

Fort Lauderdale Trial Garden—Year 5 (2006–07)

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Rooted cuttings of vegetatively propagated annuals from Danziger “Dan” Flower Farm were planted on 21 Aug. 2006 while rooted cuttings from Euro American Propagators (Proven Winners) were planted on 3 Nov. 2006. All cultivars were planted as three groups of six plants that were randomly placed in the garden. During the first week of each month, evaluations were conducted to measure and record plant height and width (size), flower number, and quality rating. Quality was rated on a scale of 1 to 5 with 5 = excellent and 1 = poor. One consumer preference survey was conducted on 22 Mar. 2007.

The trial garden at the University of Florida Fort Lauderdale Research and Education Center has been used to evaluate vegetatively propagated annual bedding plant cultivars since Fall 2002 (Moore and Fisher, 2005, 2006; Moore et al., 2003, 2004). The trial garden was established to assist bedding plant companies with unbiased evaluations of cultivar performance in southern Florida. The winter climate in this area is ideal for many annual bedding plants. The companies hope to expand availability of different and new types of annuals for winter color in south Florida based on performance and consumer preference ratings generated at the trial garden.

Materials and Methods

TRANSPLANT PRODUCTION. Rooted liners of cultivars from Danziger “Dan” Flower Farm (Beit Dagan, Israel) (Table 1) and from Euro American Propagators (Proven Winners) (Bonsall, CA) (Table 2) were transplanted into 400-mL round pots filled with a peat-based growing medium (Pro-mix “BX,” Premier Horticulture, Red Hill, PA). After transplanting, plants were placed in an open-sided greenhouse exposed to ambient air temperatures fluctuating around of 30 °C day/21 °C night. Danziger cultivars were placed in the greenhouse in July 2006 and Euro American cultivars were placed in the greenhouse in Oct. 2006. Plants were watered daily and fertilized at planting with 5 g of a 15N–4.05P–9.96K controlled-release fertilizer (CRF) (Osmocote, The Scotts Co., Marysville, OH).

FIELD EVALUATION. The 100 ft × 100 ft garden has a Margate fine sand soil with 1.6% organic matter, a pH of 6.74 pH, a soluble salt level of 0.30 mS·cm⁻¹, a nitrate-nitrogen concentration of 9.0 mg·kg⁻¹, an ammonical-nitrogen concentration of 5.0 mg·kg⁻¹, a phosphorus concentration of 27.0 mg·kg⁻¹, and a potassium concentration of 3.7 mg·kg⁻¹ (samples collected from top 6 inches of soil). Samples were analyzed by the University of Florida’s soil testing laboratory. A 3-inch composted yard trimming mulch layer was spread over the garden to help control weeds.

Plants from Danziger were planted into the garden on 21 Aug. 2006 while plants from Euro American were planted into the garden on 3 Nov. 2006. Eighteen plants of each cultivar were planted in the garden as three randomly placed groups of six plants per cultivar. The six plants in the group were planted on 15.24-cm (6 inch) centers and occupied an area of 91.44 cm × 91.44 cm (36 × 36 inch²). All cultivars were planted under 30% shade. At planting, each plant received 5 g of the CRF listed above in the hole prior to placing the plant in the ground. The first month after each planting, new plants were watered overhead three times a week for 30 min, applying an average 2.25 inches of water. Irrigation frequency was then reduced to twice a week for 30 min for the remainder of the trial.

DATA COLLECTION. Monthly mean air and soil temperature, solar radiation, and rainfall were collected using the Florida Automated Weather Network (FAWN) system (Table 3). During the first week of every month of the trial, plant height, plant width, flower number, and quality were recorded for each individual plant in the garden. Plant quality was based on the appearance of the group of six plants (three replications of six plants for each cultivar) and took into account the number of plants in flower in a group as well as uniformity in growth and appearance. Plant quality was based on a scale of 0 to 5 with 5 = top performance; 4 = strong display of color and good growth habit; 3 = plants of interest; 2 = plants are green and growing; 1 = poor performance; and 0 = dead.

One consumer preference survey also was conducted in which participants were asked to check all of the cultivars that they liked. These data were ranked using PROC RANK (SAS Systems, SAS Institute, Cary, NC) with plants being chosen more often getting a higher rank than plants that were chosen less often. The survey was conducted on 22 Mar. 2007. Data were then analyzed using analysis of variance (SAS Systems).

