Monitoring and biological control strategies for ornamental crops

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WHAT I WILL COVER

- **Importance of monitoring**
- **Monitoring guidelines**
- **Monitoring methods**
- **Biological control of aphids**
- **Summary**

Importance of monitoring

- Assessment of aphid species and levels
- Aid in decision making on control strategies
  - Biocontrol
  - Chemical control
- Early intervention before becoming a problem
- Provides better understanding of pest vs beneficial ratios
- Provides clues for poor control strategies

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Monitoring guidelines

- Presence and evidence of aphids – look for honeydew, aphid skins, actual aphids
- Presence of natural enemies – are there parasitic wasps, ladybirds, hoverflies etc.
- Evidence of potentially contributing factors – plants under stress, weeds, others
- Evidence of damage:
  - Is the damage caused by aphids or other factors
  - Where the damage is found
  - Are live aphids still found in the crop
- Consider the time of year (seasonal peaks)
- Frequency of monitoring should match the aphid development by species
- Indicator crops

Frequency of monitoring

- Regular intervals
- Determined by:
  - Species – host specific species easier than generalist species
  - Crop – some crops are also used as indicator crops
  - Situation crops are grown in
  - Crop value, crop volume, sales window

Months	Outdoor	Protected	Glasshouse
January to March	Monthly	Fortnightly	Weekly
April to October	Fortnightly	Weekly	Twice weekly
November to January	Monthly	Fortnightly	Weekly

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Size of area, speed and records

- Depends on the crop, size of batches, and nursery size
- Enough to provide field representation
  - For every 1,000 pots minimum 10 pots
  - Outdoor field grown crops – minimum 10m for every 100m of crops
- Use of set patterns – S, X, W, V, Z, U
- Glasshouse crops – on 60m^2 minimum 1m^2 of plants (for 2L pots 28-36 pots)
- Walking speed 1-2m/s for field and 0.5-2m/s for protected situations

Score	
1	0-5% Low infestation
2	6-10% Medium infestation
3	11- 25% High infestation
4	> 25% Severe infestation

Area	Bed	Crop	Pest	Presence of beneficials?	% of crop	% of plant	Score
Tunnel	5	Veronica 'First Love'	Shallot aphid	2 ladybird larvae	3	10	2

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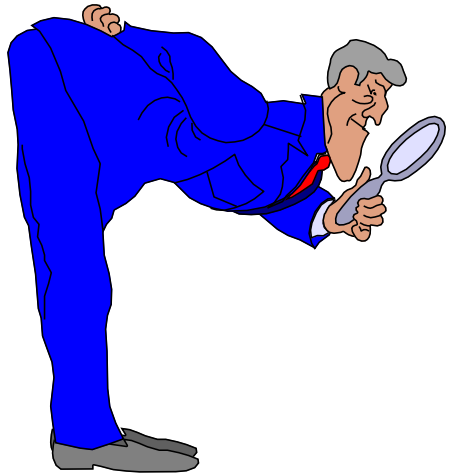
Monitoring methods



- **Visual / crop walking** – count, identification, location, crop damage
- **Sticky / water traps** – only relevant if monitoring winged adults
- **Indicator plants** – informative, but not the only approach
- **Nursery staff** – unreliable, but never ignoring it
- **Field and crop history** – important for building a control strategy
- **Sales complaints –** too late, but a learning opportunity

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Biological control of aphids

1. Cannot rely on the biocontrol strategy alone!
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4. Backbone of effective control is a reduction in the background level of aphids
5. Particularly effective in glasshouses and to an extent in tunnels
6. Requires proactive approach, i.e. introduce before aphid populations increase
7. Do not use as a curative option
8. Risk of hyperparasitism if not carefully monitored

