Hexazinone and Fertilizer for Smutgrass Management

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Smutgrass continues to be the most problematic weed in bahiagrass pastures. Although smutgrass management has been researched since the 1950s, adequate control continues to be difficult. Currently, hexazinone is the only herbicide that is used for selective control of smutgrass in bahiagrass pastures. While hexazinone is usually effective, lack of control following application of this herbicide is commonly observed.

Hexazinone is a herbicide that is typically soil active, especially on sensitive grasses, and it must be absorbed through the root system and translocated with water through the xylem to the active site in the plant where it interrupts photosynthesis. Since it must be absorbed through smutgrass roots, rainfall is necessary to move the hexazinone into the soil for uptake. However, too much rainfall can result in hexazinone movement across the soil surface, or below the root zone of smutgrass plants. Our research over the past two years has been attempting to determine ways to increase activity or make hexazinone more consistent for smutgrass management.

In 2018 and 2019 we began investigating the strategy of using liquid fertilizer (equivalent to applying 50 lb N per acre) as a carrier instead of water when applying hexazinone. In 2018 we used 19% sodium-ammonium nitrate (incorrectly reported as calcium-ammonium nitrate in the June 2020 Ona Update) as the carrier and compared that with water as the carrier for hexazinone at 1 or 2 quarts per acre. This fertilizer had no impact on smutgrass control. In fact, it appeared that using 19% sodium-ammonium nitrate as the carrier resulted in less control than when hexazinone was mixed in water.

In 2019 we used 32% urea ammonium nitrate (UAN) as the carrier in place of 19% sodium-ammonium nitrate. In this scenario, the use of UAN as the carrier resulted in smutgrass control equal to or greater than that observed when mixing hexazinone in water. For example, smutgrass control was similar when hexazinone was applied at 2 quarts per acre with mixed in either water or UAN (Figure 1). However, smutgrass control was greater when hexazinone at 1 quart per acre was mixed in UAN compared to water. In fact, visually, control was similar between hexazinone at 1 quart per acre mixed in UAN to hexazinone at 2 quarts per acre in water.

Figure 1. Response smutgrass 30 days after treatment with hexazinone: A) 1 qt/A hexazinone mixed in water, B) 2 qt/A hexazinone mixed in water, C) 1 qt/A hexazinone mixed in 32% UAN, D) 2 qt/A hexazinone mixed in 32% UAN. Note: When 32% UAN was utilized, the application rate was at 50 lb N per acre. At our output (30 gallons per acre), the mix was approximately 50% UAN solution and 50% water.

We have also been investigating hexazinone-impregnated dry fertilizer for smutgrass management. In our first attempt with this, we impregnated ammonium nitrate. However, we found that the impregnated ammonium nitrate would need to dry for some time before it could be spread. We then switched to a 10-5-10 fertilizer, which did not end up as wet after the impregnation process and could be spread immediately. Although the 10-5-10 impregnated with hexazinone was drier than when using ammonium nitrate, distribution of the fertilizer through spreading appears to be negatively affected. In our plots we can see that we have good kill in the center 10-15 feet of the plots, but the hexazinone-impregnated fertilizer doesn't appear to have made it to the edges of the plots (note the green smutgrass near the top edges of Figure 2 (B and C).

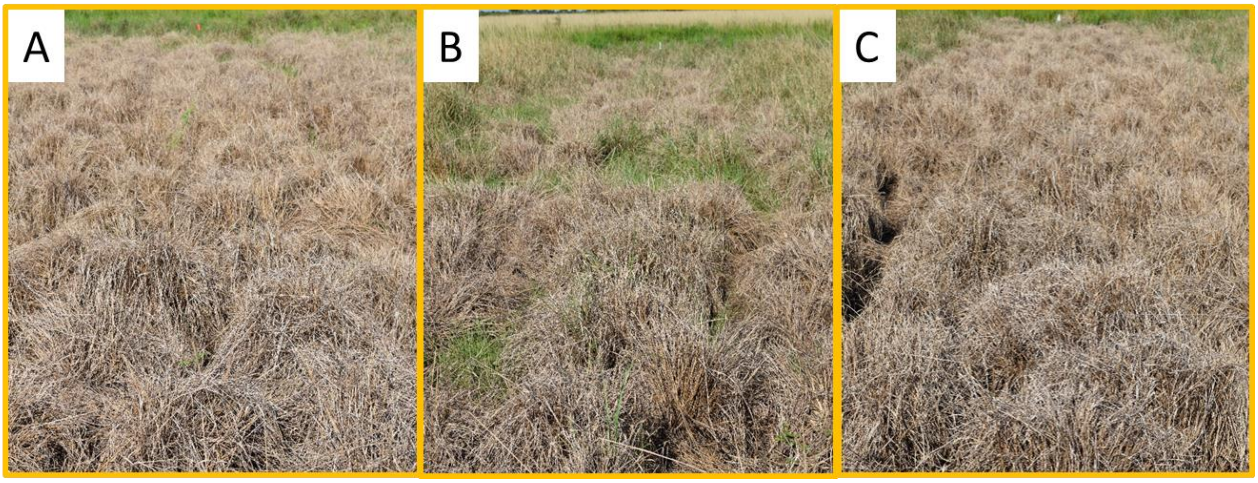

Figure 2. Response of smutgrass to: A) broadcast application of hexazinone mixed in water, B) impregnated (1 qt/A) 10-5-10 fertilizer, and C) impregnated (2 qt/A) 10-5-10 fertilizer. Note the green smutgrass in the upper corners of 'B' and 'C' indicating that the dry fertilizer was not spread across the entire plot due to the wetness of the fertilizer following impregnation.

We plan to repeat these experiments in 2020 and to look at additional rates of UAN to determine the amount of nitrogen necessary for the level of control we observed in 2019. At this point in time, we are not ready to make a recommendation for either practice (liquid nitrogen as a carrier or impregnating dry fertilizer), but using UAN as a carrier is showing some promising results at reduced hexazinone application rates. While I believe that impregnating dry fertilizer with hexazinone has some merit, we have some things to figure out to get our distribution where it needs to be. Even commercial applications using this approach have had difficulty dispersing the impregnated fertilizer to their normal width. In any case, we did not achieve 100% control, which suggests that a multi-year approach will still be required for managing smutgrass.