

1995 Edition

CULTIVAR TRIALS

OF BEDDING PLANTS

UNIVERSITY OF MINNESOTA

Horticulture Research



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1995 EDITION

CULTIVAR TRIALS OF BEDDING PLANTS



Test locations for the cultivar trials reported in this publication.

Continued growth of over 15 percent per year has marked the bedding plant industry since 1978. On the wholesale level, producing annuals and perennials has become a billion-dollar business nationally. The University of Minnesota supports this growing industry in Minnesota in various ways, among which are the cultivar trials conducted on Minnesota Agricultural Experiment Stations at Morris, St. Paul, and Grand Rapids.

At these sites, new and old cultivars are grown from seed donated by seed companies, planted out, and rated periodically for field performance. The gardens are open to the public and industry for self-guided tours throughout the growing season, providing a unique opportunity to compare performance of bedding plant cultivars under regional conditions.

In this publication, results from all three sites are summarized. The data reflect the growing conditions at each site during 1994 only; cultivars may have performed quite differently in previous years. For results from earlier trials, contact the site supervisor directly, or obtain earlier editions of this publication from the MES Distribution Center. Not all years may be available.

All-America Selections

Each test site is a designated All-America Selections Display Garden, joining the Minnesota Landscape Arboretum at Chanhassen in that honor. The All-America Selections organization, founded in 1932, tests new cultivars and introduces those with superior performance to the horticultural public. Winners are selected on the basis of trials in official AAS Trial Gardens and are readily available from retail seed companies. As official AAS Display Gardens, each Minnesota site grows the current year's winners as well as past selections. Our trial grounds allow comparison between these national winners and local favorites.

Rating the Cultivars

Bedding plants are grown for the ornamental value of their foliage and flowers. In rating cultivars entered in the trials conducted by the Minnesota Agricultural Experiment Station, the two aspects of foliage and flowers are each rated independently on a 1 to 10 scale where 1 = poor and 10 = very good. The values are averaged to create an overall quality rating of 1 to 10. An exception is made for plants such as kale which are grown for foliage only. In those, the vegetative rating is simply recorded.

Ratings are taken several times during the growing season, typically mid-July, mid-August, and mid-September. The objective is to assess quality over the growing season, so the actual dates vary per site to accommodate differences in climate. Care should be taken when studying the ratings for herbaceous perennial bedding plants. Most perennials do not normally bloom well the first year from seed, and their lower overall ratings reflect that fact.

Plant height and flower size are measured at field maturity. Height is often less than the maximum at Grand Rapids due to the shorter growing season. Flower size is relatively unaffected by location. "Flower size" usually refers to the width of a single blossom, but in certain cases, specified in a given table's footnotes, it may mean the length of a spike (i.e., snapdragon) or width of a head (i.e., geranium).

Unlisted Cultivars

The selection of plants and cultivars to be emphasized in Minnesota's trials varies from year to year. Their selection is based on results of previous trials, on current trends and on industry recommendations. Relative performance data for many plants and cultivars not in this *Cultivar Trials of Bedding Plants* may be available in editions from other years.

Acknowledgements

Authors of this publication are Anne M. Hanchek, Steven R. Poppe, and David K. Wildung. Additional text is by Larry A. Etkin and Sharon J. Gondek.

Cultivar trials in 1994 at St. Paul, Morris, and Grand Rapids were supervised by Bradley Pedersen, Steven R. Poppe, and David K. Wildung, respectively with the help of Mark Strefeler, John Erwin, Deborah Schwarze, and Anne Hanchek. Many thanks are due station staff and Minnesota Extension Service Master Gardeners for their assistance in conducting the trials.

Thanks also to All-America Selections for information, photos and artwork on AAS winners illustrated in this publication. The cover background photo is by Dave Hansen. Other illustrations are by Tammy Nelson-Foster.

Disclaimer

Reference in this publication to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Minnesota Agricultural Experiment Station or the University of Minnesota is implied.

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TEST LOCATIONS

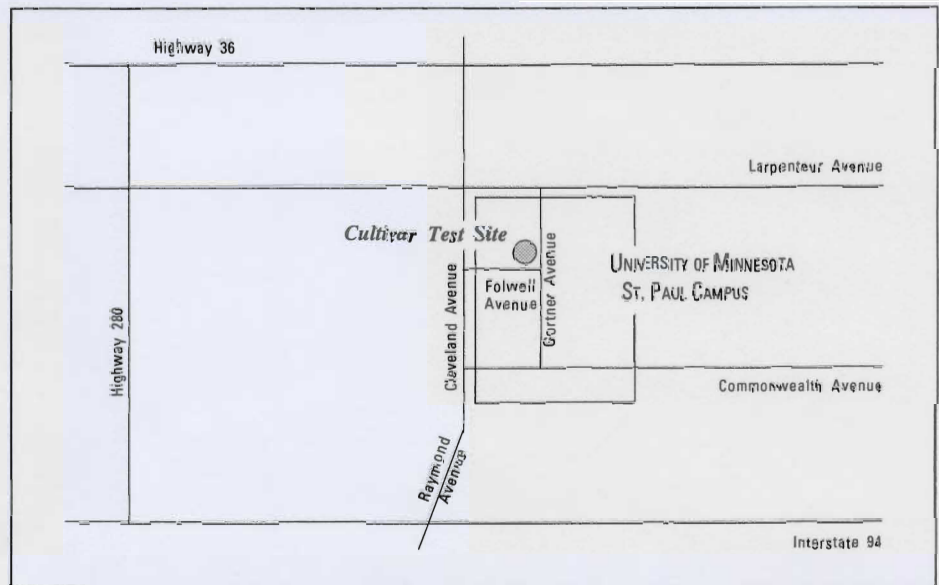
Department of Horticultural Science, Display and Trial Garden, St. Paul

A horticulture teaching and display garden was established in 1977. As its primary function, it serves as a learning laboratory for horticulture and landscape architecture students. In fact, five different undergraduate classes use it as an active part of their studies, by designing, constructing, propagating plants and planting the Garden. But as the numbers of cultivars being displayed and tested have increased over the years, the site has become increasingly popular with the public.

The Garden is located at the north end of the St. Paul Campus, between the major cluster of campus buildings and the Minnesota Agricultural Experiment Station fields, at the intersection of Gortner and Folwell Avenues. Its approximately 1.5 acres are divided between a woodland garden, a prairie garden and an annual-perennial flower garden. In 1993 and 1994, following a new master plan, the Garden took on a new look and improved function. An outdoor classroom and an extensive perennial garden were added. Additional renovations in 1995 include the installation of a sustainable landscape carrel and a turfgrass trial area to complement the ongoing annual trials.

Though the Garden is open for inspection at all times, parking in the near vicinity is limited during times when classes are in session on the campus.

In 1994, most cultivars were grown from seeds or cuttings in on-site greenhouses, seed-



ing dates varying with plant type. A few cultivars were purchased from local growers. Seedlings were transplanted to the field between May 19 and May 31. A 6-24-24 granular fertilizer was applied at planting. Several mid-season 20-20-20 liquid fertilizer applications were made. No pinching was practiced, but pest control, overhead irrigation and mechanical/hand/chemical weeding were applied as needed.

The 1994 St. Paul area growing season was 198 days, much longer than the annual 158-day average. The last spring frost was recorded on April 30 and the first fall frost on October 26. Rainfall during the growing season was 21.63 inches, which was about equal to the annual average of 21.2 inches for that period. Temperatures were 2°F above average.

West Central Experiment Station, Morris

From 1910 through 1963, the experiment station at Morris shared facilities with the West Central School of Agriculture. When that school became the University of Minnesota, Morris, the West Central Experiment Station moved to a new adjacent site.

Under the direction of the station horticulturist, plant trials that were begun before 1955 were continued at the new site. These included trials for small fruits, home garden vegetables, soil conservation plant materials and annual flower cultivars, and USDA single row field

windbreak test plantings.

More than 500 cultivars are on view at the West Central Experiment Station in a typical year. Program objectives include evaluating flower bloom, size, color, frost resistance and quality characteristics; evaluating plant growth, habit and disease characteristics; and identifying cultivars most suited for western Minnesota conditions.

All the cultivars were grown in on-site greenhouses, the seeding date varying with

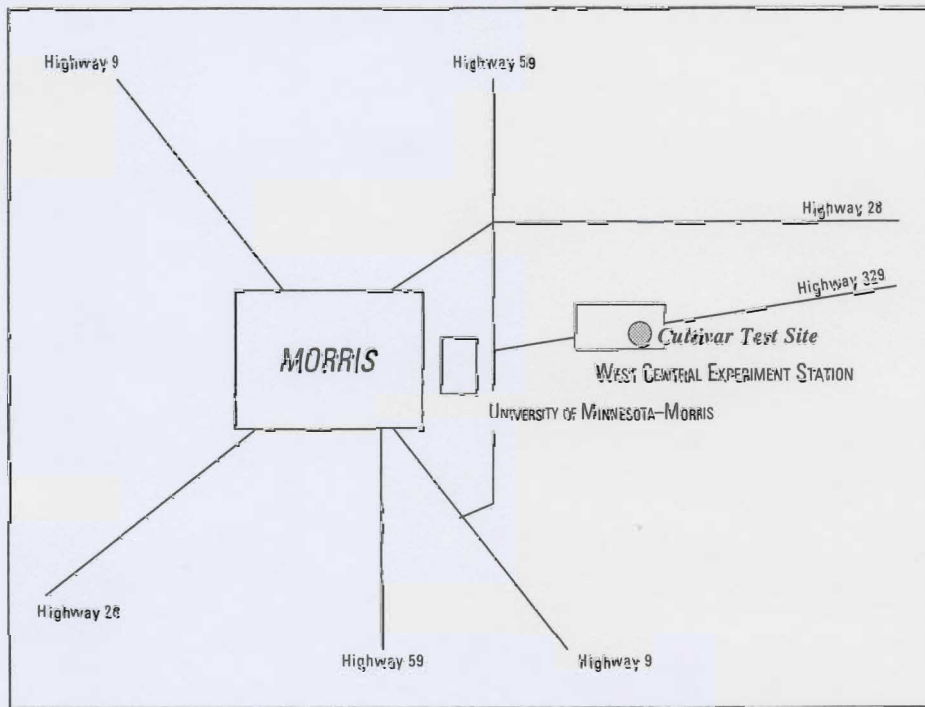
plant type. In 1994, seedlings were transplanted to the field between May 25 and June 2, into triangular beds, ten plants per plot.

Greenhouse growth and development were normal, and 1994 field performance was average. An early July wet period reduced growth and development, leading to average results on some cultivars. It caused poor plant performance in most carnations, celosia, godetia, lisianthus, lobelia and salvia. Above average ratings were given to many ageratum, begonias, pansies, petunias and all impatiens.

Ratings for *Salvia farinacea* 'Victoria' and 'Argent White' continue to be very good for the past three years.

The 1994 growing season was 173 days (average is 156 days) with the last spring frost on May 5 and the first fall frost on October 25. Rainfall between May 1 and September 30 was 13.92 inches, which was 1.73 inches below the 15.65-inch season average. Temperatures were above average in May, June and September, but below average in July and August.

An annual event at the West Central Experiment Station is Horticulture Night, usually held each year in July. For more information call (612) 589-1711 or fax (612) 589-4870.



North Central Experiment Station, Grand Rapids

In 1895, the state legislature provided funds to establish several agricultural experiment stations across Minnesota. One of the first was established in 1896 at Grand Rapids. Its first horticulturist came to the station in 1926. Early work focused on small fruits, vegetables, and an arboretum.

In recent years, work has expanded to include blueberries and commercial vegetable and fruit crops. Management studies evaluate cultural practices for optimum fruit and vegetable production in northern Minnesota. Annual flower trials began in 1965, and have become

a focal point for public tours. More than 400 cultivars are reviewed each year. Program objectives include evaluating flower bloom, size, color, frost resistance and quality characteristics; evaluating plant growth, habit and disease characteristics; and identifying cultivars suited for northern Minnesota conditions.

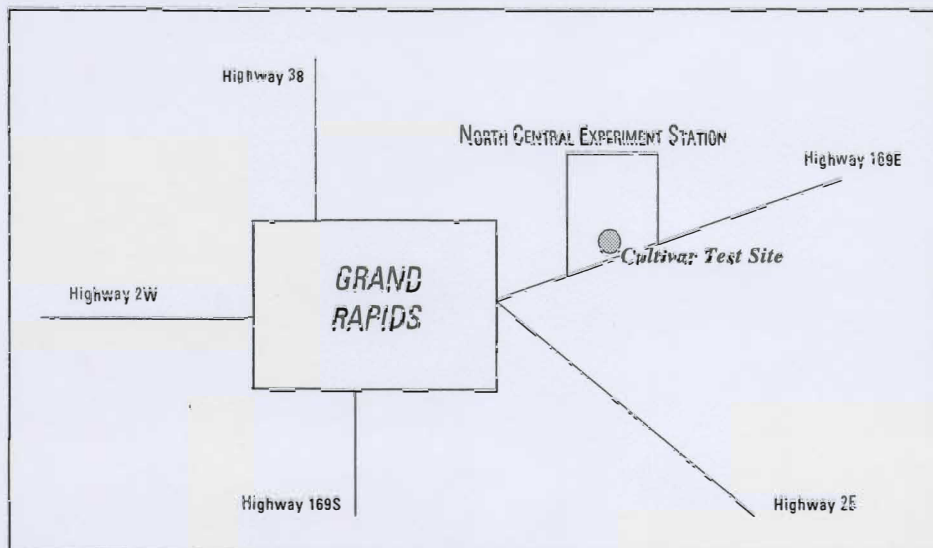
Cultivars are grown in on-site greenhouses; seeding date varies with plant type. In 1994, all seedlings were transplanted to the field between June 20 and 27, into rows 4 feet apart, with ten plants per plot 1 foot apart. Fertilizer was broadcast at planting (400 pounds per

acre of 20-10-10) as well as applied as a liquid starter drench (9-45-15). On July 6 and August 3, plots were banded with 20-10-10 at 200 pounds per acre. Insecticide was applied to marigolds, petunias and chrysanthemums (7/18, 8/4, 8/24) to control aster leafhopper. Overhead irrigation and mechanical or hand weeding was applied as needed.

Greenhouse growth and development were normal. Overall field performance was average. The wettest June on record (11.66 inches) delayed planting and early development. It also resulted in considerable disease problems. The bloom peaked in mid-August for petunias, but more frost-tolerant types like chrysanthemums continued to bloom well into late October. Kale, petunias (especially 1995 All-America Selections 'Purple Wave'), delphiniums and chrysanthemums were among the better types.

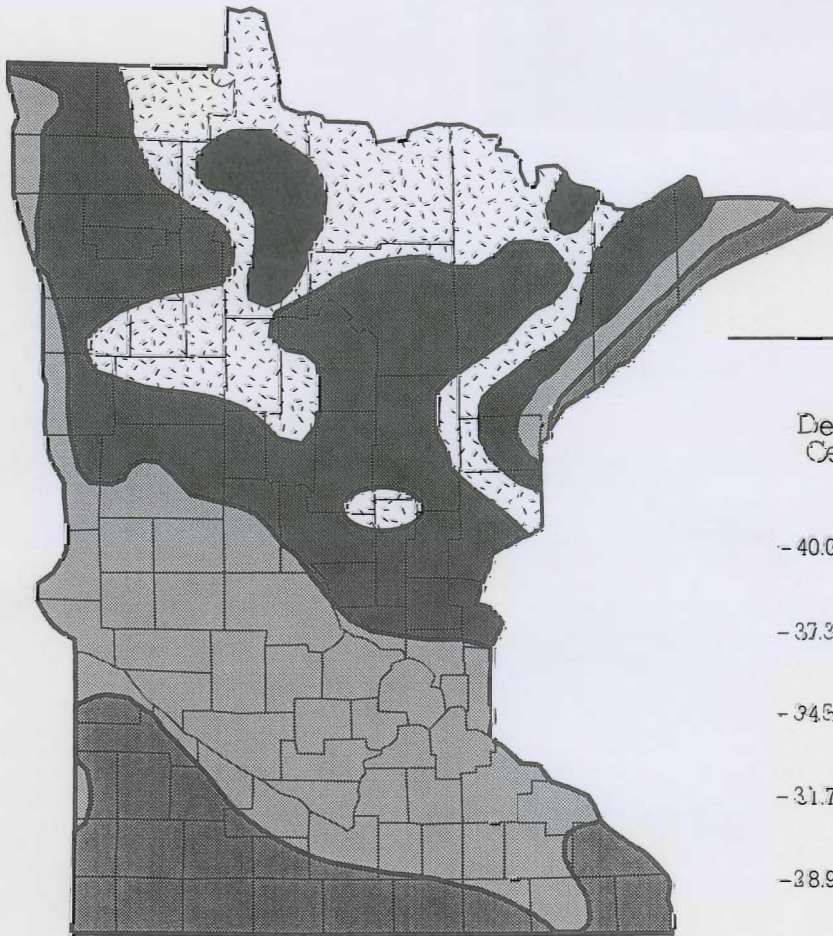
The 1994 growing season was 139 days long (average is 110 days) with the last spring frost on May 10 and the first fall frost on September 27. Rainfall between May 1 and September 30 was 20.6 inches, which was 2.6 inches above average. Temperatures were above average in June, September and October. Temperatures in July and August were slightly below average.

Events at North Central Experiment Station include Horticulture Day (the last Wednesday in August) and several special horticultural group tours. For more information call (218) 327-4490 or fax (218) 327-4126.



