

# National Training on

## Biological Control in Plant Disease Ecology: Mechanisms, Interactions, and Applications

February 18-25, 2025

### Programme Director

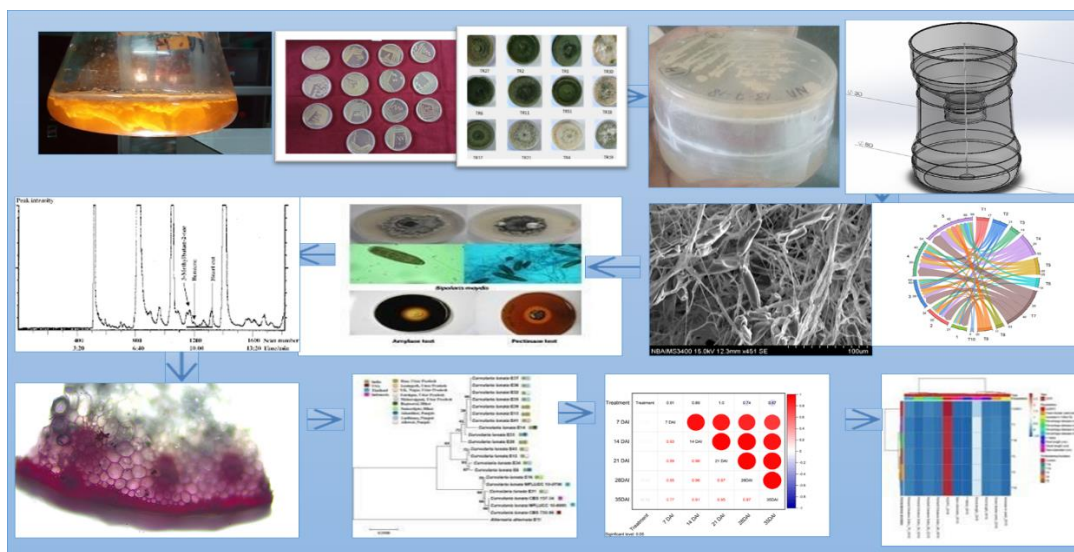
Dr. Alok K. Srivastava, Director

### Course Coordinators

Dr. Abhijeet S. Kashyap, Scientist (SS) (Plant Pathology)

Dr. Nazia Manzar, Scientist (SS) (Plant Pathology)

Dr. Jyoti P. Singh, Scientist (Plant Biochemistry)



## ICAR-National Bureau of Agriculturally Important Microorganisms

(ISO 9001:2008 Certified Institute)

Kushmaur, Maunath Bhanjan-275103

Uttar Pradesh, India

Tel.: +91-547-2970727 , Fax: +91-547-2970727

E-mail: [director.nbaim@icar.gov.in](mailto:director.nbaim@icar.gov.in)

Web: <https://nbaim.icar.gov.in>, <https://mgrportal.org.in>

Understanding and conserving our national heritage of agriculturally important microorganisms

## About NBAIM

National Bureau of Agriculturally Important Microorganisms (NBAIM) is one of the premier institutions of Indian Council of Agricultural Research (ICAR), leading research and development programs in the field of microbial research in India. The Bureau aims at the collection, maintenance, and conservation of agriculturally important microorganisms and their resources for future needs. The Bureau is engaged in cutting-edge research in Agricultural Microbiology, Microbial Biotechnology, Plant Pathology, and Bioinformatics for the benefit of researchers and farmers. Apart from core research, human resource development is also one of its mandates. The Bureau has organized several successful training programs on various aspects of basic and applied sciences to benefit different stakeholders of society. In this line, national and international training programs on different areas of molecular and microbial identification, characterization, molecular taxonomy, biological control, plant-microbe interactions, and the applications of bioinformatics in gene mining have been organized since the inception of the Bureau.



Key research areas at ICAR-NBAIM pertained to microbial diversity analysis from extreme and unique habitats, biological control of plant diseases, microbiome, microbe-mediated plant growth promotion, plant-microbe interaction, abiotic stress tolerance, quality microbial management system with special emphasis on biosystematics, DNA fingerprinting, microbial genomics and proteomics, metabolomics and bioinformatics.

