FROM THE WEEDS: SFNMC HERBICIDE UPDATE

2017 SFNMC Contact Meeting
Myrtle Beach, South Carolina
July 10, 2017

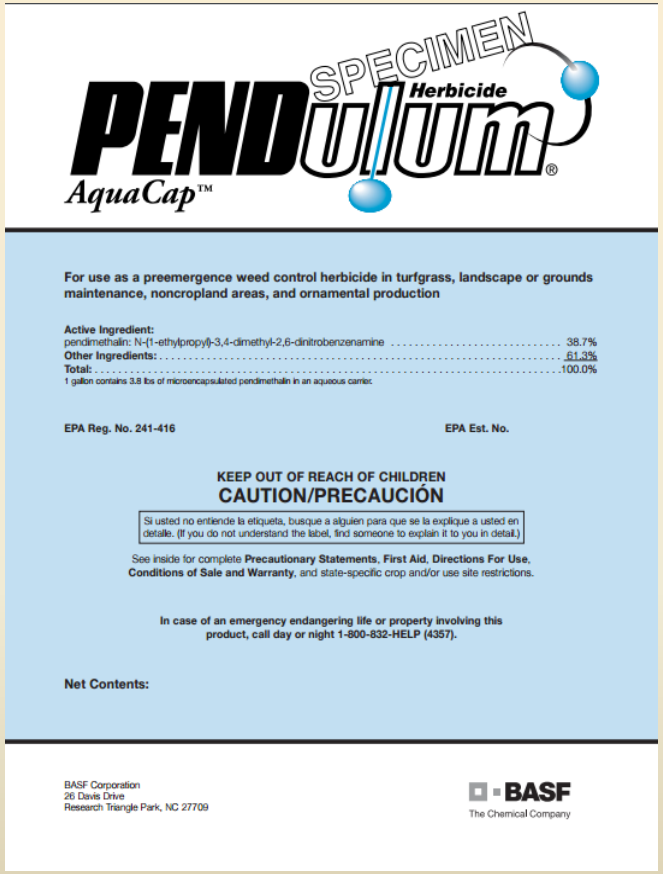
Nina Dowling Payne
SFNMC
Auburn University

2016 Trials

All studies designed to test seedling tolerance and herbicidal effectiveness

- *Pendulum® AquaCap™ (PAC) container trial and outplanting trial*
- *Marengo® container trial and outplanting trial*
- *4 'new' post-emergent herbicides (bareroot)*

Pendulum® AquaCap™ container trial


SPECIMEN

PENDULUM® Herbicide

AquaCap™

For use as a preemergence weed control herbicide in turfgrass, landscape or grounds maintenance, noncropland areas, and ornamental production

Active Ingredient:
pendimethalin: N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine 38.7%
Other Ingredients: 61.3%
Total: 100.0%
1 gallon contains 3.8 lbs of microencapsulated pendimethalin in an aqueous carrier.

EPA Reg. No. 241-416 EPA Est. No.

KEEP OUT OF REACH OF CHILDREN
CAUTION/PRECAUCIÓN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See inside for complete **Precautionary Statements**, **First Aid**, **Directions For Use**, **Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

Net Contents:

BASF Corporation
26 Davis Drive
Research Triangle Park, NC 27709

BASF
The Chemical Company

pendimethalin

- pre-emergent herbicide
- apply AT SOWING
- for control of grasses and broadleaf weeds not sedges
- will not control established weeds
- conifer and hardwood nurseries listed on label
- Group 3 herbicide/root growth inhibitor
- approx. 60% of SFNMC bareroot nurseries use PAC operationally

2016 Pendulum® AquaCap™ container trial

- Second PAC container study
- Installed at IFCO Moultrie, GA nursery
- Includes loblolly, slash, longleaf and shortleaf pine (450 trays)

- Applications made 1X week for 6 weeks to capture willow seed dispersal

- Trays sprayed on day of sowing or +1

2016 results on container pine tolerance to PAC

- **Loblolly**: no negative effect except lower density at high rate
- **Longleaf**: no negative effect on any seedling characteristic
- **Shortleaf**: no negative effect except lower plug weight at high rate
- **Slash**: no negative effect on any seedling characteristic

2016 results of willow control in containers with PAC

- Regardless of pine species, when sowing dates overlap willow seed dispersal times, the use of PAC significantly reduced the number of willow per tray
- Non-treated loblolly trays averaged 2.4 willow per tray; treated trays averaged 1.6 (low rate) and 0.6 (high rate) willow per tray
- Non-treated longleaf trays averaged 1.6 willow per tray; treated trays averaged 0.3 (low rate) and 0.2 (high rate) willow per tray
- Slash and shortleaf trays had no difference in willow quantities in untreated and treated trays + fewer willow overall than loblolly and longleaf trays; may be due to their sowing dates later in willow seeding process

2016 results of control of weeds other than willow in containers with PAC

- Loblolly and shortleaf trays had significant reductions in ‘other’ weeds; no difference seen in longleaf and slash trays

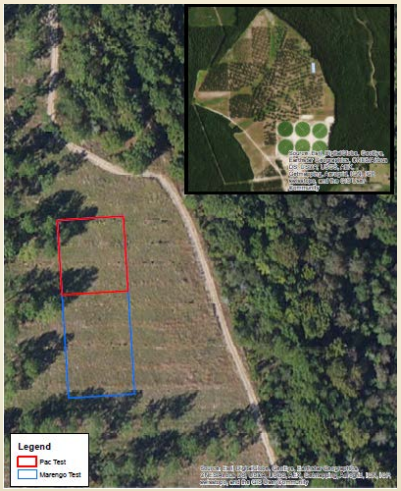
- Weed control results are not pine species-dependent but may be affected by location of trays in nursery and timing of weed seed dispersal

Results of PAC outplanting trials

- To determine carryover effect of PAC on container loblolly
- Maintenance and measurements done by Westervelt and IFCO

Eutaw, AL site

DeRidder, LA site



- Results showed no differences in survival, height or RCD between non-treated and treated seedlings one year after outplanting

2016
Pendulum®AquaCap™
results reported in
RR 17-03

Auburn University
Southern Forest Nursery
Management Cooperative

RESEARCH REPORT 17-03

PENDULUM® AQUACAP™ (PENDIMETHALIN) APPLICATIONS ON TOLERANCE OF CONTAINER-GROWN LOBLOLLY, LONGLEAF, SHORTLEAF AND SLASH PINE AND ON BLACK WILLOW AND WEED POPULATIONS IN CONTAINERIZED GROWING SYSTEMS

by
Nina Payne and Scott Enebak

INTRODUCTION

Following numerous successful trials conducted by the Southern Forest Nursey Management Cooperative of pendimethalin applied as Pendulum® AquaCap™ (PAC) in bareroot forest tree nurseries, the operational use of PAC is increasing in Cooperative members' bareroot nurseries. If **applied at sowing**, the use of PAC has decreased the incidence of prostrate spurge (*Chamaesyce maculate*) and other weeds while preventing gall formation that may occur with the use of this herbicide post-sowing.

Although hand-weeding is performed in both bareroot and container forest tree nurseries, the use of this weed control practice in container nurseries is more common in order to produce weed-free seedlings for shipment. Herbicide applications that could control both black willow (*Salix nigra*) and other weeds found in containers could decrease the time and expense of hand-weeding. The quantity and coverage of willow seed in an area is unpredictable year to year so the timing of a PAC application is crucial. The herbicide should be applied **at the time of sowing** the containers and prior to willow seed dispersal if possible. Applications made after willow seed flight could provide control of other weeds.

