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New Caladium Cultivars 'Dots Delight' and 'Wonderland'[1]

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Caladiums [*Caladium* × *hortulanum* Birdsey, Araceae Juss.] are ornamental aroids valued for their vibrant and morphologically diverse foliage. They are often used as container or landscape plants. The majority of commercial caladium plants are produced by forcing tubers in containers. Florida growers produce essentially all the caladium tubers used in the United States and in the world for potted plant production and tuber sales (Bell, Wilfret, and DeVoll 1998; Deng et al. 2019). Most caladium tubers are used to produce potted plants, with a smaller portion directly planted in the landscape. Prior to planting, caladium tubers are often de-eyed to improve the quality of containerized caladium plants. Similar to shoot tipping, this practice entails removing or destroying one or more of the main buds on the tubers (Evans, Wilfret, and Harbaugh 1992). Sufficient plant vigor, development of multiple bright leaves, sunburn tolerance, and good leaf health are essential for caladium plants to perform well in the landscape. Tuber yield and size are very important to Florida caladium growers because these factors determine the commercial value of a caladium cultivar in the field planting.

Commercial caladiums can be broadly classified into eight groups based on leaf type (fancy and lance-leaved) and leaf color (white, red, pink, and multi-colored) (Bell, Wilfret, and DeVoll 1998). Fancy-leaved caladiums have heart-shaped (triangular- or round-ovate) leaves with three main veins, a petiole attached to the back, and the two large basal lobes. Lance leaves have a broad sagittate to cordate-lanceolate base, obvious or barely obvious basal lobes, and a petiole attached to the base of the leaf. Generally, plants of lance-leaved cultivars are shorter, have thicker and denser leaves that are more resilient to environmental stresses such as sunburns and wind damage, and produce more branched tubers. Consumer demand for lance-leaved cultivars has been increasing steadily. Surveys indicated that growers planted more acres for this group of cultivars in recent decades than before (Bell, Wilfret, and DeVoll 1998; Deng et al. 2019). To meet this need from consumers and growers, the caladium breeding program at the UF/IFAS Gulf Coast Research and Education Center (GCREC) has been developing new lance-leaved cultivars that can produce attractive and robust plants with many bright, colorful leaves and an improved tuber yield potential. The breeding approach used by this program has been to hybridize commercial caladium cultivars and breed lines, followed by multi-year, rigorous selection and evaluation. Recently, the UF/IFAS GCREC caladium breeding program has released two new lance-leaved cultivars, 'Dots Delight' and 'Wonderland'. This publication is prepared for growers who are interested in growing these cultivars as a horticultural crop and for greenhouse or nursery growers who are

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interested in producing potted caladium plants using these cultivars. More detailed description of these cultivars can be found in the *HortScience* journal articles by Deng, Peres, and Desaeger (2022, In press).

Origin

'Dots Delight' (Figure 1) is a progeny of selfed 'Miss Muffet' (Deng, Peres, and Desaeger 2022), a non-patent commercial cultivar. The self-pollination was done in Bradenton, Florida in 2004. Initial selection was made in spring 2007 and coded 5412. 'Dots Delight' was released under the name 'UF-R1410'.

Figure 1. A typical plant of 'Dots Delight' caladium (47 days old) forced from four No. 1 tubers in an 8-inch container. Tubers were planted on May 31, 2019; the plant was grown in a greenhouse with approximately 30% light exclusion; and the photo was taken on July 17, 2019.
Credits: K. Druffel, UF/IFAS

'Wonderland' (Figure 2) is a progeny of the cross between a proprietary caladium breeding line UF 317 and a non-patent commercial cultivar, 'Gingerland' (Deng, Peres, and Desaeger, In press). The cross was made in Balm, Florida, in July 2012. 'Gingerland' is a lance-leaved cultivar with long petioles and spotted leaves. UF 317 had white fancy leaves with numerous burgundy spots and was a progeny of a cross between two commercial cultivars 'Florida Sweetheart' (Wilfret 1993) and 'Miss Muffet'. 'Wonderland' was initially selected in September 2015 and given the code 1227R-1, which was re-coded as 15-23 in April 2016. This caladium was released under the name 'UF-15-23'.

The ancestry of 'Gingerland' and 'Miss Muffet' is unknown. 'Miss Muffet' was developed by Frank M. Joyner (T. Bates, person. comm.) in Tampa, Florida, probably in the 1940s or early 1950s (Carnathan 2012). 'Florida Sweetheart' is a progeny of 'Candidum Junior' and 'Red Frill' (Wilfret 1993).

