



California Watermelon Pollination



Watermelons Require Pollination

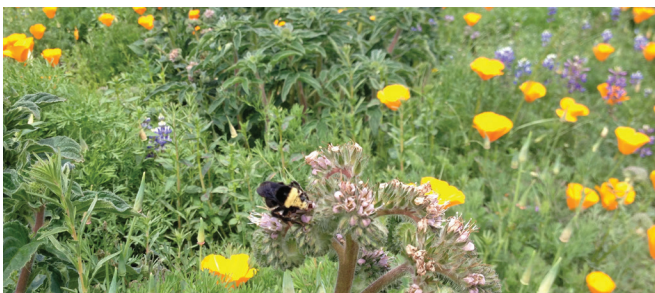


Watermelon plants produce separate male flowers, which make pollen, and female flowers which bear fruits. In order to set marketable fruit, bees need to transfer 500-1,000 pollen grains from male flowers to female flowers. Therefore, it's important to **consider pollination strategies that ensure consistent and reliable fruit set**. Honey bees are the most important pollinators of commercial watermelon in California. However, some fields also receive pollination from wild bees like bumble bees and sweat bees. Like honey bees, these pollinators visit watermelon flowers to collect pollen and nectar.

Integrated Crop Pollination: combining strategies to improve pollination

Watermelon growers can benefit from using multiple pollination strategies. Research from Northern California shows that **both managed honey bees and wild bees are important pollinators of watermelon**. Some bee species are better than others at pollinating watermelon. Honey bees are not the best pollinator on a bee per bee basis, but they are so abundant in crop fields that they remain important for crop production. Bumble bees, on the other hand, are less common than honey bees, but able to move more pollen.

ICP researchers are identifying ways to support wild bees and managed honey bees on commercial watermelon farms. One strategy they are testing is adding wildflowers in field borders. Wildflower plantings in Northern California lead to more abundant and diverse bees. In addition, preliminary analyses show that **watermelon yield increased in fields with borders planted with wildflowers compared to those with weedy field borders**.



Native wildflower plantings provide extra pollen and nectar for wild and managed bees. Photo: Kimiora Ward (UC Davis)



Striped sweat bees (*Halictus* species) are some of the most common wild bees visiting California watermelon. Photo: Logan Rowe (UC Davis)

These studies suggest that **combining different pollinator species and farm management strategies can help growers ensure reliable pollination**. Depending on where your farm is located, some pollination strategies may be more appropriate than others. Wild bees are more often found in watermelon fields near natural habitat. In these areas, maintaining natural habitat will be important. Growers with fields far from habitat can diversify pollination strategies by combining honey bees and wild bees, and by planting flowering resources to support those managed bees and attract wild species.

Meet the Pollinators

Honey Bees (*Apis mellifera*) are the most common visitor of watermelon flowers – especially on large farms in intensively farmed landscapes. Honey bees are social insects; on any given day, a 6-8 frame colony will have roughly 14,000 – 19,000 pollinating bees. Hives are typically placed at a rate of 3-7 hives/acre for hybrid watermelon seed production. While honey bees can fly up to 3 miles from their hive, most prefer to forage on nearby flowers, so groups of hives within a field or along field edges are placed no more than 0.25 miles apart to ensure even pollination throughout the field.



Wild Bees are important pollinators of watermelon in Northern California, especially on small farms, where at least 23 bee species visit watermelon flowers. On a bee per bee basis, wild bees tend to be more efficient than honey bees. However, honey bees tend to be more common than wild bees. The best watermelon wild bee pollinators are bumble bees, squash bees, long-horned bees, and striped sweat bees.



Bumble Bees (*Bombus* spp.) are highly efficient watermelon pollinators. There are at least 7 species of wild bumble bees that pollinate Northern California watermelon. A single colony of bumble bees has around 25–400 bees. Because of their large body size, bumble bees are able to deposit more pollen than other bees making them especially effective at pollinating watermelon.



Squash Bees (*Peponapis pruinosa*) are solitary bees that nest in the soil. These bees collect pollen from pumpkin and squash, but will visit watermelon for nectar. In doing so, they inadvertently pick up and move pollen from male to female flowers. They preferentially nest in soil below squash and pumpkin vines and spend the Fall, Winter, and Spring below ground.

Long-horned Bees (*Melissodes* spp.) are solitary bees that nest below the soil surface. There are at least four species of long-horned bees that commonly visit watermelon in Northern California. Long-horned bees have long antennae in relation to their body size. Males have longer antennae than females.



Striped Sweat Bees (*Halictus* spp.) are a group of small, dark, striped bees that also nest below the soil surface. Although they are not able to deposit much pollen during single flower visits, they can be very abundant in watermelon fields and, therefore, become important pollinators.



Four Practices to Support Bees

1 Minimize pesticide risks to pollinators

Use integrated pest management (IPM) to make targeted pest management decisions. Avoid spraying during bloom. If sprays are needed, spray after dusk or before dawn when bees are not active in the field, and avoid tank mixes. Whenever possible, select pesticides that are less toxic to bees.

2 Add flowering plants to orchard edges or as a cover crop

Flowering plants provide pollen and nectar for bees. More diverse nutrition helps bees stay healthy and produce more offspring.

3 Communicate with your beekeeper

Set up a contract to define the expectations of both parties and communicate if spraying the field.

4 Provide honey bees with clean water

Honey bees need access to pesticide-free water for feeding larvae and cooling the hive on hot days.

Additional Resources

Integrated Crop Pollination
<http://projecticp.org>

Conservation Cover for Pollinators
<http://bit.do/meadows-for-bees>

Wildflowers for CA Crop Pollinators
<http://bit.do/wildflowers>

How to Reduce Bee Poisoning from Pesticides
<http://bit.do/reduce-risk>

Relative Toxicity of Cucurbit Pesticides to Honey Bees
<http://ipm.ucanr.edu/PMG/r116900311.html>

Watermelon Pollination Webinar
<https://learn.extension.org/events/2952>

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