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Eco-friendly management for mango hoppers

Dharanikota Lalithambica Devi and Sunil Kumar Mandal

Department of Entomology, RPCAU, Pusa, Bihar

Email:

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Abstract

Mango hoppers are widely distributed and serious pest of the entire mango growing regions of India. The pest remains active throughout the year, but maximum damage is inflicted during February-April. The damage is caused by both nymphs and adults through sucking cell sap and losses about 40-60 per cent. The hoppers can be managed by manipulation of cultural practices, biological practices and judicious use of chemical insecticides.

Key Words: Mango, Leaf hoppers, Management strategies.

Introduction

Mango, Mangifera Indica L. is considered to be the king of all fruits in Indian origin. It is grown throughout the Indian sub-continent. India accounts for nearly 80 per cent of the world's mango production and export substantial quantities. The seedling varieties are very tall, whereas the grafted ones are short and commercially more acceptable. In addition to being sweet and succulent, the fruit is a rich source of vitamin A and also Vitamin C (*Singh, 1969*).

Over 175 species of insects have been reported damaging mango trees (*Fletcher, 1917*, *Vevai 1969 c. Nayer et.al., 1976*), but the most abundant and destructive at the flowering stage are the mango hoppers (*Atwal and Dhaliwal, 1997*). These are the most notorious pests of all the varieties of mango. Twenty two species of mango hoppers were reported to be infesting on mango Out of these, only three species are *Amritodes atkinsoni Leth, Idioscopus clypealis Leth and Idioscopus nineosparsus Leth* were economically important earlier, only *Amritodes atkinsoni* was the predominant species. However, since 1983, *Idiocopus nineosparsus* has become number one and more serious during flowering period (Godase *et.al*., 2012). *A. atkinsoni* is comparatively more common in north India, while I. *clypealis* is more serious in south (*Singh 2009*).

Identification of the hopper species

Eggs and nymphs of two species are difficult to distinguish from each other. Young nymphs are wedge shaped whitish in colour and have two small red eyes. At each moulting the colour changes to yellow, yellowish - green, green and ultimately to greenish brown, Nymphs of I. *clypealis* are dust yellow and less active, whereas nymphs of *A. atkinsoni* are pale yellow and more active. Adults are wedge shaped and greenish - brown body and pale yellow vertex. Fore wings are thicker than hind wings. The adult of I. *clypealis* is smaller and has three dark brown spots on head, a prominent white medium band and two black spots on pronotum. Besides, black triangular marking on scutellum and a central longitudinal dark streak dilated both anteriorly and posteriorly is noticeable identification mark of this species. Whereas, the adult of *A. atkinsoni* is without central longitudinal streak on scutellum. This species, however, possesses two spots on scutellum in adult stage (*Singh, 2009*).

Seasonal abundance and behaviours of the hopper species

Adults are available throughout the year under bark of the tree. With the onset of winter seasons, hoppers appear in large numbers. Female lays about 100-200 eggs singly in flowering shoots, flower buds or tender leaves from end January to till March, which hatch in about 4-7 days. After moulting thrice, the nymphs turn into adults in 8-13 days. The complete life cycle from egg to adult varies from 18 to 20 days. There are two generations in a year *viz.* Spring generation (February to April) and summer generation (June to August). The spring generation is more destructive as the hoppers feed on inflorescence. Hoppers love and prefer damp and shady places

which multiply in large number in neglected and water-logged orchards. The pest hibernates in adult stage by hiding in cracks and crevices or in the bark of the trees.

Losses by the hoppers

There are no authentic figures available regarding the extant of losses caused by these hoppers. According to Rao (1930) and Hoseev (2006) these hoppers cause a loss of 20 to 100 per cent of inflorescence, whereas cheema *et.al*. (1954) and Gangully *et.al.* (1957) reported the loss to be 25 to 60 per cent. Recently these hoppers can cause a loss up to 40-60 per cent (Singh, 2009, and Godase *et.al., 2012*).

Damaged cause by the hoppers

The nymphs and adult suck the sap from tender shoots, leaves, inflorescence and even tender fruits. However, the infestation was more severe during flowering, causing strict flowers and fruits drop. Apart from the feeding injury, they also secrete honeydew like substance which invites the problem of black sooty mould. Hopper hinders the photosynthetic activity of the plant and deteriorates the fruits quality. Such types of fruits fetch less price in the market.

Management Practices

- Do not go for high density planting as it provides favourable habitat for the hopper multiplication.
- Do not encourage plants to put intermittent flushes by regular irrigations and also use split doses of nitrogenous fertilizes
- Avoid water logged or damp conditions in the orchards.
- In old dense orchards, prune some of the branches during winter to have better sun light interception.
- Monitoring is the basic step especially in case of mango hoppers infestation in the orchards. It is essential to monitor the pest in off season and also to identify the shelters on cracks of bark in tree trunks or in dead wood to manage the pest effectively at right stage.
- Neem-based sprays can be utilized at initial stage of hopper population (Azadirachtin 3000 PPM@2 ml/L of water).
- Protecting and encouraging bio control agent like

(a) Predators: *Mallada boninensises, chrysopa lacciperda*

(b) Egg parasite: *Polynema spp, Gonatoceirus spp. Tetrastichus spp.*

(c) Entomogenous fungi:

Lecanicillium lecanii, Jsaria stellate, Hirsotella Versicolor

- Application of bio-agents, Beauveria bassiana @10^8 cfu/ml on tree trunk once during off season and twice at 7 days interval during flowering season.
- Need based application of chemical insecticide sdepending on the pest intensity. First spray before flowering with cypermethrin 25 EC @ 0.5 ml/L, second at panicle-initiation stage with Quinalphos 25 EC@ 2 ml/L, subsequent sprays with Imidacloprid 17.8 SL@ 03 ml/L, Thiomethoxam 25 WDG@ 0.3 gm/L or Dimethoate 30 EC@2 ml/L of water.

Conclusion

Mango hoppers are the most destructive pest of mango ecosystem and that cause substantial qualitative and quantitative loss of the fruits. The warm and humid climate is the most congenial for development of the pest. The success of mango crop is associated with how effectively hoppers populations are managed. Therefore, mango growers are very much concerned about crop protection. They indiscriminately apply whatever insecticides that is available in the local market. This has resulted in development of resistance to insecticides, resurgence of the pests and insecticide residues in fruits.

Therefore, the farmers should be applied combines different management practices to grow healthy mango fruits and minimize the use of chemical insecticides and residues risk in fruits.

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