1994

BEDDING PLANT FIELD TRIALS

Report of Progress 735

Agricultural Experiment Station
Kansas State University, Manhattan
Marc A. Johnson, Director

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1994 Bedding Plant Field Trials

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Introduction

Cultivars of carnation, dianthus, gazania, seed and zonal geranium, impatiens, African and French marigolds, petunia, salvia, snapdragon, sunflower, and zinnia were evaluated. Production information is provided. The cultivars were tested at the Horticulture Research Center-Manhattan, the Horticulture Research Center-Wichita, and the Agricultural Research Center-Hays.

Greenhouse and Field Cultural Procedures

All plants were produced in the Kansas State University greenhouses. When cultivar series were used, the white, red/scarlet/carmine, rose/pink/cherry, salmon/coral, purple/violet/lilac/blue, and orange/apricot cultivars were selected. Also selected were new introductions regardless of the color group. Seeds for most material were sown in 20-row seed trays filled with Jiffy-Mix and placed under intermittent mist with bottom heat (70°F). Marigold and sunflower cultivars were seeded directly into 1204 cell-packs filled with Strong-Lite Bedding Plant Mix and placed under intermittent mist with bottom heat (70°F). When seeds germinated, seed trays or flats were moved to a bench in a 60°F (day/night) greenhouse. Seedlings were irrigated from overhead with a constant liquid feed program (170 ppm nitrogen from Peter's 20-10-20 General Purpose Peat-Lite fertilizer). Seedlings in trays were transplanted into 1204 cell-packs filled with Strong-Lite Bedding Plant Mix. Most plants were grown in the same greenhouse and received constant liquid feed. For most plants, night temperatures were reduced to 55°F during the last month of production. The salvias were grown in a warmer greenhouse (63°F night); night temperatures were not reduced during the last month of production. Zonal geraniums were received as rooted cuttings from commercial propagators and planted immediately into 4-inch black pots held pot-to-pot in growing trays. Plants were grown under the same temperature conditions as the seed geraniums. Strong-Lite Universal Growing Mix was used. Plants received constant liquid feed as described for the seed geraniums.

Sowing and transplanting dates and cultivar sources are given in each plant section. Stage of flowering at planting also is noted in each plant section as: green (no flower buds visible above the foliage), budded (flower buds present), or color (flower buds present and showing petal color). If 50% flowering (one-half of the plants were flowering) was reached prior to planting in the field, the date is given.

The sun plots were planted on May 11, and the shade plots were planted on May 12 in Manhattan. The carnation, dianthus, impatiens, salvia, and snapdragon cultivars were in the 50% shadehouse. Most plant material was planted on 12-inch centers except for petunias (12- x 18-inch centers); dianthus, salvia, and snapdragon cultivars were on 8-inch centers. After planting, XL 2G (benefin and oryzalin combination), a preemergent herbicide, was applied at the rate of 2.0 lbs per 1,000 sq ft. One pound of actual nitrogen from 13-13-13 per 1,000 sq. ft. was broadcast over the plots after planting and in late June. Orthene 75W, Malathion 25W, Omite 30W, and Kelthane 35W were used over the course of the growing season to control insect and mite problems. Irrigation was applied as needed.

At the Horticulture Research Center-Wichita, the cultivars were planted on May 12 and 13. Fertilizer [1.75 lbs of actual nitrogen (13-13-13) per 1,000 sq ft] was incorporated prior to planting. A second fertilizer application was made in late July (13-13-13, 1.5 lbs of actual nitrogen per 1,000 sq ft). XL 2G (benefin and oryzalin combination), a preemergent herbicide, was applied after planting (2.0 lbs per 1,000 sq ft). No serious insect problems were diagnosed.

At the Agricultural Research Center-Hays, cultivars were hardened off and then planted on 12-inch centers from May 23 and 24. Plants were mulched with wheat straw. No herbicides were used. Dry fertilizer (12-12-12) was incorporated into the soil before planting. Iron sulfate was used only when an iron chlorosis problem arose. No insecticides or fungicides were used. Rainfall was adequate to excessive during most of the growing season; irrigation was applied only when needed.

Data Collection

Visual ratings were made during the third weeks of June, July, and August in Manhattan, Wichita and Hays. The rating scale used at all sites was 0=dead plant material; 3=average, acceptable display; and 5=excellent display. Plant height and width were measured in the third week of August at all sites. If plants grew together and width of individual plants could not be measured, no width was recorded. This is denoted by an "A" in the tables. If visual rating was 0.5 or less, neither height nor width was measured. If no data are presented for a cultivar at one of the sites, the cultivar was not planted there.

Weather Conditions

Precipitation was near normal in Manhattan, which was a marked contrast to the very wet summer of 1993. Wichita and Hays had below-normal precipitation in May, June, and August and above-normal precipitation in July. May was drier than normal in Manhattan, but precipitation was normal throughout the remainder of the growing season. Daily maximum and minimum temperatures were above normal for May, well above normal for June, drastically below normal for July, and near normal for August at the three sites

Average minimum and maximum daily temperatures, monthly precipitation (inches), and departure from normal values for May through August for the three evaluation sites.

