Market Search

MTDC searched for ways to make the application of herbicides more efficient and safer. We looked at hooded sprayers, roller/wick applicators, brush and other mechanical weeders, ultralow-volume and controlled-droplet-application sprayers, chemical injection systems, and sensors that could identify chlorophyll. Some benefits we sought included reductions in:

- The size of field crews
- The field crew's exposure to chemicals
- Wasted chemicals
- The time needed to clean equipment

Commercially Available Sprayers

The Egedal sprayer is imported from Denmark by Timm Enterprises. The Augusta Forestry Center purchased one of these units as this project was underway. In January 2000, the price of this Type GS Bed Cultivator with eight-row spray system (figure 1) was about $14,000.

Figure 1—The Egedal sprayer, which is commercially available, also has mechanical weeding attachments.

Roller/Wick Applicators

Roller/wick applicators (figure 2) were considered because they use less herbicide than sprayers and the spray does not drift. However, roller/wick applicators were dropped from further consideration because they might not eradicate low weeds, such as prostrate spurge, and because mud may accumulate on them.

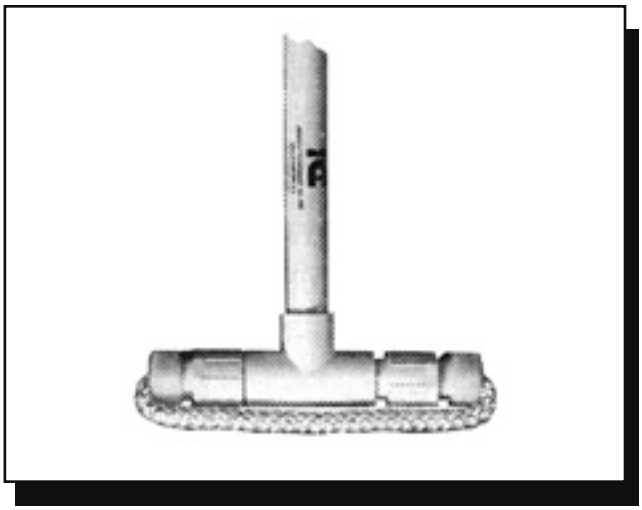

Figure 2—Spray does not drift when it is applied with roller/wick applicators, but the applicators may become gummed up with mud when weeds are close to the ground.—*Courtesy of Reddick Equipment Co., Inc.*

Brush Weeders

Several nurseries use the FOBRO Brush Hoe (imported by Baertschi-FOBRO AG, figure 3). Nursery employees

Figure 3—The FOBRO Brush Hoe uses plastic bristles to gently remove weeds. The unit also has an optional sprayer.—*Courtesy of Baertschi-FOBRO AG*

told us that the brush hoe works fairly well in loose soils when weeds are not well established. An optional sprayer attachment is available. The larger of the two models had just 13 inches of clearance for plants, too little for some of the taller hardwood seedlings

Other Mechanical Weeders

Spyders, torsion weeders, and spring hoe weeders (figure 4) were investigated. Each requires a specialized weeding tractor that allows the weeding unit to be mounted between its front and rear wheels so the tractor operator can see the weeding devices and keep them away from the plants. These weeders are gentler on the plants than weeders that use sweeps and shanks. The tradeoff is that these weeders may not remove all the weeds.

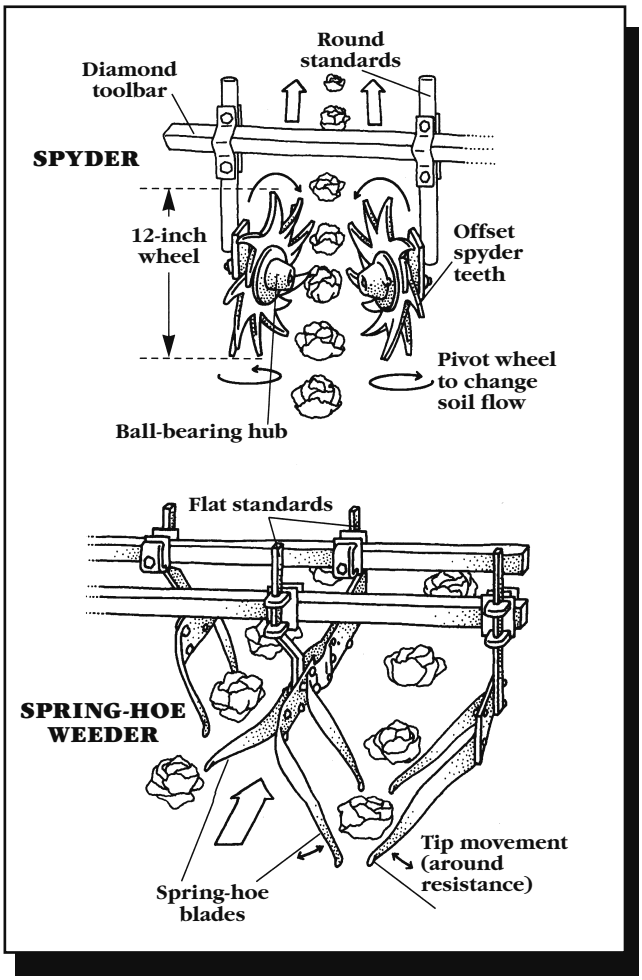

Figure 4—Spyders, torsion weeders, and spring-hoe weeders typically are more aggressive than weeders that use plastic bristles. Their potential to damage the crop is also greater.—*Illustration by John Gist. Reprinted from* Steel in the Field: A Farmer's Guide to Weed Management Tools *with permission from the Sustainable Agriculture Network (http://www.sare.org).*

