

Caladium Cultivars ‘Cosmic Delight’, ‘Fiesta’, and ‘Hearts Desire’¹

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Caladiums are commonly grown in containers, hanging baskets, or planted directly in the landscape as accent and border plants. Florida growers supply the majority of the caladium tubers used throughout the United States and around the world. New cultivar introductions are important not only to the Florida caladium tuber-production industry, but also to the greenhouse/nursery industries and commercial landscape maintenance companies. The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) has maintained a caladium breeding program at the Gulf Coast Research and Education Center (GCREC). This program released three new caladium cultivars, ‘Cosmic Delight’, ‘Fiesta’, and ‘Hearts Desire’, in 2015. This publication describes the origin and plant characteristics of these new cultivars, their tuber yield potential in production trials, and plant performances in container and landscape trials.

Origin

‘Cosmic Delight’ originated from a cross between ‘Gingerland’ and ‘Florida Moonlight’. ‘Fiesta’ was the progeny of a cross between ‘Florida Cardinal’ and ‘Florida Sweetheart’. ‘Hearts Desire’ was derived from a cross between ‘Grey Ghost’ and ‘Miss Muffet’.

Description

‘Cosmic Delight’ (Figures 1 and 2) produces upright, outwardly arching leaves. Leaves are sagittate-cordate, 8

to 12 inches long, 5 to 8 inches wide, and slightly undulate with white penniform venation. Leaves have white main veins and white interveinal areas, except for the areas near the margins, which have irregular greyish-green mottling and blotching. Light red-purple spots appear throughout the upper leaf surface. Petioles are green at the apex and greyed-purple with blotching of brown near the base. Jumbo-size tubers each bear five to nine dominant eyes (or buds).



Figure 1. ‘Cosmic Delight’ plants (approximately 4 months old) grown in the caladium field in full sun at Lake Placid, FL for tuber production. Credits: Zhanao Deng, UF/IFAS

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Figure 2. A typical 'Cosmic Delight' plant (approximately 8 weeks old) forced from a single No.1-sized, de-eyed tuber in a 4.5-inch square container.

Credits: Gail Bowman, UF/IFAS

'Fiesta' (Figures 3 and 4) produces multiple leaves cascading from the center of the plant. Mature leaves are approximately 8 inches long and 6 inches wide. Leaves are peltate and sagittate-cordate with palmate-pinnate venation. The upper leaf surface is white with greyish purple primary veins near the center. Bands of red bleed along primary and secondary veins. Petioles of mature leaves are greyed-orange with long streaks or blotches of greyed-orange. Jumbo tubers each bear three to five dominant eyes.



Figure 3. Typical young 'Fiesta' plants approximately 30 days after tubers were planted in the ground bed.

Credits: Zhanao Deng, UF/IFAS

'Hearts Desire' (Figures 5 and 6) produce upright, outwardly arching leaves. Mature leaves are 12 inches long and 8 inches wide. Leaves are peltate, sagittate-cordate, with green-white palmate-pinnate venation. The upper surface is green with bleeding of white radiating from the mid and primary veins. Interveinal areas are greenish white near the central main vein and change to green near the margin. Numerous purple blotches variable in size are scattered

along with netted green veins. Petioles are green with green blotches or streaks near the base.



Figure 4. A typical 'Fiesta' plant (approximately 8 weeks old) forced from two Jumbo-sized, de-eyed tubers in an 8-inch container.

Credits: Gail Bowman, UF/IFAS



Figure 5. 'Hearts Desire' plants (approximately 4 months old) grown in the caladium field in full sun at Lake Placid, FL for tuber production.

Credits: Zhanao Deng, UF/IFAS



Figure 6. A typical 'Hearts Desire' plant (approximately 8 weeks old) forced from two Jumbo-sized, de-eyed tubers in an 8-inch container.

