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HERBICIDE EVALUATION FOR SMUTGRASS CONTROL USING THE WEED WIPER METHOD

Lemus, R., Extension Forage Specialist, Mississippi State University
Mowdy, M.J, Forage/Livestock Area Extension Agent, Mississippi State University
Davis, A, County Extension Director, Mississippi State University

ABSTRACT

Smutgrass (*Sporobolus indicus* L.) is a very invasive bunchgrass causing serious weed problems in perennial grass pastures and roadsides in Mississippi. The weed wiper (WeedWorks) was used to treat smutgrass with Velpar® (hexazinone) at a rate of 4 pt/ac and glyphosate (41% isopropylamine salt) at two different rates (33%, G33 and 50%, G50 solution) in June of 2009. Glyphosate application was done using two methods in the pasture: (1) application in a single direction in the plot (1X) or (2) applying glyphosate in both directions in the plot (2X). A visual appraisal of weed control in May of 2010 indicated a 95, 20, 65, 80, and 90 percent control with Velpar®, G33-1X, G33-2X, G50-1X, and G50-2X, respectively.

INTRODUCTION

Smutgrass (*Sporobolus* sp.) is an invasive bunch grass causing serious weed problems in perennial grass pastures and roadsides in Mississippi. Most of the ranches in the southern part of the state are heavily infested with this invasive weed and it has started to proliferate in the central and northern areas of the state as well. Some of the control practices have included chemical control and cultural practices such as mowing, burning, or renovation of the pasture. Research has shown that mowing or burning does not control smutgrass (Ferrell and Mullahey, 2006), but instead promotes the spread and germination of seed (Sellers, Ferrell, & Mullahey, 2009). On the other hand, pasture renovation is an expensive management practice and it yields variable results because of smutgrass re-establishment from the large seed bank in the soil.

The recommended control method for smutgrass is hexazinone at 0.69 to 1.13 lb/ac of active ingredient (a formulation of 2.75 to 4.5 pt/ac), respectively, with a quart of surfactant (Anonymous, 2013, p. 111). The majority of the land in the southern region of Mississippi are mainly bahiagrass (*Paspalum notatum*) pastures, making smutgrass control with hexazinone more difficult because of its detrimental effect on bahiagrass. Hexazinone is taken up through the roots of the plant requiring optimum moisture for translocation (Mislevy, Currey, & Brecke, 1980). Spot treatment or complete broadcasts have shown effective control. Spot spraying smutgrass will eliminate the entire plant(s), and may warrant additional herbicide applications. The timing of hexazione application during the summer months is extremely important because rainfall is a necessary component to good smutgrass control. Best control of smutgrass using hexozinoe is obtained when applications are made from the first of May through the end of June. Although some grazing occurs on mature smutgrass, most of it is usually unpalatable to livestock and cattle will only graze it under adverse circumstances (Sellers, Ferrell, & MacDonald, 2008).

Cultural practices have not been successful for control of smutgrass and chemical control has been limited to hexozinone or glyphosate (Wilder et al., 2011). Hexazinone is a highly effective herbicide, but it is also quite expensive. Costs could range from 25 to 30 dollars per acre (Mullahey, 2000). Consequently, the application of hexozinone is warranted when smutgrass population reaches densities of approximately 50 percent (Ferrell et al., 2006). Applications made prior to this level of infestation will not result in enough additional bahiagrass forage production and the ability to increase stocking rate to justify the cost of hexozinone application (Barton, Sellers, Ferrell, & McDonald, 2011). Glyphosate-based herbicides will control smutgrass. Unfortunately, injury may occur to the desirable grass spices. Spot spraying glyphosate is also difficult when more than 10 percent of the pasture is infested. Because of the high cost and specific mode of action of hexozinone, there is the need to find alternative ways to optimize smutgrass control with other herbicides. The objective of the study was to assess the impact of different herbicides on smutgrass control and suppression using a weed wiper.