Results and Discussion

All cultivars planted in the garden in 2006–07 did grow and show an increase in plant height, width, and flower number. This data is available on the Fort Lauderdale Trial Garden website (http://frec.ifas.ufl.edu/trial_garden/index.shtml).

The highest plant quality for Harmony new guinea impatiens and Musica double impatiens from Danziger occurred 103 to 135

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Table 1. Plant quality rating (0 = dead; 1 = poor performance; and 5 = top performance) of Danziger “Dan” Flower Farms cultivars planted on 21 Aug. 2006. Data were collected 75, 103, 135, 159, and 195 d after planting (DAP).

Cultivar	Quality				
	75 DAP (Nov. 2006)	103 DAP (Dec. 2006)	135 DAP (Jan. 2007)	159 DAP (Mar. 2007)	195 DAP (Apr. 2007)
New Guinea Impatiens Harmony					
Apricot Cream	3.0	3.7	3.2	2.8	2.3
Candy Cream	3.3	3.8	3.7	3.5	2.7
Dark Pink	3.3	4.3	4.0	3.5	2.2
Deep Red	3.7	4.0	3.5	3.5	2.3
Magenta	3.0	2.7	2.7	2.3	2.2
Raspberry Cream	3.0	3.7	4.0	3.7	2.5
Osteospermum					
Purple Eye	2.8	2.0	2.7	3.3	2.5
Jamesbrittenia Britney					
Deep Pink	3.5	3.0	2.8	2.0	2.5
Maroon	3.2	3.8	3.5	2.0	2.5
Orange	3.7	4.7	3.0	1.7	1.7
Purple	3.5	4.2	3.0	2.3	1.7
Calitunia Purple	2.5	4.5	3.2	2.3	1.0
Snapdragon					
Impr Bicolor Pink	2.7	4.8	4.0	3.3	2.5
Double Impatiens Musica					
Bicolor Pink	3.2	4.7	4.3	2.8	2.5
Cherry Red	2.5	4.5	3.8	2.5	2.3
Pink Aroma	4.7	4.8	4.7	2.7	2.0
Pink Energy	4.2	4.8	5.0	2.7	2.7
Spicy Orange	4.2	4.5	4.7	2.7	3.0
Spicy Red	3.3	5.0	3.7	2.5	2.2
White	2.8	4.5	3.8	2.5	2.0
<i>P</i> > <i>F</i>					
Replicate	0.1429	0.1801	0.1093	0.3276	0.7912
Cultivars	0.0093	0.0001	0.0008	0.0038	0.0077

Table 2. Plant quality rating (0 = dead; 1 = poor performance; and 5 = top performance) of Euro American (Proven Winners) cultivars planted on 3 Nov. 2006. Data were collected 31, 63, 89, and 125 d after planting (DAP).

Cultivar	Quality			
	31 DAP (Dec. 2006)	63 DAP (Jan. 2007)	89 DAP (Mar. 2007)	125 DAP (Apr. 2007)
Angelonia				
Angel Face Blue	4.0	3.0	3.0	1.0
Angel Face Blue Bicolor	4.0	3.0	3.0	1.0
Angel Face White	4.0	3.0	3.5	1.5
Dresden Blue	3.0	3.0	2.0	1.0
Pink	3.0	3.0	2.5	2.0
Arctotis				
Bumble Bee	4.0	3.0	4.0	2.0
Peachy Mango	4.0	3.0	3.0	2.5
Pink Sugar	4.0	3.0	4.0	3.0
Pumpkin Pie	4.0	2.0	4.0	3.0
Sashe	3.0	2.0	3.5	2.0
Sun Spot	4.0	2.0	3.5	3.0
Bidens Solaire	3.0	2.0	2.0	2.0
Calibrachoa				
Million Bells Cherry Pink	3.0	1.0	0.0	0.0
Million Bells Craklin Fire	2.5	2.0	1.0	2.0
Million Bells Lavender	3.0	3.0	2.5	2.0
Million Bells Terra Cotta	4.0	4.5	3.5	2.0
Million Bells Trailing Blue	3.0	3.0	2.0	1.0
Million Bells Trailing Pink	3.0	3.0	1.0	1.0
Million Bells Yellow	4.0	4.5	3.0	1.5
Superbells Blue	3.0	3.0	3.5	2.0
Superbells Cherry Red	3.0	3.0	3.5	3.0
Superbells Coral	3.0	3.0	3.5	2.0

Table 2. Continued on next page.

