

The Pitfalls of Container Production

Wayne Bell

Wayne Bell is Chief Operating Officer of International Forest Company (IFCO), 1265 Ga. Hwy. 133 N, Moultrie, GA 31768-7165 ; email: wbell@interforestry.com.

Bell W. 2013. The pitfalls of container production. In: Haase DL, Pinto JR, Wilkinson KM, technical coordinators. National Proceedings: Forest and Conservation Nursery Associations—2012. Fort Collins (CO): USDA Forest Service, Rocky Mountain Research Station. Proceedings RMRS-P-69. 32-35. Available at: http://www.fs.fed.us/rm/pubs/rmrs_p069.html

Abstract: This paper summarizes ten of the biggest “pitfalls” or challenges I have encountered in my experience growing southern pine seedlings in containers over the past 30 years. Learning from challenges is an important part of growing successful nursery operations.

Keywords: container choice, water quality, irrigation

Introduction

Container seedling production has increased significantly over the last 30 years in the Southeast U.S. Currently, it is estimated to be between 150 to 180 million seedlings annually. This paper addresses some of the “pitfalls” or challenges encountered in my experience in growing container seedlings. I have narrowed it down to what I consider to be the ten most important challenges. My comments pertain primarily to southern pine production. I hope you can avoid some of these pitfalls by reading this paper.

Ten Pitfalls of Container Production

1. Container Size and Shape

The challenge: In my opinion, the most pivotal decision for any container production is what container will be used. Species that will be produced will dictate the seedling attributes needed. Container choice will have a huge impact on economics, efficiency, and quality. The number of cavities per tray can be a huge consideration. The size of the cavity will also drive economics. In my opinion, the range of density for cavities must be from 45 to 52 per square foot to produce a quality seedling and for economical production. Cell length is a debatable effect. I have not seen any research on southern pine to indicate this is an issue if root systems are well developed. There can be sensitivity if some species are planted too deeply in the field. Field planting method must be taken into consideration with the container choice. Root volume is more important than root length in my opinion.

The pitfall: Inappropriate container choice was the first pitfall we experienced. Our operation chose a small tray of 40 cells. However, as production started to build, handling a huge number of trays increased our costs significantly. We increased the number of cavities per tray to 120 to increase efficiency and improve this problem.

To avoid this pitfall, carefully consider the size operation you will have in the future and evaluate how you will handle the large numbers of containers. Labor will be your number one cost and containers will be your largest investment in capital.

2. Other Container Features

The challenge: Configuration of your container is also very important as it will affect all your equipment used for filling with growing media and for sowing seed. A mixture of container types is often necessary because of the different species grown. Drainage features of containers are very important in root development in a seedling crop. The size of the drainage hole in the bottom will affect all aspects of root development. Our company has custom developed two different containers to improve drainage aspects. Drainage features will affect the irrigation rate necessary to grow seedlings. Another important aspect of container is raised ribs inside of the container to prevent root spiraling. Most manufacturers know that this is essential.

The pitfall: Our nursery has 6 different container sizes. This mixture of container types makes growing more difficult as it also affects watering schedules and plant development. For example, each container type differs in the rate of drying and how quickly root systems develop.

To avoid pitfalls with containers, talk with customers who use your product to evaluate what their desired seedling size will be and what they are willing to spend to purchase the product. Also, talk with other growers who have used the container to see what they consider the advantages as well as disadvantages.

3. Container Durability

The challenge: Color of the material used to make containers is important. This can affect the temperature of the growing medium in heat conditions and can affect the life of the container if ultraviolet inhibitors are less in lighter-colored trays.

The pitfall: We bought containers that lasted only a few years because ultraviolet inhibitors were poor. Containers we purchased from a cheaper source lasted only half the life of containers made with better materials.

To avoid this pitfall, be sure to ask about the expected life of the materials used and, if possible, visit someone who is using the material in similar conditions to see what their container life is.

4. Benches

The challenge: Benching systems are a huge part of the financial investment for production. Things to consider are initial investment, ease of use, and life of the material. We currently use galvanized metal posts and aluminum rail benching for the majority of our production. We have also used wire panels on concrete blocks. Neither of these systems is easily moved. Another consideration in choosing a bench system is whether the system can be reconfigured as production changes or if you have to move operations.

The pitfall: We made some benches from cheap metal and the life of these benches was half the length of better quality metal benches. Also, as our production sites changed we needed to reconfigure our bench system. After a number of years in production in different locations, we decided to consolidate operations and some of our benches were not able to be moved as they were permanently installed. This required the investment in new benches.

Allowing the appropriate time for construction with weather delays and contractor issues must be planned. Many people thought they had plenty of time and later realized they could not complete construction in time to meet biological windows.

To avoid this pitfall, I recommend you carefully consider bench configuration, material life-span, construction time, and the need for movability so that you invest in the most appropriate benches for your needs and don't waste your resources.

