

# Controlling Purple Nutsedge on Fallowed Ground with EPTC and Butylate

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## ABSTRACT

*Field research was conducted at Yuma and Goodyear, AZ on fallowed ground to measure the response of purple nutsedge to butylate and EPTC (Goodyear only). At Yuma, the greatest reduction in the number of live tubers resulted when two years of fallow were combined with annual summer application of 3.3 lb/A of butylate. At Goodyear, butylate and EPTC were more effective at controlling purple nutsedge when applied in early July vs early September. Also, one timely application of EPTC or butylate made in July was more successful in reducing the number of live tubers than two applications (July, Sept). September herbicide treatments were not as effective with an irrigation compared to without.*

## INTRODUCTION

Growers with acreage infested with purple nutsedge (*Cyperus rotundus*) are concerned with the uncontrollable spread of this perennial weed. Currently the only control methods available to the Arizona cotton grower include frequent mechanical cultivations and postemergence applications of MSMA. Cultivation does not control weeds in the seed row, and it depletes soil moisture. Sequential applications of MSMA are usually necessary to control purple nutsedge and applications cannot be made until cotton is 8 in tall. This makes chemical control very expensive.

To effectively reduce populations of purple nutsedge, growers must reduce the number of viable tubers in the soil. Purple nutsedge produces an abundance of above ground plant material from emergence (March) until early July. Photosynthate is then directed to the production of underground tubers which contain numerous buds that remain viable for 2-3 years. To prevent reproduction and further infestation, this weed must be controlled before it develops tubers.

Purple nutsedge thrives on the hot, moist conditions prevalent in irrigated cotton fields; however, its vigor is reduced when moisture is limiting. With the cotton program of 1986, substantial acreage was fallowed. This provided an opportunity for growers to expose heavily infested fields to harsh desert conditions.

EPTC and butylate are active preemergence on purple nutsedge. Research was conducted by the University of Arizona, in cooperation with several growers, to study the combined effects of a thiocarbamate application and stress induced by fallow on the population of viable tubers in the soil. It was hypothesized that the combined effects of herbicide and fallow would reduce tuber populations greater than when either method was utilized alone.

## MATERIALS AND METHODS

### YUMA.

In 1985, four acres of a five-acre fallowed field (loamy sand) that was heavily infested (50 stems ft<sup>2</sup>) with purple nutsedge was treated with 3.3 lb/A of butylate on August 28. The herbicide was disked in 4 to 6 in. and a 6 in. irrigation following on September 3 and October 2. Visual and quantitative estimates of purple nutsedge populations were taken on November 7. Each observation consisted of counting the number of live and dead tubers in an area 3 ft by 3 ft to a depth of 12 in with 6 in increments and the number of live stems/ft<sup>2</sup>.

In 1986, the same five acre field was fallowed again and one acre was left untreated; two acres received an additional 3.3 lb/A of butylate (July 15); and 2 acres were not treated (August 1985 application). Plots were evaluated as described previously. The results are listed in Table 1.

### GOODYEAR.

Two more tests were conducted in 1986 at Goodyear, AZ on a fallowed sandy clay loam to measure the response of purple nutsedge to 3.3 and 6.7 lb/A of butylate or EPTC. The first test consisted of plots 200 ft long by 20 ft wide. Each plot had a 10 ft by 200 ft strip left untreated to account for variability in population due to field location.

The first application was made on July 8 for the entire length of the field; live tubers were counted in the top 6 in. on September 9. After evaluations were complete, the experimental area was divided in half.

The first 100 ft of each plot received an additional herbicide application of the appropriate rate which was immediately incorporated and irrigated (6 inch) following treatment. The last 100 ft of each plot received no additional herbicide or irrigation.

Another test similar to that described above was conducted on an adjacent area. Treatments were applied (Sept. 9) the length of the field, but only the first 100 ft was irrigated. The last 100 ft depended on precipitation. On December 4, both tests were evaluated and the results are listed in Tables 2A,B,C.

