Department of Agriculture
Gardennote
No. 24
Replaces Bulletin 4565

Control of Mediterranean Fruit Fly (Medfly) in Backyards

By Sonya Broughton, Francis de Lima, Bill Woods, Entomology Branch and Harald Hoffmann, Biosecurity Communications

Figure 1. The adult female Mediterranean fruit fly

The Mediterranean fruit fly - (*Ceratitis capitata*)

The Mediterranean fruit fly (Medfly), *Ceratitis capitata*, is thought to originate from tropical Africa. It is a pest in many areas of the world including Western Australia. Medfly is not present in other Australian states or territories. It was first detected at Claremont in 1895 and is now found as far south as Esperance and as far north as Derby. The main area of infestation extends from Carnarvon to Bunbury.

Medfly is known to infest over 200 fruit and vegetable species. In Western Australia, stone fruit, pome fruit, citrus, loquats and guavas are particularly susceptible.

Life cycle

The onset of Medfly activity is temperature dependent. In the metropolitan area and the south-west of the state, Medfly is active in late spring, summer and autumn. In winter, the fly may become inactive in cold areas. Medfly can overwinter as adults, as eggs and larvae (in fruit), or as pupae in the ground. Adult Medfly is active in winter when temperatures exceed 12ºC (Figure 2).

As temperatures increase in spring, adults begin to emerge from the ground and overwintering flies become active. If control is not started at this time, Medfly populations will increase to cause problems later in the season.

The adult fly

The adult fly is 3 mm to 5 mm long, slightly smaller than a housefly. The body is light brown. The wings are mottled with distinct brown bands extending to the wing tips.

The abdomen is brown, encircled by two light coloured rings. The thorax (middle) has irregular patches of black and silver, giving it a mosaic appearance. The female Medfly has an ovipositor; the male does not. Adult Medfly may live for two to three months and are often found in the foliage of fruit trees. As long as fruit is present, most Medfly do not move very far, from 20 m to 50 m.

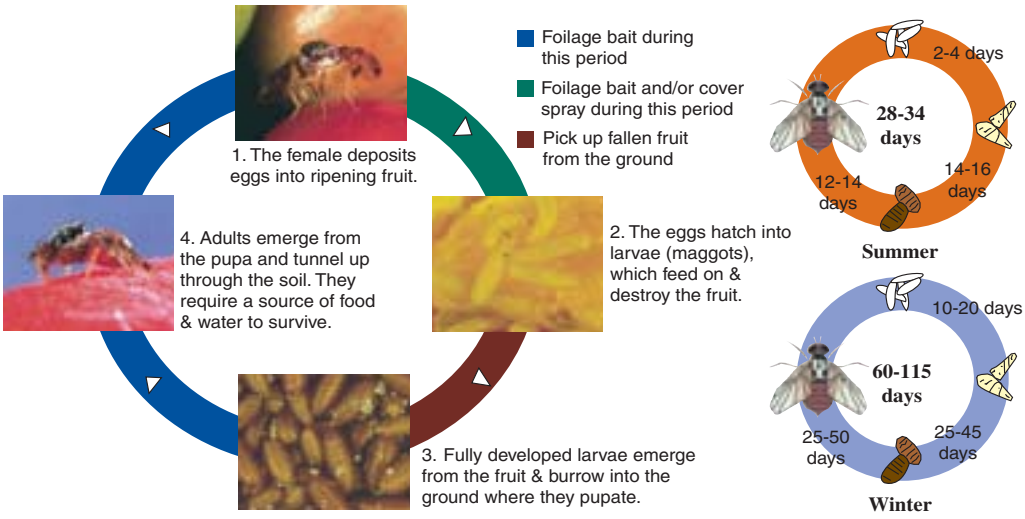


Figure 2. Life cycle of the Mediterranean fruit fly

Eggs

It takes seven to ten days before a female is ready to mate and lay eggs. After mating, females search for a suitable host. Fruit such as apricots are preferred to hosts such as apples and pears. However, when Medfly populations are high, females become less choosy and will infest less preferred hosts such as olives. Female Medfly will also infest less preferred hosts if preferred hosts are not available, even when populations are low.

