

**PREEMERGENCE AND POSTEMERGENCE  
WEED CONTROL IN WEST TEXAS WITH  
“STAPLE” HERBICIDE**

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**Abstract**

“Staple” Herbicide (*Pyriithiobac Sodium*) recently received Federal registration for postemergence weed control in cotton. Since 1990, more than 100 replicated small plot trials have been conducted in West Texas and New Mexico to evaluate preemergence and postemergence efficacy on key weeds in cotton, crop tolerance, and grass herbicide interactions. This paper summarizes these test results.

Postemergence applications of Staple at 1.0 oz ai/ac have given good to excellent (>80%) control of Palmer amaranth, redroot pigweed, prairie sunflower, red morningglory, entireleaf morningglory, devil’s claw, lanceleaf sage and common cocklebur. Control of venice mallow has been poor at 27%. Crop injury from postemergence applications of Staple 1.0 oz ai/ac has averaged 5.0% at 7 to 14 days and decreased to 1.1% at 21 to 28 days after treatment.

Strong antagonism in johnsongrass control has been seen when Staple is tank mixed with most over-the-top grass herbicides. Control of seedling and rhizome johnsongrass was decreased when Staple was mixed with Select, Fusilade and Poast Plus. The addition of Staple to “Assure” II had no effect on grass control.

Preemergence trials have concentrated on Staple at 0.5 to 1.0 oz ai/ac alone and in combination with “Karmex” Herbicide. Staple at 0.5 to 1.0 oz ai/ac provided good to excellent (>80%) control of palmer amaranth, lanceleaf sage and venice mallow, while control of red morningglory and entireleaf morningglory required Staple at 1.0 oz ai/ac. The addition of Karmex 8.0 and 12.8 oz ai/ac to Staple increased control over Staple alone on red morningglory, prairie sunflower and devil’s claw. Crop injury in sandy loam to clay soils following treatment from Staple 1.0 oz ai/ac averaged 1.1% at 14 days and 2.4% at 28 days after treatment. Crop injury in sand to loamy sand soils averaged 14.4% at 14 days after treatment and increased to 26.8% at 28 days after treatment.

**Introduction**

On behalf of DuPont Agricultural Products I’d like to spend the next few minutes reviewing the preemergence and

postemergence data from “Staple” trials conducted the last six years in West Texas. Since 1990, more than 100 replicated small plot trials have been conducted by DuPont and university researchers in West Texas and New Mexico to evaluate preemergence and postemergence efficacy on key weeds in cotton, crop tolerance and herbicide interactions. These data represent a cross section of soil types and environmental conditions found throughout West Texas and New Mexico. This paper is a summary of these data.

**Results and Discussion**

Based on 1990-1995 results, Staple has demonstrated excellent safety when applied postemergence and good crop tolerance when applied preemergence. As can be seen in Table 1, visual cotton injury from postemergence applications was minor at all rates. A non-ionic surfactant at 0.25% v/v or crop oil concentrate at 1.0% v/v was used with all post applications, and cotton size at time of application ranged from cotyledon to 8 leaf stage. These ratings are based on observations at 7, 14 and 28 days after treatment (DAT). Visual injury from Staple 1.0 oz ai/a averaged 5.3% at 7 days after treatment and decreased to 0.7% at 28 days after treatment.

Visual injury, when observed, occurs at approximately 5 to 7 days after application. Injury expresses itself as a slight leaf yellowing and is transient in nature.

Cotton soils in West Texas generally range in texture from almost pure sand to clay. Therefore, data on preemergence crop tolerance is divided into the following two groups: 1) sandy loam to clay soils, and 2) loamy sand to sand. As noted in Table 2, early season cotton injury from preemergence applications in soils with sandy loam to clay texture averaged 1.1% at 14 days and 2.8% at 28 days after treatment. Preemergence applications in these soils have demonstrated good crop tolerance. Visual injury symptoms, when observed, consist of slight stunting and chlorosis. These results are based on observation dates of 14 to 28 days after treatment.

As indicated in Table 3, visual injury from preemergence applications to sandy soils was considerably greater and appeared rate related. Visual injury from Staple 1.0 oz ai/a in sand to loamy sandy soils averaged 14.4% at 14 days after treatment and increased to 26.8% at 28 days after treatment.

Postemergence applications of Staple at 1.0 oz ai/a have given good to excellent (>80%) control of palmer amaranth, redroot pigweed, prairie sunflower, red morningglory, entireleaf morningglory, devil’s claw, lanceleaf sage and common cocklebur. However, control of venice mallow has been poor at 27%. These post applications were made at the weed stages indicated, and evaluations were made at 28 days after treatment. Spray

volumes ranged from 10 to 31 gallons per acre. Either non-ionic surfactant at 0.25% v/v or crop oil concentrate at 1.0% v/v was included with all post applications.

