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Yield and Production Stability of Strawberry Cultivars Grown at the Ohio Agricultural Research and Development Center, Wooster, 1952-1987[1]

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Abstract

Yield data on 33 strawberry cultivars is summarized. The highest yielding cultivars were 'Honeoye,' 'Raritan,' 'Redchief,' and 'Guardian.' Particularly noteworthy for their consistency of production from year-to-year were 'Honeoye,' 'Allstar,' and 'Scott.'

Introduction

The strawberry is an important fruit crop to Ohio. The state grows strawberries on nearly 2,000 acres and ranks 6th to 8th nationally in strawberry production. The majority of Ohio's crop is harvested "pick-your-own."

To assess the yield potential of new strawberry cultivars for northern Ohio, a variety trial has been ongoing at the OARDC, Wooster since 1952. This article describes the trial and summarizes 36 years of yield data.

Materials and Methods

The OARDC is located just south of Wooster, Ohio (40° 47'N latitude) at an elevation of approximately 311 m above sea level. The climate at Wooster is continental in nature, characterized by moderate extremes of temperature and precipitation. Summers are generally warm and humid, although temperatures rarely exceed 90°F (32°C). Winters are cold with an average of about 6 days of sub-zero weather. Temperatures below -20°F (-29°C) occur infrequently. Plant dormancy is usually broken in early April, and the harvest season begins in late May or early June.

Each year, 12 to 14 strawberry clones were planted on a silt loam soil with moderate to good drainage. The experimental layout consisted of 3 to 6 replications of each clone in a randomized block design. Twelve foot (3.7 m) long plots were established by setting dormant plants 24 inches (61 cm) apart in the row, with 4 feet (1.2 m) between rows. The plants were deblossomed and allowed to form matted rows 24 inches (61 cm) wide. The trial was maintained according to Ohio State University Extension Service recommendations (5). Plots were harvested for only 1 season, with fruit being picked and weighed twice a week.

Results and Discussion

'Honeoye' had the highest average yield, and was a very consistent producer (Table 1). It had the lowest coefficient of variation of yield among the 33 cultivars listed. 'Honeoye' has been the top yielder in other yield trials throughout the Great Lakes region as well (6). The major weakness of 'Honeoye' appears to be its susceptibility to red stele root rot caused by *Phytopthora fragariae* Hickman (6).

'Raritan,' 'Redchief,' and 'Guardian' were also high yielders. 'Raritan' produces very attractive fruit, but this cultivar's susceptibility to red stele and verticillium wilt caused by *Verticillium albo-atrum* Reinke & Berth has made Ohio growers cautious about planting it—especially now that resist-

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Table 1. Years tested, average yield, yield rank, and variability of yield for strawberry cultivars grown at OARDC, Wooster, Ohio 1952-1987.

Cultivar	Years tested	Avg. yield (lbs/acre)	Rank	Coefficient of variation[z]
Allstar	8	17,316	7	16
Armore	9	11,633	23	35
Catskill	8	14,796	14	20
Cyclone	6	17,941	5	24
Darrow	4	16,610	9	32
Delite	7	17,853	6	26
Earlidawn	15	10,254	28	28
Earliglow	9	16,884	8	36
Empire	6	8,868	29	17
Erie	6	13,569	18	41
Fairland	7	7,140	32	17
Fletcher	4	12,393	22	35
Frontenac	6	7,980	31	59
Fulton	5	13,319	19	33
Guardian	15	18,738	4	26
Honeoye	5	22,232	1	14
Jerseybelle	11	12,404	21	34
Marlate	4	13,239	20	20
Midway	20	15,766	12	22
Plentiful	6	13,883	16	25
Pocahontas	7	15,871	11	27
Premier	18	10,576	26	34
Raritan	11	21,153	2	28
Redchief	14	20,316	3	29
Redcrop	4	6,325	33	19
Robinson	26	13,588	17	46
Scott	7	16,228	10	18
Sparkle	9	11,106	25	52
Stelemaster	4	10,300	27	49
Sunrise	5	11,318	24	31
Surecrop	16	14,405	15	32
Vermilion	6	8,450	30	26
Vesper	8	15,347	13	23

[z]Coefficient of variation = (100) standard deviation/mean.

ant cultivars are available. 'Redchief' has been grown in Ohio for over 20 years, and continues to be a popular cultivar. It has good overall performance and is resistant to red stele. 'Guardian' gained popularity in Ohio primarily because of its large fruit size and resistance to major disease problems, but it is now being replaced by cultivars that produce more attractive fruit.

