GROWERTALKS

Features

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Secrets for Early Dahlia Cut Flower Harvests

Roberto Lopez & Jessie Brown

Dahlia (Dahlia ×hybrida) specialty cut flowers are typically grown locally and regionally. They are highly sought after for many purposes, but especially wedding centerpieces and arrangements due to their showy and unique forms, array of colors and strong stems (Figure 1). Given this high demand and short production window, they can wholesale $5 per dinnerplate stem and $15 for five ball-type stems. Their only downside is a short vase life of four to five days.

Figure 1. Lindsay Daschner, editor-at-large of the Bloom Beat *newsletter and owner of Forget-Me-Not Farms in Lake Ottawa, Michigan, posing with a bountiful harvest of dahlias.*

Dahlias are tuberous rooted perennials native to mountainous regions of Mexico and Central America, and are consequently winter hardy to USDA Zones 7 to 10. The influence of daylength on dahlia growth and development is well understood; vegetative growth is promoted by long daylengths and flowering and tuber formation occur under short daylengths (≤10 hours). Most dahlias are facultative short-day plants, meaning that they'll flower faster under short days, but will eventually flower under longer days. However, others are day-neutral or obligate short-day plants. Given this flowering response, we typically see that dahlias planted in May outdoors will flower from late summer (daylengths are getting shorter) until the first frost in the fall.

Wouldn't it be great if we could easily get dahlia cut flowers earlier in the season? Previous research has determined that daylength sensitive crops such as celosia (*Celosia argentea*), cosmos (*Cosmos bipinnatus*), coreopsis (*Coreopsis grandiflora*; *Coreopsis lanceolata*), strawberry (*Fragaria ×ananassa*) and marigold (*Tagetes erecta*) can be induced into flower under non-inductive daylengths by first growing them under photoinductive conditions (photoperiods that promote flowering) for a short duration of time. Therefore, our objectives in this study were to determine: 1) the minimum number of photoinductive short-day cycles required for dahlia flower bud initiation and development; and 2) the impact of short-day photoinductive cycles on time to harvest, stem length and yield.

The study

In mid-March, #1 size tubers of Dahlia Jan Ryecroft and Linda's Baby (ball form), Karma Prospero (waterlily form), and Salmon Runner (decorative form) were received from a commercial distributor and were planted in bulb crates and plastic netting was used to support the plants. To encourage vegetative growth, crates were placed in a greenhouse with a day and night temperature set point of 72/64F (22/17C) and under a natural daylength of 12 hours (short days) in East Lansing, Michigan (lat. 43° N). Light-emitting diode (LED) fixtures were used to extend the daylength to 16-hours (long days) for seven weeks.

Five weeks after transplant or when plants were 15- to 18-in. tall, approximately 1 to 2 in. of each shoot were pinched off to encourage branching. After seven weeks of vegetative growth, a black cloth was then manually retracted over the crates from 5:00 p.m. to 8:00 a.m. to create a nine-hour daylength and a 15-hour night length (short day) for either five, 10, 15, 20, 25 or 30 days. A subset of crates was left under 16-hour or nine-hour daylengths for the duration of the study.

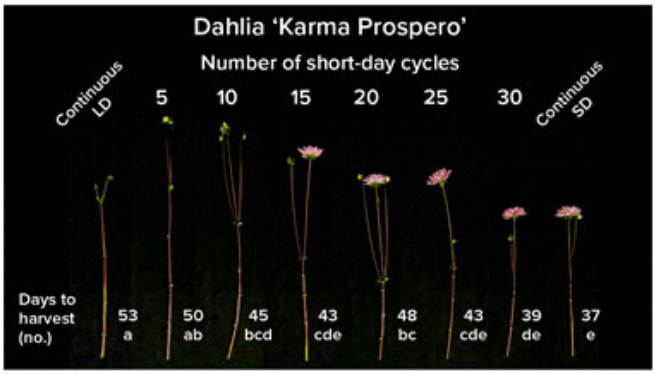

Figure 2. The effect of continuous 16-hour long days (LD), photoinductive short-day cycles for five 10, 15, 20, 25 or 30 days or continuous short days (SD) on time to harvest (days) of Dahlia Karma Prospero.

