Growing Media Report

In our annual Growing Media Report, you'll find updates from growers across North America, the latest on substrate security and more.

In Case You Missed It: *This 2023 sponsored report on the state of growing media in the industry has data that remains quite relevant today – and it's something you might want to review before making your next buying decision on substrates!*

Sponsored By:

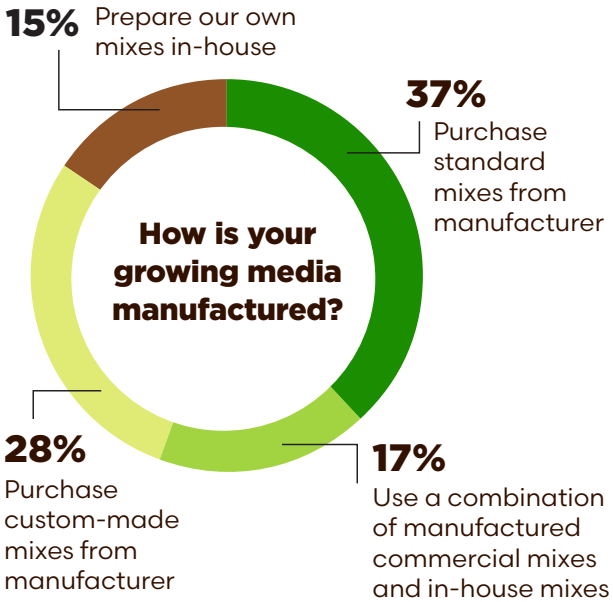
HydraFiber®
Engineered Media

A CLOSER LOOK AT GROWING MEDIA
USE AND REQUIREMENTS

From the mix-your-own debate and component choices to just-in-time delivery needs and availability issues, see what your peers revealed about needs and practices regarding growing media.

Growing media consists of components that provide water, air, nutrients and support to plants in all stages of production. In turn, growing media plays a key role in the health and marketability of greenhouse crops from roots to tips. Choosing the best growing media mix for your crops requires research and trials, as well as communication with both your growing team and suppliers.

Editor's note: We surveyed North American greenhouse growers in May 2023 and received 153 qualified responses. Not all answers add up to 100% due to rounding.



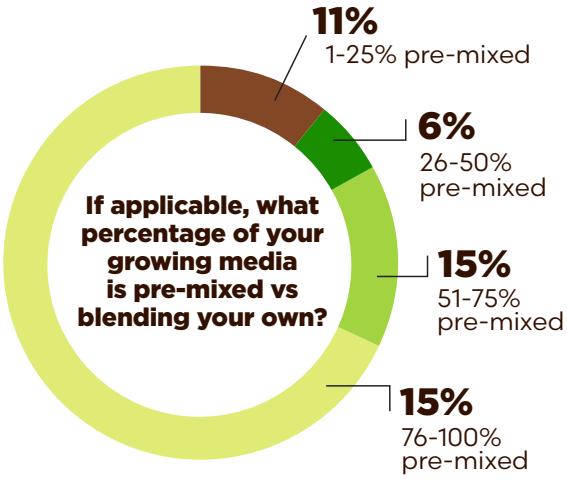


PHOTO: ©MARTIN BERGSMA | ADOBESTOCK

If applicable, why do you buy pre-mixed growing media?

69% Convenience

11% Lack of labor

5% Lack of expertise

15% Lack of space

If applicable, why do you blend growing media in-house?

28% I prefer the control of mixing my own product

51% I require several mixes for different crops

21% Cost savings

How many different growing mixes do you use during a typical growing season?

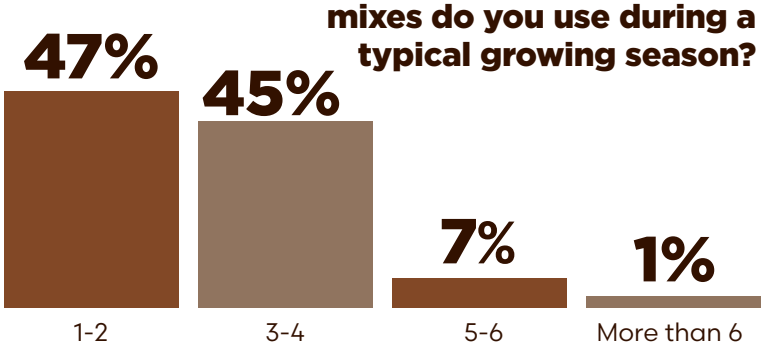


PHOTO: ©PYRRPREE | ADOBESTOCK

Which components are important to your growing media mixes?

