



Planting Black Walnut

Black walnut (*Juglans nigra*) is the most commercially valuable tree in Kansas. Its chocolate-colored wood is highly desired for fine furniture, veneer, interior finish, cabinets, and gun stocks. The wood is straight grained, strong, heavy, decay resistant, easily worked with tools, and shrinks and swells little after seasoning. Many consider the nutmeats a delicacy and the ground shells are used as abrasives.

Planting black walnut is a good long-term investment for landowners. In most cases, the cost of planting is borne by one generation and the income from sales received by the next. However, financial incentives are often available through government programs to help landowners with establishment costs. This publication outlines the elements necessary for successful establishment of black walnut.

Site Selection

Black walnut will grow under a variety of site conditions. However, selecting a site where black walnut will thrive is an important factor for success. Most often the best sites will be found on well-drained loamy bottomlands not subject to prolonged flooding (3 to 4 days of standing water). During the growing season, floods that submerge young crowns for more than 2 days usually kill the trees. Good sites

may be found in draws and along the base of north- and east-facing slopes of less than 15 percent. Black walnut grows best when crowns are exposed to full sun in an environment protected from wind and extreme temperature variations.

Soils. Optimum growth occurs in loamy soils (both sand and silt) of medium texture that is at least 3 feet deep. Avoid soils with restrictive layers of coarse sand, gravel, rock, or heavy clay. Black walnut likes fertile, moist, but well-drained, soils with high organic matter. Alternate streaks or blotches of yellowish brown, red, or gray may be an indicator of poor internal drainage.

Naturally occurring fragipans — layers of compacted soil associ-

ated with cultivation and the use of heavy equipment — can hinder root development.

The most important nutrients for good black walnut growth are available at a pH between 5 and 8, however, a range between 6.5 and 7.2 is best. Most Kansas soils suitable for black walnut have adequate fertility. However, it is always a good idea to test soil before planting since soil amendments are most practical during site preparation. For a small fee, local K-State Research and Extension offices can provide soil tests.

It is not a good idea to fertilize black walnut the first year of planting unless the fertilizer is a slow-release formulation or thoughtfully

Black Walnut Soil Nutrient Requirements for Major Elements	
pH	6.5 to 7.2
Organic Matter	2 to 3.5%
Nitrogen	0.25 to 0.3%
Phosphate	60 to 80 pounds per acre
Calcium	3,000 to 4,000 pounds per acre
Potassium	225 to 275 pounds per acre
Magnesium	375 to 600 pounds per acre

mixed into the soil during site preparation. Without a good weed-control program, any fertilization will be wasted. Fertilizing pole-sized trees is more likely to provide a better economic return.

County soil information is available on the Web site, <http://soil-datamart.nrcs.usda.gov> and from local conservation districts, Natural Resources Conservation Service, and local K-State Research and Extension offices. The information may include soil type maps (Verdigris and Kennebec are some of the best soils for black walnut), soil descriptions, and the suitability of various soils for tree planting. Keep in mind that although a soil type may be listed as suitable for black walnut, individual fields can vary considerably.

Before selecting a site for a black walnut plantation, it is always a good idea to examine soil characteristics firsthand with a probe or by digging a hole.

Site Preparation

Good site preparation saves a landowner time and money, and requires less weed and grass control after planting. Site preparation involves removing competitive vegetation, usually through cultivation or herbicide treatment. Site preparation also can require improving the physical and chemical condition of the soil. Methods and the degree of site preparation depend on the existing groundcover and erosion potential. General recommendations for preparing various planting sites are listed. Seek professional advice from a forester for specific recommendations.

Cropland. Since cropland is cultivated, it may not require site preparation, which in turn conserves soil moisture and limits the introduction of weed and grass seed. Whether or not to cultivate a cropland site should be decided on a case-by-

case basis since in some situations soil may become compacted into a “plow pan” or “hard pan” from years of repeated cultivation and use of heavy equipment on the site. In those cases plow or deep chisel in the fall and disc before planting in the spring. However, even with such treatments there is a possibility that the plow pan will return. Apply a glyphosate herbicide in the spring before planting if weeds and grass are present.

Abandoned Cropland. (invaded by grass, woody brush, or perennial weeds) If undesirable woody vegetation is present, treat with a nonselective herbicide after green-up in the spring, 1 year before planting, by broadcast spraying. Selective herbicide treatment also may be required. The following fall, mow as close to the ground as possible, and plow to a 12- to 18-inch depth. Disk prior to spring planting.

