

# Queensland fruit fly

*Information for garden advisors*

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Nillumbik Shire Council



JANREN  
CONSULTING



Nillumbik  
The Green Wedge Shire

## CONTENTS:

- What fruit and veg do they attack?
- What does Qld fruit fly look like?
- When do they attack?
- What does fruit fly damage look like?
- Control of pest fruit flies in the home garden

## DEFINITIONS:

- **BAIT** – Fly is attracted to feed on a patch of foliage, trunk or surface where a mix of protein and pesticide has been applied and dies by ingestion of pesticide
- **COVER SPRAY** – Foliage is covered with a pesticide so that the fly, when seeking feed or egg-laying site, contacts the chemical and dies
- **TRAP** – Fly is attracted into a container by a lure and stopped from exiting by a pesticide (contact or fumigant), or on a sticky surface or in water
- **MAT** (Male annihilation technique) – Males are attracted to an absorbent pad soaked in male-specific lure and pesticide and dies by contact with or ingestion of pesticide
- **BAIT STATION** – Females and males are attracted to an absorbent pad soaked in protein and pesticide and dies by ingestion of pesticide
- **LURE** – A natural or synthetic substance that attracts males or females (or both) but does not kill them



**Sourced from Agriculture Victoria, 2016 and the internet (some images, 2020).  
NOTE: This list is not exhaustive as it doesn't include all native and tropical hosts.**

# QUESTIONABLE HOST STATUS..

✓ QFF HOST  
✗ NOT A QFF HOST

? HOST IN LAB BUT NOT IN FIELD  
?? HOST IN SOME OFFICIAL PEST  
LISTS BUT NOT IN OTHERS

- CHOKO ✗
- COFFEE BERRY ✗
- CUCUMBER ??
- MELONS, PUMPKINS ??
- ZUCCHINI ??
- PRICKLY PEAR ✓
- LILLI PILLI
- ASIAN (CALLERY) PEAR  
✗, ??

- ROSE HIPS ✓
- FLOWERING PRUNUS ✓
- GINGKO ✗
- KAFFIR PLUM ✗
- PINEAPPLE ✗
- MONSTERA ✗
- OLIVE ✓
- BOX THORN ??

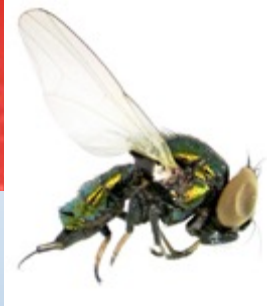
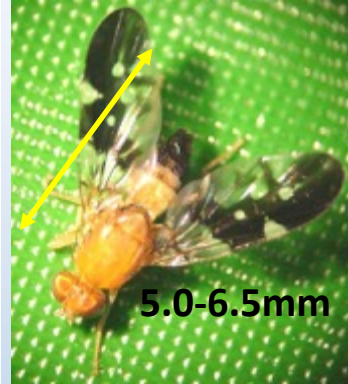
- DWARF QUINCE ✓
- CRABAPPLE ?
- MURRAYA ✗
- CLIVEA ✓
- OSAGE ORANGE ✓
- FINGER LIME ??
- KANGAROO APPLE ✓

# Qff resistant *(but not Qff proof!)*

- Crops that are harvested before Christmas
  - Loquats
  - Apricots
  - Cherries
- Small, shiny fruit
  - Cherry tomatoes
  - Roma tomatoes

- Limes
- Finger limes
- Lemons (not Lemonades or Meyer lemons)
- Winter fruit
  - Mandarins
  - Navel oranges
- Eggplant
- Cucurbits (e.g. pumpkin, zucchini, cucumber)

# Flies found in Qff traps



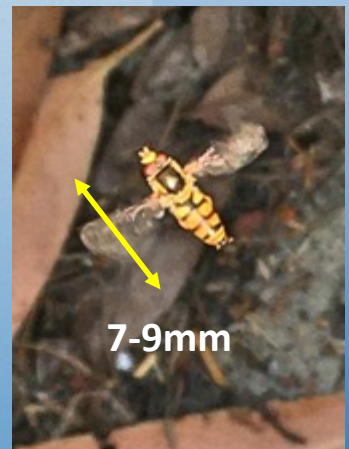
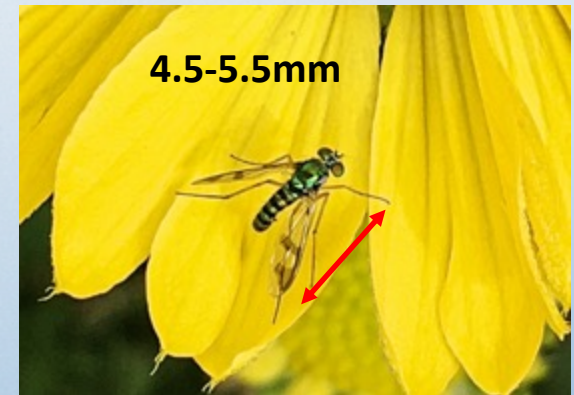
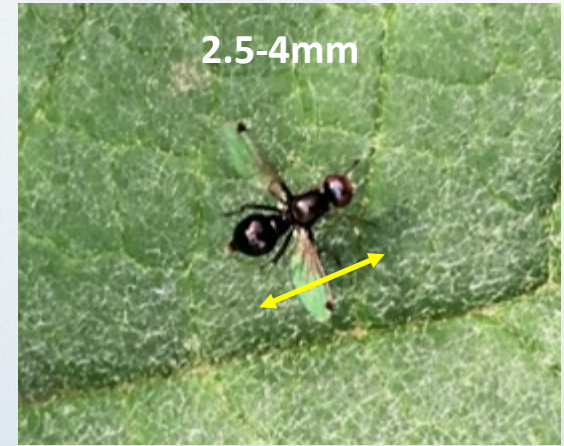
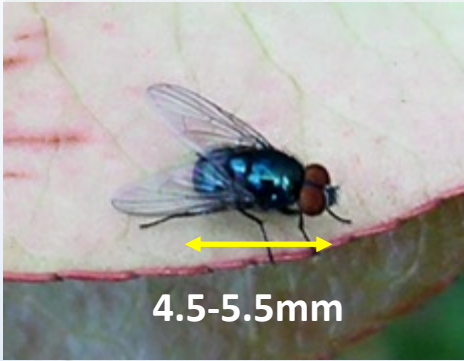
**Left:** Large fly is a Qld fruit fly (male) and the 3 small flies, and inset, are vinegar flies (*Drosophila* spp) (often known as “Fruit Flies”, they feed on overripe fruit).

