

**ICAR sponsored Winter School**

**Training on**

**Insecticide Resistance: Biochemical and  
Molecular Perspectives and Strategies for  
Combating Resistance to Insecticides**

**8 - 28 January, 2020**

**Sponsored by**

**Indian Council of Agricultural Research**

**New Delhi**

**Course Director**

**Dr. M. Mohan**

**Course Coordinators**

**Dr. T. Venkatesan**

**Dr. R. Gandhi Gracy**

**Dr. M. Sampath Kumar**



**Organised by**

**ICAR-National Bureau of Agricultural Insect Resources**

**Hebbal, Ballari Road, Bengaluru - 560 024, Karnataka**

**[www.nbair.res.in](http://www.nbair.res.in)**

## Background

Evolution of resistance to insecticides in insects' costs billions of U.S. dollars per year worldwide. Breakthroughs in chemistry and molecular biology may provide many new pesticides and novel methods for pest control, but there is also a considerable chance that the evolution of pest resistance will outpace human innovation. Insecticide resistance is an example of a dynamic evolutionary process in which chance mutations conferring protection against insecticides are selected for in treated populations. In practical terms, the evolution of resistance has undoubtedly contributed to overall increases in the application of chemicals to crops, with significant implications for both human health and the environment.

Resistant insects continue to affect our agricultural productivity, imposing huge economic burden for crop management. Moreover, it is proving very difficult to combat resistance by embarking on a chemical arms race. The development of a new insecticide takes an average over a decade at a huge cost and the rate of discovery of new insecticidal molecules, unaffected by current resistance mechanisms, appears to be on the decline. Given the breadth and diversity of insecticide resistance mechanisms in pests reported to date, it can confidently be assumed that no insecticide, however novel or unconventional in its effect, is immune to the evolution of resistance.

Over the years, researchers have made great progress in the continuing battle against insecticide resistance by monitoring and characterizing pesticide resistance and in understanding some of the genetic, molecular, ecological and operational factors that affect the speed of its development. Managing insecticide resistance is complex, in part because resistance takes a variety of forms. Therefore, local strategies must be tailored to the type of resistance present. The two main mechanisms metabolic resistance and target-site resistance include multiple forms, which are of varying importance for different classes of insecticide. A further complication is 'cross resistance' between insecticides that have the same mode of action for killing a specific insect pest.

Only by monitoring, characterizing and predicting the appearance and spread of resistance can we hope to use existing chemical tools in a sustainable manner. The introduction of any new compound should be followed by careful monitoring to detect any shifts in resistance that may arise. Modifications to usage recommendations can then be made accordingly. Insecticide resistance management strategies seek to minimize the selection for resistance among pest species. The factors that affect resistance development can be grouped into three categories: the pest's genetic make-up, the pest's biology, and "operational factors" including cropping practices and the pesticide characteristics and application.

The winter school training on ***"Insecticide resistance: Biochemical and molecular perspectives and strategies for combating resistance to insecticides"*** of 21 days will be handled by experienced NBAIR and guest faculty with focus on hands on practical's.



## Objectives

- To provide advanced hands on training on detection and management of insecticide resistance in insects
- To provide an opportunity to discuss and exchange ideas with experts / resource persons in the field of insecticide resistance management

## Course Outline

- ✓ Overview on different classes of insecticides and insecticide resistance in insect pests & mites
- ✓ Insecticides and their toxicological interaction with insect system
- ✓ Biochemical and molecular basis of insecticide resistance in insects
- ✓ Population genetics and genetics of insecticide resistance in insects
- ✓ Insect endosymbionts in insecticide resistance: Metagenomic perspective
- ✓ Monitoring and detection of insecticide resistance: Conventional and molecular methods
- ✓ Insecticide resistance management strategies against major insect pests and mites
- ✓ Mechanisms of insect resistance against *Bacillus thuringiensis* and the future of insect resistance management strategies against *Bt* crops

## Faculties/Resource Persons

ICAR-NBAIR has renowned Scientists working on genomics and insecticide resistance. In addition, resource persons / experts from other Institutions will be invited for delivering specific lectures and practical's.

## Venue, Date and Duration

The 21 days winter school will be conducted at ICAR-NBAIR, Bengaluru from 8- 28 January, 2020.

## Target Group

Participants should be from ICAR Institutes/SAUs/CAU/ Agricultural faculty of AMU, BHU, Vishwa Bharti and Nagaland University in the cadre of Assistant Professors or equivalent and above in Entomology, Plant Protection, Plant Pathology, Nematology or any other related disciplines. The number of participants for the programme will be limited to 25. The selection of the candidates will be made by screening committee as per the guidelines of ICAR.

## Apply for the training (on-line only)

To apply for the training programme, the interested candidates should register and apply online through 'ICAR Capacity Building Programme' (CBP) portal and Login using your user ID and Password. To create user ID use "Create New Account" link.

The advance application form will be generated after filling qualification and experience details in the portal (<https://cbp.icar.gov.in/>). Please click on 'Print' button to take a print of Advance Application form, take signature on this form from your competent authority and upload this signed Advance Application form on this portal. The approved hard copy along with non-refundable registration fee of Rs. 50/- (Rupees fifty only) in the form of postal order or demand draft to be drawn in favour of Director, ICAR-NBAIR, payable at Bengaluru should be submitted to the course director. Payment may also made through online in the name of NBAIR, A/C No. 10476392081, IFSC code: SBIN0001316. The final selection will be subject to receipt of the application through the portal duly recommended by the competent authority.

### Important Dates

Last date for receiving the nomination form	: 25 November, 2019
Intimation of selection	: 1 December, 2019
Confirmation by participants	: 5 December, 2019
Intimation to waitlisted participants if selected	: 10 December, 2019

### Travel, Boarding & Lodging

Selected participants are eligible for TA (up to 2 AC Train fare by shortest route as per ICAR norms). Food & accommodation will be provided by the organizers. No DA is admissible to the participants. The local participants are not eligible for boarding and lodging, however, working lunch and refreshments will be provided.

### Institute information

ICAR - National Bureau of Agricultural Insect Resources (NBAIR) is a nodal agency for collection, characterization, documentation, conservation, exchange and utilization of agriculturally important insect resources (including mites and spiders). NBAIR is located in the Bengaluru to Bellary Highway N.H. 7 towards the international airport. The Institute is 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 Yeshwanthpur railway station and 8 km from Bengaluru city junction and 35 km from Kempegowda International airport, Devanahalli. Buses which are plying to Yelahanka, Devanahalli, Doddaballapur, international airport will pass through NBAIR. Participants are requested to get down at CBI bus stop to reach NBAIR.



## Correspondence

### Course Director

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### *For Further Details*

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