

More about Blueberries *Vaccinium* spp.

How a cranberry farmer worked with a botanist to breed commercial blueberries, and what makes them blue!

Blueberries were a basic and important food for Native Americans who passed on their knowledge of cultivation, harvesting, use and preservation to European immigrants to North America but it was not until the early 20th century, in 1912, that blueberries were successfully cultivated commercially.



Distribution of *Vaccinium* in North America, compiled from [Vander Kloet \(1988\)](#).

The development of the modern, cultivated blueberry can be traced back to two extraordinary individuals: Elizabeth Coleman White, the daughter of a New Jersey cranberry farmer, and Dr Frederick Coville, a botanist with the United States Department of Agriculture. In 1911, Elizabeth White read Coville's book, *Experiments in Blueberry Culture*, which included his landmark discovery that blueberries required moist, very acid soils. She volunteered part of her farm for blueberry research, the start of a partnership with Coville that

would provide the basis for the development of the modern blueberry industry. The two worked together for 26 years, focussing their attention on the selection of wild types, propagation and the continuing selection of improved cultivars.

Elizabeth Coleman White and her father spent much time sourcing suitable wild types for their breeding program. This from 1953 interview: *[My father and I] had talked about the possibility of adding blueberries to our cranberry crop, but we weren't the*



Dr Frederick Coville. Photo: Unknown author, Attribution, via Wikimedia

first ones to realise that we had to have a uniform product. We knew that the wild bushes were very, very different. We would go around and taste these fruits and one was too tart, one was too flat, one was too small and finally we would get to one that Dad called a peach, but we didn't know how to propagate the plant. At that time, it was said among farmers in New Jersey that blueberries could not be grown.



Elizabeth Coleman White

By 1916, Coville and White were able to propagate and grow the first saleable commercial crop of blueberries. Their initial success was very much dependent on help from members of the local community who searched for large fruited blueberry bushes. Blueberry pickers were paid for every large fruited bush located, and as far as possible, Elizabeth Coleman White named each newly acquired bush after the collector.

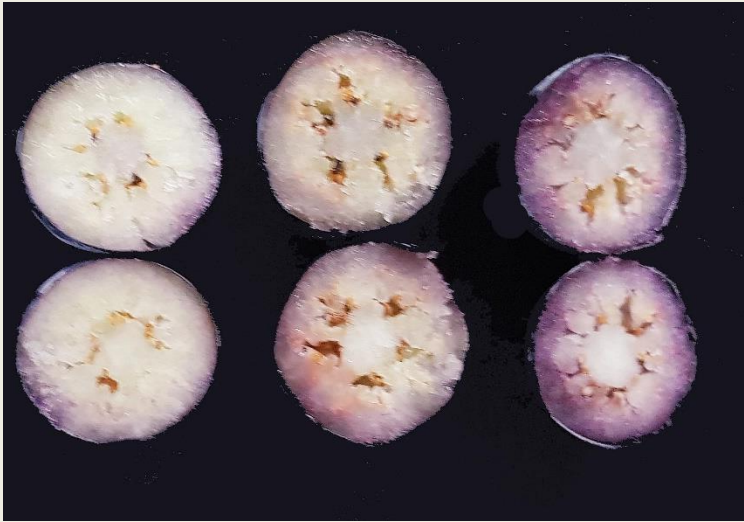
Blueberries are widely considered to be *super foods* and it is the pigments, principally anthocyanins found in the skin, that contribute to the blue colour and supposed health benefits. If you carefully cut a blueberry in half, the flesh is **white**, and only when the skin is damaged do the pigments leak into the cut cells. The *blue* colour changes to a much darker purple when the fruit is cooked or processed and in their natural environment, the deep reds and purples of the anthocyanins are thought to attract animals that eat the fruit then play a major role in dispersal. Anthocyanins are considered by some to be of major importance in providing a range of health benefits, such as enhancing vision and brain function, reducing gut inflammation and providing protection against cardiovascular disease but there is continued debate about their role as antioxidants and their potential effect on human health.



Pine Barrens, typical blueberry habitat.

[Mullica River, Pinelands National Reserve, New Jersey, USA, 2010](#)

Photograph: Brian W. Schaller, FAL, via Wikimedia Commons



Anthocyanins occur in the skin of blueberries but not in the flesh. When berries are cut in half, initially the flesh is white but as pigments leach from the damaged skin, they progressively stain the flesh.

Anthocyanins are water-soluble pigments (*flavonoids*) that produce blue, red, purple and black coloration in flowers, fruit and leaves. *Flavonoids* are *secondary metabolites* mostly produced by plants, fulfilling a role in ecological interactions, fecundity and survival of plant communities, and defence from herbivory.

Alison Downing, Brian Atwell, Karen Marais and Kevin Downing

Gough R E. 1997. Blueberries-North and South, Journal of Small Fruit & Viticulture, 4:1-2, 71-106. DOI: [10.1300/J065v04n01_03](https://doi.org/10.1300/J065v04n01_03)

Mainland C M. 2012. Frederick V. Coville and the History of North American Highbush Blueberry Culture, International Journal of Fruit Science, 12:1-3, 4-13, DOI: [10.1080/15538362.2011.619117](https://doi.org/10.1080/15538362.2011.619117)

McCord G. 2018. What are Anthocyanins? The Spruce Eats: <https://www.thespruceeats.com/what-are-anthocyanins-2774852>

Wikipedia: <https://en.wikipedia.org/wiki/Vaccinium>

Wikipedia: <https://en.wikipedia.org/wiki/Blueberry>

Wikipedia: [Anthocyanin - Wikipedia](https://en.wikipedia.org/wiki/Anthocyanin)

Yang W, Guo Y X, Liu M et al. 2022. Structure and function of blueberry anthocyanins: A review of recent advances. Journal of Functional Foods: 88, 104864, ISSN 1756-4646, <https://doi.org/10.1016/j.jff.2021.104864>



Blueberry bush with fruit and flowers. Photo: Leigh Staas



MACQUARIE
University
SYDNEY · AUSTRALIA

