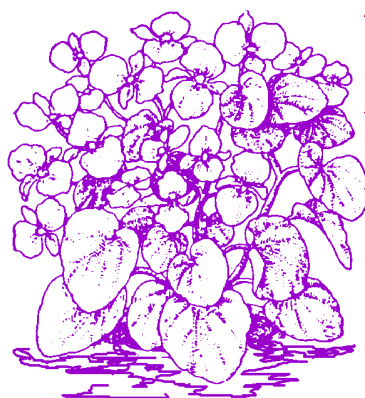


1996
NORTH CAROLINA STATE UNIVERSITY
WINTER ANNUALS EVALUATION

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Introduction

Pansies have become the most popular annual for mid-autumn to late-spring color in the Southeast. Intensive breeding programs selecting for unique flower colors, large flower size, greater flower number, and temperature tolerance have led to many new and exciting cultivars to choose from for use in the landscape. With all the different cultivars available, selecting which ones to grow for customers (and which ones to plant in the landscape) can be a difficult task. During November 1995 through mid-May 1996, we evaluated 68 pansy selections plus 3 viola entries and recorded how well they performed in the North Carolina landscape. We also evaluated 23 dianthus and 5 snapdragon cultivars.

The trial gardens are located at the North Carolina State University Horticulture Field Laboratory, 4301 Beryl Road, in Raleigh. The site is located on lat. 35°47'N, long. 78°42'W with an elevation of 400 ft. Transplants grown in 2.5" ×

2.2" containers were planted in the trial garden on 2 November 1995, and plant spacing in the trial was 10" × 12" (in-row × between-row spacing). Twelve plants of each entry were used to evaluate the performance of single-color cultivars, and 24 plants (two rows) were evaluated for each mix.

Weather during the winter and spring of 1996 was unkind to cool-season annuals. Dianthus were smaller and less floriferous than in past years, and many snapdragons died before blooming. Even the pansies suffered, and flowering was less throughout the trial than during previous trials.

Temperatures in November (-10%), December (-9%), and January (-6%) were well below normal (Table 1 and Figure 1). February was slightly (+1%) above normal; March was well below (-9%) normal; April was slightly below (-3%) normal; and May temperatures were normal. This equates into a -5% deviation from the 30 year average temperature for the seven month period.

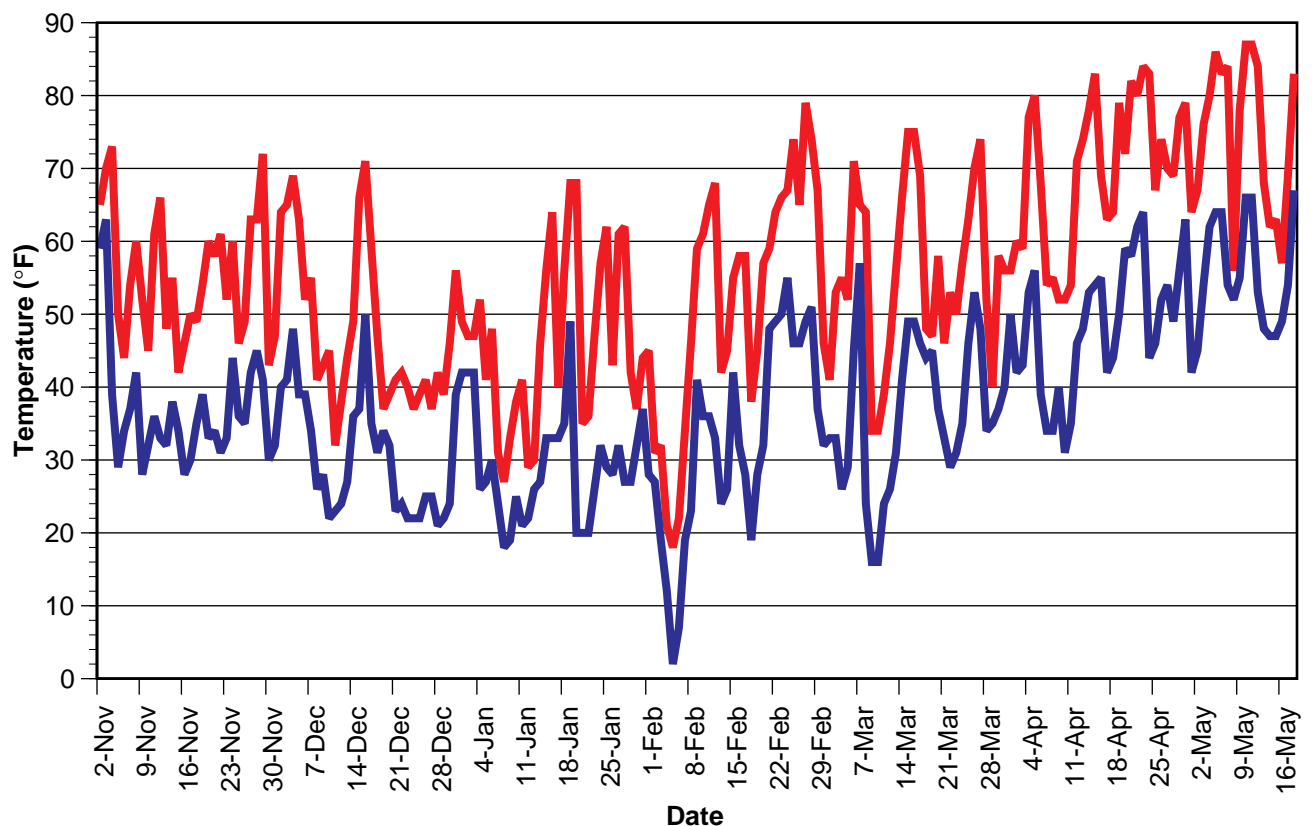


Figure 1. Daily minimum and maximum temperatures for Raleigh, North Carolina from 2 November 1995 to 18 May 1996.

