Pacific Pests, Pathogens, Weeds & Pesticides - Online edition

Maximising biocontrol (outdoor vegetables) (472)

Summary

- Common BCAs: ladybird beetles; hoverflies (syrphids); rove beetles; lacewings; wasps; & spiders.
- Conserve & attract BCAs:
  - Avoid broad-spectrum pesticides
  - Grow flowering plants near crops (especially brassicas) – they attract parasitoids
  - Plant grasses near vegetables – they attract aphids, which attract predators
  - Note, BCAs naturally find prey
- Check **Table 1** for risk of pesticides to predators and parasitoids
- Use an IPM Decision Pathway to manage pests
  - Scout the crop
  - Id infestations & make records; are they increasing or decreasing?
  - **Assess risks to the crop:**
    - **Stage of crop? Seedling, leafy, flowering?**
    - **Stage of pest life cycle? Eggs, immatures, pupae, adults?**
    - **Is crop healthy, are there weeds, is weather cool or hot?**
    - **Does the market tolerate crop damage?**
  - Decide to spray or not to spray
  - Choose pesticide (if spraying) – low impact to humans, animals (bees & BCAs)
  - Assess history of local pesticide use – rotate between different MoAs?
  - Apply pesticide safely & effectively - read pesticide label; check sprayer, choose correct nozzle
  - Continue to scout the crop

Photo 1. Ladybird beetle larvae can be very numerous on foliage, and large larvae can eat many small insects every day.

Photo 2. The most important ladybird beetle predators are those that breed in crops where eggs, larvae, pupae and adults occur.

Photo 3. A large hoverfly larva eating aphids. A large larva can eat 20 to 30 aphids a day.

Photo 4. Rove beetle searching a bean flower for food.

Photo 5. A cocoon of a *Cotesia vestalis* that has killed a diamondback moth (*Plutella xylostella*) caterpillar (larva). Other *Cotesia* species attack the larvae of other important pests.

Photo 6. Wasp parasitoid emerging from a cocoon.

Photo 7. Cocoon mass of *Cotesia* species that parasitise *Spodoptera* and other caterpillars.

Photo 8. A cocoon formed by the larva of a parasitoid wasp that emerged from the body of the dying *Spodoptera* caterpillar.

Photo 9. An empty skin of an aphid (called a mummy) that has been parasitised by a parasitic wasp, *Aphidius* species.

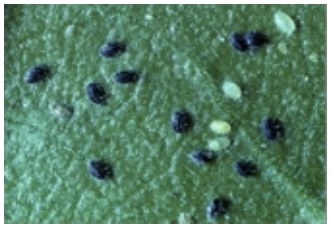

Photo 10. Whitefly nymphs change from white to black when parasitised by *Encarsia* species.

Photo 11. An adult parasitoid wasp.

Photo 12. Lynx spider (Oxyopid); a foliage-dwelling predator that mostly ambushes its prey.

Photo 13. Wolf spider (Lycosid); a soil-dwelling predator, commonly found where plastic mulch is used.

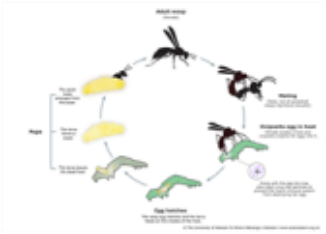

Diagram. Life cycle of a larval parasitoid (one adult wasp emerges from each host caterpillar).

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Information from Gardner-Gee *et al.* (2014) Effect of selected oils and insecticides on beneficial insect species: 2013/14 results. Report for Potatoes NZ. Plant & Food Research; and May *et al.* (2015) Minimizing Pesticide Risk to Bees in Fruit Crops. Extension Bulletin E3245, May 2015, Michigan University; and Ndakidemi B, *et al.* (2016) Impacts of Synthetic and Botanical Pesticides on Beneficial Insects. Agricultural Sciences: 7, 364-372; and Walsh B (2005) Impact of insecticides on natural enemies found in brassica vegetables. Poster, National Diamondback moth project team, Horticulture Australia Ltd.; and from University of California Statewide Integrated Pest Management Program.

(http://ipm.ucanr.edu/GENERAL/pesticides.html). Diagram Science Learning Hub. Pokapū Akoranga Pūtaiao, University of Waikato.

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