**Middle:** Top 2 flies are *Dacus* spp native to Australia but are non-pests. The lower 3 flies are all Qld fruit fly (male) showing a range of sizes.

**Above:** Island fly and Boatman fly - native to Australia but are non-pests.

**Right:** Metallic-green tomato fly - native to Australia and can be a pest in tomato fruit.

# Garden flies



**Centre:** Female Queensland fruit fly [*Bactrocera tryoni*] - Photo courtesy of the International Atomic Energy Agency, Vienna, Austria

**Top left:** Muscid fly (non-pest, they feed on decaying organic material)

**Middle left:** *Homoneura* fly (non-pest, they feed on leaf litter)

**Bottom left:** *Anthomyia* fly (a non-pest, feeds on animal dung)

**Top right:** Sepsid fly (non-pest, feeds on decaying organic material)

**Middle right:** Long-legged fly (a beneficial insect, preying on mites, thrips, aphids, etc)

**Bottom right:** Hover fly (a beneficial insect, its larvae prey on mites, thrips, aphids, etc, and the adult is a pollinator)

Any questions?





# Potential for population explosion – Example 1



**After just 1 mating, a single female laid eggs for 66 days**



**Laid 2,015 eggs - producing 970 pupae**



**Reared 824 fertile adult flies (402 fem)**



## Potential for population explosion – Example 2



**9 untended feijoa trees (9,920 fruit) produced  
120,645 flies**

# LIFE CYCLE Part 1



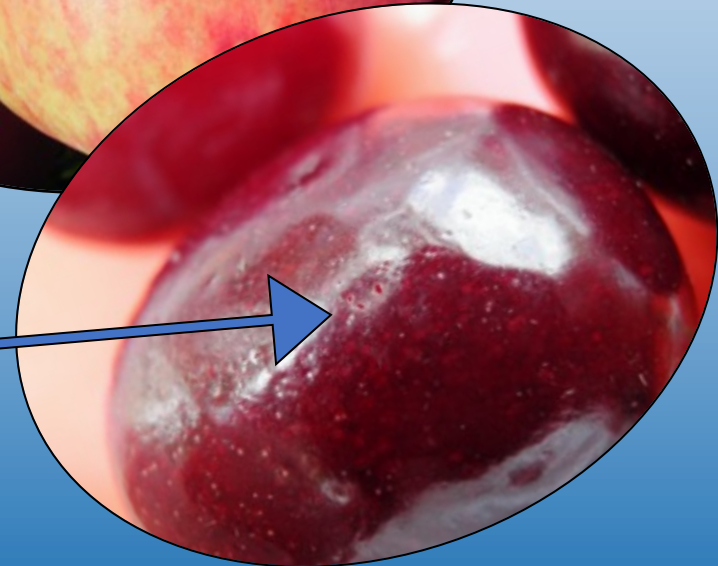
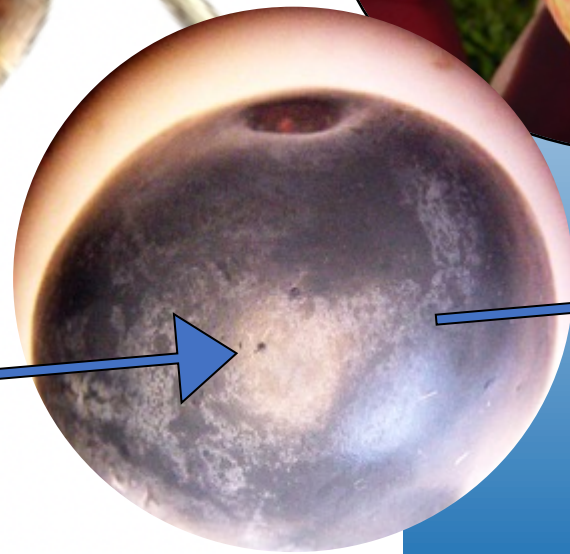
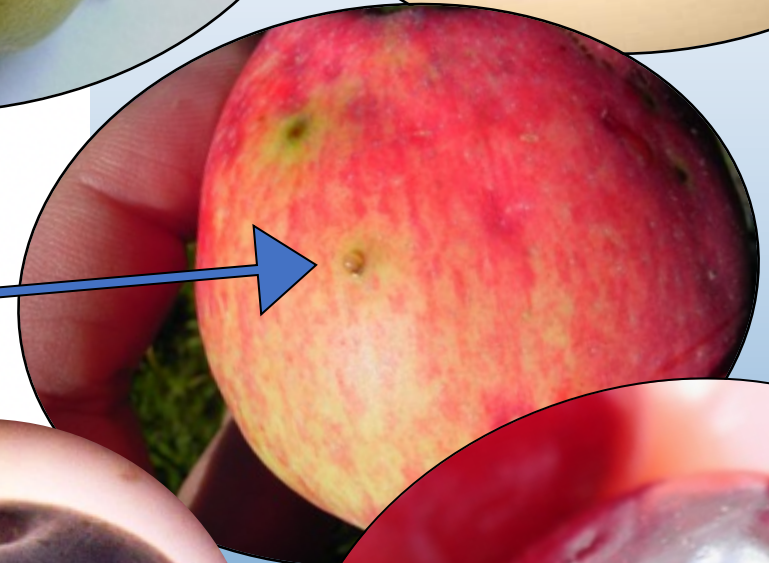
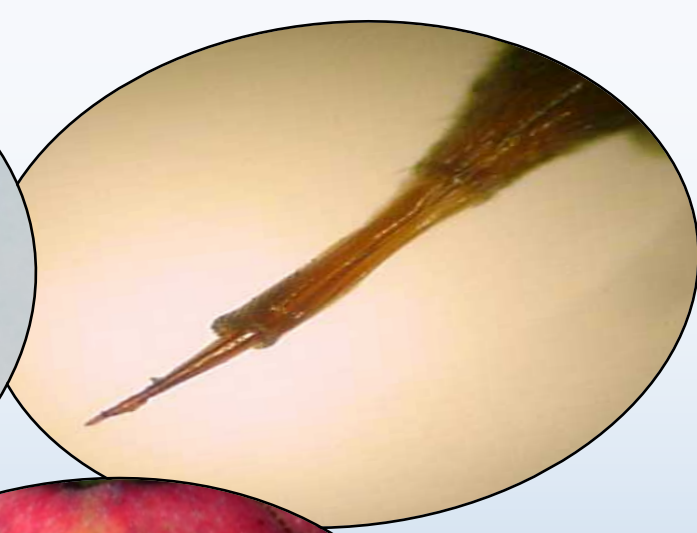
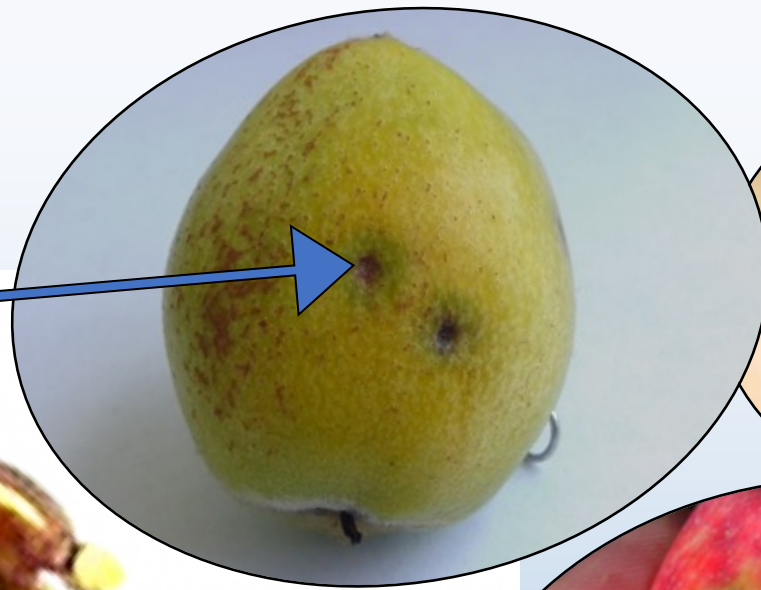
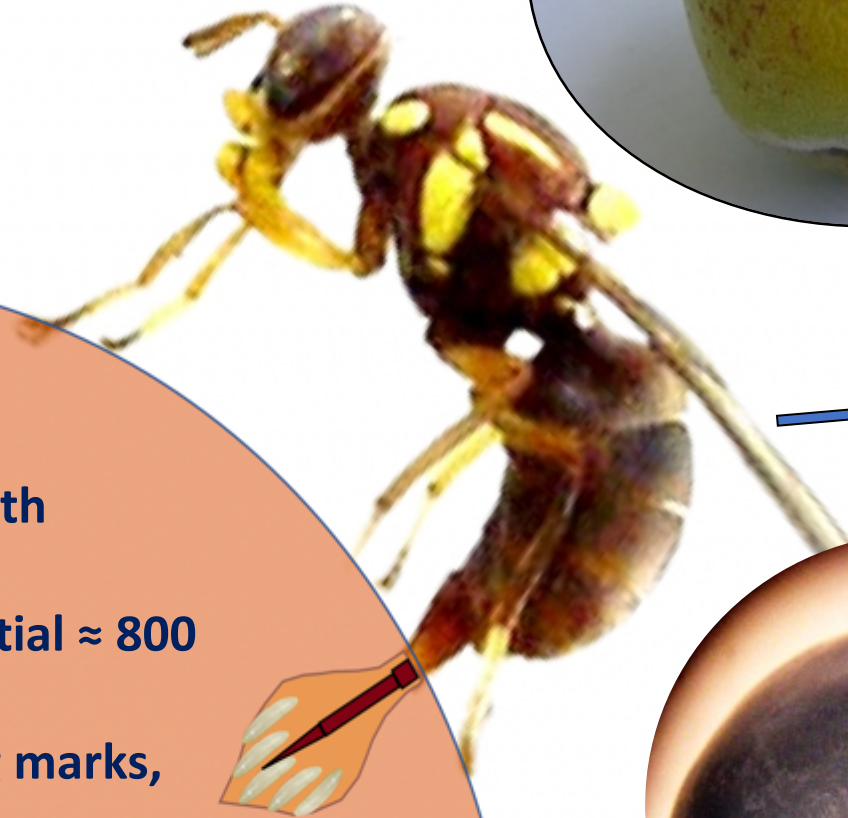
6 to 20 days