Precipitation fluctuated during the seven month trial with 3 months well above average, 3 months well below, and 1 month slightly below average (Table 1 and Figure 2). However, overall, we received 25.45 inches of precipitation, which is 97% of normal precipitation (26.27 inches) for the seven month period.

The fertilization program for the plants consisted of a preplant incorporation of 17-17-17 and monthly broadcasts of 15.5-0-0 through March. No pesticide applications were made during the evaluation in order to document major pest problems, and no major pest or disease problems were noted throughout the trials.

Explanation of Cultivar Evaluations

Plants were given a visual rating by the same individual once a week for 26 weeks beginning 22 November 1995 (week 47 of 1995), three weeks after planting

through 15 May 1996 (week 20 of 1996). Entries were evaluated for plant size, flower number, flower size, and attractiveness of flowers (consistency between plants in an entry, whether flowers are borne upright and easily visible, and attractiveness of flower color). As the weather turned warmer, plants were evaluated for heat tolerance--did flower number decrease; did flower size decrease; and did flower stalks become "floppy", causing flowers to lay down rather than staying upright and easily visible? The rating scale used ranged from 1 (very

Table 1. Temperature and precipitation for November 1995 through May 1996 and 30 year temperature and precipitation averages for Raleigh, N.C.

Month	1995-96		1995-96	
	average daily temperature (°F) and percent change from 30 year avg	30 year average daily temperature (°F)	monthly precipitation (inches) and percent change from 30 year avg	30 year average monthly precipitation (inches)
November	46.6 (-10%)	51.7	5.19 (+53%)	3.40
December	39.2 (-9%)	42.9	1.87 (-44%)	3.34
January	37.8 (-6%)	40.2	4.72 (+25%)	3.79
February	42.4 (+1%)	42.1	2.25 (-40%)	3.75
March	45.7 (-9%)	50.1	3.84 (-8%)	4.19
April	58.7 (-3%)	60.4	4.07 (+21%)	3.36
May	67.8 (0%)	68.1	3.51 (-21%)	4.44

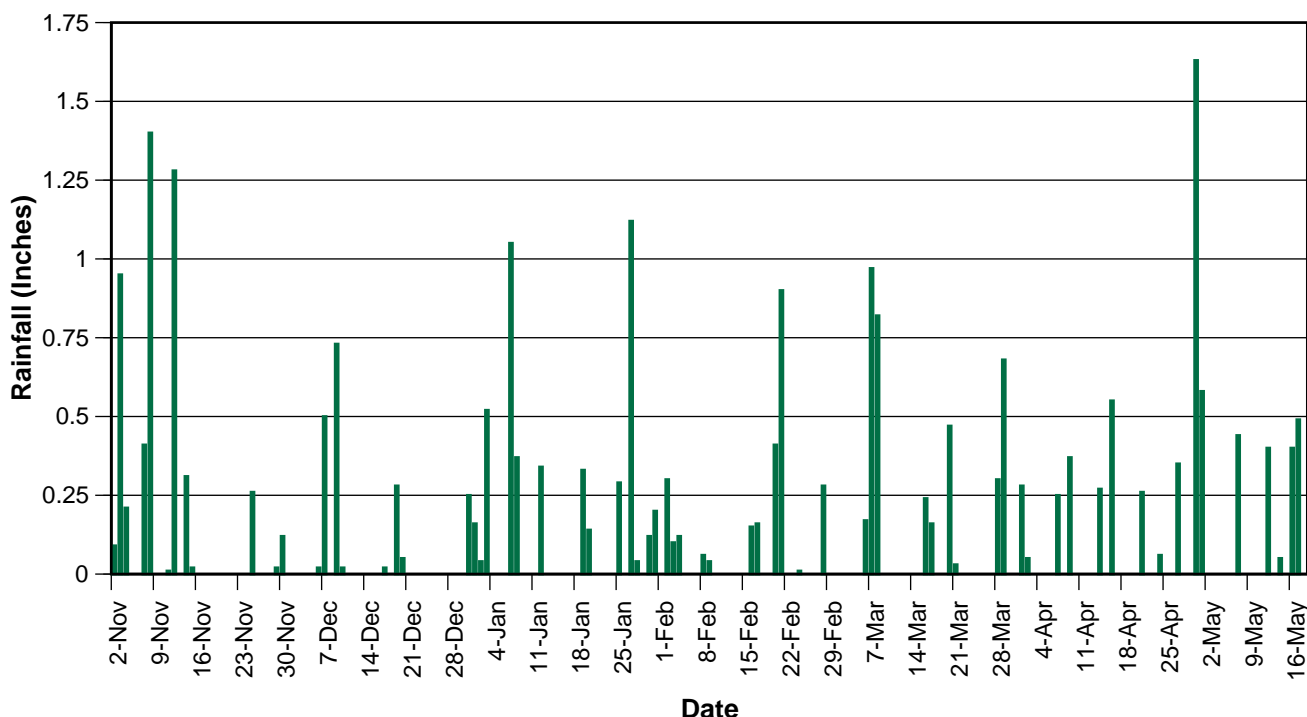


Figure 2. Precipitation received from 2 November 1995 to 18 May 1996.

