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“Let’s Manage Some” Blue Ribbon Hardwoods No. 3
Michigan State University
Cooperative Extension Service
Natural Resources Series
Melvin R. Koelling, and Lester E. Bell
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12 pages

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American basswood

Black cherry

Black walnut

Northern red oak

Sugar maple

White oak

Yellow birch

Yellow poplar

"LET'S PLANT SOME"

BLUE RIBBON HARDWOODS

No. 3 of a Series

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Let's Plant Some

BLUE RIBBON HARDWOODS

MELVIN R. KOELLING
LESTER E. BELL

QUALITY HARDWOOD TREES represent the choicest product of America's Eastern Forest. For generations these trees have supplied basic raw material for the manufacture of high quality veneer, furniture, and related wood items (Fig. 1).

However, the available supply of quality hardwood lumber and veneer is being exceeded by ever increasing demands, as pointed out in two previous publications on Blue Ribbon Trees. (See Extension Bulletins 620, *Let's Grow Some Blue Ribbon Hardwoods*, and 621, *Let's Meet Some Blue Ribbon Hardwoods*).

This publication, the third in a series on Blue Ribbon Hardwoods, describes planting and initial care of hardwood trees. Other publications on cultural and management practices for established hardwood plantations and natural stands will follow.

Hardwood trees grow on a variety of soils, but best growth is obtained on soils which are also suited to agricultural production (Fig. 2). Thus, much prime land capable of producing high quality hardwoods has been cleared for agriculture since this country was first settled. This clearing, usually without regard for harvesting the forest crop has greatly reduced the area available for hardwood production. Subsequent lumbering and grazing of remaining forest stands have also contributed to a decline in the available supply of quality hardwood. A recent awareness of this decline by industry and educational institutions is resulting in new emphasis on planting and managing existing hardwood stands.

It is estimated that approximately 80 percent of the wood used in quality veneer and solid furniture parts is supplied by eight principal species: American basswood, black cherry, black walnut, northern red oak, sugar maple, white oak, yellow birch and yellow poplar. Since all of these species grow well in our state, Michigan forest landowners are in an excellent position to provide a good share of quality hardwood in the future.



Figure 1. — Heirloom-type furniture produced from Michigan hardwoods (Black Cherry) will be highly prized for many years. (Photo courtesy Mich. Furn. Mfgs. Ass'n.)

CONSIDERATIONS IN PLANTING

All of the blue ribbon hardwoods grow best on deep, well-drained, loamy soils. While some species may survive on other soils such as sands or clays, maximum growth and thus maximum efficiency in production will be obtained from plantings made on good sites (Fig. 3). For poorer soils, various conifers should be considered.

Planting blue ribbon hardwoods should not be restricted to forested areas of the state. Many farms



Figure 2.— Hardwood timber, such as this northern red oak stand, grows best on well-drained, fertile, loam soils. Such stands will furnish the lumber and veneers for our future use (U.S. Forest Service Photo).

in agricultural regions have sites on which quality hardwood trees will grow extremely well. Small, irregularly shaped plots of land remaining after highway construction, openings in farm woodlots and land along streams offer excellent planting sites (Fig. 4). Openings in established conifer woodlots are also good planting locations.

Plant Trees Native to the Area

When planting quality hardwood trees, several factors should be kept in mind. Initial consideration should be given to the soils and climatic conditions of the proposed planting location. When possible, plant trees which are native to the area. For example, let us suppose a landowner in the Upper Peninsula has some acreage of loam soil on which he would like to plant hardwoods. Certain species, such as black walnut, white oak and yellow poplar would not be good selections since these trees are out of their natural range. Much greater success would be obtained with American basswood, sugar maple or yellow birch which are better suited to the more rigorous climatic conditions of the north. (Black walnut and yellow poplar should be planted only in the southern counties of the state).