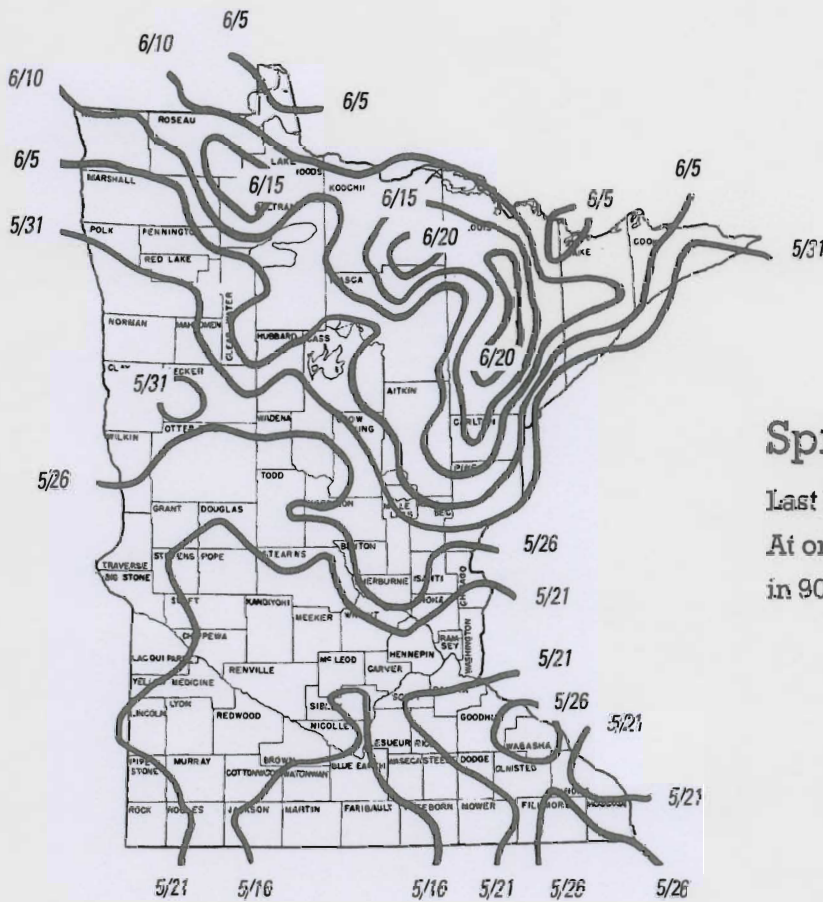
CLIMATOLOGICAL INFORMATION

United States Department of Agriculture
Plant Hardiness Zones



Average Annual Minimum Air Temperature

Degrees Celsius	USDA Zone	Degrees Fahrenheit
-40.0 to -42.7	1b	-40 to -45
-37.3 to -40.0	3a	-35 to -40
-34.6 to -37.2	3b	-30 to -35
-31.7 to -34.4	4a	-25 to -30
-28.9 to -31.6	5	-20 to -25

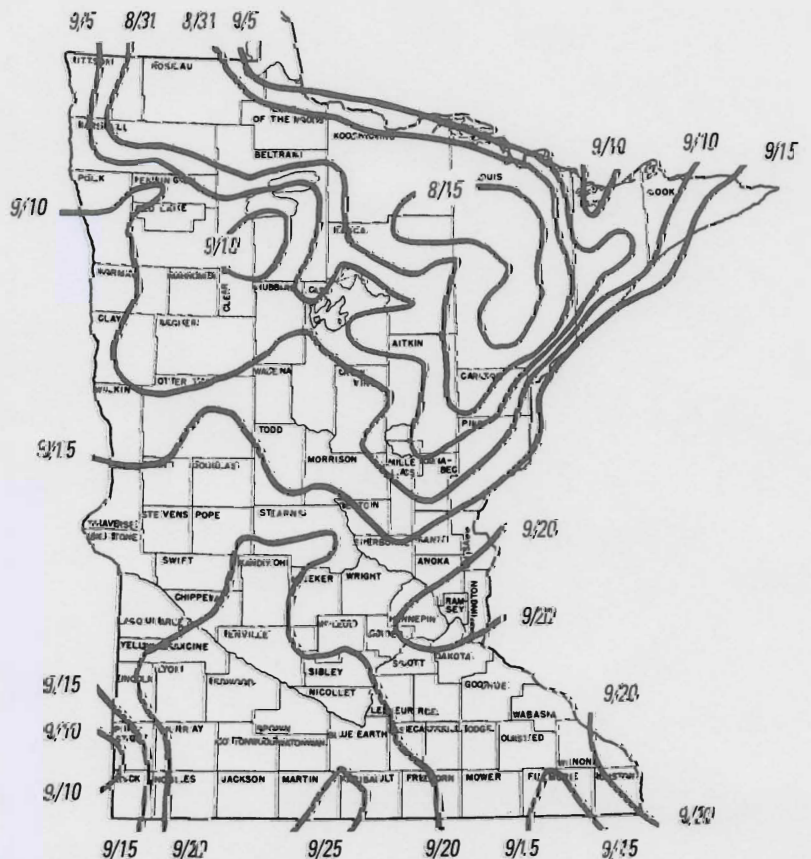


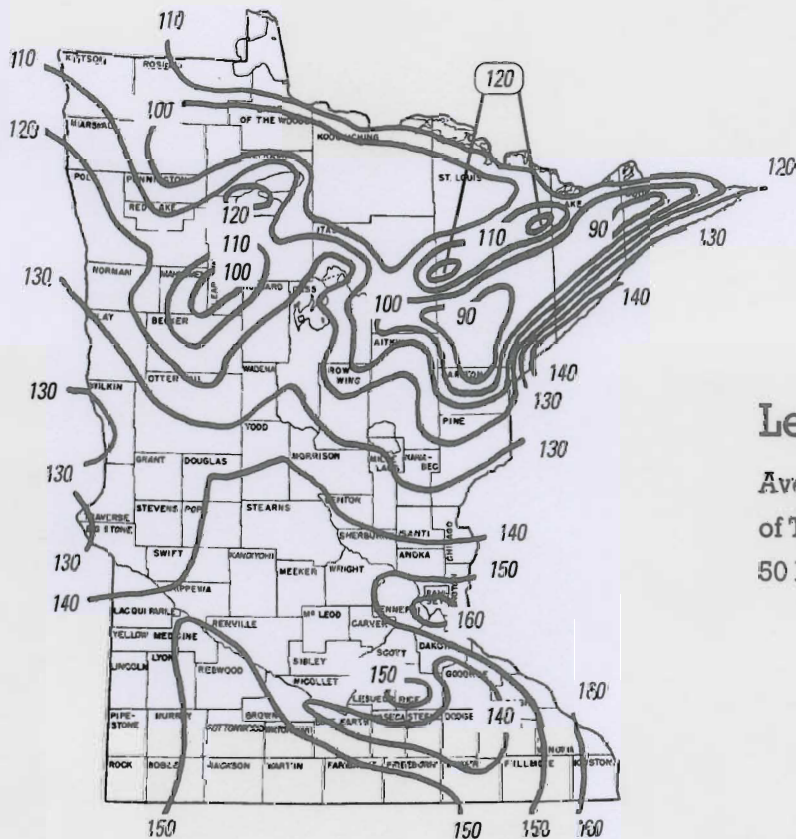
Spring Frost Date

Last Date of Minimum Temperature
At or Below Freezing (Last Frost)
in 90 Percent of Years

Fall Frost Date

Average Date of First Occurrence
of a Temperature At or Below
Freezing (First Frost) in 90
Percent of Years



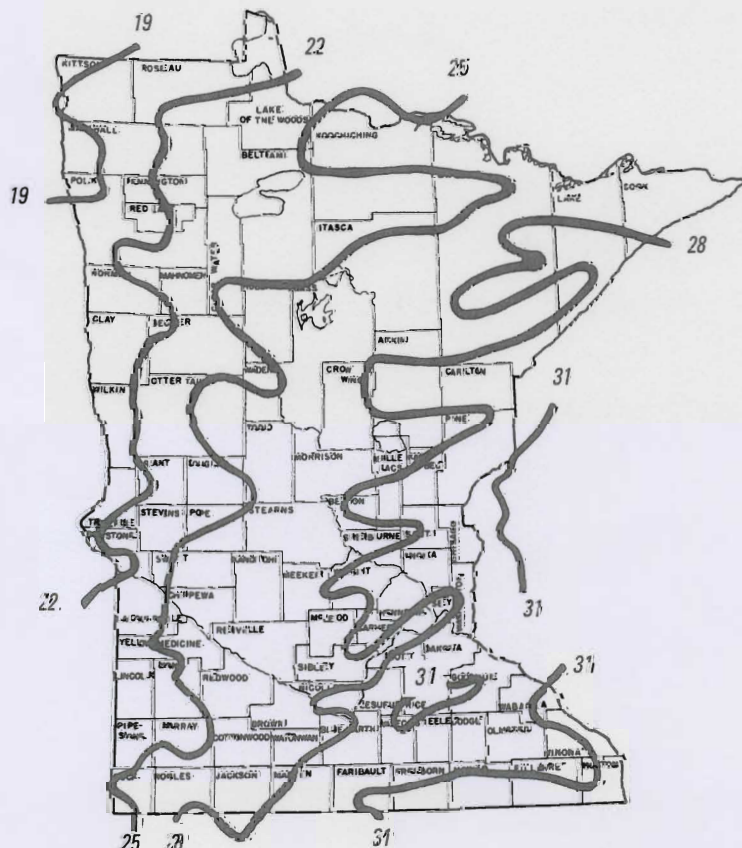


Length of Growing Season

Average Duration in Days of the Period Free of Temperatures At or Below Freezing in 50 Percent of Years

Annual Precipitation

Average Annual Precipitation, in Inches, Over 30 Years (Liquid Equivalent of All Precipitation, Including Snow)



BEGONIA

North American gardeners have adopted the begonia as one of their favorites. The begonia is a compact or trailing plant that grows and flowers continuously from small plants through to the killing frost, and can even be brought indoors for the winter.

Begonias grow from cuttings, but commercial production is mostly from seed requiring light to germinate. Seeds are very fine and rarely be sown successfully directly into a garden. Seeds should be started in greenhouses at least eight weeks before the weather is warm enough to transplant outdoors.

The trend in breeding is toward develop-

ing plants which flower earlier in packs. Colors include white, red and pink in fibrous begonias (*Begonia semperflora-cultorum*), plus orange, yellow and some with second color edging in tuberous forms (*Begonia x tuberhybrida*). A new type is *Begonia hiemalis*, a fibrous-rooted begonia that grows like a tuberous begonia.

Narrow-petaled types of begonias have been supplanted in the market by cultivars with broad petals and more abundant and larger flowers. Foliage may be green, red or bronze.

Begonias can be grown in either sun or open shade, but they do not compete well when interplanted between other annuals or

perennials, or in the root areas of woody plants such as trees. Plant heights can range from 6 to 10 inches. Spaced properly, begonias produce solid beds or groups for garden landscapes, or for filled planters and window boxes.

Tuberous and fibrous begonias accounted for 7.3 percent of the total U.S. bedding plant crop in 1994. Among growers/marketers, 38 percent rated them as excellent items.

Minnesota's begonia trials in 1994 looked at all three types of begonias. All generally grew better toward the end of the season.

Table 1. Begonia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Olympia Mix	fibrous	EB	4.0	7.0	7.5	5.0	7.0	7.5	1.3	2	5	3	6	8	5	9
Party Fun	fibrous	EB	6.0	10.0	13.0	9.0	11.0	11.0	1.6	3	5	4	8	8	5	9
Rio Formula Mix	fibrous	SG	7.0	7.0	9.0	8.0	8.2	7.5	1.4	5	8	5	7	8	5	9
Varsity Formula Mix	fibrous	SG	5.0	5.0	9.5	8.0	7.0	9.0	1.1	3	8	4	7	8	3	9
Vision Red	fibrous	EB	6.0	8.0	10.5	7.0	7.0	9.0	1.1	3	5	4	7	9	4	8
Charisma Coral	hiemalis	EB	—	—	6.0	—	—	5.0	1.8	—	—	—	—	—	3	5
Charisma Orange	hiemalis	EB	4.0	—	7.5	7.0	—	5.0	1.8	1	4	2	—	—	1	5
Panorama Orange	tuberous	EB	8.0	—	—	13.0	—	—	2.5	3	2	4	—	—	—	—

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

CHRYSANTHEMUM

Trials of chrysanthemum (now renamed *Dendranthema grandiflora*) are conducted at several sites throughout the state, including Morris, St. Paul and Grand Rapids. The trials compare performance of both named cultivars and selections from the long-standing University of Minnesota breeding program. The tests

identify cultivars most suited to northern Midwest growing conditions. Plant breeders are concerned with cold hardiness, early flowering, flower color and plant form.

Chrysanthemum plants are largely propagated from cuttings. Early pinching encourages

lateral branching which produces bushier plants and more abundant flowers. Colors can be yellow, white, crimson, bronze, lavender, pink, rose or orange.

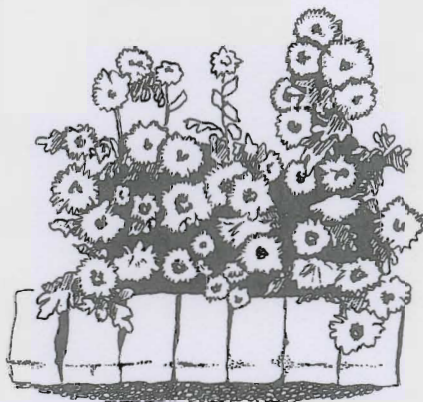
Field trial results for 1994 are presented for the Grand Rapids site only.

Table 2. Chrysanthemum cultivars evaluated in 1994 at Grand Rapids.

Cultivar	Height (inches) ¹	Spread (inches)	Habit	First Bloom	Flower Color	Flower Size (inches) ²	Overall Quality Rating ³	
							9/6	10/6
Autumn Fire	19	21	strongly upright	8/31	dark orange	3.5	7	8
Bit-O-Sunshine	14	17	upright	8/15	medium yellow	2.5	6	8
Burnt Copper	13	16	moderately spreading	8/16	dark orange	2.5	7	9
Centennial Sun	15	20	strongly spreading	8/16	gold	2.2	8	9
Centerpiece	17	21	strongly upright	8/23	pale lavender quill	4.0	7	9
Chippewa	15	19	strongly spreading	9/09	dark lavender	2.8	5	9
Cortice Rice	16	16	upright	8/31	dark yellow	3.5	6	8
Cream Top	12.5	12.5	upright	9/24	creamy white	2.5	3	4
DeeDee Ahrens	10	11	upright	9/02	creamy white	2.8	4	5
Dr. Longley	9	10	spreading	8/19	pale lavender	3.2	8	6
Gold Country	16	17	strongly upright	8/20	dark yellow	4.2	7	9
Gold Strike	10	13	upright	8/19	gold	2.0	7	7
Golden Jubilee	17	20	upright	8/20	golden orange	2.8	7	8
Golden Star	13	17	moderately spreading	8/23	medium-dark yellow spider	3.2	8	7
Grape Glow	11	13	upright	9/11	dark lavender	4.0	4	5
Harmony	15	21	strongly spreading	8/17	medium bronze	2.5	7	7
Harvest Bronze	12	17	moderately spreading	8/20	yellowish orange	3.2	7	7
Homecoming	16	19	strongly upright	8/24	pale peach	4.2	7	9
Lemonsota	9.5	13	cushion	8/15	pale yellow	1.5	9	8
Lindy	17	21	strongly upright	8/29	pale lavender spider	4.5	7	9
Maroon Pride	12	16	moderately spreading	8/16	medium lavender	3.8	9	9
Mellow Moon	14	17	upright	8/24	creamy white	4.0	5	8
Minnautumn	8.5	14	cushion	8/18	medium orange	1.8	9	8
Minnbronze	10	15.5	cushion	8/30	medium bronze	2.0	6	10
Minnehaha	15	23	strongly spreading	8/31	bronze	3.2	5	8
Minnogopher	9.5	13	cushion	8/24	bronze red	2.5	7	6
Minnpink	13	20	moderately spreading	8/22	medium pink	2.2	5	8
Minnqueen	11	18	cushion	8/31	bronze pink	3.5	5	7
Minnrose	14	21	moderately spreading	8/21	rose pink	2.0	5	8
Minnruby	11	16	cushion	8/26	bronze red	2.8	7	8
Minnwhite	10	16	cushion	9/01	creamy white	1.5	6	9
Minnyellow	10	15	cushion	9/01	medium-dark yellow	2.5	7	10
Pipestone	13	27	strongly spreading	8/12	bronze/orange	2.2	9	6
Poise	12	13	upright	8/22	creamy white	3.0	7	7
Prairie Moon	9	12	cushion	8/17	creamy white	1.5	6	5
Princess	12.5	18	strongly spreading	8/24	peach	2.2	8	9
Purple Star	14	12	upright	9/02	dark lavender	2.0	6	8
Rose Blush	14	18	strongly spreading	8/15	pale bronze	3.5	6	6
Rosy Glow	12	13	upright	8/21	medium lavender	3.5	6	8
Royal Pomp	13	12	strongly upright	8/23	dark lavender	1.5	5	7
Snowgata	11	17	cushion	8/18	white	1.5	6	9
Sunny Glow	15	15	upright	8/17	golden orange	2.2	7	7
Superior	11.5	18	moderately spreading	8/22	medium orange	2.5	7	9
Tenstrike	12	12	cushion	8/24	medium lavender	1.8	5	7
Violet	9	10	dwarf	8/20	rose pink	2.0	6	4

Table 2 (continued). Chrysanthemum cultivars evaluated in 1994 at Grand Rapids.

Cultivar	Height (inches) ¹	Spread (inches)	Habit	First Bloom	Flower Color	Flower Size (inches) ²	Overall Quality Rating ³	
							9/6	10/6
Vulcan	14	20	strongly spreading	8/18	pale bronze	2.8	9	7
Wanda	13	23	strongly spreading	8/17	medium bronze	2.8	8	8
Water Lily	12	11.5	slightly spreading	8/18	cream daisy	2.2	6	5
Wayzata	18	22	strongly upright	8/29	dark yellow	2.8	7	10
Wendy Ann	11	12	upright	8/23	creamy yellow	3.5	7	8
White Daisy Mum	9.5	11.5	upright	8/23	cream daisy	2.8	5	5
Yellow Glow	16	18	upright	8/16	dark yellow	2.5	8	9
Yellow Ruth Lehman	16	22	strongly spreading	8/18	medium yellow spider	3.2	8	9
Zonta	15	21	upright	8/18	medium orange	2.0	7	10

*Chrysanthemum 'Minnautumn'*

First introduced by the University of Minnesota in 1962, 'Minnautumn' is a vigorous, cushion-type plant with brilliant reddish-bronze fade-resistant flowers and dark green foliage. The sturdy plants reach a height of 15 inches and spread to three feet when grown in full sun. Blooms open in the first half of September in the Minneapolis-St. Paul area.

¹ Mature height including flowers; site average. ² Average width of flower head. ³ Rating on 1 to 10 scale for floral display and foliage quality.

DIANTHUS

Dianthus (*Dianthus chinensis*) is a plant growing both in popularity and in the availability of new cultivars. It has a fragrant flower with clear, vibrant colors.

Dianthus flowers can usually be found in solids and combinations of white, pink and red. Recent breeding efforts have extended its color range toward violet and purple. One good example of this is the 1992 All American Selections 'Ideal Violet.'

To get a head start on blooming, seeds can be sown indoors or in a cold frame, or they can

be directly seeded into the garden. Seedlings are hardy and can be transplanted easily. Although it is considered a low maintenance plant, it sets seed quickly after flowering, so stems should be snipped off as soon as the first blooms begin to fade. This will encourage new growth that will produce more flowers.

A compact plant that grows to only 6 to 10 inches, dianthus requires sun or partial shade. It tolerates a wide range of temperatures, and can be depended on to bloom all summer and well into the fall. It requires a well-drained soil and regular watering. It can withstand consid-

erable frost, and can even occasionally survive a Minnesota winter.

Dianthus held about 2.6 percent of the 1994 U.S. market for bedding plants, with 30 percent of bedding plant growers/marketers rating it an excellent item.

Dianthus F, 'Ideal Violet'

This cross between a Sweet William and a Chinese pink has strong stems and good weather tolerance. Unique purple flowers appear about 14 weeks after sowing. It does well in sunny locations with well-drained soil and needs little garden care. This was a 1992 All-America Selections choice.

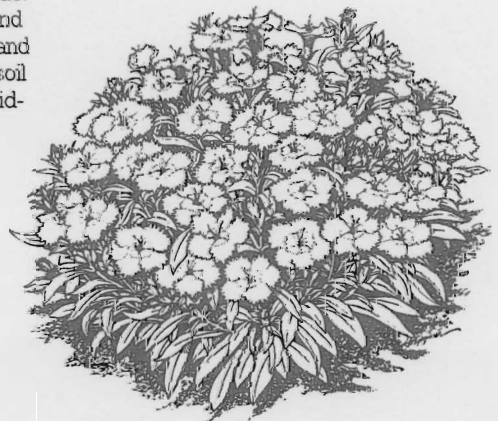


Table 3. *Dianthus* cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
		8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Cherry Picotee	BA	11.0	8.5	10.0	14.0	12.4	11.0	1.3	8	9	5	7	5	6	3
Floral Lace Picotee	BA	10.0	11.0	—	14.0	13.0	—	1.3	8	9	6	7	5	—	—
Floral Lace Purple	BA	10.0	8.2	9.5	15.0	11.5	10.0	1.2	7	10	7	5	5	7	6
Floral Lace Rose	BA	9.0	10.5	8.0	12.0	14.0	11.0	1.5	7	9	6	7	4	8	6
Floral Lace Rose Bicolor	BA	11.0	9.5	9.0	14.0	12.0	10.0	1.4	8	9	6	5	5	8	5
Floral Lace Violet	BA	8.0	9.0	—	11.0	11.5	—	1.5	7	7	4	6	5	—	—
Floral Lace Violet Picotee	BA	11.0	10.5	—	13.0	11.0	—	1.3	7	9	6	8	6	—	—
Ideal Violet	AAS	8.0	9.0	8.0	11.0	11.5	12.5	1.4	7	7	4	6	6	5	6
Parfait Raspberry	GO	7.0	6.5	6.0	11.0	8.5	10.0	1.5	6	5	4	7	5	6	5
Parfait Strawberry	GO	9.0	9.5	5.5	8.0	13.5	7.0	1.7	5	6	4	7	5	7	5
Princess Crimson Eye	GO	8.0	9.0	9.5	10.0	9.5	11.3	1.1	7	6	4	7	4	5	5
Princess Pink	GO	10.0	11.0	9.5	14.0	14.5	7.5	1.1	7	8	6	8	4	6	6
Princess Purple	GO	8.0	9.5	—	12.0	10.7	—	1.1	7	7	5	7	5	—	—
Princess Scarlet	GO	9.0	10.5	10.0	12.0	12.8	11.5	1.1	6	8	5	7	5	7	5
Rose Bicolor	BA	—	9.0	—	—	9.0	—	1.0	—	—	—	6	6	—	—
Rosemarie Velvet	BS	5.0	7.7	6.5	9.0	7.7	10.0	1.5	5	6	4	4	5	4	5

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

GERANIUM

Geraniums (*Pelargonium hortorum*) originated in South Africa, and were probably grown in Dutch settlers' gardens as early as 1652. By 1690, they arrived in England and became favorite garden plants. Geraniums came to the United States in 1786 when Thomas Jefferson sent some home from France. From then to the present, geraniums have grown in garden popularity and in diversity: about 200 species and 10,000 cultivars are known to exist.

