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ENH1201

'Strawberry Star' – A Spotted, Fancy-Leaved Caladium for Use in Containers and Landscapes[1]

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Caladiums are grown in containers and landscapes for their bright, colorful leaves. Commercially available caladium plants are generally produced from tubers. Some existing commercial caladium varieties have attractive colors or coloration patterns but poor container and landscape performance and/or poor tuber yield. 'Marie Moir' is an example of this type of variety (Wilfret and Hurner 1982). Its leaves are very attractive but are few, resulting in poor container and landscape displays that are unsatisfactory for commercial or homeowner acceptance. Additionally, its field production of tubers has been unstable over the years, and caladium growers cannot profitably grow the variety.

'Strawberry Star' is a fancy-leaved variety with a primarily white leaf face and attractive red spots (Figure 1) (Deng and Harbaugh 2011). It is similar to 'Marie Moir' in leaf color and coloration pattern but different from 'Marie Moir' in petiole color (green vs. brown on 'Marie Moir'). Compared to 'Marie Moir', 'Strawberry Star' sprouts earlier, produces high-quality container plants, demonstrates better landscape performance, and yields more tubers. These improvements make 'Strawberry Star' a desirable replacement for 'Marie Moir' and an additional sun-tolerant variety for the landscape plant palette.

'Strawberry Star' is distinct from 'Cranberry Star', a variety released in 2007 that has burgundy/purple spots on its leaves. 'Strawberry Star' is much improved over 'Cranberry Star' in sunburn tolerance and landscape performance.

Figure 1. 'Strawberry Star' caladium plants grown in ground beds in full sun
Credits: Zhanao Deng, University of Florida

Origin

'Strawberry Star' resulted from a cross between 'Summer Rose' and 'Florida Fantasy' and was initially released under the name UF 85-5. 'Summer Rose' was the progeny of 'Aaron' and University of Florida caladium breeding line UF-FCT, which resulted from a cross between 'Fire Chief' and 'Torchy'. 'Florida Fantasy' was the progeny of 'Candidum Junior' and 'Red Frill'. The ancestry of 'Aaron', 'Candidum Junior', 'Fire Chief', 'Red Frill', and 'Torchy' is unknown.

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Leaf and tuber characteristics

'Strawberry Star' leaves are heart shaped and have palmate-pinnate venation. The upper leaf surface has a green margin bordering the entire leaf, several green main veins, and numerous secondary green veins, which are netted over the whole leaf blade (Figure 1). Interveinal areas are mostly green-white. Red spots occur between main veins in the range of 10–30 per fully developed leaf. The undersurface has a yellow-green undertone with heavily netted veins of grayed-green. Primary veins are grayed-green at the basal notch and near the tip of the leaf. Spots are grayed-purple and vary in size. The prominent petiole color is yellow-green with streaks of grayed-brown to brown. Jumbo-sized (1.5–2.5 inches in diameter) tubers have multiple segments and bear four to six dominant buds. The tuber surface is brown, and the cortical area is yellow.

Tuber production

'Strawberry Star' was evaluated for tuber production under the field conditions at the Gulf Coast Research and Education Center in Wimauma, Florida, in 2005 and 2006. The soil is EauGallie fine sand with about 1% organic matter and a pH between 6.2 and 7.4. Plants were grown in a plastic-mulched, raised-bed system with a constant water table maintained through seepage irrigation. On February 25, 2005, ground beds were fumigated with a mixture of 67% methyl bromide and 33% chloropicrin (by volume) at the rate of 350 pounds per acre. The raised beds were 32 inches wide and 8 inches high. Caladium seed pieces (cut tuber propagules ~1 inch x ~1 inch x ~1 inch) were planted in early to mid-April with 6 inches in-row and between-row spacing. Osmocote®, a controlled-release fertilizer (18-9-12, 8–9 months), was manually applied to the bed surface at the rate of 300 pounds of nitrogen (N) per acre when caladium shoot tips were emerging from the soil. Tubers (new crop) were harvested in late November 2005. Harvested tubers were washed, dried, weighed, counted, and graded. Tuber grading was by maximum diameter: No. 2 (1–1.5 inches), No. 1 (1.5–2.5 inches), Jumbo (2.5–3.5 inches), Mammoth (3.5–4.5 inches), and Super Mammoth (> 4.5 inches). Tuber counts and grades were converted into a production index (PI) to show the relative economic value of the harvested tubers per experimental plot: PI = n (No. 2) + 2n (No. 1) + 4n (Jumbo) + 6n (Mammoth) + 8n (Super Mammoth), where n is the number of tubers in each grade. The same cultural practices were used in 2006, except that the beds were fumigated on March 10, 2006, with the same fumigant mixture but at the rate of 175 pounds per acre, and tubers were harvested in mid-December 2006.