Location and Parameter	May	June	July	August
Manhattan				
Avg. maximum (°F)	79.3	88.8	88.5	90.1
departure	+2.0	+2.6	-3.2	-0.3
Avg. minimum (°F)	51.7	63.8	64.8	64.3
departure	-1.8	-0.6	-3.2	-2.0
Precipitation	3.22	5.66	4.07	3.18
departure	-1.28	+0.37	+0.11	0.00
Hays				
Avg. maximum (°F)	79.1	91.8	88.7	91.9
departure	+3.6	+5.6	-3.9	+0.8
Avg. minimum (°F)	52.3	64.6	62.6	64.9
departure	+2.3	+4.4	-1.9	+0.9
Precipitation	1.04	0.72	5.50	0.27
departure	-1.66	-2.66	+2.04	-2.36
Wichita				
Avg. maximum (°F)	77.9	90.9	88.4	90.8
departure	+1.0	+4.1	-4.4	+0.1
Avg. minimum (°F)	54.9	67.6	66.8	67.2
departure	+0.6	+3.0	-3.1	-0.7
Precipitation	0.95	2.72	5.89	2.30
departure	-2.86	-1.59	+2.76	-0.72

Carnations

Carnations were sown on February 4 and transplanted on February 24. When planted, the plants were well budded. The Monarch series was supplied by Goldsmith Seeds. Plants received acceptable ratings by the end of the summer evaluation period. Plant size ranged for the different colors in the series. 'Monarch White' had the largest plants; 'Monarch Light Salmon' had the smallest. Flowering was limited and peaked late in the season. Plants were within the reported height range for these cultivars. Branching was acceptable, contributing to the good spread. When used as bedding plants, they should be planted no more than 8 inches apart for good coverage. At 12-inch centers, coverage of the soil would be inadequate.

Table 1. Visual ratings, height, and width for carnations grown in the shade in Manhattan.

Cultivar	JU	JY	AU	Avg.	Height (cm)	Width (cm)
Monarch Series						
Pink	3.0	2.5	3.0	2.8	24.7	20.3
Light Salmon	2.0	2.5	3.0	2.5	18.0	15.0
Orange	3.0	3.0	3.0	3.0	22.0	18.3
White	3.5	3.0	3.0	3.2	26.7	25.0
Yellow	2.5	3.0	3.0	2.8	21.3	24.0

Dianthus (China Pinks)

Dianthus seeds were provided by Elidia (Ideal series), Goldsmith (Parfait and Princess series), and Ball Seed (Floral Lace series and the experimental cultivar). The Parfait, Floral Lace, Princess, and experimental cultivars were sown on February 28 and transplanted on March 16. The Ideal cultivars were sown on March 9 and transplanted on March 30. The two Floral Lace and the one Princess cultivars were at 50% flowering on May 9; the experimental cultivar was at 50% flowering on May 3. 'Ideal Red' was showing color when planted. 'Ideal Raspberry' (new for 1995) and 'Ideal Violet Picotee' (new for 1995) were budded but not showing color when planted. 'Ideal Cherry'(new for '95), 'Ideal Pink', and 'Strawberry Parfait' were green when planted. The Ideal series reportedly is an earlier series than other dianthus. However, we could not see this in our greenhouse trials, because we received the seed later than the others.

These plants were set in the field on 8-inch centers. This was adequate for bed coverage. Any spacing greater than 8 inches would result in undesirable coverage. Spacings tighter than 8-inches would be beneficial in areas of low moisture and higher light levels.

Table 2. Visual ratings, height, and width of dianthus grown in full sun at Manhattan.

Cultivar	JU	JY	AU	Avg.	Height (cm)	Width (cm)
Ideal Series:						
Cherry	3.0	3.5	4.0	3.5	26.7	25.7
Pink	3.0	3.5	4.0	3.5	25.3	25.7
Raspberry	2.5	3.5	4.0	3.3	24.7	22.7
Red	2.5	3.5	3.5	3.2	22.7	20.0
Violet Picotee	3.0	3.5	4.0	3.5	26.7	25.0
Princess Crimson Eye	3.0	3.0	3.5	3.2	17.0	17.0

Table 2. Visual ratings, height, and width of dianthus grown in full sun at Manhattan. (continued)

Cultivar	JU	JY	AU	Avg.	Height (cm)	Width (cm)
Parfait Series						
Raspberry	2.0	3.0	4.0	3.0	22.7	23.0
Strawberry	2.0	3.0	4.0	3.0	23.0	23.3
Floral Lace Series						
Rose Bicolor	2.5	3.5	4.0	3.4	19.7	22.3
Rose	2.0	3.0	4.0	3.0	20.3	19.3
Exper'l Cherry Picotee	3.0	3.5	4.0	3.5	19.0	21.0

Seven dianthus cultivars were planted at Hays during the 1993 season. These were not removed from the beds and did not receive any special overwintering treatment. Hays experienced a mild winter (December, 1993 through March, 1994). The dianthus cultivars reflowered during the 1994 growing season. Five were in the Floral Lace series (crimson, rose, purple, violet, and violet picotee). The other two dianthus were 'Princess Pink' and *Dianthus superbus* 'Primadonna.' The Floral Lace cultivars averaged a visual rating of 3.8 with a range from 3 to 5. 'Princess Pink' was rated 3.7, and 'Primadonna' was rated 2.7 over the course of the 1994 growing season. 'Primadonna' was rated only 2 in June and July but 4 in August.

Gazanias

Gazanias were provided by Benary. The seeds were sown on February 14, and seedlings were transplanted on March 5. The plants were green when planted to the field. These two cultivars were evaluated in 1993. Comparing the results, the 1994 plants received higher visual ratings than the 1993 plants (average visual rating of 3.5 for both cultivars). Plants were also larger in 1994: 32 to 34 cm versus 26 cm in 1993 and 25 to 26 cm versus 19 cm in 1993 for plant width. The difference in plant size can be attributed to the drier and warmer growing season in 1994 as compared to the 1993 growing season. Gazanias should be planted tighter than 12-inch centers.

Table 3a. Visual ratings of gazanias grown in full sun at Wichita and Hays.

Cultivar	Wichita			Hays			Avg
	JU	JY	AU	JU	JY	AU	
Talent Mix	3.5	4.0	3.0	5.0	5.0	5.0	4.3
Talent Yellow	3.0	4.0	3.0	2.0	3.0	5.0	3.3

Table 3b. Height and width of gazanias (measured in August) grown in full sun in Wichita and Hays.

