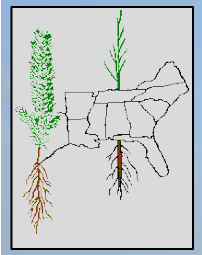
Pendulum AquaCap Trials at Sowing



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AUBURN

FORESTRY AND WILDLIFE SCIENCES

PENDULUM® Herbicide
AquaCap™

How It Works

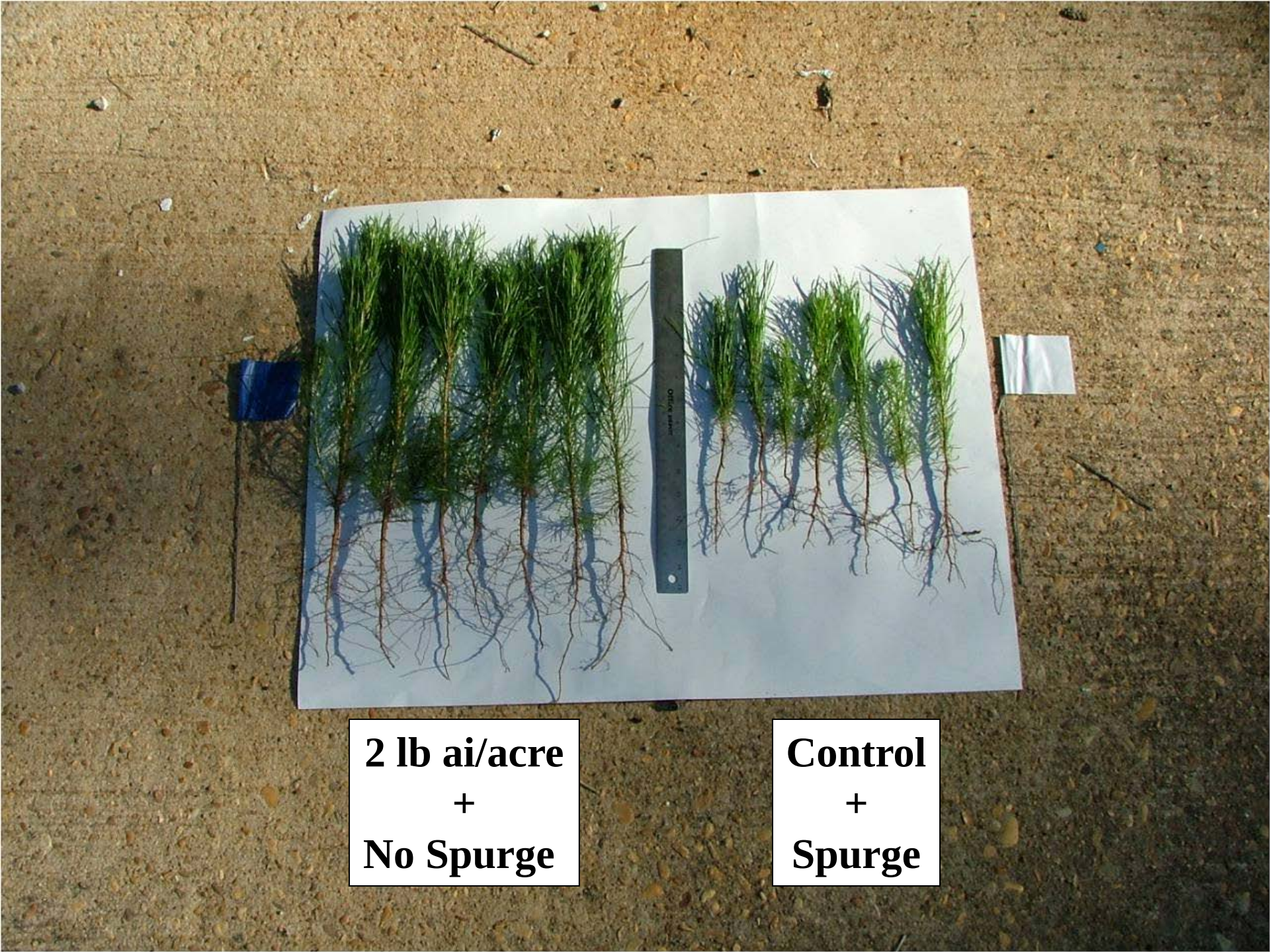
Pendulum AquaCap encapsulates a water-based formulation of the industry's leading preemergent active ingredient — BASF pendimethalin — in an ultra-thin microcapsule.

Capsules are primarily broken by drying and wetting of the capsule walls, but can also be ruptured by other factors (impact, friction, biological action, etc.) to release the active ingredient.

