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**INTERNATIONAL BOARD FOR
PLANT GENETIC RESOURCES**

**CONSULTATIVE GROUP ON
INTERNATIONAL
AGRICULTURAL RESEARCH**

**ANNUAL REPORT
1983**

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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

By the end of 1983 the IBPGR had completed nine years of operation. During that time substantial progress has been made on all genetic resources activities but particularly the widespread collection of germplasm samples, the establishment of genebanks, the initiation of research and training.

The IBPGR is unique in many ways among scientific institutions: its role is not mainly that of a major funding organization but it stimulates and mobilizes action as a result of its inputs. It focuses its action so as to bring cohesiveness and purpose to the multitude of crop genetic resources activities scattered throughout the world and to weld these into a viable global network.

Despite the progress made to date, there is no room for complacency. In preparation for 1984, which marks the ten-year anniversary of the Board, a major planning exercise was started to review how IBPGR support should be targeted in the next decade. During 1984 an updated strategy and long-term plan will be issued. At the same time constraints to the work were identified through a variety of mechanisms, including consultations with national programmes, committee reports and special studies.

These activities led to three conclusions. First, the scientific work in many institutions needs to be upgraded. If the germplasm collections are to be maintained for posterity, agreed standards must be rigorously implemented. This will be vigorously pursued in 1984. Secondly, it has become obvious that the numbers of samples listed as the holdings of particular institutions are being widely misinterpreted. The numbers are only meaningful when numerous redundant duplicates have been sorted out and the samples have been characterized and documented. Thirdly, the Board has had to rethink its strategy and changes are needed in its mode of operation. Specifically, the widespread collecting of cultivars will be

slowed down except for documented emergency situations and much greater emphasis placed on characterization, documentation and generally bringing order to existing collections; there will be much more concentration on wild species so that the genetic variability in collections is widened; more stress will be put on conservation methodology for clonally propagated crops; and collecting which is done will be better focused through the use of ecogeographical surveys and other techniques.

The CGIAR was informed of these shifts toward the end of 1983 and the changes in direction welcomed. The Board, as a result, is likely to become much more involved with research than has been possible hitherto.

The IBPGR is also unique in that it is able to mobilize the willing and voluntary services of several hundred of the most knowledgeable breeders and scientists and capitalizes on this body of goodwill. With this base the Board moves toward its tenth anniversary with confidence.

It will be noted that the Annual Report summarizes very briefly the Board's major activities. Details are always readily available from the ever-increasing number of individual reports available in the Secretariat. As the activities have grown the Secretariat has found it necessary to computerize the data accumulated. This is understandable when it is realized that by 1983 well over 400 scientists, mostly from developing countries, had become involved in field work including 300 collecting missions in all parts of the world. The operational base is supported by IBPGR outreach staff in critical regions of genetic diversity.

It is a pleasure to record the industry of the staff of the IBPGR, the backing provided by our donors, the logistic support of FAO and the cooperation with the crop centres of the CGIAR, other regional and national centres and individual scientists throughout the world.

J.T. Williams
Executive Secretary, IBPGR

ACRONYMS

AAASA	- Association for the Advancement of Agricultural Sciences in Africa (Ethiopia)	CFI	- Commonwealth Forestry Institute (UK)
ACCT	- Agence de coopération culturelle et technique (France)	CGIAR	- Consultative Group on International Agricultural Research
ACRI	- American Cocoa Research Institute (USA)	CIAT	- Centro Internacional de Agricultura Tropical - CGIAR
ACSAD	- Arab Centre for the Study of Arid Zones and Dry Lands (Syria)	CIF	- Centro de Investigaciones Fitocogenéticas (Bolivia)
AIDA	- Asociación Interprofesional para el Desarrollo Agrario (Spain)	CIMMYT	- Centro Internacional de Mejoramiento de Maíz y Trigo - CGIAR
ARARI	- Aegean Regional Agricultural Research Institute (Turkey)	CIP	- Centro Internacional de la Papa - CGIAR
ARC	- Agricultural Research Centre (Libya)	CIRF	- Consejo Internacional de Recursos Fitogenéticos (IBPGR in Spanish)
ARC	- Agricultural Research Corporation (Sudan)	CIRP	- Conseil international des ressources phylogénétiques (IBPGR in French)
ARI	- Agricultural Research Institute (Cyprus)	CNR	- Consiglio Nazionale delle Ricerche (Italy)
ARI	- Agricultural Research Institute (Burma)	COGENE	- Committee on Genetic Experimentation - ICSU
ARS	- Agriculture Research Service (USA)	COMECON	- Council for Mutual Economic Assistance
AVRDC	- Asian Vegetable Research and Development Centre (China)	CRI	- Crops Research Institute (Ghana)
BALITAN	- Food Crops Research Institute (Indonesia)	CSIRO	- Commonwealth Scientific and Industrial Research Organization (Australia)
BALITRI	- Industrial Crops Research Institute (Indonesia)	CTFT	- Centre technique forestier tropical (France)
BARC	- Bangladesh Agricultural Research Council (Bangladesh)	DANIDA	- Danish International Development Agency (Denmark)
BARC	- Beltsville Agricultural Research Center (USA)	DPI	- Department of Primary Industry (Papua New Guinea)
BARI	- Bangladesh Agricultural Research Institute (Bangladesh)	ECP/GR	- European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources - UNDP/FAO
BOSTID	- Board on Science and Technology for International Development (USA)	EEC	- European Economic Community
BRRI	- Bangladesh Rice Research Institute	EMBRAPA	- Empresa Brasileira de Pesquisa Agropecuária (Brazil)
CAAS	- Chinese Academy of Agricultural Sciences (China)	ENSAM	- Ecole nationale supérieure agronomique de Montpellier (France)
CATIE	- Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)	EUCARPIA	- European Association for Research on Plant Breeding
CEC	- Commission of European Communities - EEC	FAL	- Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft (Germany, Fed. Rep.)
CENARGEN	- Centro Nacional de Recursos Genéticos (Brazil)	FAO	- Food and Agriculture Organization of the United Nations
CEPEC	- Centro de Pesquisas do Cacau (Brazil)	GERDAT	- Groupement d'études et de recherches pour le développement
CEPGL	- Communauté économique des pays grands lacs		

GRIN	- de l'agronomie tropicale (France) - Genetic Resources Information Network - USDA/LISA	INRA	- Institut national de la recherche agronomique (France)
GTZ	- Agency for Technical Cooperation (Germany, Fed. Rep.)	INTA	- Instituto Nacional de Tecnología Agropecuaria (Argentina)
IADS	- International Agricultural Development Service (USA)	INTSOY	- International Soybean Program
IAN	- Instituto Agronómico Nacional (Paraguay)	IOCC	- International Office of Cocoa and Chocolate
IARC	- International Agricultural Research Centre	IPB	- Institute of Plant Breeding (Philippines)
IARI	- Indian Agricultural Research Institute (India)	IRAT	- Institut de recherches agronomiques tropicales et des cultures vivrières (France)
IBPGR	- International Board for Plant Genetic Resources - CGIAR	IRAZ	- Institut de recherche agricole et zootechnique
ICA	- Instituto Colombiano Agropecuario (Colombia)	IRCA	- Institut de recherches sur le caoutchouc (France)
ICAC	- International Cotton Advisory Committee	IRCT	- Institut de recherches du coton et des textiles exotiques (France)
ICAR	- Indian Council of Agricultural Research (India)	IRFA	- Institut de recherches sur les fruits et agrumes (France)
ICARDA	- International Centre for Agricultural Research in the Dry Areas - CGIAR	IRHO	- Institut de recherches pour les huiles et oléagineux (France)
ICRAF	- International Council for Research in Agroforestry	IRGC	- International Rice Germplasm Centre (IRRI) - CGIAR
ICRISAT	- International Crops Research Institute for the Semi-Arid Tropics - CGIAR	IRRDB	- International Rubber Research and Development Board
ICSU	- International Council of Scientific Unions	IRRI	- International Rice Research Institute - CGIAR
ICTA	- Instituto de Ciencia y Tecnología Agrícola (Guatemala)	ISHS	- International Society for Horticultural Sciences
IDESSA	- Institut des savanes (Ivory Coast)	ISNAR	- International Service for National Agricultural Research - CGIAR
IDRC	- International Development Research Centre (Canada)	ISSCT	- International Society of Sugar Cane Technologists
IGF	- International Genetic Federation	ISTA	- International Seed Testing Association
IICA	- Instituto Interamericano de Cooperación para la Agricultura - OAS	IUBS	- International Union of Biological Sciences
IIRB	- Institut international de recherches betteravières	IUCN	- International Union for the Conservation of Nature and Natural Resources
IITA	- International Institute of Tropical Agriculture - CGIAR	IVRAZ	- Institut voltaïque de recherche agricole et zootechnique (Upper Volta)
ILCA	- International Livestock Centre for Africa - CGIAR	IVT	- Institute for Horticultural Plant Breeding (Netherlands)
ILRAD	- International Laboratory for Research on Animal Diseases	KPPNN	- National Committee for Germplasm Conservation (Indonesia)
INCAP	- Instituto de Nutrición de Centro América y Panamá (Guatemala)	LBN	- National Biological Institute (Indonesia)
INENCO	- Instituto de Energía no Convencional (Argentina)	LCTAP	- London Cocoa Trade Amazon Project (UK)
INIA	- Instituto Nacional de Investigaciones Agrarias (Spain)	LISA	- Laboratory for Information Science in Agriculture (USA)
INIA	- Instituto Nacional de Investigaciones Agrícolas (Mexico)	MARDI	- Malaysian Agricultural Research and Development Institute (Malaysia)
INIAER	- Instituto Nacional de Investigação Agrária e de Extensão Rural (Portugal)	MIDINRA	- Ministerio de Desarrollo Agropecuario y Reforma Agraria (Nicaragua)
INIAP	- Instituto Nacional de Investigaciones Agropecuarias (Ecuador)	NARC	- National Agricultural Research Centre (Pakistan)
INIPA	- Instituto Nacional de Investigación y Promoción Agropecuaria (Peru)	NBGR	- National Bureau of Plant Genetic Resources (India)

NGB	- Nordic Gene Bank		(ECP/GR)
NIAVT	- National Institute for Agrobotany Variety Testing (Hungary)	SPC	- South Pacific Commission (New Caledonia)
NIHORT	- National Horticultural Research Institute (Nigeria)	SVP	- Foundation for Agricultural Plant Breeding (Netherlands)
NPGRL	- National Plant Genetic Resources Laboratory (Philippines)	TAC	- Technical Advisory Committee - CGIAR
NRC	- National Research Council (Canada)	TCC	- Technical Consultative Committee (ECP/GR)
NSSL	- National Seed Storage Laboratory (USA)	TISTR	- Thailand Institute of Scientific and Technical Research (Thailand)
NVRS	- National Vegetable Research Station (UK)	UKM	- National University of Malaysia (Malaysia)
OAU	- Organization of African Unity	UNA	- Universidad Nacional Agraria, La Molina (Peru)
OIS	- Office Information Systems		
OIV	- Office international de la vigne et du vin	UNDP	- United Nations Development Programme
ORSTOM	- Office de la recherche scientifique et technique outre-mer (France)	UNEP	- United Nations Environment Programme
PARC	- Pakistan Agricultural Research Council (Pakistan)	UPLB	- University of the Philippines at Los Baños (Philippines)
PBI	- Plant Breeding Institute (UK)	USDA	- United States Department of Agriculture (USA)
PCA	- Philippine Coconut Authority (Philippines)	VIR	- N.I. Vavilov Institute of Plant Industry (USSR)
PGR	- Plant Gene Resources of Canada (Canada)	WARDA	- West African Rice Development Association - CGIAR
PGRC	- Plant Genetic Resources Centre (Ethiopia)	WICSCBS	- West Indies Central Sugar Cane Breeding Station (Barbados)
PHILSUCOM	- Philippine Sugar Commission (Philippines)	WLAC	- Western Luzon Agricultural College (Philippines)
RAPA	- Regional Office for Asia and the Pacific (FAO)	WWF	- World Wildlife Fund
RTI	- Royal Tropical Institute (Netherlands)	ZIGuK	- Zentralinstitut für Genetik und Kulturpflanzenforschung (German Dem. Rep.)
SAC	- Scientific Advisory Committee		

HIGHLIGHTS OF THE YEAR

- The IBPGR informed the CGIAR in 1983 that its work will include programme shifts to:
 - Reduce emphasis on general collection (except for specific situations) and give more attention to research on materials already collected;
 - Assess existing non-base collections to include their greater participation in the IBPGR global network;
 - Increase support for *in vitro* conservation;
 - Put greater emphasis on bringing scientific standards in institutes to internationally agreed levels;
 - Improve data gathering and data transference; and
 - Overcome constraints affecting movement of genetic material.
- The IBPGR is now cooperating with 100 countries and 580 key agricultural institutes. Thirty genebanks in 24 countries, half of which are in the developing world, have been designated to hold base collections of 34 crops or groups of crops.
- The five Crop Advisory Committees continued, in conjunction with the respective International Agricultural Research Centres (wheat with CIMMYT and ICARDA, rice with IRRI, maize with CIMMYT, sorghum and millets with ICRISAT and *Phaseolus* with CIAT), to liaise between the Board and the world community of scientists and breeders. The Wheat, Rice and *Phaseolus* Committees met in 1983.
- Five Working Groups (on cotton, *Hevea*, *Cacao*, barley and *Prunus* — the latter two held jointly with ECP/GR) met respectively to discuss gaps in collections, revise collecting priorities, implement steps to ensure that samples represent the spectrum of variability, and identify practical ways of accelerating characterization of collected materials.
- Following recommendations of the Advisory Committee on *In Vitro* Storage, the IBPGR inaugurated an international computerized data base and commissioned review work on temperate fruits and the potential of *Allium* for *in vitro* conservation. A subcommittee of the *In Vitro* Committee met to review novel collecting techniques.
- The Advisory Committee on Seed Storage met and agreed that international standards should be rigorously promulgated for genebanks.
- A consultation was organized to identify constraints affecting the collection and exchange of samples of wild species and primitive cultivars.
- The IBPGR established formal links with the 1984 *in situ* conservation campaigns of IUCN and WWF, particularly as it relates to wild relatives of crops.
- Programmes for crops continued to make progress in 1983:
 - During 1983 material was collected in 79 missions for:
 - 28 global priority 1 crops from 35 countries
 - 23 global priority 2 crops from 25 countries
 - 5 global priority 3 crops from 23 countries
 - A world survey of the genetic resources of sorghum and millets was published; crop reports on the genetic resources of *Capsicum*, cassava, Cucurbitaceae, okra and soyabean were published and reports on rice and eggplant were prepared.
 - Descriptor lists were published on cowpea, *Echinochloa* millet, kodo millet, grape, pear, *Phaseolus coccineus* and safflower; descriptor lists in preparation were grasses and forage legumes, almond, apricot (revised), banana (revised), cashew, cherry, *Citrus*, finger millet, papaya, peach, plum, *Phaseolus acutifolius* and wild *Phaseolus* species and several *Vigna* species. This brings to over 80% the crops of high IBPGR priority which will have descriptor lists available. Of these, 100% of the crops of global priority 1, 90% of the crops of global priority 2 and 50% of the crops of high regional priority are now covered.
 - A global plan of action for forages was finalized. Provision was made for the creation of forage working groups leading to an international advisory committee and enhanced ties with international and national programmes and training.

- Under conservation programmes
 - Scientific investigations were continued on seed physiology, on *in vitro* culture of banana, cassava and cacao; *in vitro* research was initiated on *Allium*, *Citrus* and taro.
 - The IBPGR began utilizing certain centres to distribute primitive and wild germplasm collected in IBPGR-supported missions to designated genebanks.
 - Funds for new storage facilities (or upgrading) were provided to CIMMYT, NIHORT, China, Colombia, Cuba, Ivory Coast and Kenya; equipment was sent to Bangladesh, Ecuador, Ghana, Greece, India, Ivory Coast, Kenya, Republic of Korea, Mozambique, Nicaragua, Niger, Papua New Guinea, Peru, Sudan, Togo, Thailand, Upper Volta and Uruguay.
- Under the information and data management programme
 - The Secretariat installed a data management computer system and upgraded its microcomputers.
 - Data bases were initiated on the status of collections in the IBPGR network, on *in vitro* culture, and on wild relatives of crops. Information on samples is also being compiled in IBPGR international or regional data bases on individual crops including apple, cotton, maize, okra, *Phaseolus*, *Prunus*, soyabean and sugarcane.
 - Microcomputers were installed in institutes in Cyprus, Hungary, Portugal, Trinidad and Yugoslavia.
 - Multiplication, evaluation and documentation of stored germplasm was initiated or continued with IBPGR support in numerous institutes world-wide.
- Under the training programme
 - Continued support was given to the post-graduate course on plant genetic resources at the University of Birmingham, UK and to the costs of students from developing countries to attend; nine technical short courses (on different aspects of germplasm conservation, seed physiology, seed technology and genebank management) hosted at various institutes were organized and funded.
 - IBPGR interns were recruited to begin work at AVRDC and ICARDA and at institutes in Papua New Guinea, Solomon Islands and Togo.
- Under regional activities
 - Phase II of the European Cooperative Programme came under the aegis of the IBPGR, which will direct the day-to-day work. The programme is funded half by UNDP and half by the participating governments.
 - An IBPGR-sponsored meeting of the countries of the Southern Cone of Latin America was held to refine crop priorities and assess collecting and training needs. A number of catalogues on maize germplasm held in these countries and in Andean countries were issued.
 - IBPGR missions to South and Southeast Asia reviewed the status of collecting and conservation in the regions.
 - Support to the Mediterranean region will be made on a crop basis and emphasis will be laid on field work in North Africa.
 - A new staff position of collector was created. In 1983 one collector was posted to Cyprus for North Africa and another to IRRI for rice in Asia.



CROPS

Introduction

The IBPGR, during almost a decade of work, has been instrumental in focusing awareness on the need for crop genetic conservation and has in practice precipitated a great deal of action world-wide on the collection of germplasm. This has been matched by the establishment of storage facilities to hold the materials.

These developments have come about largely through IBPGR support to national, regional and international programmes (including IARCs) devoted to crops.

One of the most striking results of the Board's activities has been the mobilization of the best scientific opinion so that the collection, conservation and documentation of samples can be targeted to address emergency situations and to fill important gaps in existing collections.

This has resulted in larger collections being available to breeders than have ever existed before in the history of plant breeding. The Board is grateful to the scientists who serve in this largely voluntary way.

The Board has continued to receive advice on five major crops from its Crop Advisory Committees in cooperation with the respective IARCs. These are a Rice Committee cosponsored by IRRI, a Maize Committee cosponsored by CIMMYT, a Sorghum and Millets Committee cosponsored by ICRISAT, a *Phaseolus* Committee cosponsored by CIAT, and a Wheat Committee cosponsored by CIMMYT with the participation of ICARDA.

In addition these Crop Committees also provide a bridge between the IBPGR and user communities; practicable advice is the end result. The IARCs have been very cooperative and those mentioned above, as well as CIP, act as important centres in the global genetic resources network.

The Board convenes *ad hoc* expert international working groups to obtain the best advice on action to be taken on other crops. In 1983 Working Groups were formed and consultations held to advise the Board on rubber, cotton and cacao. In addition a sub-committee met to consider the possibility of developing *in vitro* techniques for the collection of important clonally propagated crops. In the regional setting, joint IBPGR-ECP/GR working groups met for *Prunus* and barley during the year.

By the end of 1983 the Board had developed plans of action and started their implementation for **all global first priority crops and 85% of the global second priority crops** (in total covering 40 crops or groups of crops). In addition a great deal of work had been carried out on global third priority crops and a number of crops rating high priorities in the regions designated by the Board.

One of the major efforts of the Board in 1983 was an attempt to identify practical constraints, other than quarantine, affecting the collection and exchange of samples of wild species and primitive cultivars and to suggest improvements. Several such problems had been raised at the FAO/UNEP/IBPGR Technical Conference in April 1981. The consultation was organized by the IBPGR and held at Beltsville, USA, 14-15 March (see Appendix VII for participants).

The major constraints identified included those relating to the timing of collecting, lack of well-trained collectors, packaging procedures which cause delay in transmission of material, lack of adequate documentation, international quarantine restrictions, delays in identifying samples in storage through taxonomic verification and standardization of the duties of curators in genebanks. These items are presented in more detail in the IBPGR publication

Practical Constraints Affecting the Collection and Exchange of Samples of Wild Species and Primitive Cultivars (1983).

The Board also started the development of comprehensive computerized data bases on previous and ongoing world-wide activities under the auspices of all agencies and centres (p. 73) in the world network. The preliminary results led the Board to conclude that its work should be consolidated. In practical terms this will entail a slowing down in the overall collection on a wide basis and in the future much more effort will be directed toward post-collection activities especially characterization, documentation and the multiplication and duplication of samples in genebanks.

This does not mean that further collecting is not contemplated: general collecting in previously little or unvisited regions will still be needed. Further collecting in areas already covered will need to be more specific and is likely to be based on more intensive field work — ecogeographical survey followed by collecting over longer periods of time than hitherto.

The IBPGR is attempting to facilitate the distribution of germplasm collected under its auspices. In 1983 such a service was provided by the Seed Bank of the Royal Botanic Gardens, Kew, UK for collecting undertaken in Africa.

In addition the Board has noted that the amount of germplasm and wild species held in genebanks world-wide is extremely low. Collection of such material will be accelerated; work on rice and wheat started in 1983.

When the germplasm available in collections includes a sufficient representation of the primary and secondary (and even in some cases the tertiary) gene pools, then the Board and the scientific community will be in a much better position to discuss germplasm enhancement and use of genebank materials.

Other constraints identified appeared to stem from the practices of curators who do not always wish to publicize practical constraints stemming from lack of funds or manpower. In 1984 the Board intends to address this somewhat specialized forum with the aim of raising standards. A corollary to this will be the need to develop a second tier of the genebank network which has to date been concerned in the main with long-term storage. The active collections need to be assessed to see which can be formally accorded responsibilities as part of the Board's network. This too means attention to standards and this will be addressed in 1984.

The numbers of samples held in collections can be meaningless unless information is available on their variability, their uniqueness, and until collections have been rationalized by sorting out excessive redundancy. To give an example, estimates show that of the cereals in collections in Europe less than a quarter of the samples are unique. Such lack of critical analysis has led a part of the non-scientific media in the past few years to misinterpret the intentions of developed countries holding, voluntarily for the IBPGR, security collections of samples. This debate is likely to continue until more complete documentation is available.

CEREALS

In view of the importance of cereals as staple food crops the IBPGR allocates 25% of its funds available for practical work to collect, characterize and document samples of major species — wheat, rice, maize, sorghum, millets and barley.

During 1983 action was accelerated through the development of specific action plans for barley (ECP/GR Working Group) and the co-

sponsorship with IRRI of the Planning Workshop for rice genetic resources at which the IBPGR Advisory Committee on Rice participated. Other standing crop committees on maize, sorghum and millets continued to provide advice. The Wheat Advisory Committee met on the occasion of the International Wheat Genetics Symposium in Japan.

Much of the IBPGR's support in 1983 was

directed toward characterization and documentation of existing collections of cereals germplasm, in addition to the traditional support given to new collecting. Such support was provided to ICRISAT for minor millets (including computerization of the data), to Israel for barley and to Portugal for maize. In addition, the regeneration and rationalization of the working collection of wheat at CIMMYT is almost complete. ICARDA established a Crop Genetic Resources Unit in 1983 and is preparing a five-year programme, much of which will involve evaluation of collected material. As part of an IBPGR-supported project to characterize maize and make inter-racial composites in the Southern Cone of Latin America, maize catalogues were produced in 1983 which have evaluation data of germplasm held in Argentina, Bolivia, Paraguay and Uruguay.

The IBPGR wheat officer, appointed in 1982, was given responsibility for barley in 1983 and will begin organizing data on barley collections throughout the world. As in the case of wheat, a more complete understanding is necessary of the makeup of the barley collections, particularly in regard to redundancy, so that future collecting can be better targeted. ZIGuK will rationalize the barley collections held in Europe and the USDA has increased the entry of barley passport data on computer.

The Secretariat finalized two global status reports which will be published early in 1984. These will provide an overview of the work accomplished to date on sorghum and millets and on rice.

Two additional cereal descriptor lists were published in 1983, bringing to eight the lists now available for the major cereals: barley, *Echinochloa* millet, kodo millet, maize, pearl millet, rice, sorghum, wheat and *Aegilops*. Descriptor lists for finger millet and *Panicum* were finalized in 1983 and will be published in 1984. Directories of germplasm collections are available for barley, maize, rice, sorghum and millets, and wheat.

Cereals with lower global priorities, e.g. rye, oats, and minor grains such as quinoa and amaranths, continue to receive attention in a regional context. Descriptor lists have been published for amaranths and quinoa.

Collection activities for cereal crops during 1983 are shown on a country basis in Figure 1.

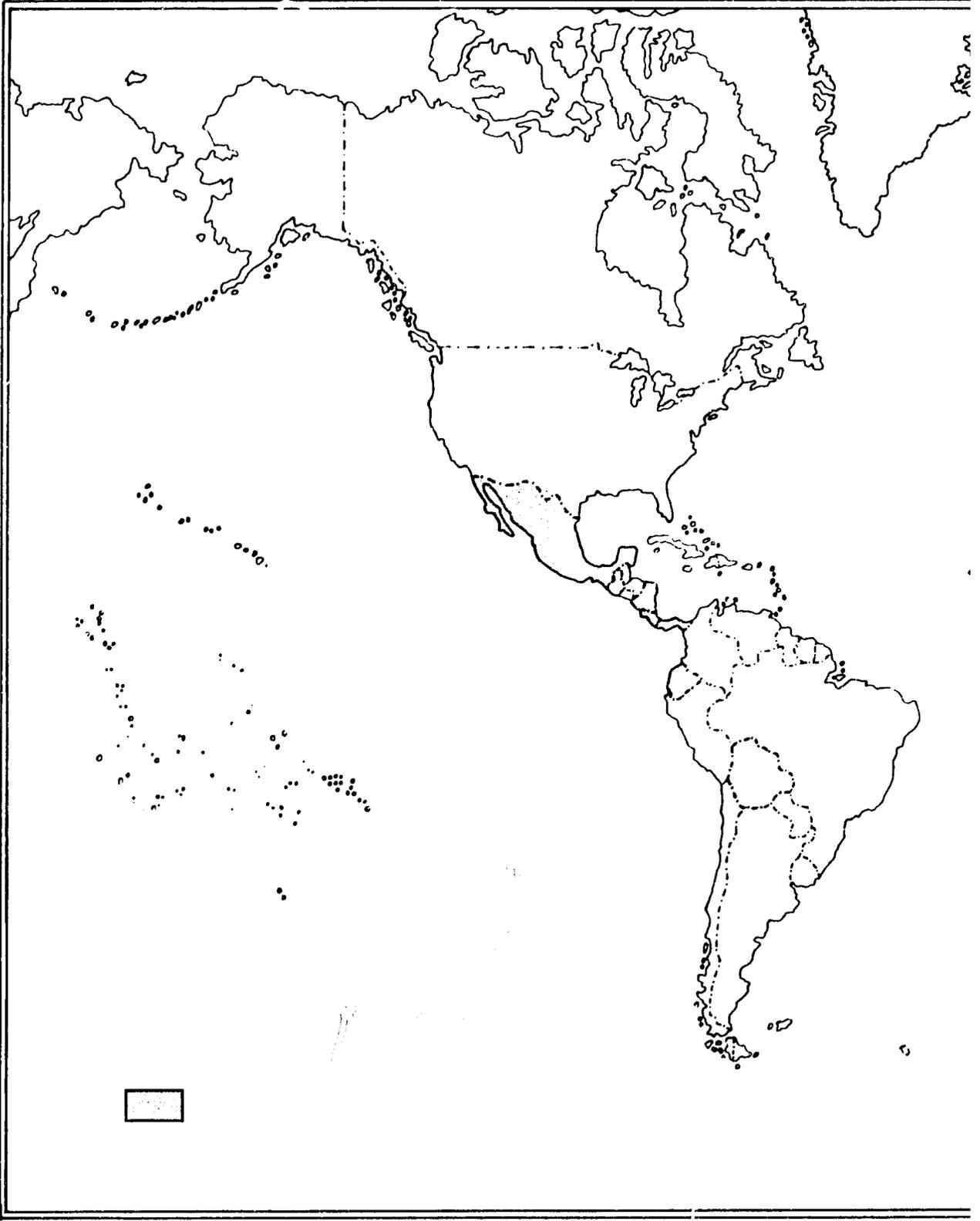
WHEAT

Work on wheat developed considerably during 1983, and the fourth meeting of the IBPGR Wheat Advisory Committee met in Kyoto, Japan in December 1983 following the Sixth International Wheat Genetics Symposium. Those attending included, for the first time, representatives of China and the German Democratic Republic.

A detailed survey was prepared of the wheat collections from the developing countries of the Mediterranean, East Africa and Southwest Asia for examination at the Advisory Committee meeting. The difficulties of this sort of work have been greatly eased where information has been available on computer tapes, enabling its manipulation for particular purposes, e.g. sorting by countries or species. Access to USDA computer facilities and the help



Wild *Aegilops*, Afghanistan



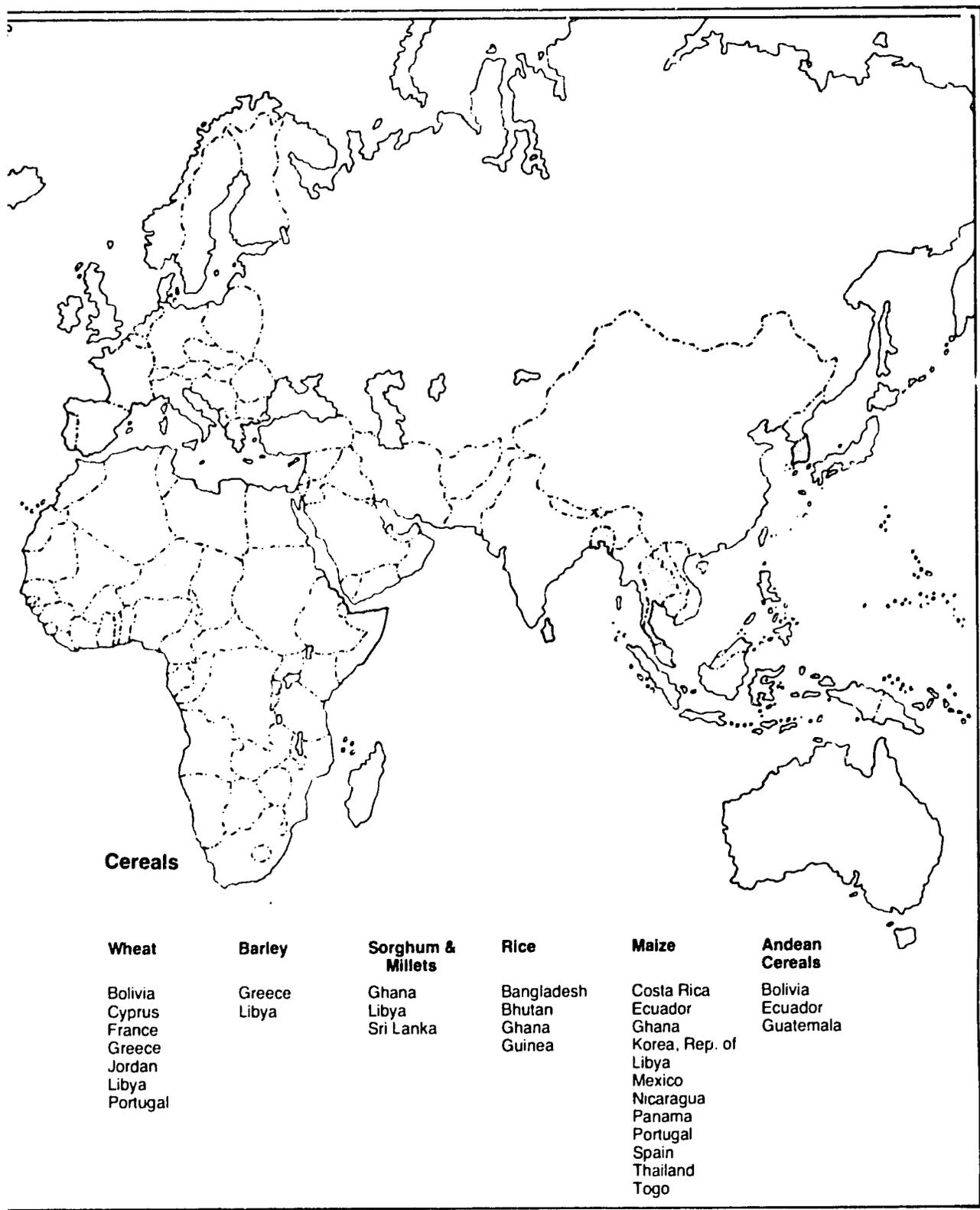


Figure 1. Countries where the IBPGR organized or collaborated in collecting cereals during 1983

of a programming assistant have been especially valuable in this respect. In addition, the large number of mission reports from recent years has more clearly enabled the monitoring/tracing of material to and among collections. Much of the duplication among collections, therefore, could be identified and discounted.

As might be expected, identifying duplicates has lowered the numbers of accessions apparently collected from some countries as listed in the IBPGR publication *A World Survey of Wheat Genetic Resources*. On the other hand, the more detailed and recent listings available raised the figures in others. Within the area surveyed over 33 000 samples had been collected, the great majority being landraces.

These data were also related to the areas where wheat grew in the period 1948-52. They were chosen to reflect the traditional wheat-growing areas before the advent of the high-yielding varieties, so that the intensity of collecting in each country could be gauged. This ranged from one sample for every 53 ha in Ethiopia to one for every 5 850 ha in Morocco. These figures can serve as a guide to priorities for future collecting, though other important factors also need to be taken into account.

The revised priorities set by the Committee for further collection of cultivated material are provided in Figure 2 and Table 1. Owing to the collecting missions of recent years, the priority status of a number of countries has changed.

Wild material continues to be underrepresented in collections, although the Committee did not think it was seriously threatened by genetic erosion at present. The need is rather that more be available for use by breeders and researchers. A major contribution to the collection and identification of wild material has been the publication of *A Guide to the Species of Aegilops L.* by the IBPGR in 1983. A companion volume on the wild species of *Triticum* is planned.

The Committee recommended that a survey of the wild species be carried out as a basis for planning future collecting. In addition interest is being taken in other members of the Triticeae and in preserving wild \times cultivated material for further breeding work.

With the improvement in the amount of wheat germplasm collected, the emphasis is shifting toward the post-collection phases of

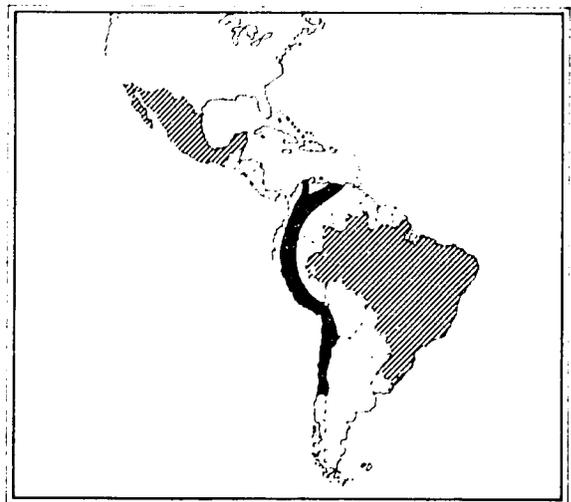
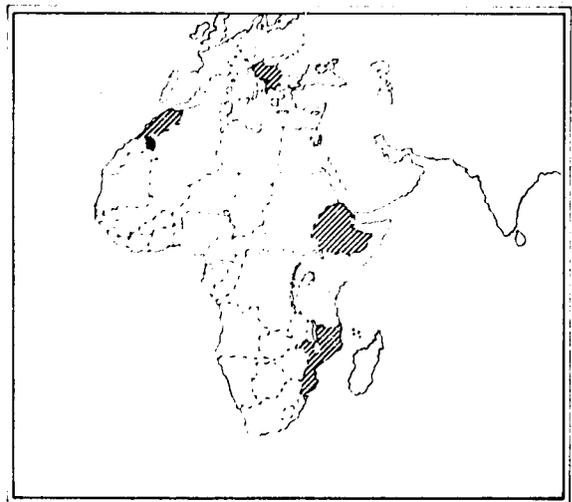
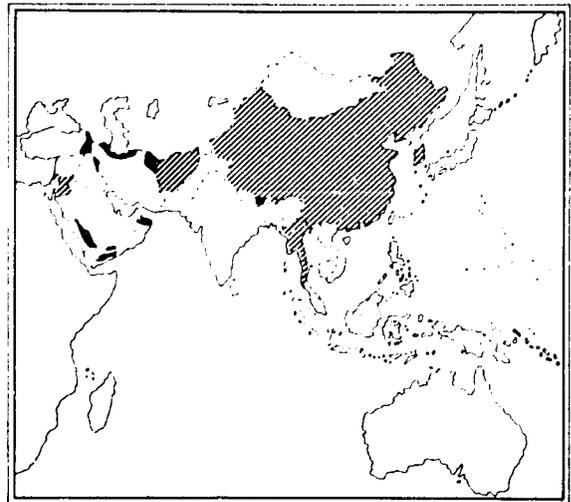


Figure 2. Priority areas for wheat collecting (Dec. '83).

Table 1. Priority areas for wheat collection (Dec. '83)

Priority 1				
Mediterranean				
Albania				
Algeria			Tindouf area	
Morocco			Landraces seriously threatened	
Yugoslavia			For <i>T. monococcum</i>	
Southwest Asia				
Iraq			Sulaimaniya region only	
Jordan				
Lebanon				
Oman			Mountainous areas	
Saudi Arabia			Mountainous areas	
Turkey			Areas of east and southeast	
Yemen, Democratic			Mountainous areas	
Central Asia				
Afghanistan			Areas as yet unexplored	
Iran			Azerbaidzhan, Elburz mountains, Mashad	
East Asia				
Korea, Rep. of				
Priority 2				
Africa				
Ethiopia			Has an active, continuing national programme	
Mozambique			Status of collection at INIA needs to be investigated	
South Asia				
Bhutan			Collecting planned for 1984	
Burma			Capture adaptive variability developed in that country since Indian wheats were introduced	
Nepal			Western hill regions	
East Asia				
China			Continuing programme at national level	
South America				
Bolivia			Andean area	
Brazil				
Colombia			Andean area	
Ecuador			Andean area	
Mexico				
Peru			Andean area	
Venezuela			Andean area	
Regions thought to have been adequately collected (Countries in parenthesis still have certain areas to be collected: see above)				
Mediterranean		East Africa		Southwest & Central Asia
Algeria	Libya	Sudan	(Iraq)	India
Cyprus	Portugal		Israel	(Nepal)
Egypt	Spain		Pakistan	
Greece	Tunisia		Syria	
Italy	(Yugoslavia)		(Turkey)	
			Yemen AR	
Countries for which more information is needed				
Korea, PDR		Mongolia	USSR	

work. These include maintenance and regeneration, documentation, evaluation and seed distribution. Few of the major collections handle all of these aspects well, though particular collections may excel in some respects. The IBPGR is willing to assist in the resolution of these problems if approached, but in many cases the difficulty is one of outlook rather than resources.

A survey of the distribution of wheat material from the major collections has been carried out. This showed that in 1982 over 100 000 samples were sent out, about two-thirds in response to domestic, and one-third to foreign requests. The majority — over 70% — of the distributions among countries were carried out by the National Small Grains Collection, Beltsville, USA.

It has been agreed to complete the already extensive duplication between the collections at Beltsville and Bari, Italy. The duplication of the Kyoto collection of wild material at Tsukuba, Japan should be completed during 1984. Arrangements are also being made to duplicate the important wild collection held at Riverside, California.

One major deficiency with most collections is the lack of information on further evaluation. This sort of work is often beyond the facilities of a genebank. It would help, however, if breeders and other research workers returned data on the samples they have screened to the genebank.

Work at the two IARC's with wheat as a mandate crop moved forward. The regeneration and rationalization of the working collection at CIMMYT is almost complete. Work on establishing a computer data base linked into the breeders' systems is proceeding. At ICARDA the recently established Crop Genetic Resources Unit is preparing a five-year programme of collection and evaluation.

During 1983 the IBPGR assisted a number of missions that collected wheat material.

A mission with ARI, Cyprus collected 166 samples of *Aegilops* in the south of **Cyprus**. Another mission for *Aegilops* with ENSAM, Montpellier, France collected a total of 40 samples (*A. macrochaeta* 3, *A. ovata* 17, *A. triaristata* 10 and *A. triuncialis* 10) in south-eastern **France** during June and July. Material of both missions was sent to the Royal Botanic Gardens, Kew, UK for further distribution.

The Greek Gene Bank, Thessaloniki, **Greece** visited the islands of Limnos, Lesbos, Chios and Samos and collected *Aegilops* 36, *Triticum aestivum* 8, *T. boeoticum* 5, and *T. turgidum* 24. During 1983 wild material and landraces were also collected in **Jordan**.

A collection mission in southern **Portugal** with INIAER took place during June. Material was kept by INIAER and duplicates were sent to INIA, Spain.

A joint mission with the Istituto del Germoplasma, CNR, Bari, Italy and ZIGuK, Gatersleben, GDR collected from the Fez and Tripoli areas of **Libya** in April-May. A total of 64 populations of wheat and wild relatives was collected (*Aegilops* 3, *Triticum aestivum* 58, and *T. durum* 3). The samples were sent to the IBPGR-designated base collection in Bari and duplicates were left at ARC, Libya and sent to ZIGuK, Gatersleben.

