

# Soilless Culture: On the Forefront of Science and Innovation

It is common in academia for professors to have “split appointments,” which define (roughly) what our career focus and programmatic areas are at our respective universities. At North Carolina State University (NCSU), I have a two-way split between being a teacher and a substrate scientist. A “teacher” is pretty self-explanatory, but a substrate scientist may not be! With teaching and research, my career at NCSU allows me to engage, teach, mentor, advise and learn from young adults who are aspiring to be the next generation of industry professionals, scientists and history makers.



*Brian E. Jackson is an associate professor and director of the Horticultural Substrates Laboratory at North Carolina State University. He can be reached at [brian\\_jackson@ncsu.edu](mailto:brian_jackson@ncsu.edu)*

## BACKGROUND IN SOILLESS PLANT PRODUCTION

My research program focuses on soilless substrates (growing media) for horticultural production in various cropping systems. Since 2003 I have studied, practiced and engaged with substrate manufacturers, academic researchers, and growers around the world in efforts to advance the science of soilless production and product innovation for our industry.

Soilless plant production is the culture of plants in containers or systems that does not involve mineral/field soil. Soilless substrate components most commonly include (a mixture of) organic and inorganic materials including peat moss, coconut coir, bark, perlite, vermiculite, mineral wool, etc. Other soilless culture systems could include hydroponic and aquaponic systems.

## GAME CHANGERS

Within the broad scope of horticultural plant production, especially in controlled environment systems, there are two game-changing “trends” that I think will soon be common place permanent fixtures in our production systems: 1) wood fiber substrates and 2) cannabis.

These two items, while obviously very different in their potential impact, are the hottest topics with the truest potential for innovative success across North America and Europe. Granted, the new discoveries and introductions of plant genetics, biologicals, lighting, mechanization, etc. are incredibly important, but I would like to highlight some exciting prospects of wood fiber and cannabis.

Wood fiber substrates have been around for decades (mainly in Europe) but have made significant headway here in the U.S. in the past five years. Since 1979, there have been almost 40 wood products commercialized or researched with hopes of entering the growing media market. The recent timing of the broader acceptance of wood fiber use has not been by accident. Several factors have culminated in the tremendous growth the substrate industry is experiencing relative to the demand for wood fiber in growing mixes.



Wood fiber growing media components offer a new approach to traditional growing practices.

These factors include 1) some public and consumer demand for “local and organic” products which have included substrates; 2) the occasional wet summer in Canada which led to slight peat shortages for some growers; 3) an economical benefit of using wood fiber compared to other materials; 4) a decade plus of intense research on the use of wood substrates in cropping systems; 5) broad grower acceptance of wood as a perlite replacement; 6) numerous reports of advantageous root growth and shortened production times for many crops; and 7) eager and proactive substrate manufacturer marketing, promotion, and education about the use of wood fiber materials. The full potential of using these materials in our current and future cropping systems has yet to be understood.

## ENTER CANNABIS

Cannabis. Ah yes, cannabis. Our industry is currently spinning and going in many directions as we try to figure out our role in producing, managing and taking advantage of this crop. We (horticulture) HAVE TO own this crop and be the leaders in its production! Cannabis is a polarizing topic for many in our industry but not as polarizing as it was just a few years ago.

Why am I excited about this crop and its role in horticulture’s future? My reasons fall beyond the obvious discussions of high value, recreational uses, medicinal potential, etc. but instead involve the general interest of the public. As a teacher I see many students coming to horticulture just because they want to learn about cannabis or at least learn basic principles of growing plants (so they can grow their own cannabis at home). I welcome these young curious minds and I hope all horticulture departments and faculty do the same.

This is our BEST opportunity to reach more people (of all ages) and properly educate them on the value and necessity of horticulture. If this plant is our gateway to educate the general public about the broad spectrum of horticulture and increase student enrollment in horticulture courses, I say, “Let’s go!” [gpn](#)