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MASSACHUSETTS STATE BERRY: CRANBERRY

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Wishing a very Happy Eat a Cranberry Day.

Enjoy these amazing treats that are loved for their taste and goodness

November 23rd is observed as National Cranberry Day and this occasion is certainly a day to share Eat a Cranberry Day messages and wishes to remind everyone of the goodness and health benefits of cranberry that make it a special fruit [12].



Fig. 1. Student researcher Domska Valeriia.



Fig. 2. Cranberry flowers and a crane.

Of all the fruits only three are native to North America, the cranberry is one of them (Fig. 2, 3, 4). . It is a perennial crop grown commercially in man-made wetlands



Fig 3. The cranberries.



Fig. 4. The harvest cranberries.

or bogs in primarily five states in the U.S. Americans consume nearly 400 million pounds of cranberries per year, 20 percent of them during Thanksgiving week. The U.S. per capita consumption of cranberries is 2.3 pounds, almost entirely in the form of juice or juice blends.

Cranberries are at the top of the list of healthy foods. Besides being high in vitamin C, manganese and fiber, cranberries are rich in phyto-nutrients (naturally derived plant compounds), particularly proanthocyanidin antioxidants, which are essential for all-round wellness [3].

Wampanoag People (Fig. 5, 6) across southeastern Massachusetts (Fig. 7, 8) have enjoyed the annual harvest of sasumuneash – wild cranberries – for 12,000 years. Some ate berries fresh while others dried them to make nasampe (grits) or pemmican - a mix of berries, dried meat and animal fat which could last for months. Medicine men, or powwows, used cranberries in traditional healing rituals to fight fever, swelling, and even seasickness [42] (see video [20]).



Fig. 5. Mashpee Wampanoag Tribe (1833)[18]. Fig. 6. Mashpee Wampanoag Tribe (2017).

Native Americans also used cranberries for dye to color robes, rugs and blankets, and for medicinal purposes (they believed cranberries had a calming effect on nerves, and they made a poultice from cranberries to draw the poison from arrow wounds). Pilgrims learned about the berry from the natives and cranberries became part of the colonial diet as well. The Pilgrims thought the cranberry blossom resembled the head of a sandhill crane and originally called them "crane berries." Sailors began taking cranberries aboard ships for whaling expeditions and the long journeys to China



Fig. 7. The USA. Massachusetts State. Fig. 8. Wampanoag (across southeastern Massachusetts).

(cranberries are high in vitamin C and prevented scurvy) [24].

Europeans exploring and settling New England in the 16th and 17th centuries were not surprised to see sasumuneash. Many were familiar with European cranberry varieties which grew in the boggy regions of southern England and in the low-lying Netherlands. The English had many names for the fruit, but "craneberries" (Fig. 2) was the most common because many thought the flower resembled the head of a Sandhill crane [42] (see **videos** [36; 37]).

Massachusetts, officially the Commonwealth of Massachusetts, is the most populous state in the New England region of the United States (Fig. 7, 8). It borders on the Atlantic Ocean to the east, the states of Connecticut and Rhode Island to the south, New Hampshire and Vermont to the north, and New York to the west. The capital of Massachusetts is Boston, which is also the most populous city in New England. It is home to the Greater Boston metropolitan area, a region influential upon American history, academia, and industry. Modern Massachusetts is a global leader in biotechnology, engineering, higher education, finance, and maritime trade [22].

The Massachusetts law designating the cranberry as the official Massachusetts state berry is found in the General Laws of Massachusetts Part I Title I Chapter 2 Section 39:

PART I. ADMINISTRATION OF THE GOVERNMENT.
TITLE I. JURISDICTION AND EMBLEMS OF THE COMMONWEALTH, THE GENERAL COURT, STATUTES AND PUBLIC DOCUMENTS.
CHAPTER 2. ARMS, GREAT SEAL AND OTHER EMBLEMS OF THE COMMONWEALTH.
Section 39.

Chapter 2: Section 39. Berry of commonwealth

Section 39. The cranberry (*Vaccinium macrocarpon*) shall be the official berry of the commonwealth [8; 23] (Fig. 9).



Fig. 9. Massachusetts State Berry: Cranberry.

Two years of petitions and lobbying by a fifth-grade class on the North Shore were rewarded in 1994 when Massachusetts legislature recognized the cranberry (*Vaccinium macrocarpon*) as the official state berry. Cranberry is also one of the official state collors of Massachusetts (Fig. 10), and cranberry juice is the state beverage (Fig. 11).



Fig. 10. Massachusetts license plate.



Fig. 11. Cranberry juice. Fig. 12. A state cookie.

Bay staters have also adopted several other food symbols: a state cookie (Fig. 12) [38; 25] (see videos [27; 28]), donut (Fig. 13), muffin (Fig. 14) and bean. All State Foods [8; 1].



