

'Florida Radiance' Strawberry

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There is a need for a strawberry (*Fragaria ×ananassa* Duch.) cultivar to complement 'Strawberry Festival' (Chandler et al., 2000) yields, currently the primary cultivar in Florida and an important cultivar in other winter and early spring production areas around the world. 'Strawberry Festival' has become a grower favorite because it is a sturdy upright plant that is easy to harvest with relatively well-distributed yield throughout the season and produces very few non-marketable fruit. It has become a supermarket favorite because its fruit are attractive, fit well in 450-g clamshell containers, and have a long shelf life. However, early in the season (late November and early December in west central Florida), 'Strawberry Festival' produces relatively low yields, and during the second half of the main production period (starting in late February in west central Florida), it tends to produce fruit of marginal size. 'Florida Radiance' strawberry has produced high early-season yields and has maintained good fruit size throughout the main production period in plots at the former University of Florida research center at Dover and on several commercial farms in west central Florida and southwest Spain. It is recommended for trial in areas with mild winter climates. This strawberry genotype is named 'Florida Radiance' because of the attractive luster of its fruit.

Origin

'Florida Radiance' originated from a 2001 cross between 'Winter Dawn' and 'FL 99-35' (Fig. 1). 'Winter Dawn', a 2005 release from the Florida Agricultural Experiment Station of the University of Florida, was used as a parent because of its high early-season yield potential and ability to produce large primary and secondary fruit. 'FL 99-35' was used as a parent because of its ability to

produce firm, attractive fruit. Based on the desirable appearance and firmness of 'Florida Radiance' fruit during the 2001–2002 season, it was included (as 'FL 01-116') in randomized complete block trials at Dover, FL, during the 2003–2004 and 2004–2005 seasons. The soil at the experimental site is classified as a Myakka fine sand siliceous hyperthermic Oxyaquic Alorthod. The organic matter content and the soil pH of the experimental site were less than 1.5% and 7.3, respectively. Planting beds were 27 inches wide at the base, 24 inches wide at the top, 10 inches high, and spaced 4 feet apart on centers. Finished beds were fumigated with methyl bromide plus chloropicrin (67:33 v/v) at a rate of 350 lb/acre to eliminate soilborne diseases, nematodes, and weeds in the soil. Simultaneously, beds were covered with black high-density polyethylene mulch (1 mil thick), and a single line of drip irrigation tubing (25 gal/acre per min; T-Tape Systems International, San Diego, CA) was buried 1 inch deep on bed centers. Plant nutrients were supplied to the crop under nonlimiting conditions through the drip lines and pest management followed current statewide recommendations (Peres et al., 2006).

Fruit were harvested twice per week starting on the third week in December of each season. A marketable fruit was defined

as a fruit without visible blemishes and with at least 75% of red skin. For postharvest quality analysis, fresh fruit was transported to the Citrus and Subtropical Products Laboratory, Agricultural Research Station, U.S. Department of Agriculture in Winter Haven, FL, once each month during the 2007–2008 harvest season. An additional sensory panel and quantitative analysis was performed in Feb. 2008 at the Food Science and Human Nutrition Department, University of Florida, in Gainesville, FL (data not shown). Fruit were analyzed for surface color using a colorimeter (Chromameter CR-400; Konica Minolta, Inc., Osaka, Japan), where the *L* value is a measure of lightness with 0 = black and 100 = white. Fruit firmness was measured using a penetrometer (Instron 4411, Canton, MA) and it was expressed as the force needed to penetrate the fruit to a depth of 10 mm with a 5-mm diameter probe. These measurements were taken as the average of eight fruit per treatment. Soluble solids were measured by placing a drop of pure fruit juice on the Abbe Mark II digital refractometer (Misco Refractometer, Cleveland, OH). Extracted fruit juice was used to measure titratable acidity, calculated as citric acid, with Titrimo 719 S (Metrohm USA, Westbury, NY). The ratings of 100 untrained panelists were collected for fruit for appearance, color, firmness, flavor, and sweetness. These characteristics were rated on a 1 to 9 hedonic scale with 1 = dislike extremely, 5 = neither like nor dislike, and 9 = like extremely.

Description

'Florida Radiance' is a short-day cultivar. It has a more open plant habit than 'Strawberry Festival'. This habit, along with fruit that are attached to long pedicels, makes the plant easy to harvest. 'Florida Radiance' has a mean fruit weight in west central Florida of between 21 and 23 g compared with between 18 and 21 g for 'Strawberry Festival' (Tables 1 and 2). Fruit are mostly medium conic in shape with some early-season fruit being elongated and some primary fruit being asymmetrical (Fig. 2). The achenes are slightly sunken, giving the fruit a smooth appearance. External fruit color is a glossy bright to dark red (depending on maturity). 'Florida

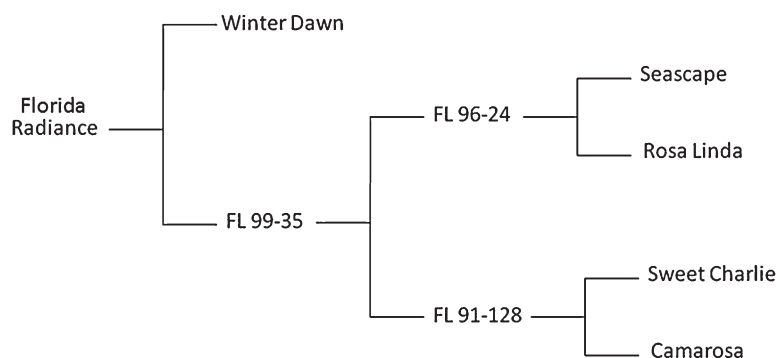


Fig. 1. Pedigree of 'Florida Radiance' strawberry.

