

**Improving farm integrated pest management through biodiversity**

Australian Government National Landcare Program Regional Agriculture Landcare Facilitator Port Phillip & Westernport CMA

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**Topics**

- A bit about beneficial insects - handout
- What is an insectary anyway? - handout
- Multiple benefits of planting an insectary
- Useful links (research) -handout
- What should I plant?
- Pretty flowers!
- Monitoring results from our demonstration sites
- Cost/benefit of ladybirds

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**Key beneficials**

**Ladybirds**- both adults and larvae are generalist predators. **Adults require nectar.**

**Lacewings**- green lacewing adults feed on nectar, pollen, aphids and honeydew, larvae feed on thrips, mites, LBAM eggs and larvae and mealybugs. Brown lacewing adults and larvae are also generalist predators. **Green lacewings prefer large shrubs and trees. Brown lacewings prefer native grasses.**

**Spiders**- generalist predators that live in both plant canopies and ground dwelling

**Parasitoid wasps (ie Trichogramma)**- parasitise caterpillars and aphids. Some are egg parasitoids. **Require a nectar source.**

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**Key beneficial- an example**

**Hoverflies**- adults feed on nectar before females lay eggs near aphid populations. The larval stage are predatory.  
 So, attracting hover flies in abundance = nectar producing flowers, ideally in early spring and summer just before the warmer weather leads to aphid incursions.  
 A secondary ecosystem service benefit is they are also pollinators



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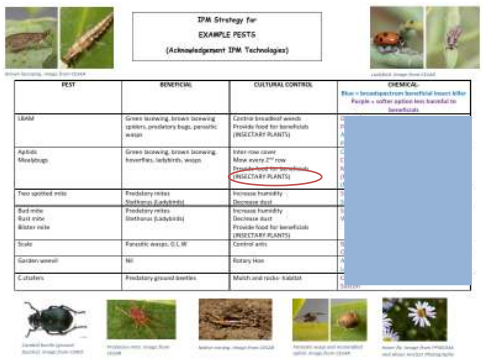
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**IPM Strategy For: EXAMPLE PESTS (Acknowledgement IPM Technologists)**

PEST	BENEFICIAL	CULTURAL CONTROL	CHEMICAL
Leafhopper	Green lacewing, brown lacewing caddis predators high, parasitic wasps	Control broadleaf weeds Provide food for beneficials (BROCCOLI PLANTS)	None - broadleaf trees beneficial insect killer Parathion - suffer aphid has beneficial in broadleaf
Aphids Mealybugs	Green lacewing, brown lacewing beneficial, ladybirds, wasps	Water over cover Water weeds off crop Provide food for beneficials (BROCCOLI PLANTS)	
Two spotted mite	Predatory mites Daphnia (aquaculture)	Increase humidity Dissolve dust	
Bird mite	Predatory mites Daphnia (aquaculture)	Increase humidity Dissolve dust	
Blister mite	Predatory mites Daphnia (aquaculture)	Provide food for beneficials (BROCCOLI PLANTS)	
Scale	Parasitic wasps, G.L.M	Control ants	
Garden weevil	Nil	Rotary hoe	
C. citrella	Predatory ground beetles	Mulch and reduce rotation	



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**Research Links: (I can email these links, just ask!)**

**Viticulture in SA**

**TOP PICK:**  
<http://www.viti.com.au/pdf/Rmjr0811VineyardBiodiversityandInsectInteractionsBookletFINAL.pdf>  
[https://www.treesforlife.org.au/sites/default/files/Revegetation%20by%20Design%20\(SARDI\).pdf](https://www.treesforlife.org.au/sites/default/files/Revegetation%20by%20Design%20(SARDI).pdf)

**CSIRO Pest Suppressive Landscapes:**  
<http://www.nipi.com.au/research/pest-suppressive-landscapes/>

**Cropping and Pastures:**  
<https://grdc.com.au/Resources/Factsheets/2014/05/Pest-Suppressive-Landscapes-fact-sheet>  
<https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2013/07/Landscape-and-weed-influence-on-pest-and-beneficial-insect-populations>

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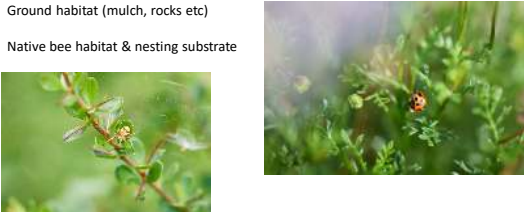
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### Insectaries

- An area planted with year round flowering plants to provide shelter, pollen and nectar for natural populations of beneficial invertebrates.
- Overwintering habitat
- Ground habitat (mulch, rocks etc)
- Native bee habitat & nesting substrate



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### The multiple benefits of having native vegetation on your farm

- Pollination
- Habitat and food source for insects
- Shelterbelts/Windbreaks
- Perennial groundcover
- Filtration services along drainage lines
- Biodiversity values (consider offsets in planning applications)
- Meet obligations in Environmental Assurance programs



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### Where can you plant an insectary?

- Grasses under vine or inter-row, end of row strainer posts
- Surrounding a dam
- Land class zoned unsuitable for production
- Garden beds
- Containerised gardens
- Headlands, buffers and riparian zones
- Re-vegetated shelterbelts- add lower story shrubs
- Embankments and erosion prone areas
  - with careful planning and
  - suitable species



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Where can you plant an insectary?



Top (left to right): Werribee vegetable farm, embankment adjacent to dam wall, strawberry farm planting close to dam

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Werribee South Farm M, April 2021

Before



After

Western Crop Trials  
AgriForum - AgriPoint  
© WCA

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Werribee South Farm A, August 2021



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Top (left to right): *Acacia brownii*, (prostrate heath wattle), *Brachyscome basaltica* (basalt daisy), *Dichondra repens* (kidney weed), *Carpobrotus rossii* (pigface)



Top (left to right): *Leptospermum lanigerum* (woolly tea-tree), *Thryptomene* sp (Grampians/Vic lace flower), *Dinella revoluta* (Black-anther flax lily)

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*Westringia fruticosa* - great hedge plant. Observed with ladybirds and hover fly abundance

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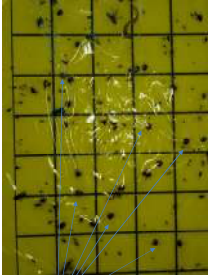
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**Monitoring results over three seasons (Nursery, vineyard, orchard, strawberry)**  
Monitoring analysis undertaken by Dr Linda Thomson (Melbourne University)

In total, 97,000 invertebrates from 66 groups were counted, however the focus was on 'beneficial species' that reduce pest abundance:

- The abundance of ladybirds increased by a factor of five
- Over 12,000 parasitoids collected. Abundance trebled over 3 seasons
- Four times as many lacewings
- Beetles: Australia wide there are 117 families. We collected five and a half thousand beetles from 26 families. More families added to the list each year. Beetle functions include predation, pollination and recycling.
- Predatory bugs- an increase of four times
- Rove beetle numbers doubled

Strawberry springs: March 2019 trapping- 221 ladybirds in insectary and existing windbreak area. Traps were out for 7 days. Flowered for the first year since planting in 2016.

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