# International Board for Plant Genetic Resources



ANNUAL REPORT

1982

INTERNATIONAL BOARD FOR
PLANT GENETIC RESOURCES

CONSULTATIVE GROUP ON
INTERNATIONAL
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# 1982

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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, as defined by the Consultative Group, is to promote an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

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# PREFACE

The past few years have witnessed a remarkable increase in activities for crop genetic resources conservation in many parts of the world. For instance international efforts on particular crops have been accelerated, largely through the International Centres of the CGIAR; many new national programmes, dealing with a range of crops, have come into being; and there has been a dramatic increase in the number of genebanks with facilities for the long-term conservation of germplasm, not least in the developing countries.

In all these activities the IBPGR has played an important part, by direct funding, indirectly by mobilizing expertise or in a more general sense by acting as a stimulant or catalyst.

By the end of 1982 the IBPGR was pleased to record that it was approaching collection of the one-hundred-thousandth seed sample of designated priority species. At the same time the number of species with which the IBPGR concerns itself has increased — there are over fifty first priority crops. It is fair to say that never before have breeders had access to so much variability. However, there is no room for complacency. Much still needs to be done to make collections fully representative of natural variability and to characterize and document the materials in store.

In view of the widespread risk of erosion or in some instances of total loss of genetic resources, the emphasis of the Board's work to date has been on the urgent collection and storage of material. However the Board recognizes that this rescue operation is only the first step in a sequence of events leading to the utilization of germplasm in breeding programmes.

During the past two years it has become clear that it is now necessary to give more attention to subsequent steps in this sequence — to improving storage techniques and to the creation of comprehensive data bases in a form permitting rapid exchange of information.

In 1980 the Board established a committee to advise on seed storage techniques. In 1982 it convened another advisory group following the commission of a comprehensive review of the potential of *in vitro* techniques for the conservation of vegetatively propagated material. These developments should enable the Board to commission appropriate research and to provide authoritative technical advice to genebanks as required.

It is becoming apparent that the biggest and most difficult problem to solve is that of the accurate documentation of collections. This is a prerequisite to the rational planning of further collecting expeditions, to the elimination of unnecessary material from collections and to ready utilization of material in breeding programmes. And yet evidence from genebanks shows that there are frequent difficulties in obtaining information and in computerizing new data. Furthermore the problems of transforming old data from notebooks or card indexes can be formidable.

The Board recognizes therefore that when identifying key areas for research and development it should give particular attention to documentation and to the promotion of this aspect of the work through funding, human resources and training.

The Board has looked critically at its own operations and effectiveness and has agreed that it should — as a matter of routine — monitor the activities of its network of genebanks and the effectiveness of its various funding exercises.

It is a pleasure to record the significant backing provided by our donors, the contribution of the staff of IBPGR and the support of FAO.

J.T. Williams
Executive Secretary

# HIGHLIGHTS OF THE YEAR

- There are now over 50 first priority crops; these crops include food crops and other economic species of world-wide or regional importance.
- The five Crop Advisory Committees (for wheat, maize, rice, sorghum and millets and *Phaseolus* beans) continued, in conjunction with the appropriate IARCs, to liaise between the Board and the respective world communities of scientists and breeders.
- In 1982 the Advisory Committee on Seed Storage stimulated:
  — revision of the publication on the design of seed storage facilities; and
  — publication of a guide on the use of deep-freeze chests for small seed collections.
- In 1982 expert international Working Groups were formed and consultations held to advise the Board on: Banana and Plantain; Cassava; *In Vitro* Conservation; and Soyabean.
- During 1982 the Board approached collection of its 100 000th seed sample of priority species through the approximately 250 collection missions it has supported.
  During 1982 material was collected for:
  — 41 first priority crops from 31 countries in 7 regions;
  — 28 second priority crops from 35 countries in 6 regions; and
  — 12 third priority crops from 21 countries in 6 regions.
- Regional activities increased through:
  — Establishment of Regional Offices in East Africa and Latin America; and
  — IBPGR collection priorities being established for the first time in Europe and expanded in Southeast Asia.
- Programmes for crops continued to make progress in 1982, especially for:
  — Forages with the appointment of a new Forage Officer;
  — Vegetables with the publication of a comprehensive directory of collections of genetic resources and several specific crop genetic resources reports.
- In 1982 the information and data management programme:
  — Standardized the format for descriptors and published 9 lists while an additional 35 were under preparation;
  — Provided computer hardware to Ecuador, Cyprus and Portugal;
  — Worked on directories of computer use in genebanks, collections of oats and rye and tropical fruits; and
  — Held an international training course on documentation and data management.
- The Board has designated, in consultation with the centres concerned, a network of institutions responsible for maintaining the world's base collections of seeds of the principal food crops. This network was expanded in 1982 and Board funding was provided to several storage facilities.
- In 1982 the Board continued its support of training at both the post-graduate and short course levels; such courses being aimed at providing germplasm institutes with much-needed technical mid-level personnel.

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# CROPS

## Introduction

During 1982 the IBPGR continued to expand its work in organizing and coordinating the worldwide efforts on crop genetic conservation.

The Board is engaged in the full range of conservation work — a diversity of activities with the goal that as much crop diversity as possible be preserved.

In the eight years since its inception, the IBPGR has been instrumental in focusing awareness from both the scientific and lay communities on the importance of genetic resources. In particular, there have been marked increases in collecting and the establishment of storage facilities to hold the material. At the same time, there has been increased IBPGR support to national, regional and international programmes (including IARCs) devoted to crops.

Equally important, the conservation activities are being accomplished in a coordinated fashion as part of the IBPGR global network to facilitate most effectively the use of available manpower and money.

Priorities for IBPGR action are necessary so that support can be more efficiently mobilized. The Board has received continuing 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 1982 Working Groups were formed and consultations held to advise the Board on banana and plantain, cassava, soyabean, and aspects of *in vitro* conservation important for clonally propagated materials.

The priorities accorded crops by the IBPGR are shown in Table 1, and on these the Board focuses as much attention as possible. The categories of crops include major food crops and non-food crops.

One of the major problems confronting the IBPGR in 1982 has been good documentation of material in collections. As a result, the IBPGR assists organizations wherever possible to put collections in order and to see that these are accurately documented.

The IBPGR acknowledges the support and collaboration of the IARCs of the CGIAR. In particular it was pleased to note that: **ICARDA** is now fully committed to the development of a Genetic Resources Department for its mandated crops and has appointed a leader; **ICRISAT** announced the broadening of its mandate to "serve as a world centre for the improvement of grain yield and quality of sorghum, millets, chickpea, pigeonpea and groundnut and to act as a world repository for the genetic resources of these crops"; **IITA** made its long-term store functional during 1982; **IRRI** agreed to accelerate its collecting in Asia and planned a strategy workshop for 1983-1987. These and the other crop IARCs — **CIAT, CIMMYT** and **CIP** — helped IBPGR with training and expertise.

Table 1. Global crop priorities

| Crop | Global Priority 1 | Global Priority 2 | High Regional Priority■ |
|---|---|---|---|
| Cereals | Wheat | * Sorghum<br>* Finger millet<br>* Barley<br>* Pearl millet<br>* Foxtail millet<br>* Rice | Maize<br>Quinoa |
| Food legumes | *Phaseolus* beans | * Groundnut<br>* Soyabean<br>* Cowpea<br>* Yard long bean<br>* Winged bean<br>* Chickpea<br>* *Vigna radiata*<br>* *V. mungo*<br>*V. aconitifolia*<br>*V. umbellata* | *Vicia faba*<br>Lentil<br>Lupin |
| Roots and tubers | Cassava<br>Sweet potato | Potato | Yam<br>Taro and Aroids<br>Minor S. American tubers |
| Oil crops | | Oil palm (*Elaeis melanococca*)<br>* Coconut<br>* Oilseed brassicas | |
| Fibres | | Cotton | |
| Starchy fruits | | * Starchy banana and Plantain | Breadfruit and Jackfruit |
| Sugar crops | | * Beet<br>* Sugarcane | |
| Beverages | Coffee | Cocoa (* Criollo varieties) | |
| Subtropical and Tropical fruits | | * Dessert banana<br>* Citrus<br>* Mango | Avocado<br>*Lansium*<br>*Annona*<br>*Passiflora*<br>Peach palm<br>Durian<br>Rambutan |
| Temperate fruits | | * Apple<br>* Pear and Quince<br>Peach and Nectarine | |
| Vegetables | Tomato | * Amaranth<br>* Brassica<br>* Cucurbits<br>* Eggplant<br>* Okra<br>* Onion<br>* Chilli<br>* Radish | Bitter gourd<br>Globe artichoke<br>*Cucumis*<br>*Sechium*<br>Kangkong<br>*Spinacia* |
| Trees | | Trees for fuelwood and environmental stabilization | |

* = a first priority in at least one region.
■ Although having a lower global priority, these crops all have a first priority in at least one region.

# CEREALS

Much of the world's population depends upon the major cereals — wheat, rice, maize, sorghum and millets — as important staple foods. Because of this, the IBPGR has placed emphasis on support for the genetic conservation of these crops. Cereals have been accorded high priority both because they are widespread in their cultivation throughout the world and because, in many areas, genetic erosion has been severe. Modern cultivars are rapidly replacing the landraces in the centres of diversity and the IBPGR has attempted to organize the collection of such landraces whenever possible.

The Board has also maintained a close interaction between curators and plant breeders largely through its standing Cereals Committees and the IARCs which cosponsor them.

Collection activities for cereal crops continued throughout the world in 1982 (Fig. 1).

A Wheat Officer, appointed to the Secretariat in 1981, continued to investigate, analyse and report on the status of wheat germplasm holdings and collection needs throughout the world. A substantial amount of work remains to be done to clarify the documentation of the samples in view of the large amount of the stored material.

Rice is largely covered by the IRRI programmes but the IBPGR has supplemented this to a limited extent in Asia and through the organization of the field work in Africa.

Collection of maize was supported by the IBPGR in Chile, Mexico and Spain, and in other countries as part of multiple-crop collecting missions. Since 1977 the IBPGR has supported an ongoing systematic collection of maize landraces in Latin America.

A world survey of sorghum and millets was started by the Secretariat in 1982 and this indicates that many areas with known variability have not been fully explored and that collecting work needs to be accelerated on minor millets. The Board works in close collaboration with ICRISAT on sorghum and millets.

The findings of an *Ad Hoc* Working Group on Barley resulted in the publication of a *Barley Descriptors* list in 1982 and the Board also published a directory of barley germplasm collections.

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.

## WHEAT

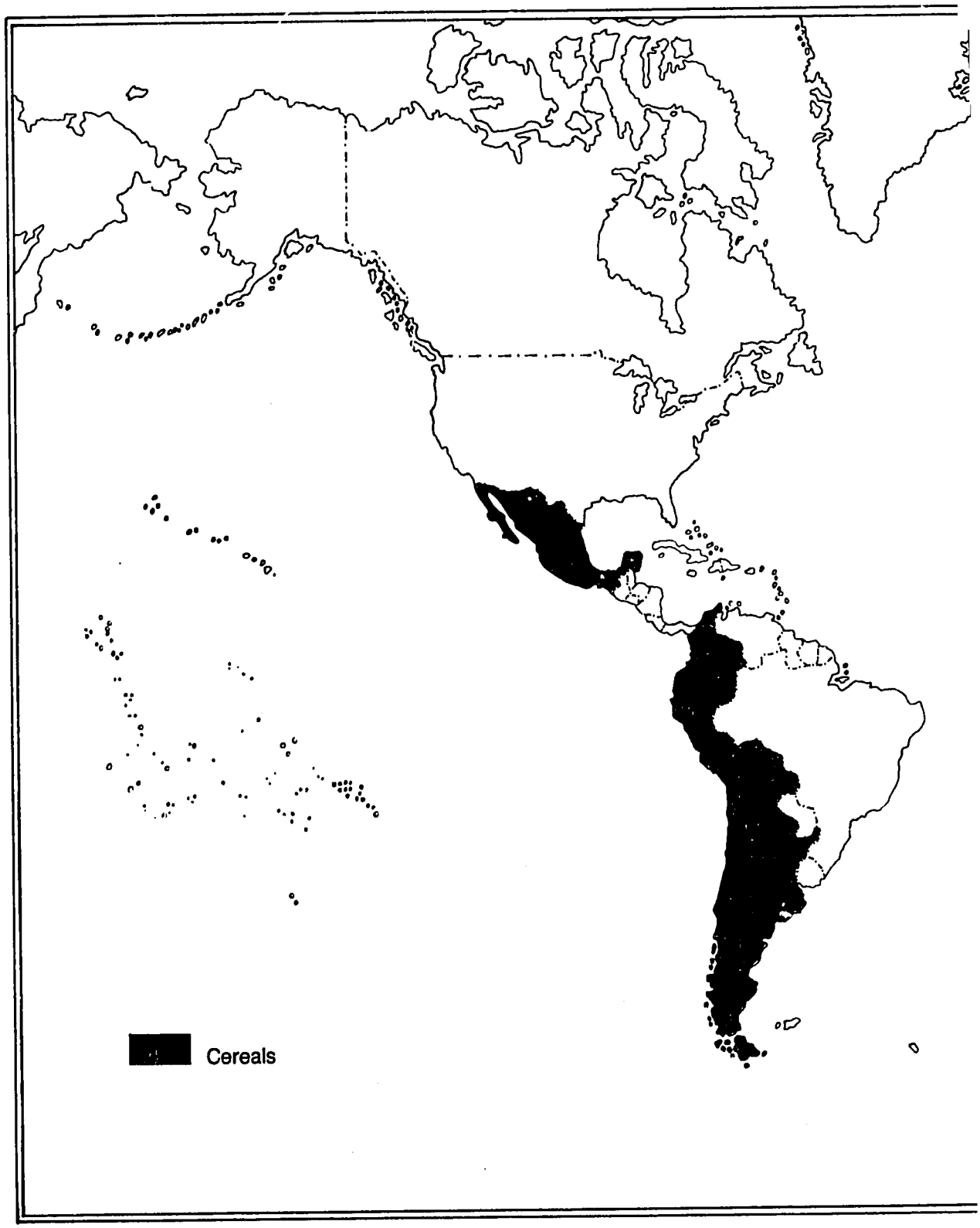
Sorting out major collections and assessing what they contain has been given impetus by the work of the IBPGR Wheat Officer.

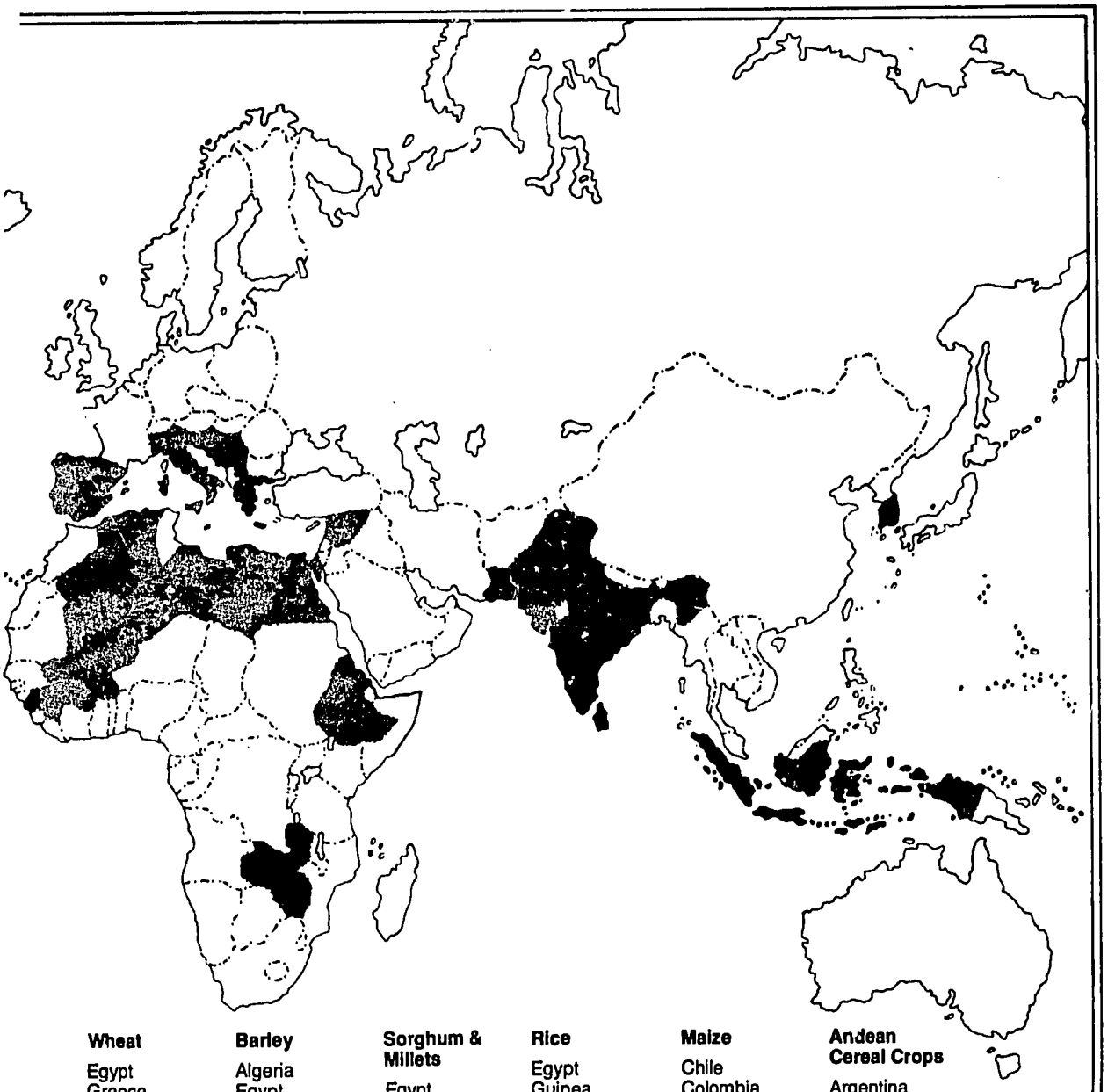
During the year a number of major collections in Australia, Europe, Japan, Mexico, and the United States were visited. Generally, the conditions under which seed is being stored and generated were found to be good, taking into consideration the purposes of the individual collections.

A current difficulty, which the IBPGR is ready to assist in resolving, concerns the documentation of material. Some centres do not yet have their data computerized, and those which do often experience difficulty in handling information. On the other hand, other centres have smooth-running systems which they use in routine day-to-day management.

The extent of evaluation is highly variable, both within and between collections. In some cases information exists as a result of work undertaken outside of the centre holding the collection, and this needs to be incorporated in the data base. The IBPGR is cooperating with the Small Grains Collection, United States Department of Agriculture (USDA), Beltsville, Maryland in the characterization and preliminary evaluation of a part of their wheat material since this is the major international supplier.

Work has been proceeding during 1982 at the two International Agricultural Research Centres (IARCs) with wheat as a mandate crop. Reorganization and evaluation of the working collection of the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT) is being actively pursued following the comple-


Cereals



| Wheat | Barley | Sorghum & Millets | Rice | Maize | Andean Cereal Crops |
|---|---|---|---|---|---|
| Egypt | Algeria | Egypt | Egypt | Chile | Argentina |
| Greece | Egypt | Ethiopia | Guinea | Colombia | Bolivia |
| Italy | Ethiopia | India | Indonesia | Ecuador | Ecuador |
| Libya | Greece | Mali | Mali | Egypt | Peru |
| Pakistan | Italy | Pakistan | Pakistan | Korea, Rep. of | |
| Portugal | Libya | Upper Volta | Sri Lanka | Mexico | |
| Syria | Pakistan | Zambia | Upper Volta | Upper Volta | |
| | Portugal | Zimbabwe | Zambia | Yugoslavia | |
| | Spain | | Zimbabwe | Zambia | |
| | | | | Zimbabwe | |

Figure 1. Countries where the IBPGR organized or collaborated in collecting cereals during 1982

tion and fitting out of the new storage and handling facility. Disease resistance is to be assessed by growing material in known "hot spots". A curator has been recently appointed for the collection at the International Center for Agricultural Research in the Dry Areas (ICARDA).

Many data on collections have been assembled in the past year, those from the collections at the Germplasm Institute, Bari, Italy; the Australian Wheat Collection, Tamworth, Australia; and the National Seed Storage Laboratory (NSSL), Fort Collins, USA having been provided on computer tapes. Direct access to the computer files of the USDA Small Grains Collection will be possible through a computer terminal being linked to the USDA main frame computer. This will enable detailed comparisons of the inventories of the various collections to be made in order to obtain a truer picture of their overall contents.

Preliminary work has confirmed that duplication is extensive. For example, of the 30 000 lines held at the Germplasm Institute, Bari and the 37 000 at the Small Grains Collection, Beltsville, 21 000 lines are in common. It seems that the estimate of 50% duplication, suggested in the IBPGR publication *A World Survey of Wheat Genetic Resources,* may be too conservative.

This degree of duplication is a welcome insurance against accidental loss, although in the past it has been a haphazard process. More recently it has become evident that the amount of deliberate and systematic duplication, especially of newly collected material, has greatly increased. Arrangements are being made for the full duplication at the Small Grains Collection, Beltsville, USA, of the 8 000 lines of the Kyoto collection of wild and weedy material at the National Institute of Agricultural Sciences (NIAS), Ysukuba, Japan.

A detailed survey of the Small Grains Collection has shown that about one half is composed of landraces, one quarter of breeders' material or varieties and, apart from a small number of wild accessions, the status of the remaining quarter cannot be determined.

Such detailed passport information is not generally available on the other lists, but inspection suggests that these proportions are roughly correct over all collections. It seems therefore that, perhaps contrary to expectation, landraces make up the major portion of the lines in the global collection.

During 1982 the IBPGR funded a number of multi-crop collecting missions which gathered samples from the wheat genepool. In the Mediterranean, multi-crop missions collected 37 *Triticum aestivum* and *T. durum* from **Egypt**; 55 *Aegilops*, 7 *T. aestivum* and 1 *T. boeoticum* from **Greece**; and 37 *Triticum* and 5 *Aegilops* from **Libya**. A mission also collected *T. aestivum* in **Portugal**.

The Pakistan Agricultural Research Council (PARC) collected 43 samples of wheat in Sind, Punjab and Northwest Frontier provinces in **Pakistan**. Material collected in Pakistan earlier with IBPGR support is being evaluated at the Foundation for Agricultural Plant Breeding (SVP), Netherlands. Similarly multiplication and characterization of local materials are underway at the Instituto Nacional de Investigaciones Agrarias (INIA), Spain, and evaluation is being conducted at the Plant Genetic Resources Centre (PGRC), Ethiopia.

The programme at the Zentralinstitut für Genetik und Kulturpflanzenforschung (ZIGuK), Gatersleben, German Democratic Republic has been active, firstly by assisting the IBPGR programme in Libya in 1982 and secondly in characterizing material (*T. macha, T. timopheevi, T. aestivum* and *T. dicoccon)* collected collaboratively with colleagues in the Republic of Georgia (USSR) and Czechoslovakia. ZIGuK, Gatersleben joined the Germplasm Institute, Bari in collecting in southern **Italy**. A total of 32 samples of wheat were collected and new locations for still cultivated *T. monococcum* and *T. dicoccon* were discovered in Campania.

Other national programmes which have reported to the Secretariat active evaluation in 1982 of earlier collected materials include the El-Kad Agricultural Research Center, Democratic Yemen; Darulaman Station, Afghanistan; Plant Genetic Resource Division, Seed and Plant Improvement Institute (SPII), Iran; and PGRC, Ethiopia (presently holding 3 547 samples of *Triticum*, 1 574 of which were collected with IBPGR support).

ICARDA, in association with the University of Saskatchewan, Canada, collected material in 1978, 1980 and 1981 in Southwest Asia and active evaluation has continued. This pro-

gramme is expected to expand into the Mediterranean basin.

In 1982 some collecting of *Aegilops comosa* and *A. longissima* was possible in northern **Syria** as part of the IBPGR Southwest Asia programme.

## BARLEY

Since the nineteen twenties, exploration missions for barley germplasm have been carried out in many parts of the globe. Most of these expeditions collected germplasm from the major centres of diversity. In recent years the IBPGR Secretariat and a few other organizations have been active in the field.

In 1982 missions supported by the IBPGR collected barley germplasm in Algeria, Egypt, Ethiopia, Greece, Libya, Pakistan, Portugal and Spain.

During the two missions fielded in **Egypt** by the IBPGR Mediterranean programme (April-May and October 1982), 42 samples were collected from the New Valley and Marsa Matruh provinces. The IBPGR Secretariat and PGRC, Ethiopia, collected 21 accessions of barley from the western part of **Ethiopia**. The Agricultural Research Centre (ARC), Libya, in cooperation with IBPGR, collected 15 samples of barley from areas south of Tripoli and the Sabha region of **Libya**.

PARC, with IBPGR support, collected 40 samples of barley in September 1982 from the provinces of Sind, Punjab and Northwest Frontier of **Pakistan**.

During June-July 1982 the Estaçao Agronómico di Oeiras, Instituto Nacional de Investigaçao Agraria (INIA), Portugal, and the Banco de Germoplasma Vegetal, INIA, Spain, collected a few samples of barley from the Tras-os Montes and Alto Douro areas of **Portugal** and north-central **Spain**.

A few samples of *Hordeum* were also collected in IBPGR-organized missions for other crops in **Algeria**, **Greece** and **Italy** during 1982.

The Swedish University of Agricultural Sciences, Svalov, Sweden and the Royal Veterinary and Agricultural University, Copenhagen, Denmark, explored parts of North America during 1980 and 1982 for *Hordeum* species. The aim of the mission was to collect material of two endangered species, viz. *H. intercedens*

Multiplication of a population sample (J.R. Witcombe)

and *H. arizonium* which, except for small pockets, seem to have disappeared from their former habitats.

A *Barley Descriptors* list was published in 1982 by the Board following finalization of the list agreed by the *Ad Hoc* Working Group on Barley in 1981. The Board also published a directory of barley collections at the beginning of 1982.

The Cereal Improvement Programme of ICARDA, in close collaboration with the IBPGR Southwest Asia programme, continued to evaluate and describe the *Hordeum* samples assembled at Aleppo, Syria. In 1982 the IBPGR also provided funds to ICARDA for characterization and multiplication of small samples. Toward the end of 1982 the IBPGR

requested the Plant Gene Resources (PGR) of Canada to characterize and duplicate barley at the Nordic Gene Bank (NGB), Lund, Sweden.

The UNDP/IBPGR European Cooperative Programme (ECP) has proposed that a Working Group on Barley should meet in Gatersleben, German Democratic Republic during May 1983 to discuss cooperative action in Europe.

## SORGHUM AND MILLETS

Sorghum and millets are extremely important cereals in semi-arid zones. The IBPGR has accorded first priority to both sorghum and *Pennisetum* millet and second priority to the other millets. The IBPGR and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) jointly sponsor an Advisory Committee on Sorghum and Millet Germplasm and the Committee has met regularly since 1976 to assess progress.

During 1982 the IBPGR Secretariat started a world survey of sorghum and millets germplasm holdings. The preliminary results indicate that, although considerable progress has been made since the creation of ICRISAT and IBPGR, the existing collections do not yet contain adequate and representative genetic variability.

ICRISAT has been actively involved in germplasm activities on sorghum and pearl millet as well as on six minor millets as requested by the IBPGR (*Eleusine coracana, Setaria italica, Panicum miliaceum, P. miliare, Paspalum scrobiculatum* and *Echinochloa crusgalli*). ICRISAT already possesses a medium-term store and a long-term one is under construction. The ICRISAT genebank holds 21 264 sorghum, 14 340 pearl millet and 4 039 minor millets. The IBPGR has provided a small grant to ICRISAT for the collection, characterization and documentation of minor millets.

The University of Illinois, USA, in close

Samples of millets in the world collection, ICRISAT

collaboration with IBPGR and the Genetic Resources Unit, ICRISAT, has been studying the variation in the ICRISAT collection of 1 421 *Eleusine coracana*. 1 197 *Setaria italica*, 735 *Panicum miliaceum*, 242 *P. miliare*, 85 *Brachiaria ramosa* and 26 *Setaria glauca.*

During 1982, samples of sorghum and millets were collected from Burundi, Egypt, Ethiopia, India, Mali, Pakistan, Rwanda, South Africa, Zambia and Zimbabwe. These missions were organized by the IBPGR and/or ICRISAT in cooperation with the participating national programmes.

In May-June the Genetic Resources Unit of ICRISAT collected 98 samples of sorghum in Burundi and Rwanda and 77 sorghum and 30 pearl millets in South Africa.

With IBPGR support a total of 163 samples of various minor millets was collected by the University of Illinois and ICRISAT from the tribal areas along the eastern ghats of Andhra Pradesh, **India**.

IBPGR and ICRISAT teams explored Mali and Zimbabwe for germplasm of various crops. In **Mali** the Sixth and Seventh regions of the country were visited during January 1982 and 245 sorghum and 93 millet samples were collected. The IBPGR provided another grant to Mali for the collection of wild relatives of pearl millet. A four-month expedition (April-June 1982) throughout **Zimbabwe** resulted in the collection of *Sorghum bicolor* (300), *Sorghum* spp. (2), *Eleusine africana* (6), *E. coracana* (286), *Pennisetum americanum* (125), and *Pennisetum* spp. (4) from the provinces of Bulawayo Sholo, Mashonaland, Manicaland, Victoria and Midlands. The material collected has been deposited at ICRISAT, the Zimbabwean national programme, NSSL (USA) and PGR (Canada). Sorghum is being replaced by maize in many parts of the country, hence it is essential to complete collection in Zimbabwe.

During June-July 1982, an IBPGR Mission in **Zambia** visited Luapula, Northern and Northwestern provinces and collected samples of sorghum (43), *Eleusine coracana*, (40) and *Pennisetum americanum* (10).

In January 1982 the IBPGR, in collaboration with the PGRC, Ethiopia, explored Illubabor, Wollega, Kefa, Shoa and Sidamo provinces of **Ethiopia** for vegetable crops germplasm but the mission also collected sorghum (33), finger millet (6) and teff (4).

Collecting finger millet, Zimbabwe

The Département des services agricoles (DSA), Upper Volta, with financial support from the IBPGR, collected 187 sorghum and 83 pearl millet samples from the southwestern parts of **Upper Volta** during January-February 1982. The material collected will be multiplied and distributed to the IBPGR-designated centres for long-term storage.

In the IBPGR-supported multi-crop collecting mission of PARC in Sind, Punjab and the Northwest Frontier provinces of **Pakistan**, sorghum (30) and millets (35) were collected. After the seed has been increased, the material will be sent to IBPGR-designated genebanks for long-term storage.

The IBPGR Mediterranean programme, in collaboration with the Field Crops Research Institute, Giza, fielded a multi-crop collection mission in **Egypt** comprising the western desert oases of Elkharga, El Dakhla, El Farafra and El Bahariya in which sorghum (12) and pearl millet (4) were collected.

## RICE

The collection of rice germplasm in the countries of South and Southeast Asia continued during 1981-82 by the genetic resources programme of the International Rice Research Institute (IRRI). The IBPGR provided IRRI with funds to meet in-country costs.

In 1982, IRRI's activities were concentrated in **Indonesia** and **Sri Lanka** and plans for collecting in Bangladesh and Nepal in 1983 were finalized. In addition to the IRRI/IBPGR cooperative efforts in Asia, several national programmes also continued their activities.

During IBPGR-funded multi-crop collecting missions, a few samples of rice were collected in Egypt, Mali, Pakistan and Zambia.

In **Egypt** 12 samples, mostly *japonica* types, were collected from oasis areas. Five samples of *Oryza sativa* were collected in the Sixth and Seventh regions of **Mali** during January 1982. In **Pakistan**, 5 samples of rice were collected from Punjab province and in **Zambia**, 7 samples of *O. sativa* were collected from Luapula and the Northwestern province.

In **Zimbabwe**, a total of 80 samples of rice germplasm was collected from Victoria (12), Manicaland (26), Midland (15), Mashonaland (24) and Bulawayo Sholo (3) provinces. The material collected was mainly brown-grained and highly shattering types. In Zimbabwe, rice is generally cultivated on a small scale in the high and middle velds.

The Institut de recherches agronomiques tropicales et des cultures vivrières (IRAT) of the Office de la recherche scientifique et technique outre-mer (ORSTOM) was able to visit **Guinea** on behalf of the IBPGR to collect rice. This mission commenced in November and will be completed during January 1983.

IBPGR also provided funds to IVRAZ, Upper Volta, for the collection of rice in **Upper Volta**. This collection will be completed during 1983.

The Genetic Resources Programme of IRRI has continued its efforts in the multiplication, characterization and evaluation of several thousand accessions of *Oryza* germplasm. Thousands of samples are also being duplicated at the NSSL, Fort Collins, USA.

The IBPGR agreed in 1982 to provide a collector to IRRI during 1983 to strengthen the efforts on collection in Asia. The IBPGR and IRRI also finalized plans for a rice genetic resources strategy meeting which will be held in April 1983.

(T. Ton That)

## MAIZE

Since 1977 the IBPGR has supported the systematic collections of maize landraces in South America and the Iberian peninsula. Maize has also been collected as part of multi-crop collecting missions in many other countries of the world. Duplicates of all collections made are being stored either in CIMMYT or the NSSL, USA.

Since 1980 the IBPGR has supported a regional cooperative project to characterize and make inter-racial composites of the collections made in Peru and the Southern Cone of Latin America and to help with data organization including the production of catalogues.

During 1982 field work was supported by the IBPGR in Chile, the Republic of Korea, Mexico and Spain.

In **Chile** the Instituto Nacional de Investigaciones Agropecuarias (INIA), completed the collection of maize in Norte Grande, Atacama, Aconcagua, Santiago, Ñuble, Bio Bio and Llanquihue; 536 samples were collected.

In **Spain** samples were collected as follows: Andalucia (81), Castilla-La Mancha (109), La Coruña (60), Lugo (61), País Vasco (166), Pontevedra (66), Santander (309), Tenerife (181) and Valencia (30).

The Choong-Nam National University, Daejeon, **Republic of Korea** continued to collect local landraces of maize in the peninsula area and surrounding islands. Up to 1982 a total of 2 541 samples had been collected.

Additional samples of maize were gathered during multi-crop collection missions supported by the IBPGR in 1982: **Colombia** (16), **Ecuador**, **Egypt** (7), **Upper Volta** (123), **Yugoslavia** (41), **Zambia** (73) and **Zimbabwe** (36).

In Thailand the Institute of Scientific and Technological Research (TISTR) is being supported by the IBPGR to establish a national genebank that will have responsibility for long-term storage of Asiatic maize.

## ANDEAN CEREAL CROPS (OTHER THAN MAIZE)

Since 1978 the IBPGR has assisted national and regional institutes to collect quinoa (*Chenopodium quinoa*), cañihua (*C. pallidicaule*) and coimi (*Amaranthus caudatus*).

The Instituto Interamericano de Cooperación para la Agricultura (IICA) was funded to collect amaranth germplasm in **Argentina**, **Ecuador** and **Peru**. A total of 205 samples of *Amaranthus caudatus* was collected.

In **Bolivia** the Centro de Investigaciones Fitoecogenéticas, Pairumani started in 1982 a three-year multi-crop collecting mission which includes Andean cereals. Also the Instituto Nacional de Investigaciones Agropecuarias (INIAP) of **Ecuador** initiated a two-year multi-crop collecting mission to be carried out in the inter-Andean provinces. Sixty-one quinoa and 104 amaranths were collected in 1982 from the provinces of Bolívar, Loja and Pinchincha.

Local grains, Bolivia (M. Tapia)

During 1982 IBPGR published a list of descriptors in Spanish for the use in the characterization and evaluation of quinoa.