'Allstar' and 'Scott' were among the top 10 producers and had a coefficient of variation approaching that of 'Honeoye.' 'Allstar' is a relatively new red stele resistant cultivar (3) that produces large, attractive berries. It has become the principal replacement for 'Guardian' in Ohio. 'Scott,' introduced in 1980 (2), has many fine qualities, but may not become a major cultivar in Ohio because of the general perception that it lacks flavor.

'Earliglow,' 'Delite,' 'Cyclone,' and 'Darrow' were also among the top 10 producers. In this group, only 'Earliglow' has become commercially important in Ohio. 'Earliglow' is presently the standard early ripening cultivar. 'Delite,' a late ripening cultivar, has not been extensively planted in Ohio, apparently because of growers' preference for early and mid-season cultivars. Although 'Cyclone' had high yields during the period it was tested (1968-74), its fruit was generally soft, and therefore was not recommended as a suitable cultivar. The tendency of 'Darrow' to produce relatively few runners has limited its use for matted row culture, the predominate cultural system used in Ohio.

Three relatively old cultivars, 'Empire,' 'Fairland,' and 'Redcrop' were among the steadiest producers, but their average yields were also among the lowest. Two of the lower yielding cultivars in our trial, 'Sparkle' and 'Sunrise,' have been important cultivars in other regions of the U.S. (7). 'Sparkle' is a productive cultivar in the Northeast. It is noted for its high flavor and good freezing quality. 'Sunrise' was an important early-season cultivar in the south central states during the 1970's.

