



CAFT Training Programme on
“Diversity, genomics and development of robust
diagnostics for *Fusarium* spp. associated with major
economically important diseases in India”

October 11-20, 2022

Course Director

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The Indian Agricultural Research Institute, New Delhi, invites applications from faculty members and researchers of Indian universities / research institutions for a 10 days training programme on **“Diversity, genomics and development of robust diagnostics for *Fusarium* spp. associated with major economically important diseases in India”** sponsored by the Indian Council of Agricultural Research, New Delhi, scheduled from October 11-20, 2022.

Objective

The major objective of the training programme is to train young faculty and scientists on the basic and strategic front of agriculture with particular reference to major economically important diseases caused by *Fusarium* species with latest advancement namely diversity, genomics and development of robust diagnostics. The recent advances on *Fusarium* pathogen will assist researchers to update their skill on identification, diversity analysis, genomics, diagnostics and management of important crop diseases caused by *Fusarium* species/species complexes. The proposed training program would therefore be an essential event for researchers of plant pathology on a national scale to have active interactions and experiences to hone their skills in the area of fungal pathology. Hands-on training in the topic will be imparted in addition to lectures by eminent experts so that the participants could apply the same in their research programmes.

Eligibility

M.Sc/Ph.D in Plant Pathology of Agricultural University /ICAR Institute working not below the rank of Assistant Professor and equivalent in Plant Pathology or relevant subject.

How to apply

The participants should apply online (ICAR mandate) using CBP portal through or under the link. Capacity Building Programme at portal through <https://cbp.icar.gov.in/>. After filling the online applications, take a printout of the application and get it approved by the competent authority of the organization and upload the scanned copy of application through CBP portal on or before September 15, 2022. Selection of participants will be from online applications and the selected participants list will be uploaded/displayed on the portal.

However, he/she may send an advance copy (via email) directly to the Course Director (r.gogoi@rediffmail.com; head_patho@iari.res.in) / Course Coordinator (mssaharan7@yahoo.co.in). The selected candidates will be informed individually also. The participants are requested keep in contact with the Course Director regarding their selection status.

Participants Intake: 25 (Twenty five only)

TA/DA & Accommodation

The participants will be provided to and fro fare restricted to AC-II-Tier train fare or any state road transport services as per the ICAR guidelines. Participants should produce a certificate that they have not been given TA/DA by their host institute (Head of the Department/Institute) and the training period should be considered 'On Duty' by the participant's parent institution. Boarding and lodging for the participants will be provided at the ICAR guest houses and the charges will be met by the training programme.

About the training programme

Fusarium spp. are ubiquitous in the environment, and several strains presenting pathogenicity to plants and producing mycotoxins are reported. Moreover most of these groups are vast, diverse and complex making the identification task equally complicated and difficult. *Fusarium oxysporum*, *F. solani*, *F. fujikuroi*, and *F. graminearum* are the representative species known as plant-pathogenic *Fusarium*. Division of Plant Pathology, ICAR-IARI is continuously working on *Fusarium* diseases in the area of diversity, genomics, development of robust diagnostics and management strategies. New *Fusarium* species associated with different diseases of tomato, chickpea and rice have been reported. DNA barcodes were developed for all the agriculturally important *Fusarium* spp. Many cryptic species were delineated from *Fusarium* species complexes. The etiology of an emerging bakanae and head blight diseases was established. Population structure of different *Fusarium* spp. associated with rice and wheat were also mapped using different types of molecular markers and genomic regions. The whole genome of *Fusarium fujikuroi* was sequenced, and PCR, real Time PCR, LAMP and RPA based markers for the diagnosis of *Fusarium* diseases were developed. Further, different disease management strategies including biocontrol agents, synthetic chemicals and resistance sources were explored. Therefore, our group has been instrumental in successfully demonstrating the modern research in proposed area. In the proposed training, these success stories will be demonstrated with the main objective to provide a hands-on training on recent advances on *Fusarium* research.

About the Division

The Division of Plant Pathology is more than 100 years old. It was originally established in 1905 as Mycology section of Imperial Agricultural Research Institute (IARI) at Pusa, Bihar to initiate mycological and plant pathological research in India. The sectional status was raised to the status of Division of Mycology in 1943-44 after the Institute was shifted to New Delhi. Disease diagnosis, detection of pathogens and management of disease risks have been the main fabric of Divisional research. The Division has evolved over the years with four major sections, i.e., Mycology, Fungal Pathology, Bacteriology and Virology. Herbarium Cryptogamae Indiae Orientalis (HCIO) and Indian Type Culture Collection (ITCC), Centre for Advanced Faculty Training (CAFT) in Plant Pathology and Referral Centre for virus indexing of tissue culture raised plants are the "Life Lines". The Division has highly trained scientific, technical and field staff. It has well equipped laboratories to work on next generation sequencing, host pathogen interaction, diagnosis and characterization of plant pathogens, electron and confocal microscopy, advance molecular tools for disease diagnosis, tissue culture, plant transformation etc.

Topics to be covered

1. *Fusarium* spp. diversity and their races in India: An overview
2. Recent approaches for the development of diagnostics against fungal pathogens
3. Taxonomy of *Fusarium* species complexes
4. Multilocus sequence typing for the *Fusarium* characterization
5. *Fusarium* genomics and its role in pathogen characterization
6. Comparative genomics of fungal pathogens
7. Development of specific markers for the identification and characterization of *Fusarium* spp. affecting rice
8. *Fusarium* diseases of vegetables: Diversity and management

9. *Fusarium* head blight disease of wheat: pathogen characterization, variability and managements
10. Banana wilt in India: Diagnosis and race characterization
11. Phenomics based high-throughput disease evaluation
12. Stalk rot of maize: Current status and its management
13. Breeding for resistance to *Fusarium* diseases: An overview
14. Application of bioinformatics for the understanding of *Fusarium* genomics
15. Characterization of secondary metabolites and mycotoxins of *Fusarium* spp.
16. Soil health management for the *Fusarium* diseases

Hands-on sessions

1. Morphological identification of important *Fusarium* spp.
2. *Fusarium* species complexes and their identification
3. Delineation of cryptic species and their taxonomic characters within important *Fusarium* complexes
4. DNA extraction and gel electrophoresis
5. PCR amplification with specific and random primers and sequence analysis using different software
6. Development of PCR based diagnostics for the detection of *Fusarium* spp.
7. RNA extraction, cDNA synthesis, quality check
8. Real time PCR based expression studies of effectors/pathogenicity related genes
9. Development of loop-mediated isothermal amplification assay (LAMP) based diagnostics
10. Development of recombinase polymerase amplification assay (RPA) based diagnostics