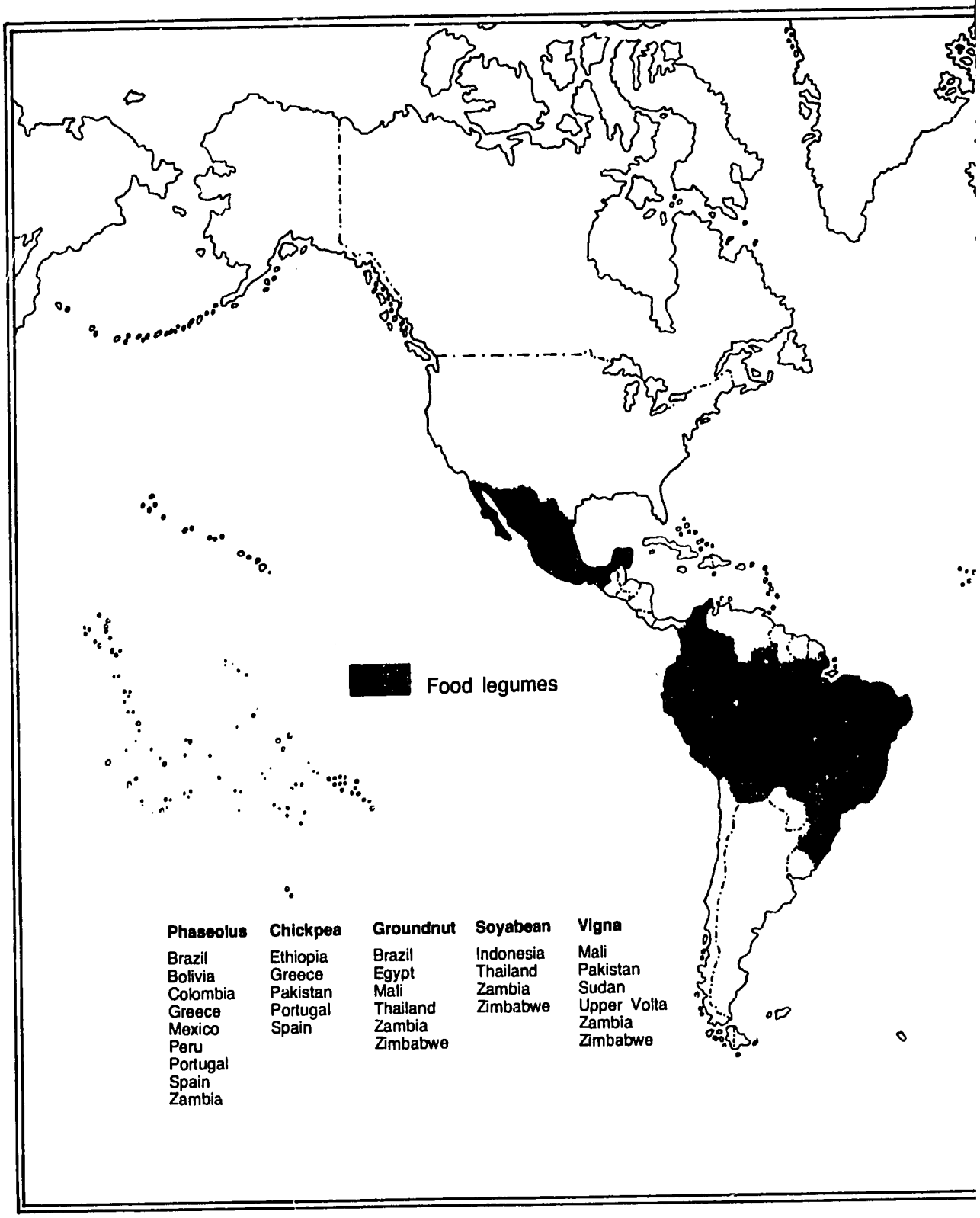
# FOOD LEGUMES

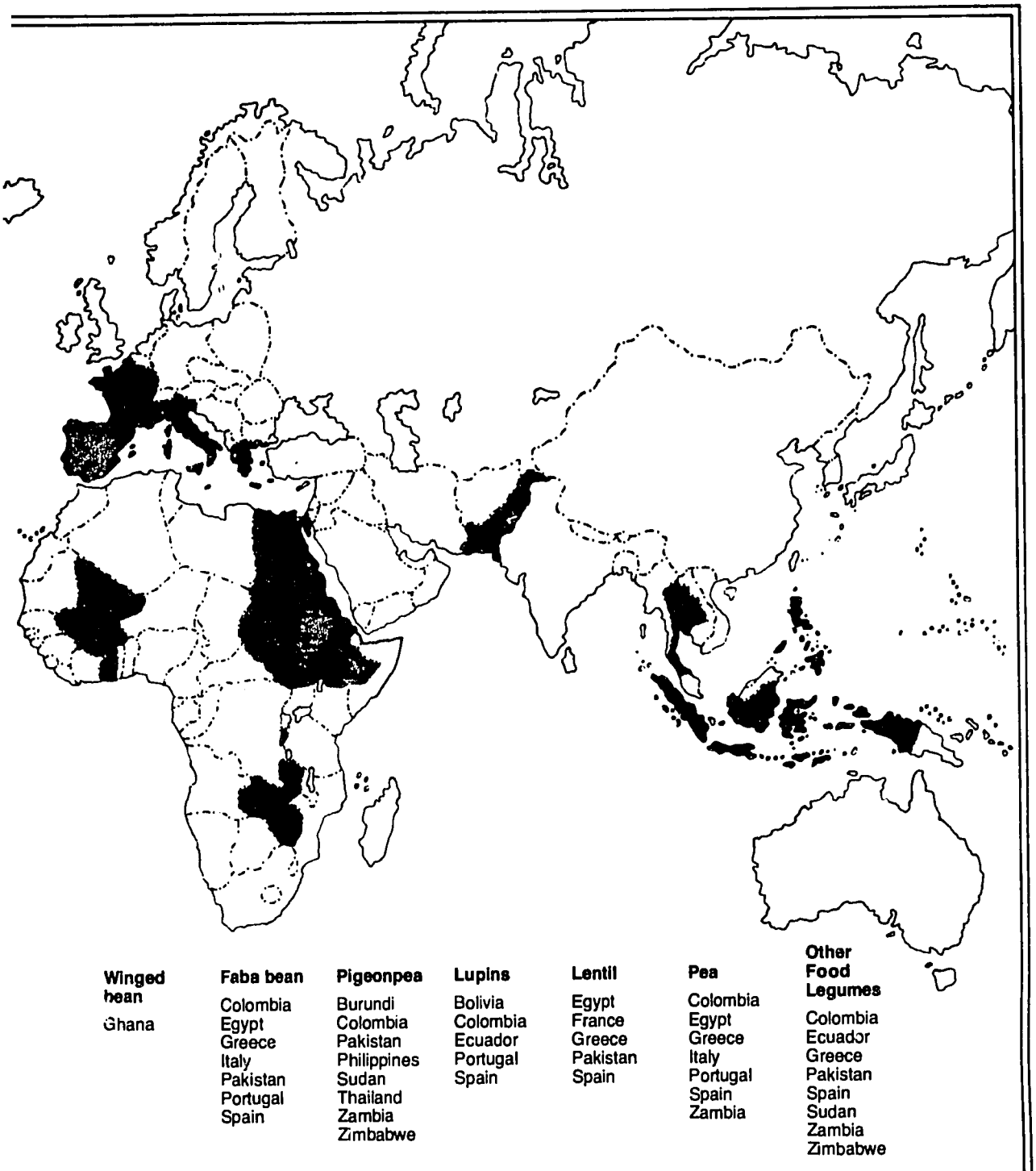
Legume seeds are the primary source of protein for millions of people in many parts of the world, as well as being important sources of calories, oil, carbohydrates, vitamins and minerals. Unfortunately, the yield levels of most food legume crops remain low. Moreover, modern agriculture is increasingly leading to the replacement of these crops by high-yielding cereals.

In order to preserve the genetic diversity, the Board has initiated action and/or supported work on broad bean, chickpea, groundnut, lentil, lupin, pea, *Phaseolus*, pigeonpea, soyabean, *Vigna* species, winged bean and others.

In these activities the IBPGR closely collaborates with other IARCs, viz. the Centro Internacional de Agricultura Tropical (CIAT), ICARDA, ICRISAT, the International Institute of Tropical Agriculture (IITA), the Asian Vegetable Research and Development Center (AVRDC), as well as participating national programmes.

Collection activities for food legume crops continued globally in 1982 (see Fig. 2).


Food legumes
Phaseolus
Brazil
Bolivia
Colombia
Greece
Mexico
Peru
Portugal
Spain
Zambia
Chickpea
Ethiopia
Greece
Pakistan
Portugal
Spain
Groundnut
Brazil
Egypt
Mali
Thailand
Zambia
Zimbabwe
Soyabean
Indonesia
Thailand
Zambia
Zimbabwe
Vigna
Mali
Pakistan
Sudan
Upper Volta
Zambia
Zimbabwe



| Winged bean | Faba bean | Pigeonpea | Lupins | Lentil | Pea | Other Food Legumes |
|---|---|---|---|---|---|---|
| Ghana | Colombia | Burundi | Bolivia | Egypt | Colombia | Colombia |
| | Egypt | Colombia | Colombia | France | Egypt | Ecuador |
| | Greece | Pakistan | Ecuador | Greece | Greece | Greece |
| | Italy | Philippines | Portugal | Pakistan | Italy | Pakistan |
| | Pakistan | Sudan | Spain | Spain | Portugal | Spain |
| | Portugal | Thailand | | | Spain | Sudan |
| | Spain | Zambia | | | Zambia | Zambia |
| | | Zimbabwe | | | | Zimbabwe |

Figure 2. Countries where the IBPGR organized or collaborated in collecting food legumes during 1982

During May 1982, ICARDA organized, with financial support from the IBPGR, a short training course on food legume germplasm at Aleppo, Syria (p. 84). Major emphasis was given to the collection and conservation of chickpea, lentil and faba bean germplasm.

## *PHASEOLUS*

Since 1978 the IBPGR has provided funds to CIAT to organize and coordinate, in association with national institutes, *Phaseolus* collecting in Latin America. National institutes have also been supported by the IBPGR for multi-crop collecting missions that often include *Phaseolus*.

The following CIAT projects on *Phaseolus* were supported by the Board during 1982. In **Peru** 64 samples of *P. vulgaris* and 9 samples of *P. lunatus* were collected in the departments of La Libertad and Ancash. Thirty-five samples of wild species were collected in **Mexico**, in collaboration with INIA, in the departments of Hidalgo, México, Puebla, Morelos and Oaxaca. In **Brazil**, in cooperation with the Centro Nacional de Recursos Genéticos (CENARGEN), 59 samples of *P. lunatus* were collected in the São Francisco river valley, west Maranhao and south Rondonia and 287 of *P. vulgaris* in Bahia state. A total of 1 006 duplicate samples of *P. vulgaris*, *P. lunatus*, *P. acutifolius* and *P. coccineus* was transferred from Brazil, Peru, Mexico, Costa Rica, Hungary and Bhutan to CIAT's genebank.

During multi-crop missions supported by the IBPGR in 1982, *Phaseolus* was collected in Bolivia, Colombia, Greece, Peru, Portugal, Spain and Zambia.

In **Bolivia** the Centro de Investigaciones Fitoecogenéticas de Pairumani collected 70 samples as part of a three-year multi-crop collecting mission.

In **Colombia** ICA collected a total of 29 samples during a two-year multi-crop collection mission.

In **Greece** 47 samples of *P. vulgaris* and *P. coccineus* were collected in the regions of Pieria and Thessaly by the Greek Gene Bank, Thessaloniki, supported by the IBPGR. During a collecting mission in Thessaly and Epirus by the Fodder Crops and Pastures Institute, additional samples of *P. vulgaris* were also collected.

The Universidad Nacional de Huánuco, Peru is being supported by the IBPGR to collect over a two-year period in nine regions of **Peru**. In 1982, 34 samples of *P. lunatus* and 150 samples of *Phaseolus* spp. were collected.

In **Portugal** 288 samples of *P. vulgaris* were collected, with IBPGR support, during a multi-crop collecting mission carried out in the Tras-os Montes and Alto Douro regions by the Estaçao Agronómico de Oeiras, INIA, Portugal, in cooperation with the Banco de Germoplasma Vegetal of INIA, Spain. During the same mission an additional 170 samples of *P. vulgaris* and three samples of *Phaseolus* spp. were collected in north-central **Spain**.

In **Zambia** 82 samples of *Phaseolus* were collected by a multi-crop collecting mission carried out in the country by IBPGR in association with local institutions.

During 1982 the IBPGR published descriptor lists for *P. vulgaris* and *P. lunatus* and lists for *P. coccineus* and *P. acutifolius* were under preparation.

In 1982 the IBPGR provided a grant to the Faculté des sciences agronomiques de l'Etat, Université de Gembloux, Belgium, to begin to analyse the available plant genetic resources

data for *P. vulgaris* toward the preparation of a full global status report on the available variability of the crop and how it could best be utilized.

## CHICKPEA

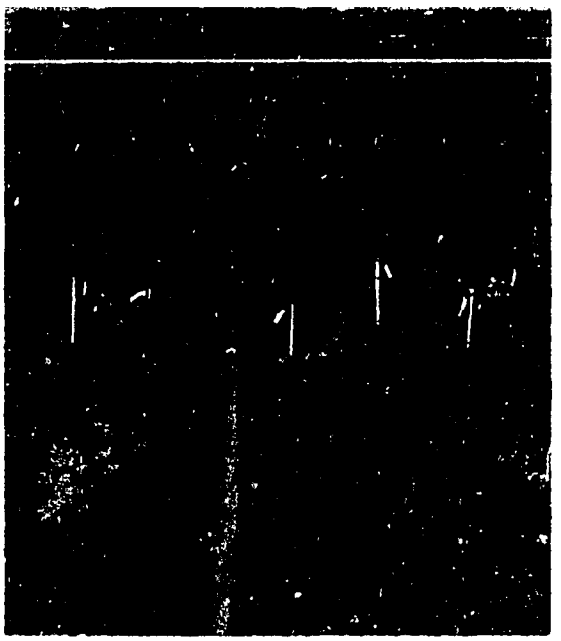
The Genetic Resources Unit of ICRISAT collected in Ethiopia and India. In January-February 1982, ICRISAT, and the PGRC, Ethiopia, collected 210 samples in Shoa, Gojjam and Gondar provinces of **Ethiopia**. The IBPGR provided partial funding for the mission. ICRISAT also collected 41 samples of chickpea in the Jammu area of Kashmir state of India in April 1982.

As part of the documentation work at the ICARDA genebank, passport and evaluation data for 27 characters of 3 300 accessions of chickpea have been computerized.

In September-October 1982, the Plant Genetic Resources Unit of PARC, with IBPGR support, collected in **Pakistan** of several food legumes — with major emphasis on chickpea. Due to an epidemic of *Ascochyta* blight and wilt during the past three years, crop losses have been considerable and the farmers in the region are replacing chickpea with other crops. To preserve the threatened variability, PARC organized an exploration mission in the major chickpea-growing areas along the Indus river. A total of 341 samples of chickpea was collected from the provinces of Sind, Punjab and the Northwest Frontier.

During 1982, the Fodder Crops and Pasture Institute of Greece, with funding from the IBPGR, fielded a multi-crop mission in **Greece** to Thessaly and to the islands of Crete and Rhodes. Of the material collected there were 68 samples of chickpea.

The Banco de Germoplasma Vegetal, INIA, Spain, and the Estaçao Agronómica de Oeiras, Portugal, with financial support from the IBPGR, collected food legume germplasm during June-July 1982. In **Portugal**, 55 samples of chickpea were collected from the Tras-os Montes and Alto Douro regions. Twenty-seven chickpea samples were collected in **Spain** from the provinces of Burgos, Soria, Zamora, León, Palencia, Salamanca and Valladolid.



Chickpea at ICRISAT

## GROUNDNUT

In its collection and preservation of *Arachis* germplasm, the Board has close links with ICRISAT, Texas A & M University (USA), CENARGEN of the Empresa Brasileira de Pesquisas Agropecuárias (EMBRAPA) (Brazil), and various national programmes. Between 1976-82, 13 expeditions visited Argentina, Bolivia, Brazil, Paraguay and Peru and a total of 477 accessions of *Arachis hypogaea*, and 293 accessions of wild relatives was collected. The areas collected are shown in Fig. 3. Of the 293 wild *Arachis*, there were at least 24 species which had not been collected previously and re-collection occurred for seven species which were not present in collections.

The material has been shared among the participating national institutes and the host country. Texas A & M University has also undertaken to multiply the material and distribute it to ICRISAT and USDA.

In addition to the germplasm collected, a considerable amount of information has been accumulated on further exploration needs. Present estimates indicate that from 50% to

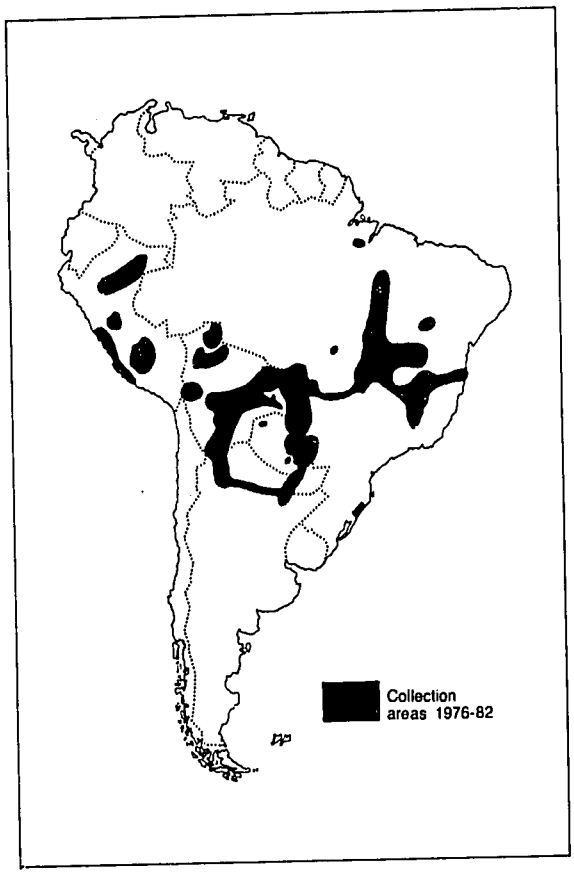



Figure 3. IBPGR *Arachis* collections

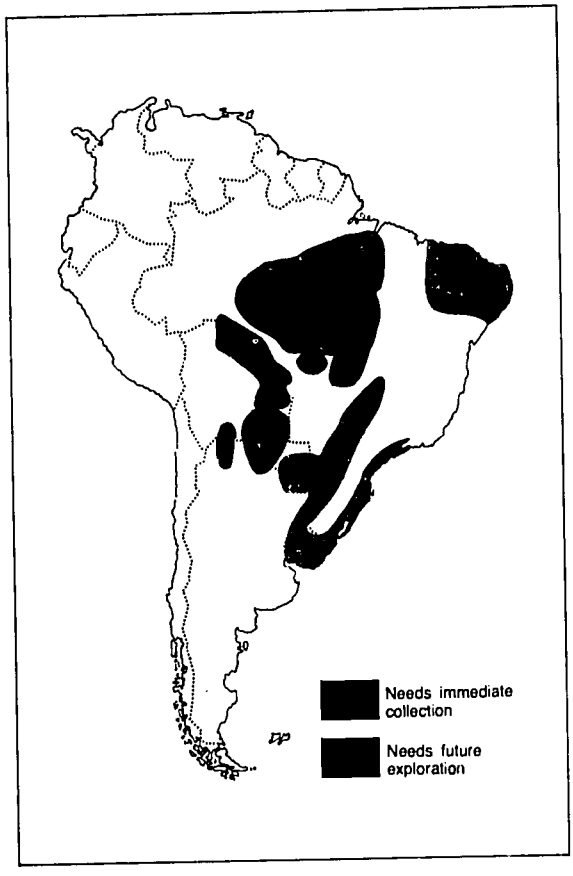



Figure 4. *Arachis* collection priorities

60% of the cultivated *Arachis* germplasm now being grown in South America has been collected and Fig. 4 shows the areas where additional collection work is required for wild *Arachis* germplasm.

During 1982, groundnut germplasm was collected in Brazil, Zambia and Zimbabwe.

In **Brazil**, CENARGEN/EMBRAPA conducted a series of field missions between June 1981 and May 1982, with financial support from the IBPGR. A total of 159 accessions was obtained in four expeditions, 57 of which were cultivated groundnuts and 102 were wild species. The first expedition visited parts of the semi-arid northeast, especially along the middle and lower valleys of the São Francisco river; the second mission covered parts of Goiás and Mato Grosso states (along the Bolivian border); the third expedition extended along northern Goiás state into the western part of Maranhão state; and the fourth mission visited eastern Goiás, Minas Gerais and Bahia states.

The IBPGR also provided funds to CENARGEN to establish an international living collection of wild species of *Arachis*. Maintenance of living plants and the increase of seeds has been very effective. Accessions of wild species are also conserved as seeds.

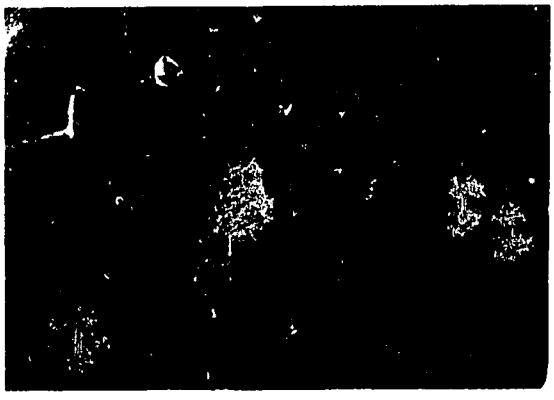
In 1982 the IBPGR Secretariat, in cooperation with national programmes and ICRISAT, organized multi-crop collecting expeditions in **Zambia** (June/July) and **Zimbabwe** (April/July); 37 accessions from the Luapula, Northern and Northwestern provinces and 183 accessions from Victoria, Manicaland, Midlands, Mashonaland and Bulawayo Sholo provinces were obtained respectively.

A few samples of groundnut were also collected during multi-crop collection expeditions in **Mali** (9), **Thailand** (10) and **Egypt** (3).

ICRISAT participated in the field work in Brazil and Zimbabwe. Additionally, ICRISAT fielded expeditions in Burundi, Ethiopia, Kenya, Rwanda and South Africa for their mandate crops which resulted in the collection of groundnut.

Members of the IBPGR Working Group on Soyabeans examining material from the Vavilov collection

Undescribed species of *Arachis* (J.F.M. Valls)



## SOYABEAN

An *Ad Hoc* Working Group on the Genetic Resources of *Glycine* species was convened by the IBPGR in association with the International Soybean Program (INTSOY), 9-11 August 1982, at the University of Illinois, Urbana, USA (see Appendix VI for membership).

A number of countries held collections but after reviewing their contents, the Working Group noted that no collection is comprehensive or fully representative. It identified priorities for collecting three types of material: cultivated soyabean, related wild annual species and perennial species.

The collection priorities for cultivated soyabean are given as follows **in order of priority**, to make the major global collections more comprehensive:

— China, (south and west); northeast China has been adequately collected
— Korea, Democratic Republic of
— Indonesia
— India, Nepal, Bhutan, Afghanistan, Pakistan (Northwest Frontier province)

— Burma, Thailand (northern part), Viet Nam, Kampuchea and Laos
— Japan
— Local areas of Malaysia, the Philippines and the South Pacific, especially where ethnic Chinese are long-time inhabitants
— Other countries with a relatively long history of cultivation (material to be acquired largely by exchange).

Following another recommendation of the Working Group, the IBPGR initiated action for the collection in 1983 of wild perennial *Glycine* species held in Australia. Toward the end of 1982, the IBPGR provided a small grant to CSIRO, Canberra, Australia, for multiplication and distribution of perennial *Glycine* species.

A list of soyabean descriptors was agreed in 1982. In collaboration with INTSOY, the IBPGR Secretariat prepared for the inventory and documentation of soyabean germplasm collections on a global scale to be started early in 1983.

During July-August 1981, the National Committee for Plant Genetic Resources, **Indonesia**, with financial support from the IBPGR, collected a total of 61 landraces from Bali (28), Lombok (16) and Sumbawa (17). In addition a few samples of soyabean were also collected in **Thailand**, **Zambia** and **Zimbabwe** during multi-crop collecting missions in 1982.

## VIGNA

The major conclusions of an *Ad Hoc* Working Group on *Vigna* species were reported in the Annual Report for 1981. Since it was agreed that initial emphasis should be placed on:

**Asiatic Vigna species:**

| | |
|---|---|
| *V. radiata* | (green gram/mung bean) |
| *V. mungo* | (black gram) |
| *V. umbelleta* | (rice bean) |
| *V. angularis* | (adzuki bean) |
| *V. aconitifolia* | (moth bean) |

**African Vigna species:**

| | |
|---|---|
| *V. unguiculata* | (cowpea) and its relatives |
| *V. subterranea* | (Bambara groundnut) |

the preparation of descriptor lists for *V. aconitifolia*, *V. mungo*, *V. radiata*, *V. umbellata* and *V. unguiculata* were started in 1982 and publication is envisaged for 1982.

In 1982, the IBPGR organized and/or provided funding to multi-crop collecting expeditions in several parts of Asia and Africa. During such exploration missions, germplasm of *Vigna* species was collected in Mali, Pakistan, Sudan, Upper Volta, Zambia and Zimbabwe. ICRISAT also mounted a multi-crop expedition to South Africa and collected 12 samples of cowpea.

In January the IBPGR, in association with ICRISAT and the Malian national programme, collected samples of cowpea (22) and Bambara groundnut (4) in **Mali**.

The Plant Genetic Resources Unit of PARC, with financial support from the IBPGR, collected *Vigna* germplasm from the Punjab province of **Pakistan** during two missions in 1982. A total of 396 accessions, including *V. radiata* (193), *V. mungo* (125), *V. unguiculata* (68) and *V. aconitifolia* (1) was collected.

The Agricultural Research Corporation (ARC), Sudan, and the IBPGR Secretariat fielded an exploration mission in the eastern and central regions of **Sudan**. Several horticultural crops including a few samples of *V. unguiculata* were collected.

The Ministry of Rural Development, **Upper Volta**, with financial support from the IBPGR, carried out a multi-crop collection in the southwestern part of the country during January-February 1982. More than 50 samples of cowpea and some Bambara groundnut were among the material collected. A second IBPGR mission for vegetable crops also collected 16 samples of Bambara groundnut in October-November 1982.

In **Zambia**, a multi-crop collecting mission was fielded during June-July 1982 and a total of 40 cowpea and 22 Bambara groundnut samples was collected from Luapula, Northern and Northwestern provinces.

In **Zimbabwe**, during the 1982 IBPGR multi-crop mission, a total of 208 samples of cowpea was collected from Victoria (21), Manicaland (41), Midlands (51), Mashonaland (78) and Bulawayo Sholo (17) provinces. The major traditional legume in Zimbabwe is the Bambara groundnut, and 150 samples were collected.

During 1981/82, the Department of Horticulture, Kasetsart University, Thailand, as-

sembled a collection of 160 accessions of yard long bean, the majority of which (147 accessions) were collected in central (89), north (7), east (7), northeast (25) and south (19) Thailand. This collection is currently being evaluated and 80 accessions have been fully characterized.

AVRDC holds the largest collection of *Vigna radiata* (more than 5 000 samples) and sizeable collections of other Asiatic *Vigna* species. During 1982, AVRDC duplicated 4 854 accessions of *V. radiata* in the IBPGR Regional Genebank in the Philippines (p. 60).

## WINGED BEAN

Considerable attention has been paid, both by the IBPGR and other organizations, on the genetic resources of winged bean (*Psophocarpus tetragonolobus*). The *IBPGR Regional Committee for Southeast Asia Newsletter* devoted a special issue to this crop and during 1982 the IBPGR published a *Revised Winged Bean Descriptor List*. Much of the collecting results from IBPGR support.

Partly with IBPGR support, sizeable collections of winged bean have been established in Bangladesh, Ghana, India, Indonesia, Malaysia, Papua New Guinea, the Philippines, Sri Lanka and Thailand. Although some areas in Asia still need to be explored (e.g. Malaysia and Papua New Guinea), more emphasis needs to be given to the collection of wild *Psophocarpus* species in Africa.

An IBPGR-supported project in the **Philippines** in 1982 was carried out by the National Plant Genetic Resources Laboratory (NPGRL), Institute of Plant Breeding (IPB), University of the Philippines at Los Baños, and resulted in the collection of 208 accessions from 30 provinces in seven major regions (Ilocos, northern and highland, southern Luzon, Bicol, eastern-, western-, and central-Visayan). As of July 1982 a total of 600 winged bean accessions had been recorded by the NPGRL, consisting of 208 indigenous accessions obtained under the IBPGR project, 131 indigenous accessions held prior to the project and 261 accessions of introduced material. The IBPGR will also support the characterization of the collection.

In the *1981 Annual Report* details were provided on the winged bean project in Thailand. During 1982 additional funds were provided by the IBPGR for the multiplication of this collection (528 accessions) and its deposition in IBPGR-designated genebanks for long-term conservation in the Philippines (NPGRL/IPB) and at TISTR in Thailand.

A multi-crop mission in **Ghana** collected winged bean in 1982 with IBPGR support (p. 50).

Toward the end of 1982, the IBPGR provided funds to collect winged bean germplasm in Malaysia and East Africa. During 1983 the National University of Malaysia will collect, characterize and document winged bean germplasm from Sabah and Sarawak over a three-year period and the Royal Botanic Gardens, Kew, UK, will organize the collection of population samples of wild *Psophocarpus* species from East Africa.

## FABA BEAN

During 1982 work was under way with ICARDA to develop a descriptor list for *Vicia faba*. The Commission of European Communities (CEC) and the European Cooperative Programme (ECP) may also participate. ICARDA has computerized passport information for its faba bean collection.

During IBPGR-supported multi-crop collecting missions in 1982, samples were collected in **Colombia** (15), **Egypt** (31), **Greece** (61), **Italy**, **Pakistan** (4), **Portugal** (15) and **Spain** (39).

## PIGEONPEA

The Genetic Resources Unit of ICRISAT fielded expeditions to Kenya and South Africa during 1982 in which several samples of pigeonpea were collected. A few accessions were also collected in **Burundi, Colombia, Pakistan**, the **Philippines, Thailand, Sudan, Zambia** and **Zimbabwe** during IBPGR-supported multi-crop collection missions in 1982.

The Thailand Institute of Scientific and Technological Research, Bangkok, with IBPGR funds, finalized plans for collection, characterization and documentation of local

germplasm including pigeonpea. This project will commence early in 1983.

## LUPIN

Since 1978 the IBPGR has given 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* has been collected during multi-crop collecting missions carried out by the Instituto Boliviano de Tecnología Agropecuaria (IBTA), in **Bolivia**, (4 *L. mutabilis*), ICA in **Colombia**, (30 *Lupinus* spp.) and INIAP in **Ecuador** (22 *L. mutabilis*).

In the Mediterranean region lupin has also been collected in the Iberian peninsula. In **Spain** the IBPGR supported INIA, Spain to collect lupins and other legumes in the provinces of León, Valencia, Valladolid, Zamora, Salamanca, Avila and Segovia, and this resulted in 57 *L. albus*, 19 *L. angustifolius*, 10 *L. hispanicus* and 7 *L. luteus*. The Instituto Nacional de Investigação Agraria (INIA), Portugal was given financial support to collect lupins and other crops in the northeastern part of **Portugal**, mainly in Chavez and Bragança. A total of 55 samples of lupins was collected: 6 *L. albus*, 27 *L. angustifolius*, 13 *L. hispanicus*, 6 *L. hispanicus* bicolor and 3 *L. luteus*.

During 1982 the IBPGR also provided initial support to the Department of Agronomy and Range Science of the University of California to multiply, characterize and distribute to genebanks samples of lupins in 1983 and 1984.

## LENTIL

During 1982 the IBPGR was in the process of developing a list of descriptors for lentil. Of the *ca.* 5 400 lentil samples in the ICARDA genebank, 3 500 have been evaluated for 16 characters and computerized.

In 1982, lentil (*Lens culinaris*) germplasm was collected in southern France, Spain, Greece, Egypt and Pakistan.

With IBPGR funds, an Israeli scientist collected landraces of small-seeded lentils in southeast and northern **Spain**, the Spanish and French Pyrenees and the Alpine area of **France**. More than 20 accessions and many individudal plants were collected. In another mission in Spain, undertaken by the Banco de Germoplasma Vegetal, INIA, 12 samples of lentils were collected from seven provinces.

In **Greece**, Pieria, Thessaly and the islands of Crete and Rhodes were explored for food legume crops germplasm and 48 accessions of lentil were collected. Six samples of *Lens culinaris* were also collected in **Egypt** during 1982 by the IBPGR Mediterranean programme. In **Pakistan** the Plant Introduction and Genetic Resources Division collected 60 samples of lentil germplasm from the provinces of Sind, Punjab and the Northwest Frontier.

## PEA

A few samples of *Pisum* germplasm were collected during 1982 multi-crop collection missions in **Colombia** (6), **Egypt** (13), **Greece** (16), **Italy, Portugal** (18), **Spain** (10) and **Zambia** (6).

A workshop on *Documentation modelling for Pisum Genetic Resources*, held at the Swedish University of Agricultural Sciences, Alnarp, was jointly organized by the Nordic Gene Bank (NGB) and the IBPGR. The problems associated with collecting, storing and utilizing information relevant to genebanks were dealt with by using the well-developed system of pea data handling at the Weibullsholm Plant Breeding Institute as a model (p. 79). A report of the workshop went to press in late 1982 and will be available in early 1983.

## OTHER LEGUMES

Other legumes collected during multi-crop missions in 1982 are: *Dolichos lablab* (**Greece, Sudan** and **Zimbabwe**), *Cyamopsis tetragonoloba* (**Pakistan**), *Canavalia* spp. (**Zambia** and **Zimbabwe**), *Lathyrus* spp., (**Colombia, Greece, Pakistan** and **Spain**), *Mucuna* spp. (**Zimbabwe**) and *Pachyrhizus* spp. (**Ecuador, Zambia**).

# ROOTS AND TUBERS

Activities on root and tuber crop germplasm have received increased emphasis during 1982. Two of these crops, i.e. cassava and sweet potato, have global first priority.

Since the publication in 1980 of a directory of collections (aroids, cassava, potato, sweet potato and yams), a large amount of additional information has been compiled. A revised edition of this directory will be issued. IBPGR descriptor lists are at present available for potato (1977), *Colocasia* (1980), yams (1980) and oca (*Oxalis tuberosa* - 1982) and a 1983 publication date is planned for cassava, olluco (*Ullucus tuberosus*), isaño (*Tropaeolum tuberosum*) and ginger/turmeric.

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

## CASSAVA

At its meeting in 1982, the IBPGR endorsed a report entitled *Genetic Resources of Cassava and Wild Relatives* which synthesized the information and recommendations provided by two IBPGR/CIAT Working Groups (see Appendix VI for membership). The Working Groups reviewed the major existing collections, studied areas of genetic diversity, analysed known genetic erosion, identified priorities for collection, proposed the designation of repositories, prepared descriptors and made general recommendations on transfer, quarantine and training.

Priority areas for collecting cassava and wild relatives in Latin America are shown in Figures 6 and 7. Although there is not enough information to define priorities in Africa or Asia, central West Africa was identified as having the highest genetic diversity in that continent.

