TEMPERATURE EFFECTS ON SNAPDRAGON FLOWER DEVELOPMENT

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Introduction

Snapdragon (*Antirrhinum majus* L.) is grown as a cut flower throughout the year. Because shipping snapdragons is difficult, cut snapdragons frequently are grown near where they are marketed. Production and scheduling of snapdragons throughout the year can be difficult as photoperiod, irradiance (light intensity) and temperature vary considerably during the year in the United States. Because of the variation in the environment, production and scheduling of cut snapdragons can become an art, as well as a science.

Snapdragon (*Antirrhinum majus* L.) is grown as a cut flower throughout the year.

Snapdragons are quantitative long-day plants. i.e. the snapdragon is capable of flowering under short-days but flowers earlier under long-day conditions. Earlier research (Erwin, 1991) identified that flower initiation occurred earlier, or the number of leaves below the inflorescence decreased from 65 to 44 leaves, when day length was extended from 8 to 14 hours on the cut snapdragon cultivar 'Winchester'. Similarly, the number of flowers in an inflorescence increased from 23 to 34 flowers when daylength was extended from 10 to 14 hours.

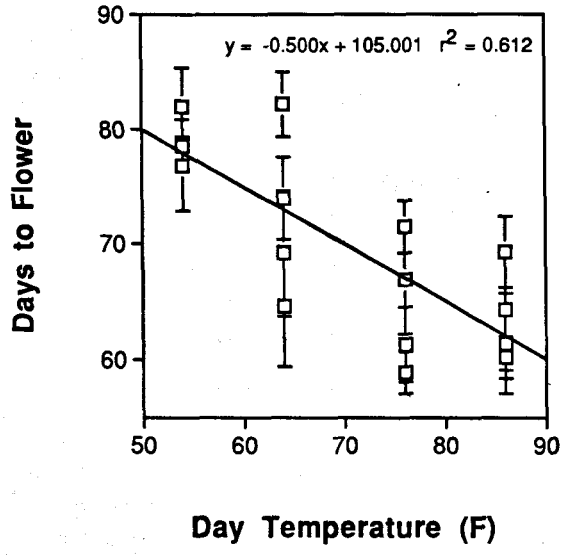

Figure 2. The effect of day temperature on the time from initation of temperature treatments until opening of the first flower on *Antirrhimum majus* L. cv 'Winchester'.

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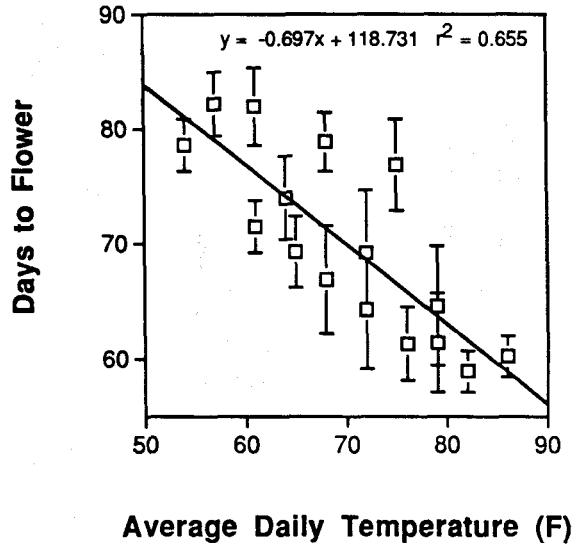

Figure 1. Effect of average daily temperature on the time from initiation of temperature treatments until opening of the first flower on *Antirrhinum majus* L. cv 'Winchester'.

A primary concern of cut snapdragon growers is maintaining quality throughout the year. The great variation in environmental conditions throughout the year often results in tremendous variation in cut snapdragon quality. Difficulties often arise in timing and achieving adequate stem height during winter months. In contrast, flower quality often suffers and stems have excessive height during the summer months.

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The objective of this project was to identify how day and night temperature influenced flower development and the rate at which flowers developed.

The time from initiation of the temperature treatments until flowering was primarily dependent on the average daily temperature which plants were grown at.

