‘Dynamite Red’—A Red Fancy-leaved Caladium for Sunny Landscapes and Containers

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Caladiums (*Caladium ×hortulanum* Birdsey) offer a variety of leaf colors and shapes. They are often forced in containers or planted in landscapes (Evans et al., 1992). More than 95% of the caladium tubers used throughout the world for container forcing and landscape planting are produced in south-central Florida. In a 1998 survey of the Florida caladium tuber production industry (Bell et al., 1998), red fancy-leaved cultivars represented 23% of the total production acreage, compared to 29% and 28% for fancy white or pink cultivars, respectively. These data indicate that red-leaved cultivars are also popular for both containers and landscapes. Two primary cultivars in the red fancy-leaved group are ‘Frieda Hemple’ and ‘Postman Joyner’, which accounted for 29% and 12%, respectively, of the red cultivars grown (Bell et al., 1998). Their leaves have intense red color, but their tuber production is poor and plants are susceptible to soilborne diseases. The Univ. of Florida caladium breeding program, since its beginning in 1976, has aimed to develop new red-leaved cultivars with improved tuber production and plant performance (Wilfret, 1988). Toward this objective, ‘Florida Cardinal’ was developed and released in 1988 (Wilfret, 1988). This cultivar was bred primarily for use in containers because it produces many leaves without the need to de-eye tubers. ‘Dynamite Red’ (Fig. 1) produces large leaves with intense red color and performs well in sunny landscapes and large containers. Its improved tuber production over ‘Frieda Hemple’ and ‘Postman Joyner’ will benefit caladium tuber producers as well.

Origin

‘Dynamite Red’, derived from a cross between the red lance-shaped leaf caladium cultivar Red Frill and the fancy heart-shaped leaf caladium ‘White Queen’, was evaluated in 2001 as GC274. ‘Red Frill’ was selected as the female parent because of its bright red color, production of many leaves, and excellent sun tolerance. ‘White Queen’ was selected because of its large leaves and bright red vein color. Ancestry of ‘Red Frill’ and ‘White Queen’ is

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unknown. Tubers were propagated on fumigated Eau Gallie fine sandy soil at the Gulf Coast Research and Education Center at Bradenton, Fla, and were treated with hot water for nematode control (Rhodes, 1964).

Description

Descriptions of color for plant parts are based on comparison with the Royal Horticultural Society (RHS) colour chart (Royal Horticultural Society, 1986). Plants used for describing color were grown in 15-cm containers in a 25% shaded greenhouse (with a photosynthetic photon flux of 600 to 1200 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$) from jumbo (6 to 9 cm in diameter) de-eyed tubers.

Jumbo-sized tubers of ‘Dynamite Red’ are multi-segmented, usually bearing three

dominant buds. Tuber surfaces are brown (RHS 200A-B) with the cortical area yellow (RHS 4C) to a darker yellow-orange (RHS 8B). Leaves are peltate, sagittate-cordate, with palmate-pinnate venation. The center veins are red (RHS 46A) and diffuse into a red-purple color toward the leaf edge. The upper surface has a green (RHS 147A) irregular margin, 2–4 cm wide, bordering the entire leaf except for the basal leaf sinus where it is grayed-purple (RHS 185A). Interveneal areas are red (RHS 46A) in the leaf center diffusing into a grayed-purple (RHS 185A) toward the leaf margin. The undersurface is primarily grayed-green (RHS 191A) with primary veins and a small interveneal area around these veins grayed purple (RHS 186A). Petioles are 4–5 mm thick and are streaked dark red-purple (RHS 71A) and light red-purple (RHS 73D).

‘Dynamite Red’ plants grown for approximately 4 months in full sun in ground beds had an average height of 56 cm (Table 1). Its leaves are similar in size to other red-leaved fancy cultivars, averaging 32 cm long and 22 cm wide (Table 1). The largest leaf on plants grown in a 25% shaded greenhouse produced from an intact number one tuber in a 12.7-cm pot averaged 22 cm long and 17 cm wide 7 weeks after planting (Table 2).

Performance

‘Dynamite Red’ was evaluated for tuber production and plant performance at the Gulf

Fig. 1. Caladium ‘Dynamite Red’ forced in a 10-cm container using one No.1 tuber (>3.8 and <6.4 cm). Dominant eyes were excised from tubers before planting.

