



NYC Parks

# Habitat Gardening

Parks and gardens provide essential habitat – places that provide food and shelter for local biological diversity. The best way to maintain this habitat is by planting native wildflowers, shrubs, and trees, and leaving our gardens in a more natural state with leaves, logs, and plant stems.

Birds and insects rely on plants as a source of food, providing pollen, nectar, fruits, nuts, and seeds. They also need plants for shelter and nesting sites. Native plants have co-evolved with other native plants and animals. They are adapted to the local food chain, part of the local soil food web, more resilient than exotic species, and better adapted to regional climate cycles. Studies have also shown that introduced plants do not provide the same amount of food resources that native plants do.

The vast majority of insects are harmless. Almost all pollinators are insects (other pollinators include birds and bats). Many amphibians, reptiles, birds, and mammals eat insects as their sole food source or at least a portion of their diet. Some insects feed on other insects, keeping harmful pest populations in check. Others feed on decaying plant and animal matter, decomposing the dead matter and producing much of the nitrogen, carbon, and minerals that plants need for growth. They contribute to soil quality by aerating the soil profile. Insects that perform these functions are generally called “beneficials.”

Two groups of insects are of particular importance: caterpillars of butterflies and moths, and pollinators. The former are an essential part of the food web, especially for songbirds, and the latter, especially native bees, fulfill the essential function of pollinating not only our food crops but also our native plants.

**Flower Diversity:** To provide pollen and nectar for pollinators, select several different plant species that flower at once, so that you have plants flowering throughout the growing season. Use plants with different flower sizes, shapes, and colors, as well as varying plant heights and growth habits. Create diverse plantings that resemble naturally occurring native plant communities and are the most likely to resist pest, disease, and weed invasions. Avoid cultivars that have been bred for features such as color or petal size; these plants may have become incompatible with the insects that evolved to eat them. Include native grasses along with wildflowers. Grasses, in particular bunch grasses, provide habitat for many insects, especially caterpillars and grasshoppers, and birds eat their seeds during the winter months.

**Larval Host Plants:** Leaves are the primary source of caterpillar food, whereas butterflies need nectar sources. Birds eat insects, seeds, and fruit, but feed their young primarily caterpillars. One nest of chickadees needs 6,000 to 9,000 caterpillars. Some species of caterpillars will eat only a single species of plant, while others will eat a wide range. Often, butterflies and moths have specialized relationships with a native larval host plant, and they lay their eggs directly on the host plant for the soon-to-be caterpillar to begin feeding.

**Shelter:** Along with needing plants for food, butterflies and moths need secure places to pupate, spend the winter, and seek cover during bad weather. Under tall grass, leaf litter, and pile of leaves or sticks are all places caterpillars will crawl to pupate. Butterflies that overwinter as adults are likely to take shelter in tree cavities, behind loose bark, under logs, leaf litter, or rocks, or within evergreen foliage. Man-made sites such as stone walls, buildings, and fences also provide shelter. Butterflies also like to bask on rocks to warm their bodies.

Birds and insects both need undisturbed habitat for reproduction and winter hibernation. Insects like bunch grasses, leaf litter, bare ground, pithy (soft or spongy) stems, thick piles of dead brush, rock piles, or decomposing logs, stumps, and snags (dead or dying trees) for overwinter survival, egg-laying, and pupation. Leaf litter is a refuge for many insects.

**Birds** like layers of plants – an overstory or high tree canopy with a mid-story of smaller trees and shrubs, and an understory of groundcovers and perennials. They like to find shelter, sleep, and nest in evergreen conifers or a thicket of branches. They tend to perch in dead trees, which they use as singing posts to defend their territories. Leave a few dead branches in shrubs where they do not pose any hazards.

Berries from introduced plants contain very little fat and are high in sugar, whereas berries from native plants are loaded with fat. Both migrating and overwintering birds depend on fall berries for the fats they need to either fuel their migration or build fat reserves for the long winter months if they don't migrate. Planting in clumps helps by providing highly visible, massed displays of fruit. This will also ensure that there are male and female plants, and that the females are pollinated and produce fruit.

**Native bees**, for the most part, are solitary and approximately 70 percent nest in the ground, digging tunnels in patches of bare or sparsely vegetated, well-drained soil. Ground nesting bees are easy to accommodate as long as the soil is loose enough for them to excavate. They like small bare patches of sunny, well-drained soil, and where possible, a southeast-facing slope. You can create a mound of sand or sand/loam or dig a pit and fill it with a sand/loam mix to attract ground nesting bees. Avoid walking across the site. Look for holes in the ground surrounded by small mounds of excavated soil, similar to an ant's nest.

