

Wild

POLLINATORS

Native bees and other creatures provide the ecological services that keep our web of life intact

We live in a state that is rich with wildlife. Some of us choose to go deep into the woods and mountains to experience it, while others may enjoy it from the porch. Wherever the view, we know that New Hampshire's wildlife are dependent on field, forest, edge, wetland and other natural communities to provide them with food, shelter and water year-round. Some animals – bear, deer and birds – can travel through a range of these ecosystems to forage for a wide selection of berries, nuts and other foods. Others are more specialized in their diet or, like skunk, turtle and chipmunk, have a smaller natural range. But they all have something unexpected in common: pollinators. Why? Pollinators provide the ecological services that support plant communities, which in turn ensure a healthy and adequate supply of food and shelter.

MORE THAN PRETTY FLOWERS

Pollination is much more than the reproduction of flowers. It is at the very root of what sustains an ecosystem. Each community – whether it's your backyard, the Concord Pine Barrens (where our own state butterfly, the Karner blue, ekes out a living) or your favorite hiking or fishing spot or raspberry patch—is in some way dependent on the interaction between insects and plants. These ecosystems exist if not solely, certainly largely due to pollinators, and not just from floral reproduction. For example, water and nutrient movement in soil and its texture are all improved by the activity of ground-nesting bees; beetle larvae create tunnels in trees where bees can nest; the larvae of butterflies, moths, beetles and flies consume plants, a process that helps maintain a natural balance. Except for the occasional moment when we pause to watch a pollinator at work, we take for granted that they are out there busily fulfilling their critical roles in the natural world.

Pollinators have been getting a lot of attention the last few years. Stamps in their honor and even their own national week (June 22-28, 2009) are well deserved for these unsung ecological heroes. Sadly, we have also been seeing the impact of Colony Collapse Disorder (CCD), which is severely diminishing honeybee colonies across the U.S. It has been devastating to many beekeepers and will no doubt have long-term effects on us as consumers, because we as a society have become heavily reliant on honeybees to pollinate food crops. The future for honeybees, and the systems they support, is uncertain.

Fortunately, honeybees are not our only pollinators, not by a long shot! Though honeybees are not native to the U.S., some 4,000 different species of bees are, and they've been pollinating our plant life since the beginning of time. The honeybee crisis underscores the need for us to take special care of our natives, to maintain our natural systems and the supply of food and shelter for wildlife and humans alike.

BEE V. BEE

Bees – all bees, not just honeybees – are the most efficient pollinators, in that they intentionally visit flowers to collect pollen and nectar to bring back to their nests to provide for their young. In the process, they unintentionally pollinate by transferring pollen from flower to flower. They also carry out something called “flower constancy”; they visit only one species on any given foraging trip. In this way, they do not waste pollen by bringing it to the stigma (female floral reproductive part) of a different species.

As pollinators, native bees have several advantages over the introduced honeybee. One example is the blue orchard bee (*Osmia spp.*) or

BOB. This species, like the majority of our native bees, is “solitary.” Solitary bees do not live in social groups like the more familiar bumblebees or honeybees, but rather each nest contains individual cells. The female will provision a cell with “bee bread,” which she makes from pollen and nectar. She then lays a single egg in each cell, seals it up and repeats this for however many eggs she will lay in that given nest. The BOB, leafcutter and other wood-nesting bees often have only a few eggs in a long, narrow nest; others, like ground-nesting bees, can have very complex tunnels containing many, many brood cells. Once the egg hatches, the larva will feed on its nectar/pollen meal, giving the nourishment it needs to transform into the next life stage, the pupa, before emerging as an adult bee.

Although the blue orchard bee pollinates many native shrubs and trees, an important one is the early fruiting apple family (*Rosaceae*), which many of our resident wildlife depend on for food and cover. Some of these you may know well: serviceberry, wild

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A hummingbird moth uncurls its proboscis to feed on long, tubular flowers; pollen sticks to its body and is carried to the next flower.



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Nonnative honeybees (left) have distinctive leg “pockets” for pollen; efficient native bees, like the blue orchard bee (center) and bumblebees (right), perform the essential service of pollination in slightly different ways.

cherry, hawthorn, blackberry and raspberry. Many orchardists and growers have incorporated the blue orchard bee into their pollination systems for some of these species, just as nature did eons ago.

