

Performance of Selected New Strawberry Cultivars in Tennessee

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Strawberry production was once a major fruit enterprise in Tennessee. Commercial acreage dropped from 26,000 in 1920; to 15,000 in 1956; and to 700 in 1979 (1, 3). Several processors once packed frozen strawberries but this industry was terminated in the 1960's. Fresh market shipments of 60 to 70 rail cars were said to be shipped daily from each of the major production centers in the 1950's, but actual records are not available. Production was spread throughout the state with major centers near Dayton, Portland, and Humbolt in East, middle, and West Tennessee, respectively.

The industry decline was partly due to lack of labor for weed control and harvest. However, the main problem appeared to be economic as production levels were higher in other regions. As the processing industry declined, the fresh market industry also declined.

Blakemore was the major cultivar produced in the early years of the Tennessee strawberry industry (1). Tennessee Beauty, developed by the Tennessee Agricultural Experiment Station in 1933, rapidly replaced Blakemore (2). Several new strawberry cultivars have been developed in recent years. Eight of the most promising new cultivars, along with Sunrise and Tennessee Beauty, were included in University of Tennessee trials. The tests were conducted at the West Tennessee Experiment Station (WTES) at Jackson and at the Plateau Experiment Station (PES) at Crossville. Results of these trials are reported herein.

Procedure

The 8 selected cultivars tested were Atlas, Fletcher, Garnet, Cardinal, Holiday, Apollo, Titan, and Gala, along with Sunrise and Tennessee Beauty as checks. Plants from commercial nurseries were set in May of 1975. Irrigation was used at each site to improve plant survival and runner development due to the relatively late planting date. Each plot consisted of 10 plants set 2 feet apart in 4 foot rows. Plot design was randomized complete block with four replications. Soil types were Memphis silt loam at WTES, and Hartsells sandy loam at PES.

Cultural practices were those recommended by the Tennessee Agricultural Extension Service (1). Initial fertilization was based on soil tests. Annual fertilization was 30 lbs. of nitrogen at renovation and repeated in August. Weed control was by cultivation and diphenamid. The level matted row was developed to a width of 3 feet.

Records taken in October, 1975 included initial percentage plant survival and ratings of plant vigor and runner development. During the three harvest years (1976-1978) records taken included yields, berry size, and visual ratings of several fruit characteristics.

Results

Plant survival was excellent with counts ranging from 93 to 97 per cent for the 10 cultivars at the end of the first growing season (Table 1). Plant vigor, rated at the same time, was low for Cardinal and Tennessee Beauty;

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Table 1. Plant survival, vigor, and runner production of 10 strawberry cultivars at WTES and PES, 1975.

Cultivar	% survival	Vigor rating ¹	Runner production rating ¹
Atlas	95	4.3	4.4
Fletcher	97	2.6	4.4
Garnet	97	3.3	4.2
Cardinal	97	1.8	4.5
Tennessee Beauty	94	2.2	3.8
Holiday	93	3.4	3.8
Apollo	97	2.8	3.2
Titan	97	3.0	3.6
Sunrise	95	4.0	4.5
Gala	95	4.4	3.9

¹Rating 1 - 5; 1 = poor, 5 = excellent.

adequate for Fletcher, Garnet, Holiday, Apollo, and Titan; and excellent for Atlas, Sunrise, and Gala. Apollo produced few runners; Tennessee Beauty Holiday, Titan, and Gala produced adequate runners; and Atlas, Fletcher, Garnet, Cardinal, and Sunrise produced abundant runners.

Atlas was the most productive cultivar tested with a mean yield (1976-1978) of 14,900 quarts/A. (Table 2). Fletcher, Garnet, Cardinal, Tennessee Beauty, Holiday, and Apollo also yielded well with an average of 13,200

to 11,800 quarts/A. Titan, Sunrise, and Gala produced low yields.

Yields were highest in 1976, the first harvest year. Yields were lowest in 1977 which followed a severe winter. Cardinal was the only cultivar which had different yield patterns at the two locations. At WTES, Cardinal yielded as well as Atlas. At PES, Cardinal was outyielded by all cultivars except Gala and Titan.

Berry size was determined by counting the number of berries per pound. Berry size of most cultivars was smaller at later harvest dates and the number of berries increased from 44 to 95 per pound between the second and eighth harvest dates (Table 3). Atlas, Cardinal, Holiday, Sunrise, and Gala had the fewest berries per pound at the second harvest. Atlas and Titan had the fewest berries per pound at the eighth harvest. These two cultivars retained excellent berry size throughout the season at both locations.

