

Morningglory and Nutsedge - Biology and Control in Sugarcane

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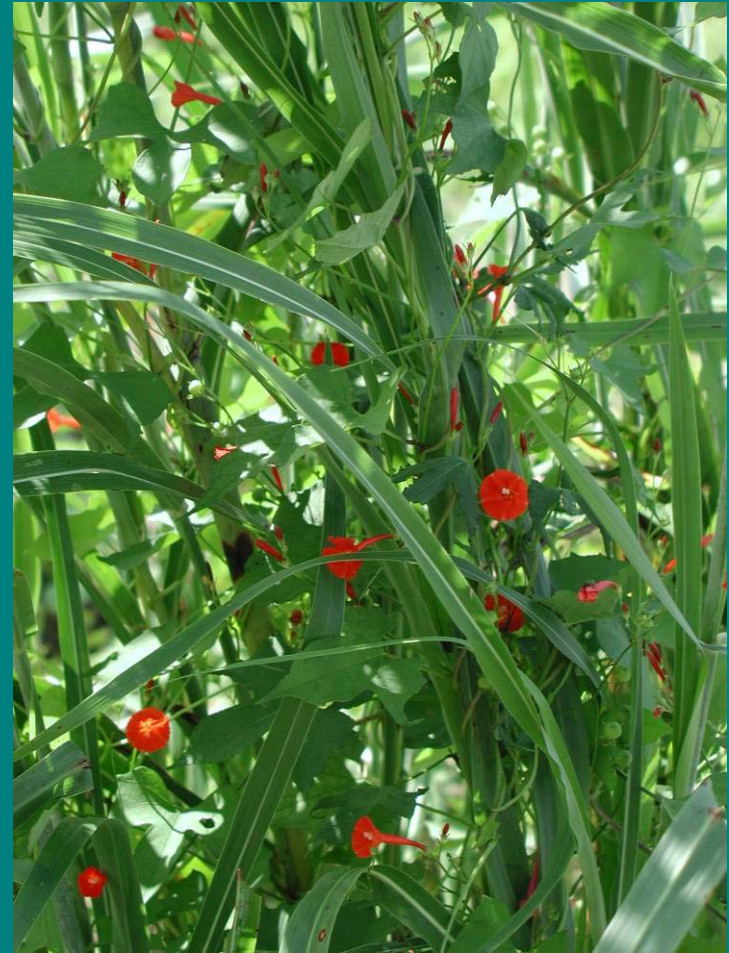


Ten Most Common/Troublesome Weeds in Louisiana Sugarcane

1. Johnsongrass
2. Bermudagrass
3. Itchgrass
4. Red Morningglory
5. Pitted Morningglory
6. Entireleaf Morningglory
7. Nutsedges (# 3 or 4?)
8. Browntop Panicum
9. Italian Ryegrass
10. Clovers



Red Morningglory Biology



Red Morningglory

Red Morningglory Seedling Emergence Study

- **General Location Information**

West Baton Rouge Parish

Commerce silt loam, Organic matter: 1.8 %, pH: 6.5

Natural red morningglory population

Soil population of seed determined in June and in October

- **Treatments**

Tillage vs. No-Tillage

2001 - 05/29, 06/21, 07/21, 08/11

2002 - 05/30, 06/19, 07/16, 08/14

2004 - 06/11, 07/15, 08/11, 09/27

Tillage at a 4 inch depth with PTO driven tiller

No-tillage plots treated at each tillage date with glufosinate to control all vegetation

Seedling per m² data collected 20 to 41 days after each tillage operation

Red Morningglory Seedling Emergence Study

Treatment ^b	Sampling date			
	July	August	September	Total
	no./m ²			
No tillage	68.9 a ^c	44.5 b	15.1 c	128.5*
Tillage	69.2 a	67.1 a	58.1 ab	194.4

Red Morningglory Shade Study Methods

- **General Location Information**
West Baton Rouge Parish
Commerce silt loam
Natural red morningglory population
- **Red Morningglory Shade Study**
Shade levels - 0, 30, 50, 70, and 90%
Shade structures - 2 ft x 2 ft x 2 ft



Weed emergence, plant height, and leaf area data collected 20 to 41 days after soil was tilled to a four-inch depth and shade enclosures were installed.