Fig. 13. The Boston cream donut



Fig. 14. Corn muffin.



Fig. 15. Cranberry sauce.



Fig. 16. Baked beans.



Fig. 17. Bees that pollinate the cranberry blossoms.



Fig. 18. Honey.

Cranberries are a unique and special little fruit [33].

Cranberries were important in the diets of native Americans for hundreds of years before the Pilgrims landed. They ate them raw, dried, boiled with honey or maple sugar, and baked with cornmeal into bread. A mixture of cranberries, cornmeal, deer meat, and animal fat was pounded into cakes and dried in the sun to make pemmican (a 'trail cake' that did not spoil for hunting trips and long journeys) [24].

The cranberry is a superfood. They are super rich in antioxidants and high in vitamin C. They can be processed into juice, jams and jellies, or dried as a raisin substitute. A holiday meal isn't complete without a festive dish of tart, red cranberry sauce (Fig. 15), (see video [13]) [10].

The recipe for cranberry sauce appears in the 1796 edition of *The Art of Cookery* by Amelia Simmons, the first known cookbook authored by an American (Fig.19). Although the Pilgrims may have been aware of the wild cranberries growing in the Massachusetts Bay area, it is unlikely that cranberry sauce would have been among the dishes served at the First Thanksgiving meal. Cranberries are not mentioned by any primary sources for the First Thanksgiving meal. The only foods mentioned are "Indian corn", wild turkey and waterfowl, and venison. The rest remains a matter of speculation

among food historians. Although stuffings are not mentioned in primary sources, it was a common way to prepare birds for the table in the 17th century.

Cranberry sauce is often eaten in conjunction with turkey for Christmas in the United Kingdom and Canada or Thanksgiving in the United States and Canada (Fig. 20), and it is only rarely eaten or served in other contexts there [11].



Fig.19 The Art of Cookery (1796).

Fig. 20. Dishes for Thanksgiving.

Cranberry honey is made by bees that pollinate the cranberry blossoms (Fig. 17; 18, 25). Cranberries blossom in late June and July. Early settlers thought the blossom looked like the head of a crane, hence the name ‘crane berry.’ This light honey has a delicate, tart flavour and is only available seasonally.

Each cranberry upright produces 5–7 flowers, which, if all goes well, will form into 3-5 cranberries. Good pollination is critical to berry formation (Fig. 17). Each grain of pollen a bee brings to the blossom means another seed in the cranberry, and cranberries need at least 20 seeds to be viable (Fig. 21. 22).



Fig. 21. Cranberry seed.

Fig. 22. Seeds.

Fig. 23. Cranberry Fruits.

Cranberry seed powder also contains natural vitamin E and its chemical cousins, the tocotrienols, 30 to 50 times more powerful than vitamin E, which quench the full spectrum of free radical toxins which are generated during intense exercise and daily metabolism. The building blocks of cell membranes are phospholipids, fatty acids that

are obtained from the diet and which are also made naturally in the body from dietary fats. Cell membranes are continuously being damaged by free radicals and this damage must be repaired by an adequate supply of phospholipid building blocks. Cran Naturelle seed powder is a natural source of phosphatidylcholine and phosphatidylserine, phospholipids that support circulatory and memory health and are necessary for cell repair [15].

Cultivation of the cranberry began in 1816, shortly after Captain Henry Hall, a Revolutionary War veteran, of Dennis, Massachusetts, noticed that the wild cranberries in his bogs grew better when sand blew over them. Captain Hall began transplanting cranberry vines and spreading sand on them (Fig. 24). When others heard of Hall's technique, it was quickly copied. Continuing throughout the 19th century, the number of growers increased steadily [42; 43].



Fig. 24. Cranberry vines and sand.

Fig. 25. Cranberry blossoms.

Cranberries are a group of evergreen dwarf shrubs or trailing vines in the subgenus *Oxycoccus* of the genus *Vaccinium*. In some methods of classification, *Oxycoccus* is regarded as a genus in its own right. They can be found in acidic bogs throughout the cooler regions of the northern hemisphere.

American cranberry has a low growing, trailing, and sprawling habit. It can reach 1 to 4 in. tall and spread indefinitely. The evergreen leaves are simple and alternate, reach 1/4 to 3/4 in. long by 1/10 to 1/3 in. wide, and are light green and maroon colored when young. With maturity, leaves become shiny dark green. Flowering occurs in early to mid-summer, and the flowers, in clusters of four or five, are light pink and 1/3 to 1/2 in. wide. The fruit is a red berry about 1/3 to 2/3 in. in diameter [24].