Use Quality Stock

Research has repeatedly demonstrated that planting quality nursery stock is the first step for production of quality trees. Healthy, vigorous planting stock result in rapidly growing seedlings (Fig. 5). The difference in growth rates between good and poor stock is especially important during the first part of the seedlings life when competition with other vegetation for moisture, nutrients and growing space is most critical. When selecting seedlings it is wise to use stock produced in local nurseries unless it has been found to be inferior. In general, local stock will yield better growth and survival rates. Several research programs aimed at producing superior strains of high

Figures 3. & 4.— Black walnut plantation thriving on deep, loamy soil (left). Irregularly shaped pieces of land make excellent hardwood planting sites (right). Such parcels of land seldom fit into cropping patterns.



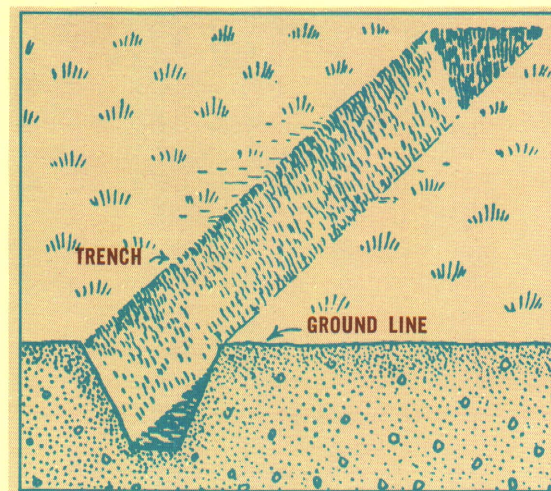
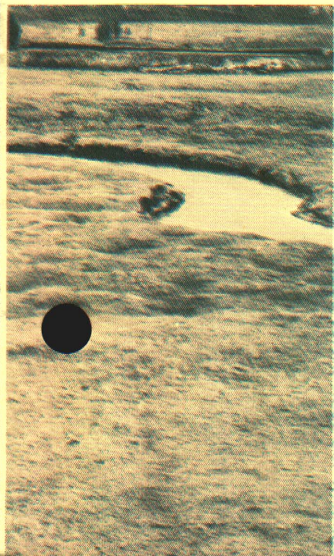
value species are currently in progress. The availability of such stock should be determined before an extensive planting program is contemplated. Early placement of orders with seedling nurseries will assist in obtaining good planting stock.

Handle Planting Stock Carefully

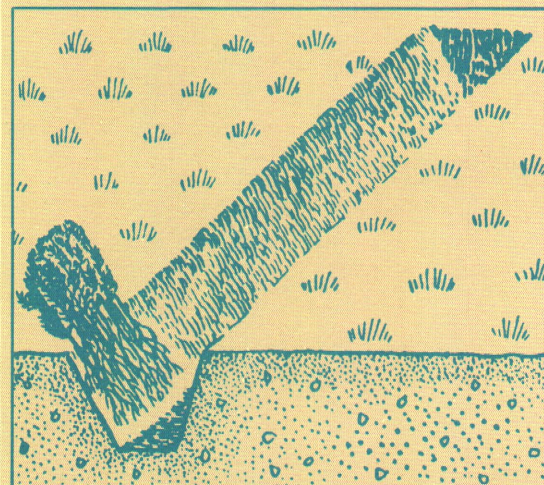
Initial seedling survival and success of the plantation often depend on proper handling and care of planting stock. Seedling loss will be minimal if the seedlings are replanted as soon as possible after removal from the nursery beds. At the planting location, seedlings should be stored in a moist, cool, area. If planting is delayed by 48 hours or more, the seedlings should be 'heeled-in' in a shaded, well-drained trench. The heeling-in bed should be deep enough to allow the roots to occupy a natural position (Fig. 6). Moist soil should be placed around the roots and packed thoroughly to eliminate air pockets. Frequent watering will help maintain a healthy condition.

