PURDUE UNIVERSITY Extension - Entomology

Pest&Crop newsletter

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In This Issue

Does AMS Color Influence Weed Control With Glyphosate And Glufosinate?

(Bill Johnson), (Julie Young) & (Marcelo Zimmer)

During this time of year, many growers are making decisions about purchasing inputs for the next growing season. It is very common to lock in fertilizer prices during the fall, and with the utility of AMS as both a fertilizer and a spray adjuvant, we routinely get questions about some of the different AMS products that are carried by ag retailers.

Ammonium sulfate

There are a number of different sources of AMS products that can be used with weak acid herbicides to overcome hard water antagonism and improve efficacy. Some of these products contain ingredients that impart a slight difference in color of the AMS product. Some companies will use this as a marketing ploy to indicate that it implies it is a lower quality product.

We conducted a greenhouse trial to compare one of the off-colored AMS products (AdvanSix AMS) with commonly used white AMS products (Martin ZippSol and APF S-Sul). We planted barnyardgrass and velvetleaf in greenhouse pots, allowed the weeds to grow to around 6 inches in height, and applied herbicide treatments with a greenhouse track sprayer. The reason we use barnyardgrass and velvetleaf in adjuvant trials, is that these weeds are somewhat difficult to control with both glyphosate and glufosinate, and we have learned that these weed species provide reliable responses to adjuvants in the hundreds of adjuvant trials that we have done over the last several years. In this trial we evaluated control of both barnyardgrass and velvetleaf with glyphosate (Roundup PowerMax), velvetleaf control with glufosinate (Liberty).

The rates of herbicides used were Roundup PowerMax at 16 fluid ounces per acre for barnyardgrass, 21 fluid ounces per acre for velvetleaf, and Liberty at 23 fluid ounces per acre for velvetleaf. In our adjuvant trials, we choose a herbicide rate that will provide somewhat marginal control so we can tease out the impact of any adjuvant that would be added to the spray solution. We evaluated three different AMS products. The AdvanSix product is an off-color AMS product, while the Martin and APF products are classified as “white” AMS products. In order to test the impact of the AMS products on overcoming antagonism by hard water, the spray solutions were made-up in one of three different hardness levels. The hardness levels we evaluated were zero, 500, and 800 parts per million.

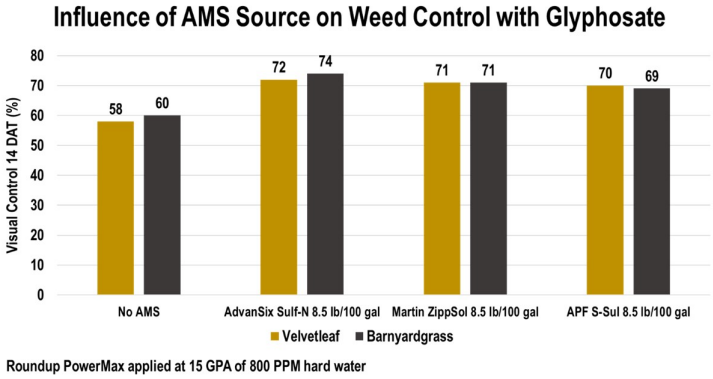


Figure 1. Influence of AMS source on velvetleaf and barnyardgrass control with glyphosate.

In Figure 1, we show the weed control with glyphosate in hard water, (800 parts per million), that is well above the average hardness that we see in the eastern corn belt, which ranges from about 100 to 350 parts per million. The data in figure 1 show that velvetleaf and barnyardgrass control without AMS is around 60%. The addition of any source of AMS increases control around 10% and there were no significant differences between any of the AMS brands.

