Can New Nursery Growing Methods Improve Fall Transplanting Survival?

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Are you afraid to move to Leyland cypress in fall? Have you ever sold a Leyland cypress to a landscaper in the fall who came back in the spring with a dead plant? If not, you have been lucky, so far. The Leyland cypress continues to grow very late into the fall with new growth still elongating well into November. The plant just doesn't seem to harden off in the fall before the really cold weather moves into the area.

In a verbal survey conducted of nursery managers this fall, most told us that they don't dig field grown or sell Leyland cypress after Oct. 15 unless the buyer wants to take the plant material without a guarantee. They tell us that they have had too many unhappy customers who install from Oct 16 through December and end up with severely damaged or dead Leyland cypress.

Looking for a solution

At the Better Container Production seminar in October, several nursery managers discussed whether growing Leyland cypress in root containment bags, in pots, or in Amaroo boxes would enable a landscape manager to transplant Leyland cypress later into the fall without suffering water injury or death of the plants.

Landscape managers and nursery plant producers are always searching for the perfect production method that allows high success rate in transplanting trees. The search for the best method of tree growing and transplanting has been going on since people started moving trees into landscapes. The market drives the need for refinement and change in production methods.

This November we set up a trial involving Ruppert Nursery, Country Springs Nursery, Kurt Reiger of Root Control Co., and Scott Loosen of Amaroo Co. in evaluating a Nov. 1 planting of Leyland cypress. In each block we used 8 to 10 foot tall Leyland cypress that were either grown in 24-inch Root Containment bags for three years, grown in the Amaroo Boxes for three years, grown in pot-in-pot systems, and field grown for three years. The planting blocks were established at the Central Maryland Research and Education Center in three open, exposed sites. Each tree was staked using the T-Mato Co., Ind.

We will observe any winter injury on each of the plants in the spring and summer of 2006.

What are these growing methods?

In the 1990's pot-in-pot showed up on the nursery production scene. This growing method enabled nursery producers to provide plant material at most times of the year. The number of Maryland nurseries moving into pot-in-pot production is increasing steadily each year. A well grown pot-in-pot plant is often a very good product. Landscape managers are picking between some of the common container sizes of 7 gallon, 15 gallon and even 30 gallon container grown trees and shrubs. The problem is that some very vigorous plant material rapidly fills the pot and results in circling roots. A plant with circling roots quite often just does not establish well in a landscape without a lot of pulling roots outwards.

Container grown plant above ground in Maryland?

In the winter of 2002 Kurt Reiger of Root Control Co. approached us at the Central Maryland Research and Education Center and asked if we would consider trying out the new above ground root containment bags called the Smart Pot. The Smart Pot looks like a typical root containment bag with a few exceptions. The bag is coated with a chemical that inhibits the ultraviolet (UV) light breakdown of the fabric material. Also, the bottom of the root containment bag consists of a fabric bottom that allows small roots to grow through the bottom of the bag. Typical root containment bags that are inserted into the ground have a plastic bottom on the inside that prevents roots from penetrating the bottom of the bag.

When you are growing in the ground, roots growing through the bottom would make it difficult to pull the bag from the ground.

The Smart Pot is designed to grow above the ground, usually on top of a weed barrier. The small roots that grow through the cloth bottom give it some anchoring so it is less likely to blow over in the wind.

The idea of the Smart Pot is you can grow a plant above ground and when roots reach the outside perimeter of the fabric bag they are air root prune and branch within the confines of the bag. Theoretically, the majority of roots are kept within the confines of the rootball so they should transplant well into the landscape setting. Root Control Co. has been selling these pots to growers in the south, especially Florida, where this system works well. In Maryland, this has not seemed feasible since our cold winters kill roots of may landscape trees in pots that are sitting above ground.

At the same time we had contact with Scott Loosen of Amaroo Enterprise Co. of Temecula, Calif. Amaroo Co. had designed a nursery growing box with open slits on the side and plastic ridges on the inside. The plastic ridges block circling roots from forming and the open slits cause air root pruning. The air root pruning creates a branched root system within the rootball.

