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# Pollinator Enhancement

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## *Pollinator Enhancement*

Cranberry requires pollination (pollen transfer from male to female flower parts) to maximize yields. Bees are the most important pollinators in cranberry. One bee, which has special structures on it body to carry pollen, may visit thousands of flowers, and in the process carry pollen from flower to flower. Taking steps to conserve and enhance a diverse assemblage of pollinators on a cranberry farm is an important best management practice. This helps to assure adequate pollination, carried out by many species, rather than depending on a single species. On most cranberry beds, many species of bees are associated with bloom, including bumble bees, mining bees, sweat bees, and leaf-cutter bees. This is in addition to the honey bee, a species introduced to the US nearly 400 years ago by European settlers. Honey bees come from managed hives, either via rentals from migratory operations or from local beekeepers; as of this writing, there are few feral colonies. Some of the practices detailed below show that even small changes may have significant impacts on pollinator numbers.

## Recommended Practices

**Be familiar with pollination levels on each bed.**

Walk the beds during bloom and assess pollinator numbers. Cranberry beds vary enormously in the level of bee activity during bloom. On an average bed, counts of pollinating bees should be in the range of 1-2 individuals per minute. Native bee counts (e.g. bumble bees) may be lowest on beds that are flooded by honey bees or on beds that are surrounded by extensive tracts of cranberry bogs or forest; on the other hand, isolated beds surrounded by varied land uses may have a high and diverse assemblage of pollinators.

**Be familiar with the types and diversity of native bees on each bed.**

Take note of bees that are carrying loads of pollen (yellow blobs on the leg or abdomen) on sunny days. This will include several species of **bumble bees** (*Bombus*), which all have hairy bodies with various and black and yellow patterns. All bumble bee species are social, meaning that there is a queen and workers that live together in a colony and share the labor of its maintenance. Bumble bees are the most important native pollinators on Massachusetts cranberry. They are several times more efficient at pollinating cranberry flowers than honey bees and may start to forage very early in the morning and continue towards dusk. A mated bumble bee queen overwinters and emerges in early spring. These large (ca. ¾ inch long) robust females can often be seen flying low to ground in search of next sites where rears a first worker brood. This new brood of workers (ca. ½ inch or smaller) takes care of the nest and collects food for other developing immatures in the nest. After the colony is established and grown, new queens and males are produced, some as early as June and through late summer. Depending on species, bumble bees nest at varied sites, usually cavities, for example, in abandoned rodent burrows, or in slash piles, stone walls, vegetative debris, or matted grass.

Some of the most common species of native bees are considerably smaller than honey bees, but may be highly efficient pollinators that forage under poor weather conditions. The may be social or solitary, but most are solitary. In a solitary species, a female constructs and provisions a nest by herself; she typically produces 20-30 offspring. Most solitary bees are active for only a few weeks and have only one generation per year. The different species may be difficult to tell apart. **Mining bees** (Family Andrenidae) are common in cranberry habitats and are ground-nesting bees. They carry pollen on the sides of the abdomen and on their hind legs. They create tunnels in the ground with entry holes that are ¼" or smaller; the entry holes may have mounds of excavated sandy soil around them and be easily confused with

anthills. The burrows are located in areas of well-drained, exposed soil.The different species range from small to medium-sized. Some of the larger and more common *Andrena* species are about the size of honey bees, and although they have furry thoraxes (central part of the body), the backside of the abdomen is shiny black and much less fuzzy than a honey bee. Others are considerably smaller and may be black, striped, or metallic green. **Sweat bees** (Family Halictidae) are also a common group of small native bees found on bogs. Most species nest in the ground and most are solitary. Large numbers may create nests close together. They are very diverse, are often small, and can be black, brown, striped, or metallic-colored. They carry pollen on their hind legs. **Leafcutter bees** (Family Megachilidae) are also found and are medium-sized native bees. Pollen is carried on the underside of the abdomen. See: ftp://ftp-fc.sc.egov.usda.gov/NH/WWW/New%20England_NRCS_Pollinator_Tech_Note_FINAL.pdf

