

# Seventh International Training Course *In Vitro* and Cryopreservation for Conservation of Plant Genetic Resources: Current Methods and Techniques

17-28 February 2014, NBPGR (ICAR), New Delhi, India

The National Bureau of Plant Genetic Resources (NBPGR), is a nodal organization under the aegis of Indian

Council of Agricultural Research (ICAR) for the management of plant genetic resources in India. NBPGR operates as per the mandate of the Government of India and actively contributes to the global efforts in ensuring food and nutritional security. The institute also recognizes the need to integrate *ex situ* and *in situ* conservation approaches in a network mode with all its stakeholders.



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The International Training Course is being organized by the National Bureau of Plant Genetic Resources (NBPGR) - Bioversity International Centre of Excellence. NBPGR is one of the leading institutes under the Indian Council of Agricultural Research (ICAR), New Delhi, India for plant genetic resources (PGR) management. The 2014 training course is being co-organized with the Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), a programme of Asia-Pacific Association of Agricultural Research Institutions (APAARI). The course will be conducted from **17 to 28 February 2014** at NBPGR, IARI Campus, New Delhi, India.

## Course objectives

This practical, hands-on course is designed for those currently involved in the development and use of *in vitro* and/or cryopreservation techniques for the medium- to long-term conservation of vegetatively propagated and non-orthodox seed species.

The course aims to:

- Improve skills of participants in using tissue culture techniques for conservation and management of PGR;
- Equip participants with essential knowledge necessary for developing and using cryopreservation techniques;
- Enhance the use of *in vitro* conservation and cryopreservation protocols for germplasm of crops relevant in their countries;
- Acquaint the participants with molecular techniques for PGR management.
- Understand the underlying principles of stress tolerance during processing for conservation.

## Application

Applicants must have prior experience in and/or be actively working on *in vitro* conservation and cryopreservation of PGR, stress responses *in vitro* and *ex vitro* and using molecular marker techniques in their own work.

The completed application should be sent to:

### The Coordinator

Asia-Pacific Consortium on Agricultural Biotechnology

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## About the NBPGR - Bioversity International Centre of Excellence

The NBPGR - Bioversity International Centre of Excellence has been established for conducting International Training Courses on *In Vitro* and Cryopreservation Techniques for Conservation of Plant Genetic Resources on a regular basis. The Centre of Excellence aims to provide training opportunities to enhance the capacity of national programmes for using *in vitro* and cryogenic techniques for conservation of plant genetic resources. This Centre is equipped with advanced facilities for *in vitro* conservation, particularly cryopreservation, and staffed with knowledgeable and experienced resource persons for imparting theoretical knowledge as well as hands-on training.

## About the course


Plant diversity conservation and 'conservation through use' are some of the themes increasingly emphasized World over in view of their obvious links to seeking food and nutritional security, poverty alleviation and environmental protection. Complementary approaches of *in-situ* and *ex-situ* conservation, in this regard are much in vogue to provide holistic approach. Seed genebanking of orthodox seed species of major agricultural crops in most of the national and international genebanks as *ex-situ* approach has proven its usefulness. However, intensive conservation efforts are needed for clonally propagated crops, constituting about 1000 species and for difficult-to-store seeds, constituting about 88,250 species throughout the World. *In vitro* approaches, including tissue culture maintenance and cryopreservation, are recognized as useful tools for medium- to long-term conservation of these groups of species. Molecular techniques are now increasingly being used for aiding these methods.

The course consists of a series of lectures and practical sessions using various vegetatively propagated and recalcitrant and intermediate seed species and all related cellular, physiological, biochemical and molecular aspects. Young scientists, in particular female scientists, are encouraged to participate in the training course.

The participants will be given an opportunity to discuss their research endeavours especially, related to *in vitro* conservation and cryopreservation to promote sharing of information and experiences, and to enable them to analyze the problems. Participants would be encouraged to discuss any specific problems faced in their current application of *in vitro* and cryopreservation techniques and related biotechnological applications so that the instructors and fellow participants are able to suggest possible solutions.

They may also bring material, in specific cases, for hands-on practice. For this, prior information needs to be sent to the organizers to facilitate clearance of the material for its entry into India.