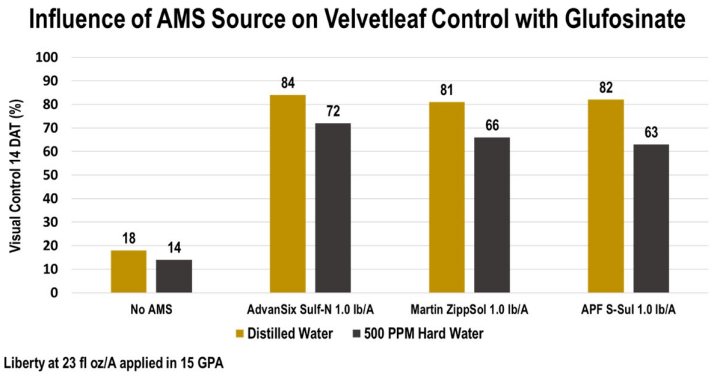


Figure 2. Influence of AMS source on velvetleaf control with glufosinate.

In figure 2, we show velvetleaf control with Liberty, and compare the control in distilled water versus 500 parts per million of hardness with the three AMS products. In the absence of AMS, velvetleaf control is less than 20%. The addition of AMS, whether it be to distilled water or hard water increases control 50% or more and there are no significant differences between the three AMS products.

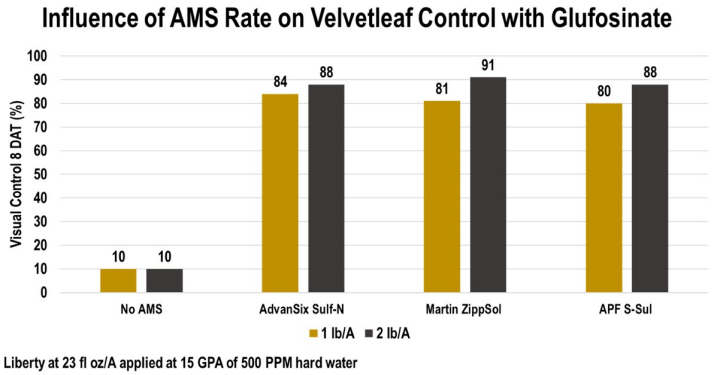
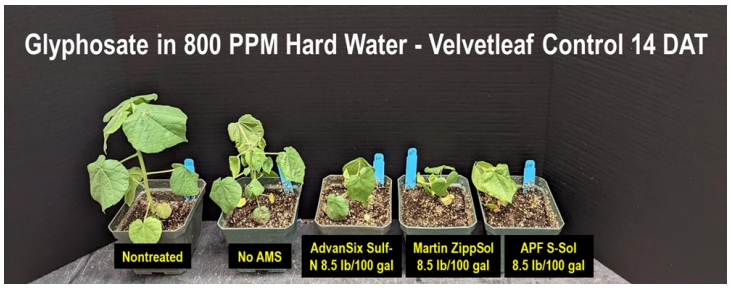
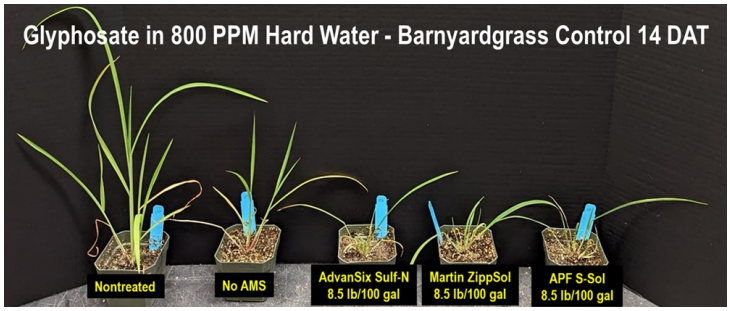


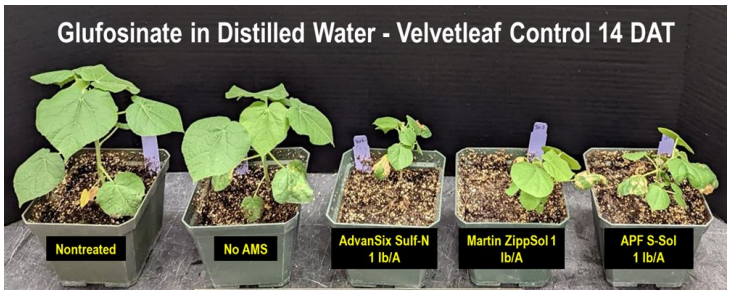
Figure 3. Influence of AMS source and rate on velvetleaf control with glufosinate.

