APAARI Newsletter

Asia-Pacific Association of Agricultural Research Institutions

VOL 18, No. 1 June 2009 ISSN 0858-6063

CONTENTS

Editorial

The past few decades have witnessed tremendous agricultural development and economic growth through the spread of high yielding crop varieties and hybrids. While the gains have been very impressive particularly in addressing food security in the developing countries, the input intensive agriculture, much dependent on greater use of chemical fertilizers, pesticides etc. has resulted in some undesirable/adverse effects on the environment and the overall sustainability of the farming systems. Accordingly, to address this global concern, the wider use of biopesticides and biofertilizers is gaining importance. Thus, the demand for technologies and products based on biological processes has been increasing steadily. Worldwide data for biofertilizer market are not available though the sale volume is estimated to be US$ 3 billion. This is likely to increase further, as more area comes under organic farming. Currently, nearly 22 million hectares of land is cultivated organically.

While some Asian countries like Japan, India, Chinese Taipei and Korea have made significant advances in the development and use of biopesticides and biofertilizers, their potential remains largely underutilized due to several reasons. Compared to chemical agents, bioagents are perceived to have low efficacy. There is limited information on how best to use them in particular agro-ecosystems and as components of integrated pest and nutrient management strategies. Long-term impact assessment studies of biopesticides and biofertilizers including ecological impacts are lacking. Regulatory and registration systems specifically suited to the potential advantages and limitations of bioagents are still evolving. Public awareness and stewardship programs need to be undertaken along with promotion and marketing. Also, several technological and policy issues have been identified which need to be addressed on priority.

Keeping in view the potential of biopesticides and biofertilizers as an important component of sustainable agriculture, particularly on small-farmer holdings, the Asia-Pacific Association of Agricultural Research Institutions (APAARI) has decided to organize an Expert Consultation on "Biopesticides and Biofertilizers for Sustainable Agriculture" in 2009. As a follow-up, the Steering Committee of Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), a program of APAARI, in its meeting held on 30th January 2009 decided to hold the Expert Consultation in Taiwan, as a part of the APAARI-CoA Taiwan collaborative program. The Council of Agriculture (CoA), Taipei, being an active member of APAARI, has offered to host the meeting at Taiwan Agricultural Research Institute, Taichung from 27-29 October, 2009.

The main objective of the meeting will be to: (i) Review the current status of research, development and use of biopesticides and biofertilizers in agriculture at the regional level; (ii) Develop consensus on issues of quality control, regulatory management, commercialization and marketing; (iii) Identify the role of public and private sector organizations and public-private participation in promoting use of bioagents in agriculture; (iv) Promote stewardship, public awareness and stakeholders' participation; and (v) Highlight technological and policy issues and areas of regional cooperation.

It is expected that with diverse expertise/participation of NARS, CG Centers, Regional Fora, GFAR and other international organizations, NGOs and FOs; several emerging issues will be addressed to find a way forward towards promoting the use of biopesticides and biofertilizers for sustainable agriculture in the Asia-Pacific.

Editors

C/o Food and Agriculture Organization of The United Nations, Regional Office for Asia and the Pacific, Maliwan Mansion
39 Phra Atit Road, Bangkok 10200, Thailand Tel: +662-697-4371, Fax: +662-697-4408, E-mail: apaari@apaari.org, http:// www.apaari.org/

ICRISAT Genebank- Conserving Biodiversity for Food Security

The Rajendra S. Paroda Genebank at ICRISAT, Patancheru, India serves as a world repository for the *ex situ* collections of five mandate crops: sorghum, pearl millet, chickpea, pigeonpea and groundnut, beside six small millets (finger millet, foxtail millet, little millet, kodo millet, proso millet, and barnyard millet). With 119,074 accessions assembled from 144 countries, the collection is currently the largest among the genebanks for these crops. The collection includes 116,349 cultivated accessions and 2,725 accessions of wild non-domesticated species. These provide insurance against genetic erosion and good source of tolerance to diseases and pests, beside improved grain quality and yield. Several landraces conserved in the ICRISAT genebank have already disappeared from their natural habitats both in Africa and Asia.

Dr. Raj Paroda with Dr. Hari Upadhyaya, Head, ICRISAT Genebank

Germplasm Collections in-trust

A majority of the collections (96%) has been placed in-trust with the Food and Agriculture Organization (FAO) of the United Nations on behalf of the Governing Body of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), under the multilateral system and is available to the world community using Standard Material Transfer Agreement (SMTA).

Germplasm Characterization, Evaluation and Regeneration

Majority (96%) of the collection in the genebank has been characterized for important morpho-agronomic traits. After several years of detailed evaluation and screening for biotic, abiotic stresses and for quality characteristics (by multidisciplinary teams of ICRISAT and national program scientists), new genetic stocks have been identified for use in crop improvement. Germplasm has also been evaluated for agronomic traits over locations jointly with NARS scientists in Burkina Faso, Canada, China, Ethiopia, India, Indonesia, Japan, Kenya, Namibia, Nepal, Thailand, Ukraine, USA and Vietnam. The results have led to better understanding of the germplasm conserved. Hundreds of such genetic stocks have already been identified and are being used by NARS scientists throughout the world.

