



# CENTRAL HARDWOOD NOTES

## Seeding And Planting Upland Oaks

Oaks can be planted or seeded in uplands to: (1) afforest old fields, strip-mined areas, or other areas devoid of trees, and (2) supplement natural reproduction within existing forests. Planting is usually more successful than direct seeding. But even under good conditions survival and growth of planted oak has been considerably poorer than with conifers and other hardwoods.

Upland oaks grown in central hardwood nurseries include bur oak, white oak, black oak, scarlet oak, and northern red oak. Except for northern red oak, guidelines for planting upland oaks are not well established. On forested sites, the following steps for planting northern red oak under a shelterwood will give best results. Planting in clearcuts is not recommended.

### How to Plant Northern Red Oak Under a Shelterwood

1. Underplant regeneration-deficient stands with at least 55 percent overstory stocking in trees 2 inches d.b.h. and larger based on the central hardwoods stocking chart (see Note 5.02 *Stocking Chart for Upland Central Hardwoods*). Plant only sites where the site index for northern red oak is 65 or better. Middle to lower north- and northeast-facing slopes are usually good northern red oak sites.
2. Determine how much planting is needed by first evaluating the existing natural oak regeneration potential of the stand. Use guides developed for that purpose if they are available for your specific geographic area (see Note 3.02 *Assessing Regeneration Potential*). If guides are not available for your area, you will have to rely on experience or extrapolation of guides for similar areas to evaluate the oak regeneration potential.
3. Reduce competition from woody plants less than 2 inches d.b.h. and/or other competitors by applying a herbicide *before* underplanting. Several registered herbicides are suitable for this purpose. To control woody vegetation, use 2,4-D + picloram (e.g., Tordon RTU<sup>1</sup>) or a similar herbicide with stem injection or cut stump applications during the dormant season (see Note 6.10 *Individual Tree Control*). During the growing season, herbicides such as glyphosphate (e.g., Roundup) can be applied to the foliage of unwanted vegetation. Use a low-pressure (e.g., less than 20 psi) hand sprayer if vegetation is less than 6 feet tall. Spray only unwanted vegetation and avoid drift or drip of the herbicide onto desirable advance regeneration.
4. Make a shelterwood cut and leave a well spaced overstory of about 55 percent stocking. If the overstory of the stand to be underplanted is only 55 to 65 percent stocked to start with, a cut is not necessary. If the trees to be eliminated in the shelterwood cut are unsalable, then steps 3 and 4 can be combined.

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<sup>1</sup> Use of trade names does not constitute endorsement by the USDA Forest Service.

5. Plant large I-O, 2-O, or I-I nursery stock: discard stock less than 3/8-inch in stem diameter 1 inch above the root collar. The larger the diameter the greater the chances for survival and acceptable height growth. Transplants or 2-O undercut seedlings are more likely to reach tree size than seedlings of the same diameter that have not been undercut or transplanted in the nursery. Undercut seedlings are root pruned in the nursery bed to produce branched root systems.

Estimate from table 1 the number of trees to plant per acre from the number of planted trees required to produce one "successful" tree. For example, with undercut 2-O stock averaging 7/16-inch in diameter, 2.1 seedlings must be planted to produce one successfully established seedling. Therefore, if 200 seedlings per acre are desired, 420 (2.1 x 200) seedlings should be planted.

Table 1 .-Number of underplanted northern red oaks needed to obtain one successfully established tree

<b>Stem diameter 1 inch above the root collar (1/16 inch)</b>	<b>Planted trees needed to obtain 1 successful tree</b>
<i>Number</i>	
1-O and 2-O seedlings (not undercut in nursery bed)	
4	9.1
5	5.9
6	4.3
7	3.4
8	2.9
9	2.6
10	2.4
2-O undercut seedlings and I-I transplants	
4	5.9
5	3.7
6	2.6
7	2.1
8	1.9
9	1.7
10	1.6

Plant in the spring. After the seedlings have been culled, prune the roots 8 inches below the root collar and prune the tops 8 inches above the root collar (fig. 1).

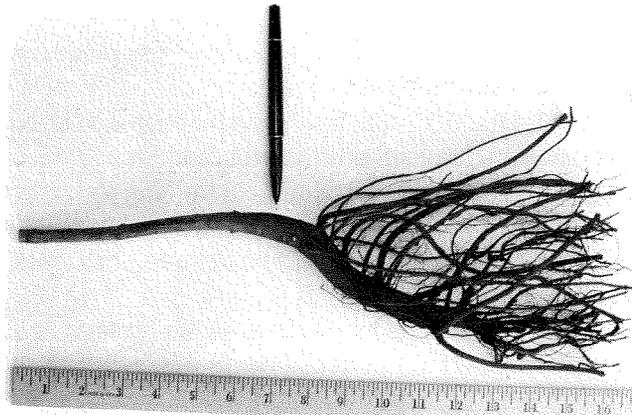


Figure 1 .-Northern red oak nursery stock ready for field planting should look like this 2-0 undercut seedling. Roots and top have been pruned 8 inches below and 8 inches above the root collar, respectively.

6. Remove the shelterwood during the dormant season after three to six growing seasons. No special precautions are needed to protect planted trees from top breakage during logging because large, well-established stock will produce fast-growing, new sprouts from dormant buds near the root collar. If there are too many trees of undesirable species in the shelterwood, treat their stumps with an herbicide to prevent sprouting.

#### Underplanting Other Upland Oaks

Limited experience suggests that white oak also can be successfully underplanted in shelterwoods as described above. However, it may take 3 years to grow white oak nursery stock to the 3/8-inch diameter necessary for acceptable field performance. Guidelines for underplanting other upland oaks are lacking.

#### Afforestation by Planting

On old fields and other non-forested areas, control competing vegetation with an appropriate herbicide before planting. On dry sites such as upper slopes, south- or southwest-facing slopes, and ridge tops, plant drought-hardy species such as black, white, scarlet, or bur oak. Restrict planting of northern red oak to the better sites with deep soils. Spring plant with stock at least 3/16-inch in diameter. Top-prune stock greater than 30 inches tall and root prune as described for underplanting northern red oak. If site quality and growth rate of planted trees justifies intensive culture, see Note 3.05 *Seeding and Planting Hardwoods*.

Plant drought-hardy species on strip-mined areas with soils between pH 4 and 7. If pH is near 7, plant bur oak-which is more tolerant of high pH than other upland oaks.

## **Direct Seeding**

Direct seeding of upland oaks is not recommended because of the inconsistent results experienced over many years of trials. Rodent pilferage is a major problem. For those who want to continue the quest for better ways to establish oaks, the following suggestions are offered for small scale seeding trials:

1. Select red oak site index 65 or better sites in forest openings or other open areas that are at least 1/2-acre.
2. Get rid of brush, tops, and other vegetation and debris to reduce competition and eliminate the habitat of acorn predators.
3. Use quality seed with 75 percent or better germinative capacity.
4. Sow acorns 1 to 2 inches deep in spots in the fall as soon after natural seedfall as possible. Each spot should have three or four acorns sown about a foot apart.
5. Sow at least twice as many spots as the number of established seedlings desired.
6. Control weed competition as needed.

## **References**

- Johnson, P.S.; Dale, C.D.; Davidson, K.R.; Law, J.R. 1986. Planting northern red oak in the Missouri Ozarks: a prescription. *Northern Journal of Applied Forestry* 3: 66-68.
- Johnson, R.L. 1981. Oak seeding-it can work. *Southern Journal of Applied Forestry*. 5: 28-33.

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