Colombia

Dr. R.J. Williams
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Commonwealth Scientific and Industrial Research Organization
Brisbane, Queensland
Australia

1 Mr. B. Pengelly (CSIRO) attended as a resource person.

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Members:

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Zentralinstitut für Genetik und
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ECP/GR OAT WORKING GROUP

Chairman:

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Members:

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Dr. M. Güllord
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1 The following resource persons also participated: Mr. Z. Kiss (Hungary), Mr. M. Minaljcevic (Yugoslavia), Dr. J. Miller (USA), Prof. W. Sackston (Canada) and Dr. G.J. Seiler (USA).

APPENDIX VII

TASK FORCE ON ECOGEOGRAPHICAL SURVEYING AND *IN SITU* CONSERVATION [1]

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1 The following resource persons also attended: Dr. C.G.D. Chapman (IBPGR) and Messrs. W Ellis Davies (IBPGR), G.B. Ingram (IBPGR), and C. Sperling (Harvard University Herbaria).

APPENDIX VIII

CONTRIBUTIONS TO IBPGR (1984)[1]

	Core	Special projects[2]
Australia	102 886	
Austria		3 664
Belgium	63 849	1 860
Canada	329 583	
China	99 994	
Denmark	96 806	
France	32 904[3]	5 785
Germany	124 775	28 615
Iceland		465
India	901[4]	
Ireland		2 762
Italy	131 477	
Japan	536 907	80 000
Netherlands	290 264	
Norway	78 329	
Spain	149 915[5]	3 657
Sweden	172 570	
Switzerland	102 230	
UK	297 935	4 650
UNEP	27 000	
USAID	900 000	
World Bank	540 000	
	4 078 325	131 458

1 In US$ equivalents
2 European Cooperative Programme/Genetic Resources (Phase II) and Collection of Plant Genetic Resources in Nepal (Japan)
3 Half of 1984 pledge; balance will be paid in 1985
4 Balance of 1983 pledge
5 Including part of 1983 pledge ($49 946) received in 1984

APPENDIX IX

STATEMENT OF ACCOUNT FOR 1984[1]

RECEIPTS

Balance as at 1 January 1984		1 643 845[2]
Various Governments contributions		4 078 325
Special projects		131 458[3]
Interest credited in 1984		89 351
		5 942 979

DEDUCT

Cash expenditure		
Core Programme		
Personnel services	978 157	
Official duty travel	501 161	
Contractual services	1 792 222	
General operating expenses	45 059	
Supplies and materials	148 309	
Furniture and equipment	74 155	
Fellowships	167 682	
	3 706 745	
Special projects	102 327	
Project servicing costs[4]	1 483	
External Programme Review	22 919	
Payment of obligations carried forward from previous years	794 158	
Transfer to CGIAR stabilization mechanism	100 000	
	4 727 632	
Commitments		
Incurred in 1984[5]	405 351	
Unliquidated obligations from previous years	928 855	
	6 061 838	6 061 838
BALANCE AT 31 DECEMBER 1984		(118,859)

1 In US$ equivalents
2 Unobligated cash balance (1983) and unliquidated obligations (1983 and previous years)
3 European Cooperative Programme (Phase II) and Collecting in Nepal (Japan)
4 13% on TF 9202 (REM 031)
5 Including commitments for special projects and EPR/EMR

1984 EXPENDITURE BY FUNCTIONS [1]

	Total
1. Collection and survey	874 656
2. Conservation	527 781
3. Characterization and documentation	316 724
4. Training	580 360
5. Strategic research	215 562
6. Publications	110 951
7. Programme coordination	884 263
8. Regional coordination	516 770
	4 027 067
9. External Programme Review	80 310
10. Special Projects	131 448
11. CGIAR Stabilization Mechanism	100 000
	4 338 825

[1] In US$ equivalents

APPENDIX X

IBPGR PUBLICATIONS IN 1984 AND OTHERS IN PRINT

(IBPGR publications are free of charge except where indicated available from booksellers. Publications are sometimes in limited quantity. The following are IBPGR distribution centres.)

Asia & the Pacific

Dr. N. Chomchalow
IBPGR Regional Coordinator
for Southeast Asia
Regional Office for Asia
and the Pacific
Maliwan Mansion
Bangkok 10200
Thailand

Latin America

Dr. M. Holle
IBPGR Regional Coordinator
for Latin America
c/o CIAT
Apartado Aereo 67-13
Cali
Colombia

North America

Dr. C. Chapman/Mr. W.E. Davies
IBPGR Genetic Resource Officers
IBPGR Liaison Office for North
America
101 22nd St. NW, Suite 300
Washington, D.C. 20437
USA

East & Southeast Africa

Mr. F. Attere
IBPGR Regional Coordinator
for East Africa
c/o ILRAD
P.O. Box 30709
Nairobi
Kenya

West & Southwest Africa

Mr. M. Horn
IBPGR Regional Coordinator
for West Africa
c/o FAO Representative's
Office
Boite Postal 575
Ouagadougou
Burkina Faso

Europe, Mediterranean & SW Asia

IBPGR Executive Secretariat
Crop Genetic Resources Centre
Plant Production and Protection
Division
Food & Agriculture Organization
Via delle Terme di Caracalla
00100 Rome
Italy

General

- Treatise on Plant Health and Quarantine in International Transfer of Genetic Resources, edited by W.B. Hewitt and L. Chiarappa (1977) (Available from CRC Press)
- Crop Genetic Resources Field Collection Manual, by J.G. Hawkes (1980), copublished with EUCARPIA
- Revised Priorities among Crops and Regions (1981)
- Crop Genetic Resources (An introduction to the IBPGR) (1981)
- Genetic Resources and the Plant Breeder, edited by R.B. Singh and N. Chomchalow (1982) (Available from IBPGR/SEAP Regional Office, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok-10200, Thailand)
- Los recursos fitogenéticos: Una inversión segura para el futuro, by J.T. Esquinas Alcazar (Revised, 1983) copublished by INIA, Spain
- Facts about the IBPGR (1983); Qu'est-ce que le CIRP (1983); Datos sobre el CIRF (1983)
- Plant Varieties Rights and Genetic Resources (1983)
- Practical Constraints Affecting the Collection and Exchange of Samples of Wild Species and Primitive Cultivars (1983)
- A Global Network of Genebanks (1983); Un reseau mondial de banques de gènes (1983); Red Mundial de Bancos de Genes (1983)
- Crop Genetic Resources booklet with slidepack photos and text (1983)
  - in Chinese, Japanese, Korean
  - in English, Indonesian, Thai
  - in Spanish, Portuguese, English
  - in Arabic, English, French
  - 60 slide series
- IBPGR in its Second Decade: An Updated Strategy and Planning Report (1984)
- Crop Genetic Resources: Conservation & Evaluation, edited by J.H.W. Holden & J.T. Williams (1984) (Available from George Allen & Unwin)

