# Panel Discussion: Trends in Container Types

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**Abstract:** Container types and sizes vary depending on the requirements of the target seedling and the nursery culturing regime. Containers designed specifically for root pruning are available, as well as different types, sizes, and shapes for various species and objectives. With more options accessible to the grower, container use has changed over time.

**Keywords:** root pruning, container size, subirrigation

## Introduction

Constantly changing nursery growing regimes and the culturing of increasing numbers of native species have required container manufacturers and vendors to provide a wider variety of propagating containers and individual pots. An overview of some of the new concepts in container seedling production and recent trends in seedling containers and pots are presented below.

## Container Types

### Root Altering Methods

Both air and chemical root pruning have been used to enhance lateral root development along the entire root ball in many species.

**Air Root** Pruning—Plastic containers with side slits on the vertical side of the cavities are most commonly used for air pruning. These slits provide a lateral location for pruning, creating many lateral roots up and down the vertical side of the plug (figure 1). A recent innovation in this system is to block off the side slits on one side of the perimeter trays of the growing area to help prevent the excessive dry down of the outside row of cavities.

Chemical Pruning—Coating cavities or pots with a copper coating material has become a popular method to chemically prune roots at the cavity wall. The copper coating will prune the roots as they come in contact with the cavity wall, thus creating more lateral roots at the point of pruning. When copper coating is used, the root tips will form throughout the length of the tube (figure 2). Roots in uncoated containers will form down the sides with the tips emerging at the bottom drain hole.

**Copper•Treated Ground** Cloth—Ground cloth fabric permeated with copper will prune roots protruding from the bottom drain holes of seedling cavities when the containers are placed in direct contact with the ground ( figure 3).

### Plug-In-Plug

The plug-in-plug growing concept involves growing seedlings for 6 to 12 weeks in small cavities and transplanting into much larger plugs to complete their growth during the next 8 to 12 months (figures 4a and 4b). The use of polymer plugs is popular for the smaller plugs, since transplanting can take place prior to full root development,

Figure 1—Containers with vertical side slits enable the air pruning of lateral roots.

Figure 2—Seedling produced in a copper-treated cavity with good lateral root formation-

Figure 3—Bottom-pruned seedlings grown in containers in direct contact with copper-impregnated ground cloth.

