

## **Evaluation of Dianthus, Snapdragon and Assorted Cultivars as Bedding Plants Winter/Early Spring 2001-2002**

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**Summary.** We evaluated 100 cultivars from five genera of **Alstroemeria** [(*A. × hybrida*) lily of the Incas], **Dianthus** [(*D. chinensis* L.); China pink, rainbow pink; (*D. barbatus* L.); Sweet William; (interspecific hybrids)] **Helichrysum** [(*Helichrysum cassianum*); strawflower], and **Snapdragon** (*Antirrhinum majus* L.) **and Wallflower** (*Cheiranthus cheiri* Linn.) in replicated class tests at the University of Florida Gulf Coast Research and Education Center at Bradenton, Fla. [lat. 27.4 N, long. 82.5 W; AHS Heat Zone 10; USDA (American Horticultural Society, 1999); USDA Cold Hardiness Zone 9b (U. S. National Arboretum, 1990) in the winter and early spring of 2001-2002. In this report we provided objective plant measurements of vegetative and flowering characteristics, as well as 1-3 subjective ratings that permit readers to evaluate foliage and flower characteristics and the affects of pests at different times during the season, and to evaluate performance over time. Subjective ratings were on a scale from 1 to 7 with the highest rating of 7 for excellent. In general, cultivars with an adjusted overall performance rating > 5.6 being considered outstanding, 5.0-5.5 as good, 4.0-4.9 as fair, and < 4.0 as poor. Cultivars were grouped into classes within each species or interspecific hybrid group based on growth habit, plant height, flower type, foliage, flower or fruit color, and are listed here by performance within class.

**Outstanding** cultivars (> 5.6) were:

**Dianthus.** (dwarf – purple, red- violet class) ‘**Diamond Purple**’; (dwarf – purple, red-violet/white class) ‘**Ideal Violet Picotee**’; (dwarf – red/white) ‘**Ideal Cherry Picotee**’ and ‘**Telstar Picotee**’; (dwarf – red shades/tints) ‘**Diamond Carmine Rose**’, ‘**Telstar Carmine Rose**’ and ‘**Telstar Crimson**’; (dwarf – white to pink color shift class) ‘**Diamond Blush Pink**’. **Snapdragon.** (dwarf – open flower, mixes class) ‘**Bells Mix**’; (dwarf – open flower, purple, light blue- violet class) ‘**Bells Frosty Lavender**’; (dwarf – open flower, white class) ‘**Bells White**’; (dwarf – standard flower, bronze class) ‘**Floral Showers Deep Bronze**’; (dwarf – standard flower, orange/yellow class) ‘**Montego Orange Bicolor**’;

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(dwarf – standard flower, purple, red-violet class) ‘**Floral Showers Lilac**’ and ‘**Montego Purple**’; (dwarf – standard flower, red/yellow class) ‘**Floral Showers Red & Yellow Bicolor**’; and (dwarf – standard flower, yellow class) ‘**Floral Showers Yellow**\*’.

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### **Introduction**

The United States wholesale value (1.01256 Euros = 1 US dollar) of floricultural crops was \$4.4 billion (€4.9 billion) in 2001, estimated from growers with sales = (\$10,000; €10,126). Bedding and garden plants comprise 49% of the floriculture value at \$2.18 billion (€2.21 billion), (United States Department of Agriculture, 2002). Florida (\$101.6 million; €102.9 million) ranks fifth behind California (\$303.5 million; €307.3 million), Michigan (\$189.4 million; €191.8 million), Texas (\$187.2 million; €189.6 million), and Ohio (\$131.8 million; €133.5 million), who together generate 42% of the bedding/garden plant wholesale value. The wholesale value in the United States (in millions) for snapdragon (flat/pot) was \$9.1/\$2.0 (€9.2/€2.0) snapdragon. (United States Department of Agriculture, 1998). No values were provided for the other crops grown in this trial.

### **Materials and methods**

Seeds of 100 cultivars from five genera of **alstroemeria**, **dianthus**, **helichrysum**, **snapdragon** and **wallflower** were sown between 5-10 Oct. into a no-phosphate soil mix containing peat, vermiculite and perlite (3:2:1, volumetric) prepared and amended with dolomite [7 lbs./yd<sup>3</sup> (3.2 kg/m<sup>3</sup>)], gypsum [3 lbs./yd<sup>3</sup> (1.4 kg/m<sup>3</sup>)] and Micromax [(The Scotts Co., Marysville, Ohio) 1.0 lb./yd<sup>3</sup> (0.45 kg/m<sup>3</sup>)]. This mix is used to maintain compact transplants, supplying phosphate only through soluble fertilizer applications. Germination occurred at 72 to 75 °F (22 to 24 °C) in a growth room with a photosynthetic photon flux (PPF) of 30 μmol·m<sup>-2</sup>·s<sup>-1</sup> for 12 h from cool-white fluorescent lamps. Immediately after germination, seedlings were transplanted into Todd® planter flats [model 128: 1.5 inches x 1.5 inches x 2.5 inches (3.8 cm x 3.8 cm x 6.4 cm) cells; Speedling Incorporated, P. O. Box 7220, Sun City, Florida] containing the same soil mix used in sowing, and placed into a screen-sided, fiberglass-covered greenhouse.

