

Fruit fly management

A systems approach

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Fruit fly – the enemy

- Fruit fly is a very serious threat
- Potential for significant crop loss
- Best tackled with a 'systems approach'
- Good results are possible
- Need to understand the biology and behaviour of the pest



Biology and behaviour

Eggs:

- often associated with a 'gummy exudate'
- egg laying introduces organisms that produce a characteristic rot
- are deposited into healthy maturing fruit
- hatch within a few days



Biology and behaviour

Larvae:

- feed on the rotting flesh
- soon cause the fruit to drop
- leave the fruit to pupate in the soil



Biology and behaviour

Adult flies:

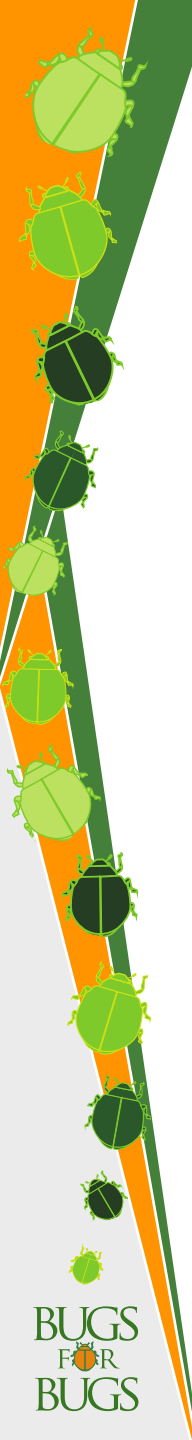
- are long lived
- can travel some distance*
- the female requires a protein feed before her eggs will mature
- male flies also actively seek protein
- the sexes behave differently



Changing Status of Fruit Fly in Australia

- Qld fruit fly is extending its range as a result of:
 - Expanding and contiguous horticulture
 - Climate change
 - Winters less cold
 - Changing rainfall patterns

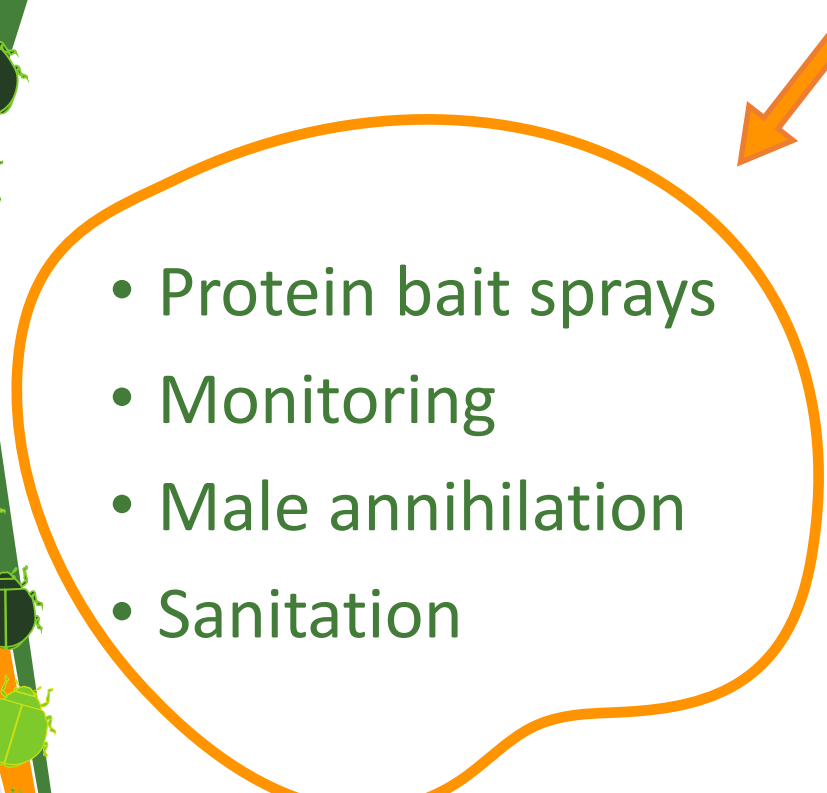




Available tools

- Protein bait sprays
- Monitoring
- Male annihilation
- Sanitation
- Female traps
- Crop management
- Physical control
- Cover sprays (insecticides)
- Biological control
- SIT
- Post harvest

A 'systems approach'

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Cover sprays

- Organophosphate insecticides
 - Dimethoate (e.g. Rogor)
 - Fenthion (e.g. Lebaycid)
 - Trichlorfon (e.g. Dipterex)
- These chemicals
 - Were the mainstay of fruit fly control for over 40 years
 - Are highly disruptive
 - Have finally been phased out
- Replacement chemicals have their own problems



