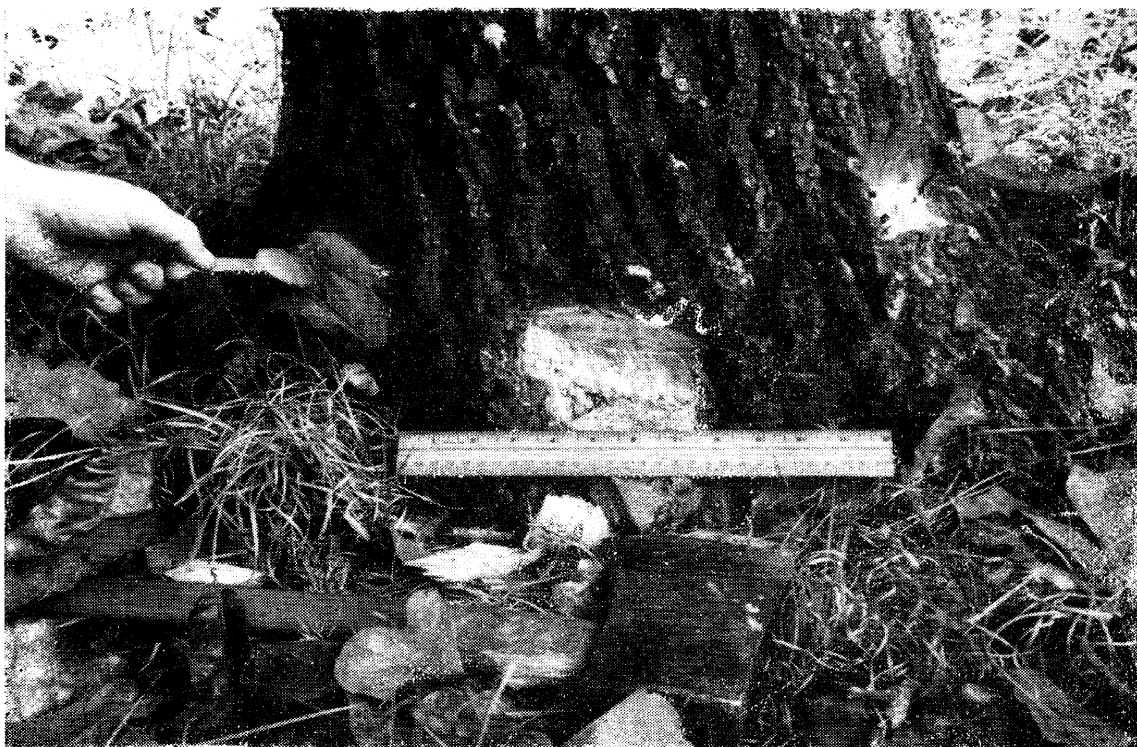


# Eradication of Trees & Shrubs

Circular 526



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# Eradication of Trees and Shrubs

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The information in this circular has been taken from publications of the Red Plains Conservation Experiment Station, the Oklahoma A. & M. College Experiment Station, The Southern Forestry Experiment Station of the U. S. Forest Service and from various other state publications. It includes considerable material assembled by Dr. Michael Afanasiev of the Department of Forestry, Oklahoma A. & M. College. Experience and observation of field workers is also included. Remember that the recommendations and procedures are not final. Farmers interested in killing trees or shrubs should not only study the information enclosed but should get personal help from county agents or other agency workers.

The destroying of some types of woody plants is a common problem on many Oklahoma farms. Scrubby growth of blackjack, post, and shinnery oaks and dense thickets of persimmon are generally of little value. This also applies to mesquite in some sections.

## Caution

It is pointed out that although a tree may be worthless as a source of wood, it still may serve a very good use in other ways. The ability of trees to prevent or to reduce soil erosion is of great importance.

Land covered with woody tree growth is best adapted to that crop, or nature would have had it covered with grass. This means that any job of completely removing trees or brush will need to be followed with a crop or pasture management program, which will keep woody plants from coming back in. The idea that certain land with all the trees removed would automatically be good land is usually not the case.

Chemicals 2,4-D and 2,4,5-T will kill legumes such as clover, alfalfa and lespedeza. It drifts in the wind and may damage trees, and cotton crops.

Sodium arsenite is poisonous to livestock and people.

Chlorates are inflammable so are dangerous to handle.

Power saws should be treated with utmost respect.

There is more than one way to kill a tree. Each problem of clearing should be considered by itself and only the owner of the land who knows his land best is in a position to make the final decision on the way to remove trees and bushes.

