Best Practices For Spraying

Get The Most Out Of Your Sprayer

FarmProgress

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Before you fire up the sprayer, consider reviewing best practices for spraying, including pre-application equipment checks, drift avoidance, environmental considerations and equipment clean-up.

The ultimate goal for producers is to minimize drift – the movement off-target of both spray particles and vapors – and minimize input costs. Preparing accordingly can ensure your spraying experience is productive and rewarding. Remember, spray drift is herbicide dollars lost and trouble invited.

CONSIDER THE BASICS BEFORE YOU BEGIN

Determine the health of your sprayer by reviewing some equipment preparation and spraying basics:

- How will you keep track of sprayer pressure? Does your sprayer have a read-out that is easy to watch, either in the cab on a self-propelled sprayer, or in a convenient place on a pull-type sprayer?
- If you are bringing water or herbicide to the field, is the vehicle you're using free of leaks and in top condition? Plastic poly water tanks that ride to the field sometimes develop 'checking,' which means the tank is weak and could break or be broken more easily.
- If you are spraying residual herbicides and haven't before, have you considered an injection system to keep soil-applied products out of the main tank and avoid mixing issues? Some sprayers come with them standard. You can add them on to other sprayers.
- Have you walked behind the sprayer while it is operating to make sure the pattern is correct? Have you calibrated the sprayer to make sure it is delivering the right volume? See more on this below, if you determine worn nozzles are to blame for poor coverage.

ADD A SPRAYER EMERGENCY KIT

After making any necessary sprayer repairs, put together a sprayer emergency kit to carry with you, in the event that problems surface during operation.

Extra hoses, hose clamps, and perhaps an extra pair of protective clothing could be among the starting items for an emergency sprayer repair and safety kit.

Some of the things to consider using would be electrician's tape, duct tape, washer-headed screws and caulking compound.

If there are other items that may be used to slow or stop a potential leak or spill, include those as well. It may also be good to carry a plastic tarp of some sort. If the sprayer forms a leak, you can spread the tarp underneath the sprayer and use dirt to build a berm underneath the tarp at the edges so that there's a pocket or depression in the middle to catch fluid.

That may serve to contain the spray and eliminate the problem with soil contamination until you have time to stop the leak and get it repaired.

Critical replacement parts, absorbent materials, plastic bags and a shovel are among the other items that can round out an emergency kit.

A pesticide applicator should always put on protective clothing before trying to stop or contain a spill.

EQUIPMENT CONSIDERATIONS FOR MINIMIZING DRIFT

After preparation, consider how you will work to minimize drift. Lowering the boom height, replacing worn nozzles, and spraying at lower pressures are all mechanical updates or options you can implement to help minimize drift.

REPLACING WORN NOZZLES

The number one thing you can do to get better herbicide performance and limit drift potential is often to replace nozzles if you have used them for any length of time.

As a rule of thumb if you suspect there are worn, they most likely are worn. Don't hold on to them too long. Instead, replace them with a new set of nozzles.

The materials most nozzles are made of today, a poly material, wears very well. However, even it can eventually wear to the point where nozzles are not delivering a consistent pattern across the soil surface.

There are a couple ways to check, rather than just making the switch based on acres. First, you can stand behind each nozzle and collect output in a measuring cup over a specified time. Calculate the amount of liquid that you should collect, and see if it is the same from each nozzle.

The second way, as mentioned previously, is to simply stand behind the boom while it sprays water in the barn lot. Look for streaks and skips ion patterns coming from a nozzle. If you can pick up streaking or skipping in the nozzles, then that is a sure sign it is time to change them without going any further.

Droplet diameter: Droplets that are somewhere between the diameter of a sewing thread and a human hair are small enough to be easy candidates for drift. Scientists measure them in microns. You want to hold down the percentage of droplets that are 200 microns or less in size. Both nozzle and sprayer pressure can affect droplet size.

Solutions wear on nozzles: One reason nozzles wear is that solutions often contain some grit that you can't see. Depending on the type of material that the nozzles are made of and the nature of the solution, spraying these materials over an extended time can result in more nozzle wear than you might expect.

Drift reduction agents: If you are adding something to reduce drift, check the herbicide labels to make sure the compound is compatible. Adding products that are not compatible can cause more headaches than any good they might do.

Nozzle economics: Remember that compared to the price of the spray rig you may be using, a set of nozzles is extremely cheap. Yet nozzles go a long way toward determining how well the application works, and whether or not there is drift. Don't gamble on worn nozzles or the wrong type of nozzle just because you don't want to buy another set.

