

Peonies as Field Grown Cut Flowers for Alaska
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Summary: Peonies as field grown cut flowers have potential as a horticultural export from Alaska because harvest times occur in late June to August when peonies from other world markets are not available. Research was begun to identify appropriate cultivars and best management practices for field cultivation. Six cultivars were eliminated from cultivar trials because they died or productivity was too low for commercial production: 'Better Times', 'Gardenia', 'Mos. Jules Elie', 'Nancy Nichols', 'Raspberry Sundae', and 'Vivid Rose'. The cultivars producing the greatest number of U.S. quality grade cut stems were 'Dr. Alexander Fleming', 'Duchess de Nemours', 'Sarah Bernhardt', 'Felix Crouse', 'David Harum' and 'Festiva Maxima'. Amending soils with garden waste compost or Lemeta peat moss did not increase the number of flowering or vegetative stems in the first three years. A within row plant spacing of 30 cm, 45 cm or 60 cm showed no consistent difference in number of flowering and vegetative stems or stem quality in the first three years. Variation among individual plants in both experiments was so great it masked any treatment effects. No differences were recorded in flowering times, and number of vegetative and flowering stems during the first growing season between 'Sarah Bernhardt' and 'Duchess de Nemours' with three levels of shade (0, 10 and 60 percent) used to delay spring snow melt and potentially delay flowering times. A test market of Alaska peonies with Los Angeles wholesale flower distributor affirmed that Alaska peonies meet market standards and may be sold for at least three times the value of peony stems sold during the major May-June market season.

Introduction: Cultivation of peonies as field grown cut flowers was begun in 2001 at the Agricultural and Forestry Experiment Station Fairbanks Experiment Farm with a trial of 30 cultivars recommended as cut flowers. Peony cut stems are not harvested commercially until the third or fourth growing season, but growth and yield data from the first three years provided a "top 10" cultivar list and the recommendation that growers begin with 'Sarah Bernhardt' and 'Duchess de Nemours' for high yields and quality blooms. Potential problems identified in the first three years included *Botrytis* sp. rot, short stem length, and thrips (Holloway *et al.* 2003, 2004).

Recommendations for field production of peonies vary widely among commercial growers and researchers. Plant spacing recommendations range from 18 inches to 4 feet between plants. Because peonies grow across a broad geographic area, recommendations on soils and soil amendments differ by region. Field trials begun in 2002 showed no difference in growth and flowering of 'Sarah Bernhardt' peonies planted on soils amended with peat or compost or at 12-inch (30 cm), 18 inch (45 cm) or 24 inch (60 cm) within-row spacings. (Holloway *et al.* 2004).

Research was begun in 2000 to identify markets for field grown cut peonies. Klingman (2002) identified methods of handling, grading and processing cut stems as well as modes of transportation from Alaska to markets. She also estimated startup costs and potential return per acre given the limited production information we had at the beginning of this research.

The purpose of this report is to share results of continuing research as well as new projects begun in 2005 and 2006. Projects include year five of cultivar trials, spacing and soil amendment trials, a field shading study, and observations on commercial markets for Alaska cut flowers.

Cultivar Trials

One hundred fifty peonies were planted between 15 – 20 August 2001 into a 20 x 60 ft (6 x 18 m) plot located on a south facing slope at the Fairbanks Experiment Farm's Georgeson Botanical Garden. Peonies were planted in Fairbanks silt loam soil in double-row raised beds with landscape fabric; each row was equipped with a double row of Roldrip® trickle irrigation. Spacing was 18 inches (46 cm) between plants within each row and between adjacent rows on the same 39-inch-wide (1.0 m) raised beds. Each raised bed was 59 inches (1.5 m) on center between beds. Experimental design consisted of six replicates with a single plant each of 30 cultivars. Guard rows of 'Sarah Bernhardt' peonies surrounded the plot on all sides. Plants were fertilized annually with 4 lb per 100 sq ft (195 g per square meter) 10-20-20. Plots were mulched with spruce branches in Oct 2001 and straw in Oct 2002. They were not mulched in 2003, but foliage was removed at the end of the season to minimize disease problems. They were mulched with straw in 2004 and artificial snow or straw in 2005, and foliage was removed to minimize disease.

Two of the thirty cultivars, 'Nancy Nichols' and 'Vivid Rose' had greater than 50 percent plant death in the trial plots and were eliminated from the evaluations. In addition, four cultivars were eliminated because they produced fewer than three flower buds per plant in five years and probably would not be economical to grow commercially for cut flowers. The cultivars were 'Gardenia', 'Better Times', 'Mons. Jules Elie', 'Raspberry Sundae'. The remaining cultivars differed in their ability to produce salable cut flowers, and they are ranked in Table 1 according to production of flowers. The top five cultivars averaged about 9- 10 flower buds per plant with more than seven normal flowers per stem, the remainder showing bud blast. The major problem encountered was *Botrytis* sp. on the buds late in the season.

Bloom times for most cultivars was similar to 2002 and 2003. All of the top five cultivars began blooming 27 June. The cultivar with the last blooms was 'David Harum'. Data were not collected during 2005 because flowers were used to evaluate cut flower storage conditions at the experiment farm. The top recommended cultivars from two previous years, 'Sarah Bernhardt' and 'Duchess de Nemours' remain in the top five for number of flowering stems produced. These cultivars were not ranked for stem length and other cut flower qualities.

