ROOTMAKER® PRODUCTS COMPANY newsletter
WINTER 2005

RootMaker® News

Happy Holidays. We want to take the opportunity to thank all our customers and friends and wish all Happy Holidays and a most prosperous New Year.

Product Announcements: It is my displeasure to announce a price increase for Knit Fabric containers, RootBuilder®II, and RootMaker®II propagation trays. Our new price list is included with this newsletter. The prices will take effect for all orders shipped after January 1, 2005.

We have taken the RBII18 RootBuilder® and added a solid bottom to make the RootBuilder®II Premium #5 container.

The RBII12 has been deleted from our inventory. RMII18 and RMII32 are in stock. 12" cable ties have replaced the rivet and washer fastening assembly.

The development of RootTrapper®II containers will provide additional drainage compared to the original RootTrapper® containers. This configuration has an uncoated strip at the bottom of the sidewall.

Planting depth is becoming more of an issue with purchasers of trees. Maintaining the proper position of the root collar (at the top of the root ball) will determine whether the trees are acceptable.

More nurseries have become Certified RootMaker® Growers. The entire list can be found at www.rootmaker.com. The interest from the landscaping industry to locate certified plants is steadily increasing. This is also true for nurseries looking for quality plants for their production.

Mike Richardson of Richardson Farms reports that he has had some interest in his desire to form a national RootMaker® Growers Association. He can be reached at 512-635-2490 or burningtrees01@yahoo.com.

Don't forget to visit our web site, www.rootmaker.com regularly. We are updating it often. Anything new will be found there before it is featured in this newsletter.

We have added the Western Tradeshow in Overland Park, KS to the schedule for 2005. We will be in the following trade shows in January and February. Direct links to the shows can be found on our web site.

January Shows

MANTS, Baltimore, Jan 5 - 7, Booth # 743
Western 2005, Overland Park, KS, Jan 9 - 11, Booth # 343 & 344
Mid-American, Chicago, Jan 19 - 21, Booth # 648
Green & Growin', Greensboro, Jan 14 - 15, Booth #1538
CENTS, Columbus, Jan 24 - 26, Booth # 5004 - 5006
Gulf States Horticultural Expo, Mobile, Jan 21 - 22, Booth # 534 - 536

February Shows

New England Grow, Boston, Feb 1 - 3, Booth # 470 - 471
SCHI 2003, Myrtle Beach, SC, Feb 4 - 5, Booth # 100
Tampa Spring Expo, Tampa, Feb 25 - 26, Booth # 34

Lacebark News

Greetings from Oklahoma. Our big news is TWIN GRANDSONS born August 18, 2004 to son, Benjamin and wife Pam. All are doing well and the boys are really growing. Before long they will be tending Lacebark's Northern Test site (Ben and Pam's yard in Fort Atkinson, Wisconsin).

NEW TREES: After extensive testing for best methods for propagation and production, Lacebark has filed for patents and trademarks on two new outstanding trees. These trees will be propagated in quantity in 2005 and liners will be shipped to growers who have signed a license to propagate. If you are interested in becoming a licensed propagator and grower of these new plants, call, fax, or email and sign up as it will be first come-first serve as liners are available. As with the unique new crapemyrtle plants patented by Lacebark Inc. there is no fee to get a license and you may propagate as few or as many as you anticipate you can sell.

City Slicker™ River Birch has white bark once stems reach about ¾ inch diameter. The tree has good form and creates a nice multi-stem tree from a single rooted cutting. Foliage is dark green with buttery yellow fall color. Growth is vigorous the second year following rooting of cuttings the previous June or July. This tree is a fourth generation seedling resulting from seed originally collected from the western-most native river birch in the country. The original parent trees are native in central

Oklahoma along a stream where soils are slightly alkaline and the streams are dry nine months or more each year. City Slicker™ river birch appears to have good drought and hear tolerance compared to other cultivars in the trade. City Slicker™ has endured two Wisconsin winters undamaged.

Easy Street™ Lacebark Elm grows with a central leader and has exceptionally strong wood, dark green foliage and attractive bark. Cuttings taken in June or July root readily but make only modest growth the remainder of the first year.

However, liners shifted from one gallon RootMaker® containers to three gallon RootMaker® containers in May of 2004 were five to six feet tall by mid-October 2004 and had gradual stem taper from the top of the growth medium to the tips, like a deep sea fishing pole, and had never been staked. During two severe ice storms that bent over or broke off other seedlings of the same age, Easy Street™ remained erect and undamaged. Easy Street™ has endured two winters in Wisconsin undamaged. Pedigree for this tree can be traced back to seeds collected by Dr. Frank Meyer nears Sian, China in 1914 and sent to Mr. E. W. Johnson at the USDA Research Station near Woodward, OK where a search was on for trees suitable for windbreaks and shelterbelts.