Crops

- Wheat Genetic Resources: Proceedings of an International Symposium held 14-22 July 1975 (1976) (Available from the N.I. Vavilov Institute of Plant Industry, Leningrad, USSR — copublished by the V.I. Lenin Academy of Agricultural Sciences)
- Proceedings of the IRRI/IBPGR Workshop on the Genetic Conservation of Rice, held 12-15 December 1977 (1978) (Available from IRRI, P.O. Box 933, Manila, Philippines)
- 1983 Rice Germplasm Conservation Workshop (1983), copublished by IRRI
- Coffee Genetic Resources (1980)[1]
- Fruits, English version written by M.A. Rifai and I. Lubis and edited by C.H. Lamoureux from the Indonesian *Buahbuahan* 1977 (1980)
- Vegetables, English version written by N.W. Soetjipto and S.H. A. Lubis and edited by C.H. Lamoureux and M.A. Rifai from the Indonesian *Sayur-Sayuran* 1977 (1981)
- Root and Tuber Crops, English version written by M.S. Prana and S. Dahlimiharja and edited by C.H. Lamoureux and M.A. Rifai from the Indonesian *Ubi-Ubian* 1977 (1981)
- Genetic Resources of Sweet Potato (1981)[1]
- Genetic Resources of Cocoa (1981)[1]
- Genetic Resources of Amaranths, by G.J.H. Grubben and D.H. van Sloten (1981)[1]
- Genetic Resources of Tomatoes and Wild Relatives, by J.T. Esquinas Alcazar (1981)[1]
- Genetic Resources of Sugarcane (1982)[1]
- Genetic Resources of *Allium* Species (1982)[1]
- Genetic Resources of *Vigna* species (1982)
- Genetic Resources of *Citrus* (1982)
- Genetic Resources of *Vitis* Species (1983)
- Genetic Resources of Cassava and Wild Relatives, by P.J. Gulick, C. Hershey and J.T. Esquinas Alcazar (1983)[1]
- Genetic Resources of *Capsicum* (1983)[1]
- Genetic Resources of Cucurbitaceae, by P.J. Gulick and J.T. Esquinas Alcazar (1983)[1]
- Genetic Resources of Soyabean (1983)
- ECP/GR *Prunus* Working Group Report (1983)
- ECP/GR Barley Working Group Report (1983)
- ECP/GR Forages Working Group Report (1984)
- ECP/GR *Allium* Working Group Report (1984)
- ECP/GR Sunflower Working Group Report (1984)
- ECP/GR Oat Working Group Report (1984)
- A World Survey of Sorghum and Millets Germplasm (1984), by E. Acheampong, N. Murthi Anishetty and J.T. Williams
- A Plan of Action for Forage Genetic Resources, by W. Ellis Davies (1984)
- Forage and Browse Plants for Arid and Semi-Arid Africa (1984), copublished with Royal Botanic Gardens, Kew, UK
- Tropical and Sub-Tropical Forages: Report of a Working Group (1984)
- Wild Relatives of Crop Plants in India by R.K. Arora and E.R. Nayar (1984), copublished with NBPGR
- IBPGR Cocoa Working Group: Report of the Second Meeting (1984)
- Genetic Resources of *Hevea* (1984)
- Genetic Resources and Their Exploitation — Chickpeas, Faba Beans and Lentils, edited by J.R. Witcombe and W. Erskine (1984), copublished with ICARDA
- Catalog of *Arachis* Germplasm Collections in South America 1976-83, by C.E. Simpson and D.L. Higgins (1984), copublished with TAES

[1] Also contain descriptors

Woody species

(All woody species publications are copublished by the FAO Forestry Department and are available from FAC Distribution and Sales, Via delle Terme di Caracalla, 00100 Rome, Italy upon request. Use the job number i parentheses when ordering.)

- Genetic Resources of Tree Species in Arid and Semi-arid Areas (1980) (Job no. N7389/E)
  Ressources génétiques d'essences arborées des zones arides et semi-arides (1980) (Job no. N7389/F)
  Recursos Geneticos de Especies Arboreas en las zonas aridas y semiaridas (1980) (Job. no. N7389/S)
- Handbook on taxonomy of *Prosopis* in Mexico, Peru and Chile, by P.F. Ffolliott and J.L. Thames (1983) (Job nc Q2580/F)
  Manuel de taxonomie de *Prosopis* au Mexique, Pérou, Chili, par P.F. Ffolliott et J.L. Thames (1983) (Job nc Q2580/F)
  Manual sobre taxonomia de *Prosopis* en México, Perú y Chile, por P.F. Ffolliott y J.L. Thames (1983) (Job nc Q2580/S)
- Handbook on seed insects of *Acacia* species, B.J. Southgate (1983) (Job no Q2585/E)
  Manuel de lutte contre les insectes parasites des semences d'acacias, par B.J. Southgate (1983) (Job no Q2585/E)
  Manual sobre insectos que atacan a las semilla de *Acacia*, por B.J. Southgate (1983) (Job no. Q2585/S)
- Handbook on seed insects of *Prosopis* species, by C.D. Johnson (1983) (Job no. Q4165/E)
  Manual sobre insectos que infestan la semilla de *Prosopis*, por C.D. Johnson (1983) (Job no. Q4165/S)
  Guide des insectes parasites des semences de *prosopis* par C.D. Johnson (1983) (Job no. Q4165/F)
- Manual on taxonomy of *Acacia* species, by J.P.M. Brenan (1983) (Job. No. Q2934/E)
  Manuel sur la taxonomie des espèces d'acacias, par J.P.M. Brenan (1983) (Job no. Q2934/F)
  Manual sobre la taxonomia de algunas especies de *Acacia*, por J.P.M. Brenan (1983) (Job no. Q2934/S)
- Handbook on seeds of dry-zone acacias, by J.C. Doran, J.W. Turnbull, D.J. Boland and B.V. Gunn (1983) (Job no Q2190/E)
  Guide des semences d'acacias des zones sèches, par J.C. Doran, J.W. Turnbull, D.J. Boland and B.V. Gunn (1983) (Job. no. Q2190/F)
  Manual sobre las semillas de acacias de zonas secas, por J.C. Doran, J.W. Turnbull, D.J. Boland and B.V. Gunn (1983) (Job no. Q2190/S)
- Collection, handling, storage and pre-treatment of Prosopis seeds in Latin America, by P.F. Ffolliot and J.L. Thames (1983) (Job no. Q2180/E)
  Recoleccion, manipuleo, almacenaje y pretratamiento de las semillas de *Prosopis* en América Latina, by P.F. Ffolliot and J.L. Thames (1983) (Job no. Q2180/S)
  Récolte, manipulation, conservation et prétraitement des semences de Prosopis en Amérique latine by P.F. Ffolliot and J.L. Thames (1983) (Job no. Q2180/F)