An IBPGR consultant visited the priority areas in Latin America to draw up systematic plans and strategies for collecting and transfer. Following the consultant's recommendations and those of the Working Groups, the following projects were funded by the IBPGR during 1982:

— A two-year project to transfer duplicates of collections from Argentina, Brazil and Paraguay to the CIAT collection in Cali,

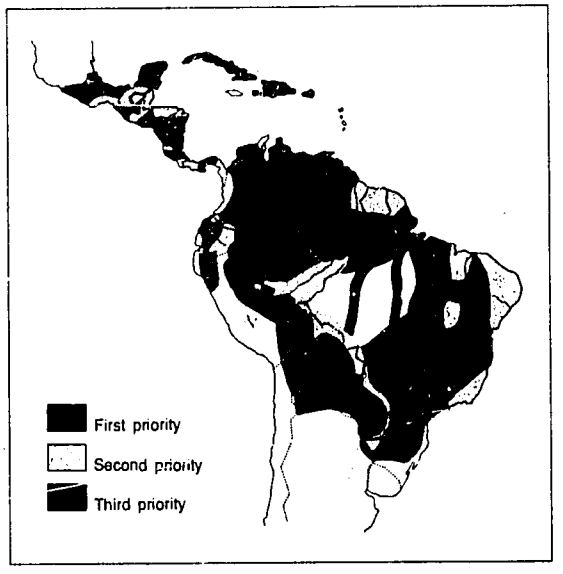



Fig. 6. Priority areas for collecting cassava in Latin America

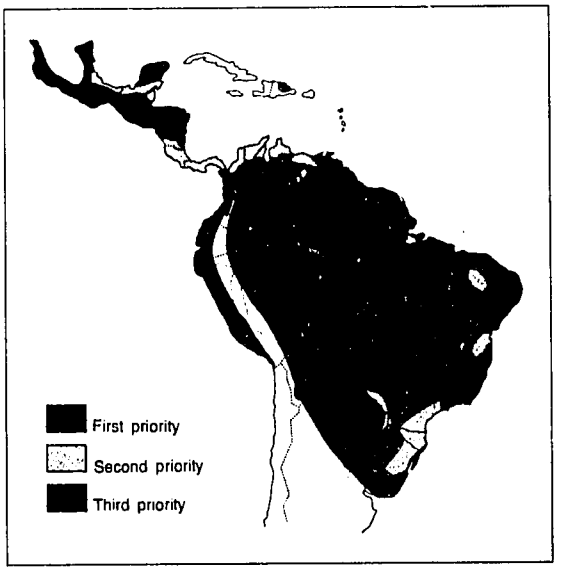
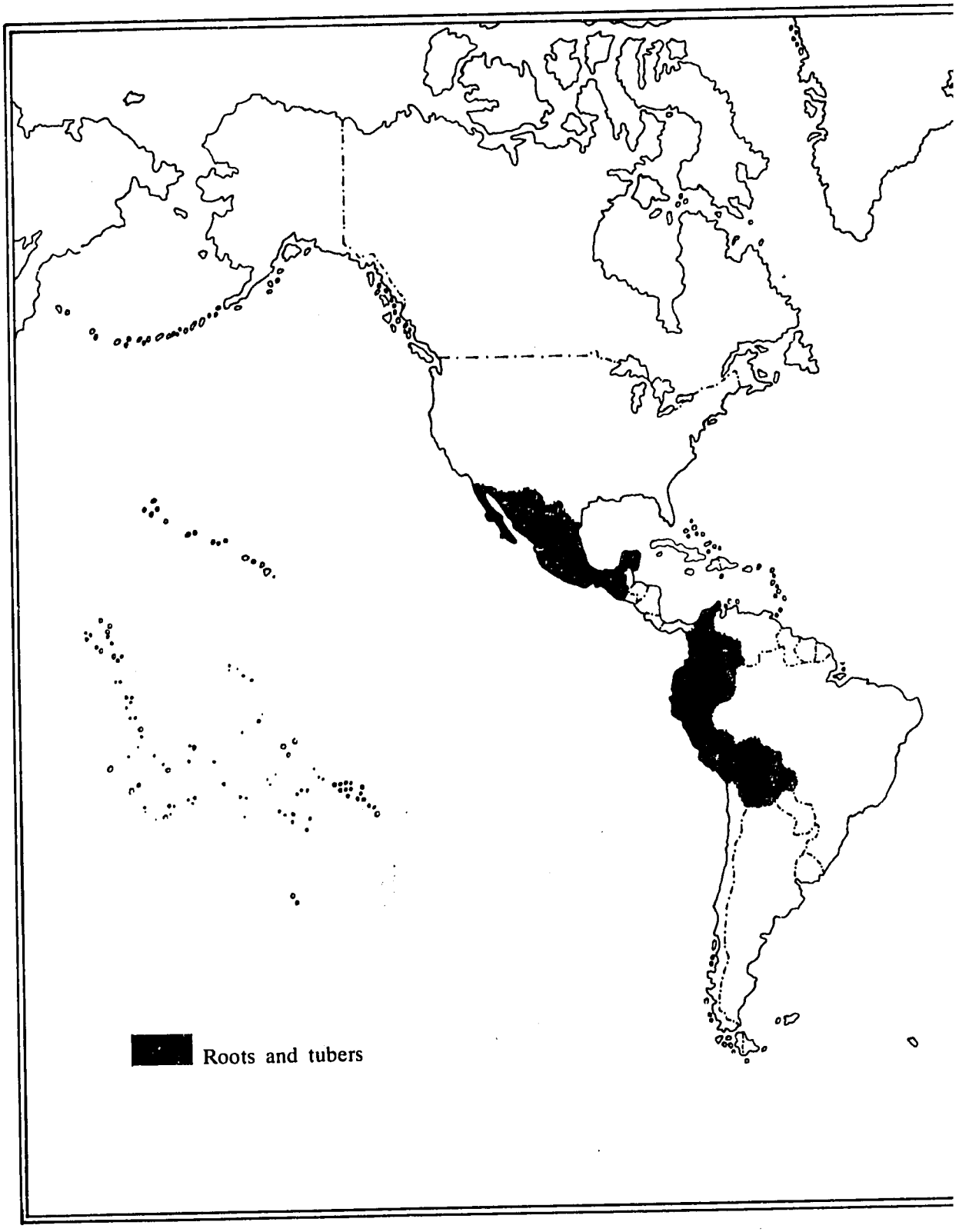
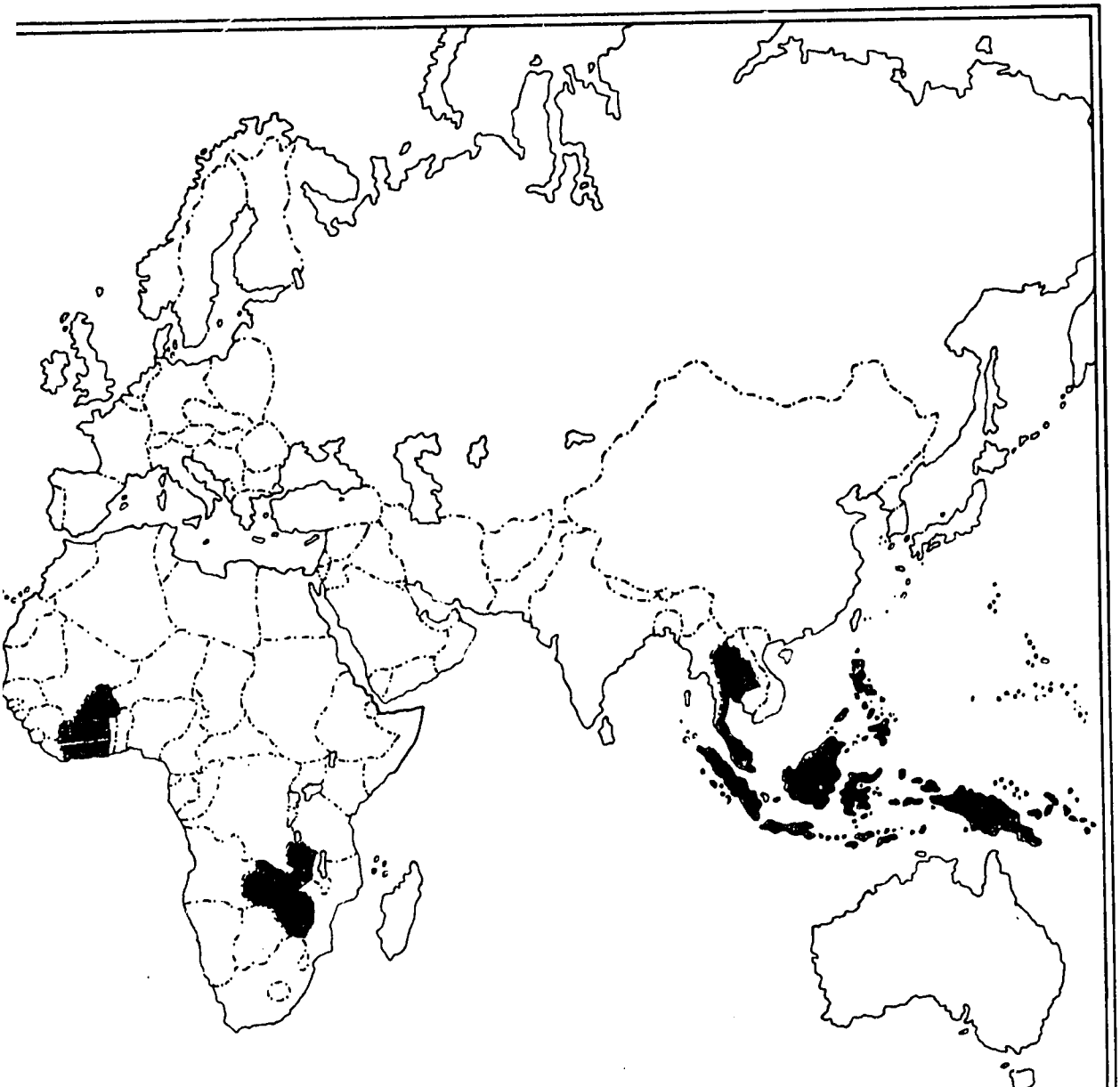



Fig. 7. Priority areas for collecting *Manihot* species in Latin America


Roots and tubers



| Cassava | Sweet potato | | Potato | Andean Roots and Tubers | Other Roots and Tubers | |
|---|---|---|---|---|---|---|
| Guatemala | Guatemala | Peru | Bolivia | Colombia | Ghana | Peru |
| Mexico | Indonesia | Philippines | Colombia | Ecuador | Indonesia | Philippines |
| Peru | Malaysia | Thailand | Guatemala | Peru | Ivory Coast | Thailand |
| Philippines | Papua New Guinea | Upper Volta | | | Malaysia | Upper Volta |
| Upper Volta | | | | | Papua New Guinea | Zambia |
| Zambia | | | | | | |

Figure 5. Countries where the IBPGR organized or collaborated in collecting roots and tubers during 1982

Colombia through *in vitro* meristem culture. In 1982, 350 samples of *Manihot esculenta* were transferred from Brazil.

— In **Guatemala** the Universidad de San Carlos, in cooperation with the Instituto de Ciencia y Tecnología Agraria (ICTA), collected 33 samples of *Manihot* during the first year of a four-year multi-crop collecting mission.

— In **Mexico** the Instituto Nacional de Investigaciones Agrícolas (INIA), in cooperation with CIAT, collected samples of 14 species of wild *Manihot* in the areas of Tamaolipas, Nayarit, Oaxaca, Durango, Sinaloa, Colina, Puebla, Nuevo León, Michoacán and Morelos.

— In Paraguay the IBPGR has supported CIAT in planning for a collection mission of cassava and wild relatives in the Paraguay river basin and in eastern Paraguay. Collecting activities will start early in 1983.

— In **Peru** the Universidad de San Carlos de Huamanga, Ayacucho collected 29 samples of *M. esculenta* and five samples of two species of wild *Manihot* during multi-crop collection in the departments of Loreto and San Martín.

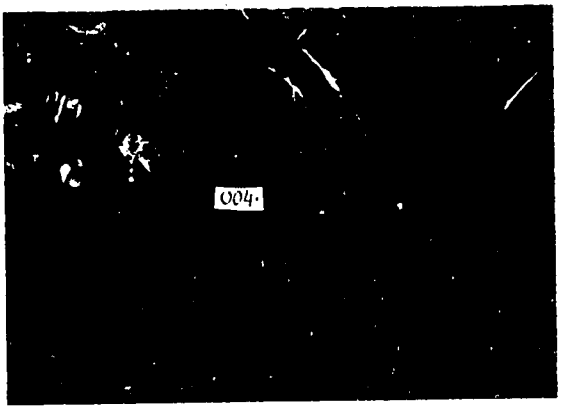
In the **Philippines** 152 samples of cassava were collected during a root and tuber multi-crop collecting mission carried out by the Philippine Root Crops Research and Training Center (PRCRTC) with support from the IBPGR.

The IBPGR supported IVRAZ in **Upper Volta** for the collection, evaluation and storage of root and tuber crops, including cassava. In another multi-crop collection 12 samples of cassava were collected in **Zambia.**

The IBPGR has started cooperative work at the Prairie Regional Laboratory (PRL) through the Saskatchewan Research Council (SRC), Saskatoon, Canada to accelerate work on the cryopreservation of cassava genetic resources in association with CIAT.

## SWEET POTATO

Following an IBPGR consultancy in 1981 to initiate activities in the major centre of origin




Sweet potato in its major centre of diversity

of sweet potato (Colombia, Ecuador, Guatemala and Peru), the IBPGR funded two multi-crop projects in 1982, one in Guatemala and the other in Peru, to collect, characterize and conserve sweet potato diversity as well as other crops.

The Universidad de San Carlos, in cooperation with ICTA, began a four-year multi-crop project in 1982 to explore, collect, evaluate and maintain plant genetic resources in **Guatemala.** Sweet potato is one of the major crops in this project and during 1982 a total of 20 *Ipomoea* spp. was collected. The Universidad San Cristóbal de Huamanga, Ayacucho, **Peru** was provided with a two-year grant to collect sweet potato, cassava and other root and tuber crops in the country. During October 1982, with the assistance of an IBPGR consultant, 60 accessions of *I. batatas* and 18 wild relatives were collected in the departments of Amazonas, Loreto and San Martín.

Although first priority needs to be given to collecting in the centre of origin, secondary centres of variability need to be explored. Activities are underway in Southeast Asia, where the crop has been assigned a high regional priority and in West Africa (Upper Volta).

In **Indonesia** the National Committee for Plant Genetic Resources formulated a plan of action for the collection of root and tuber crops. The IBPGR provided support for a three-year period (1980/83) especially to collect sweet potato and taro. During 1982, 79 cultivars of sweet potato were collected, mainly from east and central Java.

The IBPGR also provided support to a two-year project in **Malaysia** to collect sweet

potato, aroids and *Dioscorea* spp. which started in 1982.

During 1981, 31 accessions of sweet potato were collected in **Papua New Guinea** (PNG) under an IBPGR grant. A large collection has been established at the Aijura Agricultural Station, PNG (731 accessions of which 200 have been characterized using the IBPGR descriptor list) and further support from the IBPGR is envisaged.

The Philippine Root Crops Research and Training Center (PRCRTC) received IBPGR support for a two-year project (1981-82) to collect and characterize roots and tubers (sweet potato, cassava, aroids and yam) in the **Philippines**. Of the total 1 835 accessions assembled, 800 are samples of sweet potato.

In **Thailand** support has been provided to Chiang Mai University and during 1981/82 a total of 450 sweet potato accessions was collected or assembled (including material previously maintained at Fang Horticultural Experiment Station). The characterization of 225 accessions has been completed for at least 12 characters. An additional grant was provided in 1982 to complete the collecting activities during 1983, especially in the central and northeastern parts of Thailand. Further detailed studies on this large collection are envisaged.

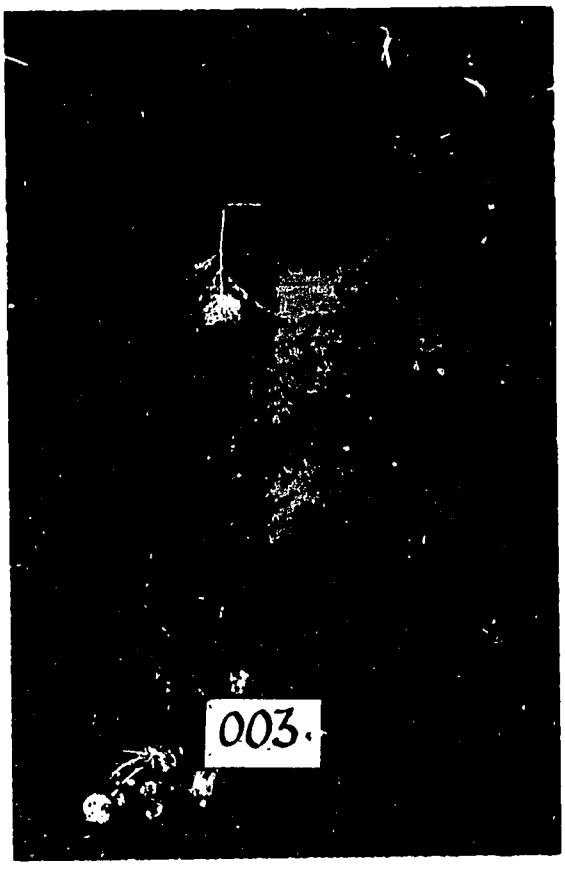
Some sweet potato samples were collected in **Upper Volta** during the multi-crop mission fielded by the IBPGR and IVRAZ in 1982.

## POTATO

Although major world responsibility for potato germplasm lies with the Centro Internacional de la Papa (CIP), IBPGR is providing some assistance to national centres to collect and conserve local germplasm.

In Argentina the Estación Experimental Agropecuaria de Balcarce of the Instituto Nacional de Tecnología Agropecuaria (INTA) will be supported by the IBPGR in a project to collect wild potatoes in January-February 1983 in the department of Rosario de Lerma (Salta) and old cultivated varieties of *Solanum tuberosum* subsp. *andigena* in the departments of Iruya and Santa Victoria (Salta).

In **Bolivia** the IBPGR is assisting CIP to carry out an exploration and collecting mission




*Solanum tuberosum*, Colombia

for *S. ajanhuiri* and other wild and cultivated potatoes in the western regions of the departments of La Paz and Oruro.

ICA **Colombia** completed a two-year multicrop collecting mission in 1982 in which 48 *Solanum* sp. were collected. Another project, supported by the IBPGR and conducted by ICA for the collection of wild potatoes obtained a total of 33 samples of *Solanum* species including a few *S. tuberosum*, *S. phureja*, *S. topiro* and *S. flahualtii*.

A total of 48 samples of *Solanum* spp. was collected by the Instituto de Ciencia y Tecnología Agrícola (ICTA) during 1982, the first year in a four-year collection project in **Guatemala**.

## ANDEAN ROOTS AND TUBERS

Oca (*Oxalis tuberosa*), olluco or melloco (*Ullucus tuberosus*), isaño or mashua (*Tropaeolum tuberosum*) and arracacha or

zanahoria blanca (*Arracacia xanthorrhiza*) are among the roots and tubers of high local importance as food crops in the Andean region. Since 1978 the IBPGR has assisted national and regional organizations of the Andean countries to collect, conserve and evaluate this germplasm.

In **Colombia** ICA completed a multi-crop collecting mission started in 1981 in which a few samples each of arracacha, olluco and oca were collected.

INIAP, Ecuador began a multi-crop collecting mission in 1982 that will eventually cover 10 provinces of **Ecuador**. Samples collected during 1982 included: 12 oca, 20 melloco, 13 mashua, 7 zanahoria blanca, 2 miso (*Mirabilis expansa*) and 2 jícama.

A few samples of local Andean root and tuber crops such as oca, olluco, mashua, arracacha, achira (*Canna edulis*) and maca (*Lepidium meyenii*) were also collected in 1982 during a multi-crop collecting mission in **Peru** carried out by the Universidad de San Cristóbal de Huamanga, Ayacucho.

In 1982 the Board published *Descriptores de Oca* to aid with the documentation of this crop. Work is progressing on descriptor lists for olluco and isaño.

## OTHER ROOTS AND TUBERS

Germplasm of root and tuber crops other than those discussed above, has been collected in Southeast Asia, Ghana, the Ivory Coast, Upper Volta and Zambia. Usually these crops were collected as part of multi-crop collections, although in some cases specific missions have been fielded, e.g. yam and *Colocasia* in Thailand and yam in the Ivory Coast.

The following material was collected in **Indonesia**: 17 taro, 3 *Canna edulis*, 1 *Dioscorea alata*, 1 *D. esculenta*, 2 *Maranta arundinacea* and 7 *Xanthosoma violaceum*. The IBPGR-supported mission in **Papua New Guinea** collected a number of indigenous crops during 1981 including taro and yams (143 *Colocasia esculenta*, 13 *Dioscorea alata* and 75 *D. esculenta*). Some samples of *Xanthosoma* spp. were collected in the multi-crop collection in the jungle of **Peru** (p. 55). The two-year root and tuber collecting project in the **Philippines** assembled the following: 2 *Alocasia macrorrhiza*, 1 *Amorphophallus campanulatus*, 280 *Colocasia esculenta*, 2 *Crytosperma chamissonis*, 469 *Dioscorea alata*, 1 *D. bulbifera*, 95 *D. esculenta*, 24 *D. hispida*, 5 *D. pentaphylla*, 2 *Maranta arundinacea* and 2 *Xanthosoma sagittifolium*.

IBPGR funding was also provided to projects on *Colocasia* and *Dioscorea* in **Thailand**. Fifty accessions of *Colocasia* and the related genera *Alocasia* and *Xanthosoma* were collected by the Department of Agronomy, Kasetsart University. All accessions are currently being characterized. A two-year (1980/82) collecting project carried out by TISTR resulted in the collection of 364 samples of *Dioscorea* comprising the following: 85 *D. alata*, 74 *D. hispida*, 58 *D. bulbifera*, 55 *D. glabra* and related species, 50 *D. pentaphylla* and related species, 9 *D. membranacea* and 33 unidentified samples.

The Laboratoire de Génétique, Faculté des Sciences, Université Nationale, Abidjan undertook the exploration of central, north and northeast **Ivory Coast** for *Dioscorea* germplasm during 1982 with IBPGR support. A total of 173 named cultivars and 2 wild species (respectively 51 *D. alata*, 122 *D. cayenensis-rotundata*, 1 *D. bulbifera* and 1 *D. esculenta*) were encountered during the first phase of this project. The second phase will take place in January/February 1983 to collect the samples observed.

# VEGETABLES

As indicated in the *1981 Annual Report*, the IBPGR has organized the preparation of action-oriented reports on eight major vegetable crops or groups of crops, details of which are discussed below. These reports have been finalized and during 1982 emphasis was given to the implementation of their recommendations.

An important aid toward the organization of world-wide genetic resources efforts was the publication in 1982 of the IBPGR directory of vegetable genetic resources collections, which lists more than 100 institutions in 50 countries with major vegetable collections. The directory contains sections for *Abelmoschus, Allium, Amaranthus, Capsicum,* Cruciferae, Cucurbitaceae, *Lycopersicon, Solanum* (*S. melongena* and related species) and Other Vegetables. In addition, a brochure, describing IBPGR activities on vegetable genetic resources was published and widely distributed to underline the need to safeguard these genetic resources.

A number of methods have been used to collect vegetable germplasm:

- missions for specific high priority vegetable crops, e.g. okra collecting in Benin and Togo;
- missions for specific high priority vegetables, which also included the collection of other vegetable crops, e.g. eggplant collecting in Upper Volta;
- missions to collect horticultural crops in general, e.g. collecting projects in Ethiopia and Sudan;
- multi-crop collecting missions where high priority vegetables were included, e.g. multi-crop collecting projects in Bolivia and Colombia; and
- missions primarily for the collection of other crops, but which also included some vegetables, e.g. sorghum and millet mission in Mali.

In all these instances accessions of high priority vegetables obtained are reported below (see Fig. 8).

## TOMATO

The IBPGR report *Genetic Resources of Tomatoes and Wild Relatives* was published in 1981 and details were provided in the *1981 Annual Report.*

During 1982 the IBPGR supported the Departamento de Horticultura, UNA, La Molina, Peru, to complete collecting tomato germplasm in **Peru**, with major emphasis on the areas around the Marañón river. The same Department received IBPGR funds for a project to collect *Lycopersicon* and *Capsicum* species in the departments of Cuzco, Madre de Dios and Puno during 1982, but the project had to be postponed until 1983. During multi-crop missions in 1982 some tomato germplasm was also collected ir **Guatemala** (21) and **Upper Volta** (4).

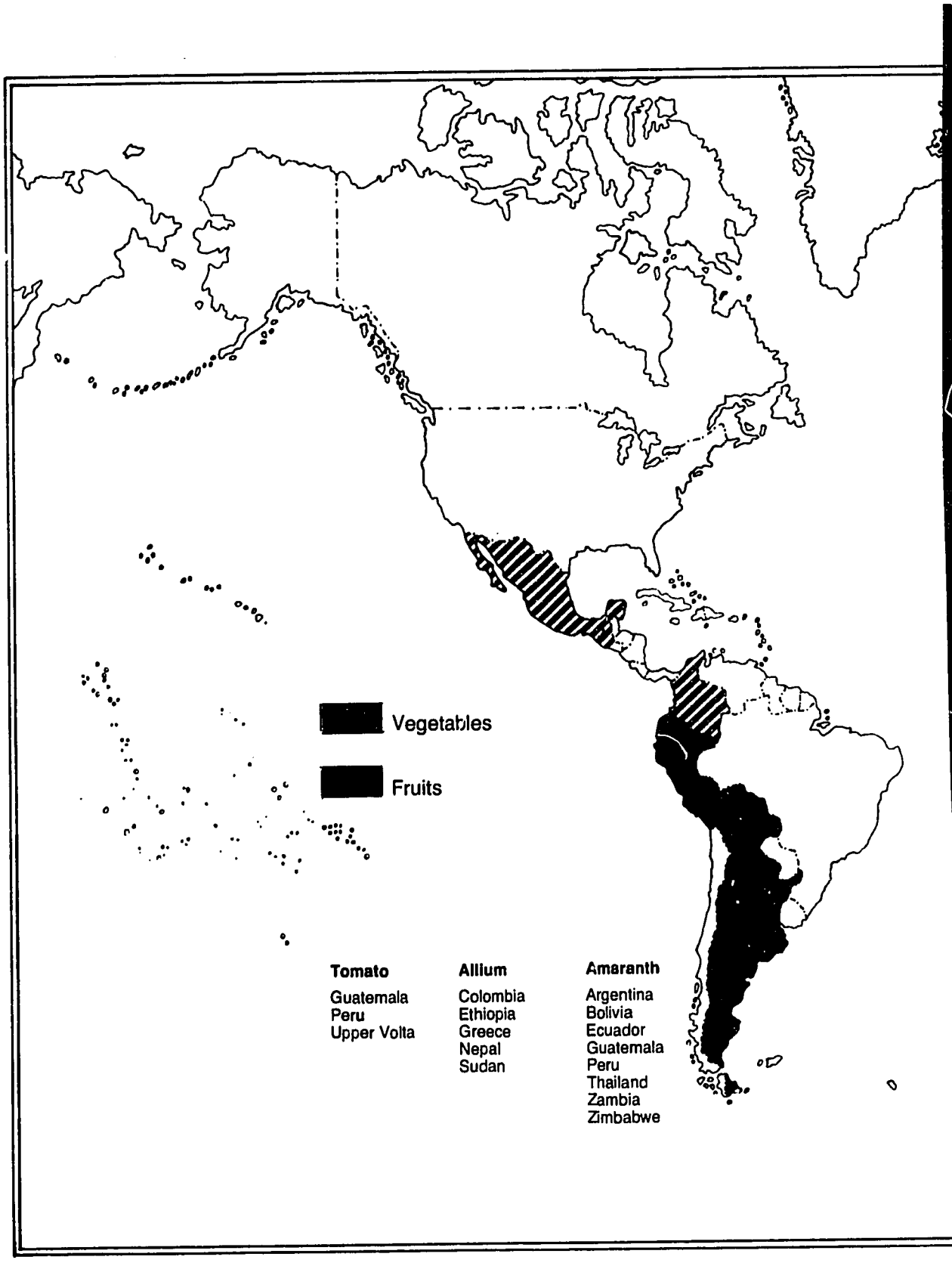
## ALLIUM

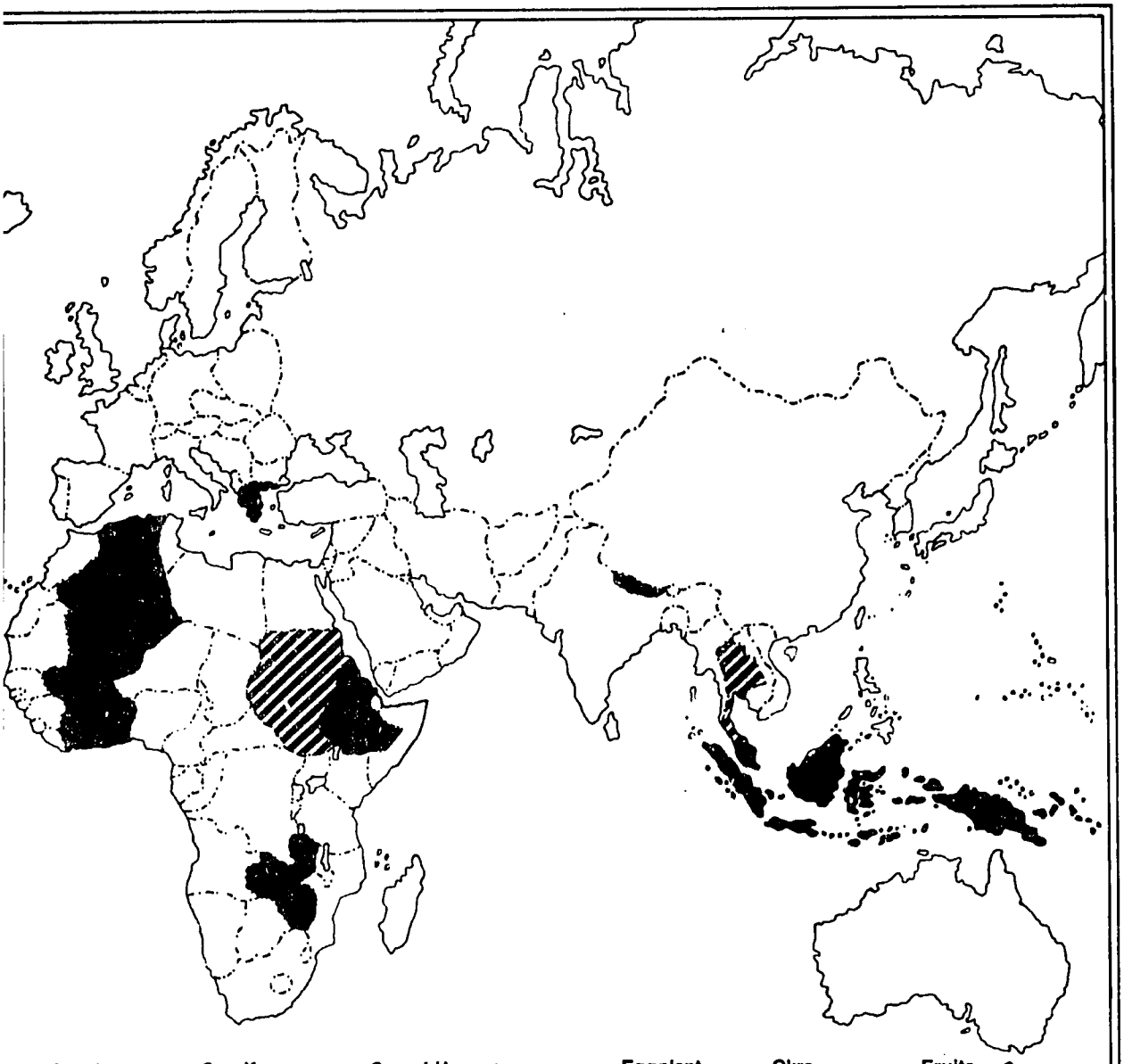
The report on the *Genetic Resources of Allium Species* (which also contains an *Allium* descriptor list) was endorsed by the IBPGR and published in May 1982. On the basis of this report, the IBPGR has designated base collection centres (p. 67) and agreed on the priorities for collection listed in Table 2.

Also during 1982, the UNDP/FAO European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (ECP) organized an *Allium* Working Group at the National Vegetable Research Station (NVRS), Wellesbourne, UK. The Working Group agreed to follow the recommendations outlined in the IBPGR *Allium* report, and is proposing coordinated activities in Europe. The ECP provided a grant to the Netherlands for the collection, evaluation and storage of *Allium* germplasm (1982/83) and the Working Group is actively pursuing further collecting in Europe, possibly with financial assistance from the European Community (EC).

Recognizing the importance of *Allium* species in Israel and neighbouring countries and Israel's efforts to coordinate national activities on these species through the onion committee of the Israel Gene Bank, the IBPGR provided a grant toward the end of 1982 to support the complete collection, characterization, documentation and storage of all *Allium* species in Israel. This includes the duplication of the collected material in IBPGR-designated genebanks. A similar project is being supported in **Greece** and during 1982 a total of 22 *A. cepa,* 23 *A. porrum*, 8 *A. sativum* and 4 *Allium* spp. was collected.

*Allium* germplasm was also collected during 1982 by other multi-crop missions, namely in **Colombia** (61 *Allium* spp.), **Ethiopia** (3 *A. cepa* and 6 *A. sativum*) and **Sudan** (13 *A. cepa*).


Vegetables
Fruits
Tomato
Guatemala
Peru
Upper Volta
Allium
Colombia
Ethiopia
Greece
Nepal
Sudan
Amaranth
Argentina
Bolivia
Ecuador
Guatemala
Peru
Thailand
Zambia
Zimbabwe



**Capsicum**
Bolivia
Colombia
Ecuador
Ethiopia
Guatemala
Mexico
Sudan
Upper Volta

**Cruciferae**
Algeria
Ethiopia
Greece
Nepal
Sudan
Zimbabwe

**Cucurbitaceae**
Benin
Bolivia
Colombia
Ethiopia
Guatemala
Mali
Peru
Sudan
Thailand
Togo
Zambia
Zimbabwe

**Eggplant**
Ghana
Ivory Coast
Thailand
Upper Volta
Zambia
Zimbabwe

**Okra**
Benin
Ghana
Mali
Papua New Guinea
Sudan
Togo
Upper Volta
Zambia
Zimbabwe

**Fruits**
Colombia
Guatemala
Indonesia
Malaysia
Mexico
Sudan
Thailand

Figure 8. Countries where the IBPGR organized or collaborated in collecting vegetables and fruits during 1982.

Table 2. *Allium* collection priorities

| Global Priority | Region | Crop |
|---|---|---|
| 1 | Europe, Asia (Central Asia, Southwest Asia, Indian sub-continent) and Africa (Egypt, Sudan, West Africa, South Africa) | *Allium cepa* (dry bulb) local cultivars and landraces |
| | Countries of major production in Europe, North America and Asia | *Allium cepa* (dry bulb) modern cultivars |
| | Europe (Norway, Finland, USSR), West Africa and Southeast Asia | *Allium cepa* (shallot and vegetatively propagated onion) |
| 2 | China, Japan and Southeast Asia | *Allium fistulosum* cultivars and landraces |
| | Europe and the Middle East | *Allium ampeloprasum* leek and kurrat cultivars and landraces |
| 3 | Europe (especially the Mediterranean), Asia and Africa (especially Egypt) | *Allium sativum* clones |
| | Mediterranean and Central and Southwest Asia | Most important wild species (*A. ampeloprasum, A. farctum, A. galanthum, A. oschaninii, A. pskemense, A. vavilovii*) |
| 4 | | Asiatic *Allium* crops (*A. chinense, A. tuberosum, A. wakegi*) |
| | | *A. schoenoprasum* and *A. ampeloprasum* (great-headed garlic types) |
| | | Other wild species |

## AMARANTH

The IBPGR report, *Genetic Resources of Amaranths*, was published in 1981. Since then the Board has designated base collection centres for long-term conservation (p. 67) and initiated collecting activities.

