The Oak Trees' Mighty Role in Habitats and Humanity

Oaks are indeed mighty trees. Prized for their grandeur, longevity, and high-value wood, oak trees (genus *Quercus*) also support more life forms than any other type of tree, making them vital members of their ecological communities.

Worldwide, there are hundreds of species in the genus, and they're the most widespread hardwood trees in the temperate zones of the northern hemisphere. There are about 90 oak species native to the United States.

With so many species of oaks, it's not surprising that their characteristics vary widely. Some oaks are deciduous, and some are evergreen. Mature heights vary from 30' to 100' or more. Their average life spans range from decades to many hundreds of years. Despite their great variety, oak species share one similarity: they all grow from acorns!

The Great Oak

One oak in particular stands out for its size, magnificence, and significance: Called The Great Oak, this coast live oak (*Quercus agrifolia*) is recognized as the largest of its kind in the Western United States. Estimated to be up to 2000 years old, the tree is over 100' tall and boasts a trunk measuring 20' in circumference. The tree is located in Temecula, California, on the reservation of the Pechanga Band of Luiseños Indians, who call it by the name Wi'áaşal. The tree has a broad canopy that has provided shelter for many generations, as well as nutritious acorns. It has come to symbolize the strength, wisdom, longevity, and determination of the Pechanga people.

The Ecology of Oak Trees

"Oaks support more forms of life and more fascinating interactions than any other tree genus in North America." — Douglas Tallamy, *The Nature of Oaks*

Oaks are a keystone species, which can be defined as a species that has a larger effect on its ecosystem that would be expected by its relative abundance. Keystone species play critical roles in maintaining the structure and stability of an ecosystem and affect the type and abundance of other species.

Throughout their native range, oak trees not only provide food, they also:

- Offer shelter, from their roots to treetops, for an array of organisms.
- Provide shade under their broad canopies that helps soils retain moisture and keep it cool.
- Reduce erosion with their extensive root systems.
- Sequester large amounts of carbon.

Oaks support an astonishing array of insects. Over 900 species of butterflies and moths rely on oaks — even though their flowers

offer no nectar since they are wind-pollinated. Oak leaves are the primary diet or "host plant" for these animals as caterpillars.

If you live in a region with lots of oaks, you may have noticed some interesting characteristics.

Galls. Have you seen bumps or other odd growths on oak leaves? These are galls created by tiny wasps, which are, in turn, parasitized by other insects, in a fascinating display of interconnection among species. The galls cause little to no damage to the oaks.

Leaf litter. Fallen oak leaves decompose more slowly than those of most trees. This leaf litter provides a thick, protective blanket for soil-dwelling creatures.

Masting. Many oak trees produce widely varying crops of acorns year to year. For example, an oak may produce a bumper crop one year (called masting) and produce fewer acorns over the next few years. Producing acorns requires much energy for a tree. Ecologists hypothesize that they produce an abundant crop one year to ensure that at least some of the acorns will be around to germinate and grow after squirrels and other hungry animals have had their fill. Over the next few years, the trees build up the energy they'll need for the next bumper crop.

Human-Oak Connections

Uses for oak trees abound from the earliest recorded history to the present. In addition to familiar uses, such as furniture and flooring, the trees have benefited humans in other remarkable ways.

- Different cultures, including many Native American groups, use acorns as a food source.
- The tannins leached from acorns and bark can be used in dyes. The plant produces these tannins to protect it from fungi and insects.
- Oak galls were used for centuries as a main ingredient in inks; documents written in oak gall ink include the U.S. Constitution and Bill of Rights.
- Oak barrels are essential in the aging process of many wines and spirits.
- Oak wood chips are used for smoking fish, meats, and cheeses.
- Several kinds of truffles — fungi that grow underground in a symbiotic relationship with the roots of trees, often oaks — are highly valued as culinary delicacies, with some fetching $1,000 or more per pound.
- The bark of the cork oak is used to produce cork products like stoppers for bottles.

Although the leaves and acorns of oaks are poisonous if eaten in large amounts by most livestock due to their high tannin content, the domestic pig can consume them without ill effect.

Plant Oaks in Your Neighborhood and Schoolyard

To plant a tree is to believe in tomorrow, and this is especially true for planting mighty yet slow-growing oaks. Planting an oak tree in your neighborhood or schoolyard and nurturing it over the years is an investment in the well-being of all species — human, animal, insect, and fungi alike. That said, because oaks vary widely in their mature size and habitat requirements, it's vital to research the best species for each situation. After planting, your new oak sapling will require careful attention for the first few years to ensure proper irrigation and nutrient availability so it can grow into the majestic, life-supporting tree it is meant to be.

The Homegrown National Park initiative. The brainchild of entomologist Doug Tallamy and entrepreneur Michelle Alfandari, the Homegrown National Park initiative encourages each of us to "put life back where we live." A grassroots call to action, its goal is to regenerate biodiversity and ecosystem function by planting native plants and creating new ecological networks. Learn more: https://homegrownnationalpark.org/