Update on Herbicide Trials for Weed Control

2014 SFNMC Contact Meeting
Williamsburg, VA
July 21, 2014

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Outline of Talk

1. 6 trials conducted in 2013/2014

2. 3 trials in process this year

6 trials conducted in 2013/14:

- 3 - Pendulum AquaCap
- 1 - Marengo
- 1 - RonstarFlo
- 1 - Clearcast

Pendulum AquaCap

BASF

2.5 gallon container

approx. $140

PAC Operational Trial

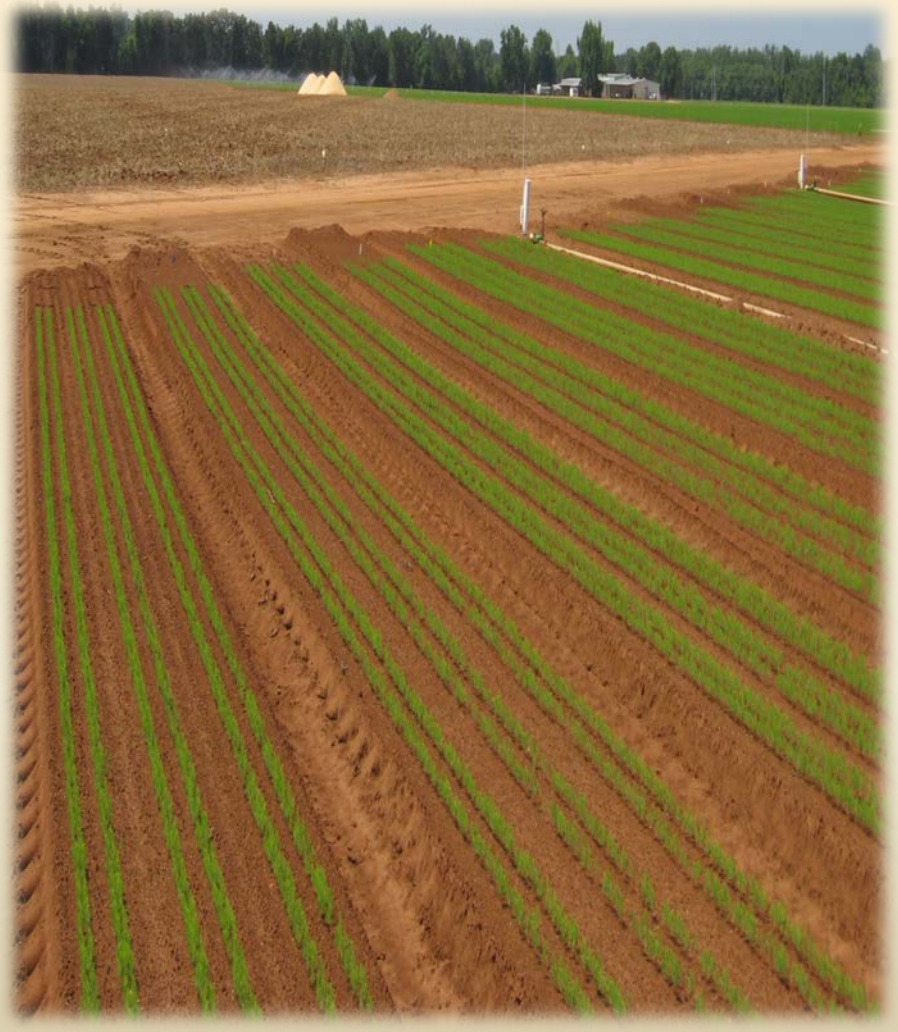
- PAC is effective in controlling spurge
- PAC should be applied at sowing to avoid galls
- In order to make one spray pass, is a combined PAC, Goal2XL and soil stabilizer application made at sowing effective?