Transplants were fertilized with a 15N-0.87P-16.5K water soluble fertilizer (15-2-20 Ca-Mg Excel; Scotts Co., Maryville, Ohio) solution applied at the rate of 250 mg·L<sup>-1</sup> twice weekly. On 21 (dianthus-unsprayed field), 27 and 29 Nov., plugs were transplanted into raised ground beds with 5 plants per plot, having 4 plants spaced 12 inches (30.5 cm) apart from 1 center plant. Beds were 32 inches (81.3 cm) wide x 8 inches (20.3 cm) high in full sun and spaced 5 ft. apart from center. Nutricote® 13N-5.7P-10.8 K fertilizer (13-

13-13 100-day slow release type with micronutrients; Florikan, Sarasota, Florida) was applied by hand to each plant on the soil surface approximately an inch from the plant stem under the plastic mulch at 261 lb/row acre (293 kg-ha<sup>-1</sup>) of nitrogen. Beds were fumigated between 5-8 Oct. with a mixture of 66% methyl bromide and 33% chloropicrin at 392 kg-ha<sup>-1</sup> (350 lb/acre) and covered with white-on-black polyethylene film. Subsurface seepage irrigation water was supplied from lateral ditches spaced 12.8 m (42 ft) apart (Howe and Waters, 1997).

Integrated pest management was employed in the spray-on-demand field to determine when pesticide applications were needed to control arthropod pests and plant pathogens. **Temperature** @ 2ft (61.0 cm) after transplanting to the field ranged from a maximum of 29.8 °C (85.6 °F) to a minimum of 6.3 °C (43.3 °F), and averaged 18.8 °C (65.8 °F) in December; in January it ranged from a maximum of 30.5 °C (86.9°F) to a minimum of -1.4 °C ( 29.5 °F), and averaged 16.3 °C (61.3 °F); in February it ranged from a maximum of 29.0 °C (84.2 °F) to a minimum of 0.78 °C (33.4 °F), and averaged 16.1 °C (61.0 °F). **Total rainfall** was 1.9 cm (0.75 inches) in December, 5.2 cm (2.0 inches) in January, 8.1 cm (3.2 inches) in February. On 30-31 Jan (snapdragons), 2 Feb (dianthus), 15 Feb. (helichrysum and wallflower) and 21 Apr (alstroemeria) three plants per plot were selected from the center and edge of each plot, and the plant height (from the stem base to the inflorescence tip) and plant width were recorded for each plot. Plants in each plot were selected from the same positions in that plot. Subjective ratings for foliage and flower quality were made for each cultivar in the spray-on-demand field on 16 Jan. (22 April for alstroemeria) for rating 1, 26-27 Feb. (dianthus, helichrysum and snapdragon), 5-6 Mar. (snapdragons) and 22 May (alstroemeria) for rating 2; 6-7 Apr. (dianthus, helichrysum, snapdragon and short dwarf snapdragons) for rating 3; and for pest symptoms in the unsprayed field on 24-29 Jan. for rating 1; and 27 Feb.-2 Mar. (dianthus), 7-9 Mar. (snapdragons) and 24 Apr. (alstroemeria) for rating 2, the final rating. Each cultivar was rated on a 1 to 7 scale with the highest rating of 7 for excellent. Plant characteristics that merited a 7 were: (1) all plants in a plot had full and uniform foliage; (2) foliage and flowers were free of pest symptoms; (3) plants were free of abnormalities or weaknesses such as lodging; and (4) flowers were numerous and uniformly distributed over the plant.

In order to provide meaningful performance comparisons, dianthus, snadragon and assorted cultivars were divided into classes based on plant growth habit and flower color. Color hues with similar shades and tints were grouped together into one class. The choice of best-of-class for winter 2001-2003 was determined by comparing the adjusted overall performance ratings. When few or no dead plants occur, this value is the overall performance rating, arrived at using the formula  $OP = (Q + P)/2$ , where OP is overall performance, Q = overall foliage/flower ratings (Table 2) and P = overall pest ratings (Table 4). In this trial dead plants occurred, therefore OP becomes  $OP_{adj}$ , and  $OP_{adj} = Q + P_{adj}/2$ , where  $OP_{adj}$  is the adjusted overall performance, where  $P_{adj} = P - (dp \times dpf)$ ; and where dp = number of dead plants/plot and dpf = dead plant factor. The value  $4 dpf = \text{number plants per plot/highest rating possible}$ . The dpf was  $5 \text{ plants}/7 = 0.71$ . Cultivars  $> 5.6$  were considered outstanding, 5.0 to 5.5 as good performers,  $< 5.4$  to 5.0, and 4.0 – 4.9 as fair, and  $< 3.9$  as poor. The highest value (whether or not it is

significantly higher than another) is selected as best-of-class. Best-of-class may have an overall performance that is fair to poor for a class by our standards, indicating that the class does not do well, based on cultivars trialed, but the selected cultivar is currently the best performer. Best-of-class is used as the standard by which all future entries will be compared, until a better performer replaces it.

Each class was analyzed as a separate experiment. A randomized complete block experimental design was used with three blocks each containing six plants that represented the experimental unit. All data were analyzed by analysis of variance (ANOVA) methods, and means of dependent variables significant at the 0.05 level of probability were separated using Duncan's multiple range test (PROC ANOVA, SAS Institute, Cary, NC).

