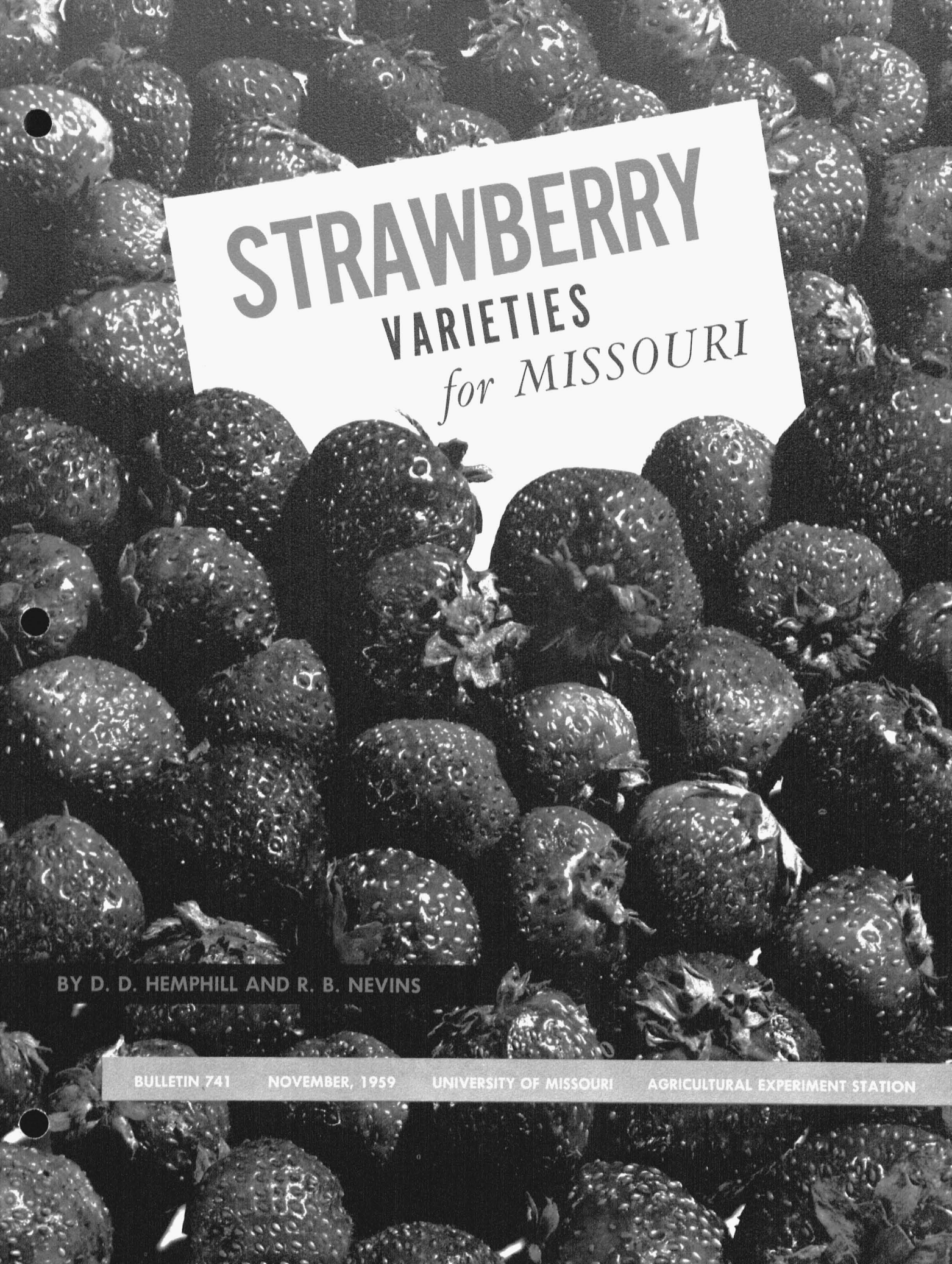

STRAWBERRY VARIETIES *for* MISSOURI

BY D. D. HEMPHILL AND R. B. NEVINS

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BY D. D. HEMPHILL AND R. B. NEVINS

The list of strawberry varieties most desirable in a given region must be constantly revised because of the continuing introduction of new and better varieties. Plant breeders have been giving increasing attention to this crop. Seven new strawberry varieties have been added to the Missouri trials in the three years since the last publication of results.[1] Many of those in previous trials have since been abandoned as unsuitable for Missouri conditions, or because they are surpassed by newer varieties.

