

Do You “Know Your 5”?

SQUASH POLLINATION

With more than 350 species of bees in Vermont, it can be daunting to understand them all. This factsheet presents a brief overview of squash pollination and some important bees for — and supported by — blossoms of these crops. By identifying and understanding the natural history of these bees, you can provide the specific habitat that will help to ensure resilient and abundant pollination services and the tasty treats that result from the bee/plant relationship.

The domesticated western honey bee (*Apis mellifera*) gets credit for most of the agricultural pollination in North America. However, in many cases, wild bee species are more effective pollinators. And unlike honey bees in the Northeast, wild bees do not need human assistance to survive. They just need a safe place to nest and plenty of flowers to eat from.



Squash Pollination Overview

Insect mediated pollination is essential for fruit set and seed production. Flowers are single sex, presenting as either male or female. Male flowers appear before female flowers and outnumber female flowers. Each plant produces multiple flowers over several days. Blooms open for one day only, beginning pre-dawn and generally close around noon, never to reopen. Pollen viability is highest during early morning hours and fruit set requires around 2,000 grains of pollen per stigma. More pollen deposition can improve fruit set and retention.

General Recommendations For Supporting Diverse Pollinators

Provide flowers, especially native blooms, for as much of the growing season as possible. Also leave a messy area with leaf litter and dead plant stalks and stems, which provides important nesting and overwintering habitat for many bees. Use exclusion netting when possible, and be careful and conservative with pesticide applications. Avoid spraying during bloom or times of peak pollinator activity when possible, and follow an integrated pest and pollinator management plan.

The following five bees are important to pollination of and/or are supported by squash blossoms:

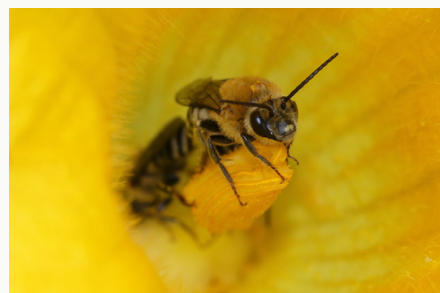
Bumble Bees (genus *Bombus*)

These large, charismatic bees are great pollinators of many crops. Most squash pollination is done by the workers, especially of the common eastern bumble bee (*Bombus impatiens*). Early blooming flowers (willows, maples, etc.) and nesting habitat (hedgerows, woodlots) are important to maximize local populations. There are 13 species in Vermont and with practice many can be identified in the field. Having multiple species on a farm adds resilience and increases pollination in inclement weather. (Photo courtesy of Kent McFarland.)



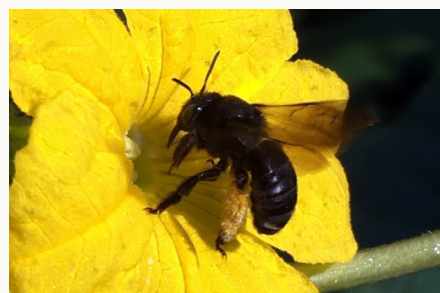
Pruinose Squash Bee (*Peponapis pruinosa*)

Originally evolved in the southwestern part of North America, this species followed human cultivation of cucurbits and is now widespread in the U.S., including Vermont. While closely associated with winter squash, pumpkins and zucchini (genus *Cucurbita*), it does not visit watermelon or cucumbers. This bee nests in the ground (preferably sandy soils) near squash fields or gardens.



Two-spotted Longhorn (*Melissodes bimaculatus*)

Females, pictured here, are all black with two distinct small white marks on her abdomen, in contrast to males of the same species who do not have these specific markings. This bee is a midsummer generalist with a fondness for squash, cucumbers, corn and peas. It is currently limited to the warmer Vermont valleys but is likely spreading north. It is also a ground nesting bee.



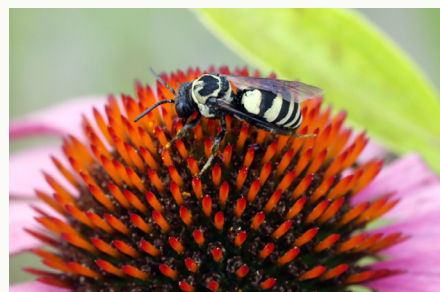
Western Honey Bee (*Apis mellifera*)

Honey bees are abundant and well known in most agricultural landscapes. In Vermont, they exist only in managed hives, though nearly all of the agricultural land in the state is well within the foraging range of existing hives. Colonies can be rented for pollination of specific crops, including squash. Even though it is less efficient than most wild bees on a per visit basis, it is often much more abundant. (Photo courtesy of Laura Johnson.)



Squash Longhorn-Cuckoo (*Triepeolus remigatus*)

This distinctive species is a brood parasite of the pruinose squash bee. The female lays its eggs in the nests of the squash bee where the larvae feed on stored squash pollen. While not a primary pollinator of squash, it is dependent on the pruinose squash bee for survival and likely is an indicator of a healthy squash bee population. The squash longhorn-cuckoo bee may be found “nectaring” on a number of commercial crops, including cucumbers.



All photos courtesy of Spencer Hardy unless otherwise noted. “Do You Know Your 5?” is a project of the Vermont Pollinator Working Group, with funding from the Gund Institute’s Apis Fund (<https://www.uvm.edu/gund/apis-fund>). For more information about bees, email shardy@vtecosudies.org. For questions about pollinator support practices on farms, email laura.o.johnson@uvm.edu.