

PEONIES FOR FIELD CUT FLOWER PRODUCTION SECOND-YEAR GROWTH

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Cultivar trials with herbaceous peonies were initiated during the summer of 2001 to evaluate their potential as field-grown cut flowers. The plants became well established, and all but three cultivars bloomed in 2002. The bloom times for all cultivars ranged from 30 June through the first week of August (Holloway *et al.* 2003). The purpose of this report is to present evaluations of the cultivar trials through the 2003 growing season and identify possible problems with flowering and plant establishment. Peonies for the cut flower market are typically not harvested until their fourth season, so this initial data only reflects the plant establishment phase of field production.

One hundred fifty peonies were planted between 15–20 August 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 Ro-drip® 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. Plots were mulched with spruce branches in Oct 2001 and straw in Oct 2002. Because stems were not harvested in the first two seasons, no harvest data are available.

All peonies survived the winter despite a second year of low snowfall. All cultivars produced blooms, although individual plants of nine cultivars did not bloom (cvs. 'Doris Cooper', 'Duchess de Orleans', 'Felix Supreme', 'Festiva Maxima', 'Gardenia', 'Mighty Mo', 'Mons. Jules Elie', 'Mrs. FDR', 'Vivid Rose') (Table 2). More than 50 percent of all flower buds did not mature into full blooms



Peonies at the Fairbanks Experiment Farm.

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in all but two cultivars ('Better Times' and 'Jaycee') (Table 1). The resulting bud blast occurred throughout the trial bed. Two buds examined in the laboratory showed damage from gray mold (*Botrytis* sp.), the most destructive disease of peonies throughout the United States and one possible cause of bud blast (Stevens *et al.* 1993, Stimart 1985). It is not known whether this disease is the direct cause of all the recorded bud blast or secondary infection following winter injury. Other factors causing bud blast include spring frost damage, thrips, winter injury, root damage and poor nutrition (Armitage & Lauschman 2003).

Cut flower grading is based, in part, on stem length with U.S. No 1 grade requiring a minimum stem length of 20 inches (51cm), and U.S. No 2, 18 inches (46 cm). In addition to the desired product length, growers cut stems high enough to leave at least 12 inches (30 cm) of leafy base to promote future growth (Gast 1997). Therefore, the

Table 1. Percent full bloom in relation to number of flower buds.

Cultivar	Full Bloom (%)	Cultivar	Full Bloom (%)
Better Times	54.5	Kansas	21.6
Bowl of Beauty	43.2	Karl Rosenfield	35.0
David Harum	26.1	Louis Van Houtte	35.0
Doris Cooper	12.2	Mighty Mo	31.8
Dr. Alexander Fleming	10.0	Mons. Jules Elie	35.0
Duchess de Nemours	20.8	Mrs. FDR	28.5
Duchess de Orleans	13.0	Nancy Nicholls	12.5
Edulis Superba	0.0	Pink Parfait	30.2
Felix Crouse	25.7	Princess Bride	36.4
Felix Supreme	38.4	Raspberry Sundae	28.0
Festiva Maxima	36.3	Red Charm	0.0
Florence Bond	44.4	Sarah Bernhardt	33.9
Gardenia	0.0	Shawnee Chief	26.3
Gay Paree	43.7	Therese	26.3
Jaycee	58.3	Vivid Rose	15.0

combined stem length for commercial production is 32 inches (81 cm) for U.S. No.1 stems and 30 inches (76 cm) for U.S. No 2 stems. Our cultivars in their second growth year averaged 19.2 inches (49 cm) in maximum stem length (range 6–29 inches, 15–74 cm). This length was barely sufficient for U.S. No 2 grade and not sufficient to allow for a 12-inch (30 cm) stem remaining after cutting (Table 2a). This lack of stem height may be a result of the black cloth landscape fabric cooling soils during the growing season. The black cloth will be removed in 2004.

The 2002 and 2003 flowering periods were similar, with both beginning on 30 June and the 2003 season ending before August. In some cultivars a shortened bloom period was related to fewer flower buds opening to full bloom, but the response varied among cultivars. The most productive peonies for stems in full bloom were: ‘Bowl of Beauty’, ‘Sarah Bernhardt’, ‘Louis Van Houtte’, ‘Karl Rosenfield’ and ‘Felix Crouse’ (Table 2).

