

AGENCY FOR INTERNATIONAL DEVELOPMENT  
 WASHINGTON, D. C. 20523  
**BIBLIOGRAPHIC INPUT SHEET**

FOR AID USE ONLY

*Batch 70*

1. SUBJECT CLASSIFICATION	A. PRIMARY Serials	Y-AF30-0000-0000
	B. SECONDARY Food production and nutrition--Plant production--Plant breeding	

2. TITLE AND SUBTITLE  
 Annual report, 1976

3. AUTHOR(S)  
 (101) Int. Board for Plant Genetic Resources

4. DOCUMENT DATE 1977	5. NUMBER OF PAGES 34p.	6. ARC NUMBER ARC
--------------------------	----------------------------	----------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS  
 IBPGR

8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)  
 (Activity summary)

9. ABSTRACT  
 A PROJECT: To promote an international network of genetic resources centers 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.  
 DURATION: 1975 ongoing  
 DEVELOPMENTS: In 1976, the second full year of operation of the International Board for Plant Genetic Resources (IBPGR), numerous collection activities for priority crops were conducted, many with Board financing. Several regional programs in priority areas were initiated, and two new genetic resources centers became operational. Crop Germplasm Advisory Committees for five of the world's principal food crops met and submitted action recommendations for improvement of the conservation, evaluation, and use of genetic resources for those crops. Advances were made in the development and application of a computer-based data classification and retrieval system designed to make the world's principal germplasm collections more readily accessible to breeders everywhere. The principal aim of the Board is to promote a world-wide program in which collection, conservation, documentation, and evaluation are coordinated with regard to the requirements of geographic regions as well as particular crops. In 1976 the outlines of the prospective world network were more clearly defined, and lines of communication between workers and institutions essential to a coordinated program were established and are being used.

10. CONTROL NUMBER <b>PN-AAE-522</b>	11. PRICE OF DOCUMENT
12. DESCRIPTORS Plant genetics	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/ta-G-1272 GTS
	15. TYPE OF DOCUMENT

AGPE:IBPGR/76/27  
March 1977

CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

ANNUAL REPORT 1976

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

Rome, 1977

CONTENTS

	<u>Page</u>
Preface	v
INTRODUCTION	1
GENETIC RESOURCES ACTIVITIES AT THE INTERNATIONAL AGRICULTURAL RESEARCH CENTRES	4
OTHER COLLECTION ACTIVITIES	6
DEVELOPMENT OF REGIONAL PROGRAMMES	9
CROP SPECIFIC ACTIVITIES	11
OTHER WORK ON SPECIFIC CROPS	14
STORAGE AND CONSERVATION	15
INFORMATION	17
TRAINING	18
PUBLICATIONS	19
PLANT HEALTH AND QUARANTINE	19
MEMBERSHIP OF THE BOARD	19
FINANCE	20
APPENDIX I Membership List	21
II Membership of Advisory Committees in 1976	23
III Main Recommendations and Conclusions of the IBPGR Working Group on Engineering, Design and Cost Aspects of Long-Term Seed Storage Facilities	27
IV IBPGR Publications	29
V Statement of Account as at 31 December 1976	31

## PREFACE

The International Board for Plant Genetic Resources (IBPGR) is an autonomous, international, scientific organization under the aegis of the Consultative Group for International Agricultural Research (CGIAR). IBPGR, which was established by the CGIAR in 1973, is composed of 14 members from 13 countries (see Appendix I); its Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of 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.

## ANNUAL REPORT

### INTRODUCTION

1976 was the second full year of operations for the Board. It witnessed substantial progress in translating into concrete action the groundwork for a global genetic resources network previously laid. Numerous collection activities for priority crops were carried out, many with Board financing; several regional programmes in priority areas were set in motion, also with Board assistance; two new genetic resources centres for regions of substantial plant genetic variability became operational; and Crop Germplasm Advisory Committees for five of the world's principal food crops met and submitted action recommendations for the improvement of genetic resources conservation, evaluation and use in those crops. In addition, advances were made in the development and application of a computer-based data classification and retrieval system designed to make the world's principal germplasm collections more readily accessible to breeders everywhere.

The cooperation and support which the Board has received clearly demonstrates the increasing concern to collect, conserve and use the genetic potential represented by old crop varieties and their wild and weedy relatives. The Board's current programmes are determined by the immediate need to collect and conserve irreplaceable genetic material from regions in which these old varieties are being replaced by a limited number of modern cultivars.

The Board's eventual aim is to promote a world-wide programme in which collection, conservation, documentation and evaluation are coordinated with regard to the priorities and requirements of the geographical regions on the one hand, and particular crops on the other. In 1976 the outlines of the prospective world network of conservation centres became more clearly defined and lines of communication between workers and institutions essential to a coordinated programme were laid down, and are now being used.

But the IBPGR should not be primarily considered as a funding agency for the global network. Its funds are used to finance urgent collections and capital projects on the one hand, and on the other to identify gaps in collections and in the genetic resources network and to stimulate action to fill those gaps.

An important step forward in 1976 was the agreement, at the Board's third meeting, on priorities for collections. (See Publications in Appendix IV: Priorities among Crops and Regions.) The most urgent needs are now being more precisely specified by the Crop Germplasm Advisory Committees which met for the first time this year. A sharper focus has been imposed on the Board's future collection programme in particular, by the proposals made by these five specialist Committees (on wheat, rice, maize, sorghum and millets, and Phaseolus beans), and as far as possible these will be followed up in 1977.

Effective programmes in the various geographical regions, covering all aspects of genetic resources work, are a crucial part of the proposed international network. Progress has been made in developing regional programmes for two of the five regions designated of

highest priority. The Board has taken over financial responsibility for the Southwest Asian regional programme (previously supported by the Swedish International Development Authority (SIDA) ), and is in process of setting up a Genetic Resources Support Unit (GRSU), based in Turkey and Iran, to assist the national genetic resources programme of the six countries which had previously participated in the Near East Regional Project. The GRSU should be fully operational in 1977. Agriculture is changing rapidly in all the countries of this region and time for collections is running out - within five years much valuable material will have disappeared.

Erosion of the genetic resources represented by old crop varieties cultivated in countries bordering the Mediterranean is also proceeding at an alarming rate, and the Mediterranean regional programme, based at present at the Italian National Research Council's Germplasm Laboratory at Bari, is now working effectively.

1977 should see the emergence of a Southeast Asian regional programme and a European programme. The outlines of regional programmes in West Africa and South Asia are also being laid down.

The world network was also strengthened in 1976 by the establishment of Genetic Resources Centres in Ethiopia and Costa Rica, with funding from the Federal Republic of Germany, which will form the nuclei of regional programmes in those areas. Thus, the Board envisages that, within the next two years, effective programmes will be in operation in all five regions which have been accorded highest priority by the Board, and that, within the next five years, similar programmes will be mounted in perhaps an additional five regions accorded priority 2 or 3.

Development of the global network will require more trained personnel, although not in very large numbers. The Board is already helping the University of Birmingham to provide places for 10 M. Sc. students from developing countries on its genetic resources training course, and it is considering support for additional technical and practical training.

Fewer collections were made in 1976 than had been hoped originally but a number of expeditions received Board support or endorsement, including the collection of cereals and legumes in Algeria and Tunisia; millet and sorghum in the Sahel; grain legumes, roots and tubers in West Africa; cereals in NW India; cereals and pulses in Pakistan; potatoes in Argentina; and groundnuts in Brazil. The proposals from the Crop Germplasm Advisory Committees should result in a substantially greater number of collections in 1977.

The International Agricultural Research Centres (IARC's) supported by the Consultative Group on International Agricultural Research (CGIAR) are actively cooperating with the Board in sponsoring Crop Germplasm Advisory Committees, and in forging links with collectors, storage centres and documentation and information specialists. The IARC's have also agreed to hold the world's base collections of germplasm of most of the crops for which they have been assigned research responsibility by the CGIAR. Other national and regional genetic resources centres also hold base collections, especially for local crops.