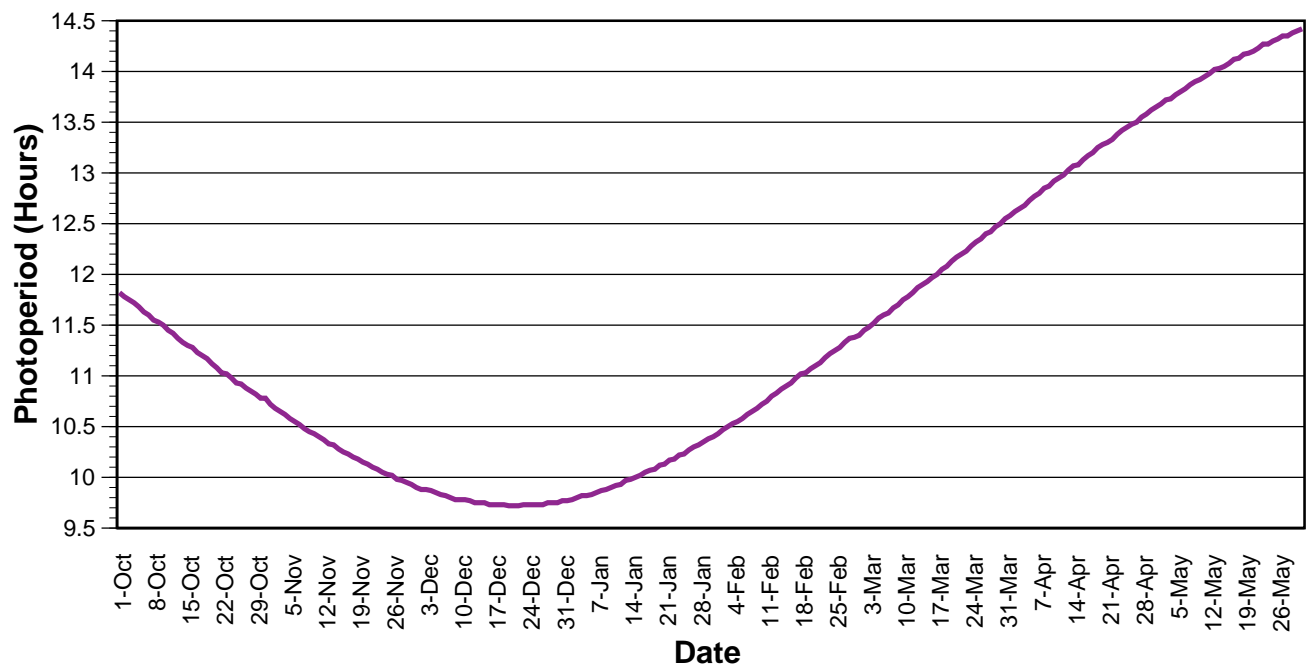


Figure 3. Photoperiod (sunrise to sunset) for Raleigh, N.C. from October 1 to May 31.

poor) to 5 (excellent), with 0.5 unit increments; a 0 rating indicates all plants of the cultivar died. Weekly ratings were averaged (season average rating column in Table 2) to provide an overall rating for the entire season. In addition to a numeric value indicating plant performance, the number of plants flowering per cultivar was noted each week. If less than 50% of the plants representing a cultivar were flowering during a given week, a dash (“-”) appears after the weekly evaluation score in Table 3. The final column in Table 3 indicates how many weeks (out of a possible 26 weeks) more than 50% of the plants were in bloom.

Cultivars in Tables 2 and 3 are listed by species in descending order for overall seasonal average rating by flower type (clear and blotched) within each flower color (white, yellow, orange, rose, red, blue, purple, and mixes). A cultivar that received a seasonal average rating of 3.2 or above is considered an excellent choice for full-season (November through May) color. A seasonal average rating of 2.6 or above indicates the cultivar is a satisfactory choice for full-season color. A seasonal rating below 2.6 indicates the cultivar may not be the best choice for our area.

Pansies are divided into pure-color flowers and multicolored flowers (see the color--type column

in Table 2). Single-color flowering varieties are called “clear” whereas varieties having a distinct dark blue or black center on the flowers are called “blotched” or “faced” pansies. Some blotched pansies may have a different color blotch than the usual dark blue or black; if so, the blotch color will be noted in the comments column of Table 2. For example, 'Scala Mid-Blue' has a yellow blotch. Other multicolored pansies have white or light colored edges on their petals or have petals of differing colors. Most of these two or three color pansies also have a dark face. The two major colors of multicolored pansies are indicated in Table 2 by a slash between the two colors listed in the color--type column. 'Rally Lilac Cap' is a blotched pansy that is multicolored. Blue and white are the major petal colors outside of the blotched center.