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Cultivar	Quality			
	31 DAP (Dec. 2006)	63 DAP (Jan. 2007)	89 DAP (Mar. 2007)	125 DAP (Apr. 2007)
Superbells Peach	3.0	3.0	4.0	1.0
Superbells Pink	3.0	3.0	3.5	3.0
Superbells Pink Kiss	3.0	3.0	3.5	2.0
Superbells Plum	3.0	3.0	3.0	3.0
Superbells Red	3.0	3.0	3.5	3.0
Superbells Tequila Sunrise	2.0	3.0	3.5	3.0
Superbells Trailing Blue	3.0	3.0	3.5	2.0
Superbells Trailing Light Blue	3.0	3.0	3.5	3.0
Superbells Trailing Plum	3.0	3.0	3.5	2.0
Superbells Trailing Rose	3.0	3.0	3.5	2.0
Superbells White	3.0	3.0	3.5	3.0
Chrysocephalum Flambe				
Orange	3.0	3.0	4.0	3.0
Yellow	4.0	4.5	4.0	3.0
Cuphea Flamenco				
Rumba	4.0	3.0	3.0	1.5
Samba	4.5	4.5	3.5	1.5
Tango	4.5	3.0	3.0	1.0
Diascia Flying Colors				
Trailing Antique Rose	4.0	4.0	3.5	2.0
Coral	4.5	3.0	4.0	2.0
Red	5.0	3.0	4.0	2.0
Euphorbia Diamond Frost	4.0	5.0	4.0	3.5
Gypsophila Festival Star	4.5	4.0	4.0	2.5
Heuchera				
Crème Brule	4.0	3.0	4.0	2.0
Crème de Mint	4.0	4.0	4.0	3.0
Key Lime Pie	3.0	3.0	2.5	2.0
Licorice	3.0	3.0	4.0	3.0
Mocha Mint	4.0	4.0	3.0	2.0
Peach Melba	4.0	3.0	3.0	2.0
Mecardonia Gold Flake	4.0	3.0	4.0	3.0
Nemesia				
Blue Bird	4.5	4.5	3.0	1.0
Compact Innocence	4.5	4.5	3.0	1.0
Opal Innocence	4.5	4.5	2.0	1.0
Refined Innocence	4.5	3.0	3.0	1.0
Safari Pink	4.5	4.5	3.0	1.0
Safari Plum	4.5	4.5	3.0	2.0
Safari Violet Rose	4.5	4.5	3.5	2.0
Safari White	3.5	4.0	3.5	2.0
Sunsatia Mango	3.5	4.0	3.0	2.0
Sunsatia Peach	4.0	3.0	3.0	1.0
Sunsatia Raspberry	4.0	4.0	3.0	1.0
Osteospermum				
Lemon Symphony	2.0	0.0	0.0	0.0
Soprano Lilac Spoon	3.0	4.0	3.5	2.0
Orange Symphony	2.5	0.0	0.0	0.0
Soprano Light Purple	3.0	1.0	0.0	0.0
Soprano Purple	3.0	4.0	3.5	2.0
Oxalis				
Charmed Jade	4.5	4.0	4.0	2.0
Charmed Velvet	4.5	4.0	3.0	2.0
Charmed Wine	4.5	4.0	3.0	2.0
Phlox				
Intensia Cabernet	4.5	4.5	3.5	3.0
Intensia Lavender Glow	4.5	4.5	3.5	3.0
Intensia Lilac Rose	4.5	4.5	3.5	3.0
Intensia Neon Pink	4.5	4.5	4.0	3.0
Intensia White	4.5	4.5	4.0	3.0