## **Results and Discussion**

### **Pests-disease**

**Fusarium crown rot.** Plant pathologists isolated this fungus from diseased dianthus and snapdragon samples. The average number of dead plants/plot will be indicated for each cultivar in this discussion, if it is uncontested, or if there is more than one cultivar in a class, the range will be given.

**Graymold.** Favorable conditions due to heavy fogs may have caused graymold (*Botrytis cinerea*) to proliferate and cause plant death in dianthus and snapdragon by moving from heavily infested flowers down through the flowers into the rest of the plant.

### **Pests-arthropods**

**Armyworms/other.** Armyworms (*Spodoptera* spp.) seemed to prefer dianthus, infesting them in the screen house and in the field. In the screen house, these larvae would bore directly into the terminal bud of *Dianthus barbatus* cultivars, but when feeding upon other dianthus species or interspecific hybrids, this mode of attack was not evident. The larvae were not a serious problem for most cultivars in either the sprayed or unsprayed field and any damage was not continuous throughout the season. Thrips on flowers and leafminer on snapdragon were observed, but did not become a significant problem.

### **Other problems**

**Pollution injury.** Symptoms of pollution injury were detected, but the source and agent were not determined. Symptoms were striking and most severe on *Dianthus barbatus*, causing chlorotic striations on the foliage, but also appeared in *D. hybrida*. Symptoms were not detected in any other crop in this trial, but were reported on vegetable crops in the Tampa Bay area during the same period in late February. The symptoms resemble sulfur dioxide injury. Photographs of the injury were sent to a dianthus breeder in California who concurred with the pollution diagnosis.

Abstracts of overall foliage/flower ratings (Table 2), overall foliage/flower pest ratings, overall cultivar performance ratings and best-of-class selections (Table 4) are discussed below. Detailed information on objective plant measurements, flowering and subjective ratings are found in Tables 1-4.

### **Alstroemeria [(A. × *hybrida*) lily of the Incas]**

This crop requires a long time to mature, compared to the other crop species in this trial. Ratings began in early spring. Plant and flower variability and foliage condition affected ratings.

**Purple/rose/yellow class.** The overall foliage/flower rating was 3.9 for ‘Jazze Purple Rose’. The overall foliage/flower pest rating was 6.0. The adjusted overall performance rating was 4.9 for this uncontested best-of-class.

**Rose/white/yellow class.** The overall foliage/flower rating was 3.0 for ‘Jazze Rose Frost’. The overall foliage/flower pest rating was 6.2. The adjusted overall performance rating was 4.6 for this uncontested best-of-class.

**Rose/yellow class.** The overall foliage/flower rating was 3.9 for ‘Jazze Deep Rose’. The overall foliage/flower pest rating was 6.1. The adjusted overall performance rating was 5.0 for this uncontested best-of-class.

### **Dianthus species and interspecific hybrids**

*D. barbatus*, *D. chinensis* and some *D. hybrida* were severely affected by soilborne pathogens. The affect occurred in both fields and was consistent across replicated plots. Most of the *D. hybrida* cultivars had high ratings, peaking during the second rating period in late February.

### **China Pink s or Rainbow Pinks (*D. chinensis*)**

**Pink/red class.** The overall foliage/flower rating was 2.4 for ‘Super Parfait Strawberry’. The overall foliage/flower pest rating was 5.0\*<sup>4</sup>. Average number of dead plants/plot was 4.7. The adjusted overall performance rating was 2.6\* for this uncontested best-of-class.

**Purple, red violet/white/red class.** The overall foliage/flower rating was 2.5 for ‘Super Parfait Raspberry’. The overall foliage/flower pest rating was 7.0\*. Average number of dead plants/plot was 4.7. The adjusted overall performance rating was 3.2\* for this uncontested best-of-class.

<sup>4</sup> An asterisk (\*) appearing by a number indicates the rating was an observation from one plot, due to plant death in the other plots. If the asterisk appears by a cultivar name, it indicates that cultivar was selected best-of-class, based on the overall adjusted performance rating in Table 4..6

### **Sweet William (*D. barbatus* L.)**

**Purple, blue violet class.** The overall foliage/flower rating was 4.7 for ‘Noverna Purple’. The overall foliage/flower pest rating was 7.0. Average number of dead plants/plot was 5.0. The adjusted overall performance rating was 4.1 for this uncontested best-of-class.

**Purple, red violet class.** The overall foliage/flower rating was 3.7 for ‘Heritage Purple’. The overall foliage/flower pest rating was 6.1. Average number of dead plants/plot was 5.0. The adjusted overall performance rating was 3.1 for this uncontested best-of-class.

**Red shades/tints class.** The overall foliage/flower rating was 2.5 for ‘Heritage Crimson’. The overall foliage/flower pest rating was 5.7. Average number of dead plants/plot was 3.7. The adjusted overall performance rating was 2.8 for this uncontested best-of-class.

**White class.** The overall foliage/flower rating was 3.0 for ‘Heritage White’. The overall foliage/flower pest rating was 5.7. Average number of dead plants/plot was 5.0. The adjusted overall performance rating was 2.6 for this uncontested best-of-class.

