Herbaceous Perennials: Delphinium

Figure 1 (left). Delphinium grandiflorum 'Summer Blues' has a beautiful flower color and ideal growth habit for container production. Figure 2 (right). Delphinium x belladonna 'Volkerfrieden' is a cut flower that also looks great in a pot, or in the garden.

by CATHY WHITMAN, ARTHUR CAMERON, ERIK RUNKLE, and ROYAL HEINS

True blue flowers are a coveted rarity in the garden. Delphiniums are a great source of this sought-after color, and thus have an enduring appeal. The genus contains more than 300 species, and many are native to the northern temperate zones of North America, Asia, or Europe. Most delphiniums prefer cool conditions and can be rather short-lived in the garden in much of the United States. However, the gardening public is willing to overlook this drawback in order to have those incomparable blue flowers in their gardens.

Delphiniums have been the focus of extensive breeding work ever since the mid 1800s. The classic garden hybrids, descended in part from D. elatum, have tall, narrow spikes that reach up to 10 feet tall and are densely packed with flowers. Flower spikes of the D. grandiflorum types are branched and open, and the plants are more compact and rounded in shape. Belladonna hybrids are the result of crosses between D. elatum and D. grandiflorum, and maybe D. cheilanthum.

We have recently tested two delphinium varieties with good potential for pot culture. Delphinium grandiflorum 'Summer Blues' is a compact plant with numerous flowers of a sky blue color (Figure 1). It is described as having better heat tolerance than others of this type, and cold hardy to USDA zone 4. However, it may best be used as an annual in zones 8 or warmer, and in climates having cold wet winters with fluctuating temperatures.

Delphinium x belladonna 'Volkerfrieden' ('World Peace') is a very popular commercial cut flower, with graceful, wiry stems holding masses of intensely blue flowers on branched spikes (Figure 2). The plants are tall but relatively sturdy, and are reportedly suitable for USDA hardness zones 3 to 7. 'Volkerfrieden' plants survived the 2002-2003 winter in the mid-Michigan

Schedule
Michigan State University researchers' seven-part series on herbaceous perennials covers topics from Phlox paniculata to chemical height control.

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July: Delphinium
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Propagated And Plant Size

"Summer Blues" is propagated by seed. Germination takes 14 to 18 days at 68°F to 72°F (20°C to 22°C). Cover the seeds lightly and maintain constant humidity levels during germination. 'Volkerfrieden' is propagated by tissue culture.

Neither of these delphiniums appears to have a juvenile phase. We found that seedlings of 'Summer Blues' with four to seven leaves and 'Volkerfrieden' plants with seven to nine leaves flowered readily.

Cold Treatment

Neither of these delphinium varieties require cold for flowering. Foliage of both died back during a 15-week cold treatment in lighted coolers (nine-hour photoperiod) at 41°F (5°C), which caused some delay in their development.

Some of our 'Summer Blues' plugs died during the 15-week cold treatment and surviving plants produced fewer flowers than those not exposed to a cold treatment. Cold did not hasten flowering or affect plant height. Shorter durations of 41°F (5°C) caused fewer problems, but it may be best to avoid cold storage of 'Summer Blues' unless absolutely necessary.

'Volkerfrieden' tolerated the 15-week cold treatment without trouble, but this duration of cold caused a delay in flowering of 10 to 14 days. Cooled plants flowered more uniformly than uncooled plants, and we saw an increase in lateral shoots after cold treatment. We also found that six weeks of cold induced a second flush of flowering in 'Volkerfrieden' plants, which had flowered, then were cut back. Long-term cold storage is optional for this delphinium.

Photoperiod

Both these delphinium varieties flowered readily under either nine-hour short days or 16-hour long days,
but plants were more compact and took four to 10 days longer to bloom under short days. We didn’t grow any plants under photoperiods between nine and 16 hours, but we suspect height and flower number would increase as photoperiod duration increases above nine hours.

‘Summer Blues’ grown under nine-hour short days were too small for our five-inch containers and had noticeably fewer flowers than those grown under long days (Figure 3). Therefore, we suggest forcing ‘Summer Blues’ under photoperiods of 12 hours or longer.

For ‘Volkerfrieden,’ photoperiod had little effect on the number of buds on the main inflorescence but plants had more flower spikes, and thus total flower...
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buds, when grown under long days. The plants were still very showy and nicely proportioned under short days. We recommend forcing ‘Volkerfrieden’ under natural daylengths.