Also, many national program scientists have been trained in plant characterization. Regeneration is one of the most important processes at the genebank. Germplasm samples for conservation are multiplied mainly during the post-rainy season (October-April) to get better quality seed. Genetic integrity is maintained by pollination control while regenerating cross-pollinating crops such as sorghum, pearl millet, and pigeonpea.

Germplasm Conservation

The active collections are stored in standard aluminum cans for all crops and in plastic cans for groundnut at 4°C and 30% relative humidity. These active collections (kept for medium-term storage) are available for multiplication and distribution to research collaborators. Base collections are kept for long-term,

Range of Variation in Chickpea Germplasm

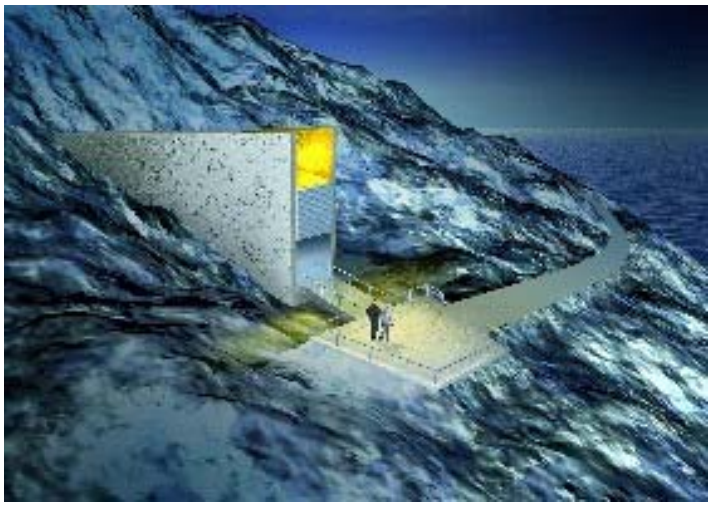
Regeneration of Pearl Millet Germplasm

solely for 'posterity', and are not drawn upon except for viability testing and subsequent regeneration, if needed. These collections are maintained at -20°C in vacuum packed standard aluminum foil pouches at 3-7% seed moisture content, depending on crop species and with initial seed viability above

85%. Base collections ensure long-term viability of material (more than 50 years) as a backup to the active collection. Germplasm accessions that do not produce adequate seed for conservation (such as wild species of groundnut and pearl millet), are maintained as live plants in a botanical garden and in green houses.

Ensuring Germplasm Safety

ICRISAT Genebank is designed to withstand natural disasters. For further safety, the base collection is duplicated in other genebanks. Duplicates of a large portion of chickpea germplasm are conserved at the International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria; and pearl millet, groundnut and small millets at the ICRISAT Regional Genebank, Niamey, Niger. The Nordic Gene Bank has invited ICRISAT to deposit its in-trust seed collections at the Svalbard Global Seed Vault (SGSV), Norway. ICRISAT proposed a 5 year schedule to deposit about 111,000 germplasm seed samples of its five mandate crops and six small millets. During 2008, ICRISAT genebank has deposited 20,000 accessions of various crops at SGSV. Dr. William D. Dar, Director General, ICRISAT was part of the delegation that participated in the opening of this global initiative.



The Svalbard Global Seed Vault

Directors General of ICRISAT and IRRI during the Inauguration

Making a Long-Term Impact

Rajendra S. Paroda Genebank has been highly successful in assembling and conserving germplasm as part of the global effort for the conservation of biodiversity for food security. The greatest impact is in conserving the germplasm and making diverse material readily available for use in crop improvement globally, including the semi-arid tropics. ICRISAT's Genetic Resources Unit continues to assemble germplasm from unexplored areas of diversity, and make it freely available for use in crop improvement for the benefit of humankind. Also, for overall sustainability of its program, ICRISAT has trained a large number of scientists and technicians from developing countries in Asia and Africa on germplasm collection, conservation, characterization, evaluation and documentation. These trained scientists are now helping their countries in conserving and utilizing the genetic resources.

(Source: Hari D. Upadhyaya, C.L.L. Gowda and D.V.S.S.R. Sastry, ICRISAT, Patancheru, India, h.upadhyaya@cgiar.org)

Dr. William Dar Honoured

Dr. William D. Dar, Director General, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Ex-Chairman, APAARI, was honored with the Father Jose Burgos Award on February 4, 2009, the highest recognition given by the provincial government of Ilocos Sur, Philippines, to national or international achievers who have rendered outstanding service to the Filipinos. The award was given to him for his outstanding contribution to the field of agriculture.

Dr. Dar strives to help alleviate the conditions of the poor people living in the drylands of Asia and sub-Saharan Africa. Egged on by the Ilocos Surian spirit, Dr. Dar has learnt to tackle each contentious issue, understand it and then bring about a transformation in the lives of the poor through innovations and partnerships in ICRISAT's R&D work.

Accepting the award through his representative, Dr. Dar said, "This award in a way is a validation of all I struggled for during my childhood. I believe that individuals have in them the tenacity and will to create the energy and momentum to mobilize change, to be the yeast that enables growth". APAARI family congratulates Dr. Dar for this well deserved recognition.