Vegetarian Newsletter

A Horticultural Sciences Department Extension Publication on Vegetable Crops

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Issue No. 546 June 2009

'Florida Elyana': First Florida-Bred Cultivar Designed for Tunnel and Greenhouse Production

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Introduction

There are two predominant strawberry (*Fragaria* × *ananassa* Duch.) production systems throughout the world: Open-field cultivation and production under protective structures (e.g. high-tunnels and greenhouses). In California and Florida, strawberry is produced predominately under open-field conditions, whereas in Japan and in parts of Europe, such as Spain, Netherlands, and Germany, the latter system is widely utilized. Because the environmental differences between of these two systems, there is a necessity for breeding cultivars that could be adapted to each specific situation. 'Florida Elyana' is the first Florida-bred cultivar designed for tunnel and greenhouse production. It is a short-day plant and produces flavorful fruit. 'Florida Elyana' produces larger fruit than 'Strawberry Festival', which is the predominant cultivar in Florida and it holds a large market share in Spain, Morocco, and Egypt.

Origin

'Florida Elyana' strawberry (*Fragaria* × *ananassa* Duch.) originated from a 2000 cross between FL 96-114 and FL 95-200. FL 96-114 resulted from a cross between 'Sweet Charlie', a 1992 University of Florida release, and 'Cuesta' (U.S. Plant Patent 8,662), a Univ. of California cultivar released in the early 1990s. FL 95-200 is a result of a cross of the lines FL 93-46 and FL 93-66, both of which have a number of cultivars in its complex pedigree, including 'Rosa Linda' and 'Pajaro'.

Based on the desirable appearance and firmness of 'Florida Elyana' fruit, it was included in randomized complete block trials at the Gulf Coast Research and Education Center of the University of Florida at Dover and Balm, Fla., respectively, during the 2004-05 and 2006-07 seasons. Ripe fruit were harvested, graded, counted, and weighed twice a week from December through March. For postharvest quality analysis, sensory evaluations were conducted at the Gulf

Coast Research and Education Center two times during 2006 and three times during 2007. At least 50 untrained panelists participated in the sensory panels, and rated fruit for appearance, texture, and flavor. Panelists were asked to taste the berries following the codes written on their ballot sheets and answer the questions on the ballots. Presentation was randomized across panelists and serving order was balanced so that each sample was tested in each station. Panelists were asked to rate samples for appearance, flavor and texture on a 9-point hedonic scale (1 = dislike extremely and 9 = like extremely). A line for comments was provided after each question. Fresh fruit were analyzed for soluble solids content (SSC) and titratable acidity (TA). Fruit were analyzed for surface color using a colorimeter (Konica Minolta Sensing, Inc., Japan), and firmness using a penetrometer (Instron, Model 4411, Canton, Mass.).

Description

'Florida Elyana' is a short-day cultivar. It is smaller and has a lower stature plant than 'Strawberry Festival'. This habit, along with fruit that are attached to long pedicels, makes the fruit easy to harvest (Fig. 1). 'Florida Elyana' produces larger fruit than 'Strawberry Festival'. It has a mean fruit weight in west central Florida of between 24 and 27 g, compared to between 17 and 21 g for 'Strawberry Festival' (Tables 1 and 2). Fruit are mostly medium-conic to wedge-shaped, with the wedge-shaped fruit often showing a longitudinal crease on the broad sides of the fruit (Fig. 2). 'Florida Elyana' fruit are quite susceptible to surface cracking, which is due to exposure to free moisture. Thus we are not recommending this cultivar for open-field culture where there is a high likelihood of multiple rain or dew events during the fruiting season. External fruit color is a bright red, and internal color is carmine pink. The calyx is generally medium in size and attractive. Fruit texture is firm (Table 3), and the flavor is usually sweet with a pleasant aroma. The soluble solids content of 'Florida Elyana' fruit is as high as or higher than that of 'Strawberry Festival' (Table 4), and its SSC/TA ratio is consistently higher than that of 'Strawberry Festival'.

Performance

'Florida Elyana' is as productive as 'Strawberry Festival' in December and January, but not as productive later in the season (Tables 1 and 2). This could be due to the fact that 'Florida Elyana' plants stay relatively small throughout the season, whereas 'Strawberry Festival' plants are more vigorous in terms of producing new branch crowns. However, in a high tunnel trial at the Gulf Coast Research and Education Center in the 2006-07 season, total season yield for 'Florida Elyana' was not significantly different from that of 'Strawberry Festival'. Growers may be able to increase the productivity of 'Florida Elyana' on a per unit area basis by planting this cultivar at a higher than standard density. 'Florida Elyana' 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 an unsprayed trial during the 2007-08 season, only 3% of the 'Florida Elyana' fruit harvested from mid-February to mid-March showed symptoms of anthracnose fruit rot, compared to 53% for 'Treasure', the susceptible control. 'Florida Elyana' also appears to have resistance to wilts which are most likely caused by *C. gloeosporioides* (Penz.) Penz. and Sacc. and *Phytophthora* spp. In summary, 'Florida Elyana' is recommended for winter and spring production areas where strawberries are grown in tunnels or greenhouses.

Availability

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

Fig. 1. Plants of 'Florida Elyana' strawberry in Spain. Photo by: Craig Chandler, GCREC.

Table 1. Performance of strawberry cultivars at Dover, Fla. during the 2004-05 season in open-field culture[z].