Figure 2. A typical plant of 'Wonderland' caladium (approximately 45 days old) forced from four No. 1 tubers in an 8-inch container. Tubers were planted on May 14, 2020; the plant was grown in a greenhouse with approximately 30% light exclusion; and the photo was taken on June 28, 2020.
Credits: K. Druffel, UF/IFAS

The first asexual propagations of the new cultivars were in Balm, Florida, during spring 2007 for 'Dots Delight' and during spring 2014 for 'Wonderland'. Since these dates, they have been asexually propagated through tuber division annually. Plant, foliar, and growth characteristics of 'Dots Delight' and 'Wonderland' have been stable and consistent during asexual propagation.

Botanical Description

Descriptions of color for plant parts were based on comparison with the "RHS Colour Chart" (Royal Horticultural Society [RHS] 1986). Plants used for color descriptions were grown from intact (non-de-eyed) No. 1 tubers (four per container) in 8-inch containers in a shaded greenhouse with approximately 30% light exclusion. The containers were filled with Pro-Line 4B commercial potting mix (Jolly Gardener®, Poland Spring, ME), amended with Osmocote® commercial controlled-release fertilizer (15-9-12, 5–6 months; Scotts Co., Marysville, OH) at the rate of 7.25 pounds per cubic yard and with MicroMax® micronutrients (Everris, Geldermalsen, The Netherlands) at the rate of 0.81 pounds per cubic yard.

'Dots Delight'

'Dots Delight' plants were forced from four intact No. 1 tubers in 8-inch containers for approximately eight weeks, where they grew about 14.6 inches tall and 23.2 inches wide with upright, outwardly arching leaves. Mature leaves had an average size of 9.5 inches (length) × 6.3 inches (width).

Leaves had a sagittate-cordate base, a slightly undulate margin, an acuminate to acute apex, and a pinnate venation pattern. The upper surface had a green (RHS 137A/B) margin bordering the entire leaf except for the basal leaf valley formed by the two lobes where it was red purple (RHS 59A/B, or 60A/B). The midrib and primary veins were yellow white (RHS 158C) and streaked with green (RHS 137B). Irregular blotches or spots of light red purple (RHS 65C, 69A/B/C, or 73D) were distributed throughout the leaf surface against a green background (RHS 135B or 137A/B). Irregular, small, light red-purple (RHS 65C, 69A/B/C, or 73D) mottling and or blotching was present along the leaf margin. The underside surface had greyed-green (RHS 191A) margins, up to 0.6 inches wide, as well as a light-green (RHS 137D) center and greyed-green (RHS 193D) midrib and primary veins. Petioles were greyed green (RHS 188D, 189D, 190D, 191D, or 197B) with short streaks of brown (RHS 200B). Tuber surfaces were greyed orange (RHS 165B) with spots of 165B, and the cortical area was yellow (RHS 11B/C/D) with spots of 11A in the center.

'Wonderland'

Plants were approximately 11.0 inches tall and 24.4 inches wide and produced outwardly arching leaves. Mature leaves had an average size of 8.2 inches (length) × 5.4 inches (width). Leaves had a cordate base, a slightly undulate margin, an acuminate apex, and a pinnate venation pattern. The upper surface had a green (RHS 137A) margin bordering the entire leaf except for the basal leaf valley formed by the two lobes where it was red purple (RHS 58A to 61C). The midrib and primary veins were white (RHS 155A) and streaked with red purple (RHS 61A/B). Numerous spots of red purple (RHS 61A), in various sizes and irregular shapes, were distributed throughout the leaf surface against a white (RHS 155D) to green-white (RHS 157A) background. Irregular, small, light red-purple (RHS 61C/D) mottling and or blotching was present along the leaf margin. The underside surface had greyed-green (RHS 190D) margins, up to 15.0 millimeters wide, a very thin edge of red purple (RHS 58A), a creamy-white (RHS 157C/D) center, a greyed-green (RHS 192D) midrib, and greyed-green (RHS 192A/B) primary veins. Petioles were brown (RHS 200B) or grey brown (RHS 199D) near the leaf base, with short streaks of red purple (RHS 61B). The tuber surface was brown (RHS 200A), and the cortical area was yellow (RHS 14B) with darker yellow edges (RHS 14C).

