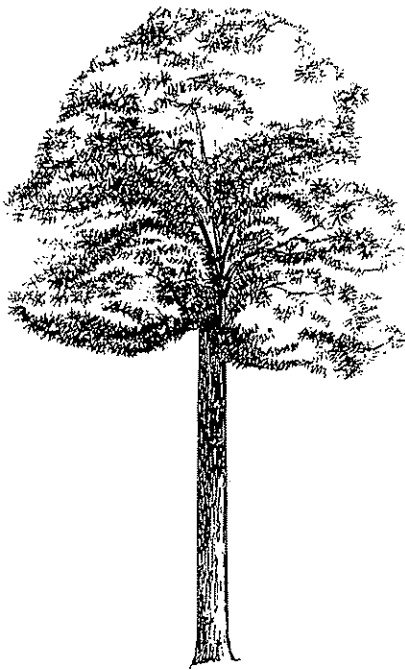


Growing
Walnut for
Profit and
Pleasure



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Forward

The purpose of this booklet is to suggest steps woodland owners can take to manage their black walnut and other high quality hardwood trees.

The results of years of observation, field experience, and hours of technical research have been summarized herein.

We acknowledge the support and technical assistance we have received from mills, timber buyers, foresters, and the many governmental and academic agencies who helped with this revision.

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The importance of walnut

American black walnut [*Juglans nigra* L.] is the most respected of North America's fine hardwoods. Walnut has many wonderful and practical physical properties, but most of the popularity of American black walnut is directly attributed to the beauty of the wood itself.

Walnut finishes to a naturally warm, rich color, yet it can be easily stained. The attractive grain patterns are always in style and express good taste.

Walnut's woodworking properties have earned the respect of fine craftsmen since the 16th Century. Black walnut, while native only to North America, is recognized worldwide as the "aristocrat of the fine hardwoods."

The wood of walnut is tough, workable, dent-resistant, easy to finish, yet of moderate weight. These characteristics are very important to designers, architects, and the woodworker who uses wood daily in his or her work.

Walnut is used in the manufacturing of household furniture, office furniture, exquisite interiors, beautiful flooring, and first-class architectural applications of lasting beauty.

Because of its shock resistance and unmatched beauty, the finest of gunstocks are still made from walnut.

The use of walnut in the manufacture of novelties and giftware is further test to its popularity.

Walnut is readily available, and supplies of this valuable, renewable natural resource are more sustainable than they were 40 years ago.

Walnut is a unique species

Because American black walnut is unique, timber growers have found it profitable to practice good forest management on individual walnut trees.

Walnut trees have brought consistently higher returns than other individual hardwood species.

Walnuts are found naturally scattered in our woodlands in the eastern half of the United States, yet they can be grown with success in plantations.

Through an agro-forestry approach, other crops can be grown and reaped while the walnut plantation is maturing.

On a good site, walnut is one of the easiest species to establish.

Properly managed walnut trees are a good investment.



Walnut crop tree

Working with existing trees

Black walnut is a fast growing, sun-loving species. On the proper site, if the walnut gets started at the same time as the other species, it can compete and will most likely become a dominant tree in the stand.

Since walnut needs sunlight in the early years, it will rarely be found in the dense under story of an existing stand of trees. Because of this intolerance, it is not recommended for inter-planting under existing trees.

Walnut is one of the species that benefits from large woods openings or other forms of even-aged management or group selection harvests.

Thinning of existing walnut trees may be needed

In a natural stand, competition for sunlight, growing space, soil nutrients, and soil moisture is fierce. Only the strongest of the trees survive. The shade tolerant species will prevail, unless something happens to change the situation, like a tornado, wildfire, or a man-made thinning or harvest.

Walnut trees that have their tops in the upper part of the canopy of the forest are candidates to be selected for crop trees. When the surrounding trees start to touch or overtop the walnuts, they should be "released" by thinning.

In this step the crop trees receive favorable treatment and the poorer grade trees are removed. But before thinning, make sure the trees you select as crop trees have a high potential. Emotion should not enter into this decision.

The crop trees should be vigorous with an orangish inner-bark in the deep valleys, straight, generally limb-free, and again, need to be tall enough to be in the upper story of the surrounding trees. They should not show evidence of frost cracks, fire scars, insect holes, and other signs of damage or decay.



Candidate for a thinning or release effort

How do I know which trees to remove and which to keep?

Releasing walnut or any high quality hardwood involves a high level of common sense. Do not sacrifice, remove or kill, other high quality species for a low quality walnut, just because of emotion. Do not over thin.

Girdling, a ring-cut penetrating the bark and cambium with a chain saw, or another tool, with an application of herbicide is the most common way method. A double ring, 3" apart, may be used in lieu of herbicides.

A "push" from below is good, but crowding is still crowding. If the walnut tree is bending or leaning to get away from neighboring trees, that is probably a good sign that it needs help.

In the woods, observe the walnut trees and their relationship to other trees in the immediate area. Clusters or groups of 2 to 5 trees may be able to live in harmony and not deform or overly crowd each other.

