

# BLACK WALNUT

Most of us like to eat walnuts. We eat them plain or we mix them with other foods that we enjoy. Walnuts can be easily purchased at almost any supermarket.

However, the walnuts that we buy at the store are actually the English, French, Madeira, Carpathian, Persian, or Common Walnuts (*Juglans regia* L.). These walnuts were originally from Eurasia but are now cultivated in the United States, especially in California.

There are a few Walnut species that are native to America. One that is native to Ohio is the Black Walnut (*Juglans nigra* L.).

The Black Walnut is a member of the Walnut Family (Juglandaceae). The generic name, *Juglans*, is from the Latin word, *Jovis glans*, which means “Nuts of Jupiter”. Jupiter (or *Jovis*) was the Roman name for the Greek God, *Zeus*. A walnut was considered to be a nut of a God. The specific epithet, *nigra*, is Latin for “black”. A scientific synonym for the Black Walnut is *Wallia nigra* (L.) Alefeld.

The common name, Walnut, is from the German word, *Welshnuss*, which means “foreign nut”, probably because the Common Walnut had traveled all over Europe. The common word, “nut”, came from the Latin word, *nux*. Other common names for the Black Walnut are the American Walnut, Eastern Black Walnut, and Walnut.

The Black Walnut tree is a shade-intolerant tree. It is a fast-growing tree when young and is a long-lived tree, sometimes living for up to 250 years.

## Allelopathy

The Black Walnut is an allelopathic tree. It contains toxic chemicals that inhibit the presence of other plant species.

This tree contains juglone, which is an allelopathic quinone that is toxic to other plants and that inhibits their growth. Juglone is highly concentrated in the buds, the hulls, and the roots. It is less concentrated in the leaves and in the stems.

When the juglone is contained within the tree, it is in the form of a glycoside, hydrojuglone, which is clear and non-toxic. When it comes into contact with the air, the hydrojuglone becomes the light brown and toxic juglone.

Juglone is either leached into the soil from the fallen leaves or is exuded from the tree’s dead or living roots. Juglone raises the pH of the adjacent soil, which affects many nearby plant species. Some species cannot tolerate juglone and other species can tolerate it. Young Black Walnut seedlings cannot tolerate juglone.

Juglone can also have adverse affects on animals. Horses are especially susceptible to this chemical. Bedding made of Black Walnut sawdust can make a horse very ill.

To help ensure propagation of the Black Walnut, many species of rodents (*Rodenta*) will bury these nuts away from the tree in small caches. Some of these caches may be up to 50-100 feet from the tree. The buried nuts that are not recovered may later germinate.

## Lumber Uses

The wood of the Black Walnut is probably the most valuable wood in North America. It is easily worked, takes a fine polish, and is used for airplane propellers, cabinetry, coffins, furniture, gunstocks, interior finish and paneling, shipbuilding, veneer,

waterwheels, and woodenware. It was a highly popular furniture wood during the 19<sup>th</sup> Century.

Gunsmiths favored this wood because there was less jar and recoil. The old saying in the military, “to shoulder walnut”, used to mean enlisting into the military.

The demand for Black Walnut wood is so high that it was almost harvested into extinction. It takes nearly a century for a Black Walnut lumber tree to fully mature. A fully mature tree, which is now quite rare, may be worth tens of thousands of dollars to a lumber mill. This tree is so valuable that thefts of these trees have occurred. There has even been Black Walnut tree rustlings occurring here in central Ohio.

When the Black Walnut trees were more common, they were also used for charcoal, fence posts, fence railing, firewood, and railroad ties. The wood was first exported to England in 1610.

## **Edible Uses**

The kernels or nutmeats are edible, tasty, and oily. Many people say that they taste better than the store bought Walnuts. These nuts are highly nutritious and contain beta-carotene, protein, vitamins A, B (thiamine, niacin, and riboflavin), and C, and the minerals iron, magnesium, phosphorous, potassium, and sodium. They also contain the fatty acids, linoic acid and linolenic acid.

These nuts can be eaten straight or can be mixed with other foods. Many recipes using the walnuts were listed in Martha Washington’s *Booke of Cookery*. However, excessive consumption of these walnuts may have a laxative effect on some people.

Walnuts can even be made in to walnut butter. However, this butter should be refrigerated to keep the oils from going bad.

The nuts are also eaten by many species of animals, especially squirrels. By observing the holes on the nutshells, one may be able to identify some of the species that consumed the nuts. The Eastern Fox Squirrel (*Sciurus niger* L.) and the Eastern Gray Squirrel (*Sciurus carolinensis* Gmelin) make 2 large holes on each side of the nutshell. The Red Squirrel (*Tamiasciurus hudsonicus* [Erxleben]) makes a hole from only 1 end. The Southern Flying Squirrel (*Glaucomys volans* [L.]) makes 4 circular side holes.