The catalog of any large strawberry nursery may list as many as three dozen kinds of strawberries, all of which are described in the most glowing terms. The question arises, "Why is it necessary to have so many varieties if they're all so good?" There are several reasons for this plethora of strawberries. The principal factor is that any strawberry variety is rather demanding in its environmental requirements and will perform best in only a limited region. Such factors as the length of day, extremes of temperature in both summer and winter, length of chilling, amount of moisture, and soil type all influence the success of a given variety. One must consider also the effect of these factors on the disease organisms to which the particular variety is susceptible. In many instances a strawberry has been successful in one region, but has failed in another more conducive to development of leaf diseases. Finally, the kind of strawberry grown will depend on its use—whether the objective is fresh fruit for the home, shipping, freezing or preserving.

One word of warning if you are buying strawberry plants: be sure they are free of virus and root fungus diseases. It is better to buy new plants from an inspected and certified nursery rather than grow your own, or get them from a well meaning neighbor. A great many queries about strawberry failures are received by the University, and a high proportion of these are caused by the grower's using poor plants from previously established beds in the neighborhood. Besides the danger of disease, often seedling plants become established in an old bed, and these will not perform as expected. All of the better nurseries are subject to some form of state inspection and follow rigid procedures to ensure that their plants remain free of nematodes, virus, and root rot diseases. Plants which are not certified may not only give the purchaser disappointing (if any) results, but may also infect a locale with red stele root disease or nematodes which are likely to spread to other growers. It is illegal in Missouri to sell strawberry plants which have not been inspected and certified.

Results given in this bulletin have been obtained in variety trials conducted during 1957, 1958 and 1959 on the Horticulture Farm at New Franklin, in central Missouri. Each variety was represented by a 25-foot matted row, arranged randomly in four blocks. The soil was Menfro Silt Loam, which was limed and fertilized to give a high level of phosphorus and medium fertility in other major elements. Dieldrin was applied before planting to control soil insects. The plants were set at three-foot intervals, in rows four feet apart. The plots were irrigated as necessary.

In addition to yields (computed as 24-

[1]Hemphill, D. D. and R. B. Nevins, 1957. *Performance of Strawberry Varieties in Missouri.* Mo. Agr. Exp. Sta. Bul. 690.

quart crates per acre), each variety was rated for its first three or four pickings as to berry size, uniformity, neck, firmness, flavor, internal and external color and lack of a hollow core.

The tables show that the performance of any given variety varies from year to year, so that it is well to consider the record over several years in deciding what to plant. The summary of ratings in Table V gives a reliable estimate of the average comparative performance of these varieties under Missouri conditions.

DISCUSSION OF VARIETIES

Surecrop appears to be an excellent variety for Missouri. It is a high yielding, attractive berry and grows vigorously. It shows some leaf diseases, but is not nearly as suceptible as Blakemore or Armore. It is a recent red stele resistant introduction of the USDA.

Dixieland is another recent USDA introduction. It is very firm and has an attractive medium-red berry. The berry is decidedly necked, like Blakemore, which makes it attractive to freezers, but it lacks Blakemore's biggest failing—the loss of berry size after the first few pickings. It is fairly vigorous, but will show some leaf scorch.

Sparkle is resistant to the most common strain of red stele. The fruit is very attractive, shiny, but somewhat darker and rougher than Dixieland. The yield is essentially the same. It is very vigorous, forming a dense, attractive row, with dark green foliage. Sparkle has relatively little trouble with leaf diseases. It has also been sold as *Paymaster.*

Pocahontas, another recent USDA introduction, has been planted with some success in the southeastern states in the fall for harvesting the following spring. In some years, it has an extremely heavy infection of leaf scorch.

Tennessee Beauty shows some susceptibility to leaf diseases. The berries tend to have a green tip but are above average in firmness and processing quality.

Fig. 1—Variety trial plot. In these beds, which will fruit in 1960, each variety is represented by five 10-foot plots.

Fig. 2—Seedling trials. Each of these plants was grown from seed, and is potentially a new variety. About 6000 seedlings per year are grown and evaluated in the Missouri strawberry breeding program.

Fig. 3—Some varieties are poor runner producers. Under our conditions, Jerseybelle, above, has difficulty filling a row.

Fig. 4—On the other hand, Surecrop is a prolific runner maker.