References

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Table 2a. Peony Flowering Data: Buds and Vegetative Stems

Cultivar	Year	Average no. flower buds	No. flower buds (min-max)	Average Unopened fl buds (blast) per plant	Average no. flowers opened	Average flowering stem length max	Average flowering stem length min	Average no. veg. stems per plant	Average height of veg. stems	Earliest date of first color
Better Times	2002	2.5	1-5	0.3	2.2	50.3	41.6	0.8	41.1	30-Jun
	2003	3.3	1-10	1.7	1.8	21.0	20.0	4.7	18.8	30-Jun
Change from last year		0.8		1.4	-0.4	-29.3	-21.6	3.9	-22.3	
Bowl of Beauty	2002	3.0	0-5	0.3	2.7	63.2	57.6	5.2	49.3	1-Jul
	2003	8.8	2-17	5.0	3.8	29.0	22.8	11.7	27.0	30-Jun
Change from last year		5.8		4.7	1.1	-34.2	-34.8	6.5	-22.3	
David Harum	2002	1.2	0-3	0.2	1.0	47.2	42.5	5.2	34.3	30-Jun
	2003	6.5	2-13	4.8	1.7	26.0	20.5	9.5	18.2	6-Jul
Change from last year		5.3		4.6	0.7	-21.2	-22.0	4.3	-16.1	
Doris Cooper	2002	1.0	0-2	0.3	0.7	52.8	39.6	3.3	34.8	30-Jun
	2003	2.7	0-10	2.0	0.3	21.0	19.0	5.7	16.5	6-Jul
Change from last year		1.7		1.7	-0.3	-31.8	-20.6	2.4	-18.3	
Dr. Alexander Flemming	2003	1.7	1-3	1.5	0.2	16.0	16.0	1.8	11.2	30-Jun
Duchess de Nemours	2002	1.8	0-2	0.5	1.3	52.1	47.0	3.3	33.0	30-Jun
	2003	4.8	2-8	3.8	1.0	22.3	19.5	6.8	19.3	30-Jun
Change from last year		3.0		3.3	-0.3	-29.8	-27.5	3.5	-13.7	
Duchess de Orleans	2002	0.0		0.0	0.0			4.8	36.0	
	2003	2.3	0-5	2.4	0.3	23.5	23.5	8.8	19.8	6-Jul
Change from last year		2.3		2.4	0.3			4.0	-16.2	
Eduilis Superba	2002	0		0	0			3	24	
	2003	1.0	1.0	1.0	0.0			2.3	11.3	6-Jul
Change from last year		1.0	1.0	1.0	0.0	0.0	0.0	-0.7	-12.7	
Felix Crouse	2002	2.3	0-3	0.2	2.2	51.8	44.7	5.7	36.8	8-Jul
	2003	10.5	5-15	7.8	2.7	24.8	22.5	16.5	21.3	6-Jul
Change from last year		8.2		7.6	0.5	-27.0	-22.2	10.8	-15.5	
Felix Supreme	2002	0.3	0-2	0.0	0.3	54.0	48.0	2.0	41.0	30-Jun
	2003	1.3	0-2	0.8	0.5	22.0	22.0	3.0	12.5	2-Jul
Change from last year		1.0		0.8	0.2	-32.0	-26.0	1.0	-28.5	

