

The Ashworth Blueberry as a Parent in Breeding For Hardiness and Earliness

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Present cultivated varieties of blueberries have sometimes withstood temperatures as low as minus 20°F., but usually only if previous temperatures have been low enough so that the plants are well-hardened. They have performed best in central and southern New Jersey and southwestern Michigan; but even in such areas flower buds may be killed and the canes killed back severely by low winter temperatures. They seem to withstand slightly lower temperatures than do the hardier varieties of peaches.

In 1952 and 1957, when there were no fruits on even the hardiest peaches

species, *V. corymbosum*, however, is found in northern New York and northern New England, north of the areas where the original parents of cultivated varieties were selected. Several selections from these areas are now being tested for their value as parents. One of these was made by F. L. Ashworth in northern New York and referred to here as the Ashworth variety.

The Ashworth blueberry was found in a field about four miles from Heuvelton, N. Y., in the St. Lawrence River Valley. It is a highbush type reported to have fruited following temperatures as low as minus 50°F.

TABLE I. A comparison of berries of Ashworth with those of Earliblue in greenhouse tests.¹

	Color	Scar	Size	Firmness	Calyx	Season ²
Ashworth	5	9	5(158) ³	5	8	10
Earliblue	8	7-8	9(75)	10	8	9

¹10 = Most desirable, 1 = least desirable.

²10 = Earliest, 1 = latest.

³Number of berries per half-pint cup.

in southern Vermont, several varieties of blueberries bore full crops. Blueray and Bluecrop seemed the hardiest, bearing full crops when other varieties had light to medium crops.

The cultivated varieties now available were bred from wild plants of the lowbush blueberry, *Vaccinium lamarckii*, and the highbush blueberry, *V. australe*, selected in southern New Hampshire, New Jersey, and North Carolina. The tetraploid highbush

It has the pubescent leaves and stems of *V. corymbosum*. Berries of the Ashworth ripening in the greenhouse were rated in comparison with Earliblue in Table I.

The small scar and rather tender skin suggest that Ashworth has genes from *V. lamarckii*. Because of its earliness and probable hardiness, Ashworth was crossed with Coville, Berkeley, Bluecrop, and Earliblue varieties in 1951 and since then with 11-93 (GM-

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TABLE II. Qualities of seedlings of crosses involving Ashworth compared with crosses of other varieties, (average of 20 seedlings of each cross in 1956)

Location of test and cross ¹	Croping ability (% of full crop)		Size (berries per cup)		Color rating of berries ²		Mean season of ripening rating ⁴	Mean scar rating
	1956	1957	Mean	Range	Mean	% seedlings with 6 to 10 rating		
<i>Outer Lake, Michigan:</i>								
Ashworth x Earliblue	100	87	102	58-137	5.8	85	9.6	8.0
Earliblue x US-3	—	—	93	71-145	—	—	—	—
Berkeley x Earliblue	—	—	73	53-110	—	—	—	—
Earliblue x 11-93	—	—	62	44-82	—	—	—	—
Ashworth x Bluecrop	92	102	—	—	6.8	100	8.2	8.2
<i>Tonesboro, Maine:</i>								
Ashworth x Earliblue	53	—	99	73-132 ²	6.1 (5-7)	85	9.5	—
Ashworth x Bluecrop	43	—	89	66-128	6.7 (5-8)	95	7.4	—
US-3 x US-5	65	89	105	70-154	2.0 (2-8) ³	30	7.3	8.9
Earliblue x Bluecrop	11	—	—	—	7.0 (4-9)	95	7.9	—
NH-1	25	—	—	—	—	—	8.2	—

¹Percentage of selections; US-3 = Dixi x Mich. No. 1; US-5 = Dixi x F. Jamarckii; NH-1 = 7 (Coville x lowbush 5) x 6 (Coville x lowbush 4); 11-93 = EM-97 x CU-5.

²Average of 17 seedlings.

³10 lightest blue; 1 shiny black; 6 to 10 commercially usable

⁴10 earliest; 1 latest.

⁵Percentage of seedling with 8 color is questioned.

37 x CU-5) for large fruit size and G-65 (Earliblue x 11-93) for large fruit size and earliness.

The seedlings from the 1951 crosses were sent to the following locations for further testing:

140 seedlings of Ashworth x Coville
—Hammonton, N. J.

200 seedlings of Ashworth x Bluecrop—Otter Lake, Mich.

300 seedlings of Ashworth x Earliblue—Otter Lake, Mich.

250 seedlings of Ashworth x Bluecrop—Jonesboro, Maine.

170 Seedlings of Ashworth x Earliblue—Jonesboro, Maine.

80 seedlings of Ashworth x Earliblue—Heuvelton, N. Y.

