



# NEWSLETTER

## FOR ASIA, THE PACIFIC AND OCEANIA

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### About the Newsletter

The International Plant Genetic Resources Institute (IPGRI) is one of the 16 Centres of the Consultative Group on International Agricultural Research (CGIAR) with its Headquarters at Rome, Italy. IPGRI's mission is to encourage, support and undertake activities to improve the management of genetic resources worldwide so as to help eradicate poverty, increase food security and protect the environment. IPGRI focuses on the conservation and use of genetic resources important to developing countries and has an explicit commitment to specific crops. IPGRI works in partnership with other organizations, undertakes research and training, and provides scientific and technical advice and information. IPGRI operates in five geographical areas: Sub-Saharan Africa (SSA), the Americas, Europe, Central and West Asia and North Africa (CWINA), and Asia, the Pacific and Oceania (APO). APO Regional Office is based in Serdang, Malaysia with sub-regional offices for East Asia and South Asia located in Beijing, China and New Delhi, India, respectively. There is also an outposted staff in Pokhara, Nepal.

The APO Newsletter is produced thrice a year and is mainly aimed at promoting the overall concern on plant genetic resources, with emphasis on their conservation and use. [Contd. on page 2]

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### Editorial

## Science and Technology for Managing Plant Genetic Resources - IPGRI's Initiatives

Plant diversity is vital to the development and welfare of human society. Plant Genetic Resources (PGR) contribute enormously towards achieving global objectives of food security, poverty alleviation, environmental protection and sustainable development. IPGRI, since its inception, has laid priority to meet these needs through its concerted efforts which focused on the conservation and use of plant genetic resources, in eight strategic areas of work namely: strengthening national systems/programmes, promoting regional, crop and thematic networks, improving conservation strategies and technologies, increasing the use of plant genetic resources, managing and communicating information, addressing socio-economic and policy issues, conserving and using specific crops and conserving and using forest genetic resources.

There has been a very rapid progress in the science of plant genetic resources, particularly in the past two decades. To keep pace with these achievements, IPGRI considered it appropriate to review the state of technology developments in conservation and management of PGR. The International Conference on Science and Technology for Managing Plant Genetic Resources in the 21<sup>st</sup> Century (SAT 21) provided a platform to discuss

the major scientific challenges and work out suitable strategies to develop a global perspective or vision for the sustainable management of genetic resources in the 21<sup>st</sup> century.

The conference was organized by the International Plant Genetic Resources Institute (IPGRI) and the Malaysian Palm Oil Board (MPOB) at K.L. Hilton International, Kuala Lumpur, Malaysia from 12-16 June 2000. It was sponsored by the Food and Agriculture Organization (FAO), the Canadian International Development Agency (CIDA), the German Federal Ministry for Economic Cooperation and Development (BMZ), the Forest Research Institute of Malaysia (FRIM), the Malaysian Agricultural Research and Development Institute (MARDI), the Universiti Putra Malaysia (UPM), the Technical Centre for Agricultural and Rural Cooperation (CTA), the Australian Agency for International Development (AusAID), and the US Agency for International Development (USAID).

The conference was attended by 231 participants from 63 countries. Over 60% of the participants were from developing countries and over 20% were women. The region-wise break up of participants was: 116 from Asia, the Pacific and Oceania, 13 from Central and West Asia

and North Africa, 17 from Sub-Saharan Africa, 64 from Europe, 11 from Latin America and 10 from North America. Forty IPGRI staff, together with three IPGRI Board members participated. Five former Board members also attended. Participating scientists gave keynote speeches and made oral and poster presentations.

The programme commenced with the opening ceremony which included short welcome speeches by Drs Marcio de Miranda Santos, Geoff Hawtin and Mahmud Duwayri, with the conference officially opened by Dato' Haji Zainal Bin Dahalan, Deputy Minister, Ministry of Science, Technology and Environment (MOSTE), Malaysia. The speakers highlighted the global need to safeguard biodiversity and stressed on the conservation, use and sustainable management of PGR.

Three keynote addresses were delivered by Drs G.T. Scarascia-Mugnozza (Italy), J. Peacock (Australia) and M.S. Swaminathan (India). These set the scene for the conference by looking at the history of conservation and use of plant genetic resources, the future impact of frontier science, and the contribution of farmers to the management of plant genetic diversity over time. Forty three papers were presented covering a broad range of topics, distributed over 11 thematic sessions, viz., the application of genomic sciences for a better understanding of genepools, technologies and strategies for *ex situ* conservation, development and management of genetic diversity in agro-ecosystems, role of bioinformatics in conservation and use, exploring underused species - diverse options, *in situ* conservation of wild species, germplasm enhancement and prebreeding, indicators for sustainable management of genetic resources, implications of gene transformation techniques for *ex situ* conservation choices, GIS application for genetic resources management and the economics of managing genetic resources and the role of private and public sectors. In addition, approximately 250 posters were presented in different

sessions. Abstracts of the papers and posters were produced as a booklet and distributed to all participants.

The conference also deliberated on key issues relating to the application of plant genetic resources in development by organizing evening sessions. One of these entitled, "Contribution of plant genetic resources to the alleviation of poverty" was moderated by Dr Setijati D. Sastrapradja (Indonesia); the other focussing on policy, entitled "Perspectives on the renegotiation of the FAO Undertaking and the proposed multilateral system for access and benefit sharing", was moderated by Dr Mahmud Duwayri (FAO).

The Conference dinner, which was sponsored by the Ministry of Science, Technology and Environment, Malaysia, was highlighted by the speech of Professor Jack Hawkes (University of Birmingham, UK) who was also presented with a certificate by Marcio de Miranda Santos and Geoff Hawtin, in recognition of his pioneering and outstanding role in the global system to the conservation and use of plant genetic resources for over six decades.

During the week, technical visits were arranged to relevant agencies in Malaysia in which approximately 200 delegates participated.

The closing session included a general summary by Dr Geoff Hawtin, who gave an overview of the conference including follow-up actions. Four of the Session Chairs, namely, Drs Brad Fraleigh, Nigel Maxted, Marleni Ramirez and Eva Thörn, summarized the eleven themes and Dr Geoff Hawtin focused on the concerns highlighted by participants for follow-up on global vision of SAT21.

There were important recommendations, generated during SAT 21, one of which is to pursue the possibility of creating an international society or other mechanisms for continuing the momentum generated by the meeting.

An opening day press conference highlights and three press releases were issued. Journalists from the New Scientist and Diversity magazine, as well

as some local Malaysian journalists, attended the conference. A two-page feature in the New Scientist was devoted to the conference; the relevant issue of Diversity will be published later in 2000. Displays on the activities of IPGRI, the CGIAR System-wide Genetic Resources Programme and MPOB were displayed outside the Conference Hall. Also, publications of IPGRI and SGRP were distributed and a special poster prepared for the conference.

From the feedback received, both from participants during the conference, as well as from messages received afterwards, the conference was a considerable success, yielding great benefit to the scientific community worldwide. While gatherings of a more political or policy-oriented nature had taken place over the past 25 years, there had been no international conference devoted exclusively to scientific and technological issues relating to plant genetic resources. Therefore, the conference filled a very important gap. It was felt that international collaboration in conservation and use of genetic resources has been greatly strengthened through the opportunities for exchange of information and know-how, and for networking [From materials of SAT 21 Report For BOT 16; Percy E. Sajise, Bhag Mal and V. Ramanatha Rao. IPGRI-APO, Serdang, Malaysia and New Delhi, India].

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*Contd. from page 1*

It provides information on plant genetic resources activities carried out by national programmes and other centres in the region. Information is also periodically abstracted from recent literature (books, periodicals, etc.), and brief research contributions published. With over 2500 addressees on its mailing list, the APO newsletter is widely distributed to focus on IPGRI's mandate to advance the conservation and use of plant genetic resources for the benefit of present and future generations.

## Headquarters

### Future Harvest Global Conservation Trust Meeting

A meeting of the Future Harvest Global Conservation Trust was organized on 2-3 August 2000 at IPGRI, Rome, Italy to explore the possibility of undertaking a fund raising campaign to support plant genetic resources collections around the world, including those in the Future Harvest Centres. The Director of Future Harvest, several IPGRI staff members, fund raising experts from Europe, Canada and the USA, and representatives from FAO participated in the meeting. An important outcome of the two-day meeting was the realization that a great deal more thought as well as research is needed before it is decided to launch a very considerable campaign. The fund raising consultants provided briefings on endowment campaigns and effective strategies for raising funds from the wealthy-through-tax advantage strategies. The experts reflected that the case to support plant genetic resources collections around the world was marketable, but that the message would have to be tested more broadly to gain a better read of potential.

The vision for the project is the achievement of a rational and sustainable global genetic resources system, as called for in the Global Plan of Action for plant genetic resources. To attain this, the vision will require a number of steps, some of which can occur simultaneously. These steps, all of which need funding, would essentially constitute the components of a major campaign. They include:

- Bringing all the genetic resources collections of the Future Harvest Centres to target standards of operation, as described in the upgrading plan developed by the System-wide Genetic Resources Programme (SGRP)
- Ensuring long-term sustainable



### International Plant Genetic Resources Institute Vavilov-Frankel Fellowships 2001

IPGRI has established the Vavilov-Frankel Fellowship Fund to commemorate the unique contributions to plant science by Academician Nikolai Ivanovich Vavilov and Sir Otto Frankel.

The Fund aims to encourage the conservation and use of plant genetic resources in developing countries through awarding Fellowships to outstanding young researchers.

The Fellowships will enable the applicants to carry out relevant, innovative research outside their own country for a period of three months to one year. The research should have a clear benefit to the home country, preferably in areas of the applicant's future research. Awards can be held concurrently with other sources of support.

In 2001, a total of US\$ 50,000 will be made available for awards. The maximum award per Fellow will be US\$ 25,000 which is intended to cover travel, stipend, bench fee, equipments, conference participation or any other appropriate use. Such research should be linked to innovative topics related to the conservation and use of plant genetic resources such as new conservation technologies and strategies, socioeconomic and human aspects of conservation and use, germplasm management, forest genetic resources, policy development, genetic erosion assessment and mitigation and conservation and utilization of specific crops. It is unlikely that work purely on plant breeding or molecular characterization would be selected. Fellows are encouraged to present the results of their research at an international conference. This can take place within one year of termination of the Fellowship.

Applications for the year 2001 are invited from developing-country nationals, aged 35 or under, holding a masters degree (or equivalent) and/or doctorate in a relevant subject area. Application forms in English, French and Spanish may be obtained from: Vavilov-Frankel Fellowships, IPGRI, Via delle Sette Chiese 142, 00145 Rome, Italy [Fax: (39)065750309 or Email: [e.clancy@cgiar.org](mailto:e.clancy@cgiar.org) or URL: <http://www.ipgri.cgiar.org/training/vavilov.htm>] and should be returned to IPGRI, Rome. Applications can be sent by mail, fax or email. Applications must be received at IPGRI by 15 November 2000.

Applications must be in English, French or Spanish and should include a covering letter, completed application form, full curriculum vitae, research proposal (maximum 1000 words which should include a clear statement of objectives, methodology, materials and justification) and letter of acceptance from the proposed host institute. The successful applicants will be informed by 31 March 2001 and are required to take up their Fellowships before 31 December 2001.



**IPGRI is an institute of the Consultative Group on  
International Agricultural Research (CGIAR).**

support for the Future Harvest Collections

- Designing the elements of an internationally agreed rational global genetic resources system
- Putting into place and ensuring long-term sustainable support for the global system

The initiative will be undertaken within the framework of the International Undertaking and the FAO Commission will be kept informed of progress.

It was agreed to invite CCS-an international fund raising company, to submit a proposal for undertaking a feasibility study for the campaign. The study which will take 4-5 months to complete, will assess whether the campaign is worth pursuing and if so, where and how it might best be undertaken.

The feasibility study will be co-financed by SGRP, Future Harvest, and the CGIAR Finance Committee [Ruth Raymond, Senior Scientist, IPGRI Headquarters, Rome, Italy].

### Dr J. Coosje Hoogendoorn joins as DDG (Programmes) at IPGRI, Rome, Italy

Dr Coosje Hoogendoorn, a Dutch national, studied plant breeding and genetics at Wageningen University. She carried out her PhD in 1984 at the Plant Breeding Institute (PBI), Cambridge, U.K., and worked on the genetics and physiology of earliness in wheat. At the same Institute, she then completed a post-doctoral research project on the genetics and physiology of dwarfing genes in wheat, in close collaboration with CIMMYT, Mexico.



In 1990, Dr Coosje became Head of the Arable and Forage Crops Applied Genetics Department at the Plant Research Institute in Wageningen. In 1998, she was appointed to lead the Research Strategy Department at Wageningen University and Research Centre, which involved a very broad spectrum of activities across agricultural research (from molecule to ecosystem and economics), and interaction with a similar broad range of stakeholders.