Several evaluations of fruit characteristics were made and the results are shown in Table 4. The fruit of Fletcher and Garnet was too rough to be commercially acceptable. Garnet fruit also had prominent green tips and

Table 2. Average yields of 10 strawberry cultivars at WTES and PES, 1976-1978.

Cultivar	Year			mean
	1976	1977	1978	
	thousands of quarts/acre			
Atlas	19.5 a ¹	12.8 a	12.4 ab	14.9 a
Fletcher	19.8 a	8.7 cd	11.1 ab	13.2 b
Garnet	18.9 ab	9.4 bc	10.9 ab	13.1 b
Cardinal	18.9 ab	8.4 cd	11.5 ab	13.0 b
Tennessee Beauty	16.3 bc	7.8 d	13.8 a	12.6 b
Holiday	16.1 c	9.2 bc	11.2 ab	12.2 b
Apollo	15.4 c	10.1 b	9.8 b	11.8 b
Titan	12.2 d	6.0 e	9.9 b	9.4 c
Sunrise	11.4 d	5.4 e	10.7 ab	9.2 c
Gala	7.1 e	5.1 e	6.1 c	6.1 d
mean	15.6	8.3	10.7	11.5

¹Mean separation within columns by Duncan's multiple range test, 5% level.

Table 3. Number of fruit per pound at second, fifth, and eighth harvests of 10 strawberry cultivars at WTES and PES, 1976-1978.

Cultivar	Harvest		
	Second	Fifth	Eighth
Atlas	31 d ¹	48 d	69 d
Fletcher	58 a	71 bc	113 ab
Garnet	53 ab	49 d	72 d
Cardinal	37 cd	76 bc	113 ab
Tennessee Beauty	47 bc	84 ab	121 a
Holiday	35 d	63 cd	91 bcd
Apollo	53 ab	67 cd	89 cd
Titan	52 ab	47 d	67 d
Sunrise	33 d	93 a	113 ab
Gala	40 cd	70 bc	99 abc
mean	44	67	95

¹Mean separation within columns by Duncan's multiple range test, 5% level.

shoulders which were very undesirable. Cardinal fruit had excellent dark red internal and external color. Atlas fruit had a light internal color and Sunrise fruit had a light external color. Atlas fruit had the most desirable appearance.

Summary and Conclusions

Atlas, Cardinal, Holiday, and Apollo were the outstanding cultivars test-

ed. Atlas performed well at both locations but performed slightly better at PES than at WTES. Yields were high; fruit size and appearance were good, but internal color was light red or pink. Cardinal yielded well and the fruit had excellent color and firmness at WTES. Cardinal yields were low and fruits were too dark, hard, and small to be acceptable at PES. Holiday and Apollo had good yields and fruit characteristics at both locations. Both cultivars were quite acceptable. Apollo is reported to need a pollinator to be productive.

Fletcher, Garnet, and Tennessee Beauty had good yields but less favorable fruit characteristics. Titan, Sunrise, and Gala had low yields but acceptable fruit characteristics.

Literature Cited

1. Bird, J. J. 1956. *Growing Strawberries in Tennessee*. Tenn. Agr. Ext. Ser. Pub. 344, Knoxville, TN.
2. Drain, B. D., G. A. Shuey, and J. J. Bird. 1956. *Tennessee Beauty Strawberry*. Tenn. Agr. Exp. Sta. Circular No. 81, Knoxville, TN.
3. Rutledge, A. D. 1979. *Tennessee Vegetable and Small Fruit Situation*. Tenn. Agr. Ext. Ser. Mimeograph.

Table 4. Fruit characteristics of 10 strawberry cultivars at WTES and PES, 1976-1978.

Cultivar	Characteristic						
	Roughness	Seed	Green tip	Cavity fill	Internal color	External color	Appearance
				rating ¹			
Atlas	4.7	4.7	4.6	4.2	2.8	4.4	4.6
Fletcher	2.8	4.3	4.7	3.9	3.4	4.5	3.1
Garnet	2.8	3.9	3.2	4.1	3.3	4.3	3.1
Cardinal	4.0	3.9	4.6	4.7	5.0	4.7	4.0
Tennessee Beauty	4.2	3.7	4.6	4.2	4.2	4.6	3.6
Holiday	4.3	4.2	4.7	4.3	3.0	4.5	4.3
Apollo	4.4	4.2	4.9	4.2	3.7	4.6	4.4
Titan	4.1	4.2	5.0	4.4	4.1	4.9	4.1
Sunrise	4.8	4.6	5.0	4.2	3.4	3.5	4.0
Gala	4.1	4.0	4.7	3.7	4.2	4.2	4.1

¹Rating 1 - 5; 1 = poor, 5 = excellent.