# EXPERIENCES WITH SHARPEN IN OKLAHOMA

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## Abstract

Two Experiments were conducted in 2010 to evaluate horseweed control in no-till Oklahoma cotton. The first experiment focused on combinations of 2, 4-D or Clarity alone or in combination with one of three PPO inhibitor herbicides. These herbicides were ET, Sharpen and Aim. Below standard rates of both 2, 4-D and Clarity were used when tank mixing with the PPO inhibitor herbicides in order to highlight any advantages that one may have over the other. Although some of these treatments containing below standard rates of 2, 4-D or Clarity performed better than expected, prior experience has shown that the higher rates (22 oz/A 2, 4-D (6lb) or 8 oz/A Clarity) are necessary for consistent and dependable control of horseweed in the rosette stage of growth. At the 30 day evaluation treatments 1-4 (the full rate of Clarity alone or 1/2 rates of Clarity combined with either ET, Sharpen or Aim) controlled horseweed 87-94%, while treatment 5 (2,4-D alone at 1.0 lb ai/A) provided 82% control. Treatments 6-8 (1/2 rate of 2, 4-D combined with ET, Sharpen or Aim) only provided 61-73% control 30 days after treatment. The second experiment (Jackson County East) focused on utilizing full rates of 2, 4-D (22 oz/A of LV6) or Clarity (8 oz/A) in combination with either Glyfos X-tra (at 32 oz/A) or Sharpen (at 1 oz/A). Seven days after treatment, only applications including Sharpen (treatments 3, 6 and 7) controlled horseweed >90%. All other treatments observed at this time controlled horseweed $\leq$ 75%. By 30 days after application all treatments except treatment 8 controlled horseweed 96-100%. Treatment 8 (32 oz/A of Glyfos X-tra applied alone) only controlled horseweed 50%.

## Introduction

Widespread adoption of no-till cotton production (typically including glyphosate based weed control programs) has magnified the difficulty producers experience when trying to control horseweed with chemical applications. The lack of pre-season tillage and ineffectiveness of glyphosate has led producers to primarily depend on hormone-type herbicides (2, 4-D or Dicamba) for effective pre-plant control of horseweed. Currently there are very few effective chemical options for controlling horseweed pre-plant in cotton. In addition even the most effective hormone-based programs begin to lose effectiveness as weed size at application increases. This suggests that there may be a benefit from the addition of tank-mix partners that have the potential to improve horseweed control. Sharpen (saflufenacil) is a new PPO (protoporphyrinogen) inhibitor introduced by BASF which has the potential to provide effective burn-down (post-emergence) activity on horseweed. Unlike other PPO inhibitors that provide burn-down activity (such as ET or Aim) Sharpen has the potential to also provide residual activity on some weed species. In addition, Sharpen belongs to a class of chemistry (pyrimidinediones) which currently has no documented cases of chemical resistance. Two replicated experiments were conducted in the spring of 2010 in order to explore the effectiveness of this product on horseweed when tank-mixed with either ET, Aim, Glyfos X-tra, 2, 4-D or Clarity. The objectives of this project was to (1) compare the effectiveness of Sharpen tank-mixes to tank-mixes with other PPO inhibitors (ET or Aim) for pre-plant control of horseweed in limited tillage cotton and (2) compare standard horseweed control programs (hormone based) to programs including Sharpen (saflufenacil) herbicide applied prior to cotton planting.

## Materials and Methods

Field studies were conducted in 2010 in Jackson County in order to evaluate the effectiveness of Sharpen (saflufenacil) herbicide for the control of horseweed in limited tillage cotton. Treatments were arranged in a randomized complete block design with four replications on clay loam soils. Broadcast over-the-top herbicide applications were made with a compressed air, high-clearance, sprayer applying 12 gallons of water per acre at 4 mph. Eight treatments were applied on April 3rd, 2010 at the Western Jackson County location. The horseweed was slightly beyond the rosette stage (2-4 inches) at the time of application. The objective of this trial was to compare the effectiveness of Sharpen/growth regulator tank-mixes to tank-mixes with other PPO inhibitors (ET or Aim) commonly used for pre-plant burn down applications in Oklahoma cotton. In addition, eight additional treatments were applied on April 8$^{th}$, 2010 at an Eastern Jackson county location. The horseweed had begun to bolt

and was 1-2 inches at application timing. The objective at this location was to determine the effectiveness of Sharpen tank-mixed with either Dicamba, 2, 4-D or glyphosate on horseweed prior to cotton planting. The treatments for each location are listed in figure 1. Horseweed control evaluations were taken at 7, 14 & 30 days after treatment at each location.