Sources of Seeds

We are indebted to the following companies for supporting our 1995–96 winter trials. The companies are acknowledged in the ratings tables by the abbreviation that appears to the left of the company name:

- **AAS** All America Selections, 1311 Butterfield Road, Suite 310, Downers Grove, IL 60515
- **BALL** Ball Seed Co., P.O. Box 335, West Chicago, IL 60185
- **BEN** Ernst Benary of America, Inc. 1444 Larson Street, Sycamore, IL 60178
- **BG** Bodger Seeds Ltd., 1800 North Tyler Avenue, Lompoc, CA 91733-3618
- **CSP** Clause Semences Professionnelles, 100 Breen Road, San Juan Bautista, CA 95045
- **ELI** Elidia Seed, Z.I. La Motte, BP 83, 26800 Portes lès Valence, France
- **GOLD** Goldsmith Seeds, Inc., P.O. Box 1349, Gilroy, CA 95020
- **PA** Pan American Seed, P.O. Box 438, West Chicago, IL 60185
- **S&G** S&G Seeds, 5300 Katrine Avenue, Downers Grove, IL 60515

Appreciation is also expressed to **Fafard, Inc.**, P.O. Box 26, Anderson, SC 29622; and to the **North Carolina Commercial Flower Growers' Association** for their donations to and support of the 1995–1996 winter annual trial garden.

N.C. State Leaders of the Pack

The following were selected in 1996 on their ability to display attractive landscape color throughout the majority of the winter and spring season. At any one time, other entries may have made a better short-term showing, but the “Leaders of the Pack” were selected for consistent, dependable full-season performance as a source of color and beauty in the landscape. The cultivar source is shown in parenthesis.

Pansies:

- White--Clear:** 'Rally Pure White' (PA), 'Universal Plus White' (GOLD)
White--Blotch: 'Rally White w/ Blotch' (PA), 'Accord White Blotch' (GOLD), 'Happy Face White' (BG), 'Bingo White w/ Blotch' (PA)
Yellow--Clear: 'Rally Yellow' (PA)
Yellow--Blotch: 'Universal Plus Yellow Blotch' (GOLD), 'Rally Yellow w/ Blotch' (PA)
Orange--Blotch: 'Scala Orange w/ Blotch' (ELI)
Rose--Blotch: 'Universal Plus Rose Blotch' (GOLD)
Red--Blotch: 'Accord Red Blotch' (GOLD)
Red / Yellow: 'Bingo Red & Yellow' (PA)
Blue--Clear: 'Rally True Blue' (PA), 'Accord Clear Blue' (GOLD), 'Vernale Atlantis' (ELI)
Blue--Blotch: 'Maxim Marina' (AAS)
Purple--Blotch: 'Rally Lilac Cap' (PA)
Purple / White: 'Experimental Beaconsfield' (PA), 'Scala Beaconsfield' (ELI)
Mix: 'Universal Plus Blotch Mix' (GOLD), 'Accord Mix' (GOLD), 'Bingo Mix' (PA)
Violas: 'Mini Pansy Purple' (CSP), 'Velour Blue' (CSP)

NCSU Exceptional Performance Winners

Each year, the best of the best, those cultivars that exemplify outstanding performance during the trials, will be recognized as Exceptional Performance award winners. The winners are judged on full-season performance and are recommended as outstanding selections for our region. Growers, retailers and landscapers are encouraged to consider these cultivars first for their winter and spring color needs. Only two cultivars were selected from 99 entries in the 1995–1996 winter trial:

1. *Pansy*, 'Maxim Marina' (AAS)
2. *Pansy*, 'Rally White ^{w/} Blotch' (PA)

Series Ratings and Cultivar Performance

The season average ratings for the dianthus, pansy, and snapdragon series that had at least three entries are listed to the right in descending order of average performance. As mentioned earlier, the weather this year severely reduced plant performance in our trials. The overall scores for this year are well below the averages attained over the past 4 years.

None of the dianthus cultivars rated at or above the 3.2 level set as exceptional for full-season color. Flowering was very sporadic and plants were injured during winter cold snaps. Only two cultivars of dianthus had greater than 50% flowering during any of the 26 weeks of the trials.

Scala was the top performing pansy series in the 1995 / 1996 winter trials. Vernale and Accord were all top performers as well. These top three series are good choices, but notice that 50% of the Vernale plants were in flower only an average of 13 weeks out of 26 whereas the 10 Accord cultivars averaged 20 weeks with 50% or more of the plants in flower. Since full season flowering is such an important landscape performance feature, we have summarized average number of weeks with 50% or more of the plants in flower by flower color and type on page 6. White cultivars appear to be the most consistent in flowering, while orange cultivars are significantly less floriferous than any other flower color. Yellow flowering cultivars are close behind whites in performance, and purple, blue, red, and rose cultivars are grouped closely together following yellow cultivars. Within a given color, there appears to be little difference between clear and blotched flowers. This information may be useful to landscapers seeking

Series average ratings for the 1995 / 1996 winter trials.

Series	Number tried	Source	Avg. rating	No. wks with 50% plants in bloom
Dianthus				
Floral Lace	7	BALL	2.6	0
Ideal	7	ELI	2.6	0
Princess	7	GOLD	2.4	0.6
Pansy				
Scala	3	ELI	3.2	16
Vernale	3	ELI	3.2	13
Accord	10	GOLD	3.2	20
Rally	11	PA	3.1	17
Universal Plus	10	GOLD	3.1	19
Happy Face	6	BG	3.1	18
Bingo	10	PA	3.1	19
Atlas	6	BG	2.9	17
Snapdragon				
Chimes	4	GOLD	1.3	0

to select color schemes that maintain color throughout the winter bedding plant season.

