

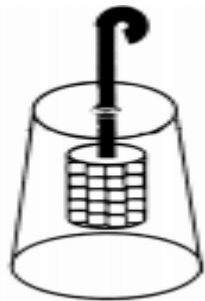
Simpler homemade traps can be utilized for smaller groves. One of these involves the use of jars filled with a lure. These wide mouthed jars are left without the lid but with a kind of cover to protect it from the rain. Other modifications using empty soft drink containers can be made into simple traps. The whole idea with trapping is to observe how the populations of the flies fluctuate. If increases are noted then the interval of application can be shortened. It is important to place the traps in areas of the tree canopy where fruitflies are most likely to be trapped (Fig 5 )



**Fig. 5 Placement of the traps at 3/4 the height of the canopy.**

## Use of homemade traps for controlling flies

One of the common methods for small groves is to use a corncob trap impregnated with Malathion and Staley Bait (Fig. 6). The traps are serviced every ten days. The plastic cup protects the chemical from being washed out by the rain.



**Fig 6. Corncob and cup trap**

## Spot spraying

### Important tips to follow

The recommended method of control used in Belize is spot spraying with a poisonous bait consisting of a protein lure and an insecticide. Spot spraying is a relatively simple and effective method of control. This method is selective for fruit flies since the bait will only attract fruit flies, therefore beneficial insects are not affected. It basically consists of spraying small quantities of a protein bait and an insecticide in large droplets to the underside of the leaf enough to cover an area of 6-12 inches in diameter. There are a few pointers to consider when preparing the mixture and spraying.

(1) The insecticide generally used for fruit fly control is Malathion. There are many formulations of Malathion but the two most commonly used are Malathion 57% and Malathion 96%. The most recommended formulation is Malathion 57% because it is water-based. The 96% formulation is an emulsifiable concentrate and is not very compatible with the staley bait. The mixture tends to separate and continuous agitation is required to keep a good, even mixture. However, a lot of growers say that this is the best formulation because it lasts longer in the foliage.

(2) The bait generally used with the insecticide is Staley bait or Nu-Lure. Nu-Lure is a broad-spectrum attractant and will attract most species of fruit flies.

(3) Only mix the exact amount of bait and insecticide. Never leave the mixture for future use since the Malathion will be deactivated by the lure.

(4) Fruit flies are more active at feeding in the early morning and late evening. For better efficiency, it is recommended to apply during these hours. Do not spray just prior to rain or during rain. As a general rule, if one inch or more of rain falls after spraying, it will be necessary to spray again.

(5) The spraying should be directed to the underside

of the leaves since this will protect from eventual wash off from the rain. The spraying should be directed midway up the tree or preferably to the upper portion of the tree. Experiments have shown that a greater number of flies are caught on the upper and mid portion of the canopy.

(6) Treatment should start as soon as the fruit begins to mature and continue until the crop is over. As a rule of thumb, spraying should start when the fruits are the size of a tennis ball. The spray interval should be every ten to fourteen days.

(7) If there is a high infestation of the fly, the first two sprays should be given at a three-day interval and further sprays at seven-day intervals until the populations come down and the fourteen-day intervals can resume.

(8) It is important to spray all the perimeter trees on the grove. Within the grove, every other tree should be sprayed (Fig.5). On small groves, those less than three acres, it is recommended to spray every tree.

## Economics of fruitfly control

Yield per acre when fruit fly is controlled with a spot spraying program:

600 boxes @ 3.00 per box = \$1800.00

Yield per acre when no control is done (50% losses):

300 boxes @ 3.00 per box = \$900.00

Cost per acre per year for fruit fly control, doing 20 applications of insecticide and bait

20 applications @ \$15.00 per application = \$300.00

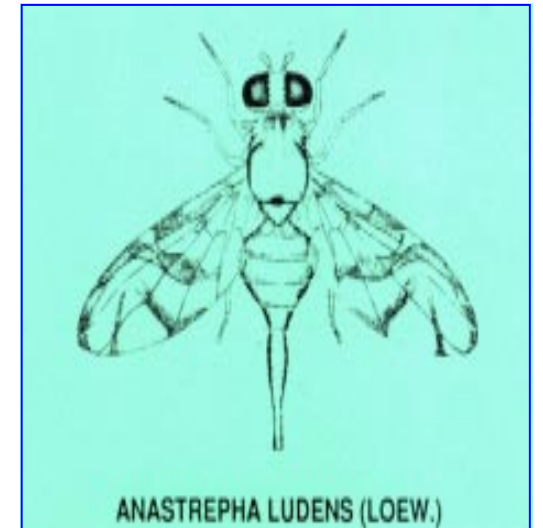
Gross income per acre with control = \$1800.00

Gross income per acre without control = \$900.00

Cost of control = \$300.00

Profit made by doing spot spraying = \$600.00

## MEXICAN FRUITFLY CONTROL ON GRAPEFRUIT



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# The Mexican Fruitfly

## Description

The Mexican fruit fly is a small brownish yellow fly not much bigger than a housefly. The fly has clear wings with brown stripes and the females have a long ovipositor at the end of the abdomen, which is the apparatus used for depositing eggs beneath the surface of the skin of the fruit. The stage of development of the fly that causes damage is the larval stage. The larvae of the Mexican fruit fly are typical fruit maggots, about 10 mm in length and cream yellowish in color. The Mexican fruit fly attacks many species of fruits besides citrus, including mangos, guavas, mamey apple, star apple and many other fruit species.