Spacing and Soil Amendments

In 2002, a second trial plot identical in size and similar in layout on raised beds to the cultivar trials was planted with 'Sarah Bernhardt' peonies at three spacings: 30, 45 and 60 cm between plants. Treatments were randomized among three main plots: un-amended Fairbanks silt loam soils and those amended with a 15 cm layer of Lemeta peat or

compost from the UAF Agricultural and Forestry Experiment Station farm. The amendments were tilled into the top 8 inches of the soil surface before planting. Between row spacing, irrigation, and use of fabric mulch were identical to the cultivar study. Peonies were planted in a split plot design with ten plants per spacing/amendment combination. Five plants per treatment were randomly selected for non-destructive analysis using Analysis of Variance. No data were collected in 2003.

As in the previous two years, no differences in flower production occurred on ‘Sarah Bernhardt’ peonies planted on silt loam soils compared to those amended with peat or compost. In addition, no differences occurred among plants grown at three different within-row spacings. Data for total number of flower buds, amount of bud blast, number of vegetative stems, height of flowering and vegetative stems and flower bud diameter did not differ significantly among treatments. Since planting, the between-plant variation was very large and masked any treatment effects. Even three years after planting, there is significant variation from plant to plant. For example, the number of flowering stems on the soil treatment at 30-cm spacing ranged from no flowers to 17 flowers per plant (mean 10 ± 6.8 SD flowers per plant) in the single-plant replicates. Even with a single cultivar, the variation in growth among plants is very large.

Shading Experiments

In July 2005, ‘Sarah Bernhardt’ and ‘Duchess de Nemours’ peonies were planted in east to west raised beds at 24 inch (60 cm) spacings in single rows. Beds were covered with landscape fabric for weed control. Rows were shaded with plastic fencing material at two different densities (10 and 60 percent average shade) located approximately 20 inches (50 cm) south of the row at a height of 45 inches (114 cm). One treatment received no shade. The experiment was a randomized complete block design with ten plants per treatment and three replicates. Data were analyzed with ANOVA. The objective of the experiment was to learn if flowering could be delayed and stem length increased with shading. We anticipated that shade would delay snowmelt, promote cooler soils and thus delay shoot emergence and flowering.

During the first growing season following planting, treatments did not differ significantly in the number of flower buds, amount of bud blast, flowering and vegetative stem length and number of stems. Very few flowers were produced, and all bloomed between 30 June and 5 July. Like the spacing study, individual plant response was highly variable.

Potential Markets

In May- July 2006, we visited wholesale flower markets in Los Angeles and San Francisco and peony growers in Oregon, Washington and British Columbia. The largest wholesaler, Mayesh Wholesale Flower Distributor, Los Angeles, provided basic information on flower maturity as well as cut flower packing and marketing. They agreed to evaluate a sample of Alaska-grown peonies when they were harvested in early July. Our findings are summarized below:

- a. The flower markets are composed of individual wholesalers and growers who rent space in big warehouses mostly for local sales. Flowers are sold to florist shops and other retailers early in the morning. Some stores also sell direct retail later in the day.
- b. Shipping boxes for peonies are 6 inches deep and 18-24 inches wide and 3-4 feet long; some boxes are 12 inches deep. They are packed 10 bundles to a box, five facing each end with 3 lb gel packs wrapped in newspaper in the center. A pad of macerated newspaper covers the entire contents, and this is secured with wires to the sides of the box. The flowers don't move in shipment.
- c. Flowers are sold in bundles of 10. They sometimes come to the wholesalers bundled in different numbers, but they are re-bundled before being sold. Stem length did not seem to be a big issue with wholesalers or buyers.
- d. Flowers arrive at the wholesaler at different stages of maturity depending on cultivar. The dark red peonies were tight bud, while the whites were more open.
- e. Mayesh receives peonies in late June or early July from one grower in Vermont. Other wholesalers were finished with peonies by the third week of June.
- f. Sarah Bernhardt is a favorite cultivar, and many wholesale distributors know to request it by name. Others are sold by color, not cultivar name. Other popular cultivars are Coral Charm and Red Charm. Avoid Karl Rosenfeld. The flowers are poor quality.
- g. If flower buds are loaded with a sticky residue, some florists did not like them stating they attracted bugs in the retail shop.
- h. Our trial cutting of peonies was received favorably by Mayesh. They offered to purchase peonies next year for \$1.25 per stem.

We held a statewide meeting and audioconference in December 2006 to identify grower interest in peony cut flowers. More than 25 individuals attended the meeting in Fairbanks, and there were audio connections with 7 others. Twelve of the attendees had already planted peonies for cut flower production. Most individuals have small test plots to determine if peonies would grow under the wide variety of conditions in Alaska. One grower planted 3000 peonies in Homer, Alaska. A second grower in Fairbanks has 2000 plants. Based upon discussions from that meeting, we will continue our field trials for best field management practices; we will continue market research by test marketing our peonies to wholesalers, through Ebay and farmer's markets; and we help define the cut flower markets to explore the feasibility of developing a statewide cut flower industry.

Table 1 Flowering dates and cut flower yield of the top five cultivars of peonies grown in Fairbanks, Alaska (see attached)

References

Holloway, P. J. Hanscom and G. Matheke. 2003. Peonies for field cut flower production. First-year growth. University of Alaska Fairbanks Agricultural and Forestry Experiment Station Research Prog. Report 41. 4p.

Holloway, P. J. Hanscom and G. Matheke. 2004. Peonies for field cut flower production. Second-year growth. University of Alaska Fairbanks Agricultural and Forestry Experiment Station Research Prog. Report 43. 8p.

Klingman, M. 2002. Production and transportation considerations in the export of peonies from Fairbanks, Alaska. University of Alaska Fairbanks Agricultural and Forestry Experiment Station Senior Thesis ST-05-01.