Weed Control

David South
Auburn University

Handweeding at the Stuart Nursery near Pollock, Louisiana

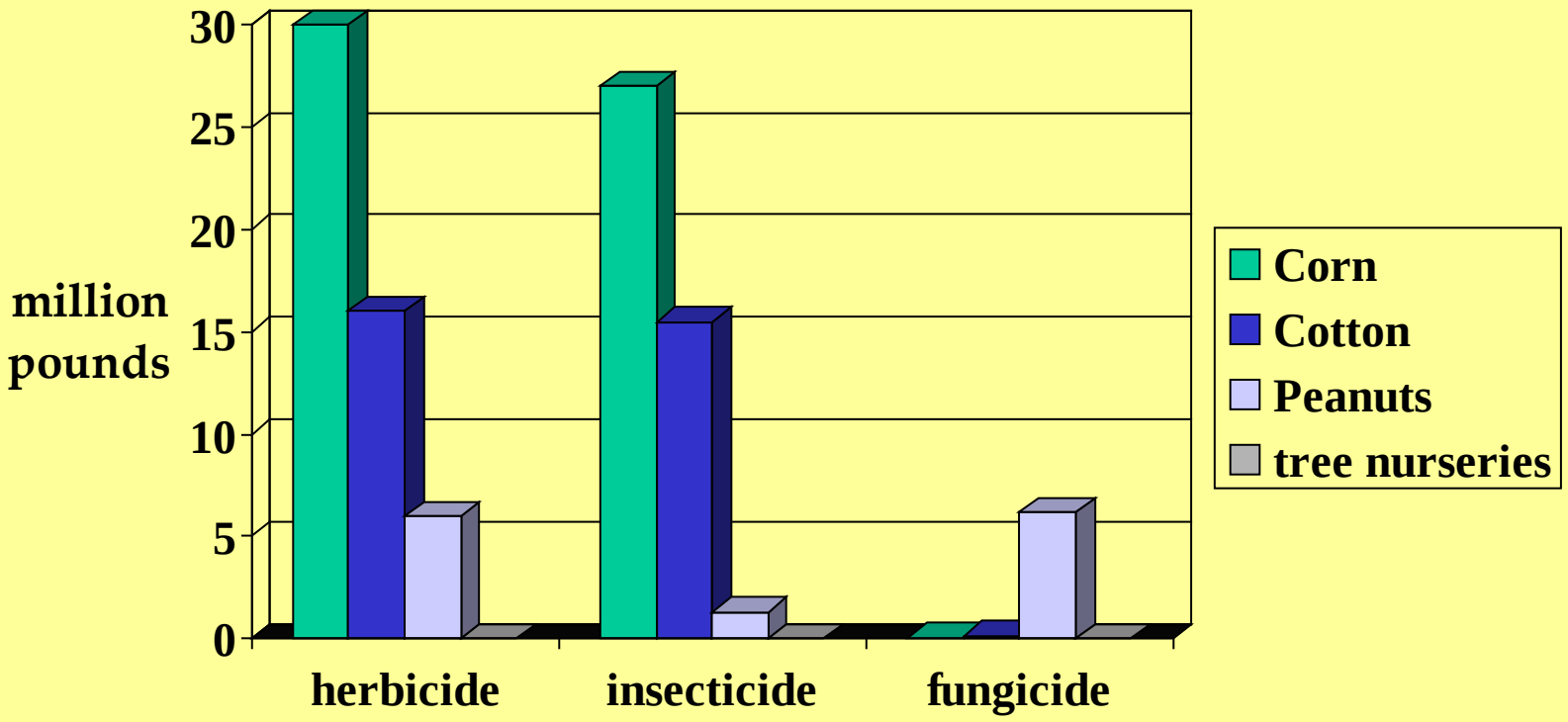
Photo taken by M.A. Huberman October 1935. Credit Line: U.S. Forest Service. (photo #310266)