Cultivars	Marketable fruit yield					
	December	January	February	March	Total	(g/fruit)
	(g/plant)					
Florida Elyana	76 a[y]	108 b	178 a	353 a	715 a	27.1 a
Strawberry Festival	37 b	144 a	155 b	592 a	928 b	20.6 b

[z]Mean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.
[y]Means based on four replications of 10 plants each. Mean separation within columns by Fisher's protected LSD test, $P < 0.05$.

Table 2. Performance of strawberry cultivars at Dover, Fla. during the 2006-07 season in high-tunnel culture[z].

Cultivars	Marketable fruit yield					
	December	January	February	March	Total	(g/fruit)
	(g/plant)					
Florida Elyana	46 a[y]	99 a	159 b	322 b	626 b	24.4 a
Strawberry Festival	65 a	94 a	218 a	459 a	836 a	17.3 b

[z]Mean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.
[y]Means based on four replications of 10 plants each. Mean separation within columns by Fisher's protected LSD test, $P < 0.05$.

Table 3. Mean acceptance scores (9-point hedonic scale) for appearance, texture, and flavor of 'Florida Elyana' and 'Strawberry Festival' strawberry evaluated over two harvest seasons.

	Feb. 06	Mar. 06	Jan. 07	Feb. 07	Mar. 07
Appearance					
Florida Elyana	6.6 b[z]	7.5 a	5.9 a	6.4 b	6.0 a
Strawberry Festival	7.8 a	6.8 b	6.2 a	7.2 a	6.3 a
Texture					
Florida Elyana	7.4 a	7.1 a	6.9 a	6.9 a	6.2 a
Strawberry Festival	7.5 a	6.6 a	6.4 a	6.8 a	6.2 a
Flavor					
Florida Elyana	7.3 a	7.0 a	6.5 a	6.7 a	6.2 a
Strawberry Festival	7.3 a	6.2 b	5.9 b	6.9 a	5.1 b

[z]Mean separation within columns by Fisher's protected LSD test, $P \leq 0.05$.

Table 4. Soluble solids content (SSC) and titratable acidity (TA) of 'Florida Elyana' and 'Strawberry Festival' strawberry evaluated over two harvest seasons.

	Feb. 06	Mar. 06	Jan. 07	Feb. 07	Mar. 07
SSC (°Brix)					
Florida Elyana	10.2 a[z]	8.2 a	7.7 a	9.6 a	7.3 a
Strawberry Festival	7.5 b	7.5 b	6.9 b	9.8 a	6.2 b
TA (%)					
Florida Elyana	0.82 a	0.58 a	0.78 b	0.71 b	0.69 a
Strawberry Festival	0.75 b	0.63 a	0.91 a	0.87 a	0.73 a

[z]Mean separation within columns by Fisher's protected LSD test, $P \leq 0.05$.

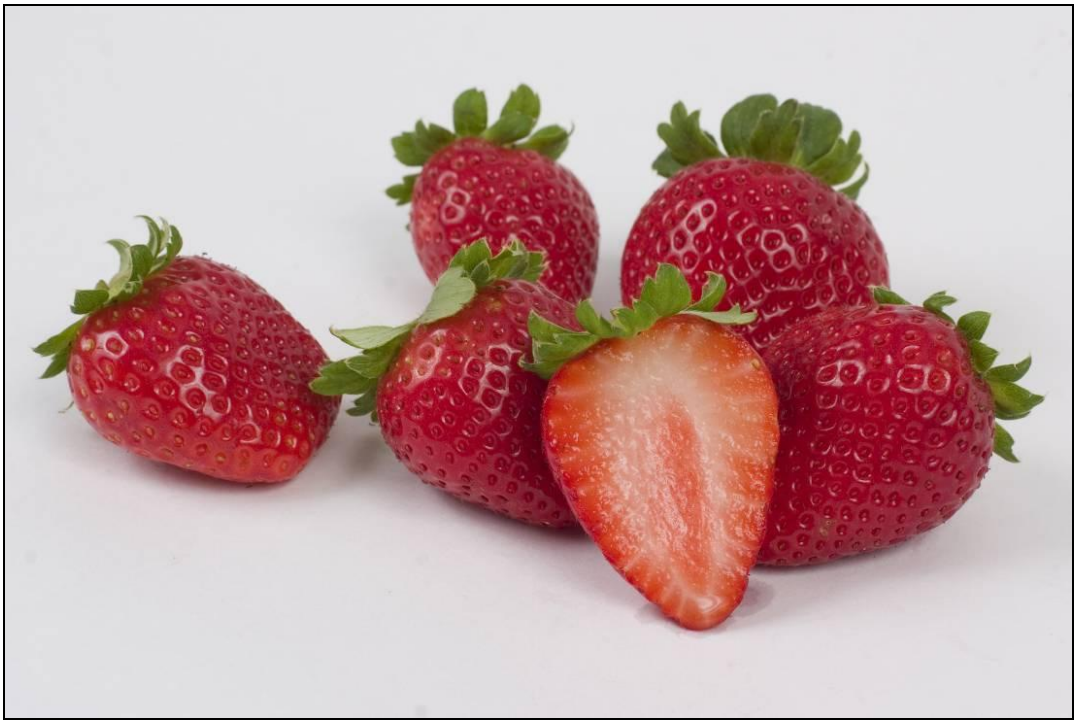

Fig. 2. Fruit of ‘Florida Elyana’ strawberry. Photo by: Bielinski Santos, GCREC.