Cultivar	Height (cm)			Width (cm)		
	Wichita	Hays	Avg	Wichita	Hays	Avg.
Talent Mix	23.0	30.0	26.5	30.0	34.0	32.0
Talent Yellow	21.0	29.0	25.0	38.0	30.0	34.0

Geraniums, Seed

All cultivars but the Avanti series (Clause) were sown between February 14 through the 18. The Avanti series was sown on March 16. Transplanting of seedlings varied: the Dynamo series (Sluis & Groot) was transplanted on February 24; the Pinto series (Sluis & Groot) was transplanted on February 25; the Elite (Goldsmith) cultivars, Orange Appeal (Goldsmith), the Orbit (Goldsmith) cultivars, and Ringo 2000 (Sluis & Groot) cultivars were transplanted on March 2; the Glamour (Ball) series was transplanted on March 5; and the Avanti and Signal (Clause) series were transplanted on March 30. All seed geranium cultivars were green when planted to the field.

Overall plant performance was better in 1994 than in 1993, when comparing the visual ratings for the various cultivar series. All but five cultivars ('Avanti Lilac Rose', 'Dynamo Deep Scarlet', 'Glamour Rose Pink', 'Glamour Scarlet', and 'Glamour White') received at least an acceptable rating of 3.0. No cultivar received an average visual rating over 3.6. The overall visual ratings for the Glamour cultivars might have been biased, because these plants were more compact in comparison to the other seed geraniums.

Table 4a. Visual ratings of geraniums grown in full sun in Manhattan, Hays, and Wichita.

Cultivar	Manhattan			Hays			Wichita			Avg.
	JU	JY	AU	JU	JY	AU	JU	JY	AU	
Avanti Series										
Cherry	2.0			4.0	4.0	3.0	3.0	3.0	2.5	3.1
Lilac Rose	2.0			3.0	3.0	3.0	3.0	3.0	2.5	2.8
Red	2.0			4.0	4.0	4.0	3.0	3.0	2.5	3.3
Dynamo Series										
Rose	2.0			4.0	4.0	4.0	3.0	3.5	3.0	3.4
Salmon	2.0			4.0	4.0	4.0	3.5	3.5	2.5	3.4
Deep Scarlet	1.0			4.0	4.0	3.0	3.5	3.0	2.0	2.9
White	1.5		3.0	4.0	4.0	4.0	2.5	3.0	3.0	3.3
Elite Series										
Pink	3.0	2.5		4.0	4.0	4.0	3.0	3.5	3.0	3.4
Red	3.0	3.0		4.0	4.0	4.0	3.0	4.0	4.0	3.6
White	2.5		2.0	4.0	3.0	4.0	2.5	3.5	3.0	3.1
Glamour Series										
Rose Pink	2.5			4.0	5.0	4.0	2.5	2.0	1.5	2.4
Light Salmon	2.5		3.0	4.0	4.0	4.0	2.5	3.0	3.0	3.3
Scarlet	1.5			4.0	3.0	4.0	2.5	2.0	1.5	2.6
White(exper.)	1.5		3.0	4.0	4.0	4.0	2.5	2.5	2.0	2.9
Orange Appeal	3.0	3.0	3.5	4.0	4.0	4.0	3.0	3.0	2.5	3.3

Table 4a. Visual ratings of geraniums grown in full sun in Manhattan, Hays, and Wichita. (continued)

Cultivar	Manhattan			Hays			Wichita			Avg
	JU	JY	AU	JU	JY	AU	JU	JY	AU	
Orbit Series										
Cardinal	2.0		3.0	4.0	4.0	4.0	2.5	2.5	2.5	3.1
Rose	2.0		3.0	4.0	4.0	4.0	3.0	3.5	2.5	3.3
Deep Salmon	2.0		3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.2
Violet	1.5		2.5	4.0	4.0	3.0	3.0	3.0	3.0	3.0
White	2.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0	3.2
Pinto Series										
Rose	3.0	3.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	3.6
Salmon	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.5	3.5	3.5
Scarlet	2.5	3.0	3.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5
Violet	3.0	3.0	3.5	4.0	4.0	4.0	3.0	3.5	3.5	3.5
White	3.0	3.0	2.0	4.0	4.0	4.0	2.5	3.5	3.5	3.3
Ringo 2000 Series										
Rose	3.0	3.0	3.0	4.0	4.0	4.0	3.0	2.5	3.0	3.3
Salmon	3.5	3.0	3.0	4.0	3.0	4.0	3.0	2.5	3.0	3.2
Deep Scarlet	2.5	3.0	3.0	4.0	4.0	4.0	3.0	2.5	2.5	3.2
Violet	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.5	3.0	3.4
White	3.5	3.0	4.0	4.0	4.0	4.0	3.0	3.5	3.5	3.6
Signal Series										
Orange	2.5	2.5	3.5	4.0	3.0	3.0	3.0	3.5	3.5	3.2
Bicolor Red	3.0	3.0	4.0	4.0	3.0	3.0	3.0	3.5	4.0	3.4

Table 4b. Height and width (measured in August) of geraniums grown in full sun in Manhattan (Man.), Hays, and Wichita (Wic.).

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Avanti Series								
Cherry		35.0	17.0	26.0	10.3	30.0	26.0	22.1
Lilac Rose		20.0	17.0	18.5	12.0	25.0	24.0	20.3
Red		47.0	18.0	32.5	14.0	45.0	26.o	28.3
Dynamo Series								
Rose		27.0	24.0	25.5	18.3	28.0	23.0	23.1
Salmon		31.0	23.0	27.0	15.3	29.0	25.0	23.1
Deep Scarlet		27.0	21.0	24.0	14.7	25.0	20.0	19.9
White	20.3	34.0	25.0	27.8	20.3	33.0	23.0	25.4
Elite Series								
Pink		30.0	24.0	27.0	12.0	34.0	23.0	23.0
Red		30.0	32.0	31.0	23.0	34.0	40.0	32.3
White	18.0	30.0	30.0	27.2	18.0	30.0	31.0	26.3

Table 4b. Height and width (measured in August) of geraniums grown in full sun in Manhattan (Man.), Hays, and Wichita (Wic.). (continued)

