Keep the Yarra Valley Fruit Fly FREE

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Queensland Fruit Fly - Teachers Resource

Dear Educator,

My name is Holly Hale. I run a business called Holly's Backyard Bees and teach a range of mini-beast incursions supporting children's understanding and knowledge about the role that insects play in our environment and sustainable eco-systems. I love helping children make connections between what they eat, and how it grows and am excited that you have agreed to take part in this program teaching children and communities about the Queensland Fruit Fly (QFF) and the impact that this has on the way we grow food in the Yarra Valley. Our school based QFF learning package is designed to assist educators and schools in raising awareness about what QFF is, what we can do to prevent it, and how to respond to a detection.

We have created a series of short videos and corresponding worksheets / activities that are simple to understand, engaging with plenty of hands on learning opportunities. In this document, you will find an overview of the lesson plan, some additional teacher resources and links to relevant websites for extra info. Together with our Yarra Valley QFF Regional Coordinator Bronwyn Koll, we are here to provide you with any extra support you need along the way as you partner with us to deliver this important education to your students, so please get in touch as needed.

Many Thanks, Holly

Queensland Fruit Fly Lesson overview:

- Video 1 - Introduction to QFF (approx 6 minutes)
  Video link: https://youtu.be/V9_9q3CCYi8
  - Worksheet 1 (approx 5-10 minutes)
- Video 2 - Lets make a trap! (approx 12 minutes)
  Video link: https://youtu.be/ujElpYh9-qM
  - Queensland Fruit Fly trap making activity (approx 20 minutes)
  - Trap making instruction sheet
- Video 3 - What do we do if we find QFF? (approx 4 minutes)
  Video link: https://youtu.be/hUJxVq8rdF8
  - Life cycle activity Sheet (optional)
  - Extension worksheet (this worksheet is designed as an optional extra where students may need to apply some additional research skills)

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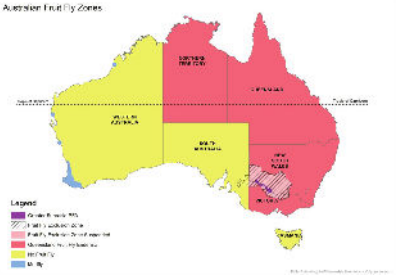
Lets look at this issue in greater detail



Queensland Fruit Fly (QFF) is a pest native to the rainforests of north east Australia. The small flies are hardly noticeable, and the pest is often only seen once the fly lays eggs in fruit and the larvae rot becomes visible inside ripening fruit, yes—take a bite and find out the inside is full of larvae! The pest can cause billions of dollars of damage to commercial fruit crops, and can potentially ruin a home gardener's entire fruit harvest if left unchecked.

The QFF population has spread from QLD & NSW to VIC and now is established in Northern Victorian fruit growing regions. Area Wide Management (AWM) programs are now in operation in these areas to assist both commercial and residential fruit growers to reduce the impact this pest causes to fruit production. The Yarra Valley also has an AWM project to protect the region from the entry and establishment of QFF. In such programs it is essential that everyone that manages land and fruit is aware of the pest, what damage it does and how they can each prevent the pest. It is also important that land managers can manage a detection so that it doesn't spread further or become established in the area. The Yarra Valley QFF management plan is based on early detection and rapid response. All fruit growers are encouraged to perform QFF surveillance with traps and fruit inspections, reporting any suspect QFF to the Regional Co-ordinator. This triggers area alerts to inform the immediate area and the wider Yarra Valley to elevate everyone's QFF plans to the next level. The Regional Co-ordinator is funded to support gardeners and commercial fruit growers with advice and some tools to help fix the issue, helping facilitate the neighbourhood to work together to arrest the pest population establishing and calling the Yarra Valley home.

Prior to 2018, the Yarra Valley was a recognised pest free production area, allowing fruit to be grown, packed and traded into important QFF free states and countries. Whilst work in this space is dedicated to re-establishing fruit trade with a more robust set of trade rules, the low pest population and a decently cold Yarra Valley winter places the Yarra Valley in a unique position of being able to focus on preventing the establishment of a fruit pest. The Yarra Valley also faces a QFF threat from established QFF populations in the Melbourne suburbs.

The school based QFF learning package is designed to assist teachers and schools to support the community they are a part of, by teaching students and the school community about QFF (what it is, what to do to prevent it, or respond to a detection). Most Yarra Valley schools have students, staff and families that are connected with either commercial horticulture in the region or with home garden production, with many schools even having their own kitchen garden that is worth protecting.