### **Interspecific Hybrids**

**Dwarf – mixes class.** The overall foliage/flower rating was 4.3 for ‘Ideal Sweetheart

Mix'. The overall foliage/flower pest rating was 6.3. Average number of dead plants/plot was 1.0. The adjusted overall performance rating was 5.0 for this uncontested best-of-class.

**Dwarf – pink class.** The overall foliage/flower rating was 4.7 for 'Diamond Pink'. The overall foliage/flower pest rating was 6.3. The adjusted overall performance rating was 5.3 for this uncontested best-of-class.

**Dwarf – purple, red-violet class.** The overall foliage/flower rating ranged from 4.4 for 'Ideal Violet' to 4.9 for 'Diamond Purple'. The overall foliage/flower pest rating ranged from 5.5 for 'Ideal Violet' to 6.4 for 'Diamond Purple'. Average plant death ranged from 0.0 plants/plot for 'Diamond Purple' to 1.0 plants/plot for 'Ideal Violet'. The adjusted overall performance rating ranged from 4.6 for 'Ideal Violet' to 5.6 for 'Diamond Purple', the best-of-class.

**Dwarf – purple, red-violet/white class.** The overall foliage/flower rating was 5.2 for 'Ideal Violet Picotee'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.9 for this uncontested best-of-class.

**Dwarf – red.** The overall foliage/flower rating was 4.2 for 'Diamond Red'. The overall foliage/flower pest rating was 6.1. The adjusted overall performance rating was 5.2 for this uncontested best-of-class..7

**Dwarf – red/white.** The overall foliage/flower rating ranged from 2.9 (rating 1) for 'Valentine' to 5.0 for 'Telstar Picotee'. The overall foliage/flower pest rating ranged from 6.7 for 'Ideal Cherry Picotee' to 6.9 for 'Telstar Picotee'. Average plant death ranged from 0.0 plants/plot for 'Ideal Cherry Picotee' and 'Telstar Picotee' to 3.7 plants/plot for 'Valentine'. The adjusted overall performance rating ranged from 3.5 for 'Valentine' to 6.0 for 'Telstar Picotee', the best-of-class.

**Dwarf – red shades/tints.** The overall foliage/flower rating ranged from 3.9 for 'Diamond Coral' to 5.3 for 'Diamond Carmine Rose'. The overall foliage/flower pest rating ranged from 6.2 for 'Diamond Coral' and 'Ideal Carmine' to 6.6 for 'Diamond Carmine Rose'. The adjusted overall performance rating ranged from 5.1 for 'Diamond Coral' to 5.9 for 'Diamond Carmine Rose', the best-of-class.

**Dwarf – white.** The overall foliage/flower rating was 5.3 for 'Ideal White'. The overall foliage/flower pest rating was 6.3. Average plant death was 3.0 plants/plot. The adjusted overall performance rating was 4.7 for this uncontested best-of-class.

**Dwarf – white to pink color shift class.** The overall foliage/flower rating was 4.9 for 'Diamond Blush Pink'. The overall foliage/flower pest rating was 6.4. The adjusted overall performance rating was 5.7 for this uncontested best-of-class.

**Tall – pink class.** The overall foliage/flower rating was 4.3 for 'Melody Pink'. The overall foliage/flower pest rating was 6.2. The adjusted overall performance rating was 5.2 for this uncontested best-of-class.

**Tall – purple, red-violet class.** The overall foliage/flower rating was 4.0 for 'Bouquet Purple'. The overall foliage/flower pest rating was 7.0. The adjusted overall performance rating was 5.5 for this uncontested best-of-class.

**Tall – white class.** The overall foliage/flower rating was 4.4 for 'Melody White'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.5 for this uncontested best-of-class.

**Tall – white to pink color shift class.** The overall foliage/flower rating was 4.5 for 'Melody Blush Pink'. The overall foliage/flower pest rating was 6.3. The adjusted

overall performance rating was 5.4 for this uncontested best-of-class.

**Helichrysum [(H. cassianum); strawflower]**

**Rose shades class.** The overall foliage/flower rating was 4.4 for 'Porcelain Rose Shades'. The overall foliage/flower pest rating was 6.7. Average plant death was 1.0 plants/plot. The adjusted overall performance rating was 5.2 for this uncontested best-of-class.

**Snapdragon (*Antirrhinum majus* L.).8**

**Dwarf – open flower, mixes class.** The overall foliage/flower rating was 4.9 for 'Bells Mix'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.6 for this uncontested best-of-class.

**Dwarf – open flower, purple, light blue -violet class.** The overall foliage/flower rating was 5.6 for 'Bells Frosty Lavender'. The overall foliage/flower pest rating was 6.6. Average plant death was 1.0 plant/plot. The adjusted overall performance rating was 5.7 for this uncontested best-of-class.

**Dwarf – open flower, white class.** The overall foliage/flower rating was 4.8 for 'Bells White'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.7 for this uncontested best-of-class.

**Dwarf – standard flower, bronze class.** The overall foliage/flower rating was 5.6 for 'Floral Showers Deep Bronze'. The overall foliage/flower pest rating was 6.7. Average plant death was 1.0 plant/plot. The adjusted overall performance rating was 5.8 for this uncontested best-of-class.

