



# Eighth International Training Course on *In Vitro* and Cryopreservation Approaches for Conservation of Plant Genetic Resources



ICAR-National Bureau of Plant Genetic Resources  
Pusa Campus, New Delhi, India

November 5-19, 2019



The ICAR – National Bureau of Plant Genetic Resources (NBPGR) and Bioversity International (BI) announce organizing an **International Training Course on *In Vitro* and Cryopreservation Approaches for Conservation of Plant Genetic Resources (PGR)**. NBPGR is the premier institute under the Indian Council of Agricultural Research (ICAR), New Delhi, India, for PGR management and designated as a Centre of Excellence (CoE) to undertake international training programs on *in vitro* conservation and cryopreservation, since 2006. This year, the training course is being co-organized with the Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), a program of Asia-Pacific Association of Agricultural Research Institutions (APAARI). The course will be conducted during **November 5-19, 2019** at **ICAR-NBPGR, Pusa Campus, New Delhi, India**.

### About the course

Conservation of crop germplasm bearing orthodox seeds is being effectively carried out by *ex situ* conservation of seeds in 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 non-orthodox seed species and all related cellular, physiological, biochemical and molecular aspects. Young scientists/technicians are encouraged to participate in the training course.



### About the ICAR-NBPGR – Bioversity International Centre of Excellence (CoE)

The NBPGR–Bioversity International CoE was established in 2006 for conducting International Trainings on *In Vitro* and Cryopreservation Techniques for Conservation of PGR. The CoE aims to enhance the capacity of national program to handle “difficult-to- conserve” germplasm of varied plant species. The CoE, which is a part of the Tissue Culture and Cryopreservation Unit (TCCU) under the National Genebank of NBPGR, is equipped with advanced facilities for plant tissue culture and cryobiological approaches for conservation of PGR. Over the last three decades, germplasm of >15,000 accessions of ~950 species which are either clonally propagated, non-orthodox seeded or rare/endangered, are conserved either as *in vitro* cultures or cryobanked using varied explants (meristems, embryos, seed, pollen, budwoods). The CoE has highly qualified and experienced staff for imparting theoretical knowledge and hands-on training. Till date, seven trainings have been conducted under the CoE which has facilitated in capacity building of >100 participants from 30 countries.



## Course objectives

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



## 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

- Infrastructure requirements
- Normal/slow growth conditions
- Management of large collections

#### 4. Principles of Cryopreservation

- 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 vitrification
- 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 somaclonal variation
- Molecular markers for analysis of diversity and genetic stability of conserved germplasm







## Other information



### Practical sessions

Lectures will be reinforced with 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/ meristem tips
5. Cryopreservation of seeds, zygotic embryos, embryonic axes, dormant buds and pollen
6. Cryobanking procedures
8. Molecular marker techniques - ISSR, STS, SSR, SNP

### Resource persons/trainers

Resource persons for this course would be from NBPGR, BI and APCoAB. Additional faculty is also expected from ITC Katholieke Universiteit Leuven (KU Leuven), Belgium, Royal Botanic Gardens, Kew, United Kingdom, Mahidol University, Thailand and Tsukuba University, Japan.

### Course language

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

### Course fees

No bench fees will be charged. However, participants will have to bear the cost of travel (including visa fee) from their own organizations or other funding agencies.

The following shall be funded by the organizers:

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

### Climatic conditions

November is a pleasant time in New Delhi when the winter season is about to set in and the temperature is around 20-25°C during the day and 15-20°C at night. However, light woollens 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 on daily basis to the participants from the Guest House/Hotel to NBPGR campus.

### Accommodation

The participants will be accommodated in the Guest House/Hotel during the course of the training. The cost of any additional stay (beyond the dates of training) would be at trainee's own expense. Information on extended stay needs to be given in advance.

### More information

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

## Application

Applicants should preferably have prior experience and/or be actively working on *in vitro* conservation and cryopreservation of PGR, plant tissue culture and / or using molecular marker techniques in their research work.

The application form is attached herewith. The completed application should be sent to:

### Dr Anuradha Agrawal

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**Last date for application: June 30, 2019**

**Maximum number of participants: 15**



*For further information contact*



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Educational Qualifications (B.Sc./M.Sc./PhD/any other)			
Degree	Year	Subject(s)	University/Institute

**How did you find about the training (Restrict 50 to 100 words)**

**Describe your duty and job description (Restrict to 300 words)**

**How will this training help you? (Restrict to 300 words)**

Full Name of Applicant \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

Remarks and Recommendations of the Host Organization (Please state clearly the strong and weak points about applicant and how this training will be useful for your organization/country)

Date \_\_\_\_\_

Signature \_\_\_\_\_

Place \_\_\_\_\_

Name of Forwarding Authority \_\_\_\_\_

Seal \_\_\_\_\_