ICAR-NBAIM

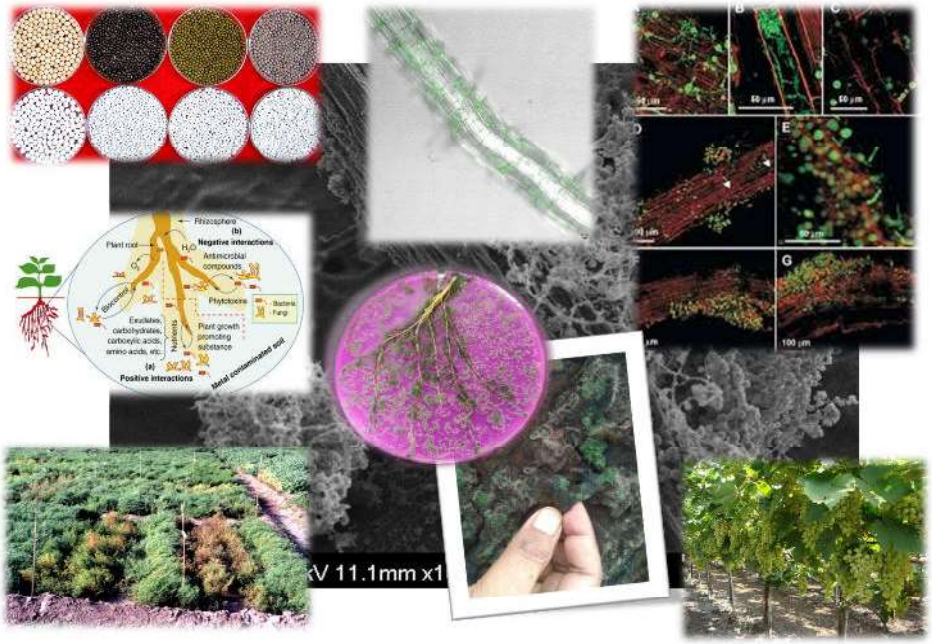
Understanding and conserving our national heritage of agriculturally important microorganisms

National Training

on

"Distinct microbe-based approaches for plant stress amelioration"

February 23 to March 02, 2023



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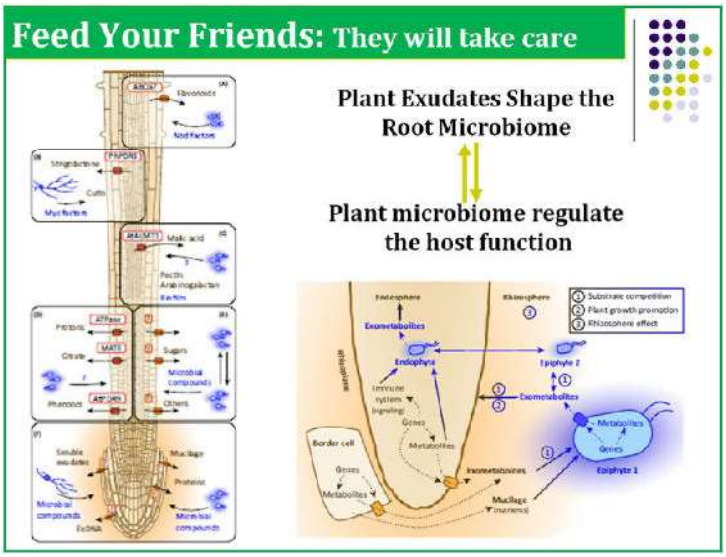
About NBAIM


NBAIM Building, Mau (Uttar Pradesh)

National Bureau of Agriculturally Important Microorganisms (NBAIM) is one of the premier institutions of the Indian Council of Agricultural Research (ICAR), leading research and development programs in the field of Agricultural Microbiology 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 Indian agriculture 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, 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.

