

NATURALIST'S CORNER

Mighty Oaks in Winter



The oaks in my backyard stand as skeletons against the winter sky. They certainly look dormant, but appearances notwithstanding, they are an important hub of activity in New England's winter ecology. Oak trees tend to hold onto some of their leaves over the winter, a trait called marcescence. This phenomenon makes cleaning up your yard an ongoing nuisance, but it also ensures a protective blanket for many overwintering organisms. Indeed, the forest floor under the oak leaves can contain up to million nematodes per square meter. These microscopic animals provide food for larger arthropods that also inhabit the rich leaf litter. Nematodes are probably the most numerous animals on our planet. They act as decomposers, recycling nutrients that the oaks use again and again.

During the last ice age, ~65,000 years ago, the snow and ice here in New England was more than a mile deep, with nothing growing at all. As the ice gradually melted ~10,000 years ago, birds, especially acorn-loving jays, brought seeds to our area. As a result, oaks, maples, and other trees from the unglaciated south found a new home here. Today, though, there is a slow-motion war between fast-growing maples and slow-growing oaks. Maples may win the rush to the top, but when high winds blow, oaks are the clear winners.

Those oaks in my backyard may look lifeless in the winter, but they are a hub of above-ground activity, too. Oak trees support 30% of the moth species that overwinter as caterpillars the cracks of bark. Among the birds that depend on these tiny caterpillars are brown creepers and yellow-crowned kinglets, which all winter long eat nothing but insects. Our bird feeders offer a supply of seeds, but the insects on oaks provide an essential protein source for these and other overwintering birds. In spring, the caterpillars that spent the winter on oaks are an essential food source for migrating birds making their way to the north.

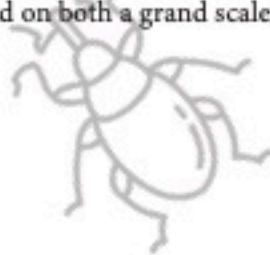
Have you ever noticed that the number of acorns on the ground varies tremendously from year to year? Oak trees communicate with each other and "decide" when to have a bumper crop of acorns. In years when the acorn supply is especially abundant, species that rely on this food source do exceptionally well, and there are even enough acorns left over to germinate. The following year the number of acorns is much smaller, and the numbers of acorn eaters declines, too.

My very first nature journal entry was about an acorn with a tiny hole—the work of an acorn weevil. The acorn weevil lays her egg in a developing acorn, then overwinters inside this snug home, dining on the nutritious nut. In spring, the larva chews its way out, finds a mate, then lays an egg in another developing acorn. Native Americans used acorns to make flour. To avoid acorns inhabited by weevils, they sorted all acorns in water. The acorns that were hollow due to the weevil would float and could be discarded. But the weevil story goes on. As the weevil chews its way out of the acorn, it creates a hollow home just right for one species of ant to use as an apartment. One hundred of these tiny ants can inhabit an acorn, protected from predators.

Have you ever noticed lumps and bumps in oak leaves and stems? These are produced by gall wasps, tiny insects the size of gnats, of which there are 800 species in North America. Most of the species specialize in oaks. After a gall wasp lays an egg, the tree builds additional tissue to protect itself—according to the construction specifications of the wasp DNA. The resulting gall shelters the developing larva. Once leaves have fallen, these gall wasps burrow into the ground to finish developing. Leaves are temporary for the oak, so this damage does not affect the entire tree. Gall wasps themselves are parasitized by 20 known species and are the most heavily parasitized group of animals on earth. As you can see, there is a lot of drama going on in that oak tree, even in winter.

While visiting Tennessee, I became enamored of the oaks there. In keeping with the pattern of higher biodiversity closer to the equator, Tennessee is home to 20 oak species, whereas Massachusetts has only 10.

At this time of year, the line of oaks in my backyard seem dormant and lifeless, but that is hardly the case. Those oaks are intimately connected with the ecology of New England on both a grand scale, and a microscopic scale.



~Sonya Vickers