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

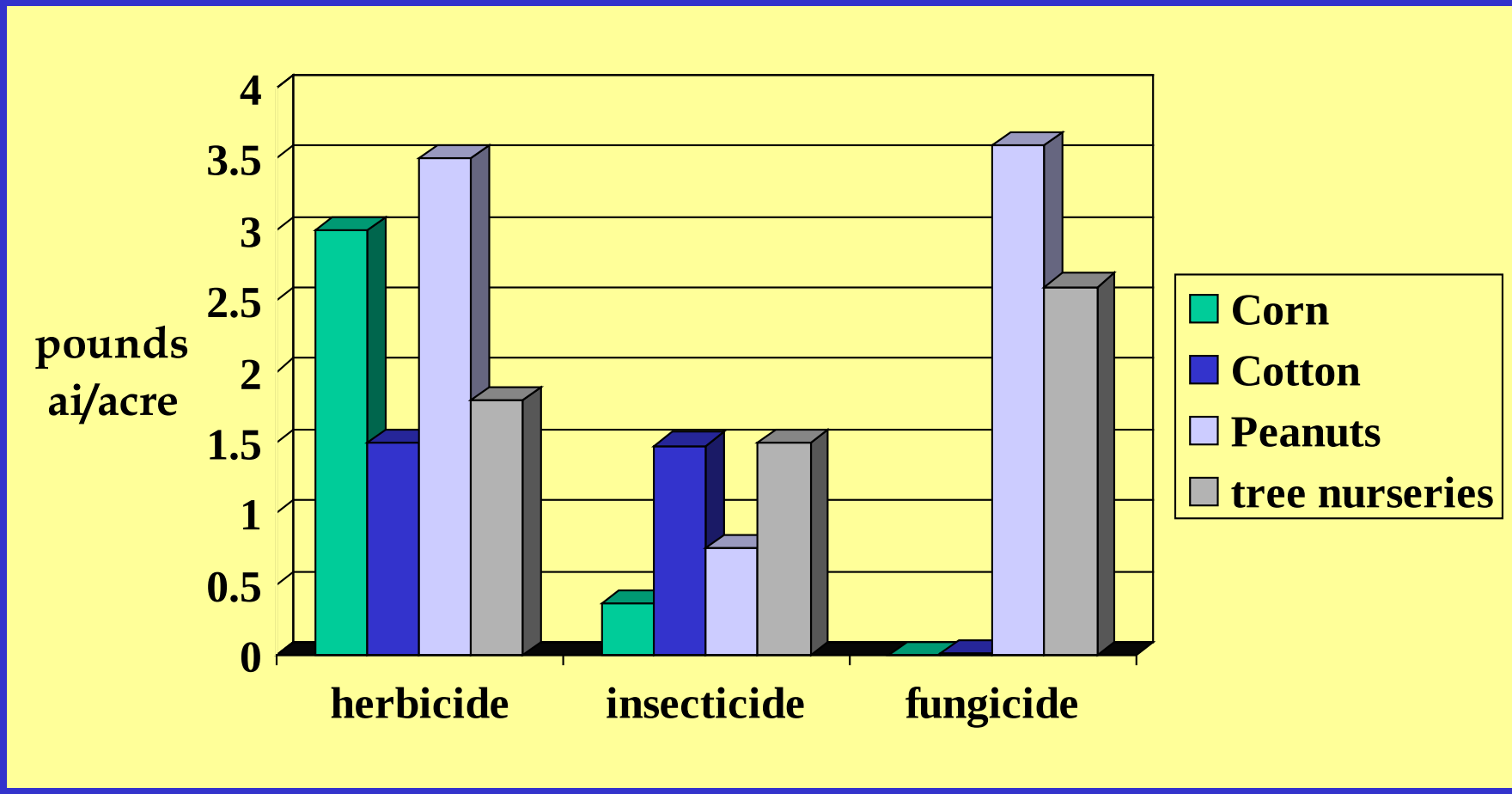
Pesticide use 1989-92

219

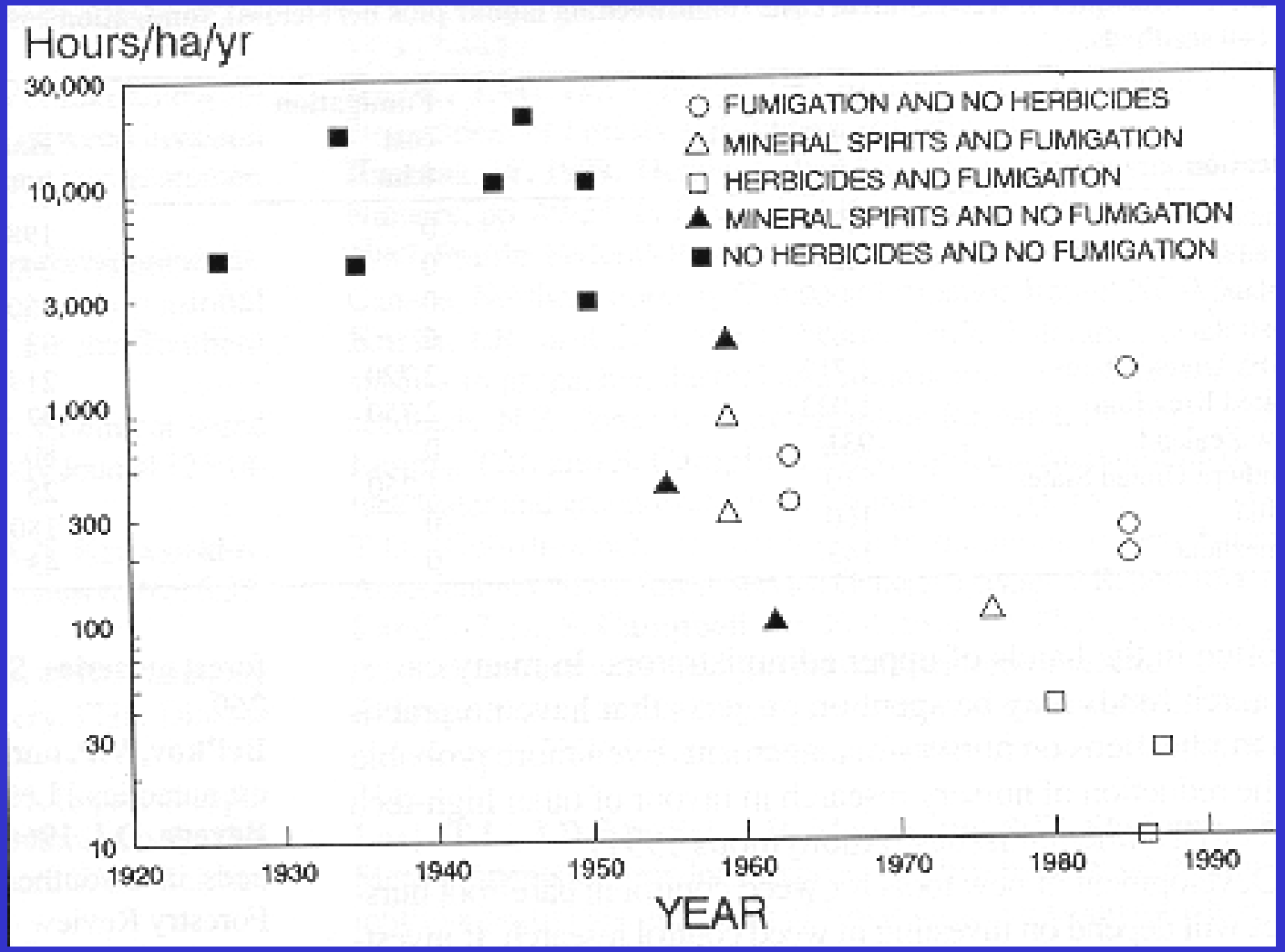


7,300 6,000 10,300 lbs tree nurseries

Pesticide use 1989-92



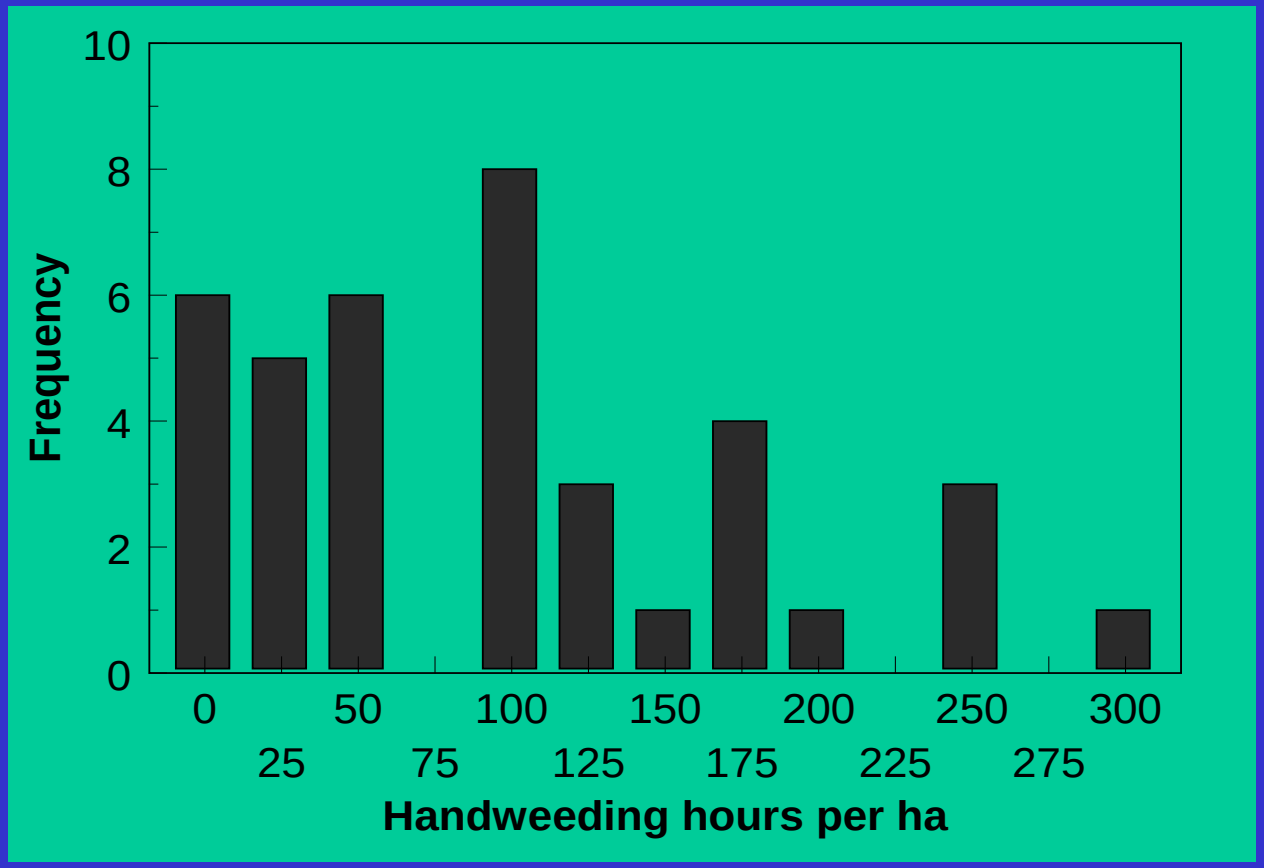
Handweeding times in forest tree nurseries.



