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CONFERENCE PROCEEDINGS

Invasive insect pest threats in horticultural crops and strategies for their management

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Increased globalization and international trade in agricultural and horticultural commodities has resulted in inadvertent entry of several exotic pests of invasive nature in last two decades. They have been positng serious threat to domestic agriculture. Serpentine leaf miner, Coffee berry borer, Spiraling whitefly, coconut Eriophid mite, papaya mealy bug, cotton mealy bug, Erythrina gall wasp, South American tomato leaf miner, Rugose spiraling whitefly, Fall armyworm are prominent invasives which made entry and have established in India in the recent past. Invasion of the pests in the new areas leads to the outbreak of the pest due to absence of natural enemies and due to presence of favourable climate in the introduced country. Hence, exploration for natural enemies should be made in the areas of origin to curtail the pest population to economic threshold level. Invasive insect pests can be managed through the intervention of biological control agents, natural enemies, parasitoids, pheromone traps, light traps and quarantine measures etc., Apart from these measures, it is very important to sensitize the researchers, extension personnel, farmers, and other stakeholders on the threats posed by the invasive insect pests to the agriculture, horticulture and related fields in order to manage them effectively. To address these issues, a Webinar on "Invasive Insect Pests Threat in Horticultural Crops & Strategies for their Management" has been organized by Dr. Y. S. R. Horticultural University (Dr. YSRHU), Venkataramannagudem, Andhra Pradesh in virtual mode on 18 August, 2020. The objectives of the webinar were to create awareness among the plant protection scientists on the invasive pests of coconut, tomato and to deliberate on the current status and researchable issues of invasive insect pests infesting horticultural crops.

The webinar took off with a welcome address by Dr. B. Srinivasulu, Director of extension and plant protection advisor, Dr. YSRHU. He also explained about the objective of oraganizing the webinar and Importance of invasive insect pests and necessity to create awareness among the scientific fraternity in the existing scenario.

The Webinar was inaugurated by Dr.T. Janakiram, Vice Chancellor, Dr. YSRHU. In his inaugural address, Dr. Janakiram had explained the new initiatives taken in the University such as establishment of Farmers Advisory Centre (FAC), Plant Protection Advisory Cell (PPAC) to benefit the stakeholders and the farming community. He also stressed on the various invasive insect pests which are a threat to the biodiversity and inflicting huge economic losses to the horticultural crops and called for formulating management strategies in the wake of their introduction outside their natural habitat into the new areas. It was informed that globalisation permitted the free movement of seeds, planting material and international trade has enabled the entry of invasive pests into the country. Participants were enlightened on the Department of Plant Protection, Quarantine and Storage, Acts such as Plant Quarantine Order, 2003 that restrict the entry, establishment, spread of invasive pests, diseases and weeds into India to safeguard the agricultural, horticultural, forestry produce and the various plant quarantine stations stationed at the entry points that are strictly implementing the Act. Dr Janakiram had emphasized the havoc created by Rugose Spiralling Whitefly (RSW) and the role played by the University its effective management in collaboration with ICAR-IIOPR, Pedavegi. Other pest deserving attension is the South American Tomato moth (*Tuta absoluta*) and coconut mite (*Aceria guerroronis*). Geographical tracking of the invasive insect pests, development of resistant cultivars and formulation of management strategies using biological control agents with judicious usage of chemical pesticides on community basis was called for to minimize losses caused by the invasive pests.

Dr.Y.G.Prasad, ICAR-ATARI, Hyderabad outlined the occurrence of several invasive insect pests particularly horticultural crops such as American serpentine life miner *Liriomyza trifolii* which has broad host range (castor, coriander, celery, guava etc.,), Cotton mealy bug *Phenococcus solenopsis* and Diamond back moth, *Plutella xylostella.* The problem of absence of natural enemies in the new environment coupled with development of insecticidal resistance by the pests making the management cumbersome was discussed. Studies on bioecology of invasive insect pests, devising of management strategies employing classical biological control supplemented with neem seed kernel extract @ 5% by the farming community for easier adoption was suggested. Further, he urged to take up the surveillance of pests and diseases in horticultural crops particularly in

plantation crops, orchards such as banana, oil palm, sapota, mango, acid lime at fortnightly/monthly intervals along with weather based services involving huge man power which was available in the form of scientists of research stations, KVK's, state horticulture department, village horticultural assistants to avert the outbreaks/disasters with funding from RKVY/ Department of Horticulture, A.P as such projects had witnessed tremendous success in other state agricultural universities. Such coordinated efforts will pave the way for doubling of farmers income.

In the technical session, there were three invited talks. In the first talk on "Successful strategies adopted in management of coconut eriophyid mite – A Guide for Invasive pest management" Dr.A.Sujatha, Dr.YSRHU, made a detailed presentation on the bioecology and management of coconut mite in Andhra Pradesh. Integrated Pest Management measures such as collection and destruction of mite infested dropped nuts, application of neem cake@5-10 kg/palm/year along with organic manures, recommended dose of fertilizers and cultivation of intercrops like banana, yam, cocoa, vegetables and turmeric followed by spraying of sulphur @ 6g/liter of water, root feeding with monocrotophos @10 ml/10 ml of water or Azadirachtin 10,000 ppm @10 ml + 10 ml of water or Azadirachtin 10000 ppm @ 5ml/ liter of water was suggested for effective management of coconut eriophyid mite. Holistic approach for the integrated crop management through IPM and INM was also recommended as coconut mite still continues to be a menace in coconut cultivation.