When the microcapsule is broken, it releases the pendimethalin.

TIMING IS IMPORTANT

- SEED SOWN APRIL 28
- PHOTO TAKEN MAY 21
- HERBICIDE APPLIED MAY 26


2 lb ai/acre
+
No Spurge
Control
+
Spurge


Gall from Pendulum
AquaCap (PAC)

Pendulum AquaCap Facts, Thus Far…..

- No stunting or loss of seedlings from Pendulum AquaCap.
- Spurge control good with preemergence application.
- Galls can occur at some nurseries at 2 lb ai/acre rate and frequency is rate dependent.

The formation of herbicide galls is most likely dependant on three factors:

1. Specific nursery (possibly climate, soils, OM, etc?)
2. Timing of application
3. Rate applied

PAC Study Objectives in 2010

- To gather more data on gall formation and seedling quality with applications at sowing
- To test dimethenamid (Tower®) with PAC at sowing
- To evaluate the use of pine bark mulch as a factor in herbicide gall formation

Dimethenamid (Tower®) and Spurge Control

		30 days after treatment	
Treatment	**Rate**	**Cotyledon stage**	**2-4 leaf stage**
Freehand	200 lbs	3.9 c	5.0 bc
Freehand	400 lbs	9.9 a	6.0 b
Tower	1.5 lbs aia	10.0 a	4.0 c
Tower	3.0 lbs aia	10.0 a	8.7 a
Pendulum	2 lbs aia	10.0 a	8.0 a
Pendulum	4 lbs aia	10.0 a	8.7 a
Non-treated		1.0 d	1.0 d

Marble et al. 2009

Trial 1

Herbicide	Product/Acre (oz)	Rate
Control	0	------
PAC	34	1X
PAC	68	2X
PAC + Pine Bark	68	2X
PAC + Tower	34 + 21	1X + 1X

Trial 1 took place at:

- Camden, AL
- Elberta, AL
- Trenton, SC

Camden, AL

Sown: April 19; Treated: April 20; Lifted: Nov 8

Treatment (Prod/acre)	Herbicide(s)	Density (ft^2)	RCD (mm)	Height (cm)	RWR (%)
68 oz	PAC	20.7 b	4.96 a	27.5 a	18.1 a
68oz	PAC + Bark	26.1 a	4.67 a	28.6 a	17.1 a
34 oz + 21 oz	PAC + Tower	------	------	------	------
LSD (α=0.05)	------	(3.8)	(0.41)	(3.0)	(2.6)

NO GALLS

N = 25 seedlings/treatment

Elberta, AL

Sown: April 22; Treated: April 26; Lifted: Dec 1

Treatment	Herbicide(s)	Density	RCD	Height	RWR
68 oz	PAC	17.3 a	4.65 b	26.3 a	20.5 b
68oz	PAC + Bark	17.7 a	4.53 b	26.2 a	19.5 bc
34 oz + 21 oz	PAC + Tower	8.0 b	5.91 a	26.9 a	23.0 a
LSD (α=0.05)	------	(2.9)	(0.56)	(1.7)	(1.9)