For all practical purposes, the forest must be periodically thinned to ensure the health of the forest. Whether that is every 5, 10, 15, or perhaps 20 years is part of the challenge, and the answer lies within the trees themselves.

As the trees grow into sawtimber size and begin to crowd each other, the growth rates decline. The trees lose some of their vigor and then all signs point to the need for a thinning.

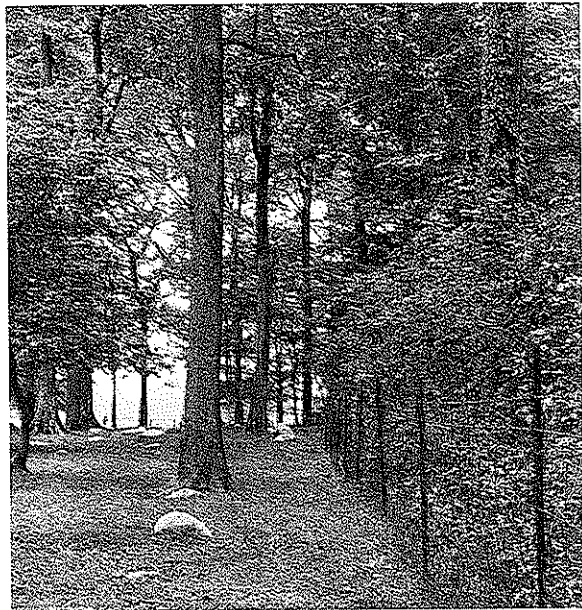
A more technical measure of stocking in plantations as an expression of competition is the Crown Competition Factor [CCF]. CCF is the ratio of the sum of the potential crown areas for all trees within a planting to the actual ground area of the planting, and is usually expressed as a percentage. For more information about CCF, ask your forester.

Why is it important to keep livestock and wildfire out of my woodlands?

Livestock, such as cows and hogs, compact the forest soil and interrupt the air and water balance in the root system. In the process, the roots are often damaged thus allowing entry of decay and insect problems.

Livestock eat the tops out of small trees, thus deforming them. They often eat the bark, which encourages more insect and disease problems, or even kills the tree by girdling.

In some instances, noxious plants exist in the woodland that are harmful to livestock. In general, it is a good idea for livestock to be kept away from the trees at all times.



Keep livestock out of your trees!

Deer browse can be a serious problem facing plantation managers. Deer rubs often break the tops out of small trees and remove bark. Controlling herd populations is probably the best way to handle deer. Fencing and repellants have been used with some success.

Fire, when properly used by the forester, can be a useful management tool. Uncontrolled wildfires are not good for high quality timber production, and fire is not good for walnut trees.

How can one improve the quality of existing walnut trees?

In order to make a veneer log, the walnut trees need to grow at a steady rate. The growth rings should be about the same size throughout the entire life of the tree.

Periods of fast and slow growth combinations do not yield the desired look expected in high quality veneer and lumber.

Thinning, harvesting, and other management decisions should take into account the impact on the growth rate.

With walnut, the management emphasis should be on quality first, fast growth second.

Which forest practices are best in your existing timber?

For the best quality, it is important to maintain a fairly steady growth rate for all the trees in the woods. While a certain level of competition keeps the young trees reaching upward for sunlight, too much crowding slows the growth rate, thus periodic thinnings are needed.

This concept is not easy to explain, and it often takes many years of working in the woods to gain a full understanding.

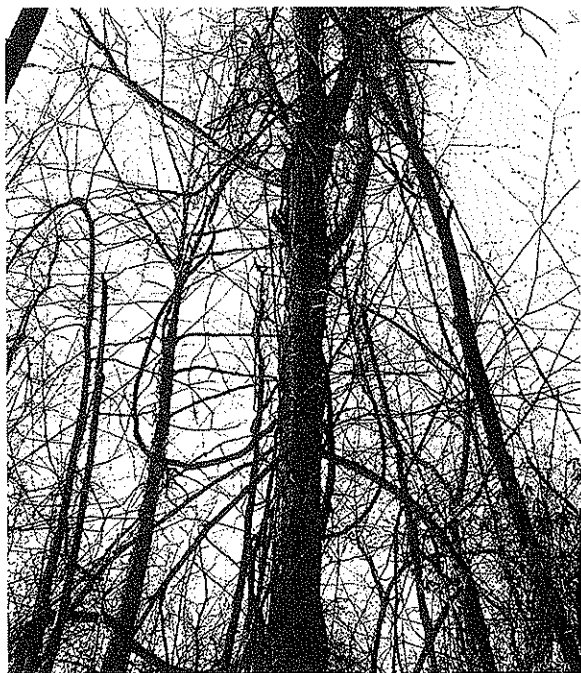
It is a good practice to identify hollow, forked, diseased, crooked, fire-scarred, and generally poorly formed trees. These trees will likely be

marked for early removal from the stand. A few hollow trees should be kept for wildlife habitat.

In most woodlands, there always seems to be one or two very large, old, gnarly trees "wolf trees" that take up a lot of space and are competing with better trees. These trees usually represent very little economic potential, other than firewood, and they will probably not pay their way out of the woods. Get rid of them!

Vines are a problem, and they should be kept out of all hardwood trees, especially walnut.