As indicated by the low rating for the Chimes series, snapdragons were severely injured during our winter in 1996. However, in about three out of every four winters in Raleigh, snapdragons will overwinter and produce attractive early spring color in the landscape.

The number of pansies continues to increase each year, and the quality appears to improve as well. However, there is still a need for contrasting plant materials during our cool season in the Southeast. Hopefully other companion plants will be discovered in the future.



Number of weeks where 50% of the plants representing each cultivar was in bloom (total of 26 weeks in the trial).

Color--Type	No. of cultivars	No. of wks in bloom
White--all	10	21
White--clear	5	22
White--blotch	5	20
Yellow--all	12	20
Yellow--clear	5	21
Yellow--blotch	7	19
Orange--all	7	10
Orange--clear	3	10
Orange--blotch	4	10
Rose--all	7	18
Rose--clear	2	16
Rose--blotch	5	19
Red--all	5	17
Red--clear	1	17
Red--blotch	4	17
Blue--all	12	17
Blue--clear	5	19
Blue--blotch	7	16
Purple--all	6	18
Purple--clear	3	16
Purple--blotch	3	20

Visit the NCSU Floriculture Home Page at:

<http://www2.ncsu.edu/unity/lockers/project/floriculture/www/index.html>

- *Read Roy Larson's monthly column, "The Tangled Web"*
- *Download the latest floriculture extension and research publications and software available from NCSU for free*
- *Visit the NCCFGA pages at this site*
- *Download the latest entomology notes for greenhouse pest control*

Table 2. Season average rating and comments for dianthus (D), pansy (P), snapdragon (S), and viola (V) cultivars. Dianthus are listed by flower color and pansy cultivars are listed by season average rating for each flower color type (clear and blotch) within each flower color category.

Species	Cultivar	Color--Type	Source	Season average rating	Comments
D	Princess White	White	GOLD	2.5	
D	Ideal Pearl	White	ELI	2.5	
D	Ideal Pink	Pink	ELI	2.5	
D	Ideal Carmine	Pink	ELI	2.5	
D	Princess Pink	Pink	GOLD	2.1	
D	Strawberry Parfait	Pink/Red	GOLD	2.5	
D	Raspberry Parfait	Red/Pink	GOLD	2.5	
D	Floral Lace Rose	Rose	BALL	2.7	
D	Ideal Rose	Rose	ELI	2.7	
D	Floral Lace Crimson	Red	BALL	2.7	
D	Princess Scarlet	Red	GOLD	2.6	
D	Ideal Crimson	Red	ELI	2.6	
D	Princess Crimson	Red	GOLD	2.4	
D	Floral Lace Picotee	Red/White	BALL	2.6	
D	Princess Crimson Eye	Red/White	GOLD	2.3	
D	Princess Salmon	Salmon	GOLD	2.4	
D	Floral Lace Violet Picotee	Purple/White	BALL	2.5	
D	Ideal Deep Violet	Purple	ELI	2.7	
D	Floral Lace Purple	Purple	BALL	2.6	
D	Princess Purple	Purple	GOLD	2.6	
D	Ideal Fuchsia	Purple	ELI	2.6	
D	Floral Lace Violet	Purple	BALL	2.4	
D	Floral Lace Mix	Mix	BALL	2.7	
P	Rally Pure White	White--Clear	PA	3.2	Best clear white pansy; true pure white color
P	Universal Plus White	White--Clear	GOLD	3.2	Most heat-tolerant white pansy
P	Accord Clear White	White--Clear	GOLD	3.1	
P	Fama White	White--Clear	BEN	3.0	
P	Atlas White	White--Clear	BG	2.9	Large yellow eye; not truly a clear white
P	Rally White ^w / Blotch	White--Blotch	PA	3.6	Best white blotched pansy
P	Accord White Blotch	White--Blotch	GOLD	3.2	Large flower size, but sporadic flowering during cold weather
P	Happy Face White	White--Blotch	BG	3.2	
P	Bingo White ^w / Blotch	White--Blotch	PA	3.2	
P	Universal Plus Ivory/Rose Blotch	White--Blotch	GOLD	3.0	Blotch is rose; very sporadic flowering all season
P	Vernale Cassis Shades	Rose/White--Blotch	ELI	3.3	Very sporadic flowering all season
P	Rally Yellow	Yellow--Clear	PA	3.2	Best clear yellow pansy

Table 2, Continued.

