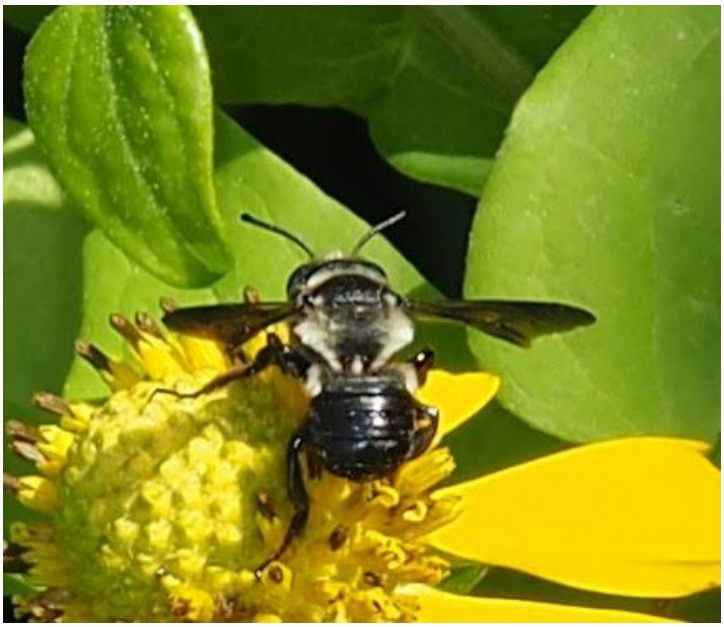
Gardening for bees

Everyone knows that the European honeybee has taken terrible hits in recent years. What is less well known is that the 400+ species of native bees in Virginia are under serious threat from the actions of human beings. Not only are native bees important pollinators of many food crops, they play an essential role in our ecosystem as a whole. Bees and a whole array of less noticeable animals - including many species of flies, ants and beetles - pollinate the majority of the plants we see around us. In other words, they ensure the survival of most of the plant kingdom.

Want to save the bees? This task is far more complicated than you might guess. Here is the bottom line:



1. Humans cannot reproduce the vast and complicated biodiversity of natural areas, so the first priority has to be preservation of those areas and removal of invasives. Even small patches of invasive plant species have cascading effects on the insect population of a much greater area around them. Removing those invasive plants does wonders for biodiversity.
2. Where natural biodiversity has already been destroyed, humans can help by planting a wide variety of native species. You can't prevent species extinctions by focusing on a single plant-pollinator interaction. You have to focus on the ecosystem as a whole. So add as many species of native plants as your growing conditions allow, and cram in as many plants as you can afford. Plan for a succession of blooms from early spring to late fall.

Different bee species need different types of nectar and pollen. The species that are in decline are the ones who need the most help. They specialize on certain plants and are more susceptible to the effects of insecticides.

- Nectar: Adult bees use nectar for their own energy, and some bees are plant generalists. Many are specialists, though, requiring flowers of different shapes depending on the length of the bee's tongue and other foraging factors.

- Pollen: Not all pollen is the same. Bees get themselves covered with pollen accidentally and therefore help with pollination. But to feed their young, they need the pollen from specific plant species and seek it out deliberately, often "buzzing" the flowers to collect it. The population of many species of bees is limited by the availability of the right pollen. One strategy to provide needed food

pollen from spring to late summer would be to plant native willows, native St. John's Wort, Virginia Rose and Carolina Rose.

The problem of non-native plants: Even a small patch of non-native flowers may seriously distort the diversity of bee species in your garden. It is always best to stick to natives. Seeing a large number of bumblebee individuals in your yard does not necessarily mean you have created a healthy ecosystem. If you are trying to prevent the decline of threatened bee species, what counts is how many different bee species you are seeing.

The problem with insecticides:
Studies of the effect of pesticides on bees have focused on short term effects on those species that have immediate economic importance to human beings, namely the European honeybee and to a much lesser extent, the Common Eastern Bumblebee. Massive and heart-breaking die-offs of individual worker bees are dealt with by generating more queen bees under artificial conditions. Meanwhile, the effect of pesticides on the numerous declining species of native bees is largely ignored, though studies have demonstrated that they are more susceptible to lower doses of insecticides.

Plants for bees

About 80% of bees are plant generalists - they can forage on a wide variety of flowers. To support these bees, provide a succession of blooms from early spring to late fall. Use locally native plants that fit into the ecosystem.

20% are specialists, requiring certain plant species. (An easy example is the Southeastern Blueberry Bee.) The life cycle of these bees is timed to the bloom time of their plants. One major determinant of which flowers they use is the shape of the bloom. For example, some bees have absurdly long tongues, others have short ones. All these bees (and their associated plants) are essential for a healthy ecosystem.

