

# Pest Management in Winter Cereals

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# Key Pests

Crop stage/ Pest	Emergence	Vegetative	Flowering	Heading	Grainfill
Cutworm					
Mites					
Wireworms/ False Wireworms					
Black-headed cockchafer					
Aphids					
Armyworm					
Helicoverpa spp.					

# Risk Management Table

High risk	Reduced risk	Low risk
<b>Aphids &amp; BYD Virus</b>		
<ul style="list-style-type: none"> <li>• Wet summer &amp; green bridge</li> <li>• Wet autumn, early sowing</li> <li>• Warm, dry growing season</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative hosts controlled pre-season</li> <li>• Large numbers aphid predators and/or aphid mummies</li> </ul>	<ul style="list-style-type: none"> <li>• Dry, cool summer; wet, cool winter</li> <li>• Heavy grazing to reduce plant/weed hosts</li> </ul>
<b>Armyworms &amp; Helicoverpa</b>		
<ul style="list-style-type: none"> <li>• After periods of drought</li> <li>• Adjacent pastures chemically fallowed, spray topped or cultivated in spring</li> </ul>	<ul style="list-style-type: none"> <li>• Large numbers wasp parasitoids</li> <li>• Weed control</li> </ul>	<ul style="list-style-type: none"> <li>• Wet winter/spring</li> </ul>



# Aphids





# Pest ID: Key Aphid Species

**Decision Making**  
for Insect Management  
in Grain Crops



- Oat aphid
  - July to end Aug\*
  - Crown and lower stems
- Corn aphid
  - mostly barley
  - Aug to early Sept
  - Whorl and top leaf axis
- Rose-grain aphid
  - Uncommon & sporadic
  - Upper leaves



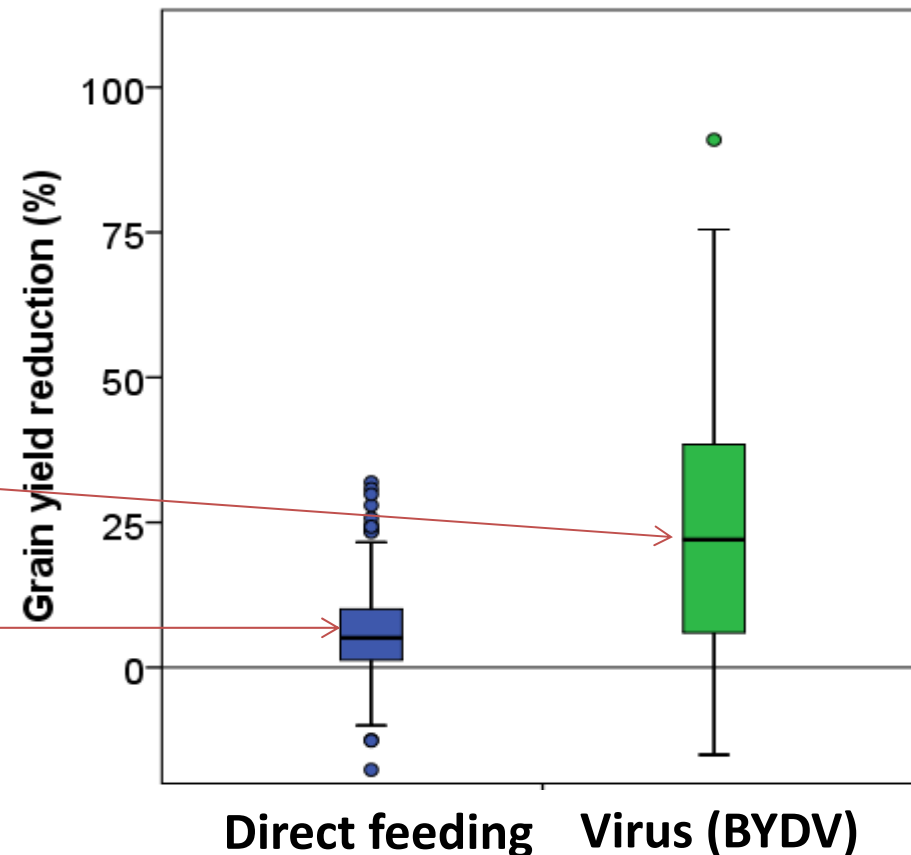
# Impact (yield loss) of aphid damage on cereals

Median values

Virus transmission 21%

Direct feeding 6%

But regionally variable!



