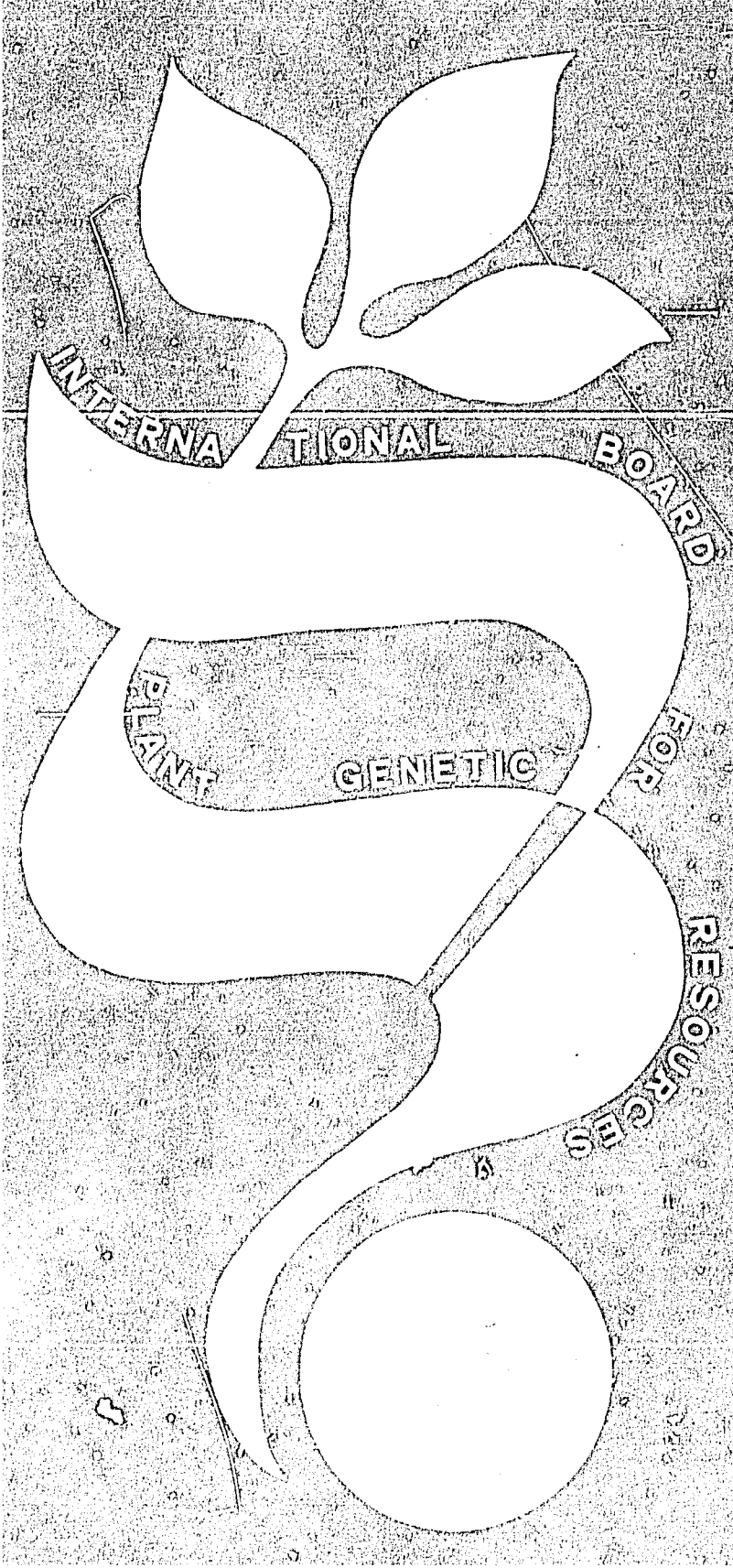


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PLANT GENETIC RESOURCES

CONSULTATIVE GROUP ON
INTERNATIONAL
AGRICULTURAL RESEARCH

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1981

ROME

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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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CONTENTS

	<i>Page</i>
Membership of the Board	V
Preface	IX
Highlights of the Year	XI
Crops	1
Introduction	1
Cereals	3
Food legumes	12
Vegetables	19
Fruits and tree nuts	26
Roots and tubers	29
Forages	34
Trees	35
Industrial crops	36
Regional Activities	43
Africa	43
East Asia and the Pacific	45
Europe	46
Mediterranean	47
Latin America	48
South Asia	52
Southeast Asia	54
Southwest and Central Asia	56
Conservation	61
Information and Data Management	71
Technical Conference	75
Training	79
Administration	83
Appendixes	85
I - Membership of the Secretariat	87
II - Crop Advisory Committees	88
III - Membership of the Regional Committee for Southeast Asia	92
IV - <i>Ad Hoc</i> Advisory Committee on Seed Storage	93
V - Membership of Crop Working Groups and Consultations on the Genetic Resources of Specific Crops Held in 1981	94
VI - IBPGR Publications	98
VII - Statement of Account for 1981	101
VIII - 1981 Contributions Received	102
IX - IBPGR Grants	103
X - Acronyms used in the Report	109
Le point des activités de l'année	112
Aspectos sobresalientes del año	114
أهم أحداث العام	116
去年的工作重点	118

Illustrations

<i>Figure</i>	<i>Page</i>
1 Countries where the IBPGR organized or collaborated in collecting cereals during 1981	4
2 Countries where the IBPGR organized or collaborated in collecting food legumes during 1981	14
3 Countries where the IBPGR organized or collaborated in collecting fruits and vegetables during 1981	24
4 Countries where the IBPGR organized or collaborated in collecting roots and tubers during 1981	30

Tables

<i>Table</i>	
1 Global crop priority	2
2 Action plan for first priority crucifers	21
3 Some Andean regional responsibilities for conservation	50
4 IBPGR network of base centres for seed crops	62

PREFACE

During 1981 considerable time was spent on a revision of the publication *Priorities among Crops and Regions* that had been issued by the International Board for Plant Genetic Resources in 1976. The revision was needed in order to take account of extensive, accurate data that had been accumulated since the mid-seventies. These data were provided firstly by crop and regional consultations organized by the Board and secondly by analysis of information resulting from a large number of IBPGR-sponsored field missions.

The grouping of countries into fourteen regions remains essentially unaltered, although higher priority is now to be given to Central Asia and East Asia.

Whereas in 1976 eight crops were assigned a first priority, at least in particular regions, the recent revision now includes over fifty first priority crops. This will require accelerated efforts and this report describes the action taken or proposed.

The increase in the number of high priority crops produces a corresponding increase in the scope of activities. The overall work programme is defined in a report entitled *The IBPGR in the Eighties: A Strategy and Planning Report*, approved by the Board at its eighth meeting in February and published in April 1981. Such a plan is essential to coordinate properly a programme of work which embraces many countries. The programme expanded from action in a handful of countries during the first year of the Board's operation to current activity in over seventy. By the end of 1981 the Board had had some influence in all of its fourteen regions and had taken action on a large number of its priority crops.

The production of a strategy and long-term programme was not the first exercise of this kind. An earlier report was made available in 1978 and the Board will continue periodically to take a hard look at its work.

At its eighth meeting, the Board also agreed to pay more attention to the conservation of clonally propagated crops and to support more research where this is necessary for the practi-

cal implementation of its programmes. The implications of these decisions are included in the strategy report.

A highlight of 1981 was the international Technical Conference sponsored by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP) and the IBPGR, held in Rome 6-10 April. This was the fourth conference of its kind and 54 countries participated as well as CGIAR centres and inter-governmental and non-governmental organizations. In general this Conference fully endorsed the major thrusts of the IBPGR programme.

The Annual Report highlights the expansion of the Board's programme. The IBPGR has been extremely active with field work in an attempt to collect valuable germplasm. Substantial progress has also been made in the conservation, characterization and documentation of material. In addition, support has been given to training activities which provide adequate human resources for genetic conservation work throughout the world.

In all its activities the IBPGR follows the important principles originally promulgated by FAO:

- i) material will be freely and fully available to all who can make use of it for the benefit of mankind; and
- ii) duplicates of material collected are always left in the country of origin.

A matter of general interest, directly related to this report, is the wide publicity recently given in the press to genetic engineering and its relevance to plant breeding. The uninformed may consider that new techniques could replace the need for large germplasm collections. However, evidence points to the contrary: genetic engineering, in its most productive form, will involve the artificial transfer of naturally-occurring genes. When collections of germplasm are thoroughly evaluated and documented these genes will be the more readily available, whatever the techniques in

use. The role of the IBPGR will, therefore, be seen to be of extreme importance in the successful utilization of the "new genetics".

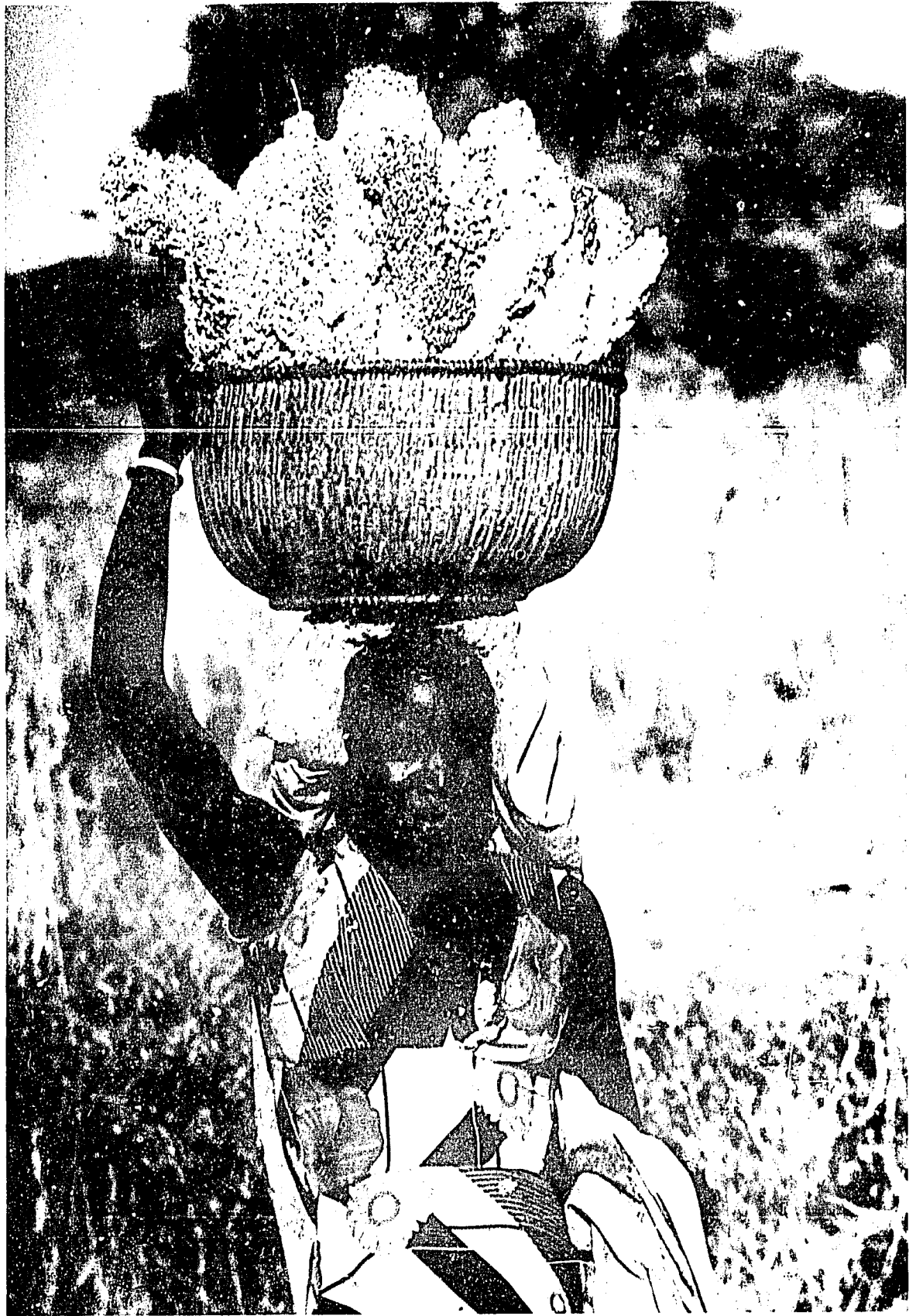
It is a pleasure to record the loyalty and industry of the staff of the IBPGR, the support

of FAO and the excellent cooperation with the crop centres of the CGIAR, other regional and national centres and the breeders and scientists without whose cooperation our tasks would be so much more difficult, if not impossible.

J.T. Williams
Executive Secretary

HIGHLIGHTS OF THE YEAR

- The Board co-hosted, along with FAO and UNEP, the Fourth Technical Conference on Crop Genetic Resources. Delegates were present from over 50 countries, from the CGIAR centres, inter-governmental organizations, non-governmental organizations and many others involved in crop genetic resources work.
- The Board revised its crop and regional priorities in 1981. There are now over 120 crops within the Board's programme, although only a limited number will receive high priority attention. High priority crops include food plants and other plants of global or regional importance.
- The five Crop Advisory Committees (for wheat, maize, rice, sorghum and millets and *Phaseolus* beans), operating in conjunction with the appropriate IARC, serve as a bridge between the Board and the global community of scientists working on these crops. In 1981 the five committees advised the Board on proposals for collecting missions; and the Wheat, Rice and Sorghum and Millets Committees met and reviewed ongoing work.
- With reference to the multifaceted information programme:
 - Lists of accessions held at the principal genetic resources centres have been published in new directories of holdings for rice, sorghum and millets, some industrial crops and barley.
 - As a consequence of expert Working Groups or Crop Advisory Committee consultations, additional lists of descriptors have been published for groundnut, pearl millet and pigeonpea (in collaboration with ICRISAT); almond, lupin and sesame. A revised list was issued for wheat. Additional descriptor lists were published as appendixes to crop genetic resource documents for sweet potato, *Theobroma*, amaranths, crucifers and tomato.
 - The Board assisted several countries in the provision and installation of appropriate documentation systems for the storage and retrieval of information concerning their crop genetic holdings.
- In 1981 a number of expert Working Groups were formed and consultations were held to advise the Board on global action for barley, sugarcane, *Vigna* and *Citrus*.
- The Board supported and organized a series of collecting missions in the following regions: Mediterranean, Southwest and Central Asia, South Asia, Southeast Asia, East Africa, West Africa and Central and South America.
- Regional activities have continued to expand through:
 - The appointment of a Regional Officer for West Africa.
 - The sponsorship, with ICA and JUNAC of a regional meeting to increase cooperation and to devise a plan of action for the Andean zone.
 - A consultant investigation of the plant genetic resources of the Pacific region.
- A new initiative started in 1980 on tropical fruits continued and the Board's programme on vegetables was accelerated.
- Following a world survey of wheat genetic resources the Board appointed a Wheat Officer to accelerate the task of putting the major collections into order and to stimulate evaluation.
- The Board has designated, in consultation with the centres concerned, a network of institutions responsible for maintaining the world's major base collections of seeds of the principal food crops. This network was expanded in 1981 and the Board funded a number of storage facilities.
- In 1981 the Board continued to support training at the technical and post-graduate level in an attempt to expand the numbers of personnel in the developing world who are trained for genetic resources work: short courses and fellowships were organized. In addition, a decision was taken to start training aimed at extension workers in 1982 at the non-graduate level.
- In the past the Board agreed, as a matter of policy, to support limited research in areas where the results would accelerate the practical work of the Board. Projects supported were all associated with conservation methodology.



CROPS

Introduction

When the Board identified its priorities for action in 1976 a number of crops were designated for further study: these included coconut, grape, fruits, vegetables and forages. Since that time a number of consultations have been held and studies commissioned which provide a basis for clear decisions. In addition the Board has received continuing advice on five major crops from Crop Advisory Committees in cooperation with the appropriate International Agricultural Research Centre (IARC). These are a **Rice** Committee, co-sponsored by the International Rice Research Institute (IRRI); a **Maize** Committee, co-sponsored by the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT); a **Sorghum and Millets** Committee co-sponsored by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); a **Phaseolus** Committee co-sponsored by the Centro Internacional de Agricultura Tropical (CIAT), and a **Wheat** Committee co-sponsored by CIMMYT with the participation of the International Center for Agricultural Research in the Dry Areas (ICARDA).

These Crop Committees provide a bridge between the IBPGR and the user communities and result in advice concerning action to be taken to collect, conserve, document and make available the genetic resources of these crops. In all cases the IARCs have been very cooperative and those mentioned above as well as the Centro Internacional de la Papa (CIP) act as important centres in the global genetic resources network.

Although other crops had been accorded priorities, the Board has found it necessary to hold *ad hoc* Working Groups to obtain the best advice on action to be taken. In addition to those mentioned above, Working Groups met during 1977-80 inclusive on banana, beet,

Capsicum, cassava, coffee, cruciferous crops, groundnut, lupin, sweet potato, taro, *Theobroma*, winged bean, and yam and in 1981 on barley, *Citrus*, sugarcane and *Vigna* species.

Based upon the recommendation of Crop Advisory Committees, Working Groups and the advice received from regional meetings, the Board was able to revise its crop priorities in 1981.

Table 1 shows the highest global priority crops on which the board will concentrate attention. The categories of crops include major food crops and non-food crops. A review of the CGIAR system undertaken by the CGIAR and presented at its annual meeting in November 1981 included a recommendation, subsequently adopted, that the IBPGR should continue to work on non-food crops.

Table 1 does not include crops of global third and fourth priorities, except where these have a higher priority in one or more of the 14 recognized regions. The full list is to be found in *Revised Priorities among Crops and Regions* issued in June 1981.

The Board has detailed information on a large number of the more than 120 crops for which it has priorities. This information has been the base for the global plan of action developed in 1980 and itemized in the strategy and long-term planning report mentioned in the preface.

The Board is also concerned to promote the documentation of important germplasm collections and lists of internationally acceptable descriptors are necessary for this task. By the end of 1981 the Board had published lists of descriptors for 26 crops and had initiated action on others. Work continued on the compilation of information of genetic resources collections in the form of directories and by the end of the year the major crops had been covered. The

Table 1. *Global crop priorities*

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

directories have proven to be extremely useful in the information network and have pointed to the fact that a large number of collections have not been characterized or evaluated.

The Board intends to devote more effort to ensuring that information on characterization and preliminary evaluation is available, especially since it has been accepted that work in this area is an important task for genetic resources centres. Many centres need stimulation to gather such data during multiplication or regeneration. Ideally passport data should always be sent to the recipients of subsamples for which there are key identifiers, e.g. collector's name and number and the number given by the institute holding the sample. More emphasis has to be given by curators to the improvement of information exchange and by the users to the feedback of information.

This section of the Annual Report emphasizes collecting activities. Such activities will remain a major thrust for the IBPGR due to

the urgency with which much of the work has to be done. As a result of the Board's work over the past few years there are now many more germplasm collections available than hitherto, but much still remains to be done in all parts of the world.

The Technical Conference emphasized that the collection of wild relatives of most crops has been woefully inadequate. This is especially true for cereals. More importantly, such material in collections has been inadequately evaluated even though wild relatives have in the past proven to be valuable sources of resistance to diseases, pests, cold, heat; and for diverse growth habit, cytoplasmic male sterility and others. Further action needs to be stimulated to collect more wild material and to transfer valuable characters of wild species into breeding lines of cultivated plants. This will give breeders a wider range of valuable characters that can be rapidly integrated into their programmes.

CEREALS

From its creation the IBPGR has laid emphasis on major cereals — wheat, rice, maize, sorghum and millets — because for much of the world's population cereals are the most important staple food. Modern varieties are rapidly replacing the landraces in the centres of diversity and the IBPGR has attempted to organize the collection of these landraces wherever possible (see Fig. 1).

As reported in the 1980 Annual Report, much of the field work has been completed for maize. Rice is well covered by the IRRI programme and the IBPGR has only had to supplement this to a limited extent in Asia and through the organization of work in Africa. Considerable field work is still needed for sorghum and millets, especially in Africa.

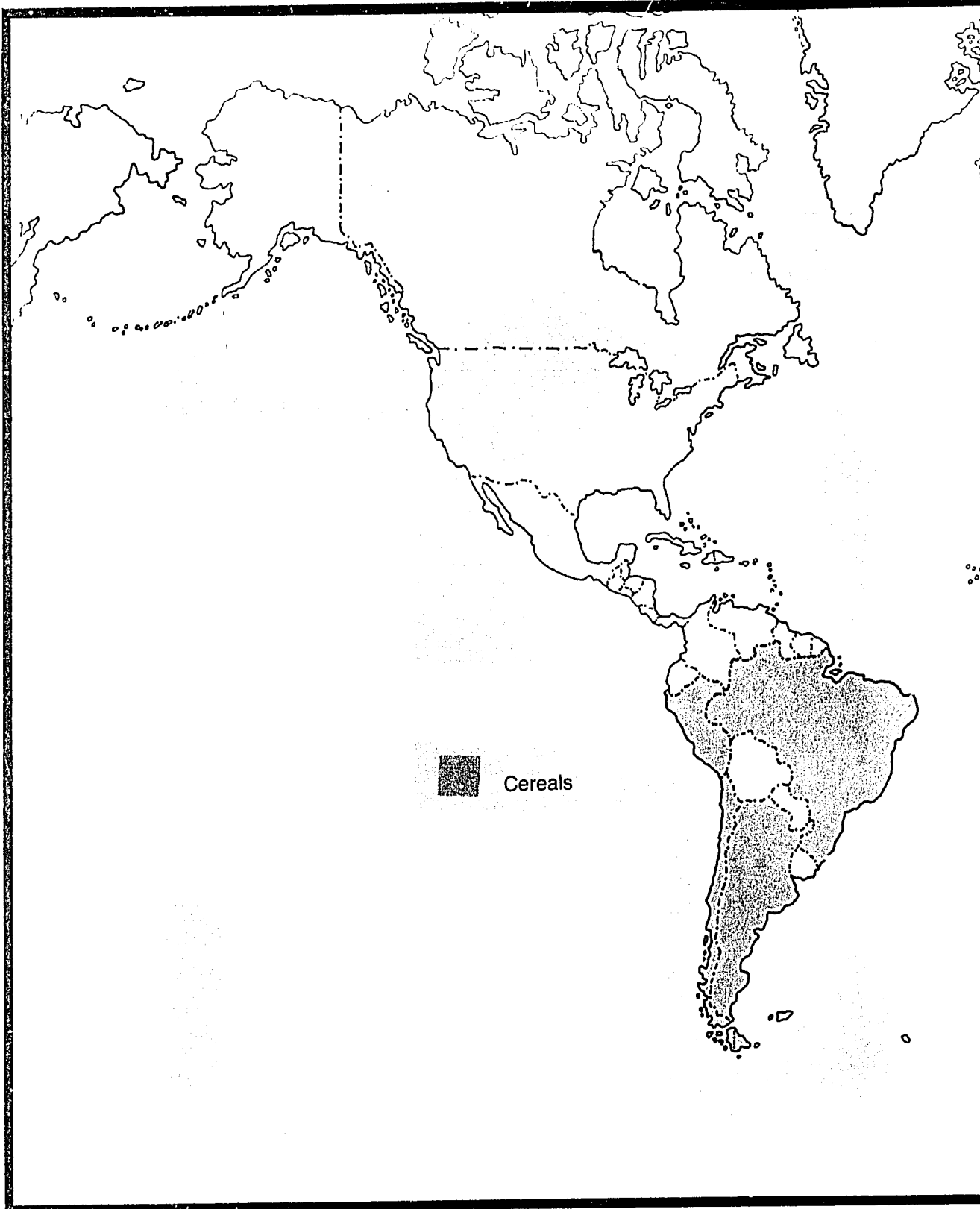
For wheat the Board reported early in 1981 that despite substantial holdings around the world it is evident that a great deal of work still remains to be done and consequently an IBPGR Wheat Officer was appointed, late in

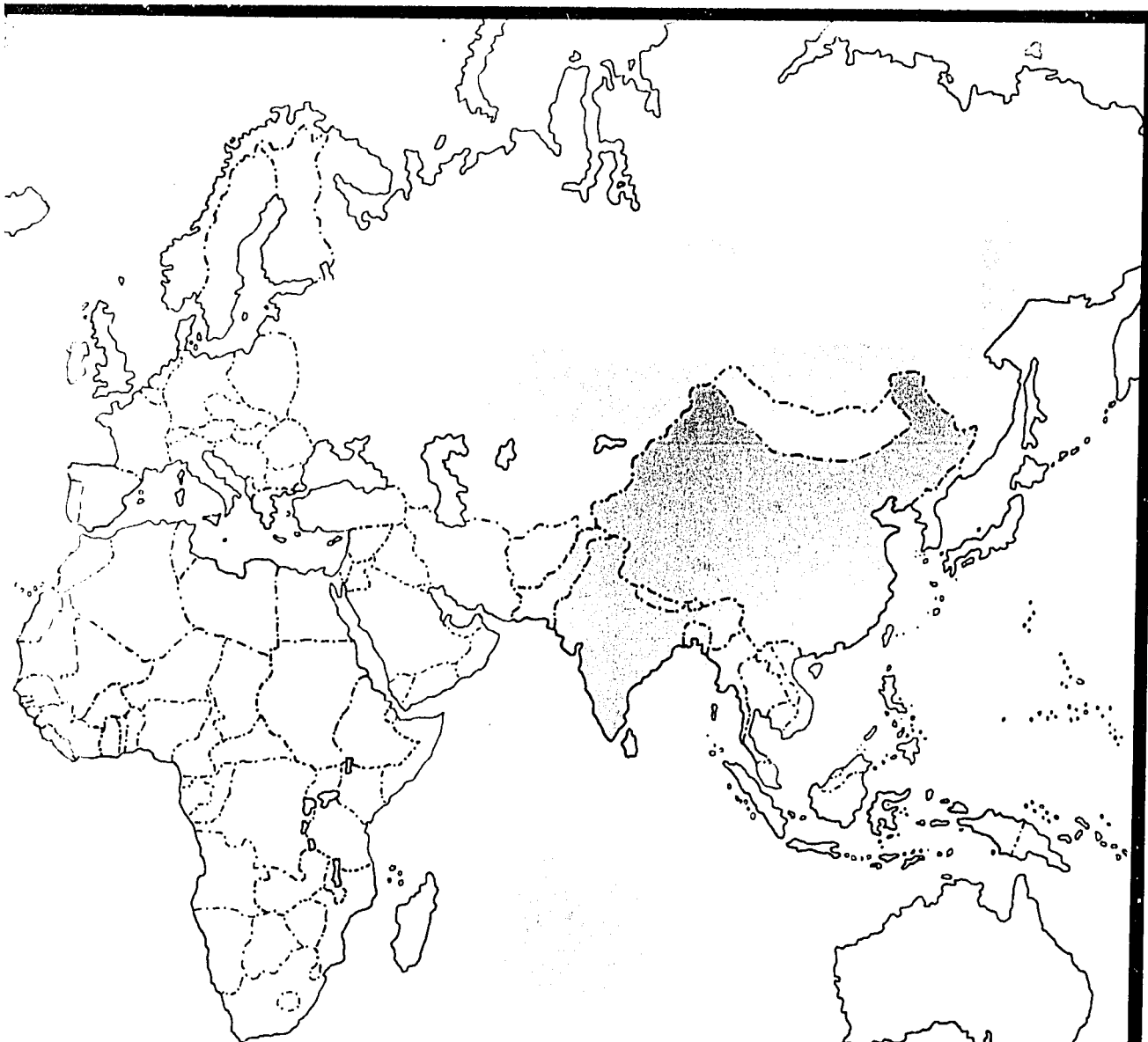
1981, to stimulate this work.

In addition the Board moved ahead with barley by convening an *ad hoc* Working Group in July 1981, on the occasion of the Fourth Barley Genetics Symposium. In association with ICARDA, this will lead to a more concerted approach to this crop in future years. Previously collecting had been carried out in the context of regional and national activities.

Those cereals with lower global priorities, e.g. rye, oats (and also grains such as quinoa and amaranths) will continue to receive attention in a regional context.

The Board continued to maintain various levels of interaction between curators and plant breeders largely through its Committees and through the IARCs. It continues to be conscious that many major collections need to be *put in order* and that they should be rationalized in the future so that size of collection is not infinite and the work of maintenance and evaluation can be practicable.





Wheat

Bhutan
Ethiopia
Greece
Jordan
Libya
Pakistan
Sudan
Syria

Barley

Bhutan
Ethiopia
Jordan
Libya
Pakistan
Sudan
Syria

Rice

Bangladesh
Bhutan
Burma
China
Guinea
India
Indonesia
Nepal
Sri Lanka
Thailand
Zambia

Maize

Argentina
Brazil
Bhutan
Chile
Korea, Rep. of
Pakistan
Peru
Spain
Upper Volta
Zambia

Sorghum & millets

Bhutan
Ethiopia
Ghana
Mali
Mozambique
Pakistan
Sudan
Upper Volta
Zambia

Figure 1. Countries where the IBPGR organized or collaborated in collecting cereals during 1981

WHEAT

Although much collecting has been carried out by scientists and institutes around the world, wheat and its wild relatives still remain a high priority for action by the IBPGR. In the *Revised Priorities among Crops and Regions*, wheat has still been given a first priority for action, especially in the Mediterranean, South-west Asia and the Himalayas.

The IBPGR published *A World Survey of Wheat Genetic Resources* in February 1981. The report provides the summary data of major wheat collections. These data are helpful in identifying the gaps in the taxonomic range of wheats and relatives, as well as gaps in geographic areas, and in defining priorities for future collections.

The third meeting of the Advisory Committee on Wheat Genetic Resources was held at CIMMYT, Mexico in January 1981. The Committee reviewed the results of the collecting missions since 1978 and revised the priorities for action both in relation to political feasibility and apparent gaps in the collections. The following are the first and second global priority areas for various *Triticum* species.

PRIORITY 1

Mediterranean

Albania	
Algeria	Tindouf area
Egypt	For <i>durum</i>
Libya	Coastal highlands and wadis (south of Tripoli)
Portugal	Northeast Portugal
Spain	Northern Spain
Yugoslavia	For <i>T. monococcum</i>

Southwest and Central Asia

Afghanistan	
Iran	Azerbaijan, Elburz Mountains, Masad
Iraq	Sulaimaniga region
Jordan	
Lebanon	
Oman	Mountainous regions including Dhufa
Yemen, Democratic	Mountainous regions bordering on Yemen Arab Republic and Hadhramaut

Saudi Arabia Hejaz region along the Red Sea, adjacent to Yemen Arab Republic and Abha Asir regions

South Asia

Bhutan

PRIORITY 2

Africa

Ethiopia
Mozambique

Mediterranean

Morocco

Central, South and East Asia

Burma
China, People's Republic
Korea.
Republic of
USSR
Especially in the west and Tibetan regions
Especially the Caucasus (Armenia and Georgia)

South America

Bolivia
Uruguay

The Committee also identified countries in which the collection of *Aegilops* species should be accelerated. These are: Afghanistan, Algeria, Cyprus, Egypt, France, Greece, Hungary, Israel, Italy, Lebanon, Libya, Morocco, Romania, Spain (including the Canary Islands), Tunisia and Yugoslavia.

The report of an IBPGR pilot project on wheat evaluation was used to draw up a revised list of descriptors for wheat. This was issued by the IBPGR in May 1981.

The Committee again emphasized the need for a full-time officer to carry out the recommendations of the Committee. One of the tasks of the Wheat Officer would be to identify duplicates in the existing collections. Based upon this recommendation, the IBPGR appointed a Wheat Officer in November 1981; he is based in Washington, D.C., USA and will receive technical assistance from the US Small Grains Collection, Beltsville, Maryland.

During 1981, in collaboration with the participating national programmes and agencies, the IBPGR fielded expeditions in Ethiopia,

Sudan (two missions) and Bhutan for the collection of wheat germplasm.

In **Bhutan** some middle Himalayan areas were explored and 24 samples of *T. aestivum* collected (see p. 53). A few samples each of *T. diococcon* and *T. durum* were collected in the Arsi and Gemu Gofa regions of **Ethiopia** (see p. 45). In Jebel Marra and Darfur provinces of the **Sudan**, 47 accessions of *T. aestivum* were collected (see p. 44).

In Southwest Asia, in collaboration with the respective national programmes, the regional programme organized collecting expeditions in **Jordan** and **Syria** during May-June 1981 (see p. 58). These missions concentrated on *Aegilops* germplasm, collecting 59 accessions in Jordan and 56 in Syria. An IBPGR multi-crop expedition to the Baluchistan province of **Pakistan** collected 294 samples of wheat and wild relatives during May-June (see p. 57).

The IBPGR Mediterranean Programme collected large numbers of wild wheat and *Aegilops* during its second mission in **Greece** in July 1981 and 32 samples of wheat in **Libya** during May-June 1981.