## RESULTS AND DISCUSSION

### YUMA.

Butylate applied on August 28 reduced the number of live tubers in the top 6 in of soil by 91% when samples were taken 71 days after treatment. In contrast, the number of live tubers in the 6-12 in depth was reduced by only 23%. Since tubers can readily emerge from depths greater than 24 in deep, emerging tubers would rapidly reinfest the treated area once it was put back into production in 1986. The second evaluation of the 1985 treatment showed a further reduction in the number of shallow tubers (97% reduction) and deep tubers (92% reduction).

The untreated check in 1986 had 43% fewer tubers in the top 6 in.; however, there was an actual rise in the number of deep tubers. This indicated that fallow alone may reduce tuber population in the top 6 in., but deeper tubers appear to be safe against the harsh conditions of fallow.

Similar results were obtained when butylate was applied in 1986. Shallow tubers were reduced by 95% by the herbicide fallow combination, compared to a 62% decline in the number of tubers in the bottom 6 in. sampled. It appears that the July application was slightly more effective at controlling the emergence of deep tubers.

### GOODYEAR.

July 8 vs September 9 Application. At Goodyear, 98% of the tubers were confined to the top 6 in. (sandy clay loam); therefore sampling was limited to this area. EPTC and butylate were both very effective at reducing the number of live tubers (93% average) when they were applied on July 8. However, when applications were delayed until September 9, average control diminished to 68% (see Table 2A). Rate did not appear to be important for either EPTC or butylate.

One Application vs Two Applications. Two applications of EPTC or butylate were inferior to a single application made on July 8. If two applications were made, butylate appeared more effective than EPTC. It may be that the two irrigations which accompanied the two applications were more conducive to purple nutsedge growth and restrictive to EPTC longevity. However, butylate appears to be equally effective in both instances (see Table 2B).

September 9 Application: Irrigated vs Non Irrigated. If butylate or EPTC was applied on September 9, both herbicides were more effective without an irrigation. EPTC and butylate treated plots without irrigation had 84% fewer live tubers than when untreated. When an irrigation followed these same treatments, there was an average 14% more live tubers (see Table 2C).

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**Table 1. Response of purple nutsedge to fallow applied  
3.3 lb/A of butylate (Yuma, AZ).**

Herbicide	Date applied	Purple Nutsedge Live tubers/bulbs	
		0-6 in	6-12 in
butylate	8/28/85	12 (2)*	26 (4)
butylate	7/15/86	4	21
butylate	8/28/85	0	3
	7/15/86		
untreated	1985	132	34
	1986	74	55

(\*) 2nd evaluation of 1985 application  
8/85 Application evaluated 71 DAT  
7/86 Application evaluated 109 DAT

Tables 2 - A, B, C. Comparing various fallow applications of EPTC and butylate (Goodyear, AZ).

**Table A. One application (7/6) vs one application (9/9).**

Herbicide	Rate (lb/A)	Application	
		July 8 Purple nutsedge tubers Live/dead	Sept 9 Live/Dead
butylate	3.3	4/75	20/50
eptc	3.3	5/55	10/60
butylate	6.7	6/125	4/10
eptc	6.7	10/175	30/15
untreated	-	60/15	55/10

**Table B. One application (7/8) vs two applications (7/8, 9/9).**

Herbicide	Rate (lb/A)	Application	
		July 8	July 8 Sept 9
		Purple nutsedge tubers	
		Live/dead	Live/Dead
butylate	3.3	4/75	4/10
epc	3.3	5/55	10/130
butylate	6.7	6/125	4/60
epc	6.7	10/175	45/10
untreated	-	60/15	40/55

**Table C. Comparing 9/9 application irrigated vs non-irrigated.**

Herbicide	Rate (lb/A)	Irrigation	
		0	1 Sept 9
		Purple nutsedge tubers	
		Live/dead	Live/Dead
butylate	3.3	4/100	20/50
epc	3.3	5/115	10/60
butylate	6.7	4/55	4/10
epc	6.7	12/77	30/15
untreated	untreated	39/20	55/10