Woodland Management

Growing Black Walnut in Iowa

Select the Right Planting Site

Black walnut can be grown commercially throughout Iowa except in the northwest corner (figure 1). But even in the northwest corner it can be grown if old walnut trees near the planting site have demonstrated the suitability of the local environment.

Selection of a poor planting site is a common mistake. Walnut is sensitive to soil and moisture conditions. Although walnut may survive if planted in dry, upland fields and pastures or on ridgetops, it grows slowly and is typically of poor quality. Worn-out cropland is usually not suitable for good walnut production. Land suitable for corn is probably fertile enough for walnut, but it may be compacted and have poor internal and surface drainage. Trees on poor sites often will be short, crooked, limby, and produce low-quality material that is not very marketable.

Suitable planting sites usually are found in sheltered draws, on natural terrace formations or second bottomlands, and at the base of north- and east-facing slopes. Best growth usually occurs on deep, sandy loam or silty loam soils that are fertile and well-drained, but with good water-holding capacity, and that are porous to a depth of at least 24 inches. Good growth also will occur on bottomlands along streams if the area is not subject to flooding that lasts several days during the growing season. Avoid planting in clay soils, poorly drained flats, or gravelly areas. The best sites generally occur as narrow strips or small areas. Forest openings 100 feet or wider make good planting sites if the soil is suitable. Presence of vigorous walnut trees in the immediate area is a good indication of a favorable walnut site.

Avoid planting large plantations, since much of the tending necessary to get the plantation off to a good start must be done during the growing season when farm or other work schedules are already crowded. A small, successful plantation is better than a large failure.

Avoid planting walnut in areas that will be exposed to herbicide drift. Walnut is very sensitive to many herbicides used in agriculture.

Do not plant in fence rows or near buildings. Walnut buyers are wary of such trees because the wood often contains imbedded metal that will damage expensive processing machinery, such as lathe knives, planer knives, and saws.

Prepare the Planting Area

Site preparation and weed control are essential for seedling survival and fast growth. Fields covered with dense, tall, perennial weeds and grasses should be disked thoroughly before planting. Where this is not possible, planting areas at least 3 feet in diameter can be scalped by hand with a grub hoe, mattock, or spade. Another alternative for site preparation is to use a nonselective herbicide to kill competing vegetation in strips or 3-foot planting circles.

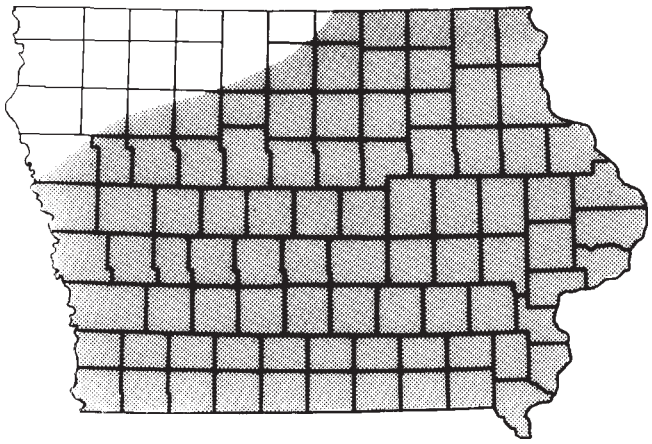

Figure 1. Shaded area shows generalized commercial range of black walnut in Iowa.

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Pre-emergent herbicides that kill germinating weed seeds can be used to keep the area around the seedlings free of weeds. Do not till or work the ground after the herbicide has been applied. Careless handling of chemicals can be dangerous to yourself and the seedlings. Follow the instructions on the label and, when in doubt, check with your dealer, district forester, or county extension education director.

You need not remove forest litter when planting forest openings. Remove areas of dense underbrush by cutting it and spraying stumps with an appropriate herbicide or by foliar application of herbicide during the summer preceding planting. Use a garden hand sprayer on brush up to 10 feet tall; a backpack mist blower is effective on taller saplings. Use foliage sprays only on calm, clear days to avoid damage to nearby crops and trees.