Descriptors[1]

— Winged Bean	(Revised 1982)
— Rice	(1980) (published by IRRI in collaboration with IBPGR)
— Pearl Millet	(1981) (in collaboration with ICRISAT)
— Lupin/Lupinos	(1981)
— Barley	(1982)
— Apple	(1982) (in collaboration with CEC)
— Safflower	(1983)
— Cowpea	(1983)
— *Echinochloa* Millets	(1983)
— Kodo Millets	(1983)
— *Phaseolus coccineus*	(1983)
— Grape	(1983)
— Soyabean (Chinese/English)	(1984)
— Banana	(Revised 1984)
— Sorghum	(Revised 1984) (in collaboration with ICRISAT)
— Forage Legumes	(1984) (in collaboration with CEC)

[1] See also under crops for descriptor lists for *Allium*, amaranths, cacao, *Capsicum*, cassava, coffee, Cucurbitaceae, sugarcane and tomatoes.

Regions

- Plant Genetic Resources of Southeast Asia, edited by J.T. Williams, C. Lamoureux and Wulijarni-Soetjipto (1975) (Available from the National Biological Institute, Bogor, Indonesia — This publication was partly sponsored by IBPGR)
- Report of the Fourth Meeting of the IBPGR Regional Committee for Southeast Asia (1982)
- Report of the Fifth Meeting of the IBPGR Regional Committee for Southeast Asia (1983)
- IBPGR Symposium on the Genetic Resources of the Far East and the Pacific (1981)
- Report of South Asia Liaison Officers Meeting (1982)
- Report of Meeting of Liaison Officers for the Mediterranean Programme (1982)
- ECP/GR Introductory Booklet (1984)
- A Cooperative Regional Programme in Southeast Asia: Five-Year Plan of Action 1985-89 (1984)

Conservation

- Institutes Working on Tissue Culture for Genetic Conservation, by L.A. Withers (Revised 1982)
- Use of Deep-Freeze Chests for Medium-and Long-Term Storage of Small Seed Collections, by R.H. Ellis and E.H. Roberts (1982).
- IBPGR Advisory Committee on Seed Storage: Report of the First Meeting (1982)
- IBPGR Advisory Committee on Seed Storage: Report of the Second Meeting (1984)
- IBPGR Advisory Committee on *In Vitro* Storage: Report of the First Meeting (1983)
- Crop Genetic Resources: The Conservation of Difficult Material, edited by L.A. Withers and J.T. Williams (1983), copublished by IUBS and IGF (Available from booksellers)
- Seed Management Techniques for Genebanks: Proceedings of a Workshop held at the Royal Botanic Gardens, Kew 6-8 July 1982, edited by J.B. Dickie, S. Linington and J.T. Williams (1984)
- Institutes Conserving Crop Germplasm: The IBPGR Global Network of Genebanks by J. Hanson, J.T. Williams and R. Freund (1984)
- The Potential for Using *In Vitro* Techniques for Germplasm Collection (1984)
- Genetic Variability in Tissue Culture: Impact on Germplasm Conservation and Utilization by W.R. Scowcroft (1984)

Training

- Plant Exploration and Collection: South Asian Training Course Lectures, edited by K.L. Mehra, R.K.Arora and S.R. Wadhi (1981), copublished by ICAR (Available from NBPGR)
- Plant Exploration and Collection: South Asian Training Course Lectures in Hindi, translated from English by B. Kumar (1983), copublished by ICAR (Available from NBPGR)

Information

Bibliographies and Glossaries

- English/Arabic Glossary of Plant Genetic Resources Terms, by W.G Ayad (1979)
- A Bibilography of Crop Genetic Resources by J.G. Hawkes, J.T. Williams and R.P. Croston (1983)

Documentation

- Documentation of Genetic Resources: A Model, edited by B. Blixt and J.T. Williams (1982), copublished with NGB
- Collection of Crop Germplasm: The First Ten Years 1977-84, edited by T. Lawrence (1984)

Newsletters

- FAO/IBPGR Plant Genetic Resources Newsletter
  45, 46, 47, 48 (1981) 49, 50, 51, 52 (1982) 53, 54, 55, 56 (1983) 57, 58, 59, 60 (1984)
- IBPGR Regional Committee for Southeast Asia Newsletter (Available from IBPGR, c/o FAO Regional Office for Asia and the Pacific (RAPA), Maliwan Mansion, Phra Atit Road, Bangkok — 10200, Thailand)
  Vol. VII Nos. 1-4 (1983) Vol. VIII. Nos. 1-4 (1984)

Directories of Germplasm Collections

1* Food Legumes, by W.G. Ayad and N. Murthi Anishetty (1980) (under revision)

2* Root Crops, by A.B. Damania and J.T. Williams (1980) (under revision)

3.I Wheat, by W.G. Ayad, J. Toll and J.T. Williams (1980)

3.II* Maize, by W.G. Ayad, J. Toll and J.T. Esquinas Alcazar (1980)

3.III Rice, by J. Toll, N. Murthi Anishetty and W.G. Ayad (1981)

3.IV Sorghum and Millets, by N. Murthi Anishetty, W.G. Ayad and J. Toll (1981)