A total of 82 samples of *Triticum* spp. was collected by CIF, Pairumani, Bolivia during 1983 (the second of a three-year collecting programme) in **Bolivia**. The samples were gathered from the three distinct geographical areas of the country. The tropical zone (500-1 500 m), the temperate valleys (1 500-3 000 m), and the high valleys and plateaux (3 000-4 000 m). A set of the samples has been deposited in the active collection at Pairumani and a duplicate set will be sent to the IBPGR-designated base collection.

Exploration continues with the national programmes of China, Ethiopia and India. Despite the political situation which limits exploration in some areas, further collecting of wild and cultivated material is envisaged in France, Italy, Jordan, Morocco, Syria and Turkey, the Arabian peninsula and Iran, and South America.

BARLEY

During 1983 it was agreed that work on barley needed to be accelerated. Accordingly, the IBPGR Wheat Officer was asked to take on the responsibility for barley as well, particularly since both crops are frequently held in the same institutes.

A specialist Barley Working Group was convened as part of Phase II of the UNDP/IBPGR European Cooperative Programme (ECP/GR), 18-19 May 1983 at ZIGuK, Gatersleben, German Democratic Republic, to assess action needed in Europe. A list of participants is given in Appendix VI.

The working group provided data on the representation within European collections including information on wild species and special lines. Although at present there are about 85 000 accessions of barley in European collections, approximately 60 percent are duplicates. Besides the European collections important ones also exist in Canada, Ethiopia, Japan and the United States. It was recognized that the genebank at Gatersleben should act as a first step in the development of a European Barley Inventory. This work began in 1983. Data on collections at the PGRC, Ethiopia and ICARDA would also be linked by the IBPGR to the central data base at Gatersleben. The IBPGR provided advice on documentation to Gatersleben in order to facilitate the heavy workload expected.

Outside of Europe work on barley evaluation and documentation also moved forward. Data on collections at PGRC, Ethiopia and ICARDA will be standardized and the USDA Small Grains Collection has also increased the entry of barley passport data into its data base. The IBPGR Wheat and Barley Officer started to gather data from numerous other collections in many parts of the world as a first step toward their rationalization.



Covered two-rowed barley, Jordan (J R. Witcombe/IBPGR)

Toward the end of 1983 the IBPGR provided a grant to the genebank in **Israel** for multiplication and characterization of barley germplasm in order to deposit duplicate samples for safety in the IBPGR-designated base collections.

The IBPGR supported several collecting missions for barley during 1983. The Istituto del Germoplasma, Bari, Italy and ZIGuK, Gatersleben, German Democratic Republic, in collaboration with ARC, Libya explored the Tripoli and Fez areas of **Libya** for cereals and grain legumes during April-May 1983 and collected 48 samples of *Hordeum vulgare*. In June 1983, the Greek Gene Bank, Thessaloniki collected *Hordeum* germplasm from the islands of Limnos, Lesbos, Chios and Samos in the east Aegean region of **Greece**. The material collected included *H. spontaneum* 26 and *H. vulgare* 5.

The Genetic Resources Unit of ICARDA, with some financial support from the IBPGR, has initiated the characterization and evaluation of barley germplasm. In 1983 data were recorded on about 5 000 accessions for 22 characteristics. All information recorded during evaluation is being computerized. ICARDA plans to continue this characterization of 14 000 accessions through 1985 and to set up a global data base.

The PGRC, Ethiopia, has also started the evaluation of barley germplasm.

SORGHUM AND MILLETS

Since the establishment of ICRISAT and the IBPGR a decade ago, considerable progress has been made in the collection of sorghum and pearl millet germplasm from the centres of diversity in Africa and India. The world collection at ICRISAT contains 22 500 sorghum and 15 500 pearl millet accessions. Besides these, the collection at ICRISAT also includes 1 450 finger millet, 1 200 foxtail millet (*Setaria italica*), 750 proso millet (*Panicum miliaceum*), 250 little millet (*Panicum samatrense*), 400 barnyard millet (*Echinochloa crusgalli*) and 300 kodo millet (*Paspalum scrobiculatum*). Although the major portion of this germplasm is currently conserved in medium-term storage,



(F. Bous FAO)

it is envisaged that by the end of 1984 long-term storage chambers will be operational.

During 1983 the Genetic Resources Unit of ICRISAT fielded expeditions in India, northern Nigeria, southern Sudan, Malawi, northern Cameroon and Sierra Leone and collected sorghum and millets including some wild relatives. Besides collecting, ICRISAT also continued its work on characterization and evaluation. The IBPGR provided funds to assist ICRISAT in the characterization and documentation of minor millets. This work will continue through 1985. Characterization and evaluation is well under way and by the end of 1983 data on about 16 670 sorghum, 10 000 pearl millet and 1 440 *Setaria* and *Panicum* accessions were recorded in data bases.

During 1983 the IBPGR supported collection of sorghum and millets in several areas. CRE, Bunso, **Ghana**, fielded a multi-crop collecting mission between November 1982 and January 1983 which collected 61 samples of

sorghum. The Agricultural Experiment Station at Nyankpala has undertaken the multiplication and distribution of duplicates to ICRISAT. During another multi-crop collection mission in **Libya**, 19 sorghum and 10 pearl millet accessions were collected in April-May. During 1983 the Department of Agriculture, **Sri Lanka**, commenced the collection of local landraces of finger millet; this work will continue in 1984.

The IBPGR Secretariat finalized *A World Survey of Sorghum and Millets Germplasm* which will be published as a tenth anniversary series monograph. This world survey examines the existing collections of sorghum and millets in order to identify gaps and inadequacies, thereby providing a basis for the formulation of recommendations for further collecting. In 1983 descriptor lists for *Echinochloa* millet and kodo millet were published and those for finger millet and *Panicum* species will be published in 1984.

RICE

A Workshop on the Conservation of Rice Germplasm was organized by the IBPGR and IRRI to review progress made since 1977 in the collection and conservation of rice genetic resources and to develop a plan of action for the field work necessary to assemble the uncollected germplasm from around the world. It was held at IRRI headquarters, Los Baños, the Philippines from 25-26 April 1983 and was attended by 60 participants representing 23 countries of Africa, Asia, Europe, the Americas and eight regional and international organizations. The members of the IBPGR/IRRI Advisory Committee on Rice germplasm also participated.

An earlier Workshop (held in 1977) had formulated a five-year (1978-82) plan of action which has led to the collection of 13 400 distinct seed samples from 14 countries in Asia. Another result of the direct participation of IRRI and the IBPGR in collecting germplasm and the collaboration of various national institutions in Asia was that during the same period IRRI received an additional 16 500 accessions from other countries. Similarly in Africa, with the lead of IBPGR and collaborative efforts of numerous international regional and national organizations (IITA, IRAT, ORSTOM, WARDA etc.), over 7 000 samples from 23 African countries were collected. The new collections have not only enriched both national repositories and the base collections maintained at IRRI and IITA, but have provided new material for breeding and added security to rice germplasm conservation.

During the Workshop (1983), the Chairman of the IBPGR, Prof. L. Kähre, presented a keynote address on behalf of the IBPGR and urged the Workshop to take stock of the current situation of rice germplasm collections and develop a clear action programme. Dr. M.S. Swaminathan, Director General of IRRI, outlined the main objectives, and representatives from various national programmes presented reports. The agenda also included discussions on the conservation of wild species of *Oryza*, collaborative efforts on exchange and preservation at duplicate sites and seed storage studies.

In order to assist in formulating a plan of



action, sub-groups were formed and proposals were prepared for field collections in 1983-87 in countries in South Asia, Southeast Asia and Africa. Details are available in the proceedings of the *1983 Rice Germplasm Conservation Workshop* published during the course of the year.

In March 1983 the Board of Trustees of IRRI established an International Rice Germplasm Centre (IRGC) in place of the former Genetic Resources Programme and Dr. T.T. Chang was appointed to head the new Centre.

During the year the IBPGR, in addition to providing funds to IRRI to meet in-country costs in their joint collection programme, funded the post of an IRRI/IBPGR Rice Collector to assist national programmes. Since taking up this post the collector has participated in missions in Bangladesh and Bhutan. In **Bangladesh** 91 accessions were collected during August-September from five districts comprising 71 Aus, 17 Aman and 3 Boro types. In **Bhutan** during October-November 84 samples of high altitude cold-tolerant landraces were

collected. Of this collection 23 samples were from altitudes above 2 000 metres.

The IBPGR also provided financial support for other collecting missions during 1983. IRAT and ORSTOM, in collaboration with IDESSA and the Guinean Ministry of Agriculture, visited upper **Guinea** and the Fouta Djallon areas from November 1982 to January 1983. A total of 770 accessions was collected during this multi-crop mission including *Oryza sativa* (573), *O. glaberrima* (172) and 25 wild species. The materials collected have been shared by the Guinean Ministry of Agriculture, the International Rice Research Institute, the International Institute of Tropical Agriculture, the West African Rice Development Association and IRAT/IDESSA.

CRI, **Bunso, Ghana**, fielded a multi-crop collecting mission from November 1982 to January 1983 in which *O. sativa* (54) and a few samples of *O. longistaminata* were collected. The Agricultural Experiment Station, Nyankpala, Ghana received this collection for multiplication.

MAIZE

Since 1977 the IBPGR has supported the systematic collecting of maize landraces in Argentina, Bolivia, Brazil, Chile, Rep. of Korea, Paraguay, Peru, Portugal, Spain, Thailand and Uruguay. Maize has also been collected as part of multi-crop collecting missions in many other parts of the world. Duplicates of all samples collected are being deposited at the IBPGR-designated base centre (see Table 12).

In 1980 the IBPGR began to support a regional cooperative project to characterize and make inter-racial composites of the germplasm collected from Peru and the Southern Cone of Latin America and to help with data organization. This project will result in the publication of maize catalogues that include evaluation data for Argentina (1983), Bolivia (1983), Brazil (1984), Chile (in press), Paraguay (1983), Peru (1984) and Uruguay (1983).





Quinoa, Bolivia

During 1983 the IBPGR also supported the Experimental Station of Braga, INIAER, **Portugal**, to evaluate maize samples collected in the country in previous years.

During 1983 maize collecting was supported by the IBPGR in several countries. In the **Republic of Korea**, the Chung-Nam National University, Daejeon continued to collect local landraces of maize in the eastern and southern parts of the country. In **Spain** INIA continued collecting activities initiated in 1981 to cover the entire country. During 1983, 18 samples of maize were collected in Andalucía and 30 samples in Guipúzcoa. In **Thailand**, the Institute of Field Crops, Bangkok, collected 157 samples of maize from throughout the country.

Additional samples of maize were also gathered during multi-crop collecting missions supported by the IBPGR in: **Costa Rica and Panama** 31, **Ecuador** 22, **Ghana** 29, **Libya** 11, **Mexico** 35, **Nicaragua**, **Portugal** and **Togo**.

A training course on Maize Germplasm Collection and Handling was organized for IBPGR in 1983 by the Maize Research Institute, **Yugoslavia**. Scientists from Czechoslovakia, Egypt, Greece, Hungary, Mali, Poland, Spain,



Amaranths collected in Latin America by IBPGR in 1983

Togo, Turkey, Upper Volta and Yugoslavia attended.

ANDEAN CEREAL CROPS (OTHER THAN MAIZE)

Quinoa (*Chenopodium quinoa*), cañihua (*C. pallidicaule*), and coimi (*Amaranthus caudatus*) are among the grains of high local importance as food crops in the Andean region. Since 1978 the IBPGR has assisted national and regional institutes to collect these crops and in 1983 the following germplasm was collected.

In **Ecuador** INIAP collected 325 samples of *C. quinoa* and 132 samples of *Amaranthus* spp. in the Andean areas. *Amaranthus* spp. was also collected in **Bolivia** 30 and **Guatemala** 29 as part of multi-crop collecting missions. In **Peru**, IDRC Ottawa, Canada supported the collection of 73 samples of *C. quinoa* and a few samples of *C. pallidicaule* and *Amaranthus* spp. IDRC also financed the evaluation of a number of collections of Andean cereals.

FOOD LEGUMES

From its inception the IBPGR has been involved in the conservation of legume germplasm and in its current five-year plan approximately 15% of the funds available for practical work are allocated to this group of crops.

At present grain legume yields are well below optimum levels, especially in comparison to cereals, and as such, there is a greater need for improvement of food legume crops through the utilization of genetic diversity. Whereas genetic erosion has been recognized most in cereals since the mid-1960s, there is now evidence that in the traditional legume growing areas genetic erosion is becoming more serious.

The Board has close links with the IARCs whose mandates include legumes, viz: CIAT (*Phaseolus* beans); ICARDA (chickpea, *faba* bean and lentils); ICRISAT (chickpea, groundnut and pigeonpea) and IITA (cowpea, lima bean and soyabean). In addition to the IARCs, the IBPGR works with two other international institutes, AVRDC (mung bean and soyabean), and INTSOY (soyabean), as well as with numerous national programmes. During 1983 the *Phaseolus* Advisory Committee held its fourth meeting.

Collecting activities for food legume crops continued in 1983 in many parts of the world (see Fig. 3). In addition, a great deal of work on multiplication and deposition of duplicate samples in IBPGR-designated base centres (with their concomitant characterization and documentation) was initiated during 1983.

PHASEOLUS

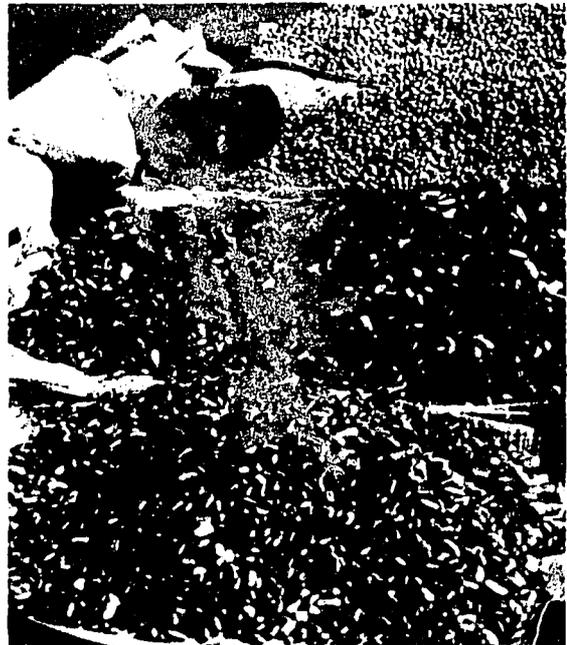
The *Phaseolus* Advisory Committee held its fourth meeting 21-23 July at the Institut für Angewandte Botanik, University of Hamburg, Federal Republic of Germany. After review of

recent collecting, the priority areas for grain *Phaseolus* were revised and priorities for green *Phaseolus* established (Fig. 4 and Table 2). In addition it was agreed that more emphasis should be given to collecting wild species.

The Committee also analysed constraints faced at present by the institutes designated by the IBPGR as base collections and made a number of recommendations.

CIAT continued collecting in Latin America in 1983 with IBPGR support. Through CENARGEN/EMBRAPA, a total of 237 samples of *P. vulgaris* and 11 of *P. lunatus* was collected in the states of Pernambuco and Santa Caterina, **Brazil**.

The Universidad Nacional de Huanuco, **Peru** continued extensive collecting begun in 1982. A total of *P. vulgaris* (1 115), *P. lunatus* (74) and *P. polyanthus* (18) samples from the departments of Ancash, la Libertad, Lambayeque, Cajamarca, Amazonas, San Martín, Huanuco, Pasco, Junín, Lima, Ica, Arequipa,



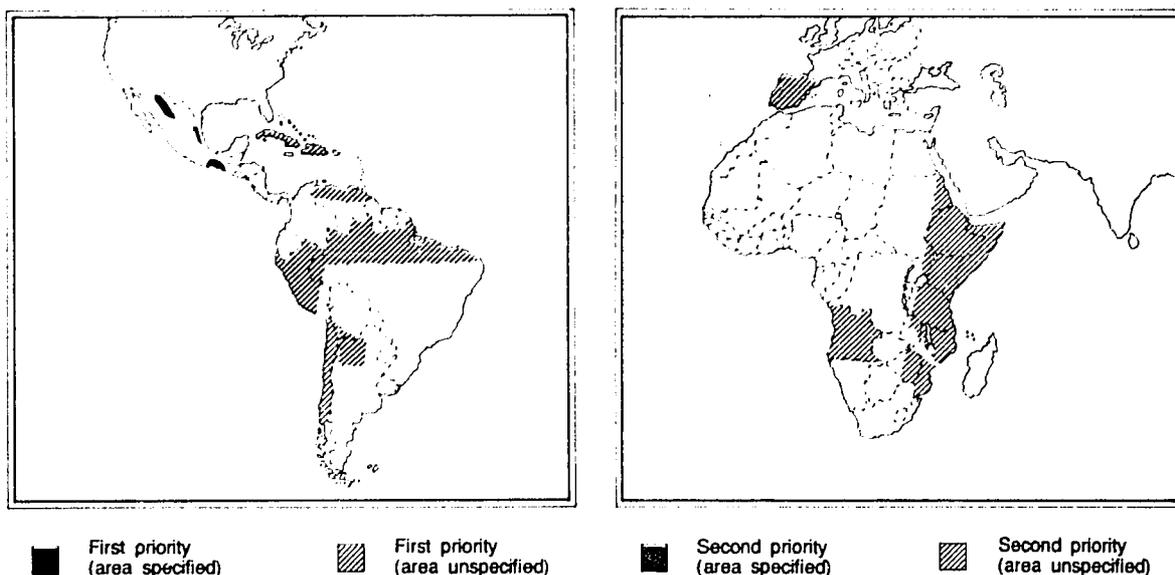


Figure 4. Priority areas for *Phaseolus* collecting (July '83)

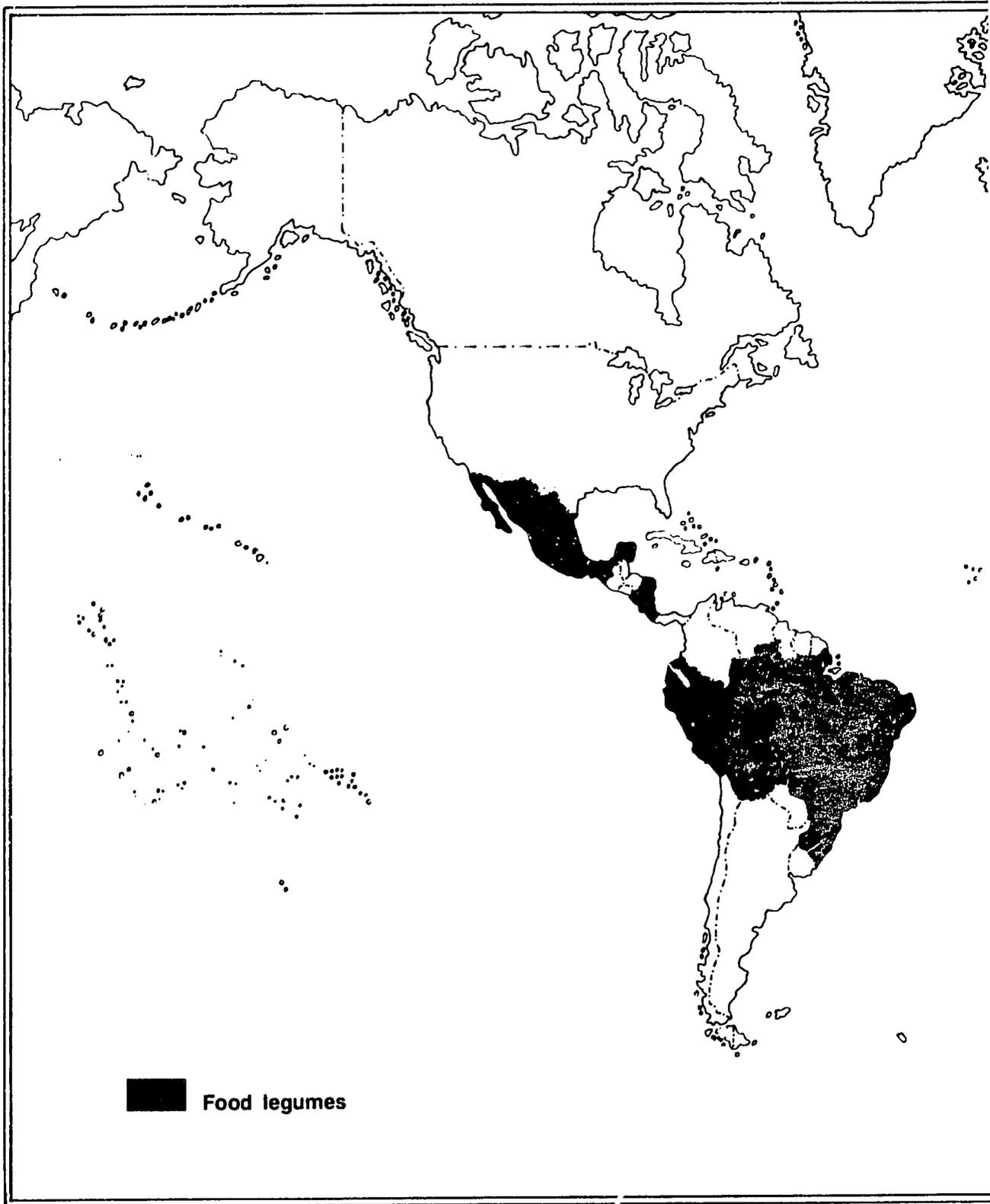
Table 2. *Phaseolus* collecting priorities (Aug. '83)

Priority 1 (for grain <i>Phaseolus</i>)	
Mexico	— Oaxaca area — Northern Sierra Madre Occidental of Chihuahua and Sonora — Eastern region of San Luis Potosi and adjacent states
Cuba, Dominican Republic, Haiti and Venezuela (northern)	— (mainly for <i>P. vulgaris</i> , <i>P. lunatus</i> and <i>P. polyanthus</i>)
Brazil (northern) and Peru	— (mainly for <i>P. lunatus</i>)
Argentina (northwest), Chile (north-east) and Bolivia (southwest)	— (for <i>P. lunatus</i> , <i>P. aborigineus</i> and <i>P. augustii</i>)
Iberian peninsula	— (mainly for <i>P. vulgaris</i>)
Priority 2 (for grain <i>Phaseolus</i>)	
Chile and Ecuador (Galapagos islands)	— (mainly for climbing types of <i>P. vulgaris</i>)
Angola, Mozambique and East Africa	
Priority 3 (for green vegetable <i>Phaseolus</i>)	
Chile	— mainly in Valdivia
Italy, Portugal, Spain, Switzerland (Alpine villages) and UK	— (old landraces)

Puno, Cuzco, Apurimac and Puquio was collected 1982-83.

During multi-crop missions supported by the IBPGR in 1983, *Phaseolus* germplasm was collected in many countries. The CIF, Pairumani, **Bolivia** collected 68 samples as part of a three-

year multi-crop collecting mission. In **Brazil**, CENARGEN also collected 15 samples of *P. lunatus* during an *Arachis* expedition in the northeast. In the southern Talamanca mountains of **Costa Rica** and **Panama**, CATIE gathered 36 samples of *Phaseolus* spp. In



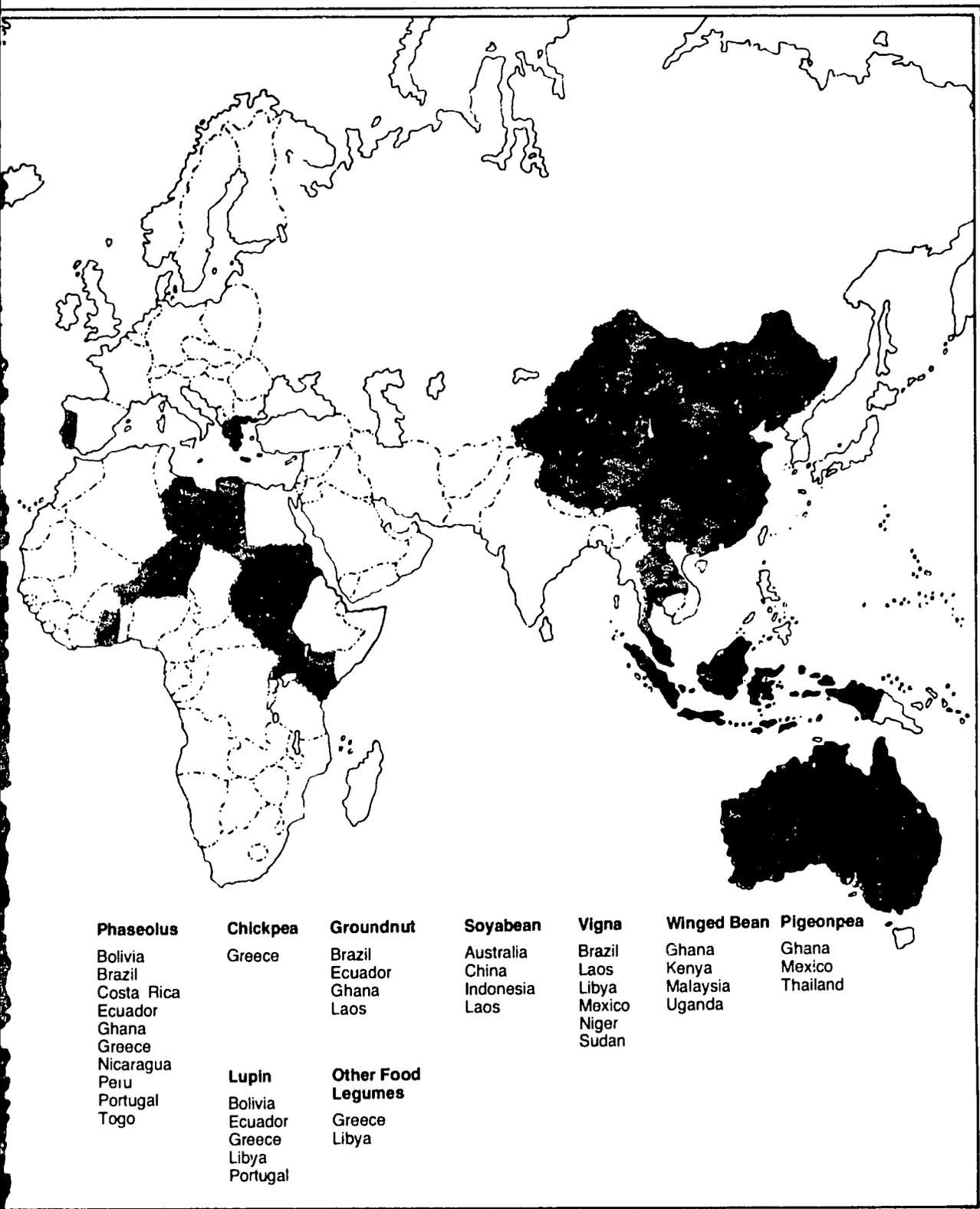


Figure 3. Countries where the IBPGR organized or collaborated in collecting food legumes during 1983

Ecuador, INIAP collected 12 samples of cultivated *Phaseolus* in the Andean zone. In **Ghana**, CRI, Bunso collected 20 samples of *P. lunatus*. In **Greece**, the Fodder Crops and Pastures Institute, Larissa collected *P. vulgaris* (49) from Epirus, Evia and Macedonia. In another collecting mission in Greece, the Tobacco Institute, Drama gathered *P. vulgaris* (74) from eastern Macedonia and Thrace. In **Mexico**, the Universidad Autónoma Chapingo collected 54 samples of *Phaseolus* spp. during a multi-crop collection in the Yucatán peninsula. The Programa de Semillas, MIDINRA — in cooperation with the Universidad Autónoma Central collected *Phaseolus vulgaris* during a multi-crop collecting mission in the III and IV regions of **Nicaragua**. In **Portugal**, INIAER carried out two collecting missions that included *Phaseolus*, one to the province of Alentejo and Algarve and the other to the islands of Madeira and Porto Santo. In **Togo** the Direction de la recherche agronomique, Lomé collected *Phaseolus* during a multi-crop collecting mission.

During 1983 the IBPGR published the descriptors for *Phaseolus coccineus* and lists were under preparation for *P. acutifolius* and for wild *Phaseolus* species.

The IBPGR continued to support the project initiated in 1982 by the Faculté des sciences agronomiques de l'Etat, Université de Gembloux, **Belgium** to analyse the available plant genetic resources data for *P. vulgaris* toward the preparation of a full global status report. In 1983 the work focused on creating a single data base of passport and evaluation data from numerous different germplasm collections.

CHICKPEA

The Genetic Resources Unit of ICRISAT — the IBPGR-designated base centre — currently holds a total of 12 336 accessions of chickpea. The majority of the samples has been characterized and evaluated and passport and other data computerized. ICRISAT has prepared a list of descriptors for chickpea which is being circulated to experts for comments and it is expected that it will be published in the near future.

During 1983 ICARDA published a *Kabuli Chickpea Germplasm Catalogue* with the assistance of the IBPGR Technical Officer for the Southwest Asian Programme. About 3 400 accessions from 31 countries have been evaluated for 29 descriptors.

Through field activities of the Fodder Crops and Pasture Institute, Larissa, **Greece**, with funding from the IBPGR, 46 accessions of *Cicer arietinum* were collected in Macedonia and the Peloponnesus in July and November 1983. These accessions are being multiplied before depositing in the IBPGR-designated base centre. In another mission, the NBPGR explored Lahul and the Spiti valley of Himachal Pradesh in India and collected a few samples of *C. microphyllum*.

GROUNDNUT

Since 1976 the IBPGR has been active in collecting and conserving *Arachis* germplasm and has developed close links with several national and international organizations including: ICRISAT; CENARGEN/EMBRAPA; USDA-ARS; Texas A & M University; North Carolina State University; INTA, Argentina; Universidad Nacional del Nordeste, Argentina; INIAP, Ecuador and several other national programmes.

In **Brazil** CENARGEN/EMBRAPA has continued its collection, characterization, documentation and conservation of *Arachis* germplasm. The IBPGR has provided funds to EMBRAPA for the collection and maintenance of germplasm of wild species. Of the 1 300 accessions of *A. hypogaea* in the EMBRAPA collection, about half has been collected during the period of IBPGR assistance. About 800 accessions have been characterized during 1981-83 using the IBPGR/ICRISAT descriptor list and the data have been computerized. In addition to cultivated groundnut, EMBRAPA has a collection of 260 accessions of wild species, which represent 50 of the 70 known species of *Arachis*. This collection is being maintained as a field genebank. Most of these samples are shy bearers and produce little seed; about 50 accessions do not produce any seed and have to be maintained vegetatively.

The Texas Agricultural Experiment Station,



Collecting groundnuts (C. Simpson)

Stephenville, Texas, USA continued its activity on the characterization and evaluation of the *A. hypogaea* collected under IBPGR sponsorship in Latin America between 1976 and 1982. This work is being carried out in conjunction with multiplication and distribution of the germplasm and is expected to be completed in 1984. Funds were also allocated for the publication of an IBPGR catalogue of the collections.

During 1983 groundnut germplasm was collected with IBPGR assistance in Brazil, Ecuador, Ghana and Laos.

During the groundnut collecting missions conducted by CINARGEN in northeastern and southern **Brazil**, material collected included 17 samples of 5 unnamed *Arachis* spp., 15 wild *Arachis* spp., 12 *A. burkarii* and 16 *A. hypogaea*.

In May 1983, scientists from USDA-ARS, INTA, Argentina; CIAT, Bolivia and INIAP, Ecuador collected 53 accessions of cultivated groundnut and 7 *Rhizobium* samples from three geographical areas of **Ecuador**: Boliche,

Pedro Carbo; Piñas, Zaruma, Loja, Macará, Catacocha, Balzar; and Quito, Sangolquí, San Antonio.

The multi-crop mission carried out in January 1983 by CRI, Bunso, **Ghana** collected 40 samples of groundnut.

During November 1983 the National Agricultural Research Centre, Japan and AVRDC, in association with the Laotian Ministry of Agriculture, Irrigation and Cooperation, carried out a mission to **Laos** and collected 23 samples of Spanish-type groundnut with a range of variation in seed size and seed coat colour.

INTA, **Argentina**, with financial support from the IBPGR, has initiated multiplication and characterization of *Arachis* germplasm samples in the national collection. On completion the materials will be duplicated for safety in the ICRISAT genebank.

The IBPGR provided funds to the Universidade Eduardo Mondlane, Maputo, **Mozambique** for the establishment of facilities (55 m² and -5°C) to safely store groundnut.

SOYABEAN

Following the recommendations of the IBPGR Working Group on the Genetic Resources of *Glycine* species, the Board initiated considerable action not only on collection and conservation but also on documentation. In early 1984 a descriptor list for soyabean will be published in Chinese and English.

A documentation project was initiated — with funds from the IBPGR — which INTSOY is administering. The project is surveying all major soyabean germplasm collections and computerizing the data.

The IBPGR provided assistance for collecting activities in 1983 in Australia, China, Indonesia and Laos.

The University of Illinois at Urbana-Champaign, USA, in collaboration with CSIRO, Canberra, Australia collected wild perennials in the Cape York peninsula, northern Queensland, **Australia** during July-August 1983. Samples of five perennial species which in recent years have been found to be of potential interest in breeding were collected from 98 sites. The material was collected as seeds and plants and is being multiplied at CSIRO.

Toward the end of 1983, the Nanjing Agricultural College, **China** initiated a programme for collection, preservation, multiplication, characterization, evaluation and documentation. It is estimated that about 5 000 samples will be gathered from the Chang-Jiang valley, southeast, mid-south and tropical sub-regions.

The LBN, Bogor, **Indonesia**, has collected a total of 131 samples of local landraces of cultivated soyabean during 1980-83. This collection is being multiplied and characterized.

During November 1983, scientists from Japan and AVRDC fielded exploration missions in Vientiane province, **Laos**, and collected 13 samples of soyabean. This material is being multiplied and characterized at national agricultural research centres in Japan and at AVRDC.

With financial support from the IBPGR, AVRDC — which holds a large collection of soyabean germplasm (9 280 accessions) — has initiated characterization and evaluation. It is envisaged that duplicate accessions will be

sorted out and materials will be deposited in the IBPGR-designated base collection (see Table 12).

VIGNA

The IBPGR Secretariat commissioned draft descriptor lists for several *Vigna* species from the NBPGR, India. In 1983 the *Descriptors for Cowpea* was published and a revised list of mung bean (*V. radiata* and *V. mungo*) descriptors will be published soon. Two other lists, (i) *V. umbellata* and *V. angularis*, and (ii) *V. aconitifolia* and *V. trilobata* are under preparation.

IITA, with funds from the IBPGR, has continued its work on multiplication, characterization and evaluation of cowpea. About 3 000 samples were grown during the 1983 crop season for data recording and will be duplicated for safety. In other projects the genetic resources programmes in the Philippines and AVRDC have also continued characterizing *V. radiata*.

During the year the IBPGR supported activities which led to the collection of *Vigna* species in Brazil, Laos, Libya, Mexico, Niger and Sudan.

In **Brazil**, the Centro Internacional de Agricultura Tropical, through CENARGEN/EMBRAPA, collected 193 samples of *Vigna unguiculata* in the states of Pernambuco and Santa Catarina. In another mission for forages by the Royal Botanic Gardens, Kew and EMBRAPA an additional 15 samples of *V. unguiculata* were collected in northeastern **Brazil**.

The National Agriculture Research Centre, Japan, in association with AVRDC and the Laotian Ministry of Agriculture, Irrigation and Cooperation, collected food legume germplasm from Vientiane province, **Laos** during November 1983. The material collected included *Vigna radiata* 15, *V. unguiculata* var. *unguiculata* 32 and other *Vigna* spp. 3 and is being multiplied and characterized at AVRDC.

A few samples of *V. unguiculata* var. *sesquipedalis* were collected during a multi-crop mission in **Libya**.

During multi-crop collection in the Yucatán peninsula, **Mexico**, 15 samples of *Vigna* spp.

were collected by the Universidad Autónoma Chapingo.

From 1978 to 1983 several missions in **Niger** resulted in the collection of 390 samples of cowpea, many of which are local cultivars and primitive types.

In **Sudan** a multi-crop mission collected 14 samples of *Vigna unguiculata*.

WINGED BEAN

Most of the collecting of winged bean (*Psophocarpus tetragonolobus*) germplasm world-wide has been supported by the IBPGR; this has resulted in sizeable collections, especially in a number of Asian countries. The IBPGR considers that most of the variability of cultivars has been sampled with the exception of Burma, China, Malaysia and possibly Papua New Guinea.

In order to fill one of these gaps, the IBPGR provided funds toward the end of 1982 to **Malaysia** to start a three-year project for the collection of winged bean germplasm. This project is operated by the National University of Malaysia and during 1983 130 samples were collected.

The 1982 *Annual Report* already indicated a shift in emphasis toward collecting wild *Psophocarpus* species in Africa. A multi-crop mission in Ghana in 1982/83 collected one sample of *P. palustris*. Also during 1983, the Royal Botanic Gardens, Kew, UK, with IBPGR funding, organized a collecting mission for wild *Psophocarpus* species in East Africa. Material was obtained from **Uganda** (*P. grandiflorus* 3, *P. scandens* 4) and **Kenya** (*P. scandens* 1). A second mission to West Africa is scheduled for February 1984, in association with TISTR, Thailand.

Since most of the variability of the cultivated winged bean has been collected, attention is being given to multiplication, characterization (using a revised IBPGR descriptor list published in 1982), and documentation and deposition of the material in the IBPGR-designated base collections in the Philippines (NPGRL/IPB) and Thailand (TISTR). During 1983 excellent progress was made through partial IBPGR support on multiplication, characterization and documentation of the 600 acces-



Multiplication of winged bean seed
(L. Pongpangan/TISTR)

sions held at the NPGRL/IPB in the **Philippines**. The IBPGR also provided funds for the multiplication of 528 accessions maintained by TISTR, **Thailand**. This project faced difficulties with floods at one multiplication site and severe drought at another. Multiplication will again be attempted in 1984. During an IBPGR mission to **Sri Lanka**, progress was observed on the multiplication and characterization of 120 winged bean accessions at the University of Peradeniya.

PIGEONPEA

ICRISAT has continued collection, conservation and evaluation of pigeonpea germplasm and the ICRISAT collection at present contains 11 975 accessions. The passport, characterization and evaluation data for the majority of these accessions have been completed. ICRISAT has also completed a monograph on *Cajanus* which will be published during 1984.

During 1983, TISTR, with financial support from the IBPGR, fielded a collecting mission in **Thailand** and amassed 289 accessions. This material will be multiplied and duplicate samples will be sent to ICRISAT, the IBPGR-designated base centre.

During multi-crop collecting missions undertaken by the CRI, Bunso, Ghana, and the Universidad Autónoma Chapingo, Mexico, 14 and 5 samples of pigeonpea were collected respectively.

LUPIN

The IBPGR continued to give attention to the collection and conservation of *Lupinus* spp., both in the Andean centre of diversity as well as in the Mediterranean.

In the Andean region, *Lupinus* was collected during multi-crop collecting missions carried out by INIAP in Ecuador (*L. mutabilis* 35) and by the Centro de Investigaciones Fitoecogenéticas, Pairumani in Bolivia (32 samples).

In the Mediterranean region, the IBPGR has also supported multi-crop missions that collected some samples from the Tripoli and Fez regions of Libya, in the Peloponnesus and Macedonian regions of Greece, and in the provinces of Alentejo and Algarve of Portugal.

The Department of Agronomy and Range Science, University of California, USA has started a two-year project supported by IBPGR to multiply, characterize and distribute to genebanks samples of lupins. IBPGR has also supported the Experimental Station of Braga, INIA, Portugal to evaluate lupins material previously collected in the country.

OTHER LEGUMES

During the various multi-crop collecting missions which were fielded in 1983, germplasm of



Lupinus mutabilis, Bolivia

other food legumes was collected. In Greece the Fodder Crops and Pasture Institute, Larissa collected several crops including *Vicia faba* 44, *V. sativa* 25, *Lens culinaris* 20, *Pisum sativum* 3, *Lathyrus sativus* 8 and *Ervum ervilia* 4. In Libya, ARC, in association with the Istituto del Germoplasma, CNR, Bari, Italy and ZIGuK, Gatersleben, German Democratic Republic, collected samples of *Vicia faba* 12, *Vicia* spp. 8, *Pisum sativum* 6 and *Trigonella foenum-graecum* 7.

ROOTS AND TUBERS

Under the IBPGR's current five-year plan approximately 16% of the resources available are utilized for root and tuber crops. During 1983, collection, characterization, documenta-

tion and conservation of root and tuber crops, have received increased attention in all major areas of diversity. This increase in activities world-wide is also reflected in the enlargement,

both in number and size, of root and tuber germplasm collections. The IBPGR is therefore currently updating the *Directory of Germplasm Collections 2. Root Crops* (1980) for publication in the near future.

IBPGR descriptor lists are at present available for potato (1977), *Colocasia* (1980), yam (1980), sweet potato (1981), oca (*Oxalis tuberosa*, 1982) and cassava (1983). Revised descriptor lists for *Colocasia* and yam are currently under preparation and a revised list for potato, in association with the CFC, has been agreed.

Collecting, supported or organized by the IBPGR, continued in many countries throughout the world (see Fig. 5).



CASSAVA

Following the recommendations published in the *Genetic Resources of Cassava and Wild Relatives* (1983), the IBPGR has accelerated support to CIAT to organize and coordinate — in association with national institutions — cassava collection in Latin America and to transfer duplicates of major existing collections to the CIAT genebank in Cali, Colombia.

During 1983 cassava accessions were transferred to CIAT as *in vitro* meristem cultures from Tarapoto, **Peru** (106), Santa Catarina, **Brazil** (249), Coacupe, **Paraguay** (142) and Corrientes, **Argentina** (20).