These trees are from the breeding and selection program begun 19 years ago at Lacebark, Inc. Other promising plants include Desert Willow, Londonplane tree, Siberian Elm (yes, Siberian elm as it is one of the toughest trees around, anywhere, and some seedlings are great trees with very small hard leaves and to date have had no elm leaf beetle damage), Shantung Maple, Vitex, Southern Was Myrtle, Chinese Tree Lilac, Butterfly Bush and others. Breeding new trees and shrubs is a very slow process, but we have a number or promising specimens that, if they pass the propagation and subsequent production hurdles, may be great additions. For more information, see www.lacebarkinc.com.

Solutions for Pot-in-Pot Root Escape, Root Circling and Heat Shock at Harvest

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Heat, cold and blow-over have been major problems plaguing plant production in the unnatural environment of a man-made container since the beginning. Roots evolved in soil, generally protected further by an insulated mass of debris on the surface. Sensitivity to temperature extremes by plant roots appears to vary modestly among species. Installing a 'socket' pot in the ground, then inserting a production pot inside seemed like the golden answer. But up until now, in many locations it has turned out to be more akin to iron pyrites.

The technique was first tried with high expectations in 1973 and 74 (2). The two soils available were a clay loam and a sandy clay loam in which most species grew well. However, pot-in-pot studies during two growing seasons ended with dead plants following rainy periods, so was written off as a good idea that did not work. The concept next surfaced in 1990 when Lancaster Farms, near Suffolk, VA reported on their success with the concept in deep sand soils (3). Since that time we have watched with interest the assortment of successes, errors and problems that have come to light from this production procedure. (1, 4, 6).

Pot-in-pot has turned out to be a classic case of the 'good' news and the 'bad' news…….
The 'good' news is:
a) Plants do not blow over,
b) Roots are kept cooler in summer and warmer in winter and more in line with their natural environment
c) More roots may be produced compared to above ground conventional plastic containers with some species.

The 'bad' news is:
a) Soils that drain well are a must,
b) Plants are still in conventional containers where roots circle and intertwine and are terrible by time of harvest,
c) Root escape through drain holes is a major problem that can create chaos at harvest and shock plants severely,
d) Techniques such as copper coated pots and release of Treflan from Biobarrier material have provided only moderate benefits to the root escape problem,
e) Once above ground at harvest and the sun hits the exposed side of black containers, root death can occur in as little as 15 minutes. With roots heavily concentrated against the inside wall of the plastic container, if a container is handled such that several sides are exposed to the sun, plant appearance and salability can be affected and rate of establishment in the landscape slowed or worse and
f) It appears that roots produced in a pot-in-pot system are more sensitive to heat compared to roots of the same species in above ground containers. Ruter (5) reported that pot-in-pot plants are more susceptible to root damage by high temperatures during postproduction handling compared to plants grown conventionally above ground. In the revised edition of Production of Landscape Plants II (9) it was noted that "Some mechanism is needed to stop roots from circling and to stimulate root branching. At this point in time, I know of no practical solution", and that "root escape is a major problem".

In 2000, a procedure for laminating certain fabrics with white polyethylene was developed. The initial tests were done by sewing the coated fabric into containers that fit into cavities of a cinder block. Tree seedlings of several species were allowed to grow for five months. No root escape occurred with most species and only a few thread-sized roots exited seams even with aggressive Catalpa, *Catalpa speciosa*. Root tips were trapped in the fabric, which stimulated branching. Seedlings were then removed and planted into five-gallon containers following

removal of the fabric.

Catalpa seedlings evaluated 10 days after transplanting had produced huge numbers of roots, many nine inches long (8), Figure 1. These results suggested that making a container from this material might solve the major problems of pot-in-pot.

Figure 1. Ten days following transplanting into five-gallon containers, catalpa seedlings were removed and evaluated for root growth. Large numbers of roots had grown out from the original rootball, with many nine inches long.

