



# TECHNICAL NOTES

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
MICHIGAN

AGRONOMY #19  
SUBJECT: Brush Management  
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TO: All Offices

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To provide supplemental information for BRUSH MANAGEMENT Standard & Specifications.

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Brush may be managed to:

1. Eliminate all or some of the brush
2. Control the height, width and/or density of all or some of the brush.
3. Change the composition of the brush to favor species which are:
  - A. Favorable to wildlife
  - B. Aesthetically pleasing
  - C. Able to restrict foot traffic because of thorns, density or other features

Mechanical Equipment. Handtools and motorized equipment can both be used to manage brush.

#### A. Handtools

A variety of handtools can be used for brush control. Handtools are very labor intensive and are best suited to small, remote areas or very sparse stands.

##### Common Handtools

Chain saws, brush cutters, crosscut saws, pruning saws, pruning shears, hand clippers, brush hooks, axes, pulaskis, and shovels etc.

##### Capabilities

Handtools can be used on steep or inaccessible terrain.

##### Limitations

Handtools cannot effectively treat sprouting trees and shrubs.

#### B. Motorized Equipment for Controlling Trees and Shrubs

##### Rubber-tired Tractors

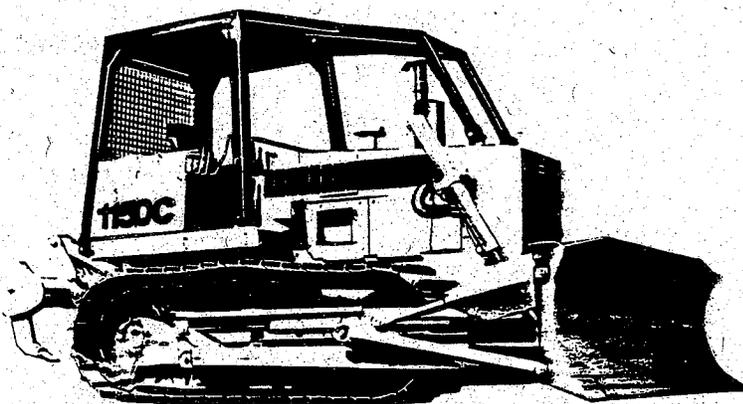
Tractors are limited to fairly flat ground with slopes under 20 percent. Numerous sharp rocks or brush snags may damage tractor tires. Because the weight of rubber-tired tractors is concentrated on a small area of tire tread, these tractors contribute to soil compaction and may destroy soil structure if operated on wet ground. Agricultural tractors may lack the ability to treat heavy stands of brush.



Typical Rubber-Tired Tractor

### Crawler-Tractors

Crawler tractors are used on rough terrain, on steep slopes, or when moving large implements. They are usually equipped with standard dozer blades. Crawler tractors are widely adaptable to a variety of conditions. Crawler tractors can work on slopes up to 35 percent. They are well suited to rough terrain and areas where objects could damage rubber tires. Crawler tractors are rugged machines and can be operated under extreme conditions.



Typical Crawler Tractor

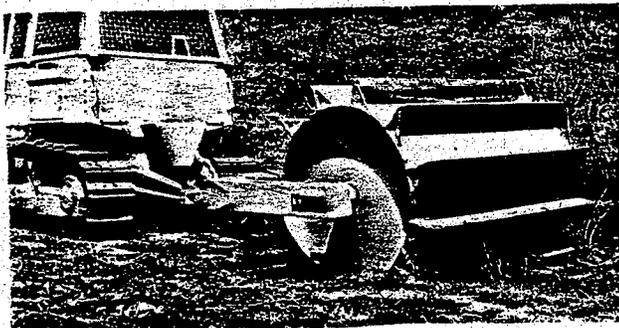
### Rolling Choppers

Rolling choppers cut and crush brush, small trees, or slash. They can also pit and imprint the soil by making small deep holes, intermittent depressions, or minute trenches in the ground surface to increase infiltration and retain runoff, which provides more water for plant growth.

Rolling choppers mounted on dozer blades simply extend the crushing effect of the crawler tracks to the full width of the tractor.

Permanent control of sprouting species is not realized because the root crowns remain intact. The action of the cutting blades may contribute to erosion. The cutting blades are easily damaged by large rocks.

The crushing and chopping action of rolling choppers effectively controls non-sprouting brush up to 5 in. (12.7 cm) in diameter. Rolling choppers can operate on slopes of 35 to 40 percent, although 15 to 20 percent is maximum for towing on the contour.



Towed Rolling Cropper

### Grubbers

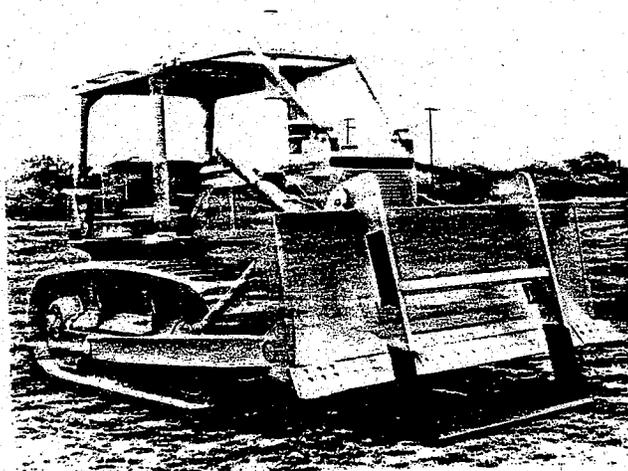
Grubbers remove individual trees or shrubs by severing the root underground and lifting the plants from the ground.