The IBPGR-funded projects in **Thailand** to collect *Amaranthus* and other indigenous vegetables received a setback due to the transfer of key staff, but these projects will be completed in 1983. During 1982 support was provided to the Instituto Interamericano de Cooperación para la Agricultura (IICA) of the Organization of American States (OAS), for the collection of *Amaranthus* and other Andean crops in **Argentina, Bolivia, Ecuador** and **Peru**. A total of 205 accessions of *A. caudatus* was collected.

During 1982 other multi-crop missions also collected amaranths, namely in **Bolivia** (4 *Amaranthus* spp.), **Ecuador** (104 *Amaranthus* spp.), **Guatemala** (18 *Amaranthus* spp.), **Zambia** (9 *Amaranthus* spp.) and **Zimbabwe** (13 *A. hybridus*, 3 *A. spinosus* and 3 *Celosia trigyna*).

The Board on Science and Technology for International Development (BOSTID), National Research Council, USA, provides research grants to projects on grain amaranths and limited support to vegetable amaranths. During 1982 grants were awarded to institutes in Guatemala, Kenya, Mexico, Peru, Tanzania and Thailand for research on *Amaranthus*, including collection and screening of germplasm. The National Research Council is also preparing a book on amaranths and the IBPGR Secretariat provided detailed information on genetic resources for this publication.

## CAPSICUM

A report on the *Genetic Resources of Capsicum* was finalized in 1982 and will be published early in 1983. The major recommendations on collecting priorities and designated base collection centres (p. 67) were outlined in the *1981 Annual Report.*

The Centro de Investigaciones Agrícolas del Bajío (CIAB) of INIA, Mexico collected *Capsicum* germplasm in **Mexico** during 1980-82. A total of 319 samples (*C. annuum* var. *annuum, C. annuum* var. *glabriusculum, C. chinense* and *C. pubescens*) was collected. Toward the end of 1982 funds were provided to the Biology Department, Ramkhamhaeng University, Thailand to collect and evaluate *Capsicum* germplasm in 1983/84.

During 1982 a number of other multi-crop missions obtained *Capsicum* germplasm in

Multiplication of *Amaranthus hybridus* at NIHORT (T. Badra)

*Capsicum* sp. variability, West Africa

**Bolivia** (100 *Capsicum* spp.), **Colombia** (2 *C. sinensis,* 147 *Capsicum* spp.), **Ecuador** (5 *Capsicum* spp.), **Ethiopia** (4 *C. annuum*), **Guatemala** (57 *Capsicum* spp.), **Sudan** (14 *Capsicum* spp.), and **Upper Volta** (6 *C. annuum*).

The projects initiated in 1981 with IBPGR funding to multiply and characterize *Capsicum* collections in Greece (Greek Gene Bank, Thessaloniki), Peru (UNA, La Molina) and Spain (INIA, Madrid) continued in 1982. During the year 50 local populations entered the Greek Gene Bank after being multiplied and evaluated according to the IBPGR *Capsicum* descriptor list. Adequate material should be available shortly from the other institutes to deposit in designated genebanks. In addition during 1982 the IBPGR provided funds to INIA, Mexico for deep-freezers to properly store its large *Capsicum* collection.

## CRUCIFERAE

The IBPGR report on the *Genetic Resources of Cruciferous Crops* was published in June 1981 and major recommendations on collecting priorities and designated genebanks (p. 67) were provided in the *1981 Annual Report.*

During 1982 descriptor lists were under preparation for *Brassica campestris* subsp. *pekinensis, B. campestris* subsp. *rapa, B. carinata, B. juncea, B. napus, B. oleracea, Raphanus* spp. and wild Mediterranean brassicas. These have all been modified to fit the IBPGR standard format and they are due for publication in one report by mid-1983.

A detailed plan of action for the wild Mediterranean brassicas has been developed

and the first mission was fielded in **Greece** during 1982 by the Greek Gene Bank, in cooperation with Prof. D.C. Gómez-Campo (Spain) and Dr. M. Gustafsson (Sweden). The mission collected 22 population samples of *Brassica cretica* subsp. *cretica* and 3 population samples of *Brassica cretica* subsp. *nivea*. Collection will continue in 1983 for wild brassicas in Greece. In order to multiply these properly and other wild brassicas previously collected, the IBPGR provided funds to the Universidad Politécnica, Madrid and the Greek Gene Bank, Thessaloniki for the construction of insect-proof multiplication cages.

The collection of landraces in EC countries continued with support from the European Communities Standing Committee on Agricultural Research. The IBPGR supported the collection of *Brassica*, *Allium* and tobacco in **Greece** (central and west Macedonia) through the Greek Gene Bank and the Tobacco Institute of Greece. During 1982 a total of 43 landraces of *Brassica oleracea* was collected.

Also during 1982 several IBPGR-funded multi-crop missions collected cruciferous crops in **Algeria** (6 *Brassica* spp.), **Ethiopia** (56 *B. carinata*, 10 *B. nigra*, 2 *Brassica* spp. and 1 *Raphanus sativus*), **Greece** (24 *Brassica* landraces and 1 wild *B. tournefortii* on Crete), **Sudan** (11 *Eruca sativa* and 7 *Raphanus sativus*) and **Zimbabwe** (32 *B. juncea*, 6 *B. napus*, 7 *B. oleracea*, 3 *Brassica* spp. and 1 *Raphanus sativus*).

The IBPGR-sponsored projects on the multiplication and characterization of *B. carinata* at the SVP, Netherlands (39 samples in 1981, 50 samples in 1982) and of Chinese cabbage at the AVRDC, Taiwan, China are progressing well and some accessions have been, or will shortly be, deposited in designated base collections. Furthermore, the initial study on population genetics of Chinese cabbage resulted in an IBPGR-supported project at the Department of Genetics, University of Birmingham, UK, on the "Application of population genetics theory to problems in genetic conservation".

## CUCURBITACEAE

The study on the genetic resources of Cucurbitaceae, prepared by the IBPGR Secretariat in collaboration with Dr. T.W. Whitaker and other experts, has now been finalized and will be discussed by the IBPGR early in 1983. The report also contains descriptor lists for the three major species of cucubirts.

The IBPGR-funded *Momordica* collecting project, carried out by the Kasetsart University in **Thailand** has resulted in a total of 241 accessions of *M. charantia* and related species. All of the accessions were characterized during 1981/82 and a detailed report is awaited.

No specific missions were fielded during 1982 for Cucurbitaceae, but in the following countries germplasm of this family was collected during multi-crop missions: **Benin** and **Togo** (9 *Lagenaria* spp.), **Bolivia** (100 Cucurbitaceae), **Colombia** (1 *Citrullus* sp., 1 *Cucumis* sp., 49 *Cucurbita* spp., 55 *Cyclanthera* spp., 1 *Lagenaria* sp., 1 *Luffa* sp. and 14 *Sechium* spp.), **Ethiopia** (12 *Cucurbita pepo* and 5 *Lagenaria siceraria*), **Guatemala** (107 *Cucurbita* spp.), **Mali** (14 Cucurbitaceae), **Peru** (32 *Cucurbita ficifolia*, 25 *C. maxima* and 16 *Cucurbita* spp.), **Sudan** (1 *Citrullus colocynthis*, 6 *Cucumis* spp. and 11 *Cucurbita* spp.), **Zambia** (45 Cucurbitaceae) and **Zimbabwe** (134 *Citrullus lanatus*, 10 *Cucumis anguria*, 42 *C. melo*, 29 *C. metuliferus*, 1 *C. sativus*, 1 *Cucumis* sp., 122 *Cucurbita* spp., 1 Cucurbitaceae, 106 *Lagenaria siceraria* and 1 *Luffa cylindrica*).

*Citrullus lanatus*, Zimbabwe

## EGGPLANT

The IBPGR Secretariat finalized the report on eggplant genetic resources with the cooperation of Dr. B. Choudhury of the Division of Vegetable Crops, Indian Agricultural Research Institute (IARI), Dr. R.N. Lester, Department of Plant Biology, University of Birmingham, UK, and other experts. The report, which also contains a descriptor list, will be published in early 1983. The major recommendations on collecting priorities and designated base collection centres have been outlined in the *1981 Annual Report.*

During 1981 the IBPGR agreed to support a collecting programme in West Africa under the overall guidance of Dr. R.N. Lester. The 1981 collecting mission to Benin, Ghana and Togo was continued in 1982 in **Ghana** and the following total number of samples were collected: 126 *Solanum gilo*, 91 *S. macrocarpon*, 33 *S. gilo-macrocarpon* complex, 6 *S. melongena*, 7 *S. scabrum* and 3 other *Solanum* species. Although a mission was scheduled for Upper Volta and Mali in 1982, due to unforeseen problems collecting could only be carried out in **Upper Volta.** Notwithstanding the mission being primarily concerned with *Solanum* germplasm, a large number of vegetable crops were also collected. The following *Solanum* germplasm was obtained: 40 *S. aethiopicum*, 2 *S. anguivi/aethiopicum*, 1 *S. anguivi*, 3 *S. gilo*, 4 *S. macrocarpon*, 5 *S. melongena*, 1 *S. scabrum* and 2 *Solanum* spp. As part of this project in West Africa the IBPGR also funded a collecting mission during 1982 in the **Ivory Coast**, carried out by the Centre Néerlandais,

*Solanum mammosum*, Zimbabwe

ORSTOM, and a number of samples of *S. aethiopicum, S. gilo, S. macrocarpon, S. melongena* and *S. nigrum* were collected. Part of these collections are being multiplied and characterized in Ghana (samples from Benin, Ghana and Togo) and the Ivory Coast (samples from the Ivory Coast and Upper Volta), while the entire collection is being studied in detail at the University of Birmingham, UK.

The IBPGR also provided funds to two collecting projects in **Thailand**. A total of 76 accessions, mainly of *S. melongena*, was collected by the Kasetsart University during 1980-82 in central, eastern and southern Thailand. In northern and northeastern Thailand, the Chiang Mai University collected a total of 75 accessions (60 *S. aculeatissimum*, 1 *S. erianthum*, 1 *S. indicum*, 10 *S. melongena*, 1 *S. sanitwongsai*, 1 *S. stramonifolium* and 1 *S. torvum*). Both universities are currently multiplying and characterizing these accessions.

Also during 1982 other multi-crop missions collected eggplant germplasm in: **Zambia** (11 *Solanum* spp.) and **Zimbabwe** (1 *S. aculeastrum*, 3 *S. incanum*, 1 *S. mammosum*, 13 *S. melongena* and 4 other *Solanum* species).

## OKRA

The draft report on okra genetic resources, prepared by Dr. A. Charrier, ORSTOM, Ivory

Table 3. Okra collection priorities

| Global Priority | Region | Crop |
|---|---|---|
| 1 | Bangladesh, Burma, India, Pakistan | *Abelmoschus esculentus* (cultivars); *A. manihot; A. moschatus;* wild relatives |
| | Benin, Mali, Niger, Togo, Upper Volta | *A. esculentus* (cultivars); *A.* sp. Guinéen (cultivars); *A. manihot; A. moschatus;* wild relatives |
| 2 | Indonesia, Malaysia, Papua New Guinea, Pacific Islands | *A. esculentus; A. manihot; A. moschatus;* wild relatives |
| | Egypt, Ethiopia, Sudan | *A. esculentus; A. ficulneus* |
| 3 | Turkey, Syria, South and Central America | *A. esculentus* |

Coast, was endorsed by the IBPGR in 1982. The report, which also includes a descriptor list, has recently been finalized and will be published in 1983 in English and French. On the basis of this report, the IBPGR has designated base collection centres and agreed on the following priorities for collection given in Table 3.

The IBPGR provided financial support to ORSTOM to multiply and characterize the okra collection in the Ivory Coast. About 600 accessions (including approximately 300 accessions previously collected by the Centre Néerlandais in the Ivory Coast) have been multiplied, characterized and evaluated and the information has been computerized. All the material from the Ivory Coast has been despatched to the base collection in the USA for long-term storage. ORSTOM agreed to continue this work with accessions collected by the IBPGR in different parts of the world.

During November/December 1982 ORSTOM organized a collecting mission in **Benin** and **Togo** with IBPGR support; more than 710 accessions of okra were collected, comprising *A. esculentus*, *A.* sp. Guinéen and *A. moschatus* (30).

In addition a number of multi-crop missions also collected okra in the following countries: **Mali** (21 *A. esculentus*), **Papua New Guinea** (83 *A. manihot*), **Sudan** (44 *Abelmoschus* spp.), **Upper Volta** (22 *A. esculentus*), **Zambia** (7 *A. esculentus*) and **Zimbabwe** (69 *A. esculentus*).

# FRUITS AND TREE NUTS

As reported previously, work on fruits has been usually carried out in the context of regional programmes, particularly in Southeast Asia. Increased activities on a global scale can be reported for 1982, both on tropical and temperate fruits.

A large amount of information has been obtained through a world-wide survey of germplasm collections of tropical and subtropical fruits and tree nuts. The resulting directory of germplasm collections is under preparation and will be published in 1983. A similar survey for temperate fruits will be initiated early in 1983 with publication expected in 1984.

In addition to descriptor lists already available, action has been initiated to develop descriptor lists for cashew and citrus. During 1982 an agreement was reached with the CEC Programme Committee on Disease Resistance Breeding and Use of Genebanks to jointly publish a number of descriptor lists including the following temperate fruits: apple (1982), apricot (revised), cherry, peach and pear.

## TROPICAL FRUITS

The IBPGR-funded study on the genetic resources of tropical and subtropical fruits and tree nuts, conducted by the Royal Tropical Institute (RTI), Amsterdam, Netherlands, was finalized in late 1982. As recommended by the IBPGR, the different crop reports have been circulated to specific crop experts for comment and the study will be published during the course of 1983.

The *1981 Annual Report* provided some information on the IBPGR-supported project in the Philippines to collect regional priority fruits (mango, rambutan and durian) and fruits of high national priority (mangosteen and *Lansium*). During 1982 the final report of this project was received and the information is presented below on a crop basis. As a follow-up the IBPGR agreed to partly fund the establishment of a mango collection in the Philippines during 1983.

**Mango:**

The mango (*Mangifera indica*) collection now totals 433 accessions of which 142 were collected under this project including 36 accessions from Thailand, 26 from Malaysia and 17 from Indonesia. The following *Mangifera* species were also collected: 1 *M. altissima*, 1 *M. caesia* and 1 *M. foetida*. A few samples had been collected previously of *M.*

*altissima* (1), *M. caesia* (1) and *M. odorata* (4). Because of precocity and resistance to pests and diseases the *M. odorata* accessions are interesting. Since fruit size and shape are also ideal for handling and shipping they may prove useful in future mango breeding.

**Rambutan:**

The rambutan (*Nephelium lappaceum*) collection now contains 96 accessions of which 70 were collected under this project (66 from the Philippines and 4 from Thailand). In addition to the 2 *N. mutabile* accessions already in the collection, 1 *N. intermedium* and 1 *N. mutabile* were collected.

**Durian:**

The durian (*Durio zibethinus*) collection contains 104 accessions of which 51 were obtained from the Philippines and 34 from Malaysia and Thailand under this project.

**Mangosteen:**

The collection in the Philippines contains 3 old mangosteen (*Garcinia mangostana*) accessions. Very little difference was found in fruit and tree characters in this collection from seedling trees observed elsewhere. This, and the fact that mangosteen seeds are apomictic, supports the view that all mangosteen populations in the world belong to only one clone. The following *Garcinia* species were collected from the Philippines and Indonesia: 1 *G. binucao*, 1 *G. celebica*, 1 *G. lateriflora*, 1 *G. picrorhiza*, 2 *G. xanthochymus*.

**Lansium:**

The original collection in the Philippines contains 35 accessions. No other material was obtained since very little variability was observed.

The Instituto Colombiano Agropecuario (ICA), **Colombia** carried out a two-year project to explore and collect horticultural plants and some samples of fruits were gathered: *Annona, Bactris, Bixa, Carica, Cyphomandra, Passiflora* and *Psidium*.

The IBPGR agreed to fund a three-year (1982-84) collecting programme for horticultural crops (vegetables, fruits and medicinal plants) in the **Sudan** and during 1982 the following fruit germplasm was obtained: 1 *Annona squamosa*, 1 *Carica papaya*, 3 *Citrus aurantifolia*, 3 *C. aurantium*, 20 *Psidium guajava* and 2 *Punica granatum*.

Also during 1982 IBPGR-funded tropical fruit collecting projects have been initiated in Malaysia, Mexico and Thailand. In **Malaysia** a four-year project for the exploration and collection of domesticated and wild species of Malaysian fruits started toward the end of 1982. The Universidad Autónoma Chapingo in **Mexico** is establishing a collection of native crops and received an IBPGR grant for the exploration and conservation of indigenous species in the Yucatán peninsula, which includes native fruit trees of the Annonaceae, Lauraceae and Sapotaceae families. Also during 1982 the Faculty of Natural Resources, Prince of Songkla University, Thailand, started a two-year project to collect and conserve *Lansium* and mangosteen germplasm in southern **Thailand**.

## BANANA AND PLANTAIN

The Board held an initial expert consultation on the genetic resources of *Musa* in 1977. Since then it has supported the collection of primitive cultivars in Southeast Asia, but the impact of the Board's recommendations on international transfer and conservation required reassessment. Accordingly, a second expert Working Group met in Rome, 14-15 October 1982 (see Appendix VI for membership).

The Working Group reviewed the priorities for collecting as follows:

**Cultivars:** Burma, Indochina, Kampuchea and north Malaysia with lower priority on the remote islands of Indonesia and the Philippines; Africa.

**Wild species:** *M. acuminata*/*M. balbisiana*: collecting should be an international responsibility, but a study of the variability is necessary in the first instance. Other wild species: small collections should be built up through botanic gardens.

Banana Working Group, 1982

A consensus was reached on the number of clones necessary for the different cultivar collections: e.g. a total of 250 clones in the Southeast Asia regional collection should adequately represent the regional variability; similarly, 100 clones of plantains should be representative for Africa.

The Working Group has requested that the IBPGR consider the designation of major international collections. The Board will take action on this matter in 1983.

The IBPGR is supporting a three-year (1980-83) collecting project in **Indonesia** for wild and cultivated banana. The IBPGR also supported a collecting project in Thailand, in which a total of 303 accessions were collected. Characterization has been carried out following Simmonds and Shepherd's method based on 15 characters together with chromosome counting.

A major development since the banana consultation in 1977 has been the establishment of a regional Southeast Asian banana collection in Davao, Philippines. The establishment and maintenance of this collection has been supported by the IBPGR but as of 1 January 1983 the Philippines have agreed to completely fund the maintenance. Currently this collection contains material from the Philippines (75 accessions), Malaysia (29 accessions) and Thailand (35 accessions). Transfer of the material from Malaysia and Thailand has been funded by the IBPGR. Distinct accessions from Indonesia and Papua New Guinea will be transferred to the regional collection in 1983 and 1984 respectively.

The unique banana collection in Papua New Guinea has recently been transferred from Lae to Laloki. The IBPGR has provided financial support to the Department of Primary Industry for the maintenance of this collection at Laloki. Following earlier visits to the Lae collection in 1975 and 1978, Mr. K Shepherd travelled to the new banana collection site in Laloki during 1982, with partial support from the IBPGR, and provided a detailed classification of this collection.

The IBPGR began a project (1982-85) to assist the Banana Company of Jamaica in replanting and labelling its *Musa* collection in order to maintain this valuable and unique germplasm.

## CITRUS

A summary of the report on *Citrus Genetic Resources*, prepared by an IBPGR Working Group which met in Japan during 1981, was presented in the *1981 Annual Report*. The IBPGR endorsed the report and as a result

agreed to designate regional field genebanks and accept the collecting priorities as described below. The final report was published in 1982.

A number of countries will be invited by the IBPGR to maintain collections of a regional nature. Taking into account the natural distribution of Aurantioids, the probable areas of origin of cultivated citrus, the present distribution of citrus cultivation and the present location of major citrus collections, the IBPGR intends to designate the following countries to maintain field genebanks:

- China and Japan, to cover East Asia;
- India, to cover South Asia;
- Spain, to cover the Mediterranean area. In addition, France (Corsica) should be invited because of its coverage not only of the Mediterranean but of many tropical countries as well, including Africa south of the Sahara;
- USA, to cover North America and as a specialized centre;
- Brazil, to cover South America and tropical regions elsewhere;
- Malaysia to coordinate national collections in the countries of Southeast Asia; and
- A country in the Pacific area, including Australia and New Zealand, to be determined.

National institutes in countries with citrus genetic resources will be encouraged to collect and special support will, in the first instance, be provided to the following regions:

- East, South and Southeast Asia, in particular for wild Aurantioideae and old cultivars;
- Mediterranean, for cultivars; and
- Central Africa, especially for wild Aurantioideae.

Species and areas which are of *special* interest for collecting are:

- Northeast India, where many wild and cultivated forms of citrus occur;
- Malaysia and other Southeast Asian countries for their richness in forms of pummelo (*C. grandis*);
- China and Japan and perhaps other countries for *Poncirus* and natural *Poncirus* hybrids. These materials would be valuable as rootstock;
- China for sweet orange, in particular for tristeza resistance and dwarf stature;
- China for mandarins;
- China, Japan and the Mediterranean area for old cultivars;
- From Papua New Guinea to Australia for related genera including *Eremocitrus*; and
- Africa for *Citropsis*.

Since 1981 the IBPGR has been funding a project on the collection and conservation of genetic resources of citrus in **Thailand**. At present 254 accessions of the following *Citrus* species have been collected from the northern, central and southern parts of the country: *C. aurantifolia, C. hystrix, C. japonica, C. limon, C. maxima, C. medica* var. *sarodaefylis, C. paradisi, C. reticulata* and *C. sinensis*. In addition collections were made of several hybrids and other unidentified species.

In order to avoid recontamination with pests or diseases, some of the citrus germplasm may have to be conserved under screenhouse/glasshouse conditions. The IBPGR therefore provided a grant to the Centro de Levante, (INIA), Spain, for the establishment of additional insect-proof screenhouses.

## TEMPERATE FRUITS

The *1981 Annual Report* already provided a brief indication of activities on temperate fruits and tree nuts in different countries. The IBPGR has also initiated some action, especially in cooperation with the CEC (for descriptors, see p. 76), the European Association for Research on Plant Breeding (EUCARPIA) and the FAO/UNDP European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (ECP). The latter programme will operate under the IBPGR umbrella from 1 January 1983 and it is planned to establish a European Working Group on *Prunus* in 1983.

During 1982 the IBPGR has provided funds to the EUCARPIA fruit section to collate information on apple collections in Europe following the new IBPGR/CEC apple descriptor list (p. 76).

The IBPGR is funding (1982/83) a study to assess the availability and current application

of *in vitro* techniques to temperate fruits, and this is being coordinated by Dr. C. Bishop, Board member, in association with the Plant Gene Resources (PGR) of Canada (p. 72).

Also during 1982 the IBPGR commissioned a paper on "Seed storage and germination of apple and pear" from the University of Reading, UK. The results show that by using certain techniques apple and pear seed can be stored under conventional seed storage conditions. This paper has been published in the *Plant Genetic Resources Newsletter, 50.*

# INDUSTRIAL CROPS

The IBPGR has accorded high priority to a number of industrial or cash crops primarily because of their importance in rural development.

These include sugar crops (beet and cane), beverages (cacao, coffee, grape), fibres (cotton), coconut, oil palm and others. Although major emphasis is given by the Board to staple food crops, when the genetic diversity of others is under threat, action is taken as necessary. The Board has to date received expert advice on cacao, coconut, coffee, grape, sugar beet and sugarcane.

Descriptor lists have already been published for beet, cacao, coconut, coffee, cotton and sugarcane and descriptors are under preparation for grape, jute and safflower.

Collecting activities, supported or organized by the IBPGR, increased for many industrial crops in 1982 (see Fig. 9).

## BEET

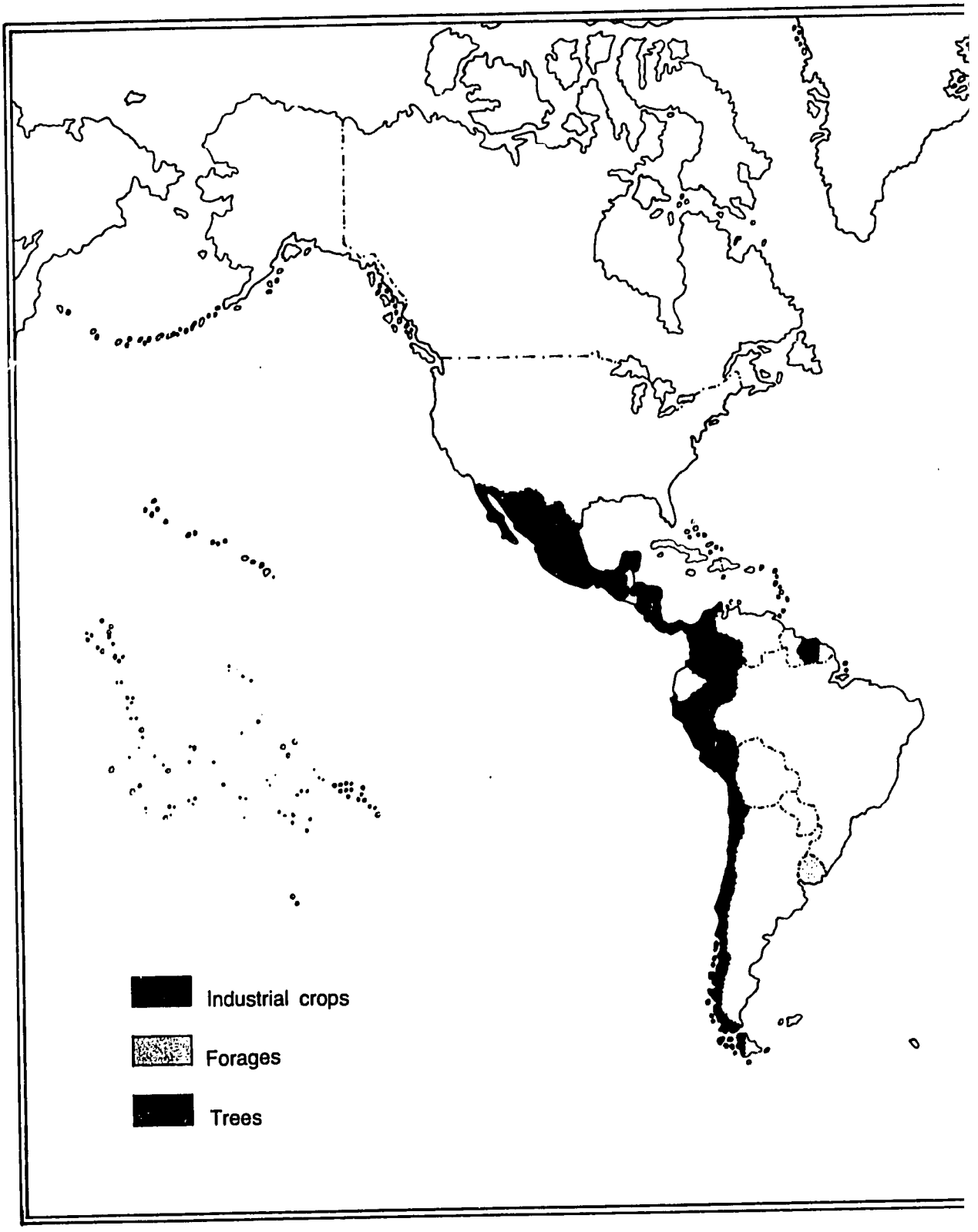
The IBPGR programme initiated in 1980 to make genebank collections of *Beta* more comprehensive continued in 1982. Attention is being paid to the beet genepool, i.e. both garden and fodder beets as well as sugar beet and wild species. A consultant continued to visit breeders and centres in Europe in order to accelerate the movement of seed into the designated base collections and to prepare a data base.

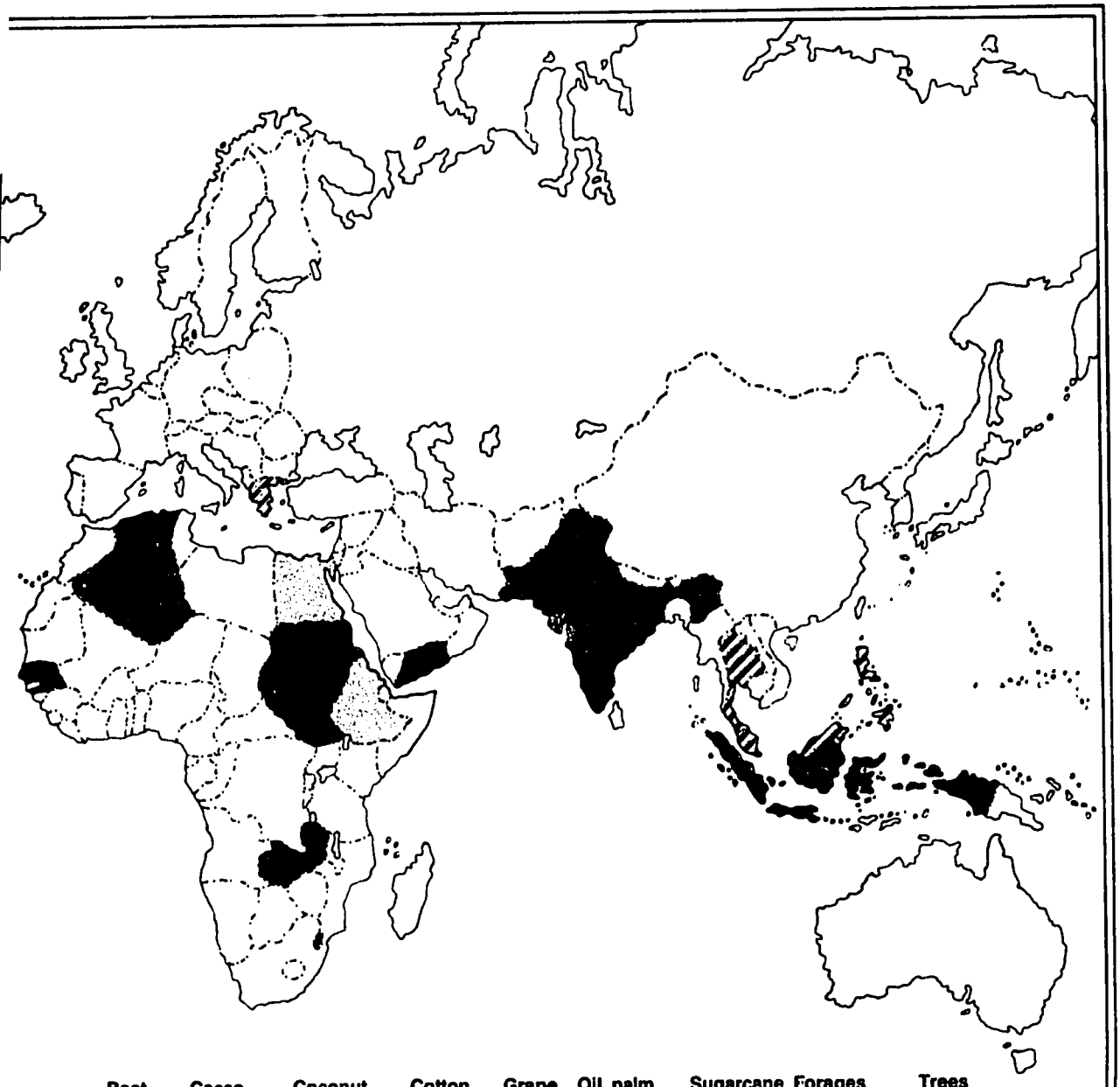
During 1982 the IBPGR agreed that in order to multiply and evaluate samples, a limited number of regional base collections should be designated (p. 67), in addition to the major one at the Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft (FAL), Braunschweig-Völkenrode, Federal Republic of Germany. A small grant was provided to the Hellenic Sugar Industry to grow out small samples in order to multiply stocks and characterize the material.

Collecting missions were organized in Algeria and Greece during 1982. Emphasis was put on wild and weedy material but landraces were also collected. In **Algeria** Dr. B. Ford-Lloyd, the consultant assisting the Secretariat with the beet programme, led a collecting mission which gave particular emphasis to the sub-maritime region. Wild *Beta vulgaris, B. maritima* and *B. macrocarpa* were collected.

In **Greece**, Crete was explored by the Hellenic Sugar Industry, with IBPGR support, and 46 samples, ranging from wild maritime to vegetable landraces, were collected. In 1983 Thessaly and Pieria will be explored.

Hybrid leaf/red beets, Greece


Industrial crops
Forages
Trees



| Beet | Cacao | Coconut | Cotton | Grape | Oil palm | Sugarcane | Forages | Trees |
|---|---|---|---|---|---|---|---|---|
| Algeria | Guatemala | Indonesia | Colombia | Greece | Colombia | Thailand | Egypt | Chile |
| Greece | Mexico | Malaysia | Mexico | | Costa Rica | | Ethiopia | India |
| | | Philippines | Pakistan | | Honduras | | Greece | Mexico |
| | | | Sudan | | Nicaragua | | Malaysia | Pakistan |
| | | | Zambia | | Panama | | Philippines | Peru |
| | | | | | Suriname | | Thailand | Senegal |
| | | | | | | | Uruguay | Sudan |
| | | | | | | | | Yemen |

Figure 9. Countries where the IBPGR organized or collaborated in collecting industrial crops, forages and trees during 1982

## CACAO

At its meeting in 1981 the Board endorsed a proposed framework for action on this crop. However, in view of the number of countries involved in Central and South America, the Board agreed to organize a consultancy so that the practicalities of collecting in such a vast area could be assessed. The American Cocoa Research Institute (ACRI) is overseeing the administration and a technical report is to be discussed by a small group of scientists from the region in February 1983. A report will then be finalized for consideration by the IBPGR and the International Office of Cocoa and Chocolate (IOCC).

As opportunities arose for collecting, following the consultant's visit, the Board funded two small projects, one in **Guatemala** (ICA) and the other in **Mexico** (INIA). Both projects will supply duplicates to CATIE, Costa Rica.

The Board continued its support in 1982 to work done on *in vitro* conservation of *Theobroma cacao* and its clonal propagation at the University of Nottingham School of Agriculture, UK.

## COCONUT

Since 1981 the IBPGR has supported the exploration, collection and conservation of coconut genetic resources throughout the **Indonesian archipelago**, carried out by the Indonesian National Committee for Plant Genetic Resources in cooperation with the Industrial Crop Research Institute, Indonesia. During 1982 work started on survey and collection in Celebes through the Manado Research Institute for Estate Crops. Altogether, 16 districts in northern Celebes have been explored (including many surrounding islands) and characterization data recorded using the IBPGR descriptor list. Fifteen populations were sampled, especially of drought-resistant types in East Nusa Tenggara province during November-December 1982.

In Indonesia, three areas of 500 ha have been requested to be set aside as coconut collection gardens; one in Sumatra for areas west of the Wallace line, one in Bone-Bone, Celebes for islands east of the Wallace line and one in Flores for material of the Lesser Sunda Islands.

Support was provided in 1981 by IBPGR to the Malaysian Agricultural Research and Development Institute (MARDI) to collect coconut germplasm in peninsular **Malaysia**; however, field work was delayed until November 1981 and continued through 1982. Systematic collection is intended primarily with respect to the Malaysian talls which are a heterogeneous population and which also constitute the largest proportion of Malaysian coconuts although Malaysian dwarfs, generally assumed to be homogeneous, will be sampled. As of July a total of 14 talls, 9 dwarfs and 10 specific variants from 14 locations had been collected.

The Board has provided grants to the Philippine Coconut Authority (PCA) to establish a coconut genetic resources centre in the **Philippines** and to further collect samples. Since initiation in 1980, 71 accessions have been established. The centre will include national, regional and international material at the PCA-Zamboanga Research Center, San Ramón, Zamboanga City.

