The Life of a Leaf at Jenkins

ON A QUIET MORNING IN EARLY SPRING, THE FIRST LEAF OF A RED OAK (*QUERCUS RUBRA*) UNFURLS FOR THE SEASON. This leaf and its siblings get to work immediately, converting sunlight into food as the tree emerges from its winter sleep. There's a lot of work to be done, and quickly, if the tree is to begin its yearly growth cycle, sending out new shoots, leaves, and flowers for the growing season.

Under the oak tree, the Jenkins horticulture team and volunteers are busy mulching the garden beds with nutrient-rich oak leaves from last season. These decomposing leaves contain tannins believed to increase the acidity of the soil, perfect for the native plants in the gardens. Staff and volunteers are careful as they work, mindful of the delicate spring wildflowers like Virginia bluebells (*Mertensia virginica*) that have started to emerge. These ephemeral wildflowers are racing the oak tree, soaking in as much spring sun as they can before the oak leaves transform the garden into a shaded woodland.

Before long, the leaves of the oak tree grow to their final size, thickening with age and darkening in color as they shift their energy to making food for the tree. Many of the leaves become food themselves as hungry caterpillars chew their way through the canopy. Some of these caterpillars will become butterflies, moths, or even sawflies, but many are picked off by birds to feed their noisy nests of hatchlings. In this way, the oak tree and its inhabitants contribute to the greater habitat and form the foundation of life for the forest.

As spring fades to summer, the leaves of the oak tree provide shade and protection for plants and animals to retreat from the sun and predators. The staff and volunteers at Jenkins are grateful for the respite of this cool shade as they spread a layer of chopped leaves in the garden beds, protecting plants' roots from the hot, drying summer sun. These decomposing leaves continue to break down, holding moisture and adding nutrients to the soil as they do. These nutrients feed the oak tree as it draws large stores of energy to transform its flowers into acorns.

These acorns drop as summer dips into fall. The amount of sun continues to lessen, prompting the oak tree to send chemical signals to its leaves that it is time to prepare for winter. The leaves send stored carbohydrates into the tree for dormancy. Then the green photosynthetic molecule, chlorophyll, breaks down. In its absence, the other molecules change the leaf's color into a vibrant display of yellow, orange, and red.

As daylight decreases even further, the tree instructs its stems to disconnect their leaves. The leaves flutter and fall; the first red oak leaf of the season lands on the path and is gathered by staff and volunteers and brought to their work area. Here, the oak leaf and many others like it are chopped and stored in bags for the winter.

The red oak will go into dormancy with a coat of freshly fallen leaves at its base, the latest annual layer of decomposing leaves to enrich the soil. As they decompose, the leaves provide overwintering habitat for native insects, including queen bumblebees, luna moths, and swallowtail chrysalises. Other leaves do not make it to the ground. Some, like those caught in azaleas, are removed by staff and volunteers before pest insects like sap-sucking mealybugs can claim shelter for the winter.

Sitting out in the winter sun, the leaves gathered into bags begin to break down, creating a warm, wet environment similar to what is happening deep in the leaf layers throughout the garden. In the spring, these leaves are returned to the garden as mulch around new plantings, or added after an area is weeded to prevent weeds from returning. The first red oak leaf of last season is used to edge a garden bed of spring ephemeral wildflowers as the ground thaws. Above, the buds on its parent tree swell, and the next generation of oak leaves unfurl.