

JAKE TINGA: Thank you. I agree that if you run out of good soil you'd better grow in containers. I would like to stress a couple of points that Lin mentioned; one of the watering problems is putting all these multi-sized containers together and giving them a common watering scheme. He has solved that by putting all his plants with similar watering requirements together and putting them on one line. This is a very important concept. One of the problems that I also see is inventory control. It is easier to hold material in the field than in a container. Lin is planning ahead and knows how many containers he will have at a given date which is a form of inventory control. One other point: growth is money; you need to shift plants up before they "need" shifting, to prevent costly growth slowdowns.

WILDWOOD NURSERIES PROGRAM

EARLE R. MARVIN

Wildwood Nurseries

Walterboro, South Carolina 29488

I would like to discuss our methods of marketing field-grown plant materials. We use what is called a field-to-can method of marketing and harvesting our plant material. This basically means we dig our plants out of the field, put them in containers and allow them to root sufficiently for transportation to site of sales or planting. We are an old nursery trying to learn a new method of plant production. We do not have, or claim to have, all of the answers. All I can do is share with you some of our ideas and some of the things we are trying to do and learn.

Our plants are planted 18" apart in 4' rows. We plant two rows of plant material and leave one row vacant for harvesting. We start our field program by fumigating all of our acreage before planting with methyl bromide. This assures a good start for young trees and shrubs, free from weeds and soil insects. We have what is classified as Goldsboro type soil, which is fairly sandy but contains sufficient amount of clay to permit this type of digging program. Most of our plant material is harvested by hand digging. We settled on two-men digging crews because it seemed to be the most efficient for our operation. We have tried several types of digging machines and found them satisfactory in certain conditions but for the high quality and types of plant material we dig we think the best way of harvesting for us is hand digging. We use 3, 5, 7, 12 and 20-gallon containers.

Basically, we dig every other plant at the end of the second year. However, before every other plant is dug, the particular plant selected for digging that year must reach sufficient size to

go in the container designated for it. After the first crop of plants has been completely taken off the field (which is usually by the end of the second year, or shortly thereafter) the remaining plants remain for another year to a year and a half, depending on how long they take to reach the next container size or the next designated size that we wish to use for this particular plant.

When a field has been cleared of all plant material, it is then re-plowed, subsoiled, and landgraded. This field will not again be planted for three years. We use these three years to plant cover crops to rebuild soil structure for the next planting.

The plant, and the time of year it is dug, determine how it is handled from that time forward. All summertime digging is handled as follows: All plants, regardless of cultivar or size, are sprayed with an anti-desiccant before digging. All of our plants are dug, depending on the weather, up to about midday. Plants are not left in the field freshly dug over 45 minutes; by then they are put under a constant mist and remain there for two days. We use a specially designed trailer with a hydraulic elevator-type lift to bring the containerized trees to the mist area. Species and weather conditions dictate somewhat where the plants go from there. The larger trees usually go under a drip irrigation system.

Our winter digging is handled a little differently from our summer digging in that a lot of our deciduous trees are dug and placed directly under an outdoor drip system; again, the plant material dug determines whether the plant material goes directly into an outdoor drip system or into a shaded area for misting and hardening off. In the winter we dig all day. We don't put a lot of emphasis on getting the plant material out of the field within the 45 minutes that we try to adhere to in the summer. Some trees dug in the winter grow roots all winter and are ready to sell before leaves come on in the spring. Some cultivars, on the other hand, have to be held for an additional one to two months in the spring to make sure that they survived the winter digging and put on a good enough root system to support the tree for shipment and sale. Our 5 and 7 gallon plant material, instead of going under the mist, usually goes directly under an overhead sprinkler irrigation system, which we use as a mist for two to three weeks to harden it off.

After 6 to 8 weeks the newly dug plants have established enough of a root system so that they can successfully be moved. The way we test our plants to see if they are rooted sufficiently for moving and transporting is to inspect the roots by pulling them out of the cans to see if we can find a uniform root system fully developed. If it appears from the outside that this is the case, then we try picking up at random several plants through-

out the batch by their tops. If the plants can be lifted in a fairly wet condition we know that they are sufficiently rooted and ready for transporting. We have cans specially made for us by the Lerio Corporation in Valdosta, Georgia. These cans allow good drainage, which is important, since we have field soil in the containers. It also gives more aeration to the root systems of the plant, allowing them better and quicker rooting. We have been getting excellent results with this program generally; however, we found several kinds of plants that do not fit our type of digging and program, so we have abandoned them. We have also found that our type of digging is particularly beneficial for certain plants which are hard to dig and move balled and burlapped. Some of these plants are dwarf burford holly and sasanqua camellias. If these plants are dug in the summer, misted properly and allowed to root sufficiently before moving, we get much better results than we did when they were balled and burlapped.