In both 2005 and 2006, 13-square-foot field plots were organized in three randomized complete blocks, each with 30 plants. Three commercial varieties, 'Candidum', 'Marie Moir', and 'Miss Muffet', were included in the experiment for comparison. 'Candidum' is the No. 1 or No. 2 best-selling caladium variety (Bell, Wilfret, and DeVoll 1998; Deng et al. 2008) and shares a similar coloration pattern (without the spots) with 'Strawberry Star.' As mentioned previously, 'Marie Moir' is the closest to 'Strawberry Star' in leaf coloration among commercial varieties. 'Miss Muffet' was included because it is a popular spotted variety.

'Strawberry Star' was significantly more productive than 'Candidum' and 'Miss Muffet' in both the 2005 and 2006 growing seasons (Table 1). Its average tuber weight was 115% (2005) and 83% (2006) greater than that of 'Candidum' and 75% (2005) and 103% (2006) greater than that of 'Miss Muffet'. Its production index was 66% (2005) and 53% (2006) higher than that of 'Candidum' and 49% (2005) and 65% (2006) higher than that of 'Miss Muffet'. Its number of marketable tubers was 50% (2005) and 44% (2006) larger than that of 'Candidum' and 36% (2005) and 28% (2006) larger than that of 'Miss Muffet'. 'Strawberry Star' showed good consistency in tuber weight, number of marketable tubers, and production index between growing seasons, while 'Marie Moir' had poor consistency between growing seasons in tuber production. 'Marie Moir' and 'Strawberry Star' yielded similarly well in 2005, but 'Marie Moir' yielded poorly in 2006—approximately 33% less than the tuber weight and production index of 'Strawberry Star' and only about 50% of the number of marketable tubers for 'Strawberry Star'. These results are similar to growers' reports of 'Marie Moir' over the years; that is, 'Marie Moir' is not a dependable variety from year to year.

Container forcing and performance

The suitability of 'Strawberry Star' for container forcing was evaluated by forcing tubers in 4.5-inch containers. No. 1 tubers of 'Strawberry Star', 'Marie Moir', and 'Miss Muffet' were planted either intact or de-eyed in a peat/vermiculite mix (VerGro Container Mix A, Verlite, Tampa, Fla.) in March 2007. Container plants were grown on metal benches in a greenhouse with 45% light exclusion. Temperatures in the greenhouse ranged from 61°F (night) to 85°F (day) during the experiment.

'Strawberry Star' tubers sprouted in 30 days (intact) or 32 days (de-eyed) after planting, similar to 'Miss Muffet' plants, but 4–9 days earlier than 'Marie Moir' plants

(Table 2). Container-grown 'Strawberry Star' plants were 7–9 inches tall, regardless of tuber treatment (intact or de-eyed), similar to plants of 'Marie Moir' but significantly taller (2–3 inches) than 'Miss Muffet' plants. 'Strawberry Star' produced an average of 12 leaves per intact plant 8 weeks after planting and 21 per de-eyed plant, similar to 'Miss Muffet' but significantly more than 'Marie Moir'. 'Strawberry Star' leaves were significantly smaller than those of 'Marie Moir' when tubers were planted intact (~3 inches shorter and ~1 inch narrower). When tubers were de-eyed, leaf size differences became smaller (~0.8 inches shorter and 0.8 inches narrower). With numerous medium-sized leaves, 'Strawberry Star' container plants were of significantly higher quality (3.4–4.4) than those of 'Marie Moir' (1.9–2.4). 'Strawberry Star' container plant quality ratings were similar to those of 'Miss Muffet', which is known for its good growth habit. Container trials indicated that tuber de-eyeing results in higher plant quality ratings for 'Strawberry Star' (Table 2).