These nuts can be ground and used as feed for livestock. However, the husks and moldy nuts are toxic to livestock.

The sap of the Black Walnut contains sugar. Like the sap of the Maple trees (*Acer* sp.), it can be tapped and boiled done to sweet syrup. Unlike the Maple Syrup, this syrup has a high concentration of a more processed sugar, which is similar to white sugar.

## **Medicinal Uses**

Aside from the lumber and the food uses, the Black Walnut had medicinal uses. Different parts of the tree served different purposes.

The bark was made into a tea and was used as an emetic and as a purgative. The bark tea was also used as an astringent, a wash, or as a gargle for sore mouths, sore throats, or diphtheria. The bark was chewed as a treatment for toothaches. The bark was also used as a poultice for wounds, headaches, inflammations, and snakebites, or for treating various skin ailments, such as eczema or ringworms.

The fruit's husk (or hull) was chewed for treating colic. The juice was used as a gargle, a purgative, and a vermifuge. The husk has also used as a poultice for inflammations, athlete's foot, ringworms, toothaches, warts, and hemorrhoids.

The leaves were used as an antifungal, an astringent, a salve, and a tonic. A leaf tea was used for treating sores and running ulcers.

Even the nuts had medicinal uses. The oils from the nut were used externally for treating skin ailments, wounds, and toothaches. The nutmeat was supposed to cure mental illness. According to the medieval *Doctrine of Signatures*, because the shell and the kernel resembled the human brain, it was believed that all walnuts could cure mental illnesses.

The leaves and the fruit both contain ellagic acid. Ellagic acid may have some anti-cancer properties.

The husks contain tannin, juglandic acid, juglandin, and juglone. The toxic juglone has sedative properties, which are similar to diazepam. Juglone may have antibiotic or antifungal properties and may also be used for treating cancer.

## **Other Uses**

The fruit of the Black Walnut serves other purposes. The husks were used in tanning leather. The bruised husks were once used to stun fish, but it is now an illegal practice in most areas.

The husks were also used in making a yellow-brown to black dye for cotton and wool cloth. To make this dye, the husks were first soaked and then boiled in water. The solution was then strained and cooled. Afterwards, the cloth was placed in the solution, boiled, and then simmered for about 1 hour.

To avoid staining the hands when peeling off the husk, it is best to use gloves. Promptly applying lemon juice or bleach to the stained hands may sometimes remove the stains. Handling the husks (and the leaves) may cause contact dermatitis to some people.

It may also be helpful to store the fruits in a pile and to allow the hulls to dry. Dry husks are soft and brittle and are easier to remove.

After the husks are removed, the nuts should be spread out and thoroughly dried for about 2-3 weeks before consuming them. Undried nuts may become moldy.

The hard nutshells were ground and had a few uses. They were used as an abrasive material for polishing metals, cleaning jet engines, scrubbing smokestacks, and as blasting grit. They were also used as anti-slip agents for tires, as activated charcoal, or were used as filler for spices or for textured paint. The Middle Woodland Indians of Ohio and Indiana carved some of these shells into shapes of birds or used them as pierced earrings. Remains of some of them have been found while excavating their mounds.

The nutmeat oil was boiled from the groundnuts. It was used in making hair oil, artists' paint, and soap.

The bark had some uses. It was used for tanning leather or was used as a dye. The brown bark made a yellow to brown dye and the black bark made a black dye.

The leaves also had their uses. They were used for making a green dye. These leaves were also used as an insect repellent.

Because of Black Walnut's popularity, it was preserved or planted on many new farms and homesteads. George Washington planted some at Mount Vernon and Thomas Jefferson planted some at Monticello.

## **Pests and Diseases of the Black Walnut**

The Black Walnut is susceptible to a number of animal pests. The Eastern Tent Caterpillar (*Malacosoma americanum*), the Luna Moth caterpillar (*Actius luna*), the Walnut Datana caterpillar (*Datana integerrima*), the Walnut Sphinx caterpillar (*Laothoe juglandis*), and the Walnut Lace Bug (*Corythuca juglandis*) all eat the leaves. The Black Walnut Curculios (*Conotrachelus retenus*) attacks the young shoots. The Walnut Blister Mite (*Aceria erinea*) produces felt-like galls on the leaf's underside. The Walnut Shoot Moth caterpillar (*Acrobasis demotella*) attacks the terminal buds. The Fall Webworm (*Hyphantria cunea*) builds their unsightly nests at the ends of the tree's branches. The Ambrosia Beetle (*Xylosandrus germanus*) bores under the bark. The Oystershell Scale (*Lepdosaphes ulmii*) sucks the sap from the tree. The Yellow-bellied Sapsucker (*Sphyrapicus varius* L.) drills unsightly holes in the bark to get to the sweet sap. The Whitetail Deer (*Odocoileus virginianus* [Boddaert]) will browse upon these twigs.