Several companies manufacture nozzles that are designed to reduce drift. Some examples to consider are TeeJet AI, AIXR, and TTI; Greenleaf TurboDrop XL; and Hypro Ultra Low Drift, among others.

Often, 10,000 acres is often the breaking point on wear.

ADDITIONAL EQUIPMENT CONSIDERATIONS TO MINIMIZE DRIFT

In concert with weather and environmental conditions, which will be discussed later, there are options for manipulating spraying equipment to minimize exposure to non-target crops and areas.

- Reduce spraying pressures. Lower pressures allow for larger droplet sizes.
- Increase carrier volumes per application rate. If possible, use 20 gallons or more per acre instead of 10 gallons or fewer per acre.
- Use lower spray boom heights and make sure to use nozzles that have a 110° or more spray angle which allows the boom to be lowered more than nozzles with lesser angles, but ensure spray pattern and proper overlap is maintained.
- Reduce sprayer ground speed to less than10 mph. Faster speeds cause more boom bounce and a wider spray vortex, often sending spray droplets higher in the air.

- Use drift retardants. There are many good products on the market.
- Invest in "high-tech" sprayers, using pulse modulation, for instance. The pulsing system seems to assist in better application and drift reduction.

KEEP A CLOSE EYE ON LOCATION, WEATHER CONDITIONS

Before you head out to spray, you'll need to consider other ways to manage spray drift, aside from switching out nozzles. This includes a review of the locations to be sprayed and the weather.

DO YOUR HOMEWORK ON DRIFTWATCH WEBSITE

Thanks to an online registry of pesticide-sensitive areas, pesticide applicators now have a source to help locate these areas before spraying.

If your operation falls into the pesticide-sensitive category, you can add it to the registry to help protect your crops from spray drift. Spray applicators can check the registry before spraying to help them avoid such areas.

KNOW YOUR NEIGHBOR'S CROPS

The two most sensitive crops to 2,4-D drift are tomatoes and grapes. Both tomatoes and grapes are high-value crops. Knowing where they are and talking to the neighbor who owns them in advance could go a long way toward avoiding issues later.

Always let neighbors know when you're spraying and what chemical you are spraying.

If you believe you caused a spray drift issue, it is in your best interest to call your Extension educator, but they walk a fine line between offering advice and becoming potential material witnesses, should the damage be severe enough to warrant a lawsuit. Do your best to prevent problems, but if one occurs, get in touch with the state chemist staff as soon as possible. That's who your neighbor will be calling if he thinks you harmed his trees or crops.

WEATHER AND ENVIRONMENTAL CONSIDERATIONS

Weather conditions, wind speed, the possibility for an air inversion and topography are all factors to consider when planning to spray. Keep in mind that the objectives of any spray application are to balance productivity, efficacy and prevent off-site movement of pesticides.

Also watch for an inversion. An inversion occurs when it is warmer near the ground than above ground level. Chemical vapors tend to hover, and can move to off-site locations. It is most common at sunset and at sunrise, but can occur at other times. For example, if it were legal to burn in your area, the smoke would stay in a cloud instead of trailing off on days like this.

Wind. Though you do not want to spray chemicals at wind speeds above 10 miles per hour, you also want to avoid spraying in calm wind

speeds of zero to two miles per hour. Those conditions can be right for an inversion, which allows chemical drift to move and settle off-target.

Instead, spray when there is a gentle breeze; 3 to 9 miles per hour. Carry an instrument to measure wind speed as it changes during the day.

Temperature. When temperatures are high, spray droplets will be small and the potential for drift is greater. That is why there is normally greater drift when conditions are hot and dry.

Very little vertical mixing of the air occurs under these conditions, even with a breeze. Small spray droplets may fall very slowly, or be suspended in the air and carried miles away from the spray site by a light breeze.

Low cloud cover. If it is very calm and there is low cloud cover, you also want to be careful about spraying. These conditions can also produce an inversion, as noted above, and cause chemical drift and vapors to collect and move off-site.

SPRAYER CLEAN-UP AND POST-APPLICATION MAINTENANCE

Proper clean-up between applications and after the season's final application is crucial, both to avoid sprayer damage and crop injury.

CLEANING BETWEEN APPLICATIONS

It can be difficult to find the time when weather limits opportunities to spray, but failing to clean equipment may result in contamination and crop injury.

Risk of crop injury is greatest when:

- Crops that are highly sensitive to the contaminating herbicide (or other pesticide) are being sprayed.
- The product is very active in small amounts.
- Residues from non-selective herbicides like glyphosate and glufosinate remain in the spraying system.

