

## Proper Sprayer Clean-out to Help Avoid Crop Injury

Sprayer clean-out is important when switching between crops or between products that have different herbicide resistant technologies. A small amount of herbicide remaining in the sprayer system can cause crop injury. Spraying until the tank is empty does not mean it is clean. Herbicide residues can remain in the spray tank, lines, sump, pump, filters, and nozzles. Thorough cleaning of the sprayer system is necessary to help avoid crop injury.

### Always Read Herbicide Labels for Tank Cleaning Recommendations

Herbicide labels provide specific instructions for cleaning field sprayers. Roundup® brand agricultural herbicides that contain glyphosate require a thorough flushing of the sprayer system with water. Other herbicide products require the use of tank-cleaning agents along with water.

Tank-cleaning agents penetrate, loosen, dissolve, and sometimes deactivate herbicide residues in sprayer equipment. Household ammonia, commercial tank-cleaners, and household detergents are a few examples of types of tank-cleaning agents. Commercial tank cleaners and detergents help remove water and oil-soluble herbicides. Commercial tank cleaners usually perform better than household detergents and can deactivate some herbicides in addition to dissolving them. Ammonia solutions can effectively penetrate and loosen deposits and residues in the spraying system. Ammonia binds to 2,4-D,



Several issues can cause cupped soybean leaves, one of which is tank contamination from PGR herbicides.

### Tips to Help Minimize Frequency and Maximize Efficiency and Efficacy of Sprayer Clean-Out:

- Mixing the minimum amount of herbicide solution needed can help reduce the amount of rinsate.
- Planning the order of applications can help reduce the number of clean-outs needed.
- Remember to consider all of the spray equipment that may need to be cleaned-out, such as inductors, tender trucks, etc.

dicamba, and other plant growth regulator herbicides (PGRs) making them more water soluble. Ammonia also increases the pH of the rinse solution, making sulfonylurea herbicides more soluble and easier to remove. Always consult product labels for recommendations on cleaning agents, concentrations, and procedures for cleaning field sprayers.

### General Cleaning Procedure

Having a clean and empty sprayer at the end of the workday can help prevent drying and hardening of product residues and reduce the risk of corrosion and damage to spray equipment. If using the same product mixture the next day, flushing the sprayer system with water is likely sufficient. However, if you are switching products or crops, a more thorough cleaning is likely required. The following is recommended for all herbicides unless the product label specifies a different procedure:

1. The tank should be filled half way with water. Agitation and spraying should then be done for at least five minutes to flush the tank, lines, booms, and nozzles. This is best done in the field having rinse water available either on the sprayer or a support vehicle. [to pg. 2](#) ▶

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2. The tank should be filled with water and one of the following tank cleaning agents should be added per 100 gallons of water:

- 1 gallon household ammonia, or
- 8 pounds trisodium phosphate cleaner detergent, or
- Commercial tank cleaner (follow label instructions).

The cleaning solution should be agitated in the tank for 15 minutes. The sprayer should be operated long enough so that all boom lines and nozzles are filled with cleaning solution. The solution should stand in the sprayer system for several hours. For growth regulator herbicides, ammonia should be used and the solution should stand in the sprayer overnight. The solution should be agitated and then sprayed onto an area suitable for the rinsate.

3. More water should be added and the system should be rinsed again using a combination of agitation and spraying. Nozzles, screens, and strainers should be removed and cleaned separately in a bucket of cleaning agent and water.

4. The entire spraying system should be rinsed again with water.

A tank-cleaning agent is not necessary when cleaning sprayers previously loaded with only a Roundup® agricultural herbicide. Read and follow the Roundup® agricultural herbicide label for specific instructions on flushing the system. However, a tank-cleaning agent is needed if Roundup® agricultural herbicides were mixed with other herbicide products in the tank.

More time, care and effort should be taken when cleaning sprayers previously loaded with growth regulator herbicides before spraying soybeans, cotton, or other broadleaf crops. Residues of these herbicides in the sprayer can be redissolved



Depending on the amount of glyphosate residue left in the tank, symptomology can vary from a white band to deep reddish-purple plants.

by other herbicides, surfactants, or fertilizer additives. The sprayer should be rinsed a second time with ammonia or a commercial tank cleaner to remove herbicide residue.

### Rinsate Disposal

The sprayer should be cleaned in an area that will not contaminate water supplies, streams, or crops. The area should also be inaccessible to children, pets, and livestock. The best method for disposal is in the field according to the product label.

*Sources: M. VanGessel. 2004. Sprayer Clean-out Guidelines: Reducing Crop Injury Due to Herbicide Contamination. University of Del Coop. Ext.*

*L. Steckel et.al. 2005. Cleaning Plant Growth Regulator (PGR) Herbicides Out of Field Sprayers. Univ. of Tenn Coop Ext. W071.*

*B. Pringnitz. 1997. Sprayer Clean-out Guidelines: Avoiding crop injury due to contamination. Iowa State University Extension. PAT-30.*

**Individual results may vary**, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

**ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** **Tank mixtures:** The applicable labeling for each product must be in the possession of the user at the time of application. Follow applicable use instructions, including application rates, precautions and restrictions of each product used in the tank mixture. Monsanto has not tested all tank mix product formulations for compatibility or performance other than specifically listed by brand name. Always predetermine the compatibility of tank mixtures by mixing small proportional quantities in advance. Technology Development by Monsanto and Design(SM) is a servicemark of Monsanto Technology LLC. Roundup® is a registered trademark of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2010 Monsanto Company. 031010EJP