Insect Management in Papaya

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Insects may be a limiting factor in growing papayas, especially from fruit set until harvest. Among those likely to be a problem are the papaya fruit fly, webworm, whitefly, mites, aphids, scales, mealybugs, leafhoppers and hornworms. Of these pests, the papaya fruit fly is especially important because it is difficult to control and requires some preventive control measures. According to EPA data bank information sources several materials are approved for use on papayas (Table 1). The uses may extend and include application to fruit-bearing plants or they may be restricted to ornamental or nursery use only. It is the responsibility of the applicator to use only labeled materials to meet their specific needs. See Table 1.

Local authorities, agricultural supply dealers and the County Agricultural Extension office may be able to supply additional information. Under the FIFRA amendment of 1978 the grower may use a material (insecticide) that is legal and EPA approved for a pest on a crop for other non-listed pests as long as the user follows the label directions and rates for an approved pest.

Specific Pests

Mites, *Tetranychus* spp.

Spider mites are observed on the underside of older leaves causing leaf decoloration and leaf drop. When populations are high, the apical leaves show deformity, mottling and virus-like symptoms.

**Papaya Fruit Flies, *Toxotrypana curvicauda* Gerstaecker**

These are sometimes called wasps, because of the long ovipositor of the female fly as well as similarities in size and color. This long egg-laying organ, which is as long as the body proper, penetrates the flesh of the fruit and enters the seed cavity. Eggs are usually laid in small fruit, about two to three inches in diameter, but they may be deposited in smaller and larger fruit, especially during high populations of the fly.

The larvae, which are small legless maggots, feed on the seed and interior parts of the fruit. When the larvae become mature, they emerge from the fruit, drop to the ground beneath the plant and pupate just below the soil surface. After about two to four weeks...
Each fruit may be enclosed in a 3-5 pound size bag tied around the fruit stem to hold the bag. Newspaper, one-half sheet (about 12-15 inches in size), may be rolled to enclose the fruit, then tied around the fruit stem, and also the free end. Bagging should begin when the fruit is small, shortly after the flower parts have fallen. This method of control is more adapted to small (1 to 25 plants) than to large (one-fourth acre or more) plantings. Although bagging the fruit is the most certain method of control, it is a laborious process and requires attention at regular intervals (10 to 14 days) to keep the young fruit covered. Also, this procedure will injure some of the fruit unless handled carefully.

Sanitation is important in the control of the papaya fruit fly. It consists of destroying all dropped and prematurely ripe fruit, as well as small fruit suspected of being infested to prevent the larvae from developing into adult fruit flies.

**Papaya Webworms**

These are sometimes referred to as the fruit cluster worm, but is commonly called papaya webworm. It develops under a web between and around fruits and along stems of plants. The webworm cause injury to fruit and stem, providing an entrance for the fungus disease, anthracnose.

**Control.** Permethrin (Pounce 3.2 EC used at 8 oz/acre) is recommended. Use of malathion and/or *Bacillus thuringiensis* for other insects may reduce or aid in the control of webworms.

**Papaya Whiteflies**

Adult is a small white insect which often can be detected by shaking the leaves of the plant -- especially young leaves. The eggs are yellow and oval shaped, and appear to have been dusted. The crawlers are flat and resemble scale crawlers, feeding and developing on the undersides of leaves.

Three growth stages are followed by a pupa, and then the winged adult. The whiteflies produce honeydew, on which sooty mold grows. The whitefly in papaya is parasitized by *Amitus fuscipennis* MacGown & Nebeker, *Amitus* sp. and *Encarsia tabacivora* Viggiani.
Scales

The papaya scale, *Philephedra tuberculosa* Nakahara and Gill, attacks papaya and Annona fruits.

Scale infestation results in 3 types of damage to papaya plants. First, flower and leaf drop occur from severely infested young plants. Secondly, when the infestation on seedlings or on young plants is localized near the apex, distortion of apical leaves is induced. Thirdly, females attached to the fruit cause cosmetic damage that makes fruit unmarketable.

**Figure 3.** Papaya infested with *P. tuberculosa* females.

**Life History.** Female scales produce up to 900 eggs over 3 to 4 weeks. Eggs hatch after 12-17 days, and crawlers settle on leaves, stem and fruit. The papaya scale pass through two nymphal (immature) stages.

This scale has at least 9 different predators, among them the mealy bug ladybird (*Cryptolaemus montrouzieri*), and it is attacked by fungus *Verticillium lecanii*, which causes, during the summer, up to 90% mortality.

There are two small parasitic wasps, e.g., *Coccophagus lycimnia* and *Trichomastus portoricensis*, that periodically cause significative mortality.