Species	Cultivar	Color--Type	Source	Season average rating	Comments
P	Accord Clear Yellow	Yellow--Clear	GOLD	3.1	
P	Bingo Yellow	Yellow--Clear	PA	3.1	
P	Atlas Primrose	Yellow, light--Clear	BG	3.1	
P	Atlas Yellow	Yellow--Clear	BG	2.8	
P	Universal Plus Yellow Blotch	Yellow--Blotch	GOLD	3.5	Best yellow blotched pansy
P	Experimental Yellow #1288	Yellow--Blotch	PA	3.3	
P	Rally Yellow ^{w/} Blotch	Yellow--Blotch	PA	3.2	
P	Happy Face Yellow	Yellow--Blotch	BG	3.0	
P	Accord Yellow Blotch	Yellow--Blotch	GOLD	3.0	
P	Bingo Yellow ^{w/} Blotch	Yellow--Blotch	PA	3.0	Very large flowers, but sporadic flowering during cold weather
P	Universal Plus Yellow/Red Blotch	Yellow--Blotch	GOLD	2.9	Blotch is red; sporadic flowering during the trials
P	Rally Orange	Orange--Clear	PA	2.9	Extremely sporadic flowering during the trials
P	Atlas Orange	Orange--Clear	BG	2.9	Very sporadic flowering, especially during cold weather
P	Padparadja	Orange--Clear	AAS	2.1	Very poor flowering; not suited for fall color
P	Scala Orange ^{w/} Blotch	Orange--Blotch	ELI	3.2	Best orange blotched pansy, but extremely sporadic flowering
P	Rally Orange ^{w/} Blotch	Orange--Blotch	PA	2.9	Extremely sporadic flowering
P	Universal Plus Orange Blotch	Orange--Blotch	GOLD	2.6	Most heat-tolerant orange pansy; small flowers
P	Joker Pokerface	Orange/Blue--Blotch	BEN	2.7	
P	Universal Plus Rose	Rose--Clear	GOLD	3.0	Best rose clear pansy
P	Vernale Rose	Rose--Clear	ELI	3.0	Most heat-tolerant rose pansy
P	Universal Plus Rose Blotch	Rose--Blotch	GOLD	3.3	Best rose blotched pansy
P	Happy Face Rose	Rose--Blotch	BG	3.1	
P	Accord Rose Blotch	Rose--Blotch	GOLD	3.1	
P	Bingo Light Rose ^{w/} Blotch	Rose--Blotch	PA	2.8	
P	Accord Red Blotch	Red--Blotch	GOLD	3.3	Best red blotched pansy
P	Happy Face Red	Red--Blotch	BG	3.1	
P	Bingo Red ^{w/} Blotch	Red--Blotch	PA	3.0	Very sporadic flowering during cold weather
P	Bingo Red & Yellow	Red/Yellow--Clear	PA	3.2	Attractive color combination and large flowers, but few flowers
P	Accord Red Wing	Red/Yellow--Blotch	GOLD	3.0	Very consistent flowering
P	Rally True Blue	Blue--Clear	PA	3.5	Best blue clear pansy; very consistent flowering
P	Accord Clear Blue	Blue--Clear	GOLD	3.4	
P	Vernale Atlantis	Blue--Clear	ELI	3.2	Very sporadic flowering during cold weather
P	Universal Plus True Blue	Blue--Clear	GOLD	3.1	
P	Atlas Blue Splash	Blue, light--Clear	BG	3.0	
P	Experimental Blue #1194	Blue	PA	3.4	

Table 2, Continued.

Species	Cultivar	Color--Type	Source	Season average rating	Comments
P	Experimental Blue #3459	Blue	PA	3.3	Very consistent flowering
P	Maxim Marina	Blue--Blotch	AAS	3.7	Best blotched blue pansy; blotch is blue; petals have light blue edges
P	Scala Mid-Blue	Blue--Blotch	ELI	3.1	Blotch is yellow; very heat tolerant, but sporadic flowering
P	Bingo Blue ^w / Blotch	Blue--Blotch	PA	3.1	
P	Accord Blue Blotch	Blue--Blotch	GOLD	3.1	
P	Rally Deep Blue ^w / Blotch	Blue, dark--Blotch	PA	3.1	
P	Happy Face Blue	Blue--Blotch	BG	3.0	Sporadic flowering during cold weather
P	Rally Light Blue ^w / Blotch	Blue, light--Blotch	PA	3.0	Most heat-tolerant blue pansy
P	Bingo Deep Purple	Purple, dark--Clear	PA	3.0	Sporadic flowering during cold weather
P	Atlas Purple	Purple--Clear	BG	3.0	Very sporadic flowering during the trials
P	Rally Lilac Cap	Purple, light--Blotch	PA	3.2	Top petal is purple and bottom petals are yellow; blotch is dark red
P	Happy Face Purple	Purple--Blotch	BG	3.0	
P	Experimental Beaconsfield #1492	Purple/White--Blotch	PA	3.6	Best purple blotched pansy; very consistent flowering
P	Scala Beaconsfield	Purple/White--Blotch	ELI	3.4	
P	Bingo Mix	Mix--Clear	PA	3.2	
P	Universal Plus Clear Mix	Mix--Clear	GOLD	2.9	
P	Universal Plus Blotch Mix	Mix--Blotch	GOLD	3.3	Best pansy mix; very consistent flowering
P	Bingo Blotched Mix	Mix--Blotch	PA	3.1	Very large flowers; consistent flowering during the trials
P	Accord Mix	Mix--Both	GOLD	3.3	
P	Fama Mix	Mix--Both	BEN	2.8	Sporadic flowering during cold weather
P	Rally Mix	Mix--Both	PA	2.8	Very sporadic flowering during the trials
S	White Chimes	White	GOLD	1.3	
S	Yellow Chimes	Yellow	GOLD	1.1	
S	Bronze Chimes	Bronze	GOLD	1.3	
S	Tahiti Scarlet	Red	S&G	1.2	
S	Cherry Chimes	Red	GOLD	1.2	
V	Mini-Pansy Purple	Purple	CSP	3.4	Best viola in trials; excellent heat tolerance, but sporadic flowering
V	Velour Blue	Blue	CSP	3.2	Excellent heat tolerance, but sporadic flowering
V	Cuty	Purple & White	AAS	2.5	Very sporadic flowering during the trials

Table 3. Weekly ratings and degree of flowering ("-") after the rating indicates less than 50% of the plants were flowering) for dianthus, pansy, and viola cultivars. Cultivars are listed in the same order as in Table 2.

