Caladium 75-14, a Spotted, Fancy-leaved Cultivar for Containers and Sunny Landscapes

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As a common pot and landscape plant, caladium (Caladium ×hortulanum Birdsey, Araceae Juss.) is valued for its colorful leaves and low maintenance requirements (Evans et al., 1992). Commercial caladium plants are grown from tubers. Central Florida growers produce greater than 95% of the tubers for the worldwide market (Bell et al., 1998; Deng et al., 2005). Tuber yield is one of the primary factors determining a caladium cultivar’s production value and whether the cultivar will be acceptable to growers and viable in commercial production. Poor tuber yield has been one of the main reasons why many early cultivars were removed from commercial tuber production and many new breeding lines with novel colors or coloration patterns have not become commercialized. Developing caladium cultivars with good tuber yield has been one of the main breeding objectives for the University of Florida’s caladium breeding program at the Gulf Coast Research and Education Center since the program began in 1976.

Caladium 75-14 (Figs. 1 and 2) is a new spotted, fancy-leaved cultivar with superior tuber yield. Plants of caladium 75-14 are vigorous and can quickly fill a landscape space. Its leaves are resistant to sunburn, allowing this cultivar to perform well in full-sun landscapes. With its multiple branching habit and plant vigor, caladium 75-14 produces high-quality plants in container forcing.

Origin

Caladium 75-14 was initially selected in 2002 as GCREC-1075-14 out of a population of progeny from a cross made in 2001 between ‘Gingerland’ and ‘Florida Moonlight’ (Fig. 3). ‘Gingerland’ was selected as the seed parent because of its sun tolerance and bright leaf spots. ‘Florida Moonlight’ was used as the pollen parent for its high tuber yield, multiple branching habit, pure white leaf color, and heart-shaped leaf. ‘Florida Moonlight’ was a progeny from the cross ‘Aaron’ × ‘Candidum Junior’ (Miranda and Harbaugh, 2003). The ancestry of ‘Gingerland’, ‘Aaron’, and ‘Candidum Junior’ are unknown, although ‘Candidum Junior’ is suspected to be a field mutation of ‘Candidum’. ‘Florida Moonlight’ was a progeny from the cross ‘Aaron’ × ‘Candidum Junior’ (Miranda and Harbaugh, 2003). The ancestry of ‘Gingerland’, ‘Aaron’, and ‘Candidum Junior’ are unknown, although ‘Candidum Junior’ is suspected to be a field mutation of ‘Candidum’ (Wilfret, 1991).

Description

Color designations for plant parts [e.g., Royal Horticultural Society (RHS) 200B] are based on comparison with the Royal Horticultural Society Colour Chart (RHS, 1986). Plants used for describing color were grown in 11.5-cm containers in a 45% shaded greenhouse from No. 1 (3.8 to 6.4 cm) de-eyered tubers.

Leaves of caladium 75-14 are peltate, sagitate–cordate with green–white (RHS 157A) palmate–pinnae venation. The upper surface has dark green (RHS 141A) margins, 2 to 3 mm wide, bordering the entire leaf except for the basal leaf valley where it is grayed purple (RHS 185A). Interveinal areas are green–white (RHS 157A) near the central main vein and change to dark green (RHS 141A) near the margin. Leaves have a small red–purple blotch (1 to 3 mm diameter) at the petiole attachment and numerous (1 to 40 mm in diameter) grayed purple (RHS 185B) spots. Netted green–white (RHS 157D) venation occurs on the leaf surface. The underside has a greened gray (RHS 191B) margin 2 to 3 mm wide. Primary veins are grayed green (RHS 194B), and netted venation is grayed green (RHS 191A). Interveinal areas are green–white (RHS 157A) near the central main and large veins and change to grayed green (RHS 191A) near the margin. Grayed purple spots (RHS 186A) are numerous and scattered between primary veins. Petoioles are 3 to 6 mm in diameter and light green (RHS 138D) at the apex, but the colors diffuse into a dark brown (RHS 200B) at the base that is ≤5 to 9 mm in diameter.

Plants of caladium 75-14 grown for ≈4 months in full sun in ground beds had an average height of 40 cm. The largest leaf on plants grown in a 45% shaded greenhouse produced from an intact No. 1 tuber in an 11.4-cm pot averaged 19 cm long and 12 cm wide 8 weeks after planting.

Jumbo-sized (greater than 6.4 cm and less than 8.9 cm in diameter) tubers are multi-segmented, bearing five to six dominant buds. Tuber surfaces are brown (RHS 200C) with the cortical area yellow–orange (RHS 15C).

