

**POSTEMERGENCE APPLICATION OF STAPLE  
FOR BROADLEAF WEED CONTROL  
IN THE SOUTHERN ROLLING PLAINS OF TEXAS**

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**Abstract**

Staple has been applied as an over-the-top postemerge herbicide to cotton (*Gossypium hirsutum*) in eleven replicated small plot tests since 1992 and six large acreage plots since 1994 in the Southern Rolling Plains of Texas. It has effectively controlled entireleaf morningglory (*Ipomoea hederacea*), tall morningglory (*Ipomoea purpurea*) red morningglory (*Ipomoea coccinea*), devilsclaw (*Proboscidea louisianica*) redroot pigweed (*Amaranthus retroflexus*), and palmer amaranth (*Amaranthus palmeri*) when applied to young unstressed plants that are growing under favorable environmental conditions.

Broadleaf weed control was lower in plots where Staple was applied to plants developing under unfavorable growing conditions. This reduction in weed control usually results in additional expense to producers because alternate control practices have to be used. In most of the tests, Staple had to be applied at a minimum rate of 1.5 ounces active ingredient (a.i.) to control weeds for a period of time long enough to keep the late developing weed populations from interfering with cotton harvest.

These tests indicate that effective weed control depends on the age of the weeds, the amount of stress encountered during development, the amount of soil moisture available for plant development, and the environmental conditions at the time of application.

**Introduction**

Several species of annual weeds are increasing problems on acreage planted to cotton in the Southern Rolling Plains of Texas. The cotton herbicides commonly used to control broadleaf weeds have very limited effect on morningglory, devilsclaw, and lanceleaf sage. Finding a herbicide that will provide consistent control of these weeds is important, otherwise, producers will need to rotate production into other less profitable crops where effective alternate herbicides can be used.

The increase in weed population can be directly correlated with the higher expense of using physical labor for selective weed removal by hoeing. Much of the increased hoeing expense can be contributed to laws passed by our federal government. These include: increased minimum wages, increased worker's compensation costs, and new requirements dictated by the worker protection standard. As labor costs increase, producers are becoming more dependant on herbicides for complete weed control.

**Materials and Methods**

Date Applied:	mid-July to mid-August
Relative Humidity:	50 to 60 percent--11 tests less than 50 percent--6 tests
Wind Speed:	1 to 3 miles per hour--1 test 4 to 6 miles per hour--9 tests 7 to 9 miles per hour--7 tests
Wind Direction:	South / Southwest
Air Temperature:	70 to 80 <sup>o</sup> Fahrenheit--2 tests 81 to 90 <sup>o</sup> Fahrenheit--11 tests 91 to 100 <sup>o</sup> Fahrenheit--4 tests
Application Device:	1 test applied by airplane 16 tests applied with a self-propelled ground rig
Carrier:	10 to 15 gallons of water per acre--5 tests 16 to 20 gallons of water per acre--8 tests more than 21 gallons of water per acre--3 tests
Nozzle Height:	19 inches in 11 tests applied as a broadcast application 9 inches in 5 tests applied in a 10 to 15 inch band
Pressure:	22 pounds per square inch--1 test 30 to 35 pounds per square inch--13 tests

Adjuvant:	more than 35 pounds per square inch--2 tests 11 tests without 6 tests with
Test Design:	Randomized Complete Block Design replicated 3 times--11 tests large acre tests with 5 or more acres--6 Strip Tests
Plot Size:	20 feet by 25 feet--1 test 13.33 feet by 20.0 feet--3 tests 13.33 feet by 60 feet--7 tests more than 5 acres--6 tests
Plot Location:	Runnels County--7 tests Tom Green County--5 tests Nolan County--2 tests McCulloch County--2 tests Glasscock County--1 test

## **Results and Discussion**

### **When Staple Is Applied Under Favorable Growing Conditions**

Staple, a E. I. du Pont de Nemours & Co., Inc. herbicide, did a good job in controlling entireleaf, tall and red morningglory, devilsclaw, redroot pigweed, and palmer amaranth. The herbicide is readily absorbed into the plant and in 10 to 14 days after application, the weed's terminal begins to turn pale green and growth is stunted. It is not uncommon for it to take an additional 10 to 14 days for the plant to die. This slow rate of death is usually a concern to producers who are using this material for the first time.