Cassava collection (supported by the Board) was organized by CIAT, CENARGEN and IAN during 1983 in **Paraguay**. A total of 130 samples of cultivated *Manihot esculenta* and 8 wild species (*M. anomala*, *M. coerulescens*, *M. grahamii*, *M. populifolia*, *M. tripartita*, *M. hassleriana*, *M. guaranitica*) was collected. During multi-crop collecting missions supported by the Board through national institutions in 1983, many samples of *Manihot* were collected.

- In **Brazil** CENARGEN collected a few wild species of *Manihot* and EMBRAPA/Royal Botanic Gardens, Kew gathered an additional 4 samples of wild *Manihot* spp. in the northeastern part of the country.
- In **Costa Rica** and **Panama** 4 samples were collected by CATIE from the southern Telamanca mountains.

- In **Guatemala** the Universidad de San Carlos and ICTA collected 62 samples.
- In **Indonesia** during the 1980-83 collection by KPPNN, 205 samples were collected.
- In **Peru** the Universidad de San Carlos de Huamanga, Ayacucho collected some samples.
- In the **Solomon Islands** cassava germplasm was collected during multi-crop collection of roots and tubers.
- In **Sri Lanka** cassava was among the 367 samples of roots and tubers collected.
- In **Uganda** the Serere Agricultural Research Station collected cassava germplasm.

In 1983 the IBPGR continued support to a project at the Plant Biotechnology Institute through the NRC, Saskatoon, **Canada** to accelerate work on the cryopreservation of cassava genetic resources (see p. 82).



SWEET POTATO

During 1983 sweet potato germplasm was collected in a number of countries in Latin America, Africa, Southeast Asia and the Pacific.

The Universidad de San Carlos, in cooperation with ICTA, initiated a four-year multi-crop collecting project starting in 1982 in **Guatemala**. Sweet potato is one of the major crops and during 1983 a total of 67 *Ipomoea* spp. was collected. A three-year project in **Indonesia** (1980-83) resulted in a total of 386 sweet potato samples from Bali, East Java, East and West Lesser Sunda Islands, Irian Jaya and North Sumatra. The IBPGR continued support to a two-year project in **Malaysia** and by the end of 1983 a total of 488 samples of sweet potato had been collected. A total of 19 samples of *Ipomoea* spp. was collected in the Yucatán peninsula, **Mexico** by the Universidad Autónoma Chapingo. Toward the end of 1983 the Board funded a two-year (1983-85) sweet potato collecting project in **Papua New Guinea**. The Universidad San Cristóbal de Huamanga collected 237 samples of wild and cultivated sweet potato in Peru during July-September. A similar project for a three-year period (1983-86) to collect root and tuber



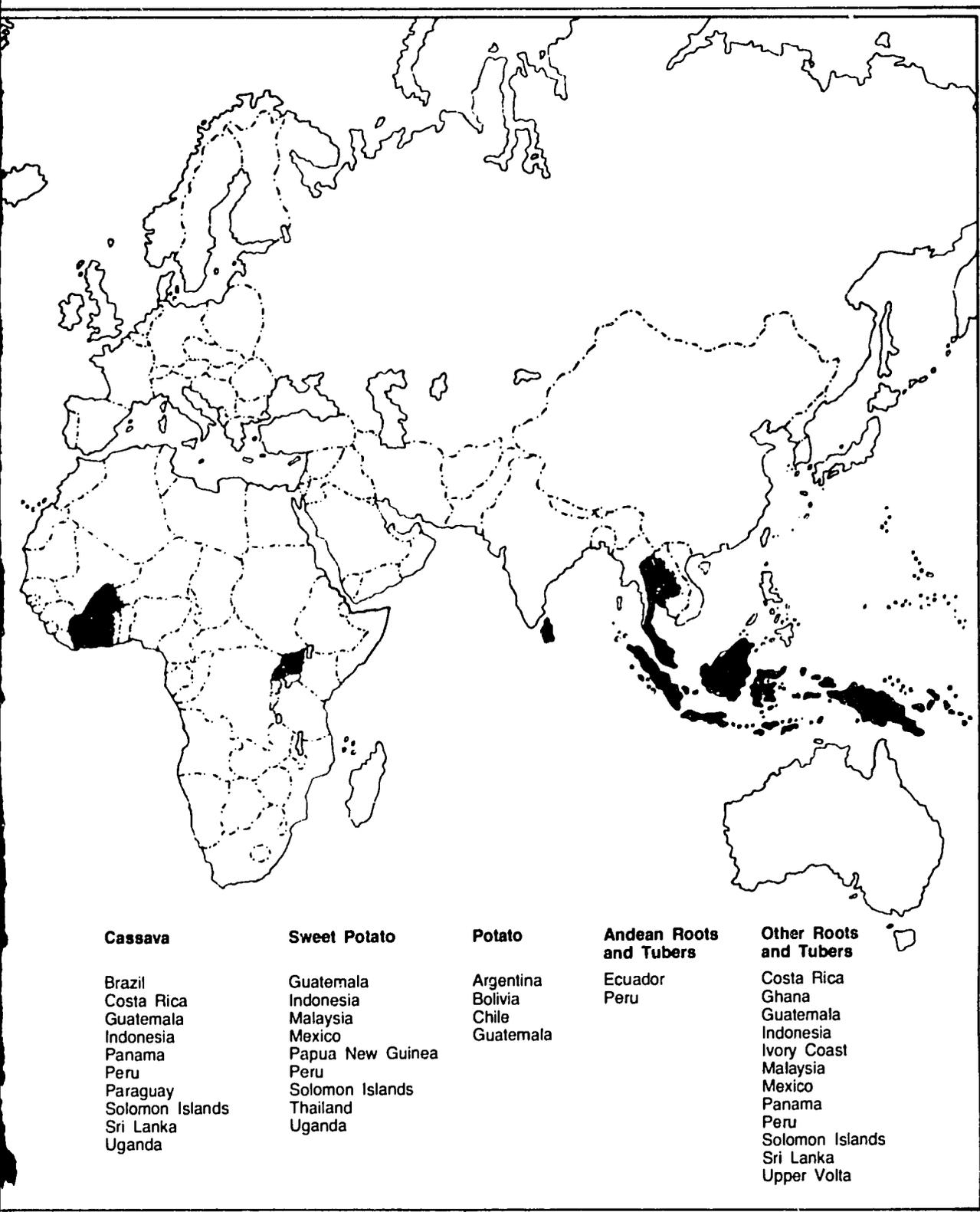


Figure 5. Countries where the IBPGR organized or collaborated in collecting roots and tubers during 1983

crops germplasm in the **Solomon Islands** was approved early in 1983. The Chiang Mai University in **Thailand** initiated collection of sweet potato in that country in 1981 and by 1983 a total of 550 accessions had been assembled. During 1983 a two-year project (1983-85) was funded by the IBPGR to collect sweet potato (and cassava) in **Uganda**.

In accordance with recent IBPGR policy, more emphasis has been given to the characterization and documentation of the collected materials. This is an integral part of a number of the above-mentioned projects, notably in **Indonesia, Malaysia, Papua New Guinea, the Solomon Islands, Uganda and Upper Volta**. Specific funds for the multiplication, characterization and documentation of the sweet potato germplasm already collected have been provided by the IBPGR to **Guatemala and Thailand**.

The IBPGR has also provided substantial support to a two-year project (1983-85) on the preliminary evaluation of morphological and cytological traits of *Ipomoea* collections, carried out by the Department of Biological Sciences, Florida Atlantic University, **USA**. Past study has shown an apparent correlation between sepal size, ploidy level and utility for cultivation. The project has started with a statistical analysis of herbarium material to examine this hypothesis in detail. Results of the project will assist breeders by pointing out useful accessions. In addition the project should result in a more accurate understanding of the origin of sweet potato and provide further insight into geographic sub-areas.

The Florida project has been structured to provide short-term training opportunities, especially for scientists from Latin America, in cooperation with the USDA Vegetable Laboratory, Charleston, South Carolina and the North Carolina State University, Raleigh.

In order to strengthen the sweet potato programme in Papua New Guinea, negotiations were finalized for the appointment of an IBPGR intern, who commenced her assignment in March 1984. In addition the IBPGR will support graduate training of a fellow from Papua New Guinea on sweet potato germplasm. An IBPGR intern has also been recruited to assist the Agricultural Research Division, Ministry of Home Affairs and National Development in the Solomon Islands to

further strengthen the IBPGR project on root and tuber crops in that country. The intern will take up his post early in 1984. IBPGR support has also been provided for a short visit of the sweet potato collaborator from the Chiang Mai University in Thailand to the USDA Vegetable Laboratory, Charleston, South Carolina.

Efforts to culture sweet potato clones *in vitro* are underway at IITA, at AVRDC, in Japan and in the United States. The IBPGR has agreed to further support this work through a special project which will look at methods suitable for the widest possible range of genotypes at Clemson University and with participation of the USDA Vegetable Laboratory (p. 83).

A brief literature review on the practicability of genetic conservation of sweet potato using long-term seed storage has been carried out by the IBPGR-supported project on seed storage at the University of Reading, **UK**. Viability studies conducted on seed lots of sweet potato spanning a 21-year storage period were carried out at the USDA Vegetable Laboratory, Charleston, South Carolina, **USA** and the results were recently published. This study demonstrated that sweet potato seed stored at 18°C and 45-50% RH for as long as 21 years maintains germination similar to that of freshly harvested seed.

In Asia, the AVRDC has established a large sweet potato collection. In addition, substantial collections have been assembled — in most instances with IBPGR funding — in Indonesia (completed), Malaysia (ongoing), Philippines (completed), Thailand (completed) and Papua New Guinea (ongoing), while work in the Pacific is still ongoing (Solomon Islands — FAO, root crops project). In order to link these activities at the country level with global conservation efforts, AVRDC's sweet potato research coordinator will visit the collections in Southeast Asia and the Pacific, starting early in 1984. He will demonstrate the polycross method for obtaining true seed (for long-term storage in IBPGR-designated base collections) and make arrangements for the duplication of vegetative material at AVRDC.

POTATO

Although major world responsibility for potato germplasm lies with CIP, IBPGR con-

tinues to provide some assistance to national centres to collect and conserve local germplasm.

In **Argentina**, the Estación Experimental Agropecuaria de Balcarce, INTA received support from the IBPGR in 1983 to collect wild potatoes and old cultivated varieties in the provinces of Salta and Jujuy. The project was carried out with the cooperation of USDA and the Facultad de Agronomía, Universidad de Mar del Plata. A total of 274 samples including the following *Solanum* species was collected: *S. acaule* 30, *S. chacoense* 12, *S. gourlayi* 54, *S. × indunii* 6, *S. infundibuliforme* 11, *S. megistacrolobum* 15, *S. microdontum* 12, *S. ophocense* 3, *S. spegazzini* 7, *S. tarijense* 8, *S. tuberosum* subsp. *andigena* 55, *S. venturii* 6, *S. vernei* 20 and *S. vidaurrei* 7.

The IBPGR assisted CIP to carry out an exploration and collecting mission for *S. × ajanhuiri* and related species in the western zones of the department of La Paz and Oruro in **Bolivia** and 462 samples of five cultivated species were collected.

In **Chile**, the Universidad Austral organized an emergency collecting mission supported by IBPGR to the Aysén region where a major road was under construction. A total of 83 samples of potatoes and wild relatives was collected.

The Universidad de San Carlos and ICTA collected 22 samples of *Solanum* spp. in **Guatemala** as part of the multi-crop collecting mission supported by IBPGR in 1983.

ANDEAN ROOTS AND TUBERS

Since 1978 the IBPGR has assisted national and regional organizations of the Andean countries to collect, conserve and evaluate germplasm of oca (*Oxalis tuberosa*), olluco or melloco (*Ullucus tuberosus*), isaño or mashua (*Tropaeolum tuberosum*), arracacha (*Arracacia xanthorrhiza*) and other roots and tubers.

In 1983 the IBPGR supported collecting missions to Ecuador and Peru. In the Andean areas of **Ecuador**, INIAP collected samples of melloco 80, mashua 38, oca 42, arracacha 25, jicama (*Polymnia sanchifolia*) 4 and miso (*Mirabilis expansa*) 2 as part of multi-crop collecting missions. In **Peru**, the Universidad de San Cristóbal de Huamanga, Ayacucho carried

out a multi-crop mission in which 44 samples of Andean roots and tubers were collected.

OTHER ROOTS AND TUBERS

Germplasm of other root and tuber crops has been collected with IBPGR support in Costa Rica, Ghana, Indonesia, the Ivory Coast, Malaysia, Mexico, Panama, Peru, the Solomon Islands, Sri Lanka and Upper Volta.

A CATIE/IBPGR project to obtain ethnobotanical information and germplasm from the Talamanca mountains in **Costa Rica** and **Panama** collected a few samples of *Dioscorea* and *Xanthosoma* species.

An IBPGR multi-crop collecting mission in **Ghana** (1982-83) obtained the following *Dioscorea* samples: 41 *D. alata*, 2 *D. bulbifera*, 8 *D. cayenensis*, 9 *D. dumentorum*, 3 *D. esculenta*, 4 *D. praehensilis* and 103 *D. rotundata*.

Another IBPGR multi-crop collecting project in **Guatemala** obtained the following samples of roots and tubers during 1983: 19 *Colocasia* spp., 18 *Dioscorea* spp. and 17 *Xanthosoma* spp.



Oca collected in Latin America by IBPGR during 1983



Taro, Indonesia

The IBPGR-funded root and tuber crops germplasm collecting project in **Indonesia** assembled a total of 65 *Colocasia* samples and 14 accessions of other root and tuber crops in addition to a substantial amount of sweet potato and cassava germplasm.

As a follow-up to the 1982 IBPGR-supported exploration in central, north and north-west **Ivory Coast**, by the Laboratoire de génétique, Faculté des sciences, Université nationale, Abidjan, the following *Dioscorea* material was collected in February 1983: 115 *D. alata* and 340 *D. cayenensis* - *rotundata* complex. During October 1983 the central and western portions of the Ivory Coast were explored for yam germplasm in preparation for collecting in early 1984.

By the end of 1983 a total of 27 *Alocasia*, 23 *Amorphophallus*, 518 taro, 72 *Xanthosoma* and 144 yam had been collected during multi-crop collection in **Malaysia**.

A multi-crop collecting mission carried out by the Universidad Autónoma Chapingo col-

lected 8 *Dioscorea* spp. and 7 *Xanthosoma* spp. in the Yucatán peninsula of **Mexico**.

The IBPGR is supporting a collecting project in **Sri Lanka**, carried out by the Department of Crop Science, Faculty of Agriculture, University of Peradeniya. During 1983 a total of 367 samples had been collected, of which the majority were *Dioscorea* species, but samples of *Alocasia*, *Amorphophallus*, cassava, *Coleus* and *Colocasia* were included.

An IBPGR-supported project in **Upper Volta**, executed by IVRAZ, collected the following germplasm during 1982-83: 6 *Dioscorea alata*, 250 *D. cayenensis* and 4 *Dioscorea* spp.

In order to develop techniques for *in vitro* conservation of taro (*Colocasia esculenta*), the IBPGR provided a grant to the Department of Biology, Northeastern University, Boston, **USA**. Investigations will be carried out on *in vitro* preservation of taro germplasm applying both slow growth and cryopreservation methods (p. 83).

VEGETABLES

Vegetables currently receive 10% of IBPGR's resources under the present five-year plan. The number of collecting missions in which vegetable germplasm was obtained during 1983 was similar to those in 1982 due to the high priority given to these crops. Details of the material collected are reported on a crop basis below and illustrated in Figure 6.

In the coming years it is not anticipated that the number of missions will increase, and emphasis will be given to collecting (i) in very specific areas of high diversity not previously sampled, (ii) in areas of severe genetic erosion, and (iii) the wild relatives of the cultivated vegetables.

It is gratifying to record that for the first time a very specific mission has been organized to collect all available vegetable germplasm on a country basis (Pakistan). Similar missions are envisaged for Egypt, Spain and Syria in 1984, the latter based on a consultant report (p. 71).

During 1983 much more attention has been paid to the characterization, multiplication, documentation and duplication of vegetable material in IBPGR-designated genebanks, either as part of collecting projects or under separate IBPGR funding.

Another sign of increased awareness regarding the conservation of vegetable genetic resources has been the request for FAO/IBPGR funding for the establishment of genebanks specifically for vegetables in Africa and Asia:

- a long-term seed storage facility for vegetable germplasm is being established at the Beijing Vegetable Research Centre, Beijing, **China** with FAO/UNDP assistance;
- the IBPGR has provided funds for equipment (coolers, laboratory equipment) for the upgrading of the vegetable seed storage facilities at **AVRDC**;
- substantial IBPGR funding has been allocated for the equipment component of the long-term vegetable seed storage facility at NIHORT, Ibadan, **Nigeria**. It is anticipated

that additional funding will be provided through a two-year FAO/UNDP project (1984-85); and

- equipment has been purchased by the IBPGR for the establishment of vegetable seed storage (deep-freezers) and seed laboratory facilities at the Horticultural Research Station, ARC, Wad Medani, **Sudan**.

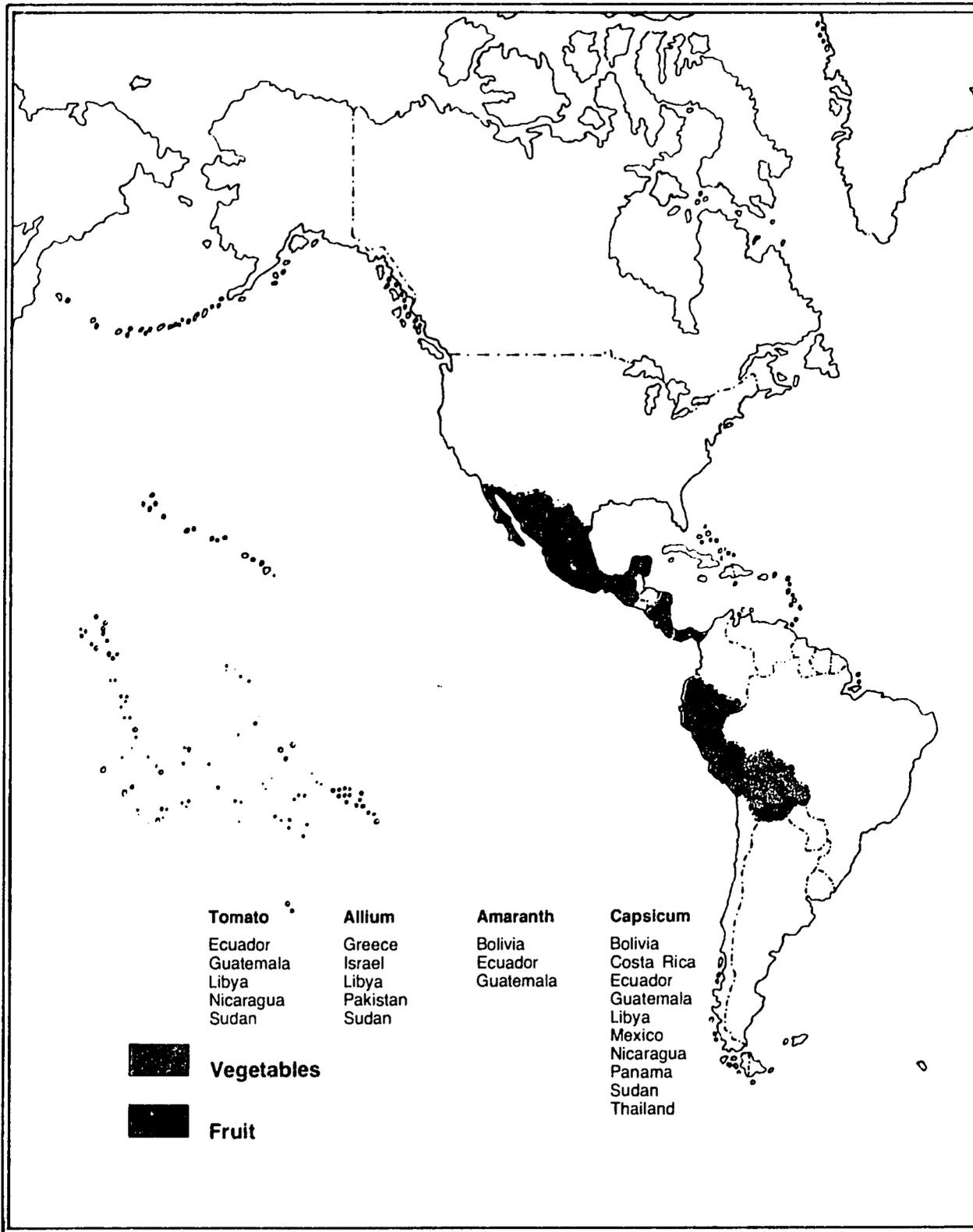
TOMATO

Most of the available diversity of tomato is already in collections and specific missions have only been envisaged for the Andean region. The Departamento de Horticultura, UNA, La Molina, Peru has received IBPGR grants for the collection of *Lycopersicon* species in that country, but no mission could be fielded there during 1983. During 1983 multi-crop collecting missions, some tomato germplasm was collected in **Ecuador** (6), **Guatemala** (15), **Libya** (7), **Nicaragua** and **Sudan** (36).

A joint project of the Ministerio de Educación y Ciencia, Spain and INIPA, Peru was fielded to collect wild species in **Peru** during June 1983. A total of *L. pimpinellifolium* (15), *L. peruvianum* (18), *L. hirsutum* (10) and *Solanum pennellii* (4) was obtained.

ALLIUM

During the first phase of the ECP/GR an *Allium* Working Group had stimulated activities in a European context and resulted in the gathering together of a total of 263 samples (186 *A. cepa* and 77 *A. porrum*) from different seed companies in the Netherlands. This material is being conserved in the IBPGR-designated genebanks in the Netherlands (IVT) and the UK (NVRs). As agreed by the TCC for the second phase of the



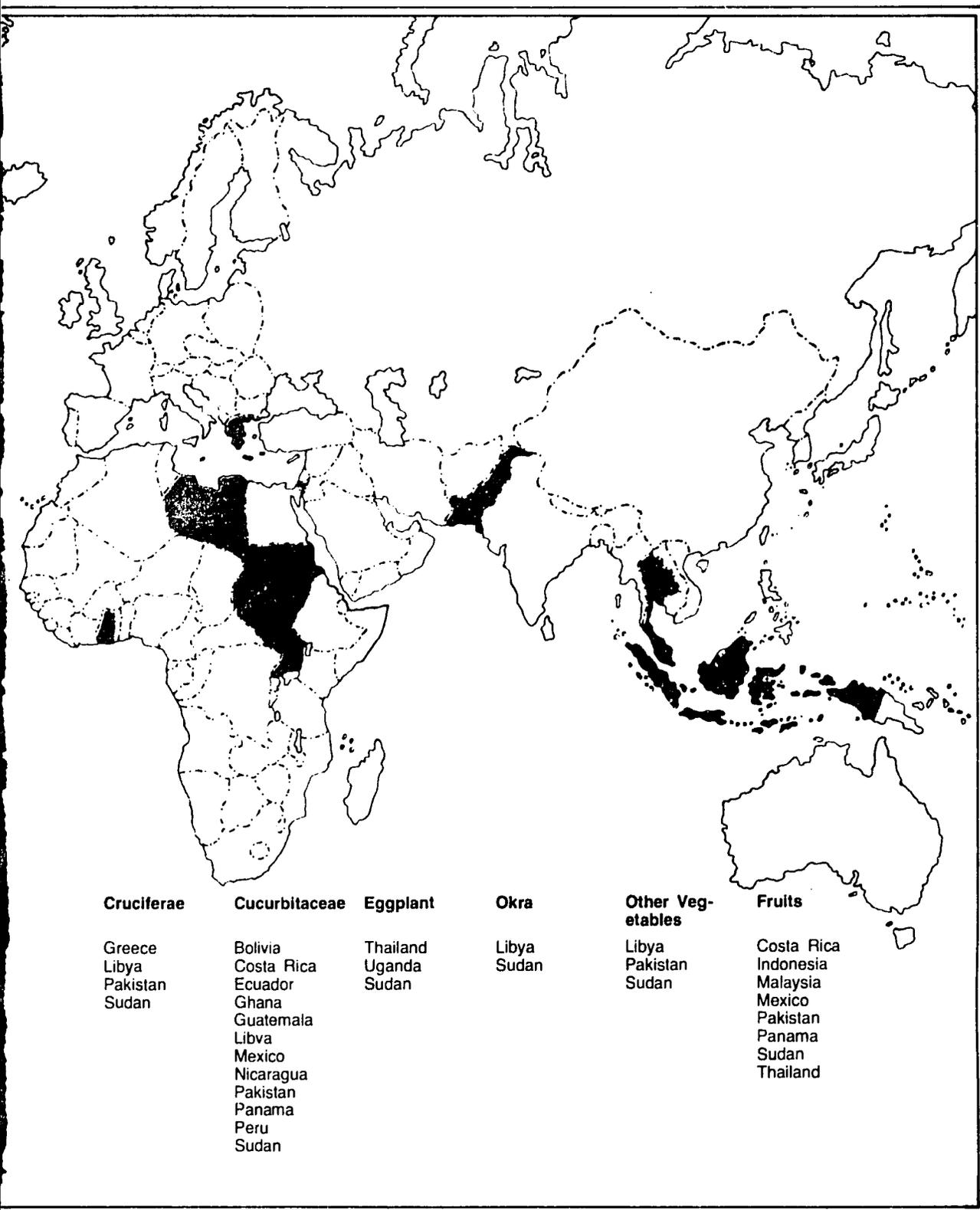


Figure 6. Countries where the IBPGR organized or collaborated in collecting vegetables and fruits during 1983



(AVRDC)

ECPCR (p. 60), the *Allium* Working Group will meet in 1984.

The Mendel-Frimmel-Gesellschaft für angewandte Genetik e.V. organized an *Allium* Conference in July 1983 in Freising, Federal Republic of Germany. A special section was devoted to taxonomy, cytogenetics and genetic resources and one of the members of the ECP *Allium* Working Group attended to increase awareness for the need to conserve *Allium* genetic resources.

With IBPGR funding a two-year (1983-84) project was initiated in collaboration with the Faculty of Agriculture, Hebrew University of Jerusalem, Israel, to collect representative samples of the 55 wild *Allium* species which occur in Israel and neighbouring areas, to characterize and document these materials and to conserve them both in static (as seeds) and dynamic (as continued field plots) form. During the first year a total of 168 ecotypes of 22 *Allium* species was collected (see Table 3).

The IBPGR is considering support to a similar project covering all *Allium* species in India in cooperation with the Department of Botany, University of Kashmir, Srinagar, India for a three-year period (1984-86).

During multi-crop collecting missions in 1983 the following *Allium* landraces were collected in: **Greece** (16 *A. cepa*, 31 *A. porrum*, 6 *A. sativum*), **Libya** (12 *A. cepa*, 3 *A. sativum*), **Pakistan** (7 *Allium* spp.) and **Sudan** (12).

Toward the end of 1983, the IBPGR provided a grant to the Faculty of Agriculture, Hebrew University of Jerusalem, Israel for the preparation of a status report on the necessity and feasibility for *in vitro* conservation of *Allium* germplasm (p. 81).

AMARANTH

Since the publication of the IBPGR report *Genetic Resources of Amaranth* (1981), a sub-

stantial amount of germplasm has been collected in Latin America, Africa and India, and sizeable collections now exist in Bolivia, China, German Democratic Republic, India, Indonesia, Nigeria, Peru, Thailand, United Kingdom, United States and Zambia.

No specific IBPGR amaranth collecting missions were fielded in 1983, but a number of multi-crop missions collected amaranth germplasm in **Bolivia** (30), **Ecuador** (132) and **Guatemala** (29).

One of the most important developments during 1983 was the transfer of material from **India** (990 *Amaranthus* spp., donated by the NBPGR) and **Peru** (26 *A. caudatus*, resulting from an IBPGR-sponsored mission in 1982) to the IBPGR-designated base collection for safety.

In addition to the support provided to research projects on *Amaranthus* (including col-

Table 3. Number of *Allium* species and ecotypes collected in Israel and neighbouring areas during 1983

Section	Species	Number of ecotypes
Allium	<i>A. ampeloprasum</i>	32
	<i>A. artemisiatorum</i>	21
	<i>A. curtum</i>	7
	<i>A. dictioprasum</i>	2
	<i>A. faneranteum</i>	5
	<i>A. rotundum</i>	7
	<i>A. truncatum</i>	2
Codonoprasum	<i>A. desertorum</i>	6
	<i>A. palens</i>	2
	<i>A. paniculatum</i>	2
	<i>A. stamineum</i>	21
Melanocromyum	<i>A. aschersonianum</i>	7
	<i>A. nigrum</i>	3
	<i>A. rothii</i>	4
	<i>A. schuberti</i>	2
	<i>A. tel-avivense</i>	8
Molium	<i>A. carmeli</i>	3
	<i>A. erdelii</i>	6
	<i>A. neapolitanum</i>	9
	<i>A. negevense</i>	4
	<i>A. gasyunense</i>	1
	<i>A. trifoliatum</i> subsp. <i>hirsutum</i>	14

lection and screening of germplasm) to Guatemala, Kenya, Mexico, Peru, Tanzania and Thailand, BOSTID, USA now also sponsors the publication of the *Amaranth Newsletter*. This Newsletter is published by the Archivos Latino-americanos de Nutrición, INCAP, Guatemala.

CAPSICUM

Although the IBPGR report on the *Genetic Resources of Capsicum* (which includes a *Capsicum* descriptor list) was published in 1983, a summary was already provided in the 1981 *Annual Report*.

The Biology Department, Ramkhamhaeng University, **Thailand** received IBPGR funds for a two-year (1983-84) project to collect and evaluate *Capsicum* germplasm. In 1983, 23 samples were collected. In addition a number of multi-crop missions collected *Capsicum* germplasm during 1983 in **Bolivia** (202 *Capsicum* spp.), **Costa Rica** (5 *Capsicum* spp.), **Ecuador** (18 *Capsicum* spp.), **Guatemala** (87 *Capsicum* spp.), **Libya** (10 *C. annuum*), **Mexico**



Capsicum pubescens, Bolivia

(15 *Capsicum* spp.), **Nicaragua**, **Panama** (3. *C. frutescens*) and **Sudan** (41 *Capsicum* spp.).

Many multi-crop collecting missions, especially in Latin America, now include cultivated *Capsicum* in their projects and no further specific missions are envisaged. From 1984 more emphasis will be given to the collection of wild species and an agreement has already been reached with CENARGEN for collecting in Brazil with IBPGR funding. In addition the IBPGR will provide two expert consultants for this project.



CRUCIFERAE

The report on the *Genetic Resources of Cruciferous Crops* was published in 1981. Subsequently descriptor lists have been under preparation for a number of *Brassica* and *Raphanus* species and these will be published in the near future.

The five-year IBPGR-supported project to collect wild Mediterranean brassicas, coordinated by Prof. D.C. Gómez-Campo (Spain) and Dr. M. Gustafsson (Sweden), made excellent progress during 1983. After the first mission in 1982 a second mission was fielded in

Greece during 1983 by the Greek Gene Bank. The mission collected 5 population samples of *Brassica cretica* subsp. *cretica* and 14 population samples of *Brassica cretica* subsp. *nivea* from Crete, Evia and Limnos. A similar mission, organized by the Tohoku University of Japan with the participation of Prof. Gómez-Campo in **Turkey**, aimed at the collection of crucifers in general but with emphasis on *Brassica campestris*, *B. cretica*, *B. deflexa*, *B. elongata*, *B. napus* and *B. tournefortii*. Seven population samples of *B. cretica* subsp. *cretica* were collected.

In order to strengthen the project on wild Mediterranean brassicas, the IBPGR also provided a grant to the Universidad Politécnica Madrid, **Spain** for multiplication and characterization of wild brassicas collected during 1982-85.

For landraces no specific projects were organized, but during 1983 a number of multi-crop collecting missions obtained cruciferous germplasm in Greece (55 *B. oleracea*, 7 *Brassica* spp.), **Libya** (7 *B. napus*), **Pakistan** (15 *Brassica* spp., 2 *Raphanus sativus*) and **Sudan** (5 *Raphanus sativus*, 4 *Eruca sativa*).

The brassica material collected by the IBPGR/PGRC (Ethiopia) during 1982 has been the subject of detailed studies at the



Collecting seeds from *Cucurbita pepo*, Latin America

NVRS, UK and the University of Birmingham.

The IBPGR-sponsored project on the multiplication and characterization of *B. carinata* at the SVP, Netherlands neared completion in 1983. Over 100 grams of seed have been produced of each of the 94 *B. carinata* and 6 *B. nigra* accessions.

Early in 1983, the IBPGR provided a grant for a two-year extension (1983-84) of a regeneration project for Chinese cabbage at AVRDC. In addition an IBPGR intern has been appointed to work on the Chinese cabbage project (multiplication, characterization, documentation and duplication of material at

NVRS) and also to provide assistance to the activities of AVRDC's seed laboratory.

CUCURBITACEAE

The IBPGR endorsed a report on the *Genetic Resources of Cucurbitaceae* in its meeting in 1983. The report, which also contains descriptor lists for *Cucumis melo*, *Cucumis sativus* and *Cucurbita* spp. is in press. On the basis of this report, the IBPGR has designated base collection centres (p. 74) and agreed on the priorities for collecting as listed in Table 4.

Table 4. Priorities for collecting Cucurbitaceae

<p>Priority 1 - Cucurbita</p> <p>A. Mexico (Yucatán, Chiapas, Tabasco, Huastecas, Oaxaca, Veracruz, northern and northeastern Baja, the central plateau, the northeast coast, the central-west coast, southern Michoacán and northern Guerrero-Balsas basin): <i>Cucurbita ficifolia</i>, <i>C. pepo</i>, <i>C. mixta</i>, <i>C. moschata</i> and wild <i>Cucurbita</i> species.</p> <p>B. South America</p> <p>i) Coastal valleys of Peru: <i>C. maxima</i>, <i>C. moschata</i></p> <p>ii) Eastern Colombia: <i>C. moschata</i></p> <p>iii) Northeast Brazil: <i>C. moschata</i></p> <p>iv) Pampa Húmeda in western Argentina and in southern Uruguay: <i>C. maxima</i>, <i>C. pepo</i>, <i>C. moschata</i> and wild <i>C. andreana</i></p> <p>v) Northwestern Argentina and Bolivia: <i>C. maxima</i></p> <p>vi) Northeastern Argentina, Paraguay and Brazil</p>	<p>Priority 1 - Citrullus</p> <p>A. India (Indo-Gangetic plains, scattered areas in north-western India): <i>C. lanatus</i></p> <p>B. South and southwest Africa (Kalahari region): wild and relatives of <i>C. lanatus</i></p>
<p>Priority 2 - Cucurbita</p> <p>A. Guatemala and Honduras: <i>C. moschata</i>, <i>C. ficifolia</i> in higher elevations, and wild species</p> <p>B. West foothills of the Andes, the coastal areas of Ecuador and Colombia, and inter-Andean valleys of Peru: <i>C. moschata</i> and <i>C. ficifolia</i> in higher elevations (up to 2 000 m) and wild species</p> <p>C. Chaco area of Paraguay and Bolivia: <i>C. andreana</i></p>	<p>Priority 2 - Citrullus</p> <p>A. South and southwest Africa (Kalahari region): cultivated <i>C. lanatus</i></p>
<p>Priority 1 - Cucumis</p> <p>A. Southwestern Asia (Turkey to Afghanistan): <i>C. melo</i></p> <p>B. India (sub-Himalayan tract to northeastern hills, western Ghats, eastern peninsular tract, and Indo-Gangetic plains): <i>Cucumis</i> spp. wild and cultivated</p> <p>C. Burma and southern China: <i>C. melo</i></p>	<p>Priority 3 - Citrullus</p> <p>A. Southern USSR and Iran: <i>C. lanatus</i></p> <p>B. Tropical Africa: <i>C. lanatus</i></p>
<p>Priority 2 - Cucumis</p> <p>A. India, Southeast Asia, southern China: <i>C. melo</i>, wild <i>C. sativus</i></p> <p>B. Tropical Africa, especially Sudan: <i>C. melo</i></p> <p>C. Tropical and southern Africa: wild <i>C. anguria</i> (<i>C. longipes</i>)</p> <p>D. Iberian peninsula: <i>C. melo</i></p>	<p>Priority 1 - Other Cucurbitaceous Species</p> <p>A. Mexico: <i>Sechium edule</i></p> <p>B. Northeastern India, Indochina and Malaysia: <i>Momordica</i> spp.</p>
<p>Priority 2 - Cucumis</p> <p>A. Brazil: <i>S. edule</i></p> <p>B. Central America: <i>S. edule</i></p> <p>C. India:</p> <p>i) Northeastern hills: <i>Cucurbita</i> spp., <i>Benincasa</i> spp.</p> <p>ii) Indo-Gangetic and northwestern plains: <i>Momordica</i> spp., <i>Luffa</i> spp., <i>Lagenaria</i> spp.</p> <p>iii) Southern peninsular tract: <i>Trichosanthes anguina</i></p> <p>iv) Bengal plains, Assam valley</p> <p>v) Northeastern hills of North Bengal, Sikkim: <i>Cyclanthera</i> spp., <i>Sechium edule</i></p> <p>D. Arabian peninsula: <i>Luffa cylindrica</i></p> <p>E. South and Southeast Asia (areas not included above): <i>Momordica</i> spp.</p>	<p>Priority 2 - Other Cucurbitaceous Species</p> <p>A. Brazil: <i>S. edule</i></p> <p>B. Central America: <i>S. edule</i></p> <p>C. India:</p> <p>i) Northeastern hills: <i>Cucurbita</i> spp., <i>Benincasa</i> spp.</p> <p>ii) Indo-Gangetic and northwestern plains: <i>Momordica</i> spp., <i>Luffa</i> spp., <i>Lagenaria</i> spp.</p> <p>iii) Southern peninsular tract: <i>Trichosanthes anguina</i></p> <p>iv) Bengal plains, Assam valley</p> <p>v) Northeastern hills of North Bengal, Sikkim: <i>Cyclanthera</i> spp., <i>Sechium edule</i></p> <p>D. Arabian peninsula: <i>Luffa cylindrica</i></p> <p>E. South and Southeast Asia (areas not included above): <i>Momordica</i> spp.</p>
<p>Priority 3 - Other Cucurbitaceous Species</p> <p>A. South and Southeast Asia: wild and cultivated <i>Trichosanthes cucumerina</i></p>	<p>Priority 3 - Other Cucurbitaceous Species</p> <p>A. South and Southeast Asia: wild and cultivated <i>Trichosanthes cucumerina</i></p>

No specific missions have been organized for Cucurbitaceae, but in the following countries germplasm was collected during multi-crop missions: **Bolivia** (173 Cucurbitaceae), **Costa Rica** (4 *Cucurbita* spp., 1 Cucurbitaceae), **Ecuador** (5 *Cucurbita* spp.), **Ghana** (8 *Citrullus lanatus*, 2 Cucurbitaceae, 24 *Lagenaria siceraria*), **Guatemala** (76 *Cucurbita* spp.), **Libya** (3 *Citrullus* spp., 7 *Cucumis melo*, 3 *Cucurbita pepo*, 5 *Lagenaria siceraria*), **Mexico** (33 *Cucurbita* spp., 8 *Citrullus* spp., 6 *Cucumis* spp.), **Nicaragua**, **Pakistan** (9 *Cucurbita* spp., 1 *Lagenaria siceraria*), **Panama** (6 *Cucurbita* spp., 2 *Lagenaria siceraria*, 1 *Luffa aegyptiaca*, 1 *Sechium edule*), **Peru** (118 *Cucurbita* spp. (1982-83)) and **Sudan** (79 *Cucurbita* spp.).

The IBPGR is supporting a project at ICA, Colombia for the characterization and multiplication of germplasm collected in that country during 1982. In 1983 a total of 40 *Cucurbita* accessions were being dealt with in cooperation with the IBPGR Regional Coordinator for Latin America. A similar project is in progress in Guatemala.



EGGPLANT

The IBPGR report on the *Genetic Resources of Eggplant*, which includes a descriptor list, will be published in 1984. Details of collecting priorities and designated base collections were already published in the 1981 Annual Report.

The world-wide inventory of eggplant germplasm collections clearly showed the complete absence of species related to *Solanum melongena*. The IBPGR therefore agreed to fund the collection of this material during 1981/82, especially in Africa. Specific missions for the African eggplants have been carried out in Benin, Ghana, Ivory Coast, Upper Volta and Togo, while a few multi-crop missions have also collected some material (Sudan, Zambia, Zimbabwe). In addition some FAO/UNDP crop improvement projects have collected local eggplant germplasm (Liberia, Nigeria).

During 1983 no specific eggplant collecting missions were organized except for the continuation of the project carried out by the

Chiang Mai University in **Thailand** where a total of 115 samples has been collected. Eggplant germplasm has also been collected in **Uganda** (5 samples) and **Sudan** (7 samples).

Emphasis has been given to the multiplication, characterization and documentation of material collected in Africa during 1981/82. At present there are four institutions engaged in this activity.

The Agricultural Experiment Station, Bunso, **Ghana** has assumed responsibility for the characterization and multiplication of those materials collected in Benin, Ghana and Togo. During 1983 a total of 62 *Solanum* accessions (*S. aethiopicum*, *S. dasyphyllum*, *S. gilo*, *S. macrocarpon*, *S. nigrum*, *S. scabrum*) collected in Benin and Togo were deposited in the IBPGR-designated base collection, IVT, the Netherlands.