SFNMC Research Report 14-01

3 sprays applied operationally with soil stabilizer:

- Goal2XL only
- Tank mix of Goal2XL + PAC 34 oz/ac (low rate)
- Tank mix of Goal2XL + PAC 68 oz/ac (high rate)

- at sowing
- on second-year fumigated ground

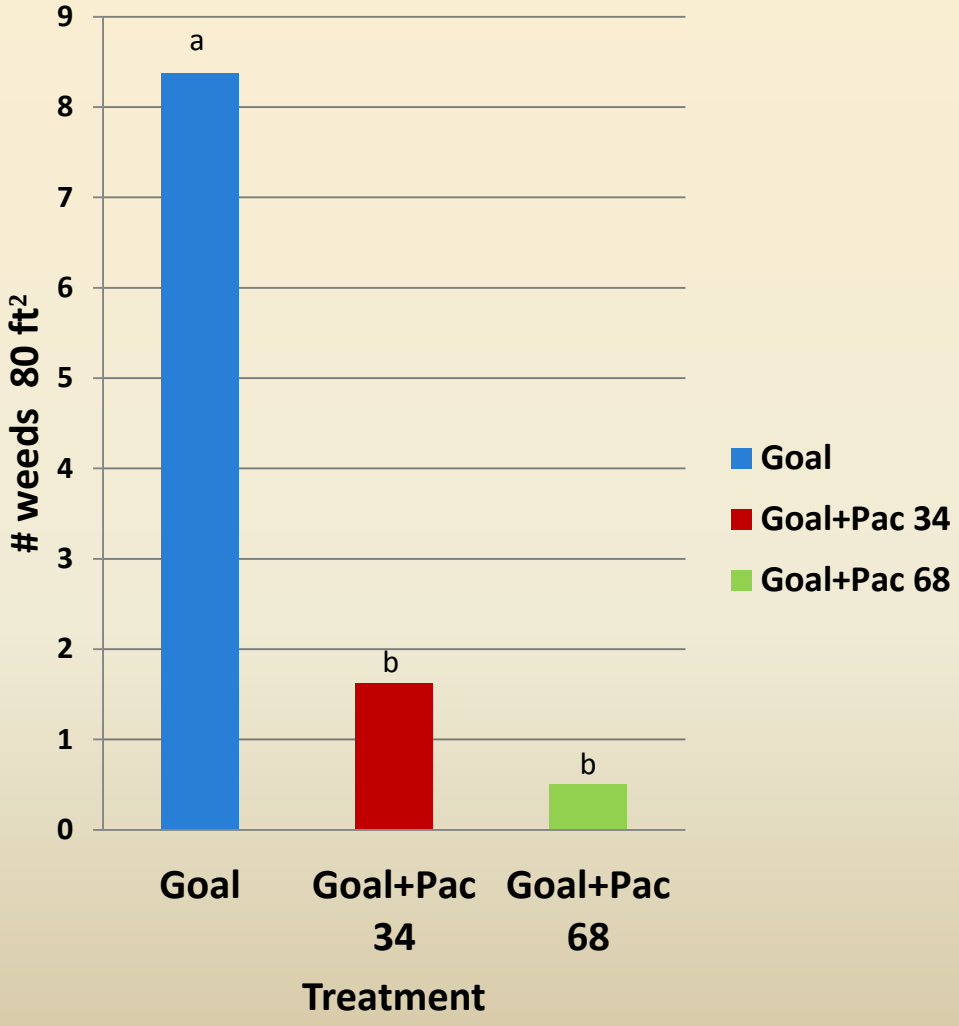


- **Both low and high rates of PAC in tank mix greatly reduced spurge populations**

- **No statistical differences were seen between low and high rates of PAC, so lower rate could be more cost-efficient**

- **No adverse effects were seen nor were galls produced on loblolly pine for applications of both rates of PAC made at sowing**

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



PAC can be mixed with Goal2XL and soil stabilizer applied at sowing for control of spurge

PAC Outplanting Trial

- PAC should be applied at sowing to avoid galls
- If spraying occurs later than sowing and galls DO form, what is effect of galls on seedling performance after outplanting?