Because of the positive results of PAC use in bareroot nurseries yet limited information available about the interaction of pendimethalin and organic media, the SFNMC began testing of the herbicide in container nurseries in 2015. Trials of two rates (34 and 68 oz/ac) of PAC were installed at two member nurseries on two pine species to gauge seedling tolerance and the effectiveness of PAC on willow and weed control and tolerance **at sowing**. Results (RR16-03) showed that most growth characteristics of containerized loblolly and slash pine were not affected by applications of PAC. However, lower plug weights in slash pine and smaller root collar diameters (at the high rate only) in loblolly pine suggested the possibility of diminished root production of treated seedlings. Although total willow populations were lower in 2015 than previous years, the quantity of willows in treated trays was statistically less than in non-treated trays. Significant decreases in the number of weeds other than willow were also recorded. The results of the 2015 trials indicated the need for further studies that would include additional pine species and an increase in willow populations (to test for treatment significance) if available.

Therefore, the objectives of this trial were 1) to evaluate the tolerance of container loblolly, longleaf, slash and shortleaf pine to pre-emergent applications of PAC and 2) to assess willow and

What we've learned from 2015 and 2016 Pendulum® AquaCap™ container studies:

- loblolly, longleaf, shortleaf and slash pine tested

  2015 results: lob - lower RCD at high rate

  slash - lower plug weights at both rates

  2016 results: lob - lower survival at high rate

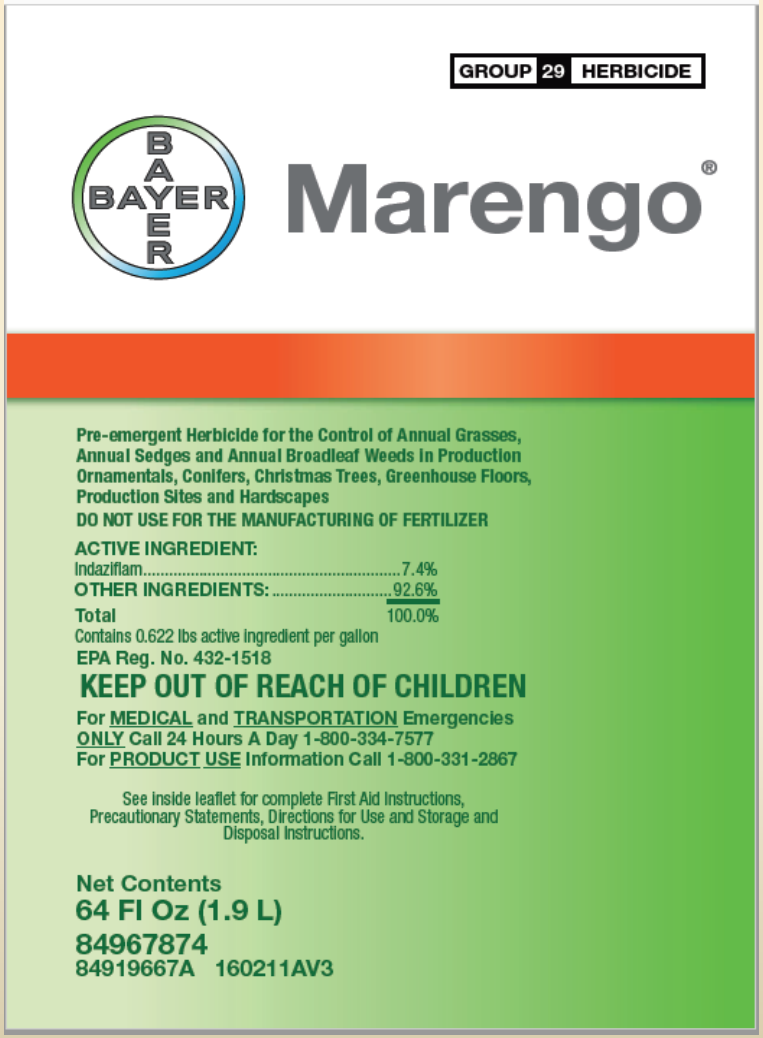
  shortleaf - lower plug weights at high rate

- significant reductions in willow populations in trays sown during willow seed dispersal

- significant reductions in 'other weeds' in some trays but no effect in others

Questions/comments?

Marengo® container trial



indaziflam

- primarily used as pre-emergent herbicide for residual control up to 8 months
- apply to soil
- for control of grasses, sedges and broadleaf weeds
- conifer nurseries are listed on label but as a directed spray application only *“Do not apply to seedlings or seedbeds”*
- Group 29 herbicide/root growth inhibitor

2016 Marengo® container trial

- Third Marengo® container study
- Installed at IFCO Moultrie, GA nursery
- Includes loblolly, slash, longleaf and shortleaf pine (160 trays)

- Trays sprayed between 6 and 8 weeks post-sowing (timing based on bareroot seedling results)

2016 results on container pine tolerance to Marengo®

- **Loblolly**: plug weight reduced at medium rate, root growth potential not affected
- **Longleaf**: plug weight reduced at high rate, root growth potential reduced at all rates
- **Shortleaf**: plug weight not affected, root growth potential not affected
- **Slash**: root growth potential not affected

2016 results of willow control in containers with Marengo®

- The use of Marengo® significantly reduced the number of willow in loblolly and longleaf trays

- Slash and shortleaf trays showed no difference in willow quantities in untreated and treated trays; initial willow counts were lower than other trays

2016 results of control of weeds other than willow in containers with Marengo®

- Loblolly and longleaf trays had significant reductions in ‘other’ weeds; no difference seen in shortleaf and slash trays

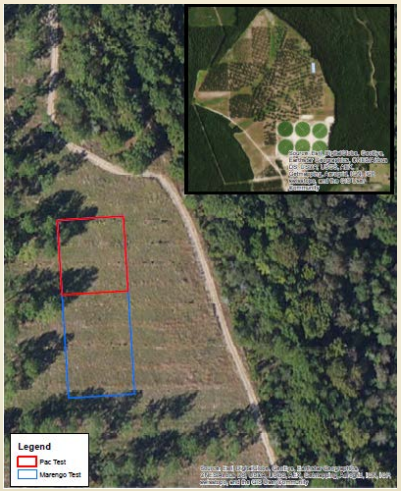
- 2015 results showed significant reductions in ‘other’ weeds in loblolly and slash trays (only species included in study)

Results of Marengo® outplanting trials

- To determine carryover effect of Marengo® on container loblolly
- Maintenance and measurements done by Westervelt and IFCO