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Glamour Series								
Rose Pink		25.0	21.0	23.0	13.7	30.0	21.0	36.1
Light Salmon	21.3	34.0	24.0	29.4	21.3	35.0	23.0	26.4
Scarlet		35.0	22.0	28.5	18.0	30.0	18.0	22.0
White(exper.)	22.3	28.0	21.0	24.0	22.3	36.0	24.0	27.4
Orange Appeal	26.0	33.0	22.0	27.2	26.0	43.0	26.0	31.7
Orbit Series								
Cardinal	15.0	36.0	23.0	26.0	15.0	33.0	28.0	25.3
Rose	21.7	33.0	27.0	29.4	21.7	23.0	27.0	23.9
Deep Salmon	24.7	30.0	28.0	27.4	24.7	36.0	25.0	28.6
Violet	18.0	28.0	27.0	24.7	18.0	30.0	24.0	24.0
White	27.7	42.0	20.0	31.0	27.7	39.0	26.0	30.9
Pinto Series								
Rose	21.0	39.0	30.0	32.2	21.0	38.0	34.0	31.0
Salmon	26.3	38.0	24.0	30.4	26.3	39.0	27.0	30.8
Scarlet	22.3	42.0	23.0	30.4	22.3	40.0	26.0	29.4
Violet	28.0	40.0	31.0	33.4	28.0	35.0	26.0	29.7
White	21.0	42.0	23.0	29.2	21.0	39.0	31.0	30.0
Ringo 2000 Series								
Rose	23.0	35.0	20.0	27.8	23.0	30.0	24.0	25.7
Salmon	25.0	30.0	24.0	27.2	25.0	30.0	21.0	25.3
Deep Scarlet	27.3	35.0	21.0	28.8	27.3	35.0	24.0	28.8
Violet	24.3	37.0	25.0	30.4	24.3	40.0	21.0	28.4
White	23.3	32.0	29.0	29.9	23.3	37.0	31.0	30.4
Signal Series								
Orange	22.7	27.0	27.0	26.8	22.7	31.0	28.0	27.2
Bicolor Red	26.3	28.0	25.0	27.3	26.3	27.0	35.0	29.4

Geraniums, Zonal

The Americana and Eclipse cultivars were provided by Goldsmith. The others are some of the Selects cultivars produced by Ecke Ranch. Upon receipt on March 30, the rooted cuttings were planted into 4-inch pots. They did not receive any growth regulator treatment.

All of the Selects cultivars except 'Ganymed' and 'Greco' received at least an average overall visual rating of acceptable. Many of the Americana cultivars did not perform as well as the Selects cultivars. The reduction in overall visual rating of many of the Americana cultivars can be attributed to poorer performance in Wichita, where the preemergent herbicide XL 2G was used. Sensitivity of geraniums to this herbicide is evident from the reduced height and width of those plants grown in Wichita as compared to those grown in Hays. Figures for cultivars grown in Manhattan are not presented because of damage caused by this herbicide. Examining only the data from Hays shows that all zonal geranium cultivars tested performed well. No single outstanding cultivar was outstanding.

Table 5a. Visual ratings of zonal geraniums grown in full sun at Wichita and Hays.

	Hays			Wichita			
Cultivar	JU	JY	AU	JU	JY	AU	Avg.
Selects Cultivars							
Anabel	4.0	4.0	4.0	3.0	3.5	3.0	3.6
Cecile	4.0	3.0	4.0	2.0	2.5	2.5	3.0
Claire	4.0	4.0	3.0	3.5	4.0	3.5	3.7
Dacapo	4.0	3.0	4.0	2.5	3.0	3.0	3.3
Ecco	4.0	3.0	4.0	2.5	3.0	2.5	3.2
Emira	4.0	4.0	4.0	3.0	4.0	3.5	3.7
Gala	4.0	4.0	4.0	3.0	4.5	4.0	3.9
Ganymed	3.0	3.0	3.0	2.0	3.0	3.5	2.9
Gomera	4.0	4.0	4.0	2.5	3.0	3.0	3.4
Greco	4.0	3.0	4.0	2.0	2.5	2.5	2.9
Greta Garbo	3.0	3.0	4.0	3.0	3.0	3.0	3.1
Guido	5.0	4.0	4.0	3.0	4.0	3.5	3.9
Americana Series							
Pink	4.0	4.0	4.0	2.0	1.5	1.5	2.8
Red	4.0	3.0	4.0	1.5	3.0	2.5	3.0
Rose	4.0	3.0	4.0	2.0	2.0	2.0	2.8
Salmon	4.0	4.0	4.0	3.0	3.5	3.0	3.6
Light Salmon	4.0	5.0	4.0	2.5	3.0	3.0	3.6
Scarlet	4.0	4.0	4.0	3.0	3.0	3.0	3.5
White	4.0	3.0	4.0	3.5	4.0	3.5	3.7
Coral				2.5	3.0	2.5	2.6
Cherry Rose				2.0	2.5	2.0	2.0
Violet				2.0	2.5	2.0	2.3
Cherry Red				1.5	2.0	2.0	2.3
Light Pink				2.5	3.0	3.0	2.8
Eclipse Series							
Red	4.0	4.0	4.0	1.5	2.5	2.0	3.0
Salmon Orange	4.0	4.0	4.0	2.0	3.0	2.0	3.2
Light Salmon	4.0	4.0	4.0	2.5	3.5	3.0	3.5
White				1.5	2.0	1.5	1.8

Table 5b. Height and width of zonal geraniums grown in full sun in Wichita (Wic.) and Hays.

