LED lights provide light to a seasonally dark Pacific Northwest nursery owned by Iwasaki Bros. Inc. in Hillsboro, Oregon. PHOTO COURTESY OF GLOECKNER

An illuminating trend

LEDs are helping nurseries gain all kinds of new efficiencies

BY JON BELL

A MID-JANUARY MORNING in Hillsboro, Oregon: It's gray, it's drizzly and, most depressingly, it's dark.

Dark enough that 10:30 in the morning feels like dusk, which at this time of year comes far too early for most; dark enough that the region would be lucky to get even a fraction of the light required for optimal personal outlook or — for those in the nursery business — growing healthy, happy plants.

"You want something like 10 moles of light per day to produce a nice cutting," said Kathleen Baughman, operations manager at Iwasaki Bros. Inc. wholesale greenhouses, using a standard industry term for measuring light. "Here, even on bright sunny days, you only get four moles of light. And on stormy days like today? We won't get to a mole. It's just really difficult. The rosemary and thyme, they just kind of sit here and pout."

Of course, in this day and age — and for decades, really — the nursery industry has been able to harness the growing power of artificial light to help boost its pouty plants during the dark days of the year. High-pressure sodium (HPS) lights have been the go-to for decades, but light emitting diodes — LEDs for short — also started to emerge as far back as the 1980s.

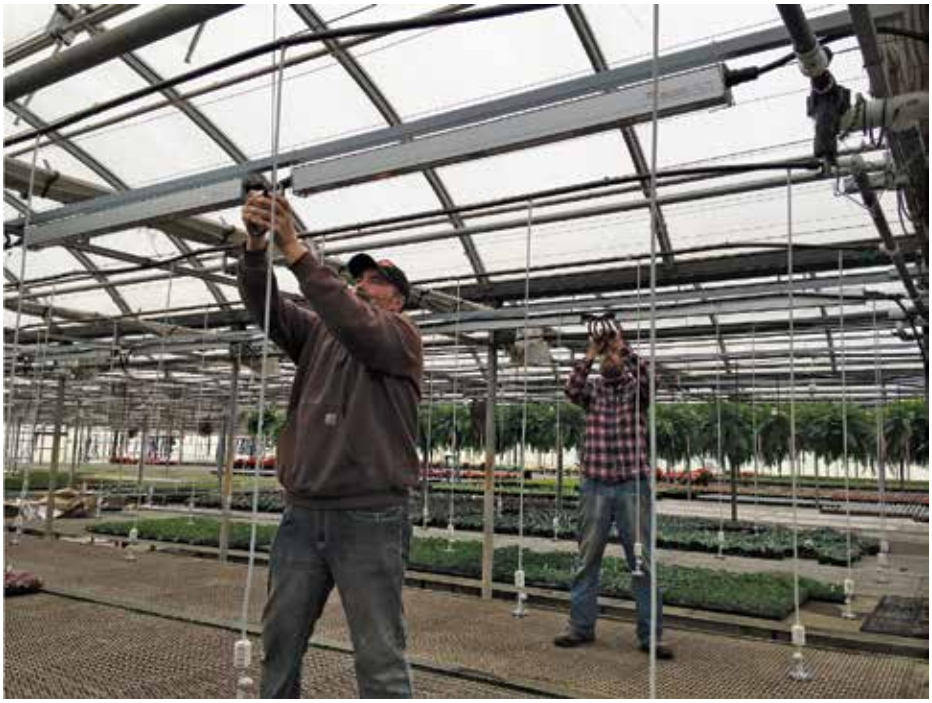
More recently, however, LEDs have become even more innovative, offering consistent and specific lighting that is helping growers produce high-quality plants, often over a shorter timespan and with greater efficiency and return on investment than ever before. Throw in generous incentives from the likes of the Energy Trust of Oregon (ETO) that help offset the costs of converting to LEDs, and the future's looking bright for Oregon nurseries.

"It's really exciting," said Ben Verhoeven, president and general manager of Peoria Gardens, a wholesale bedding plant nursery in Albany, Oregon that recently illuminated about a quarter of its greenhouse propagation area with new LEDs. "It's something new that we're throwing into the mix that we are confident will keep us growing and improving and learning and, hopefully, keeping the doors open for a long, long time."

Seeing the light

Verhoeven is a second-generation nursery pro whose father, Tom, founded Peoria Gardens in 1983. The nursery grows annuals, perennials and vegetables, as well as succulents, herbs and an assortment of premiums across about 10 acres of land, including five acres that are in greenhouses.

Years ago, Peoria Gardens used some HPS lights to kick its plants into gear, but for about the past 8–10 years, the nursery »



has relied on little more than natural light. For a nursery located in western Oregon, it's difficult to make that work.

"The old system could be summed up as such — however much light we could eke out of an Oregon wintertime, which is practically nothing," Verhoeven said. But, the longer a plant sits in the greenhouse growing, he added, the more expensive it is to the business.