Since 1972 the CIMMYT wheat programme has maintained an active collection of bread and *durum* wheat, triticale and barley under short-term cold storage conditions. During 1981 construction of storage facilities was initiated and they are expected to be fully functional during the first half of 1982 at which time the genebank will accommodate ca. 90 000 samples (1 kg each) for medium-term storage and ca. 100 000 samples (50-100 g each) for short-term storage. A curator joined CIMMYT in October and inventory of the existing collection and relevant evaluation has begun. At present there are ca. 70 000 samples in the active collection, 10 000 of which have been grown during the 1981-82 winter for regeneration, characterization and evaluation purposes.

BARLEY

In July 1981, an IBPGR *Ad Hoc* Working Group on Barley reviewed the existing collections and identified the priorities below for the collection of both wild and cultivated barley. The membership of the Working Group is shown in Appendix V.

PRIORITY 1

Mediterranean: Algeria, Greece, Morocco and Tunisia
East Asia: China (especially Tibet)
South Asia: Nepal (western hill regions)
Central Asia: Pakistan (Waziristan and the coastal region of Baluchistan)

PRIORITY 2

Mediterranean: Egypt, Libya and Yugoslavia
Europe: Austria, Czechoslovakia, Poland and Romania
East Asia: Mongolia
Central Asia: Iran and the Soviet Caucasus and Turkmenistan region
Southwest Asia: Iraq, Lebanon and Democratic Yemen

PRIORITY 3

South Asia: Bhutan and India

The Group finalized a list of barley descriptors and the list will be published early in 1982. In addition the Secretariat completed a directory of barley germplasm which went to press at the beginning of 1982.

Thirty samples of *Hordeum vulgare* (including samples of naked barley) were collected during a multi-crop collecting mission in **Bhutan** (see p. 53). In **Ethiopia** 129 samples were collected (see p. 45) and an additional small number of samples of *Hordeum* were collected in Jordan, Syria and Sudan. In **Pakistan** nearly 100 samples of *Hordeum* and wild relatives were collected (see p. 57). The IBPGR Mediterranean Programme's cereal mission to **Libya** during May-June 1981 gathered 24 samples of barley.

RICE

Considerable progress has been reported in the last decade on rice genetic resources. IRRI has taken a lead in organizing systematic plant exploration missions in tropical Asia with collaboration from national programmes. In most rice-growing countries, sizeable germplasm collections were in existence and, with the increasing awareness of the usefulness of genetic resources, collection work was expanded.



Tribal woman, Jeypore, India, harvesting wild rice (T.T. Chang)

Japanese plant explorers, French workers and their associates in West Africa at the Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT) and the Office de la Recherche Scientifique et Technique d'Outre-Mer (ORSTOM), FAO, the International Institute of Tropical Agriculture (IITA), the West African Rice Development Association (WARDA) and several other scientists and/or organizations were concerned with germplasm collection. A five-year plan to collect, conserve and rejuvenate rice germplasm stocks was formulated in 1977 under the leadership of IRRI and the IBPGR (see 1977 Annual Report). Following the formulation of this plan collection in Asia and Africa has been intensified.

The IBPGR Committee on Rice, jointly sponsored by IRRI, has recommended to the Board practical action which has been supported. The IBPGR has made funds available to IRRI to coordinate and collect in several countries of East, South and Southeast Asia during 1980-81. The countries cooperating in-

clude Bangladesh, Burma, China, India, Indonesia, Nepal, Sri Lanka and Thailand. There were numerous missions in these countries and the material collected is being shared between the participating nations and the IRRI genebank.

In 1980 the Board also provided funds to the national programme in **Thailand** for the collection of high altitude rice and this project was completed in 1981.

The Genetic Resources Unit of IITA has carried out 37 missions in 18 African countries, 1976-80, and collected ca. 4 400 accessions of rice (including *Oryza sativa*, 3 155; *O. glaberrima*, 991; and wild species and natural hybrids, 250). Evaluation and cataloguing of the material is in progress.

The Research Department of WARDA fielded missions in Nigeria, Mali and Senegal in 1979 and 1980. Samples collected totalled: Nigeria, 562 (*O. sativa*, 308; *O. glaberrima*, 237; *O. longistaminata*, 9; *O. barthii*, 6 and *O. stapfii*, 2); Mali, 104 (including *O. sativa*, *O.*

glaberrima, *O. longistaminata* and *O. barthii*); and Senegal, 62 samples of *O. sativa* and 19 samples of *O. glaberrima*.

During 1980-81 the IBPGR provided financial assistance to IRAT/ORSTOM to collect African rice germplasm in **Guinea**. This work will be continued in 1982.

In addition to giving support to the national, regional and international organizations, IBPGR multi-crop missions resulted in 82 rice samples from **Bhutan** (p. 53), and 29 samples from **Zambia** (p. 45) in 1981.

The IBPGR compiled information on rice germplasm holdings and published a directory in 1981.

The third meeting of the IBPGR/IRRI Rice

Committee was held at the Central Rice Research Institute (CRRRI), Cuttack, India, 28-29 September 1981. Following the meeting the Committee visited the Jeypore tract of Orissa State to observe and collect wild species since the theme of the meeting was collection and conservation of wild rices.

Although there is no immediate interest in the utilization of wild species, rice workers do have a long-term interest in using wild material in breeding. There is rapid disappearance of the species due to changes in the ecology of their natural surroundings, and hence an urgent need for conservation while it is still possible.

Of 19 wild species, the Committee assigned priorities for collection as follows:

Priority	Genome	Continent	Species
1	A or its subgenomes	Asia Africa Australia America	<i>rufipogon</i> , <i>nivara</i> , <i>spontanea</i> <i>barthii</i> , <i>longistaminata</i> , <i>stapfi</i> <i>meridionalis</i> <i>rufipogon</i> subsp. <i>cubensis</i>
2	C, CD, BC and E	Asia Africa Latin America Australia	<i>officinalis</i> , <i>minuta</i> <i>eichingeri</i> , <i>punctata</i> <i>alta</i> , <i>grandiglumis</i> , <i>latifolia</i> <i>australiensis</i>
3	F taxa of undetermined genome(s)		<i>brachyantha</i> <i>granulata</i> , <i>longiglumis</i> , <i>meyeriana</i> , <i>ridleyi</i> , <i>schlechteri</i>

To accelerate field work, the Committee suggested the need for specialist training courses on collection of wild rices. The Committee has also asked the Board to request IRRI to serve as a world depository for base storage of wild rice.

MAIZE

The IBPGR has been supporting the collection of landraces of maize in the centres of diversity for the past four years. The work has been systematically carried out in Argentina, Bolivia, Brazil, Paraguay, Peru and Uruguay with the result that more than 4 500 samples have been collected. Material is kept in the following institutions:

- Argentina: Estación Experimental, Pergamino of the Instituto Nacional de Tecnología Agropecuaria (INTA) and the Universidad de Buenos Aires
- Bolivia: Centro de Investigaciones Fitoecogenéticas, Pairumani
- Brazil: Centro Nacional de Recursos Genéticos (CENARGEN)
- Paraguay: Instituto Agronómico Nacional (IAN)
- Peru: Universidad Nacional Agraria (UNA), La Molina
- Uruguay: Universidad de la República;

and duplicates of collections are in CIMMYT, Mexico and/or the National Seed Storage Laboratory (NSSL), USA.

Details of the programmes supported by IBPGR in 1981 are itemized below.

In **Argentina**, INTA collected in the south-west province of Buenos Aires and the north-east province of La Pampa. 131 samples of 12 groupings were collected. Also in Argentina the Facultad de Agronomía of the Universidad de Buenos Aires collected landraces in isolated localities of Jujuy and Salta provinces which had not been covered in previous expeditions and 99 samples were obtained.

In **Brazil** a programme, carried out by CENARGEN/Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) to collect in the Amazon region continued in 1981. A total of 119 samples of traditional races were obtained in the Federal Territory of Roraima (northern Brazilian Amazon). Forty-five other maize populations were collected in the Xingu National Park, Mato Grosso State. During field missions for other crops in the states of Acre, Goiás and Minas Gerais, CENARGEN collected several samples of maize used by small farmers.

In **Chile**, the Instituto Nacional de Investigaciones Agropecuarias (INIA) continued to collect and by March/June 1981 three missions had been carried out to Atacama and Valparaíso, Santiago and Ñuble, and Bio Bio and Llanquihue. A total of 261 accessions were obtained in 1981 and collection will continue in 1982.

IAN, **Paraguay** has continued from 1979 to collect in the northeast, east-central and south-east zones of the country, as well as the area bordering Brazil.

The maize programme of UNA, La Molina, **Peru**, continued to collect in the Peruvian jungle. The programme has already fielded several missions in the departments of San Martín, Madre de Dios, Junín, Cajamarca, Loreto, Ucayali, Cerro de Pasco, Amazonas and Huánaco and a total of 374 samples (164 in 1981) have been collected.

In **Spain** the Instituto Nacional de Investigaciones Agrarias (INIA) collected 200 samples throughout the country. The work will continue in 1982. It is coordinated by the experimental stations in Alcalá de Henares (Madrid) and La Coruña. To date, it has covered portions of regions of Galicia, Asturias, Santander, Vascongadas, Navarra, Aragón, Cataluña, Baleares, Meseta del Duero, Castilla la Nueva, Mancha, Extremadura, Levante, Murcia, Andalucía and the Canarias.



Korean maize with multiple tillers

Local maize lines in the **Republic of Korea** were collected and evaluated, through IBPGR support, by Choong-Nam University, Daejeon.

In addition maize germplasm was also collected during multi-crop collecting missions in **Malawi**, **Sudan** (p. 44), **Upper Volta** (51 samples - p. 44), **Zambia** (160 samples - p. 45), **Bhutan** (47 samples - p. 53) and **Pakistan** (60 samples - p. 57).

Upon the recommendation of the Maize Committee and as a part of the information programme, the IBPGR continued to support a regional cooperative project to characterize the collections of maize made in Peru and the Southern Cone and to make interracial composites. National institutes in Bolivia, Brazil, Chile, Peru and Uruguay are participating in this project (see p. 72).

SORGHUM AND MILLETS

Sorghum, pearl and finger millet are important in the daily diets of most of the peoples of Africa and in parts of South Asia. From its inception the IBPGR has given highest priority to the collection and conservation of sorghum and millet germplasm. Emergency collection of

millet in the drought-hit Sahelian zone was organized in 1975 by FAO/IBPGR with UNEP funding. Subsequently, an IBPGR Committee on Sorghum and Millets, co-sponsored by ICRISAT, was established in 1976. Following the recommendations of the Committee, the Board has organized and/or supported the collection of sorghum and millets in a number of priority areas in Africa. Together with national programmes, the IBPGR, ICRISAT, IITA and ORSTOM/IRAT individually and/or collectively have participated in collection missions in Africa.

In 1981 the exploration and collection was continued both by the IBPGR and ICRISAT in the following countries: Ethiopia, Ghana, Mali, Mozambique, Sudan, Upper Volta and Zambia.

The IBPGR, together with the Plant Genetic Resources Centre (PGRC), **Ethiopia**, collected sorghum and finger millet from November 1980 to January 1981 in Goudam, Gojam, Arsi and Gemu Gofa regions. In February 1981 a joint ICRISAT/PGRC mission collected zera-zera types of sorghum from the Gambella region.

In **Ghana** ICRISAT, in collaboration with the Plant Introduction and Exploration Unit (PIE), Crops Research Institute of Ghana (CRI), collected sorghum and millets in June 1981 and further collection is planned for 1982-83.

A joint IBPGR/ICRISAT team, in association with national scientists, explored the Nampula and Zambezi regions of **Mozambique** during April-May 1981 and collected 26 samples of sorghum and 14 samples of pearl millet and wild relatives (see p. 43).

In **Sudan** 35 sorghum and 35 pearl millet samples were collected in November 1981 by IBPGR/ARC/Jebel Marra Development Project to the west of the Jebel Marra mountains (p. 44) and in multi-crop missions in **Bhutan** and **Pakistan** 54 and 50 samples were obtained respectively (see p. 53 and p. 57).

The IBPGR provided funds to the Institut Voltaïque de Recherche Agricole et Zootechnique (IVRAZ), **Upper Volta**, which together with the IBPGR Regional Office for West Africa, explored the northern, eastern, and southern regions of the country in October-November 1981 and collected over 300 samples of sorghum and millet. A second mis-



sion, in November and December 1981, visited western Upper Volta and collected a wide range of variability of pearl millet, sorghum and fonio millet (310 accessions in total - see p. 44).

In association with Malian scientists, the IBPGR and ICRISAT collected 337 samples of pearl millet and sorghum in the sixth and seventh regions of **Mali**, December 1981 to January 1982 (p. 44).

A second IBPGR mission in **Zambia**, April-June 1981, in collaboration with local scientists, collected samples of sorghum (155), pearl millet and wild relatives (127), and finger millet (63) from Copperbelt, Western, Central, Southern, and Luapula provinces (see p. 45).

In October 1981 the Sorghum and Millets Committee held its fourth meeting in Dakar, Senegal. It reiterated the priorities for the collection established at previous meetings and pointed to the need for a regional storage and maintenance facility in Africa.

A descriptor list for pearl millet was finalized during 1981 and was published jointly by the IBPGR and ICRISAT at the end of the year. The IBPGR also compiled information of the holdings of sorghum and millet and a directory was published in December 1981.

Finally, the IBPGR provided small grants during 1981 to ORSTOM (France) and the Plant Gene Resources of Canada (PGR) to rejuvenate and multiply pearl millet samples from Africa.

ANDEAN CEREAL CROPS (OTHER THAN MAIZE)

Quinoa (*Chenopodium quinua*), cañihua (*C. pallidicaule*) and coimi or achis (*Amaranthus*

caudatus) are still of high local importance in the Andes. The IBPGR has assisted national institutes to collect material since 1978 through the Instituto Interamericano de Cooperación para la Agricultura (IICA) of the Organization of American States (OAS). The collections held are as follows:

Chenopodium quinua

- 1 457 Instituto Boliviano de Tecnología Agropecuaria (IBTA), Bolivia
- 151 Instituto Nacional de Investigaciones Agropecuarias (INIAP), Ecuador
- 272 Facultad de Agronomía, Escuela Politécnica, Chimborazo (ESPOCH), Ecuador
- 28 Instituto Colombiano Agropecuario, (ICA), Colombia
- 1 530 Universidad Nacional, Bogotá, Colombia
- 1 500 UNA, La Molina, Peru
- 250 Universidad Nacional Huancayo, Peru
- 2 200 Universidad Nacional Técnica del Altiplano, Peru
- 1 431 Centro de Investigación Agropecuaria (CIA), Puno Experimental Station, Peru

C. pallidicaule

- 420 Universidad Nacional Técnica del Altiplano, Peru
- 412 IBTA, Bolivia

Amaranthus caudatus

- 5 INIAP, Ecuador
- 78 Universidad Nacional San Antonio Abad, Peru

An IBPGR descriptor list for *C. quinua* is in press and will be available in 1982.

FOOD LEGUMES

Success in food legume improvement depends partly on the exploitation of genetic variability; from the outset, the IBPGR has regarded action on food legume germplasm collection and conservation as important (see Fig. 2).

An Advisory Committee on *Phaseolus* beans, co-sponsored by CIAT, has provided advice since 1976; collection of *Archis* germplasm has been carried out since 1976 and a Working Group on Groundnut Genetic Resources was

convened, jointly with ICRISAT, in 1979. In September 1981, an *ad hoc* Working Group on *Vigna* discussed the needs for work on the different species.

In addition, during 1981 the IBPGR supported work on winged bean, lupin, lentil, pigeonpea and a few other food legumes. During the year the revised IBPGR priorities included many food legumes not previously considered, e.g. greengram, blackgram, moth bean, cluster bean, etc.

GROUNDNUT

The IBPGR cooperative project for collection of *Arachis*, initiated in 1976 and undertaken by several agencies in North and South America and ICRISAT, continued in 1981. Two expeditions were fielded — one in Peru and the other in Brazil. The collecting team included experts from Argentina, Bolivia, Brazil and the USA. The Peruvian mission covered the areas of Tingo Maria, Tarapoto, Iquitos, Ayacucho and Casma. In Brazil, CENARGEN-EMBRAPA collected local varieties of groundnut and populations of related species in remote regions of Brazil in 1981, firstly in June (in the middle and lower valleys of the São Francisco river) and secondly in August (the eastern Mato Grosso area). Collection will continue in 1982 with a third mission scheduled for February.

A total of 67 samples of cultivars was collected in **Peru**. In **Brazil**, 43 accessions of wild *Arachis* and nine cultivars were collected. The wild species included *A. glabrata*, *A. helodes*, *A. lutescens* and 5-6 undescribed species and 3-4 known species but previously uncollected.

Rhizobium nodules were collected from some wild species and were deposited with North Carolina State University, Raleigh, USA. After isolation, material will be distributed to ICRISAT and other users. The plants are being multiplied for distribution to participating countries and ICRISAT. CENARGEN is examining the possibilities of sending the germplasm it has collected to ICRISAT through the post-entry quarantine scheme at NBPGR.

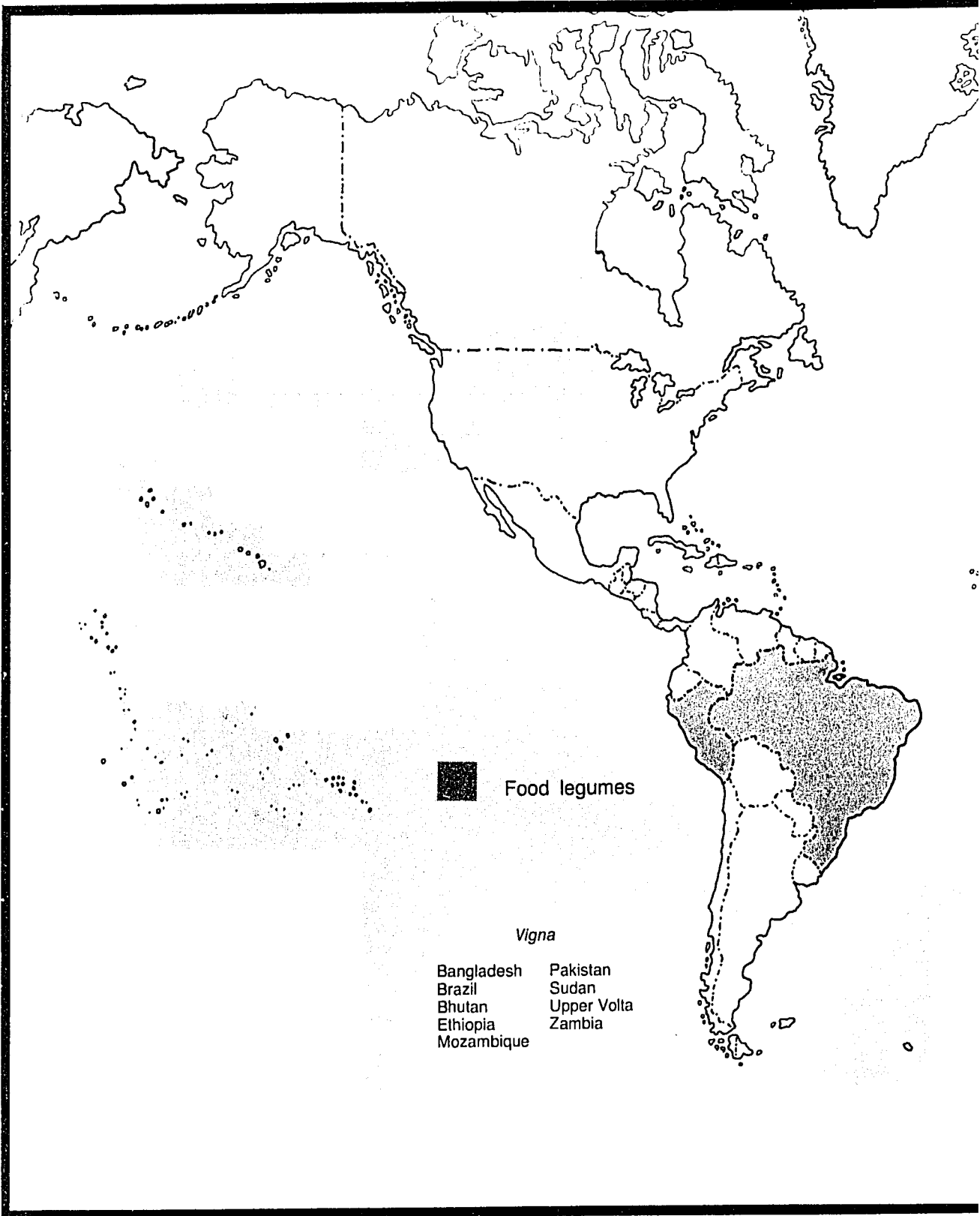
In **Mozambique**, the IBPGR and ICRISAT jointly collected 99 samples of groundnut germplasm from the Nampula and Zambesi



provinces in April-May. A second IBPGR mission to Southern, Western, Central, Copperbelt and Luapula provinces of **Zambia** during April-June resulted in the collection of 114 samples of groundnut (see p. 45). The material collected in Mozambique and Zambia has been divided between the national programmes and ICRISAT.

The Genetic Resources Unit of ICRISAT continued its efforts to further the maintenance and evaluation of groundnut germplasm. Rejuvenation and transfer of material into the newly-built medium-term store was also in progress. The descriptor list for groundnut, agreed in 1980, was finalized and issued as a joint IBPGR/ICRISAT publication at the end of 1981.

During 1981 the IBPGR made small grants available to the Texas Agricultural and Mechanical University, USA, for multiplication and distribution of *Arachis* germplasm to ICRISAT, USDA and to the national programmes of those countries where samples had been collected.



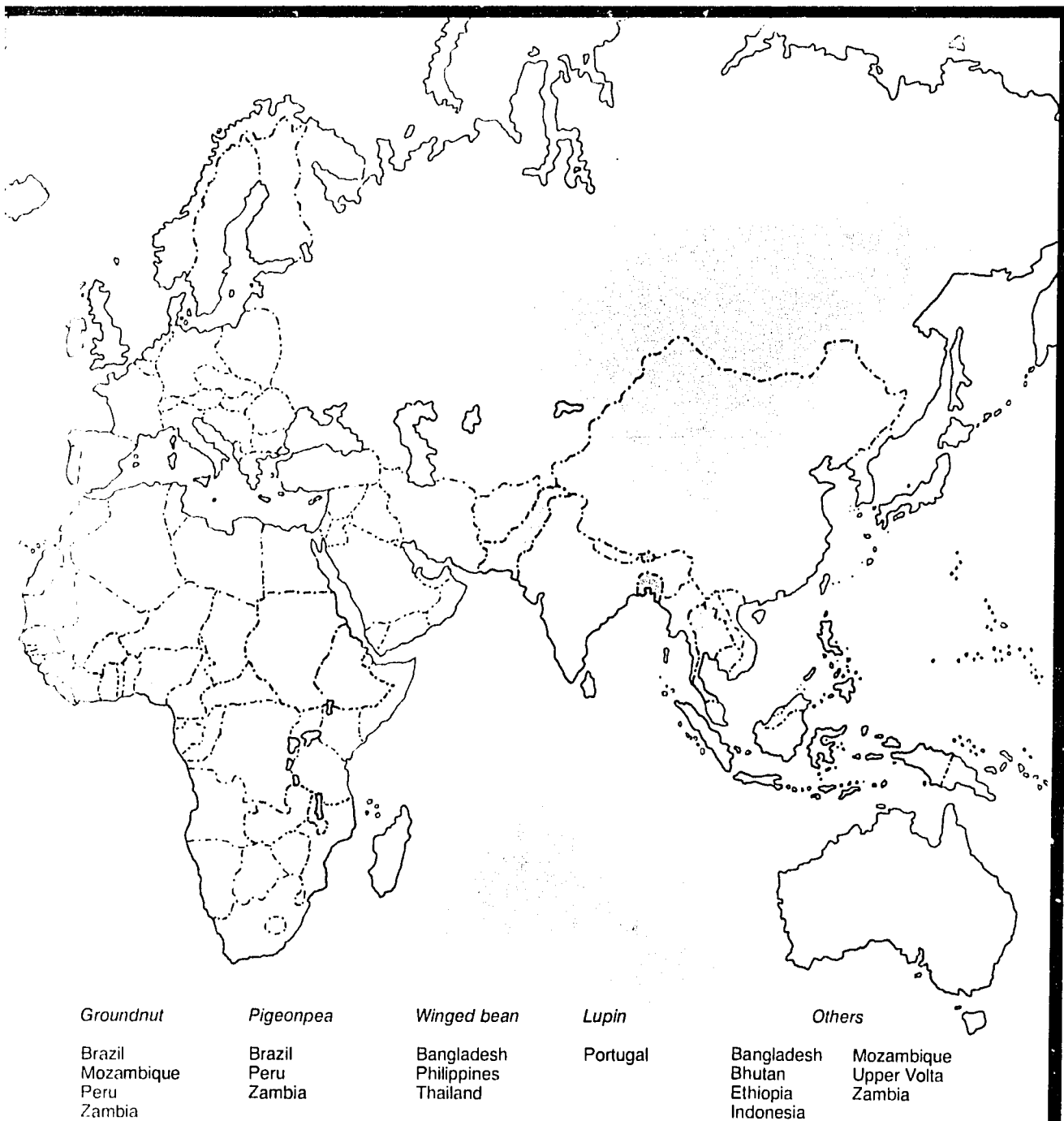


Figure 2. Countries where the IBPGR organized or collaborated in collecting food legumes during 1981

PIASEOLUS

The world collection designated by the IBPGR at CIAT holds 32 042 accessions of *Phaseolus*. (*P. vulgaris*, 89%; *P. lunatus*, 7%; *P. coccineus* and all subspecies, 3% and *P. acutifolius*, 0.5%). The collection also includes noncultivated species of *Phaseolus* and an additional 429 accessions of other genera --- mainly *Vigna* and *Psophocarpus*.

The IBPGR provided funds to CIAT to organize and coordinate, in association with national institutes, an ambitious programme of *Phaseolus* germplasm collection that started in 1978. The programme covers the following countries: Argentina, Brazil, Guatemala, Mexico and Peru. To date major systematic missions have been fielded in Brazil (1980/81), Mexico (1979/80) and Peru (1979/80/81).

Since 1978 the following have been collected, and duplicates stored at CIAT:

Brazil:	723, mainly <i>P. vulgaris</i> and <i>P. lunatus</i>
Cameroon:	268 <i>P. vulgaris</i>
Ecuador:	327 <i>P. vulgaris</i>
Iberian Peninsula:	424, mainly <i>P. vulgaris</i>
Guatemala:	545, mainly <i>P. vulgaris</i> and <i>P. coccineus</i>
Malawi:	144, mainly <i>P. vulgaris</i>
Mexico:	460, mainly <i>P. vulgaris</i> , <i>P. acutifolius</i> , <i>P. lunatus</i> and wild species
Peru:	536, mainly <i>P. vulgaris</i> and <i>P. lunatus</i>
Zambia:	206, mainly <i>P. vulgaris</i>

Collection of African material was also supported by IITA and ICRISAT. Seventy-two samples of French bean were gathered during a multi-crop collection mission in **Zambia** during 1981 (p. 45).

VIGNA

Most of the large number of species of *Vigna* are found in Africa and Asia. However, only a few species are cultivated and most of these are Asiatic forms belonging to the subgenus *Ceratropis* (Piper) Verde. They include: *V. aconitifolia*, *V. angularis*, *V. mungo*, *V. radiata*

and *V. umbellata*. The subgenus *Vigna* includes two African species: *V. unguiculata* and *V. subterranea*.

Because of the great importance of *Vigna* species in South and Southeast Asia and Africa, an IBPGR *ad hoc* Working Group was convened to discuss the current status of genetic resources work and to identify areas for collection. The Working Group met in New Delhi 17-19 September 1981 and the membership is shown in Appendix V. Both Asiatic and African species were considered of equal importance, although it was recognized that there is an urgent need to collect Asiatic species.

The Working Group concluded that emphasis should, in the first instance, be placed on the following:

Asiatic species:

<i>V. radiata</i>	(greengram/mung bean)
<i>V. mungo</i>	(blackgram)
<i>V. umbellata</i>	(rice bean)
<i>V. angularis</i>	(adzuki bean)
<i>V. aconitifolia</i>	(moth bean)

African species:

<i>V. unguiculata</i>	(cowpea) and its relatives
<i>V. subterranea</i>	(Bambara groundnut)

Knowledge of the gaps in existing collection and known diversity led to the listing of the following areas, **in order of priority**, for exploration:

Vigna radiata

- Burma, China, Thailand
- Afghanistan, Indonesia, Iran, Philippines
- Malaysia
- Eastern Africa, Madagascar, South Africa
- Caribbean

Vigna mungo

- Burma
- Bhutan, Nepal
- Bangladesh
- Afghanistan, Iran
- N. Malaysia, Philippines

Vigna umbellata

- S. China, Kampuchea, Laos, Vietnam

- Indonesia
- Bangladesh, Bhutan, upper Burma, Nepal, Thailand
- South Pacific

Vigna angularis

- Democratic People's Rep. of Korea, Republic of Korea
- China

Vigna aconitifolia

- Pakistan
- Arabian peninsula, Ethiopia, Iran, Somalia, Sri Lanka

Vigna unguiculata (cultivated forms)

i) Africa

- Fernando Po, Mozambique, Zimbabwe
- Botswana, Lesotho, South Africa, Swaziland
- Central African Republic, Zaire
- Angola, Congo, Gabon

ii) Southeast Asia and China

Vigna unguiculata (wild forms) and V. nervosa

- South Africa (Natal and Transvaal), Zimbabwe
- East African and Zambebian phytogeographical zones

Vigna subterranea

- Fernando Po, Mozambique, Zimbabwe
- Botswana, Lesotho, South Africa, Swaziland
- Central African Republic, Zaire
- Angola, Congo, Gabon
- The West African savanna zone

Recommendations to the Board were made for the designation of centres to hold the various species for IBPGR decision at its ninth meeting in 1982.

In 1981 IBPGR multi-crop collecting missions in **Bangladesh, Bhutan, Ethiopia, Mozambique, Pakistan, Sudan, Upper Volta, and Zambia** collected samples of cowpea, Bambara groundnut and *Vigna radiata*. Also the Genetic Resources Unit of IITA has continued to collect cowpea and Bambara groundnut from various African countries since

1978, and CIAT also collected some samples of cowpea in **Brazil** during IBPGR-supported collecting for other crops.

In India the collection of indigenous material started in 1961. Expeditions were fielded in various parts of the country and a wide range of variability was collected. The National Bureau of Plant Genetic Resources (NBPGR) currently holds the following:

<i>V. aconitifolia</i>	460
<i>V. mungo</i>	1 994
<i>V. radiata</i>	2 220
<i>V. umbellata</i>	297
<i>V. unguiculata</i>	1 794
Wild species	96

The Asian Vegetable Research and Development Center (AVRDC) has assembled *V. radiata* from 49 countries since 1972 and currently holds 5 016 accessions (about half are from India). The collection also includes *V. angularis* (92), *V. mungo* (185), and *V. umbellata* (140).

The national programme of the Philippines maintains a collection of 2 346 *V. radiata*, 1 563 *V. unguiculata* and 81 *V. umbellata* accessions.

Apart from the collections mentioned above there are sizeable collections of Asiatic *Vigna* in Australia, China, Japan and Korea.

An outstanding one is the cowpea collection of IITA (*ca.* 12 500 accessions). Besides cowpea, the IITA collection also includes *ca.* 1 400 accessions of Bambara groundnut (*V. subterranea*).

The *Vigna* Working Group initiated work on descriptors for the different species. A draft list of descriptors for cowpea has been prepared and circulated to the Group members for comment; it should be published during 1982.

WINGED BEAN

During 1981 the national programmes in Thailand, Philippines and Bangladesh continued the collection of winged bean with support from the IBPGR. The project in **Thailand** is now completed: 528 accessions have been collected and evaluated according to the IBPGR descriptors and considerable variation was observed in leaflet shape, calyx colour, corolla colour, pod shape, seed colour, days to

first flowering pod length, seeds per pod, 100-seed weight, and shelling percentage.

In **Bangladesh** the Bangladesh Agricultural Research Institute (BARI) continued to collect pulses, including winged bean, in March-April 1981. A total of *ca.* 300 accessions were collected during 1980 and 1981.

In January 1981, the IBPGR arranged a meeting to review the collecting work, to assess how far the evaluation had proceeded and whether use of the descriptors issued in 1979 was practicable. The meeting discussed on-going activities in Bangladesh, Southeast Asia, Ghana, and Australia, revised the descriptors, provided collecting priorities and recommended proper maintenance procedures (see p. 55). A revised list of descriptors for winged bean will be published in early 1982.