Herbicide residues are more likely to cause visual crop injury but contamination can occur with all pesticides. Spraying equipment should be cleaned between different applications whether the products are herbicides, fungicides or insecticides.

Crops can be injured for up to several weeks after being treated with contaminated equipment, including after several separate applications. Water alone is generally not adequate to remove all pesticides,

and injury can occur when residues that adhered to sprayer surfaces are brought back into solution.

Some herbicides – such as plant growth regulator (dicamba, 2, 4-D, Status, NorthStar etc.) or HPPD inhibitor (Callisto, Impact, Laudis) herbicides – may be particularly difficult to clean from a sprayer and can cause visual symptoms on soybeans.

Several herbicides (glyphosate in particular) make very effective tank cleaners and do an excellent job of removing any pesticide residues that were not removed by rinsing, thus increasing the risk of injury from residue remaining in the spraying system.

Leaving a sprayer load standing for a few hours or overnight can also increase the risk of contamination. To reduce the risk of crop injury or contamination from previous applications, keep these clean-up guidelines in mind:

Don't wait to clean. Clean the sprayer as soon as possible after use. Sprayers can retain significant amounts of pesticide solution even after they are considered "empty." Leaving the spray solution in the sprayer for long periods of time increases the risk of contamination. Dried pesticides are harder to remove than pesticides still in solution.

Determine where to clean. Clean the spraying equipment where the rinsate can be safely disposed of and will not contaminate water supplies or other sensitive areas. The best place for rinsate disposal is usually in the field, consistent with the product's label.

Use the right cleaner. Cleaning agents should be selected based on the pesticide and formulation to be cleaned. Refer to the label for specific cleaning products to use. Some product labels recommend the cleaning solution stand in the sprayer for several hours or overnight.

Clean all equipment parts. Focus on more than just the tank. Pesticide residues on hoses, sumps, strainers, pump surfaces and other sprayer components can also cause contamination.

Clean strainers daily. Check and clean strainers each day when you are spraying, as these can be a source of contamination. Most sprayers have up to three different strainers. In addition, partly plugged strainers may create a pressure drop and reduce the nozzle flow rate.

Handle safely. When cleaning sprayer equipment, wear the same personal protective equipment required by the pesticide label for making the application. It is also a good idea to wear a chemical-resistant apron and eye protection.

Remember that cleaning practices will vary depending on equipment and products used. Always refer to the pesticide label for specific cleaning instructions.

AFTER FINAL USE, WINTERIZE YOUR SPRAYER

Any grower who uses a ground sprayer will benefit from knowing proper winterizing procedures to ensure the sprayer will function properly in the spring.

Rinse. Prior to storing sprayers for the winter, they need to be thoroughly rinsed of all pesticide residues. It is better to rinse sprayers several times with a small amount of clean water than to fill it up only once.

Dispose of the rinsate in a field that has proper setbacks from all water sources. Do not allow the rinsate to accumulate into puddles. It is preferable to rinse sprayers on an impervious surface where the rinsate can be collected in a secondary containment facility.

At this time make sure that all water is drained out of the sprayer so no damage is caused by water freezing. Once the inside of the tank is cleaned, do not forget about the outside of the sprayer. The outside should be rinsed with clean water and if at all possible, also on an impervious surface, and the rinsate collected.

Always remember to read the label of the pesticide used and use appropriate personal protective equipment when cleaning.

Clean. Once you have the tank properly rinsed the next step is to decontaminate it. Commercial cleaning agents or some common household products can be purchased to clean your system. Remember to run the cleaning solution through the entire system including agitation and return lines.

Rinse clean water through the system after it has been thoroughly cleaned opening up the nozzles and running the water until only clean water is coming out. If you have foam markers and flow meters do not forget to clean these following the manufacturer's suggestions.

Maintain. With the sprayer is rinsed and cleaned, again carefully inspect the system making note of any maintenance concerns and repairing them. Inspect nozzles, screens, hoses, valves, pumps, boom and the tank.

This is a good time to check for tank integrity. Please remember that even though the system has been cleaned you still need to be cautious and wear personal protective equipment.

Store. The final step is to properly store the system. Any removable parts should be removed to ensure that there is no damage during storage. For example: nozzles, filters, tips, check valves, screens, pressure gauges. If at all possible, store these in an area that will not freeze.

Clean filters with soapy water before storage. The last step is to circulate an antifreeze solution throughout the system including the boom's hoses. Cap the boom nozzles; one or two nozzles may need to be left open to ensure total circulation remember to cap them when the system is filled to make sure that antifreeze is in the entire system.