Catskill forms a medium-heavy row, with light to moderate incidence of foliage diseases.

Dunlap is a very old variety, having been grown since the late 1800's. Although cold hardy and fairly vigorous, it is susceptible to leaf diseases; and in comparison with any of the foregoing varieties the fruit is soft, small, rough, and unattractive.

Earlidawn and *Stelemaster* are also new USDA introductions, with the latter having multiple red stele resistance. The fruit of both varieties tends to be somewhat small, but Stelemaster is the more attractive of the two. Both are likely to have heavy infections of various leaf diseases. During the past season, Stelemaster was by far the most susceptible to mildew of all varieties tested. Earlidawn is, as the name implies, one of our earliest varieties.

Blakemore has for many years been the leading variety in the midwest. However, it has had several disadvantages which are overcome in some of the newer varieties, particularly its rapid loss of size as the season progresses. It is excellent for preserving and does better

Fig. 5—Armore, a variety originated by Prof. Swartwout of the Missouri College of Agriculture, makes a heavy row.

than most varieties under the conditions of neglect found in many home plantings. It forms a very heavy row—too heavy in fact—and is subject to foliage diseases.

Armore was introduced in 1950 by the University of Missouri, as a result of a strawberry breeding project by H. G. Swartwout. It is a seedling from two parents well adapted to Missouri conditions, Blakemore and Aroma. Its yield is about the same as Blakemore's, but the fruit is appreciably larger and has a more desirable flavor for fresh use. Disadvantages are that it is subject to foliage diseases in wet years and the fruit does not hold up as well as Blakemore for shipping. It is a late-season berry.

Midland is an older variety with rather high dessert quality. It is usually not overly vigorous as a plant maker and yields are consequently low.

Robinson is a variety noted for its extremely large fruit; however, the fruit is also very rough in shape. It is the leading variety in Michigan, but Missouri is out of Robinson's best range.

Redglow is a USDA introduction that possesses resistance to one strain of red stele. It is fairly vigorous, but quite susceptible to foliage diseases. The fruit is not large but is otherwise very attractive.

Vermillion, an Illinois introduction, was one of the first red stele resistant varieties. It is susceptible to leaf scorch but has attractive fruit.

Although *Starkrimson* has shown itself quite resistant to foliage diseases, it has been a shy runner maker in our trials. Fruit quality is above average.

Mo. 154, a sister seedling of Armore, has shown some promise for use as a home berry, but it has the same drawbacks as Armore without the compensation of large berries.

Premier is an older variety, not overly vigorous. It has little to recommend it in comparison with the foregoing varieties.

The variety that is the latest to fruit in our trials has been *Redstar,* and it may be useful in prolonging the season, particularly in the home garden. It is quite vigorous and comparatively free of foliage diseases. However, the yield is probably too low for most commercial operations.

Two varieties should be mentioned for their outstanding fruit, although their yields are comparatively low. Both might well find a place in either a home garden or in a commercial operation for a high quality trade. The standard in high dessert quality is set by *Fairfax,* which characteristically is large, fairly firm, and tends to be a dark red color. Plants of this variety are vigorous and fairly free of foliage diseases but are generally light runner makers. *Jerseybelle* probably has the most impressive fruit in appearance of any variety—extremely large (sometimes only 18 berries per quart), glossy, with prominent seeds. The flavor is acceptable but the texture tends toward mushiness. It makes very few runners under our conditions, but yields might be raised by setting the plants at closer intervals with both these latter varieties. Jerseybelle is a late berry and is prone to show some foliage diseases.

The other varieties shown in the tables do not seem to be sufficiently well adapted to this region to be worthwhile.

Everbearing varieties. A number of varieties are available which will produce some fruit throughout the summer. Unfortunately, Missouri summers are too hot for these varieties to be at their best. Our trials have been disappointing. You should not expect to match the performance claimed for everbearers in regions with cooler summers. Some of the better varieties are *Redrich,* which has an excellent dessert quality, but low production here; *Gem* and *Superfection,* with lower quality but better production. *Ozark Beauty,* which originated in Arkansas, is intermediate between the above varieties in both quality and production. Special cultural practices are needed to get the best performance from everbearers.

