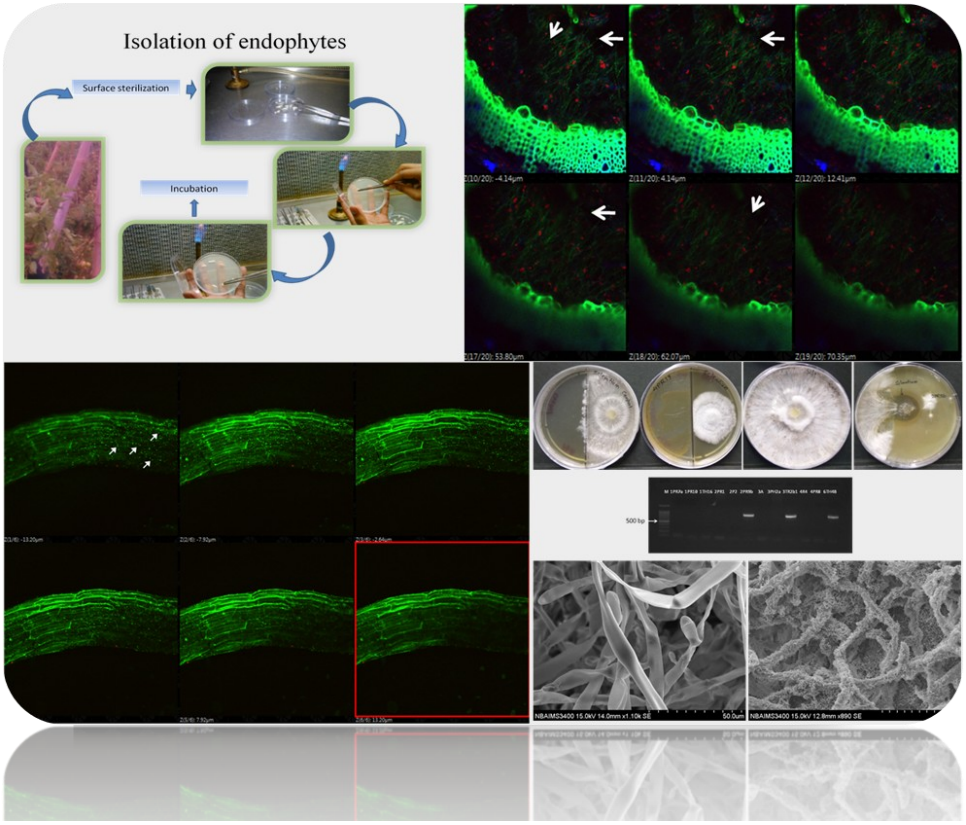
ICAR-NBAIM

Understanding and conserving our national heritage of agriculturally important microorganisms

National Training
on
Bacterial endophytes in agriculture: concepts to application

January 07 to January 16, 2019



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About NBAIM

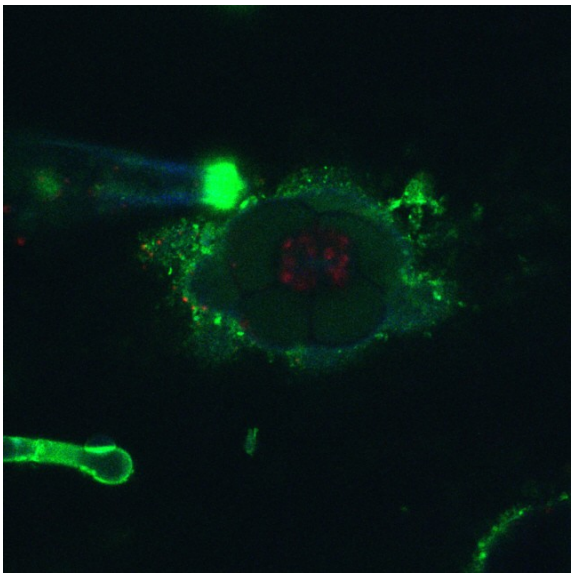
ICAR-National Bureau of Agriculturally Important Microorganisms (NBAIM) is one of the premier institutions of Indian Council of Agricultural Research (ICAR) leading research and development programs in the field of Agricultural Microbiology in India. The Bureau aims at collection, maintenance and conservation 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.


