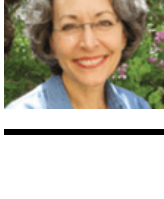


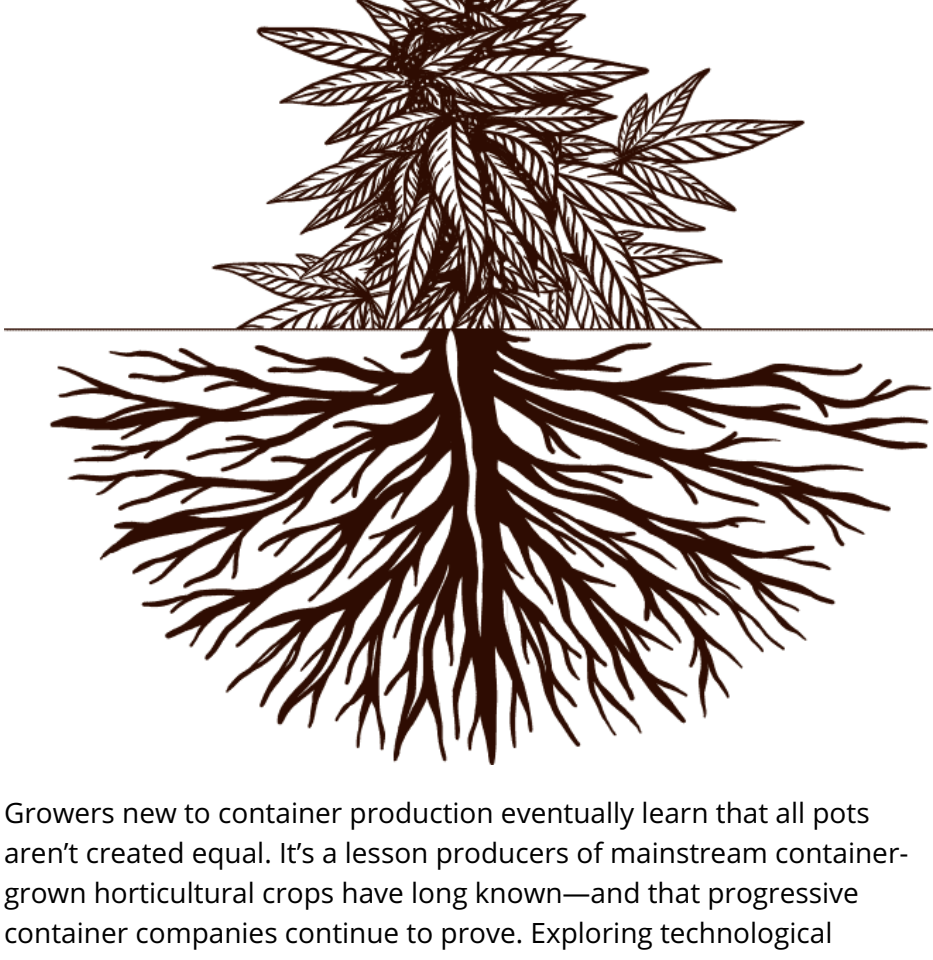
FEATURES

Building Strong Roots

Advances in container technology can help optimize plant root growth from propagation to the field.



Jolene Hansen



Growers new to container production eventually learn that all pots aren't created equal. It's a lesson producers of mainstream container-grown horticultural crops have long known—and that progressive container companies continue to prove. Exploring technological advances in growing containers, often backed by decades of horticulture industry research and use, can help growers decide what pots best suit their needs—and their roots.

Looking Beyond Traditional Plastic

Standard plastic nursery containers are a common choice for many container growers. Used throughout the nursery and greenhouse industries, solid, straight-sided plastic pots are easy to source through suppliers nationwide. But experienced growers will tell you: This relatively inexpensive, easy-to-sterilize and re-usable option can sometimes spell trouble. Plants held in solid plastic pots often develop circling roots, which inhibit growth, complicate transplanting and limit yield.

When Matt Spitzer, founding partner of Triangle Hemp (<https://www.trianglehemp.com/>) in Raleigh, N.C., moved into hemp from the hydroponic produce space, he soon discovered the negative impact solid plastic and girdling roots had on the company's seedlings and clones—especially if Triangle had to hold starts longer than expected when field farmers faced weather delays.



