



The Texas A&M University System

Result Demonstration/Applied Research Report

2005 Purple Nutsedge Weed Control

Scurry County

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Summary

Envoke™ herbicide treatments with and without other herbicides, Zorial Rapid 80™, and Roundup Weathermax™ were applied to purple nutsedge, *Cyperus rotundus*, on July 12, 2005. The application of Roundup Weathermax™ with ammonium sulphate provided the highest level of control for the longest period of time and was the most cost effective at \$12.24 per acre. The addition of either Sequence™ or Touchdown HiTech™ did not enhance the performance of Envoke™. The addition of both Sequence™ and Touchdown HiTech™ to Envoke™ did improve control, but the cost for this mixture would be cost prohibitive at \$34.41 per acre.

Problem

Purple nutsedge, *Cyperus rotundus*, is a common perennial weed in fields throughout the Southern Rolling Plains of Texas. Plants have triangular stems with prominent mid-ribbed leaves produced in groups of 3 at the base of the plant. The flower head of the purple nutsedge has a reddish tinge with dark brown or black seeds. Plants form several tubers, "nutlets", on rhizomes that are 8 to 14 inches below the soil surface. Mature tubers can resprout as many as 10 to 12 times and may survive for 1 to 3 years. New buds from the tubers form large patches that spread profusely. Cultivation and tillage practices worsens the weed infestation by moving tubers around in the soil that can resprout.

Control is difficult with systemic herbicides because very little of the herbicide will translocate from leaves to mature tubers. Thus, postemergent herbicides must be applied before the 5th-leaf stage while energy reserves are being translocated from leaves to newly forming tubers. Also, applications must be repeated and may only result in limited suppression of this weed. Herbicide activity is further hindered in the Southern Rolling Plains of Texas by semi-arid conditions that can limit soil moisture and cause plant stress conditions. Syngenta Chemical Company markets a herbicide, Envoke™, for sedge control in picker-type cotton varieties, but its' registered use is limited to portions of Texas east of I-35. The use of Envoke™ was evaluated to determine the feasibility of purple nutsedge control for producers in the Southern Rolling Plains of Texas.

Objective

This field test is designed to 1) determine the effectiveness of Envoke™ alone and in combination with other herbicides for purple nutsedge control 2) determine injury levels to cotton, and 3) determine the economic feasibility of using Envoke™ applications.

Materials and Methods

Cooperating County Producer: Mr. Jon Derouen
Location: 4 mile East of Dunn, TX

Application Information:

Date Applied:	July 12, 2005
Time:	9:00 a.m. to 10:00 a.m.
Wind Speed:	5 to 8 mph
Wind Direction:	North
Air Temperature:	78 degrees F
Relative Humidity:	70 percent
Pressure:	32 p.s.i.
Boom Height:	19 inches
Water Applied:	18 gallons per acre
Nozzle:	Air Induction 11002 on 20 inch centers
Ground Speed:	3 miles per hour
Application Device:	Self propelled rig
Plot Size:	13.33 feet wide by 60 feet long
Test Design:	Randomized complete block design with three replications
Weed Stage:	Purple Nutsedge - 2 to 4 inches
Crop Stage:	Cotton - 4 leaf stage and stressed for moisture

Plant Information

Purple nutsedge plants were 2 to 4 inches tall with 10 plants per square foot at the time of application. The field was planted on May 18. Cotton plants were at the 4 leaf growth stage at the time of application. Cotton and purple nutsedge plants were stressed for moisture. Prior to spraying the herbicide trial, the producer sprayed Roundup UltraMax™ (22 oz/ac) on June 7 to suppress purple nutsedge growth. Soil moisture conditions were extremely dry on July 12 and for 14 days following herbicide treatments.

Results and Discussion

Conditions were hot and dry prior to and after the application of the tested herbicides. These conditions coupled with the producers application of Roundup UltraMax™ on June 7 resulted in plant and leaf necrosis which were indicated by percentage of control (33) in the untreated plots 8 days after treatment (Table 1). None of the tested herbicides provided any significant mortality of purple nutsedge during these dry conditions.

