

The following observations have been compiled over a period of years to try and discover a new cost effective means of controlling the aggressive nature of anchoring roots. Many different container styles were studied and the results were not as positive as was expected. The use of chemical pruning was not considered due to the remaining question of leaching and environmental issues. Virtually all of the container designs were effective in successfully air-pruning the small feeder roots and their divisions along the side wall. Circling was not a major problem with any of the containers used in this study. It should be pointed out that none of the container designs provided adequate pruning of the anchoring roots along the bottom. Some band style containers actually allow the roots to grow into the soil to be used to eliminate the need to stake the plants against wind topple.

Some bottomless containers use an impervious or semi-impervious mat to allow a few roots to penetrate in to the ground. Other bottomless band style containers use mats that effectively stop any penetration of the anchoring roots. The latter type is not recommended because the anchoring roots hardened without branching. These branchless roots do not continue to grow if the plant is transplanted into the landscape. They must be removed or cut to restart the branching process.

One approach was more successful than all the others with respect to air-pruning the anchoring roots. This approach uses a container stand to elevate the root ball off the ground surface which allows adequate air flow to maximize the opportunity for air-pruning to occur. It was our observation that a simple series of holes or slots in the bottom of the container did not necessarily force the anchoring roots out of the container. The openings in the bottom must be designed to guide the root tip to an opening thereby forcing the tip to exit the container. This approach seems to indicate positive root pruning results. However, the cost of the wire stand and the container may be prohibitive for some nurseries to use. If these costs can be reduced, more nurseries would use the system without hesitation.

These observations are not intended to criticize any container design, manufacturer or growing system. These containers performed as they were designed but did not prove to be effective against the common problem of pruning the anchoring roots. It is our opinion that the anchoring roots and the feeder roots are two very different root types and should be addressed accordingly when designing an air-pruning container. We are interested in forming an organization to advance the science of natural air-root pruning through various designs and techniques.

If you have a different opinion or experience using any of these techniques, please let us know. We will certainly offer any contrary opinion that would advance the science of air-pruning.

Experiments are being conducted throughout Florida using a variety of materials and container designs in an effort to establish a cost effective means of air-pruning both types of roots.



This root system is typical of the problem associated with anchoring root control. The feeder roots air-pruned well but in the same length of time the anchoring roots proved to be more aggressive and as a consequence, began to loop back and forth. These roots must be cut away before the plant can be transplanted into a larger container.



Another example of an aggressive anchoring root that was not air-pruned even with a bottom grid of open spaces for root pruning to occur. Notice the brownish circled root in the center of the root ball. The fibrous root branching indicates that the anchoring root found soil and tacked. This is unacceptable for transplanting albeit better than the first example.

The kit shown at right is used to produce the root ball shown above.



This example illustrates the aggressive nature of the anchoring roots. Soil build up along the base of the container allowed these roots to continue to develop in the warm, moist environment beneath the container. The container must be elevated more than the design allowed if it is to be used successfully for air-pruning the anchoring roots. Although the container was designed to allow underside air flow, insufficient elevation was determined to be the cause for the root system shown.



A typical bottomless band style container that uses cone shaped appendages with the tips removed. The stated purpose for these appendages is to guide the root tip into the opening for air-pruning to occur. However, when the cone becomes filled with root tips the air-pruning effect is no longer available to subsequent root divisions and spiraling can occur.



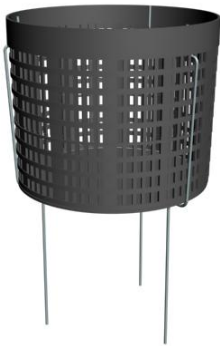
Another popular container that was designed to prevent root circling seemed to perform well along the side but failed to control the anchoring roots as is demonstrated by the perforated grid shown. The roots have grown through the grid without being pruned. These roots will be cut away to remove the grid. This internal grid approach has proved to be ineffective for air-pruning the anchoring roots.



These fabric bottomless containers are yet another approach to air-pruning. The feeder roots are affected by the fabric in a way that stops the growth using dehydration. The anchoring roots are allowed to tack into the soil to eliminate the need for staking. These anchoring roots must be cut to harvest the plant. The investment in the root system of irrigation, nutrients, labor and time are lost using this system. A temporary benefit of the elimination of staking materials and associated labor is gained.



This root ball is an example of what can be expected if the plant is held in a conventional smooth wall container. The spiraling, circling and eventual girdling root system would render this plant unusable for landscape purposes.



The rendered picture at left is yet another approach to the anchoring root problem encountered by growers everywhere. By elevating the plant approximately 4 to 6 inches above the ground surface a large volume of air is produced beneath the container which is required for air-pruning to occur. The stand is inserted through the ground cover into the soil approximately 6 inches. The filled container is placed into the stand and the liner is inserted into the filled container. The container must incorporate a system of perforations that guide the anchoring roots into the opening and out of the bottom.



The net style container has been used successfully for the intended purpose of air-pruning all roots when used with a pot stand. The illustration at left shows a wire pot stand designed for a different style pot and cannot be used for the net styled pot. There are so many different diameters, heights and wall angles used to manufacture a typical 3 gallon size pot that no standard can be achieved. All pot stands are purchased on a custom basis which forces the grower to adopt a growing system that may not be effective. A trial of each system needs to precede any decision to purchase both the pot style and the stand.