

FORT LAUDERDALE TRIAL GARDEN—YEAR 4 (2005-2006)

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Abstract. Rooted cuttings of vegetatively propagated annuals from Danziger “Dan” Flower Farm were planted on September 9, 2005 while rooted geranium cuttings from Fischer/Goldsmith were planted on December 1, 2005. All cultivars were planted with 3 groups of 6 plants that were randomly placed in the garden. Plants were watered 3 times a week for 30 minutes using overhead irrigation. Monthly evaluations were conducted to measure and record plant height, plant width, flower number, and quality rating. Quality was rated on a scale of 0 to 5 with 5 = top performance, 3 = plants of interest, 1 = poor performance, and 0 = dead. One consumer preference survey was conducted in March 2006. Results from the consumer preference survey and from the monthly quality ratings are presented in the text.

The trial garden at the University of Florida Fort Lauderdale Research and Education Center has been evaluating vegetatively propagated annual bedding plant cultivars for the past 3 years (Moore and Fisher, 2005; Moore et al., 2004, 2003). The trial garden was established to assist bedding plant companies with unbiased evaluations of cultivar performance of vegetative annual plants before summer trials in the rest of

the US. Winters in Fort Lauderdale are an ideal time to grow annual bedding plants in the landscape.

Materials and Methods

Transplant production. Rooted liners from commercial companies were transplanted into 400 mL round pots filled with Pro-mix ‘BX’ (Premier Horticulture, Inc., Red Hill, Penn.). After transplanting, plants were placed in an open-sided greenhouse exposed to ambient air temperatures of $\approx 30^{\circ}\text{C}$ day/ 21°C night. Plants were watered daily and fertilized twice a week with 150 mg·kg⁻¹ of nitrogen (N) from Peter’s 21N-2.2P-16.6K (The Scotts Company, Marysville, Ohio).

Cultivars from Danziger “Dan” Flower Farm (Israel) were placed in the greenhouse in July 2005, while cultivars from Fischer/Goldsmith (Boulder, Colo.) were placed in the greenhouse in Oct. 2005 (Table 1).

Field evaluation. The 100 ft × 100 ft garden has a Margate fine sand soil with 1.6% organic matter, a pH of 6.74, a soluble salt level of 0.30 mS/cm, a NO₃-N concentration of 9 mg/kg, an NH₄-N concentration of 5 mg·kg⁻¹, a P concentration of 27 mg·kg⁻¹, and a K 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 mulch (partially composted woody yard waste) layer was spread over the garden to help control weeds.

Plants from Danziger were planted into the garden on September 9, 2005 while plants from Fischer/Goldsmith were planted into the garden on December 1, 2005. On each planting date, 18 plants of each cultivar were planted in the garden as 3 randomly placed groups of 6 plants per cultivar. All culti-

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Table 1. List of cultivars planted in the Fort Lauderdale Trial garden in 2005. Cultivars from Danziger were planted in the garden on September 9, 2005 while cultivars from Fischer were planted in the garden on December 1, 2005.

Company	Plant	Variety	
Danziger “Dan” Flower Farms	Bacopa-Copia	Dark Pink, Pink Shade, Sunshine Blue	
	Bacopa	Golden Leaves White	
	Bacopa-Gulliver	Lavender, White	
	Bidens	Yellow Glow	
	Calibrachoa-Calimor	Deep Violet, Wild Purple	
	Double Impatiens—Musica	Dark Salmon, Pearl, Pink, Pink Energy, Ruby Red	
	Jamesbrittania		
	New Guinea Impatiens—Harmony	Pink Smile, Scarlet	
	Petunia	Sunray, Scarlet Dream	
	Scaevola	White, Mini Soft Blue	
	Torenia	Indigo Moon, Purple Violet, Roslyn Moon	
	Verbena—Donalena	Crimson, Dark Blue, Deep Pink, Lilac Whisper, Magenta, Pink Heart, Red Pepper, Violet, White Hail, Hot Lavender, Purple Splash	
	Fischer/Goldsmith	Ivy Geraniums	Holiday Purple Blizzard, Holiday Purple Dream, Holiday Red Blizzard, Luna 05, Marimba, Maxine, Taj Mahal, Tutti Frutti
		Geranium	Diablo, Gloria 06, Graffiti Salmon Rose, RM Coral, RM Deep Rose, RM Lavender, RM Light Salmon, RM Red, RM White 06, Tango Fire, Tango Neon Pink, Tango Pink
Ivy Geranium—Caliente		Deep Red	
Ivy Geranium—Freestyle		Artic Red, Deep Rose, Pink II	
Geranium—Americana		Cherry Rose II, Coral, Dark Red, Deep Rose, Deep Rose II, Light Salmon, Red, Salmon, Violet, White Splash II	
Geranium Eclipse		Pink, Rose	

Table 2. Average monthly air and soil temperature, solar radiation, and rainfall measured at the University of Florida's Fort Lauderdale Research and Education Center during winter 2005-2006. The Florida Automated Weather Network (FAWN) collected the weather data.

