

Creating Pollinator Habitat on Farms in Ontario

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Credit: Jay Adam

Dedicated to

The many farmers in Ontario that have already created or preserved pollinator habitat on their farms, especially the late Bob Irvine of Rocky Lane Farms (pictured above) who was an early implementer of pollinator habitat on his farm.

The growing number of farmers specializing in growing native plants and seeds for use in pollinator plantings.

This factsheet is also available online at <http://farmsatwork.ca/pollinators/resources>.

Who Are the Pollinators Providing Pollination Services on Farms?

Pollinators are insects, such as bees, flies, beetles, and moths or butterflies that transfer pollen from the male to female parts of plants to enable fertilization, seed set and fruit production to occur. In Ontario most crop pollinators are native bees like solitary bees and bumble bees, although non-native managed honey bees can also be important. Certain crops, especially those in the carrot family, are pollinated by flies. Native bees and flies also pollinate wild plants which allows those plants to reproduce and supply food for wildlife. For more information about native pollinators on farms see [Factsheet 1: Introduction to Native Pollinators on Ontario Farms](#)

What do Pollinators Need?

Globally, pollinator populations are declining. Many factors are contributing to this decline, including disease, pesticide exposure, climate change, and loss of habitat. For more information read “[Status and Trends of Pollinator Health in Ontario](https://rainelab.files.wordpress.com/2015/12/status-and-trends-of-pollinator-health-in-ontario-march-8-2017-tagged.pdf)” which can be found at <https://rainelab.files.wordpress.com/2015/12/status-and-trends-of-pollinator-health-in-ontario-march-8-2017-tagged.pdf>

Pollinators, like all other animals, require food, water and shelter. For most pollinators, food and water come from nectar and pollen gathered from flowers. Nectar provides an energy source and pollen provides a protein source. Unlike honey bees, native bees do not collect and use water to cool their nests. Nesting sites for pollinators are the equivalent of shelter, and these may be found in the ground, in hollow stems of plants, or in empty cavities such as abandoned rodent nests. Some bees collect mud to partition individual cells in their nests, others use leaf pieces (Figure 1) or soft hairs collected from fuzzy leaves (Figure 2) to line their nests. Bumble bees and some other groups of bees form annual colonies that are linked from year to year by individual mated queens. To survive the winter, these mated queens need overwintering habitat. In order for bee pollinator populations to thrive on farms, foraging, nesting, and overwintering habitat must be available as needed. Butterflies, and moths may require specific host plants on which to raise their larval stages. For example, Monarch Butterflies need milkweed to survive because their larva only eat milkweed leaves. Research shows that hoverflies that are pollinators at the adult stage and provide pest control at the larval stage show preference for certain plants when laying their eggs.



Figure 1 Nest cells of leafcutter bee (credit: S Chan)



Figure 2 Nest cells of woolcarder bee (credit: S. Chan)



Why Should Farmers Create or Preserve Pollinator Habitat on their Land?

Because farms cover such large areas of land, they have great potential to be beneficial to pollinators, while also benefitting themselves by protecting the pollination services that are necessary for high yield and quality in many crops. See [Factsheet 1: Introduction to Native Pollinators on Ontario Farms](#) for a list of crops that require or benefit from insect pollination services.

Farms in Ontario benefit both directly and indirectly from the activities of pollinators. Direct benefits come from the pollination of any insect-pollinated crop grown on the farm. Indirect benefits include pollination for seed production to enable farmers to plant crops such as hay crops, vegetable crops, canola, and others. For example, if a beef farmer feeds alfalfa hay to cattle, although the alfalfa does not need pollination to produce a crop, the seed that is used to sow the alfalfa crop relies entirely upon the pollination services of bees such as the alfalfa leafcutter bee.

Often farms will pay beekeepers for costly pollination services from managed honey bees. In some cases, this may be unnecessary if a healthy population of native bees already exists. For a variety of reasons, native bees may be more efficient pollinators of some crops than honey bees. As a result, encouraging and protecting strong native bee populations on farms can result in better yields and reduced costs, while benefitting the wider environment. Even in the farming system where honey bees are the pollinators of choice, research has shown that native pollinators are important contributors to pollination success.

Except for bumble bees, native pollinators pose very little stinging risk on farms.

What Should Farmers Do to Encourage and Protect Native Pollinators?

If farmers want to encourage healthy populations of native pollinators on their farms, creating and protecting plantings of pollinator-friendly plants provides one piece of the solution. Although crops provide food for pollinators during bloom, pollinators also require food during the rest of their active lives if they are going to survive to pollinate again the next year. Pollinator plantings on a farm can be designed to provide flowering plants near the crop that provide food for the pollinators when the crop is not in flower, but do not compete with the crop when it is in flower. These plantings can also have secondary benefits to a farmer as they can be aesthetically appealing, can be a secondary cash crop, can provide a wind break, erosion control, capture nitrogen or phosphorus, or have other benefits depending on the needs of the farmer and how the planting is designed.

What are Some of the Plants that are Commonly used on Farms in Ontario to Create Pollinator Habitat?

