Karnataka J. Agric. Sci., 23(1) : (165) 2010

Establishment of sapota seed borer, *Trymalitis margarias* Meyrick, an invasive species in India: Exigencies involved in limiting the spread

The sapota seed borer (SSB), *Trymalitis margarias* Meyrick (Tortricidae: Lepidoptera) is an exotic pest that has been introduced into India a decade back and established over a period of time (Jayanthi and Verghese, 2009). First reported from Dahanu areas of Maharashtra (Patel, 2001), sapota seed borer (SSB) has since spread to major sapota growing belts in Gujarat, Karnataka and Tamil Nadu. An understanding of the potential distribution of this pest contributes to the evaluation of the environmental, economic and social costs of invasive species.

The seed borer, *T. margarias* is a monophagous, microlepidoteran pest attacking immature fruits of sapota. A female moth lays eggs on medium sized immature fruits of sapota and the neonate larva bore into the fruit and finally enter the seed (Patel, 2001). The larvae feeds only on endosperm of the seed and completes its larval period inside the seed. For pupation, the mature larva comes out by tunneling out the fruit which usually coincides with the fruit harvest.

During the year 2000, 40 to 90 per cent fruit damage was observed in Dahanu areas of Maharashtra. Later, during 2001/2003-04, 21 and 40 per cent incidence of *T. margarias* was reported in Thane and Gandevi, respectively (Anon., 2001, 2005). In southern India, 25 per cent incidence in Bangalore during 2006-07 (Anon., 2008) and 60 per cent incidence were observed in Periyakulam during 2008-09 (Dr Kumar, Pers. comm.). This clearly showed that in the last one decade since its first report, *T. margarias* has spread to southern parts of India, may be through fruit shipment and established over a period of time creating infestation epicenters in major sapota growing belts.

The chances of natural dispersal of the SSB through flight by adult moths are relatively short as the adult moths are weak fliers. Thus, the mature harvested fruits remain as an important dispersal pathway for sapota seed borer. The harvested fruits move through many formal and informal pathways, making it difficult to identify, track and regulate the spread of infested fruits. Another factor making the harvested fruits as an important pathway is the ability of SSB to survive in the mature fruits during transport. Thus, movement of harvested fruits that harbors live larvae of SSB contributes to the human mediated spread of SSB across the country. Hence it is concluded that SSB spread must be associated with human assisted movement of infested fruits. Perhaps this explains the 'jump' dispersal of SSB to much larger distances down the south viz., Karnataka, Tamilnadu from the place of its first detection i.e., Dahanu in Maharashtra in 2001.

Pre-harvest area wide control (as developed at IIHR) under system approach in infested areas along with regulated domestic quarantine for inter state movement for fruits from infestation epicenters will definitely help to limit the infestation as the sapota seed borer might have spread by human-mediated transport. Most of the evidence suggests that the major pathway for movement of SSB is infested fruits. Thus, the mature larvae have chances of emerging out the fruit either during transport or in *mandis* (ripening houses) where the fruits will be stocked, thereby pupating in cracks and crevices. Post harvest treatments like fumigating the containers/conveyance means/ ripening places during periodic arrivals will definitely cut down the risk of SSB spread. The bulk fruit shipment segment is complex; nevertheless, the formal basic structure involves farmers, wholesalers, distributors, retailers and end-users. The need of the hour is to quantify the data on flows and risks associated with the infested sapota fruit shipment; it will be difficult to devise effective strategies of regulation for reducing the spread of SSB.

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