Sprayer Calibration for Pesticide Application
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October 1975
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COOPERATIVE EXTENSION SERVICE

MSU Natural Resources Facts No. 1

IN FOREST PLANTINGS:

Sprayer Calibration for Herbicide Application

Extension Bulletin E-916 October 1975

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Control of competing vegetation at the time of planting and for several years following planting is often essential for good survival and growth of the trees. The most economical and effective method of accomplishing this is with herbicides. Many of the herbicides used in forestry are applied with a sprayer, and their accurate application at prescribed rates requires calibrating the sprayer. If the sprayer is not accurately calibrated, too little, or too much, herbicide may be applied resulting in unsatisfactory weed control or damage or death of the seedlings.

Herbicides are generally prescribed in pounds or quarts per acre. A recommendation might, for example, be 3 lbs./A (acre) or ½ qt./A. Sprayer calibration involves determining how much herbicide and water should be mixed in the sprayer to deliver the herbicide at the desired rate, whether the area sprayed is 1 acre or 1/1000 acre.

The first step in calibrating a sprayer is to determine the volume of spray delivered by your sprayer to a known area. This may be done in one of two ways:

1. Fill the sprayer with a known volume of water, spray a known area of ground as if you were applying herbicide, and measure the amount of water needed to refill the sprayer. For example, a small compression tank sprayer might use 1 gallon (128 fluid ounces) to spray an area 4 ft. wide and 85 ft. long (340 sq. ft. or .0078/A).*

2. Fill the sprayer with a known amount of water, spray as if you were applying herbicide until the tank is empty, and then measure the square foot of area sprayed.

Make this determination several times and use the average value. **The amount of herbicide** to add to a particular volume of water can now be calculated as follows:

$$\text{Weight of Herbicide Needed} = \text{Recommended Herbicide Rate in Pounds/Acre} \times \text{Acreage Covered with Known Volume of Water}$$

Using our example sprayer, which sprays .0078/A with 1 gallon and a recommended herbicide application rate of 2 lbs./A (32 ounces/A), the calculation would be as follows:

$$\text{Weight of Herbicide Needed} = (32 \text{ ounces/A}) \times (.0078 \text{ A}) = .25 \text{ ounces}$$

To apply herbicide with our sprayer at a rate of 2 pounds acre, ¼ ounce of herbicide should be added to each gallon of water. The amount of herbicide to mix with a full sprayer of water is then calculated as follows:

$$\text{Weight of Herbicide to Add to Full Sprayer} = \text{Weight of Herbicide to Add to Known Volume of Water} \times \frac{\text{Volume of Sprayer}}{\text{Known Volume of Water}}$$

In our example, if our sprayer's total capacity was 2½ gallons:

$$\text{Weight of Herbicide to Add to Full Sprayer} = (\tfrac{1}{4} \text{ ounce}) \times \frac{2\tfrac{1}{2} \text{ gallons}}{1 \text{ gallon}} = .625 \text{ ounces}$$

Herbicide recommendations are often made in pounds of active ingredients per acre (lbs. a.i./A) instead of the usual pounds of total material per acre (lbs./A). When this is the case, the amount of herbicide needed is determined by dividing the "Weight of Herbicide Needed," as calculated above, by the percent active ingredients in the herbicide.** Using our example above, if the recommendation had been for 2 lbs. a.i./A instead of 2 lbs./A, and the herbicide had been 80% active ingredient, we would have needed to add 0.31 ounces to each gallon of water or 0.78 ounces to our full sprayer to obtain the recommended rate of 2 lbs. a.i./A.

$$\frac{.25 \text{ ounces}}{.8} = .31 \text{ ounces} \qquad \frac{.625 \text{ ounces}}{.8} = .78 \text{ ounces}$$

* There are 43,560 sq. ft./A. Therefore, 340 sq. ft. $= \frac{340 \text{ sq. ft.}}{43{,}560 \text{ sq. ft.}} = .0078/\text{A}$

**Percent active ingredient is stated on the label.