Her connections with genetic resources and biodiversity began when she worked for a short period on research activities at the CATIE genebank in Costa Rica, subsequently testing and using genebank materials as part of her research work on arable and forage crops, in particular, in relation to disease resistance and quality improvement. She was also involved in the assessment of the role of genetic variation within species in agro-ecosystems.

She is looking forward, in her new position as Deputy Director General (Programmes) of IPGRI, to contributing to the conservation and sustainable use of biodiversity in general and plant genetic resources in particular.

## Regional

### Update on IPGRI-APO Activities

#### New Initiatives

During the past 4 months, IPGRI has established several new collaborative activities with different institutions as indicated below:

- Institute of Industrial Crops of Xinjiang Academy of Sciences: to undertake work on ecological adaptability of safflower germplasm in Xinjiang, China
- Institute of Agricultural and Animal Sciences (IAAS): to undertake work on phenogenetic variation in pummelo (*Citrus grandis* L.) in the Eastern Hills of Nepal
- Universiti Kebangsaan Malaysia (UKM): to assist Professor Normah Mohd. Noor to participate in the

International Symposium on Tropical and Subtropical Fruits in Cairns, Australia from 23 November – 1 December 2000

- Department of Biological Sciences, National University of Singapore: to undertake work on identification of genetic markers for gender determination in dioecious rattans
- Kunming Institute of Botany, the Chinese Academy of Sciences: to undertake work on genetic diversity and sustainable development of bamboo resources in Xishuangbana, Yunnan Province, Southwest China
- Yunnan Academy of Agricultural Sciences (YAAS): to assist in developing an Indigenous Knowledge Manual based on the work carried out in Yunnan

- Nepal Agricultural Research Council (NARC): to undertake work on strengthening the scientific basis of *in situ* conservation of agricultural biodiversity: Nepal Country Component

- LI-BIRD: to strengthen the scientific basis of *in situ* conservation of agricultural biodiversity : Nepal Country Component

#### IPGRI supports sesame core collection in South Korea

Some progress has been made in a study on the establishment of a core collection of *Sesamum indicum* of Korean landraces in progress at the National Crop Experiment Station, Rural Development Administration (RDA), Suwon. Landrace collection has been divided into groups based on their geographic occurrence (using agricultural zonation of the country) and were



planted along with 10 Korean released cultivars for characterization and preliminary evaluation for yield and yield components. Further work on data analysis for designing core set is in progress [Abstracted from C.W. Kang. 2000. Establishment of sesame (*Sesamum indicum* L.) core collection of Korean landraces. Interim Project Report. IPGRI-APO, Serdang, Malaysia].

### Ecobiology studies on buckwheat in China

Ecobiology studies on buckwheat continued at the Chengdu Institute of Biology, Chinese Academy of Sciences, Chengdu, P R China with support from IPGRI. Twenty counties in Sichuan and Yunnan Provinces were covered for studying the ecobiological characters of tatar buckwheat (*Fagopyrum tataricum*) and related species, including *F. esculentum* (common buckwheat), *F. dibotrys*, *F. urophyllum*, *F. lineare*, *F. statice*, *F. leptopodum* var. *leptopodum*, *F. leptopodum* var. *grossii* and *F. gracilipes*. A total of 56 plant communities were investigated and 277 specimens, belonging to eight species and one variety were collected. Agrobiological characters of buckwheat and wild species were recorded. Allozyme work and the agrobiological research on 50 samples using cluster analysis and principal component analysis were completed. A total of 200 plant specimens were identified for classification. Analysis for amino acid composition of 10 buckwheat species is being carried out [Abstracted from: Zhao Zuocheng. 2000. Ecobiology and conservation of tartary buckwheat in East Asia. Project Report, IPGRI-APO, Serdang, Malaysia].

### IPGRI helps to strengthen DPR Korea's documentation capacity

A documentation training course was organized at the Exhibition House of Three Revolutions in Pyongyang, from 23-27 August 1999, under the sponsorship of the Academy of Sciences. Twenty two scientists and PGR experts from various institutes and universities in the country attended the course. The participants were exposed

to different softwares for PGR documentation and information management. Dr Zhang Zongwen and Dr Paul Quek from IPGRI provided their expertise as resource persons. Two new computers were also provided by IPGRI to the national PGR programme of DPR Korea [Abstracted from IPGRI Project Report 1999. Report on Training Course for plant genetic resources documentation in DPR Korea. IPGRI-APO, Serdang, Malaysia].

### Tomato improvement at AVRDC

The tomato breeding unit at the Asian Vegetable Research and Development Centre (AVRDC) has developed the following four new inbred lines of tomato for distribution and evaluation:

- CLN2116B: This is a tomato yellow leaf curl virus (TYLCV) tolerant line possessing fresh market characteristics, determinate habit and elongated fruit weighing about 50 g. The line is also resistant to tomato mosaic virus (TMV), *Fusarium* wilt race 1, and bacterial wilt.
- CLN2123A: This is a TYLCV tolerant line possessing determinate habit with globe shaped fruit weighing about 60 g and good internal colour development and jointless pedicel. The line is also resistant to TMV and *Fusarium* wilt race 1.
- CLN1314G: This is a beta-carotene rich (high vitamin A) indeterminate line, with fresh market characteristics, and oblate, large, orange-coloured fruit. The line is resistant to TMV, *Fusarium* wilt race 1, and bacterial wilt.
- CLN2070A: This is a beta-carotene rich (high vitamin A) indeterminate line, with fresh market characteristics, and orange coloured fruit weighing about 50 g. The line is resistant to TMV and *Fusarium* wilt race 1.

For more details contact: Dr Peter Hanson, Tomato Breeder, AVRDC [Centerpoint, Vol. 18, No.1, March 2000.

AVRDC, OPC PO: Box 42, Shanhua, Taiwan].

### TaroGen Highlights

**Collecting and conservation:** Morphological description of the Papua New Guinea collection (over 800 accessions) was completed using selected IPGRI descriptors and information is being documented to select a core sample for conservation in collaboration with IPGRI. There is still a concern over the Solomon Islands collection of about 600 accessions planted at Fote in Malaita as recent reports indicated severe disease infection. The Fiji collection of 70 accessions maintained at Koronivia is growing vigorously and morphological description of the collection has started. The Polynesian collection of about 90 accessions maintained in tissue culture in the Regional Germplasm Centre (RGC), Suva, Fiji is being used for DNA fingerprinting, virus indexing and subsequently for field planting at Koronivia for morphological description. The Vanuatu and New Caledonia collections (about 500 and 90 accessions, respectively) have been described using TANSO descriptors (a set different from that of TaroGen). As agreed at the last six monthly project review meeting, the TANSO databases have been sent to IPGRI for selecting the cores.

Research on developing conservation technology for taro is continuing at the RGC. Several experiments have been carried out using the methodology developed in Japan by Dr Thinh. To date, 80-100% success is achieved with the meristem controls and the loading solution controls, but no recovery of the meristems observed after cryopreservation. High incidence of endogenous bacterial contamination is noticed, and it might affect the success of the technique. Cleaning the accessions is being attempted. A pilot genebank study to compare an *in vitro* genebank with that of field genebank is continuing in collaboration with MAFF, Fiji. Seeds received from the PNG breeding programme for the seed

storage study showed poor germination and fresh seed will be obtained. The *in situ* conservation project for Vanuatu was not accepted by UNDP. Discussions are continuing with other donors for the funding of a long-term project for the Pacific. Discussions are ongoing between SPC and USP regarding the duplication of the RGC collection in the laboratory at USP, Samoa. A draft Germplasm Acquisition Agreement (GAA) for USP has been drawn up and submitted to SPC. There have also been discussions with USP and FAO regarding the funding and the conservation of the regional germplasm collection.

**Plant improvement:** In PNG, about 120 crosses were made to create progenies for cycle 4. Evaluation of G x E trials of 7 elite lines from cycle 2 for several morphological characteristics and disease assessment continued. Observations were taken from two trials at Ok-Tedi. Compared to other trials, conditions for TLB development were very favourable at this site. The elite lines continued to show good tolerance to TLB compared to the susceptible controls. Twenty-five lines from cycle 3 were selected based on high suckering ability and planted in replicated trials at two sites for further evaluation. The best lines will be selected for the next cycle of G x E trials. Programme to evaluate Palau varieties for TLB resistance continued. Twenty-five clones selected by the USP taro improvement project (TIP) from its first breeding cycle are being evaluated. The project is also evaluating and distributing seven selected Palau and Micronesian varieties to farmers. The TIP club holds monthly meetings where farmers' views and performance of selected breeding lines/varieties are discussed. Selected farmers in the TIP club will start evaluation of the twenty-five clones later this year.

**Management:** The AusAID review of the project was completed in July. The review team (Mr Mike Finlayson, Dr David Gallacher and Dr Roger Ashburner) presented its report to AusAID in August. Issues raised by the review team were considered and

detailed comments forwarded to AusAID [Abstracted from the TaroGen Report for August 2000 prepared by Mr Danny Hunter, Team Leader, TaroGen].

## Global Environment Centre

The Global Environment Centre located in Selangor, Malaysia was established in 1998 to work on environmental issues of global importance. The Centre, a non-profit organization, supports information exchange and capacity building as well as the strategic projects particularly in developing countries. It coordinates activities worldwide through the Global Environment Network that has a partnership with other relevant international and national organizations and focuses on the following activities:

- Information exchange and dissemination - through newsletter, website and the internet
- Institutional strengthening - South-South Network and the training programmes
- Education and public awareness programme - through dissemination of awareness materials and organization of awareness campaigns
- Policy development - through strategic workshops and policy development initiatives
- Demonstration projects - undertaking strategic projects in conjunction with partner agencies

The Global Environment Centre is the Secretariat of the Global Environment Network (GEN), a global network of groups and agencies currently working on environmental issues of global significance in more than 30 countries in 6 continents. The programme of GEN is guided by an Advisory Council comprising representatives from the global environment conventions together with other experts and agency representatives. The guidelines for involvement in the network are as follows:

- *Government and international agencies* - can obtain information/

support from the Centre or members of the Global Environment Network

- *Project/programme partners* - organizations may become partners in particular projects or activities providing input and support in their development or implementation
- *Members* - organizations or individuals who wish to receive/contribute to newsletters and participate in lower level activities can become ordinary members of the Global Environment Network

GEN will provide to the members of the Network the newsletter and technical advice, updates about funding opportunities, opportunity for involvement in projects and will be a channel to make contact with other GEN members [For more information, contact: Global Environment Centre, 7A Jalan 19/29, 46300 Petaling Jaya, Selangor, Malaysia; Tel: +60-3-757 2007; Fax: +60-3-757 7003; Email: info@genet.po.my; Website: http://genet.cjb.net].

## Workshop on Forest Planning, Database and Networking

This regional workshop was held in Thimphu, Bhutan from 23-26 May 2000. Twenty six participants from India, Nepal, Sri Lanka, Myanmar, Pakistan, Bangladesh, Bhutan and FAO representatives participated. Papers were presented and discussions held on forest planning, database management and networking. The experiences and lessons learnt by individual countries were shared. Concern on forest cover change was highlighted for different countries. A number of recommendations were made which included: establish a Regional Forestry Information Network; develop FAO Country Profiles; develop national forest inventories; develop a common forest policy for the South Asia region and examine possibilities for regional policy development; liaise with other initiatives in this field and organize workshops; develop a South Asian Forestry Institution to establish a platform for deliberating on common problems

and sharing experiences [Mr Ngawang Norbu, Druk Forestry News, Issue No. 29, July 2000].

## Bamboo and Rattan, and Forest Genetic Resources Update

The highlights of activities relating to bamboo and rattan and the forest genetic resources are summarized as under:

### Bamboo and Rattan

Bamboo and rattan activities were actively pursued. Final reports on some studies have been received and these include, rattan genetic resources in Vietnam, bamboo resources in Vietnam, country report on bamboo in Thailand, country report on rattan in Thailand, genetic diversity and mating system of *Calamus palustris* in Thailand, and economically important bamboos and rattans of Indonesia published in the native language. These reports are being reviewed and edited for publication and dissemination. A project on genetic diversity and sustainable development of bamboo resources in Xishuangbana, Kunming, China was initiated and undertaken by the Kunming Institute of Botany. Four other projects on rattan and bamboo are being evaluated for implementation in Vietnam, Malaysia, Nepal and Indonesia.