Standards and recommendations for long-term seed storage conditions, developed by an expert panel convened by the Board, were approved by the Board in 1976 and will be published early in 1977. The Board intends to encourage an upgrading of storage

facilities to these standards where necessary. Moreover, as the regional programmes develop, the Board believes that it will probably be called upon in some instances to help finance either the construction or improvement of storage facilities needed for the implementation of those programmes.

Now that standards for the easily stored seeds have been set out, the Board will have to consider the problems posed by seeds which are not easily stored under standard conditions. This problem, and that of plants which can at present only be conserved as vegetative material, will only be resolved by further research.

Since its inception, the Board has recognized the importance of an efficient system for collecting, storing and retrieving information on collections throughout the world. Too often in the past collections have remained under-utilized for want of proper description and so the Board has continued its support for the computerized genetic resources communication, information and documentation system (GR/CIDS) developed at the University of Colorado, Boulder, through the use of which it should be possible eventually to maintain inventories of all major collections, in such a way that useful information can be easily retrieved. This effort at the University of Colorado, formerly at the Taximetrics Laboratory, has been renamed the Information Sciences/Genetic Resources Program (IS/GR). One important function of the Crop Advisory Committees in this respect is to agree the standard list of descriptors for each crop. In its directions to collecting expeditions receiving support, the Board has stressed the importance of collaboration at the earliest stage with the IS/GR team and the relevant Crop Advisory Committee, where one exists, to ensure that the collected material is properly described and the fullest possible information obtained on the environment from which the samples come.

The urgent need for new collections, and the provision of adequate storage in the regions, must of necessity take first place, but there are many other problems which fall within the Board's remit. Many existing collections need overhauling immediately; otherwise much valuable, sometimes irreplaceable material will be lost. It is also imperative that existing and new collections be properly evaluated to be of use to the plant breeder. In future, as the collection programme develops, it will be an increasingly important part of the Board's work to ensure that evaluation does not lag too far behind collection. But it is important to recognize that, although the Board has an important part to play in encouraging plant breeders to make good use of collections, the Board has no remit to support breeding work itself.

1977 is likely to see a rapid growth in practical action by the Board which should continue for the next five to ten years, particularly through development of the regional programmes and through bringing a wider range of crops into the Board's network. To finance these activities, the Board envisages a steady growth in its budget from its 1976 level of \$1/1.4 million to a ceiling of about \$3 million per annum by 1980 or 1981. Such growth is believed necessary if the IBPGR is to make significant progress towards achieving its objectives. With the relatively modest annual budget increases which the proposed ceiling implies, such growth should not be inconsistent with the CGIAR's general policy of consolidation for the established IARC's in the period immediately ahead.

## GENETIC RESOURCES ACTIVITIES AT THE INTERNATIONAL AGRICULTURAL RESEARCH CENTRES

The Board has established excellent cooperative relations with the relevant crop Agricultural Research Centres (IARC's), which are now all cooperating in the IBPGR programme. They provide information on their own genetic resources efforts and have agreed (except for CIMMYT in the case of wheat) to accept world-wide responsibility for coordinating, in consultation with the IBPGR, many aspects of the conservation effort in the crops for which they have research responsibility and to hold base collections of these crops. They have also agreed to organize and co-sponsor the Crop Germplasm Advisory Committees (see page 11).

CIAT: In 1976 the Board endorsed CIAT's programme to collect the genetic resources of tropical forage legumes. Extensive explorations had been made in 1975 under IBPGR sponsorship and this work continued in and included a collaborative project in El Salvador with the Banco de Fomento and UNDP/FAO. By the end of the year CIAT's forage legume germplasm bank consisted of 1600 accessions, chiefly of Stylosanthes, Desmodium, Centrosema and Macroptilium. Provision for financing this programme was originally included in the IBPGR's budget, but with the recommendation, accepted by the CGIAR, that the amount provided be transferred to CIAT's core budget. The IBPGR has also noted with approval CIAT's plan to modify an existing meat cold storage facility to provide long-term seed storage and short-term tuber storage and, at the request of CIAT, provided in 1976 a short-term consultant to advise on the modification. The Board also made a grant to CIAT in 1976 to finance the purchase of refrigeration equipment for the storage facility. This facility will be available, while space permits, to store seeds not only of crops being worked on at CIAT but also of other crops of regional importance. The Phaseolus Germplasm Advisory Committee, which is co-sponsored by CIAT, met in September 1976 and produced a series of proposals relating to existing collections and exploration targets. Future collecting plans at CIAT will include other crops of the Centre such as cassava.

CIMMYT: Through help provided by the GR/CIDS team under its contract with the IBPGR, CIMMYT has made substantial progress in documenting its data on accessions in its own germplasm bank and other maize banks. In addition, the GR/CIDS team has, with direct CIMMYT funding, developed the use of EXIS packages for that Centre. The Deputy Director General of CIMMYT is a member of the IBPGR's Advisory Committee on the GR/CIDS project. CIMMYT co-sponsored the first meeting of the Maize Germplasm Advisory Committee in May 1976 and this will result in a coordinated effort to collect material in Latin America, and in 1976 the IBPGR Mediterranean programme, reported below, started the collection of land races of maize as recommended by the Committee.

CIP: Work on the genetic resources of potatoes at CIP is well advanced. The Board endorses CIP's programme for the collection, maintenance, and coordinated evaluation of potato germplasm. The CIP programme follows the conclusions at the eleventh planning conference on the

exploration and maintenance of germplasm resources, held in March 1976. In particular, the Board has agreed that the GR/CIDS team will assist in the standardization of descriptors and descriptor states. Because of the expertise of CIP, the Board has not felt it necessary to establish a Potato Germplasm Advisory Committee. However, IBPGR collaborates closely with CIP and seeks its advice on exploration proposals, such as, for example, that reported below for Argentina.

ICRISAT: ICRISAT has collaborated with the IBPGR in connection with sorghum and millets and also groundnuts, and has continued work on assembling the genetic resources of chickpea and pigeonpea. In 1976 the Board commenced support for groundnut exploration in Brazil with advice from ICRISAT. It will also continue to support the collection of sorghum and millets in the Sahelian zone of Africa, an effort organized by the IBPGR in which ICRISAT, ORSTOM and IRAT will all cooperate with advice from the Sorghum and Millets Germplasm Advisory Committee, co-sponsored by ICRISAT. The first meeting of this Committee was held in September 1976. In 1976, a total of 10 exploration missions by ICRISAT collected sorghum in Andhra Pradesh, India, chickpea in several parts of India and Afghanistan and pigeonpea in several states of India and Kenya. Some training was provided by ICRISAT in 1976 by introducing 18 African trainees in Crop Improvement and Crop Production to the principles of genetic conservation and three trainees from Ethiopia and the Sudan to germplasm work with chickpea. During the year, collection, morphological and agronomical descriptors were prepared for computerization for sorghum, pearl millet, chickpea and pigeonpea and the Centre is liaising with the staff of the IS/GR Program in Colorado.

IITA: In 1976 the Board allocated funds to help IITA start a programme for the collection and conservation of grain legumes, roots and tubers in West Africa, with the understanding that subsequent financing of the programme would be included in IITA's core budget. In late 1976 this programme was extended to a wider range of crops and provision was made for a number of African graduate students and post-doctoral fellows, as well as some undergraduates, to be brought to IITA for training. The Germplasm Unit of IITA was engaged in 1976 in three plant collecting expeditions. One covered all of the ecological zones of Ghana for a range of crops; another was in Sokoto State in northwest Nigeria, with emphasis on rice; and the third was in Kaduna State of Nigeria for lima beans. By the end of 1976 the Germplasm Collection Unit had taken formal responsibility for the yam germplasm collection and, as planned facilities become available, other IITA germplasm collections will join those of the Unit. In 1977, the IITA Germplasm Unit should be fully operational.