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Research

Report

14-02

- Sprayed loblolly pine seedlings at 8 weeks to induce gall formation

- Planted trees with and without galls, planted deep and shallow, planted with and without irrigation

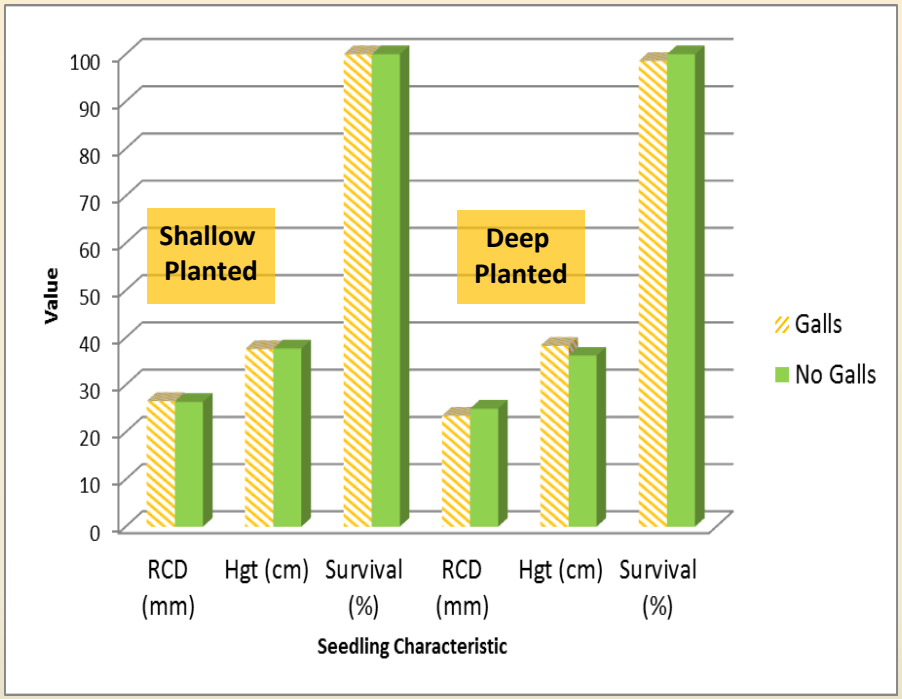
- Would seedlings with galls planted shallow without irrigation have poorest survival and morphology?

No effect of herbicide galls on:

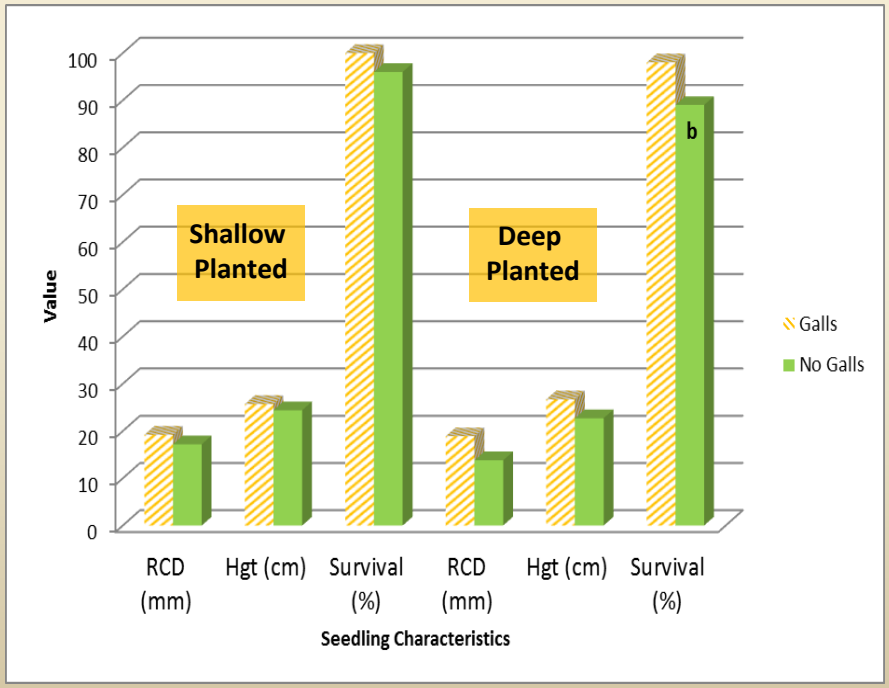
- **Seedling survival**
- **Ground line diameter**
- **Growth**

when planted either deep or shallow

Loblolly pine seedling characteristics with and without herbicide galls 12 months after planting either deep or shallow under irrigation.



Loblolly pine seedling characteristics with and without herbicide galls 12 months after planting either deep or shallow without irrigation.



