



THE MAJESTIC OAKS

A Program of Conservation and Preservation



From top: Uncommon prostrate tree trunks persisting after a fall demonstrate the resilient nature of this oak to survive natural disaster.

Acorns one-inch long with blunt tips and bluish, mostly smooth-edged leaves are characteristic of Engelmann oaks.

The Engelmann oak grove on Tallac Knoll is home for most of the 225 *Quercus engelmannii* found on the grounds of the Arboretum. These native Southern California oaks, purportedly the largest extant population in Los Angeles County, are not replacing themselves so we have implemented an aggressive program to preserve this majestic oak for future generations.

Fossil evidence indicates the geographical distribution of the trees to have been from the coast of California east to Arizona, south to northern Mexico and west to Baja California Norte. Aridification that formed the Sonoran and Mojave deserts caused the range to shrink from east to west. Today, the population distribution in California is restricted to the Black Mountains of San Diego County, the Santa Rosa Plateau of Riverside County, Orange County and Los Angeles County.

Photos by Frank McDonough

Natural regeneration has been observed to be poor within most Engelmann oak populations. No conclusive reason is known but it seems to coincide with the introduction of grazing from sheep and cattle by early European settlers. Livestock compact soil and their browsing habits have a considerable negative impact on acorn survival (both fallen and on the tree), as well as on lower tree canopies. Another detriment to the overall tree population is residential and commercial development by humans.

Successful regeneration of the Engelmann oak, often called the Pasadena oak or mesa oak, ultimately relies on three critical issues: acorn production, acorn germination and seedling/sapling establishment.

Acorn production on Tallac Knoll was extremely bountiful in 2010 and winter precipitation was nearly double the average annual rate, resulting in thousands of naturally germinating acorns under the canopy of our grove.

Engelmann oak acorns don't need to be buried in soil to germinate. When germinating, the embryonic root and shoot emerge out of the acorn and deeply into the soil which may make it well adapted to exposed habitats and bare ground. This unusual germination mechanism does not occur in coast live oak but does occur in other white oaks.

Germination generally occurs in early winter. The greatest percentage of germination occurs within the shade of parent or nurse-parent trees—as high as 75%. The remaining acorns germinate in half-day shade at or



Above: Flags mark locations of spontaneous seedlings beneath mature trees on Tallac Knoll. Left: Some of the nearly 700 Engelmann oak seedlings being watered in the nursery.



Landscape considerations

IF YOU HAVE AN ENGELMANN OAKS IN YOUR LANDSCAPE, YOU MAY THINK THAT JUST BECAUSE THIS OAK IS NATIVE TO SOUTHERN CALIFORNIA IT WILL TOLERATE ALL OF THE CLIMATIC VAGARIES PROVIDED BY MOTHER NATURE AND BE PLASTIC ENOUGH TO ADJUST. *Living Among the Oaks* AND MANY OTHER RESOURCES RECOMMEND THAT WHEN THE ANNUAL PRECIPITATION IS BELOW NORMAL (15"), SUPPLEMENTAL DEEP AND THOROUGH MONTHLY WATERING THROUGH SPRING IS ADVISABLE. IF SUMMER TEMPERATURES ARE ABOVE NORMAL (WITH EXTENDED PERIODS OF EXTREME HEAT), ONE OR TWO SUPPLEMENTAL SATURATING APPLICATIONS OF WATER ARE ALSO ADVISABLE (IN AUGUST AND/OR SEPTEMBER). APPLY THE WATER WELL INTO THE DRIP LINE AND BEYOND, KEEPING THE WATER AWAY FROM THE TRUNKS BECAUSE THEY CONCENTRATE AND FUNNEL WATER DIRECTLY TO THE MAIN ROOTS WHICH ARE MOST SUSCEPTIBLE TO *Armillaria*. AND, ALL PRUNING SHOULD BE RESTRICTED TO THE MONTHS OF JULY TO SEPTEMBER.

—J.E.H

just outside tree drip lines. They typically don't germinate more than 1 meter from the drip lines where the soil water content is lower. Seedlings require some amount of sunlight for long-term survival and this need increases with sapling age. Interestingly, Engelmann oak acorns have a higher tolerance to moisture stress during germination than do coast live oak acorns.

On Tallac Knoll, about 3,600 irrigation flags document the locations of naturally occurring seedlings. Selected seedlings will be caged and given special care to aid their long-term establishment as a replacement generation. In addition, nearly 1,200 acorns were harvested from our trees and planted in the nursery to provide a supplemental seedling population that will be planted out this winter. In addition, the weedy understory will ultimately be replaced with native species to create a more natural ecosystem.

The Engelmann oak grove is one of the highlights of the Arboretum. Plant enthusiasts planning a visit should make an effort to include this naturally occurring population in their tour, especially during winter and spring. We encourage periodic visits to see our slow, but methodical progress toward a stable grove of Engelmann oak trees for future generations. 🌱

—James E. Henrich is Curator of Living Collections at the Arboretum.



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