On July 12, 2003, a study was established using Nursery Supplies 15 gallon, 6900T as the socket pot and production pot or with the production pot made of white root-tip-trapping material now called RootTrapper®. Growth medium was pine bark, peat and sand (3-1-1 by volume) amended with Micromax®, dolomite and Osmocote appropriate for the irrigation water used and soil temperatures. Containers were installed in a sandy loam soil with sufficient drainage and irrigation was by individual spray stakes, one per container. Species used in the study were three or five gallon; loblolly pine, *Pinus taeda*, crapemyrtle, *Lagerstroemia indica*, pecan, *Carya illinoensis*, shumard oak, *Quercus shumardi*, catalpa, *Catalpa bignonioides*, river birch, *Betula nigra* and bald cypress, *Taxodium distichum*. Treatments were replicated three, four or five times, depending on number of plants available for each species.

On August 31, 2004, two plants of each species and each production container type were removed from the socket pot beginning at 1:30 PM on a clear sunny day when air temperature was 92° F (36°C) and exposed for about 2.5 hours. Center of exposed side of containers was marked for future reference prior to replacement in the socket pots. Plants were maintained with normal watering and conditions until Sept. 8 when they were again removed for evaluation. By this time roots killed by heat were black and distinct in comparison to healthy roots. In addition, containers that had never been exposed to the sun were removed for comparison of root conditions.

Root escape occurred with all species with conventional pots, Table 1. Root escape also occurred with white RootTrapper® containers, with catalpa, crapemyrtle and river birch, however, there was a huge difference in numbers of roots and size of roots that escaped. For example, with catalpa in conventional pots, escape roots were 0.4 to 1.0 inches in diameter and completely filled some drain holes making removal of the containers challenging, whereas in white RootTrapper® containers escape roots were few and about 0.1 inch diameter or less, Figure 2. Escape roots were few and less than 0.1 inch for crapemyrtle and river birch with the white RootTrapper® containers. Further, roots were girdled where they grew through the vertical or bottom seam, restricting their growth and making their removal easy.

Figure 2. Root escape was severe with conventional production pot and catalpa with three of six drain holes fully blocked in this example. Only a few roots had escaped the RootTrapper® production pot at the seams and had made little growth outside the container.

	Root Escape Conventional Container	**Root Escape** RootTrapper®	**Root Damage** from Heat Conventional Container	**Root Damage** from Heat RootTrapper®	**Root Circling** Conventional Container	**Root Circling** RootTrapper®
Loblolly Pine	10	1	10	1	10	1
Crapemyrtle	6	2	10	1	10	1
Pecan	6	1	10	1	10	1
Shumard Oak	5	1	10	2	8	1
Catalpa	10	3	10	1	10	3
River Birch	6	2	10	1	9	1
Bald Cypress	6	1	10	1	10	1

Table 1. Evaluation of Root Escape, Root Heat Damage, and Root Circling in Conventional Black Plastic Containers VS. White RootTrapper® Containers used as Production Pots in Pot-In-Pot.

Root Escape, Root Heat Damage, and Root Circling were rated on a scale of 1-10, where 1=none and 10=severe. Roots exposed to sun for 2.5 hours were compared to those never exposed to estimate damage. Values are averages of two or three replications.

Root circling was extensive in conventional pots, with roots concentrated against the outside wall, Table 1. Root circling was nonexistent in the white RootTrapper® containers, with root branching throughout the container growth medium Figure 3. Sections cut from sides of rootballs showed many more roots distributed throughout the growth medium with RootTrapper® containers vs. conventional containers. Root distribution throughout the growth medium aids water and nutrient recovery and plant growth, plus, reduces root vulnerability to temperature extremes during harvest, shipping and storage.

Root death following harvest and 2.5 hours exposure to sun was severe in all black conventional containers, Table 1. By contrast, roots against the inside surface of the white RootTrapper® fabric containers remained white and normal due to the 20° F (12° C) reduction in temperature, Figure 3. In addition, since roots in the RootTrapper® containers were distributed throughout the growth medium and not concentrated at the inner wall, they were much less vulnerable to temperature extremes.

Figure 3. With white RootTrapper® fabric containers, white root tips were present on the exposed side of the container and on the surface of the exposed growth medium.

Constructing the production pot of white RootTrapper® fabric solves three major problems of pot-in-pot production. It is important to note that drainage of water through the field soil outside the socket pot remains a critical ingredient and must not be overlooked when using this production procedure. Roots were present at the very bottom of all containers of both types of all species, which confirms growth medium used and drainage of soil on the site were satisfactory. It further suggests that drainage through the myriad of stitch holes in the vertical seam and bottom of the white RootTrapper® container was sufficient. If drainage of soil supporting the socket pot is even marginal, this technique is not recommended. Instead, above ground systems for protecting plants from blow over and insulating roots from heat and cold should be considered (7).

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