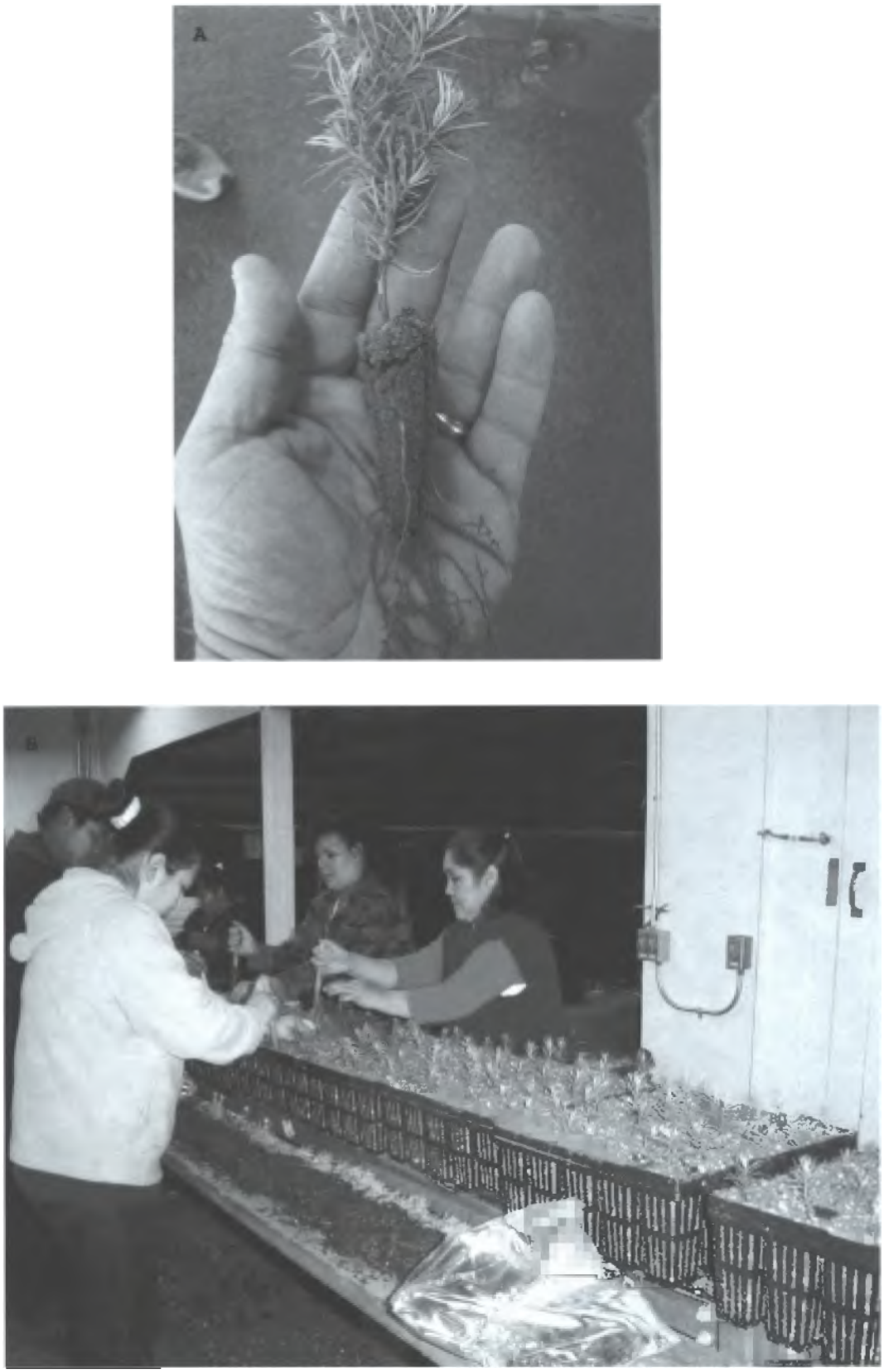


Figure 4—(Top) Seedling grown in small cavity for plug-in-plug system. (Bottom) Transplanting small plugs into larger cavities for the remainder of the growing season.

### Individual Cell Systems

Individual cell systems allow for spacing of the crop as the top foliage (or canopy) becomes crowded (figure 5), although some growers use fixed cavity trays and space out their sowing. Seedlings can be shipped in the individual cells to protect against moisture loss and damage to the root system.

### Clear Inserts

Clear inserts made to fit Styroblock' containers can be used to monitor early root development by viewing the roots through the transparent insert. One disadvantage to this system, however, is the buildup of algae after 2 to 3 months in the upper two thirds of the tube. This buildup inhibits the ability to monitor root growth.

The cell inserts can be made in solid colors for creating an individual cell system within the Styroblock™ system (figure 6).

### Larger Cavities or Pots

The demand for larger and larger cavities and pots is increasing (figure 7). The larger cavities have resulted in better survival and faster establishment following outplanting. In addition, plants can more easily outgrow brush competition.

### White-Colored Pots or Cavities

Cells or pots at the perimeter of the growing areas can be subjected to extreme heat buildup during the growing season. This heat buildup can cause erratic germination and growth, damage to tender root systems and root collars, excessive dry down of the soil on the edge of the growing area, and even seedling mortality. Coloring pots or cavities white, especially on the outside edge of the growing compound, can reduce heat buildup in the cells (figure 8).

## Container Handling and Culturing Systems

### Cell or Cavity Sleeves

Native species tend to produce more fragile root systems than those found in conifer and hardwood species. Extraction of these plants from traditional containers can result in damage to tender root systems. Cavity sleeves are web mesh or thin plastic sleeves set into cavities or pots to make extraction and outplanting easier (figure 9). Sleeves are currently being developed for a variety of container systems, including the Ray Leach Cone-tainer™ supercell system.