Site Preparation is Desirable

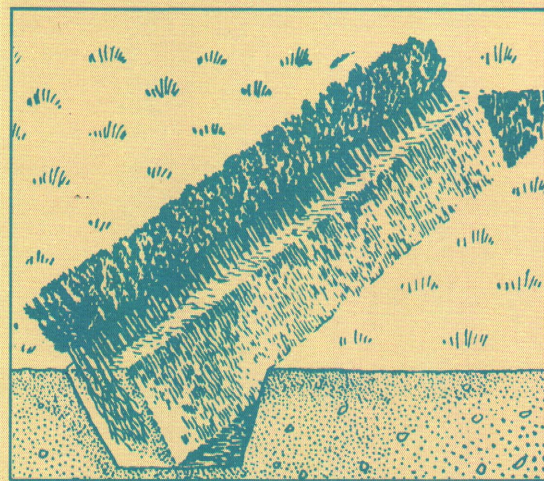
Chances for establishing a successful hardwood plantation are increased when the site is prepared prior to planting. Removal of competing woody and herbaceous vegetation will increase seedling survival. Large overtopping trees should be felled and smaller brush removed or killed.



A



B



C

Figure 6.—Method of trenching and heeling-in nursery stock: A. Trench is dug deep enough to accommodate roots; B. Layer of trees is laid against slanting wall, and C. Soil is piled and packed against tree roots, leaving trench ready for another layer of trees to be heeled-in the same way.

Figure 5. — Healthy, well grown seedlings, with large root systems give best survival and good later growth.

Scalping and furrowing immediately prior to planting have been used to eliminate herbaceous competition in the past, but such treatments often cause many problems, particularly on poorer soils containing dense, herbaceous growth. Scalping removes most of the top soil which results in the seedling being planted in a poorly structured, infertile subsoil (Fig. 7). Competing for soil nutrients and moisture, herbaceous vegetation frequently overtakes newly planted seedlings.

The application of brush, weed and grass controlling chemicals prior to planting can eliminate the need for such treatments. Excellent control of heavy sod and other herbaceous growth can be obtained with selective herbicides. Fall treatment for spring planting is highly recommended. This increases survival chances and promotes early growth rates. Taking time for site preparation can boost returns several fold.

Hand vs. Machine Planting

Hardwood plantings have been successfully developed from both hand and machine planted seedlings. Machine planting reduces time and labor, however, seedling mortality rates may be greater, especially on certain species like black walnut and red or white oak which possess a rather long taproot. Hand planting is preferable for most hardwoods (Fig. 8). Regardless of the method used, the following should be kept in mind:

- (1) The root system of the seedling must be kept moist prior to and during planting.
- (2) The planting hole or slit should be large and

deep enough to allow roots to occupy a natural, un-curved position.