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Cultivar	Quality			
	31 DAP (Dec. 2006)	63 DAP (Jan. 2007)	89 DAP (Mar. 2007)	125 DAP (Apr. 2007)
Salvia Golden Delicious	4.0	4.0	4.0	2.0
Stachys				
Royal Cloak	4.5	4.0	4.0	2.0
Sentimental Journey	4.5	4.0	4.0	2.0
Sutera				
Cabana Blue	4.5	4.0	3.0	2.0
Cabana	4.5	4.0	3.0	2.0
Snowstorm Giant Snowflake	4.5	4.0	3.0	2.0
Snowstorm White	4.5	4.0	3.0	2.0
Torenia				
Catalina Midnight Blue	5.0	4.0	2.5	2.0
Catalina Pink	4.5	4.0	3.0	2.0
Verbena (Superbena)				
Burgundy	4.0	4.0	3.0	2.0
Coral	3.0	4.0	2.0	1.5
Coral Red	4.0	4.0	3.0	2.0
Dark Blue	4.0	4.0	2.5	2.0
Large Lilac Blue	4.0	4.0	3.0	2.0
Pink Shades	4.0	4.0	3.0	2.0
Purple	4.0	4.0	3.0	2.0
<i>P > F</i>				
Replicate	0.1289	0.5648	0.5623	0.9745
Cultivars	0.0002	0.0001	0.0001	0.0079

Table 3. Average mean air and soil temperature, relative humidity, solar radiation, and rainfall measured at the University of Florida's Fort Lauderdale Research and Education Center during Winter 2006–07. The Florida Automated Weather Network (FAWN) collected the weather data.

Month/year	Avg mean air temp (°C)	Avg mean soil temp (°C)	Relative humidity (%)	Avg mean solar radiation (W·m ⁻²)	Monthly rainfall (inches)
Sept. 2006	26.90	27.18	77	190	13.65
Oct. 2006	25.48	26.40	70	197	2.63
Nov. 2006	21.71	22.88	72	138	2.08
Dec. 2006	22.78	22.86	75	117	5.06
Jan. 2007	21.46	22.32	73	142	1.20
Feb. 2007	19.62	20.74	73	166	2.20
Mar. 2007	22.13	22.75	67	211	1.76
Apr. 2007	22.48	24.12	65	254	0.59

d after planting (DAP), while the highest quality osteospermum from Danziger occurred 159 DAP (Table 1). The highest quality for Jamesbrittenia, calitunia, and snapdragons occurred 103 DAP. Plant quality started to decline after 159 DAP. In the 2005–06 trial garden, the Danziger Musica, Harmony, and Jamesbrittenia cultivars had quality ratings of 3 or better 86 DAP and showing decline 171 DAP (Moore and Fisher, 2006). Plant quality started to decline in Apr. 2006 similar to plant decline in Apr. 2007. Solar radiation levels and temperatures increase in March and April while relative humidity is low and rainfall is reduced (Table 3).

The highest quality for angelonia, bidens, Million Bells calibrachoa, cuphea, nemesia, oxalis, phlox, saliva, stachys, sutera, torenia, and verbena from Euro American occurred 31 to 63 DAP (Dec. 2006 to Jan. 2007) (Table 2). The highest quality chrysocephalum and Superbells calibrachoa occurred 89 DAP. The arctotis, diascia, heuchera, and mercardonia cultivars had quality ratings of 3 or better 31 DAP followed by a drop in quality 63 DAP and then an increase in quality 89 DAP. The only

two cultivars of osteospermum from Euro American that grew were 'Soprano Lilac Spoon' and 'Soprano Purple'. Average air temperatures in Dec. 2006 were approximately 3.3° warmer than in Dec. 2005, while temperatures in Nov. 2006 were 1.45° cooler (Table 3) (Moore and Fisher, 2006). Dec. 2006 also had more rain than in Dec. 2005. The warmer temperatures in December may have impacted plant quality. All of the Euro American cultivars started to decline 125 DAP (Apr. 2007).

The cultivars that ranked high in the survey included new guinea impatiens 'Harmony Candy Cream' and 'Harmony Deep Red'; double impatiens 'Musica Bicolor Pink', 'Musica Pink Energy', and 'Musica Spicy Orange'; arctotis 'Bumble Bee', 'Pumpkin Pie', 'Sashe', and 'Sun Spot'; calibrachoa 'Superbells Pink' and 'Superbells Tequila Sunrise'; chrysocephalum 'Flambe Yellow'; euphorbia 'Diamond Frost'; mecardonia 'Gold Flake'; osteospermum 'Soprano Purple'; oxalis 'Charmed Velvet'; phlox 'Intensia Cabernet', 'Intensia Neon Pink', and 'Intensia White'; and verbena 'Superbena Purple' (Table 4). As observed

Table 4. On 22 Mar. 2076, 28 people were asked to select their favorite cultivars planted in the University of Florida Fort Lauderdale trial garden. Responses were ranked statistically with cultivars being selected by more people having a higher rank than cultivars selected by fewer people. Any cultivar that was not selected had a ranking of 5.5.