Financial and productivity reasons aside, the most important reason for preventing and managing QFF in any production system is protecting the beneficial insects and pollinators that thrive in a balanced fruit production environment. The opportunity that exists in the Yarra Valley is the ability to prevent the potential cost of QFF establishing in the region. The complications that established QFF populations could cause fruit growers with netting and structures designed to keep insects out (even the good bugs), targeted pesticide use (useful, but costly and time consuming), and the least desirable option of using broad spectrum application of chemical (a common practice in areas with QFF that is damaging to all the good insects).

Agribusiness Yarra Valley with funds from Agriculture Victoria, invite you, your classroom, and your greater school family to understand QFF, it's lifecycle, and how each individual can use this knowledge to target the pest with appropriate surveillance, reporting and management. The Yarra Valley does not need to accept this pest as a part of the day to day production processes. Students can learn about elements of the Area Wide Management of a pest in a community or region (using a variety of communication skills), how to make a fruit fly trap (utilising procedural writing and practical skills), and learn how to manage an insect pest by developing extensive understanding of the QFF lifecycle (using biology skills, or cover the mini beasts element of the junior Victorian schools program).

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Understanding the Queensland Fruit Fly Life cycle, prevention and management

Eggs

Image: Jaye Newman

Image: Agriculture Victoria

Female fruit flies lay eggs in ripening fruit using their ovipositor (a tube that can pierce fruit skin and push eggs safely inside). She can produce up to 800 new QFF in her lifetime of about 3 months on average. That's a lot of daughters to also lay eggs in a season!

Fruit fly eggs are difficult to see with a naked eye. They are creamy white, and only a few mm long. Once eggs are safely inside, they take 2-3 days to hatch into larvae. Birds and possums eating fruit is the only real threat.

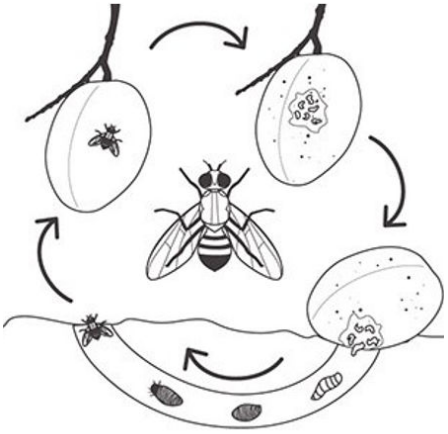

Image: preventfruitfly.com.au

Prevention and management

Female fruit flies lay eggs. This requires lots of protein. **Protein bait** (food based attractant with an insecticide) can be applied weekly as droplets onto leaves. **Protein traps** (food based attractant inside a plastic container hung in a tree) can also be used to monitor for QFF females. These traps have a kill agent (chemical, sticky or liquid to drown them). Some male QFF get caught too.

Fruit fly eggs in fruit can be prevented by covering the host plant in a fine netting that a QFF can not penetrate. Some hard, green, unripe fruit are ignored by female QFF as the skin is too hard to penetrate. Not all fruit can be protected— especially if it is too high to net.

Larvae

Image: Agriculture Victoria

Image: Agriculture Victoria

Fruit fly larvae take 5-10 days to mature, going through three instars (stages of growth). They suck up rotten fruit jelly to help them grow. Once mature, they chew their way out of the ripe fruit. They do not like being in rotten fruit too long.

Prevention and management

Fruit fly can't spread if the fruit is harvested and contained. Fruit should be protected and then harvested before it falls to the ground (to prevent any larvae escaping and surviving until the next stage). Fruit should be harvested and picked up to avoid attracting QFF to the area

Fruit fly infested fruit can be treated using heat (boiling or microwaving or solarisation in a double sealed plastic bag), or by freezing until solid. All treated waste should be sealed in a container or bag and put in the rubbish bin.

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Pupae

Image: gmv-qldfruitfly.com.au

Mature fruit fly larvae can move the ground by putting head to tail and jumping with a flick or a skip. They hide in compost and soil. They grow a hard case around themselves and over 10- 15 days, their bodies change into a fly.

Prevention and management

Image: Agriculture Victoria

Fruit fly pupae can be damaged by toiling the soil or eaten by chickens. This is only a support tool, as some pupae will survive these processes, allowing the population to survive.

Adult

Image: Agriculture Victoria

Fruit flies emerge from under the ground and need to eat food (proteins found in moulds and fungi) for about 10 days to become mature enough to breed. Fruit flies sense when the conditions are humid and warm. They crawl upwards to the surface and dry their wings, ready to feed.

