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# History of Maine's Wild Blueberry Industry

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## **Abstract**

Wild blueberry plants were first established as the glacier receded 10,000 years ago and were used by native Americans, but the commercial industry began in the 1800's and continued to expand to the 1950's, when Maine was the largest blueberry producer in the United States. Wild blueberries were first picked fresh by hand, then raked and canned and now are mostly mechanically harvested, and 99% of the crop is frozen and is used principally as an ingredient in processed foods. The crop increased over time from less than one million pounds in 1896 to the bumper crop of over 110 million pounds produced in 2000. It now averages about 100 million pounds which is produced on 44,000 acres, half of which are harvested each year. Harvest techniques from hand-picking to hand-raking, to the current practice of 24 hr/day machine harvesting, have changed over time. Pest challenges that have faced the industry include the blueberry maggot in 1919 to the introduction of the newest pest, the spotted wing drosophila in 2012. Changes in pruning from burning to mowing began when the price of oil increased in the 1970s, when fields were de-rocked, leveled and mowed to reduce cost and facilitate mechanical harvesting. Wild blueberry growers were early adopters of IPM techniques which include fruit fly trapping and border spraying to minimize applications, use of sweep net to monitor for chewing insects, monitoring weather conditions to apply fungicides, leaf sampling to determine fertilizer needs and the use of sulfur to reduce soil pH as a cultural management tool to suppress weeds. These improved weed, disease and insect management techniques, and the increased use of imported pollinators and irrigation, have increased yields and reduced the cost of production allowing wild blueberry growers to be economically competitive.

## **Why Wild**

In the final paper of the 2018 NABREW proceedings, the *Glacial Geology of Maine's Blueberry Barrens*, Harold Borns (2019) described the development of the glacial landscape that enabled the establishment of wild blueberries. The wild blueberry is principally the sweet low *Vaccinium angustifolium* Aiton (tetraploid) with the velvet leaf *V. myrtilloides* Michx. (diploid) contributing a minor component in most areas (Vander Kloet 1988, Jones et al. 2014) were early colonizers and were among the first plants to be established in Maine after the glacier receded. Seeds were spread by birds and bears coming onto the glacial outwash plains (Bell et al. 2009). Plants were able to establish on these barren landscapes because of a mycorrhizal association where a fungus infects blueberry roots and extends the root surface to obtain unavailable bound nutrients from the soil for wild blueberries. The fungus gets food from plant in return, so both benefit from this symbiotic relationship (Smith and Read 2018).

Since each plant was established from a seed, there are over a hundred different plants or clones in every acre with an estimated 4.75 million clones on Maine's 44,000 acres of wild blueberries (Yarborough 2015), an estimate developed from clone sizes reported by Whitton (1964). Wild blueberry fields have a unique genetic diversity (Bell et al. 2012) not found in cultivated fields that only have a few varieties per acre. It also imparts a unique and complex flavor as many varieties are mixed to produce a wild product that can't be duplicated by cultivated blueberries.

The wild blueberry is a stress tolerant plant able to survive under low nutrients and low pH in sandy loam soils that do not hold much water. When the forest over story grew up, wild blueberries were shaded out but the plants were able to persist vegetatively until trees were burned by Native Americans or cut by European colonists for ships masts, lumber and firewood. Fields are currently pruned by cutting to within one inch of the ground to promote more productive juvenile growth. Blueberry spread is vegetative and lateral in soil as 60% of the plant biomass is in an underground stem or rhizome. When pruned, new stems emerge from the rhizome, grow vegetatively and form flower buds the first year. Leaves turn red and fall off in the fall. Covered by snow, plants are protected from the cold winter wind and low temperatures in Maine. In May, plants bloom and are pollinated by bees. The crop is harvested principally in August. This two-year production cycle interrupts several of the insect and disease cycles and reduces the need for pesticide inputs for their control.

The size of the berry is much smaller than the cultivated blueberry *V. corymbosum* and *V. virgatum* which have been selected for a larger size, but larger than the European bilberry *V. myrtillus* (Fig. 1). Wild blueberries are used as an ingredient as 99% of the crop is frozen, unlike the cultivated blueberry which has been selected and bred for the fresh market and is principally sold fresh.



Figure 1. Size comparison (L to R) of *Vaccinium myrtillus*, *V. corymbosum*, *V. angustifolium*  
Photo compliments of Sonia Dierking.

### **Changes in the Industry**

The University of Maine was involved with the industry early, as Munson (1898, 1901) first described the wild blueberry in Maine when the crop was less than one million pounds and described its potential for culture as a crop and possible ornamental use. In the 1950's Maine

was the largest producer of blueberries in the country (Fig. 2). The 1951 USDA *Blueberry Growing* (Anonymous 1951) reported wild blueberry production in Maine took place on 150,000 acres; by the 1970s production declined to 60,000 acres and now it is estimated that 44,000 acres are managed for wild blueberries (NASS 2017). This sounds like an industry in decline, but over the same time Maine production in 1950 was 15 million pounds, increased to 20 million pounds in 1970, and now averages 100 million pounds (Fig. 3).

