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VERMONT POLLINATOR WORKING GROUP

GUND INSTITUTE FOR ENVIRONMENT

Do You "Know Your 5"?

APPLE POLLINATION

There are more than 350 species of wild bees in Vermont and it can be daunting to understand them all. This factsheet provides a brief overview of apple pollination and the five important bees for — and supported by — apple blossoms. 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 and the tasty treats that result from the bee/plant relationship.

Photo: Laura Johnson

The domesticated western honey bee *(Apis melifera)* gets credit for most of the agricultural pollination in North America. However, in many cases, wild bee species are more effective pollinators. 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.

Apple Pollination Overview

Many apple cultivars are self-incompatible or partially self-fruitful. This requires interplanted compatible pollinizer varieties for pollination and viable fruit set in large single variety blocks. Apple bloom time varies depending on the cultivar, but generally apples flower at a time in the spring when there are diverse and abundant wild insect pollinators for pollination.

Emerging research suggests nocturnal pollinators such as moths play an important synergistic role with bees in apple pollination. The presence of wild bees has been shown to increase honey bee movement between trees, increasing the chance of cross pollination. In many orchards where wild pollinators are sufficiently abundant, managed honey bees may not be required for commercial yield and fruit quality.

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, which provides important nesting and overwintering habitat for many bees. Be careful and conservative with any pesticide applications. Avoid spraying during bloom (whenever possible) and follow an integrated pest and pollinator management plan.

The following five bees are important to apple pollination:

Mining Bees (genus *Andrena)*

These bees are among the most abundant apple pollinators. At least 12 species have been recorded on apples with the Hawthorn Miner *(Andrena crataegi)* being the most common. This species is active from mid-May through June. Adding June blooms to a farmscape might help increase numbers of this and other species. Blackberries, American chestnut, cilantro and staghorn sumac are all good options for this bee.

Mason Bees (genus *Osmia)*

These shiny blue bees are efficient pollinators of many spring blooming fruits. The blue orchard bee *(Osmia lignaria)* is a well-known fruit tree pollinator that may be active as early as late March. Females can be identified by the pollen (or pollen collecting hairs) underneath the abdomen. Many species nest above ground in pre-existing cavities (including bee hotels).

Bumble Bees (genus *Bombus)*

These large, charismatic bees are great pollinators of most crops. Queens emerge in early spring and do most of the apple pollination. Smaller workers are born in early June. 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 Laura Johnson.)*

Unequal Cellophane Bee *(Colletes inaequalis)*

This is one of the first bees to emerge in the spring. The first signs of this bee are often "ant" hills with pea-sized holes which are the nesting sites of females. Other ground nesting bees make similar nests, but the large aggregations of this species in sandy soil are particularly noticeable. This species is done flying by early June but is likely an important pollinator of some orchards, especially early blooming ones near sandy soils which are their preferred nesting habitat.

Pure Green Sweat Bee *(Augochlora pura)*

These brilliant metallic bees are one of several green species which may visit fruit crops. The pure green sweat bee nests in rotting logs and stumps and can be abundant in many habitats, especially around heavy or wet soils where ground nesting bees are sparser. Leaving large logs to rot near an orchard is an easy way to attract this and several other log-nesting species.

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.

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