

# Kochia Control in Grain Sorghum with Fluroxypyr-based Treatments

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## Introduction

- Most herbicides currently registered for postemergence use in grain sorghum have narrow margins of crop safety, lack flexibility in application timing, or do not provide adequate control of some important weeds, such as kochia.
- Fluroxypyr controls kochia in small grain cereal crops and has promising potential for use in grain sorghum.

## Objectives

- Evaluate kochia control and grain sorghum tolerance to fluroxypyr applied in tank mixtures and at different times of application.
- Quantify the effects of adjuvants on fluroxypyr efficacy in grain sorghum.

## Materials and Methods

- Two field experiments were conducted at the Kansas State University Agricultural Research Center, Hays, KS, in 2001.
- A preemergence treatment of S-metolachlor was applied at 660 g ai ha<sup>-1</sup> to control grass weeds.
- DeKalb 44 grain sorghum seeded May 16, 2001 at 129,000 seed ha<sup>-1</sup>.
- A Randomized Complete Block design was used with 4 replications.
- Visual control and injury ratings were taken at 7, 14, and 28 DAT.
- Data were analyzed by analysis of variance.

### Experiment 1: Fluroxypyr efficacy as affected by tank mixtures and application timings

Table 1: Herbicide Treatments

Treatments	Rate
Atrazine + COC <sup>1</sup>	560 g ai ha <sup>-1</sup> + 1% v/v
Fluroxypyr + NIS <sup>2</sup>	210 g ae ha <sup>-1</sup> + 0.5% v/v
Fluroxypyr + Atrazine + COC	210 g ha <sup>-1</sup> + 560 g ha <sup>-1</sup> + 1% v/v
Fluroxypyr + Metsulfuron + NIS	210 g ha <sup>-1</sup> + 2.1 g ai ha <sup>-1</sup> + 0.5% v/v
Dicamba + Atrazine	310 g ae ha <sup>-1</sup> + 590 g ha <sup>-1</sup>

<sup>1</sup>Premium Crop Oil Concentrate, United Suppliers Inc., Eldora, IA

<sup>2</sup>LI 700, Loveland Industries, Greeley, CO

- Treatments applied in water at 93 l ha<sup>-1</sup> on: June 16, 2001: Sorghum, V3-V4, 10 to 15 cm; kochia, 3 to 12 cm June 22, 2001: Sorghum, V5-V7, 20 to 25 cm; kochia, 3 to 20 cm

### Experiment 2: Fluroxypyr efficacy as affected by adjuvants

- Fluroxypyr was applied at 105 g ha<sup>-1</sup> without an adjuvant and with the following adjuvants:

- ↗ Crop Oil Concentrate (1% v/v)
  1. Premium Crop Oil Concentrate
  2. Herbimax
- ↗ Methylated Seed Oil (1% v/v)
  1. MSO Concentrate Oil (MSO)
- ↗ Non-Ionic Surfactant (0.5% v/v)
  1. LI 700
  2. Liberate
  3. Dispatch 111
  4. Activator 90

- Treatments were applied to 13 to 18 cm tall sorghum. Kochia was 3 to 13 cm tall.

## Results and Discussion

### Kochia control at 102 and 96 days after treatment (DAT)

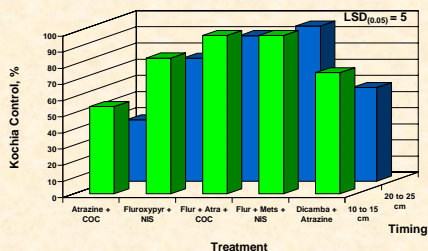
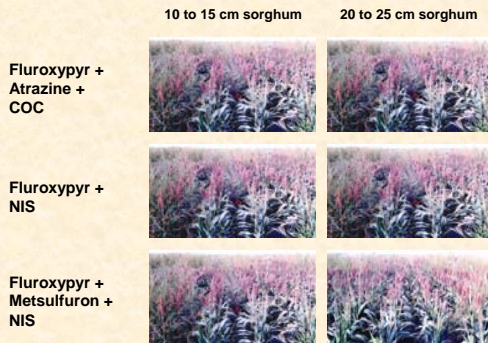


Figure 1: Comparison of kochia control at 28 DAT.

- Most treatments controlled kochia better when applied at the earlier of the two timings; control with fluroxypyr + metsulfuron + NIS did not differ between timings.
- Within application timing, the fluroxypyr + atrazine or metsulfuron treatments controlled kochia more than fluroxypyr + NIS, which in turn was more effective than atrazine + COC or atrazine + dicamba.

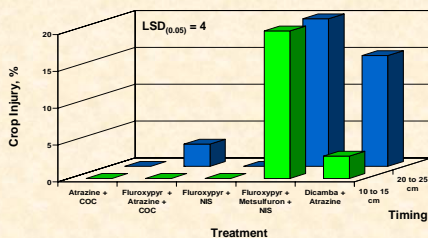


Figure 2: Comparison of grain sorghum injury at 28 DAT.

- Crop injury occurred when fluroxypyr was tank mixed with metsulfuron at both timings, and the later timing of dicamba + atrazine.

## Results and Discussion

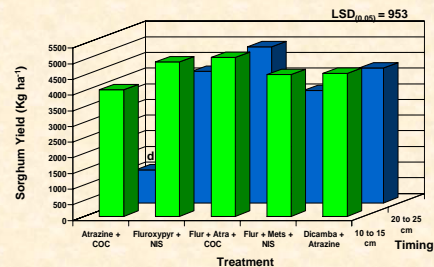


Figure 3: Grain sorghum yield as affected by herbicide treatment.

- Fluroxypyr + atrazine + COC at both timings provided the highest yield followed by fluroxypyr alone applied at the first timing.

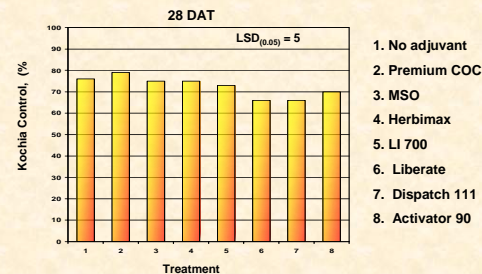


Figure 6: Effect of adjuvants on kochia control with fluroxypyr.

- None of the adjuvants tested improved kochia control significantly compared to fluroxypyr alone.
- Liberate, Dispatch 111, and Activator 90 reduced kochia control compared to fluroxypyr alone.

## Conclusion