

ROOT PRODUCTION METHOD SYSTEM

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Lovelace, W. 2002. *Root Production Method System*. In: Dumroese, R.K.; Riley, L.E.; Landis, T.D., technical coordinators. *National Proceedings: Forest and Conservation Nursery Associations—1999, 2000, and 2001. Proceedings RMRS-P-24*. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station: 20-21. Available at: <http://www.fcnet.org/proceedings/1999/lovelace.pdf>

Abstract

The RPM system (Root Production Method) is a multistep production system of container tree production that places primary emphasis on the root system because the root system ultimately determines the tree's survival and performance in its outplanted environment. This particular container production system has been developed to facilitate volume production, in a high-quality tree with good height-caliper balance. Approximately 80% of our production consists of native trees, many of which present transplanting difficulties using conventional nursery growing systems. We specialize in oak production, currently growing 26 varieties.

Key Words

Oak production, container nursery

SEED SELECTION, COLLECTING, PROCESSING AND GRADING

Superior trees growing on specific sites are selected for seed collection. Experience has taught us that most species have ecotypes that are site specific. We look towards the wetlands or floodplains as a prime seed source for native tree species that are found growing on both wetland and upland sites. Since they have evolved under stress we find they will consistently outperform their upland counterparts on virtually any site, particularly on highly stressed sites.

After basic cleaning and drying procedures are completed, all seeds are graded and sized using aspirators or gravity tables. We find the weight of individual seeds to be more important than size; thus air separations that use specific gravity give the best results. This step is the first "grading," but it is of great importance in our steps to produce uniformity.

Step I—Seeding, Timing, Stratification, and First Root Pruning

Seed are placed in a bottomless mesh flat measuring 18.5 by 14.5 by 2.5 inches deep with mesh spacings of 0.375 inch. Our standard growing medium consists of 40% composted rice hulls, 40% pine bark, 20% sand plus slow release

fertilizer, micronutrients, and a wetting agent. The medium is also inoculated with mycorrhizae spores. Air space is of utmost importance in this step. This media mix provides between 35% and 40% air space. Seeded flats requiring stratification are stacked on pallets, wrapped in polyethylene, and placed in cold storage at 34 °F (1 °C).

Timing and type of stratification become most important because production timing requires moving seeded, stratified flats to heated greenhouses February 1st to begin germination. The first air root pruning is done during February so that grading, selection and transplanting can be done approximately March 1st. The purpose of the shallow root pruning to approximately 1.5 to 2.0 inches depth is to force first lateral roots higher on the root collar. Since most tree roots are just under the soil surface, we find this technique to benefit all species. This is of extreme importance for wetland plantings where air becomes a critical factor in survival and future growth. This also allows for more even distribution of roots when containerized, which is one of the prime objections of shallow root pruning.

Step II—Grading, Selection, Transplanting to Bottomless Band

On approximately March first, when seedlings have made their initial first flush of growth, plants are carefully graded, selected, and transplanted to a plastic, square bottomless band. Particular attention is given to height, caliper, and root development. In most species, the top 50% is used and the remainder is discarded. A standard plastic bottomless band measuring 2.875 by 2.875 by 5.5 inches has been shortened to 3.75 inches in depth. The shorter band gives us comparable growth and improves the root distribution in the production container. Transplanted seedling bands are placed on bottomless benches for approximately 60 days where additional air pruning occurs on the secondary lateral roots, further enhancing development of a shallow root system. These first 2 steps are timed so that the bands are ready to go outside to the container production area the first of May, avoiding late frosts and freezes.

Step III—Hardening Off to Marketing Size

Flats holding 36 tree bands are moved from greenhouses on 4-by 6-ft pallets and placed outdoors in full sun for hardening off for 48 hours. During this hardening period they are misted intermittently to relieve stress. After 2 days

(48 hours), the pallets are moved to container production areas where they are dibbled into existing prefilled containers. A shallow growing container is preferred, realizing that most of the feeder roots will always remain in the upper 6 to 8 inches of soil after the tree is outplanted. Our standard growing container is a squat container measuring 10 inches across and 7 inches in depth. This 2.5-gallon container allows more root mass to develop laterally. This system allows us to finish most native species to marketable size in 1 growing season or approximately 210 days from germination.

SUMMARY

RPM system, a multistep tree growing program using seed selection and handling, 2 steps of air root pruning, and careful production planning can produce container-grown tree liners that are uniform in grade and quality. Air root pruning at a shallow depth ensures more feeder roots higher on the root collar, providing better air uptake, faster growth, and near-perfect survival after transplanting to final growing sites. RPM results in uniform top growth, and in most cases this uniformity persists. This is important in plantings where repetition is desired. Seedlings provide a broad genetic base, which will ensure longevity and protection against diseases and conditions that might endanger certain asexually produced and over-used varieties.