Blooms,

Stems, Foliage, Roots, Sap, Seeds…

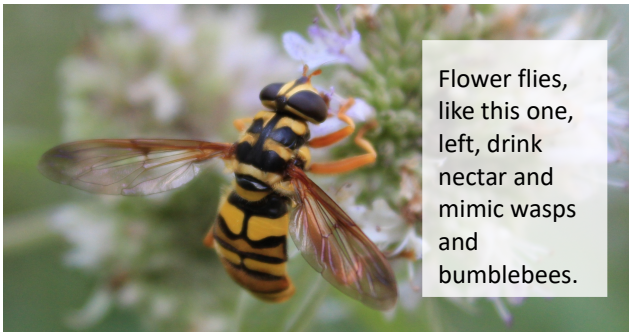
Exploring how native insects depend on native plants

When we see a native plant, the first thing we often think of is its bloom: the pink pea-like flowers of Redbuds, the cheery yellow of Spicebushes, the tiny pink trumpets of Wild Basil that are blooming as I write. Sometimes, we think of its foliage, seeing it as a host plant for caterpillars of monarchs or buckeyes or swallowtails. But, how often do we think of its roots? How often do we think of its sap?

Native insects depend on native plants in specific ways. Some, like bees and butterflies, use their blooms for nectar or pollen. Others, including caterpillars, depend on their foliage. But, still others have formed unique relationships with parts of native plants beyond what we usually see, like their roots and sap.

Here, I'll take a look at the different parts of a native plant, from the flowers to the root, and how various species of insects depend on each part for their survival.

Blooms



Flower flies, like this one, left, drink nectar and mimic wasps and bumblebees.

The flowers of native plants are used by native insects for two main purposes: drinking nectar, which provides energy to insects, or eating pollen, a source of protein that insects often use as food for their larvae. Insects like butterflies need nectar for sustenance, while bees like our various native bumblebees depend on both nectar and pollen. Let's look at a few other, less-known insects that also rely on the blooms of native plants and, in turn, act as essential pollinators for native plants:

-Flies: Flies don't usually come to mind when we think of flowers and pollinators, but many species of flies depend on nectar. One group, the aptly-named flower flies (pictured above), can be

found on blooms throughout summer. But, as wasp and bumblebee mimics, they can be easy to misidentify! Another group, bee flies, are round with spiky hairs and also drink nectar from native blooms.

-Wasps and Bees: Native wasps and bees are divided into two categories: social (ones that nest in groups) and solitary (ones that don't nest in groups). Most bees and wasps are solitary and non-aggressive and are often seen on native blooms, drinking nectar or collecting pollen. Look for thread-waisted wasps, solitary wasps with a unique, very thin stick-like body.

-Caterpillars: Blooms aren't only for nectar and pollen. Some caterpillars eat the blooms, as well as foliage, of their host plant, some even disguising themselves by covering their body with flower petals, making them well-hidden from predators like birds.

Foliage

A buckeye caterpillar on its host plant, American Plantain.

The foliage of native plants plays a huge role in the lives of many insects and their larvae.

-Butterflies and Moths: While most adult butterflies and moths drink nectar, their caterpillars depend entirely on native plant foliage instead: each butterfly or moth uses a specific native plant or plant family as its host plant, and this host plant is the only plant that its caterpillar is able to eat. Monarchs and milkweed are just one example of this insect-host plant relationship; these relationships repeat throughout nature in every butterfly and moth, as well as in other insect families.

-Sawflies: If you've ever come across a group of caterpillar-like larvae munching gregariously away at plant foliage, you've probably experienced a native sawfly. Sawflies have specific host plants just like caterpillars but, instead of maturing into butterflies and moths, turn into adults that resemble wasps.

-Grasshoppers: Equally essential aspects of ecosystems, our wide variety of native grasshoppers also depend on native plant foliage, eating various grass species and herbaceous plant foliage.

