

Major Insect Pest Problems of Tamarind and Pipal and Management Practices

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Pests of Tamarind

1. **Mango mealybug:** *Drosichastebbingi* (Margarodidae, Hemiptera), **Tamarind mealybug:** *Drosichiella tamarindus* (Green), **Mealybug:** *Perisopneumon tamarindus* (Green)

Distributions: China, Bangladesh, India (Haryana, Kerala, Maharashtra, Punjab).

Alternate host: Mango

Bioecology: The mealy bug deposit eggs in soil in April-May at the depth of 15-20 cm in silken purses. The eggs hatch in December last week or January first week. 80% of the newly hatched nymphs immediately ascend on the tree and settle on suitable tender portion of the crop. The females descend the trees and enter the soil to lay their eggs. On hatching, the nymphs crawl up to the aerial portion of the tree and settle on succulent and tender foliage to feed. The body is covered with white waxy fluffy secretions, which is the characteristic of mealy bugs. First instar nymphs are noted during December to February while second instars during February to mid-March and third instars from March to April and then become adults. The adults mate immediately and lay eggs in soil.

Damage symptoms: Both the nymphs and adults suck the cell sap on growing twigs and developing pods, resulting in premature shedding of flower buds and immature pods. Fruit setting is also affected, the fruit size much reduced and the shape malformed. The honeydew excreted by the mealy bugs retards fruit development. Yield losses of up to 70% are recorded in orchard cultivation due to mealy bug attack.

Management: Physically remove the insects by handpicking or prune them out. Insecticidal soaps, horticultural oil, or neem oil insecticides applied directly on mealy bugs can provide some suppression, especially against younger nymphs that have less wax accumulation. 70% or less solution of isopropyl (rubbing) alcohol in water may be dabbed directly on mealybugs with a cotton swab to kill them or remove them (Jayaraj and Ananthan, 2009).

2. **Oriental yellow scale/Oriental red scale:** *Aonidiella orientalis* (Newstead) (Diaspididae, Hemiptera), **West Indian red scale/Rufuos scale:** *Selenaspilus articulatus* (Morgan)

Distributions: This species is likely native to Asia. It can be found nearly worldwide today. It is common in many tropical and subtropical areas.

Bioecology: The female attaches to the surface of a plant, forms a waxy shield, and lays eggs beneath it. They are often viviparous, producing live young instead of laying eggs. The larvae emerge and leave the shield; at this point they are called "crawlers". They roam the plant, feeding on sap by inserting their stylets. Males reach the adult stage at about 19 days. Females reach adulthood and yield the next generation of larvae at about 44 days. Males have wings but no mouthparts, and they do not feed. There are about 3-5 generations/year, depending on conditions. This is a scale insect, a tiny insect which is most easily identified by the female, which attaches itself to a host plant, loses its legs, and remains stationary covered by a somewhat rounded scale-like shield of wax. In this species, the female forms a flat, circular scale which is white, brown, or yellow in color. The winged male of this species also produces a scale.

Damage symptoms: Insect damages the plant by sucking sap, weakening it. The physical damage includes discoloration and deformation of leaves. Flowers and fruits fail to develop. When the insects feed on the fruits they get discoloured and warped, reducing their value on the market. Infestations can kill plants, even established trees. Heavy infestation causes yellowing of foliage and defoliation, dieback of small twigs, and premature fruit drop.

Management:

- ✚ To get rid of scale insects prune and dispose of infested branches, twigs and leaves

- ✚ When scale numbers are low, they may be rubbed or picked off of plants by hand.
- ✚ Dabbing individual pests with an alcohol-soaked cotton swab or neem-based leaf shine will also work when infestations are light.
- ✚ Commercially available beneficial insects, such as ladybugs and lacewing, are natural predators of the young larval or “crawler” stage.
- ✚ Organic pesticides, like insecticidal soap and d-Limonene can also be used to kill the larvae

3. Tamarind weevil: *Sitophilus linearis* (Curculionidae, Coleoptera)

Alternate host: It is only found from the seeds of tamarind.

