

Figure 1.—Sprayer equipped Beloit planter pulled by Ford 3400 with Calsa tank. (Courtesy Ontario Dept. of Lands & Forests)

Controlling Competing Vegetation...

Sprayer-Equipped Planter Applies Herbicides at Planting Time

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Competition from vegetation, particularly the grass species, has long been recognized as a major factor in mortality of planted forest tree seedlings in Southwestern Ontario. Competition from vegetation, particularly the grass species, has long been recognized as a major factor in mortality of planted forest tree seedlings in Southwestern Ontario.

Traditionally, scalpers mounted on tree planting machines have been employed to overcome the competition problem. Their use often results in conditions which may be far more detrimental to seedling survival than the competition being controlled. For example, the trenches created provide ideal

conditions for the free passage of rodents. The scalping process also displaces the fertile top soil as well as undesirable sod. Exposed soil may allow temperatures to build up to levels lethal to young seedlings.

Herbicides applied at planting time can be used to overcome the competition problem while eliminating many of the detrimental effects of scalping. They can also produce conditions more favorable to the establishment of the planted seedlings. In addition to eliminating competition for up to 2 years, a minimum of soil is

disturbed, a mulch of dead vegetation is created, and a degree of rodent protection is provided.

Equipment Needed

The mechanics of herbicide application are not new. For farm purposes, any number of makes and models of commercially available machines are suitable for this job. In forestry practice, and particularly for forest tree planting, however, such equipment is not readily available.

The first custom designed sprayer-equipped planter was built for use in the Lake Huron

District of Ontario in the spring of 1968. Since that time, numerous modifications have been made and 10 of these units were in use in the spring of 1971. Others have been constructed and are being used in other Districts in Southern Ontario.

The original idea was to apply herbicide mechanically at the time of planting. This would allow tree planting and vegetation control in a single operation as did the traditional machine with planter-mounted scalpels. The cost of planting would thus not be radically affected; the only additional cost would be for the herbicide used.

The necessary equipment is relatively simple, but requires an operator who is well versed in farm equipment and its operation to set it up properly. The operator must also be trained in maintenance.

Specifications

The basic requirements for the sprayer-planter are as follows: A tractor (farm, industrial, or crawler) equipped with a power take-off, preferably with half tracks; a water container of at least 50 gallons capacity; a pump to operate off the power take-off; a regulator system; an agitator system; sprayer nozzles and screens; line filters, and high pressure hose.

The possible combinations of the above items are numerous--many types and brands of tanks, pumps, and hose are available. There are also several types of planters to which the system could be adapted.

Figure 1 illustrates a unit which operated during the 1970 spring

planting season. It is typical of the wheel tractor-drag planter arrangements used in the Lake Huron District. The tractor is a Ford Industrial 3400 equipped with half tracks. The planter is a Beloit heavy duty drag type.

The tractor is equipped with a Calsa 100-gallon fiber glass 3-point-hitch-mounted tank, with a worm-type agitator. The pump is a Red Line 8 roller "ni-resist" type, custom-mounted on a platform behind the tank. The filter system is also installed in this area. The platform has been modified by removing non-essential parts, and is reinforced with steel plate to reduce the possibility of damage to vital parts. The regulator is custom-mounted on the front of the tank within easy reach of the driver. A quick-shutoff valve is an integral part of the regulator system.

A single high-pressure hose with a break-away connector passes from the tractor to the planter. A hydraulic fluid hose may also extend between the tractor and planter, if the planter is hydraulically equipped. The herbicide hose running to the extreme rear of the planter where two fan type Tee Jet nozzles are mounted so that approximately a 6" band is unaffected by spray between the packing wheels (fig. 2). The spray should create a 12" - 15" band on either side of the unsprayed band. The type of nozzle used will depend on the planting speed, pressure, and other factors, but should be designed to apply 50 gallons of liquid per acre. Rubber or metal deflectors (guards) similar to those shown may be required

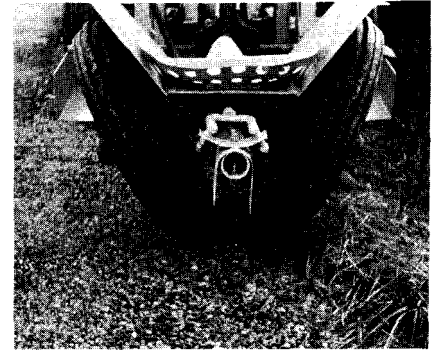


Figure 2.—Fan spray pattern produced by Tee Jet 8005 nozzles mounted behind packing wheels of Beloit tree planter. (Courtesy Ontario Dept. of Lands & Forests)

depending on the chemicals used.

