HERBICIDE TRIALS 2020 + 2021

SFNMC 2021 CONTACT MEETING

JULY 19, 2021

Southern Forest Nursery Management Cooperative

Nina Dowling Payne

TRIALS INSTALLED IN 2020

- HARDWOOD Flumioxazin Trial – 13 species
- BAREROOT Post-Emergent Herbicide Screening Trial – 3 herbicides

Southern Forest
Nursery Management Cooperative

HARDWOOD Flumioxazin Trial – 13 species

Southern Forest
Nursery Management Cooperative

Background

- Consistent, dependable weed control in hardwood nurseries is difficult to identify
- Challenge in testing herbicides = large variety of hardwood species grown + large number of weed species + untested active ingredients + different rates + different application times + different application methods
- Of 173 SFNMC herbicide trials since 1995 → 11 trials in hardwoods
- Surveyed all Cooperative nurseries growing hardwoods to develop list of most common species grown
- This trial initiated by SFNMC nursery member who had tested this active ingredient

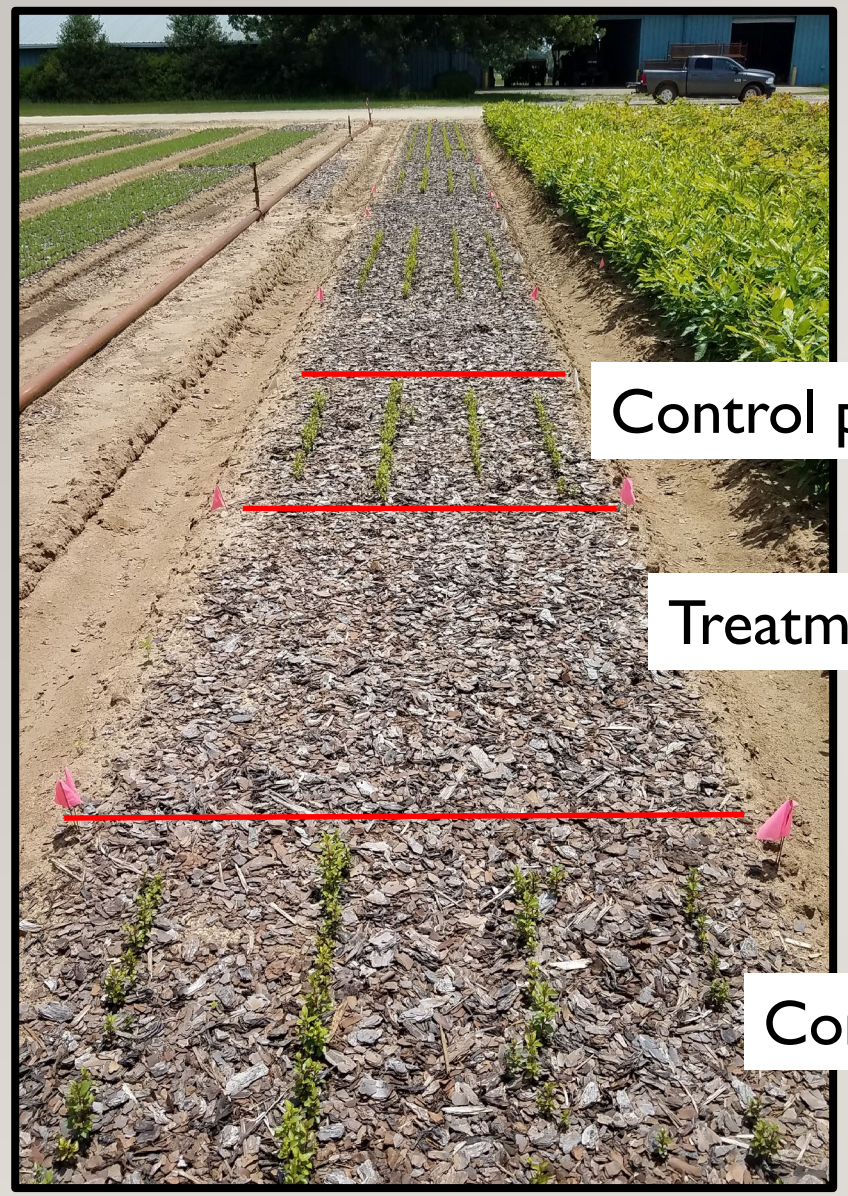
2020 HARDWOOD FLUMIOXAZIN TRIAL

- 1 Herbicide: flumioxazin 51.0% WDG, pre-emergent
- 1 Rate: 10 oz./ac
- 1 Timing : at sowing
- 1 Nursery: Georgia Forestry Commission Nursery
- 13 Species:
  - Baldcypress
  - Catalpa
  - Chickasaw plum
  - Crabapple
  - Crepe myrtle
  - Dogwood
  - Persimmon
  - Redbud
  - Yellow poplar
  - Oaks – Northern red oak
  - Sawtooth oak
  - Swamp chestnut oak
  - White oak

