

## Propagation of *Quercus virginiana* by Cuttings®

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### INTRODUCTION

Live oak, *Quercus virginiana*, is an important ornamental tree in the southeastern United States. They are used extensively along the U.S. Gulf Coast and East Coast, and as far north as the outer banks of North Carolina.

Due to the great variability in growth habits of individual seedling trees, clonal selections are needed for nurseries and the urban landscape. Selections need to be made for trees that have a strong central leader, dense growth, dark green foliage, evergreen foliage, and growth habits suitable for the urban forest.

### ROOTING LIVE OAK

Wood for cutting propagation is collected early in the morning. The cutting wood is collected from 2- to 4-year-old trees since juvenility and maturation are important in live oak root initiation. Rooting percentages decrease as the trees age, even with rootable selections.

Cuttings are taken from the branches in the first 2 m (6 to 7 ft) of the stock plant. We use only long and straight terminal tips that are 15 to 30 cm (6 to 12 inches). The cuttings are taken after the first and second flush, just when the new wood and foliage hardens. The wood should have turned from green to gray. In northeast Florida this is typically during May and August. The cuttings are not allowed to dry at any time during cutting and preparation for rooting.

The cuttings are then prepared for sticking in the propagation facility. In preparation, the lower 5 to 10 cm (2 to 4 inches) of the leaves and branches are removed by hand. Approximately 0.6 cm (0.25 inch) of the base of the cutting is removed. If the cutting has not been wounded by the removal of a small shoot, it should be wounded by dragging the clipper along the side of the base. The wound should be 2.5 to 3.8 cm (1 to 1.5 inches) in length. Terminal buds are retained and the leaves are not removed or trimmed. Some 15 to 20 cuttings are bunched for treatment with rooting solution.

The cuttings are dipped in the liquid rooting solution for 5 sec. Only the basal 2.5 to 5 cm (1 to 2 inch) of the cutting is dipped. We mix our own rooting solutions. For *Q. virginiana* SDLN, Cathedral Oak™ live oak PP#12,015 cuttings we use a solution consisting of 10,000 ppm K-IBA (potassium salt of indole-3-butyric acid) and 6000 ppm K-NAA (potassium salt of naphthalene acetic acid). The appropriate amount of chemical is dissolved in three parts distilled water to one part isopropyl alcohol.

Other selections of *Q. virginiana* we root require from 8000 to 12,000 ppm K-IBA and 4000 to 8000 ppm K-NAA. Using 2000 ppm IAA (indole-3-acetic acid) has improved rooting percentages of some live oak selections.

Once the cuttings have been dipped in the appropriate rooting solution they are immediately stuck in the propagation medium. The medium we use is Canadian peat and horticultural grade perlite (1 : 4, v/v). Sticking depth is 2.5 to 4 cm (1 to 1.5 inches). One cutting is stuck per container.

We have tested many different containers for live oak propagation and advise using pots that lead to a more fibrous and branched root system. Preferred containers are a minimum of 6.4 cm (2.5 inches) in diameter and 7.6 centimeters (3 inches) or more in depth.

The trays are then placed in the propagation house. The propagation houses are plastic covered with 50% shading. Misting is done using plastic deflection mist nozzles spaced approximately 1.2 m (4 ft). The duration of the mist is generally 5 to 6 sec. The misting frequency is controlled by solar misting controllers, therefore frequency is dependent on light conditions. During bright summer days the mist will come on every 6 to 8 min.

Once 50% to 60% of the cuttings have initiated roots the mist is reduced by approximately 20%. We feel inducing some drought stress stimulates the callused cuttings to form primordia and start to root. When we determine that the majority of cuttings have rooted, the mist is reduced another 50% for 4 weeks to harden-off the cuttings. Plants are then watered as needed until the root system is finished as desired for potting up.

Sanitation is important with any propagation program. Clippers are disinfected periodically when preparing the cuttings. Fungicide applications are often necessary. The first week live oak cuttings have been stuck, they are drenched with Subdue and Captan at label rates. Phyton 27 is applied as a foliar spray every 2 weeks. It is important to check for powdery mildew and any other possible pests in the propagation house and treat accordingly.

Liquid fertilization is applied when the cuttings begin to root. The first application is a 9N-45P-15K at 100 ppm N. Thereafter, the rooted liners are fertilized with 21N-7P-7K at 200 ppm N every other week until potting. Fertilization is applied with the fungicide drench if needed.

## CONCLUSION

Some *Q. virginiana* selections can be rooted from cuttings. *Quercus virginiana* SDLN, Cathedral Oak™ live oak typically roots in the 70% to 75% range at Shadowlawn Nursery.

By rooting live oak selections, we produce superior crops with fewer culls, which increases our bottom line.