IRRI: The genetic conservation programme for rice has been an important aspect of IRRI since its beginning and plans were drawn up in 1976 for extending the operations into the next decade. In its 1976 budget, IBPGR proposed to assist IRRI financially to expand

its germplasm bank by collections of rice in Indonesia, Bangladesh and other countries, but, at the recommendation of the Board, this financing was transferred, by the CGIAR, to IRRI's core budget. During 1976 IRRI made field collections in Bangladesh, Java and Sri Lanka. At the end of the year the IRRI Germplasm Bank had a total of 34,229 registered accessions of Oryza sativa, 1,403 of O. glaberrima and 650 strains of wild taxa and genetic testers. All have been entered on computer tape and, as the Unit continues to evaluate the material, data are added. In 1976 IRRI collaborated with the Agricultural Research Institute of Burma and the Indian Council of Agricultural Research for the preservation of rice collections. Plans for the IRRI Germplasm Bank for 1976-81 were presented to the first meeting of the IBPGR/IRRI Rice Advisory Committee, held in April 1976, at Los Baños.

#### OTHER COLLECTION ACTIVITIES

Mediterranean: A team from the Germplasm Laboratory at Bari, Italy, visited Algeria and Tunisia in 1976 primarily to collect, for long-term conservation, land races of wheat, species of Aegilops and barley, and secondarily other crops, especially pasture plants and Vicia species. Collections began in Tunisia, around Befra and Le Kef, and continued throughout the Atlas mountains to the Numidian Chain to the north and also the Aures Massif. In addition, a joint FAO/Bari mission visited Spain in October/November 1976 to collect land races of maize from the Galicia region.

West Africa: Due to widespread crop failure after drought, germplasm of two highest priority crops, sorghum and pearl millet, has been endangered in the Sahelian zone. Emergency collecting in 1975, funded by UNEP, concentrated on pearl millet. Collections were made by ORSTOM (with participation by ICRISAT) in the Republics of Central Africa, Mali, Niger, the People's Republic of Benin, Togo and Upper Volta. In 1976 IBPGR supported a further series of missions to this region. Emphasis in 1976 has continued to be placed on Pennisetum millet species and its related wild and weedy forms. Two teams explored Nigeria, the first organized by FAO to collect early millets (non-photosensitive) in August, the second by ORSTOM to collect late millets (photosensitive) in October. ORSTOM teams also visited Niger, Senegal and the southern part of Mauritania.

The collection of pearl millet from the countries along the southern fringe of the Sahara has continued to be an emergency task since local material is being replaced by new varieties after the widespread droughts. Although collections of 1975 and 1976 have captured a wide range of variability, the programme has a long way to go to capture fully the variability representative of West Africa. The Crop Advisory Committee on Sorghum and Millets has already suggested a plan of action for this purpose for 1977 and 1978, involving the Governments of the West African countries.

Apart from providing samples for long-term storage, the material from West Africa is immediately important for breeding programmes in the region and elsewhere. The millet collection maintained at ICRISAT, for example, contains material largely from the Indian subcontinent.



Fig. 1. IBPGR sponsored collections in 1976

Pakistan: A joint Netherlands-Pakistan expedition was undertaken to some of the remote areas of northern Pakistan (Chitral and Swat). The main aim of the expedition was to collect land races of wheat, barley, maize, grasses and pulses still existing in those inaccessible regions. The other objective was to compare the situation today with that known in 1935 to assess genetic loss. The expedition was organized jointly by the Foundation for Agricultural Plant Breeding (SVP) at Wageningen and the Agricultural Research Council (ARC) at Islamabad. Most of the preparatory work was carried out in cooperation with Dutch mountaineers.

The cultivated crops collected included many species of wheat (T. aestivum, T. durum, T. compactum, T. sphaerococcum, T. turgidum), barley (both covered and naked), rye (including Triticale), maize, rice, millets, pulses (Vigna, Vicia, Lens, Cicer, Pisum, Lathyrus), oil seeds (Brassica), flax and fodder crops (Medicago, Trifolium). Many related wild species were also collected.

The mission will be followed by storage, multiplication, distribution, evaluation and utilization of the germplasm collected. After adequate storage in Pakistan and in the Netherlands all the samples will be multiplied in 1977. By the end of 1977 material will be distributed to interested institutions. The first evaluations will be carried out by both the ARC and the Foundation for Agricultural Plant Breeding, in Pakistan and the Netherlands respectively, resulting in information from two very diverse environments.

The team noticed that modern varieties of wheat, maize and rice had been introduced in many of the places which it visited, indicating the need for further plant collecting in the remote areas, without delay, to save the old local varieties which are in danger of extinction.

Northwest India: From June to December 1976, cereals were collected from villages in very widely scattered areas of northern India, especially Uttar Pradesh and Himachel Pradesh. This mission was organized by the University College of North Wales; the collecting team was made up of British and Indian personnel and the material made freely available to a wide range of institutes. Severe genetic erosion was encountered, particularly in the Kashmir valley where few local varieties remain. The Ladakh area proved extremely interesting and there were many local land races, especially of Triticum compactum-T. aestivum mixtures. Interesting wild barley was collected in the Indus valley.

Argentina: Collections of andigena potatoes and related wild species were made by staff of the Agricultural Experiment Station, Balcarce, Argentina, in the departments of Santa Victoria and Iruya of the Salta province. Over 250 clones of andigena potatoes and a smaller number of the related wild species, Solanum acaule, S. boliviense, S. juzepczukii, S. microdontum and S. tarijense were obtained by the team. A working collection will be maintained at the Agricultural Experiment Station, Balcarce, and material has been sent to CIP, Tucumán, Argentina and the Potato Introduction Station, Sturgeon Bay, USA.

Brazil: A team from North Carolina State University at Raleigh, USA, the National University of the Northeast Corrientes, Argentina, EMBRAPA, Brasilia, Brazil and CENARGEN, Campinas, Brazil, is exploring the Gran Pantanal, Mato Grosso in Brazil for groundnut germplasm. It also intends to visit and collect in the original locality where Arachis diogoi was collected, and to complete, at the Universidad Nacional del Nordeste in Corrientes, the naming of specimens previously collected. Collecting will continue during 1977 in Argentina, Bolivia, Brazil and Paraguay.



Fig. 2. Collecting land races of maize in Spain (see Mediterranean programme below)

#### DEVELOPMENT OF REGIONAL PROGRAMMES

Mediterranean: The IBPGR is developing a cooperative programme for the countries of the Mediterranean basin with the exception of those of Southwest Asia. This programme is based on the Germplasm Laboratory (CNR) at Bari, Italy, acting in cooperation with the FAO Crop Ecology and Genetic Resources Unit. The Germplasm Laboratory at Bari has good seed storage where material from other countries in the region can be deposited, but it is contemplated that eventually seed stores will also be established in other countries. In addition, Bari is providing facilities for short-term technical training not only for scientists from the region but also for students to gain field and genetic resources experience before they attend the M.Sc. course at the University of Birmingham (see page 18). Bari has an active programme of evaluation, and this will expand with the regional programme. As already noted, a team from Bari collected in Algeria and Tunisia in 1976, primarily wheat and barley, but also some other crops (see page 6), and a joint FAO/Bari mission visited Spain in October and November 1976 to collect land races of maize from the Galicia region.

Discussions have been held with Governments of the Mediterranean countries for the future development of this regional programme. Initially, emphasis is being placed on collection and by 1977 nationals from Algeria, Greece, Italy, Portugal, Spain and

Tunisia will be fully involved in collection work. The Mediterranean programme is the first regional programme sponsored by the Board to become operational; eventually up to 12 countries will be involved.