Ultralow-Volume and Controlled-Droplet-Application Sprayers

Ultralow-volume sprayers, such as the Mankar (figure 5), Herbi, and Herbiflex, typically use shrouded spinning discs that are designed for controlled-droplet application of herbicides in narrow bands. Some units like the

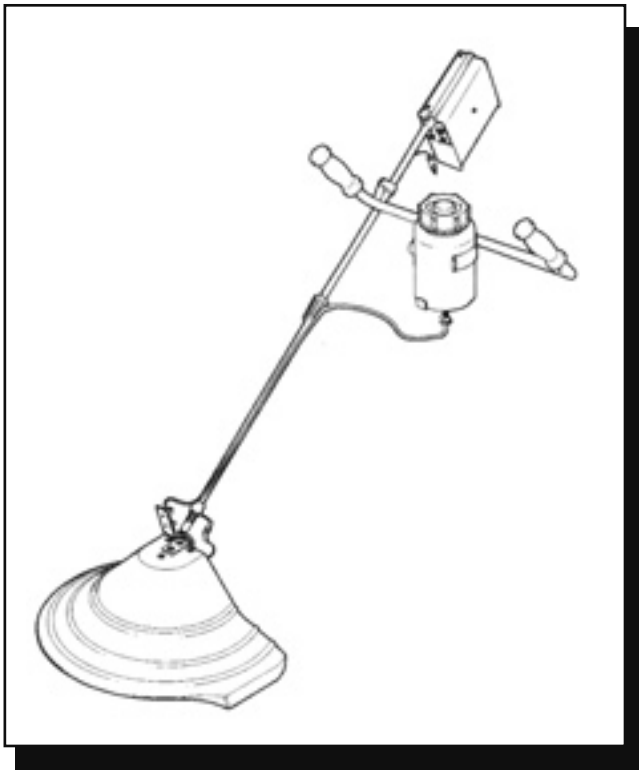

Figure 5—The Mankar ultralow-volume controlled-droplet-application sprayer.—*Courtesy of Superb Horticulture/Mankar*

Mankar can apply undiluted Roundup. The Vegedome by BUBCO (figure 6) claims to reduce the amount of water used by 80 to 90 percent and to reduce the amount of herbicide used by 50 percent. Commercially available units have been mounted under hoods and used on all-

terrain-vehicle sprayers. These sprayers claim to apply herbicide more efficiently.

Figure 6—The controlled-droplet-application system in the Vegedome sprayer by BUBCO uses a spinning-disc rotary atomizer to produce optimum-size spray droplets that are evenly distributed. This system allows low-pressure, low-volume application, minimizing chemical waste and environmental contamination, and extending the time a tank of herbicide can be used between refills.—*Courtesy of BUBCO, Inc.*

Figure 7—A remote camera allows the operator to view the sprayer operation. These systems are commonly found on recreational vehicles.

Remote Observation

If the tractor operator could view and adjust the sprayer bar remotely, one person could handle the application. Remote camera systems (figure 7) are common. Inexpensive units are used in motor homes to help drivers back up safely. MTDC did not evaluate this type of system because the Auburn Nursery Co-op members thought the tractor operator would quickly become fatigued from steering the tractor while watching the sprayer's position in a monitor.

Tractor Toolbar Guidance Systems

Several commercial units are available, including the Navigator (by Automatic Equipment Manufacturing, figure 8), Slide Guide (by Sukup), Buffalo Scout II Shifter guidance system (by Fleischer Manufacturing), and Acura Trak (by Sunco). Some units have several ground sensor options that can provide input to the system.

Figure 8—The guidance system for a sprayer toolbar.—*Courtesy of Automatic Equipment Manufacturing Co.*

Remote Control of Spray Flow

These systems feature basic remote shutoff, pressure control, and speed control to keep the application rate constant. Raven Industries, Inc., and Midwest Technologies, Inc., make this type of equipment (figure 9).

Figure 9—Automated spray control equipment by Raven Industries, Inc.

Figure 10—The SCS Sidekick chemical injection system by Raven Industries, Inc.—*Courtesy of Raven Industries, Inc.*

Herbicide Injection Systems

These systems (figure 10) eliminate the need to mix batches of herbicide in large spray tanks. They eliminate the practice of dumping unused mix and the need to clean the mixing tank. Raven Industries, Inc., and Midwest Technologies, Inc., make this type of equipment.

Sensors To Identify Chlorophyll

NTech Industries makes a system (figures 11a, 11b, and 11c) that uses sensors to recognize plants by the presence of chlorophyll. The company was willing to come up with an appropriate hood configuration for the nurseries. These systems spray only when they sense the presence of chlorophyll.

Figure 11a—The WeedSeeker by NTech Industries can recognize the presence of chlorophyll. The complete system, folded for transport, is shown here.—*Courtesy of NTech Industries*

Figure 11b—One of the WeedSeeker's individual spray hoods.
—*Courtesy of NTech Industries*

Figure 11c—The underside of the WeedSeeker's spray hoods.
—*Courtesy of NTech Industries*