

EXTENSION
BULLETIN
260
REVISED
APRIL
1951

**SELECTING
AND
PLANTING**

SHADE TREES



BY

L. C. CHADWICK

Professor of
Horticulture

AGRICULTURAL
EXTENSION
SERVICE

THE
OHIO
STATE
UNIVERSITY

Selecting and Planting *Shade Trees*

Success with shade trees is based on careful selection of suitable types and healthy sound specimens of the types selected. Some trees are rather specific in their requirements. Check the soil, moisture, and exposure requirements of the species of tree as well as its susceptibility to injurious insects and diseases, to determine its adaptability to conditions under which they will be planted. Select trees that will blend in with the house and that will satisfy other specific requirements of the particular location.

Selecting Right Trees

Trees recommended for both street and lawn planting in congested areas are Ginkgo, London Plane (sycamore), Moraine Honeylocust, and Red Oak.

For planting in residential areas as both street and lawn trees the following are recommended: Sugar Maple, Norway Maple, Moraine Honeylocust, Red Oak, Scarlet Oak, Texas Red Oak, Shingle Oak, Silver Linden, Littleleaf European Linden, Sweetgum, and the Corktree. Pin Oak can be used in acid soil regions. For narrow streets the Erect Norway Maple and the Upright Ginkgo are satisfactory. As lawn trees in residential areas the following, in addition to those above, are recommended: European Beech, Chinese Scholartree, Yellowwood, Kentucky Coffeetree, Black Tupelo, Red Maple, and English Elm.

There is a need for medium (30-40') and small sized (20-30') trees for both street and lawn planting. Some of the best types in these groups are: Medium size—English Maple, Red Horsechestnut, American Hornbeam, American Hophornbeam, and Japanese Zelkova; Small-size—Amur Maple, Tatarian Maple, Pyramid European Hornbeam, Flowering Dogwood, Washington Hawthorn, Panicked Goldenraintree, Magnolias, and Flowering Crabapples.

Be sure the trees selected are healthy and sound. Healthy specimens will show good terminal twig growth for the past three to five years. Buds should be plump and fresh. Foliage should be of normal size and good color. Select trees with wide forks, strong crotches, and free from insects, diseases, frost cracks, and other environmental or mechanical injuries. Make sure the leader is strong and limbs are well balanced.

Transplanting Season

Plants are living organisms. They respond readily to favorable conditions. In their natural habitat, growth conditions are usually favorable, but such is not always the case following transplanting. For a tree, transplanting is a major operation and it takes time for it to recover. The more favorable the conditions are for recovery, the more successful will be the result. Trees move easier during the dormant period than in active growth. However, with experienced help and adequate equipment, most trees can be moved successfully at any season.

Ample soil moisture and favorable temperatures are factors favoring early reestablishment of the plant. Fall planting has the advantage of a favorable soil temperature, usually adequate moisture, and time for root establishment before the hot, dry summer months. Spring planting has the advantage of ample soil moisture but usually less favorable temperature than occurs in the fall planting months. Some trees, such as the Magnolia with thick fleshy roots, are best transplanted during early spring. Some other trees best moved in the spring include the Flowering Dogwood, Hornbeam, and Yellowwood.

Digging Operations

Since home owners usually will buy trees dug by the nurseryman or land-

scape gardeners, little discussion of this operation is necessary. Deciduous trees up to 2½ to 3 inches in trunk diameter, 1 foot above the ground, are usually moved bare-root. Over this size, or smaller, if they are known to be especially difficult to transplant, they are moved with a ball of soil.

Bare-root trees always should be carefully dug to retain a large proportion of the roots. The roots should be protected from drying out by

covering them with moist burlap or other suitable material.

When plants are moved with a ball of soil, the size of the ball will depend upon such factors as size and species of the plant, kind of soil, and the extent of aftercare.

In general, the size of the ball will be 1 foot in diameter for each inch in diameter of the tree trunk, 1 foot above the soil.

