Lowbush Blueberry Fact Sheet

Indigenous Bees and Wild Blueberry Pollination

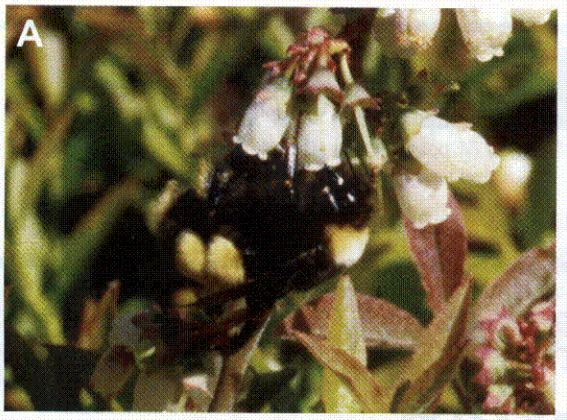
Wild blueberries are pollinated by a diverse and abundant indigenous or native bee fauna of more than 60 species. The major bee groups include bumble bees (*Bombus spp.*), as well as three groups of solitary bees, the Andrenidae, Halictidae and Megachilidae (*Osmia* spp.) (Fig. 1a-d). Indigenous bees make up on average 64% of the bees foraging on commercial fields, maintaining high populations even when managed bees are present. Some indigenous bees have been shown to be better wild blueberry pollinators (on a bee for bee basis) than managed honey bees and alfalfa leafcutting bees. Therefore, it is a wise investment to conserve or even enhance their numbers as much as possible.

Indigenous bees forage throughout their adult life, require proper nesting habitats, and sometimes require other items such as mating areas or a source of nest or cell material. These requirements are often specific to particular species or groups of insects. In order to sustain a diverse and abundant indigenous bee population, the agro-ecosystem must provide all their life requirements, and growers need to be aware of the consequences of their management activities on indigenous bees.

Bee Groups

Field recognition of the indigenous bee groups is useful for blueberry growers. **(1)** Bumble bees (Fig. 1a) are large (13-18 mm), fuzzy, often black and yellow coloured and make loud buzzing sounds while foraging. They have an annual colony cycle with a social period. The mated queens emerge in early spring, locate a nest site, and begin foraging and building their wax pots to rear young. Once the first adult workers (sterile females) emerge, the queen stays in the nest and lays eggs, while the workers take over both the nest and foraging activities. The colony builds up over the season until reproductive males (drones) and females (queens) are produced in late summer. After mating, the new queens dig into the ground to overwinter and the rest of the colony dies.

All females of the solitary bee groups are reproductives who build their own nests, forage for themselves and lay their own eggs. **(2)** The digger bees, *Andrena* species, (Fig. 1b) are small to moderate sized (7-14 mm) bees which nest in the soil, often within the blueberry fields. They may form large nest aggregations (Fig. 2) or nest singly among the plant roots. **(3)** The sweat bees, Halictids, (Fig. 1c) are a very diverse group of tiny to moderate sized (3.5-15 mm) ground nesting bees that are very common in blueberry fields. **(4)** The mason bees, *Osmia* species, (Fig. 1d) are usually not very common in blueberry fields. However, they are good blueberry pollinators and have potential to be semi-managed because they are above ground nesters. In nature, they use wood boring insect holes or cracks and crevices in wood or rock faces. Thus, we are able to supply them with artificial nests (Fig. 3) to build up field populations.



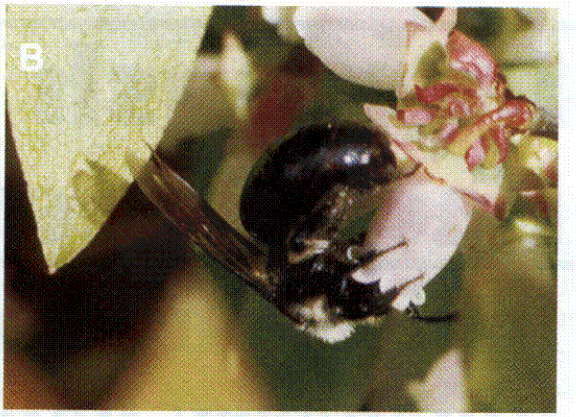


Fig. 1a-d. Bees foraging of wild blueberry flowers.
A. bumble bee, B. *Andrena sp.*, C. Halictid bee, D. *Osmia sp.*