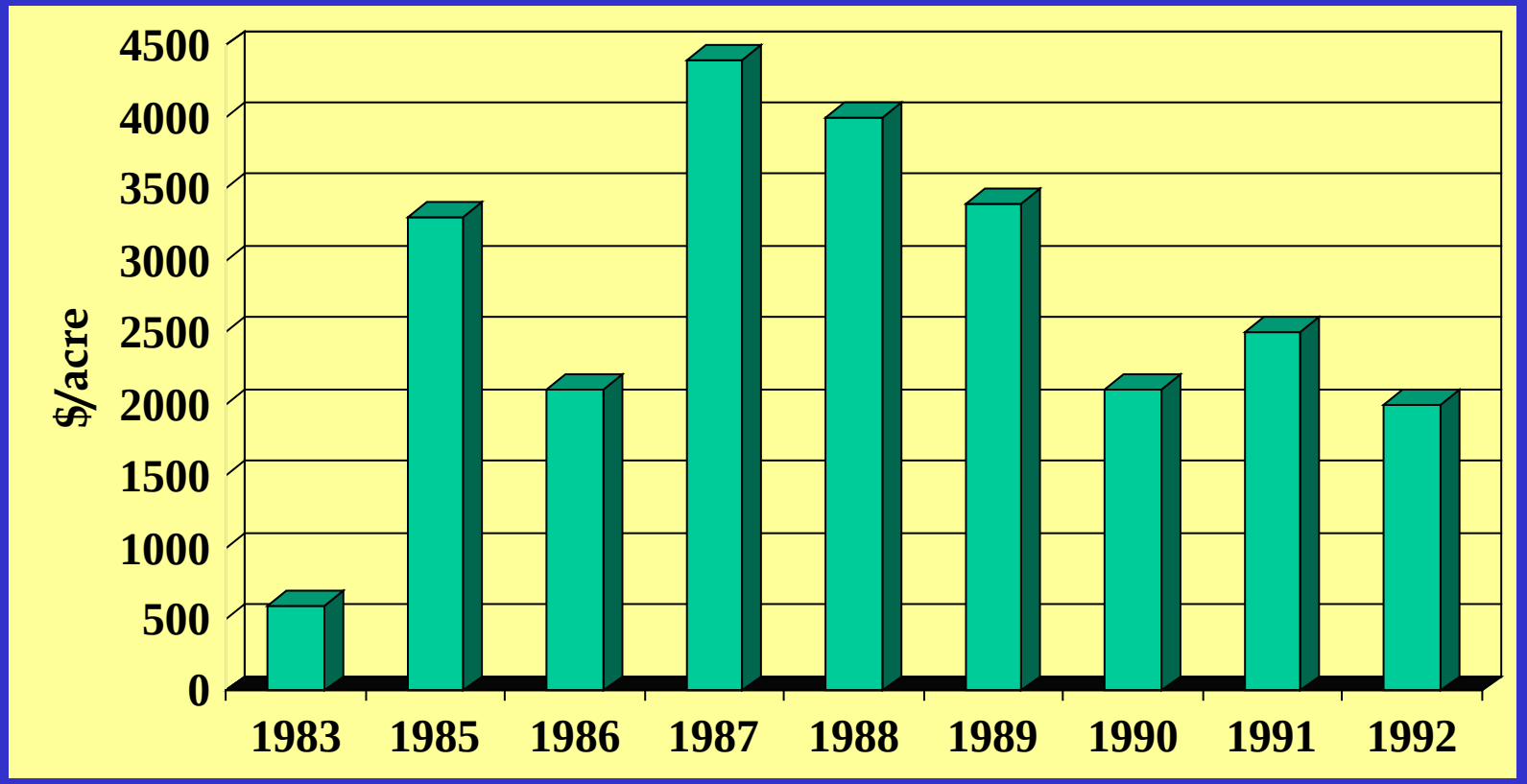
Handweeding in 2000

- 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*

CHUFA

GLENDALE ENTERPRISES, INC.

Chufas

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

Up
Next

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

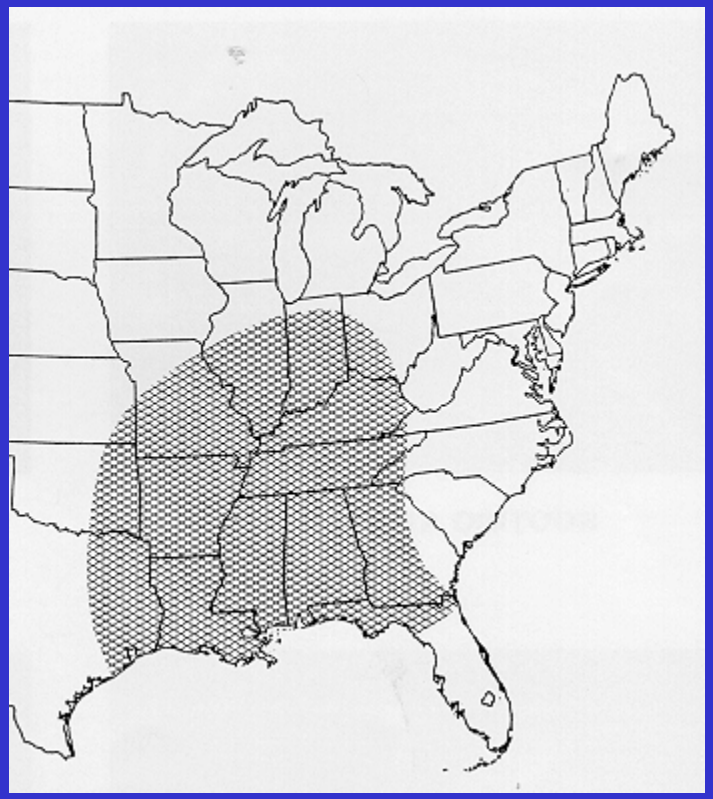
1 tuber = 280 shoots in 6 months

All within 10 feet

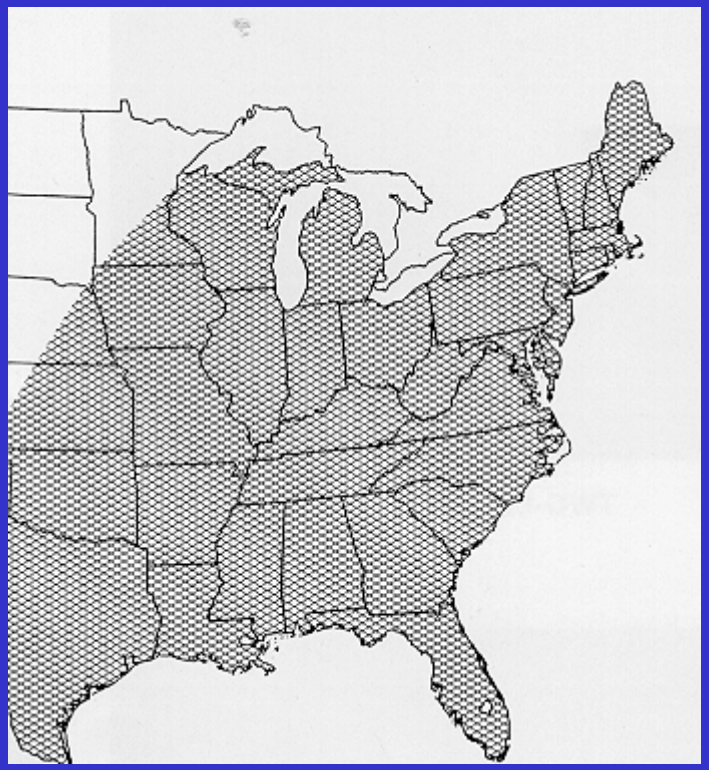
Annual sedges: Flathead sedge 12% of nurseries

Annual broadleaf: Prostrate spurge 65% of nurseries

Prostrate spurge



Spotted spurge



Prostrate spurge

FLOWER

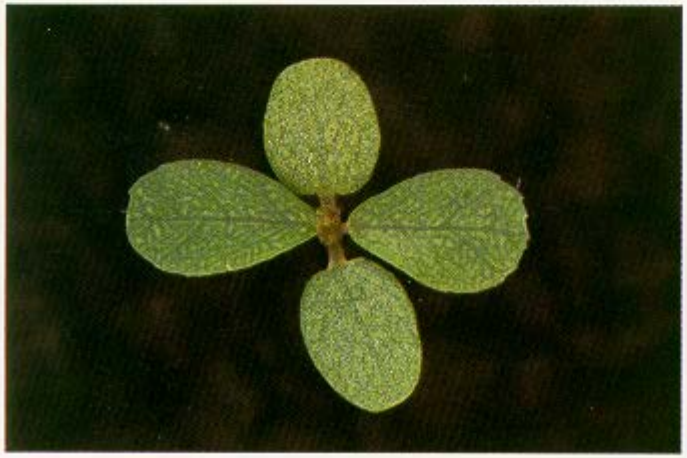
YOUNG SEEDLINGS

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: marestail 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?

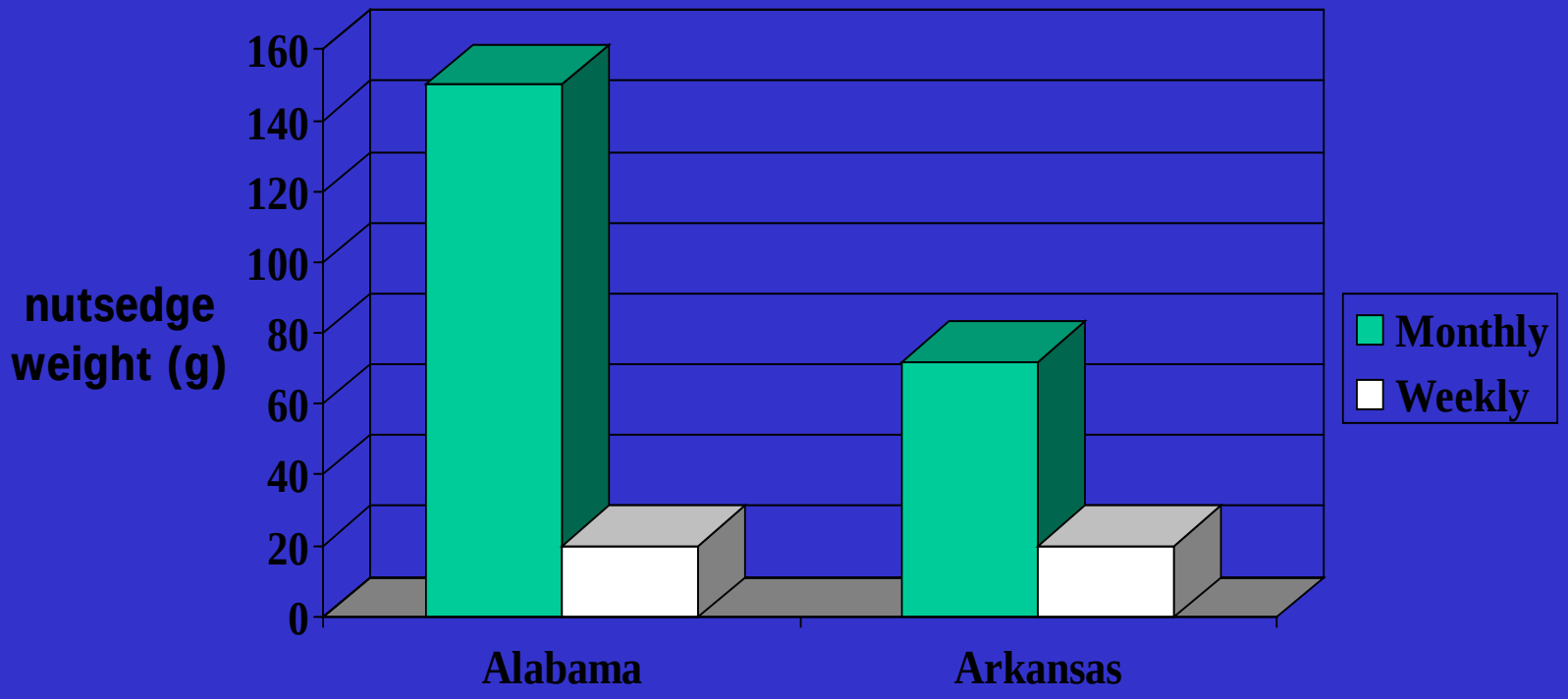
Soil Fumigation…and sanitation and a 24/7 weed management program