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Table 1. Performance of strawberry cultivars at Dover, FL, during the 2003–2004 season.^z

Cultivars	Marketable fruit yield					(g/fruit)
	December	January	February	March	Total	
	(g/plant)					
Florida Radiance	65 a ^y	77 b	270 a	435 b	847 a	21.2 a
Strawberry Festival	44 b	112 a	84 b	642 a	881 a	18.5 b
Significance ($P < 0.05$)	*	*	*	*	*	*

^zMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^yMeans based on four replications of 10 plants each. Mean separation within columns by Fisher's protected least significant difference test ($P < 0.05$).

Table 2. Performance of strawberry cultivars at Dover, FL, during the 2004–2005 season.^z

Cultivars	Marketable fruit yield					(g/fruit)
	December	January	February	March	Total	
	(g/plant)					
Florida Radiance	86 a ^y	82 b	321 a	558 a	1,047 a	22.4 a
Strawberry Festival	37 b	144 a	155 b	592 a	928 b	20.6 b
Significance ($P < 0.05$)	*	*	*	*	*	*

^zMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^yMeans based on four replications of 10 plants each. Mean separation within columns by Fisher's protected least significant difference test ($P < 0.05$).



Fig. 2. Fruit of 'Florida Radiance' strawberry.

Table 3. Physical and chemical characteristics of strawberry fruit harvested at Floral City, FL, on 12 Feb. 2008.^z

Cultivars	Surface color ^y (L value)	Firmness ^x (kgf)	Soluble solids (%)	Titrateable acidity (% citric acid)
Florida Radiance	37.5	0.44	6.8	0.81
Strawberry Festival	38.1	0.36	7.8	0.84

^zL and firmness values were the average of eight observations.

^yL value is a measure of lightness with 0 = black and 100 = white.

^xFirmness is expressed as kilograms of force to penetrate the fruit to a depth of 10 mm with a 5-mm diameter probe.

Table 4. Sensory characteristics of strawberry fruit harvested at Floral City, FL, on 12 Feb. 2008.^z

Cultivars	Appearance	Color	Firmness	Flavor	Sweetness
Florida Radiance	6.8 a	6.8 a	6.6 b	5.7 b	5.5 b
Strawberry Festival	7.1 a	6.9 a	7.1 a	6.8 a	6.3 a
Significance ($P < 0.05$)	*	*	*	*	*

^zMeans based on the ratings of 100 untrained panelists. Mean separation within columns by Fisher's protected least significant difference test ($P < 0.05$). Characteristics were rated on a 1 to 9 hedonic scale with 1 = dislike extremely, 5 = neither like nor dislike, and 9 = like extremely.

Radiance' fruit are not significantly different in lightness than 'Strawberry Festival' fruit (Table 3). The internal color of 'Florida Radiance' fruit is a warm red (1795C in the Pantone Color Formula Guide, Carlstadt, NJ). The calyx is generally medium to large in size and attractive. Fruit of 'Florida Radiance' are firm (Table 3) yet juicy with acceptable fruit flavor, although lower than 'Strawberry Festival' that has been harvested fully mature (Table 4).

Performance

Marketable yields of 'Florida Radiance' were complementary to those of 'Strawberry Festival' during both the 2003–2004 and 2004–2005 seasons (Tables 1 and 2). This observation was demonstrated in the monthly yield patterns of both cultivars; 'Florida Radiance' had higher production than 'Strawberry Festival' in December and February of both seasons, whereas 'Strawberry Festival' had higher production than 'Florida Radiance' in January and March (Tables 1 and 2).

'Florida Radiance' is moderately resistant to the two most serious disease problems on strawberry in Florida: Botrytis fruit rot [caused by *Botrytis cinerea* (de Bary) Whetzel] and anthracnose fruit rot (caused by *Colletotrichum acutatum* Simm.). In a fungicide-free study during the 2007–2008 season, only 3% of the 'Florida Radiance' fruit harvested from mid-February to mid-March showed symptoms of anthracnose fruit rot compared with 53% for 'Treasure', the susceptible control (N. Peres, unpublished data). However, 'Florida Radiance' is susceptible to crown rots (C.K. Chandler, personal observations), which are most likely caused by *C. gloeosporioides* (Penz.) Penz. and Sacc. and *Phytophthora* spp.

Availability

Information on nurseries licensed to propagate 'Florida Radiance' can be obtained from the Florida Foundation Seed Producers, Inc. (<http://ffsp.net>).

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