For many years, bedding geraniums were primarily grown from cuttings taken from overwintered stock. Now, high quality seed-grown hybrids are available in many colors and heights. There generally appears to be little overall difference in quality between seed and cutting types. Ivy-leaved geraniums (*Pelargonium peltatum*) are usually grown from cuttings, but are now also available in seedling lines.

Geranium flowers come in white, pink, red, salmon, lavender, orange and fuchsia. The true orange is found with 'Orange Appeal,' a 1991 Fleuroselect Gold Medal Winner. New cultivars

like 'Freckles' even offer bicolored flowers. Whether individual blossoms are single or double, they are borne in large clusters or heads.

Plant height ranges from 10 to 30 inches. Recent breeding trends in bedding geraniums have been toward shorter plants that hold their heads well above the foliage. Other popular types are bred for hanging baskets and feature long, trailing stems.

Geranium seed should be sown in moist medium at temperatures below 76°F. Under these conditions, germination is as rapid as seven days. Seed should be started in Minnesota in mid-January to produce stocky, budded transplants for spring. Optimum growth and earlier flowering require supplementary lighting equivalent to 16-hour days. Although day length per se does not affect flower initiation, total amount of light does. Cooler day temperatures will result in shorter, stockier plants with more flower heads. Stem elongation increases as day temperature increases.

Outdoors, geraniums require full sun and well-drained soil for best growth and full flowering. Transplants should not be set out until frost danger has passed and soil has warmed. Over fertilizing will reduce flowering. Dead flower heads should be removed to avoid *Botrytis* fungus problems.

Geraniums, both cutting and seed combined, accounted for about 21 percent of the total bedding plant crop in 1994. In that year, it was the third most popular plant among consumers. Among growers/marketers, 62 percent rated cutting geraniums as an excellent or good item; 31 percent felt the same about seed geraniums.

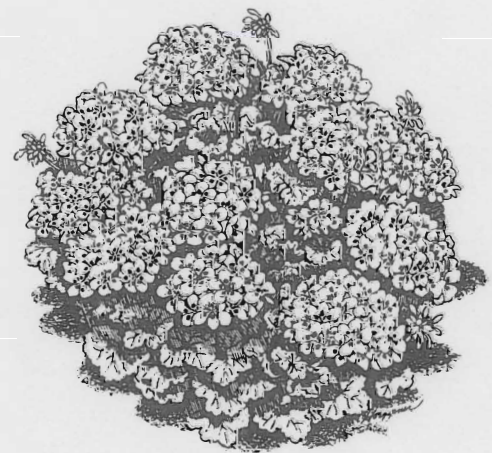
Many geraniums received high ratings (around 8 out of a possible 10) at trial sites in 1994, but only 'Multibloom Deep Scarlet' and 'Multibloom Scarlet Eye' received a perfect mid-season score.

Table 4. Geranium cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
										8/10	9/6	9/15	8/5	9/9	7/27	9/21
Americana Cherry Red	cutting	GO	9.5	14.0	-	15.0	20.5	-	3.8	6	9	4	6	5	-	-
Americana Cherry Rose	cutting	GO	12.0	10.0	-	14.0	14.7	-	3.9	7	7	5	2	4	-	-
Americana Coral	cutting	GO	18.0	-	-	19.0	-	-	3.8	6	9	6	-	-	-	-
Americana Light Pink	cutting	GO	16.0	11.5	-	23.0	17.0	-	3.8	7	9	6	5	6	-	-
Americana Light Salmon	cutting	GO	15.0	15.0	-	20.0	17.5	-	3.1	7	7	7	7	7	-	-
Americana Pink	cutting	GO	14.0	-	-	21.0	-	-	5.0	7	5	7	-	-	-	-
Americana Red	cutting	GO	13.0	-	-	23.0	-	-	4.5	7	8	7	-	-	-	-
Americana Rose	cutting	GO	10.0	12.5	-	12.0	15.0	-	3.5	6	6	4	6	6	-	-
Americana Salmon	cutting	GO	10.0	10.5	-	15.0	14.5	-	3.6	7	8	6	4	6	-	-
Americana Scarlet	cutting	GO	16.0	19.0	-	21.0	21.2	-	3.5	7	8	8	7	7	-	-
Americana Violet	cutting	GO	9.0	10.5	-	15.0	10.7	-	3.8	7	6	4	5	6	-	-
Americana White	cutting	GO	12.0	13.0	-	17.0	16.5	-	3.8	6	7	4	5	5	-	-
Eclipse Light Salmon	cutting	GO	12.0	11.7	-	18.0	13.5	-	3.5	7	8	6	8	6	-	-
Eclipse Red	cutting	GO	14.0	10.0	-	18.0	10.2	-	3.8	8	8	7	4	4	-	-
Eclipse Salmon Orange	cutting	GO	14.0	14.6	-	19.0	15.3	-	4.0	7	8	6	7	6	-	-
Eclipse White	cutting	GO	10.0	9.5	-	18.0	14.5	-	3.4	6	7	6	5	5	-	-

Geranium 'Freckles'

Rose freckles on pink petals give a special look to this vigorous geranium. Flower heads are large and held above the foliage for good effect. Expect 12- to 15-inch plants with continuous flower color. This was a 1997 All-America Selections choice.



Tornado Lilac Cadix	peltatum	SG	-	-	8.0	-	-	-	-	-	-	-	-	-	4	4
Tornado White Felix	peltatum	SG	4.0	-	3.5	17.0	-	12.5	2.0	3	3	2	-	-	3	4
Avanti Lilac	seed	CL	-	-	14.0	-	-	13.0	3.5	-	-	-	-	-	6	6
Avanti Red	seed	CL	-	-	13.5	-	-	8.0	4.0	-	-	-	-	-	5	5
Cameo	seed	BA	14.0	-	9.0	26.0	-	8.0	3.6	7	8	6	-	-	2	3
Dynamo Deep Rose	seed	SG	11.0	-	-	19.0	-	-	3.0	7	9	6	-	-	-	-
Dynamo Deep Scarlet	seed	SG	13.0	13.0	-	19.0	11.5	-	3.1	7	10	7	6	5	-	-
Dynamo Rose	seed	SG	10.0	-	15.0	13.0	-	16.0	4.0	8	9	7	-	-	8	6
Dynamo Salmon	seed	BS	-	13.5	-	-	17.7	-	3.2	-	-	-	7	7	-	-
Dynamo White	seed	BS,SG	15.0	13.0	-	20.0	19.0	-	3.6	7	9	3	5	5	-	-
Elite Cherry	seed	GU	-	15.0	-	-	14.5	-	2.7	-	-	-	8	8	-	-
Elite Pink	seed	BS,GO	12.0	18.2	13.5	17.0	20.5	13.5	4.1	7	9	5	6	5	7	6

Table 4 (continued). Geranium cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
			8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Elite Red	seed	BS,GO	11.0	14.0	—	16.0	16.5	—	4.3	7	7	6	6	4	—	—
Elite Salmon	seed	BS	—	16.0	—	—	15.0	—	3.0	—	—	—	7	7	—	—
Elite Scarlet	seed	BS,GO	13.0	13.5	—	17.0	21.5	—	3.1	8	9	6	4	6	—	—
Elite White	seed	BS,GO	12.0	12.0	—	16.0	11.5	—	3.1	6	6	4	5	5	—	—
Experimental Rose	seed	BS	—	13.0	—	—	14.5	—	3.0	—	—	—	6	3	—	—
Freckles	seed	AAS	11.0	11.7	15.0	15.0	12.0	24.0	3.8	6	6	4	7	5	7	6
Glamour	seed	BA	—	—	14.5	—	—	14.0	3.0	—	—	—	—	—	7	6
Glamour Light Salmon	seed	BA	—	—	20.0	—	—	24.0	4.5	—	—	—	—	—	8	5
Glamour Rose Pink	seed	BA	12.0	—	—	18.0	—	—	4.5	8	8	5	—	—	—	—
Glamour Scarlet	seed	BA	13.0	—	9.0	18.0	—	8.5	4.0	6	9	6	—	—	4	4
Glamour White	seed	BA	13.0	—	19.5	16.0	—	25.0	3.6	7	7	6	—	—	6	6
Lilac Rose	seed	BS	—	15.0	—	—	17.5	—	5.6	—	—	—	7	6	—	—
Multibloom Bright Rose	seed	BS,GO	14.0	11.7	10.0	10.0	12.7	11.5	2.5	7	9	6	6	3	4	4
Multibloom Lavender	seed	BS,GO	—	12.2	13.0	—	11.0	12.0	2.9	—	—	—	7	6	4	6
Multibloom Pink	seed	GO	—	14.0	—	—	16.5	—	2.5	—	—	—	7	6	—	—
Multibloom Red	seed	GO	15.0	13.0	—	13.0	13.0	—	3.3	7	8	4	6	4	—	—
Multibloom Salmon	seed	BS	—	10.7	—	—	13.7	—	1.7	—	—	—	6	6	—	—
Multibloom Scarlet	seed	GO	—	11.5	—	—	14.0	—	3.8	—	—	—	5	6	—	—
Multibloom Scarlet Eye	seed	GO	11.0	—	—	18.0	—	—	4.0	7	10	5	—	—	—	—
Multibloom White	seed	GO	15.0	13.5	—	17.0	15.5	—	3.2	7	7	4	6	6	—	—
Orange Appeal	seed	BS,GO	15.0	13.0	14.0	16.0	16.0	15.5	3.7	6	7	5	4	6	6	4
Orbit Cardinal	seed	BS,GO	13.0	15.2	16.5	18.0	14.5	17.0	3.7	7	9	6	7	5	7	8
Orbit Cherry	seed	GO	—	17.7	—	—	22.2	—	3.5	—	—	—	7	6	—	—
Orbit Coral	seed	BS	—	14.7	—	—	15.7	—	3.0	—	—	—	7	5	—	—
Orbit Deep Salmon	seed	BS	—	16.0	—	—	13.5	—	3.0	—	—	—	7	5	—	—
Orbit Glow	seed	BS	—	15.2	—	—	16.2	—	3.7	—	—	—	7	4	—	—
Orbit Hot Pink	seed	GO	12.0	15.5	—	15.0	21.5	—	4.1	7	6	4	3	6	—	—
Orbit Light Salmon	seed	BS	—	12.2	—	—	17.2	—	2.0	—	—	—	5	6	—	—
Orbit Orchid	seed	BS	—	15.7	—	—	14.0	—	3.0	—	—	—	7	6	—	—
Orbit Pink	seed	GO	—	16.5	—	—	17.0	—	3.0	—	—	—	5	7	—	—
Orbit Red	seed	GO	—	18.0	—	—	24.0	—	3.5	—	—	—	7	6	—	—
Orbit Rose	seed	GO	18.0	11.5	—	17.0	15.0	—	4.3	7	8	7	7	5	—	—
Orbit Salmon	seed	BS	—	17.0	—	—	15.0	—	3.0	—	—	—	7	7	—	—
Orbit Violet	seed	BS	—	13.5	11.0	—	13.0	12.0	3.1	—	—	—	7	3	7	6
Orbit White	seed	GO	16.0	13.7	—	16.0	13.0	—	3.5	6	9	4	6	4	—	—
Pinto Deep Rose	seed	SG	11.0	—	—	15.0	—	—	4.0	8	8	6	—	—	—	—
Pinto Red	seed	SG	14.0	17.0	—	20.0	22.0	—	4.6	8	8	6	8	7	—	—
Pinto Rose	seed	SE	14.0	—	14.0	18.0	—	20.0	4.4	8	9	7	—	—	7	5
Pinto Salmon	seed	BS,SS	—	18.0	15.5	—	18.5	20.0	3.0	—	—	—	8	5	8	7
Pinto Salmon Orange	seed	BS	—	21.7	—	—	23.0	—	3.0	—	—	—	5	6	—	—
Pinto Scarlet	seed	SG	16.0	16.7	—	19.0	20.5	—	3.6	7	8	6	8	5	—	—
Pinto White	seed	SG	16.0	16.2	—	20.0	16.0	—	3.9	7	8	6	7	5	—	—
Ringo 2000 Deep Rose	seed	SG	13.0	12.0	—	19.0	11.5	—	3.6	8	8	6	5	5	—	—
Ringo 2000 Deep Scarlet	seed	SG	14.0	15.0	—	16.0	20.0	—	3.0	7	9	6	5	6	—	—
Ringo 2000 Light Salmon	seed	BS	—	17.7	—	—	20.2	—	2.5	—	—	—	7	6	—	—

Table 4 (continued). Geranium cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Ringo 2000 Rose	seed	SG	13.0	—	—	18.0	—	—	4.5	8	9	6	—	—	—	—
Ringo 2000 Salmon	seed	BS,SG	—	17.5	11.0	—	15.7	11.0	3.1	—	—	—	8	5	6	7
Ringo 2000 White	seed	BS,SG	15.0	14.5	7.5	18.0	15.5	12.5	3.3	7	8	5	7	5	5	4

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of flower cluster; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

IMPATIENS, STANDARD

Impatiens wallerana, first found in East Africa in 1896, has gained widespread popularity as a low maintenance bedding plant that blooms profusely in shady areas throughout the summer. Different cultivars grow to heights of 8 to 14 inches. Dwarf plants that have more numerous flowers, and which do not need pinching, are growing in popularity.

Color range of impatiens blooms includes salmon, orange and many shades of red, pink, lilac, violet and white. Bicolors also occur.

Impatiens are easy to root from cuttings, but they are primarily grown from seed. There are about 45,000 seeds per ounce. It takes about three months for standard impatiens to grow from seed to good-sized flowering plants, although breeders are now releasing earlier flowering series.

Impatiens seeds need to be thinly sown into a thoroughly moist light medium, with a minimal covering of very fine vermiculite just sufficient to maintain moisture. Light must be able to reach the seed for maximum, uniform germination. Constant red light hastens germination — to between three and five days — but seeds germinate in 14 to 21 days under greenhouse conditions. Light sources need to be either removed or switched to cool white immediately after germination to avoid seedling blanching and stretching. Seedlings must be kept moist.

Seedlings 1 inch tall can be transplanted into trays, flats or small pots about a month after sowing, but damage easily and must be handled carefully. Plug production is an excellent alternative. Impatiens are susceptible to frost, but not sensitive to day length.

Impatiens tolerate partial shade, and require deeply dug and improved soil. They do not compete well with tree roots. They produce bushier plants if branch tips are pinched. They also make excellent container and window box plants.

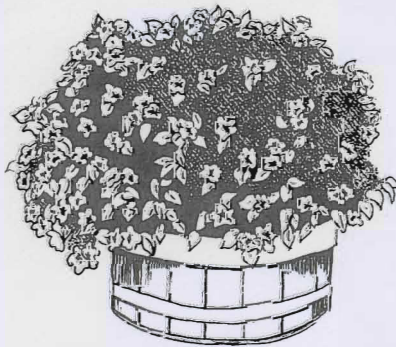
Impatiens continue to dominate the market as the most popular bedding plant among consumers. They accounted for about 15 percent of the total bedding plant crop in 1994. Among growers/marketers, 63 percent rated them to be excellent items. No other plant is consistently rated as well as impatiens by as many growers. It has been the best selling plant for more than 50 percent of growers since 1990.

Table 5. Standard impatiens cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Accent Apricot	G0	4.0	—	17.0	12.0	—	16.0	2.0	5	5	4	—	—	8	6
Accent Bright Eye	G0	—	9.5	—	—	14.7	—	1.5	—	—	—	8	9	—	—
Accent Burgundy Star	G0	—	5.5	20.5	—	15.0	19.0	1.8	—	—	—	7	9	8	6
Accent Carmine	G0	—	17.0	—	—	20.5	—	1.7	—	—	—	8	8	—	—
Accent Coral	G0	3.5	—	—	14.0	—	—	1.8	5	4	3	—	—	—	—

Table 5 (continued). Standard impatiens cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
		8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Accent Deep Pink	BS,GO	5.0	11.0	—	15.0	16.5	—	1.4	4	6	5	9	8	—	—
Accent Lavender Blue	GO	—	8.5	—	—	15.5	—	1.7	—	—	—	8	7	—	—
Accent Lilac	GO	5.0	7.2	—	15.0	13.7	—	1.9	4	3	2	8	7	—	—
Accent Mixture	GO	3.0	—	—	12.0	—	—	1.8	2	3	2	—	—	—	—
Accent Orange	GO	—	19.0	—	—	23.0	—	2.0	—	—	—	9	8	—	—
Accent Orange Star	GO	—	13.0	—	—	21.0	—	1.5	—	—	—	8	9	—	—
Accent Pastel Mixture	GO	4.0	—	—	14.0	—	—	1.8	5	5	3	—	—	—	—
Accent Pink	GO	—	9.7	—	—	12.2	—	1.5	—	—	—	6	8	—	—
Accent Red	GO	3.0	11.5	—	12.0	15.5	—	1.9	5	4	4	8	9	—	—
Accent Red Star	GO	—	6.5	—	—	10.5	—	1.2	—	—	—	3	6	—	—
Accent Rose	GO	—	14.0	—	—	19.5	—	1.5	—	—	—	7	7	—	—
Accent Rose Star	GO	—	16.0	—	—	16.7	—	1.7	—	—	—	7	7	—	—
Accent Salmon	GO	—	16.5	—	—	18.2	—	1.7	—	—	—	9	8	—	—
Accent Scarlet	GO	—	21.0	—	—	24.5	—	1.7	—	—	—	9	7	—	—
Accent Star Mixture	GO	4.0	—	—	14.0	—	—	1.5	3	3	2	—	—	—	—
Accent Violet Improved	GO	4.0	13.0	17.0	15.0	18.0	13.0	1.9	5	3	5	9	9	7	7
Accent White	GO	4.0	13.0	15.0	11.0	20.5	14.0	1.9	4	4	3	8	8	6	5
Blitz 2000 Light Pink	SG	—	13.8	14.0	—	18.9	18.5	1.8	—	—	—	7	8	7	8
Blitz 2000 Mix	SG	6.0	—	—	15.0	—	—	2.0	4	4	2	—	—	—	—
Blitz 2000 Pink	SG	—	—	16.0	—	—	20.0	2.5	—	—	—	—	—	6	7



Impatiens 'Blitz'

The 'Blitz' series of standard impatiens is known for its extra-large flowers, up to 2.5 inches. The plants grow 12 inches tall, and their large, intense flowers contrast against light bronze foliage. 'Blitz' was a 1981 All-America Selections choice.