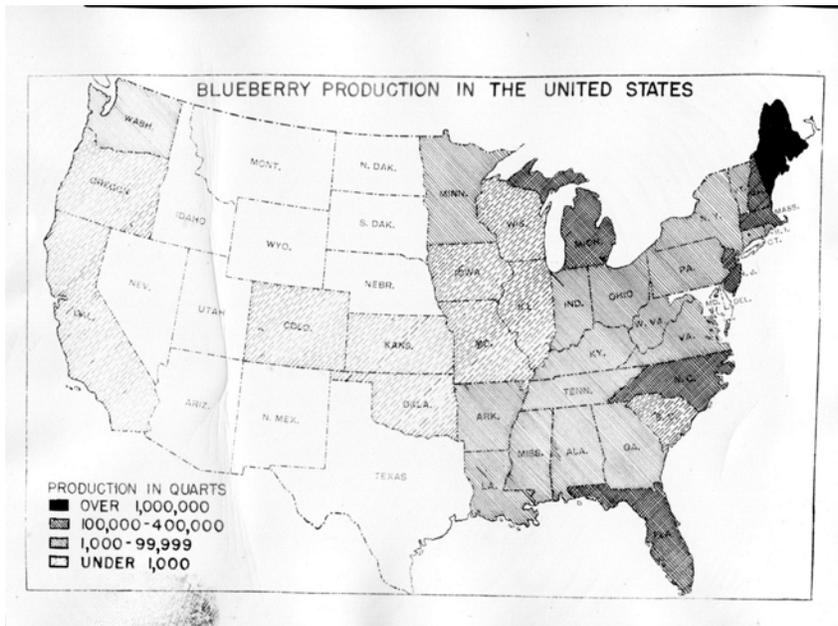


Figure 2. Blueberry production in the United States circa 1950s.

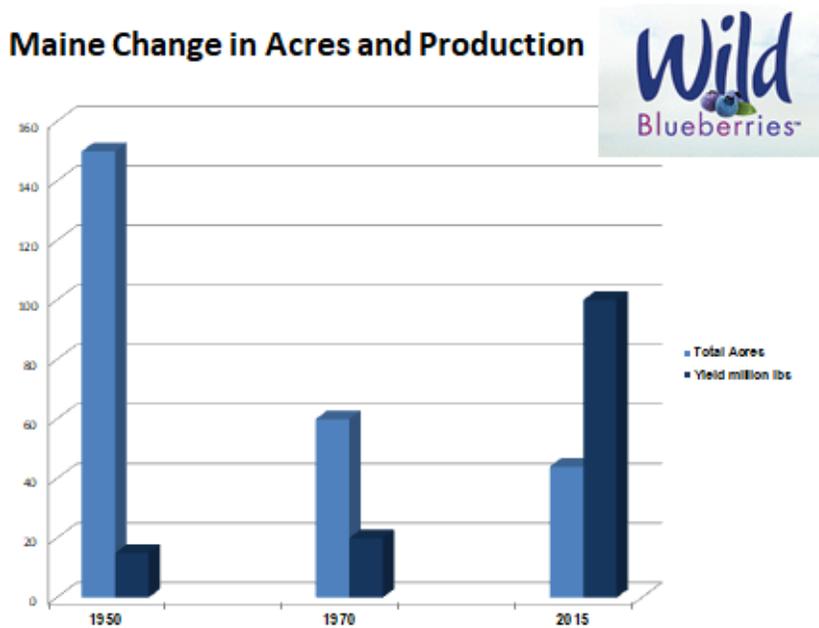


Figure 3. Maine changes in acres and production.

The registration of the herbicides terbacil and hexazinone resulted in reduced weed competition and a doubling of yield by 1974. Sulfur application to reduce the soil pH to 4.0 was shown to reduce weed competition and the need for herbicides (Yarborough and Guiseppe 2006). Improvements in weed management, fertility, insect and disease control, commercial pollinators (such as honeybees and bumblebees) and irrigation all have contributed to both a larger and more stable crop yield from year to year for Maine wild blueberry growers (Yarborough 2004, Yarborough et al. 2017).

Over the years, less productive rocky and uneven fields were either de-rocked and leveled or taken out of production, abandoned or sold for house lots, especially those with ocean views. The increase in productivity has occurred as wild blueberry growers have transitioned from the traditional management of burning and later harvesting fields to a more information based intensive management that has increased fruit yields from 225 lb/a to 4500 lb/a. De-rocking and leveling fields allowed growers to transition from burning to mowing fields, greatly reducing oil consumption. Flat fields with few boulders also set the stage for the adoption of mechanical harvesting from a picking head developed at the University of Maine (Dale et al. 1994). As seasonal workers for harvest have been harder to find, the capacity of available local and migrant labor to harvest the larger crops has been exceeded and so now the crop is 90% mechanically harvested. The reduction of the two highest input costs of production (pruning and harvesting) has enabled the growing of wild blueberries at a lower investment cost (Yarborough and D'Appollonio 2017).

The adoption of Integrated Pest Management trapping; development of economic thresholds; border and spot spraying to reduce inputs and still control the wild blueberry fruit fly in the 1970s (Drummond and Collins 1999, Dill et al. 2001), which continued with new pests such as spotted wing drosophila (Drummond et al. 2018); and disease scouting techniques using weather station predictions that prevent yield losses from insect and disease threats (Annis et al. 2009) has resulted in a more environmentally sound production system. Growers now use Geographic Positioning Systems (GPS) for their pest control applications and smart phones to record their fly counts (Yarborough pers. comm.).

Organic production in Maine has benefited from research at the University of Maine that showed the use of sulfur combined with a burn could increase crop yield threefold (Drummond et al. 2009). Extension efforts continue to support this small, but important, part of the wild blueberry industry. Research and Extension outreach at the University of Maine has provided growers with the techniques they need to remain competitive with Canadian production, which has experienced large increases in production acreage over the past decade. Wild blueberries compete with the cultivated blueberries both from the US and from overseas. World blueberry production now totals over 1.5 billion pounds (Brazelton et al. 2017). Maine growers have continued to adapt to these global changes in production and because of this, Maine wild blueberry production will remain a viable agricultural industry in the future.

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