Credits: Gain Bowman, UF/IFAS

Tuber Yield Potential

'Cosmic Delight', 'Fiesta', and 'Hearts Desire' were evaluated for tuber production at the GCREC in Wimauma, FL in 2007, 2009, and/or 2014. In each growing season, caladium tuber chips (pieces or seed pieces) were planted in plastic-mulched raised-beds, and plants were grown in the field in full sun (Deng and Harbaugh 2006). In the 2007 season, drip tapes were buried under the plastic mulch to deliver water and fertilizers to the beds. Fertigation (at 1.7 lbs per acre per day) began when shoots of young caladium plants emerged from the soil. In the 2009 season, irrigation and fertigation began when the young caladium plants emerged the same as in 2007, but one teaspoon of Osmocote® (15-9-12) was also applied to each plant. In the 2014 season, irrigation occurred through seepage (Geraldson et al. 1965), and each plant was fertilized with two teaspoons of Osmocote®. In each growing season, field plots were arranged in a randomized complete block design with three replicates. Each plot consisted of 7 linear ft of bed space (13 square ft), and 30 tuber chips were planted in each plot. At the end of the season, the tubers (new crop) were dug manually, washed, and dried. The weight (after air-drying) of tubers produced in each plot was recorded, and all tubers produced in each plot were graded by their maximum diameters. Based on the number of tubers in each grade, a production index was calculated to estimate the economic value of the tubers produced in each plot. Major commercial cultivars with similar coloration patterns ('Florida White Ruffles', 'White Wing', and 'Gingerland') were planted in the field as controls to assess the tuber yield and plant performance of 'Cosmic Delight', 'Fiesta', and 'Hearts Desire'.

'Cosmic Delight': The tuber weight and production index of this cultivar were significantly greater than those of 'Florida White Ruffles', 'White Wing', and 'Gingerland' in both 2007 and 2014 (Table 1). The tuber weight of 'Cosmic Delight' was 65% to 578% greater than the tuber weight of the three controls in 2007, and 125% to 246% greater in 2014 (Table 1). The production index of 'Cosmic Delight' was 62% to 259% greater than that of the controls in 2007, and 91% to 183% greater in 2014 (Table 1). 'Cosmic Delight' produced more mammoth- and jumbo-grade tubers than 'White Wing'. Overall, data from both 2007 and 2014 growing seasons showed that 'Cosmic Delight' had much higher tuber yields than 'Gingerland', 'Florida White Ruffles', and 'White Wing'.

'Fiesta' was not significantly different from 'Florida Fantasy' or 'White Queen' in tuber weight and production index in 2007 and 2009 (Table 1).

'Hearts Desire' was not significantly different from 'Miss Muffet' in tuber weight and production index in both growing seasons (Table 1).

Container Trials

The suitability of 'Cosmic Delight' and 'Hearts Desire' for container plant production was evaluated by forcing tubers in 4.5-inch containers in 2014. No. 1 tubers were planted in April in a commercial potting mix (Fafard 3B) amended with Osmocote®; plants were grown in a greenhouse with approximately 30% light exclusion. Quality of the potted caladium plants was rated on a scale of 1 to 5, with 1 = very poor, unattractive, totally unacceptable as potted plants with few leaves, and 5 = very attractive, full plants with a symmetrical shape, an appropriate height, and many bright, colorful leaves. The suitability of 'Fiesta' for container production was evaluated in spring 2008. No. 1 tubers were planted in 4.5-inch containers filled with a peat/vermiculite mix in April 2008. The greenhouse was covered with an aluminum net that provided approximately 45% light exclusion.

'Cosmic Delight': Intact tubers sprouted 25 days after planting, approximately 5 days earlier than 'White Wing' (Table 2). Leaves of 'Cosmic Delight' were about 1 to 1.5 inches wider than those of 'Gingerland' or 'White Wing' (Table 2). De-eyed tubers of 'Cosmic Delight' sprouted in 24 days after planting (Table 2). There were no significant differences in plant height, number of leaves, and leaf length among plants of 'Cosmic Delight', 'White Wing', and 'Gingerland' forced from de-eyed tubers. However, 'Cosmic Delight' had wider leaves than 'White Wing' and received a lower plant quality rating than 'Gingerland'.

'Cosmic Delight' produced marketable container plants without tuber de-eyeing. However, de-eyeing resulted in pot plants of higher quality (Table 2). 'Cosmic Delight' plants from de-eyed tubers had 91% more but smaller (22% shorter and 31% narrower) leaves, and received a higher quality rating of 3.9 vs. the 3.0 rating of plants from intact tubers.

'Fiesta' was quick to sprout regardless of tuber treatments. Intact and de-eyed tubers sprouted 22 and 23 days after planting, 7 to 13 days earlier than 'Florida Fantasy' and 'White Queen' (Table 2). 'Fiesta' was not significantly different from 'Florida Fantasy' in plant height, but significantly shorter than 'White Queen' (Table 2).

