

RootMaker Container---Facts!
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Political correctness is a can of worms that benefits no one. I watch and read in disgust as my former university colleagues in research or extension try to make every product sound grand so as not to offend anyone (and to get more grant money). Title of a recent paper in a journal and even the abstract made it sound like the mycorrhizae products used in the study were beneficial. However, when viewed by a trained eye, data presented clearly showed there was no benefit. Another example came from Oregon under the title "Searching for the perfect pot" where several types of containers were being compared. Root circling and water use are key items of interest to nurserymen, yet differences in water use was not evaluated. And as for root circling, only one sentence was included; "The industry standard container did result in root circling; however, this was observed with many of the other container types as well". The implication is that roots circled in the RootMaker® containers as well. Phooey! I know that roots do not circle in RootMaker® containers. And as for trying to evaluate root quality by weight, we threw that out decades ago as one large coarse root typically weighs more than many small roots, yet the small ones are far more efficient and beneficial.

RootMaker® containers work by stopping root circling and stimulating root branching either by air-root-pruning or root-tip trapping. Years ago while working with college students, I coined the phrase, "Let's ask the plant?" Meaning, give the plant the opportunity to respond to several treatments and if set up and evaluated with appropriate scientific safeguards, namely, randomized and replicated to avoid bias, the plant will typically tell which treatment it likes best. This is the procedure I have used for the past 40+ years.

When we compared water loss from containers in Oklahoma, conventional black plastic pots used 1.5 times more water than a white RootTrapper® container of the same size. A black, porous fabric pot used 3.2 times more water than a white RootTrapper® container. The difference is due to root-zone temperature and evaporation.

The RootMaker system works. To date, plants grown in RootMakers® have outperformed the variety of other containers on the market that have been used in comparison studies here in Oklahoma. But it is important to note that our studies have been done using the best cultural and nutrition programs known. If nutrition is poor or if drainage / aeration in the mix is marginal or poor, having a fibrous root system provides few benefits to plant growth. A great fibrous root system provides the greatest benefits when matched with optimum nutrition and other cultural conditions. Growing

trees in the optimum way is a system of many factors and any factor less than optimum will restrict growth. In talks, I often use the analogy of my 57 Chevy. Nitrogen is like gas in the tank, Phosphorus is like the lubricating oil, and molybdenum is like the small wire that connects the coil to the distributor. It is just a very small piece of the system. But, without it --- you walk!

1. RootMaker® Propagation Containers.

Visual evaluations are especially useful when trying to determine root branching and root numbers. For example, at one point I set up a study with the objective to count numbers of roots produced by plants grown in RootMaker® propagation containers and then transplanted at the optimum time. My plan was to count the number of roots growing out from Catalpa seedlings in 18 cell RootMaker® cavities after 4, 8 or 12 days. The photo showing catalpa roots after 0, 4, 8 and 12 clearly shows why I did not follow through with my evaluation procedure (Figure 1). In my notes, I simply wrote *lots*, as nothing practical would be gained from spending hours and hours trying to count massive numbers of roots.



Figure 1. Catalpa seeds planted 4-17-05. Photo 7-6-05 after 0, 4, 8 and 12 days following seedlings transplanted to three gallon containers. During the 12 day period, tops grew very little, but root growth was extensive. Root growth is the result of air-pruning to stimulate branching in combination with proper aeration, watering and nutrition for production of energy. Without energy produced by green tissues, root growth would have been much less. Proper nutrition and water management beginning at seed germination is very important.

2. RootTrapper Containers.

For any skeptic that RootTrapper® containers may be less effective in stimulating root branching compared to standard RootMaker®, or RootBuilder® containers, I present two photos of plant response in a detailed study (Figures 2 and 3). And, again, I chose not to try to count or somehow cut and weigh the massive number of fibrous roots as it was impractical. For those wondering why I use Catalpa as a test plants, it is quite simple --- Catalpa grow quite uniform from seed, roots are vigorous and aggressive and even when roots are ½ inch or larger in diameter remain white, so photograph well. Oak roots, on the other hand, quickly turn tan and about the same color as the container growth medium and photograph poorly.

Similar studies have been done with one, three and five gallon RootMaker® containers and a variety of species and with similar results. See Plant Production in Containers II for details and photos.



Figure 2. Root systems of two Catalpa trees. Both trees were grown in white RootTrapper® containers. The one on the left had a smooth plastic liner inside, making the wall like a conventional pot. The one on the right had the standard root-tip trapping that stops roots from circling and stimulates root branching. Note that when the containers were removed, lots of big roots were pressed against the smooth outside wall, while only a few white root tips were visible with the RootTrapper® wall.



Figure 3. When the two trees in Figure 2 were transplanted into 30 gallon containers and left for just 15 days, far more roots grew out from the tree grown in the RootTrapper® compared to the container with smooth sidewall. Note that most of the root growth out from the smooth sidewall container was near the bottom and averaged about four inches long. By contrast, many roots that had grown from the RootTrapper® container were 11 inches long and root distribution was from top to bottom of the sides of the original rootball. The seedling in the center shows the size of the RootMaker® liner planted into the seven gallon containers 3.5 months earlier.

The RootMaker® System and Large Trees.

A recent article in a trade magazine included the statement “There had been little existing research into the effect of container type on plant growth and no research investigating container type on tree quality and growth after shifting to larger containers”. Where had that person been? That is total fiction. For any skeptic that wonders if the benefits of this early root branching carry over when transplanting larger trees, I offer two photos from our extensive studies (Figures 4 and 5).



Figure 4. These shumard oak trees were grown with the RootMaker system and were six years old from time the seed was planted and had stem diameters of about six inches. There were 35 shumard oaks harvested from the field in this study. Note the 52 inch root ball held in the air has no wire basket and no burlap, yet soil ball remains firmly in tact. The reason is the fibrous root system. Six trees from the study were selected and counts of root ends at the outer face of the ball were done. The average for the six trees was 291 roots with diameters ranging from less than $\frac{1}{4}$ inch to the largest which were about $\frac{1}{2}$ inch.



Figure 5. This root system is of a bur oak, six years old from the time the seed germinated and has a stem diameter of about six inches. It was dug from a permanent planting location using a 52 inch spade. Much soil remains in the center of the root mass as it was impractical to remove more without destroying the outer roots. Just a typical bur oak root system ----- right?

If the old adage that *a picture is worth a 1,000 words* is correct, I just shortened a lengthy dissertation to this brief message.