For the control of morningglory with Staple, the weeds had to be young (usually no older than the four-leaf stage) at the time the chemical was applied. To effectively control lanceleaf sage (*Salvia reflexa*), Staple had to be applied prior to the weeds emergence and for control of Devilsclaw it had to be applied before the weeds exceeded two inches in height. Also, Staple was effective in controlling redroot pigweed and palmer amaranth as long as plants did not exceed four inches in height.

Staple provided very little control of lanceleaf sage in two different tests where Staple was applied to unstressed emerged weeds that were actively growing and less than two inches in height. In two other tests where high populations of lanceleaf sage were known to exist, Staple was applied prior to the emergence of lanceleaf sage and control was above 90 percent.

In most of the tests conducted in the Southern Rolling Plains of Texas when Staple was applied at a 1.0 to 1.25 ounces active ingredient (a.i.) rate, the morningglory, lanceleaf sage, and devilsclaw were controlled for approximately three to four weeks. Five weeks after Staple was applied, significant new growth was obvious. When a higher rate of 1.5 to 2.0 ounces a.i. was used, an additional one to two weeks control was obtained.

In three tests where Staple was applied after the cotton plant had begun to bloom, the cotton leaves turned a lighter shade of green for 10 to 14 days. Other than this change of color, the cotton plant did not show any signs of physical injury from the application of Staple in any test at any rate applied.

Due to the projected price of Staple, producers will probably band this material to reduce the cost per acre. From the tests conducted, it would appear that producers would need to establish a band width large enough that the untreated area could be plowed with minimum disturbance to the cotton plant root system. Whatever tillage practice is used, soil movement should be minimized. When untreated soil is thrown onto the top of the row, it provides an untreated area for weeds to germinate. In two irrigated plots, the morningglory populations exceeded 25 per square foot. The weeds covered all areas of the seedbed and furrow. At first, this appeared to be a field that would not be harvested due to the heavy population of weeds. However, in about two weeks the morningglory's root system entered the zone where herbicides were originally applied in a band and during the next two weeks, the growing point of those weeds turned yellow and the plants eventually died. When the field was evaluated the next week, the morningglories were still growing in all areas except for a 14 inch wide band on top of the seedbed.

Shallow tillage is usually recommended when trying to control morningglory. Deep plowing results in seeds being distributed throughout a larger portion of the soil profile which extends the time period necessary for control. When the field is plowed, a new group of seeds are brought up into an area of the soil where they can germinate when soil moisture becomes available.

In acreage that broadleaf weeds are a problem, a good herbicide program needs to be established before the cotton is planted. In the Southern Rolling Plains of Texas producers would use a pre-plant incorporated herbicide such as Treflan or Prowl prior to planting. Then at planting time, a pre-emerge herbicide needs to be selected and used that will provide some control of the problem weed species. In our region, depending on the type of broadleaf weed to be controlled, producers would select a herbicide such as Caparol, Karmex, or Cotoran. This dual herbicide approach is beneficial and needed in controlling high weed populations. In most of the tests conducted, the base treatment of herbicides provided 3 to 5 weeks of control.

### **Weed Control When Staple Is Applied To Stressed Plants**

Staple effectiveness to control morningglory, lanceleaf sage, and devilsclaw is reduced when applied to moisture stressed plants, even at application rates up to 2.0 ounces a.i. per acre. However, this is the same result that would be expected from most herbicides applied to moisture stressed weeds. Under conditions that cause stress to the weeds to be controlled, producers would be better off to wait in making a herbicide application.

In some tests where plant stress occurred to morningglory and devilsclaw prior to the application of Staple, no weed control was observed. In other tests, the weeds were not killed but stunted for the remainder of the growing season. It was not unusual for the plants to become pale green and later chlorotic, but returned to their normal color by the end of five weeks after the Staple was applied. In most plots when morningglory had runners longer than 5 inches, the entire plant would turn pale green, but after three to four weeks regained its normal color and continued to grow.

Staple herbicide was applied in two tests at the time of cultivation. Nozzles at the back of the cultivator sprayed a ten inch band of herbicide on each side of the cotton plant. Most of the morningglory and devilsclaw were in a 1 to 3 leaf stage at the time of cultivation. The young weeds growing in the unplowed band were controlled with Staple when spray coverage was thorough; this took approximately three weeks. However, if large weeds were shielded by the cotton leaf canopy at the time Staple was applied, their growth continued and caused problems at the time of harvest.

Stage of growth and growing conditions are an important consideration for the successful use of this product. Staple, if used correctly, can provide producers with an excellent herbicide for cleaning up cotton fields infested with several different types of broadleaf weeds.

### **Acknowledgements**

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