TABLE III

STRAWBERRY VARIETY PERFORMANCE - 1959
(Second Fruiting Season)

Variety	Yield Crates per Acre	Berries per Qt. (3d harvest)	Uniformity	Firmness	Flavor	Color		Lack of Core
						Ext.	Int.	
Surecrop	458	81	4*	4	3	3	3	2
Tenn. Beauty	428	93	3	4	3	4	4	2
Sparkle	424	81	2	4	4	3	3	3
Catskill	407	69	2	3	3	3	3	2
Blakemore	393	108	3	4	3	4	3	3
Pocahontas	361	71	2	3	3	3	3	3
Armore	338	48	2	3	4	3	2	4
Mo. 154	326	102	3	3	4	4	3	3
Dixieland	326	92	4	5	3	4	3	2
Starkrimson	313	107	4	4	3	3	3	3
Dunlap	274	120	2	2	2	2	3	4
Stelemaster	268	116	4	4	3	4	3	3
Robinson	218	69	2	3	3	3	2	2
Redstar	213	47	2	4	3	3	3	3
Redglow	203	93	4	4	4	4	4	2
Earlidawn	201	101	3	3	3	3	4	3
Premier	162	120	3	3	3	3	3	3
Fairfax	155	72	2	4	5	3	3	3
Jerseybelle	134	63	4	4	3	4	4	2
		Av. 87						

* 1-unacceptable 2-inferior 3-average 4-excellent 5-superior

TABLE IV

STRAWBERRY VARIETY PERFORMANCE - 1959
(First Fruiting Season)

Variety	Yield Crates per Acre	Berries per Qt. (3d harvest)	Uniformity	Firmness	Flavor	Color		Lack of Core
						Ext.	Int.	
Stelemaster	416	86	4*	4	3	4	4	3
Dixieland	385	72	3	5	3	4	3	3
Tenn. Beauty	377	87	4	4	3	4	4	2
Surecrop	375	48	4	5	3	4	3	2
Sparkle	318	92	3	3	3	4	3	3
Starkrimson	309	117	4	3	4	4	3	4
Blakemore	282	98	3	4	3	3	3	2
Armore	279	62	2	4	3	2	3	3
Vermillion	272	66	4	3	4	4	3	4
Pocahontas	266	72	3	3	3	3	3	4
Earlidawn	238	107	3	3	3	4	4	3
Midland	235	99	3	3	4	3	3	2
Redglow	185	122	4	4	4	4	4	2
Robinson	178	38	2	2	3	3	3	3
Premier	159	111	3	2	3	2	3	3
Mo. 154	150	117	3	3	4	3	3	4
Jerseybelle	149	60	4	4	3	4	3	2
Fairfax	147	51	3	5	5	3	2	4
Dunlap	82	126	1	1	2	1	5	5
		Av. 86						

* 1-unacceptable 2-inferior 3-average 4-excellent 5-superior

TABLE I

STRAWBERRY VARIETY PERFORMANCE - 1957

Variety	Yield Crates per Acre	Berries per Qt. (3d harvest)	Uniformity	Firmness	Flavor	Color		Lack of Core
						Ext.	Int.	
Midland	470	67	3*	4	4	4	4	3
Earlidawn	453	79	3	4	3	4	3	3
Dixieland	416	74	4	5	3	4	3	5
Pocahontas	405	68	3	4	3	3	3	3
Robinson	341	58	2	3	3	3	3	3
Sparkle	323	75	3	4	3	4	3	3
Tenn. Beauty	322	75	3	4	3	3	3	3
Redglow	319	77	4	4	3	4	3	4
Stelemaster	310	84	4	4	2	4	3	3
Vermillion	282	72	3	3	3	4	3	4
Dunlap	275	92	2	1	2	2	3	3
Armore	267	56	3	3	4	3	2	3
Blakemore	238	103	3	4	3	3	3	3
Catskill	235	72	3	3	3	4	2	4
Premier	229	150	2	2	3	3	3	2
Starkrimson	226	72	3	4	3	4	4	4
Redcrop	208		3	2	3	2	3	4
Fairpeake	196		2	4	4	4	4	4
Fairfax	192	65	2	4	4	4	3	4
Bellmar	185		3	3	3	3	4	4
Mo. 154	175	114	3	3	5	4	2	4
Redstar	171							
Ambrosia	122		3	3	3	3	3	
Empire	122		4	3	3	3	3	4
Big Joe	70							
Albritton	50		3	3	3	3	3	3
		Av. 81						

