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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

The pyramid event provided very high levels of control of Fall armyworm. F2 screenings of 117 families showed a low frequency of resistance alleles against the Cry1A.105+Cry2Ab2 maize, and a high frequency of Cry1Ab resistance alleles. While the high dose/refuge IRM strategy is effective IRM strategy in industrial farming systems, its application has unique challenges in small holder farming systems.

O8-3. Fall armyworm, *Spodoptera frugiperda* (J E Smith): incidence, host range and its management

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The invasive fall armyworm (FAW) *Spodoptera frugiperda* (J.E. Smith) was reported for the first time on maize causing severe damage in Karnataka, India during May 2018. Thereafter, the pest has spread to most states of India and now reported from many south Asian countries. The biology under laboratory condition showed that the fecundity was 1064 eggs. Incubation, total larval and pupal period were observed from 2-3, 14-19 and 9- 12 days, respectively. The larval population varied during different growth stages of the crop on maize in Shivamogga and Davanagere districts during *Kharif* and *Rabi* seasons. Heavy population buildup of *S. frugiperda* in Karnataka on sorghum was recorded in Kalaburgi, Raichur, Koppal and Shivamogga districts in November and December months. The damage on maize during July 2018 to February 2019 varied between 20.0 to 80.0 per cent. The management practices like installation of pheromone traps, removal of eggs and use of two rounds of insecticides (Chlorantraniliprole, spinetoram and emamectin benzoate) were found to be effective in reducing the larval population and recorded higher yield. Efficacy of various aspects on *S. frugiperda* is discussed in this paper.

O8-4. FAW management: balancing farmers' needs, product development and regulations

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Fall armyworm (FAW), *Spodoptera frugiperda* presence and damage were first reported in India in July 2018, since then it has been detected in ASEAN and China. The Food and Agriculture Organization expects FAW to continue spreading in Asia-Pacific. As it has a very wide host range, multi crops, especially grass hosts such as corn, sugarcane, etc are preferred. Crop damage results mainly from larvae consuming leaf tissue, destroying potential future plant growth and cause final yield loss, which can reach 30-60%. In order to manage FAW successfully in Asia Pacific, we need balancing the farmers' needs, product development and regulations. Which means for the short term, we need align with local government to get proper effective commercialized products for emergency use, meanwhile, we shall develop full solutions ASAP including seed treatment, seeding time in furrow application, early post-emergence protective application and late crop stage rescue application. In the long run, new mode of action (MOA) Lepidoptera compounds without cross resistance with existing MOA are extremely required.