ABSTRACTS OF INVITED TALKS

B.V.PATIL

Keynote Address
Entomology2018: Advances and Challenges

RECENT TECHNOLOGIES IN INSECT PEST MANAGEMENT

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Abstract

The concept and components of Integrated Pest Management (IPM) is undergoing transformation through introduction of new insect pest management technologies over traditional management practices. Novel pest management techniques such as plant biotechnology, green label insecticide molecules, nanopesticides, e-surveillance of pests, pest prediction models through GIS and remote sensing, semiochemical mediated control etc. are imparting significant changes in containing pests across the globe. Cultivation of GMO crops across the globe has not only achieved better pest management but also reduced input cost and saved earth from pesticide pollution. Similarly, novel green label molecules coupled with nano-technology have become more effective even at nano-quantity. Use of Information Communication Technology (ICT) such as e-surveillance and advisories on pests and diseases not only helps to reach the farming community on real time but also provides opportunity to develop an accurate pest prediction models which could be developed into short or long term forewarning systems. Significant development in the field of semiochemicals has assured the use of sex pheromones as mating disruption or mass trapping techniques in managing some of the notorious pests like cotton pink bollworm. All the latest technologies have ensured their efficacy in various cropping ecosystems. However, our prudence lies in how best these methods can be integrated with traditional techniques in right composition at right time. By doing so, we can not only achieve a better pest management but also insure higher crop productivity with minimum input cost to farmer and environment pollution. Adoption of novel IPM practices also ensures doubling the farmer income in coming years.

K.K. Sharma

Invited Talk #01
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Pesticide Residues in Food and the Environment : Myths and Realties

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Abstract
In India 15-25% of the potential crop production is destroyed by pests, diseases and weeds. Crop protection chemicals are widely used to reduce yield losses however, occurrence of their excessive residues is a cause of concern for food, human health and environment safety. In India pesticide residues on food crops/commodities are monitored under the ICAR-All India Network Project on Pesticide Residues through GAPs based multi-locational supervised field trials in different agro-climatic regions to fix MRLs and recommend waiting period/pre-harvest intervals. The pesticide residues in different food commodities are also monitored under the Central Sector Scheme on Pesticide Residues at National Level as per ISO/IEC 17025 by a network of 30 accredited laboratories located in different locations in the country. These laboratories validate analytical methods and develop standard operating procedures (SOPs) for sampling, sample preparation, extraction, clean up and analysis of pesticides on food commodities and in the soil and water samples. The generated data helps the authorities to focus government intervention to propose suitable measures in region of high prevalence of pesticide residues. The availability of safe food in India is thus ensured through effective networking of laboratories engaged in research on pesticide residue analysis and food safety.

Chandish R Ballal

Invited Talk #02
Entomology2018: Advances and Challenges

Biological Control for management of Agricultural Pests: Focus on potential strains / isolates of bioagents

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Abstract

Biological control has several successes to its credit in India and other countries. Success stories include saving of the citrus industry from heavy infestations by the cottony cushion scale in Southern California in the 1880s utilising the beetle *Rodolia cardinalis* and the successful conservation of endangered plants in the Galapagos from being devoured by the same pest utilising the same bioagent in 2010. In India, right from the classic example of the biological control of prickly pear using imported Cochineal insect to the recent spectacular success in the management of papaya mealy bug using the exotic parasitoid *Acerophagus papayae*, there have been several success stories. However, there have been several instances where the expected success has not been achieved in biocontrol initiatives. One of the reasons attributed to these failures is the strainal variations and inappropriateness of a particular strain of the biocontrol agent utilized for a specific target pest / host plant / ecosystem, etc. The natural enemies of insect pests and diseases - macrobials and microbials - are numerous in species and diverse in characteristics. It is often observed that there are clear variations even in populations within the same species. These may not be morphologically distinguishable, but could differ biologically or physiologically. Such populations are generally termed as biological, physiological or geographical races / strains. Some of these strains possess superior biological traits and when such strains are identified, they can be used effectively in biological control programmes. Attempts have been made by researchers to identify superior strains / isolates of parasitoids, predators and more effective isolates of microbials, which possess one or more of the characteristics that are of significance in their role as bio-control agents of pests or diseases on in a particular area. This paper attempts to bring out the importance of strainal variations in biocontrol agents and how the success of a biological control programme can also depend on the strain of biocontrol agent utilized.

