

Weed Control

David South
Auburn University



Handweeding at the Stuart Nursery near Pollock, Louisiana



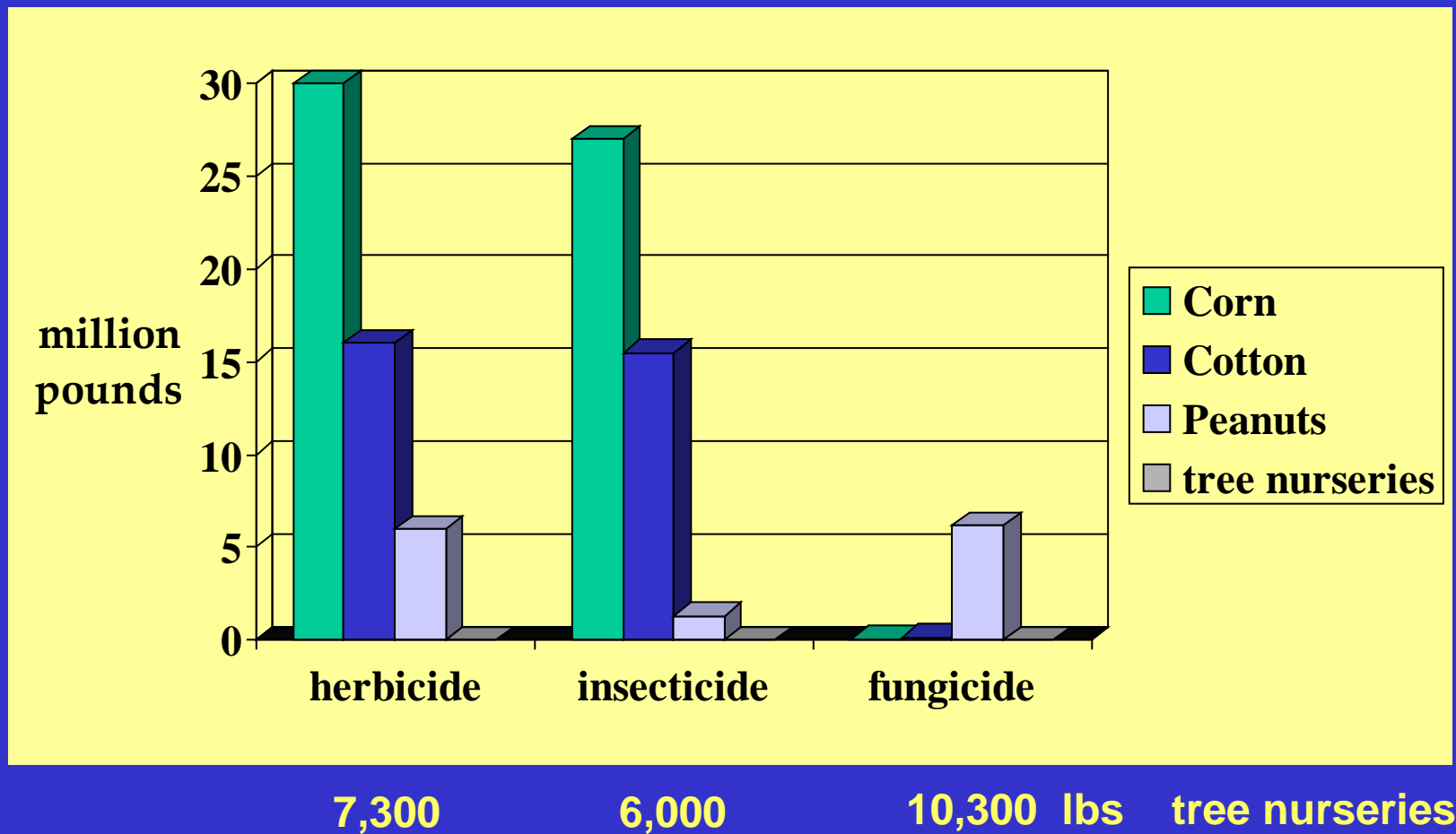
Photo taken by M.A. Huberman October 1935. Credit Line: U.S. Forest Service. (photo #310266)

High value : Ultra-minor crop

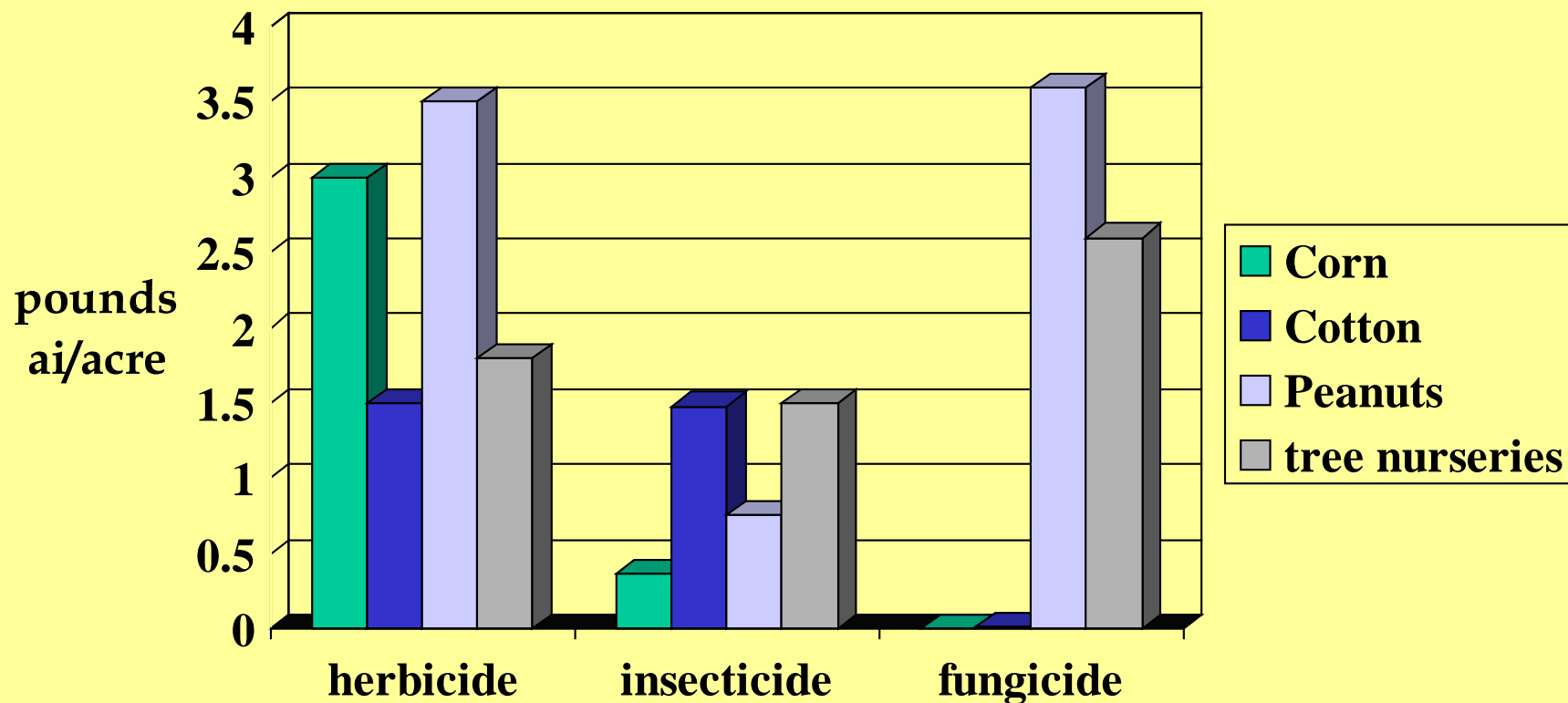
- 1 acre of loblolly pine nursery is worth about \$30,000.
- 2,000 crop acres would be enough land to produce 1.277 billion loblolly pine seedlings