Europe: Since 1966 the European Association of Plant Breeders (EUCARPIA) has fostered the development of genebanks in the EUCARPIA countries. In recent years it has seemed logical to coordinate activities at Bari, Italy, and Braunschweig-Völkenrode, Federal Republic of Germany, with those of the Council of Mutual Economic Assistance (MEA) set up by the member nations of Eastern Europe in the Council for Mutual Economic Cooperation (COMECON). A regional programme contemplating such coordination has been developed by EUCARPIA for UNDP financing. The programme will commence operation in 1977, and will be carried out by FAO which also provides the Secretariat for the IBPGR. Thus, close links with the Board's Mediterranean and Southwest Asian programmes will be assured.

Southwest Asia: The Board has decided to set up a Genetic Resources Support Unit (GRSU), which will be operational in 1977, to assist the national programmes in the six countries which had previously participated in the Near East Regional Project (Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey). The GRSU will be based in Menemen, Turkey, with some staff members in Karaj, Iran. Staff members of the GRSU are expected to be appointed early in 1977.

Collecting missions were undertaken in 1976 under the auspices of the developing national programmes in six countries of the Southwest Asia region. An expedition to Northern Afghanistan in June yielded 82 samples of oil seeds and grain legumes. In addition, a joint expedition with ICRISAT is planned for later in the season to collect cereals and grain legumes also in the northern parts of Afghanistan. In Iraq, exploration is continuing in conjunction with the botanical survey of that country and preparation of a Flora of Iraq. The headquarters of the Iranian Plant Genetic Resources Unit is at the Seed and Plant Improvement Institute at Karaj. Staff of this Unit were involved, with a plant explorer from USSR, in the collection of wild and primitive populations of cereals, particularly wheat, and grain legumes. This expedition was to the mountainous regions of West and Northwest Iran. A germplasm collection mission in Pakistan was undertaken in May and June as part of the activities of the Pakistan national programme. Eight hundred samples of oil seed crops, especially safflower, and grain legumes, were collected from Sind, Baluchistan, Punjab and Northwest Frontier provinces. Wheat and grain legumes were collected in Syria from southwestern Syria and expeditions are planned to areas of northern Syria. The extensive Syria lentil collection was evaluated and screened, primarily for erect-growing genotypes.

A country-wide project for Turkey is now approved; the initial phase of which covers the five-year period until 1981. The survey, collection, evaluation and conservation of primitive local cultivars and their wild relatives is one of the purposes of this Turkish national project, based at the Aegean Regional Agricultural Research Institute at Menemen, near Izmir.

Southeast Asia: In December 1976, the IBPGR co-sponsored, with the Philippine Council for Agriculture and Resources Research (PCARR), a Working Group to formulate a regional genetic resources programme for Southeast Asia. Representatives of the Governments of Indonesia, Malaysia, Papua New Guinea, Philippines and Thailand participated.

A proposed organizational framework and plan of action for a cooperative regional programme were formulated and will be discussed by the Board at its meeting in February 1977.

South Asia: Plans have been discussed with the Government of India for a regional symposium to be held in 1977, to include all countries of the South Asia region (Bangladesh, India, Nepal and Sri Lanka). Because the region has a number of crops in common with the Southeast Asian region, developments in Southeast Asia will be taken into account in the South Asian programme. A similar pattern of a symposium followed by a working group at governmental level is being followed in both regions.

West Africa: The International Institute of Tropical Agriculture (IITA) has initiated a programme endorsed by the Board to collect indigenous root, tuber and leguminous crops, and West African rice, through its Germplasm Collection Unit (see page 5). IITA recognizes that it will be very difficult to collect and maintain a germplasm collection of roots and tubers in West Africa and ways of overcoming these difficulties are being investigated at IITA, especially in the case of yam. The Board has also sponsored the collection of sorghum and pearl millet from the Sahel (see page 6).

Ethiopia: The Board welcomes the bilateral agreement between the Federal Republic of Germany (FRG) and Ethiopia signed in 1976 providing FRG support for the new Plant Genetic Resources Center at Addis Ababa. The Board looks forward to receiving reports on the collection and storage activities of the new Ethiopian Center, which should be in full operation in 1977. Duplicates of stored material will, under the terms of the bilateral agreement, be sent to Braunschweig.

Meso-America: The Board similarly welcomes the bilateral agreement between FRG and the Government of Costa Rica, also signed in 1976, under which the FRG is helping to finance a Germplasm Bank at the Centro Agronomico Tropical de Investigación y Enseñanza (CATIE), Turrialba, Costa Rica. The Director took office in September. This new regional germplasm centre should also be in full operation in 1977.

## CROP SPECIFIC ACTIVITIES

### Germplasm Advisory Committees

In their forward planning in respect of some important crops, the Board is guided by Crop Advisory Committees which represent world-wide professional opinion on priorities for exploration and collection, on ways in which accessions should be described and on other aspects of genetic resources work. Additional specific Crop Advisory Committees will be established, if necessary, as the crop-specific dimension of the world-wide network of genetic resources centres is built up.

The Crop Advisory Committees have been set up to consider the following items:

- (1) to review the current state of the genetic resources collections and conservation facilities for the particular crop;
- (2) to indicate geographical regions in which there have not yet been adequate collections and which of these regions have the highest priorities for collection, particularly in view of the likelihood that genetic resources, if not collected, may soon be lost;

- (3) to identify the institutions best situated and equipped to undertake further collections and/or to conserve the genetic resources of the crop;
- (4) to identify the most important gaps in existing collections and to indicate the types and races that are not yet adequately represented in these collections;
- (5) to determine whether existing seed storage facilities for long-term conservation at various institutions are adequate, and to advise on what additional facilities may be necessary;
- (6) to advise on where and how base collections should be maintained and on the principles to be followed to ensure safe conservation of collections;
- (7) to advise on procedures for the regeneration and distribution of plant germplasm and its evaluation for future use;
- (8) to advise, in cooperation with the coordinating centre, if any, on the requirements of breeders and others so that they can be taken into account by the Board;
- (9) to advise on the effectiveness of procedures for the distribution and exchange of seed material and related genetic information for the benefit of plant breeders and on the usefulness of GR/CIDS for compiling genetic resources data;
- (10) to assess the future requirements for additional trained personnel to carry out the kind of genetic resources programmes which the Committee believes desirable; and
- (11) to advise on a minimum standardized list of descriptors.

The four Crop Advisory Committees established in 1975 (on maize, rice, wheat and sorghum and millets) met during the year. In addition, an IBPGR Committee on Phaseolus germplasm, co-sponsored by CIAT, was established and met in 1976. The membership of the IBPGR Crop Advisory Committees is shown in Appendix II.

Wheat: The Advisory Committee on Wheat Genetic Resources held its first meeting in Rome this year. It endorsed most of the priority regions recommended by the 1975 Leningrad Symposium, and has ranked the various wheat species in order of priority as follows: tetraploid; hexaploid; and diploid, including Aegilops. It has also identified a lack of wild species in existing collections. To remedy this it recommends that the regional networks should monitor areas rich in wild species so that when they come under threat, emergency collections can be made at short notice. A seminar on wild species is to be held in Turkey in 1977.

The Committee also stressed the need for greater international collaboration. It endorsed two recommendations of the 1975 Leningrad Symposium - that future plans for wheat collection should be communicated well in advance to the IBPGR Secretariat, and that the Secretariat should also be kept informed of seed exchanges and requests for material that have gone unanswered.

Proposed priority collections for 1977 and 1978 in Southwest Asia, Greece, the Mediterranean region, and the Indian subcontinent have been recommended and are in some cases now in the planning stage for 1977.

The Committee recommended that the list of collection descriptors and the list of collection record descriptors agreed upon at the Leningrad Symposium be adopted.