Habitat Usage by Indigenous Bees

Various habitats in and around wild blueberry fields are used by indigenous bee species, all of which have a longer adult life than the blueberry bloom. The bumble bee queen is among the first bees seen in the spring and the colony lives into early fall. Many of the solitary species emerge a week or two before the blueberry bloom and live a few weeks after bloom is finished. Thus, it is important to have alternate forage plants in surrounding areas that are present before and after blueberry bloom. In early spring the flowering shrubs and trees such as willows and cherries are important. After blueberry bloom, wildflowers become important. Without these plants in the environment, bee populations cannot build up. While some bee species nest within the blueberry fields, many require other habitats. *Osmia* will be found nesting in forested areas, while bumble bees use abandoned fields and forested areas for nest sites. Some bees such as the *Osmia* species collect leaf material for their cells, using forest trees and herbs for this purpose. Still other bees have specific requirements for mating areas. Recent research by Steve Javorek and colleagues has shown that the more diverse the surrounding habitats around a blueberry field, the more diverse and abundant the bee fauna will be.

Fig. 2. ***Andrena*** **nesting site** showing entry holes

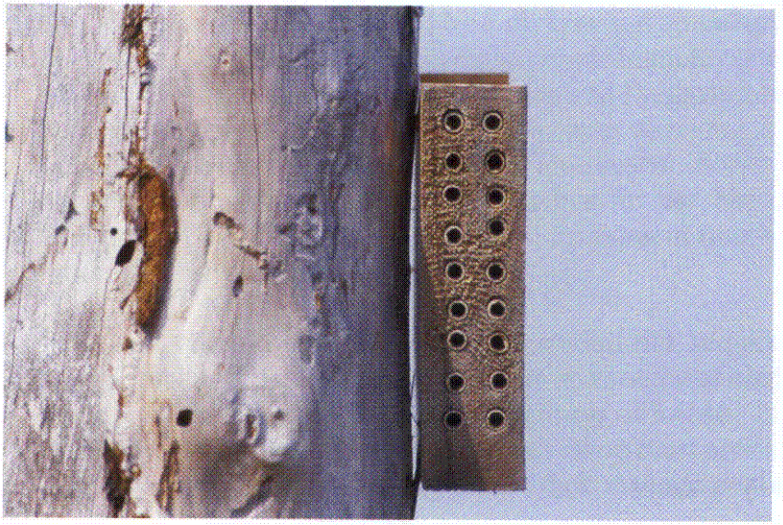


Fig. 3. Artificial nesting block for *Osmia* species

Indigenous Bee Conservation and Enhancement

Some ideas to encourage indigenous bee populations within the wild blueberry agro-ecosystem are listed here.

1. Split fields. Using fields that have both a prune and crop section each year ensures that there will be ample forage available every year. Because of the two year cycle of wild blueberry production, a field that is entirely cropped in one year becomes a 'feast' or 'famine' for bees, which doesn't encourage population build up. Small fields also promote bee diversity and abundance because of the surrounding vegetation.

2. Maintain diverse habitats surrounding fields. Maintaining edge with blooming herbs and shrubs, woodlands, meadows or wildflower areas, etc., ensures that everything required is present in the near landscape to provide at least some of the wide variety of habitats required by native pollinators.

3. Ensure diverse floral availability especially before and after blueberry bloom. Monitor areas surrounding your fields before and after blueberry bloom to see if there is any alternate bloom present. It is possible to plant flowers and shrubs in surrounding lands to ensure adequate forage for your indigenous bees.

4. Judicious use of pesticides. Always be careful with the use of pesticides and especially so during blueberry bloom. The best practice is not to apply pesticides during bloom. However, if an application is necessary and there is a choice, use the least hazardous material to bees. Apply in late evening or early morning when bees aren't foraging. Don't overdo herbicide use to ensure that alternate forage needed by bees is present.

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June 2004

Wild Blueberry Producers Association of Nova Scotia

Nova Scotia Wildflower Honey

Nova Scotia Agriculture and Fisheries

Canada Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada

Agri-Futures Nova Scotia's Adaptation Council

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