Pesticide use 1989-92

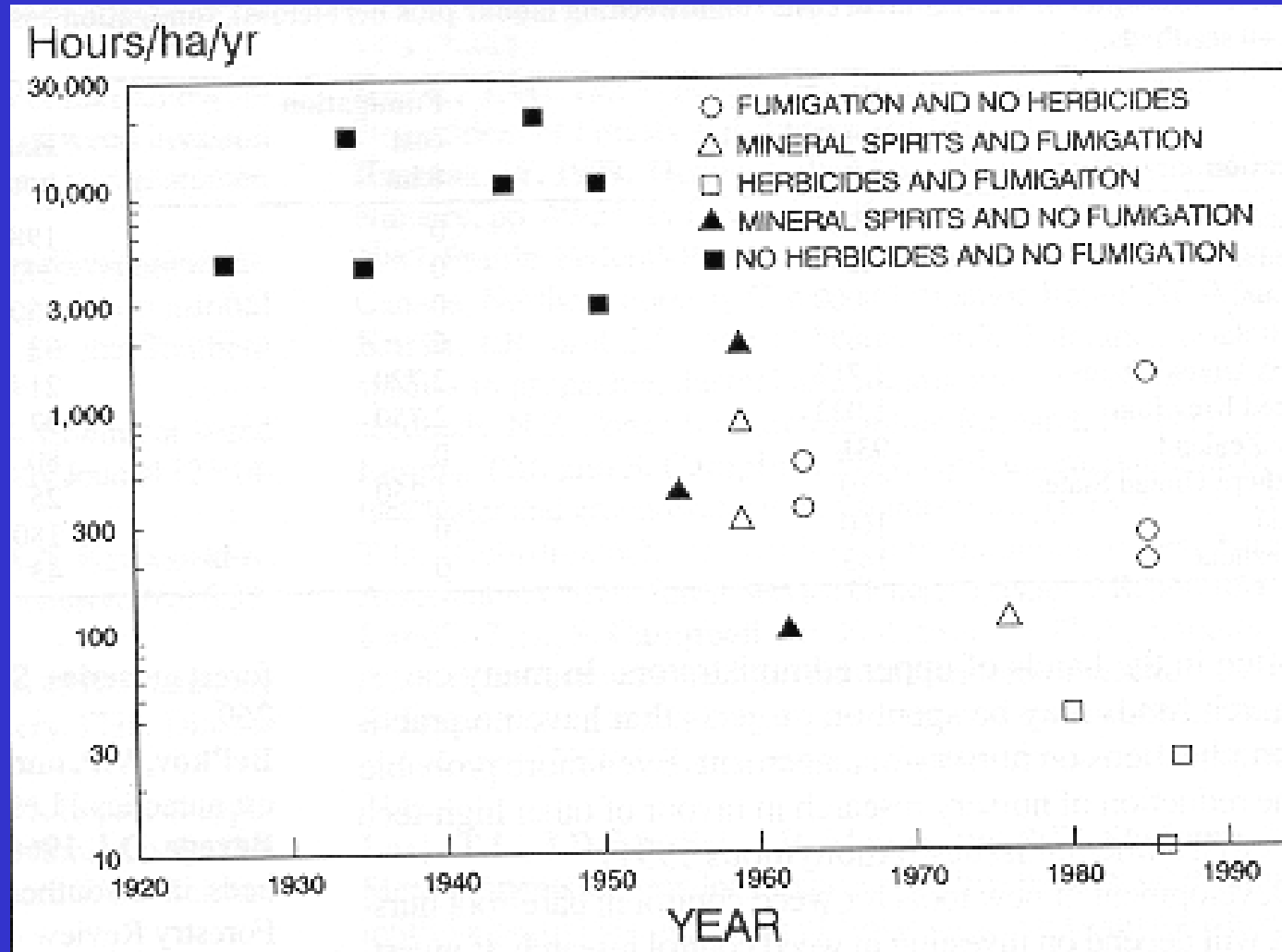
219



Pesticide use 1989-92



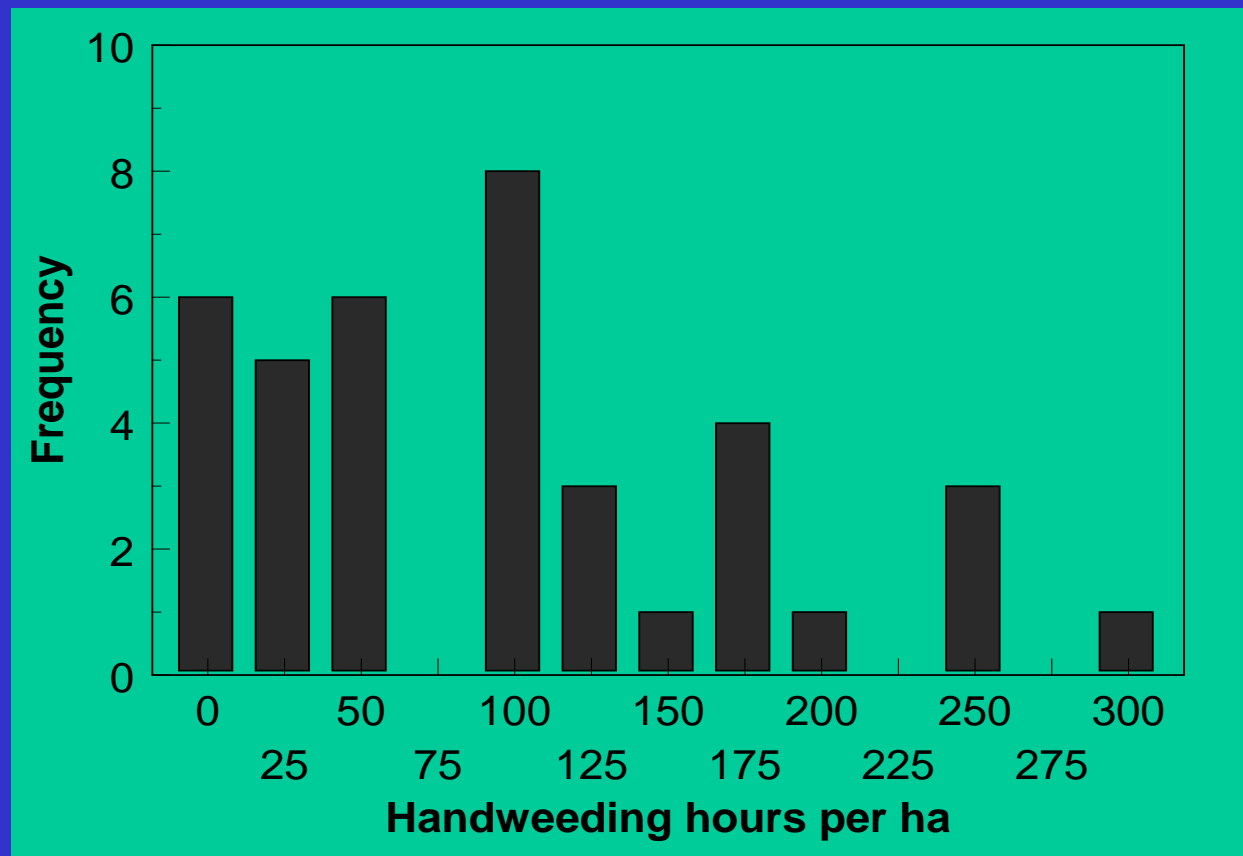
Handweeding times in forest tree nurseries.