Vines can cause the tops of trees to break off or collapse as a result of the additional weight. Depending on the size of the vines, and the age of the trees, the damage can permanently damage or deform the quality of the tree.



Vines damage good trees!

It is not necessary to remove the vines, killing them is sufficient. Always cut the upper portion of the vines high enough that they cannot touch the ground and start growing again.

Use non-volatile herbicides, that can be either injected or painted on the cut of the lower portion of the stem, which will then translocate into and kill the root system.

If you insist on having few vines and wolf trees in your woods, then please confine them to the open edges of your woods where dry, harsh growing conditions usually discourage quality tree growth. A 30-40 foot buffer strip can slow the moisture loss and be of some benefit to wildlife.

How about removing side limbs on existing walnut trees?

Nature generally does a good job of removing lower limbs, especially when the lower limbs are in the shade.

The main advantage to having the lower limbs removed as early as possible, is that the wood that is produced from then on is of higher quality.

If the woods is fairly open and shading is not doing the job, then removing the lower side limbs in the early years can be very beneficial. This type of pruning of sapling and pole-sized trees is good.

Again, it is important to concentrate the effort on crop trees. It is not necessary to prune every tree. Some trees will never make it to market.

It is desirable to remove limbs when they are small, 1" to 2", or perhaps as large as 3" in diameter. The 1" to 2" pruning scars callus over quicker.

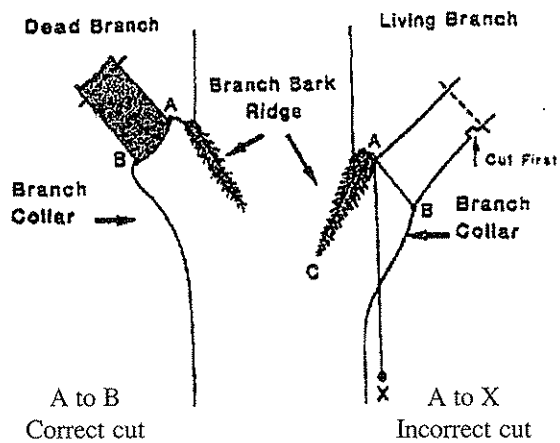
Limbs over 3" are probably too big to remove. The pruning wound may not callus over quick enough to result in better log quality.

When working with young saplings, one may want to look for low forks in the branching. A straight single stem for the main trunk, and one main leader in the top is desirable.

All dead limbs and broken stubs should be removed back to the outer edge of the branch collar to help produce a clean, knot-free log.

Try not to remove more than one third the live crown in any one dormant season. We must be careful not to create other problems with our effort. Removing too much of the live crown can cause the tree to slow down in growth, or sprout more new branches to combat the excessive loss of leaves.

There is a right way and a wrong way to remove the lower side limbs. In order to prevent tearing bark away from the stem, make the first cut away from the trunk of the tree, and then go back and make the final cut. The undercut method also works for the heavy limbs.



The correct way to remove side limbs

It is very important to make the final cut just outside the branch collar, as shown in the illustration. Do not make a flush cut.

Treating the wound with a dressing is not necessary. Pruning is recommended during the dormant season, but in reality can be done about anytime. Some feel pruning done after the middle of June may encourage additional limb growth or new sprouting, and this new growth may not be ready for the first frost in the fall.

A lower-limb pruning program takes several years and is usually continued until at least 17 feet is pruned. Common sense again enters in, as each tree is different. Some trees will allow higher pruning, and some will give reasons to stop before 17 feet.

Various tools are used, but always remember that the pruning tools are not as important as the pruning technique.

Walnut trees and fence rows

Since walnut trees love full sunlight, and squirrels are the best planters, it is not uncommon to find them growing in fence rows. The problem is the fence wire. The trees inevitably grow into the fence.

When fence wire comes in contact with chain saws, bandsaws, circular saws, or veneer knives, it damages the blades and is a serious safety hazard for the employees.

If growing high quality trees is the goal, keep them out of the fence rows. A timber cutting crew will discard the portion of the log where the fence and the tree grew together. The upper portion of the salvaged log may still have grade reducing bluish metal stain in the wood caused by the chemical reaction between the wood and the metal.

The butt log is the most valuable portion of the tree, so much of the value is lost when the tree and the fence grow together.

Should one collect and plant walnut seeds?

There are many arguments on the issue of planting seeds vs seedlings. Most foresters seem to recommend seedlings. In some locations squirrels will feed on the planted seeds and make it difficult to be successful. Also, the germination rate of the seed source is generally unknown, thus making the task somewhat risky.

It is possible to collect walnut seeds from local sources in the fall of the year for planting the next spring. When collecting seeds, it is important to try to look at the source tree and observe the tree vigor and form characteristics.

The source tree should have one main leader. Excessive forking is not desirable, and may be an inherited trait. The branch angle should be as close to 90 degrees from the trunk as possible. A 30 degree branch angle might indicate another undesirable trait.

The bark pattern of the source tree can often tell something about the growing habit of the seed tree and its seeds.