Bioecology: The adult is reddish brown to dark brown, slightly shiny, and measures 4-4.5 mm long. Mating takes place a few days after emergence and egg laying commences a week after mating. A female lays an average of 165 eggs (132-180) during a period of 86.8 days (77-98) in a small hole it excavates in seeds. Adult longevity was in the range 91-126 days. The egg is white and oval with a rounded bottom and is glued to the seed. There are four larval instars, the fourth transforms into a prepupa and moults into a pupa a few hours later. The pupa is white, with an oval head with a slender, elongated beak.

Damage symptoms: It causes significant damage and reduces the contents of the pod to powder and almost every tree being affected by the weevil. Pupation takes place inside the pod and the adult emerges through an exit hole in the pod.

Management

- ✚ Drying of seeds under sunlight or using any developed dryers
- ✚ Sanitation of the storage site is a prerequisite
- ✚ Several improved bins are available
- ✚ Inert dusts like clay, sand, ash etc are effective in managing the insect by moisture loss of the insect body by abrasion
- ✚ Fumigation using Celphos is recommended

4. Groundnut seed beetle: *Caryedon serratus* (Oliver) (Bruchidae, Coleoptera)

Distributions: *C. serratus* has a cosmopolitan distribution and is reported as infesting groundnut (*Arachis hypogaea* L.), tamarind and *Acacia spp.* *C. serratus* is of Asian origin, but is distributed to many tropical and subtropical regions of the world (Southgate, 1979).

Alternate host: Tamarind, Acacia, Cotton, African oil palm, Beans, Cocoa.

Bioecology: The eggs of *C. serratus* are translucent, white, oval, approximately 1 mm long and 0.5 mm wide. The larvae are scabrous and sparsely hairy. They usually leave the pods of their host before pupation. Pupae are creamy white, glabrous, about 5 mm long. It is a large robust bruchid which is almost always associated with groundnuts or tamarinds. It has a reddish-brown cuticle, densely clothed with grey-brown setae, but with dark, irregular markings on the elytra. The pygidium in the female is fully visible from above. Antennae are 5 to 10 serrate with 2-4 segments impressed basally. Head is with prominent and median carina.

Damage symptoms: The translucent milky-white eggs are attached to the pod wall. After hatching, the larva burrows straight through the egg shell and the pod wall, and starts eating the seed. The first sign of attack is the appearance of 'windows' cut into the pod wall by the larva to allow the adult to leave the pod after emerging from the pupal cocoon. Fully grown larva sometimes come out through the exit holes made by the previous generations. They often live in the storage sacks and pupate in large numbers at the bottom of the pile of sacks.

Management

- ✚ Fumigation with methyl bromide by 32g/m^3 for 4hrs followed seed treatment with chlorpyrifos 3g/kg seed.
- ✚ Removal of the infested seeds followed by the seed treatment.

5. Groundnut bruchid: *Caryedononagra* (Fab.) (Bruchidae, Coleoptera).

Distributions: *C. gonagra* is widely distributed in the old-world tropics and sub tropics but it is absent in from Australasia and has only a restricted distributions in the new world tropic.

Alternate host: Groundnut, Tamarind, almost all leguminous crops.

Bioecology: Small translucent milky-white eggs can be seen attached to the pod wall. The larva burrows through the pod wall and starts eating the seed. Fully grown larva often leaves the storage sack and pupate in large numbers at the bottom of the pile of. The females laid 53-95 or several hundred eggs, gluing them to the surface of the shells (pods) or kernels (seeds). The incubation period was 8.5 days. The newly hatched larva burrows straight through the eggshell and pod wall, and eats the kernel, feeding only within a

single seed. The cocoon was capsule-shaped and dirty white in colour. Longevity of the adult female was 31.1 days, while adult males survived for 28.1 days.