← Eutaw, AL site

DeRidder, LA site →

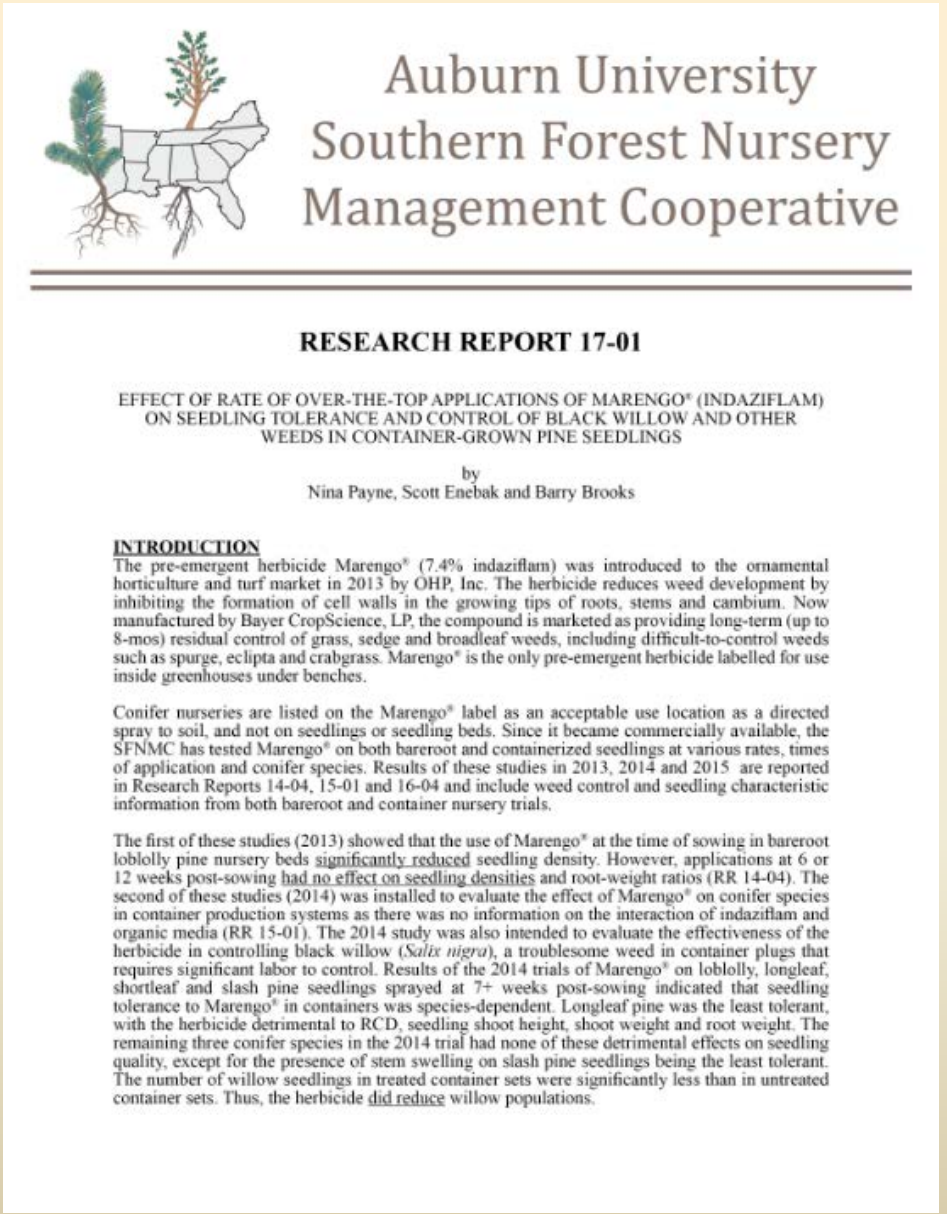


- Results showed no differences in survival, height or RCD between non-treated and treated seedlings one year after outplanting

What we've learned from 2014, 2015 and 2016 Marengo® container studies:

- loblolly, longleaf, shortleaf and slash pine tested
- **herbicide tends to lower plug weights**
- longleaf is most sensitive to Marengo® in all measures of seedling quality
- significant reductions in willow populations in trays sown earlier in spring
- significant reductions in 'other weeds' in some trays but no effect in others

2016
Marengo®
results reported in
RR 17-01



Auburn University
Southern Forest Nursery
Management Cooperative

RESEARCH REPORT 17-01

EFFECT OF RATE OF OVER-THE-TOP APPLICATIONS OF MARENGO® (INDAZIFLAM) ON SEEDLING TOLERANCE AND CONTROL OF BLACK WILLOW AND OTHER WEEDS IN CONTAINER-GROWN PINE SEEDLINGS

by
Nina Payne, Scott Enebak and Barry Brooks

INTRODUCTION

The pre-emergent herbicide Marengo® (7.4% indaziflam) was introduced to the ornamental horticulture and turf market in 2013 by OHP, Inc. The herbicide reduces weed development by inhibiting the formation of cell walls in the growing tips of roots, stems and cambium. Now manufactured by Bayer CropScience, LP, the compound is marketed as providing long-term (up to 8-mos) residual control of grass, sedge and broadleaf weeds, including difficult-to-control weeds such as spurge, eclipta and crabgrass. Marengo® is the only pre-emergent herbicide labelled for use inside greenhouses under benches.

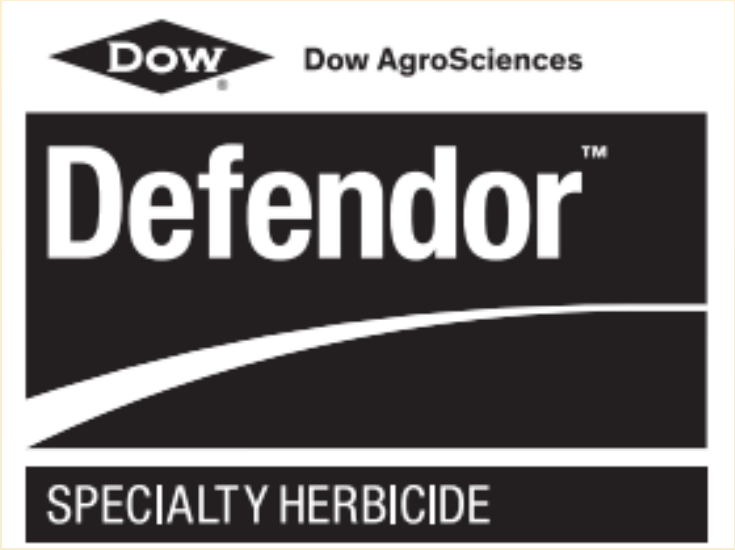
Conifer nurseries are listed on the Marengo® label as an acceptable use location as a directed spray to soil, and not on seedlings or seedling beds. Since it became commercially available, the SFNMC has tested Marengo® on both bareroot and containerized seedlings at various rates, times of application and conifer species. Results of these studies in 2013, 2014 and 2015 are reported in Research Reports 14-04, 15-01 and 16-04 and include weed control and seedling characteristic information from both bareroot and container nursery trials.

The first of these studies (2013) showed that the use of Marengo® at the time of sowing in bareroot loblolly pine nursery beds significantly reduced seedling density. However, applications at 6 or 12 weeks post-sowing had no effect on seedling densities and root-weight ratios (RR 14-04). The second of these studies (2014) was installed to evaluate the effect of Marengo® on conifer species in container production systems as there was no information on the interaction of indaziflam and organic media (RR 15-01). The 2014 study was also intended to evaluate the effectiveness of the herbicide in controlling black willow (*Salix nigra*), a troublesome weed in container plugs that requires significant labor to control. Results of the 2014 trials of Marengo® on loblolly, longleaf, shortleaf and slash pine seedlings sprayed at 7+ weeks post-sowing indicated that seedling tolerance to Marengo® in containers was species-dependent. Longleaf pine was the least tolerant, with the herbicide detrimental to RCD, seedling shoot height, shoot weight and root weight. The remaining three conifer species in the 2014 trial had none of these detrimental effects on seedling quality, except for the presence of stem swelling on slash pine seedlings being the least tolerant. The number of willow seedlings in treated container sets were significantly less than in untreated container sets. Thus, the herbicide did reduce willow populations.

Questions/comments?

