



Reducing Crop Production Time of Photoperiodic Annual Bedding Plants

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Background

Many bedding plant species are photoperiodic. That is, they will flower earlier when grown under an appropriate day length. Interestingly, photoperiodic plants typically do not have to be grown continuously under the appropriate photoperiod for flowering to occur. Often, only a short duration of the appropriate photoperiod is sufficient to induce flowering.

Objectives

1. Determine the number of photoinductive cycles necessary for floral induction of several photoperiodic annual bedding plant species.
2. Determine how many leaves must be unfolded before plants are capable of being induced to flower (i.e. juvenile period length).

Methods

To determine how long plants must be exposed to the appropriate photoperiod to induce flowering and when in development plants were capable of being induced to flower, plants were moved into the appropriate photoperiod for flowering (i.e. night-interruption long days for long-day species, and 9 hour short days for short-day species) every 5 days after the first true leaf/leaf pair unfolded and remained in the inductive photoperiod for 5, 10, 15, 20, 25, or 30 days, after which they were moved back to a non-inductive photoperiod. Short-day species evaluated were *Celosia spicata* 'Flamingo Feather Pink' and *Celosia argentea* var. *plumosa* 'Gloria Scarlet'. Long-day plants evaluated were *Lobelia erinus* 'Riviera Midnight Blue' and *Antirrhinum majus* 'Classic Liberty Bronze'.

Results and Conclusions

***Celosia spicata* 'Flamingo Feather Pink'**

Days to Flower and Leaf Number:

- Exposing plants to short days for 15 days or more beginning on Day 0 (1 leaf pair) was as effective in reducing leaf number below the first flower as growing plants under short days continuously.
- For earliest flowering, plants should be grown under short days very early in development (when only 1 leaf pair has unfolded or earlier) and plants should remain under short days for 2-3 weeks.

Flower Number:

- While 10 short days beginning on Day 0 was sufficient to induce flowering, flower number was reduced compared to plants grown under short days continuously.
- For maximum flower number, *Celosia* 'Flamingo Feather Pink' plants should be exposed to short days for at least 4 weeks.

***Celosia argentea* var. *plumosa* ‘Gloria Scarlet’**

Days to Flower and Leaf Number:

- Exposing *Celosia* ‘Gloria Scarlet’ plants to only 5 short days starting Day 0 induced flowering, with timing and leaf number similar to plants grown under continuous short days.
- Waiting until Day 20 (5 leaf pair stage) to begin short day exposures almost completely eliminated the benefits of the short day treatments, with plants flowering at a similar time as those grown continuously under long days.
- For earliest flowering, plants should be grown under short days very early in development (when only 1 leaf pair has unfolded or earlier) and plants should remain under short days for 2 weeks.



Flower Number:

- While 5 to 15 short days beginning on Day 0 greatly accelerated flowering, flower number was reduced compared to plant grown under short days continuously.
- For maximum flower number, *Celosia* ‘Gloria Scarlet’ plants should be exposed to short days for 3 weeks.

***Lobelia erinus* ‘Riviera Midnight Blue’**

- Exposing *Lobelia* ‘Riviera Midnight Blue’ plants to 5 long days starting Day 0 was not sufficient to induce flowering. However, exposure to 10 or more long days starting Day 0 reduced time to flower and leaf number below first flower compared to plants grown under continuous short day conditions.



Impact of the number of long-days (night-interruption) on flowering.

Treatments started when plants had unfolded one true leaf.
Photo was taken 53 days after seed sow.

- Delaying the beginning of the long day exposure to Day 10 or Day 20 delayed flowering compared to exposures starting Day 0. In fact, if long day exposures did not begin until Day 20, plants flowered at a similar time to plants grown under continuous short days.

- For earliest flowering, plants should be grown under long days very early in development (when only 1 leaf has unfolded) and plants should remain under long days for at least 2 weeks.

***Antirrhinum majus* ‘Classic Liberty Bronze’**

- Long day exposures of 10 days or less did not accelerate flowering compared to the constant short day treatment, regardless of when long day exposure began. Exposure to at least 15 long days was necessary to accelerate flowering.
- Plants grown under continuous long days flowered earlier than any of the other long day treatments in this experiment, indicating that more than 30 long days are required for earliest flowering. Therefore, plants should be grown under long days for the entire crop cycle to minimize time to flower.