3.V Barley, by N. Murthi Anishetty, J. Toll, W.G. Ayad and J.R. Witcombe (1982)

4. Vegetables, by J. Toll and D.H. Van Sloten (1982)

5.I Industrial Crops (Cacao, Coconut, Pepper, Sugarcane and Tea), by J.T. Williams and A.B. Damania (1981)

6.I Tropical and Subtropical Fruits and Tree Nuts, by P.J. Gulick and D.H. van Sloten (1984)

7. Forages (Grasses & Legumes), by W. Ellis Davies and B.T. McLean (1984)

— Directory of Germplasm Collections: Southeast Asia, by R.B. Singh (1981) (Available from IBPGR/SEAP Regional Office, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok — 10200, Thailand)

— Directory of European Institutes Holding Crop Genetic Resources Collections (2nd edition — 1983) FAO/UNDP

* Out of print

LE POINT DES ACTIVITES DE 1984

- Le dixième anniversaire de l'IBPGR a été célébré par dix grandes manifestations, et plusieurs autres de moindre envergure organisées en Afrique, en Asie en Europe et en Amerique latine. Le plus souvent ces manifestations ont été organisées et initiées au niveau local.
- Les programmes relatifs aux cultures ont continué de progresser en 1984:
  - 82 missions de collecte bénéficiant de l'aide de l'IBPGR ont été organisées dans 49 pays pour recueillir du matériel génétique
  - au total, plus de 18 000 échantillons des principales plantes cultivées ont été réunis:
    des plantes classées au premier rang des priorités ont été échantillonnées 111 fois dans 43 pays
    des plantes classées au deuxième rang des priorités ont été échantillonnées 60 fois dans 26 pays
    des plantes classées au troisième rang des priorités, ont été échantillonnées 29 fois dans 16 pays
  - plus de 2,000 échantillons de variétés sauvages des plantes classées comme prioritaires ont été recueillis. L'attention accrue portée aux espèces sauvages par l'IBPGR devrait être apparente dans le futur
  - deux groupes internationaux de travail se sont réunis (plantes fourragères tropicales et sub-tropicales, et palmier à huile) tandis que dans le cadre du projet spécial IBPGR/UNDP du Programme Coopératif Européen pour la conservation et l'échange des Ressources Génétiques, des groupes de travail se sont réunis sur l'*Allium*, les plantes fourragères, l'avoine et le tournesol.

  Trente-huit documents au total ont été publiés en 1984, notamment:
  - 5 monographies spéciales "10 ème anniversaire" (consacrées à diverses questions scientifiques), 4 listes de descripteurs, 2 répertoires des collections de matériel génétique, 4 rapports des groupes de travail du Programme Coopératif Européen, 5 dossiers techniques sur la conservation, 6 rapports techniques sur les souches d'espèces cultivees, 8 bulletins d'information, un catalogue du matériel phytogénétique, un fascicule publicitaire du Programme Coopératif Européen, le *Rapport prévisionnel pour la deuxième décennie de l'IBPGR*, et le *Rapport annuel 1983*.
  - 13 affiches éducatives illustrant les activitées de l'IBPGR ont été imprimées
- Programme de conservation
  - de nouvelles normes internationales pour la conservation des semences ont été mises au point en 1984
  - les réunions suivantes ont eu lieu:
    Comité consultatif sur la conservation *In Vitro*
    Comité consultatif sur la conservation des semences
    groupe spécial chargé de l'enquête écogéographique et de la conservation *In Situ*
  - 32 spécialistes ou techniciens des pays développement ont reçu une formation spécialisée aux divers aspects de la conservation avec le concours de l'IBPGR
  - l'IBPGR a collaboré à la conservation du matériel phytogénétique avec des centres de recherche et dés agronomes dans près de 100 pays
  - l'IBPGR a désingé le premier janvier 1985 47 banques de gênes, réparties dans 33 pays (19 dans des pays en développement et 14 dans des pays développés), et chargées de réunir, pour janvier 1985, 37 espèces cultivées différentes afin d'en assurer la conservation.
  - l'IBPGR a fourni des fonds et des conseils de spécialistes pour améliorer les installations de conservation de moyenne et longue durée dans les pays suivants: Chine, Fiji, Iran, Malaisie, Maroc, Nigéria, Papouasie-Nouvelle-Guinée, Pérou, Portugal, Soudan, Thaïlande et Tunisie.
  - de nombreux échantillons d'espèces à reproduction végétative ont été introduits, par culture *In Vitro*, dans les banques de matériel phytogénétique.

- Programme d'information et de gestions des données
  - des ordinateurs et les logiciels correspondants ont été fournis à des instituts en Chine, au Pakistan, en Pologne, en Espagne et à la Trinité
  - 10 experts ou techniciens ont reçu une formation spécialisée à l'information et à la gestion des données grâce à l'IBPGR
  - l'IBPGR a fourni une aide a la constitution de bases de données pour la conservation de 24 espèces cultivées: *Allium*, pommier, orge, *Capsicum*, cacao, *Cucumis*, aubergine, plantes fourragères (8 genres), arachide, avoine, gombo, *Phaseolus*, *Prunus*, seigle, soja, tournesol et blé
- Programme de formation
  - 17 étudiants des pays en développement ont reçu des bourses de 3ème cycle
  - 99 étudiants ou techniciens ont reçu une formation spécialisée au moyen de stages de formation de courte durée
  - 6 personnes ont été affectées à plein temps au CIAT, à l'ICARDA, à l'AVRDC, à l'HAES (Papouasie-Nouvelle-Guinée), aux îles Salomon et à un projet de l'IBPGR pour la conservation *In Vitro* de la banane, en Belgique.

LE POINT DE DIX ANNEES D'ACTIVITES (1974-84)

- Au terme de ses dix premières années d'activités, l'IBPGR a réuni, grâce aux 582 missions de collecte qu'il a financées, plus de 121 000 échantillons de matériel phytogénétique. Ces missions de collecte eurent lieu dans plus de 90 pays et ont inclu toutes les zones considérées prioritaires pour l'IBPGR.