	Height (cm)			Width (cm)		
Cultivar	Hays	Wic.	Avg.	Hays	Wic.	Avg.
Selects Cultivars						
Anabel	30.0	18.0	24.0	40.0	28.0	34.0
Cecile	30.0	16.0	23.0	30.0	25.0	27.5
Claire	23.0	17.0	20.0	25.0	26.0	25.5
Dacapo	27.0	16.0	21.5	21.0	22.0	21.5
Ecco	23.0	16.0	19.5	25.0	19.0	22.0
Emira	30.0	19.0	24.5	20.0	22.0	21.0
Gala	28.0	17.0	22.5	20.0	28.0	24.0
Ganymed	18.0	16.0	17.0	20.0	23.0	21.5
Gomera	27.0	12.0	19.5	28.0	21.0	24.5
Greco	20.0	14.0	17.0	24.0	22.0	23.0
Greta Garbo	27.0	14.0	20.5	24.0	23.0	23.5
Guido	24.0	16.0	20.0	24.0	23.0	23.5
Americana Series						
Pink	34.0	15.0	24.5	35.0	21.0	28.0
Red	27.0	16.0	21.5	29.0	24.0	26.5
Rose	23.0	15.0	19.0	26.0	17.0	21.5
Salmon	26.0	14.0	20.0	25.0	26.0	25.5
Light Salmon	25.0	21.0	23.0	40.0	28.0	34.0
Scarlet	28.0	20.0	24.0	26.0	24.0	25.0
White	30.0	20.0	25.0	20.0	29.0	24.5
Coral		13.0	14.7		20.0	18.0
Cherry Rose		14.0	13.2		21.0	17.2
Violet		15.0	14.9		19.0	16.4
Cherry Red		19.0	19.4		21.0	22.4
Light Pink		17.0	15.7		27.0	21.5
Eclipse Series						
Red	28.0	18.0	23.0	26.0	23.0	24.5
Salmon Orange	27.0	19.0	23.0	35.0	24.0	29.5
Light Salmon	27.0	22.0	24.5	30.0	33.0	31.5
White		16.0	15.4		21.0	18.0

Impatiens

The Accent (Goldsmith), Blitz 2000 (Sluis & Groot), Impulse (Sluis & Groot) and Dazzler (Ball) cultivars were sown on February 28. The Impact (Sakata) and Tiara (Clause) cultivars were sown on March 16. Transplanting was on March 30 and 31 for the early-sown cultivars; April 15 for the late-sown cultivars. Only 'Accent Red', 'Accent Violet' (improved for 1994), 'Blitz Violet', 'Impulse Lilac' 'Impulse Rose', 'Impulse Salmon', 'Impulse Violet', and 'Impulse White' were at 50% flowering when planted. The others were either budded or showing color. Overall visual ratings ranged from slightly below acceptable to slightly above acceptable (approximately 2.5 through 3.3). All cultivars covered the plots well, with the Blitz 2000, Impulse, and Accent cultivars having the greatest spread. The Impact cultivars did not have as great a spread as the others. 'Accent Red Star' did not show a stable star pattern in June. By July, this was not an evident problem.

Table 6. Visual ratings, height, and width of impatiens grown under a 50% shadehouse in Manhattan.

Cultivar	Visual Rating				Height (cm)	Width (cm)
	JU	JY	AU	Avg.		
Accent Series						
Red	3.0	3.0	3.0	3.0	30.7	38.3
Red Star	3.0	3.0	4.0	3.3	43.7	38.3
Rose	3.5	3.0	3.0	3.3	36.0	35.3
Salmon	3.0	3.0	3.0	3.0	31.3	34.0
Violet	3.0	3.5	3.0	3.1	32.7	36.0
White	3.5	3.0	3.5	3.3	27.7	34.7
Impact Series						
Blush	3.0	3.0	2.5	3.0	20.3	34.0
White	2.5	3.0	3.0	2.7	14.0	31.7
Purple	3.0	3.0	2.0	3.0	26.7	35.7
Rose	3.0	3.0	2.0	2.7	19.3	35.0
Deep Salmon	2.5	3.0	1.0	2.5	14.7	30.7
Orange	3.0	3.0	3.0	3.0	26.7	36.7
Neon Rose	2.5	3.0	3.0	2.8	18.3	33.0
Red	3.0	2.5	3.0	2.8	23.0	30.3
Blitz 2000 Series						
Red	3.5	3.0	3.5	3.3	37.0	38.7
Rose	3.0	3.0	3.5	3.2	39.0	44.7
Salmon	3.0	3.0	3.0	3.0	34.0	42.7
Violet	3.0	3.5	3.0	3.2	34.3	48.0
White	2.5	3.0	3.0	2.8	22.0	38.7
Dazzler Bright Eye	3.0	3.0	3.5	3.2	29.0	36.7
Impulse Series						
Appleblossom	3.0	3.0	3.0	3.0	26.3	41.3
White	2.5	3.0	3.0	2.8	22.3	38.3
Violet	3.0	3.5	3.0	3.2	34.0	47.3
Rose	2.5	3.5	2.0	2.7	24.7	34.7
Salmon	2.5	3.0	1.0	2.2	18.3	31.3
Lilac	3.0	3.0	3.0	3.0	20.7	28.7
Tiara Rose Picotee	3.0	3.0	3.0	3.0	24.0	40.7

African Marigolds

New this year is the Antigua series from Goldsmith. Others planted in the trials were the Excel (Goldsmith), Inca (Goldsmith), and Zenith (Clause; triploids) cultivars. All cultivars were sown directly into the bedding plant trays on April 2. At planting, the Antigua, Excel, and Inca cultivars were green. The Zeniths either were showing color or were budded.

The Antigua cultivars are reportedly day neutral and compact and earlier flowering than other African or American marigolds. In the field, they proved to be shorter than the Excel and Inca cultivars. The Antigua cultivars have about the same spread as the Excel cultivars but much less than the Inca cultivars. Flower size for the Antigua cultivars is comparable to that of the Inca cultivars. The Antigua series provides a good alternative to the Inca marigolds for tight spaces or where less height is needed.

Table 7a. Visual ratings of African marigolds grown in full sun at Manhattan, Hays, and Wichita.