Many collections have not been evaluated sufficiently to be of use to plant breeders. To provide a model evaluation scheme, the Committee has recommended a pilot project in which material from three major 'world' collections will be evaluated during 1977-1978 at institutes throughout the world, using agreed standardized descriptors.

Rice: The Rice Advisory Committee held its first meeting at IRRI this year. It recommended the following allocation of responsibility for the storage and conservation of seed stocks:

- (1) IRRI should preserve and regenerate the indica and javanica varieties of Oryza sativa, and the other species of Oryza including for the time being those from Africa; IRRI should also store all conserved stocks of rice;
- (2) Japan should preserve and regenerate the japonica varieties;
- (3) The United States should preserve and regenerate the US varieties, those from the temperate zone of South America, and varieties from the Mediterranean area; the US should also continue to assist IRRI on the duplicate storage of conserved stocks; and
- (4) A centre or centres in West Africa (to be designated) should increase and regenerate varieties of O. glaberrima and wild species from Africa.

A review of existing collections identified an alarming lack of indigenous varieties of Oryza sativa and of wild species and weedy races of Oryza. Many varieties, including primitive ones from hill areas, high elevations, coastal areas, and deep water areas are completely missing from existing collections. Areas which should be explored in South-east and South Asia and West Africa, and the types of varieties that should be collected in each area, have been specified in some detail. In particular, collections should be made in north and northeast India, northern Burma, northern Thailand, and Yunnan Province of China, which comprise the Asian belt of genetic diversity in rice. Priority should also be given to the collection and conservation of minor cultivars in the undisturbed areas of tropical Asia and of the annual weed races and wild species. African rice should also be collected. <sup>1/</sup>

Maize: The first meeting of the Advisory Committee on Maize Genetic Resources was held at CIMMYT this year. The Committee identified the development of an up-to-date inventory of all material in existing collections and the highest priority. The GR/CIDS team at Boulder has now begun to prepare the data base for such an inventory. Holders of collections are to be asked to provide all available data including that on evaluation, and a list of standard descriptors will be circulated amongst interested workers inviting their comments on its value.

<sup>1/</sup> To implement this recommendation, a staff member with experience in rice has been appointed by IITA.

The preservation of collections already in store was given the next highest priority. Also, new collections to fill the existing gaps should be made urgently in western Peru, Santa Cruz Plains (Bolivia), Argentina and Spain. (As already noted, collections in Spain were started in 1976 as part of the Mediterranean regional programme. Provision will be made in the 1977 budget for the other proposed collections.)

Sorghum and millets: The first meeting of the Advisory Committee on Sorghum and Millets Germplasm was held at ICRISAT this year. Among the Committee's major recommendations were these:

Sorghum: The most urgent need for collection of sorghum in 1977 is in Mali and Niger in West Africa, and Sudan in East Africa. During 1977-1979 collections should also be made in Chad and the Central African Republic, Tanzania, Malawi and Somalia, and Botswana, Zambia and Mozambique (by 1979).

Pennisetum millets: Collections should be made in 1977 in Chad and Sudan. (The Sudan Government has been requested to undertake the desired collections in Sudan.)

The Committee also recommended that sorghum and millets should be taken into account in the Mediterranean regional programme. The Turkish and Syrian national programmes should also be asked to collect a representative number of sorghum accessions. Collections should also be made, if possible, in Thailand, Indonesia, the Indian tribal areas, Pakistan and the Yemen. A review of existing collections shows very weak representation of wild sorghum species. Recommendations on types of collections, descriptors, storage conditions, evaluation and quarantine were also made.

Phaseolus: The Advisory Committee on Phaseolus Genetic Resources held its first meeting at CIAT. The most important task, in the view of the Committee, is to determine the gaps in existing collections. After evaluation of the deficiencies, the Committee believes that the future emphasis in collections should be on P. vulgaris and P. coccineus in the highlands and lowlands of Peru and Mexico, and P. vulgaris in Turkey and the Iberian peninsula; P. lunatus in Peru and Brazil and also possibly in Guatemala and the Caribbean Islands; P. aborigineus in Argentina, Honduras, Peru and the Galapagos Islands; and P. acutifolius in northern Mexico and Arizona. However, in the view of the Committee, the collection of this germplasm is not a matter of urgency. The Committee also recommended a standard minimum list of descriptors to be used by all centres wishing to contribute to the international network of Phaseolus holdings.

#### OTHER WORK ON SPECIFIC CROPS

Various crops require further study in order to determine priorities for their collection.

- (1) Coconuts: A Working Group was held in Jamaica in April 1976 co-sponsored by the IBPGR and the Coconut Industry Board. Its report will be considered by the IBPGR at its meeting in February 1977.

- (2) Tropical fruits: The Board considered the need for a study and survey of the germplasm of the most important tropical fruits, but decided that relevant information would emerge from regional programmes.
- (3) Vegetables: A survey on the use, geographical distribution and genetic resources of vegetables, especially tropical vegetables, has been undertaken by the Royal Tropical Institute, the Netherlands, and the results are available.
- (4) Forest species: The IBPGR considered the question of forest genetic resources at its Board meeting in 1976, and although in principle it supported two modest proposals submitted by the FAO Panel of Experts on Forest Gene Resources, the Board has asked the Technical Advisory Committee (TAC) of the CGIAR to advise it how far it should go in this field. Meetings on this subject will take place in 1977.

## STORAGE AND CONSERVATION

### Designation of base collections

If collected germplasm is to be both used and conserved, different types of collections must be held at genetic resources centres. The Board has accepted the FAO definitions of various types of collection as follows:

- Base collections are kept for long-term conservation and not for distribution. The number of individual samples should be large enough to represent the original population variability. Base collections should, for safety, be replicated in more than one institution;
- Active collections are kept for medium-term storage, regeneration, evaluation and distribution;
- Working collections held by plant breeders are outside the framework of the conservation system except as far as they provide information on the performance of various cultivars.

To provide a framework for the crop-specific dimension of the global network, the IBPGR has proposed that particular international and regional institutions be designated the holders of 'world' base collections in some important crops. Such proposed 'world' base collections in no way assume that base collections will not also be held elsewhere. Those Centres invited in 1976 to accept responsibility for holding base collections and which have accepted or are still so considering, are:

### Rice

Oryza sativa - indica  
javanica  
japonica

IRRI, Philippines  
IRRI, Philippines  
National Institute of Agricultural Sciences,  
Japan

Rice (continued)

Mediterranean forms, temperate S. American and intermediate types from the USA	National Seed Storage Laboratory (NSSL), Fort Collins, USA
Wild species	IRRI, Philippines

Wheat

Cultivated species	N. I. Vavilov Institute of Plant Industry, USSR; CNR, Germplasm Laboratory, Bari, Italy; NSSL, Fort Collins, USA (each institute's collection duplicated at one of the others.)
Wild species of <u>Triticum</u> and <u>Aegilops</u>	Plant Germplasm Institute (University of Kyoto), Japan (duplicated in one of the above institutes)

Sorghum

Cultivated and wild	NSSL, Fort Collins, USA
---------------------	-------------------------

Millets

Cultivated and wild <u>Pennisetum</u> spp. (pearl millets)	NSSL, Fort Collins, USA; Canadian Genebank, Ottawa, Canada
<u>Eleusine</u> spp.	ICRISAT, Hyderabad, India
Minor Indian millets	Indian Council for Agricultural Research, New Delhi, India
<u>Eragrostis</u> spp.	Plant Genetic Resources Center, Addis Ababa, Ethiopia
<u>Panicum miliaceum</u>	ICRISAT, Hyderabad, India
<u>Setaria italica</u>	ICRISAT, Hyderabad, India

Phaseolus (New World)

All species but emphasis on <u>P. vulgaris</u> , <u>P. coccineus</u> , <u>P. lunatus</u> and <u>P.</u> <u>acutifolius</u>	CIAT, Cali, Colombia
--	----------------------

Seed storage: standards and construction

The Board convened a Working Group in 1976 to provide recommendations on the design, engineering and cost aspects of long-term seed storage facilities. The Report of the Working Group, which was approved by the IBPGR, will be available in 1977. A summary of major recommendations can be found in Appendix III.