During 1982 a total of 380 *Solanum* accessions was collected in **Ivory Coast** by the Centre néerlandais, ORSTOM (272 *S. aethiopicum*, 22 *S. anguivi*, 3 *S. dasyphyllum*, 2 *S. incanum*, 52 *S. macrocarpon*, 23 *S. melongena*, 5 *S. scabrum* and 1 *Solanum* sp.). In 1983 the Centre néerlandais characterized and multiplied 170 of these accessions in addition to 58 samples collected in Upper Volta.

Through an FAO/UNDP project at NIHORT, Ibadan, **Nigeria** a sizeable collection of *Solanum* spp. has been established. The material is currently being characterized and multiplied.

Recently the IBPGR appointed an intern to assist the national genetic resources programme in **Togo**. It is envisaged that the intern will characterize those accessions which are not being dealt with in the programmes in Ghana, Ivory Coast and Nigeria (e.g. eggplant germplasm collected in Liberia, Sudan, Zambia and Zimbabwe).

Duplicate samples of seed of all African eggplants collected have been forwarded to the Department of Plant Biology, University of Birmingham, **UK**, which has assumed a coordinating role for the full characterization and multiplication in addition to documenting the entire collection using existing computer facilities. Part of this work is being carried out through the IBPGR-supported M.Sc. course and three theses were prepared during 1983 dealing with *S. macrocarpon* and *S. aethiopicum*.

OKRA

The IBPGR/ORSTOM report *Les Ressources génétiques du genre Abelmoschus Med. (Gombo)* was published in French in June 1983 and details were provided in the 1982 Annual Report. The report, which also contains the okra descriptor list, has been translated into English and will be published in the near future.

During the period 1980-82 the IBPGR supported the collection of approximately 1 500 *Abelmoschus* samples from 15 African countries, both through crop-specific and multi-crop missions. In 1983 multi-crop missions have collected okra germplasm in **Libya** (4 *A. esculentus*) and **Sudan** (45 *Abelmoschus* spp.). No further specific *Abelmoschus* missions are scheduled in Africa, with the exception of Egypt and southern Sudan in 1984. Attention will be directed to the collection of *Abelmoschus* species other than *A. esculentus*, especially in India and Southeast Asia.

Early in 1982, ORSTOM, Ivory Coast, initiated a project for the characterization, evaluation, documentation and multiplication of 571 *Abelmoschus* accessions. This material includes 273 duplicates of the USDA collection and 298 accessions from the Ivory Coast, previously collected by the Centre néerlandais, ORSTOM. The IBPGR provided financial support and during 1983 this project was completed and seed of 240 accessions (79 *A. esculentus* and 161 *Abelmoschus* sp. type Gui-

nean) from Ivory Coast were sent for long term conservation in the IBPGR-designated base collection.

In August 1983 the IBPGR provided another grant to ORSTOM for the multiplication, evaluation, documentation, conservation and duplication of all *Abelmoschus* material collected by IBPGR/ORSTOM during the period 1980-84. At present about 1 300 accessions have been assembled at ORSTOM from Benin, Cameroon, Ghana, Guinea, Ivory Coast, Liberia, Mali, Nigeria, Sudan, Togo, Upper Volta, Zambia and Zimbabwe. It is expected that this number will be increased to approximately 2 000, especially after specific missions in Egypt and the Sudan during 1984. On completion of the project all material will be conserved in base collections in the Ivory Coast and the USA.

OTHER VEGETABLES

Other vegetable and spice crops collected during 1983 in multi-crop missions include: *Anethum graveolens* (**Libya**), *Corchorus olitorius* (**Libya, Sudan**), *Coriandrum sativum* (**Libya, Pakistan, Sudan**), *Daucus carota* (**Libya, Pakistan**), *Hibiscus sabdariffa* (**Libya, Sudan**), *Lactuca sativa* (**Libya, Pakistan**), *Malva* spp. (**Pakistan**), *Petroselinum crispum* (**Libya**), *Portulaca oleracea* (**Libya, Sudan**), *Spinacia oleracea* (**Pakistan**) and *Trigonella foenum-graecum* (**Libya, Sudan**).

FRUITS AND TREE NUTS

Fruits and tree nuts receive approximately 7% of the IBPGR's allocations under the current five-year plan. The world-wide survey of germplasm collections of tropical and subtropical fruits and tree nuts was completed during 1983. A resulting Directory of Germplasm Collections will be published in 1984. A similar survey was initiated in 1983 for temperate fruits and will continue through 1984.

Collecting activities for fruits and nuts are illustrated in Figure 6.

Descriptor lists are available for banana and plantain (1978), tropical fruits (revised, 1980), apricot (1980), almond (1981), apple (1982) and pear (1983), whereby the latter two were published jointly with the CEC Programme Committee on Disease Resistance Breeding and Better Use of Genebanks. Preparations

have started on a number of descriptor lists: banana (revised), almond (revised, ECP/GR), apricot (revised, ECP/GR & CEC), cashew, cherry (ECP/GR & CEC), citrus, papaya, peach (ECP/GR & CEC) and plum (ECP/GR & CEC).

In order to assess the fruit genetic resources situation in areas of high diversity, an FAO/IBPGR consultant visited Pakistan and Syria during 1983. Detailed recommendations have been provided for the initiation of a programme in these countries starting in 1984.



TROPICAL FRUITS

An IBPGR-funded study on the genetic resources of tropical and subtropical fruits and tree nuts, contracted to RTI, Amsterdam, the Netherlands, was completed in 1983 with the input of many specialists around the world. The final report will be assessed by the IBPGR in 1984 and subsequently published.

In 1983 major attention was given to high priority tropical fruits, namely banana and plantain, citrus and mango, and activities on these crops are described in separate sections below.

A joint IBPGR/CATIE project in **Costa Rica** and **Panama** collected samples of the following fruits: *Anacardium occidentale*, *Annona* spp., *Carica papaya*, *Persea americana*, *Pouteria* spp. and *Psidium* spp.

The IBPGR has provided financial assistance for an initial three-year period (1982-85), to MARDI for the exploration and collection of domesticated and wild species of Malaysian fruits in peninsular **Malaysia**. By the end of 1983 the following material had been collected: 203 durian, 64 mango and 68 rambutan.

A grant has also been provided to the Universidad Autónoma Chapingo in **Mexico**, which is establishing a collection of native crops, especially of the Yucatán peninsula. These native crops include fruit trees of the Anacardiaceae, Annonaceae, Lauraceae and Sapotaceae.

A total of 56 fruit species was collected in **Sudan** by ARI, Wad Medani in the second year of a three-year IBPGR-supported project. Species collected included 6 *Annona squamosa*, 17 *Citrus* spp. and 26 *Psidium guajava*.



Rambutan, Indonesia

A two-year (1982-84) IBPGR-supported project to collect langsung (*Lansium domesticum*) and mangosteen (*Garcinia mangostana*) in the southern part of **Thailand** is being executed by the Faculty of Natural Resources, Prince of Songkla University. Toward the end of 1983 a total of 93 samples was collected consisting of: 22 *Lansium domesticum*, 3 *Garcinia atrovirides*, 2 *G. maingayi*, 59 *G. mangostana*, 4 *G. prainiana*, and 3 other species of *Garcinia*.

The IBPGR has recognized the need to safeguard breadfruit collections in the Pacific, which were previously established through the South Pacific Commission (SPC). Contacts have been made with the University of the South Pacific, Western Samoa and it is possible that the IBPGR might provide assistance to Western Samoa and Fiji starting in 1984.



BANANA AND PLANTAIN

The three-year (1980-83) IBPGR-supported collecting project for wild and cultivated banana in **Indonesia** has been completed and a total of 333 accessions are now maintained in the Bogor and Purwodadi Botanic Gardens. Also in 1983 the final report was received from the Kasetsart University in **Thailand** regarding the IBPGR-sponsored project for the collection and evaluation of banana germplasm in that country.

As already reported in the *1982 Annual Report*, the Philippines has agreed to completely fund the Regional Southeast Asian Banana Genebank in Davao, where material from Malaysia, the Philippines and Thailand has been assembled. With the completion of the collecting project in Indonesia and the replanting of the banana collection at Laloki, Papua New Guinea, distinct accessions from these collections will be duplicated in the Regional Genebank in 1984.

The IBPGR is also financially supporting the Banana Company of **Jamaica** in order to replant and label the unique *Musa* collection. The first grant has been used for the purchase of irrigation equipment essential for the maintenance of this collection at Bodles Experiment Station. In order to discuss further IBPGR support, Dr. D.C. Giacometti (Board member) visited Jamaica during 1983.

The Centre de recherche agronomique d'Ekona of IRA, **Cameroon**, at the request of the IBPGR, has agreed to act as a regional field genebank.



Regarding aspects of *in vitro* conservation, the IBPGR is supporting research/training at the Catholic University of Leuven, **Belgium** on *in vitro* culture of banana (see p. 83).

CITRUS

The Botany Department, Faculty of Science, Chulalongkorn University, Bangkok initiated a two-year (1981-83) citrus collecting project in **Thailand** with IBPGR support and a total of 332 samples was collected. A detailed breakdown by species is provided in Table 5.

Following the recommendations of the IBPGR Working Group on Citrus Genetic Resources, 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. Expeditions will be organized in a number of countries (e.g. Burma, Laos, Thailand, Viet Nam) and the germplasm collected will be shared between the country of collection and Japan. The project will also establish a data base following the proposed IBPGR citrus descriptor list, both for material collected through the project and for existing collections in East Asia.

The first phase of the project proposed a collecting mission in Burma and Thailand, but due to unforeseen difficulties it could only visit Thailand during Nov.-Dec. 1983. The mission was carried out by the two organizers of the Fruit Tree Research Station, Japan, one participant from USDA (Florida) in collaboration with three Thai Universities (Chiang Mai, Chulalongkorn, and Prince of Songkla). Support was also provided by the IBPGR Regional Coordinator for Southeast Asia and a total of 160 samples was collected (see Table 5).

In addition to the data base for East Asia being established in Japan, the IBPGR is considering support to a similar exercise for all citrus collections in the Mediterranean. A project is most likely to be initiated in 1984 in cooperation with INRA/IRFA, Corsica, France.

Regarding *in vitro* conservation, the IBPGR has provided a grant to INIA, Valencia, **Spain** for the preliminary screening of techniques for *in vitro* conservation (p. 82).

Table 5. Citrus germplasm collected in Thailand

Genus/species	Number of samples	
	Chulalongkorn University 1981-83	International mission Nov.-Dec. 1983
<i>Aegle marmelos</i>	—	2
<i>Citrus aurantifolia</i>	39	12
<i>C. aurantium</i>	18	—
<i>C. grandis</i>	123	25
<i>C. hystrix</i>	15	2
<i>C. ichangensis</i>	1	—
<i>C. limon</i>	1	7
<i>C. macroptera</i>	—	2
<i>C. medica</i>	11	1
<i>C. microcarpa</i>	—	1
<i>C. mitis</i>	—	1
<i>C. nobilis</i>	2	—
<i>C. paradisi</i>	2	—
<i>C. reticulata</i>	41	21
<i>C. sinensis</i>	15	7
<i>Citrus</i> spp. (unidentified)	61	73
<i>Clausena lansium</i>	—	1
<i>Feronia limonia</i>	—	1
<i>Feroniella oblata</i>	—	1
<i>Fortunella japonica</i>	3	1
<i>Hesperethusa crenulata</i>	—	1
<i>Murraya paniculata</i>	—	1
TOTAL	332	160



Pomelo (*Citrus grandis*)

MANGO

Following a tropical fruit collecting project in the Philippines, the IBPGR has provided financial assistance for the establishment of a mango collection in that country. The major collection will be located at the IPB, Los Baños and a duplicate collection will be established in the Western Luzon Agricultural College (WLAC), San Marcelino, Zambales. At project completion a total of 247 accessions had been planted at the IPB and 197 at WLAC, and the remaining 83 accessions were repropagated and will be planted in the respective collections during 1984-85.

The world-wide inventory of tropical fruit collections reveals that most of the cultivated *Mangifera indica* variability appears to be conserved *ex situ*. Major emphasis needs therefore to be given to other wild and minor cultivated *Mangifera* species and the IBPGR agreed to undertake an eco-geographical survey of these *Mangifera* species. This work is being carried out by Prof. S.K. Mukherjee and during 1983 he visited the Rijksherbarium, Leiden, the Netherlands, to study the available herbarium material. For 1984 visits are envisaged to herbaria in France and the UK and links are being established with WWF/IUCN for field work in Asia.

TEMPERATE FRUITS

Following a fruit collecting expedition in Balistan, Pakistan in 1982, the Plant Genetic Resources Laboratory, NARC, PARC, Islamabad organized another collecting mission to northern Pakistan (Gilgit and Hunza) in January 1983. The mission collected 227 samples (17 almond, 32 apple, 73 apricot, 5 cherry, 37 grape, 15 peach, 5 pear, 6 plum, 6 pomegranate, 24 walnut and 7 others). The material is maintained at the NARC, Islamabad, at the Agricultural Research Institute, Sariat, Quetta and at the Agricultural Research Station, Mingora, Swat. The material has also been duplicated in the USA, but due to the short notice a high percentage of the material shipped did not survive.

The USDA Northwest Plant Germplasm

Repository has initiated a study on the genetic vulnerability of temperate fruit and nut crops. A proposal for IBPGR support to this project will be discussed by the Board in 1984.

A data base for the apple germplasm collections in Europe is being established as a joint IBPGR/EUCARPIA project. The publication of detailed catalogues is expected during 1984 (see p. 87).

A similar exercise for the European *Prunus* collections is being organized through the NGB in the framework of the ECP/GR *Prunus* Working Group. For further details see p. 59.

The IBPGR-supported project in Canada to study and assess the availability and current application of *in vitro* techniques to temperate fruits, will be completed early in 1984 (see p. 81).

INDUSTRIAL CROPS

Although the IBPGR works primarily on staple food crops it has incorporated in its programme a number of industrial or cash crops when they are of importance in rural development. Work on these crops received approximately 7% of available resources during the current five-year plan.

Over the past five years the Board has been active in developing field programmes on beet, cacao, coconut, cotton, grape and sugarcane and advice from international working groups has formed the basis for practical action. This action extends from the collection of threatened germplasm to its documentation. Figure 7 indicates where collecting occurred during 1983 for these crops.

In 1983 working groups were held on cacao, cotton and *Hevea* and in 1984 a working group will be convened on oil palm.

The review of the CGIAR in 1981 noted particularly that the IBPGR was the only Centre concerned with these crops and recommended that the work should continue.

maintaining close links with breeders and curators and during 1983 substantial progress was made on the compilation of a computerized data base.

Due to the nature of the material, many samples from collecting missions have been too small to deposit in the genebanks. Accordingly the IBPGR continued to provide a small grant to the Hellenic Sugar Industry, Greece to grow out small numbers of samples in order to multiply stocks and characterize the material.

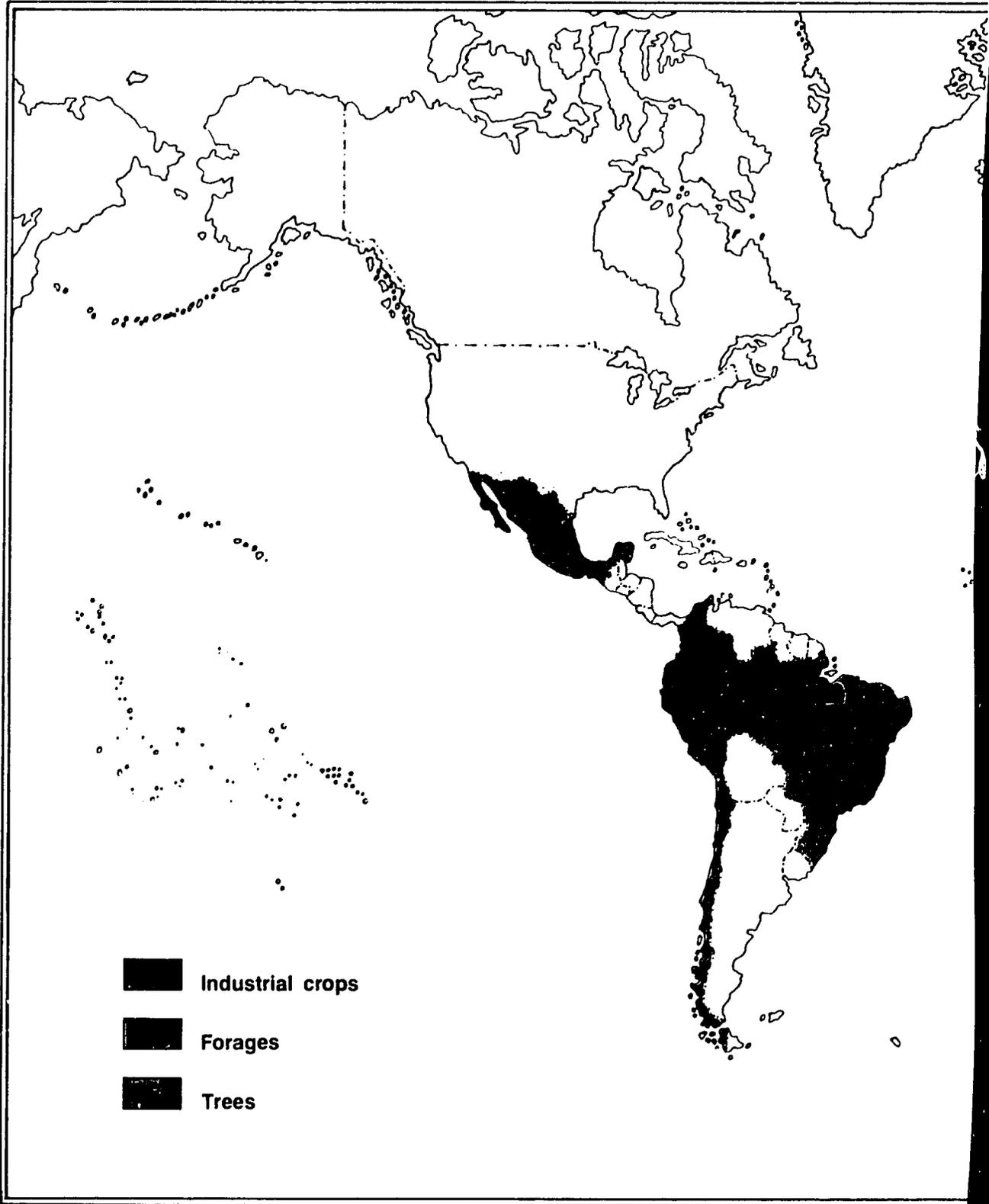
During 1983 the IBPGR supported a mission in Greece by the Hellenic Sugar Industry to explore the inland and maritime areas of Thessaly and eastern Macedonia (except Chalcidice which has been explored in the past), with emphasis put on wild material and primitive cultivars. A total of 62 samples was collected. Many primitive populations were found

BEET

Since 1980 the IBPGR has been attempting to widen the representation of the gene pool in existing genebanks through, firstly, the aggregation of materials scattered in numerous working collections, especially in Europe, and secondly, by collection of wild and primitive material in the Mediterranean region. A consultant has continued to assist the Secretariat in



Red beet collected by IBPGR, Greece



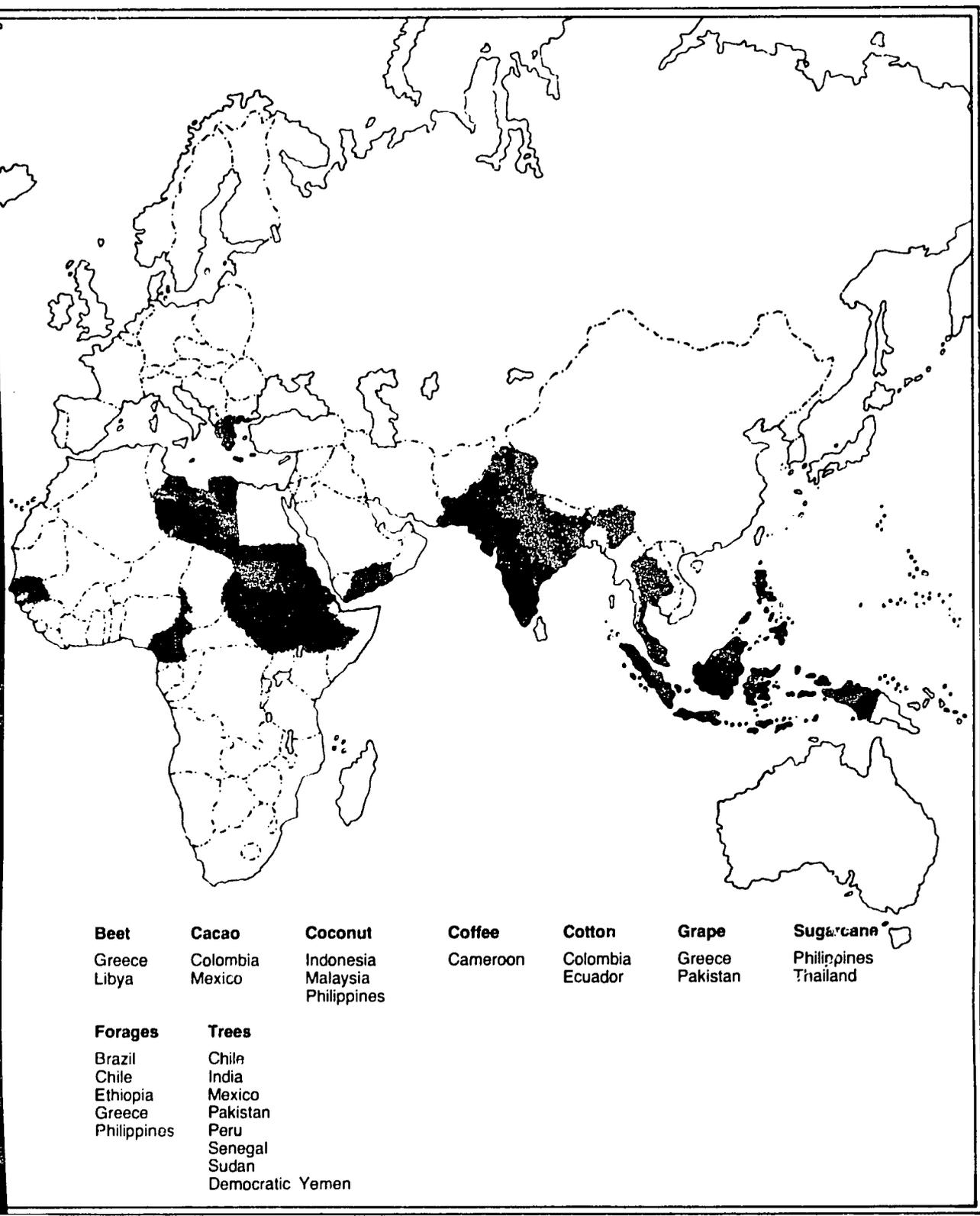


Figure 7. Countries where the IBPGR organized or collaborated in collecting industrial crops, forages and trees during 1983

to have been contaminated with sporadic introductions.

Since 1980 the IBPGR collecting missions have covered many of the priorities agreed by the IBPGR/IIRB Working Group. Nonetheless the TCC of the ECP/GR which met in December 1983 (p. 60) recommended that the IBPGR programme on beet should be accelerated. As a result in 1984 the Board will attempt to finish most of the priority collecting and to issue, as speedily as possible, an international catalogue of all samples.

Additionally, in a multi-crop collecting mission in Libya in the Tripoli and Fez areas in April-May, a small number of *Beta vulgaris* was collected. The mission was carried out in cooperation with the ARC, Tripoli, by the Istituto del Germoplasma, Italy, and ZIGuK, German Democratic Republic. Samples were sent to ZIGuK, with duplicates to the ARC



CACAO

Following endorsement in 1981 of a proposed framework of action developed by an IBPGR/IOCC Working Group the IBPGR has (through a consultant) been gathering information about collections in the countries within the primary centre of diversity in Latin Ameri-

ca, assessing the commitments of governments to genetic conservation of *Theobroma* and preparing more concrete action. The Working Group which met in 1980 stressed the need for such action on primary diversity.

By the end of 1982 sufficient fact-finding enabled a group of specialists from Latin America to meet with Dr. J. León, the IBPGR consultant, and agree on measures which would be acceptable to the countries concerned. This enabled a detailed discussion paper to be produced and it formed the basis for the decisions which were made by a second meeting of a Working Group, 21-22 October 1983. (See Appendix VI for membership of the Working Group.)

Updated information was provided on national collections in Brazil, Colombia, Ecuador, Mexico, Peru and Venezuela. The Working Group saw no reason to change the recommendation made earlier that primary field genebanks be designated and in addition agreed with the proposed designation of the two universal collections in Trinidad and Costa Rica (see *1980 Annual Report*). Nevertheless a number of constraints were noted in relation to the national collections, especially as regards documentation. Most of these collections do not have quarantine facilities and those that do exist are often inadequate. This re-emphasizes the need for quarantine transfer collections.



Wild cacao, Ecuador (J. Alan)

The Working Group refined the priorities for collecting as follows:

BELIZE

Southern section (Criollos, possibly autochthonous)

BOLIVIA

Department of Pando and Beni: Upper courses of the Madre de Dios, Beni and Mamore rivers: centre for expeditions and germplasm bank at Riberalta.

BRAZIL

CEPEC and CENARGEN have detailed plans, manpower and other facilities for the organization of collecting expeditions. The critical areas, especially in Acre, are being collected in view of the threat of deforestation and the establishment of hydroelectric plants. The following areas are planned for exploration: Eixo da Rodovia BR-152, Regiao do Baixo Tocantins, Eixo da E.F. Carajás-Itaqui, Regiao da Serra dos Carajás, Alto Xingu, Projeto Jari, Rio Trombetas, Area da Hidroeletrica de Balbina, Rodovia Perimetral Norte, Rio Branco, Alto Rio Negro, Medio Solimões (Fonte Boa), Alto Japurá (Cagneta), Alto Solimões, Baixo Juruá, Medio Juruá, Regiao de Costa Marques, Area da Hidroeletrica de Samuel, Area de Colonizacao de Rondônia, Area de Colonizacao da Tendeco.

COLOMBIA

Amazonian region: basins of the rivers Yari, Caguán, Artegaça-Caqueta, Putumayo

Orinoco: (upper region) headwaters of the Arauca, Casanare, Cusiana, Upía

Pacific coast

Pockets of diversity: Antioquia; Huila, Atlantic coast (Criollos and mixtures); Cauca; Northern Santander.

COSTA RICA

Pacific coast: (Criollos from old plantations) Nicoya, El General, Burica

Northern section: Upala-Guatuso (Criollos and Pentagona).

ECUADOR

Amazonian region: The systematic exploration currently under way should be continued.

GUATEMALA

Pacific coast: Retalhuleu-Mazatenango Suchitepequez (Criollo, relics of former plantings).

Alta Verapaz: Cobán, Criollos and Pentagona in forests.

GUYANA, SURINAME

Forest areas in the southern section (wild Calabacillo).

HONDURAS

Atlantic coast (Criollos, possibly autochthonous) Rio Aguán, Cuyamel, Olanchito.

MEXICO

Chiapas, Lacandón forest: Sinai, Nueva Zamora, Bonampak (autochthonous Pacific coast, from Tehuantepec populations) to Colima (isolated planting of Criollo).

NICARAGUA

Pacific coast (Criollos from abandoned plantings): Valle Menier, Nandaime, Masatepe.

PANAMA

Pacific coast: Azuero (Criollos, from old plantations).

VENEZUELA

Orinoco: delta and medium and upper courses
Pockets of diversity: Rio Catatumbo; Santa Barbara, Chama; coastal area.

The report of the Working Group will be discussed by the eleventh meeting of the Board in February 1984.

However, as opportunities arose for collecting during 1983, the Board initiated activities. A mission was fielded in **Colombia** during October by ICA and material was collected from the Pacific coastal region. Collecting was continued under a project begun in 1982 in **Mexico** in cooperation with INIA and duplicates will be supplied to CATIE, Costa Rica.

Since 1980, the London Cocoa Trade Amazon Project (LCTAP) in association with INIAP, Ecuador has been systematically collecting in the Amazonian part of Ecuador. The methodology followed in this project could be used by the IBPGR as a basis for training

scientists from national programmes since the Working Group recorded its satisfaction with the LCTAP.

In addition, one of the universal collections to be designated by the IBPGR, the International Cocoa Genebank, **Trinidad** received funding from the Board to document the collection using the IBPGR descriptors published in the *Genetic Resources of Cocoa*. The project will run for two academic years (1983/84 to 1984/85).

Work has continued on *in vitro* conservation of *Theobroma cacao* and its clonal propagation at the University of Nottingham School of Agriculture, UK. Dr. L. Withers, who is involved with this *in vitro* work acted as a resource person at the Working Group meeting mentioned above. She provided a report synthesizing current activities and world-wide opinions on *in vitro* culture of cocoa thereby enabling the Working Group to consider these in detail prior to making its recommendations.

COCONUT

Toward the end of 1980, the IBPGR provided funds to the National Committee for Germplasm Conservation in **Indonesia** for a three-year coconut collecting project and this was completed in 1983. The project was carried out in cooperation with the Research Institute for Industrial Crops (BALITRI), Bogor and Manado, and collecting was undertaken in Mentawai Islands, west Sumatra, Nias Island, north Sumatra and Riau Archipelago. A total of 139 population samples was obtained and these are maintained at BALITRI, Manado.

MARDI, in cooperation with the Department of Agriculture (coconut replanting and rehabilitation unit) carried out a collecting project with IBPGR funding. By the end of 1983, 52 populations had been sampled from 33 collection sites in peninsular **Malaysia**. Seventeen sites still remain to be explored. All samples are maintained at MARDI's Hilir Perak and/or Kemaman Stations.

From 1980 onward, the IBPGR has provided funds to the PCA for the establishment of a coconut genetic resources centre in the **Philippines** and to further collect material. The PCA has followed a coarse grid sampling

strategy whereby the country has been divided into 218 grids of 40 × 40 km. Up to mid-1983 a total of 69 grids had been surveyed representing 162 sampling sites in Davao, two Ilocos provinces (Iloilo and Laguna), part of Quezon province and two Zamboanga provinces. The collection is maintained at the PCA's Zamboanga Research Centre and partially duplicated at its Davao and Albay Research Centres (the latter uses the material for screening against cadang-cadang). Already 12 populations out of the 29 flowering accessions in the collection have been used as parents for 45 hybrids now in trial by PCA.

GRAPE

In 1982 a programme was initiated to establish a germplasm collection of *Vitis* in **Greece**. This project will continue for a number of years and will cover exploration, collecting, characterization, documentation and conservation of *Vitis vinifera* and *Vitis silvestris*. It is implemented by the Vine Institute, Lycovryssi, Athens in cooperation with the Greek Gene Bank, Thessaloniki and the Viticultural Institute, Heraklion. Grants have been provided by the IBPGR covering the exploration and collecting phase (1982-84) and it is anticipated that the Greek institutions will assume full financial responsibility for subsequent phases of this programme.

In the initial stage of exploration a total of 819 cultivars have been identified which are not yet represented in existing collections, and these were distributed in the different regions of Greece as follows:

— East Macedonia and Thrace	180
— Central and West Macedonia	102
— Thessaly	67
— Central Greece	53
— Attica/Aegean Islands	86
— Epirus	86
— Ionian Islands	66
— Peloponnesus	154
— Crete	25

A total of 37 samples of grape was collected in northern **Pakistan** during the multi-temperate fruits mission conducted by NARC, PARC (p. 40).

Both the IBPGR consultation on *Vitis* Genet-

ic Resources (1982, Thessaloniki, Greece) and the 62nd General Assembly of OIV (Office international de la vigne et du vin), Paris indicated the need to produce an inventory of all major *Vitis* collections in the world in order to be able to make this information available to all possible users both in developing and developed countries. Funds for this work were provided by the FAO Crop Genetic Resources Centre to OIV, which will assume overall responsibility for the implementation of this project. The actual work is being carried out by Professor Dr. R. Bläich of the Bundesforschungsanstalt für Rebenzüchtung, Geilweilerhof, Federal Republic of Germany. The project is being carried out in two phases:

a) Directory of collections

Both the OIV and the IBPGR have carried out preliminary investigations on the contents of major *Vitis* collections in OIV member countries and Europe respectively. This information will be analysed and further details obtained. As a result a joint FAO/IBPGR/OIV Directory of *Vitis* Germplasm Collections, (following the format of the IBPGR Directories of Germplasm Collections) will be issued.

b) Data base

A data base covering all collections will be developed (see p. 86).

The IBPGR-supported research programme on seed physiology at the University of Reading, UK, has investigated the storage of grape seeds and a paper has been published.

COFFEE

Although the IBPGR endorsed recommendations in 1980, little action has been initiated on collecting. In 1983 field work was carried out in **Cameroon** for wild species through ORSTOM, Centre d'Adiopodoumé, Abidjan, Ivory Coast with IBPGR support. This work explored a region of diversity of *Coffea liberica*, *C. canephora*, *C. brevipes* and *C. congensis*. The materials were divided between the Institut de la recherche agronomique at Nkolbisson (for evaluation) and the Centre at Adiopodoumé (for storage).

In addition the Ethiopian authorities have been active in declaring *in situ* reserves in the primary centre of diversity of *Coffea arabica*.

COTTON

An *ad hoc* Working Group on the genetic resources of *Gossypium* was convened by the IBPGR, hosted by GERDAT, Montpellier, France, 14-16 June 1983 and cosponsored by IRCT. The members of the Working Group are listed in Appendix VI.

Although a number of countries hold germplasm collections, after reviewing these holdings the Working Group noted that none of the collections was comprehensive; hence the need to increase the representative variability.

It identified geographic gaps for each species of *Gossypium* and determined that collection of both cultivated and wild species was equally important.

The collection priorities agreed are listed in **order of priority**:

- Caribbean islands, Mexico, Africa and northeast India
- Central America, Bolivia, Brazil, Paraguay, Peru, Australia (wild species), Burma, Kempuchea, Laos, Thailand and Viet Nam
- Other countries with a relatively long history of cotton cultivation.

Since 1980 the IBPGR has been actively involved in the collection and conservation of *Gossypium* germplasm from the centres of diversity in Central America, Mexico and the Caribbean islands. This activity has been carried out largely by IRCT on behalf of the IBPGR but the Board has provided funds to some national programmes.

During 1983, with financial support from the IBPGR, two collection expeditions were fielded in **Ecuador** during September-October and December 1983. This was a collaborative mission with IRCT, USDA-ARS, IBPGR and INIAP. A total of 264 accessions of door yard sub-spontaneous and wild species of *G. barbadense* was collected from the mainland and the Galápagos islands. The material from the Galápagos islands (Santa Cruz, Floreance, Española, Gardner, San Cristóbal and Eden)

was primarily samples of *G. barbadense* var. *darwinii* (125) and *G. klotzschianum* (32). The material collected included populations of endemic wild *G. barbadense* from Guayas and Los Ríos provinces and door yard cotton from Loja and Azuay provinces. (Due to unseasonal rains in early July, the maturity of the crop was delayed in many parts of the country and a second mission was fielded in December in the western part of Guayas province. This resulted in the collection of an additional 61 samples of *G. barbadense*.)

The Instituto Colombiano Agropecuario (ICA), Bogotá, Colombia with financial support from the IBPGR started the collection of cotton germplasm from Atlántico, Bolívar, Córdoba, César, Choco, Magdalena, Guajira, Sucre, Cauca, Valle del Cauca and Narino provinces. Support was provided in response to an emergency situation arising from the proposed widespread use of herbicides. The mission will continue in 1984.

The ARS/USDA, on behalf of the US National Plant Germplasm System, in collaboration with CSIRO, Australia, collected several samples of Australian species of *Gossypium* from the Kimberley region, Western Australia during Jan.-Feb. 1983. The materials collected included *G. pulchellum* and many undescribed taxa. More collecting missions are planned and the IBPGR may take part in these explorations in the future. ARS-USDA also visited Mexico during the latter part of 1983 to collect cotton.

Since 1980 the IBPGR/IRCT collecting missions in Latin America have collected over 1 200 accessions of *Gossypium*. These materials are being grown in Guadeloupe for multiplication, characterization and distribution of duplicate samples to designated base collections. The genebank at Montpellier, France has, as suggested by the IBPGR, computerized most of the information (passport data and, to a lesser extent, the characterization and evaluation data). The IBPGR Secretariat has been attempting to gather additional data from other countries with the aim of producing a world catalogue.

RUBBER

The IBPGR convened a Working Group on the Genetic Resources of *Hevea*, 21-22 Sep-

tember 1983. It was cosponsored by IRRDB and hosted at the Tun Abdul Razah Laboratory of the Malaysian Rubber Producers' Research Association. The participants at the Working Group are shown in Appendix VI. The purpose of the meeting was to assess the availability for applied research of *Hevea brasiliensis* and other related species, to consider whether material is under threat in the centre of diversity and to advise the IBPGR on the necessary requirements to ensure that representative samples of the genetic viability of the gene pool are conserved.

It was noted that collection of species other than *H. brasiliensis* is needed; the primary role of EMBRAPA in the conservation of *Hevea* should be acknowledged and supported as deemed necessary; the Brazilian authorities should be approached with a view to strengthening *in situ* conservation; ecogeographical work is needed in the Amazon basin; and standard descriptors should be developed.

Priorities (both taxonomic and geographic) for collecting were agreed as follows:

- | | |
|------------------------|---|
| <i>H. brasiliensis</i> | 1. Basin of Purus and Madeira Rivers, the latter under stress from human population pressure. |
| | 2. Northern Bolivia and Madre de Dios (Peru). |
| <i>H. benthamiana</i> | Central Amazonas around Manaus. Material from this region is poorly represented in collections. |
| <i>H. guianensis</i> | Peru, Bolivia, Southern Amazonas, French Guiana, Guyana and Suriname. |
| <i>H. pauciflora</i> | West of Manaus and the Colombian/Bolivian border. |
| <i>H. camporum</i> | } Basin of the Rio Negro, West of Manaus and Brazilian/Colombian border. These areas are not threatened by human population pressure. |
| <i>H. microphylla</i> | |
| <i>H. nitida</i> | |
| <i>H. rigidifolia</i> | |
| <i>H. spruciana</i> | |

The Board considered the report of the Working Group at its eleventh meeting in February 1984.

SUGARCANE

Collecting missions in 1983 followed the priorities agreed by the IBPGR in 1981. Missions were fielded in the Philippines and Thailand and preparations advanced for work in Indonesia.

In September a two-year programme was initiated with PHILSUCOM, Research and Development Office, in association with its experiment station at La Granja, Le Carlote City to collect throughout the **Philippines** the old cultivars of sugarcane that are no longer commercially important and their wild relatives. PHILSUCOM will carry out cytogenetic studies on the samples and see that duplicates are maintained at the Luzon Sugarcane Experiment Station, Florida-blanca, Pampanga; seeds and clones will also be distributed to IBPGR-designated collections in other countries.

In March 1982 the IBPGR provided funds to the Botanical Section, Botany and Weed Science Division of the Department of Agriculture, **Thailand** for the collection of *Saccharum* germplasm. Expeditions were made in all parts of the country over a period of 18 months. By September 1983 a total of 198 accessions were



Saccharum Officinarum, Thailand (J. Sadakorn)

obtained including 44 *Saccharum officinarum*, 115 *S. spontaneum*, 3 *S. sinense*, 23 *Erianthus* spp., 9 *Sclerostachya fusca* and 4 *Narenga porphyrocoma*. Of the *Saccharum officinarum* samples representatives included the Mauritius, Ooi kao, Tapao and Ooi dum groups, although diversity was low.

The IBPGR sponsored an additional collecting mission in **Thailand** by the Thai Department of Agriculture, which was assisted by a scientist from the Sugarcane Breeding Institute of ICAR, India. A total of 175 samples was collected consisting of 27 *Saccharum officinarum*, 3 *S. sinense*, 120 *S. spontaneum*, 9 *Sclerostachya fusca*, 4 *Narenga porphyrocoma* and 10 *Erianthus* spp. A follow-up by the Board to see that characterization and documentation are completed is expected in 1984.

Since the ISSCT has been active — through its Committee on Germplasm and Breeding — in collecting germplasm, especially in the eastern parts of the Melanesian region, the Board contracted in 1983 with ISSCT — in association with the national programme in Indonesia — for the collection of *Saccharum* in eastern Indonesia.

The IBPGR project for joint documentation, according to the agreed descriptors, of the two major ISSCT world collections in India and the United States (through a grant to the Florida Sugar Cane League), was delayed somewhat due to the time taken for an Indian scientist to receive clearances.

Of the two ISSCT collections the one in the United States has accepted designation as an IBPGR base collection and negotiations are under way for the Indian collection to be similarly designated as a field genebank.

Experiments at the University of Reading, UK on the viability of sugarcane seeds stored under a variety of moisture contents and at different constant temperatures were finished in 1983. The results of the tests help indicate why previous work on storing sugarcane seeds has not always been successful.

In addition a 16-month project was initiated in 1983 by WICSCBS, Barbados to test the reliability of the IBPGR descriptors for sugarcane over a variety of sites. The project will also determine whether clones which are disease-susceptible and hard to maintain would be more securely stored *in vitro* rather than in the field.

TOBACCO

Tobacco does not have IBPGR world-wide or regional priority, but it is an important crop locally in some sub-regions, i.e. in parts of the Mediterranean.

The IBPGR continued support to the Tobacco Institute of Greece for the collection of *Brassica* and *Allium* species, tobacco and other crops. The project, which will last five years, started in 1982. In 1983, 173 samples of wild and cultivated *Nicotiana tabacum* were col-

lected in Greece in eastern Macedonia and Thrace, bringing the total collected in the project to 323 samples. The material was deposited at the Greek Gene Bank, Thessaloniki with duplicates sent to the Tobacco Institute, Drama.

