



Oregon Cane Fruit Pollination



Cane Fruits Need Pollination



Cane (or bramble) fruits belong to the genus *Rubus*, which includes cultivated blackberries and red, black, and purple raspberries. Cane fruits are self-fertile, but **each flower needs pollen transferred by a pollinator to yield a fully formed, large fruit**. Poorly pollinated flowers are the most common cause of ill-formed, crumbly fruits, though certain viruses can cause this too. Most Oregon *Rubus* growers bring in managed hives of European honey bees for pollination. Several types of wild bees, particularly bumblebees, are regular visitors of cultivated *Rubus*, but honey bees are the predominant pollinators of Oregon *Rubus*. All bees visit *Rubus* flowers for nectar; many also collect the gray or pale tan pollen of *Rubus* to feed their young.

At left: Unpollinated blackberries (left), and blackberries that received full pollination (right). Poor pollination can lead to small, misshapen fruit. Photo: Jim Cane.

Three Practices to Support Cane Fruit Pollinators

1 Retain some natural habitat around crop fields and add additional flowering species to support wild bees

Uncultivated land can provide nesting sites for wild bees (e.g. rodent nests for bumblebees, deadwood for twig nesters like *Ceratina*, at right, and wood nesters like some *Osmia*, below left). Wild bees that pollinate *Rubus* are all floral generalists, so they can use many flowering species for pollen and nectar. This is essential to the social species like bumblebees that are active before and after *Rubus* bloom.



A twig-nesting Ceratina bee foraging on Rubus. Photo: Jim Cane.



Some Osmia species are being experimentally managed for Rubus pollination. Photo: Jim Cane.

2 Minimize pesticide risks to pollinators

Use integrated pest management (IPM) to make targeted pest management decisions. Avoid spraying insecticides on blooming *Rubus*. If sprays are needed, spray short-lived formulations after dusk or before dawn when bees are not active in the field, and avoid tank mixes. Whenever possible, choose pesticides that are less toxic to bees. Ongoing research is raising concerns about the risks of some fungicides; consult with extension or crop advisors for latest insights.

3 Communicate with your beekeeper

Set up a contract to define the expectations of both parties and notify your beekeeper in advance if you expect to be spraying insecticides.

Integrated Crop Pollination: combining strategies to improve pollination



Combining different pollinator species and pollination management strategies can help growers ensure reliable pollination of cane fruits. Cool, rainy, and windy spring weather can reduce activity by most *Rubus* pollinators, notably honey bees. In contrast, bumblebees fly and forage even during chilly, cloudy weather when honey bees remain in their hives. Having wild bumblebees on farm extends the hours when caneberries are pollinated. Bumblebees will need additional flowering resources, beginning before *Rubus* bloom (for example, from blueberries) and extending through the summer.

At left: A wild bumble bee foraging on red raspberry. Photo: Jim Cane.

Meet the Pollinators

Honey Bees

(*Apis mellifera*) are commonly managed or rented for *Rubus* pollination. Honey bees are effective raspberry pollinators, providing >10,000 foraging pollinators per healthy hive in fair weather. They distribute themselves well across a field. They are typically stocked at two hives/acre. At peak bloom in good weather, 1 honey bee per every 1-2 plants (3-6' of row) should satisfy pollination; fewer than 1 forager per 4 plants is too sparse. Survey away from apiaries, counting bees per plant or yard of row on facing row halves during a slow 40'-100' walk.



Wild Bees

A limited diversity of wild bees visit *Rubus* in Oregon. Excepting several twig-nesting *Ceratina*, all are ground-nesters (e.g. *Lasioglossum*, *Andrena*, *Halictus*). Generally no more than a few hundred individuals/acre were found during surveys of flowering *Rubus* (or just one female per 20 ft of row). All drink *Rubus* nectar and most collect its pollen. They are all floral generalists.



Bumble Bees (*Bombus* spp.) are frequently present at Oregon raspberries and blackberries. Five species are common *Rubus* visitors, as abundant as one bee every three blooming plants, but more typically, a few bumblebees per 100 ft of row. When abundant, they no doubt contribute to commercial fruit set, especially in cooler, rainier springs when honey bees remain in their hive. Queens are present during blueberry bloom, and worker generations are active through the summer.



Small Carpenter Bees (*Ceratina* spp.) are shiny black tiny solitary bees that nest and overwinter in small pithy twigs, including cut raspberry, blackberry and rose canes. They multiply in black raspberries (whose dead canes accumulate), cut stubs of dead raspberry canes (6" or taller), and roses. They are floral generalists and are active *Rubus* pollinators. Adults forage at flowers from before raspberry bloom through mid-summer, and again by late August.



Mason Bees (*Osmia* spp.) are infrequent *Rubus* visitors, but several western cavity-nesting species (*O. lignaria*, *O. aglaia*, *O. bruneri*) are being experimentally managed for *Rubus* pollination. All three are equally effective as honey bees for pollinating red raspberry flowers (research in press by Corey Andrikopoulos). Practical, cost-effective nesting substrates, shelters and stands have been developed for their commercial propagation (<http://bit.do/beemailshelter>), but honey bees remain the least expensive option on a per forager basis.

Additional Resources

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

Plants for Pollinators in Oregon
<http://bit.do/OR-bee-plants>

Gardening for Native Bees
<http://bit.do/ent133>

Blue Orchard Bees
<http://bit.do/BOBs>

OSU Extension: Raspberries for
the Pacific Northwest
<http://bit.do/pnw655>

USU Extension:
Raspberries for Utah
<http://bit.do/utah-raspberries>

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

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