Dr. V. Sridhar, ICAR-Indian Institute of Horticultural Research, Bengaluru delivered a talk on "Integrated management of South American Tomato Moth *Tuta absoluta*(*Meyrick),* an Invasive pest in India". He gave an account of the invasive tomato pest and its current status. According to Dr. Sridhar, in Andhra Pradesh, it is more prevalent in Madanapalle region of Chittoor district causing significant yield losses. Alternate hosts of *Tuta absoluta* belonging to Solanaceae, life cycle (3-4 weeks) of the pest were furnished. He emphasized on having IPM package involving host plant resistance (antixenosis and antibiosis), physical methods (pheromone, light traps), cultural methods such as good agricultural practices(GAP) for nursery raising, clean cultivation, biological control agents such as egg parasitoids, entomopathogens, judicious usage of insecticides. Dr. Sridhar highlighted the management strategy standardized by ICAR-IIHR. The recommendation includes using pheromone trap @ 10/acre, light trap (8/acre) and releasing egg parasitoids like *Trichogramma pretiosum* @ 60,000–70,000/ ha every five weeks. Judicious use of chemicals such as spinetoram 12 SC@1.25 ml/liter or cyantraniliprole 10 OD@1.8ml/literor flubendiamide 480 SC @ 0.20 ml/ liter or Neemazal 5EC @ 2ml/liter are also advocated for successful management of *Tuta absoluta.* It was explained that adoption of IPM practices resulted in 6% damage in contrast to 56 % incidence in control plots.

The third invited talk on "Status of recent invasive whiteflies in coconut and their management studies" was delivered by Dr. N. B. V. Chalapathi Rao, Principal Scientist (Entomology), Dr YSRHU, Ambajipet. Dr. Rao elaborated on the origin and spread of Rugose spiralling whitefly (RSW), *Aleurodicus rugioperculatus* in India. Incidence of RSW in A.P was reported on a wide variety of hosts such as fruit, plantation and ornamental crops such as coconut, oilpalm, cocoa, banana, papaya, mango, custard apple, curry leaf, Heliconia, cabbage tree, bird of paradise etc., besides cereals(maize) and grasses (hybrid napier grass) and leafy vegetables(Spinach) following which pest alert was given. Roving survey revealed the high incidence of RSW in Srikakulam, West Godavari districts of A.P. Besides RSW, incidence of Bondar's nesting whitefly *(Paraleyrodes bondari)*, Nesting whitefly and palm infesting whitefly have also been reported from A.P. Management of RSW was carried out by release of *Encarsia guadeloupae* procured from TNAU and CPCRI, Kasargod which resulted in the efficient parasitisation of the RSW particularly during February, March months was explained. Spraying of entomopathogenic fungus, *Isaria fumosorosea* was recommended for effectively managing the rugose spiralling whitefly in the plantation crops and orchards. Low cost, easy methodology for mass multiplication of *Isaria fumosorosea* on broken rice grains was popularised for practice by farming community in association with Department of horticulture. It was also mentioned that a predator *(Dichochrysa astur)* of RSW was identified which has potential to devour the egg masses in a short period of time in the plantations. Dr. Rao also shared the active role played by DRYSRHU in educating farmers and popularizing management strategies among farmers.

Technical session was followed by an interactive session where participants and panelists exchanged views related to invasive pests. During interactive session, problems in managing the eriophyid mite owing to its preference in residing under the perianth, microscopic nature and difficulty in employing chemical pesticide for management owing to residue problems was discussed and called for development of ecofriendly approaches on community basis. Foliar application of palm oil (200ml)+ water(800ml)+sulphur (5 gms)+detergent(5gms) from 4th bunch and below coupled with root feeding of fenazaquin, application of neem cake, FYM and other organic manures with effective fertigation focussing on

potash application (3 ½ kg/ tree) and optimum irrigation had also yielded successful results. Thus INM along with IPM in community basis can give desirable management in field level for coconut mite. Constraints in application of recommended chemicals on tall coconut trees was expressed for which usage of robotics, unmanned aerial vehicles/agricultural drones was suggested. Utilization of cutting edge level technology such as robotics from ground/aerial level employing

The webinar had about 100 participants from across the country including scientists, research scholars, students and extension personnel. The webinar ended with formal vote of thanks by Dr.K.Sesha Kiran, member secretary, PPAC, Dr YSRHU. The following are salient action points emerged out of the deliberations of the webinar.

- Emphasis should be given to studies on bioecology of invasive insect pests
- Surveillance of insect pests and diseases in horticultural crops including fruit and plantation crops should be undertaken at regular intervals along with weather based services to avert the outbreaks.
- There is a need to have network projects involving Dr.YSRHU and ICAR institutes such as IIHR, CPCRI and IIOPR for effective management of invasive insect pests duly employing robotics such as unmanned aerial vehicles (UAVs) /agricultural drones.
- IPM practices of South American Tomato moth *(Tuta absoluta)* need to be demonstrated in farmers field by Dr.YSRHU in association with ICAR-IIHR in areas like Madanapalli in Chittoor district where year round tomato cultivation is in practice.
- Management practices of the prevalent invasive insect pests of A.P to be prepared in Telugu language and communicate to the farmers through KVKs of Dr.Y.S.R.Horticultural University.
- Work on Coconut Eriophyid mite, *Aceria gurreronis* needs to be intensified by deploying more Entomolopgists as it is a still a national menace and has eluded effective management practices.

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