4 'new' post-emergent herbicides trial

- in response to need for safe, selective, over-the-top post-emergent herbicides for control of later-season grasses, sedges, and broadleaf weeds
- 18 installations at 4 nurseries on bareroot loblolly and slash pine
- sprayed at lowest recommended rate at sowing and at 8, 13 and 16 weeks post-sowing.
- none labelled for conifer nurseries, 'borrowed' from ag and turf markets
- trial designed to determine seedling tolerance to 4 herbicides
- accepted weeds listed as controlled or suppressed on label
- Group 2 and Group 14 herbicides/ALS and PPO inhibitors



florasulam

penoxsulam

trifloxysulfuron

sulfentrazone

2016 results on pine tolerance to 'new' herbicides

- no negative effects on loblolly or slash pine at any application time

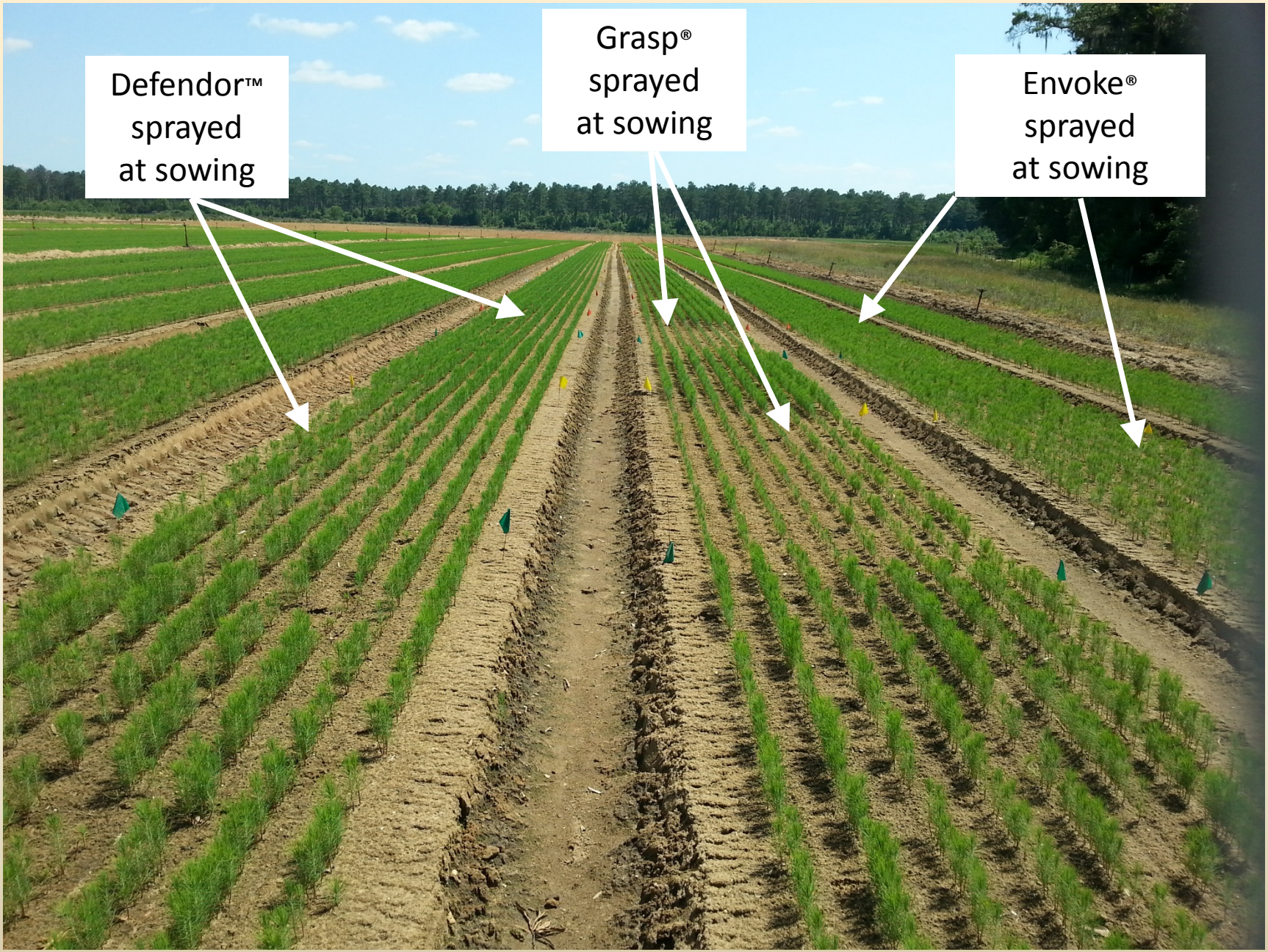
- no negative effects on loblolly or slash pine at any application time EXCEPT at sowing

2016 results on pine tolerance to 'new' herbicides

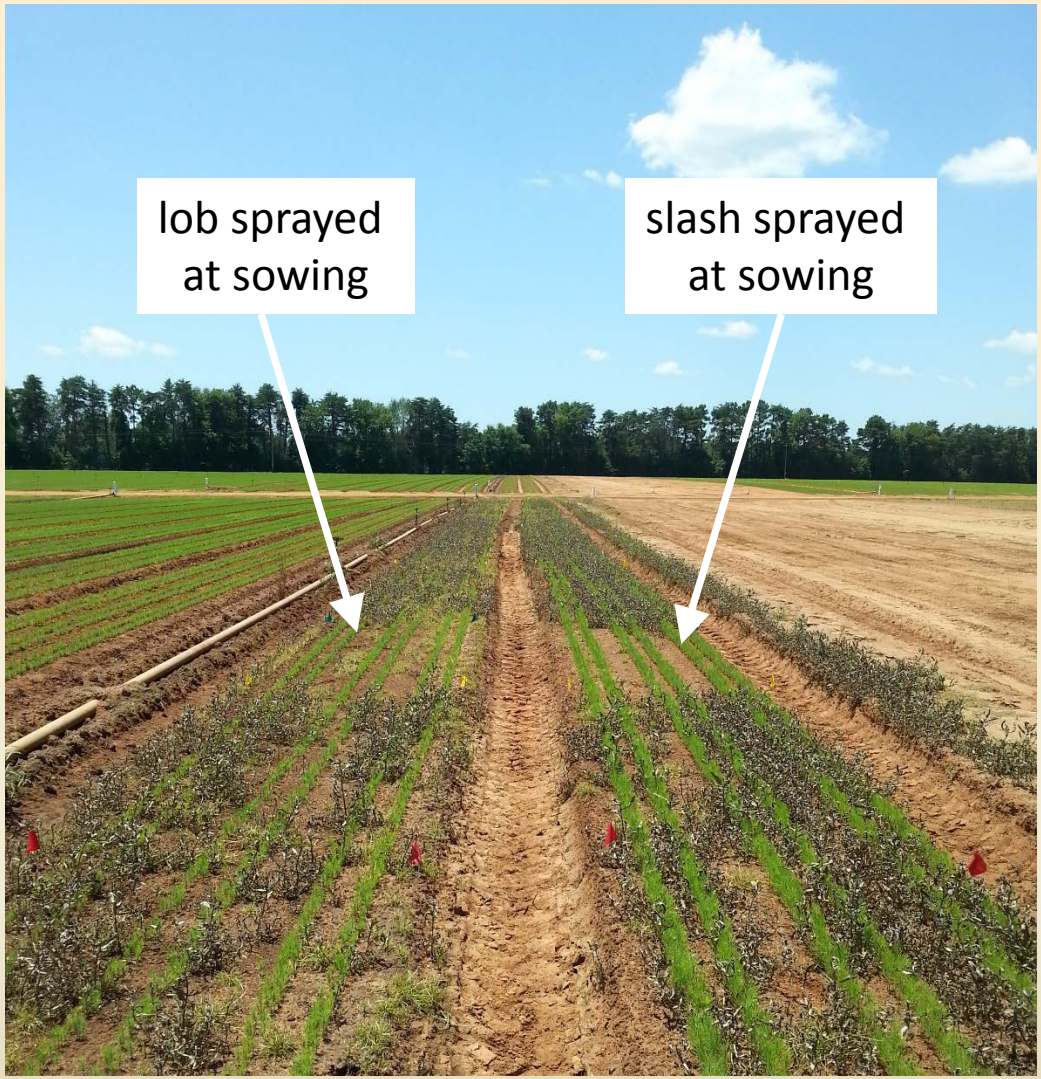
continued

- no negative effects on loblolly or slash pine at any application time EXCEPT at sowing

