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Performance of Cranberry Cultivars at Aylesford, Nova Scotia

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Abstract

Eight cranberry cultivars were evaluated for yield, fruit size, and berry quality in Nova Scotia. Cultivar 'Crowley' equalled or exceeded the currently important cultivar 'Stevens' in all categories.

Introduction

The first planting of cranberry vines in Nova Scotia was thought to be by William McNeill of Melvern Square in 1870 (E. L. Eaton, unpublished report). The success of this early planting led to additional planting during the next few decades. Local cranberry vines, obtained from the wild, were used to establish most of these bogs although some vines were imported from Massachusetts during the early 1900's. By 1941, 'Howes' and 'Early Black' were planted by several commercial growers in an attempt to improve productivity and fruit quality. In 1957, Eaton (1) described these two cultivars and another, 'Beaver,' which originated in a bog at Beaver River, Nova Scotia. Eaton considered early ripening as the primary factor for cultivar selection in Eastern Canada.

After the introduction of several new cranberry cultivars in the U.S.A. (2, 3), the cranberry cultivar situation in Canada was reviewed by Hall (4). It was clear that an objective assessment of modern cranberry cultivars was required to make informed recommendations to growers in the Canadian Maritime Provinces.

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Materials and Methods

The Cranberry Experiment Station, East Wareham, Massachusetts, provided cranberry cuttings for the cultivar evaluation trial in Nova Scotia. Cultivars were propagated during the spring and summer of 1981 in a greenhouse at the Agriculture Canada Research Station, Kentville, Nova Scotia. Rooted cuttings were planted into 3-inch peat pots containing peat, sand and soil (2:1:1 v/v) with added nutrients. The cultivar evaluation trial was established within a commercial cranberry bog at Aylesford, Nova Scotia, in the spring of 1982. The bog was sand-based, with a soil composition of 81% sand, 8% gravel, 6% silt and 4% clay. The trial layout followed a randonized complete block design with eight cultivars in four blocks. Individual plots contained 25 plants each, maintained at 2 m x 2 m in subsequent years with a 1 m walkway between plots. Vines of cultivar 'Stevens' were obtained directly from the commercial bog.

The cultivar trial received the same management program as the rest of the cranberry operation. Weed and pest management followed the Atlantic Provinces Protection Guide for Cranberries (Atlantic Committee on Crops, publication 1017). Water management practices included flooding for harvesting and winter protection, and use of overhead irrigation for frost control. Plots were harvested with a combination of hand picking and raking, soon after the commercial harvest.

In 1985, cranberry sauce and juice were made from fresh berries of each cultivar. Sauce was prepared by bringing to a boil 500 ml water, 420 g white sugar and 500 g cranberries. The mixture was held at this temperature for 10 minutes, then cooled. Sauce was assessed by two of the authors (A. R. J. and I. V. H.) on the basis of color, texture and flavor. Juice, extracted from crushed cranberries and filtered through cheesecloth, was rated for color intensity and analyzed for soluble solids, pH and total acidity. Total acidity was determined by titrating a diluted sample of juice with 0.5 N NaOH to pH 8.1 with a Mettler DL40RC automatic titrator and percent acid calculated as citric.

Results and Discussion

Plots of all cranberry cultivars, except 'Pilgrim,' filled in well and a full crop was produced in 1985. Ratings of plant stand taken in 1984 showed that the early growth of 'Pilgrim' was retarded. Despite this setback, 'Pilgrim' ranked second in yield when averaged over four harvests (Table 1). 'Crowley' ranked first in yield in each year. Fruit size of 'Crowley' was similar to 'Stevens,' the most widely grown cultivar in Nova Scotia (Table 2).

Little cultivar variability was observed in sauce quality; all products were considered acceptable. Wide variability was observed in the color

Table 1. Yield of eight cranberry cultivars from 1985 to 1988 in plots established in 1982.

	Yield (kg/m²)				
Cultivar	1985	1986	1987	1988	1985-88
Crowley	1.68[z]	0.88	0.90	2.06	1.43
Pilgrim	0.91	0.50	0.52	1.81	0.94
CN	1.31	0.66	0.38	1.20	0.89
Bergman	1.08	0.86	0.40	1.21	0.89
Norman Lemunyon	0.89	0.54	0.30	1.49	0.80
Black Veil	0.67	0.55	0.29	1.14	0.66
Stevens	0.66	0.53	0.33	1.09	0.65
Franklin	1.24	0.33	0.23	0.69	0.52
SEM[y]	0.225	0.155	0.107	0.204	0.160
LSD (P = 0.05)	0.669	0.461	0.316	0.602	0.472

[z]Multiply yield by 89 to calculate hundredweight per acre.
[y]Degrees of freedom were 18 for 1985 and 1986, and 20 for 1987, 1988, and 1985-88 rather than the expected 21, due to missing observations.

Table 2. Cranberry weight and size count averaged over four years (1985-88).

Cultivar	Berry weight (g/berry)	Berry size (number/ 250 ml)
Stevens	1.47	78.9
Crowley	1.45	78.7
Norman Lemunyon	1.41	81.3
Pilgrim	1.39	80.9
CN	1.33	91.1
Bergman	1.27	98.9
Franklin	1.14	114.6
Black Veil	1.09	107.6
SEM (n = 4 df = 20)[z]	0.044	3.21
LSD (P = 0.05)	0.130	9.47

[z]Degrees of freedom were 20 as a result of one missing observation.

Table 3. Analysis of cranberry juice for eight cultivars in 1985.

	Juice analysis			
Cultivar	Color rating[z]	Soluble solids (°Brix)	pH	Total acidity (%)[y]
Bergman	dark	7.8	2.57	2.67
Black Veil	very dark	8.2	2.56	2.17
CN	dark	8.0	2.52	2.44
Crowley	medium	7.3	2.50	2.66
Franklin	dark	7.3	2.51	2.60
Norman Lemunyon	light	8.2	2.55	2.70
Pilgrim	light	7.9	2.47	2.68
Stevens	light	8.4	2.52	2.67

[z]Rated on a four point scale: light, medium, dark, and very dark.
[y]Calculated as percent citric acid.

of juice (Table 3). 'Norman Lemunyon,' 'Pilgrim,' and 'Stevens' produced a light red juice indicating low anthocyanin concentration. The inverse relationship between fruit size and pigment content, noted by Vorsa and Welker (5) was generally borne out by this group of cultivars. 'Crowley,' however, was well colored and produced a medium colored juice despite its large fruit (Tables 2, 3).

Under trial conditions, cultivar differences in fruit size and pigmentation were very similar to those obtained elsewhere (6, 7), suggesting minimal genotype x environment interactions for these traits. Furthermore, the high yield of 'Crowley' in Washington and Oregon (3), was also found in Nova Scotia.

In the provinces of Nova Scotia, New Brunswick, and Prince Edward Island, the prinicpal cranberry cultivar is 'Stevens' at present. 'Bergman,' 'Early Black,' and 'Howes' are also cultivated. The cultivar trial at Aylesford, Nova Scotia, has identified 'Crowley' as a good choice for this region. 'Bergman' and 'CN' will also be of value where intense pigmentation is favored over fruit size.

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