

# RootMaker®



*The Original Root-Pruning Container System.®*

1-800-824-3941    [www.rootmaker.com](http://www.rootmaker.com)

# RootMaker® Growing System

## The RootMaker® Advantage

- More active root tips than any other container system.
- Complete root-pruning container system from propagation to finish.
- Fibrous, non-circling root systems.
- Increased root tip surface area for better efficiency and faster establishment.
- Fibrous root systems are less susceptible to damage from winter cold and summer heat.
- Accelerates plant growth, increases vigor.

- Greater efficiency of water and nutrient absorption.
- Little or no transplant shock.
- Plants are equipped for rapid transplant success and long-term health.
- Increase yields in produce crops.
- Higher quality product in less time means more profit.
- Researched and patented.
- Proudly made in the U.S.A.

### Container History

The nursery industry's first outdoor containers were metal food cans but they created circling root systems. The change to black plastic pots allowed for stacking but continued producing circling roots.

In his early research projects, Dr. Whitcomb tested numerous container designs.



Milk cartons (left) and tree bands (right) only prune roots at the bottom, creating few side branches.



Containers with vertical slots (above) still result in circling roots and excessive water loss. These and other designs were tested and rejected until root-pruning containers evolved to the current line of patented RootMaker® products.

### How it Works

The RootMaker® System is a thoroughly researched system for the production of more uniform plants with fewer problems, less risk, more rapid growth and establishment for less cost. RootMakers® are designed to create fibrous,

non-circling root systems horizontally and vertically at all phases of production to equip plants for transplanting success.

Each step complements the next, building upon the previous fibrous root system. Trees grown with this system are securely anchored and supported in the landscape by the growth of many small roots in all directions. Many small roots provide secure anchorage much like many small strands provide strength to a cable. An increased number of active root tips and surface area will increase stem diameter and results in a healthier, more efficient plant.

### From Start...



3 days old oaks, Right, with RootMaker®.

### To Finish.



Large specimen tree showing benefits of RootMaker® system.

# The 3 Methods of Root Pruning

## Air-Root-Pruning

- Air-root-pruning works by dehydrating the root tips.
- The first step to creating a fibrous root system is with **RootMaker®** air-root-pruning propagation trays.
- Following propagation, larger **RootMaker®** containers are designed to continue air-pruning at the sidewall.

- **RootMaker®** injection molded containers use a series of ribs and ledges that stop root circling and direct roots to openings.
- The **RootBuilder®** container prunes by air with 100% of the sidewall directing roots to openings.



## Root-Tip Trapping

- The **RootTrapper®** container is a black, spun-bonded fabric, laminated with a white outer coating.
- This unique container stops circling roots and continues to stimulate root branching by trapping root tips.
- Each square inch can prune up to 100 roots.

- The **RootTrapper® II** allows for increased drainage.
- **RootTrapper®-In-Pot** is made to fit any socket pot.
- The **RootTrapper® Grounder** has a **RootTrapper®** sidewall and a Knit Fabric bottom.



## Constriction Pruning

- The Knit Fabric In-Ground container allows small roots to extend through the fabric but does not allow them to expand.
- Plants grown with this method have less production costs and maintenance.

- Constriction pruning leads to root branching and an accumulation of energy.
- Constriction pruning, or root girdling, is effectively accomplished in field soil where roots are allowed to grow through a fabric container wall.



# Applications



0, 4, and 8 day tomatoes transplanted from  
**RootMaker® 32 cell.**



0, 4, 8, and 12 days Catalpa transplanted from  
**RootMaker® 18 cell.**

**RootMaker®** products are considered the premier fibrous root production tool by leading nurseries around the world. **RootMaker®** containers have been designed to provide maximum air-root pruning. The benefits of a fibrous root system is proving to be tremendous for ANY plant from vegetables to trees, whether organically grown or with standard commercial practices. When the root tip surface area is increased, there is a corresponding increase in the efficiency of the plant.



