



# Fifth International Training Course

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

15-27 November 2010, New Delhi, India

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 2010 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 **15 to 27 November 2010** at NBPGR, Pusa 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.

This 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 application form may be downloaded here. The completed application should be sent to:

#### The Director

National Bureau of Plant Genetic Resources  
Pusa Campus, New Delhi-110012, India  
Tel: +91-11-25843697 Fax: +91-11-25842495  
Email: director@nbpgr.ernet.in

#### With a copy to:

#### The South Asia Coordinator

Bioversity International, Sub-regional Office for South Asia  
NASC Complex  
Pusa Campus, New Delhi 110012, India  
Tel: +91-11-25849000/01 Fax: +91-11-25849002  
Email: p.mathur@cgiar.org

**Deadline for applications: 30 September 2010**

**Maximum number of participants: 15**

### About the NBPGR - Bioversity International Centre of Excellence

The NBPGR - Bioversity International Centre of Excellence has been established for conducting an International Training Course 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.

*Bioversity International strives for diversity in gender and nationality in its training and capacity development programmes*



## About the course

Conservation and effective utilization of PGR contributes to food and nutritional security, poverty alleviation and environmental protection, which are major challenges faced by humankind in the 21<sup>st</sup> Century. Conservation of crop germplasm bearing orthodox seeds is being effectively carried out by *ex situ* conservation of seeds in seed genebanks. However, traditional method of *ex situ* conservation of germplasm of vegetatively propagated species through field maintenance and of non-orthodox seed species is still problematic. *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 present a brief seminar on a topic of their choice, relating to *in vitro* conservation and cryopreservation to promote sharing of information and experiences, and to enable them to analyze the problems relating to their work. Participants are 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

#### 1. Importance of *in vitro* conservation and cryopreservation techniques

- *In vitro* techniques for medium-term conservation
- Cryopreservation for long-term conservation
- Complementary conservation strategies

#### 2. Methods of *in vitro* clonal propagation

- Shoot/meristem culture
- Development/standardization of protocols
- Rapid multiplication and field transfer

#### 3. Methods of *in vitro* conservation

- Normal/slow growth conditions
- Management of large collections

#### 4. Cryopreservation: principles and prospects

- Mechanism of desiccation and low temperature injury
- Freezing injury, natural tolerance and recovery/survival
- Artificial cryoprotection

#### 5. Techniques of cryopreservation

- Classical vs.vitrification based methods
- Vitrification procedure
- Desiccation, pre-growth and encapsulation-dehydration procedures
- Droplet freezing
- Step-wise cooling

#### 6. Applications of cryopreservation

- *In vitro* cultures
- Non-orthodox seeds
- Dormant buds
- Pollen

#### 7. Cryobanking of plant germplasm

- Important laboratory requirements
- Operation, maintenance and management of cryobank
- Database management

#### 8. Molecular marker techniques for PGR management

- Molecular markers for analysis of diversity
- Molecular markers to promote germplasm characterization and utilization

### ***Practical sessions***

Lectures will be reinforced with practical hands-on laboratory exercises and interactive discussions.

1. Preparation of culture media
2. Preparation of solutions/cryoprotectants for cryopreservation
3. Preparation/isolation of shoot tips for cryopreservation
4. Cryopreservation of shoot tips
5. Cryopreservation of seeds, zygotic embryos, embryonic axes, dormant buds and pollen
6. Cryobanking procedures
7. Cellular, physiological and biochemical markers for stress tolerance during conservation
8. Molecular marker techniques - RAPD, ISSR, STMS, SCAR

### **Other information**

#### **Resource persons/trainers**

Resource persons for this course will be from NBPGR, Bioversity International, APCoAB, IRD (Institut de recherche pour le développement) and the Millennium Seed Bank - Royal Botanic Gardens, Kew.

#### **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**

November is a pleasant time in New Delhi when the winter season starts and the temperature is around 20-25°C during the day and 12-15°C at night. However, 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.