The box is made from recycled plastic that is colored black and consists of four sides and a bottom that are clipped and bolted together in about 5 minutes. The boxes come in a 35, 75, and 125 gallon size containers. The boxes are pretty substantial but are relatively light in weight (12 pounds for a 35 gallon box). The Amaroo boxes were supplied through Worthington Farm of Greenville, N.C. Tod Williams was our contact with Worthington Farms.

In 2002 they supplied 24-inch (35 gallon) tree/shrub boxes. These boxes are made of recycled plastic and are delivered in 5 sections that are easily clipped and bolted together. The boxes have a series of slotted holes on the side that create and air-pruned root system. The insides of the boxes have plastic ridges that prevent the formation of circling roots. The plants are grown in the container above ground. When you are ready to harvest, just unbolt the wing nuts on the corners and pull the box sides off. The rootball can be slipped into a daisy basket lined with burlap and easily star-laced for shipment. The 35-gallon Amaroo boxes cost around $18/box. (Purchase more than 2,000 and the cost drops to $13 per box). This sounds expensive but the Amaroo box is designed for growing the tree then re-using the box for additional sets of trees. You can expect to grow a tree in the box for one to two years and then move it into the market.

The plastic should hold up for 10 years, according to Scott Loosen. The ones in our trial plots at CMREC are three years old and are holding up well.

The Amaroo boxes are filled with substrate and trees planted in the box. When roots expand and hit the side, they air root prune and remain within the confines of the box. When a tree is ready to go to the landscape market, the box sides are un-bolted and unclipped and the root ball is slid out. Most nursery managers place the rootball into a burlap-lined daisy basket which is star laced.

You end up with a root system that is pretty much intact but of quality similar to root containment grown plants.

In the spring of 2002 we planted ten Leyland cypress 4 feet high into 24-inch diameter Smart Pots from Root Control Co. and ten Leyland cypress in the Amaroo boxes. We also planted 3 foot tall Thuja "Green Giant" in the root containment bags. The substrate being a mix of 20 percent topsoil, 40 percent leaf compost, and 40 percent milled pine bark. The plants in the Smart Pots and Amaroo Boxes were placed on weed barrier cloth. A trickle irrigation system was installed and the plants were fertilized with a slow release fertilizer of Nutricote 20-7-14.

Our intent in the winter of 2002/2003 was to surround the rootballs with wood chips supplied by a local arborist. Unfortunately, the arborist forgot about us until mid-January and we had been through a couple of very cold spells. We decided that the plant material root systems were probably already damaged by the cold weather and decided that the trial would conclude at this point. Science often involves serendipity. We planned to get rid of the plants later in the season. In June we started to remove one of the rootballs and found very little injury. In fact the tops of the plants looked pretty good. By late June the plants started producing new foliage and appeared to be growing as well as similar Leylands and Thuja growing in the ground at our research facility.

Temperature was recorded over the winter of 2002, 2003 and 2004 using a temperature data logger. In 2003 the ambient air temperature plunged to 3 degrees F. for two days and rose to 5 degrees F. for three days. In January of 2004 the temperature dropped to 4 degrees F. and maintained a temperature of 4 to 5 degrees F., according to temperatures recorded at 7 a.m. on each of these mornings. In the spring of 2004 we examined several Leyland cypress growing in the ground at nurseries in central Maryland and

found that several branches suffered winter injury. We did not see similar injury on the Leyland cypress and Thuja "Green Giant" growing in the Smart Pot.

We examined the root systems on the edge of the rootball after the winter of 2003 and 2004 and found a small amount of injury on the perimeter roots. There was no scorching of leaves on any of the plants. Plant growth was strong during the summer months of 2003 and 2004. The plants in the Smart Pots and Amaroo Boxes had doubled in height over the two-year period.

They grow well above ground but do they transplant well?

We plan to grow the trees in the Smart Pots and Amaroo boxes for one more season. They will then be transplanted into the ground and evaluated for establishment. So far the root systems look good with little if any evidence of circling roots in either the above ground Smart Pots and Amaroo box grown trees.

We welcome anyone who wishes to visit the Central Maryland Research Center to take a look at the trial of fall transplanting of Leyland cypress. Call us at (301) 596-9413.