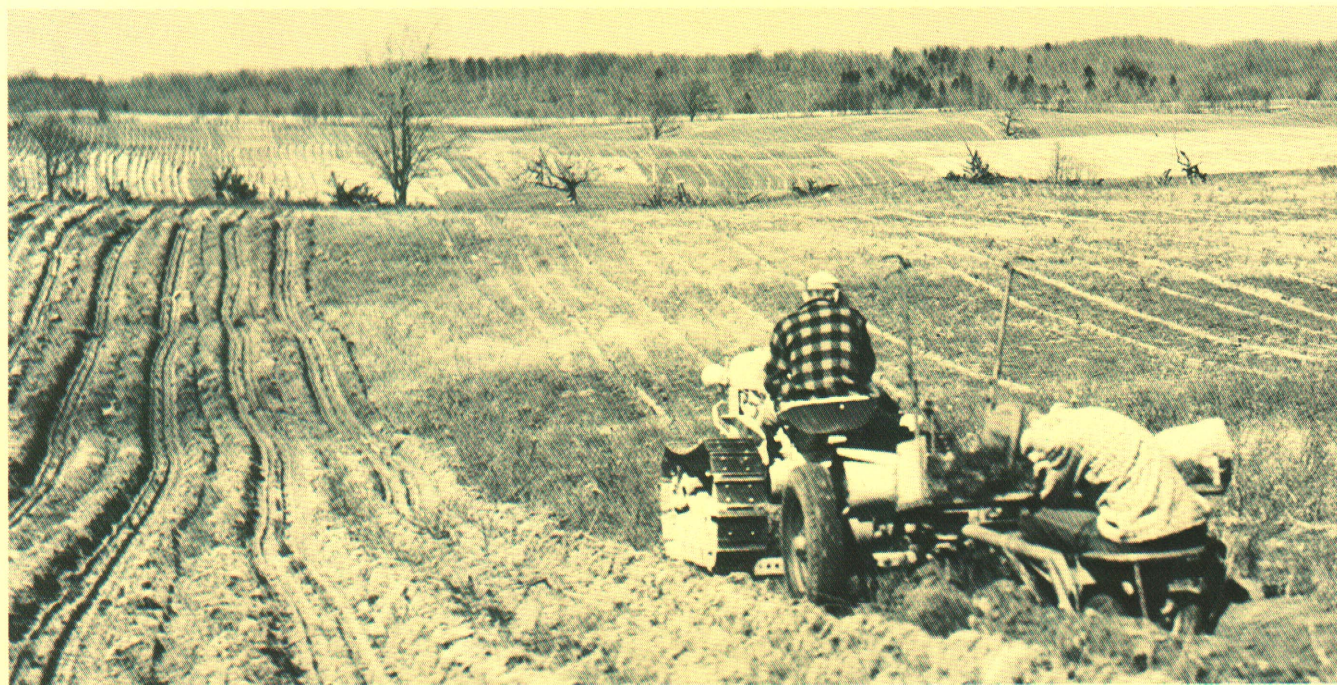
- (3) The seedling should be planted in an upright position at a depth only slightly deeper than in the nursery.
- (4) The planting hole or slit should be back-filled with good soil and well compacted to prevent the roots from drying up.

Spacing of Planting Stock

Overcrowding is extremely undesirable in hardwood plants. For maximum growth rates and best form development, seedlings should be placed at least 10 feet apart. When both lumber and nuts are to be produced as with walnut, wider spacings may be wise. In some plantations with wide spacings, ornamental nursery stock, Christmas trees, or wildlife food plots have been produced between the planted rows of trees. Spacings of 10 feet or wider allow for cultivation around the seedlings. The number of trees required to plant an acre at various spacings are:

10' x 10'	— 435 trees per acre
12' x 12'	— 303 trees per acre
14' x 14'	— 222 trees per acre
16' x 16'	— 170 trees per acre
18' x 18'	— 134 trees per acre
20' x 20'	— 109 trees per acre

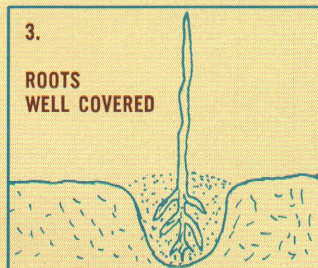
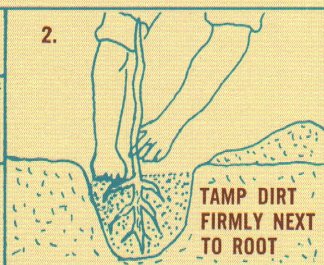
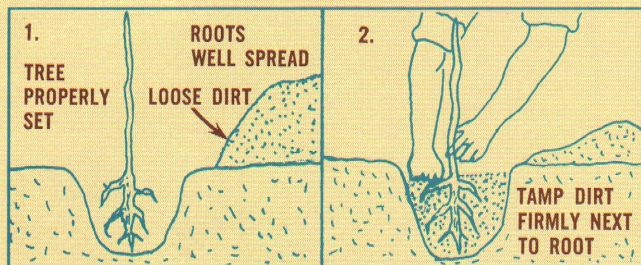
Figure 7.—Deep furrows created by tree planting machines impede movement of machines and remove fertile top soil. Offering only partial weed control, they can create serious erosion problems, a hazard to field travel, hiding places for destructive rodents, and an unsightly landscape.