### IUFRO World Congress in Malaysia

About 2400 delegates from more than 60 countries participated the XXI World Congress of the International Union of Forestry Research Organizations (IUFRO) held in Kuala Lumpur from 7-12 August 2000. The theme of the Congress was "Forests and Society: The Role of Research". IPGRI was represented by FGR staff from both the APO Office in Malaysia (Mr L.T. Hong and Dr Jarkko Koskela) and the Headquarters in Rome (Dr Weber Amaral and Dr Leonardo Petri). The Congress provided an excellent opportunity for the FGR staff and IPGRI's partners not only from the APO region but also from elsewhere to exchange ideas and disseminate information on their activities.

During the Congress, a number of organizations also held Satellite or Business Meetings in the evenings after the daily sessions. IPGRI organized a Satellite Meeting on 8 August 2000 with a theme "Shaping an Information Services on the Forest Genetic Resources". The new forestry programme coordinator, Dr Weber Amaral gave a short briefing on the institute's activities on FGR after which Dr Leonardo Petri introduced the background of a survey on information needs on FGR carried out during the Congress. The results of this survey will be presented at IPGRI's homepages later this year and will also be used for developing a search engine for FGR related information that is already available in the Internet.

In the evening of 11 August 2000, IPGRI staff participated in a Satellite Meeting on international rattan research and development needs organized by the International Network on Bamboo and Rattan (INBAR). Representatives from Africa, Asia-Pacific region and Latin America briefed the audience on the state-of-art on rattan resources and research in their regions and Mr Hong presented the present status of rattan from genetic resources point of view. The participants were informed that Food and Agriculture Organization (FAO) will invite a group of different stakeholders to a rattan workshop to be held in Rome in December 2000 and that INBAR is planning to organize a World Congress on Rattan in 2002.

Dr Amaral presented a paper "*In situ* conservation, genetic management and sustainable use of tropical forests: IPGRI's research agenda" (prepared jointly with J.M. Boffa and L. Petri) in a Sub-Plenary Session on Sustainable Management of Natural Resources: Management and Conservation of Forest Gene Resources on 12 August 2000. This paper summarises the institute's research programme on FGR, highlights the importance of FGR and their conservation, and refers to constraints and challenges encountered in tropical environments. The full paper is published in the IUFRO World

Congress Proceedings (Volume 1, pp. 120-132).

During the Congress, the IUFRO Task Force on Forest Gene Resources held two informal meetings on 6 and 10 August in which IPGRI staff was also present. The issues discussed related to a survey on research activities carried out by IUFRO member institutions on FGR, technical aspects of the sessions chaired by the Task Force persons and also future activities of the Task Force. During the Congress, representatives of IPGRI, Centre for International Forestry Research (CIFOR) and International Centre for Research in Agroforestry (ICRAF) also discussed several times about possible new activities in the field of FGR and how to further increase collaboration between the three Centres.

### World Forestry Exhibition

In conjunction with the Congress, 42 organizations and institutions relating to forestry displayed their activities at World Forestry Exhibition from 7-9 August 2000. IPGRI, CIFOR and ICRAF also disseminated information on their FGR activities at a joint booth during the Exhibition. IPGRI's programme, based on three major areas of work: i) strengthening institutional frameworks and contributing to international collaboration through national programmes and regional initiatives, ii) generating knowledge and developing appropriate methodologies for decision making and priority setting for conservation, and iii) devising and providing practical tools for measuring genetic diversity to improve the conservation and use of FGR, were highlighted during the Exhibition. Similarly, CIFOR and ICRAF described their activities on forest resources.

### New FGR information available

IPGRI's FGR programme published its annual research highlights and the institute's Strategic Action Plan on FGR in July 2000 and both publications were widely distributed during the XXI IUFRO World Congress. FGR Research Highlights is an informal publication providing an update on IPGRI's research



on conservation and use of FGR worldwide and it also provides useful contact information on IPGRI's national partners in FGR activities. Simultaneously with the release of the

institute's new homepages last July, IPGRI's FGR programme also launched its own webpages where more detailed information on global FGR activities can be found at <http://www.ipgri.cgiar.org>;

click either Genetic resources or Crops/Species [Mr L.T. Hong, Specialist, Bamboo and Rattan and Forest Genetic Resources, IPGRI-APO, Serdang, Malaysia].

## National

### BHUTAN

#### Bhutan-German Sustainable Renewable Natural Resources Development Project

A three day project planning workshop for phase III of the Bhutan-German Sustainable Renewable Natural Resources (RNR) Development Project (BG-SRDP) was held at the Natural Resources Training Institute (NRTI), Lobeyssa from 10-12 April 2000. Thirty RNR officials from Thimphu, Punakha and Wangdue participated. Dasho Sangay Thinley, Secretary, Ministry of Agriculture graced the Opening Session of the workshop as the Chief Guest. The workshop objective was to evaluate the German-Bhutanese bilateral projects and to apprise possible areas of future collaboration. The mission recommended that the term of the project in Wangdue and Punakha be extended beyond the current phase, which expires on 31 December 2000.

The project aims at improving the capacity of farmers of Punakha and Wangdue and to develop and utilize the natural resources so as to achieve the overall goal of socio-economic upliftment of the people while conserving the environment [Druk Forestry News, Issue No.29, July 2000].

### CHINA

#### National Centre of Soybean Improvement

The National Centre of Soybean Improvement (NCSI) is associated directly with the Ministry of Agriculture and includes the Soybean Research Institute of Nanjing Agricultural University and other related key laboratories, with Professor Junyi Gai as its Director. The main functions of NCSI are to: i)

collaborate in international research on soybean related aspects, organizing research in each sub-centre, ii) organize collecting, characterization, and exchange of soybean germplasm, iii) carry out research on breeding technologies, iv) develop new materials and methods, providing elite germplasm to agricultural research and educational institutions, and v) represent China to collaborate with international soybean research organizations. The Institute is composed of four laboratories as described below:

**Laboratory of Genetic Resources:** The main work of this laboratory is to collect, characterize, and conserve soybean germplasm; set up the central storage facility; study genetic variation, evolutionary relationship and application potential of cultivated and wild types of soybean.

**Laboratory of Genetic Improvement of Yield and Quality:** The main work is to select soybean varieties with desirable characters; identify materials with ideal morphotype or high photosynthetic efficiency; study the yield and important characters of tofu, soymilk or other soy-related foods; study growth and regulation of newly released varieties and seed production technologies.

**Laboratory of Resistance and Tolerance to Biotic and Abiotic Factors:** This laboratory undertakes studies on resistance to diseases (SMV, SCN), insects, and physiological stresses (drought, salt); develop disease screening technique and study genetics of resistance or tolerance in soybean.

**Laboratory of Biotechnology and Breeding Theory:** This laboratory focuses on biotechnological applications for breeding: male sterility and application of heterosis and isolation,

expression and regulation of genes controlling important traits; genetic mapping and QTL location; molecular marker based breeding; genetic transformation systems, and functional genomics.

Additionally, international collaboration has been established with emphasis on soybean germplasm characterization, genetics, genetic engineering and other research aspects [Professors Junyi Gai and Deyue Yu, National Centre of Soybean Improvement, Nanjing Agricultural University, Nanjing 210095, P.R. China, Fax: 86-25-4395110 Tel: 86-25-4396410, Email: [nausri@publicl.ptt.js.cn](mailto:nausri@publicl.ptt.js.cn), or [dyyu@smtp.njau.edu.cn](mailto:dyyu@smtp.njau.edu.cn)].

#### Developing a Core Collection of Special Genetic types in Wheat

Research on core collection of special genetic materials in wheat was conducted at the Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences. A total of 951 accessions including artificial allopolyploids, aneuploids - monosomic, nullisomic, trisomic, tetrasomic, telosomic, substitution lines, translocation lines, sterile lines and nucleoplasmic replacement lines, were used for developing a core collection of special genetic types in this study. The genotypes were identified for their main biological and agronomic traits, differences for chromosome number and structure, and variation in protein and esterase enzyme by electrophoresis. The data for different phenotypes/individuals for chromosomes and protein molecular markers were analyzed for grouping and selecting accessions. This core collection consists of 329 accessions (34.6%) and represents broad genetic diversity in the wheat collections [For details, contact:



Mr Liu Xu, Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences, Beijing 100081, P.R. China. Abstracted from Journal of Plant Genetic Resources, Vol.1 (No.2) p.8, Beijing, China].

### **Present Status and Future Strategies of Sweet potato Germplasm Research**

There are about 2000 accessions of sweet potato in China. These are maintained both in field genebank and *in vitro* genebank. Most of these were evaluated for disease resistance and nutritional quality. The sweet potato germplasm used in breeding and production included landraces, introduced varieties, improved varieties, mutants and related wild species. Future studies will focus on establishing the conservation system, evaluating genotypes, setting-up core collection, efficiently utilizing and developing novel germplasm in sweet potato [For details contact: Mr Guo Xiaoding, Xuzhou Sweet potato Research Centre, Jiungsu, 221121, P.R. China. Abstracted from Journal of Plant Genetic Resources, Vol.1 (No.2) p.63, Beijing, China ].

### **DPR KOREA**

#### **Conservation of Plant Genetic Resources**

The Institute of Botany, Academy of Science, DPR Korea, has made efforts on collecting, evaluation and conservation of plant genetic resources, and developed an inventory to promote effective use of plant resources. To date, the total number of plant species investigated is 8785 of which 2549 species belong to algae, 1857 to fungi, 436 to lichens, 767 to liverworts, 198 to pteridophytes, and 2978 to seed plants. About 100 species can be used as raw materials for fibre and paper production, 50 as oil seeds, 900 for medicinal use and 30 as wild fruit plants. Among seaweeds, 80 species are edible, 50 medicinal and 100 of industrial use. Also, 200 fungal species are edible and 90 medicinal. Of the total species investigated, 315 species have originated from DPR Korea.

As assessed, 52 species are endangered and of these, 10 are in danger of extinction. In addition, 75 species have been identified as rare. Evaluation of these threatened species has been carried out. The Institute of Botany has also carried out research on correlation between morphological characters by karyotype and genome analysis to understand species relationships. Data on karyotypic analysis of 1000 species have been accumulated. The study on regional adaptation of plant genetic resources in protected sites is mainly concentrated on adaptation to alpine situations and low areas of the region.

Besides *in situ* conservation of wild plant habitats, some botanical gardens have also been established throughout the country. These botanical gardens serve as centres for *ex situ* conservation of the plant genetic resources and for research and training. The Central Botanical Garden in Pyongyang conserves about 6500 species, of which 4000 have been valuable presents received by the great leader Kim Jong Il from presidents of various countries and foreign personnel. A 100 ha arboretum is being constructed where 2500 species of trees will be conserved. In addition, protected areas for natural habitats of animals and plants have been set up. Six nature reserves and fourteen plant reserves were established with a total area of 2 428 590 ha. Of these reserves, Mt. Paekdu Biosphere Reserve is typical one which covers 13 200 ha in area and has 639 species of seed plants and 1573 species of spore bearing plants.

In recent years, because of global climate change, breeding and development of drought-resistant trees has become a research priority. Attention to protect endangered and rare endemic plant species has to be given due importance. Plans on protection and multiplication of overall plant genetic resources are being made. Priority for research is to promote sustainable use of plant genetic resources [Dr Ri Jin Yong, Senior Officer, Bureau for International Science & Technology Cooperation, Academy of Sciences,

Pyongyang, DPR Korea. Fax: 850-2-3814580].

### **INDIA**

#### **Promising Hybrids of Okra Developed**

Okra occupies an important place in green vegetable production in India. The Indian Institute of Vegetable Research has selected okra germplasm having resistance to yellow vein mosaic virus (YVMV). Recently, two promising hybrids have been developed namely, DVR-1 and DVR-2, which produced larger green fruits and exhibited good bearing and field resistance to YVMV under multilocation trials. These newly developed hybrids have outyielded national check Parbhani Kranti by 30-40%. These are the first hybrids which have been identified through All India Coordinated Research Project (AICRP) for Vegetables for cultivation under areas covering sub-humid Satluj-Ganga-alluvial plains-Arid Lava plateau and central high level as well as arid-western plains of the country. These two hybrids, having resistance to YVMV, are very suitable for producing high quality fresh green fruits and for large scale cultivation [Dr G. Kalloo, Director, Indian Institute of Vegetable Research, 1 Gandhinagar (Naria), Sunderpur, Varanasi (Uttar Pradesh) 221 005, India; ICAR News, January-March 2000].

#### **National Seminar on Hi-tech Horticulture**

A National Seminar was organized by the National Academy of Agricultural Sciences, New Delhi in collaboration with the Horticultural Society of India, New Delhi and the Indian Institute of Horticultural Research, Bangalore at Hotel Atria, Bangalore from 26-28 June 2000. More than 300 participants attended the seminar. Professor M.S. Swaminathan, Chairman, M.S. Swaminathan Research Foundation, Chennai, India was the Chief Guest at the inaugural session presided over by Dr R.S. Paroda, Director General, ICAR and Secretary, DARE, Government of India.