The seedlings in New Jersey, Michigan, and Maine fruited in 1956, and it was noted that Ashworth had transmitted extreme earliness of ripening, hardiness to low temperatures, and resistance of bud or flower to frosts. Again in 1957, the seedlings showed earliness and hardiness.

In Michigan and Maine cropping ability, color, and berry size of the Ashworth crosses and other crosses of Ashworth were compared (Table II).

In 1956 in Michigan, all seedlings of Ashworth x Earliblue had a full crop in spite of serious low-temperature damage to named varieties in the same field. In Maine, where winter temperatures were much lower than in Michigan in 1956, only one of 20 seedlings of this cross had a full crop, 11 had commercial crops, and nine had light crops. For the Ashworth x Bluecrop crosses the average crop on 20 seedlings in 1956 was estimated at 92 percent in Michigan and 43 percent in Maine.

In contrast, none of the Earliblue x Bluecrop seedlings had a commercial crop in Maine in 1957. Although seedlings of a half-high cross (US-3 x US-5)

were mostly hardy, all had unacceptable, very dark berries.

Additional evidence of the ability of Ashworth to transmit hardiness to its offspring has been furnished by Mr. Ashworth. He reported that 54 of 80 seedlings of Ashworth x Earliblue had survived until 1956, while only 5 of 76 seedlings of other crosses had survived at Heuvelton, in northern New York.

In general, berries of seedlings of the Ashworth x Earliblue cross have been of about the same size in Michigan and Maine. The berries of the seedlings averaged about 25 percent smaller than those of crosses of seedlings of two commercial varieties (Table II). However, the berries of some seedlings of Ashworth x Earliblue were large.

Though the berry color of the seedlings was not as light blue as is desirable, 17 of 20 of the Ashworth x Earliblue and all but 1 of 20 Ashworth x Bluecrop rated as having a passable blue color.

The earliness of seedlings of the Ashworth x Earliblue and Ashworth x Bluecrop was notable. In Maine, 17 of 20 seedlings of Ashworth x Earliblue and 3 of 20 seedlings of Ashworth x Bluecrop were as early as Earliblue and many seedlings were earlier. In Michigan, 37 of 51 (73 percent) of Ashworth x Earliblue plants were earlier than Earliblue in 1957.

Selections have been made as follows: Ashworth x Coville—seven in New Jersey; Ashworth x Earliblue—three in Michigan and four in Maine; Ashworth x Bluecrop—one in Michigan and 16 in Maine; and Earliblue x Ashworth—one in Michigan. Among these, one selection of the Ashworth x Earliblue cross is fully a week earlier than Earliblue in Michigan, and seems worthy of propagation as a named variety.

One disadvantage in using Ashworth in breeding is the susceptibility of seedlings of the crosses so far observed to witches'-broom. A large percentage of the seedlings already show the disease. So far, little is known about the resistance of named varieties to this trouble. Many desirable sites in the North, where greatly increased hardiness is desired, are near native

stands of fir, the alternate host of the causal organism.

The most valuable characteristics of Ashworth in breeding appear to be (1) resistance to low winter temperatures; (2) resistance to frost at blossom time; and (3) early ripening. Its chief limitation appears to be susceptibility to witches'-broom.



Tydeman's Early Worcester — An Early McIntosh-type Apple

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The great and continuing popularity of the McIntosh apple, and the trend in merchandising methods to make apples available all year round makes it important that apples of McIntosh type be available to the market in late summer. Of all early varieties tested at the Research Station in Summerland only one has appeared to be of sufficient merit to warrant introduction for limited commercial trial. This variety is Tydeman's Early Worcester, the name of which has been abbreviated locally for convenience to Tydeman's Red.

Tydeman's Early Worcester was grown as a seedling in 1929, fruited in 1936, and introduced in 1945 by the East Malling Research Station, Kent, England. It was bred by H. M. Tydeman and is the result of a cross between McIntosh and Worcester Pearmain. This variety was selected for trial at the Summerland Research Station in 1948, propagated on Malling I rootstock and has been fruiting consistently since 1955. The favorable ob-

servations at the Summerland Research Station and at other Stations, and comments by visitors have led to its introduction.

Tree

The tree is similar in appearance to McIntosh but its hardiness is not known. However, it would be reasonable to presume that it might be of about the same hardiness as McIntosh, since it is the result of a cross between McIntosh and a variety maturing earlier than McIntosh. In the nursery row, the young trees are exceptionally vigorous and make rapid growth when planted out in the orchard. The variety tends to be an annual bearer like its McIntosh parent.

Fruit

The fruit of Tydeman's Early Worcester closely resembles McIntosh in size, shape and color. (See Fig. 1). Local observations and reports from elsewhere indicate that it is an extremely well-colored apple. The color

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