'Florida Cardinal' Caladium

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Caladiums (*Caladium × hortulanum* Birdsey), colorful members of the Aroid family and originating in South America, comprise a floricultural crop that owes its commercial existence to growers and breeders of central Florida. Grown on > 500 ha of muck soil in southern Florida, the harvested caladium tubers provide at least 90% of caladiums used throughout the world. These tubers are either forced in containers for retail sales or sold as cured tubers for land-

scape use. The known 1500 cultivars range in plant height from 10 to 90 cm, in leaf shape from heart to strap, and in leaf color from white to red. Fewer than 100 cultivars are being grown, and probably 20 of these comprise 85% of caladium sales. Although the white-leaved 'Candidum' is most in demand, the red-leaved cultivars are also very popular for containers and the landscape. The two most widely grown red cultivars are 'Frieda Hemple' and 'Poecile Anglais'. Although their leaves are a bright red, the cultivars produce few tubers and they are very susceptible to various soil-borne diseases. Incorporation of production of large tubers, plant health, vigor, and intense red leaf color would be an improvement over 'Frieda Hemple' or 'Poecile Anglais'. Hybridization among commercial caladium cultivars and their subsequent culture and selection on muck and sandy soils culminated in the development and release in 1988 of the cultivar Florida Cardinal from the Univ. of Florida. This cultivar is recommended primarily for forcing in containers but can be used in semi-shady locations in the landscape.

Origin

'Florida Cardinal', evaluated as S-14, was derived from a selection made in 1978 from a 1976 cross between 'Frieda Hemple' and 'Carolyn Whorton.' Ancestry of neither parent is known. The seed parent, 'Frieda Hemple', was selected for its bright red foliage, short growth habit, and multiple leaf development. 'Carolyn Whorton' was selected for its strong, upright petioles, its large leaves, and its deep-green leaf margins. Neither parent is considered a good tuber producer. Tubers of 'Florida Cardinal' were propagated on fumigated sandy soils at Bradenton and were increased under aseptic conditions in the tissue culture laboratory during 1980 and 1981.

Table 1. Plant characteristics of caladium cultivars when forced in containers (Summer 1984).

Cultivar ²	Plant ht (cm)	Leaves (no.)
Florida Cardinal	54.5 b ²	42.7 a
Candidum	58.3 ab	32.0 b
Candidum Junior	54.5 b	44.2 a
Carolyn Whorton	61.7 a	23.7 c
Fannie Munson	62.0 a	24.7 c
Frieda Hemple	53.8 b	31.8 b

²Grown in a glass greenhouse with 40% shade and tree No. 1 tubers per 15-cm (1.47-liter) pot; evaluated 8 weeks after planting; means are of three replications of three pots each.

³Mean separation within columns by Duncan's multiple range test, *P* = 0.05.

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Fig. 1. Containerized plant of 'Florida Cardinal' *Caladium*.

Table 2. Effect of de-eying caladium tubers on plant development of cultivars when forced in containers (Summer 1984).

Cultivar ^a	Leaves (no.)		Plant ht (cm)	
	Intact	De-eyed	Intact	De-eyed
Florida Cardinal	26.7 ab	49.7 a	35.3 d ^y	25.3 c
Postman Joyner	18.0 c	30.2 c	48.5 bc	35.5 b
Poecile Anglais	26.7 ab	44.3 ab	35.7 d	26.7 c
Frieda Hemple	26.0 ab	41.8 b	43.7 c	34.0 b
Carolyn Whorton	22.2 bc	30.7 c	56.8 a	44.5 a
Candidum	28.0 a	42.5 ab	51.2 ab	47.7 a

^aThree No. 1 tubers per 15-cm (1.47-liter) pot and grown under 30% shade from 23 Aug. to 17 Oct. 1984. Means are of three replications of three pots each.

^yMean separation within columns by Duncan's multiple range test, $P = 0.05$.

Table 3. Tuber production of caladium 'Florida Cardinal' and virus-free commercial cultivars grown on sandy soil at Bradenton (1982 and 1983).

Cultivar	Wt tubers dug (g)	Percent tubers dug (by grade) ^z					Marketable tubers dug (no.)	Production value ^y (units)
		Super mammoth	Mammoth	Jumbo	No. 1	No. 2		
1982 ^x								
Florida Cardinal	2017 a ^w	8.6	28.6	42.9	14.3	5.7	11.7 ab	66.5 a
White Christmas	1735 ab	2.3	9.3	46.5	30.2	11.6	14.3 c	52.4 a
Postman Joyner	1382 bc		2.6	41.0	41.0	15.4	13.0 bc	36.2 bc
Candidum	1313 bc	2.7	13.5	24.3	46.0	13.5	12.3 abc	43.5 b
Frieda Hemple	1240 c		7.0	30.2	51.2	11.6	14.3 c	41.5 b
Candidum Junior	965 cd		8.6	20.0	48.6	22.9	11.7 ab	31.3 bc
Carolyn Whorton	722 d			36.7	33.3	30.0	10.0 a	24.4 c
1983 ^y								
Florida Cardinal	2012 b		1.0	33.0	38.6	27.4	30.3 cd	74.1 a
Candidum	2765 a		3.5	42.2	34.2	20.1	28.3 c	81.1 a
Candidum Junior	1672 bc			14.9	45.5	39.6	33.7 d	63.9 ab
Frieda Hemple	830 d			4.5	32.5	63.0	15.3 a	22.5 c
Carolyn Whorton	1338 cd		1.3	10.3	62.8	25.6	22.3 b	45.3 b

^aTubers graded by maximum diameter; Super Mammoth (≥ 11.4 cm); Mammoth ($\geq 8.9 < 11.4$ cm); Jumbo ($\geq 6.4 < 8.9$ cm); no. 1 ($\geq 3.8 < 6.4$ cm); and no. 2 ($\geq 2.5 < 3.8$ cm).