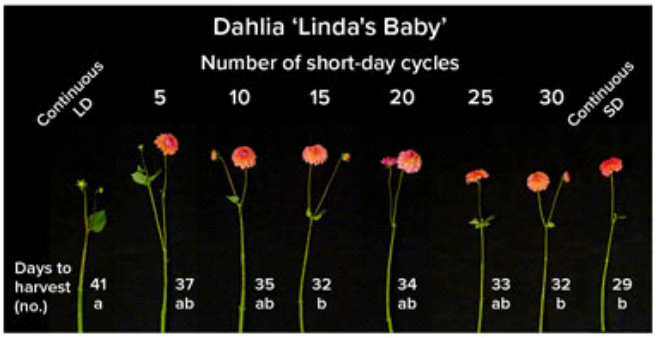

Figure 3. The effect of continuous 16-hour long days (LD), photoinductive short-day cycles for five, 10, 15, 20, 25 or 30 days or continuous short days (SD) on time to harvest (days) of Dahlia Linda's Baby.

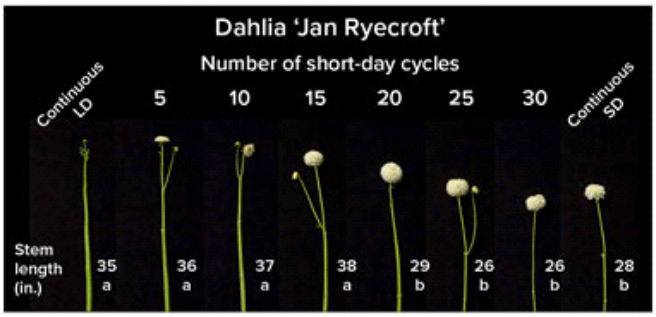

Figure 4. The effect of continuous 16-hour long days (LD), photoinductive short-day cycles for five, 10, 15, 20, 25 or 30 days or continuous short days (SD) on stem length (inches) of Dahlia Jan Ryecroft.

What we found

Regardless of the daylength treatment we provided (nine hours continuously after the seven weeks of vegetative growth or for five, 10, 15, 20, 25, 30 days or 16 hours continuously), all plants eventually flowered. However, time to harvest of Jan Ryecroft, Karma Prospero, Linda's Baby and Salmon Runner was reduced by the number of photoinductive short days they received compared to plants grown under continuous long days.

For instance, time to harvest of Karma Prospero grown under 15 or 30 short days was reduced by 10 days or 14 days, respectively, compared to those grown under continuous long days (Figure 2). Similarly, time to harvest of Jan Ryecroft, Linda's Baby, and Salmon Runner was hastened by eight, 10 and 11 days, respectively, when plants received 30 photoinductive short days compared to plants under continuous long days (Figure 3). Generally, we found that stem length was greatest under continuous long days and five short days, while plants that received 30 days or continuous short days produced the shortest stems (Figure 4). The total number of stems harvested across all cultivars was lowest when plants remained under continuous short days as the plants began putting energy into tubers, while plants grown under all other treatments produced 92% more stems.

Our results suggest that dahlias should initially be grown under long days (≥15-hour daylengths) to promote vegetative growth for at least five to seven weeks, followed by 10 to 15 short days (nine to 12-hour daylength) under black cloth for flower induction. After this, the use of black cloth can be discontinued. Plants should then be given long days for the remaining duration of their life cycle to promote high-quality flower development and increased stem length, and allow plants to put energy into flowering.

Take-home message

Whether in the field or inside a greenhouse, dahlia cut flower growers can provide limited inductive short-day cycles by pulling black cloth or plastic over simple PVC or metal structure (not directly on top of plants) when the natural photoperiod isn't inductive to harvest flowers earlier in the season and to better predict harvest windows, reduce overall production time and improve quality of dahlia cuts (Figure 5).

Figure 5. This is an example of a simple hoop structure used to place black cloth or plastic over a chrysanthemum crop to promote flowering. A similar system can be used to provide photoinductive short days to dahlia.

For example, if you're growing dahlias outdoors, plant tubers as soon as you're able, allow the plants to grow to a height of 15 to 18 in., pinch, allow new shoots to form and pull black cloth or plastic for 10 to 15 days. If you're growing dahlias in a greenhouse or heated high tunnel, plant as early as possible, and maintain the correct photoperiods for vegetative and reproductive growth. **GT**

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Roberto Lopez is an Associate Professor and Controlled Environment/Floriculture Extension Specialist, and Jessie Brown is a former graduate student at Michigan State University.