The grubber is a short, stout blade mounted between two heavy supports. The device is mounted in front of a crawler tractor on, or in place of, the dozer blade. Push bars may also be included.

Grubbers control sprouting species by severing the roots. The short blade concentrates tractor power and minimizes soil disturbances.

Grubbers are adapted to removing scattered stands of sprouting shrubs or trees.

Because effective grubbing is time consuming, grubbers are not suited for dense stands of vegetation.



Detachable Grubber mounted on a Standard Dozer Blade.

### Rotary Cutters

Rotary cutters remove weeds or brush at the ground level and chop the material into mulch.

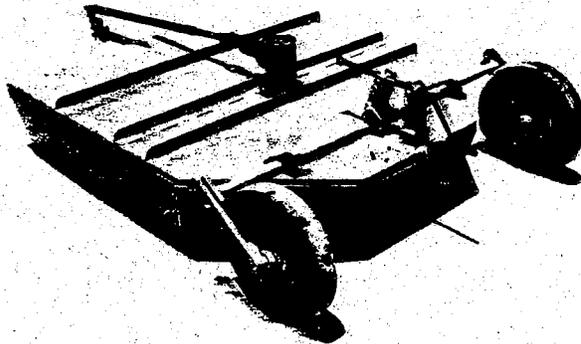
Rotary cutters can be mounted on a tractor, or towed. Some models are mounted on retractable booms that can be maneuvered hydraulically into various cutting positions.

Trees and shrubs up to 1 1/2 in (3.8 cm), and sometimes up to 3 in (7.6 cm) in diameter can be cut and shredded with rotary cutters.

Rotary cutters are effective in controlling upright annuals. They are useful for frequently repeated treatments of sprouting species. Rotary cutters can operate on slopes up to 30 percent.

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Treatments with rotary cutters usually have to be repeated frequently to be effective. Rotary cutters also present a safety hazard because chips and other debris are widely scattered by the blades. The machines should not be operated in rocky areas.



Typical Power-take-off Rotary Cutter

### Rotobeaters

Rotobeaters cut brush at the ground level and chop it into mulch. They are often used for maintenance plant control on previously treated areas.

Rotobeaters have swinging stirrup cutters, hammers, or flails attached to a wide horizontal shaft that revolves at high speeds. Rotobeaters are powered hydraulically, with power-take-off attachments or by separate gasoline engines. The cutting apparatus is enclosed in shrouds that provide safety and contribute to the shredding action by keeping the material near the cutters. Rotobeaters can be mounted on the rear or sides of tractors or small front-end loaders.

Because rotobearing is a surface treatment, it must be repeated often to control most shrubs. Rotobeater flails are quickly dulled in rocky areas.

Most rotobeaters can handle stems up to 2 in (5.1 cm) in diameter. Slopes up to 35 percent can be treated. Rotobeaters are safer than rotary cutters because chips and debris are not thrown outward by the action of the flails.

Self-propelled Rotobeater Shredder Cutting Brush.

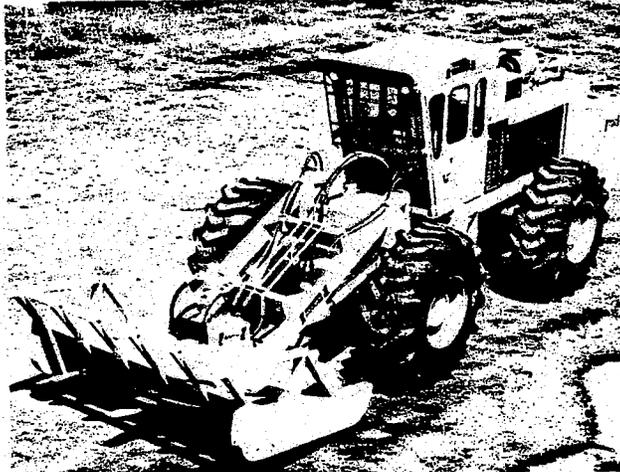
### Shredders

Shredders initially treat and maintain control of heavy brush. Shredders remove the brush or slash near ground level and shred the material into a fine mulch.

Shredders are large, self-propelled or self-powered brush cutters. They may be of either rotary blade or rotobearer design.

Shredders on crawler tractors can handle heavy brush conditions on slopes from 30 to 35 percent. Rubber-tired shredders can negotiate 15 to 20 percent slopes. The mulch that remains after treatment helps prevent erosion and usually does not smother the undergrowth.

Although shredding effectively removes heavy brush growth, it is an expensive method of brush control. Lasting control usually is not achieved because the roots of the plants remain intact. Repeated treatments are necessary for effective controls.