At the time of data collection red morningglory in the no shade (full sun) treatment had three- to six-leaves. Data were expressed as percent of the full sun treatment.

Red Morningglory Shade Study

Shade	Emergence	Height	Leaf Area
%	----- % of full sun -----		
0	100 a	100 a	100 c
30	95 b	149 a	183 ab
50	92 b	148 a	200 a
70	63 c	136 a	134 bc
90	57 c	141 a	130 bc

Red Morningglory Control



Red Morningglory Control Methods

- **General Location Information**

West Baton Rouge Parish

Commerce silt loam, Organic matter: 1.8 %, pH: 6.5

Natural red morningglory population

- **Red Morningglory Preemergence Study**

Application: June 10, 2004, May 25, 2005

Data collected: Red morningglory control 5, 7, 9, 11 WAT

After each rating date, glufosinate at 0.37 kg/ha was applied to the entire experimental area to control all vegetation.

Red Morningglory Residual Control

Herbicide	Rate	5 WAT	7 WAT	9 WAT	11 WAT
	Product/A	_____ % _____			
Spartan 75 DF	3 oz	87 de A	80 b A	69 b B	64 b B
Spartan 75 DF	4 oz	96 abc A	94 a A	83 a B	78 a B
Spartan 75 DF	5 oz	97 a A	94 a A	84 a B	78 a C
Spartan 75 DF	6 oz	97 a A	94 a A	84 a B	78 a B
Spartan 75 DF	7 oz	98 a A	93 a A	84 a B	80 a B
Spartan 75 DF	8 oz	98 a A	94 a A	88 a B	82 a C
Atrazine 4L	2 qt	88 cde A	69 d B	50 de C	30 efg D
Atrazine 4L	3 qt	92 abcd A	69 d B	53 cde BC	44 cd C
Atrazine 4L	4 qt	90 abcde A	70 d B	53 cde C	39 cde C
DuPont K-4	4 lb	96 abc A	79 bc B	61 bc C	46 c D
Sencor 75DF	2 lb	89 bcde A	55 e B	37 g C	26 g D
Sencor 75 DF	3 lb	94 abcd A	54 e B	41 fg C	27 fg D
Valor 51WDG	2 oz	63 g A	44 f AB	39 fg B	26 fg B
Valor 51WDG	4 oz	92 abcde A	55 e B	45 efg BC	36 def C
Valor 51WDG	6 oz	93 abcd A	68 d B	56 cd BC	43 cd C
Valor 51WDG	8 oz	96 ab A	71 cd B	61 bc B	46 c C

Findings Red Morningglory Biology/Control Research

- Red morningglory can emerge and grow well under the sugarcane canopy into late July.
- Red morningglory control failures are not due to the herbicide failing to control the weed, but rather due to herbicide not controlling the weed long enough. i.e. lack of long residual control.
- To maximize the effectiveness of soil applied herbicides, the layby application should be delayed until late June or early July to assure that sufficient herbicide is present in soil when germination of red morningglory seed can be expected.
- Of the herbicides evaluated, Spartan was most effective and at 4 oz/A provided around 90% control 7 WAT and around 80% 11 WAT.
- Atrazine at 4 qt/A provided 70% control 7 WAT and 39% 11 WAT.
- A late season application of 2,4-D, Weedmaster, Clarity, or Atrazine may be necessary to eliminate harvest problems associated with red morningglory.