Performance

Caladium 75-14 was evaluated for tuber production and plant performance at the Gulf Coast Research and Education Center in Wimauma, FL, in 2005 and 2006. The soil was EauGallie fine sand with ≈1% organic matter and pH of 6.2. Plants were grown on plastic-mulched raised beds with a constant water table maintained using a seep irrigation system (Geraldson et al., 1965). In 2005, ground beds were fumigated on 25 Feb. (6 weeks before planting) with a mixture of 67% methyl bromide and 33% chloropicrin (by volume) at the rate of 392 kg·ha⁻¹, and in 2006, the beds were fumigated on 10 Mar., 10 d before planting, with the same fumigant mixture but at 196 kg·ha⁻¹. The beds were 91 cm wide and 20 cm high with 2.54-cm caladium seed pieces (tuber pieces) planted 15 cm apart in three rows. Osmocote 18N–2.6P–10K 8–9 month controlled-release fertilizer (Scotts Co., Marysville, OH) was applied to the bed surface when shoots were emerging from the soil with nitrogen at 336 kg·ha⁻¹. Tubers were harvested in Nov. 2005 and Dec. 2006, respectively. Dried tubers were graded by their maximum diameter: No. 2 (greater than 2.5 cm and less than 3.8 cm), No. 1 (greater than 3.8 cm and less than 6.4 cm), Jumbo (greater than 6.4 cm and less than 8.9 cm), Mammoth (greater than 8.9 cm and less than 11.4 cm), and Super Mammoth

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Table 1. Tuber weights, production index, and tuber grade distribution of caladium 75-14 and three commercial cultivars (controls) harvested in 2005 and 2006.a

| Cultivar        | Wt (kg) | Production index | Marketable (number) | Super Mammoth | Mammoth | Jumbo | No. 1 | No. 2 |
|-----------------|---------|------------------|---------------------|---------------|---------|-------|-------|-------|
| 75-14           | 8.2 a   | 247 a            | 58 a                | 14 a          | 22 ab   | 30    | 26 a  | 8 a   |
| Galaxy          | 5.8 b   | 163 c            | 34 b                | 10 a          | 32 a    | 45    | 9 b   | 4 b   |
| Gingerland      | 4.6 c   | 197 b            | 59 a                | 0 b           | 18 ab   | 37    | 30 a  | 14 a  |
| Miss Muffet     | 3.2 d   | 115 d            | 37 b                | 0 b           | 11 b    | 39    | 40 a  | 11 a  |
| P value         | <0.001  | <0.001           | 0.004               | 0.011         | 0.038   | NS    | 0.029 | 0.020 |

| Cultivar        | Wt (kg) | Production index | Marketable (number) | Super Mammoth | Mammoth | Jumbo | No. 1 | No. 2 |
|-----------------|---------|------------------|---------------------|---------------|---------|-------|-------|-------|
| 75-14           | 8.6 b   | 240 a            | 70 a                | 5 b           | 26 a    | 16    | 32    | 21    |
| Galaxy          | 11.9 a  | 240 a            | 59 a                | 15 a          | 21 a    | 26    | 17    | 21    |
| Gingerland      | 5.8 b   | 170 b            | 39 b                | 13 a          | 32 a    | 20    | 23    | 21    |
| Miss Muffet     | 2.7 c   | 106 c            | 39 b                | 0 c           | 9 b     | 29    | 41    | 21    |
| P value         | 0.002   | 0.001            | <0.001              | 0.032         | NS      | NS    | NS    | NS    |

The production index is an indicator of economic value of the crop harvested and is calculated as: N (No. 2) + 2N (No. 1) + 4N (Jumbo) + 6N (Mammoth) + 8N (Super Mammoth) where N = number of tubers in each grade. Tuber distribution data (%) were transformed using the formula arcsine [square root (percentage / 100)] before analysis of variance and mean separation. Tuber grades 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 (greater than 11.4 cm).

*Values presented are means of three replications with 30 propagules per 1.2-m² plot per year.

*aNumbers in the same column followed by the same letter are not significantly different by protected Fisher’s least significant difference test at P = 0.05. NS = nonsignificant at P ≥ 0.10.
Table 2. Plant and leaf measurements, plant performance ratings, and sunburn tolerance ratings of caladium 75-14 and three commercial cultivars grown in ground beds in full sun (2005 and 2006).

| Cultivar          | Plant ht (cm) | Leaves (no.) | Leaf length (cm) | Leaf width (cm) | Plant performance rating a | Sun tolerance rating b |
|-------------------|---------------|--------------|------------------|-----------------|---------------------------|-----------------------|
| 75-14             | 40 a          | 40 a         | 19.7 bc          | 12.4 b          | 4.5 a                     | 4.9 a                |
| Galaxy            | 30 a          | 40 a         | 22.7 b           | 15.2 a          | 3.6 b                     | 4.1 ab               |
| Gingerland        | 31 a          | 25 b         | 26.7 a           | 14.6 a          | 1.8 c                     | 3.4 ab               |
| Miss Muffet       | 14 b          | 19 b         | 16.3 c           | 10.0 c          | 1.5 c                     | 1.3 ab               |
| P value           | 0.006         | 0.011        | 0.002            | <0.001          | <0.001                    | 0.001                |

aPlants were 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 in June, July, and Aug. 2005 and Aug. and Sept. 2006, respectively.

bPlants’ 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 resulting holes on leaf surfaces taken in June, July, and Aug. 2005.