In addition, a small number of samples of *Nicotiana rustica* was collected during a multi-crop mission in Libya by the Istituto del Germoplasma, Italy and ZIGuK, German Democratic Republic. The latter organization will store the samples. ARC, Tripoli cooperated with the mission and received duplicates of the samples.

FORAGES

In view of the world-wide importance of forages, a global plan was formulated and approved at the Board's tenth meeting in February 1983. The plan outlines priorities for semi-arid and arid areas, those with Mediterranean climates, tropical/subtropical zones and temperate areas. It lists genera/species for collection and itemizes action over a five-year period.

Under the plan:

- A forage crop advisory committee and specific working groups for (a) semi-arid and arid areas and (b) tropical and subtropical zones will be formed.
- Cooperative ties will be enhanced for forage conservation with ICARDA for its mandate region; and with the Division of Tropical Crops and Pastures of CSIRO, Queensland, Australia, CIAT and ILCA for tropical and subtropical germplasm.
- Steps will be taken for cooperation with two Australian State Departments of Agriculture for annual medics and annual *Trifolium*.
- Training courses in forage germplasm conservation will be organized and supported.

To facilitate implementation of the global

plan, the IBPGR has an officer exclusively devoted to forages.

The CEC/IBPGR *Grass and Forage Legume Descriptor List* was finalized and prepared for joint publication. This list will be presented for adoption at the ECP/GR Forages Working Group early in 1984. The *Directory of Germplasm Resources: 7. Forages* is also being prepared for publication.

In 1983 the IPB, Philippines, continued characterization of forages, some of which were previously collected in that country (mainly in Luzon). The forage collection totals 348 accessions, including *Aeschynomene*, *Cajanus*, *Colopogonium*, *Desmodium*, *Gliricidia*, *Leucaena*, *Macroptilium*, *Pueraria*, *Sesbania*, *Vigna*, *Crotalaria* and *Prosopis*.

Numerous collecting missions were sponsored, cosponsored or supported by the IBPGR during the year.

The Royal Botanic Gardens, Kew, UK, in cooperation with CENARGEN/EMBRAPA, Brazil collected 187 samples of leguminous and 4 of grass species in northeast Brazil during April-May. The aim of the mission was to collect in the arid and semi-arid areas of Brazil which have a very diverse flora. The samples comprised mostly *Aeschynomene*, *Centrosema*, *Stylosanthes* and *Zornia*. Duplicates of the collection will be deposited at CENARGEN and

at Kew. In another mission conducted by CENARGEN for groundnut in northern **Brazil**, 14 grasses and 4 legumes were also collected.

The Instituto Nacional de Investigaciones Agropecuarias (INIA), **Chile**, began collecting forage germplasm in Chile in October 1983 to evaluate the germplasm for adaptation to land unsuited to exotic species, to introduce species to cold climates and to study toxic properties. Storage and documentation of accessions will be undertaken at the Instituto de la Patagonia, Chile and determination of toxic properties will be carried out by the Universidad de Magallanes, Chile, where duplicate samples will be deposited. Genera collected will include: *Adesmia*, *Agropyron*, *Agrostis*, *Alopecurus*, *Astragalus*, *Atriplex*, *Bromus*, *Deschampsia*, *Deyeuxia*, *Elymus*, *Ephedra*, *Festuca*, *Geranium*, *Lathyrus*, *Muytenus*, *Phleum*, *Poa*, *Puccinellia*, *Rytidosperma* and *Vicia*.

A project to collect highly variable forage germplasm was undertaken by ILCA in **Ethiopia** from May to December. The germplasm will be conserved at the Plant Genetic Research Centre (PGRC), Ethiopia, and evaluated for adaptability to other tropical pasture lands with similar ecoclimates. Genera that were collected include *Andropogon*, *Desmodium*, *Festuca*, *Lotus*, *Medicago*, *Pennisetum*, *Phalaris*, *Phynchosia*, *Setaria*, *Snowdenia*, *Stylosanthes*, *Trifolium* and *Vigna*. The material will be screened for adaptability to high (2 800 m), medium (2 400 m), low (1 700 m) and lowland (1 000 m) altitude areas. Duplicate samples will be deposited in CSIRO, Australia and at CIAT, Colombia.

A comprehensive series of collecting missions for forages were made in **Greece** by the Fodder Crops and Pastures Institute, Larissa, Greece. The zones collected ranged in altitude from sea level to 1 300 m and comprised: the islands of Evia (July), Syros, Paros and Naxos (August); Epirus (August); and Thessaly (July, September and October). A total of 166 samples was collected, including *Dactylis glomerata* (30), *Lolium* spp. (7), *Oryzopsis* spp. (6), *Phalaris tuberosa* (6), *Trifolium alexandrinum* (8), *T. pratense* (13), *T. repens* (17), other *Trifolium* species (32). The material was collected to enhance breeding programmes and to curtail genetic erosion resulting from heavy grazing, increasing cultivation over large areas

of pasture land and the spread of improved cultivars. After multiplication of 60 of the forage samples collected the entire collection will be conserved in the Greek Gene Bank base collection at Thessaloniki.

A preliminary survey of cultivated and wild forms of forage germplasm in northern **Portugal** was made in July by Portuguese scientists and the University of Southampton, UK. The survey will be followed up by collecting during 1984. Genera to be collected include *Cicer*, *Lathyrus*, *Lens*, *Pisum* and *Vicia*. Some of the forages in northern Portugal are unique and appear isolated from eastern Mediterranean forage populations. Following collection in 1984, detailed characterization and documentation will be made. Duplicates will be provided to the Portuguese national germplasm programme, the Istituto del Germoplasma, CNR, Bari, Italy, the Zentralinstitut für Genetik und Kulturpflanzenforschung (ZIGuK), Gatersleben, German Democratic Republic (the latter two are base collections) and the University of Southampton.

A three-year tropical forage collection and conservation project was begun by CIAT in January in Southwest Asia. CIAT has a programme for improvement of pastures under acid soil conditions, and the collectors will give emphasis to forages growing on these soils.



Trifolium pratense, Greece

TREES

The IBPGR continued its support during 1983 to a programme aimed at sampling and conserving the genetic resources of woody species in arid and semi-arid regions. The programme, begun in 1979, is funded by the IBPGR (utilizing UNEP funds) and FAO and organized by the FAO Forestry Department.

The objective of the programme is to gather information and genetic material in order to better utilize tree species which are vitally important in many rural areas.

Trees, of the genera *Acacia*, *Atriplex* and *Prosopis*, provide fuel, food, fodder, utility wood, shade and shelter in tropical, arid and semi-arid areas. In addition to collection, evaluation and conservation of germplasm, the project is also helping to create a self-supporting network of centres that work with multi-purpose tree species.

The emphasis has been on fuelwood species in low rainfall areas because the scarcity of wood to burn for cooking is often a leading cause of hunger in the target areas.

A further aim is to promote the use of well-adapted genetic material suitable for village woodlots, shelterbelts, fodder and land rehabilitation. Priority is given to existing stands of shrubs and trees which are in danger of extinction or genetic erosion but which are adapted to prevailing environmental conditions and are accepted by local people. Priority is also given to provenance trials in which local and introduced species can be compared under uniform management systems.

Eight countries are at present formally cooperating in the programme: Chile, India, Mexico, Pakistan, Peru, Senegal, Sudan and Democratic Yemen. The national research institutes or forest services of the participating countries are carrying out the exploration, collection and evaluation work. In addition, seed is also being collected in Australia and Israel.

Collaboration in some of the collection activities is provided by CTFT of GERDAT,

France (for West African *Acacia* species); CFI, UK (for Central and South American *Acacia* and *Prosopis* species); and the Royal Botanic Gardens, Kew, UK (for East and Central African species).

Seed collection of *Acacia*, *Atriplex* and *Prosopis* continued in **all cooperating countries** during 1983. The amount of seed collected varied from 0.5 to 20 kg per provenance. It has also been decided that seed of *Cercidium* spp., *Chilopsis* spp. and *Balanites* spp. would also be collected in Mexico, Senegal and Democratic Yemen for evaluation within the framework of the project.

Seeds are documented in standard format, initially cleaned and sent for further cleaning and treatment to the Forest Tree Seed Centre, of the Danish International Development Agency (DANIDA), Denmark, and are then distributed to cooperating countries. Seed samples are also sent to the IBPGR-designated base collection centre for long-term storage, the Royal Botanic Gardens, Kew, UK.

In March 1983 a list of the seed available was sent to cooperating countries, which then specified those they planned to evaluate. Following is a summary of the seedlots distributed:

Country	No. of seedlots	No. of sites for evaluation
Chile	12	1-4
India	37	2-10
Israel	7	2
Mexico	20	4
Pakistan	19	4
Peru	18	4
Senegal	34	2
Sudan	31	2
Dem. Yemen	10	1-3

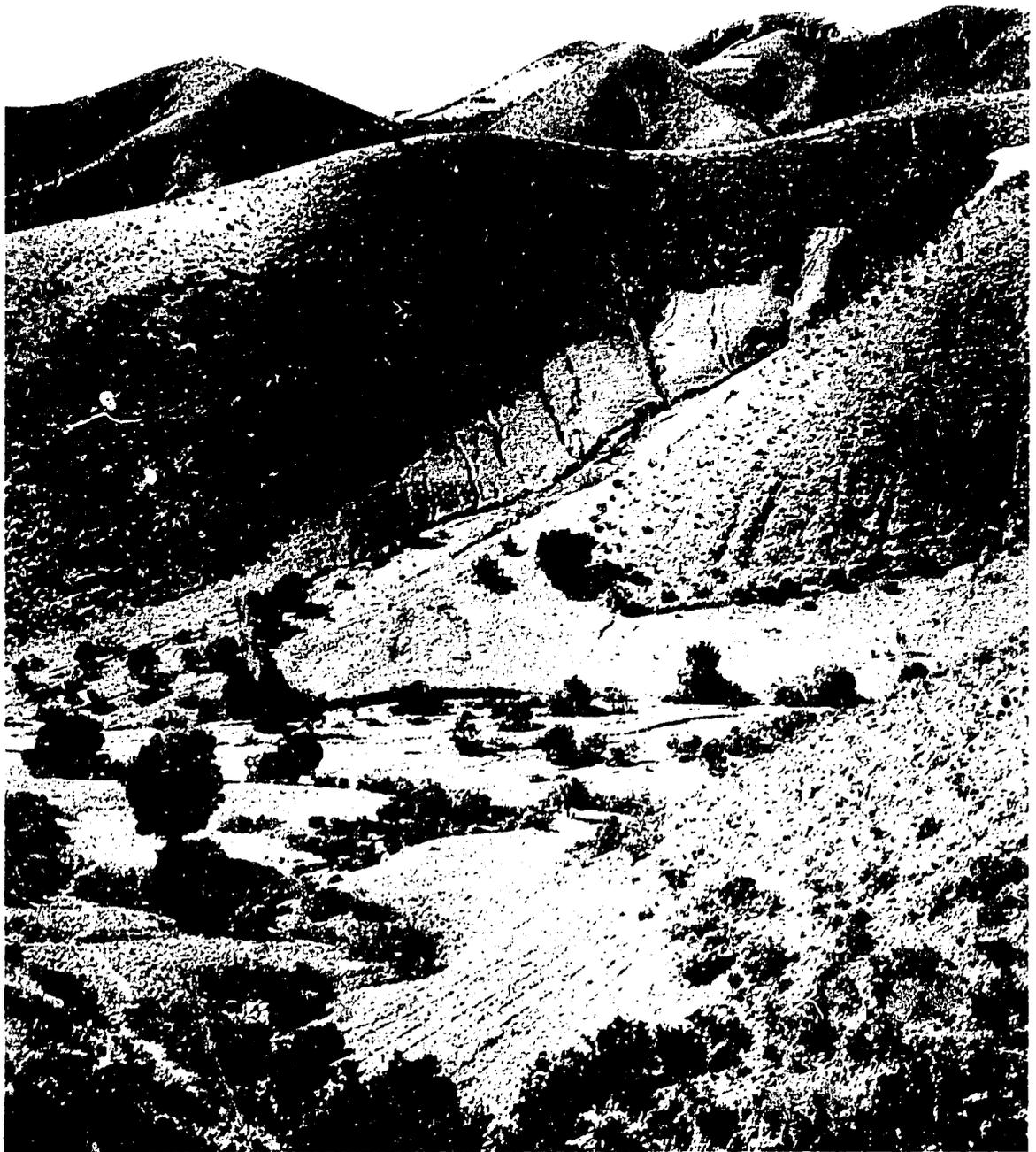
Representatives of the Board and the FAO Forestry Department were present at a plan-

ning workshop on Multipurpose Tree Germplasm to discuss international cooperation. The workshop was cosponsored by ICRAF, IBPGR and CFI, was hosted by the National Academy of Sciences, Washington, D.C., and was held from 31 May to 4 June.

During 1983 training — in the form of study tours — was conducted for technical staff involved in the project who visited other countries with similar ecological conditions (Peruvians to Chile and Argentina; Yemenis to Australia; Chileans to Mexico; Indians to the Un-

ited States, Brazil and Australia). Seminars and courses on practical aspects, such as seed collection in arid zones, were held or planned in Mexico, Senegal and Sudan.

In 1983, six technical manuals were prepared on *Acacia* and *Prosopis* which deal with taxonomy; seed insects; and seed collection, handling and storage. The handbooks were published in English, French and Spanish and will be distributed in 1984 (see Appendix X for titles). The manuals fill an information gap.



REGIONAL ACTIVITIES

AFRICA

Since its establishment, the IBPGR has had an active role in the conservation of African crop genetic resources. The Board identified Ethiopia, Western Africa and Eastern Africa as priority areas for action with the aim of stimulating and encouraging national germplasm programmes to establish a viable network of plant genetic resources centres. The IBPGR has established Regional Offices in Western and Eastern Africa. Much has been accomplished during the past few years in the collection of local landraces of major food crops. In this endeavour the IBPGR works with a large number of national, regional and international organizations: ICRISAT, IITA, ILCA, ICRAF, IRAT, IRAZ/CEPGL, ORSTOM, GERDAT, WARDA, Institut du Sahel, OAU, ACCT, AAASA and others.

Joint collaboration continued in 1983 between IITA and the IBPGR. Characterization and evaluation of cowpea germplasm — initiated during 1982/83 — is being continued during 1983/84. IITA and the IBPGR jointly organized a training course for research technicians in genebank management and seed technology during August 1982. Eighteen students from various African countries attended (p. 92). In another project the IBPGR, in association with IITA, has initiated a detailed survey on African plant genetic resources. The first draft report is currently being revised.

Assistance is also rendered to national programmes which in many cases are in the emerging stages. Most countries possess some collections, often in the form of breeder's stocks of

exotic and indigenous material. The Board has also been providing assistance/equipment to upgrade storage facilities in many countries.

During 1983 the IBPGR sponsored or co-sponsored collecting missions in many African countries (see Table 6). In several institutions, multiplication and characterization were also in progress; details of these are provided in the respective crop section.

At the request of the Institut de recherche agronomique et zootechnique of the Communauté économique des pays grands lacs (IRAZ/CEPGL), the Regional Coordinator for East Africa visited several research stations in Burundi, Rwanda and Zaire. Following these visits, the IBPGR agreed to field exploration missions in CEPGL countries during 1984-86 and also to provide deep-freeze cabinets and drying equipment to IRAZ.

The Plant Genetic Resources Centre of Ethiopia (PGRC) maintains germplasm of a wide variety of crops (cereals, food legumes, oil crops and vegetables). The total accessions, numbering 20 000, are being characterized and evaluated in cooperation with various institutions in the country. During 1983 the IBPGR provided a consultant to PGRC to assist in barley germplasm collection and characterization. The cold storage facilities which have been provided by GTZ are being expanded. In addition to PGRC, the forage programme of ILCA is also involved in the collection of germplasm. During late 1982 and early 1983, ILCA explored the Ethiopian highlands and the Rift valley and collected samples of forage

Table 6. Collecting missions supported by the IBPGR in Africa during 1983

Country	Period	Participating Institute/ country	Crops	No. of samples
Cameroon	Jan.-March	IRA, Cameroon & ORSTOM, Ivory Coast	<i>Coffea</i>	63
Ethiopia	Dec. 1983 to Jan. 1984	PGRC, Ethiopia & ZIGuK, German Democratic Republic	cereals oil crops pulses	186
Ethiopia	1982-83	ILCA	forage legumes	
Ghana	1982-83	CRI, Bunso	rice	55
			sorghum	61
			maize	29
			groundnut	40
			pigeonpea	14
			<i>Dioscorea</i> spp.	170
			lima bean	26
			cowpea	63
			Bambara groundnut	30
			other food legumes	30
			<i>Citrullus lanatus</i>	8
			<i>Lagenaria siceraria</i>	24
Guinea	1982-83	ORSTOM, IRAT, IDESSA, Ivory Coast & Ministry of Agriculture, Guinea	rice	770
Ivory Coast	1982-83	Université nationale, Abidjan	<i>Dioscorea</i> spp.	455
Kenya	1983	Royal Botanic Gardens, Kew, UK	39 legumes	
Sierra Leone	1983	ICRISAT	sorghum, pearl millet, groundnut	—
Somalia	1983	Royal Botanic Gardens, Kew, UK	multi-crop	33
Sudan	1982-83	ARC, Wad Medani	Vegetable crops and fruits	331
Uganda	1983	Royal Botanic Gardens, Kew, UK	<i>Psophocarpus</i> spp. 38 other legumes	7
Upper Volta	1982-83	IVRAZ	<i>Dioscorea</i> spp.	260

legumes. In 1983 PGRC and ILCA started the joint publication of a newsletter on plant genetic resources.

The CRI, Bunso, Ghana has continued its activities in the collection and characterization of germplasm. Toward the end of 1982 and early 1983, CRI, with funds from the IBPGR, fielded expeditions to several parts of the country. A total of 700 accessions belonging to 16 genera, including cereals, grain legumes, vegetables and root crops was collected. This material is being multiplied at Nyankpala Agricultural Experiment Station. The Station has also undertaken the multiplication of *Solanum*

germplasm collected in Benin, Togo and Ghana for safe-keeping in IBPGR-designated base centres. The IBPGR provided deep-freeze cabinets and other equipment to the ARS for the conservation of germplasm assembled there.

Several institutions in the Ivory Coast have close links with the IBPGR and have been involved in the collection, characterization and documentation, and training activities. The Ministère de la recherche scientifique, with partial funding from the IBPGR, will establish a long-term storage facility at IDESSA. This genebank will have regional responsibility for

the conservation of maize, minor millets and vegetable crops. The Université nationale de Côte-d'Ivoire, the ORSTOM centre at Adiopodoumé and the IBPGR jointly organized a training course on crop genetic resources at Abidjan from 3 May to 6 June 1983. This course was held in French and participants from several francophone countries attended.

Plans to establish a national genetic resources centre at Thika, Kenya have been finalized. GTZ is providing the financial assistance for this project under a bilateral agreement with Kenya. In addition, the IBPGR also provided a grant to the Agricultural Research Institute, Muguga, in 1983 for the improvement of existing storage facilities and also for rejuvenation and multiplication of available germplasm. The Royal Botanic Gardens, Kew, UK explored the Kitale and Mombasa regions and collected various species, including wild relatives of winged bean.

The Universidade Eduardo Mondlane of Mozambique, with support from the IBPGR and IDRC, is establishing a cold storage facility for the conservation of groundnut germplasm at Maputo. The University proposes to continue collection and characterization of available material.

The National Horticultural Research Institute (NIHORT), Ibadan, Nigeria is in the process of finalizing plans to expand its cold storage facilities. The IBPGR has agreed to provide the necessary equipment and when completed it will serve as a base centre for vegetable germplasm.

The Université de Niamey, Niger, with funding from the IBPGR, has purchased deep-freeze chests for the storage of existing germplasm.

The Agricultural Research Corporation (ARC), Wad Medani, Sudan, in 1983 continued the collection of vegetable crops germplasm. The IBPGR provided funds for



Multiplication of amaranths at NIHORT (T. Badra)

collection activities and also supplied equipment to establish a cold storage facility for the preservation of germplasm of agri-horticultural crops.

The Direction de la recherche agronomique, Lomé, Togo, received funds from the IBPGR

for the purchase of deep-freeze chests and also other equipment to improve storage facilities. At the request of the Togo authorities the IBPGR has agreed to appoint an intern to assist national scientists in genetic resources collection, characterization and documentation.

EAST ASIA AND THE PACIFIC

As a follow-up to the IBPGR Symposium held for East Asia and the Pacific, the Board organized a formal mission to the People's Republic of China in April 1983. Cordial discussions were held with the President and staff of CAAS in Beijing and mutual agreement reached on areas of cooperation. The Board looks forward to closer work in the future.

The CAAS is in the process of constructing a large genebank in Beijing which will act as a national repository. Funds have been provided by the Rockefeller Foundation. However, by 1983 it appeared that inflationary costs were being experienced. The Board, in view of the importance of this facility (already agreed in principle to be designated as a base collection by the IBPGR), decided to provide a substantial contribution to meet some of these inflationary costs.

The Nanjing Agricultural College proposed during 1983 to start a major programme for the collection, conservation, documentation and use of soyabean germplasm throughout China. This programme is expected to last for at least five years. The IBPGR provided funds for the start-up of the work and will publish a soyabean descriptor list in Chinese and English in early 1984.

During 1983 the Board provided study tours for staff of CAAS to visit Japan to see the national seed storage facility and to visit other centres working on genetic resources. Two Chinese scientists also attended the IBPGR Training Course on Seed Physiology held at Cornell University, USA.

Japanese scientists assisted the work of the Board during 1983; a training course was organized with funds from the Japanese Government for students from other countries of

East Asia and some from Southeast Asia. Also plans were finalized for the Fruit Tree Research Station, Tsukuba to collect *Citrus* in East and Southeast Asia. In 1983 this started in Thailand.

Support continued for the work initiated in 1981-82 by the IBPGR at the Chung-Nam National University, Korea to evaluate the maize collected. During 1983 a scientist from the Republic of Korea attended the IBPGR course on Seed Physiology held at Cornell University, USA. In another training course a student from the Rep. of Korea attended the course on Seed Technology for genebanks, held at the Edinburgh School of Agriculture, UK.

During the year the Secretariat was grateful for the ready services of Prof. M. Iizuka (Board member) and Dr. J.L. Creech (former Board member) in assisting with the work in East Asia.

The Board has continued to strengthen its links with the AVRDC, since the Board has in recent years placed major emphasis on vegetables in the tropics. The IBPGR project initiated in 1980 for regeneration of the Chinese cabbage germplasm collection continued through 1983, and toward the end of the year the Board provided funds to regenerate the mung bean collection and to duplicate them in IBPGR base collections. An IBPGR intern has been provided to help with seed storage.

In the Pacific the Board funded an important programme on root crop genetic resources at the Dodo Creek Research Station, Guadalcanal and Dala Farm, Malaita Institute, Solomon Islands. The project is for the collection, conservation and evaluation of sweet potato, taro and yam and an intern was also provided for a one-year period.

EUROPE

Following the recommendations of the Governing Board of Phase I of the UNDP/FAO European Cooperative Programme, held on 18-20 October 1982, Phase II of this Programme became, in 1983, a special project of IBPGR funded half by UNDP, half by the participating governments. Accordingly, following agreement by the IBPGR, the Executive Secretary assumed the title of Executive Secretary of ECP/GR and a new officer was appointed to the Secretariat for the day-to-day work. Mr. P.M. Perret, formerly IBPGR Regional Coordinator for West Africa, was transferred to Rome to become Regional Officer for Europe.

A project document defining the objectives, the framework of activities and the budget was, after some modifications, approved by UNDP/FAO and signed by 19 countries either directly or by corresponding letter of agreement with IBPGR. Seven other countries have indicated their firm intention to sign early in 1984. Membership is shown in Appendix V.

Although by the end of 1983, 16 countries had paid their first year's contribution to Phase II, the project will not be officially declared operational by UNDP until all participating countries have paid their contributions. Due to protracted negotiations over the wording of the project document and to the slow response from countries in committing themselves to the Programme, there was a gap between the end of Phase I and the beginning of Phase II. The IBPGR funded activities during this period as an interim measure. These activities included the starting up of active working groups, which — as recommended by the evaluation mission which assessed Phase I — form the core of the Programme's activities.

A *Barley Working Group* was held at the Zentralinstitut für Genetik und Kulturpflanzenforschung (ZIGuK), Gatersleben, GDR, 18-19 May 1983. ZIGuK was confirmed as the European lead institute for this crop. It was the opinion of the Working Group that of the total

of approximately 85 000 accessions listed in Europe, some 60 percent occur in more than two collections, underlining the need for documentation and rationalization.

Following the recommendations of the Working Group, countries were requested to send passport data of barley to the central data base at Gatersleben for registration as a first step in the establishment of a European Barley Inventory. Passport data on 26 000 accessions were available by the end of 1983.

It is expected that during 1984 data of most of the European accessions will be entered in the central data base. This will be followed by the computer sorting of entries to allow identification of multiple accessions of the same material, the publication of a first catalogue and the rationalization of collections. Later work will lay emphasis on the registration of characterization and evaluation data.

A *Prunus Working Group* was held at the NGB, Lund, Sweden, 24-27 May 1983. It considered the most effective way to establish a European inventory for *Prunus*. It recommended that the IBPGR accept the offer of the NGB to form a central data base for *Prunus*. In addition, it proposed the format of questionnaires to be used in collecting the essential passport data and suggested the names of coordinators to deal with cherries, peaches, apricots, almonds and plums who would assist NGB in this process. The data from these questionnaires will be compiled at NGB in mid-1984 and thereafter characterization/evaluation data will be sought for a shorter selected list of unique accessions. A microcomputer was provided by the IBPGR to the Maize Research Institute, Zemun, Polje in order to accelerate full registration of all data from *Prunus* collections held in Yugoslavia.

Four *Prunus* descriptor lists (peach, plums, apricots and cherries), initiated by members of the CEC temperate fruit committee and to be published in 1984 jointly by CEC and IBPGR have been widely circulated to specialists for

comments and suggestions before finalization. The IBPGR almond descriptor list published in 1980 was revised.

A working group for forage grasses and legumes will be held in Larissa, Greece, 7-9 February 1984.

The Scientific Advisory Committee (SAC) to Phase I of ECP/GR recommended that a working group on aromatic and medicinal plants should rate high priority. The Secretariat prepared a status report which identified several hundred species, and was based on literature searches, attendance at specialist meetings, personal contacts and a widely distributed questionnaire. The aim was to establish which species are of sufficient economic or social importance and are threatened with severe genetic erosion to justify the establishment of a working group.

Both the Governing Board and the SAC of Phase I have been replaced by a Technical Consultative Committee (TCC). This met for the first time at the Station fédérale de recherches agronomiques de Changins, Nyon, Switzerland, 19-21 December 1983 and reviewed progress and provided advice on future activities. Although it recognized the achievements in registration of data, the TCC expressed the wish that country coordinators should

play a much more active role for the exchange of information. It also agreed that, where constraints occur, the Secretariat should promote active data capture by visiting teams using data loggers.

The SAC of Phase I listed *Vitis*, *Beta*, potato, pea, rye, *Allium*, *Vicia faba*, *Citrus*, cotton, tobacco and sunflower as priority crops. The TCC selected oat, *Allium* and sunflower for three additional working groups because of their wide genetic diversity in Europe, the threat of genetic erosion and the lack of coordination of existing work for these three crops. It was agreed that two working groups established in Phase I, namely pea and rye, should remain in being and be recognized as working groups of Phase II but that these should not draw upon financial assistance from ECP/GR.

Apart from advising on working groups, the TCC made diverse recommendations on *in situ* conservation, the maintenance of fruit tree germplasm, and data registration and exchange. It was strongly of the opinion that the momentum must be maintained in Phase III (1987-89), that a coordinating centre for the programme in the form of minimal Secretariat services should continue and that these services could only be effectively provided by the IBPGR.

MEDITERRANEAN

The IBPGR has for a number of years stimulated cooperative activities among countries of the Mediterranean region. There are now strong national programmes in Italy, Spain, Portugal and Greece and the IBPGR has provided storage facilities and/or equipment in Portugal, Spain, Greece, Cyprus and Egypt.

The Istituto del Germoplasma, Bari, Italy was, on behalf of the IBPGR, instrumental in stimulating a great deal of activity through a small IBPGR Secretariat. Between 1975 and 1982 the Board provided assistance to countries in the region through funding well in excess of US \$1.1 million. The following countries have participated in field work and for

regional meetings: Algeria, Cyprus, Egypt, Greece, Italy, Libya, Morocco, Portugal, Spain, Tunisia and Yugoslavia.

By the end of 1982, 25 collecting expeditions sponsored by the IBPGR had been carried out from which about 8 000 samples of Mediterranean germplasm have been obtained, mainly samples of wheat and its wild relatives, maize, rye, grain legumes, *faba* bean, *Phaseolus* and lupin, wild beets and some forage grasses. A number of missions were carried out in 1983 and are listed in Table 7.

In the autumn of 1982 the IBPGR organized a review mission to advise on all aspects of the Board's work in the region. The report was

Table 7. Collecting missions supported by the IBPGR in the Mediterranean during 1983

Country	Period	Participating institute/ country	Crops	No. of samples
Cyprus	May-June	IBPGR & ARI	<i>Aegilops</i>	166
Cyprus	May-June	ARI, Cyprus	<i>Cicer</i> <i>Vicia</i> <i>Ervum</i>	— — —
France	September	ENSAM, Montpellier	<i>Aegilops</i>	40
Greece	June	Greek Gene Bank	wild <i>Brassica</i> <i>Hordeum</i>	19 4
Greece	August	Department of Aromatic and Medicinal Plants (Greek Gene Bank)	medicinal and aromatic plants	50
Greece	June	Greek Gene Bank	<i>Hordeum</i> <i>Triticum</i> <i>Aegilops</i> others	32 38 36 17
Greece	1983-84	Vine Institute, Lycovryssi	<i>Vitis</i>	—
Greece	1983	Tobacco Institute of Greece, Drama	<i>Nicotiana</i> <i>Brassica</i> <i>Allium</i>	173 62 53
Greece	1983	Fodder Crops and Pastures Institute, Larissa	<i>Cicer</i> <i>Lens</i> <i>Vicia</i> <i>Lathyrus</i> others	46 20 67 10 6
Greece	July-October	Fodder Crops and Pastures Institute, Larissa	<i>Triticum</i> <i>Medicago</i> <i>Dactylis</i> <i>Phaseolus</i> others	70 22 30 50 44
Greece	July-August	Hellenic Sugar Industry	<i>Beta</i>	62
Libya	April-May	ZIGuK, GDR & Istituto del Germoplasma, Italy	<i>Triticum</i> <i>Hordeum</i> <i>Sorghum</i> <i>Zea</i> <i>Pennisetum</i> <i>Vicia</i> <i>Allium</i> <i>Capsicum</i> <i>Cucumis</i> <i>Lycopersicon</i> <i>Brassica</i> <i>Beta</i> others	61 48 19 11 10 20 15 10 7 7 7 5 156
Portugal	Sept.-Oct.	INIAER	<i>Zea</i>	—
Portugal	June	Estação Agronomica Nacional, Oeiras	<i>Aegilops</i> <i>Lupinus</i> <i>Phaseolus</i>	— — —
Spain	1983	INIA	<i>Zea</i>	48

iii) A crop approach could forge links with crop activities in other regions, especially Europe, through the ECP/GR, ICARDA and others. Major emphasis will be given to the following crops:

- **Cereals:** wheat, barley, maize
- **Food legumes:** chickpea, *faba* bean, lentil
- **Forage legumes:** *Lupinus* sp., *Vicia* sp. and *Lathyrus*
- **Fruits:** grape, citrus



Natural habitat, Greece

made available to the Board at its annual meeting in 1983 and the following conclusions drawn:

- i) There should be a crop approach instead of a regional one, i.e. activities will be organized according to the priorities for crops. This conclusion represents a stage of evolution in the programme since past work in the region has been so effective.
- ii) Countries in the Mediterranean region have formed into informal working groups of north and south Mediterranean countries. Within the southern Mediterranean countries, Portugal and Spain work closely together as do Greece, Cyprus and Italy.

iv) Technical assistance to North African countries should be increased. This will be facilitated by the appointment of an Arabic-speaking IBPGR field officer. Dr. W.G. Ayad, previously a member of the Mediterranean Programme Secretariat in Bari, took up his post in November 1983. He is located at ARI, Cyprus.

In 1983 grants for regeneration and characterization of small seed samples were provided to Greece (beet), Spain (wild *Brassica*), and Portugal (maize and lupin) and the IBPGR provided technical assistance on documentation to Portugal, Cyprus and Yugoslavia.

Following the endorsement of a Working Group report on *Citrus* a small grant was provided to INIA, Centro de Levante, Maccada, Valencia, Spain for *in vitro* studies. Negotiations were held with INRA and IRFA, Corsica, to start in 1984 the establishment of a regional data base for *Citrus* collections of the Mediterranean.

In September the Maize Institute, Yugoslavia hosted an IBPGR training course on *Maize Genetic Resources*. Apart from scientists in the Mediterranean, a number of participants from West Africa and eastern Europe participated. Those from the Mediterranean included Egypt (1), Greece (1), Spain (1) and Yugoslavia (6).

Two scientists from Egypt attended the IBPGR course on *Seed Physiology* at Cornell University, USA. In addition two fellowships were provided for the University of Birmingham M.Sc. course for Greece (one in 1982-83 and one in 1983-84) and Cyprus (one in 1983-84). One of these attended the Edinburgh School of Agriculture course on *Practical Seed Technology for Genebank Personnel*.

LATIN AMERICA

A number of countries (Brazil, Colombia, Costa Rica, Mexico and Peru) have already established national structures for genetic resources activities and others (Argentina, Bolivia, Cuba, Ecuador, Guatemala and Venezuela) have accelerated their activities with the IBPGR acting as a catalyst. Argentina, Bolivia, Ecuador, Guatemala and Venezuela have all organized national meetings on genetic resources during 1983 with the participation of institutions involved with germplasm activities in each respective country.

The major initiative in Latin America in 1983 was the Southern Cone Regional Meeting sponsored by the IBPGR, in close cooperation with IICA/CENARGEN, in Brasilia, Brazil during October 1983. It was attended by delegations from Argentina, Bolivia, Chile, Brazil, Paraguay and Uruguay. The major objectives were to review the general situation of genetic resources in the region: to discuss and agree on points of regional interest such as priorities by species, sharing of responsibilities, needs for conservation and training; to outline short-, medium- and long-term plans for systematic collecting, conservation, evaluation, documentation and training in each of the countries; and to analyse the region's needs in terms of structures and organization.

Each country provided information on institutions and scientists working on germplasm and their existing collections' storage facilities and requirements. The report is in preparation for publication in the near future.

The Meeting noted that the following countries hold significant collections:

- **Argentina** Maize, other cereals, forages, grain, legumes, *Arachis* and potatoes
- **Bolivia:** Maize and Andean crops
- **Brazil:** Maize, other cereals, grain legumes, *Arachis*, *Manihot*, sunflower, forages, rubber, cacao and a number of fruit trees
- **Chile:** Maize, potatoes and forages
- **Paraguay:** Maize and *Manihot*
- **Uruguay:** Forages

The Meeting also noted that long-term storage facilities are only available in Argentina and Brazil and that genetic erosion was reported to have accelerated in the region, particularly for maize, Andean crops, wild *Solanum*, *Arachis* spp. and some forage crops such as *Bromus mango* in Bolivia.

National and regional crop priorities for 209 species in the Southern Cone region were defined by the delegates based on the IBPGR criteria. The participants also discussed their willingness to accept regional responsibilities for conservation, evaluation, multiplication and distribution of 127 of these crops.

Agreed plans for the systematic collecting of IBPGR priority crops include 44 projects to be



Collecting in Latin America

Table 8. Collecting missions supported by the IBPGR in Latin America during 1983

Country	Participating Institute(s)	Crops	No. of samples
Argentina	INTA, Balcarce	Potatoes (wild)	274
Bolivia	Centro de Investigaciones Fitoecogenéticas, Pairumani	<i>Capsicum</i>	202
		Cucurbitaceae	173
		<i>Phaseolus</i>	68
		<i>Lupinus mutabilis</i>	32
		<i>Triticum</i>	82
		Faba beans	113
Bolivia	CIP	<i>Solanum x ajanhuiri</i>	462
Brazil	CENARGEN	<i>Arachis</i>	62
		Forages	18
		<i>Phaseolus</i>	15
Brazil	CENARGEN & CIAT	<i>Phaseolus</i>	220
		<i>Vigna unguiculata</i>	7
Brazil	EMBRAPA & CIAT	<i>Phaseolus</i>	28
		<i>Vigna unguiculata</i>	186
Brazil	Royal Botanic Gardens, Kew (UK) & CENARGEN	Forages	191
		<i>Manihot</i> (wild)	4
		<i>Vigna unguiculata</i>	15
Colombia	ICA	Cotton	—
Colombia	ICA	Cacao	—
Chile	INIA	Forages	—
Chile	Universidad Austral	<i>Solanum</i>	83
Costa Rica & Panama	CATIE	Maize	31
		<i>Manihot</i>	4
		<i>Phaseolus</i>	36
		Tropical fruit trees	—
		Others	—
Ecuador	IRCT (France)	Cotton	325
Ecuador	Texas A & M University	<i>Arachis</i>	53
Ecuador	INIAP	Quinoa	325
		<i>Amaranthus</i>	132
		<i>Lupinus mutabilis</i>	35
		Oca	42
		Melloco	80
		Mashua	38
		Arracacha	25
		Capuli	88
		Maize	22
		<i>Phaseolus</i>	12
Guatemala	Universidad de San Carlos & ICTA	<i>Capsicum</i>	87
		<i>Cucurbita</i>	78
		<i>Ipomoea</i>	67
		<i>Manihot</i>	62
		<i>Amaranthus</i>	29
		<i>Solanum</i>	22
		<i>Colocasia</i>	19
		<i>Dioscorea</i>	18
		<i>Xanthosoma</i>	17
		<i>Lycopersicon</i>	15
Mexico	Universidad Autónoma, Chapingo	Cucurbitaceae	51
		<i>Ipomoea</i>	19
		Maize	35
		<i>Phaseolus</i>	54
		<i>Dioscorea</i>	8
		<i>Capsicum</i>	15
		<i>Xanthosoma</i>	7
Nicaragua	MIDINRA	<i>Phaseolus</i>	200
		<i>Capsicum</i>	
		<i>Cucurbita</i>	
		Maize	

Paraguay	CIAT, IAN & CENARGEN	<i>Manihot</i>	130
Peru	Universidad de San Cristóbal de Huamanga	Andean roots & tubers <i>Ipomoea</i>	44 237
Peru	Universidad Nacional de Huanuco	Cucurbits	118

Table 9. Activities (other than collecting) supported by the IBPGR in Latin America during 1983

Country	Participating Institute	Project
Argentina	Facultad de Agronomía, Universidad de Buenos Aires	Multiplication of native maize
Argentina	INTA, Pergamino & Universidad Nacional del Nordeste, Corrientes	Multiplication and characterization of <i>Arachis</i>
Barbados	WICSCBS	Characterization and conservation of sugarcane
Brazil	IICA	Southern Cone Meeting
Colombia	ICA	Long-term storage facilities
Colombia	ICA	Characterization and multiplication of horticultural plants collected in 1982
Colombia	ICA	Characterization and multiplication of IBPGR priority crops
Colombia	CIAT	Transfer of major existing <i>Manihot</i> collections
Colombia	CIAT	Development of <i>in vitro</i> culture methods for propagation and conservation of wild <i>Manihot</i> species
Colombia	CIAT	IBPGR intern for 12 months
Colombia	CIAT	Training course
Cuba	Academia de Ciencias	Long-term storage facilities
Ecuador	INIAP	Improving medium-term storage facilities
Guatemala	Universidad San Carlos & ICTA	Characterization of vegetables and root crops
Mexico	CIMMYT	Long-term storage facilities
Peru	UNA	Training course
Peru	UNA	Characterization and documentation of maize
Peru	INIPA	Medium-term storage facilities
Peru	UNA	Maize collection catalogue
Peru	UNA	Improvement medium-term storage facilities
Peru	UNA	Characterization of Peruvian <i>Phaseolus vulgaris</i>
Trinidad	Cocoa Research Unit	Computer-aided compilation St. Austine of cocoa descriptor listing

carried out over the next six years. Projects for multiplication and evaluation were also outlined.

During 1983, the IBPGR continued its close collaboration with CIMMYT (for maize and wheat), CIP (for potatoes), and CIAT (for forages, *Phaseolus* and cassava). Specific proj-

ects carried out through these centres are detailed in the crop section.

Collecting missions supported by the IBPGR during 1983 are listed in Table 8. Details of these missions are provided in the respective crop section. Activities, other than collecting, supported in 1983 by IBPGR in the region are provided in Table 9.

The IBPGR has also supported national institutions to multiply and characterize, following IBPGR descriptor lists, a number of crops: Argentina (maize and *Arachis*), Colombia (horticultural and other IBPGR priority plants), Guatemala (root crops) and Peru (maize and *Phaseolus*).

During 1983, the work started in Colombia and Cuba to establish long-term storage facilities supported by IBPGR has continued. IBPGR has also provided support to CIMMYT to improve and adapt its existing storage facilities to long term; and has supported Ecuador and Peru to improve their medium-term storage. IBPGR has provided support to

INENCO, Universidad Nacional de Salta, Argentina to design a project for a long-term storage facility run by non-conventional energy in high dry areas.

