

## TRENDS IN CONTAINER SEEDLING PRODUCTION

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In 1972 at the Containerized Forest Tree Seedling Symposium, container seedlings were described as "one of forestry's most promising new developments," "a possible solution to the age old problem of delayed reforestation," and part of the answer to the "quest for en masse' regeneration to meet the world's wood demand projections." In this part of the world the container seedling industry was being born then and is still in its infancy. Let's take a few minutes to consider where we've come from and where we are going.

Many of the early container seedling facilities were small, producing a few hundred thousand seedlings each year. Production was carried out largely by hand with improvised tools. The seedlings grew quickly and many people were fascinated with how quickly a large seedling could be produced. We planted those seedlings in the field and hurried back to the greenhouse to plant more. We were well into our next crop when we received reports from the field that our trees weren't doing too well. We had been so busy growing tall, green tops that we had forgotten all about the roots. So we conducted root symposiums and learned a little about how to grow roots. We started talking about a balanced seedling and root/shoot or shoot/root ratios. Soon our seedlings began to shrink in height.

As the market increased, so did the number of producers. Each producer had a little different model of greenhouse with their own improvised equipment. For each grower there seemed to be a little different container and very quickly we created our own jargon.

"Say, we're using the old quarterblock 2s but we're thinking about switching to Leech Pine Cells or Super Cows."

"Oh yeah, we're in paper pots and Tinus books but we're looking at Polyloams and 'Multipots."

"Do your Super Cows have ribs?"

"No, but my Multipots have legs."

It's been fun participating in this growth and confusion and I'm sure we all have stacks and stacks of old containers, advertising brochures and our own sketches of new devices guaranteed to solve the latest problem at the least cost. But where are we now? What has survived through this fast, evolutionary process?

Of course, my perspective is a limited one. I am not familiar with all of your operations or with each supplier of

horticultural equipment. But as a participant in the process, let me share one man's view of where we are now.

1. Automation - One figure that I have heard is that wages and salaries represent 65% of a greenhouse's budget. This may be very conservative. We are automating the procedures that we repeat year after year. I am seeing more and more flat fillers, seeders, packaging devices and container washers. Although many of the prototypes for these devices were made by greenhouse staff, most of the present machines are built by equipment manufacturers. Modifications of a standard design are made to meet individual needs. Much of this equipment costs a great deal considering the few hours that a sower or flat filler is used in one year. Yet when compared to increasing labor costs, the equipment can have a positive cost/benefit ratio for larger operations.

2. Seedling Oriented Management - There were times in the past when some of the procedures followed in the greenhouses seemed to be more oriented to administrative goals than to the biological needs of the seedlings. When rapid growth was demanded we raised the temperature, doubled the fertilizer, turned the lights on 24 hours/day and spewed out fungicide to keep our losses down. When we wanted them to stop growing we turned off the lights, leached them for "40 days and 40 nights," gave them a no nitrogen-high phosphorus and potassium fertilizer and then drought-stressed them until we could see "the browns of their buds." In the more recent past our cultural practices have been directed by principles such as plant moisture stress, foliar analysis, salt levels and root regeneration potential. Our interest no longer ends with bud set and the first frost but continues through packaging, cold storing, shipping, and some of us are even involved in planting and compliance.

3. Energy - In the past 10 years we have experienced a radical change in our energy resources. Many of us were caught unprepared to respond quickly to this sudden change. Although much has been said about changing existing facilities or using new technologies to deal with this problem, I have not seen a lot of work done.

New facilities are trying to make the best of the resources that they have and I am sure future designs will give a higher priority to energy resources. But until energy becomes a larger proportion of our budget few of us can afford to make major changes.

4. Growers - Many of us present today have been growing seedlings for 5 years. Few of us were raising seedlings 10 years ago. In early years of container seedling production many floriculturists competed for contracts and raised forest seedlings along side pansies and petunias. Although we learned a great deal from these people, few of them remain in the forest seedling market today. Today's growers are likely to be raising only reforestation stock as part of the reforestation program of

a large industrial, state or federal agency. More and more of these growers have college degrees and many have assistants with college degrees. Information is accumulating quickly and many decisions can be based on past experience or published information. The grower today is a specialist within a larger organization. A common concern among growers is the lack of opportunity for career advancement in the forest industry which stresses generalist experience. Advancing in these organizations means leaving the field of horticulture and competing with generalists for general management positions.

5. Seedling Culture - Here again I would like to reemphasize my limited perspective. I am much more aware of the cultural practices in Washington and northern Oregon than in the rest of our region and I offer these observations as one man's perspective.

Styroblocks are the most common container used in my region. Commonly 4As are used for stock going directly to the forest and 2As used for Plug-1 stock. Leech tubes are used for genetic stock although not exclusively. Most operations raising 1 million seedlings or more are using sprinkler systems although the controls vary. The Roberts sprinkler head is commonly used with fixed irrigation systems although several growers are replacing them with Spinner sprinklers. Most growers are mixing their own fertilizers and often have a contract with a private consultant to analyze the soil and foliage on a regular basis. Shadecloth is less commonly used than it used to be and there appears to be no consensus as to the necessity of artificial lighting for standard production. The Plug-1 seedling has a mixed popularity, some growers using it extensively and others very little. The August-September transplanting interval is most popular although several operations transplant many of their seedlings in the Spring depending on the planting site. Those seedlings destined to go directly to the forest from the greenhouse are commonly extracted from the container and placed in wax coated boxes. Few foresters in my region have chosen to have the seedling shipped in the growing container. Cold storing facilities have improved significantly in the past few years. Many growers rent commercial cold storage space or have quality facilities at the greenhouse. Below freezing and above freezing storage have both been used. Many operations also ship the seedlings in refrigerated trailers and have cold storing facilities near the planting site. In our region seedling planting rarely begins before December and most growers avoid storing seedlings packaged before January. The trend in soil mixes has been toward commercially prepared soils but as prices continue to rise, I suspect that we will all be looking for cheaper growth medias. The appropriate use of Botran, Daconil, and other fungicides has significantly reduced the problem of fungi during growing and storing;.

The Crystal Ball - As the industry continues to mature I see progressive changes developing;. The place of container seedlings is weakly established in the reforestation industry and I believe

that the future emphasis will be on economics. Those operations who are large enough to justify the costs of purchasing labor saving equipment will be able to produce a quality product at less cost than the smaller hand-labor oriented operation. Quality will still be required but with automation's help we can reduce costs without reducing quality.