Sizeable collections of winged bean have now been built up in Bangladesh, Ghana, India, Indonesia, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, and Thailand. The Board has designated the Thailand Institute of Scientific and Technological Research (TISTR), Bangkok, and the Seed Storage Laboratory, Institute for Plant Breeding (IPB), Los Baños, the Philippines, for long-term conservation. Both of these genebanks have received financial support from the IBPGR.

LUPINS

Lupins have two centres of diversity, one in Latin America and the other in the Mediterranean. *L. mutabilis*, in particular, provides a major source of protein for humans and animals in the Andes. Although lupins are used to a lesser degree in the Mediterranean, *L. albus* and *L. luteus* are regarded as species with great potential.

Andean Region

The IBPGR has provided funds, through ICA, to a number of national institutions to collect *Lupinus* spp. in Bolivia, Peru and Ecuador. Collections are now held as follows:

Lupinus mutabilis

- 19 INIAP, Ecuador
- 22 ESPOCH, Ecuador

- 33 Universidad Central, Ecuador
- 324 UNA, La Molina, Peru
- 100 Universidad Nacional del Centro, Peru
- 1 009 CIA, Huancayo Experimental Station, Peru
- 1 200 Universidad Nacional San Antonio Abad, Peru
- 412 CIA, Cuzco Experimental Station, Peru
- 406 CIA, Puno Experimental Station, Peru
- 341 IBTA, Experimental Station, Belén, Bolivia

L. mutabilis still merits a high priority for collection in Bolivia, Ecuador and Peru, but a lower priority in Colombia.

Bolivia, Ecuador and Peru have agreed to share responsibilities for the maintenance, multiplication, evaluation and distribution of *L. mutabilis*.

Iberian Peninsula

Approximately 800 samples of lupins have been collected in the Iberian Peninsula with IBPGR funding and the material is duplicated in INIA, Spain and INIA, Portugal: 119 of these were collected by the IBPGR Mediterranean Programme-coordinated mission to **Portugal** in June 1981.

The IBPGR published a list of descriptors for Lupin species in both English and Spanish in 1981.

PIGEONPEA

In December 1980, an International Workshop on Pigeonpea was organized by ICRISAT and the Indian Council of Agricultural Research (ICAR) at ICRISAT. Although the world collection at ICRISAT includes 9 000 accessions, it is deficient in samples from many African countries. It is also recognized that Southeast Asia and Central America are under-represented in the world collection.

During 1981 the Genetic Resources Unit at ICRISAT continued collecting in India and, in addition, multiplication and evaluation of existing germplasm was also in progress. The evaluation information, together with passport data, are catalogued and entered in a computerized data base. Pigeonpea germplasm (32 accessions) was collected during IBPGR multi-

crop collecting missions in **Mozambique** and **Zambia**. Twelve samples from **Brazil** were also collected by CIAT through IBPGR-supported missions in 1978-81.

A draft descriptor list prepared by ICRISAT was circulated at the Workshop for comment and after finalization was published jointly by IBPGR/ICRISAT late in 1981.

OTHER FOOD LEGUMES

In 1981 the IBPGR Secretariat organized collecting missions in **Bangladesh**, **Bhutan**, **Ethiopia**, **Mozambique**, **Upper Volta** and **Zambia**, in collaboration with the participating national programmes and ICRISAT or IITA.

(Details are provided in respective regional reports.) During the missions, samples of soybean, pea, fenugreek, chickpea, *Kerstingiella geocarpa* and *Dolichos lablab* were collected.

During 1981 soybean was collected in eastern **Indonesia** by the Indonesian National Committee for Plant Genetic Resources, with IBPGR support, and a few samples were found during a multi-crop collection in **Bhutan** under the auspices of the ECP. In 1982 the IBPGR intends to address global needs for work on soybean.

During 1981, Working Groups met to discuss the status of faba beans and *Pisum sativus*. The former initiated a survey to take stock of European collections and the latter divided conservation responsibility between the three genebanks present.

VEGETABLES

Following an IBPGR publication on *Tropical Vegetables and their Genetic Resources*, an expert consultation identified those vegetables requiring attention. Subsequently the IBPGR agreed to designate institutions to coordinate and prepare action-oriented reports on high priority species. Most of these reports have now been prepared and are discussed below.

The information provided in these reports enabled the IBPGR to refine its crop priorities and to include a number of vegetable species (see Table 1 on p. 2). Attention is also given to species which are primarily used as cereal, food legume, root or oilseed crops but are also used as vegetables.

The Secretariat is compiling a directory of vegetable genetic resources collections throughout the world; this directory will be published in 1982.

TOMATO

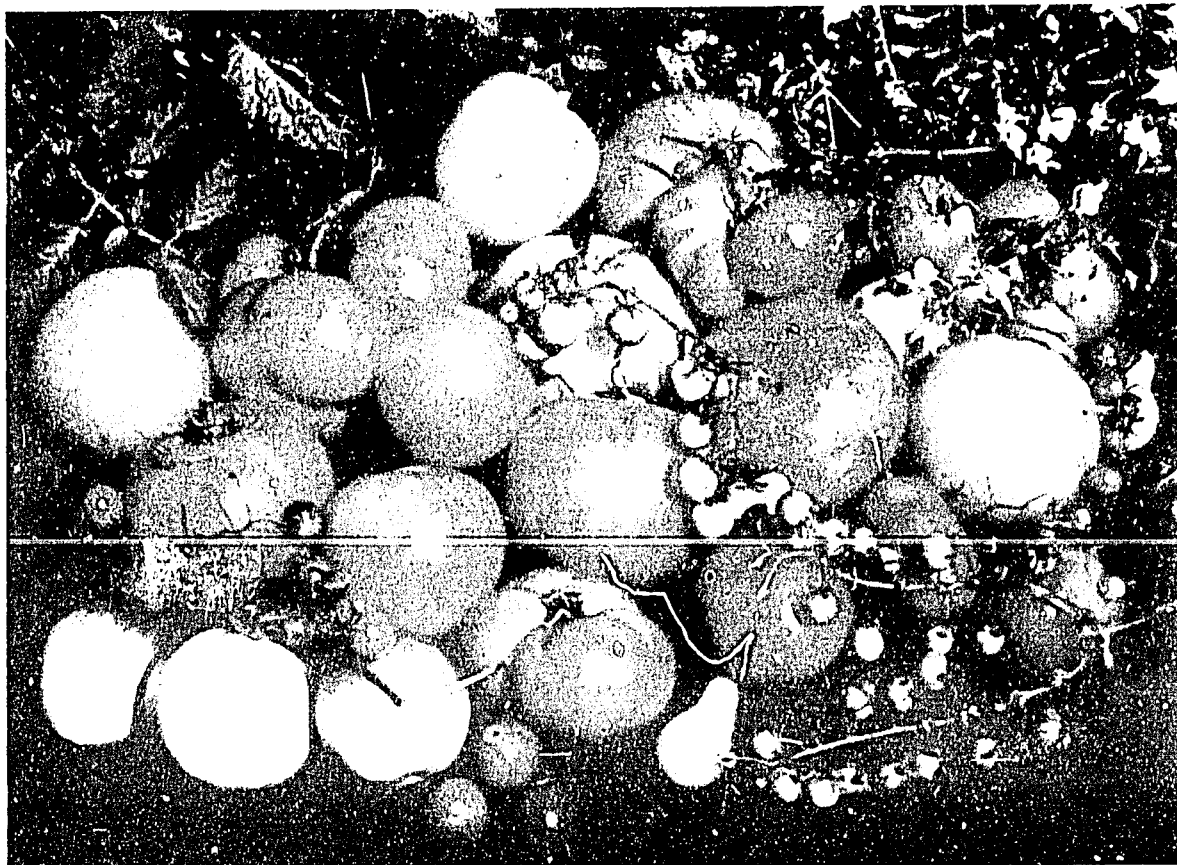
A desk study, carried out by the Secretariat, was completed in 1981 and endorsed by the IBPGR. The report, *Genetic Resources of*

Tomatoes and Wild Relatives, was published in September 1981.

Although the genetic resources of tomato have been fairly well collected, some additional collecting is required both for primitive cultivars and wild material. For instance, wild material is required from the Andean zone and missions are being organized in 1982. Urgent collection of primitive cultivars should be carried out in southeast Ecuador, South and Southeast Asia, the Mediterranean and Mexico.

The IBPGR proposes that tomato germplasm should be conserved at:

- i) **A genebank in the Andean zone**
A genebank in the Andean zone as soon as suitable long-term storage facilities are available;
- ii) **Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Turrialba, Costa Rica**
CATIE has agreed to hold a global base collection as part of the IBPGR global network until a genebank in the Andean zone is operational;



Variation in tomato (D. Barton)

iii) **The National Seed Storage Laboratory (NSSL), Fort Collins, Colorado, USA**

The NSSL has agreed to hold a global base collection as part of the IBPGR network;

iv) **Zentralinstitut für Genetik und Kulturpflanzenforschung, Gatersleben, GDR**

This institute has been invited by the IBPGR to hold a global base collection as part of the IBPGR network;

v) **Institute for Plant Breeding (IPB), Los Baños, Philippines**

The IPB has agreed to hold a base collection of Asian *Lycopersicon* as part of the IBPGR network.

Funds were provided by the IBPGR to Fang Horticultural Station, Thailand, to collect *Amaranthus* and other indigenous vegetables in Thailand during 1981. In Indonesia 84 samples of *Amaranthus* spp., mainly *A. tricolor*, were collected through national funding. Collecting missions with IBPGR support are scheduled for 1982 in the Andean region and Guatemala.

The regional station of the National Bureau of Plant Genetic Resources (NBPGR), Simla, India has built up the largest collection of *Amaranthus* in the world (1 139 accessions). Extensive collecting of grain amaranths (*A. caudatus*, *A. cruentus* and *A. hypochondriacus*) has been carried out during 1978-80 in north-west India and details are also to be found in *Plant Genetic Resources Newsletter*, 48.

The National Research Council of the National Academy of Sciences, USA provides research grants to projects on grain amaranths with limited support to vegetable amaranths. Several projects in developing countries will be financially supported by this programme, and

AMARANTH

The report, *Genetic Resources of Amaranths*, was published at the beginning of 1981 and the major recommendations were described in the 1980 Annual Report.

the collection and screening of germplasm will form an integral part of these projects.

CRUCIFEROUS CROPS

As reported in the 1980 Annual Report, a preliminary meeting was convened in Japan during 1980 on the genetic resources of high priority *Brassica* and *Raphanus* species. As a result of a proposal of the European Association for Research on Plant Breeding (EUCARPIA) — Cruciferous Genetic Conservation Group (CGCG) — the IBPGR agreed to widen the scope of the study to include all *Brassica* species. On the basis of reports from specialists, an IBPGR Secretariat Consultation was held 17-19 November 1980 and the resulting report "Genetic Resources of Cruciferous Crops" was published in June 1981.

This report provides information on all major species, their origin, diversity and degree of genetic erosion and provides a detailed list of priorities for collection. An action plan for priority species has been established (Table 2) and a number of genebanks have been desig-

nated by the IBPGR to conserve material (see Table 4, p. 62).

During the course of 1981, the IBPGR initiated a study on suitable multiplication procedures for outbreeding crops, using Chinese cabbage as an example. This study will be carried out by the Department of Genetics, University of Birmingham, UK in collaboration with the Asian Vegetable Research and Development Center (AVRDC), Taiwan, China and the National Vegetable Research Station (NVRS), UK. In addition funds have been provided to multiply the Chinese cabbage collection at AVRDC and the *Brassica carinata* collection at the Foundation for Agricultural Plant Breeding (SVP), the Netherlands, for long-term storage in designated genebanks.

The European Communities Standing Committee on Agricultural Research is supporting a project for the collection of landraces of *Brassica* spp. in European Community (EC) countries. The project, finalized in July 1981, provides for about 15 collecting missions during 1981-83 under the guidance of a coordinating committee. Collection in the UK and the Netherlands during autumn and winter 1981-82 has already begun.

Table 2. Action plan for first priority crucifers

Region	Taxa	Action
China	<i>Raphanus sativus</i> <i>Brassica campestris</i> subsp. <i>chinensis</i> <i>B. campestris</i> subsp. <i>pekinensis</i> <i>B. campestris</i> subsp. <i>rapa</i> <i>B. campestris</i> subsp. <i>oleifera</i> <i>B. juncea</i> oilseeds <i>B. juncea</i> vegetables	Seed storage technology
Indian subcontinent	<i>B. juncea</i> oilseeds <i>B. campestris</i> subsp. <i>oleifera</i> <i>B. juncea</i> vegetables <i>B. campestris</i> subsp. <i>rapa</i> <i>B. sativus</i>	Seed storage technology and collecting missions
Mediterranean	<i>B. oleracea</i> (wild relatives) <i>B. oleracea</i> var. <i>acephala</i> <i>B. oleracea</i> var. <i>botrytis</i> <i>B. oleracea</i> var. <i>capitata</i> <i>B. oleracea</i> var. <i>italica</i> <i>Raphanus sativus</i> <i>Brassica campestris</i> subsp. <i>rapa</i>	Collecting missions

The Groupe consultatif international de recherche sur le colza (GCIRC) initiated action in 1980 to gather cultivars of rapeseed which are no longer in cultivation and consequently in danger of being lost. By the end of 1981 *ca.* 50 samples had been forwarded by different breeders and seed companies to the genebank in Braunschweig, FRG, while duplicates are held at PGR, Ottawa, Canada.

CUCURBITS

Although a report was originally planned to cover only species of *Cucurbita*, during the course of the study it was decided to include some other genera of Cucurbitaceae. The study, prepared by the IBPGR Secretariat, in collaboration with Dr. T.W. Whitaker and other experts, will be discussed by the IBPGR in 1982.

A collection and evaluation programme for bitter melon, funded by the IBPGR, is being carried out in **Thailand** under the guidance of Dr. M.L. Anothai Choomsai, Kasetsart University, Bangkok. A total of 225 accessions of *Momordica charantia* and related species have been collected, and are currently being evaluated.

EGGPLANT

A report on the genetic resources of eggplant, prepared by Dr. B. Choudhury of the Division of Vegetable Crops and Floriculture, Indian Agricultural Research Institute (IARI), was discussed by the IBPGR in 1981.

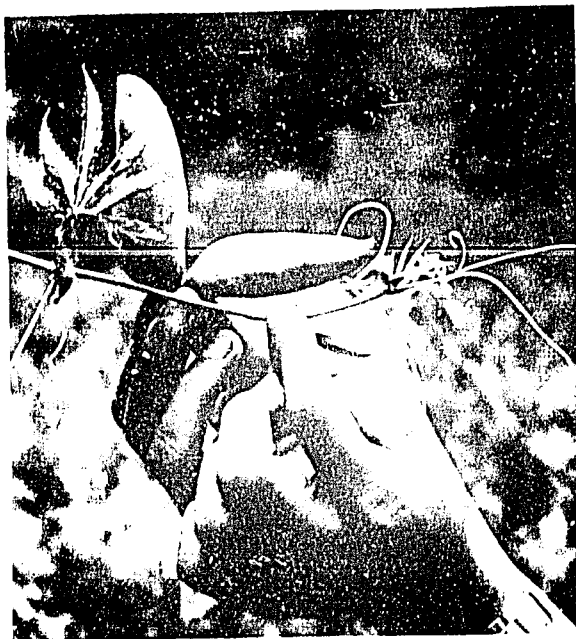
Following the endorsement in principle of this report, the IBPGR designated several genebanks to hold material in long-term storage (see Table 4, p. 62). In addition the following priorities were agreed for collection:

- Priority 1: South Asia and West Africa;
- Priority 2: Southeast Asia and East Africa
- Priority 3: Southwest Asia and parts of Latin America,

and the IBPGR commissioned the Department of Plant Biology, University of Birmingham, UK to provide up-to-date information on the taxonomy of the species, a taxonomic key and

species descriptions, and to finalize the descriptor list and develop a standard collecting form. The Secretariat is incorporating this information into a definitive report on the species which will be published early in 1982.

The IBPGR agreed to support a three-year collecting programme in West Africa under the overall guidance of Dr. R.N. Lester of the University of Birmingham, UK. During



Cucurbitaceous vegetables in the Himalayas

November-December 1981 about 300 accessions were collected in **Ghana, Togo and Benin** and exploration missions are scheduled for Ivory Coast, Liberia and Upper Volta in 1982 and Guinea, Senegal and Sierra Leone in 1983.

Financial support for 1980-83 has also been provided to Kasetsart and Chiang Mai Universities in **Thailand** to collect and evaluate eggplant germplasm (mainly *Solanum melongena*, *S. torvum* and *S. ferox*). From November 1980 to July 1981, 54 accessions of eggplant were collected and this material is being multiplied for characterization, evaluation and long-term storage.

OKRA

Dr. M. Charrier, ORSTOM, Ivory Coast finalized a study on the genetic resources of okra and this will be submitted to the IBPGR in early 1982.

As mentioned in the 1980 Annual Report, important collections of okra are being built up, especially in Africa at IITA, the Nigerian National Horticultural Research Institute (NIHORT) and ORSTOM. The 1981 collecting mission for eggplant to **Ghana, Benin** and **Togo** also succeeded in collecting about 80 samples of okra. A sorghum millet collecting mission to **Upper Volta** in October to December 1981 also gathered some okra (see p. 44). Further collecting missions are being scheduled for West Africa and the Sahelian zone starting in 1982.

ALLIUM SPECIES

A report on the genetic resources of *Allium*, prepared by Dr. D. Astley and Professor N.L. Innes, NVRIS, Wellesbourne, UK in collaboration with Ir. Q.P. van der Meer, Institute for Horticultural Plant Breeding (IVT), Wageningen, the Netherlands, has been finalized and will be discussed by the IBPGR in early 1982.

CAPSICUM SPECIES

On the basis of the report on the genetic resources of *Capsicum* species, formulated by an expert meeting in August 1980, the Board has designated base collection centres (see p. 63) and agreed on the following priorities for collection:

Priority 1: Latin America (Argentina, Bolivia, Brazil, Central America, Ecuador, Mexico, Peru)

Priority 2: India, Turkey

Priority 3: China, Africa, Southeast Asia

Since the report did not include full information on the genetic resources of *Capsicum* in India, Southeast Asia, Japan, China, Turkey and Africa, the Secretariat gathered the additional information during 1981. This work has been completed and the final report will be published in early 1982.

The IBPGR provided funds to the Centro de Investigaciones Agrícolas del Bajío (CIAB) of the Instituto Nacional de Investigaciones Agrícolas (INIA), **Mexico** to collect *Capsicum*

in the states of Nayarit, Nuevo León, Chiapas, Yucatán and Tabasco in 1981 since Mexico rates a high priority for field work.

A number of *Capsicum* collections exist which are not yet duplicated in the IBPGR designated base collection centres. Therefore, in 1981 the IBPGR provided funds to multiply and describe the *Capsicum* collections of UNA, La Molina, Peru; INIA, Spain, and the National Genebank, Thessaloniki, Greece so that there will be adequate material to deposit in designated genebanks.

OTHER COLLECTING ACTIVITIES

Specific collecting missions organized for vegetables are described above. However, a number of IBPGR multi-crop missions have paid attention to vegetables (see Fig. 3). Those which collected a substantial number of vegetable accessions are listed below:

Colombia: tomato, 16; *Capsicum*, 18; *Allium*, 11, and Andean roots and tubers.

Sudan: tomato, 11; *Coriandrum sativum*, 6; *Allium cepa*, 2; *A. sativum*, 2; *Foeniculum vulgare*, 3; *Amaranthus* spp., 2; *Citrullus lanatus*, 1; *Cucumis sativus*, 3; *Abelmoschus esculentus*, 5; *Hibiscus sabdariffa*, 6.

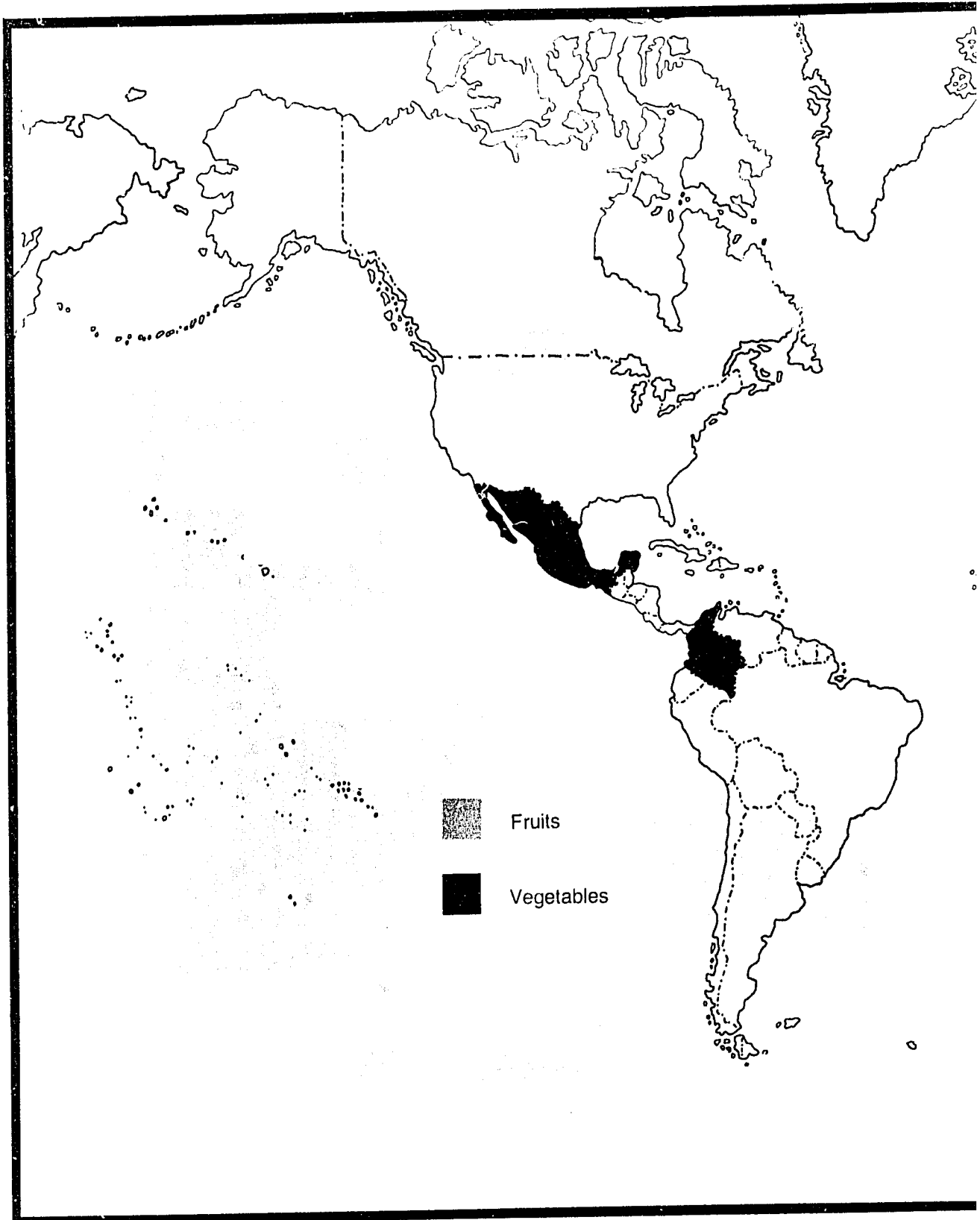
Zambia: okra, 85; *Hibiscus sabdariffa*, 110; cucurbits, 486; *Solanum* spp., 38; *Amaranthus* spp., 65; *Corchorus* spp., 24, and a number of minor vegetables.

Pakistan: onion, 23; carrot, 8; spinach, 9; tomato, 2; okra, 9; gourds, 13; cucumber, 6; radish, 11; melons, 54; *Capsicum*, 3; leek, 1; *Foeniculum*, 2; cumin, 41; coriander, 5; *Brassica* spp., 20; *Eruca*, 5.

Bhutan: brassicas, 50; amaranths, 17; *Allium*, 20; *Raphanus*, 11; cucurbits, 20; *Capsicum annuum*, 18; *Coriandrum sativum*, 7.

DESCRIPTOR LISTS

Most of the reports on the genetic resources



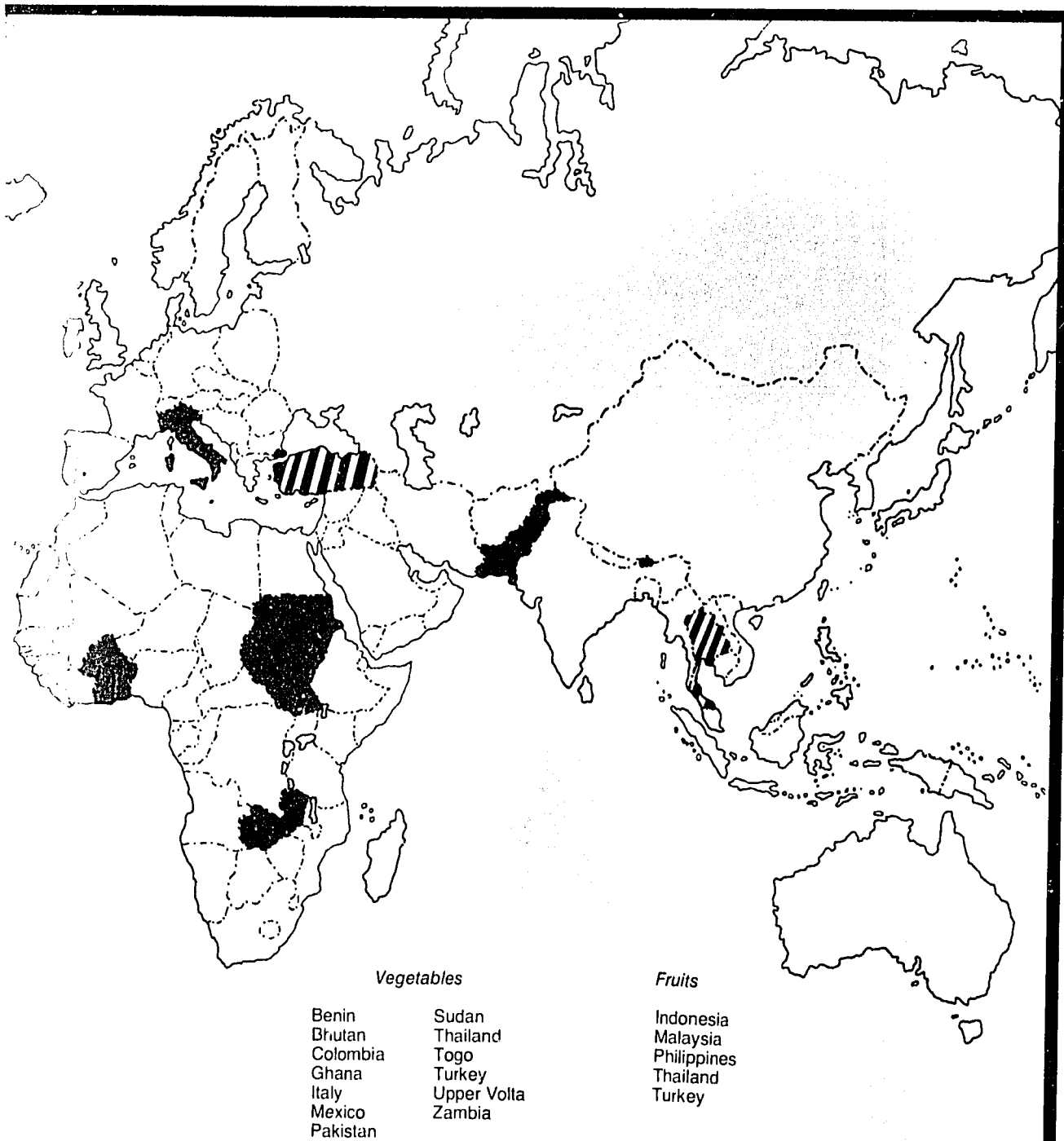


Figure 3. Countries where the IBPGR organized or collaborated in collecting vegetables and fruits during 1981

of specific vegetables or groups of vegetables contain descriptor lists for the characterization and evaluation of germplasm. These include tomato, *Amaranthus*, cruciferous crops (passport data only, while full descriptor lists are being developed for *Brassica oleracea*, *B.*

juncea, *B. campestris* subsp. *pekinensis* and *B. campestris* subsp. *rapa*, *B. carinata* and *Raphanus* spp.), *Solanum melongena* and related species, *Abelmoschus esculentus* and related species, *Allium* species and *Capsicum* species.

FRUITS AND TREE NUTS

In the 1980 Annual Report it was pointed out that most IBPGR work on fruits had been in the context of regional activities. During 1981 the Secretariat has been able to spend considerably more attention on some species. Collecting activities in 1981 are summarized in Fig. 3.

The Secretariat undertook a world survey of the genetic resources collections of avocado, banana, citrus, mango and pineapple during 1979-80. This is presently being updated and information added for other tropical fruits and tree nuts in order to publish a directory during the course of 1982. Another survey dealing with major temperate fruits is expected to be available in 1983.

TROPICAL FRUITS

A study on the genetic resources of tropical and subtropical fruits and tree nuts, commissioned from the Royal Tropical Institute (RTI), Amsterdam, the Netherlands, neared completion by the end of 1981.

In order to supplement this desk study with practical information, the scientist of RTI in charge of the study visited France, Greece, Turkey, Iraq, India, Thailand, Malaysia, the Philippines, Japan, USA, Cuba, Honduras, Costa Rica and Morocco in order to contact major institutions responsible for the genetic conservation programmes and to discuss interests, plans, and achievements in the collection, conservation, documentation and utilization of species under study. In addition, information was obtained on these crops concerning location, composition and documentation of

existing collections. Finally discussions were held on the respective country's interest and willingness to participate in establishing fruit and nut germplasm collections, which will safeguard material of a wide range of genotypes which can be used in genetic improvement programmes.

The study required more time than originally envisaged and consequently the publication of the final report is postponed until early 1983. However, based on the preliminary reports, the Board, in its 1981 revision of crop priorities, included *Citrus*, mango, avocado, cashew, date, fig, papaya and pineapple — not previously included — as global priority species.

The IBPGR-sponsored collection of fruits concentrated mainly on Southeast Asia where a number of species have for several years been recognized as important.

In **Thailand** support was provided to collect mango (*Mangifera* spp.), rambutan (*Nephelium* spp.) and durian (*Durio* spp.). From different regions of Thailand most of the collections were made in clonal form and grafted onto local rootstocks for uniformity in evaluation and for safe establishment of the collection. Some seeds and seedlings, mainly in the case of mango and wild species, were also collected and established. Collections of mango (80 indigenous, 10 exotic), durian (68 indigenous) and rambutan (7 indigenous, 4 exotic) have been established.

Financial support was provided to the **Philippines** to carry out a project to collect regional priority fruits (mango, durian and rambutan) and fruits of high national priority (*Garcinia* and *Lansium*). During 1980 the following collections were made in the Philip-

pinces: 344 accessions of mango and 8 of other *Mangifera* species, 84 of rambutan and 2 of other *Nephelium* species, 66 of durian, and 5 species of *Garcinia*. Samples of these fruits from Thailand, Indonesia and Malaysia were transferred to the Philippines for safe duplication.

In **Indonesia** national funds were allocated for the exploration of fruit germplasm and a total of 201 samples was collected. This collection included *Garcinia*, *Lansium*, *Baccaurea*, *Citrus* and other genera.

BANANAS AND PLANTAINS

In recent years the Board has supported a substantial amount of work on bananas, especially in Southeast Asia.

With the support of the IBPGR, collecting missions have explored Thailand, the Philippines and Papua New Guinea and large collections have been established. Further collecting is considered to be unnecessary.

In Indonesia, an extensive collection programme of wild banana germplasm was initiated in 1979, supported by the IBPGR. In 1981 collections of wild diploid bananas were made in West Sumatra, Lesser Sunda Islands and Irian Jaya, while the Moluccas will be explored in 1982.

The IBPGR has designated, in agreement with the Philippine Government, the collection at Davao, Philippines as a regional banana collection for Southeast Asia. In 1978, the collection at Los Baños, the Philippines was duplicated at Davao and its transfer was completed during 1979. In 1980, 29 distinct types were transferred from the Malaysian Agricultural Research and Development Institute (MARDI) to Davao, and in 1981, 35 distinct types -- including wild species -- were transferred from Thailand to the Philippines. During 1982-83 the banana collections from Indonesia and Papua New Guinea will be duplicated at Davao, thereby completing the regional collection. Both the establishment and maintenance of the Davao collection, as well as the transfer of material from other Southeast Asian countries, have been supported by the IBPGR.

In order to assess global action on bananas, the Board will convene a Working Group in 1982 to advise on further action. This decision

resulted from the need for an assessment of the safety of the banana collection in Jamaica.