(Check all that apply)

Other answers included: Dolomitic lime; biofungicide; mycorrhizae; controlled-release fertilizer; manure

How important is it to have a substrate that helps reduce and/or conserve water?

34%	35%	24%	7%
Very important	Important	Somewhat important	Not at all important

Rank the most important attributes you look for when selecting your substrate. 1 most important to 5 least important

1. PERFORMANCE
2. CONSISTENCY
3. COST
4. AVAILABILITY
5. SUSTAINABILITY

PHOTO: ©JULIE CLOPPER | ADOBESTOCK

Do you buy direct from the manufacturer, from a regional distributor or both?

47%	28%	25%
Direct	Regional distributor	Both direct and from a regional distributor

Have you changed your growing media formulation during the last two years because of availability issues?

49% *yes* | **51%** *no*

In terms of your growing media inventory management (either raw materials or finished materials), do you tend to place just-in-time orders or warehouse extra inventory?

43% Just-in-time orders | **57%** Warehouse extra inventory

Do you currently use an automated pot and/or flat filler?

53% *yes* | **47%** *no*

Do you currently use a bale breaking machine?

25% *yes* | **75%** *no*

PEAT MOSS PROJECT

In June, the Canadian Sphagnum Peat Moss Association (CSPMA) announced the securement of funding for a large-scale, five-year project aimed at restoring horticultural peat extraction sites. The CanRePeat project is realized in partnership with Environment and Climate Change Canada (ECCC) under the Nature Smart Climate Solutions Fund, which aims to restore and secure carbon-rich ecosystems across Canada.

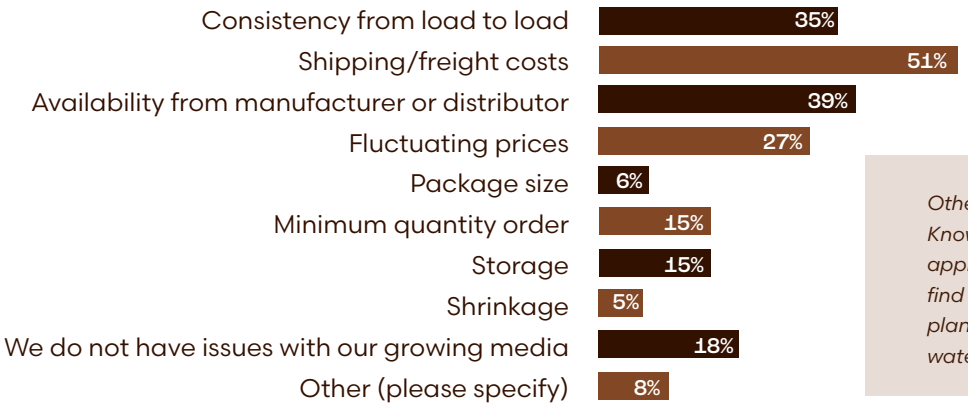
The CanRePeat project has three principal components: (1) inventory and characterization of peatlands to be restored; (2) their restoration back to peat-accumulating ecosystems; and (3) their conservation in perpetuity. The peatlands being restored have not been subject to a legal obligation to restore at the time of their entry into operation. The CSPMA was successful in obtaining the full requested amount of $6.7 million over 5 years (2023 to 2027). The funding formula is a 50:50 split, with $3.37 million cash from ECCC and $ 3.37 million from the CSPMA and its members as cash or in-kind contributions.

Peat harvested in Canada is exclusively used in horticulture, primarily as an important ingredient in growing media mixes used for food production and home gardening. Although the footprint of the horticultural peat industry is small (less than 0.03 percent of Canadian peatland area), the CSPMA acknowledge the importance of establishing best practices for peat harvesting and peatland restoration to ensure that this sensitive and valuable resource is managed with sustainability in mind.