Landscape performance

The landscape performance of 'Strawberry Star' under full-sun conditions was evaluated in 2005 and 2006 in the same field plots used for evaluating tuber production. 'Candidum', 'Marie Moir', and 'Miss Muffet' were included in the tests for comparison. The overall plant performance was rated multiple times (June, July, and August) in each growing season on a scale of 1–5, with 1 being very poor (few leaves and lack of vigor) and 5 being excellent (full plants, numerous leaves, and bright color display). Leaf sunburn tolerance was also evaluated multiple times in each growing season on a scale of 1–5, with 1 being very susceptible to sunburn and showing numerous sun-damaged areas or holes on leaves and 5 being resistant to sunburn and not showing any sun-damaged areas. At approximately 4 months after planting, plant height, number of leaves, and leaf sizes were measured.

'Strawberry Star' plants were 4.1–5.4 inches taller and developed significantly more (~100%) leaves than 'Candidum' and 'Marie Moir' (Table 3). Leaf sizes were similar among 'Strawberry Star', 'Candidum', and 'Marie Moir' (9.4–9.8 inches long and 5.9–6.1 inches wide). 'Miss Muffet', a dwarf variety, had shorter plants (7.1 inches) and smaller leaves (on average, 6.6 inches long and 4.3 inches wide). 'Strawberry Star' plants performed well in the landscape, with performance ratings between 3.6 and 4.8, significantly higher than those of 'Candidum' (1.7–3.1), 'Marie Moir' (1.4–3.3), and 'Miss Muffet' (1.5–2.4). 'Strawberry Star' received the highest sunburn tolerance ratings in all the evaluations in each growing season, indicating better sun tolerance in this variety compared to the commercial varieties and potential for use in sunny locations in the landscape. 'Strawberry Star' showed a high level of similarity to 'Cranberry Star' in plant height, leaf number, and leaf size, but 'Cranberry Star' is sensitive to full sun (Table 3) and thus is limited to use in shady locations in the landscape.

Recommendation

'Strawberry Star' sprouts 4–9 days earlier, produces higher-quality container plants, and performs better in the landscape than 'Marie Moir', and it has shown better sunburn tolerance than 'Cranberry Star.' Additionally, 'Strawberry Star' has shown improved tuber yield potential over 'Marie Moir', 'Candidum', and 'Miss Muffet'. In container plant production, 'Strawberry Star' behaves like 'Miss Muffet', with a similar number of days to sprout, a similar number of leaves, more or less similar-sized leaves, and similar plant quality, except that 'Strawberry Star' plants are 2–3 inches taller. Tuber de-eyeing seems to be optional for container plant production, but this practice can improve the quality of containerized 'Strawberry Star' plants. 'Strawberry Star' plants show excellent sunburn tolerance and produce a large number of leaves in sunny locations, thus this variety is suitable for a wide range of locations (shady to sunny) in the landscape.

Availability

The Florida Agricultural Experiment Station has applied for a plant patent for 'Strawberry Star' (UF 85-5), and production of this variety 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. (http://ffsp.net/).