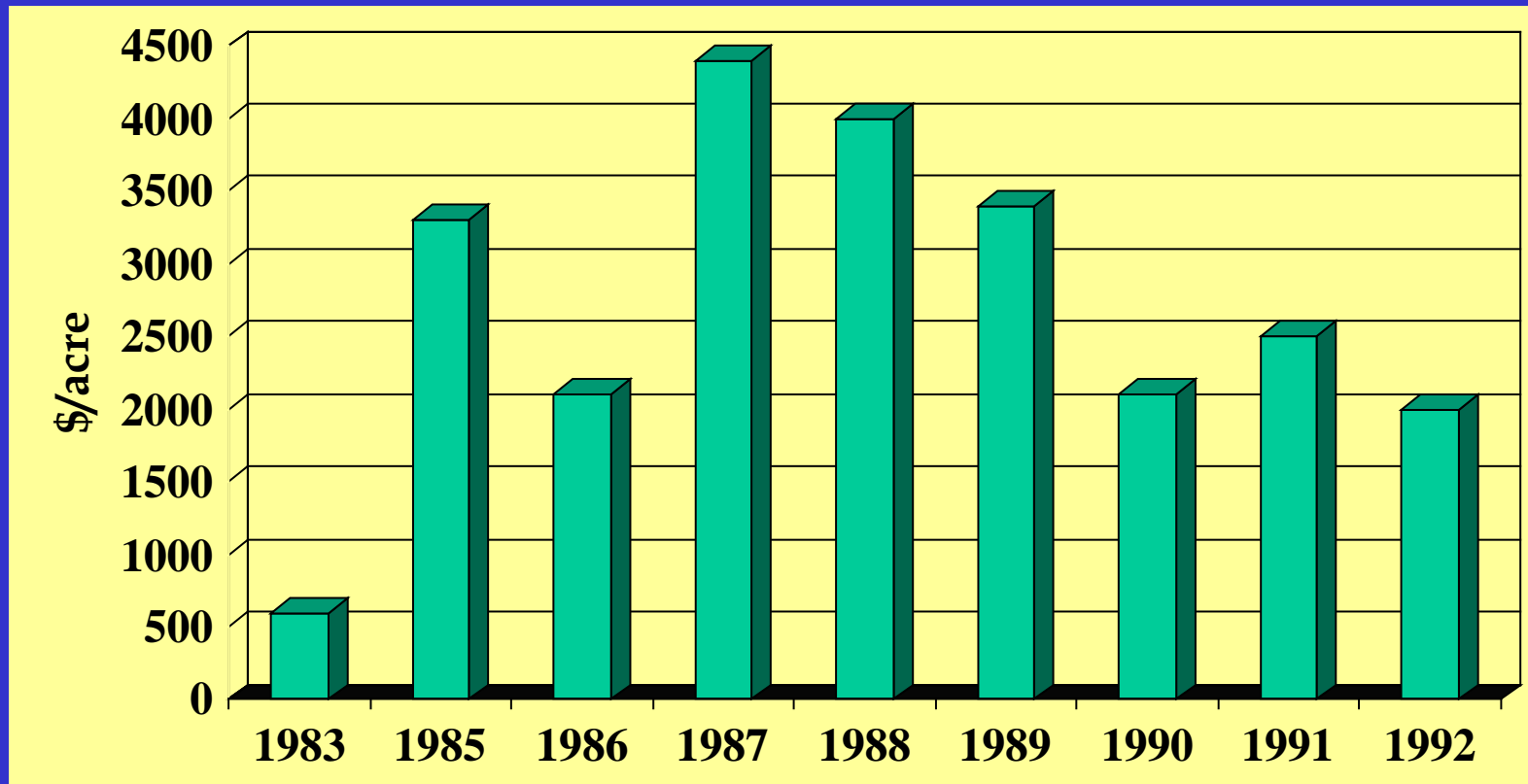
Handweeding in 2000

- AL- 2 hours/pine acre
- NC, GA, VA- 3
- AR- 5
- GA- 11
- TX- 24
- SC- 6-87
- Hardwoods up to 120 hours per acre

Handweeding hardwoods in 2006



Weed Control Costs – J.H. Stone Nursery



No herbicide - 1985-1992

Nursery Weed types

- Grasses
 - Annual
 - Perennial
- Broadleaves
 - Annual
 - Perennial
- Sedges
 - Annual
 - Perennial

Perennial grasses: Bermudagrass 6% of nurseries



Annual grasses: large crabgrass 12% of nurseries



Annual grasses: goosegrass 12% of nurseries



Perennial sedges: Yellow nutsedge 44% of nurseries



1 tuber = 140 shoots in 6 months
All within 8 inches

Perennial sedges: chufa *Cyperus esculentus* var. *sativus*



Chufas

Home Up What Are They Horchata de Chufa ☒ Not Michigan Harvesting Chufas

Information

- ☞ The "[What Are They](#)" page.
- ☞ The "[How To Grow](#)" page.
- ☞ The "[Horchata de Chufa](#)" page.



Chufas shown in root turf

Perennial sedges:

Purple nutsedge



1 tuber = 280 shoots in 6 months

All within 10 feet

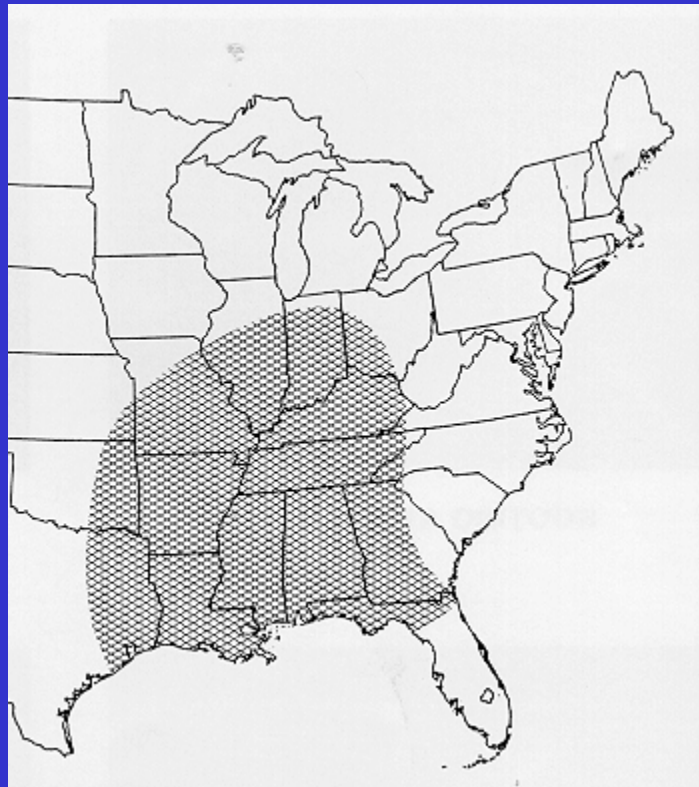
Annual sedges: Flathead sedge 12% of nurseries



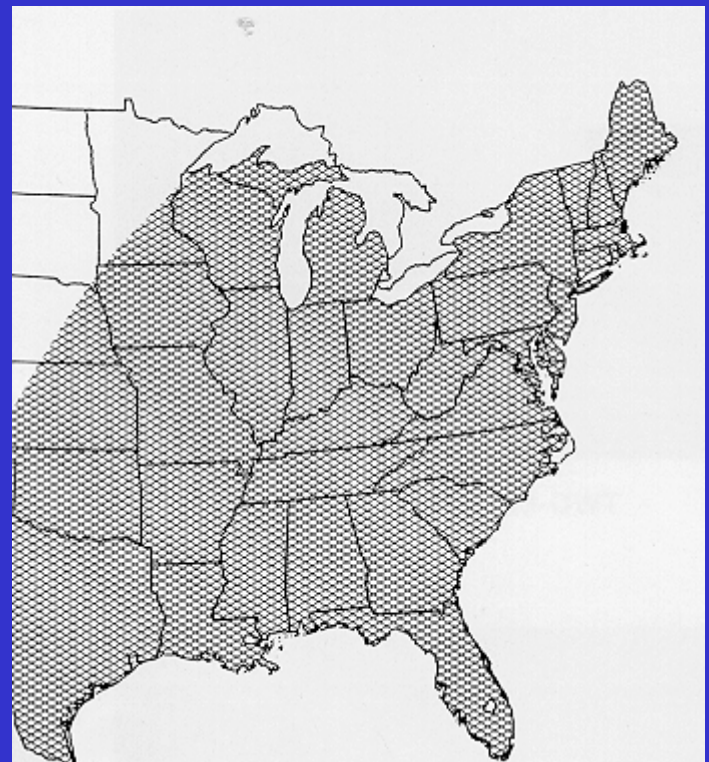
Annual broadleaf: Prostrate spurge 65% of nurseries



Prostrate spurge



Spotted spurge



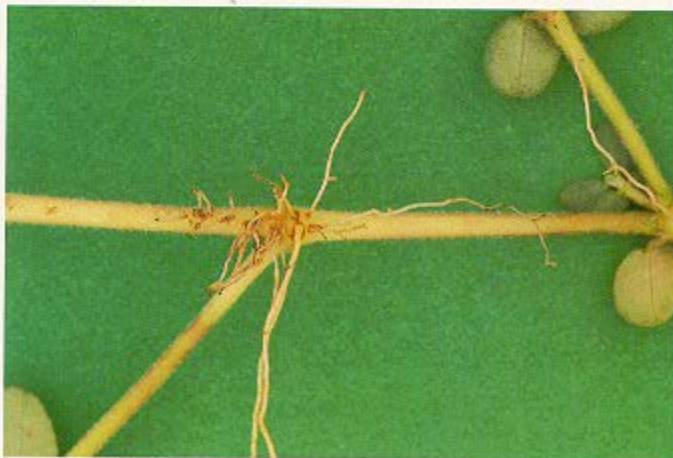
Prostrate spurge



FLOWER



YOUNG SEEDLINGS



ROOTING AT NODE



TWO-LEAF SEEDLING

Spotted spurge



FLOWER



TWO-LEAF SEEDLING

Annual broadleaf:

