

# FINE TUNING YOUR SPRAYER PREVENTS WASTEFUL HERBICIDE APPLICATIONS

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The key to efficient use of herbicides is to apply them at the rate needed. By applying too little herbicide, poor weed control can occur, often resulting in a loss of yield. Applications of herbicides above recommended rates, on the other hand, will increase the possibility of nontarget plant injury, in addition to wasting valuable herbicide dollars. Growers should beware, though. Even if you follow the label instructions, you may not be getting correct herbicide application.

There are several components of the sprayer that growers should check regularly. The most important of these are the pump, agitation system, pressure regulator, and the nozzle tips.

## The Pump

The most commonly used pumps on herbicide sprayers are the roller pump and the centrifugal pump. Both of these have their advantages as well as their drawbacks.

Roller pumps have three distinct advantages. They are relatively inexpensive, their upkeep is fairly easy, and they will operate efficiently at tractor PTO speeds. However, the rollers of the pump can wear and will have to be replaced after continued use. Abrasive materials like wettable powders and limestone can cause extensive wear. These materials should be avoided in roller, gear, vane, or other rotary type pumps.

The primary advantage of centrifugal pumps is that abrasives can safely be used in them, as well as diaphragm or squeeze-hose pumps. Another advantage of centrifugal pumps is that they can deliver high volumes of liquid at relatively low

pressures.

Centrifugal pumps require a high speed power source and, in most cases, will not operate efficiently at tractor PTO speeds. Some type of speed-up mechanism, like belts and pulleys, or gears, is required to increase the speed of the PTO to the speed of the pump.

## Agitation System

Constant agitation is necessary in the spray tank to insure an evenly mixed herbicide. Without sufficient agitation, herbicides can settle to the bottom of the tank causing uneven application — the spray mixture coming from the top of the tank will not contain enough herbicide to control weeds, while the bottom part of the tank will contain a higher concentration of herbicide which can cause crop injury.

To mix herbicides properly, thorough, yet moderate agitation is needed. Do not use excessive agitation when tank mixing several chemicals as it may cause one of the chemicals to settle out and set up in the spray tank.

Most herbicides are compatible with each other and the various carriers, including liquid fertilizers. If there is any doubt about compatibility of a particular combination, however, always check it out with small quantities before tank mixing.

## Pressure Regulator

Proper agitation in the spray tank produces an even herbicide application. Continuous herbicide application, on the other hand, is insured by the pressure regulator. A faulty pressure regulator

will cause inconsistent weed control in much the same way as insufficient agitation does. By increasing or decreasing the pressure, the volume of herbicide applied will be increased or decreased. A pressure regulator in top working condition is essential for maintaining a constant delivery of the spray mixture.

### **Nozzle Tip Identification**

There are many different types of nozzle tips which deliver various types of spray patterns. The three major categories of nozzles are flat spray, cone spray, and flood spray nozzles.

There are two basic types of flat spray nozzles — flat fan and even spray. The first is designed for broadcast applications and has an “F” designation. The spray of the adjacent flat fan nozzles must overlap for even distribution. An “E” designation applies to even spray nozzles designed for band spraying. It delivers an equal amount of herbicide across the spray pattern. Both types of nozzles work best at a pressure of about 30 psi.

Cone spray nozzles are designed to operate at higher pressures than flat spray nozzles to produce fine spray droplets. There are two general classes of cone nozzles — hollow cone and solid cone, both of which have large orifices to reduce clogging. The solid cone nozzle mainly operates at extremely high pressures and is best suited for insecticide applications. Operating efficiently at a pressure range of 30 to 50 psi, the hollow cone nozzle delivers a small volume of spray well suited to post emergence applications. The most popular kind of hollow cone nozzle, the whirl chamber, can operate at pressures equivalent to the flat spray nozzles and still deliver an even coverage of the herbicide.

For broadcast applications of preplant incorporated and preemergence herbicides, a small volume of liquid is sufficient to give adequate coverage of the soil and good weed control results. Therefore, flat fan and whirl chamber nozzles are best suited at these times.

Flood type nozzles are useful for high volume coverage at low pressures; capacity is measured at 10 psi. These nozzles deliver a spray of

large droplets in relation to flat spray and cone nozzles. This is an advantage where drift from the herbicides could be a problem. Like the flat fan nozzle, the flood type nozzle must also overlap for even herbicide distribution.

### **Nozzle Tip Care**

Regardless of the kind of nozzle tip, they are probably the most neglected and abused component of the sprayer. Yet, these tips are the most important part concerning the even distribution of herbicides on foliage or on the soil surface.

Nozzle tips will wear when used heavily. The orifice in the nozzle tip will become larger, delivering more herbicide than is needed. In fact, tests have shown that wettable powders may wear the tips enough to increase the application rate by 12% after spraying just 50 acres. Therefore, when abrasives are being applied, nozzle tips should be checked every other day or so for wear, especially if brass tips are used.

Nozzle tips are available in four different materials — brass, aluminum, plastic (nylon), and stainless steel. Brass and aluminum are the least expensive but also have the shortest life expectancy. Plastic nozzles will last nearly twice as long as brass, while stainless steel, the most expensive, will last three times longer than brass. In this regard, a few dollars more for durable nozzles will keep aiming chemicals where you need them.

One way to help preserve nozzle life is with proper cleaning. Nails and wire should not be used to clean a clogged nozzle tip since this may enlarge the orifice. The nozzle should be removed and washed, or if this is impractical, a soft toothbrush can be used to remove the clog.

In any case, a good practice to follow each year is to replace the nozzle tips before using the sprayer. This will help insure proper herbicide coverage at the most economical levels.

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