NBAIM Building, Mau (Uttar Pradesh)

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, proteomics, metabolomics and bioinformatics.

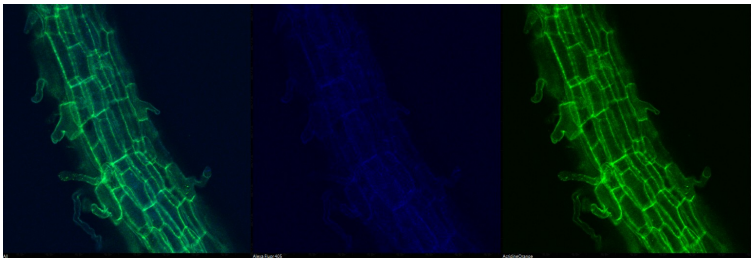
Background

Increasing pest outbreak and uncertain weather conditions has caused a huge disturbance in intensive crop production systems. Plants suffer from stress caused by a number of biotic factors like fungi, bacteria, viruses, nematodes, etc. and abiotic factors like drought, salinity, cold, heat, flood, etc. leading to severe economic loss by reducing crop yield and quality. Diminishing effects of chemical agents is also a serious concern apart from visible ill effects to ecosystem. The huge diversity of microorganisms that reside in the rhizosphere and endosphere can thus be utilized for plant growth and health promotion. Current research is addressing ways of efficiently harnessing such biodiversity in agriculture production.



Endophytic microbes are those living inside the plants without any apparent disease symptoms. History indicates huge potential of these endophytic microbes in production of novel secondary metabolites, especially in life saving drug discovery. Endophytes have beneficial roles in plants growth too. They help in several plant processes like nutrient uptake, growth promotion, biotic and abiotic stress tolerance, etc. New dimensions have been realized in biological control of plant pathogens and alleviation of abiotic stresses using endophytes. Endophytes have advantage of being close to plant cells in order to influence plants' internal immunity. There are reports of endophytes contributing to plant immunity against biotic and abiotic stresses. The potential therefore, can be harnessed in order to meet the growing demand of increasing population and mitigating losses arising out of climate change. The concept of holobiome is also coming into picture indicating that genome of endophytic microbes is also contributing significantly to the plant genome expression and phenotype. Recently, attention has been given to identifying and utilizing the endophytes that can mediate in-

duced systemic resistance (ISR) and induced systemic tolerance (IST), a condition in which the innate defence responses of plants are raised against biotic and abiotic challenges, respectively.



All these signifies the role of endophytes in modern agro-approaches. To harness most out of endophytes it is important to know about its ecology, mode of action, isolation technique, methods to realise higher potential etc. Research insights on *omics* of host and endophytes are also opening an arena for biocontrol of these pathogens. This is forming base for future face of biological input in agriculture.

This training program concentrates on basic aspects of endophyte biology, its function, isolation techniques with special concern to surface sterilization, confocal imaging and localization of endophytes in plants cells using live dead cell imaging system, molecular and biochemical characterization for plant growth promotion, biological control and abiotic stress alleviation.

Theme

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

- Isolation, identification and characterization of endophytes
- Ecology of endophytes
- *In-planta* tracking and visualization of endophytes
- Advances in endophyte metabolite research
- Applications of endophytes in agriculture

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 surface sterilization, isolation and characterization of bacterial endophytes following conventional techniques and advanced molecular tools.
- Young researchers on endophyte plant interaction will get structured training on endophyte handling and applied aspects and anyone involved or embarking into this field will be benefited by getting exposure and know about cutting edge research in endophytes.

Eligible participants

Ph.D. students, Research Scholars, Post-Doctoral 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 Technical officers, Scientists/Assistant Professors/Lecturers or above from Public/Private Universities or Govt. Institutions. Rs. 10000/- per trainee for researchers from private or Non-Government organizations/Companies/Firms**.**

How to apply?

Eligible participants may write to the Director, ICAR-NBAIM along with their RESUME (not more than one page) on/or before 30th November, 2018 to -
email id: **endophyte.training@gmail.com; nbaimicar@gmail.com**
Please send a copy also to- **pramod15589@gmail.com**.

The selected candidates will be notified on 05th December, 2018 by E-mail.