Purslane

0% of nurseries
(once found in 30%)



Annual broadleaf:

Sicklepod

18% of nurseries



Annual broadleaf:



Coffee senna

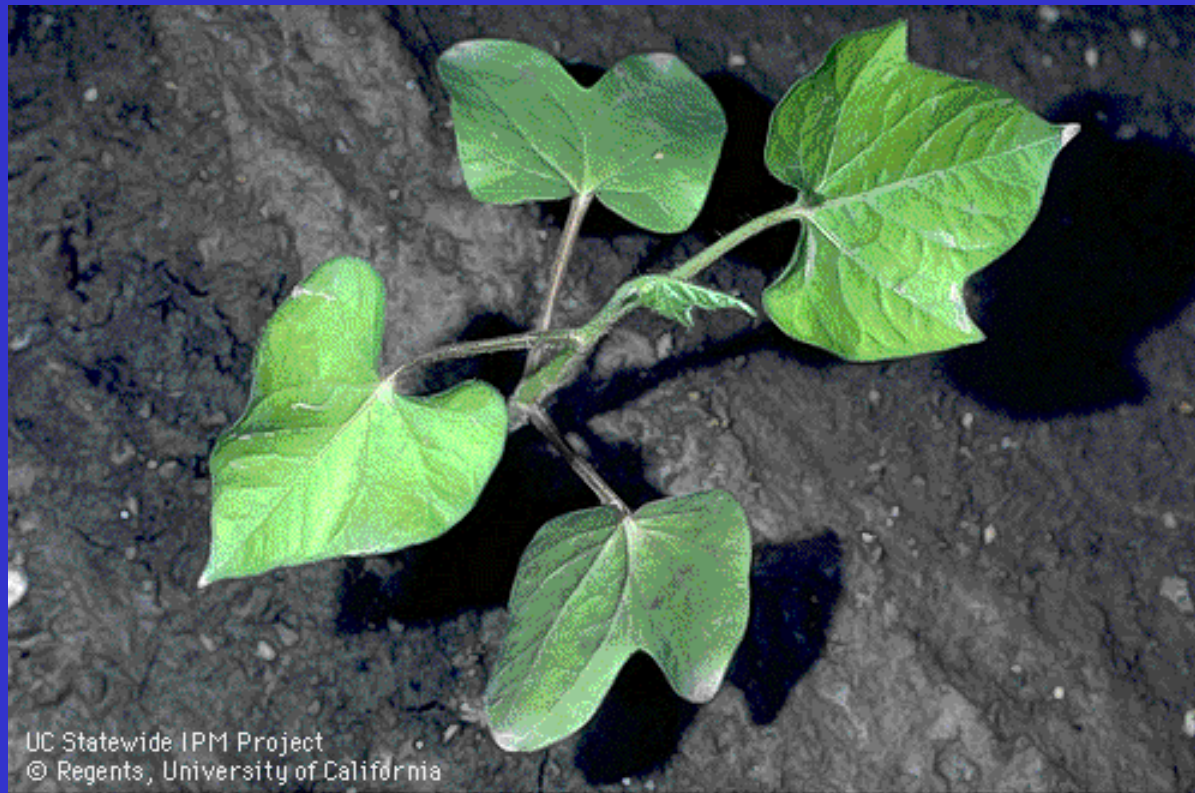
15% of nurseries



Annual broadleaf:

Morningglory

35% of nurseries



Annual broadleaf:

Eclipta

6% of nurseries



Annual broadleaf:

Dogfennel

3% of nurseries



Annual broadleaf: maretail or **horseweed** 3% of nurseries



Perennial broadleaf: knawel 3% of nurseries



Perennial broadleaf: white Clover 3% of nurseries



Equipment 100% use sprayers



55% use shielded sprayers



55% use shielded sprayers









29% use wipers



Weed wiper \$3,900 -6 foot
cottonwood easy to control with glyphosate



www.weedproblems.com

<http://smuckermfg.net>





Almost none use in bed cultivators



Weed Control

Part 2

David South

Auburn University



How do you control nutsedge?



Soil Fumigation...and sanitation and a 24/7 weed management program



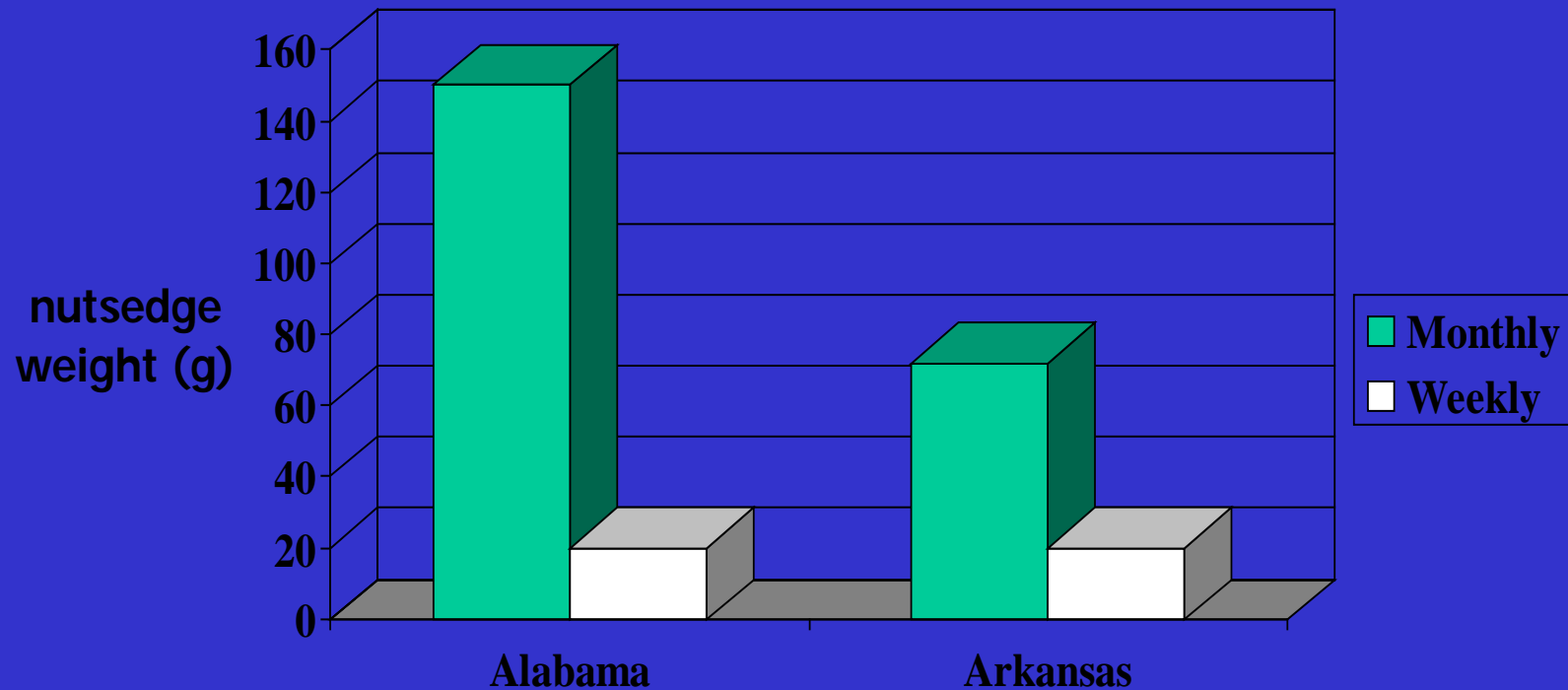
A 24/7 Nutsedge program

- Cover crop: Permit – Roundup ready corn
- Fallow land: Oust-Roundup-Reflex tank-mix
- Methyl bromide fumigation (while it lasts)
- Reflex at time of sowing (for sandy nurseries)
- Weekly applications of Goal-Cobra
- Drip apply Roundup-Reflex to center of escape nutsedge plants (use purple dye)