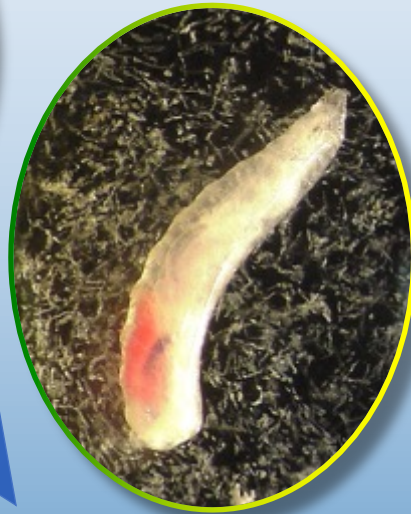
**VIDEO COURTESY OF BRON KOLL, REGIONAL FRUIT FLY  
COORDINATOR, YARRA VALLEY**

# STING MARKS

- Life span  $\approx$  6wk to 4mth
- Egg potential  $\approx$  2000
- Adult offspring potential  $\approx$  800
- Bacteria with eggs
- Some fruit show sting marks, others don't
- Eggs laid at above  $12^{\circ}\text{C}$
- Eggs laid 1 to 2 days after mating



# LIFE CYCLE Part 2



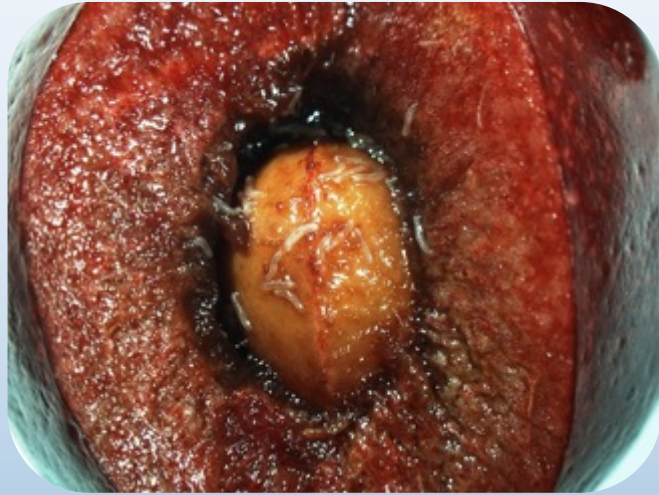
