Department of
Primary Industries and Regional Development

GOVERNMENT OF WESTERN AUSTRALIA

Managing Mediterranean fruit fly in backyards

Mediterranean fruit fly (*Ceratitis capitata*) or Medfly is a serious horticultural pest worldwide. It attacks more than 250 species of cultivated fruits and some fruiting vegetables.

In Western Australia, Medfly has established in the south west because of the presence of suitable hosts and Medfly's capacity to adapt to different climatic conditions. Medfly can survive hot temperatures in irrigated environments such as orchards and backyard gardens.

Damage

The first sign of damage is often larvae-infested or 'stung' fruit. Stinging is caused by the female laying eggs into unripened or ripe fruit. Larvae may develop from the eggs and damage fruit from the inside. Fruit rot often occurs due to secondary infection.

Sting marks on peach

Infested grapefruit

Impact

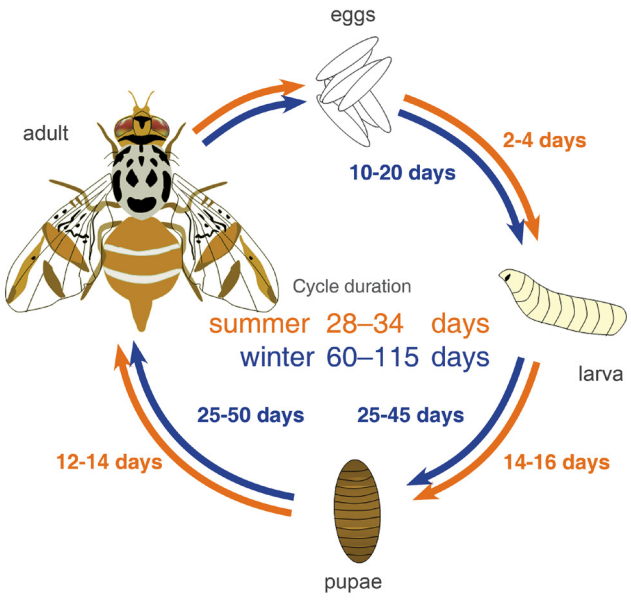
Medfly's wide host range and tolerance to cooler climates makes it highly invasive, affecting orchards and household fruit trees. It has been estimated that up to 100% of susceptible fruits such as apricots and nectarines can be infested by Medfly if no action is taken.

Economic impacts to commercial fruit producers include reduced yield and quality and increased control costs. The presence of Medfly also affects market access to countries and regions that regulate against Medfly.

Life cycle of Medfly

Fruit fly activity is dependent on temperature. Medfly is active in late spring, summer and autumn. In winter, it can become inactive in cold areas such as Manjimup in the south west of WA. When temperatures start to fall, Medfly can still survive through the winter months as adults, eggs and larvae (in fruit), or as pupae in the ground.

Adult Medfly become active when temperatures exceed 12°C. As the temperature rises in spring, the fruit fly that survived the winter become active and flying adults begin to emerge from the ground. **If control is not started at this time, Medfly populations will increase to cause problems later in the season.**



One life cycle takes 28-34 days to complete in summer and 60-115 days in winter

Understanding the Medfly life cycle is important to understand why and how to control fruit fly all year round

Adult stage

The adult fly is 3–5mm long. Its body is light brown, and the abdomen is encircled by two light-coloured rings. The thorax has irregular patches of black and silver, giving it a mosaic appearance. The wings are mottled with distinct brown bands extending to the wing tips. The female has an ovipositor or egg-laying organ.

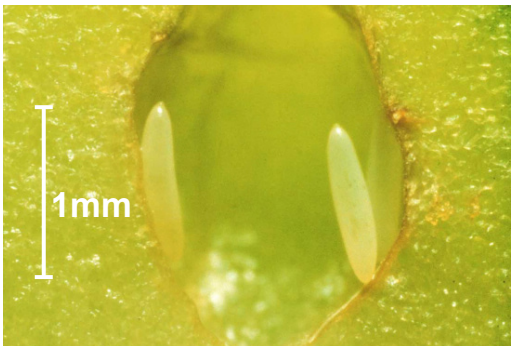
Adult Medfly **may live for 2–3 months** and are often found in fruit tree foliage, especially citrus trees. As long as fruit is present, most Medfly will remain within the tree. However, they will travel further if no hosts are present. Fruit fly can 'hop' between properties thanks to the presence of host plants. Fruit fly can also travel longer travel distances aided by wind or by human transportation of infested fruit.