The seminar was organized in 7 broad themes which included: i) opportunities for new biology for germplasm enhancement and crop improvement; ii) recent techniques in Hi-Tech propagation of horticultural crops; iii) agro-techniques in Hi-Tech production of horticultural crops; iv) protected cultivation; v) recent trends in crop protection; vi) new developments in post-harvest management, and vii) logistics and policies for Hi-Tech horticulture in Karnataka State. All oral presentations were made by eminent experts including scientists and experts from the industry, financial sector and policy makers from the state and central organizations. A special lecture 'An overview of Hi-Tech Horticulture' was delivered by Dr K.L. Chadha, ICAR, National Professor (Horticulture). Dr Bhag Mal made a keynote presentation on 'Issues in germplasm identification, conservation and exchange in horticultural crops' and also acted as chairperson of the expert panel for selecting the best poster paper for three theme areas.

## Activities at NBPGR

### Plant biodiversity garden established

To mark the celebration of its silver jubilee year, NBPGR has established a "Plant Biodiversity Garden" at its campus and it was inaugurated by Dr R.S. Paroda, Director General, ICAR and

Secretary, Department of Agricultural Research and Education (DARE), Government of India on 7 August 2000. To begin with, 180 species belonging to 153 genera and 69 families have been planted. Some examples are: avenue and timber trees (*Acacia*, *Chukrasia*, *Ficus*, *Terminalia*, *Tectona*), ornamental trees (*Bauhinia*, *Jacaranda*), medicinally important trees (*Cassia*, *Santalum*), fruit trees (*Annona*, *Amygdalus*, *Citrus*, *Embllica*, *Aegle*, *Syzygium*, *Cocos*), spice trees (*Cinnamomum*, *Tamarindus*), climbers (*Piper betel* and *P. nigrum*) root/tuber/rhizomatous types *Amorphophallus*, *Curcuma*, *Zingiber* and *Alpinia* spp.) and gymnosperms (*Cryptomeria*, *Cupressus*, *Pinus*). It is also envisaged to have collection of other important groups of plants such as medicinally important herbs, ornamentals, palms, etc.

### Orientation course on biosafety considerations for evaluation of transgenic crops

This orientation course was organized at NBPGR, New Delhi from 17-26 July 2000 under the Department of Biotechnology (DBT) funded project on National Containment/Quarantine Facility for Transgenic Planting Material. The main aim of the course was to develop a critical mass at national level that can comprehend, appreciate and participate in tackling various issues relating to

biosafety concerns for evaluation of transgenics. The 28 participants attending the course represented various institutes of the Indian Council for Agricultural Research (ICAR), State Agricultural Universities, Central Universities, State Government Departments, NGOs and international organizations. The 33 speakers/panelists included eminent biotechnologists, seed technologists, ecologists, plant breeders, plant pathologists, representatives of private sector, NGOs, etc. The topics discussed dealt with different aspects of genetic engineering, provisions of International Biosafety Protocol, quality seed law enforcement, seed certification in relation to transgenics, impact of Genetic Use Restriction Technologies (GURT), quarantine strategies, regulatory mechanism for import of transgenics and for undertaking limited field trials, impact of transgenics on environment and human health and case study of Bt cotton (from lab to fields).

The deliberations during the orientation course clearly indicated the need for generating awareness on biosafety issues among the scientific community who could further carry the right message down to the farmer level through the extension workers. Also, it was felt that there should be a central nodal agency at the national level where all the issues and requirements concerning biosafety can be dealt with under one umbrella.

### Seed certification protocols for management of seed-transmitted viral diseases of grain legumes

A new project on 'Diagnostics and development of seed certification protocols for management of seed-transmitted viral diseases of grain legumes' under the National Agricultural Technology Project (NATP) of the Indian Council for Agricultural Research (ICAR) was launched on 22 July 2000. NBPGR, New Delhi is the Lead Centre and Gujarat Agricultural University, Anand and University of Mysore, Mysore are the Cooperating Centres.



Dr R.S. Paroda, DG, ICAR, inaugurating the Plant Biodiversity Garden at NBPGR, New Delhi



Participants of Orientation Course on Biosafety Considerations for Evaluation of Transgenic Crops

Studies on grain legume host-virus systems including seed-transmitted viruses would be undertaken. These would include bean common mosaic potyvirus (BCMV) of mungbean, urdbean leaf crinkle virus (ULCV) of urdbean and mungbean, black-eye cowpea mosaic potyvirus (BICMV), cowpea aphid borne mosaic potyvirus (CABMV) and southern bean mosaic sobemovirus (SBMV) of cowpea, soybean mosaic potyvirus (SMV) of soybean and pea seed borne mosaic potyvirus (PSbMV) of pea. The incidence and prevalence of the diseases would be assessed, detection methodology standardized and information on key epidemiological parameters generated. The findings would be utilized to develop seed certification norms for selected seed-transmitted viruses as model cases, which has to be at par with European and American standards. The information generated on key parameters of epidemiology would also be utilized in developing Pest Risk Analysis and in identifying Pest Free Areas as per the mandatory requirements of Sanitary and Phytosanitary Agreement (SPS) of the World Trade Organization (WTO).

[Director, National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi 110 012, India].

## JAPAN

### Indigenous Okinawan *Vigna* species

From the point of view of collaborative research to study the phylogenetic relationships of Asian *Vigna* spp. and also for germplasm conservation and utilization, several exploration missions have been undertaken focussing on *Vigna* spp. in Japan. Among the accessions collected from the southwest islands of Okinawa, *V. minima* var. *minor* was found to occupy a unique position by having an interesting reproductive behaviour. The germplasm collected from roadside of the Ishigaki Island were found to be compatible both with *V. umbellata* and *V. angularis* var. *angularis*.

The fact that *V. minima* var. *minor* can be hybridized both with *V. umbellata* and *V. angularis* opens an avenue for gene transfer from *V. umbellata* and its relatives to another group of this genus (subspecies *Ceratotropicis*), overcoming the incompatibility barrier. Exploration of genetic diversity and the search for ways to improve agronomic characters in *Vigna* species are still under way through international cooperation between Japan International Research Centre for Agricultural Sciences (JIRCAS) and the National Institute of Agrobiological Resources (NIAR).

Ms D. Siriwardhane, a counterpart scientist in Japan International Research Centre for Agricultural Sciences (JIRCAS) Project on PGR, contributed to the studies of cross-compatibility of *Vigna* species, while she was at National Institute of Agrobiological Resources (NIAR), Japan on leave from PGRC, Sri Lanka [Dr Y. Egawa, JIRCAS, Okinawa and Dr N.Tomooka, NIAR; GRP Newsletter, No.36, March 2000].

### Indigenous Okinawan Bananas

In Okinawa, the southwestern island of Japan, some indigenous varieties of banana still exist and are highly appreciated by local communities. Among these, famous and popular varieties are Sanjaku (three feet) and Shima (island banana), especially the later, which is sweet, small, and has a thinner peel, is used in the festivities of some local communities and sells in the market for higher price than the imported banana. Fruits of Sanjaku are closer to the varieties in the world market. Plants are, however, very dwarf. The Okinawa Subtropical Station, JIRCAS is a designated substation of the National Genebank for tropical fruit trees. It maintains more than 370 accessions of fruit trees including mango, pineapple, papaya, etc. in the field. A sizeable number of these are from the islands of Okinawa [Tropical Fruit Laboratory, Okinawa Subtropical Station, JIRCAS; GRP Newsletter, No.36, March 2000].

### Research Institute for Bioresources, Okayama University

Under the Research Institute for Bioresources of Okayama University, which now has a broadened mandate, is the Division of Genetics which consists of the Laboratory of Molecular Genetics, the Laboratory of Cell Genetics and the Laboratory of Plant Genetics. In cooperation with the barley germplasm group, studies on barley transformation are under way. Despite a rather limited staff, the Division is involved in a wide range of studies examining utilization of



# COGENT Update

## ADB and IFAD Funded Project Meetings

The annual meetings of the ADB and IFAD funded projects were held back-to-back from 26-30 June 2000 in Apia, Samoa for the 10 participating South Pacific countries, and 10-15 July 2000 in Manila, Philippines for the 10 Asian countries, respectively. The South Pacific countries included Cook Islands, Fiji, Kiribati, Marshall Islands, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. The participating Asian countries were Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.

The third annual meeting of the ADB funded project entitled "Coconut Genetic Resources Strengthening in Asia and the Pacific (Phase 2)" reviewed the 1999/2000 accomplishments and 2000/2001 proposed work plans of the 20 participating countries involved in coconut projects. Progress reports on the human resource development component were presented, together with reports on the biotechnology and embryo culture components. The three host countries, namely, Indonesia, India and Papua New Guinea, presented reports on the activities of the International Coconut Genebank (ICG).

Several issues were raised during the meetings. Among these, the important ones are: the use of embryo culture in collecting; the need to check the purity of hybrids distributed to farmers; the need for member countries to identify varieties to be conserved in the ICGs and to look at the possibility of use and conservation of genetic diversity on-farm.

The meeting was attended by project leaders, donors, and representatives from IPGRI and partner institutions.

The third annual meeting of the IFAD funded project entitled "Sustainable Use of Coconut Genetic Resources for Enhancing the Income and Nutrition of Small holders in Asia and the Pacific"

reviewed the 1999/2000 accomplishments of the 14 countries involved and the overall performance of the project, which ends in August 2000. Reports on farmer participatory research to promote the multipurpose uses of the coconut and projects for increasing income from coconut-based farming were presented and discussed. Progress reports on feasibility studies on high-value coconut products were presented by Vietnam, Bangladesh, Thailand, Indonesia and the Philippines.

Several issues and comments were raised during the meetings. During his opening speech at the IFAD-funded project meeting for the South Pacific countries, the Minister of Agriculture, Forests, Fisheries and Meteorology of Samoa, the Hon. Mafasolia Papu Vaai, commented that the involvement of entrepreneurs and the private sector would greatly benefit the coconut industry as it would enhance the utilization of coconut products. Other issues raised during the meeting include the possibility of each country to have a strategy where farmers can increase their income through high-value products apart from supplying raw materials; the convergence of external and indigenous knowledge; the need for farmers to benefit from *in situ* conservation; and the need to clarify the understanding of deployment of diversity in comparison to dissemination.

The meeting was attended by project leaders of the IFAD funded project, donors and representatives from IPGRI and partner institutions.

## International Coconut Genebank Workshop

The International Coconut Genebank Workshop was held in Chennai, India on 17-18 July 2000. The workshop was hosted by the Central Plantation Crops Research Institute (CPCRI), India and funded by ADB and IPGRI. The meeting reviewed the progress of work on the establishment of the International

Coconut Genebank (ICG) in each of the host countries, and related ongoing research projects and work plans for the next seven years. The host countries for the ICGs are Indonesia for Southeast and East Asia, India for South Asia, Papua New Guinea for South Pacific and Côte d'Ivoire for Africa and the Indian Ocean. Negotiations are underway for Brazil to host the ICG for Latin America and the Caribbean.

The workshop also discussed and addressed urgent constraints and opportunities, and updated and refined the ICG work plans and budgets for submission of a proposal to an appropriate donor. Strategies to make the ICG sustainable were also discussed and these included: i) the host country to maintain conserved germplasm, ii) government to allow the income from the ICG to be ploughed back to cover the maintenance cost, iii) requesting countries to bear the cost of the requested seednuts/embryos, iv) plant additional areas to high-value products or other crops to generate income for maintenance, v) practise intercropping or livestock/fodder production, vi) produce high-value products from kernel, husk, shell, wood and water, vii) superimpose research and training in the ICG as appropriate; and viii) to establish a Trust Fund.

## COGENT 9<sup>th</sup> Steering Committee Meeting

The 9<sup>th</sup> Meeting was held in Chennai, India from 19 – 21 July 2000 and was attended by the 12 Steering Committee members and representatives from partner institutions. The meeting reviewed the ongoing and proposed projects and activities of COGENT and assessed the constraints and opportunities. It reviewed the status of COGENT, to formulate future directions for enhancing its effectiveness.

The meeting also reviewed the progress of the five COGENT regional networks, projects and activities in COGENT,

IPGRI and collaborating partner institutions. It also discussed the COGENT Work and Action Plan for the Year 2000 and draft plan for Year 2001. The meeting was funded by IPGRI/COGENT.

## International Coconut Conference (ICC)

The International Coconut Conference

(ICC) 2000 was held in Chennai, India, from 24 - 28 July 2000 within the ambit of the APCC XXXVII COCOTECH Meeting. The conference reviewed the performance of the various sectors of the coconut industry to identify problems and opportunities to be addressed in the new millennium. The recommendations of the conference will be used as a guide in developing project proposals to address priority activities. The

conference was hosted by the Government of India through the Coconut Development Board and jointly sponsored by the Asian Pacific Coconut Community (APCC), Bureau for the Development of Research on Tropical Perennial Oil Crops (BUROTROP) and IPGRI-COGENT.

