Combined Proceedings IPPS 72:191-195. 2022.

Softwood Cutting Propagation of Clonal Oak Trees

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Keywords: Indole butyric acid with potassium salt (K-IBA), *Quercus phellos*, *Quercus nutallii*, *Quercus lyrata*

Summary

Selected species of oak can be clonally propagated from cuttings. Clonal rooting practices at Moons Tree Farm, Inc., Washington, Georgia, for three oak species are described. Optimal rooting of *Quercus phellos* (Willow Oak) occurred with softwood cuttings propagated between May to August, quick-dipped in a solution of 3000 ppm indole butyric acid with potassium salt (K-IBA). For *Quercus nutallii* 'QNMTF', Tytlest® (Nuttall Oak), optimal rooting occurred with softwood cuttings propagated between May to June, quick-dipped with 4000 ppm K-IBA. Optimal rooting of *Quercus lyrate* (Overcup Oak) occurred between May and August with softwood cuttings quick-dipped at 2500 ppm K-IBA. The first spring flush is the best time to harvest softwood cuttings. Timing of softwood cutting collection season, and water-management of the mist irrigation system are critical and discussed in greater detail.

PROPAGATION OF *QUERCUS PHELLOS* (WILLOW OAK)

Propagation of *Quercus phellos* is done between May and August at Moons Tree Farm, Inc., Washington, Georgia (**Fig. 1**). After a new flush has set the terminal buds, 15-20 cm (4 to 6-in.) long softwood cutting are harvested from clean, healthy, vigorous growing plants which are free of disease and insects.

Figure 1. Mist propagation of *Quercus phellos* (Willow Oak) cuttings.

All cuttings are taken in early morning to keep plants well hydrated while preparing them for sticking on mist benches. Bottom leaves are removed and the cuttings are quick-dipped into a solution of indole butyric acid with potassium salt (K-IBA) at 3000 ppm (**Fig. 2**).

Figure 2. (Left) Callus development (arrow) of *Quercus phellos (*Willow Oak) cutting, after 3-weeks, and (right) rooting (arrow) of cutting.

In some selections, K-IBA treatment is as high as 6500 ppm. The propagation media is a combination of 2 parts bark fines and 1 part Pro Mix BF (**Fig. 3**).

Figure 3. (Left) Rooted liner of *Quercus phellos* 'QPMTF, Wynstar® (Willow Oak), and (right) clonal trees under field production.

PROPAGATION OF *QUERCUS NUTTALLII* 'QNMTF', TYTLEST® (NUTTALL OAK)

Propagation of *Quercus nuttallii*, is done between May and June. After a new flush has set the terminal buds, 15-20 cm (6 to 8-in.) long softwood cuttings should be harvested from clean, healthy plants (**Fig. 4**).

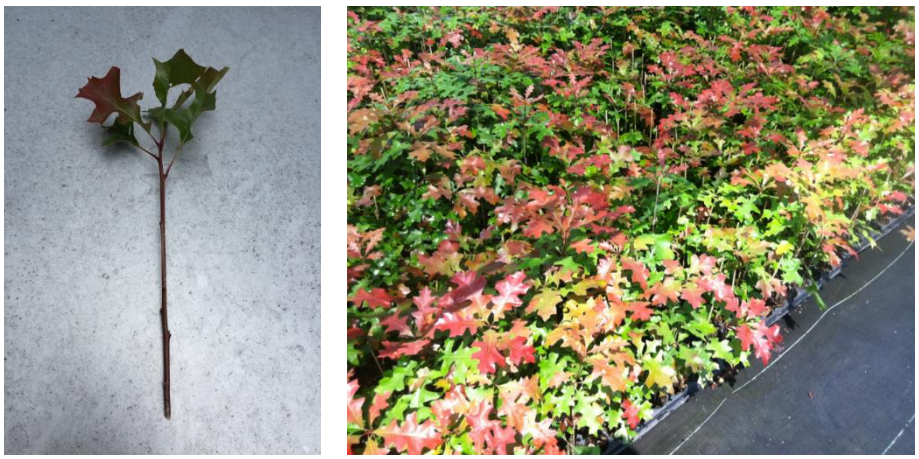

Figure 4. (Left) Cutting of *Quercus nuttallii* 'QNMTF', Tytlest® (Nuttall Oak), and (right) cuttings in propagation flats.

The bottom leaves should be removed and the remaining leaves reduced in size to aid in cuttings not being too congested in the propagation benches.

Cuttings are quick-dipped in a solution of 4000 ppm K-IBA, while some selections received 6000 ppm K-IBA. The propagation media should be 3 parts bark fines to 1 part Pro Mix BF (**Fig. 5**).

Figure 5. Clonal *Quercus nuttallii* 'QNMTF', Tytlest® (Nuttall Oak) propagated from cuttings and transplanted into 3-gal containers (left).Field grown *Quercus nutallii* 'QNMTF', Tytlest® (Nuttall Oak) propagated from cuttings (right).

PROPAGATION OF *QUERCUS LYRATA* (OVERCUP OAK)

Propagation of *Quercus lyrata*, is done between late May thru August. Terminal softwood cuttings should be 15-20 cim (6 to 8-in) long with the bottom leaves removed and the remaining leaves cut/reduced in size. Cuttings are quick-dipped in a solution of 2500 ppm K-IBA with some selections treated at 4000 ppm K-IBA. The propagation media is 3 parts bark to 1 part Pro Mix BF.

TIMING AND CONDITION OF CUTTING STOCK PLANTS

The timing and condition of harvesting softwood cuttings is imperative in achieving optimum results for well rooted plants that will survive throughout the winter months. *The first spring flush is absolutely the best time to harvest softwood cuttings* as these plants will have a more prolific root system and flush of growth before fall. Trees that are rooted in later months must be over wintered in the greenhouse to protect them from the cold. Frost cracks can be an issue in plants which are rooted later in the summer months.

MISTING CYCLE AND WATER REGIMENTS

Rooting response can be slow in all oaks, with some species slower than others. Water regiments are very important. Too much water can slow the development of multiple root initials. Too little water can cause cutting to only callus and never form roots.

- In Washington, Georgia, USA [latitude 33.736795, longitude -82.739309], the mist start time should be at 9:00 and off time at 19:00.
- Three seconds mist on time with 4-min delay (week one)
- Four seconds mist on time with 8-min delay (week two)
- Six seconds mist on time with 12-min delay (week three)
- Eight seconds mist on time with 16-min delay (week four). This regime is maintained until roots begin to emerge; there should be a 20% increase in delay time every 3 to 4 days until the plants are acclimated off misting.

LONG TERM CARE AND HANDLING

After rooted liners are put on a once-a-day watering schedule, a slow-release Caliber Cote 17-5-17 (N-P-K) Fertilizer is given at a low rate. Plants are then moved into a 30% shade for two weeks after which time the shade is removed. Plants will then be potted into 3-gal Redi-Root containers late in the summer, and they will be ready for field planting in the following spring.

landscapes are often slower to adopt sustainable practices than production agriculture (Doxon, 1996).