## Taxonomy

The Mexican fruit fly, *Anastrepha ludens* belongs to the Tephritidae family, which includes other insect pests of agricultural importance, including the Mediterranean fruit fly, Caribbean fruit Fly, Oriental fruit fly and most other flies that affect fruits. Figure 1 shows the wing pattern of the Mexican Fruit Fly.

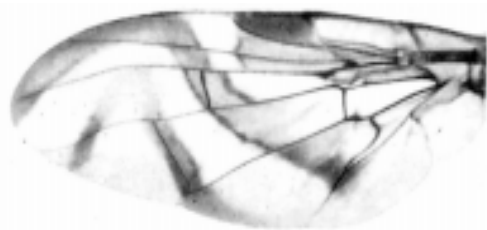


Fig. 1 Wing pattern of the Mexican Fruit-fly

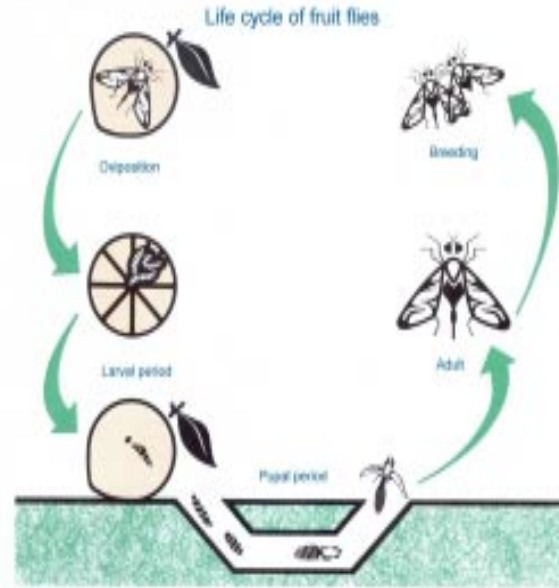


Fig 2 Life Cycle of the Mexican Fruitfly

## Life Cycle

The fruit fly, as is common with most insects, goes through a series of stages through its life cycle (Fig. 2). After the eggs are deposited in the fruit, it takes around seven days for these to hatch into tiny larvae. These tiny larvae burrow deep into the fruit feeding on the pulp and causing internal damage, rendering the fruit useless for processing and consumption. This period lasts approximately three weeks.

After this period, the larvae crawl out of the fruit and burry into the ground where they turn into pupae. The pupal stage lasts from two to three weeks until they crawl out as adults. The females can start

laying eggs as early as ten days and can

lay several hundred eggs during their adult life. On average, it is believed that adult flies can live up to six months. Under experimental conditions, some flies have been observed to live up to a year.

An important factor in Belize that contributes to a constant presence of the fly is the variability of hosts all year round. Fruit flies will reproduce and feed on many other species of fruit trees and maintain healthy populations when the grapefruit crop is over. During the off-season, the mango season is on and mango fruits are highly preferred by the Mexican fruit fly. Guavas and golden plums are other favorite host.

## Economic importance

The Mexican fruit fly is the single most important pest problem of grapefruit in Belize. When no kind of control programme is implemented, losses in grapefruit can be from 50% to 100%. Quite commonly, most of the second crop is lost to fruit fly damage. Of all the citrus species and varieties, fruit flies will primarily affect grapefruit. However, fruit flies will attack other varieties such as early varieties of sweet oranges and even Valencia varieties when there are large populations of the fly and the grapefruit crop is over.

## Damage

The damage on grapefruit is caused by the larval stage of the insect. These larvae are deposited directly under the rind and eventually make their way to the pulp where they feed for a few weeks. This feeding causes internal damage that leads to fruit drop. Growers should monitor their fruit for signs and symptoms of fruit fly damage. Infected fruit will turn yellow before reaching maturity and will develop

brown spots on the skin. When the skin is cut, light brown spots appear on the albedo (White spongy layer). An unusually heavy fruit drop usually accompanies these early infestations.

## Management of fruitflies

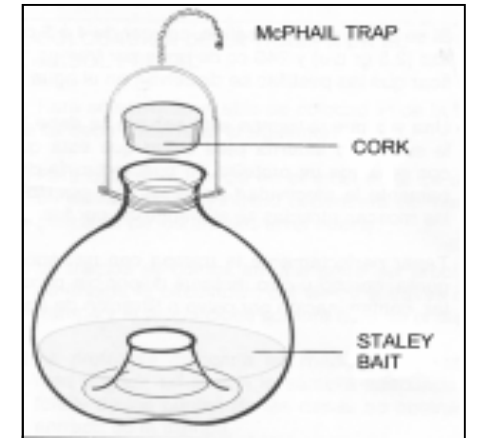


Fig. 3 The McPhail Trap

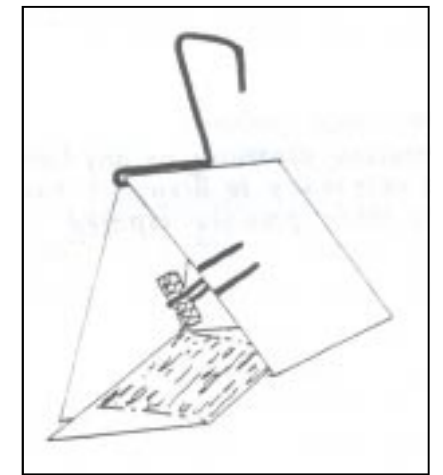


Fig. 4 The Jackson trap