Cultivar	Manhattan			Hays			Wichita			Avg.
	JUL	JLY	AUG	JUL	JLY	AUG	JUL	JLY	AUG	
Antigua Series										
Gold	3.5	4.0	4.5	5.0	5.0	5.0	3.5	4.0	4.0	4.3
Orange	3.0	3.5	4.5	5.0	5.0	5.0	3.5	4.0	4.0	4.2
Yellow	3.0	3.5	4.5	5.0	5.0	5.0	3.5	4.0	3.5	3.9
Excel Series										
Gold	3.0	3.5	4.0	5.0	5.0	4.0	3.0	4.0	4.0	3.9
Orange	3.0	3.5	4.0	5.0	5.0	5.0	3.5	3.5	3.5	4.0
Yellow	3.5	4.0	4.0	5.0	5.0	5.0	2.5	3.5	4.0	4.1
Inca Series										
Gold	3.0	4.0	4.0	5.0	5.0	4.0	4.0	4.0	4.0	4.1
Orange	3.0	4.0	4.0	5.0	5.0	5.0	3.5	3.5	3.5	4.1
Yellow	2.5	4.0	4.0	5.0	5.0	5.0	4.0	4.5	4.5	4.2
Zenith Series										
Orange	3.0	2.5	4.0	5.0	5.0	5.0	3.0	3.5	3.0	3.8
Red & Gold	3.0	3.0	3.5	5.0	5.0	5.0	3.5	4.0	3.0	3.9
Orange & Red	2.5	2.5	2.5	4.0	5.0	4.0	3.0	3.0	3.0	3.3
Yellow	3.5	3.0	3.0	5.0	5.0	3.0	3.5	3.0	3.5	3.6
Golden Yellow	3.0	4.0	3.0	5.0	5.0	4.0	4.0	4.5	4.0	4.1
Lemon Yellow	3.0	3.0	3.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0

Table 7b. Height(cm) and width(cm) of African marigolds grown in full sun at Manhattan (Man.), Hays, and Wichita (Wic.).

Cultivar	Height				Width			
	Man.	Hays.	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Antigua Series								
Gold	46.3	48.0	43.0	45.8	49.0	50.0	56.0	68.0
Orange	40.7	40.0	32.0	37.6	40.7	35.0	45.0	40.2
Yellow	37.0	30.0	29.0	32.0	41.0	31.0	41.0	37.7
Excel Series								
Gold	47.7	60.0	36.0	47.9	56.7	50.0	53.0	53.2
Orange	57.3	68.0	43.0	56.1	48.0	55.0	65.0	56.0
Yellow	59.3	52.0	31.0	47.4	46.0	50.0	52.0	49.3
Inca Series								
Gold	76.3	60.0	50.0	62.1	78.0	50.0	70.0	66.0
Orange	75.3	60.0	45.0	60.1	68.0	60.0	53.0	60.3
Yellow	65.0	73.0	53.0	63.7	61.0	69.0	55.0	61.7

Table 7b. Height(cm) and width(cm) of African marigolds grown in full sun at Manhattan (Man.), Hays, and Wichita (Wic.). (continued)

Cultivar	Height				Width			
	Man.	Hays.	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Zenith Series								
Orange	40.7	40.0	23.0	34.6	44.0	25.0	48.0	39.0
Red & Gold	38.0	59.0	28.0	41.7	28.0	35.0	72.0	45.0
Orange & Red	25.0	27.0	22.0	24.7	24.3	37.0	45.0	35.4
Yellow	45.7	45.0	34.0	41.6	35.3	38.0	69.0	47,4
Golden Yellow	38.0	49.0	24.0	37.0	36.0	35.0	60.0	43.7
Lemon Yellow	39.0	50.0	25.0	38.0	35.3	47.0	48.0	43.4

French Marigolds

The French marigolds were sown directly into bedding plant flats on April 3. Both cultivar series were provided by Goldsmith. 'Aurora Orange', 'Aurora Red', and 'Janie Spry' have not been evaluated previously. These new introductions were comparable to others in the series that had been tested previously in Kansas. Comparison to 1993 results indicates consistent performance between the two growing seasons. 'Janie Spry' is a compact, deep red and golden yellow bicolor.

Table 8a. Visual ratings of French marigolds grown in full sun at Manhattan, Hays, and Wichita.

Cultivar	Manhattan			Hays			Wichita			Avg.
	JU	JY	AU	JU	JY	AU	JU	JY	AU	
Aurora Series										
Gold	3.0	4.0	4.5	5.0	5.0	5.0	3.5	4.5	4.0	4.3
Orange	3.0	3.0	4.5	4.0	5.0	5.0	3.0	4.0	3.5	3.9
Red	3.0	4.0	3.0	4.0	4.0	5.0	4.0	3.5	2.0	3.6
Janie Series										
Flame	3.5	3.0	2.5	5.0	5.0	5.0	3.0	4.0	4.0	3.9
Deep Orange	3.5	3.0	2.5	4.0	4.0	5.0	2.5	4.0	4.0	3.6
Spry	2.5	3.0	2.5	4.0	4.0	4.0	2.5	3.5	4.0	3.3

Table 8b. Height (cm) and width (cm) of French marigolds grown in full sun at Manhattan (Man.), Hays, and Wichita (Wic.).

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Aurora Series								
Gold	47.3	40.0	42.0	43.1	45.7	45.0	57.0	49.2
Orange	40.7	37.0	33.0	36.9	46.7	36.0	42.0	41.6
Red	42.0	41.0	35.0	39.3	44.0	40.0	59.0	47.7

Table 8b. Height (cm) and width (cm) of French marigolds grown in full sun at Manhattan (Man.), Hays, and Wichita (Wic.). (continued)

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Janie Series								
Flame	34.3	42.0	34.0	36.8	35.3	36.0	58.0	43.1
Deep Orange	35.7	34.0	25.0	31.6	34.3	35.0	40.0	36.4
Spry	25.7	30.0	29.0	28.2	26.0	25.0	49.0	33.3

Multiflora Petunias

The Madness (Ball), Polo (Sluis & Groot), and Primetime (Goldsmith) cultivars were sown on March 9 and transplanted between April 1 and 6. The Horizon (Clause) and Merlin (Sakata) cultivars were sown on March 16 and transplanted on April 20. All but the Primetime series [50% flowering: 'Primetime Pink' (May 9) and 'Primetime Lavender' (May 11); other Primetime colors were budded] were planted green.

