ROTARY CUTTER PREPARES PINE SEEDBED FOR NATURAL REGENERATION WHILE CLEARING BRUSH

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Tests in north Arkansas show that tractor-powered rotary brush cutters are effective for preparing shortleaf pine seedbeds where natural regeneration is difficult to attain. Treatment with the brush cutters resulted in a more satisfactory seedling catch, following the bumper 1957 seed crop, than was obtained by prescribed burning or chemical control of hardwoods. After 2 years, sprouting from stems severed by the cutters is not yet a problem, and it is likely that the pine will come through without early need for chemical eradication of competing hardwoods, though vines such as greenbrier and poison-ivy may be troublesome.

Use of rotary brush cutters is, of course, restricted to rock-free sites of moderate slope. The test area--on the Henry R. Koen Experimental Forest near Jasper, Arkansas-had sandy soil supporting a poorly stocked stand of shortleaf pine in mixture with a heavy growth of undesirable hardwoods. Vegetation to 3 inches in diameter was readily mowed by the swiftly rotating blades, and the soil surface was scarified without loss of litter and humus. The litter and smaller stems were mulched thoroughly, so that the forest floor had a park-like appearance.

In October 1957, just before seedfall, plots were prepared by brush cutting, prescribed burning, and chemical eradication of undesirable hardwoods with no seedbed disturbance. Some plots were also left untreated. The plots were in four contiguous blocks, with each treatment randomly replicated in each block on 0.5-acre plots. The chemical was the propylene glycol butyl ether ester of 2, 4, 5-T (4 pounds acid equivalent per gallon) used in a 16 pounds ahg concentration in diesel oil. It was sprayed onto the basal portions of all stems less than 4 inches d.b.h. and into frill girdles on larger stems.

In March 1959, one growing season after treatment, the sites prepared by brush cutting had 7,088 seedlings per acre, as compared with 1,362 for the burned plots, 1,012 for those chemically treated, and 1,200 on the check plots. Differences between brush cutting and the other treatments were significant at the 1 percent level. No measure of stocking distribution was obtained.

The machine used in the test (fig. 1) was one of several makes that are now on the market. This model has a tempered steel rotor that is driven at about 750 r.p.m. from the power takeoff of the tractor. Reversible, flat blades are jointed to the ends of the rotor by a single bolt, lockwasher, and nut (figs. 2 and 3). The blades are held in cutting position by centrifugal force as the rotor turns. The machine can mow swaths as much as 7 feet wide. The jointing protects the blades by reducing the shock when obstacles are struck. Heavy shielding around a strong frame contains the cut material until it is discharged out the rear.

Two types of hitches are available. The "integral" type can be used on any tractor having a standard three-point hitch and power takeoff. In effect, the cutter becomes part of the tractor when it is attached, being supported only by a wheel or a pair of steel skid shoes which takes the strain off the lift and gives a floating action over rough ground.

Another hitch is of the "pull" type, with a rigid A-frame and a handwheel for leveling. It can be fitted with either a remote hydraulic cylinder or a manual screw jack to position the cutter for operation. Two caster wheels ease the lift strain and assure accurate tracking over uneven ground. This kind of machine can be used with any tractor having standard drawbar and power takeoff dimensions.

Cutting height can be adjusted from ground level to 14 inches above the ground. Setting the cutting height at ground level on the integral type increased the scarification action by causing the implement to drag on the straightaway and slide and scrape on the turns.

Initial costs vary from $400 for a model cutting a 5-foot swath to $750 for a 7-foot model. Shields to protect the operator and the cutter wheels from flying debris can be purchased. Operating costs are approximately $3 an hour.

Observations indicated that crawler tractors might be more practicable than wheel tractors in dense stands of small saplings and entangled vines.

The tractor should have sufficient weight and power so that the operator can maintain control at all times. Operators should take precautions to guard against injury that could result from material thrown free by the mower. Steep slopes cannot be mowed with safety no matter what type of motive power is used. Costly repairs can be prevented by making a preliminary survey of the treatment area and marking boulders, stumps, and other major obstructions so that the operator can avoid them.