Timing is very important. Once a fibrous root system has been created, it is time to shift to a larger container. If plants are left in **RootMakers®** too long, the benefits will begin to decrease and water management may become more difficult due to the unique, high concentration of roots. Monitor your plants' progress. Seize every opportunity to continue root branching momentum.

Depending on your production requirements, there are several options. A good rule of thumb is “the 4-inch Rule” (visit [www.rootmaker.com](http://www.rootmaker.com) for full explanation of this phenomenon). Similar to pruning shrubs, research has shown that when a root is pruned, root branching occurs at the tip to about four inches back. This is why **RootMaker®** propagation containers are 4 inches deep.



Papaya, same age. One with a timely shift.

If plants are shifted to a larger **RootMaker®** container with a sidewall difference less than 4 inches, excellent branching will occur but this fibrous root system will soon exhaust container volume and may require an additional shift. If plants are shifted to a container that has a sidewall difference greater than 4 inches, some root branching opportunities or sales could be missed.

# Propagation

- First and most critical step toward creating a fibrous root system.
- Non-circling fibrous roots allow for rapid establishment following transplanting.
- Greater root tip surface area means greater efficiency in water and nutrient absorption.
- Promotes horizontal root branching.
- Available Sizes: 18-Cell, 32-Cell, 60-Cell, 105-Cell. All fit 10 X 20 lightweight mesh flat.
- The 18-Cell and 32-Cell are available in pull-a-parts.
- **RootMaker® Express 18** is an injection-molded, 18-Cell propagation tray that holds individual cells.



**RootMakers®** are designed to direct roots into openings in the container. The first root to reach an opening is usually the tap root. When this occurs, the tip dehydrates and stops growing and secondary roots form that are horizontal in growth habit. These secondary roots are dehydrated and create additional root branching.

For best results, we recommend using **RootMaker®** propagation trays on top of a wire bench or other support that allows airflow, 18 to 24" above the floor to allow good air circulation and thus efficient air-root pruning on all sides of the container, not just the bottom.



Left, oak in standard plug. Right, oak in **RootMaker®** 18 cell. 20 days after germination.

**RootMaker®** propagation containers can be filled with a mix of peat and perlite 40/60 , or pine bark, peat, and perlite at 50/30/20 by volume. Add 1.0 pound of Micromax® micronutrients, 3 pounds of dolomite, and 6 pounds of Osmocote® 18-6-12 (no substitutes) per cubic yard of mix.

The length of time in **RootMaker®** propagation containers varies, depending on the plant, but it is typically between 2 to 4 months.



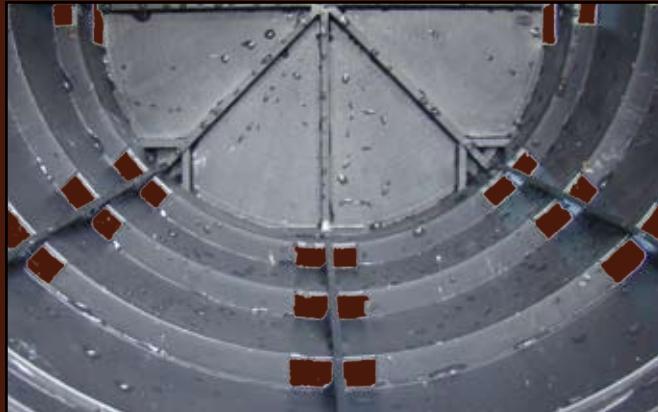
Same age blueberries grown in 32-Cell **RootMakers®** (left) and standard pot (right). Notice the massive size difference.



Root system created by **RootMaker® Express** propagation container.

# Injection Molded

- Continues to air-root-prune and promote horizontal root branching.
- Predictable results.
- Rapid establishment following transplanting.
- No transplant shock.