The Merlin series had not been evaluated previously. These cultivars behaved similarly to the other cultivar series. Overall visual rating for 'Merlin Red' was reduced because of low June ratings in Manhattan and Wichita. All other cultivars received acceptable to above acceptable ratings, with 'Primetime Blue', 'Primetime Midblue', 'Primetime Lavender', and 'Primetime Red' all receiving above acceptable ratings (greater than 4.0).

Table 9a. Visual ratings of multiflora petunias grown in full sun at Manhattan, Hays, and Wichita.

Cultivar	Man.			Hays			Wichita			Avg.
	JU	JY	AU	JU	JY	AU	JU	JY	AU	
Horizon Series										
Flame	2.0	3.0	2.0	3.0	4.0	5.0	2.0	3.0	3.0	3.0
Rose Halo	2.0	3.0	2.0	3.0	4.0	3.0	3.0	3.5	3.5	3.0
Deep Rose	3.0	3.5	2.0	3.0	4.0	5.0				3.4
Light Salmon	3.5	3.5	2.0	4.0	3.0	2.0	3.0	3.5	4.0	3.2
Madness Rose Impr	3.0	3.0	2.0	4.0	4.0	4.0	3.5	4.0	4.0	3.6
Double Madness Rose	2.0	3.0	2.0	5.0	5.0	5.0	3.0	3.0	3.0	3.4
Merlin Series										
Blue			2.0	3.0	5.0	5.0	2.5	3.0	3.0	3.4
Pink	2.0	2.5	2.0	3.0	5.0	5.0	2.5	3.5	3.0	3.2
Red	1.0	2.0	2.0	4.0	4.0	3.0	1.5	2.0	2.0	2.4
Salmon	3.5	3.0	2.5	4.0	4.0	4.0	3.0	4.0	3.5	3.5
White	3.0	3.0	3.0	5.0	5.0	5.0	3.0	4.0	4.0	3.8
Polo Mix	2.0	3.0	2.0	5.0	4.0	4.0	3.5	3.0	3.0	3.3

Table 9a. Visual ratings of multiflora petunias grown in full sun at Manhattan, Hays, and Wichita. (contd)

Cultivar	Man.			Hays			Wichita			Avg.
	JU	JY	AU	JU	JY	AU	JU	JY	AU	
Primetime Series										
Blue	4.0	4.0	3.0	5.0	5.0	5.0	3.5	3.0	4.0	4.1
Midblue	4.0	4.0	3.0	5.0	5.0	5.0	3.5	3.03	4.0	4.1
Carmine	3.0	3.0	3.0	5.0	5.0	5.0	3.5	0	3.5	3.8
Lavender	4.0	4.0	3.0	5.0	5.0	5.0	3.5	3.5	4.0	4.1
Pink	3.0	3.0	3.0	5.0	5.0	4.0	3.5	4.0	3.3	3.8
Pink Morn	3.5	3.5	3.0	4.0	4.0	2.0	3.0	3.0	3.0	3.2
Red				4.0	4.0	4.0				4.0
Salmon	3.0	3.0	3.0	4.0	4.0	5.0				3.7
Salmon Morn	4.0	4.0	4.0	5.0	5.0	4.0	3.0	3.0	3.0	3.9
Scarlet	3.0	3.0	3.0	4.0	4.0	4.0	2.5	2.5	2.5	3.0

Table 9b. Height (cm) and width (cm) of multiflora petunias grown in full sun at Manhattan (Man.), Hays, and Wichita (Wic.).

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Horizon Series								
Flame	27.7	35.3	20.0	27.6	27.3	A	43.0	35.2
Rose Halo	32.3	24.0	23.0	26.4	32.0	24.0	53.0	36.3
Deep Rose	29.3	30.0		29.7	32.7	A		32.7
Light Salmon	31.3	20.0	16.0	22.4	33.3	A	51.0	42.2
Madness Rose Impr.	30.7	30.0	21.0	27.2	36.3	A	56.0	46.2
Double Madness Rose	31.3	33.0	22.0	28.8	35.0	A	50.0	42.5
Merlin Series								
Blue		45.0	23.0	34.0		A	54.0	54.0
Pink	23.0	25.0	20.0	22.7	20.0	A	50.0	35.0
Red	18.3	37.0	26.0	27.1	20.7	A	32.0	26.4
Salmon	30.0	30.0	17.0	25.7	26.7	A	50.0	38.4
White	39.0	36.0	18.0	31.0	33.0	A	69.0	51.0
Polo Mix	29.0	36.0	19.0	28.0	35.3	A	44.0	39.7
Primetime Series								
Blue	46.3	32.0	30.0	36.1	49.0	A	55.0	52.0
Midblue	45.3	45.0	34.0	41.4	43.0	A	58.0	50.5
Carmine	39.3	42.0	36.0	39.1	43.3	A	68.0	55.7
Lavender	49.7	45.0	35.0	43.2	45.0	A	63.0	54.0
Pink	32.3	35.0	30.0	32.4	29.3	A	64.0	46.7
Pink Morn	32.7	37.0	24.0	32.2	35.0	A	54.0	44.5
Red		36.0		36.0		A		
Salmon	31.7	30.0		30.9	32.7	A		32.7
Salmon Mom	44.7	42.0	30.0	38.9	39.3	A	49.0	44.2
Scarlet	32.7	30.0	22.0	28.2	39.0	A	35.0	37.0

Salvia

'Cover Girl' (Benary), 'Marbella' (Elidia, new for 1995), 'Maestro' (Clause), and the Sizzler series (Clause) were evaluated. 'Cover Girl' was sown on February 28, transplanted on March 30, and was at 50% flowering on May 9. 'Marbella' was sown on March 9 and transplanted on March 30. The other cultivars were sown on March 16 and transplanted on April 15. All of these cultivars were showing color when planted to the field on 8-inch centers. This tighter spacing is appropriate for these more compact cultivars. 'Marbella' is a mix of white, salmon, pink, rose, scarlet, and velvet. 'Sizzler Purple' is an addition to the Sizzler series; the salmon and white cultivars are improvements.