Larvae (maggots)

The eggs hatch within two to four days into larvae. The larvae are white with a flat, pointed head. It is this stage of the life cycle that you are most likely to see. When the larvae first hatch they are about l mm long, but quickly grow to 8 mm. The larvae feed on the flesh of the fruit, causing it to decompose. When fully grown, larvae stop feeding and leave the fruit, burrowing into the soil to pupate.

Pupae

Pupae resemble a small brown capsule or barrel about 4 mm long. Within the pupae the Medfly slowly develops into an adult. The adult fly cuts through the pupal case and burrows up through the soil.

Control

If control methods are not used, Medfly can infest 100 per cent of susceptible fruit such as apricots, nectarines, peaches and mandarins and to a lesser extent, fruits such as apples and pears. All citrus is susceptible in warm winters. Only early maturing varieties of stone fruit or fruit fly tolerant varieties of fruit such as some lemon cultivars and avocados can be grown without insecticide applications.

Two control methods are currently recommended: foliage baiting and cover spraying. Foliage baits are used to control the adult population; cover sprays control adult Medfly and provide some control of eggs and larvae.

Hygiene

For chemical methods to be effective, fly-infested or unwanted fruit must be destroyed. Fruit can be destroyed by soaking it in water, topped with a layer of kerosene for – four to five days. Medfly larvae can survive in water for a few days unless their oxygen supply is cut off. The kerosene layer prevents oxygen exchange between the air and water.

Freezing fruit for a few days or cooking or pureeing fruit (which can then be fed to poultry or pigs) are other methods of disposal. Burial is not recommended since Medfly larvae can survive burial. Do not take fly-infested fruit to the dump without first treating it.

Foliage baiting

Foliage baits consist of an insecticide (consult your local plant nursery or chemical reseller on registered chemicals) and a source of protein. The female Medfly requires a source of protein for the maturation of her eggs and in the 'wild' can obtain this from substances such as fruit juices, bacteria and bird droppings. By providing a protein and insecticide in one formulation, the bait is attractive as a food source to both male and female Medfly. The baits are eaten by the adult Medfly, which forage over the leaves for food.

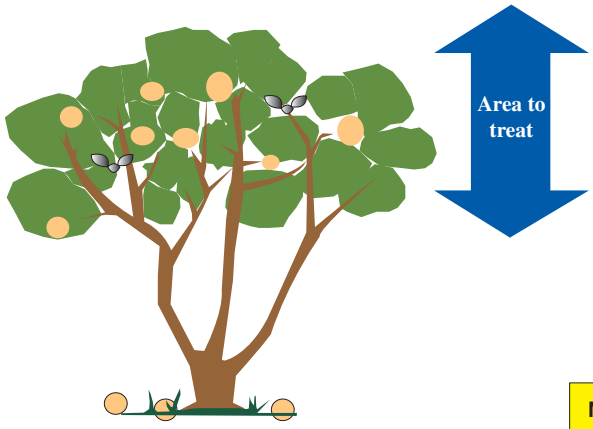
Application

You do not need to spray the entire tree with the bait since Medfly will be attracted from a few metres away. Aim the bait into the middle (Figure 3) rather than the extreme top or bottom of the tree, and into the centre rather than the outer foliage. Avoid hitting the fruit with the bait mixture and avoid baiting trees with ripe fruit.

Apply bait in the morning if possible. If you apply bait at midday or in the evening, there is a risk of burning or scarring leaves and fruit.

In urban and peri-urban areas, all fruit trees should be baited. If the Medfly population is particularly high, the number of trees baited can be increased to include non-fruiting trees and non-fruit trees (that is, decoy trees), or the frequency of baiting can be increased to once a week. In cooler months or on isolated properties, the frequency of baiting may be decreased to once every fortnight. Rain will wash off foliage baits, so after heavy rainfall you should reapply the bait.

1. Start baiting when fruit is half size.
2. Before using any chemicals, read the label. You will need to wear personal protective equipment when applying foliage baits.
3. Stand slightly back from the tree and apply bait as coarse droplet using either a paintbrush or sprayer.