Most arborists start with this size

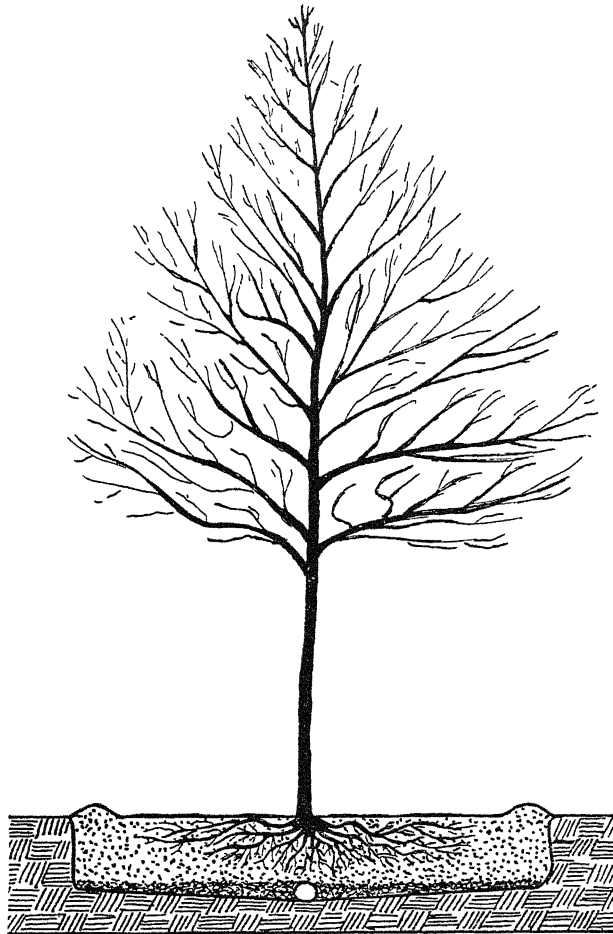


Fig. 1.—Bare root planting. The hole for a tree should allow the roots to be spread and provide about 1 foot beyond the roots. Where possible, a tile in the bottom of the hole and covered with gravel, sand, or cinders and leading to an open outlet is desirable. A few inches of good soil should be under the roots.

but cut it down as conditions allow. Usually a 5-inch tree will have a 4-foot ball. The depth of the ball will be about two-thirds its width.

Planting Trees

The width of the hole for bare-root plants should be sufficiently large to accommodate the full expanse of the roots. The roots should be straightened out, preventing any doubling under and crowding in the hole and as much crossing of the main roots as possible. A satisfactory width of the hole for balled plants is at least 2 feet wider than the soil ball. The depth of the hole should be such that when finally set, the plant will be at the same depth, but no deeper, than it was in its former location. Allowance should be made for proper drainage and settling.

Proper drainage is one of the most important factors in successful transplanting. Poor drainage, characteristic of heavy soils, probably accounts for more losses in transplanting than any other single factor. Good drainage, accompanied by good aeration, is vital to quick recovery and healthy growth of the plant. Unfortunately, in many well populated residential districts, effective drainage is difficult to install due to lack of suitable free outlets. However, all large trees when planted in heavy soil should be tile-drained. The extent of the drainage will depend on the texture of the soil. A single tile run across the bottom of the hole plus crushed stone or gravel to the depth of this tile, is recommended for holes up to 6 feet in diameter dug in clay soils. The bottom of the hole should slope toward the tile. In similar soils and with holes over 6 feet in diameter, two lines of tile laid in the form of a V on the bottom of the hole is advisable. The tile, if at all possible, should be carried to a suitable free outlet.

Only good soil should be used in planting. If the top soil thrown out of the hole is heavy, mix with it $\frac{1}{2}$ sand and $\frac{1}{2}$ peat moss or well-rotted manure, or replace completely with good soil. The addition of some com-

mercial fertilizer at the time of planting is advisable with plants moved with a ball and may be added with caution with bare-root plants. One-half pound of 4-12-4 or 1 pound of 20 percent superphosphate mixed with 4 bushels of soil is adequate.

After the bare-root tree is correctly set in the hole, drive in the guy stakes as needed and work the prepared soil well in among the roots. Gently move the plant up and down to help to settle the soil about the roots. When the roots are covered, tamp the soil firmly. If the soil is wet, avoid most of the tamping. If the soil is sufficiently moist avoid watering or add only enough to settle the soil about the roots. Finish filling the hole but leave the soil loose. Watering-in is advisable in sandy soils. After the soil has been carefully tamped about the roots, fill the hole with water and let it settle. Then finish filling the hole with soil. Leave the top layer of soil slightly concave to facilitate later watering.