Afrique	34 000
Asie du Sud-Ouest et centrale	6 000
Asie du Sud	9 000
Asie du Sud-Est	21 000
Asie, région Est et du Pacifique	5 000
Amérique latine	27 000
Bassin méditerranéen	19 000

- l'IBPGR publié au total 237 documents (en majorité des rapports techniques).
- Les Groupes de travail et Comités internationaux de l'IBPGR se sont réunis 51 fois au cours des dix dernières annees:
  - 39 fois au sujet de 22 espèces cultivées prioritaires
  - 7 fois au sujet de la conservation de matériels phytogénètiques
  - 5 fois au sujet de l'information et de la gestion des données
  - en outre 7 Groupes de travail régionaux sur les espèces cultivées se sont réunis. Ces Groupes de travail ont mis en commun des connaissances de base permettant de mettre en oeuvre une action rapide et de préparer des plans à plus long terme.
- De nouveaux programmes nationaux concernant les ressources génétiques ont été entrepris dans une cinquantaine de pays, et des comités nationaux des ressources génétiques se sont constitués dans 25 pays.
- L'IBPGR a organisé des réunions intergouvernementales dans 9 régions prioritaires.
- Réalisations dans le domaine de la conservation:
  - l'IBPGR a fourni des fonds ou une aide technique à la majorité des installations de stockage des semences (plus de 300) pour la conservation active et de base dans des institutions publiques du monde entier.

— les collections de base désignées par l'IBPGR, inexistantes il y a dix ans, sont aujourd'hui au nombre de 45, et assurent donc la pérennité des souches génétiques des espèces cultivées
— l'IBPGR a financé des projets de caractérisation et d'évaluation du matériel génétique, conduits dans 60 pays par 108 institutions différentes.

- Réalisations dans le domaine de l'information et de la gestion des données:
  — des ordinateurs et les logiciels utiles ont été fournis à 23 institutions publiques
  — 84 experts ou techniciens ont été formés à l'information et à la gestion des données
  — des bases de données internationales, régionales ou nationales ont été créées, avec le soutien de l'IBPGR, pour 29 espèces cultivées (5 pour les céréales, 3 pour les légumineuses vivrières, 6 pour les espèces horticoles, 3 pour les espèces fruitières, 3 pour les cultures industrielles, 8 pour les cultures fourragères et une pour une culture oléagineuse).
- Réalisations dans le domaine de la formation:
  — 192 étudiants (dont 133 ressortissants de 45 pays en développement) ont reçu une formation de 3ème cycle à l'Université de Birmingham, dans le cadre d'un programme soutenu par l'IBPGR
  — 1 022 spécialistes ou techniciens ont reçu une formation spécialisée au moyen de stages de courte durée
  — de nombreux spécialistes ont reçu une aide pour effectuer des voyages d'étude

ASPECTOS SOBRESALIENTES DEL AÑO 1984

- En 1984, el IBPGR conmemoró su décimo aniversario con diez actos importantes y varios menores, en Africa, Asia, Europa y America Latina. La iniciativa y la organizacion de la mayoría de ellos fueron locales.
- En 1984 continuaron progresando los programas sobre cultivos:
  - se recolectó germoplasma en 82 misiones patrocinadas por el IBPGR en 49 países;
  - se recolectó un total de más de 18 000 muestras de cultivos importantes:
    111 cultivos de prioridad 1, en 43 países
    60 cultivos de prioridad 2, en 26 países
    29 cultivos de prioridad 3, en 16 países
  - se recolectaron más de 2 000 muestras de parientes silvestres de los cultivos prioritarios.
- Un mayor énfasis en especies silvestres se observará probablemente en futuros informes.
  - se reunieron dos Grupos de Trabajo internacionales sobre forrajes tropicales y aceite de palma; y, en el contexto del proyecto especial del IBPGR/PNUD/ECP/GR, se reunieron los Grupos de Trabajo sobre *Allium*, forrajes, avena y girasol.
- En 1984, se publicaron en total 38 documentos:
  - 5 monografías sobre el Décimo Aniversario (relativas a diversos temas científicos), 4 listas de descriptores, 2 de colecciones de germoplasma, 4 informes de Grupos de Trabajo ECP/GR, 5 documentos técnicos sobre recursos genéticos de cultivos, 8 Noticieros, 1 catálogo de germoplasma, 1 folleto publicitario ECP/GR, 1 informe sobre la planificación del Segundo Decenio del IBPGR y el Informe Anual de 1983.
  - se publicaron 13 carteles didácticos que ilustran las actividades del IBPGR.
- Programa de Conservación
  - En 1984, se prepararon nuevas normas internacionales para almacenamiento de semillas.
  - Celebraron reuniones los siguientes grupos:
    El Comité Asesor sobre Conservación *In Vitro*
    El Comité Asesor sobre Almacenamiento de Semillas
    La Mision Especial sobre Estudios Ecogeográficos y Conservación *In Situ*
  - 32 científicos/técnicos de países en vías de desarrollo recibieron, con el patrocinio del IBPGR, capacitación sobre diversos aspectos específicos de la conservación.
  - El IBPGR trabajó con centros de investigación y técnicos de agronomía de casi cien países, en relación con la conservación de germoplasma.
  - El IBPGR habia designado 45 bancos de genes en 31 países (18 en vías de desarrollo y 13 desarrollados), que debían tener 35 especies diferentes de cultivos para enero de 1985.
  - El IBPGR proporcionó fondos o/y expertos para mejorar los locales de almacenamiento a medio y a largo plazo en China, Fiji, Iran, Malasia, Marruecos, Nigeria, Papua Nueva Guinea, Perú, Portugal, Sudán, Tailandia y Túnez.
  - Se transfirieron numerosas muestras de cultivos de propagacion vegetativa a bancos de genes mediante cultivos *in vitro*.
- Programa de información y manejo de datos
  - Se proporcionaron ordenadores y programas a institutos de Espana, Pakistán, Polonia y Trinidad.
  - 10 científicos/técnicos recibieron, bajo el patrocinio del IBPGR, capacitación sobre temas específicos relacionados con la información y manejo de datos.
  - En 1984, el IBPGR prestó apoyó a bases de datos sobre colecciones de 24 cultivos: *Allium*, manzano, cebada, *Capsicum*, cacao, *Cucumis*, berenjena, forrajes (8 géneros), maní, avena, quimbombo, *Phaseolus*, *Prunus*, centeno, soja, girasol y trigo.