*Inside patented **RootMaker®** container showing unique ledges, ribs, and holes.*

Following propagation many nurseries shift to an Injection Molded 1, 3, or 5 Gallon **RootMaker®** to continue air-root pruning. These **RootMaker®** containers are designed to air-prune at the container sidewall and maintain roots poised to grow horizontally immediately following transplanting. This is done with a series of ribs and ledges that stop root circling and direct roots into openings for continued air-pruning. This also creates a root system throughout the volume of growth medium and not just in a congested layer at the sidewall.

- Accelerated growth.
- Durable and long lasting production tools.
- Sizes: 1, 3, and 5 gallon round.
- More efficient use of water and nutrients.



*Left, standard production with circling roots. Right, fibrous root system created by **RootMaker®** 3 gallon.*

Transplanting seedlings with excellent root systems into conventional smooth walled plastic pots is a gross error. Roots grow outward, contact the sidewall and circle. Active root tips decline and anchorage of the plant is poor (above, left). By contrast, when a rooted cutting or seedling from a **RootMaker®** propagation container is transplanted into a three gallon **RootMaker®** container, the result is a continued fibrous root system with no circling and large quantities of root tips are poised to extend and establish the plant in the field or landscape (above, right).



A good mix for above-ground **RootMakers®** is ground pine bark, peat, and sand 60/20/20 by volume. Add 1.5 pounds of Micromax® micronutrients and 14 pounds of 17-7-12 Osmocote® per cubic yard. The quantity of dolomite required for best growth depends on the minerals dissolved in your irrigation water. Other recommendations are site specific.



**RootMaker®** 3 gallon oaks in nursery production.

# RootBuilder® II

- Creates a highly branched fibrous root system.
- No circling roots.
- 100% of the sidewall directs roots to openings.
- Total area of openings is only 6% of the sidewall to conserve water.



*Dense fibrous root system from High 5®.*

The **RootBuilder® II** is a highly successful, patented container that continues air-root pruning. A hole is at the tip of each outwardly projecting funnel on the sidewall of this container. Roots are directed outward to these holes and forced to branch again by air-root pruning. Because of the configuration, the sidewall is shaded, reducing temperature and evaporation.



**RootBuilder® High 5®**

- Available in kits. Sizes: Propagation, Quart, 1, 2, 3 gallon. **High 5®**.
- Larger sizes can be expanded in the field.
- Pre-cut sizes from 15 – 100 gallon.



*Magnolias in RootBuilders®.*

The **RootBuilder® II** expandable container comes in a 100 foot continuous roll and can be cut to create any size container. With a few inches of overlap, the container is assembled using cable ties. For best results, use our **RootTrapper® Disk** as the bottom of the container.



*Root system from a RootBuilder® Quart.*



# RootTrappers®

- Stops root circling by root-tip-trapping, which stimulates root branching.
- White coating reduces container temperature.

- Water exit is slowed to conserve water.
- Soft-sided container will not scar stems during transport.

## RootTrapper®

The **RootTrapper®** container is a black, spun-bonded fabric, laminated with a white outer coating. The inner fabric stops circling roots and continues to stimulate root branching by trapping root tips. The white outer coating greatly reduces container temperature so roots do not die on the sunny side as with black plastic containers. Water seeps out the hundreds of holes created by the unique manufacturing of **RootTrapper®** material, reducing water usage and costs.



Trees in production in **RootTrappers.®**

## RootTrapper® Pot-in-Pot Inserts

**RootTrappers®** that are custom made to fit any size socket pot to solve the problems of pot-in-pot production. Plants do not blow over and roots are kept cooler in summer and warmer in winter. By using the **RootTrapper®** insert, root escape is almost non-existent and a fibrous root system is created. Containers can be completely sewn together or overlapped for easy removal.



Grown in **RootTrapper®** Pot-in-Pot Insert.