**Dwarf – standard flower, mixes class.** The overall foliage/flower rating ranged from 4.5 for 'Palette Formula Mix' to 4.6 for 'Floral Carpet Mix'. The overall foliage/flower pest rating ranged from 6.5 for 'Palette Formula Mix' to 6.7 for 'Floral Carpet Mix'. Average plant death ranged from 0.3 plants/plot for 'Floral Carpet Mix' to 2.3 plants/plot for 'Palette Formula Mix'. The adjusted overall performance rating ranged from 4.7 for 'Palette Formula Mix' to 5.5 for 'Floral Carpet Mix', the best-of-class.

**Dwarf – standard flower, yellow/orange shades/tints class.** The overall foliage/flower rating was 4.1 for 'Floral Showers Apricot Bicolor'. The overall foliage/flower pest rating was 6.8. Average plant death was 1.0 plant/plot. The adjusted overall performance rating was 5.1 for this uncontested best-of-class.

**Dwarf – standard flower, orange/yellow class.** The overall foliage/flower rating was 5.0 for 'Montego Orange Bicolor'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.7 for this uncontested best-of-class.

**Dwarf – standard flower, purple, light blue -violet/white class.** The overall foliage/flower rating was 4.6 for 'Floral Showers Lavender Bicolor'. The overall foliage/flower pest rating was 6.6. Average plant death was 3.0 plants/plot. The adjusted overall performance rating was 4.5 for this uncontested best-of-class.

**Dwarf – standard flower, purple, red-violet class.** The overall foliage/flower rating ranged from 3.7 for 'Palette Purple' to 5.2 for 'Montego Purple'. The overall foliage/flower pest rating ranged from 6.5 for 'Floral Showers Purple' to 6.7 for 'Floral Showers Lilac'. Average plant death ranged from 0.7 plants/plot for 'Floral Showers Lilac' to 3.3 plants/plot for 'Floral Showers Purple'. The adjusted overall performance rating ranged from 4.5 for 'Palette Purple' to 5.6 for 'Floral Showers Lilac' and 'Montego Purple', the best-of-class.

**Dwarf – standard flower, purple, red-violet/white class.** The overall foliage/flower

rating ranged from 4.9 for 'Floral Showers Fuchsia' to 5.0 for 'Floral Showers Wine Bicolor'. The overall foliage/flower pest rating was 6.8 for 'Floral Showers Fuchsia' and 'Floral Showers Wine Bicolor'. Average plant death was 1.0 plant/plot for 'Floral Showers Fuchsia' and 'Floral Showers Wine Bicolor'. The adjusted overall performance rating was 5.5 for 'Floral Showers Fuchsia' and 'Floral Showers Wine Bicolor'. 'Floral Showers Wine Bicolor' was the best-of-class, based on the overall foliage/flower rating (Table 2).

**Dwarf – standard flower, red class.** The overall foliage/flower rating ranged from 4.8 for 'Montego Red' to 5.5 for 'Floral Showers Scarlet'. The overall foliage/flower pest rating ranged from 6.5 for 'Floral Showers Crimson' and 'Montego Red' to 6.6 for 'Floral Showers Scarlet'. Average plant death ranged from 1.7 plants/plot for 'Floral Showers Scarlet' to 2.0 plants/plot for 'Floral Showers Crimson' and 'Montego Red'. The adjusted overall performance rating ranged from 4.9 for 'Montego Red' to 5.4 for 'Floral Showers Scarlet', the best-of-class.

**Dwarf – standard flower, red/white class.** The overall foliage/flower rating was 4.2 for 'Floral Showers Coral Bicolor'. The overall foliage/flower pest rating was 6.6. Average plant death was 2.0 plants/plot. The adjusted overall performance rating was 4.7 for this uncontested best-of-class.

**Dwarf – standard flower, red/yellow class.** The overall foliage/flower rating was 5.2 for 'Floral Showers Red & Yellow Bicolor'. The overall foliage/flower pest rating was 6.7. Average plant death was 1.0 plant/plot. The adjusted overall performance rating was 5.6 for this uncontested best-of-class.

**Dwarf – standard flower, rose class.** The overall foliage/flower rating ranged from 4.8 for 'Palette Rose Eye' to 5.8 for 'Floral Showers Rose Pink'. The overall foliage/flower pest rating ranged from 6.6 for 'Floral Showers Rose' to 6.9 for 'Floral Showers Rose Pink'. Average plant death ranged from 0.7 plants/plot for 'Palette Rose Eye' to 2.3 plants/plot for 'Floral Showers Rose Pink'. The adjusted overall performance rating ranged from 5.3 for 'Floral Showers Rose' to 5.5 for 'Palette Rose Eye' and 'Floral Showers Rose Pink'. 'Floral Showers Rose Pink' was chosen best-of-class based on the overall foliage/flower rating (Table 2).