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Festiva Maxima	2002	0.8	0-1	0.5	0.3	46.0	32.0	4.6	38.4	8-Jul
	2003	3.3	0-6	1.7	1.2	24.0	19.5	6.3	18.0	30-Jun
Change from last year		2.5		1.2	0.9	-22.0	-12.5	1.7	-20.4	
Florence Bond	2002	1.3	0-2	0.3	1.0	25.4	40.5	1.0	31.5	30-Jun
	2003	1.8	1-3	1.0	0.8	13.8	13.8	3.0	13.7	30-Jun
Change from last year		0.5		0.7	-0.2	-11.6	-26.7	2.0	-17.8	
Gardenia	2002	0.7	0-1	0.5	0.2	40.0	35.0	1.8	30.0	30-Jun
	2003	0.8	0-2	0.8	0.0			3.5	10.2	30-Jun
Change from last year		0.1		0.3	-0.2	-40.0	-35.0	1.7	-19.8	
Gay Paree	2002	2.2	1-3	0.2	2.0	45.2	39.0	1.3	28.4	8-Jul
	2003	3.2	1-5	1.8	1.4	21.3	21.3	4.4	19.0	8-Jul
Change from last year		1.0		1.6	-0.6	-23.9	-17.7	3.1	-9.4	
Jaycee	2002	0.8	0-3	0.8	0.0	35.0	35.0	6.2	34.0	8-Jul
	2003	2.4	1-4	1.0	1.4	18.0	15.7	5.8	15.2	8-Jul
Change from last year		1.6		0.2	1.4	-17.0	-19.3	-0.4	-18.8	
Kansas	2002	0.5	0-3	0.0	0.5	55.0	48.0	8.0	41.0	8-Jul
	2003	3.7	2-7	2.8	0.8	28.0	22.0	8.5	19.8	15-Jul
Change from last year		3.2		2.8	0.3	-27.0	-26.0	0.5	-21.2	
Karl Rosenfield	2002	0.3	0-1	0.0	0.3	54.5	54.5	8.5	41.3	8-Jul
	2003	8.0	1-16	5.2	2.8	27.8	24.5	21.5	24.3	8-Jul
Change from last year		7.7		5.2	2.5	-26.7	-30.0	13.0	-17.0	
Louis Van Houfte	2002	1.3	0-2	1.0	0.3	50.7	33.0	8.3	42.8	30-Jun
	2003	8.0	5-12	5.2	2.8	28.2	23.6	19.3	25.7	30-Jun
Change from last year		6.7		4.2	2.5	-22.5	-9.4	11.0	-17.1	
Mighty Mo	2002	0.5	0-1	0.0	0.5	37.6		5.0	34.3	1-Jul
	2003	2.2	0-5	1.5	0.7	21.8	21.8	5.7	17.5	30-Jun
Change from last year		1.7		1.5	0.2	-15.8	21.8	0.7	-16.8	

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Cultivar	Year	Average no. flower buds	No. flower buds (min-max)	Average Unopened fl buds (blast) per plant	Average no. flowers opened	Average flowering stem length max	Average flowering stem length min	Average no. veg. stems per plant	Average height of veg. stems	Earliest date of first color
Mons. Jules Elie	2002	1.7	0-3	0.8	0.8	42.7	35.0	3.4	35.5	1-Jul
	2003	2.0	0-6	1.7	0.7	21.0	21.0	5.0	14.5	8-Jul
Change from last year		0.3		0.9	-0.1	-21.7	-14.0	1.6	-21.0	
Mrs. FDR	2002	0.2	0-1	0.2	0.0	12.0		2.0	29.8	8-Jul
	2003	1.4	0-2	1.0	0.4	17.0	17.0	3.2	10.8	6-Jul
Change from last year		1.2		0.8	0.4	5.0	17.0	1.2	-19.0	
Nancy Nicholls	2002	0.8	0-3	0.0	0.8	53.0	52.0	4.5	39.8	15-Jul
	2003	4.0	1-6	3.5	0.5	12.0	15.5	7.7	17.8	15-Jul
Change from last year		3.2		3.5	-0.3	-41.0	-36.5	3.2	-22.0	
Pink Parfait	2002	1.2	0-3	0.3	1.0	41.5	45.0	1.8	38.8	8-Jul
	2003	4.3	1-8	3.0	1.3	21.0	20.2	5.0	18.8	15-Jul
Change from last year		3.1		2.7	0.3	-20.5	-24.8	3.2	-20.0	
Princess Bride	2002	2.2	0-2	1.3	0.8	38.5	40.0	2.0	34.0	8-Jul
	2003	2.2	1-3	1.3	0.8	19.5	19.3	3.0	19.0	8-Jul
Change from last year		0.0		0.0	0.0	-19.0	-20.7	1.0	-15.0	
Raspberry Sundae	2003	2.5	1-4	1.8	0.7	19.3	18.7	4.5	16.0	15-Jul
Red Charm	2003	1.5	1-2	1.5	0.0			2.3	7.3	
Sarah Bernhardt	2002	3.2	0-3	1.2	2.0	61.0	46.0	3.0	46.8	30-Jun
	2003	11.2	4-18	7.3	3.8	29.0	24.0	11.0	25.0	30-Jun
Change from last year		8.0		6.1	1.8	-32.0	-22.0	8.0	-21.8	
Shawnee Chief	2002	0.3	0-2	0.3	0.0	32.0	32.0	12.1	33.8	6-Jul
	2003	3.8	1-6	2.8	1.0	19.0	16.5	19.6	16.2	8-Jul
Change from last year		3.5		2.5	1.0	-13.0	-15.5	7.5	-17.6	
Therese	2002	1.8	0-5	0.0	1.8	59.2	42.3	3.0	41.8	30-Jun
	2003	3.8	2-7	2.8	1.0	27.0	25.7	8.4	22.4	8-Jul
Change from last year		2.0		2.8	-0.8	-32.2	-16.6	5.4	-19.4	
Vivid Rose	2002	1.0	0-3	0.2	0.8	38.5	40.5	3.8	29.6	12-Jul
	2003	2.0	0-6	1.7	0.3	6.3	9.5	3.7	8.8	8-Jul
Change from last year		1.0		1.5	-0.5	-32.2	-31.0	-0.1	-20.8	

