

Ch-Ch-Ch-Changes ... An Industry Advancing



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This month's guest is Dave Kuack, a freelance technical writer who has been writing about the commercial horticulture industry for more than 25 years and was previously an editor at national trade magazines. For the last seven years he has focused much of his writing on controlled environment agriculture production of edible crops.

Peter: Thanks for joining me, Dave. The two of us spent the majority of our careers on the ornamental crop side of greenhouse horticulture, you reporting and writing for decades and I growing and researching. A prolific writing career has positioned you to have a unique perspective regarding change. Let's discuss a few changes we've witnessed as we both shifted our attention to edible crops during this decade. What's the reason for your focus on food crops, and how do you view the advancing sector of controlled environment agriculture (CEA)?

Dave: After leaving the trade magazines in 2011, I began working with Chris Higgins at Hort Americas. His company is a wholesale horticultural distributor that works with controlled environment growers who produce both ornamental and edible crops. Hort Americas works with CEA edible crop growers who produce in a variety of structures including greenhouses and vertical farms.

Since most of my writing with the trade magazines focused on ornamental crops, learning and writing about edible crop production was a whole new venture. Chris is a big advocate of educating growers, sharing information and answering technical questions. This was a new and exciting opportunity for me to learn and write about CEA edible crop production.

Peter: I've had the pleasure of crossing paths with Chris as I shifted my focus to CEA as well, and his commitment to grower education is a welcome contribution. It's true that learning never stops; CEA technology is advancing rapidly across all crop categories. Grower education demands attention from several perspectives including companies such as Hort Americas, traditional academic institutions and private sector educators. What's highest on your list of factors responsible for CEA's advancement?

Dave: I consider one of the biggest advancements in CEA technology to be the use of light emitting diode (LED) luminaires. Both ornamental and edible crop growers are using LEDs in both greenhouses and vertical farms. Many of the university researchers who had been focused on ornamental crops have added food crops to their programs. Some of that has to do with funding availability. NASA is also doing research with LEDs for food production during space travel. NASA scientists are developing light recipes for growing leafy greens with LEDs that will be applicable to production in space and on Earth.

Peter: I'm pleased to see the locally grown food movement fueling a resurgence of the family farm and complementing high tech CEA. This part of agriculture, family horticulture operations, has been a special focus for me having grown up on a farm and greenhouse operation. A question I have asked for decades is whether one can remain small and be successful in an ever-evolving business environment. The

rise of the locally grown movement, in my opinion, is a huge vote of confidence in small operations.

Largely responsible for the rise in demand is our current generation of young adults. Many of today's young adults and parents are committed to questioning the sustainability of industrial agriculture and encouraging decentralization in our food production model. They are creating the demand to pull agriculture back to their towns and cities. What's your perspective on young consumers and their influence on agriculture?

Dave: It's not just not the ag industry that is trying to get a handle on the increasing interest for locally sourced and organic products. The Hilton global hospitality company recently surveyed 72,000 of its guests who stayed at the company's properties worldwide asking for their thoughts on the impact of social, environmental and ethical issues on their buying and booking behavior. Fifty-six percent of the responding consumers indicated they would intentionally purchase products that are fair trade, organic, local or had not been tested on animals. Sixty-two percent of survey respondents also said they would switch brands if a brand they typically bought was in the news for unethical purposes. This switch would occur even if the alternative brand was more expensive.

Hilton's new 2030 goals include the following environmental and social targets:

- Sustainably source produce, meat, poultry, seafood and cotton.
- Double the amount spent with local, small and minority-owned suppliers.

Do you think that most consumers, especially the millennials, understand or care about the difference between locally grown and organic edible crops?

Peter: That's a good question and my answer is yes, they do care. But I can't leave it at that, I believe there's a ton of effort needed, right now, to educate these engaged consumers. My observation is



that the meaning of organic in many of their minds has drifted too far toward marketing.

A personal story illustrates this further. My daughter-in-law is committed to both locally grown and organic. So much so that when my granddaughter and grandson visit my greenhouse mom takes note that granddad's cukes, tomatoes and lettuce, while as local and fresh as can be, are not organic. It's basically my fertilizer source that's the wedge ... I get it and hope both of us remain engaged in thoughtful discussion.

How do you see food safety issues as CEA advances? Is it as simple as comparing a decentralized production system to a diversified investment portfolio? More small growers spreading out the risk resulting in smaller risk points but a potentially larger number of them?

Dave: If food safety issues with field-grown produce continue to occur, like the recent contamination of romaine lettuce with E.coli, expect more CEA growers to start producing leafy greens. The Center for Disease Control reports as of May 15, 2018, 172 people had been infected with cases occurring in 32 states.

CEA vertical farm grower Bowery, based in New York City, is using the concerns with food contamination

and food safety to promote itself as a company that can deliver clean, pesticide- and fungicide-free produce. Bowery co-founder Irving Fain recently told HortiDaily that "the answer to bacteria and disease control is indoor farming. Being in control of the entire plant environment provides such an opportunity."

An increasing number of CEA growers in both greenhouses and vertical farm facilities are promoting themselves as a more sustainable and environmentally friendly way of producing edible crops compared to field production. Better control of inputs (i.e., water, energy, fertilizer, pesticides, fungicides, etc.), shorter shipping distances and fresher, safer products are all factors CEA growers are using to persuade investors, customers and consumers that they offer a better product.

Peter: I view this issue similarly Dave where the "control" in controlled environment agriculture by definition contributes to food safety. I am concerned, however, that some growers might assume control is automatic, without extra effort. Shifting greenhouse production from ornamental to edible crops requires a new level of attention for a grower. He or

she needs to learn how to add the layer of food safety to edible crops that petunias and geraniums don't require. Moving on, is there a developing area within CEA that you see as special and exciting?

Dave: I'm particularly excited about the potential of gene editing with edible crops. One form of genome or gene editing that is receiving an increasing amount of media coverage is called CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). This technology was adapted from the defense systems of bacteria. What makes CRISPR unique is that the crops produced from this technology are not considered genetically modified.

University of Connecticut plant geneticist Yi Li said CRISPR has the potential to be used with a number of perennial and annual edible and ornamental crops, including citrus, apple, sugarcane, grape, pear, banana, poplar, pine, eucalyptus, strawberry, potato and sweet potato.

Penn State University plant scientists are using CRISPR to breed cacao trees with desirable traits including enhanced resistance to fungal diseases. Siela Maximova, senior scientist and professor of horticulture at Penn State, said the

ultimate goals of the research are to raise the standard of living for small West African growers and to stabilize a threatened cocoa supply. CRISPR is being used to develop plants that are more resistant to diseases and more adaptable to climate change and other challenges.

Peter: I like hearing the goal of helping small growers, wherever they live. My commitment to them is accompanied by respect for large growers. Experience has taught me that large growers sometimes have more direct access to consultants and other avenues of guidance that small growers might not have. As we return a portion of industrial agriculture to the local level we need to expand our small grower support system.

My final observation of CEA, ornamental and edible crops, and food safety is pretty basic; it's harder to enjoy flowers if we're hungry. I and many fellow bedding plant growers grew up farming, shifted to flowers when industrial ag ascended, and now have the opportunity to return to food crops via CEA. What goes around comes around says it well. Dave, thanks for sharing your insight with us. [gpn](#)

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