- Programa de capacitación
  - Se financió la capacitación de 17 estudiantes postgraduados de países en desarrollo.
  - 99 estudiantes/técnicos recibieron capacitación especializada en cursos breves.
  - Se destinaron 6 becarios a CIAT, ICARDA, AVRDC, HAES (Papúa Nueva Guinea), Islas Salomón y el proyecto de banano *in vitro* del IBPGR en Bélgica.

ASPECTOS SOBRESALIENTES DE DIEZ ANOS (1974-84)

- Durante el primer decenio de trabajo del IBPGR, se recogieron más de 121 000 muestras de germoplasma en 582 misiones, parcialmente financiadas por el IBPGR, en más de 90 países de todas las regiones a las que el IBPGR habia asignado prioridad:

Africa	34 000
Asia Sudoccidental y Central	6 000
Asia Meridional	9 000
Asia Sudoriental	21 000
Asia Oriental y el Pacífico	5 000
America Latina	27 000
Mediterraneo	19 000

- El IBPGR publicó un total de 237 documentos (principalmente informes técnicos).
- Los Grupos de Trabajo y Comités Internacionales del IBPGR celebraron 51 reuniones durante el último decenio:
  - 39 sobre 22 cultivos prioritarios
  - 7 sobre conservación de germoplasm
  - 5 sobre información y manejo de datos
  - tambien se reunieron otros 7 grupos de trabajo sobre cultivos regionales. Estos grupos de trabajo han establecido una base de conocimientos para llevar a cabo actividades urgentes y una planificación más avanzada.
- Se han iniciado nuevos programas nacionales sobre recursos genéticos en 50 países aproximadamente y se han establecido comités nacionales de recursos genéticos en 25 países.
- El IBPGR ha organizado reuniones entergubernamentales en 9 regiones prioritarias.
- Los progresos realizados en materia de conservación han sido los siguientes:
  - el IBPGR ha proporcionado fondos o ayuda a la mayoría de los locales de almacenamiento de semillas (activos y base), que son más de 300, en insitituciones públicas de todo el mundo.
  - las colecciones base designadas por el IBPGR han aumentado hasta 47 asegurando asi la conservación de germoplasma de plantas cultivadas.
  - el IBPGR ha financiado parcialmente proyectos para caracterizar y evaluar germoplasma en 108 institutos de 60 países.
- Los progresos realizados en materia de información y manejo de datos han sido los siguientes:
  - se han suministrado ordenadores y programas a 22 instituciones publicas
  - se ha capacitado a 48 científicos/técnicos en materia de información y manejo de datos
  - el IBPGR ha prestado apoyo a bases internacionales, regionales o nacionales de datos sobre 29 cultivos (5 de cereales, 3 de leguminosas alimentarias, 6 de hortalizas, 3 de frutas, 3 de cultivos industriales, 8 de forrajes y 1 de cultivos oleaginosos).
- Los progresos realizados en materia de capacitación han sido los siguientes:
  - 192 estudiantes (133 de los caules proceden de 45 países en desarrollo) han recibido capacitación a nivel de postgraduado, en el curso de la Universidad de Birmingham, patrocinado por el IBPGR.
  - 1 027 científicos/técnicos han recibido capacitación especializada en cursos breves
  - se ha prestado asistencia a numerosos científicos para viajes de estudios.

1984年主要工作

* 国际植物遗传资源委员会1984年在非洲、亚洲、欧洲和拉丁美洲举行了十次重大的和几次规模较小的十周年庆祝活动。这些活动大部分由当地发起和组织。
* 作物计划在1984年继续取得进展：
  - 国际植物遗传资源委员会资助的32个样品收集小组在49个国家收集种质。
  - 已收集的主要作物样品共18，000份：

    在43个不同国家收集了第一类优先作物的样品，共111次。

    在26个不同国家收集了第二类优先作物的样品，共60次。

    在16个不同国家收集了第三类优先作物的样品，共29次。
  - 收集了2，000多个优先作物的野生亲缘种样品。这种对野生种更加重视的情况在今后的报告中很可能被反映出来。
  - 两个国际工作组（热带和亚热带饲料作物和油棕）举行了会议，而且在国际遗传资源委员会／联合国开发计划署的欧洲作物遗传资源保存和交换合作计划／遗传资源特别项目的范畴内，国际葱、草料、燕麦和向日葵工作组也召开了会议。
* 1984年共出版了38份文件，包括：
  - 五篇十周年纪念专题文章（不同学科专题的著述），四份描述符目录、二份种质保存库名录、四份欧洲作物遗传资源保存和交换合作计划／遗传资源工作组报告、五份保存方面的技术文件、六份作物遗传资源技术报告、八份简报、一份种质目录、一本欧洲作物遗传资源保存／交换合作计划／遗传资源宣传手册、国际植物遗传资源委员会第二个十年规划报告和1983年年度报告。
  - 印刷了13幅教育性的招贴画，以阐述国际植物遗传资源委员会的各项活动。
* 保存计划
  - 1984年制定了新的国际种子贮藏标准。
  - 召开的会议有：

    咨询委员会召开的离体贮藏会议

    咨询委员会召开的种子贮藏会议

    工作组召开的生态地理考察和原生环境保存会议
  - 来自发展中国家的32名科学家／技术员接受了国际植物遗传资源委员会资助的有关保存的各个方面的培训。
  - 国际植物遗传资源委员会与近100个国家的研究中心和农业科学家进行种质保存方面的协作。
  - 截至1985年1月，国际植物遗传资源委员会已特定33个国家（其中19个发展中

国家，14个发达国家）的47个基因库保存37个不同的作物品种。

- 国际植物遗传资源委员会对下列国家提供了资金／技术知识，以增进其中期或长期种子库的贮藏设备：中国、斐济、伊朗、马来西亚、摩洛哥、尼日利亚、巴布亚新几内亚、秘鲁、葡萄牙、苏丹、泰国和突尼斯。
- 许多无性繁殖的作物样品通过离体培养而转移到基因库。

* 资料和数据管理计划
  - 向中国、巴基斯坦、波兰、西班牙、特立尼达的研究所提供了计算机硬件和软件。
  - 10名科学家／技术员接受了国际植物遗传资源委员会资助的资料和数据管理的专门培训。
  - 1984年24种作物数据库得到国际植物遗传资源委员会的支持：葱、苹果、大麦、辣椒、可可、黄瓜、茄子、草料（8种）、花生、燕麦、黄秋葵、菜豆、李、黑麦、大豆、向日葵和小麦数据库。

