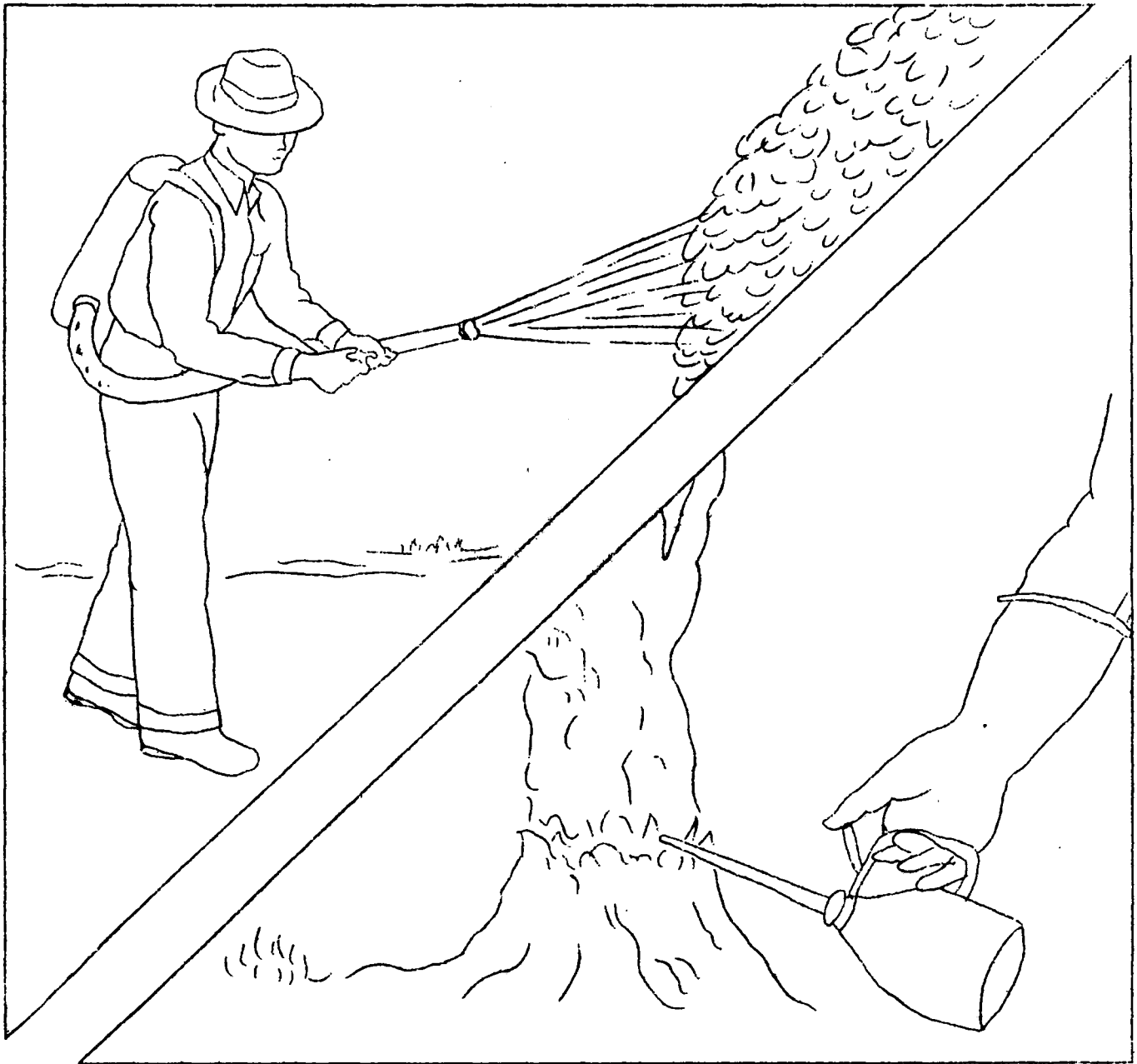


METHODS OF KILLING TREES, SPROUTS, AND BRUSH

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METHODS OF KILLING TREES, SPROUTS, AND BRUSH

Certain trees, notably the broad-leaf trees, and certain species of brushy plants often occupy land useful for grazing or tillage. It is possible to eradicate them by various methods, several of which will be described in this circular.

TREES AND STUMPS

Cutting

Perhaps the trees to be removed can be made into marketable fuel wood or other forest products. If so, cutting will help to pay part of the cost of removing the undesirable trees. Vigorous sprouting, however, often follows cutting and the job is unfinished. It has been shown that cutting at or below the root collar at ground level gives better results than cutting above the collar. The kill will be better and less sprouting will result.

