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Strawberry Cultivar Testing in Canada's Maritime Provinces[4]

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Co-operative testing of strawberry cultivars at the Agriculture Canada Research Stations at Kentville, Nova Scotia, Fredericton, New Brunswick and Charlottetown, Prince Edward Island, was first undertaken in 1967 and reported in Fruit Varieties and Horticultural Digest, V. 25, No. 4, 1971. A new group of cultivars became available for testing in 1970. These cultivars and their place of origin were: 'Bounty' and 'S68-108' (Tioga x Guardsman S[1]), Kentville, N. S.; 'Veestar' and 'Vibrant', 'Vineland', Ontario; 'Redcoat', Ottawa; 'Raritan', New Jersey; 'Guardian' and 'Redchief', Maryland. Plants of the cultivar 'Guardian' were not available for planting at Kentville in 1970. 'S68-108' was placed in the Kentville and the Charlottetown test plots in 1972 and 1973 because it had performed well in observational type test plots at Kentville.

Plants for all test plots were grown in propagation beds at Kentville. The cultivars were planted at the 3 locations in 4 randomized complete blocks of 10 plants per plot each spaced 2 feet apart in rows 4½ feet apart. The plants formed matted rows which were maintained at a 2-foot width. All plots were plowed under after producing one crop of fruit. Standard fertility and pesticide programs were used at all locations. Fruit was considered unmarketable when it was malformed, damaged by rot or mechanically damaged.

Fruit size was calculated by randomely selecting and weighing 25 fruits from each replicate on each picking date. Fruit size was indicated in this report by the percentage of the marketable crop composed of fruit weighing more than 7 g. The 7 g level was chosen because the minimum fruit size to meet the Canada No. 1 Grade is 1.9 cm in diameter (1). A strawberry fruit of this diameter weighs approximately 7 g.

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Table 1. Marketable yield of strawberries in pounds per acre, Charlottetown, P. E. I.

Cultivar	1971	% of total crop	1973	% of total crop	1974	% of total crop
Bounty	16613 b[1]	97	15633 a	95	15682 a	97
Guardian	12307 d	95	11132 bcd	94	—	—
Raritan	16359 b	96	10648 cd	95	7780 b	92
Redchief	11205 d	95	13842 a	94	—	—
Redcoat	14665 c	97	8809 d	92	7308 b	89
Veestar	19554 a	96	11229 bcd	94	6667 b	87
Vibrant	17424 b	97	12003 bc	97	9498 b	91
S68-108	—	—	13262 ab	93	13576 a	96

[1]Within a column, values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

Results

The yield data (Tables 1-3 were analysed by analysis of variance. The analysis showed significant interactions between cultivars and locations and cultivars and years. This suggested that variety means over locations and years are not meaningful and consequently results are presented for each location. 'Redchief' and 'Guardian' were not fruited in 1974 because their fruit was found to have commercially unacceptable appearance in the earlier years. These cultivars, which were developed in Maryland, did not respond favorably to more northern growing conditions.

Charlottetown. Yields were generally lower and fluctuated more between years than at the other two locations (Tables 1-3). Plants in the test plots were severely damaged during the winter of 1971-72 due to a lack of snow cover, low temperatures and strong winds. Yields recorded in that year (1972) ranged from 1,355 lb/acre for 'Raritan' to 4,066 for 'Vibrant' with none of the cultivars possessing an acceptable tolerance level to this degree of stress. Charlottetown also reported some winter kill from the 1973-74 winter, which may account for the rather low 1974 yields (Table 1). The cultivars 'Vibrant' and 'Bounty' were more consistent in yields than the other cultivars. Two years of data from 'S68-108' suggested that it also might be a good performer.

'Redchief' produced the smallest fruit and 'S68-108' the largest (Table 4).

The season of ripening at Charlottetown is later than at the other locations by approximately 7-10 days. The order of ripening was similar to the other locations (Table 5).