**Figure 4.** Papaya mealybug.

**Papaya Mealybug**

Papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink feed on leaves, stems, fruits and even on seedlings. Mealybugs cause deformity, wrinkling and rolling of the leaf edges and early leaf drop. Attack to unripe fruits causes sap running and blemishes, a source of fruit downgrading. Papaya fruit can be heavily infested with mealybugs, becoming white and essentially inedible. Under heavy infestations, the abaxial side of the lower leaves can be covered with insects that congregate near the main vein.

**Figure 5.** Papaya mealybugs infesting fruits.

The parasitoid, *Acerophagus nubilipennis* Dozier (Hymenoptera:Encyrtidae) is an effective parasitoid of the mealybug in Florida.

**Leafhoppers (Homoptera: Cicadellidae)**

Leafhoppers cause two types of damage: direct feeding and secondary damage as vectors. Symptoms of leafhopper feeding include tip burn, wrinkling and cupping of the leaves, burning of leaf margins in large trees, and stunting of smaller plants. Leafhoppers are more important for their vectoring...
Figure 6. Papaya leaves infested with papaya mealybug.

ability than for the mechanical damage. In Florida, *Empoasca stevensi* Young is the only cicadellid species collected from papaya leaves.

Figure 7. Leaf curling is one of the symptoms of attack by the leafhopper, *Empoasca stevensi*, in Florida.

*Aphids (Homoptera: Aphididae)*

*Aphids* do not colonize papaya plants, but are a serious threat to papaya production due to their ability to transmit diseases, in particular papaya ringspot virus (PRSV) and the papaya mosaic virus. The aphids, *Myzus persicae* (Sulzer) and *Lipaphis erysimi* (Katenbach) infest leaves of papaya plantings in south Florida. These species increase from November through May.

**References**

Table 1. Insecticides registered for guava in Florida.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Brand Name(s)</th>
<th>Pest(s) Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azadirachtin</td>
<td>Align, Azatin</td>
<td>general insecticide</td>
</tr>
<tr>
<td><strong>Bacillus thuringiensis</strong></td>
<td>Dipel, others</td>
<td>lepidoptera larvae</td>
</tr>
<tr>
<td><strong>Beauveria bassiana</strong></td>
<td>Mycotrol</td>
<td>aphids, mealybugs, others</td>
</tr>
<tr>
<td>Bifenazate</td>
<td>Floramite(^1)</td>
<td>mites</td>
</tr>
<tr>
<td>Bifenthrin</td>
<td>Talstar(^1)</td>
<td>various insects, mites</td>
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<tr>
<td>Fenbutatin-oxide</td>
<td>Vendex</td>
<td>mites</td>
</tr>
<tr>
<td>Fenpropathrin</td>
<td>Tame(^2)</td>
<td>various insects, mites</td>
</tr>
<tr>
<td>Hexythiazox</td>
<td>Savey(^2)</td>
<td>various insects, mites</td>
</tr>
<tr>
<td>Hydramethylnon</td>
<td>Amdro(^1)</td>
<td>ants</td>
</tr>
<tr>
<td>Kaolin (clay)</td>
<td>Surround</td>
<td>barrier and irritant to various insects</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>Provado</td>
<td>thrips</td>
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<tr>
<td>Malathion</td>
<td>Malathion</td>
<td>scales, thrips</td>
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<tr>
<td>Methoxyfenozide</td>
<td>Intrepid</td>
<td>lepidoptera larvae</td>
</tr>
<tr>
<td>Permethrin</td>
<td>Pounce, Ambush</td>
<td>mites</td>
</tr>
<tr>
<td>Potassium salts of fatty acids</td>
<td>Safer Soap</td>
<td>aphids, lace bugs, mealybugs, spidermites, others</td>
</tr>
<tr>
<td>Pymetrozine</td>
<td>Endeavor(^2)</td>
<td>aphids, whiteflies</td>
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<tr>
<td>Pyrethrin + rotenone</td>
<td>Pyrellin</td>
<td>aphids, lepidoptera, thrips</td>
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<tr>
<td>Pyrethrins</td>
<td>Pyrenone</td>
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<tr>
<td>Pyriproxyfen</td>
<td>Esteem Ant Bait</td>
<td>ants</td>
</tr>
<tr>
<td>Pyriproxyfen</td>
<td>Knack, Esteem</td>
<td>scales</td>
</tr>
<tr>
<td>S-methoprene</td>
<td>Extinguish</td>
<td>ants</td>
</tr>
<tr>
<td>Spinosad</td>
<td>SpinTor 2SC</td>
<td>lepidoptera larvae, mirids, thrips</td>
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<tr>
<td>Various refined horticultural oils</td>
<td>Sunspray, citrus spray oil, crop oil, FC 435-66, FC 455-88, others</td>
<td>aphids, mites, scales</td>
</tr>
</tbody>
</table>

\(^1\) For use with non-bearing trees only.
\(^2\) For nursery/nonbearing trees only.

Archival copy: for current recommendations see http://edis.ifas.ufl.edu or your local extension office.