Replacement cover sprays

- Examples
 - Maldison
 - Spinetoram (Success Neo)
 - Clothianidin (Samurai)
- Still disruptive to beneficials
- Residue issues remain
- Not a long-term solution



Protein bait sprays

- This is the essence of fruit fly management
- Adult flies emerge from the soil after pupation
- Females must mate and feed on protein before they can lay eggs
- We have a 5-7 day window before they can damage fruit
- Protein can be acquired from fungi or bacteria - or from our applied bait sprays
- Freshly applied protein bait is a much more attractive option for fruit fly



Protein bait sprays

- Differ from cover sprays
- 'Spot' treatment only
- Protein + toxicant
- Attract & kill



Protein bait sprays

- Quick and efficient
- There are many and varied bait applicators
 - Typically 12 - 20 km/h
 - Up to 20 ha per hour
 - 50+ ha in 3 hours



Tips for best results

- Start early, before fruit is susceptible
- Apply regularly
- Don't miss a treatment
- Place on foliage or trunk (never on ground, weed mat or grass)
- Re-treat after rain
- Increase frequency during high-risk periods
- Apply fresh
- Use thickeners
- Adopt an area-wide mentality



Monitoring

- Trapping of male fruit flies
 - Male specific traps
 - Indicator of population trends only
 - Treatment decisions should never be based on trap counts alone



Monitoring

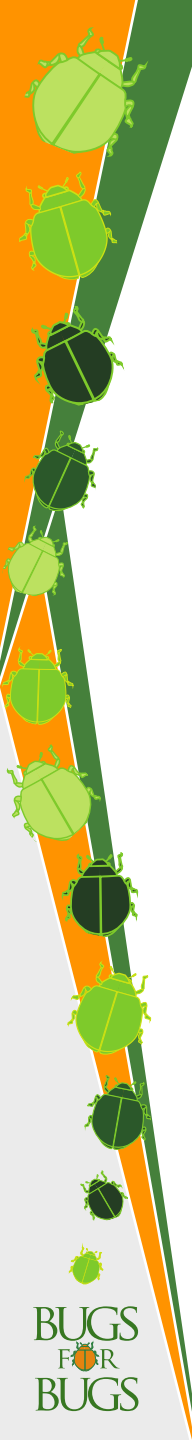
- Monitoring should also include:
 - Regular field assessment
 - Possibly twice weekly in critical periods
- Look for:
 - Adult flies visible
 - Evidence of 'stinging'



Male annihilation technology (MAT)

- Suppression of the male fly population
- An invaluable tool in an area wide management (AWM) program
- Incremental gains over time





Sanitation

- Remove all fruit after harvest
- Late hanging fruit are high risk
- Issue of fallen fruit...
 - If stung review procedures
 - If not stung then little risk



Biological control

- Several parasitoids
- Insufficient as stand-alone agents
- Not yet available commercially in Australia



Physical control

- Netting or bagging
 - Effective
 - Probably the most practical solution for backyard fruit trees
 - Can lead to other problems such as high scale insect or pest mite levels



Physical control

- Netting
 - Effective
 - Expensive
 - Other issues
 - Disease management
 - High labour costs
 - Can exclude beneficials (leading to scale and mealybug problems)

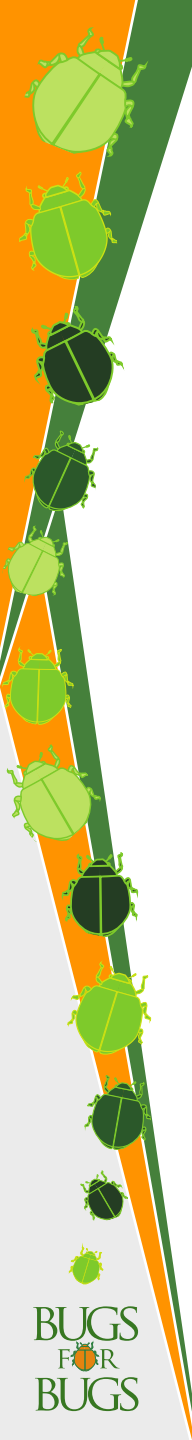


Additional tools

Traps based on feeding attractants

- Provide additional mortality factor
- Only in addition to the standard suite (protein baits, MAT, monitoring)





Research priorities

- There is a lot of funding for ‘blue sky’ research
- Very little fruit fly research is of practical value to commercial growers in endemic areas
- What do we need?
 - Access to better toxicants
 - Existing toxicants are effective but old chemistry may be withdrawn
 - Several compounds are of potential interest
 - Chemical companies will never pursue this due to low sales potential
 - Crop specific research to fine tune the systems approach for critical industries (e.g. table-top strawberries and blueberries)