Cutting is reported more effective if done during July or August. During these months there is less food stored in the roots. Consequently, sprouting is said to be less vigorous. Professor A. W. Oliver reports that tests on poison oak and white oak by the Oregon Experiment Station at Corvallis did not bear this out, however.

Cutting and girdling will usually be the method where it is unsafe to use poison. It may not be practical to girdle or to poison trees of less than 3 inches in diameter because these operations take so much more time than cutting. Poison is ordinarily more successful than other methods in getting a complete kill and in preventing sprouting. Those who use poison should appreciate the cautions required.

Girdling

A shallow girdle is recommended as the most effective. Remove a band of bark about eight inches wide from around the tree. The sapwood should not be cut, but care must be taken to sever the inner bark completely because this tissue conducts manufactured food from the leaves to the roots where it is stored. If shallow girdling is done correctly, the tree will continue to live during the year in which the work is done and sometimes longer. Sprouting will be absent or very weak at the end of this time, however, because the food supply which was stored in the roots will be exhausted.

Deep girdling, in which the cut extends through the sapwood, causes immediate death to the tree tops. Sprouting is usually much more vigorous than in shallow girdling.

Poisoning

Investigators in Oregon and elsewhere have found that the most suitable poison to kill trees is a sodium arsenite solution. If there are not a great many trees to be killed, commercially prepared solutions may be more economical and convenient than a homemade solution. The commercial product can be obtained through some of the drug and chemical concerns. We are not able to report the proven strengths of sodium arsenite needed to kill large hardwoods in western Oregon. Not enough tests have been made as yet. We are giving the best information we have from tests made elsewhere. ALWAYS REMEMBER SODIUM ARSENITE IS EXTREMELY POISONOUS TO MAN AND ANIMALS IF TAKEN INTERNALLY. IT ALSO AFFECTS THE SKIN OF SOME PERSONS, SO HANDS AND CLOTHING SHOULD BE PROTECTED.

How to Prepare Sodium Arsenite Solution at Home

Any one of the following three methods may be used:

1. Stir two pounds of white arsenic (As_2O_3) with one-half pint of lukewarm water to form a smooth paste. Add one and one-half pints of lukewarm water, stir until the arsenic is completely in suspension, and then slowly stir in one-half pound of sodium hydroxide (NaOH), also called caustic soda. The chemicals will boil and give off heat while being mixed. DO THE MIXING OUTDOORS AND BE CAREFUL NOT TO BREATHE ANY FUMES FROM IT AS THEY ARE POISONOUS. Use 1 part of the above stock solution (1 quart) to 2 parts water (2 quarts) for methods A, B, or C.

For methods A and B it is suggested that two parts liquid laundry starch be added instead of the 2 parts water. It is prepared by stirring 1 cup gloss starch in 1 gallon of boiling water. Starch will cause the poison to adhere better.

2. Dissolve two pounds of commercial sodium arsenite powder in $2\frac{1}{2}$ quarts of lukewarm water.
3. Dilute one gallon of commercial liquid sodium arsenite with $1\frac{1}{2}$ gallons of water.

By method number one, the cost of the poison was about \$1.25 per gallon for the chemicals bought at retail drug stores.

How to Apply Sodium Arsenite Solution

Late summer or early fall is believed preferable, but unsatisfactory results have been reported throughout all seasons. There is some question about treating on damp days. A number of methods have been used to apply the poison, as follows:

- Method A. In pastures or other areas where total clearing is necessary to facilitate mowing, the trees should be cut off at, or preferably below, the surface of the ground. The top of the stump is treated with the solution. After allowing about 30 minutes for the chemical to become absorbed, the earth should be backfilled to prevent animals from getting to the poison.
- Method B. The tree can be "frilled" at the base by making a series of overlapping hacks completely around it. These axe cuts form a crevice to catch and hold the poison until it is taken up into the sap stream of the tree. Care should be taken that the inner bark is completely severed and that the sapwood is cut about one inch deep. Pour a small quantity of the poison solution into the cuts all around the stump. An engineer's oil can with pump attachment is best for this. Only sufficient solution to completely encircle the trunk is necessary. Heavier application merely wastes the poison. This method has the most danger to animals. They should be kept away until sufficient rain has fallen to wash away the poison or dilute it to the harmless stage.

Method B might be done differently to keep the poison away from animals which may stray into the area. Remove soil about the stump or tree to a depth of 4 inches. Girdle below ground level by hacking the bark. Apply poison, and replace soil about roots so the girdle and the poison are completely covered. Also cover with soil any solution spilled on the ground. Domestic animals are attracted to alkali arsenites.