Learn more at peatmoss.com

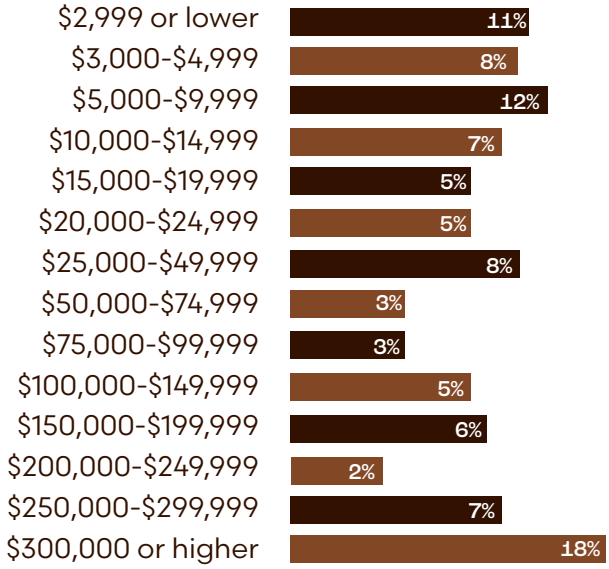
Source: Canadian Sphagnum Peat Moss Association

What are the biggest challenges you face regarding growing mixes? (Check all that apply.)



Other answers included: Knowledge about most appropriate mix; trying to find one growing mix for all plants; getting the correct water holding capacity

What are your OVERALL annual growing media expenses?



TIPS FOR GROWING **MEDIA STORAGE**

- Don't buy too much growing media unless you have a suitable storage location available.
- Never store any growing media directly on the floor. At a minimum, use a pallet.
- Immediately tape all tears in wrapping, boxes, etc., to prevent contamination.
- When in doubt with older grow media, contact the manufacturer to see if it is still good, or go with the old phrase, "When in doubt, toss it out."
- Read the label. Most good suppliers will indicate where and how long to store their products.
- Knowing your media's source is critical since some growing media has an expiration date. Knowing how long it spent in transit to you is also important. It's helpful to develop direct relationships with the manufacturers when possible. This will eliminate holding times at distributors and guarantee the freshest products possible.

Source: Christopher Sloper, horticulture consultant

HANDLING GROWING MEDIA

To avoid compaction, containers (including plug trays) should be lightly filled and the excess brushed off the top. Air space can be drastically reduced by compaction. At no time should any growing containers be stacked. The moisture content of the medium prior to filling containers may also be important. Adding water to peat-based mixes before filling plug trays causes the media to swell and helps create more aeration. Water added to about 100% by weight of the media is sufficient for cell packs. Plug mixes should have about 200% by weight water added before filling plug trays. Moistening of the medium before filling larger containers does not have much benefit.
Source: UMass Extension

POTENTIAL RISKS OF RECYCLING GROWING MEDIA

Recycled growing media can have some detrimental properties that should be considered and monitored. First is the potential loss of physical properties of reused media. Over time, organic particles naturally break down (decompose), thereby decreasing structure and air porosity. If materials are ground up or otherwise handled during sterilization processes, the particle size will continue to reduce, therefore changing the physical properties when repotted. Blending in some percentage of new growing media with the old/reused would likely help with this problem.

Secondly, reused growing media can house potentially harmful pathogens, pests and other unwanted goodies if not properly sterilized or treated. The infection or exposure that improperly recycled materials can have on a grower operation can be very detrimental to future crops and cropping cycles. Recycled materials left outdoors can easily be contaminated with weed seeds and/or pathogens. Recycled materials not properly sterilized could contain Pythium, Fusarium, Phytophthora and other plant-sensitive diseases. The recent increase in legalized cannabis production has also exposed new biological concerns (many may be unfounded) including the presence of E. coli and Salmonella in growing media that are now being monitored and, in some cases, regulated for.

Lastly, there can be some toxicity effects from reused growing media. Mostly in the form of residual fertilizer salts that can create high EC in mixes when re-blended or reused in future crop productions. This can alter fertility practices and management as well as crop growth response and control. Desalinization via washing or flushing with hot water is needed to remove potential salts from materials like coco coir.