We have tried several containers for our type of operation and found that metal cans are the most satisfactory for us mainly because the metal containers are easier to stack in shipping. Also, the plant material can stay in the metal containers longer than it can in one of the perishable-type containers. These are some of the reasons we think our field-to-can method of plant harvesting is, in some instances, better than a continuously container-grown plant. In South Carolina, the Piedmont areas have an extremely heavy clay soil. When planting a container-grown plant into a clay situation without proper drainage and bed preparation, we find that the clay around the peat or bark ball acts like the walls of a bathtub, holding the water around the root system of the plant and causing it to drown. Let me say however, that if the bed were properly prepared, and the drainage properly done on a particular bed, the containerized plant material would do very well. The water transfer from sandy loam to this clay is sufficient for the plant to live and thrive. In the sandy soil of Hilton Head or Kiawah or any of the coastal areas of South Carolina our sandy loam also gives good water transfer when planting directly into little prepared beds. Our plant material essentially is a B & B plant put into a container and allowed to put on a new root system.

VOICE: Do you find it economical to decontainerize your plants and wrap the roots in burlap for shipping?

EARLE MARVIN: We don't do that because we don't like to disturb the root system, although this method is used successfully by some companies.

JAKE TINGA: Let me add to that: the cost of burlapping (labor and materials versus cans) is greater for B & B.

EARLE MARVIN: We have found the costs to be very close together.

JIM WELLS: What about overpotting? If you put a small plant into a large mass of soil does it grow well as if it is stepped up frequently from small containers to larger containers? My second question is how important is it when transplanting container grown plants to their final position to break up the ball before planting?

EARLE MARVIN: Our landscape company has found that our containerized plants don't require breaking up of the root ball — in fact, we don't recommend it. Very seldom are our plants in containers so long that you would need to do this.

LIN TABER: About overpotting, Mr. Wells; when I first started this business I had always heard you should not overdo it in container sizes between moves, then I began to experiment for myself and found out that we could take a 4 inch liner and put it into a 2 gallon container or a 3 or 4 gallon container and at the end of 1 growing season there was very little difference between them; if anything the liner in the larger container was larger. Thus, these two plants became salable in the same amount of time. If the soil mix is well drained there is no restriction put on root growth in a container.

JIM WELLS: What about breaking up the root ball of a container-grown plant? When planting a field-grown plant into the ground there is no need to break up the ball; what about container grown root balls in artificial media? If the plant is rootbound I think you should loosen the roots or cut some, whether planting in a larger container or in the field; one should not let a plant get rootbound.

JOHN ROLLER: Jim, for some time I have been observing that if you take a potted liner or a container-grown plant grown in soil the roots will enter a light, manufactured medium, but a liner grown in an artificial medium has real problems getting its roots out into a heavy soil. Jake, this whole thing gets us back to the question of potting plants. Jim Wells asked can you over-pot a plant. The world is 8,000 miles in diameter and we pot into it every day. That is the grossest kind of overpotting anyone could imagine. Any organic mix is going to shrink when it gets dry, and that shrinkage is a real problem in establishing plants in the ground because a quarter of an inch dry space can develop between the root ball and the native soil and the root cannot get through that very easily, if at all. I have put a Chapin system on a landscape job so that the root ball never got dry and the plants took right off without a problem. An

earth ball is very different from an artificial mix ball and the care the latter receives the first two weeks after transplanting is critical.

LARRY CARVILLE: Earle, when you dig these field plants and put them in containers, do you backfill the container with soil?

EARLE MARVIN: It depends on the kind of plant. If it's a magnolia or dogwood we may just put bark in the bottom of the container. If it's a crape-myrtle, then the ball is not as deep as the container and we just put regular field soil down in the bottom.

JAKE TINGA: Another comment about the soil-root ball boundary — when you have a pasty soil and you use one of these machine diggers, the whole outside of the ball is compressed and if it's too wet you'll make an adobe brick out of it and the roots can't get out of it when it dries. I've seen pin oaks planted two years which haven't gotten out of the ball. Another thing, the burlap coming up out of the ground acts like a wick and you can induce drying in the zone around the roots in this way.

CHARLIE PARKERSON: Lin, how did you decide on your container spacing?

LIN TABER: We used trial and error. With our larger containers we try to arrive at a spacing that will allow plenty of room to work with these plants even after they are of salable size. I've found, by trial and error, that I'd rather space the plants a little wide in the beginning than have to go back and respace the beds later on. As for placing our boxes at 45° angles to the beds, our fork lift driver suggested this to save time, and it does. In our watering we are moving toward individual container watering with spitters, not drippers, because spitters are easier to see working. We have had problems with the drippers becoming plugged up or coming out of the container.

SOME WATER QUALITY PROBLEMS FACED BY HORTICULTURISTS

CHARLES R. JOHNSON

*Department of Ornamental Horticulture, University of Florida
Gainesville, Florida 32611*

Water quality is a subject of major concern to all horticulturists. Water problems to nurserymen in coastal areas relate to salt intrusion into wells and heavy salt drift, but in urban areas nurserymen are faced with high levels of chloride (Cl) and fluoride (F) in domestic water supplies. Many water resources