



Wild Blueberry Fact Sheet

Wild Blueberry Culture in Maine

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Introduction

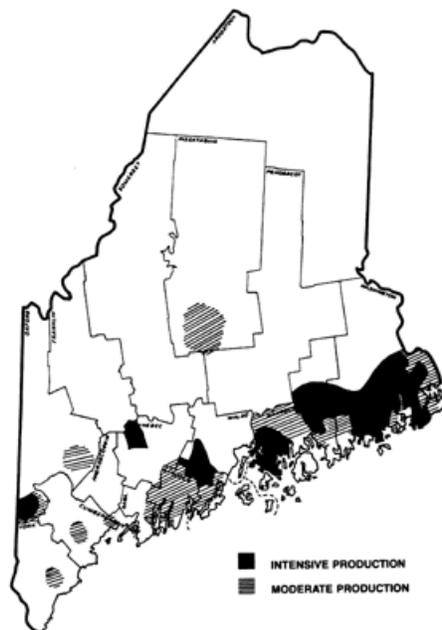
The wild blueberry is one of four fruit crops native to North America. Blueberry growth was first encouraged by Native Americans by periodically burning over fields. In the early 1800's, the European settlers gathered berries as a public privilege on the blueberry barrens of Washington County. Blueberries were canned and shipped to the Union troops during the Civil War in the 1860's. After the war, public access was limited and production was improved by more frequent pruning. Management intensity and production has increased over the years.

Maine is the largest producer of wild blueberries in the world. Maine produces 10 percent of all blueberries in North America, including both wild and cultivated production. Twenty percent of the total blueberry crop is produced in the Canadian provinces of Nova Scotia, Québec, New Brunswick, Prince Edward Island and Newfoundland. The remaining 70 percent of the crop are cultivated blueberries which are produced in Michigan, New Jersey, British Columbia, Washington, Oregon, Georgia, Arkansas, and in other states.

Wild blueberries are grown on 44,000 acres in Maine. These fields have been developed from native plants that occur naturally in the understory of the forest. Because of the pruning practices employed, only half of the acres are available to be harvested every year. [Six companies](#) operate processing plants that freeze and can berries, and there is one fresh pack cooperative. Currently, 99 percent of the crop is frozen and most is used as a food ingredient, so less than one percent of the wild blueberry crop is sold fresh.

Photo (left to right): Wild blueberry, cultivated blueberry, bilberry
 Photo complements of Sonia Dierking, www.dierking.de

MAINE DISTRIBUTION OF BLUEBERRY PRODUCTION



Botanical Classification

All blueberries and cranberries are in the *Ericaceae* plant family or *Heath* family. There are several species of wild blueberries found in Maine. Blueberries and cranberries are in the genus *Vaccinium*. The most abundant wild blueberry in Maine is known as the low sweet blueberry and has the species name *angustifolium*. It has smooth stems that vary in color from tan to red, and plants vary in height from 4 to 15 inches. Leaves of *angustifolium* are dark green, smooth and sometimes have slightly toothed edges. Blossoms are bell-shaped and usually white or pinkish-white. The fruit is usually dark blue, but it is colored with a waxy coating or bloom that gives the fruit a light, powder blue appearance. A black-fruited variety of the low sweet blueberry, *nigrum*, is also commonly found in wild blueberry fields. It has the same characteristics as low sweet, except that the fruit is black without a waxy coating. Also, the berry size tends to be larger and the fruit sweeter than the low sweet blueberry.

The next common variety is the sour top blueberry, *Vaccinium myrtilloides*. This species tends to be more prevalent in mountains or hilly areas. Stems and leaves are covered with tiny hairs and are more branched than are those of the low sweet. Sour top stems grow 6 to 24 inches tall. Leaves are light



green, hairy on the underside and tend to curl down on the edges, earning its other name, velvet leaf blueberry. Blossoms are bell-shaped and greenish-white, but sometimes tinged with red. Berries are usually smaller and less sweet than the low sweet. They are bright blue and covered with a waxy coating.