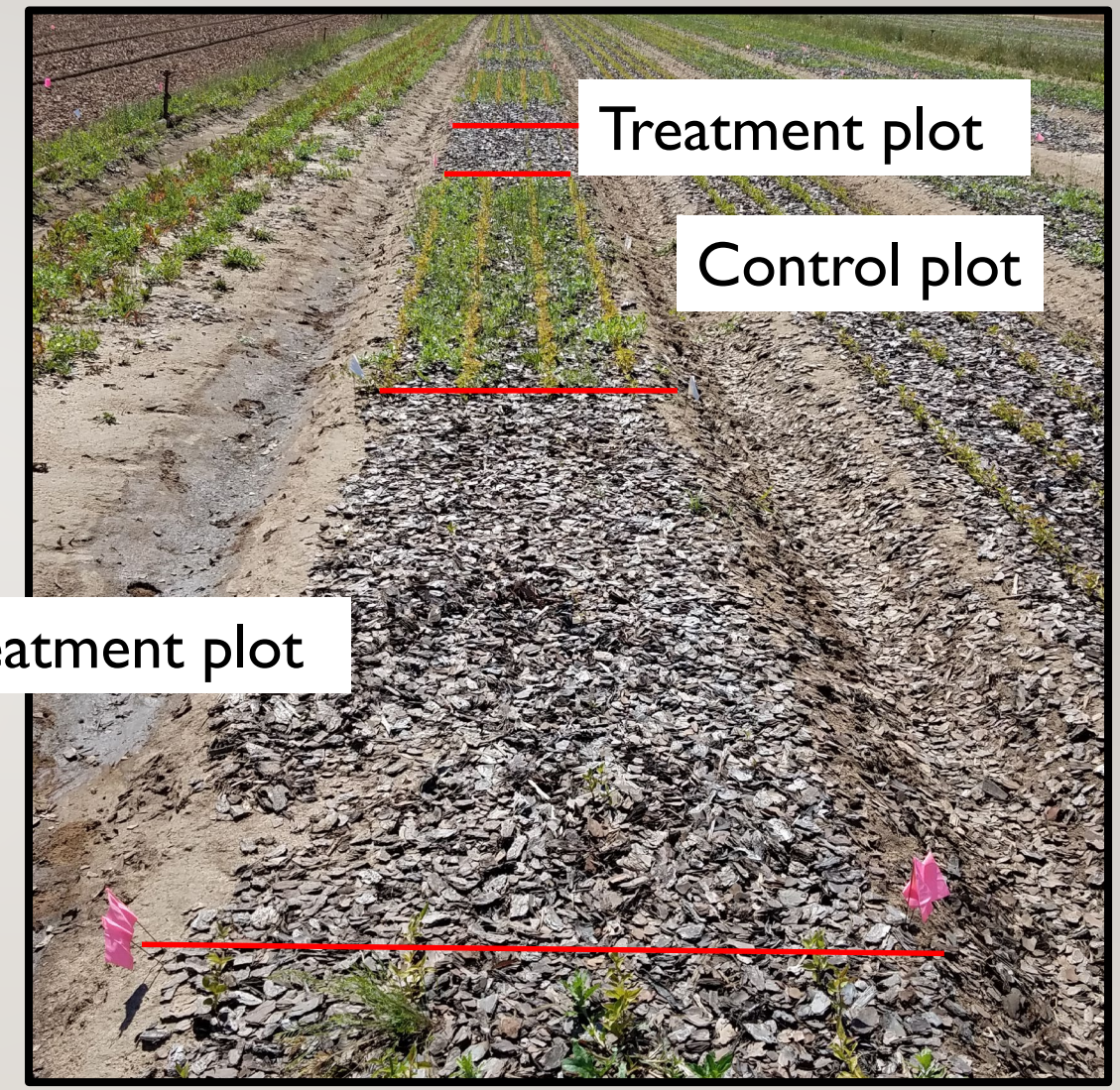
SEMERA® 51.0% WDG

Southern Forest Nursery Management Cooperative