- no negative effects on loblolly or slash pine at any application time (no applications made at sowing)



3 ‘new’ herbicides in 8 week old loblolly



Defendor™
in 8 week old loblolly and slash

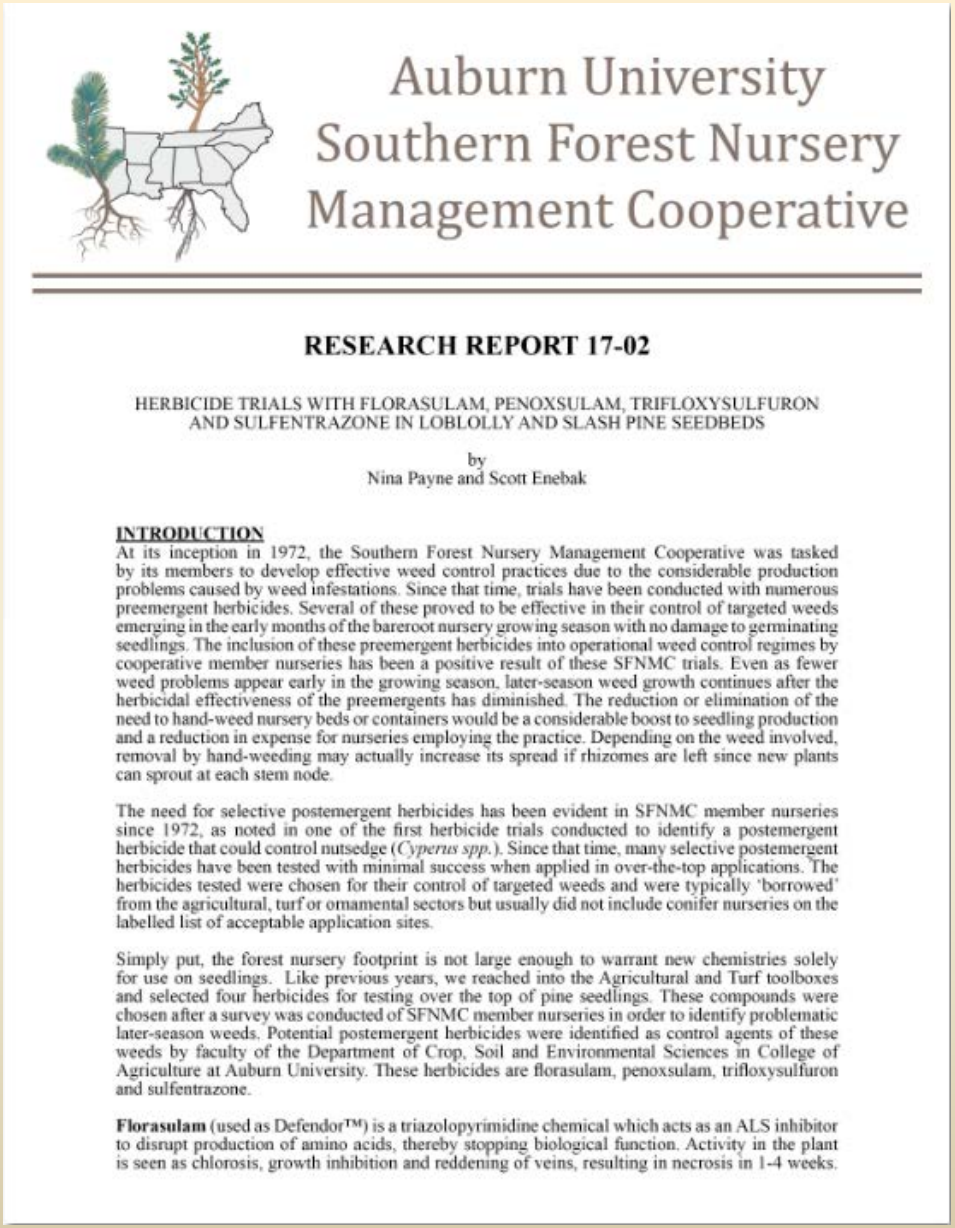
Grasp®
in 8 week old slash and loblolly

Envoke®
in 8 week old loblolly and slash

What we've learned from 2016 'new' post-emergent herbicide studies:

- bareroot loblolly and slash pine tested
- no negative effects of herbicides on seedling characteristics except when applied at sowing
- herbicides are available for testing but task of testing will lie with SFNMC and nurseries

2016
'new' herbicides
results reported in
RR 17-02



Auburn University
Southern Forest Nursery
Management Cooperative

RESEARCH REPORT 17-02

HERBICIDE TRIALS WITH FLORASULAM, PENOXSULAM, TRIFLOXYSULFURON AND SULFENTRAZONE IN LOBLOLLY AND SLASH PINE SEEDBEDS

by
Nina Payne and Scott Enebak

INTRODUCTION

At its inception in 1972, the Southern Forest Nursery Management Cooperative was tasked by its members to develop effective weed control practices due to the considerable production problems caused by weed infestations. Since that time, trials have been conducted with numerous preemergent herbicides. Several of these proved to be effective in their control of targeted weeds emerging in the early months of the bareroot nursery growing season with no damage to germinating seedlings. The inclusion of these preemergent herbicides into operational weed control regimes by cooperative member nurseries has been a positive result of these SFNMC trials. Even as fewer weed problems appear early in the growing season, later-season weed growth continues after the herbicidal effectiveness of the preemergents has diminished. The reduction or elimination of the need to hand-weed nursery beds or containers would be a considerable boost to seedling production and a reduction in expense for nurseries employing the practice. Depending on the weed involved, removal by hand-weeding may actually increase its spread if rhizomes are left since new plants can sprout at each stem node.

The need for selective postemergent herbicides has been evident in SFNMC member nurseries since 1972, as noted in one of the first herbicide trials conducted to identify a postemergent herbicide that could control nutsedge (*Cyperus spp.*). Since that time, many selective postemergent herbicides have been tested with minimal success when applied in over-the-top applications. The herbicides tested were chosen for their control of targeted weeds and were typically 'borrowed' from the agricultural, turf or ornamental sectors but usually did not include conifer nurseries on the labelled list of acceptable application sites.

Simply put, the forest nursery footprint is not large enough to warrant new chemistries solely for use on seedlings. Like previous years, we reached into the Agricultural and Turf toolboxes and selected four herbicides for testing over the top of pine seedlings. These compounds were chosen after a survey was conducted of SFNMC member nurseries in order to identify problematic later-season weeds. Potential postemergent herbicides were identified as control agents of these weeds by faculty of the Department of Crop, Soil and Environmental Sciences in College of Agriculture at Auburn University. These herbicides are florasulam, penoxsulam, trifloxysulfuron and sulfentrazone.

Florasulam (used as Defendor™) is a triazolopyrimidine chemical which acts as an ALS inhibitor to disrupt production of amino acids, thereby stopping biological function. Activity in the plant is seen as chlorosis, growth inhibition and reddening of veins, resulting in necrosis in 1-4 weeks.

Questions/comments?