**Dwarf – standard flower, white class.** The overall foliage/flower rating ranged from 4.4 for 'Palette White' to 5.2 for 'Floral Showers White'. The overall foliage/flower pest rating ranged from 6.5 for 'Palette White' to 6.7 for 'Floral Showers White'. Average plant death ranged from 1.0 plant/plot for 'Montego White' to 2.7 plants/plot for 'Palette White'. The adjusted overall performance rating ranged from 4.5 for 'Palette White' to 5.2 for 'Floral Showers White' and 'Montego White'. 'Floral Showers White' was selected best-of-class, based on the overall foliage/flower rating (Table 2)..10

**Dwarf – standard flower, yellow class.** The overall foliage/flower rating ranged from 4.8 for 'Palette Yellow' to 5.4 for 'Floral Showers Yellow'. The overall foliage/flower pest rating ranged from 6.4 for 'Palette Yellow' to 6.7 for 'Floral Showers Yellow' and 'Montego Yellow'. Average plant death was 1.0 plants/plot for 'Floral Showers Yellow', 'Montego Yellow' and 'Palette Yellow'. The adjusted overall performance rating ranged from 5.2 for 'Palette Yellow' to 5.7 for 'Floral Showers Yellow', the best-of-class.

**Tall – open flower, bronze class.** The overall foliage/flower rating was 3.5 for 'La Bella Medium Bronze'. The overall foliage/flower pest rating was 6.5. The adjusted overall performance rating was 4.8 for this uncontested best-of-class.

**Tall – open flower, pink class.** The overall foliage/flower rating was 3.3 for ‘La Bella Light Pink’. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 4.8 for this uncontested best-of-class.

**Tall – open flower, red class.** The overall foliage/flower rating was 3.7 for ‘La Bella Red’. The overall foliage/flower pest rating was 6.5. Average plant death was 1.3 plants/plot. The adjusted overall performance rating was 4.6 for this uncontested best-of-class.

**Tall – open flower, purple, red-violet class.** The overall foliage/flower rating was 4.0 for ‘La Bella Purple’. The overall foliage/flower pest rating was 6.5. The adjusted overall performance rating was 5.3 for this uncontested best-of-class.

**Tall – standard flower, bronze class.** The overall foliage/flower rating ranged from 3.8 for ‘Coronette Bronze’ to 3.9 for ‘Sonnet Bronze’. The overall foliage/flower pest rating ranged from 6.4 for ‘Sonnet Bronze’ to 6.8 for ‘Coronette Bronze’. The adjusted overall performance rating ranged from 4.9 for ‘Sonnet Bronze’ to 5.2 for ‘Coronette Bronze’, the best-of-class.

**Tall – standard flower, mixes class.** The overall foliage/flower rating ranged from 3.7 for ‘Kim Mix’ to 3.8 for ‘Solstice Mix’. The overall foliage/flower pest rating was 6.7 for ‘Kim Mix’ and ‘Solstice Mix’. The adjusted overall performance rating was 5.0 for ‘Kim Mix’ and ‘Solstice Mix’. ‘Solstice Mix’ was selected best-of-class, based on the overall foliage/flower rating (Table 2).

**Tall – standard flower, orange/yellow/white class.** The overall foliage/flower rating was 3.9 for ‘Solstice Orange Tricolor’. The overall foliage/flower pest rating was 6.8. The adjusted overall performance rating was 5.1 for this uncontested best-of-class.

**Tall – standard flower, pink class.** The overall foliage/flower rating ranged from 3.5 for ‘Coronette Pink’, ‘Solstice Pink’; and ‘Sonnet Pink’ to 3.7 for ‘Freesong Pink’. The overall foliage/flower pest rating was 6.6 for ‘Coronette Pink’, ‘Solstice Pink’, ‘Sonnet Pink’ and ‘Freesong Pink’. Average plant death ranged from 0.0 plants/plot for ‘Coronette Pink’ to 1.0 plants/plot for ‘Freesong Pink’. The adjusted overall performance rating ranged from 4.8 for ‘Freesong Pink’ to 5.0 for ‘Coronette Pink’ and ‘Sonnet Pink’. ‘Sonnet Pink’ was selected best-of-class, based on the overall foliage/flower rating (Table 2).

**Tall – standard flower, purple, blue -violet class.** The overall foliage/flower rating was 4.4 for ‘Liberty Classic Lavender’. The overall foliage/flower pest rating was 6.8. The adjusted overall performance rating was 5.3 for this uncontested best-of-class.

**Tall – standard flower, purple, red-violet class.** The overall foliage/flower rating ranged from 3.9 for ‘Solstice Purple’ to 4.3 for ‘Solstice Burgundy’. The overall foliage/flower pest rating ranged from 6.5 for ‘Solstice Purple’ to 6.8 for ‘Coronette Orchid’. The adjusted overall performance rating ranged from 5.0 for ‘Solstice Purple’ to 5.5 for ‘Coronette Orchid’ and ‘Solstice Burgundy’. ‘Solstice Burgundy’ was selected best-of-class, based on the overall foliage/flower rating (Table 2).

**Tall – standard flower, red class.** The overall foliage/flower rating ranged from 3.1 for ‘Crown Scarlet’ to 4.3 for ‘Crown Red’. The overall foliage/flower pest rating ranged from 6.6 for ‘Coronette Cherry’ and ‘Sonnet Crimson’ to 6.8 for ‘Coronette Deep Red’ and ‘Freesong Scarlet’. Average plant death ranged from 0.0 plants/plot for ‘Freesong Cherry’ to 2.3 plants/plot for ‘Coronette Cherry’ and ‘Sonnet Crimson’. The adjusted overall performance rating ranged from 4.3 for ‘Sonnet Crimson’ to 5.3 for ‘Crown Red’.

and 'Freesong Cherry'. 'Crown Red' was selected best-of-class, based on the overall foliage/flower rating (Table 2).