A rich brown bark, with long ridge plates and an orangish inner-bark in the deep valleys of the bark usually indicates a vigorous tree, which would give reason to expect the same performance from the seed. Likewise, a dull gray, short ridge plate, bark pattern usually indicates a slow growing tree.

The above mentioned criteria are not absolutes, since soil and site conditions are always

critical to the success of walnut, but they are common sense indicators.

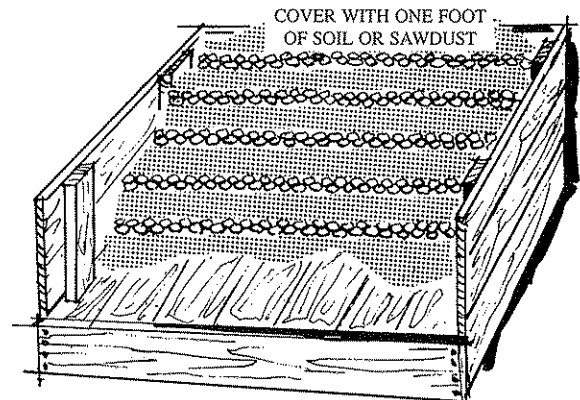
How does one store walnut seeds over winter?

Crack a few of the hulled nuts and observe the seed for quality. Crack a few to see if they contain light colored kernals with no shrunken or decayed parts. Then put them to the "float" test. Floaters are full of air and can be discarded. The sinkers would appear to contain good kernals and can be stored in a cool, shaded, moist place until spring.

Do not let the nuts dry out over winter, but do not store them in water. Do not store in a warm basement or a heated building. Do not store in thick-walled bags which prevent an air exchange. Small quantities can be stored in plastic bags in a refrigerator or meat cooler.

A properly designed soil pit seems to be the best way to store large quantities of nuts over winter.

Storing Walnuts for Planting



Walnut stratifying bin

Alternating levels of one inch of sand and two layers of hulled walnuts in a well-drained, two foot deep soil pit or a wooden stratifying bin of the same general dimensions, outdoors, covered with soil and a screen to keep the rodents out is the proven recommendation.

Always design the soil pit so surface water cannot drain into it. In the spring, when the stratified nuts are removed, you can again float them in water. However, this time many more will float because they have been aging and you will be testing the floaters, but anticipating most will be okay to plant. This is just a random test.

So you want to plant some walnut trees!

Planting walnut seedlings or seeds can be a rewarding and pleasant experience. It can also be a great disappointment. A little knowledge goes a long way with this subject. There is no reason to experiment, because many people have gone the trial and error route, and we have learned a lot from their mistakes!

Planting a woods opening

Do not plant under an existing canopy of trees. Walnut must have full sunlight to get established.

If you want to plant in a woods opening, the general rule is to make sure the opening is at least as wide as 2 times the height of the surrounding timber. If the surrounding trees in a woods opening are 120 feet tall, then an opening is needed that is at least 240 x 240 feet wide. This would be an area greater than one acre in size.

An acre is roughly 208.7 x 208.7 feet or 43,560 square feet. Any opening less than one acre is probably inviting failure.

When planting in a woods opening, make sure all trees greater than two inches in diameter have been removed. The purpose is to create an even-aged situation giving the young seedlings a fair chance for survival. In most instances, it is desirable to treat the stumps of the brush and small trees with herbicides to minimize sprouting.

Plant only on deep, well-drained, fertile soils, those identified as approved for walnut. Do not plant walnut on marginal to poor soils. It is just a waste of time and effort with walnut.

Walnut wants plenty of available moisture, but does not like to have its "feet wet." Neither, does it like the droughty, very high upland sites.

Starting a walnut plantation in open ground

Walnut is very sensitive to soil conditions. It grows best on deep, well-drained, nearly neutral soils which are fertile and moist, but not wet. Again, walnut wants plenty of available moisture, but it does not want to stand in water.

The favorite sites are often in coves, along narrow streams, and on north and east-facing slopes. Walnut seems to do best on limestone-derived soils. Walnut does not do well in wet bottomlands or on sandy, dry ridges, or soils underlain by shallow bedrock, gravel, or hard-pans which limit root penetration.

On the best soil, with a lot of luck and optimum growing conditions, black walnut can be

expected to grow 2-4 feet in height per year, and in 50 to 60 years produce a log of sufficient size to meet market requirements.

What about site preparation?

After the site is selected, but before actually planting the seedlings, take some time to analyze the site conditions. Are there a lot of weeds, especially grasses? Are there a lot of small undesirable trees, vines, or other woody vegetation on the site? It is easier to deal with existing vegetation before planting.

If one merely wants to address the rows or planting spots, again it is often easier prior to planting. Sod is probably the biggest concern. Sod can be very detrimental to walnut seedling growth. Sod can either be plowed under or treated by spraying with a broad-spectrum herbicide. Some heavy sods need both.

If the site was recently in row crops and clean cultivation is desired, then now is the time to do it.

For crop residues, such as corn stubble or common farm weeds, simple disking or mowing may be sufficient. Soil amendments, such as lime, are again easier to apply when done prior to planting.

Should I plant a pure stand of walnut or mixture with other species?