Method C. The poison can be injected by means of holes bored into the stem of the tree near the ground line, or into the roots. One hole is sufficient for trees smaller than five inches diameter at the stump. Two or three holes are required for trees up to ten inches. About two teaspoons of poison are put in each hole. If an oil can with a long spout is used, spilling can be avoided. This saves the chemicals and lessens the danger, should livestock break in.

A special axe with a hollow punch attached to the head has been devised to punch holes for this method. It can be bought from certain axe companies. A more efficient killing job is reported when holes are used. Poison tends to leak away from hacks.

Method D. The Basin method has been used to kill Juniper trees and stumps, and mesquite, on the dry range lands of Arizona. It does not require cutting or brushing out. A shallow basin or trench is dug around the trunk of the tree. Wherever the ground is level, the needle litter is pushed to one side with a sharp stick or tool handle, forming a slight depression or groove. Into this groove or basin a pint of arsenic solution is poured. The same stock solution is prepared as described on page 2, and 5 parts water are added to one part stock solution. A pint can attached to a wooden handle is used to measure and pour the solution into the basin. If accessible to livestock, the basin should be covered back with soil or brush.

The cost for chemicals was reported something over 1¢ per tree 3 or 4 years ago with bulk purchases. Junipers 2 inches or less were killed by lopping off tops close to the ground with an axe.

The Use of Sodium Chlorate

Sodium chlorate may be used in place of sodium arsenite in poisoning trees and stumps. Where the solution method of application is used, the sodium chlorate should be dissolved at the rate of two pounds per gallon of water and this solution applied.

Where it is desirable to poison the stump, this material should be inserted into holes bored around periphery of the stump or tree and the dry material put in. The holes should then be closed by means of wooden plugs. About two ounces of sodium chlorate should be used for every foot of diameter of the tree.

SPROUTS

Oftentimes a stump from a tree that has been cut down gives rise to a number of sprouts. Intensive grazing of these sprouts or repeated slashings will eventually eradicate them. However, one or two applications of chemicals control sprouts more

rapidly and simply. One of the effective materials for this is sodium chlorate used as a spray in which one pound of sodium chlorate dissolved in a gallon of water constitutes the spray mixture. Another material that is equally as effective in controlling sprouts and brushy plants is the Ammate or ammonium sulfamate weed killer also used at the rate of one pound to the gallon of water.

For many species of woody plants the new weed killer 2,4-D is very effective. (See following list for these susceptible species.) Where 2,4-D is to be used it is recommended that the ester types of this weed killer be used. The other forms of this weed killer are often equally as effective as the esters on brushy plants but under adverse conditions or where the plant is difficult to wet, the esters have proved to be more effective. This material is used at the rate of three pounds of parent acid per hundred gallons of spray. For concentrated ester forms of the spray, which usually run between 35 and 50 percent ester, this will correspond roughly to three quarts of the ester of 2,4-D per hundred gallons of spray.

BRUSHY PLANTS

A brushy type of growth often occurs on land which could be put to better use. This might consist of saplings, Alder, Poplar, Willow, various types of berry bushes and so forth. The problem here is to obtain control of the plants as cheaply as possible.

Grazing

Close and continuous grazing with such animals as goats and sheep aids in bringing about eradication of brushy type plants. Certain species of the brush will be controlled nearly entirely by grazing whereas others will be materially weakened and can be controlled following the period of grazing very easily by the use of other methods such as the use of one of the above-mentioned chemicals or cutting.

Cutting

Continued cutting of young sapling growth is a fairly effective method of controlling brushy plants. On land where it is possible to operate machinery, mowing machines are effective against very young plant growth. A minimum of two to three mowings per season is necessary to prevent the plants from reestablishing themselves.

Use of chemicals

Probably the easiest and fastest method of eradicating undesirable plants is through application of chemicals which bring about their destruction. This method is not always the most economical but in many instances it is the cheapest and most effective.

Sodium chlorate

Sodium chlorate may be applied as a spray for the control of nearly any type of brushy plant. Approximately four pounds are required per square rod to obtain control where the stand is very dense.

The spray solution of sodium chlorate consists of one pound of sodium chlorate per gallon of water. This is usually mixed by filling the spray tank one-half to three-fourths full of water, adding the desired quantity of sodium chlorate and then filling the tank. If a large spray tank is used it should be equipped with an agitator that can be operated during the filling of the tank. In making application of the sodium chlorate to the plants, the spray solution should be applied until the plant is very thoroughly wet but not until runoff occurs. For spraying rather heavy stands of brushy plants, pressures of 100 to 150 pounds are required and pressure even higher than this is often beneficial in making treatment to rather large stands.

Sodium chlorate will destroy all but a few species of plants if proper application is made. For hard-to-wet plants, however, the addition of the wetting agent is helpful.

