

Holiday light technology could be the secret to growing better crops

SPECIAL TO FLORIDA WEEKLY

It's the time of year when festive lights outline rooftops and driveways, but University of Florida researchers have a different reason to celebrate the same technology that's becoming popular yule-time décor — better-growing crops.

Light-emitting diodes are now common replacements for incandescent bulbs in applications ranging from coffeemakers to holiday string lights. They stay cool to the touch, don't burn out as easily and use up to 90 percent less energy.

However, LEDs can also be designed to emit very specific frequencies of light, and researchers are using those exacting frequencies to promote plant growth.

"Everyone knows about greenhouses or home growers that use these special fluorescent white lights or filtered light to help plants grow," said Kevin Folta, a horticulture researcher at the UF Institute of Food and Agricultural Sciences. "Light is the language plants listen to when deciding how to grow, and broad spectrum light is a noisy combination of different languages. We're learning how to speak these various ways to make the plant do what we want it to do, when we want them to do it."

A paper published in a special December issue of the journal HortScience, Mr. Folta and undergraduate researcher Kayla Shea Childers report on progress made using combinations of LEDs to direct plant growth.

All plants have a unique combination of photoreceptors, pigments used to specific frequencies of light. These pigments trigger different behaviors in the plant, such as leaf growth, flowering, rooting or even speeding up and slowing down stem and shoot growth.

As a demonstration of the technology, they report using specific light frequencies to restrict flowering in the early life of strawberry plants — causing the plants to divert their resources to growing more runners and leaves.

If such techniques were employed by growers, the result could be stronger plants that produce more fruit. Farmers may even want to employ colored mulches and reflective panels to supplement the effect.

"We still have a lot to learn before we



UNIVERSITY OF FLORIDA/IFAS/ERIC ZAMORA
Horticulture researcher Kevin Folta observes strawberry plants grown under various colors of light emitting diodes. LEDs, while gaining popularity for use in household appliances and holiday decorations, may prove valuable to farmers as specialized light sources to promote plant growth.

can start using these techniques on a large scale, but it is certainly looking more and more attractive of a possibility," Mr. Folta said. "Overall consumer demand for LEDs is beginning to make the technology really inexpensive, so it's not inconceivable to picture acres of crops spurred on by LEDs."

Similar studies are taking place around the planet on crops such as rice, peas, tomatoes and maize. However, one of the most prominent uses of the technology could someday be off-planet.

Future astronauts could use the same technology used to light Christmas trees to grow their own trees and plants in space.

"As we start to explore space for longer periods of time, we're not going to be able to just take food with us, we'll have to grow it," Mr. Folta said. "Humans can do well with anything that lets us see, but crops have evolved to specifically need the kind of light that they get on Earth, and not — oh, say — Mars. We'll have to give it to them to ensure that desirable plant products are there when we need them." ■

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