6 to 40 days

10 to 20 days

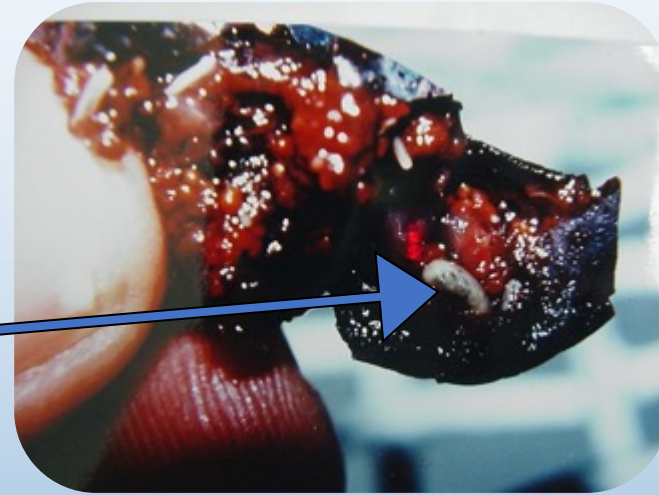
<1 TO 2 days



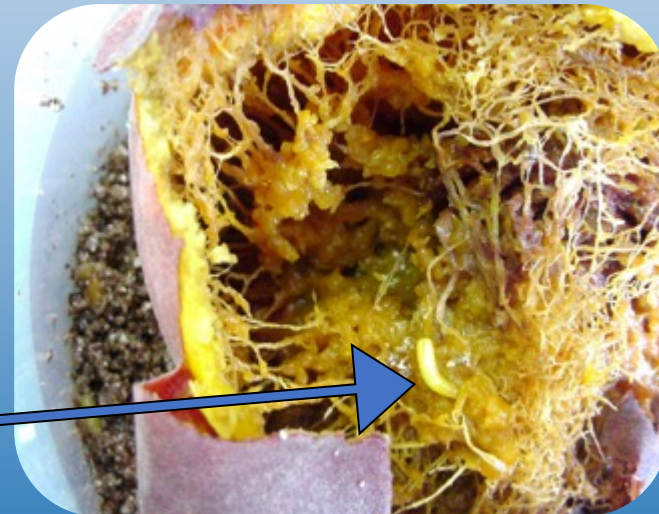
# INTERNAL DAMAGE



**First and second instar larvae in a cherry (l) and blueberry (r)**



**Fruit fly damage in an orange (l) and peach (r)**



# LARVAL EXIT WOUNDS



**Fruit fly damage (external) in an orange (L.) & peach (R.)**



Any questions?

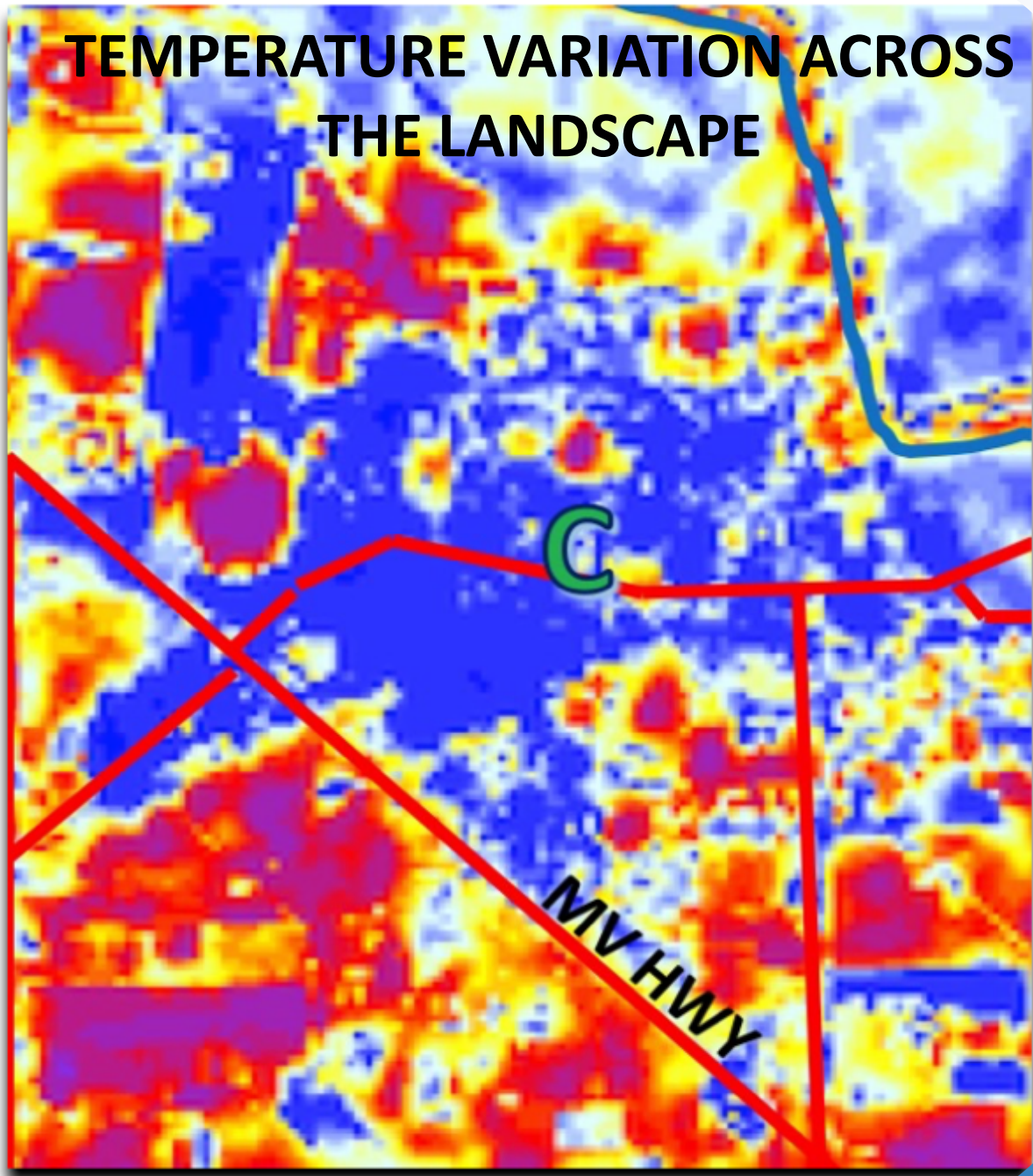
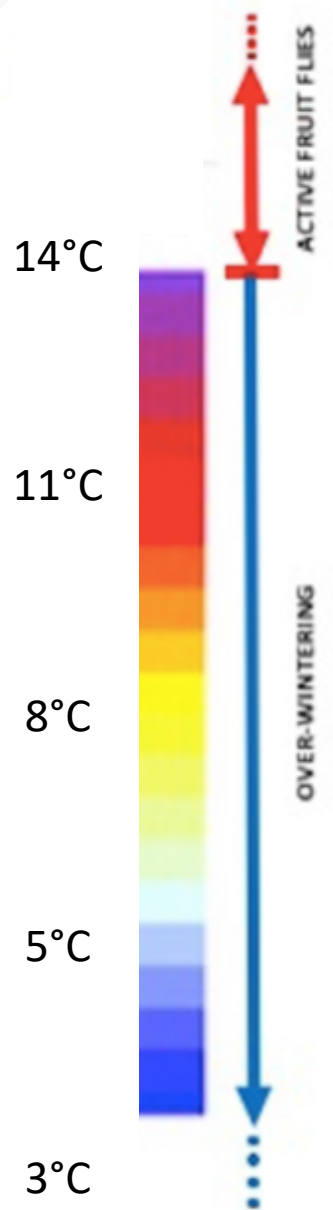


