Journal of the American Pomological Society 58(3):126-128 2004

The 'Early Black' Cranberry

CAROLYN J. DEMORANVILLE[1]

The American cranberry, *Vaccinium macrocarpon* Ait., is a low-growing, stoloniferous, semi-evergreen perennial plant native to eastern portions of the United States and Canada. Its native range extends from Newfoundland, south to the higher elevations of North Carolina, and west to Minnesota. Early European settlers found the cranberry already well known to the native population who used the fruit medicinally, as a food flavoring, and as a dye. However, it was not until the 19th century that commercial cultivation of cranberries began on Cape Cod, Massachusetts. Circa 1816, Henry Hall of North Dennis noticed that wild cranberry plants covered by blowing sand produced better crops. Hall transplanted cranberry sods into the first cranberry "yards", cultivating the crop by periodically adding sand to the planting. Others observed Hall's success and also planted cranberries into areas receiving sand drift. By 1854, the industry had gained enough importance to be recognized in an official census conducted by the Massachusetts Department of Agriculture. At that time, there were 197 acres of cultivated cranberry in Barnstable County (Cape Cod). By 1865, the cranberry acreage had increased to 1074 (2).

Early cranberry cultivars were selections from the wild — the first hybrid cultivars were not released until 1950 (3). Many of the early cultivars were named for the men who selected them and brought them under cultivation. 'Early Black' was an exception. In the 1840s, Captain Cyrus Cahoon acquired vines from Nathaniel Robbins of Harwich and planted them at the site of Black Pond. Cahoon's wife, Lettice, observed that the berries were different from others grown locally, ripening early and having a deep red, almost black color. She named the cultivar Early Black in recognition of its location (Black Pond), color, and early ripening (2, 5). 'Early Black' became a favorite with early growers including Abel D. Makepeace, who became the largest cranberry cultivator in the country. The cranberry company he later established was one of the founding members of the Ocean Spray Cooperative. By the late 1850s, New Jersey farmers were importing 'Early Black' vines from Massachusetts as the cranberry industry expanded in that state (2). 'Early Black' became the predominant cranberry cultivar in both Massachusetts and New Jersey and remains so to the present (Figure 1). By 1958, four cultivars, one of which was 'Early Black', comprised more than 90% of the United States cranberry acreage (5).

Cultivar description (5): 'Early Black' vines are fine-textured, with few runners, short upright vertical shoots (the fruit bearing stems), and small light green leaves. The fruit ripens early, usually during the first two weeks of September. The fruit are pyriform — the stem end is somewhat pointed with a small stem pit and the calyx end is broadly rounded, with the calyx lobes open and moderate in size. The fruit are blackish red when fully ripe and glossy with little or no waxy bloom. The average seed number per fruit is 12, with a range of 8-14 (9). Fruit mass is average for native selections (about 1 g). The fruit color well in storage and keeping quality is good to very good.

Table 1 shows a list of cultivar characteristics for 'Early Black' and a comparison to characteristics of 'Stevens', the industry standard hybrid cultivar (11). While flowering is similar for the two cultivars, fruit mass is approximately double

[1] Extension Associate Professor, University of Massachusetts Amherst Cranberry Station, P.O. Box 569, E. Wareham, MA 02538 carolynd@umext.umass.edu

in 'Stevens' (8). The modest fruit mass of 'Early Black', along with the small stature of the plant and its lower leaf nitrogen content, account for its moderate requirement for nitrogen fertilizer and poor tolerance of high nitrogen applications in comparison to those of 'Stevens' (6, 7, 8).

Cranberries, particularly the native selections, have a tendency to be biennial bearers. Flowers arise from a terminal mixed bud on the upright shoots. For all cranberry cultivars, the chance of an upright bearing fruit decreases if that upright flowered in the previous year (compared to one that had not) (13). A comparison of return flowering in 'Early Black' and 'Stevens', showed that return bloom was lower by roughly half in the native 'Early Black' (14).

The advantage of the consumption of fruit, particularly that high in antioxidants, as part of a healthy diet has become widely recognized. Anthocyanin, the primary pigment in cranberry fruit, is a recognized antioxidant compound. 'Early Black' fruit are high in anthocyanin, having almost double the extractable pigment of 'Stevens' fruit (1). 'Early Black' is high in cyanidin, the blue anthocyanin pigment established as the most effective antioxidant among cranberry anthocyanins (15).

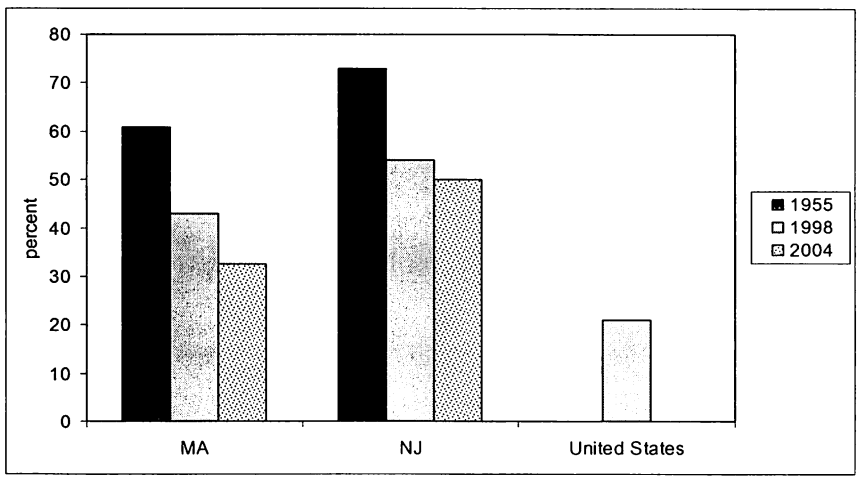

Figure 1. Acreage planted to 'Early Black' cranberry (percent). Data from Chandler and Demoranville (5) and Roper (12), and personal communication).