5. Irrigation

The challenge: A key question to production is how to irrigate the crops. There are a number of options and choosing which one to

use often depends on local conditions, water sources, water quality, and production volumes required. We currently use pivot irrigation but have used traveling booms and fixed irrigation. We like the pivot irrigation due to uniformity of water distribution and cost effectiveness. Fixed irrigation requires less up front capital but has the most variation in watering. Booms are effective but can require more maintenance and investment.

The pitfall: When water control systems fail and irrigation does not run we have lost seedlings (Figure 1). There is very little buffer if you cannot irrigate during the growing season. In warm conditions, seedlings dry very quickly when rainfall is not abundant. You can lose seedlings to dehydration in a matter of two to three hours in extreme cases.

To avoid this pitfall, invest in water sensors.

6. Growing Media

The challenge: The choice of growing media affects your crop from the beginning to the end. We have tried several different growing media



Figure 1. Effects of loss of water for a few hours.

but prefer peat moss mixes due to uniformity.

Handling of media can be a big issue as production increases. When growing 500,000 seedlings, one system may work but increasing to 5 million seedlings can require a dramatically different system. We currently use 220 cubic feet sky bales to handle our mix.

The pitfall: We experienced a huge downfall in production when some batches of media mistakenly had increased pH (Figure 2).

To avoid this pitfall, check pH of the media and be sure to work with a quality media producer.

7. Water Quality

The challenge: Water quality is essential for growing any plant. The pH of water can vary largely in the Southeastern U.S.



Figure 2. Effects of high pH media on seedlings.

The pitfall: We lost over 2 million seedlings because the water pH changed during the growing season (Figure 3).

To avoid this pitfall, acidify water that has a high pH.

8. Filling and Seeding Containers

The challenge: Filling cavities with growing media is important. Again, if production is small, one system may work but as production increases it another system may be needed to meet biological deadlines. Careful evaluation must be made of this process. Sowing equipment and procedures can present the same issues for meeting deadlines. Accuracy is critical as nurseries cannot afford empty

spaces due to poor sowing. We currently use vacuum sowing equipment. Container production can require large amounts of workers during sowing and shipping (Figure 4).

The pitfall: authorities can show up to verify the legal status of all the workers. This can be difficult for everyone involved, including the nursery which can lose its labor force overnight.

To avoid this pitfall, plan carefully to ensure the nursery has workers when workers are needed. Meet with contractors to discuss needs for documentation of all workers and get copies for your records several weeks ahead of critical production times.

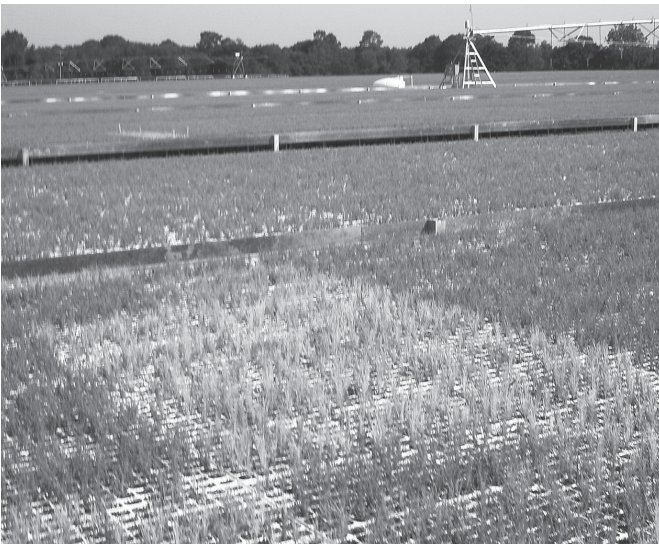


Figure 3. The effects of high water pH and media differences.



Figure 4. Production activities such as sowing require many people.

9. Finding Customers

The challenge: If production goes well, knowing where you can sell the seedlings is a major consideration. Planting of seedlings has been decreasing over the last several years. Finding buyers is no simple process. Everyone has experienced producing seedlings that they cannot sell.

The pitfall: unsold seedlings kill profitability.

To avoid this pitfall, have a quality marketing and sales plan.

10. Keeping Customers

The challenge: Customers are hard to find and hard to keep. They must be treated with respect. Nurseries must learn to adapt to customer needs and also to communicate nursery requirements.

The pitfall: Customers can go away as a result of no fault of the nursery. There have been huge changes in land ownership changes in the U.S. in recent years, for example.

To avoid this pitfall, develop new customers as well as diversify with different types of customers.

Conclusion

Even with these pitfalls and challenges, nursery production and sales can be very satisfying. With the improvements in genetics and technology, along with the need for trees, I see an excellent future for container seedling production. I hope that sharing some of the stories of “pitfalls” I’ve encountered can help you avoid these pitfalls as you grow your nursery!