| Treatments | Rates |
|---|---|
| **Jackson County (West Location)** | |
| 1. Clarity + NIS | 8oz/A + 0.25% v/v |
| 2. Clarity +ET + Crop Oil | 4 oz/A+ 2 oz/A + 1% v/v |
| 3. Clarity + Sharpen + MSO | 4 oz/A + 1 oz/A + 1% v/v |
| 4. Clarity + Aim + Crop Oil | 4 oz/A + 1 oz/A + 1% v/v |
| 5. 2,4-D (LV6) + NIS | 21 oz/A + 0.25% v/v |
| 6. 2,4-D (LV6) + ET + Crop Oil | 11 oz/A + 2 oz/A + 1% v/v |
| 7. 2,4-D (LV6) + Sharpen + MSO | 11 oz/A + 1 oz/A + 1% v/v |
| 8. 2,4-D (LV6) + Aim + Crop Oil | 11 oz/A + 1 oz/A + 1% v/v |
| **Jackson County (East Location)** | |
| 1. Clarity + NIS | 8 oz/A + 0.25% v/v |
| 2. Clarity + Glyfos X-tra + NIS | 8 oz/A + 32 oz/A + 0.25% v/v |
| 3. Clarity + Sharpen + MSO | 8 oz/A + 1 oz/A + 1% v/v |
| 4. 2,4-D (LV6) + NIS | 21 oz/A + 0.25% v/v |
| 5. 2,4-D (LV6) + Glyfos X-tra + NIS | 21 oz/A + 32 oz/A + 0.25 % v/v |
| 6. 2,4-D (LV6) + Sharpen + MSO | 21 oz/A + 1 oz/A + 1% v/v |
| 7. Glyfos X-tra + Sharpen + MSO | 32 oz/A + 1 oz/A 1% v/v |
| 8. Glyfos X-tra + NIS | 32 ozA + 0.25% v/v |

Figure 1. Product and rates evaluated at each location

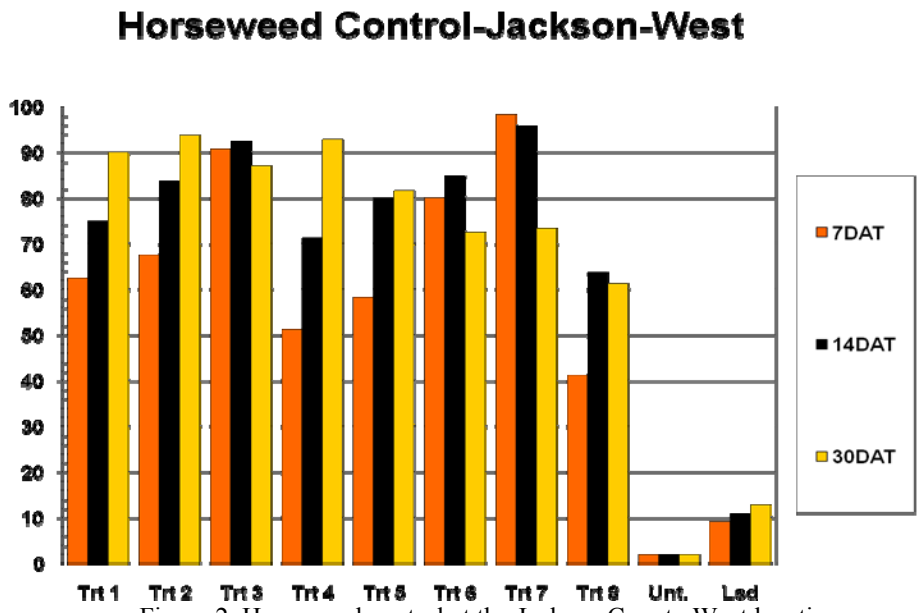

Figure 2. Horseweed control at the Jackson County West location.

