

The Indian Agricultural Research Institute, New Delhi invites applications from **MSc and PhD students** for a two weeks **National training on "Genomics of Agriculturally Important Pathogens, Microbes, and Insects"** sponsored by **NAHEP-Centre for Advanced Agricultural Science and Technology(CAAST)**, Indian Council of Agricultural Research, New Delhi.

WHO CAN PARTICIPATE: MSc and PhD students on roll in the ICAR-Accredited SAUs/ CAUs/ CUs/ other UGC recognized Universities and IARI Hubs are eligible to apply. The total number of participants will be limited to **Thirty ONLY**

REGISTRATION FEE: No registration fee is to be paid; the programme is fully sponsored by NAHEP-CAAST

HOW TO APPLY: Complete application form in the prescribed format forwarded by chairperson should reach the **course director** on or before **10th June 2024** by **Email to: labnumber54@gmail.com**; Cc to **application.icar.iari@gmail.com** application form can be downloaded from **www.iari.res.in**

TRAVEL: Selected applicants are eligible for a travel allowance for the journey performed in third-tier AC train via the shortest route as per NAHEP norms

FOOD and ACCOMMODATION: Food and accommodation will be provided for all trainees. Refreshments will be provided during the programme.

Training dates: 22 July to 2 August 2024

Last Date for application: 10th June 2024
Intimation of selection: 15th June 2024

Venue

Lectures: NRL Auditorium, Discovery Center, ICAR-IARI New Delhi
Practical: Discovery Center, ICAR-IARI, New Delhi

Organizers

Convenor

Dr. C. Viswanathan

Joint Director (Research)& Principal Investigator-NAHEP-Centre for Advanced Agricultural Science and Technology (CAAST), ICAR-IARI, New Delhi

Course Directors

Dr. A. Kumar

Division of Plant Pathology, ICAR-IARI, New Delhi

Dr. S. Subramanian

Division of Entomology, ICAR-IARI, New Delhi

Dr. B. Ramakrishnan

Division of Microbiology, ICAR-IARI, New Delhi

Co-Course Directors

Dr. Deeba Kamil Division of Plant Pathology

Dr. Suresh M Nebapure Division of Entomology

Dr. Rajna S Division of Entomology
ICAR-IARI, Pusa Campus, New Delhi



National Agricultural Higher Education Project



National Training

Genomics of Agriculturally Important Pathogens, Microbes, and Insects

22 July to 2 August 2024

**Discovery Center
ICAR-IARI, New Delhi**



**Organized by
Center for Advanced Agricultural Science and Technology (CAAST)**

ICAR-Indian Agricultural Research Institute, New Delhi- 110012

About NAHEP-CAAST

Centre for Advanced Agricultural Science and Technology (CAAST) is a new initiative and student centric sub-component of **World Bank** sponsored **National Agricultural Higher Education Project (NAHEP)** granted to IARI to provide a platform for strengthening educational and research activities of post graduate and doctoral students. CAAST theme for IARI is **Genomic assisted crop improvement and resource management** that specifically aims at inculcating genomics literacy and skills among the student.

ICAR-IARI

The Indian Agricultural Research Institute (IARI) in New Delhi is currently involved in research on genomic initiatives targeting pests, pathogens, and microbes. By employing cutting-edge genomic technologies, IARI is unraveling the genetic makeup of various pests, pathogens, and microbes that threaten crop yields and food security.

Through comprehensive genomic analyses, including sequencing and functional genomics, key genetic factors involved in pest resistance, pathogen virulence, and microbial interactions in agricultural ecosystems are being identified. This multidisciplinary approach not only enhances the understanding of these biological agents but also paves the way for developing sustainable and resilient crop management strategies tailored to the unique needs of Indian agriculture.

Background

Global food production needs to keep pace with ever growing human population of 7 billion that is expected to touch 10 billion by 2050. With shrinking cultivable area and consequent 'agricultural habitat loss for sustained crop production, one of the approaches for ensuring, sustainable and enhanced agricultural productivity and nutritional security by reducing the losses due to biotic and abiotic stress factors. Biotic factors like pest & diseases, multitude of climate and environmental related abiotic factors are among the major constraints that threaten global agriculture.

The cracking of the first microbial genome by Crag Venter in the year 1996 culminated in the birth of the science of genomics. In the last two decade, 'omics science' and genomic data has enabled us to understand diverse plant-associated microbial communities, pathogens of crop plants and their behaviour on plant-associated niches. The exponential growth of genome-related information and the associated "Omics tools" provided an opportunity for the biologist to understand the population genetics of microorganisms, pathogens, pest and their host interactions at the cellular and genome levels.

A total of **5,63,346** whole genome sequencing projects encompassing most of the plant pathogens and microbes are underway throughout the world that includes **5,13,511**organisms (<https://gold.jgi.doe.gov/>). To harness the potential of the genome information, we need to create appropriate infrastructure facilities and human resources to face the challenges in the coming decades.

Genomics

Recent advances in pathogen, pest, and insect genomics have transformed our understanding of their biology and interactions with agricultural ecosystems. Genomic techniques such as whole-genome sequencing, transcriptomics, and metagenomics are being currently used to uncover the genetic mechanisms behind pathogen and pest reemergence, virulence, and beneficial microbial traits. This deeper understanding helps in identifying new targets for disease and pest management strategies, including the development of genetically resistant crop varieties, precision-targeted pesticides, and environmentally friendly biocontrol methods.

Genomic approaches have also helped in exploring microbial communities associated with plants revealing their roles in plant health, nutrient cycling, and ecosystem resilience. These developments highlight the transformative potential of genomics in addressing critical challenges in global agriculture, from protecting crop yields to promoting sustainable farming practices.

With this background, the Centre for Advanced **Agricultural Science and Technology (CAAST)** under NAHEP is organizing a 2-week **National Training on Genomics of Agriculturally Important Pathogens, Microbes, and Insects**

COURSE OUTLINE

A training program focusing on the genomics of agriculturally important pathogens, microbes, and insects would cover a range of topics crucial for understanding and addressing crop production and protection challenges. Participants would be exposed to fundamental genomics concepts such as DNA sequencing technologies, genome assembly, and annotation methods tailored to pathogens, microbes, and insects.

Practical sessions would involve using genomic tools to trace the evolutionary origin of pest and pathogens, identify virulence factors in pathogens, understand microbial interactions in soil and plant microbiomes, and uncover the genetic basis of insecticide resistance in pests. In addition, the program would cover advanced bioinformatics techniques for analyzing large-scale microbial and pest genomic datasets and interpreting genomic information to design effective disease management strategies and sustainable crop production

Hands-on workshops and case studies would provide opportunities for participants to apply genomic approaches to understand the pest and pathogen biology, their transmission necessary for addressing the evolving challenges in modern agriculture. Genome analysis of microbes will be useful for understanding beneficial microbial agents for climate resilient agriculture.

Exposure to facilities will be made during the course of training.

Group activities

Trainee groups will be allotted a set of topics for discussion and moderation. Trainees are expected to bring their laptop computer.

Application deadline: 10th June 2024