The remaining 30 percent of solitary native bees are cavity nesters. They use abandoned beetle burrows or other tunnels in stumps and snags, as well as pithy plant stems. Young adults emerge in early spring or early summer depending on the type of bee. Leave perennial stems standing through the winter as shelter for overwintering insects. Cut the stems 15" high in the spring, as new growth will cover the stems, or if you must cut shorter, throw the stem cuttings behind larger shrubs and leave them for the bees to find or emerge from if they have already nested. Woody stem nesters also build their nests in soft wood such as downed logs or branches or dead branches attached to a tree.

One of the only native bees that is social is the bumble bee. They live in small colonies and like to nest in tree cavities, under roots, leaves, logs, rock piles, or empty mouse burrows. To find active ground nesting bees or a bumble bee nest, pay attention to bees flying low over the ground where flowers are *not* present, especially if they look as if they are searching for something.

**Habitat Tips:** In addition to providing floral resources for food, it is important to protect nest and egg-laying sites. Tolerate some dead wood and leave a few untidy corners. By managing habitat for bees and butterflies, you will meet most of the overwintering and egg-laying needs of flies and beetles and the nutritional needs of their larvae.

Bees nest in pithy stems of perennials such as monarda, sunflower, black eye Susan, penstemon, coneflower, goldenrod, and asters, as well as woody plants such as elderberry, oak leaf hydrangea, and sumac.

The clumping base of native perennial **bunch grasses** provide shelter and overwintering sites for butterfly life stages as well as shelter and nesting areas for bumble bees and other beneficial insects, such as beetles. Let the grass grow tall and fall over in clumps. Bunch grasses include *Panicum virgatum* (switchgrass), *Andropogon gerardi* (big bluestem), *Schizachyrium scoparium* (little bluestem), *Sorghastrum nutans* (Indian grass), *Sporobolus heterolepis* (prairie dropseed), and *Carex spp.*

**Butterflies** need larval host plants and nectar sources. Native oaks, willows, and wild cherries support dozens, if not hundreds, of butterfly and moth species. A number of trees and shrubs are also important nectar plants and some, such as buttonbush and chokecherry, can act as both larval hosts and nectar sources. *Vaccinium* (blueberries and cranberries), the number two woody plant for specialist bees, is also highly ranked in the caterpillar list. Milkweeds are particularly important as they are the host plant for monarch caterpillars.

**Herbaceous flowers for forage:** Goldenrod, aster, and sunflower are ranked number one, two, and three for caterpillars and bees. These plants are also attractive to generalist pollinators such as butterflies, flower flies, and solitary wasps. Other top perennial plants include Joe pye weeds, monardas, and mountain mints.

Early season flowers: *Aquilegia canadensis* (columbine), *Geranium maculatum* (wild geranium), *Penstemon spp.* (beardtongue), *Pycnanthemum spp.* (mountain mint), *Lupinus perennis* (wild lupine), and *Zizia aurea* (golden Alexanders).

Mid-season: *Agastache foeniculum* (anise hyssop), *Asclepias spp.* (milkweeds), *Echinacea spp.*, *Eutrochium spp.* (Joe Pye weed), *Helianthus* (sunflowers), *Heliopsis helianthoides* (false sunflower), *Liatris spp.*, (blazing star), *Lobelia spp.*, *Monarda spp.* (bee balm), *Oenothera spp.*, *Penstemon digitalis* (smooth beardtongue), *Rudbeckia spp.* (black-eye Susan), *Verbena spp.* (vervain), and *Vernonia spp.* (ironweed).

Late season: Asters (*Symphyotrichum* and *Eurybia spp.*), *Eupatorium perfoliatum* (boneset), Goldenrods (*Solidago* and *Euthamia spp.*), and *Helenium autumnale* (sneezeweed).

**Shrubs for forage:** *Amelanchier* (shadbush), *Aronia spp.* (chokeberry), *Ceanothus americanus* (New Jersey tea), *Clethra alnifolia* (sweet pepperbush), *Cornus* (dogwood), *Prunus virginiana* (chokecherry), *Rhus spp.* (sumac), *Rosa spp.*, *Salix spp.* (willow), *Sambucus spp.* (elderberry), *Vaccinium spp.* (blueberry), and *Viburnum spp.*

Be mindful of plants that spread easily. Here are a few examples:  
*Asclepias syriaca*, *Eupatorium perfoliatum*, *Helianthus divaricus*, *Monarda fistulosa*, *Solidago canadensis*, *Solidago speciosa*, and *Symphyotrichum laeve*.