Tuber Yield Potential

'Dots Delight' and 'Wonderland' were evaluated for tuber yield potential in replicated experimental field plots in Balm, Florida, in 2014, 2015, 2019, and 2020. The soil was EauGallie fine sand with about 1% organic matter and a pH between 6.2 and 7.4. Caladium plants were grown in the field plots using a white plastic-mulched raised-bed system (Deng and Harbaugh 2006). In the 2014 evaluation, beds (32.0 inches wide and 7.9 inches high) were fumigated on January 9th with Pic-Clor 60® (39.0% 1,3-dichloropropene and 59.6% chloropicrin) at 400 pounds per acre. Plantacote® Pluss, a controlled-release fertilizer (14N-9-15, 12 months, X-Calibur Plant Health Company, LLC, Summerville, SC), was incorporated into the bed at 400 pounds per acre. Caladium seed pieces were planted on April 15th at approximately 6-inch spacing between rows and in rows. Irrigation was by seepage (Geraldson, Overman, and Jones 1965), which maintained a relatively consistent water table below the covered beds. Caladium plants were fertilized with 600 parts per million of nitrogen with a commercial water-soluble fertilizer (20-20-20, Southern Agricultural Insecticides, Inc., Palmetto, FL) on September 18 and October 1, 2014. Tubers were dug on December 1, 2014. Dried tubers from each experimental field plot were weighed, graded, and counted on January 11, 2015, as described by Deng and Harbaugh (2006). Tuber grading was by the maximum diameter: Super Mammoth (greater than 4.5 inches), Mammoth (3.5 to 4.5 inches), Jumbo (2.5 to 3.5 inches), No. 1 (1.5 to 2.5 inches), and No. 2 (1.0 to 1.5 inches). Tuber grades and counts were converted into a production index to show the relative economic value of the harvested tubers per field plot: Production index = 8n (Supper Mammoth) + 6n (Mammoth) + 4n (Jumbo) + 2n (No. 1) + 1n (No. 2), where n = number of tubers in the grade. The relative values assigned to the five tuber grades in calculating production index were based on the relative market prices provided by Florida caladium tuber producers.

In the 2015 season, ground beds were fumigated on February 23rd with Pic-Clor 60 at 400 pounds per acre. Caladium seed tubers were treated in hot water (122°F) for 30 minutes. Seed tuber pieces (approximately 1 × 1 × 1 inch) were dusted with a biological fungicide, RootShield® Plus WP (BioWorks, Victor, NY), and planted manually on April 14th at the same in-row and between-row spacing as in 2014. Irrigation was through a seepage system as described in the previous paragraph. Approximately 7.0 grams of Osmocote® (15-9-12, 5–6 months) were applied to each plant on April 30th and again on July 28th. New crop tubers were dug and washed on December 7th to 8th and air-dried for approximately 30 days inside a greenhouse before they were weighed, graded, and counted as described in the previous paragraph.

For the 2019 evaluation, beds were fumigated on February 24th with Pic-Clor 60 at 400 pounds per acre. Caladium seed pieces were planted on April 4th. Granular nitrogen was incorporated into the soil prior to bedding at a rate of 50 pounds of N per acre. Fertigation began on June 1st by injecting a commercial liquid fertilizer (5-2-8, e.g., from Chemical Dynamics) at 1 pound of nitrogen per acre a day. The fertilization rate was increased to 2 pounds of nitrogen per acre a day on July 24th and ended on October 31st. Tubers were dug and washed on December 9th, dried in the greenhouse for approximately 45 days, and then weighed, graded, and counted on January 21, 2020, using the same protocol that was used in 2014.

In the 2020 season, ground beds were fumigated on February 12th with Pic-Clor 60 at 400 pounds per acre. Caladium seed tuber pieces were dusted with a biological fungicide RootShield® Plus WP and planted manually on April 15th with the same in-row and between-row spacing as in 2014. Two drip tapes were buried under the plastic mulch along the raised beds, which provided the irrigation water and fertilization. Fertigation began on May 28th, injecting a commercial liquid fertilizer (5-2-8, e.g., from Chemical Dynamics) at the rate of 1 pound of nitrogen per acre a day.

In all growing seasons, field plots were arranged in a randomized complete block design with three replicates. The plot size was 13 square feet, planted with 30 caladium propagules (tuber pieces). 'Gingerland' was included as a check (i.e., control) cultivar for 'Dots Delight' and 'Wonderland'.

'Dots Delight'

Its tuber weight and production index were significantly greater than that of 'Gingerland' in both 2014 and 2015 (Table 1). Tuber weight of 'Dots Delight' was 185% greater than the tuber weight of 'Gingerland' in 2014 and 211% greater in 2015 (Table 1). The production index of 'Dots Delight' was 155% greater than that of 'Gingerland' in 2014 and 49% greater in 2015 (Table 1). 'Dots Delight' and 'Gingerland' were not significantly different in the number of marketable tubers, producing about 26 to 36 marketable tubers per experimental plot in 2014 and 2015. The primary grade of tubers produced by 'Dots Delight' was Jumbo (46.9% in 2014 and 56.2% in 2015), followed by No. 1 (25.9% in 2014 and 25.7% in 2015) and No. 2 (14.2% in 2014 and 12.4% in 2015). 'Dots Delight' produced more Jumbos and fewer No. 1 and No. 2 tubers than 'Gingerland' in 2014 and 2015 (Table 1).

