



Black Walnuts

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Introduction

The two major varieties of walnuts grown for food in the U.S. are black walnut (Eastern black walnut, *Juglans nigra*; and California black walnut, *Juglans hindsii*); and Persian walnut (*Juglans regia*), also called Carpathian walnut or English walnut. Eastern black walnut is native to North America and is a valuable timber tree, long harvested for veneer lumber. Black walnuts also have a long history as a food ingredient, and Eastern black walnuts are one of the few wild-harvested commercial food crops in the U.S. Persian walnut trees were introduced in California by Spanish missionaries in the 1700s, and California dominates U.S. commercial Persian walnut production.

This profile focuses on Eastern black walnut for nut production. Persian walnuts are not recommended for commercial production in Kentucky, where Persian walnut is limited by cold temperatures, winter injury and late spring frost damage; walnut blight; and squirrels, which eat the nuts when they are immature. Detailed production information for both Eastern black walnut and Persian walnut is available in the University of Kentucky Extension publication ID-77, Nut Tree Growing in Kentucky. The University of Missouri offers a very detailed publication, listed in the Selected Resources section at the end of this publication, on establishing and cultivating Eastern black walnut for nut production.

Marketing

Nut crops are suitable to be added to many farm marketing plans, especially direct markets such as farmers markets, community supported agriculture or subscription sales, and on-farm stands. Eastern black walnuts are also widely collected throughout Kentucky and



surrounding states for wholesaling to hulling stations. Black walnut nutmeats are used in baking, ice cream, candies and other food preparations. State and federal food safety, labeling and other food manufacturing regulations, including allergen concerns, may apply when shelling nuts and making food products containing tree nuts. Hulled and cleaned in-shell black walnuts have also been used in some arts and crafts products.

Black walnut buying and hulling stations each fall purchase in-hull black walnuts gathered from native trees in yards, woodlots and forests. Black walnut trees are also used in conservation plantings, as well as agroforestry, where harvesting black walnuts can be combined with practices such as grazing or intercropping. The major black walnut processor east of the Rockies is Hammons Products Company, of Stockton, Mo. (www.black-walnuts.com). This company hulled and purchased black walnuts at about 25



¹Matt Ernst is an independent contractor with the Center for Crop Diversification.

buying stations in Kentucky in 2016. Walnuts are bagged in mesh bags after hulling, starting the drying process, and trucked to the Missouri processing plant. After shelling and nutmeat separation, black walnut shell is further processed and marketed as a co-product in abrasives applications.

Market Outlook

Tree nuts enjoy favorable consumer perception because of the nutrition profile of nuts. Tree nuts contain a favorable fat profile and are high in fiber, and tree nuts have gained popularity in snacking and meal choices among health-conscious consumers. Consumption of the major tree nuts (walnuts, pecans and almonds), which remained around 2 pounds per person during the 1970s and 1980s, doubled during the 1990s and early 2000s, according to the USDA. Tree nut consumption remained at 4 pounds per person from 2012 to 2015. This growth is mainly due to almond consumption, as walnut and pecan disappearance have each remained at about ½-pound per person per year in the U.S.



Black walnuts are low in carbohydrates and simple saturated fats and are a source of alpha-linolenic acid, an omega-3 fat. Walnuts enjoy a positive consumer perception, with U.S. consumers showing a willingness to pay premium prices for high-quality tree nuts. Eastern black walnuts also appeal to consumers seeking food from native species and food containing wild-harvested ingredients. Black walnut oil has gained some niche popularity as a native, specialty food product.

The wholesale price paid for in-shell black walnuts varies by seasonal supply. Prices are paid based on the weight of the nuts after hulling. Prices have recently ranged from about \$10 to as much as \$14 per 100 pounds of black walnuts, with prices slightly higher at hulling stations west of the Mississippi River. Hammons Products Co. reported that the price paid in 2016, \$14 per hundredweight east of the Mississippi at the beginning of the black walnut season, was the highest in company history.

