

Hydroponic Growing Systems for Small Growers



Peter Konjoian is president of Konjoian's Horticulture Education Services Inc. His career spans four decades as a commercial grower, researcher and consultant. Paul Brentlinger is second-generation owner of CropKing Inc. in Lodi, Ohio. Konjoian can be reached at peterkfes@comcast.net.

Today's guest is Paul Brentlinger, second generation owner of CropKing Inc. in Lodi, Ohio. Paul has over 20 years of experience working with controlled environment agriculture (CEA) growers and has studied best-of-breed controlled environment and hydroponic practices across the globe to integrate the most efficient and cost-effective practices into optimal systems for CropKing. Paul leads the CropKing team in consulting, sales and management.

Peter: Thanks for joining me today, Paul. Let's begin by discussing CEA from your perspective with a focus on small- to medium-sized operations. Please share your philosophy about how these systems support the progress of our locally grown food movement.

Paul: CEA by definition is a very broad segment ... any aspect of control around the plant environment falls into this category. Frost nets or row covers are actually a simple form of CEA. However, as it relates to CropKing, we consider our "goal" to be total control over the environment. To the extent that it makes sense financially, we want as much control as we can get regarding heating, cooling, lighting, CO₂, air flow, etc.

That statement about making sense financially is of the utmost importance. For example, growth chambers have extremely high levels of control and very tight parameters around these environmental variables but are much too expensive to consider for commercial scale agricultural production.

Peter: That's an excellent point, Paul, about row covers qualifying as CEA. High tunnels are on the list, too. Perspective is key here as a traditional greenhouse grower might feel that an unheated high tunnel is a step backward while a traditional field farmer will feel like it's a step forward.

Paul: One of the main differences that will be obvious to many growers who are utilizing some form of cover (cold frames, row covers, or even greenhouses for bedding plants) is the desire and need for more control. Most of the time with hydroponics we are looking to be growing year round in that space, so we do tend to invest heavily in environmental control systems. Heating, cooling, humidity control, CO₂ supplementation, lighting, air flow and computer systems that assist in the optimization of these systems are the main objectives.

When we start focusing on control over these variables, we want to have as much as is financially justifiable. Assuming the grower has the capacity and is willing to learn how to utilize these systems, they will make him or her a better, more efficient grower.

Peter: Your point about how much tech a grower should consider investing in confirms a philosophy I live by ... just because we can doesn't mean we should. Your reference to growth chambers fits this point perfectly. I'm enjoying an ongoing conversation with Dave Bartlett of Bartlett Instruments on this topic, too. Our advice to growers when it comes to investing in environment control technology is to

jump onto a low rung of the ladder initially based on his or her level of understanding and financial resources and then make a plan to take small steps up the ladder with the ultimate goal being as much control as makes sense.

Writing with you and Dave reassures me that we have private sector groups who conduct business with the goal of helping small growers climb these tech ladders — you with hydroponic systems, Dave with environment control, and others in their respective areas of expertise.

For traditional growers considering diversifying into CEA systems and crops, how does this arena of production differ from traditional production systems with crops grown in containers of growing media?

Paul: The caveat here is "financially justifiable." As growers we would all love the excellent control of a growth chamber but we would all go broke growing food in space as expensive to build and operate as a growth chamber. It's about finding that middle ground and that can be done either through trial and error or by working with experts who specialize in the task.

Peter: Let's drill down a bit deeper on this point. We have a group of ornamental crop greenhouse operators that is shifting or considering shifting a portion of production space into CEA edible crops. These growers have been experiencing the maturation of the ornamental crop market and are looking to participate in the rapidly expanding locally grown food movement. I'm sure you field questions from this group of growers regularly. What is your advice when they ask what systems need to be updated or otherwise adjusted?

Paul: It will always be based on what they are currently doing and what they want to accomplish. What kind of facility are they currently operating in ... what is the "portion of production space" that they

are dedicating to this project, what kind of control does it have? What crops do you want to grow? Are they short term or long term crops?

The answers to these questions will determine what needs to be changed or adjusted and can give us insight into what might need to be learned. However, most of the time, pest management will look very different when we focus on edible crops versus ornamentals. The toolbox contains many more options for pest control when growing non edible plants as compared with what we can use on food crops.

All good growers will answer yes to the question, “Do you manage your nutritional regimen?”, but it is another area where there are significant differences that need to be addressed when recirculating systems are involved. And certainly there are ornamental growers that use much higher technology than some vegetable growers so my experience always comes back to understanding their facility and priorities as they move into edible crops.

Another factor that will almost always be a discussion point is the cost of the changes and the return on investment (ROI). This will obviously be a much deeper conversation and require some homework on the grower’s part but certainly something that anyone considering entering the CEA space should dive into.

Peter: Got it ... pest management, crop nutrition and system investment ROI are among the most common topics CropKing discusses with inquisitive growers. I’ll push this topic one more step. Share with us your observations on the rapid expansion of hydroponic production. What type of activity are you seeing between traditional greenhouse ornamental growers compared to in-ground, outdoor edible crop growers venturing into hydroponics? Also, we are seeing many new growers entering this exciting ag sector either in greenhouses or indoor vertical farms. What are you seeing in this group?