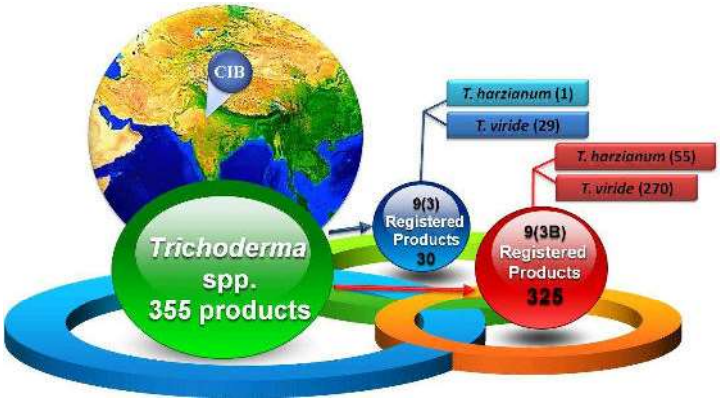
Background



Increasing biotic and abiotic stresses have caused a huge disturbance in intensive crop production systems. Climate change has added to the difficulty in stress management. Plants suffer from many pests and diseases caused by several fungi, bacteria, viruses, and nematodes leading to severe economic loss by reducing crop yield, and quality and contaminating grains with toxic chemicals. Similarly, several abiotic factors adversely affect crop production and productivity. Chemical control is considered one of the most effective control measures regardless of being highly expensive and toxic to non-target organisms in agroecosystems. Further, the use of resistant cultivars is another important approach conferring sustainability to the ecosystem but the breakdown of resistance has remained a great concern. The huge diversity of microorganisms residing in the rhizosphere and phyllosphere are responsible for diseases in plants as well as their suppression. Current research is addressing ways of harnessing such biodiversity to control plant diseases.

Farmers are aware of the ill effects of excessive agrochemical use. It is, therefore, necessary to bring new, effective environment-friendly approaches to manage stresses in the plants at field conditions. The popularization of microbial inoculants for stress amelioration in plants needs very effective formulations in the market. In order to enhance the efficacy of microbial inoculants, it is important to have stringent microbial research. The multi-billion dollar agrochemical industry is also moving towards biologicals, realizing its future potential in sustainable agriculture.

The application of microbial inoculants in agriculture has become cutting-edge research in recent years as green technology. The adoption & inclusion of microbe-based approaches is one such crucial technique that is currently at the forefront. Over a period of time, various microbe-based strategies have experimented with great promises and success.



The developments in science and technology implemented various new methodologies for the treatment of plants against biotic and abiotic stresses. Moreover, the study emphasizes the use of upcoming methodologies like microbiome management, rhizosphere engineering, phage cocktails, genetically modified biocontrol agents, and microbial volatilome instead of whole microbes. The effectiveness of several microbe-based commercial formulations in the laboratory is not showing similar results in the field's conditions. Another constraint is felt about the ecological fitness of bio-inoculants with native microflora. More importantly, a critical analysis of the various methods enumerated in the several research findings indicates the need to combine these techniques to improve the degree of stress alleviation offered by microbes individually. This training program will address these issues and provide distinct microbial-based approaches for plant stress amelioration.

New insights into mechanisms of plant-microbe interaction have revealed new concepts relating to microbial inoculants and harnessing their potential to be used in crop protection. However, recent attention has been given to identifying and utilizing the consortia of rhizospheric beneficial microbes that can mediate systemic resistance/tolerance, a condition in which the innate defense responses of plants are raised against biotic challenges and rhizosphere microbiome plays a key role in reprogramming the defense responses of plants Research insights on omics of host and pathogens are also opening an arena for bio-control of these pathogens. This is forming a base for the future face of microbial inoculants in agriculture.

Theme

In this perspective, the following thematic areas will be addressed in this training-

- Characterization and identification of microbial inoculants.
- Recent advances in the delivery mechanisms/strategies for enhancing microbial inoculants efficacy.
- Molecular and biochemical basis of systemic resistance/tolerance in plants
- Recent advances in microbe based product development.
- Issues related to biological control of plant pathogens.
- Development of research modules and pipelines for commercialization and regulatory requirements concerning microbial inoculants.

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 microbial inoculants following conventional techniques and advanced molecular tools.
- Early career researchers and anyone involved or embarking into this field will be benefited by getting exposure and know how to cutting edge research in microbe-based approaches for plant stress amelioration.

Eligible participants

Research scholars, Post-docs, Students, 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. 4000/- per trainee for students/research scholars and Rs. 6000/- for Scientist/Lecturers/Technical officers from public/private Universities or Govt. Institutions, Rs. 10,000 per trainee for researchers from private or non-government organizations.

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 10 February, 2023. The selected candidates will be notified on 15 February, 2023 by email.
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