A 3.5 inch rain the week before the 22 day evaluation improved conditions for purple nutsedge growth and herbicide activity. At the 22 day evaluation, Roundup Weathermax™ with ammonium sulphate and the mixture of Envoke™ + Touchdown HiTech™ + Sequence™ + NIS were beginning to kill purple nutsedge plants and were the only treatments to result in significant purple nutsedge control over the untreated and Zorial Rapid 80™. At this date each of the Envoke treatments did not differ in the level of purple nutsedge control.

Additional rains 10 days prior to the 35 day evaluation date continued to provide good growing conditions. Purple nutsedge response to the applied herbicides increased in all treatments which provided statistically significant control of the weed over the untreated. Injury symptoms, white leaf streaking, from the pigment inhibitor herbicide, Zorial Rapid 80, were evident at this sample date and the level of control had increased from the 22 day sample date. The treatment using Roundup Weathermax™ with ammonium sulphate and the mixture of Envoke™ + Touchdown HiTech™ + Sequence™ + NIS provided significantly better control (82% and 83%, respectively) than any of the other treatments.

By October 13 (93 days after application), Roundup Weathermax™ with ammonium sulphate and the mixture of Envoke™ + Touchdown HiTech™ + Sequence™ + NIS maintained a significant level of control over the other Envoke™ and Zorial™ treatments and the untreated. Purple nutsedge growth had recovered in the other herbicide treatments.

The heavy infestation of purple nutsedge in the test plots prevented normal growth and establishment of cotton. Therefore, herbicide crop injury assessment could not be made on the cotton.

The poor performance of Envoke™ + NIS, Envoke™ + NIS + Sequence™, Envoke™ + NIS + Touchdown HiTech™, Zorial Rapid 80™ would not justify the expense of these herbicides for purple nutsedge control. Although, the mixture of Envoke™ + Touchdown HiTech™ + Sequence™ + NIS provided acceptable levels of control, the \$34.41 per acre cost of the mixture would be prohibitive to use. The most cost effective herbicide application for purple nutsedge control was Roundup Weathermax™ with ammonium sulphate.

Acknowledgments

We want to take this opportunity to thank Mr. Jon Derouen for his help in plot establishment and management.

We would also like to thank Syngenta and Monsanto for providing herbicides for this test.

Table 1. Purple nutsedge control following applications of herbicide mixtures with and without Envoke™. Dunn, TX 2005.

Treatment	Rate	% Control				Cost/ac
		8 Day 7/20/05	22 Day 8/3/05	35 Day 8/17/05	93 Day 10/13/05	
Envoke + NIS	0.15 oz/ac + 0.25%	26.7 a	20.0 abc	56.7 b	13.3 b	\$10.50 + <u>\$ 0.91</u> \$11.41
Envoke + NIS + Sequence	0.15 oz/ac + 0.25% + 2.5 pt/ac	53.3 a	20.0 abc	51.7 b	6.7 b	\$10.50 + \$ 0.91 + <u>\$16.25</u> \$27.66
Envoke + NIS + Touchdown HiTech	0.15 oz/ac + 0.25% + 19.2 oz/ac	28.3 a	16.7 bc	56.7 b	23.3 b	\$10.50 + \$ 0.91 + <u>\$ 6.75</u> \$18.16
Envoke + NIS + Sequence + Touchdown HiTech	0.15 oz/ac + 0.25% + 2.5 pt/ac + 19.2 oz/ac	43.3 a	30.0 ab	83.3 a	66.7 a	\$10.50 + \$ 0.91 + \$16.25 + <u>\$ 6.75</u> \$34.41
Roundup Weathermax + Ammonium Sulphate	22 oz/ac + 0.17 lbs/gal	33.3 a	33.3 a	81.7 a	80.0 a	\$ 7.95 + <u>\$ 4.29</u> \$12.24
Zorial Rapid 80	0.6 lbs/ac	13.3 a	0.0 d	41.7 b	13.3 b	\$ 9.00
Untreated		33.3 a	6.7 cd	10.0 c	10.0 b	
Anova F values		0.3410	0.0011	0.0003	0.0009	

Means in each column followed by the same lowercase letter are not significantly different according to Duncan's multiple range test (P=0.05[Agriculture Research Manager Statistical Program]).

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