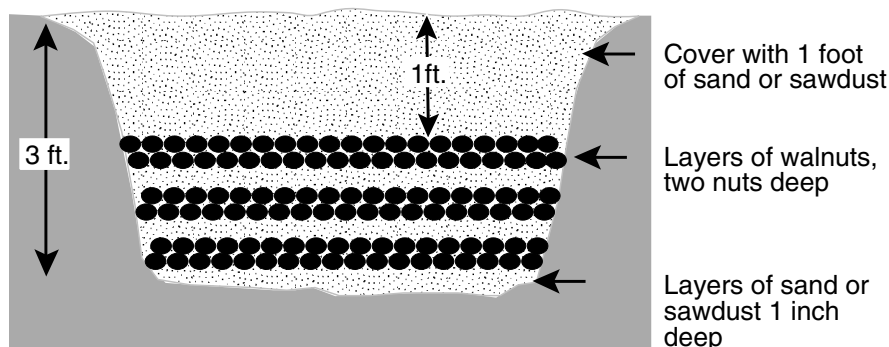
Grassland and Pasture Sites. Apply a broadcast treatment with a glyphosate product to kill grasses. Timing of application depends on whether it is a warm-season (native) or cool-season grass such as brome or fescue. Warm-season grass should be killed in August in the boot-to-early seedhead stage and cool-season grass in the fall when there is 6 to 12 inches of new growth. Burning or mowing in the spring can reduce residue and

make fall treatments more effective. Cool-season grasses also may be treated in early summer if the grass is actively growing in the boot-to-early seedhead stage. Kill grass that surrounds tree plantations and apply annual spot treatments as necessary to prevent grass spreading back into the trees. After herbicide treatment, cultivate the site according to the instructions provided for abandoned cropland.

Forest Openings and Conversion. Black walnut requires full overhead sunlight for proper growth and development. For this reason it is best to clear a circular area of at least 1 acre or 236 feet in diameter. Two acres are even better (333 feet in diameter circle). If deer damage is a problem, then even larger areas should be cleared and damage protection measures considered.

When creating new openings or expanding existing ones, all trees that shade the planting area should be killed with a selective herbicide. Converting areas of unwanted trees such as honeylocust, boxelder, elm, and osage orange may be done by hand clearing or bulldozing. Treat stumps and girdle cuts with an approved herbicide to prevent sprouting. If competing grasses and/or shrubs exist, treat as outlined in abandoned cropland. Plant black walnuts into existing forest litter.

Figure 1. A walnut stratifying pit.



Underplantings. Planting black walnuts in the shade of existing trees is recommended only if all competing trees are removed from the site within 2 years. Dense shrub growth, small trees, and stump sprouts must be controlled.

Selecting Seedlings and Nuts

Either seedlings or nuts may be planted. Bare-root black walnut seedlings and stratified nuts can be ordered for spring planting from Kansas Forest Service, through local K-State Research and Extension offices, or county conservation district offices.

Know the source of the seedlings and nuts. Research on provenance performance suggests that seeds collected from trees within 100 miles north or south of the planting site have the greatest survival rate. Seeds collected from areas within 200 miles south of the planting site grow significantly taller. It is also a good idea to limit the seed source to within 200 miles east and west of the planting site. Seed sources east of Missouri should not be considered for Kansas. Seedlings from other parts of the country are generally not adapted to the Kansas climate and growing conditions.

Spacing

Proper spacing depends on whether trees are being grown for nut production or for timber products. For timber production, no fewer than 300 trees per acre (12 feet by 12 feet) should be planted. A 10-foot by 10-foot spacing provides 436 trees per acre. Spacings less than 10 feet by 10 feet will provide even more trees to choose from when selecting crop trees, which will increase growth and stem quality, shortening the time it takes for canopy closure and reducing the time span required for weed and grass control.

Trees should be planted at square spacings to encourage canopy closure and for distribution purposes when the thinning process begins. When planting black walnut for nut production, recommended tree spacing is 30 feet by 30 feet, or 48 seedlings per acre. Although any walnut tree can be used as rootstock for grafting on quality nut producing cultivars, nuts from the cultivars *Kwik-Krop*, *Sparrow*, and *Giles* produce superior rootstock trees.