LDAF

2,4-D Application Restrictions

3/15 – 9/15: Waiver needed for all commercial application statewide, except where otherwise restricted



RESTRICTED AREA

3/15 – 4/1: Commercial applicator waiver (aerial or ground)

4/1 – 5/1: Commercial ground applicator waiver, commercial aerial applicator permit

5/1 – 8/15: No 2,4-D application (commercial or private)

8/15 – 9/15: Commercial applicator waiver (aerial or ground)

After 9/15: No restriction

Nutsedge in Sugarcane



**Purple nutsedge, yellow nutsedge,
cocograss, nutgrass**

Purple Nutsedge

Cyperus rotundus L.

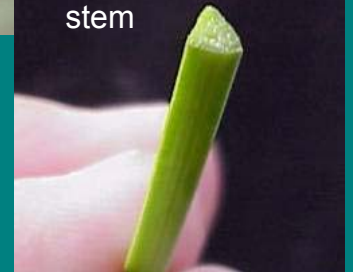
Leaves taper to a point abruptly



Seedhead is purple in color



Triangle-shaped stem



Tubers are dark and rough textured (shaggy looking) and bitter to the taste.

Purple Nutsedge

- Propagates from tubers (not seed) – a single tuber can produce 3.1 million plants and 4.4 million tubers per acre during a full season of growth
- Growth process - tuber sprouts and produces a vertical rhizome and shoot. The shoot forms a basal bulb and emerges from the soil. The basal bulb produces rhizomes from which new plants originate. Rhizomes produce multiple tubers.



Yellow Nutsedge

Cyperus esculentus L.



Seedhead yellow in color



Leaves taper to a point gradually

Tubers are smooth and sweet to the taste.

Yellow Nutsedge

- Propagates from both tubers and seeds – a single tuber can produce 1,918 plants and 6,864 tubers per acre during a full season of growth. Note: Purple nutsedge was in the millions.
- Growth process - tuber sprouts and produces a vertical rhizome and shoot. The shoot forms a basal bulb and emerges from the soil. The basal bulb produces rhizomes from which new plants originate. Rhizomes can also produce new tubers, but in all cases only a single tuber is produced per rhizome.

Rice Flatsedge/Annual Sedge



- Similar in appearance to yellow nutsedge
- Leaves taper to a point gradually.
- The seedhead is yellow in color.
- Tubers are not produced.
- Glyphosate is effective.
- For identification, leaves have a “Christmas tree-like” smell.

Why the Interest in Nutsedge?