Irrigated plots **Non-irrigated plots**

Even though herbicide galls show no outplanting issues,

APPLY PAC AT THE TIME OF SOWING

PAC Timing Trial

- PAC should be applied at sowing to avoid galls
- Galls typically form when PAC is sprayed 8-10 weeks post-sowing
- For late season spurge control, is there also a later time when it is safe to spray PAC to avoid galls?

SFNMC Research Report 14-03

Sprayed PAC at 2 rates:

- at 34 oz/ac (low rate)
- at 68 oz/ac (high rate)

at 3 times:

- 8 weeks post-sowing
- 12 weeks post-sowing
- 16 weeks post-sowing

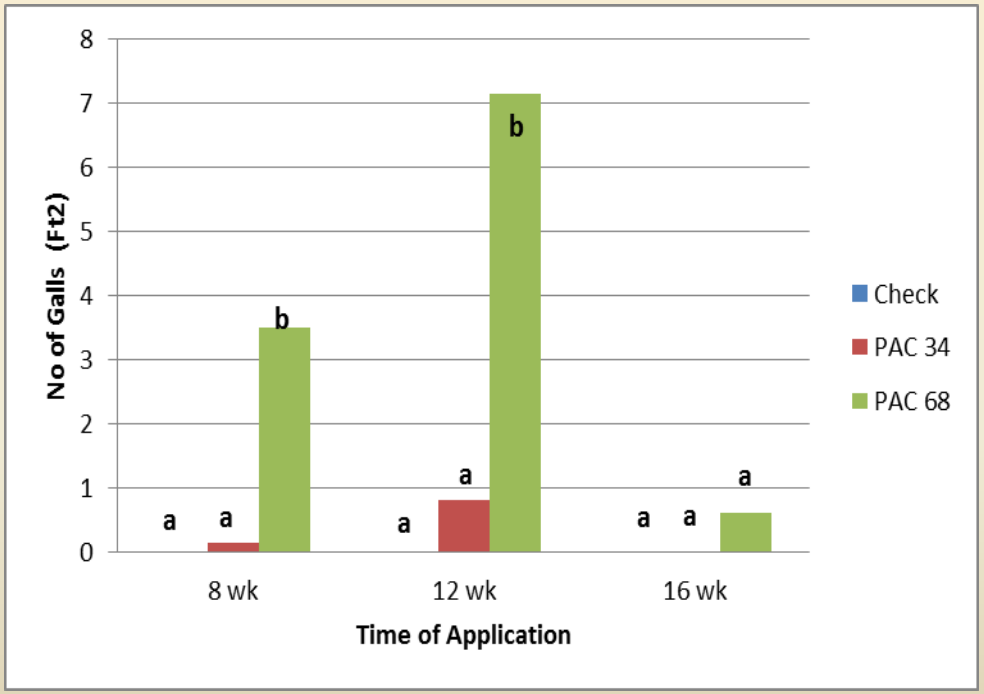
Herbicide galls formed at:

- **8 weeks at both low and high rates**
- **12 weeks at both low and high rates**
- **Smaller quantity at 16 weeks at high rate**

No herbicide galls formed at:

- **16 weeks at low rate (34 oz/ac)**

Effect of PAC timing post sowing and rate on the production of gall formation on loblolly pine – Shellman, GA 2013.



Now we have a second PAC spray timing and rate option for weed control:

at 16 weeks post-sowing at 34 oz/ac

APPLY PAC AT THE TIME OF SOWING

Marengo

OHP, Inc.

0.5 gallon container

approx. $740

http://www.ohp.com/Literature/pdf/Marengo_PPT.pdf

Marengo Rate and Timing Trial

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14-04

- New herbicide released in January 2013
- Label listed for conifer nurseries
- Weeds listed on label as controlled include spurge and grasses
- At what rates and times of spraying are loblolly pine tolerant of Marengo?
- At what rates and times of spraying are weeds affected by Marengo?

