



Capacity Building Program on

Advances and innovations in promotion and utilization of microbials for biological control of crop pests

December 14-24, 2016



Organized by



Human Resources Development Cell,
ICAR-National Bureau of Agricultural Insect Resources,
P.B.No.2491, HA Farm Post, Bellary Road, Bengaluru-560024

About the Capacity Building Program:

Insects like other organisms are prone to a variety of diseases by pathogens like bacteria, viruses, fungi, nematodes and protozoans, and these pathogens are utilized for biological control of insect pests through inoculative and inundative applications. There has been considerable increase in research on microbial pathogens of insects in recent times to find out environmental friendly alternatives to chemical insecticides. The microbial pesticides occupy around 1.3 per cent of the world's total pesticide market of which, 90 per cent of them are used as insecticides. The most successfully utilized insect pathogen is the bacterium, *Bacillus thuringiensis* (Bt) which is used extensively for management of certain lepidopteran pests. In India, mostly imported products of *Bt kurstaki* used are expensive and there is a serious need to develop aggressive indigenous *Bt* strains against various pests. Baculoviruses comprising nuclear polyhedrosis virus (NPV) and granulosis virus (GV) have been successfully used as insect pathogens because of their high virulence and specificity. NPV and GV formulations are used for lepidopteran pests like *Helicoverpa armigera* (HaNPV) and *Spodoptera litura* (SINPV) in India. Entomopathogenic fungi like *Beauveria bassiana*, *B. brongniartii*, *Metarhizium anisopliae*, *M. anisopliae* var. *acridium*, *Lecanicillium* spp., *Hirsutiella thompsonii*, *Nomuraea rileyi* and *Isaria fumosorosea* have gained importance in the crop pest control in recent years due to the simpler, easier and cheaper mass production techniques. Naturally occurring entomopathogenic nematodes (EPN) like *Steinernema* spp. and *Heterorhabditis* spp. and their symbiotic bacteria (*Xenorhabdus* spp. in *Steinernema* and *Photorhabdus* spp. in *Heterorhabditis*) are important biotic factors in suppression of insect pest populations in soil and cryptic habitats. The virulent species of these nematodes are commercially produced as biological control agents all over the world. India has a great potential to exploit these beneficial nematodes for the suppression of insect pests.

ICAR-NBAIR, erstwhile, Project Directorate of Biological Control (PDBC) hand-in-hand with AICRP Biological control of Insects, Diseases, Weeds and Nematodes have immensely contributed to the science of biological control of insect pests, diseases, weeds and nematodes, and is considered as the centre of excellence for microbial biocontrol in the country. The expertise and technological knowledge evolved by the scientists have been formulated in to a training module for the benefit of enthusiastic scientists, faculty and researchers pursuing biological control of insect pests across the country. The current programme envisages capacity building in the field of biological control.

Program contents

The following major topics are intended to be covered.

- Status and prospects of microbial biocontrol for insect pest management
- Advances in mass production and utilization of insect hosts
- Role of AICRP on biological control of crop pests
- Advances and innovations in production and utilization of entomopathogenic fungi
- Advances and innovations in production and utilization of entomopathogenic bacteria (*Bt* etc.)
- Advances and innovations in entomopathogenic nematodes production and utilization
- Viruses for insect pest management
- Registration of microbial biopesticides and regulation requirements
- Commercialization of microbial biopesticides
- Visits to commercial units, fields.

About the Bureau

National Bureau of Agricultural Insect Resources (NBAIR), formerly National Bureau of Agriculturally Important Insects (NBAII) is located in Bengaluru, Hebbal in the same premises at which The Commonwealth Institute of Biological Control (CIBC), Indian Station was established in 1957. The advent of CIBC marked the beginning of organized and systematic biological control research in India. During this period, our knowledge of natural enemies of crop pests and weeds increased manifold. CIBC Indian station was closed during 1987 and All India Coordinated Research Project on Biological Control of Crop Pests and Weeds (AICRP-BCCP&W), which was launched in 1977 under the aegis of the Indian Council of Agricultural Research was shifted to the same campus in 1988. The centre was named as Biological Control Centre and the entire programme functioned under the administrative/financial control of the National Centre for Integrated Pest Management (ICAR). In the eighth five-year plan, the project was elevated to an independent Project Directorate of Biological Control, with its headquarters in Bangalore during 1993. PDBC was the nodal agency in the country that organizes biological control research at the national level with 16 centres spread across the country. The Directorate at Bangalore carried out basic research on the biosystematics of important groups of insect bioagents. The reference collection maintained at PDBC was catalogued in the form of a technical bulletin on and also available in a retrievable, electronic format. Besides, work on strain development, molecular characterization, mass production technologies, semiochemicals, biopesticides work for insect and disease management was intensified. During XI plan, PDBC

was upgraded as National Bureau of Agriculturally Important Insects (NBAII) to act as a nodal agency for collection, characterization, documentation, conservation, exchange and utilization of agriculturally important insect resources (including mites and spiders) for sustainable agriculture. In the twelfth five year plan the Bureau is now renamed as National Bureau of Agricultural Insect Resources (NBAIR) and the bureau's activities are divided in three divisions.