Fredericton. Yield differences of some cultivars were as great between years as between cultivars within a year (Table 2). 'Vibrant' and 'Veestar' were the most consistent performers. 'Vestar' and 'Redchief' produced the smallest fruit, and 'S68-108' the largest. Fruit size was smaller in 1971 than in other years (Table 4). The season of ripening pattern was similar to the other locations (Table 5).

Kentville. Between year yield differences were less than those at the other locations and in gneral yields were higher. 'Bounty' yields were consistently high (Table 3). 'Redchief' produced the smallest fruit, and 'S68-108' the largest (Table 4). Fruit size was smaller in 1971 than in '73 and '74. The season of ripening pattern was similar to the other two locations (Table 5).

Discussion

The data show that 'Bounty' consistently produced good crops at Kent-

ville which was as expected since it was developed there. 'Bounty' also performed well at Charlottetown but did not do as well at Fredericton. 'Raritan', a New Jersey cultivar, appeared to be adaptable because in most years it performed well in all test locations. 'Redcoat', the most widely planted cultivar in eastern Canada, was not outstanding with its yield potential being consistently less than that of either 'Bounty' or 'Raritan'. 'Veestar' and 'Vibrant' performed moderately well at all locations. 'S68-108' appeared to have good potential as a new cultivar for the region.

Cultivar fruit size was fairly consistent for the 3 locations but varied from year to year (Table 4). The availability of moisture to the plant and the ambient temperature greatly influence fruit size. Webb (4) suggested year to year fruit size differences may also be due to reduced branching of inflorescences during the flowering initiation stage. He also points out that, during the fruiting season, flowers of certain ranks fail to form either through some defect of development or because they emerge when pollination conditions are poor.

It was of interest to note that in spite of rather small fruit size 'Bounty' produced high yields. This lends support to the statement that the total crop is determined mainly by the number of fruits produced and not by fruit size (2, 3).

The percent of the crop that was marketable (Tables 1-3) was consis-

Table 2. Marketable yield of strawberries in pounds per acre, Fredericton, N. B.

Cultivar	1971	% of total crop	1972	% of total crop	1973	% of total crop	1974	% of total crop
Bounty	14375 b[1]	98	9535 c	99	14472 a	95	8470 b	94
Guardian	9632 d	89	10358 c	97	9874 b	96	—	—
Raritan	18586 a	95	13552 ab	98	13891 a	98	9172 b	94
Redchief	15343 b	90	16166 a	98	10358 b	88	—	—
Redcoat	9051 d	84	13891 ab	95	15778 a	92	9801 ab	92
Veestar	14907 b	92	15294 ab	98	10648 b	94	10188 ab	94
Vibrant	12148 c	86	13262 b	97	14810 a	95	11483 a	94
S68-108	—	—	14472 ab	95	—	—	8627 b	93

[1]Within a column, values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

Table 3. Marketable yield of strawberries in pounds per acre, Kentville, N. S.

Cultivar	1971	% of total crop	1972	% of total crop	1973	% of total crop	1974	% of total crop
Bounty	23135 a[1]	94	20764 a	90	22022 a	96	22642 a	95
Guardian	—	—	15101 de	91	18160 c	92	—	—
Raritan	22651 a	93	18440 ab	91	18465 bc	94	17850 b	96
Redchief	19312 ab	92	12826 e	87	16708 cd	92	—	—
Redcoat	15149 c	84	17569 bcd	88	18382 bc	92	16640 b	90
Veestar	16698 bc	88	18198 abc	92	16224 cd	94	16712 b	95
Vibrant	17714 bc	92	17618 bcd	93	14462 d	95	18837 b	94
S68-108	—	—	—	—	19917 ab	95	21441 b	95

[1]Within a column, values followed by the same letter are not significantly different at the 5% level according to Duncan's Multiple Range Test.

Table 4. Fruit size as expressed by per cent of the marketable crop weighing more than 7 g per fruit.