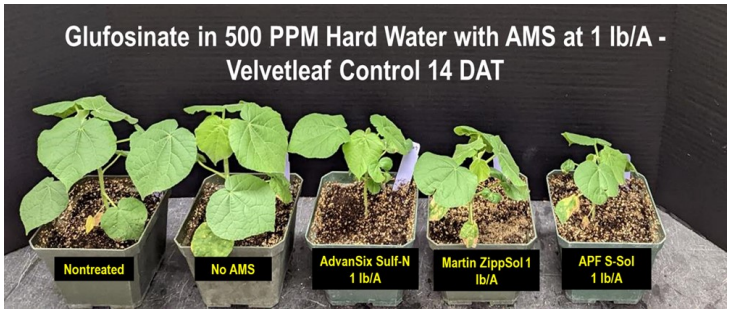
In figure 3, we show velvetleaf control with glufosinate, and compare 1 lb/A per acre to 2 lb/A per acre of three ammonium sulfate products. Once again we see no significant difference between the ammonium sulfate products, and note that the addition of ammonium sulfate increases control of velvetleaf at least 50%, and that there this is an advantage to increasing the rate of AMS to 2 lb/A when the spray solution contains 500 ppm of hardness.

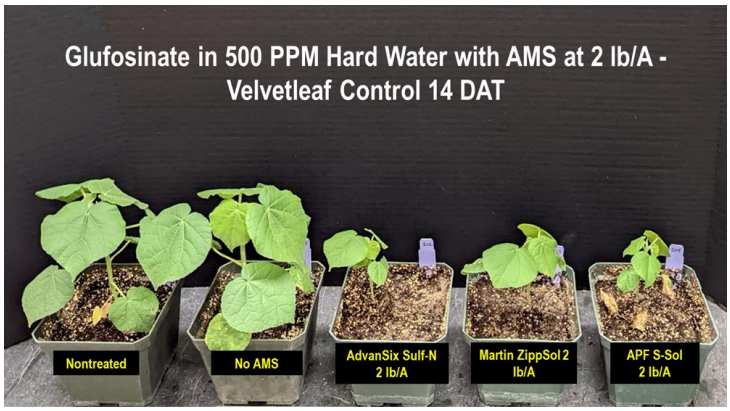
While we recognize the importance of showing data in a graphic format it's also important to view pictures of the results as well. Shown below are a couple of pictures of the treated plants at 14 days after treatment with various levels of hardness, and the three ammonium sulfate products. The headings on these photographs should be self-explanatory to describe what is shown in the pictures.











In conclusion, the results of this greenhouse experiment indicate that there are really no differences in the control of barnyardgrass and velvetleaf with glyphosate, or velvetleaf control with glufosinate with these three sources of AMS. The off color AMS product worked just as well as the white color AMS product in these trials.

An Eerie Poisonous Fog

(Keith Johnson) & *(Brad Shelton)*

Perhaps it is fitting that the eerie poisonous gas flowed from the end of a silo bag not adequately sealed at the end with a lime pile as this is "National Farm Safety and Health Week". During the ensiling process, toxic gasses of nitrogen dioxide ($N0_2$) and nitrogen tetroxide (N_{24}) are produced when nitric oxide comes in contact with oxygen. Nitrates that have not been converted to true protein are the source of nitrogen oxide. Nitrates accumulate in plants when drought and/or when excess nitrogen is present in the soil.

The orange, heavy, and poisonous gas, nitrogen tetroxide, flows out the end of a silage bag filled with corn chopped and bagged the previous day.

