



Figure 1. Experimental machine illustrating the position of the spray nozzle.

# CONTROL OF ALFALFA WEEVIL WITH A "SPRAYROWER"

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Feeding injury to the 1965 Idaho alfalfa hay crop by alfalfa weevil larvae exceeded 11 million dollars. This occurred even though several effective insecticides were available for larval control. This bulletin explains how to adapt a sprayer onto a swather equipped with a hay conditioner, thus making it possible to treat the stubble during the swathing procedure. The insecticide treatment will kill the weevil larvae in the stubble after they have fallen from the windrowed hay and before they can feed on the growing buds. Harvesting first cutting hay with a sprayer-equipped swather can reduce the weevil control treatments to one yearly application, which is a savings in the cost of insecticide and labor. Further modification and adaptation of these principles to other alfalfa hay harvesting equipment is possible.

## SPRAYER EQUIPMENT

The basic sprayer equipment components required to convert a self-propelled windrower into

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a combination swather-sprayer are similar to equipment needed for a field sprayer—only the nozzles, tips and boom are special to this application.

**Pump**—A 4- or 6-roller "Hypro" pump as used in the experimental machine or a pump capable of delivering 30 to 50 psi line pressure is adequate. The pump can be connected to the windrower power unit or to a separate power source.

**Tank**—Tank requirements are the same as for any other field sprayer. Tank capacities and tank mountings are dependent on the windrower capabilities and the ingenuity of the individual operator. A 100-gallon tank mounted on the windrower is adequate under most conditions and will not decrease the maneuverability or operation of the swather.

**Tank Agitation**—Either mechanical or jet agitation can be used. Jet agitation from the pump is simple to install and does not require an additional connection to the power source. However, a special jet agitator nozzle should be used for proper agitation. The jet agitator should be con-

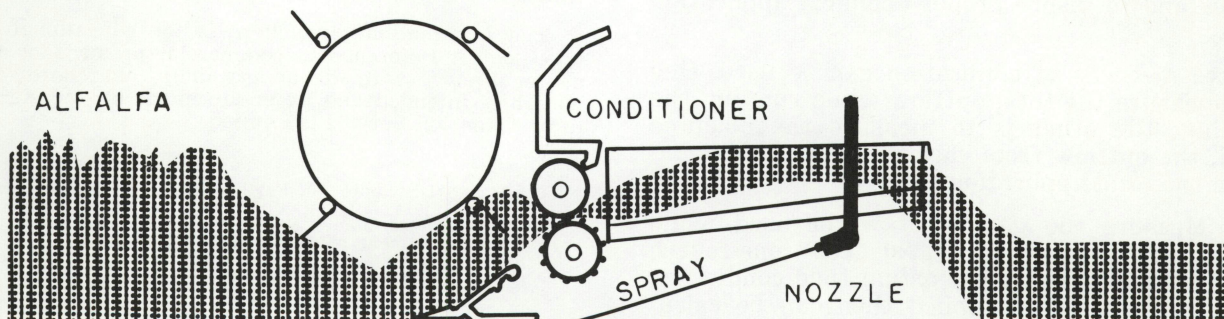


Figure 2. Side-view schematic of the stubble treatment. Note nozzle location and position of the cut hay which permits treating stubble under the hay swath.



nected between the pump and regulator, instead of using the bypass return line.

**Control Valve**—One control valve is needed to control the flow to the 6 nozzles. Mount it in a location convenient to the operator.

**Pressure Regulator**—A pressure of 30 psi is adequate. The regulator should include a pressure gauge for best operation of the system.

**Nozzles**—Experimental machines set up for demonstrations used double nozzles at the outside positions and single nozzles at each side of the conditioner as shown in Figure 3. Spray tips were Spraying Systems Company 4186-1/4-2T0C01 and 4186-1/4-2T0C02. Both sets of tips have a wide spray angle to one side as illustrated in Figure 3 and were identical, except the 02 tips have a flow rate (15 gpa for all six nozzles) twice that of the 01 tips. The nozzles were mounted from 9 to 12 inches above the soil surface at an approximate angle of 45°. The angle was adjusted to give best coverage for the entire machine width.

All nozzles were equipped with strainers to prevent plugging of the tips.

**Booms**—The spray booms were constructed of 3/8-inch pipe with 1/4-inch pipe drops. Connecting hoses were common garden hose; this hose is adequate for pressures not exceeding 75 psi.

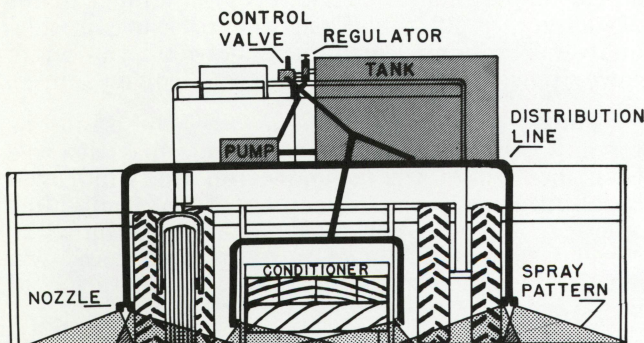


Figure 3. Rear-view schematic of a windrower-sprayer to illustrate the position of nozzles and the spray pattern.

## SPRAYER CALIBRATION

Sprayer nozzle calibration is important to obtain equal and consistent discharge from all nozzles and to insure proper chemical application rates.

Two methods of calibration can be used. One is to measure the total outflow while running the machine; the other is to measure the machine speed, the outflow from each nozzle and then calculate the total application rate.

I. Measure the gallons of water used while driving the sprayer for 1,320 feet (one-fourth mile), at field speed under actual field conditions. The gallons per acre applied then can be calculated as follows:

**for a 12-foot machine only**  
gallons per acre=gallons used in 1,320 ft. x 2.75.

II. This method involves 2 steps. First, ground speed can be determined by measuring the time it takes to travel 100 feet and dividing into 68.2. The machine should be at operating speed under field conditions when the first marker is passed.

$$\text{Miles per hour} = \frac{68.2}{\text{time in seconds}}$$

Second, after the ground speed has been determined, catch the outflow from each nozzle for 1 minute. If the nozzles vary by more than 5 percent, clean the screens or change tips and repeat. After the outflow has been balanced between nozzles, measure the total flow from all 6 nozzles and calculate the gallons per acre applied as follows:

**for a 12-foot machine only**

$$\text{gallons per acre} = \frac{41 \times \text{total flow for 1 min. in gals.}}{\text{speed in miles per hour}}$$

**Remember**—once a speed has been selected, the machine must be operated only at that speed because the application rate varies inversely with the ground speed of the machine.

## WINDROWER-SPRAYER APPLICATIONS

To prevent hay losses from alfalfa weevil larvae feeding, control treatments must be precisely timed and properly applied. These are typical situations:

I. Plants have an occasional blossom, but the leaves are ragged appearing as a result of larvae feeding. **Solution:** Use harvesting equipment with a sprayer as described in this bulletin and cut hay immediately. Stubble treatment is the only way to prevent the larvae from holding back the next crop.

II. Plants are being damaged by a pea aphid infestation and by alfalfa weevil larvae. **Solution:** Using this spray equipment to apply an approved insecticide immediately will control both insects in one application.

For insecticide recommendations see the latest University of Idaho Current Information Series "Controls for Alfalfa Weevil."

**The grower is responsible for residues on his crops, as well as for problems caused by drift from his property to other properties or crops. Follow the insecticide label container instructions.**

The information given here is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Agricultural Extension Service is implied.

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