Table 1. Performance of caladium cultivars grown from 2.54-cm tuber propagules in ground beds under full sun.

Cultivar	Plant ht ^z (cm)	Leaves ^z (no.)	Leaf ^z		Overall plant performance ^y		
			Length (cm)	Width (cm)	Early	Middle	Late
Cardinal	47	16	30	19	3.7	4.1	4.3
Dynamite Red	56	13	32	22	5.0	4.6	3.8
Frieda Hemple	50	21	31	20	2.7	4.3	4.3
Postman Joyner	39	13	29	18	2.5	2.7	3.7
Red Flash	44	12	34	20	3.2	4.0	4.0
LSD ($\alpha = 0.05$)	7.8	3.3	2.7	1.7	0.8	0.5	0.6

^zValues presented are means of three replications with three plants measured per plot per year, averaged over 2 years (2003 and 2004).

^yOverall plant performance was rated 22 July (early), 31 Aug. (mid), and 16 Nov. (late), 2004, on a scale of 1 to 5, with 1 = very poor (stunted plants with few leaves and severe sun burn), and 5 = very good (full plants with many bright colorful leaves and little sunburn).

Table 2. Plant performance for caladium cultivars grown from No. 1 tubers planted 24 June, 2002, in 11.4-cm containers in a 50% shaded glasshouse, Bradenton, Fla. Values represent the means of eight plants produced from intact or de-eyed No. 1 (3.8 to 6.4 cm in diameter) tubers planted individually per container.

Cultivar	Days to sprout ^z		Plant ht (cm)		Leaves (no.)		Leaf length (cm)		Leaf width (cm)	
	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed	Intact	De-eyed
Dynamite Red	17	19	37	42	9	16	22	22	17	15
Frieda Hemple	16	17	42	38	10	20	25	19	17	12
Postman Joyner	21	23	45	46	6	11	27	23	18	17
Scarlet Beauty	17	20	39	37	9	22	27	22	19	15
LSD ($\alpha = 0.05$)	NS	5.2	NS	8.7	NS	5.8	NS	2.6	NS	2.0

^zNumber of days from planting to the first unfurled leaf.

Table 3. Tuber weights, production index, and tuber grade distribution of caladium cultivars harvested in 2003 and 2004. Values presented are means of three replications with 30 propagules per 1.2-m² plot per year.

Cultivar	Tuber			Tuber distribution ^y (%)				
	Wt (g)	Production index ^z	Marketable (no.)	Super Mammoth	Mammoth	Jumbo	No. 1	No. 2
Year 2003								
Cardinal	4168	125	37	0	23	32	31	14
Dynamite Red	4659	155	43	0	17	49	29	5
Frieda Hemple	2937	110	45	0	2	30	46	21
Postman Joyner	3156	107	34	1	6	48	32	11
Red Flash	4394	133	45	0	16	29	28	27
LSD ($\alpha = 0.05$)	251	10	8	2	12	37	30	14
Year 2004								
Cardinal	6161	168	41	8	21	39	25	7
Dynamite Red	6091	151	40	10	15	33	36	6
Frieda Hemple	3956	124	50	0	4	27	51	19
Postman Joyner	3118	104	47	0	0	23	56	21
Red Flash	4799	133	32	1	29	48	19	3
LSD ($\alpha = 0.05$)	942	23	2	11	20	5	17	9

^zThe production index is an indicator of economic value of the crop harvested and is calculated as: N (No. 2s) + 2N (No. 1s) + 4N (Jumbos) + 6N (Mammoth) + 8N (Super Mammoth); where N = number of tubers in each grade.

^yTubers graded by maximum diameter; No. 2 (2.5 to 3.8 cm), No. 1 (3.8 to 6.4 cm), Jumbo (6.4 to 8.9 cm), Mammoth (8.9 to 11.4 cm), and Super Mammoth (>11.4 cm).