The highbush blueberry, *Vaccinium corymbosum*, which can grow to more than six feet in height are also found wild along lakes or ponds adjacent to managed wild blueberry fields and occasionally will cross with the lowbush plants to produce a hybrid that has characteristics of each plant. These are the unimproved versions of the cultivated varieties of the highbush blueberry that are grown through out the world and are found in home gardens or in small plantings in Maine but are not part of the commercial wild blueberry industry in Maine.

The bilberry *Vaccinium myrtillus* as it is known in Europe or as one of the western huckleberry plants found in the US is smaller and has a darker color than the wild blueberry. There are also other blueberry species that are referred to as huckleberries in the Western United States that are *Vaccinium* species and would be considered to be blueberries.

Growth Habits and Genetic Diversity of the Wild Blueberry

Wild blueberry plants occur naturally in the understory of the forest in Maine. Blueberry plants are initially established from seed. These plants send out underground stems called rhizomes. These rhizomes grow near the soil surface, periodically sending up new stems above the soil surface. Roots develop on the rhizomes as they grow. The original plant, with its spreading rhizome system, is referred to as a clone. Each clone is genetically different from neighboring plants. Clones will vary in size, but the area they cover is related to their age; the younger clones cover less area. An average clone will cover from 75 to 250 square feet. Although clones can grow very large, a clone one half mile in length has been observed; in any given field the average distance between clones is 20 feet which means there would be an average of 109 clones per acre. If this is multiplied by the 44,000 acres we have in Maine it would produce over 4.75 million clones. It is the complex mixture of clones that gives wild blueberries their rich diversity of flavors. Average yield is nearly 5,000 pounds per acre but fields with dense stands of productive clones and more intensive management could potentially have double that production.

New plants may be propagated from seed, softwood cuttings, rhizome cuttings, by digging up sod pieces or by tissue culture. Cuttings or sods of plants are slower to establish and spread than seedlings or tissue culture plants. Surface mulches of bark or peat encourage rhizome growth and subsequent plant spread.

Most wild blueberry fields are pruned to the ground every other year. In the growing season immediately following the pruning, the vegetative and formative growth takes place. Flower buds are formed during this season. In May of the following year, or the crop year, the flower buds open and come into bloom. This bloom period lasts from two to four weeks. Blueberries require cross pollination for a successful fruit set. After pollination and fruit set, the blueberries develop and ripen in late July and August.

Cultural Practices

Pruning

Until recently, most commercial blueberry fields have been pruned by fire with straw or oil burners. Repeatedly burning fields for a number of years has resulted in a decline in production associated with the destruction of the organic pad and exposure of the rhizomes. Mechanical mowing will produce equivalent yields without depleting the organic pad. Mowing is less costly than using oil or straw and has been widely adopted by blueberry growers. Burning does reduce certain insects and diseases that reside in the leaf litter. Favorable weather conditions could lead to periodic outbreaks of these pests in mowed fields, which would require periodic burning to reduce populations. Pruning also serves to interrupt the insect and disease cycles and reduces insect and disease outbreaks and so reduces the need for pest control applications.

Pollination

Blueberries require insect pollination, and the use of honeybees, bumblebees and native bees will increase the fruit set and seed number resulting in much higher yields. Current recommendations are for two to four honeybee hives per acre depending on the field size and location.

Fertilization

Fertilization recommendations used to be based on noting stem height and leaf spotting and applying nitrogen from urea. Growers now use leaf tissue samples to determine if fertilizer is needed since

standards of satisfactory levels of nutrients in leaf tissue have been developed. Blueberries have responded well to fertilization, resulting in more rapid establishment, greater plant growth and higher yields.

Soil Acidity

The optimum acidity level, or pH, for wild blueberry soils is 4.0. The acidity of these soils should be kept near this optimal level. Soil testing will identify if treatment with sulfur (to lower pH level and increase soil acidity), or lime (to increase the pH level and lower soil acidity) is needed.

Irrigation

Irrigation will result in an increase in the number and weight of berries if moisture is limiting. Irrigation provided in the nonbearing year increases bud formation, which increases the potential yield in the crop year. Currently, irrigation is used commercially by a few growers during the crop year and irrigating nonbearing fields is also done if water is available.