Figure the cost carefully. In January, 1948, the Red Plains Conservation Experiment Station reported a cost of \$20.00 to \$100.00 per acre for killing a stand of brush with 2,4-D or Ammate. The cost varies depending on the density of the stand and the height of the plants. The cost may change with the change of price of chemicals or labor, and more experience.

Attempts are often made to destroy brush by burning. This practice not only fails to permanently kill the brush; but also, destroys other vegetation, reduces humus and fertility and increases the chance of erosion.

The use of common salt, diesel oil and kerosene to the soil will destroy the ability of the ground to grow other crops for some time. The extent of this effect will depend on the kind and amount of the substance used.

### **Cutting**

Evergreen trees such as pines and red cedar can be cut without danger of producing sprouts or suckers. On the other hand, most broad-leaved trees have a tendency to form new growth from the stump, the roots or both. Although this tendency varies with the species and the age of trees, cutting of healthy, rapidly growing broad-leaved trees will produce sprouts in most cases. Among the species having a strong tendency to sprout from roots or stumps are black locust, bois d'arc (osage orange), catalpa, mulberry, persimmon and Chinese elm, oaks, pecan and others. Broad-leaved trees, 10 inches or more in diameter, generally will not sprout.

For best killing results, trees should be cut during the late spring or summer when they are growing rapidly.

### **Frequent Mowing**

Mowing of small, thin-stemmed brush has been successfully used at the Red Plains Conservation Experiment Station at Guthrie to keep a pasture clear of woody growth. This method has failed, however, to destroy the brush permanently and oak sprouts continue to appear after several years of mowing.

This practice combined with pasture weed mowing is a very good control measure even though it does not completely kill brush.

### **Grubbing**

When the trees are small (less than 1 inch in diameter) and not too numerous, grubbing is still the surest way of eradication. Grubbing can be done with a combination of hand tools, as ax, spade, pick, crowbar, hoe or mattock, depending on the depth, the extent of roots, and the type of soil on which the plants are growing.

### **Grazing**

Grazing heavily with brush goats is sometimes used; but the cost of fencing, expense of management, erosion hazard caused, generally make this practice impractical.

## MACHINES

At the Guthrie Conservation Experiment Station, several kinds of machines have been designed or adopted for cutting brushy plants. They include power mowing machines, tractor saws, small portable saws, chain saws, power brush beaters, bull dozers, tree dozers, heavy root plows, crushers, tree shears and buck rakes. These implements all gave satisfactory results when used on material for which they were best suited.

It appears unlikely that any one machine or clearing method can be developed to operate satisfactorily in all conditions and types of brush. A machine to handle brushy material such as sage brush must be quite different from one for tough, taller growing material like blackjack or persimmon.

The types of vegetation to be removed may be classified into three groups: brushy shrubs, tough shrubs, and trees.

**Bushy shrubs**, such as sage brush, and sumac can be readily cut with brush mowing machines. Such brush also breaks easily under the impact of a beater or heavy crusher like a large stalk cutter. Sage brush was controlled to best advantage in western Oklahoma by cutting it in June.

**Tough shrubs**, such as thickets of plum, persimmon, blackjack oak, buck brush or other woody plants with stem sizes up to one and one-half inches can be cut with a power brush mower or a heavy stalk-cutter type machine. Portable saws, either tractor mounted or small, manually operated, have also worked nicely for cutting this kind of brush.

**Trees** ranging in trunk size from 2 inches or larger may be removed with saws or dozers on large crawler tractors. Small portable saws were most satisfactory on trees in size from 2 to 10 inches in diameter. Larger trees were cut, but with increasing difficulty. Much larger trees were cut with tractor-mounted saws, and they work as well as the portable saws on small trees. Chain saws operate best on large trees. They can be used on steep banks or in close places where other types of saws cannot be operated.

Studies made at the Red Plains Conservation Experiment Station showed that with power saws, spring is the best time to cut. In the spring twice as much work was done per hour as in the winter and 50% more than in the summer.

Brush buck rakes have been used to save many man hours of labor for bunching the brush after cutting. The Red Plains Experiment Station reports results to date show that the time required for land clearing with four men and a portable saw was between 30 and 40 man hours per acre. When a buck rake, portable saw and four men were

used, the time varied from 20 to 30 hours per acre. But a tractor saw and buck rake combination reduced the time for clearing to between 5 and 10 man hours per acre.

## **Deadening Individual Trees**

Quite often it is necessary to deaden unwanted trees that are growing in forest areas, in parks, orchards, groves, or other places where sprays cannot be safely used. Several methods for killing individual trees exist.

### **Girdling**

The term "girdling" when used in reference to trees means removal of a ring of bark and wood from around the trunk of the tree. The girdle should be at least 6 inches wide and close to the ground. Remove the bark completely. If the ring is too narrow or strips of the bark are left in the ring, it may heal over and the whole job fail.