Many crops are in fact pollinator plants:

Orchard Crops	Provide excellent pollinator foraging habitat in spring. Attractive to all bees.
Strawberry Crops	Provide pollinator foraging habitat from spring to early summer. Strawberries are more attractive to solitary bees and flies than they are to bumble bees or honey bees because of the shape of the flower and the small amounts of nectar that the flowers provide.
Cane Crops	Provide high quality abundant pollinator foraging habitat when in bloom. Fruiting canes of raspberry provide nesting habitat for small carpenter bees (<i>Ceratina</i>) if they are not burned or shredded after pruning or mowing and are left in close proximity to the crop. <i>Ceratina</i> nests do not affect production negatively.
Gooseberry, Currants	Provide excellent high quality foraging habitat for all bees.
Haskaps	Provide excellent high quality foraging habitat very early in the spring. Especially supportive to newly emerged bumble bee queens because they bloom so early in the season when other nectar sources may be limited.
Legumes	Alfalfa, clovers, and trefoil used as hay crops, cover crops, or seed crops. Very attractive to most bees. To be a benefit to pollinators they must be allowed to flower. An acceptable compromise between maximum nutrient value of hay crops for animals and providing foraging habitat for bees can be reached by leaving hay uncut until 20% flower. Legumes such as beans are also attractive to pollinators.
Buckwheat	Used as a green manure crop, cover crop, and cash crop. It provides copious nectar to bees, however some of the newer licensed non-shattering varieties produce much less nectar than common buckwheat. For green manure and cover crops use common buckwheat.
Oil Seed Crops	Include canola, soybean, and sunflower which are grown for food-grade oil. Native bees visit all these crops for nectar and pollen, although canola and sunflower produce much higher quantities of nectar and pollen than soybean
Cucurbit Crops	Squash, pumpkin, summer squash, and gourds provide copious nectar and pollen in July and August to a wide variety of pollinators. These crops are the only food source for the specialist squash bee (<i>Peponapis pruinosa</i>). Cucumber and watermelon crops provide very little nectar to foraging pollinators and so are much less attractive, although they need insect pollination.
Herbs	Provide excellent nectar and pollen resources if allowed to flower
Asparagus	Provides nectar and pollen, especially favoured by honey bees
Rhubarb	Provides nectar and pollen. Allow to flower and remove flowering stalk before seed production

Although crops can be considered pollinator habitat during their bloom time, they rarely can provide foraging habitat throughout the active period of pollinators from April to October. For this reason, farms should consider non-cropped/natural lands as important foraging habitat for pollinators. Natural lands can also provide nesting and overwintering habitat in the form of standing deadwood, rotting logs, hollow dry stems, rock piles, tufted grasses and patches of bare ground. However many ground-nesting solitary bees that pollinate agricultural crops also nest in and around agricultural fields. Examples of pollinator habitat in non-cropped land can include:

Rock Piles: The spaces between rocks in a rock pile can provide overwintering and nesting habitat for bumble bees.

Standing Deadwood: Dead trees, especially those with channels bored by beetles or woodpeckers can provide nesting habitat to cavity-nesting bees. Carpenter bees can bore their own holes in wood to make their nests. Hollows in deadwood can also be used by bumble bees for their nests.

Rotting Logs: Rotting logs can provide nesting habitat for some solitary bees in Ontario, including the metallic green sweat bee, *Augochlora pura*.

Deciduous Trees: Trees like maples provide early spring sources to pollinators when nothing else is in bloom. Shrubs such as pussy willow provide copious nectar and pollen. Other trees such as ash, poplar, and oak can provide pollen later in the spring.

Hedgerow plants: These plants include trees such as hawthorn and wild apple and shrubs such as sumac, elderberry, wild raspberry, choke and pin cherries, and Canada plum. These flowering trees and shrubs provide nectar and pollen sources in the spring or summer. Pithy stemmed hedgerow plants such as elderberry, sumac, and raspberry can provide hollow stems for nesting habitat for some solitary bee species.

Marginal and unused lands: Marginal land is full of wildflowers that provide pollinator habitat. Flowers like goldenrod and asters provide an excellent fall food source for pollinators when crop plants have finished blooming. Known for their importance to Monarch Butterflies, common and swamp milkweeds are also very important nectar sources for bees that pollinate crop plants.



Figure 3 Honey bees gathering nectar from the monarch butterfly host plant, milkweed (credit: Nigel E. Raine)

To provide even more pollinator habitat, and to strengthen existing pollinator habitat, intentional plantings of pollinator plants can be established. Pollinator plantings can be established via seeding for herbaceous plants, via bare root stock for shrubs or trees, or via potted plants for both. The least costly method is planting from seed, but this requires proper seed bed preparation and careful attention to weed control during the establishment phase. Seeding is not effective for plantings to improve hedgerows or in wild scrubby spaces. Ideally native plant stock should be used but annual/perennial horticultural plants are also an option. Care should be taken to choose plants that are appropriate to your region and to the specific growing conditions such as sun exposure, and moisture levels. An online tool to help farmers choose pollinator plants is available at <http://decisiontool.farmsatwork.ca>.

Remember that the best pollinator planting is one that fits the farming system that you use. If you are a vegetable grower, intercropping annual horticultural plants and herbs within your growing system may be the easiest and most cost-effective way of providing pollinator habitat (Figures 4&5). If you are planting into uncropped land, bare root stock planted early in April or early May may work well. Directly planting native plants from seed to create a pollinator meadow requires some expertise to determine the best planting time, the best seed mix, and appropriate weed control. Contact your local conservation authority (<http://conservationontario.ca/conservation-authorities/find-a-conservation-authority/>) or native seed supplier for help.

Case studies and planting plans for a variety of pollinator plantings on Ontario farms can be viewed at <http://farmsatwork.ca/pollinators/pollinator-habitat-on-farms>



Figure 4 Planting herbs for pollinator habitat on Cedar Lane Farm, Morpeth, ON (Credit: Bea Chan)



Figure 5 Interplanting of annual flowering plants within a vegetable growing system at Howe Family Farm, Aylmer ON (Credit: Katie Fisher)