Queensland fruit fly

Fact sheet

Bactrocera tryoni

Alison Fattore and Andrew Creek, NSW DPI, 2023

Table 1. Risk and monitoring period for Queensland fruit fly activity.

		Flowering		Fruit drop		Golf ball				Colour break		Maturation
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	

Description

Eggs: are banana-shaped, white, 1 mm long and hatch within 2–3 days.

Larvae: are cream maggots, starting at 1 mm long and growing up to 10 mm, tapering at one end. Mature larvae 'flick' themselves into the air to help them find a suitable pupation site. Larvae carry bacteria, causing fruit breakdown.

Pupae: are hard-skinned, brown, barrel-shaped and about 4–5 mm long.

Adults: are flies 6–8 mm long, reddish-brown with yellow markings (Figure 1). They are strong fliers and can spread many kilometres, especially after the fruit is harvested.

Figure 1. Adult Queensland fruit fly.

Life cycle

A Queensland fruit fly (QFF) life cycle takes about 4 weeks in favourable conditions (warm temperatures and high rainfall and humidity), but longer in cool, dry weather (Figure 2). The adult population reduces in winter, with some inactive adults surviving by sheltering (over-wintering) in protected areas. Adult female flies lay eggs in batches of up to 12 by stinging ripening fruit. Eggs hatch in 2–3 days and larvae begin feeding on the fruit. The larvae (maggots) are fully grown in about 10 days and emerge by 'flicking' from the fruit to pupate in the soil. Pupation lasts about 10–20 days with the adult fly emerging to feed on water, protein and sugars. Female flies mate once, while male flies can mate many times. If a female has fed on protein, she begins laying eggs 7–20 days after emerging from the soil. Adult flies can live from weeks in the summer, up to months over winter.

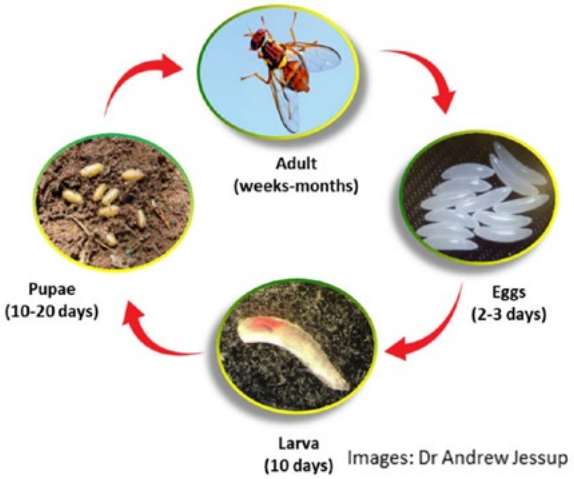

Figure 2. Queensland fruit fly life cycle.

Damage

Fruit from the early stages of maturation (colouring) up to harvest are at risk. Most citrus are QFF hosts. Valencia are at greater risk than Navel due to fruit maturation occurring in the warmer months when QFF are most active. Sting marks can be seen on the fruit skin and appear as discolouration and/or gum-like exudates. The fruit is destroyed by feeding larvae and the resulting breakdown (Figure 3), which results in secondary fungal infections such as brown rot and moulds (Figure 4). The fruit decay causes early fruit drop from the tree (Figure 5).

Risk period: September to May (Table 1).

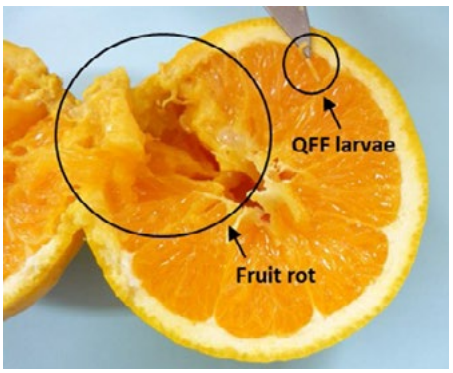

Figure 3. Damage from Queensland fruit fly larva feeding in an orange and associated fruit rot.

Monitoring

Traps: place one male lure trap (Figure 6) every 5–10 ha (3 per farm minimum) and check them regularly. Hang one trap in higher-risk areas (e.g. house garden and orchard boundary) to monitor fly numbers. Check traps weekly from November to May, then fortnightly from June to October.

IPDM for the citrus industry

This project has been funded by Hort Innovation, using the citrus research and development levy, contributions from the Australian Government and co-investment from New South Wales Department of Primary Industries, Queensland Department of Agriculture and Fisheries and the Agricultural Produce Commission. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

Once checked, empty traps and record QFF numbers. Use trap counts to indicat the effectiveness of the control program. Sudden spikes indicate a problem. Wicks should be replaced every 3 months.

Management and control

The best results are gained from area-wide fruit fly control where the whole region works together implementing cultural, biological and chemical control techniques.

Cultural: remove all mature fruit from host trees in and near the orchard (including gardens and sheds). Sweep fallen fruit from under the trees into the inter-row and apply mulch. Remove feral and neglected fruit trees. QFF exclusion netting is effective to protect host plants.

Biological: area-wide release of sterile adult male flies using sterile insect technique (SIT) will result in fewer offspring and reduce the QFF population. Parasitic wasps and assassin bugs are natural predators that help with local QFF populations, however, they are unlikely to reduce the spread of QFF.

Chemical: regular protein bait sprays are most important for the control of QFF. Bait spray efficacy lasts about 1 week. Weekly bait spraying based on label rates, treating both sides of every second inter-row, is effective. High QFF pressure during warm, wet weather can require 2 sprays per week. Bait spray is applied using a coarse stream aimed at the lower skirt of the trees. Thickening agents can be used to improve the longevity of the bait spray (follow label recommendations). The male annihilation technique (MAT) involves a male attractant lure with a rapid-kill insecticide hung at high densities in trees. MAT reduces the male population.

Figure 4. Secondary infections from Queensland fruit fly sting sites, brown rot (left) and mould (right).

Figure 5. Early fruit drop from premature fruit decay caused by Queensland fruit fly.

Figure 6. A male lure Queensland fruit fly trap.

More information

Fattore A and Creek A. 2023. *Protein bait spraying*. NSW Department of Primary Industries.

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