The honeybee carries pollen in leg “pockets” and mixes it with nectar, making it moist, thus minimizing its transfer as she moves among the flowers. The female BOB, on the other hand, has numerous body hairs called *scopa* densely packed under her abdomen and on her legs; these hairs hold considerably more pollen than a honeybee’s pocket, allowing the pollen to catch on the stigma of the next flower. Interestingly, the honeybee’s anatomy actually prevents its body from even touching the anther (which holds the pollen) of some flowers, while the orchard bee, like many native bees, lands directly on this male floral reproductive organ while nectaring. Being a rather “skittish” kind of bee, the orchard bee tends to flit from tree to tree,

providing better cross-pollination. In contrast, the honeybee spends more time on every blossom of the same tree. All of these characteristics provide higher pollination results for the BOBs. Some other interesting differences between native bees and honeybees:

- Honeybees, because of their short tongue length, are unable to pollinate many native plant families.
- Many native bee species fly at lower temperatures, which means they are busy earlier in the day when pollen begins germinating – resulting in more pollination opportunities.
- Native bumblebees and some solitary bees perform an effective technique called “buzz pollination,” where they buzz their wings to release firmly held pollen from the anther of some plants such as blueberries. (In some cases, at a certain pitch – tomatoes are at middle C!)

How You Can Help Our Pollinators

Individual home and landowners can take steps to help offset some of the challenges faced by native pollinators. We want not only to attract pollinators, but offer what is being taken away – the often-overlooked shelter and nesting sites. Some things to consider while you’re gardening and doing yard work this year:

- Most native bees are solitary and many nest in wood. Some make their own nests, but most use existing holes often made from wood-boring beetles. Leave snags and dying trees, when it’s safe to do so; these also provide homes for the eggs and larvae of many fly and beetle species.
- You can buy or make bee nest blocks or tie hollow stem bundles together (making sure the back end is closed off). Leave mud areas – mason bees and wasps use mud to build the walls in the nests.
- Bumblebees prefer undisturbed sites, such as meadows with grassy clumps, where they may move into an abandoned mouse nest. Keep open areas and minimize turning over soil so as not to disturb other ground-nesting bees.
- If you have a large expanse of lawn, consider keeping part of it unmown and create a meadow – reintroduce natives and watch for invasives.

- Reduce or eliminate pesticides, or look for natural alternatives that won’t harm “good” insects and other wildlife.
 - When planning your landscape, use different tree/shrub layers. For the herbaceous layer or garden, consider flower shape, color, fragrance, season and plant family. Group plantings for pollinator efficiency and safety from predators.
 - Let your garden be a little more relaxed. The leaves you rake up every fall may house the cocoons and pupae of moths and butterflies. The seedhead, stem and leaf clippings you toss in the compost pile may contain eggs that would have otherwise overwintered. Leave your plants whole – they are all part of your pollinators’ habitat. Even rotting fruit provides a source of food for bees and butterflies.
- For more on pollinator conservation, visit the Xerces Society website at www.xerces.org.



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Attract solitary bees by putting out nest boxes, such as this one made of Binderboard®.

- Bumblebees will come out in rainy and cooler weather, while honeybees will retreat to the warmth of their hives.

SHARING THE WORK

It's not just early-rising native bees doing pollination duty – but also native moths, flies, wasps, butterflies and beetles. You have likely seen the syrphid, or hover, fly which actually looks like a diminutive yellow (or white) and black striped bee or wasp. Not only is the syrphid fly an important pollinator, but the larvae of different species feed on decaying matter, aphids, thrips and other destructive insects – another essential ecological service.

Pollinating moths, flies and the rest do not collect pollen intentionally, but like their buzzing counterparts do move pollen from plant to plant inadvertently. It collects on hairs, scales, even feet and antennae while they feed on nectar – or the flower itself – hunt an insect meal, search for warmth or even a mate. When they visit the next plant, the pollen sticks to the flower's stigma. While not always visiting the same species of plant decreases the guarantee of pollination, this in no way diminishes their importance as pollinators.

Native pollinators are adapted to environmental stresses, such as temperature fluctuations, and have well-developed resistance to pests and disease. But insects are wildlife, too. They have the same needs as other wildlife species, and they suffer similar threats, yet on a greater scale, because of how numerous and

widespread they are. Some of our pollinators serve as “indicator” species, in that their health can help warn us of changes in an ecosystem. The greatest risks to native pollinators are overdevelopment; invasive species; and pesticide use that results in habitat loss, habitat degradation and diminished floral diversity.

A handful of New Hampshire's native pollinators are “species of concern” – mostly moths and butterflies associated with Pine Barrens and high-elevation habitats. As more and more communities start using the habitat conservation strategies specified in the N.H. Wildlife Action Plan, the future health and abundance of these and all our native pollinators will be a little more secure.

A SAFE FLIGHT

Our native pollinators tell us so much about the interconnectedness of nature, as they quietly do their part to maintain our plant and wildlife diversity. If we want to continue our outdoor pursuits, have food on the table, and enjoy our views from the porch, we need to keep our smallest inhabitants in mind, right beside the larger furry ones.

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It's not just bees; native moths and butterflies like the painted lady (below left) also pollinate our plant life. The bee-mimic hover fly (below) and a variety of beetles do their part, too.



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