Blitz 2000 Red	SG	4.0	—	—	11.0	—	—	2.3	5	6	6	—	—	—	—
Blitz 2000 Rose Star	SG	—	20.0	28.0	—	31.5	15.0	2.0	—	—	—	8	6	8	5
Blitz 2000 Violet	SG	3.0	—	—	11.0	—	—	2.0	3	3	2	—	—	—	—
Blitz 2000 White	SG	3.0	—	—	11.0	—	—	2.0	3	5	3	—	—	—	—
Dazzler Bright Eye	BA	—	14.0	20.0	—	16.0	17.0	2.0	—	—	—	8	6	7	6
Impact Mixed	SK	3.0	—	11.0	10.0	—	12.0	1.8	3	3	2	—	—	5	6
Impulse Carmine	SG	—	16.5	25.0	—	22.0	18.5	1.9	—	—	—	9	7	9	9
Impulse Lilac	SG	5.0	—	—	13.0	—	—	1.8	4	3	3	—	—	—	—
Impulse Lilac Blue	SG	—	16.7	21.0	—	18.5	15.0	1.8	—	—	—	9	7	7	6
Impulse Mix	SG	5.0	—	16.0	16.0	—	13.0	1.9	4	5	2	—	—	7	7
Impulse Orange	SG	5.0	—	—	13.0	—	—	2.0	5	3	5	—	—	—	—
Impulse Red	SG	4.0	—	—	12.0	—	—	2.0	4	6	6	—	—	—	—
Impulse Rose	SG	—	17.5	20.5	—	27.5	13.0	1.3	—	—	—	9	7	8	6
Impulse Salmon	SG	—	11.2	22.0	—	15.5	16.5	2.0	—	—	—	8	9	8	8
Impulse Salmon Rose	SG	—	10.0	14.0	—	10.5	16.0	1.6	—	—	—	8	8	6	7

Table 5 (continued). Standard impatiens cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
		8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Impulse Violet	SG	6.0	~	~	13.0	~	~	1.5	5	4	4	~	~	~	~
Impulse White	SG	5.0	~	~	16.0	~	~	2.3	4	6	3	~	~	~	~
Mega Orange Star	GO	~	14.0	~	~	~	19.5	~	~	~	~	6	7	~	~
Satin Blue	BS	~	7.2	~	~	~	19.2	~	~	~	~	6	8	~	~
Showstopper Cherry Flair	BA	~	7.0	11.0	~	~	15.5	12.0	~	~	~	6	9	7	5
Showstopper Soft Blue	BA	~	7.5	22.0	~	~	16.0	13.5	~	~	~	7	7	7	8
Tempo Apricot	BS	3.0	5.0	~	10.0	13.5	~	1.6	4	5	4	7	9	~	~
Tempo Blue Satin	BS	5.0	~	~	14.0	~	~	1.8	5	5	4	~	~	~	~
Tempo Blush	BS	~	11.5	~	~	~	16.5	~	~	~	~	8	8	~	~
Tempo Burgundy	BS	~	12.5	~	~	~	17.5	~	~	~	~	9	8	~	~
Tempo Coral	BS	6.0	14.5	~	17.0	19.2	~	1.9	7	8	7	8	8	~	~
Tempo Deep Pink	BS	4.0	17.0	~	14.0	18.5	~	1.6	6	5	4	8	9	~	~
Tempo Lavender	BS	~	18.0	~	~	~	13.5	~	~	~	~	7	7	~	~
Tempo Lilac	BS	2.0	8.7	~	9.0	13.2	~	1.6	3	2	2	7	8	~	~
Tempo Mix	BS	4.0	~	~	9.0	~	~	1.5	3	3	2	~	~	~	~
Tempo Orange	BS	~	11.5	~	~	~	18.0	~	~	~	~	8	7	~	~
Tempo Pastel Mix	BS	2.0	~	~	11.0	~	~	1.8	3	3	2	~	~	~	~
Tempo Pink	BS	4.0	~	4.5	14.0	~	12.5	1.9	5	6	4	~	~	4	6
Tempo Red Improved	BS	2.0	12.0	~	14.0	25.0	~	1.9	4	4	5	7	9	~	~
Tempo Rose	GO	~	8.2	~	~	~	17.2	~	~	~	~	8	9	~	~
Tempo Salmon	BS	6.0	~	10.0	15.0	~	18.0	1.8	7	5	4	~	~	7	6
Tempo Scarlet	BS	4.0	~	17.0	12.0	~	16.0	2.0	5	5	5	~	~	7	8
Tempo White	BS	3.0	~	3.5	12.0	~	12.0	1.8	3	5	3	~	~	3	8
Tiara Rose Picotee	CL	3.0	~	~	12.0	~	~	2.0	4	5	4	~	~	~	~

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

KALE, ORNAMENTAL

Though flowering cabbages and kales (*Brassica oleracea* Acephala Group) are actually edible members of the cabbage family, many cultivars have been grown in the Orient for hundreds of years for their beautiful colored foliage.

Ornamental kale's "flower" is its central leaf cluster. The leaves of this cluster turn a contrasting color as the days and nights become cooler in late summer and fall. Colors range from white to pink to red. Leaf shape also varies between cultivars, from the smooth, wavy,

"round-leaved" plants to the frilly "fringed-leaved" to the deeply notched "feather-leaved" type.

Because ornamental kale is quite frost-tolerant, it is growing in popularity as a bedding plant with consumers in colder regions. Its color intensifies with frost, and plants can hold a good appearance right up to the first snowfall.

Ornamental kale can be sold in spring, summer or fall, but it takes about 11 weeks to produce a marketable transplant in a

6-inch pot. Germination occurs in 10 days at 70°F and requires light. Excessive stem elongation may be a problem if plants experience high temperatures or low light. When planting outside, space the transplants 18 inches apart to allow for mature spread.

Most cultivars of kale were excellent performers at Grand Rapids, but did not do as well at Morris.

Table 6. Ornamental kale cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Type	Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
										8/10	9/6	9/15	8/5	9/9	7/27	9/21
Kamome Red	feather leaf	AT	10.0	16.0	—	18.0	18.0	—	5.8	7	8	7	9	5	—	—
Kamome White	feather leaf	AT	10.0	12.5	—	22.0	22.0	—	4.3	9	8	8	9	4	—	—
Chidori Red	fringed leaf	AT	11.0	13.0	—	25.0	21.5	—	5.0	7	8	8	9	4	—	—
Chidori White	fringed leaf	AT	11.0	12.0	—	20.0	20.0	—	5.8	8	8	7	8	7	—	—
Nagoya Red Improved	fringed leaf	SK	13.0	13.0	16.5	24.0	22.5	12.5	5.0	7	8	7	9	5	9	7
Nagoya Rose	fringed leaf	SK	10.0	14.0	—	22.0	19.0	—	5.5	7	8	9	7	5	—	—
Nagoya White	fringed leaf	SK	9.0	—	9.0	22.0	—	13.0	5.8	8	8	7	—	—	9	6
Beauty Pink	round leaf	AT	14.0	16.0	—	16.0	19.5	—	7.0	9	8	10	7	5	—	—
Osaka Pink	round leaf	SK	18.0	25.0	—	24.0	20.0	—	6.5	8	8	6	8	5	—	—
Osaka Red	round leaf	SK	14.0	20.0	—	20.0	21.5	—	6.3	9	6	7	8	5	—	—
Osaka White	round leaf	SK	15.0	19.0	11.0	24.0	26.0	10.0	6.8	8	6	7	7	6	6	5
Pigeon Red	round leaf	AT	12.0	18.0	—	18.0	19.0	—	8.8	8	10	10	8	7	—	—
Pigeon White	round leaf	AT	13.0	—	—	22.0	—	—	7.0	9	10	9	—	—	—	—
Tokyo Pink	round leaf	SK	16.0	18.0	17.0	22.0	24.0	15.0	7.0	7	8	7	7	6	6	6
Tokyo Red	round leaf	SK	18.0	18.0	22.0	26.0	24.0	15.0	6.8	7	8	7	7	4	7	4
Tokyo White	round leaf	SK	14.0	16.5	20.0	18.0	19.5	15.0	7.0	8	10	9	6	5	9	6



Kale 'Tokyo Red'

Very uniform and cold-hardy, round-leaved 'Tokyo Red' contrasts a deep greenish-purple outer foliage with a rosy-red center. The dwarf plant develops more color as the nights grow cooler, and besides being beautiful, is also edible.

¹See Source List for seed source key. ²Mature height; site average. ³Width of colored center in early September in Grand Rapids. ⁴Rating on 1 to 10 scale for display and foliage quality.

LISIANTHUS

Native to the Great Plains of North America, lisianthus (*Eustoma grandiflorum*) was introduced to Europe in 1835. By 1952, it was being grown in Japan, where its beauty and keeping qualities after cutting made it a highly prized flower, and the focus of intensive breeding efforts. Lisianthus are now available in many shades of white, pink, blue and violet, plus bicolors.

Lisianthus' large, cupped flowers resemble tulips when single and roses when double. The

flowers are excellent in arrangements because of their long vase-life. Lisianthus can also be grown as flowering pot plants.

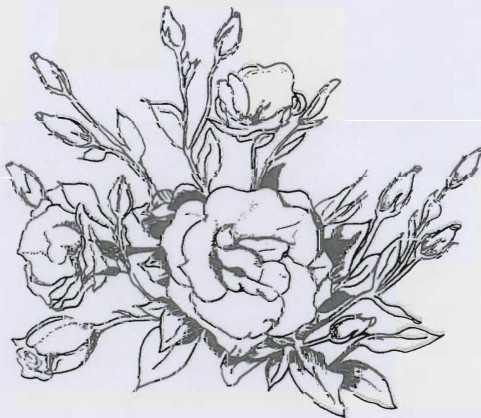
Propagation is by tiny seeds, which germinate easily. However, subsequent growth is slow and seedlings need cool temperatures and bright light to develop well. For blooming plants in June in Minnesota, seed should be started in January. Lisianthus are also sensitive to over-fertilizing when young. After five pairs of true leaves appear, growth is more rapid.

Care must be taken to not damage the brittle root system when transplanting.

Several strains of lisianthus are available in different heights, including the 'Mermaid' series, an extra dwarf type that remains about 8 inches tall. Other lisianthus will grow as tall as 24 inches.

Table 7. *Lisianthus* cultivars evaluated in the 1994 bedding plant trials at Grand Rapids and Morris.

Cultivar	Seed Source ¹	Plant Height (inches) ²		Plant Spread (inches)			Overall Quality Rating ⁴				
		Grand Rapids	Morris	Grand Rapids	Morris	Power Width (inches) ³	Grand Rapids			Morris	
							8/10	9/6	9/15	8/5	9/9
Echo Blue	SK	—	21.2	—	8.2	2.8	—	—	—	6	4
Echo Light Blue	SK	—	22.0	—	9.0	3.0	—	—	—	7	3
Echo Lilac Rose	SK	—	19.7	—	8.2	1.2	—	—	—	6	4
Echo Pink	SK	—	20.2	—	8.7	2.7	—	—	—	5	3
Echo Pink Picotee	SK	—	24.0	—	11.5	3.0	—	—	—	7	5
Echo White	SK	—	17.5	—	6.0	2.0	—	—	—	5	2
Heidi Lilac Rose	SK	—	17.5	—	10.2	2.5	—	—	—	6	4
Heidi Pastel Blue	SK	—	19.2	—	9.2	1.5	—	—	—	4	3
Heidi Rose Pink	SK	—	23.2	—	8.2	2.0	—	—	—	7	4
Mermaid Blue	SK	7.0	—	5.0	—	—	2	3	2	—	—
Mermaid Pink	SK	6.0	—	6.0	—	—	2	6	5	—	—
Mermaid White	SK	7.0	—	8.0	—	1.5	2	6	5	—	—

*Lisianthus* 'Echo Blue'

A native of the North American prairies, *Lisianthus* hybrids developed by breeders in Japan are excellent cutflowers. New shorter cultivars can also be striking container and bedding plants with their rose-like petals and smooth foliage. *Lisianthus* resent transplanting and drought, so keep a close eye on pot plants and repot before they become rootbound.

¹See Source List for seed source key. ²Mature height including flowers; site average. ³Width of single blossom; value given is average across sites. ⁴Rating on 1 to 10 scale for floral display and foliage quality.

LOBELIA

Bedding lobelia (*Lobelia erinus*) offers the gardener intensely blue flowers on short, fine-leaved plants. It also offers colors such as sky blue, deep blue, violet blue, rose, lilac, white, and white eyes.

Despite its origin in South Africa, bedding lobelia grows best in cool conditions. Start seeds at 65°F. and allow extra time for germination. Lobelia's very fine seeds should not be

covered. They require about 20 days to germinate, and flower about 100 days after sowing.

Newcomers to the bedding plant scene, these lobelia hybrids (*Lobelia speciosa*) are tall, large-flowered plants. These flowers are in shades of pink, salmon, lavender and brilliant red. Some plants have red or bronze foliage as well. These new lobelias should be sown in January for July flowers, and they may be able

to overwinter in the greenhouse.

Lobelia requires moist garden soil, but tolerates partial shade, making it an excellent companion for impatiens. Trailing lobelias are available that show well in hanging baskets.

Lobelia represented about 2 percent of the commercial bedding plant crop in 1994 and was rated a good product by most growers.

Table 8. Lobelia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Species	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Blue Moon	erinus	SG	8.0	7.0	5.0	10.0	11.0	11.5	0.5	5	3	2	4	5	8	4
Palace Blue	erinus	BS	6.0	9.0	—	9.0	13.5	—	0.5	5	3	2	6	5	—	—
Palace Blue with Eye	erinus	BS	4.0	5.0	4.5	3.0	6.2	7.5	0.4	6	4	3	5	5	7	6
Palace Royal	erinus	BS	7.0	7.0	—	12.0	12.5	—	0.4	5	5	4	9	4	—	—
Palace White	erinus	BS	5.0	7.0	—	8.0	11.5	—	0.6	5	4	2	6	4	—	—
Fan Cinnabar Rose	speciosa	BS	—	20.0	—	—	11.0	—	7.0	—	—	—	3	2	—	—
Fan Orchid Rose	speciosa	EB	—	15.0	13.0	—	9.5	9.0	6.0	—	—	—	4	4	3	3
Fan Scarlet	speciosa	EB	—	13.5	12.5	—	15.0	9.0	5.2	—	—	—	3	3	5	4

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Erinus: single blossom width; speciosa: length of spike; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

MARIGOLD

The marigold (*Tagetes*) is one of the most widely grown annuals. Hundreds of cultivars are available in the trade. The species originated in Mexico and was grown in Spain more than 400 years ago. Different types spread through France, Africa and England, and later returned to North America with "French" and "African" attached to their names to distinguish them from the European native *Calendula* which was then called the "pot marigold."

Tagetes patula, the French marigold, is a shorter plant with small, broad-petalled flowers that are quickly produced from seed. Many

flowers are crested, with the central disk higher than the surrounding petals.

Tagetes erecta, the African or American marigold, is much taller, up to 3 feet in height, with larger flowers that tend to be produced late in summer. The 'Excel' series, however, blooms in just 10 weeks from seed.

Much breeding of these plants is done in the United States, and many of those efforts have been All-America Selections. A recent development is the triploid type, a naturally sterile hybrid (*Tagetes erecta patula*). These triploids

do not set seed, and they continue to flower heavily through the growing season.

For early flowers, seeds should be sown indoors into thoroughly moist media about six weeks ahead of outdoor planting. The seeds have a high germination rate and should be scattered thinly. Seedlings can be transplanted into a variety of soil mixes. Planted directly in the garden, seeds should be covered thinly with moist earth. Seedlings grow rapidly in warm weather.

Marigold flower colors span the range of

Table 9. Marigold cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Amigva Gold	American	GO	11.0	15.0	14.5	15.0	19.5	15.5	3.3	6	7	6	6	3	7	6
Amigva Orange	American	GO	11.0	15.0	14.5	14.0	20.0	16.0	3.4	7	7	6	7	3	6	3
Amigva Yellow	American	GO	10.0	12.5	13.0	15.0	16.5	14.5	3.5	5	8	6	6	2	6	2
Discovery Orange	American	BS	12.0	—	15.0	16.0	—	16.0	3.0	5	5	5	—	—	8	2
Discovery Yellow	American	BS	15.0	14.0	12.0	20.0	18.0	16.0	3.1	5	6	6	8	4	8	5

Yellows, oranges, creams and reds, and can be found both in solid colors and in combinations. Most marigolds flower sooner under short days.

Aster leafhoppers, spider mites and aphids on seedlings and small plants can all be prob-

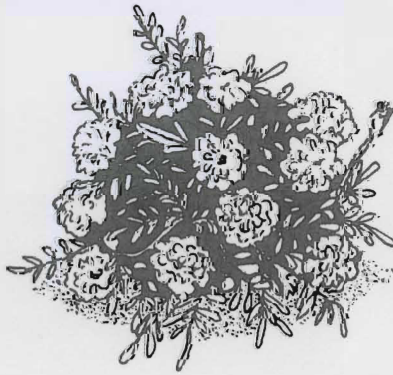
lems for growers. In the garden, diseases and insects are rarely a problem for marigolds, though aster yellows can be severe in some seasons.

Together, the dwarf French and tall American marigolds accounted for about 7 percent

of the total U.S. bedding plant crop in 1994. Among growers and marketers, 25 percent rated them to be excellent items.

Table 9 (continued). Marigold cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Double Eagle	American	BS	26.0	27.0	45.0	36.0	32.0	14.0	3.8	4	5	6	6	6	7	4
Double Sun	American	BS	29.0	26.0	41.0	30.0	27.5	24.0	3.6	4	6	8	7	5	7	6
Excel Gold	American	GO	-	18.7	-	-	19.2	-	3.0	-	-	-	7	5	-	-
Excel Orange	American	GO	17.0	21.2	-	20.0	20.5	-	3.5	5	7	6	7	5	-	-
Excel Primrose	American	GO	-	22.2	-	-	21.7	-	2.5	-	-	-	7	4	-	-
Excel Yellow	American	GO	-	20.0	-	-	25.5	-	3.0	-	-	-	7	5	-	-
Inca Gold	American	GO	-	15.5	-	-	16.5	-	3.5	-	-	-	6	2	-	-
Inca Orange	American	GO	14.0	20.0	-	18.0	19.0	-	4.0	5	6	5	5	3	-	-
Inca Yellow	American	GO	-	20.5	-	-	26.0	-	4.0	-	-	-	6	4	-	-
Perfection Gold	American	GO	-	27.5	-	-	28.2	-	3.2	-	-	-	6	4	-	-



Marigold 'Hero Harmony'

This French marigold boasts large flowers, early color, and a compact habit of growth. It is especially recommended for parks and garden settings because of its exceptional flowers and weather resistance. 'Hero Harmony' has a bicolor bloom, combining red and gold. Other members of the series offer flowers in solid shades of red, orange, and yellow.

