

Management (Cont'd)

◆ Chemical Control:

Insecticide used to treat soil and spot spray host plants in areas where fruit flies are known to occur will kill fly pupae in the soil and adult that come in contact with the chemical.

◆ Biological Control:

Use of Parasitoids:

These are tiny wasps that attack the larvae in fruits or on the ground when they leave the fruit to pupate. They attack fruit flies by laying eggs in the fly larvae. The Parasitoid larvae develop and consume the body of a fruit fly pupa killing it before it can develop into an adult.



The braconid wasp, *Diachasmimorpha longicaudata* parasitizing larvae of the Caribbean Fruit Fly, *Anastrepha suspensa* (Loew).

Sterile Insect Technique (SIT)

Is a "Birth Control" concept of insect pests. It involves the release of a large number of laboratory reared sterile male flies in the environment. Mating between the sterile lab-reared flies and fertile wild flies interrupts the native population because offspring are not produced, this causes the population to diminish overtime.

◆ Regulatory Control

This involves the development of National as well as International Laws and Regulations to restrict the free movement of fresh fruits and vegetables in order to prevent the introduction and spread of fruit flies within a country as well as from one country to another.

Why Manage Caribbean Fruit Fly?

The economic losses caused by fruit fly damage include destruction and excessive spoilage of fruits and vegetables by larvae, the increased cost of imports due to a scarcity of locally grown fruits and vegetables, the increased costs associated with implementing control measures, and loss of local market share due to unwillingness by consumers to purchase products that are known host of fruit flies. The high reproductive rate, extensive damage and wide host range would become significant obstacles to agricultural diversification and food security.

How You Can Help....

- ◆ Participate in good cultural practices by, bagging fallen and/or unwanted fruits into sturdy, garbage bags, seal them and keep them in the sun for 4-5 days to kill the maggots.
- ◆ Allow authorized, trained agricultural workers access to your property to place and service traps,
- ◆ Always inspect fruits for signs of any insect damage.
- ◆ Prevent the introduction of other major fruit flies species: Do not bring or mail fruits, vegetables, or plants into the Cayman Islands unless you have obtained prior permission from the Department of Agriculture.
- ◆ Cooperate with local quarantine restrictions; do not carry infested fruits from Grand Cayman to the Sister Islands.



**Be alert, look out for maggots in fruits.
Report your find to the Department of
Agriculture immediately.**



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Working together, growing together

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Caribbean Fruit Fly

Anastrepha suspensa (Loew)

A New Pest to the Cayman Islands



....and a Threat to Food Security



Caribbean Fruit Fly (*Anastrepha suspensa*) Loew

About Fruit Flies

Fruit flies are the most devastating and feared agricultural and horticultural pest throughout the world as they pose a serious threat to crop production and the marketability of fruits and vegetables.

Fruit flies cause direct damage by puncturing the fruit skin to lay eggs. During egg laying bacteria from the intestinal flora of the fly are introduced into the fruit. These bacteria cause rotting of the tissues surrounding the egg. When the eggs hatch, the maggots feed on the fruit flesh making galleries. These provide entry for plant disease causing organisms (pathogens) and increase the fruit decay, thereby making fruits unsuitable for human consumption.

Small holes on the fruits are visible when the maggots leave the fruit. Generally, the fruits fall to the ground as soon as, or just before the maggots are ready to pupate.



Punctured wounds in Guava



Larvae feeding in fruit

The Status of Fruit Flies in the Cayman Islands

In January 2009 the Department of Agriculture with technical assistance training from the United States Department of Agriculture (USDA), launched a fruit fly trapping and monitoring programme in Grand Cayman. The primary objective of the programme was to place trapping devices with the most effective attractant for major fruit flies, at strategic locations for early detection of these pests. In April 2009, *Anastrepha suspensa*, also known as the Caribbean Fruit Fly was found in a trap in the Lower Valley area of Grand Cayman. In response, the trap lines were expanded across Grand Cayman and introduced in Cayman Brac.

To December 2012 *A. suspensa* has been recovered from traps in all districts in Grand Cayman but not in Cayman Brac and guava fruits were found to be the preferred and primary host of the pest.