R.K. Seth

Invited Talk#03
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VARIOUS MODES OF EMPLOYING RADIATION IN INSECT PEST MANAGEMENT

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Abstract

Devising novel pest control biorational strategies, that are efficacious, environmentally safe and benign to non-target organisms, has an immense importance in view of the long term environmental concerns of the conventional insecticides associated with insecticidal resistance in pests. Electromagnetic radiation, especially gamma-rays as highly ionizing radiation has been vastly used in controlling a number of noxious insect pest species belonging to different orders (Diptera, Lepidoptera, Coleoptera, etc.) having immense agricultural and medical/veterinary importance. Employing radiation in insect pest management carries a tremendous scope and the mode of using radiation may depend upon the nature of pest, damaging profile, host (standing crop or stored agro-commodity), ecological niche and environmental concerns. Ionizing radiation can be employed to fully sterilize the insect pests (usually Dipterans) to be used in Sterile Insect Technique (SIT), or in another mode by using sub-sterilizing radiation in Inherited Sterility technique (IS), especially developed for Lepidopteran pests. Phytosanitary irradiation (PI) prevents development and/or reproduction of quarantine pests, and generic treatment using one dose for a group of pests and/or commodities has a great commercial value. Further, UV/visible light wavelengths (in the emission spectrum of the sun) can be efficiently utilized to activate photosensitizers (e.g. xanthenes, porphyrins) to act as potent insecticides in India having no scarceness of sun throughout the year. Radiation can also impact in various indirect modes (like augmenting biological control, etc) that would supplement the effective management of pests. Nuclear energy with multifaceted role through different modes may act as a vital component of integrated and sustainable management of serious pests.

P D Kamala Jayanthi

Invited Talk #04
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Revisiting unexploited potential of Chemical Ecology, In search of reliable IPM tools

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ABSTRACT

In recent past, chemical ecology based behavioural manipulation methods involving semiochemicals (push-pull strategies or Stimulo-Deterrent Diversionary Strategies, SDDS) are increasingly becoming popular. These methods use repellent/deterrent (push) and attractive/stimulant (pull) stimuli to direct the movement of pest or beneficial insects for environment friendly pest management. However, their potential is under exploited particularly in India. This may be mainly because of lack of thorough understanding of chemical mediated processes to manipulate trophic interactions to manage several pests across a range of crops. Thus, development of reliable, robust and sustainable push-pull strategies requires a clear scientific understanding of the behavioral/chemical ecology involving the interactions with its hosts, conspecifics and natural enemies at different trophic levels to underpin key processes that can be exploited as weak links. Further, in order to understand/manipulate the various phyto/semio-chemicals (pheromones, allelochemicals, kairomones, allomones, synomones) and to maximize their usefulness in integrated pest management, collaborations between biology, chemical ecology, physiology, analytical chemistry and molecular biology are paramount for India.

Suresh Nair

Invited Talk #05
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Is IPM possible without insect population identity?

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ABSTRACT

Pest management, as the name suggests, endeavours to maintain the insect pest populations at levels that they do not cause excessive economic damage or economic injury level. When several such components (strategies) are combined to achieve this end result, it is commonly referred to as integrated pest management (IPM). One of the key components of IPM is the identification of the pest in question. Further, and in addition, a clear understanding of the population structure of the same insect species prevalent in several crop-growing areas is also a necessity. The reasons and the problems arising by not correctly deciphering and identifying the pest are discussed specially when the crop genotypes/cultivars containing naturally occurring resistance genes are deployed to mitigate the pest problems. Using two model pest-host systems i.e. the gall midge-rice and the brown planthopper-rice, development of useful tools for identification of populations or different biotypes are discussed. In addition, these tools could also be a part of an early warning system to inform concerned people should any change in the population structure occur over time so that suitable interventions can be effected or planned before the changed insect population(s) cause(s) a major devastation of the crop plant in question.

R.A. Balikai

Invited Talk#06
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WEATHER-BASED TOOLS IN IPM AND EVOLVING CLIMATE CHANGE ADAPTATION STRATEGIES

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Keywords: Forewarning, pest forecasting, pest weather calendars, prediction models, weather based tools, thumb rule

Abstract

Integrated Pest Management (IPM) strategies have acquired importance under the plant protection umbrella, but they are found wanting in terms of utilization of weather based information that can improve their efficacy by many folds. The most sensible approach is to make the best use of knowledge on meteorological influence on the incidence on insect pests for adoption of suitable management practices. In order to reduce the losses, the farmers need to be informed regarding the prevailing weather and forewarn the farmers about the impending weather, its effect on pest incidence and for implementation of management operations. The importance of a weather based forewarning models of insect pests can be emphasized only by its ability to forecast their attack well in advance to plan for implementation of the management schedules. It provides sufficient time to the farmers to get prepared for taking actions against insect pests which reduces the cost of production and serves as prerequisite to IPM. Nationwide projects on development of weather-based forewarning system for different crops was started under NATP for different agro-climatic zones. AICRP on Agro-meteorology and some of the State Agricultural Universities/ Institutes are being involved in developing the models. The main requirements for developing pest forecasting models are data on weather parameters, pest population, natural enemies and crop phenology. Pest weather calendars are also prepared by using these parameters. The developed prediction/ forewarning models of various insect pests in different agro-climatic zones on field and horticultural crops have been presented and discussed in this paper.