Weekly applications of Goal improve weed control



Monthly vs weekly Goal



Controlling nutsedge with herbicides



Hardest



Seedbeds



cover-crop



fallow

Easiest



NC-20484

UBI-S734

DPX-4129

ethofumesate

bentazon

cyperquat

perfulidone

hexazinone

glyphosate

imazapyr

EPTC

imazaquin

metolachlor

fomesafen

metsulfuron-methyl

halosulfuron-methyl

sulfometuron-methyl

cloransulam-methyl

metsulfuron-methyl

Selective Nutsedge Herbicides for pine

- Reflex – PRE (AL, AR, GA, MS, NC, SC, TX)

do not use on fine textured soils

POST (NC) no-surfactant

Nutsedge Herbicides for fallow land

- **Methyl bromide**
- **Roundup**
- **Glyphomax**
- **Finale - Liberty**
- **Oust**
- **Permit – Sedgehammer**



Oust (1.33 oz product per acre) - experimental application



Permit in corn or fallow ground



Questionnaire (11 nurseries)

of postemergence Goal and Cobra applications

# trips	# nurseries	Total herbicide
15	1	2.3 pounds
9	2	1.3-1.2
8	2	1.2-2.1
7	2	0.9-1.7
6	3	0.5-0.8-0.8
5	1	0.8

WORK PLAN

3-WAY TANK-MIX FOR NUTSEDGE ON FALLOW LAND

Project Leader: Dr. David South: Auburn University

A. Objectives:

To evaluate the efficacy of a tank-mix (glyphosate, fomesafen, sulfometuron) for controlling purple and yellow nutsedge on fallow land.

B. Procedures:

Table 1. Herbicide rate per treated acre. (all rates in product per acre rates)

Treatment	<u>Roundup-ultramax</u>	Reflex	Oust	First application	Second application	Third Application (if needed)
Tank mix	2.5 quarts	1.5 pints	1.33 ounces	July	--	--
	2.5 quarts	none	1.33 ounces	--	August	Late September
	2.5 quarts	none	1.33 ounces	--	--	Late September
Roundup	2.5 quarts	none	none	July	August	Late September

Treat in 25 to 40 gallons of water per acre.

Apply when nutsedge plants are 3-6 inches tall.

herbicide tank-mix for fallow land

- | | | |
|-----------------------------------|------------------------------------|-----------------------------------|
| • First spot
spray | • Second
spot
spray | • Third
spot
spray |
| • Roundup
• Oust | • Roundup | • Roundup |

AI Pest Management Handbook

Weed control ratings (0-10)

	Cobra	Reflex	Duel	MSMA	First Rate	Eptc	Roundup	Permit Sedgehammer
Yellow nutsedge	2	4	1	7	6	7	7	8
Purple	2	4	6	7	6	7	7	8

Selective Nutsedge Herbicides for cover-crops

- Permit – Field corn – grain sorghum – millet
- Roundup – Roundup ready corn

Non-selective control of nutsedge in seedbeds



Non-selective control of nutsedge on riser-lines



Direct treatment



How do you control spurge?





At sowing

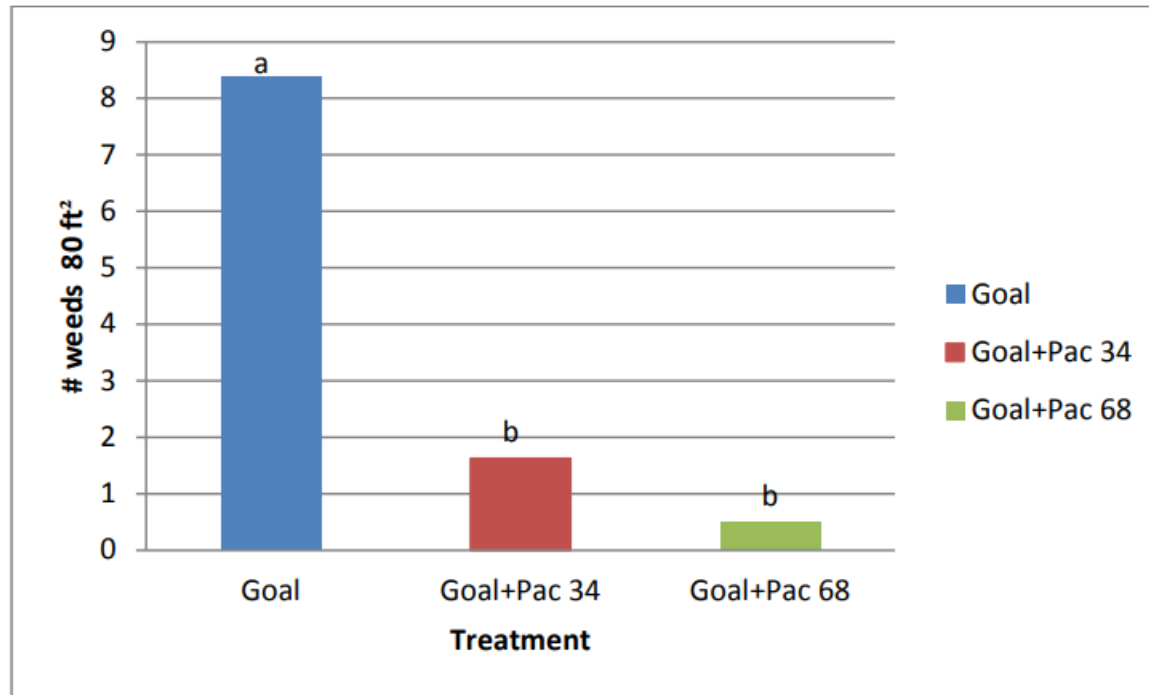


Figure 1. Effect of tank mixes of Goal[®] 2XL and Pendulum[®] AquaCap[™] on prostrate spurge control, Pine Hill Nursery 2013.

Spurge trials

SPECIMEN

PENDULUM Herbicide
AquaCap™

For Use as a Preemergent Weed Control Herbicide in Turfgrasses, Landscape or Grounds Maintenance, Noncropland Areas and Ornamental Production

ACTIVE INGREDIENT	
pendimethalin, N-[1-ethylpropyl]-3,4-dimethyl-2,6-dinitrobenzamine	98.7%
INERT INGREDIENTS:	51.3%
TOTAL	100.0%

(1 gallon contains 3.8 lbs. of microencapsulated pendimethalin in an aqueous carrier)

EPA Reg. No. 241-418 EPA Est. No. _____

1 quart per acre

\$17 per acre

May 28th

Control

Pendulum AC



June 26th - % spurge cover

Control	--	95% a
Sureguard	6 oz	82% bc
Pendulum AC	1 quart	88% ab
Oryzalin	2 quarts	87% ab
Oust	1.33 oz	74% c
Pendulum AC	2 quarts	46% d

November 1

Control



Pendulum





PENDULUM AC

The image shows a large field of young pine trees, likely a nursery or a plantation. The trees are arranged in neat rows, and the ground is covered with brown mulch. A blue flag is visible in the foreground, marking a specific tree. The text 'PENDULUM AC' is overlaid on the left side of the image.

CONTROL

The text 'CONTROL' is overlaid on the right side of the image, indicating a control group or treatment in the study.



May PendulumAC

May Pendulum
+June PendulumAC

May PendulumAC+Escort

Control

ESCORT® XP may be applied on conifer and hardwood plantations, and noncrop sites that contain areas of temporary surface water caused by the collection of water **between planting beds, in equipment ruts**, or in other depressions created by management activities.



Equipment rut

0.2 ounce/acre



How do you control this weed?



How do you control sicklepod?

FUMIGATION IS NOT THE RIGHT ANSWER!





STINGER

Southern Pine Seedbeds in Forest Nurseries

(Registered for Use in Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia) (Not Registered for Use in Florida)

Stinger may be applied over the top of loblolly pine, slash pine, and longleaf pine to control sicklepod and other susceptible broadleaf weeds in southern pine seedbeds in forest nurseries. Apply as a broadcast or spot treatment from May through July when weeds are actively growing.

Application Timing

For best results, apply when weeds are small and actively growing. For control of sicklepod, apply after the majority of basal leaves have emerged.