Perfection Orange	American	GO	18.0	22.0	-	23.0	25.5	-	3.9	7	8	9	8	4	-	-
Perfection Yellow	American	GO	-	23.0	-	-	30.0	-	3.0	-	-	-	7	4	-	-
Sovereign	American	BS	23.0	23.5	36.0	25.0	31.0	16.0	3.7	4	8	8	7	5	8	7
Voyager Orange	American	BS	15.0	18.5	-	17.0	23.7	-	3.8	6	9	8	8	3	-	-
Voyager Yellow	American	BS	17.0	14.0	18.0	24.0	20.0	15.5	3.1	6	8	7	8	3	8	-
Aurora Blue	French	GO	-	11.0	-	-	16.0	-	2.2	-	-	-	5	3	-	-
Aurora Gold	French	GO	9.0	-	-	16.0	-	-	1.3	6	7	5	-	-	-	-
Aurora Light Yellow	French	GO	-	11.2	-	-	17.0	-	1.7	-	-	-	7	3	-	-
Aurora Mix	French	GO	-	13.5	-	-	16.0	-	2.2	-	-	-	8	2	-	-
Aurora Orange	French	GO	10.0	8.5	11.5	16.0	17.3	10.0	2.2	6	7	5	6	2	5	2
Aurora Red	French	GO	10.0	10.0	-	16.0	17.8	-	1.9	5	6	6	6	3	4	1
Aurora Yellow Fire	French	GO	-	8.5	-	-	14.5	-	2.0	-	-	-	6	2	-	-
Bounty Mix	French	SK	6.0	-	11.0	10.0	-	13.5	1.8	5	6	4	-	-	5	2
Disco Flame	French	BS	7.0	9.2	-	15.0	11.2	-	1.8	7	6	6	7	4	-	-
Disco Golden Yellow	French	BS	-	12.0	-	-	19.5	-	2.2	-	-	-	5	3	-	-

Table 9 (continued). Marigold cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
			8/10	9/6	9/15	8/10	9/6	9/15		8/5	9/9	7/27	9/21			
Disco Marietta	French	BS	-	5.0	-	-	10.5	-	1.5	-	-	-	5	1	-	-
Disco Mix	French	BS	-	8.5	-	-	11.7	-	1.5	-	-	-	5	4	-	-
Disco Orange	French	BS	8.0	12.0	-	14.0	15.2	-	1.9	5	3	3	7	3	-	-
Disco Red	French	BS	-	12.7	-	-	17.2	-	2.0	-	-	-	8	3	-	-
Disco Yellow	French	BS	-	9.5	-	-	18.5	-	1.7	-	-	-	7	5	-	-
Hero Flame	French	BS	-	12.5	-	-	14.2	-	1.2	-	-	-	7	3	-	-
Hero French	French	BS	-	10.0	-	-	15.0	-	1.5	-	-	-	4	2	-	-
Hero Gold	French	BS	-	12.0	-	-	20.5	-	1.7	-	-	-	6	4	-	-
Hero Harmony	French	BS	-	12.0	-	-	17.0	-	1.5	-	-	-	8	4	-	-
Hero Mix	French	BS	-	11.5	-	-	17.0	-	2.0	-	-	-	7	2	-	-
Hero Orange	French	BS	9.0	-	-	14.0	-	-	2.3	6	6	4	-	-	-	-
Hero Red	French	BS	-	12.0	-	-	15.0	-	1.5	-	-	-	7	6	-	-
Hero Spry	French	BS	-	13.0	-	-	14.5	-	2.0	-	-	-	9	2	-	-
Hero Yellow	French	BS	9.0	7.7	-	16.0	12.2	-	2.0	5	8	5	4	5	-	-
Janie Bright Yellow	French	GD	8.0	8.5	-	13.0	14.0	-	1.9	5	8	5	7	4	-	-
Janie Deep Orange	French	GD	8.0	7.5	-	13.0	8.5	-	1.9	6	5	3	4	3	-	-
Janie Flame	French	GD	9.0	7.7	-	16.0	13.2	-	2.0	7	6	8	6	2	-	-
Janie Harmony	French	GD	-	10.0	-	-	14.0	-	1.7	-	-	-	6	3	-	-
Janie Mix	French	GD	-	7.2	-	-	11.7	-	1.5	-	-	-	6	2	-	-
Janie Primrose	French	GD	-	8.0	-	-	1.3	-	1.0	-	-	-	6	3	-	-
Janie Spry	French	GD	8.0	6.5	8.5	12.0	7.0	13.5	1.7	5	6	5	3	3	5	3
Little Hero Flame	French	BS	-	7.0	-	-	7.0	-	1.7	-	-	-	3	2	-	-
Little Hero Gold	French	BS	-	9.0	-	-	12.0	-	1.5	-	-	-	5	5	-	-
Little Hero Harmony	French	GD	-	9.0	-	-	15.0	-	1.7	-	-	-	5	4	-	-
Little Hero Mix	French	BS	-	8.0	-	-	9.5	-	1.7	-	-	-	5	3	-	-
Little Hero Orange	French	BS	8.0	8.2	-	14.0	11.2	-	1.7	4	4	3	-	-	-	-
Little Hero Spry	French	BS	7.0	8.0	-	13.0	12.5	-	1.7	4	4	3	6	2	-	-
Little Hero Yellow	French	BS	-	10.7	-	-	20.2	-	1.5	-	-	-	5	4	-	-
Safari Bolero	French	BS	-	10.0	-	-	12.5	-	2.0	-	-	-	4	3	-	-
Safari Gold	French	BS	-	9.5	-	-	13.0	-	2.5	-	-	-	4	5	-	-
Safari Mix	French	BS	-	12.0	-	-	17.0	-	2.5	-	-	-	8	4	-	-
Safari Orange	French	BS	10.0	15.0	-	17.0	20.0	-	2.8	5	5	4	6	4	-	-
Safari Primrose	French	BS	-	12.5	-	-	14.0	-	2.2	-	-	-	7	2	-	-
Safari Queen	French	BS	-	15.0	-	-	22.0	-	2.2	-	-	-	7	2	-	-
Safari Scarlet	French	BS	-	14.2	-	-	17.0	-	2.0	-	-	-	8	5	-	-
Safari Tangerine	French	BS	11.0	12.5	-	18.0	21.0	-	2.4	6	5	4	7	2	-	-
Safari Yellow	French	BS	-	11.0	-	-	16.5	-	2.0	-	-	-	8	6	-	-
Zenith Golden Yellow	Triplid	CL	-	-	8.5	-	-	13.5	2.0	-	-	-	-	-	5	1
Zenith Lemon Yellow	Triplid	CL	-	-	16.0	-	-	14.5	2.5	-	-	-	-	-	7	2
Zenith Orange	Triplid	CL	9.0	-	-	11.0	-	-	2.3	5	5	3	-	-	-	-

¹ See Source List for seed source key. ² Mature height including flowers, site average. ³ Width of flower head; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

PANSY

Pansies (*Viola x wittrockiana*) are botanically considered biennials or perennials, but are thought of as annuals because in most places their flowering lives last only one gardening year. They can survive a Minnesota winter to bloom again.

Fall planting of pansy cultivars is the newest trend. Minnesota's 1994 trials examined cultivars planted the previous spring (June 18, 1993), the previous fall (September 1, 1993), and the current year (June 1994). All grew and flowered comparably well in the 1994 summer.

Pansy flowers can be found in nearly every color imaginable, as single colors, mixes and

blends, and with smooth flowers or ruffles. Larger flowers, more vigorous plants and the increased ability to bloom in hot weather are characteristic of modern cultivars. They do, however, prefer cooler temperatures, and tolerate partial shade.

Small-flowered pansies, or violas, are becoming quite popular with consumers, and more cultivars are released yearly.

Pansy seeds are sown in mid-January if they are to flower between May and June. They need good, well-drained soil and cooler temperatures to germinate, and cool, 50°F temperatures for growing. They should be set out in

the garden as soon as possible in the spring.

Pansies are considered to be medium-maintenance plants that flower best when old blossoms are picked off before going to seed. Sprawling branches can be cut back close to the base to allow for new growth and blooms.

The pansy market continues to expand. In 1994, pansies were fourth in total sales and accounted for about 6 percent of the total U.S. bedding plant crop. Among bedding plant growers/marketers, 55 percent rated pansy sales as excellent in 1994, up from 45 percent the previous year.

Table 10. Pansy cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

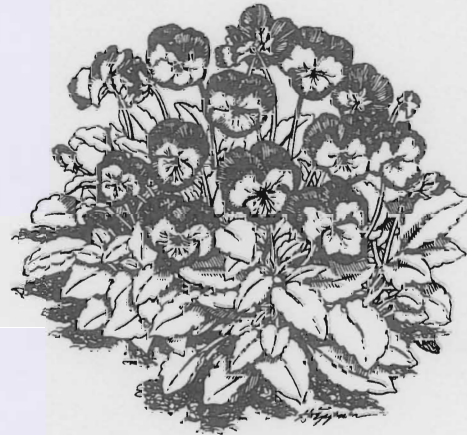
Cultivar	Planted	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids		Morris		St. Paul		
			8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Accord Rose Blotch	spring-93	GD	10.0	-	-	21.0	-	-	2.0	7	7	6	-	-	-	-
Bingo Red & Yellow	spring-93	PA	9.0	-	-	16.0	-	-	2.3	5	6	5	-	-	-	-
Crown Rose	spring-93	SK	10.0	-	-	13.0	-	-	2.0	6	6	5	-	-	-	-
Crystal Bowl Rose	spring-93	SK	9.0	-	-	20.0	-	-	2.0	7	8	7	-	-	-	-
Crystal Bowl Scarlet	spring-93	SK	6.0	-	-	20.0	-	-	1.8	6	6	4	-	-	-	-
Fama Red	spring-93	EB	8.0	-	-	19.0	-	-	2.3	6	6	4	-	-	-	-
Fama Silver Blue	spring-93	EB	9.0	-	-	16.0	-	-	1.8	5	7	4	-	-	-	-
Giant Forerunner Illumination	spring-93	EB	8.0	-	-	19.0	-	-	2.3	5	7	5	-	-	-	-
Giant Forerunner Ruby	spring-93	EB	10.0	-	-	21.0	-	-	1.8	8	7	6	-	-	-	-
Imperial Frosty Rose	spring-93	AT	19.0	-	-	11.0	-	-	2.3	6	8	7	-	-	-	-
Imperial Pink Shades	spring-93	AT	8.0	-	-	25.0	-	-	1.8	7	8	6	-	-	-	-
Joker Mahogany-Gold	spring-93	EB	9.0	-	-	24.0	-	-	1.9	6	7	5	-	-	-	-
Jolly Joker	spring-93	AAS	9.0	-	-	19.0	-	-	1.8	4	6	3	-	-	-	-
Maxim Marina	spring-93	SK	8.0	-	-	30.0	-	-	2.0	6	9	6	-	-	-	-
Maxim Red	spring-93	SK	8.0	-	-	17.0	-	-	2.0	7	7	5	-	-	-	-
Maxim Red & Yellow	spring-93	SK	7.0	-	-	19.0	-	-	1.8	6	8	5	-	-	-	-
Maxim Rose	spring-93	SK	8.0	-	-	17.0	-	-	2.0	7	8	5	-	-	-	-
Maxim Sunset	spring-93	SK	9.0	-	-	17.0	-	-	2.0	6	7	4	-	-	-	-
Padparadja	spring-93	EB	8.0	-	-	17.0	-	-	2.0	5	6	4	-	-	-	-
Presto	spring-93	SH	7.0	-	-	19.0	-	-	1.8	7	8	4	-	-	-	-

Table 10 (continued). Pansy cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Planted	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Raspberry Rose	spring-93	TM	9.0	-	-	19.0	-	-	2.0	7	6	5	-	-	-	-
Regal Red & Yellow w/Blotch	spring-93	SK	10.0	-	-	24.0	-	-	1.8	5	6	5	-	-	-	-
Regal Rose with Blotch	spring-93	SK	12.0	-	-	16.0	-	-	2.3	7	6	6	-	-	-	-
Regal Scarlet with Blotch	spring-93	SK	9.0	-	-	13.0	-	-	1.8	7	6	4	-	-	-	-
Regal White w/Rose Blotch	spring-93	SK	8.0	-	-	20.0	-	-	2.0	6	7	6	-	-	-	-
Regal Yellow w/Red Blotch	spring-93	SK	8.0	-	-	15.0	-	-	2.3	5	8	5	-	-	-	-
Skyline Red	spring-93	SG	7.0	-	-	20.0	-	-	1.8	7	5	3	-	-	-	-
Skyline Red Wing	spring-93	SG	9.0	-	-	21.0	-	-	2.0	8	8	7	-	-	-	-
Ultima Pink Shades	spring-93	SK	7.0	-	-	23.0	-	-	2.0	8	7	5	-	-	-	-
Universal Mix	spring-93	GO	10.0	-	-	21.0	-	-	1.8	7	8	6	-	-	-	-
Universal Red Bicolor	spring-93	GO	8.0	-	-	20.0	-	-	2.0	8	7	6	-	-	-	-
Watercolor Pansies	spring-93	SH	8.0	-	-	21.0	-	-	1.8	6	8	5	-	-	-	-

Pansy 'Jolly Joker'

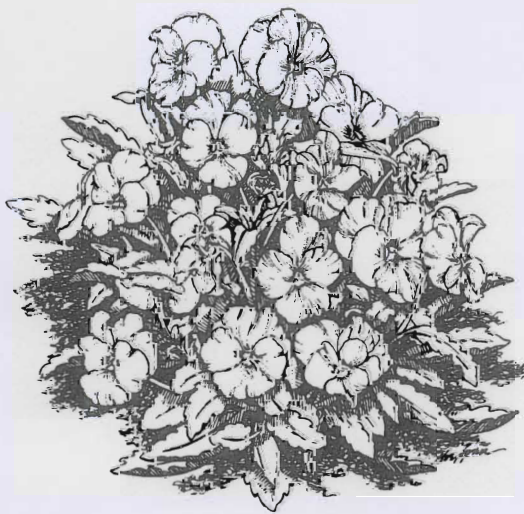
This stunning orange/purple bicolor is an attention getter. It has better than average heat and weather tolerance, dwarf habit and large flowers. Normal pansy culture produces a flowering pack in about four months. This was a 1990 All-America Selections choice.



Accord Rose Blotch	fall-93	GO	10.0	-	-	18.0	-	-	2.5	5	9	3	-	-	-	-
Crown Golden	fall-93	SK	8.0	-	-	16.0	-	-	2.5	6	7	3	-	-	-	-
Crown Rose	fall-93	SK	7.0	-	-	13.0	-	-	2.0	4	5	2	-	-	-	-
Crown Scarlet	fall-93	SK	9.0	-	-	17.0	-	-	2.0	6	7	3	-	-	-	-
Crystal Bowl Rose	fall-93	SK	11.0	-	-	18.0	-	-	2.0	6	8	2	-	-	-	-
Crystal Bowl Scarlet	fall-93	SK	8.0	-	-	15.0	-	-	2.0	4	6	3	-	-	-	-
Fama Red	fall-93	EB,SK	9.0	-	-	16.0	-	-	2.1	5	5	2	-	-	-	-
Fama Silver Blue	fall-93	EB	7.0	-	-	18.0	-	-	2.0	6	8	2	-	-	-	-
Giant Forerunner Illumination	fall-93	EB	9.0	-	-	16.0	-	-	2.0	5	7	3	-	-	-	-
Giant Forerunner Ruby	fall-93	EB	11.0	-	-	19.0	-	-	2.0	7	6	3	-	-	-	-
Imperial Frosty Rose	fall-93	SK	8.0	-	-	17.0	-	-	2.3	6	8	2	-	-	-	-
Imperial Pink Shades	fall-93	AT	8.0	-	-	16.0	-	-	2.0	5	7	3	-	-	-	-
Joker Mahogany-Gold	fall-93	EB	9.0	-	-	16.0	-	-	2.0	3	8	3	-	-	-	-
Maxim Marina	fall-93	SK	9.0	-	-	24.0	-	-	2.0	6	8	3	-	-	-	-
Maxim Red	fall-93	SK	11.0	-	-	19.0	-	-	2.3	5	7	3	-	-	-	-
Maxim Rose	fall-93	SK	9.0	-	-	16.0	-	-	2.3	7	7	4	-	-	-	-
Maxim Sunset	fall-93	SK	7.0	-	-	14.0	-	-	2.3	5	6	2	-	-	-	-
Paparadja	fall-93	EB	9.0	-	-	19.0	-	-	1.5	5	7	3	-	-	-	-
Regal Rose with Blotch	fall-93	SK	7.0	-	-	14.0	-	-	2.0	6	7	3	-	-	-	-
Regal Scarlet with Blotch	fall-93	SK	10.0	-	-	13.0	-	-	2.5	6	7	3	-	-	-	-

Table 10 (continued). Pansy cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Planted	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
			8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Regal Yellow w/Red Blotch	fall-93	SK	8.0	-	-	14.0	-	-	2.0	5	7	2	-	-	-	-
Ringo Red & Yellow	fall-93	FA	7.0	-	-	16.0	-	-	2.0	6	6	3	-	-	-	-
Ultima Pink Shades	fall-93	SK	9.0	-	-	16.0	-	-	2.0	7	6	3	-	-	-	-
Universal Red	fall-93	GU	9.0	-	-	14.0	-	-	2.0	6	7	4	-	-	-	-
All Sky Mix	spring-94	SG	10.0	-	5.0	12.0	-	5.0	1.9	7	8	5	-	-	2	4
Atlas Purple	spring-94	BS	8.0	8.0	9.0	13.0	13.0	7.0	2.2	7	7	5	9	6	6	6
Atlas Yellow	spring-94	BS	9.0	9.7	8.5	11.0	16.7	9.0	2.3	7	7	5	8	7	2	2
Crown Blue	spring-94	SK	-	8.5	-	-	9.2	-	2.0	-	-	-	6	6	-	-
Crown Mix	spring-94	SK	6.0	-	8.0	10.0	-	9.0	2.0	3	8	4	-	-	1	1
Crown Orange	spring-94	SK	-	8.0	-	-	18.0	-	2.2	-	-	-	5	4	-	-
Crown Rose	spring-94	SK	-	6.5	-	-	11.2	-	1.5	-	-	-	7	5	-	-
Crown Scarlet	spring-94	SK	-	4.5	-	-	6.2	-	1.5	-	-	-	1	1	-	-
Crown White	spring-94	SK	-	8.2	-	-	12.5	-	2.2	-	-	-	7	5	-	-
Crown Yellow	spring-94	SK	7.0	-	7.0	10.0	-	6.0	2.2	6	7	5	-	-	2	3
Crown Yellow Splash	spring-94	SK	-	7.0	-	-	11.7	-	1.5	-	-	-	7	8	-	-
Crystal Bowl Blue Center	spring-94	SK	-	7.0	-	-	10.5	-	1.5	-	-	-	4	4	-	-
Crystal Bowl Deep Blue	spring-94	SK	-	7.0	-	-	8.5	-	1.5	-	-	-	5	5	-	-
Crystal Bowl Mix	spring-94	SK	6.0	-	8.5	9.0	-	8.0	2.1	5	7	8	-	-	5	5
Crystal Bowl Orange	spring-94	SK	-	8.5	-	-	17.5	-	1.7	-	-	-	7	7	-	-
Crystal Bowl Rose	spring-94	SK	-	10.5	-	-	10.5	-	1.5	-	-	-	7	8	-	-
Crystal Bowl Scarlet	spring-94	SK	-	7.5	-	-	17.0	-	2.0	-	-	-	3	2	-	-
Crystal Bowl True Blue	spring-94	SK	-	6.0	-	-	10.5	-	1.2	-	-	-	6	4	-	-
Crystal Bowl White	spring-94	SK	-	7.0	-	-	18.0	-	1.5	-	-	-	6	6	-	-
Crystal Bowl Yellow	spring-94	SK	-	9.0	-	-	18.2	-	1.2	-	-	-	8	8	-	-
DeChalon Mix	spring-94	CL	8.0	-	-	8.0	-	-	1.5	2	6	5	-	-	-	-
Delta Blue with Blotch	spring-94	SG	8.0	-	6.5	7.0	-	8.0	2.1	5	7	5	-	-	2	4
Delta Carmine with Blotch	spring-94	SG	6.0	-	-	8.0	-	-	2.8	4	6	5	-	-	-	-
Delta Mix	spring-94	SG	8.0	-	-	12.0	-	-	2.5	3	3	4	-	-	-	-
Delta Pure Colours Mix	spring-94	SG	7.0	-	-	10.0	-	-	2.0	3	4	3	-	-	-	-



Pansy 'Pacparadja'

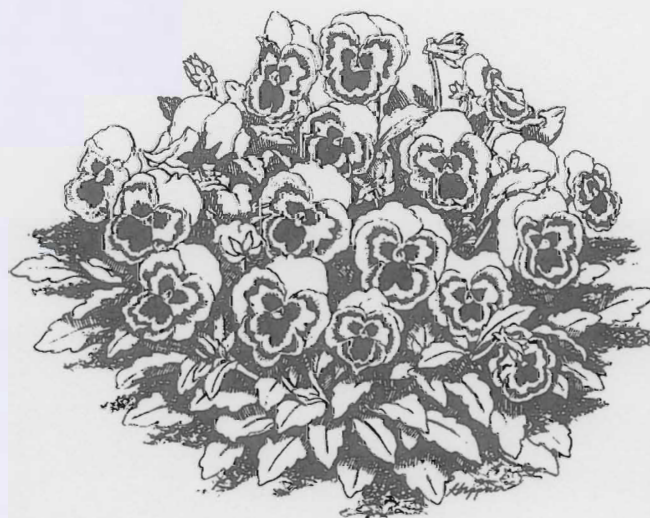
This deep, pure orange colored pansy is a floral gem. A small 6-inch plant, it retains its rich color even in hot summer weather. It performs well in sun or semishade and is easily grown from seed. This was a 1991 All-America Selections choice.