## Curriculum

Lectures	Practicals
<ol style="list-style-type: none"><li><b>1. Importance of <i>in vitro</i> conservation and cryopreservation techniques</b><ul style="list-style-type: none"><li>• <i>In vitro</i> techniques for medium-term conservation</li><li>• Cryopreservation for long-term conservation</li><li>• Complementary conservation strategies</li></ul></li><li><b>2. Methods of <i>in vitro</i> clonal propagation</b><ul style="list-style-type: none"><li>• Shoot/meristem culture</li><li>• Development/standardization of protocols</li><li>• Rapid multiplication and field transfer</li></ul></li><li><b>3. Methods of <i>in vitro</i> conservation</b><ul style="list-style-type: none"><li>• Normal/slow growth conditions</li><li>• Management of large collections</li></ul></li><li><b>4. Cryopreservation: principles and prospects</b><ul style="list-style-type: none"><li>• Mechanism of desiccation and low temperature injury</li><li>• Freezing injury, natural tolerance and recovery/survival</li><li>• Artificial cryoprotection</li><li>• Fundamentals of cryobiology</li></ul></li><li><b>5. Techniques of cryopreservation</b><ul style="list-style-type: none"><li>• Classical vs.vitrification based methods</li><li>• Vitrification procedure</li><li>• Desiccation, pre-growth and encapsulation-dehydration procedures</li><li>• Droplet vitrification</li><li>• Step-wise cooling</li></ul></li><li><b>6. Applications of cryopreservation to</b><ul style="list-style-type: none"><li>• Clonally propagated crops</li><li>• Non-orthodox seeds</li><li>• Dormant buds</li><li>• Pollen</li></ul></li><li><b>7. Cryobanking of plant germplasm</b><ul style="list-style-type: none"><li>• Important laboratory requirements</li><li>• Operation, maintenance and management of cryobank</li><li>• Database management</li></ul></li><li><b>8. Molecular marker techniques for PGR management</b><ul style="list-style-type: none"><li>• Molecular markers for analysis of diversity</li><li>• Molecular markers to promote germplasm characterization and utilization</li></ul></li></ol>	<ol style="list-style-type: none"><li><b>1. <i>In vitro</i> methods and viability determination</b></li><li><b>2. Preparation of solutions/ cryoprotectants for cryopreservation</b></li><li><b>3. Preparation/isolation of shoot tips for cryopreservation</b></li><li><b>4. Cryopreservation of shoot tips, PLB's etc.</b></li><li><b>5. Cryopreservation of seeds, zygotic embryos, embryonic axes, dormant buds and pollen</b></li><li><b>6. Cryobanking procedures</b></li><li><b>7. Cellular, physiological and biochemical markers for stress tolerance during conservation</b></li><li><b>8. Molecular marker techniques - RAPD, ISSR, STMS, SCAR</b></li></ol> 



## Other information

### Resource persons/trainers

Resource persons for this course will be from NBPGR, Bioversity International, APCoAB and other organizations

### Course language

All course notes and lectures will be in English. Therefore, participants should have a good command of English and knowledge of the appropriate technical terms used in PGR.

### Climatic conditions

February is a pleasant time in New Delhi and the temperature is around 10-24°C. Woolen/warm clothes are required.

### Transportation

Indira Gandhi International Airport and the Domestic Airport in New Delhi are about 20 km and 15 km, respectively from the NBPGR campus. Transport from the airport to the Guest House and back will be provided by NBPGR. Also transport will be provided daily to the participants from the Guest House to NBPGR.

### Lodging and Boarding

The accommodation and meals for the participants in the Guest House/Hotel would be booked from 16-28 February 2014. Information on extended stay for payment basis needs to be given in advance.

### Training course fees

This is a fee-based course and participants are encouraged to seek assistance from their own organizations or other funding agencies. However, both Bioversity International and NBPGR will make efforts to identify sources of funding for a few full or partial scholarships. The course fees are US\$700 for non-Indian participants and Rs 7,000/- for Indian participants and include the following:

- Lecture and course materials
- Local transportation
- Tea / Coffee
- Administration charges

### More information

Additional information on the course will be provided to all the participants who are selected for admission to the course.

*For further information*

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