Source: Brian Jackson, director of the Horticultural Substrates Laboratory at North Carolina State University

PHOTO: ©MULDERPHOTO | ADOBESTOCK

Guest voice // Op-Ed

IT'S **SECURITY,** STUPID

Recently learned lessons to ensure substrate security into the future.

By Jeb Fields and Jim Owen


Jeb Fields

Quite a lot has changed in 24 months. Plastics for containers, irrigation and polymer coated fertilizer are more abundant. Fertilizer costs are stabilized (although likely at a new baseline that is higher than pre-COVID). Peat is being readily harvested and well-poised to manage customer demand. Droughts have been averted on the West Coast through record rainfalls and snowpack. As a result, on-demand and on-time supply of the needed natural and manufactured resources is on the rebound — minus the continued labor and trucking issues.

Lest we forget, disruptions to supply chain processes across the board have caused product availability to dwindle nationwide in past years and decades. Talk at major trade shows was focused on stockpiling supplies, and dare we say hoarding, with an eye to an uncertain future. We are all keenly aware of the issues surrounding plastics and containers, as well as the dramatic rise in fertilizer prices. However, nothing hit home to the industry like the scarcity of peat and rising cost of shipping bark and intensifying outcry that accompanied this growing problem.

We have been here before. While Canadian sphagnum peat suppliers are now having healthy harvests again, what happens in the future when peat harvests are limited by uncertainty of weather? Consider the other major U.S. substrate component, bark. Bark prices fluctuate based on standard supply and demand economic principles.

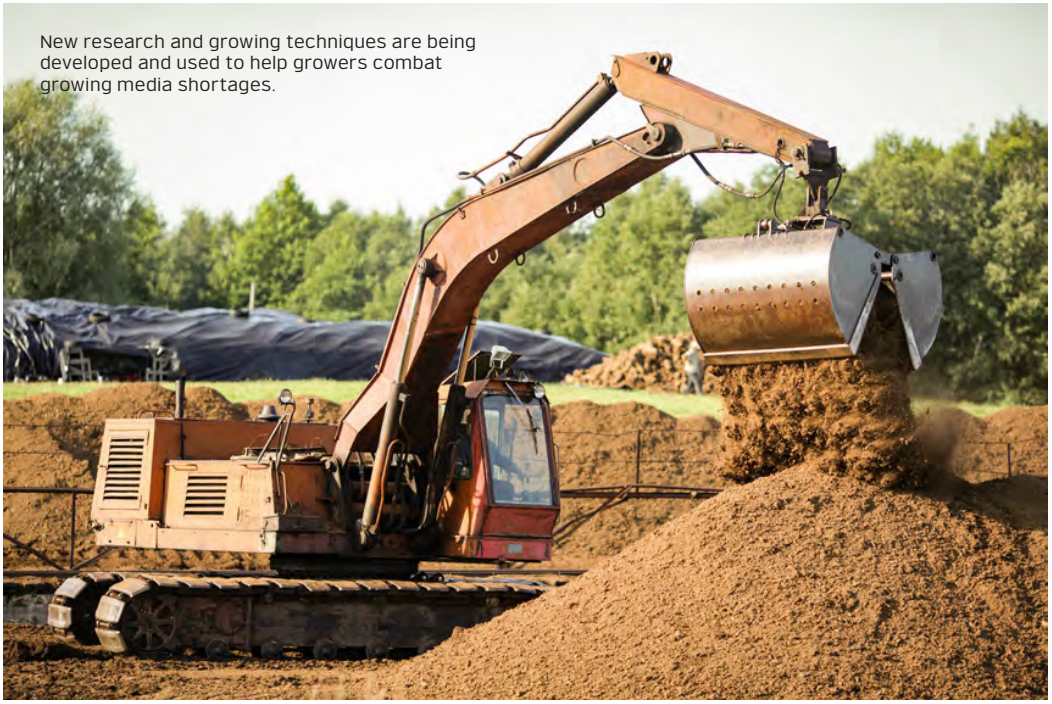

New research and growing techniques are being developed and used to help growers combat growing media shortages.