Examples of plants for specialist bees (always choose the native varieties within these categories):

Perennials

- Spring beauty *(Claytonia virginica)*
- Jacob's ladder *(Polemonium reptans)*
- Golden ragwort *(Packera aurea)*
- Native wild strawberries *(Fragaria virginiana)*
- Violets *(Viola sororia, labradorica, pedta, pubescens, striata, cucullata)*
- Golden Alexander *(Zizia aurea)*
- Beardtongue *(Penstemon digitalis)*
- Sun drops *(Oenothera fruticosa, biennis)*
- Hibiscus *(Hibiscus moscheutos)*
- Monarda *(Monarda didyma, fistulosa, punctata)*

- Thistles *(Cirsium discolor, muticum, carolinianum, altissimum)*
- Woodland sunflowers *(Helianthus divaricatus, angustifolius, strumosus)*
- Asters *(Symphyotrichum laeve, novae-angliae, novi-belgii, cordifolium, lateriflorum, oblongifolium; Eurybia divaricata)*
- Goldenrods *(Solidago altissima, caesia, flexicaulis, graminifolia, juncea, nemoralis, odora, rugosa)*

Trees and shrubs

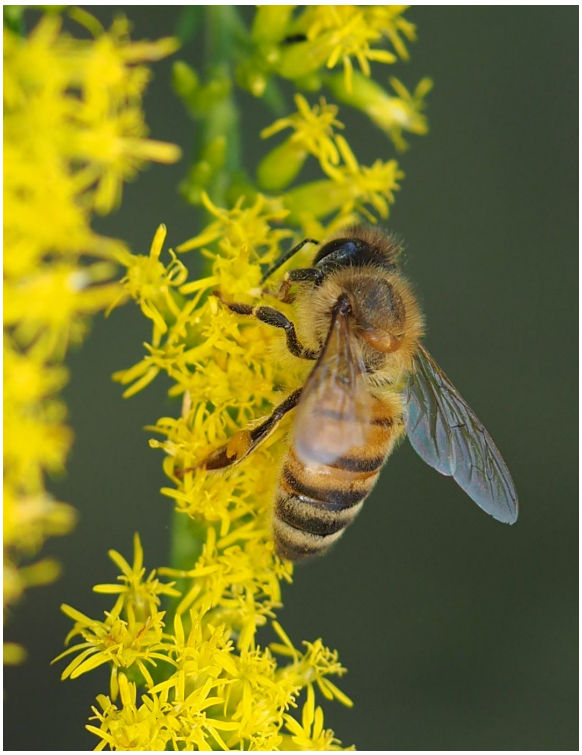
- New Jersey tea *(Ceanothus americanus)*
- Hollies *(Ilex verticillata, opaca, glabra)*
- Willows *(Salix nigra, sericea)*
- Blueberries *(Vaccinium corymbosum, pallidum, angustifolium)*
- Native roses *(Rosa carolina, palustris)*
- Saint John's Wort *(Hypericum prolificum)*

Honeybees are generalists that prefer to forage on one plant species at a time, so trees and mass plantings of perennials work well for them, but of course there need to be multiple species within a mile or so to feed them all year. The main source of food in the spring is trees, so local woods do the work here. As those flowers finish, we need to provide summer and fall perennials. They prefer some species over others.

Native species which are particularly popular with honeybees include:

Perennials

- Blazing Star *(Liatris species)*
- Mountain Mint *(Pycnanthemum species)*
- Joe Pye Weed (*Eutrochium species)*
- New England Aster *(Symphyotrichum novae-angliae)*
- Goldenrods *(Solidago species)*



Trees and shrubs

- Tulip Poplar *(Liriodendron tulipifera)*
- Maples *(Acer rubrum)*
- Oaks *(Quercus alba, bicolor, coccinea, falcata, marilandica, michauxii, montana, muehlenbergii, palustris, phellos, rubra, stellata, velutina)*
- Hazelnut *(Cornus americana, cornuta)*
- Redbud *(Cercis canadensis)*
- Dogwoods *(Cornus alternifolia,amomum, florida, racemosa)*
- Birch *(Betula nigra)*
- Magnolias *(Magnolia virginiana)*
- Sumacs *(Rhus aromatica, copallinum, glabra)*
- Black Locust *(Robinia pseudoacacia)*

- Buttonbush *(Cephalanthus occidentalis)*
- Summersweet *(Clethra alnifolia)*
- Witch Hazel *(Hamamelis virginiana)*

Nest sites

Most native bees are ground nesters. Provide them with some bare ground to tunnel into.

Some bees nest in dead plant stalks. Leave the plants in place over the winter, then cut them back to around 18 inches in late winter or early spring. At that point, the bees may burrow into the cut ends to lay their eggs. Continue to leave these stems in place until a year later, after the next generation of bees has had a chance to emerge in the early spring.

Bee boxes are cute. They may or may not be helpful to bees.
http://ahsgardening.org/uploads/pdfs/Native_Bees_TAG_ND14.pdf

How to ID bumblebees and study them in your own yard:
https://beecology.wpi.edu/website/participate#page-title

Fascinating lecture on plant-pollinator interactions:
https://grownativemass.org/Great-Resources/experts-videos/More-than-Just-the-Buzz

Providing nest sites:
https://www.xerces.org/publications/fact-sheets/nests-for-native-bees