When enlarging existing openings or making new openings, fell trees that will shade the planted walnut. Treat the stumps with herbicide to prevent sprouting.

Plant Large Seedlings or Good Seeds

Seedlings can be purchased from the State Forest Nursery at Ames, Iowa, or from private nurseries. For good growth, the seedlings should be dormant, have 10- to 14-inch tops, and a stem diameter (1 inch above the root cellar) of at least 1/4 inch. Larger seedlings are better as long as the root system is correspondingly large and fibrous. Do not plant seedlings that are not dormant, have broken taproots, or have root rot.

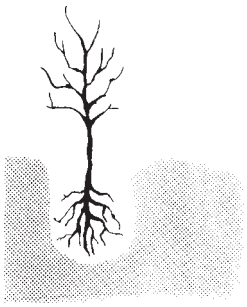
Spring is the best time to plant. Plant as soon as the frost is out of the ground. The soil is moist at this time, the climate is mild and humid, and the trees are dormant. When placed in the soil, the rootlets will start growing when the soil becomes warm enough for plant growth.

Plant the seedlings as soon as possible after they arrive from the nursery. Seedlings come bundled in durable water-holding material or packed in plastic to preserve moisture. They can be stored in a cool, shady place for several days without deteriorating. Turn the bags every day to promote even moisture distribution. The bundles also may be kept in cold storage for several weeks if they are kept between 35° and 40°F.

An alternative, although less desirable, method is to "heel-in" bare-rooted stock. Trees properly heeled in can be held for 2 to 3 weeks. The procedure is as follows: dig a sloping trench in a moist, shady spot on a north slope; place the trees along the sloping side of the trench; immediately pack and cover the roots with moist soil; water moderately; and cover the tops with straw or burlap.

Keep the roots of the seedlings moist and cool during planting. Dried out seedlings generally have poor survival. To keep the seedlings from drying during planting, carry them in a bucket of water or in a planting box with their roots wrapped in saturated material such as the sphagnum moss or shavings in which they were shipped from the nursery.

Walnut seedlings have large roots. Be sure the planting hole is wide and deep enough to accommodate the roots in their natural position. Avoid doubling or twisting the roots. Set the trees so the root crown is about an inch below the surface of the ground.

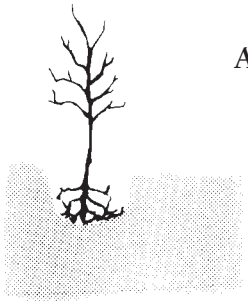


Do

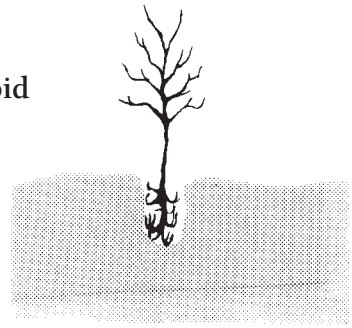
Set the tree slightly deeper than it stood in the nursery. Pack soil firmly around roots.

Make the hole large enough to spread roots naturally.

Avoid



Tree set too shallow.



Roots crowded and turned up.

Planting seed is easier and cheaper than planting seedlings, but it has some disadvantages. Seed must be collected and stored, planted seed must be protected from pilfering rodents, and germination may be poor. But these are not insurmountable problems.

It is best to collect the walnuts yourself from local trees or buy stratified walnuts from a reputable nursery. ("Stratification" involves a seed treatment to break dormancy and to promote rapid, uniform germination.) In this way, the new trees will be suited to local weather extremes. If you collect your own seed, select seed from the best trees with straight, clear trunks having no bumps, rot and frost cracks. Do not collect seed from crooked, short-bodied, limby and forked trees. Collect the nuts soon after they fall. Do not collect nuts that have been on the ground during the winter. Crack a few nuts before collecting to be sure they are good.

