



## Session VII

### Novel Approaches II – Integrated Pest Management

Chair Dr T P Trivedi

#### Lead Speaker

Keynote: **Dr O M Bambawale, India**  
**Biopesticides and IPM in India**



Session 7 in progress



**Dr T P Trivedi**, Director, DIPA (ICAR) and ADG (ARIS), ICAR chaired the session. He welcomed the keynote address speaker Dr OM Bambawale, Director, NCIPM, New Delhi and all other dignitaries on the dais. He exhorted upon all the orators to identify the weak links in the low utilization of biopesticides in the entire gamut of plant protection so as to strengthen the lead institutions/bodies like DBT.



**Dr O M Bambawale** in his keynote address elaborated on the entire evolution of IPM strategies in the country—from Ashta model to the current scenario such as the introduction of Bt cotton in the country. He elaborated on the need for validation of IPM beyond the generic modules already available with the Directorate of Plant Protection, Quarantine, and Storage, Government of India. The success stories of IPM in rice and cotton have to be extended to other crops. He identified constraints in biological control at the customer, market, and production levels. He also stressed on issues like screening of isolates for species specificity, development of R&D facilities, lack of aggressiveness in marketing, and lack of confidence in the product.

#### Speakers

Dr K Krishnaiah, India ■ Dr K P Jayanth, India ■ Dr R Sudhakaran, India ■ Dr G V Ranga Rao, India  
 Dr S Gopalakrishnan, India

**Dr K Krishnaiah** introduced the use of novel formulation of auto-confusion pheromone for yellow stem borer of rice and its economic and environmental suitability in managing this pest. He clarified the question of edge effect

and cost estimates by elaborating the isolation distances across study areas coupled with limited migration of this pest. He further answered a query on pheromone specificity by addressing the need for studies on polymorphic



Dr K Krishnaiah

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Dr R Sudhakaran

Dr G V Ranga Rao

Dr S Gopalakrishnan

responses of different geographical populations of pests.

**Dr K P Jayanth** presented the work of BCRL on pheromone-based mass trapping of red palm weevil conducted across four different states of southern India. He showed that through this technology, effective management of red palm weevil is possible in a large area if community-based approach is followed on a long-term basis. He also stressed on the maintenance of sanitation of farms by destroying the dead and affected palms.

**Dr R Sudhakaran** presented the experiences of using Neemazal® from EID Parry's Bio, which was reported by more than 86% of the users to be effective by more than 70% against different pests. He further informed that this product is being used in 36 countries all over the world and has its inherent strengths in terms of raw material availability, patent, global benchmarks, complimentary to chemicals, suitability to IPM, and overall sustainability to agriculture.

**Dr G V Ranga Rao** from ICRISAT presented the whole series

of experimentation on IPM and NPV use in ICRISAT programmes. He emphasized the reasons for low use of biopesticides by farmers. He also presented the work on village-level NPV production programme in collaboration with NCIPM. He proposed public-private partnership and integration of multiple disciplinary teams in the implementation of such programmes. Dr Opendar Kaul and Dr Trivedi emphasized the expression of uniform standards of dosages in products based on neem.

**Dr S Gopalakrishnan** from ICRISAT presented the consolidated efforts of ICRISAT in the use of various biological control options relevant to and applied under different IPM programmes.

Dr Trivedi concluded the session with the remarks that the users of biopesticides have to be convinced and provided with incentives and benefits of their use and production. He emphasized that biopesticides are essential components but not desirable replacements of IPM.

#### Following recommendations emerged from the deliberations of the session

- Development of pest surveillance programmes for key pests such as brown planthopper of rice, yellow rust and powdery mildew in wheat, and tobacco caterpillar in soybean.
- Screening of strains and CFU counts may be given due attention while recommending the biopesticides.
- National Virtual Networking of all such surveillance programmes should be established and followed up with advisories on IPM strategies. There is a need to modernize IPM programme advisories based on pest surveillance, ICT, and geographical situations.
- Pheromone technologies for mass trapping may be utilized to manage pests such as yellow stem borer of rice and red palm weevil through community-based approaches under wide-area IPM programmes. Such measures have to be followed in combination with sanitation of farms by destroying dead and infected palms.
- Public-private partnership and integration of multidisciplinary teams in the implementation of IPM programmes should be taken up.

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# Session VIII

## Laboratory to Land Issues—Research Trends and Success Stories

Chair Prof. Anwar Alam ■ Co-chair Dr H S Gaur

### Speakers

Dr Noor Hisham Hamid, Malaysia ■ Dr N Mathivanan, India ■ Dr M S Rao, India ■ Dr Apostolos Papadopoulos, UK  
Dr S Ganguly, India ■ Dr V V Sudheendrakumar, India ■ Dr P Lakshmi Santhi, India ■ Dr Mohan Bajjkar, India



Session 8 in progress

**Dr Noor Hisham Hamid** began the session with his address. He emphasized on controlling *Oryctes rhinoceros* by using powder formulation of *Metarhizium anisopliae* and observed 100% mortality

at 10 weeks after treatment. About 0.84 kg of product in 700 litres of water is sufficient for one hectare of old breeding site of trunk chips, five months after felling in Malaysia. Further studies on the improvement of product quality and field application are also needed.

**Dr N Mathivanan** mentioned about the successful promotion of *Trichoderma* sp.



Dr Noor Hisham Hamid Dr N Mathivanan Dr M S Rao Dr Apostolos Papadopoulos

from lab to land for farmers' practices. He has developed low-cost production technology and identified different strains of *Trichoderma* for the management of different diseases of crops at farmers field. More extension effort is also required.