Production considerations

Cultivars

Cracking qualities, anthracnose resistance and

tendency toward alternate bearing are major considerations for black walnut cultivar selection. The selection of a walnut cultivar should combine cultural considerations with desired nut quality; consult university cultivar recommendations during selection. Cracking qualities include thinner shells and a high kernel percentage, characteristics found in cultivars like ‘Thomas Myers,’ ‘Pounds 2’ and ‘Neel 1’. Many black walnut cultivars produce a higher nut volume every other year; some cultivars like ‘Surprise’ show a lower tendency toward alternate bearing.

The Eastern black walnut industry is moving toward orchard plantings of cultivars improved for nut production, trees which produce higher quantities of nuts with thinner shells than most native trees. Establishing black walnut trees grafted to cultivars with desirable characteristics is a best management practice for long-term success with black walnut trees for nut production.

Site selection and planting

Walnut trees grow best in deep, well-drained soil with medium to good fertility. The University of Kentucky recommends a soil pH of around 6.5; black walnuts can thrive in soils with a pH slightly higher or slightly lower than this. Sites for nut orchard establishment should have soil with good water holding capacity. Supplemental watering or irrigation may be necessary during establishment, especially dry years, as walnuts do not do well in drought conditions.

Walnuts may be planted from seed, seedlings, or grafted trees. Seeds must be stratified before planting. Trees started from seeds or seedlings should be grafted to the desired variety. Grafting black walnuts is more challenging than for most other nut trees; grafted trees will produce nuts faster but may be more expensive or less available. Proper soil fertility, hole preparation and weed management will improve the likelihood of superior tree growth during establishment. Wildlife prevention is an important consideration as squirrels challenge establishing walnut trees from seed, and rabbits and rodents can damage young trees. Appropriate measures should also be taken to protect young trees from sunscald.

Adjust soil fertility at least one month before planting, based on soil test recommendations. Apply fertilizer in late February, increasing the amount applied as the

tree grows, following university recommendations for fertilizer type and quantity. Apply lime in late winter, as needed to keep soil pH above 6.0.

Pest management

Walnut trees should be managed for diseases and insects, as well as protected from wildlife damage. Walnut anthracnose is the major disease affecting black walnut trees in Kentucky. Spores of the anthracnose fungus, *Gnomonia leptostyla* (*Marssonina juglandis*), are expelled in the spring from dead walnut leaves on the ground. Infection on walnut leaflets appears as irregular, dark brown spots in early summer. Secondary spread to nearby foliage then occurs, more likely in wet conditions. Planting resistant cultivars is critical for black walnut production in Kentucky. Anthracnose defoliates trees in wet seasons and the nuts fail to produce nutmeats or produce shriveled kernels. Other diseases with possible effects on black walnut trees in Kentucky include crown gall, bunch disease, powdery mildew and shoestring root rot. Thousand cankers disease is a fungus disease vectored by the walnut twig beetle that kills black walnut trees. This disease does not spread rapidly and has not been found in Kentucky, but has been detected in several surrounding states.

Insect pests in walnut trees may be controlled through preventative measures and insecticide treatments. The two major insect pests in commercial black walnut orchards are walnut curculios and walnut husk flies. Walnut caterpillars and fall webworms can also cause leaf damage in Kentucky walnut plantings. Other possible insect pests of walnuts in Kentucky include aphids, walnut lace bugs and borers. Scales, stinkbugs and twig girdlers may also impact tree health. Monitoring and scouting insect populations, and developing an appropriate Integrated Pest Management (IPM) for the specific site, is essential for long-term nut crop success.