Source: Valenzuela (2013) GRDC rpt: Aphid economic impacts on grains  
([iva@unimelb.edu.au](mailto:iva@unimelb.edu.au)).

# Virus transmission

## Yellow dwarf viruses

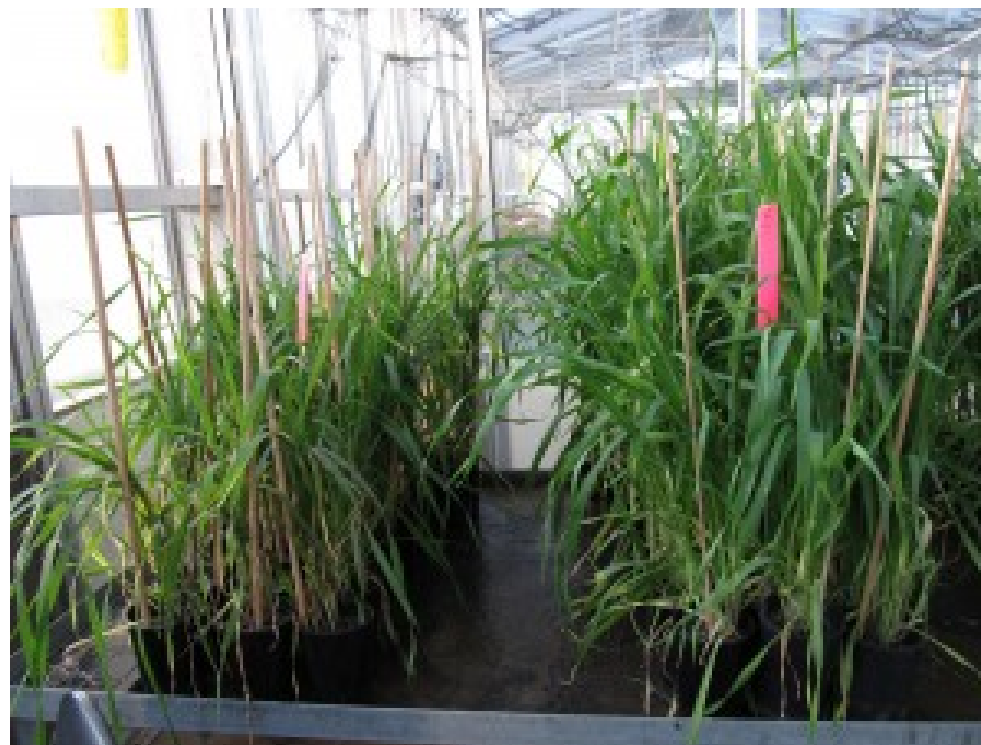
- Transmitted by aphids
- Yield losses
  - early infection 12 - 79% (rare)
  - infected post-tillering 6-9%
- Summer/autumn “green bridge” increases aphid and virus survival





# Direct feeding

- Retarded growth through nutrient removal
- Honeydew & sooty mould
- Toowoomba 2012 expt: early vs late infestation
- Impact: dry matter, # tillers, # heads, seed weight reduced after early prolonged infestation



Early (Z12) and  
continuous  
infestation

Late (Z24)  
infestation

# Direct feeding results

Parameter	Early infestation	Late infestation	Control	LSD
Number of tillers	4.3a	6.3b	6.7b	0.5
Plant height (cm)	57.6a	63.6b	65.3b	3.9
Effective heads per plant	2.8a	4.8b	5.8c	0.47
Seed weight per plant	0.8a	1.6b	2.1c	0.3
100 seed weight	4.6a	4.8a	5.0a	0.37

Impact: dry matter, # tillers, # heads , seed weight  
reduced after early prolonged infestation





