PURDUE EXTENSION

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ATS and Burndown Herbicide Treatments (updated with velvetleaf data and pictures)

This spring we have received a number of questions regarding the use of glyphosate-based burndown herbicides programs with ATS (ammonium thiosulfate). Increased use of ATS is being driven by the fact that sulfur deficiency symptoms are showing up on fields with low sulfur soil test levels. Because of the number of questions we were receiving, we conducted a quick study in the greenhouse to determine the impact ATS has on weed control with glyphosate and glyphosate plus 2,4-D.

Regrowth of velvetleaf sprayed with glyphosate + AMS + ATS (7 gal/A) at 21 days after application.

We chose to evaluate wheat, velvetleaf, and lambsquarters, because these weeds are known to be tough to control with glyphosate. In this article, we will discuss wheat and velvetleaf control. Our treatment structure and results at 14 days after application (DAA) are shown in Figures 1 and 3. Figures 2 and 4 show wheat and velvetleaf control 21 and 19 DAA, respectively. Results for lambsquarters are inconclusive at this point.

As you can clearly see in the figures, use of ATS with glyphosate resulted in lower control of wheat and velvetleaf in this greenhouse study. It is also important to emphasize that adding 2,4-D to glyphosate reduced wheat control if no AMS was added, but increased velvetleaf control, especially for treatments containing ATS.

To translate what this would mean in the field, the potential for control of weeds or cover crops like wheat, annual ryegrass, barnyardgrass, velvetleaf, lambsquarters, marestail, etc. could be lower or result in incomplete kill if ATS is used with a burndown herbicide program that relies on glyphosate or glyphosate + 2,4-D. This situation is more likely to occur when the weeds are large, or when spray applications are made to plants that are not actively growing (e.g. cool, cloudy weather conditions for many days surrounding spray day). Please note this research included full rates of both glyphosate and 2,4-D under warm greenhouse conditions that favor herbicide activity.

We also recorded the pH of the spray solution prior to application and noted that ATS applied at a high rate of 7 gal/A increased the pH by approximately 1.5 pH units. Since we don't currently understand the basis for the antagonism between glyphosate and ATS, we can't suggest that this change in pH is the primary cause of reduced efficacy or that reducing the pH with an adjuvant that reduced spray pH will restore glyphosate activity.

To avoid antagonizing glyphosate activity in a situation like this, we would suggest the following strategies:

1) Apply ATS in a separate trip across the field a few days after the burndown treatment
2) Increase the rate of glyphosate to at least 2 qts/A
3) Consider adding another effective mode of action to glyphosate for control of weed species that are historically difficult-to-control in a spring burndown with glyphosate.

ATS and wheat control with glyphosate

Figure 1. Effect of ammonium thiosulfate (ATS) on glyphosate activity on wheat 14 days after treatment.