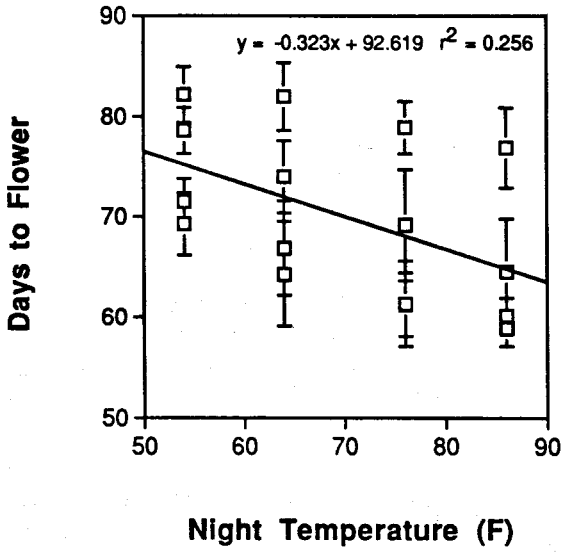


Figure 3. The effect of night temperature on the time from initation of temperature treatments until opening of the first flower on *Antirrhimum majus* L. cv 'Winchester'.

Materials and Methods

In general, flower number per inflorescence decreased from 26 to 15 flowers as average daily temperature increased from 54 to 86°F.

Two hundred forty cut snapdragon cv 'Winchester' seedling were received from Raker's in plug trays. Seedlings were grown in plug trays until four true sets of leaves had unfolded. At this stage all seedlings had initiated flowers. Time of flower initiation was identified in a previous paper (Erwin, 1991). Plants were grown in at constant 54°F under a 12 hour photoperiod.

Plants were then transplanted into 4" plastic pots in a soilless media and divided into 16 groups with 12 plants in each group. Four flats were placed in each of four greenhouses maintained constant 54, 64, 76, or 86°F. Groups of plants were rotated among greenhouses each day at 0800 hr and 1600 hr to deliver 16 different day/night temperature treatments (each group was grown under a different day/night temperature combination). Black cloth was pulled over plants at 1600 hr and retracted at 0800 hr to deliver a constant 8 hr photoperiod to the seedlings.

Day and night temperature did not affect flower number per inflorescence equally.

The date when the plant flowered, anthesis of the first flower, was identified. In addition, the total number of flowers in an inflorescence was counted when all flowers were visible. Leaf number was not significantly different between and among treatments, identifying that flower initiation had occurred prior to the initiation of temperature treatments.

Results

Time To Flower

The time from initiation of the temperature treatments until flowering was primarily dependent on the average daily temperature which plants were grown at (Figure 1). In particular, the time to flower decreased from approximately 83 to 62 days as the average daily temperature increased from 54 to 75°F. Increasing average daily temperature above 75°F did not hasten flowering significantly. Even though the length of the day was 8 hours shorter than the length of the night, day temperature was more highly correlated with day to flower than night temperature (Figures 2 and 3).

Flower Number Per Inflorescence

In general, flower number per inflorescence decreased from 26 to 15 flowers as average daily temperature increased from 54 to 86°F (Figure 4). The affect of average daily temperature on flower number per inflorescence was primarily a result

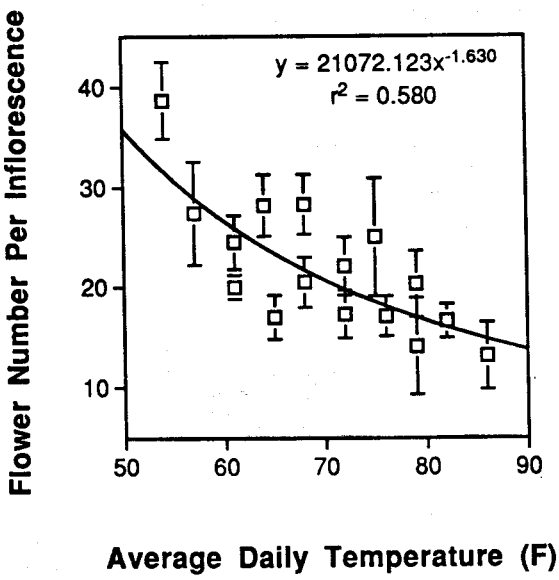


Figure 4. The effect of average daily temperature on the number of flowers in an *Antirrhinum majus* L. cv 'Winchester' inflorescence.