Last summer, Verhoeven attended the industry's annual Cultivate conference in Ohio. There, he caught testimony from another Oregon nursery, Iwasaki Bros., about their experience with LED lighting. He was, so to speak, enlightened by what he heard.

"They are growing the same plants in the same market," Verhoeven said. "Hearing them talk about their results was pretty telling."

Iwasaki Bros. has about 19 acres of grow space at its nursery in Hillsboro, about 17 of which are in greenhouses. The nursery is one of the largest wholesale growers of bedding plants in the Northwest, producing most of its own plants through seeding and unrooted cuttings.

Baughman said the nursery used HPS lights for many years to ensure plants were getting the light they needed. But while HPS worked well for Iwasaki, Baughman said they were using a ton of energy, they put out lots of heat, and they take time to get warmed up after they're turned on. HPS lights also tend to degrade quickly and not very uniformly.

"They just become highly variable over time," she said. "You think you'd be able to predict how much light you're getting, but you can't."

Iwasaki Bros. decided to convert large portions of its operations to LEDs about two years ago. The nursery worked in part with Ricardo Campos, director of sales for North America, Canada and Latin America for Fred C. Gloeckner & Company Inc., a certified partner with lighting company Philips. The nursery operation now has several different kinds of lighting in use and is testing various setups.

The results so far, according to Baughman, have been impressive. In some cases, she said, rooting time has been reduced by a third to a half; some unrooted cuttings that used to take six weeks to be ready to plant now take three. In addition to the quickness, Baughman said the nursery has also seen plants in cell trays that stay a little more compact under the LED lights, but they develop solid root systems. That works well for the automatic planting machine later on in production.

Growing under HPS lamps often produces plants that are very leafy up top but underdeveloped down below at the

Oposite page: Staff members install LED lights at Peoria Gardens.
PHOTO COURTESY OF PEORIA GARDENS

roots. Baughman said that's not the case with LEDs, and it ends up saving labor because there's no need to apply plant growth regulator.

Similarly, Campos said that LEDs also help trim labor costs by producing more uniform crops.

"When you have uniformity of the crop because of the light, then you have less need to touch those plants," he said. Furthermore, consistency results in better yields and less waste in terms of seeds and cuttings.

Make the case

While nurseries that have converted to LEDs have generally enjoyed improvements in their plants and their energy usage, there is still a case to be made for nurseries to consider other options, including sticking with HPS lights.

Plenty of research has been done to help determine just how beneficial LEDs can be compared to traditional HPS lights, but a clear-cut winner has yet to be determined. Much depends on the particular plants being grown, what kind of lights are currently in use — and what shape they're in — and other factors.

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> Ricardo Campos, Fred C. Gloeckner & Company Inc.

Eric Runkel, a professor and floriculture extension specialist in the horticulture department at Michigan State University, is one of the most well-known researchers in the world of nursery lighting. His extensive studies go into great detail and help shed light on when converting to LEDs might make the most sense for a nursery. In one study that best sums up the most prudent approach, Runkel and co-researcher Brian Pole note that it's wise to include a deep analysis of an operation's economics before making the switch.

"Whether choosing LEDs or HPS lamps as your supplemental lighting source, consider factors in addition to plant growth," the two wrote in one study.

Incentive to switch

At Peoria Gardens, Verhoeven hopes to enjoy all the benefits that LEDs promise — including an energy »

savings of up to 50 percent. In January, the nursery switched on its new LED lights which were installed in about a quarter of its propagation area for seeds and unrooted cuttings. If all goes well by the end of the summer, he plans to install even more.

Verhoeven said the first installation ran about $35,000, or roughly $10.40 per square foot. The system should cost about $1,800 to run over two months. As the days get longer and more sun shines, Peoria will rely on the system less and less.

To help offset the cost of installation, Energy Trust of Oregon offers financial incentives to nurseries that meet certain requirements. Baughman said ETO had been a "fantastic partner" and provided some "substantial energy credits" for Iwasaki Bros. to transition from HPS lights to LEDs.

Robinson Nursery, a wholesale bare root and container nursery in Amity, Oregon, swapped out many of its HPS lights for LEDs with the assistance of ETO, as well. But at Robinison, the LEDs weren't for growing areas, but simply for its workspaces, according to Adam Tucker, maintenance supervisor for the nursery.

"We swapped out basically because the old High Pressure Sodium ballasts were just going bad," he said. "We replaced 141 lights with high bay LED lights that range from 220 watts down to 185. They're a lot brighter and you don't get that blinking, flickering light."

Tucker said the overall cost for the renovation was about $70,500; ETO chipped in close to $18,000 as a cash incentive. Robinson Nursery expects to save about $7,500 a year on its lighting energy costs, so it should recoup its investment in about eight years.

Campos said the efficiency offered by LEDs, both in electrical savings and in the way they help produce higher quality, more consistent plants, is what the lights are all about.

"Our emphasis has been on efficiency, because at the end of the day it's all about net profits," he said. "And as efficiency increases, the net profits increase."

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