# Where do Qff go in the winter???

Winter temperatures vary over the landscape and Qff move to the warmest spots as winter approaches, go into slow-motion mode and, if they manage to find a warm spot, will survive for several months until spring – and then it all starts again.

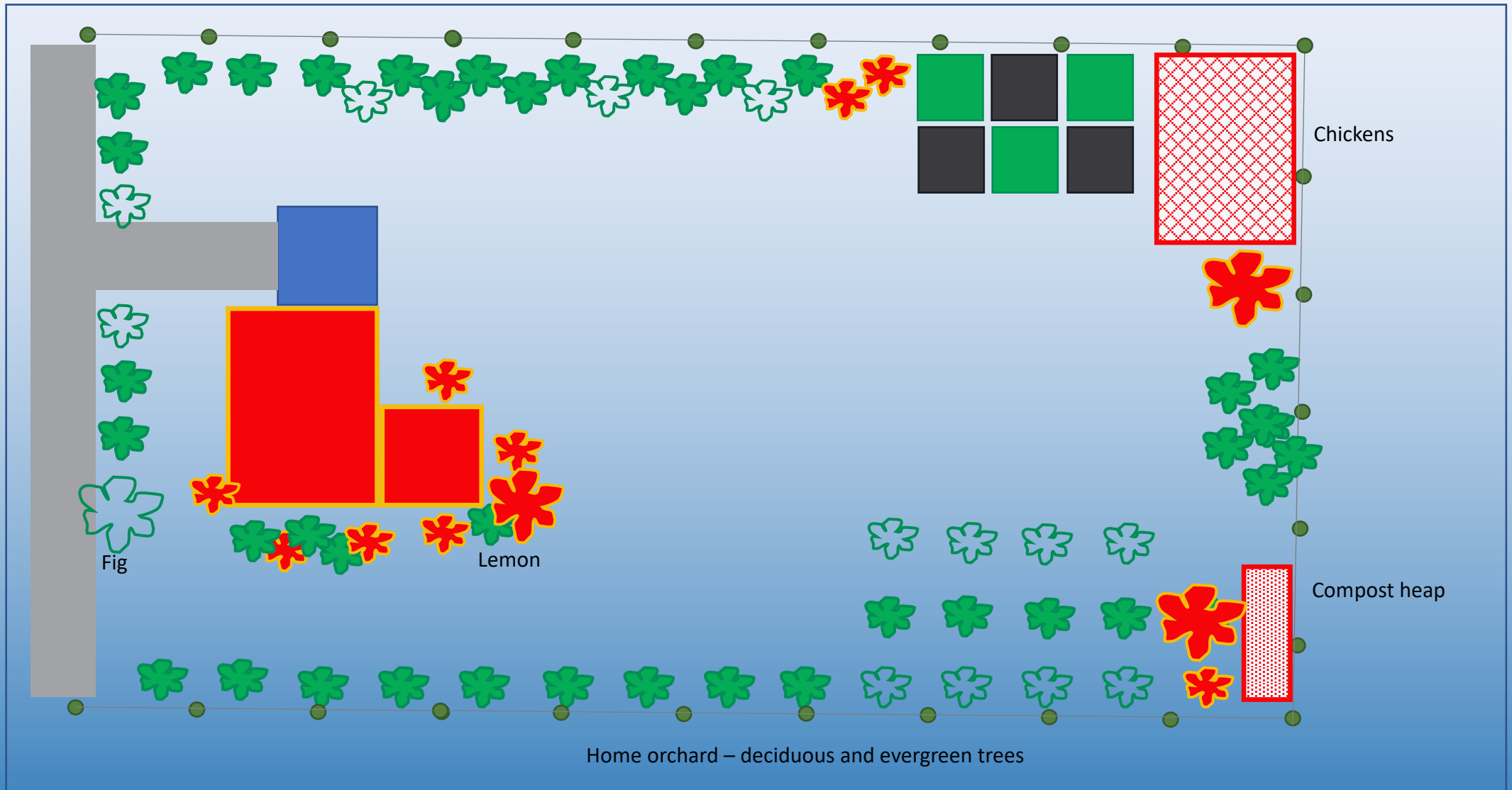
*Qff has become adapted to Victorian weather conditions – all year round.*