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

Easiest

Seedbeds

cover-crop

fallow


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

- Eptam (PPI 14 days before sowing)

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	Roundup-ultramax	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**
  - **Roundup**
  - **Oust**
- **Second spot spray**
  - **Roundup**
- **Third spot spray**
  - **Roundup**

Al Pest Management Handbook Weed control ratings (0-10)

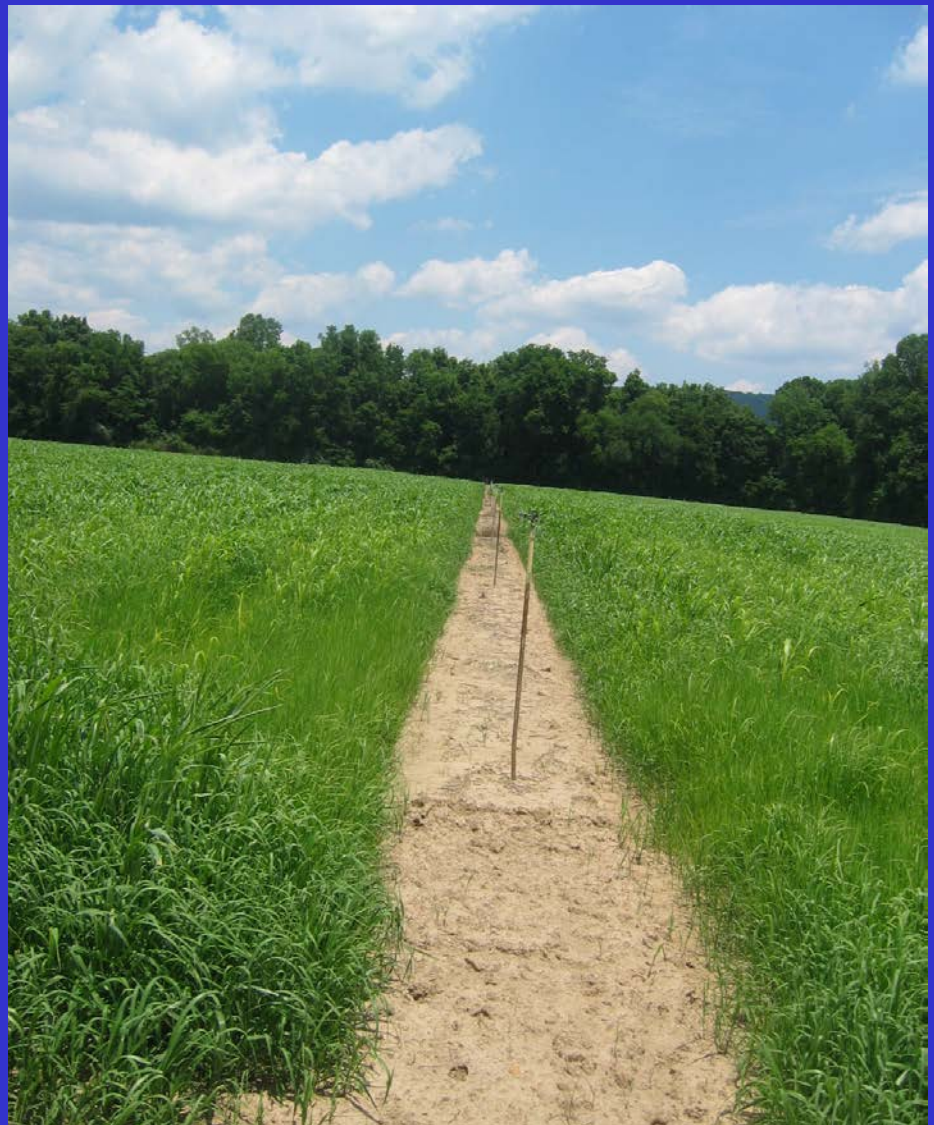
	Cobra	Reflex	Duel	MSMA	First Rate	Eptc	Roundup	Permit Sedgehammer
Yellow nutsedge	2	4	1	7	6	7	7	8
Purple	2	4	6	7	6	7	7	8

Selective Nutsedge Herbicides for cover-crops

- Permit – Field corn – grain sorghum
- 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?

Rate product/acre

Cobra 2EC	13 fl oz	Apply before 1” diameter
Pendulum AquaCap	34 fl oz	Apply at sowing
Scythe	1 gal/acre	Apply on hot day before 1” diameter

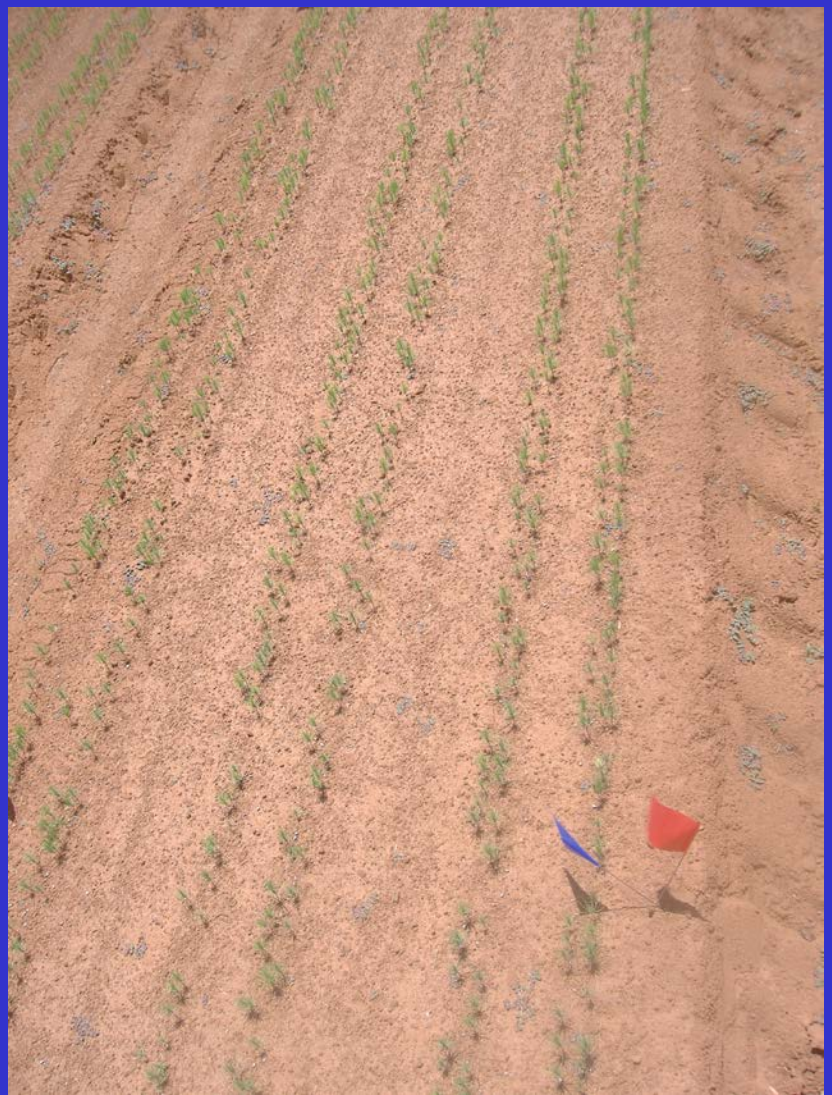
Spurge trials

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
CONTROL


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.

BUT YOU MUST HAVE THE SUPPLEMENTAL LABEL.

Equipment rut

0.2 ounce/acre

How do you control this weed?

How do you control sicklepod?

FUMIGATION IS NOT THE RIGHT ANSWER!