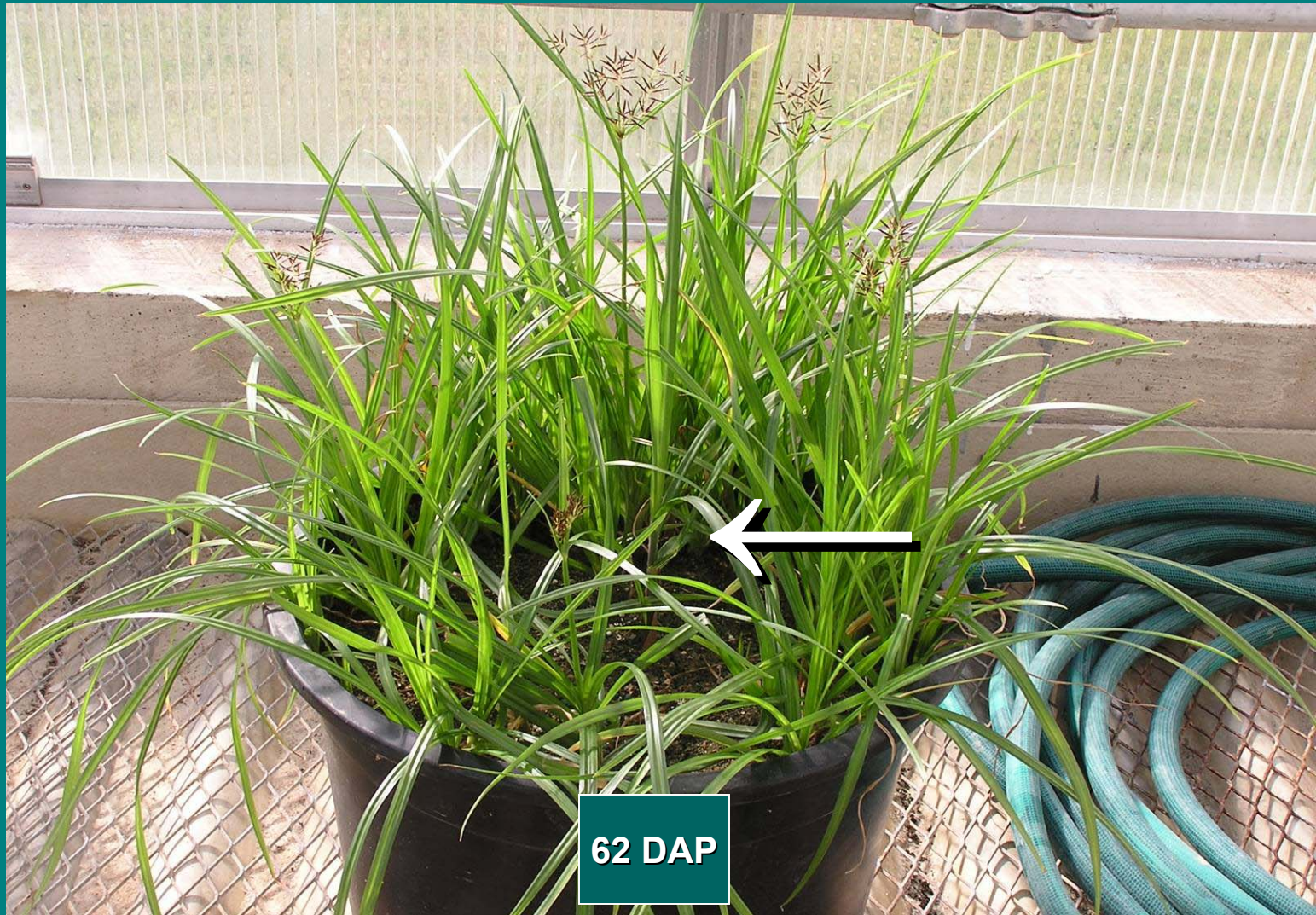


Roundup plus Permit on August 1 in a fallowed field controlled purple nutsedge around 80%.

Nutsedge was still a problem in the plant cane crop (first production year).

