

Proper Cleaning of a Boom Sprayer

On most farms, boom sprayers are invaluable management tools. They are versatile pieces of equipment that allow a farmer to control weeds, insects and diseases in an efficient and economical way. However, there are challenges to this versatility. For example, phenoxy herbicides, used to control broadleaf weeds, can be pulled off the walls of the spray tank and hoses by subsequent applications of insecticides that may be applied to crops sensitive to these herbicides. Therefore, it can be critical to clean a boom sprayer properly especially if it is used for more than one type of pesticide.

Synergism, antagonism, precipitates and tank residues are all issues that can impact a pesticide effectiveness and crop safety if improper or poor cleaning of the spraying equipment is done.

There is often confusion among farmers on what is the best way to clean a boom sprayer. There are also concerns about what to do with the rinsate and how the whole cleaning process slows down an already tight management schedule. This factsheet will show how cleaning a sprayer is critical for crop safety, but will help save the grower money in the long term with fewer equipment repair costs, less crop damage and better pest control.

Pesticides:

All pesticides are not equal and should not be treated that way. As mentioned before in this series, product labels should always be used as your main source of information for handling any pesticide. Often the pesticide label will give detailed instructions on how to clean a boom sprayer for that particular product.

Residue and Spray Volume Left in the Tank:

Pesticide residue is the product left on the inside of the hoses, nozzles and tank of a sprayer. This residue can be dried and bound tightly to the interior of these structures. Depending on the nature of these residues, they can be pulled off the wall of the tank and hoses by certain pesticides. These residues will then be mixed into the spray solution in relatively low concentrations. However, certain crops can have severe reactions to even low concentrations of certain pesticides.

Even if the anticipated next application is the same product as was just applied, the sprayer should at least be rinsed at the end of the day. This helps prevent product from drying on the interior surface of the tank and hoses. This limits clogging or chemical build-up in the sprayer.

Unused spray volume left in the tank can have a greater impact on subsequent applications. Some sprayer systems are designed in such a way that over 20 litres of spray solution can be left in the tank while the suction is pulling air from the tank. This often occurs in hilly fields and with drum shaped spray tanks. Applicators need to be aware of this and take extra care when rinsing the tank. Basically the more spray volume left in the tank, the greater potential for impact on the next application.

Synergisms, Antagonisms and Precipitates:

Synergism, when talking about pesticides, can be described as two or more products, when applied together, having a greater effect than the individual products applied separately. This means there might be an amplifying effect. Many people might consider this a good thing, especially when they are trying to control a hard to control weed. However, from a tank residue standpoint, this synergism may increase the potency of a pesticide so that crop safety may become an issue. Environmental conditions that stress the crop like dry, hot weather may also play a factor in this increased crop sensitivity.

Antagonism can be described as a reduction in efficacy. Two or more pesticides may react in a way that causes them to be less effective than they would be if applied alone. Certain pesticide residues left in a spray tank may reduce the efficacy of a subsequent pesticide application. This could lead to inadequate pest control, which means wasted time and wasted money.

Precipitates are the result of chemical reactions that cause solids to form out of solution. These precipitates tend to block nozzles and hoses as well as reduce the effective concentration of the pesticides in the spray tank. This will reduce pest control and increase down time with the sprayer.

Common Cleaning Procedure:

As mentioned above, always follow the product label for specific sprayer cleaning instructions. However, not all product labels have cleaning instructions. Included below is a generic procedure that should be done between applications of different pesticides or when storing the sprayer at the end of the year.

Begin by rinsing the outside of the sprayer. Ideally a mild detergent should be used. Remove the nozzle tips and screens and clean them with a strong detergent and water. Use a soft brush. Partially fill the spray tank with clean water. Flush this through the booms and drain. Repeat this rinse cycle if residue can still be seen.

Fill the tank nearly full with clean water and add household ammonia (1L to 100L of water). Allow this to agitate for 15-30 minutes. Spray out and drain. Partially fill with clean water twice more and spray out and drain.

The volume of water used for each step can be reduced if a rinse nozzle is used inside the tank. This allows thorough coverage of water and ammonia solution inside the tank. Different models can be purchased at any equipment dealer.

Triple Rinsing:

Tests have shown that triple rinsing the spray tank is better than using just one single rinse. For example, using 100 gallons of clean water in one single rinse to clean a 100-gallon sprayer tank reduced the concentration of the original spray solution from 100% to 5% both in the tank and at the nozzle. If triple rinsing was performed using 33 gallons of clean water per rinse, a concentration of 0.2% to 0.5% was gained. (*Landers, A. 2002. Cleaning Sprayers after use, Cornell University*) Therefore the same volume of water reduced the spray residue left in the tank by 10 fold. This reduction will vary depending on the type of pesticide in the tank, but the general principles will remain.

Applicator Safety:

Whenever an applicator is cleaning a boom sprayer, safety precautions should be taken to protect the applicator. Even though the concentration of pesticide will be reduced with each subsequent rinse, the risk of exposure is still there for the applicator. Always follow safety precautions for each product provided on the pesticide label.

Disposal of Rinsate:

What to do with the rinsate? Rinsate should be applied to the crop on which the pesticide is registered. It is important to not apply more to a unit area of land than the maximum label rate. Some sprayers have infield rinse systems that allow for the sprayer to be rinsed in the field, thus saving travel time. Never wash or drain a sprayer near a well or water course.

Cleaning Agents:

Household ammonia is the most common and versatile cleaning solution for cleaning and neutralizing certain pesticides in spray tanks. Chlorine bleach is also effective but should not be used unless advised by the product label, as it can form toxic fumes with certain chemicals that can be hazardous to the applicator. There are many other commercially available cleaners that can be used. Contact your local chemical supply dealer for a list of these and always follow the instructions on the label.

For more information, please contact:

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