These salvia cultivars did well at Manhattan. They tended to decline during the summer months at Wichita. 'Sizzler Salmon' received less than acceptable visual ratings at Hays. Plant size was acceptable, with plants providing good coverage of the bed area by the end of the growing season.

Table l0a. Visual ratings of salvias grown in shade at Manhattan and partial shade at Wichita and Hays,

	Manhattan			Hays			Wichita			
Cultivar	JU	JY	AU	JU	JY	AU	JU	JY	AU	Avg.
Cover Girl	4.0	4.0	4.0	2.0	3.0	4.0				3.5
Maestro	3.5	4.0	3.0	3.0	3.0	5.0	3.5	2.5	2.0	3.3
Marbella	3.0	3.5	3.0	3.0	3.0	4.0	3.0	2.5	2.5	3.1
Sizzler Series										
Burgundy	3.5	3.5	3.0	2.0	3.0	3.0	3.5	2.5	2.0	2.9
Purple	3.0	3.5	2.5	2.0	3.0	4.0				3.0
Red	3.5	4.0	4.0	3.0	3.0	4.0				3.6
Salmon	3.0	4.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0	2.8
White	4.0	4.0	3.0	2.0	3.0	4.0	3.5	4.0	3.5	3.4

Table 10b. Height and width for salvia grown under shade in Manhattan (Man.) and partial shade in Hays and Wichita (Wic.).

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Cover Girl	49.0	31.0		40.0	43.3	26.0		37.2
Maestro	41.3	34.0	15.0	30.1	32.0	27.0	25.0	28.0
Marbella	39.0	35.0	26.0	33.3	36.0	25.0	25.0	28.7
Sizzler Series								
Burgundy	43.0	32.0	35.0	36.7	35.3	23.0	21.0	26.4
Purple	36.7	40.0		38.4	25.7	45.0		35.4
Red	48.3	18.0		33.2	47.0	10.0		28.5
Salmon	47.7	25.0	27.0	33.2	41.7	21.0	27.0	29.9
White	46.0	32.0	31.0	36.3	45.7	23.0	30.0	32.9

Snapdragons

New for the 1994 trials are the Bells and Chimes Mixtures from Goldsmith. Sluis & Groot supplied 'Tahiti Mix', and Goldsmith supplied 'Liberty Mix.' These latter two cultivars have been evaluated in past years. Seeds for all cultivars were sown on March 16, and seedlings were transplanted on April 20. 'Chimes Mix' was budded when planted to the beds. The others were green. All were planted on 8-inch centers under 50% shade. By August, only 'Liberty Mix' received an acceptable rating.

Table 11. Visual ratings, width (cm), and height (cm) of snapdragons grown in the shade at Manhattan

	Visual Ratings					
Cultivar	JU	JY	AU	Avg.	Height	Width
Bells Mixture	3.0	3.0	2.0	2.7	20.0	24.0
Chimes Mix	3.0	3.0	2.0	2.7	23.0	A
Liberty Mixture	3.0	3.0	3.0	3.0	41.3	26.0
Tahiti Mix	3.0	3.5	2.5	3.0	24.3	32.3

Sunflowers

Sunflower cultivars were sown directly into bedding plant flats on April 29. 'Sonja' (Benary) is a new introduction for 1995. Sakata supplied 'Sunbeam' and 'Sunbright'. 'Sonja' branches and produces numerous flowers suitable for cutting. The flowers on 'Sonja' were smaller than those on 'Sunbeam' and 'Sunbright'. 'Sunbeam' and 'Sunbright' were just coming into bloom during the third week of July when the visual rating was taken in Manhattan. All three cultivars performed extremely well. Towards the end of the season, on those that did not receive regular deadheading, the visual rating was reduced. By late September, the sunflower cultivars were dead.

Table 12a. Visual ratings of sunflowers grown in full sun at Manhattan, Hays, and Wichita.

	Manhattan			Hays			Wichita			
Cultivar	JU	JY	AU	JU	JY	AU	JU	JY	AU	Avg.
Sonja	3.5	4.0	4.0	5.0	5.0	3.0	3.0	3.0	1.5	3.6
Sunbeam	4.0	4.0	4.0	5.0	5.0	5.0	4.0	4.5	3.0	4.3
Sunbright	4.0	4.0	4.0	5.0	5.0	4.0	3.5	4.0	4.5	4.2

Table 12b. Height (cm) and width (cm) of sunflowers grown in full sun at Manhattan, Hays, and Wichita.

Cultivar	Height				Width			
	Man.	Hays	Wic.	Avg.	Man.	Hays	Wic.	Avg.
Sonja	105.3	90.0	54.0	83.1	43.0	20.0	85.0	49.3
Sunbeam	150.0	128.0	61.0	113.0	41.3	50.0	140.0	77.1
Sunbright	187.3	150.0	67.0	134.8	44.7	60.0	185.0	96.6

Zinnia

Zinnias were sown on April 3 and transplanted on April 15. Seeds were provided by Goldsmith Seeds. These mixes did very well in Hays during the 1994 summer. Disease problems were minimal, and the plants performed well. 'Short Stuff' lived up to its name, being half the height of 'Peter Pan.' Plant width for both cultivars was acceptable for flower beds. Landscape contractors wanting a more "instant" landscape effect should plant these tighter than 12-inches apart to achieve more rapid coverage. At 33 to 38 cm (13 to 15 inches), it took longer than desired to get complete coverage. We recommend a maximum of 10-inch spacing. Less space would work in areas of good air circulation to minimize foliage disease problems.

Table 13. Visual ratings, height and width of zinnia cultivars grown in Hays.

Cultivar	JU	JY	AU	Avg.	Height (cm)	Width (cm)
Peter Pan Mix	5.0	5.0	5.0	5.0	52.0	38.0
Short Stuff Mix	5.0	4.0	4.0	4.3	27.0	33.0

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