Application Rate

Apply at a broadcast rate of 1/4 to 1/2 pint per acre in a spray volume of 20 gallons or more per acre. Application may be made any time after May 1, but some needle curling may occur if applied during active conifer growth. When making spot applications, use a calibrated boom, or if a hand-held sprayer is used, care should be taken to apply the spray uniformly and at a rate equivalent to a broadcast application. Otherwise, do not use more than 1/5 fl oz (1 tsp.) of Stinger per gallon of spray and direct spray onto weeds. Avoid spraying pine seedlings whenever possible.

Specific Use Precautions and Restrictions:

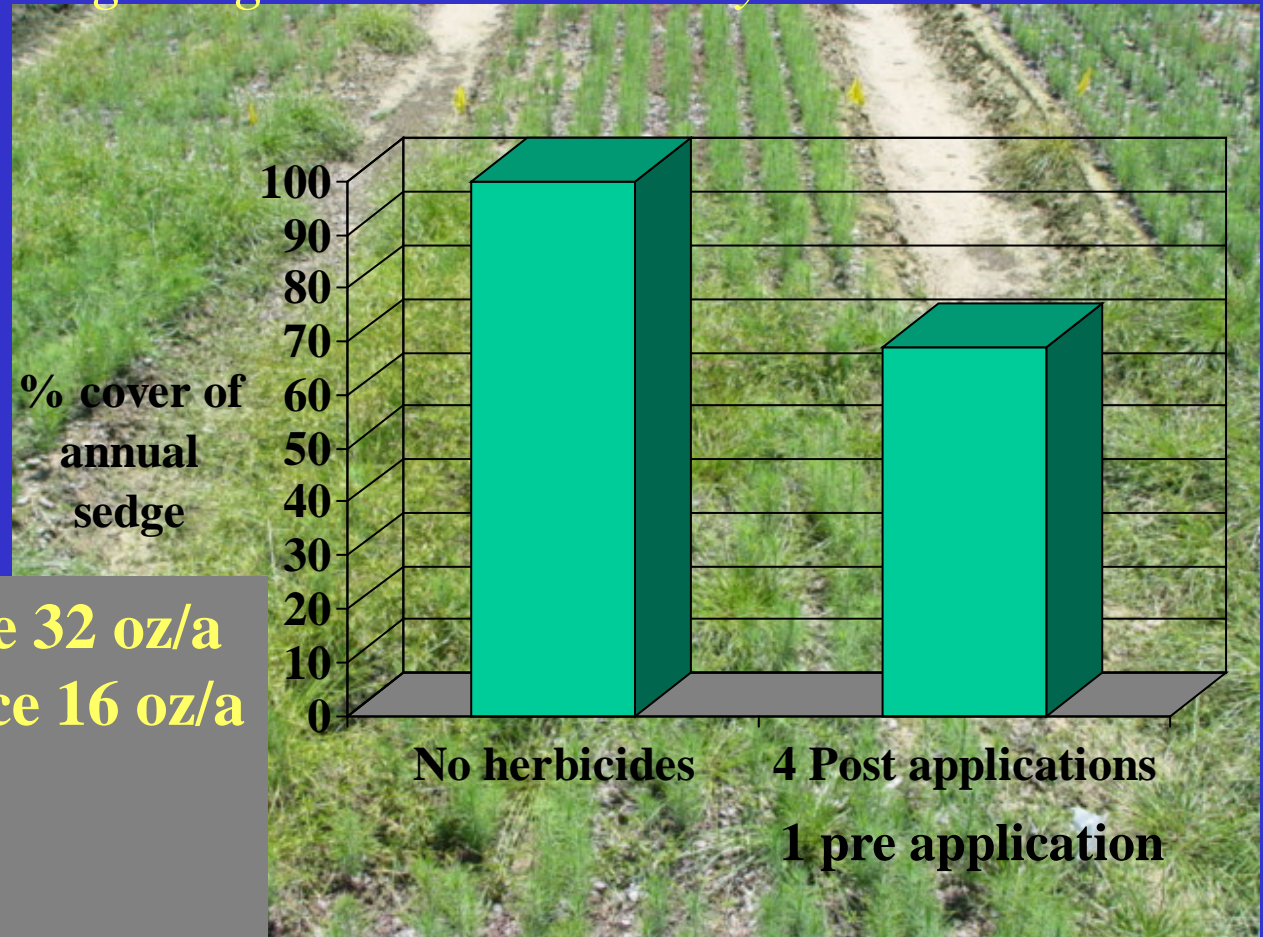
- Application of Stinger during active growth of conifers may cause some needle curling.
- Do not use surfactants or crop oils in spray mixtures as the potential for tree injury in the form of needle curling may be increased.

How do you control this weed?



Postemergence

Inadequate control when using only 4 postemergence applications. Applying every 4 weeks between treatments allows annual sedge to get established early.

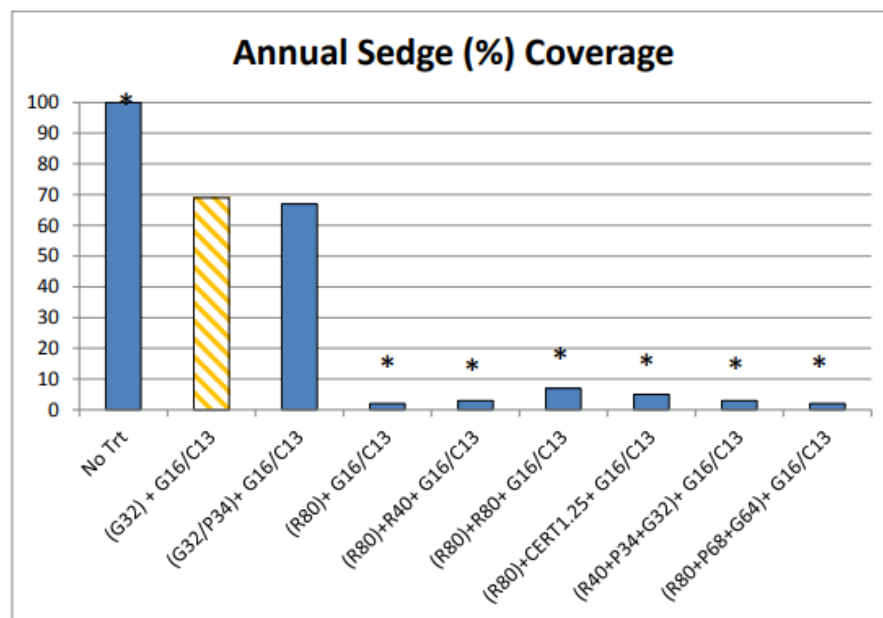


Goal preemergence 32 oz/a
Goal postemergence 16 oz/a
Cobra post 13 oz/a
Goal post 16 oz/a
Cobra post 13 oz/a

Postemergence

*Good control when using Ronstar Flo preemergence
Followed by Goal and Cobra postemergence.*

Figure 2. Presence of annual sedge by herbicide treatment at the Quail Ridge Nursery in 2012.



*Denotes significant differences between a treatment and the operational treatment; dashed bar.

() Denotes a Pre-emergent application. G=Goal® 2XL, P=Pendulum® AquaCap, C=Cobra®, R=Ronstar® Flo, CERT=Certainty®, number denotes oz/ac, G16/C13 denotes four applications including two Goal® 2XL and two Cobra® post-emergent applications.

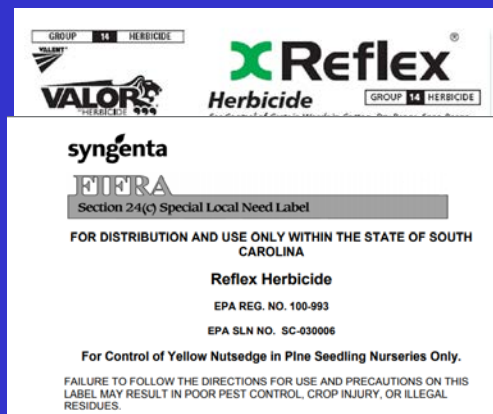
Preemergence – 16/24/24



16 oz /A (less chance of co-distillation)



24 oz /A



24 oz /A



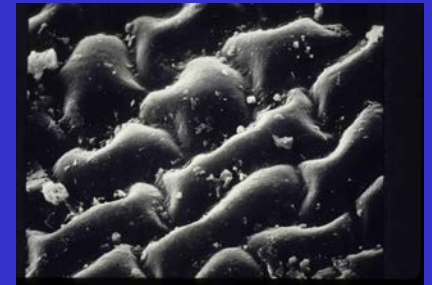
How do you control this weed?