Due to its excellent color, early ripening, keeping quality and resistance to false blossom and rose bloom diseases, 'Early Black' has been favored as a parent in cranberry breeding programs (3,15). Of the six cultivars named and released from the original 1929-1930 crosses of the USDA cranberry breeding program, three – 'Beckwith', 'Bergman', and 'Franklin' — have 'Early Black' as one parent (3, 4). 'Early Black' remains a good germplasm source today. However, there is some confusion regarding what constitutes the exact 'Early Black' genotype. Of eight purported 'Early Black' examples from MA, NJ, and WI, only three were genetically identical in silver-stained RAPDs analysis (10). It was noted that since cranberry is generally clonally propagated, a cultivar may not consist of a single genotype (10).

Despite its poorer yield in comparison to improved cultivars, 'Early Black' remains popular in the east coast cranberry regions (Figure 1). Some 'Early Black' acreage was converted to 'Stevens' during the 1980s and 1990s in order to achieve greater yields and genetic diversity. Nonetheless, this cultivar remains popular in the fresh market, advertised locally in Massachusetts as an 'heirloom' variety. Its deep color and keeping

qualities make 'Early Black' attractive to consumers. Ripening earlier than many of the other popular cultivars, 'Early Black' can be harvested by mid-September, allowing growers to spread their harvest over a longer period. With the current emphasis on the health benefits of cranberry consumption, a cultivar rich in antioxidant anthocyanins is likely to remain a significant part of cranberry cultivation and cranberry germplasm in the future.

Table 1. Characteristics of 'Early Black' cranberry and comparison to the hybrid 'Stevens'.

Characteristic	'Early Black'	'Stevens'	Reference
Avg. berry mass (g)	0.85	1.77	8
Flowers/upright	4.26	4.03	8
Percent repeat bloom	21	43	14
Ideal fertilizer N (kg/ha)	22-34	34+	6, 7, 8
Percent N in leaf tissue	0.96	1.09	8
Anthocyanin (mg/100g)	65	32	1
Percent cyanidin	57.8	49.5	15

Literature Cited

1. Boone, D. M. 1994. Cranberry cultivar evaluation. Wisconsin cranberry school proceedings, pp. 5-8. http://www.library.wisc.edu/guides/agnic/cranberry/proceedings/1994/craboo.pdf
2. Burrows, F. A. 1976. Cannonballs and Cranberries. William S. Sullwold Publishing, Taunton, MA. 96 pp.
3. Chandler, F. B., H. F. Bain, and H. F. Bergman. 1950. The Beckwith, the Stevens, and the Wilcox cranberry varieties. Cranberries 14(11): 6-7.
4. Chandler, F. B. and I. E. Demoranville. 1961. Three new cranberry varieties. Fruit Varieties and Hort. Digest 15:65.
5. Chandler, F. B. and I. E. Demoranville. 1958. Cranberry varieties of North America. MA Exp. Sta. Bull. 513. University of Mass. 24 pp.
6. Davenport, J. R. 1996. The effect of nitrogen fertilizer rates and timing on cranberry yield and fruit quality. J. Amer. Soc. Hort. Sci. 121:1089-1094.
7. Davenport, J.R. and N. Vorsa. 1999. Cultivar fruiting and vegetative response to nitrogen fertilizer in cranberry. J. Amer. Soc. Hort. Sci. 124: 90-93.
8. DeMoranville, C. J. 1992. Cranberry nutrients, phenology, and nitrogen-phosphorus-potassium fertilization. PhD. Diss. University of Mass., Amherst. 297 pp.
9. Filmer, R. S., P. Marucci, and H. Moulter. 1958. Seed counts and size of cranberries. Amer. Cran. Growers Assn. Proc. 88th Ann. Mtg. pp. 22-30.
10. Novy, R. G. and N. Vorsa. 1995. Identification of intracultivar genetic heterogeneity in cranberry using silver-stained RAPDs. HortScience 30:600-604.
11. Roper, T. R. 2001. 'Stevens' cranberry. J. Amer. Pomol. Soc. 55(2):66-67.
12. Roper, T.R. 1999. Cranberry cultivar acreage survey. Cranberries 63(5):13-14.
13. Roper, T.R., K.D. Patten, C. J. DeMoranville, J. R. Davenport, B.C. Strik, A.P. Poole. 1993. Fruiting of cranberry uprights reduces fruiting the following year. HortScience 28:228.
14. Strik, B.C., T.R. Roper, C.J. DeMoranville, J. R. Davenport, and A.P. Poole. 1991. Cultivar and growing region influence return bloom in cranberry uprights. HortScience 26:1366-1367.
15. Vorsa, N., J. Polashock, D. Cunningham, and R. Roderick. 2003. Genetic inferences and breeding implications from analysis of cranberry germplasm anthocyanin profiles. J. Amer. Soc. Hort. Sci. 128: 691-697.