Cultivar	Survey ranking	Cultivar	Survey ranking	Cultivar	Survey ranking
<i>Danziger "Dan" Flower Farms</i>					
New Guinea Impatiens Harmony		Million Bells Trailing Blue	32.5	Safari Plum	77.5
Apricot Cream	77.5	Million Bells Trailing Pink	5.5	Safari Violet Rose	45.5
Candy Cream	111	Million Bells Yellow	18	Safari White	58.5
Dark Pink	88.5	Superbells Blue	18	Sunsatia Mango	74
Deep Red	104	Superbells Cherry Red	69	Sunsatia Peach	58.5
Magenta	69	Superbells Coral	45.5	Sunsatia Raspberry	18
Raspberry Cream	45.5	Superbells Peach	18	Osteospermum	
Osteospermum Purple Eye	77.5	Superbells Pink	99.5	Lemon Symphony	5.5
Jamesbrittania Britney		Superbells Pink Kiss	5.5	Soprano Lilac Spoon	18
Deep Pink	45.5	Superbells Plum	32.5	Orange Symphony	5.5
Maroon	32.5	Superbells Red	83	Soprano Light Purple	5.5
Orange	45.5	Superbells Tequila Sunrise	107	Soprano Purple	92.5
Purple	45.5	Superbells Trailing Blue	69	Oxalis	
Calitunia Purple	18	Superbells Trailing Light Blue	32.5	Charmed Jade	18
Snapdragon Impr Bicolor Pink	32.5	Superbells Trailing Plum	32.5	Charmed Velvet	104
Double Impatiens Musica		Superbells Trailing Rose	58.5	Charmed Wine	77.5
Bicolor Pink	92.5	Superbells White	18	Phlox	
Cherry Red	58.5	Chrysocephalum Flambe		Intensia Cabernet	96
Pink Aroma	83	Orange	69	Intensia Lavender Glow	88.5
Pink Energy	96	Yellow	98	Intensia Lilac Rose	58.5
Spicy Orange	101.5	Cuphea Flamenco		Intensia Neon Pink	101.5
Spicy Red	83	Rumba	32.5	Intensia White	110
White	58.5	Samba	69	Salvia Golden Delicious	45.5
<i>Euro American (Proven Winners)</i>					
Angelonia		Tango	5.5	Stachys	
Angel Face Blue	18	Diascia Flying Colors		Royal Cloak	18
Angel Face Blue Bicolor	32.5	Trailing Antique Rose	58.5	Sentimental Journey	74
Angel Face White	18	Coral	58.5	Sutera	
Dresden Blue	5.5	Red	45.5	Cabana Blue	18
Pink	5.5	Euphorbia Diamond Frost	92.5	Cabana	32.5
Arctotis		Gypsophila Festival Star	74.0	Snowstorm Giant Snowflake	18
Bumble Bee	104	Heuchera		Snowstorm White	58.5
Peachy Mango	77.5	Crème Brule	58.5	Torenia	
Pink Sugar	83	Crème de Mint	88.5	Catalina Midnight Blue	45.5
Pumpkin Pie	107	Key Lime Pie	32.5	Catalina Pink	18
Sashe	109	Licorice	83	Verbena (Superbena)	
Sun Spot	99.5	Mocha Mint	58.5	Burgundy	83
Bidens Solaire	45.5	Peach Melba	45.5	Coral	58.5
Calibrachoa		Mecardonia Gold Flake	92.5	Coral Red	58.5
Million Bells Cherry Pink	32.5	Nemesia		Dark Blue	32.5
Million Bells Craklin Fire	32.5	Blue Bird	83	Large Lilac Blue	45.5
Million Bells Lavender	69	Compact Innocence	5.5	Pink Shades	58.5
Million Bells Terra Cotta	88.5	Opal Innocence	32.5	Purple	107
		Refined Innocence	18		
		Safari Pink	5.5		

in past years, the popular colors were vibrant pinks, purples, and reds. The bright yellow and orange flowers on the arctotis and chrysocephalum cultivars against their green tomentose foliage also were very popular.

Summary

Information about bedding plant field performance is important when making recommendations for landscape use. Annual bedding plant trials also are useful to evaluate plant growth, plant and flower uniformity, and floral display. Consumer surveys

also help in marketing flower colors and plants that appeal to the general public.

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