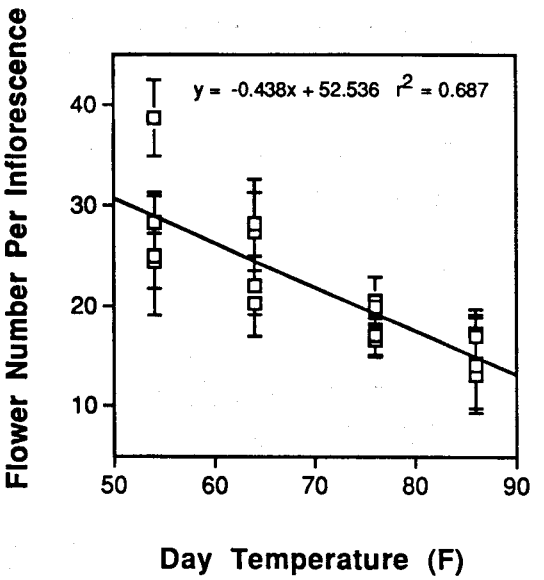


Figure 5. The effect of day temperature on the number of flowers in an *Antirrhinum majus* L. cv 'Winchester' inflorescence.

of the affect of day temperature on flower number rather than night temperature.

Day and night temperature did not affect flower number per inflorescence equally. Interestingly, even though day temperatures were only delivered for 8 hours over a 24 hour period (day/night cycle), day temperature appeared to play a greater role in affecting flower number than night temperature. Flower number per inflorescence decreased from 30-40 to approximately 15 flowers per inflorescence as day temperature increased from 54 to 86°F (Figure 5). In contrast, flower number was relatively unaffected by night temperature (Figure 6).

So What's It Mean?

1) Average daily temperatures above 75°F will not hasten cut snapdragon cv 'Winchester' flowering.

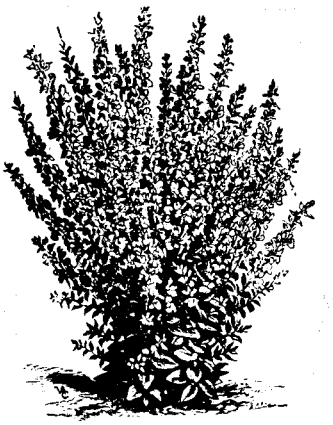
2) Day temperature is more important than night temperature in maintaining cut snapdragon inflorescence quality.

3) High day temperatures will decrease flower number per inflorescence.

4) Adequate cooling via evaporative pads, fans, shading with white wash and having top vents during warmer periods of the year (especially during the day) is critical in maintaining high cut snapdragon inflorescence quality.

Literature Cited

Erwin, J.E. 1991. The interaction between light intensity and photoperiod on cut snapdragon flower initiation. Minn. Comm. Flow. Growers Bull. 40(2):1-5.



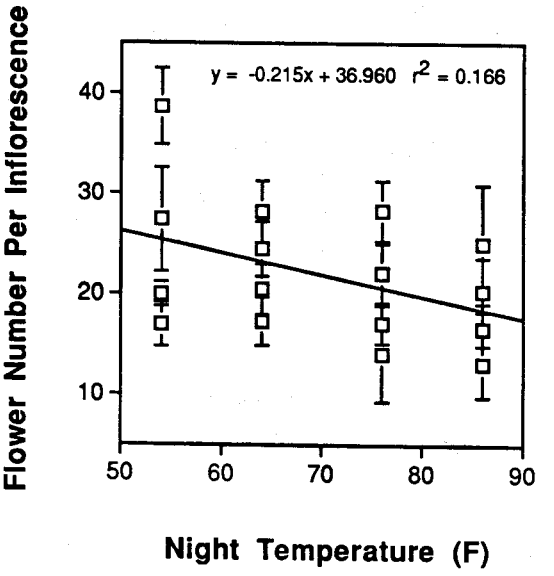


Figure 6. The effect of night temperature on the number of flowers in an *Antirrhinum majus* L. cv 'Winchester' inflorescence.

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