Weekly applications of Goal (before this weed germinates)



Weekly applications of low rates of Goal

Another reason why weekly applications of Goal work so well



Weekly applications of low rates of Goal

Weekly applications of Goal repair breaks in the herbicide barrier.



Preemergence

Ronstar Flow

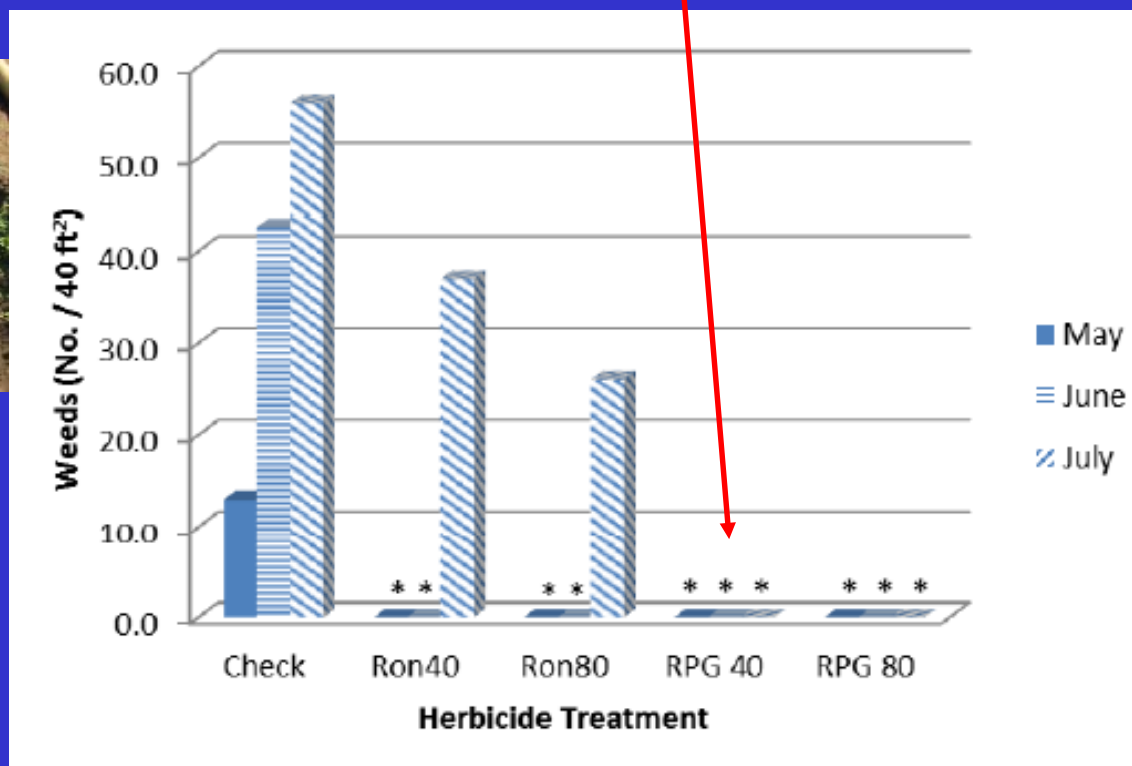
Pendulum AquaCap

Goal 2XL

40 oz product per acre

34 oz product per acre

32 oz product per acre



Preemergence

Ronstar Flow

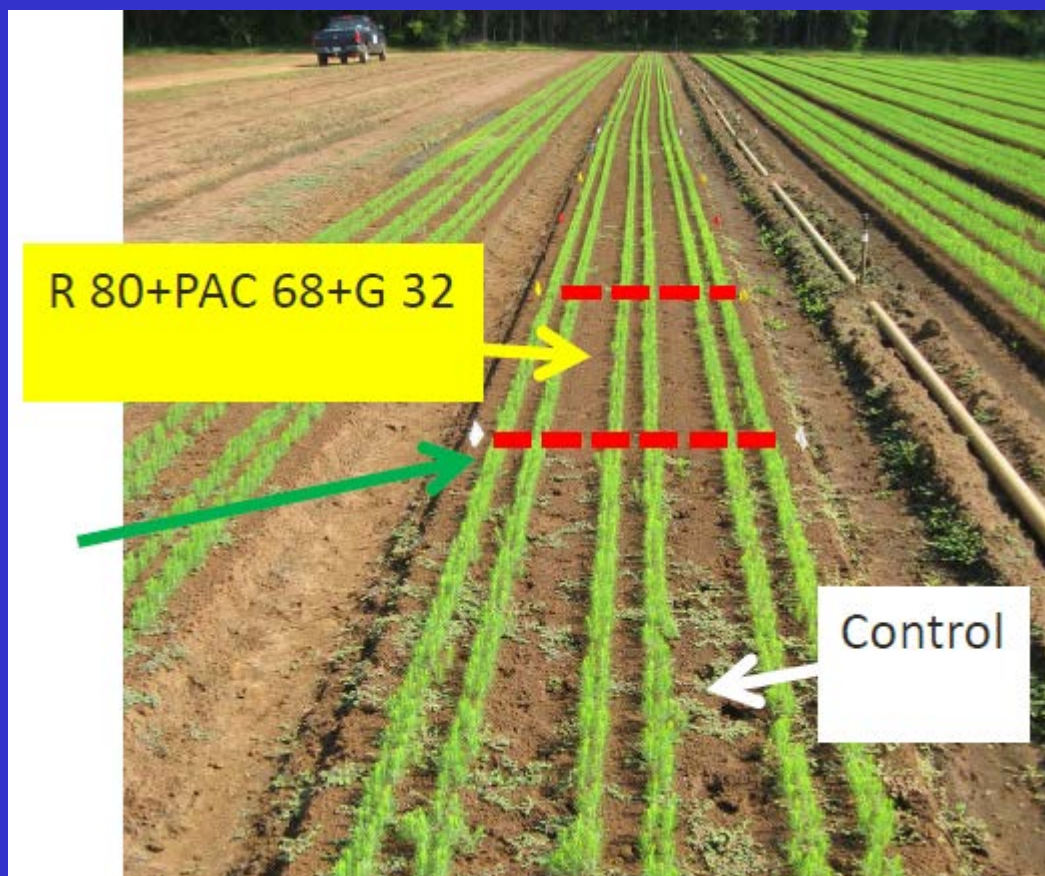
80 oz product per acre

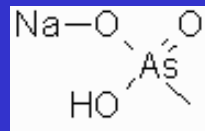
Pendulum AquaCap

34 oz product per acre

Goal 2XL

32 oz product per acre





Postemergence



Check



Not legal

MSMA 1-2 pints/acre

How do you control this weed?



How do you control alligator weed?

One manager was able to control this weed in tractor paths by applying Escort at 0.2 oz/ac



How do you control this weed?



How do you control knawel?



How do you control knawel?



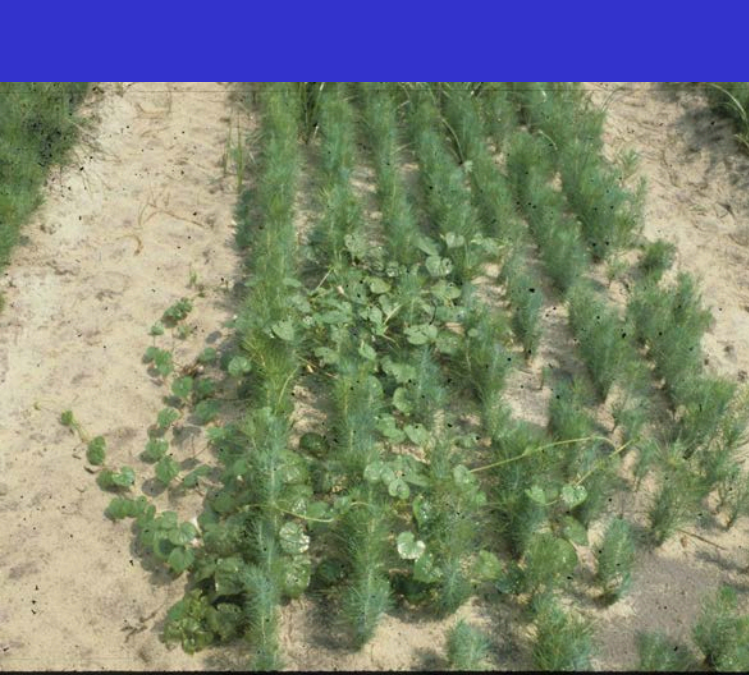
Escort does a heck of a number on knawel. We made one application of 1/10 oz/ac during the second week of April of last year. We did it on a Friday, got about a tenth of an inch of rain on Sunday and by Tuesday, it was dead. It also cleaned most of everything else up too except for the nutsedge. We have since used it in longleaf, loblolly, shortleaf and Virginia pines with good results.
... It seems that knawel knows no boundaries.

