

Ground Cherry and Tomatillo Pollination

Do you “Know your 5”?

With more than 350 species of bees in Vermont, it's daunting to understand them all. Presented here is a brief overview of ground cherry and tomatillo 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.

The domesticated Western Honey Bee (*Apis melifera*) gets credit for most of the agricultural pollination in North America, but in many cases, it is the wild bee species that are more effective pollinators. And unlike the Honey Bees in the northeast - wild bees do not need human assistance to survive - just a safe place to nest and plenty of flowers to eat from.



***Physalis* pollination overview:** Ground cherries and Tomatillos are in the genus *Physalis,* which also includes at least one native species in Vermont. Ground cherries appear to be self-fertile, though with most crops, insect visits increase fruit quality and yield. Tomatillos are self-incompatible at the molecular level, called gametophytic self-incompatibility (GSI). While blossoms contain both pistils and anthers, cross pollination is needed across individual plants. At least two plants to provide genetic diversity are needed, which implies insect-mediated pollination is necessary. With five *Physalis* associated native bees, this genus presents an opportunity to support several rare bees with a commercial crop.

General recommendations for supporting diverse pollinators

Provide flowers, especially native ones for as much of the growing season as possible. Also leave a messy area with leaf litter and dead plant stalks, which provide important nesting and overwintering habitat for many bees. Be careful and conservative with pesticide applications - avoid spraying during bloom when possible, and follow an integrated pest and pollinator management plan.



Bumble Bees (genus Bombus) - These large, charismatic bees are great pollinators of most crops. Of the 12+ active species in Vermont, the Common Eastern Bumble Bee (*Bombus impatiens*) is the only one frequently found on *Physalis*. Early blooming flowers (willows, maples, etc) and nesting habitat (hedgerows and woodlots) are important to maximize local populations.



Cellophane Bees (genus *Colletes*) - Two similar species of cellophane bees appear to be specialists of Tomatillos and Ground cherries. They have slight differences in leg shape and flight period, but are otherwise indistinguishable. The more common Broad-footed Cellophane Bee (*Colletes latitarus*) is especially quick to find new plantings of Ground cherries or Tomatillos. Both nest in the ground.



Ground Cherry Fairy Bee (*Perdita halictoides*) - One of the smallest bees in Vermont, at ~⅛ inch in length. Easy to overlook and rarely recorded, though known to be abundant at a few sites. They only nest in sandy soils and are unlikely to forage more than a few hundred yards from the nest site. Listed as imperiled in Vermont.



Ground Cherry Sweat Bee (*Lasioglossum pectinatum*) - This is one of the few specialized Sweat Bees. It is considered critically imperiled in Vermont, and only known from a few locations, all tomatillo patches. Unlike some of the other specialists, this species has been recorded from June through October, making it potentially valuable for early or late tomatillo production. Ground nesting species.



Two-banded Cellophane-cuckoo Bee (*Epeolus bifasciatus*) - This parasitic bee is quite distinctive, and often more noticeable than its host - the Broad-footed Cellophane Bee - which is a Tomatillo and Ground cherry specialist. Like other cuckoo bees, this one is a generalist, visiting a number of different flowers, including Tomatillo and Ground cherries. The presence of this bee indicates its host is nearby, either on cultivated plants or wild ground cherries.

A project of the Vermont Pollinator Working Group, with funding from the Gund Institute's 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. All photos courtesy of Spencer Hardy unless otherwise noted..

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