Month/Year	Avg. air temperature ^z (°C)	Avg. soil temperature ^y (°C)	Avg. solar radiation (W·m ²)	Rainfall (inches)
August, 2005	28.56	29.29	210	10.65
September, 2005	27.69	28.23	193	7.62
October, 2005	25.56	26.04	160	10.74
November, 2005	23.16	23.41	85	4.64
December, 2005	19.48	20.90	105	2.40
January, 2006	19.81	20.69	157	0.76
February, 2006	18.69	20.25	192	4.34
March, 2006	21.32	22.76	230	0.18
April, 2006	24.29	25.39	263	1.35

^zMeasured at 2 m above the soil surface.

^yMeasured at a depth of 10 cm.

Table 3. Plant quality rating (0 = dead, 1 = poor performance, and 5 = top performance) of Danziger "Dan" Flower Farms cultivars planted on September 9, 2005. DAP = days after planting.

Cultivar	Quality					
	36 DAP	86 DAP	119 DAP	171 DAP	219 DAP	
Bacopa	Copia Dark Pink	0.00	0.00	0.00	0.00	0.00
	Copia Pink Shade	1.50	1.00	4.00	3.00	2.00
	Copia Sunshine Blue	1.75	3.75	3.00	4.50	2.50
	Golden Leaves White	1.50	3.00	3.00	4.00	2.00
	Gulliver Lavender	1.00	2.00	2.00	3.00	1.00
	Gulliver White	1.50	3.50	4.00	5.00	2.00
	Bidens Yellow Glow	0.00	0.00	0.00	0.00	0.00
Calibrachoa	Calimor Deep Violet	1.50	2.63	3.00	3.75	2.50
	Calimor Wild Purple	0.00	0.00	0.00	0.00	0.00
Double Impatiens	Musica Dark Salmon	1.00	2.00	1.00	2.00	0.00
	Musica Pearl	2.00	4.00	4.00	5.00	3.00
	Musica Pink	0.00	0.00	0.00	0.00	0.00
	Musica Pink Energy	1.67	3.30	3.00	5.00	2.3
	Musica Ruby Red	1.00	0.00	0.00	0.00	0.00
	Jamesbrittania	1.50	3.00	3.00	3.00	2.00
	New Guinea Impatiens					
	Harmony Pink Smile	2.00	3.00	3.00	3.00	2.00
Harmony Scarlet	0.00	0.00	0.00	0.00	0.00	
Petunia	Sunray	2.00	4.00	4.00	5.00	2.00
	Scarlet Dream	2.00	0.00	0.00	0.00	0.00
	Scaevola White	2.25	2.75	3.00	3.50	3.50
	Scaevola Mini Soft Blue	1.88	3.50	3.30	4.75	4.50
Torenia	Indigo Moon	2.50	3.50	4.00	3.50	2.50
	Purple Violet	2.00	4.00	2.00	2.25	2.00
	Roslyn Moon	2.00	2.00	1.00	1.50	2.00
Verbena	Donalena Crimson	1.83	3.30	3.00	5.00	2.70
	Donalena Dark Blue	1.00	3.00	3.00	5.00	3.00
	Donalena Deep Pink	1.50	3.50	3.00	5.00	3.00
	Donalena Lilac Whisper	2.00	3.50	3.00	5.00	3.00
	Donalena Magenta	2.50	2.50	2.30	4.00	2.00
	Donalena Pink Heart	1.50	3.00	2.00	5.00	3.00
	Donalena Red Pepper	1.50	3.00	2.00	5.00	3.00
	Donalena Violet	2.25	3.75	3.50	5.00	3.00
	Donalena White Hail	1.50	4.00	3.00	5.00	3.00
	Donalena Hot Lavender	3.00	4.00	4.00	5.00	3.00
Donalena Purple Splash	2.00	4.00	4.00	5.00	3.00	
<i>P > F</i>						
Replicate	0.7280	0.4082	0.2328	0.1144	0.3482	
Plant (species)	0.4833	0.5279	0.0018	0.0001	0.0001	
LSD (<i>P</i> ≤ 0.05)	0.9500	1.1800	0.9600	0.3600	0.4000	

vars were planted in the 10,000-ft² area of 30% shade. At planting, each plant was top dressed with 5 g of an 18N-2.6P-6.6K controlled-release fertilizer (Nutricote Total 18-6-8 type 70 Florikan Corp., Sarasota, Fla.). Plants were watered overhead three times a week for 30 min.