Cultivar	Source	Weekly ratings (week of the year) and degree of flowering																				Wks in bloom									
		47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	17	18	19	20			
Princess White	GOLD	3.5-	3.5-	3.5-	3.5-	3.5-	3.5-	3.5-	3.5-	3-	3-	3-	3-	3-	2.5-	2.5-	3-	3.5-	.5-	.5-	1-	1.5-					0				
Ideal Pearl	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	.5-	.5-	1-	1.5-	1.5-	2-				0				
Ideal Pink	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	2.5-	2.5-	3-	3.5-	.5-	.5-	1-	2-	2-	2.5-			0				
Ideal Carmine	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	.5-	.5-	1-	1.5-	1.5-	2-			0				
Princess Pink	GOLD	3.5-	2.5-	2-	2.5-	2.5-	2.5-	2-	2-	2-	2-	2-	2-	2-	2-	2.5-	3-	.5-	1-	1.5-	2-	2-					0				
Strawberry Parfait	GOLD	3-	2.5-	2.5-	2.5-	2.5-	2.5-	3-	3-	3-	3-	3-	3-	3-	2.5-	2.5-	3-	2.5-	1-	1.5-	2-	2.5-	2.5-	2.5-			0				
Raspberry Parfait	GOLD	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	.5-	1-	1.5-	1.5-	2-				0				
Floral Lace Rose	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3.5-	1-	1.5-	2.5-	2.5-	3-				0				
Ideal Rose	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	4-	.5-	.5-	1-	1.5-	1.5-	3-			0				
Floral Lace Crimson	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	.5-	1-	2-	2.5-	2.5-	3-			0				
Princess Scarlet	GOLD	3.5-	3.5-	3-	3-	3.5-	3.5-	3-	3-	3-	3-	3-	3-	3-	2.5-	2.5-	3-	3-	.5-	.5-	1.5-	1.5-	2.5-				0				
Ideal Crimson	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	.5-	.5-	1-	2-	2-	2.5-			0				
Princess Crimson	GOLD	3.5-	3.5-	3.5-	3.5-	3.5-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	2.5-	.5-	.5-	1-	1.5-	2-	2-	2.5-		0				
Floral Lace Picotee	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	1-	1.5-	2-	2-	2.5-		0				
Princess Crimson Eye	GOLD	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	.5-	1-	1.5-	1.5-			0				
Princess Salmon	GOLD	3.5-	3.5-	3	3.5	3.5	3-	3.5-	3-	3-	3-	3-	3-	3-	2.5-	2.5-	3-	3-	.5-	.5-	1-	1.5-	1.5-	3-			3				
Floral Lace Violet Picotee	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	1-	1.5-	1.5-	2.5-			0				
Ideal Deep Violet	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	.5-	1-	1.5-	2.5-	2.5-	2.5-			0				
Floral Lace Purple	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	.5-	1-	2-	2-	3-			0				
Princess Purple	GOLD	3	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	.5-	.5-	1.5-	2-	2-	3-			1				
Ideal Fuchsia	ELI	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	.5-	1-	2-	2-	2.5-			0				
Floral Lace Violet	BALL	3-	3-	3-	2.5-	2.5-	2.5-	2-	2-	2-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	3-	3-	.5-	1-	2-	2.5-	2.5-	3-			0				
Floral Lace Mix	BALL	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3.5-	3-	.5-	1-	2-	2.5-	2.5-	3-			0				
Rally Pure White	PA	3-	3	3.5	3.5	3.5	3.5	3.5	3.5	3	3	3	3	3	3-	3-	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3	2	2	21			
Universal Plus White	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	3.5	2.5	22	
Accord Clear White	GOLD	3-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3.5	2	22		
Fama White	BEN	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.5	3	2	23
Atlas White	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	1.5	1.5	22
Rally White w/ Blotch	PA	3.5	3.5	3.5	3.5	3.5-	3.5-	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5-	3.5-	3.5	3.5	3.5	3.5	3.5-	4	4	4	4	4	4.5	4	3	2.5	21
Accord White Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	2.5	17

Week 47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11
Date	29 Nov.	6 Dec.	13 Dec.	20 Dec.	27 Dec.	3 Jan.	10 Jan.	17 Jan.	24 Jan.	31 Jan.	7 Feb.	14 Feb.	21 Feb.	28 Feb.	6 Mar.	13 Mar.

Week 12	13	14	15	16	17	18	19	20	
Date	20 Mar.	27 Mar.	3 Apr.	10 Apr.	17 Apr.	24 Apr.	1 May	8 May	15 May

Table 3, Continued.

