Strategies *for* Supplemental Lighting

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Different methods of greenhouse lighting have different purposes — sometimes to extend the photoperiod and sometimes to increase the daily light interval. Knowing their differences may help you make better choices for your operation.

There is sometimes confusion between lighting to create a long photoperiod and lighting to increase the daily light integral (DLI). Photoperiodic lighting requires only low-intensity light (typically 10 foot-candles or 1-2 µmol·m-2·s-1) and is used only after sunset or before sunrise. In contrast, supplemental lighting delivers a high intensity of light (typically 400 to 500 foot-candles) and is typically used from October through March on cloudy days and during the night.

The table below compares and contrasts the primary characteristics of each lighting strategy. Sometimes, growers will use supplemental lighting to increase the DLI, to create artificial long days or both. For example, providing 18 hours of light from high-pressure sodium lamps (e.g., on a cloudy winter day), increases the DLI and provides a long day simultaneously.

Cyclic lighting is a strategy used to create long days in which light is provided to plants on an intermittent basis, typically for four hours in the middle of the night. Methods to deliver cyclic lighting include turning incandescent lamps on and off (for example, on for 10 minutes and off for 20 minutes), using high-pressure sodium lamps with rotating reflectors (such as Beamflickers), and operating booms mounted with high-intensity lamps back and forth over crops. Cyclic lighting can be useful to manipulate the photoperiod but has essentially no effect on the DLI.

Photoperiodic lighting is often used on stock plants (to inhibit flowering of short-day plants), to finish long-day bedding and to induce early flowering in perennial crops. High-intensity supplemental lighting is often used on plugs and liners produced in Northern climates until early spring because the cost on a per-plant basis is small and ambient light levels are low. Supplemental lighting on ornamental crops during the finish stage is less common in the United States and usually restricted to crops that require high light for adequate plant quality. GPN

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Characteristics of Lighting Strategies

	Photoperiodic lighting	*Supplemental lighting*
Objective	Create a long day	Increase photosynthesis by increasing the DLI
Plants targeted	Those in which flowering is influenced by day length	Shade-avoiding (high light) plants
Plant responses	Inhibit flowering in short-day plants, promote flowering in long-day plants	Increased rooting, more branching, thicker stems, more flowers, sometimes faster flowering
Intensity desired (foot-candles)	10 or more	400 to 500
Time of year typically used	August to April	October to March
Time of day used	After sunset or during the middle of the night	During the day when it is cloudy and at night