'Fiesta' had 84% (intact tubers) and 188% (de-eyed tubers) more leaves than 'White Queen' (Table 2). Leaves of 'Fiesta'

and 'White Queen' plants from intact tubers were similar in length and width, whereas leaves of 'Fiesta' plants from de-eyed tubers were shorter and narrower than those of 'White Queen' plants from de-eyed tubers. Plants of 'Fiesta' received a quality rating of 2.4 and 4.0 for intact and de-eyed tubers, respectively. Both were significantly higher than the quality rating of 'White Queen' plants.

Plants of 'Fiesta' from intact tubers had similar numbers of leaves and leaf lengths compared to those plants from 'Florida Fantasy', but a greater leaf width and a lower quality rating than plants of 'Florida Fantasy'. However, plants of 'Fiesta' from de-eyed tubers had 59% more leaves, and leaves were about 1 inch shorter and half an inch narrower than the leaves of 'Florida Fantasy' from de-eyed tubers. Plant quality ratings of 'Fiesta' and 'Florida Fantasy' were comparable when tubers were de-eyed before planting.

'Hearts Desire': Tubers of this cultivar sprouted in 16 days from intact tubers and in 24 days for de-eyed tubers, about 2 days earlier than 'Miss Muffet' (Table 2). Plants of 'Hearts Desire' from intact tubers were 6 inches taller than plants of 'Miss Muffet', and the leaves of 'Hearts Desire' were about 2.5 inches longer and 1.5 inches wider. Plants of 'Hearts Desire' from intact tubers received a similar quality rating as plants of 'Miss Muffet' from intact tubers. Plants of 'Hearts Desire' grown from de-eyed tubers were 51% taller (about 5 inches) than those of 'Miss Muffet'. Leaves of 'Hearts Desire' plants were about 1 inch wider than those of 'Miss Muffet'. Plants of 'Hearts Desire' forced from de-eyed tubers received a plant quality rating of 4.0, which was similar to the plant quality rating of 4.5 for 'Miss Muffet'.

Landscape Performance

Landscape performance was evaluated using a scale of 1 to 5, with 1 being very poor (few leaves and lack of vigor), and 5 being excellent (full plants, numerous leaves, and bright color display). Leaf sun tolerance was evaluated on a scale of 1 to 5, with 1 being very susceptible to sunburn (leaves having numerous sun-damaged areas or holes) and 5 being resistant to sunburn (no visible sun-damaged areas). Three to four evaluations were conducted in each growing season for plant performance and sunburn tolerance.

'Cosmic Delight': Plants were 4 to 5 inches taller than those of 'Gingerland' and 'White Wing' (Table 3), and had about twice the number of leaves as 'Gingerland' and 'White Wing'. 'Cosmic Delight' leaves were longer than those of 'Gingerland' and 'White Wing' and wider than leaves of 'White Wing'.

'Cosmic Delight' performed well in both the 2007 and 2014 growing seasons, with performance ratings between 4 and 5 (Table 4), which were significantly higher than those of 'Gingerland', 'White Ruffles', and 'White Wing' in all evaluations in 2007, and also significantly higher than those of 'Gingerland' and 'White Wing' in two or three evaluations in 2014 (Table 4). 'Cosmic Delight' showed good-to-excellent sunburn tolerance in both 2007 and 2014 growing seasons (Table 5).

'Fiesta': 'Fiesta' and 'Florida Fantasy' were not significantly different in plant height and number of leaves (Table 3). Compared to 'White Queen', 'Fiesta' had 63% more leaves and the leaves were about 2.5 inches shorter. 'Fiesta' showed excellent sunburn tolerance in both 2007 and 2009 growing seasons (Table 5).

'Hearts Desire': This cultivar is relatively tall, with an average plant height of 18 inches, 84% taller than the dwarf cultivar 'Miss Muffet' (Table 3). 'Hearts Desire' received good to excellent performance ratings in both the 2009 and 2014 growing seasons, which was better than or comparable to the performance ratings of 'Miss Muffet' in all evaluations in 2009 and 2014 (Table 4). 'Hearts Desire' showed acceptable sunburn tolerance in both the 2009 and 2014 growing seasons, but 'Hearts Desire' had a lower score than 'Miss Muffet' in October 2014 (Table 5).