Although no collecting was carried out in the Pacific during 1982, further work is envisaged.

## COTTON

Collection and conservation of *Gossypium* germplasm was initiated by the IBPGR in 1978. The Institut de recherches du coton et des textiles exotiques (IRCT), France, is actively collaborating with the Board for the collection in the Caribbean, Colombia, French Guiana, Mexico and Peru of either spontaneous or subspontaneous types and primitive landraces of *G. hirsutum* and *G. barbadense*.

During February-March 1982 the IRCT, in cooperation with INIA, Mexico, explored cotton-growing areas in **Mexico** in the states of Michoacán, Guerrero, Oaxaca, Chipas, Tabasco, Campeche, Quintana Roo, Yucatán, Veracruz and Morelos for sub-spontaneous and local landraces of cotton. A total of 75 samples was collected including the following: *G. hirsutum* races *latifolium, morrillii, richmondii, palmeri, punctatum,* and *yucatanense, G. barbadense* var. *brasiliense*. Since Mexico is the centre of

diversity for *G. hirsutum*, a wide range of variability is still existent in some localities, particularly in the states of Yucatán and Campeche.

During multi-crop collecting missions fielded by the IBPGR, a few samples of cotton germplasm were also collected in **Colombia, Pakistan, Sudan** and **Zambia**.

## GRAPE

The IBPGR organized a Consultation on *Vitis* Genetic Resources at the Cereals Institute, Thessaloniki, Greece, 29 April - 1 May 1982. This meeting gave special attention to Europe and was cosponsored by the Ministry of Agriculture in Greece, EUCARPIA nad the FAO/UNDP European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources (ECP). The Office international de la vigne and du vin (OIV) agreed to participate formally (for membership see Appendix VII).

The Consultation stressed the continued need for the IBPGR to accord the following global collecting priorities with emphasis on the wild species of the genepool:

**First** - China, North India and Nepal

**Second** - Afghanistan, Pakistan and Near East

**Third** - Caribbean

The meeting specifically addressed the collecting needs in the Mediterranean basin and other European countries and the following priorities for *V. vinifera* and wild *V. sylvestris* were agreed:

**Priority 1** - Cyprus, Greece, Israel, Lebanon and Turkey

**Priority 2** - Algeria, Egypt, France, Italy, Libya, Morocco, Portugal, Spain and Tunisia

**Priority 3** - Albania, Bulgaria, Hungary, Romania and Yugoslavia

**Priority 4** - Austria, Czechoslovakia, Federal Republic of Germany, Luxembourg and Switzerland

The Working Group further agreed that:

- collecting in the Mediterranean and other European countries should be initiated by national institutions;
- the characterization of existing collections is of utmost importance and will lead to clear lists of synonyms and elimination of redundant duplicates; and
- collecting of local *Vitis* genetic resources on a national scale should be undertaken simultaneously with characterization.

During the meeting existing collections in Europe were reviewed as well as current collection and conservation activities on *Vitis* genetic resources. Recommendations were also provided on different methods of conservation, quarantine and a framework for future action. The report will be discussed by the IBPGR in February 1983 and published thereafter.

One of the functions of the IBPGR is to stimulate activities in coordination with specialized organizations. Therefore close links were established with the OIV and agreement on a standard grape descriptor list was reached between the IBPGR, OIV and the International Union for the Protection of New Varieties of Plants (UPOV). During the meeting in Thessaloniki a list of 20 characters was defined to serve as the minimal descriptors for the characterization of an accession. The descriptor list has since been finalized and will be available early in 1983.

During the 1982 General Assembly of OIV, a full session was devoted to the genetic resources of *Vitis* and the Assembly adopted the following resolution:

The General Assembly,

having taken notice of reports concerning the collection and conservation of the genetic resources of *Vitis* spp.,

noting that these resources are diminishing in most of the centres of diversity, particularly in Europe and North America, but that certain countries nevertheless have undertaken substantial efforts to stop this loss,

also noting that the conservation of the widest possible genetic variability of *Vitis* spp. constitutes an indispensable base for the improvement of grape varieties and their adaptation to ecological conditions and future economic demands,

Recommends that member Governments

- establish field collections of genera, species, varieties and clones of cultivated and wild grapes (field genebanks);
- maintain existing collections and assure their conservation and study;
- undertake or intensify studies concerning the possibility of conservation *in vitro*;
- organize exploration and collecting missions for grape genetic resources in China, in the Asiatic part of the Soviet Union, in the Near and Middle East and in Central America;
- promote international cooperation between genebanks and facilitate exchange of genetic material; and
- permanently employ, in all countries, amelographic specialists capable of using the collections for the preparation of varietal descriptions and varietal synonymy in order to carry out successfully the collecting missions mentioned above.

As already indicated in the *1981 Annual Report*, the IBPGR is supporting a long-term project to explore, collect, characterize, evaluate and conserve *Vitis* germplasm in **Greece**. The project is organized in cooperation with the Institute of Viticulture, Athens.

The IBPGR-funded two-year project on the maintenance of proliferating grapevine shoots *in vitro* at low temperature, carried out by the Division of Horticultural Research, Commonwealth Scientific and Industrial Research Organization (CSIRO), Adelaide, Australia, has been completed (p. 71).

## OIL PALM

In 1982 the Board started support to collect representative material of this crop. A grant was provided to the Palm Oil Research Institute of Malaysia (PORIM) to supplement its funds for the collection of *Elaeis oleifera* in Latin America. Institutes collaborating were CATIE and United Brands Company in Costa Rica, IICA and Cohdefor in Honduras, IICA and the Institut national de la recherche agronomique (INRA) in Nicaragua, ICA in Colombia, the Department of Agriculture in Suriname, PPAB in Panama and the Universidad Nacional de la Amazonia, Iquitos in Peru.

The basic aim of the collection was to provide a comprehensive range of germplasm and a total of 36 954 seeds was collected from 167 appropriately-spaced trees: **Colombia** (41), **Costa Rica** (61), **Honduras** (14), **Nicaragua** (18), **Panama** (27) and **Suriname** (6) of 15 population samples. Duplicates were deposited with institutes in the respective countries.

## SUGARCANE

The major conclusions of an IBPGR Working Group on Sugarcane were outlined in the *1981 Annual Report*. The report, entitled the *Genetic Resources of Sugarcane*, was published in June 1982 and included a descriptor list.

During 1982 an agreement was made for the Florida Sugar Cane League to organize joint documentation according to the agreed descriptors of the two major International Society of Sugar Cane Technologists (ISSCT) world collections in India and the USA.

A two-year collecting project organized by the Department of Agriculture, Thailand (in cooperation with the Sugarcane Breeding Institute, Coimbatore, India) was initiated in 1982. Material will be collected throughout **Thailand**, especially for wild *Saccharum spontaneum* and *S. barberi/sinense*. Although erosion is not high for the former, material needs to be screened for its potential value in breeding. In the latter erosion is high.

In the past much of the collection of primitive and wild material has been carried out with leadership from the ISSCT Committee on Germplasm and Breeding. The Committee agreed to continue its valuable work and to mobilize funding.

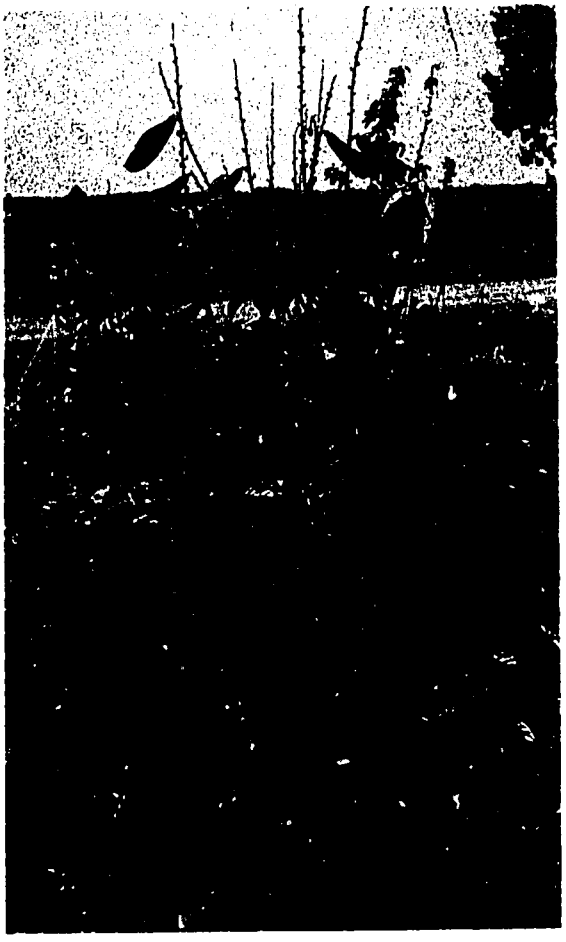
## TOBACCO

Although tobacco has no IBPGR world-wide or regional priority, it does rate high priority in some sub-regions, i.e. Greece and Yugoslavia in the Mediterranean region. The evaluation mission for Phase II of the ECP (1983-85) noted that an *ad hoc* meeting might be necessary for tobacco, among other crops, to advise the ECP on action to be taken.

The IBPGR began support to the Tobacco Institute of **Greece** in 1982 for a five-year mission for *Brassica* and *Allium* species, tobacco and other crops. A total of 150 samples of local populations, mainly *Nicotiana tabacum* was collected in central and western Macedonia. Collection will continue in Thrace and eastern Macedonia during 1983.

# FORAGES

In 1980, the Board assigned a high priority to forages in arid and semi-arid zones and agreed that a Forage Officer was to be appointed in 1982 to the Secretariat. The Forage Officer, working from the IBPGR office in Washington, was named in March.



*Flemingia* spp. in CIAT's living forage collection

One of his first duties was to begin compiling a comprehensive directory of forage germplasm storage sites. This entailed visiting several genebanks to obtain first-hand information on stocks of seeds that are stored, their condition and availability for exchange. The directory is expected to be published in mid-1983. At the same time, he made on-the-spot recommendations to the Secretariat from several genebanks on requests for IBPGR support.

A major five-year global plan for forages will be presented to the Board early in 1983. It will provide suggestions for long-range planning on a world-wide basis as well as drawing up priorities for specific areas.

The forage programme of the ECP is to be placed under the aegis of the IBPGR beginning in 1983. The programme's aims will continue to be followed under IBPGR authority and a small preliminary Working Group made up of experts from member countries was formed in 1982 to advise on germplasm conservation efforts in the region. The group will be widened in 1982. It will use a common data/retrieval system, identify duplications and gaps in collections, promote joint collection expeditions where necessary, and facilitate the exchange of adequately documented germplasm information.

The CEC/IBPGR forage grass descriptors list will be finalized and adopted in the documentation of the European forages. The CEC Programme has also agreed to complete a descriptor list for grass land legumes in 1983 in accordance with IBPGR guidelines.

Several important collecting missions were sponsored or cosponsored by the IBPGR in 1982 (see Fig. 9). Among them was a mission

to **Thailand** and **Malaysia**, supported by the IBPGR and implemented by CIAT, in which almost 400 forage germplasm samples were collected. This comprehensive expedition extended as far as northeast Thailand, a region especially important because forages indigenous to the area are thought to be drought-resistant. Two legume species. *Desmodium ovalifolium* and *Pueraria phaseoloides*, were collected, both of which have considerable potential as forage plants particularly in pasture improvement programmes on acid, infertile soils. Since the genetic base of commercial cultivars of both these species is quite narrow its broadening is highly important.

The IBPGR continued support in 1982 for collection by the Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina, of forage legumes and grasses of **Uruguay**. The project was begun in 1981 and completed during 1982 and a total of 5 079 accessions from 133 species were collected.

Another mission to assess and collect indigenous forage legumes in the highlands of **Ethiopia** was organized by the International Livestock Center for Africa (ILCA) with support from the IBPGR. During November-December a total of 637 samples of forage legumes was collected.

Two missions to collect forage landraces in **Egypt** were mounted in 1982, one in the spring for winter-growing crops and the other in the autumn for summer crops. Among the winter crops collected were *Medicago* spp., *Trifolium alexandrinum, Vicia sativa*, and *Scorpirus* spp. Forage plants collected in the autumn were *T. alexandrinum* (10), *M. sativa* (9), and *Trigonella foenum-graecum* (3).

The IBPGR provided support to the IPB, Philippines, for the collection, documentation, conservation and evaluation of indigenous forage legumes from the **Philippines** (mainly Luzon). A total of 101 samples was collected and consisted of 12 *Centrosema pubescens*, 15 *Desmodium* sp., 7 *Macroptilium atropurpureum*, 3 *Pueraria phaseoloides*, 6 *Calapogonium* sp., 28 *Vigna* sp., 18 *Leucaena leucocephala*, 8 *Cajanus cajan*, 1 *Sesbania grandiflora* and 3 *Gliricidia sepium*. They were planted later in the year (September) for seed increase and characterization.

Support was given to the Fodder Crops and Pastures Institute, Larissa, **Greece**, for collection of forage species in Thessaly and Epirus between March and September 1982.

# TREES

IBPGR support for conservation of tree genetic resources began in 1979 when the IBPGR partially funded an exploratory survey by the Forestry Department of FAO of trees in semi-arid areas.

A joint IBPGR/FAO collection and conservation project was started in January 1981. The project involves eight countries in the semi-arid and arid areas of the world: Chile, India, Mexico, Peru, Senegal, Sudan and Democratic Yemen. In 1982 Pakistan became the eighth country when it joined the project. All countries have initiated collection activities, primarily of *Acacia, Atriplex* and *Prosopis* (see Fig. 9). Within the framework of the project, seed is also being collected in Australia and Israel.

Seed of *Eucalyptus microtheca* has been distributed to IBPGR/FAO cooperators and other interested developing countries for evaluation. The first distribution of *Acacia* and *Prosopis* will take place in mid-1983.

The purpose of the project is to build up the capacity and knowledge of research institutes in arid and semi-arid areas to enable them to be self-sufficient after termination of IBPGR/FAO involvement.

The main emphasis has been directed toward fuelwood species in areas receiving less than 500 mm of rainfall and in dry tropical regions with six or more rainless months per year. Lack of fuelwood in these areas is critical, and many people often go hungry not for lack of food but for lack of fuel in the form of wood

*Acacia albida* loses leaves in rainy season (above) allowing crops underneath needed sunlight and has lush leaf-growth during summer (below) providing shade

to cook it. Much of the food consists of grain and roots such as rice and cassava which cannot be consumed without cooking. In these areas wood is the only fuel source as other fuels are unavailable or too expensive.

Of the 137 samples which have been targeted for collection from **Chile**, **India**, **Mexico**, **Pakistan**, **Peru**, **Senegal**, **Sudan**, and **Democratic Yemen**, 98 samples have been collected thus far.

IBPGR/FAO officers provided technical advice during visits to Chile, India, Mexico, Pakistan and Peru in 1982. In some cases, equipment also was provided. In 1983, participating African countries will receive similar assistance.

Six manuals on *Acacia* and *Prosopis* have been prepared and will be published in early 1983.

In addition, two basic design documents have been prepared on collecting and sampling techniques and on testing seed for passport data.

Agreements for cooperation with germplasm institutions have been made or further strengthened in 1982.

— Centre technique forestier tropical (CTFT), France, has agreed to provide seed samples of *Acacia* species mainly from West Africa. The seed will be stored at CTFT, Paris, until distribution to cooperators for evaluation is accomplished.

— Commonwealth Forestry Institute (CFI), UK, will provide seed samples to complement IBPGR/FAO collection activities, primarily *Acacia* and *Prosopis* species from Central and South America. CFI also will provide storage and distribute seeds upon request.

— Forest Tree Seed Centre, Denmark, of the Danish International Development Agency (DANIDA) has agreed to undertake medium-term storage of seed at no cost, and to distribute the seed to cooperators for conservation.

— Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia, will collect and store seeds in Australia upon the request of IBPGR/FAO.

— Royal Botanic Gardens, Kew, UK, has undertaken to store seed at no cost in its newly-expanded long-term storage facilities.*

— Survey of Economic Plants for the Arid and Semi-Arid Tropics (SEPASAT), Royal Botanic Gardens, Kew, UK, is collecting in Ethiopia and Somalia and will provide samples to IBPGR/FAO.

Although some seed had been collected in 1981, the bulk of existing collections was made in 1982. At the end of the year, more than 100 seedlots of *Acacia*, *Atriplex* and *Prosopis* species had been collected and forwarded to DANIDA. Some 20 additional seedlots were being temporarily stored for the project by CSIRO, CTFT and CFI. A total of 73 seedlots of *Eucalyptus microtheca*, collected within the framework of the project, was distributed for characterization in 1981-82. Part of the seed is stored by CSIRO for conservation purposes.

* This will be the IBPGR designated "base" collection.

# REGIONAL ACTIVITIES

## AFRICA

The IBPGR has identified Ethiopia, West Africa and East Africa as priority areas for action in the African continent south of the Sahara.

With the aim of strengthening the genetic resources efforts of national programmes, to help promote awareness of the IBPGR's overall objectives and to provide effective leadership for IBPGR-supported activities within the region, the Board appointed a Regional Officer for West Africa in 1981 and the IBPGR Regional Office for East Africa was established in June 1982 at the International Laboratory for Research on Animal Diseases (ILRAD). These officers are stationed in Upper Volta and Kenya respectively.

Since its inception in 1974, the IBPGR has continued to accelerate collection and conservation of crop germplasm in Africa. Much work has been accomplished in association with IARCs (ICRISAT, IITA), regional programmes (West African Rice Development Association - WARDA, ORSTOM, IRAT and Agence de coopération culturelle et technique - ACCT), and participating national institutions.

As a result of the Board's stimulation, during the past eight years over 38 000 samples have been collected from 28 countries throughout Africa south of the Sahara. The crops collected are: sorghum (6 000), millets (6 500), rice (6 500), cowpea (5 400), Bambara groundnut (3 000), *Phaseolus* (3 000), groundnut (1 000), okra (2 000), *Solanum* spp. (1 000) and various other crops.

Collection missions supported by the IBPGR in Africa in 1982 are listed in Table 4. Details of these missions are provided in the respective crop section.

Among the genetic resources centres in Africa, the Plant Genetic Resources Centre (PGRC) in Addis Ababa, Ethiopia is notable. It was established in 1976 under a bilateral agreement between the Ethiopian government and the Agency for Technical Cooperation (GTZ) of the Federal Republic of Germany. The Centre has fully operational long-term (75 $m^3$, $-10°C$) and medium-term (50 $m^3$, 4°C, 30% RH) seed storage facilities. An additional cold store of 100 $m^3$ at $-20°C$ is planned during the third phase of the project. At the end of June 1982 the Centre held 20 102 accessions of over 50 species. Of this material, 7 928 samples were collected from 1976-82 by the PGRC, in collaboration with various IARCs, viz. the IBPGR, ICRISAT and ICARDA. The majority of samples in the collection consist of: sorghum (5 566), barley (5 369), wheat (3 547), *Vicia faba* (985), linseed (887), pea (822), *Brassica* spp. (555), *Guizotia abyssinica* (524), teff (347), chickpea (326), lentil (169), castor (137), *Lathyrus sativus* (109), sesame (106) and finger millet (97).

During 1982 the Institut de recherche agricole et zootechnique (IRAZ), established contact with the IBPGR and has agreed to collaborate in genetic resources work in IRAZ countries (Burundi, Rwanda and Zaire).

After the third collection mission (1982) fielded by the IBPGR, Zambia is now fairly well sampled for most crops. The 3 500 accessions held at the Mount Makulu Research Station need to be characterized, evaluated, documented and utilized in the national breeding programmes.

At the invitation of the Department of Re-

Table 4. 1982 collection missions supported by IBPGR in Africa

| Country | Period | Participating Institute/Country | Crop |
|---|---|---|---|
| Benin | Nov.-Dec. | ORSTOM, Ivory Coast | Okra |
| Burundi | July | ICRISAT & Burundi | Sorghum |
| Ethiopia | Jan.-Feb. | PGRC | *Brassica* |
| Ethiopia | Nov.-Dec. | ILCA | Forage legumes |
| Ghana | 1982-83 | CRI, Bunso | Multi-crop |
| Ghana | 1982 | UK | Eggplant |
| Guinea | Nov.'82-Jan.'83 | IRAT/ORSTOM | Rice, cereals |
| Ivory Coast | 1982 | Centre néerlandais/ORSTOM | Eggplant |
| Ivory Coast | 1982 | Université nationale, Abidjan | Yam |
| Mali | Jan. | ICRISAT & Mali | Multi-crop |
| Mali | 1982 | Mali | Millet (wild relatives) |
| Rwanda | July | ICRISAT & Rwanda | Sorghum |
| Sudan | Oct.-Nov. | ARC | Horticultural crops, medicinals |
| Togo | Nov.-Dec. | ORSTOM, Ivory Coast | Okra |
| Upper Volta | Jan.-Feb. | IVRAZ | Cereals and others |
| Upper Volta | Oct.-Dec. | IVRAZ | Roots, tubers, rice |
| Zambia | June-July | Zambia | Multi-crop |
| Zimbabwe | April-July | Zimbabwe | Multi-crop |

search and Specialist Services and the Department of Agricultural, Technical and Extension Services of the Ministry of Agriculture, the IBPGR fielded a multi-crop collection mission for cereals, food legumes, oil and vegetable crops in Zimbabwe during 1982. With funding provided by the United Nations Environment Programme (UNEP) and the IBPGR, ICRISAT also participated in the expedition during part of the mission.

The IBPGR has agreed to provide funding to the Ministry of Agriculture, Zimbabwe, for the establishment of a cold storage facility in Harare. This facility, when established, could serve as a regional genebank for the countries of the South African Development Coordination Conference (SADCC), which comprises Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe.

## EAST ASIA AND THE PACIFIC

East Asia (formerly referred to as the Far East) was elevated by the Board from third to second regional priority in 1981 and consists of China, Japan, the Democratic People's Republic of Korea, the Republic of Korea, and Mongolia. The Pacific island nations have a third priority status.

The Board, at its meeting in February 1981, endorsed the report of the IBPGR Symposium held at Tsukuba, Japan in October 1980. The proceedings of the Symposium — *Crop Genetic Resources of the Far East and the Pacific* — were published in book form and distributed during 1982.

During 1982 the Board carried out a series of discussions aimed to accelerate work in the regions. Dr. J.L. Creech, a former Board member, has acted as Senior Adviser for East Asia and during the year visited institutions in Japan and the People's Republic of China (together with Board member Prof. M. Iizuka). At the same time he has, on behalf of the IBPGR, maintained close links with the Rockefeller Foundation which has agreed to fund a central seed storage facility in Beijing.

The International Agricultural Research Centres (IARCs) held their first book exhibition in China in May 1982. The exhibition featured some 500 books, periodicals, films and slide sets produced by the IARCs. The International Rice Research Institute (IRRI) and the China National Publications Import and Export Corporation (CNPIEC), cosponsored the ten-day exhibition held simultaneously in Beijing, Sian and Ch'angsha. The IBPGR displayed 18 of its publications which are most pertinent to China's crop genetic resources development. After the exhibition concluded the books were displayed on a rotating basis in New Book Show Rooms and Foreign Language Book Stores throughout China.

The Board has strengthened its links with the AVRDC, since the Board has in recent years greatly accelerated work on vegetables in the tropics. The IBPGR project initiated in 1980 for regeneration of the Chinese cabbage germplasm collection continued through 1982 and toward the end of the year the Board provided funds to upgrade the seed storage facilities. This will ensure the safety of the substantial holdings of mung bean, tomato and Chinese cabbage.

The Choong-Nam National University, Daejeon, Republic of Korea, with IBPGR support, continued the collection of local maize lines, initiated in 1981 (p. 10).

# EUROPE

Priority crops for Europe were defined for the first time in April 1982. The Scientific Advisory Committee (SAC) and the European Cooperative Programme (ECP/GR) met jointly with the EUCARPIA Gene Bank Committee (EGBC) in Thessaloniki, Greece, and established crop priorities for the region.

The European programme is organized under the auspices of FAO/UNDP. The IBPGR has maintained links with the ECP's programme through the participation of the Executive Secretary of the IBPGR at all meetings.

Priority crops were identified within the following sub-regions: (a) Council for Mutual Assistance (CMEA), (b) Nordic, (c) Mediterranean, (d) European Commission. The CMEA region was subdivided into north and south. Those of highest priorities within the sub-regions were listed, including certain minor crops. Those crops which rated priority in all four sub-regions were listed as first priority crops for genetic resources work in Europe; those which rated priority in three sub-regions were listed as second priority crops in Europe; and those which rated priority in two sub-regions were listed as third priority crops for Europe. They are:

| **Priority 1** | | **Priority 2** | **Priority 3** |
|---|---|---|---|
| Barley | Wheat | Tomato | Rye |
| Forages | *Vitis* | *Allium* | *Vicia faba* |
| *Prunus* | Maize | Beet | Oat |
| | *Brassica* | Potato | *Capsicum* |
| | Aromatic and Medicinal Plants | *Pisum* | |

The SAC considered ongoing working parties and their activities; in particular those of EUCARPIA, CMEA, IBPGR, ECP in Phase I, and CEC. Where a crop was considered to be adequately covered by these activities the SAC agreed there was no need for a crop working group in Phase II of ECP, e.g. for wheat, maize, *Brassica*, tomato and *Capsicum*. *Allium* was considered to be only partly covered.

A number of crops which are important but have only restricted distribution were identified viz. cotton, tobacco, *Citrus* and sunflower. The SAC agreed that these rated special interest in view of their production by some countries and their importance to others.

Within the context of the ECP, working groups have met in the past on barley and tomato at Gatersleben, German Democratic Republic and on *Allium* at Wellesbourne, UK, and in 1982 on *Vitis* — jointly with IBPGR and EUCARPIA — in Thessaloniki, Greece (p. 43).

In the spring of 1982, UNDP, FAO and the participating countries organized an evaluation mission. The report of this mission advised that Phase II of the ECP (1983-85) should be organized on a different basis since the time for initial discussions and diplomacy was past; rather, the work should be more at the scientific level organized around a number of crop working groups. In addition, concerning institutional arrangements, it was recommended that the ECP be operated by the IBPGR using non-core funds from UNDP and cost-sharing contributions from participating governments. This latter recommendation had been anticipated by number countries at the second meeting of the Governing Board in December 1981. It was discussed by the ninth meeting of the IBPGR which agreed also.

These proposals, amongst others, were unanimously accepted at an Extraordinary Meeting of the Governing Board in Geneva 14-16 June 1982.

The SAC, noting the proposals of the evaluation mission, recommended to the Governing Board meeting in Brussels, 18-20 October 1982, that in Phase II — under the auspices of the IBPGR — working groups should be organized for some of the following crops:

**Priority 1:** Barley, Forages, *Prunus*

**Priority 2:** *Vitis*, Aromatic and medicinal plants, Beet, Potato, *Pisum*

**Priority 3:** Rye, Oat, *Allium*, *Vicia faba*

In addition *ad hoc* meetings might need to be held to advise the ECP on action for the special interest crops in the following *order of priority: Citrus*; cotton; tobacco; and sunflower.

In addition to the IBPGR Mediterranean programme activities, the IBPGR continued its assistance in other developing countries of the region, in particular Poland in 1982 in the field of documentation and it has been agreed to help Hungary in 1983.

The IBPGR also cosponsored, with ECP and EUCARPIA, a workshop on seed technology held at the Royal Botanic Gardens, Kew, England, 5-9 July. It provided expenses for some speakers and participants from developing countries.

# MEDITERRANEAN

Since its creation the IBPGR has attempted to stimulate 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 in Portugal, Spain, Greece, Cyprus and Egypt. The Germplasm Institute, Bari, Italy headed by Prof. E. Porceddu, has been coordinating activities on behalf of the IBPGR and countries have nominated liaison officers to assist with collaboration.

The Report of the *Meeting of Liaison Officers for the Mediterranean Programme*, which was held in Rome at the end of 1981, was published during 1982. Regional and national crop priorities were defined for the first time by the participants at the meeting.

The IBPGR has provided the Germplasm Institute with a small secretariat for the programme and during 1982 this was active in establishing cooperation and providing information through a regional newsletter.

During 1982 a number of missions collected material. These are listed in Table 5 and details are provided in the relevant crop section of this report.

Outside the framework of the Mediterranean programme secretariat, the IBPGR provided technical assistance on documentation to Cyprus, Greece and Portugal in 1982. In addition small grants for regeneration of small seed samples were provided to Greece and Spain. Multiplication facilities were provided to the Universidad Politécnica Madrid and the Greek Gene Bank, Thessaloniki. Funds were also provided to INIA, Centro de Levante, Moncada, Valencia for the establishment of insect-proof screenhouses for *Citrus* work.

The IBPGR-organized Working Group on *Vitis* determined collection priorities for *Vitis vinifera* and wild *V. sylvestris* (p. 43).

Typical habitat for wild beet, Greece

Table 5. 1982 collection missions supported by IBPGR in the Mediterranean

| Country | Period | Participating country | Crop |
|---|---|---|---|
| Egypt | April-May | Egypt, Italy, Spain | Cereals, grain legumes, forages |
| Egypt | October | Egypt, Italy | Cereals, grain legumes, forages |
| Greece | Throughout | Greece | *Vitis* |
| Greece | March-Sept. | Greece | Forage species |
| Greece | May-July | Greece | Fodder crops, food legumes |
| Greece | June | Greece | *Beta* |
| Greece | July-August | Greece | Cereals, legumes |
| Greece | Summer | Greece | *Brassica, Allium,* tobacco |
| Greece | July | Greece, Spain, Sweden | *Brassica* |
| Italy | Aug.-Sept. | Italy, GDR | Cereals, food legumes, vegetables |
| Libya | May | Libya, GDR, Italy | Cereals & others |
| Portugal | June-July | Portugal, Spain | Cereals, grain legumes |
| Spain | Throughout harvesting | Spain | Maize |
| Spain | July | Spain, Portugal | Grain legumes, cereals, forages |
| Spain, France | June | Spain, Israel | Lentil |
| Yugoslavia | Autumn | Yugoslavia, Italy | Maize |

During the year a number of participants from Spain, Portugal, Greece and Cyprus attended IBPGR short training courses in Birmingham, UK, and the Hebrew University of Jerusalem, Israel. Also a scientist from Portugal was provided with a one-year fellowship to attend the international post-graduate course in Birmingham, UK.

# LATIN AMERICA

The IBPGR strengthened its activity in Latin America during 1982 with the appointment of a Regional Officer and his stationing at CIAT headquarters in Cali, Colombia.

A visible concern for genetic resources and active programmes to preserve them has only begun to be demonstrated recently in some countries (Argentina, Brazil, Colombia, Costa Rica, Cuba, Ecuador, Mexico and Peru). In Costa Rica a regional centre for genetic resources is already very active; in Brazil, Colombia, Mexico and Peru, official national centres for genetic resources have recently been created. In Peru the Sistema Nacional de Recursos Genéticos (SINARGEN) was established by INIPA during 1982 as a national system for genetic resources work and a national coordinator has been designated. In many other cases, the concern and enthusiasm shown at the technical and scientific level has not yet had the necessary official support.

Collection missions supported by the IBPGR during 1982 are listed in Table 6. Details of these missions are provided in the respective crop section. They include the most important crops and are spread over countries covering about 90% of Latin America.

As a follow-up to the IBPGR/IICA/JUNAC

Table 6. 1982 collection missions supported by IBPGR in Latin America

| Country | Participating Institute | Crop |
|---|---|---|
| Argentina | INTA | Potato (wild) |
| Argentina | IICA | Amaranth |
| Bolivia | Centro de Investigaciones Fitoecogenéticas, Pairumani | Multi-crop (*Phaseolus*, *Lupinus*, *Amaranthus*, *Capsicum*, Cucurbitaceae spp.) |
| Bolivia | CIP | Potato (wild) |
| Bolivia | IICA | Amaranth |
| Brazil | CENARGEN/EMBRAPA | Groundnut |
| Brazil | CIAT & CENARGEN | *Phaseolus* |
| Chile | INIA, Chile | Maize |
| Chile | Universidad Austral, Chile | Potato |
| Colombia | ICA | Multi-crop (*Capsicum* & other vegetables, Andean roots & tubers, native fruits) |
| Colombia | ICA | Potato (wild) |
| Colombia | PORIM | Oil palm |
| Costa Rica | PORIM | Oil palm |
| Ecuador | INIAP & Universidad Central, Ecuador | Multi-crop (*Amaranthus*, Andean roots & tubers) |
| Ecuador | IICA | Amaranth |
| Guatemala | ICTA & Universidad de San Carlos, Guatemala | Multi-crop (*Cucurbita*, *Capsicum*, *Amaranthus*, roots & tubers) |
| Guatemala | ICTA | *Theobroma* spp. |
| Honduras | PORIM | Oil palm |
| Mexico | INIA, Mexico | *Capsicum* |
| Mexico | Universidad Autónoma de Chapingo | Multi-crop (maize, *Phaseolus*, henequen, native fruits) |
| Mexico | IRCT | Cotton |
| Mexico | INIA, Mexico | *Theobroma* spp. |
| Mexico | CIAT | *Manihot* (wild) |
| Nicaragua | PORIM | Oil palm |
| Panama | PORIM | Oil palm |
| Peru | UNA, La Molina | *Lycopersicon*, *Capsicum* |
| Peru | Universidad de San Cristóbal, Huamanga | Multi-crop (sweet potato, cassava, Andean roots & tubers) |
| Peru | Universidad Nacional, Huánuco | Multi-crop (*Cucurbita*, *Phaseolus*, other food legumes) |
| Peru | UNA, La Molina | *Lycopersicon* |
| Peru | University of Turku, Finland | Amazonian medicinals |
| Peru | CIAT | *Phaseolus* |
| Peru | IICA | Amaranth |
| Suriname | PORIM | Oil palm |
| Uruguay | Universidad de la República | Forage grasses, legumes |

Collecting *Phaseolus* in Latin America

Andean regional meeting on plant genetic resources in the Andean Zone (reported on in the *1981 Annual Report*), IBPGR has provided (at the request of JUNAC-Andean Pact) a consultancy to advise on the organization of a regional structure to coordinate activities for the genetic resources of the member countries (Bolivia, Colombia, Ecuador, Peru and Venezuela).

The Universidad Nacional Agraria (UNA), La Molina, Peru offered a three-week training course for technicians working on plant genetic resources in the Andean countries. The course took place in September with the participation of about 30 students, 19 of whom were sponsored by IBPGR: Bolivia (2), Colombia (3), Chile (1), Ecuador (2), Peru (9) and Venezuela (2). The IBPGR also provided training fellowships to Brazil (2) and Colombia (1) in 1982 (p. 85).

A regional project to evaluate maize collected in the Southern Cone has been extended into 1983. This project is financed by IBPGR through UNA, La Molina, Lima, Peru and executed jointly by national institutes of Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay (p. 10).

In another regional project the IBPGR is supporting the transfer of all major existing cassava collections in Latin America to CIAT's premises in Colombia for safety (p. 24).

The IBPGR is also aiding ICA, Colombia, to establish a long-term base storage facility of 50 $m^3$ that will serve on a national and regional basis. The planned facilities will include a cold store at $-15°$ to $-20°C$ with 25-40% RH as well as an active genebank of 300 $m^3$ with a temperature range from 0°C to 5°C and uncontrolled humidity.

# SOUTH ASIA

The IBPGR recognizes the importance of continuing liaison between countries of the region and liaison officers held their first meeting in September 1981 at Kathmandu, Nepal. The *Report of the South Asia Liaison Officers Meeting* was published in 1982.

In accordance with the wishes of the countries of the region, the IBPGR has been encouraging and supporting the establishment of genetic resources programmes for collection and conservation. The Board also continued to provide training fellowships to increase the specialized manpower in the respective countries.