Nitrogen dioxide is colorless and nitrogen tetroxide is reddish brown. These gases have caused permanent lung damage in people; and have killed both livestock and humans. Greatest concern is the first few days after putting the chopped forage in the silo structure or bag. However, care should be taken for ten days after packing occurs. These silo gases float down a tower silo chute and into a barn or confined area. Whenever toxic gases are a possibility, care must be taken to protect both humans and animals. Make sure that enclosed areas around the feed storage area (feed rooms, silos, and animal pens) are well ventilated and safe before entry. Doors and windows to enclosed areas should be opened, and silo blowers should run before any attempt is made to enter a tower silo. If there is any doubt about toxic gases being present, a properly fitted oxygen mask should be used in and around the feed storage area.

After fermentation is complete after four weeks, it would be advised to request a nitrate test along with nutrition analyses used to balance rations. Fermentation does reduce the initial nitrate concentration at harvest. If nitrate concentration is a concern as noted by test results, seek the advice of a trained nutritionist to utilize other feedstuffs to blend with the silage to meet livestock performance goals and that will make the ration safe to feed.

The concern of toxic gasses emphasizes the importance of being safe and healthy with all farming tasks.

https://extension.entm.purdue.edu/newsletters/pestandcrop/wp-content/uploads/sites/2/2022/09/mah01745-2.mp4

Much of the text is from “Beef Management Practices When Forages are in Short Supply Because of Drought” that is in the process of being made a Purdue Extension publication. Authors are Ron Lemenager, Keith Johnson and Nick Minton.

Warm, Dry Conditions Ahead

(Beth Hall)

After another wet weekend and cooler temperatures to start this week, it may be surprising to hear that conditions will be changing back to warm and dry for the next several weeks. Climate models are strongly favoring above-normal temperature throughout the rest of September with a slight favoring of below-normal precipitation. Abnormally dry conditions continue to persist in counties across northern Indiana, but the spatial extent is gradually shrinking (Figure 1). It is too soon to tell if the upcoming warm and dry outlooks will be strong enough to expand and intensify those drier areas or if a few periodic rain events will be enough to keep conditions relatively stable. Monthly (October) and seasonal (September-October-November) outlooks were released on 15 September 2022. For both of these time frames, the outlooks are favoring above-normal temperatures to continue with below-normal precipitation across Indiana (Figure 2).

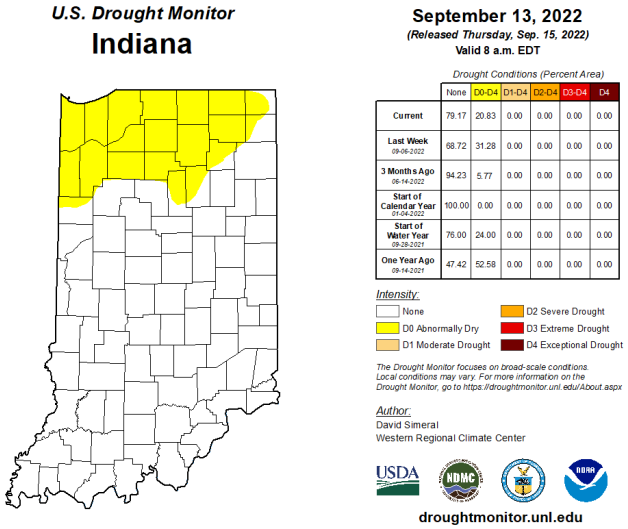


Figure 1. U.S. Drought Monitor for data through August 30, 2022.

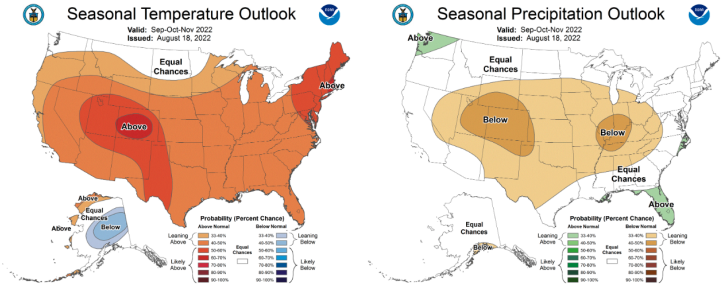


Figure 2. Climate outlook for the 3-month period of September-October-November from the national Climate Prediction Center. Levels of shading indicate levels of confidence for above- or below-normal conditions to occur. Temperature outlook is on the left; Precipitation outlook is on the right.