As in the case of cutting, girdling alone is effective only on larger and older trees (diameter 10 inches or larger). Young trees when girdled produce many sprouts below the girdle. Girdling should be done during the late spring and summer.

### **Poisoning**

Individual trees can usually be killed by placing chemicals in ax gashes or holes bored in the tree near the ground. To lessen the chances of livestock getting the poison, the gashes or holes may be below the ground level and covered with dirt. One band of gashes is usually sufficient for trees 4 to 8 inches in diameter. Two bands are needed on trees 8 to 12 inches, and larger trees should probably have 3 bands of ax cuts around them. These bands may be approximately 4 to 6 inches apart.

### **Ammonium Sulfamate (Ammate)**

Ammate applied to gashes or holes in the tree is very effective, particularly on upland trees. One tablespoonful of crystals is generally enough to kill trees 4 inches or less, 2 tablespoonfuls are needed for trees 4 inches up and larger amounts on larger trees.

Small trees and sprouts are harder to kill than larger trees. Accordingly, it is best to spray the foliage with 32.5% solution of Ammate (4 lbs. in 1 gal. of water). The spraying must be done when the plants are in full leaf. Stems as well as leaves should be covered with the solution. Late growing season (late summer and fall) is probably the best time to use Ammate.

Poor results were obtained with Ammate applied to stumps for sprout control.

### **Sodium Arsenite**

Sodium arsenite is by far the most effective and widely used tree poison, particularly on bottom land trees. It may be applied to standing trees as well as to stumps. It is best applied in dry form or concentrated solution in gashes or holes. It is not effective as a spray. This chemical is **deadly poison** not only to trees but to men and animals as well. Keep livestock away from treated trees for at least 3 or 4 weeks. It is not safe to turn them in until a good rain has washed off the excess chemical.

Although arsenic is the most effective tree poison, one should not always expect complete results. In some cases, more than one application of the poison might be necessary; in others, even repeated applications will fail to kill the trees. Not all species of trees respond to the treatment alike. Most oaks, maples, elms, black locust and ash are very susceptible to the poison. Persimmon, hickories, and cottonwood are less liable to be killed.

The concentration of sodium arsenite to be used for poisoning trees may range from 1½ to 2 pounds per gallon of water. The chemical is easily soluble in both cold and hot water.

### **Poisoning Stumps with Sodium Arsenite**

When dealing with stumps sodium arsenite is applied to all freshly exposed surfaces with a brush, a swab, or a sprayer. A few deep cuts with an ax on the surface of a stump prior to the use of the poison are helpful. It is suggested that sodium arsenite be used within an hour after the tree has been cut, yet rather good results were obtained in California when treatment followed cutting by as much as one month.

If the stump has sprouted before the poison has been applied, the sprouts must be broken off (not cut) and the freshly exposed tissues where sprouts were removed covered with the poison. A sprayer is the best type of equipment to use in such cases.

When the stump is small (3 inches or less in diameter) favorable results can be secured by making a "basin" 3 to 4 inches deep in the ground around the stump and pouring a pint or two of sodium arsenite into the basin. Such treatment is most effective when made during the cool season (November to February).

In case of ARSENIC POISONING call a doctor. Before the doctor arrives, induce vomiting. Give epsom salts, sweet oil or equal parts of sweet oil and lime water, or lime water alone, raw eggs, milk and stimulants.

### **Chlorates**

Sodium chlorate and calcium chlorate are used very successfully in killing small trees, shrubs, and vines. These chemicals are highly combustible when mixed with organic matter. Calcium chlorate is somewhat less dangerous than sodium chlorate.

Calcium chlorate (or sodium chlorate) is used as a spray which should cover thoroughly the entire crown (foliage) of the plant. The solution for such a spray is prepared by dissolving 2 pounds of the dry chemical in one gallon of water. The best time of application is when the plant is in full leaf, during late spring and summer.

A poison containing one of the chlorates as the active ingredients and yet safer than either of the above two pure chemicals, is sold under the trade name of "Atlacide." It is effective on small woody plants such as poison ivy, sumac and thornapple. Directions on the package should be followed carefully.

### **2, 4-D and 2, 4, 5-T**

These chemicals are not practical for use on trees. They will kill sprouts from stumps of most trees but are not very effective as a chemical applied to gashes in the bark or stump.

## **CHEMICALS FOR BRUSH CONTROL**

This information will be helpful to persons interested only in brush control (not tree deadening). Particular attention should be given to precautions necessary, to keep from damaging nearby crops or other valuable plants or trees.