'Wonderland'

The tuber weight, marketable tubers, and production index of 'Wonderland' were not significantly different from those of 'Gingerland' in 2019 (Table 1), but the tuber weight, marketable tubers, and production of 'Wonderland' were 112.0%, 279.0%, or 150.0%, respectively, greater than those of 'Gingerland' in 2020 (Table 1). These results indicate that 'Wonderland' may have higher tuber yield potential than 'Gingerland'. The primary grade of tubers produced by 'Wonderland' was No. 2 (48.7% in 2019 and 74.5% in 2020), followed by No. 1 (45.8% in 2019 and 22.9% in 2020). 'Wonderland' produced more No. 1 tubers than 'Gingerland' in 2019 (Table 1).

Container Trials

The suitability of 'Dots Delight' for container plant production was evaluated in 2019 by forcing tubers in 4.5-inch (diameter) containers following the protocol of Harbaugh and Tjia (1985). No. 1 tubers (intact or de-eyed) were planted on May 31st in Pro-Line 4B commercial potting mix (Jolly Gardener®) amended with Osmocote® fertilizer (15-9-12, 5–6 months) at 7.2 pounds per cubic yard and with MicroMax® macronutrients (ICL Fertilizers) at 0.8 pounds per cubic yard. Potted tubers and plants were grown in a greenhouse with approximately 30% light exclusion. Temperatures in the greenhouse ranged from 75°F (night) to 91°F (day). Potted tubers and plants were arranged on metal benches, with a pot-to-pot spacing of 1.3 feet in the greenhouse in a randomized complete block design with six or seven replicates. Subdue Maxx® fungicide (Syngenta Group Company, Switzerland) was applied as a drench to all potted plants on June 4th. Plant height, plant width, number of leaves, and foliar characteristics were recorded approximately eight weeks after planting (July 23rd and 24th). Quality of the potted caladium plants was rated on a scale of 1 to 5, with 1 being very poor, unattractive, and totally unacceptable as potted plants with few leaves and 5 being very attractive, full plants with a symmetrical shape, an appropriate height, and many bright, colorful leaves. The suitability of 'Wonderland' for container plant production was evaluated in 2020 by forcing tubers in 5-inch containers (diameter). No. 1 tubers (intact or de-eyed) were planted on May 1st. Growing conditions and experimental design were the same as described for 'Dots Delight'. Subdue Maxx® fungicide and Neemix® insecticide (Certis USA, Columbia, MD) were applied as a drench to all potted plants. Data on plant height, width, leaf size, plant quality, etc. were taken approximately eight weeks after planting. 'Gingerland' was included as a check cultivar for 'Dots Delight' and 'Wonderland'.

'Dots Delight'

Intact tubers of 'Dots Delight' sprouted about 33 days after planting, approximately 22 days later than 'Gingerland' (Table 2). Plants forced from intact tubers had an average height of 9.9 inches, an average width of 12.6 inches, an average number of 5.1 leaves, and an average leaf size of 6.9 inches long and 4.5 inches wide. Thus, plants of 'Dots Delight' forced from intact tubers and grown for eight weeks were 5.9 inches narrower, and leaves were 2.2 inches shorter and 1.9 inches narrower than 'Gingerland'. De-eyed tubers of 'Dots Delight' sprouted 36 days after planting, about 15 days later than 'Gingerland'. On average, plants of 'Dots Delight' forced from de-eyed tubers were 8.0 inches tall and 11.6 inches wide, having about seven leaves per plant that were 5.7 inches long and 3.4 inches wide. Compared to 'Gingerland' plants from de-eyed tubers, 'Dots Delight' plants from de-eyed tubers were 4.7 inches narrower and had much fewer leaves (about one-third). Plants of 'Dots Delight' from intact and de-eyed tubers received a quality rating of 2.6 or 2.7, respectively. When the container trial was extended for two more weeks, 'Dots Delight' plants developed more leaves and received a quality rating of 3.0 or above. These results indicate that 'Dots Delight' was slower to sprout and may need additional time for production of prefinished or finished container plants.

'Wonderland'

Intact tubers of 'Wonderland' sprouted about 32 days after planting, approximately 17 days later than 'Gingerland' (Table 2). Plants forced from intact tubers had an average height of 8.5 inches, an average width of 15.3 inches, an average number of 13.2 leaves, and an average leaf size of 7.8 inches long and 5.0 inches wide. Thus, plants of 'Wonderland' forced from intact tubers and grown for eight weeks were 7.1 inches shorter and 2.6 inches narrower, with leaves 2.9 inches shorter and 2.1 inches narrower than 'Gingerland' (Figure 3). De-eyed tubers of 'Dots Delight' sprouted about 33 days after planting, approximately eight days later than 'Gingerland'. On average, plants of 'Wonderland' forced from de-eyed tubers were 8.6 inches tall and 15.6 inches wide, having about 15 leaves per plant that were 6.3 inches long and 3.9 inches wide. Compared to 'Gingerland' plants from de-eyed tubers, 'Wonderland' plants from de-eyed tubers were 1.9 inches shorter and had fewer leaves (15.2 vs. 28.8). Plants of 'Wonderland' from intact and de-eyed tubers received a quality rating of 3.1 or 3.2, meeting the required quality for potted caladium plants. These results indicate that 'Wonderland' is slower to sprout than 'Gingerland', but it does not need additional time for production of prefinished or finished container plants. In addition to producing more compact plants in containers, 'Wonderland' also had fewer blooms (0 to 0.2 vs. 1.2 to 1.7 per plant) than 'Gingerland'. 'Wonderland' produced quality potted plants without de-eyeing; thus, de-eyeing is not necessary for this new caladium.