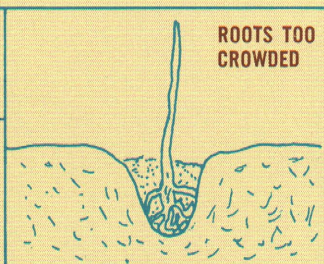
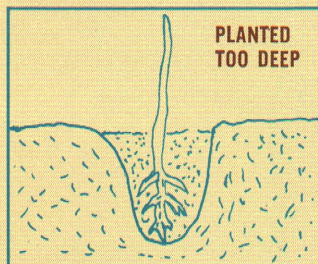
Time of Planting

Hardwood seedlings usually grow best when planted in the spring as soon as possible after the soil is free of frost. Seedlings planted in late March, April or early May are usually not affected by frost heaving and winter-caused drying. Damage from rodents and browsing animals is also less than that for fall planted seedlings. For container grown seedlings, plantings may be made anytime weather and soil conditions permit (Fig. 9).

Figure 8. — Correct and incorrect methods of hole planting.



CORRECT



INCORRECT



Figure 9. — Container-grown black walnut seedling approximately 3 months old. The use of containers greatly increases survival and initial growth of young seedlings since the shock and normal slowdown due to transplanting is nearly non-existent. Entire package is set in soil.

RECOMMENDED PLANTING PROCEDURES

American Basswood — Black Cherry

These two species are not major components of Michigan forest stands. They usually occur as scattered individuals or small groups mixed in with other hardwood species. Both have been infrequently planted, and little is known about specific requirements for successful establishment through planting.

American basswood is quite exacting in soil requirements and should be planted on moist, loamy soils, preferably sandy or silt loams. Cove sites are ideal for this species. Highly tolerant of shade, it is well suited for underplanting in older stands. Difficulty in obtaining seed germination has undoubtedly contributed to lack of planting for reforestation or stand improvement purposes. When planting stock is available, the use of 2-0 stock has proven quite successful. Protection of transplanted seedlings from rabbit and deer browsing is essential.

Both direct seeding and nursery stock planting have been used in attempts to establish black cherry. Like American basswood, successful plantings are most frequently obtained when black cherry is planted in mixed stands containing other hardwood species.

When sowing directly into the soil, plant freshly collected seed on cultivated soils in the fall. Elimination of herbaceous vegetation can greatly increase growth rates of young seedlings.