With balled trees, raise or lower the ball so that the tree is in a perpendicular position before the back-fill is added. Continue to add and tamp the soil until the hole is about half full. Water is usually added at this stage. After it has drained away finish filling the hole, packing the soil less firmly than at the bottom. The amount of tamping and watering will depend on the soil type and its moisture content. Heavy soils should not be tamped too firmly as close packing will result in poor aeration and root response.

Pruning New Trees

The amount of pruning necessary for newly-set trees will depend largely upon the ease with which the species of tree in question normally responds to transplanting, proportion of the roots lost in transplanting, and the quality of the maintenance the trees will receive during their re-establishment. In general, with small trees, 20-30 percent of the leaf-bearing wood should be removed. Broken, weak, and interfering branches should be

entirely removed. One member of a bad fork or weak crotch should be removed. If these practices do not remove a sufficient amount of the top to balance the loss of roots, additional thinning out or heading-in should be practiced. With many trees, it makes little difference whether they are cut back or thinned out. Elms respond to thinning out while maples and oaks respond more readily to cutting in the sides. Do not remove the small twigs along the main branches or trunk.

In all cases, retain the normal shape of the plant and proper spacing of the branches. Plants like Pin Oak should not have the main leader cut back. When the lower side branches are removed, allow the small twigs and feather growth to remain. This practice aids in quicker healing of the pruning wounds and gives some protection against sun scald of the trunk.

All pruning cuts should be as close to the crotch as possible and in most cases parallel to the adjoining branch or trunk. Stubs or rough wood should never be left. These will heal very slowly and chances of infections are increased. If it is impossible to cut close with a saw, the stub should be removed with a chisel. Avoid tearing bark when removing limbs. Wounds over 1 inch in diameter should be treated with an asphalt base pruning paint.

Mulching

In most cases in transplanting trees, it is advisable to provide a mulch for the first year or more. This mulch may be of peat moss, straw, ground corn cobs, partially decomposed leaves, or manure or other organic materials. Peat moss is one of the most desirable mulching materials. It should be moistened before applying and may well have a small amount of soil mixed with it to prevent blowing. A 2 to 4-inch mulch extending over the entire root area will aid in a number of ways. It will conserve moisture by cutting down evaporation from the soil surface, by reducing weed growth, and by preventing the surface from crusting. Prevention of the crust will favor ready penetration of water into

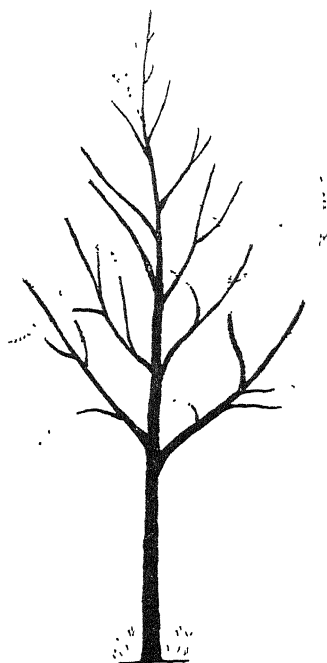


Fig. 2.—Twenty to 30 percent of the leaf bearing wood of a tree should be pruned away after it is transplanted. The dotted lines represent wood removed all around a newly planted oak.

the soil and good aeration. A mulch is beneficial in maintaining a more uniform temperature and in encouraging new fibrous root development.

Plants set in the fall should have the mulch applied at once, since at this time the soil is warm and the mulch will help to prevent rapid changes in temperature, and to maintain a more favorable temperature for root growth. A mulch should not be applied following early spring planting until the soil has warmed up. A heavy mulch at the time of planting in a cold soil might delay reaching a good soil temperature by 2 weeks.