Recommendation

'Cosmic Delight' is a vigorous cultivar producing taller plants with more and larger leaves than 'Gingerland' and 'White Wing'. 'Cosmic Delight' showed exceptional tuber yield potential, excellent landscape performance, and sunburn tolerance, and thus is suitable for landscape use in sunny and shady locations. It should also be suitable for use in large containers. Its tubers may need to be de-eyed for use in small containers.

'Fiesta', a new addition to the fancy novelty cultivar group, sprouts earlier and produces fuller potted plants with more leaves than 'White Queen'. This cultivar is highly desirable for use in container production. 'Fiesta' is also expected to perform well in the landscape.

'Hearts Desire' is taller than 'Miss Muffet' and is characterized by a novel combination of leaf attributes. This new cultivar performed well in large containers and landscapes. Tubers may need de-eyeing for container production.

Availability

'Cosmic Delight', 'Fiesta', and 'Hearts Desire' were released under the name 'UF-R304', 'UF-R1012', and 'UF-R813', respectively. The United States Patent and Trademark Office (USPTO) has issued plant patents for these cultivars ('Cosmic Delight': PP27,154; 'Fiesta': PP26,833; and 'Hearts Desire': PP27,155). Commercial production of these cultivars will require licensing agreements with the Florida Foundation Seed Producers, Inc., PO Box 309, Greenwood, FL 32443. Information on propagation agreements can be obtained from the Florida Foundation Seed Producers, Inc. (<http://www.ffsp.net/>).

References

Deng, Z. and B.K. Harbaugh. 2006. "Garden White' – A large white fancy-leaved caladium for sunny landscapes and large containers." *HortScience*. 41:840–842.

Deng, Z., B.K. Harbaugh, and N.A. Peres. 2016. "Caladium cultivars Cosmic Delight, Fiesta, and Hearts Desire." *HortScience*. 51(6):766–771.

Geraldson, C.M., A. J. Overman, and J. P. Jones. 1965. "Combination of high analysis fertilizers, plastic mulch and fumigation for tomato production on old agricultural land." *Proc. Soil and Crop Sci. Soc. Fla.* 25:18–24.

Table 1. Tuber weight and production index of 'Cosmic Delight', 'Fiesta', 'Hearts Desire', and six commercial cultivars grown in Wimauma, FL in 2007, 2009, or 2014.

Cultivars	Tuber weight (LB)			Production index		
	2007	2009	2014	2007	2009	2014
Cosmic Delight	13.4		9.9	149		119
Gingerland	8.2		2.9	92		42
Florida White Ruffles	2.2			43		
White Wing	2.0		4.4	41		62
Fiesta	18.1		5.7	221		80
Florida Fantasy	9.3		5.1	142		69
White Queen	10.4		5.1	167		64
Hearts Desire		9.5	5.7		117	87
Miss Muffet		5.5	7.3		73	95

Notes: Values presented for each year are average values of three plots in three randomized complete blocks, and each plot was 13 sq ft with 30 tuber chips planted. The production index is an indicator of the economic value of the tubers harvested and is calculated as follows: n (No. 2) + $2n$ (No. 1) + $4n$ (Jumbo) + $6n$ (Mammoth), where n is the number of tubers in each grade. Tubers were graded by maximum diameter: No. 2 (1 to 1½ in), No. 1 (1½ to 2½ in), Jumbo (2½ to 3½ in), and Mammoth (3½ to 4½ in).

Table 2. Days to sprout, plant height, leaf number, leaf size, and plant quality of 'Cosmic Delight', 'Fiesta', 'Hearts Desire', and commercial checks grown from No. 1 tubers in 4.5-inch containers in a shaded greenhouse in Wimauma, Florida (2008 or 2014). Values represent the averages of 6 or 8 plants produced from intact or de-eyed No. 1 tubers planted individually per container. Data were taken 8 weeks after planting.

