

Beneficial Insects of Strawberries

Beneficial Insects

Beneficial insects include **pollinators** and **natural enemies** of pests. Supporting beneficial insects can reduce reliance on commercial bees and pesticides.

Pollinators of Strawberries

Cultivated strawberries are self-fertile, but pollination by **honey bees** and **native bees** has repeatedly been shown to enhance strawberry quality. In general, **bee diversity** has been shown to enhance fruit quality of various plants.¹

Strawberry pollination by bees has been shown to:

- increase **fruit size** and **weight**^{2,3}
- decrease **malformations**^{2,3,4}
- enhance fruit **redness**²
- increase **firmness** and **shelf life**²
- **speed up** fruit development time⁵



Honey bees (*Apis mellifera*) caught foraging in a strawberry farm in CA.



Photo credit: Kristine Krewenka, Agroecology, Gottingen, Germany.

Natural Enemies of Strawberry Pests



Natural Enemy	Pest
Parasitic wasps and flies	<ul style="list-style-type: none">• aphids• beet armyworm• cabbage looper• corn earworm• Lygus bug• saltmarsh caterpillar• whiteflies
Minute pirate bug (<i>Orius</i> spp.)	<ul style="list-style-type: none">• corn earworm• Lygus bug• spider mites• western flower thrips• whiteflies
Bigeyed bug (<i>Geocoris</i>)	<ul style="list-style-type: none">• Lygus bug• spider mites• whiteflies
Lacewings (<i>Chrysopa</i> & <i>Hemerobius</i>)	<ul style="list-style-type: none">• aphids• spider mites• whiteflies
Damsel bugs (<i>Nabis</i> spp)	<ul style="list-style-type: none">• Lygus bug• spider mites
Ladybeetles (Coccinellidae)	<ul style="list-style-type: none">• aphids• spider mites
Syrphid flies (Syrphidae)	<ul style="list-style-type: none">• aphids

Indicates insects that are known to benefit from feeding on floral nectar or pollen

Supporting Beneficial Insects



Floral resources such as **nectar** and **pollen** are important for pollinators of strawberries and natural enemies of strawberry pests.

Honeybees are important pollinators of strawberries, but are more attracted to other floral resources.⁶ Planting flowering plants that may help sustain **native bees**, may and retain honeybee populations when strawberries are not in bloom.

Many **natural enemies** can live longer, attack more prey, and produce more offspring when they have access to nectar and/or pollen.⁷ Beneficial insects might utilize strawberry flowers, but may benefit from the **addition of other flowers**.

Pesticides are associated with **honeybee** and **native bee** population declines. Pesticides have lethal and sub-lethal effects on bees, and make bees more susceptible to disease.⁸

Natural enemies are also sensitive to pesticide exposure, even to insecticides that target specific pest populations.⁹

Thus, reduction in pesticide use may help sustain beneficial insects on strawberry farms.



A big-eyed bug (*Geocoris*) that just fed on nectar of this strawberry

Learn More

- University of California Integrated Pest Management www.ipm.ucdavis.edu/
- The Xerces Society for Invertebrate Conservation www.xerces.org/fact-sheets/

1) Frund et al. 2013. Bee diversity effects on pollination depend on functional complementarity and niche shifts. *Ecology*.

2) Klatt et al. 2014. Bee pollination improves crop quality, shelf life and commercial value. *Proc R Soc B*.

3) Chagnon et al. 1993. Complimentary aspects of strawberry pollination by honey and indigenous bees (Hymenoptera). *Ecology and Behavior*.

4) Lopez-Medina et al. 2006. Misshapen fruit in strawberry, an agronomic evaluation. *Acta Horticulturae*.

5) Paydas et al. 2000. Effects of pollination of strawberries grown in plastic greenhouses by honeybees and bumblebees on the yield and quality of the fruits. *Acta Horticulturae*. 6) Free and Smith. 1961. The foraging behaviour of honeybees from colonies moved into a pear orchard in full flower. *Bee World*. 7) Lundgren. 2009. Relationships of natural enemies and non-prey foods. Springer. 8) Pettis et al. 2013. Crop pollination exposes honey bees to pesticides which alters their susceptibility to the gut pathogen *Nosema ceranae*. *PLoS ONE*. 9) Prabhaker et al. 2011. Compatibility of two systemic neonicotinoids, imidacloprid and thiamethoxam, with various natural enemies of agricultural pests. *Biological and Microbial Control*.