How do you control this weed?



How do you control morningglory?

FUMIGATION IS NOT THE RIGHT ANSWER!



How do you control tall morningglory?



How do you control tall morningglory?



Treat when small when it has not developed a waxy leaf and can be affected by herbicides like.



Goaltender....

Cobra

Cobra with UAN

Goal with UAN

How do you control tall morningglory?

Preemergence



How do you control tall morningglory? Postemergence



*One manager applied stinger
(6oz product /acre) in early June
Followed by Goal 2XL about
4 days later. This sequence resulted
In dying morningglory 4 days later*

How do you control tall morningglory?

An expensive preemergence treatment

\$236/acre

\$472/acre

Morningglory Trial

• Control

Broadstar 100 lbs/ac

Broadstar 200 lbs/ac



How do you control this weed?



How do you control marestail or horseweed ?



4 to 8 oz of Stinger/acre

Postemergence only

Up to 5 leaf stage

How do you control marestail or horseweed ?



*Wick application
of Liberty herbicide*

Postemergence when tall

How do you control this weed?



How do you control white clover?



4 to 8 oz of Stinger/acre

Postemergence only

How do you control this weed?





How do you control eclipta?

*Hard to control with
preemergence herbicides.*

Some control with Goal+AquaCap



*Cobra applied to
very young seedlings.*

*Old seedlings Cobra just turns
it black.*

How do you control this weed?



How do you control crabgrass?



*Before it germinates with weekly applications
of diphenylether herbicides*

Goaltender.....Goal..... Cobra....

How do you control crabgrass after it germinates?



Acclaim
Fusilade II
Vantage
Envoy

How do you control this weed?



How do you control bermudagrass after it germinates?



Multiple applications of

Acclaim

Fusilade II

Vantage

Envoy

How do you control this weed?



How do you control this common purslane?



Goal or Cobra or Goaltender

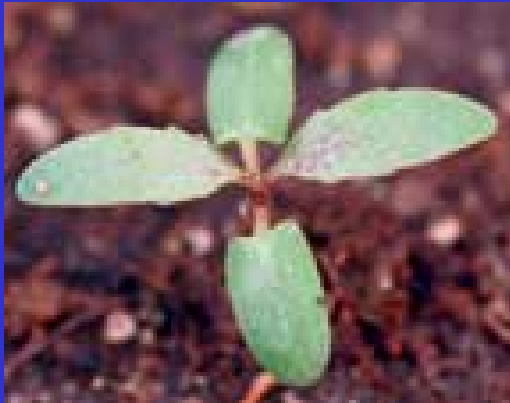
How do you control this weed?



How do you control this cogongrass?



How do you control this weed?



How do you control cottonwood in hardwoods?



*Wick application of glyphosate
on taller cottonwood seedlings*

QUESTIONS?





Herbicide formulations

- EC – emulsifiable concentrate
- AS – aqueous solution
- WP – wettable powder (EPA does not like)
- WSP – water soluble packet
- F – flowable
- DF- dry flowable
- DG – dispersible granule
- G - granular (often costs much more)

G?

OR

DG?





Goal

Dow AgroSciences



NEW GoalTender herbicide

GoalTender herbicide contains the same active ingredient as Goal 2XL, oxyfluorfen. However, GoalTender is formulated as a water-based flowable and is a 4 lb a.i./gallon material (Goal 2XL is a 2 lb a.i./gallon material). The unique formulation of GoalTender reduces the potential for "lift-off" (or co-distillation), increasing the safety to adjacent crops. GoalTender has effectively no odor.

Apply 0.125 pounds a.i. of oxyfluorfen per acre

How many fluid ounces per acre?

Dilution equations

Active ingredient vs. Product

$$\frac{\text{Rate of a.i./acre}}{\text{lbs a.i. Per gallon}} = \text{gallons of product/acre}$$

$$\frac{0.125 \text{ lbs/acre}}{4 \text{ lbs a.i./gallon}} = \frac{1}{32} \text{ gallon of Goal 4F/A}$$

(or 4 fluid ounces)



Escort XP

(60% a.i.)

We tested 3.4 g a.i. of metsulfuron methyl /acre

How much product to measure out ??

$$\frac{3.4 \text{ g a.i. /acre}}{0.6 \text{ a.i.}} = 5.67 \text{ g product/acre}$$



Escort XP

(60% a.i.)

Tommy says apply 0.2 ounce product/acre

How much product to measure out???

$$\frac{454 \text{ g/lb}}{16 \text{ ounces/lb}} = 28.375 \text{ g/oz}$$

16 ounces/lb

$$28.375 * 0.2 = 5.675 \text{ g product per acre}$$

Mobile Apps



Sprayer Calibration App for iOS and Android

Improperly calibrated pesticide spraying equipment may cause either too little or too much pesticide to be applied. This free mobile app was created to aid in the proper calibration of spraying equipment. Simply select the type of sprayer you want to calibrate (Broadcast or Banded), insert values in each input box, select what you want the app to calculate (Volume/Area or Catch/Nozzle), and tap 'Calculate'. Each input's units can be customized by tapping the units. Sprayers can be saved with user-defined names.

This free mobile smartphone app is designed for iPhone, iPod Touch, iPad and Android devices. Select the appropriate icon to download.



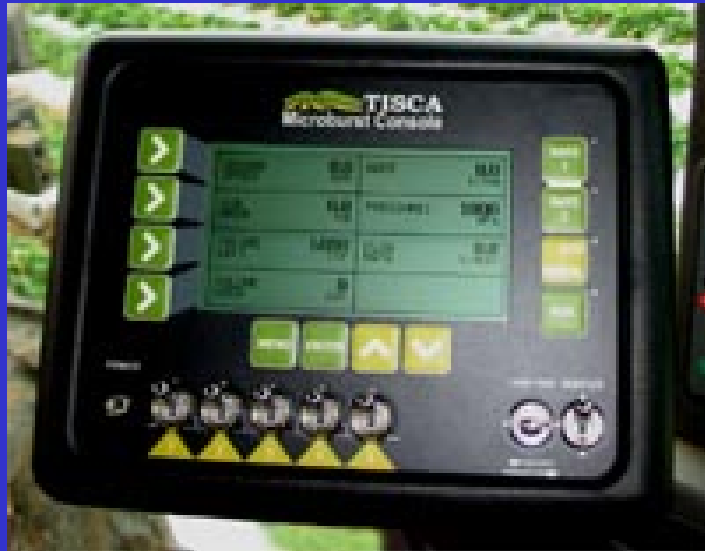
If you have questions regarding this sprayer calibration app, please contact Jeremy Greene <green4@clemson.edu>.



Mix My Sprayer for iOS and Android

Mix My Sprayer was created to aid with quick, accurate calculations of product mixes to be applied with spraying equipment. Users can create custom lists of favorite products by category. Simply add or select a product, insert values in each input box, and the app automatically calculates the amount of product to include in the user-defined mix size. Units for each input can be customized by tapping the unit buttons. Products are saved with the user settings last used.

Automatic sprayer calibration



Proper storage of pesticides



Warning about banded applications!!!!

*Fertilizer folks don't use the same method as
Herbicide folks....*

Apply 100 lbs/acre in a 50% band...



Fertilizer folks purchase 100 lbs of product

Herbicide folks purchase only 50 lbs of product

*Therefore, fertilizer folks apply twice as much
product per “treated acre.”*

*Question... what happens when fertilizer folks
apply herbicides?*

QUESTIONS?