Supplemental Labeling

Dow AgroSciences

Dow AgroSciences LLC 9330 Zionsville Road Indianapolis, IN 46268-1054 USA

Stinger*

EPA Reg. No. 62719-73

Control of Sicklepod and Other Susceptible Broadleaf Weeds
in Southern Pine Seedbeds in Forest Nurseries

For distribution and use only in the states of Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia

Application Timing

General broadleaf weed control: For best results, apply when weeds are small and actively growing.
Sicklepod: For best results, apply after the majority of basal leaves have emerged.

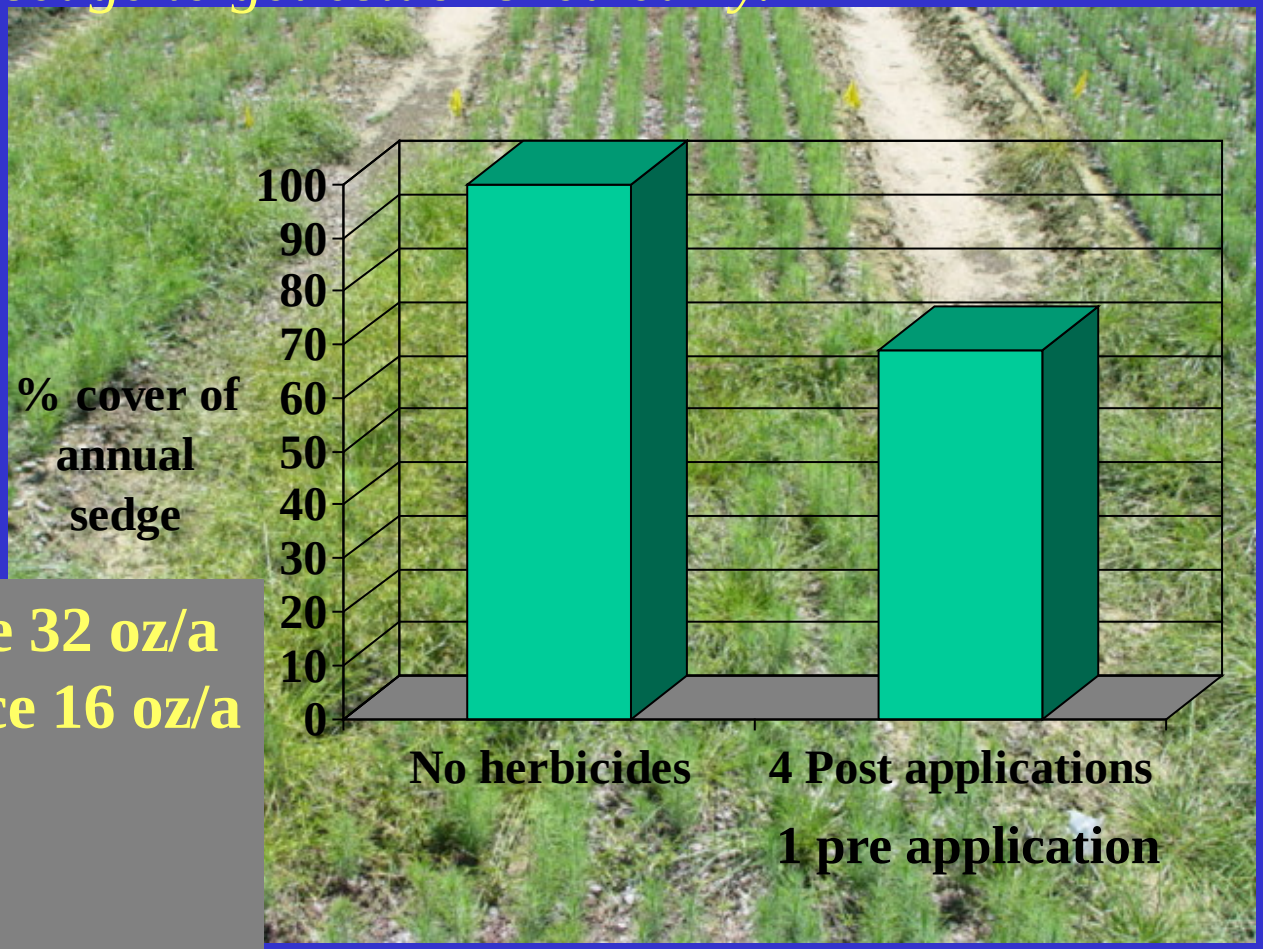
Application

Apply at a broadcast rate of 1/4 to 1/2 pt per acre in a spray volume of 20 or more gallons 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

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.

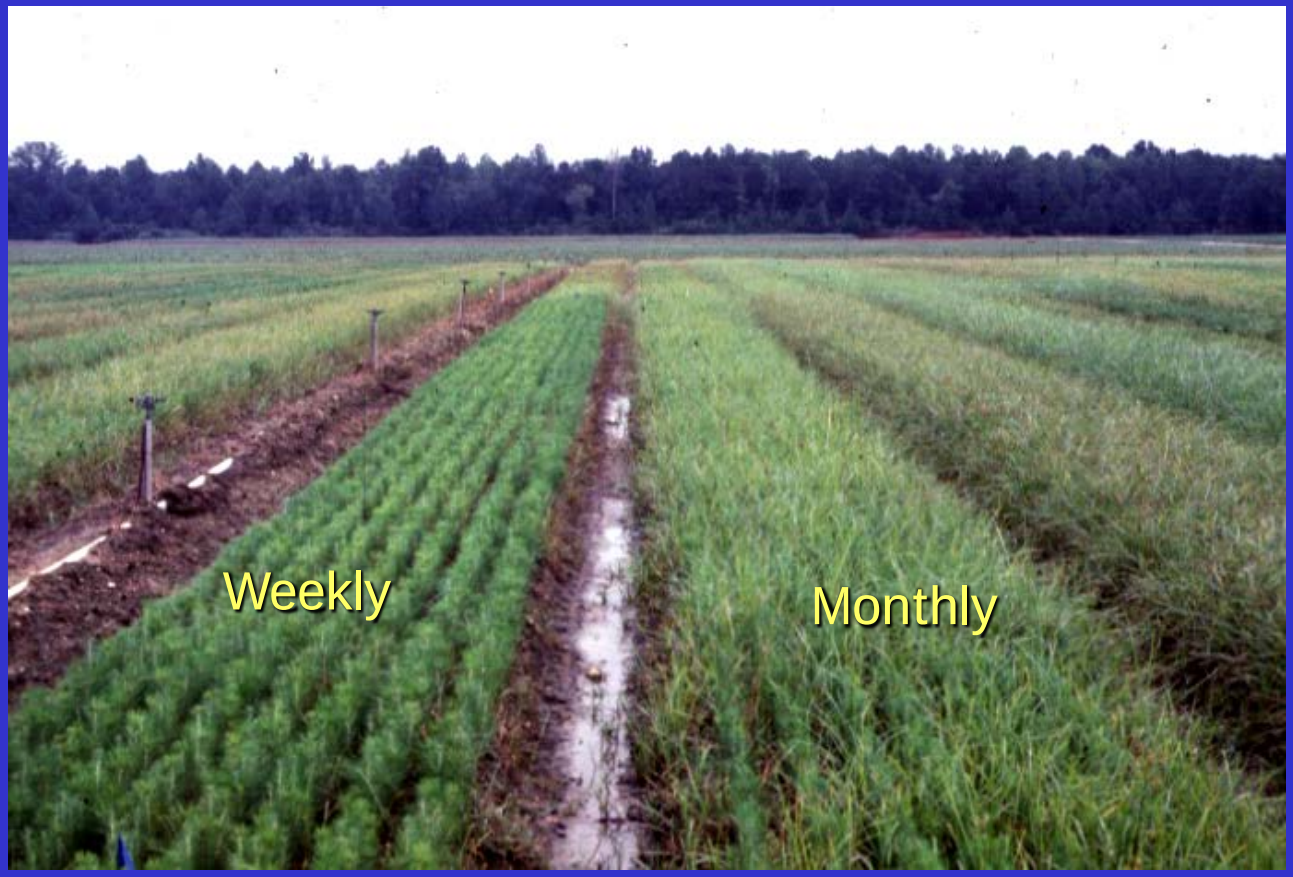


Goal preemergence 32 oz/a
Goal postemergence 16 oz/a
Cobra post 13 oz/a
Goal post 16 oz/a

Cobra post 13 oz/a

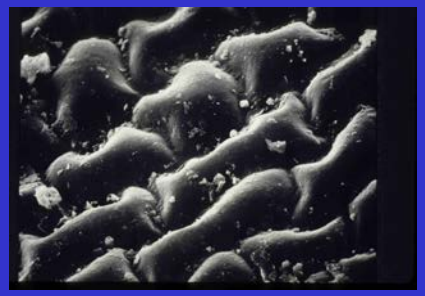
How do you control this weed?