CITRUS

The IBPGR convened a Working Group on Citrus Genetic Resources, 4-6 November 1981, Tsukuba, Japan in collaboration with the Fruit Tree Research Station, Tsukuba. (See Appendix V for membership of Working Group). The meeting of this Working Group was organized in conjunction with the IVth International Citrus Congress to take advantage of the presence of many citrus specialists. The Working Group recommended that the IBPGR initiates action as described below on establishment and documentation of collections. It was agreed that:

- i) The IBPGR should encourage each country having genetic resources of the Aurantioideae (embracing the two tribes Clauseneae and Citreae), whether indigenous, wild or cultivated, to bring these together in collections for maintenance;
- ii) Special support is in first instance warranted in the following regions:
 - East Asia and South Asia, in particular for wild Aurantioideae and old cultivars;
 - Southeast Asia, in particular for wild Aurantioideae and old cultivars;
 - The Mediterranean area, for cultivars; and
 - Central Africa, especially for wild Aurantioideae;
- iii) Collecting missions should also attempt to assess genetic erosion and the distribution of wild species;
- iv) The Working Group recommended the establishment/expansion/maintenance of a number of repositories of a regional character. It also noted the importance of the USA collections;
- v) The Working Group noted with satisfaction that the IBPGR is preparing an inventory of citrus collections. It recommended that this work be expanded to obtain more detailed information concerning the composition of the various collections.

Germplasm Conservation: The Working Group

felt that germplasm should in the first instance be conserved in the form of plantations to allow evaluation. In addition, it recommended that, whenever possible, disease-free materials should be maintained under screen or glass-house to avoid recontamination by disease and pest or losses due to climatic hazards. Recognizing the expenditure involved in this conventional method of conservation, the group strongly recommended that IBPGR encourage research on alternative conservation methods such as seed and pollen conservation and various methods of tissue culture.

The Working Group recommended that *in situ* conservation of citrus genetic resources, especially wild relatives should be encouraged in South, Southeast and East Asia, especially through contacts with the Man and the Biosphere Programme (MAB) of the United Nations Educational, Scientific and Cultural Organization (Unesco) to enable scientists to study and collect these genetic resources in protected areas.

Quarantine: Whenever there is need for introducing vegetatively propagated material, shoot

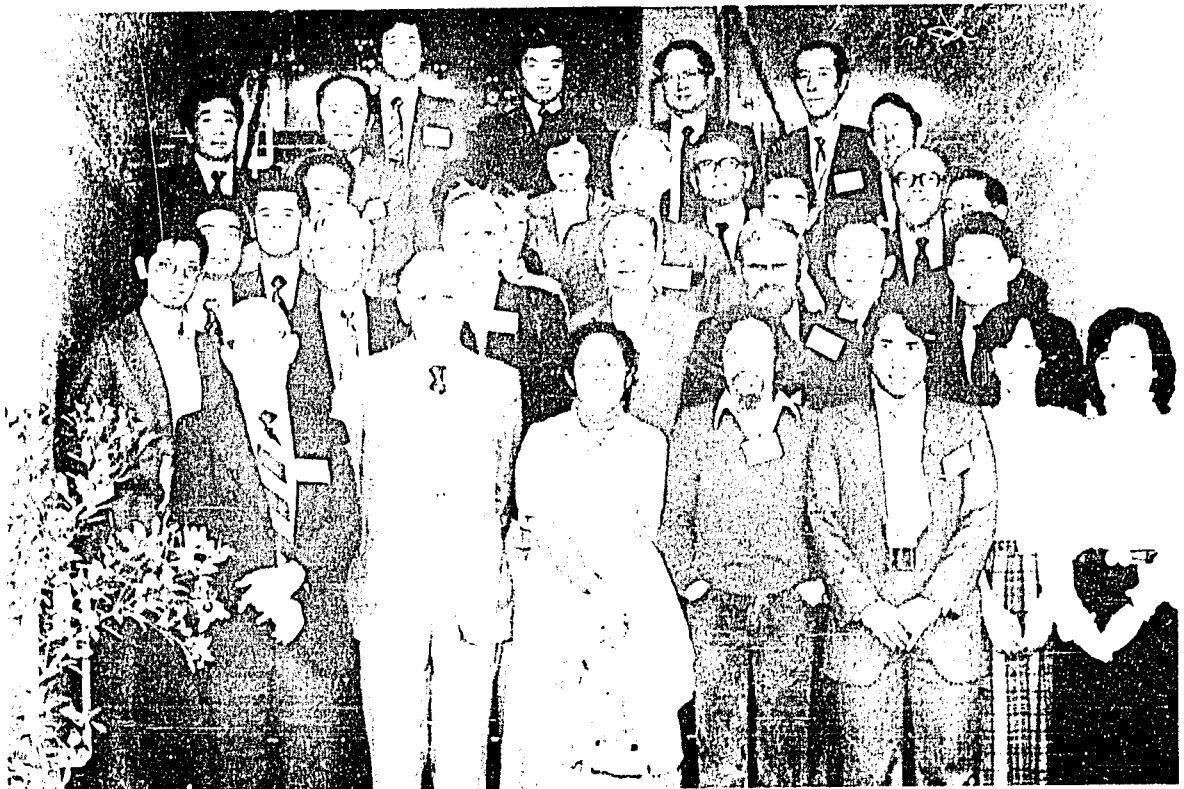
tip grafting *in vitro* is the safest method provided sufficient facilities for tissue culture and indexing exist. In the absence of these facilities, and the materials to be imported are not certified to be free of pathogens, only the introduction of seed should be considered.

An IBPGR-funded project on collection and conservation of genetic resources of *Citrus* in Thailand commenced in October 1981 and will conclude in the latter part of 1983.

TEMPERATE FRUITS

A study on the genetic resources of temperate fruits and tree nuts has been initiated by the Secretariat. A number of other organizations have also started new activities on these crops, e.g. EC Expert Group on Tree Fruits (apples, pears, almonds, apricots, plums, sweet and sour cherry), the European Cooperative Programme (ECP) (apricot and peach) and a number of individual countries with specific interest in temperate fruits and tree nuts.

A relatively large number of countries have



Citrus Working Group, Tsukuba, Japan, 1981

established, or are in the process of establishing clonal repositories, e.g. Canada, USA, USSR, EC nations, Turkey, India, Japan and others. Attempts will be made by the IBPGR to combine these activities into its global programme.

Prior to the finalization of the study the IBPGR has assigned global priorities to apple, pear and quince, peach and nectarine, apricot, cherry, plum, strawberry, almond and walnut.

MAINTENANCE

Many of the fruits and tree nuts possess seeds which are short-lived and cannot withstand either drying or low temperatures or both ('recalcitrant' seeds). Research on recalcitrant seed physiology and *in vitro* culture techniques may lead to new methods of conservation for vegetatively propagated crops and those with 'recalcitrant' seeds. Some relevant research in this field was supported by the IBPGR in 1981 (p. 65).

However, it needs to be emphasized that vegetatively propagated crops, and trees in particular, need to be maintained in clonal repositories to allow characterization and evaluation as well as to provide breeders with the material they require.

The need for clonal repositories of fruit trees has now been widely recognized, but, to date the only clonal repository for fruit trees desig-

nated by the IBPGR is the regional Southeast Asia banana collection at Davao, the Philippines. It is envisaged that after completion of the studies on tropical and temperate fruits and tree nuts, many more will be designated.

In addition to this *ex situ* conservation, there are possibilities for *in situ* conservation, especially for vegetatively propagated crops. A major study on this subject was supported by the IBPGR in 1980-81 and it is hoped that agencies responsible for *in situ* conservation will carefully consider the needs for economic plants. A good example of such *in situ* conservation is the establishment of a reserve for citrus in the Garo hills of northeast India where about 10 000 ha has been set aside to preserve citrus species in natural conditions.

DESCRIPTOR LISTS

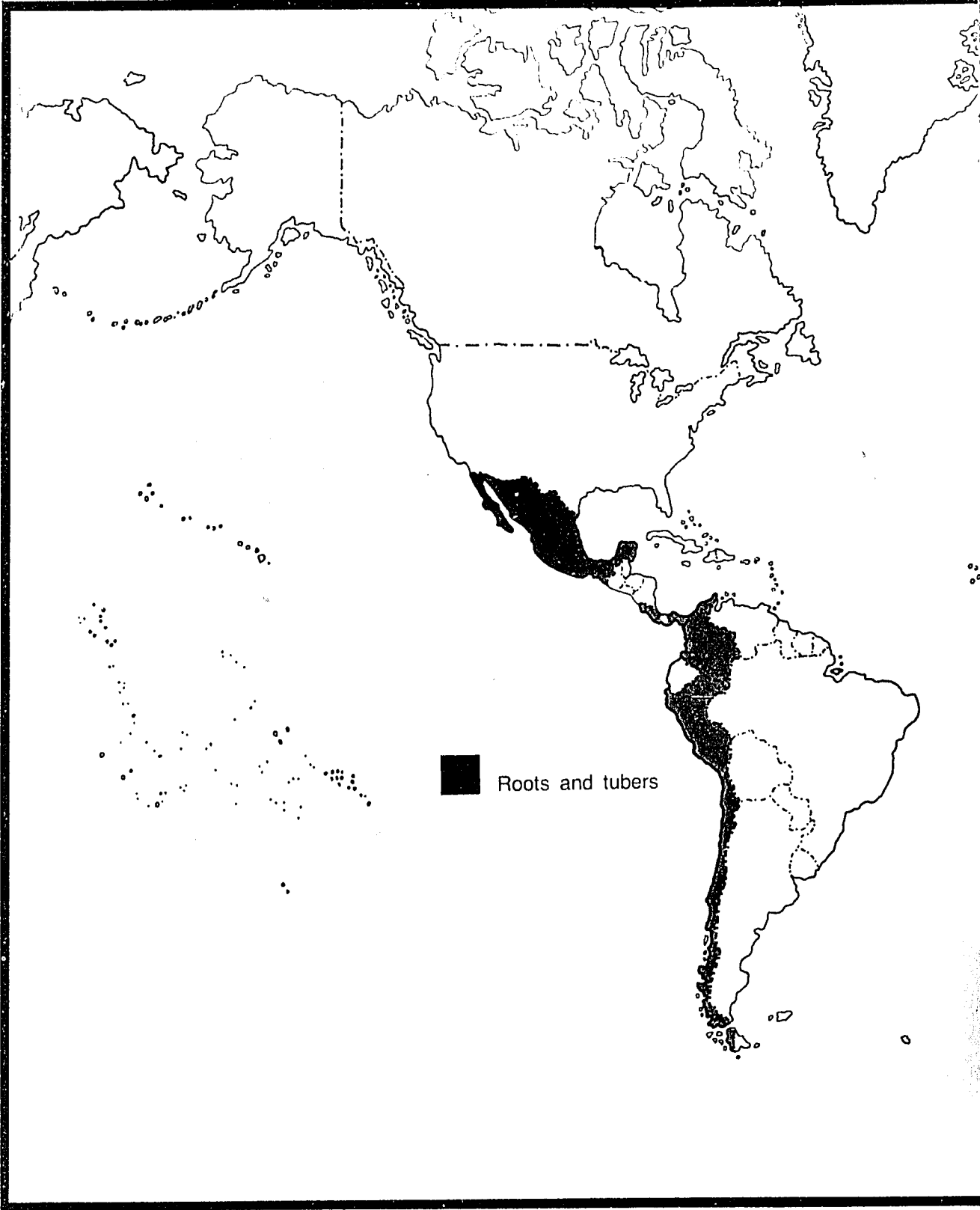
The IBPGR has published descriptor lists for tropical fruits (revised, 1980), apricot (1980) and almond (1981). In addition the *Genetic Resources of Bananas and Plantains* (1978) report contains a descriptor list for this crop. Descriptor lists for some temperate fruit crops are to be developed in consultation with the EC Expert Group on Tree Fruits, the ECP, the International Union for the Protection of New Varieties of Plants (UPOV), and a number of countries with specific interest in the genetic resources of temperate fruits.

ROOTS AND TUBERS

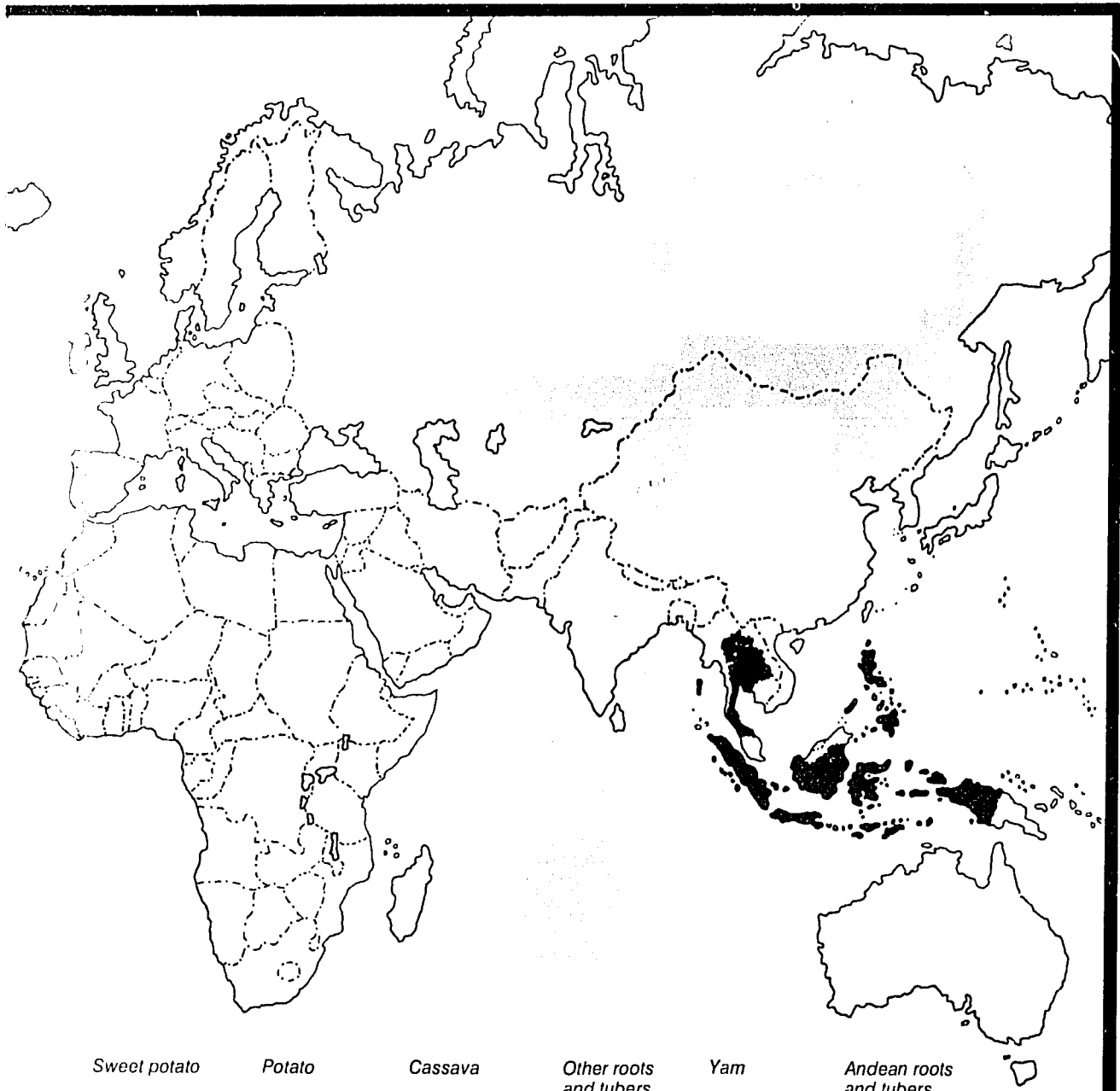
A directory of collections (aroids, cassava, potato, sweet potato and yams) was published in 1980. As information is gathered, other root crops, especially temperate ones, will be dealt with. IBPGR descriptor lists are available for potato, sweet potato and yam.

Collecting, supported or organized by the IBPGR, continued for many roots and tubers in numerous countries (see Fig. 4).

During 1981 the Board continued to take note of tissue culture research in relation to the conservation of root and tuber germplasm, particularly at the Centro Internacional de la Papa (CIP) and the University of Birmingham, UK for potato; CIAT for cassava; IITA for sweet potato, yam and cocoyam; and the Department of Tropical Crop Science, Agricultural University, Wageningen, the Netherlands for aroids.



■ Roots and tubers



Sweet potato

Indonesia
Philippines
Thailand

Potato

Chile
Colombia

Cassava

Philippines
Mexico
Costa Rica

Other roots
and tubers

Thailand
Philippines
Indonesia

Yam

Thailand

Andean roots
and tubers

Colombia
Peru

Figure 4. Countries where the IBPGR organized or collaborated in collecting roots and tubers during 1981

The work is also of interest as a method for overcoming the quarantine restraints impeding the movement of vegetative materials because the possibilities of spreading diseases can be largely avoided.

An IBPGR training course on characterization, evaluation and utilization of root crop germplasm was held in the Philippines, 29 November to 18 December 1981. Although this course was similar to one organized in 1980, the emphasis in 1981 was on sweet potato and cassava.

POTATO

CIP convenes planning conferences from time to time and several of these critically review the genetic resources of the crop. The up-dated priorities for collecting were summarized in the 1979 IBPGR Annual Report and they will be reassessed by CIP in the future.

In 1981 CIP collected a total of 140 accessions from the departments of La Libertad and Lambayeque in northern Peru and Puno, Cuzco and Apurimac in southern Peru. Of these, 71 have already been classified. The IBPGR indicated to CIP its willingness to assist with the collecting programmes and during 1981 funds were provided by the IBPGR to the Instituto Colombiano Agropecuario (ICA) in order to collect wild relatives of potato in **Colombia**. The work took place during both 1980 and 1981 in the departments of North and South Santander, Boyacá, Cundinamarca, Caldas, Valle, Quindío and Nariño. This Colombian centre works closely with CIP, with the Potato Introduction Center, Sturgeon Bay, USA and with the world community of potato breeders.

In addition, the collection and preliminary evaluation of potato germplasm in southern **Chile** with IBPGR support was concluded in 1981. The work was carried out by the Universidad Austral de Chile with advice provided, when necessary, by CIP. Collecting concentrated on wild and semi-cultivated ecotypes of tuber-bearing species, particularly *Solanum tuberosum*, growing under long-day conditions. A total of 496 accessions were collected.

SWEET POTATO

Following publication of the IBPGR report on the genetic resources of sweet potato (see 1980 Annual Report), action was taken to prepare for work in Guatemala, Ecuador, Colombia and Peru in 1982-85. During 1981 the IBPGR employed consultants to visit these countries to prepare plans for the collection and conservation of sweet potato. Based on the consultancy reports collection will begin in 1982. Polycrosses will be made to obtain true seed and material will be maintained in clonal collections.

Collecting in the secondary centres of variation (China, Southeast Asia and East Africa) needs to be encouraged. Since the crop is recognized as a high regional priority crop in Southeast Asia, collecting in the past has been supported by the IBPGR in all countries in this region. Financial support has been provided to **Indonesia** to collect sweet potato and taro (1980-82) and 85 accessions of sweet potato have already been collected. Support was also provided to PRCRTC, the **Philippines** to collect indigenous root crop germplasm (sweet potato, cassava, aroids and yam) during 1981 and to Chiang Mai University, **Thailand** to collect sweet potato germplasm (1981-82). An IBPGR consultant visited Papua New Guinea in 1981 to assess the collections and advise on action.

The IBPGR is to request the following centres to hold global collections of sweet potato and wild relatives:

- i) IITA, Nigeria (seed and clonal material);
- ii) NSSL, Fort Collins, USA (seed);
- iii) USA clonal repository for sweet potato; and
- iv) National Institute of Agricultural Science (NIAS), Japan (seed).

CASSAVA

An IBPGR Working Group prepared a first report on the genetic resources of *Manihot* sp. and this was discussed in a preliminary way by the Board in 1982. It was agreed that this should be supplemented by consultant reports and correspondence and a further meeting



Cassava, South America (CIAI)

convened to finalize the report in February 1982.

With IBPGR support, 300 (Brazil), 52 (Peru) and 5 (Malaysia, Thailand) cultivars were transferred to CIAI as meristem cultures. The institutes participating are CENARGEN, Brazil; Instituto Nacional de Investigaciones y Promoción Agropecuaria (INIPA), Peru; MARDI, Malaysia and the Department of Agriculture, Thailand.

ANDEAN ROOTS AND TUBERS

In the past few years IBPGR funds have been distributed through IICA (OAS) to national centres in Bolivia, Peru and Ecuador to collect and conserve oca (*Oxalis tuberosa*), ulluco (*Ullucus tuberosus*) and isano (*Tropaeolum tuberosum*) and collecting centred in Peru in 1981.

The Andean Regional Meeting noted that the following collections have been built up:

Ullucus tuberosus

- 12 ICA, Colombia
- 16 ESPOCH, Ecuador
- 437 Universidad Nacional San Cristóbal de Huamanga, Peru
- 202 IBTA, Experimental Station Belén, Bolivia

Oxalis tuberosa

- 14 ESPOCH, Ecuador
- 250 Universidad Nacional del Centro, Peru
- 550 Universidad Nacional San Cristóbal de Huamanga, Peru
- 650 Universidad Nacional San Antonio Abad, Peru
- 22 CIA, Puno Experimental Station, Peru
- 425 IBTA, Experimental Station Belén, Bolivia

Tropaeolum tuberosum

- 5 ESPOCH, Ecuador
- 356 Universidad Nacional San Cristóbal de Huamanga, Peru
- 131 Experimental Station Belén, Bolivia.

U. tuberosus, *O. tuberosa* and *T. tuberosum* all have a high Andean regional priority for collection in Bolivia, Ecuador, Peru and Venezuela, and Peru and Bolivia have agreed to jointly share regional responsibility for conservation, multiplication, evaluation and distribution of these germplasm.

YAM

Scientists from the Agricultural Research Division, TISTR, financially supported by the IBPGR, have undertaken a project to collect *Dioscorea* germplasm in Thailand 1980-82. So far, 256 accessions have been collected and the following species clearly identified: *D. hispida*, *D. esculenta*, *D. alata*, *D. myriantha*, *D. bulbi-*

fera, *D. glabra* and *D. pentaphylla*. Collecting activities will continue and all accessions will be evaluated.

OTHER ROOTS AND TUBERS

The IBPGR is also supporting the collection of *Colocasia* in Thailand (1981-82) and the collection of indigenous root and tuber crop germplasm in the Philippines. The collection of indigenous roots and tubers has continued in Indonesia during 1980-81, with national funding, and a total of 581 accessions have been collected of the following: *Zingiber*, *Amorphophallus*, *Dioscorea* and *Colocasia*. The samples are maintained by the National Biological Institute, Bogor.

FORAGES

In the 1980 Annual Report the reasons for the lack of a global plan for collection of this group of species were specified. They related especially to the great taxonomic diversity, the lack of knowledge of many species and the emphasis in breeding being concentrated only on a limited number of these species. Nonetheless in 1981 the Board agreed that a high priority should be given to forage plants in arid and semi-arid zones and, in order to start the preparation of a global plan of action, agreed that a Forage Officer should be appointed to the Secretariat to gather the basic information, visit important genetic resources programmes and advise the Board. It is expected that the officer will be in post early in 1982.

In the interim, the Board has responded to requests for help and provided funds to INTA, Argentina for a programme (1979-81) to collect native sub-tropical areas. More than 1 900 samples have been collected and duplicates have been sent to CIAT. A similar project, for native forages of Uruguay, was completed in 1981. A total of 630 accessions from 47 (primarily wild) species were collected.

These IBPGR efforts supplement those of CIAT which places emphasis on acid infertile soils. The forage programme at CIAT was triggered by funds from the IBPGR in the 1970s. It is now a very active programme and during 1981 undertook three major missions in Venezuela and Brazil. The total number of accessions held at CIAT now total 8 635, of which 1 500 were added in 1981. The species are all tropical species and the bulk represent forage legumes, especially *Stylosanthes*, *Desmodium*, *Centrosema*, *Zornia*, *Macropitium* and *Aeschynomene*.

In Southeast Asia, the IBPGR Regional Committee discussed forages and agreed that field work should start on a number of priority species. This decision stemmed from an expert Working Group which met in March 1981, the full report of which will be available in 1982.

Some forage grasses were also collected in Jordan during a multi-crop expedition organized by the Southwest Asia regional programme in May 1981.

In Africa the IBPGR continued its links with the National Agricultural Research Station,

Kitale, Kenya by providing some equipment to existing storage facilities in order to ensure that the large collection of grasses, legumes and forage shrubs at that station was conserved in acceptable conditions.

In Europe, the Executive Secretary of the

IBPGR was consulted on the institutions to be included in the ECP Working Groups on grasses and clovers which will meet in 1982.

The Board looks forward to reporting in greater depth on forages in future Annual Reports.



Woody species are essential for fuelwood in areas such as the Sahel

TREES

An exploratory survey on the genetic resources of trees for the improvement of rural living in semi-arid and arid areas of Africa, India, Southwest Asia and Latin America was carried out, with IBPGR support, by the FAO Forestry Department in 1979.

A report, *Genetic Resources of Tree Species in Arid and Semi-arid Areas*, published in 1980, recommended the establishment of a second phase (1981-82) which would explore,

collect and conserve select species in the genera *Acacia*, *Eucalyptus* and *Prosopis*. In addition some countries will also collect *Atriplex*, *Azadirachta* and *Capparis*. The IBPGR endorsed the report in 1980 and a joint FAO/IBPGR project started in January 1981. The project includes collection in Australia,¹ Chile, India, Israel, Mexico, Peru, Senegal,

¹ Australia is collecting with FAO funds only.

Sudan and Yemen (PDR) and evaluation and training in several of these countries. All countries, except India, formally agreed to participate and initiated collection activities -- mainly *Acacia* and *Prosopis* -- in 1981.

The Forest Tree Seed Centre, Humlebaek, Denmark of the Danish International Development Agency (DANIDA) will store and distribute seed collected without charge. In addition, a number of seedlots will be made available (partly on an exchange basis) by the Centre technique forestier tropical (CTFT), France. These seedlots will complement the coverage of the collections planned in the countries directly cooperating in the project.

Locally run courses for personnel directly involved in the project are being organized in Senegal and Mexico. The other cooperating

countries proposed study tours to neighbouring countries with similar environmental conditions. These study tours will be organized in some of the cooperating countries in 1982.

Seed collection activities will continue in 1982; it is hoped that an agreement can also be reached with India early in 1982. It is also hoped that enough seed will be available in the second half of 1982 for the distribution and establishment of field trials of at least some of the *Acacia* and *Prosopis* species included in the project.

In 1982 handbooks will be finalized and published on taxonomy, seed collection, and handling of the species involved and additional manuals will be prepared on the practical aspects of seed handling, storage and treatment, evolution, and conservation.

INDUSTRIAL CROPS

Amongst the crops accorded high priority by the IBPGR are a number of industrial or cash crops, e.g. sugar crops (beet and cane), beverages (coffee, cocoa, grape, etc.), fibres (cotton) 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 *Citrus* and banana (see section on tropical fruits), coconut (see below), beet (see below) and coffee (see Annual Report 1980). In 1981 expert advice was received for sugarcane.

In addition a directory of collections was published in 1981 for a number of cash crops. This included black pepper, cocoa, coconut, sugarcane and tea. A number of others will be included in future directories.

Many industrial crops are of interest in rural development. In most cases the genetic resources are being lost both in the field as well as from the older collections which were established during colonial periods. The IBPGR will

continue to direct its attention to such crops when clearly justified.

BEET

After the endorsement by the Board of a report of a joint IBPGR/Institut international de recherches betteravières (IIRB) Breeding and Genetics Group meeting, the IBPGR initiated a programme designed to make collections of beet (both garden and fodder beets as well as sugar beet) in genebanks more comprehensive.

The priority taxa and geographical areas of beet were listed in the 1979 Annual Report. The highest emphasis has to be given to European countries. In 1980-81 the IBPGR commissioned a consultant to visit breeders and centres in order to accelerate the movement of seed into the designated base collection at the Institute of Crop Science and Plant Breeding of the Federal Agricultural Research Centre

(EAI), Braunschweig-Volkernode, Federal Republic of Germany; see that small samples are multiplied for this purpose; and implement the recording of data concerning samples following the IBPGR descriptor list published in 1980.

In addition, two collecting missions were organized in Greece, two in Italy, and one in the Canary Islands. Emphasis was put on wild and weedy material but landraces were also collected. In Greece the zones were the coastal areas of the Peloponnese and the Halkidiki peninsula and a total of 76 samples were collected, of which 18 were *Beta maritima*; in Italy the areas explored were Sicily and the coastal zone of Sardinia and a total of 106 samples were gathered. In the Canary Islands (Spain) several interesting wild species (*B. patula*, *B. vulgaris* subsp. *macrocarpa* and others) were collected.

Finally, the field survey of local populations of *B. nana* in the mountains of Greece was expanded. It appears that the species is endemic on a few mountains (Olympus, Taigetos, Parnassos, Giana and Vardousia). It is found above the tree-line (1700-1800 m) in short, closed turf, in crevices between rocks, in rough tracks and in severely grazed open plant communities. At present there is little danger of

loss of populations except on Mt. Parnassos. A full report of the work in 1980 and 1981 will be published in 1982.

SUGARCANE

Sugarcane has always been considered as a relatively high priority for action but an initiative had not been started by the Board because the International Society of Sugar Cane Technologists (ISSCT) has, for a number of years, had an active Standing Committee on Germplasm and Breeding. This Committee has helped with field collecting, especially in the Melanesian archipelago.

However, following advice from regions and in line with its long-term plan and strategy, the Board convened an expert Working Group on Sugarcane in 1981. This was hosted by the USDA Sugarcane Field Station, Canal Point, Florida, 27-29 July 1981. The Working Group included curators of major collections, the Chairman of the ISSCT Committee and scientists knowledgeable in the diversity of *Saccharum* and related genera (see Appendix V for the membership of the Working Group).

The Working Group agreed that:



Sugarcane Working Group members examining wild sugarcane

- a) There has been a loss of clones from existing collections due to maintenance problems; moreover there has been little coordination of information between existing collections;
- b) wild genomes are threatened in certain areas;
- c) the crop is a major world crop and has important socio-economic features;
- d) the crop is also of importance in rural development;

- e) evaluation, especially characterization, of existing collections is urgent; and
- f) the crop has great potential for fuel and fibre.

Most germplasm collections, to present, have been linked with active breeding programmes: the Working Group stressed that with such clonal material this principle should be adhered to. The collections were reviewed and a number of gaps identified. The following summarizes the known erosion and breeding needs.

	Genetic erosion	Breeding needs
<i>S. officinarum</i>		
Indonesia, (Baliem, Irian Jaya)	low	low
Indonesia (Kalimantan)	low	low
Northern India	high	low
Southern Philippines	low	low
<i>S. spontaneum</i>		
Indochina, India/China borders, Thailand, Malaysia, Burma, Bangladesh	low	high for Indochina and Thailand
Egypt	low	medium
East Africa	low	low
Northern Pakistan and Iran	high	medium
Afghanistan, Iraq, Turkey, Southern USSR	low	low
<i>S. robustum</i>		
Papua New Guinea (Irian Jaya river areas - especially Kainantu, Bayer, Markham and Upper Ramu rivers)	high	medium
Indonesia (Sulawesi, Seram, Halmahara, Buru)	medium*	low
<i>S. barberisinese</i>		
Thailand	high	low**
Burma	high	low**
<i>Miscanthus</i>		
Highlands of Irian Jaya and other parts of Southeast Asia	high	high
China	high	high
Himalayas (Bhutan and Nepal)	high	high

(Early action was not envisaged on *Ripidium* (Asiatic *Erianthus*), *Saccharum edule*, *Sclerostachya*, *Nerenga*, *Eccoilopus*, *Spodiopogon*, *Miscanthidium* and *Impera*)

* local adaptabilities from hills and small islands need collection.
 ** but may be important sources of disease resistances.

The IBPGR is requested to recognize the two designated ISSCT world collections and to see that these form a part of the IBPGR network of base collections. A number of seed stores were also recommended as repositories

of seed. In addition the Board was asked to oversee and to provide funds for the joint documentation of the two major collections according to the descriptors agreed by the Working Group.

COCOA

A major initiative of the IBPGR on this crop was reported in the Annual Report for 1980. At its meeting in February 1981, the Board endorsed the proposed framework for action including a collection programme and agreed that, in principle, a conservation network based on a number of national programmes should be considered.

In view of the number of countries involved in Central and South America, the Board agreed to fund a consultant's visit so that agreed practical work can be implemented. The American Cocoa Research Institute (ACRI) is overseeing the administration, and it is expected that a report will be ready for consideration by the IBPGR and the International Office of Cocoa and Chocolate (IOCC) during 1982.