Dennis, Massachusetts was not only the birthplace of the cultivated cranberry, but to the invention and standardization of harvesting, packaging, and shipping equipment and practices. In 1868, Captain Warren Hall invented an improved cranberry gatherer. In 1876, Luther Hall (Henry Hall's grandson), Zebina Hall and Captain William Crowell patented the cranberry picker. The most successful invention was William Crowell's fruit box, patented in 1877, which is still used today for cranberries and other fruits (Fig. 26). Dennis cranberry growers were also instrumental

in standardizing the methodology for branding the variety, size, quality and durability of cranberries which became the Rules for Branding in the 1880's [6].



Fig. 26. Cranberry harvest at its Origin, Dennis, Massachusetts (2016).

As the cranberry industry grew it became necessary to set standards to identify the variety, color, size, durability, and quality of cranberries. Due to the increasing number of independent growers it was also necessary to clearly identify each cranberry shipment. The result was the Rules for Branding shown below the sample branding images. We can see a rather sizeable collection of antique cranberry brand labels. While they are all beautiful some are very intricate works of art [35] Fig. 27, 28, 29.

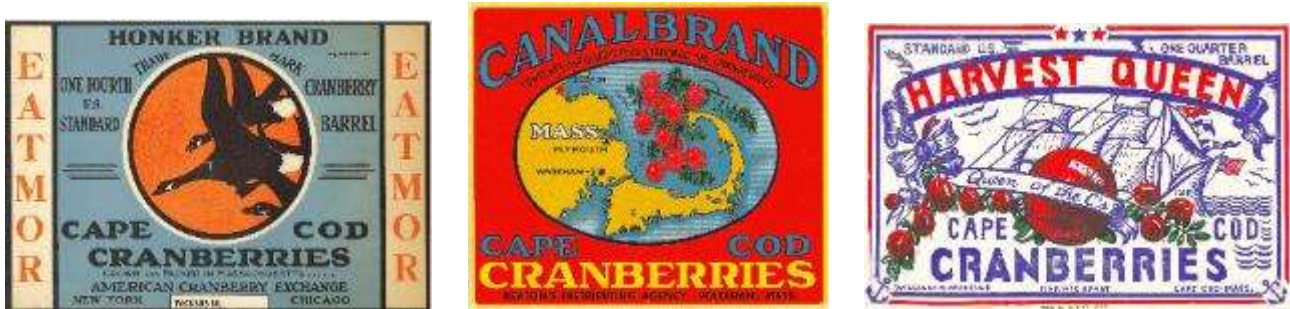


Fig. 27. Howes Brands. Fig. 28. Branding image 'Canal Brand'. Fig. 29. Branding image 'Harvest Queen'.

Roughly 60 percent of the U.S. cranberry crop is produced in Wisconsin, generating close to US\$1 billion in revenue and 4,000 jobs. Other top-producing states include Massachusetts, New Jersey, Oregon and Washington. Overall, cranberries are almost exclusively North American. Roughly 85 percent are grown in the United States and Canada, with the rest scattered across Chile, Western Europe and a few former Soviet republics [9].

A key component of growing cranberries is that they require a unique environment. The vines or shrubs thrive in layers of gravel, then acidic peat soil and sand. The growing season runs from April to November, with the harvest in the fall, usually running from mid-September to mid-November [14].

In Massachusetts they call the place where cranberries grow a bog. Natural bogs evolved from deposits left by the glaciers more than 10,000 years ago. These deposits were left in impermeable kettle holes lined with clay. The clay prevents materials from leaching into the groundwater.

Rocks and other organic materials were collected by the glaciers. When the ice finally melted deposits of heavy materials were layered on top of the clay [24].

These kettle holes were filled with water and organic matter which created the ideal environment for cranberries. In the early 1800s Henry Hall, a veteran of the Revolutionary War who lived in Dennis noticed that sand blown in from nearby dunes helped vines grow faster. Today, growers spread a inch or two of sand on their bogs every three years. The sand not only helps the vines grow but also slows the growth of weeds and insects [24].

Cranberry plants, or *Vaccinium macrocarpon*, are woody, low growing perennial vines. Native to the temperate zones of the east coast, the central U.S., and from southern Canada in the north all the way to the Appalachian mountain range in the south, cranberries are often harvested commercially in water (Fig. 30), but contrary to popular belief, actually flourish when grown on dry land (Fig. 31), **see video [5]**. Cranberry plants grow runners measuring from 1 to 6 feet (31 cm. to 2 m.) long with dark green, glossy leaves during its growth phase and reddish brown during the dormant season. Along the runners, short vertical branches develop and form flower buds jutting above the matted vines. From these branches, berries form [17].



Fig. 30. Wet Harvest.



Fig. 31. Dry Harvest.

Cranberry, or American Cranberry, is a low-growing, creeping shrub with small glossy leaves, fuchsia-pink flowers and cheerful, bright red cranberries in Fall. The leaves stay green all winter, which makes Cranberry a lovely ornamental as well as a food source.