NO GALLS

N = 25 seedlings/treatment

Trenton, SC

Sown: April ??; Treated: April 12; Lifted: Nov 15

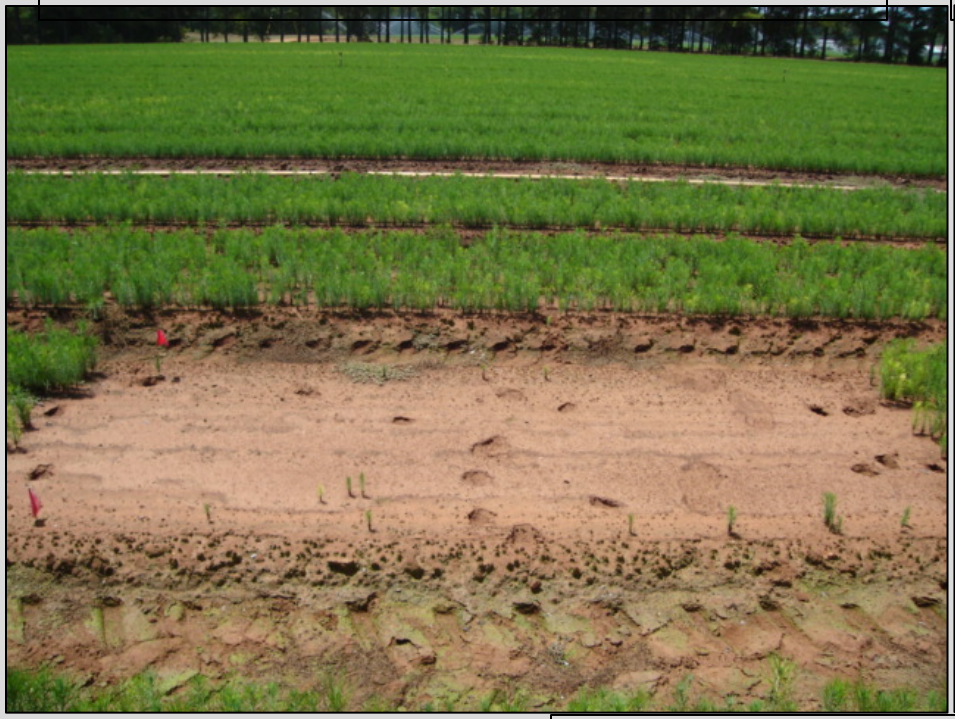
Treatment	Herbicide(s)	Density	RCD	Height	RWR
68 oz	PAC	21.7 a	5.00 a	28.2 a	24.2 b
68oz	PAC + Bark	25.8 a	4.72 a	27.6 a	24.8 ab
34 oz + 21 oz	PAC + Tower	------	------	------	------
LSD (α=0.05)	------	(5.2)	(0.35)	(1.4)	(2.7)

NO GALLS

N = 25 seedlings/treatment

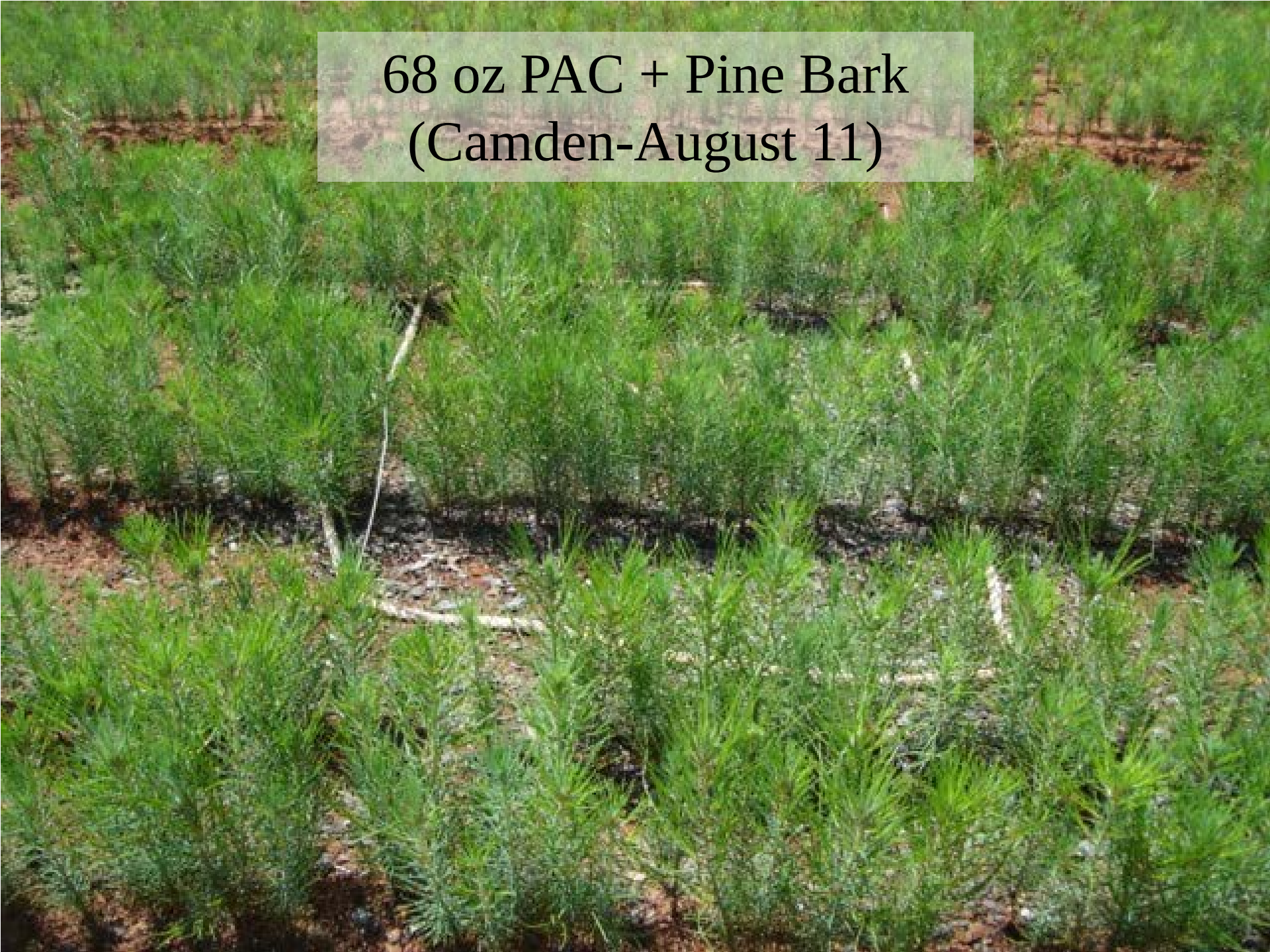
Tower Controlled Spurge and Loblolly Pine