[For details contact: Dr P. Batugal, COGENT Coordinator, IPGRI-APO, Serdang, Malaysia].

(Contd. from page 11)

plant genetic resources. Among other topics, the response to aluminium toxicity and tolerance to acid soils of various plant species have been extensively studied. Another research target has been developing transgenic tomato resistant to TMV through interference by virus coat proteins. Genetic probes for indexing TM-1 and TM-2 genes for TMV coat proteins in transgenic tomato plants have been developed. Studies on chromosome behaviour with the combined use of *in situ* DNA hybridization and other biotechnological tools aim to elucidate telomere region of *Arabidopsis* chromosomes with artificial chromosomes as a final target.

Other contributors to the broadened research activities of the Institute include: Barley and Wild Plant Resources Centre; the Division of Functional Biology, and the Division of Environmental Biology [Dr K. Takeda, Director, Barley and Wild Plant Resources Centre, Research Institute for Bioresources, Okayama University, <http://www.rib.okayama-u.ac.jp>; GRP Newsletter No.35, February 2000].

## The Barley and Wild Plant Resource Centre, Okayama University

The Barley and Wild Plant Resources Centre at Okayama University has a Division exclusively designed to preserve wild plants. As of February 8, 2000, the Laboratory of Wild Plant Resources maintained 45 069 accessions of

herbarium and 23 087 accessions of viable seeds. The herbarium samples are composed of 347 families and 5997 species and the seed samples are of 217 families and 4530 species. In addition, 9802 seed accessions are conserved in long-term storage. This laboratory is the sole facility preserving and serving viable wild plant seeds [Dr T. Enomoto, Barley and Wild Plant Resources Centre, Okayama University, <http://www.rib.okayama-u.ac.jp>; GRP Newsletter No.35, February 2000].

## SRI LANKA

### Nagenahiru Development Foundation

Nagenahiru is a non-profit organization established in 1991 to promote community participation to safeguard the rich biodiversity of Sri Lanka. It has surveyed more than 600 farmers in rural areas in five districts, and identified rice, yams, fruits, vegetables and medicinal herbs as more important commodities to collect and conserve biodiversity of traditional varieties. This has been achieved through a strong educational community awareness programme. The key activities of the programme include: i) development and strengthening of an institutional mechanism among rural farmers for *in situ* conservation of traditional crops, ii) cater to training and extension needs of the farmers engaged in biodiversity conservation, iii) encourage and popularize sustainable use of traditional food plant varieties and to create/make market demand in different sectors of the society.

The foundation has supported establishment of community nurseries and home gardens with traditional species of different food crops and women groups are coordinating this work. All these activities are being implemented under the Project Heritage of Traditional Crops - Sri Lanka (HATRAC) by different coordinators, one each located in different districts in different agro-climatic zones. In each of these districts, five interior rural villages have been selected and in each village 10-15 farmers are actively engaged in conservation activities. Thus, a network of about 50-75 farmers is expected to operate activities in each district. Also a farm/research centre has been established in the vicinity of Galle among small holder farmers. This centre is undertaking training and demonstration activities to distribute and promote exchange of information and the seeds and planting materials among different communities and persons engaged in academic and research activities, including *in situ* conservation and community seed bank activities of the members involved in this programme of HATRAC.

Nagenahiru will prepare and distribute educational materials, leaflets, posters and use other means to generate public awareness and promote sustainable use of indigenous medicinal and food crops [For details, contact: Nagenahiru Development Foundation, Patabenclimula, Ambalangoda, Sri Lanka].

## Meetings/Training Programmes

### NEPAL: Asian Participatory Plant Breeding Symposium for Strengthening Farmer and Informal Sectors Role in Crop Improvement and Biodiversity Enhancement, Pokhara, Nepal, 1-6 May, 2000.

More than 70 scientists, farmers, NGOs, development workers, CG Centres and representatives from donors congregated in the first Asian PPB Symposium in Pokhara, Nepal to share experiences, findings and reservation about the germplasm enhancement and PPB approach.

The symposium was organized by the System-wide Programme on Participatory Research and Gender Analysis for Technology Development (PRGA Programme) of the CGIAR and held at Bluebird Hotel, Pokhara, Nepal. The symposium focussed on experiences of Participatory Plant Breeding (PPB) in South and Southeast Asia. The symposium provided equal opportunity to formal sector-led and farmer-led PPB approaches with a focus on both PPB and dynamic approaches for biodiversity conservation and enhancement. The objectives of the symposium were to:

- Exchange and compare the diversity of experiences of PPB/dynamic biodiversity enhancement in South and Southeast Asia
- Encourage a dialogue between professionals and farmers on PPB
- Identify gaps in experience of PPB and networking needed for potential second regional workshop in 2002
- Network South Asian and South East Asian plant breeders who are using participatory methodologies, tools and approaches
- Make current contributions to a working document on guidelines for PPB prepared in an expert consultation held in June 1997 and updated in a Latin American Symposium in August 1999

- Identify follow-up actions to support farmer-led and formal sector-led PPB
- Identify follow-up actions to support dynamic approaches for biodiversity conservation and enhancement
- Sensitize institutional plant breeders on participatory approaches to crop improvement

IPGRI and its national partners LI-BIRD and NARC played key roles in identifying researchers and farmers to present cases of participatory crop improvement. Three farmer groups from *in situ* villages presented papers and posters.

Executive Director of Nepal Agricultural Research Council and also Chairperson, TCC of the *in situ* project was the chief guest of the inaugural session. He focussed on the role of farmers and the NARC and other concerned countries in PPB activities; and NARC institution in developing farmer selected varieties.

Dr Louise Sperling from PRGA presented an overview on recent advances in Participatory Plant Breeding. On behalf of IPGRI, a strong team consisting of Dr Percy Saijse, Regional Director from Malaysia, Dr Pablo Eyzaguirre from Rome, Dr Prem Mathur

from IPGRI-APO, New Delhi and Dr Bhuwon Sthapit, IPGRI-APO, Pokhara, Nepal took part in the Symposium. Dr Pablo Eyzaguirre presented a paper on "How farmers characterise and select within crop diversity: some ethno-botanical indicators" whereas Dr Mathur presented the paper on "Participatory plant breeding in relation to monitoring genetic erosion: a possible approach". Dr Sthapit presented one of the keynote papers on first day entitled, "Enhancing biodiversity and production through participatory plant breeding". In total, five papers were presented by the national partners of Nepal and Vietnam and role of IPGRI in strengthening the capacity of informal and formal sector in participatory approaches was highlighted. IPGRI played key role to identify key presenters and grassroots institutions involved in the region.

It was co-hosted by the System-wide Programme on Participatory Research and Gender Analysis (PRGA, CIAT, Columbia), International Plant Genetic Resources Institute (IPGRI), Local Initiatives for Biodiversity, Research and Development (LI-BIRD), Plant Science Programme, DFID, The Eastern Himalayan Network, DDS, SANFEC, and IDRC [Bhuwon Sthapit, IPGRI-APO, Pokhara, Nepal]



Participants of PPB Symposium interacting with women group during field visit in Begnas, Nepal



**INDIA: Project Design Workshop on Good Practices for Operationalizing the Benefit Sharing Provisions of the Convention on Biological Diversity at the Project Level, M.S. Swaminathan Research Foundation, Chennai, 28-30 June 2000.**

A Project Design Workshop on Good Practices for Operationalizing the Benefit Sharing Provisions of the Convention on Biological Diversity at the Project Level was held at M.S. Swaminathan Research Foundation (MSSRF), Chennai from 28-30 June 2000. Eleven representatives from different organizations, namely, United Nations Development Programme (UNDP), International Plant Genetic Resources Institute (IPGRI), International Potato Centre (CIP) and MSSRF attended the workshop.

In his opening remarks, Dr M.S. Swaminathan explained the scope of the workshop and the expected outcome. He also spoke on equity provisions of Convention on Biological Diversity (CBD) and the national arrangements for benefit sharing. Dr. Maria Tapia in his presentation elaborated the benefit sharing issues as applicable in Peru. Brief remarks were also made by Dr Bhag Mal about IPGRI's concerns and role in the area of plant genetic resources. Mr Tor Sukudol of UNDP made a presentation on 'GEF process for presentation of medium scale projects and explained about the GEF project' development and process. The discussions largely focussed on the design of travelling workshops and regional consultations and to identify the resource persons and the host institutes. The project design exercise mainly aims to develop and disseminate options of good practices for sharing the benefits from the conservation of sustainable use of biodiversity. It is expected to play a key role in guiding the project developers in the design of Global Environment Facility (GEF) projects. This exercise will involve three developing countries, namely, India, Ethiopia and Peru and is expected to enhance knowledge in designing and developing good projects in the area of conservation of biodiversity



Participants of Project Design Workshop on Benefit Sharing Provisions, MSSRF, Chennai, India

through knowledge in the following areas: a) collaboration with countries, b) improved access to plant genetic resources and c) equitable sharing of benefits.

A Drafting Committee was constituted to consider and streamline various aspects relating to good practices for operationalizing the benefit sharing provisions at the project level. Dr Bhag Mal of IPGRI Delhi Office was a member of this committee. The committee considered i) refinement of definition of benefit sharing, ii) scope of application, iii) multilateral system of exchange, iv) benefit sharing practices and their compatibility with equity provisions, v) national level consultations, vi) site workshops for validation, and vii) international consultation.

The following venues were identified for various workshops and consultations:

- *National level consultations:* i) CIP, Lima, Peru for Latin American Region; ii) ICRAF/UNEP, Nairobi, Kenya for African Region, and iii) CIFOR/KEHATI, Bogor, Indonesia for ASEAN and Australian Region.
- *Site workshops for validation:* i) Kerala Forestry Research Institute, Trichur/MSSRF Centre, Wyanad; ii) Cajamarca, Peru; iii) Nordic Genebank, Oslo, Norway; iv) Iwokrama, George Town, Guyana;

v) Addis Ababa, Ethiopia; and vi) ICIMOD, Kathmandu, Nepal.

- *International consultation:* MSSRF, Chennai, India.

## **Forthcoming Meetings**

### **MEXICO: International Symposium on Scientific Basis for Participatory Improvement and Conservation of Crop Genetic Resources, Oaxtepec, Morelos, Mexico, 8-14 October 2000.**

The symposium will lay emphasis on the participatory aspect of crop improvement. It will focus on the scientific basis for linking participatory crop improvement with resource conservation and will invite specific participatory projects for in-depth study [For details, contact Dr Adi Damania, Symposium Secretariat, Genetic Resources Conservation Programme, University of California, Shields Avenue; Davis, CA 95616, USA].

### **THAILAND: International Conference on Tropical Agriculture Technology for Better Health and Environment, at Kasetsart University, Kamphaeng Sean Campus, Nakhon Pathom, Thailand, 29 November - 2 December 2000.**

The conference will be held to

disseminate the knowledge, technologies and research activities related to tropical agriculture, which has had an important impact on health and environment [For details, contact: Dr Permpong Sriprasertsak, Secretariat, Fax (66) 34-3513920].

**USA: International Society of Citriculture - ISC 2000 Ninth Congress, Walk Disney World's Coronado Springs Resort, Driando, Florida, 3-7 December 2000.**

The programme will be targeted to industry problems and challenges, with

symposium on citrus production, post-harvest and processing [For details, contact: ISC Congress, University of Florida, Institute of Food and Agriculture Sciences, Citrus Research and Education Centre, 700 Experiment Station Road, Lake Alfred, Florida 33850, USA].

## Interesting Books, Periodicals and Websites

**Agarwal Anil, Sunita Narain and Anju Sharma, editors. Green Politics - Global Environmental Negotiations I. 1999.** Centre for Science and Environment, 41, Tughlakabad Institutional Area, New Delhi 110 062, India. 409 p.

The book in nine chapters provides a critical analysis of important environment related conventions. It discusses the Convention on Biodiversity, the Climate Change, UN Convention to combat Desertification, International Negotiations on forests, Proposed Multilateral Agreement on Investment (MAI), Global Environmental Facility and evolving institutional framework of the United Nations for Environment and Development. It is a comprehensive analysis presenting southern perspective of the impact of global environmental governance on the lives of real people. It takes information as the starting point to promote understanding between northern and southern governments and civil society. The information is centred on post-Rio conventions and negotiations. This publication is the result of information provided by the Global Environmental Governance Network partners, the institutional collaborations and the individual collaborations. Over 120 collaborators around the world have helped to provide information and broadening the perspective of this synthesis.

