

National Training on Technological Advances in Biological Control of Plant Pathogens September 25 to October 04, 2018



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About NBAIM

ICAR-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 Agricultural Microbiology in India. The Bureau aims at collection, maintenance and conservation of agriculturally important microorganisms and their genomic resources for future needs. The Bureau is engaged in the cutting-edge research in Agricultural Microbiology, Microbial Biotechnology, Plant Pathology and Bioinformatics for benefit of Indian agriculture and farmers. Apart from core research, human resource development is also one of its mandates. The Bureau has organised several successful training programs on various

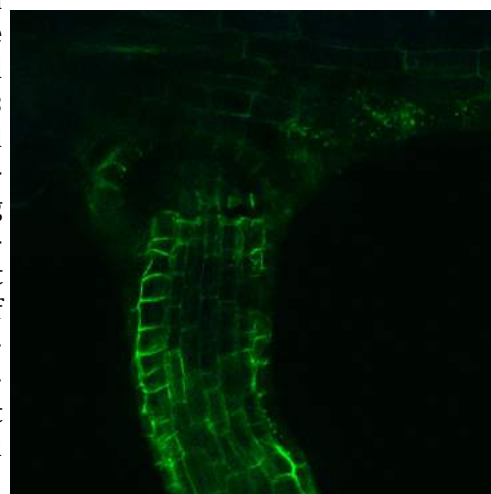


aspects of basic and applied sciences to benefit different stakeholders of the society. In this line, national and international training programs on different areas of molecular microbial identification, characterization, molecular taxonomy, biocontrol, plant-microbe interactions and the applications 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 pest and disease outbreak has caused a huge disturbance in intensive crop production systems. Climate change has added to the difficulty in pest management. Plants suffer from a number of pest and diseases caused by a number of fungi, bacteria, viruses and nematodes leading to severe economic loss by reducing crop yield, quality and contaminating grains with toxic chemicals. Chemical control is considered as one of the most effective control measures regardless of being highly expensive and toxic to non-target organisms in agroecosystems. Further, use of resistant cultivars is another important approach conferring sustainability to the ecosystem but breakdown of resistance has remained a great concern. The huge diversity of microorganisms that reside in the rhizosphere and the 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 and effective pest management practices to the farmers' field. There is enhanced work on biological agents for crop production and protection. Popularization of bioagents for disease control needs very effective formulations in the market. To enhance the efficacy of biocontrol agent, it is important to have a stringent biocontrol research. The multi-billion dollar pesticide industry is also moving towards biologicals realizing its future potential in sustainable agriculture.

Earlier, it was thought that plants try to defend themselves against fungal and other microbial pathogens by the induction of both localized and systemic responses. Interaction of a pathogen with host plant triggers a localized hypersensitive response. Complex molecular mechanisms that regulate the colonization and

spread of pathogens are still less explored. Simultaneously, initiation of long distance signals at the infection site takes place leading to the induction of specific pathogenesis related (PR) genes in uninfected parts of the plant is also a question of research.

New insights into mechanisms of plants microbe interaction has revealed new concepts relating to bioagents and harnessing their potential to be used in crop protection. We now have an array of mechanisms to be targeted for effective biocontrol research for different pathogens. One of the earliest microbe mediated defence responses is the generation of reactive oxygen species (ROS) and antioxidant enzymes, such as hydrogen peroxide (H_2O_2), superoxide anion (O_2^-) and hydroxyl radical ($\bullet OH$). This may trigger many downstream processes which cause a dynamic defence response leading to phytoalexin production, callose deposition, strengthening of cell walls, synthesis of secondary metabolites and pathogenesis related (PR) proteins resulting in inhibition of the growth of invaders. However, recently attention has been given to identifying and utilizing the consortia of rhizospheric beneficial microbes that can mediate induced systemic resistance (ISR), a condition in which the innate defence responses of plants are raised against biotic challenges and also rhizosphere microbiome plays a key role in reprogramming the defence responses of plants. Research insights on omics of host and pathogens are also opening an arena for biocontrol of these pathogens. This is forming base for future face of biocontrol of plant pathogens.



Theme

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

- Characterization and identification of biological control agents.
- Recent advances in the delivery mechanisms/strategies for enhancing biocontrol efficacy.
- Molecular and biochemical basis for differentiating ISR and SAR.
- 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 bio-pesticides

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 biological control agents of microbial origin following conventional techniques and advanced molecular tools.
- Early- stage experimental researchers and anyone involved or embarking into this field will be benefited by getting exposure and know how to cutting edge research in biological control of plant pathogens.

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. 2500 per trainee for students/ research scholars and Rs. 5000/- for Scientist/Lecturers/Assistant Professors or above/Technical officers from Universities or Govt. Institutions. Rs. 10000 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) on/or before 05th September, 2018. The selected candidates will be notified on 10th September, 2018 by email.

E-mail, Director ICAR-NBAIM - nbaimicar@gmail.com

Please send a copy also to pawan112000@gmail.com, nbaimudai@gmail.com