Figure 3. 'Wonderland' (right) in comparison with 'Gingerland' (left) when forced in 8-inch containers. Four No. 1 tubers were planted in each container on May 14, 2020; the plants were grown in a greenhouse with approximately 30% light exclusion; and the photo was taken on June 28, 2020.
Credits: K. Druffel, UF/IFAS

Plant Performance in Open Fields

'Dots Delight' and 'Wonderland' were evaluated for plant growth, leaf color display, sunburn tolerance, and leaf health in the same field plots that were used for evaluating tuber production. Growing conditions were described above. A scale of 1 to 5 was used for rating plant growth, with 1 being very poor (few leaves and lack of vigor) and 5 being excellent (full plants, numerous leaves). A scale of 1 to 5 was used for rating leaf color display, with 1 being very poor (dull or bleached, lack of color display) and 5 being excellent (bright, very attractive). Sunburn 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). Leaf health was evaluated on a scale of 1 to 5, with 1 being completely unsightly (numerous diseased spots) and 5 being healthy (free of visible leaf spot disease). These evaluations were done on August 13, September 10, and October 1, 2014; July 16, August 17, September 16, and October 15, 2015; July 13, August 13, September 18, 2019; and July 31, August 21, September 25, and October 15, 2020.

'Dots Delight'

Plants of 'Dots Delight' grew well in both 2014 and 2015 seasons, with a growth score between 2.5 and 4.7 (average 3.2) (Table 3). Its growth scores were significantly higher

than those of 'Gingerland' (1.7 to 2.8) in two out of three evaluations in 2014 and in one out of three evaluations in 2015. Leaf color scores were between 3.5 and 4.7, higher than the leaf color scores of 'Gingerland' in one out of three evaluations (Table 3). Plants of 'Dots Delight' showed good to excellent sunburn tolerance in both 2014 and 2015 growing seasons, with sunburn tolerance ratings between 3.7 and 4.5 (Table 4). Its sunburn tolerance ratings were not significantly different from those of 'Gingerland' (2.5 to 4.5) in five out of seven evaluations, but for two evaluations, 'Dots Delight' received a higher score in August 2015 and then a lower score in September 2015.

'Wonderland'

Plants of 'Wonderland' received a score of 1.3 to 4.0 for their growth in seven evaluations in 2019 and 2020 (Table 3). These scores were relatively low but still significantly higher than those of 'Gingerland' (1.2 to 2.5) in one of the three evaluations in 2019 and in two of the four evaluations in 2020, indicating better plant growth than 'Gingerland'. Leaf color scores were between 2.8 and 4.2, higher than the leaf color scores of 'Gingerland' in two out of the seven evaluations (Table 3). This may be due to the fact that spots on 'Wonderland' leaves are darker while the leaf background color is whiter, resulting in a better color contrast. Plants of 'Wonderland' showed good to excellent sunburn tolerance in both 2019 and 2020 growing seasons, with sunburn tolerance ratings between 3.7 and 4.8 (Table 4). Its sunburn tolerance ratings were not significantly different from those of 'Gingerland' (3.8 to 4.8) in all seven evaluations. The leaf health scores of 'Wonderland' ranged from 2.3 to 4.8 in 2019 and from 3.5 to 4.5 in 2020, which were not significantly different from those of 'Gingerland', except that 'Wonderland' received a higher leaf health score in one evaluation.

Plant Performance in Garden Trials

'Dots Delight'

Two garden trials were conducted in summer 2019 to evaluate the plant performance of 'Dots Delight' against 'Gingerland'. Garden beds were covered with black landscape fabric. Two drip tapes were laid below the fabric to provide irrigation water. No. 1 tubers were planted on May 31st. Data on leaf number, leaf length, and leaf width were taken on August 21st (approximately three months post-planting). Plants were rated on a scale of 1 to 5 for plant growth, leaf color display, sunburn tolerance, and leaf health as described in the previous section, Plant Performance in Open Fields. 'Dots Delight' performed well in full sun as well as under shade, receiving a plant rating of 3.2 (full sun) and 3.8 (shade), a leaf color rating of 3.7 (full sun) and 3.7 (shade), sunburn tolerance rating of 4.3 (full sun) and 4.2 (under shade), and leaf health rating of 5.0 (full sun) and 5.0 (under shade) (Table 5). 'Dots Delight' was superior to 'Gingerland' in leaf color display and health, especially in full sun garden trials (Table 5, Figure 4). These results indicate that 'Dots Delight' has excellent resistance to leaf spot diseases.