Paul: So this is a big question, Peter. The rapid expansion of hydroponic production is being driven by a couple of different segments of the market. You have the indoor vertical farms raising large amounts of capital and building out projects that

are “unique” and “innovative” but maybe not profitable at the moment. Then you have existing greenhouse space being converted to hydroponic edible crops — this is probably the smaller segment.

Existing greenhouse space typically means it is not new, which

often indicates it may not have the most up-to-date tech or the necessary equipment to transition to food crops. So, if these growers “test” the market and decide it is worth pursuing, they may opt to build new facilities rather than retrofit existing production space.



John enjoys a hike with friends while his Autofog treats his greenhouse.

What will you do with the time the AutoFog saves you?



Available with stainless steel nozzle

For use w/Oxidizers

AutoFog

Spraying made automatic, safe & effective



Small



Medium



Large



Extra Large



Scan Code for video & more information

Automatically apply insecticides, fungicides, and bio-rationals. Dramm has an AutoFog for every size greenhouse.

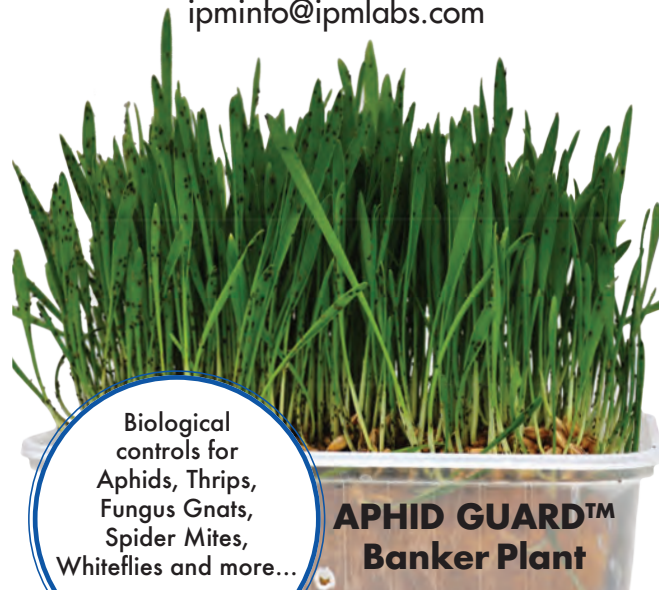
Call to find out which one is right for you.

DRAMM
Integrated Plant Health

information@dramm.com
www.dramm.com
920.684.0227



www.ipmlabs.com • 315 497 2063
ipminfo@ipmlabs.com



Biological controls for
Aphids, Thrips,
Fungus Gnats,
Spider Mites,
Whiteflies and more...

APHID GUARD™
Banker Plant



Grow Your Business & Transform Your Community



Learn how America in Bloom connects consumers to your products and services.

Participation in America in Bloom creates opportunities for horticultural businesses to showcase the value of plants and landscapes in communities.

Learn how at AmericanInBloom.org

“ The rapid expansion of hydroponic production is being driven by a couple of different segments of the market. ”

Finally, where we are currently seeing the most growth is in large-scale projects. The CEA industry is maturing relatively fast at this point and with that we see many multi-acre leafy greens and vine crop facilities being constructed. In regards to outdoor edible crop growers, the industry just saw Taylor Farms purchase Pure Greens in Indiana; they are not the first outdoor grower to get in, but they signal a big change in perception of our space.

Peter: You're describing the landscape exactly as greenhouse growers are experiencing it, Paul, regardless of crop focus. Change happens much faster today than decades ago and growers who procrastinate about getting into or out of certain crop categories can find themselves behind the curve. Even more reason for them to find trustworthy sources to help them understand ROI and the crop culture demands of new crops.

So, concluding on this important note, CropKing has been offering grower schools for some time. I assume one goal is to serve growers as a trustworthy source of expertise and guidance. How did you get started in this area of outreach which, to me and how I too operate, fits the descriptor of private sector extension work?

Paul: The grower schools have really been a driving force in

our goals from the beginning, especially when CropKing was founded in the 1980s by my father. A bit of history is in order. CropKing was started in response to a lack of education that he was looking for as a commercial hydroponic farmer back then. So when he started CropKing educating the customer was a founding principal and, in my opinion, a huge key to our success.

The growers schools have evolved over the last four decades as we gain experience across a diverse range of growing conditions and crops. We really like to look at ourselves as facilitators in the CEA space more than a sales team. Our goal is to disseminate the information in such a way that the customer can make the most informed decision. This is not a cheap way to farm but it is still farming so we want people to be prepared and aware of what they are embarking on before spending significant capital on a project.

Peter: As a former field farmer, ornamental crop grower, and current hydroponic researcher I enjoyed learning about your philosophy and focus, Paul. I also enjoy highlighting family businesses embedded in our supply chain that are committed to helping smaller growers advance their efforts. Thank you for sharing your expertise with us. gpn