Staking or Guying

Practically all trees over 1 inch in diameter should be supported by staking or guying to keep the plant in an

upright position and to prevent loosening of the roots. Various methods of staking and guying are practiced. Trees up to 2 inches in diameter can be supported by a stake, 2 x 2 inches x 8 feet, driven into the ground to a depth of 18 inches below the bottom of the hole, about 1 foot away from the trunk. This stake should be driven in the hole before the soil is put around the roots, so that the roots will not be injured in the operation. The tree can be attached to the stake

by means of a single loop of soft rope, a burlap strip, or a wire run through an old piece of hose. Cross the hose or rope between the stake and the tree trunk to prevent chafing. When only a single stake is used, it should be put on the side of the prevailing winds.

Trees from 2 to 4 inches in diameter should be supported by two or three stakes. Where two stakes are used, they are placed on opposite sides of the tree and the tree attached to them, as described above. Be sure the wire is

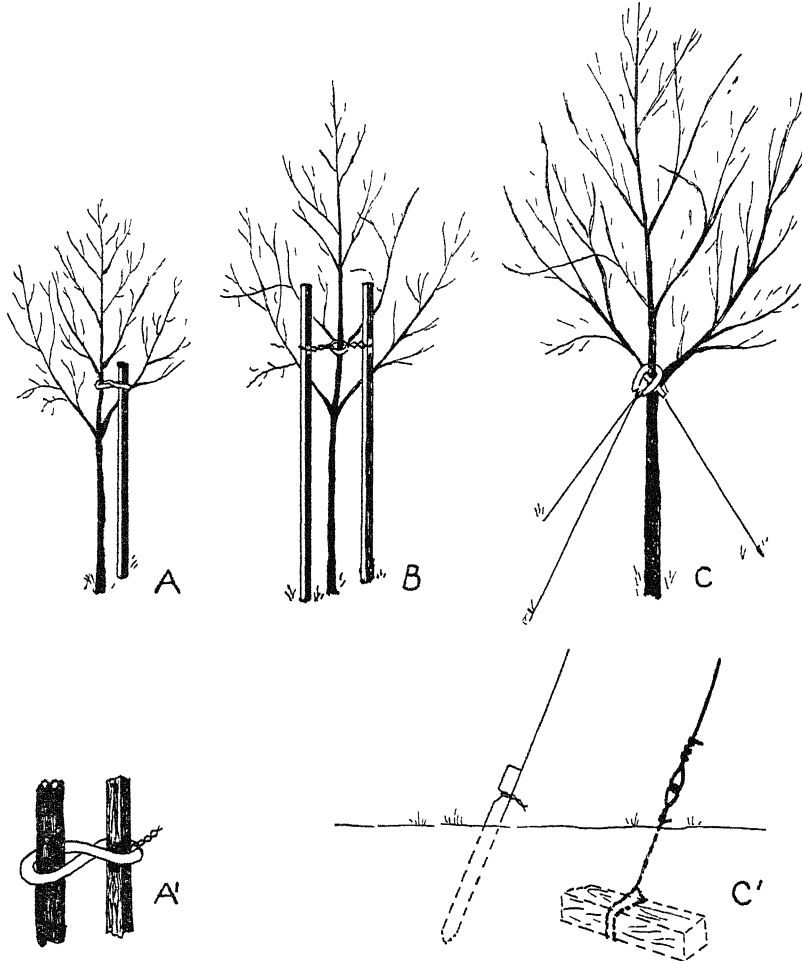


Fig. 3.—Staking and guying transplanted trees. A single stake is sufficient for trees not more than 2 inches in diameter. See A and A'. B indicates method of using two stakes and C and C' suggests the use of guy wires for trees more than 4 inches in diameter.

run through a hose so that it will not injure the bark. Use only a single loop so that there will be no possibility of restricting trunk during growth.

When guy wires are used, keep them taut for 2 years by twisting the wires.

Wrapping

Protection of trunks and larger branches of newly planted trees with burlap or special tree wrapping crepe paper has become an accepted practice. This is especially true with thin-bark trees and those that have

had the tops considerably reduced or thinned out or are otherwise unduly exposed to sun and wind. Wrapping aids successful recovery by retarding loss of water and subsequent drying out of the bark, protects the trunk against sun scald, and is at least a partial protection against borer infestation.