Purple Nutsedge Competition Study

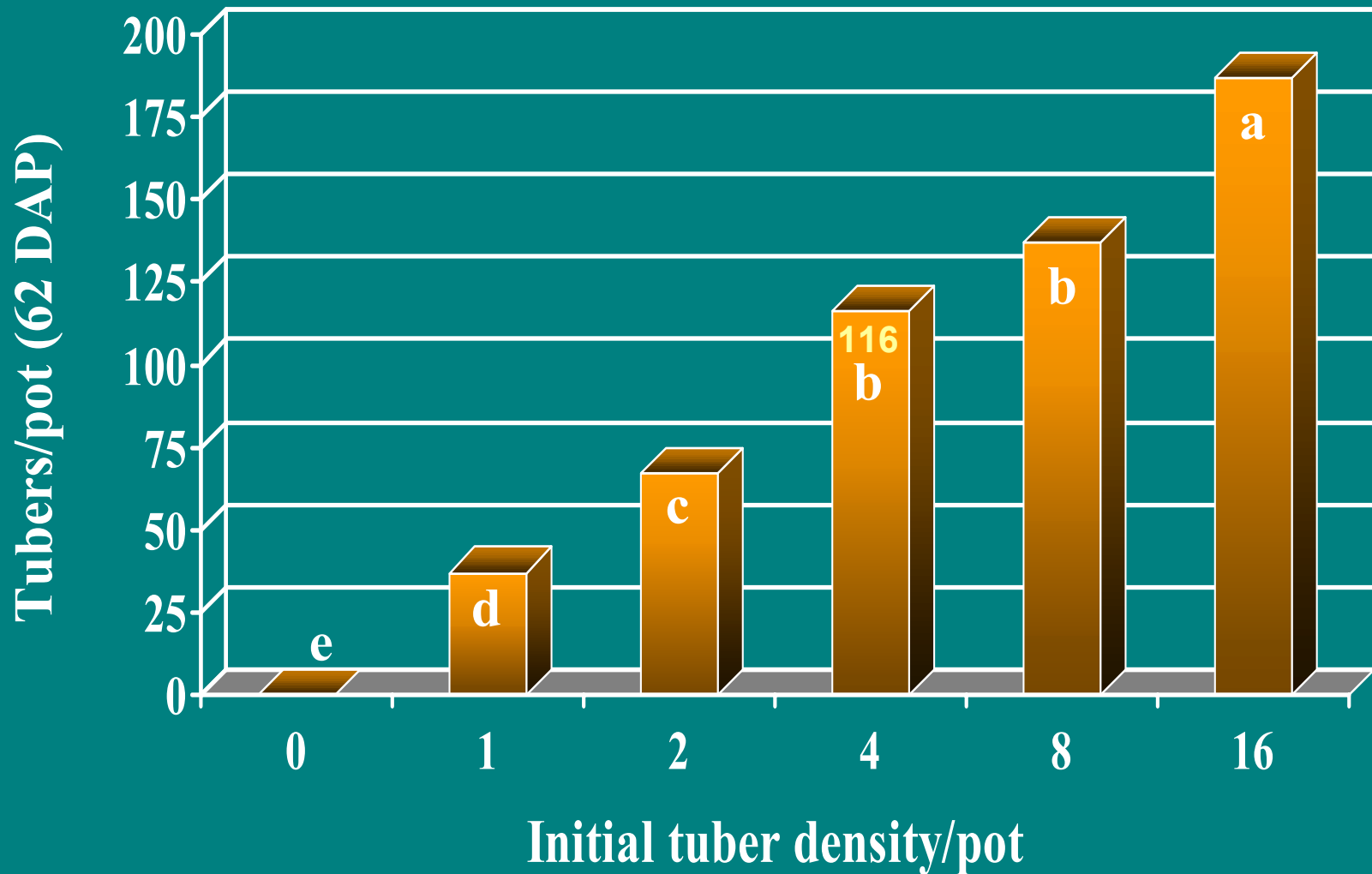
Initial Density 4 tubers/pot



62 DAP

Purple Nutsedge Competition Study

Tuber Production



Purple Nutsedge Shade Study



Full Sun



90% Shade

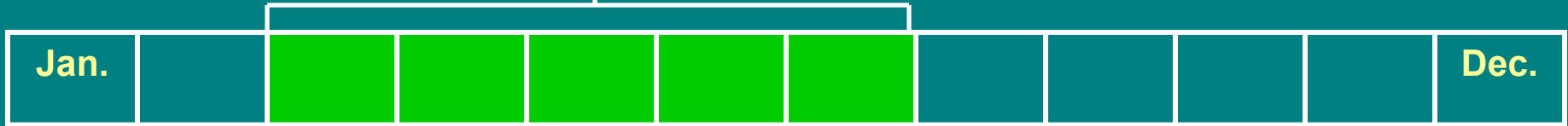
Purple Nutsedge Shade Study

Shade Level	Shoots/4ft² 60 days	Dry weight 60 days
90%	34 c	6 b
70%	27 c	5 b
50%	66 b	10 b
30%	75 b	14 b
Full Sun	136 a	46 a

Biology and Ecology

Purple Nutsedge vs. Corn and Sugarcane

Corn Life Cycle (annual)

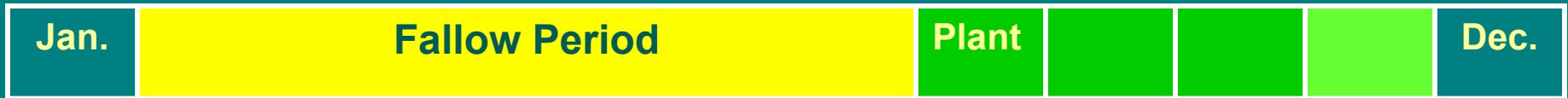


Nutsedge Life Cycle (perennial)



Highly competitive

Sugarcane Life Cycle (perennial)



Harvest

Weeds Present at Planting ...

