

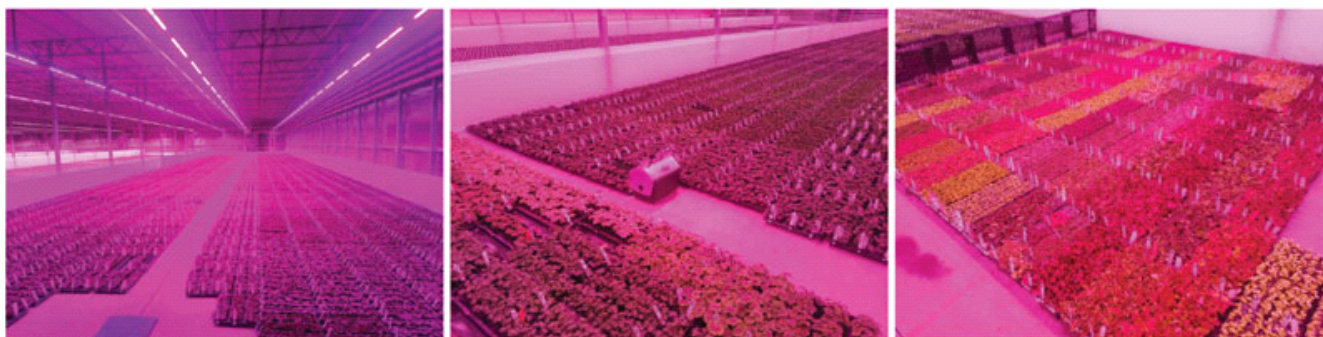
GROWERTALKS

Features

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The Impact of LEDs on Floriculture Germination & Propagation

Bill Calkins



Pictured: Signify worked with Lucas Greenhouses in Monroeville, New Jersey, to design, install and implement LED lighting systems for young plant propagation. Growers at Lucas have seen quicker rooting time, reductions in PGR usage, improved crop readiness and better overall vigor.

More control over the greenhouse nursery environment where plants are starting life is something every plant propagator wants, for many reasons. Control, in this case, means reducing environmental variance to allow more uniform control of the critical greenhouse factors for plant growth. Creating the best possible lighting scenario for young plants with the precision of LEDs means you can focus your time and effort on the other four factors of plant growth—temperature, water, humidity and nutrition—knowing that your crop can now take the fullest advantage of cultural strategies you put in place. The use of supplemental LED lighting technology allows growers to produce more crop-utilized light and less wasted heat, giving more control over their crops, environments and, ultimately, yields.

GrowerTalks caught up with Daniel McMahon, key account manager with Signify (formerly Philips Lighting) who has plenty of greenhouse production experience, including a deep knowledge of greenhouse technology and lighting. He works closely with North American young plant propagators on ways to capitalize on benefits that come from LED greenhouse lighting. Dan knows from experience what propagators can expect when making the switch to LEDs.

Germination & rooting improvements

“Growers at young plant operations, including Jolly Farmer Products and George Sant & Sons Greenhouses, are seeing 10% to 15% higher seed germination rates using supplemental LED lighting,” Dan says. “And some have observed vegetative crops, such as coleus, putting roots on in as little as three days.”

When Dan and the Signify team work with growers, they dig into the specifics of each operation to develop a supplemental light “recipe” that allows them to create the optimum light spectrum for the crops that will grow below. Young plants in propagation require different light designs than finished crops, he explains. These recommendations are based off crops, crop stage, DLI requirements and location.

“Germinating and propagating reacts better to higher blue light than general production,” he says.

The greenhouse environment required for germination and rooting requires tremendous precision, and LEDs allow growers to dial it in much more so than traditional lighting, like high pressure sodium (HPS).

“With LEDs, there’s less environmental impact in terms of temperature,” he says. “Heat generated by LEDs is very minimal compared to HPS, leaving the grower more in control.”

Consistency & efficiency

Moving from HPS to LED lighting in liner production results in similar gains as in germination, but the improvements can be even more substantial. Benefits realized by propagators include reduced labor and spot watering, quicker turns, more uniformity, lush foliage, compactness or less internode elongation, and more blooms on healthier plants, according to Dan.