Adult female Medfly

Eggs

Medfly prefer to lay eggs in soft-fleshed fruit such as apricots, peaches, plums, nectarines, figs and loquats. When Medfly numbers are high and competition is greater, females become less choosy and will infest less preferred hosts such as olives. They can also infest some other fruits or vegetables if preferred hosts are not available.

Once a suitable host is found, the ovipositor is used to pierce the fruit skin. Batches of up to 300 white banana-shaped eggs are laid into this hole. Eggs are just visible to the naked eye and **take 2–4 days to hatch in summer and 19–20 days in winter**.



Medfly eggs

Larvae (maggots)

The larvae are white with a flat, pointed head. This stage of the life cycle is the most damaging and when they are most likely to be seen. When the larvae first hatch they are about 1mm long, but grow quickly to 8mm. The larvae feed on the fruit, causing it to decompose. When fully grown, larvae stop feeding and jump out from the fruit, burrowing into the soil to pupate. The larval stage **takes about 14–16 days in summer and 25–45 days in winter**.

Medfly larvae

Pupae

Pupae resemble small brown capsules or barrels about 4mm long. Within the pupal case the Medfly slowly develops into an adult. When mature the adult fly cuts through the case and burrows up through the soil. The pupal stage **lasts 12–14 days in summer, and 25–50 days in winter.**

Medfly pupae

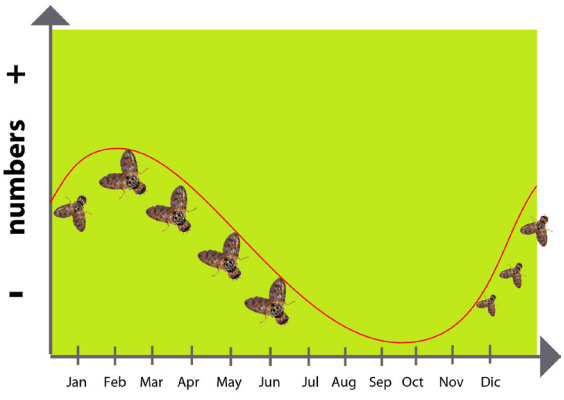


Figure 2 Fly activity and numbers are greater during warmer months

Managing Medfly on your property

Fruit trees such as stone fruit (apricots, peaches, plums, nectarines) can be difficult to grow free of fruit fly in areas such as Perth where Medfly populations are high. Backyard fruit can be a significant source of Medfly to commercial orchards where they occur close to each other. If you are unable to manage Medfly or do not want to harvest your fruit, consider removing unwanted trees.

Hygiene

Remove all fly-infested, fallen or unwanted fruit, including ripe fruit left on the tree.

Infested fruit must be treated before disposal:

- boil fruit or freeze fruit for two days
- solarise by sealing in black plastic bag and place in the sun (3-5 days).The heat from the sun kills the eggs and larvae
- soak fruit in a bucket of water with oil film (3 days)
- burying (only if fruit is buried at least 1m deep).

Hygiene is the most important method to control fruit fly and to minimise re-infestations.

Baiting

Baiting consists of applying coarse droplets of protein laced with insecticide to leaves or tree trunk. Male and female Medfly are attracted to the protein as they forage for food, feed on it, and acquire a lethal dose of insecticide. Baiting targets only Medfly adults and conserves beneficial insects.

The organophosphate maldison and a biologically-derived insecticide spinosad are currently registered for use (see Table 1). Spinosad is only available in a pre-made formulation with insecticide and protein added. It requires dilution with water.

The bait is applied to the foliage as a coarse spot spray of 60 to 100mL for each tree, depending on size. Entire tree coverage is not necessary. The bait can be applied with a garden pressure sprayer, hand-held spray bottle, or flung onto foliage and tree trunk from a bucket with a paint brush. Make sure that the droplets are large – at least 2mm across. You can also 'paint' on the tree trunk at the begining of warm weather to attract emerging adult fruit flies from the ground. **Baits needs to be re-applied at weekly intervals or if there is more than 5mm of rain.**

Baiting may not provide control of Medfly in properties with highly susceptible hosts, or in high pressure areas such as in suburbs with many established fruit trees.