Rotary Blade Shredder

Situations and Corresponding Treatments  
for Controlling Undersirable Brush

Methods of Eliminating All or Some of the Brush.

- A. Small area with small brush. (Small Areas with irregular shape or no access may have to be treated with hand tools.)

Treatment a - Help landowners determine cost and economic feasibility. Cut and pile brush with hand tools such as axes, machetes, brush hooks, and/or grub hoes. Brush piles will provide cover for wildlife.

Treatment b - Use a backpack sprayer and spray brush with chemicals.

- B. Small area with large brush 2 inches or larger in diameter.

Treatment a - Use hand tools such as axes, power chain saws, wheel mounted circular saw, etc. to cut brush. Treat stumps or use basal sprays as needed.

- C. Large area with small brush. (Areas too large to treat with hand tools frequently range between 1/2-5 acres.)

Treatment a - If site is not too rocky or steep, tractor-drawn moldboard plows, disk plows, rotary mowers, rolling brush cutters, etc. can be used. Sickle mowers can be used to cut brush up to 1 1/2 inches in diameter.

Treatment b - Use tractor-drawn spraying equipment and apply suitable chemicals.

- D. Large area with large brush.

Treatment a - Use crawler tractors. Many types of attachments are available for brush clearing. Select the type that will leave the site best prepared for the desired land use. Plan erosion control practices such as diversions, critical area planting, grassed waterways or outlets, mulching, etc. to avoid creating erosion problems. Apply chemicals as needed.

Chemical Control of Sprouts - Brush that tends to sprout can be cut off by mechanical equipment but the stumps must be treated with chemicals 1/ or the root system must be plowed out or disturbed sufficiently to prevent sprouting before the brush will die. Many different types, formulations, or concentrations of herbicides are available. Chemical treatments may be combined with mechanical maintenance. Chemical treatments are generally less expensive than mechanical control.

To be effective chemical applications must be timed to coincide with the most vulnerable stages of plant development. Brush tends to sprout more if cut during the dormant period when the leaves are off. Cutting brush during the leaf on period will kill a greater percent of the brush and may decrease the need for chemicals.

Woody Plants That  
Do Not Readily Sprout

Evergreens (conifers)  
Ash  
Cherry  
Sugar maple  
Hawthorn  
Birch  
Elm

Woody Plants That Tend To  
Sprout From Roots or Stumps

Red and silver maple  
Oak  
Aspen  
Hickory  
Basswood  
Sassafras  
Sumac  
Dogwood  
Raspberry  
Blackberry  
Multiflora rose  
Autumn olive  
Honeysuckle  
Willow  
Yellow poplar  
Black walnut

Stumps must be treated with chemicals immediately after being cut or the xylem cells in the freshly cut stump will die and fail to transport the chemical to the root system. The root system will then remain alive and send up sprouts.

Where brush is too tall for foliage applications or there is a need to be selective in killing certain brush species, it may be necessary to apply herbicides to the base of the individual species. Brush species in excess of 4 inches in diameter cannot usually be killed with chemicals unless they are girdled or cut. Brush smaller than 4 inches in diameter can usually be killed by saturating the lower 15-18 inches of trunk with selected herbicides.

Herbicides frequently do not kill 100% of the brush treated. When herbicides are used, plan for follow-up treatments.

1/ SCS does not make pesticide recommendations different from Michigan State University or other official publications. "Pesticides include insecticides, herbicides, fungicides, rodenticides, defoliant, repellents, etc." All recommendations, with a few exceptions, must follow directions on labels. For exceptions, consult the Cooperative Extension Service or the Michigan Department of Agriculture.

When working with the public, SCS personnel can hand out Michigan State University publications or copies of publications that give specific instructions to landowners on the use of "Pesticides." SCS personnel can also quote from these publications when working with landowners.

Control of Aesthetics and Wildlife

In the development of campgrounds, picnic areas, or other recreational facilities, it is often desirable to retain shrubs that are attractive.

Some trees, shrubs, vines, and ground covers that have particular value for aesthetics and or wildlife are as follows:

<u>Trees</u>	<u>Shrubs</u>	<u>Vines and Ground Cover</u>
Red maple	Sumac, staghorn	Wild grape
Hickory	Autumn olive	Virginia creeper
Crabapple spp.	Lilac	Bittersweet
Mulberry	Honeysuckle spp.	Bearberry
Hawthorn	Dogwood spp.	Partridgeberry
Sassafras	Yew spp.	Aromatic wintergreen
Sugar maple	Juniper spp.	Trailing arbutus
Red oak	Forsythia	
White birch	Spirea	
Spruce	Elderberry	
Red pine	Winterberry	
White pine	Am. cranberrybush	
	Hazelnut	
	Serviceberry	

For additional plants having wildlife value, refer to Standard and Specifications for Wildlife Upland Habitat Management, 645, page 12.

References: Equipment for Clearing Brush from Land  
USDA, 1961  
Revegetation Equipment, USDA, 1980  
Pesticides for Ornamentals, MSU, E944, 1979

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