Table 10 (continued). Pansy cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Planted	Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
										8/10	9/6	9/15	8/5	9/9	7/27	9/21
Presto Primrose	spring-94	BS	-	7.5	-	-	14.0	-	1.5	-	-	-	5	4	-	-
Presto Purple	spring-94	BS	-	8.0	-	-	18.0	-	1.7	-	-	-	7	5	-	-
Presto Red	spring-94	BS	-	7.5	-	-	11.2	-	1.5	-	-	-	7	5	-	-
Presto Rose	spring-94	BS	-	8.0	-	-	13.7	-	1.2	-	-	-	7	5	-	-
Presto White	spring-94	BS	-	5.5	-	-	19.0	-	3.0	-	-	-	7	6	-	-
Presto Yellow	spring-94	BS	-	9.0	-	-	13.2	-	1.5	-	-	-	8	7	-	-
Purple Crown	spring-94	SK	6.0	-	6.3	8.0	-	4.5	2.6	5	7	5	-	-	2	2
Regal Deep Blue w/Blotch	spring-94	SK	-	10.0	-	-	12.5	-	2.2	-	-	-	8	6	-	-
Regal Mix	spring-94	SK	6.0	-	-	10.0	-	-	2.3	6	8	5	-	-	-	-
Regal Orange with Blotch	spring-94	SK	7.0	-	-	11.0	-	-	2.3	4	8	4	-	-	-	-

Pansy 'Maxim Marina'

A tough and enduring pansy with delicate blue and white flowers. With enough moisture, even continuous sun and heat will not stop its flowering. It grows easily in beds and containers. This was a 1991 All-America Selections choice.



Roc Formula Mix	spring-94	SG	9.0	-	-	13.0	-	-	2.5	6	8	5	-	-	-	-
Roc Golden	spring-94	SG	9.0	-	7.5	10.0	-	6.5	2.5	7	7	5	-	-	2	4
Ultima Beacon Bicolor	spring-94	SK	6.0	-	10.0	7.0	-	9.0	1.8	5	8	7	-	-	7	4
Ultima Pink Shades	spring-94	SK	8.0	-	8.5	14.0	-	8.5	2.4	7	8	4	-	-	1	3
Ultima Silhouette Mix	spring-94	SK	6.0	-	7.0	9.0	-	5.5	2.1	5	8	4	-	-	3	2
Universal Plus Clear Mix	spring-94	GD	6.0	-	-	9.0	-	-	2.3	5	7	4	-	-	-	-
Universal Plus Faces Mix	spring-94	GD	9.0	-	-	11.0	-	-	2.0	6	7	5	-	-	-	-
Watercolors Mix	spring-94	CL	9.0	-	-	14.0	-	-	2.3	8	7	6	-	-	-	-

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

PETUNIA

The ancestors of the modern *Petunia* probably originated in South America. Breeding among open-pollinated cultivars was pioneered by a French botanist in the 1800s. Modern hybrids were introduced in the 1950s and now essentially form the entire market. There are hundreds of named varieties, categorized according to flower size and growth habit as multifloras, floribundas or grandifloras, single or double types, or as the new landscape types.

Large-flowered grandifloras have been the most popular type, although they have fewer flowers than the smaller free-flowering multifloras. Recently, however, floribunda petunias that combine many of the better qualities of both have been gaining in popularity. All cul-

tivars bloom throughout the summer. Flowers can be found in almost every color: white, pink, red, blue, lavender, purple, yellow and combinations. Many petunias have been designated All-America Selections over the years.

Petunia seeds are very small (there are about 200,000 per ounce) and must be sown carefully on the surface of a moist, light soil mix. They require light and uniform moisture. Germination takes about one week.

To keep petunias in bloom in the garden, faded flowers should be removed, along with the portion of the plant immediately below the flower where the seeds form. Petunias require full sun and a warm soil. Plant heights range between 10 and 15 inches.

Insects are not usually a problem in production, but diseases can be, specifically damping-off caused by *Rhizoctonia*, *Pythium* or *Phytophthora*.

The multiflora and floribunda petunias generally provide more colorful displays and hold up better under wet weather than do grandifloras.

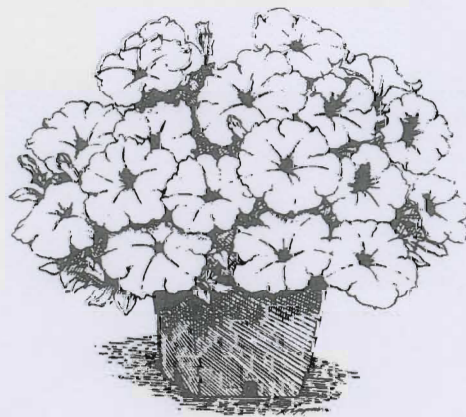
Petunias are the second most popular annuals, substantially trailing impatiens but now surpassing geraniums. Petunias accounted for about 9 percent of the 1994 U.S. market for bedding plants. Many bedding plant growers/marketers (38 percent) strongly rated them as excellent items.

Table 11. *Petunia* cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Celebrity Blue	floribunda	BS	11.0	15.5	—	26.0	30.0	—	2.8	6	8	4	7	7	—	—
Celebrity Blue Ice	floribunda	BS	14.0	—	—	29.0	—	—	3.0	8	9	4	—	—	—	—
Celebrity Burgundy	floribunda	BS	—	16.2	—	—	36.0	—	2.5	—	—	—	8	5	—	—
Celebrity Chiffon Morn	floribunda	BS	16.0	14.5	12.0	34.0	38.0	20.0	2.6	7	9	4	8	7	10	6
Celebrity Desert Sky Mix	floribunda	BS	13.0	—	—	20.0	—	—	2.5	6	7	4	—	—	—	—
Celebrity Hot Pink	floribunda	BS	—	16.0	—	—	36.0	—	2.5	—	—	—	6	5	—	—
Celebrity Just Pink Mix	floribunda	BS	16.0	—	—	27.0	—	—	2.8	5	6	4	—	—	—	—
Celebrity Lilac	floribunda	BS	—	15.8	—	—	35.3	—	3.0	—	—	—	6	7	—	—
Celebrity Morn Mix	floribunda	BS	13.0	—	—	33.0	—	—	2.8	6	8	5	—	—	—	—
Celebrity Niagara Mix	floribunda	BS	14.0	—	—	36.0	—	—	3.0	7	8	4	—	—	—	—
Celebrity Peach Ice	floribunda	BS	—	11.2	—	—	23.2	—	2.5	—	—	—	6	7	—	—
Celebrity Pink Morning	floribunda	BS	18.0	18.5	—	36.0	31.3	—	2.6	8	8	4	7	5	—	—
Celebrity Raspberry Ice	floribunda	BS	—	15.2	—	—	34.5	—	2.5	—	—	—	6	7	—	—
Celebrity Red Morning	floribunda	BS	—	13.5	—	—	52.0	—	2.5	—	—	—	8	7	—	—
Celebrity Rose Star	floribunda	BS	—	16.0	—	—	35.2	—	2.7	—	—	—	8	7	—	—
Celebrity Salmon	floribunda	BS	19.0	13.7	—	34.0	34.2	—	2.8	8	9	5	7	7	—	—
Celebrity Sky Blue	floribunda	BS	15.0	15.8	—	36.0	28.0	—	2.7	8	8	4	7	6	—	—
Celebrity Strawberry Ice	floribunda	BS	—	14.0	—	—	36.0	—	2.7	—	—	—	7	7	—	—
Celebrity Summer Ice	floribunda	BS	—	13.0	—	—	38.0	—	2.2	—	—	—	6	3	—	—
Celebrity White	floribunda	BS	14.0	10.0	—	31.0	36.0	—	2.9	7	8	3	7	6	—	—

Table 11 (continued). Petunia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Madness Double Rose	floribunda	BA	-	17.0	21.0	-	23.7	11.5	2.5	-	-	-	8	7	7	5
Madness Plum Crazy	floribunda	BA	17.0	13.0	-	31.0	43.0	-	2.9	7	8	3	8	7	-	-
Madness Rose Improved	floribunda	BA	-	19.5	-	-	31.5	-	2.7	-	-	-	7	7	-	-
Aladdin Blue	grandiflora	GD	14.0	12.0	-	25.0	36.5	-	3.6	7	4	4	7	7	-	-
Aladdin Pink	grandiflora	BS	-	10.8	-	-	26.0	-	3.0	-	-	-	8	6	-	-
Aladdin Red	grandiflora	GO	13.0	10.0	-	26.0	30.5	-	3.3	5	8	4	5	5	-	-
Aladdin Salmon	grandiflora	GO	15.0	12.0	-	28.0	20.5	-	3.3	7	8	4	5	6	-	-
Aladdin White	grandiflora	BS	-	13.0	-	-	28.0	-	3.5	-	-	-	6	6	-	-
Cherry Frost	grandiflora	GO	-	14.5	14.0	-	33.2	13.0	2.8	-	-	-	6	4	5	5
Flash Blue	grandiflora	SG	14.0	-	-	29.0	-	-	3.3	7	7	5	-	-	-	-



Petunia 'Celebrity Chiffon Mom'

Winner of the 1995 AAS Bedding Plant Award, this floribunda has 2.5-inch blooms in an eye-catching pastel pink. These mounded plants grow 24 inches high with an equal spread. Fresh flowers are immediately produced after severe weather such as wind or rain, making this cultivar very weather-tolerant. It also quickly flowers from seed (in about eight to 10 weeks), especially if grown when temperatures drop below 60°F at night.

Flash Blue/White	grandiflora	SG	14.0	-	-	30.0	-	-	3.5	6	6	4	-	-	-	-
Flash Coral	grandiflora	SG	13.0	-	-	25.0	-	-	2.8	5	7	4	-	-	-	-
Flash Pink Centre	grandiflora	SG	15.0	-	-	27.0	-	-	3.3	7	8	4	-	-	-	-
Flash Red	grandiflora	SG	11.0	-	-	27.0	-	-	3.5	4	6	5	-	-	-	-
Flash Salmon	grandiflora	SG	12.0	-	-	28.0	-	-	3.0	7	8	3	-	-	-	-
Prism Rose Halo	grandiflora	CL	-	21.7	13.5	-	34.7	10.0	3.0	-	-	-	6	4	4	5
Rose Frost	grandiflora	GO	-	18.2	-	-	31.7	-	2.2	-	-	-	6	5	-	-
Ultra Blue	grandiflora	GO	14.0	18.0	-	29.0	29.5	-	3.1	7	7	5	6	6	-	-
Ultra Blue Star	grandiflora	GO	20.0	-	-	30.0	-	-	2.8	6	5	4	-	-	-	-
Ultra Blue Vein	grandiflora	GO	14.0	15.0	-	25.0	28.5	-	3.0	7	6	3	6	3	-	-
Ultra Burgundy	grandiflora	BCI	-	12.2	-	-	26.0	-	3.2	-	-	-	5	5	-	-
Ultra Crimson Star	grandiflora	GO	18.0	14.0	-	26.0	25.2	-	3.4	7	6	4	7	5	-	-
Ultra Light Pink Vein	grandiflora	BCI	18.0	11.7	-	30.0	26.7	-	3.5	7	8	4	7	6	-	-
Ultra Peppermint	grandiflora	BCI	-	13.7	-	-	25.5	-	3.0	-	-	-	6	4	-	-
Ultra Pink	grandiflora	BCI	-	12.7	-	-	34.7	-	3.0	-	-	-	7	3	-	-
Ultra Plum	grandiflora	GO	13.0	11.5	-	29.0	24.2	-	3.1	6	5	3	5	4	-	-
Ultra Red	grandiflora	GO	18.0	11.0	-	34.0	20.5	-	3.0	6	6	3	4	3	-	-
Ultra Red Star	grandiflora	GO	15.0	15.0	-	31.0	24.5	-	3.1	7	6	3	6	5	-	-
Ultra Rose	grandiflora	GO	-	15.0	-	-	34.2	-	3.2	-	-	-	5	5	-	-
Ultra Rose Star	grandiflora	GO	-	13.2	-	-	26.2	-	3.0	-	-	-	6	6	-	-

Table 11 (continued). Petunia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
Ultra Salmon	grandiflora	GO	15.0	10.0	—	30.0	30.0	—	3.4	7	6	4	5	5	—	—
Ultra Scarlet	grandiflora	GO	13.0	10.5	—	29.0	30.0	—	3.2	6	6	4	4	4	—	—
Ultra Sky Blue	grandiflora	GO	13.0	—	—	30.0	—	—	2.8	7	4	3	—	—	—	—
Ultra White	grandiflora	GO	16.0	10.5	—	33.0	37.0	—	3.6	5	5	3	6	5	—	—
Horizon Flame	multiflora	CL	13.0	8.0	—	28.0	18.5	—	2.6	5	5	4	4	2	—	—
Horizon Light Salmon	multiflora	CL	14.0	14.0	18.0	32.0	36.0	30.0	2.7	8	8	4	6	5	9	7
Landscaper Rose	multiflora	GR	—	20.5	—	—	28.0	—	2.0	—	—	—	9	4	—	—
Merlin Blue	multiflora	SK	11.0	16.0	10.5	20.0	28.0	17.0	2.5	6	7	3	6	5	6	6
Merlin Cherry Rose	multiflora	SK	—	15.7	—	—	34.2	—	2.0	—	—	—	5	6	—	—
Merlin Pink	multiflora	SK	—	11.0	—	—	30.5	—	3.0	—	—	—	6	6	—	—
Merlin Red	multiflora	SK	10.0	8.0	13.5	20.0	20.5	19.5	2.2	5	7	4	5	5	8	7
Merlin Salmon	multiflora	SK	13.0	13.5	—	23.0	24.2	—	2.5	9	6	3	9	5	—	—
Merlin White	multiflora	SK	13.0	15.0	15.0	23.0	34.5	20.0	2.8	5	7	3	9	4	8	7
Polo Burgundy Star	multiflora	AAS	14.0	—	14.0	27.0	—	14.0	2.1	8	6	3	—	—	9	7
Polo Salmon	multiflora	AAS	15.0	14.5	13.0	32.0	29.5	28.0	2.3	8	9	4	8	7	6	5
Primetime Blue	multiflora	GO	16.0	17.0	14.0	36.0	35.0	34.0	2.6	9	7	5	8	10	7	7
Primetime Blue Star	multiflora	GO	12.0	14.5	—	32.0	27.0	—	2.4	6	7	4	6	5	—	—
Primetime Burgundy	multiflora	GO	—	14.5	11.5	—	29.2	24.0	2.4	—	—	—	7	5	9	5
Primetime Burgundy Star	multiflora	GO	—	15.5	—	—	2.6	—	2.7	—	—	—	7	4	—	—
Primetime Carmine	multiflora	GO	—	16.2	—	—	34.7	—	2.2	—	—	—	7	7	—	—
Primetime Crystal Plum	multiflora	GO	—	12.0	—	—	44.0	—	2.7	—	—	—	6	2	—	—
Primetime Fiesta White	multiflora	GO	—	18.0	—	—	31.0	—	2.5	—	—	—	7	6	—	—
Primetime Lavender	multiflora	GO	—	21.0	—	—	30.5	—	2.0	—	—	—	8	6	—	—
Primetime Light Blue	multiflora	GO	14.0	16.0	—	36.0	27.5	—	2.3	8	7	4	8	6	—	—
Primetime Lt. Pink Veined	multiflora	GO	12.0	15.0	—	38.0	48.0	—	2.6	8	7	4	8	6	—	—
Primetime Mid Blue	multiflora	GO	14.0	—	—	34.0	—	—	2.5	9	8	4	—	—	—	—
Primetime Pink	multiflora	GO	—	12.0	11.5	—	34.5	12.0	2.1	—	—	—	5	3	7	7
Primetime Pink Morn	multiflora	GO	12.0	—	—	34.0	—	—	2.5	8	8	4	—	—	—	—
Primetime Pink Veined	multiflora	GO	13.0	12.5	11.0	30.0	29.7	16.0	2.7	7	7	4	7	7	7	8
Primetime Plum	multiflora	GO	16.0	—	—	33.0	—	—	2.8	8	7	3	—	—	—	—



Petunia 'Polo Salmon'

This improved multiflora flowers earlier and covers itself with a flat canopy of blooms. It shows heat, drought and weather tolerance. A bedding plant crop can be produced in about 11 weeks. This was a 1990 All-America Selections choice.

Petunia 'Purple Wave'

An All-America Selections choice for 1995, 'Purple Wave' is the only seed-grown cultivar in a new class of petunias that grow horizontally, spreading up to 4 feet. Flowers resemble floribunda types in size and number. Spreading petunias should be grown in pots, not in packs, as the stems quickly intertwine. A perfect plant for sunny hanging baskets or containers, 'Purple Wave' is also an excellent annual ground cover, growing only 6 inches high with great heat and weather tolerance. Seed should be started early since the time from seed to flower is three to four months.

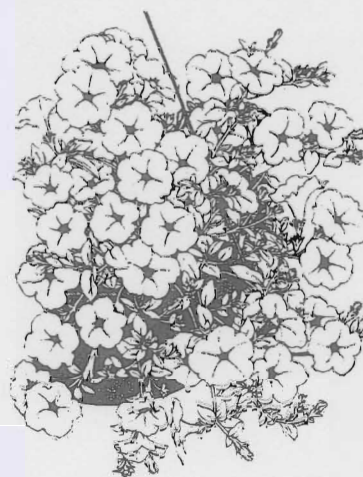
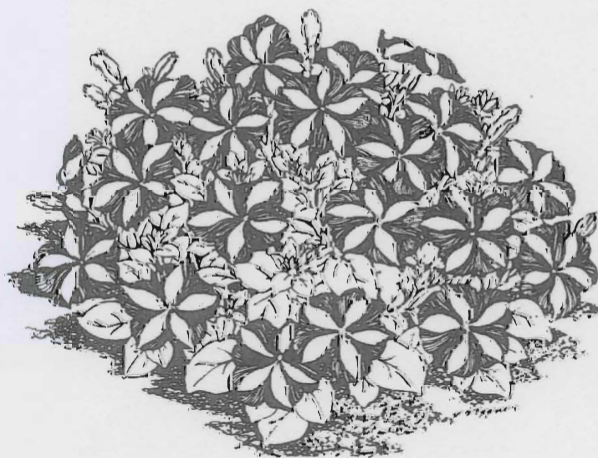


Table 11 (continued). Petunia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
			8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Primetime Red	multiflora	GO	17.0	12.0	—	28.0	25.5	—	2.9	7	6	4	4	5	—	—
Primetime Red Frost	multiflora	GO	14.0	11.2	5.0	23.0	24.7	8.5	2.7	5	5	3	4	3	3	2
Primetime Red Star	multiflora	GO	12.0	15.0	—	30.0	23.2	—	2.3	6	4	3	4	1	—	—
Primetime Red Vein	multiflora	GO	16.0	13.5	—	32.0	31.2	—	2.4	7	6	4	7	6	—	—
Primetime Rose	multiflora	GO	—	15.0	9.0	—	35.5	32.0	2.1	—	—	—	8	5	6	7
Primetime Rose Star	multiflora	GO	—	14.5	—	—	25.2	—	2.5	—	—	—	3	3	—	—
Primetime Salmon	multiflora	GO	14.0	13.7	—	29.0	29.0	—	2.4	8	9	4	8	5	—	—
Primetime Salmon Morn	multiflora	GO	12.0	—	—	36.0	—	—	2.9	7	7	3	—	—	—	—
Primetime Scarlet	multiflora	GO	14.0	13.0	—	27.0	29.7	—	2.3	6	5	4	7	3	—	—
Primetime Twilit, Mid Blue	multiflora	GO	—	24.0	—	—	31.0	—	2.0	—	—	—	6	5	—	—
Primetime White	multiflora	GO	—	—	8.5	—	—	15.0	2.5	—	—	—	—	—	4	4
Purple Wave	landscape	AAS	6.0	—	—	62.0	—	—	2.5	10	10	7	—	—	—	—

Petunia 'Polo Burgundy Star'

This improved single multiflora petunia shows a vivid white star pattern. Its compact spreading habit encourages exceptionally true bloom without shearing or deadheading. Its 2-inch flowers are produced about 10 weeks after greenhouse sowing. This was a 1990 All-America Selections choice.



