

Winterstar™ ('FL 05-107') Strawberry¹

Vance M. Whitaker, Craig K. Chandler, Bielinski M. Santos, and Natalia A. Peres²

Introduction

Winterstar™ ('FL 05-107') is a new strawberry cultivar released from the University of Florida in 2011. This cultivar originated from a 2005 cross between 'Florida Radiance' (female parent) and 'Earlibrite' (male parent). It was tested over several years in field plots at the University of Florida Gulf Coast Research and Education Center (GCREC) in Balm, at the Florida Strawberry Growers Association (FSGA) headquarters in Dover, and on several commercial farms. Data from these trials were used to generate the following information and recommendations to help growers obtain optimal performance of this cultivar in West Central Florida. Comparisons are made to the cultivars 'Strawberry Festival' (Chandler et al. 2000), which is the current industry standard for firmness, shelf life, and resistance to water damage, and 'Florida Radiance' (Chandler et al. 2009), which is the current industry standard for fruit size and early and total yields.

Fruit and Plant Characteristics

Winterstar™ is a short-day plant adapted to annual, winter plasticulture growing systems. The plant is compact and upright with moderately long pedicels, making the fruit easy to harvest (Figure 1). It produces conic fruit that are very uniform in shape throughout the season because of excellent pollination, resulting in few unmarketable fruit. A small internal cavity was observed in some primary fruit but rarely in secondary or tertiary fruit.

The fruit size of Winterstar™ was, in some seasons, intermediate between 'Strawberry Festival' and 'Florida Radiance' and equal to that of 'Florida Radiance' in others. Firmness was approximately equal to 'Strawberry Festival', and shelf life was equal to 'Strawberry Festival' in preliminary tests. However, at some times during late season, the firmness of Winterstar™ exceeded that of 'Strawberry Festival', appearing to maintain its firmness quite well as temperatures increased in March. The resistance of Winterstar™ to water damage is similar to 'Florida Radiance', though the fruit sometimes develops a pale, water-soaked spot when standing in water on top of the plastic mulch. This spot usually disappears or diminishes in size as the fruit dries out. The external color of the fruit is bright red that appears slightly lighter than 'Florida Radiance' and does not darken overly late in the season. Since the fruit is firm and develops external color gradually, growers may consider altering picking schedules early in the season to allow for the development of optimal external color and flavor. Winterstar™ fruit has a lower acid content than either 'Strawberry Festival' or 'Florida Radiance', giving it a milder, sweeter flavor that improves continually during ripening (Whitaker et al. 2011).

Field Performance

In some years of testing, early season and total yields of Winterstar™ were intermediate compared to those of 'Strawberry Festival' and 'Florida Radiance', while in other

1. This document is HS1198, one of a series of the Horticultural Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date April 2012. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
2. Vance M. Whitaker, assistant professor, Horticulture; Craig K. Chandler, professor emeritus, Horticulture; Bielinski M. Santos, assistant professor, Horticulture; and Natalia A. Peres, associate professor, Plant Pathology, University of Florida Gulf Coast Research and Education Center, Balm, FL 33598.

The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication do not signify our approval to the exclusion of other products of suitable composition.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. U.S. Department of Agriculture, Cooperative Extension Service, University of Florida, IFAS, Florida A&M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Millie Ferrer-Chancy, Interim Dean



Figure 1. Plants and fruit of Winterstar™ (‘FL 05-107’) strawberry in late March, 2010 in Dover, FL
Credits: Craig K. Chandler

years, they were equal to ‘Florida Radiance’. When planted early in the season, the plant maintained its compact nature and no overly elongated fruit were observed, in contrast to ‘Florida Radiance’, which can produce elongated fruit when planted early in West Central Florida and exposed to hot weather in October and early November. Winterstar™ planted on approximately October 1 performed very well in GCREC field plots as well as in protected culture environments, such as high tunnels (Figure 2). Because of the compact nature of the plant, an in-row spacing of 14–15 inches is recommended.



Figure 2. Plants and fruit of Winterstar™ (‘FL 05-107’) strawberry (U.S. Patent Pending)
Credits: José Jon Garcia Allen

Plant Establishment

This cultivar can be established from bare-root transplants available from certified nurseries. The traditional transplant practice in West Central Florida uses approximately 10–12 days of sprinkler irrigation for 8–12 h/day, depending on

air temperature. Growers may elect to reduce irrigation volumes during early October transplanting by using foliar applications of crop protectants based on either kaolin clay or calcium carbonate on the morning of the 8th day after 7 days of sprinkler irrigation. More information on this practice is available at <http://edis.ifas.ufl.edu/hs1188>.

Fertilization and Irrigation

Fertilization program selection should be based on the crop requirement and the natural fertility of the soil. A revision of the fertilization and irrigation practices for strawberries is available at <http://edis.ifas.ufl.edu/pdffiles/CV/CV13400.pdf>. Field studies and observations suggested that Winterstar™ is a moderate-fertilization cultivar, similar to ‘Florida Radiance’. Excess nitrogen (N) reduces fruit quality during mid and late season. Average N and potassium (K) rates of 150–175 lb/acre during the season have resulted in excellent fruit yields from December to mid-March. Previous research has indicated that other Florida cultivars do not require preplant N fertilization (see <http://edis.ifas.ufl.edu/hs370>), and it is expected that Winterstar™ will follow the same pattern.

