GROWERTALKS

Features

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Dodging Heat Delay

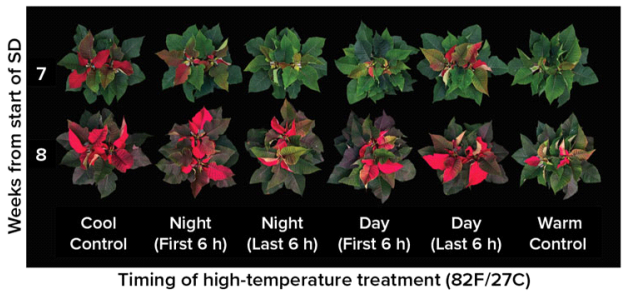
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American Society for Horticultural Science

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For poinsettia growers, tight sales windows and high expectations for plant quality are standard. Delays in bract coloration and reductions in overall plant quality caused by high temperature can significantly disrupt production schedules and market readiness.

Our recent research examined when poinsettias are most sensitive to heat within a 24-hour cycle. The objective was to identify the specific time of day when elevated temperatures have the greatest impact on flowering time and plant quality, allowing growers to focus temperature management efforts when they matter most.



Timing is critical

Poinsettias initiate the flowering process when night length reaches approximately 12 hours, typically beginning in mid-September through early October across most of the U.S. During these first few weeks of short days, poinsettia are especially sensitive to high temperatures with day or night temperatures of ~82F (27C) resulting in delayed flowering for heat-sensitive cultivars. Our previous work has shown that poinsettias initiated under black cloth systems (14- to 15-hour night lengths) are much less sensitive to high temperatures and are sensitive to high temperatures only during the night.

Figure 1. The effect of high temperatures (82F/27C) delivered during different hours within a 24-hour cycle for Prestige Red Poinsettias. Note that the plants placed at 82F for the last six hours of the night have delayed flowering comparable to the plants grown continuously (24 hours a day) at 82F.

Many plant processes are influenced by daily, clock-like fluctuations—termed circadian rhythms—that are entrained to light and dark cycles. So the next question that we sought to answer was: Under natural light conditions, is there a

specific time during the day and/or night that poinsettias are particularly sensitive to high temperature? The answer to this question should allow growers to more effectively avoid high temperatures during the most sensitive periods of the day and/or night.

How we tested it

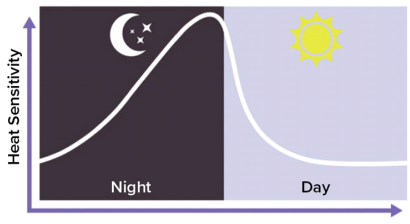
To pinpoint heat-sensitive periods, we grew poinsettias under 12-hour nights and exposed them to 82F (27C) for six-hour blocks at different times within a 24-hour cycle. Outside of those six-hour windows, plants were kept at a moderate temperature (72F/22C). We also included plants grown continuously at 72F and others continuously grown at 82F as controls. Importantly, all treatments occurred during the first two weeks of short days—the period when we know poinsettia are most vulnerable to heat delay.

The key finding: Late night is critical

The results were clear. Poinsettias were most sensitive to high temperature during the last six hours of the night (Figure 1). Exposing plants to 82F during only this portion of the night caused a flowering delay equal to plants kept at 82F continuously.

In contrast, high temperatures during the first six hours of the night and last six hours of the day resulted in little to no delay in flowering. Some sensitivity was also observed during the first six hours of the day, but the strongest effect occurred late in the night.

This finding is important because many greenhouses reduce cooling overnight. Fans cycle less frequently, venting is minimized and evaporative cooling systems are turned off. Yet this late-night to early morning window turns out to be the most critical time for preventing heat-related flowering delays.



What this means in the greenhouse

For growers, the takeaway isn't necessarily that greenhouses must stay cool around the clock. Instead, temperature control should be prioritized during the end of the night and early morning hours during the first two weeks of short days.

Figure 2. Relative sensitivity to heat delay fluctuates throughout a 24-hour cycle. The most sensitive time is the last six hours of the night followed by the first six hours of the day.

We know that 75F (24C) is generally safe, while 82F (27C) can cause measurable delay. Although we didn't test temperatures between those points, delays likely increase gradually as temperatures approach 82F.

Another important point: Heat sensitivity decreases as flower development progresses. After the initial short-day period, plants become more tolerant of high temperature. That means cooling efforts are most critical early in the crop cycle.

Practical strategies to reduce heat delay

Based on this research, growers can consider several management adjustments:

1. Prioritize cooling during late night. If energy costs limit 24-hour cooling, focus resources on maintaining lower temperatures during the last half of the night and into early morning during early short days. Even a few degrees of reduction during this window may prevent significant delays.
2. Review night ventilation practices. Because the most sensitive period occurs overnight, evaluate whether ventilation, horizontal airflow and evaporative cooling are sufficient during that time. In some

climates, temperatures may remain elevated longer into the night than expected.

3. Consider cultivar selection. Heat tolerance varies among poinsettia cultivars. Breeders increasingly provide information about heat sensitivity and selecting more heat-tolerant varieties will reduce risk in warmer production regions.
4. Use blackout curtain. Extending night length to 14 to 15 hours with blackout cloth reduces sensitivity to high temperature.
5. As production costs and weather variability continue to challenge greenhouse operations, understanding when crops are most vulnerable allows for smarter decision-making. By combining targeted temperature control with appropriate cultivar selection and strategic blackout use, growers can avoid heat-delayed flowering, improve crop uniformity and deliver high-quality poinsettias to market. **GT**

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