The Black Walnut

General Information:

The black walnut (*Juglans nigra*) belongs to the Juglandaceae family, which is commonly known as the walnut family. This family includes a variety of deciduous trees and shrubs, most of which produce edible nuts. The black walnut belongs to the angiosperm group in relation to the broader plant evolutionary classification. Specifically, it is classified as a dicot in the class Magnoliopsida. Within this group it is part of the order Fagales which also includes beech, oak, and hickory trees. The black walnut is native to eastern North America (Figure 1). It can be found in regions of the eastern United States and parts of southern Canada, stretching from southern parts of New England, across the Great Lakes, south to Texas, Louisiana, and Florida. Black walnut trees prefer moist, well-drained, fertile soils. They are typically found in bottomland forests, riverbanks, and floodplains. They thrive in full sunlight and are relatively intolerant of shade. These trees can also be found in mixed hardwood forests, oftentimes growing alongside species like oak, hickory, and ash.

The black walnut is a deciduous tree that can grow up to 98 to 130 feet tall, with a trunk diameter of up to 4 feet (Figure 3). It typically has a broad, rounded crown with a relatively straight trunk. The branching pattern of the black walnut tree has an alternate branching pattern, meaning the branches are arranged one at a time on opposite sides of the stem. This is a common feature of many trees in the walnut family. The leaves of the black walnut are pinnately compound with 15 to 23 leaflets, on each side of a central stem. The leaflets are elliptic or ovate in shape, with finely serrated edges (Figure 2). The leaves are deciduous, turning yellow in the fall before dropping. Each leaflet is typically around 2-4 inches in length. The Leaf Surface at first is minutely hairy, then nearly smooth and somewhat shiny, the underside is hairy and glandular.

The black walnut flowers May through June. The male flowers are yellow-green catkins that droop from the tree and the female flowers are in spikes. Black walnut trees will contain both male and female flowers and are capable of self fertilization. However, they are primarily wind pollinated. The fruit of the black walnut is globular and yellowish-greenish and ripens between September and October (Figure 2). Once the fruit has ripened the husk softens and turns dark brown to black. The nut is usually 1 1/2 to 2 1/2 inches in diameter, containing a sweet oil-rich edible seed. In terms of reproduction, black walnut trees are monoecious and wind-pollinated. While they are self-fertile, they predominantly outcross through a reproductive system unique to Juglans species called hetero dichogamy where pollen shed can occur either before or after pistillate flowers become receptive.

Another interesting feature of black walnut trees is that they produce juglone, a chemical found in their leaves, nuts, and roots. Juglone is toxic to many other plants and can inhibit the growth of nearby vegetation, this is known as allelopathy. This feature helps the black walnut tree to outcompete other plants for resources.

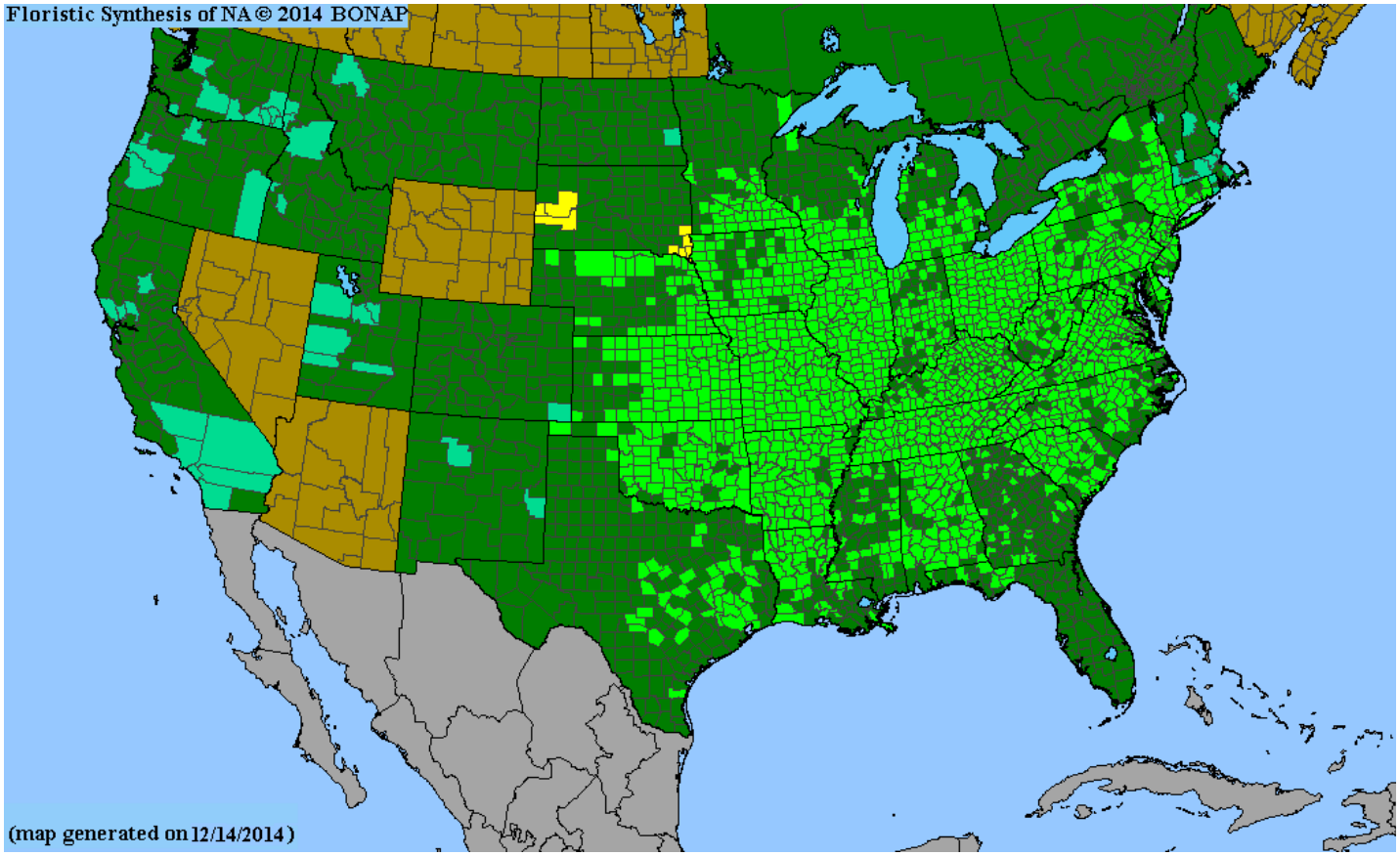
Biological and Ecological Significance:

Black walnuts play their role in structuring ecosystems through allelopathy where one plant releases chemicals that inhibit the growth of surrounding vegetation. The black walnut produces a compound called juglone which it releases into the soil around its roots. Juglone inhibits some plants from growing around the walnut, reducing competition. However, species such as maple, birch, and beech have shown resistance to the compound. Ecologically, black walnut trees are important to forest dynamics; they provide habitats and food for various wildlife species. The

nuts are a valuable food source for animals like squirrels and birds. Also, black walnut trees are host plants for over 100 species of butterflies and moths, including the Luna Moth, Regal Moth, and Imperial Moth. However, black walnut trees are also susceptible to several diseases that can harm their health and ecological role. One significant threat is Thousand Cankers Disease, caused by the fungus *Geosmithia morbida* and transmitted by the walnut twig beetle. This disease has led to large-scale die-offs of walnut trees, particularly in the western United States, and has recently been identified in the eastern United States, including Tennessee.

Cultural importance:

The black walnut holds significant cultural importance among Indigenous peoples of Appalachia. The nutmeats were a vital food source that was often ground and incorporated into breads, puddings, and corn soups. The fresh nuts would be crushed and boiled to make a beverage. Beyond consumption, various parts of the black walnut tree were utilized for medicinal purposes. The bark was chewed for toothaches and made into a decoction as an emetic, to get rid of bile, and as a laxative. The bark of charred twigs and old bark from the trunk was mixed with water and used as a remedy for snake bites. An inner bark infusion was used for smallpox, and a tea from the leaves treated goiter and was used to wash sores. A poultice from the leaves and crushed hulls of the nuts was applied topically to remove ringworm, treat athlete's foot, and hemorrhoids. The sap was used externally as an anti-inflammatory. In contemporary Appalachian culture black walnuts continue to be sought after for their culinary and economic value. The nuts are harvested and used in recipes including baked goods and confections while the hard shells are ground into an eco-friendly abrasive, and the wood is highly valued for its durability and rich color, making it a sought after material for furniture and cabinetry. Additionally, the green husks of black walnuts are used as a fish poison to stun fish for harvest. Another bit of cultural importance that the black walnut has is its importance in Pennsylvania Dutch folklore, it is said that when german dutch settlers were looking for land they took black walnut trees as a sign of fertile land. It is also folk belief that they attract lightning and people would build their houses near them to spare their houses from being struck. Black walnut contributions to food, medicine, craftsmanship, folklore, and local economies highlight the deep connection between the people of Appalachia and this remarkable tree.



(Figure 1) Native range of Black walnuts

(Figure 2) Fruit and leaves of Black walnut tree

(Figure 3) Bark and trunk of black walnut tree

Citations:

Kartesz, J.T., The Biota of North America Program (BONAP). 2015. *Taxonomic Data Center*. (http://www.bonap.net/tdc). Chapel Hill, N.C. [maps generated from Kartesz, J.T. 2015. Floristic Synthesis of North America, Version 1.0. Biota of North America Program (BONAP). (in press)]

Native Plant Profile: Black Walnut (Juglans nigra). (n.d.). News.maryland.gov. https://news.maryland.gov/dnr/2021/06/21/native-plant-profile-black-walnut-juglans-nigra/

Ebrahimi, A., Lawson, S. S., Frank, G. S., Coggeshall, M. V., Woeste, K. E., & McKenna, J. R. (2018). Pollen flow and paternity in an isolated and non-isolated black walnut (Juglans nigra L.) timber seed orchard. *PLoS ONE*, *13*(12), e0207861–e0207861. https://doi.org/10.1371/journal.pone.0207861

Black Walnut slide 67c 360% slide 67b 360% slide 67d 360%. (n.d.). https://www.ag.ndsu.edu/trees/handbook/th-3-137.pdf

Home Baking Association. (2020, October 14). *In the Kitchen with Black Walnuts: America's Indigenous Baking Nut*. -. https://www.homebaking.org/in-the-kitchen-with-black-walnuts-americas-indigenous-baking-nut/?utm_source=chatgpt.com

Black Walnut : Indigenous Peoples' Perspective Project : Programs | Events : Adkins Arboretum. (2021). Adkinsarboretum.org. https://www.adkinsarboretum.org/programs_events/ipp/black-walnut.html?utm_source=chatgpt.com

BLACK WALNUT Juglans nigra L. Plant Symbol = JUNI. (n.d.). https://plants.usda.gov/DocumentLibrary/factsheet/pdf/fs_juni.pdf

Black Walnut Trees (U.S. National Park Service). (n.d.). Www.nps.gov. https://www.nps.gov/articles/000/cny-treephenology-blackwalnut.htm

ReadingEagle. (2016, May 2). *The Historian: Black walnuts in local folk culture*. Reading Eagle. https://www.readingeagle.com/2016/05/02/the-historian-black-walnuts-in-local-folk-culture/