* 培训计划
  - 来自发展中国家的17名学生受到了研究生培训的资助。
  - 99名学生／技术员在短训班接受了专业培训。
  - 6名实习学者被安排到国际热带农业中心（比利时国际植物遗传资源委员会的香蕉离体保存项目）、粮农组织干旱地区国际农业研究中心、中国台北亚洲蔬菜研究及发展中心、夏威夷农业实验站（巴布亚新几内亚）和所罗门群岛等地进行实习。

十年主要工作（1974-84年）

* 在国际植物遗传资源委员会的头十年工作中，国际植物遗传资源委员会资助了582个样品收集小组。这些小组在国际植物遗传资源委员会各个优先区域中，包括90多个国家，收集了12.1万份种质样品。

非　洲	34,000份
亚洲，西南部和中部	6,000份
亚洲，南部	9,000份
亚洲，东南部	21,000份
亚洲，东部及太平洋地区	5,000份
拉丁美洲	27,000份
地中海区	19,000份

* 国际植物遗传资源委员会共出版了237份文件（主要是技术报告）。
* 国际植物遗传资源委员会国际工作组和各委员会在最近十年中举行了51次会议：
  - 有关22种不同优先作物的，39次
  - 关于种质保存的，7次
  - 有关资料和数据管理的，5次
  - 此外，7个区域工作组举行了会议。这些工作组为迅速行动和预先规划奠定了知识基础。
* 大约50个国家开始了新的国家遗传资源计划。25个国家成立了国家遗传资源委员会。
* 国际植物遗传资源委员会在9个优先区域召开了多次政府间的会议。
* 保存方面取得的进展包括：
  - 国际植物遗传资源委员会为世界各地300多个公共机构的大多数种子贮藏设施（常用和基础收集品库）提供了资金和援助。
  - 国际植物遗传资源委员会的特定基础收集品库从零增加到45个，从而为作物种质提供了安全保障。
  - 国际植物遗传资源委员会支持许多项目，以帮助60个国家的108个不同机构进行种质的性状记述和评价，
* 资料和数据管理方面的进展包括：
  - 为23个公共机构提供了计算机硬件和软件。
  - 84名科学家／技术员接受了资料和数据管理的培训。
  - 29种作物（5种谷物、3种食用豆类、6种蔬菜、3种水果、3种经济作物，8种草料和1种油料作物）的国际、区域和国家数据库得到了国际植物遗传资源委员会的

支持。

* 培训方面的进展包括：
  - 192名学生（其中133名来自45个不同的发展中国家）参加了由国际植物遗传资源委员会支持的、在伯明翰大学举办的研究生级培训班。
  - 1,022名科学家／技术员在短期培训班接受专业培训。
  - 资助许多科学家参加考察组工作。

أهم أحداث عشر سنوات (١٩٧٤ - ١٩٨٤)

- استطاع المجلس الدولى للموارد الوراثية النباتية أن يجمع خلال السنوات العشر الأولى من عمله أكثر من ١٢١ ٠٠٠ عينة من العينات الوراثية من خلال ٥٨٢ بعثة من بعثات التجميع المعانة من المجلس التى انتشرت فى أكثر من ٩٠ بلدا للجمع من كل الأقاليم التى أعطاها المجلس أولوية لجمع العينات منها :

أفريقيا	٣٤ ٠٠٠
آسيا (جنوب غرب ووسط)	٦ ٠٠٠
آسيا (الجنوب)	٩ ٠٠٠
آسيا (جنوب شرق)	٢١ ٠٠٠
آسيا (الشرق والمحيط الهادى)	٥ ٠٠٠
أمريكا اللاتينية	٢٧ ٠٠٠
البحر المتوسط	١٩ ٠٠٠

- نشر المجلس الدولى ٢٣٧ وثيقة (معظمها تقارير فنية)

- عقدت لجان المجلس الدولى ومجموعات العمل التابعة له ٥١ اجتماعا خلال السنوات العشر من عمله :
  - ٣٩ اجتماعا بشأن ٢٢ محصولا من محاصيل الأولوية
  - ٧ اجتماعات بشأن حفظ العينات الوراثية
  - ٥ اجتماعات بشأن ادارة المعلومات والبيانات
  - اجتمعت سبع مجموعات عمل اقليمية للمحاصيل . وقد وضعت مجموعات العمل هذه قاعدة للمعلومات لسرعة العمل والتخطيط على المدى البعيد .

- بدأ تنفيذ برامج قطرية جديدة للموارد الوراثية فى نحو ٥٠ بلدا كما أنشئت لجان قطرية للموارد الوراثية فى نحو ٢٥ بلدا .

- نظم المجلس الدولى للموارد الوراثية النباتية لقاءات حكومية فى تسعة أقاليم من أقاليم الأولوية .

- شمل التقدم الذى أحرز فى مجال الحفظ ما يلى :
  - قدم المجلس الدولى الأموال أو المساعدات الى معظم مرافق تخزين البذور التى يفوق عددها ٣٠٠ مرفق (للبذور العاملة والأساسية) فى المؤسسات العاملة فى مختلف أنحاء العالم .
  - زادت المجموعات الأساسية للعينات الوراثية التى يحددها المجلس الى ٤٥ مجموعة بعد أن كانت غير موجودة أصلا ، الأمر الذى وفر الموارد الوراثية للمحاصيل .
  - ساعد المجلس الدولى المشروعات الخاصة بتوصيف الموارد الوراثية وتقييمها فى ١٠٨ معاهد فى ٦٠ بلدا .

- شمل التقدم الذى حدث فى مجال ادارة المعلومات والبيانات ما يلى :
  - تزويد ٢٢ مؤسسة عامة بأجهزة الكومبيوتر وبرامجها .
  - تدريب ٨٤ عالما وفنيا على ادارة المعلومات والبيانات .
  - ساعد المجلس فى وضع قواعد بيانية دولية واقليمية وقطرية لـ ٢٩ محصولا (٥ محاصيل حبوب ، ٣ محاصيل بقول غذائية ، ٦ محاصيل خضر ، ٣ محاصيل فاكهة ، ٣ محاصيل صناعية ، ٨ محاصيل علفية ، ومحصول زيتى واحد) .