- Have already removed moisture from the beds. If rainfall is limited after planting, sugarcane germination and growth can be affected.
- Interfere with opening of rows and covering of sugarcane.
- May produce allelochemicals that hinder growth of sugarcane seedlings.



Nutsedge Control in Louisiana Sugarcane?

- **Fallow – Yes**
 - To reduce nutsedge tuber production
 - To reduce nutsedge green material turned under at planting



Fallow Sugarcane Control Programs - Taken From Weed Guide

- Glyphosate is not effective.
- Permit at 1.0 to 1.33 oz/A and Envoke at 0.15 to 0.2 oz/A will provide some control of nutsedge. The higher rate is needed when nutsedge is large and the population is dense.
- For best results apply herbicide when nutsedge is around 6 inches tall. If application is delayed until nutsedge forms a dense mat on the soil surface a sizeable tuber population will have developed underground and control will be reduced. (4 tubers/ft² produced 116 tubers in 62 days)
- Permit and Envoke can be applied with glyphosate products without negatively affecting grass control.
- If two applications of glyphosate are planned, Permit or Envoke should be applied with glyphosate in the first application. The follow up application of glyphosate alone should be effective on nutsedge regrowth.

Fallow Nutsedge Control Programs - Taken From Weed Guide

- Both Permit and Envoke have some soil residual activity but are more effective when applied postemergence. Do not cultivate for 7 days after application of Permit or Envoke to allow adequate time for movement of herbicide to underground nutsedge tubers.
- Yukon, a 67.5% DG premix of halosulfuron (the active ingredient in Permit) and dicamba (the active ingredient in Clarity/Vision) can provide control of both nutsedge and broadleaf weeds. A 4 oz/A rate of Yukon is equivalent to a 0.67 oz/A rate of Permit and a 4 oz/A rate of Clarity/Vision.
- In situations where nutsedge and others weeds may interfere with row opening at planting, Gramoxone Max at 2 pt/A or Gramoxone Inteon at 3 pt/A can be applied 1 to 2 weeks before planting to desiccate above ground plant material. Because herbicide does not move to underground nutsedge tubers rapid reestablishment should be expected and Permit or Envoke application in September or October should be considered.

Recommendation: Apply Permit or Envoke with glyphosate in the first application. The follow up application of glyphosate alone should be effective on nutsedge regrowth. Why?



Nutsedge Competition

- **Nutsedge should be controlled in fallowed fields to reduce tuber production and to reduce nutsedge green material turned under at planting.**



If nutsedge pressure is heavy in fallowed fields expect nutsedge to be competitive with emerging plant cane. Control measures should be implemented in the Fall.

Nutsedge Control in Louisiana Sugarcane?

- **After Plant Cane Emergence / Fall Application (September/October) – Yes**
 - Newly planted cane
 - Stubble crops harvested for seed in August
 - Stubble crops harvested for early delivery to mill in September/October

After Plant Cane Emergence / Fall Weed Control Programs – Taken From Weed Guide

- None of the currently labeled soil applied herbicides are that effective on nutsedge; Command releases nutsedge.
- To control nutsedge in early planted sugarcane apply Permit at 1.0 to 1.33 oz/A or Envoke at 0.2 oz/A. Activity for both herbicides is slow and four weeks may be needed to maximize control. Yukon can provide control of both nutsedge and broadleaf weeds.