Courtesy of Yabba Cannaba
HempPots utilize a grid-like insert with an outer holder.

In looking for solutions, Spitzer turned to the ornamental tree industry. "They were the industry that really had the biggest issue with regard to root girdling," he shares. As he explored container options being used in the tree industry, he learned that container-grown tree roots respond differently when they hit air instead of solid container walls. Rather than circling the pot's interior, roots stop outward growth—as though they were pruned—and instead focus on dense, fibrous, lateral growth instead.

This natural air-pruning response has spawned an industry of container companies aiming to capitalize on this reaction and optimize healthy root growth. These "aeration pots," available in materials from papers to plastics, offer increased air-to-root interfaces that have been proven in traditional horticulture to air-prune roots, release root zone heat, discourage root disease and promote higher yields.

Working with aeration pots has been key to Triangle Hemp's success and given rise to its rootbound-free guarantee, says Spitzer. "That actually gave us a leg up [in the] second year of production because not many people were really aware of the issue with transplants," he says. "So, we were able to produce a superior product that was not rootbound. The people who had never planted hemp before didn't quite know that was so important. But if you had planted the year prior, you knew it was very important."

Propagating with Paper Pots

Some container growers opt for paper alternatives, but choices transcend pulp pots and corrugated trays. Daniel Ortega is head grower at Denver-based Yabba Cannaba (<https://yabbacannaba.com/>) hemp company and its sister company, ornamental grower Botany Lane Greenhouse. Ortega has used paper Ellepots (<https://www.ellepot.com/>) for ornamental propagation for many years.

Made from degradable, environmentally friendly papers, the permeable air-pruning pots seemed a natural match for hemp propagation in Ortega's eyes. "Hemp roots very vigorously, very quickly, but we saw that even though it roots quickly, the roots aren't as strong," Ortega says. He explains that's a problem when roots attach to the outer edge of a regular plastic plug tray and get pulled loose, causing stress at transplanting time.

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"Because of the air porosity that's available there with the paper Ellepots, it roots a little bit quicker, but I think when you're transplanting is the biggest benefit," Ortega says. "On the Elle[pots], because they're wrapped in paper, they take that transplanting a little bit easier. There's not that big of a transplant shock."

Lars Jensen, national sales manager for Blackmore Co (<https://www.blackmoreco.com/>), which distributes Ellepots throughout North America, says the aeration technology gives hemp transplants a big advantage. "It just has an explosion of feeder roots on the inside, so that it takes off so much quicker and bigger once you're trying to transplant," he says.

Exploring Fabric Container Alternatives

Fabric growing containers have flooded commercial and retail outlets in recent years, but Oklahoma City-based High Caliber Growing



Courtesy of Lars Jensen

Ellepots are made with degradable paper. (<https://treebag.com/>)'s fabric container technologies date back more than 30 years. Known as Smart Pots (<https://smartpots.com/>), these time-tested fabric aeration pots are well known in the ornamental tree industry. Dustin Locks, Smart Pots West Coast key accounts manager, says the pots are gaining fans among hemp growers shifting to controlled greenhouse environments to grow hemp strains for cannabidiol (CBD) year-round.

Locks says the consistency and purity of Smart Pot's permeable fabric—designed specifically for growing plants and air pruning to maximize root mass and nutrient uptake—are strong draws for hemp growers.

He says hemp growers especially appreciate the difference with mother plants, which are constantly stressed by the cutting process. "If you don't have that root mass for that plant to generate more vegetative growth, then you're waiting longer and longer to take cuttings," he says. Another plus is the ability to get custom Smart Pots built to specific dimensions, with prototypes ready in weeks. "Everybody's garden is different, and we can make that unique product for their needs," Locks says.

At Triangle Farm, Spitzer turned to fabric aeration containers to minimize the risk of root disease and binding roots in the company's mother plants.

Already familiar with fabric containers and their benefits, he settled on the RootTrapper II line by RootMaker (<https://rootmaker.com/>), a container company based in Huntsville, Ala., that has served ornamental tree growers for decades. These soft-sided black fabric pots are laminated with a white coating down to the bottom 2 inches of the pot. Designed to eliminate circling roots and stimulate dense lateral root branching, the air pruning pots allow drainage at the unlaminated base while the pot's coating protects the root ball against rapid moisture loss.