Variety	Days to sprout		Plant height (inch)		Leaves (no.)		Leaf length (inch)		Leaf width (inch)		Quality rating	
	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed
Cosmic Delight	25	24	10.6	10.4	14	26	9.3	7.2	6.2	4.3	3.0	3.9
Gingerland	21	25	12.0	11.5	11	30	8.4	6.3	6.0	3.8	3.0	4.4
White Wing	30	27	9.8	9.8	14	20	8.6	6.8	4.6	3.2	3.3	4.0
Fiesta	22	23	8.0	7.3	15	33	10.7	8.0	8.5	5.7	2.4	4.0
Florida Fantasy	35	30	9.0	8.5	14	21	9.8	9.1	7.0	6.4	3.0	3.7
White Queen	34	30	12.6	11.5	8	11	11.6	9.3	8.6	7.1	1.9	2.8
Hearts Desire	16	24	15.6	15.5	11	30	11.9	7.6	7.7	5.4	3.0	4.0
Miss Muffet	18	24	10.4	10.3	15	33	9.4	6.9	6.1	4.4	3.5	4.5

Notes: Days to sprout is the number of days from planting to the appearance of first unfurled leaves. Plant quality was rated on a scale of 1 to 5, with 1 being very poor, 3 fair and acceptable, and 5 excellent in plant vigor, fullness, and color display as pot plants.

Table 3. Plant characteristics of ‘Cosmic Delight’, ‘Fiesta’, ‘Hearts Desire’, and five commercial cultivars after tuber chips (approximately 1 in × 1 in × 1 in) were planted in ground beds (sandy soil) and plants were grown in full sun in Wimauma, FL for approximately 4 months.

Cultivar	Years	Plant height (in)	Leaves (no.)	Leaf length (in)	Leaf width (in)
Cosmic Delight	2007, 2014	13.5	23	8.9	5.1
Gingerland	2007, 2014	8.1	11	7.4	4.6
White Wing	2007, 2014	9.3	12	6.9	3.9
Fiesta	2007, 2009	12.6	22	8.8	6.9
Florida Fantasy	2007, 2009	15.1	22	11.3	7.1
White Queen	2007, 2009	13.7	14	11.4	7.2
Hearts Desire	2009, 2014	18.1	19	10.0	6.2
Miss Muffet	2009, 2014	9.8	20	8.0	4.7

Note: Values presented are averages of two years’ data from three replicates and three plants measured per plot per year.

Table 4. Plant performance ratings of ‘Cosmic Delight’, ‘Fiesta’, ‘Hearts Desire’, and six commercial cultivars (checks) when planted in ground beds and grown in full sun in Wimauma, FL.

	2007			2009			2014			
	July	Aug.	Sept.	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.
Cosmic Delight	4.0	4.2	4.9				4.0	4.1	4.3	5.0
Gingerland	1.8	1.7	2.8				3.2	2.9	2.7	2.3
Florida White Ruffles	2.2	1.8	2.2							
White Wing	2.6	2.2	2.0				3.2	3.4	3.3	3.2
Fiesta	4.1	3.3	2.7	3.2	4.3	4.2				
Florida Fantasy	2.9	3.4	3.1	3.7	4.3	4.2				
White Queen	23.3	3.5	3.6	3.2	3.8	3.8				
Hearts Desire				4.8	3.8	4.0	4.4	4.4	3.7	4.0
Miss Muffet				3.7	3.8	3.8	3.4	4.4	4.0	3.4

Notes: Plant performance was rated on a scale of 1 to 5, with 1 being very poor, 3 fair and acceptable, and 5 being excellent in plant vigor, fullness, and color display. Ratings presented are averages of three replicates in each year based on whole plot evaluation.

Table 5. Sunburn tolerance ratings of ‘Cosmic Delight’, ‘Fiesta’, ‘Hearts Desire’, and six commercial cultivars (checks) when planted in ground beds and grown in full sun in Wimauma, FL.

	2007			2009			2014			
	July	Aug.	Sept.	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.
Cosmic Delight	3.9	4.8	4.7				4.5	4.0	3.8	3.7
Gingerland	3.0	4.6	4.0				4.4	3.7	4.0	2.9
Florida White Ruffles	3.6	4.0	4.0							
White Wing	3.9	4.0	4.7				4.3	3.8	3.4	3.3
Fiesta	4.0	4.6	4.2	4.3	4.5	4.3				
Florida Fantasy	3.8	4.3	4.0	4.0	4.5	3.8				
White Queen	3.5	4.8	4.6	4.8	5.0	4.5				
Hearts Desire				4.0	3.5	3.8	4.6	4.0	3.0	4.0
Miss Muffet				4.8	4.5	4.2	4.3	4.5	4.1	4.1

Notes: Sunburn tolerance was rated on a scale of 1 to 5, with 1 being very poor, 3 fair and acceptable, and 5 being excellent without showing any signs of leaf burns or holes caused by sunburn on leaf surfaces. Values presented here are averages of three plots in each evaluation.