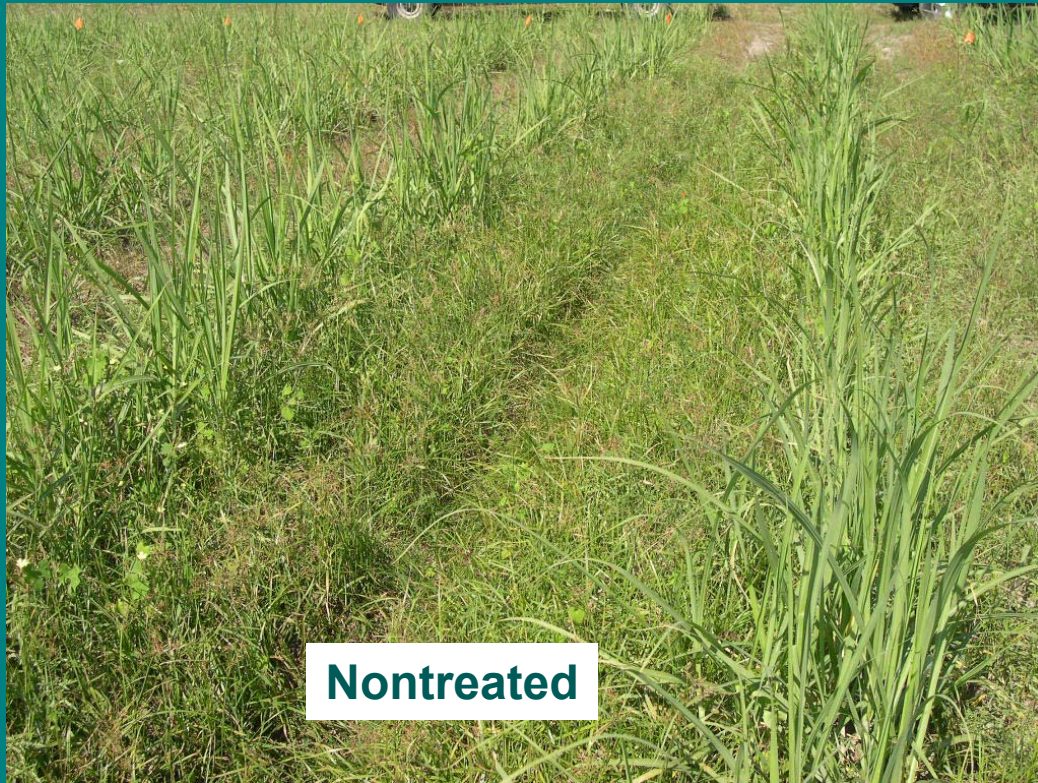
After Plant Cane Emergence / Fall Weed Control Programs – Taken From Weed Guide

- For best results apply herbicide when nutsedge is around 6 inches tall (usually around 6 to 8 weeks after planting). If application is delayed until nutsedge forms a dense mat on the soil surface a sizeable tuber population will have developed underground and control will be reduced.
- Envoke can cause some yellowing and white banding on sugarcane leaves as well as slight stunting but no negative effect on sugarcane growth and emergence in spring has been observed. Envoke will also provide some residual control of winter weeds.

Yellow NS Control - New Roads, LA (47 DAT)



Purple NS Control - Vacherie, LA (47 DAT)



Sugarcane shoot population was increased in the fall and in the following spring when nutsedge was controlled in planted sugarcane.

Nutsedge Control in Louisiana Sugarcane?

- **In the Spring (March-April) – Probably No??**
 - **Once the sugarcane crop has become established its early emergence in the spring prior to that of purple nutsedge and its ability to produce rapid growth and shading suggests that sugarcane will be much more competitive than other agronomic crops.**
 - **Mechanical tillage (off-barring) will destroy nutsedge on row shoulders and in middles.**
 - **Shading combined with the late harvest in October-December will lessen the severity of nutsedge in stubble crops.**

Questions?