In **Bangladesh** the genebank at the Jute Research Institute became fully operational during the latter part of 1982. The funding for this facility was provided by the Asian Development Bank (ADB). The Bangladesh Agricultural Research Institute (BARI) is also estab-

Collecting in the Himalayas (J.R. Witcombe)

lishing a medium-term storage facility, with partial funding from the IBPGR. Two trainees, after completion of their M.Sc. degree in genetic resources at the University of Birmingham, UK, have returned to Dhaka.

The genetic resources programmes in **Bhutan**, **Burma** and **Sri Lanka** have continued to make progress during 1982. The material collected in previous years has been grown for multiplication and evaluation.

In March 1982 an IBPGR consultant visited Kathmandu, **Nepal**, to assist the IBPGR Nepalese liaison officers in developing an organizational structure for their plant genetic resources programme. As a result of the consultancy the IBPGR is providing the Department of Agriculture with funds for the purchase of equipment.

The National Bureau of Plant Genetic Resources (NBPGR), New Delhi, **India**, continued its efforts in the collection, multiplication, evaluation and exchange of crop germplasm. The NBPGR published a monograph on the *Plant Genetic Resources of India: their Diversity and Conservation* in 1982. This report summarizes the work accomplished during the past decade, updates genetic resources holdings, and provides priorities for future collecting.

The NBPGR, at the request of the IBPGR, organized a third short training course on plant exploration and collection techniques during February-March 1982 (p. 84). Unlike the two earlier courses in 1982, candidates from Africa, the Caribbean and Southeast Asia also participated. The trainees gained practical experience in the collection of germplasm in the field and they also had the opportunity of attending the Regional Workshop on Conservation of Tropical Plant Resources in Southeast Asia held in New Delhi, 8-12 March 1982. The IBPGR Secretariat participated in this Regional Workshop which was organized by the Department of Environment of the Government of India.

# SOUTHEAST ASIA

The activities in this region are coordinated by the IBPGR Regional Committee for Southeast Asia which currently comprises government-designated members from Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand (for membership see Appendix III). The Regional Committee held its fifth meeting in Goroka, Papua New Guinea, 20-22 October 1982, when — for the first time — observers from Viet Nam attended. During 1982, at the request of the IBPGR, governments renominated or designated other members to reconstitute the Regional Committee and formal invitations were forwarded to the governments of Laos and Viet Nam to designate representatives. The IBPGR supports ac-

Asian forage material collected by IBPGR/CIAT

tivities in this region with the assistance of a Regional Officer, stationed at the FAO Regional Office, Bangkok, Thailand.

During the meeting in Papua New Guinea, the Committee reviewed existing priorities for the crops of the region. Table 7 lists those crops currently rating high priority for action.

All countries in Southeast Asia have undertaken a large number of collecting missions during 1982. Some of these have been supported by the IBPGR and these are listed below. Further details are provided in the reports on specific crops.

INDONESIA

- **Banana** (wild and cultivated): Germplasm was collected in the Moluccas as part of a three-year project (p. 37).
- **Coconut**: As part of a three-year project, the Manado Research Institute for Estate Crops explored 16 districts in north Celebes (p. 42). During another exploration additional populations were sampled in East Nusa Tenggara province (p. 42).
- **Roots and tubers**: Sweet potato, taro and other roots and tubers were collected in east and central Java as part of a three-year collecting project (p. 24).
- **Soyabean**: During 1981, cultivars were collected from Bali, Lombok and Sumbawa as part of a two-year collecting project (p. 42).

MALAYSIA

- **Coconut**: exploration and collection by MARDI in 14 locations as of July 1982 (p. 42).
- **Fruits**: A four-year project to collect domesticated and wild species of Malaysian fruits was approved and collecting commenced toward the end of 1982 (p. 36).
- **Sweet potato, aroids and Dioscorea spp.**: A two-year project to collect these crops was initiated in 1982 (p. 25).

PAPUA NEW GUINEA

- **Vegetables and staples**: The IBPGR allocated funds for the collection of vegetables and roots and tubers in Sepik and Madang provinces.

PHILIPPINES

- **Coconut**: A number of grants have been provided since 1980 to the PCA for the establishment of a coconut genetic resources centre in the Philippines and collection of indigenous material (p. 42).
- **Indigenous forages**: IPB, University of the Philippines at Los Baños, collected during 1981-82 (p. 46).
- **Roots and tubers**: a two-year collecting programme by PRCRTC.

THAILAND

- **Amaranth and indigenous vegetables**: Although this two-year collecting project was delayed due to the transfer of the project leader, activities have now begun (p. 30).
- **Citrus**: The Botany Department of the Chulalongkorn University is undertaking a

Table 7. Southeast Asia regional crop priorities

| CROP | Indonesia | Malaysia | Papua New Guinea | Philippines | Thailand | Viet Nam |
|---|---|---|---|---|---|---|
| **CEREALS** | | | | | | |
| Maize | x | | | x | x | x |
| Rice | x | x | | | | x |
| **FOOD LEGUMES** | | | | | | |
| Groundnut | | | | | | x |
| Mung bean | x | | | | x | x |
| Soyabean | x | | | | x | x |
| Winged bean | | x | x | | | |
| **ROOTS AND TUBERS** | | | | | | |
| Sweet potato, yam, taro | x | x | x | x | x | x |
| Zingiberaceae | x | | | x | x | |
| **VEGETABLES** | | | | | | |
| Amaranth | x | | x | x | x | |
| Bitter gourd | | | | x | | |
| Brassicas | | | | | x | x |
| *Capsicum annuum* (chillies) | x | | | | x | |
| Eggplant | | x | | | x | |
| Indigenous species | | | x | | x | |
| *Ipomoea aquatica* | x | | | | x | x |
| Yard long bean | x | x | | x | x | |
| **FRUITS AND TREE NUTS** | | | | | | |
| *Artocarpus* spp. | x | x | x | x | x | x |
| Banana | x | x | x | | | x |
| Cashew | | x | | x | x | |
| Citrus | x | x | x | x | x | x |
| Durian | x | x | | x | | |
| *Lansium* | | x | | x | x | |
| Mango | x | x | | x | | |
| Mangosteen | | x | | | x | |
| Rambutan | x | x | | x | | |
| **INDUSTRIAL CROPS** | | | | | | |
| Coconut | x | x | x | x | x | x |
| Cotton | | | | | x | x |
| Mulberry | | | | | x | x |
| Pili nut | | | | x | | |
| Spices, especially | | | | | | |
| — Cinnamon | x | | | | x | |
| — Clove | x | | | | | |
| — Pepper (*Piper* spp.) | x | x | | | x | |
| Sugarcane | | | x | x | x | |
| **FORAGE LEGUMES** | | | | | | |
| *Desmodium cajanus* and allied genera, *Calopogonium* and *Gliricidia* | x | x | | x | x | |
| *Sesbania* | x | x | | x | x | x |
| *Stylosanthes sundaica* and *Glycine wightii* | x | | | | | |
| *Canavalia rosea* and *Zornia diphylla* | | x | | | | |
| *Aeschynomene* and *Vigna unguiculata* | | | | x | | |
| *Alysicarpus vaginalis* | | x | | | x | |
| *Crotalaria* spp. | | | | | x | x |

x = high priority action

two-year collecting programme (1981-83) (p. 38).

- **Colocasia**: During 1981/82 the Department of Agronomy, Kasetsart University, collected *Colocasia, Xanthosoma* and *Alocasia* (p. 26).
- **Dioscorea**: A two-year (1980-82) collecting project carried out by TISTR (p. 26).
- **Eggplant**: Two collecting projects; one by the Kasetsart University, Bangkok, for central south Thailand and the other by the Chiang Mai University for northern Thailand (p. 34).
- **Sugarcane**: A two-year collecting project initiated in 1982 by the Department of Agriculture (p. 44).
- **Sweet potato**: Two grants to the Chiang Mai University (1981 and 1982) to collect sweet potato (p. 25).
- **Yard long bean**: During 1981/82 collection by Kasetsart University (p. 19).

In addition to these collecting projects organized by national institutions, two IARCs carried out collecting missions in Southeast Asia with IBPGR support: CIAT for forage legumes in Thailand and Malaysia (p. 46) and IRRI for rice germplasm in some countries in the region (p. 10).

The Regional Programme has a base seed store at IPB, University of the Philippines, Los Baños, which was constructed with IBPGR funds and is now operational. The facilities will be augmented by several other long-term storage units through a grant of the Philippine Council for Agricultural and Resources Research and Development (PCARRD). During 1982 the IBPGR provided funds for the transfer of germplasm from AVRDC to this regional base collection. A total of 9 596 accessions was transferred (4 854 *Vigna radiata*, 4 536 tomato and 206 Chinese cabbage).

Through IBPGR assistance other storage facilities are operational in a number of countries in the region. The seed store in Indonesia is one example. Another is the Thailand Institute of Scientific and Technological Research (TISTR) which has constructed a national genebank comprising both medium- and long-term storage facilities, seed cleaning/drying rooms, laboratories, offices etc. This facility will be fully operational in 1983 and has been designated by the IBPGR to hold the global collection for winged bean and the Asiatic maize collection.

A very large seed storage facility has been constructed at the Rice Research Institute, Rangsit, Thailand, with Japanese funding for the conservation of rice germplasm, although eventually other crops could be stored there as well. In addition FAO/UNDP projects have constructed seed storage facilities in Laos and Viet Nam.

Field genebanks (clonal repositories) have been or are being established in the region, especially for tropical fruits. For several crops, however, it would not be feasible to have one regional collection, and preference is given to a coordinated network of national collections. Malaysia and the Philippines have been entrusted coordinating roles for citrus and coconut respectively.

There is, however, one exception to this approach of coordinated national collections, namely the regional banana collection in Davao, the Philippines (p. 37).

The IBPGR cosponsored a regional training course on the collection, conservation, evaluation and utilization of germplasm of tropical perennial crops in Malaysia, 16 November to 11 December 1982 with MARDI, PORIM and the Rubber Research Institute of Malaysia (RRIM). Two participants each from Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand and approximately 15 local observers attended the course.

Two fellows, one from Indonesia and one from Malaysia, successfully completed the 1981/82 M.Sc. course in Birmingham, UK, while one fellow from the Philippines is attending the 1982/83 course. Two fellows from Indonesia attended the two short courses at Birmingham during 1981/82 with World Bank funding (p. 83).

The IBPGR also supported on-the-job training for a genetic resources worker of the PRCRTC at the University of Hawaii. Two months specialized training was provided on the maintenance and utilization of aroid germplasm with emphasis on taro and *Xanthosoma*. On-the-job training was also provided to two scientists from TISTR at the IRRI Genebank from 22-30 March 1982.

The Thai National Plant Genetic Resources Coordinating Subcommittee (TN/PGRCS) or-

ganized the first Thai National Seminar on Plant Genetic Resources from 2-5 September 1982, which was attended by nearly 175 participants. The response was overwhelming and the seminar not only generated awareness at various levels, but also drew government attention to the need to intensify plant genetic resources activities in the country.

# SOUTHWEST AND CENTRAL ASIA

The Board supports genetic resources activities in Southwest and Central Asia through an FAO-operated project (TF:REM-31/IBPGR). It recognizes 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, the links with ICARDA and other institutes and will, at its tenth meeting in 1983, take decisions on the future of IBPGR support to the region.

The IBPGR Technical Adviser for the Regional Project is outposted to ICARDA and in 1982 he helped with the documentation of accessions and other developmental aspects of the ICARDA genebank.

When allowance is made for the constraints under which the national programmes operate — few staff (except in Turkey), not infrequent changes of personnel and very modest budgets — it can be concluded that progress in 1982 has been as good as could be expected. The project passed through a particularly difficult period in 1982 largely owing to the unsettled conditions in the region it serves.

A measure of the difficulties is that a proposed meeting in Rome in late April to discuss technical activities had to be cancelled because only the leaders of the genetic resources units in Iran and Pakistan would have been able to attend.

Highlights of the national programmes are outlined below. In Pakistan particular emphasis has been placed on collecting. Country-wide surveys followed by subsequent collecting expeditions are a routine feature of the Turkish programme.

## AFGHANISTAN

During 1982 the IBPGR was informed of ongoing work on rejuvenation and evaluation of previously collected samples and the use of wheat samples for the wheat improvement programme at the Darulamen Research Station. The germplasm unit has recently been upgraded in status by the Government and a seven-year plan of work was drawn up. This includes the construction of a new genebank to hold 100 000 samples and a duplicate store in Baghlan Province as well as upgrading of laboratory and other facilities.

Two genetic gardens will be established in different ecological areas to conserve fruits and medicinal plants.

## IRAN

The Plant Genetic Resources Division at the Seed and Plant Improvement Institute reported to the Secretariat on progress made. Since the 1940s collections have been made of a variety of crops.

Up to 1981, due to the special situation in the country, the genebank's activities were restricted to the study and transfer of existing collections to the genebank. In this respect 4 000 accessions of wheat from the Cereal Division, 4 000 varieties of vegetable crops from the Vegetable Division, 2 000 lines of safflower from the Oil Crops Division and 100 varieties of sorghum from the Maize Division were transferred to the genebank. At present the genebank holds 8 400 accessions.

During 1982 four missions to northwest and northeast Iran were planned with emphasis on wheat, barley, pulses and vegetable collections.

An active evaluation programme during the year included:

- Determination of spring and winter types of 1 200 transferred accessions of wheat and barley, in collaboration with the Cereal Division.
- Individual plant selection of pulse crops in respect to desirable characters, in collaboration with the Pulse Crop Division.
- Individual plant selection from 120 sorghum varieties, in collaboration with the Maize Division.
- Multiplication and botanical study of *Hordeum murinum* × *H. bodganii, H. spontaneum, Aegilops triuncialis, A. biuncialis, A. crassa, A. squarrosa, A. triaristata* and *Triticum boeoticum*, in collaboration with the Cereal Division.

## IRAQ

In April the Plant Genetic Resources Division, Botany Directorate, Abu-Ghraib, sent 33 accessions of wheat from seeds which had been multiplied during 1981 for long-term storage in the genebank at the Germplasm Institute, Bari.

Due to the difficult situation other details of the programme have not been received.

## PAKISTAN

In 1982 the IBPGR had very close contact with the national programme of Pakistan located at the Plant Genetic Resources Unit at the Pakistan Agricultural Research Council (PARC), Islamabad, and the Coordinator of the Unit visited the Secretariat in April. A return visit was made by the Secretariat to Islamabad in October.

The Unit has been very actively engaged in collecting during the year:

— fruit germplasm in Baluchistan, January 1982;

— chickpea and lentil along the Indus river, April-May 1982;

— cereal germplasm in Azad Kashmir, June 1982; and

— *Vigna radiata, V. aconitifolia, V. unguiculata*, and *V. mungo* in Punjab, September-October 1982.

A building programme at the National Agricultural Research Centre (NARC) is well underway. It is expected that the new laboratory building for the Plant Introduction Centre and the National Unit on Plant Genetic Resources will be ready for occupancy in the second half of 1983. Considerable emphasis is currently being placed on plant introduction as it is believed that notable contributions to Pakistan's agriculture could be made in the short term by the introduction and testing of exotic varieties of both old and new crops.

The cold store now holds about 8 000 accessions and a programme for the multiplication and characterization of material is being carried out.

The Secretariat had extensive discussions on fruit germplasm with personnel in the country and it is expected that IBPGR support will be provided in 1983.

## SYRIA

The work of the Plant Genetic Resources Unit at the Directorate of Agricultural Research, Douma, has slowed down with the loss of the former full-time curator of the Unit. 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 the Arab Center for the Studies of Arid Zone and Dry Lands (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. Also there are plans to establish collections of almond and other nut trees, apricot and olive.

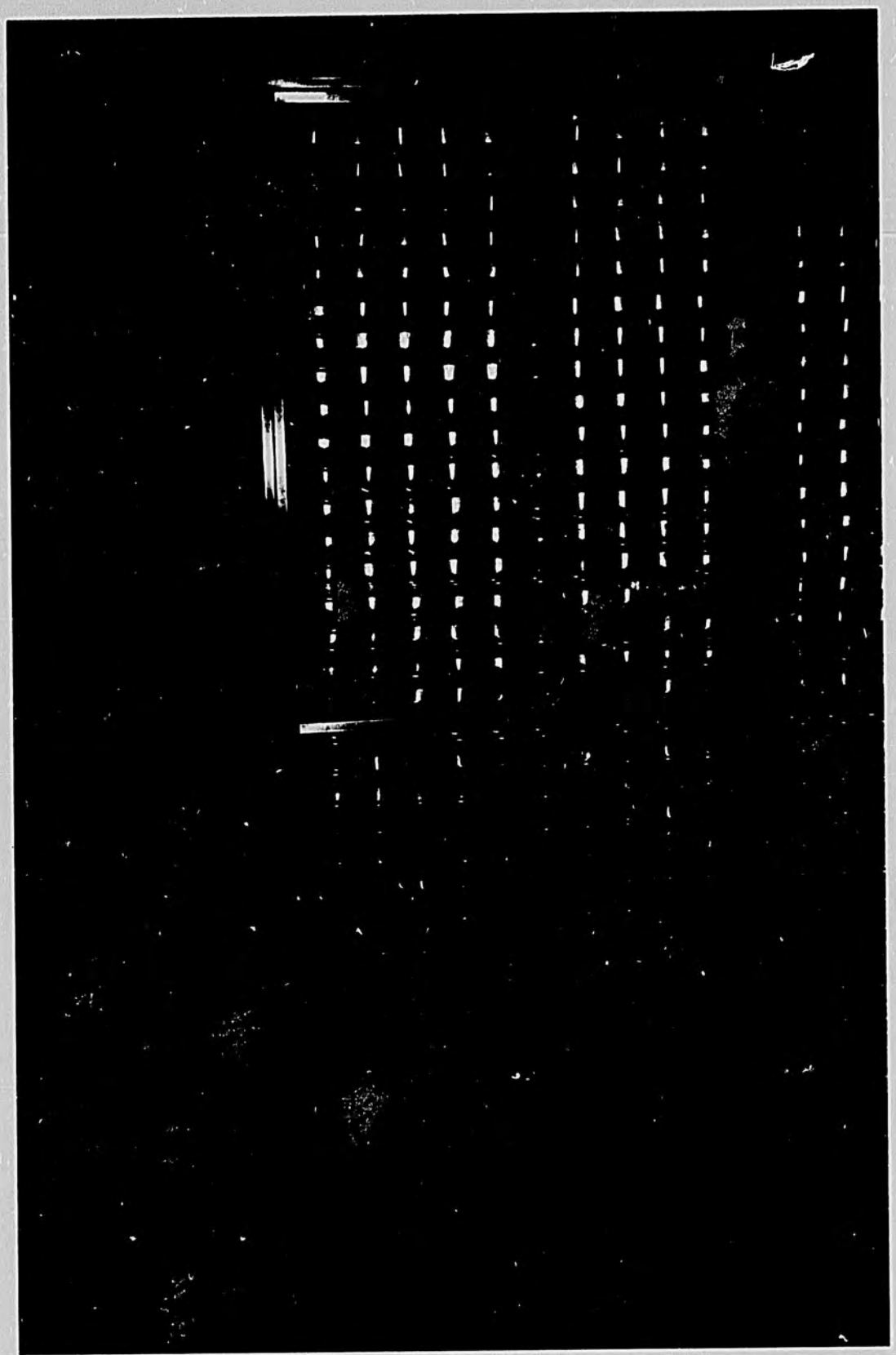
## TURKEY

Collecting trips and multiplication and evaluation of accessions are now routine pro-

cedure each year in the national genetic resources programme that is organized around eight groups of crops.

Regeneration and multiplication of seed samples are being done with the cooperation of several stations selected, as far as possible, in climatic zones similar to those of the sites where the accessions were collected. Evaluation studies are carried out at the same time.

Considerable effort is being made in the national genetic resources programme to document collections on the computer at the Computation Centre, Ege University. An *Index Seminum* was produced in 1982 listing 10 880 accessions collected between 1970 and 1980. It may be regarded as the first result in the effort of using the computer for information management. The *Index* lists accessions held at the Aegean Regional Agricultural Research Institute (ARARI) with the local name of each entry and an indication of whether or not seeds are available for distribution. The next phase should include collection and characterization, data and evaluation data that may be available.



Long-term storage of rice, IRRI

# CONSERVATION

Genetic conservation programmes worl-dwide have to date concentrated on annual crop plants. When the IBPGR started its work there were very few seed storage facilities in the world available to safeguard genetic resources. Since that time the Board has provided funds or acted as a catalyst for the establishment of many more. By 1985 the Board expects to have designated enough base collections to cover all major seed-propagated crops.

In 1982 the Board, in association with FAO, started to inventory the standards used by individual genebanks and to list these genebanks so that the scientific community can be easily informed.

Long-term storage of duplicate samples can be effected satisfactorily in stores far from the original sources of the material. However, for periodic regeneration and increase it is important that adequate facilities for seed storage are available at genetic resources centres near the sites where the seeds have been collected.

Aspects of conservation, other than seed storage, also need consideration. In many cases *in situ* conservation is the best method of preserving the variability in valuable wild species. The Board has stated its willingness to be associated with any advisory body. Other agencies might wish to consider genetic resources aspects of *in situ* conservation and IBPGR maintains links with UNEP (through an *ex officio* member of the Board).

Neither seed storage, nor *in situ* conservation, are applicable to crops which are clonally propagated. These are normally maintained as collections in plantations or in short-term stores as roots and tubers. In addition there are other species which produce so-called 'recalcitrant' seeds which do not survive drying or cold (the accepted standards for seed storage).

During 1982 the Board addressed all types of conservation and in particular initiated a report to accelerate work on *in vitro* conservation. This will have its full impact in future years when the technology for the conservation of difficult material has undergone development.

The lack of appropriate *in vitro* work has been due to several factors. For instance research has frequently been conducted on model systems and species with seeds that can easily be stored for conservation: priority species which have short-lived seeds or are normally propagated vegetatively have received little attention. In addition research has tended to concentrate on rapid clonal multiplication, "cleaning-up" of stocks especially for viruses and, more recently, the generation of variability for breeding using biotechnological methods.

## THE WORLD NETWORK OF SEED COLLECTIONS

The IBPGR has requested important conservation centres to accept responsibility to serve as "world" or "regional" depositories for major base collections of specific crops. Five international centres — CIAT, CIP, ICRISAT, IITA and IRRI — as well as national and regional centres had accepted such designations up to the end of 1982 (see Table 8). ICARDA has already informed the Board that it will participate when its facilities are available. At the eighth and ninth Board meetings the IBPGR planned a number of future designations which have to await the establishment of seed storage facilities.

It will be noted that duplicate collections have not always been designated. The designation of duplicate stores depends on there being an adequate number of available seed stores; the burden of this task should not be carried by a few centres. The Board has agreed that 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

Table 8. IBPGR network of base centres for seed crops (as of 31/12/82)

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

| Crop | Species/Type | Institute |
|---|---|---|
| | **CEREALS** | |
| Barley | Cultivated and wild | PGR, Ottawa, Canada |
| | | NGB, Lund, Sweden |
| | | PGRC, Addis Ababa, Ethiopia |
| | | NIAS, Tsukuba, Japan |
| Maize | New World | NSSL, Fort Collins, USA |
| | Asian | NIAS, Tsukuba, Japan |
| | | VIR, Leningrad, USSR |
| | European | Portuguese Genebank, Braga, Portugal |
| Millets | Cultivated and wild; *Pennisetum* spp. | NSSL, Fort Collins, USA |
| | | PGR, Ottawa, Canada |
| | | ICRISAT, Hyderabad, India |
| | *Eleusine* spp. | PGRC, Addis Ababa, Ethiopia |
| | | ICRISAT, Hyderabad, India |
| | Minor Indian millets | NBPGR, New Delhi, India |
| | *Eragrostis* spp. | PGRC, Addis Ababa, Ethiopia |
| | *Panicum miliaceum* | ICRISAT, Hyderabad, India |
| | *Setaria italica* | ICRISAT, Hyderabad, India |
| Oats | Cultivated and wild | PGR, Ottawa, Canada |
| | | NGB, Lund, Sweden |
| Rice | *Oryza sativa* - *indica* | IRRI, Los Baños, Philippines |
| | - *javanica* | IRRI, Los Baños, Philippines |
| | - *japonica* | NIAS, Tsukuba, Japan |
| | African forms | IITA, Ibadan, Nigeria |
| | Mediterranean, temperate and intermediate forms from the USA (plus duplicates from other centres) | NSSL, Fort Collins, USA |
| | Wild species | IRRI, Los Baños, Philippines |
| Rye | Cultivated and wild | Polish Genebank, Radzikov, Poland |
| Sorghum | Cultivated and wild | NSSL, Fort Collins, USA |
| | | ICRISAT, Hyderabad, India |
| Wheat | Cultivated species | VIR, Leningrad, USSR |
| | | CNR, Germplasm Institute, Bari, Italy |
| | | NSSL, Fort Collins, USA |
| | Wild species of *Triticum* and *Aegilops* | Plant Germplasm Institute, University of Kyoto, Japan |
| | **FOOD LEGUMES** | |
| Chickpea | | ICRISAT, Hyderabad, India |
| Groundnut | | ICRISAT, Hyderabad, India |
| | | INTA, Pergamino, Argentina |
| Lupin | | ZIGUK, Gatersleben, GDR |

| | | |
|---|---|---|
| Pea | Mediterranean and South European material | NGB, Lund, Sweden<br>CNR, Bari, Italy |
| | Central and East European material | Polish Genebank, Radzikov, Poland |
| *Phaseolus* | Wild species | University of Gembloux, Belgium |
| | New World material | CIAT, Cali, Colombia<br>NSSL, Fort Collins, USA |
| | European material | FAL, Braunschweig, Germany, F.R. |
| Pigeonpea | | ICRISAT, Hyderabad, India |
| Winged bean | | IPB, Los Baños, Philippines<br>TISTR, Bangkok, Thailand |
| | **ROOT CROPS** | |
| Potato | Wild and cultivated | CIP, Lima, Peru |
| | **VEGETABLES** | |
| *Allium* | | NVRS, Wellesbourne, UK<br>NSSL, Fort Collins, USA<br>NIAS, Tsukuba, Japan |
| *Amaranthus* | | NSSL, Fort Collins, USA |
| *Capsicum* | | CATIE, Turrialba, Costa Rica<br>IVT, Wageningen, Netherlands |
| Crucifers | *Brassica carinata* | FAL, Braunschweig, Germany, F.R.<br>PGRC, Addis Ababa, Ethiopia |
| | *B. Oleracea* | NVRS, Wellesbourne, UK<br>IVT, Wageningen, Netherlands |
| | *Raphanus* spp. | NVRS, Wellesbourne, UK |
| | Wild spp. | Universidad Politécnica, Madrid, Spain<br>Tohoku University, Sendai, Japan |
| | Oilseeds and green manure crucifers | PGR, Ottawa, Canada<br>FAL, Braunschweig, Germany, F.R. |
| | Vegetables and fodders<br>(*B. campestris, B. juncea, B. napus*) | NVRS, Wellesbourne, UK |
| | (*B. napus*) | FAL, Braunschweig, Germany, F.R. |
| | All cruciferous crops | NIAS, Tsukuba, Japan |
| Eggplant | | IVT, Wageningen, Netherlands<br>NSSL, Fort Collins, USA |
| Tomato | | CATIE, Turrialba, Costa Rica<br>ZIGUK, Gatersleben, GDR<br>NSSL, Fort Collins, USA<br>IPB, Los Baños, Philippines |
| | Southeast Asian vegetables | IPB, Los Baños, Philippines |
| | **INDUSTRIAL CROPS** | |
| Beet | | FAL, Braunschweig, Germany, F.R.<br>NGB, Lund, Sweden |
| | South European | Greek Gene Bank, Thessaloniki, Greece |
| | **OTHERS** | |
| Trees spp. (fuel and environmental stabilization in arid areas) | | Royal Botanic Gardens, Kew, UK |

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.

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), 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.

## INVESTIGATIONS ON SEED PHYSIOLOGY

The Board has supported research on seed physiology since 1977 in an attempt to build up a body of information so that practical advice can be provided to genebank curators on how to handle and maintain seeds of specific crops. This work has been carried out at the University of Reading, UK, under the leadership of the Chairman of the IBPGR Advisory Committee on Seed Storage (see Appendix IV for membership).

In 1982 work continued on the determination of regeneration intervals in orthodox seeds. The purpose of this investigation is to provide information on the expected regeneration intervals of accessions under all storage conditions. Too frequent monitoring would increase genebank workloads and profligately deplete accessions, thereby resulting in unnecessarily early regeneration. On the other hand too infrequent monitoring would result in loss of genetic integrity and increase the danger of the complete loss of some accessions.

This project has included large multi-factorial experiments in which seeds are stored under various controlled conditions, and their viability monitored at regular intervals. These data are analysed in terms of a universal viability equation, developed earlier, which enables predictions to be made of percentage viability of seed lots of varying initial quality after any period, under any storage conditions. The species which have been included in the investigations are listed in Table 9.

Table 9. Species being examined for regeneration intervals in orthodox seeds

| | Common name |
|---|---|
| * *Allium cepa* | onion |
| *Beta vulgaris* | beet |
| * *Cicer arietinum* | chickpea |
| *Eleusine coracana* | finger millet |
| *Eragrostis tef* | teff |
| * *Glycine max* | soyabean |
| *Guizotia abyssinica* | niger |
| * *Hordeum vulgare* | barley |
| *Manihot esculenta* | cassava |
| *Oryza glaberrima, O. sativa* | rice |
| *Paspalum scrobiculatum* | kodo millet |
| *Pennisetum americanum* | pearl millet |
| *Saccharum* spp. | sugarcane |
| *Setaria italica* | foxtail millet |
| *Solanum tuberosum* | potato |
| *Sorghum vulgare* | sorghum |
| *Triticum aestivum, T. durum* | wheat |
| * *Vigna unguiculata* | cowpea |
| *Zea mays* | maize |

* Indicates examination has been completed.

Following the recommendations of the FAO/UNEP/IBPGR Technical Conference (see *1981 Annual Report*) the IBPGR requested Professor Roberts to begin investigations of seed dormancy in relation to the problems facing genebanks. This is necessary because dormancy interferes with viability testing; in addition it is also important to know how to remove dormancy before regeneration of accessions and for curators to provide advice to users.

Dormancy is of greater concern to genebanks than in official seed testing for several reasons. First, it is clear that longevity in storage is very much a function of initial seed quality so that genebanks are being encouraged to dry and store accessions as soon as possible after harvest. This, coincidentally, means they are having to deal with more dormant samples than are often dealt with in commerce. Secondly, they have to deal with relatives or primitive landraces which often exhibit more dormancy than modern cultivars. Thirdly, low-temperature storage not only conserves viability but also prolongs the dormant state. Thus, both on receipt and during subsequent monitoring, low germination due to dormancy can be confused with low viability.

The project aims to assemble information which can be incorporated into an advisory manual on seed testing for genebanks. The work is being carried out in collaboration with the Seed Bank of the Royal Botanic Gardens, Kew. The work involves an algorithm approach in devising a dichotomous key to provide a guide as to the most rapid and economical investigational approach to developing practical procedures.

At the same time investigations are necessary and during 1982 rice, *Vitis*, *Fragaria*, *Triticum* (*aestivum*, *monococcum* and *dicoccum*), barley, oat and rye were used in experiments.

## ADVISORY COMMITTEE ON SEED STORAGE

Although the Committee did not meet in 1982 a number of activities by members of the Committee were undertaken and the report of the first meeting of the *IBPGR Ad Hoc Advisory Committee on Seed Storage* was published during the course of the year. The major effort was the finalization of a revision of the Board's initial *Report on Engineering, Design and Cost Aspects of Long-Term Seed Storage Facilities* (1976) and in 1982 *The Design of Seed Storage Facilities for Genetic Conservation* was published.

Centres to conserve crop genetic resources vary according to size, equipment and back-up facilities. Until such time as there are large numbers of samples it is not necessary that expensive facilities be constructed. The IBPGR, therefore, commissioned work to be done to provide specifications for small seed stores and the resulting guide — *Use of Deep-Freeze Chests for Medium- and Long-Term Storage of Small Seed Collections* was published in 1982.

To date the programme has not developed data management systems for routine viability testing, although recommended to do so by the Seed Storage Committee. This is an area which needs development in the immediate future.

## SEED HEALTH TESTING IN GENEBANKS

The Board has commissioned a study on guidelines for non-destructive seed testing for genebanks and 75 seed genebanks were contacted from all over the world to assess plant health problems in long-term seed stores.

Several research investigations were initiated to test the efficiency of non-destructive inspection methods; the effect of short periods of exposure to temperatures below zero (−5°C and −20°C) 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.

## *IN VITRO* CONSERVATION

Following consideration of the IBPGR-commissioned expert report *Institutes Working on Tissue Culture for Genetic Conservation* (1980), and the recommendations firstly of an IUBS/IGP/IBPGR international workshop on the genetic conservation of recalcitrant seeds and tissue cultures and secondly of an FAO/UNEP/IBPGR Technical Conference (see *1981 Annual Report*) that a Working Group should be established, the IBPGR agreed at its meeting in February 1982 to the composition (see Appendix V) and terms of reference of an expert group.

The Working Group met at Colorado State University, Fort Collins, USA, from 16-20 August, at the invitation of the US National Plant Germplasm System which was concurrently holding a National Germplasm Committee Workshop on Cryogenics. As a result, a very wide range of expertise was available.

The Working Group assessed the present situation and reported to the Board that despite repeated statements in the past fifteen years that *in vitro* techniques will form the basis of genetic conservation for a number of priority world crops, very little research had been appropriately directed and there are no known major proposals to fulfil this need.

Equally disturbing is the fact that clonal collections have come into existence without any clear concept of representative genetic variability. They represent, for the major part, collections of current or old varieties, breeders' collections or botanic garden material. Also related wild species are hardly represented. While it is the case that such *ex situ* collections are required for evaluation and utilization also, new approaches are needed by curators depending on the diverse breeding and propagation mechanism.

The confident use of *in vitro* conservation techniques, whose many advantages may be offset to some degree by risks of instability under sub-optimal culture and storage conditions, will depend upon the ability to check the genetic integrity both of cultured material and of plants returned to the field after repeated culture cycles.

Genetic stability in culture has long been a matter of concern. The Working Group expressed the view that problems of genetic stability/instability should not be over-emphasized, rather that efforts should be made to characterize *in vitro* progeny (new systems for the characterization of cultures are required), to determine the relative risks attending different modes of culture (e.g. adventitious *versus* non-adventitious regeneration) and storage (e.g. cryopreservation *versus* growth limitation) and to clarify the nature of regenerated material. This work should be compared with *in vitro* field situations.

In order to apply the long-accepted terminology of base and active collections to clonal and other growing collections, the following definitions were proposed by the Working Group:

- "*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" - to replace the term "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.

The Working Group noted that no *in vitro* base collections exist at the present and where *in vitro* active collections have started to develop, little attention is paid to procedures for duplication of samples and handling growing material in and between consecutive subcultures. As a result crop specific standards will have to be developed.

The following crops were rated for priority attention by the IBPGR:

**Priority 1** - Cacao, *Citrus*, Coconut, *Musa*, Sweet potato

**Priority 2** - *Allium*, Aroids (Taro etc.), Oil palm, Sugarcane, *Vitis*, Yam

**Priority 3** - Cassava, Coffee, Potato, Temperate fruits

Future consideration could be given to: *Artocarpus*, Olive, Tropical fruits, Rubber, Sago, Medicinal plants and Spices.

Recommendations have been made to the Board for the crops in priority categories 1, 2 and 3 on specific research needs, and institutions where the work could be carried out have been suggested. These recommendations will be discussed in detail by the Board at its tenth meeting in February 1983. The Board looks forward to reporting substantial progress in its next annual report.

## CONSERVATION AND 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 for sweet potato and cassava; *Citrus*, banana and coconut; *Vitis*; sugarcane and *Theobroma* (see respective crop section).