## RootTrapper® II

The **RootTrapper® II** does not have the bottom two inches of the sidewall laminated. This improves drainage and aeration where the soil column needs it most, while not exposing the entire sidewall to excessive evaporation and water loss. The **RootTrapper®** and **RootTrapper® II** are available in sizes from 5" diameter to 500 gallon.



Crapemyrtle in production in **RootTrapper® II**.

## RootTrapper® Grounder

The **RootTrapper® Grounder** not only prunes by trapping root tips with the **RootTrapper®** sidewall, it has the additional benefit of pruning the bottom roots by constriction while allowing the roots to grow into the soil through the knit fabric bottom. This allows the plant to capture additional water and nutrients.



**RootTrapper®** Grounder harvested to show tacking roots.

# Knit Fabric In-Ground

- Continuous root pruning by constriction.
- Root branching by constriction leads to an accumulation of energy and accelerated growth.
- Protected from temperature extremes and blow over.
- Water and fertilizer management is less complicated in the field.
- Extended harvest period.
- Less soil removed during harvesting.
- Smaller root ball at harvest increases number of trees per load.
- Rapid establishment at transplant.
- All Knit Fabric containers except for the 5" and 8" diameter have a **RootTrapper®** bottom.
- Sizes available: 5" diameter to 48" diameter.



*Trees in production in Knit Fabric containers.*

The knit fabric container offers the ability of growing in the field with the ease of harvest and mobility of containers. With openings 5/64th inch in diameter, root pruning is predictable and precise. Root constriction occurs at the proper root diameter in order to stimulate secondary root-branching. As a root increases in size, both inside and outside the fabric wall, a callus bridge will form at the adjacent opening in the fabric. When the plant is harvested, the roots break off at the face of the fabric. This callus bridge prevents stunting of tree growth.



*Root callous bridge created by this unique Knit Fabric container stores energy and creates branching roots inside.*



*Fibrous root system created in Knit Fabric containers.*

Water management is less complicated in the field and the root system is protected from temperature extremes. Remove the fabric once a tree has been harvested. Once planted, the tree will benefit from having a great majority of the root system intact, well branched, and equipped to establish into the surrounding soil.



*Installation of Knit Fabric container (left) and finished planting (right).*

Cinder block bags are 5 inch diameter with folded bottoms. These grow excellent tree liners 3 to 5 feet tall for the field or large containers. Plants cannot blow over, roots are insulated from heat and cold and moisture is more uniform than above ground containers.

# Additional Products

## RootCaps®

- Effectively reduce weeds without the use of herbicides.
- Conserve significant quantities of water.
- Made of short pieces of coarse recycled synthetic fibers.
- Reusable. Long lasting.
- Increase root growth in upper growth medium that is typically void of roots.
- Reduce root zone temperature.
- Reduce weeds without chemicals.



## Pot Licker®

- **RootTrapper®** sidewall designed to fit inside a smooth conventional pot.
- Root-tip trapping technology.
- Roots cannot grow through the **Pot Licker®** or circle as with other sleeves because the root tips become trapped.
- Reusable. Long lasting.



## RootBarrier

- When installed in a trench, this unique fabric traps root tips and works as a root barrier in landscaping.
- The 36" wide rolls are installed with the "fuzzy" side toward the roots to be trapped.
- Provides maximum protection against root escape while allowing the production of new roots in the zone of loosened soil.



## RootSkirts®

- The **RootSkirt®** is a sleeve of laminated fabric which slips over a plastic container to moderate root temperatures.
- Reduces root zone temperature up to 20° F.
- Reduces root injury when plants blow over.
- Extends root growing period in fall.
- Slows emergence of growth in spring. Reduces likelihood of damage from late spring freezes.



# Certification

## Certified Grower Program

### RootMaker® Certified Select



Trees or shrubs must have been grown from seed or cuttings in RootMaker® propagation containers.



### RootMaker® Certified Gold

Trees or shrubs must meet Certified Select requirements **plus**,

- Complete at least a **second** step or shift to a larger container from the line of **RootMaker®** products.