PHOTO: ©INGUS EVERTOVSKIS| ADOBESTOCK

As fuel costs rise, bark is used as a fuel source to supplement energy. As housing crises arise or new construction slumps, less lumber is cut and there is less bark available to age and ship. We had our taste of competition and shortages of bark both in the early 1990s and 2000s. While it has historically rebounded, this cyclic nature should be expected again — possibly much sooner than later based on some forecasts.

Also consider the rapidly rising substrate end-users. Globally, small fruit, hemp, medicinal marijuana and leafy greens operations are shifting to soilless production, increasing demand for substrate materials. In the U.S. alone, COVID also resulted in the creation of millions of new gardeners. As new soilless growers and gardeners join in the production of soilless culture, more and new substrate components will be required to satisfy their demand.

Another looming concern for the peat industry is the perceived negative environmentalism and sustainability — making headlines in the *New York Times* and *National Geographic* to name a few. These articles have resulted in public backlash towards the use of sphagnum peat — today's gold standard for soilless substrates. This backlash against the peat industry has been growing at a rapid pace, to where we hear consumers and the public discussing peat in everyday conversations with only the "facts" found via social media and non-ag related news. More than ever, soilless production of ornamentals and food are in the spotlight. The horticultural industry, growers and allied suppliers alike, must inform the consumer we remain the "green" industry.

A comparison was presented by one of my mentors in recent discussions that bears weight in this op-ed. A decade ago, researchers found that while the use of neonicotinoid chemicals effortlessly control major pests like scale, it can be devastating to insect populations. There was major public outcry, and it was expected that we would have to end their use to save the bee populations. However, 10 years later, we never hear mention of this, and imidacloprid is used regularly and ubiquitously. Did the problem go away? No — imidacloprid — when properly used provides a valuable tool to combat insect pests without negative effects on the bee population.

There is less mention, or one may say disregard, of the habitat loss, pollution and climate change decreasing the number and diversity of insect populations. Think about

Even if supply is strong now, growers should plan for the future and for potential changes to what products are available.

PHOTO: © GRAFVISION | ADOBESTOCK

it — when was the last time you had to clean bugs off your windshield after a road trip? My guess is not often and 10 or 15 years ago it was nearly standard practice. All this to say, finger pointing followed by quickly forgetting as we move on with the next news cycle is common and can have dire consequences for our industry. Perhaps the clamoring surrounding peat usage will be forgotten, but perhaps it is here to stay as it is in the United Kingdom, which has outlined a ban on all peat-based gardening products by 2030.

There has been much discussion of using "alternative" materials such as coir and wood fiber to address substrate shortages and increasing number of users. These are viable alternatives and becoming ubiquitous, but may require a learning curve when incorporating into production. Like bark, wood products are susceptible to being used as a low-cost fuel for energy. Significant resources are required to wash coconuts prior to use as a coir. Additionally, coir must be transported, typically via shipping containers, to North American growers with availability and pricing varying based on your U.S. location. There are also mentions of social justice surrounding coir production that may impact consumer perceptions in the future.

We still routinely hear the increasing need for affordable, regional materials to improve availability and reduce transportation costs. In the Gulf South, we have vast deposits of sugarcane bagasse in which research is underway to determine suitability and use in soilless substrates. Other regions have similar options that may yet have a major commercial entity backing the use of their byproducts, so it may take some specific investigation and time investments, but options are out there.

Another issue that is constantly discussed is the need for substrate consistency that leads to a uniform crop. Growers across the country continually complain about the lack of uniformity with their substrate from batch to batch. As the industry progresses into precision agriculture, the need for quality control is at an all-time high. Work with your substrate suppliers to ensure continuous quality control. I know they all strive for ultimate quality and want nothing more than your continued success.