With each day that passes, we get closer to the first fall freeze event – whether that is defined at 32°F, 28°F, or some other temperature threshold. Over the past several decades, with increasing temperatures, the story has been an expanding growing season defined as the consecutive number of days between the last spring freeze and first fall freeze. Is this expanded season highly variable from year to year or relatively stable? If the growing season, on average, is expanding, is it due more to earlier last spring freeze dates or later first fall freeze dates? The Midwestern Regional Climate Center (mrcc.purdue.edu) has developed a new tool that allows users to peruse the historical data and find answers to these questions and more. This tool will be formally launched later this fall, but a webinar is being offered this next Wednesday, September 21, 2022 at 11am EDT (https://www.zoomgov.com/j/1605071265) for anyone wanting sneak peek and learn more about what the findings say. This is a project that was supported by the USDA Midwest Climate Hub with a focus on

agricultural impacts and awareness regarding climate trends and extremes.

Finally, as temperatures gradually cool, the accumulation rate of modified growing degree days (MGDD) slows down. Figures 3 and 4 show the latest accumulation totals and departure from climatological average, respectively. MGDDs now range from slightly over 3400 units in southern Indiana to around 2000 units in the northern counties. These accumulations are around 150-200 units above normal across central and southern parts of the state and near normal in the northern third counties.