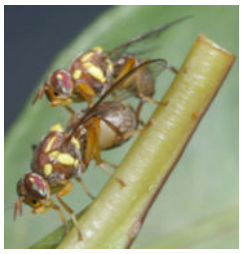

Image: Ajay Narendra

Fruit flies meet in tree tops to breed on sunset. Evenings that are 15 deg C or warmer are ideal for breeding to take place. The males release a scent to attract the females to them.

Prevention and management

Fruit flies can be trapped (using different types of traps) or managed with area wide controls, however not all flies comply. A multi pronged approach is needed to catch the flies at all the different stages of the lifecycle. Mating disruption and surveillance - we use "lures" (parcels of scent) to attract male QFF to the scent he wants more of. It's called Cuelure. It is placed in a trap at several sites with a kill agent (chemical, sticky or liquid to drown them). Cuelure is used in QFF traps for standard industry surveillance. Weekly monitoring (inspection and counting) of the number of QFF in each trap, assists fruit growers by indicating what the QFF population trends are. They can then make decisions on how to manage the QFF. Hopefully, they don't have to do anything if we are fruit fly free!

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Further Information and Eductaion

Yara Valley Regional Coordinator

Report suspect QFF to the YV Regional Coordinator

Bronwyn Koll: 0490 381 999
qff@agribusiness-yarravalley.com
fruitflyfreeyv.com.au

WEB Resources:

Agribusiness Yarra Valley
www.fruitflyfreeyv.com.au (links to all QFF resources are on this website's "useful links" page)

Agriculture Victoria
https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/ queensland-fruit-fly

FUSE education
http://bels.boxhill.edu.au/ff/

Prevent Fruit Fly
https://preventfruitfly.com.au/

Port Phillip & Westernport Catchment Management Authority
https://www.ppwcma.vic.gov.au/resources/farms2schools- resources/

Managing Queensland Fruit Fly in your home garden PDF (brochure for students and families)
https://agriculture.vic.gov.au/__data/assets/pdf_file/0005/532139/Managing-Queensland-fruit-fly-in-your-home-garden.pdf

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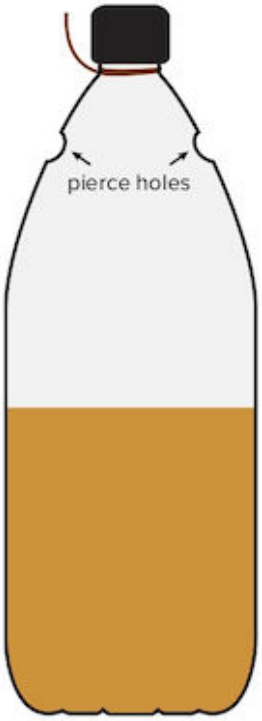
Video 2 - Trap making guide

Fruit flies could enter the Yarra Valley in many areas and in many ways. It is good to have lots of traps. Make one for yourself, a neighbour, and a relative or friend.
Fruit flies like to hang out in the leaves of trees. Hang traps in trees, 1.5m high in amongst the leaves, on the warm side of a tree, but keep the trap out of direct sunlight to avoid a greenhouse effect preventing fly entry.
Report any suspicious QFF with a photo to qff@agribusiness-yarravalley.com

STEPS FOR MAKING YOUR TRAP



Ingredients for 3 traps

1 tablespoon of Vegemite™

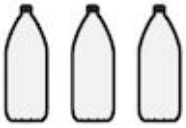
1 litre of water

1/4 cup of sugar

5 drops of unscented or lemon scented dishwashing liquid

Chopped fruit peels

Materials you need


3 x 1.25 litre plastic bottles

Scissors

String

Mixing bowl

1. Combine all ingredients in a mixing bowl
   (Note: warm water helps melt the ingredients together)
2. Divide mixture evenly between the 3 x 1.25L bottles
3. Top up with cold water until the bottle is half full
4. Add chopped fruit peels. You can use a banana peel or other fruit peels are fine too
5. Pierce two or three holes in the neck of each plastic bottle as shown in the diagram
   (Note: ask an adult for assistance with cutting the holes)
6. Replace the lid
7. Attach string under lip of lid to prevent string slipping off
8. Hang securely in vulnerable trees and garden beds
9. Check the trap and replace the liquid regularly

Note: The easiest way to check the trap is to tip the trap contents into a bowl through a large sieve. Tip the sieve contents (insects) onto white paper towel for identification. Return the liquid back to the bottle and top up contents.

https://www.ppwcma.vic.gov.au/resources/farms2schools-resources/