As shown in Table 4, strong antagonism in johnsongrass control has been seen when Staple is tank-mixed with most over-the-top grass herbicides. Applications in two trials near Fieldton, TX were made to 10-12" rhizome johnsongrass. Spray volume was 10 gallons per acre, and 1.0% crop oil concentrate was added to all treatments. Control of rhizome johnsongrass was decreased when Staple was mixed with Select, Fusilade and Poast Plus. The addition of Staple to Assure II had no effect on grass control. As a result of the antagonism seen here and in other trials throughout the other cotton growing states, Staple is labeled for tank mixture with only Assure II post grass herbicide. To avoid poor control of rhizome johnsongrass, we recommend other post grass herbicides be applied at least 3 days prior to the application of Staple.

Preemergence trials have concentrated on Staple at 0.5 to 1.0 oz ai/a alone and in combination with Karmex Herbicide. Based on evaluations at 4-5 weeks after treatment, Staple at 0.5 to 1.0 oz ai/a provided good to excellent control of palmer amaranth, lanceleaf sage and venice mallow, while control of red morningglory and entireleaf morningglory required 1.0 oz ai/a.

The addition of Karmex 8.0 and 12.8 oz ai/a to Staple increased control over Staple alone on red morningglory, prairie sunflower and devil's claw.

In summary, the following key points can be made regarding Staple:

- Crop tolerance from postemergence applications has been excellent. Preemergence crop tolerance has been good in sandy loam to clay soils, but poor in sand to loamy sand soils.
- Postemergence applications have resulted in good to excellent control of any key weeds, including red morningglory, entireleaf morningglory, devil's claw, palmer amaranth, redroot pigweed, cocklebur, lanceleaf sage, and prairie sunflower.
- Strong antagonism in johnsongrass control has been seen when most over-the-top herbicides were mixed with Staple. Least antagonism was seen with Assure mixtures. To avoid poor control of rhizome johnsongrass with herbicides other than Assure, we recommend Application at least 3 days prior to the application of Staple.
- Preemergence applications of Staple 1.0 oz/a have given good to excellent control of lanceleaf sage, venice mallow, red morningglory, redroot pigweed and palmer amaranth.

- The addition of Karmex 8.0 and 12.8 oz ai/a to Staple increased control over Staple alone on red morningglory, prairie sunflower, and devil's claw.

We believe Staple will provide cotton growers in West Texas with an important new tool for postemergence control of a broad range of annual weeds. Continued research is also planned for the preemergence use of DPX-PE350 in cotton.

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**Table 1. Cotton tolerance to postemergence applications of Staple in West Texas, 1990-1995.**

TREATMENTS	% VISUAL INJURY		
	7 DAT	14 DAT	28 DAT
STAPLE 1.0	5.3 (46)	2.8 (87)	0.7 (116)
STAPLE 2.0	9.9 (44)	4.8 (55)	1.3 (76)
MSMA 16.0	8.2 (6)	3.5 (11)	0 (8)

( ) Denotes no. of tests cotton size cotyledon-8 leaf 0.25% NIS or 1.0% COC

**Table 2. Visual injury to cotton from preemergence applications of Staple in sandy loam - clay soils in West Texas, 1990-1995.**

TREATMENTS	% VISUAL INJURY	
	14 DAT	28 DAT
STAPLE 0.5	0.7 (11)	0.8 (25)
STAPLE 0.75	0.4 (9)	1.6 (27)
STAPLE 1.0	1.1 (18)	2.4 (42)
STAPLE 1.5	0 (5)	0.8 (8)
STAPLE 2.0	1.0 (12)	4.5 (32)
CAPAROL 19.2	2.3 (9)	0.9 (25)

( ) Denotes no. of tests

**Table 3. Visual injury to cotton from preemergence applications of Staple in sand - loamy sand soils in West Texas, 1990-1995.**

TREATMENTS	% VISUAL INJURY	
	14 DAT	28 DAT
STAPLE 0.5	6.5 (2)	21.0 (4)
STAPLE 0.75	10.9 (2)	24.2 (4)
STAPLE 1.0	14.4 (2)	26.8 (4)
STAPLE 2.0	17.4 (2)	39.3 (4)

( ) Denotes no. of tests

**Table 4. Rhizome johnsongrass antagonism to mixtures of Staple + over-the-top grass herbicides, Fieldton, TX, 1994.**

TREATMENTS	% CONTROL	
	14 DAT	42 DAT
STAPLE 1.0	21 (2)	60 (2)
ASSURE 1.0	95 (2)	94 (2)
FUSILADE 3.0	86 (2)	81 (2)
SELECT 2.0	93 (2)	92 (2)
POAST PLUS 3.0	74 (2)	72 (2)
STAPLE 1.0 + ASSURE 1.0	93 (2)	94 (2)
STAPLE 1.0 + FUSILADE 3.0	72 (2)	32 (2)
STAPLE 1.0 + SELECT 2.0	74 (2)	42 (2)
STAPLE 1.0 + POAST PLUS 3.0	70 (2)	38 (2)

( ) Denotes no. of tests 10 GPA, 1.0% v/v COC