**Dr M S Rao** spoke about the application of bio-control agents in a consortium mode. He said that combining application of compatible organisms might be more effective than individual micro-organisms.

**Dr Apostolos Papadopoulos** talked about Bug oil derived from three plant species and innovative biopesticides based on the synergy of essential oils blended in a benign vegetable oil offering. He claimed efficacy against white fly and spider. However, it will require proper field-testing and evaluation before any recommendation.

**Dr S Ganguly** focused on the success story of a heat-tolerant species of EPN from the Indian soil, that is, *Steinernema thermophilum*, an ideal bio-agent for managing a wide range of insect pests of crops not only in India but also tropical and sub-tropical regions. It has a shelf life of 6–8 weeks at 35 °C and 2–4 weeks at

40 °C. Commercial production systems need to be developed for the same.

**Dr V V Sudheendrakumar** spoke in detail about development of a novel landscape-level management strategy for teak defoliator by integrating precise understanding on the spatio-temporal behaviour of pest outbreaks and the transmission biology of the HpNPV.

**Dr P Lakshmi Santhi**, in her address, described her observations on patenting trends and the technology aspects on the basis of several patent applications that are pending for grant and the country-wise filing, which gives an idea of the business plans of patent filers. She emphasized the need for protection of IPR.

**Dr Mohan Bajjkar** said that the claim on the efficacy of yield-enhancing agent, that is, chitosan in inducing innate immunity in plants against all kinds of pests and pathogens needs proper validation. Further, it would be necessary to understand the mechanism and its biosafety.



Dr S Ganguly Dr V V Sudheendrakumar Dr P Lakshmi Santhi Dr Mohan Bajjkar

# Session IX – Panel Discussion I

## Linking the Stakeholders I – Farmers Perspective and PPP

Chair Dr Gabor Szocs ■ Co-chair Dr T P Rajendran

### Speakers

Mr Vivek Singhal, India ■ Dr M H Mehta, India ■ Mr J Bhosle, India

### Panellists

Dr G N Qazi, India ■ Dr V V Sadamate, India ■ Dr T C Jain, India



Session 9 in progress

**Dr Rajendran**, Assistant DG (Plant Protection), ICAR, New Delhi emphasized on good agricultural practices. He explained that good agricultural practices encompass all the practices and also the use of biopesticides for the production of safe food for the society. He also indicated that environment management is a very important aspect wherein the conservation and utilization of biopesticides play a key role. He encouraged all the stakeholders to work together to develop and document good agricultural practices.

**Mr Vivek Singhal** talked about the need to have IPM in India and the scope of commercialization of biopesticides. He indicated that almost all the pests can be controlled by biopesticides. *Pyrrilla* sp. on sugar cane, which could not be controlled by any chemical, was managed successfully by the use of biopesticides. He mentioned that nearly 200 industries are producing biopesticides in India. He expressed concern that a few industries

are not maintaining the quality of the biopesticides. He also indicated that there are no laboratories in various states to test the quality of the biopesticides produced by various entrepreneurs.

**Dr M H Mehta** shared his experiences on linking the stakeholders in the development of the biopesticide industry. He listed various factors that have to be integrated together for promoting biopesticide use in India. He mentioned that poverty, hunger, and environmental sustainability are the key issues in the world that need to be addressed. He said that a consortium of biopesticides and biofertilizers could deliver the goods. Dr Mehta felt that 500 million tonnes of agro waste, which is produced per year in India, if utilized for making bio compost, could solve many problems.

**Mr J Bhosle**, in his address, asked for training of farmers in the use of biopesticides and pheromones by government agencies. He made an



Mr Vivek Singhal Dr M H Mehta Mr J Bhosle Dr G N Qazi Dr V V Sadamate Dr T C Jain

important point that farmers should have access to biopesticides in their regions. He emphasized that the pricing of biopesticides should be reasonable so that farmers can buy and use them. He spoke about women self-help groups in promoting the use of biopesticides and also the extensive demonstrations by the various agencies. He felt that there should be a separate authority for biopesticides registration in India.

**Dr G N Qazi** expressed concern that there has been slow growth in the production and utilization of biopesticides in India. He felt that there are not adequate collaborative efforts from the universities, NGOs, and entrepreneurs. He asked the scientists to be truthful in their claims on the quality of the shelf life of biopesticides. He also felt that there is no foolproof mechanism in India to check the quality of biopesticides and this is the reason that very many industries are producing biopesticides of inferior quality.

**Dr V V Sadamate** categorized lack of awareness among the farmers as

a major issue for the slow growth of biopesticides industry in India. He said that the media can play a great role in awareness generation and urged the state agricultural universities, ICAR institute, industry, and NGOs to give wide publicity to the successful technologies on biopesticides.

**Dr T C Jain** appreciated the efforts made by all stakeholders in the field of biopesticides. He also informed that there is no alternative but to use the biopesticides for sustainable agriculture. He said that a strategy with an action plan has to be drawn by this congregation to increase awareness and linkages among the stakeholders. He mentioned that technologies are not properly documented or complied with and are not validated. He urged the stakeholders, particularly the government agencies, to document all the technologies in a proper manner for further validation. He said that there is a need to strengthen the activities of technology transfer on biopesticides such as training the farmers, exposure visits, and a participatory research programme.