¹ See Source List for seed source key. ² Mature height including flowers, site average. ³ Width of single blossom, value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

PORTULACA

Portulaca grandiflora is a small, trailing plant with vivid flowers that will normally grow in the poorest of soils, provided it has excellent drainage and full sun. Its double-flowered cultivars, looking like miniature roses, give rise to its common name "moss rose."

Portulaca flowers are phototropic in that they orient themselves toward the sun. They generally open fully only in bright sunlight, and then close at night. However, a few new cultivars (such as the 'Sundial' series) both flower two weeks earlier and open fully under much lower light levels. Portulaca flowers can be pink, red, yellow, cream, white or orange.

The 'Sunnyside Cherry Red' cultivar was a

good performer at Morris in 1994.

Portulaca seed is very fine and will not germinate in cool temperatures.

Portulaca held slightly more than 2 percent of the 1994 U.S. market for bedding plants. The number of bedding plant growers and marketers who considered it to be an excellent or good item dropped to 24 percent.



Portulaca 'Sundial Orange'

The 'Sundial' series offers the grower a rainbow of separate colors, unlike older open-pollinated cultivars only available as mixes. Flowers stay open longer into the evening and also develop up to two weeks earlier in the season. Portulaca is a good choice for dry, sunny areas of poor soil, and requires little or no maintenance.

Table 12. Portulaca cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21
Sundial Cream	BS	—	2.5	—	—	17.7	—	1.0	—	—	—	8	3	—	—
Sundial Fuchsia	BS	7.0	7.0	5.5	23.0	23.0	16.0	1.7	8	6	4	8	2	8	3
Sundial Gold	BS	6.0	3.0	—	20.0	16.5	—	1.6	7	6	4	5	2	—	—
Sundial Mix	BS	4.0	—	—	22.0	—	—	2.0	7	6	5	—	—	—	—
Sundial Orange	BS	3.0	4.5	2.5	16.0	16.5	15.0	1.6	7	5	3	8	2	7	4
Sundial Peppermint	BS	6.0	5.0	9.0	21.0	19.0	19.0	1.6	7	7	5	6	2	8	3
Sundial Pink	BS	—	4.5	—	—	18.0	—	1.7	—	—	—	5	2	—	—
Sundial Scarlet	BS	7.0	8.7	9.0	21.0	16.5	13.0	1.6	7	6	4	8	2	6	3
Sundial White	BS	4.0	6.0	5.0	19.0	20.0	13.5	1.6	7	5	4	7	3	5	3
Sundial Yellow	BS	5.0	5.5	4.0	22.0	17.5	13.0	1.6	6	4	3	5	1	3	3
Sunnyside Cherry Red	CL	9.0	8.5	—	26.0	22.0	—	1.8	7	4	3	9	1	—	—
Sunnyside Mixture	CL	3.0	—	9.0	19.0	—	17.0	1.5	6	6	4	—	—	7	4
Sunnyside Pink	CL	—	—	7.0	—	—	14.0	1.0	—	—	—	—	—	6	3
Sunnyside Red	CL	—	—	6.0	—	—	13.0	1.0	—	—	—	—	—	6	2
Sunnyside Rose	CL	—	3.0	—	—	18.5	—	0.7	—	—	—	3	1	—	—
Sunnyside Rose Clair	CL	—	4.5	—	—	17.5	—	0.7	—	—	—	5	2	—	—

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

SALVIA

The two major species of annual salvia are *splendens* (a compact Brazilian shrub that is not winter hardy) and *farinacea*. The *farinacea* has narrow leaves and clusters of small flowers arrayed along slender, upright stems. A new salvia type (*coccinea*) was introduced in 1992.

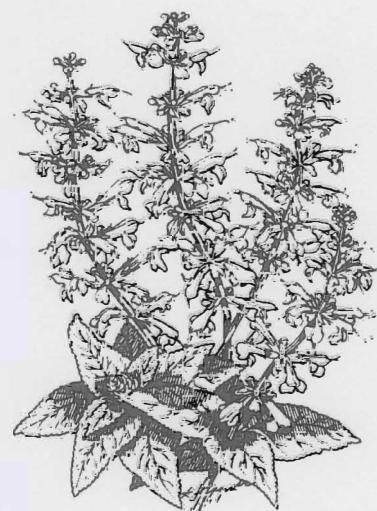
Most *splendens* flowers are red, though newer cultivars offer white, pink and purple shades. The *farinacea* typically has white, blue or purple flowers borne on showy terminal clusters. The flower stalks produce new buds continuously at their tips as they grow taller.

Salvia is a low-maintenance plant. It flowers continuously through late September frost. Salvia can vary in height from 10 to 30 inches.

All three salvia types need full sun for optimal growth, and bring with that need some tolerance for heat and drought. Their seeds, in fact, need considerable heat to germinate. Plants should not be set into the garden until the weather is reliably warm.

Compared to *farinacea* and *coccinea*, *splendens* type salvias did poorly in 1994.

Salvia represented about 3 percent of the 1993 U.S. market for bedding plants. About 13 percent of bedding plant growers/marketers considered them to be excellent items.



Salvia 'Lady in Red'

Derived from a western wildflower, this plant tolerates heat and drought while continuing to open its scarlet flowers. The flower spike is airy and more open than standard salvias, and is produced in about 13 weeks from sowing. This was a 1992 All-America Selections choice.

Table 13. Salvia cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Type	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
			Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	8/21	
Lady In Red	<i>coccinea</i>	AAS	27.0	9.5	-	19.0	8.0	-	4.5	7	10	8	1	2	-	-
Argent White	<i>farinacea</i>	CL	18.0	22.0	13.0	21.0	20.5	14.0	5.7	5	6	6	9	9	3	6
Rhea Blue	<i>farinacea</i>	BS,CL	14.0	21.0	13.5	15.0	20.5	8.0	5.9	5	7	8	7	7	4	7
Victoria	<i>farinacea</i>	BS,CL	17.5	25.0	28.0	18.5	22.5	21.0	8.2	5	8	9	7	9	8	9
Cover Girl	<i>splendens</i>	EB	8.0	11.0	13.5	14.0	14.0	18.0	4.3	6	8	6	1	3	7	6
Fuego	<i>splendens</i>	SG	-	9.0	10.0	-	12.2	18.0	3.5	-	-	-	1	3	6	7
Little Tango	<i>splendens</i>	SK	9.0	5.5	-	13.0	7.0	-	2.4	5	5	4	1	2	-	-
Maestro Red	<i>splendens</i>	CL	8.0	10.2	-	9.0	9.0	-	3.5	4	4	3	1	4	6	1
Sizzler Burgundy	<i>splendens</i>	CL	-	9.5	-	-	9.5	-	2.0	-	-	-	2	3	-	-
Sizzler Deep Salmon	<i>splendens</i>	CL	-	10.0	-	-	8.0	-	3.0	-	-	-	1	1	-	-
Sizzler Lavender	<i>splendens</i>	CL	-	13.5	-	-	9.0	-	6.5	-	-	-	1	4	-	-
Sizzler Mixture	<i>splendens</i>	CL	6.0	-	-	12.0	-	-	1.3	4	5	4	-	-	-	-
Sizzler Purple	<i>splendens</i>	CL	-	11.0	12.0	-	7.0	17.0	4.6	-	-	-	3	5	8	6
Sizzler Red	<i>splendens</i>	CL	6.0	12.5	-	12.0	10.5	-	2.9	5	5	4	3	4	-	-
Sizzler Salmon	<i>splendens</i>	CL	-	-	13.0	-	-	15.0	4.0	-	-	-	-	-	7	8
Sizzler White	<i>splendens</i>	CL	-	9.5	14.5	-	10.5	21.0	3.4	-	-	-	3	5	6	6

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

SNAPDRAGON

More than 200 hybrid snapdragon (*Antirrhinum*) cultivars are currently available. These plants have strong stems topped by long flower heads containing closely spaced blooms which give the appearance of a spike. Flowers can be red, pink, yellow, orange, bronze, white or bicolor.

Snapdragons are exceptionally vigorous. They grow quite uniformly, and are largely resistant to disease. Some snapdragons can stand up well to strong winds, but taller cultivars need to be staked. Snapdragons require sun, like cool temperatures and can survive severe frosts.

For snapdragons to flower through summer heat, seeds must be started early, about 11 weeks before the last frost, so that plants are well established before hot weather arrives. A fine soil or starting mix should be used and the seeds barely covered. Seedlings should be transplanted into small pots for additional growth before going into the garden.

Plants can range from 6-inch dwarves to 30-inch giants. Tall upright cultivars will grow bushier if the main shoot is nipped off when the plants are about 6 inches high. To continue its blooms, a flower head should be cut back to

the branch below as soon as the last flower of a stalk drops.

Snapdragon has held about 2 percent of the U.S. market for bedding plants since 1991. The National Garden Bureau celebrated 1994 as the 'Year of the Snapdragon.'

Table 14. Snapdragon cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
		8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Bells Mixture	GO	12.0	—	6.5	9.0	—	11.0	5.1	5	4	4	—	—	6	4
Carpet Mix	SK	14.0	—	15.0	19.0	—	4.0	6.0	3	6	4	—	—	5	6
Chimes Mix	GO	8.0	—	7.5	10.0	—	8.0	3.5	3	4	3	—	—	3	2
Liberty Bronze	GO	—	20.5	—	—	12.0	—	8.5	—	—	—	4	3	—	—
Liberty Cherry	GO	23.0	19.0	—	13.0	14.5	—	8.8	5	6	6	4	5	—	—
Liberty Crimson	GO	19.0	21.0	—	11.0	12.0	—	7.5	4	7	7	6	5	—	—
Liberty Lavender	GO	—	23.0	18.5	—	14.0	7.5	11.0	—	—	—	5	4	6	5
Liberty Light Pink	GO	—	23.0	—	—	13.0	—	6.8	—	—	—	5	5	—	—
Liberty Mixture	GO	18.0	—	17.5	9.0	—	8.0	6.3	3	6	6	—	—	5	6
Liberty Rose Pink	GO	16.0	20.0	—	14.0	13.5	—	9.3	5	10	8	5	4	—	—
Liberty Scarlet	GO	15.0	21.5	22.8	14.0	12.5	12.0	10.0	5	6	5	6	4	6	4
Liberty White	GO	—	17.2	18.0	—	9.0	12.0	8.0	—	—	—	4	3	5	5
Liberty Yellow	GO	—	22.5	—	—	10.0	—	9.0	—	—	—	3	2	2	1
Royal Carpet Mix	AT	16.0	—	—	19.0	—	—	4.0	4	7	5	—	—	—	—
Showers Formula Mix	SK	9.0	—	—	12.0	—	—	2.8	5	6	4	—	—	—	—
Sonnet Mixed	SK	19.0	—	22.0	12.0	—	8.0	9.6	5	10	5	—	—	6	5
Sonnet Rose	—	—	—	17.0	—	—	9.0	6.8	—	—	—	—	—	5	3
Tahiti Formula Mix	SG	9.0	—	30.0	16.0	—	9.0	3.4	5	9	5	—	—	6	7

¹See Source List for seed source key. ²Mature height including flowers; site average. ³Length of spike; value given is average across sites. ⁴Rating on 1 to 10 scale for floral display and foliage quality.

VERBENA

Clumped masses of clear, bright colors characterize verbena. These plants are noted for tolerating heat and drought. They are also noted for usually solid-colored flowers, sometimes contrasted with a second colored eye in the center of each bloom.

Verbena grows to a height of between 8 and 16 inches, with trailing stems. The stems spread laterally and can root at the joints. It makes a very good flowering ground cover.

Verbena colors are typically blue, pink, red, white or purple. An entirely new type is the 'Imagination' cultivar which was a 1993 All-America Selections choice.

Propagation of verbena can be by either cuttings or seeds. The seeds take about two weeks to germinate in 65°F temperature. They should be started indoors in March for a mid-May outdoor planting. Pinching the main stem as it grows forces branching. Flowers should

also be pinched as they begin to fade, to prevent the plant from setting seeds.

Verbena requires full sun, and is drought and heat tolerant. It needs well-drained soil.

Verbena represented less than 2 percent of the 1994 U.S. market for bedding plants.

Table 15. Verbena cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
		8/10	9/6	9/15	8/5	9/9	7/27		9/21						
Imagination	AAS,EB	6.0	9.7	8.0	29.0	24.0	—	1.6	6	5	4	7	5	5	7
Novalis Bright Scarlet Red	EB	10.0	9.5	15.0	16.0	21.5	16.0	2.2	8	8	4	8	7	8	6
Novalis Brilliant Rose	EB	12.0	12.0	11.0	11.0	22.5	10.0	1.8	7	6	5	7	5	7	5
Novalis Deep Blue w/Eye	EB	9.0	9.5	11.0	12.0	12.2	10.0	2.0	7	8	5	7	5	9	5
Novalis Mix	EB	11.0	—	—	15.0	—	—	2.0	6	8	5	—	—	—	—
Novalis Rose Red w/Eye	EB	11.0	8.0	—	17.0	8.0	—	1.5	8	9	6	5	5	—	—
Novalis Rose with Eye	EB	9.0	7.0	—	13.0	14.0	—	1.8	7	8	6	6	5	—	—
Novalis White	EB	8.0	7.7	—	15.0	18.2	—	1.8	6	4	6	9	5	—	—
Peaches & Cream	AAS	11.0	9.0	13.0	16.0	22.0	25.0	2.7	6	8	5	7	6	9	6
Romance Mix	SG	7.0	—	—	19.0	—	—	2.3	6	8	6	—	—	—	—

Verbena 'Imagination'

A newer hybrid verbena, 'Imagination' has finely cut, grayish-green, lacy leaves that provide an excellent contrast to the brilliant violet flowers. Like most verbenas, it thrives on heat and sun, covering the ground with a rapid spreading habit. This was a 1993 All-America Selections choice.



¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of flower cluster; value given is average across sites. ⁴ Rating on 1 to 10 scale for floral display and foliage quality.

OTHER MISCELLANEOUS ANNUAL BEDDING PLANTS

Although the U.S. bedding plant market is dominated by large sales of a few plants such as impatiens, petunias, and geraniums, a significant demand does exist for annuals that are unusual, that are seen less commonly in gardens or that offer a new look for a land-

scape. Many of these are not new to the trade, but seem new to many gardeners.

The Minnesota cultivar trials incorporate a number of these different species each year, taking a look at both old and new cultivars. This

year's trials included some unusual flowers such as *Trachymene*, *Calandrinia*, sweet pea (*Lathyrus odoratus*), and ornamental sunflowers (*Helianthus*).

Table 16. Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Ageratum Houstonianum</i>															
Blue Blanket	SG	6.0	—	—	12.0	—	—	1.3	7	9	8	—	—	—	—
Danube Blue	BS	8.0	7.0	7.0	14.0	14.6	12.0	0.8	6	9	8	7	7	7	6
Hawaii Blue	BS	7.0	6.5	—	12.0	11.5	—	0.8	6	9	7	8	8	—	—
Hawaii Improved White	BS	7.0	—	6.0	11.0	—	11.5	1.1	7	9	6	—	—	7	7
Hawaii Royal	BS	6.0	5.5	6.5	11.0	9.5	10.0	0.9	6	7	6	6	5	5	3
Hawaii White	BS	—	7.5	—	—	16.0	—	1.0	—	—	—	9	7	—	—
Horizon Tall Blue	SK	19.0	25.0	31.0	30.0	25.0	18.0	0.9	6	9	9	9	7	10	9
Royal Blue	BS	—	6.5	—	—	11.7	—	0.7	—	—	—	7	5	—	—
<i>Alyssum, sweet (Lotularia maritima)</i>															
Golf Pastel Mix	CL	6.0	6.0	4.5	14.0	17.5	11.5	1.0	7	8	8	8	7	6	8
Wonderland Deep Rose	BS	4.0	3.5	4.5	9.0	7.0	10.0	0.6	6	5	7	1	5	8	8
Wonderland Purple	BS	4.0	3.0	6.5	15.0	10.0	12.0	0.6	8	9	9	4	7	8	7
Wonderland White	BS	0.5	5.2	5.0	0.8	15.2	18.0	0.8	8	10	9	9	9	10	8
<i>Amaranthus</i>															
Early Splendor	SK	32.0	16.0	18.0	32.0	21.5	3.8	4.9	4	4	5	1	1	1	1
Illumination	SK	25.0	27.0	42.0	22.0	25.0	25.0	6.8	4	3	4	1	0	3	1
Splendor Perfecta	SK	24.0	—	24.0	27.0	—	13.0	4.8	4	4	4	—	—	2	1
<i>Aster, annual (Callistephus chinensis)</i>															
All Change Blue	T.M.	—	—	—	—	—	—	—	—	—	—	—	—	4	0
Cowbird Supreme	T.M.	—	—	9.0	—	—	5.5	1.8	—	—	—	—	—	3	0
<i>Balsam, garden (Impatiens balsamina)</i>															
Camellia Flowered Mix	L.V.	—	—	43.0	—	—	19.0	2.1	—	—	—	—	—	6	7
<i>Bellis perennis</i>															
Habanera Mix	E.B.	4.0	—	7.5	9.0	—	9.0	1.4	2	2	1	—	—	2	2
<i>Blueweed (Echium vulgare)</i>															
T&M Dwarf Mix	T.M.	—	—	20.0	—	—	27.0	2.0	—	—	—	—	—	9	3

Table 16 (continued). Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴							
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul		
									8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Browallia speciosa</i>																
Starlight Mix	SK	8.0	11.7	-	12.0	12.5	-	0.9	3	5	5	8	8	-	-	
<i>Bush Morning Glory (Convolvulus tricolor)</i>																
Ensign Rose	TM	-	-	10.0	-	-	34.0	1.5	-	-	-	-	-	4	5	
Ensign White	TM	-	-	8.0	-	-	14.5	1.8	-	-	-	-	-	4	3	
<i>Canna</i>																
Tropical Rose	AAS,AT	16.0	33.5	32.0	20.0	22.5	26.5	7.5	4	3	2	2	5	6	7	
<i>Carnation (Dianthus caryophyllus)</i>																
Monarch Light Salmon	GO	9.0	9.0	-	10.0	10.0	-	1.8	5	7	6	4	4	-	-	
Monarch Orange	GO	-	7.2	-	-	9.0	-	1.5	-	-	-	3	3	-	-	
Monarch Pink	GO	-	8.0	-	-	8.0	-	1.5	-	-	-	4	3	-	-	
Monarch Purple	GO	9.0	6.5	-	8.0	8.5	-	1.7	4	6	6	4	3	-	-	
Monarch White	GO	-	8.0	-	-	9.2	-	2.0	-	-	-	6	6	-	-	
Monarch Yellow	GO	8.0	7.5	-	10.0	12.5	-	1.9	6	7	6	5	5	-	-	
<i>Celosia plumosa</i>																
Castle Pink	AAS,AT	10.0	8.0	-	7.8	8.2	-	2.8	6	7	4	2	3	4	1	
Century Mix	SK	-	10.0	21.0	-	10.0	14.3	8.3	-	-	-	3	3	8	7	
Ice Castles	-	-	-	21.0	-	-	17.0	8.0	-	-	-	-	-	10	8	
Kimono Mix	SK	12.5	-	-	10.0	-	-	5.5	6	7	4	-	-	-	-	
Miss Nippon Mix	EB	15.0	8.0	14.0	12.8	7.0	21.0	3.9	5	7	5	2	1	6	3	
Miss Nippon Scarlet	EB	10.0	6.2	15.0	7.0	7.5	20.0	3.8	6	7	4	2	2	7	4	
<i>Chilean bellflower (Notholaena)</i>																
Cliffhanger	-	-	-	3.5	-	-	20.2	2.0	-	-	-	-	-	2	2	



Celosia 'Castle Pink'

This was the first pink plumosa celosia bred for uniform color and habit. The 8-inch plumes retain color even in poor weather, on compact 14-inch plants. This was a 1990 All-America Selections choice.

