8. Green Scale (*Coccus viridis*):

Nymphs are pale lemon yellow whereas adults are green coloured, flat and oval shaped soft scale.

Nymphs and adults suck the sap from leaves resulting yellowing of leaves.

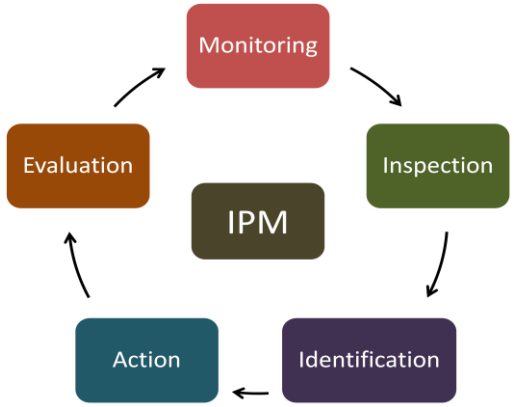
II. Pest Surveillance

Surveillance on pest occurrence in the field should commence soon after crop establishment and at weekly intervals thereafter by walking across the field and choosing 20 trees/acre randomly across the diagonal of the field. Fruit flies, aphids and whiteflies (nymphs and adults) of on five randomly selected fruits/leaves per plant may be counted. Thrips may be counted by nymphs and adults forms present on five terminal leaves per plant (tapping method also can be used to count). Pest monitoring for fruit flies using methyl eugenol should be done regularly from fruiting stage onwards.

III. Integrated Pest Management strategies

- Collect and destroy infested fruits.
- Clean cultivation should be maintained, as weed plants serve as alternate hosts
- Cover fruits with paper bags to avoid infestation of Borers.
- Pomegranate should not be cultivated close to guava as this is the most preferred host of *Deudorixisocrates.*
- Undertake pruning to regulate the shade to facilitate proper penetration of sunlight inside the canopy to reduce the infestation of mealy bug and tea mosquito bug.
- Summer ploughing to expose pupa
- Use light trap @ 1/ ha to monitor the activity of *Deudorixisocrates* adults.
- Hanging of 10 bottle traps/ha containing 100 ml water emulsion of methyl euginol (0.1%) + malathion (0.1%) during fruiting season (April - July) is very effective for control of fruitfly.
- Installation of yellow sticky traps.
- If more than 5 flies trapped, Bait spray combining molasses or jaggery 10g/l and one of the insecticidetwo rounds at fortnight interval before ripening of fruits need to be given.
- Insecticide sprays as and when required according to the approved list provided under CIB & RC.
- Release *Cryptolaemousmontrouzieri* beetles @ 10/tree for control of mealy bugs and white flies.
- Conserve parasitoids such as *Trichogrammachilonis* (egg), *Tetrastichus* sp. (egg), *Telenomu ssp.* (egg), *Chelonusblackburni* (egg-larval), *Campoletischlorideae* (larval), *Bracon* sp. (larval) etc.
- *Opius compensates*, *Spalangiaphilippinensis*for fruit flies.
- Need based spraying of CIB&RC approved insecticides for both fruit fly and thrips.

Important activities for pest free Guava production for export



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Integrated Pest Management (IPM) in Guava (*Psidium guajava*) for export purpose

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Guava (*Psidium guajava*) is often referred to as the apple of the tropics. It is a native of tropical America and has been naturalised in India. It is a very popular fruit and is available throughout the year except during the summer season. Being very hardy, it gives an assured crop even with very little care.Many insect pests attack on guava and degraded the quality of fruit meant for export.

I. Identification of important pest

1. Fruit Fly (*Dacus dorsalis*):

Under field conditions a female can lay up to 1,200 to 1,500 eggs. Development from egg to adult under summer conditions requires about 16 days. The mature larva emerges from the fruit, drops to the ground, and forms a dark brown puparium. Pupation occurs in the soil. About nine days are required for attainment of sexual maturity after the adult fly emerges. Adult are brown or dark brown with hyaline wings and yellow legs.

Adults and maggots attack semiripe fruits. Oviposition punctures visible on fruits. Maggots destroy and convert pulp into a bad smelling. Discoloured semi liquid mass.



2. Guava fruit borer (*Conogethes punctiferalis*):

Eggs laid on top leaf axils, inflorescence, tender part of plant and fruits, egg period 6-7 days. Larva pale reddish brown with numerous tubercles on body. Larval period 12-16 days. Pupation inside the fruit in a silken cocoon, pupal period 4-11 days. Adults are medium sized bright orange-yellow color has numerous black dots on wings. Life cycle completed in 25-33 days.

Caterpillar bores into young fruits. Feeds on internal contents (pulp and seeds) making the fruit hollow from inside resulting fruit rotting and dropping.


3. Anar butterfly / Fruit borer (*Virachola isocrate*):

Shiny, white, oval shaped eggs laid singly on calyx of flowers and on tender fruits. Egg period 7-10 days, larval period 18-47 days. Caterpillar, dark brown, having short hairs and white patches all over the body. Larvae pupates inside fruit but occasionally outside even, attaching themselves to stalk of fruits, pupal period 7-34 days. Male glossy, bluish violet, female brownish violet with an orange patch on forewings. Four generations completed in a year.

Larvae bore inside the developing fruits and feed on pulp and seeds just before the rind exhibiting round bore holes on fruit. Infested fruits are also attacked by bacteria and fungi, which ultimately fall off and give an offensive smell.


4. **Thrips (Redbanded thrips) (*Selenothrips rubrocinctus*):**

Thrips are small (1.5 mm) and slender and best viewed using a hand lens; adults are dark brown to black in color and female has red pigmentation on abdominal segments.

When thrips population is high, leaves may be distorted. Leaves are covered in coarse stippling and may appear silvery; leaves speckled with black feces. Avoid planting next to onions, garlic or cereals where very large numbers of thrips can build up; use reflective mulches early in growing season to deter thrips; apply appropriate insecticide if thrips become problematic.


5. Mealy Bugs (*Ferrisa virgata*):

Female lays 350-500 orange coloured eggs in a loose cottony terminal ovisac; egg period 5-10 days. Crawler nymphs orange coloured, females and males with 3 and 4 nymphal instars respectively. Adult females pinkish and sparsely covered with white wax. One generation per month, life cycle extends in winter months.

Both nymphs and adults suck sap that results in crinkling and yellowing of leaves and rotting of berries.


6. Spiraling whitefly (*Aleurodicus dispersus*):

Adult - Powdery white, active during early morning hours. Nymph - short glass like rods of wax along the sides of the body.Nymphs and adults suck the sap from leaves. Honey dew - development of sooty mould fungus. Yellowing of leaves and dropping of affected leaves.


7. Scarlet Mite (*Brevipalpus phoenicus*):

Mite lays eggs on stalks of fruits, calyx and leaves. Both nymphs and adults suck the cell sap from fruits which results in browning of nodal regions and appearance of brown patches on calyx and surface of fruits. In severe infestation, these symptoms cover the entire surface of fruits leading to splitting of fruits. Life cycle completed in 22 days.