Southern Forest
Nursery Management Cooperative

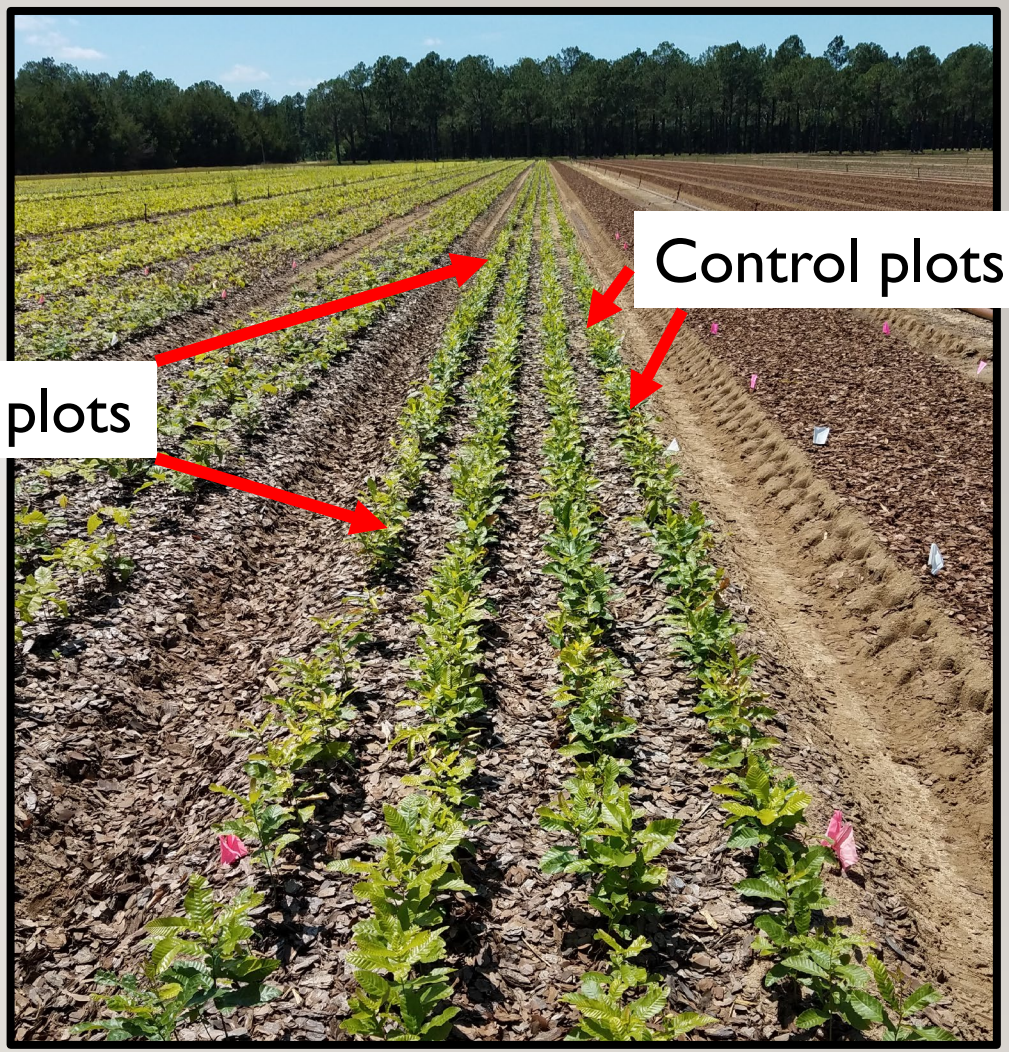