**APAARI. 1999. National Agricultural Research Systems in the Asia-Pacific Region - A Perspective.** Asia-Pacific Association of Agricultural Research Institutions, FAO Regional Office for Asia and the Pacific, Bangkok. 228 p.

This publication is based on the deliberations of the Expert Consultation on Agricultural Research Management organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI) at the Rural Development Administration, Suwon, Republic of Korea in October 1998. The contributed papers by member NARS have been dealt with in three parts. Part-I deals with the case studies presenting well developed NARS - India and the Philippines; Part-II on country status reports giving the current structure of NARS in the region, and Part-III deals with important regional networks. The publication presents different organizational models of NARS and R&D thrusts/approaches to meet food security. The strengths and weaknesses of the system have been reflected, particularly operation, management, coordination, and also the need for human resources development.

**Bhag Mal, P.N. Mathur and V. Ramanatha Rao, editors. 1999. Proceedings of the South Asia Network on Plant Genetic Resources (SANPGR) Meeting held at Nepal Agricultural Research Council, Kathmandu, Nepal, 1-3 September 1998.** IPGRI Office for South Asia, New Delhi, India. 179 p. [ISBN 92 9043 426 0].

This publication deals with the deliberations of the fourth meeting of SANPGR. Session- I reviews the follow-up actions on the recommendations of the last meeting; Session II deals with country reports presenting status of national PGR programmes of Bangladesh, Bhutan, India, Nepal and Sri Lanka; Session III presents activities

in the APO region in subregional and regional context and Session IV on national policies on Plant Genetic Resources for Food and Agriculture (PGRFA) and their implementation reflects the implementation of these PGR issues/policies by national programmes of this region; Session V discusses the strengthening of PGR collaboration, Session VI on promoting PGR conservation and use, and Session VII deals with identifying research and training needs. The publication provides an update on overall perspective of PGR activities for South Asia and will be useful to the countries in this region.

**Bhatia, A. and S. Karki, editors. 1999. Participatory Forest Management: Implications for Policy and Human Resources' Development in the Hindu Kush-Himalayas. Vol.1. Workshop Proceedings.** International Centre for Integrated Mountain Development (ICIMOD), GPO Box 3226, Kathmandu, Nepal. 83 p. [ISBN: 92 9115 9700, 92 9115 9840].

This volume provides information on ICIMOD's participatory Natural Resources' Programme, workshop objectives and an overview of participatory forest management in the Hindu Kush-Himalayas - broad goals of forest policies, laws, framework, community and participatory forest management, role of government institutions, human resource development, strategic issues for participatory forest management (PFM) in the Hindu Kush-Himalayas, and delves on policies such as equity and gender, benefit sharing, HRD challenges, sensitization of policy makers, constraints and advantages of PFM, factors for

successful PFM, and institutional challenge of The Hindu Kush-Himalayan Forum for Forestry Conservation and Management (HICOM) with strong country endorsements for the programmes.

**Chandel, K.P.S. and R.S. Paroda. 2000. Status of Plant Genetic Resources Conservation and Utilization in Asia-Pacific Region. Regional Synthesis Report.** Asia-Pacific Association of Agricultural Research Institutions, FAO Regional Office for Asia and the Pacific, Bangkok. 158 p.

This 'Regional Synthesis Report' has been prepared by APAARI on behalf of the FAO and is a joint publication of the FAO and APAARI. Information on the status of PGR conservation and utilization in Asia-Pacific region is covered in 11 chapters; these provide a brief introduction on the indigenous genetic resources, loss of genetic diversity and the need for its conservation, present status of germplasm collection, conservation and utilization of major staple food crops, organization of national programmes involved with these activities, emphasis on conservation and utilization, existing subregional and regional programmes, networks and international collaboration, policy issues, future priorities and overall recommendations. The appendices provide information on important crop commodities production in the Asia-Pacific and a list of economically important crop plant species of this region.

**Choudhary, S.L., G.S. Sharma and Y.L. Nene, editors. 2000. Ancient and Medieval History of Indian Agriculture and its Relevance to Sustainable Agriculture in the 21<sup>st</sup> Century. Proceedings of the Summer School held from 28 May to 17 June 1999, Rajasthan College of Agriculture, Udaipur.** Rajasthan College of Agriculture, Udaipur 313 001, Rajasthan, India. 363 p.

This book is mainly based on the lectures delivered during the Summer School conducted for senior level managers/

professors, etc. to provide in-depth information on the history of Indian agriculture and its relevance to sustainable agriculture in the 21<sup>st</sup> century. Over 40 papers have been included, providing details on the ancient and medieval periods of history; history of crop cultivation in prehistoric India; agriculture in the vedic period, ancient agricultural practices and scientific basis; seed-health in ancient history and its relevance to present day agriculture; history of cereals, its significance for achieving sustainable production; shifting cultivation, a replica of early stage in agriculture; agriculture and animal husbandry in ancient India; ancient history and scope of fruit culture for sustainable agriculture. A Foreword by Dr R.S. Paroda, Director General, ICAR and Secretary, DARE, Ministry of Agriculture stresses on the importance of this book for scientists and others engaged in study of agriculture.

**Engelmann, Florent and Hiroko Takagi, editors. 2000. Cryopreservation of Tropical Plant Germplasm. Current Research Progress and Application.** Japan International Research Centre for Agricultural Sciences (JIRCAS), Tsukuba, Japan/ International Plant Genetic Resources Institute (IPGRI), Rome, Italy. 496 p. [ISBN: 92-9043-428-7].

JIRCAS and IPGRI jointly organized an international workshop to assess the current status of research in cryopreservation, its applications, approaches and problems. The focus of the workshop was on the use of cryopreservation to conserve the germplasm of tropical plant species, to identify priority areas for collaborative research, technology development, transfer and application. The participants were both from developed and developing countries and presented their latest research results. The proceedings, thus, present a comprehensive overview of current knowledge concerning cryopreservation techniques, the status of the development of protocols for new species and their applications in genebanks. Apart from invited articles, over 40 poster presentations, as short

papers have also been included.

**Gaur, G.D. 1999. Flora of the District Garhwal, North West Himalaya (with ethnobotanical notes).** Trans Media, Media House, Bhandari Bag, Srinagar (Garhwal), U.P. 246 174, India. 811 p. [ISBN: 81 900807 3 3].

The publication attempts to document floristic diversity of seed-bearing plants from one of the richest zones of the Himalayas (Garhwal). Based on several years of observations, the book deals with characteristic features of widely distributed natural vegetation, cultigens and aliens, and changing scenario in the composition of vegetation, together with that of the threatened taxa. Systematic treatment of 2150 species belonging to 189 families, comprises up-to-date nomenclature, precise species description, elaborate as well as simple keys for classification and proper identification. Further, ethnobotanical information is given particularly on folk medicines, wild edible plants and others used locally for fodder, fibre, dyes and tannins or for miscellaneous purposes. Also, information provided highlights the plants useful in soil conservation, socio-agroforestry, apiculture, and sericulture, etc.

**IPGRI. 1999. Key Questions for Decision Makers. Protection of Plant Varieties under the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, Decision Tools. October 1999.** International Plant Genetic Resources Institute, Rome, Italy. 21 p. [ISBN 92 9043 420 1].

This publication is meant to assist decision-makers with the complex task of discerning the many issues of references to the conservation and management of plant genetic resources and devising a coherent and consistent policy and legislative response. This volume will be a useful tool to help understanding implementation options under Article 27-3 (b) of the TRIPS Agreement (which provides sufficient flexibility for countries to design a system that best fits their circumstances and meets their goals and objectives) as relevant to plant genetic resources.



Concern in this context are elaborated under national conditions and their obligations and objectives, key provisions of Plant Variety Protection (PVP) systems and patents and a *Sui generis* system.

**IPGRI. 2000. Descriptors for *Lathyrus* spp.** International Plant Genetic Resources Institute, Rome, Italy. 60 p. [ISBN 92 9043 436 8].

The descriptors for *Lathyrus* are mainly based on diversity observed for the three most important useful and widely cultivated species of genus *Lathyrus*: *L. sativus*, *L. cicera* and *L. ochrus*. However, these descriptors can be used also for other *Lathyrus* species. IPGRI encourages the collection of data for all five types of descriptors whereby data from the first four categories - Passport, Management, Environment and Site and Characterization - should be available for any accession. Descriptors listed under Evaluation allow for a more exclusive description of accession. This format represents an important tool for a standardized characterization system. The descriptor list provides an international format and thereby produces a universally understood language for plant genetic resources data. The Annexure 1 contains multi-crop passport descriptors. Also the collecting form for *Lathyrus* species is provided.

**MAFF. 2000. The Seventh Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan. International Workshop on Genetic Resources. Part I. Wild legumes.** Research Council Secretariat of MAFF and National Institute of Agrobiological Resources, Tsukuba, Japan, 13-15 October 1999. 235 p. [ISBN 4 93151 02 1].

The publication covers the proceedings of the international workshop on genetic resources of wild legumes. Two keynote addresses and nine papers in three sessions have been presented: Session I dealing with biosystematics and ecogeographic techniques, Session II with genetic diversity, evolution and conservation and Session III with research, evaluation and use. Diversity covered includes soybean, *Phaseolus*

beans, *Vigna* spp. and *Vicia faba*. Emphasis is given on wild species diversity and use of molecular markers in understanding/assessing the diversity.

**Nautiyal, S. and A.K. Kaul. 1999. Forest Biodiversity and its Conservation Practices in India.** Oriental Enterprises, 31-B Rajpur Road, Dehra Dun 248 001, India. 237 p. [ISBN 81 85901 08 2].

The publication provides synthesized information on all aspects related to biodiversity and its conservation in the context of Indian forests. The details are given in ten chapters that cover a wide range of topics; an introduction on forest biodiversity in India, geographical aspects; floristic diversity; plant biodiversity of different biogeographic zones; rare and threatened species; mangroves diversity in coastal ecosystem; biodiversity of arid and semi-arid regions, and implications of managing conservation in Indian Forests. Information is also provided on *in situ* conservation of biodiversity existing in the form of national parks, sanctuaries and biosphere reserves; on *ex situ* conservation in botanical gardens and in institutions as seed material, on *in vitro* genebank and its utilization. Also, an interesting chapter is added on conservation of fungal diversity in Kumaon Himalayas. A list is also compiled on selected countries/institutions as sources of seed for forestry research, which will be useful for exchange of material for research purposes.

**Padulosi, S., editor. 1999. Priority Setting for Underutilized and Neglected Plant Species of the Mediterranean region. Report of the IPGRI Conference, 9-11 February 1998, ICARDA, Aleppo, Syria.** International Plant Genetic Resources Institute, Rome, Italy. 150 p. [ISBN 92 9043 415 5].

This conference was attended by 70 participants and organized by the IPGRI Regional Office for Central and West Asia and North Africa (CWANA) located in ICARDA, Aleppo, Syria. The conference was meant to assist the

primary stakeholders such as NGOs, National Programmes and regional and international organizations to initiate action on the basis of a sound priority setting process based on consensus of all the participants. Part I of these proceedings discuss IPGRI's strategy for neglected and underutilized species and the human dimensions of agrobiodiversity. In Part II, the Mediterranean agrobiodiversity wealth is dealt with covering minor fruit tree species, cereals and forages, medicinal and aromatic plants, species for industrial uses and an article on almond germplasm conservation as a model crop for WANANET. Part III deals with country reports on underutilized species in Algeria, Cyprus, Lebanon, Morocco, Tunisia, Turkey and Egypt, and on safflower in Iraq. Part IV focuses on networking, presenting achievements of the MEDUSA network, and an analysis of the most used Mediterranean plant species. In Part V, priority setting on neglected and underutilized species is given along with workshop's recommendations.

**Scott, J. Gregory., Mark W. Rosegrant and Claudia Ringler. 2000. Root and Tubers for the 21<sup>st</sup> Century. Trends, Projections and Policy Options. Food, Agriculture and the Environment. Discussion Paper 31, May 2000.** International Food Policy Research Institute, 2033K Street, NW Washington DC, 2006. 64 p. [ISBN 0 89629 635 0].

This discussion paper developed jointly by International Potato Centre (CIP) and International Food Policy Research Institute (IFPRI) provides a global perspective on major root and tuber crops - cassava, potato, sweet potato and yam which play a significant role in global food system. Excepting yam, they rank among the top ten food crops produced in developing countries. Trends in the use and supply of roots and tubers are discussed and projections provided on production and uses, concern on growth scenario, high demand and environmental effects. Their importance for improving the welfare of the poor people to meet food security and linking smallholder farmers has been

highlighted.

