



# SBI

## Sugarcane Breeding Institute

### Coimbatore

#### Courses

1. Breeding Sugarcane for use in Sugar-Industrial Complex
2. Molecular diagnosis of sugarcane diseases

This Institute, established in 1912, is the World Leader in sugarcane breeding and genetics. It carries out research and development activities also that are related to varietal improvement. The novel idea of using the wild species *Saccharum spontaneum* in sugarcane breeding with the objectives of incorporating gene complexes for biotic and abiotic stresses and for high biomass production emanated from this Institute. The Co-canes developed from here are being cultivated through out the world. The Institute is one of the two world centres to serve as repository for sugarcane germplasm and is maintaining more than 1700 collections in various species and genera related to sugarcane. The place is endowed with all the ideal natural conditions, necessary for sugarcane flowering and seed set.

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# 1.

## Breeding Sugarcane for use in Sugar-Industrial Complex

### Training Programme

The course is designed to understand sugarcane and related species and genera in their entirety and introduce them to the principles of sugarcane breeding and genetics. They would be trained on how these principles could be applied in realising the goals of utilising the crop as the source of food, fuel and fibre. The prospects of the industry producing not only sugar, but also other products the crop is capable of giving, would give an impetus to boosting the economy of the cane growing countries, especially of the third world. It would also inculcate in them the knowledge on flowering and seed set in sugarcane and the various steps involved in handling of segregating populations towards development of varieties.

### Faculty

Well qualified and trained scientists of the Institute and invited speakers from ICAR/SAUs/Industry will constitute the faculty.

**Course Director** : Dr N Vijayan Nair, Director

**Course Coordinator**: Dr M N Premachandran  
Head, Division of Crop  
Improvement

**Duration** : 2 weeks (12-26 October 2009)

**Course fee** : US \$ 1,500 per trainee

**No. of trainees  
per course** : 10

**Accommodation** : Trainees will be accommodated in  
Scientists' home of the Institute

**Eligibility** : Graduate or higher level  
preferably in Agriculture  
  
Personnel of sugarcane research  
institutions and industry

### Course Contents

- Sugar and Sugarcane-International and National scenario and the role of Sugarcane Breeding Institute in varietal improvement
- Flowering behaviour and hybridization
- Taxonomic status of *Saccharum* complex members and floral biology
- Sugarcane genetic resources
- Control of flowering
- Selection of parents
- Incompatibility mechanism in sugarcane
- Handling of fluff and raising seedlings
- Seedling and clonal selection
- Breeding varieties with high sucrose
- Breeding varieties for cogeneration and ethanol
- Transgenetics in sugarcane
- Breeding for abiotic stress tolerance-conventional and molecular approaches
- Role of Nobilization in sugarcane breeding
- Origin, evolution and cytogenetics of sugarcane
- Molecular markers and genomics
- Juice quality parameters
- Ratooning in sugarcane
- Sugarcane pests and their management
- Micropropagation in sugarcane
- Application of tissue culture technique in sugarcane breeding
- Molecular approaches in diagnostics of sugarcane diseases
- Status of sugarcane gene bank at Kannur and complimentary strategies
- Sugarcane and *Erianthus* for paper production
- Plant breeder's rights and IPR issues
- Sugarcane seed technology
- Seed production in sugarcane and seed standards

## 2. Molecular diagnosis of sugarcane diseases

### Training Programme

The molecular tools are being applied recently in sugarcane pathology for precisely detecting pathogens and identifying pathogen variability. Hence, the training course was designed to impart skills on molecular diagnosis of sugarcane diseases to the personnel involved in research and development in different countries. The participants will be trained on all aspects of identifying sugarcane diseases, quarantine, diagnostic techniques in the field and laboratory conditions, early detection, molecular diagnosis, duplex/multiplex PCR, virus elimination through meristem culture and clean seed programme and disease management.

### Faculty

The Plant Pathology lab has been accredited with Department of Biotechnology, New Delhi for virus indexing of sugarcane seedlings. The section has a very strong team of scientists well trained on molecular plant pathology and diagnosis. Besides, other scientists from the disciplines of Breeding Genetics, Biotechnology, Seed Technology and Microbiology will constitute the faculty.

<b>Course Director</b>	: Dr R Viswanathan, Senior Scientist (Plant Pathology)
<b>Duration</b>	: Two weeks (1-15 December 2009)
<b>Course fee</b>	: US \$ 1,000 per trainee
<b>No. of trainees per course</b>	: 10
<b>Accommodation</b>	: Trainees will be accommodated in Scientists' home
<b>Eligibility</b>	: Graduate or higher level degree in Agriculture (Plant Pathology/ Plant BreedingAgronomy/ Microbiology) or Research personnel working in sugarcane research institutes/ sugar industries

### Course Contents

- Sugarcane diseases: An overview
- Vegetative propagation vis a vis varietal degeneration in sugarcane
- Disease diagnosis in sugarcane Traditional and recent approaches
- Virus-techniques for isolation, propagation and purification.
- Production of antiserum and serological techniques
- Diagnosis of sugarcane diseases in the field by dot-blot and tissue blot techniques
- Application of molecular tools in sugarcane disease diagnosis
- Designing common and specific primers to detect sugarcane pathogens by PCR
- PCR and RT-PCR techniques to diagnose sugarcane viruses
- Molecular techniques to detect bacterial diseases of sugarcane
- Molecular techniques to detect fungal diseases of sugarcane
- NASH and other high throughput diagnostic techniques
- Duplex and multiplex RT-PCR techniques to detect more than one pathogen in a single reaction
- Molecular variation in sugarcane pathogens
- Virus elimination through meristem culture and other techniques
- Quarantine and germplasm exchange