34 oz PAC & 21 oz Tower



68 oz PAC

Camden, AL
Treated-April 20, 2010
Pictures-August 11, 2010


68 oz PAC + Pine Bark
(Camden-August 11)

Trial 2-Flint River, GA

Herbicide	Product/Acre (oz)	Rate
Control	0	------
PAC	34	1X
PAC	68	2X
PAC + Tower	34 + 21	1X + 1X
PAC + Tower	68 + 42	2X + 2X

Herbicide was applied over pine bark that was put down by the nursery staff.

Results

Flint River, GA

Sown: May 10; Treated: May 10; Lifted: Oct 5

Treatment	Herbicide(s)	Density	RCD	Height	RWR
68 oz	PAC	27.1 a	3.20 a	26.8 a	12.6 ab
34 oz + 21 oz	PAC + Tower	20.4 b	3.05 a	21.5 b	12.1 b
68 oz + 42 oz	PAC + Tower	9.1 c	3.12 a	18.0 c	13.4 ab
LSD (α=0.05)	------	(3.0)	(0.18)	(2.5)	(1.5)

NO GALLS

N = 25 seedlings/treatment

Plots with Tower applied over pine bark had trees.

34 oz PAC & 21 oz Tower

68 oz PAC & 42 oz Tower

Flint River, GA
Treated-May 10, 2010
Pictures-October 5, 2010

Trial 3-Shubuta, MS

Herbicide	Product/Acre (oz)	Rate
Control	0	------
PAC	34	1X
PAC	68	2X
PAC + Tower	34 + 21	1X + 1X
PAC + Tower	68 + 42	2X + 2X

Herbicide was applied under pine bark that was put down by the nursery staff after we sprayed.

Results: No fish for Barry!!

Results-Shubuta, MS

Sown: April 22; Treated: April 23; Lifted: Oct 6

Treatment (Prod/acre)	Herbicide(s)	Density (ft^2)	RCD (mm)	Height (cm)	RWR (%)
Control		27.7 a	3.78 a	26.4 a	11.7 ab
34 oz + 21 oz	PAC + Tower	8.9 b	3.79 a	21.2 b	11.8 a
68 oz + 42 oz	PAC + Tower	2.4 c	3.75 a	16.4 c	13.1 a
LSD (α=0.05)	------	(2.7)	(0.25)	(1.9)	(1.6)