4. Apply about 100 mL (less for smaller trees) of bait mixture to the foliage (rather than the fruit) in a coarse spray.
5. Repeat at weekly or twice-weekly intervals (after heavy rain, or if Medfly populations are high).
6. Make sure that all fallen and unwanted fruit is picked and disposed of.

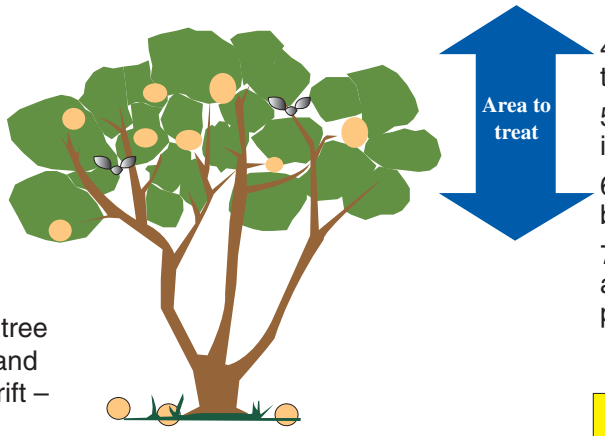
Note: The bait mixture does not retain its potency, so mix only enough to treat all your trees.

Figure 3. How to apply foliage bait

1. Start spraying when fruit is 1/2 – 2/3 full size.

2. Before using any chemicals, read the label. You will need to wear personal protective equipment when mixing and applying cover sprays.

3. Stand slightly back from the tree and apply spray to the foliage and fruit of the tree. Be careful of drift – do not spray on a windy day.



4. Apply about 9 L spray/ tree (less for smaller trees).

5. Repeat at recommended intervals.

6. Spray until 1 week before harvest.

7. Make sure that all fallen and unwanted fruit is picked and disposed of.

Note: The cover spray mixture does not retain its potency, so mix only enough to treat all your trees.

Figure 4. How to apply cover sprays

Cover spraying

Cover spraying differs from bait spraying in that all stages of the lifecycle (egg to adult) are killed. However, in addition to Medfly, any other insects present at the time of spraying will be killed.

Cover sprays kill Medfly adults on contact and destroy eggs and larvae through penetrative action. Cover sprays will not stop the female Medfly from stinging fruit. If the Medfly population in the surrounding area is particularly high, foliage baits provide additional control.

Consult your local plant nursery or chemical reseller on registered chemicals.

Application

Start spraying when the fruit is one-half to two-thirds of its full size, or if sustained numbers of Medfly are caught in traps. The aim is to cover the fruit with insecticide (5 L to 10 L/tree) (Figure 4). The amount of insecticide used depends on the size of the tree: larger trees require more insecticide, smaller trees require less. The withholding period is usually two to seven days depending on which insecticide is used.

Trapping

Trapping is not recommended as a control method because it does not control the adult population. However, it is a useful tool for detecting Medfly populations and will help reduce the number of Medfly in your backyard.

Trap types

Three types of traps are used to catch Medfly: male lure, female lure and wet traps. The male lure trap consists of a pheromone and an insecticide (Figure 5). A pheromone is a chemical that attracts a male or female of a species. Male Medfly are attracted to the pheromones trimedlure and Capilure®. The male Medfly is lured into the trap where it is killed by insecticide. Female traps consist of a McPhail trap (Figure 6) and a lure such as Biolure®. These traps are not commercially available.

Wet or food traps consist of a food source such as protein or sugar. The flies are attracted to the food source, enter the trap and are killed by the insecticide. In insecticide-free traps, flies enter the trap but are unable to leave, eventually drowning in the lure at the bottom of the trap. Wet traps are attractive to both sexes but other insects such as bush flies, ferment flies, wasps, crickets and beetles may also be caught.