Figure 5—Individual cell systems can be used to efficiently space a crop-

Figure 6—Inserts can be used to create an individual cell system in Styroblock™ containers-

Figure 7—Large cavity pots (for example, 14-in (35.5-cm ) deep D60 Deepots™) are becoming increasingly popular for seedling culture.

Figure 8—Coloring perimeter cavities white decreases heat build-up in cells during the growing season

Figure 9—Cavity sleeves reduce the potential for damage to tender-rooted species during extraction tram cells or pots.

## Corralling Your Containers

Several sizes of Treepots™ are too tall and narrow to stand upright on their own. Growers are creating a variety of methods to support these containers. Fence wire mesh (4 in 110 cm] square mesh) stretched over a wooden frame allows removal of individual pots and spacing of pots (figure 10). Large horticultural pots (5 to 10 gal [19 to 381]) can support several large Treepots™ within them; milk crates will support 9 to 12 Tall One Treepots™. An inexpensive solution is to duct tape several pots together to create a stable unit that will stay upright.

## Subirrigation

Subirrigation, or under bench watering, is an effective method to irrigate plant material with heavy top foliage.

Figure 10—Corralling pots with tence mesh is a popular method to keep potted stock upright-

This type of plant material is difficult to water uniformly with the standard overhead watering systems. Sub-irrigation systems include bench-high flood systems or plastic-lined frames built on greenhouse floors. Flow trays (24.5 x 48.6 in x 5 in [ 62 cm x 123 cm x 13 cm]) have been developed for the Ray Leach Cone-tainer™ system (figure 11).

## Trends In Container Sales

Sales records at Stuewe and Sons, Inc (Corvallis, OR) reveal that grower preferences for container type and size have varied over the past 5 years (figures 12a through 12d). Overall sales of small containers (<5 $in^3$ [82 $cm^3$]) have increased with the popularity of the plug-in-plug growing system (figure 12a). Styroblock TM containers, in particular, have shown an increase in use for smaller cavities (figure 12b).

Use of the 5 to 10 $in^3$ (82 to 164 $cm^3$) cells has held steady or slightly decreased in most rigid container systems, presumably due to a decrease in traditional tree species culture and an increase in the number of native species growers (figure 12c). Use of individual cells of this size has remained fairly steady (figure 12d).

A surge in use of larger cavities and pots has become evident in the last 1 to 3 years, particularly in the individual cell systems. With the apparent increase in outplanting survival and establishment with larger plants, this trend is likely to continue.

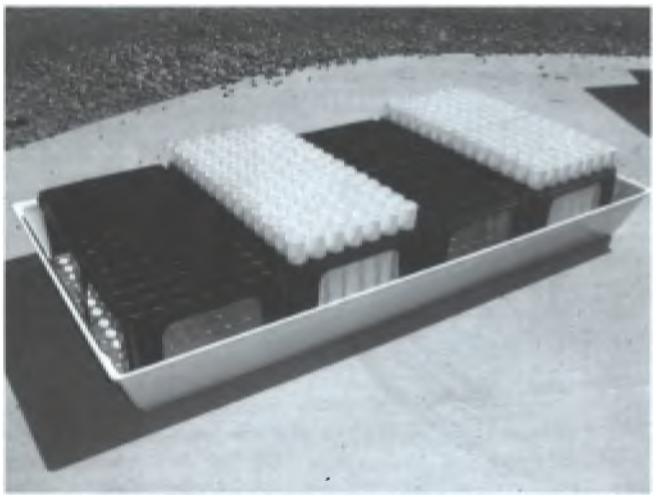


Figure 11—Flow trays have been designed for sub-irrigation with the Ray Leach Cone-tainer™ system

