



XIX International Plant Protection Congress IPPC2019



10-14 November 2019, Hyderabad, Telangana, India

Crop Protection to Outsmart Climate Change for Food Security & Environmental Conservation

Organized by:



In Collaboration with:



**SOUTH ASIA
BIOTECHNOLOGY CENTRE***
दक्षिण एशिया जैवप्रौद्योगिकी केन्द्र



Abstract Book

Our Sponsors

Gold Sponsors



FMC



CORTEVA



UPL

Bronze Sponsors



BAYER



ADAMA

Other Sponsors



Sumitomo Chemical India Pvt Ltd

Contents

S. No	Symposia/Session Title	Page
1	Spread, monitoring and management of fall armyworm (FAW)	1
2	Herbicide-resistant weeds – a global perspective	6
3	Integrated pest management (2)	10
4	Pest, host plant, and environmental interactions: Effect of climate change in managing insect pests	16
5	Pest and disease resistance gene mapping and cloning	20
6	The challenge of coconut rhinoceros beetle (<i>Oryctes rhinoceros</i>) to palm production and prospects for control in a changing world	26
7	Phytiatry (plant medicine) as a distinct university science for modern world agriculture	31
8	Fall armyworm-control technologies and management advocacy for Asia	34
9	The impact of climate change on weeds	41
10	Outsmarting the red palm weevil: A global challenge	46
11	Pollination management under protected cultivation	52
12	Biotechnology and integrated pest management	60
13	Biological control – prospects and associated challenges	64
14	Crop protection in horticulture	71
15	Predicting population dynamics of insect pests under climate warming	78
16	Pesticide resistance management	83
17	Plant-pest/pathogen interactions in the context of chemical ecology	88
18	A greener IPM: Development of ecologically-based management of pests, weeds and diseases in cereal grain crops	93
19	Beneficial microbes for plant protection – current performance and future expectations	98
20	Integrated management of the cactus cochineal, <i>Dactylopius opuntiae</i> (Hemiptera: Dactylopiidae)	103
21	Molecular pathology and entomology	107
22	Conventional and omic approaches to integrate host plant resistance in IPM	114
23	Breeding for disease/pest resistance (HPR 1)	119
24	Spread, monitoring and management of <i>Tuta absoluta</i>	128
25	Biosystematics for effective crop protection under changing climatic scenario	134
26	Endophytes for plant protection	139
27	Detection and diagnosis of plant pathogens: DNA barcoding	144

28	Artificial intelligence (AI) based smart plant protection – futuristic scenario	152
29	Taxonomy and diversity of pest populations	158
30	Germplasm health: Facing future challenges	165
31	Emerging pathogens and their management: phytoplasmas, viruses and viroids	171
32	An overview of frameworks used for predicting, monitoring and responding to new pests	177
33	Emerging pests and their management: Nematodes	182
34	Integrated pest management (3)	188
35	Remote sensing and machine learning for determination of spatio-temporal distribution of invasive species	195
36	Host plant × pest interaction (HPR 2)	201
37	Integrated pest management (1)	207
38	Climate change effects on pests and pest management	213
39	Extension education and technology transfer	218
40	Post-harvest pests and their management	224
41	Integrated pest management (4)	229
42	Food safety: Mycotoxins and pesticide residues	235
Poster Session	Thematic Area	
I	Integrated pest management (IPM 1)	240
II	Mitigating climate change	272
III	Integrated pest management (IPM 2)	284
IV	Host plant resistance	307
V	Detection and diagnosis: DNA barcoding	329
VI	Food and nutritional security	339
VII	ICT in crop protection	343

O32-5. Informing an emergency response to the detection of a non-native plant pest in the landscape

Jaap van Kretschmar

NSF Center for Integrated Pest Management, North Carolina State University, Raleigh, NC, USA.

Email: jbkretsc@ncsu.edu

The objective of an emergency response to the introduction of a non-native plant pest is to eradicate or contain the exotic pest population. Those accountable for this work requires information relevant to the identification, survey, and control of the introduced species. Emergency responders must be able to distinguish the non-native pest from native species, delimit the distribution of the pest population in the invaded landscape, and eradicate or suppress that population. This presentation will focus on the sources and application of information to these facets of an emergency response after the detection of a new pest.

O32-6. A spatial analytic framework to manage plant pest species in regulatory phytosanitary applications

Yu Takeuchi

NSF Center for Integrated Pest Management, North Carolina State University, Raleigh, NC, USA.