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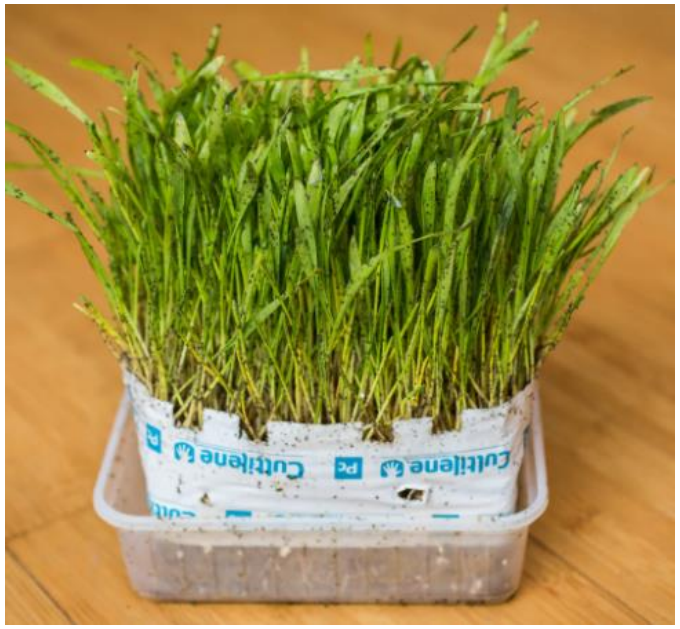
Which biocontrol methods

1. **Banker plants** – mainly for mono cropping situations
2. **Parasitic wasps** – good range available, some clever marketing by the biocontrol companies, effective but slow
3. **Predatory insects (lacewings, hoverflies, ladybirds, predatory midges) –** voracious feeders, good for hot spot treatments, can be costly, sensitive to crop protection products



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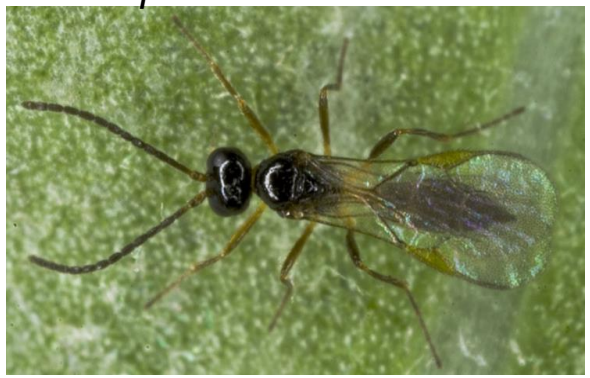
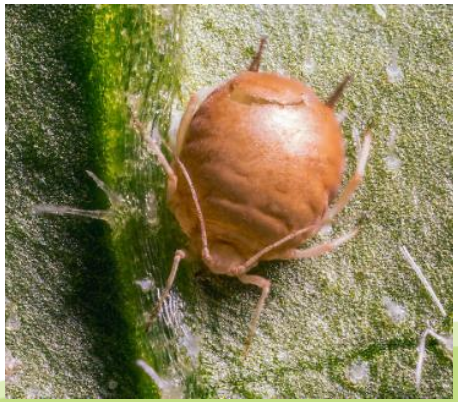
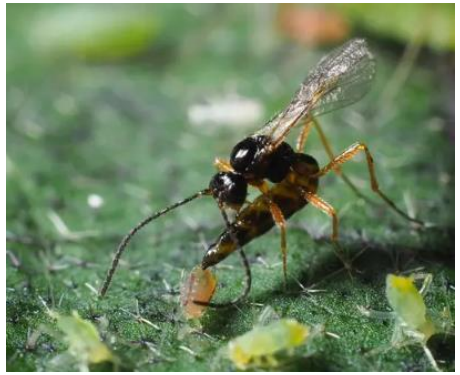
Parasitic wasps