-Walkingstick: A less conspicuous insect, the Common Walkingstick eats the foliage of native trees including Oak species and Black Locust.

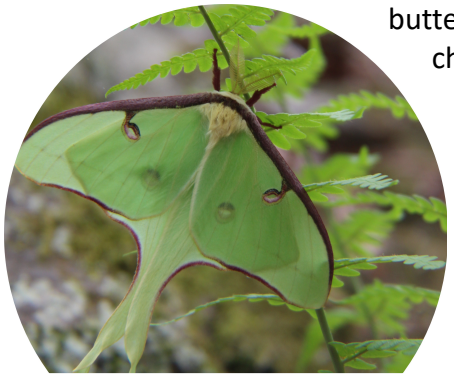
-Beetles: Some beetles also depend on native plant foliage. The lesser known, though quite gregarious, Blisters Beetles are one example. While adult Blister Beetles feed on foliage, their larvae, like many insects, are dependent on an entirely different part of native plants (pollen) and therefore do not compete with the adult phase of the insect for sustenance. Like butterflies and moths, Blister Beetles have specific host plants: the Clematis Blister Beetle depends entirely on the foliage of plants like our wild clematis, Virgin's Bower (Clematis virginiana)**,** and Thimbleweed (Anemone virginiana).

While it's an essential food source for native insects, foliage isn't just about sustenance. Native plant foliage plays a major role in other aspects, like providing shelter. All insects rely on the shelter of foliage, whether from perennials and grasses or tree leaves or bark—in fact, this shelter is such a vital role that many insects have adaptations that help them camouflage right into their

chosen source of shelter. Native plant foliage also provides vital spots where insects can lay their eggs.

This skiff moth caterpillar shows how insects have adapted to camouflage with foliage.

In fall and winter, fresh green foliage turns into an abundance of fallen leaves. This leaf litter is essential to insects, as habitat during the growing and dormant seasons. Though we don't see many active native insects in winter, they are still all around us, hibernating through the winter months in varying stages of their life cycles, a term we call overwintering. Insects overwinter in one of four stages, depending on the species: adult, larval, pupal, or egg. Many insects overwinter in their egg stage, and some, like the Common Walkingstick, simply lay their eggs directly onto fallen leaves, where they will spend the cold months before hatching in spring. Other insects overwinter in the pupal stage instead. Many butterfly and moths, for example, overwinter in this stage, as chrysalises and cocoons. Some, like many of our native hornworms, prominents, and large silkworms (including the Luna Moth and Polyphemus Moth) create cocoons on plants or trees, only securing them lightly. These cocoons fall with the leaves in autumn, landing among the leaf litter, where they will spend the winter, insulated and hidden among the leaves.



Butterflies and moths depend on fallen leaves for overwintering. To ensure that they're around in summer, avoid disturbing fallen leaves: Moths like Luna Moths (above) might be overwintering in them!

Stems

Native plant stems are essential components of insects' lives. In fact, they are the basic necessity for many insects when it comes to two important stages in their life cycles: nesting and, for those that don't do so in fallen leaves, overwintering.

While some insects, like butterflies and moths, lay their eggs on plant foliage, many insects lay their eggs on or in plant stems. Take our native crickets and katydids, for example. Females use a saw-like ovipositor (the egg-laying contraption, like a bee's stinger) to cut into small twig and plant stems, laying their eggs inside the stems. Many native wasps and sawflies have similar methods. Our native Carolina Mantid (pictured, right) also relies on stems for its eggs, but in a different method. Like many native insects, it lays eggs directly onto, rather than in, native plant stems.

The native Carolina mantid

Other insect groups, like some bees and ants, turn stems into a sort of nursery, creating separate cells in the stems that house eggs and growing larvae. Galls are an interesting example of this. Insects from species of beetles and flies to aphids and wasps induce galls on plant stems, using them as protective homes to raise larvae or simply live in themselves. Gall wasps are responsible for many

interesting galls that can be found on native plants, especially oaks. These galls house their worm-like larvae until adulthood.