Sprayed Marengo at 3 rates:

- 3.75 oz/ac (low rate)
- 7.5 oz/ac (medium rate)
- 11.25 oz/ac (high rate)

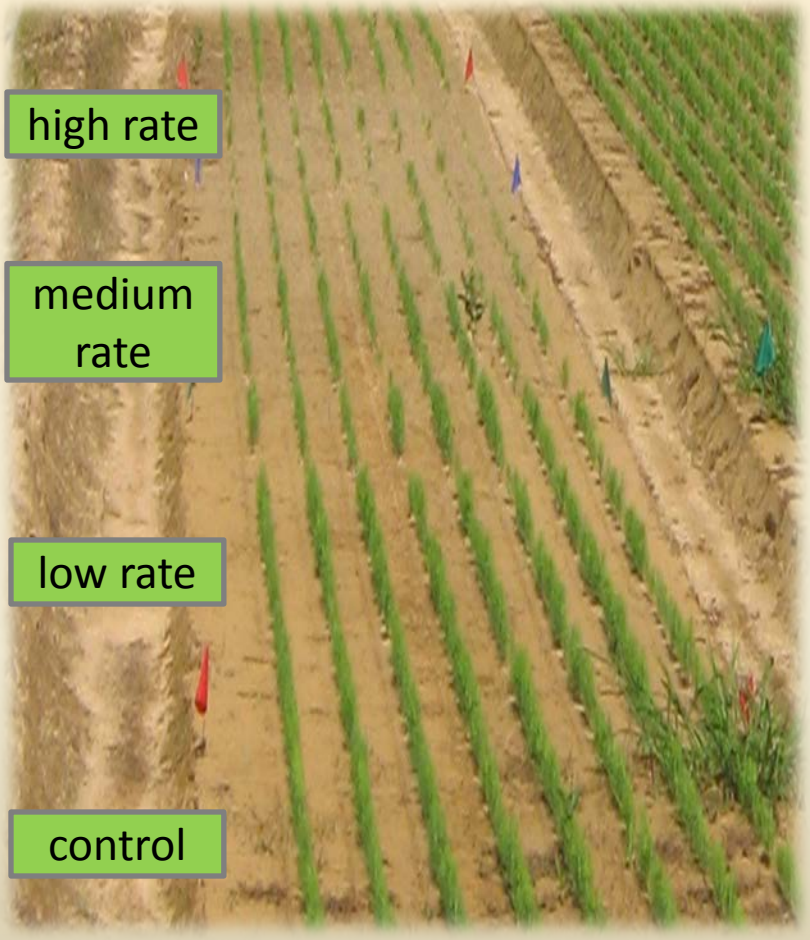
At 3 times:

- at sowing
- at 6 weeks post-sowing
- at 12 weeks post-sowing

At sowing spray application,
lower density of seedlings at all rates

At 6 weeks spray application,
no difference in seedling density
at low and medium rates ,
but fewer seedlings
at high rate application

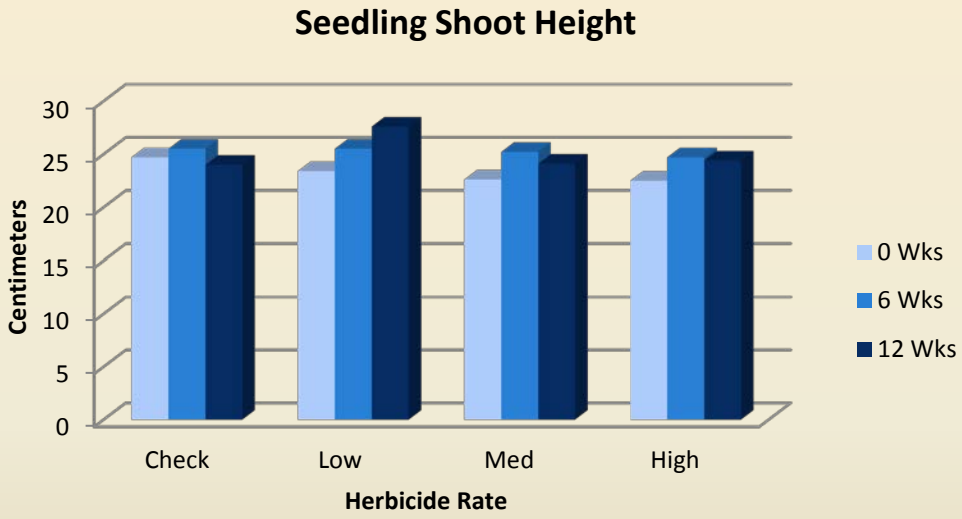
At 12 weeks spray application,
no difference in seedling density
at all rates of application,
BUT least effective in
weed control



Herbicide applied at sowing
Photo taken 6 weeks post-sowing

DO NOT apply Marengo at sowing

Effect of Marengo® and application time on loblolly pine seedling shoot height at the ArborGen Supertree Nursery, Shellman, GA 2013.