Planting Nuts

Black walnut is a good tree to plant from seed. It tends to have a 60 to 70 percent germination rate and although the husk is messy, it prevents the seed from drying out. Large nut crops occur every two to three years. Nuts can be collected locally beginning in late August when husks change color. Seed viability percentage can be estimated before collecting a lot of nuts from a tree by cracking or cutting 10 seeds to determine freshness, color, moisture and the presence of mold or insects. Collect seed from high quality trees and store it in piles less than 10 inches deep to avoid “heating up” and losing viability. Nut piles should be protected from squirrels.

Nuts should be planted in the fall with the husk on at a 2- to 3-inch depth. Recommended rates for broadcasting black walnut, which may be accomplished with a fertilizer spreader, are 3,000 to 4,800 seeds per acre. Recommended rates for planting seed in rows with a direct seeding machine or by hand are 1,500 to 3,000 seeds per acre.

Stratified nuts can be planted in the spring. Walnuts are stratified by being subjected to 90 to 120 days of 31 to 41 degrees Fahrenheit temperatures (what they would normally endure if planted in the fall). Nuts may be stratified with hulls on, or

hulls can be removed. If hulls are removed, floating nuts in a tub of water can test viability. Discard all nuts that float and store in a stratifying pit (Figure 1) or in a refrigerator at 41 degrees Fahrenheit. It may be necessary to cover stratifying pits with chicken wire to protect nuts from predators.

Establishing black walnut by seed is a good choice for large plantings and for people who want to plant in the fall. Nut plantings avoid transplant shock that can occur in seedlings. Knowledge of correct collection, handling, planting, and weed and grass control for the first 3 years is critical for success. Assume that purchased seed is neither stratified nor tested, and must be planted in the fall or stratified by cold storage for spring planting.

Planting Seedlings

Seedlings can be planted with a tree planting bar, shovel, power auger, or tree planting machine. Planting holes should be wide and deep enough to accommodate roots without doubling or twisting.

Black walnut seedlings often have a long, well-developed taproot and a large mass of fine feeder roots. If possible avoid pruning roots. However, roots grow so quickly in nurseries that it may be necessary to lightly prune them with sharp pruning shears to fit seedlings into planting holes. Plant seedlings at or ½ inch below the depth they grew in the nursery, evident by a color change just above the swollen area on the taproot. Water trees immediately after planting and, if practical, every 7 to 10 days during a prolonged drought.

Species such as red oak and other trees with similar growth rates can be planted along with black walnut in the plantation. Shrubs planted along borders of the plantation will provide food, cover, and nesting

habitat for wildlife. Two experienced tree planters can hand plant 1,000 to 1,500 trees in a day. For large plantations, a three-person machine planting crew can plant 4,000 to 6,000 seedlings in a day. Tree planting machines are available from the Kansas Forest Service. In addition, several county conservation districts and district offices of the Kansas Department of Wildlife and Parks have tree-planting machines available for public use.

Post-Planting Care

The area around young trees should be weeded as often as necessary to prevent competition, especially during the first 3 to 5 years. To obtain best growth, keep trees free of weed and grass. Weeds can be controlled over the entire plantation area, in 4-foot strips along tree rows, or in a 4- to 6-foot radius around each tree. Both cultivation and the use of approved pre- and/or postemergence herbicides are effective weed control options. In areas

not subject to flooding, fabric mulch can be used to control vegetation in the row. Some introduced ground covers — such as hairy and crown vetch, or Crimson clover — can actually increase tree growth if managed properly.

Tree plantings must be protected from fire, livestock, wildlife damage, and misuse of herbicides. Inspect your planting periodically for problems such as insects, disease, and wind or ice damage. Deer damage has become a common problem and should be considered before planting.



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Additional Information

Tree planting plans, site evaluation, and post-planting advice are available from your district forester, local K-State Research and Extension office, Natural Resources Conservation Services county office, and Kansas Forest Service at Kansas State University, Manhattan.

Programs may be available to help with the cost of planting and establishing black walnut stands.

Related Publications

The following publications are available on the World Wide Web at www.oznet.ksu.edu

- *Tree Planting Guide*, L-596
- *Chemical Weed Control in Tree and Shrub Plantings*, MF-656
- *Improving Black Walnut Stands*, L-718
- *Deer Damage Control Options*, C-728

The following publication is available at on the World Wide Web at www.centerforagroforestry.org/

- *Propagating Pecan and Black Walnut in Missouri*, University of Missouri Center for Agroforestry

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