

HRD Training Programme
on
Use of Semiochemicals as Biocontrol-Compatible Technology for Insect
Pest Management

16 – 20 November 2026



Organized by

ICAR – NATIONAL BUREAU OF AGRICULTURAL INSECT RESOURCES (NBAIR)
P. B. No: 2491, H. A. Farm Post, Hebbal, Bengaluru – 560 024

ABOUT THE PROGRAMME

Insect pests, including invasive species, and plant pathogens are among the major constraints to agricultural productivity, causing significant crop losses and posing serious challenges to global food security. Chemical pesticides remain the predominant means of managing these threats. However, their indiscriminate and repeated use has resulted in several undesirable consequences, including the development of pesticide resistance, pest resurgence, secondary pest outbreaks, pesticide residues, environmental contamination, and adverse impacts on non-target organisms such as pollinators and natural enemies. These concerns highlight the urgent need for sustainable, environmentally safe, and ecologically compatible approaches to crop protection.

Biological control provides an environmentally sound and sustainable alternative to conventional chemical pest management. Nevertheless, its large-scale adoption is often constrained by the timely availability, adequate quantity, field efficacy, and consistent quality of biological control agents. Therefore, there is a need to develop complementary technologies that enhance the effectiveness of biological control while reducing dependence on conventional pesticides. Emerging and converging technologies, particularly those integrating semiochemicals, nanotechnology, precision delivery systems, and biological control, offer considerable potential for developing innovative and sustainable approaches to integrated pest and disease management.

Semiochemicals have emerged as promising tools for sustainable pest management by exploiting the chemical signals that mediate insect-plant and insect-insect interactions. Pheromones, kairomones, and plant-derived volatile organic compounds (VOCs) can be effectively employed for pest monitoring, mass trapping, mating disruption, attract-and-kill strategies, and other behavioural management approaches. Semiochemicals can also modify the host and prey searching behaviour of parasitoids and predators, thereby enhancing the effectiveness of biological control. Their high degree of target specificity, low environmental persistence, and compatibility with natural enemies make semiochemicals valuable components of integrated pest management (IPM).

Despite their considerable potential, the field application of semiochemicals is often limited by their high volatility, rapid dissipation, and susceptibility to environmental factors such as light, temperature, oxygen, and moisture. Nanotechnology provides promising solutions to these limitations through the development of suitable carrier and delivery matrices that protect semiochemicals from degradation and facilitate their controlled and sustained release. Nano-enabled systems also offer opportunities for improving the delivery and efficacy of insecticides and microbial biocontrol agents. Incorporation of pheromones and VOCs into nano-matrices can provide controlled release over extended periods, thereby enhancing behavioural responses, improving trapping efficiency, and increasing the field persistence of semiochemical-based technologies. Furthermore, nanotechnology has significant potential for developing advanced sensors, diagnostic systems, and precision tools for the early detection and management of insect pests and plant diseases.

ICAR-National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru, is a premier institution engaged in research on agricultural entomology, insect resources, biological control, and innovative crop protection technologies. The institute has been actively pursuing research on the integration of semiochemicals and nanotechnology for sustainable pest management. ICAR-NBAIR has developed novel delivery matrices for pheromones and other semiochemicals, along with sensor-based technologies for the detection of semiochemicals and

xenobiotics. Several of these technologies have progressed towards patenting, technology transfer, and commercialization. The expertise and infrastructure available at the institute provide a strong foundation for capacity building, knowledge exchange, and dissemination of semiochemical- and nanotechnology-enabled crop protection technologies.

In this context, a five-day training programme entitled “Use of Semiochemicals as Biocontrol-Compatible Technologies for Insect Pest Management” is proposed to enhance the knowledge and technical capacity of plant protection scientists. The programme will provide participants with an understanding of the principles, mechanisms, applications, and recent advances in semiochemicals, nanotechnology, and their integration with biological control. Emphasis will be placed on practical applications, technology development, field deployment, and the integration of semiochemical-based approaches with IPM programmes to promote sustainable, environmentally compatible, and precision-oriented crop protection.

Objectives

- To introduce participants to semiochemicals for crop protection.
- To provide hands-on training in the collection and identification of bioactive compounds, including semiochemicals, for incorporation into nanomatrices.
- To familiarize participants with semiochemical formulations and their applications in sustainable pest management.

Topics at a glance

- Introduction to semiochemicals and insect chemical communication
- Identification and Evaluation of Semiochemicals
- Semiochemicals in pest monitoring, mass trapping and behavioural manipulation
- Herbivore-induced plant volatiles (HIPVs) and their role in plant-insect interactions
- Semiochemicals in biological control and IPM
- Nanotechnology and nanomaterials for semiochemical-based pest management
- Nano sensors in plant protection
- Role of semiochemicals in pollinator ecology
- Modelling in semiochemical research

Faculties / Resource persons

ICAR-NBAIR scientists with expertise in semiochemicals and nanotechnology will deliver specialized lectures and hands-on practical sessions. Experts from IISc Bengaluru, IISER Pune, ICAR-IARI New Delhi, ICAR-IIHR Bengaluru, JNCASR, NCBS Bengaluru and ICAR-NIRCA, Andhra Pradesh will also contribute, providing exposure to recent advances in semiochemical and nanotechnology-based crop protection technologies.

Venue, Date and Duration

The 5 days training programme will be conducted at ICAR-NBAIR, Bengaluru from 16 – 20 November, 2026.

Eligibility

Participation in this training program is open for the researcher Scholars / Scientist / Assistant Professor/ Lecturer / Subject Matter Specialist having a minimum of two years' experience in related research / teaching /extension experience in ICAR/ State & Central Agricultural Universities/ AMU/ BHU/ Viswa Bharti/ Nagaland University/ KVK's in Entomology, Plant Protection, Plant Pathology, Nematology, Agricultural Microbiology or any other related disciplines. The number of participants for the programme will be limited to 20. The selection of the candidates will be made by screening committee as per the guidelines of ICAR in force.