MATERIAL AND METHODS

The demonstration site was a bahiagrass pasture with 50 percent smutgrass infestation in Centreville, MS. The site was grazed before the treatments were applied to expose smutgrass before herbicide application. Plots were 14 foot x 25 foot. Herbicide treatments were applied on June 17, 2009 in 10 gal of water/acre at 30 PSI using a weed wiper (GrassWorks Manufacturing, LLC, Strafford, MO). Figure 1 offers a description of the functionality and uses of the GrassWorks weed wiper. Treatments consisted of Velpar® L (VL, hexazinone) applied at 4 pt/ac with one pass and glyphosate applied at two rates. Glyphosate was applied at a 33 (G33) and a 50 percent v/v solution (G50) using a unidirectional (1X) or bidirectional (2X) application. Soil moisture was limited at the time of herbicide application due to 6 weeks of drought in the area. Visual ratings of smutgrass control were made through the rest of the growing season. Ratings were made by determining the number of live smutgrass plants in the plot. Ten random plants that had moderate to severe herbicide damage

were marked in each plot in September of 2009 before the end of the growing season and evaluated in May of 2010 for regrowth and estimated percent control.

Figure 1. The GrassWorks Weed Wiper (GrassWorks Manufacturing, LLC, Strafford, MO) is an herbicide applicator that can be pulled with an all-terrain vehicle (ATV) or mounted in a tractor. It can be adjusted to different heights to target undesirable weed species without harming desired forage crops. The weed wiper includes a steel rotating drum that is covered with a specialized synthetic carpet-like material and wetted by a 12-volt pump. In the pull-type model used in this study, the rotating drum is powered by a ground-drive system. Any possible chemical drip is minimized because the rotating drum turns at a constant speed in the opposite direction to which the weed wiper is traveling. A shielded boom sprayer is positioned over the rotating drum and it keeps the rotating drum saturated with chemicals and eliminates any potential drift issues. When the operator sets the ATV at the correct speed and drives across the field, the drum passes over the weeds and the touch of the plant releases the herbicide from the absorbent cover. The rotating drum will not physically damage the weeds, but larger plants exert more pressure against the drum and therefore receiving a proportionately larger chemical dose. The advantage of the weed wiper is that it allows the use of selective herbicides for a better weed and bush control in pastures.

RESULTS

Smutgrass control ranged from 10 to 90 percent throughout the season. Velpar and the 50 percent glyphosate application were the most effective (Figure 2). The bidirectional rate application of glyphosate at 33 percent solution had a moderate activity. Velpar® application turned the smutgrass brown, resulting in 90 percent injury 15 days after application. A visual appraisal of weed control in May of 2010 indicated a 95, 20, 65, 80, and 90 percent with Velpar®, G33-1X,

G33-2X, G50-1X, and G50-2X, respectively. Glyphosate at 50 percent solution and Velpar® offered the best smutgrass control. At the glyphosate 50 percent (G50) application rate, bermudagrass was observed colonizing some of the bare spots previously colonized by smutgrass.

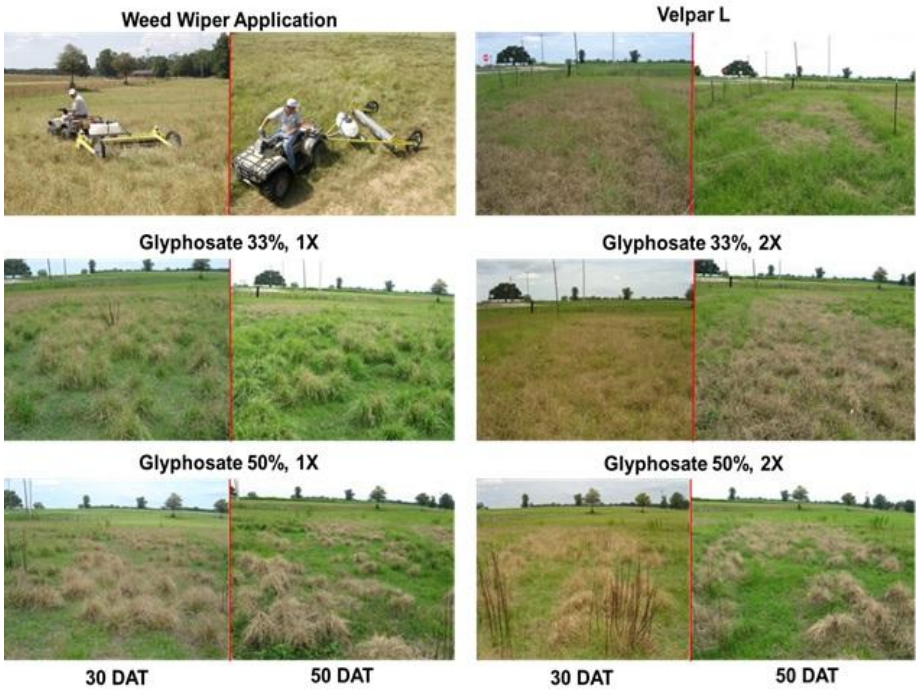

Figure 2. Effect of Velpar®L (hexozinone) and glyphosate application on smutgrass control at 30 and 50 Days After Treatment (DAT) in Centreville, MS. Treatments were applied in June 17, 2009.