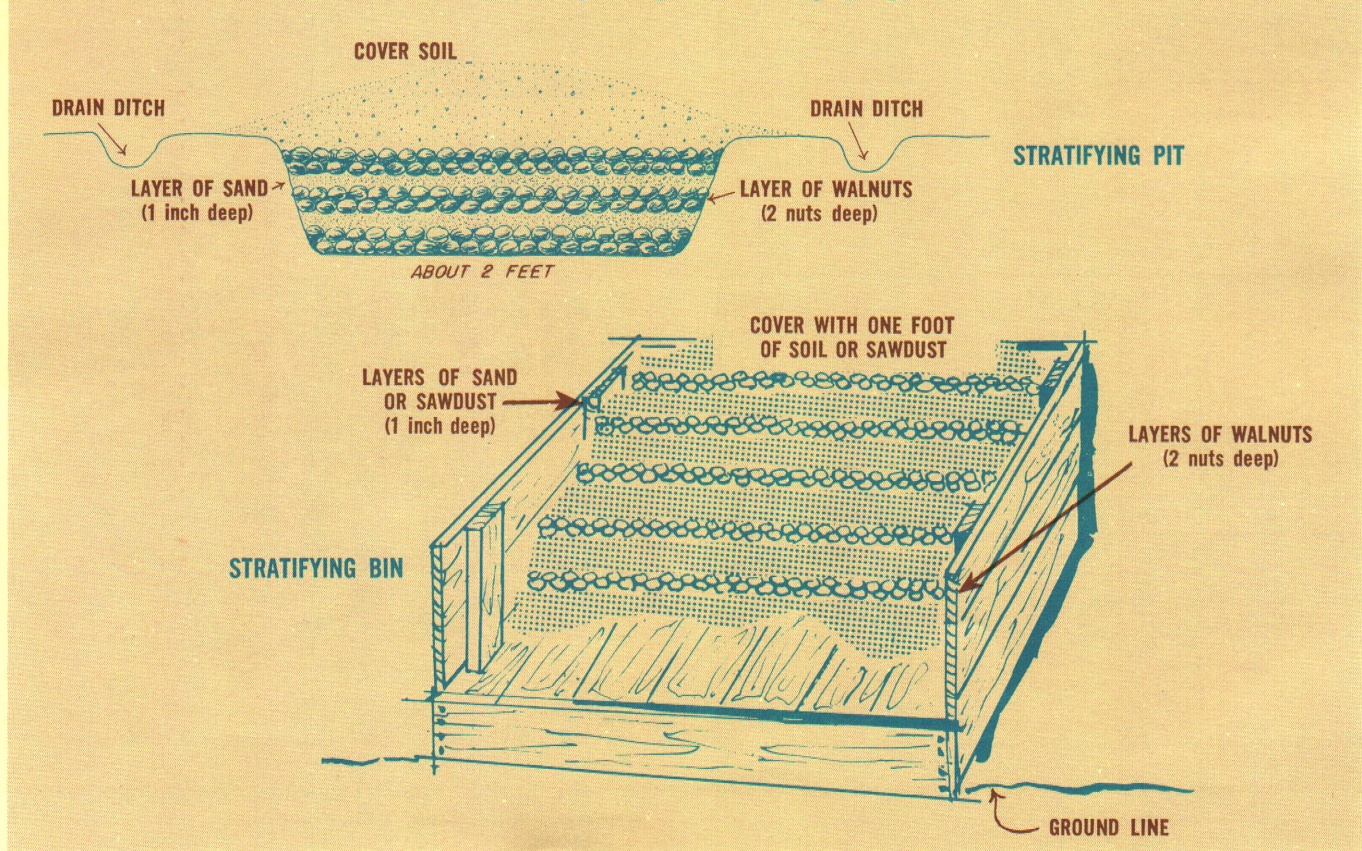
When nursery seedlings are transplanted, root pruned 1-0 and 2-0 stock have given good results. Plantings should be made in open or sparsely wooded areas which contain deep, well-drained soils. Since black cherry is quite susceptible to frost injury, low lying areas should be avoided. Use of seedlings with wide spreading root systems will help prevent frost-heaving on heavy soils.

Black Walnut

Black walnut has probably been the most widely planted hardwood tree in the past few years. Increased demand and excellent stumpage prices have attracted many landowners to plant black walnut.

Either nuts or seedlings may be used. When sowing nuts, stratified nuts should be used, if available (Fig. 10). While planting black walnut nuts is the least expensive alternative, some means of rodent protection must be given to the planted nut. On the other hand, the long tap root on walnut seedlings makes transplanting, difficult, frequently resulting in poor survival and slow growth.

Figure 10. — To obtain maximum germination, walnuts should be stratified prior to planting. Either a stratification pit or bin may be used. Both must be constructed so that water will not stand in them at any time. Walnuts over-wintered out of doors under these conditions are ready for planting the following spring.



Black walnut usually grows best in mixed hardwood stands. Poor form and growth rates are characteristic of pure walnut plantations. Recommended planting locations: small openings in woodlots, in scattered stands of older trees, in open conifer plantings, or along stream banks and flood plains.

If seeds are planted:

- (1) Plant nuts from quality trees, if available.
- (2) Plant nuts in the fall about 1 to 2 inches deep in soil (Fig. 11). If stratified nuts are available, planting may be completed in the spring. Planting 2 nuts at each location will increase survival percentages. Excess stems may be thinned later.
- (3) Spacing may be varied to suit local conditions, but nuts should not be planted closer than 10 x 10 feet.
- (4) Provide protective cone-shaped screen covers over nuts to prevent rodent damage (Fig. 12).

