By Erik Runkle

What Is Your Photoperiod?

Understanding your location's natural photoperiod will help determine the most economical strategy for providing long days when needed.

The photoperiod, or day length, is the number of consecutive hours of light in a 24-hour period. The number of hours of darkness — not the photoperiod itself — is what influences photoperiodic plant responses, including flowering, stem extension and dormancy. Therefore, knowing your natural photoperiod and how to manipulate it efficiently can help ensure you are providing a desirable and economical duration of light.

Plants can perceive very low light intensities — in some cases, less than one foot-candle — but sensitivity varies among plants. Therefore, it is not surprising that plants perceive light before sunrise and after sunset. Thus, the natural photoperiod (the daylength that plants perceive) is longer than from sunrise to sunset. How much longer depends primarily on location, greenhouse light transmission and presence of clouds. A good rule of thumb is to assume plants perceive light inside a greenhouse about 15 to 20 minutes before sunrise and about 15 to 20 minutes after sunset. Based on this assumption, a good estimate of the natural photoperiod can be made by first identifying your approximate latitude in Figure 1 and then using Figure 2 to identify which curve best represents your natural photoperiod.

Figure 1. *Latitude map.*

Short Days and Long Days

A short day for many common greenhouse crops is any photoperiod less than 12 hours, meaning that the continuous night length is at least 12 hours long. Therefore, natural short days begin around early October and continue until around early March. If the long night period is shortened, either by extending the day with artificial lighting or by providing night interruption lighting for four hours, then a short night (long day) is created. A blackout system is needed to create a short day from March through September.

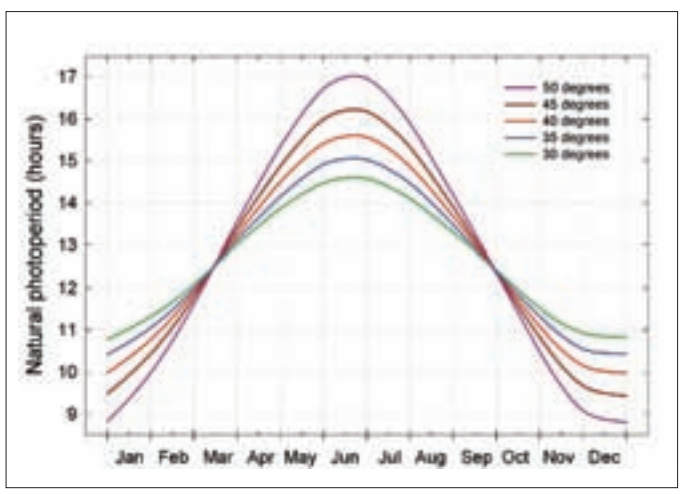

Figure 2. *Natural photoperiod.*

Intuitively, long days would be photoperiods longer than 12 hours (night length shorter than 12 hours), but in most instances, this is not true. For many common floriculture crops, a long day is 14 hours or longer (the night is 10 hours or shorter). Therefore, natural long days don't begin until mid-April or later and continue until early to late August, depending on location. For some species, a long day must be greater than 15 hours, and so providing a night length of eight hours or shorter is often recommended.

Providing Long Days

The most economical strategy to produce a long day depends on location and time of year. For example, in Indianapolis, (40° N latitude) the natural photoperiod in early January is approximately 10 hours. To deliver a long day, a grower could provide artificial lighting (at least 10 foot-candles) for six hours, beginning soon after sunset, to create a 16-hour day. Alternately, the grower could provide four-hour night-interruption lighting between 10 p.m. and 2 a.m. to create a short night. In this example, a four-hour night interruption is more economical because lights are operated for two fewer hours.

In early April, the natural photoperiod is around 13½ hours in Indianapolis. To provide a long day, the grower could either add day-extension lighting for two and a half hours to achieve a 16-hour photoperiod, or provide four-hour night interruption lighting. Here, day-extension lighting is more economical because the lights are operated for a shorter period each day. Analyze the natural photoperiod in your location to determine the most economical long-day lighting strategy when needed for your greenhouse crops. GPN

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