2017 Trials

All studies designed to test seedling tolerance and herbicidal effectiveness

- Third Pendulum® AquaCap™ (PAC) container trial and second-year measurements of outplanting trial (1 nursery/5 installations)
- High rate Pendulum® AquaCap™ (PAC) bareroot and container trial (5 nurseries/8 installations)
- Ronstar®Flo (*oxadiazon*) bareroot and container trial (5 nurseries/8 installations)
- Marengo® on cedar bareroot trial (1 nursery/1 installation)
- Post-emergent herbicide screening trial of 9 herbicides (4 nurseries/5 installations)

Pendulum® AquaCap™ (PAC) container trial

- Third PAC container study

  2015 results: lob - lower RCD at high rate
  slash - lower plug weights at both rates

  2016 results: lob - lower survival at high rate
  shortleaf - lower plug weights at high rate

  Significant reductions in willow populations in trays sown during willow seed dispersal

  Significant reductions in 'other weeds' in some trays but no effect in others

- Installed at IFCO Moultrie, GA nursery
- Includes loblolly, slash, longleaf and shortleaf pine (270 trays)
- Trays sprayed on day of sowing or +1
- Applications made 1X week for 6 weeks to capture willow seed dispersal

Questions/comments?

High rate Pendulum® AquaCap™ trial

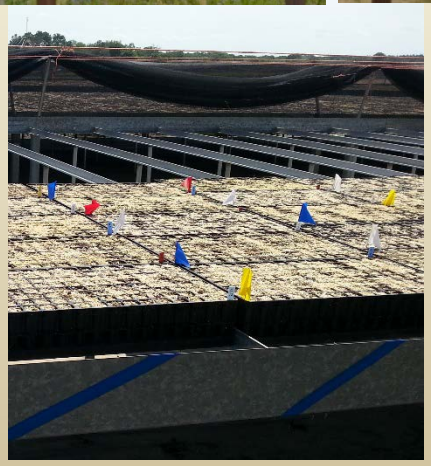
- Label allows for applications up to 139 oz/ac for ‘long term (6 to 8 months) control’

- Bareroot trials installed at ArborGen Blenheim, ArborGen Shellman, K & L and SCFC nurseries in loblolly + slash at 1 nursery
- Container trial installed at IFCO Moultrie, GA nursery in loblolly, slash, longleaf and shortleaf pine

Questions/comments?

Ronstar®Flo (*oxadiazon*) trial

- Follow-up to 2012 and 2013 SFNMC trials reporting positive results on seedling tolerance and annual sedge control (*RR13-04, RR14-06*)
- Bareroot trials installed at ArborGen Blenheim, ArborGen Shellman, K & L and SCFC nurseries in loblolly pine



- Container trial installed at IFCO Moultrie, GA nursery in loblolly, slash, longleaf and shortleaf pine

Questions/comments?

Marengo® on cedar trial

- Follow-up to 2015 SFNMC trial reporting positive results on cedar seedling tolerance (RR16-04)
- Bareroot trial installed at GFC Flint River Nursery

Questions/comments?

Post-emergent herbicide screening trial

- expansion of 2016 post-emergent herbicide trial
- 9 herbicides applied at lowest labelled rate at 9 weeks post-sowing
- bareroot trials installed at ArborGen Blenheim, ArborGen Shellman, K & L and SCFC nurseries in loblolly + slash at 1 nursery

- trial designed to determine seedling tolerance to 9 herbicides not currently labelled for conifer nursery use
- accepted weeds listed as controlled or suppressed on label
- Groups 1, 2, 6, 14 and 27 herbicides (various modes of action, sites of action, target weeds and currently labelled crops)

Post-emergent herbicide screening trial (continued)

Basagran T/O *bentazon*

Defendor *florasulam*

Dismiss *sulfentrazone*

Envoke *trifloxysulfuron*

Frequency *topramezone*

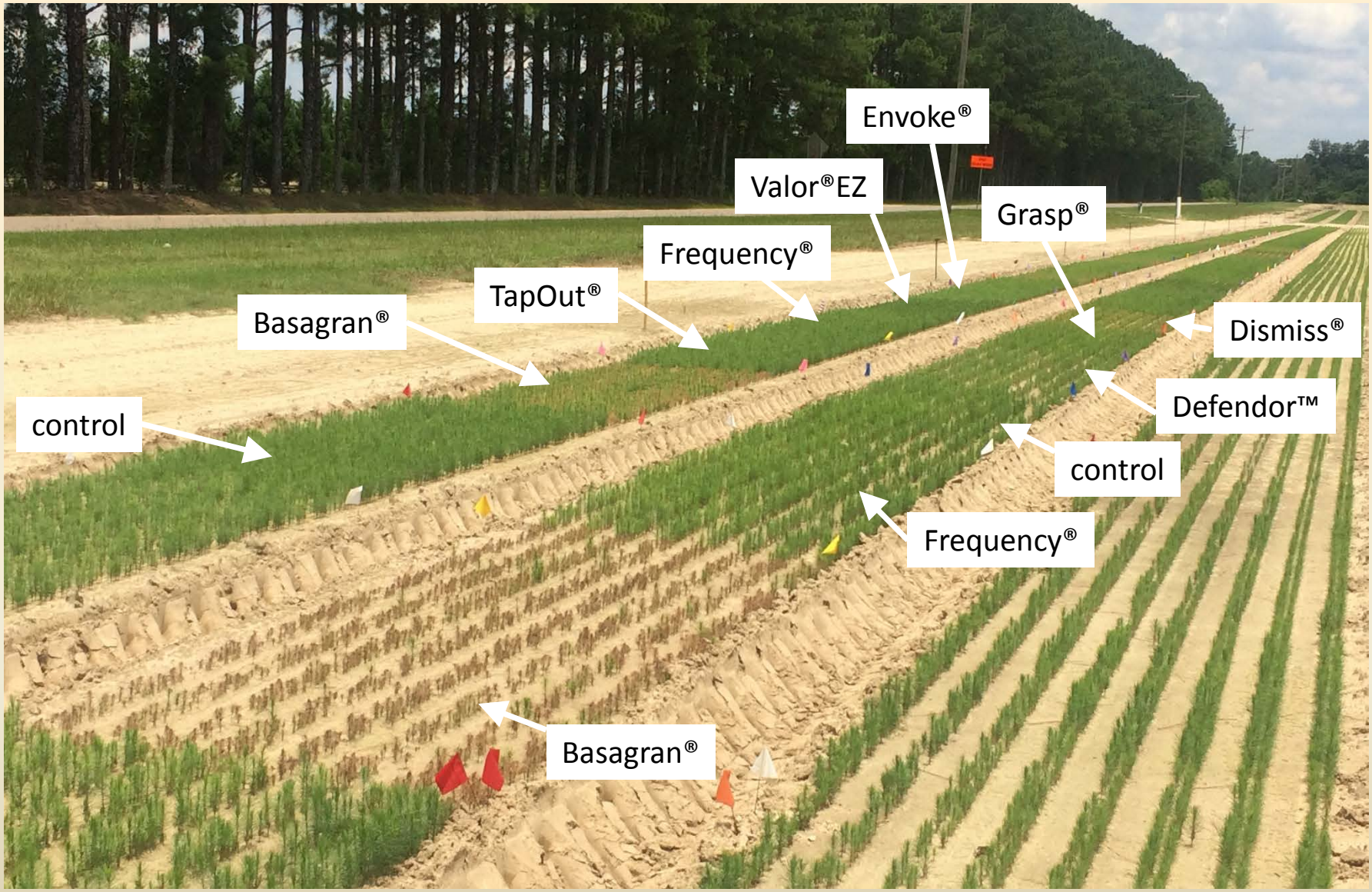
Grasp *penoxsulam*

TapOut *clethodim*

ValorEZ *flumioxazin*

Velocity *bispyribac*

herbicide	crops	targeted weeds	herbicide	crops	targeted weeds
Basagran T/O	turf, ornamentals	annual sedge, yellow nutsedge, teaweed, ragweed, other broadleaf	Velocity SG Herbicide	turf	yellow nutsedge, clover, dandelion, henbit, other broadleaf
Defendor	turf	catchweed , clover, dandelion, groundsel, other broadleaf	TAPOUT	conifer trees, cotton, flax, food crops	grasses only
Dismiss Turf Herbicide	turf, ornamentals	beggarweed, eclipta, pigweed, red sorrel, spurge, purple & yellow nutsedge, globe sedge, green kylinga, goosegrass	Valor SX Herbicide	cotton, corn, soybeans, sugarcane, wheat, beans, VM	eclipta, marestail, pigweed, teaweed, beggarweed, morning glory, palmer amaranth, crabgrass, goosegrass, sicklepod, rice flatsedge
Envoke Herbicide	cotton, sugarcane	beggarweed , Johnsongrass, marestail, morning glory, purple & yellow nutsedge, pigweed, sicklepod	Grasp SC Herbicide	rice	eclipta, rice flatsedge, pigweed, ragweed, morning glory, yellow nutsedge
Frequency herbicide	conifer plantations, VM	Palmer amaranth, carpetweed, marestail, morning glory, pigweed, crabgrass, goosegrass			



Post-emergent herbicides applied 9 weeks after sowing
photo taken 2 weeks after application

Questions/comments?