Harvest and storage

Black walnuts fall from the tree in their characteristic green hulls. The hulls should be removed as quickly as possible, as they can cause discoloration and off-flavor to the nut meats. In-hull black walnuts may be collected by hand, by raking or using hand tools designed for picking up nuts, or by using mechanical nut gathering equipment. The hulls are best removed with a mechanical huller. Home harvesters, of smaller

quantities of black walnuts, may hull the walnuts by using a rubber mallet or stomping off the hulls. Black walnuts that are mechanically hulled are placed in mesh bags to begin drying; some home harvesters wash the nuts to remove hull fragments and the black hull stain.

Black walnuts should be dried, for at least two weeks in a cool spot with good air circulation, before cracking.

Labor requirements

The diversity in walnut planting methods, as well as the equipment used to harvest walnuts, creates highly variable labor requirements for walnut production. Hand harvest, with assistance from hand tools, may be suitable for smaller nut production. Modified pecan harvesters and mechanical hullers may be used for larger production settings. Total labor hours required for nut orchard establishment and production greatly vary according to the type of nursery stock, wildlife control methods and pruning times.

Economic considerations

The main costs of establishing walnut trees for nut production are the purchase costs of the trees and the cost of wildlife prevention (deer, rabbits, rodents). Annual costs will include weed control, pruning labor, and insect and disease management. Harvest costs will include either wage rates for hand labor or purchase of mechanical harvesters.

Producers interested in establishing a walnut orchard for nut production will need to have a marketing plan in place for the nuts. A financial analysis model developed at the University of Missouri indicated a 14-year breakeven period for a 10-acre black walnut orchard planted for nut production, based on a nut price of 29 cents per pound. Establishment costs per acre were estimated about \$650 for planting costs, mainly the cost of 25 trees, and about \$400 per acre for wildlife barriers. The longer payback period and high price per pound, compared to Kentucky wholesale prices for in-shell nuts, means producers would likely need to realize other land management or economic benefits from establishing an orchard for wholesale production. Selling black walnuts at higher prices, or as part of value-added food products, will improve the profitability outlook.

Black walnuts are purchased at hulling stations based

on the weight of the hulled nuts, with prices typically between \$10 and \$15 per hundredweight east of the Mississippi River. The time required for hand harvest, combined with the time or mileage required to transport and unload in-hull black walnuts, means it is important for a hulling station to be located nearby the collection point for most walnut gatherers to generate a reasonable hourly wage equivalent. Other, non-financial benefits can be realized from black walnut collection; these include removal of the nuts from yards and landscape, outdoor leisure activity and exercise, and an activity with some financial payoff for youth learning basic business and entrepreneurship skills.

Black walnut trees grown for nut production are planted farther apart than those for timber production, which produces a more spreading branched tree that is not as desirable for logging.

Selected Resources

- “Nut Tree Growing in Kentucky.” (University of Kentucky Extension Publication ID-77) <http://www2.ca.uky.edu/agcomm/pubs/id/id77/id77.pdf>
- Growing Black Walnut for Nut Production. (University of Missouri Center for Agroforestry, 2009) <http://extension.missouri.edu/explorepdf/agguides/agroforestry/af1011.pdf>

- Selling Black Walnuts in Kentucky - 2016 (University of Kentucky Extension Publication FORFS 16-29) https://forestry.ca.uky.edu/sites/forestry.ca.uky.edu/files/forfs16-29_selling_blk_walnuts.pdf
- The Kentucky Nut Growers Association <http://www.pawpaw.kysu.edu/KNGA.htm>
- “Why Black Walnuts?” (Nutritional Information, University of Missouri) <http://www.centerforagroforestry.org/pubs/whywalnuts.pdf>
- USDA/ERS Fruit and Tree Nuts Yearbook Tables <https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/yearbook-tables>
- Hammons Products Company www.black-walnuts.com
- Eastern Black Walnut: Potential for Commercial Nut Producing Cultivars. (Purdue University, 1990) <https://hort.purdue.edu/newcrop/proceedings1990/V1-327.html>
- Walnuts in California <http://fruitandnuteducation.ucdavis.edu/fruitnutproduction/Walnut/>

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