### **2, 4-D and 2, 4, 5-T Acid**

The ester formulations of 2, 4-D and 2, 4, 5-T acid generally have given the best control of brush. The 2, 4-D is not effective on all woody species. Table on page 8 shows the response of various Oklahoma species to this chemical. A 50/50 or 2/3-1/3 combination of 2, 4-D and 2, 4, 5-T acid will affect a wider range of plants. Results from these chemicals are quite variable. They are influenced by soil moisture and by the growth stage of the plants. Generally, 2, 4-D and 2, 4, 5-T spray solutions have gotten the best kill when applied on brush just after the plants have reached full leaf size.

Three pounds of 2, 4-D acid per acre in a sufficient volume of water to get good coverage of leaves of dense stands had given control of sumac, sand or Chickasaw plum, buck brush, and Western crab apple.

The white, blackjack, dwarf chinquapin, running oaks, and hickory are somewhat resistant to 2, 4-D. Good control can be had on these species only under favorable conditions. A combination of 2, 4-D and 2, 4, 5-T will increase the effectiveness of the spray material. Where one is used alone, 2, 4, 5-T has been more effective than 2, 4-D under more adverse conditions.

Buy prepared chemicals and follow directions on the package. Drug, seed and supply stores generally have these chemicals under some trade name. The percentage of chemical is given on the package.

Diesel oils, either for high concentration applications or mixed with water, have improved the kills of brush by these chemicals. However, large amounts of oil will often injure or retard the grasses. In using oil carriers, an additional emulsifying material is quite often needed in order to hold the chemical, water, and oil in workable mixture or emulsion.

Remember 2, 4-D and 2, 4, 5-T will kill your legumes in your pasture.

The chemicals 2, 4-D and 2, 4, 5-T and combinations of them are on the market under many trade names such as: 46% Ester of 2, 4-D; Esteron 2, 4, 5; Esteron 44; Brush Killer No. 32; Weed-No-More; Ded Weed T-E-5; Esteron brush killer and many others.

### **Ammonium Sulfamate ("Ammate")**

Ammonium sulfamate has given good control of all woody plants common to the Cross Timbers, including all of the species listed in the Table below. This material at one pound to one gallon of water will give more positive reaction than 2, 4-D or 2, 4, 5-T. It will, however, injure the native grasses.

Brush treated with Ammate quite often produces clusters of new leaves along the main stems, and sometimes a few sickly sprouts appear from the roots. These sprouts usually do not have much vigor. The new leaves remain green unless treated a second time. Sometimes a third application may be necessary to completely kill this growth.

Ammate spray solution is prepared by mixing one pound of the powder to each gallon of water.

TABLE—Degree of Control of Woody Plants by 2, 4-D

#### **Control 85 to 95 Percent**

Sumac, Sand plum, Black locust, Honey locust, Western crab apple, Sassafras.

#### **Control 75 to 85 Percent**

Blackjack oak, Post oak, Dwarf chinquapin, Hickory, Willow.

#### **Control Slight**

American elm, Winged elm, Mesquite, Persimmon, Hackberry, Bois d'arc.

#### **No Control**

Red cedar, Tamarix.

### **Common Salt**

Common salt is effective in killing ivy and other plants but since it kills the soil for several years it is not considered practical.



**Diesel Oil and Kerosene**

Diesel oil, 27° A.P.I. gr., applied as a spray to freshly cut surface of the stump and sprouts proved to be as effective in killing them as sodium arsenite. The gravity of the oil (27°) is very important.

The method of treatment consists of hacking the stump (exposing more surface), breaking off (not cutting) the sprouts, uncovering the roots around the stump to a depth of 3 or 4 inches, cutting into the exposed roots with an ax or shovel, and finally applying the oil to all exposed and injured surfaces of the stump and the roots by means of a sprayer. It is suggested that oil be applied three consecutive times to make sure that enough of it is absorbed by the tissues. Stumps can be treated successfully with Diesel oil at all seasons of the year.

As far as is known at present, kerosene is very effective in killing only mesquite, and is ineffective on other trees.

## **SPECIAL CASES**

### **Poison Ivy: Brambles**

Use ammate to eradicate ivy or brambles.

### **Mesquite**

Diesel oil or kerosene may be used effectively.

### **Sage Brush**

Southern Great Plains Field Station at Woodward can provide information.

### **Persimmon**

At the Colgate Pasture Fertility Station good results have been had by mixing 1 pint of 2, 4, 5-T with 39 pints of kerosene and painting the stems of smooth bark persimmons sprouts for a distance of 1 foot or more from the ground. The bark should be dry and enough solution put on to soak into the growing layer. Large persimmon trees can be killed with sodium arsenite or ammate.

### **Blackjack Oak**

For trees, use sodium arsenite. For sprouts, use 2, 4-D and 2, 4, 5-T combination or ammate.



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