When seedlings are planted, success will be greatest if only large, healthy seedlings are used. Stem diameters at the root collar should be at least 7/32-inch and tops should be 10 to 14 inches long. Plantings should be completed with 1-0, root pruned 2-0, or larger stock.

Sugar Maple — Yellow Birch

Sugar maple and yellow birch are both major constituents of the Northern Hardwood Forest located in the northern part of the state. Artificial regeneration of these species has not been extensively practiced due to the relative ease of natural reproduction in most areas.

Sugar maple frequently occupies the understory of much of our hardwood forest land, since it is tolerant of shade. This makes it especially well suited for underplanting in grazed or open old-growth woodlots. Under such conditions it is normally slow growing, but does frequently respond to release cuttings. Sugar maple is often planted in old, open field areas for the establishment of sugar bush.

Sugar maple success is usually greatest when large seedlings are planted on moist, well-drained fertile soil. Five to seven-foot seedlings as well as smaller 2-0 nursery stock have been transplanted quite successfully. Like most hardwood seedlings, protection of newly planted sugar maples from rodents and deer is a prerequisite for good plantation establishment. The use of larger seedlings helps reduce this problem.

Yellow birch, found in hardwood mixtures in a variety of soil conditions, generally should not be grown in forest plantations. Abundant natural seed production occurs at regular intervals, however, ger-

mination and survival is usually low because of rather exacting seedbed requirements.

Plantings with 2-0 nursery stock have been made on well-drained soils. Planting under a light overstory will encourage more rapid growth. Success, however, requires complete protection from deer and rabbit browsing.

Red and White Oak

Natural regeneration of red and white oak is evident in many Michigan hardwood forests. However, some areas contain poorly stocked stands, or are stocked with other undesirable species. Both red and white oak may be planted from acorns, or with nursery-produced seedlings. Many of the same considerations listed for black walnut must be followed since rodents prey heavily on acorns, and oak seedlings also possess a long tap root. Both species of oak grow well in mixed or nearly pure stands, on sandy or gravelly-loam soils.

If acorns are to be planted, they should be collected in early fall from quality trees. Acorns should be fall-planted about 1 to 2 inches deep in mineral soil to obtain maximum germination. Protective screen covers will greatly reduce rodent losses.

For seedlings, success has been obtained using either 1-0 or 2-0 nursery stock. The 1-0 seedlings may be easier to transplant due to a shorter tap root than present in 2-0 stock. The long root system must not be curled or crooked when transplanting.

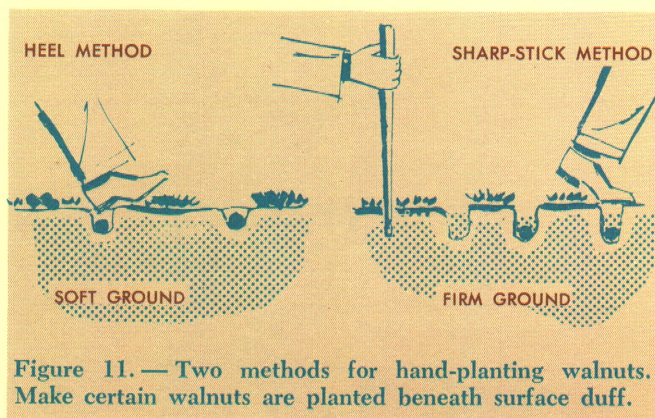


Figure 11. — Two methods for hand-planting walnuts. Make certain walnuts are planted beneath surface duff.

Yellow Poplar

Yellow poplar can be established through direct seeding and outplanting nursery produced stock. However, much variation exists in survival and growth among various yellow poplar plantations. Like black walnut, form and growth generally are better if mixed plantings are made.

This species is well suited for underplanting in sparsely wooded areas although some later release from older trees will be needed to obtain maximum

growth. It is especially vulnerable to dieback, sun scald, and frost injury when planted on weedy, old-field sites.