Cultivar	Source	Weekly ratings (week of the year) and degree of flowering																				Wks in bloom					
		47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	17	18	19
Happy Face White	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Bingo White ^{w/} Blotch	PA	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5
Universal Plus Ivory/Rose Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Vernale Cassis Shades	ELI	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Rally Yellow	PA	3.5	3.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Accord Clear Yellow	GOLD	3.5	3.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Bingo Yellow	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Atlas Primrose	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Atlas Yellow	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Universal Plus Yellow Blotch	GOLD	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3	2.5
Experimental Yellow #1288	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Rally Yellow ^{w/} Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Happy Face Yellow	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Accord Yellow Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Bingo Yellow ^{w/} Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Universal Plus Yellow/Red Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Rally Orange	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Atlas Orange	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Padparadja	AAS	2.5	2.5	2.5	2.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Scala Orange ^{w/} Blotch	ELI	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Rally Orange ^{w/} Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Universal Plus Orange Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Joker Pokerface	BEN	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2
Universal Plus Rose	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Vernale Rose	ELI	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Universal Plus Rose Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Happy Face Rose	BG	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Accord Rose Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Bingo Light Rose ^{w/} Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
Accord Red Blotch	GOLD	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2

Week 47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11
Date	22 Nov.	29 Nov.	6 Dec.	13 Dec.	20 Dec.	27 Dec.	3 Jan.	10 Jan.	17 Jan.	24 Jan.	31 Jan.	7 Feb.	14 Feb.	21 Feb.	28 Feb.	6 Mar.
Week 12	13	14	15	16	17	18	19	20								
Date	20 Mar.	27 Mar.	3 Apr.	10 Apr.	17 Apr.	24 Apr.	1 May	8 May	15 May							

Table 3, Continued.

Cultivar	Source	Weekly ratings (week of the year) and degree of flowering																				Wks in bloom							
		47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	17	18	19	20	
Happy Face Red	BG	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	14	
Bingo Red w/ Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	2	
Bingo Red & Yellow	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	2	
Accord Red Wing	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	24	
Rally True Blue	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	25	
Accord Clear Blue	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	21	
Vernale Atlantis	ELI	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	11	
Universal Plus True Blue	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	21	
Atlas Blue Splash	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	16	
Experimental Blue #1194	PA	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2	20	
Experimental Blue #3459	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	24	
Maxim Marina	AAS	3.5	3.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	13	
Scala Mid-Blue	ELI	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	14	
Bingo Blue w/ Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	18	
Accord Blue Blotch	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	18	
Rally Deep Blue w/ Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	16	
Happy Face Blue	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	14	
Rally Light Blue w/ Blotch	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	21	
Bingo Deep Purple	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	16	
Atlas Purple	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.5	11	
Rally Lilac Cap	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	20	
Happy Face Purple	BG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	11	
Experimental Beaconsfield #1492	PA	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	24	
Scala Beaconsfield	ELI	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	25	
Bingo Mix	PA	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3	22	
Universal Plus Clear Mix	GOLD	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	17	
Universal Plus Blotch Mix	GOLD	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	25	
Bingo Blotched Mix	PA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3.5	25
Accord Mix	GOLD	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	18	
Fama Mix	BEN	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	16	
Week 47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Date	22 Nov.	29 Nov.	6 Dec.	13 Dec.	20 Dec.	27 Dec.	3 Jan.	10 Jan.	17 Jan.	24 Jan.	31 Jan.	7 Feb.	14 Feb.	21 Feb.	28 Feb.	6 Mar.	13 Mar.	20 Mar.	27 Mar.	3 Apr.	10 Apr.	17 Apr.	24 Apr.	1 May	8 May	15 May	22 May	29 May	

Table 3, Continued.

Cultivar	Source	Weekly ratings (week of the year) and degree of flowering																				Wks in bloom						
		47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16	17	18	19	20
Rally Mix	PA	3-	3-	3-	3-	3-	3-	3-	3-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5	2.5	3	3	3	3	10
White Chimes	GOLD	3-	3-	2.5-	2.5-	2.5-	2.5-	2.5-	2.5-	2-	2-	2-	2-	2-	1-	1-	1-	1-	0-	0-	0-	0-	0-	0-	0-	0-	0	
Yellow Chimes	GOLD	2.5-	2.5-	2.5-	2.5-	2-	2-	2.5-	2.5-	2-	2-	2-	2-	2-	1-	.5-	.5-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0	
Bronze Chimes	GOLD	3-	3-	3-	3-	2.5-	2.5-	2.5-	2.5-	2-	2-	2-	2-	2-	1-	1-	1-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0	
Tahiti Scarlet	S&G	3-	3-	3-	3-	3-	3-	3-	3-	2.5-	2-	1.5-	1.5-	.5-	.5-	.5-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0	
Cherry Chimes	GOLD	2.5-	2.5-	2.5-	3-	2.5-	2.5-	2.5-	2.5-	2-	2-	2-	2-	2-	1-	.5-	.5-	0-	0-	0-	0-	0-	0-	0-	0-	0-	0	
Mimi-Pansy Purple	CSP	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3	3.5-	3.5	3.5	3.5	3.5	4	4.5	4.5	5	10	
Velour Blue	CSP	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3	3-	3.5	3.5	3.5	3.5	3.5	4	4	4.5	11	
Cuty	AAS	3.5-	2.5-	2-	2-	2-	2-	2.5-	2.5-	2.5-	3-	3-	3-	3-	3-	3-	3-	3-	3-	3-	2	2	2	2	2.5	2.5	2	8

Week 47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11
Date	29 Nov.	6 Dec.	13 Dec.	20 Dec.	27 Dec.	3 Jan.	10 Jan.	17 Jan.	24 Jan.	31 Jan.	7 Feb.	14 Feb.	21 Feb.	28 Feb.	6 Mar.	13 Mar.

Week 12	13	14	15	16	17	18	19	20
Date	20 Mar.	27 Mar.	3 Apr.	10 Apr.	17 Apr.	1 May	8 May	15 May