Figure 4. 'Dots Delight' caladium grown in full sun in Wimauma, Florida, in late August 2018.
Credits: K. Druffel

'Wonderland'

One garden trial was conducted in 2022 to evaluate the plant performance of 'Wonderland' under 30% shade. Five No. 1 intact tubers were planted into the beds on April 22nd with a spacing of approximately 30 inches. One tablespoon of Osmocote® (15-9-12, 5–6 months) was applied to each plant. Approximately 12 weeks after planting, plants were evaluated for plant growth, leaf color display, sunburn tolerance, and leaf health as described in the previous section, Plant Performance in Open Fields. 'Wonderland' performed well under shade, receiving a plant growth score of 4.5, a leaf color score of 4.4, sunburn tolerance score of 4.1, and leaf health score of 4.3 (Table 5). 'Wonderland' was comparable to 'Gingerland' in these four parameters (Table 5). These results indicate that 'Wonderland' performed well under shade.

Resistance to Fusarium Tuber Rot

Fusarium tuber rot is a major postharvest disease in caladium. It is caused by *Fusarium solani*. The majority

of caladium cultivars in commercial production are susceptible or highly susceptible to this disease (Goktepe et al. 2007). In 2019 and 2020, cured, stored tubers of 'Wonderland' and multiple commercial cultivars were inoculated with three isolates of *F. salani* to determine the relative susceptibility to Fusarium tuber rot, following the procedure of Goktepe et al. (2007). 'Wonderland' showed a moderate level of resistance to Fusarium tuber rot, similar to commercial cultivars 'Candidum Senior' and 'Florida Sweetheart', which were both previously classified as moderately resistant or resistant (Goktepe et al. 2007).

Grower Trials

Both 'Dots Delight' and 'Wonderland' were tested in grower fields. It was estimated that 'Dots Delight' could produce 2,178 Jumbo tubers; 20,741 No. 1 tubers; and 20,741 No. 2 tubers, per acre. 'Wonderland' was evaluated in open caladium fields in full sun in 2019, 2020, 2021, and 2022. This new caladium performed well in the fields, with a plant growth rating of 4 from July to October in 2019, 2020, and 2021 (Table 6). This new cultivar showed excellent leaf color display (an average score of 5) and sunburn tolerance (an average score of 5) in those three years. In 2022, caladium growers in Lake Placid, Florida, experienced a severe drought and extreme heat stress. Under these stresses, 'Wonderland' received a plant growth score of 3, leaf color score of 4, and sunburn tolerance score of 5. In grower trials, 'Wonderland' was shorter but fuller than 'Gingerland'. Tuber increase rates were estimated at about 3 or 4, which indicated a lower tuber yield potential than 'Gingerland'.

Recommendation

'Dots Delight'

'Dots Delight' caladium is characterized by white main veins, multiple light pink spots, excellent tolerance to sunburn, and strong resistance to the leaf spot disease. It is well suited for use in the landscape, especially sunny locations. In full sun, color contrast intensifies, and leaves become more attractive. Tubers of this caladium may be slower to sprout; thus, they may need an additional one to two weeks to produce prefinished or finished potted plants. Tuber yield potential is intermediate to high.

'Wonderland'

'Wonderland' caladium is characterized by a compact plant stature and multiple white/creamy-white leaves with a short petiole and numerous brightly colored red-to-burgundy spots. It shares a similar leaf-coloration pattern with 'Gingerland', but this new cultivar is shorter in plant height as well as shorter and narrower in leaf size. In addition, this new caladium does not require de-eyeing for forcing potted plants in small containers and produces few blooms, whereas 'Gingerland' tends to have multiple blooms when forced in containers. Thus, this new caladium is better suited for potted plant production, especially in small containers (5 inches or smaller in diameter). In open fields as well as gardens, 'Wonderland' caladium showed good leaf color display, good sunburn tolerance, and good leaf health. This cultivar is expected to perform well in both sunny and shaded landscapes. 'Wonderland' has been observed to have a lower tuber yield potential compared to other lance-leaved caladiums. Nevertheless, growers' data seem to indicate profitable tuber production with this caladium. It is important to provide adequate irrigation and fertilization to keep this caladium growing well in the field.

Although extensive research and evaluations have been performed on small acreages, tuber producers are encouraged to plant only limited quantities of these cultivars until having gained experience in producing them. Standard postharvest treatment of tubers is recommended (Harbaugh and Tjia 1985), and pre-plant hot-water treatment of tubers is encouraged to prolong their life.

Availability

Plant patent and/or trademark may be applied for 'Dots Delight' and 'Wonderland'. Commercial production of these caladiums requires a licensing agreement with the Florida Foundation Seed Producers, Inc., P.O. Box 309, Greenwood, FL 32443. Information on tuber availability and licensing agreements can be obtained from the Florida Foundation Seed Producers, Inc.