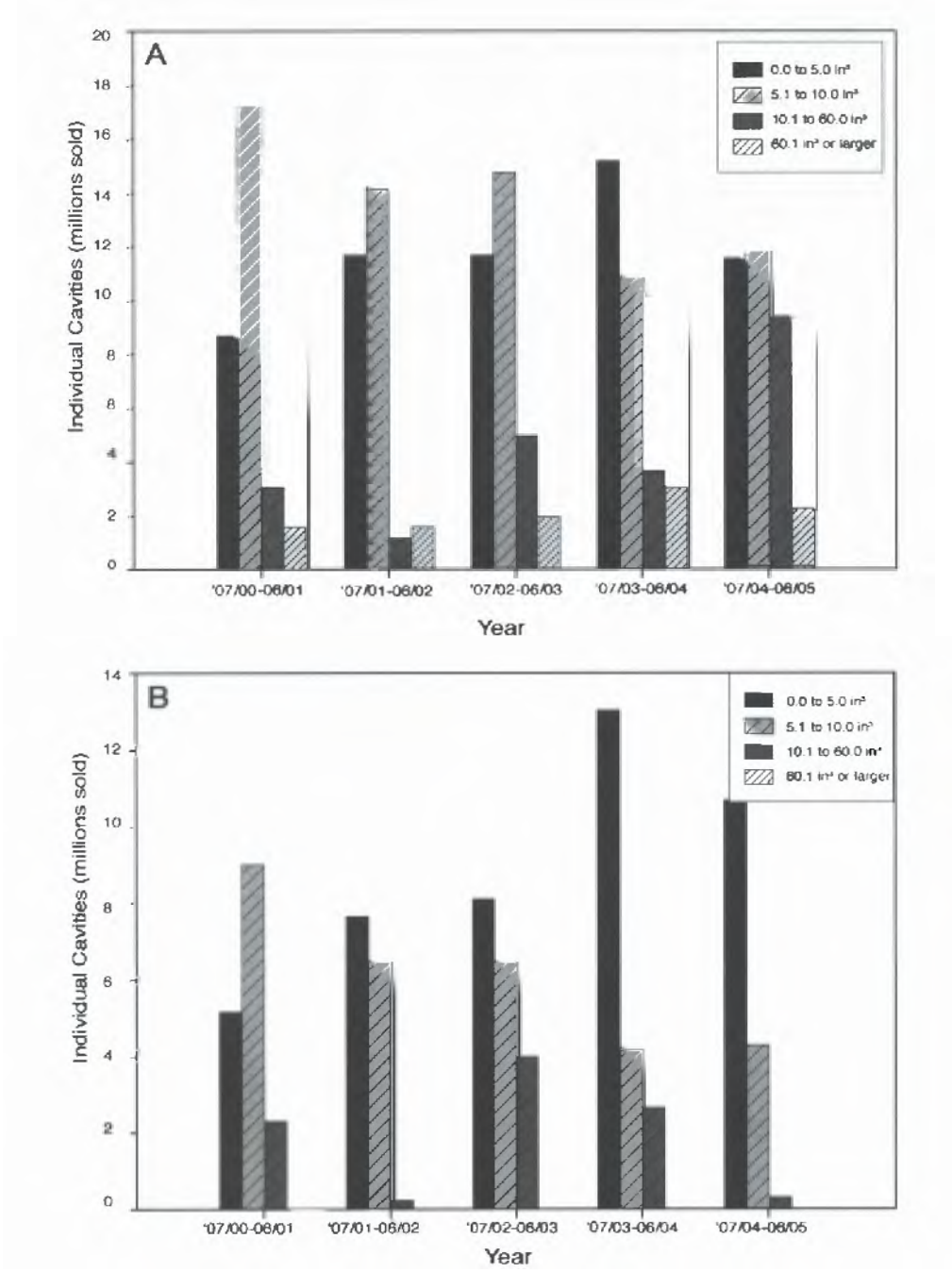
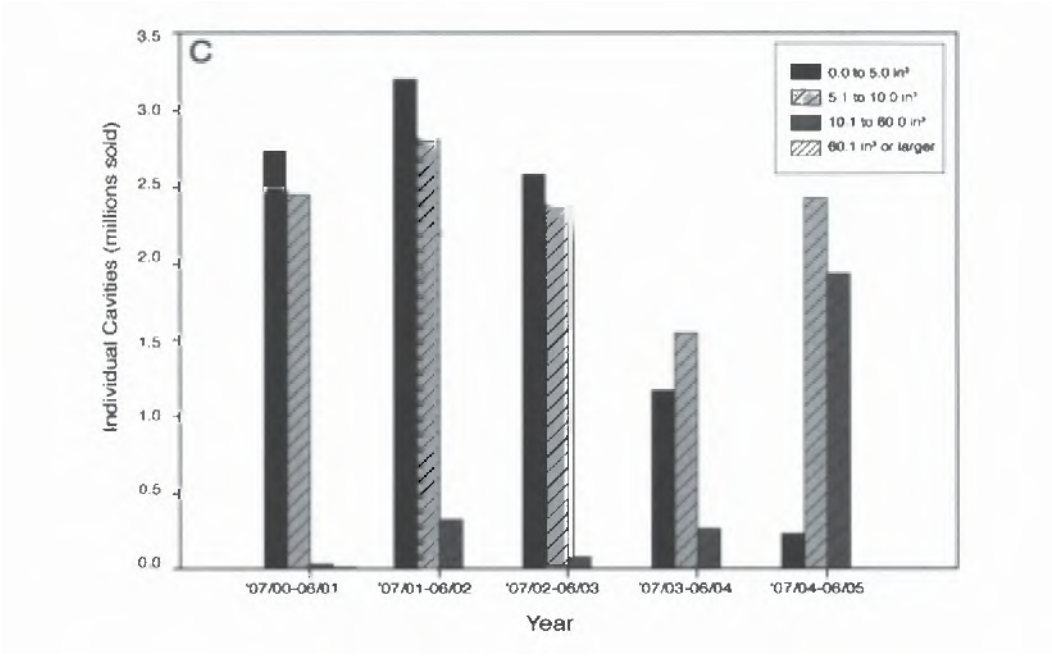