**Tall – standard flower, rose class.** The overall foliage/flower rating ranged from 3.8 for 'Sonnet Rose' to 4.5 for 'Liberty Classic Rose Pink'. The overall foliage/flower pest rating ranged from 6.6 for 'Sonnet Rose' to 6.8 for 'Liberty Classic Rose Pink'. Average plant death ranged from 0.0 plants/plot for 'Crown Rose' to 2.0 plants/plot for 'Liberty Classic Rose Pink'. The adjusted overall performance rating ranged from 4.9 for 'Rose Pink' to 5.5 for 'Crown Rose', the best-of-class.

**Tall – standard flower, white class.** The overall foliage/flower rating ranged from 3.4 for 'Sonnet White' to 4.0 for 'Crown White'. The overall foliage/flower pest rating ranged from 6.5 for 'Sonnet White' to 6.8 for 'Liberty Classic White'. Average plant death ranged from 0.3 plants/plot for 'Coronette White' and 'Crown White' to 1.0 plants/plot for 'Liberty Classic White'. The adjusted overall performance rating ranged from 4.7 for 'Sonnet White' to 5.2 for 'Crown White', the best-of-class.

**Tall – standard flower, yellow class.** The overall foliage/flower rating ranged from 3.7 for 'Solstice Yellow' to 4.6 for 'Crown Yellow'. The overall foliage/flower pest rating ranged from 6.4 for 'Freesong Yellow', 'Liberty Classic Yellow' and 'Sonnet Yellow' to 6.8 for 'Coronette Yellow'. Average plant death ranged from 0.0 plants/plot for 'Freesong Yellow' to 1.3 plants/plot for 'Crown Yellow'. The adjusted overall performance rating ranged from 4.9 for 'Sonnet Yellow' to 5.3 for 'Crown Yellow' and 'Freesong Yellow'. 'Crown Yellow' was the best-of-class, based on the overall foliage/flower rating (Table 2).

**Tall – standard flower, yellow/red class.** The overall foliage/flower rating was 4.2 for 'Crown Candy Corn'. The overall foliage/flower pest rating was 6.6. The adjusted overall performance rating was 5.1 for this uncontested best-of-class.

**Wallflower** (*Cheiranthus cheiri* Linn.)

**Yellow class.** The overall foliage/flower rating ranged from 4.4 for 'Charity Cream Yellow' to 4.5 for 'Charity Yellow'. The overall foliage/flower pest rating ranged from 6.6 for 'Charity Yellow' to 6.7 for 'Charity Cream Yellow'. The adjusted overall performance rating was 5.3 for 'Charity Cream Yellow' and 'Charity Yellow'. 'Charity Yellow' was selected best-of-class, based on the overall foliage/flower rating (Table 2), the best-of-class.

## Conclusions

While early or late season performance, a particular plant height, or shade of the same color may be a selection criteria outweighing seasonal performance, the combined foliage and flower ratings represent an overall view of performance for each cultivar in its class over the entire season. We consider cultivars with an adjusted overall performance rating > 5.6 as outstanding, 5.0-5.5 as good performers, 4.0-4.9 as fair and 1.0-3.9 as poor. This is a summary of cultivar selections listed by performance and class order, with best-of-class indicated with an asterisk (\*):

**Outstanding** cultivars (> 5.6) were:

**Dianthus.** (dwarf – purple, red- violet class) '**Diamond Purple**'\*; (dwarf – purple, red-violet/ white class) '**Ideal Violet Picotee**'\*; (dwarf – red/white) '**Ideal Cherry Picotee**'

and **'Telstar Picotee'**\*; (dwarf – red shades/tints) **'Diamond Carmine Rose'**\*, **'Telstar Carmine Rose'** and **'Telstar Crimson'**; (dwarf – white to pink color shift class) **'Diamond Blush Pink'**\*.

**Snapdragon.** (dwarf – open flower, mixes class) **'Bells Mix'**\*; (dwarf – open flower, purple, light blue-violet class) **'Bells Frosty Lavender'**\*; (dwarf – open flower, white class) **'Bells White'**\*; (dwarf – standard flower, bronze class) **'Floral Showers Deep Bronze'**\*; (dwarf – standard flower, orange/yellow class) **'Montego Orange Bicolor'**\*; (dwarf – standard flower, purple, red-violet class) **'Floral Showers Lilac'** and **'Montego Purple'**\*; (dwarf – standard flower, red/yellow class) **'Floral Showers Red & Yellow Bicolor'**\*; and (dwarf – standard flower, yellow class) **'Floral Showers Yellow'**\*.

Good cultivars (5.0-5.5) were:

**Alstroemeria.** (rose/yellow class) **'Jazze Deep Rose'**\*.

**Dianthus.** (dwarf – mixes class) **'Ideal Sweetheart Mix'**\*; (dwarf – pink class) **'Diamond Pink'**\*; (dwarf – red) **'Diamond Red'**\*; (dwarf – red shades/tints) **'Diamond.13**

**Coral'** and **'Ideal Carmine'**; (tall – pink class) **'Melody Pink'**\*; (tall – purple, red-violet

class) **'Bouquet Purple'**\*; (tall – white class) **'Melody White'**\*; (tall – white to pink color shift class) **'Melody Blush Pink'**\*.