### RootMaker® Certified Platinum

Trees or shrubs must meet Certified Gold requirements **plus**,

- Complete at least a **third** step or shift by “finishing” in a **RootMaker®** Container.

#### Disqualifications:

- Plants grown in plug trays
- Plants grown in smooth, conventional containers
- Plants damaged by toxic levels of copper

The **RootMaker®** Certified Grower Program is open to commercial plant production nurseries or tree farms, whose primary business is providing top quality plant material to another nursery, landscape contractor, or the general public via retail garden centers. Cooperating nurseries and tree farms agree to follow best management practices available in other aspects of plant growth and health.

**RootMaker®** Products Company will make available a list of best management practices for anyone seeking assistance.

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Note: Individual results may vary, depending on the manner in which the product is used, and its location. Manufacturer assumes no responsibility to any product as used, and its location. Manufacturer assumes no responsibility to any purchasers or users of **RootMaker®** products. No warranties, either expressed or implied, are made with respect to the **RootMaker®** products, including, but not limited to, the implied warranties of merchantability and/or fitness for a particular purpose, and Manufacturer expressly disclaims all warranties not stated herein. In no case shall Manufacturer's liability exceed the purchase price of the **RootMaker®** products purchased.

# Books

## Lacebark, Inc.

Lacebark, Inc. is a horticultural research company near Stillwater, OK, created in 1986 by Carl Whitcomb, Ph.D. His research led to such developments as Micromax® micronutrient fertilizer, several patented container designs (**RootMaker®**, **RootBuilder®**, etc.), and eight patented crapemyrtles (Dynamite®, Pink Velour®, Red Rocket®), to name a few. Currently, his research also addresses cultural factors in containers, field, and landscape, from water chemistry, nutrition, improved root systems, weed control, cover crops. He also consults and speaks on a variety of topics, as time allows.



**Know It and Grow It III: A Guide to the Identification and Use of Landscape Plants** (3rd Edition published 1999) 8.5" by 11" format, over 800 pages and 2000 black and white photos, weighs over 6 lbs. Covers most plants that can be grown east of the Rocky Mtns and from the Gulf Coast to Canada. Each plant has several photos plus a map showing geographic area to which it is adapted. Both common name and scientific name index makes it especially easy to use. No line drawings and no botanical gibberish; blunt, and to the point. Price: \$60.00 plus \$14.00 shipping via UPS.



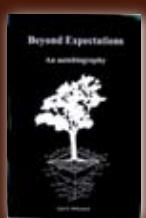
**Plant Production in Containers II** Revised 2003, Reprinted 2006 with new format and cover. Covers all aspects of producing plants in unique, man-made environment called a container, from propagating from seed or cuttings, to growth medium, nutrition, watering, weed control, and more. Over 460 pages, 8.5" x 11" format, hard back, many photos. Price: \$69.00 plus \$11.00 shipping via UPS.



**Production of Landscape Plants II (in the field)** (2nd Edition Published 2001) Covers all aspects of field production, including bare root, balled-in-burlap, pot-in-pot, knit fabric in-ground containers, and more. Over 700 pages, 6" x 9" format, hardback, many photos. Price: \$49.00 plus \$11.00 shipping via UPS.



**Establishment and Maintenance of Landscape Plants** (3rd Edition Published 2006) Covers drainage, nutrition, and other factors dealing with both the planting and establishment and the long term care of landscape plants. 350 pages, 8.5" by 11" format, hardback, many photos. Price: \$59.00 plus \$11.00 shipping via UPS.



**Beyond Expectations** Dr. Whitcomb's autobiography. From childhood on rented farms in Southeast Kansas to his education, research, and stories behind other accomplishments in the fields of Horticulture and Plant Science. Price: \$10.00. Includes shipping and handling via UPS.

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# Whatever your production method, there is a **RootMaker®** for you.