A number of institutions already maintain base collections, and the IBPGR, with the help of FAO, will continue to review their seed storage conditions to see whether they meet the standards recommended.

INFORMATION

Genetic Resources Communication, Information and Documentation System (GR/CIDS) of the Information Sciences/Genetic Resources Program (IS/GR)

Information about crop genetic resources is both generated and required at every stage in the processes of exploration, collection, conservation, evaluation, documentation and utilization. Unfortunately, in the past, exploration and collection work often provided insufficient field information and incomplete documentation for effective use of the collections, and samples in the collections were often cursorily evaluated for characteristics of current importance and then set on one side or even abandoned. Even where the collections have been maintained, the data about accessions are all too often confused or inaccurate. Consequently, valuable scientific information is either not available or cannot be used for breeding or research, and as a result, a good deal of the cost of making and maintaining the collections has been wasted. Collections are only as good as the use that can be made of them, and without information they can hardly be used at all.

Different collections of the same species have been made by different people and for different purposes, and so they have been described in dissimilar ways. Only to the extent that the information about their contents can be systematically arranged and communicated, can collections be useful to workers other than those who have assembled them. The Board recognizes that, as crop research, and particularly crop improvement, become increasingly international, an internationally-accepted system for the description and documentation of genetic resources, and for the management and communication of the information, becomes increasingly essential.

A further difficulty arises from the sheer volume of the information. Such volumes of information are far too large to be handled in practice by manual procedures, and this has naturally led to the development of computer procedures for storing and classifying the data. An internationally-accepted system to collect, record, classify, analyse and communicate information about accessions, and to correct it and keep it up-to-date, is therefore essential for an active world-wide genetic resources network. Accordingly, the Board has continued to support the development of such a computer-based system at the University of Colorado at Boulder.

At its third meeting, 17-20 February 1976, the International Board for Plant Genetic Resources approved the membership and terms of reference, proposed by its Executive Committee, of an Advisory Committee on GR/CIDS. The members appointed by the Board to the Advisory Committee are given in Appendix II.

The first meeting of the Advisory Committee was held at the University of Colorado, Boulder, 12-15 April 1976. The Committee recommended that the IS/GR Program should:

- (a) seek to promote the use of EXIR (Executive Information Retrieval) in as many centres as possible;
- (b) prepare a general account of EXIR, directed to non-technical readers, so that this may be circulated widely (see Appendix IV);
- (c) complete and publish the existing draft EXIR users' manual, edited to ensure that the inexperienced can readily understand it (see Appendix IV); and
- (d) prepare a technical account of EXIR and of EXIS (Executive Information System) also in due course, intended for systems programmers, and make this available.

The Advisory Committee felt that it would be appropriate for the team itself to assemble and organize the information about the accessions in the collections of Centres, in cases where the work would also benefit the IS/GR Program and the Board. In some cases at least, the cost should be borne or shared by the users. The GR/CIDS team will build up a world-wide collection of duplicate information about collections, and provide training courses and other assistance in the use of the EXIR System.

#### Other information services

In 1976 the Board provided support for the establishment of a computerized Arachis Information Service based at the Institute of Food and Agricultural Sciences, University of Florida, Gainesville. The Service was recommended by the 1975 Workshop on Germplasm Resources and Genotype Evaluation in Peanuts. It is envisaged that most of this work will be taken over by ICRISAT in the future, since ICRISAT will have prime responsibility for Arachis in the IBPGR network.

#### TRAINING

As a result of support by the IBPGR to increase the number of staff at the International Course in Conservation and Utilisation of Plant Genetic Resources in the Department of Plant Biology (formerly the Department of Botany) at Birmingham University, UK, the University agreed to accept for training up to ten extra students each year from the developing countries. During the 1975/76 academic year, students attended from the following developing countries: Afghanistan (1); Egypt (1); Indonesia (2); Iraq (1); Malaysia (1); Pakistan (1); Poland (1); Sri Lanka (1); and Syria (1).

In addition, the expansion has allowed better coverage of plant breeding in the course. A new laboratory and a lecture room have been made available by the University especially for the training course and a grant for complete re-furnishing was also provided from University funds.

Most of the overseas students have returned to their own countries, but some are undergoing further training at genetic resources centres. It is of interest to note that graduates from this course participated in 1976 in the germplasm programmes of IITA, CIP and IRRI as well as many national and regional programmes, and in the collecting missions reported above in North Africa, Nigeria and Spain.

The Board notes that the National Biological Institute of Indonesia is to establish a bilateral link with the University of Birmingham with emphasis on training, particularly short field training courses, and that IITA will also provide a six-week practical training course for African students enrolled for the Birmingham M. Sc. course.

#### PUBLICATIONS

A current list of IBPGR publications is shown in Appendix IV. The Bibliography of Plant Genetic Resources, commissioned in 1975, was published in March 1976 and due to the favourable response it has received, a short supplement has been issued. The Secretariat has continued to build up its mailing list and documents are now sent to 92 countries.

Background, non-technical information on plant genetic resources can be found in the Brochure published by the IBPGR, 'Conservation of Crop Genetic Resources', obtainable free from the Secretariat, and in an illustrated filmstrip 'Genetic Conservation' obtainable in English, French and Spanish at a cost of \$5.00 from FAO, Rome.

#### PLANT HEALTH AND QUARANTINE

There is an increasing need to accelerate the collection and utilization of plant genetic resources and this requires increased international transfer of plant materials which creates the danger of serious pests and diseases being introduced into countries where they are not present. The Board therefore sponsored a group of international experts, first to assemble information on pests and disease risks in international germplasm transfer, and second, to make recommendations on the solutions that this problem poses.

As a result, an FAO/IBPGR Task Force on the Safe Transfer of Genetic Material met in December 1975. This Task Force recommended that in addition to currently established phytosanitary requirements, a new standard applicable only to germplasm transfers could be established to ensure safe and accelerated transfer. This subject was discussed at the Government Consultation on the International Plant Protection Convention which met in Rome in November 1976.

In addition, a treatise on 'Plant Health and Quarantine in International Transfer of Genetic Resources' was prepared for publication in 1977. The specific pest and disease problems for seventeen crops or groups of crops are included in this treatise together with the latest information on quarantine principles, phytosanitary measures and methodologies. Consideration was given on the one hand to the crops and regions assigned priorities by IBPGR and, on the other, to the importance of the risk due to pathogens or pests and the geographical distribution of 'risk areas'.

#### MEMBERSHIP OF THE BOARD

The terms of office of four Board members, Messrs. Creech, Kugler, Roberts and Tayşi, expired at the end of 1976. The Board recommended and the Consultative Group re-elected all four members, the first three to serve for a full three-year term and Prof. Tayşi to serve for a one-year term or until such earlier date as the Board's programme in Southwest Asia becomes fully operational. Elected members of the IBPGR serve in their personal capacities irrespective of their professional or official affiliation. In some cases members report to donors. Nevertheless the Board has agreed that a donor not represented may send an observer especially if such an observer has a professional interest in the work of the IBPGR.

FINANCE

The Board gratefully acknowledges the following pledges for its 1976 programme:

Belgium	B. F.	2,000,000
Canada	Can. \$	100,000
Germany, Fed. Rep. of	D. M.	100,000
Netherlands	U. S. \$	125,000
Norway	N. Kr.	400,000
Saudi Arabia	U. S. \$	10,000
Sweden	S. Kr.	400,000
UK	£ Stg.	30,000
UNEP	U. S. \$	100,000
USA	U. S. \$	200,000

A statement of account for the year 1976 is shown in Appendix V.