NO GALLS

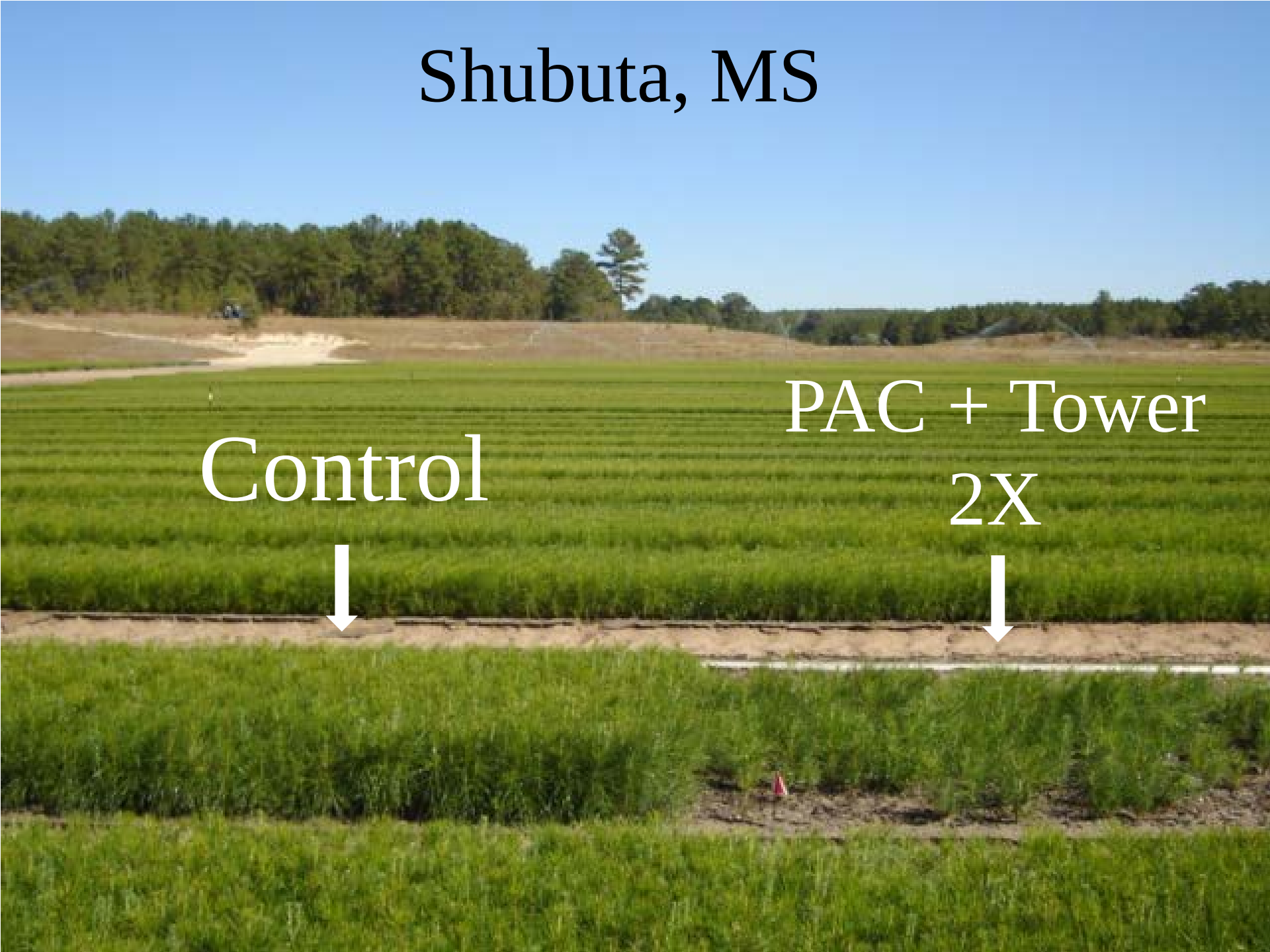
N = 25 seedlings/treatment

Plots with Tower applied under pine bark had trees.