Marengo application at 6 weeks post-sowing at low or medium rates could provide effective weed control without reducing seedling density or affecting seedling height

Clearcast

BASF

1 gallon container
approx. $280

(same chemical as
Raptor
approx. $570)

Clearcast Hardwood Trial

- Need herbicide to safely spray over hardwood and to control morning glory
- At what rates will hardwood species be tolerant to Clearcast?
- At what rates will morning glory be affected by Clearcast?

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Research

Report

14-05

Sprayed Clearcast on four hardwood species:

- Northern red oak
- Plum
- Swamp chestnut oak
- White oak

At 2 rates:

- 4 oz/ac
- 6 oz/ac

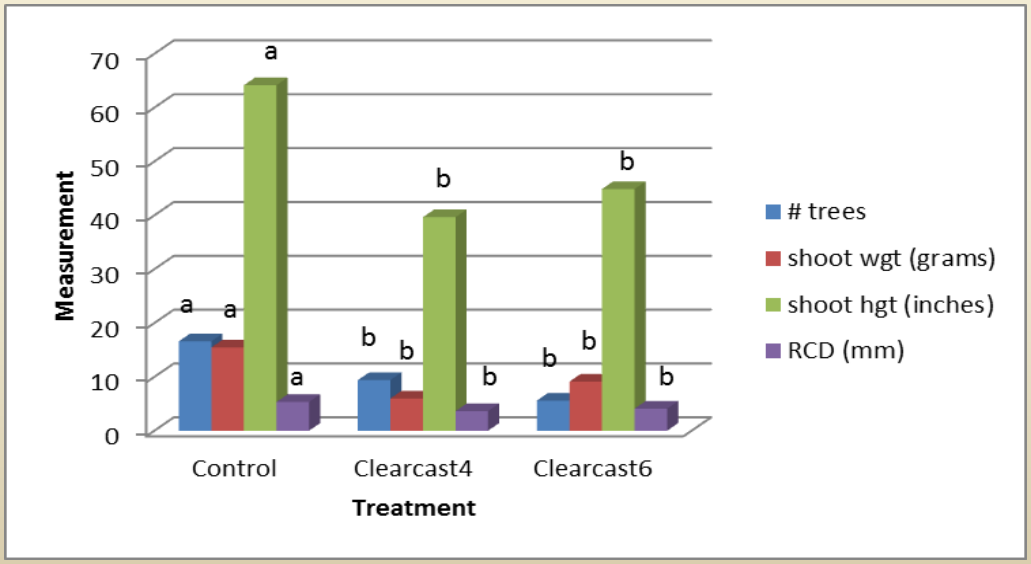
At 2 nurseries

At approximately 4 weeks post-sowing

Morning glory was stunted but not killed by herbicide application, so multiple applications may be required

Hardwood tolerance to Clearcast varied by species:

- Most tolerant – Northern red oak
- Next in tolerance – Swamp chestnut oak
- Least tolerant oak – White oak
- Least tolerant of all 4 species - Plum



Plum Seedling Characteristics treated with Clearcast® at East Tennessee Nursery

DO NOT APPLY Clearcast to Plum

RonstarFlo

Bayer CropScience

2.5 gallon container

approx. $500

RonstarFlo Tank Mix Trial

SFNMC Research Report 14-06

- RonstarFlo is effective when sprayed at sowing (sedge)
- In order to make one spray pass, is RonstarFlo effective on weed control when combined with PAC, Goal 2XL and soil stabilizer at sowing and on a variety of soil types?
- At what rates of spraying is loblolly pine tolerant of RonstarFlo?