**Birds** are a little more complicated. Different birds need different types of food in different seasons. Chick rearing birds in the spring need a lot of energy, so fruits high in sugar such as blackberries, mulberries, and wild cherries are good choices. Fall migrants need fruits with a high fat content such as the fruits from flowering dogwoods, spicebush, and mapleleaf viburnum. Birds that over-winter need fruits that are persistent through the winter such as conifers, bayberry, hawthorns, crabapples, and sumacs.

## Resources

Native Species Planting Guide to New York City 3<sup>rd</sup> edition

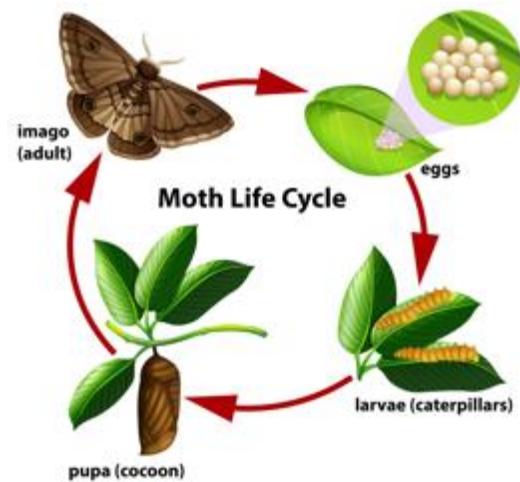
[https://www.nycgovparks.org/pagefiles/144/Native-Plant-Guide-2019-Final-CC\\_\\_5dbb1a8b1bc6a.pdf](https://www.nycgovparks.org/pagefiles/144/Native-Plant-Guide-2019-Final-CC__5dbb1a8b1bc6a.pdf)

<https://www.nwf.org/nativeplantfinder>

<https://xerces.org/pollinator-conservation/pollinator-friendly-plant-lists>

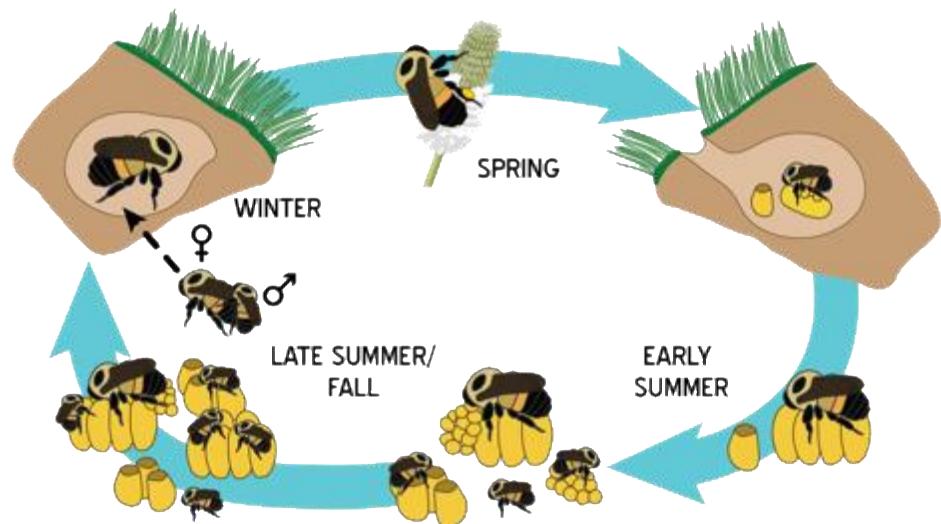
<https://www.audubon.org/plantsforbirds>

**Moth life cycle:** Caterpillar eggs and larval stages are completed on host plants. Oak trees support the most species of caterpillars of all trees – 557 in the mid-Atlantic region. The caterpillar falls off the tree and either burrows into the soil, a rotting log to pupate, or spins a cocoon in the leaf litter under the tree. Native groundcover beneath trees makes the perfect site for caterpillars to complete their development – not compacted lawn. Add a fallen log or old tree stump to the bed. Once a moth emerges, it needs to find a mate before it can lay its eggs in the oak tree above. Many moths require energy from nectar collected from nocturnal flowers nearby. Then they lay eggs in the oak tree, and when the eggs hatch, the caterpillars feed on the leaves of the oak tree, feeding dozens of baby birds.



<https://www.vecteezy.com>

**Life Cycle of a Bumble Bee:** Fertilized queens survive the winter, emerge in early spring foraging for nectar and pollen. She will select an underground nesting site to build a nest to lay eggs. Once the worker bees pupate she will let them do all the work. New queen bees will mate in the fall and hibernate alone for the winter.



<https://wisconsinbumblebees.entomology.wisc.edu/about-bumble-bees/life-cycle-and-development/>