Table 3. Plant performance for caladium cultivars grown from No. 1 tubers in 11.4-cm containers in a 45% shaded glasshouse, 2007, Wimauma, FL.

| Cultivar          | Days to sprout | Plant ht (cm) | Leaves (no.) | Leaf length (cm) | Leaf width (cm) | Quality rating |
|-------------------|----------------|---------------|--------------|------------------|-----------------|---------------|
| Candidum Junior   | 37 bc          | 25 a          | 15 b         | 18.1 b           | 18.0 ab         | 12.2 b         |
| Galaxy            | 33 b           | 26 a          | 7            | 22.3 a           | 18.4 a          | 14.6 a         |
| Miss Muffet       | 27 c           | 15 b          | 19 ab        | 19.4 ab          | 15.4 b          | 12.5 b         |
| P value           | <0.002         | 0.073         | <0.001       | <0.001           | 0.059           | 0.091         |

aValues represent the means of plants produced from eight intact or 10 de-eyed No. 1 (greater than 3.8 and less than 6.4 cm in diameter) tubers planted individually per container.

bNumber of days from planting to the first unfurled leaf.

cMean separation within columns by protected Fisher’s least significant difference test at P = 0.05.

dSignificant differences shown at the P values as indicated in the last row (0.059 to 0.091). Mean separation within columns was by protected Fisher’s least significant difference test.

and mean separation were done using the GLM procedure in the SAS program to compare the performance of caladium 75-14 to the controls.

Caladium 75-14 sprouted in 37 d (intact or de-eyed) after planting, similar to ‘Galaxy’, but 3 to 6 d later than ‘Candidum Junior’ and 7 to 10 d later than ‘Miss Muffet’ (Table 3). Caladium 75-14 plants were 27 cm (intact tubers) or 25 cm (de-eyed tubers) tall, similar to ‘Galaxy’ in height, but were significantly taller than ‘Candidum Junior’ (8 to 10 cm taller) and ‘Miss Muffet’ (10 to 12 cm taller), a known dwarf cultivar. Caladium 75-14 had seven leaves on intact plants 8 weeks after planting, similar to ‘Galaxy’ but less than ‘Candidum Junior’ or ‘Miss Muffet’ plants, although the difference was not statistically significant. When tubers were de-eyed, caladium 75-14 produced more leaves (13 per plant). In leaf size (length and width), caladium 75-14 was similar to ‘Galaxy’ and ‘Candidum Junior’. Tuber de-eyeing significantly improved the quality rating of the pot plants, from 3.3 to 4.2. This indicates that caladium 75-14 can be used for forcing in small containers, but tuber de-eyeing will be required to produce high-quality plants.

In summary, caladium 75-14 is a new spotted, fancy-leaved cultivar. It has shown superior tuber production potentials in the replicated field trials. This yield is consistent with growers’ trials (T. Cantwell-Bates, personal communication). With its vigorous growth habit, caladium 75-14 can quickly fill a landscape space with many leaves and resist sunburn. These characteristics allow it to perform well in the landscape in full sun. In container forcing, caladium 75-14 behaves much like ‘Galaxy’ with similar sprouting time, leaf size, and plant height, but caladium 75-14 produces pot plants of higher quality regardless of tuber treatments (intact or de-eyed). Tuber de-eyeing can improve caladium 75-14’s plant quality when forced in small containers (10 cm in diameter), although this practice is not required for producing pot plants in 20- or larger containers (Z. Deng, personal observation). For commercial tuber production, growers are encouraged to use preplant hot water treatment (Rhodes, 1964) and standard postharvest treatment (Harbaugh and Tija, 1985).

Availability

Caladium 75-14 will be trademarked as Berry Patch. A plant patent will be sought from the U.S. Patent and Trademark Office and plant patent rights will be assigned to the University of Florida, Board of Trustees. Propagation and distribution will be licensed by the Florida Foundation Seed Producers, Inc., P.O. Box 110200, Gainesville, FL 32611. Information on tuber availability and propagation agreements can be obtained from the Florida Foundation Seed Producers, Inc.

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