# Aphid management considerations

- timing
- beneficials
- monitoring
- thresholds

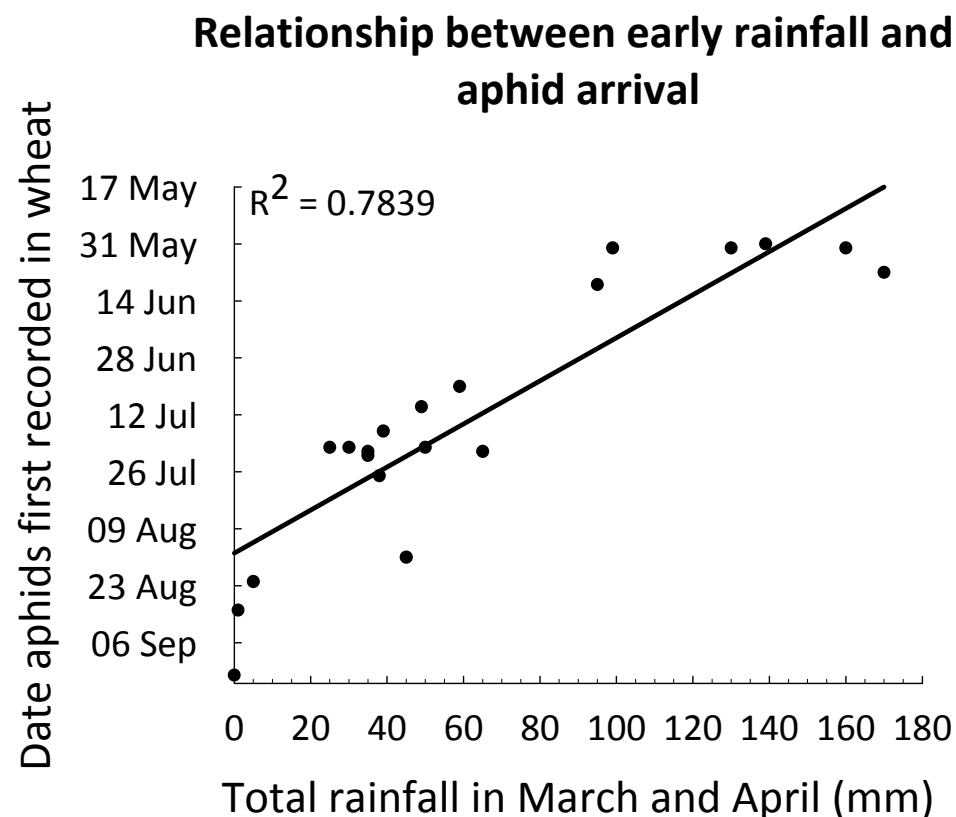
# The weather and timing of aphid invasions

**Decision Making**  
for Insect Management  
in Grain Crops



## Strong correlations:

- Early autumn rains can bring earlier invasions
- Earlier invasions can bring BYDV



Source: Thackray et al 2009 on Oat aphid





# Common aphid beneficials

Lacewings



Hoverflies



Ladybirds



Wasp parasitoids





# Monitoring aphids

- Monitor and record
  - Aphids and beneficials
  - Changes in pop'n dynamics?
- Repeat sampling
  - Seedling, tillering, ripening
- 3-6 locations
  - 5 random plants at each