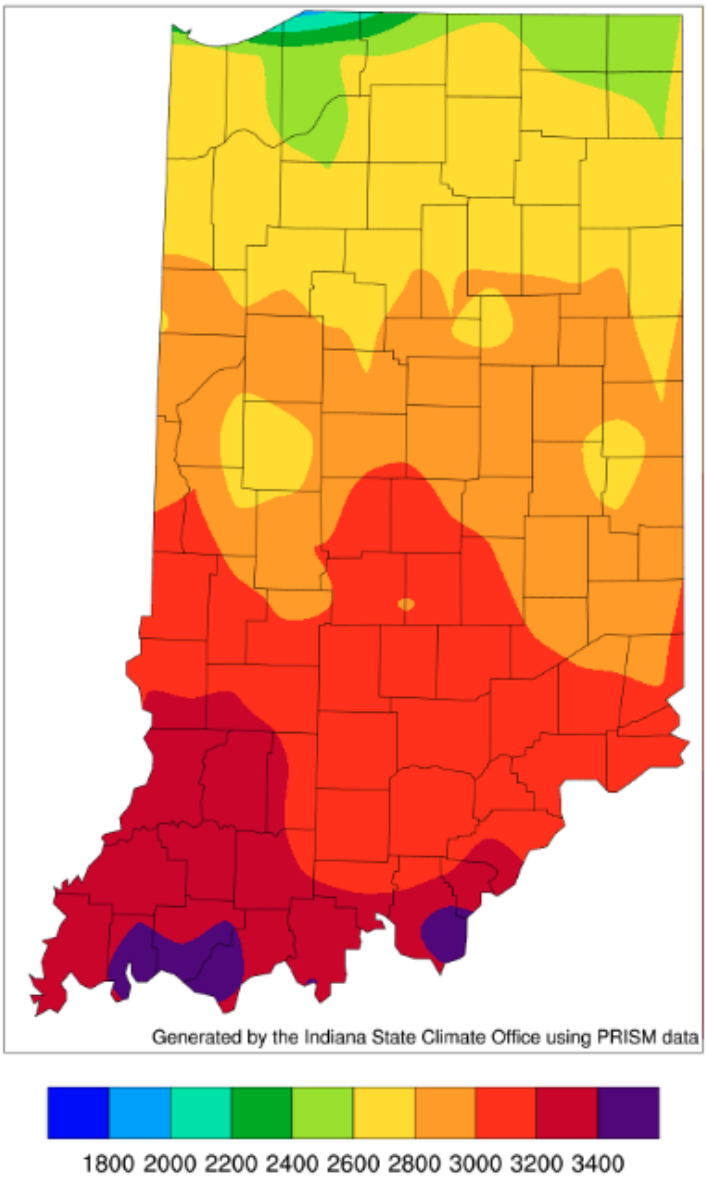


Figure 3. Modified growing degree day (50°F / 86°F) accumulation from April 15-September 13, 2022.

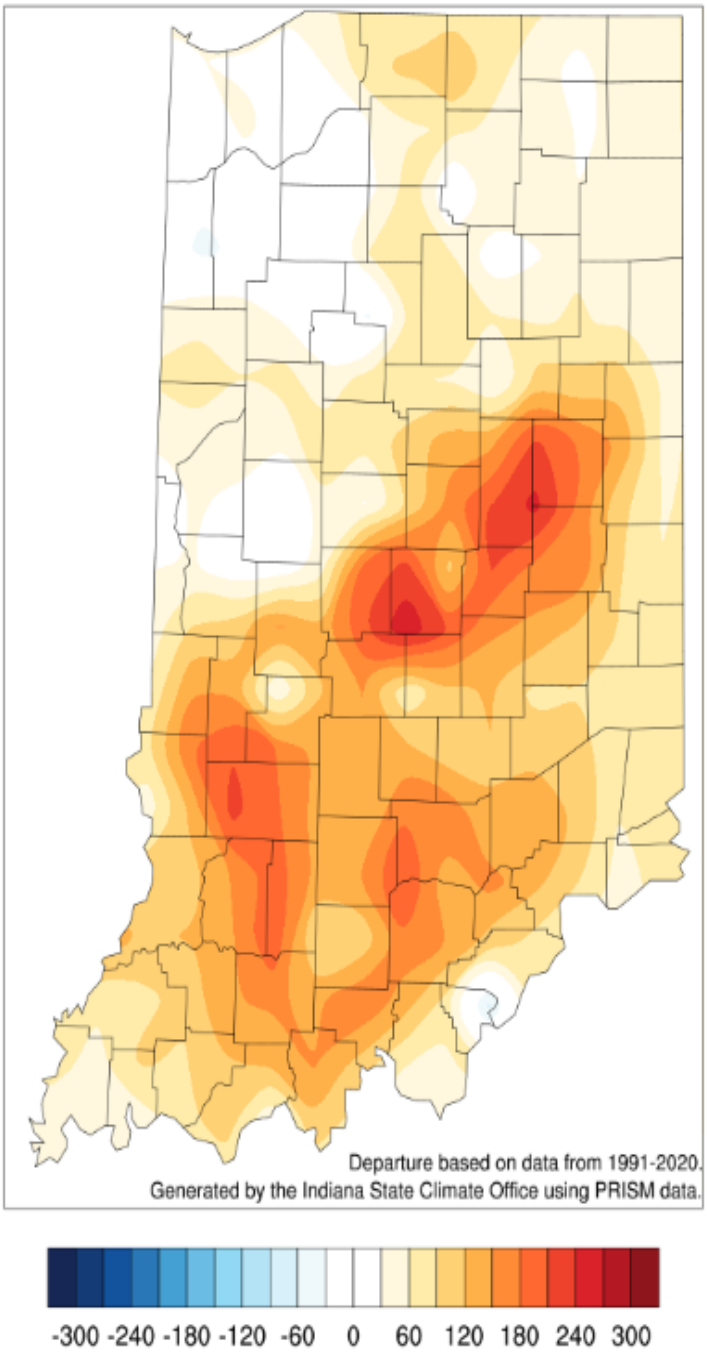


Figure 4. Modified growing degree day (50°F / 86°F) accumulation from April 15-September 13, 2022, represented as the departure from the 1991-2020 climatological average.

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