Canna 'Tropical Rose'

This canna produces large flowers of soft rose above wide, lush foliage in about 100 days from sowing. Its large seeds germinate easily under warm conditions. As with all cannas, this cultivar performs best in warm weather under full sun. The tubers can be saved for the next year if brought indoors before the frost. This was a 1992 All-America Selections choice.



Table 16 (continued). Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
									8/10	9/6	9/15	8/5	9/9	7/27	9/21
<i>Cleome hassleriana</i>															
Queen Mix	BU	-	-	57.0	-	-	45.5	5.5	-	-	-	-	-	8	7
<i>Cosmos</i>															
Ladybird Mix	SK	5.0	18.0	-	7.0	17.7	-	1.5	3	1	0	8	0	-	-
Versailles Mix	SK	19.0	40.0	36.0	23.0	39.0	19.5	3.2	4	5	5	6	1	8	1
<i>Bidens (Trachymene)</i>															
Lacy Blue	BS	-	27.0	-	-	18.0	-	1.5	-	-	-	3	1	5	0
<i>Dill (Anethum graveolens)</i>															
Fernleaf	AAS	16.0	-	-	16.0	-	-	2.8	2	4	1	-	-	-	-
<i>Gaillardia pulchella</i>															
Red Plume	AAS,SG	10.0	-	19.0	11.0	-	23.0	1.9	5	6	5	-	-	8	4
<i>Gazania</i>															
Talent Gold	EB	10.0	7.5	11.0	14.0	11.2	11.0	2.5	6	7	7	6	6	8	6
Talent Mix	EB	8.0	12.0	11.0	13.0	14.5	9.0	2.6	5	6	7	7	6	9	6

*Gaillardia pulchella* 'Red Plume'

A relatively new garden plant, 'Red Plume' is a superior performer under hot and dry growing conditions. It produces large red flowers continuously through the season. It has a compact, branching growth habit and does not require pinching or pruning. This was a 1991 All-America Selections choice.

Gerbera

Skipper Mix	SK	5.0	9.7	4.5	7.0	14.5	10.0	2.7	2	3	3	4	5	3	4
Tempo Mix	SK	4.0	7.7	-	9.0	12.7	-	2.7	3	5	4	6	5	2	0

Godetia (Clarkia amoena)

Satin Deep Rose	SK	10.0	9.2	-	7.0	6.2	-	2.5	7	0	0	6	0	-	-
Satin Lavender	SK	8.0	6.0	-	4.0	3.5	-	1.8	6	2	0	2	0	-	-
Satin Lilac Rose	SK	8.0	7.0	-	12.0	6.0	-	2.3	5	0	0	5	0	-	-
Satin Mixed	SK	8.0	7.5	-	10.0	6.7	-	2.3	7	0	0	6	0	-	-
Satin Pink	SK	6.0	8.0	-	2.0	3.7	-	1.5	1	0	0	2	0	-	-
Satin Red	SK	12.0	7.0	-	5.0	5.0	-	2.0	6	0	0	3	0	-	-
Satin Red w/White Edge	SK	9.0	6.0	-	5.0	4.5	-	2.0	7	0	0	2	0	-	-
Satin Salmon	SK	10.0	8.0	-	7.0	5.7	-	2.8	7	2	0	3	0	-	-
Satin White	SK	6.0	8.2	-	12.0	6.7	-	2.5	7	3	0	2	0	-	-

Table 16 (continued). Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Globe Amaranth (Gomphrena)</i>															
Full Series Mix	TM	—	—	26.5	—	—	14.0	1.0	—	—	—	—	—	10	10
Gnome Rose	SK	5.0	6.0	8.5	7.0	7.2	9.5	0.7	4	6	3	5	6	7	8
Gnome White	SK	7.0	6.7	9.3	9.0	12.2	14.5	0.7	4	7	3	6	7	6	7
<i>Heliotrope (Heliotropium arborescens)</i>															
Marine	LV	—	—	16.0	—	—	11.5	3.0	—	—	—	—	—	5	7
<i>Hollyhock (Alcea rosea)</i>															
Double Mix	NK	—	—	68.0	—	—	12.0	3.3	—	—	—	—	—	6	1
<i>Knautia macedonica</i>															
—	TM	—	—	25.0	—	—	12.0	1.0	—	—	—	—	—	6	2
<i>Lavatera trimestris</i>															
Silver Cup	TM	—	—	24.0	—	—	16.0	2.5	—	—	—	—	—	9	3
<i>Love-in-a-mist (Nigella damascena)</i>															
Persian Jewels	TM	—	—	15.0	—	—	14.0	—	—	—	—	—	—	8	0
<i>Nasturtium (Tropaeolum majus)</i>															
Cherry Rose	—	—	—	16.0	—	—	—	1.8	—	—	—	—	—	6	5
Double Gleam Mix	BU	—	—	21.0	—	—	—	2.3	—	—	—	—	—	6	6
<i>Nicotiana</i>															
Sensation Mix	BU	—	—	32.0	—	—	16.0	1.7	—	—	—	—	—	6	6
<i>Nierembergia</i>															
Mont Blanc	AAS,AT	6.0	9.0	6.0	17.0	15.5	13.0	0.9	6	9	4	9	7	6	4
<i>Pepper (Capsicum annuum)</i>															
Anahaim Chili Hot	—	—	—	26.5	—	—	10.0	6.0	—	—	—	—	—	8	6
Treasures Red	SK	8.0	—	9.0	14.0	—	12.0	1.9	5	8	16	—	—	8	8

Nierembergia 'Mont Blanc'

The first white nierembergia from seed, 'Mont Blanc' combines heat, drought, and severe weather tolerance with delicate, demure good looks. The plant is low, only 9 inches at most, and spreading. Plan on 10 to 17 weeks from seed to flower. This was a 1993 All-America Selections choice.

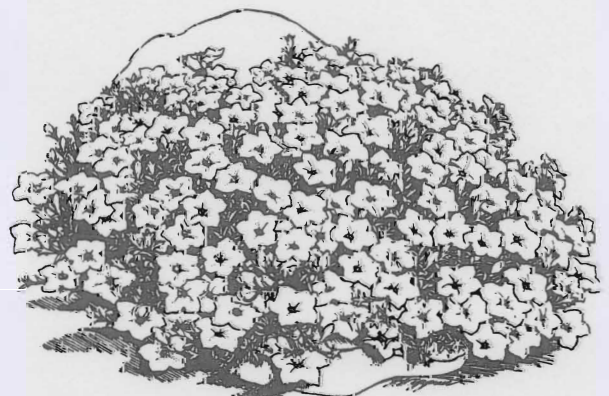


Table 16 (continued). Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Phlox drummondii</i>															
Palona Formula Mix	SG	4.0	—	—	12.0	—	—	2.0	3	7	3	—	—	—	—
<i>Rock Purslane (Calandrinia umbellata)</i>															
—	TM	—	—	6.0	—	—	10.0	0.3	—	—	—	—	—	2	1
<i>Rudbeckia hirta</i>															
Indian Summer	AAS	28.0	—	31.5	18.0	—	14.0	5.8	5	6	9	—	—	8	2
Toto	EB	8.0	8.0	—	9.0	10.8	—	2.4	5	6	7	6	1	5	0
Z-Scape Goldie	GR	27.0	27.2	34.0	40.0	21.2	8.5	2.6	6	8	10	9	7	8	3
<i>Scarlet Flax (Linum grandiflorum)</i>															
Bright Eyes	TM	—	—	10.5	—	—	12.0	1.3	—	—	—	—	—	2	1
Rubrum	TM	—	—	20.0	—	—	14.5	—	—	—	—	—	—	3	0



Rudbeckia 'Indian Summer'

This new black-eyed Susan has huge golden yellow blooms of 8 to 9 inches with a dark center, held on well-branched 3 foot stems. Derived from a wildflower native to the eastern United States, 'Indian Summer' has excellent disease, heat, and drought resistance. Although the parent species can be perennial, this cultivar should be grown as an annual that flowers from seed in 10 to 14 weeks.

Vinca 'Pretty in Rose'

The deep rose-colored flowers of this vinca contrast well against a glossy green foliage. Once established, these rounded 16-inch plants show exceptional heat and drought tolerance. They also do well growing in containers. This was a 1991 All-America Selections choice.



Statice (Limonium sinuatum)

Excellent Mixed	SK	16.0	31.5	29.0	17.0	28.5	16.0	2.1	7	4	4	8	4	3	7
Turbo Apricot	BS	25.0	30.7	25.0	21.0	26.7	14.0	1.7	8	5	5	9	4	7	6
Turbo Blue	BS	22.0	30.2	25.0	17.0	26.5	11.5	1.3	8	5	5	8	5	7	3
Turbo Carnine	BS	21.0	25.7	—	16.0	29.2	—	1.9	8	3	4	8	3	—	—
Turbo Light Blue	BS	—	25.7	—	—	17.2	—	1.0	—	—	—	8	4	—	—
Turbo Peach	BS	—	23.1	—	—	27.5	—	1.0	—	—	—	8	4	—	—
Turbo Purple	BS	27.0	23.5	—	21.0	23.5	—	1.5	8	3	4	7	3	—	—
Turbo White	BS	28.0	28.2	23.0	23.0	31.5	12.0	1.9	9	5	5	7	4	4	6
Turbo Yellow	BS	25.0	26.2	—	28.0	31.5	—	1.9	8	5	4	8	4	—	—

Table 16 (continued). Other miscellaneous annual bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Stock (Mathiola)</i>															
Dwarf Ten Week Mix	-	-	-	19.0	-	-	15.0	12.0	-	-	-	-	-	7	3
Giant Imperial	-	-	-	11.0	-	-	15.0	9.0	-	-	-	-	-	3	6
<i>Sunflower (Helianthus annuus)</i>															
Big Smile	AT	18.0	-	-	13.0	-	-	5.0	6	0	0	-	-	-	-
Floristan	EB	36.0	47.0	37.0	26.0	34.5	16.0	4.3	5	9	7	5	2	5	2
Musicbox	EB	41.0	39.0	-	36.0	36.0	-	3.5	4	9	7	6	1	-	-
Sonja	EB	37.0	42.0	28.0	29.0	24.5	9.0	2.6	5	10	6	6	1	8	1
Sunbeam	SK	34.0	47.0	55.0	24.0	24.0	20.0	8.1	2	6	5	6	1	6	1
Sunbright	SK	44.0	76.0	-	34.0	36.0	-	6.9	2	4	4	4	1	-	-
Valentine	BS,EB	58.0	64.0	54.0	40.0	27.0	25.0	3.8	4	9	8	4	1	6	1
<i>Sweet Pea (Lathyrus odoratus)</i>															
Explorer Mix	BS	8.0	-	-	31.0	-	-	1.5	4	2	1	-	-	-	-
Winter Eleg. Deep Rose	BS	9.0	-	-	24.0	-	-	1.3	5	1	0	-	-	-	-
Winter Eleg. Lavender	BS	6.0	-	-	13.0	-	-	1.5	3	1	0	-	-	-	-
Winter Eleg. Pink Diana	BS	6.0	-	-	24.0	-	-	1.5	4	1	1	-	-	-	-
Winter Elegance Rose	BS	11.0	-	-	23.0	-	-	1.5	4	1	1	-	-	-	-
Winter Elegance Scarlet	BS	14.0	-	-	18.0	-	-	1.5	5	2	1	-	-	-	-
<i>Tomato (Lycopersicon esculentum)</i>															
Red Robin	SK	9.0	-	9.5	11.0	-	8.5	1.0	7	4	7	-	-	8	5
Yellow Canary	SK	9.0	-	-	9.0	-	-	-	7	4	6	-	-	-	-
<i>Torenia fournieri</i>															
Panda Blue	SK	-	4.5	-	-	7.5	-	0.6	1	0	1	3	4	-	-
Panda Pink	SK	-	4.0	9.5	-	6.0	12.0	0.8	2	0	0	1	2	6	5
<i>Vinca (Catharanthus roseus)</i>															
Little Mix	SK	9.0	13.7	12.0	11.0	12.7	12.0	1.4	2	5	4	6	6	6	8
Parasol	AAS	11.0	12.5	14.0	10.0	12.5	17.0	1.3	3	3	3	5	5	8	9
Pretty In Pink	PM	-	-	11.0	-	-	15.5	1.8	-	-	-	-	-	8	9
Pretty In Rose	AAS	9.0	11.5	-	9.0	10.5	-	1.5	3	5	4	4	4	-	-
<i>Zinnia elegans</i>															
Giant Flowered	BU	-	-	29.0	-	-	18.0	2.3	-	-	-	-	-	4	1
Peter Pan Mix	BS,GO	11.0	15.7	-	11.0	16.2	-	3.6	4	7	6	6	4	-	-
Scarlet Splendor	AAS,PM	18.0	30.7	27.0	16.0	29.2	25.0	3.8	5	5	2	7	6	5	0
Short Stuff Mix	GO	11.0	-	8.5	13.0	-	11.0	2.5	4	6	4	-	-	6	1

¹ See Source List for seed source key. ² Mature height including flowers; site average. ³ Width of single blossom or flower head except for sweet alyssum, amaranthus, cleome, didiscus, dill, heliotrope and statice (width of flower cluster); for canna, celosia plumosa and stock (length of spike); for pepper and tomato (length of fruit). ⁴ Rating on 1 to 10 scale for floral/fruit display and foliage quality.

MISCELLANEOUS PERENNIAL BEDDING PLANTS

Interest is growing in raising perennials that will flower from seed the first year. While most perennial plants will not mature in the first year, growers have succeeded in developing some that do. The following perennials were started

from seed in the spring of 1994 and grown and rated as though they were annuals. The achilleas 'Summer Pastels', Coreopsis 'Early Sunrise', and Lavender 'Lady' were All-America Selections in previous years.



Achillea (Yarrow) 'Summer Pastels'

This cultivar is an improved yarrow which is easy to grow almost anywhere. It has a dwarf growth habit and produces a wide range of soft pastel flower colors. It is a perennial that can be grown as a green bedding plant in about 12 weeks from seed. This was a 1992 All-America Selections choice.

Table 17. Miscellaneous perennial bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
								8/10	9/6	9/15	8/5	9/9	7/27	9/21	
<i>Columbine (Aquilegia)</i>															
Music Harmony Mix	EB	9.0	—	—	14.0	—	—	—	3	4	4	—	—	—	—
Rocky Mountain Blue	LV	—	—	6.0	—	—	16.5	—	—	—	—	—	—	1	1
Scott Elliot Mix	NK	—	—	9.0	—	—	11.0	—	—	—	—	—	—	2	2
<i>Campanula carpatica</i>															
Clips Deep Blue	BS,EB	—	8.2	6.5	—	12.5	8.5	1.5	—	—	—	6	4	7	4
<i>Coreopsis</i>															
Early Sunrise	BU	—	—	17.0	—	—	13.0	1.5	—	—	—	—	—	7	5
<i>Delphinium Magic Fountains Series</i>															
Dark Blue w/Dark Bee	BS	30.0	—	—	15.0	—	—	25.0	4	5	8	—	—	—	—
Dark Blue w/White Bee	BS	29.0	—	—	12.0	—	—	16.0	5	6	6	—	—	—	—
Lavender w/White Bee	BS	6.0	—	—	19.0	—	—	23.0	3	6	8	—	—	—	—
Lilac Pink w/White Bee	BS	32.0	—	—	21.0	—	—	20.0	3	5	7	—	—	—	—
Pure White	BS	34.0	—	—	15.0	—	—	25.0	4	3	5	—	—	—	—
Sky Blue w/White Bee	BS	27.0	—	—	10.0	—	—	23.0	4	7	7	—	—	—	—
White w/Dark Bee	BS	29.0	—	—	13.0	—	—	21.0	4	7	5	—	—	—	—
<i>Doronicum</i>															
Goldcut	EB	4.0	—	—	8.0	—	—	—	1	2	1	—	—	—	—

Table 17 (continued). Miscellaneous perennial bedding plant cultivars evaluated in the 1994 bedding plant trials at Grand Rapids, Morris and St. Paul.

Cultivar	Seed Source ¹	Plant Height (inches) ²			Plant Spread (inches)			Flower Size (inches) ³	Overall Quality Rating ⁴						
		Grand Rapids	Morris	St. Paul	Grand Rapids	Morris	St. Paul		Grand Rapids			Morris		St. Paul	
		8/10	9/6	9/15	8/5	9/9	7/27	9/21							
<i>Hibiscus moscheutos</i>															
Disco Belle Mix	SK	14.0	15.5	23.0	18.0	12.0	16.5	5.4	3	4	3	1	5	3	6
<i>Lavender</i>															
Lady	AAS	—	15.2	10.5	—	11.5	15.0	2.8	—	—	—	4	7	5	7
<i>Nepeta faassenii</i>															
Blue Carpet	BA	—	—	14.0	—	—	16.0	1.5	—	—	—	—	—	6	4
<i>Oenothera speciosa</i>															
Pink Petticoats	TM	—	—	10.0	—	—	—	—	—	—	—	—	—	5	6
<i>Salvia X superba</i>															
Blue Queen	EB	11.0	12.5	—	14.0	20.5	—	4.1	4	5	4	6	4	—	—
<i>Yarrow (Achillea millefolium)</i>															
Summer Pastels	AAS	10.0	23.0	22.0	17.0	31.0	16.0	2.6	5	7	7	9	8	10	7

*Coreopsis 'Early Sunrise'*

This plant was one of the first perennials to be recognized as an All-American Selections choice, in 1989. It blooms readily the first year from seed, if started early, and will be covered with bright yellow flowers until frost.

Lavender 'Lady'

This is an improved aromatic herb with dense 10-inch spikes of deep purple blossoms. The soft gray-green foliage has the same clean fragrance as its buds and blossoms. Actually a hardy perennial, 'Lady' will flower the first year from seed when sown four to six months before planting outdoors in a sunny location. Lavender 'Lady' was a 1994 All-America Selections choice.



¹See Source List for seed source key. ²Mature height including flowers; site average. ³Width of single blossom or flower head for campanula, coreopsis and hibiscus; width of flower cluster for achillea and nepeta; length of spike for delphinium, lavender and salvia. ⁴Rating on 1 to 10 scale for floral display and foliage quality.

SEED SOURCES

Source List. Sources of seeds for the 1994 bedding plant trials.

Code	Company Name	Address
AAS	All-America Selection Trials	1311 Butterfield Road, Suite 310, Downers Grove IL 60515
AT	American Takii, Inc.	301 Natividad Road, Salinas CA 93906
BA	George J. Ball, Inc.	P.O. Box 335, West Chicago IL 60185
BS	Bodger Seed, Ltd.	1800 North Tyler Avenue, South El Monte CA 91733
BU	W. Atlee Burpee Company	300 Park Avenue, Warminster PA 18974
CL	Clause Semences Professionnelles	100 Breen Road, San Juan Bautista CA 95045
EB	Ernest Benary	P.O. Box 1127, Muenden, Germany
GO	Goldsmith Seeds, Inc.	2280 Hecker Pass Highway, P.O. Box 1349, Gilroy CA 95020
GR	G.S. Grimes	201 West Main Street, Smethport PA 16749
LV	Lake Valley Seed	5741 Arapahoe, Boulder CO 80303
NK	Northrup King Company	7500 Olson Memorial Highway, Golden Valley MN 55427
PA	Park Seed Company	P.O. Box 31, Greenwood SC 29646
PM	Pan American Seed Company	P.O. Box 438, West Chicago IL 60185
SG	Sluis & Groot	7337 West Jefferson, Suite 250, Fort Wayne IN 46840
SH	Shepard's Garden Seeds	6116 Highway 9, Felton CA 95018
SK	Sakata Seed America, Inc.	P.O. Box 6007, Salinas CA 93912
TM	Thompson & Morgan	P.O. Box 1308, Jackson NJ 08527