Damage symptoms: The first sign of attack is the appearance of window cut into the pod wall by the larva. The larva burrows through the pod wall, eats the seeds.

Management: Drying the pods to less than 10% moisture before storing. Spraying the bag with pods with DDVP at 2ml/l of water or dusting with 5% malathion. Fumigation of pods with aluminum phosphide @3g tablets/bag of tamarind and covering the sack with polythene sheet for 5 days can effectively control the bruchids without affecting the seed viability.

Pests of Papal

1. White fly: *Bemisia tabaci* (Aleyrodidae, Hemiptera)

Distributions: Tropical and warm temperate countries of the world: South Europe, Africa, India.

Alternate host: *B. tabaci* is a polyphagous insect has a wide host range of more than 500 host plant species belonging to more than 60 plant family's economic importance, such as vegetables, oil and ornamental plants.

Bioecology: Eggs are usually laid in circular groups, underside of the leaves, with the broad end touching the surface and the long axis perpendicular to the leaf. Eggs are pear shaped with a pedicel spike at the base, approximately 0.2 mm long. The pupa is flat, irregular oval shape, about 0.7 mm long, with an elongate, triangular vasi form orifice. The first instar is the only nymphal stage of this whitefly which is mobile. It moves from the egg site to a suitable feeding location on the lower surface of the leaf, after which its legs are lost in the next moult and the larva becomes sessile. It does not move again throughout the remaining nymphal stages. The fourth nymphal stage is termed the puparium, or also known as "red-eye nymphs". Adults are approximately 1 mm long, the male slightly smaller than the female. The body and both pairs of wings are covered with a powdery, waxy secretion, white to slightly yellowish in colour. The life span of the female can extend to 60 days. The life of the male is generally much shorter, being between 9 and 17 days. Each female can oviposit over 300 eggs during her lifespan.

Damage symptoms: *B. tabaci* damage the crop by sucking the sap and reduce the crop yield about 50%. Whiteflies cause damage to plants in two ways firstly by sucking the sap

and secondly by excreting honey dew on which sooty mould grows. Direct damage is caused by adults and nymphs. They feed by inserting their mouthparts especially in young plants phloem sap from sieve tubes with their sucking mouthparts. The honeydew is colonized by sooty molds, which reduces the quality.

Management: Avoid the alternate, cultivated host crops of the white fly in the vicinity. Adopting crop rotation with non-preferred hosts such as sorghum, ragi, maize etc., for the white fly to check the buildup of the pest. Removal and destruction of alternate weed hosts. Monitoring the activities of the adult white flies by setting up yellow pan traps and sticky traps at 1 feet above the plant canopy and also in situ counts.

2. **Greenish silk moth:** *Trilochavarians* (Bombycidae, Lepidoptera)

Distributions: It is widespread in the Oriental region from India, Sri Lanka, China, extending to Taiwan, the Philippines, Pakistan, Sulawesi and Java.

Alternate host: Siamese rough bush

Bioecology: There are two colour varieties in the species; *albicollis* is the greyish form and *varians* is the reddish form. Head, thorax and abdomen of males are pale or dark reddish brown. Forewings are pale reddish brown or greyish, with two antemedial curved waved lines. There is a dark patch on the outer margin below the apex. The costal edge is paler with cilia being dark reddish brown. Hindwings are pale or dark reddish brown or with greyish with outer reddish-brown area. The postmedial line is indistinct. Ventral surface is paler with some dark red stripes. Larvae is elongated and brown with dark dots and a lateral row of black spots. There is a slight protuberance on each of the thoracic and 5th, 8th somites. A long slender horn can be seen on anal somite. A silken cocoon is oval and pale. Pupation takes place in a boat-shaped cocoon, closely woven with white or yellow rather-papery silk. The pupa is pale yellow.

Damage symptoms: Larva completely defoliates and kills the plant. Dried up and completely defoliated trees. At the peak of infestation, larvae can consume all of the leaves of an individual shrub in just overnight.

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