Aphidius colemani

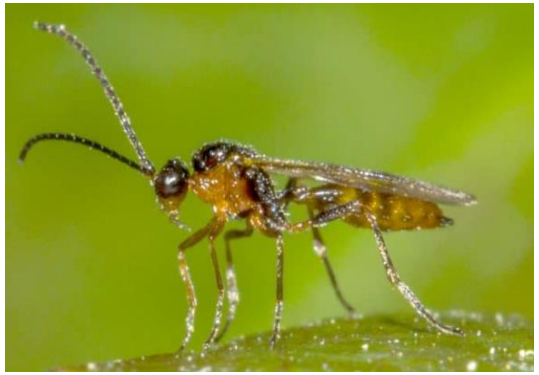




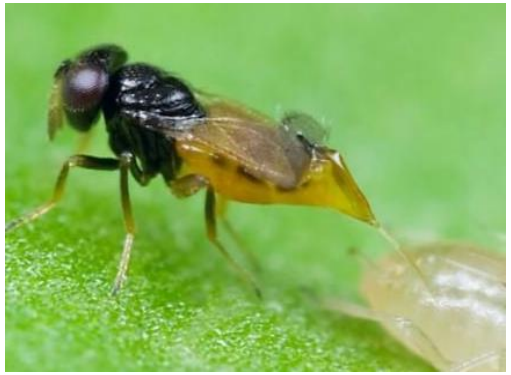
Aphidius ervi



Aphidius matricarea



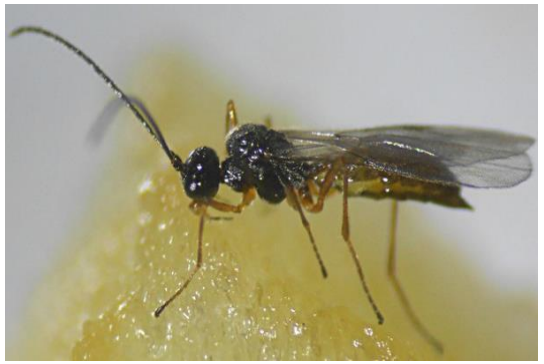
Aphelinus abdominalis

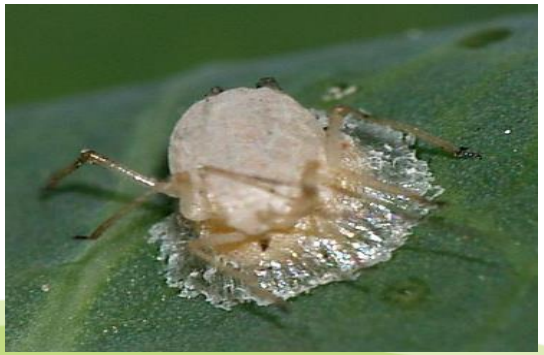


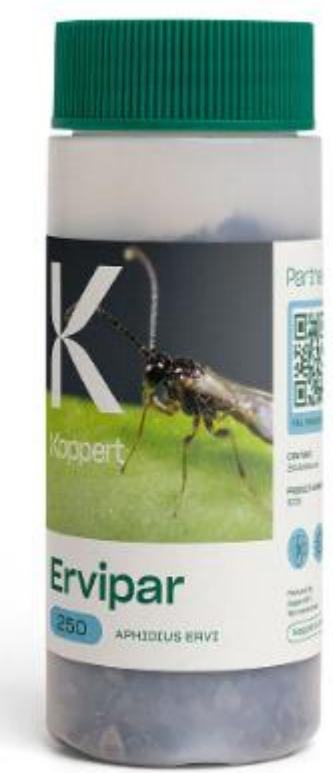
Parasitic wasps

Ephedrus cerasicola

Praon volucrae







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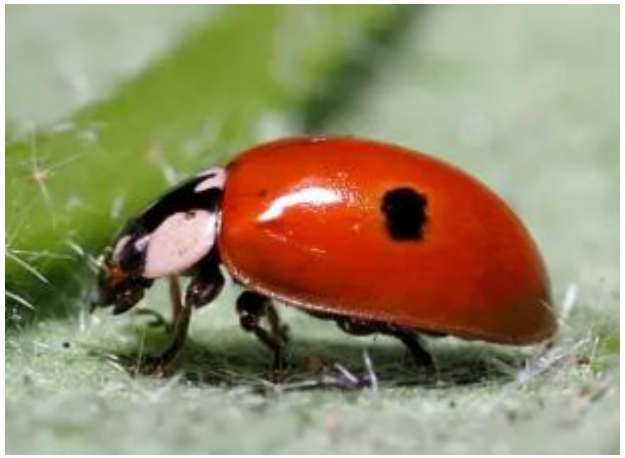
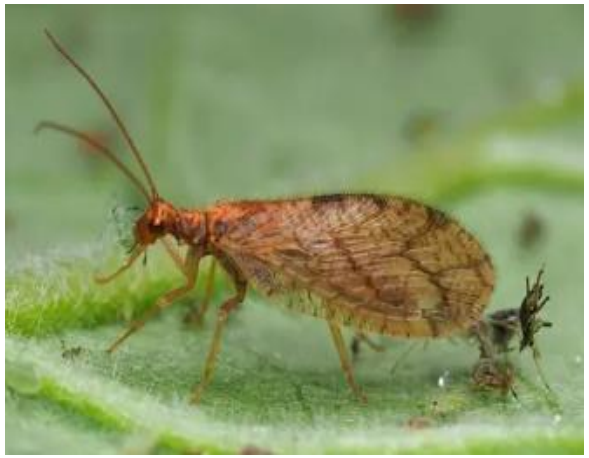
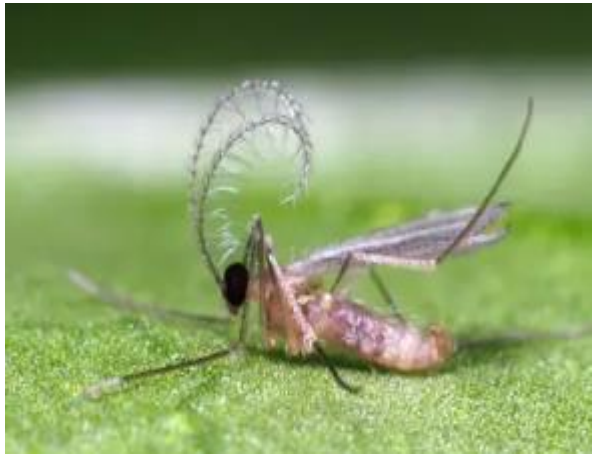
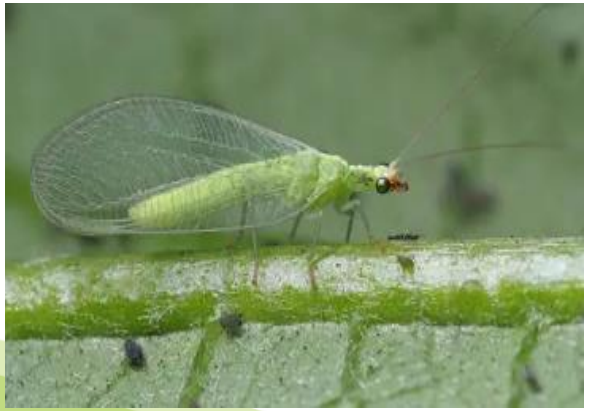
Predatory insects



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Biocontrol planning

1. **Light and temperature –** minimum 9 hours of light and 8°C for 4 hours. Around WK 10-14
2. **Introduction rates** – always start with higher rates at the beginning – 0.5/m^2
3. **Cropping types** – check potting plan vs current stock
4. **Sales windows** – the worst sale is the one that hasn't made it out of the door!
5. **Crop protection programme** – avoid pyrethroids during low light intensity
6. **Irrigation system in place** – overhead is not good news

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SUMMARY

- Monitoring is the first and most important step of IPM
- Monitoring, aphid identification, and record keeping are crucial to decision making
- Biocontrol alone is not an option for aphid control on ornamentals
- Background pressure of aphids must be reduced to a minimum
- Biocontrol introduction and planning should be based on your own nursery
- Good availability of products and formats, but cost can be prohibitive in some crops/sectors
- Crop protection product choice is very important

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