**Yadav, J.S.P. and G. B. Singh, editors. 2000. Natural Resources Management for Agricultural Production in India.**

International Conference on Managing Natural Resources for Sustainable Agricultural Production in the 21<sup>st</sup> Century, 14-18 February 2000, New Delhi. 1022 p.

This voluminous publication brought out during the international conference deals with invited articles from specialists. The contents are dealt in two parts. Part-I deals with soil, water and weather/climate resources management, and management of agro-biodiversity and value of multipurpose tree species. Part II deals with diverse ecosystems such as management of arid agro-ecosystem, rainfed agro-ecosystem, irrigated agro-ecosystem, hill and mountain agro-ecosystem and the coastal ecosystem. The ten chapters on the above topics have been very systematically covered and information is well-synthesized.

**Zhou, M., Z. Zhang and V. Ramanatha Rao, editors. 1999. Conservation and Use of Plant Genetic Resources in East Asia. Proceedings of the meeting of the Regional Network for Conservation and Use of Plant Genetic Resources in East Asia, 14-16 September 1998, Suwon, Republic of Korea. IPGRI Office for East Asia, Beijing, China, 97 p. [ISBN 92 9043 423 6].**

The publication contains 13 papers, dealing with the country reports of China, Japan, Republic of Korea and Mongolia; an overall view of IPGRI activities in East Asia; National Information Network and implementation of the Global Plan of Action in Plant Genetic Resources of East Asia. Specific topics dealt with include: conservation of rare and endemic plant genetic resources in Mongolia; studies on on-farm management in Republic of Korea; molecular techniques for assessing plant genetic diversity; data and information resources management in genebanks. Recommendations stressed on development of a regional PGR directory, increased collaboration among crop

networks through EA-PGR, *ex situ* management of germplasm, particularly the regeneration activities, development of 'Accession Management Monitoring System' by China and Japan; identification of minimum descriptor list for priority crops of East Asia; identification and elimination of duplicate accessions from genebanks, *in situ* management of rare species for conservation in China and Mongolia and identifying areas for study of on-farm management of diversity. All members laid emphasis on more studies on use of molecular methods in assessing diversity. Studies were recommended on adzuki bean (Japan), rice (Republic of Korea) and buckwheat (China). Importance of germplasm exchange was stressed and for public awareness, a poster by IPGRI-APO will be developed.

### Periodicals/Reports

**Asian Agri-History. 2000 (Vol.4, No.2, April-June 2000).** Asian Agri-History Foundation, 47 ICRISAT Colony 1, Brig. Sayeed Road, Secunderabad 500 004, Andhra Pradesh, India. Pp. 85-172 [ISSN 0971 77 30].

Asian Agri-History is an international journal of history of Asian agriculture including environment. It is a quarterly publication of the Asian Agri-History Foundation (AAHF), a non-profit trust which facilitates dissemination of information on agricultural history to promote research on sustainable agriculture in the South and Southeast Asia region. This issue contains interesting articles on the famous Royal Botanic Garden, Calcutta and on coconut in the folk culture of Orissa. Among other interesting articles, one deals with the future for the Indian village and another on peasantry in pre-modern India - both being very thought provoking contributions. Also useful, historical information is provided on opium poppy and tobacco and on forests and wild life from old literature - Kautilya's Artha-Sastra.

**Botanic Gardens Conservation International. The Gran Canaria Declaration - Calling for a Global Progress for Plant Conservation.**

Botanical Gardens Conservation International Deseanso House, 199 Kew Road, Richmond, Surrey, TW93BW, UK. 4 p.

Gran Canaria Declaration is the outcome of the meeting held in Gran Canaria, Spain on 3-4 April 2000 to consider the need for a global initiative for plant conservation. Fourteen countries participated. The group resolved that a Global Strategy for Plant Conservation and associated programme for its implementation should be developed urgently within the framework of CBD. The aim of this programme would be to support and facilitate appropriate plant conservation initiatives at all levels, aimed at helping the current and continuing un-acceptable loss of plant diversity. The strategy addressed for enhanced collaboration and networking with diverse partners including NGOs and local communities.

**Ethnobotany. 1999 (Vol.11, Nos.1 & 2).** Deep Publications, A3/27A DDA Flats, Paschim Vihar, New Delhi 110063. 155 p. [ISSN 0971 1252].

Ethnobotany is a half-yearly journal brought out by the Society of Ethnobotanists and provides diverse information on topics of ethnobotanical interest. This issue contains 26 articles that deal with plant worship, folk/ethnic medicine, wild edible plants, home gardens, and ethnobotanical studies in tribal areas such as Garhwal Himalayas. The article on 'Comparison of past and present distributions of Hawaiian bananas with emphasis on factors shaping their distribution is interesting.

**Global Newsletter on Underutilized Crops. 2000 (June issue).** ICUC, Institute of Irrigation and Development Studies, The University of Southampton, Highfield, Southampton SO17, 1BJ, UK. 32 p.

This newsletter includes ICUC (International Centre for Underutilized Crops) activities which provide global coverage on underutilized species networks in Africa, Asia, Europe and

other regions. Interesting information is provided on cat's claws (*Uncaria tomentosa*) an anti-inflammatory agent, effective in treatment of arthritis, gastritis and various haematological infections. Information is provided on important future meetings and the publications on underutilized crop and agrobiodiversity aspects, agroecosystems, R&D aspects etc. Brief information on activities of regional and other crop based regional and international meetings is provided such as on APAARI, DFID, FAO, UTFANET, Cucurbit network, TF-NET and others. UTFANET has now moved to PCAARD and the new Coordinator is Dr Flordeliz D Tiamzon.

#### **ICRISAT Annual Report. 2000. Science with a Human Face.**

International Crops Research Institute for the Semi-Arid Tropics, Patancheru 502 324, Andhra Pradesh, India. 44 p [ISSN 1017 9933].

The report highlights activities in agricultural research and development undertaken by ICRISAT in Asia, Southern and Eastern Africa, Western and Central Africa. A brief update on recent programme strategies, activities and accomplishments is given particularly on: i) Genetic resources and enhancement, ii) Natural Resources Management, iii) Socioeconomics and Policy, and iv) Information Resource Management. Publications brought out during 1999 have been listed.

**IPGRI/FAO. 2000. Plant Genetic Resources Newsletter (No.121).** International Plant Genetic Resources Institute, Via delle Sette Chiese 142, 00145 Rome, Italy. 70 p. [ISSN 1020 3362].

This newsletter is quarterly published by

IPGRI/FAO and deals with activities on plant genetic resources in wider perspective. The issue includes among other articles, two interesting articles from APO region: i) Participatory methods for collecting germplasm: Experiences with farmers in Rajasthan, India, and, ii) Assessment of diversity among *Taxus wallichiana* accessions from Northeast India using RAPD analysis.

#### **PROSEA Foundation Annual Report.**

**1999.** PROSEA Publication Office, P.O. Box 341 6700, A4 Wageningen, The Netherlands. PROSEA Network Office, PO Box 332, Bogor 16122, Indonesia. Bogor/Wageningen March 2000. 56 p.

This annual report provides information on PROSEA programme and highlights the work undertaken during 1999. It gives information on PROSEA databank, PROSEA handbooks published so far and under publication, and on other publications and the CD-ROMs, and their dissemination/distribution, information on training and workshops, etc.

#### **Websites**

<http://www.wcmc.org.uk/index.html>

This site provides information services on conservation and sustainable use of the world's living resources and helps others to develop information systems of their own. The information services include: i) Latest News and Products, ii) Conservation Databases, iii) Information Services, iv) International Conventions and Programmes, v) Capacity Building and Training and species information like i) The World List of Threatened Trees, ii) Threatened Plants of the World.

<http://www.agroforester.com/overstory/osprev.html>

This free e-mail journal serves people working with tropical agroforestry, forestry and sustainable development in 131 countries. The contents include: i) Homegardens, ii) Structure of Homegardens, iii) Food Production from Homegardens, iv) Research on Homegarden Systems.

<http://www.cgiar.org/ifpri>

The International Food Policy Research Institute (IFPRI) launched its World Wide Website in 1997. Since then, the site has grown significantly to include information on research programmes and projects, many publications available for free download, many Spanish, French, and Portuguese translations, job postings, media relations and conference information to name a few.

<http://www.nature.com/nature>

A collection of reviews in 'Nature Insight' focuses on the science of biodiversity covering underlying concepts, pure and applied research, and biodiversity loss from the human perspective.

<http://www.futureharvest.org>

Scientists from international research centres in Asia, Africa and Latin America highlight global efforts to advance sustainable food production.

<http://news.bbc.co.uk/hi/english/static/events/reith 2000/>

The site provides a series of lectures on sustainable development, biodiversity and poverty.

<http://www.new-agri.co.uk/>

This site provides the current edition of 'New-Agriculturist' on line magazine.

## **Scientific Contributions**

### **In vitro Conservation of Citrus Germplasm**

The National Citrus Repository occupying 14 ha area has been established in Chongqing, where more

than 1000 accessions were collected and preserved. However, in the recent past, the number of accessions decreased due to many reasons. Aiming at conserving the important germplasm of citrus *in vitro*, the studies were initiated several years

ago with the support of National Nature Science Foundation of China. This paper summarizes the important findings.

**Callus induction and preservation:** Embryogenic calli of commercial varieties



such as Jincheng sweet orange, Ponkan mandarin and Satsuma mandarin were induced from the unfertilized or immature ovules. More than 60 genotypes of citrus including those given by Dr Grosser of the University of Florida were preserved *in vitro* as callus for research purpose. The oldest one, Jincheng sweet orange, introduced 16 years ago and kept in hormone free medium, still maintains embryogenesis capacity. Each year, a few calli of some local varieties were added to the list. This small callus bank covers most of the commercially cultivated varieties in China, and has been providing material for protoplast fusion as well as for genetic transformation. More than 30 intergeneric and interspecific somatic hybrids have been developed. The calli were kept in the medium at 25°C by sub-culturing at one month interval.

To prolong the time between subcultures, an experiment was designed for keeping the calli at low temperature. Calli of twelve genotypes (Valencia sweet orange, Anliuchen sweet orange, Newhall navel orange, Ponkan, Sour orange, *Microcitrus*, Satsuma mandarin, Murcott tangor, Marsh grapefruit, Minneola tangelo and Kumquat, etc.) were cultured and kept at 10°C without light for one year. All of them survived and slowed down the growth. The average growth rate at 10°C for one year was just equal to that of 3 weeks culture at 25°C. These calli recovered growth when transferred to normal temperature. Interestingly, some genotypes showed increasing capacity of embryogenesis; the calli regenerated embryoids directly without any induction treatment after they were shifted into normal temperature. For those genotypes that had lost the embryogenesis capacity, the low temperature conservation could not recover it.

**Shoot tips and shoots conservation at low temperature:** Since the somaclonal variation commonly occurred in callus induction and regeneration, shoots and the rooted plants *in vitro* were

used for the conservation in the culture chamber at 5°C. Two genotypes, trifoliolate orange (*Poncirus trifoliata*) and red tangerine, were used. Results showed that the shoots of trifoliolate orange had 90% survival rate after 15 months of storage without subculturing with 100% of the plantlets surviving. Red tangerine required higher temperature; under 10°C, shoots had 60% survival rate after 9 months in the medium without subculturing. Shoots that survived could recover growth when transferred to the normal conditions. Mature shoots from field used in the experiment, however, were recalcitrant to regenerate, especially in the old cultivars. Until now, the mature shoots were not successfully conserved *in vitro*. This method has great potential for the conservation of germplasm of the polyembryonic varieties since their nuclear embryos can easily regenerate plants true to type. As an alternative for liquid nitrogen conservation, this method is suitable for use in the developing countries where the liquid nitrogen is not available, or it is costly.

**Cryopreservation of shoot tips:**

Trifoliolate orange and three genotypes of sweet orange were used in this experiment and the vitrification method was adopted. Shoot tips about 2.5 mm long, were pre-cultured in 5% DMSO medium for 0-6 days before treating with 60% PVS for loading, followed by dehydration of PVS at 0°C and then kept in liquid nitrogen. The results indicated that 6-day pre-culture followed by 30 minutes loading and then one hour dehydration was satisfactory for all the tested genotypes, although there were slight differences among them. The shoot tips were cultured in the medium after thawing. Culture results showed that 90% of the shoot tips of trifoliolate orange and 20-30% of sweet orange recovered growth. The mature shoot tips were also tested and they survived in the liquid nitrogen, however, they did not regenerate because of poor regeneration capacity of the mature materials in the open field.