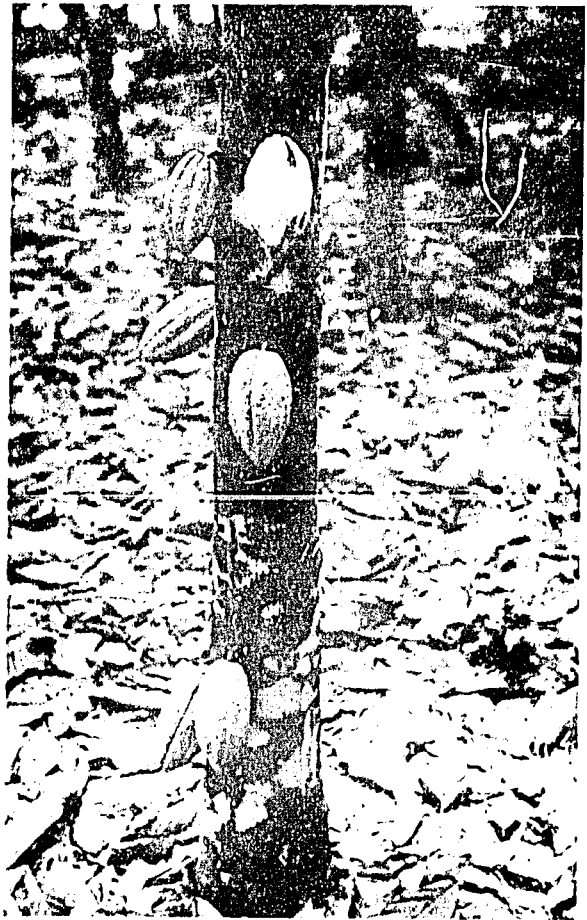
The Board continued its support in 1981 on genetic conservation, *in vitro*, of *Theobroma cacao* and its clonal propagation (see p. 69).

GRAPE

The descriptor lists developed by the IBPGR in 1979, by UPOV and by the Office international de la vigne et du vin (OIV) were discussed during a consultation organized by the OIV, 25-26 February 1981, in Colmar, France. Agreement was reached on a single, all-purpose descriptor list, and an additional minimum descriptor list for genetic resources use was developed following the agreed standard list. Both these descriptor lists will be published early in 1982.

In response to a need to stimulate research into alternative storage methods, the IBPGR agreed to support a two-year project for the maintenance of proliferating grapevine shoots *in vitro* at low temperature. This project which began in June 1980 is being carried out by the Commonwealth Scientific and Industrial Research Organization (CSIRO), Division of Horticultural Research, Adelaide, Australia (p. 68).

In view of the importance attached to *Vitis* in the Mediterranean, the IBPGR is supporting the survey and collection of *Vitis* germplasm in Greece. A project, organized by the Greek



Genebank, was finalized during 1981 and survey started late in the year.

A *Vitis* germplasm Workshop will be organized in April 1982 with participation from EUCARPIA, ECP, the IBPGR and OIV. The final result of this Workshop should be a detailed report on the genetic resources of *Vitis*, regional action plans for the ECP and the IBPGR Mediterranean Programme and recommendations to the IBPGR and possibly OIV on global action.

COTTON

The IBPGR initiated work on cotton germplasm during 1978; in 1979 the descriptors were agreed and the Board also started the collection of *Gossypium* germplasm.

The Institut de recherches du coton et des textiles exotiques (IRCT), with financial support from the IBPGR, explored several islands in the Caribbean region during 1980 and collected spontaneous or sub-spontaneous and

traditional cultivars of cotton. The work continued during 1981 in several countries of South America. In all countries visited there was active collaboration from the national institutes.

In **French Guiana** 31 samples of *G. barbadense* and 4 of *G. hirsutum* var. *marie-galante* were collected. During exploration it was observed that *G. barbadense* is frequently associated with human activity whereas var. *marie-galante* is able to survive spontaneously.

In **Venezuela**, material collected included only 2 samples of *G. barbadense*. The sub-spontaneous cottons in this country are being eliminated to control boll weevil (*Anthonomus*) damage.

In **Colombia**, the following were collected: *G. hirsutum* var. *marie-galante* from dry areas; *G. barbadense*, mostly from wet areas; and the "hybrido nativo" which include offsprings of ancient crossings between sub-spontaneous var. *marie-galante* and commercial varieties of *G. hirsutum* or *G. barbadense*.

In **Peru**, during October-November 1981, the team collected many samples of *G. barbadense*.

The collection of *Gossypium* will continue during 1982 in Central America.

COCONUT

Following an IBPGR Expert Consultation on Coconut Genetic Resources in 1978, the IBPGR has supported the survey and collection of coconut germplasm in priority areas of Southeast Asia and the Pacific.

The IBPGR supported the exploration, col-

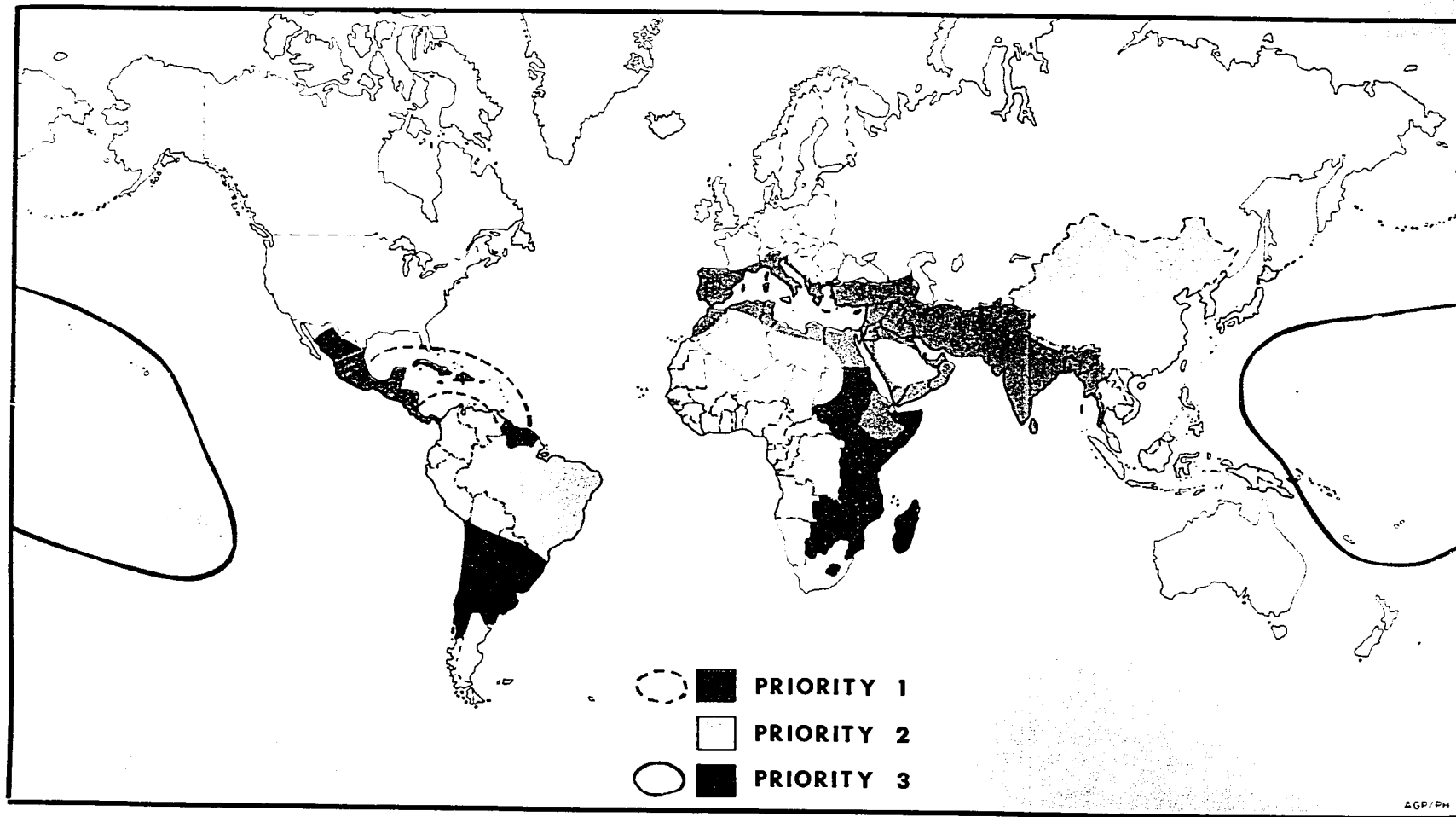
lection and conservation of coconut genetic resources throughout the Indonesian archipelago, carried out by the Indonesian National Committee for Plant Genetic Resources in cooperation with the Industrial Crop Research Institute, **Indonesia**. During 1980-81 this project covered the Mentawai Island, West Sumatra, Nias Island, North Sumatra and Riau archipelago.

Support was also provided to the Malaysian Agricultural Research and Development Institute (MARDI), to explore and collect coconut germplasm in all eleven states of **West Malaysia** (1981-82).

The Philippine Coconut Authority (PCA) received a grant from the IBPGR to establish a conservation centre in the Philippines.

Two scientists from the Central Plantation Crops Research Institute of ICAR, Kerala, India carried out a survey and collecting mission for coconut in seven Pacific territories. The mission, supported by the IBPGR, visited the **Solomon Islands** (Yandina and Guadalcanal Islands), **Fiji** (Vanualevu and Tavuenu), **American Samoa**, **Western Samoa**, **Tonga**, **French Polynesia** (Tahiti, Moorea, Bora Bora and Rangiroa) and **Papua New Guinea** (Trobriand Islands, New Ireland and East New Britain) during August-October 1981. Samples were collected from 30-40 palms at the rate of 3-4 nuts per palm. From these pooled samples, 100 nuts were collected randomly for conservation and 10 nuts for nut analysis. A total of 24 collections were made, 21 tall types and 3 dwarfs. The collected samples have been forwarded to the Andaman Islands (India) where a coconut repository will be established. Further collecting in the Pacific is envisaged.

THE IBPGR REGIONAL PRIORITIES AS OF 1981



REGIONAL ACTIVITIES

AFRICA

The African continent, excluding the Mediterranean basin nations, contains three priority regions: Ethiopia, Western Africa and Eastern Africa.

The IBPGR has promoted, organized and funded numerous exploration and collection missions in Africa since 1975. Close links are maintained with ICRISAT and IITA, which coordinate many aspects of the genetic resources of the crops for which they have research responsibility. In addition the Board cooperates with regional organizations such as WARDA, IRAT and ORSTOM (particularly in Western Africa for the collection of rice, sorghum and millet respectively) and the IBPGR works as far as possible with national programmes.

In 1978, a Workshop on Crop Genetic Resources in Africa, convened by the Association for the Advancement of Agricultural Sciences in Africa (AAASA) and IITA, recommended a detailed survey of African genetic resources. Initial efforts to gather the information by correspondence were unsuccessful, and in 1981 FAO and IBPGR jointly provided funds to IITA to employ consultants to visit countries. The work is expected to be completed by the middle of 1982.

Another recommendation of the 1978 Workshop was that AAASA should form an African Plant Genetic Resources Committee (APGRC). To help this initiative the IBPGR provided funds for a steering meeting at IITA in April 1981. The Board noted that no action plan was forthcoming and intends to accelerate action through IBPGR Regional Officers. In July 1981 the Regional Officer for Western Africa took up his duties at Ouagadougou,

Upper Volta; an Officer for Eastern Africa will be in post in early 1982.

For crop genetic resources activities to be successful, the Board looks to national centres and programmes as essential operating units. Accordingly, a substantial part of the Board's efforts in Africa will be devoted to strengthening national programmes.

The following work had been accomplished in Africa by the end of 1981.

GHANA, BENIN AND TOGO

The Genetic Resources Unit, ICRISAT, in association with PIE of Crops Research Institute, Bunso, Ghana, collected samples of ICRISAT mandate crops in Ghana during June 1981. In October-November 1981, with the financial support from the IBPGR, University of Birmingham, UK, in cooperation with local personnel, collected eggplants in Ghana, Togo and Benin. The activity was continued by PIE in late December 1981 and January 1982.

MOZAMBIQUE

During April-May 1981, IBPGR/ICRISAT, in cooperation with the Department of Agriculture and the Faculty of Agronomy, University Eduardo Mondlane, Maputo, explored the Nampula and Zambezi regions of Mozambique and collected the following: groundnut (99), sorghum (26), pearl millet and wild relatives (14), cowpea (19), pigeonpea (13), Bambara groundnut (7) and other grain legumes (7).

SUDAN

Sudan has long been regarded as an important area of crop genetic diversity for both sorghum and *Pennisetum* millet; these two crops form an integral part of the country's traditional agriculture. Following the recommendations of the Advisory Committee on Sorghum and Millets Germplasm, the IBPGR has been fielding expeditions in various parts of the country from 1977. During all missions, the IBPGR has cooperated closely with the University of Khartoum and ARC, Wad Medani.

In 1981, the IBPGR and ARC fielded two missions. In April 1981 the Jebel Marra mountain massif was explored in the form of a reconnaissance mission, and in November 1981 the Jebel Marra Development Project, Zalingei joined with IBPGR and ARC in collecting in the areas west of the Jebel Marra mountains (Garsila, Foroburunga, Buidis, Kalbar and Um Dukhn in the Dardur province, including areas adjacent to the Chad border). The following were collected: sorghum (35), wheat (17), pearl millet (35), fenugreek (11), tomato (11) and various food legumes and vegetables.

MALI

At the request of the Malian authorities, ICRISAT and the IBPGR organized a collecting mission in late December 1981 to January 1982 to the sixth and seventh regions of the country (this area had not been collected during the ORSTOM/IBPGR mission in 1978). Among the crops collected were 245 sorghum, 92 pearl millet and 112 samples of *Vigna unguiculata*, *Abelmoschus esculentus*, *Zea mays*, Curcubitaceae, *Triticum aestivum* and others.

UPPER VOLTA

In July 1981, the IBPGR Regional Officer took up his post in Ouagadougou. He established contacts with IVRAZ, and programmes of the Institute of Sahel, ICRISAT, IITA and the Groupement d'études et de recherche pour le développement de l'agronomie tropicale (FERDAT - ORSTOM). In collaboration with IVRAZ, he participated in two exploration



Breadwheat at the Jebel Marra

missions in October-December 1981. A scientist from ORSTOM also participated in the first, during which the northern, eastern and southern regions of the country were surveyed, and about 300 samples of sorghum and millet and 80 samples of maize, okra and other crops were collected. The second mission visited the western region and resulted in a total of 587 accessions of pearl millet, sorghum and fonio millet germplasm. The material collected also included 117 samples of maize, cowpea and okra.

ZAMBIA

An IBPGR mission April-June 1981 visited Southern, Western, Central, Copperbelt and Lupula provinces. This mission sampled variability of numerous crops and resulted in a total

of 2 129 accessions: sorghum (155), finger millet (63), maize (160), rice (29), pearl millet (71), wild *Pennisetum* (56), *Phaseolus* (72), cowpea (149), groundnut (114), Bambara groundnut (73), pigeonpea (19), other legumes (31), *Hibiscus* sp. (110), okra (85), various cucurbits (486), *Solanum* sp. (38), *Cleome* sp. (32), *Amaranthus* (65), *Brassica* sp. (25), castor (43), *Sesamum* (55), *Corchorus* sp. (24), and other crops (174).

NIGERIA

The National Horticultural Research Institute (NIHORT), Ibadan, Nigeria and FAO project NIR/72/007 collected and characterized germplasm of various fruits and vegetables. In addition the Sixth African Horticultural Symposium organized by NIHORT, 19-25 July 1981, emphasized genetic resources. The IBPGR maintains close links with NIHORT.

ETHIOPIA

The collection and conservation of crop germplasm in Ethiopia is the responsibility of PGRC, Addis Ababa, established in 1976 un-

der a bilateral programme between the Agency for Technical Cooperation (GIZ) of the Federal Republic of Germany and the Ethiopian government. The facilities of the Centre include fully operational long-term (-10°C, 75 m³) and medium-term (4°C, 50 m³, 30% RH) seed stores.

The 1977-78 crop season marked the beginning of the field work of the PGRC. Between 1977 and 1981, several expeditions were made to various parts of the country and since 1980 the IBPGR has been actively participating and collaborating with the PGRC in collecting missions.

During the period November 1980 to January 1981, an IBPGR-PGRC team surveyed the regions of Gojam, Gondar, Aisi and Gemu Gofa and collected local landraces of wheat (32), barley (129), sorghum (38) and various food legumes and oilseeds. In February 1981, ICRI/SAI, the Ethiopian Sorghum Improvement Programme, and the PGRC jointly explored the Gambella region of Hubabor for zera-zera sorghums. ICRI/SAI plans to collect chickpea germplasm in Ethiopia early in 1982.

The IBPGR has also completed plans to collect various vegetable crops germplasm, giving special attention to the *Brassica* gene pool, in early January 1982.

EAST ASIA AND THE PACIFIC

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

The Board, at its meeting in February 1981, considered the report of the IBPGR Symposium held at Tsukuba, Japan in October 1980 (see Annual Report 1980) and agreed that:

i) a Working Group should be convened for the East Asian countries to discuss cooperation and practical action; and

ii) a consultant should visit the Pacific countries to obtain more information on existing collections and assess what actions would be practicable.

During 1981 negotiations were undertaken to prepare for an East Asian Working Group meeting and the Secretariat arranged visits in the Pacific in order to report to the Board in 1982.

During 1981 the Proceedings of the Symposium were prepared for press and a number of negotiations initiated with governments in the two regions. An important result of the Symposium was the endorsement of the priori-

ty crops of the region (see Annual Report 1980).

Although negotiations are proceeding to determine a framework for action, the IBPGR initiated some collecting:

— The Central Plantation Crops Research Institute of ICAR, Kerala, India, supported

by the IBPGR, collected coconut germplasm in seven Pacific Ocean territories from August to October 1981.

— The Choong-Nam National University, Dae-jeon, Korea, with IBPGR support, collected local maize lines in 1981 in the Republic of Korea.

EUROPE

Although the Board cooperates with institutes and breeders in the most developed zones of the world, some, e.g. North America and Europe, have not been given a regional priority status by the IBPGR because of the paucity of indigenous variability.

Following agreement in 1979 to a cooperative programme on genetic resources (ECP) for European countries organized under the auspices of FAO/UNDP, the programme started the first of three projected phases. The first phase runs through the end of 1982.

In 1981, the IBPGR Secretariat has maintained very close links with the activities, the Executive Secretary of the IBPGR or members of his staff attended all meetings including the Scientific Advisory Committee (SAC) which met jointly with the EUCARPIA Genebank Committee in Lund, Sweden in July 1981. At this meeting SAC agreed to the establishment of a number of European working groups for specific crops (barley, rye, pea, *faba* bean, potato, grasses and clovers, *Prunus* sp., *Allium*, tomato and *Vitis*). The activities are planned so that there is no duplication of effort with the work of IBPGR and — within the regional context — they will complement the global efforts.

The Pea Working Group met 13 July 1981 in Lund, Sweden and representatives of the genebanks at Bari (Italy), Gatersleben (GDR) and the Nordic Gene Bank agreed to divide responsibilities for collections from Central and Eastern Europe; Mediterranean and Southern

Europe; Northern Europe, Great Britain and Ireland; and other countries. All three genebanks agreed to collect passport information and to characterize and evaluate samples where this has not yet been done.

A meeting for *faba* beans was held at Bari, Italy on 1 September 1981 and was attended by scientists from the United Kingdom, the German Democratic Republic and Italy. The meeting initiated an enquiry to ascertain the nature of the collections in Europe and also to devise a descriptor system.

The Rye Working Group met at the Plant Breeding and Acclimatization Institute, Radzikow, Poland 2-4 September 1981. This resulted in a five-year agreement for closer working relations between the Nordic Gene Bank and the programme in Poland for evaluation, conservation and documentation.

Within the context of the ECP, sub-regional activities form an important basis for cooperation. These include the IBPGR Mediterranean Programme, the Nordic Gene Bank (established to serve the five Nordic countries), the Council for Mutual Economic Assistance (CMEA), for the socialist countries of the east and the European Commission (EC) Programme on Better Use of Genebanks and Disease Resistance.

In addition to the IBPGR Mediterranean Programme activities, the IBPGR assisted programmes in other developing countries of the region in 1981, in particular those of Po-

land and Bulgaria, in the field of documentation. The IBPGR also participated in a conference on regeneration in cross-pollinated species organized by the EC and held at Nyborg, Denmark in July 1981.

The Governing Board of the ECP held its second meeting in Geneva, 14-18 December

1981 and a major conclusion of the government representatives was that even closer cooperation should be sought with the IBPGR. This will be discussed by the Board at its ninth meeting in February 1982 and a report will be made to an extraordinary meeting of the Governing Board of the ECP in June 1982.

MEDITERRANEAN

Since its creation the IBPGR has attempted to stimulate cooperative activities between countries of the region. There are now strong national programmes in Italy, Spain, Portugal and Greece and the IBPGR has provided storage facilities in several countries. The Germplasm Institute, Bari, Italy has been coordinating activities on behalf of the IBPGR and countries have nominated liaison officers to assist with collaboration.

The liaison officers met 10-11 December 1981 in Rome and 10 countries were represented as well as the ECP, EC programme and ICARDA. For the first time the national and regional crop priorities were defined. Overall priorities within the region are as follows:

Priority 1: wheat, barley, *Vitis*, citrus, forage legumes

Priority 2: maize, *Vicia faba*, lupin, chickpea, olive, beet, onion, *Capsicum*, tomato, cucurbits, aromatic and medicinal plants, forage grasses

Priority 3: rice, *Phaseolus*, lentil, pea, *Prunus*

In addition date, cotton and tobacco rate high priority in sub-regions.

Although not all countries could agree to undertake regional responsibilities the following nations agreed to hold material on a regional basis:

Egypt: oil seed crops

Greece: cotton, tobacco, beet, *Vitis*,

Italy: aromatic and medicinal plants
wheat, *Vicia faba*, *Vitis*, *Prunus*,
pea, forages

Portugal: maize

Spain: forage legumes, almond, citrus,
olive, *Vitis*, *Prunus*

Yugoslavia: sunflower, maize

ICARDA: barley, chickpea, lentils, forages



Collecting *Aegilops*, Polygyros, Greece

Several of the genebanks have been designated by the IBPGR and others will be designated when facilities are available.

The liaison officers unanimously agreed that the IBPGR Mediterranean Secretariat headed by Professor Porceddu was very effective and

should continue for the time being in order to support and stimulate implementation of the regional programme.

During 1981 a number of missions collected material. Details are provided under the Crops Sections of this report.

<i>Country</i>	<i>Date</i>	<i>Participating countries</i>	<i>Crops</i>	
Egypt:	May	1981	Egypt, Italy, Spain	Cereals, grain, legumes and others
	October	1981	Egypt, Italy	Multi-crop
Greece:	June	1981	Greece, IBPGR	Beet,
	July	1981	Greece, IBPGR	Beet, <i>Aegilops</i>
Italy:	June	1981	Italy, IBPGR	Beet
	August	1981	Italy, GDR	<i>Triticum</i> , legumes
Libya:	May-June	1981	Italy, GDR	Cereals
Portugal:	June	1981	Portugal, Spain	Lupin, Secale
Spain:	June	1981	Spain, IBPGR	Beet
	Aug.-Sept.	1981	Portugal, Spain	Lupin, Secale, <i>Phaseolus</i>

LATIN AMERICA

Latin America includes four IBPGR regions: Central America, Brazil, Andean zone and Southern South America because of the centre of diversity of numerous crops of importance.

Activities on crop genetic resources have accelerated; the IBPGR has been successful in acting as a catalyst and several countries (Argentina, Brazil, Colombia, Mexico and Peru) have already established national structures for genetic resources activities supported by national budget allocations.

A highlight of 1981 was an Andean regional meeting sponsored by IBPGR (with close cooperation from IICA/UNAC) in Lima in April 1981. It was attended by delegates of the Andean Pact countries (Bolivia, Colombia, Ecuador, Peru and Venezuela). The major objectives were to review the general situation of genetic resources in the region; to discuss and agree on priorities for species, distribution of responsibilities, needs for conservation and training; and to consider the establishment of a regional structure to coordinate activities.

Each country provided information on institutions and scientists working on germplasm and their existing collections, storage facilities and requirements. It will be published by the IBPGR in 1982.

The following countries hold significant collections:

- Bolivia — maize and minor Andean crops;
- Colombia — legumes, maize, rice, potato, tomato, forage, minor Andean crops, coffee and fruit trees;
- Ecuador — legumes, Andean minor crops;
- Peru — legumes, maize, potato, groundnut, cotton, tomato, minor Andean crops;
- Venezuela — groundnut, sesame legumes, maize.

There are no long-term storage facilities in any of these countries other than those in CIAT and CIP but medium-term storage exists

in Peru, Colombia and Venezuela, mostly for specific crops. Colombia and Peru have small collections of vegetatively propagated crops. Colombia and Peru both expressed their interest to establish regional genebanks for long-term conservation.

Genetic erosion was reported to have accelerated in the region, particularly for *Phaseolus*, maize, groundnuts, minor Andean crops, cotton, forage, *Capsicum*, *Lycopersicon*, *Cucurbita*, *Theobroma cacao*, species of *Carica* and *Passiflora* and other fruit trees.

The IBPGR has had a significant impact on training: nine students from the five countries have been trained at Birmingham University, UK and more than twenty other post-graduates have attended one of the short training courses

in Latin America since 1979 (see p. 79 for details concerning 1981). The University of La Molina plans to start a post-graduate training course in Spanish in the near future.

Crop priorities for 84 species in the Andean region were defined by the delegates based on the IBPGR criteria. The participants discussed their willingness to accept regional responsibility for conservation, multiplication, evaluation and distribution of 57 of these crops. A full list is provided in the report of the meeting available from the Secretariat. Some examples are shown in Table 3.

The delegates prepared a document on the establishment of a regional organizational structure to be discussed by the governments within the framework of the Andean Pact.



Table 3. *Some Andean regional responsibilities for conservation*
(R = willingness to act regionally)

Crop	Bolivia	Colombia	Ecuador	Peru	Venezuela
<i>Phaseolus vulgaris</i>	—	R	R	R	—
Maize	R	R	R	R	—
Minor Andean roots and tubers	R	—	—	R	—
Tomato	—	R	R	R	—
<i>Capsicum</i>	—	—	R	R	—
Pineapple	—	R	—	—	—

During 1981 the IBPGR continued its close collaboration with CIMMYT (for maize and wheat), CIP (for potato) and CIAT (for forages, *Phaseolus* and cassava). Practical work by the IBPGR in a number of countries is detailed below.

The following projects of the IBPGR, **covering more than one country**, are reported in the section dealing with crops:

- *Phaseolus* in Central and Southern America through CIAT (p. 16);
- Cotton in the Caribbean, French Guiana, Colombia, Venezuela and Peru, through IRCT (p. 39);
- Andean grains and tubers in Bolivia, Ecuador and Peru, through IICA (p. 12);
- Groundnut in South America (p. 13); and
- Cassava in Mexico and Costa Rica, through CIAT (p. 33).

In addition the IBPGR provided funds to the Palm Oil Research Institute of Malaysia to collect *Elaeis melanococca* in Costa Rica, Honduras and Panama.

The following developments are reported in **individual countries**:

ARGENTINA

The Experimental Station of Pergamino, INTA collected populations of maize with IBPGR support in the southwest province of Buenos Aires and the northeast province of La Pampa (p. 10) and the Faculty of Agronomy of the University of Buenos Aires, also supported by IBPGR, collected maize samples from isolated places in the provinces of Jujuy and Salta in northwest Argentina.

The Experimental Station of Salta, INTA completed the programme started by the IBPGR in 1979 to collect native sub-tropical forages in the Argentinian provinces of Salta, Jujuy, Tucumán and Santiago del Estero and the Bolivian provinces of Yacuiba, Tarija and Santa Cruz de la Sierra.

BOLIVIA

During 1981 the Centro de Investigaciones Fitocogenéticas, Pairumani planned multi-crop collecting to start in 1982. This will cover most of the country for *Phaseolus vulgaris*, *P. lunatus*, *Lupinus mutabilis*, *Amaranthus* spp. and other crops.

BRAZIL

CENARGEN/EMBRAPA has started a systematic national programme of exploration to collect 14 groups of priority species in 1981-82 (see FAO/IBPGR *Plant Genetic Resources Newsletter*, 46).

An IBPGR project, carried out by CENARGEN to collect maize germplasm in the Amazon region of Brazil continued in 1981 (p. 10).

A two-year project of IBPGR and CENARGEN to collect cultivated groundnut and related species in remote regions of Brazil began in 1981 (p. 13). The IBPGR has provided funds to CENARGEN to establish an international living collection of wild *Arachis* spp. (p. 68).

CHILE

INIA continued an IBPGR project to collect maize: three missions were fielded to Atacama and Valparaíso, Santiago and Ñuble, and Bio Bio and Llanquihue in 1981 (p. 10).

The Facultad de Ciencias Agrarias of the Universidad Austral de Chile has completed an IBPGR project to collect, maintain and evaluate Chilean potato germplasm and wild relatives (p. 32).

COLOMBIA

During 1981 ICA developed a system to centralize and coordinate plant genetic resources activities; it is also planning to build a genebank. ICA has continued an IBPGR project to collect potato and wild relatives in the departments of Santander, Boyacá, Cundinamarca, Caldas, Valle, Quindío and Nariño. The project started in 1980 and continued into early 1981 (p. 32).

The Board is supporting a multi-crop expedition of ICA in the departments of Cauca, Valle, Quindio, Risaralda, Caldas, Tolima and Antioquia. In 1981 the expedition collected *Lycopersicon* (16), *Capsicum* (38), *Cucurbita* (18), *Allium* (11), *Passiflora* (12), *Solanum* and wild relatives (45).

ECUADOR

During 1981 Ecuador established an inter-institutional *ad hoc* committee to deal with national genetic resources activities. Plans were made in 1981 for IBPGR to support multi-crop collecting covering 10 provinces of Ecuador and the department of Nariño in southern Colombia. This will be led by INIAP in cooperation with the Facultad de Ciencias Agrícolas of the Universidad Central.

GUATEMALA

The Universidad de San Carlos, in cooperation with the Instituto de Ciencia y Tecnología Agrícola (ICTA), and other national organizations, has discussed plans to collect, maintain

and evaluate genetic resources. The IBPGR Secretariat has assisted in preparing a four-year project for the collection of cassava, sweet potato, chilli, cucurbits, amaranths and other priority species from throughout the country.

MEXICO

Since 1977 Mexico has had a national unit for plant genetic resources under INIA that coordinates national activities on this subject through INIA's network of experimental stations.

Following the recommendation of a Workshop on *Capsicum* germplasm that met in CATIE, Turrialba, Costa Rica, the IBPGR has supported the collection of *Capsicum* in the Mexican states of Nayarit, Nuevo León, Chiapas, Yucatán and Tabasco during 1981 (p. 23).

PARAGUAY

In 1981, the IBPGR continued to support the collection of landraces of maize carried out by IAN in several regions of Paraguay (p. 10).

PERU

During 1981 IBPGR has continued its support to the maize programme of UNA, La Molina to collect maize in jungle areas of Peru. Several expeditions have been carried out in the departments of San Martín, Madre de Dios, Junín, Cajamarca, Loreto, Ucayali, Cerro de Pasco, Amazonas and Huánuco (p. 10). Plans are advanced for the collection of cassava, sweet potato, *Lycopersicon* spp., *Capsicum* spp., *Cucurbita* spp. and a number of other crops in 1982.

URUGUAY

During 1981 the Agronomy Faculty of the Universidad de la República completed an IBPGR project started in 1979 to collect native forage grasses and legumes from different regions of Uruguay. Plans are advanced for work on other crops in 1982.

SOUTH ASIA

The South Asian region remains a first priority region for action due to the rapid replacement of large areas of traditional cultivation and the wide variability present in the region.

Following an IBPGR Workshop on South Asian Plant Genetic Resources held in 1978, the governments in the region designated country Liaison Officers to coordinate genetic resources activities within their countries and to maintain links between the corresponding institutions of the other countries in the region.

The Liaison Officers met in Kathmandu, 23-25 September 1981, and those from Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka were present. The meeting reviewed the regional crop priorities and up-dated the list for action as follows:

Priority 1: rice, minor millets, Asiatic *Vigna* species, oilseed brassicas, jute, eggplant, chilli, cucurbits, citrus, mango and medicinal plants

Priority 2: maize, wheat, soybean, *Dolichos* sp., sesame, cotton, sweet potato, yam, ginger, betelvine, *Piper* sp. and tea

The meeting noted the urgent need to establish a long-term storage facility in the region (the 1978 Workshop recommended that the proposed national long-term storage facility in India could serve the needs of the region). It was suggested that in addition to the genebank pending in India, the other countries should all develop medium-term facilities.

The meeting unanimously agreed that descriptor lists for priority crops should be developed as soon as possible.

Further, it was recognized that all the countries were in need of additional trained manpower. The impact of the IBPGR short training courses held at the National Bureau of Plant Genetic Resources, India was recognized and there is a need for additional training.