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

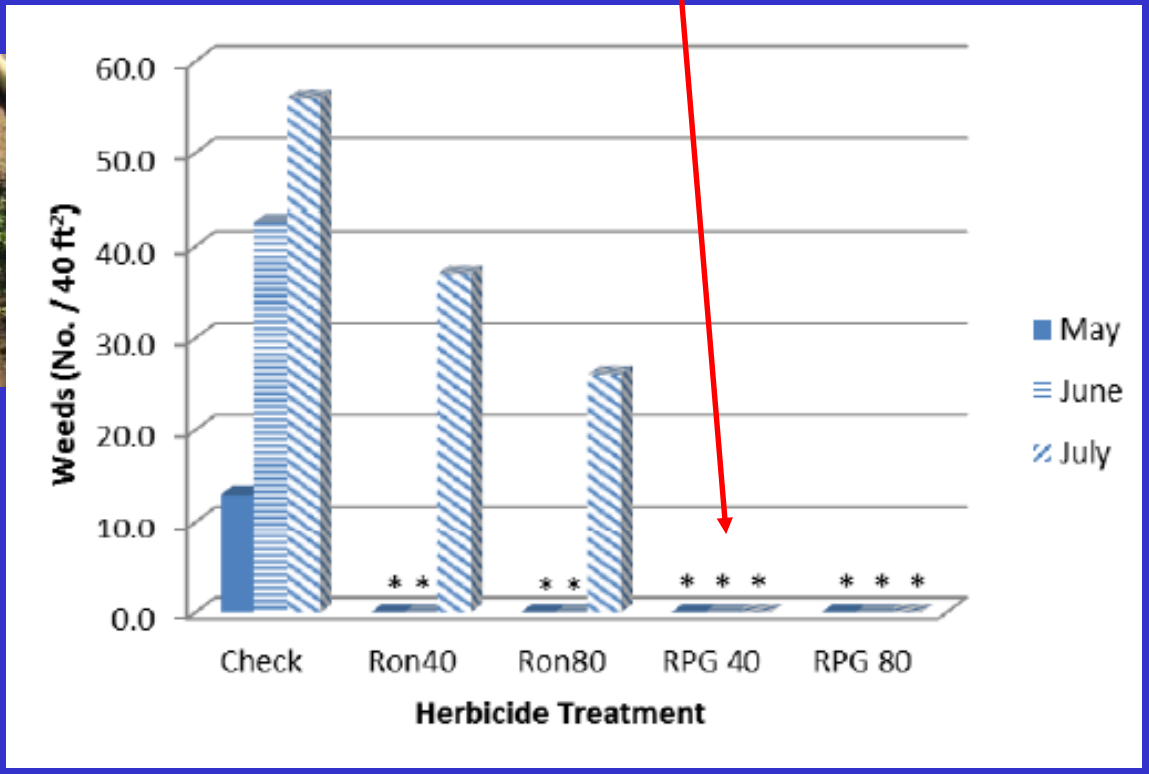


Weekly applications of low rates of Goal

Weekly applications of Goal repair breaks in the herbicide barrier.

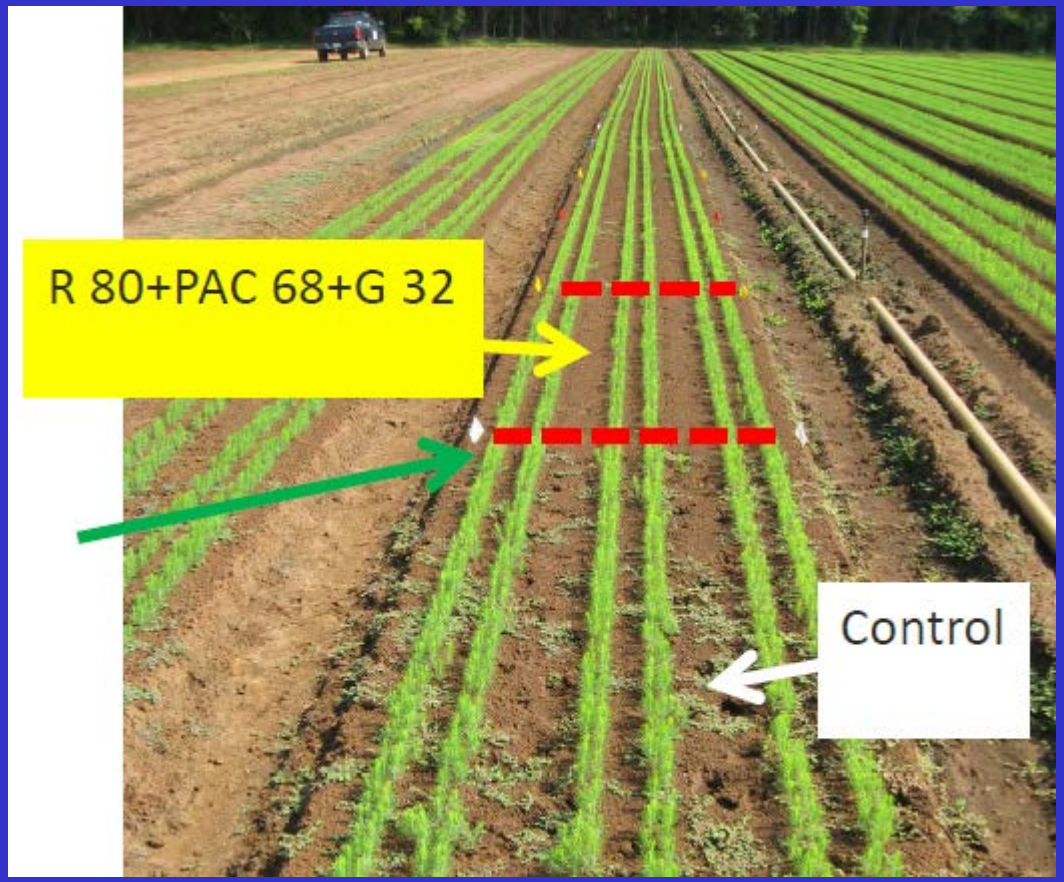
Preemergence

Ronstar Flow	*40 oz product per acre*
Pendulum AquaCap	*34 oz product per acre*
Goal 2XL	*32 oz product per acre*

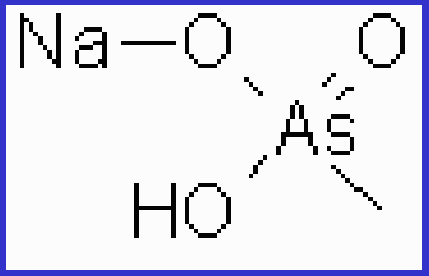


Preemergence

Ronstar Flow	*80 oz product per acre*
Pendulum AquaCap	*34 oz product per acre*
Goal 2XL	*32 oz product per acre*



Postemergence
Not legal



Check **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?

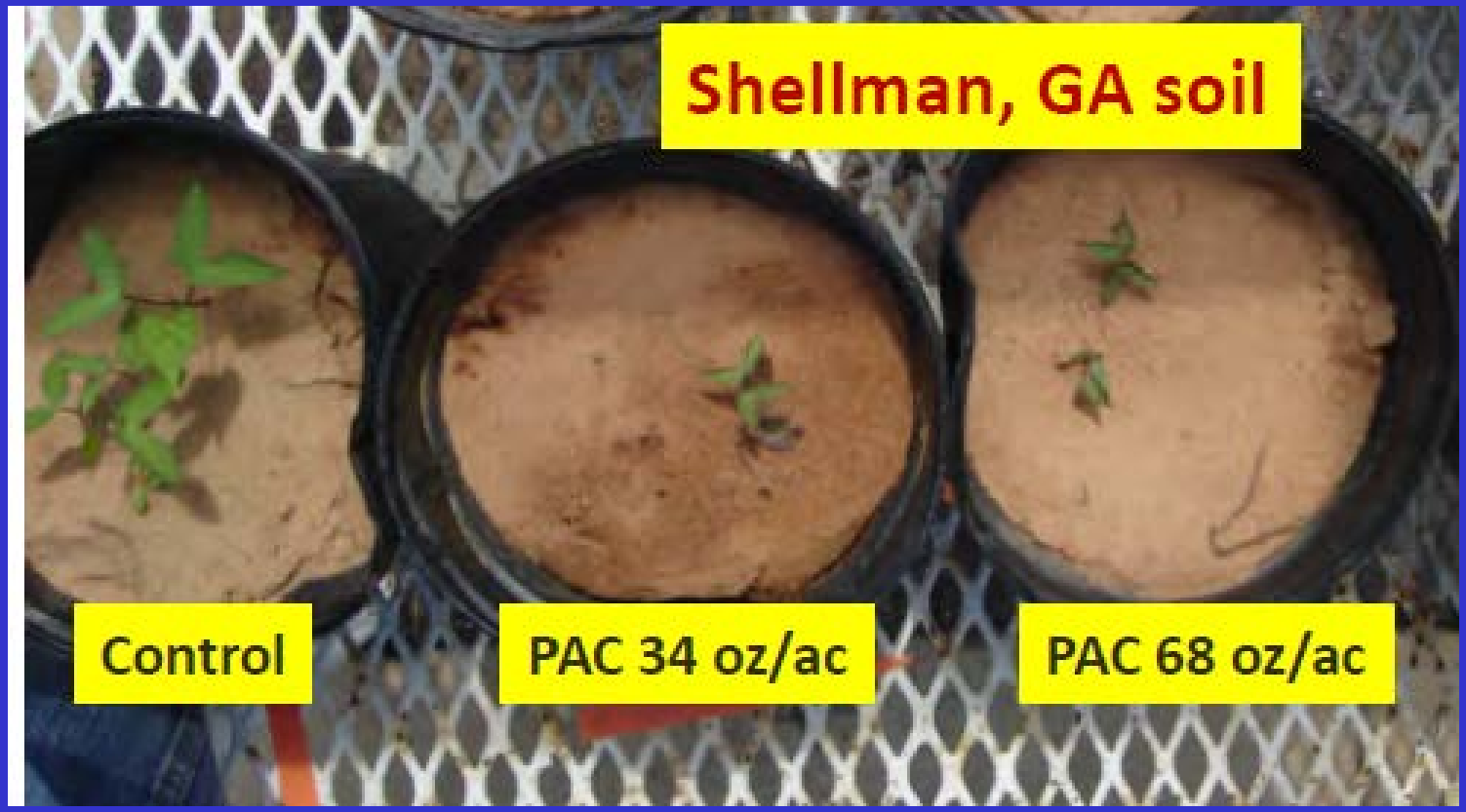
How do you control tall morningglory?