Short training courses for the region in genetic resources have been supported through CIAT, Colombia and UNA, Peru. The UNA training course from 2 May to 10 June was attended by 16 post-graduate students from Bolivia, Colombia, Chile, Ecuador, Peru and Venezuela. The CIAT training course from 10 January to 4 February was attended by 19 students from Colombia, Brazil, Ecuador, Guatemala, Mexico, Peru and Venezuela.

SOUTH ASIA

The South Asian region comprises Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka and recently the Maldives have been included by the Secretariat in the regional programme. South Asia has been accorded first priority for action because of the immense genetic diversity of crops to be found there. This diversity is of national and international importance.

Notwithstanding its priority status, the IBPGR has had comparatively less impact in this region than in others. It has organized short training courses, provided fellowships for training and funded a few germplasm collecting missions in Bangladesh, Bhutan, Nepal and Sri Lanka. See Table 10 for a list of collecting activities during 1983.

There is scope for more collaborative work and at its tenth meeting in February 1983 the IBPGR initially decided to send a Board mission to India which was subsequently extended by the Executive Committee to Bangladesh, Burma, Nepal and Sri Lanka. The mission to India was led by Dr. W.J. Peacock, Board member, and to the other South Asian countries by Prof. M. Iizuka, Board member, and Dr. A.B. Joshi, Senior Adviser for the South Asian region.

The mission visited Bangladesh, Burma, Nepal and Sri Lanka from 11-27 November 1983 and India during the International Congress of Genetics which was held in New Delhi from 12-21 December 1983.

The missions concluded that:

- i) There is an urgent need to constitute a national policy and steering committee on



IBPGR Press Conference at International Congress of Genetics, New Delhi

Table 10. Collecting missions supported by the IBPGR in South Asia during 1983

Country	Period	Participating institute/ country	Crops	No. of samples
Bangladesh	Aug.-Sept.	BRRI & IRRI	rice	91
Bhutan	Oct.-Nov.	IRRI	rice	84
Sri Lanka	1933-84	Department of Agriculture, Peradeniya	finger millet sorghum <i>Sesamum</i> groundnut	— — — —
Sri Lanka	1983-85	University of Peradeniya	<i>Dioscorea</i> <i>Alocasia</i> <i>Amorphophallus</i> <i>Coleus</i>	367

plant genetic resources in all the countries; this is most important in India in view of the diffuse programme.

- ii) A national genetic resources unit with adequate staff and appropriate facilities should be established and/or strengthened; in India and Bangladesh these are urgent.
- iii) There is a need for more training at the technician level; there is a tendency for the wrong people to be nominated to the IBPGR for training.
- iv) There is serious genetic erosion in parts of Nepal and Sri Lanka, especially for medicinal plants and fruit trees.
- v) External financial and technical support is required in all the countries, both for short- and long-term activities.

In Bangladesh during 1983 construction of the national genebank at BARI was completed. Equipment and facilities were provided by the IBPGR and GTZ of the Federal Republic of Germany. This facility will become operational in 1984.

The Bangladesh Agricultural Research Council (BARC), on the occasion of its tenth anniversary, agreed to set up a national policy planning and monitoring committee and a fully-fledged national plant genetic resources centre under its aegis.

One trainee from Bangladesh, sponsored by the IBPGR, attended a short course on *Crop Plant Diversity, its Exploration and Conservation* at the University of Birmingham, UK.

In order to strengthen crop germplasm work in Bhutan the IBPGR has agreed to appoint a collector; it is expected that he will be in post

by early 1984. During October-November 1983, the IBPGR/IRRI rice collector explored the high-altitude belt of Bhutan from west to east, and gathered 84 samples, about a third of which were from areas above 2 000 m.

Crop germplasm activities in Burma have been sporadic with primary attention being focused on rice. In 1983, ARI, in collaboration with the Agricultural Extension Division, carried out an exploration mission in western parts of Magwe division to collect local landraces and wild relatives of rice.

The NBPGR in India has continued its exploration and characterization activities. During 1983 missions were fielded in southern India. The NBPGR also published a catalogue on its wheat germplasm holdings.

Toward the end of 1983, the NBPGR received two cold storage units from the United Kingdom under a bilateral aid programme. The construction work on the long-term storage facility may also commence in 1984. The entire NBPGR collection of Amaranth species, viz. 990 accessions, has been duplicated in the IBPGR-designated base centre in the United States for safety.

The candidates sponsored by the Government of India attended short training courses on genetic resources held at the University of Birmingham, UK, the Edinburgh School of Agriculture, UK, and Cornell University, USA (p. 91).

The IBPGR has provided a small grant to the Central Institute of Medicinal and Aromatic Plants to prepare a status report on medicinal and aromatic plants of South Asia since

these rate high regional priority. The IBPGR Secretariat held discussions with the Botanical Survey of India to undertake an ecogeographical survey of the Andaman and Nicobar islands of India and work on this project will commence in 1984.

During October-December 1983 an IBPGR consultant visited various islands of the Maldives and prepared a report on several agricultural crops, their distribution and genetic variability. Consequently, a collecting expedition for coconut germplasm is being planned for 1984.

The Agricultural Botany Division of the

Department of Agriculture, Nepal, established a 55 m³ (4°C and 40% RH) seed storage facility at Kumaltar as a part of the Nepal Seed Production and Inputs Storage Project under the aegis of IADS. This facility will become operational during 1984.

The University of Peradeniya, Sri Lanka, maintains a large collection of winged bean germplasm. During 1983 about 120 accessions were planted for detailed evaluation. The Department of Minor Export Crops in Sri Lanka which maintains a sizeable collection of *Piper* and cinnamon, collected important spice and essential oil crops germplasm.

SOUTHEAST ASIA

The activities in the region are coordinated by the IBPGR Regional Committee for Southeast Asia, comprising government-nominated members from Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand (for membership see Appendix III).

In June 1983 Dr. N. Chomchalow took up his post as Regional Coordinator, stationed at the FAO Regional Office, Bangkok, Thailand. He succeeds Prof. R.B. Singh, who resigned from the IBPGR post in August 1982.

In July-August 1983 a Board mission visited the region in order to assess the present situation and to discuss future genetic resources activities. In addition, the Regional Coordinator, in consultation with the members of the Regional Committee, developed a five-year plan of action. Both the mission report and the five-year plan of action will be discussed by the IBPGR at its meeting in February 1984; subsequently the Regional Committee will finalize the plan.

All countries in Southeast Asia have undertaken a large number of collecting missions during 1983, of which a substantial number

have been funded by the IBPGR. Information on these missions is summarized in Table 11 and details are provided in the relevant crop sections.

Most of the projects listed in Table 11 include a component on multiplication, characterization and documentation. Special grants have been provided to Thailand for the multiplication, characterization and documentation of sweet potato and winged bean.

As already mentioned in the *1982 Annual Report*, seed storage facilities are operational in Indonesia, Laos, Philippines, Thailand and Viet Nam. During 1983 the IBPGR approved the provision of funds for seed storage facilities in Malaysia (medium-term storage) and Papua New Guinea (deep-freezers).

IRRI and IBPGR jointly co-sponsored a workshop on rice germplasm genetic conservation during April 1983 at IRRI, Los Baños, Philippines (p. 11). In this connection a special issue of the *IBPGR Regional Committee for Southeast Asia Newsletter* has been devoted to rice germplasm.

The IBPGR cosponsored a regional training

Table 11. Collecting missions supported by the IBPGR in Southeast Asia during 1983

Country	Period	Participating Institute(s)	Crop(s)	No. of samples ¹	Genebanks receiving material/Remarks
Indonesia	1980-83	KPPNN with Bogor & Manado	BALITRI, Coconut	139	BALITRI, Manado

Indonesia	1980-83	KPPNN	Banana	333	LBN (Bogor and Purwodadi Botanic Gardens); accessions will be duplicated in the Regional Genebank, Davao, Philippines
Indonesia	1980-83	KPPNN	— cassava	205	BALITAN, Sukamandi
			— sweet potato	386	BALITAN, Sukamandi
			— taro	65	LBN, Bogor
			— other roots & tubers	14	LBN, Bogor
Indonesia	1980-83	KPPNN	Soyabean	131	LBN, Bogor
Laos	November 1983	Agriculture Research Centre, Tsukuba, Japan and AVRDC, with Ministry of Agriculture, Irrigation and Cooperatives, Laos and IBPGR Regional Coordinator for Southeast Asia	Groundnut	23	Multiplication and characterization will be carried out in Japan (groundnut and soyabean) and at AVRDC (soyabean and <i>Vigna</i> spp.) before material is deposited in IBPGR-designated base collections
			Soyabean	13	
			<i>Vigna</i> spp.	56	
Malaysia	1981-83	MARDI with the Department of Agriculture, Malaysia	Coconut	52	NARDI Hilir Perak Station & MARDI Kemaman Station
Malaysia	1982-83	MARDI with the Department of Agriculture, Malaysia and Farmers Organization Authority	<i>Alocasia</i>	27	MARDI, Serdang, Selangor & MARDI, Pontian
			<i>Amorphophallus</i>	23	
			Sweet potato	488	
			Taro	518	
			<i>Xanthosoma</i>	72	
			Yam	144	
Malaysia	1982-86	MARDI with the Department of Agriculture, Malaysia, Sabah and Sarawak, Forest Research Institute and University of Malaysia	Malaysian fruits	—	MARDI, Serdang, Selangor
Malaysia	1982-85	UKM	Winged bean	130	UKM
Philippines	1981-84	NPGRL, IPB, UPLB	Forage legumes	348	NPGRL/IPB
Philippines	1981-84	PCA with the Agricultural Resources Centre, UPLB	Coconut	46	PCA - Zamboanga Research Centre, partially duplicated at PCA - Davao Research Centre & PCA - Albay Research Centre
Thailand	1981-83	Chiang Mai University	Sweet potato	550	After multiplication, characterization and documentation, material will be deposited in IBPGR-designated world collections
Thailand	1981-83	Chiang Mai University	Eggplant	115	TISTR
Thailand	1981-83	Chulalongkom University	Citrus	332	Material will be duplicated in Japan and USA
Thailand	Nov./Dec. 1983	Fruit Tree Research Station, Japan and USDA (Florida) with three Thai Universities (Chiang Mai, Chulalongkom and Prince of Songkla) and IBPGR Regional Coordinator for Southeast Asia	Citrus	160	Material duplicated at Fruit Tree Research Station, Japan and eventually in USA
Thailand	1982-83	Department of Agriculture, Thailand	Sugarcane	198	After multiplication, characterization and documentation material will be duplicated in IBPGR-designated world collections
Thailand	June 1983	Department of Agriculture, Thailand with Sugarcane Breeding Institute Coimbatore, India	Sugarcane	175	After multiplication, characterization and documentation material will be duplicated in IBPGR-designated world collections
Thailand	1982-84	Prince of Songkla University	<i>Garcinia</i>	71	
			<i>Lansium</i>	22	
Thailand	1983-84	Ramkhamhaeng University	<i>Capsicum</i>	23	
Thailand	1983-84	Department of Agriculture	<i>Zea mays</i>	157	
Thailand	1983-85	TISTR	Pigeonpea	296	

¹ Most of the collecting projects in Southeast Asia have a duration longer than one year. The figures in the column "number of samples" represents the total number collected from the initiation of the project up to the end of 1983.

course on characterization and preliminary evaluation of plant germplasm in Thailand, 16-29 October 1983 with the Kasetsart University, TISTR and the Thai National Plant Genetic Resources Coordinating Subcommittee (see p. 92).

One fellow from the Philippines successfully

completed the 1982-83 M. Sc. course in Birmingham, UK, while another scientist from the Philippines participated in a short course on *Genebank Seed Physiology*, USA. The IBPGR also supported on-the-job training at the IRRI genebank for two scientists from the Rangsit rice genebank in Thailand.

SOUTHWEST AND CENTRAL ASIA

The Board has supported genetic resources activities in Southwest and Central Asia through an FAO-operated project (TF:REM/31/IBPGR) for a number of years. It has recognized that the national programmes are still undergoing development and depend to a considerable extent on external aid. However, during 1982 the Board reviewed progress in the region and at its tenth meeting in 1983 took decisions on the future of IBPGR support to the region.

The Board agreed that the regional project should terminate at the end of 1983 and that in the future support would be given to national programmes when they are seen to be thriving. It regretted that political constraints in the region had led to limited collecting in this major centre of diversity.

In view of ICARDA assuming a major responsibility for germplasm of its mandate crops (*durum* wheat, barley, chickpea, lentil, *faba* bean and forages) and the establishment of a national genetic resources unit in 1983, the Board wishes to phase over some responsibility to ICARDA, although IBPGR will continue its work on vegetables and fruits. Accordingly it will offer limited support to ICARDA while the unit is being developed, particularly with a view to completing the documentation of collections and until such time as ICARDA has adequate core funds to fulfil this aspect of its mandate. An IBPGR intern was provided to ICARDA late in 1983 to help with forage genetic resources. The IBPGR Collector with responsibility for North Africa (p. 96) will also assist the Secretariat for field work in parts of Southwest Asia.

The Arab Centre for the Studies of Arid Zone and Dry Lands (ACSAD) is set up specifically to serve Arab countries. Action to conserve and utilize crop genetic resources has not yet moved beyond the planning stage but the Board agreed to foster collaboration with ACSAD to ensure the availability of information about any collections that may be assembled and to participate in the field collecting, particularly in the Arabian peninsula, whenever the organization sponsors collecting missions.

In 1983 one fellowship was awarded to a scientist from Pakistan to attend the University of Birmingham M. Sc. course in 1983-84. Three scientists from the region attended the course on *Seed Physiology* (Pakistan, Turkey and ICARDA) at Cornell University, USA, and in addition to the Birmingham fellow from Pakistan an ICARDA scientist attended the course at Edinburgh School of Agriculture, UK on *Practical Seed Technology for Genebank Personnel*.

During 1983 progress in the region related largely to the completion of data bases at ICARDA by the IBPGR Technical Officer (chickpea, lentil and *faba* bean); assistance with the vigorous programme being developed in Pakistan, collecting in Jordan, discussions on vegetables in Syria and the start-up of discussions with Iran. These are summarized below.

PAKISTAN

The programme on crop genetic resources at PARC, Islamabad is expanding. Regular field

trips for collecting are included in the work plan of the Department as are evaluation studies in collaboration with staff of the Plant Breeding Section. A major building programme is being implemented at PARC with bilateral funding which will provide more spacious accommodation for the Plant Genetic Resources Department in the near future.

In July-August the IBPGR supported the collection of vegetable germplasm (83 samples) in northern areas of Pakistan (Chilas, Gilgit, Astor, Skardu, Hunza, Ishkuma, Yasin Gupis and Chitra valleys) by PARC. The national programme collected fruits in early 1983 in Gilgit and Hunza (227 samples). A consultant visited March-April to discuss the organization of the work on fruits and advised on cooperative links with other countries.

JORDAN

A grant was provided to Yarmuk University, Irbid, to collect landraces of wheat in the mountains of Jordan from Ras-Naqb to Ajlun in 1983 and for the characterization of the materials in 1984.

SYRIA

The work of the Plant Genetic Resources Unit at the Directorate of Agricultural Research, Duma, has slowed down because of changes in staff. However, much closer contact has been established between Syrian agricultural research projects and those of ICARDA and joint work is being carried out. In the future, therefore, the genetic resources of ICARDA will be at the disposal of the Syrian national programmes. In addition ACSAD is working cooperatively with the Syrian Directorate of Agricultural Research. Staff of ACSAD plan to collect indigenous varieties of wheat, barley, rye and oat and their wild relatives

throughout the Arab world as well as forage grasses and legumes. ACSAD has already established at Ezraa a 20 ha collection for the five fruit crops adapted to the region — grape, olive, fig, pistachio and almond.

Two consultants were provided to advise on work to be done on fruit germplasm and vegetables. IBPGR will follow up on a number of recommendations in 1984.

IRAN

During 1983 the Deputy Minister for Research and Educational Affairs discussed with the Secretariat the modernization of the genebank facilities at Karadj. The government authorities have agreed to build a new genebank and IBPGR helped in 1983 by providing the services of an architect. Construction of the building, to be funded by the Government, will begin in 1984; the IBPGR is expected to assist in the provision of equipment and advice and also to revitalize the field collecting programmes.

TURKEY

The Board also notes the continuing work of the programme at ARARI, Izmir, Turkey. Under a revised national programme on crop genetic resources started in 1980, crop plants are being dealt with in eight groups — cereals, food legumes, industrial crops, vegetables, fruit crops, forage crops, medicinal plants and ornamentals. The genebank contains ca 9 000 samples (including over 2 500 cereals, 1 657 grain legumes, 430 other legumes). A country-wide survey has been made of fruit tree resources and steps are being taken to establish living collections at designated centres.

During 1983 the Tohoku University of Japan collected *Brassica* in Turkey jointly with staff of ARARI.



Immature cacao embryos proliferating secondary embryos (L.A. Withers IBPGR)

CONSERVATION

Since its creation, the IBPGR's approach to conservation has changed progressively so that by 1983 attention was focused on crops which produce seeds which can be dried and stored at low temperatures and on vegetatively propagated crops which are normally maintained in field genebanks. Since 1974 the programme has responded by:

- i) the provision of support to increase the number of genebanks available, and
- ii) the definition of priorities for research on *in vitro* culture and support to research and development.

Attention to the first, and the development of standards for seed storage has permitted the establishment of a global network of genebanks to function as a security measure to store materials (base collections) which are freely available. The definitions now used for some of the various types of *ex situ* collections are:

- "*in vitro* base collections" — for long-term storage and not for distribution. This can only be material stored by cryopreservation;
- "*in vitro* active collections" — material stored for relatively short periods, preferably in slow growth under defined conditions (hence with infrequent subculturing), to provide material for multiplication, evaluation, indexing and distribution;
- "*in vitro* genebanks" — comprising *in vitro* base and active collections as defined above; and
- "field genebanks" — synonymous with "clonal repository" and covering plantations, orchards, living collections, etc. The field genebank is in essence a working collection but is a back-up to the cultures. It can in no way provide a base collection.

However, as the Board's programme develops new initiatives, particularly an ecogeographic approach which will ultimately lead to a better spread of representative variability in *ex situ* collections, and an emphasis on wild species more attention will be devoted to *in*

situ conservation. In these areas the IBPGR intends to maintain a leadership role and link the conservation work more closely to characterization, methods of assessing variability and the data bases which have information on samples. In essence it will try to ensure that genebanks incorporate in a cohesive way all genetic resources activities.

Itemized below are summaries of the different aspects of conservation in which the Board was engaged in 1983. It will be appreciated that as this work has developed — particularly the scientific research — no more than short summaries can be provided in an annual report.

The Board is also pleased to report that one of its Secretariat posts has been filled in January 1984 by a specialist in seed physiology.

THE WORLD NETWORK OF SEED COLLECTIONS

The IBPGR has requested conservation centres to accept responsibility to serve as "world" or "regional" depositories for major base collections of specific crops. It is predicted that the designation of a network, adequate for all staple food crops, will be completed by 1986.

Five international centres — CIAT, CIP, ICRISAT, IITA and IRRI — have accepted such designation, as well as all important regional centres and numerous national centres. The current list of centres is shown in Table 12.

Other international centres — ICARDA, CIMMYT, ILCA — are expected to participate in the IBPGR base collection network in the near future.

It will be noted that duplicate collections have not always been designated — although material is rarely unique to one collection. Samples are frequently duplicated in several genebanks or working collections and often

Table 12. Current IBPGR network of base centres for seed crops (March '84)¹

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

¹ (NOTE: Many other genebanks are being designated, particularly in developing parts of the world, but do not feature below due to protracted negotiations)

Pea	Mediterranean	NCB, Lund, Sweden
	Central and East European	CNR, Bari, Italy
<i>Phaseolus</i>	Wild species	Polish Genebank, Radzikow
		Faculté des sciences agronomiques de l'Etat, Gembloux, Belgium
	Cultivated species	{ CIAT, Cali, Colombia
		{ NSSL, Fort Collins, USA
	European	FAL, Braunschweig, Germany, F.F.
Pigeonpea		ICRISAT, Hyderabad, India
Soyabean		NSSL, Fort Collins, USA
<i>Vigna</i> spp.	Wild species	Faculté des sciences agronomiques de l'Etat, Gembloux, Belgium
	<i>Vigna radiata</i>	{ IPB, Los Baños, Philippines
	<i>Vigna unguiculata</i>	{ AVRDC, Tainan, China
		{ IITA, Ibadan, Nigeria
		{ NSSL, Fort Collins, USA
Winged bean		IPB, Los Baños, Philippines
	Asian	TISTR, Bangkok, Thailand

ROOT CROPS

Cassava	Seeds of wild and cultivated species	CIAT, Cali, Colombia
Potato	Seeds of wild and cultivated species	CIP, Lima, Peru
Sweet potato		NSSL, Fort Collins, USA
		AVRDC, Tainan, China

VEGETABLES

<i>Allium</i>		NVRS, Wellesbourne, UK
		NSSL, Fort Collins, USA
	Asian	NIAS, Tsukuba, Japan
<i>Amaranthus</i>		NSSL, Fort Collins, USA
	Asian	NBPGR, New Delhi, India
<i>Capsicum</i>		CATIE, Turrialba, Costa Rica
		IVT, Wageningen, Netherlands
Crucifers	<i>Brassica carinata</i>	{ FAL, Braunschweig, Germany, F.R.
		{ PGRC, Addis Ababa, Ethiopia
	<i>B. Oleracea</i>	{ NVRS, Wellesbourne, UK
		{ IVT, Wageningen, Netherlands
	<i>Raphanus</i> spp.	NVRS, Wellesbourne, UK
	Wild spp.	Universidad Politécnica, Madrid, Spain
		Tohoku University, Sendai, Japan
	Oilseeds and green manures:	
	<i>B. campestris</i> , <i>B. juncea</i> ,	{ PGR, Ottawa, Canada
	<i>B. napus</i> , <i>Sinapis alba</i>	{ FAL, Braunschweig, Germany, F.R.
	Vegetables and fodders:	
	<i>B. campestris</i> , <i>B. juncea</i> ,	{ NVRS, Wellesbourne, UK
	<i>B. napus</i>	{ FAL, Braunschweig, Germany, F.R.
	<i>B. napus</i>	
	All cruciferous crops	NIAS, Tsukuba, Japan
Cucurbits	Species of <i>Benincasa</i> , <i>Luffa</i> , <i>Momordica</i> and <i>Trichosanthes</i>	IBP, Los Baños, Philippines
	Species of <i>Cucumis</i> and <i>Citrullus</i>	{ NSSL, Fort Collins, USA
		{ INIA, Madrid, Spain
	<i>Cucurbita</i> 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
Sugarcane	Seed	NSSL, Fort Collins, USA

OTHERS

Tree spp.	(fuel and environmental stabilization in arid areas)	Royal Botanic Gardens, Kew, UK
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there is a degree of redundant duplication. The designation of duplicate stores depends on the availability of an adequate number of such facilities; the burden of this task should not be carried by a few centres.

With these considerations in mind the IBPGR has planned a number of future designations which now await the establishment of suitable genebanks. The Board has also agreed that a limited number of additional cold stores for seed conservation should be provided to strengthen the international network. However, negotiations with governments take considerable time, especially with regard to reaching the following agreement for **base collections**:

- a) that the collection will continue to receive adequate operating funds and personnel and that if, at some future time, this is not possible FAO/IBPGR will be alerted promptly;
- b) that if the material stored is not available from an active collection, it will be made freely available in reasonable quantities from the base collection to any professionally qualified institution or individual seriously interested in using it;
- c) that material will be accepted for storage on a global or regional basis;
- d) that appropriate arrangements will be made for regeneration of the material; and

e) that arrangements will be made to duplicate the material for safety.

The IBPGR recognized that, depending on the size of the collection, most seed materials can be stored satisfactorily in deep-freeze chests. (Advice on the methodology is provided in *Use of Deep-Freeze Chests for Medium- and Long-Term Storage of Small Seed Collections* - 1982).

During 1983 the Board agreed to consider the next tier of the conservation network, i.e. the **medium-term** stores for active collections. In 1984-85 the collections with significant variability will be assessed prior to designation. The Advisory Committee on Seed Storage (see below) has stressed both in 1981 and 1983 the need to monitor the practice in genebanks because the procedures being followed do not always reach international (not indeed scientific) standards. Greater attention will be paid to this in the immediate future.

In many cases the Board provides support for medium-term conservation storage facilities and the same commitments are required, without the proviso in sub-paragraph (b), for base collections and the following additional ones:

- f) that suitable links will be made with the base collections designated by the Board and that duplicates of the materials held in the active collection will be deposited in such base collections; and

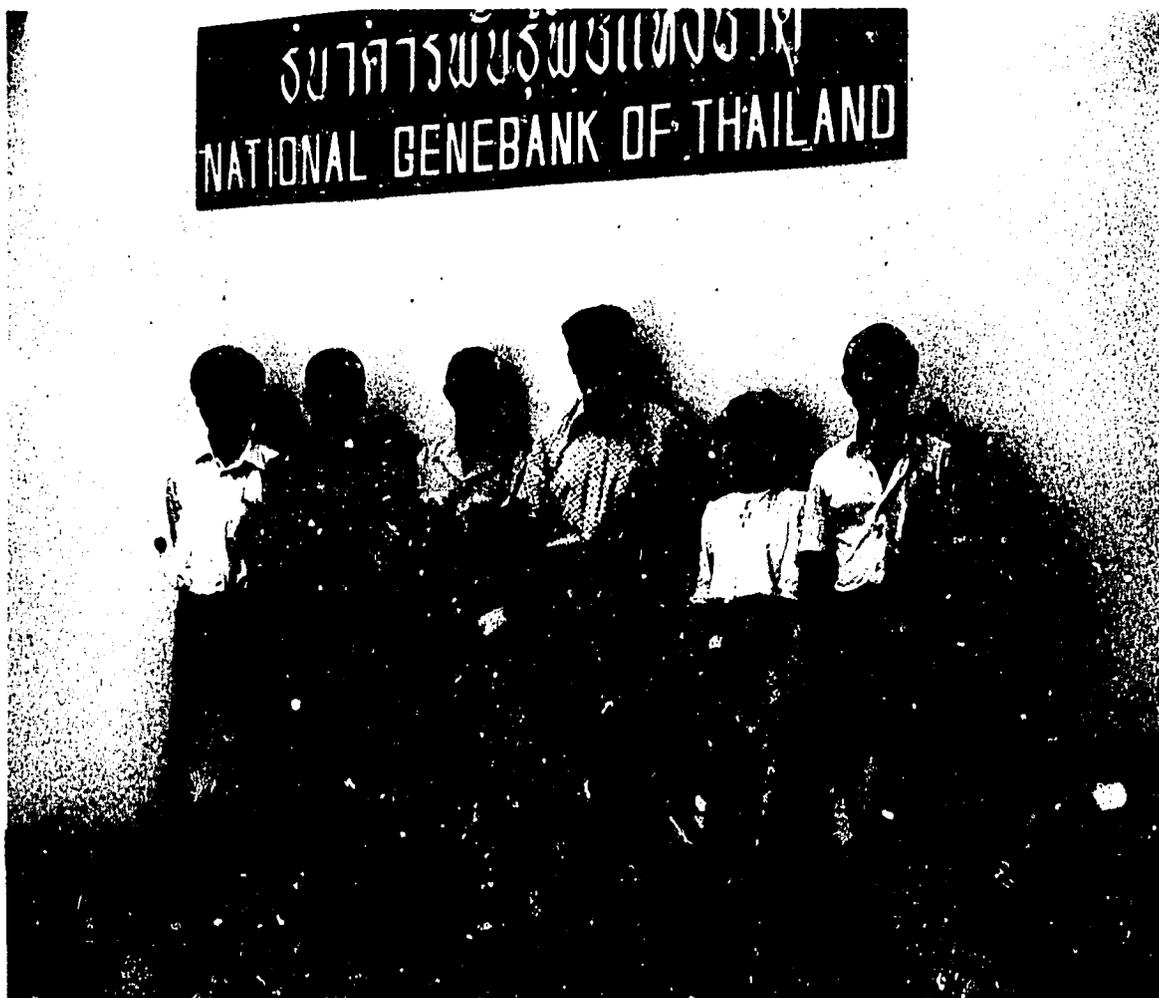
g) that characterization and preliminary evaluation of the material will be carried out and that the resulting data will be provided to the curators of the base collections and will otherwise be made freely available along with material.

In a publication issued in 1983 providing brief information on the *IBPGR Global Network of Genebanks* it was noted that present indications are that about 50 base collections will form a reasonably complete network. They will cater for about 40 major crops or groups of crops and other genetic resources. To date by agreement between host countries and the IBPGR, genebanks in 28 countries have been designated to hold base collections of 34 crops or groups of crops. About 60 different active collections are envisaged to complement the base collections. Much remains to be done to complete this part of the network. An urgent

task is to identify important active collections already in existence (at present there are at least 100 significant germplasm collections around the world). Indications are, however, that many of these older collections may not be as valuable as was first thought. Not infrequently the genetic diversity of the crop is poorly represented and exchange of samples among collections has led to duplication that cannot easily be traced owing to poor records.

SUPPORT FOR CONSERVATION FACILITIES

Funds were provided in 1983 to establish a new storage facility in the Ivory Coast (Ministère de la recherche scientifique, Abidjan) for long-term storage of local crops including dup-



lication of horticultural material held in NIHORT.

In addition funds were provided to the Plant Quarantine Station, Muguga Agricultural Research Institute, Kenya to upgrade the existing seed store for medium-term storage, and to CIMMYT, Mexico for the upgrading of the facilities so that maize germplasm can be stored for long periods. The national genebank, CAAS, Beijing, China, being built with support from the Rockefeller Foundation has met certain inflationary costs and the IBPGR agreed to provide additional funds in 1983. Support was given to INIPA, Peru to establish a medium-term storage facility, and to INIAP, Ecuador to improve its medium-term facilities.

Negotiations were under way in 1983 for the funding of a medium-term store in Malaysia at MARDI and for the upgrading of the long-term store at NIHORT, Ibadan, Nigeria. In principle the IBPGR has agreed to certain levels of funding and disbursement is expected early in 1984.

Equipment, including deep-freeze cabinets and seed drying and packaging equipment was provided in 1983 to Mozambique (Universidade Eduardo Mondlane, Maputo), Niger (Ecole supérieure d'agronomie, University of Niamey), Peru (UNA) and Togo (Direction de la recherche agronomique).

Additional deep-freezers were provided to Ghana, CRI; Kenya, National Plant Breeding Station, Njoro; Republic of Korea, Kyung-Hee University, Seoul; Nicaragua, Seed Programme INTA; and Uruguay, Universidad de la República.

Packaging equipment was sent to Bangladesh, BARI; Greece, Cereals Institute; India, NBPGR, IARI and Central Rice Research Institute; Ivory Coast, ORSTOM; Kenya, National Agricultural Research Station; Papua New Guinea, Department of Primary Industry and University of PNG; Sudan, ARC; Thailand TISTR and Chiang Mai University; Upper Volta, IVRAZ; and Zambia, Mt. Makulu Research Station.

It has been of concern for some time that there were not enough conservation centres in Africa south of the Sahara. The IBPGR support in 1983 in addition to established centres in Ethiopia (PGRC), Nigeria (IITA) and Zimbabwe (IBPGR support agreed in 1982) will go a long way to improving the situation.

At the end of 1982 the Board started to inventory the standards used by individual genebanks world-wide and to establish a comprehensive list of these genebanks so that the scientific community can be easily informed. Replies from centres were slow but by the end of 1983 the inventory and list were completed. A publication will be issued early in 1984 which will replace the only extant one issued in 1978 and now considerably out of date.

ADVISORY COMMITTEE ON SEED STORAGE

The Committee (see Appendix IV for membership) met 19-20 September 1983 and reassessed the constraints affecting the operations of seed stores. In general these have not improved since recommendations were made in 1981. The Committee noted that genebanks should be aware of staffing needs and sufficient operating budgets. It pointed out to the Board that scientifically there is a strong justification for the development of an international register of genebanks and the periodic monitoring by the IBPGR of the standards. During April 1984 attention will be paid by the Committee to the minimal standards for registration.

The Committee recognized that seed dormancy is a more significant problem than was thought hitherto. A report commissioned by the Board will not be ready before 1984. In addition, because the Board is embarking on a major programme on forages, the Committee pointed out that for many species of grasses there is little information on dormancy or germination testing and a programme needs to be developed.

In the first report of the Committee attention was drawn to the possibility that there may be two types of recalcitrant seeds but recent research provides evidence that there is probably only one type of recalcitrant behaviour, i.e. those which are damaged by desiccation, although, at the high moisture contents necessary for their survival, some of these are also damaged by chilling and all are killed by freezing.

The Committee wishes to see the identification of exactly which species produce seeds

with recalcitrant behaviour and recognized that the development of *in vitro* techniques is likely to mean that less emphasis needs to be placed on seed physiology research in those species.

INVESTIGATIONS ON SEED PHYSIOLOGY

The work initiated by the Board through a contract with the University of Reading, UK has made substantial progress and is nearing completion. It is directed by the Chairman of the IBPGR Advisory Committee on Seed Storage, Professor E.H. Roberts. The aim of the work has been to provide the scientific basis for the handling of seeds in genebanks.

During 1983 work continued on the determination of regeneration intervals in orthodox seeds. It has involved large factorial experiments on seeds of several cultivars each of 21 crop species stored under a wide range of conditions, in order to determine the value of viability constants required to predict longevity. From this work it should be possible to give guidance as to expected storage periods under any conditions and make suggestions for appropriate intervals between viability monitoring tests in genebanks.

During the course of this project it has become evident that the quantitative response of longevity of seed of quite different species to temperature was similar, if not identical, but the quantitative response to seed moisture content differs. Nevertheless, certain patterns of differences and similarities between species have become evident.

During 1983 attention has been paid to the relationship between oil content and the relative effect of seed moisture content on longevity. In the longer term, it is anticipated that, if a definable relationship exists, it would enable estimates of longevity in medium- and long-term stores to be provided for the majority of species with orthodox seeds on the basis of much less experimental work than has been necessary using the empirical approach adopted to date. However, the possibility of a rational relationship with oil content would not have

emerged had not a large amount of empirical work been carried out.

The solution of the problems of seed dormancy facing genebanks has been a major topic of work in 1983. The main problem is that dormancy interferes with viability testing; but in addition it is also important to know how to remove dormancy in order to regenerate some accessions, and to provide advice to recipients of genebank material. This project will result in the report requested by the Seed Committee and is being carried out for the IBPGR by Reading in collaboration with the Seed Bank of the Royal Botanic Gardens, Kew.

Earlier annual reports of the IBPGR have indicated that the Board's support to the seed physiology investigations will be incorporated into an advisory manual on seed testing for genebanks. A draft of a major portion of the advisory manual was despatched in July to members of the IBPGR Committee on Seed Storage to enable discussion of the proposed contents of the meeting of the Committee mentioned above.

One other noteworthy aspect of the IBPGR project relates to the sequential analysis of results within genebank seed viability monitoring tests. The sequential test plan recommended by the IBPGR (see *FAO/IBPGR Plant Genetic Resources Newsletter*, 44) included a regeneration standard of 85% viability, which it has been suggested is too high. Consequently more work has been carried out to test the practical suitability of sequential germination test plans for monitoring viability in genebanks. This has been reported in an article in *Newsletter* 55 which demonstrates that the sequential test requires one third the number of seeds that are required traditionally by fixed sample size tests, while the accuracy (in terms of the decisions made) of both types of test is identical.

During 1983 the IBPGR continued to fund a project at the Universiti Pertanian Malaysia for screening species for the identification of seed behaviour, i.e. orthodox or recalcitrant. Over 50 species of tropical plantation crops, forestry and horticultural crops have been studied. For many of the species ISTA rules have not been established. Special investigations were also carried out on the storage of mango and rubber seeds, especially to assess the effects of maturity of the seed on short-term storage.

SEED HEALTH TESTING IN GENE BANKS

The Board has commissioned a study on guidelines for non-destructive seed treatment for genebanks.

Several research investigations were continued in 1983 to test the efficiency of non-destructive inspection methods: the effect of short periods of exposure to below zero temperatures on different stages of storage pests (such as weevils, bruchids and grain moths) developing within seeds — and on various dormant pests and pathogens; the efficiency of alternative non-destructive control methods; and procedures for preventing infestation of seeds, or for reducing the degree of infection. It is expected that the report will be published in 1984.

IN VITRO COMMITTEE

At its tenth meeting in February 1983 the Board endorsed the report of the *In Vitro* Committee which had met in August 1982. The major recommendations of the Committee were outlined in the *1982 Annual Report* and these recommendations have stimulated a great deal of international interest. Considerable optimism is felt in scientific circles that the conservation of vegetatively propagated crop plants will be drastically simplified in the near future. Methods are being developed whereby cell cultures and small pieces of plant tissue are stored *in vitro* under conditions that greatly

reduce growth rate. In the foreseeable future there is the possibility of cryopreservation whereby tissues will be held *in vitro* virtually indefinitely in a state of suspended growth. The report of the *In Vitro* Committee has also stimulated interest in disease indexing of vegetatively propagated species.

As a result of the first meeting of the *In Vitro* Committee the Board commissioned:

- i) the development of an **international computerized data base** to include all significant activities. This was established during 1983 and reached the stage where most data were entered and queries could be answered. This is regarded as a Secretariat function but at present it is contracted to the laboratory of the Technical Secretary of the *In Vitro* Committee. Much of the ongoing *in vitro* work related to the maintenance of *in vitro* active collections (material stored for relatively short periods, preferably with slow growth under defined conditions); and the cleaning-up of materials and rapid propagation. The data base covers the priorities of the IBPGR for crops and those of priority interest for *in vitro* research. In addition it incorporated information however scanty on disease indexing and characterization of cultures. The data base has been drawn from the replies from 639 contacts in approximately 60 countries. The crops covered are shown in Table 13.
- ii) a **report on stability** to provide better appreciation of the current framework for studying the genetic variability of somatic tissues *in vitro* which will augment conven-

Table 13. Crops included in the IBPGR *in vitro* data base

Roots and tubers	Industrial crops	Fruit	Others
Potato	Rubber	Banana	Olive
Cassava	Cacao	Citrus	Sago palm
Sweet potato	Coffee	Artocarpus	Date palm
Taro	Sugarcane	Other tropical fruits	Other palms
Yam	Oil palm	Other temperate fruits	Medicinal plants and spices
Cocoyam	Coconut		Other woody species
Other aroids	Vitis		
Allium			

tional genetics and plant improvement of the technology of *in vitro* genetic characterization; and of the relationship between type of culture system, culture conditions and the occurrence of instability. It is expected that this report will be available early in 1984;

- iii) a status report on temperate fruits to include the availability and current application of *in vitro* techniques (including the cryopreservation of buds and pollen) to temperate fruits, and the extent to which work carried out to date had involved the checking of material returned to field genebanks. This report is being coordinated by Dr. C.J. Bishop (Board member) and it is expected that it will be available in mid-1984. The report has been prepared at the University of Saskatchewan, Saskatoon, Canada (where the Board was also pleased to note the ongoing work on cryopreservation of apple);
- iv) a status report on *Allium* on the necessity and potential for *in vitro* conservation. This work is being carried out at the Faculty of Agriculture, Hebrew University of Jerusalem, Rehovot, Israel and will be finalized during 1984;
- v) a specialist report on the design and costing of an *in vitro* genebank. This report will review requirements in terms of equipment and expertise. Since it will have to give due regard to likely geographic locations and the varying standards required from crop to crop, this report is not expected before the end of 1984.

Research proposed by the Committee and initiated by the IBPGR is described below. In addition the Board, at its tenth meeting in 1983, requested a special meeting of a Subcommittee to review the potential of developing novel collecting techniques using *in vitro* methods so that materials of vegetatively propagated species and "difficult" species such as coconut could be handled more effectively. If this is possible then explants could be obtained in the field and enter culture systems quickly, thereby obviating many traditional procedures and ensuring that genetic conservation *in vitro* is streamlined.

The Subcommittee met 14-16 September 1983 (see Appendix IV for membership). This

recognized that emphasis has been laid on cultivars for clonal crops and more systematic exploration of the gene pools will lead to better conservation. A number of crops were discussed in detail: cassava, sweet potato, taro and *Xanthosoma*, yam, *Musa*, coconut and cacao. The Subcommittee noted that two broad approaches may be taken to *in vitro* collecting depending on the crop (i) direct transfer to *in vitro* culture with all the necessary manipulations being done at the collecting site and (ii) transfer of material collected by conventional methods to *in vitro* culture at the laboratory in the same country. Collecting by *in vitro* methods will use zygotic embryos (e.g. coconut), pre-existing buds (e.g. cassava, sweet potato) or other somatic material (e.g. cacao, potato). Proposals for research were also agreed.

SUPPORT TO FIELD GENE BANKS FOR VEGETATIVELY PROPAGATED CROPS

Following reports of expert working groups on a variety of vegetatively propagated crops, the Board has to some degree or other assisted or prompted the building up of field genebanks in numerous countries for sweet potato and cassava; *Citrus*, banana and mango; *Vitis*; *Allium*; sugarcane and *Theobroma* (see respective crop section).

IBPGR SUPPORT TO *IN VITRO* CULTURE RESEARCH

Research needs agreed by the Board include those shown in Table 14.

During 1983 the Board continued support to research on cassava, cacao and banana and initiated new work on *Citrus*, *Colocasia* and sweet potato. The work is guided by a refereeing sub-committee comprising Prof. E.A.L. de Langhe (Board member and 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). The situation was reviewed in May 1983 and a report provided to the Executive Committee and in Sep-

Table 14. Research needs

Crop ¹	Development of good culture techniques ²	Disease Indexing	Cryo-preservation
Potato			x
Cassava		x	x
Sweet potato	x	x	
Yam	x	x	
Aroids	x	x	
Banana		x	y
Coconut	x		
Sugarcane	x	x	
Citrus	x		
Vitis	x		x
Cacao	x		

¹ This lists examples only; it is not exhaustive, e.g. needs for *Allium* and temperate fruits require the status reports mentioned above; some species require work on seed physiology, e.g. wild banana etc.