Production of this cultivar in West Central Florida, where deep, sandy soils with low organic matter are the norm, requires careful management of irrigation scheduling. In most cases, drip irrigation longer than 1 h/day (≈ 25 gal/acre/min or 1500 gal/acre/h) with one drip tape per bed results in nutrient leaching. During the early stages of growth in October and early November when day temperatures are above 70°F and plants do not have a fully developed root system, it is convenient to provide one or two irrigation cycles per day totaling no more than 30 min/day (750 gal/acre). This amount varies depending on the nature of each season, and moisture on the top 6 inches of the beds should be monitored constantly using a tensiometer or other type of moisture sensor. More information about irrigation scheduling is available at <http://edis.ifas.ufl.edu/pdffiles/CV/CV10700.pdf>.

Disease Management

The resistance of Winterstar™ to *Colletotrichum acutatum* (the causal agent of anthracnose fruit rot) is superior to that of the highly susceptible cultivar ‘Treasure’ (Seijo et al. 2011) and perhaps superior to that of ‘Strawberry Festival’. More information about anthracnose can be found at <http://edis.ifas.ufl.edu/pp130>. Resistance to *Botrytis cinerea* (the causal agent of Botrytis fruit rot) is superior to that of the highly susceptible cultivar ‘Camino Real’, but Winterstar™ is more susceptible to Botrytis fruit rot than

‘Strawberry Festival’ (see <http://edis.ifas.ufl.edu/pp152> for more information on Botrytis). Fungicide applications for the control of Botrytis fruit rot should target the peak bloom periods. Captevate®, Elevate®, Scala®, Switch®, and Thiram are among the most effective fungicides for control of Botrytis fruit rot. A web-based disease forecast system to aid growers on timing of fungicide applications for control of anthracnose and Botrytis fruit rots has been developed and is available at <http://agroclimate.org/tools/strawberry/>. More information about the system is available at <http://edis.ifas.ufl.edu/ae450>.

Based on inoculation trials, Winterstar™ is susceptible to crown and root rots caused by *Phytophthora cactorum*, though it is less susceptible than ‘Florida Radiance’. Thus, fruit growers are strongly encouraged to take the same precautions against *P. cactorum* infection as they would for ‘Florida Radiance’. Mefenoxam, the active ingredient in Ridomil Gold®, is highly effective and should be injected through the drip tape as soon as plants are established. Two applications may be needed to treat an infected crop. Products containing potassium phosphite or potassium salts of phosphorous acid are alternatives that should generally be applied as foliar sprays, although some are also labeled for drip application. Members of this group are not curative, and multiple applications may be needed beginning immediately after the plants are established.

Early season plant collapse can also be caused by *Colletotrichum gloeosporioides* (the causal agent of Colletotrichum crown rot) and *Macrophomina phaseolina* (the causal agent of charcoal rot), and symptoms are virtually indistinguishable to those of *Phytophthora* crown rot. Preliminary trials indicate that Winterstar™ is more resistant to Colletotrichum crown rot and charcoal rot than ‘Strawberry Festival’. To identify the causal agent of plant wilt and collapse, growers are encouraged to submit a sample to the UF Plant Diagnostic Lab at GCREC, where the pathogen will be isolated and identified and control recommendations provided.

For Nursery Growers

Winterstar™ strawberry produces runners in the nursery at rates similar to ‘Florida Radiance’. The foliage is more robust, however, and less prone to breakage. At high-elevation nurseries in California, it has established well in the nursery field under cool temperatures. Nursery growers are strongly encouraged to take precautions against *Phytophthora cactorum* infestation as they would for ‘Florida Radiance’.

References

- Chandler, C. K., D. E. Legard, D. D. Dunigan, T. E. Crocker, and C. A. Sims. 2000. “‘Strawberry Festival’ Strawberry.” *HortScience* 35 (7): 1366–1367.
- Chandler, C. K., B. M. Santos, N. A. Peres, C. Joquand, A. Plotto, and C. A. Sims. 2009. “‘Florida Radiance’ Strawberry.” *HortScience* 44 (6): 1769–1770.
- Seijo, T., J. Mertely, V. M. Whitaker, and N. Peres. 2011. “Evaluation of Strawberry Cultivars and Advanced Breeding Lines for Field Resistance to Anthracnose and Botrytis Fruit Rots, 2009-10.” *Plant Disease Management Reports* 5: SMF020. doi: 10.1094/PDMR05.
- Whitaker, V. M., T. Hasing, C. K. Chandler, A. Plotto, and E. Baldwin. 2011. “Historical Trends in Strawberry Fruit Quality Revealed by a Trial of University of Florida Cultivars and Advanced Selections.” *HortScience* 46 (4): 553–557.