SFNMC 1979-2017 Publication shortcuts **BY HERBICIDE ACTIVE INGREDIENT**

bifenox 79-01
clopyralid TN02-01 TN04-01 99-04 07-01
cloransulam 01-10
difenopenten 81-1
dimethenamid 05-02 06-04 10-03 10-04 12-01
dithiopyr 96-01 01-09
Ecotec 15-04
EPTC 02-03
florasulam 17-02
fluazifop 83-5 TN02-01 TN04-01
flumioxazin 05-02 06-04 13-05
fomesafen TN02-01 96-03 02-03 07-01
glyphosate 80-7 TN02-01 TN04-01
halosulfuron TN97-1 TN02-01 98-07 99-07 02-03 05-03 06-02 06-03 07-01 07-03
imazamox 14-05
imazosulfuron 09-02
indaziflam 14-04 15-01 16-04 17-01
lactofen 89-31 TN02-01 96-01 07-01 13-04
metsulfuron 01-08 02-05 03-07 05-03 06-03 07-02 09-03
MSMA 06-01 07-01 07-02
napropamide TN04-01 96-01
norflurazone 96-01
oryzalin MA10-03
oxadiazon 00-08 13-04 14-06
oxyfluorfen 84-16 85-19 TN02-01 TN04-01 96-01 99-08 04-04 13-04 14-01 14-06
pendimethalin MA10-03 MA12-02 96-01 09-01 10-04 11-05 12-01 12-03 12-05 13-03 13-05
14-01 14-02 14-03 14-06 16-03 17-03
penoxsulam 17-02
prodiamine MA10-03 TN02-01 TN04-01 96-01
rimsulfuron 09-02 10-03
sethoxydim 81-1 83-4 TN02-01 TN04-01
sulfentrazone 13-05
sulfometuron 02-03 07-01
sulfosulfuron 02-03 13-04
Terracyte 15-04
thiazapyr 02-04 03-01
trifluraline TN04-01
trifloxysulfuron 17-02

handout in your packet

list of SFNMC publications
1979-2017
by herbicide
active ingredient

herbicide-related publications on SFNMC website

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SFNMC Homepage > Members Only > Publications and Documents > Research Reports

Research Reports

2015

15-01 Effect of Timing and Rate of Marengo® (
Seedlings Grown in Containers
15-02 A Modified Method for Calculating a Parti
15-03 Evaluation of Sumagrow™ as a Biologica
15-04 Effect of Terracyte®Pro and Ecotec® Ap
15-05 The Use of Seed Polymers and Seed Colc

2014

14-01 Operational Application of Pendulum® A
Formation of Herbicide Galls
14-02 Effect of Pac-Induced Herbicide Galls on
14-03 Effect of Timing of Pac Applications 8, 12
14-04 Effect of Timing and Rate of Marengo® (
Supertree Nursery in Shellman, Ga
14-05 Effect of Imazamox (Raptor® and Clear
Ga and the East Tennessee Nursery
14-06 Effect of Ronstar® Flo, Alone and in Tan
Pine and Weed Control in Five Different Nurseri

2013

13-01 Evaluation of Methyl Bromide Alternativ
in Camden, Alabama
13-02 Evaluation of Plastic, Reduced Rates an
Seasons
13-03 The Effect of Hardwood Seed Size, Spec
AquaCap
13-04 Annual Sedge (Cyperus Compressus) C
13-05 Controlling Morning Glory (Ipomoea Sp.
Nurseries

2012

12-01 Screening of Pendulum® AquaCap™ a

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SFNMC Homepage > Members Only > Publications and Documents > Technical Notes

Technical Notes

2014

14-01 2012 Bareroot Forest Nursery Practices in the Southern United St
14-02 2012 Container Forest-Seedling Nursery Practices in the Southerr
14-03 Forest Tree Seedling Production in the Southern United States for

2013

13-01 Forest Tree Seedling Production in the Southern United States for

2012

12-01 Forest Tree Seedling Production in the Southern United States for

2011

11-01 Forest Tree Seedling Production in the Southern United States for

2010

10-01 Forest Tree Seedling Production in the Southern United States for

2009

09-01 Forest Tree Seedling Production in the Southern United States for

2008

08-01 Forest Tree Seedling Production in the South for the 2007-2008 F

2007

07-01 A New Visual Technique for Diagnosing Cold Damage in Stems of F
07-02 Forest Tree Seedling Production in the South for the 2006-2007 F
07-03 Comments on Alternatives to Methyl Bromide for Quarantine Purp

SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

OLD COOP NOTES

Members Only Home

Members Only Homepage > Publications and Documents > Old Coop Notes

1979

79-01 Modown Registred for Postemergence Application On Southern Pine Seedlings
79-02 1979 Silvicultural Studies: Progress Report
79-04 Herbicides Registered For Forestry Brush Control
79-05 New Herbicide Registrations For Forest Site Preparation

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80-07 Roundup Registered For Forestry

1981

81-01 Postemergence Control of Grases with Selective Herbicides in Pine and Hardwood Seedbeds
81-02 New Fungicide Registered For Use in Conifer Nurseries

1982

82-03 EPA Proposes A Nursery Pesticide Policy

1983

83-04 Poast Registered For Use In Forest Nurseries
83-05 Fusilade Registered For Use In Forest Nurseries

1984

84-06 Growing the "Best" Seedling For Reforestation Success
84-07 Recommended Fusiform Rust Treatment Schedule For Forest Tree Nurseries
84-08 Survival and Growth of Loblolly Pine As Influenced By Seedlin Grade 13-Year Results
84-09 Root Growth Potential Of Loblolly Pine (Pinus Taeda L.) Seedlings From Twenty Southern Nurseries
84-10 Some Economic Aspects of Forest Seed Efficiency
84-11 Effect of High Soil Moisture on Pinus Taeda L. Seedling Morphology In the Nursery
84-12 Sowing Date Influences Seedling Weight
84-13 Speed of Germination Affects Diameter at Lifting of Nursery-Grown Loblolly Pine Seedlings
84-14 Nutrient Content of Nursery-Grown Loblolly Pine Seedlings
84-15 A Comparison of Nursery Sowers
84-16 Response of Loblolly Pine and Sweetgum Seedlings To Oxyfluorfen

