Perennials Produced As Bedding Plants

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INTRODUCTION

Perennials are providing the “new” look in landscapes. Naturalistic flower beds of perennials offer subtle variations in color and foliage pattern during the season. They thrive for an indefinite number of years, but die to the ground every year; they have annual stems and perennial rootstocks.

During the first growing season after a spring sowing many perennials produce only vegetative growth, but flower the second and each subsequent year of the plant’s life. Since the home gardener usually demands “instant color,” perennials for the bedding plant market must be grown in such a way that the plants flower the same season they are purchased by the consumer.

Nurserymen provide field-grown plants started from seed or transplants in the spring preceding the year of purchase. After a summer of vegetative growth, the plants are dug up in late fall. By this time the top growth is dead and only the crown and roots remain. These are then packed in boxes and placed in large coolers at -3°C to 1°C until spring. In preparation for shipping to retail centers, the crowns, still devoid of leaves, may be individually planted in small plastic bags of soil with crowns remaining exposed at the top of the bag. Each bagged plant is then placed in its own open-top box with a color picture of its characteristic foliage and flower. Bare-root plants may also be planted by garden centers for late spring sales. Several leaves may have sprouted by the time of purchase, and plants may or may not display a flower bud. This method of production is very successful; however, such plants are larger than flattened bedding plants.

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RESULTS

Seeds of each species were germinated and grown to various sizes in a 65°F night temperature greenhouse using standard practices. These plants were cold-stored and/or treated under several daylengths. More complete results will be available elsewhere, but the following is a summary of the findings:

1) Each of the 4 species were induced to flower by cold treatment; at least 10 weeks were required for columbine (Figure 1), 12 for basket-of-gold and lupine (Figure 2), and 16 for Shasta daisy.

2) Flower-inducing treatments were not effective until after plants were mature, as shown in Table 1.

Thus, 2 groups of species have been identified:

A. quick-maturing types which require only 3 months of vegetative growth at 65°F before cold storage.

B. slow-maturing types which require 6 months of vegetative growth at 65°F before cold storage.

Because of this required minimum size, only columbine could be produced from transplant to finish in small volume cell packs (48 cells/11 inch x 21 inch flat). The large size of the mature plants necessary for flower induction of basket-of-gold, Shasta daisy, and lupine necessitated the use of larger volume cells (18 cells/11 inch x 21 inch flat), or 3 to 4 inch pots.

3) While seed catalog information was sufficient for germination of most species, the need to scarify lupine seeds is not listed. A 45-60 minute soak in concentrated sulfuric acid improved germination in 4 days from 3% without scarification to 61% with scarification.

4) Forcing cold-stored plants to visible flower buds before spring sales was achieved in a range of times. Time varied according to whether plants were grown under short daylengths or long daylengths.

Table 1. Minimum Age (Size) for Cold Treatment of 4 Herbaceous Perennial Species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Earliest Stage Plants Ready for Flower-Inducing Treatments</th>
<th>Approximate Age (mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbine</td>
<td>12-15 Leaves</td>
<td>3</td>
</tr>
<tr>
<td>Shasta Daisy</td>
<td>Multiple Crowns</td>
<td>3</td>
</tr>
<tr>
<td>Basket-of-Gold</td>
<td>10 Crowns</td>
<td>6</td>
</tr>
<tr>
<td>Lupine</td>
<td>---</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 2. Forcing periods for 4 herbaceous perennial species when grown in long days or short days.

<table>
<thead>
<tr>
<th>Species</th>
<th>Short Days</th>
<th>Long Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbine</td>
<td>9-13</td>
<td>1-9</td>
</tr>
<tr>
<td>Shasta Daisy</td>
<td>13</td>
<td>4-7</td>
</tr>
<tr>
<td>Basket-of-Gold</td>
<td>2-3</td>
<td>2</td>
</tr>
<tr>
<td>Lupine</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

45-60 minute soak in concentrated sulfuric acid improved germination in 4 days from 3% without scarification to 61% with scarification.

CONCLUSION

Production of perennial bedding plants to market with spring annuals is feasible. The technology differs by earlier sowing followed by a cold treatment. The date of sowing is affected by the length of the juvenile period (Table 1), as well as the length of the inexpensive growing period. (Dropping temperatures to 40°F in November saves fuel compared to maintaining 65°F through December.) Thus basket-of-gold and lupine would be sown in April, and columbine and Shasta daisy in July. By November, plants are mature and ready to move to cold storage. Facilities might consist of coldframes, unheated greenhouses, or refrigerated storage. Time of raising the
temperature for forcing depends on market
demand, but would usually begin in early April
for columbine and Shasta daisy, late April for
basket-of-gold and lupine. Forcing tempera-
tures may be adjusted to slow down or speed
up bud development as needed.

Consumers need to be made aware that these
plants are spring and early summer flowering
species, and should be encouraged to buy and
plant them as soon after the frost-free date in
their area as possible.

When considering these results along with
those of Lopes and Weiler, and Kusey et al.,
natural causes of flowering in the perennial
garden seem to be the following:

<table>
<thead>
<tr>
<th>Flowering Period</th>
<th>Species</th>
<th>Causes of Flowering</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>Basket-of-Gold, Bleeding Heart</td>
<td>Winter Cold</td>
</tr>
<tr>
<td>June-July</td>
<td>Columbine, Lupine, Shasta Daisy</td>
<td>Winter Cold and Summer (long) Daylengths</td>
</tr>
<tr>
<td>July-August</td>
<td>Baby's Breath</td>
<td>Summer (long) Daylengths</td>
</tr>
<tr>
<td>September</td>
<td>Chrysanthemum</td>
<td>Fall (short) Daylengths</td>
</tr>
</tbody>
</table>

'LITERATURE CITED


Photographic Crop Records

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Timing and scheduling play a very key role in the production of all greenhouse crops. The grower may use a variety of techniques to finish a crop by a certain date. These include pinching techniques, temperature control, and watering practices, just to name a few. However, even the best grower is at the mercy of Mother Nature. Low light levels, cold or hot temperatures, or a rainy May weekend can have drastic effects.

Just as Easter lilies are difficult to sell the day after Easter, bedding plants will usually require the presence of a flower to be sold. The young and inexperienced grower will usually feel uncertain about how well the crop has been timed until several have been grown.

Potted plants and bedding plants usually go through a series of distinct changes during the time they are in the greenhouse. Educators and university extension personnel will routinely make use of color slides as part of their presentations on crop timing and culture. Growers may also find photographs of a prior crop at various stages of growth to be very helpful in determining how a current crop is progressing.

Instant print cameras are now available at reasonable cost and will simplify the whole process. However, for the photograph to be meaningful, the grower will have to take a few notes and keep them with the photographs. The following are some items to consider:

- height and spread - you may want to put a well known item in the picture (coins, pencils, etc) to use as a point of reference in judging size. Ideally, the plant should be placed in front of a background that has been marked off in inches or centimeters.
- outside weather conditions - has the weather been hot, humid, dark, cold, etc. since the last picture was taken?
- interior conditions - record average day and night temperatures, use of CO2, etc.
- Finishing Notes - Record the stage of development at the time of marketing. This would also be the time to write down any changes you would like to make next year.

The grower will then have a complete