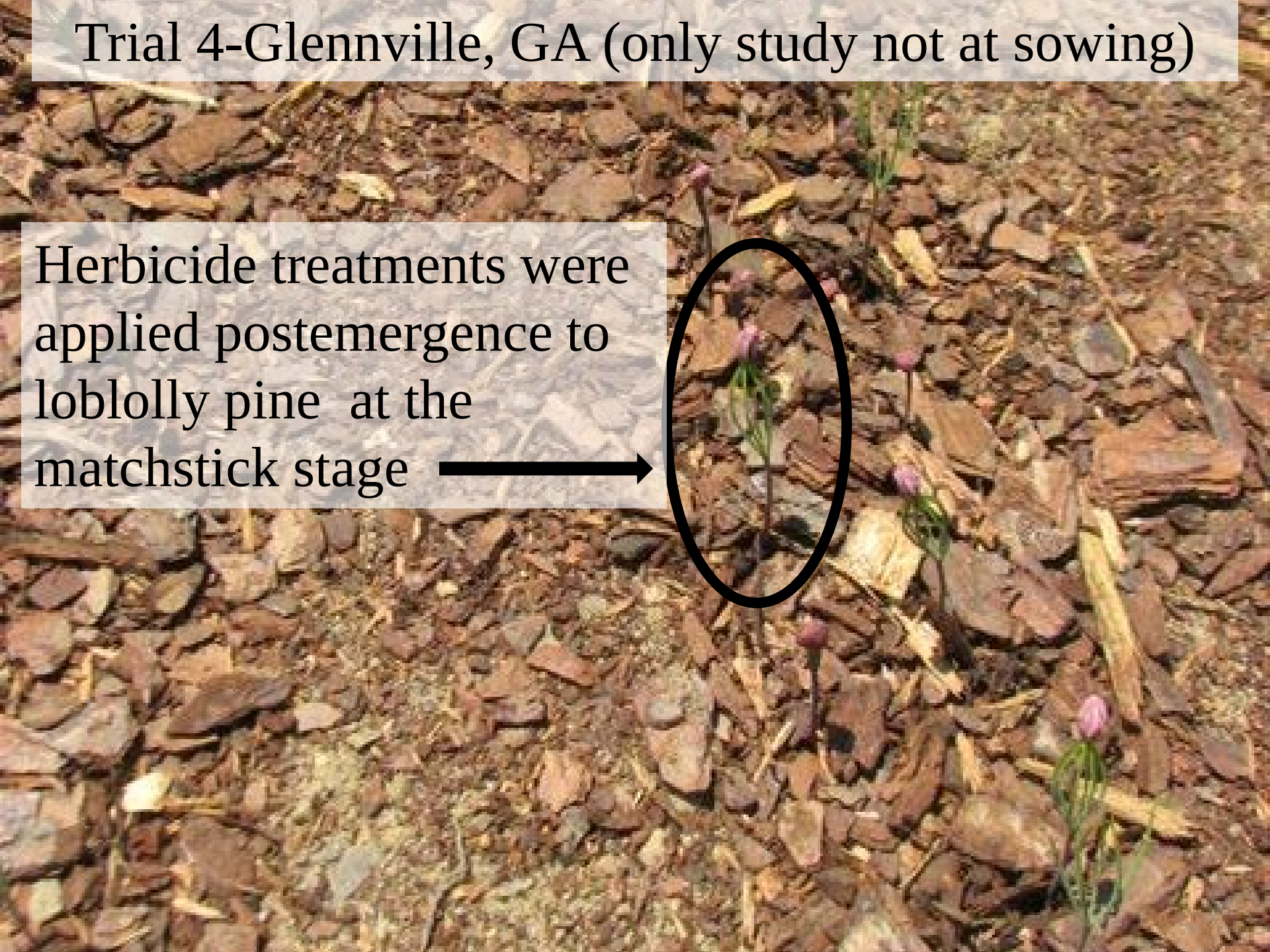
34 oz PAC & 21 oz Tower

68 oz PAC & 42 oz Tower

Shubuta, MS
Treated-April 23, 2010
Pictures-October 6, 2010


Shubuta, MS
Control
PAC + Tower
2X

Trial 4-Glennville, GA (only study not at sowing)



Trial 4-Glennville, GA

Herbicide	Product/Acre (oz)	Rate
Control	0	------
PAC	34	1X
PAC	68	2X
PAC + Tower	34 + 21	1X + 1X
PAC + Tower	68 + 42	2X + 2X

Herbicide was applied over pine bark that was put down by the nursery staff before we sprayed the seedlings.

Results-Glennville, GA

Sown: April 14; Treated: April 29; Lifted: Oct 20

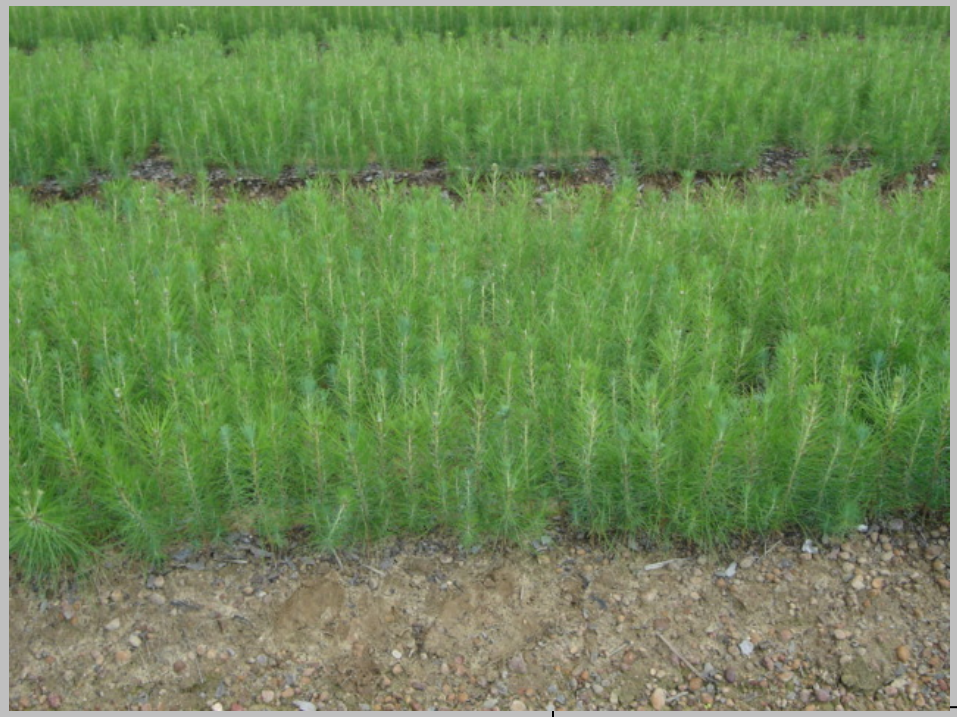
Treatment	Herbicide(s)	Density	RCD	Height	RWR	Galls
68 oz	PAC	20.0 ab	4.46 a	28.4 ab	16.6 a	3.6 a
34 oz + 21 oz	PAC + Tower	19.2 bc	4.44 a	27.1 b	17.1 a	3.0 a
68 oz + 42 oz	PAC + Tower	17.4 c	4.58 a	27.1 b	16.7 a	4.2 a
LSD (α=0.05)	------	(2.2)	(0.22)	(1.7)	(1.4)	(2.5)