## Background

In the ever-evolving domain of plant pathology, understanding the mechanisms and interactions within plant disease ecology is critical for advancing sustainable agricultural practices. Biological control has emerged as a cornerstone of environmentally friendly strategies to mitigate plant diseases, leveraging the natural interactions between plants, pathogens, and beneficial organisms. Classical methods have traditionally provided a solid foundation for exploring these complex interactions. Surveying, Koch's postulates, and disease severity assessments have enabled researchers to identify symptoms, monitor disease progression, and quantify pathogen prevalence in plant populations. The integration of pathogen isolation and culturing with the study of disease progress curves and histopathology has long been critical in understanding infection dynamics and host responses. Classical taxonomy and plant resistance studies have provided valuable insights into the morphological, physiological, and genetic characteristics of pathogens and their interactions with host plants. In recent years, the field of biological control has been transformed by advancements in molecular and bioinformatics tools, enabling a deeper exploration of plant-pathogen interactions and the mechanisms underlying biological control. Modern techniques such as DNA/RNA extraction, PCR, and sequencing facilitate precise identification and characterization of pathogens, enhancing our ability to identify key targets for biological control. Genomic and transcriptomic approaches enable researchers to analyse gene expression and regulatory pathways during host-pathogen interactions, revealing insights into how biological control agents influence these dynamics. Bioinformatics tools further empower the retrieval, assembly, and annotation of genomic data, offering a comprehensive understanding of the structural, functional, and evolutionary aspects of pathogens, hosts, and biological control agents. This training program focuses on the biochemical and cellular dimensions of plant-pathogen interactomes, with an emphasis on biological control mechanisms. Participants will delve into plant immune responses, including biochemical signaling, hormone pathways, and transcriptional networks, to understand how these systems can be modulated by biological control agents. Key elements such as reactive oxygen species (ROS), phytoalexins, and immune receptors will be explored, alongside mechanisms like induced systemic resistance (ISR), effector recognition, and hypersensitive responses. By bridging classical methodologies with modern molecular techniques, this programme aims to equip participants with the knowledge and skills necessary to investigate and harness biological control agents in plant disease ecology. This integrative approach promises to enhance our ability to develop sustainable, innovative strategies for managing plant health in diverse agroecosystems.

## Theme

In this perspective, the following thematic areas will be addressed in this hands-on training programme –

- Introduction to Biological Control: Concepts, Principles, Historical Perspectives and Mechanisms.
- Microbial Ecology and Host-Pathogen-Biocontrol Dynamics
- Microbiome Engineering: Harnessing Beneficial Microbes for Disease Suppression
- Metabolomics and Volatile Organic Compounds (VOCs) in Biocontrol
- Omics and Bioinformatics approaches in Biocontrol Research: Genomics, Transcriptomics, Metagenomics and volatilomics.
- Application Strategies for Biocontrol in Integrated Disease Management with developing Biocontrol Agent Formulation.

The training programme will include both lectures and practical sessions on the above thematic areas. Resource experts from the Bureau and other reputed institutes will address the participants.

## Expected benefits to the participants

- Participants will get hands on experience in characterization of Biocontrol agents, following conventional techniques and advanced molecular tools.
- Early career researchers and anyone involved or embarking into this biocontrol field will be benefited by getting exposure and know how to do cutting edge research in Microbial Ecology and Host-Pathogen-Biocontrol Dynamics

## Eligible participants

M.Sc./Ph.D. students, Research Scholars, Post-Doctoral Fellows, Technical Officers, Scientists/Assistant Professors/Lecturers or above, from any University/ institute/ organization working in the area of biological sciences.

## Fees for the training

Rs. 5000/- per trainee for students/research scholars, Rs. 8000/- for Scientist/Lecturers/Technical officers from public/private Universities or Govt. Institutions, and Rs. 12,000 per trainee for researchers from private or non-government organizations/Companies/ Firms. **The fees include accommodation, food, and training materials.**

## How to apply?

Eligible participants may write to the Director, ICAR-NBAIM along with their RESUME (not more than one page) and Application form on/or before 30th January, 2025. The selected candidates will be notified by email.

E-mail, Director ICAR-NBAIM- [director.nbaim@icar.gov.in](mailto:director.nbaim@icar.gov.in)

Please send a copy also to [abhijeet4497@gmail.com](mailto:abhijeet4497@gmail.com) or [naziamanzar786@gmail.com](mailto:naziamanzar786@gmail.com) or [jyotisingh58@outlook.com](mailto:jyotisingh58@outlook.com)

For any queries please contact: 8810512074 (Dr. Abhijeet), 06395985927 (Dr. Nazia), 8527184215 (Dr. Jyoti)

## \* **Bank Details: (Pls. Pay after receiving the acceptance letter)**

Registration fee may be paid through Cash/DD/BankTransfer:

In favour of ICAR-Unit NBAIM, payable at MaunathBhanjan, U.P.

Account Name: ICAR-NBAIM

Account Number-11143371878

IFSC code-SBIN0001671

Branch Name-SBI, Sahadatpura, Maunath Bhanjan, U.P.



ICAR-National Bureau of Agriculturally Important Microorganisms  
(Indian council of Agricultural Research)



**National Training**  
**on**  
**Biological Control in Plant Disease Ecology: Mechanisms, Interactions, and Applications**  
**February 18-25, 2025**

**APPLICATION FORM**

Affix  
Applicant's  
Photograph

**Personal Details Name** :  
**Gender** :  
**Designation/Occupation** :  
**E-mail** :  
**Mobile/Contact Number(s)** :  
**Contact Details Full Address** :  
**City & State** :  
**Academic Details**  
**Degree (M.Sc./M.Phil. /Ph.D.)** :  
**Subject Specialization** :  
**College/Department** :  
**University/Institute** :  
**Accommodation Required** : Yes/ No (Please select with a tick (√) mark)

**Registration fees (Tick whichever is applicable)**

Post-docs, Research scholars and Students from any university/institute/ organization	Rs. 5000/-
Scientist/Lecturers/Technical officers from public/private Universities or Govt. Institutions	Rs. 8000/-
Researchers from private or non-government organizations/Companies/ Firms	Rs. 12,000/-

.....  
Signature of the Applicant