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

Chatsworth, GA Soil

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.

Cobra applied to very young seedlings.

Old seedlings Cobra just turns it black.

Some control with Escort

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?

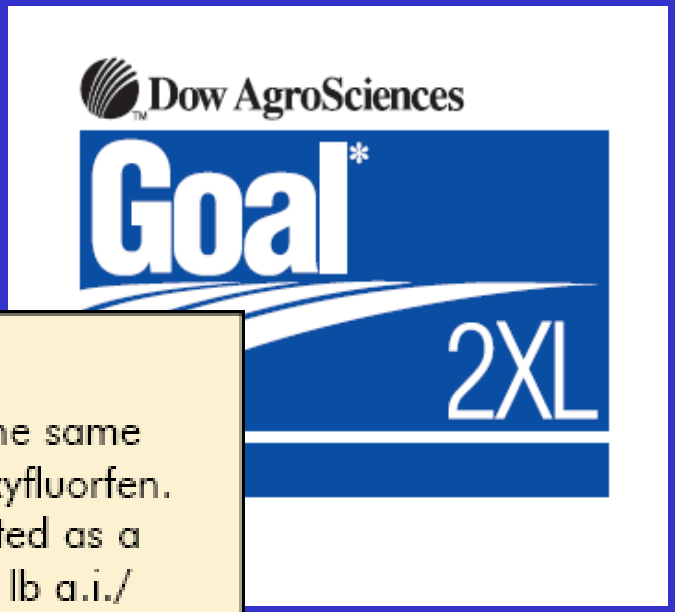

HERBICIDE
INSECTICIDE
TREFLAN
POAST
BASAGRAN
GOAL
MODOWN
VELPAR
KELTHANE
Eradicane
AAtrex
Poast
Basagran
Goal
Mobil
Modown

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



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

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

$$\frac{0.125 \text{ lbs/acre}}{2 \text{ lbs a.i./gallon}} = 1/16 \text{ gallon of Goal 2XL/A (or 8 fluid ounces)}$$

Excort XP

(60% a.i.)

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

How much product to measure out ??

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

Excort XP

(60% a.i.)

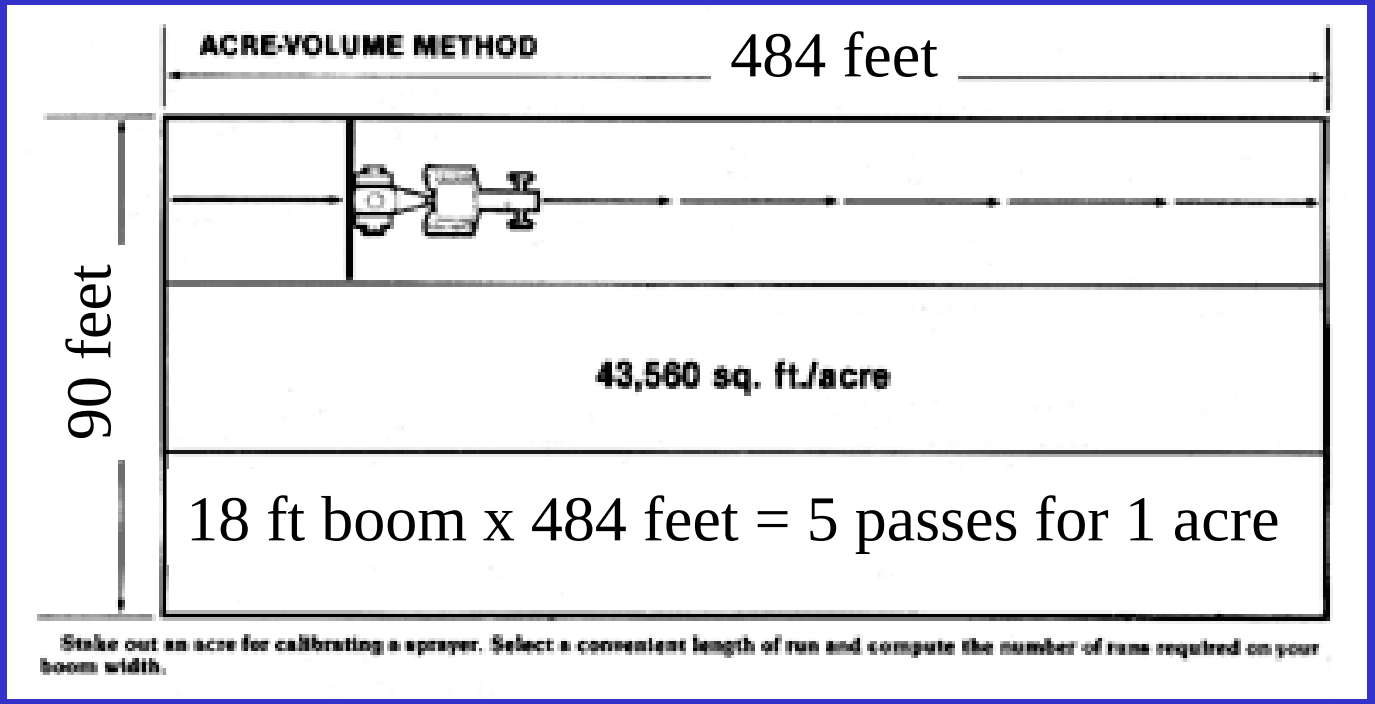
Tommy says apply 0.2 ounce product/acre

How much product to measure out???