**Determine whether good native bee habitat surrounds a bed.**

To enhance populations of wild pollinators, the cranberry agroecosystem should provide pollen and nectar in spring and summer, nest-site areas, and protection from insecticides. The entire landscape, not only the cranberry beds, but all of the surrounding upland, perhaps within 1/8 mile may be included in this assessment. Bees move extensively through these areas, so that resources may be somewhat distant from the cranberry bed: larger species like bumble bees may travel ½ - 1 mile, while smaller bees such as the mining and sweat bees may move only ¼ mile or less while foraging. Pollen and nectar-rich wild flowering plants in the open edges around cranberry beds and in the habitat surrounding the bog will be important in maintaining abundant bee populations. Observe plants where bees are foraging, for example, low-growing bramble and clover. Plants that are common pre-cranberry-bloom are bunchberry (*Cornus canadensis*), cherry (*Prunus*), blueberry, dangleberry, dangleberry, *Viburnum*, maple, birch, willow, and alder. After bloom, dewberry, aster, goldenrod, fireweed, sweet pepperbush (*Clethra alnifolia*), meadowsweet (*Spirea*), and buttonbush (*Cephalanthus occidentalis*) produce flowers that are visited by foraging bees. Habitat that might be favorable should be noted, for example, edges of ponds and streams, hedgerows, fence areas, road edges, standing dead trees, or bare areas. Bumble bees often nest in at the interface of a grassy area and woods, particularly in grassy thickets. Nesting areas for the many of the solitary bee species are well-drained or sloping ground sites that are free of plants or have patchy areas of bare ground. Others nest in dead/dying trees or rotting logs, particularly in abandoned beetle tunnels, and

**Conserve and protect good bee habitat.**

After you have determined that good bee habitat exists, take measures to protect it. Leave dead trees standing or piles of tree trunks in place. Allow areas of grasses along edges to create matted areas. Do not disturb patchy bare areas where there are nesting holes. Avoid mowing blooming plants, for example, clover or dandelions that are in grassy areas around the bog or stands of fall goldenrod that are distant enough to limit risk of invading the cranberry bed. Or, consider leaving strips of flowers or even mowing later in the season to allow bee-plants to flower.

**Consider enhancing stands of flowering plants.**

If floral resources are poor in the foraging area of the bog (before and after cranberry bloom), provide other areas of flowering plants. Blocks of flowers are more attractive and easier to find. The plantings do not have to be very close to the bog, but there is an advantage of having the plantings close to nesting habitats. Choose a large variety of species that bloom from very early in the spring to late fall. The continuous sequence of flower sources around the bog is probably one of the most important ways to support bumble bee populations since they are active all season and are unable to store food reserves for more that a few days. A diverse selection allows for bees with different preferences to be supported. For the

Northeast area, the Xerces Society for Invertebrate Conservation suggests that these flowering plants that would be well suited to local conditions: aster (*Symphyotrichum*), azalea, basil (*Ocimum*), basswood (*Tilia*), beebalm (*Monarda*), blazing star (*Liatris*), blueberry, boneset (*Eupatorium*), borage (*Borago*), catmint (*Nepeta*), cosmos, goldenrod, hawthorn, hyssop (*Agastache*), lavender, *Lobelia*, lupine, meadowsweet (*Spiraea*), milkweed, mountain mint (*Pycnanthemum*), New Jersey tea (*Ceanothus*), purple coneflower (*Echinacea*), Russian sage (*Perovskia*), serviceberry (*Amelanchier*), sneezeweed (*Helenium*), spiderwort (*Tradescantia*), squill (*Scilla*), sunflower, turtlehead (*Chelone*), wild geranium, wild indigo (*Baptisia*), wild mint (*Mentha*), wild rose, and willow (*Salix*). If there is a concern that plants that bloom concurrently with cranberry will draw pollinators away from the bog, this should be taken into account during selection of plantings.

**Create undisturbed bee zones for ground-nesting bees.**

Strips of land around the cranberry bed that are protected by a double row of evergreens (windbreak) or by a hill or hummock could support good bee habitat. Most of the native bees nest in the ground by burrowing tunnels down to chambers. Preferred locations are often on southern-exposed areas that are dry and warm. Thus, clearing vegetation (e.g., a 9'x9' area on a sunny slope or on flat bare ground) may provide nesting sites. Clearing of sites should occur only in the (early) spring (vegetation would provide insulation for overwintering bees).

**Protect bees from pesticides.**

Most insecticides are deadly to bees or may have sublethal effects, even newer chemistries such as Delegate or Belay. The insecticides used in cranberry vary enormously in toxicity to bees, ranging from highly toxic (Admire, Actara, Belay, Delegate, SpinTor/Entrust, Lorsban, Diazinon) to less toxic (Assail and Intrepid). When bloom is on the bed, do not spray or choose insecticides with the least toxicity to bees. Spray after dark; risk is reduced once the spray dries. Be careful that spray drift does not contaminate flowering weeds adjacent to the bed.

**Consult USDA's Natural Resource Conservation Service (NRCS).**

Programs may be available that support conservation and may cost-share efforts to enhance pollinator habitat. NRCS has programs that instruct growers how to establish and maintain pollinator plantings, providing not only specific methods, but also, plant lists that are suitable for a given crop and area.

**Appreciate the important role of native pollinators and recognize that even small changes in the habitat may conserve their numbers and diversity.**

**For more information:**

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Pollinator biology and habitat. 2009. USDA-NRCS New England Biology Technical Note

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*Prepared by Anne Averill, 2010.*

## *Pollinator Enhancement Checklist*

✓ Familiarize yourself with the habitat around your farm and its importance to pollinators.

✓ Consider enhancing stands of flowering plants.

✓ Protect bees from pesticides.