Nomination

Nomination for participation in the training programme may be made in prescribed proforma given herewith. Directors of ICAR Institutes, Vice Chancellors of Agricultural Universities, Heads / Directors of University Departments and Principals of affiliated colleges can nominate one or two suitable candidates from respective Institute/ University. Preference will be given for candidates who are already working/ likely to take up research work related to semiochemicals and nanotechnology for sustainable management of insect pests and diseases of crops. The duly completed application form, approved by the competent authority of the respective organization, may be submitted through the proper channel. Candidates may send the application either as a hard copy by post or as a scanned copy by email. Candidates should bring permission and relieving letter from the respective Institute.

Important dates

Last date for receiving the nomination form	: 25th October, 2026
Intimation of selection	: 30th October, 2026
Confirmation by participants	: 10th November, 2026
Intimation to waitlisted participants if selected	: 10th November, 2026

Registration fee

A registration fee of Rs. 50/- (Rupees fifty only) per participant is fixed as per ICAR guidelines, which may be paid through Online transfer

SCAN & PAY



Name of the Beneficiary: NATIONAL BUREAU OF AGRICULTURAL INSECT RESOURCES

Account Number: 10476392081

Name of the Bank: State Bank of India

Branch: Hebbal

Type of Account: Current Account

IFSC Code No: SBIN0001316

Branch Code No: 01316

UPI ID: 9343142610A@SBI

Travel and Accommodation

Travel expenses (TA/DA) and accommodation charges for participation in the training programme shall be borne by the respective participants institutes. Accommodation in the guest House of the Organizing Institute, ICAR-NBAIR, may be provided to trainees on a payment basis, subject to availability. Working lunch and session tea/refreshments will be provided by ICAR-NBAIR. Local participants will not be eligible for boarding and lodging facilities; however, working lunch and refreshments will be provided.

About NBAIR and Location

National Bureau of Agricultural Insect Resources (NBAIR) is a nodal ICAR Institute at National level for research and development on all aspects of work on harnessing resources of insects including biological control of crop insect pests and diseases, training, information, repository, technology dissemination and National / International cooperation. ICAR-NBAIR is located at Hebbal in the Bengaluru to Bellary Highway NH 7, opposite to CBI (Central Bureau of Investigation), next to Veterinary College, Hebbal Bengaluru. The Institute is located 5 km from Cantonment railway station, 4 km from Yeshwantpur railway station and 8 km from Bengaluru city junction and 35 km from KIA airport. Buses which are plying to Yelahanka, Devanahalli, Doddaballapur, international airport will pass through ICAR-NBAIR. Participants are requested to get down at CBI bus stop to reach ICAR-NBAIR.

Course Director

Dr. Kesavan Subaharan

Principal Scientist (Entomology) & Head, Division of Germplasm Conservation and Utilization,
ICAR- NBAIR, Bengaluru

Dr. T. Venkatesan

Director (A)
ICAR- NBAIR, Bengaluru

Course Coordinators

Dr. Deepa Bhagat, Principal Scientist
Dr. M. Sujithra, Senior Scientist

Course Co-Coordinators

Dr. M. Sampath Kumar, Principal Scientist
Dr. Amala U, Senior Scientist
Dr. B. Gundappa, Senior Scientist
Dr. Richa Varshney, Senior Scientist

**KINDLY FORWARD YOUR COMPLETED
APPLICATION TO:**

Dr. Kesavan Subaharan

Head, Division of Germplasm Conservation
and Utilization & Course Director
ICAR-National Bureau of Agricultural Insect
Resources (NBAIR)
P. B. No. 2491, H A Farm Post, Hebbal,
Bengaluru - 560 024
Email: subaharan_70@yahoo.com
Phone: 09483652920

**FOR FURTHER DETAILS, PLEASE
CONTACT**

THE DIRECTOR

ICAR-National Bureau of Agricultural
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Bengaluru - 560 024.
E-mail: nbairdirector@gmail.com
www.nbair.res.in

Application Form for Participation in Training Programme

(To be sent directly to Course Director of the training programme concerned)

HRD sponsored 5 days training programme on

“Use of Semiochemicals as Biocontrol-Compatible Technology for Insect Pest Management”

16–20 November 2026

1. Name in full (Block Letters) :
2. Designation:
3. Present Employer and Address:
.....
4. Address for Correspondence:
.....
5. Tel No:.....(O).....(Mob).....
6. Email:
7. Date of Birth and age:
8. Sex:
9. Marital Status: Married/ Unmarried
10. Teaching/ Research/ Professional Experience
(Mention post held during last 5 years)
11. Number and list of Publications in the relevant area:
12. Academic record:

Examination	Subject	Year of passing	Institution/University	OGPA/ %
Bachelor's degree				
Master's degree				
PhD				
Other certificates/ Diplomas etc.				

13. Mention details if you have participated in Summer or Winter Schools/ Short Courses, etc. during the previous five years under ICAR/ other organizations:
.....
14. Transaction ID /UTR No..... Date..... for Rs.50/- (Rupees fifty only) (non-refundable) for registration of application

Signature of the applicant

Recommendations of the forwarding Institute

Dr./Shri. /Ms. is hereby nominated for participation in the 5 days short course on “**Use of Semiochemicals as Biocontrol-Compatible Technology for Insect Pest Management**” at ICAR-NBAIR, Bengaluru during 16 – 20 November, 2026.

**Signature
Designation & Address**

Certificate

It is certified that the information was furnished by the office record and was found correct.

**Signature
Designation, Address and Office Seal of the Sponsoring Authority**