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

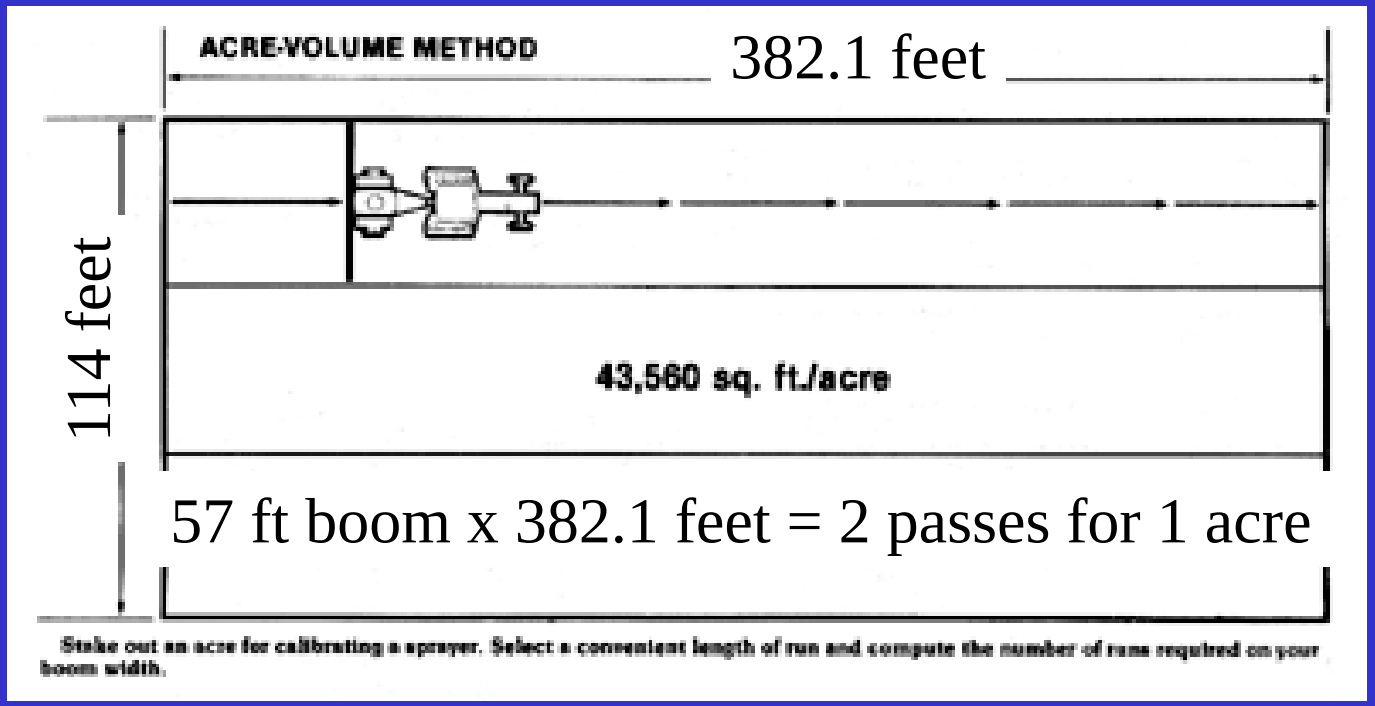
28.375*0.2 = 5.675 g product per acre

Calibration – 18’ boom



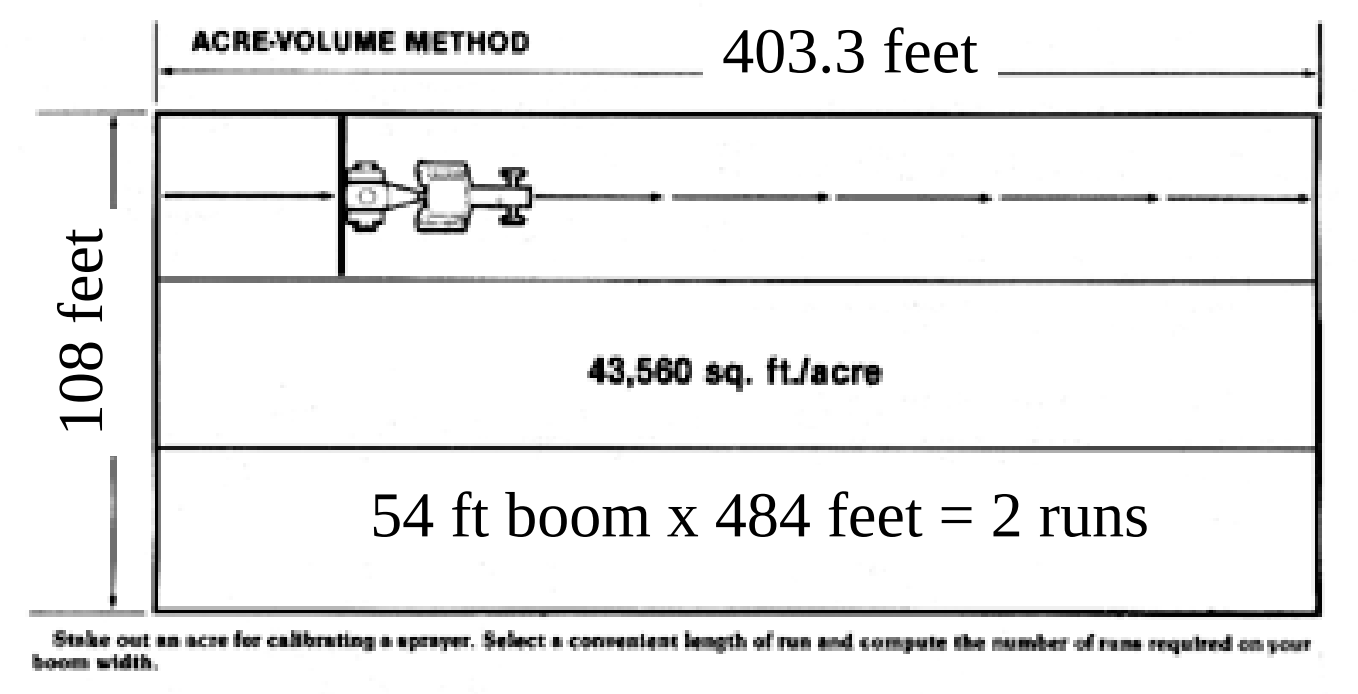
11 nozzles per boom…. 33 gallons per acre = 3 gallons/nozzle

Calibration – 57’ boom



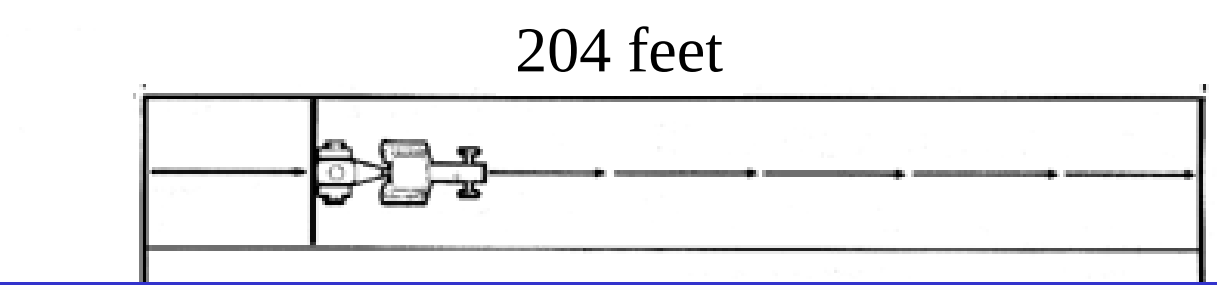
33 nozzles per boom…. 33 gallons per acre = 1 gallon/nozzle

Calibration – 54’ boom



32 nozzles per boom…. 32 gallons per acre = 1 gallon/nozzle

Calibration – 204’ method using 20” nozzle spacing



You drive the 204’ course three times and it averages 46 seconds.

You park the tractor and cath the spray from an average nozzle for 46 seconds. You measure 33 ounces… and therefore are Calibrated to spray 33 gallons per acre

Use 204’ only for 20” nozzle spacing

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.

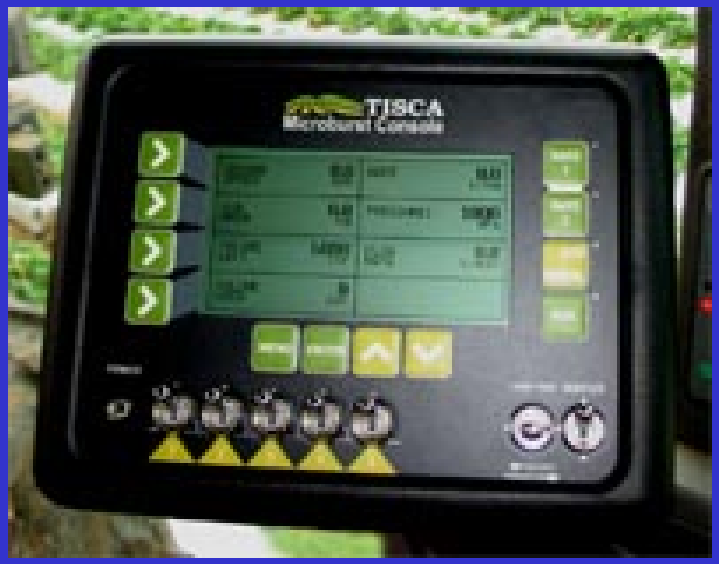
This free mobile smartphone app is designed for iPhone, iPod Touch, iPad and Android devices. Select the appropriate icon to download.

If you have questions regarding this sprayer calibration app, please contact Jeremy Greene <greene4@clemson.edu>.

Mix My Sprayer for iOS and Android

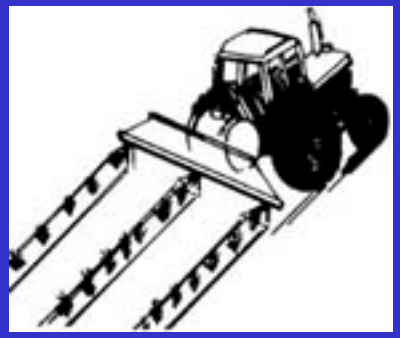
Mix My Sprayer was created to aid with quick, accurate calculations of product mixes to be applied with spraying equipment. Users can create custom lists of favorite products by category. Simply add or select a product, insert values in each input box, and the app automatically calculates the amount 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?