Remove the husks and store the walnuts in a stratification pit during the winter. Stratification matures the seed embryo so that it will germinate in the spring when the soil warms. The pit should be well drained but moist. It may be located on a slope or in deep, porous soil but never in a poorly drained area. The pit should be about 2 feet deep, with the walnuts placed in layers two nuts thick separated by layers of sand. Do not let the nuts dry out before, during, or after stratification. Nuts that are stored dry through the winter will not germinate. Cover the pit with at least 1 foot of soil to prevent excessive freezing or drying.

Plant the nuts in the spring before they begin to sprout. Make a hole 2 to 3 inches deep and drop in a nut. Fill the hole with soil and press firmly to remove air pockets. Do not apply pre-emergent herbicide over planted nuts.

Use the Right Spacing

Proper initial spacing between trees is important. A relatively wide spacing of about 10 feet by 10 feet usually is recommended for walnut plantations. Closer spacing, such as 7 feet by 7 feet, may promote more natural pruning of the lower branches, but more thinning will be required to maintain a suitable growth rate. Wider spacing means fewer trees to plant and weed; closer spacing allows a wider selection of crop trees. A spacing of at least 10 feet is required if farm equipment is to be used for weed control.

Remember, you will harvest fewer trees than you plant. If you start the plantation with 450 to 700 trees, only about 100 or less will eventually be harvest.

Spacing of trees on forest sites may be irregular to take advantage of natural openings. Keep planted walnut seeds or seedlings at least 20 feet from the edges of openings to avoid shade and competition from adjacent trees.

In the large open areas, plantings can be a mixture of walnut and other species or all walnut. In mixed plantations, the other species act as a nursecrop by helping to form a dense shade under the stand by the time it is 15 to 20 years old. This dense shade encourages natural pruning of the lower branches, which improves the wood quality. It also prevents the development of dense undergrowth in the stand. Alternate rows of red oak, green ash and white ash, or another species that grows about as fast as walnut may be planted. Autumn olive also is a good species to plant with walnut in some cases. Autumn olive survives and grows best in the southern half of Iowa. Do not plant walnut with fast-growing species such as cottonwood, black locust or sycamore. These trees soon overtop the walnut. Conifers such as white pine also can make excellent companion plantings.

Walnut trees have thin foliage and do not produce dense shade under a pure stand. Pure plantings require more frequent pruning and weeding than mixed plantings, but they contain more walnut trees from which to choose the final crop trees.

Tend the Trees

Planting is merely the first step in growing black walnut. A farmer does not plant a row crop in the spring, and come back in the fall for a bumper harvest, but tends the crop—and so must a tree farmer. Plan to weed the plantation as often as necessary to keep weeds from overtopping and shading the seedlings.

Various chemicals have been used effectively to control weeds around seedlings. Your district forester or county extension education director can help you select the right chemical. Cross-cultivation with a tractor permits removal of all weeds in the plantation except those immediately adjacent to the trees. Keep equipment at least 12 inches away from the trees to avoid damaging the stems. Cultivate only as deep as necessary to control the competing vegetation. To decrease losses from frost heaving, do not cultivate late in the growing season during the first year. In hand cultivation, control all weeds within 3 feet of each tree. As the trees reach 8 to 10 feet in height, weed control becomes less important. However, on marginal sites, growth rate can be increased with continued control of competition.

Keep fire and livestock out of your plantation. Fire kills the trees or scars the boles, which weakens the trees and makes disease entry possible. Livestock trample the seedlings, rub off bark, and compact the soil.

Most native Iowa soils on good walnut sites provide sufficient nutrients for good growth of young walnut without the addition of fertilizer. Fertilizing the plantation when it is young may do more harm than good. The root systems of the seedlings are small and absorb only small amounts of the fertilizer. Applying fertilizer will stimulate weed growth, which may already be a problem. Take a soil sample when the stand is 8 to 10 feet high. If the analysis indicates a nutrient deficiency, applying an appropriate fertilizer may benefit the trees.