Data collection. Monthly mean air and soil temperature, solar radiation, and rainfall were collected using the Florida Automated Weather Network (FAWN) system (Table 2). Every month 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 6 plants (3 groups of 6 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. This data was ranked using PROC RANK (SAS Systems, SAS Institute, Cary, N.C.) with plants being chosen more often getting a higher rank than plants that were chosen less often. The survey was conducted in March 2006. All data were then analyzed using analysis of variance to determine least significant differences (SAS Systems).

Results and Discussion

All cultivars planted in the garden in 2005 did grow and show an increase in plant height, width, and flower number. This data is available on the Fort Lauderdale Trial Garden web site (http://flrec.ifas.ufl.edu/Tgrdn/trial_grdn_hm.htm). The plant quality ratings of the Danziger cultivars increased from transplanting to 171 d after transplanting (March 2006) and then started to decline (Table 3). Last year (2004-2005) the Danziger cultivars were at the peak performance approximately 60 d after transplanting (Oct. 2004) (Moore and Fisher, 2005). However, solar radiation levels in Aug., Oct., Nov. and Dec. 2004 were higher than levels in these months in 2005 (Moore and Fisher, 2005) (Table 2). Furthermore, growth of these cultivars might have been slowed as a result of hurricane Wilma in October 2005. The plant quality ratings of the Fisher/Goldsmith cultivars also increased from the time of planting up through March 2006 (92 d after planting) and then plant quality started to decline (Table 4). These results are similar to last year with the Fisher cultivars reaching peak performance approximately 92 d after planting (Moore and Fisher, 2005). Decline in plant quality for all plants in the garden during the month of April 2006 was probably the result of increased temperatures and solar radiation in combination with reduced rainfall (Table 2).

Of the people surveyed in March 2006 about the cultivars they liked best in the garden, they preferred the following Danziger cultivars: Calibrachoa Calimor Deep Violet, Double Impatiens Musica Pink Energy, Scaevola White, Scaevola Mini Soft Blue, and Verbena Donalena Hot Lavender (Table 5). The Fisher/Goldsmith geraniums that they preferred were: Diablo, Tango Neon Pink, Tango Pink, Americana Deep Rose II, and Americana Violet (Table 5). The Danziger calibrachoa, scaevola, and verbena cultivars were low growing with a spreading habit making them excellent ground covers and very popular with the people surveyed. For all cultivars, the

Table 4. Plant quality rating (0 = dead, 1 = poor performance, and 5 = top performance) of Fischer/Goldsmith cultivars planted on December 1, 2005. DAP = days after planting.

Cultivar	Quality		
	40 DAP	92 DAP	140 DAP
Ivy Geranium			
Holiday Purple Blizzard	2.7	5.00	3.00
Holiday Purple Dream	2.0	4.80	2.80
Holiday Red Blizzard	2.0	4.20	2.50
Luna 05	2.7	4.80	2.80
Marimba	2.0	5.00	2.80
Maxine	2.0	4.50	2.70
Taj Mahal	3.0	5.00	3.00
Tutti Frutti	2.7	4.50	2.80
Geranium			
Diablo	2.3	4.80	3.30
Gloria 06	2.7	4.70	3.00
Graffiti Salmon Rose	3.0	5.00	3.00
Rocky Mountain Coral	2.3	4.80	3.30
Rocky Mountain Deep Rose	3.0	5.00	3.50
Rocky Mountain Lavender	2.3	4.80	3.00
Rocky Mountain Light Salmon	3.0	5.00	3.20
Rocky Mountain Red	2.0	4.70	3.00
Rocky Mountain White 06	2.0	4.13	2.75
Tango Fire	2.3	4.70	2.50
Tango Neon Pink	2.7	5.00	3.50
Tango Pink	2.3	4.50	3.00
Fischer/Goldsmith Ivy Geranium			
Caliente Deep Red	2.3	4.83	2.00
Freestyle Artic Red	2.3	4.33	2.30
Freestyle Deep Rose	2.0	4.50	2.30
Freestyle Pink II	2.3	4.33	3.00
Fischer/Goldsmith Geranium			
Americana Cherry Rose II	2.3	4.67	3.00
Americana Coral	2.7	4.83	2.70
Americana Dark Red	2.3	4.33	3.00
Americana Deep Rose	2.7	4.83	3.20
Americana Deep Rose II	2.7	5.00	3.20
Americana Light Salmon	3.0	5.00	3.00
Americana Red	2.7	4.67	2.80
Americana Salmon	2.3	4.17	3.00
Americana Violet	2.3	4.67	3.20
Americana White Splash II	2.3	4.50	2.80
Eclipse Pink	2.7	4.67	3.30
Eclipse Rose	2.0	4.00	2.30
P > F			
Replicate	0.2428	0.1244	0.3483
Plant (species)	0.0017	0.0001	0.0001
LSD ($P \leq 0.05$)	0.9600	0.3600	0.3900