Finally, the Liaison Officers recognized the importance of continued links between coun-



(S.L. Manandhar)

tries of the region. If these continue, the establishment of a formal regional committee is not needed for the time being.

Activities during 1981 are noted below:

BANGLADESH

Since 1978, several exploration missions have been fielded jointly with international centres (IBPGR, ICRISAT and IRRI). The establishment of a national coordinating committee in 1979 led to the establishment of a genetic resources unit at BARI and at the end of 1980 the IBPGR provided funds for the purchase and installation of refrigeration equipment and shelving for a medium-term seed store at BARI.

The Board also provided funds for the collection of various pulses (see p. 19) and in 1981 the IBPGR provided fellowships to two scientists from Bangladesh to undergo training at the University of Birmingham, UK.

BHUTAN

The Department of Agriculture and the IBPGR jointly collected, during August to October 1981, in the middle Himalayan zone of Bhutan. A total of 483 samples were collected: rice (82), wheat (24), barley (38), buckwheat (48), maize (47), millets (54), *Amaranthus* (17), grain legumes (64), soybean (16), *Sinapsis alba* (23), and various vegetables (crucifers, chilli, onion, garlic).

One trainee from Bhutan, with an IBPGR fellowship, received the M. Sc. degree in genetic conservation from the University of Birmingham, UK.

BURMA

Collection of crops other than rice which has been carried out in cooperation with IRRI and in particular grain legumes, oil crops, cotton, maize, vegetables and fruit trees has been initiated on a modest scale by the respective divisions of ARI. However, the work on these crops needs to be accelerated. The IBPGR plans to assist the Government of Burma during 1982 in establishing a national programme.

INDIA

Genetic resources work has a long history in India. The NBPGR has organized over 35 exploration missions during 1978-81. These missions have collected about 14 000 accessions of various crops and their wild relatives, and numerous scientists from the different State Departments of Agriculture, agricultural universities, ICAR and IARI agricultural institutes/research stations have participated.

NBPGR scientists have also assisted the work of the IBPGR in other parts of the world, in particular collection in Mali and Nigeria (1979/80), Malawi (1980) and Zambia (1980/81). The IBPGR provided funds to the Central Plantation Crops Research Institute, Kasaragod, India, to collect coconut germplasm in the Pacific region (p. 40). Also, assistance has been given with training by the organization of short training courses on plant exploration techniques in 1979 and 1980, in which participants from South and Southeast Asia received training. During 1981 plans for a third course in 1982 were finalized.

During 1981 the NBPGR began publishing a newsletter, which provides information on the activities of the Bureau. The Bureau organized a National Workshop on Documentation in November 1980 (see IBPGR Annual Report 1980) and the papers presented at that Workshop were published in 1981.

NEPAL

The IBPGR and the Departments of Agriculture and Medicinal Plants have continued close collaboration to collect important crops in the Himalayan foothills of Nepal. In addition, the IBPGR has agreed to provide the necessary funds for the purchase of equipment for the establishment of a genetic resources unit by the Department of Agriculture and agreed to fund a consultant to provide expert advice in 1982.

The Medicinal Plants Department has been involved in the collection and maintenance of various medicinal plants. It has also commenced work on *in vitro* conservation of genetic resources.

SRI LANKA

Genetic resources activities in Sri Lanka continue to receive greater attention and research stations have initiated work on the collection of native germplasm from the various agro-ecological regions. During 1980 and 1981

mainly millets, grain legumes and oilseeds were collected from dry and intermediate zones of the country.

The IBPGR provided fellowships to junior scientists from Sri Lanka to attend a one-year post-graduate training course at the University of Birmingham, UK.

SOUTHEAST ASIA

The activities in this region are coordinated by the IBPGR Regional Committee for Southeast Asia, and an IBPGR Regional Officer. The Regional Committee held its fourth meeting at Kuala Lumpur, Malaysia, 1-3 May 1981.

The Committee reviewed existing priorities for the crops of the region. The following currently rate high priority action:

Cereals

- High altitude rainfed rice in Thailand
- Rice in Indonesia, Malaysia
- Maize in Indonesia, the Philippines, Thailand

Food legumes

- Groundnut in Thailand
- Soybean in Indonesia
- Winged bean in Malaysia, the Philippines, Papua New Guinea
- *Vigna radiata* in Indonesia, Thailand

Fruit and tree nuts

- Rambutan in Indonesia, Malaysia, the Philippines
- Durian in Indonesia, Malaysia, the Philippines
- Mango in Indonesia, Malaysia, the Philippines
- Banana in Indonesia, Malaysia, the Philippines
- Citrus in all countries except Papua New Guinea

- *Lansium* in Malaysia, the Philippines, Thailand
- Cashew in Malaysia, the Philippines, Thailand

Vegetables, especially:

- Indigenous species in Papua New Guinea, Thailand
- Amaranth in Indonesia, Papua New Guinea, the Philippines, Thailand
- Bitter gourd in Indonesia, the Philippines, Thailand
- Eggplant in Malaysia, Thailand
- *Capsicum annuum* in Indonesia, Thailand
- *Ipomoea aquatica* in Indonesia
- Yardlong bean in all countries except Papua New Guinea

Root and tuber crops, especially:

- Sweet potato, yam and taro throughout the region
- Zingiberaceae in Indonesia, the Philippines, Thailand

Industrial crops

- Spices, especially:
 - Cinnamon in Indonesia
 - Pepper (*Piper* spp.) in Indonesia, Malaysia, Thailand
 - Clove in Indonesia, Malaysia
- Coconut in all countries except Papua New Guinea
- Sugarcane in Thailand

- Cotton in the Philippines, Thailand
- Philu nut in the Philippines

Forage legumes, especially:

- *Desmodium*, *Leucaena*, *Sesbania*, *Gliricidia*, *Cajanus* and allied genera, and *Calopogonium* in all countries
- *Stylosanthes sundaica* and *Glycine wightii* in Indonesia
- *Canavalia rosea*, *Flemingia* and *Zornia diphylla* in Malaysia
- *Aeschynomene*, *Trifolium* sp. and *Vigna unguiculata* in the Philippines
- *Alysicarpus vaginalis* in Malaysia, Thailand
- *Crotalaria* sp. in Thailand

The Committee also convened a Working Group on Tropical Pasture and Forage Legumes in the region, 19-20 March 1981 in Bangkok, Thailand. This resulted in a report highlighting the potential forage legumes in the region, the erosion of indigenous variability, and included plans for collection, conservation, evaluation, documentation and utilization.

IBPGR descriptor lists of particular interest in the Southeast Asian region have been produced for tropical fruits, winged bean, mung bean, taro and yam. The winged bean descriptors were discussed by a Working Group in Sri Lanka, 18 January 1981, and revised descriptors will be published early in 1982.

A number of collecting missions were fielded by several Southeast Asian institutes during 1981 and the following lists IBPGR support:

Indonesia:

- Wild and cultivated banana
- Root and tuber crops
- Coconut
- Soybean

Malaysia:

- Coconut

Philippines:

- Tropical fruits
- Coconut
- Winged bean
- Root and tuber crops
- Indigenous forages

Thailand:

- *Momordica* spp.
- Indigenous vegetables
- *Amaranthus*
- Yam
- Sweet potato
- Yardlong bean
- *Citrus*
- Eggplant
- *Colocasia*

Further details are mostly to be found under the reports on specific crops.

The Regional Programme has a base seed store in the Institute for Plant Breeding (IPB), University of the Philippines, Los Baños, the Philippines which is now operational. In addition the IBPGR provided funds to Thailand during 1981 to construct long-term storage facilities specifically for winged bean (global collection) and Asiatic maize. The Japanese Government has also provided funds to construct a national rice seed storage laboratory in Thailand, which consists of medium- and long-term storage facilities, seed cleaning/drying rooms, offices, etc. It is envisaged that 30 000 accessions of rice and possibly other cereals could be stored in this centre.

A regional collection of bananas has been established by the IBPGR in Davao, Philippines (see p. 27), and the designation of collections of other vegetatively propagated crops will be taken up in the near future.

Whilst exploration and conservation activities received most attention during 1981, evaluation and utilization of the existing collections need further action. In order to facilitate closer links between genetic resources workers and users, a one-day workshop was organized during the SABRAO Conference on 6 May 1981. The proceedings of this IBPGR/SABRAO Workshop on Genetic Resources and the Plant Breeder will be published by the IBPGR early in 1982.

A training course on characterization, evaluation and utilization of root crop germplasm was held in the Philippines, 29 November to 18 December 1981. The IBPGR sponsored two scientists from each of the participating countries in the regional programme and five scientists from various Pacific Islands (p. 80).

SOUTHWEST AND CENTRAL ASIA

The Board supports genetic resources activities in Southwest and Central Asia through an FAO-operated project (TF:REM 31/IBPGR). The project was due to end on 31 December 1981 but, in response to requests by governments for an extension, it will be continued for three more years subject to the availability of funds. The Board recognizes that the national programmes are still undergoing development and depend to a considerable extent on external aid.

The project document has been sent to additional governments in the regions (Jordan and Lebanon) as officials in both these countries had expressed interest in the aims of the project. If they decide to participate, national programmes will be initiated. As elsewhere in the region, local crop varieties have been and are being replaced by exotic varieties and changes in land usage also erode genetic resources.

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 1981 has been as good as could be expected.

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

AFGHANISTAN

For the time being genetic resources activities are limited to the maintenance, rejuvenation, multiplication and characterization of material collected previously.

At the request of the Director of the Plant Research and Soil Science Department, support from the project for the Genetic Resources Unit within the Department continues at the same level, namely a grant toward the operation of a vehicle to enable staff to reach

Darulamen Farm on the outskirts of Kabul and various supplies and equipment.

In February, 277 accessions of local wheat cultivars and 94 accessions of maize, complete with passport data, were received from the Unit. The material has been paced in the store at the Germplasm Institute, Bari, Italy for base storage. Passport data were also supplied for about 500 samples of wheat sent over a year ago and also stored at Bari.

IRAN

The Officer-in-Charge of the Plant Genetic Resources Unit at Karaj, attended the Technical Conference on Crop Genetic Resources held in Rome 6-10 April. The opportunity was taken to enquire about the status of the Unit. It seems that the collections made in 1978 are extant but the cold rooms are still in need of repair. Since then the Director-General of the Plant Improvement Institute has written following an enquiry to confirm that equipment previously supplied is still at the Institute.

IRAQ

The Plant Genetic Resources Division is now established in specially built accommodations that consist of a well-fitted laboratory, drying room and office.

Collecting activities are limited under present circumstances to northern and western Iraq where collections of *Aegilops*, *Triticum* and *Hordeum* species have been made.

Multiplication of samples is done at Zafaranyia Field Station close to Baghdad and also (for wheat only) at Mosul University. Characterization of samples is reduced in scale owing to the depletion of staff of the breeding programmes.

Twenty-nine samples of wheat and 14 of barley have been sent to the Germplasm Institute, Bari, Italy for base storage. In addition, 51 samples of *Triticum* and *Aegilops* species



New varieties are rapidly replacing traditional cultivars, even in remoter areas

have been sent to the base collection at the Plant Germplasm Institute, Kyoto University, Japan.

PAKISTAN

The National Coordinator, Plant Genetic Resources/Plant Introduction, PARC, reports significant progress in the genetic resources programme. Many of the neglected older collections have been reassembled so that now there are 7 318 accessions in the medium-term cold store. Bulking and characterization of wheat, rice and maize samples continues.

A notable event during 1981 was a plant collecting expedition to Baluchistan financed directly by the IBPGR. Two teams of three scientists were in the field during May-June

and comprised local scientists and scientists from SVP, the Netherlands. In the relatively short period of field work, the PARC/Netherlands expedition collected 794 samples of over 40 crops from 181 sites in four agroclimatic zones of the province.

Among the germplasm collected there were: cereals - 294 samples of wheat and wild relatives, 98 barley and wild relatives, 60 maize and 50 sorghum; vegetables - 23 onion, 54 melons and 68 samples of 14 others; pulses - 23 samples; spices - 41 cumin; oilseeds - 34 samples.

Considerable expansion of the National Plant Germplasm System is envisaged following approval of financial aid from the World Bank. New laboratories and a cold store are to be built. In addition to the activities at PARC, there will be a centre at Karachi for tropical

coastal plants and one at Quetta for winter cereals and fruit species with chilling requirements.

SYRIA

Activities at the Genetic Resources Unit were handicapped for part of the year by a reorganization of accommodation at the Directorate of Agricultural Research, Douma; however, the collecting programme was not affected. Over 50 samples of cereals and their wild relatives were collected around Homs and Hama.

Multiplication and characterization of samples are being done at Quaratah Experiment Station near Douma and at Tel Hadya, ICARDA's field station near Aleppo.

Nearly 200 wheat samples have been sent to the Germplasm Institute, Bari, Italy for long-term storage.

At ICARDA, the FAO/IBPGR Regional Adviser helped with the development and documentation of the Centre's germplasm collections. A start has been made with lentil, the first step being to reorganize data in the accession books so that they could be entered into a micro-computer on loan from the IBPGR Secretariat. Printouts of this collection should soon be available but it will be a base before all the collections are dealt with.

Using a vehicle loaned by ICARDA and project funds to meet local expenses, the Regional Adviser collected in Jordan from May 18-24 with the cooperation of colleagues in the Ministry of Agriculture and the Faculty of Agriculture, University of Jordan. In all, 220 samples were collected from 80 sites; wheat, barley, lentils and forage grasses were the main materials.

TURKEY

Collecting trips and multiplication and evaluation of accessions are now routine procedure each year in the national genetic resources programme that is organized around eight groups of crops. An expedition primarily for cereals went to the Black Sea coast in August and another collected *Medicago* species in east and southeast Turkey.

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 places where the accessions were collected. Evaluation studies are carried out at the same time.

An inventory of Turkish fruit cultivars was published during the year. It is the culmination of a survey that was started in 1975 by Dr. Engin Cetinar of the 114 state institutes and covers all of the types of fruits grown in Turkey.

Considerable effort is being made in the national genetic resources programme to document collections on the computer at the Computation Centre, Ege University. So far 10 880 accessions collected between 1970-80 have been entered. Eleven descriptors were used and a general list can now be printed out for each year. However, the 3.20 version of EXIR that is being used does not allow the data from separate years to be combined into a single large data bank and so an *Index Seminum* cannot be produced as yet. This will await modified software.

Correction, standardization and coding of the data for material collected during the period 1964-69 are in progress. When these are complete, there will remain only 1981 accessions to be dealt with. They consist of 1 842 collected samples and 65 introductions.



CONSERVATION

Genetic conservation programmes worldwide have largely centred around annual crop plants. When the IBPGR started its work there were only eight seed storage facilities in the world available to safeguard genetic resources. Since that time the Board has provided funds for, or acted as a catalyst for the establishment of many more. This exercise was so successful that by 1979 the Board was able to start designating particular genebanks as base stores for long-term conservation of crops. By 1985 this exercise should be more or less complete for all major seed-propagated species.

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 and the Board commissioned a major report from the International Union for the Conservation of Nature and Natural Resources (IUCN), Morges, Switzerland to identify the responsibilities of the IBPGR in this area and discussed there during 1981.

Neither seed storage, nor *in situ* conservation, are applicable to crops which are clonally propagated. These are normally maintained as living 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).

The Board was very pleased to participate in the dedication of the first clonal repository in the US National Germplasm System. This took

place at the Northwest Germplasm Repository at Corvallis, Oregon on 15 April 1981. This repository will hold material of pear, hazel, hop and some other small fruits. It is the first of 12 fruit and nut repositories planned in the USA and operated by USDA's Science and Education Administration (SEA) and State Agricultural Experiment Stations.

During 1981 the Board addressed all types of conservation and took major decisions which will have their full impact in future years when the technology for the conservation of difficult material has been resolved.

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 1981 (see Table 4). At the eighth Board meeting 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*:

Table 4. IBPGR Network of Base Centres for Seed Crops
(as of 31/12/81)

CEREALS

Rice	<i>Oryza sativa - indica</i> <i>javanica</i> <i>japonica</i>	IRRI, Los Baños, Philippines IRRI, Los Baños, Philippines NIAS, Tsukuba, Japan NSSL, Fort Collins, USA
	Mediterranean forms, temperate South American forms and intermediate types from the USA (plus duplicates from other centres) Wild species African forms	IRRI, Los Baños, Philippines ITA, Ibadan, Nigeria
Wheat	Cultivated species	VIR, Leningrad, USSR CNR, Germplasm Institute, Bari, Italy NSSL, Fort Collins, USA (each institute's collection duplicated at one of the others)
	Wild species of <i>Triticum</i> and <i>Aegilops</i>	Plant Germplasm Institute, University of Kyoto, Japan (duplicated in one of the above institutions and NIAS, Japan)
Maize	New World material Asiatic material	NSSL, Fort Collins, USA NIAS, Tsukuba, Japan TISTR, Bangkok, Thailand
	European material	VIR, Leningrad, USSR Braga, Portugal (for Mediterranean material)
Sorghum	Cultivated and wild	NSSL Fort Collins, USA ICRISAT, Hyderabad, India
Millets	Cultivated and wild <i>Pennisetum</i> spp.	NSSL, Fort Collins, USA PGR, Ottawa, Canada ICRISAT, Hyderabad, India
	<i>Eleusine</i> spp.	ICRISAT, Hyderabad, India PGRC, Addis Ababa, Ethiopia
	Minor Indian millets <i>Eragrostis</i> spp. <i>Panicum miliaceum</i> <i>Setaria italica</i>	ICAR, New Delhi, India PGRC, Addis Ababa, Ethiopia ICRISAT, Hyderabad, India ICRISAT, Hyderabad, India
Barley	Cultivated and wild (global collection) European material African material Asian material	PGR, Ottawa, Canada Nordic Genebank, Lund, Sweden PGRC, Addis Ababa, Ethiopia NIAS, Tsukuba, Japan
	Oats	PGR, Ottawa, Canada Nordic Genebank, Lund, Sweden

INDUSTRIAL CROPS

Sugar beet and other beets	Genebank, FAL, Braunschweig-Völkenrode, FRG
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LEGUMES

Phaseolus	New world material (all species but emphasis on <i>P. vulgaris</i> , <i>P. coccineus</i> , <i>P. lunatus</i> and <i>P. acutifolius</i>) European material Wild species	CIAT, Cali, Colombia (duplicated in NSSL, Fort Collins, USA) Genebank, FAL, Braunschweig-Völkenrode, FRG University of Gembloux, Belgium
Pigeon pea		ISCRISAT, Hyderabad, India
Groundnut		ICRISAT, Hyderabad, India INTA, Pergamino, Argentina
Chickpea		ICRISAT, Hyderabad, India
Cowpea		ITA, Ibadan, Nigeria
Pea		Nordic Genebank, Lund, Sweden
Winged bean		IPB, Los Baños, Philippines TISTR, Bangkok, Thailand

ROOT CROPS

Potato	Wild and cultivated species	CIP, Lima, Peru
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VEGETABLES

Amaranthus	Global collection Southeast Asian collection	NSSL, Fort Collins, USA IPB, Los Baños, Philippines
Allium	Global collection Asian collection	NVRS, Wellesbourne, UK NIAS, Tsukuba, Japan
Capsicum	Global collection Global collection Southeast Asian collection	CATIE, Turrialba, Costa Rica IVT, Wageningen, Netherlands IPB, Los Baños, Philippines
Eggplant	Global collection New World collection Southeast Asian collection	IVT, Wageningen, Netherlands NSSL, Fort Collins, USA IPB, Los Baños, Philippines
Tomato	Global collection Asian collection	CATIE, Turrialba, Costa Rica NSSL, Fort Collins, USA IPB, Los Baños, Philippines
Crucifers	<i>Brassica oleracea</i> Vegetable and fodder types: <i>B. campestris</i> , <i>B. juncea</i> , <i>B. napus</i> Vegetable and fodder types: <i>B. napus</i> Oilseed and green manure crucifers: <i>B. campestris</i> , <i>B. juncea</i> , <i>B. napus</i> , <i>Sinapis alba</i> , <i>B. carinata</i> <i>Raphanus</i> species Wild relatives East Asian collection	NVRS, Wellesbourne, UK IVT, Wageningen, Netherlands NVRS, Wellesbourne, UK Genebank, FAL, Braunschweig-Völkenrode, FRG PRG, Ottawa, Canada Genebank, FAL, Braunschweig-Völkenrode, FRG PGRC, Addis Ababa, Ethiopi Genebank, FAL, Braunschweig-Völkenrode, FRG NVRS, Wellesbourne, UK Universidad Politecnica, Madrid, Spain Tohoku University, Sendai, Japan NIAS, Tsukuba, Japan
Other vegetables	Southeast Asian species	IPB, Los Baños, Philippines



Seed processing at the PGRC, Ethiopia (F. Botts, FAO)

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

In many cases the Board provides support for medium-term conservation storage facilities and the same commitments are required, with-

out 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.

During 1981 the Board provided support to Thailand to provide facilities to store winged bean and Asiatic maize (jointly with Japan). Funds were also provided to Cyprus and a grant was given to ICARDA to help establish a regional genebank.

ADVISORY COMMITTEE ON SEED STORAGE

At its meeting in February 1981, the IBPGR agreed to convene an *ad hoc* Advisory Committee to advise on all aspects of seed storage, in order for the Board to be in a better position to accelerate conservation activities.

The Committee met 10-11 September 1981 under the Chairmanship of Prof. E.H. Roberts and the composition of the Committee (see Appendix IV) was such that the relevant interests of the IBPGR, the International Seed Testing Association (ISTA) and Forestry were represented.

A number of constraints were identified, of which the following were the major ones:

- i) Many genebanks continue to place seeds in storage without adequate testing and many have not properly established routine monitoring regimes;
- ii) Genebanks often have to handle peculiar material (which is frequently dormant) and there are no rules existing for the testing of much of the material;
- iii) Not enough attention is paid to the initial quality of the seed before it is accessed into storage. In practice field collectors need educating in the procedures to be followed between harvest and the material entering the bank;
- iv) Many delays exacerbate the problems of the curators, e.g. there are frequently backlogs of samples; undue delays occur in quarantine; the advantages of receiving untreated seeds are not widely appreciated; and too many samples arrive with lack of information; and
- v) Few genebanks employ full-time trained seed physiologists. People trained as seed technologists are adequate for day-to-day routine operations but such technical skills will need to be supplemented by a strong physiological component.

The Committee made a number of recommendations on seed drying, monitoring of viability and size of accessions and containers. The IBPGR will issue details of these in 1982. In addition the Committee agreed that in recent years it has become apparent that there

are several types of "recalcitrant" seeds. The main ones appear to be those:

- i) which are desiccation sensitive (all of which are sensitive to freezing, but some are also sensitive to cooling to 10°C); and those
- ii) which can be dried but are damaged by cooling to a temperature which in some cases may be above zero.

In addition it was noted that there are a number of cases in which an "orthodox" species has been mistakenly categorized as "recalcitrant", e.g. by the use of inappropriate drying techniques or by the induction of inhibition injury and dormancy. A number of tropical species have been provisionally classified as recalcitrant on the basis of reports of desiccation injury; however, some of these have been shown to be misclassified when more appropriate testing has been used.

Lastly the Committee made a number of recommendations related to future research support and these will be considered by the IBPGR at its ninth meeting.

In relation to seed storage, the Secretariat — during 1981 — commissioned a revision and up-date of the 1977 IBPGR report on engineering, design and cost aspects of long-term seed storage facilities. Following a recommendation by the Technical Conference, arrangements were made for a survey to be carried out of seed dormancy in the wild relatives of cultivated plants and of the techniques used to overcome it.

INVESTIGATIONS ON SEED PHYSIOLOGY

In 1981, support by the IBPGR was continued to two projects at the University of Reading, UK. The first was the determination of regeneration intervals in orthodox seeds which started in October 1977; the second was experimental investigations into the storage of recalcitrant seeds which started in August 1979.

The aim of the first project is to provide information on the expected regeneration intervals of accessions in long-term seed storage so that IBPGR can provide advice to genetic resources centres of the most suitable frequency for germination tests designed to monitor

the loss of viability of accessions in store. Too frequent monitoring increases genebank workloads and depletes accessions unnecessarily, thereby resulting in premature regeneration. Too infrequent monitoring will result in loss of genetic integrity and possibly complete loss of viability.

The major approach to providing this information has been to store a number of seed lots of each species under a range of environments where loss in viability is expected to occur within 2-3 years and to monitor germination at regular intervals. These data are then analysed according to the improved viability equation developed at Reading. The equation and constants derived will be used to predict longevity at low temperatures and low moisture contents. Between 1977 and 1980 such programmes had been initiated with the following species: cassava, chickpea, cowpea, finger millet, foxtail millet, kodo millet, maize, Niger, pearl millet, rice, sorghum, soybean, sugarcane, teff, winged bean and wheat (*aestivum* and *durum*).

In 1981 the longer-lived treatments of the above species have continued to be sampled and the following storage investigations begun:

Solanum tuberosum

True seeds were extracted from the fruits of three potato varieties cultivated in the UK and seed lots stored under 35 different constant storage environments within the range of 2-15% moisture content and -20°C to 80°C.

Saccharum spp.

Six breeding lots from the West Indies Central Sugar Cane Breeding Station, Barbados and a further ten seed lots from the Sugar Industry Research Institute, Mauritius have been used to commence detailed storage investigations in 35 different constant storage environments, from -20°C to 40°C and 3-12% moisture content.

Manihot esculenta

Further storage work at low temperatures and low moisture contents has commenced with additional seed lots.

Millets

Further storage work has commenced with *Eleusine coracana*, *Pennisetum typhoides* and *Setaria italica*. Two poor quality seed lots of each species have been stored at temperatures of -20°C to 30°C to estimate the quantitative effect of change in temperature on loss of viability at sub-zero temperatures.

Grain legumes

Work on the storage characteristics of three grain legumes — chickpea, cowpea and soybean — has now been completed. This work confirms that the qualitative response of these species to seed storage environment is similar to that of other species that have been investigated in detail, e.g. barley. The evidence suggests that the relative effect of temperature on the longevity of seed of very many species is the same.

However, the relative effect of seed moisture content on longevity has been found to differ both among the three grain legume species and other species, e.g. longevity of cowpea and chickpea seed is more sensitive to moisture differences than soybean. Despite such differences it is possible that a pattern to this variation may emerge in which the relative effects of moisture content are related to seed composition.

The second project on investigations into the storage of reputedly recalcitrant seeds took three approaches:

- 1) *Dry storage*. Having developed suitable germination tests, storage experiments were carried out under a wide range of conditions. It was clear that citrus seeds show orthodox behaviour and that it is possible to store lime (*Citrus aurantiifolia*), lemon (*C. limon*) and sour orange (*C. aurantium*) seeds under IBPGIR preferred storage conditions, i.e. at -20°C and 5% moisture content. Work on the royal palm (*Oreodoxa regia*) was also continued. This species is not of economic importance but it is experimentally convenient as an example of the Palmae which are reputedly recalcitrant. The work has exposed a new type of recal-

citrant behaviour: it has emerged that it is possible to dry these seeds to low moisture contents but surprisingly cool temperatures ($+3^{\circ}\text{C}$) are deleterious and sub-zero temperatures (-20°C or -196°C) result in immediate death. It would appear that oil palm (*Elaeis guineensis*) also falls into this category.

- 2) *Cryogenic storage of moist seeds.* Some work was done on various species in which the use of cryoprotectants and various cooling and warming regimes have been investigated. This work has been discontinued because it is speculative and success cannot be guaranteed.
- 3) *Storage of moist seeds at ambient or sub-ambient temperatures.* Work reported earlier on the moist storage of desiccation-sensitive

recalcitrant seeds has been discontinued. It will be encouraged in tropical countries where fresh seed supplies of economically important species are more readily available.

MULTIPLICATION AND REGENERATION OF SEED COLLECTIONS

During 1980 the Board recognized that many of the seed collections were inadequately duplicated. Often stocks consist of small samples and funding was frequently a constraint in making the duplication and exchange effective. As a result, during 1981, a number of small grants were provided to multiply important



Harvesting evaluation plots of wheat, Gatersleben, GDR

material. For instance ORSTOM (France) and PGR (Ottawa) were able to commence multiplication of pearl millet samples from Africa; SVP (Netherlands) commenced work to multiply an important collection of *Brassica carinata* to deposit in Ethiopia and to multiply material collected in Pakistan; Greece and Peru started the multiplication of *Capsicum* germplasm; AVRDC, in association with NVRS, started similar work on *Brassica campestris* subsp. *pekinensis* (Chinese cabbage); Greece on beet; IRCT (France) on cotton; and Texas A and M University (USA) on part of the world collection of *Arachis*. Finally Spain started a programme to increase size of samples and to deposit these in designated genebanks.

CONSERVATION OF VEGETATIVELY PROPAGATED SPECIES

Following the discussion of a consultant's report prepared by Dr. Lyndsey A. Withers on tissue culture storage and the discussion of the recommendations of an International Union of Biological Sciences (IUBS) Workshop held in 1980 (see Annual Report 1980), the Board issued a list of institutes working on tissue culture in March 1981. A number of conclusions emerged from the information provided by the institutes.

The most extensively investigated plants are *Citrus*, *Dioscorea*, *Manihot*, *Saccharum*, *Solanum tuberosum* and *Theobroma cacao*. The variety of genotypes studied varies greatly from large numbers in the case of *Solanum tuberosum*, other *Solanum* species, *Ipomoea*, *Dioscorea*, and *Manihot*, to few in others specified. This is important because the more species and cultivars that are observed to respond to a technique, the more likely it is to be reproducible by others and hence to be of wider use.

Data are now available on propagation potential *in vitro* of a number of species and in many cases the potential for mass propagation appears good.

Relatively few efforts have been made to try and determine whether genotypic changes occurred during culture initiation and plant propagation. Aberrations revealed by cytological examination are found in the chromosome complements of cultures of *Cocos nucifera*,

Elaeis guineensis, *Manihot* and *Saccharum*. It is clear that much more extensive studies must be carried out. However, provided that tissue culture conditions are right, regenerant plants are observed to resemble parent plants very closely.

Data are available on the species and genera which can be cryopreserved according to the literature, but of 12 reports of cryopreservation, six are described as reproducible, five as erratic. Hence cryopreservation is far from being a routine technique.

These findings and many technical details were discussed at the Technical Conference and subsequently the Board has agreed to appoint a small *ad hoc* Committee to advise on all aspects of *in vitro* conservation. The Committee will meet in 1982.

IBPGR SUPPORT TO CONSERVATION OF VEGETATIVELY PROPAGATED SPECIES

The Board has supported the establishment of living collections of coconut and banana in the Philippines. These are regional collections for Southeast Asia and include important parts of the world collections. In addition, during 1981 it assessed the status of the Jamaica banana collection through a visit by Prof. N.W. Simmonds. Support has also been given to Brazil to maintain a collection of perennial species of *Arachis*.

During 1981 the Board continued to support a project at the CSIRO Division of Horticultural Research, Adelaide, Australia in which a series of cultivars of *Vitis vinifera* and the hybrid root-stock, *V. caribaea*, *V. amurensis*, *V. rupestris* × *V. berlandieri* and *V. labrusca* were examined.

After preliminary studies, it was decided to maintain proliferating shoot cultures at 9.5°C in either constant darkness or in a 15 h light/9 h dark photoperiod. Material currently being tested in detail includes *Vitis vinifera* cultivars Cabernet, Sauvignon and Sultana, *V. labrusca* (Concord) and the hybrids *V. rupestris* × *V. berlandieri* (R-99) and *V. amurensis* × *V. vinifera* (Michurinets). Cultures are being sampled at three-month intervals over a twelve-month period and regenerated for further observation in the glasshouse.

The Board continued its support in 1981 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. Efforts are underway to achieve success using cryopreservation rather than on storage by growth limitation. Attempts have been made to initiate cultures from a

variety of tissues but most attention for propagation is being paid to adventitious development of somatic embryos from leaf discs and from immature zygotic embryos. This project on *Theobroma* is important in view of the Board's programme in the centre of diversity of this crop and the need to move and store large quantities of material.



INFORMATION AND DATA MANAGEMENT

Introduction

Detailed and reliable data on the available samples of a crop allow plant collectors, genebank curators and plant breeders to work together more efficiently and effectively. The full potential of genetic resources will be realized in practice to a much greater extent when such interdisciplinary cooperation exists.

Several different uses of information are evident. The curator needs to know whether some or all of his samples in store are redundant duplicates of resources at another centre (or even at his own) taking into account the normal procedure of duplication for safety. He also needs to know when to regenerate his accessions in order to ensure that the seeds retain adequate viability or an adequate sample size. The collector needs to know whether further expeditions are necessary, and if so in which areas. He may also need to examine the results of the evaluation of previously collected material to decide whether more intensive sampling is necessary. The breeder needs to know about the resources available that would fit in with his breeding stock.