Figure 5. Lynfield trap – used to monitor male Medfly

Figure 6. McPhail trap – used to monitor female Medfly

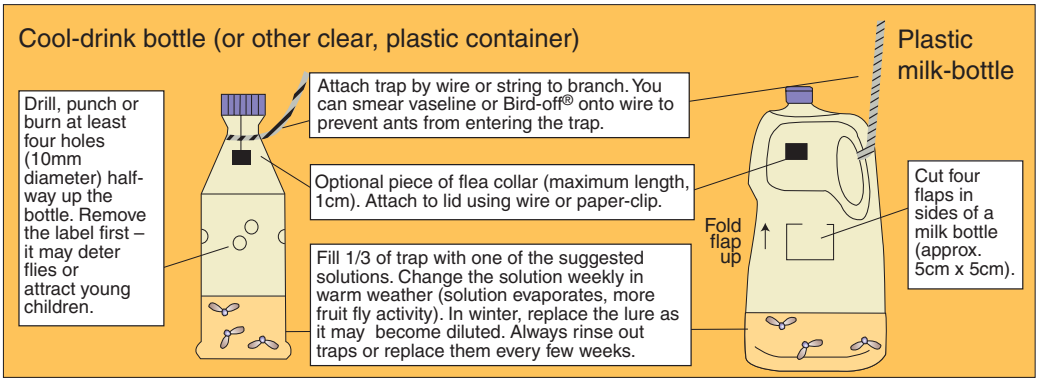


Figure 7. Making a fruit fly trap

Figure 8. Adult Drosophila melanogaster

A home-made trap can be made from a plastic 1 or 2 L cool drink container by punching small holes (8 mm diameter) into the middle of the bottle (Figure 7). Another alternative is to modify a 2 L plastic milk bottle by cutting four flaps in each of the sides (Figure 7).

Make up fresh trap solutions each time that they are required. Traps should be rinsed or replaced every few weeks. Replace the solution fortnightly or weekly if blowflies are being attracted to the trap. You will need more lure during warmer weather as the solution will evaporate.

For best results, place at least two traps per fruiting tree (maximum six traps per tree). For every three traps used in fruit trees, place one trap in a non-fruiting tree or shrub as a decoy. This will help reduce the number of Medfly going to your fruiting trees. If the number of flies caught in the traps show a sustained increase, start baiting or cover spraying.

Other control methods

The Department of Agriculture has been using sterile fruit flies in some areas. This method is not available for home gardeners, as it is only effective in isolated areas.

Other insects that could be confused with Medfly

Ferment or vinegar fly

Medfly may be confused with *Drosophila*, the ferment or vinegar fly (Figure 8). Ferment flies are often used in school genetics experiments and are sometimes referred to as a fruit fly. Ferment flies, however, are not true fruit flies. They are usually found around rotting fruit (Medfly is not). Ferment flies are also much smaller, I mm, compared to 4 mm for Medfly.

Metallic-green tomato fly

The metallic-green tomato fly (*Lamprolonchaea brouniana*) is about 6 mm long. The adult has a metallic sheen, whereas the Medfly does not have a sheen. The larvae of the metallic-green tomato fly can only be distinguished from Medfly under a microscope.

Queensland fruit fly

The Queensland fruit fly (Qfly), *Bactrocera tryoni (Figure 9)*, was accidentally introduced into Western Australia from the eastern states. The Qfly was eradicated from the Perth metropolitan area in 1990. Qfly traps have been installed throughout the state to monitor for any further incursions. A separate Farmnote is available on identification of Queensland fruit fly and other exotic fruit flies (Farmnote No. 63/99).

Responsibilities

Home gardeners and small landholders have a responsibility to control Medfly. The Department of Agriculture will enforce this law if they are situated near a commercial production area.

Plant Diseases Act

The Plant Diseases Act has regulations that govern the control of fruit fly. For further information about regulations, contact the Department of Agriculture on 9368 3333.

Not wanted in Western Australia

Exotic fruit flies include the Queensland fruit fly (Figure 9) and the Papaya fruit fly (Figure 10).

Any suspicious flies should be reported to the Pest and Disease Information Service on 9368 3666.

Figure 9. Queensland fruit fly

Figure 10. Papaya fruit fly

Note: Mention of trade names does not imply endorsement or preference of any company's product by the Department of Agriculture and any omission of a trade name is unintentional. Recommendations are current at the time of printing.

1340/10/04-5000-Key2design ISSN 0817-5969