² Applicable to a wide range of genotypes.

tember 1983 on the occasion of the meeting of the *In Vitro* Subcommittee. The Planning Committee of the IBPGR also addressed this subject and as a result the Consultative Group was alerted in October-November 1983 that the financial resources required are likely to exceed those estimated in the past.

The Board has agreed that where research and development are necessary they should be contracted to a centre of excellence so that the techniques are developed as rapidly as possible and at a later stage the Board will provide technical assistance for the transfer of technology. This approach was commended in the CGIAR discussions at the annual meeting, October-November 1983. The Board is also heartened to note parallel support to this type of work by other agencies, e.g. the establishment of a cryopreservation unit and disease indexing of sweet potato by USDA.

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

Cassava Through CIAT, funds were provided for the development of *in vitro* culture methods for the propagation of wild *Manihot* species and the transfer of samples. In 1983 accessions were transferred from Argentina, Brazil, Paraguay and Peru to the CIAT collection. At

CIAT they will be 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. Through collaboration with scientists in INIA (Mexico), CENARGEN (Brazil) and ICA (Colombia) a programme was started in 1983 to assess the applicability of current meristem culture techniques for cultivated cassava to wild species.

In association with CIAT the Plant Biotechnology Institute (until recently the Prairie Regional Laboratory) of the NRC, 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 has arranged to get a better range of material from CIAT in early 1984 so that the experimental work can be accelerated.

Citrus The Tissue Culture Unit of INIA, Moncada, 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 from August 1983 to develop preliminary screening of techniques. The work will be associated with the establishment by the IBPGR of a reference *Citrus* germplasm bank for the Mediterranean region. In addition to the development of techniques applicable to a wide range of genotypes a part of the project will assess the survival of *Citrus* cultures after freezing.

Cacao The IBPGR-funded project at Nottingham, UK continued to work on clonal propagation (using culture of shoot apices and axillary buds, asexual embryogenesis, suspension cultures and the induction of morphogenesis in callus derived from leaf and stem explants) and conservation methodology using growth limitation and attempted cryopreservation. It is emphasized that the storage methods eventually adopted must be compatible with clonal propagation. There appears to be potential for developing cryopreservation of dormant buds excised directly from the plant and then recovered either *in vitro* or by grafting. The attack on a broad front developed by this project has

already resulted in a novel *in vitro* collecting technique which is now ready for field testing.

In addition a grant to the laboratory from another source enabled the IBPGR to provide minimal extra funds to start work on biochemical characterization (of plant and cultures) using cacao as a model.

Banana In 1982 the Board initiated a project at the Katholieke Universiteit Leuven, Belgium on banana meristem culture and research on the initiation of multiple budding and long-term storage techniques. This has been combined with a training exercise. The results are expected to help in the international movement of materials to field genebanks, thereby increasing the variability represented and facilitating duplication for safety. With respect to this latter point quarantine problems are important and in May 1983 a supplemental grant was provided to initiate biochemical disease indexing.

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 is aimed at comparing characterization of phenotypes with biochemical characterization. Banana is a suitable plant for these studies due to the differing variability produced through different rates of multiplication and of subculturing.

Colocasia Late in 1983 the Board commenced 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. The scientist in charge had been involved in producing a monograph on culture methods for this crop.

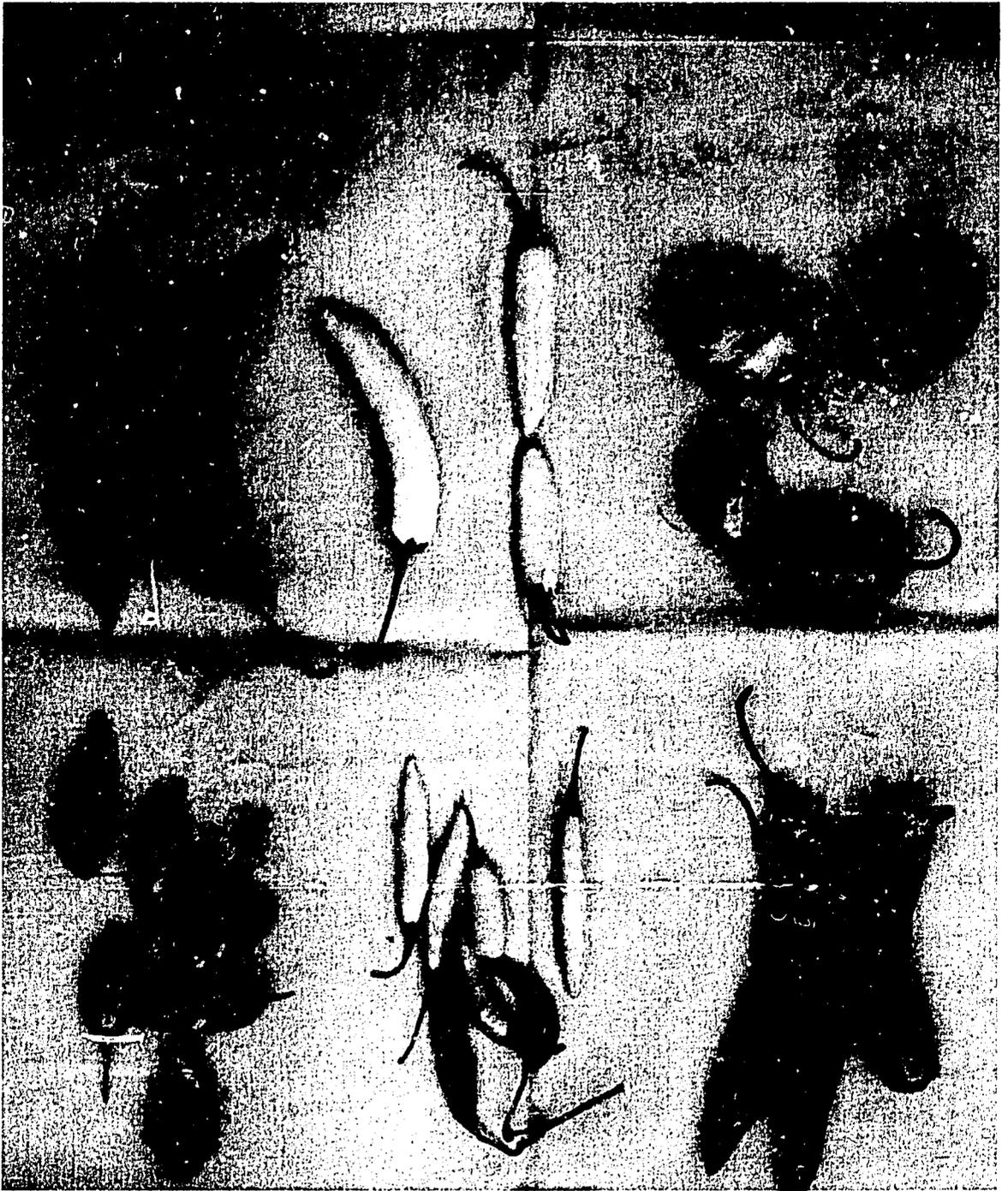
Sweet Potato During 1983 negotiations were in hand for an IBPGR project at Clemson University, South Carolina, USA in association

with Dr. A. Jones, Chairman, IBPGR Working Group on Sweet Potato and with USDA-supported work on disease indexing. This project, which will begin early in 1984, will establish techniques suitable to the widest range of genotypes possible and will produce a technical manual, essential for the transfer of material to collections.

IN SITU CONSERVATION

With the urgent need to collect and conserve seed crops the IBPGR has not formally devoted resources to *in situ* conservation, although it has been sensitive to the needs. In the past the IBPGR has endorsed recommendations of the Southeast Asia Committee and several regional meetings, and *in situ* conservation was a major item of discussion at the FAO/UNEP/IBPGR Technical Conference in 1981. Many of the recommendations from that Conference resulted from a status report commissioned by the IBPGR through IUCN. In subsequent discussions the Board has stressed the need for *ex situ* conservation for the seed crops and that designation of *in situ* reserves for conservation of many tropical species, especially fruits, require much more detailed field work than has been carried out in the past. Many protected areas do not have a plant inventory; many even lack details on population variability.

Upon learning that IUCN and WWF intended to launch a plants campaign early in 1984 the Board expressed its wish to be formally associated with this campaign since one area to which attention will be drawn is the need for conservation of wild relatives of crops. Accordingly, the IBPGR will issue a policy statement on *in situ* conservation early in 1984 and establish close contacts with the IUCN Centre monitoring data on protected areas, and organize joint projects with IUCN/WWF as part of the campaign.



INFORMATION AND DATA MANAGEMENT

One of the most difficult problems to solve over the past nine years has been the lack of readily available and easily readable data on the existing germplasm collections. This, to some degree, has hampered clear assessments of how well covered have been the centres of variability. It has therefore been difficult to base judgements for targeting action. However, owing to the heavy emphasis the Board has placed on information management, the past nine years have seen many positive changes. Along with the technical assistance provided by the Board, parallel efforts were made in a number of programmes in the IARCs and in some larger national programmes such as that of the USDA which after some years of development implemented GRIN.

There are many aspects of information management to consider. Accurate and up-to-date data on characteristics of the genetic resources samples are as important as their collection and conservation. The availability and exchange of information paves the way for samples in genebanks to be used more quickly and efficiently. At the same time data can be analysed to assess the patterns of variability and the degree to which collections contain representative variability.

There is the need, therefore, to build up data bases containing passport information, characterization data, and data relating to breeders' evaluations. In order to produce these there has to be cooperation between a large number of institutes and scientists. Data should flow among, and be understood by, collectors, curators, users and coordinating agencies. The accuracy of the information on the genetic resources of any crop depends to a large extent on the ability of workers to exchange information.

Methods of exchange should remain simple and direct so that problems which can hinder easy data transfer are kept to a minimum. It is advisable to standardize the format of the data

and also to inform cooperating personnel of the practical importance of such standardization.

Any breakdown in the collection, storage and use of data relevant to genebank procedures can have serious consequences. If, for example, data are not kept by genebanks on the monitoring of viability and regeneration cycles of samples in their care, then it will be found in the future that samples may have deteriorated until they become useless; at the least genetic variability will have been lost.

During 1983 the IBPGR — as the coordinating organization for a large global network of crop genetic resources activities — stressed a number of these aspects and these are summarized below.

In addition, by 1982 it had become apparent that the sheer magnitude of the tasks was beyond the capacity of the facilities available to the Secretariat. During 1983 a great deal of time and effort were devoted to the installation of a Wang Office Information System (OIS) computer and the upgrading of the microcomputers in day-to-day use.

The changeover to word processing has required considerable additional effort on the part of the secretarial staff but results are already visible. Most documents that undergo various review stages are prepared on the word processing package. The computerization on the Wang OIS system of the IBPGR's 4 500 addressee mailing list is a first practical use of the data handling capacity of the new system. The newly computerized mailing list will be revised during the first half of 1984. One of the microcomputers has been used to computerize the IBPGR slide and photo files, thereby making information readily available on 5 000 entries.

The Board also started to deal with information needs other than data base development for germplasm samples. This was a new area of work which is likely to have major impact on future planning and targeting of action.

DESCRIPTION OF SAMPLES

When data are standardized, efforts are not duplicated nor are they wasted on other methods of communication. This method of data handling, which follows a logical approach to the organization of information, both within and among genebanks, allows greater progress to be made. Such a system will be flexible to meet new conditions and should be allowed to evolve along coherent lines that do not lose track of the basic, standardized principles that underlie documentation work.

To facilitate this approach, in 1982 the IBPGR produced a standard format for descriptor lists and standard collection forms to interface directly with these lists. Hence a start has been made to rationalize information about collected samples. Since the basic data are often lacking, a large number of projects for data acquisition have been started.

In particular the IBPGR Wheat Programme continued its work on gathering and computerizing all information on samples held in major wheat collections. This is a large task that will be ongoing for some time and the Board is grateful for the back-up provided by USDA-ARS, Beltsville and the Small Grains Collection held there. This collection, it is estimated, currently provides over 80% of the wheat samples world-wide and as a working collection fulfils a major international role.

During 1983 the Board agreed that the Wheat Officer will start work on barley because frequently wheat and barley are held in the same centres. At the same time a major initiative was started within the framework of the ECP/GR for the acquisition of passport data on all samples of barley in European collections. They will be registered at ZIGuK, German Democratic Republic. The Secretariat has reached agreement for barley work which will link ICARDA and PGRC, Ethiopia with ZIGuK. The IBPGR officer will also start acquiring data from collections from other parts of the world.

In 1983 the Board continued work on major data bases covering several collections for many other important crops.

Maize: During 1983 the evaluation and documentation project for all maize previously

collected by the Board in the Southern Cone of South America (p. 12) resulted in the issuance of a number of catalogues based on the computer data bases. Using a standard format, all countries involved prepared inventories in the same fashion. The documentation of the Peruvian national collection of maize is also being supported and the data compiled will be in a similar format to that used for the IBPGR-sponsored collections. The information on a major portion of the maize germplasm in Latin America is now available to all interested users.

Phaseolus: *Phaseolus vulgaris* has a high global priority and samples are held in several major genebanks. Acting on the advice of the *Phaseolus* Advisory Committee, the Secretariat initiated a project in 1982 to produce an accurate global status report on available variability and to advise on how such variability might be better used. The project is also investigating the possible uses of germplasm data bases to provide accurate, useful information to assist decision-making on germplasm work. With the help of the University of Gembloux, Belgium and links with CIAT, passport and evaluation data received from genebanks were collated into a single file in 1983. These included complete or partial information from Belgium and CENARGEN-EMBPRAPA (Brazil), CIAT, CATIE (Costa Rica), University of Cambridge (UK), NVRS (UK), Fodder Crops and Pastures Institute, Larissa (Greece), Tápíószele (Hungary), Thika Horticultural Station (Kenya), INIA (Mexico), Ege Bölge Zirai Arastirma Enstitüsü, Izmir (Turkey), NSSL, Fort Collins (USA). More than 30 000 accessions were dealt with. Other centres approached included those in Argentina, Chile, Colombia, France, German Democratic Republic, Italy, the Netherlands, Nigeria, Peru, Portugal, Spain and the United States; it is expected that these and others will provide data in 1984.

This project is much smaller than the one on wheat because of the smaller numbers of samples. Nonetheless the heterogeneous nature of the information means that "cleaning up" is necessary before any statistical analysis can be implemented.

Vitis: The establishment of a data base for *Vitis* genetic resources under the lead of OIV is essential for the identification of:

- i) existing material,
- ii) duplication in collections,
- iii) gaps for further collection, and
- iv) material useful for present and future improvement programmes.

Therefore further details on each accession within the above-mentioned collections need to be obtained according to the IBPGR/OIV grape descriptor list. An attempt will be made to at least obtain the basic passport information and possibly some further details on the twenty most essential characters (characterization section of the descriptor list). The OIV has agreed to maintain the resulting data base, to improve/update this regularly and to make this information freely available to all interested users.

Soyabean: The IBPGR started a project in 1983, in association with INTSOY, to gather together, standardize and produce a computerized data base of samples in all major collections.

Cotton: The compilation of an international cotton data base, in association with IRCT, continued through 1983.

Prunus: In the framework of the ECP/GR a major programme started in 1983 to capture and register data on *Prunus* collections in Europe. The NGB is acting as a central data base on behalf of IBPGR for the information covering cherry, peach and apricot, plum and almond.

Apple: At the end of 1982 the IBPGR inaugurated a project with the EUCARPIA Fruit Section to inventory (in a computer) all accessions in European collections. The active computer work is being carried out at the East Malling Research Station, UK. Emphasis in the first instance has been put on Europe in view of the numerous collections and the need for the Secretariat to be closely associated in the methodology. In the future this work may be expanded to make the inventory completely international.

Okra: The IBPGR has an ongoing project with the ORSTOM Centre in Adiopodoumé, Ivory Coast to document all materials of okra that have been collected in Africa.

Sugarcane: The IBPGR has an ongoing project to document the two collections of sugarcane recognized by ISSCT in India and the United States. In addition to the crops listed above important data bases are being developed by other centres. However it became even more obvious in 1983 than hitherto that there are numerous constraints to be overcome. One of the most apparent is the reluctance of many national programmes to grow out and characterize materials — even those collected with IBPGR support.

In 1983 the Board informed the CGIAR that it would enter a phase of consolidation which means slowing down the previous emphasis on wide-ranging collecting and giving more attention to research on the materials already gathered.

As in previous years, the Board provided numerous small grants for the multiplication of samples in genebanks for two reasons: first the materials will be duplicated and second while being multiplied characterization data can be obtained. There were so many projects of this type that they cannot be listed individually but most are mentioned in the section on crops.

In view of the advanced stage of implementation of the US National Plant Germplasm Systems's GRIN and the international nature of the US holdings, the Board opened a small liaison office in ARC-Beltsville. This enables the IBPGR to use the data network of the United States with great advantage to the Board's programme. This office will also be involved in some of the Secretariat's work for data acquisition from other collections.

STANDARDIZATION OF DATA: CROP DESCRIPTOR LISTS

The major emphasis of the past five years on the preparation of descriptor lists continued in 1983. The lists provide the basis on which information on accessions can be produced in a standard way by all people working on the particular crop described.

In view of the need to make these lists easier to comprehend and to use by all workers, a new standard format was devised in 1982. This format makes clear the genebank curator's duties as opposed to the work which is carried out by the plant breeder. The new format also

introduces minimum standard collection information to be taken during collection missions in the field and minimum information to be kept by the curator on the status of each germplasm sample.

Following the adoption of this standard, work was undertaken to revise a large number of lists issued earlier: almond, amaranths, beets, cocoa, coffee, colocasia, cotton, groundnut, maize, millet, pigeonpea, sesame, sorghum, sweet potato, tomato, tropical fruit, wheat and yams.

In addition this year new lists were published for pear, *Phaseolus coccineus*, *Echinochloa* millet, kodo millet, cowpea, safflower and grape. Descriptor lists for grass and forage legumes, banana (revised), almond, apricot (revised), cashew, cherry, *Citrus*, papaya, peach, plum, finger millet, several *Vigna* species, *Phaseolus acutifolius* and wild *Phaseolus* species were under preparation. When these are issued, over 80% of crops of high IBPGR priority will have IBPGR descriptor lists available. Of these 100% of the crops of global priority 1, 90% of the crops with global priority 2 and 50% of the crops of high regional priority will have been covered.

DIRECTORIES OF COLLECTIONS

The IBPGR publishes directories containing details of the major holdings of accessions of high priority crops. These provide information on where germplasm samples can be obtained. Only summary information is included, e.g. total number of samples of which species; how many represent landraces or wild species; what evaluation has been carried out, and storage conditions.

These directories are a first attempt at listing collections: in the future many more details are to be gathered and the data will all be computerized, thereby allowing ready updating.

Crops already covered in directories include wheat, barley, maize, rice, sorghum and millets; food legumes; root crops; vegetables and industrial crops. The first was published in 1980 and already revision is necessary. During 1984 the root crops directory will be updated and reissued.

In 1983 a directory of tropical fruits (avocado, *Musa*, *Artocarpus*, *Citrus*, cashew, man-

go, fig, date, papaya and pineapple) and a directory on forages (grasses and legumes) were prepared. They will be published in 1984.

During 1983 the gathering of data continued for information from major genebanks for the *Directory of computer use in genebanks*. This directory will describe the hardware, software and organizational aspects of computerized information systems in current use for documenting collections in the major genebanks. It is hoped that this will promote the exchange of both computerized data and advice on computer use among genebanks.

TECHNICAL ASSISTANCE FOR HARDWARE

The headquarters of the Secretariat acts as a focal point for the provision of advice and assistance. In 1983, apart from the installation of an OIS computerized management system referred to above, a new system CP/M operating system for microcomputers was installed as well as a hard disk for the Secretariat's Apple II microcomputer to allow work in PASCAL and DOS.

Microcomputers were installed at the Tápiósztele Genebank, Hungary; ARI, Cyprus; Estação Agronómica Nacional, Portugal; International Cocoa Genebank, Trinidad and the Maize Institute, Yugoslavia. Planning was advanced for installation of microcomputers in INIA, Spain; WARDA, Sierra Leone and ARC, Pakistan in 1984. Specific technical advice was provided to ZIGuK (for registration of barley) and the Institute of Plant Introduction and Genetic Resources, Bulgaria.

OTHER DATA BASES

In 1983 significant development was made by the Secretariat of data bases on a number of genetic resources activities other than data dealing with samples. They were:

- i) **An international data base on in vitro culture.** This is temporarily sub-contracted to the University of Nottingham, UK and is described in the conservation section.

- ii) **A computerized data base of all IBPGR collections.** During 1984 the IBPGR will issue a book to mark its tenth anniversary. It will consist of summary tables of all materials collected through IBPGR programmes over the first decade. The data were collated during 1983 and in 1984 will enter a computer; thereafter these will be kept up-to-date. The book will contain lists of collected species, sites where samples were taken and locations where deposited.
- iii) **Crop-by-crop surveys.** At the request of the Board at its tenth meeting in 1983 the Secretariat started a major survey to review world-wide all action that had been carried out on any particular crop. In 1984 the data will be computerized and kept updated. This will enable the Board to target action in a logical way.
- iv) **Computerized data base on wild relatives of cultivated plants.** Through a contract with the Hebrew University of Jerusalem, Israel, the Board started a project to collate all available information on wild relatives of crop plants. Data are being obtained from researchers, informal documents including theses and herbarium labels and will include geographical data, environmental data and distribution of plant characters within populations. In the first instance the number of species are being limited to those wild relatives indigenous in Southwest Asia but this work will have to expand as the IBPGR undertakes more ecogeographical surveys.

The Board views the centralization and availability of these information bases as a major role for its Secretariat.



Students collecting during CIAT-IBPGR training course

TRAINING

Lack of trained personnel has been one of the most serious drawbacks to building up and improving genetics resources work, particularly in developing countries. Both in the international network and on a national basis, there is a great need for scientists and technicians who are properly trained in all aspects of germplasm work: collection, multiplication, conservation, evaluation, exchange and documentation.

The IBPGR has devoted considerable resources to training by assisting in the development and organization of courses and by providing teaching materials and equipment for the benefit of students from developing countries. When requested, the IBPGR is often able to send its staff members to give lectures, thereby tapping the substantial practical experience of the staff as well as familiarizing students with IBPGR programmes.

The courses are of two kinds: post-graduate courses and various short courses intended as in-service training for scientists and also aimed at technicians currently working in germplasm institutes.

During 1984, the Board plans to review its past support to training and develop new ideas for the future.

POST-GRADUATE COURSES

I. University of Birmingham, UK

The IBPGR and UNEP provide grants to students from developing countries for enrollment in a post-graduate course in plant genetic resources at the University of Birmingham, UK. The course, *Conservation and Utilisation of Plant Genetic Resources*, was started in 1969 and has been supported by the IBPGR since 1975. The course begins each year in late September and runs through to September the following year. It fills a need for persons to

learn specialized skills who can then work in germplasm conservation institutes throughout the world. In addition to meeting the cost of students from developing countries, the IBPGR offsets a portion of the cost of the course.

In the 1982/83 post-graduate course there were students from Colombia, Greece, Kenya, Nepal, Philippines, Sri Lanka and Uganda; five of the students were awarded fellowships by the IBPGR and UNEP. In the 1983/84 class, 17 students are enrolled, 11 of whom are being awarded fellowships by the IBPGR and UNEP. They are from Ethiopia, Greece, Pakistan, Sierra Leone, Somalia, Uganda, Upper Volta, Uruguay and Zaire.

A new course director, Prof. J.A. Callow, head of the University's Department of Plant Biology, was named following the retirement of Prof. J.G. Hawkes, who had been director of the course since its inauguration.

II. Universidad Nacional Agraria, Peru

A new post-graduate course has been prepared by the UNA, la Molina, Peru. The course, which is expected to start in 1984, will extend for 18 months (three semesters). This will be the first course offering an M.Sc. in genetic resources taught in the Spanish language. Over the next five years, approximately 50 students are expected to receive advanced degrees.

The Centro de la Papa (CIP), universities in the Andean region which have worked on local crop species, and regional and national genebanks will be cooperating with UNA.

SHORT TECHNICAL COURSES

The following short courses were hosted by institutes throughout the world. Organizational help and funding was provided in whole or part by the IBPGR.

University of Birmingham, UK

The University of Birmingham, UK holds two short courses each year. The first, *Genetic Resources Evaluation, Utilisation and Data Preparation and Management*, was held January-March and through IBPGR support, two students from India were able to attend. The second course, *Crop Plant Diversity, Its Exploration and Conservation*, held September-December, was attended by a student from Bangladesh sponsored by the Board.

Universidad Nacional Agraria, Peru

The Universidad Nacional Agraria, la Molina, Peru organized a course in Spanish for post-graduate students entitled *Collection, Evaluation and Conservation of Genetic Resources of the Andean Region* from 2 May to 10 June. Participating in the course were 16 students from Bolivia, Colombia, Chile, Ecuador, Peru and Venezuela. Various aspects of Andean crops were studied, including their origin and evolution, collection, evaluation, seed physiology and germplasm utilization.

Edinburgh School of Agriculture, UK

The Edinburgh School of Agriculture, UK organized a course on *Practical Seed Technology for Genebank Personnel* to coincide with the end of studies of students enrolled in the one-year course at the University of Birmingham, UK. Fifteen students from developing countries attended the course, held from 6-16 September. Most of these students will work in genebanks in their home countries upon completion of their studies. The students were taught procedures normally employed in large-scale seed operations, and studied modifications of the procedures necessary for working with small-sized seed accessions. Practical training was also given in seed testing techniques for germination, seed-borne pests and pathogens, and micropropagation methods.

ORSTOM, Ivory Coast

A course in *Collection, Evaluation and Conservation of Genetic Resources* was held at ORSTOM, Ivory Coast from 3 May to 3 June. Lectures in French were alternated with visits to the field and to ORSTOM laboratories. A total of 12 students from Benin, Burundi,

Cameroon, Congo, Guinea, Mali and Togo attended. Among the 12 were two from the Institut du Sahel, Mali.

IITA, Nigeria

A course in *Genebank Management and Seed Technology* was held at IITA, Nigeria, 15-26 August for 18 students from Africa. The students were instructed in such topics as seed dormancy, loss of seed viability during collecting, harvesting and processing. The students were from Cameroon, Ethiopia, Kenya, Liberia, Madagascar, Malawi, Nigeria, Rwanda, Senegal, Somalia, Sudan and Tanzania.

New York State Agricultural Experiment Station, Cornell University, USA

A course on *Seed Physiology* was conducted at New York State Agricultural Experiment Station, Cornell University, USA, from 1-19 August. Among the topics discussed were seed moisture content, production practices, harvesting and certification, in addition to insect and pathogen damage, deterioration, maintenance of genetic characteristics and inventory control and record keeping. The 17 students were from Argentina, Brazil, China, Costa Rica, Egypt, Ethiopia, India, Kenya, Pakistan, the Philippines, the Republic of Korea, Sudan, Syria and Turkey.

Kasetsart University, Thailand

A two-week course for 26 persons from the five member countries of the IBPGR Southeast Asia Programme was held 16-29 October at Kasetsart University, Thailand. Students from Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand attended a course on *Characterization and Preliminary Evaluation of Plant Germplasm*. In addition to the university, other course organizers were TISTR and the Thai National Plant Genetic Resources Coordinating Subcommittee. A number of local scientists gave lectures on theoretical aspects and others presented papers which were subsequently reproduced and bound.

CIAT, Colombia

A course entitled *Training in Genetic Resources in Latin America* was held at CIAT, Colombia, 10 January to 4 February. Partici-

pants were from countries with strong or emerging genetic resources programmes or individuals having field experience. They identified seed maintenance, information management and documentation as particularly helpful aspects of the course which will help improve their work in their own countries. The 19 participants were from Brazil, Colombia, Ecuador, Guatemala, Mexico, Peru and Venezuela.

Maize Research Institute, Yugoslavia

A training course on *Maize Germplasm Collection and Handling* was held at the Maize Research Institute, Yugoslavia, from 19 September to 1 October for IBPGR-supported students from Czechoslovakia, Egypt, Greece, Hungary, Mali, Poland, Spain, Togo, Turkey, Upper Volta and Yugoslavia. Topics of study included variability of maize in Europe, current

status of collections, utilization, and systems of documentation.

Other IBPGR training activities in 1983 included:

- A general review of the IBPGR training programme was begun late in 1983 and is expected to be concluded by mid-1984. The review will assess the effectiveness of current training, identify gaps and propose improvements which will be discussed by the Board in February 1984.
- The establishment, for the first time, of an IBPGR Intern Scheme (pre- and post-doctoral) was approved by the Board in 1983. This will bring the IBPGR more in line with other centres of the CGIAR. Interns were posted at AVRDC and ICARDA late in the year.
- Sponsorship of study tours for scientists and on-the-job training for technicians involved



IBPGR intern at AVRDC

- in genetic resources work was continued. The tours allow individuals to visit ongoing projects in other countries or to use reference resources otherwise unavailable to them.
- Sets of reference books on crop genetic resources were provided to 15 libraries of universities and institutes throughout Latin America. This has been carried out on behalf of the IBPGR by the International Institute of Education, New York, USA.
 - A training manual was printed based on material which was used in conjunction with an IBPGR course on food legume germplasm held at ICARDA, Syria in 1982. It will be distributed to participants of the course and other interested persons.
 - In relation to the IBPGR/FAO programme on woody species for fuelwood and environmental stabilization, training seminars and courses on practical aspects were held in Mexico, Senegal and Sudan.

ADMINISTRATION

MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1983 is shown on p. iv. At the end of the year Dr. C. Bishop (Canada), Prof. J.P. Cooper (UK), Prof. H.K. Jain (India) and Prof. G.T. Scarascia-Mugnozza (Italy) completed their terms. On the recommendation of the Board, the CGIAR re-elected these members for a second three-year term.

In addition, Dr. N. Chomchalow (Thailand) resigned from the Board during the year when he took up the post of Regional Coordinator for Southeast Asia. The Board agreed to leave a vacancy for the rest of the year and recommended to the CGIAR that Dr. R. Valmayor (Philippines) be appointed to serve for a three-year term commencing 1 January 1984.

The full Board met in Rome from 22-25 February 1983 and the Executive Committee met on 21 February and 16-18 May, also in Rome. The Executive Committee met again in Washington, D.C., 24-26 October prior to the CGIAR International Centres Week.

Elected members of the IBPGR serve in their personal capacities. Although in some cases members report to donors, the Board has agreed that any donor may, if desired, send an observer to attend meetings. The Board has expressed the hope that donors will designate as observers persons having a professional interest in the work of the IBPGR. At the tenth meeting of the Board in February 1983 observers from Canada, Italy, Japan and the Netherlands attended and observers from the United States and the Federal Republic of Germany attended the November Executive Committee.

Several donors to the IBPGR have nominated scientists to maintain liaison. These include Dr. J. Hardon (Netherlands), Dr. G. Fischbeck, past member IBPGR (Federal Republic of Germany) and Dr. C. Murphey (USA).

In respect to recipient countries there are numerous liaison officers formally nominated by governments 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 the normal TAC, Centres Directors and CGIAR meetings, the Board was represented at the following international or regional events:

-
- ISNAR Seminar on Agricultural Research, Rwanda, 4-11 February
 - Seventh African Horticultural Symposium, ISHS/ARC, Wad Medani, Sudan, 19-25 March
 - FAO Committee on Agriculture, Rome, Italy, 21-30 March
 - ACCT, Rabat, Morocco, 4-9 April
 - COGENE Federation of European Biochemical Societies, Symposium Genetic Manipulation: Impact on Man and Society, Cologne, Federal Republic of Germany, 7-9 April
 - EUCARPIA Gene Bank Committee, Belgrade, Yugoslavia, 13-15 April
 - 15th Conference of AIDA, Zaragoza, Spain, 10-12 May

- ISHS, section on aromatic, medicinal and spice plants, Angers, France, 27-29 May
- ICRAF, IBPGR, CFI Multipurpose Tree Germplasm Workshop, Washington, D.C., 31 May to 4 June.
- American Agronomy Society/Crop Science Society of America/Soil Science Society of America, International Symposium on the Conservation of Crop Germplasm, Washington, D.C., 18 August
- 10th Anniversary Celebrations, CIAT, Cali, Colombia, 10-14 October
- Sixth Latin American Congress of Genetics, Maracaibo, Venezuela, 17-21 October
- *Ad hoc* Review Committee of the Technical Information Section of ICAC, Washington, D.C., 21 October
- 10th Anniversary Celebrations, AVRDC, Taiwan, China, 19 November
- EEC/AGRIMED section on aromatic, medicinal and spice plants, Brussels, Belgium, 8-9 December
- International Congress of Genetics, New Delhi, India, 12-21 December
(The keynote address of the Congress concerned conservation of genetic resources and the importance of a concerted world-wide approach.)

In addition there was representation at a number of national seminars on genetic resources.

SECRETARIAT

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

In 1983 headquarters staff consisted of seven scientists (with one vacancy), three administrative/technical assistants, five secretaries, two clerks and one part-time scientific writer.

The work of the Secretariat was supplemented by a large number of consultants and temporary secretarial, clerical and graphic help to cope with the expanding work of the Board.

Outside headquarters, field staff serve the following regions: Southeast Asia, Southwest Asia, Mediterranean, Europe (Special Project), Eastern Africa, Western Africa and Latin America.

During 1983, following a Planning Committee report, it was agreed that Regional Officers should be retitled Regional Coordinators and that a new grade of Collector should be used for certain field staff who are involved with more practical work. Following the review of Southwest Asia and the Mediterranean (p. 62, 70) an Arabic-speaking Collector was appointed in November 1983 to work specifically with certain countries of North Africa and Southwest Asia. Other Collectors are planned in Meso-America and South Asia.

The Secretariat includes professional staff dealing with specific crops. These include horticultural crops, wheat and forages. During 1983 the Wheat Officer was asked to assume work on barley.

At the beginning of 1984 a Conservation Officer took up his post. Future developments include the appointment of a Training Officer and an Industrial Crops Officer as identified by the ninth meeting of the Board, although the latter may deal with vegetatively propagated crops.

The Executive Secretary was also assisted in 1983 for specific tasks by Special Advisers: Dr. J. Creech (Board member 1974-80) for East Asia; Dr. J.B. Joshi (Board member 1974-80) for South Asia; Dr. J.H.W. Holden (for Europe and several policy issues) and Dr. K.S. Dodds (for several policy issues).

With the Special Project of the ECP/GR the Executive Secretary is also Executive Secretary of that project and an officer was appointed in 1983 for the day-to-day work.

COMMITTEES

Two standing committees on conservation, the Seed Advisory Committee and the *In Vitro* Committee (Appendix IV), were active during the year.

Crop Advisory Committees (Appendix II) continued to provide advice during the year, assisted in refereeing proposals and of the five, those dealing with rice, *Phaseolus* and wheat met (see respective crop sections).

PUBLICATION PROGRAMME

A list of IBPGR publications is contained in Appendix X. Those which are technical manuals continue to be well received and the joint FAO/IBPGR *Plant Genetic Resources Newsletter* has been more widely circulated than hitherto — over 4 500 copies are distributed quarterly. Due to constant heavy requests for IBPGR publications, many reprintings have been necessary.

During 1983 the IBPGR published seven descriptor lists, one regional report, one conservation report, ten crop reports as well as fourteen general reports, the Annual Report for 1982, the Bibliography, 18 forestry publications, one training publication, the *Southeast Asia Regional Newsletter* and the quarterly *FAO/IBPGR Plant Genetic Resources Newsletter*.

Following agreement by the Board for the Secretariat to be assisted on a part-time basis by a Scientific Writer/Publicity Officer, the Secretariat started a programme to issue technical brochures. Three were issued in 1983.

Late in 1983 the IBPGR sent *A Bibliography of Crop Genetic Resources* to press. It is nearly three times as large as the previous one published seven years earlier. This unique reference work will be distributed during 1984.

The IBPGR also continued to publicize its work through participation at selected book fairs. The IARCs jointly display with one Centre taking the lead in organizing/coordinating participation. During 1983 the IBPGR participated at the Frankfurt Book Fair (11-16 October), at the Second Chinese Exhibition of International Agricultural Science Materials (15-24 October), and will participate in 1984 at the New Delhi Book Fair (4-14 February). Lead Centres in these three important book fairs were IRRI, IRRI and GTZ (Federal Republic of Germany), and ICRISAT, respectively.

An extremely useful catalogue entitled *Publications on International Agricultural Research and Development* was prepared for distribution at the Frankfurt Book Fair by GTZ and jointly published by GTZ, CGIAR and IRRI. It contains full information on the publications of the IARCs, both within and outside the CGIAR system, as well as GTZ and BOSTID (USA).

To further awareness of the need to conserve plant genetic resources the Board agreed to issue a new type of brochure based on a question and answer format. In 1983 two such brochures were issued: *Facts about the IBPGR* and *A Global Network of Genebanks* (both in English, French and Spanish).

Additional initiatives of the publication programme are listed below.

- A publicity-type brochure on cereals was issued. This provides summary data on priorities, and highlights achievements such as that the IBPGR has to date collected wheat in 29 countries, rice in 27, sorghum and millets in 30, barley in 20 and maize in 27.
- A series of posters for display at meetings went to press at the end of the year.
- The slide-pack of 60 slides produced in 1982 as a training aid for crop genetic resources led to the preparation of its text in four editions: Chinese, Japanese and Korean; English, Indonesian and Thai; Spanish, Portuguese and English; and Arabic, English and French. Translating the text into nine languages is a slow process but the four regional editions will be available early in 1984 to those institutions and universities, especially in the developing world, which are engaged in increasing awareness of the importance of plant genetic resources and of the part played by the IBPGR.
- The Secretariat has microfiched all of its numbered documents from 1974-82 for use by its staff outside of headquarters. A limited number of sets on microfiche of the IBPGR/FAO Newsletter (Nos. 41-55) have been prepared for key libraries within the IBPGR network.

APPENDIXES

APPENDIX I

THE IBPGR SECRETARIAT IN 1983

Dr. J.T. Williams¹
Executive Secretary

Headquarters

Dr. N. Murthi Anishetty
Assistant Executive Secretary

Dr. C.G.D. Chapman²
Genetic Resources Officer
(Wheat and Barley)

Mr. W. Ellis Davies^{2,3}
Genetic Resources Officer (Forages)

Dr. J.T. Esquinas Alcazar
Genetic Resources Officer

Dr. S.L.A. Hobbs⁴
Genetic Resources Officer (Information)

Ir. D.H. van Sloten
Genetic Resources Officer (Horticulture)

Mr. J.M. Watts (Part-time)
Scientific Writer/Publicity Officer

Ms. C. Gorelli
Programme Assistant

Mr. B.T. McLean
Editorial Assistant

Mr. G. Sayour
Research Assistant

Ms. V. Ascione-Sindery
Secretary

Ms. F. Farzad²
Secretary

Mrs. M. McArthur-Giannini
Secretary

Miss D.E. Quaye
Secretary

Ms. S. Saint⁴
Secretary

Ms. J. Shuter-Buccini
Secretary

Ms. M. Bonomi
Clerk

Miss A. Vittorini
Clerk

Regions

East Africa Programme

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

West Africa Programme

Dipl. Ing. P.M. Perret (until March)

Mr. M. Horn (from November)
Regional Coordinator
(IBPGR/159/MUL)
FAO, B.P. 575, Ouagadougou, Upper Volta

Latin America Programme

Dr. M. Holle
Regional Coordinator
c/o CIAT, Cali, Colombia

Mediterranean Programme

Dr. W.G. Ayad (from November)
Collector for North Africa
c/o ARI, Nicosia, Cyprus

Southeast Asia Programme

Dr. N. Chomchalow (from June)
Regional Coordinator
c/o FAO Regional Office
Bangkok, Thailand

Ms. S. Savigamin
Secretary

Southwest Asia Programme

Dr. J.R. Witcombe⁴
Technical Officer
c/o ICARDA, Aleppo, Syria

Europe (ECP/GR)

Dipl. Ing. P.M. Perret (from May)
Regional Officer
c/o Headquarters Secretariat

IBPGR/IRRI Rice Collector

Mr. I.R. Denton
c/o IRRI, Manila, Philippines

¹ Also Chief, FAO Crop Genetic Resources Centre and Executive Secretary, ECP/GR.

² Outposted c/o FAO Liaison Office for North America, Washington, D.C.

³ On leave of absence April-December.

⁴ Left during 1983.

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Rice Research Institute
Department of Agriculture
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¹ As of 31 December 1983

CONSERVATION ADVISORY COMMITTEES

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ADVISORY COMMITTEE ON SEED STORAGE

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AD HOC SUBCOMMITTEE ON NOVEL COLLECTING METHODS

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MEMBERSHIP OF PHASE II OF THE EUROPEAN
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(ECP/GR)

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

MEMBERSHIP OF CROP WORKING GROUPS AND CONSULTATIONS ON THE GENETIC RESOURCES OF SPECIFIC CROPS HELD IN 1983

CACAO¹

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¹ The following resource people also made significant contributions: Mr. J.B. Allen, Dr. E. Imle, Dr. L.A. Withers, Mr. R.T. O'Connell and Mr. G.A. Trout.

COTTON¹

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¹ The following resource people also participated: Drs. S. Hammer, Knupfer, B. Somaroo and M. Worede.

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¹ Dr. S. Blixt also contributed to the meeting.