GALLS!

N = 25 seedlings/treatment

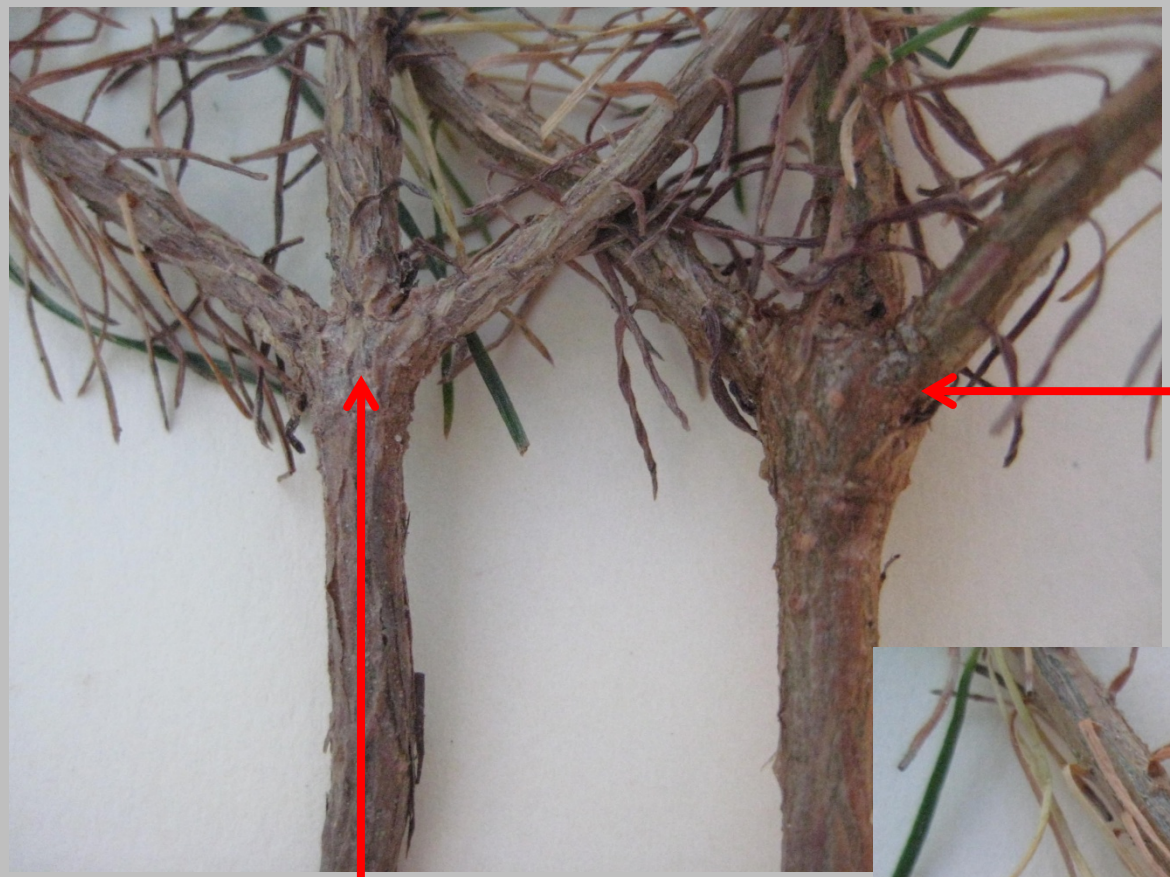
Applying Tower postemergence to loblolly pine and over pine bark resulted in higher seedling densities.