The documentation of all pertinent information and its free availability to all interested parties is not, therefore, just an idealistic goal but has a value that can be represented in terms of time and money.

The continuing role of the IBPGR is a promotional one by means of a number of diverse activities.

DIRECTORIES OF EXISTING GENETIC RESOURCES

To promote the world-wide exchange of data and information on plant genetic resources, the

IBPGR began — in 1980 — the publication of a series of directories containing information on all known major holdings of genetic resources for high priority crops. For each crop, the directories provide details of the types of samples held at each centre, the geographical representation of the collection, the features that have been characterized and evaluated, the method of documentation of the data, the storage conditions of the seed and the location of known duplicates.

The directories are working documents and so it is essential that they are kept up to date. It is anticipated, therefore, that by use of computerized data bases within the Secretariat, the information can be rapidly corrected and expanded and that revised directories can then be routinely published at approximately two-year intervals. Computerization will also allow specific enquiries to be rapidly and accurately answered and gaps in Secretariat information to be identified and filled.

Following the production of directories for food legumes, maize, root crops and wheat in 1980, those for barley, industrial crops (cacao, coconut, pepper (*Piper*), sugarcane and tea), rice, and sorghum and millets were published in 1981. Directories on vegetables and tropical fruits, and oats and rye are being compiled and are scheduled for publication in 1982.

CROP DESCRIPTOR LISTS

Crop descriptor lists are published which separate those areas of information that are the responsibility of: the **collector** (collection data); the **curator** (accession, characterization and preliminary evaluation data); and the **breeder** (full evaluation). These lists promote the ex-

change of information by expressing variability in a standardized way.

In 1981, descriptor lists were published by the IBPGR for almond, amaranths, crucifers, groundnut (in conjunction with ICRISAT), lupin, pearl millet (in conjunction with ICRISAT), pigeonpea (in conjunction with ICRISAT), sesame, sweet potato, tomato, *Theobroma* and wheat (revised). Descriptor lists due for publication in 1982 include *Allium*, apples and pears, barley, *Capsicum*, cassava, cucurbits, eggplant, grape, oca (*Oxalis tuberosa*), okra, *Phaseolus*, quinoa, safflower, soybean, sugarcane and winged bean (revised).

TECHNICAL ADVICE AND ASSISTANCE

Follow-up work was performed on the projects initiated by the IBPGR during 1979-80 of installing microcomputer systems for genetic resources data management in plant research institutes in South America. A consultant visited institutes in Brazil and Argentina that had received equipment. He provided updated material and advice and also collected feedback from the users in order that the programme could be evaluated.

As part of its information programme, and upon recommendation of the Maize Committee, the IBPGR continued to support a regional cooperative project to characterize collections of maize made in Peru and the Southern Cone and to make inter-racial composites. National institutes in Bolivia, Brazil, Chile, Peru and Uruguay are participating in this project.

The IBPGR Secretariat purchased a microcomputer with a hard-disk for installation on loan at the office of the regional FAO/IBPGR Technical Adviser at ICARDA (Syria) to assist with data management of programmes supported by the IBPGR in Southwest Asia. The hardware and software supplied were similar to those installed in the South American countries and after considerable software modification this equipment is now operating successfully.

Two microcomputers were installed at the Institute of Introduction of Plant Genetic Resources (IBPGR), Sadovo, Plovdiv, Bulgaria and a short course on their use was given to personnel at the Institute. A consultant also visited the Cereals Institute, Thessaloniki,

Greece where a computer had been installed previously by the IBPGR. The Institute was supplied with new hardware and software. Data are arranged at the Greek centre in four separate files for each crop: i.e. passport, collection, characterization, and seed store data. Progress was reported in development of files for *Triticum*, cotton and beet. The consultant was able to identify possible future areas of help.

Following the National Workshop on Documentation at the NBPGR, New Delhi, in November 1980, a consultant to the Secretariat toured several institutes in India. He visited the NBPGR, Indian Institute of Horticultural Research (IIHR), Bangalore, Andhra Pradesh Agricultural University (APAU), Hyderabad, ICRISAT, and CRRI. The systems used to process genetic resources data were studied and possible areas where IBPGR might be of assistance to ICAR were identified. There is a growing awareness that documentation is a vital element of plant genetic resource work and that the enormous potential of the material in India will only be realized if efficient information systems are installed and maintained. IBPGR input into this area might be possible by providing, on request, assistance and training at locally organized workshops or by providing support equipment.

An increased awareness of the importance of information is also developing in the ECP. At the second meeting of its Governing Board, held in Geneva, a consultant reported on a five-phase plan — extending to 1985 — that would provide documentation and free exchange of information on European crop genetic resources. The Scientific Advisory Committee (SAC) of the European Programme (ECP) intends to study and advise on data management in increased depth at its meeting in Thessaloniki, Greece, in April 1982.

TRAINING

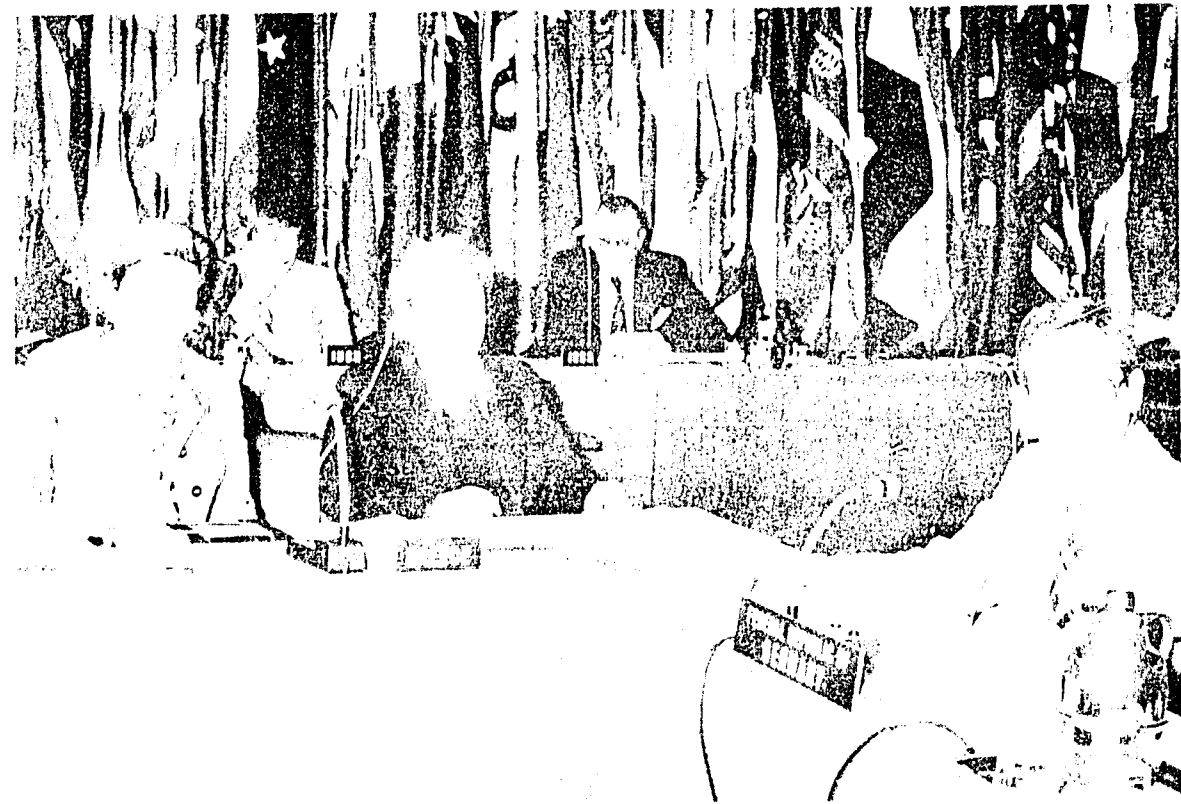
In 1981 a number of study tours were organized for people from developing countries to visit genetic resource data management systems in developed countries.

The IBPGR supported a regional course on computers in genetic resources held at the Germplasm Institute, Bari, Italy. The course

was attended by 7 sponsored participants, mainly from the Mediterranean region, and dealt with fundamental informatics, documentation techniques, and the use of specialized databanks.

The IBPGR continues its close links with the post-graduate training course on genetic con-

servation at the Department of Plant Biology of the University of Birmingham, UK. Several graduates were also sponsored by the IBPGR in 1981 to attend a short course on *Genetic Resources Evaluation, Utilization and Data Preparation and Management* at the University of Birmingham (p. 79).



TECHNICAL CONFERENCE

The Technical Conference on Crop Genetic Resources, sponsored by FAO, UNEP and the IBPGR was one of the highlights of 1981. It took place 6-10 April 1981 in FAO Headquarters, Rome. The Conference was the fourth in a series of which the first was hosted by FAO in 1961 and the second and third by FAO and the International Biological Programme (IBP) in 1968 and 1973. The proceedings of the earlier conferences had done much to move ahead work on crop genetic resources with the result that now, under the leadership of the FAO and the IBPGR, the global network is a reality rather than a proposal.

The Conference was attended by representatives of 54 countries, mostly technical experts; and participants from IARCs of the CGIAR, seven intergovernmental and several non-governmental organizations.

The opening part of the Conference was a Plenary Session, in which addresses of welcome were provided by the co-sponsors. Dr. J.T. Williams then set the scene in a keynote address on *International Cooperation, the Past Decade and Prospects for the Next One*. A series of technical sessions followed, in which eminent speakers discussed sampling, conservation, germplasm exchange, characterization and evaluation, documentation and under-exploited crops.

At the end of the Conference, an open forum raised questions associated with the utilization of germplasm collections and the duplication of collections. This session was presided over by Sir Otto Frankel, who is recognized as a leading pioneer in genetic resources conservation.

A Plenary Session examined the conclusions and recommendations finalized by the Drafting Committee and those agreed are listed below. These were addressed to FAO, UNEP,

IBPGR, IUCN, Unesco and national programmes. They are reproduced in full below and a report of the Conference is available from the Secretariat. Those recommendations marked with an asterisk have already been considered by the IBPGR and action initiated during 1981.

CONCERNING COLLECTING:

- * 1 - that the IBPGR should request the FAO, UNDP and IBRD (co-sponsors of the CGIAR) and other agencies to always make collection of endangered local species and landraces an activity within crop improvement projects;
- * 2 - that more collecting missions for wild relatives of cultivars should be carried out;
- 3 - that collecting within mixed plantings and multicropping systems should be done in a way that allows preservation of combinations of interest; and
- 4 - that as different sampling techniques must be used for different crops and different environments, a range of realistic collecting techniques should be developed to meet the needs of collectors.

CONCERNING FORAGE CROPS:

- * 5 - that an action programme to explore, collect, conserve, characterize, evaluate and use forage plant genetic resources should be initiated jointly by the IBPGR, FAO and UNEP.

CONCERNING SPECIAL CROPS:

- 6 - that genetic resources programmes should be encouraged to take responsibility for species of particular significance such as traditional and medicinal plants; and programmes with regional responsibilities should endeavour to become centres of excellence for them.

CONCERNING FORESTRY:

- * 7 - that emphasis should continue to be placed on forest genetic resources, particularly species found in arid and semi-arid zones for fuel and other tree species of wide social and economic importance or potential;
- 8 - that countries and agencies responsible for reserves should consider whether or not additional areas are needed for special needs such as conservation of wild relatives of cultivars, related weeds and the maintenance of genetic diversity within species;
- 9 - that guidelines should be set out for planners and managers of protected areas to advise them on measures that should be taken to conserve genetic resources and at the same time leave them available for use;
- 10 - that UNEP and IUCN should encourage *in situ* conservation in areas that can be used for educational, recreational and other purposes;
- 11 - that as a first step toward the establishment of a data bank for crop genetic resources maintained in protected areas, a comprehensive inventory of the wild relatives of crops should be compiled and other information essential for *in situ* conservation of plant genetic resources should be assembled; and
- 12 - that an *ad hoc* committee consisting of representatives of FAO, UNEP, IBPGR, Unesco/MAB and IUCN should be formed to advise on all aspects of the conservation of genetic resources in protected areas and to assist in the coordination of this work with

the conservation of forest and range land genetic resources.

CONCERNING CONSERVATION AND REGENERATION:

- * 13 - that additional cold stores should be provided to strengthen the international network of these facilities;
- * 14 - that, as the study of regeneration has been neglected, the IBPGR should support investigations to determine basic principles so that standard methods can be developed, particularly for tropical crops and cross-pollinated species;
- 15 - that centres holding large working collections should make the improvement of services offered to *bona fide* users a major goal; and
- * 16 - that the IBPGR should initiate a survey of seed dormancy in the wild relatives of cultivated plants and the techniques used to overcome it.

CONCERNING *IN VITRO* CONSERVATION:

- 17 - that in order to expedite the use of *in vitro* techniques for conservation, research should be intensified on the following:
 - i) the improvement of specific techniques for crops for which *in vitro* propagation has been developed to such a degree that it is now realistic to attempt to apply the techniques, or develop them more extensively, to material in genebanks;
 - ii) basic studies of crops with which little if any success has been achieved so far with *in vitro* culture and propagation techniques;
 - iii) cryopreservation of all types of plant material with the aim of establishing first principles; and
- * 18 - that a small working group should be appointed to collate and disseminate information on *in vitro* conservation and to advise on training programmes.

CONCERNING EVALUATION AND UTILIZATION:

- 19 - that work on the characterization and evaluation of germplasm in genebanks should be expedited and findings transmitted to the potential users of the germplasm as quickly as possible; and
- 20 - that the IBPGR should stimulate work designed to transfer valuable characters of wild species into breeding lines of cultivated plants in order to promote the utilization by breeders of useful characters.

CONCERNING DOCUMENTATION:

- *21 - that international descriptor lists should be used as a basis for standardization and data bases should be open-ended;
- 22 - that passport data should always be sent to the recipients of sub-samples for each of which the key identifier should be the collector's name and number and the number given by the institute holding the sample; for a breeding line the key identifier should be the breeder's number and institute; for cultivars, the varietal name and name of the institute that bred it; and
- 23 - that more emphasis should be placed on the improvement of information exchange between genetic resources centres and to the feed-back of information from users of plant genetic resources.

CONCERNING QUARANTINE:

- 24 - that all germplasm exchange should take place through national quarantine services;
- 25 - that setting up national or regional testing laboratories should be considered by governments to expedite the passage of germplasm through quarantine;
- 26 - that the establishment of third country post-entry quarantine facilities should be encouraged particularly for clonal crops and other specific crops and their relatives;

- 27 - that the investigation of pathogens and pests carried by germplasm, including those of wild species and wild relatives of cultivars, should be encouraged in national research institutes; and
- 28 - that research initiatives should be taken in the use of *in vitro* techniques for "cleaning up" plant germplasm to meet quarantine requirements especially as regards viruses.

CONCERNING TRAINING:

- *29 - that support for the training courses at Birmingham University on the conservation and utilization of plant genetic resources should continue;
- *30 - that the IBPGR should increase the support for practical training which should be obtained when feasible at a genebank;
- *31 - that regional training should be arranged in order to widen participation and reduce costs;
- 32 - that the IBPGR should consider giving support for specialist short courses on computer usage in data management to include the use of standard software packages; and
- 33 - that consideration should be given by FAO to the organization of training courses dealing with problems of plant quarantine.

CONCERNING PUBLICATIONS:

- *34 - that the IBPGR should continue to issue manuals concerned with the practicalities of genetic resources conservation and should consider producing them in several languages to enhance their usefulness;
- *35 - that a book covering the topics discussed during the Conference should be published; and
- 36 - that bodies dealing with plant genetic resources should take steps to promote public awareness of the need to conserve and utilize them for the benefit of mankind.



TRAINING

Personnel with the requisite technical skills are required so that genetic resources activities may be effectively carried out by the various institutions and the national programmes participating in the global programme. There has been a lack of trained manpower in most of the countries of the developing world and the IBPGR — from its creation — has been supporting training.

SUPPORT TO UNIVERSITY TRAINING COURSES

An international post-graduate *Training Course on Conservation and Utilisation of Plant Genetic Resources*, offered by the University of Birmingham, UK, was initiated in 1969 and has been supported by the Board since 1975. The IBPGR provides support to the University in order to double the attendance of students from developing countries. In addition, IBPGR provides fellowships, through FAO, to candidates sponsored by developing countries to enable them to attend the post-graduate Course in addition to short specialized training courses offered by the University.

During 1980-81 half of the 12 trainees who attended the post-graduate Course received IBPGR fellowships (i.e., students from Brazil, Ghana, India, Pakistan, Sri Lanka and Uganda). In 1981-82 there were seven participants from Bangladesh, Brazil, Indonesia, Iraq, Malaysia, Portugal and Turkey. In addition six participants (from Bangladesh, Brazil, Egypt, Indonesia and Nepal) attended a specialist short course on *Crop Plant Diversity - its Exploration and Conservation*. (It is envisaged that participants from Bangladesh, Brazil, India, Indonesia and Mexico will attend a specialist short course on *Genetic Resources*

Evaluation, Utilisation and Data Preparation and Management, which commences in January 1982.) A total of 10 trainees received IBPGR fellowships during 1981 to attend the above courses.

It is recognized that the short courses meet an important need for those students working in the field of plant genetic conservation, but who are unable to leave their posts for long periods. The value of this network is demonstrated by the fact that a number of former students of the post-graduate Course have been able to successfully establish short courses for their own regions and that some of the short-course students have themselves joined the post-graduate Course at a later date.

IBPGR SHORT TRAINING COURSES

In addition to the post-graduate training course offered by the University of Birmingham, the Board has organized and/or supported a number of short technical training courses on such subjects as exploration techniques, seed technology for genebanks, documentation and information, and wheat and barley and their wild relatives. These short courses are frequently conducted in developing countries in association with participating national programmes and are usually for participants from the same region.

During 1981 the Board supported the following short training courses:

i) *Training Course on Documentation*

The Germplasm Institute, Bari, Italy, in collaboration with CNR and the Advanced Technology Application and Study Centre

(CSATA), organized a three-month (23 February to 23 May 1981) Course on Documentation. Seven participants (mainly from the Mediterranean region) attended the course which was aimed at providing computer management skills to researchers already working in genebanks in order to facilitate the exchange and storage of genetic resources information.

ii) *Training Course on Collection, Conservation and Utilization of Plant Genetic Resources*

This Training Course was organized by the University of La Molina, Lima, Peru from 4 August to 16 December 1981. There were 16 participants from Colombia, Ecuador and Peru. Although IBM provided major funding for this course the IBPGR, recognizing its usefulness, provided fellowships for five of the participants.

iii) *Training Course on Practical Seed Technology for Genebank Personnel*

This Course was organized by the School of Agriculture at the University of Edinburgh, Scotland, UK, 8-18 September 1981. All students from developing countries who attended the one-year Course at the University of Birmingham also attended this Course on seed technology.

iv) *Training Course on Characterization, Evaluation and Utilization of Root Crop Germplasm*

This Training Course was held at Los Baños, Philippines, from 29 November to

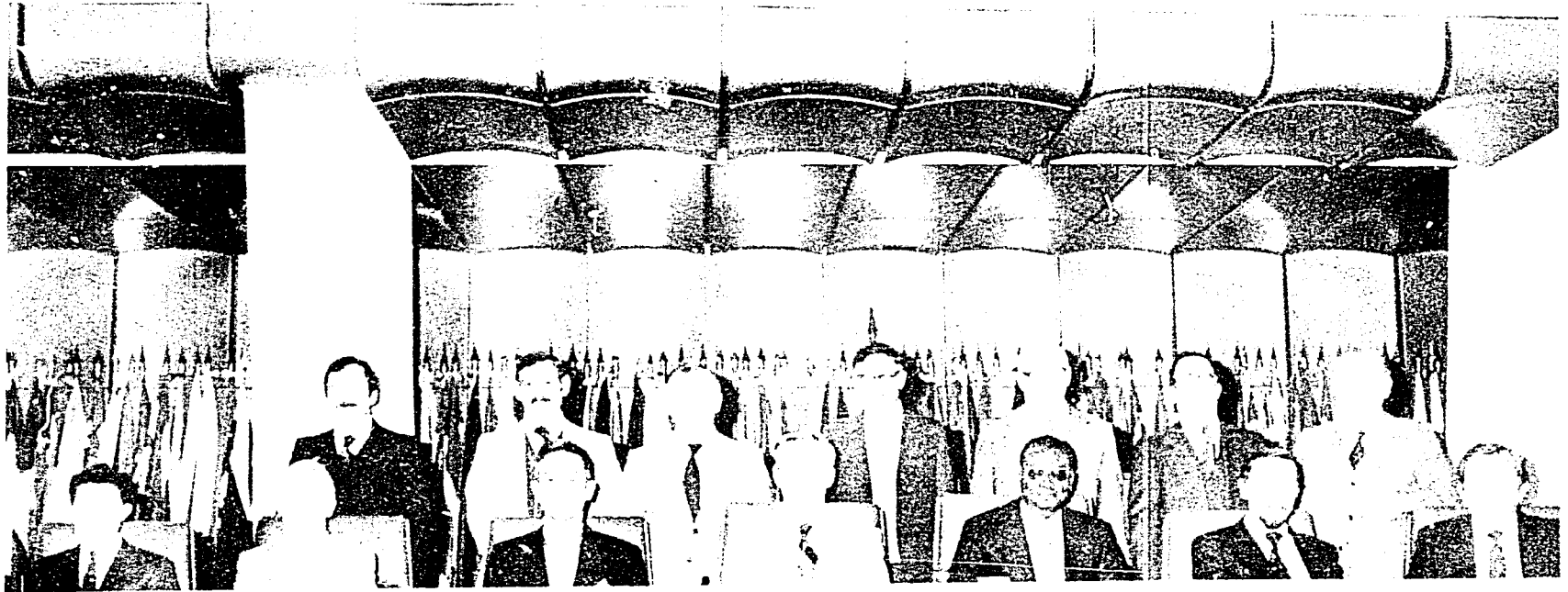
18 December 1981 and was jointly organized by PCARR, PRCRTC and IPB of the University of the Philippines, as part of the IBPGR Southeast Asia regional programme. The IBPGR provided partial funding and, in addition, sponsored a total of 16 participants: two scientists from each of the countries participating in the Southeast Asia regional programme and six scientists from the Pacific island nations of the Solomon Islands, Tuvalu, Tonga, Vanuatu (2) and Western Samoa. The main emphasis was on sweet potato and cassava.

STUDY TOURS

In addition to the formal courses listed above, the Board also funds scientists from developing countries to visit genebanks for short periods to familiarize themselves with the techniques in use and to visit programmes in neighbouring countries in order to exchange views and plan cooperative action. These study tours are arranged on an *ad hoc* basis at the discretion of the Executive Secretary and a number were funded during 1981.

IN SITU TRAINING

A number of missions include a training component so that local counterparts can become versed in field techniques, evaluation and data handling. For example, the IBPGR project on trees (see p. 35) included a training component in Senegal and Mexico, thereby allowing scientists from the other participating countries (Democratic Yemen, Chile, Peru and India) to also participate.



ADMINISTRATION

MEMBERSHIP AND BOARD MEETINGS

The membership of the Board during 1981 is shown on p. V. Of the new members elected to serve for three-year terms commencing 1 January 1979, Dr. G.E. Schmaraev (USSR) resigned at the beginning of 1981. At the end of the year Prof. E.A.L. de Langhe (Belgium), Dr. K.F.S. King (Guyana) and Prof. M. Iizuka (Japan) completed their terms.

On the recommendations of the Board, the CGIAR elected Dr. D. Giacometti (Brazil) and Dr. J. Peacock (Australia) to serve for three-year terms commencing 1 January 1982. In addition, Prof. de Langhe and Prof. Iizuka were reelected for a second three-year term.

The Board has agreed that, when acceptable, a scientist from the People's Republic of China should be asked to join the Board.

The full Board met in Rome 17-20 February 1981 and the Executive Committee met on 16 February and 13-15 May also in Rome. The latter met again in Washington, D.C., 16-19 November. During 1981 Prof. H.K. Jain and H.E. Dr. Djibril Sene joined the Executive Committee.

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 to 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 IBPGR. At the eighth meeting of the Board in February 1981, observers from France and the USA participated. In addition the Board agreed that an observer from the USSR could attend that meeting, but unfortunately he was

only able to be present for one day of the meeting.

SECRETARIAT

The composition of the Secretariat is shown in Appendix I. The Executive Secretary of the IBPGR also heads the FAO crop genetic resources group, and from 1 January 1982 becomes Chief of the Crop Genetic Resources Centre, the staff of which serves the Board's programme. In 1981 the Board agreed that the Executive Secretary should become an *ex officio* member since, with the expansion of the programme in recent years, he has become increasingly involved with policy and planning.

During 1979-80 the Secretariat was substantially strengthened. In 1981 the headquarters establishments consisted of six scientists, three administrative/technical assistants, four secretaries and one clerk. The Information Officer resigned early in the year and a replacement was in post in December.

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 and the Mediterranean, the Board agreed to appoint officers for West Africa, East Africa and Latin America. The officer for West Africa was appointed during 1981 and negotiations were carried out to site the officers in early 1982 for East Africa at the International Laboratory for Research on Animal Diseases (ILRAD) and for Latin America at CIAT.

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. A Wheat Officer took up his post on 15 November 1981 and Forage Officer will be appointed early in 1982; both are outposted to the FAO office in Washington, D.C., USA.

COMMITTEES

The Board noted with regret the untimely death of Dr. Alice Evans, Chairman of the Phaseolus Committee and also the deaths of Dr. K. Finlay and Dr. G. Anderson of the Maize and Wheat Committees respectively.

The present composition of the crop advisory committees is shown in Appendix II. The Board, from time to time, reviews the membership of the committees, in association with the co-sponsoring IARCs, so that there is a rotation of membership and a wide representation from the breeding communities concerned.

The membership of the Board's Regional Committee for Southeast Asia, approved by the governments of the countries of this region, is shown in Appendix III. The Committee held

its fourth meeting in May 1981.

During 1981 the Board approved the membership of a new *ad hoc* Committee on Seed Storage (Appendix IV), and its first meeting took place in September 1981.

A number of *ad hoc* Working Groups were convened to provide advice on specific crops. The membership is shown in Appendix V.

PUBLICATIONS

A list of current IBPGR publications is contained in Appendix VI. Those which are technical manuals have been particularly well received and the joint FAO/IBPGR Newsletter, issued quarterly, has become even more widely circulated than hitherto. Due to the constant heavy request for IBPGR publications, many printings have been necessary; over 2 000 copies of publications were distributed during the *Technical Conference on Genetic Crop Resources* held in April 1981.

The Secretariat was able to maintain its ambitious information programme (directories of germplasm collections and descriptor lists) notwithstanding the absence of an Information Officer during much of the year.

APPENDIXES

THE IBPGR SECRETARIAT IN 1981

Dr. J.T. Williams
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 Crop Genetic Resources Centre
 Plant Production and Protection Division
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 Assistant Executive Secretary
 Ms. E. Bennett (until 31 August 1981)
 Genetic Resources Officer
 Dr. J.T. Esquinas-Alcazar
 Genetic Resources Officer
 Dr. S.L.A. Hobbs (from 1 Dec. 1981)
 Genetic Resources Officer (Information)
 Mr. C.W. Howes (until 31 March 1981)
 Genetic Resources Officer (Information)
 Ir. D.H. van Sloten
 Genetic Resources Officer (Horticulture)
 Ms. C. Gorelli
 Programme Assistant
 Mr. B.T. McLean
 Editorial Assistant
 Mr. G. Sayour
 Research Assistant
 Ms. V. Ascione-Sindery
 Secretary
 Ms. J. Buccini
 Secretary
 Ms. D.E. Quaye
 Secretary
 Ms. S. Saint-Rossi
 Secretary
 Ms. M. Bonomi
 Clerk

Outposted from headquarters

Dr. C.G.D. Chapman (from 15 Nov. 1981)
 Genetic Resources Officer (Wheat)
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 Washington, D.C., USA

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 Technical Officer
 c/o ICARDA, Aleppo, Syria

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 Regional Officer
 c/o FAO Regional Office
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 Ms. S. Savigamin
 Secretary

Mediterranean Programme

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 Mr. W.G. Ayad
 Technical Assistant
 Mr. A. Dámania
 Technical Assistant
 Ms. P. Damania
 Secretary

West Africa Programme

Mr. P. Perret
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¹ At the request of the co-hosting organization Dr. J. Irvine, Director, US Sugarcane Laboratory, Houma, Louisiana provided a significant contribution at the Working Group meeting.