“Growers using LEDs have found that gains in consistency allow them to hit critical dates more effectively,” Dan says. “And they can start plants as many as two weeks later and have them ready at the same time.”

As a propagator, think about the profit gains you could realize if more efficient production leads to an extra turn. Furthermore, starting crops two weeks later (when heat is the most costly) can save a lot of money over the course of a growing season, he adds.

Detailed differences

There’s a lot of science behind LEDs and why they create ideal plant environments, but in layman’s terms, light spectrum created by LED lighting puts the best light on a crop when it’s in its peak chlorophyll production. Because of this, propagators see the benefits detailed above. But there are differences to consider and lessons to learn from production trials. Dan says the key difference for growers to be aware of when changing from HPS to LEDs is nutritional. “When you change the light, you’ll need to adjust your nutrition and fertilization,” he explains. “At the same time, when you get the lighting right, you’ll be much more able to identify exactly what needs to be adjusted, from a nutritional standpoint.”

Growers starting with LEDs will also notice that they actually need similar quantities of fertilizer as in the past even though the growing time is much quicker, and Dan says this is because of the faster growth and higher respiration/transpiration rate with the crop.

“It’s recommended when growing under LEDs for the first time, growers should be sure to have sufficient air movement over the plants,” according to Dan. “Enough additional air that you can feel the air movement, enough to make your hair move when you walk the crops.”

You need air movement to dry the crops down, so you can apply the additional water and fertilizer needed.

Other considerations

If you’re building new facilities and plan to include LED supplemental lighting, Dan suggests planning them into the infrastructure.

“When building greenhouses, don’t make lighting an afterthought,” he warns. “You do need to have infrastructure in

terms of electricity and service.”

If retrofitting, which is more often the case, be sure to factor in power requirements, in terms of voltage.

“You may need to add additional breakers or service boxes,” he advises. “You can only put 16 LEDs on a 20-amp breaker.”

But although this may add cost to the project, there are substantial ROI gains to be made. If you currently use HPS lighting and replace a 1,000-watt fixture with LEDs, you’ll use 40% less electricity to generate the same amount of light, Dan explains. If, instead, you add LED lighting to a range with HPS in a hybrid design, expect to gain 40% more plant-usable light photons with no increase in electricity used. He calls this the 40% rule when working with growers.

Ready to explore new options?

Dan spends a lot of time working with propagators changing over to LEDs and advises growers considering the switch to conduct greenhouse trials.

“Talk to other young plant growers using LEDs and find out the results they’ve seen,” he says. “Then start small, but not too small.”

He explains that an effective trial should include an entire greenhouse block, not just a bench or two. Too small a trial won’t allow you to evaluate propagation that factors in differences seen within any greenhouse environment.

Also, be sure to work with greenhouse lighting experts with experience in the field. Specialists, like the team at Signify, will answer questions specific to the crops and species you grow, and can create unique recipes to deliver the precise light spectrum your valuable crops need.

Here’s a tip from Dan that could save you big bucks: Check with your power company to find out if your operation is eligible for energy rebates on installation, labor and lights when changing over to LEDs. In some regions, extremely incentivized rebates are available. Rebates are constantly changing, Dan says, so be sure to check before and throughout any LED project.

Lastly, if you have concerns about any danger or risk to worker safety while working under LED lights, rest assured they’re completely safe. Sunlight contains UV light, which can be harmful to humans, but the LEDs used in cultivation don’t produce wavelengths harmful to human skin. That said, it will take time for some to get used to their apparent brightness. Dan has spent a lot of time under LED lights and says they seem intense at first, but you quickly get used to it and learn not to look directly at the emitters. And when you leave an LED-lit greenhouse and walk out into natural light, be ready for a high-def experience.

Think about it this way: Human eyes like traditional HPS lights, but “plant eyes” like LEDs. HPS lights were designed for humans to see in parking lots and only were first used in cultivation for their extreme intensities, which LEDs now has them beat in that marathon of sorts.

Because Dan is a distance runner, let’s close with this analogy: “Light is like calories,” he says. “If you need to replace 5,000 calories, you can grab fast food burgers. But how much nutrition will you get? Instead, a better option is eating a large, healthy and balanced meal.”

That’s what LEDs can deliver to your young plant crops to keep them running strong. **GT**