Spiral wrappings are applied from rolls of burlap or paper cut in widths of 3 to 8 inches. Three to 4-inch strips are satisfactory for small trees and 5 to 6-inch strips, for medium to large trees. The wrapping should be

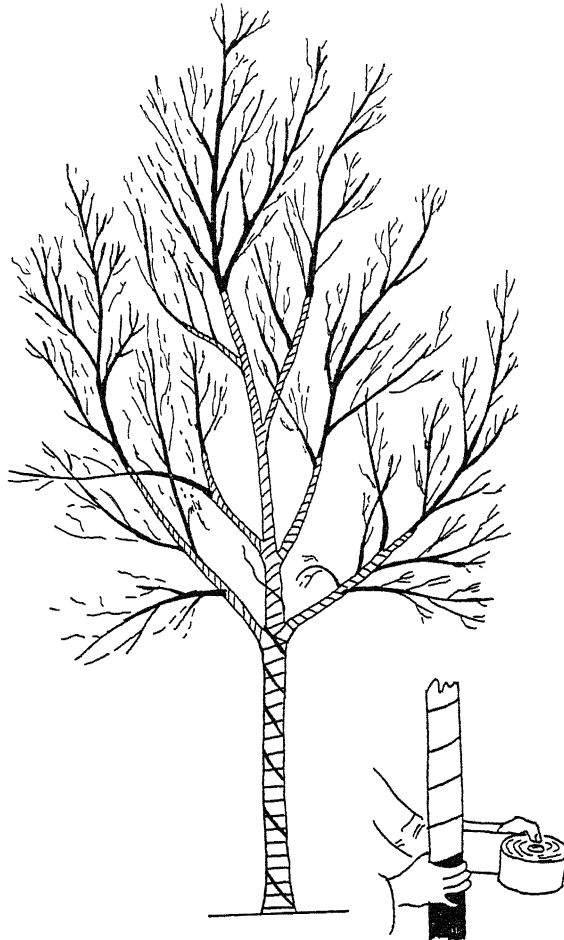


Fig. 4.—Wrapping newly transplanted trees with burlap or special wrapping paper is recommended.

applied neatly by starting out on the large branches and working down the trunk to the ground. Overlap each spiral turn one-half the width of the strip, thus a double thickness is applied. To reinforce the wrapping, bind it with a stout cord, starting at the base of the trunk and winding spirally upward in the opposite direction of the wrapping. The wrapping of burlap or paper should be left on for 2 years unless it rots or becomes unsightly.

Remove Labels

All labels attached to plants by wire or stout cord should be removed when the plants are set. Tight wire or stout cord will cause constriction of the branch as growth proceeds, often resulting in severe injury.

Watering

Proper watering is one of the most important maintenance practices, but at the same time it is very difficult to give definite rules to follow. It is advisable to keep the soil relatively dry in the spring until root growth starts. When water is applied, add sufficient to soak the soil to root depth. A good watering once in 5 to 7 days is much better than frequent sprinkling. An application of 1 gallon of water per square foot of root area every 10 days should be ample.

Recovery

If the plants have been properly dug, the roots have not dried out dur-

ing the planting, the planting operation has been carefully performed, and the plants do not dry out after planting, recovery should be relatively rapid.

Plants set during the dormant season usually develop leaves slightly later in the spring than established trees of the same species. Shoot elongation should proceed at nearly normal rate but the total length will be somewhat reduced. Root growth should start as soon as the soil warms

General Fertilization

Fertilization in fall (October 1 to November 1) or spring (March 15 to May 1).

A satisfactory fertilizer is 10-6-4, with 20 to 25 percent of the nitrogen from an organic source.

Small trees, less than 6 inches in diameter, require 2 to 2½ pounds per inch in diameter of the tree trunk; large trees, more than 6 inches in diameter, 2½-5 pounds per diameter inch. Rates are based on an unrestricted area of soil with no curb or sidewalk interfering.

Fertilizer should be applied yearly or every 3 years, depending on the kind of tree and the growth response.

Punch-bar or drill-hole is the most common method of application. The fertilizer should be applied in holes distributed evenly beneath and slightly beyond the spread of the branches. Approximately 10 to 20 holes per inch in diameter are required. Holes should be made 12 to 15 inches deep with soil auger or punchbar.

Acknowledgment is given the National Shade Tree Conference and the National Arborists' Association for the illustrations used in this bulletin.