VIGNA¹

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IBPGR PUBLICATIONS¹

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)

English text (1981)

French text (1982)

- Los Recursos Fitogenéticos: Una Inversión Segura para el Futuro by J.T. Esquinas-Alcazar (1981) (This publication was sponsored by the IBPGR and the Instituto Nacional de Investigaciones Agrarias (INIA), Spain)

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
- Fruits, translated from the Indonesian Buahhahn, 1977 (1980)
- Genetic Resources of Tree Species in Arid and Semi-arid Areas (1980)
(Available from FAO Forestry Dept. c/o C. Palmberg, Via delle Terme di Caracalla, 00100 Rome, Italy)
- Genetic Resources of Sweet Potato (1981)²
- Genetic Resources of Cocoa (1981)²
- Genetic Resources of Amaranths (1981) by G.J.H. Grubben and D.H. van Sloten²
- A World Survey of Wheat Genetic Resources (1981) by R.P. Croston and J.T. Williams
- Genetic Resources of Cruciferous Crops (1981)²
- Genetic Resources of Tomatoes and Wild Relatives (1981) by J.T. Esquinas-Alcazar²
- Genetic Resources and the Plant Breeder, edited by R.B. Singh and N. Chomchalow (1982)

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

² Also contain descriptors

Descriptors¹

Cultivated Potato	(1977)
Wheat and <i>Aegilops</i>	(1978) and revised (1981)
Winged Beans	(1979)
Tropical Fruits	(1979) and revised (1980)
Sorghum	(1980) (in collaboration with ICRISAT)
<i>Colocasia</i>	(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)

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 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)

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 (1982) revised

¹ See also under Crops for descriptor lists for banana, coconut, coffee, cocoa, amaranths, cruciferous crops and tomatoes

Information

Bibliographies & 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. 41, 42, 43, 44 (1980)

Nos. 45, 46, 47, 48 (1981)

IBPGR Regional Committee for Southeast Asia Newsletters (Available from IBPGR/SEAP Regional Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok — 10200, Thailand)

Vol. IV: Nos. 1-4 (1980)

Vol. V: Nos. 1-4 (1981)

IBPGR Annual Reports

1977

1979

1978

1980

Directories of Germplasm Collections

- 1 Food Legumes (1980) by W.G. Ayad and N. Murthi Anishetty
- 2 Root Crops (1980) by A.D. Damania and J.T. Williams
- 3.I Wheat (1980) by W.G. Ayad, J. Toll and J.T. Williams
- 3.II Maize (1980) by W.G. Ayad, J. Toll and J.T. Esquinas-Alcazar
- 3.III Rice (1981) by J. Toll, N. Murthi Anishetty and W.G. Ayad
- 3.IV Sorghum and Millets (1981) by N. Murthi Anishetty, W.G. Ayad and J. Toll
- 3.V Barley (1981) by N. Murthi Anishetty, J. Toll, W.G. Ayad and J.R. Witcombe
- 5.I Industrial Crops (Cocoa, Coconut, *Piper*, Sugarcane and Tea) (1981) by J.T. Williams and A.B. Damania

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

STATEMENT OF ACCOUNT FOR 1981
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1981		1 263 824
Various government contributions	2 898 884	
Interest credited in 1981	194 782	
		3 093 666
		4 357 490

Deduct*Cash expenditure 1981*

Personal services	709 946	
Official duty travel	487 480	
Contractual services	1 236 012	
General operating expenses	64 041	
Supplies and materials	110 533	
Furniture and equipment	50 036	
Fellowships, grants and contributions	137 721	
	2 795 769	

Project servicing costs

14% on US\$182 069	25 489	
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Commitments

Incurred during 1981 (up to 15 December)	746 995	
Total expenditure and commitments - 1981	3 568 253	
Unliquidated commitments from previous years	883 556	

4 451 809

Balance at 31 December 1981

(94 319)

1981 CONTRIBUTIONS RECEIVED¹
(as at 31 December 1981)

	US\$ <i>equivalent</i>
Australia	81 473.00
Belgium	93 030.47
Canada	150 100.20
Denmark	47 789.73
France	66 659.72
Germany, FR	133 215.00 ²
Italy	50 000.00 ³
Japan	500 000.00
Netherlands	185 000.00
Norway	107 223.48
Spain	49 908.50
Sweden	175 342.46
United Kingdom	259 138.00
United States of America	800 000.00
World Bank (IBRD)	200 003.75
	<hr/>
TOTAL	2 898 884.31

¹ Contribution pledged for 1981 not received from Italy

² First instalment of 1981 contribution (\$51 347) was received in December 1980 and included in the 1980 accounts

³ 1980 pledge, received in 1981

IBPGR GRANTS¹
(Funds committed in 1981)

	Collecting and related activities	Total Commitment (US dollars)
Argentina	Collection of germplasm of wild potatoes native to Uruguay (INTA, Balcarce)	9 700
Argentina	Collection of maize germplasm in the Jujuy and Salta provinces of Argentina (University of Buenos Aires, Buenos Aires)	5 000
Argentina	Collection of maize to complete work initiated in 1977 (INTA, Estación Experimental Regional Agropecuaria, Pergamino)	4 600
Colombia	Collection and evaluation of wild cassava (<i>Manihot</i> spp.) germplasm (CIAT, Cali)	3 500
Colombia	Study of priority areas and collection strategies for cassava germplasm (CIAT, Cali)	13 430
Colombia	Collection of cultivated plants in eight departments of Colombia (ICA, El Dorado, Bogotá)	12 660
Ecuador	Multi-crop germplasm collecting missions to be carried out in Ecuador and Colombia (INIAP, Quito)	13 930
France	Continuation of collection of cotton germplasm in Central America (IRCT, Paris)	26 920
Ghana	Exploration and collection of crop germplasm of <i>Discorea</i> spp., <i>Sphenostylis stenocarpa</i> , millet, <i>Vigna</i> , <i>Oryza</i> , <i>Arachis</i> , <i>Lagenaria</i> , <i>Psophocarpus</i> spp. and all local vegetables (Council of Scientific and Industrial Research (CSIR), Kumasi)	15 520
Greece	Collection of wild species and landraces of beet in the Peloponnese region of Greece, during 1981 (Hellenic Sugar Industry, Thessaloniki)	3 300

¹This does not represent a full list of IBPGR expenditures during the year

	Collecting and related activities (cont'd.)	Total Commitment (US dollars)
Greece	Multi-crop collection of all landrace and wild material, especially all forms of <i>Beta</i> and also <i>Aegilops umbellulata</i> , <i>A. kotschyi</i> , <i>Triticum</i> and other cereals and grain legumes, in addition to any other crop plant required (Cereals Institute, Thessaloniki)	4 630
India	Collection of coconut germplasm in Pacific Ocean islands (Central Plantation Crops Research Institute, Kasaragod, Kerala)	25 000
Italy	Collection of wheat and grain legumes in Egypt and Libya (Germplasm Institute, Bari)	45 050
Korea	Collection and evaluation of Korean local maize lines (Choong-Nam National University, Dae-jeon)	5 000
Malaysia	Collection of <i>Elaeis oleifera</i> and related species in Costa Rica, Honduras, and Panama (Palm Oil Research Institute, Kuala Lumpur)	10 000
Malaysia	Exploration and collection of coconut germplasm in West Malaysia (MARDI, Serdang, Selangor)	20 000
Pakistan	Collection of primitive cultivars and wild material of wheat, barley, maize, food legumes and forage species (Pakistan Agricultural Research Council/SVP, Wageningen, Netherlands)	17 370
Philippines	Systematic collection, documentation, conservation and evaluation of indigenous forage legumes in the Philippines (IBP, Los Baños)	10 000
Philippines	Collection of indigenous rice germplasm in South and Southeast Asia (IRRI, Manila)	20 000
Philippines	Collection and characterization of indigenous root crop germplasm (PRCRTC, Visca, Baybay, Leyte)	11 120
Portugal	Collection of maize germplasm in Algarve and Beira regions (INIA, Oeiras)	4 900
Portugal	Collection of Gramineae and Leguminosae with particular emphasis in <i>Secale</i> and <i>Lupinus</i> (INIA, Oeiras)	11 840

Spain	Collection of Gramineae and Leguminosae in northern Spain (INIA, Madrid)	13 600
Thailand	Exploration and collection of <i>Colocasia</i> native to Thailand (Kasetsart University, Bangkok)	5 000
Thailand	Collection and conservation of genetic resources of citrus in Thailand (Chulalongkorn University, Bangkok)	10 000
Thailand	Exploration and collection of all native germplasm of sweet potato (<i>Ipomoea batatas</i> (L.) Lam.) throughout Thailand (Chiang Mai University, Chiang Mai)	5 000
Thailand	Collection of eggplant (<i>Solanum melongena</i>) in Thailand (Chiang Mai University, Chiang Mai)	5 000
Thailand	Exploration and collection of yardlong bean (<i>Vigna</i> spp.) in Thailand (Kasetsart University, Nakornpathom)	5 000
United Kingdom	Collection of eggplant in Africa (Ghana, Togo and Benin) (University of Birmingham, Birmingham)	14 828
United States of America	Plan of action for cocoa genetic resources in Latin America (ACRI, McLean, Virginia)	60 000
Upper Volta	Collection de sorgho, mil, niébé et fonio en Haute-Volta (Direction des Services Agricoles, Ouagadougou)	20 985

Conservation

Brazil	Establishment of a living collection of wild species of the genus <i>Arachis</i> (GENARGEN/EMBRAPA, Brasilia)	25 000
Canada	Regeneration of samples of the global pearl millet collection from Africa (PGR, Ottawa)	5 000
Cyprus	Establishment of medium-term storage facilities at the Agricultural Research Institute (ARI) in Nicosia (ARI, Nicosia)	20 000
France	Regeneration and distribution of samples of the pearl millet collection from the West African region (ORSTOM, Paris)	8 000
France	Multiplication and exchange activities of small seed samples, particularly cotton (IRCT, Paris)	3 000

	Conservation (cont'd.)	Total Commitment (US dollars)
Greece	Multiplication of small seed samples, particularly of beet, for deposition in the genebank in Greece (Hellenic Sugar Industry, Thessaloniki)	5 000
Greece	Multiplication of the <i>Capsicum</i> collection held at Plotomais, for deposition in the genebank in Greece and duplicates, for safety, at IVT, the Netherlands (Cereals Institute, Thessaloniki)	5 000
Netherlands	Survey of genebank facilities and preparation of seed for storage in Europe (Technical and Physical Engineering Service for Agricultural Research - TDFL, Wageningen)	14 700
Netherlands	Multiplication for deposition in base storage centres of the seed samples collected in Baluchistan in 1981 (SVP, Wageningen)	5 000
Netherlands	Multiplication of a collection of land-race material of Ethiopian mustard (<i>Brassica carinata</i>) and description of the material (SVP, Wageningen)	10 000
Peru	Multiplication and description of the <i>Capsicum</i> collection held at La Molina (UNA of La Molina, Lima)	8 000
Philippines	Maintenance of the Southeast Asia banana germplasm resources centre (PCARR, Los Baños, Laguna)	12 000
Philippines	Establishment of a coconut genetic resource centre in the Philippines (PCA, Metro Manila)	10 000
Spain	Multiplication of seed samples, particularly of <i>Triticum</i> , <i>Hordeum</i> , <i>Phaseolus</i> , <i>Capsicum</i> and <i>Gossypium</i> , for characterization and deposition in designated genebanks (INIA, Madrid)	6 000
Syria	Conversion of existing buildings into a genebank (ICARDA, Aleppo)	75 000
Thailand	Long-term seed storage facilities for Asiatic maize (TISTR, Bangkok, Bangkok)	60 000
United Kingdom	Continuation of the project for the clonal propagation and genetic conservation of <i>Theobroma cacao in vitro</i> (Nottingham University School of Agriculture, Loughborough)	16 400

United Kingdom	Continuation of investigations into the long-term storage of orthodox seeds and the investigations on seed dormancy in relation to genetic conservation (University of Reading, Reading)	61 400
United Kingdom	Determination of regeneration interval in orthodox seeds and investigation into long-term storage of recalcitrant seeds (University of Reading, Reading)	82 202
United Kingdom	Multiplication of Chinese cabbage at AVRDC (NVRS, Wellesbourne)	20 000
United Kingdom	Preparation of practical guidelines for non-destructive seed inspection methods, with recommended procedures following detection of pests or diseases (Centre for Industrial Consultancy and Liaison (CICL) Edinburgh)	21 592

General

Italy	Continuation of the IBPGR Regional Programme for the Mediterranean for 1982 (CNR Germplasm Institute, Bari)	20 000
Nepal	Purchase of equipment and supplies for the national genetic resources programme of Nepal (Department of Agriculture, Kathmandu)	10 800

Information

United Kingdom	Provision of reference sets of literature to genebanks in developing countries (University of Birmingham, Birmingham)	10 944
United Kingdom	Preparation of descriptor list for <i>Brassica oleracea</i> and related wild taxa (NVRS, Wellesbourne)	923
United States of America	Characterization and preliminary evaluation of minor millet germplasm (University of Illinois, Urbana)	5 800
United States of America	Supply of a computer system to Syria (Division of Information Science Research, University of Colorado)	19 528

	Training	Total Commitment (US dollars)
Colombia	Short course on plant genetic resources in Latin America (CIAT, Cali)	25 000
Peru	Participation of live students from Andean region countries in training course (UNA, La Molina, Lima)	15 000
Philippines	Training course on characterization, evaluation and utilization of root crop germplasm with emphasis on sweet potato and cassava (PCARR, Los Baños, Laguna)	28 000
United Kingdom	Training course on practical seed technology for genebank personnel (School of Agriculture, Edinburgh University, Edinburgh)	12 790
United Kingdom	M.Sc. course on conservation and utilization of plant genetic resources at the University of Birmingham (University of Birmingham, Birmingham)	72 738
United Kingdom	Replacing of obsolete equipment used for teaching students from developing countries on the international training course on conservation and utilization of plant genetic resources (University of Birmingham, Birmingham)	15 000

ACRONYMS USED IN THE REPORT

ACRI	- American Cocoa Research Institute (USA)	CRI	- Crops Research Institute (Ghana)
APAU	- Andhra Pradesh Agricultural University (India)	CRRI	- Central Rice Research Institute (India)
APGRC	- African Plant Genetic Resources Committee	CSIR	- Council of Scientific and Industrial Research (Ghana)
ARC	- Agricultural Research Corporation (Sudan)	CSATA	- Advanced Technology Application and Study Centre (Italy)
ARI	- Agricultural Research Institute (Burma)	CSIRO	- Commonwealth Scientific and Industrial Research Organization (Australia)
ARI	- Agricultural Research Institute (Cyprus)	CTFT	- Centre technique forestier tropical (France)
ARS	- Agricultural Research Service - US Dept. of Agriculture	DANIDA	- Danish International Development Agency
ASEAN	- Association of South-East Asian Nations	EC	- European Community
AVRDC	- Asian Vegetable Research and Development Center	ECP	- European Cooperative Programme for Conservation and Exchange of Crop Genetic Resources - UNDP/FAO
BARI	- Bangladesh Agricultural Research Institute	EMBRAPA	- Empresa Brasileira de Pesquisas Agropecuárias
CAAS	- Chinese Academy of Agricultural Science	ESPOCH	- Facultad de Agronomía de la Escuela Politécnica, Chimborazo (Ecuador)
CATIE	- Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)	EUCARPIA	- European Association for Research on Plant Breeding
CENARGEN	- Centro Nacional de Recursos Genéticos (Brazil)	EXIR	- Executive Information Retrieval
CGCG	- Cruciferous Genetic Conservation Group - EUCARPIA	FAL	- Federal Agricultural Research Centre (Germany, F.R.)
CGIAR	- Consultative Group on International Agricultural Research	FAO	- Food and Agriculture Organization of the United Nations
CIA	- Centro de Investigación Agropecuaria (Peru)	FTRS	- Fruit Tree Research Station (Japan)
CIAB	- Centro de Investigaciones Agrícolas del Bajío (Mexico)	GCIRC	- Groupe consultatif international de recherche sur le colza
CIAT	- Centro Internacional de Agricultura Tropical	GERDAT	- Groupement d'études et de recherches pour le développement de l'agronomie tropicale (France)
CICL	- Centre for Industrial Consultancy and Liaison (UK)	GTZ	- Agency for Technical Cooperation (Germany, F.R.)
CIMMYT	- Centro Internacional de Mejoramiento de Maíz y Trigo	HSA	- Hawaiian Sugar Planters' Association (USA)
CIP	- Centro Internacional de la Papa	IAN	- Instituto Agronómico Nacion-
CMEA	- Council for Mutual Assistance		
CNR	- National Research Council (Italy)		

IARC	- International Agricultural Research Centre	INRA	- Institut national de la recherche agronomique (France)
IARI	- Indian Agricultural Research Institute	INTA	- Instituto Nacional de Tecnología Agropecuaria (Argentina)
IBM	- International Business Machines	IOCC	- International Office of Cocoa and Chocolate
IBPGR	- International Board for Plant Genetic Resources	IPB	- Institute for Plant Breeding (Philippines)
IBRD	- International Bank for Reconstruction and Development - World Bank	IRAT	- Institut de recherches agronomiques tropicales et des cultures vivrières (France)
IBTA	- Instituto Boliviano de Tecnología Agropecuaria	IRCT	- Institut de recherches du coton et des textiles exotiques (France)
ICA	- Instituto Colombiano Agropecuario	IRFA	- Institut de recherches sur les fruits et agrumes (France)
ICAR	- Indian Council of Agricultural Research	IRRI	- International Rice Research Institute
ICARDA	- International Center for Agricultural Research in the Dry Areas	ISSCT	- International Society of Sugar Cane Technologists
ICRISAT	- International Crops Research Institute for the Semi-Arid Tropics	ISTA	- International Seed Testing Association
IICA	- Instituto Interamericano de Cooperación para la Agricultura - OAS	IUBS	- International Union of Biological Sciences
IHR	- Indian Institute of Horticultural Research	IUCN	- International Union for Conservation of Nature and Natural Resources
IIPGR	- Institute of Introduction of Plant Genetic Resources (Bulgaria)	IVRAZ	- Institut Voltaïque de recherche agricole et zootechnique (Upper Volta)
IIRB	- Institut international de recherches betteravières	IVT	- Institute for Horticultural Plant Breeding (Netherlands)
IITA	- International Institute of Tropical Agriculture	JUNAC	- Junta del Acuerdo de Cartagena - Andean Pact
ILRAD	- International Laboratory for Research on Animal Diseases	LPPP	- Central Research Institute for Agriculture (Indonesia)
INIA	- Instituto Nacional de Investigaciones Agropecuarias (Chile)	MAFF	- Ministry of Agriculture, Forestry and Fisheries (Japan)
INIA	- Instituto Nacional de Investigaciones Agrícolas (Mexico)	MAB	- Man and the Biosphere Programme - Unesco
INIA	- Instituto Nacional de Investigação Agrária (Portugal)	MARDI	- Malaysian Agricultural Research and Development Institute
INIA	- Instituto Nacional de Investigaciones Agrarias (Spain)	NBPGR	- National Bureau of Plant Genetic Resources (India)
INIAP	- Instituto Nacional de Investigaciones Agropecuarias (Ecuador)	NIAS	- National Institute of Agricultural Sciences (Japan)
INIPA	- Instituto Nacional de Investigaciones y Promoción Agropecuaria (Peru)	NIHORT	- National Horticultural Research Institute (Nigeria)
		NSSL	- National Seed Storage Laboratory (USA)

NVRS	- National Vegetable Research Station (UK)	SEA-USDA	- Science and Education Administration - US Dept. of Agriculture
OAS	- Organization of American States	SVP	- Foundation for Agricultural Plant Breeding (Netherlands)
OIV	- Office international de la vigne et du vin	TDFL	- Technical and Physical Engineering Service for Agricultural Research (Netherlands)
ORSTOM	- Office de la recherche scientifique et technique d'outremer (France)	TISTR	- Thailand Institute of Scientific and Technological Research
PARC	- Pakistan Agricultural Research Council	UNA	- Universidad Nacional Agraria - La Molina (Peru)
PCA	- Philippine Coconut Authority	UNDP	- United Nations Development Programme
PCARR	- Philippine Council for Agriculture and Resources Research	UNEP	- United Nations Environment Programme
PGR	- Plant Gene Resources of Canada	Unesco	- United Nations Educational, Scientific and Cultural Organization
PGRC	- Plant Genetic Resources Centre (Ethiopia)	UPOV	- International Union for the Protection of New Varieties of Plants
PIE	- Plant Introduction and Exploration Unit (Ghana)	USDA	- United States Department of Agriculture
PRCRTC	- Philippine Root Crops Research and Training Center	VIR	- N.I. Vavilov Institute of Plant Industry (USSR)
RTI	- Royal Tropical Institute (Netherlands)	WARDA	- West African Rice Development Association
SABRAO	- Society for the Advancement of Breeding Research in Asia and Oceania		

LE POINT DES ACTIVITES DE L'ANNEE

- Le Conseil international pour les ressources phytogénétiques (CIRPG) organisa, conjointement avec la FAO et le PNUE, la Quatrième Conférence technique sur les ressources végétales, à laquelle participèrent des délégués de plus de 50 pays, des centres du CGIAR, des organisations intergouvernementales et non gouvernementales ainsi que de plusieurs autres organisations s'occupant des ressources génétiques végétales.
- En 1981, le Conseil eut à l'ordre de priorité des plantes et des régions. Les activités du Conseil portent actuellement sur plus de 120 plantes, bien que la priorité absolue ne soit accordée qu'à un nombre très limité. Les plantes vivrières figurent parmi celles qui ont une priorité absolue de même que certaines plantes ayant une importance globale ou régionale.
- En travaillant de concert avec le centre de recherche approprié, les cinq Comités consultatifs (pour le blé, le maïs, le riz, le haricot *Phaseolus*, le sorgho et les mils) servent de lien entre le Conseil et l'ensemble des chercheurs travaillant sur ces plantes. En 1981, les comités ont eu à conseiller le CIRPG sur les projets de missions de collecte de matériel végétal; en outre, les comités consultatifs pour le blé, le riz, le sorgho et les mils se sont réunis et ont passé en revue les activités en cours.
- En ce qui concerne le programme d'information pluridimensionnel:
 - La publication des listes des accessions maintenues dans les principaux centres de conservation des ressources végétales a été faite dans de nouveaux répertoires pour le riz, le sorgho et les mils, quelques plantes industrielles et le seigle.
 - La publication des listes des descripteurs pour l'arachide, le mil, le pois d'angole, le sésame, les amandes et le lupin a été faite grâce au travail de groupes d'experts ou des comités consultatifs, en collaboration avec l'ICRISAT. Une liste révisée a été publiée pour le blé. Des listes supplémentaires de descripteurs ont été publiées en appendice aux documents portant sur les ressources génétiques de la patate douce, le cacao (*Theobroma*), les amarantes, les crucifères et la tomate.
 - Le Conseil apporta son assistance à plusieurs pays pour la mise en place d'un système approprié de documentation et de recherche de l'information concernant les collections qu'ils préservent.
 - En 1981, plusieurs groupes d'experts se sont réunis pour conseiller le CIRPG sur une action globale sur le seigle, la canne à sucre, le *Vigna* et le *Citrus*.
- En 1981, le Conseil finança et organisa une série de missions de collecte des ressources végétales dans les régions suivantes: Méditerranée, Sud-Ouest et Centre de l'Asie, Asie du Sud et du Sud-Est, Afrique occidentale, centrale et orientale et Amérique du Sud.
- Les activités régionales ont continué à s'intensifier par:
 - La nomination d'un Fonctionnaire régional pour l'Afrique occidentale.
 - Le financement avec l'HICA et le JUNAC d'une rencontre régionale pour élever le niveau de coopération et définir un plan d'action pour la zone des Andes.
 - L'enquête (par un consultant) sur les ressources génétiques végétales de la Région du Pacifique.
- Le travail commencé en 1980 sur les fruits tropicaux a continué et le programme du Conseil sur les légumes s'est accéléré.
- A la suite d'une enquête sur les ressources génétiques mondiales du blé, le Conseil a nommé un fonctionnaire chargé d'accélérer la mise en ordre et l'évaluation des principales collections de blé.
- Le Conseil a désigné, en accord avec les centres de recherche concernés, un réseau d'institutions responsables pour la conservation des principales collections de «base» des graines des

principales cultures vivrières du monde. Ce réseau a été agrandi en 1981 et le Conseil a financé plusieurs installations de stockage.

- En 1981 le Conseil continua à financer la formation des cadres tant au niveau des techniciens qu'au niveau des post-gradués, afin d'essayer d'augmenter la main-d'œuvre pour les activités de ressources phytogénétiques dans les pays en voie de développement. Plusieurs stages de courte durée ont été organisés et des bourses universitaires ont été octroyées. Le Conseil a pris la décision de commencer, dès 1982, la formation axée sur la vulgarisation au niveau du premier cycle universitaire.
- Comme partie de ses objectifs, le Conseil avait dans le passé accepté de subventionner des recherches limitées dans des domaines où les résultats pourraient accélérer son intervention pratique. Les projets financés étaient tous en rapport avec les méthodologies de conservation.

ASPECTOS SOBRESALIENTES DEL AÑO

- El Consejo patrocinó, junto a la FAO y al PNUMA, la IV Conferencia Técnica sobre Recursos Fitogenéticos. En ella estuvieron representados más de 50 países, los centros internacionales del CGIAR, diversas organizaciones intergubernamentales, otras organizaciones no gubernamentales y numerosas personas e instituciones que realizan actividades en el campo de los recursos fitogenéticos.
- Durante 1981 el Consejo revisó sus prioridades regionales. El CIRF abarca actualmente más de 120 cultivos de los que algunos tienen máxima prioridad. Entre estos últimos se incluyen no sólo plantas alimenticias.
- Los comités asesores para cultivos (para trigo, maíz, arroz, sorgo y panizo, y frijoles o habichuelas) son coordinados conjuntamente por el CIRF y el Centro Internacional (IARC) correspondiente, y sirven de puente entre el Consejo y la comunidad de científicos que trabaja en cada uno de estos cultivos. Durante 1981 estos comités asesoraron al Consejo sobre las misiones de recolección necesarias, y tres de ellos se reunieron para revisar las actividades en marcha.
- En relación con el programa de información:
 - Se han publicado listas de colecciones de arroz, sorgo y panizo, cebada y algunos cultivos industriales. Estas listas incluyen el material mantenido en los principales centros de recursos fitogenéticos.
 - Se han publicado listas de descriptores para maní o cacahuete, panizo y guandú (los tres en cooperación con ICRISAT), almendra, lupino y sésamo. Estas listas han sido elaboradas en reuniones de grupos de trabajo o comités asesores formados por expertos en cada cultivo o grupo de cultivos. La lista de descriptores de trigo fue revisada, y en los casos de batata o camote, cacao, amaranto, crucíferas y tomate, las listas de descriptores figuran en uno de los apéndices de publicaciones más amplios sobre la situación global del germoplasma de estos cultivos.
 - El Consejo prestó su asistencia a diversos países en la instalación de apropiados sistemas de documentación para el mantenimiento y obtención de información sobre el germoplasma que almacenan.
- En 1981 se reunieron diversos grupos de trabajo formados por expertos que asesoraron al Consejo sobre las acciones necesarias en cebada, caña de azúcar, *vigna* y *citrus*.
- El Consejo financió y organizó misiones de recolección de germoplasma en las siguientes regiones: Mediterránea, Suroeste y Centralasia, Surasia, Sureste asiático, Africa Este, Africa Oeste, Centroamérica y América del Sur.
- Las actividades regionales han continuado a través de:
 - La designación de un oficial regional para Africa Oeste.
 - La coordinación, junto con el HCA y la JUNAC, de una reunión regional andina orientada a aumentar la cooperación y revisar las actividades en la zona andina.
 - Un estudio realizado sobre los recursos fitogenéticos de la región del Pacífico.
- El trabajo iniciado en 1980 sobre frutales tropicales ha continuado durante 1981 y el Consejo ha acelerado su programa de plantas hortícolas.
- El CIRF ha designado un nuevo oficial que se encarga de promover actividades en germoplasma de trigo, así como de poner en orden las colecciones existentes y estimular su evaluación.
- El Consejo ha designado, previa consulta con los centros apropiados, una red de instituciones responsables del mantenimiento de las colecciones básicas de germoplasma de los principales cultivos alimenticios. Esta red aumentó en 1981 y el CIRF también proporcionó asistencia financiera en algunos casos.

- En 1981 el Consejo continuó su programa de formación de personal técnico y graduado. Este programa está orientado principalmente a los países en vías de desarrollo.
- La política del Consejo es de proporcionar también cierta asistencia a la investigación en áreas donde ésta puede acelerar las actividades del CIRF. Los proyectos de investigación financiados durante 1981 fueron todos en relación con metodología de conservación.

أهم أحداث العام

استضاف المجلس الدولي للمصادر الوراثية النباتية بالاشتراك مع منظمة الأغذية والزراعة التابعــــة للأمم المتحدة (الفاو) وبرنامج الأمم المتحدة للبيئة ، المؤتمر الفنى الرابع للمصادر الوراثية المحصولية • حضره مندوبون من أكثر من خمسين دولة ومن المجموعة الاستشارية الدولية للبحوث الزراعية ومن هيئات حكومية مشتركة وأخرى غير حكومية بالإضافة الى الكثير من المعنيين بأعمال المصادر الوراثية للمحاصيل •

• قام المجلس بتعديل أولوياته الاقليمية والمحصولية فى عام ١٩٨١ • يوجد الآن أكثر من مائة وعشرين محصولا فى نطاق برنامج المجلس وذلك على الرغم من أن عددا محدودا منها سبيلقى اهتماما ذا أولوية عالية •
تشتمل المحاصيل ذات الأولوية العالمية على النباتات الغذائية والنباتات الأخرى ذات الأهمية الاقليمية أو العالمية •

• تعمل اللجان الاستشارية المحصولية الخمس (للقمح والذرة والأرز والسورجىم والدخن والفاصوليا) بالمشاركة مع المركز الملائم التابع للمجموعة الاستشارية الدولية للبحوث الزراعية كأداة اتصال بين المجلس والمجتمع الدولى للعلماء المعنيين بتلك المحاصيل • قدمت تلك اللجان - فى عام ١٩٨١ - توصياتها الى المجلس بخصوص بعثات الجمع ، ذلك اضافة الى أن لجان القمح والأرز والسورجىم والدخن قد قامت بمراجعة أعمالها الحالية •

• فيما يتعلق بالبرنامج المتعدد الأوجه للمعلومات :

- تم نشر قوائم العيّنات المختزنة - فى المراكز الرئيسية للمصادر الوراثية - من الأرز والسورجىم والدخن والشعير وبعض المحاصيل الصناعية وذلك فى صورة كتيبات حديثة •

- نتيجة لتوصيات مجموعات الخبراء العاملة أو اللجان الاستشارية للمحاصيل ، تم اصدار قوائم اضافية للصفات (الخاصة بالحاسب الآلى) لكل من الفول السودانى والدخن والتمرس والسمسم والبسلة الهدية واللوز بالتعاون مع المركز الدولى لبحوث المناطق الاستوائية للصف جافة • نشرت أيضا قائمة معدلة لمحصول القمح ، كما أن عدة قوائم أخرى قد تم اصدارها كملاحق لكتب المصادر الوراثية لمحاصيل البطاطا والكاكاو والطماطم والقرعيات والقطن (الأمارنتس) •

- ساعد المجلس عدة دول فى اعداد وتركيب الأنظمة الملائمة للتوثيق (أنظمة الحاسب الآلى) من أجل تخزين واستعادة المعلومات المتعلقة بما تحفظه وراثيا من المحاصيل •

• فى عام ١٩٨١ تشكلت عدة مجموعات عاملة من الخبراء وأجريت الاستشارات لتوصية المجلس بخصوص أسلوب العمل الدولى لمحاصيل الشعير وقصب السكر والموايح والفاصوليا البهائم •

• قام المجلس بتدعيم وتنظيم سلسلة من بعثات الجمع فى المناطق الآتية : البحر الأبيض المتوسط ، جنوب غرب آسيا ، وسط آسيا ، جنوب آسيا ، شرق افريقيا ، غرب افريقيا وجنوب ووسط امريكا الجنوبية •

• استمرت الأنشطة الاقليمية فى التوسع من خلال :

• تعيين موظف اقليمى لغرب افريقيا •

• الدعوة الى اجتماع اقليمى بالتعاون مع معهد العلوم الزراعية لامريكا اللاتينية ومجلس التعاون فى

بيرو لزيادة التعاون ومن أجل التوصل الى خطة عمل لمنطقة الأنديز •

• القيام ببحث استشارى للمصادر الوراثية لمنطقة المحيط الهادى •

- استمرت المبادرة الجديدة فيما يتعلق بالفواكه الاستوائية والتي بدأت فى سنة ١٩٨٠ ، كما أن برنامج المجلس لمحاصيل الخضروات قد تم التعجيل به •
- عين المجلس موظفا متخصصا فى القمح نتيجة لما تضمنه التقرير الدولى للمصادر الوراثية فى القمح ، بغرض الاسراع فى مهمة ترتيب وتنظيم المجموعات الرئيسية والحث على تقييمها •
- عين المجلس — بالتشاور مع المراكز المعنية — شبكة من المؤسسات (المعاهد) لتكون مسؤولة — على مستوى العالم — عن صيانة وحفظ " المجموعات الأساسية " الرئيسية من حيوب المحاصيل الغذائية الهامة • تم توسيع هذه الشبكة فى سنة ١٩٨١ وقد دعم المجلس ماديا عدة تسهيلات لتخزين هذه المجموعات •
- استمر المجلس فى تدعيم التدريب على المستوى الفنى والمستوى الخاص بالدراسات العليا (ما بعد التخرج) فى محاولة لزيادة عدد الأفراد المدربين على أعمال المصادر الوراثية فى العالم النامى • قدمت عدة منح دراسية للتدريب وتم عقد دورات دراسية قصيرة •
- وافق المجلس فى الماضى — كمبدأ أساسى — على دعم " بحوث محددة " فى المجالات التى تسوئدى نتائجها الى تعجيل المهام العملية للمجلس • تتعلق المشروعات المدعمة بأساليب ووسائل الحفظ والتخزين •

去年的工作重点

- * 国际植物遗传资源委员会与粮农组织及联合国环境规划署共同主持召开了第四届作物遗传资源技术会议。代表来自50多个国家，有来自国际农业研究磋商小组的各个研究中心、各政府间组织、非政府性组织，还有其他许多从事作物遗传资源工作的人。
- * 本委员会修改了它在1981年的作物工作重点和区域工作重点。本委员会的工作计划现在包括120多种作物，虽然其中仅有有限的部分将会得到优先的注意。享有高度优先地位的作物包括粮食作物和其它具有全球性或区域性重要意义的植物。有五个作物咨询委员会（小麦、玉米、水稻、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，成为本委员会和世界上从事这些作物研究的科学家之间的桥梁。这五个委员会于1981年就有关各收集小组的建议向本委员会提出了意见；小麦、水稻、高粱和谷子三个委员会举行了会议，审议正在进行的工作。
- * 特别提到多方面的情报计划：
 - * 由各主要的遗传资源中心保存的品种资源目录已在水稻、高粱和谷子、一些工业作物和大麦等新的材料索引手册上发表。
 - * 由于各专家工作组或作物咨询委员会进行磋商的结果，出版了花生、珍珠稗和木豆（与国际半干旱热带作物研究所合作）；扁桃、羽扁豆和芝麻的新的描述目录。发行了小麦的修改目录。还出版了甘薯、可可属、苋、十字花科植物和番茄的新的描述目录。
 - * 本委员会协助几个国家建立和安装了有关作物遗传材料的情报存储与检索的适当文献体系。
- * 1981年成立了若干个专家工作组，召开了磋商会议，就大麦、甘蔗、豇豆属和柑桔属采取全球行动向本委员会提出咨询意见。
- * 本委员会支持并组织了下列区域的一系列收集小组：地中海、中亚、南亚、东南亚、东非、西非、中美和南美。
- * 区域性活动通过以下途径继续扩大：
 - * 任命了一名驻西非的区域官员。
 - * 与美洲间农业科学研究所和卡塔赫纳协定委员会一道发起召开了一次区域性会议，以加强合作并修改安第斯地区的行动计划。
 - * 磋商调查了太平洋地区的植物遗传资源。

- * 1980年开始的有关热带水果的新行动在继续进行中。本委员会的蔬菜计划正加速实现。
- * 在对世界小麦遗传资源进行调查之后，本委员会任命了一名小麦官员以便加速整理收集来的主要基础品种资源并促进评价工作。
- * 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籽的主要基础材料。这个网在1981年得到了扩充。本委员会为若干存储设备提供了资金。
- * 1981年本委员会继续支持技术和研究生一级的培训，以扩大发展中国家受过遗传资源工作培训人员的数量。组织了几期短期培训班并提供了进修金。此外，决定开办培训，在1982年为肄业生一级培训从事推广工作的人材。
- * 本委员会过去曾同意：作为一项政策，在研究成果将会促进本委员会实际工作的领域支持有限的研究工作。得到支持的项目都与保存方法学有关。

亦行 屠楠 桂琴 洪穗