MEMBERSHIP LIST

Chairman:

Mr. R. H. Demuth <sup>1/</sup>  
Partner  
Surrey, Karasik and Morse  
1156 -15th Street, N. W.  
Washington, D. C. 20005  
USA

Members:

Dr. F. Albani <sup>1/</sup>  
Director  
Plant Production and Protection Division  
FAO  
Via delle Terme di Caracalla  
00100 Rome, Italy  
(Ex officio member, representing FAO)

Mr. P. Bouvarel  
Inspector General of Agricultural  
Research  
Chief of Department of Forestry Research  
Centre National de Recherches  
Forestières  
Champenoux  
54370 Einville, France

Acad. D. D. Brezhnev  
Director  
N. I. Vavilov Institute of Plant Industry  
44 Herzen Street  
190000 Leningrad, USSR

Prof. A. H. Bunting <sup>1/</sup>  
Professor of Agricultural Development  
Overseas  
Plant Science Laboratories  
University of Reading  
Whiteknights  
Reading RG6 2AS, UK

Dr. J. L. Creech  
Director  
U. S. National Arboretum  
Washington, D. C. 20002  
USA

Dr. G. de Bakker <sup>1/</sup> (Vice Chairman)  
Permanent Representative of the  
Netherlands to FAO and WFP  
Permanent Mission of the Kingdom of the  
Netherlands to FAO and WFP  
Via Australia 2  
00144 Rome, Italy

Prof. Dr. G. Fischbeck  
Technische Universität München  
Lehrstuhl für Pflanzenbau und  
Pflanzenzüchtung  
8050 Freising-Weihenstephan  
Federal Republic of Germany

Dr. A. B. Joshi <sup>1/</sup>  
Vice-Chancellor  
Mahatma Phule Agricultural University  
Rahuri, Ahmednagar  
Maharashtra, India

APPENDIX I  
(continued)

Members (continued):

Prof. L. Kåhre  
Director  
Swedish State Seed Testing  
Institute  
S-171 73 Solna, Sweden

Dr. W. F. Kugler <sup>1/</sup>  
Project Manager  
UNDP/FAO Project on Increase and  
Development of Wheat Production  
C. P. 351  
99.100 Passo Fundo  
Rio Grande do Sul, Brazil

Dr. B.N. Majisu  
Director  
East African Agriculture and  
Forestry Research Organization  
P. O. Box 30148  
Nairobi, Kenya

Dr. L.M. Roberts  
Director  
Agricultural Sciences  
Regional Office for Central America  
The Rockefeller Foundation  
5a Avenida 12-31, Zona 9  
Guatemala City, Guatemala

Dr. Setijati Sastrapradja  
Director  
National Biological Institute  
P. O. Box 110  
Bogor, Indonesia

Prof. V. Tayşi  
Department of Agroecology and  
General Plant Breeding  
Ege University  
Izmir, Turkey

Secretariat:

Crop Ecology and Genetic Resources Unit  
Plant Production and Protection Division  
FAO, Rome, Italy

Secretary: Mr. R.J. Pichel  
Chief, Crop Ecology and  
Genetic Resources Unit  
Plant Production and  
Protection Division

Dr. J. T. Williams  
Genetic Resources Officer  
(Technical Assistance)

Mr. J. T. Sykes  
Plant Introduction Officer

Mrs. A. L. Zaniboni  
IBPGR Programme Assistant

Mrs. H. M. Vano  
Secretary

APPENDIX II

MEMBERSHIP OF ADVISORY COMMITTEES IN 1976

A. ADVISORY COMMITTEE ON THE GENETIC RESOURCES COMMUNICATION,  
INFORMATION AND DOCUMENTATION SYSTEM (GR/CIDS)

Chairman:

Bunting, Dr. A.H. , Professor of Agricultural Development Overseas, Plant Science  
Laboratories, University of Reading, Whiteknights, Reading RG6 2AS, UK

Members:

Branscomb, Dr. L.M. , Vice President and Chief Scientist, IBM Corporation, Armonk,  
New York 10504, USA

Finlay, Dr. K.W. , Deputy Director General, CIMMYT, Apartado Postal 6-641,  
Londres 40, Mexico, D. F. , Mexico

Fyfe, Mr. J.L. , (formerly Deputy Director, Scottish Plant Breeding Station),  
Thornielee Cottages, Clovenfords, Selkirkshire TD1 3LN, Scotland, UK

Salhuana, Dr. W. , Programa Cooperativo de Investigaciones en Maiz, Universidad  
Agraria, Apartado 456, Lima, Peru

B. CROP GERMPLOSM ADVISORY COMMITTEES

MAIZE

Chairman:

Brown, Dr. W.L. , President, Pioneer Hi-Bred International, Inc. , 1206 Mulberry  
Street, Des Moines, Iowa 50308, USA

Members:

Brandolini, Dr. A. , Via Mazzini 30, Bergamo, Italy

Jinahyom, Dr. Sujin, Department of Plant Science, Kasetsart University, Bangkok,  
Thailand

Ogada, Dr. F. , Director, National Agricultural Research Station, P. O. Box 450,  
Kitale, Kenya

Scheuch, H. , Dr. F. , Programa de Maiz, Universidad Agraria la Molina, Apartado 456,  
Lima, Peru

APPENDIX II  
(continued)

MAIZE (continued)

Sprague, Dr. E. W. . CIMMYT, Apartado Postal 6-641, Londres 40, Mexico, D. F. ,  
Mexico

Trifunović, Dr. V. , Director, Maize Research Institute (Institute Za Kukuruz), P. O.  
Box 89, 11081 Beograd-Zemun, Yugoslavia

PHASEOLUS

Chairman:

Evans, Dr. Alice M. , Department of Applied Biology, University of Cambridge, Pembroke  
Street, Cambridge CB2 3DX, UK

Members:

Bannerot, Dr. H. , Station de Génétique et d'Amélioration des Plantes, Centre National  
de Recherches Agronomiques, Etoile de Choisy, Route de St. Cyr, 78000  
Versailles (Yvelines), France

Hudson, Dr. L. W. , Regional Plant Introduction Station, Washington State University,  
Pullman, Washington 99163, USA

le Marchand, Dr. G. , Faculte des Sciences Agronomiques de L'Etat a Gembloux, 5800  
Gembloux, Belgium

Reimann-Philipp, Prof. Dr. R. , Federal Research Institute for Horticultural Plant  
Breeding, 207 Ahrensburg/Holst, Bornkampsweg, Federal Republic of  
Germany

Vieira, Dr. C. , Departamento de Fitotecnia, Escola Superior de Agricultura,  
Universidade Federal de Vicosa, 36570 Vicosa, Minas Gerais, Brazil

Winters, Dr. H. F. , Research Horticulturist, Germplasm Resources Laboratory,  
USDA, Beltsville, Maryland 20705, USA

APPENDIX II  
(continued)

RICE

Chairman:

Chang, Dr. T. T. , IRRI, P. O. Box 933, Manila, Philippines

Members:

Adair, Dr. C. R. , 10600 Greenacres Drive, Silver Spring, Maryland 20903, USA

Hayashi, Dr. K. , National Institute of Agricultural Sciences, Division of Genetics, 1-24 Ohara, Hiratsuka, Kanagawa, Japan

Roberts, Prof. E. H. , Department of Agriculture and Horticulture, University of Reading, Earley Gate, Reading RG6 2AT, UK

Sharma, Dr. S. D. , International Institute of Tropical Agriculture (IITA), P. M. B. 5320, Ibadan, Nigeria

Shastri, Dr. S. V. S. , Plant Production and Protection Division, FAO, Rome, Italy