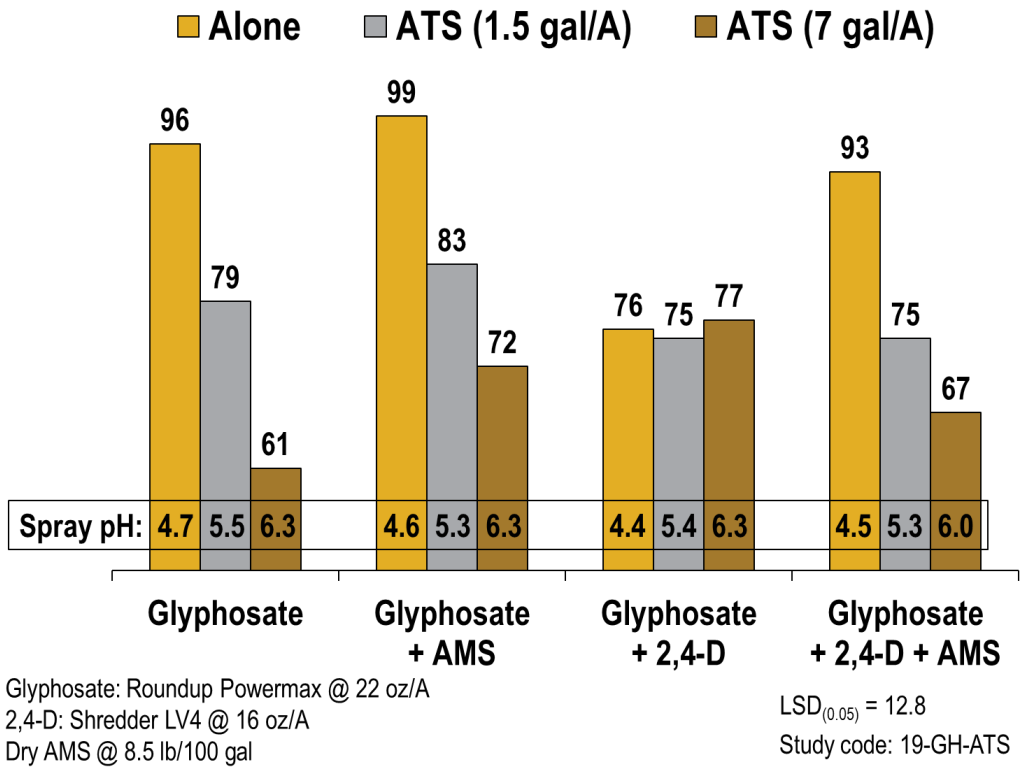

Figure 2. Effect of ammonium thiosulfate (ATS) on glyphosate activity on wheat 21 days after treatment.

Treatments: A = glyphosate (22 oz/A); **B** = glyphosate + AMS (8.5 lbs/100 gal);
C = glyphosate + ATS (1.5 gal/A); **D** = glyphosate + ATS (7 gal/A);
E = glyphosate + AMS + ATS (1.5 gal/A); **F** = glyphosate + AMS + ATS (7 gal/A)

Figure 3. Effect of ammonium thiosulfate (ATS) on glyphosate activity on velvetleaf 14 days after treatment.

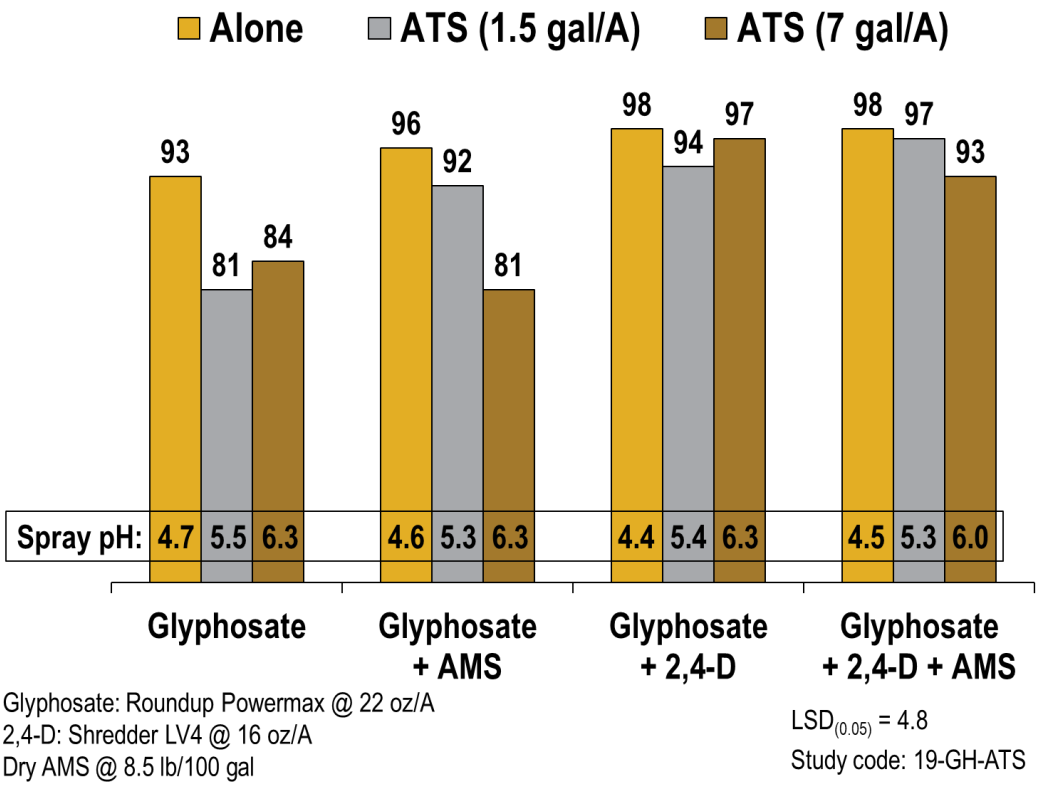

Figure 4. Effect of ammonium thiosulfate (ATS) on glyphosate activity on velvetleaf 19 days after treatment.

Treatments: A = glyphosate (22 oz/A); **B** = glyphosate + AMS (8.5 lbs/100 gal); **C** = glyphosate + ATS (1.5 gal/A); **D** = glyphosate + ATS (7 gal/A); **E** = glyphosate + AMS + ATS (1.5 gal/A); **F** = glyphosate + AMS + ATS (7 gal/A)