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 time[5]

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

bee-pollinated **self-pollinated** **wind-pollinated**

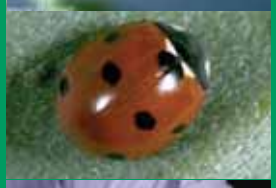
Photo credit: Kristine Krewenka, Agroecology, Gottingen, Germany.

Natural Enemies of Strawberry Pests










Natural Enemy	Pest
Parasitic wasps and flies	• aphids • beet armyworm • cabbage looper • corn earworm • Lygus bug • saltmarsh caterpillar • whiteflies
Minute pirate bug (*Orius* spp.)	• corn earworm • Lygus bug • spider mites • western flower thrips • whiteflies
Bigeyed bug (*Geocoris*)	• Lygus bug • spider mites • whiteflies
Lacewings (*Chrysopa & Hemerobius)*	• aphids • spider mites • whiteflies
Damsel bugs (*Nabis spp*)	• Lygus bug • spider mites
Ladybeetles (Coccinellidae)	• aphids • spider mites
Syrphid flies (Syrphidae)	• aphids

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

Information and pictures from UC IPM (ipm.ucdavis.edu)

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.*

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