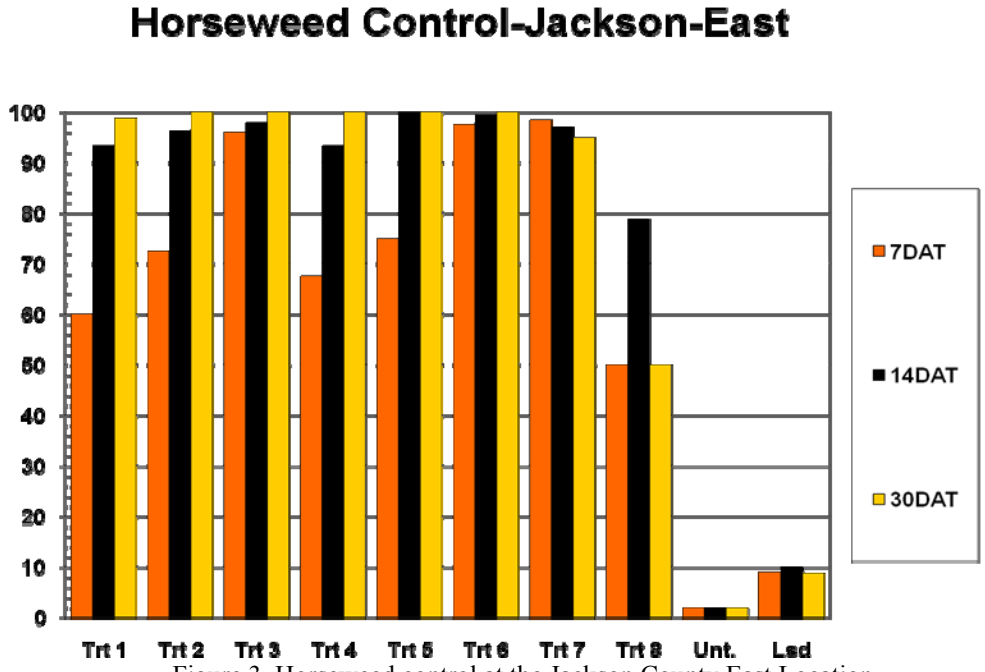

Figure 3. Horseweed control at the Jackson County East Location.

## Results and Discussion

Observations were made at each location at 7, 14 and 30 days after each treatment. The results of these observations are presented separately by location in the graphs above (figures 2 and 3). At the Jackson County West location 7 days after treatment (DAT) only treatments including Sharpen (Saflufenacil) provided acceptable control (>90%). However by the 30 day evaluation treatments 1-4 (the full rate of Clarity alone or 1/2 rates of Clarity combined with either ET, Sharpen or Aim) controlled horseweed 87-94%, while treatment 5 (2,4-D alone at 1.0 lb ai/A) provided 82% control. Treatments 6-8 (1/2 rate of 2, 4-D combined with ET, Sharpen or Aim) only provided 61-73% control 30 days after treatment.

At the Jackson County East location 7 DAT, only treatments including Sharpen (treatments 3, 6 and 7) controlled

horseweed >90%. All other treatments observed 7 DAT controlled horseweed ≤ 75%. By 30 days after application treatments 1-7 controlled horseweed 96-100%. Treatment 8 (32 oz/A of Glyfos X-tra applied alone) only controlled horseweed 50%.

## Summary

Based on these findings, Dicamba (Clarity) appears to provide a better foundation for controlling horseweed when tank-mixing with PPO inhibitors as compared to 2, 4-D (LV6). In addition, the standard recommendations of 0.25 lb ai/A of Dicamba (8 oz/A) or 1.0 lb ai/A of 2, 4-D effectively controlled horseweed 30 DAT when applied alone or tank-mixed with either Sharpen or Glyfos-Xtra. Further studies will be conducted in 2011 to continue evaluations of Sharpen for the pre-plant control of horseweed in limited tillage Oklahoma cotton.