Figure 12—Variation in sales of cavity volumes in millions of individual cavities during the past 5 years: A) all types, B) Styroblock ™ containers, C) rigid plastic trays. D) individual cell systems (continued on next page)-



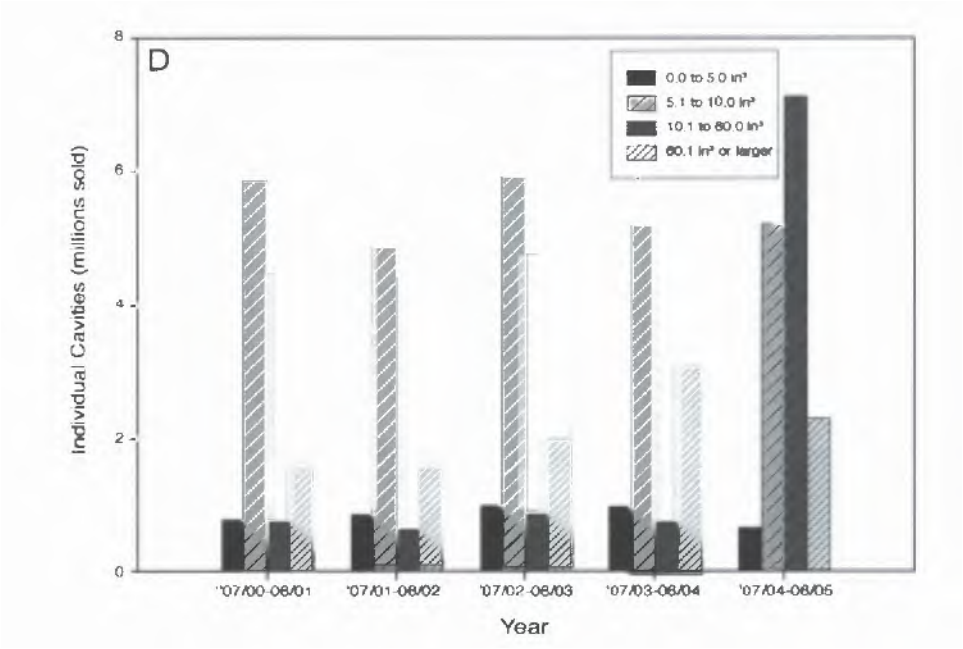




Figure 12—Continued.