**Somaclonal variation:** Aiming to understand the origin of variation occurring during culture, a 2-times protoplast culture was adopted to obtain the sister-lines to eliminate the possibility of pre-existing variation in the explant, which has been considered as one of the causes of variation. Low-melting point agarose embedding was used for the protoplast culture and the colony was picked out one by one and cultured separately. The picked colony was used once more for the protoplast culture and regeneration using the same procedure as the first one. Two times protoplast culture led to the regeneration of sister lines, which originated from the same cell a few months ago. Chromosome count of the initial calli and the sister lines of Newhall navel orange and other five genotypes verified that chromosome variation had already existed in the calli. For Newhall navel orange, in addition to diploid cells (93%), tetraploid (5%) and aneuploid (2%) cells were observed. Interestingly, its sister lines derived from the same cell also harboured non-diploid cells. In this research, 8 lines of Newhall were checked and all of them showed 7.1-6.1% (6.4% on average) of non-diploid cells. None of the lines was a pure diploid. The results indicated that chromosome variation occurred in the regeneration process. In fact, chromosome bridges and other abnormal cell division phenomena were also observed during the regeneration. The variation at the callus stage could not represent the regenerants. Recently, RAPD and AFLP markers were also used for the study of the variation produced during the *in vitro* conservation. The purpose of such studies was to understand the mechanism of occurrence and finally to find the methodology to control or decrease the variation.

From these studies, it can be concluded that the slow growth strategy by lower temperature culture is one way to control the variation as it could decrease the time of cell division compared to the normal temperature. Liquid nitrogen is the ultimate solution since all the activity

of cell nearly stops at that temperature [Dr Xiuxin Deng, Yujin Hao and Zicheng Wang, The National Key Laboratory for Crop Genetic Improvement and Citrus Research Institute of Huazhong Agricultural University, Wuhan, Hubei 430070, P. R.China].

### Cryopreservation of Desiccation Sensitive Seeds

National Bureau of Plant Genetic Resources in collaboration with IPGRI had undertaken research with funding from DFID (UK) to identify the biological mechanisms determining the recalcitrance in seeds of tea, cocoa and jackfruit and to develop cryopreservation techniques for the long-term conservation of recalcitrant seeds and vegetatively propagated plant species in India. Research on these projects is being carried out since 1991. These studies aim to investigate the biological mechanisms determining degree of recalcitrance in several recalcitrant and intermediate seed species to enable adoption of appropriate methodologies and protocols for their conservation. Cryopreservation techniques were devised and their applicability on a large scale to diverse germplasm of tea, cocoa, jackfruit, litchi and almond was ascertained. Brief report on research findings is presented.

### Research Highlights

Cryobiological studies at National Cryobank at NBPGR have concentrated mainly on the desiccation sensitivity of whole seeds and embryonic axes of tea, cocoa, litchi, jackfruit and almond at different maturity stages and ascertaining their critical moisture content for liquid nitrogen (LN) exposure. Simultaneously work on these lines was initiated on other desiccation sensitive seed species. Air desiccation in laminar flow followed by fast freezing in LN has been the preferred method, being simple and practical. Results and success achieved during experiments conducted with different fruit species is given in Table 1. These point out the following:

- In litchi (*Litchi chinensis* Sonn.), embryonic axes from seeds of varieties Rose Scented and Calcuttia harvested 60-80 days after anthesis survived LN exposure (percentage recovery 22-35%) at low moisture contents of 12.1-18.3%. This is the first report of successful cryopreservation in litchi.
- In tea (*Camellia sinensis* (L.) O.Kuntze), high percentage recovery (80-90%) after cryopreservation of axes was achieved using partially mature and fully mature seeds.
- In jackfruit (*Artocarpus heterophyllus* Lamk.), 25-30% survival of
- cryopreserved axes from partially mature and fully mature seeds was achieved. This is the second report of successful cryopreservation in this species.
- In almond (*Prunus amygdalus* Batsch.), axes survived LN exposure well with recovery percentage of 70-100%.
- Cocoa (*Theobroma cacao* L.) was found to be the most desiccation intolerant and no survival of cryopreserved axes was achieved in spite of manipulation of maturity stages, size of explant and rate of freezing.
- Use of vitrification, an improved



a. National Cryobank at NBPGR, b,c. Two months old plantlets of *Citrus medica* raised from a) fresh and b) cryopreserved embryonic axes d,e. Plantlets of almond raised from d) fresh and e) cryopreserved embryonic axes.

Table 1: Success achieved in Cryopreservation of desiccation sensitive seeds at NBPGR

Crop	Species behaviour	Seed Storage	Technique used	Explant used	Optimal MC%(f.wt)	Success (% survival)
Tea	<i>Camellia sinensis</i>	I	DFF*	EA	13.2-14.3	80-90
Jackfruit	<i>Artocarpus heterophyllus</i>	R	DFF	EA	14.5-14.8	25-30
			Vitrification	EA	-	30-35
Litchi	<i>Litchi chinensis</i>	R	DFF	EA	12.1-18.3	22-35
			Vitrification	EA	-	40-50
Trifoliate Orange	<i>Poncirus trifoliata</i>	R	DFF	EA	14.0-16.0	50-68
Citrus	<i>Citrus</i> sp. (12 spp.)	I	DFF	Seeds/EA	8.0 -12.0	60-100
Oak	<i>Quercus leucotrichophora</i>	R	DFF	EA	13.0-14.0	15-25
Neem	<i>Azadirachta indica</i>	I	DFF	Seeds	4.0-13.5	50-75
			DFF	EA	4.0 -8.0	90-100
			Vitrification	EA	-	90-100
Almond	<i>Prunus amygdalus</i>	I	DFF	EA	7.0-10.0	70-100
Black Pepper	<i>Piper nigrum</i>	I	DFF	Seeds	6.0-12.0	60-70
Cardamom	<i>Elettaria cardamomum</i>	I	DFF	Seeds	7.0-14.0	70-80
Banana	<i>Musa balbisiana</i>	I	DFF	Seeds	13.2	90

DFF- Desiccation followed by fast freezing at -196°C ; R-Recalcitrant; I- Intermediate; EA- Embryonic axes

method for cryopreservation brought some improvement in recovery percentage of cryopreserved axes in neem, jackfruit and litchi when compared with air desiccation method.

- Ultrastructural studies of the subcellular organisation of radical portion of tea, cocoa, jackfruit and litchi axes at various stages of seed development and during desiccation and freezing revealed varying degrees of damage ranging from invaginations of the membranes to their complete collapse in these species. Membrane bound organelles in parenchymatous cells were the most affected by desiccation and freezing stress. Positive correlation in degree of deterioration of subcellular components was observed with their respective intolerance to desiccation and freezing.
- For cryopreservation, simple technique of air desiccation to 4-11% moisture content followed by fast freezing has proved satisfactory.
- Use of *in vitro* technology for regeneration of plantlets from

cryopreserved axes practically free of any callus has proved successful in these species.

- Whole seeds of *neem*, citrus, black pepper, cardamom and banana have also been successfully cryopreserved. Varied germplasm of *neem*, citrus spp., tea and almond collected from different agro-climatic zones of the country exhibited fairly uniform response to desiccation and LN exposure. High survival of cryopreserved embryonic axes of tea, *Citrus* sp., *neem* and almond and seeds of black pepper has prompted the establishment of their base collection in National Cryobank.

### Future Thrusts

Collaborative research programme with IPGRI on cryopreservation has facilitated in strengthening the national programme on conservation of genetic resources of intermediate and recalcitrant seeds. Future thrust areas in this direction are:

- Testing for wider applicability and cost effectiveness of cryopreservation protocols to diverse range of germplasm.

- Extensive application of cryotechnology for establishing base collection of intermediate seed spp. like citrus, black pepper, almond, oil palm, *neem*, etc.

- Further strengthening of on-going basic studies on seed storage behaviour of indigenous recalcitrant spp. such as *Madhuca*, *Garcinia*, coconut, arecanut and of intermediate species such as oil palm, *Citrus* spp. wild apricot, utilising multidisciplinary approaches.

- Strengthening collaborative linkages especially with IPGRI, FAO, etc. for studies on cryopreservation of shoot tips, meristems and somatic embryos of citrus, jackfruit, litchi and mango. Also conservation of species based on agro-ecological analogues e.g. arid, semi-arid, wet tropics, mangroves etc.

[Dr Rekha Chaudhury, Sr. Scientist and Dr. S.K. Malik, Scientist, Tissue Culture and Cryopreservation Unit NBPGR, Pusa Campus, New Delhi-110 012, Email- rekha@nbpgr.delhi.nic.in].



# Useful Names & Addresses

## APAARI

Asia-Pacific Association of Agricultural Research Institutions  
FAO Regional Office for Asia and the Pacific  
39 Phra Atit Road  
Bangkok 10200  
Thailand

## AVRDC

Asian Vegetable Research and Development Centre  
P.O. Box 205, Taipei 10099  
Taiwan

## CSC

Centre for Science and Environment  
41, Tuzlakabad Institutional Area  
New Delhi 110 062  
India

## ICIMOD

International Centre for Integrated Mountain Development  
4/80 Jawala Khel  
GPO Box 3226  
Kathmandu  
Nepal

## ICUC

International Centre for Underutilized Crops  
Institute of Irrigation and Development Studies  
The University of Southampton  
Highfield Southampton SO17 1BJ  
UK

## JIRCAS

Japan International Research Centre for Agricultural Sciences  
1-2 Ohwashi, Tsukuba  
Ibaraki 305-8686  
Japan

## NIAR

National Institute of Agrobiological Resources  
Kannondai 2-1-2, Tsukuba  
Ibaraki 305  
Japan

Botanical Gardens Conservation International  
Deseanso House  
199 Kew Road  
Richmond  
Surrey TW 93 BW  
UK

Global Environmental Centre  
7A Jalan 19/29  
46300 Petaling Jaya  
Selangor  
Malaysia

## Dr Pons A. Batugal

Senior Scientist, COGENT Coordinator  
IPGRI Regional Office for Asia, the Pacific and Oceania  
PO Box 236, UPM Post Office  
43400 Serdang  
Selangor Darul Ehsan  
Malaysia

## Professor Junyi Gai

Director  
National Centre of Soybean Improvement  
Nanjing Agricultural University  
Nanjing 210 095  
PR China

## Dr J. Coosje Hoogendoorn

Deputy Director General (Programmes)  
International Plant Genetic Resources Institute  
Via delte Sette Chiese 142  
00145 Rome  
Italy

## Dr. S.D.G. Jayawardena

Director General of Agriculture  
Department of Agriculture  
Peradeniya  
Sri Lanka

## Dr R. S. Paroda

Secretary, DARE and  
Director General, ICAR  
Indian Council of Agricultural Research  
Krishi Bhavan  
New Delhi 110 001  
India

## Dr Percy E. Sajise

Regional Director  
IPGRI Regional Office for Asia, the Pacific and Oceania (APO)  
PO Box 236, UPM Post Office  
43400 Serdang, Selangor Darul Ehsan  
Malaysia

## Dr M.S. Swaminathan

Chairman  
M.S. Swaminathan Research Foundation (MSSRF)  
1, Taramani Institutional Area  
Chennai 600 113  
India

## Dr K. Takeda

Director  
Barley and Wild Plant Resources Centre  
Research Institute for Bioresources  
Okayama University  
Japan

## Dr Ri Jin Yong

Senior Officer  
Bureau of International Science & Technology Cooperation  
Academy of Sciences  
Pyongyang  
DPR Korea

## The Newsletter is produced by

Dr Bhag Mal, Coordinator and Dr R. K. Arora, Hon. Research Fellow, IPGRI Office for South Asia, with support from: Dr Percy E. Sajise, Regional Director, Dr V. Ramanatha Rao, Senior Scientist (Genetic Diversity/Conservation), Dr Pons Batugal, COGENT Coordinator, Dr Paul Quek, Documentation/Information Specialist at the IPGRI Regional Office for Asia, the Pacific and Oceania; Professor Zhou Ming-De, Coordinator and Mr Zhang Zongwen, Associate Coordinator at the IPGRI Office for East Asia, and Dr P. N. Mathur, Associate Coordinator at the IPGRI Office for South Asia. The addresses of these offices are:

### IPGRI Regional Office for Asia, the Pacific and Oceania

PO Box 236, UPM Post Office  
43400 Serdang, Selangor Darul Ehsan, Malaysia  
Tel: (603) 89423891; Fax: (603) 89487655  
Email: ipgri-apo@cgiar.org

### IPGRI Office for South Asia

c/o NBPGR, Pusa Campus,  
New Delhi 110012, India  
Telex: 31-77257 NBGR IN  
Tel: (91-11) 5731845, 5786112,  
Fax: (91-11) 5819899  
Email: ipgri-delhi@cgiar.org

### IPGRI Office for East Asia

c/o CAAS, No. 30 Bai Shi Qiao Road,  
Beijing 100081, P.R. China  
Telex : 222720 CAAS CN, Tel : (86-10) 62183744  
Fax: (86-10) 62174159  
Email: ipgri-caas@cgiar.org