- وشمل التقدم الذى حدث فى مجال التدريب ما يلى :
  - تدريب ١٩٢ طالبا (من بينهم ١٣٣ طالبا ينتمون الى ٤٥ بلدا نامية) بعد تخرجهم فى الدورات التدريبية التى يدعمها المجلس فى جامعة برمنغهام .
  - تدريب ١٠٢٧ عالما وفنيا تدريبا متخصصا فى دورات تدريبية قصيرة .
  - معاونة العديد من العلماء على القيام بجولات دراسية .

- تلقت بنوك الجينات الوراثية العديد من عينات المحاصيل التى تتكاثر خضريا من خلال زراعتها فى المختبرات .

برامج ادارة المعلومات والبيانات

- تم توريد أجهزة كومبيوتر وبرامجها لعدد من المعاهد فى باكستان وبولندا واسبانيا وترينيداد .
- تلقى عشرة من العلماء والفنيين تدريبا نوعيا على ادارة المعلومات والبيانات بدعم من المجلس الدولى للموارد الوراثية النباتية .
- قدم المجلس الدولى دعما فى عام ١٩٨٤ للقواعد البيانية للعينات المحفوظة من ٢٤ محصولا مختلفا هى : الثوم والتفاح والشعير والفلفل والكاكاو والخيار والباذنجان والأعلاف (٨ أصناف) والفول السودانى والشوفان والبامية والفاصوليا والبرقوق والراى وفول الصويا وعباد الشمس والقمح .

برامج التدريب

- أختير ١٧ طالبا من البلدان النامية للتدريب بعد التخرج .
- حصل ٩٩ طالبا وفنيا على تدريب متخصص فى دورات تدريبية قصيرة .
- قدمت ست منح للدراسة الداخلية فى المركز الدولى للزراعات الاستوائية والمركز الدولى للبحوث الزراعية فى المناطق الحارة ، والمركز الآسيوى لبحوث الخضر وتنميتها ، و HAES (بابوا غينيا الجديدة) . وجزر سليمان ، ومشروع لزراعة الموز فى صوبات فى بلجيكا بدعم من المجلس الدولى للموارد الوراثية النباتية .

أهم أحداث عام ١٩٨٤

* أقام المجلس الدولى للموارد الوراثية النباتية فى عام ١٩٨٤ عشرة احتفالات كبيرة وأخرى صغيرة فى أفريقيا وآسيا وأوروبا وأمريكا اللاتينية وذلك بمناسبة الذكرى العاشرة لانشائه. وقد أقيمت هذه الاحتفالات فى معظم الأحوال بمبادرة وتنظيم محليين .

* استمرت برامج المحاصيل فى التقدم فى عام ١٩٨٤ :

- قامت ٨٢ بعثة من بعثات الجمع التى يدعمها المجلس بجمع الجينات الوراثية من ٤٩ بلدا،
- بلغ مجموع ما جمعته هذه البعثات ١٨٠٠٠ عينة لمحاصيل هامة :

  ١١١ محصولا من المحاصيل ذات الأولوية الأولى من ٤٣ بلدا
  ٦٠ محصولا من المحاصيل ذات الأولوية الثانية من ٢٦ بلدا
  ٢٩ محصولا من المحاصيل ذات الأولوية الثالثة من ١٦ بلدا

- جمع أكثر من ٢٠٠٠ عينة من الأصناف البرية للمحاصيل التى لها أولويتها . وقد يلاحظ التركيز على الأصناف البرية فى التقارير المقبلة .
- اجتمعت مجموعتا العمل الدوليتان (الأعلاف الاستوائية وشبه الاستوائية ، ونخيل الزيت) ، كما اجتمعت مجموعات العمل الخاصة بالثوم والأعلاف والشوفان وعباد الشمس فى اطار المشروع الخاص ECP/GR المشترك بين المجلس الدولى للموارد الوراثية النباتية وبرنامج الأمم المتحدة للتنمية .

* نشرت ٣٨ وثيقة خلال عام ١٩٨٤ ، من بينها :

- خمس دراسات (تتعلق بموضوعات علمية مختلفة) بمناسبة الذكرى العاشرة لانشاء المجلس الدولى ، أربع قوائم وصفية ، دليلان عن الجينات الوراثية المحفوظة ، أربعة تقارير من جماعات العمل فى ECP/GR ، خمس وثائق فنية عن الحفظ ، و٦ تقارير فنية عن الموارد الوراثية للمحاصيل، و٨ نشرات وكتالوج عن الجينات الوراثية ، وقائمة بمطبوعات ECP/GR ، وتقرير عن التخطيط للعقد الثانى للمجلس الدولى للموارد الوراثية النباتية ، والتقرير السنوى لعام ١٩٨٣ .
- طباعة ١٣ ملصقا توضحا تبين نشاطات المجلس الدولى للموارد الوراثية النباتية .

* برامج الحفظ

- وضعت معايير دولية جديدة لتخزين الحبوب فى عام ١٩٨٤
- عقد اجتماعات بمعرفة :

  اللجنة الاستشارية للتخزين فى المختبرات
  اللجنة الاستشارية لتخزين البذور
  فريق العمل الخاص بالمسوحات الأيكولوجية - الجغرافية والتخزين فى المواقع الطبيعية .

- حصل ٣٢ عالما وفنيا من البلدان النامية على تدريبات نوعية فى مختلف مجالات الحفظ ، ضمن النشاطات التدريبية التى يدعمها المجلس الدولى للموارد الوراثية النباتية .
- اشترك المجلس الدولى مع مراكز البحوث وعلماء الزراعة فى نحو ١٠٠ بلد فى برامج لحفظ الجينات
- ساهم المجلس الدولى فى انشاء ٤٥ بنكا للموارد الوراثية فى ٣١ بلدا (١٨ بلدا ناميا، و١٣ بلدا متقدما) لتصل مخزوناتها فى أول ١٩٨٥ الى ٣٥ نوعا من أنواع المحاصيل .
- قدم المجلس الدولى الأموال أو الخبرات اللازمة لتحسين وسائل التخزين فى المدى المتوسط أو المدى الطويل فى الصين وفيجى وايران وماليزيا والمغرب ونيجيريا وبابوا غينيا الجديدة وبيرو والبرتغال والسودان وتايلند وتونس .