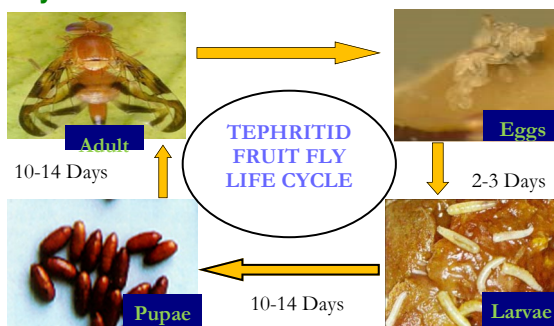
Biology

The adult Caribbean Fruit Fly is a small yellow-brown fly that can be as long as half an inch (0.5"). The wings are long with patterns which form three distinct, yellow brown to brown bands namely the Costal, 'S' and 'V' band.

The eggs are small, white, slender and are laid under the skin of host fruits.

The larvae are commonly called maggots. They are whitish with cylindrical, elongated, anterior end usually somewhat re-curved ventrally and mouth hooks that are flattened towards the caudal end.

Life Cycle



Host of Caribbean Fruit Fly:

Some preferred host include:

Guava	<i>Psidium guayava</i>
Hog Plum	<i>Spondias mombin</i>
Suriname cherry	<i>Eugenia uniflora</i>
Tropical almond	<i>Terminalia catappa</i>
Rose apple	<i>Syzygium jambos</i>
Malay apple	<i>Syzygium malaccensis</i>
Star apple	<i>Chrysophyllum cainito</i>
Sour orange	<i>Citrus aurantium</i>
Sweet orange	<i>Citrus sinensis</i>
Grapefruit	<i>Citrus paradisi</i>
Barbados cherry	<i>Malpighia glabra</i>
Sapodilla	<i>Manilkara zapota</i>

Over 90 hosts are recorded in published literature.

Spread of Fruit flies

The movement of infested fruits by human is the main pathway of introducing the pest to a previously fly-free area. Larvae may leave fruit in transit or may pupate in packaging materials or vehicles, from which the adults later escape. *Anastrepha suspensa* is a major pest of fruits and hence, severe quarantine restrictions are placed on the movement of fruits between countries.

Management of Fruit flies

The objective for managing fruit flies seeks to break the life cycle of the pests by making host fruits unavailable for egg laying and soil unavailable for pupating.

Effective methods include:

◆ Cultural Practices

a) Collection and destruction of all fallen fruits. This can be done by placing the collected fruits in a sturdy, garbage bag and leaving it in the sun for 4 to 5 days. This process (solarization) will generate enough heat to kill all the maggots that are inside the fruits.



Fruits in Bag



Do NOT leave fruits under tree

b) Pruning of HOST trees: Canopies with excess shade provide ideal conditions for the adult female to rest and lay her eggs.

c) Fruit Stripping: If fruits on tree are found to contain maggots, strip all from the tree, bag them and solarize to destroy them.

d) Early Harvesting: Harvest fruits as soon as they are mature to reduce suitable fruit fly egg laying sites.

e) Precautionary post harvest treatment of fruits by dipping them in hot water or freezing will kill the maggots. Carefully select and inspect of fruits before selling them or distributing them to friends will prevent accidental spread of fruit flies.

◆ Mass Trapping:

Involves placing traps with food lures in host trees. Food lures are usually protein based and are used to attract both male and female flies. The trapped flies are retained in water at the base of the trap. Traps should be serviced and re-baited at intervals by trained trappers.

◆ Mechanical Barriers:

This involves covering young fruits with newspaper to prevent the fruit fly from having direct contact with the fruit. This method is difficult for very small fruits but is a very effective control method for larger fruits.

◆ Bait Application Technique (BIT)

Bait Blocks: These are blocks of an absorbent material drenched with a solution of a protein attractant and an approved chemical killing agent. The blocks are placed strategically in host trees.

Bait Spray: A bait spray such as Spinosad combines a lure with a killing agent and is used to spray a small portion of host trees to attract and kill the target flies.