How to reach

ICAR-NBAIR is located on the Bengaluru-Bellary Highway NH 7 towards the Kempegowda International Airport, opposite CBI Bus stop, Gangenahalli. The Bureau is located 6 km from Cantonment railway station/about 6 km from Yaswantpur railway station/ 8 km from Krantivira Sangolli Rayanna Bengaluru railway station and 28 km from Kempegowda International Airport, Devanahalli. Buses plying to Yelahanka, Devanahalli, Doddaballapur, international airport halt at Gangenahalli or CBI Bus stop on NH 7. Participants are requested to alight at CBI/Gangenahalli bus stop to reach ICAR-NBAIR. Pre-paid three-wheeler/taxis can be availed from Airport/Railway stations/Bus stations.

Eligibility

The Capacity Building program is open for participants from ICAR institutes/SAUs/CAUs/Agriculture Faculty of NARES in the cadre of Assistant Professor or equivalent & above. Minimum qualification is M.Sc./M.Tech degree from any recognized university in relevant disciplines of Agriculture. *A maximum of 15 participants will be selected for the training. Interested participants need to get sponsored by their respective institutes for their travel, boarding and lodging.* No registration fee is charged from the selected participants or their sponsoring organizations/institutes.

Travel, Boarding and Lodging

Participants essentially need to get sponsored from their respective organizations. No TA, DA or free accommodation will be provided by the Bureau. Participants shall be provided accommodation as per ICAR Guesthouse rates in the NBAIR guesthouse/trainee hostel, with dining and cook facilities. Wholesome meals and refreshments shall be provided at the rates approved by the Council. The participants are requested not to bring their spouse or any family members as the accommodation is sufficiently enough for the trainees/participants. Bureau shall provide trainees with tea during sessions. Outstation participants are requested to reach one day prior & plan their departure on last day of training program after 16.00 hrs.

How to Apply

1. The complete application may be sent to below correspondence addresses.
2. The application should be submitted through proper channel.
3. Capacity Building Programme details are also available online at <http://www.nbair.res.in/>
4. The selected candidates will be informed by e-mail/website of the institute. Once the candidates are intimated about their selection for CBP, they need to confirm their acceptance latest by December 02, 2016.

Important Dates

- Last date for receiving of application: November 28, 2016
- Notification of selection: November 30, 2016
- Commencement of Capacity Building Programme: December 14, 2016

Correspondence:

All the correspondence to be addressed to

In-Charge, HRD Cell

Dr. K. Srinivasa Murthy, Principal Scientist,
Email: ksmurthy.nbaii@gmail.com
Mobile: 9449051687

Course Director

Dr. M. Nagesh, Principal Scientist,
Email: nagesh.M@icar.gov.in; nageshmnbaii@gmail.com,
Mobile: 9845753113

Course Coordinator

Dr. Sushil K. Jalali, Head & In-Charge AICRP-BC
Email: jalaisk1910@yahoo.co.in
Mobile: 9449673949

Course Co-Coordiators

Dr. Mahesh S. Yandigeri, Sr. Scientist Email: micromahesh@gmail.com Mobile: 9480046850	Dr. Jagadeesh Patil, Scientist Email: patiljaggi@gmail.com Mobile: 8050321486
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**ICAR - National Bureau of Agricultural Insect Resources
H.A. Farm Post, Bengaluru-560 024**

Registration/Application Form

HRD Capacity Building Program on
“Advances and innovations in promotion and utilization of microbials for biological control of crop pests”
December 14-24, 2016

(Last date for receiving of application: November 28, 2016; Notification of selection: November 30, 2016; Commencement of the CBP: December 14, 2016)

1. Full name (in block letters): _____
2. Designation: _____
3. Present employer and address: _____
4. Address for correspondence (along with email and contact number):

5. Date of Birth: _____
6. Sex (Male/Female): _____
7. ARS Batch (if applicable): _____ Discipline: _____
8. Teaching/research/professional experience: (mention posts held during last 5 years and number of publications)
9. Mention if you have participated in any Summer/Winter School/Short course/Training programme on Biological control, etc. **during the last 5 years at NBAIR** or at any ICAR/other organizations:

Title, duration, location _____

10. Accommodation required: Yes/No
11. Academic record:

Examination passed	Subjects Main/subsidiary	Year of passing	Class ranks, distinction etc.	University or Institution
Bachelor's degree				
Master's degree				
PhD				
Other certificates, Diplomas etc.				

Signature of the applicant

Recommendations of the forwarding Institute

Dr./Shri./Ms. _____ is hereby nominated and sponsored for participation in the ICAR-NBAIR, Bengaluru sponsored HRD Capacity Building Program on “*Advances and innovations in promotion and utilization of microbials for biological control of crop pests*” from December 14-24, 2016.

Signature with date:

Designation & Address

Office Seal of the Sponsoring Authority