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Table 1. Tuber weight, marketable number, production index, and grade distribution of 'Dots Delight', 'Wonderland', and commercial check caladiums in experimental field plots in 2014, 2015, 2019, and 2020.

Cultivars	Tuber			Tuber grade distribution (%)			
	Weight (lb)	Marketable number	Production index	Mammoth	Jumbo	No. 1	No. 2
---------- 2014 ----------							
'Dots Delight'	8.2	32.7	107.3	13.0	46.9	25.9	14.2
'Gingerland'	2.9	26.7	42.0			60.2	39.8
---------- 2015 ----------							
'Dots Delight'	7.9	35.0	113.0	5.7	56.2	25.7	12.4
'Gingerland'	3.7	35.7	76.0		19.5	54.3	26.2
---------- 2019 ----------							
'Wonderland'	2.6	29.0	48		5.5	45.8	48.7
'Gingerland'	1.6	23.7	33		1.2	19.6	79.2
---------- 2020 ----------							
'Wonderland'	3.1	52.0	75		2.5	22.9	74.5
'Gingerland'	1.5	13.7	30		4.9	22.0	73.1

Values presented are averages of three plots with 30 propagules planted in a plot of 13 square feet.

The production index is an indicator of the economic value of tubers harvested per plot and is calculated as such: n (No. 2s) + 2n (No. 1s) + 4n (Jumbos) + 6n (Mammoth), where n = number of tubers in each grade.

Tubers are graded by maximum diameter: No. 2 (1.0 to 1.5 inches), No. 1 (1.5 to 2.5 inches), Jumbo (2.5 to 3.5 inches), and Mammoth (3.5 to 4.5 inches).

Table 2. Days to sprout, plant height and width, leaf number, leaf length and width, number of blooms (inflorescences), and plant quality of 'Dots Delight' and 'Wonderland' in comparison with 'Gingerland' (check) grown in small containers.

Cultivars	Days to sprout		Plant height (in)		Plant width (in)		Leaves (no.)		Leaf length (in)		Leaf width (in)		Blooms (no.)		Quality rating	
	Intact	De-eye	Intact	De-eye	Intact	De-eye	Intact	De-eye	Intact	De-eye	Intact	De-eye	Intact	De-eye	Intact	De-eye
---------- 2019 ----------																
'Dots Delight'	33.4	36.0	9.9	8.0	12.6	11.6	5.1	7.1	6.9	5.7	4.5	3.4	0.3	0.6	2.6	2.7
'Gingerland'	11.1	20.7	11.4	8.2	18.5	16.3	5.9	22.1	9.2	5.7	6.5	3.7	0.6	1.3	3.0	4.4
---------- 2020 ----------																
'Wonderland'	32.3	32.7	8.5	8.6	15.3	15.6	13.2	15.2	7.8	6.3	5.0	3.9	0.2	0	3.1	3.2
'Gingerland'	15.2	24.2	15.6	10.5	17.8	16.5	10.8	28.8	10.7	6.5	7.2	3.9	1.7	1.2	2.7	4.4

No. 1 tubers were planted in 4.5- or 5-inch containers (one tuber per container) and grown in a shaded glasshouse in Balm, Florida, in 2019 and 2020.

Values represent the averages of six or seven plants (replicates) produced from intact or de-eyed No. 1 (1.5 to 2.5 inches in diameter) tubers planted individually per container.

Plant quality of the potted caladium plants was rated on a scale of 1 to 5, with 1 being very poor, unattractive, totally unacceptable as potted plants with few leaves and 5 being very attractive, full plants with a symmetrical shape, an appropriate height, and many bright, colorful leaves.

Table 3. Plant performance and leaf color display ratings of 'Dots Delight', 'Wonderland', and 'Gingerland' (check) caladiums grown from 1-inch tuber propagules in ground beds in full sun in Balm, Florida, in 2014, 2015, 2019, and 2020.

	Plant growth ratings							**Leaf color ratings**						
	------- 2014 ------			**--------- 2015 ----------**				**------ 2014 -------**						
	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.	Aug.	Sept.	Oct.				
'Dots Delight'	3.6	4.1	4.7	2.5	3.8	3.8	3.8	4.7	4.0	3.5				
'Gingerland'	3.2	2.9	2.6	2.8	2.5	2.5	2.9	2.4	4.7	3.8				
	------ 2019 -------			**--------- 2020 ----------**				**------ 2019 -------**			**--------- 2020 ----------**			
	July	Aug.	Sept.	July	Aug.	Sept.	Oct.	July	Aug.	Sept.	July	Aug.	Sept.	Oct.
'Wonderland'	2.7	2.8	1.3	2.3	2.2	4.0	2.5	4.2	4.2	2.8	3.8	3.8	3.2	3.7
'Gingerland'	2.5	1.5	1.2	1.3	1.3	2.0	1.5	3.2	3.2	2.7	2.7	3.0	3.0	3.0

For each of the listed months, three plots were evaluated for plant performance and leaf color, with a single rating assigned to each plot for both criteria. The resulting values were averaged, and these averages are shown in the table for each corresponding month.

