

## Managing Queensland fruit fly in citrus

### Sandra Hardy

Industry Leader, Citrus,  
NSW DPI, Gosford Horticultural Institute

### Gus Campbell

Research Horticulturist, NSW DPI, Bathurst

### Andrew Jessup

Research Horticulturist  
NSW DPI, Gosford Horticultural Institute

### Introduction

Queensland fruit fly (*Bactrocera (Dacus) tryroni*) is a very serious pest of most fruit in Queensland and coastal and northern inland NSW. Queensland fruit fly (QFF) prefers humid conditions but can also survive in the drier urban and irrigated areas in the south and south-western regions of NSW. It is most prevalent from October to May.

Most citrus varieties can be attacked by QFF but some varieties are more attractive than others, especially Meyer lemon and grapefruit. Citrus is not the most favourable host for QFF because of its thick skin and rind oil content, which can kill eggs and larvae.



Figure 1



Citrus fruit are normally stung when they are silver green, just changing colour or later. Fruit damage can be high in situations when there are no other suitable hosts and there are high numbers of flies or if fruit are already damaged (splitting, hail damage) or have thin skins.

In addition to the direct damage QFF can cause to fruit, an infestation can have serious implications for movement of fruit beyond and within states, especially for export. Southern NSW is on the edge of the Queensland fruit fly's natural range.

A trade zone called the Fruit Fly Exclusion Zone (FFEZ) has been established to maximise access to export markets by maintaining freedom from fruit flies within that zone. The main horticultural production areas in this zone include Griffith, Narrandera, Leeton, Hillston and Broken Hill in NSW; Shepparton, Swan Hill and Mildura in Victoria and Waikerie and Renmark in SA (Refer to Figure 1).

### Description and lifecycle

The adult QFF body is 8 mm long, and reddish brown with yellow markings. In early spring, over-wintering adult flies become active and the females lay eggs in suitably mature fruit. Larvae develop in these fruit and from then onwards the fruit fly population builds

up as successions of suitable fruit become available for infestation. By late summer–autumn the flies can be very numerous and readily infest any suitable unprotected fruit until the onset of cold weather in late autumn. QFF overwinters mostly as adults which shelter in protected locations and are difficult to trap. QFF can also enter a region via transport of infected fruit from endemic areas.



Damage from fruit fly larvae feeding inside fruit

The female lays several hundred eggs during her lifetime. She lays about six eggs at a time about 3 mm deep in the fruit. In 2 or 3 days tiny larvae (maggots) hatch from the eggs and burrow through the fruit. They develop through three larval stages and are about 9 mm long and yellowish when fully grown. When fully fed the larva pupates, usually in the soil beneath the tree.



QFF stings on citrus fruit

The larval and pupal stages each take from 9 days to several weeks, depending on temperature. At least a week elapses before the newly emerged adult female lays eggs. The adults can live for many weeks and the females continue to lay eggs. There may be five or more overlapping generations during spring, summer and autumn.

### Fruit fly 'stings'

The egg-site punctures in the fruit are commonly referred to as stings. To identify them, make a shallow

cut through the skin and look with a hand lens for the egg cavity containing eggs or the remains of hatched eggs. In citrus the sting mark may be a brown depressed spot, or have only a vague, bruised appearance; on green citrus fruit the skin can colour prematurely around the sting site.

### Damage to fruit

Infested fruit usually falls from the tree as a result of the activity of the larvae in it. Damage by fruit fly larvae tunnelling in fruit varies with the type and maturity of the fruit, the number of larvae in it, and the weather. Frequently citrus fruits, although stung, do not develop larvae, but the stung fruit sometimes fall. Larvae can successfully develop in mandarins, cumquats, grapefruit, Meyer lemons, tangelos, tangors and the fruit of the rootstock *P. trifoliata*.

### Control of Queensland fruit fly

In districts where QFF occurs, harvest fruit as early as possible. Fruit fly populations increase as the season advances and temperatures become warmer. As the fruit ripens it becomes more attractive to the egg-laying females.

Do not send damaged or fallen fruit to the packing shed and dispose of reject fruit properly.

### Traps

Traps are used to monitor male fruit fly populations in orchards. The lures in the traps attract only the male fruit fly, which are then killed. The traps, commonly called Dak-pots, contain a mixture of the male attractant or parapheremone and an insecticide. The traps are normally hung in trees. The traps are effective and convenient for detection of fruit fly but they do not control it. They are an important tool for monitoring the efficacy of bait and spray programs. There are a number of other fruit flies that are often captured in these traps such as Island fly and Callantra. These are not pest fruit flies. Traps can be purchased from your local agricultural supplier.

N.B. Traps should not be used in the Fruit Fly Exclusion Zone (FFEZ).

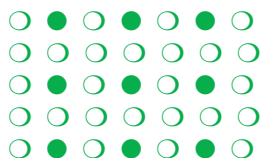
### Baits

Bait mixture is prepared using an attractant (protein source) and an insecticide. Flies are attracted to the protein which they require for egg maturation. As they feed they are killed by the insecticide. Bait spray components include the insecticides maldison or chlorpyrifos and yeast autolysate or hydrolysate as the attractant. Bait mixtures should be applied according to label directions which is normally to the lower foliage and skirts of trees. Bait contacting fruit can cause fruit burn.

For information on registered chemicals, rates, type of protein and conditions, refer to Infopest, the APVMA website, your local chemical reseller or agricultural advisor.

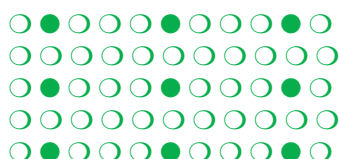
### Application of baits

It is recommended that about 50–100 mL (use the lower rate on smaller trees) of the bait be applied to the foliage of every second tree in every second row:



● = baited trees.

For double plantings, bait every fourth tree in every second row:



Baiting should commence at least 6 weeks prior to ripening. Apply weekly or after heavy rain as a splash bait when fruit fly are active. Baiting is more effective when carried out in the morning when the fruit flies are most active. Alternate the bait spraying between the rows, within the row and the side of the tree it is applied to.



Trap used to monitor male fruit flies

### Cover Sprays

Registrations exist for the chemicals dimethoate and fenthion used as cover sprays for QFF control in citrus. In most areas cover sprays are not normally cost effective or necessary in treating large commercial plantings of citrus trees. However, in areas of high fruit fly pressure cover sprays are sometimes used. Cover sprays should be applied according to label directions.

### N.B.

- Dimethoate may damage some varieties of citrus e.g. Meyer lemons, seville oranges and cumquats.
- Do not use baits or cover sprays within the FFEZ unless directed by state authorities.

### Orchard hygiene

Orchard hygiene is an important part of QFF management. Make sure you:

- remove unwanted fruit trees from around sheds, houses and along boundary fences;
- keep all house trees free of QFF;
- remove all late hanging fruit missed during harvest;
- dispose of fallen fruit properly;
- don't send damaged or fallen fruit to the packing shed;
- maintain good orchard hygiene.

### References

Dominiak B 2000, *Control of Queensland fruit fly in NSW*, NSW DPI Agnote.

*Queensland fruit fly*, NSW DPI web publication at [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

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ISSN 1832-6668

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### Always read the label

Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product, and strictly comply with the directions on the label and the conditions of any Permit. Users are not absolved from compliance with the directions on the label or the conditions of the Permit by reason of any statement made or not made in this publication.

Job number 8559