Cranberry is native to bogs and wetlands in Southern Canada and Northeastern United States and makes a great groundcover in wet environments, especially with other plants that thrive in acidic soil.

Commercial growers plant Cranberry in wet bogs and periodically flood them to protect the plants in winter, control weeds and pests, and make harvesting easier. A flooded cranberry bog is actually quite a beautiful sight, red berries bobbing across the landscape [10].

The cranberry farming process for wet harvesting is different. In this case, the cranberry harvesting equipment is very much manual (Fig. 32, 33, 34, 35). The bog gets flooded with about 18–24 inches of water about 12 hours before the harvest begins. The next morning, the farmers walk through the bog with large rods gently poking at the vines, loosening the cranberries which float to the top [14].



Fig. 32. The cranberry farming process (wet harvesting).

Fig. 33. At the farm.



Fig. 34. To harvest cranberries, growers flood the bogs. Fig. 35 The workers collect the floating fruit.

Also in the context of written above, we should return to the meaning of the word CRANBERRY.

The word cranberry comes from "cranberry"; first named by the early European settlers in America who felt the expanding flower, stem, calyx, and petals resembled the neck, head, and bill of a crane [2], Fig. 36.

In American English:

noun, plural cran·ber·ries. Word forms: plural 'cran, berries.



Fig. 36. Cranberry. Flowers.

The red, acid fruit or berry of certain plants of the genus *Vaccinium*, of the heath family, as *Vaccinium macrocarpon* (large cranberry, or American cranberry (Fig. 37) or *V. oxycoccus* (small cranberry, or European cranberry (Fig. 38), used in making sauce, relish, jelly, or juice.

The plant itself, growing wild in bogs or cultivated in acid soils, especially in the northeastern U.S.

Origin of cranberry:

An Americanism dating back to 1640–50; from Low German kraanbere; see crane, berry.

British dictionary definitions for cranberry / ('krænbəri, -bri) /noun plural -ries

Any of several trailing ericaceous shrubs of the genus *Vaccinium*, such as the European *V. oxycoccus* (Fig. 38), that bear sour edible red berries;

The berry of this plant, used to make sauce or jelly [2].

We can improve our spoken English by listening to CRANBERRY pronounced by different speakers – and in example sentences too [9].



Fig. 37. *Vaccinium macrocarpon*.



Fig. 38. *Vaccinium oxycoccus*.

Thus, below is given Biological Characteristics of Cranberry.

Biological Characteristics: Cranberry

- Kingdom:** Plantae – Plants
- Subkingdom:** Tracheobionta - Vascular plants
- Superdivision:** Spermatophyta – Seed plants
- Division:** Magnoliophyta - Flowering plants
- Class:** Magnoliopsida – Dicotyledons
- Subclass:** Dilleniidae
- Order:** Ericales
- Family:** Ericaceae – Heath family
- Genus:** *Vaccinium* L. – blueberry
- Species:** *Vaccinium macrocarpon* Aiton – cranberry.
- Cold Hardiness:** Zones 2–8.
- Edible:** Yes.



Fig. 39. Cranberry. Fruts.

Size: Ground Cover - Small shrub.

Growth Rate: Slow – Medium.

Colors: Pink, Red.

Deer Resistant: Yes.

Nitrogen Fixer: No.

Native Plant: Yes.

Germination: 60–80%.

Sun Requirements: Full Sun - Partial Shade.

Leaf: Alternate, simple, oval, blunt tip, 1/4 to 1/2 inch long, entire margins maybe slightly rolled under, shiny green above, dull paler below.

Flower: Pinkish white, hanging downward, 4 petals strongly curving backwards, usually single but maybe in a small cluster, appearing in mid to late summer (Fig. 40).



Fig. 40. Flowers.

Fruit: Large, round berry, 1/2 to 3/4 of an inch across, hang from a slender stem 1 to 1 1/2 inch long, bright red when ripe in early fall, persist through the winter (Fig. 39).

Twig: Very slender and flexible, golden brown, nearly vine-like, densely covered with leaves (Fig. 40).

Bark: Thin, golden brown to gray-brown, may develop a few fine splits and cracks (Fig. 41).

Form: A creeping, prostrate sprawling shrub up to 1 to 2 feet tall. They often form dense mats over swampy areas.

Soil Preference: Slightly acidic, consistently moist.

Spread: 24⁰.

Season Color: Summer. Fall.

Zones: 2–8.

Symbol: VAMA

Group: Dicot

Growth Habit: Shrub, Subshrub

Duration: Perennial

Native Status: CAN N

L48 N

SPM N [10; 24; 41].



Fig. 41. Cranberry. Bark.

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