Walnut can be planted in pure stands or in mixtures with other species. Pure stands are desirable for nut production. For timber production, a mixture of species is probably best.

White oak, red oak, ash, American tulipwood [yellow-poplar], cherry, and white pine are some of the timber species commonly mixed with walnut.

On the poorer sites, check with a forester, it may be advisable to stay with the conifers. Walnut is not recommended for the poor sites.

European black alder and Autumn olive are two non-timber species that have been successfully mixed with walnut on 10 foot x 10 foot spacing, with the alder or autumn olive planted 5 feet between the walnuts in each row.

Both of these species will get the site back to "woods-like condition" very quickly, which is considered a good thing by most foresters. Both black alder and autumn olive fix nitrogen, which is good for the walnut. The alder is subject to a disease which can also infect walnut

The autumn olive is considered a noxious weed in some states. It can spread quickly to other parts of the property, and often times is not wanted.

Autumn olive and alder both serve as excellent trainer trees to push the walnuts upward for sunlight. Both of these plants grow fast and develop shading of the walnut trunks which cause the side limbs to die while they are still small, and discourages vegetation such as grasses and weeds on the ground.

White pine [*Pinus strobus*] is recognized as an excellent interplanting species, and is in plantations in regions where it is a suitable species to plant.

White pine does not fix nitrogen, but it does provide shade, side tree training, and year round wind protection.

Moisture retention is good under pines and the needle layer can quickly build up on the ground, suppressing weeds and creating a woods-like condition in the soil. These features of white pine can help eliminate herbicide treatment and mowing after just a few years.

In most instances, the white pine will eventually be weakened and/or killed by the juglone in the walnut roots coming in contact with the white pine root system. This usually occurs about the time the walnut should be thinned. Overall, white pine may be the best species for interplanting with walnut.



A typical walnut plantation

What about the spacing?

The first step is to decide if the purpose is timber production or nut production. Some landowners want to do both on the same property, but many foresters feel one objective is best.

What other factors influence the spacing decision? Consider the following questions.

[1] Do you plan to use machinery in the plantation, and if so how often will it be used and how big is it?

[2] Do you want to return the site to a woods-like condition as soon as possible?

[3] Are you interested in producing high quality veneer logs or is the goal merely to produce as much wood as possible in the shortest period of time?

[4] Do you want to use improved planting stock on wide spacing or forest nursery stock on closer spacing?

If timber production is the main goal, planting walnut trees on a 10 foot x 10 foot [10 x 10] spacing will allow 436 trees per acre. An even closer spacing of 5 x 5 will require 1742 seedlings per acre.

In America, the 5 x 5 is spacing is considered by many to be too close, yet even closer spacing has been used in Europe for centuries.

The closer spacing may result in slower growing trees, but the gain in tree form, and the additional trees from which to select the crop trees in the early thinnings may be worth considering.

The closer spacing will produce a higher quality lumber and veneer trees.

The wider spacing, such as 10 x 10 can produce a reasonably high quality timber tree in fewer years than the 5 x 5 spacing. However, it will still be a challenge to maintain a steady growth rate over the life of the rotation.

For nut production, wider spacings are more desirable. A 20 x 40 spacing [54 trees per acre] will allow for agro-forestry crops between the rows.

Row intercrops include soybeans, wheat, milo, corn, red clover, Christmas trees, pumpkins, melons and ginseng.

Almost without question, regardless of the spacing, at some point in the life of the plantation a thinning will have to be accomplished. The closer the spacing, the earlier and the more drastic the thinning.

A spacing of 10 x 40 [108 trees per acre] is a compromise between maximizing the economic gain from multi-cropping and securing genetic gain from intense selection for desired characteristics as the plantation is thinned.

In order for the nut culture concept to be successful, most feel the plantation should be within the normal collection ranges of the nut crop markets.

Agro-forestry is a way to maintain some level of income from the property at least for a few years while waiting for the trees to grow.



10 x 10 spacing at age 8

What's involved at tree planting time?

Planting day is an exciting time. The seedlings have arrived, the air and soil temperature indicates springtime is here, and the planting crew is about to start a long day of very hard work.

Caring for the seedlings is critical to the health of the young seedlings and the success of the planting effort. If the tree seedlings die as a result of improper care prior to planting, then the effort will have been wasted.

Yes, many people have not done a good job of taking care of their seedlings, and in effect have spent a lot of time and money planting dead trees. The last time anyone checked, I believe they discovered dead trees do not grow well.

The first thing to do when the seedlings arrive is read the instructions!

The tree nurseries are very concerned about the condition of the seedlings they sell. They make a special effort to pack them in ways to get them to the destination in good shape.

If the planting dates are several days away, remove the seedlings from the bundles and place them in a soil trench, this is know as "heeling in."

Seedlings left in the bundles, for quick planting, must be stored in a cool place, out of the sun. A cool, dark, unheated building will work fine. Again, please read the instructions.

On planting day, special care is again needed. Even though the walnut seedlings are

probably dormant, the roots must be kept moist the entire time during the planting operation.

