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
NASC Complex, DPS Marg
New Delhi 110012, India
Tel:+91-11-32472305 Fax:+91-11-25841294
Email: j.karihaloo@cgiar.org
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

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<th>Lectures</th>
<th>Practicals</th>
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<td><strong>1. In vitro methods and viability determination</strong></td>
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<td><strong>2. Methods of in vitro clonal propagation</strong>&lt;br&gt;• Shoot/meristem culture&lt;br&gt;• Development/standardization of protocols&lt;br&gt;• Rapid multiplication and field transfer</td>
<td><strong>2. Preparation of solutions/cryoprotectants for cryopreservation</strong></td>
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<td><strong>3. Methods of in vitro conservation</strong>&lt;br&gt;• Normal/slow growth conditions&lt;br&gt;• Management of large collections</td>
<td><strong>3. Preparation/isolation of shoot tips for cryopreservation</strong></td>
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<td><strong>4. Cryopreservation: principles and prospects</strong>&lt;br&gt;• Mechanism of desiccation and low temperature injury&lt;br&gt;• Freezing injury, natural tolerance and recovery/survival&lt;br&gt;• Artificial cryoprotection&lt;br&gt;• Fundamentals of cryobiology</td>
<td><strong>4. Cryopreservation of shoot tips, PLB’s etc.</strong></td>
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<td><strong>5. Techniques of cryopreservation</strong>&lt;br&gt;• Classical vs. vitrification based methods&lt;br&gt;• Vitrification procedure&lt;br&gt;• Desiccation, pre-growth and encapsulation-dehydration procedures&lt;br&gt;• Droplet vitrification&lt;br&gt;• Step-wise cooling</td>
<td><strong>5. Cryopreservation of seeds, zygotic embryos, embryonic axes, dormant buds and pollen</strong></td>
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<td><strong>6. Applications of cryopreservation to</strong>&lt;br&gt;• Clonally propagated crops&lt;br&gt;• Non-orthodox seeds&lt;br&gt;• Dormant buds&lt;br&gt;• Pollen</td>
<td><strong>6. Cryobanking procedures</strong></td>
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<td><strong>7. Cryobanking of plant germplasm</strong>&lt;br&gt;• Important laboratory requirements&lt;br&gt;• Operation, maintenance and management of cryobank&lt;br&gt;• Database management</td>
<td><strong>7. Cellular, physiological and biochemical markers for stress tolerance during conservation</strong></td>
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<td><strong>8. Molecular marker techniques for PGR management</strong>&lt;br&gt;• Molecular markers for analysis of diversity&lt;br&gt;• Molecular markers to promote germplasm characterization and utilization</td>
<td><strong>8. Molecular marker techniques - RAPD, ISSR, STMS, SCAR</strong></td>
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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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