What does this all mean for you? I hope your biggest take away is to always heed the past and know that while things are going well right now, it never hurts to plan for future uncertainties. Benjamin Franklin once said, "Failing to prepare is preparing to fail." We strongly encourage all to be prepared. Be ready for the next turn of the dial, when prices skyrocket, or when availability rapidly diminishes due to unforeseen economic uncertainty or supply disruption from a pandemic. How can one do this? Perhaps not becoming overly reliant on any one material. It would be nice to be able to grow without water and fertilizer, but that is not a trick we have solved. In the meantime, experimenting and evaluating new techniques and materials on-farm so that you have experience and familiarity to quickly alter course. Explore new substrate materials. Perhaps you consider what it may take to implement substrate recycling into your production system. Substrate stratification is a new technique we are developing which allows multiple substrates to be layered or "stratified" in a container. Using this strategy, you can often get away with more "filler" material than you would by direct blending. Remember to think outside the box. One of our colleagues believes we will be producing our woody nursery shrubs hydroponically in the coming years, and why not? Bare root production is standard for many shrubs and trees, how could hydroponic production not be in play? The world is changing, and we must remain ever vigilant to ensure we adapt.

We close this op-ed with an eye to the maybe not-so-distant future in which substrates and soilless production systems become something entirely unfamiliar. Thus, we believe there are big changes ahead to address the ever-growing specialty crop industries that will be essential in feeding, sowing and clothing the world. Some folks doubt our ability to learn from the past, believing we continue using the same substrate systems, albeit with some minor upgrades. Some believe we may need to revisit filling containers, in part, with sterilized, mineral soils to increase water storage and delivery to address micro- and prolonged droughts. However, we believe the substrates of the future will be unrecognizable today. For example, we may use 3D technology to print containers with optimized shape for the crop or production system. Maybe it's 3D printed organic media, mineral nutrient latent substrate that consists of micro-tubes, like xylem — nature's solution to water and nutrient transport in vascular plants. We suggest you also conduct thought experiments regarding how best to reimagine and optimize an antiquated system with existing or novel technologies. Either way, we look forward to the substantial substrate innovations to come. GM

About the authors: Jeb S. Fields is an assistant professor & extension specialist with the Louisiana State University Agricultural Center and assistant research coordinator of the Hammond Research Station in Hammond, Louisiana, **JFields@agcenter.lsu.edu**. James "Jim" S. Owen Jr. is a USDA ARS research horticulturist stationed at the Application Technology Research Unit in Wooster, Ohio, **jim.owen@usda.gov**.

The views and opinions expressed in this op-ed do not necessarily reflect the views of GIE Media.

KNOW YOUR **COMPONENTS**

Understanding the parts that make up your growing media recipe will help you grow a better crop.

Successful production of container-grown plants is largely dependent on the chemical and physical properties of the growing media. Therefore, it's critical to carefully choose the best components that fit your needs. Below are some organic and inorganic amendments and their properties.

Organic amendments

Peat

Peat is a common component in both nursery and greenhouse mixes. Peat is usually included in a mix to increase the water-holding capacity or to decrease the weight. Peats used in horticulture are usually classified into three types: moss peat, reed-sedge and peat humus. Moss peat, more often called peat moss, is the most common form used in the industry and is derived mostly from sphagnum moss.

Peat moss is the least decomposed form of the peat types. It's lightweight, high in moisture holding capacity and very acid (pH 3.8 to 4.3). A significant problem with peat moss is "wetting up." Peat moss is inherently hydrophobic (repels water). To address this situation, some suppliers offer a product with a wetting agent already included. Before using peat moss, you should conduct a simple test to see how difficult the product will be to wet. If the product does not include a wetting agent, you can incorporate one or use hot water to speed up the wetting process. Most recipes call for peat moss on a volume basis (e.g. 50% peat moss:50% perlite vol:vol). Reed-sedge peat is formed principally from reeds, sedges, marsh grasses, cattails and other associated swamp plants. Peat humus is usually derived from reed-sedge or hypnum moss peat and represents an advanced stage of decomposition. This type of peat is usually dark brown to black and has a low moisture-retention capacity.

Coir (coconut fiber)

Coir is primarily used in the greenhouse industry. It's derived from the husk of the coconut fruit and originates from several countries including Sri Lanka, India, Philippines, Mexico and Costa Rica. Because it originates from such diverse geographic locations it is difficult to characterize specific chemical and physical properties. Pay attention to the total soluble salts (electrical conductivity) and sodium and chloride levels in any coir product. The typical pH range for coir is 5.5 to 6.8. It contains significant amounts of phosphorus (6 to 60 ppm) and potassium (170 to 600 ppm), and can hold up to nine times its weight in water. Since coir contains more lignin and less cellulose than peat, it is more resistant to microbial breakdown and therefore may shrink less. Coir is easier to re-wet after drying than peat moss.