There was no damage to the bahiagrass by the herbicide applications since smutgrass was taller than bahiagrass at the time of using the weed wiper. Direct application of Velpar® into a bahiagrass stand caused stunting of the grass and a dark green color for approximately 10 days before recovery was observed (Figure 3). Soil moisture and time of application could have affected the effectiveness of the treatments late in the summer. Several glyphosate applications may be necessary to optimum long-term smutgrass control. Glyphosate applications might be necessary in both directions in the field to obtain optimum results. Future studies will be conducted in replicated trials to determine the efficacy of application time, rates, and economic feasibility of these treatments. The use of this technique provides forage and livestock producers with another management tool for weed control, especially where legumes might have to be taken into consideration.

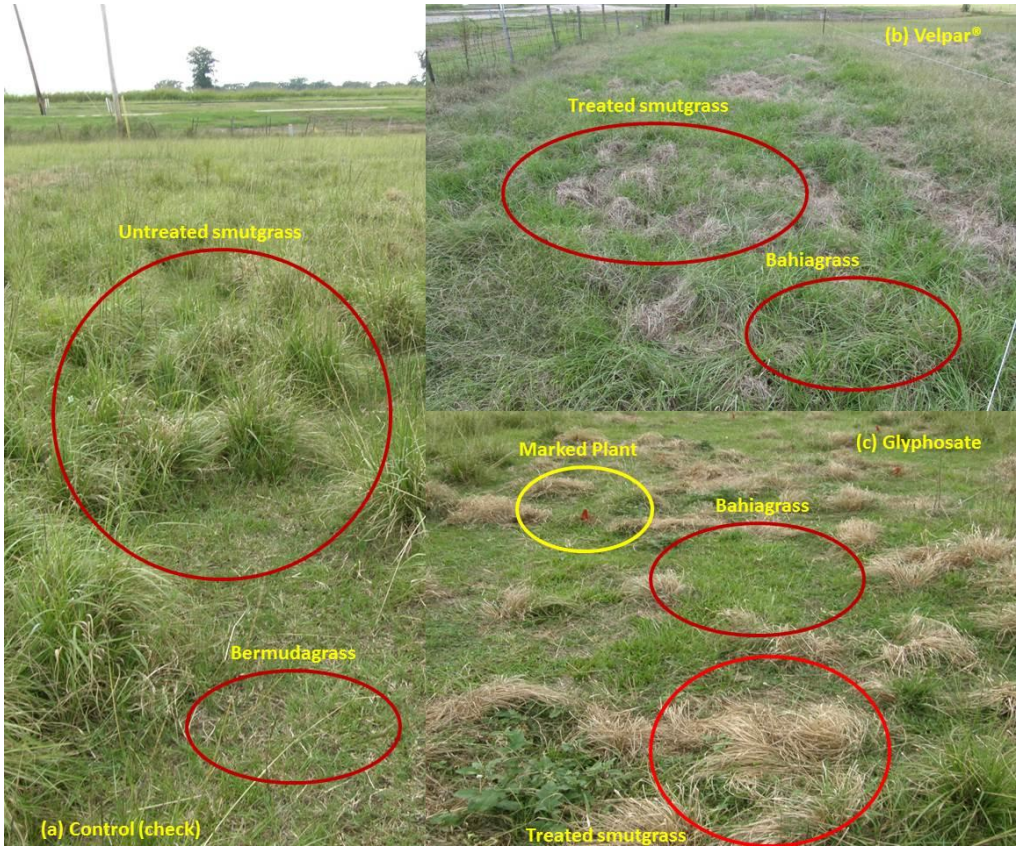

Figure 3. Smutgrass population in: (a) control (check plot), (b) Velpar® and (c) glyphosate treated areas. Circles in (a) indicates smutgrass suppressing bahiagrass and bermdugrass growth and circles in (b) and (c) indicates herbicide effect in smutgrass and bahiagrass rececovery.

LITERATURE REVIEW

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DISCLAIMER

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6584 W. Duroc Road | Maroa, IL 61756 | T (217) 794-3700 | F (217) 794-5901