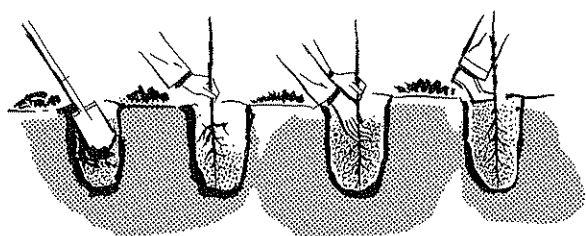
Walking around for just a few minutes with the roots exposed is not recommended. The later in the planting season, thus the warmer the weather, the more important these concerns.

Just prior to actual planting, reduce the bulkiness of the root system by root pruning the walnut seedlings to an 8 to 10 inch taproot. The long, hairy lateral roots should also be pruned to prevent future jamming of the roots into the planting hole. It is important the roots be separated as they are placed in the planting hole rather than left in a wad or a ball.

The seedlings can be planted either mechanically with a planting machine pulled behind some type of tractor, or in individual planting spots made with a spade, planting bar, or power auger.

Mechanical planters are designed to put downward pressure on the slit to pack the soil around the root area, thus eliminating excess air pockets which might later signal death for the young seedlings.

For hand planting techniques, the closure is supplied by foot power, or with the planting bar, or with a shovel when the power auger is used.



Proper hand planting

Care must be taken to insure the depth of the planting is correct. Each seedling has a "root collar" that designates where the trunk ends and the root begins. The root collar of a planted seedling should be slightly 1 to 2" below ground level.

When planting in tilled fields, the soils will become more compacted and root collars become exposed if planted at ground level. Root collars can be buried as much as 4" deep without harm according to research.

Most tree nursery seedlings will have been sorted or graded by the time they are shipped from the nursery.

A mix of local seed sources and those from within 200 miles south of the planting site are usually the best. Most nurseries are careful to collect from relatively local sources, and they hope to sell them for planting within 150 miles.

A variation from east to west does not seem as important as from north to south.

The seedlings must be planted in moist ground for good success, otherwise luck will be the only ally.

How important is weed control?

The first 3 to 5 years are very critical. The weeds and grasses will also flourish, because they too like what has been done to help the seedlings.

Weed control is essential. Some weeds and grasses are worse than others for walnut. Tall fescue is perhaps the worst. Followed by brome grass, quackgrass, Johnson grass, broomsedge, goldenrod,

and alfalfa. Alfalfa does fix nitrogen, but it may take too much water away from the seedlings during droughty summers.

Many weeds are not good for young walnut seedlings, but since grasses will come in almost immediately and they will need to be controlled, the same pre-emergent herbicides will often take care of both grasses and weeds.

Grass selective herbicides are now available that can be used during the summer if grasses become a problem. Lack of weed control is the number one cause of failure.

Even when sprayed directly on the tree foliage, they may not harm walnut at labeled rates. Some people prefer to treat spots around each seedling, others prefer to spray in rows. Both work, the important thing is to do the weed and grass control for at least three years.

Today's laws and environmental concerns, make it is nearly impossible for anyone to recommend a herbicide and feel safe doing it.

The best advice is to refer to the experts who are licensed to do the applications, and always read the label.

The seeding of legumes during the site preparation, especially winter annuals such as hairy vetch, will provide some weed control.

In addition legumes fix nitrogen. Unlike fertilizers, this nitrogen is released slowly and can be more effectively taken up by the walnut seedlings.

Mowing for weed control encourages development of undesirable grass sods and can only be recommended after the last killing frost to reduce the risk of wildfires.

Corrective pruning in the early years

In the first 3-5 years it may be necessary to shape your seedlings in order to maintain one terminal leader.

Walnut's ability to naturally straighten following damage to the terminal shoot appears to be under strong genetic control.

Poorly formed trees are not good candidates for future crop trees even with corrective pruning.

High winds, insect attack, early and late frosts, birds damage, and deer rubs can damage the terminal leader, requiring some level of pruning to correct the problems.

If it is determined the poor form is a result of some form of damage, cut the sapling off about 2" above ground then several sprouts will develop. One can then select the best sprout and remove all others. This technique is known as coppicing.

As the seedlings grow beyond 3 to 4 feet it will probably be necessary to cut back or lop-off some of the lower lateral limbs to stimulate height growth.

Side limb pruning should be accomplished during the dormant period, or not much later than the middle of June in most areas. Pruning after this time may result in new sprouts that are not "winter-hardy" for the first fall frost.

Saws and shears are common pruning tools. Several different pruning techniques are used, and most are good. The important thing is to prune properly as illustrated earlier.

Other cultural considerations

Walnut's response to fertilization is unpredictable. Signs of nitrogen deficiency are leaves less than 2' that become yellow-green late in the growing season. Consider applying nitrogen fertilizers in mid to late summer or interplant with annual legumes.

Anthracnose and other leaf spotting diseases can cause premature leaf fall. Use cultural methods such as mixed hardwood plantings, nitrogen fertilization and legume cover crops to reduce their impact.

Several insects can cause significant damage to walnut. Vigorous trees will usually recover from insect damage. The use of insecticides may be more costly than the loss in tree growth from the insect attack, and is not usually recommended.