Siwi, Dr. B. H. , Central Research Institute for Agriculture (LPPP), Department of Agriculture, Jalan Merdeka 99, Bogor, Indonesia

Will, Dr. H. , Research Coordinator, West Africa Rice Development Association (WARDA), P. O. Box 1019, Monrovia, Liberia

SORGHUM AND MILLETS

Chairman:

Harlan, Prof. J. R. , Plant Genetics, Crop Evolution Laboratory, University of Illinois, Urbana, Illinois 61801, USA

Members:

Bilquez, Prof. A. -F. , Technical Advisor, Délégué Général à la Recherche Scientifique et Technique du Sénégal, Bambey, Senegal

Doggett, Dr. H. , c/o International Development Research Centre (IDRC), P. O. Box 30677, Nairobi, Kenya

Gebrekidan, Dr. B. , Leader, Ethiopian Sorghum Improvement Programme, P. O. Box 138, Dire Dawa, Ethiopia

Kambal, Prof. Ali E. , Head, Department of Agricultural Botany, University of Khartoum, Faculty of Agriculture, Shambat, Democratic Republic of Sudan

APPENDIX II  
(continued)

SORGHUM AND MILLETS (continued)

Murty, Dr. B.R. , Project Director, Nuclear Research Laboratory, Indian Agricultural Research Institute, New Delhi 110 012, India

Sotomayor R. , Dr. A. , Research Geneticist, USDA, Agricultural Research Service, Southern Region, Mayaguez Institute of Tropical Agriculture, Box 70, Mayaguez, Puerto Rico, USA

WHEAT

Chairman:

Hondelmann, Prof. Dr. W. , Director, Genebank, Institut Pflanzenbau FAL, Bundesallee 50, 33 Braunschweig-Völkenrode, Federal Republic of Germany

Members:

Anderson, Dr. R.G. , CIMMYT, Apartado Postal 6-641, Londres 40, Mexico, D. F. , Mexico

Craddock, Dr. J.C. , Small Grains Collection, USDA, Agricultural Research Center-West, Beltsville, Maryland 20705, USA

Dorofeev, Dr. V.F. , Head, Department of Wheat, N.I. Vavilov All-Union Institute of Plant Industry, 44 Herzen Street, 190000 Leningrad, USSR

Porceddu, Prof. E. , Director, Laboratorio del Germoplasma, Via G. Amendola 165/A, 70126 Bari, Italy

Rao, Dr. M.V. , Project Coordinator, All-India Coordinated Wheat Improvement Project, Cummings Laboratory, Indian Agricultural Research Institute, New Delhi 110 012, India

Yamashita, Prof. K. , Kihara Institute for Biological Research, Yata-Ohara, Misima, Sizuoka-ken 411, Japan

APPENDIX III

MAIN RECOMMENDATIONS AND CONCLUSIONS OF THE  
IBPGR WORKING GROUP ON ENGINEERING, DESIGN  
AND COST ASPECTS OF LONG-TERM SEED STORAGE FACILITIES <sup>1/</sup>

- (1) The recommendations apply to the storage of orthodox seeds.
- (2) Acquisitions should be stored in sealed containers at about 5% moisture content in a cold room held at -20°C. The temperature could be relaxed to -10°C in special cases.
- (3) Suitable alternative sealed containers, with certain reservations, include glass jars, cans and laminated foil packets.
- (4) In general there is no need for special provision to control the relative humidity in cold storage rooms.
- (5) Seed drying needs to be carefully controlled; several alternative systems would be satisfactory.
- (6) Moisture determinations and periodic routine germination tests should be based on International Seed Testing Association (ISTA) rules, with certain modifications in order to minimize the amount of seed used for these purposes.
- (7) Ideal sizes for individual accessions will depend not only on the requirements for routine testing but mainly on the genetic heterogeneity of the accessions. In base collections the ideal is likely to be within the range 3,000-12,000 seeds.
- (8) Careful consideration needs to be given to the siting of a cold storage facility.
- (9) Prefabricated panel construction of the cold room is recommended. The entrance door should be heated and an air lock provided. Precautions should be taken to prevent frost heave in the floor.
- (10) The use of mobile shelving to house the accessions in the cold store is economic and considered desirable.
- (11) Refrigeration should be carried out using direct or indirect vapour compression systems, using conventional refrigerants and air-cooled condensers. There should be adequate recirculation of the chilled air within the store (5-10 changes/hour).
- (12) Safety precautions which should be adopted include the provision of two refrigeration units and a standby generator, incorporation of various visible and audible warning devices should the refrigeration plant fail, and devices to ensure that nobody is accidentally locked in the store. Additional precautions should be taken where earth tremors are common.

<sup>1/</sup> The full report is available from the IBPGR Secretariat

APPENDIX III  
(continued)

- (13) It is recommended that specifications of cold rooms should be based on American Society of Heating and Refrigeration Engineers (ASHRE) standards.
- (14) Ancillary rooms and equipment need to be provided for the operation of a long-term seed storage facility. Provision is required for seed drying, cleaning, testing and packaging, and for records and services.
- (15) It is judged that the requirements of many banks will be met by cold rooms within the range 85-200 m<sup>3</sup> (approximately 22,000-60,000 acquisitions), although this report has covered the range up to approximately 280 m<sup>3</sup> (90,000 acquisitions) to allow for special circumstances.
- (16) The capital cost of cold storage rooms, including shelving, is likely to vary according to the size of the store from \$0.80 to \$1.20 per acquisition stored. The capital cost of providing a complete seed storage bank, with minimum satisfactory ancillary facilities, is likely to vary from \$1.89 to \$10.74 per acquisition, according to the size and location of the bank.

IBPGR PUBLICATIONS

1. Available on request from the Secretariat in Rome:
  - Report of first meeting IBPGR, Rome, 5-7 June 1974
  - Annual Report 1974 (1975)
  - The Conservation of Crop Genetic Resources, edited by Eleanor Lawrence (1975)
  - A Bibliography of Plant Genetic Resources by J. G. Hawkes, J. T. Williams and Jean Hanson (1976)
  - Priorities among Crops and Regions (1976)
  - Annual Report 1975 (1976)
  - Report of a Working Group on Engineering, Design and Cost Aspects of Long-Term Seed Storage Facilities (1977)
  - A Bibliography of Plant Genetic Resources: Supplement by J. T. Williams (1977)
  
2. Available from the National Biological Institute, Bogor, Indonesia: (This publication was partly sponsored by the IBPGR.)
  - Plant Genetic Resources of South East Asia, edited by J. T. Williams, C.H. Lamoureux and N. Soetjipto (1976)
  
3. 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.)
  - Wheat Genetic Resources: Proceedings of an International Symposium held 14-22 July 1975 (1976)
  
4. Available from the IS/GR Program, 1229 University Avenue, University of Colorado at Boulder, Colorado 80309, USA:
  - Annual Report 1976 of the Information Sciences/Genetic Resources Program
  - EXIR Users' Manual (1976)
  - EXIR (an information brochure): also available from the IBPGR Secretariat (1976)
  - Data Organization Manual by A. L. Shafton (1976)

APPENDIX V

STATEMENT OF ACCOUNT AS AT 31 DECEMBER 1976  
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1976		182,053.82
Various donors	679,535.44	
Interest credited	<u>4,875.46</u>	<u>684,410.90</u>
		866,464.72

Cash Expenditure 1976

Personnel Services	69,674.27	
Official Duty Travel	151,977.87	
Contractual Services	659,248.44	
General Operating Expenses	11,083.19	
Supplies and Materials	6,451.42	
Furniture and Equipment	<u>14,569.40</u>	
Project Servicing Costs 14% on \$13,057.62 under TF 9202.00 only	913,004.59	
	<u>1,828.06</u>	<u>914,832.65</u>

Balance as at 31 December 1976 (48,367.93)