**Helichrysum.** (rose shades class) **'Porcelain Rose Shades'**\*.

**Snapdragon.** (dwarf – standard flower, mixes class) **'Floral Carpet Mix'**\*; (dwarf – standard flower, yellow/orange shades/tints class) **'Floral Showers Apricot Bicolor'**\*; (dwarf – standard flower, purple, red-violet/white class) **'Floral Showers Fuchsia'**; and **'Floral Showers Wine Bicolor'**\*; (dwarf – standard flower, red class) **'Floral Showers Crimson'** and **'Floral Showers Scarlet'**\*; (dwarf – standard flower, rose class) **'Floral Showers Rose'**, **'Floral Showers Rose Pink'**\*, and **'Palette Rose Eye'**; (dwarf – standard flower, white class) **'Floral Showers White'**\* and **'Montego White'**; (dwarf – standard flower, yellow class) **'Montego Yellow'** and **'Palette Yellow'**; (tall – open flower, purple, red-violet class) **'La Bella Purple'**\*; (tall – standard flower, bronze class) **'Coronette Bronze'**\*; (tall – standard flower, mixes class) **'Kim Mix'** and **'Solstice Mix'**\*; (tall – standard flower, orange/yellow/white class) **'Solstice Orange Tricolor'**\*; (tall – standard flower, pink class) **'Coronette Pink'** and **'Sonnet Pink'**\*; (tall – standard flower, purple, blue- violet class) **'Liberty Classic Lavender'**\*; (tall – standard flower, purple, red- violet class) **'Coronette Orchid'**, **'Solstice Burgundy'**\*, and **'Solstice Purple'**; (tall – standard flower, red class) **'Coronette Deep Red'**, **'Crown Red'**\* and **'Freesong Cherry'**; (tall – standard flower, rose class) **'Crown Rose'**\* and **'Sonnet Rose'**; (tall – standard flower, white class) **'Coronette White'** and **'Crown White'**\*; (tall – standard flower, yellow class) **'Coronette Yellow'**, **'Crown Yellow'**\*, **'Freesong Yellow'**, **'Liberty Classic Yellow'** and **'Solstice Yellow'**; (tall – standard flower, yellow/red class) **'Crown Candy Corn'**\*.

**Wallflower.** (yellow class) **'Charity Cream Yellow'** and **'Charity Yellow'**\*.

**Fair** cultivars (4.0-4.9) were:

**Alstroemeria.** (durple/rose/yellow class) **‘Jazze Purple Rose’\*** and (rose/white/yellow class) **‘Jazze Rose Frost’\***.

**Dianthus.** (purple, blue violet class) **‘Noverna Purple’\***; (dwarf – purple, red-violet class) **‘Ideal Violet’**; (dwarf – white) **‘Ideal White’\***.

**Snapdragon.** (dwarf – standard flower, mixes class) **‘Palette Formula Mix’**; (dwarf – standard flower, purple, light blue-violet/white class) **‘Floral Showers Lavender Bicolor’\***; (dwarf – standard flower, purple, red-violet class) **‘Floral Showers Purple’** and **‘Palette Purple’**; (dwarf – standard flower, red class) **‘Montego Red’**; (Dwarf – standard flower, red/white class) **‘Floral Showers Coral Bicolor’\***; (dwarf – standard flower, white class) **‘Palette White’**; (tall – open flower, bronze class) **‘La Bella Medium Bronze’\***; (tall – open flower, pink class) **‘La Bella Light Pink’\***; (tall – open flower, red class) **‘La Bella Red’\***; (tall – standard flower, bronze class) **‘Sonnet Bronze’**; (tall – standard flower, pink class) **‘Freesong Pink’** and **‘Solstice Pink’**; (tall – standard flower, red class) **‘Coronette Cherry’**, **‘Crown Scarlet’**, **‘Freesong Scarlet’**, **‘Liberty Classic Cherry’** and **‘Sonnet Crimson’**; (tall – standard flower, rose class) **‘Liberty Classic Rose Pink’**; (tall – standard flower, white class) **‘Liberty Classic White’** and **‘Sonnet White’**; (tall – standard flower, yellow class) **‘Sonnet Yellow’**.

**Poor** cultivars (< 3.9) were:

**Dianthus.** (pink/red class) **‘Super Parfait Strawberry’\***; (purple, red violet/white/red class) **‘Super Parfait Raspberry’\***; (purple, red violet class) **‘Heritage Purple’\***; (red shades/tints class) **‘Heritage Crimson’\***; (white class) **‘Heritage White’\***; (dwarf – red/white) **‘Valentine’**.

### **Uncontested Best-of-Class**

The uncontested best-of-class may not have good performance ratings, and would not be recommended to the public. This performance may be a reflection of the species or the individual cultivar, and offers a challenge to the breeder and the seed companies to provide new selections to trial against it in our efforts to offer the best cultivars to growers, landscapers and gardeners in Central Florida.

### **Note**

The information in this report is a summary of experimental results and does not provide recommendations for crop production. Where trade names are used, no discrimination is intended or endorsement implied.

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