Table 2b. Peony Flowering Data: Flowering dates by cultivar

Cultivar	Year	Flowering dates		2-	4-	6-	8-	10-	12-	15-	17-	19-	21-	23-	25-	27-	29-	31-	2-	4-	6-	
		30-Jun	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Jul	Aug	Aug	Aug
Better Times	2002	x	x	x	x	x	x	x	x	x	x	x										
	2003	x	x	x	x	x	x	x	x													
Bowl of Beauty	2002		x	x	x	x	x	x	x	x	x	x	x									
	2003	x	x	x	x	x	x	x	x	x												
David Harum	2002	x	x	x	x	x	x	x	x	x	x	x										
	2003																					
Doris Cooper	2002	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
	2003	x	x	x	x	x	x	x														
Dr. Alexander Flemming	2003	x	x	x	x	x	x															
Duchess de Nemours	2002	x	x	x	x	x	x	x	x	x	x											
	2003	x	x	x	x	x	x	x	x	x												
Duchess de Orleans	2002																					
	2003																					
Edulis Superba	2002																					
	2003																					
Felix Crouse	2002																					
	2003																					
Felix Supreme	2002	x	x	x	x	x	x	x	x	x												
	2003																					
Festiva Maxima	2002																					
	2003	x	x	x	x	x	x	x	x	x	x	x										
Florence Bond	2002	x	x	x	x	x	x	x	x	x	x	x	x									
	2003	x	x	x	x	x	x	x	x	x	x											
Gardenia	2002	x	x	x	x	x	x	x	x	x	x	x										
	2003	x	x	x	x	x	x															
Gay Paree	2002																					
	2003																					
Jaycee	2002																					
	2003																					

Table 2b. Peony Flowering Data: Flowering dates by cultivar

Cultivar	Year	Flowering dates	2-Jul	4-Jul	6-Jul	8-Jul	10-Jul	12-Jul	15-Jul	17-Jul	19-Jul	21-Jul	23-Jul	25-Jul	27-Jul	29-Jul	31-Jul	2-Aug	4-Aug	6-Aug	
Kansas	2002					x	x	x	x												
	2003								x	x											
Karl Rosenfield	2002				x	x	x	x	x	x	x										
	2003						x	x	x												
Louis Van Houfte	2002	x	x	x	x	x	x	x	x	x											
	2003	x	x	x	x	x	x	x	x	x	x	x	x	x							
Mighty Mo	2002				x	x	x	x	x												
	2003	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Mons. Jules Elie	2002				x	x	x	x	x	x											
	2003						x	x													
Mrs. FDR	2002						x	x													
	2003						x	x	x	x	x	x	x	x	x						
Nancy Nicholls	2002								x	x	x	x	x								
	2003								x	x	x	x	x								
Pink Parfait	2002					x	x	x	x	x	x	x	x	x	x	x	x	x			
	2003								x	x	x	x	x	x	x	x					
Princess Bride	2002								x	x											
	2003						x	x													
Raspberry Sundae	2003								x												
Red Charm	2003																				
Sarah Bernhard	2002	x	x	x	x	x	x	x	x	x	x	x									
	2003	x	x	x	x	x	x	x	x	x	x	x	x	x							
Shawnee Chief	2002								x	x											
	2003								x	x											
Therese	2002	x	x	x	x	x	x	x	x	x	x										
	2003								x	x											
Vivid Rose	2002								x	x	x	x	x	x	x						
	2003								x	x	x	x	x	x	x						



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