Insects that don't overwinter in leaf litter often overwinter in plant and tree stems. Many butterflies and moths attach their chrysalises and cocoons securely to stems or tree branches, where they sit until spring. Some insects that overwinter as adults drill holes into native plant stems, spending the cold weather in protected cavities. Whatever their method of overwintering, many native insects are entirely dependent on just two parts of a native plant during the cold winter months: its stems or its leaf litter.

Roots & Sap

Some insects have diets comprised entirely of native plants but don't have a need for nectar or foliage or pollen. In fact, one of the largest insect phenomenons in our area falls right into this category: cicadas (pictured, right). These insects spend their entire nymph stage (which makes up most of their life) underground, attached to tree roots, from which they suck sap, the sole ingredient in their diet.

Aphids are another group of sap-dependent insects. While some aphids, like the common orange aphids found on milkweed species, are non-native, many aphids are native and play important and interesting roles in natural ecosystems. All native aphids depend entirely on the sap of native plants (most obtaining it from stems, though some attach to roots) and have particular host plants. Sumac Gall Aphids, one interesting example that can be found on Sumac plants, depend entirely on sap from Sumac species, sucking it from within large white galls that they induce between the shrub's leaves. Another native aphid, Witch Hazel Gall Aphid, can be identified from the horned-shaped galls it induces on Witch Hazels. These aphids in turn become important food sources for other insects and birds, and the honeydew they produce is essential for many species of ants and insects, such as treehoppers, small insects that look like thorns and are often found feeding on sap and honeydew from aphids.

This sharpshooter, above, depends on native plant sap.

Spittlebugs and Leafhoppers are two other groups of insects that depend entirely on plant sap for sustenance. Leafhoppers (like the one pictured, left, called a Sharpshooter) are small, colorful insects that suck sap from native plant stems and leaves. All leafhoppers have certain host plants (many are very specific) from which they can consume sap. Their cousins, Spittlebugs, also suck sap and look similar as adults. However, they can easily be spotted as young nymphs: look for the “spittle” that they create in the crooks of plant stems and leaves, made by the nymphs as a home that protects them while they suck sap.

Some insects depend on roots, but not for sap. The Red Milkweed Beetle (pictured, right), commonly seen on its host plant, Milkweed, has larvae that use milkweed stems and eventually makes their way down to the plant's root. It relies on the roots for sustenance, overwintering underground in the roots.

Seeds

Foliage-eating insects, like Walkingsticks and Grasshoppers, have adapted to have chewing mouthparts, while sap-sucking insects, like Leafhoppers and Spittlebugs, have straw-like beaks, adapted for sucking liquid plant sap. But, then there are Seed Bugs, insects that consume utterly dry seeds using a straw-like system. To do this, they've adapted a sort of two-channeled “straw:” the first channel is used for squirting fluid down onto the seed to moisten it, and the second channel is then used to suck up the now-liquified seed. This incredible process is characteristic of seed-eaters like the Large Milkweed Bug, an orange and black insect that depends primarily on milkweed seeds (pictured right, tending its young). Look for it on ripening Common Milkweed (Asclepias syriaca) seed pods in late summer and fall.

A native plant is far more than its blooms and foliage, though we often think of these two qualities first. Instead, it's an entire system of leaves and stems and roots that forms the basis of our ecosystems. The next time you see a native plant, think of all the life it is giving, from the insects that depend on every part of it to the creatures that depend upon those insects. Years and years of adaptations have created a cycle of nature that works perfectly. And, as stewards of our own habitat corridors, we can all work together to protect this essential piece of life.

Resources:
-Marshall, Stephen A. *Insects: Their Natural History and Diversity.* 2nd edition. Firefly Books Ltd, 2017
-Wagner, David L. *Caterpillars of Eastern North America*. Princeton University Press, 2005.
All photos courtesy Hummingbird Hill Native Plant Nursery