# TEMPERATURE VARIATION ACROSS THE LANDSCAPE

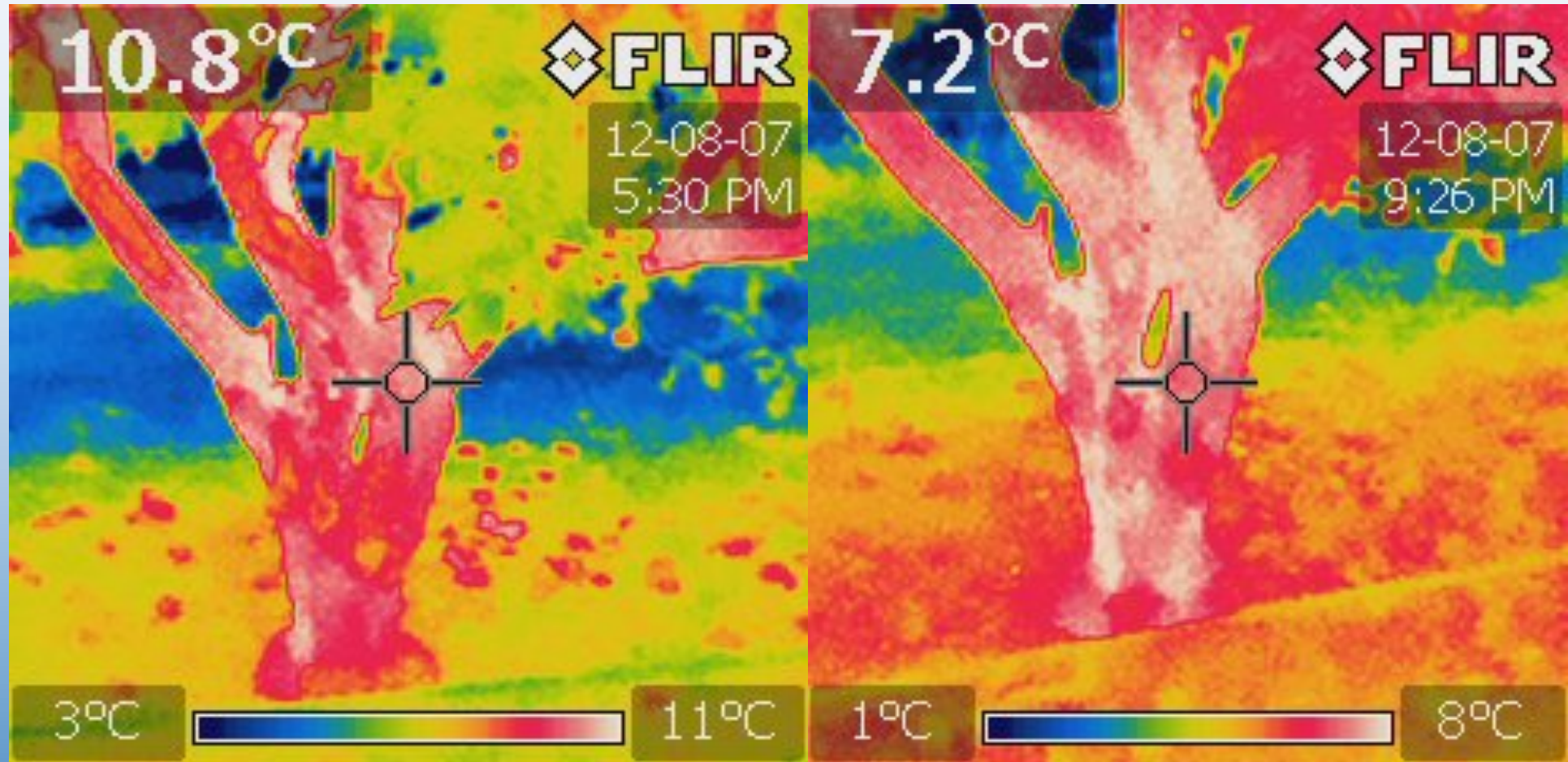


Area over Cobram, VIC – about 10:30am 27 May 2017

# Winter warm spots in a typical BACK YARD garden



# TEMPERATURE VARIATION WITHIN THE BACK YARD



Back yard lemon tree, Somersby, NSW – about 5:30pm and 9:30pm 12 August 2007

# TRAPS & BAITES

TRAPS – Are best used in the home garden all year round to tell you when pest fruit flies have entered and how big the problem is.

BAITES – Are most effective when all neighbours apply them – this is called "area-wide management".

# MALE TRAPS, MAT



1



2



3



7



8



4



5



6



10



9

1. Queensland modified Steiner trap
2. Bugs-for-bugs trap
3. Biotrap
4. NZ Lynfield trap with slow release CL and fumigant toxicant
5. NSW Lynfield traps (fore: Standard trap; rear: trap with Bugs for Bugs lure)
6. Probodelt Yellow Cone trap
7. Lure for Bugs-for-Bugs used in traps or as a stand alone lure
8. Amulet CL lure with fipronil
9. Dak-Pot
10. Searles Fruit Fly TRap



1



2



3



4

- 1. Wild May cue lure liquid trap
- 2. Rebel trap
- 3. On-Guard fruit fly trap
- 4. Jackson (delta) trap
- 5. Biotrap with sticky insert
- 6. RapidAim remote sensing trap