Deer damage in walnut plantations can be a real problem. Tree shelters are an option, however, they are expensive and require annual inspection to keep them in place. Some of the newer deer repellants mixed in latex paint show promise for season-long protection. Electric fencing is another option for deer-problem plantations.

Selling hardwood timber

This booklet is primarily devoted to the growing of trees, but it is important we discuss the practice of selling the trees.

Since trees are nothing more than an oversized vegetable, they do eventually mature and die. It still makes sense to market the merchantable logs from the trees before they die rather than allow them

to merely rot on the floor of the forest.

We basically sell trees either as part of a thinning designed to improve the overall health of the stand, or we sell them when they have reached either economic maturity or old-age maturity.

Occasionally we make a salvage cut to recoup what we can from an unexpected loss. Making a harvest to salvage killed or dying trees following a catastrophic loss helps more quickly return the health of the forest to its original condition.

In many salvage cuts it is essential to cut most of the trees in a given area, even some which are alive or undamaged and appear to have survived the catastrophe, because many or all will eventually succumb over the next few years anyway.

Selling walnut trees

While walnut seems to always be in demand, one still has to have enough trees in the sale to merit a full crew of cutters, skidders, and haulers to do the job. This is why it is so difficult to get timber buyers interested in one or just a few trees.

Yard trees are often full of labor intensive, negative surprises. They often have old hooks or screw-eyes buried way under the bark from yesteryear when a hammock or clothes line was strung from the tree to somewhere else.

Many yard trees will have iron objects such as electrical insulators, old tools, etc. buried somewhere under the bark.

Loggers working in the woods are not expected to "clean up their mess," and this is expected with yard trees. Also, the big, heavy

equipment often results in some property damage to the grounds.

Sometimes roofs and buildings get damaged in the process of felling the tree.

All these points are negative factors that discourage the mills from sending a crew out. The time they spend on yard trees could be better spent in a natural stand of trees.

How big should the walnut trees be if I want to sell them?

Trees under 14" DBH [Diameter at breast height, 4 ½ ft above ground] or 10" DIB [Diameter inside the bark at the small end of the log], are generally too small and should be left to grow several more years.

These trees also have too little heartwood to be of value to the walnut veneer industry.

The walnut trees under 14" DBH are too small to be of any real value to the industry, even when they can be obtained for very low prices.

Under 14" DBH	Low value
15 to 18" DBH	Too young
19 to 24" DBH	Making money
Over 24" DBH	Slowing down

The trees between 15 and 18" DBH are really growing very well and each inch of diameter translates into large board foot volume gains. It would be a shame to cut trees in this size class, especially when they are of veneer quality with clear butt logs.

Walnut trees over 18 inches DBH, are likely to still be growing, but they need to be watched more closely.

The trees in this size class may start to show the effects of site conditions, past management, competition, or other factors. Some will keep growing, others will not do so well. Some will show signs of damage or decay, others will appear very healthy.

A forester's expertise, or the timber buyer's years of experience can be very helpful in this decision making process.

Remember walnut is one of the last species to leaf-out in the spring, and one of the first to lose its leaves in the fall. These are not indicators of the health of the tree.

What factors determine the quality of the logs?

Size is very important. Small logs simply do not yield enough wood to merit running them through the mill.

Logs, unlike standing timber, are measured inside the bark at the small end of the log [DIB]. That is the way the volume tables are computed. A sixteen foot walnut log will routinely have a 2" thick bark layer and 2" of taper, adding 4" to the DIB in the table.

below will give you the DBH outside the bark at 4 ½ feet above ground.

Log Size vs Bd Ft Yield	
12" DBH or 08" DIB x 16 ft log	16 Bd Ft
14" DBH or 10" DIB x 16 ft log	36 Bd Ft
16" DBH or 12" DIB x 16 ft log	64 Bd Ft
18" DBH or 14" DIB x 16 ft log	100 Bd Ft
20" DBH or 16" DIB x 16 ft log	144 Bd Ft
22" DBH or 18" DIB x 16 ft log	196 Bd Ft
24" DBH or 20" DIB x 16 ft log	256 Bd Ft
26" DBH or 22" DIB x 16 ft log	324 Bd Ft

The table above quickly tells us there are advantages to allowing the walnut trees to grow a few years. Look at the difference between the 16 board feet of a 12 inch DBH tree and the 144 board feet yield of a 20 inch DBH tree!

Grade reducing defects

Crooked and twisted logs are not good. For veneer logs, no sweep or crook should be allowed. Perhaps 2" in 16' for lumber logs will be accepted. Any log with bark that exhibits a spiral grain pattern will be placed into a lumber log category.

As a buyer looks at the bark of the log, he or she is looking for evidence of **holes, bird peck, bluish-metal stain, pin-knots, cat-faces and knots. Heartrot in the first log may be indicated by excessive butt swell.** A cat-face is a bark pattern that tells the buyer where a limb once grew on the tree.

At the ends of the log, the buyer is looking for **holes, cull material, fire scars, bird peck, metal stain and the growth pattern of the annual rings.**

For veneer logs, it is important the growth be at an even, steady rate, as much as possible. Periods of fast and slow growth yield weird patterns in the veneer.