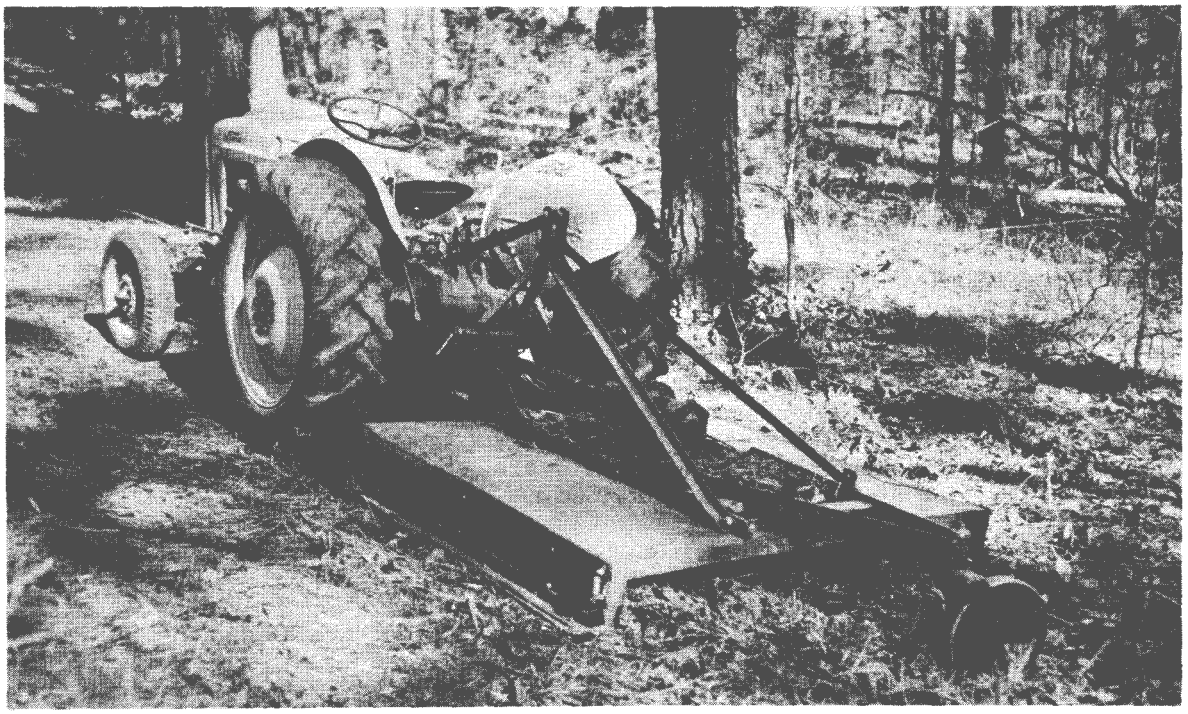

Figure 1.--Rotary brushcutter in operating position.