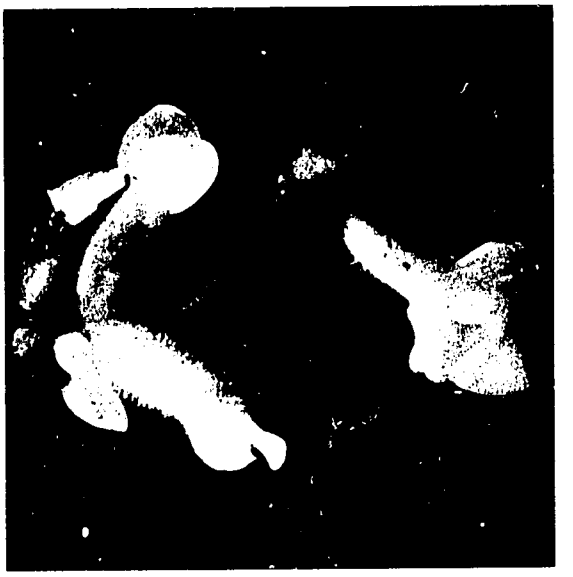
## IBPGR SUPPORT TO *IN VITRO* CULTURE RESEARCH

The Board continued its support in 1982 to a research project at the University of Nottingham School of Agriculture, UK, on genetic conservation of *Theobroma cacao in vitro* and its clonal propagation. This project rates priority in view of the Board's attempts to mobilize collecting in the centre of diversity of this crop and the need to move and store large quantities of material.

Studies on propagation are continuing along several lines and using a variety of plant parts. Immature zygotic embryos are consistently producing secondary embryos which are being bulked up for storage experiments and grown to maturity to monitor their morphology.

Shoot production from proliferation of mature zygotic embryos has also been examined. However shoot production from leaf discs has not been promising nor has anther culture. However some ovaries have remained alive within cultured flowers. More success is recorded with immature embryos and axes dissected from mature embryos cultured for several months in the presence of inhibitors and then germinated using unsupplemented medium.

Cell suspensions have been cryopreserved successfully but attempts to freeze other tissues have not been promising. However experiments are in progress involving the cryopreservation and subsequent grafting of shoot tips and axillary buds on to glasshouse-grown plants.



Secondary (cloned) embryos of cacao (above) and cacao zygotic embryos stored *in vitro* (below)
(L.A. Withers/IBPGR)

During 1982 the final report was received of the IBPGR-supported project on storage of *Vitis* cultures carried out by the CSIRO Division of Horticultural Research, Adelaide, Australia. Material tested includes *Vitis vinifera* and *V. amurensis, V. berlandieri, V. caribea, V. champini, V. labrusca, V. rupestris* and the hybrids *V. amurensis* × *V. vinifera, V. berlandieri* × *V. rupestris* and *V. longii* (*vinifera* × *riparia* × *labrusca*).

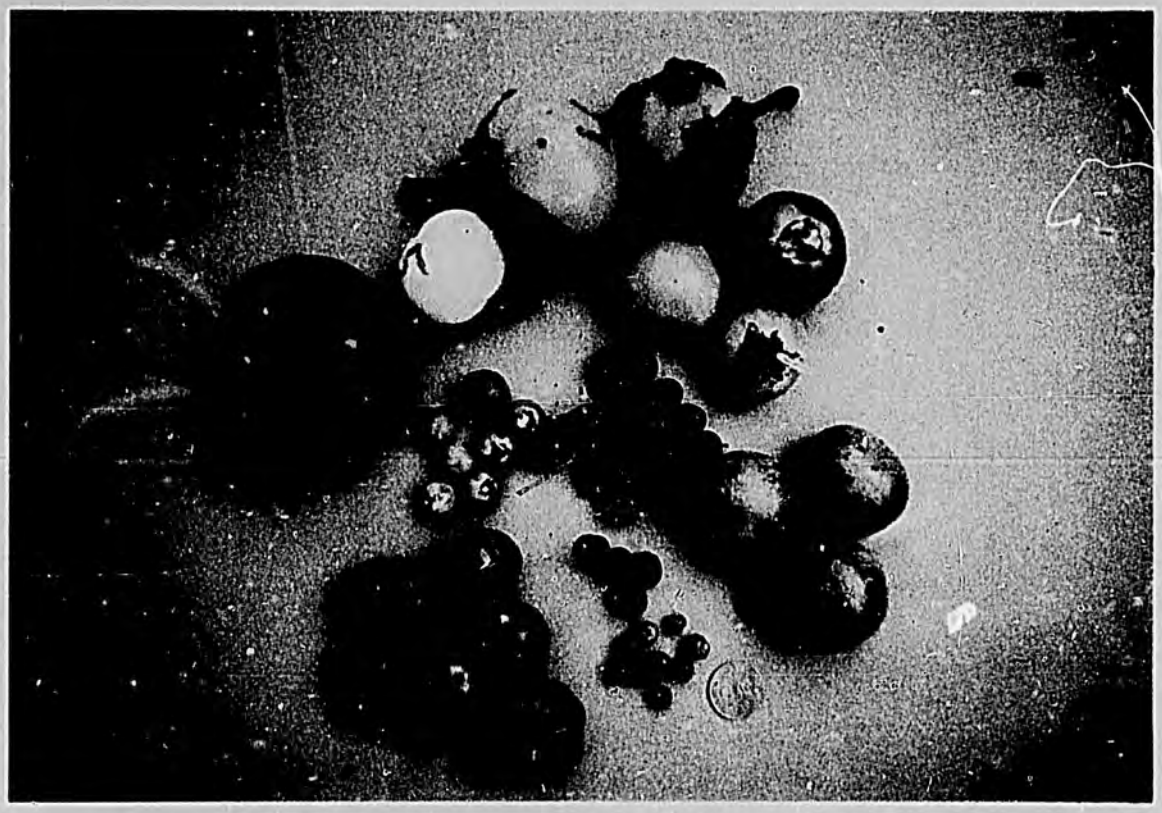
Success at storing proliferating shoot cultures has been variable and has depended on genotype. For periods longer than six months a proportion of the cultures from each genotype

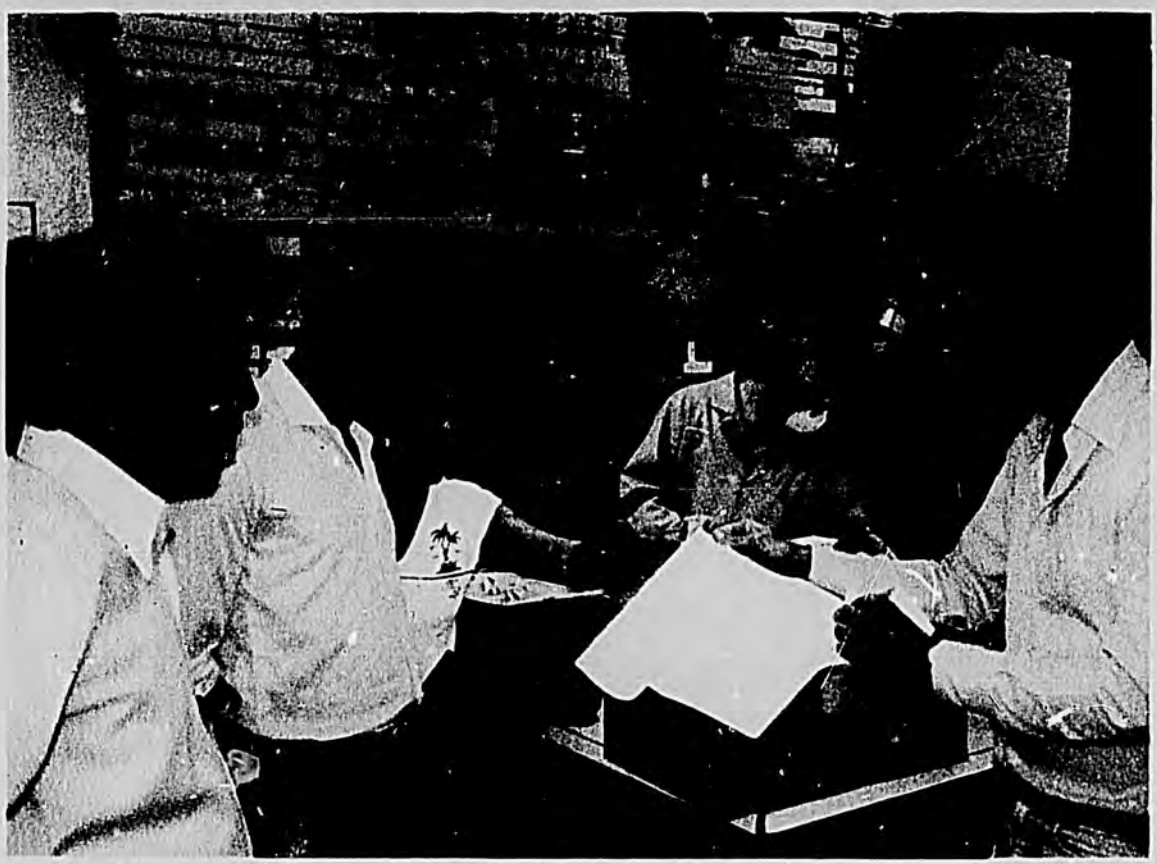
blackened and whilst some recovered after transfer to normal temperatures, the number of shoots obtainable from each culture was reduced. Nevertheless, plants could be obtained from all genotypes stored for 9-12 months except from *V. berlandieri* and *V. berlandieri* × *V. rupestris*.

Plants regenerated from cultures were phenotypically indistinguishable from the original plants. Chromosomes were also examined as checks.

The cultures were maintained at 9.5°C in a 5 h light/9 h dark regime (or constant dark) on solid media in poly-tubes for periods up to 12 months.

Further work on *in vitro* cultures was initiated toward the end of 1982. These include cryopreservation of cassava (SRC, Saskatoon, Canada, in cooperation with CIAT, Colombia) and the initiation of a status report on the availability and current application of *in vitro* techniques (including the cryopreservation of buds and pollen) to temperate fruits. The latter will be coordinated by a Board member.





# INFORMATION AND DATA MANAGEMENT

Accurate and up-to-date information about genetic resources is as important as their collection and conservation. The availability and exchange of information paves the way for samples in storage to be used quickly and efficiently as breeding or research material. Data can also be analysed to assess the progress in assembling representative variability and safeguarding it as part of the germplasm heritage.

The IBPGR, as the coordinating organization for a large global network of plant genetic resource workers, has always laid emphasis on assisting the flow of information. During 1982 the IBPGR paid special attention to standardization of methods of data handling that allow simplification, and hence improvement, of information flow.

The documentation of plant genetic resources involves 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 status of 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.

If 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.

In order to deal with these problems, 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 to collect and collate standard characterization and evaluation data have been started. Following are some of the projects reported on in this Report:

- *Allium* at the Israel Gene Bank in Israel (p. 27)
- Barley at ICARDA and PGR, Canada (p. 78)
- *Capsicum* at the Greek Gene Bank in Greece (p. 31)
- Eggplant at CRI in Ghana, at Centre néerlandais, ORSTOM in the Ivory Coast, and at the University of Birmingham, UK (p. 33)
- Forage legumes at IPB in the Philippines (p. 46)
- Minor millets at ICRISAT (p. 8)
- *Momordica* at Kasetsart University in Thailand (p. 33)
- Native genetic resources of Guatemala at CATIE (p. 55)
- Okra at ORSTOM in the Ivory Coast (p. 35)

— Root and tuber crops and African rice at IVRAZ in Upper Volta (p. 24)
— Sorghum and millets in Mali by ICRISAT (p. 9)
— Winged bean at IPB in the Philippines (p. 19).

## DIRECTORIES OF EXISTING GENETIC RESOURCES

The IBPGR publishes directories containing details of the main holdings of accessions of high priority crops in order to provide genetic resources workers with information on where germplasm samples can be obtained within the world-wide network of genebanks. The directories have information on: the species held and geographical representation; availability of samples for exchange; any evaluation of the samples; documentation methods used; and storage conditions.

Work was completed, and directories published, in 1982 for barley and for vegetables. In the latter the species covered are: *Abelmoschus, Allium, Amaranthus, Capsicum*, a number of cruciferous species, Cucurbitaceae, *Lycopersicon, Solanum melongena* and related species, as well as a number of Other Vegetables of lower priority.

Work continued during 1982 on directories covering oats and rye and tropical fruits and it is expected that these will be finalized in 1983. The major tropical fruits covered will be: avocado; banana and plantains; breadfruit and jackfruit; cashew; citrus; date; fig; mango; papaya, and pineapple.

A directory of computer use in genebanks is also being prepared for publication in 1983. This 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.

## CROP DESCRIPTOR LISTS

A major emphasis in 1982 was put on the preparation of descriptor lists. These lists provide a method by 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 has been devised. 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. Standard numbering of descriptors has been devised as well as standard descriptor states. It is expected that this standard 'language' for the descriptor lists will be adopted globally by plant genetic resources workers for the exchange of data.

The new format has also been approved by the CEC Programme Committee on Disease Resistance Breeding and Use of Genebanks and it was agreed that this will form the basis of compilation for all CEC descriptor lists. This cooperation has led to the decision that future CEC descriptor lists should be published jointly with IBPGR whenever possible. The first joint IBPGR/CEC publication *Descriptor List for Apples* (*Malus*) went to press at the end of 1982. An ECP Working Group on Barley also agreed to use this format at a meeting in Gatersleben, German Democratic Republic, in February, when it endorsed the use of the IBPGR barley descriptor list. Such close liaison between groups working on plant genetic resources documentation helps greatly to reduce the duplication of efforts in this area.

During 1982 the following descriptor lists were published:

*Allium*; apple (joint CEC/IBPGR); barley; oca (in Spanish); *Phaseolus lunatus*; *P. vulgaris*; quinoa (in Spanish); sugarcane; and winged bean (revised). All except quinoa were in the new format.

Work continued, or was initiated, on the following lists: apricots (revised, joint CEC/IBPGR); banana (revised); barnyard millet; *Capsicum*; cashew; cassava; cherry (joint CEC/IBPGR); crucifers (8 crop types); cucurbits (3 species); eggplant; faba bean (joint ICARDA/IBPGR, possibly also jointly with CEC and ECP); finger millet; forage grasses

(joint CEC/IBPGR); ginger/turmeric; grape (in collaboration with UPOV and OIV); grassland legumes (joint CEC/IBPGR); Japanese millet; jute; kodo millet; lentil; okra; peach (joint CEC/IBPGR); pear (joint CEC/IBPGR); *Phaseolus acutifolius; P. coccineus*; safflower; soyabean; *Tropaeolum tuberosum; Ullucus tuberosus; Vigna aconitifolia; V. mungo; V. radiata; V. umbellata*; and *V. unguiculata.*

It is estimated that — including those lists now under preparation — by the end of 1983, over 80% of those crops of high IBPGR priority (see Table 1) will have IBPGR descriptor lists available. Of these, **100%** of crops of **global priority 1**, **90%** of crops with **global priority 2** and **50%** of crops of **high regional priority** will have been covered. Some of these lists, however, will have to be revised in order to conform to the new IBPGR standard format.

## TECHNICAL ADVICE AND ASSISTANCE

The Board was very active during 1982 in initiating and supporting projects to collect and collate characterization and evaluation information for collected samples. Many samples exist that have little or no data available and it is important to clear this information backlog for high priority crops by achieving a streamlined flow of information between curators and users.

Ideally, the preliminary documentation of high priority crops should be made according to the recommendations of world experts. The standard IBPGR descriptor lists are compiled according to such recommendations and a limited number of descriptors are identified as being essential for scoring by all genebanks. The standardization of the lists makes such data easy to communicate once compiled. Following the publication of descriptor lists for most of the high priority crops, the Board has supplied funds for characterization and preliminary evaluation of major collections according to the IBPGR descriptor lists.

Finalization of the evaluation and documentation project for all maize collected by the Board in the Southern Cone of South America is expected during 1983 (p. 10). A standard format has been devised for the catalogue of the data and all countries involved are preparing their 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 (p. 75). The information on a major portion of the maize germplasm in South America will therefore shortly be available to all interested users.

The compilation of a cotton catalogue containing information from the major world collections is progressing. The passport and evaluation data for over 500 samples from the Sudanese cotton collection were collated and computerized at the Secretariat. A micro-computer was loaned to IRCT in order to accelerate the accumulation of data on its world cotton collection (which includes many samples collected with IBPGR support).

The IBPGR has been collecting information from the major world wheat genebanks. It is necessary to collate full information on the global status of the crop, to identify duplicates and gaps and to make recommendations for further collecting missions. Information is being incorporated from other projects that have been initiated or supported by the Board. These include the micro-computer installations in Bulgaria, Greece and Portugal. Already some gaps in documentation and preliminary evaluation have been detected — according to the IBPGR wheat descriptor list — and projects to fill these information gaps have been undertaken.

*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 has initiated a project to produce an accurate global status report on available variability and to advise on how such variability might be better used. The project will also investigate the possible uses of germplasm data bases to provide accurate, useful information to assist decision-making on germplasm work.

It is particularly important that germplasm collections of clonally propagated crops are kept in a fully rationalized manner. Holding the same accessions at many germplasm repositories represents a large wasted effort as such clonal samples must be kept and tended in the field. The IBPGR has therefore initiated

a joint project with EUCARPIA to collate apple germplasm information according to the new IBPGR/CEC descriptor list from all parts of Europe. Necessary and redundant duplicates will be identified and gaps requiring further survey will be indicated. Consolidation of the germplasm collections may then be possible.

Support has also been given for the examination of major collections of another clonally propagated crop: sugarcane. The IBPGR is sponsoring the exchange visit of an Indian scientist to the United States' collection since the global collections are held by India and the USA.

Sweet potato is both clonally propagated and has a high global priority. Work on characterization and evaluation is therefore important and the IBPGR has supported the expansion of existing projects in Thailand and Papua New Guinea.

Important collections of high priority vegetables such as *Capsicum* and okra are also in need of documentation. Work has been initiated in Greece, Peru and Spain for *Capsicum* and the Ivory Coast for okra.

Collaborative work with ICARDA (barley documentation) (p. 7) and IITA (cowpea documentation and multiplication) has been undertaken. It is hoped that this will supplement the valuable research on plant genetic resources at present existing in these IARCs as well as accelerate the availability of the germplasm to all users. An examination of minor millets is also under way, in conjunction with ICRISAT (p. 8), in order to obtain information for the compilation of descriptor lists for these crops.

In 1982, the documentation of the major *Arachis* collections from South America has been supported as has the documentation and distribution of wheat, barley and maize samples collected in Baluchistan.

Further to its technical assistance programme in documentation at genebanks, the IBPGR provided computing hardware to Ecuador, Cyprus and Portugal in 1982. It is proposed that early in 1983 computers will be installed in Colombia, Indonesia, Pakistan and Spain. All of these countries sent participants to the IBPGR documentation training course. In addition a micro-computer will be supplied to Hungary in early 1983. The purchase of a memory expansion module for the computer at the Polish genebank was proposed to enable faster registration of data. This will aid the obtaining of computerized information on the Polish wheat collection. Increased computer storage capacity was supplied to the Turkish genebank at Izmir where the EXIR program for computerization of plant genetic resources data was installed with IBPGR support in 1979-80. An *Index Seminum* of the Turkish collection was published by ARARI in 1982 using this program.

At the ninth meeting of the IBPGR it was decided that an automated office information system should be installed in the Executive Secretariat. This decision was made in view of the increasing amount of coordination work performed by the Secretariat and the large number of publications it produces. A system will be installed early in 1983.

## TRAINING

A training course was held by the IBPGR on documentation and data management at Beltsville, USA, 2-20 August 1982. The course was designed to be an introduction to information work in genebanks from both the manual and computerized standpoint. Participants came from Colombia, Cyprus, Ghana, India, Indonesia, Pakistan, Sierra Leone and Spain. In addition, three officers of the IBPGR Secretariat attended in order to be able to improve back-up support on documentation to plant genetic resources workers from throughout the world.

The first week of the course was concerned with lectures and practicals concentrating on the importance of documentation, the need for standard data, the compilation of descriptor lists and the exchange of information. The following two weeks concentrated on intensive hands-on use of micro-computers and instruction on their use in genebanks.

The Board has also supported general training courses containing documentation instruction in context with all other aspects of genetic resources work. Several graduates were sponsored to attend short courses on genetic resources evaluation, utilization and data preparation and management at the University of Birmingham, UK, in 1982. Other short techni-

Hands-on training during IBPGR Documentation and Data Management Course, Beltsville

cal courses which were partly supported by the Board in ICARDA, IITA, Peru and Malaysia (see p. 84-85), contained information training as an integrated part of their curriculum.

## COORDINATION

A workshop on documentation modelling using *Pisum* genetic resources as an example was held at the Swedish University of Agricultural Sciences, Alnarp, Sweden, in March. This was organized jointly by the NGB and the IBPGR and the report will be available early in 1983. The workshop addressed the problems associated with collecting, storing and utilizing information relevant to genebanks by using the well-developed system of pea data handling at the Weibullsholm Plant Breeding Institute as a model. It was stressed that information of high quality was the first requirement of a databank and that all levels of data should be collected and stored, right down to the DNA sequences when possible. The importance of computerized information to identify redundant duplicates of plant samples and to accurately pin-point areas for future collection missions to fill gaps in existing material was also emphasized. Generally it was felt that the first step toward obtaining an accurate analysis of the samples already held in genebanks was to register available information on computers, starting with passport data.

The Scientific Advisory Committee (SAC) of the ECP met at Thessaloniki, Greece, in April. A major portion of the agenda was given to the discussion of data management in genebanks. The need for high quality data compiled using standard descriptor lists was again emphasized as was the necessity of getting information into computer-readable form. The use of the IBPGR standard format for descriptor lists was recommended. All genebanks were urged to formulate an information structure without delay. The importance was stressed of having open-ended files so that further information, from evaluation work or from the literature, could be entered: such data include those on actual genes and alleles.

A meeting was held with the North American Chairmen of IBPGR Working Groups and Crop Advisory Committees at the World Bank, Washington D.C., USA, in November. The meeting approved a series of eight points con-

cerning documentation which was to be distributed to all Crop Committees and Working Groups for action during future meetings.

A Genetic Resources Information Network (GRIN) is a system devised jointly by the USDA and the Laboratory for Information Science in Agriculture (LISA), Colorado. In the future data on most plant accessions held within the United States germplasm system will be entered into this information network and be made available to all users throughout the USA. Individual work stations in USDA centres are linked by telephone to the central unit. Since the United States holds large stores of important germplasm and as the NSSL has been designated by the IBPGR as a base storage centre, it was agreed in 1982 that a small liaison office should be set up by the IBPGR with GRIN so that expertise and information can be exchanged. In this way the information in the United States system can be of much greater use to the international network.

## COLLECTION DATA

During its eight-year existence, the IBPGR has sponsored approximately 250 collecting missions and has gathered 100 000 crop samples. The increasing amount of work involved in keeping relevant data on each mission and each sample has led the Secretariat to rationalize its work in this area. A new standard collection form (interfacing exactly with the new standard format for descriptor lists) was devised and is to be used on all IBPGR-sponsored missions. In this way the IBPGR, through its new computer facilities, will be able rapidly to inform all interested users about newly collected samples. The Secretariat will aso be able to keep up-to-date information on the fate and safety of its collected samples.

As a service to the germplasm network and to celebrate its upcoming ten-year anniversary, the Board initiated in 1982 the compilation of a book containing information on the IBPGR's collection work. This book will contain tables of collected species, sites where samples were taken and locations where deposited.

## GENERAL

To inform more people of the need to conserve plant genetic resources and of the work of the Board, a small publicity brochure was published during 1982. In a simple ten-page, pull-out format it summarizes the activity of the IBPGR and its coordinating role in the world-wide network.

A slide pack of 60 slides was also produced as a training aid for crop genetic resources. The slide pack and its text (under preparation in four editions: Chinese, Japanese and Korean; English, Indonesian and Thai; Spanish, Portuguese and English; and Arabic, English and French) is available to those institutions and universities, especially in the developing world, which are engaged in increasing the awareness of the importance of plant genetic resources work and of the part played by the IBPGR.

# TRAINING

From its inception, the IBPGR has placed great emphasis on training not only on the post-graduate level but also for persons in supervisory and middle-level positions in germplasm institutions.

Frequent interaction among genebanks and research institutions of the IBPGR network, and increased sophistication of systems such as those for data storage and exchange, has made training in up-to-date and uniform methods of operation essential.

## UNIVERSITY POST-GRADUATE TRAINING

### i) University of Birmingham, UK

An international post-graduate course, *Training in Conservation and Utilisation of Plant Genetic Resources*, offered by the University of Birmingham, UK, continues to receive support from the IBPGR. Begun in 1969, and supported by the Board since 1975, the course has produced many students who are much needed in germplasm institutions.

IBPGR funding allows for twice the normal number of students from developing countries to attend, and the Board also funds fellowships to the post-graduate course and to short specialized training courses, which are of three-month duration.

In the 1981/82 post-graduate course, the eight students enrolled in the course were from Bangladesh, Brazil, Federal Republic of Germany, Indonesia, Malaysia, Portugal and Turkey. The IBPGR provided fellowships for four of them.

During the 1982/83 course, 11 students are participating in the course. They are from Colombia, Greece, Kenya, Nepal, Philippines, Sri Lanka, Uganda and the UK. The IBPGR and UNEP jointly provided fellowships for three of the students, and three others were funded solely by the IBPGR.

### ii) Universidad Nacional Agraria, Peru

A new M.Sc. training course, with IBPGR assistance, is being planned at the Universidad Nacional Agraria, La Molina, Peru. In 1982 the IBPGR sponsored a study tour by a UNA professor of the M.Sc. programme at the University of Birmingham, UK. The La Molina course will be the first in the Spanish language that will offer an M.Sc. It is expected to help ease an educational bottleneck for Spanish-speaking genetics resources workers, many of whom face a language barrier to post-graduate training. The course is expected to begin in 1984.

## SHORT TRAINING COURSES

Short courses, usually of three-week duration, are offered by many institutions throughout the world with IBPGR support. They have the advantage of providing training to personnel without requiring them to leave their posts for extended periods.

### i) University of Birmingham, UK

A short course held at the University of Birmingham in early 1982 on *Genetic Resources Evaluation, Utilisation and Data Preparation Management* was attended by participants from Bangladesh, Brazil, India, Indonesia, Mexico, Poland, Sri Lanka and Uganda. The IBPGR and UNEP provided funding for four of the students.

### ii) IITA, Nigeria

A three-week (15 November to 3 December) training course on *Collection and Conservation* was organized by IITA, Nigeria, with funds provided by IBPGR. The course of study involved principles of crop evolution and diversity with respect to Africa, exploration and collection techniques, and a simulated collecting mission with concomitant written reports. The 19 students who took part in the course were from Cameroon, Ethiopia, Ghana, Guinea, Kenya, Madagascar, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Zaire and Zambia.

### iii) ICARDA, Syria

A short course on *Food Legume Germplasm Training* was held at ICARDA, Syria, from 2-12 May. The programme consisted of lectures, practicals and the collection of legume germplasm including wild relatives. At IBPGR's request, invitations were sent to several countries outside ICARDA's region. A total of 20 students attended the course from Afghanistan, Algeria, Egypt, Greece, Jordan, Lebanon, Morocco, Pakistan, Spain, Syria and Tunisia.

### iv) University of Edinburgh, UK

A practical training course on *Seed Technology* as related to genebanks was held at the University of Edinburgh, Scotland, UK, from 7-17 September. Nine overseas students from the University of Birmingham (who also were enrolled in the Birmingham post-graduate course) attended as well as three additional participants.

### v) Hebrew University of Jerusalem, Israel

The IBPGR supported a short course from 21 March to 6 April organized by the Hebrew University of Jerusalem for 14 students representing both developing and developed countries. The aim of the course, which consisted of lectures, laboratory work and field trips, was to introduce the *Wild Germplasm Resources* of the zone, an especially pertinent area of study since Israel is situated in centres of diversity for many crops. The crops discussed included wheat, barley, oat, pea, chickpea, spices and olive. Students attended from Brazil, Egypt,

IITA/IBPGR Collection and Conservation Training Course

Federal Republic of Germany, Greece, Italy, Poland, Portugal, Turkey and the United Kingdom.

### vi) NBPGR, India

The third in a yearly series of short courses cosponsored by the IBPGR and the NBPGR, was held in March. The course consisted of lectures on the extent of variability among different crops in South Asia, in addition to practical experience in *Field Exploration, Recording of Data and Transport of Material*. A larger number of students participated in the 1982 course than in previous years; they came from Bangladesh, Bhutan, Cuba, Ethiopia, India, Indonesia, Malaysia, Nepal, Philippines, Sri Lanka and Thailand. The trainees had an opportunity to participate in the regional workshop on tropical plant resources in Southeast Asia, organized by the Government of India.

### vii) Beltsville, USA

A *Documentation and Data Management Training* course was sponsored by the IBPGR at Beltsville, USA, from 2-20 August. The course was designed as an introduction to both manual and computerized methods of handling information. The first half was concerned with documentation, the need for standardized data,

the compilation of descriptor lists and the exchange of information. The second half was devoted to obtaining practical experience with micro-computers and their application in genebanks. Participants came from Colombia, Cyprus, Ghana, India, Indonesia, Pakistan, Sierra Leone and Spain.

viii) **Universidad Nacional Agraria, Peru**

A three-week training course on *Plant Genetic Resources* was held in September at the Universidad Nacional Agraria, La Molina, Peru. The course, which covered collection, evaluation and conservation, was the first short course in the Spanish language directed to middle-level technicians at genebanks and institutions in the Andean region. Some 30 students took part in the course, 19 of whom were sponsored by the IBPGR. These 19 came from Bolivia, Colombia, Chile, Ecuador, Peru and Venezuela.

IBPGR Documentation and Data Management Training Course, Beltsville

ix) **Visual Training Aid**

A training aid covering broad aspects of genetic resources and conservation became available in 1982 from IBPGR; this consists of a slide pack of 60 slides and accompanying text and is available to institutions and universities interested in expanding awareness of the need for conservation of plant genetic resources, and of the role played by the IBPGR (p. 80).

x) **ECP/EUCARPIA, UK**

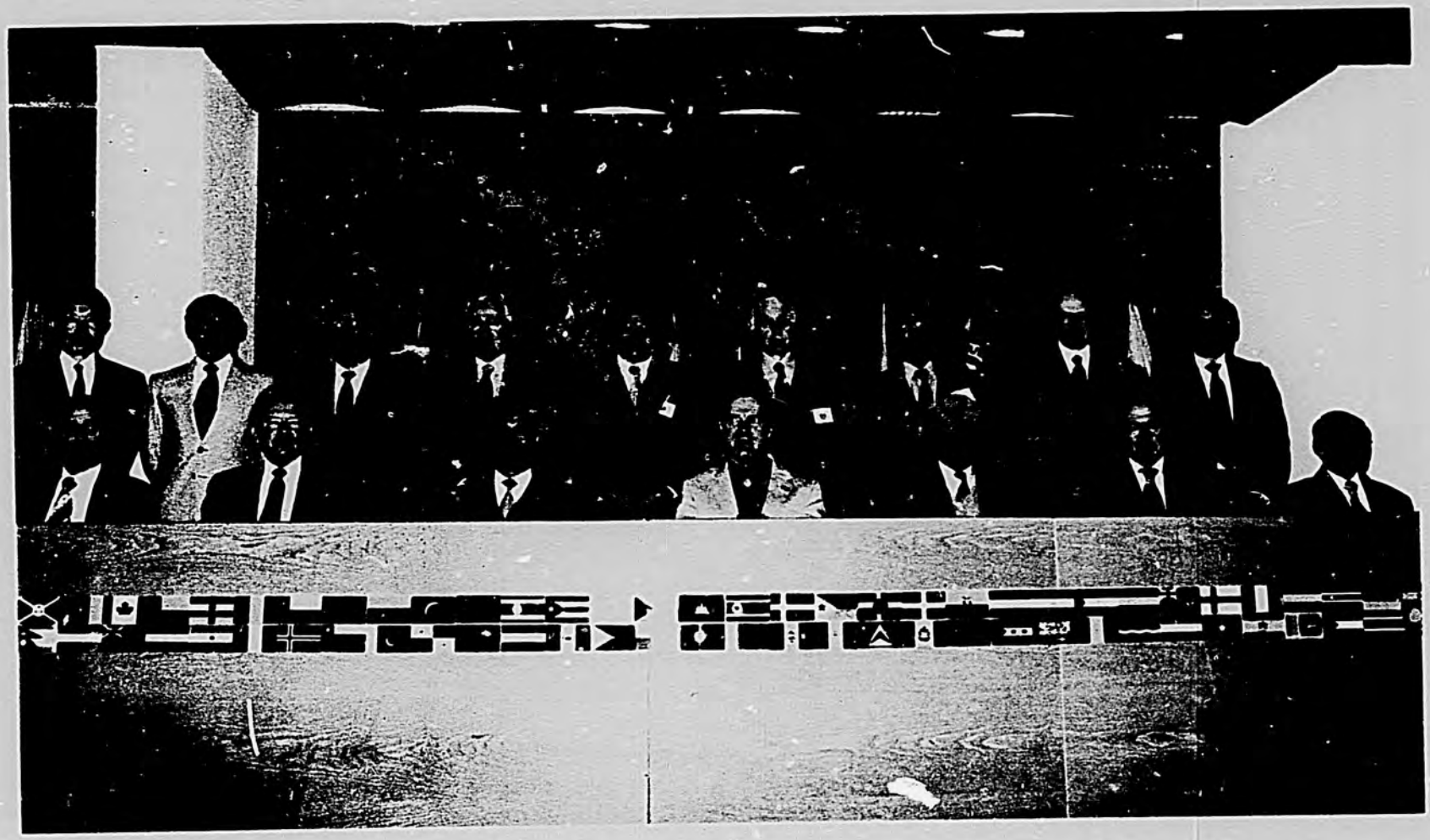
An ECP/EUCARPIA *Workshop on Seed Technology* was cosponsored by the IBPGR, 5-9 July at Royal Botanic Gardens, Kew, UK. The IBPGR provided expenses for speakers and participants from Bulgaria, Greece, Hungary, Poland and Spain.

xi) **MARDI/PORIM/RRIM, Malaysia**

A training course on the genetic resources of tropical perennial crops was cosponsored by the IBPGR in Malaysia, 16 November to 11 December. It was jointly organized with the Malaysian Agricultural Research and Development Institute (MARDI), the Palm Oil Research Institute of Malaysia (PORIM), and the Rubber Research Institute of Malaysia (RRIM). Two participants came from each of the following countries: Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand. Approximately 15 local observers also attended the course.

## STUDY TOURS

Scientists from developing countries are provided funding by the IBPGR to visit genebanks for short periods to familiarize themselves with procedure and new programmes and to travel to neighbouring countries to exchange views and plan cooperative action. Several study tours were supported in 1982 and they are arranged on an *ad hoc* basis by the Secretariat. In addition, IBPGR Officers occasionally give lectures and discussions at the invitation of or during visits to various universities or institutions. These also are arranged on an *ad hoc* basis.



1982 Board members: (sitting, left to right) E.A.L. de Langhe, Q. Jones, N. Chomchalow, L. Kåhre, Djibril Sene, M. Dokuzoguz and H.K. Jain; (standing, left ot right) M. Iizuka, F. Cardenas-Ramos, W.J. Peacock, J.P. Cooper, O.M. El Tayeb (UNEP), G.T. Scarascia-Mugnozza, D.C. Giacometti, C.J. Bishop and J.T. Williams

# ADMINISTRATION

## MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1982 is shown on p. 5. At the end of the year, Dr. F. Cardenas-Ramos (Mexico), Prof. Dr. M. Dokuzoguz (Turkey), Dr. Q. Jones (USA) and H.E. Dr. D. Sene (Senegal) completed their terms.