Cultivar	Charlottetown 1971	1973	1974	Avg.	Fredericton 1971	1972	1973	1974	Avg.	Kentville 1971	1972	1973	1974	Avg.
Bounty	49	56	50	52	49	89	76	83	74	41	49	73	78	60
Guardian	95	80	—	88	52	85	90	—	76	—	82	83	—	83
Raritan	66	75	85	75	50	92	87	90	80	62	62	78	82	71
Redchief	42	58	—	50	52	77	86	—	72	50	54	62	—	55
Redcoat	78	100	77	85	51	81	88	100	80	61	59	74	89	71
Veestar	69	62	67	66	28	78	85	96	72	53	61	62	86	66
Vibrant	92	90	70	84	77	74	86	86	81	64	85	68	89	77
S68-108	—	80	100	90	—	94	—	95	94	—	—	85	94	90

Table 5. Per cent[1] of strawberry crop picked per week at Charlottetown, Fredericton and Kentville.

Cultivar	1st week C	F	K	2nd week C	F	K	3rd week C	F	K	4th week C	F	K
Bounty	—	—	1	15	16	37	47	45	45	38	39	17
Guardian	5	4	14	53	58	63	33	31	21	9	7	2
Raritan	14	10	29	38	56	44	34	28	19	14	6	8
Redchief	17	13	30	58	59	50	20	22	16	5	6	4
Redcoat	28	8	46	44	59	41	22	26	12	6	7	1
Veestar	39	32	61	41	54	32	16	14	6	4	—	1
Vibrant	29	16	52	52	66	41	15	18	6	4	—	1
S68-108	—	—	7	23	12	46	56	43	35	21	45	12

[1]Average of all years fruited.

tent between locations and years. 'Redcoat' had the lowest percentage of marketable fruit and this is due in part to its susceptibility to fruit rots. In wet seasons its yields may be greatly reduced.

The relative season of ripening of the cultivars did not differ greatly at the different locations (Table 5). The actual dates of ripening were similar for Kentville and Fredericton with early cultivars ripe during the last week of June at these locations. The same cutivars were a week later at Charlottetown with late maturing cultivars producing fruit until August 8.

Conclusion

The results from this evaluation show the importance of conducting cultivar trials within each production area. The significant genotype-environmental interaction implies that one testing station within the Maritime Provinces cannot evaluate new cultivars for production in areas as widely separated in terms of geography and climate as Kentville, Charlottetown and Fredericton. Moreover, the genotype-environment interaction should be considered in the development of new cultivars for the region. The data also showed that there are cultivars available to the various regions that will out-perform 'Redcoat' which in the past has been recommended for general planting.

DESCRIPTION OF CULTIVARS:

Bounty (Jerseybelle x Senga Sengana) —late—

Fruit: medium size, skin medium red, flesh medium red, medium firm, tender, moderately juicy, very good fla-

vor. Hulls easily—suitable for fresh fruit and for processing.

Plant: runners freely, vigorous, productive, susceptible to Verticillium wilt and red stele, foliage resistant to leaf spot, susceptible to leaf scorch, somewhat resistant to Botrytis fruit rot. Introduced 1972 by Agriculture Canada Research Station, Kentville, N. S.

Guardian (NC1768 x Surecrop)—midseason—

Fruit: large; primary fruits irregular conic shape with a rather rough outline; secondary and later fruits more symmetrical; skin light red, glossy, flesh firm. Seedy in appearance, hull coarse and unattractive.

Plant: moderately vigorous, resistant to 5 races of red stele root rot, susceptible to green petal virus disease. Introduced in 1969 by Md. Agr. Exp. Sta. and Crops Res. Div. U.S.D.A.

Raritan (Redglow x Jerseybelle)—midseason—

Fruit: large, skin light red, bright, attractive, flesh light red, firm, good flavor. Suitable for fresh market, but unsuitable for freezing.

Plant: vigorous, somewhat sparse runnering, susceptible to Verticillium wilt and red stele; foliage susceptible to leaf spot and leaf scorch. Introduced in 1968 by the Department of Horticulture of the New Jersey State University, New Brunswick, N. J.

Redchief (N. C. 1768 x Surecrop)—midseason—

Fruit: small to medium, uniform, cone shape, unattractive, skin medium red, flesh medium red, medium firm, average quality.