Sprayed RonstarFlo alone at 2 rates:

- **40 oz/ac (low rate)**
- **80 oz/ac (high rate)**

Sprayed RonstarFlo in tank mix with PAC and Goal2XL (RPG) at 2 rates:

- **40 oz/ac + 34 oz/ac + 32 oz/ac (low rate)**
- **80 oz/ac + 68 oz/ac + 64 oz/ac (high rate)**

At 5 nurseries (to compare effectiveness in different soil textures)

At sowing

Loblolly pine is tolerant to pre-emergent applications of RonstarFlo at all rates

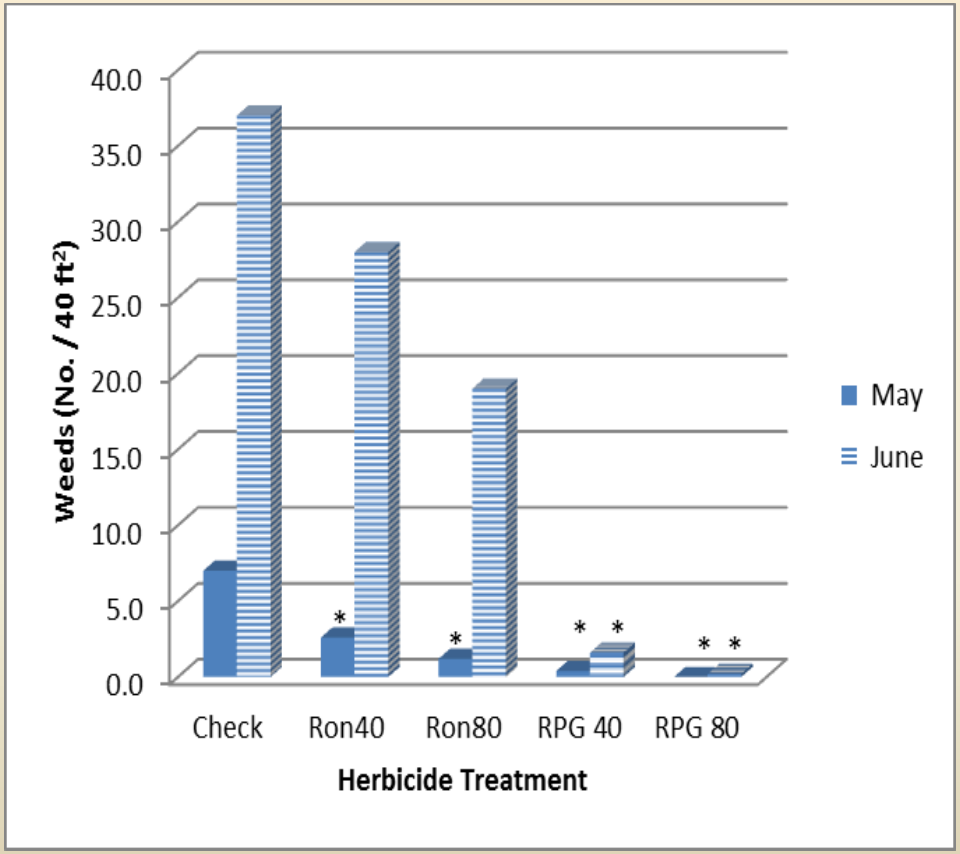
Soil texture does not seem to be a factor in herbicide's effectiveness, either when used alone or in tank mix

RonstarFlo alone:

- more weed control at high rate than low rate
- weed control didn't last as long as either of tank mixes

RonstarFlo, PAC and Goal2XL tank mixes:

- more effective weed control than RonstarFlo alone
- longer lasting weed control than RonstarFlo alone



Herbicide weed control of loblolly pine seed beds with Ronstar Flo, alone and in combination with Pendulum AquaCap and Goal 2XL at the Flint River Nursery in 2013

For additional weed control including sedge, RonstarFlo can be added in a tank mix with PAC, Goal2XL and soil stabilizer and applied at sowing

2014 Herbicide Trials

3 container trials this season (2 related to last season's trials)

- 1 - PAC soil type trial
- 1 - TerraCytePro and Ecotec moss trial
- 1 - Marengo black willow trial