Coir is easier to re-wet after drying than peat moss.

PHOTO: © PHONGTHON PREUKSRIRA | ADOBESTOCK

Softwood bark

Bark is the primary component (80% to 100% by volume) in most outdoor container nursery mixes. For many years bark was viewed as a forest waste product but today the availability for container use is limited in some markets due to alternative demands (e.g. landscape mulch fuel) and reduced timber production. Pine bark is preferred over hardwood bark since it resists decomposition and contains fewer leachable organic acids. Pine bark is usually stripped from the trees milled and then screened into various sizes. A good potting medium usually consists of 70% to 80% (by volume) of the particles in the $^{1}/_{42}$- to $^{3}/_{8}$-inch range with the remaining particles less than $^{1}/_{42}$ inch. Bark is described as either fresh, aged or composted. Many growers use fresh bark but typically add 1 lb N/yd^3 to compensate for the potential nitrogen draft that occurs in the pot. Composting bark involves moistening the bark, adding 1 to 2 pounds N/yd^3 from either calcium nitrate or ammonium nitrate, forming a pile and then turning the pile every 2 to 4 weeks to ensure proper aeration. Composting bark typi-

cally takes 5 to 7 weeks. Aging is a cheaper process, but aged bark has less humus and a greater nitrogen draw-down in the container than composted bark.

Hardwood bark

The chemical properties of hardwood bark are significantly different from pine bark. The pH of fresh hardwood bark is usually less acid (pH 5 to 5.5) than peat moss or pine bark. Composted bark may be rather alkaline (pH 7 to 8.5). Hardwood bark typically contains toxic compounds, and for this reason should be composted before use. According to the University of Illinois, for each cubic yard of bark, a grower should add 2 to 3 pounds of actual nitrogen, 5 pounds of superphosphate, 1 pound of elemental sulfur and 1 pound of iron sulfate. These amendments should be blended into the bark and some water added to the blended pile. Turning the pile three to five times during the 60-day process is recommended to get a uniform product. The temperature in the pile should approach 150° F to eliminate most pathogens.

Wood substrates

Wood-based amendments have been successfully tested as a renewable alternative for pine bark in the nursery industry and peat moss and perlite in the greenhouse industry. Research on the nursery side has focused on 'debarked loblolly pine logs' (majority wood; sometimes referred to as 'pine tree substrates' PTS) and 'whole-tree' (containing all shoot proportions of the tree and thus consisting of approximately 80% wood fiber; sometimes referred to as 'wholetree substrates' WT and 'clean chip residual' CCR) processed into container substrates. Many studies have shown that the growth of numerous woody and herbaceous plants using wood-based substrates is comparable to 100% pine bark (PB). However, the percent of wood product, particle sizing, fertilizer rate and type of crop (i.e. short or long term) will need to be strongly considered to achieve favorable results. Research has shown that when pine wood chips are used as a substitute for perlite at rates up to 30% in a peat substrate, there is no need to change cultural production practices. No differences were found in nitrogen use liming requirement or plant growth regulator efficacy. These results should not be applied or assumed for other wood components. Current efforts are centered on using wood fiber as an amendment to peat moss in the range of 10%-40%.

PHOTO: © KZENON | ADOBESTOCK

Compost and animal manures

A large variety of compost or animal manure products is available in the marketplace. Disadvantages of manures include possible high salts, fine particle size and weed seeds. The advantages include the nutrient contribution and potential improvement in media physical properties. A primary consideration when evaluating a sludge is the potential for elevated heavy metals including cadmium, lead, zinc, copper and mercury. In some areas, plant-based compost provides a low-cost media amendment. Consider the availability and consistency of the product and the particle size. Particle sizes for plant-based compost can be either too large or too fine depending on the source material and composting process.

Inorganic amendments

Perlite

Perlite is most commonly used as a component in greenhouse growing media or nursery propagation applications. It is produced by heating igneous rock under high temperatures (1,100 to 1,600° F). Perlite differs from vermiculite in that the finished product is a "closed cell" that does not absorb or hold water. For this reason, it is usually included in a mix to improve the drainage or increase the percentage of aeration. Perlite is lightweight (6 to 8 lb/ft^3) chemically inert pH neutral sterile and odorless.