Crepe myrtle
8 weeks post-spray

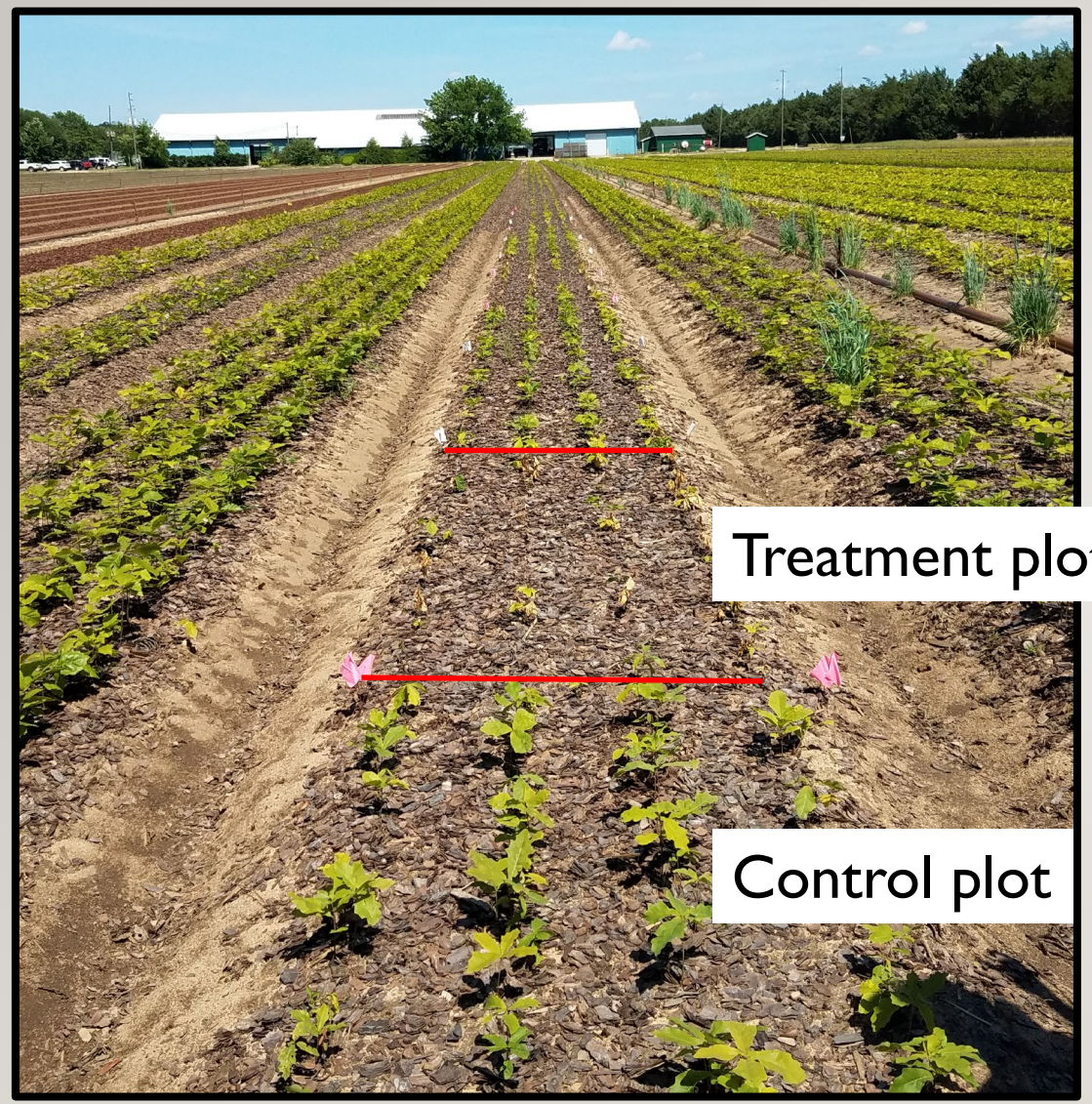


