



CLEANING UP LIGHT POLLUTION

SUPPLEMENTAL LIGHT CURTAINS PROVIDE A SIMPLE ANSWER TO AN INCREASINGLY COMMON CHALLENGE.

By Joli A. Hohenstein

As competition increases and quality and productivity pressure rises, North American growers are increasingly taking a page from their European counterparts and making lighting a crucial part of their greenhouse production programs. While extending day length and, often, the growing season offers innumerable benefits, it's not without challenges.

Some installations are remote enough that they won't create any nuisance issues. Others will be in urban areas, next to light-prohibited facilities like airports, and some will simply have neighbors who complain.

"I had a customer in Camarillo, Calif., and the first night he turned on his lights, within 20 minutes police and fire from all municipalities were converging on them because people were reporting

a massive fire," says John Walters of Philips Indal.

A supplemental lighting curtain is the only way to effectively contain emissions. It also will reflect light back to the crop, increasing the efficiency of the lighting plan. Plus, the curtain doubles as an energy conserver — all of that energy and money that's going up and out of the greenhouse is reflected back into crop.

Why Contain Light

"Typically you have neighbors complaining or a lighting ordinance in the city where the greenhouse is located," says PARsource's Ron James. "Or maybe a neighboring greenhouse has crops with a photoperiod response and you don't want light pollution on them."

Successful light containment includes installing supplemental curtains not just at the roof but also

on the sidewalls and gable walls. Typically roll-up screens or solid screens that trap light are recommended. After all, why use a supplemental screen and then let light spill out the side?

Check with your local municipality to see what the requirements are and how they define dark sky compliance and light pollution. A 100 percent dark sky isn't possible, as all light goes up somehow (think of looking down and seeing a street light from an airplane).

But you can get close with today's advanced products. Svensson's XLS SL Revolux, for example, blocks 99.5 percent of light through dual top and bottom white reflective layers around a black core layer. The goal is to reduce your light emissions to a level palatable to your surroundings.

In addition, why restrict your light use if you don't have to? Typical good stewardship practice is



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Left: A fully lit greenhouse at night with no supplemental light curtain drawn.
Right: The same fully lit greenhouse at night with the supplemental light curtain closed — in this case Svensson's XLS SL Revolux.




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that you don't run the lights between 5 and 11 p.m. That way you avoid upsetting neighbors, and you're also often avoiding peak hour charges from the power company.

If you have light pollution screens in place, you have more freedom in your lighting strategy. With that comes the flexibility to run your lights whenever you want or need to. If it makes more sense to extend day length in the evening, you can. You tailor usage to your crop needs and the cost of electricity as opposed to neighbor desires.

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Heat and Humidity Considerations

Lighting — high pressure sodium (HPS) lights in particular — puts out a lot of heat. "We're talking 1,000 watts each," says Walters. With that comes increased opportunity for fire, making distance between the curtain and the light fixture crucial.

Great Northern Hydroponics in Kingsville, Ontario, is familiar with the challenge of containing light and managing heat from HPS lights. The company's newest 14-acre greenhouse extends the growing season with 7,000 HPS fixtures that generate massive amounts of heat and light. They run the lights about 2,200 hours a year from September to April. Light

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containment was a must.

“We wanted to be a good neighbor, and I believe it would just be a function of time before this would become a bylaw so in anticipation of that together with trying to be a good steward of the

environment, [we moved forward],” says Guido Van het Hof, Great Northern president and general manager.

Great Northern designed the greenhouse with a movable double curtain



Svensson's XLS SL Revolux blocks light through dual top and bottom white reflective layers around a black core layer.

system incorporating XLS SL Revolux. Van het Hof says the ability to close the top curtain with more than 99 percent light retention capacity is vital. The walls are also equipped with light containing material.

Cognizant of heat and fire risk, Great Northern provided a buffer not only between plants and the lights but also between the plants and the lights and the curtain. The light fixture should be as high as possible to increase uniformity. Install the curtain as close to the bottom cord of the truss as possible to provide a flat surface to mount to.

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Typically, allow 30 to 50 cm between the curtain and the light fixture. Measure the distance from the top of the reflector or bulb, not necessarily the top of the fixture. If you measure from the ballast, the distance may not be great enough, increasing the opportunity for fire or the film to deteriorate or melt.

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Greenhouse view from the inside with supplemental light curtain drawn.

“Go to your curtain manufacturer to see if they have a particular melting point or other considerations in their fabric composition,” suggests James.

Having fire retardants built into the film is a must if you’re using lights. It doesn’t matter which screen you’re using or what you’re using it for; it must be flame retardant. The reality is, any time light fixtures are installed, there is a chance of fire.

Another consideration with all of the heat the lights put out: humidity. Depending on the crop, transpiration can be an issue, particularly with vegetables.

When the lights are on, plants transpire more, and humidity increases. If you’re using very high light levels such as 216 micromoles, you may need to adjust. In these facilities, installation may involve minimal gapping of the curtain so as not to force the need for humidity control.

In fact, finding your parameters for light and heat control is one of the keys to success in light containment, says Van het Hof. “Knowing how far you are willing to go in light-abatement characteristics and what the trade-off is if it comes to heat retention or possibly too much heat retention, he says. “Finding the right balance between the two is crucially important.”

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