Vermiculite

Vermiculite is similar to perlite in that they both originate as mined minerals that are heated to produce a finished product. Perlite and vermiculite differ in the rationale for including them in a mix. Perlite is usually included in a mix to increase drainage, but does not increase the retention of nutrients. In contrast, vermiculite (with its plate-like structure) holds large quantities of water and positive-charged nutrients like potassium, magnesium and calcium. Vermiculite is sterile and lightweight (5 to 8 lbs/ft^3). The pH of vermiculite will vary depending on where it is mined. Most U.S. sources are neutral to slightly alkaline, whereas vermiculite from Africa can be quite alkaline. It is usually sold in four size grades: #1 is the coarsest and #4 the smallest. The finer grades are used extensively for seed germination or to topdress seed flats. Expanded vermiculite should not be pressed or compacted, especially when wet as this will destroy the desirable physical properties. Vermiculite has been the focus of news attention several times over the past 30 years with regard to the issue of potential contamination with asbestos related fibers from a related mica mineral called tremolite. Because of this concern and attention most mines monitor this issue closely to avoid problems with commercially available product. As is the case with dry peat moss, handlers should wear a dust mask to avoid inhaling these materials. GM

SOURCE: JAMES ROBBINS, UNIVERSITY OF ARKANSAS

Sponsor Message

FROM INVENTORY TO PLANT QUALITY, **PROFILE PRODUCTS DEVELOPS LONG-LASTING PARTNERSHIPS TO HELP GROWERS ACHIEVE SUCCESS.**


Jeff Langner

At Profile Products, we have been at work for more than 50 years, providing customers with green industry solutions across North America and in more than 70 countries. We have become a leader in horticultural substrates and nutrition products since introducing HydraFiber Advanced Substrate to the horticultural industry in 2015.

Since that time, we have continued to expand our portfolio to include Sunterra Canadian Sphagnum Peat; ProfileCoir from Southern India; Quick Plug bonded media for propagation; and a complete line of Florikan controlled release fertilizers.

We partner with growers of all sizes to provide reliable inputs to improve their growing operations. Our engineered HydraFiber products are Made in the USA, offering a substrate solution that is consistent, cost effective, readily available, and high performing to improve plant rooting and nutrient uptake.

In a time where raw materials can be volatile and expensive to transport, we offer supply dependability to ease inventory concerns, and ship highly compressed fibers to allow for greater efficiency in shipping, storage, and greenhouse production.

Our Canadian Sphagnum Peat has been certified by Veriflora for our responsible harvesting practices. And our Florikan CRF has been readily adopted not just here on Earth — but in food production on the International Space Station, courtesy of our work with NASA.

We bring knowledgeable people, proven products, groundbreaking technology, and personal services to our customers. Our production facility in Conover, North Carolina, features state-of-the-art R&D greenhouses and includes a 2,500-square-foot training and education facility. We expanded production capacity last year with the grand opening of a new fiber processing facility in Monticello, Georgia. And our team partners with leading universities including North Carolina State University and Auburn University on wood fiber technology research, bringing to market products that are backed by the highest levels of testing and quality control.

We will continue to perfect our technologies and expand our suite of products to meet the needs of the market today and tomorrow. We look forward to the chance to meet you, and to show you how we can help you grow better plants, and better margins!

- Jeff Langner, Senior Marketing Manager, Profile Products

Profile
Solutions for your Environment

Profile® Growing Solutions

Performance

From The Ground Up

FROM CULTIVATION TO HARVEST, PROFILE® GROWING SOLUTIONS HAS AN EXPANSIVE PRODUCT PORTFOLIO TO SUPPORT YOUR UNIQUE GROWING OPERATION NEEDS.

TruRoot® Propagation Media

HydraFiber® Engineered Media

Profile® Harvested Media

Florikan® Controlled Release Fertilizer

propagate • optimize • cultivate • nurture

PROFILEGROWING.COM | 800.496.0955 | +1-847.353.2148 | 750 W. LAKE COOK RD. SUITE 440 | BUFFALO GROVE, IL 60089