There are some dangers in connection with using sodium chlorate as a weed killer. It forms a rather highly combustible mixture when with organic matter such as clothing, vegetation, straw, wood, and so forth. It is recommended therefore that the material be used in the spring or fall months when danger of fire is at a minimum. The person making application should take precautions to wear rubber boots and old clothing when making application. At the end of the day or when the application is finished, clothing should be thoroughly washed with cold water to remove the sodium chlorate residue. One should not smoke or have flame or hot objects around where sodium chlorate is being handled. The same precautions must be observed in treated areas until after a heavy rain or two.

Sodium chlorate is poisonous to livestock though somewhat less so than the arsenic. Therefore, livestock should be kept off treated areas until after a good rain.

Ammonium sulfamate

Ammonium sulfamate is another commonly used weed killer that is quite effective against a number of brushy plants. It is somewhat more costly to use than sodium chlorate but has the advantage of being neither toxic to livestock nor a fire hazard. It is to be recommended for use around buildings and places where fire might occur or where there is a possibility of poisoning livestock.

The material is applied in the same manner as sodium chlorate but may be applied even during the dry summer months with safety. It is mixed at the rate of one or two pounds per gallon of water and sprayed on the vegetation until it is thoroughly wet. The application usually requires two to four pounds per square rod or higher if the vegetation is extremely dense.

The number of plant species controlled by use of ammonium sulfamate is somewhat more limited than with sodium chlorate. It is most effective against poison oak, willows, alder and Scotchbroom. It is fairly effective against blackberry but not as effective as sodium chlorate. On the other hand, it is the most effective material on gorse.

2,4-D

The newly discovered herbicide, 2,4-D, is very effective against certain species of brushy plants. This material is quite cheap to use and affords an excellent means of eradicating many undesirable plants. It should be pointed out, however, that with any chemical weed killer, the dead plant will remain. Therefore, it will be necessary to cut or burn the plants if it is desired to have them off the area.

2,4-D is applied usually in the form of a spray with sufficient water to wet the plants and uniformly distribute the 2,4-D. There are many preparations of 2,4-D which range from powder to liquid. The particular preparation of 2,4-D that can be recommended for all types of brushy plant spray is the ester type. While the salt or powder types of 2,4-D are often equally effective as the ester types on brushy plants under favorable conditions, under less favorable conditions the esters are probably more sure of a kill.

It is important at this point to note the possibility of making too heavy an application of 2,4-D to the plant. Since this material must be absorbed by the plant and translocated to the roots, an application heavy enough to injure the leaves shortly after the application has been made, limits the amount of 2,4-D that will be translocated to the roots. Therefore, a desirable application is one which is sufficiently heavy to kill the plant but which will not cause noticeable injury to the plant until the 2,4-D has been translocated to the roots.

The spray solution recommended for brushy plants consists of two to three pounds parent acid of 2,4-D in the ester form. This will mean approximately two to three quarts of the 40-60 percent concentration preparations of esters to the hundred gallons. Where the plants are particularly hard to wet or the growth is over a year old, it is sometimes desirable to add four or five gallons of diesel oil per hundred gallons to facilitate wetting. The ester preparation should be mixed with the oil and then this oil combination mixed with water.

The spray solution described above is then applied with a conventional type sprayer using anywhere from 75 to 100 pounds pressure and sprayed on the plants to sufficiently wet them but not thoroughly saturate the plants.

Where a small hand sprayer of three-gallon capacity is used, a suitable mixture consists of one-quarter to one-half teacup of ester preparation with about a teacup and a half of oil with the remainder made up of water.

Results should not be expected too quickly with this material as it might take ten days to two weeks before the first injury appears and a month or more before the plant dies. The following list shows the common species that are susceptible to 2,4-D and some of those that are not susceptible to control by 2,4-D.

<u>Species controlled by 2,4-D</u>		<u>Species not controlled by 2,4-D</u>
Alder	Box elder	Blackberries
Willow	Dogwood	Maple
Poplar	Gooseberry	Oak
Cottonwood	Poison Oak	

Cost of Chemicals

Cost of chemicals vary somewhat depending upon the quantities bought, the purity, and the method of getting them. The following prices will give a general idea of prices at this writing:

Caustic Soda	Around 50¢ per lb.; much cheaper in large lots.
White Arsenic	15¢ per lb. in 5 lb. lots from Portland
Chlorates	8¢ to 10¢ per lb.
Ammate	18¢ to 21¢ per lb.
2,4-D (Ester formation)	\$3.50 to \$4.00 per lb. of the parent acid. However, it goes farther than chlorates and ammate, therefore, is far less expensive in the end.

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