A **double-heart** on the end of the log is bad. **Frost cracks, often called stress cracks,** can cause a defect clear into the heart of the log. Evidence of **ring shake** or annual ring separation will usually cause the log to be rejected. This happens a lot with tornado or wind damaged timber.

Sapwood is another concern. In certain species a wide ring of sapwood is a problem. For many applications the sapwood has to be trimmed and discarded, or in the case of walnut lumber an additional step, steaming, may be required. **End splits and splinter pulls** are also noted when observed.

Through good forest management it is possible to eliminate or reduce at least some of these grade reducing defects. The industry does not have one log grading system that all mills use. However, there are certain standard ideas and guidelines that apply and are hereafter described.

Prime Veneer Log

Must be a butt log, 14" DIB or larger, at least 9' 3" in length. Logs 10' and 11' long must be 100% clear, with no defects. Logs 11' and longer must have 3 sides clear, with the 4th side 85% clear. Logs must be from fresh cut trees.

Average Veneer Log

Can be butt logs and second cut logs. Must be 14" DIB or larger, and 7' or longer. Logs 7' long must be 100% clear. Longer logs, must have two clear sides with the other two 70% clear, and they must be from fresh cut trees.

Good Lumber Log

Logs should be able to produce high yield of upper grade [FAS] lumber. Must be 12" DIB or larger, 6' or longer, and from fresh cut trees. Must be sound, straight, free of metal and shake. Must be 85% clear in three foot cuttings on two or more sides of the log.

Average Lumber Logs

Logs are expected to yield fair percentage of upper grade lumber. Must be 11" DIB or larger, 6' or longer. Must be free of metal, but can have slight crook. Must be 85% clear in three foot cuttings on at least one side.

Poor Lumber Logs

Logs expected to yield some common and better lumber [1 Com &FAS]. Must be 10" DIB or larger, 6' or longer. Some crook permitted if 4' cuttings possible. A few other defects allowed.

Gunstock Chunks

Highly localized to specific markets, but occasionally purchased in conjunction with the rest of the tree. Must be 4' or longer, 16" DIB or larger, 1½ clear sides, and free of shake and metal.

Limb Wood

Rarely purchased. Would have to be 10" DIB or larger, 4' or longer, 3 clear sides, only slight crook or sweep, and must be free of shake and metal.

Suggestions for selling timber

First of all, *mark the bole and stump of all trees to be sold.* This way all prospective buyers are

bidding on the same thing. If one has never sold timber before, he or she will be well advised to seek help. Trial and error often converts to dollars lost in this situation.

Measure the trees and figure board foot volumes, by species and grade. Again, this gets rather complicated if one has never done it before and it may again be advisable to seek the services of a forester or take advantage of the many years experience of the timber buyer.

Timber buyers are experts at grading and measuring, but it is understood some people are more comfortable with a third party opinion, such as that which may be available from a local forester. Consulting foresters are heavily involved with this type of service.

Once the trees have been marked, measured, and the results prepared into report form, then the prospective buyers need to be invited to take a look.

Some prefer to sell, based on the relationship developed by merely meeting and talking to the buyers. Others, prefer to set a time and date and conduct a sealed bid sale. Timber auctions have worked, but they can be risky if only one buyer shows.

Conducting a sealed bid, and then opening it up to an auction is considered unethical and buyers will probably pull out of the process.

Once a buyer is selected, be prepared to sell under terms set forth in a contract.

The contract protects the interests of both the buyer and the seller. Sufficient time needs to be allowed for the buyer to remove the timber in order to take into consideration seasonal weather delays. A one to two year contract is common.

Sample sales contracts are available from many sources, including the buyer or a forester.

Get the money up front and deposit the check, before any timber is removed.

While the logs are being removed, it is a good idea to visit the site and observe what is happening.

Make sure the marked trees are still identified, so the timber cutting crew, who are seeing it for the first time, doesn't get confused and make a mistake.

Be aware, in certain terrains and under most conditions, it is desirable to implement what are known as "best management practices" that minimize erosion of the soil and siltation of nearby streams.

Ask the cutting crew to keep their damage to the residual or uncut stand to a minimum, realizing some damage will be unavoidable.

Conclusion

Many decisions are encountered and have to be resolved as trees are planted, nurtured, pruned, thinned, and finally harvested.

These are generally pleasant decisions knowing that all the effort and expense will, in the long run, leave the land in better condition than it was when the work was started.

In most instances, the efforts will also represent a good investment of time and money. It is still a great example for others to follow.

In Memoriam

In recent years the hardwood lumber and veneer industry lost two great friends to sudden or tragic death. Both families wanted to establish a memorial, dedicated to forestry, in their loved one's name.

Contributions made in remembrance of the two individuals helped make the reprinting and distribution of this forestry educational publication possible. It is to the memory of these two departed friends this booklet is dedicated.

Lutz G. C. Machon
Vice President of G. R. Wood, Inc.
1930-1988

Kenneth J. Staugas
Founder of Norstam Veneers, Inc.
1931-1996

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Educational Material

Forestry information, literature lists, buyer's guides, and membership directories are available on request from the association address furnished herein.