"We found this RootTrapper II container was really well-made and served a purpose for our mother plants extremely well," Spitzer says. "It just ensures that we don't have any binding at the base of our plants. This entire line is really quite geared towards hemp production because of their root pruning capabilities."

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Air Pruning With Plastic Options At HempTek

Courtesy of HempTek

Oregon's HempTek farm uses RootMaker plastic air pruning propagation trays that direct roots toward the container's air holes.

(<https://hemptekusa.com/>), a hemp farm in Oregon's Willamette Valley, CEO Dennis McGuire approached choosing containers for the farm's field-grown propagation with an eye on complementing the farm's organic focus. "It's a challenge growing starters and everything just using all-organic products," he shares.

After buying starts from various companies, McGuire says he grew dissatisfied with tight propagation trays that left little leeway for transplant timing—a big problem in the Pacific Northwest, where fleeting weather windows can put plans on hold for weeks. As a result, he opted for plastic trays that feature an updated design to address potential root spiraling and other issues plants grown in traditional plastic pots may develop—specifically, RootMaker plastic air pruning propagation trays, which offer a graduated, multi-cell design that directs roots toward the container's air holes.

McGuire compares air pruning and the fibrous roots it creates with the way exercise helps grow new blood vessels to transport blood and oxygen through the body more efficiently. "You can use the best soil you want, but if you don't have the right propagation tray, the plant still won't have the foundation—the root structure—it needs," McGuire says.

He adds that using RootMaker's air pruning trays from seed to field accentuates the benefits of HempTek's custom organic soil. The result is a sturdy transplant, free from spiraling roots, with short internodes and compact growth that withstands Pacific Northwest winds in the field, he says.

Yabba Cannaba's Ortega also turned to a plastic container option when he looked beyond propagation to larger hemp plants and pot sizes. He worried about root problems that can plague container plants during cool, damp Colorado winters. Ortega reached out to his Blackmore contact, conducted a small trial and quickly settled on HempPots, also known in ornamental circles as Pioneer Pots.



Courtesy Dustin Locks

Smart Pot's custom liners being used in propagation. Smart Pot's Dustin Locks says Smart Pot's permeable fabric is designed specifically for growing plants and air pruning to maximize root mass and nutrient uptake.

Blackmore's Jensen says the pots represent years of university and industry research to optimize plastic-to-air ratios and maximize aeration benefits. HempPots combine a grid-like insert with an outer holder that Ortega sees as pivotal. "The air pruning is just one piece, but then there's the base. The two-piece system adds stability for top-heavy plants, plus the plant is never touching the ground," he explains.

Ortega emphasizes that the design discourages root disease and its spread. "It's almost like every plant is on its own little island. If one is struggling, it's one plant. Everything else is going to be fine," he says. Last December through March—what Ortega describes as the toughest time of the year—the team grew about 17,000 plants for seed production. "We only lost one or two plants due to a root issue," he shares.

With the HempPots, Ortega says his plants root out to the edge or bottom in about half the time as traditional pots, plus the increased mass of feeder roots from air pruning results in impressive growth. "Having a good, strong root system is going to really benefit the grower, and this pot helps achieve that," he shares.

Investing in Your Roots

For growers exploring container options, Ortega says to keep the plant's root system foremost in mind. "In cannabis and hemp, a lot of investment goes to lights. A lot of investment goes to humidity and temperature control," he says. "This is investing in your root system. If a plant has a good root system, it's going to be able to handle a lot of variables."

Smart Pot's Locks says that air pruning is still a new concept for many growers, but there's an increasing awareness about the importance of root health. "That's something a lot of people forget about," he says. "You can have the best soil, you can have the best nutrients and the best environmental control, but if the root mass is not performing, then your plant's not performing. The right container takes care of that."

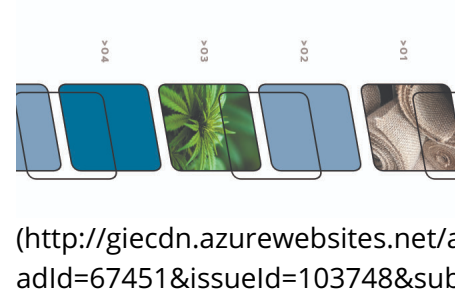
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