# Suggested thresholds



## **High virus risk (region & weather)?**

For susceptible varieties - zero tolerance at crop establishment stage

## **Early crop stage (NGA: Qld/NSW)**

20% of tillers - 10 + aphids

## **Late crop stage (WA)**

50% of tillers - 15 + aphids

**NOTE: Populations can change quickly  
& often don't reach thresholds**





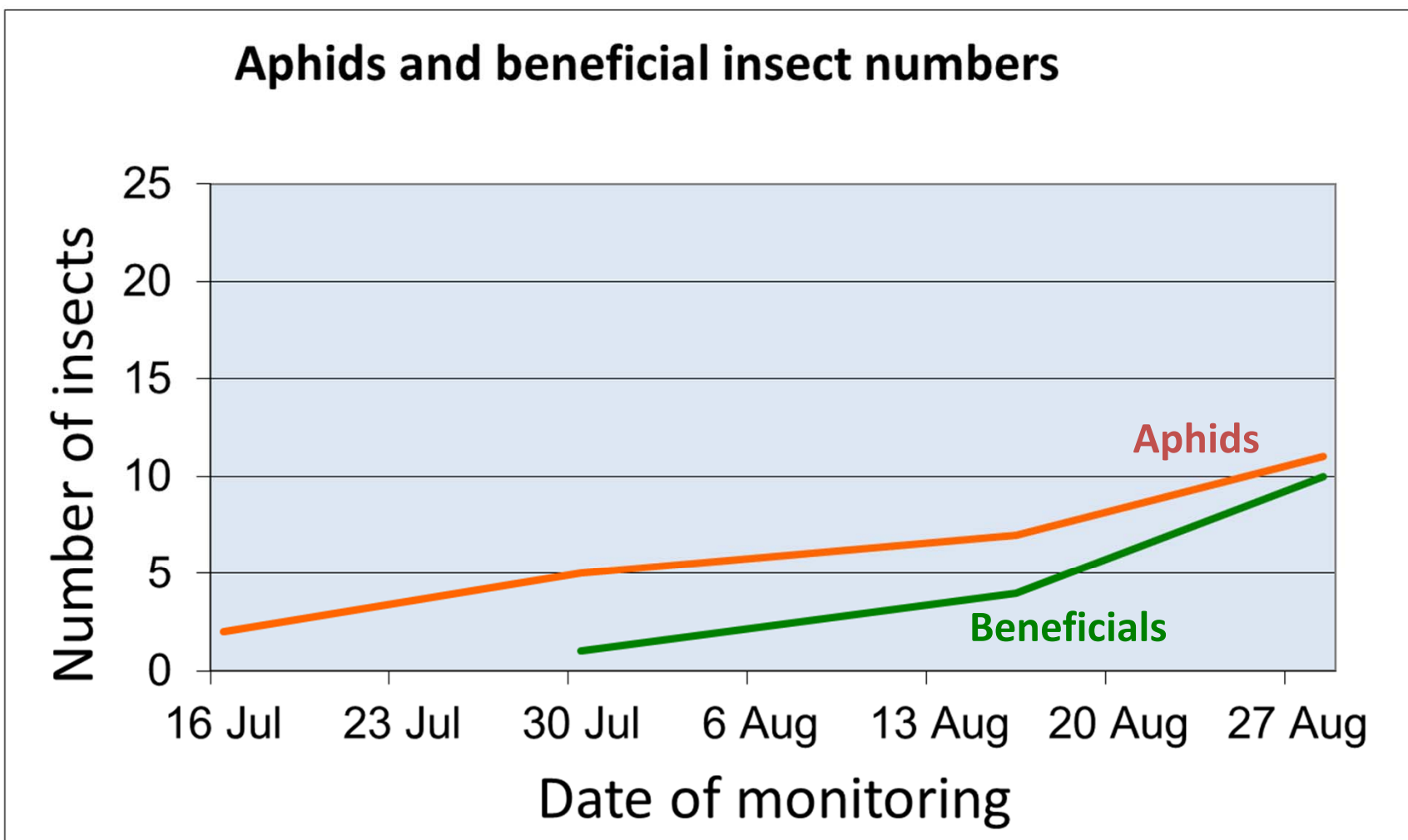
# Management considerations

- Weather conditions?
- Virus risk?
- Crop development stage?
- Is the population increasing?
- Beneficial activity?
- Intensity, duration and distribution of infestation?
- Chemical choices (pirimicarb, seed dressings, border sprays)



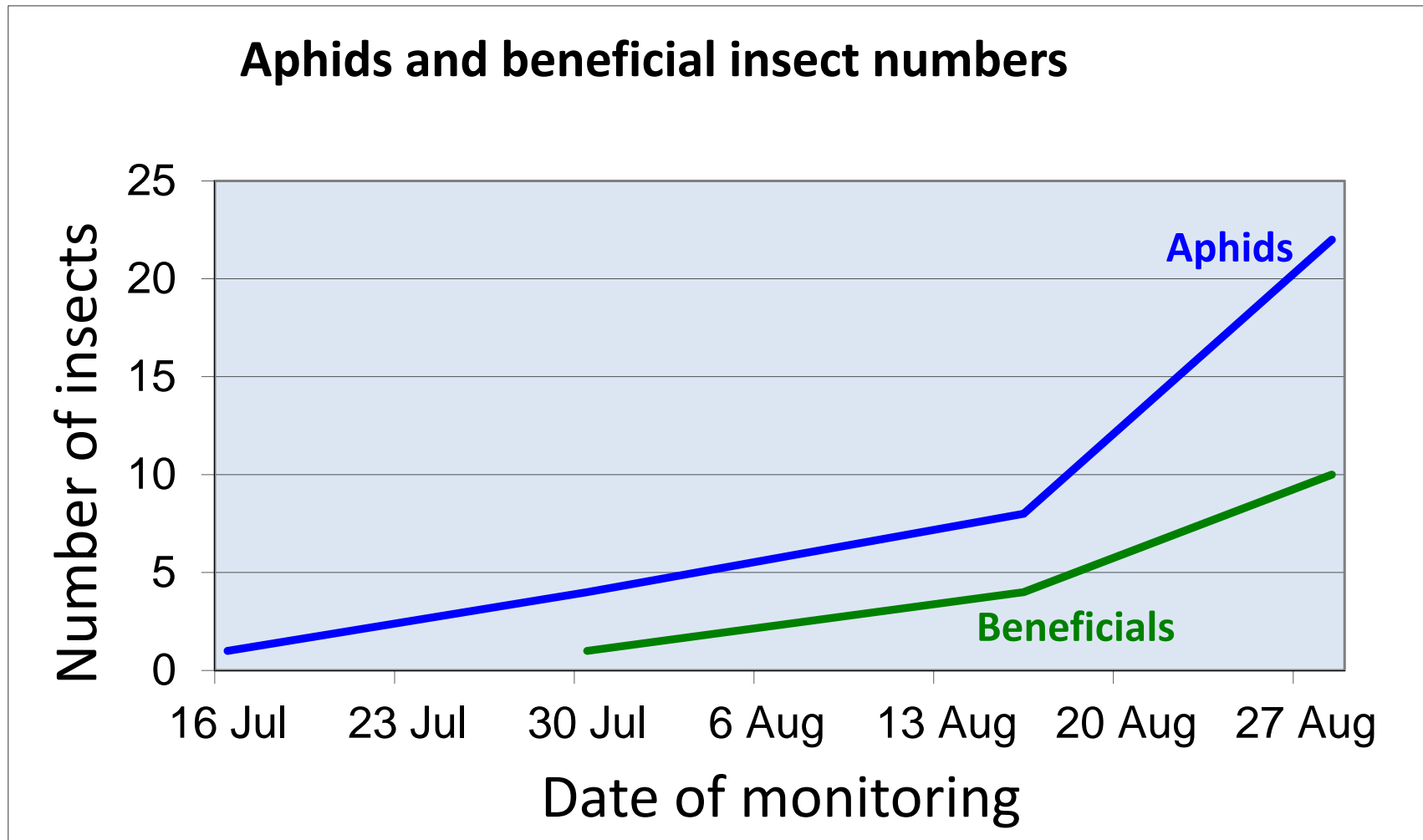
# When do I control aphids in my crop?