Coast REC–Bradenton, Fla., during 2003 and at Dover, Fla., in 2004. The soil in Bradenton was an EauGallie fine sand with about 1% organic matter and a pH of 6.2, and the soil in Dover was a Seffner fine sand with about 1% organic matter and a pH of 6.5. Plants were grown in a plastic-mulched raised-bed system maintaining a constant water table with seepage irrigation (Geraldson et al., 1965) or irrigated with drip tapes. The beds were 91 cm wide and 20 cm high with 2.54-cm caladium seed tuber pieces planted 15 cm apart in three rows (Bradenton) or 30 cm apart in two rows (Dover). Osmocote 18N–2.6P–10K 8-9 month controlled release fertilizer (Scotts Co., Marysville, Ohio) was applied to the bed surface when shoot tips were emerging from the soil with N at 336 kg·ha⁻¹.

Plots were organized in a randomized complete block design, consisting of three replications. For tuber production, each plot was 1.2 m² and contained 30 propagules. Analysis of variance was conducted to compare

the performance of ‘Dynamite Red’ to commercially important red fancy-leaf cultivars. For plant performance in the landscape, three plants in the center of each plot were selected and plant height, leaf number and leaf size were measured mid-summer.

‘Dynamite Red’ tuber production was excellent with tuber weights nearly 1.5 times greater than that of ‘Frieda Hemple’ or ‘Postman Joyner’, the two most popular red-leaved fancy cultivars. ‘Dynamite Red’ tuber weight from each plot exceeded all cultivars, except ‘Florida Cardinal’ in 2004 (Table 3), whose yield was similar. Similarly, the production index (an economic indicator of crop value) was highest for ‘Dynamite Red’ compared to all other cultivars, except ‘Florida Cardinal’, which had similarly high values. Although the same number (30) of seed pieces was planted per plot, more than 30 tubers were harvested since several sprouts might emerge per tuber and result in more than one tuber developing per planted seed piece. This of course is

advantageous as it can increase profitability. Although ‘Dynamite Red’ did not have the greatest number of marketable tubers, it ranked high compared to many other cultivars. Since it forms a “solid” tuber with few side tubers, it does not break apart into many small tubers during harvest. Tuber breakage is a problem with some other cultivars, e.g., ‘Frieda Hemple’. The lack of breakage for ‘Dynamite Red’ is also evident in the high percentage of Mammoth, Jumbo and No. 1 tubers (95% in 2003 and 84% in 2004), ideal sizes for tubers sold for use in the landscape.

Landscape performance of cultivars grown under full-sun conditions was evaluated in 2003 and 2004 on the same plots used for evaluating tuber production. Plant height, number of leaves, and foliar characteristics were recorded about 4 months after planting (Table 1). ‘Dynamite Red’ had excellent overall plant performance ratings for the first two rating periods (22 July, and 31 Aug.), and a lower, but good rating for 16 Nov. ‘Dynamite Red’ was the

tallest cultivar evaluated in this test and, again, exhibited desirable landscape traits.

'Dynamite Red' tubers were forced in 11.4-cm containers (680 mL in volume), and its growth parameters were compared to four red-fancy commercial cultivars. No. 1 tubers were planted in a peat/vermiculite mix (Vergro Container Mix A; Verlite Co., Tampa, Fla.) on 24 June, 2002. The study was conducted in a glasshouse with 50% light exclusion (400 to $800 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$) during the summer in Bradenton, Fla. Average daily temperatures ranged from a low of 21°C night to 29°C day during the experiment. Plant height, number of leaves, and foliar characteristics were recorded 7 weeks after planting.

'Dynamite Red' had similar performance in pots compared to the other red-leaved cultivars tested or was essentially "average" with no significant differences for all measured parameters (Table 2). Thus, although 'Dynamite Red' has potential as a container plant, it appears to be better suited for use in the landscape.

In summary, 'Dynamite Red' is intended for use in the landscape or large containers.

It should perform well in full sun or partial shade conditions making it an ideal plant for the garden. Although extensive research and evaluations of this cultivar have been performed on small acreages, tuber producers are encouraged to plant only limited quantities of 'Dynamite Red' until they have gained experience in producing this cultivar. Standard postharvest treatment of tubers is recommended (Harbaugh and Tjia, 1985), and preplant hot-water treatment of tubers is encouraged to prolong their life.

Availability

A patent will be applied for 'Dynamite Red' by the Florida Agricultural Experiment Station, and production of this cultivar is to be with a licensing agreement with the Florida Foundation Seed Producers, Inc., P.O. Box 309, Greenwood, FL 32443. Information on tuber availability and propagation agreements can be obtained from the Florida Foundation Seed Producers, Inc.

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