

gram because it would be difficult to overdose. You also get the benefit of a mulch. Mechanical barriers such as plastic or fiberglass will suppress weed growth but can interfere with watering and fertilizer placement and don't prevent weeds from growing up around the edges or through holes in them.

BILL CURTIS: Years ago we grew strawberries and I used chloro IPC in the fall with good results. When we got into the nursery business we began using it on our nursery stock in the fall and since then we have had excellent results and no injury to any of our plants. It takes about 30 days to be effective.

BRYSON JAMES: CIPC is an old herbicide, mainly effective on grassy weeds. It is relatively expensive.

LANNY NEEL: Curtis, we used Ronstar on a number of containerized ornamentals and did not get the phytotoxicity which you reported, although Ronstar applied to the foliage is very phytotoxic. I suspect that this difference might have something to do with your growing medium. Ours had "soil" in it whereas yours did not.

## LARGE PLANTS IN CONTAINERS

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Possibly I should first define "large plants in containers". These are plants that are produced in a manufactured container of at least a 4-gallon capacity. We are currently propagating 90% of the liners we use. From the day the propagation list is prepared, an attempt is made to plan the course of this liner as it moves from the propagation bed to its final planting in the container where it will be grown to maturity. As an example, if our ultimate goal is to inventory 20,000 4-gallon canned *Ilex* and 5,000 15-gallon canned *Ilex*, we will then shift 20,000 rooted cuttings from the propagation bed to pint containers and 5,000 rooted cuttings into 2-gallon containers. These will be staged in holding areas apart from the main growing area and will then be shifted into their respective 4 and 15-gallon containers for growing on. As you can see, there is only one shift process involved and a minimum of handling. Likewise, in planning for 20-24" boxes, we will stage 4 and 7-gallon stock in the holding area. Occasionally there will be two shifting processes when going to extra-large containers.

Unlike many specimen tree nurseries, all of our material has been containerized from the start and has gone the route of the planned series of shifts. The advantages of controlled irriga-

tion, fertilization, and weed control have prompted us to go with containers as opposed to field growing in mediocre soils.

As a potting mixture for specimen trees in containers we are making a soil from native peat, finely ground pine bark (mostly new bark), and a coarse grade of builder's sand. Our ratio for 4, 7 and 15-gallon containers is 2 parts bark, 1 part peat and 1 part sand. Occasionally, for a little heavier mix to be used in 20-24" boxes, a 1-1-1 mixture is used. The pH averages 5.7 in a newly mixed batch of soil, and this tends to rise under field conditions to 5.9 to 6.0. For acid-requiring plants the amount of dolomitic lime per yard is reduced.

Containers are placed in the growing area according to sizes. The 4-gallon plants are spaced on 50'-wide beds with a 20' roadway on either side. *Proper regulation of water*, a major factor in producing disease-free quality plants, is better controlled when all containers in a particular bed are the same size. By using a 50'-wide bed, plants are never carried over 25'. Loading can be handled directly to trucks of any size; wagons and orders with smaller quantities can be staged in a nearby loading area. With larger containers in boxes that must be lifted with a front-end loader or fork lift, two rows of plants are placed in 8' wide beds with a 12' driveway in between. Square boxes can be placed at a 45° angle to the driveway for ease of positioning with loaders.

Large-sized containers are placed in the field empty and are filled by hand from soil wagons. I have seen a cement truck used for this purpose very effectively. In our fields of large containers, overhead Rainbird irrigation is used in conjunction with 8' and 10' standpipes. For containers above 15-gallons, a suitable system for applying water to the individual containers is advisable. Our belief is that 50% of the problems that show up in *container nursery stock* result from *over-watering*, thereby bringing on soil-related fungi.

Fertilizer is applied by hand to all large containers, and a program of weed control using pre-emergence herbicides has been very successful. Herbicides must be used with caution and ample checks should be maintained throughout the nursery.

Growing container plants is a challenge and requires much supervision along with constant experimentation. No written texts have all the answers nor can any one person claim to be an expert. This is the reason that I am excited about the formation of the Southern Region of the International Plant Propagators' Society. One or two suggestions from many different sources might just fit into one's particular situation. It's worth sharing information with this goal in mind.

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**

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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