Plants were rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent in plant vigor and fullness.

Leaves were rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent in leaf color display.

Plants were rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent in plant vigor and fullness.

Table 4. Sunburn tolerance and leaf health rating of 'Dots Delight', 'Wonderland', and 'Gingerland' (commercial check) caladiums grown from 1-inch tuber propagules in ground beds in full sun in Balm, Florida, in 2014, 2015, 2019, and 2020.

	Sun tolerance ratings							**Leaf health ratings**						
	-------- 2014 -----			**--------- 2015 ----------**										
	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.							
'Dots Delight'	4.1	4.5	4.5	4.0	4.4	3.8	3.7							
'Gingerland'	4.4	3.5	4.0	3.6	2.5	4.5	4.2							
	------- 2019 ------			**--------- 2020 ----------**				**------ 2019 ------**			**--------- 2020 ----------**			
	July	Aug.	Sept.	July	Aug.	Sept.	Oct.	July	Aug.	Sept.	July	Aug.	Sept.	Oct.
'Wonderland'	4.8	4.3	3.8	4.5	4.5	3.7	3.8	4.8	4.3	2.3	4.5	4.0	3.5	3.8
'Gingerland'	4.8	4.0	3.8	4.2	4.2	4.0	3.8	4.3	1.7	2.8	3.8	3.2	2.3	3.7

Sunburn tolerance was rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent, without showing any signs of leaf burns and/or color bleaching.

Leaf health was rated on a scale of 1 to 5, with 1 being completely unsightly with numerous disease spots and 5 being resistant without any disease spots.

Table 5. Plant growth, leaf color, sunburn tolerance, and leaf health ratings of 'Dots Delight', 'Wonderland', and 'Gingerland' (commercial check) caladiums in garden trials in Balm, Florida.

Cultivars	Plant rating	Foliage color rating	Plant height (in)	Plant width (in)	Leaf number (no.)	Leaf length (in)	Leaf width (in)	Sunburn tolerance rating	Leaf health rating
	---------- 30% shade (2019) ----------								
'Dots Delight'	3.8	3.7	16.9	11.1	23.1	5.9	1.7	4.2	5.0
'Gingerland'	3.2	3.3	15.6	10.1	23.7	6.0	1.7	4.2	4.7
	---------- Full sun (2019) ----------								
'Dots Delight'	3.2	3.7	11.7	8.9	18.5	4.5	1.7	4.3	5.0
'Gingerland'	1.7	2.0	14.4	4.2	19.7	5.2	2.0	5.0	4.2
	---------- 30% shade (2022) ----------								
'Wonderland'	4.5	4.4						4.1	4.3
'Gingerland'	4.5	4.6						4.4	4.3

Data were taken approximately three months after No. 1 tubers were planted in the ground beds in full sun or inside a screenhouse (approximately 30% light exclusion).

Plant growth was rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent in plant vigor and fullness.

Leaf color was rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent in leaf color display.

Leaf sunburn tolerance was rated on a scale of 1 to 5, with 1 being very poor and 5 being excellent without showing any signs of leaf burns and/or color bleaching.

Leaf health was rated on a scale of 1 to 5, with 1 being completely unsightly, covered by numerous diseased necrotic spots, and 5 being disease-resistant, free of necrotic spots.

Table 6. Grower assessment of 'Wonderland' caladium in open fields in full sun in Lake Placid, Florida, in 2019, 2020, 2021, and 2022. Tuber increase rates were estimated based on growers' yield data.

Growing seasons	Plant growth rating				Leaf color rating				Sunburn tolerance rating				Tuber increase rate
	July	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.	July	Aug.	Sept.	Oct.	
2019	4	4	4	4	5	5	5	5	5	5	5	5	~4
2020	4	4	4	4	5	5	5	5	5	5	5	5	~3
2021	4	4	4	4	5	5	5	5	5	5	5	5	~3
2022	3	3	3	3	4	4	4	4	5	5	5	5	

Plant growth, leaf color, and sunburn tolerance of caladiums were assessed by growers in mid-July, mid-August, mid-September, and mid-October each year on a scale of 1 to 5, with 1 being very poor, 2 being poor, 3 being acceptable, 4 being good, and 5 being excellent. Field plots varied from 100 square feet up to 5,000 square feet.

Tuber increase rate was calculated by dividing the amount (in pounds or trays) of new tubers harvested at the end of the growing season with the amount (in pounds or trays) of seed tubers planted at the beginning of the season.