Propagation

Plants for establishing new blueberry fields have been produced from softwood cuttings of select clones and from seed obtained by pollinating flowers of an outstanding clone with pollen from an equally good clone. Micro-propagation techniques have been developed for the wild blueberry. Plants are now commercially available. Tissue culture propagated plants exhibit the spreading growth habit of seedlings along with the uniform productivity characteristics of rooted cuttings. Mulching has been extremely beneficial for increasing survival of planted wild blueberries and encouraging their lateral spread through rhizome growth. Using high yielding clones to fill in existing fields will make the current management practices more efficient and result in higher yields at a lower cost per pound.

Pest Management

Insects

A system of monitoring the blueberry maggot and an action threshold has been developed by University of Maine researchers, resulting in a decrease in frequency of sprays and an increase in spray efficacy. Periodic outbreaks of spanworm, flea beetle and thrips still cause sporadic damage, so continued monitoring of the fields with sweep nets for these pests is important.

Diseases

The major blueberry diseases include mummy berry and blossom blight. Wet weather during bloom provides the necessary conditions for infection and spread of these diseases. Mowed fields may have a higher incidence of mummy berry than burned fields. Leaf tissue diseases have also increased in time with the use of mowing, so increased use of fungicides may be necessary if mowing continues to be the preferred pruning practice

Weeds

Suppression of competing weeds with pre-emergence herbicides and the use of selective and non selective post-emergence herbicides have resulted in increased quality, yields and has allowed for more efficient use of mechanical harvesters.

Integrated Crop Management

This program stresses the scouting of fields to identify the pest and determine when it will reach economically damaging levels. Pesticide effectiveness may be increased while decreasing the overall costs to the grower. Fertility management is also included so that only the amount of fertilizer needed will be applied. This management concept insures that only the pesticides and fertilizers that are needed are applied, resulting in an economically and environmentally sound management program.

Harvesting

Lowbush blueberries are harvested in once over picking operation. They are harvested either by hand raking, using a metal rake or by mechanical harvesters. Harvest begins in late July or early August, when most of the berries are ripe. The raking season normally lasts up to Labor Day. Mechanical harvesters have increased in use because of improvements in harvesters and field conditions and are now used on 80% of the fields Maine.



Wild blueberry mechanical harvesters.



Hand rake.

Marketing

The [*Wild Blueberry Association of North America*](#) is an association formed in 1981 in both the United States and Canada with a mission to promote wild blueberry products. Through the efforts of this organization, sales of blueberries have increased with the larger crops, and the price has remained strong with the increased competition. Planting and production of the cultivated blueberry has increased the total blueberry crop in the United States. Both research and marketing efforts and continued cooperation between the United States and Canada will be needed to successfully compete in the future.

Wild Blueberry and Health

Wild blueberries have the highest antioxidant capacity per serving, compared with more than 20 other fruits. Using a lab testing procedure called Oxygen Radical Absorbance Capacity (ORAC), USDA researcher Ronald Prior, Ph.D., found that a one-cup serving of wild blueberries had more total antioxidant capacity (TAC) than a serving of cranberries, strawberries, plums, raspberries and even cultivated blueberries. Antioxidants help our bodies protect against disease and age-related health risks by canceling free radicals, which are unstable oxygen molecules associated with cancer, heart disease and the effects of aging. Potent antioxidants are highly concentrated in the deep-blue pigments of wild blueberries that neutralize free radicals and help prevent cell damage. Antioxidants also protect against inflammation, thought to be a leading factor in brain aging, Alzheimer's disease and other diseases of aging. The potent antioxidants found in wild blueberries include other phytonutrients such as flavonoids and other phenolics such as anthocyanins; wild blueberries were higher in anthocyanin content than other tested fruits and vegetables.

Future Trends

Increased yields will come from more intensive management by blueberry producers: inter-planting, mulching, increased pest management, fertility, irrigation and pollination. Increased production will require more promotional efforts to keep product demand ahead of supply. Researchers at the University of Maine will continue to investigate more efficient ways to produce, process, and market wild blueberries. With all of these forces working together, a healthy future is in store for the wild blueberry industry.

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