Remove one of the leaders from trees with forked tops during the first growing season to develop single-stemmed trees. Begin to remove the lower branches when the trees are 5 to 10 years old. Remove the

branches any time during the dormant season. Do not remove more than a third of the live crown at one time, and keep at least two-thirds of the total tree height in living crown. Prune before the branches become 1 inch in diameter. Remove sprouts from the bole before they develop into branches and cause knots in the wood. The goal is to have at least 17 feet of the bole free of branches and sprouts at harvest time.

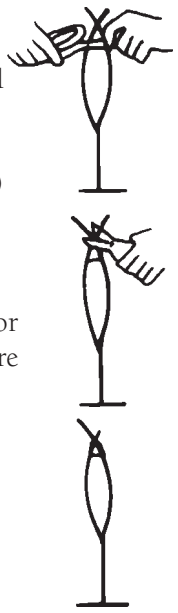
If the tree has a widely forked or multiple top, straighten the most promising leader by using one of more lateral shoots as support. Here is how to do it.

Bend the strongest, most promising shoot so that the tip is over the central axis of the main stem.

Bend another shoot (two, if necessary) so that it crosses the first one.

Fasten the shoots together with three layers of 1-inch masking tape. (Large or widely divergent shoots may need more wrappings of tape.)

Cut off the tip of the supporting shoot(s) just above the wrapping to eliminate potentially competing new growth.



When the tree crowns begin to touch, the plantation should be thinned. If thinning is done too early, crop tree selection is more difficult and growing space is wasted; if thinning is done too late, there is too much competition, which causes a loss of size and quality. If too many trees are removed during thinning, space and growth are wasted; and if not enough trees are removed, another thinning must be made sooner and individual trees may not benefit because they are not adjacent to an opening made by thinning. Leave trees that are at least as tall as their immediate neighbors. Best growth will occur on trees with their "heads in the sun." Trees that have the greatest potential for producing good quality wood in the shortest time have straight stems, undamaged bases, and no embedded nails or fences.

"Crop" trees are those trees you intend to grow until final harvest. They should be at least 30 feet apart. Some of the intervening trees may become salable for small sawlogs, but concentrate your cultural efforts on the crop trees. Nearby trees and brush will rob your crop trees of growing space, moisture and nutrients. Free them from this competition by clearing a space around each crop tree 8 to 10 feet beyond the edge of the crown. Cut all woody plants in this area and spray the stumps with herbicide. Follow-up release should be done when crown are within 6 feet of the crop tree on three sides.

Young black walnut grows 2 to 3 feet a year on the best sites. Even on less favorable sites, it may attain heights of 30 to 40 feet and diameters of 5 to 8 inches in 20 years. You could expect to harvest some small, 12-inch diameter logs in 30 to 40 years and 16-inch, veneer-quality walnut material in 45 to 50 years from most good walnut sites. Even though the minimum size requirements may be met in 30 to 50 years, it is often profitable to allow the better crop trees to remain until they reach 19 inches or more in diameter. The recommended procedure for marketing Iowa walnut and other timber is covered in the publication, *Marketing Iowa Timber,* Pm-413, from Iowa State University Extension.

Establishing and tending a walnut plantation involves a long-term investment of time and money. High-quality walnut veneer and sawlogs have increased in value in recent years and appear likely to demand high prices in the future. However, future values of high-quality walnut wood cannot be predicted. Substitution of other materials and changes in demand may reduce prices paid for fine walnut. It does seem likely that beautiful, versatile woods such as walnut will continue to bring high prices in the years ahead.

Seek Expert Assistance

A crop as valuable as walnut should be well planned. District foresters of the Iowa Department of Natural Resources can help you develop a plan for long-term management of forest production. As part of that plan, they can give on-the-ground technical advice on problems not covered in this publication. The extension forester at Iowa State University and county extension education directors also are available to provide publications and information on technical problems encountered in walnut management. Consultant foresters also provide technical services for timber owners.

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