GROWERTALKS

Features

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A Glimpse Into the Future of Soilless Substrates

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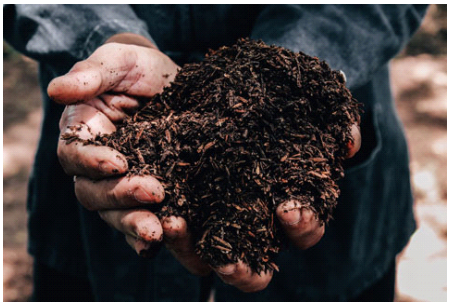

The consensus of our 2020 industry survey and post-interview analysis of specialty crop growers and substrate suppliers revealed that regardless of crop, consistently available and affordable soilless substrate components are needed to create custom growing mixes. Crop-specific substrate blends create a pathogen-free root zone and can provide equal or improved crop performance, as well as address producer and consumer concerns around environmental impact.

The perception surrounding perlite and peat is that they're the "benchmark" to create significantly "better" substrates, but that they're "energy"-intensive, environmentally unsustainable and face continuing supply challenges. Producers desire a consistent supply of substrate "on-demand" and "on-time" from a loyal substrate supplier who also can provide technical support when needed. Therefore, the horticulture industry must progress by "closing the loop" of resources for containers, media, fertilizer and water, enabling the protection of natural resources while producing plants that survive in the marketplace and provide societal benefit with a reduced environmental impact.

Research findings remain mixed regarding the cost implications of industry firms acting sustainably. It's uncertain if these actions will increase the cost of plants and other products. Dr. Charlie Hall, Professor & Ellison Chair in the Department of Horticultural Sciences at Texas A&M University, indicates that consumers will need to be presented with messaging that focuses on associated benefits, and crop producers will need to be more strategic in their pricing strategies to showcase the long-term monetary value of acting (and purchasing) in a more sustainable manner.

Where we are today

Currently, we rely primarily on forestry byproducts and sphagnum peat or coir as the basis of most organic soilless substrates. These substrates easily fulfill the decades-old physical and chemical property standards that can "do-no-harm," making for overly forgiving substrates when producing containerized crops. This approach for soilless substrate selection, coupled with a past abundance of agrichemicals and other resources, has allowed us to overcome the human, meteorological and production system challenges of inefficient cultural management, severe weather and the container effect of a perched or transient water table at a container's base. The norm in production practices is permitted to be wholly inefficient when the overapplication of resources has little consequence to our

crop and our bottom line.

The horticulture industry is currently facing acute shortages with many supplies used for crop production, including substrates. Part of the supply shortage problem is, or has been, caused by pandemic-related supply chain issues that are expected to carry on into the future. Supply chain issues have generated renewed interest in locally sourced substrate components.

Weather also can impact substrate availability, especially as it pertains to peat harvesting. Secretary of Agriculture Tom Vilsack recently listed “Addressing Climate Change via Climate-Smart Agriculture” as one of the top goals for the current administration. Part of climate-smart agriculture is sourcing a viable substrate in the face of unpredictable weather. New substrate solutions should include sourcing of components that are resilient to extreme weather.

We are, in part, the green industry and the specialty crop sector provides boundless employment and subsequent economic benefits, while our crops provide food, ecological services, health benefits and pharmaceuticals that are an integral component of society. We have an obligation to become better at responsibly sourcing necessities and effectively managing resources to prepare for a profitable future.

Where we are going

Soilless substrates provide a unique and totally adaptive method to produce crops in a system where the grower can define the physical and chemical properties without needing to adapt practices for a given soil or conventional production system. This adaptability will allow the needed paradigm shift to address increasing costs, reduced availability of agrichemicals, water limitations, decreasing arable soil, more extreme weather, regulatory oversight and an ever-growing interest in controlled environmental agriculture (e.g., vertical farms).

A greater proportion of soilless substrates will need to be produced with renewable, regionally available byproducts leading to reduced transportation costs, reduced carbon-footprint, more consistent availability and a better perception of their environmental sustainability. These byproducts will be processed prior to their use as a substrate to increase consistency and subsequent crop vigor and uniformity. This has already been observed by some crop producers with increased adoption of wood fiber and peat blends, which require capital inlay for equipment, and altering material handling and cultural practices while providing a reliably uniform substrate that growers can adapt to their desired standards.

Our survey and interview results indicated that experienced growers were willing to trial, and ultimately adopt, more costly substrate options if there were production benefits such as resource efficiency, crop quality and uniformity, pest control, and above all, quicker or increased yield. High-performance, value-added substrates now can open doors for the development of enhanced designer substrates later.

In a not-too-distant future

Products will address the ever-increasing urban populations’ need for food, herbs, alternative health pharmaceuticals, air quality, wildlife and insect habitat, and beautification. Crops will not only have been labeled accordingly if they were produced locally (e.g., how many miles they’ve travelled), but how much greenhouse gas was emitted or water used for their production. The possibility of a sustainability index or a label indicating whether employees were paid a “fair” wage is increasing. Today’s consumers (i.e., Millennials, GenY) value sustainability and will pay more for well-researched, individualized products that meet their material and ethical needs.

Substrates, especially in the western U.S., will need to be reengineered to use less water for reasons not limited to consumer marketing priorities. This will be accomplished by having substrates that retain more water with a higher ratio available to the plant, coupled with the use of “grey” instead of fresh water. Throughout the U.S., substrates that

deliver mineral nutrients could be created to supplement fertilization and minimize the environmental impact of production on local ecosystems, creating an increasing need for precision water and nutrient application to ensure profitable crop production. This will be further augmented by understanding and altering the substrate microbiome to increase crop vigor and value by providing disease resistance, increasing mineral nutrient delivery and supplying bio stimulants.

With the increased need for substrate uniformity, U.S. standards may need to be implemented to measure or specify chemical and physical properties. This combination of future possibilities will support growers in becoming the best of themselves while providing ornamental plants and food.

As mentioned in earlier articles of this series, soilless substrate use is expanding by leaps and bounds to address existing and new markets. All of what we cannot see over the horizon makes up the scariest, as well as the most exciting development. The unknowns of climate change, the changing allocation of natural resources and the preferences of generations to come will continue to shape our industry. Perhaps, in addition to recycling all substrates from culled or finished plants, we'll incorporate microplastics from the ocean, making not just our products, but our industry, value-added.

The good news is that we have time. As Abraham Lincoln said, "The best thing about the future is that it comes one day at a time." Therefore, thinking to the future is an exercise in meaningful progress and success. **GT**

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