A number of diseases also attack the Black Walnut. Some of them are Bacterial Blight (*Xanthomonas juglandis*), Bull's Eye Spot (*Cristulariella pyramidalis*), Spot (*Mycosphaerella juglandis*), and Walnut Anthracnose (*Gnomonia leptostyla*). Other diseases are Nectria Canker (*Nectria galligena*), Fusarium Canker (*Fusarium* sp.), Cytospora Canker (*Cytospora* sp.), and Armillaria Root Rots, (*Armillaria mellea* and *Armillaria taboscens*).

## **DESCRIPTION OF THE BLACK WALNUT**

**Height:** 70-150 feet.

**Diameter:** 2-8 feet.

**Trunk:** The trunk is clear, straight, and deeply divided.

**Crown:** The crown is broad, open, and round. It may spread for up to 50 feet.

**Branches:** The branches are heavy and alternate.

**Leaves:** The leaves are alternate, pinnately compound, and deciduous. The leaves are about 8-24 inches long. The leaf petioles are stout and hairy. When crushed, these leaves may either emit a spice-scented or a pungent aroma. These leaves emerge late in the spring and drop early in the fall. In the fall, these leaves turn yellow or brown.

Each leaf has about 7-25 leaflets (usually in odd numbers) and has a smooth rachis. The terminal leaflet is either absent or is very small. Each leaflet is alternate, cordate, lanceolate, narrow, oblong, or ovate. The leaflet is about 1½-5 inches long, about ½-1½ inch wide, sessile or short-stalked, has finely irregular toothed margins, and has an asymmetrical base and a pointed tip. The leaflets are smooth and dark or yellow-green above and are lighter and finely hairy below, especially along their veins.

**Flowers:** The flowers are small, green, and monoecious. These flowers are wind-pollinated. The pollen may cause hay fever to some people. Flowering season is usually April to June.

The female flowers are arranged solitarily or in clusters of 2-5 short oval spikes. Each flower has a 4-lobed hairy calyx, no corolla, a 2-lobed style, and a 2-lobed feathery stigma that is yellow-green with a red tinge.

The male flowers are arranged in narrow, 2-5½ -inch long, single-stem catkins. Each flower has a 6-lobed calyx, no corolla, and about 8-40 stamens with purple anthers. To avoid self-fertilization, the male flowers usually bloom first.

**Fruits:** The fruits are arranged in drooping clusters of 1-3. Each fruit is globose, ovoid, or spherical, is about 1½-3 inches in diameter, and is surrounded by a tight, 1-piece, thick, yellow-green, fleshy or slightly hairy drupe. When the nuts ripen, these drupes (hulls or husks) turn brown. Fruiting season is usually September to November.

Inside of the drupe is a single, dark brown or black, rounded or oval nut. This nut is about 1¼- 1½ inch in diameter. The nutshell is hard, thick, dark brown to black, and has irregular corrugated furrows and grooves or ridges.

Inside of the shell is the nutmeat or the kernel. This kernel or nutmeat is 2-4-celled at the base.

The trees begin to produce fruit after about 20-30 years of age. A given tree usually produces a good crop about every 2-3 years. Trees in open areas usually produce more fruit than trees in wooded area. In a good productive year, one Black Walnut can produce up to 3000 fruits.

**Roots:** The young trees set a deep taproot during their first year. As the tree matures, its roots become both shallow and wide spreading. These widespread roots may extend up to twice the length of the crown radius.

**Twigs:** The twigs are brown, stout, rigid, and brittle. The young twigs are lighter and have rust-colored hairs. The older twigs are darker, smooth, and have orange lenticels. These lenticels allow oxygen intake into the tree during the winter months. These twigs have a bitter taste

The pith is light brown to cream-colored and is chambered. These chambers are separated by woody diaphragm partitions.

The leaf scars are obcordate, 3-lobed, hairless, and are deeply notched on their upper margin. These leaf scars have 3 groups of bundle scars that are arranged in a U-shaped line.

**Buds:** The terminal bud is blunt, ovoid, light gray, slightly hairy, and is about 1/3-3/8 inch long. The lateral buds are hairy, gray-white, about 1/8-¼ inches long, and are superposed above the leaf scar. These buds have very few bud scales.

**Bark:** The young bark is gray or light brown and scaly. The older bark is dark brown to black and has deep furrows with rounded or sharp, intersecting, blocky ridges

**Wood:** The wood is heavy, hard, strong, durable, shock-resistant, ring-porous, and is close- and straight-grained. It won't easily check, shrink, swell, warp, or splinter. Its heartwood is dark purple-brown to black and its sapwood is light yellow.

**Habitats:** Mixed mesophytic forests, rich woods, uplands or bottomlands, open areas, roadsides. They prefer alkaline soils. These trees may be solitary or in small groves. They are rarely found in pure stands.

**Range:** The Black Walnut is found in the eastern half of the United States, except for the extreme northeast and the extreme southeast.

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