^yValue = N no. 2s + 2N no. 1s + 4N Jumbo + 8N Mammoth + 12N Super Mammoth, where N = number of tubers in each grade.

^xTen tuber chips (8 cm³) per plot spaced 15 cm apart.

^yMean separation within columns within years by Duncan's multiple range test, $P = 0.05$.

^wTwenty tuber chips (8 cm³) per plot spaced 15 cm apart.

Description

Large tubers (≥ 5 cm in diameter) of 'Florida Cardinal' planted in full sun and in EauGallie fine sand produce 40 to 50 leaves up to 32 cm long and 20 cm wide. Leaves reach a maximum height of 72 cm after 2 months. Leaves in full sun have medium-green margins [RHS Yellow Green 146A (Royal Horticulture Soc., 1986)] up to 3 cm wide. The large central area of the leaf (14 to 16 cm wide) is a dark red (RHS Red 53C). The petiole is medium brown (RHS Brown 200B) and blends to a greyed red (RHS Greyed Red 181C) at its distal end. When grown under 50% shade, the green margins are darker (RHS Yellow Green 147B) and the red center is more crimson (RHS Red 47A).

Tubers of 'Florida Cardinal' have eight to 10 dominant buds that develop simultaneously when the tubers are planted. Thus, de-eying the tubers is not necessary to obtain numerous leaves. The surface of the tuber is orange-red (RHS Orange-Red 35B), and the leaf sheaths surrounding the developing buds are a burnt orange (RHS Greyed Orange 171B). The inner cortical area of the tuber is a bright yellow (RI-IS Yellow-Orange 14C). Tubers are firm, domed, and multisegmented.

Performance

Forcing 'Florida Cardinal' tubers has been compared to that of some of the commercial caladium cultivars most widely used for this purpose. When grown as three intact No. 1 tubers $\geq 3.8 < 6.4$ cm in diameter) per 15-cm (1.47 liter) pot in a greenhouse with 40% shade and a night/day cycle of 21 to 34C, 'Florida Cardinal' was about as high as 'Frieda Hemple', 'Candidum', and 'Candidum Junior' but shorter than 'Carolyn Whorton' or 'Fannie Munson' (Table 1). Leaf count was equivalent to that of 'Candidum Junior' but higher than that of the other cultivars. De-eying the main growth before planting tubers almost doubled the number of leaves per container of 'Florida Cardinal' (Table 2). Leaf size was markedly reduced when the tubers were de-eyed, and plant height was reduced by 30% (Table 2). Intact tubers of 'Florida Cardinal' produced foliage about the same height as de-eyed tubers of 'Frieda Hemple'. The central red area of 'Frieda Hemple' was larger than that of 'Florida Cardinal', with the latter having green leaf margins 2.5 to 3.0 cm wide, compared with the 1.5- to 2.0-cm-wide margins of 'Frieda Hemple'. Visual observations of the cultivars grown in containers and the field indicated that petioles of 'Florida Cardinal' were as strong as 'Frieda Hemple', 'Poecile Anglais', and 'Postman Joyner', but were not as rigid as those of 'Candidum' or 'Carolyn Whorton'. Emergence of 'Florida Cardinal' leaves from the soil surface was earlier than those of 'Frieda Hemple' or of any other cultivar evaluated. Generally, the first leaf of 'Florida Cardinal' unfurled 7 to 10 days after planting intact tubers under optimum growing conditions.

'Florida Cardinal' was compared with

several commercial virus-free caladium cultivars for tuber production on fumigated Eau Gallie fine sand at Bradenton in 1982 and 1983 (Table 3). During 1982, the weight of 'Florida Cardinal' tubers dug was equal to that of 'White Christmas' and higher than all other cultivars. 'Florida Cardinal' produced tubers with 40% higher weight than 'Frieda Hemple'. 'White Christmas' and 'Frieda Hemple' produced more marketable tubers than 'Florida Cardinal' in 1982, but the tubers were generally smaller. Thirty-seven percent of the tubers of 'Florida Cardinal' were in the Mammoth and Super Mammoth grades, while only 7% of 'Frieda Hemple' tubers were in these grades in 1982. During 1983, overall tuber sizes were smaller, but 'Florida Cardinal' tubers were proportionately larger than 'Frieda Hemple'. In

1983, tuber weight of 'Florida Cardinal' was less than that of 'Candidum' but higher than that of 'Frieda Hemple' or 'Carolyn Whorton'. Production value per plot, determined by number of tubers in each grade, was higher with 'Florida Cardinal' than 'Frieda Hemple' and 'Carolyn Whorton' and similar to that of 'Candidum' and 'Candidum Junior'. Observational plots grown on muck soils showed similar trends with tuber quality and grade.

Availability

'Florida Cardinal' is intended for use as a container-grown plant or a landscape plant in shaded locations. The esthetics of the cultivar, when grown in containers, are enhanced when the main buds are not de-eyed and one Mammoth, two Jumbo, or three No. 1 tubers are planted per 15-cm pot. Although

extensive research and evaluation have been performed on small areas of this cultivar when grown in muck or sandy soils, growers are encouraged to plant only limited quantities of 'Florida Cardinal' until they have gained experience in its production. Standard post-harvest treatment of tubers is recommended, and preplant hot water treatment of the tubers is encouraged to prolong the life of the stock.

Information on the availability of tubers of 'Florida Cardinal' may be obtained from Florida Foundation Seed Producers, Inc., P.O. Box 309, Greenwood, FL 32443.

Literature Cited

Royal Horticulture Society. 1986. RHS colour chart. Royal Hort. Soc., London.