On the recommendations of the Board, the CGIAR re-elected Dr. Jones and Dr. Sene for a second three-year term. In addition, Dr. Xu Yun-Tian (China) and Dr. S.A. Qureshi (Pakistan) were elected to serve for three-year terms commencing 1 January 1983.

The full Board met in Rome 16-19 February 1982 and the Executive Committee met on 15 February and 17-19 May, also in Rome. The latter met again in Washington, D.C., 15-17 November. The Washington meeting of the Executive Committee was followed by a joint meeting, 17-19 November, with all North American Chairmen of IBPGR Crop Committees and Working Groups, and a press conference was held on 19 November.

Elected members of the IBPGR serve in their personal capacities. Although in some cases members report to donors, the Board has agreed that any donor may, if it so desires, send an observer the attend the meetings of the Board. 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 ninth meeting of the Board in February 1982 an observer from France participated, and an observer from the Federal Republic of Germany attended the November Executive Committee.

## REPRESENTATION AT INTERNATIONAL MEETINGS

Apart from a relatively large number of IBPGR meetings itemized in other sections of this report and the normal Technical Advisory Committee (TAC), Centres Directors and Consultative Group on International Agricultural Research (CGIAR) meetings, the Board was represented at the following international or regional events:

- TAC Workshop on Plant Breeders' Rights, Rome, 26-28 January
- Working Group (ECP) on Barley and Tomato, Gatersleben, GDR, 2-4 February
- Anniversary Celebrations, CIP, Lima, Peru, 22-26 February
- Working Group (ECP) on *Allium*, Wellesbourne, UK, 25-26 February
- Workshop on Conservation of Tropical Plant Resources in Southeast Asia, New Delhi, 8-11 March
- EUCARPIA Gene Bank Committee, Thessaloniki, Greece, 26-27 April
- Second International Conference on Lupine, Torremolinos, Malaga, Spain, 3-5 May
- Working Group (EC) on Grass Descriptors, Brussels, Belgium, 1? 3 July
- CIAT/FAO/IBPGR Internat. nal Consultation on Safe and Efficien. Germplasm Exchange, CIAT, Cali, Colombia, 15-17 June
- US National Plant Germplasm System Workshop on Cryopreservation, Fort Collins, USA, 16-20 August

— International Horticultural Congress, Hamburg, Federal Republic of Germany, 29 August-4 September
— General Assembly OIV, Paris, France, 30 August-4 September
— EUCARPIA meeting on Forage Genetic Resources, Aberystwyth, UK, 13-16 September
— RF/NifTAL/NFTA Workshop on Nitrogen Fixing Trees, Bellagio, Italy, 19-25 September
— Congress of the American Society for Horticultural Science-Tropical Region, Caracas, Venezuela, 3-8 October
— UPOV Symposium on Genetic Engineering, Geneva, Switzerland, 14-15 October
— 10th Anniversary Celebrations, ICRISAT, Hyderabad, India, 11 October
— Programme Committee, EC Programme on Better Use of Genebanks, 19 October

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.

During 1979-80 the Secretariat at headquarters was substantially strengthened. In 1982, headquarters staff consisted of five scientists (with one vacancy), three administrative/technical assistants, five secretaries and two clerks.

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

Outside headquarters, field staff are appointed to serve in some regional programmes. In addition to those in Southwest Asia, Southeast Asia, the Mediterranean and West Africa the Board agreed to appoint Officers for East Africa and Latin America. During 1982 a Regional Officer for Latin America was appointed and located at CIAT, Cali, Colombia. In addition, a Regional Office for East Africa was established at ILRAD, Nairobi, Kenya.

The Board agreed at its eighth meeting to appoint crop officers where necessary to carry out specific tasks on a fixed-term basis. In the immediate future, work should be accelerated on wheat and forages. The Wheat Officer took up his post in 1981 and the Forage Officer was appointed in 1982; both are outposted to the FAO Liaison Office in Washington D.C., USA. At its ninth meeting the Board identified the need for a Training Officer and an Industrial Crops Officer to be appointed in 1983-84.

The Executive Secretary was also assisted in 1982 for specific tasks by Special Advisers; Dr. G. de Bakker (Vice Chairman IBPGR 1974-80) for Ethiopia; Dr. J. Creech (Board member 1974-80) for East Asia, Dr. K.S. Dodds for several policy issues apart from the Southwest Asia Programme and Dr. P. Veyrat for the Mediterranean.

## COMMITTEES

During the year the Board updated the terms of reference for the five Crop Committees, the membership of which is shown in Appendix II. These Committees continued to provide advice to the Board. Professor R.J. Marechal (Belgium) was elected as Chairman of the *Phaseolus* Committee.

The Committee for Southeast Asia (Appendix III) met for the fifth time in October in Papua New Guinea. This Committee has been revised following agreements with the participating countries. The Board was saddened to note the untimely death of Mr. K Aburu of Papua New Guinea.

During 1982 the Board approved the membership of a new *ad hoc* Committee on *In Vitro* Storage (Appendix V) and its first meeting took place in August 1982. The Board proposes that this Committee and the *ad hoc* Committee on Seed Storage (Appendix IV) be elevated to the status of Standing Committees in view of their important inputs in refereeing proposals and maintaining oversight of ongoing research.

## PUBLICATIONS

A list of current IBPGR publications is contained in Appendix X. Those which are technical manuals have been particularly well re-

ceived and the joint FAO/IBPGR *Plant Genetic Resources Newsletter* has become more widely circulated than hitherto — over 3 500 copies are distributed quarterly. Due to constant heavy requests for IBPGR publications, many reprintings have been necessary.

During 1982 the IBPGR published seven descriptor lists, five regional reports, four conservation reports, four crop reports, two directories, as well as the Annual Report for 1981 and the quarterly FAO/IBPGR 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 publicity brochures. Two were issued in 1982.

# APPENDIXES

**APPENDIX I**

# THE IBPGR SECRETARIAT IN 1982

**Dr. J.T. Williams**
Executive Secretary

## Headquarters

**Dr. N. Murthi Anishetty**
Assistant Executive Secretary

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

**Dr. S.L.A. Hobbs**
Genetic Resources Officer (Information)

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

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

**Mrs. C. Gorelli**
Programme Assistant

**Mr. B.T. McLean**
Editorial Assistant

**Mr. G. Sayour**
Research Assistant

**Ms. V. Ascione-Sindery**
Secretary

**Mrs. M. McArthur-Giannini**
Secretary

**Miss D.E. Quaye**
Secretary

**Ms. S. Saini**
Secretary

**Ms. J. Shuter-Buccini**
Secretary

**Ms. M. Bonomi**
Clerk

**Miss A. Vittorini**
Clerk

*Outposted from headquarters*

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

**Dr. C.G.D. Chapman**
Genetic Resources Officer (Wheat)

**Mr. W. Ellis Davies** (from March 1982)
Genetic Resources Officer (Forages)

**Ms. F. Farzad**
Secretary

## Regions

*East Africa Programme*

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

*West Africa Programme*

**Mr. P.M. Perret**
Regional Officer
IBPGR/159/MUL
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*Latin America Programme*

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

*Mediterranean Programme*

c/o Germplasm Institute
Bari, Italy

**Prof. E. Porceddu**
(Honorary Coordinator)

**Mr. W.G. Ayad**
Technical Assistant

**Mr. A.B. Damania**
Technical Assistant

**Mrs. P. Damania**
Secretary

*Southeast Asia Programme*

c/o FAO Regional Office
Bangkok, Thailand

**Prof. R.B. Singh** (until August 1982)
Regional Officer

**Mrs. S. Savigamin**
Secretary

*Southwest Asia Programme*

**Dr. K.S. Dodds**
Senior Consultant
c/o IBPGR Secretariat, FAO, Rome

**Dr. J.R. Witcombe**
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| **MALAYSIA** | |
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| **Mrs. Rosa Kambuou**<br>Officer-in-Charge<br>Bubia Agricultural Research Centre<br>P.O. Box 348<br>Lae | **Mr. A.E. Charles**<br>Chief Agronomist<br>Department of Primary Industry<br>P.O. Box 417<br>Konedobu |
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[1] As of 1 November 1982

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# MEMBERSHIP OF CROP WORKING GROUPS AND CONSULTATIONS ON THE GENETIC RESOURCES OF SPECIFIC CROPS HELD IN 1982

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[1] At the request of the IBPGR Dr. N.A. van der Graff (FAO) contributed to the meeting.

# CASSAVA[1]

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S.K. Hahn
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Chief, Root Crops Branch
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[1]At the request of the IBPGR the following scientists made contributions: Dr L. Chiarappa and Dr. J. Karpati (FAO Plant Disease and Quarantine Group).

# SOYABEAN[1]

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[1] The following scientists also made significant contributions at the request of INTSOY: Mr. Sun Huan (China), Dr. T. Hymowitz (Illinois, USA), R. Palmer (Ames, Iowa, USA) and R.L. Nelson (USDA).

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# STATEMENT OF ACCOUNT FOR 1982
(expressed in US dollar equivalents)

| | | |
|---|---|---|
| **Receipts** | | |
| Balance as at 1 January 1982 | | 1 536 232[1] |
| Various government contributions | 3 585 742 | |
| Interest credited in 1982 | 186 783 | |
| | | 3 772 525 |
| | | 5 308 757 |
| **Deduct** | | |
| *Cash expenditure 1982* | | |
| Personal services | 543 321 | |
| Official duty travel | 198 130 | |
| Contractual services | 1 132 401 | |
| General operating expenses | 64 371 | |
| Supplies and materials | 12 241 | |
| Furniture and equipment | 67 300 | |
| Fellowships, grants and contributions | 293 421 | |
| | 2 311 185 | |
| *Project servicing costs* | | |
| 13% on US$147 379 | 19 159 | |
| *Commitments* | | |
| Incurred during 1982 (up to 15 December) | 759 406 | |
| Total expenditure and commitments - 1982 | 3 089 750 | |
| Payment of unliquidated obligations from previous years | 901 255 | |
| Unliquidated obligations from previous years | 729 296 | |
| | | 4 720 301 |
| Unobligated cash balance at 31 December 1982 | | 588 456 |

[1] Unobligated cash balance (1981) plus unliquidated obligations (1981 and previous years).

# 1982 CONTRIBUTIONS RECEIVED[1]

(as at 31 December 1982)

| | US$ equivalent |
|---|---|
| Australia | 81 690 |
| Belgium | 63 351 |
| Canada | 181 888 |
| Denmark | 50 426 |
| France | 64 742 |
| Germany, Fed. Rep. | 135 270[2] |
| India | 46 178 |
| Italy | 75 000[3] |
| Japan | 500 000 |
| Netherlands | 215 000 |
| Norway | 101 798 |
| Sweden | 195 122 |
| UK | 310 140 |
| UNEP | 183 149[4] |
| USA | 850 000 |
| World Bank | 531 988 |
| | 3 585 742 |

[1] Contribution pledged for 1982 not received from Spain.
[2] Of the four instalments to be received from the Fed. Rep. of Germany only two were credited to TF.9150, the first and the fourth. Enquiries are being made to trace the others. A supplementary allocation of US$52 109 was paid by the Fed. Rep. of Germany to IBPGR in December 1982.
[3] 1981 pledge, received in 1982.
[4] Includes the balance due for the 1978-81 project (US$55 149).

**APPENDIX X**

# IBPGR PUBLICATIONS[1]

## 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 the European Association for Research on Plant Breeding (EUCARPIA)
- The IBPGR in the Eighties: A Strategy and Planning Report (1981)
- Priorities among Crops and Regions (Revised, 1981)
- Crop Genetic Resources (An introduction to the IBPGR) (1981)
- Los recursos fitogenéticos: Una inversión segura para el futuro, by J.T. Esquinas-Alcazar (1981) (This publication was sponsored by the IBPGR and INIA, Spain)
- IBPGR leaflet (general) (1982)

## 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)
- Tropical Vegetables and their Genetic Resources, by G.J.H. Grubben, edited by H.D. Tindall and J.T. Williams (1977)
- Proceedings of the IRRI/IBPGR Workshop on the Genetic Conservation of Rice, held 12-15 December 1977 (1978) (Available from the International Rice Research Institute, P.O. Box 933, Manila, Philippines)
- Genetic Resources of Bananas and Plantains (1978)[2]
- Coconut Genetic Resources (1978)[2]
- Coffee Genetic Resources (1980)[2]
- Genetic Resources of Tree Species in Arid and Semi-arid Areas (1980)
- Fruits, translated from the Indonesian *Buahualn*, 1977 (1980)
- Vegetables, translated from the Indonesian *Sayur-sayuran*, 1977 (1981)
- Root and Tuber Crops, translated from the Indonesian *Ubi-ubian*, 1977 (1981)
- Genetic Resources of Sweet Potato (1981)[2]
- Genetic Resources of Cocoa (1981)[2]
- Genetic Resources of Amaranths, by G.J.H. Grubben and D.H. van Sloten (1981)[2]
- A World Survey of Wheat Genetic Resources, by R.P. Croston and J.T. Williams (1981)
- Genetic Resources of Cruciferous Crops (1981)[2]
- Genetic Resources of Tomatoes and Wild Relatives, by J.T. Esquinas-Alcazar (1981)[2]
- Genetic Resources and the Plant Breeder, edited by R.B. Singh and N. Chomchalow (1982)
- Genetic Resources of Sugarcane (1982)[2]
- Genetic Resources of *Allium* (1982)[2]
- Vegetable Crops leaflet (1982)
- Genetic Resources of *Vigna* (1982)
- Genetic Resources of *Citrus* (1982)

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[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.

## Descriptors[1]

| | |
|---|---|
| — Cultivated Potato | (1977) |
| — Wheat and *Aegilops* | (1977) and revised (1981) |
| — Winged Bean | (1979) and revised (1982) |
| — Tropical Fruits | (1979) and 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) |
| — 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) |
| — Quinua (Spanish) | (1981) |
| — Barley | (1982) |
| — Oca (Spanish) | (1982) |
| — *Phaseolus vulgaris* | (1982) |
| — Lima Bean | (1982) |
| — Apple | (1982) (in collaboration with CEC) |

## Regions

- — Plant Genetic Resources of Southeast Asia, edited by J.T. Williams, Ch. Lamoureux and Wulijarni-Soetjipto (1975) (Available from the National Biological Institute, Bogor, Indonesia — this publication was partly sponsored by IBPGR)
- — A Cooperative Regional Programme in Southeast Asia (1977)
- — 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 First Meeting of the IBPGR Regional Committee for Southeast Asia (1978)
- — Report of the Second Meeting of the IBPGR Regional Committee for Southeast Asia (1979)
- — Report of the Third Meeting of the IBPGR Regional Committee for Southeast Asia (1980)
- — Report of the Fourth Meeting of the IBPGR Regional Committee for Southeast Asia (1982)
- — 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)
- — South Asia Liaison Officers Meeting (1982)
- — Regional Meeting of Liaison Officers for the Mediterranean Programme (1982)

[1] See also under Crops for descriptors lists for *Allium*, banana, coconut, coffee, cacao, amaranths, cruciferous crops, sugarcane and tomatoes.

## Conservation

— Report of a Working Group on Engineering, Design and Cost Aspects of Long-term Seed Storage Facilities (1977)
— Seed Stores for Crop Genetic Conservation (1978)
— The Storage of Recalcitrant Seeds — Achievements and Possible Approaches, by M.W. King and E.H. Roberts (1979)
— Seed Technology for Genebanks (1979)
— Tissue Culture Storage for Genetic Conservation, by L.A. Withers (1980)
— Institutes Working on Tissue Culture for Genetic Conservation, by L.A. Withers (1981) revised (1982)
— Use of Deep-Freeze Chests for Medium- and Long-Term Storage of Small Seed Collections (1982)
— IBPGR *Ad hoc* Advisory Committee on Seed Storage — First Meeting (1982)
— The Design of Seed Storage Facilities for Genetic Conservation (1982)

## Information

*Bibliographies and Glossaries*

— A Bibliography of Plant Genetic Resources, by J.G. Hawkes, J.T. Williams, J. Hanson (1976)
— A Bibliography of Plant Genetic Resources — Supplement, by J.T. Williams (1976)
— English/Arabic Glossary of Plant Genetic Resources Terms, by W.G. Ayad (1979)

*Newsletters*

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

*IBPGR Annual Reports*

1976 1977 1978 1979 1980 1981

*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)
— 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)

**APPENDIX XI**

# ACRONYMS USED IN THE REPORT

| | |
|---|---|
| ACCT | - Agence de coopération culturelle et technique |
| ACRI | - American Cocoa Research Institute (USA) |
| ACSAD | - Arab Center for the Studies of Arid Zone and Dry Lands |
| ADB | - Asian Development Bank |
| ARARI | - Aegean Regional Agricultural Research Institute (Turkey) |
| ARC | - Agricultural Research Centre (Libya) |
| ARC | - Agricultural Research Corporation (Sudan) |
| AVRDC | - Asian Vegetable Research and Development Center (China) |
| BARI | - Bangladesh Agricultural Research Institute |
| BOSTID | - Board on Science and Technology for International Development (USA) |
| CASS | - Chinese Academy of Agricultural Sciences |
| CATIE | - Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica) |
| CEC | - Commission of European Communities - EC |
| CENARGEN | - Centro Nacional de Recursos Genéticos (Brazil) |
| CFI | - Commonwealth Forestry Institute (UK) |
| CGIAR | - Consultative Group on International Agricultural Research |
| CIAB | - Centro de Investigaciones Agrícolas del Bahío (Mexico) |
| CIAT | - Centro Internacional de Agricultura Tropical |
| CIMMYT | - Centro Internacional de Mejoramiento de Maíz y Trigo |
| CIP | - Centro Internacional de la Papa |
| CMEA | - Council for Mutual Assistance |
| CMPMF | - Centro Nacional de Pesquisa de Mandioca e Fruticultura (Brazil) |
| CNPIEC | - China National Publications Import and Export Corporation |
| CNR | - National Research Council (Italy) |
| CRI | - Crops Research Institute (Ghana) |
| CSIRO | - Commonwealth Scientific and Industrial Research Organization (Australia) |
| CTFT | - Centre technique forestier tropical (France) |
| DANIDA | - Danish International Development Agency |
| DSA | - Département des services agricoles (Upper Volta) |
| EC | - European Community |
| ECP | - European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources - UNDP/FAO |
| EGBC | - EUCARPIA Gene Bank Committee |
| EUCARPIA | - European Association for Research on Plant Breeding |
| EXIR | - Executive Information Retrieval |
| FAL | - Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft (Germany, Fed.Rep.) |
| FAO | - Food and Agriculture Organization of the United Nations |
| FONAIAP | - Fondo Nacional de Investigaciones Agropecuarias (Venezuela) |
| GERDAT | - Groupement d'études et de recherches pour le développement de l'agronomie tropicale (France) |
| GRIN | - Genetic Resources Information Network |
| GTZ | - Agency for Technical Cooperation (Germany, F.R.) |
| IARC | - International Agricultural Research Centre |
| IARI | - Indian Agricultural Research Institute |
| IBTA | - Instituto Boliviano de Tecnología Agropecuaria |
| ICA | - Instituto Colombiano Agropecuario |
| ICARDA | - International Center for Agricultural Research in the Dry Areas |
| ICRISAT | - International Crops Research Institute for the Semi-Arid Tropics |
| ICTA | - Instituto de Ciencia y Tecnologiá Agrícola (Guatemala) |
| IGF | - International Genetics Federation |
| IICA | - Instituto Interamericano de Cooperación para la Agricultura - OAS |
| IIE | - Institute of International Education (USA) |
| IITA | - International Institute of Tropical Agriculture |
| ILA | - International Lupine Association |
| ILCA | - International Livestock Center for Africa |
| ILRAD | - International Laboratory for Research on Animal Diseases |
| INIA | - Instituto Nacional de Investigação Agraria (Portugal) |
| INIA | - Instituto Nacional de Investigaciones Agrarias (Spain) |

| | |
|---|---|
| INIA | - Instituto Nacional de Investigaciones Agrícolas (Mexico) |
| INIA | - Instituto Nacional de Investigaciones Agropecuarias (Chile) |
| INIAP | - Instituto Nacional de Investigaciones Agropecuarias (Ecuador) |
| INIPA | - Instituto Nacional de Investigación y Promoción Agropecuaria (Peru) |
| INRA | - Institut national de la recherche agronomique (France) |
| INTA | - Instituto Nacional de Tecnología Agropecuaria (Argentina) |
| INTSOY | - International Soybean Program |
| IOCC | - International Office of Cocoa and Chocolate |
| IPB | - Institute of Plant Breeding (Philippines) |
| IRAT | - Institut de recherches agronomiques tropicales et des cultures vivrières (France) |
| IRAZ | - Institut de recherche agricole et zootechnique |
| IRCT | - Institut de recherches du coton et des textiles exotiques (France) |
| IRFA | - Institut de recherches sur les fruits et agrumes (France) |
| IRRI | - International Rice Research Institute |
| ISSCT | - International Society of Sugar Cane Technologists |
| IUBS | - International Union of Biological Sciences |
| IVRAZ | - Institut voltaïque de recherche agricole et zootechnique (Upper Volta) |
| IVT | - Institute for Horticultural Plant Breeding (Netherlands) |
| JUNAC | - Junta del Acuerdo de Cartagena - Andean Pact |
| LISA | - Laboratory for Information Science in Agriculture (USA) |
| MARDI | - Malaysian Agricultural Research and Development Institute |
| NARC | - National Agricultural Research Centre (Pakistan) |
| NBPGR | - National Bureau of Plant Genetic Resources (India) |
| NFTA | - Nitrogen Fixing Tree Association (USA) |
| NGB | - Nordic Gene Bank |
| NIAS | - National Institute of Agricultural Sciences (Japan) |
| NifTAL | - Lab for Nitrogen-fixation of Tropical Agricultural Legumes (USA) |
| NIHORT | - National Horticultural Research Institute (Nigeria) |
| NPGRL | - National Plant Genetic Resources Laboratory (Philippines) |
| NSSL | - National Seed Storage Laboratory (USA) |
| NVRS | - National Vegetable Research Station (UK) |
| OAS | - Organization of American States |
| OIV | - Office international de la vigne et du vin |
| ORSTOM | - Office de la recherche scientifique et technique outre-mer (France) |
| PARC | - Pakistan Agricultural Research Council |
| PCA | - Philippine Coconut Authority |
| PCARRD | - Philippine Council for Agricultural and Resources Research and Development |
| PGR | - Plant Gene Resources of Canada |
| PGRC | - Plant Genetic Resources Centre (Ethiopia) |
| PORIM | - Palm Oil Research Institute of Malaysia |
| PRCRTC | - Philippine Root Crops Research and Training Center |
| PRL | - Prairie Regional Laboratory (Canada) |
| RF | - Rockefeller Foundation (USA) |
| RRIM | - Rubber Research Institute of Malaysia |
| RTI | - Royal Tropical Institute (Netherlands) |
| SAC | - Scientific Advisory Committee |
| SADCC | - South African Development Coordination Conference |
| SEPASAT | - Survey of Economic Plants for the Arid and Semi-arid Tropics (UK) |
| SINARGEN | - Sistema Nacional de Recursos Genéticos (Peru) |
| SPII | - Seed and Plant Improvement Institute (Iran) |
| SRC | - Saskatchewan Research Council (Canada) |
| SVP | - Foundation for Agricultural Plant Breeding (Netherlands) |
| TAC | - Technical Advisory Committee - CGIAR |
| TISTR | - Thailand Institute of Scientific and Technical Research |
| TN/PGRCS | - Thai National Plant Genetic Resources Coordinating Subcommittee |
| UNA | - Universidad Nacional Agraria - La Molina (Peru) |
| UNDP | - United Nations Development Programme |
| UNEP | - United Nations Environment Programme |
| UPOV | - International Union for the Protection of New Varieties of Plants |
| USDA | - United States Department of Agriculture |
| VIR | - N.I. Vavilov Institute of Plant Industry (USSR) |
| WARDA | - West African Rice Development Association |
| ZIGuK | - Zentralinstitut für Genetik und Kulturpflanzenforschung (German Dem. Rep.) |

# LE POINT DES ACTIVITÉS DE L'ANNÉE

- Les plantes ayant une priorité absolue sont maintenant plus de 50; elles comprennent des plantes vivrières ainsi que d'autres plantes économiquement importantes à l'échelon mondial ou régional.
- En travaillant de concert avec les centres de recherche appropriés, les cinq Comités consultatifs (pour le blé, le maïs, le riz, le haricot *Phaseolus*, le sorgho et les mils) continuent à servir de lien entre le Conseil et les communautés mondiales des chercheurs et sélectionneurs travaillant sur ces plantes.
- En 1982, le Comité consultatif sur la conservation des semences a encouragé:
  — la révision de la publication sur les méthodes de conservation des semences; et
  — la publication d'un guide sur l'emploi de congélateurs pour les petites collections de semences.
- En 1982, plusieurs groupes internationaux d'experts ont été constitués et se sont réunis pour conseiller le CIRP sur: la banane et la plantain; le manioc; et la conservation *in vitro*.
- En 1982, le Conseil a presqué atteint le nombre de 100 000 échantillons de semences d'espèces prioritaires obtenus en finançant quelque 250 missions de collecte de matériel végétal.
  Le matériel collecté en 1982 comprenait:
  — 41 plantes à priorité absolue provenant de 31 pays dans 7 régions;
  — 28 plantes au second rang de l'ordre de priorité provenant de 35 pays dans 6 régions; et
  — 12 plantes au troisième rang de l'ordre de priorité provenant de 21 pays dans 6 régions.
- Les activités régionales ont continué à s'intensifier par:
  — la création de bureaux régionaux en Afrique orientale et en Amérique latine;
  — pour la première fois, le CIRP a établi pour l'Europe une liste prioritaire de collecte qui a été étendue aux pays de l'Asie du Sud-Est.
- L'exécution des programmes consacrés aux plantes s'est poursuivie en 1982, notamment pour:
  — les fourrages, avec la nomination d'un nouveau fonctionnaire chargé des cultures fourragères;
  — les légumes, avec la publication d'un répertoire complet des collections de ressources génétiques et de plusieurs rapports sur les ressources génétiques de certaines plantes.
- En 1982, les activités du programme d'information et de traitement des données ont compris:
  — la normalisation de la présentation des descripteurs et la publication de 9 listes, tandis que 35 autres sont en préparation;
  — la fourniture d'équipement informatique pour l'Equateur, Chypre et le Portugal;
  — la préparation de répertoires pour l'utilisation des ordinateurs dans les banques de gènes pour les collections d'avoine et de seigle et pour les fruits tropicaux;
  — l'organisation d'un stage international de formation sur la documentation et le traitement des données.
- En consultation avec les centres intéressés, le Conseil a désigné un réseau d'institutions responsables pour la conservation des collections de base des principales cultures vivrières du monde. Ce réseau a été agrandi en 1982 et le Conseil a financé plusieurs installations de stockage.
- En 1982, le Conseil a continué à financer la formation universitaire au niveau supérieur et aussi des stages de brève durée. Le but de ces cours était de mettre à la disposition des instituts s'occupant de matériel génétique le personnel technique de niveau moyen dont il a grand besoin.

# ASPECTOS SOBRESALIENTES DEL AÑO

- Actualmente hay más de 50 cultivos prioritarios; estos cultivos incluyen los alimenticios y otras especies económicas de importancia regional o mundial.
- Los cinco Comités Asesores para Cultivos (trigo, maíz, arroz, sorgo y mijo, y *Phaseolus*) continuaron, en estrecha colaboración con los centros internacionales correspondientes, el enlace entre el Consejo y las respectivas comunidades mundiales de científicos y mejoradores.
- En 1982, el Comité Asesor sobre Almacenamiento de Semillas estimuló:
  - la revisión de la publicación sobre el diseño de instalaciones para el almacenamiento de semillas; y
  - la publicación de una guía sobre el uso de congeladores para colecciones de semillas pequeñas.
- En 1982, se crearon grupos internacionales de trabajo de expertos y se celebraron consultas para asesorar al Consejo en: bananos y plátanos; soja; yuca; y conservación *in vitro*.
- Durante 1982, el Consejo se aproximó a la muestra número 100 000 de especies prioritarias a través de ayuda a un total de aproximadamente 250 misiones de recolección.
  Durante 1982, se recolectó material de:
  - 41 cultivos de primera prioridad en 31 países de 7 regiones;
  - 28 cultivos de segunda prioridad en 35 países de 6 regiones; y
  - 12 cultivos de tercera prioridad en 21 países de 6 regiones.
- Las actividades regionales aumentaron mediante:
  - la creación de oficinas regionales en Africa oriental y América Latina; y
  - el establecimiento de prioridades de recolección del CIRF en Europa y su ampliación en el sudeste de Asia.
- En 1982, continuaron progresando los programas para los grupos de cultivos, especialmente para:
  - forrajes, con el nombramiento de un oficial de forrajes; y
  - hortalizas, con la publicación de un directorio completo de colecciones de recursos genéticos y varios informes específicos sobre sus recursos fitogenéticos.
- En 1982, el programa de información y manejo de datos:
  - normalizó el formato para descriptores, publicó nueve listas de ellos y desarrolló la preparación de 35 listas adicionales;
  - facilitó material y equipo de computadoras a Chipre, Ecuador y Portugal;
  - siguió trabajando en la confección de directorios para el uso de computadoras en bancos de genes, colecciones de avena y centeno, y frutales tropicales; y
  - organizó un curso internacional de capacitación sobre documentación y manejo de datos.
- El Consejo ha designado, en consulta con los centros involucrados, una red de instituciones encargadas de mantener las colecciones mundiales de base de semillas de los principales cultivos alimenticios. Esta red se amplió en 1982 y el Consejo financió diversas instalaciones de almacenamiento.
- En 1982, el Consejo continuó su respaldo a la capacitación a nivel de postgrado y cursos cortos. Estos tienen por finalidad proporcionar a las unidades de germoplasma el personal técnico del que están tan necesitados.

## 去年的工作重点

* 现在有50多种第一优先的作物，包括粮食作物和其他具有全球性或区域性重要意义的作物。
* 五个作物咨询委员会（小麦、玉米、大米、高粱和谷子以及菜豆）与有关的国际农业研究中心协同工作，继续在本委员会与各个世界科学家团体之间进行联络工作。
* 1982年，种子储藏咨询委员会促成了：
  — 关于种子储藏设施设计的出版物的修改工作；
  — 关于收集小粒种子的快速冷冻箱的用法指南的出版工作。
* 1982年，成立了专家工作组，召开了磋商会议，就香蕉和大蕉、木薯以及离体保存问题，向本委员会提出建议。
* 1982年，本委员会通过它所支助的约250个样品收集小组，已接近完成其第10万个优先作物的种子样品收集工作。

  1982年，为下述作物收集了材料：
  — 来自7个区域的31个国家的41种第一优先作物；
  — 来自6个区域的35个国家的28种第二优先作物；
  来自6个区域的21个国家的12种第三优先作物。
* 区域活动增加，这是由于：
  — 建立了东非和拉美区域办事处；
  — 首次在欧洲建立了国际植物遗传资源委员会收集优先事项，以及此项工作在东南亚的扩大。
* 作物计划在1982年继续取得进展，特别是在：
  — 饲料方面，因为任命了一名新的饲料官员；
  — 蔬菜方面，因为出版了一份关于遗传资源收集品的名录和一些特殊作物遗传资源的报告。
* 1982年，情报和数据管理计划：
  — 对数据管理的描述符号的规格进行了标准化，出版了9份目录，另有35份在筹备之中；
  — 向厄瓜多尔、塞浦路斯和葡萄牙提供了计算机硬件；
  — 进行了关于在基因库、燕麦和黑麦以及热带水果方面的计算机使用名录的工作；
  — 举办了一期文献和数据管理培训班。
* 本委员会与有关中心协商后，指定成立了一个机构网，负责保存收集到的世界重要粮食作物种子的基础材料。这个网在1982年得到了扩充。本委员会为若干储藏设施提供了资金。
* 1982年，本委员会继续支持研究生和短训班一级的培训。这种培训班的目标是向种质机构输送迫切需要的中等程度技术人员。

## أهم أحداث العام

- يوجد الآن أكثر من خمسين محصولا لها الأولوية الأولى ، وهى تشتمل على المحاصيل الغذائية والأصناف الاقتصادية الأخرى ذات الأهمية العالمية والاقليمية .

- واصلت اللجان الاستشارية الخمس لمحاصيل القمح ، والذرة ، والأرز ، والذرة الرفيعة والدخن ، والفاصوليا ومراكز البحوث الزراعية الدولية المختصة القيام بدور حلقة الوصل بين المجلس الدولى للموارد الوراثية النباتية ومراكز العلماء كل على حدة فى أنحاء العالم .

- فى عام ١٩٨٢ ، شجعت اللجنة الاستشارية لتخزين البذور على الآتى :
  - مراجعة المطبوع الخاص بتصميم مرافق تخزين البذور
  - نشر دليل عن استخدام صناديق التبريد العميق لمجموعات البذور الصغيرة .

- شكلت فى عام ١٩٨٢ مجموعات عمل من الخبراء وعقدت المشاورات لتقديم الاستشارات للمجلس بشأن : الموز ، والموز الافريقى ، الكاسافا ، وحفظ النباتات داخل المختبرات .

- خلال ١٩٨٢ استطاع المجلس أن يجمع عددا يقترب من ١٠٠ ٠٠٠ عينة بذور للأصناف ذات الأولوية من طريق بعثات التجميع التى يقترب عددها من ٢٥٠ بعثة قدم لها الدعم .

- خلال ١٩٨٢ تم تجميع البذور للمحاصيل الآتية :
  - ٤١ محصولا من المحاصيل ذات الأولوية من ٣١ بلدا فى ٧ أقاليم ،
  - ٢٨ محصولا من المحاصيل ذات الأولوية الثانية من ٣٥ بلدا فى ٦ أقاليم ،
  - ١٢ محصولا من المحاصيل ذات الأولوية الثالثة من ٢١ بلدا فى ٦ أقاليم .

- وقد ازدادت الجهود الاقليمية من خلال :
  - انشاء المكاتب الاقليمية فى شرق افريقيا وأمريكا اللاتينية
  - تحديد أولويات جمع بذور المحاصيل بواسطة المجلس الدولى للموارد الوراثية النباتية لأول مرة فى أوروبا ثم امتد هذا النظام الى جنوب شرق آسيا .

- استمرت برامج المحاصيل تحقق تقدما خلال ١٩٨٢ ولا سيما فى المجالات الآتية :
  - أنواع العلف ، وذلك من طريق تعيين موظف جديد مختص بالأعلاف
  - الخضر ، وذلك من طريق نشر دليل كامل لمجموعات الموارد الوراثية النباتية ونشر العديد من التقارير عن الموارد الوراثية المحصولية النوعية .

- خلال عام ١٩٨٢ أنجز برنامج ادارة المعلومات والبيانات المهام التالية :
  - توحيد شكل استمارات التصنيف ونشر ٩ قوائم بينما بدأ اعداد ٣٥ قائمة اضافية مماثلة
  - تقديم معدات كمبيوترية لاكوادور ، وقبرص والبرتغال
  - البدء فى اعداد كتيبات عن استخدام آلات الكومبيوتر داخل مصارف الجينات وللشوفان والراى والفواكه الاستوائية
  - تنظيم دورة تدريبية عن التوثيق وادارة البيانات .

- عين المجلس بالتشاور مع المراكز صاحبة الشأن شبكة من المؤسسات المختصة بصيانة مجموعات بذور الأساس من المحاصيل الغذائية الرئيسية فى العالم . وقد امتد نطاق هذه الشبكة فى عام ١٩٨٢ ، وقدم المجلس التمويل للعديد من منشآت التخزين .

- وواصل المجلس خلال ١٩٨٢ دعمه لأنشطة التدريب على مستوى ما بعد التخرج أو الدورات القصيرة ، والهدف من هذه الدورات التدريبية هو تزويد معاهد البروتوبلازمات الجرثومية بالعاملين من المستوى المتوسط الذين تشتد حاجتها اليهم .