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85-17 Shoot Growth Response of Loblolly Pine, Sweetgum, and Oat To Soil-Incorporated Diphenylether
85-18 High Soil Moisture Levels in the Nursery can Adversly Affect Loblolly Pine Seedling Morphology
85-19 An Old Application Technique Prove Useful When Used With A Modern Herbicide
85-20 Seed Efficiency of Hand Sown Plots From Seven Nurseries
85-21 Using the Double-Ring Falling-Head Water Permeameter
85-22 Dephenylther Herbicides In Southern Pine Nurseries
85-23 Dormancy, Chilling Requirements, and Storability Of Container-Grown Loblolly Pine Seedlings
85-24 A Simple Method For Determining A Partial Soil Water Retention Curve
85-25 Using The Double-Ring Falling-Head Water Permeameter

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86-26 The Five Pass Method For Preparing Nine Seedbeds
86-27 The "Tarnished Plant Bug" Can Cause Loblolly Pine Seedlings To Be "Bushy-Topped"
86-28 Loblolly Pine Seedling Morphology and Production At 53 Southern Forest Nurseries
86-29 The Influence Of Seedbed Density On Loblolly And Slash Pine Seedling Grade Distributions
86-30 Excessive Seedling Height, Large Shoot-Root Ratio, and Benomyl Root-Dip Reduce Survival of Stored Loblolly Pine Seedlings

United States Department of Agriculture

Forest Service

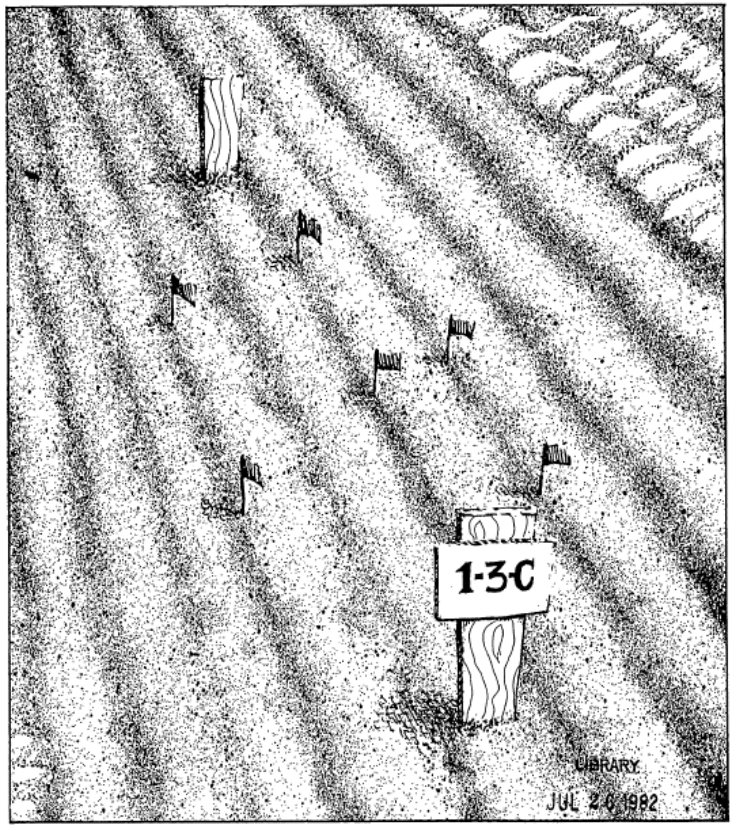
Pacific Northwest Forest and Range Experiment Station

General Technical Report PNW-127

April 1981

How to Test Herbicides at Forest Tree Nurseries

Roger E. Sandquist, Peyton W. Owston, and Stephen E. McDonald



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Recap

3 trials in 17 installations conducted in 2016

5 trials in 27 installations in progress in 2017

shortcuts by herbicide active ingredients
for SFNMC website

‘How to Test Herbicides at Forest Tree Nurseries’

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ArborGen Shellman GA Nursery
Georgia Forestry Commission Flint River GA Nursery
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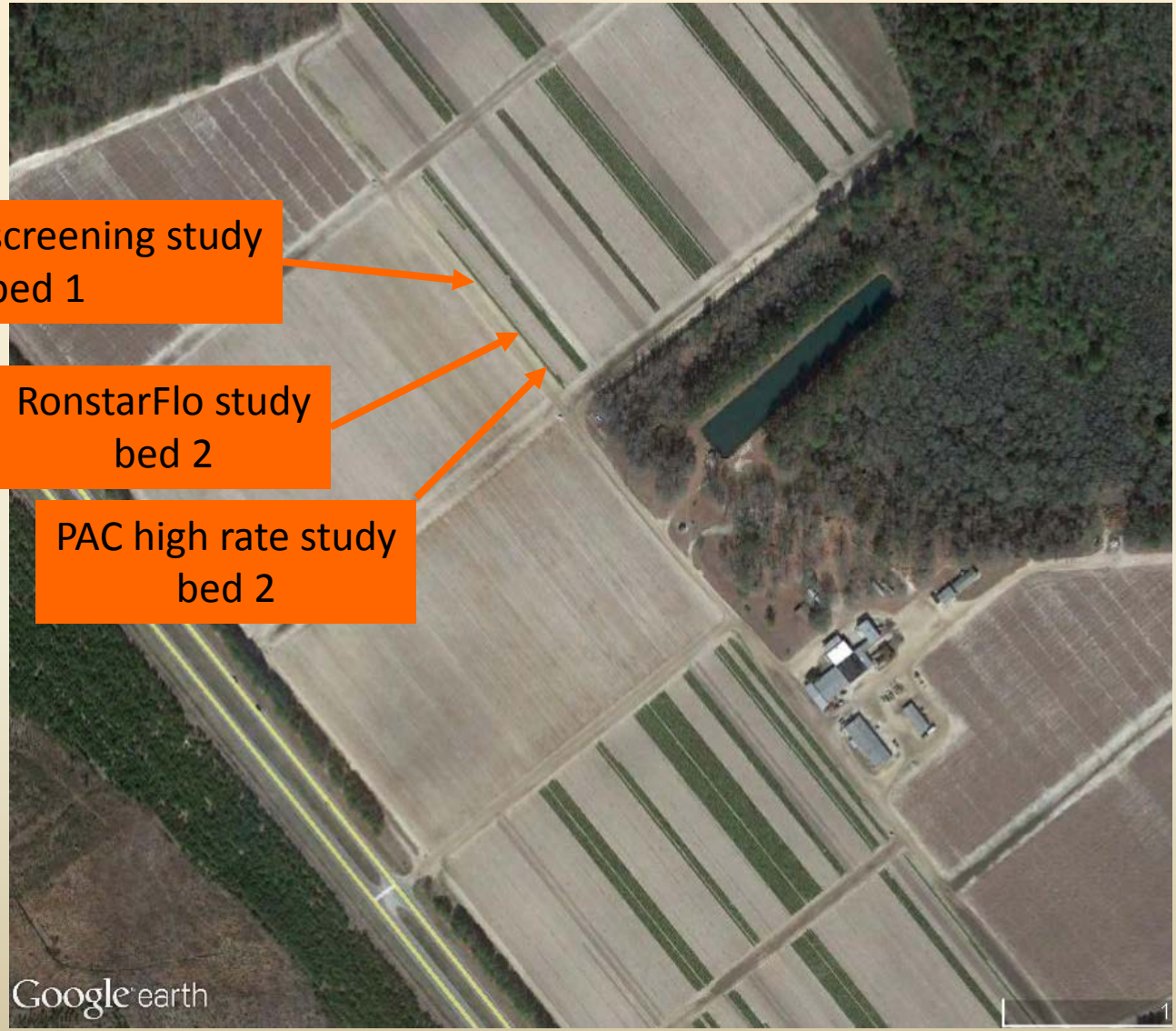
Weyerhaeuser(now IFCO) Pine Hill AL Nursery
IFCO Moultrie GA Nursery
South Carolina Forestry Commission Trenton SC Nursery

Tuesday Tour



Wyatt Mock