6


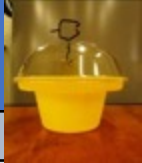







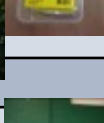









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# MALE TRAPS - NO PESTICIDES





Attribute	Males (M), females (F) or both (B)	Comparative efficiency	Longevity	Robustness	Cost	Ease of transport/ packing	Ease of setting up	Ease of service	Score (/10)	Photo
Biotrap	MALE	10	7	7	8	8	8	8	8.35	
Conetrap	MALE	10	7	5	8	8	6	8	8.00	
NZ Lynfield	MALE	8	6	7	8	8	7	7	7.47	
DECIS/ Susbin	M or F	8	7	8	6	4	6	8	6.94	
Jackson/ Delta	MALE	9	3	5	8	9	8	3	6.88	
NSW Lynfield	MALE	8	7	8	8	2	5	7	6.88	
Qld Steiner	MALE	9	7	8	4	4	6	8	6.88	
Dakpot	MALE	9	8	6	6	4	7	5	6.82	
Searles trap	MALE	8	5	5	5	8	8	8	6.76	
Bugs for Bugs	MALE	7	6	7	5	7	8	8	6.71	
Rimi	BOTH	5	4	8	8	9	7	3	6.12	
Ceratrapp	BOTH	8	6	6	3	3	8	6	5.82	
Sensis	FEMALE	3	5	7	7	7	8	8	5.76	
Bottle	FEMALE	5	4	5	7	6	8	5	5.53	
Flycatcher/Susbin	FEMALE	5	8	7	4	4	6	6	5.47	
McPhail trap	FEMALE	5	6	7	4	4	6	6	5.24	
Suterra/ Sorygar	M or F	5	8	7	3	3	6	6	5.18	

**NOTE: This survey was conducted from 2014 to 2016. New traps have since come onto the market.**

**TRAP UTILITY COMPARISON**

# PROTEIN-BASED TRAPS

1. Biotrap Gel
2. Fruition home garden trap
3. Fruition blue trap
4. Ceratrap
5. Home-made traps
6. McPhail trap
7. South African bait station



# PROTEIN-BASED BAITS

target both male and female flies



# Protein-based baits target both male and female flies





# PHYSICAL EXCLUSION, NETTING

## TYPES OF COVER

- Fruit bags
  - Paper
  - Mesh
- Truss bags
- Branch bags
- Tree netting
  - Over tree
  - Over frame
- Floating cover
  - For low-growing crops
- Orchard cover



# NETTING PRECAUTIONS

Make sure that the mesh doesn't lay on the fruit surface as Qff will lay into fruit through the mesh.

*Timing of net placement is important –*

- *Don't apply nets to fruit, bunches, trusses, branches of trees with ripe fruit inside*

Security of net cover is important –

- Cover completely
- Secure around base of stem, branch or trunk so flies won't get in that way
- Repair holes, torn sections

*Birds –*

- *If birds get in, they will eat everything and then panic!*

Mesh size –

- RECOMMENDED: 2mm X 2mm or 1mm X 3mm holes were 100% effective; 4mm X 5mm mesh was OK (98% effective)
- NOT RECOMMENDED:
  - Larger mesh sizes
  - Smaller mesh sizes: 0.8mm X 0.8mm was 100% effective but caused build-up of other insects (thrips, scale and mealy bug) inside as well as fruit quality issues).

(Fruit Fly Management for Vegetable Growers, AHR/HIA, 2017)



# PESTICIDES APPROVED FOR HOME USE



Active ingredient	Use in home garden
Chlorpyrifos (Lorsban)	BAIT
Maldison (Malathion, Fyfanon)	BAIT, COVER SPRAY, TRAP
Trichlorfon (Dipterex, Lepidex)	BAIT, COVER SPRAY
Fipronil	BAIT, TRAP
Spinosad	BAIT
Cuelure	TRAP, MAT

- RICHGRO NATURALLY BASED FRUIT FLY SPRAY CONCENTRATE: A mixture of garlic, pyrethrins and piperonyl butoxide for the HOME GARDEN

- Approved organic baits and lures: Eco-Naturalure, Yates Nature's Way Fruit Fly Control, Wild May Attractant
- Poultry, sheep, goats

**IMPORTANT:** Seek advice from supplier, product label or the APVMA (Australian Pesticide and Veterinary Medicines Authority) to ensure product is registered for fruit fly and for the crop being treated. If approved for this use, ensure all label directions are followed correctly.

- ✓ PICK UP FALLEN FRUIT
- ✓ HARVEST DAMAGED OR UNUSED FRUIT
  - ✓ USE OR DESTROY
- ✓ PULL OUT, THIN OUT, PRUNE, NET



**FREEZE**  
**DROWN**  
**SOLARISE? – CARE!**  
**HEAT or BURN**  
**BURY? - X X X**



<https://growgreatfruit.com/unburn-strikes-again/>

<https://agfax.com/2016/05/23/california-fruit-crops-why-fruit-cracking-differs-among-sweet-cherry-varieties/>

<https://electroverse.net/severe-hailstorm-destroys-fruit-vegetables-and-paddy-crops-in-kashmir/>

# Strategies for a fruit fly free region



Remove



Monitor



Imports



Clean



Trim



Cover



Treat