PAC Soil Type Trial

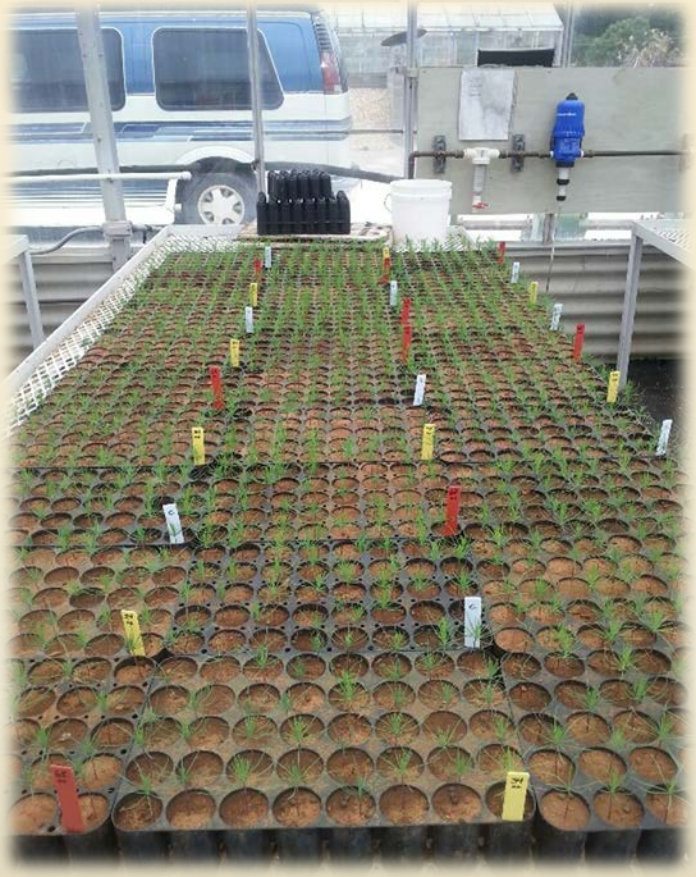
- PAC should be applied at sowing to avoid galls
- Safe to spray PAC at later date (approx. 16 weeks) post sowing to avoid galls
- Galls have no effect on seedling survival and growth at outplanting
- If seedlings are grown at the same temperature, what effect does soil type have on formation of PAC-induced galls and on seedling quality?

Study located at AU greenhouse
(temperature monitored)

- Fine and coarse textured soils collected and loblolly pine seed sown

- PAC applied at 5 weeks post-sowing to induce gall formation
- 2 PAC rates used: 34 oz/ac and 68 oz/ac

2 spray rates on fine textured soil



2 spray rates on coarse textured soil

<u>To be evaluated</u>: percentage with galls and seedling morphology (survival, RCD, height, dry weights, root weight ratio)

TerraCytePRO and Ecotec/ moss Trial

- **TerraCytePRO** algaecide/fungicide: label approved in 2004 by EPA as GreenCleanPRO (GCPro)
- Wettable powder
- Label lists container nurseries
- Cost is approx. $50 for 15 lb.; $140 for 50 lb. container
- Used primarily on golf courses

- **Ecotec** insecticide /miticide: replacement for Sporatec (discontinued due to expense of clove oil ingredient)
- Minimum risk pesticide
- Liquid
- Cost is approx. $300 for 5 gal.

TerraCyte and Ecotec applied at 3 rates at 2 times

Selecting Frasier fir trays with moss to label, count and spray

Trays back in greenhouse after applications

<u>To be evaluated</u>: fir seedling morphology (survival, RCD, height, dry weights and root weight ratio) and moss control

TerraCytePRO
high rate application

Photo taken July 16
4 weeks after
spray application

Marengo / black willow rate and timing trial

- Do not spray Marengo at sowing

- At what rate and timing are 4 pine species tolerant to Marengo?
- At what rate and timing will black willow be affected by Marengo?

Marengo applied to 4 pine species at 3 rates at 2 times

Selecting loblolly trays with willow to label, count and spray

Labeling and counting pine and willow in trays

Spraying Marengo at high rate to 4 species

Loblolly trays placed back onto tables after spraying 3 rates

Longleaf trays

Shortleaf trays

Slash trays

<u>To be evaluated</u>: pine seedling morphology (survival, RCD, height, dry weights, root weight ratio and RGP) and black willow control

3 weeks after spraying

Untreated (left side) and treated (right side) loblolly pine

High rate (11.25 oz/ac) application

3 weeks after spraying

Untreated (left side) and treated (right side) longleaf pine

Medium rate (7.5 oz/ac) application

Coming attractions….

2014 Herbicide Trial Results

Tell me....

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