

Accelerating Growth: What Works and What Does Not

A constant challenge for producers of floriculture crops is to have them at the desired stage of development on pre-determined dates. Oftentimes, this means that plants are starting to flower on the date they marketed. To accomplish this, advanced planning is required, young plants need to arrive on time and the desired environmental conditions need to be delivered. Unfortunately, it is not uncommon for plants to be

behind or ahead of schedule, so adjustments need to be made to get the plants back on track. This article summarizes what can — and can not — be done to accelerate growth and development to meet your marketing date.

Temperature.

The most effective way growers can accelerate plant

development is to increase the greenhouse air temperature.

The average temperature, not just the day or night temperature, is what controls crop timing. A few words of caution, however. When light is limiting, such as when the daily light integral (DLI) is less than $10 \text{ mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$, the combination of a high temperature and low light can lead to poor plant quality. In addition, a high temperature during the night can delay flowering of at least some short-day plants, such as chrysanthemum and poinsettia. For these crops, a maximum night temperature is around 70° F .

Light intensity. Increasing the amount of light available to plants increases photosynthesis and increases plant temperature. An exception to this rule is light from LEDs, which does not substantially increase plant temperature. Therefore, when the DLI is low, providing plants with more light can directly and indirectly accelerate plant development. An added benefit is that for most high-light (shade-avoiding) crops, plant quality also increases with DLI.

Light can be limiting in greenhouses, even when we receive ample quantities of sunlight. This happens when plants are excessively shaded from hanging baskets above and/or when too high of a shading factor is delivered by whitewash or shade curtains. It's useful to continuously monitor the DLI where plants are growing to ensure plants receive a sufficient amount of light.

Photoperiod. If plants have a photoperiodic flowering response, delivering the most inductive day length will initiate flowers earlier. Many bedding plants and herbaceous perennials have a long-day flowering response, which means that plants flower earliest when the nights are short (the days are long). For most of these crops, long days are already naturally occurring in April, in which case delivering low-

intensity lighting during the night will have no benefits. If plants have a short-day response, then shortening the days by totally excluding light from the plants for 12 hours per day will accelerate flowering.

Gibberellic acid.

Gibberellic acid (GA) is a plant hormone that regulates the elongation of different plant tissues, including leaves and stems. The common GA products labeled for use on floriculture crops are Fascination and Fresco. These products, when applied as a foliar spray and/or substrate drench, primarily increase the size

of cells and thus, plant height. However, these products usually have no effect on flowering time. In other words, plants may appear to grow quicker following an application, but they just increase in size and don't accelerate maturity.

There are a few cases, however, when GA can hasten flowering. One of them is when plants have received an overdose of a growth retardant, which stunts growth and can delay flowering. In this case, an application of GA can get plants to grow again and at least partly overcome the flowering delay.

Nutrition. Fertility rarely influences flowering time, so increasing the amount of fertilizer is not an effective method to accelerate flowering. However, when plants are grown with inadequate feed and are experiencing nutritional deficiencies, a corrective application of micro- and/or macro-nutrients can alleviate any flowering delays caused by inadequate nutrition.

In summary, if plants are behind schedule, increase the temperature and provide high light intensities. If plants are photoperiodic, ensure they are receiving the most inductive day length. Application of Fascination or Fresco, or increasing the rate of fertility, usually has no effect on crop timing. [gpn](#)

The most effective way growers can accelerate plant development is to increase the greenhouse air temperature.



Erik Runkle is professor and floriculture Extension specialist in the department of horticulture at Michigan State University. He can be reached at runkleer@msu.edu.