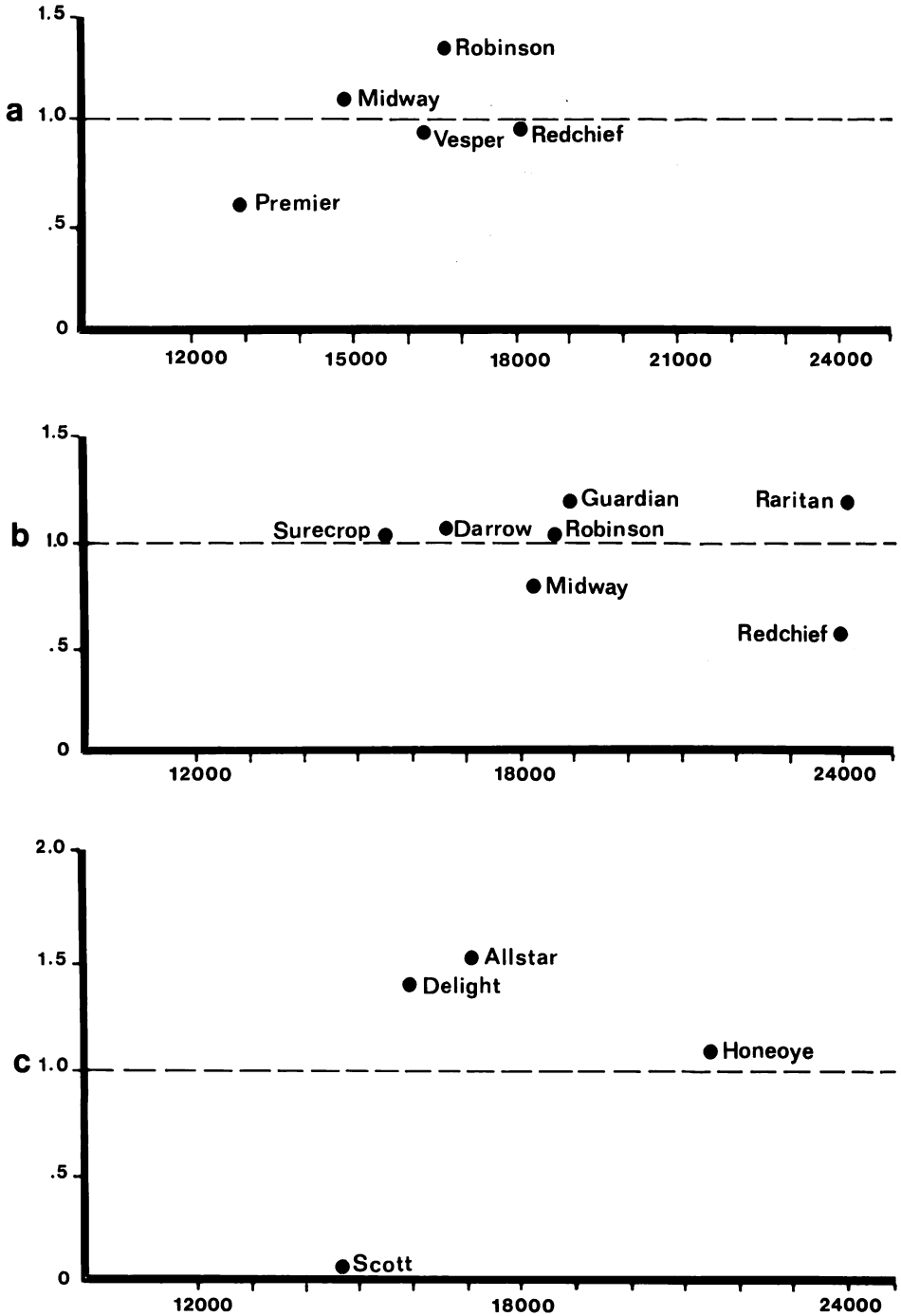

Figure 1. Cultivar regression coefficients plotted against cultivar mean yields (lbs/acre), 1965-68 (a); 1972-75 (b); 1979-82 (c).

Cultivars in our trials whose average yield may have been lowered by the use of virus infected plants during the early 1950's include the following: 'Armore,' 'Catskill,' 'Empire,' 'Erie,' 'Fairland,' 'Premier,' 'Redcrop,' 'Robinson,' 'Sparkle,' 'Stelemaster,' and 'Vermilion.'

The high coefficients of variation of 'Robinson,' 'Sparkle,' and 'Stelemaster' are probably due in part to the variability induced by the use of virus infected plants in the early 1950's and "virus free" plants in the late 1950's and early 1960's.

Taking into account the probable effect of plant quality (virus status) on the cultivars tested, there does not appear to be a trend in the newer cultivars toward more consistent production. A lack of progress in this area by plant breeders is understandable, considering the time and cost needed to adequately evaluate yield stability.

A slightly different picture of production stability was obtained when yield data from 3 groups of years were examined using the analysis of Finlay and Wilkinson (1). This analysis, which measures a genotype's relative response to environmental variability, has been used previously on strawberry data by Hancock (4). It requires that the cultivars in the analysis share a common evaluation period. Since the OARDC strawberry variety trial was not set up specifically with stability analysis as an objective, there are only a few groups of years that, when analyzed, provide meaningful comparisons. The dashed line in Figures 1a, 1b, and 1c indicates average stability (regression coefficient of 1.0). Cultivars below the line were more consistent producers than those above the line.

'Redchief' stands out as being a consistently high yielder in comparison to other cultivars grown during 1965-68 and 1972-75 (Figs. 1a and 1b). 'Honeoye' stands out as having a much higher mean yield than the other cultivars grown during 1979-82 (Fig. 1c). Its yield stability, however, was about average relative to the other cultivars in the analysis. 'Scott' was a very consistent yielder during the 1979-82 period (Fig. 1c), but its mean yield was lower than the other cultivars it was compared to.

The yield information generated by the OARDC strawberry variety trial should be useful to those making cultivar recommendations for areas with an environment similar to Wooster. It should also be useful for strawberry breeders who are interested in developing cultivars for the Midwest that are consistently high yielding.

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