#### **Accommodation**

The participants will be accommodated in the Guest House/Hotel from 14 to 27 November 2010. The cost of additional stay would be at trainee's own expense. Information on extended stay 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\$1,700 for non-Indian participants and Rs 25,000 for Indian participants and include the following:

- Lecture and course materials
- Local transportation
- All meals / Tea / Coffee
- Accommodation
- 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 contact:**

Dr. D. C. Bhandari, Director, National Bureau of Plant Genetic Resources

Email: [director@nbpgr.ernet.in](mailto:director@nbpgr.ernet.in)

[www.nbpgr.ernet.in](http://www.nbpgr.ernet.in)

or

Dr. P.N. Mathur, South Asia Coordinator, Bioversity International, Sub-regional Office for South Asia

Email: [p.mathur@cgiar.org](mailto:p.mathur@cgiar.org)

[www.bioversityinternational.org](http://www.bioversityinternational.org)

## Application form



### Fifth International Training Course on *In Vitro* and Cryopreservation for Conservation of Plant Genetic Resources: Current Methods and Techniques 15-27 November 2010, New Delhi, India

<b>Part 1 – to be completed by applicant</b>		
<b>Passport information</b>		
Name (as indicated in passport):		(SURNAME in capital letters)
Gender:	(Male/Female)	
Birth place and date:	(dd/mm/yyyy)	Citizenship/Nationality:
Passport number:		Place of issue:
Date of issue:		Date of expiry:
<b>Employment details</b>		
Department/Institute name:		
Job title/Function:		
Address:		
Telephone:		Fax:
E-mail:		Web:
Type of organisation: <input type="checkbox"/> Government/Public <input type="checkbox"/> NGO <input type="checkbox"/> Private enterprise <input type="checkbox"/> Other – specify:		
Address for correspondence if different from above:		
Telephone:		Fax:
E-mail:		
<b>Work experience</b>		
Your current position:		From:
Description of your current work:		
Previous work experience (related to the subject of the training)	From	To

<b>Academic record</b>			
Qualification (B.Sc, M.Sc. Ph.D.)	Educational Institution & Location	Subjects/Field of study	Year
Other relevant trainings undertaken:			
English language proficiency <input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> Fair			
Language used in higher education:		Mother tongue:	
1. Are you affiliated with an institution that is responsible for conservation and use of agricultural biodiversity? If so, provide details about the kind of work you have undertaken in the past at the institute.			
2. What special expertise do you have in the area of <i>in vitro</i> and cryopreservation?			
<b>Expectations from the training</b>			
What do you expect from this training?			
<b>Future plans</b>			
Describe how would you apply the knowledge gained in this training in your current work and your future plans?			
Signature of Applicant .....			
Date.....			

<b>Part 2 - to be completed by the supervisor/employer</b>	
Name of applicant:	
Name of supervisor (employer):	
Position:	
Institute name:	
Address:	
Telephone:	Fax:
Email:	Web:
1. How will the participation of the applicant in this training benefit your institute/country?	
2. How could you support the applicant to carry out follow-up training or work on conservation and use of agricultural biodiversity in your institute or country after this training?	
<b>Financing</b>	
Self-financing :	Yes/No
Grant (if yes, please specify):	
Other(s):	
Signature of supervisor/employer .....	
Date.....	
Use extra pages to include additional information relevant to the selection process.	

Return full application form by email to: [director@nbpgr.ernet.in](mailto:director@nbpgr.ernet.in) and [skm1909@gmail.com](mailto:skm1909@gmail.com) with copy to [p.mathur@cgjar.org](mailto:p.mathur@cgjar.org). The subject of the message must be "Application – Fifth International Training Course on *In vitro* and Cryopreservation for Conservation of PGR". Signed copy of application should be sent to: The Director, NBPGR, Pusa Campus, New Delhi-110012, India, Fax: +91-11-25842495 or The South Asia Coordinator, Bioversity International, Sub-regional Office for South Asia, NASC Complex, Pusa Campus, New Delhi 110012, India, Fax: +91 – 11 – 25849002. **The deadline for applications is 30 September 2010.**