Email: yu_takeuchi@ncsu.edu

Non-native pests cause economic and environmental damage to managed and natural U.S. forests and agriculture. When such species are detected in the United States, response must be rapid. Part of this response includes control efforts focusing on population management, eradication, port inspections, surveillance and monitoring, shipment treatments and pre-clearance programs. However, because each disease or pest and its associated outbreak has its own idiosyncratic characteristics, responses are often highly complex, operationally difficult and challenging to coordinate. To help phytosanitary management agencies respond more quickly to pest threats, we developed an integrated system called the Spatial Analytic Framework for Advanced Risk Information Systems (SAFARIS). SAFARIS is designed to provide a seamless environment for pest predictive models. It supports pest forecast models and tools for researchers, risk analysts, decision/policy makers, rapid-responders, and land managers in need of a streamlined and tractable system to support pest surveys, pest forecasts, pest risk analyses, emergency response, and economic analyses. The case studies of an Oriental fruit fly (*Bactrocera dorsalis* (Hendel)) and a spotted lanternfly (*Lycorma delicatula* (White)) demonstrate building analytic models and tools with multiple data sources within a single framework.

O32-7. Effect of varied weather parameters and different sowing dates on the incidence of insect pest in chickpea

J Jaba¹, Pavani T¹, S. Vashisth², S P Mishra¹ and H C Sharma¹

¹International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, 502 324, Hyderabad, Telangana State, India. ²Dr Y.S Parmar Horticulture and Forestry University, Solan, Nauni, Himachal Pradesh, India 173211.

Email: j.jagdish@cgiar.org

It is important to identify genotypes with resistance varied sowing windows. Therefore, evaluated a five diverse genotypes for resistance to *H. armigera* for three years over four sowing window. More number of eggs were observed in 2012 than in 2013 and 2014. Highest numbers of eggs were recorded in the crop sown

in October in cumulative three seasons. Among the genotypes tested, ICC 3137 had the highest number of *H. armigera* eggs (11.6) across the seasons. The lowest number of *H. armigera* eggs was observed on JG 11 (6.3) in 2012, on ICCV 10 (3.6) in 2013. The *H. armigera* larvae were highest in October sown crop (80.7) and lowest in the January sown crop (21.1) in 2014-15. The larval incidence decreased from October to December but increased in the January. Greater numbers of cocoons were recorded in the December sown crop (3.4) in 2012-13. However highest number of cocoons were recorded on ICC 3137 (2.5) and lowest on KAK 2 (1.6). The maximum temperature and minimum temperature shows a significant negative and positive correlation with *H. armigera* larvae population for October and November sown crop. Multiple regression analysis of the *H. armigera*, *S. exigua* eggs and larval population showed a significant interaction with weather parameters during all cropping seasons. The coefficient of multiple determinations (R²) was varied per cent during across different seasons for *H. armigera*, *S. exigua* population

O32-8. Risk assessment and preparedness: an encounter to agricultural transboundary pests and diseases

Mamta Sharma, Ramanagouda G, Jagdish Jaba , Raju Ghosh , Avijith Tarafdar and Amendra A K

Integrated Crop Management, International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India.

Email: mamta.sharma@cgiar.org

The transboundary crop pest and disease (P&D) outbreaks over large geographical regions jeopardizes the food security and have broad economic, social and environmental impacts. The climate change accelerated transboundary P&D are responsible for food chain catastrophes and upsurge of minor pest into major. Such accelerated events require more attention on a greater scale to strengthen food security and protect the livelihoods of poor and most vulnerable countries of the world. The ICRISAT, Center of Excellence on Climate Change Research for Plant Protection (CoE-CCRPP) is a joint initiative with Department of Science and Technology and ICRISAT to study impact of climate change on agriculture P&D in an inclusive manner with key audience (adaptation funding entities, planners, policymakers and practitioners) at national and regional level (NARS, ARIs and CGIAR). The CoE-CCRPP emphasis is on mapping the potential pest risk distribution and forecasting; short and medium term climate resilient pest management practices; as well as capacity building of various stakeholders on climate resilient agriculture. The ICRISAT center, further focus to determine and establish priority pest indicators ranking, risk assessment and distribution, socio-economics of P&D to assist in enhancement of pest policies, pre-emptive breeding, improved P&D monitoring and surveillance to strengthen global efforts to alleviate P&D complications on sustainable agriculture and food security.

Oral

O32-9. Biological control of recent invasive whiteflies (Hemiptera: Aleyrodidae) of coconut in India: a success story

Selvaraj Krishnan¹, Sumalatha B V¹, Poornasha B¹, Ramanujam B¹ and Venkatesan T¹

¹ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, India, Bengaluru, India.

Email: K.Selvaraj@icar.gov.in

Invasion and establishment of four whitefly species viz., Rugose spiralling whitefly, *Aleurodicus rugioperculatus* (Hemiptera: Aleyrodidae) in 2016, Bondar's nesting whitefly, *Paraleyrodes bondari*, nesting whitefly, *P. minei* in 2018 and palm infesting whitefly, *Aleurotrachelus atratus* in 2019 reported in coconut ecosystem in India. All the species are reported as highly polyphagous, invasive and believed to be originated from Neotropical regions. Co-existence of this species in coconut palms indicate probable simultaneous