Figure 3 shows a similar arrangement using a crawler-type tractor. A 3-point hitch Beloit tree planter has also been used with this tractor. In this case, a 45 Imperial gallon drum was used, and the pump attached directly on the power take-off shaft. Agitation is supplied by a by-pass line from the regulator mounted on the tractor canopy. The planter spray nozzles are the same as those previously described.

Use of Chemicals

It is impossible in limited space to thoroughly describe the application of chemicals by this equipment. Briefly, it is designed to discharge 50 gallons of liquid and/or wettable powder herbicides per acre (approximately 3,000 trees @ 6'x 6' spacing).

In Southern Ontario, simazine alone, or simazine in combination with amino-triazole, or paraquat, is highly effective in controlling competing vegetation. The herbicide or combination of herbicides chosen depends on the herbicide available, rainfall, soil, species

Figure 3.—Sprayer equipped Beloit planter pulled by John Deere 1010 (Courtesy Ontario Dept. of Lands & Forests)

susceptibility (simazine will kill the poplars, larches and black locust), competition levels, and the tolerance of that competition to the herbicides used.

Figure 4 shows the effects of 10 lbs. of simazine 50W and one gallon (U.S.) of amino-triazole per acre applied at the time of planting to 2-2 white pine (*Pinus strobus*) in an area of heavy twitch (quack or couch) grass (*Agropyron repens*) competition.

Summary

Where large, open areas of reasonably level ground are available for tree planting and where competition from herbaceous vegetation is a problem, experience in the Lake Huron District has shown that herbicides can be effectively applied by sprayer-equipped planters to improve survival and hasten establishment of planted tree seedlings.

Though not now commercially assembled, the equipment is easily constructed and, with adequate maintenance, relatively troublefree.

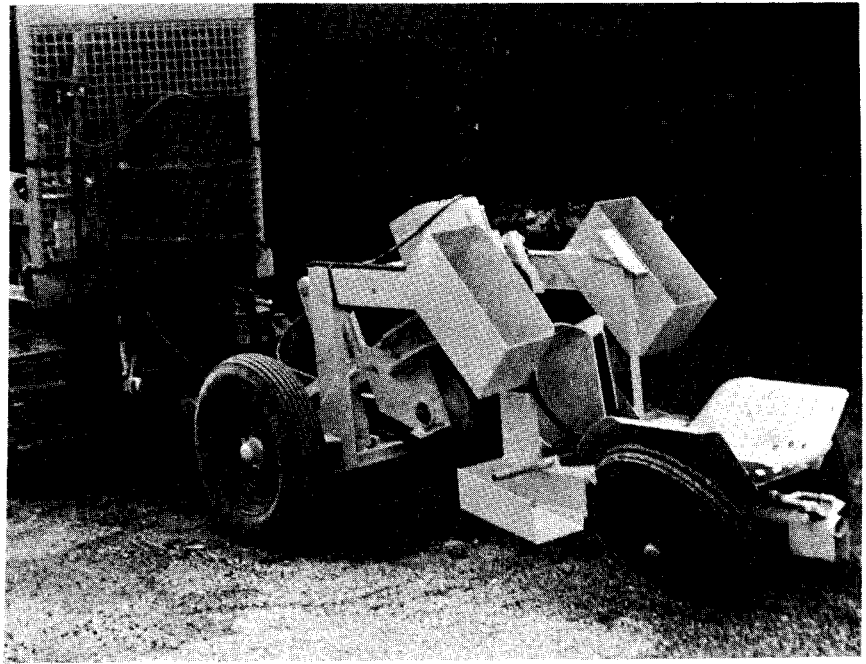


Figure 4.—Effects of simazine-amino triazole herbicide applied at the time of tree planting (Courtesy Ontario Dept. of Lands & Forests)