Literature cited

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Table 1. Tuber weight, production index, marketable number, and grade distribution of 'Strawberry Star' and three commercial caladium varieties in 2005 and 2006

	Tubers			Tuber grade distribution (%)				
Varieties	Weight (lb)	Production index	Marketable (no.)	Super Mammoth	Mammoth	Jumbo	No. 1	No. 2
				Year: 2005				
Strawberry Star	12.3	171	50.6	6.3	13.3	30.0	39.3	11.3
Candidum	5.7	103	33.7		4.0	47.7	42.3	6.0
Marie Moir	11.0	159	46.2	2.3	16.7	37.3	35.0	8.7
Miss Muffet	7.1	115	37.3		10.3	40.0	40.0	10.3
				Year: 2006				
Strawberry Star	12.1	175	49.8	7.3	16.0	30.7	29.7	16.3
Candidum	6.6	114	34.6	2.3	11.7	38.7	37.7	9.3
Marie Moir	3.3	58	29.9	2.3	0.0	11.3	43.7	43.0
Miss Muffet	6.0	106	38.7		10.0	28.3	42.7	19.0

Note: Values presented are means of three replications with 30 propagules planted in a plot in the field. The production index is an indicator of the economic value of the tubers harvested and is calculated as follows: *n* (No. 2) + 2*n* (No. 1) + 4*n* (Jumbo) + 6*n* (Mammoth) + 8*n* (Super Mammoth), where *n* is the number of tubers in each grade.
Tubers graded by maximum diameter: No. 2 (1–1.5 inches), No. 1 (1.5–2.5 inches), Jumbo (2.5–3.5 inches), Mammoth (3.5–4.5 inches), and Super Mammoth (> 4.5 inches).

Table 2. Plant performance and quality of 'Strawberry Star' and two commercial varieties grown from No. 1 tubers in 4.5-inch containers in a 45% shaded glasshouse in Wimauma, Florida, in 2007

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
Strawberry Star	29.9	32.4	8.8	7.5	12.4	21.2	8.1	6.5	5.5	4.0	3.4	4.4
Marie Moir	34.1	41.2	9.2	7.7	4.9	6.8	11.5	7.3	8.0	4.8	1.9	2.4
Miss Muffet	25.6	30.4	5.8	5.7	10.4	17.7	7.5	5.8	4.8	3.2	3.3	4.1

Note: One tuber was planted per container. Data were taken 8 weeks after planting. Values represent the average of 10 plants. "Days to sprout" is the number of days from planting to the first unfurled leaf. Plant quality was rated on a scale of 1–5, with 1 being very poor, 3 being fair and acceptable, and 5 being excellent in plant vigor, fullness, and color display as pot plants.

Table 3. Plant characteristics, performance, and sunburn tolerance of 'Strawberry Star,' three commercial varieties, and 'Cranberry Star' in 2005 and 2006[z]

Variety	Plant height (inch)	Leaf[y]			Overall plant performance ratings[x]			Sun tolerance rating[w]		
		number	length (inch)	width (inch)	June	July	August	June	July	August
Strawberry Star	16.5	27.3	9.8	5.9	3.6	4.3	4.8	3.5	4.5	4.8
Candidum	12.4	14.6	9.4	6.1	1.7	1.5	3.1	2.7	2.6	3.6
Cranberry Star	14.6	24.9	9.8	6.2	2.6	4.0	4.6	1.8	3.6	3.0
Marie Moir	11.1	13.9	9.6	6.1	1.4	1.6	3.3	1.9	4.2	4.1
Miss Muffet	7.1	16.3	6.6	4.3	1.5	1.3	2.4	3.3	4.4	4.2

[z] Plants were grown from 1-inch tuber propagules in ground beds in full sun in Wimauma, Florida. Values for plant height, leaf number, length, and width are means of three replications with three plants measured per plot per year, while performance and sunburn tolerance ratings are means of three replications based on whole plot evaluation.

[y] Data were taken over two growing seasons (2005 and 2006), approximately 4 months (August 2005 and 2006) after tubers were planted in April each year.

[x] Plants were rated on a scale of 1–5, with 1 being very poor, 3 being fair and acceptable, and 5 being excellent in plant vigor, fullness, and color display, in June, July, and August 2005 and 2006.

[w] Plant sunburn tolerance was rated on a scale of 1– 5, with 1 being very poor, 3 being fair and acceptable, and 5 being excellent without showing any signs of sunburn or resulting holes on leaf surfaces, in June, July, and August 2005 and 2006, respectively.