

## Recent Scenario of Insect-pests of Guava in North East India and Their Eco-friendly Management

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### INTRODUCTION

Guava is one of the most refereed and legendary fruit because of its hardy and positive bearing nature, high vitamin C content and more income with minimum inputs (Singh 2010). In India, guava is cultivated on 204.8 thousand hectares of land and production is about 2462.3 million tons (Anonymous 2011). Large number of insect pests has been reported to occur on guava at various growth stages, but a few are a real menace to the cultivation of this crop. More than 80 species of insects and mites have been recorded on guava trees affecting the growth and yield.

Major pest of guava in the NEH region includes trunk borer, *Aristobia testudo* (Coleoptera: Cerambycidae). *A. testudo* is the most destructive pest of Litchi in China and severe incidence of this beetle was first observed in Meghalaya on guava during 1997. Recently, the same pest was also found on pigeon-pea at the adult stage. About three species of fruit fly, *Bactrocera dorsalis*, *B. cucurbitae* and *B. tau* (Diptera, Tephritidae) found to attack guava fruits; *B. dorsalis* being the dominant. Maximum activity of fruit flies is observed during August to the December reaching its peak during September. Two species of bark eating caterpillars, *Indarbela quadrinotata* and *I. tetraonis* are commonly found in the region. Sucking pests includes Mealy scale, *Chloropulvinaria psidii* (Hemiptera, Coccidae), Mealy bugs *Ferrisia virgata*, *Plannococcus citri*, *P. lilacinus* (Hemiptera, Pseudococcidae), Tea mosquito bugs, *Helopeltis antonii* (Hemiptera: Miridae), aphids, jassids, etc (Azad Thakur et al. 2009; Kalaishekar et al. 2008; Shylesha et al. 2006). Besides, recently elephant beetles of genus *Xylotrupes* (Coleoptera: Scarabidae) was found to be a new threat to the guava farming in the region.

### MANAGEMENT PRACTICES

#### Bio-intensive pest management in guava

Bio-intensive pest management (BIPM) is essentially a component of integrated pest management. The primary goal of bio-intensive pest management is to provide guidelines and options for the effective management of pests and beneficial organisms in an ecological context. It will help to reduce the dependence on chemical pesticides and ecological deterioration. BIPM includes bio-pesticides derived from microbes, parasitoids, predators, botanicals and all conventional non-chemical methods or use of need based and less residual chemicals. Indian farming, which is going through a transition phase, is slowly but surely adopting the ways and means of pest management for sustainable agriculture.

Following pest management practices are suggested to reduce the guava pest problems in north east India.

#### Cultural practices

1. Deep ploughing of basin avoiding root cuts, to expose soil inhabiting/resting stages of insects, pathogen and nematodes.
2. Select deep, well leveled and well drained soil.
3. Use resistant rootstocks and select disease free nursery plants.
4. Avoid flood and channel irrigation.
5. Avoid injuries to trunk and roots during farm operations.
6. Adopt proper spacing, irrigation and nutrient management.
7. Avoid application of high nitrogenous fertilizers.
8. Use neem cake @ 1 ton/ ha under assured moisture conditions in nematodes infected field only.
9. For the management of mealy bugs, intermingling branches should be pruned and

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spacing trees at closed distance should be avoided so that sunlight can reach through canopy from all the sides.

10. Fallen fruits should be destroyed by burning them in the ground. There should be clean cultivation of orchard to avoid further development of fruit flies.
11. Ant colonies in the orchard should be destroyed as they are the carrier of mealy bugs to their feeding sites.

### Indigenous technical knowledge

#### Mechanical practices

1. Hand picking and removal of fallen leaves be ensured
2. Light traps may be operated for the management of scarabid beetles.
3. Regular monitoring and killing of larva of trunk borer and bark eating caterpillar by inserting wire inside the tunnel or inserting cotton swabbed with kerosene or petrol, in the hole and sealing the hole with clay.

#### Biological control/botanicals/biopesticides

1. Inundative release of the predator, *Chrysoperla* spp. (@ 2000/acre) and *Cryptolaemus montrouzieri* (@ 2-3 adults/tree) is quite successful in controlling mealy bugs
2. Neem oil (3 ml/litre) + Sweet flag 1% + release of *Mallada boninensis* @ 30 larvae/tree or one spray of imidacloprid 17.8 SL @ 0.05% + release of *Mallada boninensis* @ 30 larvae/tree is found very effective for controlling sucking pests .
3. Neem seed kernel extract (5 %) 5% are very effective in reducing sucking pest complex without affecting its natural enemies viz. lace wing flies etc.
4. Application of systemic biopesticide viz. *Verticillium leccani* culture @ 0.5 % twice at fortnightly interval during February-March, June-July and September-Oct. effectively reduces aphids, scales and tea mosquito bugs.
5. Application of *Paecilomyces fumosoroseus* culture @ 0.5 % twice at fortnightly interval at the time of leaf emergence reduces the mite population.
6. Application of *Beaveria bassiana* @ 0.5 % or *Bacillus thuringensis* @ 0.1 % thrice at fortnight interval during May- June checks the

defoliators like *Spodoptera* spp., leaf folders and loopers etc.

7. Raking or ploughing the soil and application of *Beaveria bassiana* @ 5 kg/ha and *Metarrhizium anisopliae* @ 5 kg/ha to the soil underneath the tree canopy reduces mealy bugs and fruit flies, respectively.
8. Application of neem + garlic spray @ 3.0 ml/l during rainy season act as a repellent for defoliators.

### Chemical control measures

1. Need based, judicious and safe application of pesticides are the most vital, triplicate segment of chemical control measures under the ambit of BIPM. It involves developing IPM skills to play safe with environment but proper health monitoring, observing ETLs and conserving biocontrol potential before deciding in favor of use of chemical pesticides as the last resort.
  2. Pasting of trunk with Bordeaux paste (1:1:10) + 2g/litre of Sevin, during December- January for reducing trunk borers and bark eating caterpillars.
  3. Poison baits for fruit flies and moths : Gur + Fruit juice 20 % + Malathion 2 % @ 40 baits/ha
  4. Use methyl eugenol pheromone traps at fruit development stage. Collect fallen fruits and destroy them. Spray deltamethrin (0.0025%) + molasses 1% for fruit flies.
  5. For bark eating caterpillars, spray chloropyriphos 0.07% or carbaryl 0.1% on tree
  6. For stem borer - injecting monocrotophos (0.1%) @ 5 ml/ bored hole and plugging with mud
  7. Following suggestions have important bearing for the success of control measures in the context of IPM strategy:
    - Minimize number of spray and repeated application of same pesticides should be avoided
    - Avoid using of synthetic pyrethroids which results in resurgence of sucking pests and use selective insecticides (e.g. Karanjin) during early phase of season
    - Proper spray equipment should be used; Knapsack sprayer is ideal for guava garden and use proper spray volumes for unit area.
- Insect pests are one of the major constraints in guava production in the hilly tracts of NEH region

of the country. The NEH region is exceptionally rich in terms of flora and fauna and the ecosystem has been less disturbed as compared to other parts of the India. Therefore, this region has a very good potential for use of biological control based on natural enemies for sustainable production of guava.

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