most popular colors were the vibrant pink, violet and red colors. This is similar to previous years (Moore and Fisher, 2005; Moore et al., 2004, 2003).

Summary

Information about bedding plant field performance is important when making recommendations for landscape use. Because of the mild climate in south Florida, early trials 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.

Table 5. In March 2006, 55 people were asked to select their favorite cultivars planted in the University of Florida Fort Lauderdale trial garden. Responses were ranked with cultivars being selected by more people having a higher numerical rank than cultivars selected by fewer people. Any cultivar that was not selected had a ranking of 2.0. Rankings were analyzed using analysis of variance to determine least significant differences (LSD $P \leq 0.05 = 5$).

Cultivar	Survey ranking
<i>Danziger "Dan" Flower Farms</i>	
Bacopa	
Copia Dark Pink	2.0
Copia Pink Shade	7.0
Copia Sunshine Blue	9.5
Golden Leaves White	2.0
Gulliver Lavender	7.0
Gulliver White	21.5
Bidens Yellow Glow	2.0
Calibrachoa	
Calimor Deep Violet	65.5
Calimor Wild Purple	2.0
Double Impatiens	
Musica Dark Salmon	5.0
Musica Pearl	53.0
Musica Pink	2.0
Musica Pink Energy	59.5
Musica Ruby Red	9.5
Jamesbrittenia	11.5
New Guinea Impatiens	
Harmony Pink Smile	7.0
Harmony Scarlet	2.0
Petunia	
Sunray	35.5
Scarlet Dream	2.0
Scaevola White	59.5
Scaevola Mini Soft Blue	67.0
Torenia	
Indigo Moon	45.5
Purple Violet	28.0
Roslyn Moon	4.0
Verbena	
Donalena Crimson	39.5
Donalena Dark Blue	24.5
Donalena Deep Pink	45.5
Donalena Lilac Whisper	45.5
Donalena Magenta	16.5
Donalena Pink Heart	35.5
Donalena Red Pepper	35.5
Donalena Violet	49.0
Donalena White Hail	28.0
Donalena Hot Lavender	59.5
Donalena Purple Splash	31.5
<i>Fischer/Goldsmith</i>	
Ivy Geranium	
Holiday Purple Blizzard	49.0
Holiday Purple Dream	19.5
Holiday Red Blizzard	42.5
Luna 05	42.5
Marimba	11.5

Table 5. (Continued) In March 2006, 55 people were asked to select their favorite cultivars planted in the University of Florida Fort Lauderdale trial garden. Responses were ranked with cultivars being selected by more people having a higher numerical rank than cultivars selected by fewer people. Any cultivar that was not selected had a ranking of 2.0. Rankings were analyzed using analysis of variance to determine least significant differences (LSD $P \leq 0.05 = 5$).

Cultivar	Survey ranking
Maxine	13.5
Taj Mahal	45.5
Tutti Frutti	21.5
Geranium	
Diablo	59.5
Gloria 06	24.5
Graffiti Salmon Rose	39.5
Rocky Mountain Coral	52.0
Rocky Mountain Deep Rose	35.5
Rocky Mountain Lavender	24.5
Rocky Mountain Light Salmon	28.0
Rocky Mountain Red	55.5
Rocky Mountain White 06	13.5
Tango Fire	55.5
Tango Neon Pink	64.0
Tango Pink	62.5
Fischer/Goldsmith Ivy Geranium	
Caliente Deep Red	19.5
Freestyle Artic Red	51.0
Freestyle Deep Rose	18.0
Freestyle Pink II	31.5
Fischer/Goldsmith Geranium	
Americana Cherry Rose II	39.5
Americana Coral	31.5
Americana Dark Red	31.5
Americana Deep Rose	49.0
Americana Deep Rose II	65.5
Americana Light Salmon	24.5
Americana Red	57.0
Americana Salmon	15.0
Americana Violet	62.5
Americana White Splash II	54.0
Eclipse Pink	39.5
Eclipse Rose	16.5

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