Report of Papaya mealy bug *Paracoccus marginatus* in mulberry in West Bengal

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Papaya mealy bug, *Paracoccus marginatus* (Hemiptera: Pseudococcidae) is an invasive exotic pest believed to be native of Mexico and/or Central America (Miller et al., 1999). The pest was first described by Williams and Granara de Willink (1992) and later re-described by Miller and Miller (2002). In 2002, it was reported in the Pacific Islands (Meyerdirk et al., 2004, Muniappan et al., 2006) and in 2008 in Indonesia, India, and Sri Lanka (Muniappan et al., 2008). It was reported from Bangladesh and Maldives in 2009 and Cambodia, Philippines and Thailand in 2010 (Muniappan et al., 2011). In India, the pest was first reported from Coimbatore, Tamil Nadu infesting papaya and since then a list of agricultural and horticultural crops damaged by this noxious exotic pest is growing at an alarming rate. Within a span of few months after the first record, it caused an extensive damage to the sericulture industry by spreading over 3000 acres of mulberry plantation in Tamil Nadu. Many mulberry gardens have dried up due to severe infestation and some farmers gave up sericulture due to severe infestation and uprooted mulberry (Shekhar and Qadri, 2009, Mahalingam et al., 2010). It is highly polyphagus attacking more than 80 plant species including economically important agricultural crops, tropical fruits, vegetables, ornamentals and weeds.

Presently, in Indian peninsula, the pest has invaded Tamil Nadu (Muniappan et al., 2008), Kerala (Krishnakumar and Rajan, 2009), Karnataka (Mahalingam et al., 2010, Shekhar et al., 2011), Andhra Pradesh, Kerala, Tripura, Odisha and Maharashtra (Shylesha, et al., 2011), Jammu and Kashmir (Sharma et al., 2013). The exotic pest was reported from Gujarat on Bt cotton (Dhobi et al., 2014). The pest got its entry into West Bengal infesting papaya (Seni and Sahoo, 2013). Now the pest is found spreading in the mulberry gardens of West Bengal inflicting a considerable damage to Sericulture in West Bengal.

The pest appeared in the mulberry gardens of Central Sericultural Research and Training Institute, Berhampore, West Bengal during August 2013. The mealy bugs were duly identified and confirmed as papaya mealy bug, *Paracoccus marginatus*. Subsequently the pest was recorded at mulberry fields of Panchgram, Budadanga, Qutubpur, State Sericultural farm of Akherighata in Murshidabad district, Sitalgram, Kundapara, Kalitha and Barunighata of Birbhum district, Goyasbari, Chaspara, Bamangram in Malda district and Karimpur of Nadia district during 2013-2014 survey period. The papaya mealy bug incidence recorded in mulberry grown in four sericultural districts was graphically depicted in Fig.1. The pest population ranged from 5.1-20.4 nymphs/adults per shoot with maximum incidence during June- July months of the year. The pest was also recorded in some of the preferred alternate hosts like papaya, hibiscus, brinjal, bhendi, broad bean, *Parthenium* spp., *Sida* spp., *Tridax* and *Acalypha indica* that were found in the adjoining tracts of mulberry gardens. Association of papaya mealy bug with other species of mealy bug was also noticed in mulberry and alternate hosts.
In mulberry, the nymphs and adults generally congregated along the terminal shoots and all areas of the tender leaves (plate 1A, C). Terminal shoots become bunched and distorted (plate 1B, D). Tender leaves become crinkled. In older leaves the nymphs were seen near the veins and the midribs (plate 1E, F). Severely infested older leaves turn yellow and dry up. Heavy mealy bug populations produce enormous honey dew, which results in black sooty mould that cover vegetation interrupting the photosynthesis (plate 1G). The qualitative and quantitative yield of mulberry plants was affected due to the infestation of this pest. Further, feeding the silkworms with the mealy bug infested leaves proved detrimental as it affected the growth and development of the silkworms and also the quality parameters of the cocoon.

During past few years, the changing climatic scenario is presenting new threats and opportunities for the pest management in mulberry ecosystem. New pests also impede the productivity of mulberry, thereby sericulture. Erratic monsoons, prolonged dry weather conditions, intensive cropping system, pruning pattern in mulberry and availability of many alternate hosts in the eastern zone along with multiple source of dispersal favours rapid multiplication of this pest with overlapping generations and high adaptation rate. This in consequence, is posing a serious challenge for the management of this emerging pest, in Eastern India.

In southern states of India, papaya mealy bug menace due to sudden outbreak was effectively tackled by introduction of three parasitoids, *Acerophagus papayae*, *Anagyrus loecki* and *Pseudleptomastix Mexicana*, of which, *Acerophagus papayae* established well compared to the other two parasitoids (Sakthivel, 2013). The bio diversity of the mulberry ecosystem in eastern zone needs to be conserved by avoiding application of insecticides with high toxicity and
prolonged persistency to control other major pests of mulberry. Generalist predators are diverse and abundant, and it is critical that we define their role in both agricultural and natural systems. Biological control has been hampered by the paucity of field studies that enlist the potential natural enemies in the native agro ecosystem. Introduction of proven parasitoids can further bring down papaya mealy bug population. Biological approach in IPM is the most effective long-term solution to combat mealy bug infestation because the parasitoids and predators are self-perpetuating and persist even when the mealy bug is at low population densities.

Acknowledgement: The authors thank Dr. Sunil Joshi, Principal Scientist, ICAR-NBAIR, Bangalore, Karnataka for identification of the pest.

/Plate 1. Symptoms and infestation of Papaya mealy bug in mulberry A. Nymphs and adults on terminal shoots B. Terminal shoots become bunched and distorted C. Closer view of papaya mealy bug D. Infestation on tender leaves. E. Infestation on older leaves F. Nymphs congregating along the veins and the midribs of older leaves. G. Manifestation of black sooty mould symptom due to honey dew deposition by the mealy bugs.

REFERENCES


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