34 oz PAC & 21 oz Tower



68 oz PAC & 42 oz Tower

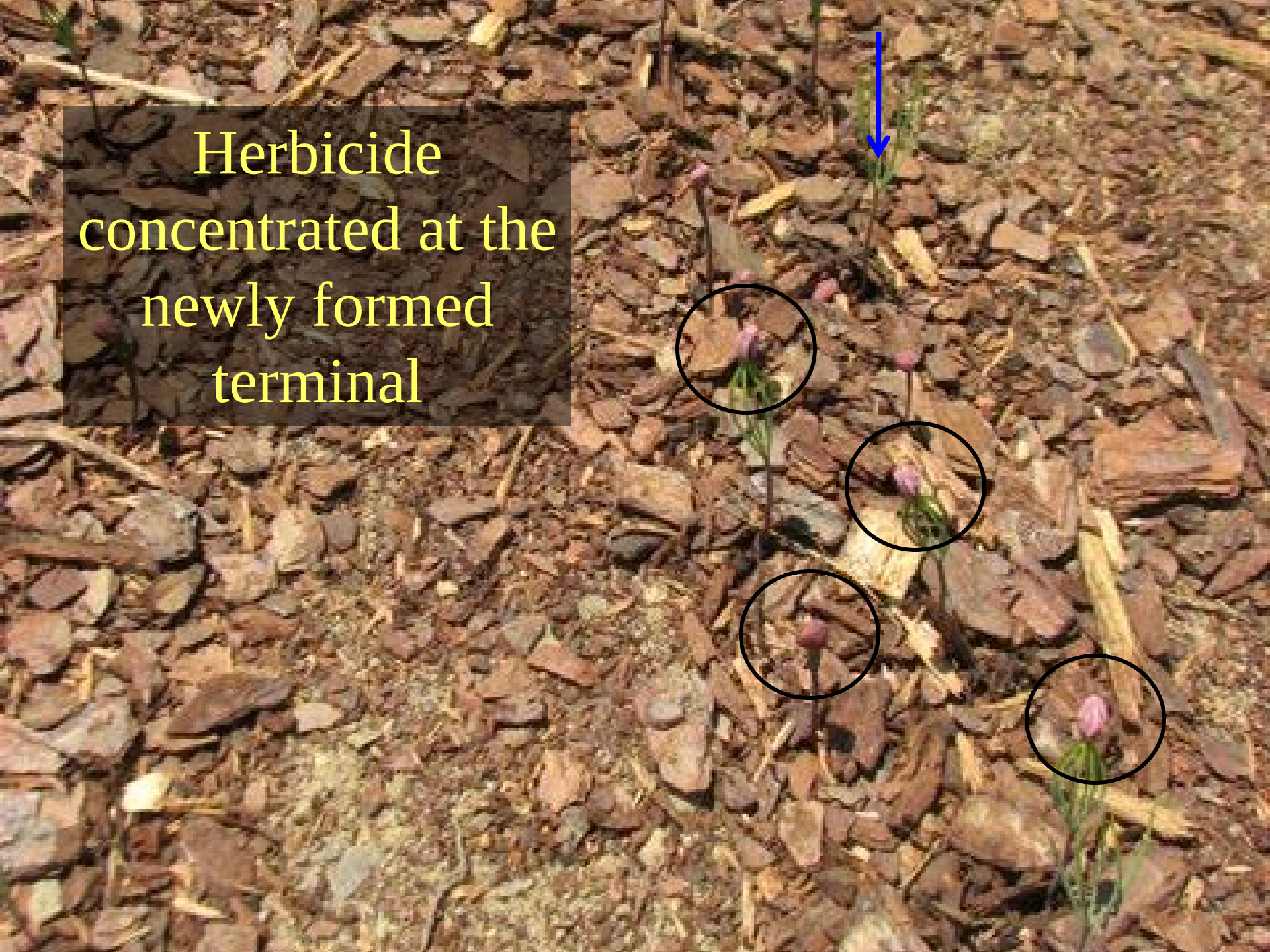
Glennville, GA
Treated-April 29, 2010
Pictures-August 6, 2010



Glennville, GA

Herbicide Galls

No Gall


Herbicide concentrated at the newly formed terminal

Conclusions

- Managers who intend to apply Pendulum Aquacap operationally to pines or hardwoods should consider treating small lots first to determine if the genotypes they sow will form galls when exposed to this herbicide.

- Preliminary results suggest that the best time to apply Pendulum Aquacap for pines is at sowing.
- The chance of gall formation is lower and timing for spurge control is better.

- Tower (dimethenamid) is not registered for use in forest tree nurseries and is bad news for loblolly pine.

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