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COVERING ENVIRONMENTS

2/1/2025

Starting With the Student

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CEA, the production of plants within controlled environments, is far more complex than just caring for plants. I recently attended the annual conference of the Entomological Society of America to speak at a session about protocols for "Debugging Your Greenhouse." Imagine entomologists wanting to learn more about CEA!

This could have been expected because of the recent diversity of interest for production of green plants and rapid expansion in greenhouses, growth rooms, high tunnels, container farms and vertical farms. The need for education in pest management has exploded. But other topics remain important as well, such as plant nutrition, root zone substrates, microclimate control, plant maintenance, harvest and handling, and logistics, all which combine to successfully achieve production management, sales/marketing, profit/loss statements, investor ROIs and, ultimately, business sustainability.

Academic programs contribute to the sustainability of CEA by educating students to a base of knowledge—specifically, a broad understanding of basic aspects of growing plants within a production process. Contemporary students have varied interests and learn to different levels of knowledge and expertise.

The good students retain the basic classroom knowledge and are highly trainable once employed. The excellent students, in addition to the knowledge, also obtain experience, such as through internships, work study, research projects and summer jobs required within their program of study.

The exceptional students are curious, seemingly endless learners who obtain a well-rounded education and hands-on experiences that surpass their cohort. Furthermore, they learn to be aware of the production situation from both the plant health and the environmental control system aspects. The source of plant stress is quickly recognized by such students as resulting from insect, nutrition, hydration or microclimate, while understanding that stress may be caused by a combination of factors. They're comfortable in debugging hardware problems, at least superficially, and recognizing when to summon the experts for a final solution, but they also have the confidence to temporarily resolve the situation to mitigate losses. They stand above their peers and are highly desired by the industry.

Clearly, it requires the advisors, faculty and mentors of the academic programs to offer opportunities beyond the classroom that will develop the exceptional students who'll ultimately flourish within the industry.

The students with CEA farming background are few. Most will arrive with excitement and youthful exuberance,

and unexposed to the real challenges of CEA plant production and unaware that “it’s all about the plant.” Employ students early in their study programs, not only from the plant sciences, but also engineering and the social sciences. Introduce them to tools to learn and succeed, and allow them to responsibly function in the care and production of a crop within a CEA system.

Technology for remote, real-time monitoring of the CEA environment helps develop awareness. A quick pre-dawn check of the previous night could indicate if the plants overnighted well from the previous day by displaying a recognizable typical environment or undesirable air temperature conditions. Did a massive weather change occur? Was the environmental control functioning properly? Is the fertigation system operating? The urgency or calm for the morning start of work will be immediately known.

When entering the greenhouse, encourage the use of human senses to listen, view and immediately interpret the plants’ status. Teach them reporting to management with sufficient detail such that a higher authority can explain corrective decisions to be implemented. In my experience, Discord, an app for documenting communication across a large team of students, has worked well for this purpose.

University of Arizona-CEAC students are required within weekly lab experiences to care for their row of plants (usually tomato) from transplant through harvest within the greenhouse hydroponic crop production undergraduate course of Dr. Triston Hooks. This plant care is overseen and graded! Access is available any time through keypad door lock and greenhouse service lights for working in the off hours. Fundamental automated environmental control and fertigation is present to prevent catastrophic losses, so that even first-time student “growers” can be successful. The excellent and the exceptional students will prosper and be recognized, as demonstrated by the hundreds that I’ve employed.

Finally, all students of CEA should develop their résumé format to exceptional student status and include their attributes: Education, Experience, Operations Awareness, Task Evaluation and Planning with effective communication capabilities. A future column will focus on how the industry should complement the educational component of CEA students.

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