Media, Fertilization, And Irrigation
Delphiniums are quite susceptible to root rot, so use of a well-drained medium is critical and plants should be grown on the dry side. Nitrogen levels of 125 ppm N in a constant liquid feed program were sufficient for healthy growth. We maintained pH levels between 5.8 and 6.2, but delphiniums traditionally thrive in basic soils, and pH levels of 6.5 to 7.0 have been suggested for ‘Summer Blues’ by the breeder, Benary Inc.

**Table 2. Delphinium grandiflorum ‘Summer Blues’ Production Schedule**

<table>
<thead>
<tr>
<th>Duration</th>
<th>Cultural Practice</th>
<th>Temperature</th>
<th>Photoperiod</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-16 days</td>
<td>Sow seeds; cover lightly</td>
<td>68°F-72°F(20°C-22°C)</td>
<td>Natural daylength</td>
</tr>
<tr>
<td>6-8 weeks</td>
<td>Grow on until plants have 4 to 8 leaves</td>
<td>60°F-68°F(16°C-20°C)</td>
<td>Natural daylength</td>
</tr>
<tr>
<td>-OR- Plant plugs (4 to 8 leaves)</td>
<td>Begin Forcing</td>
<td>≤12 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>57°F (14°C)</td>
<td></td>
</tr>
<tr>
<td>8 to 16 weeks</td>
<td>68°F (20°C)</td>
<td>6 to 7 weeks</td>
<td>to flower</td>
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<tr>
<td>to flower</td>
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Lighting And Spacing
Delphiniums grow best in full sun. We found that supplemental high-pressure sodium lighting (500 to 600 footcandles) improved the quality of ‘Summer Blues’ plants by increasing the flower number. Supplemental lighting hastened flowering of ‘Summer Blues’ and ‘Volkerfrieden’ by about seven days, probably because the lights increased the temperature of the plants.

The five-inch pots used in our experiments were the ideal size for ‘Summer Blues’ when grown under long days. Because the plants are compact, they can be spaced closely. ‘Volkerfrieden’ is best suited for pots one gallon or larger in size. ‘Volkerfrieden’ plants formed multi-
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Plant Height Control

'Summer Blues' is naturally very compact and generally doesn’t require height control. Typical plant heights under long days were 15 to 18 inches (38 to 45 cm).

In contrast, 'Volkerfrieden' plants reached 27 to 40 inches (70 to 100 cm) in height and could benefit from some height control. In our growth retardant trial, plants were sprayed six times at weekly intervals. They received A-Rest at 100 ppm, B-Nine at 5000 ppm, Bonzi at 90 ppm, Cycocel at 1500 ppm, or Sumagic at 15 ppm (Figure 4). The goal of this experiment was to determine which chemicals might be effective, not to determine recommended rates. A-Rest, B-Nine, and Sumagic all effectively reduced elongation of 'Volkerfrieden.' In one trial, a single application of Sumagic at 15 ppm reduced plant height by about 30% and resulted in very attractive plants. We encourage growers to perform their own trials to determine the best rates for height control of 'Volkerfrieden' under their conditions.

Temperatures And Scheduling

We grew plants under long days at temperatures ranging from 57°F to 79°F (14°C to 26°C). For both delphiniums, those grown at 79°F (26°C) were shorter and had markedly fewer flower buds (Figures 5a and 5b). Number of flower buds and height at flower were similar at all other temperatures. Plants bloomed more quickly under higher temperatures but were most attractive when grown at an average daily temperature of 68°F (20°C) or cooler, because the individual florets were larger and more intensely colored (Figures 6a and 6b).

The 'Summer Blues' plugs were cooled at 41°F (5°C) for eight weeks before forcing began. Average time to flower for 'Summer Blues' was eight to 10 weeks at 57°F (14°C) and six to seven weeks at 68°F (20°C).

'Volkerfrieden' plants were given 11
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Keys To Success
1. Use a well-drained medium and keep plants on the dry side.
2. Cold treatment is unnecessary — avoid prolonged exposure to low temperatures for 'Summer Blues'.
3. Force at 68°F (20°C) or cooler for best quality.
4. Force 'Summer Blues' under day lengths ≥ 12 hours. Force 'Volkerfrieden' under natural daylengths.
5. Timely height control on 'Volkerfrieden' is necessary.