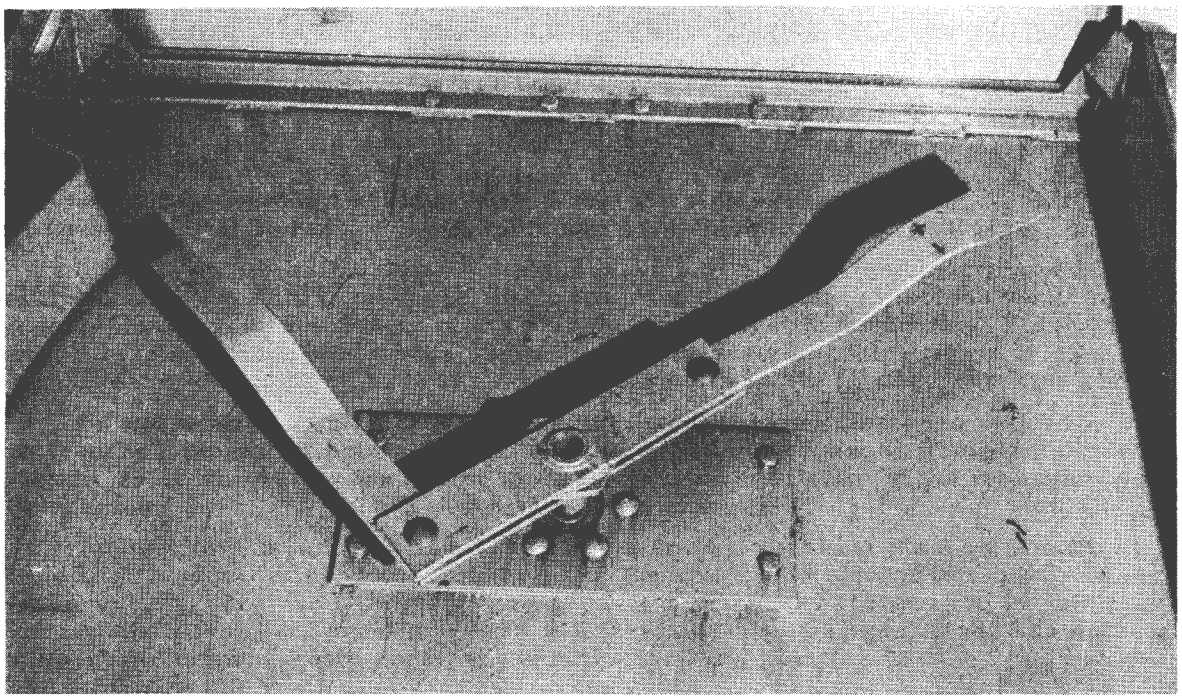

Figure 2.--View of jointed cutting bar from below. A single bolt attaches the cutter to the carrier or rotor. One blade has been swung back to show position after striking an obstacle.

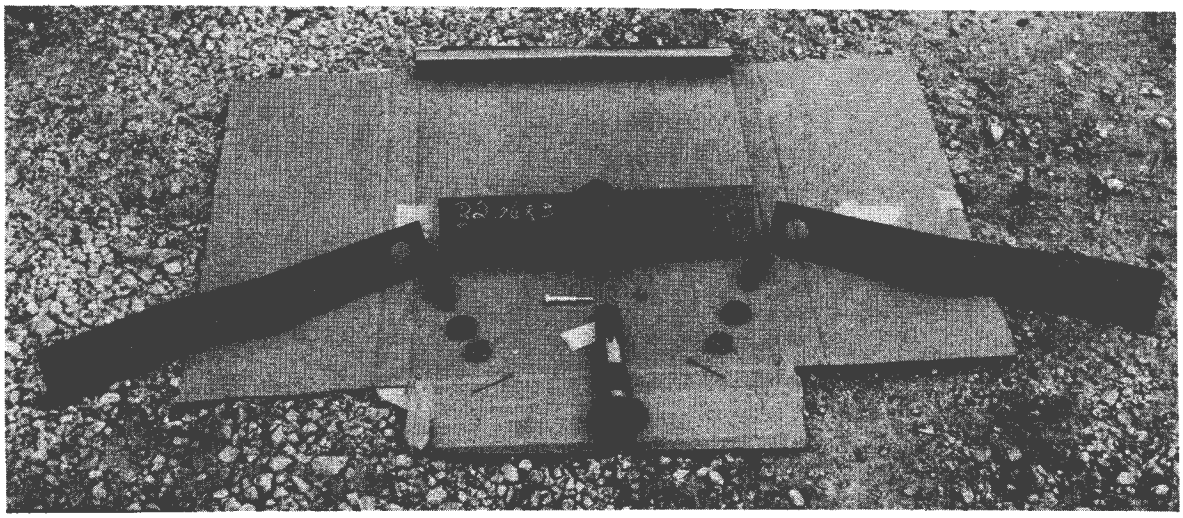

Figure 3.--Exploded view of the parts that made up the brush-cutting mechanism of the rotary brushcutter used in this study. The blades are 22 inches long and 3 inches wide. The carrier, which measures 20 by 3½ inches, is made up of two such lengths between which fit the ends of the two cutting blades. The drive shaft fits into the splined hole in the carrier and extends above the heavy steel enclosure, where the bevel gear is connected with the power take-off of the tractor.