Reforestation & Nurseries Tech Tips

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Herbicide Shield for Spraying Irrigation Pipelines

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Bareroot seedlings grown in nurseries require large amounts of irrigation water, typically from sprinklers fed by pipelines. Irrigated fields provide good growing conditions for unwanted vegetation, such as grasses and weeds. Mechanical cultivation can remove vegetation between seedling plots, but the weeds and grasses that grow next to the pipelines are difficult to cultivate (figure 1). The easiest way to eliminate weeds near irrigation pipelines is by spraying the area with herbicides.

Highlights...

- Forest Service nurseries find it difficult to spray weeds growing near irrigation pipelines because the spray kills seedlings in beds nearby.
- MTDC has developed an adjustable shield that includes two spray nozzles and a battery-powered pump so a tractor can spray weeds along irrigation pipelines.
- Mechanical drawing MTDC–1066 provides details of the shield and includes a list of materials and vendors.

Figure 1—Weeds and grass thrive around irrigation pipelines where mechanical cultivation is not possible.

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Sprinkler heads and risers make it difficult to spray around pipelines with standard herbicide application equipment. Overspray and drift from the spray nozzle must be kept off desired vegetation, such as bareroot seedlings. The Missoula Technology and Development Center (MTDC) designed a sprayer and shield that makes it easier to spray weeds around irrigation pipelines. The design evolved from a sprayer shield mounted on an International tractor at the U.S. Department of Agriculture, Forest Service's J.W. Toumey Nursery in Watersmeet, MI (figure 2).

Figure 2—A pipeline spray shield is attached to the underbelly mount on an International tractor at the J.W. Toumey Nursery, Watersmeet, MI.

Shield Design

The new design has two pieces of Lexan plastic (figure 3) that shield two spray nozzles mounted between them. The shield protects the bareroot seedlings from overspray. The shield and nozzles can be adjusted for weeds and sprinkler heads of different heights. Nozzles attach to RAM mounts that allow the nozzles to be rotated and angled in various positions (figure 4). Soft bristle brushes at the bottom of the shield keep it from digging into the ground or hanging up in weeds and grass. Drawing number MTDC–1066 provides details of the shield and includes a list of the materials used in the shield and vendors that can provide them.

Figure 3—The new design allows both the nozzles and the shield to be adjusted, providing good spray coverage on weeds and grass while keeping overspray off desired crops.

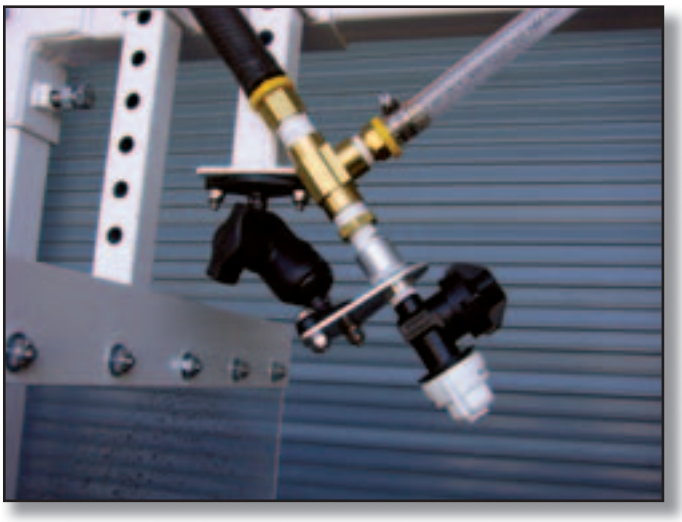

Figure 4—RAM mounts allow nozzles to be rotated and set at various angles to ensure herbicides are directed toward weeds and grasses and not onto bareroot seedlings nearby.

Sprayer Configuration

A sprayer shield was mounted to a three-point hitch sprayer designed specifically for pipeline spraying (figure 5). A 3 ½-gallon per minute diaphragm pump, such as those used on ATV sprayers, feeds the two nozzles (figure 6). The sprayer includes its own 12-volt battery to power the pump. The battery can run the pump for about 3 hours before the battery needs to be recharged with a trickle charger or solar panel. An on-off switch wired to the pump slips through the back window of the tractor, allowing the operator to control the pump. A hose reel was mounted to the sprayer to allow spot spraying in hard-to-reach areas. A power takeoff (PTO) pump would deliver much more flow than two nozzles require.

Figure 5—A sprayer shield assembly is shown mounted to a three-point hitch sprayer designed specifically for spraying around irrigation pipelines.

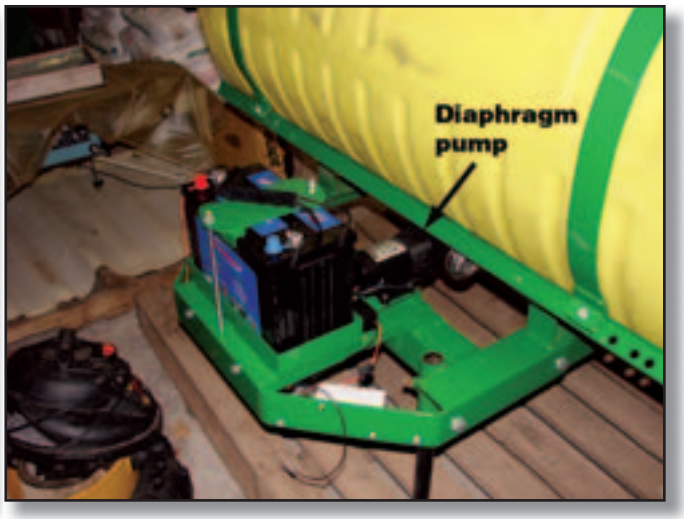

Figure 6—A small diaphragm pump, powered by a 12-volt battery, provides plenty of flow for two spray nozzles.

Pesticide Precautionary Statement

This publication does not contain recommendations for the use of pesticides, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

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About the Author

Gary Kees joined MTDC in 2002 as a project leader. Gary works in the reforestation and nursery, forest health, and GPS programs. His current projects involve laser guidance systems, ATV and backpack sprayers, nursery seeders, and remote weather stations. Gary, who has a degree in mechanical engineering from the University of Idaho, worked for 10 years as a mechanical and structural engineer, project manager, and engineering group leader for Monsanto Co. in Soda Springs, ID.

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Keywords: equipment development, nurseries, pesticides

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