PRACTICAL CONSTRAINTS AFFECTING THE COLLECTION
AND EXCHANGE OF SAMPLES OF WILD SPECIES AND
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¹ Dr. J.T. Williams, Executive Secretary IBPGR and Ms. S. Feakin, IBPGR consultant participated as resource people at the meeting.

STATEMENT OF ACCOUNT FOR 1983
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1983	2 077 158 ¹
Various government contributions	3 692 415 ²
Interest credited in 1983	<u>150 113</u>
	5 919 686

Deduct*Cash expenditure 1983*

Personnel services	8 481 819
Official duty travel	486 281
Contractual services	1 532 681
General operating expenses	151 129
Supplies and materials	123 061
Furniture and equipment	156 796
Fellowships, grants and contributions	<u>194 513</u>
	3 459 280

Project servicing costs

13% on US\$83 376	10 839
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Commitments

Incurred during 1983 (up to 15 December)	<u>1 040 033</u>
Total expenditure and commitments - 1983	4 510 152
Payment of unliquidated obligations from previous years	805 722
Unliquidated obligations from previous years	<u>682 980</u>

Unobligated cash balance at 31 December 1983	<u>5 998 854</u> (79 168)
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¹ Unobligated cash balance (1982) plus unliquidated obligations (1982 and previous years).

² Including \$12 090 for special project ECP/GR.

1983 CONTRIBUTIONS RECEIVED
(as at 31 December 1983)

	US\$
Australia	90 497
Belgium	66 527
Canada	264 199
Denmark	52 888
France	61 033
Germany, Fed. Rep. of	223 777 ¹
India	52 921 ²
Italy	291 957 ³
Japan	489 896
Netherlands	305 000
Norway	85 470
Spain	98 033 ⁴
Sweden	173 064
Switzerland	100 756
United Kingdom	295 700
UNEP	128 607
United States	900 000
	3 680,325 ⁵

¹ Including part of 1982 pledge (\$81 817) received in 1983.

² Including balance of 1982 pledge (\$3 822) paid in 1983.

³ Including 1982 pledge (\$72 294) received in 1983.

⁴ Including 1982 pledge (\$49 950) received in 1983.

⁵ Excluding \$12 090 contributions for special project ECP/GR.

IBPGR PUBLICATIONS IN 1983 AND OTHERS IN PRINT¹

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 Inc., 2255 Palm Beach Lakes Blvd., West Palm Beach, Florida 33409, USA)
- Crop Genetic Resources Field Collection Manual, by J.G. Hawkes (1980), cosponsored by EUCARPIA
- FAO/UNEP/IBPGR Technical Conference on Crop Genetic Resources (1981)
- 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)
- IBPGR brochure (general) (1982)
- Los recursos fitogenéticos: Una inversión segura para el futuro, by J.T. Esquinas-Alcazar (Revised 1983) cosponsored 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 genes (1983); Red mundial de bancos de genes (1983)
- Crop Genetic Resources booklet with slide-pack photos and text (1983)
 - in Chinese, Japanese, Korean
 - in English, Indonesian, Thai
 - in Spanish, Portuguese, English
 - in Arabic, English, French

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 — this publication was sponsored by the IBPGR and the V.I. Lenin Academy of Agricultural Sciences)
- A World Survey of Wheat Genetic Resources, by R.P. Croston and J.T. Williams (1981)
- A Guide to the Species of *Aegilops* L.: Their Taxonomy, Morphology and Distribution, by J.R. Witcombe (1983)
- 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), cosponsored by IRRI
- Coffee Genetic Resources (1980)²
 - fruits, English version written by M.A. Rifai and I. Lubis and edited by C.H. Lamoureux from the Indonesian *Buahhahn*, 1977 (1980)
- Vegetables, English version written by N.W. Soetjpto 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. Dahimiharja and edited by C.H. Lamoureux and M.A. Rifai from the Indonesian *Ubi-ubian*, 1977 (1981)
- Genetic Resources of Sweet Potato (1981)²
- Genetic Resources of Cocoa (1981)²

¹ Available on request from the IBPGR Executive Secretariat, Crop Genetic Resources Centre, Plant Production and Protection Division, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy, unless otherwise indicated.

² Also contain descriptors.

- Genetic Resources of Amaranths, by G.J.H. Grubben and D.H. van Sloten (1981)¹
- Genetic Resources of Cruciferous Crops (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
- Vegetable Crops leaflet (1982)
- Genetic Resources of *Vigna* species (1982)
- Genetic Resources of *Citrus* (1982)
- Les ressources génétiques du genre *Abelmoschus* Med. (Gombo), par. A Charrier (1983)¹
- 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)
- A World Survey of Sorghum and Millets Germplasm (1984)

Woody species

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

- Genetic Resources of Tree Species in Arid and Semi-arid Areas (1980) (Job No. N7389/E)
- Handbook on taxonomy of *Prosopis* in Mexico, Peru and Chile, by P.F. Ffolliott and J.L. Thames (1983) (Job No. Q2580/E)
 Manuel de taxonomie de *Prosopis* au Mexique, Pérou, Chili, par P.F. Ffolliott et J.L. Thames (1983) (Job No. Q2580/F)
 Manual sobre taxonomía de *Prosopis* en México, Perú y Chile, por P.F. Ffolliott y J.L. Thames (1983) (Job No. 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/F)
 Manual sobre insectos que atacan a las semillas 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 taxonomía 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 et 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 y B.V. Gunn (1983) (Job No. Q2190/S)
- Collection, handling, storage and pre-treatment of *Prosopis* seeds in Latin America, by P.F. Ffolliott and J.L. Thames (1983) (Job No. Q2180/E)
 Recolección, manipuleo, almacenaje y pretratamiento de las semillas de *Prosopis* en América Latina, por P.F. Ffolliott y J.L. Thames (1983) (Job No. Q2180/S)
 Récolte, manipulation, conservation et prétraitement des semences de *Prosopis* en Amérique latine, par P.F. Ffolliott et J.L. Thames (1983) (Job No. Q2180/F)

¹ Also contain descriptors.

Descriptors¹

- Cultivated Potato (1977)
- Winged Bean (revised 1982)
- Tropical Fruits (revised 1980)
- Sorghum (1980) (in collaboration with ICRISAT)
- *Colocasia* (1980)
- Yams (1980)
- Cotton (1980)
- Mung Bean (1980)
- Apricot (1980)
- Beets (1980)
- Maize (1980)
- Rice (1980) (published by IRRI in collaboration with IBPGR)
- Wheat and *Aegilops* (revised 1981)
- Sesame (1981)
- Almond (1981)
- Pearl Millet (1981) (in collaboration with ICRISAT)
- Groundnut (1981) (in collaboration with ICRISAT)
- Pigeonpea (1981) (in collaboration with ICRISAT)
- Lupin/Lupinos (1981)
- Quinoa (Spanish) (1981)
- Barley (1982)
- *Phaseolus vulgaris* (1982)
- Oca (Spanish) (1982)
- Lima Bean (1982)
- Apple (1982) (in collaboration with CEC)
- Pear (1983) (in collaboration with CEC)
- Safflower (1983)
- Cowpea (1983)
- *Echinochloa* Millets (1983)
- Kodo Millets (1983)
- *Phaseolus coccineus* (1983)
- Grape (1983)
- Soyabean (Chinese & English) (1984)

Regions

- Plant Genetic Resources of Southeast Asia, edited by J.T. Williams, Ch. Lamoureux and Wulijami-Soetjipto (1975) (Available from the National Biological Institute, Bogor, Indonesia — this publication was partly sponsored by IBPGR)
- Proceedings of Southeast Asian Workshop on Genetic Resources (1977) (Available from the Philippine Council for Agriculture and Resources Research, Los Baños, Laguna, Philippines)
- 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)
- Report of the IBPGR Workshop on South Asian Plant Genetic Resources (1978)
- Report of the IBPGR Regional Meeting on the Mediterranean Germplasm Programme (1979)
- IBPGR Symposium on the Genetic Resources of the Far East and the Pacific (1981)
- Crop Genetic Resources of the Far East and the Pacific, edited by J.T. Williams and J.L. Creech (1981)
- Recursos Fitogenéticos de Interés Agrícola en la Región Andina/Meeting on Plant Genetic Resources in the Andean Region (1982)
- Report of South Asia Liaison Officers Meeting (1982)
- Report of Meeting of Liaison Officers for the Mediterranean Programme (1982)
- El Germoplasma Vegetal en los Países Andinos, editores M. Bartolome Piedrabuena y J.T. Esquinas-Alcazar (1983)

¹ See also under crops for descriptor lists for *Abelmoschus*, *Allium*, amaranths, *cr cao*, *Capsicum*, cassava, coffee, Cucurbitaceae, sugarcane and tomatoes.

Conservation

- The Storage of Recalcitrant Seeds: Achievements and Possible Approaches, by M.W. King and E.H. Roberts (1979)
- Tissue Culture Storage for Genetic Conservation, by L.A. Withers (1980)
- 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)
- The Design of Seed Storage Facilities for Genetic Conservation, by A.S. Cromarty, R.H. Ellis and E.H. Roberts (1982)
- 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). Copublication with IUBS and IGF

Training

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

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- * English/Arabic Glossary of Plant Genetic Resources Terms, by W.G. Ayad (1979)
- A Bibliography 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)

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

Directories of Germplasm Collections

- 1 * Food Legumes, by W.G. Ayad and N. Murthi Anishetty (1980)
- 2 * Root Crops, by A.D. Damania and J.T. Williams (1980)
- 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, *Piper*, Sugarcane and Tea), by J.T. Williams and A.B. Damania (1981)

* Out of print.

- 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) published by FAO and UNDP

LE POINT DES ACTIVITÉS DE L'ANNÉE

- Le Conseil international des ressources phytogénétiques (CIRP) a informé le GCRAI en 1983 que ses travaux comporteraient les modifications de programme ci-après:
 - réduction de la place accordée à la collecte générale d'échantillons (sauf dans des cas particuliers) et intensification des recherches sur les échantillons déjà recueillis;
 - évaluation des collections autres que les collections de base, pour les intégrer davantage au réseau mondial du CIRP;
 - intensification de la conservation *in vitro*;
 - efforts accrus pour faire appliquer dans les instituts agréés des normes scientifiques correspondant à des critères adaptés sur le plan international;
 - amélioration de la collecte et du transfert des données;
 - suppression des obstacles à la circulation du matériel génétique.
- Le CIRP collabore actuellement avec 100 pays et 580 instituts agricoles. Trente banques de matériel génétique dans 24 pays, dont la moitié sont des pays en développement, ont été chargées de conserver des collections de base de 34 plantes ou groupes de plantes.
- Les cinq comités consultatifs ont continué, avec le concours des centres internationaux de recherche agricole appropriés (CIMMYT et ICARDA pour le blé, Institut international de recherches sur le riz, CIMMYT pour le maïs, ICRISAT pour le sorgho et les mils et CIAT pour *Phaseolus*), à assurer la liaison entre le CIRP et la communauté mondiale de chercheurs et sélectionneurs. Les comités pour le blé, le riz et *Phaseolus* se sont réunis en 1983.
- Cinq groupes de travail (cotonnier, hévéa, cacaoyer, seigle et *Prunus*) — ces deux derniers conjointement avec le Programme coopératif européen pour la conservation et l'échange des ressources génétiques — se sont réunis pour examiner les lacunes des collections, revoir les priorités en matière de collecte, prendre des mesures pour s'assurer que les échantillons représentent toute la gamme de variabilité et définir des moyens pratiques d'accélérer la caractérisation des s_i écimens récoltés.
- Sur recommandation du Comité consultatif sur le stockage *in vitro*, le CIRP a inauguré une base internationale de données informatisée et a fait faire une étude sur les fruits tempérés et les possibilités de conservation *in vitro* d'*Allium*. Un sous-comité du Comité sur le stockage *in vitro* s'est réuni pour faire le point des nouvelles techniques de collecte.
- Le Comité consultatif sur le stockage des semences s'est réuni et a convenu que des normes internationales rigoureuses devraient être établies pour les banques de matériel génétique.
- Une consultation a été organisée pour examiner les obstacles à la collecte et à l'échange d'échantillons d'espèces sauvages et de cultivars primitifs.
- Le CIRP a établi des liens officiels avec les campagnes de conservation *in situ* organisées en 1984 par l'UICN et le Fonds mondial pour la nature, particulièrement en ce qui concerne les variétés sauvages de plantes cultivées.
- Les programmes relatifs aux plantes cultivées ont continué à progresser en 1983:
 - Soixante-dix-neuf missions ont collecté des échantillons de:
 - 28 plantes classées au premier rang des priorités dans 35 pays
 - 23 plantes classées au second rang des priorités dans 25 pays
 - 5 plantes classées au troisième rang des priorités dans 23 pays.
 - Une enquête mondiale sur les souches génétiques de sorgho et de mils a été publiée; des rapports sur les souches génétiques de *Capsicum*, de manioc, de cucurbitacées, de gombo et de soja ont été publiés; des rapports sur le riz et l'aubergine ont été préparés.
 - Des listes de descripteurs ont été publiées pour le niébé, le millet *Echinochloa*, l'herbe à épée, la vigne, le poirier, *Phaseolus coccineus* et le carthame; des listes de descripteurs sont en préparation pour les graminées et les légumineuses fourragères, l'amandier, l'abricotier (nouvelle édition), le bananier (nouvelle édition), l'anacardier, le cerisier, *Citrus*, l'éleusine, le papayer, le pêcher, le prunier, *Phaseolus acutifolius* et les espèces sauvages de *Phaseolus* ainsi que plusieurs espèces de *Vigna*. On disposera ainsi de listes de descripteurs pour plus de 80 pour cent des plantes considérées comme hautement prioritaires par le CIRP (soit 100 pour cent des plantes à priorité mondiale N° 1, 90 pour cent des plantes à priorité mondiale N° 2 et 50 pour cent des plantes hautement prioritaires sur le plan régional).
 - Un plan d'action mondial pour les plantes fourragères a été définitivement mis au point. Des dispositions ont été prises pour la création de groupes de travail sur les plantes fourragères, en vue de constituer un comité consultatif international et afin de raffermir les rapports entre les institutions nationales et internationales de formation et de recherche sur ces plantes.

- Programme de conservation:
 - On a poursuivi des études scientifiques sur la physiologie des semences et la culture *in vitro* du bananier, du manioc et du cacaoyer, et l'on a entrepris des recherches *in vitro* sur *Allium*, *Citrus* et le taro.
 - Le CIRP a commencé à utiliser certains centres pour distribuer à des banques de ressources génétiques désignées des souches génétiques sauvages et primitives recueillies au cours de missions organisées avec son aide.
 - Des crédits pour la création d'installations de stockage ou leur amélioration ont été fournis au CIMMYT, au NIHORT (Institut de recherche horticole du Nigéria), à la Chine, la Colombie, la Côte-d'Ivoire, Cuba et au Kenya; du matériel a été envoyé aux pays suivants: Bangladesh, République de Corée, Côte-d'Ivoire, Equateur, Ghana, Grèce, Haute-Volta, Inde, Kenya, Mozambique, Nicaragua, Niger, Papouasie-Nouvelle-Guinée, Pérou, Soudan, Thaïlande, Togo et Uruguay.
- Programme d'information et de gestion des données:
 - Le Secrétariat a installé un système de gestion informatisé et apporté des améliorations à ses micro-ordinateurs.
 - Des banques de données portant sur les collections du réseau du CIRP, la culture *in vitro* et les espèces sauvages apparentées aux plantes cultivées ont commencé à être constituées. Des renseignements sur les échantillons de diverses plantes — pommier, cotonnier, maïs, gombo, *Phaseolus*, *Prunus*, soja et canne à sucre — sont aussi tirés dans les banques internationales ou régionales de données du CIRP.
 - Des micro-ordinateurs ont été installés dans des instituts des pays suivants: Chypre, Hongrie, Portugal, Trinité-et-Tobago et Yougoslavie.
 - La multiplication, l'évaluation et la documentation du matériel génétique conservé ont été entreprises ou poursuivies avec l'aide du CIRP dans de nombreux instituts répartis dans le monde entier.
- Programme de formation:
 - Le CIRP a continué à financer le cours d'études supérieures sur les ressources phylogénétiques à l'Université de Birmingham (Royaume-Uni) et a continué à octroyer des bourses aux ressortissants des pays en développement qui suivent ce cours. Neuf cours techniques de brève durée (sur différents aspects de la conservation du matériel génétique, la physiologie des semences, la technologie des semences et la gestion des banques de gènes) ont été organisés et financés dans divers instituts.
 - Des stagiaires du CIRP ont été recrutés pour travailler au Centre de recherche et de développement sur les légumes en Asie et à l'ICARDA, ainsi que dans des instituts des Iles Salomon, de Papouasie-Nouvelle-Guinée et du Togo.
- Activités régionales:
 - La phase II du Programme européen de coopération est maintenant patronnée par le CIRP, qui dirigera les activités. Le programme est financé pour moitié par le PNUD et pour moitié par les gouvernements participants.
 - Une réunion des pays du cône sud de l'Amérique du Sud s'est tenue sous les auspices du CIRP pour mieux définir les plantes cultivées prioritaires et évaluer les besoins d'échantillonnage et de formation. Un certain nombre de catalogues des souches génétiques de maïs détenues dans ces pays et dans les pays andins ont été publiés.
 - Des missions du CIRP en Asie du Sud et en Asie du Sud-Est ont fait le point des activités de prospection et de conservation dans ces régions.
 - Une aide sera fournie aux pays de la région méditerranéenne pour certaines plantes et l'accent sera mis sur des travaux de terrain en Afrique du Nord.
 - Un nouveau poste de collecteur d'échantillons a été créé et, en 1983, deux fonctionnaires de cette catégorie ont été affectés, l'un à Chypre (pour l'Afrique du Nord) et l'autre à l'Institut international de recherches sur le riz (pour le riz en Asie).

ASPECTOS SOBRESALIENTES DEL AÑO

- El CIRF informó al GCAI en 1983 de que efectuaría en su labor cambios de programas para:
 - dar menos importancia a las tareas de recolección en general y prestar mayor atención a la caracterización de materiales ya recogidos;
 - evaluar las colecciones activas existentes y fomentar su participación en la red mundial del CIRF;
 - incrementar la ayuda para la conservación *in vitro*;
 - insistir más para que se trabaje según las normas científicas internacionalmente acordadas;
 - mejorar la recopilación y transferencia de datos; y
 - superar las dificultades que afectan al traslado de material genético.
- El CIRF está cooperando actualmente con 100 países y 580 instituciones agrícolas importantes. Se han designado bancos de genes en 24 países, la mitad de los cuales en países en desarrollo, para mantener colecciones base de 34 cultivos o grupos de cultivos.
- Los cinco Comités Asesores para Cultivos continuaron, en estrecha colaboración con los correspondientes Centros Internacionales de Investigación Agrícola (trigo con CIMMYT e ICARDA; arroz con IRRI; maíz con CIMMYT; sorgo y mijo con ICRISAT y *Phaseolus* con CIAT), actuando como enlace entre el Consejo y las respectivas comunidades mundiales de científicos y mejoradores. En 1983 se reunieron los Comités de Trigo, Arroz y *Phaseolus*.
- Se reunieron cinco Grupos de Trabajo sobre Algodón, *Hevea*, Cacao, Cebada y *Prunus* respectivamente (los dos últimos conjuntamente con ECPGR) para examinar lagunas en las colecciones, revisar prioridades de recolección, aplicar medidas para asegurar que las muestras representen el espectro de variabilidad existente, e identificar formas prácticas de acelerar la caracterización de los materiales recogidos.
- Siguiendo las recomendaciones del Comité Asesor sobre Conservación *In Vitro*, el CIRF inauguró una base internacional de datos computerizados y encargó una revisión de los trabajos sobre frutas de zona templada y un estudio de las posibilidades de *Allium* para la conservación *in vitro*. También reunió un subcomité de dicho Comité Asesor para examinar nuevas técnicas de recolección.
- Se reunió el Comité Asesor sobre Almacenamiento de Semillas y convino en que había que promulgar normas internacionales rigurosas para bancos de genes.
- Se organizó una Consulta para identificar las dificultades con que se tropieza en la recolección e intercambio de muestras de especies silvestres y cultivares primitivos.
- El CIRF estableció enlaces oficiales con la campaña 1984 sobre conservación *in situ* de la UICN y el WWF, en particular en lo referente a los parientes silvestres de los cultivos.
- En 1983 se continuó progresando en los programas de diversos cultivos:
 - Se recolectó material en 79 misiones para:
 - 28 cultivos de prioridad mundial 1, en 35 países
 - 23 cultivos de prioridad mundial 2, en 25 países
 - 5 cultivos de prioridad mundial 3, en 23 países
 - Se publicó un catálogo mundial de recursos genéticos de sorgo y mijo; se publicaron informes sobre los recursos genéticos de *Capsicum*, yuca, *Cucurbitaceae*, quimbombó y soja, y se prepararon informes sobre arroz y berenjenas.
 - Se publicaron listas de descriptores relativas al caupí, mijo *Echinochloa*, mijo kodo, uva, pera, *Phaseolus coccineus* y cartamo. Se prepararon listas de descriptores relativas a gramíneas y leguminosas forrajeras, almendra, albaricoque (revisión), banano (revisión), anacardo, cereza, *Citrus*, mojo africano, papaya, melocotón o durazno, ciruela, *Phaseolus acutifolius* y especies silvestres de *Phaseolus*, así como varias especies de *Vigna*. Ascenden así a más del 80% los cultivos de elevada prioridad del CIRF que tienen listas de descriptores. Entre ellos se encuentran el 100% de los cultivos de prioridad mundial 1, el 90% de los cultivos de prioridad mundial 2 y el 50% de los cultivos de elevada prioridad regional.
 - Se terminó un plan de acción mundial para forrajes. Se procedió a la creación de grupos de trabajo sobre forrajes que darán lugar al establecimiento de un comité asesor internacional y estrecharán lazos con programas y actividades de capacitación internacionales y nacionales.
- Programas de conservación
 - Se continuaron las investigaciones científicas sobre cultivo *in vitro* en banano, yuca y cacao; y se iniciaron estas investigaciones en *Allium*, *Citrus* y taro.

- El CIRF comenzó a utilizar determinados centros para distribuir a los bancos de genes designados el germoplasma primitivo y silvestre recogido en misiones financiadas por el propio CIRF.
- Se proporcionaron fondos para mejorar o establecer locales de almacenamiento en CIMMYT, NIHORT, China, Colombia, Cuba, Costa de Marfil y Kenya; se envió equipo a Bangladesh, Ecuador, Ghana, Grecia, India, Costa de Marfil, Kenya, República de Corea, Mozambique, Nicaragua, Níger, Papua Nueva Guinea, Perú, Sudán, Togo, Tailandia, Alto Volta y Uruguay.
- Programa de información y manejo de datos
 - La Secretaría instaló un sistema de manejo de datos computerizado y mejoró sus microcomputadoras.
 - Se iniciaron bases de datos sobre el estado de las colecciones en la red del CIRF, sobre cultivos *in vitro* y parientes silvestres de los cultivos. También se está compilando información sobre muestras en las bases de datos internacionales o regionales del CIRF sobre diferentes cultivos, entre ellos, manzana, algodón, maíz, quimbombó, *Phaseolus*, *Prunus*, soja y caña de azúcar.
 - Se instalaron microcomputadoras en diversas instituciones en Chipre, Hungría, Portugal, Trinidad y Tobago y Yugoslavia.
 - Se iniciaron, o continuaron, con la financiación del CIRF, actividades de multiplicación, evaluación y documentación de germoplasma almacenado en numerosas instituciones del mundo.
- Programa de capacitación
 - Se proporcionó constante ayuda al curso de postgrado sobre recursos genéticos vegetales en la Universidad de Birmingham, Reino Unido, y se cubrieron los gastos de los alumnos de países en desarrollo, para que pudieran asistir al mismo; se organizaron y financiaron nueve cursos técnicos breves (sobre diferentes aspectos de la conservación de germoplasma, fisiología de las semillas, tecnología de semillas y manejo de bancos de genes) celebrados en diversos institutos.
 - Se concedieron contratos-becas del CIRF para trabajar en el AVRDC y el ICARDA, y en institutos de Papua Nueva Guinea, Islas Salomón y Togo.
- Actividades regionales
 - La Fase II del Programa Cooperativo Europeo pasó a ser patrocinada por el CIRF, que coordinará los trabajos. A la financiación del programa contribuyen en el 50 por ciento el PNUD y en el 50 por ciento restante los gobiernos participantes.
 - Se celebró, patrocinada por el CIRF, una reunión de países del Cono Sur de América Latina para reajustar prioridades de cultivos y evaluar necesidades de recolección y capacitación. Se publicaron algunos catálogos sobre germoplasma de maíz mantenido en esos países y en los países andinos.
 - Misiones del CIRF al sur y sureste de Asia examinaron la situación en materia de recolección y conservación en dichas regiones.
 - En la región mediterránea se prestará apoyo a las actividades en cultivos prioritarios y se insistirá en los trabajos de campo del norte de Africa.
 - Se estableció la figura del recolector, y en 1983 se destinó uno a Chipre para que se ocupe del norte de Africa y otro al IRRI para recolectar arroz en Asia.

1983年的工作重点

- * 国际植物遗传资源委员会于1983年告知国际农业研究磋商小组，该委员会的工作将包括计划的改变，以便：
 - 减少对一次性收集的重视程度(特殊情况除外)，更加注意对已收集材料的研究；
 - 评估现有的非基础性收集品库，以使它们更多地参加国际植物遗传资源委员会的全球网的工作；
 - 增加对种体贮存的支持；
 - 更加强调使研究机构的科学标准达到国际商定的水平；
 - 改进资料收集和资料交流；
 - 克服影响基因材料流通的限制条件。
- * 国际植物遗传资源委员会目前与100个国家和580个主要的农业研究机构开展合作，24个国家的30个基因库(其中一半在发展中国家)被指定为贮存3-4种作物或作物类群的基础收集品库。
- * 五个作物咨询委员会与有关的国际农业研究中心一起(小麦委员会与国际玉米、小麦改良中心和干地地区国际农业研究中心，水稻委员会与国际水稻研究所，玉米委员会与国际玉米、小麦改良中心，高粱和小米委员会与国际旱地热带作物研究所，菜豆委员会与国际热带农业中心)，继续在本委员会与全世界的育种家和育种者之间进行联络工作。小麦、水稻和菜豆委员会在1983年召开了会议。
- * 五个工作组(关于棉花、橡胶、可可、大麦和藜——后两个与欧洲遗传资源合作计划联合召开会议)分别开会讨论收集品库尚未收集到的样品，修改收集工作的优先次序，采取措施以保证样品能代表全部度的差异性，确定实际可行的方法以加速对已收集材料的特性记述。
- * 根据关于种体贮存咨询委员会的建议，国际植物遗传资源委员会建立了一个国际电子计算机化数据库，并对温带水果工作和洋葱的离体贮存潜力进行了研究。离体贮存委员会的一个分组委员会开会研究了新的收集技术。
- * 种子贮存咨询委员会召开过会议，并且认为应积极为基因库颁布一个国际标准。
- * 召开了一次磋商会议，以确定影响收集和交流野生物种和原始栽培品种样品的限制条件。
- * 国际植物遗传资源委员会与国际保护自然及自然资源联盟和世界野生生物基金会1984年开展的原位贮存运动建立了正式联系，尤其是因为它与作物的野生品种的保护工作有关。
- * 1983年作物计划继续取得进展：
 - 1983年，79个样品收集小组为下述作物收集了材料：
 - 来自35个国家的28种全球一类优先作物
 - 来自25个国家的23种全球二类优先作物
 - 来自23个国家的5种全球三类优先作物
 - 出版了一份关于高粱和小米的遗传资源的世界调查报告，出版了关于辣椒、木薯、葫芦科、秋葵和大豆作物遗传资源的报告，还准备就绪了关于水稻和茄子的报告。
 - 出版了下述有关作物的描述符表，如豇豆、稗属小米、雀稗、葡萄、梨、红花菜豆和红花，正在准备下述作物的描述符表，如牧草和饲料豆科植物、扁豆、杏(修定本)、香蕉(修定本)、腰果、枇杷、柑桔、椰子、番木瓜、桃子、李子、尖叶菜豆和野生菜豆种及几种豇豆种。这样

- 已作描述符表的作物达到国际植物遗传资源委员会的高度优先作物的80%以上，其中全球一类优先作物达100%，全球二类优先作物达90%，区域优先作物达50%。
- 全球饲料行动计划已最后确定，决定建立饲料工作组，然后把它发展为国际咨询委员会，并且将加强与国际和国家的培训计划的联系。
 - * 在贮存计划项下，开展了以下工作：
 - 对种子生理学，对番茄、木薯和可可的离体培养继续进行了科学研究；开始了对洋葱、柑桔和芋头的离体研究。
 - 国际植物遗传资源委员会开始利用某些中心，把该委员会支持的小组收集的原始和野生种质分发给所指定的基因库。
 - 向国际玉米、小麦改良中心，尼日利亚国家园艺研究所，中国，哥伦比亚，古巴，象牙海岸和肯尼亚提供了资金，以建立新的贮存设备（或更新设备）；向下述国家提供了设备，如孟加拉国、厄瓜多尔、加纳、希腊、印度、象牙海岸、肯尼亚、大韩民国、莫桑比克、尼加拉瓜、尼日尔、巴布亚新几内亚、秘鲁、苏丹、多哥、泰国、上沃尔特和乌拉圭。
 - * 在资料和数据管理计划项下，开展了以下工作：
 - 本委员会秘书处建立了数据管理计算机系统，并更新其微型电子计算机。
 - 开始建立数据库从而收集关于国际植物遗传资源委员会网络的种质收集状况、离体培养和作物野生品种的资料。此外又在进行汇编本委员会属下的国际或区域性有关各个作物的样品资料，这些作物包括苹果、棉花、玉米、秋葵、菜豆、李子、大豆和甘蔗。
 - 在塞浦路斯、匈牙利、葡萄牙、特立尼达和南斯拉夫的研究所安装了微型电子计算机。
 - 在国际植物遗传资源委员会的支持下，世界上许多研究所都已开始或继续对贮存的种质进行繁殖、评价和资料整理的工作。
 - * 在培训计划项下，开展了以下工作：
 - 本委员会继续对英国佐明翰大学开展的植物遗传资源的研究生计划给予支持，继续向参加学习的发展中国家的学生提供费用；组织了以不同研究所承办的9个技术短训班（关于种质储藏、种子生理学、种子技术和基因库的管理），并且为这些短训班提供了资金。
 - 国际植物遗传资源委员会的实习学者已受聘于亚洲蔬菜研究及发展中心 and 干燥地区国际农业研究中心以及巴布亚新几内亚、所罗门群岛和多哥的研究所。
 - * 在区域活动项下，开展了以下工作：
 - 欧洲合作计划的第2阶段由国际植物遗传资源委员会主办，该计划将负责指导日常工作，联合国开发计划署为该计划提供一半安全，另一半资金由参加国政府提供。
 - 召开了由国际植物遗传资源委员会发起召开的南美洲南部锥形地区国家的会议，以确定作物的优先次序并评估收集和培训方面的需要。出版了一些关于这些国家和安第斯国家贮存的玉米种质的目录。
 - 南亚和东南亚的国际植物遗传资源委员会工作组评估了这些区域的收集和储藏的状况。
 - 将根据作物的具体情况对地中海地区给予支持，并且将把重点放在北非的实地工作上。
 - 本委员会新设一个收集员职务。1983年，向塞浦路斯派遣一名官员负责北非的收集工作，同时也向国际水稻研究所派遣一名官员负责亚洲水稻种质的收集工作。

• فى برنامج ادارة المعلومات والبيانات

- أنشأت الأمانة جهاز كمبيوترى لادارة البيانات وأدخلت التحسينات على أجهزة الكمبيوتر الصغيرة •
- أنشئت قواعد بيانات عن حالة الأصناف التى جمعتها شبكة المجلس الدولى عن الزراعة فى المختبرات ومن الأفرار البرية للمحاصيل • كما يجرى أيضا تجميع المعلومات عن العينات فى قواعد البيانات الدولية أو الإقليمية التابعة للمجلس على كل محصول على حدة بما فى ذلك التفاح والقطن والذرة والبايسة والفاصوليا والبرفون وفول الصويا وقصب السكر •
- تم تركيب الأجهزة الكمبيوترية الصغيرة فى المعاهد فى قبرص والمجر والبرتغال وتريديداد ويوغوسلافيا •
- بدأت أو استمرت عملية اكنار البلازم الوراثى المخزون وتقييمه وتوثيقه وذلك بمساعدة المجلس الدولسى للموارد الوراثية النباتية فى الشتر من المعاهد فى مختلف أنحاء العالم •

• فى برنامج التدريب

- قدم الدعم المستمر للدورات التدريبية لما بعد التخرج عن الموارد الوراثية النباتية فى جامعة برمجهاام ، المملكة المتحدة ، ولنفقات حضور الدارسى من البلدان النامية ، كما تم أيضا تنظيم وتمويل تسع دورات تدريبية تقنية قصيرة استضافتها عدة معاهد (عن الجوانب المختلفة لحفظ البروتوبلازمات وفسيلوجيا البذور وتكنولوجيا البذور وادارة مصارف الجينات) •
- تم توظيف العاملين القيمين للعمل فى المركز الآسيوى لبحوث الخضر وتتميتها والمركز الدولى للبحوث الزراعية فى المناطق الجافة وفى المعاهد فى بابوا غينيا الجديدة وجزر سليمان وتوفو •

• فى الأنشطة الإقليمية

- بدأت المرحلة الثانية لبرنامج التعاون الأوروس تحت رعاية المجلس الدولى ، الذى سيقوم بتوجيهه العمل اليومى ، ومول برنامج الأمم المتحدة للتنمية نصف البرنامج المذكور ، وقدمت الحكومات المشاركة النصف الآخر •
- عقد اجتماع تحت اشراف المجلس الدولى لبلدان القرن الجنوبى فى أمريكا الجنوبية لتفقيح أولويات المحاصيل وتقييم الاحتياجات من التجميع والتدريب • واثرا اجتماعات عقدت فى هذه البلدان وفى بلدان الأنديز عدوت قوائم عن بروتوبلازم الذرة •
- أرسل المجلس الدولى بعثات الى جنوب آسيا وجنوب شرقيا لاستعراض حالة التجميع والخطط فى هذين الاقليمين •
- سيقدم الدعم الى اقليم البحر الأبيض المتوسط على أساس كل محصول على حدة ، وسيكون هناك تركيز على العمل الميدانى فى أمريكا الشمالية •
- أنشئت وظيفة جديدة هى " مسؤول الجمع " وفى ١٩٨٣ أوفد مسؤول جمع الى قبرص ليختصر بشمال افريقيا وآخر الى المعهد الدولى لبحوث الأرز ليختصر بالأرز فى آسيا •

• أنشأ المجلس الدولي للموارد الوراثية النباتية روابط رسمية مع الحملات التي قام بها الاتحاد الدولي لصيانة الطبيعة والموارد الطبيعية والصندوق العالمي للحياة البرية في ١٩٨٤ للحفاظ في الموقع وخاصة ما يتصل بالأقارب البرية للمحاصيل •

• استمرت برامج المحاصيل في التقدم في عام ١٩٨٣ :

— ففي عام ١٩٨٢ تم تجميع بذور للمحاصيل من طريق ٧٩ بعثة على النحو التالي :

- ٢٨ محصولا من المحاصيل ذات الأولوية الأولى من ٣٥ بلدا
- ٢٣ محصولا من المحاصيل ذات الأولوية الثانية من ٢٥ بلدا
- ٥ محاصيل من المحاصيل ذات الأولوية الثالثة من ١٣ بلدا

— نشرت نتائج عملية مسح عالمية عن الموارد الوراثية للذرة الرفيعة ، والدخن ونشرت تقارير عن الموارد الوراثية المحصولية للفلل والكسافا وكذلك عن الفصيلة القرعية والبامية وفول الصويا كما أعدت تقارير عن الأرز والباذنجان •

— نشرت قوائم تصنيف عن اللوبيا والدخن الحشيشي *Echinochloa millet* وحشيشة دخن كودا *Kodo millet* والعنب والكشري والفاصوليا *coccineus* والقرظ ، ويجرى اعداد قوائم تصنيف للحشائش والبقوليات العلفية واللوز والشمش (معدل) والموز (معدل) والكاشيو والكرز والحمضيات والدخن الاصبغى *Pinger millet* والبابايا والخوخ والبرقوق ، والفاصوليا الرفيعة *Acutifolius* وأنواع الفاصوليا البرية وأنواع عديدة من اللوبيا *Vigna* • وبهذا تغطى قوائم التصنيف التي يصدرها المجلس الدولي للموارد النباتية الوراثية أكثر من ٨٠% من المحاصيل ذات الأولوية للمجلس • وذلك يكون قد تم تغطية ١٠٠% من المحاصيل ذات الأولوية الأولى و ٩٠% من المحاصيل ذات الأولوية الثانية و ٥٠% من المحاصيل ذات الأولوية الاقليمية العالية •

— تم الانتهاء من خطة عمل عالمية للأعلاف ، واتخذت الترتيبات لانشاء جماعات عمل للأعلاف وهو ما أدى الى انشاء لجنة استشارية دولية وزيادة الروابط مع البرامج الدولية والوطنية والتدريب •

• في برامج الحفظ

— استمرت الاستقصاءات العلمية في مجال فسيولوجيا البذور ، وزراعة كل من الموز والكسافا والكاكاو فسي المختبرات كما بدأت البحوث في المختبرات على الثوم والحمضيات والقلقاس •

— بدأ المجلس الدولي للموارد الوراثية النباتية في استخدام مراكز معينة لتوزيع بلازم الوراثة البدائي والسريري الذي جمعه بعثات التجميع المعانة من المجلس الى مصارف الجينات المعتمدة •

— حصل المركز الدولي لتحسين الذرة والقمح وشبكة معاهد الانتاج البستاني والصين وكولومبيا وكوبا وسياحل العاج وكينيا على الأموال اللازمة لانشاء مرافق جديدة للتخزين (أو اصلاح المرافق القائمة) كما أرسلت المعدات الى كل من بنغلاديش واكوادور وفانا واليونان والهند وسياحل العاج وكينيا وجمهورية كوريا وموزامبيق ونيكاراغوا والنيجر وبنما الجديدة وبنو والسودان وتونو وتايلند وفولتس العليا وأروغواي •

أهم أحداث العام

- في عام ١٩٨٢ أبلغ المجلس الدولي للموارد الوراثية النباتية الى الجماعة الاستشارية للبحوث الزراعية الدولية أنه سيدخل تعديلات على البرامج تهدف الى :
 - تقليل الاهتمام بالتجميع العموم للبدور (فيما عدا في حالات محددة) وتوجيه المزيد من الاهتمام لاجراء البحوث على البذور التي جمعت بالفعل •
 - تقييم ما هو موجود من مجموعات غير المجموعات الأساسية لادراجها بدرجة كبيرة في الشبنة العالمية للمجلس الدولي للموارد الوراثية النباتية •
 - زيادة الدعم لعمليات الحفظ داخل المختبرات •
 - زيادة التركيز على النهوض بالمعايير العلمية في المعاهد الى المستويات المتفق عليها دوليا •
 - تحسين تجميع البيانات ونقلها •
 - التغلب على القيود التي تؤثر على حركة الموارد الوراثية •
- يتعاون المجلس الدولي للموارد الوراثية النباتية الآن مع ١٠٠ بلد و ٥٨٠ من المعاهد الزراعية الرئيسية • وقد اعتمد ثلاثين مصرفا من مصارف الجينات ، نصفها في العالم النامي ، للاحتفاظ بالمجموعات الأساسية من ٢٤ محصولا أو مجموعة من المحاصيل •
- استمرت اللجان الاستشارية الخمس للمحاصيل ، جنبها الى جنب مع نظائرها من مراكز البحوث الزراعية الدولية في اقامة الصلات بين المجلس والمجتمع العلمي في العالم والمشتغلين بالتربية (القمح مع المركز الدولي لتحسين الذرة والقمح والمركز الدولي للبحوث الزراعية في المناطق الجافة ، والأرز مع المعهد الدولي لبحوث الأرز ، والذرة مع المركز الدولي لتحسين الذرة والقمح ، والذرة الرفيعة والدخن مع المعهد الدولي لبحوث المحاصيل في المناطق الاستوائية شبه القاحلة ، والفاصوليا مع المركز الدولي للزراعة الاستوائية) • وعقدت لجان القمح والأرز والفاصوليا اجتماعاتها في عام ١٩٨٢ •
- اجتمعت كل مجموعة من مجموعات العمل الخمس (عن القطن والمطاط والكاكاو ، والشعير والبرقوق — الأخرتان ، بالاشتراك مع برنامج التعاون الأوربي / الموارد الوراثية المناقشة الثغرات في عمليات التجميع ، ومراجعة أولويات التجميع ، وتنفيذ الخطوات اللازمة حتى تكون العينات ممثلة لجميع أنواع البذور وللتعرف على الوسائل العملية لسرعة توصيف البذور التي جمعت ، •
- في أعقاب التوصيات التي أصدرتها اللجنة الاستشارية للحفظ داخل المختبرات افتتح المجلس الدولي للموارد الوراثية النباتية قاعدة كميوتية دولية للبيانات وطلب اجراء دراسة عن فاكهة المناطق المعتدلة وأماكنية حفظ الثوم في المختبرات • وقد عقدت لجنة فرعية ميثقة عن لجنة الحفظ في المختبرات اجتماعا لاستعراض أساليب التجميع الجديدة •
- اجتمعت اللجنة الاستشارية لتخزين البذور ووافقت على ضرورة اصدار معايير دولية دقيقة لمصاف الجينات •
- نظمت مشاورة لتحديد القيود التي تؤثر في عملية التجميع وتبادل عينات الأنواع البرية والأصناف البدائية •