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Equipment Recommendations for Spraying Wettable Powders

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The trend is for the use of more wettable powder chemicals for the control of weeds, insects, and diseases. Many new unnamed chemicals are appearing as wettable powders. Wettable powders are less expensive to market but more difficult to apply than soluble pesticides. Wettable powders require special nozzles to withstand wear, vigorous agitation to keep them suspended, larger screens to prevent clogging, and application volumes of 15 to 20 gallons per acre.

The following suggestions will help you use wettable powders successfully.

1. Use mechanical agitation.
2. Check the nozzle discharge and calibrate the sprayer, or replace nozzles. (See PNW 23, *Farm Power Sprayers*, for instruction on calibration.)
3. Use orifice or tip that will resist abrasion.
4. Use a 50-mesh screen, or slightly larger, but not large enough to permit particles to pass that will clog orifices.
5. Use 15 to 20 gallons of liquid per acre for boom spraying.

Laws Regulate Chemical Use

Federal and state laws require that all agricultural chemicals must pass rigid safety tests before they can be used. These laws specify the crops to be sprayed, the time for spraying, and the rate of use. Accurate control of rate of application is important, as many of these new powders are applied at rates as low as one pound active material per acre. Applications in excess of the specified amount can jeopardize a crop because of excess residues, both on the crop and in the soil.

Chemical-use regulations are passed to protect both producers and consumers, as well as wildlife and fish.

The label on the container is a reliable recommendation for using agricultural chemicals. Complete information is available from weed, insect, and plant-disease

manuals prepared annually by the OSU Extension Service. These manuals may be seen in the offices of all Oregon county Extension agents and most field men and chemical company representatives. If you wish to purchase your own copies, you may order from OSU Bookstores, Inc., Corvallis.

Agitation is Necessary

Constant mechanical agitation in the tank is essential for proper and successful use of wettable powders. Either a propeller or paddle-type mechanical agitator will be satisfactory. Hydraulic agitation, using the by-pass liquid for agitation, is not recommended. If hydraulic agitation is used, extend to the bottom of the tank a separate pipeline taken from the discharge line between the pump and the by-pass or shut-off valve. This line at the discharge end into the tank should be equipped with a fixed jet orifice agitator. The pump should have adequate reserve capacity to provide the necessary hydraulic agitation; more than one jet agitator may be necessary.

Hydraulic motors operating from the hydraulic systems of tractors can be used to drive mechanical agitators that cannot be readily driven by other means. Tractors with an adequate generator can power an electric motor-driven agitator.

Nozzle Tips

Research studies show that brass nozzle tips or orifices wear more rapidly when used with wettable powders than those made from hardened stainless steel and other special hard alloys.

Tests using 1.6 pounds of wettable powder plus 1 pint surfactant in 25 gallons of water at 30 pounds pressure showed that wear can increase the discharge as much as 20% through brass orifices after only 18 hours use. The same material sprayed through a stainless steel orifice increased the discharge rate about 4% in the same period. Another study, using 11 brass spray tips, showed an average increase in discharge capacity of 11.8% after spraying for 45 hours with simazine.



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The nozzle wear substantially increased the cost of herbicide per acre, more than a dollar an acre in some cases.

The discharge pattern in new nozzles is not uniform. After wear tests the pattern, showed even greater inconsistency, as some nozzles do not wear evenly. As wear takes place, some nozzles may show a large increase on half the pattern and a decrease on the rest.

Frequent Calibration is Needed

Unless recalibrations are made at least every 4 or 5 hours to determine the change in discharge due to wear, increased rate of application can be expected if you use brass nozzles. This will increase the cost of

materials and possibly effect residue and cause crop injury.

The alternatives, when using brass nozzles, are frequent calibration or replacement. The best choice, however, is to use the best abrasion resistant orifices available. In one make of nozzle the orifice or tip cost ranges are approximately as follows: brass, 50 cents; stainless steel, \$1.60; hardened stainless steel, \$1.95. Another make lists brass tips at 95 cents; stainless steel, \$1.40; and special hard alloy tips, \$1.95. Other makes are in about the same price range. One manufacturer supplies a wide angle nozzle of stainless steel known as a flooding nozzle that resists wear and gives uniform coverage.

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