**Decision Making**  
for Insect Management  
in Grain Crops



# When do I control aphids in my crop?

**Decision Making**  
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# Best Bet Table: Aphids

Pre-season	Establishment	Winter	Spring
Remove green bridge (weed & volunteer hosts)	<u>High (virus) risk</u>  seed dressing  SPs up to 8-10 wks  Early control along edges or patches may delay infestation	<u>High risk</u>  Monitor/record density aphids and beneficials  Delay chemical control if rain (>20 mm) forecast  Selective insecticide	<u>High risk</u>  Monitor/record density aphids and beneficials  Thresholds  Selective insecticide  Infestations later than milky grain: No yield loss





# Caterpillars







# Armyworms

## Armyworms

- Smooth bodied
- 3 stripes collar



## Damage

- Defoliation at establishment
- Sever (barley) heads



# Armyworms



- Monitor
  - Sweep net, ground searches
  - Scalloped leaves, droppings
  - Increase frequency at ripening
- Thresholds
  - Barley – 2 med sized armyworm/m<sup>2</sup>
  - Wheat and oats - 10 larvae/m<sup>2</sup>



# Helicoverpa



## Helicoverpa

- Three species
- Mostly *H. punctigera*
- Prominent black hairs
- Last spiracle in dark area



## Damage

- Graze on exposed tips
- Economic impact is rare



# Caterpillar pests - IPM opportunities

- Early recognition of problem
  - Use “pest alerts”
  - Smaller larvae easier to control
- Selective chemistry
  - preserve beneficials to do control for free
- Biopesticide
  - NPV effective for *Helicoverpa*, not for armyworm







# Best Bet Table: Armyworm

Establishment	Winter	Spring
<p><u>High risk:</u></p> <p>(cereals into standing stubbles in wet years)</p> <p>Monitor for leaf scalloping</p>	<p><u>High risk</u></p> <p>Monitor for larvae at dusk with sweep net/bucket</p> <p>Ground search for larvae and droppings</p> <p>Look for scalloped leaf margins</p> <p>Control larvae when small</p>	<p><u>High risk</u></p> <p>↑ monitoring as crop dries down</p> <p>Consider crop stage before control</p> <p>Control late in day when larvae feeding</p>



# Key messages

- Control “**green bridge**” and weeds can be very effective in reducing aphids, virus, Bryobia and caterpillars (cultural control)
- Understanding the role of **weather** is vital in predicting pest problems
- **Monitoring** is particularly important because of the transient nature of pests
- For winter and spring pests, **beneficial insects** can play a powerful role and should be monitored (biological control)
- The use of selective insecticides helps to maintain beneficial insect activity.