Plant: moderately vigorous, tolerant to 5 races of red stele root rot, susceptible to 'green petal' virus disease. Introduced in 1968 by Md. Agr. Exp. Sta. and Crops Res. Div. U.S.D.A.

Redcoat (Sparkle x Valentine)—midseason—

Fruit: medium to large, attractive, maintains size well, skin medium red, flesh firm, light red, quality fair. Suitable for fresh market, but unsuitable for processing.

Plant: very productive, susceptible to Verticillium wilt and red stele; flowers and fruit susceptable to Botrytis fruit rot. Introduced in 1957 by Agriculture Canada, Ottawa.

Veestar (Valentine x Sparkle)—early—

Fruit: medium size, skin medium red, bright; flesh light to medium red, moderately firm, good flavor, good for fresh fruit and processing but difficult to hull on existing machines.
Plant: productive, somewhat resistant to Botrytis fruit rot, moderately resistant to Verticillium wilt, susceptible to leaf scorch. Well suited to pick-your-own plantings, local fresh markets, home gardens. Not firm enough for distant shipping. Introduced in 1967 by the Hort. Res. Institute of Ontario, Vineland Station.

Vibrant (Sparkle x Valentine)—midseason—

Fruit: medium size, skin medium dark red; flesh medium red, medium firm, good flavor.

Plant: productive, some resistance to Botrytis fruit rot, susceptible to Verticillium wilt, resistant to leaf scorch. Useful for pick-your-own plantings, local fresh markets, processing and home gardens. Somewhat dark color and tender skin for distant shipping. Introduced in 1967 by the Hort. Res. Institute of Ontario, Vineland Station.

S68-108 (Tioga x Guardsman S[1])—late—

Fruit: medium to large, uniform, conic, slight neck, hulls easily, skin light red, flesh medium red, firm, good quality.

Plant: productive, vigorous, foliage apparently resistant to mildew, leaf spot and leaf scorch. Selected in 1968 at the Agriculture Canada Research Station, Kentville, N. S.[1]

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Book Review

The Peach—Varieties, Culture, Pests, Marketing, Storage. Norman F. Childers, Editor. Rutgers University, New Brunswick, NJ 08903. 659 pp. 1975.
Prices: Domestic $13.95; Foreign $14.95; Postpaid.

The third revision of the "Peach", made in 1975, is an up-to-date summary of the United States, Canada and the world peach situation. This is an excellent compilation of source material on the peach with contributions by over 70 world authorities.

It is the third updated summary of *The National Peach Conference* held at Rutgers, The State University at New Brunswick, NJ, March 11, 12, 1965.

Topics relative to the peach industry include: "varieties, breeding objectives and needs"; "rootstocks and weather problems"; "peach sites, nutrition, peach decline, general culture"; "pruning and training trends"; "thinning peach fruits, growth regulators"; "weed control"; "effect of irrigation, fertilization and pruning on peach yield and quality"; "nectarine varieties and culture"; "pest control problems (diseases, nematodes, birds, insects and mites)"; "maturity, harvesting, peach storage, processing maturity indices, and economics and marketing".

Literature citations are comprehensive, with 463 titles including the following topics: general, breeding, culture, diseases, dormancy-rest, economics, fruit composition, growth and development, growth regulators, hardiness, winter injury, frost, harvest, insects, mites, nematodes, irrigation, marketing, maturity, nutrition, packing, pesticides, postharvest decay control, processing, propagation, pruning, rootstocks, soils, statistics, storage, thinning, varieties, weed control (herbicides) and a list of papers on peach that were presented at the American Society for Horticulture Science meeting in September 1975—Honolulu, Hawaii.

This very important updated compilation of research reports and observations from the research scientists and growers from the United States and various peach producing countries of the world provides an excellent updated research and information source concerning the peach. This book would be a valuable asset to researchers, teachers, and extension personnel. Also, every peach grower should have this as a reference book.

—R. K. SIMONS