Effectiveness is increased if applied over a wide area such as in a community baiting scheme – **so encourage your neighbours to bait their trees also.**

Table 1 Chemicals registered for baiting Medfly adults in home gardens

Product name(s)	Application rate
Spinosad	
Eco-naturalure® Fruit Fly Bait Concentrate	Mix 10mL in 15mL of water: treats 1 square metre of foliage
Nature's Way® Fruit Fly Control	Mix 40mL with 260mL of water in a spray bottle: treats six trees
Amgrow Organix Fruit Fly Control	Mix 10mL in 60mL of water: treats 1 square metre of foliage
Maldison (do not pick up fruit for 4 days after spraying)	
David Gray's Malathion Garden Spray, David Gray's Fruit Garden Spray, Amgrow Chemspray Malathion Insecticide	Mix 25mL in 4L water + 25mL protein such as: • Bugs for Bugs Fruit Fly Lure, or • 2 teaspoons of Marmite or Vegemite, or • 200g sugar.

Trapping

Traps are devices that use some form of protein to attract fruit flies. Depending on the trap, the flies drown or obtain a lethal dose of insecticide. Traps are hung from fruit trees, approximately 1.5m from the ground and inside the tree canopy, generally in a shady area to reduce evaporation. It is recommended to place traps in non-fruiting plants around your property boundary to attract fruit flies comming from neighbouring properties.

Commercial traps - Ceratrap® is the only 'attract and kill' device currently registered in Australia. It consists of a plastic base and yellow lid. The base contains a protein laced liquid that attracts Medfly. The flies enter through small holes in the lid and drown in the liquid. Refills are available from major warehouses.

Homemade traps - Traps can be made out of empty soft drink bottles, water bottles, milk or juice containers, or peanut butter and honey plastic containers. Remove the label first to have a clear surface. Drill, punch or burn at least four holes on opposite sides, in the top third of the container. The size of the holes should be 6-8mm. Stick yellow electrical tape around the base of the trap to increase attractiveness.The trap can be hung from its neck by wire or string to a branch. Fill one-third of the trap with your selected recipe. Hang at least two home-made traps per tree.

Table 2 Some homemade recipes

Solution 1 • 2 tsp honey • 2 tbsp ammonia • 2 tbsp imitation vanilla essence • 1L water	**Solution 4** • Peel from 6 mandarins (or 2 oranges) • 50mL household ammonia • 1L water
Solution 2 • 1 tsp borax • 1 tsp sugar • 2 tsp bran • 1L water	**Solution 5** • 5mL imitation vanilla essence • 20mL household ammonia • 1L water
Solution 3 • 80g white sugar • 1.5g dry brewer's yeast • 920mL water	Note: Search the web for other recipes or make your own with wheatgerm, honey, sugar, vegemite, beer or fruit juices

A trap can be made with everyday household products

Remember, for long lasting results keep good property hygiene and get your neighbours involved

Physical exclusion

Whole trees or fruits can be protected with mosquito netting, shade-cloth or nylon flyscreen. Large nets will need to be supported by a frame. Frames for nets to enclose whole trees can be made from PVC irrigation pipe (5cm in diameter), which does not lose its shape in the sun. The frame is constructed by crossing over and tying together two lengths of pipe over the tree. Frames can be secured in the ground by slipping the end of poly-pipe over posts such as star pickets embedded in the ground. Covers should only be left in place while fruit is ripening to avoid damage to the tree.

Protect your fruit from being stung wth nets and bags

Individual fruits or branches can be protected with bags or sleeves made out of cloth such as gauze curtain material, muslin fly or mosquito netting. Tie off bags around the base of the fruit or branch with a twist tie or string. Commercial fruit fly exclusion bags are also available in either waxed paper or cloth.

Netting material should not touch the fruit.

Pruning and trimming

Large and unmanaged fruit trees provide the best opportunity for Medfly re-infestations.

Trimming the tree canopy will make it easier for you to collect fruit and to protect the tree with exclusion netting or bags.

Consider removing a fruit tree that is unmanageable.

Reporter

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