* 1-unacceptable 2-inferior 3-average 4-excellent 5-superior

TABLE II

STRAWBERRY VARIETY PERFORMANCE - 1958

Variety	Yield Crates per Acre	Berries per Qt. (3d harvest)	Uniformity	Firmness	Flavor	Color		Lack of Core
						Ext.	Int.	
Pocahontas	491	42	4*	4	3	4	4	3
Dixieland	490	45	3	5	3	4	3	4
Surecrop	481	56	5	4	3	4	3	3
Sparkle	443	75	3	4	4	4	3	4
Dunlap	388	51	3	2	3	3	4	4
Stelemaster	364	59	5	4	3	4	2	3
Robinson	361	40	2	3	3	3	3	3
Redglow	348	68	5	4	4	5	5	2
Tenn. Beauty	345	64	3	4	3	3	3	2
Catskill	327	63	2	2	3	4	3	4
Mo. 154	323	65	3	3	4	4	3	5
Blakemore	312	76	4	4	3	3	3	4
Earlidawn	300	61	3	3	3	4	4	2
Armore	297	53	2	3	4	3	3	3
Premier	248	76	2	2	3	2	2	4
Starkrimson	215	81	4	4	3	3	4	3
Jerseybelle	173	44	4	4	3	4	3	2
Redstar	167	70	4	4	3	4	3	3
Fairfax	145	78	4	5	5	4	3	3
		Av. 61						

* 1-unacceptable 2-inferior 3-average 4-excellent 5-superior

TABLE V

SUMMARY OF STRAWBERRY VARIETY PERFORMANCE - 1956-1959

Variety	Times Fruited	Yield Crates per Acre	Berries per Qt. (3d harvest)	Uniformity	Firmness	Flavor	Color Ext.	Color Int.	Lack of Core
Surecrop	3	438	62	4*	4	3	4	3	2
Dixieland	5	372	72	4	5	3	4	3	3+
Sparkle	5	361	80	3	4	3	4	3	3
Pocahontas	5	345	66	3	4	3	3	3	3
Tenn. Beauty	5	345	80	3	4	3	3+	4	2
Catskill	3	323	68	2	3	3	4	3	4
Dunlap	5	319	95	2	2	2	2	4	4
Earlidawn	4	298	87	3	3	3	4	4	3
Stelemaster	5	292	95	4	4	3	4	3	3
Blakemore	5	290	100	3	4	3	3	3	3
Armore	5	285	57	2	3	4	3	3	3
Midland	3	282	83	3	3	4	3+	4	2+
Robinson	5	266	53	2	3	3	3	3	3
Redglow	4	264	90	4	4	4	4	3	2
Vermillion	3	250	71	4	3	4	4	3	4
Starkrimson	5	235	87	4	4	3	3+	4	3+
Mo. 154	5	230	116	3	3	4	4	3	4
Premier	5	212	108	3	2	3	2+	3	3
Redcrop	1	208		3	2	3	2	3	4
Redstar	3	184	58	3	4	3	3+	3	3
Bellmar	2	170	102	3	3	3	3	3+	4
Jerseybelle	3	152	56	4	4	3	4	3	2
Fairfax	5	150	67	3	4	5	3+	3	3
Fairpeake	2	132	75	3	4+	4+	4	3+	4
Empire	2	123	79	4	3	3	3	3	4
Ambrosia	2	98	69	2	2+	2+	3	2+	
Big Joe	2	86	172	3	2	3		3	
Albritton	2	56	84	3+	3+	3	3	3+	3
		Av. 242	Av. 80						

* 1-unacceptable 2-inferior 3-average 4-excellent 5-superior

RED STELE RESISTANCE

Surecrop and Stelemaster are the only varieties yet introduced which have resistance to more than one strain of the red stele root disease fungus. This is a disease which has threatened the strawberry industry in several areas since it was first discovered in the 1920's. One of the big advantages of using certified plants is that the dissemination of this malady is decreased. Once the disease is established in a field, there is no practical method of eliminating it and the only solution is to use resistant varieties. The presence of several strains of the fungus is a complicating factor. Although a number of varieties resistant to the most common strain are known, Surecrop and Stelemaster also resist two other strains. Varieties tested with single-strain resistance include Sparkle, Vermillion, Redglow and Redcrop. As yet, Missouri is fortunate in having red stele in only a few locales, so that this is not a critical factor with most growers.

This bulletin reports on Department of Horticulture Project 291, "Small Fruits."