For direct seeding, plant on a cultivated soil free from competing vegetation. Spring sown seed should be covered with about $\frac{1}{8}$ -inch of soil and protected from rodents and birds.

When available, 3 to 4-year old seedlings will yield better survival than 2-year old seedlings, especially if competing vegetation is present. Transplanting success and initial growth with 1 and 2 year old seedlings can be increased if only large, well rooted seedlings are used.

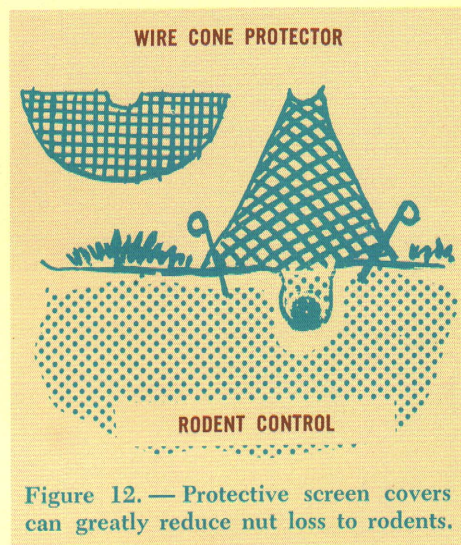


Figure 12. — Protective screen covers can greatly reduce nut loss to rodents.

CARE AFTER PLANTING

Care given the seedlings in the first few growing seasons after planting often determines the success of a hardwood plantation. Poor survival and form and slow growth rates are frequently due to competition for soil moisture and nutrients from other woody or herbaceous growth. When weed control chemicals have not been applied before or at the time of planting, their use after planting is recommended. Preventing or reducing weed and grass growth greatly increases the amount of available moisture and nutrients for newly planted seedlings and reduces cover and nesting places for rodents such as mice, shrews and rabbits (Fig. 13).

Early growth of planted seedlings can also be improved through the application of complete fertilizers. While fertilization at the time of planting is not recommended, later application and good weed control will maintain seedling vigor and reduce insect and disease susceptibility.

In areas of high deer populations, some form of seedling protection may be required in the years immediately following planting. The use of chemical repellants or mechanical devices offering complete protection may be necessary for successful establishment, optimum growth, and form development.

Finally, prune all forked seedlings to one central stem. In addition to increasing growth rates, this will encourage more rapid production of high quality stems.



Figure 13. — Grass and herbaceous vegetation are effectively controlled in this walnut plantation through the use of weed control chemicals. Casoron was applied the previous fall at the rate of 6 pounds per acre.

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FOR ADDITIONAL ASSISTANCE

In working with Blue Ribbon hardwoods you may need additional help; if you do, contact the following:

For education assistance:

Your local County Extension Agent
Cooperative Extension Service

For on the ground forestry advice:

Your local District Forester
Michigan Department of Conservation

For soils work or site selection:

Your local Soil Conservationist
County Soil Conservation District
U. S. Soil Conservation Service

For financial assistance:

Your local county office of the Agricultural Stabilization Committee — Agricultural Conservation Program

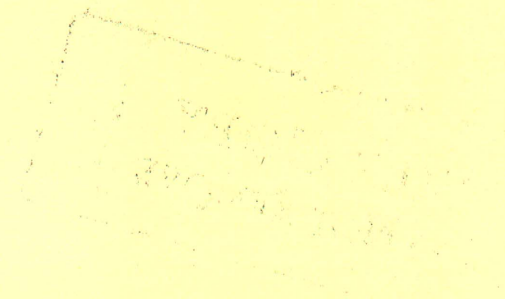
For general information on forestry and tree farming:

Extension Forester, Cooperative Extension Service, Michigan State University, East Lansing, Michigan 48823

The American Forest Institute, 1835 K. Street, N.W., Washington, D.C., 20036

The Fine Hardwoods Association, 666 North Lake Shore Drive, Chicago, Illinois 60611

The American Walnut Manufacturers Association, 666 Lake Shore Drive, Chicago, Illinois 60601



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