Dogwood 12 weeks post-spray

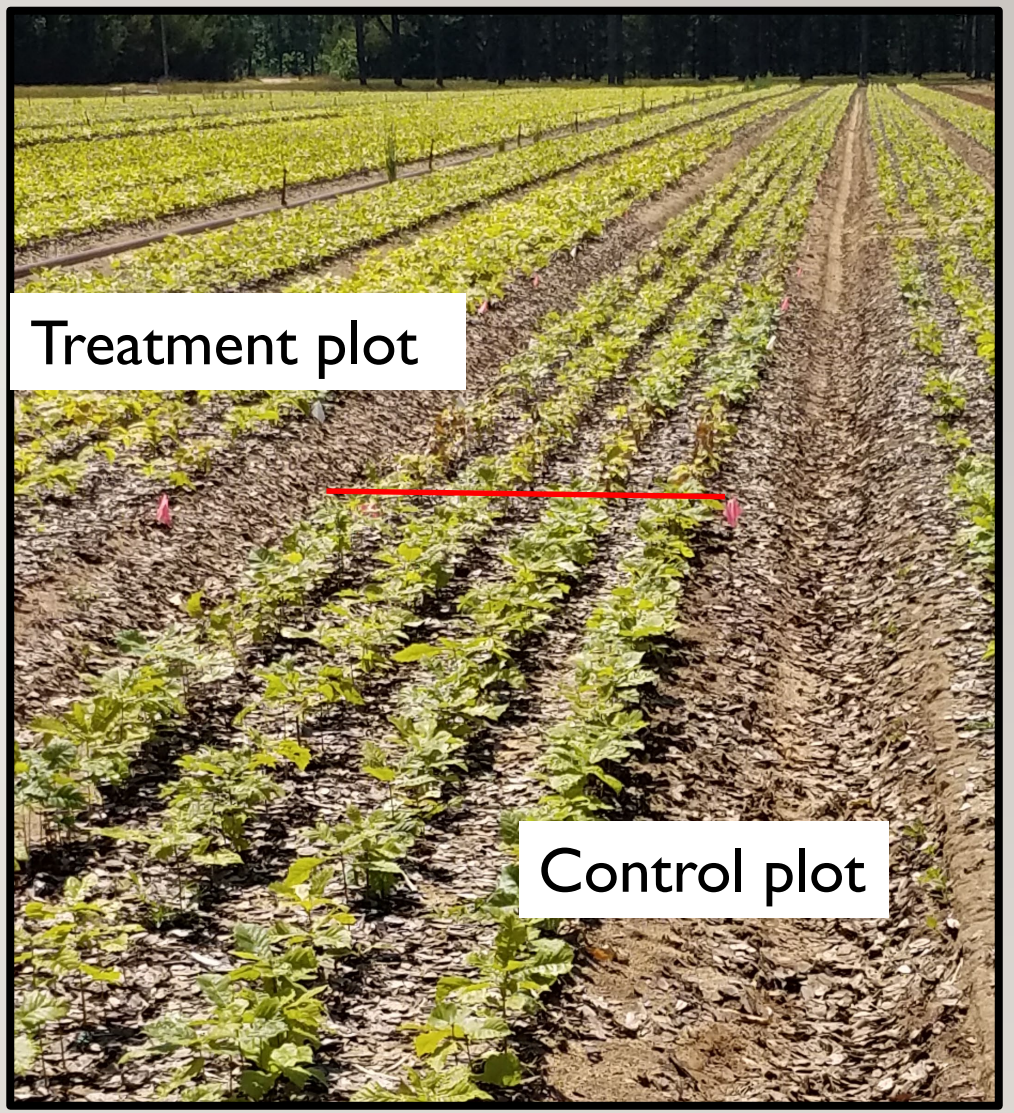
Crabapple
12 weeks post-spray



Sawtooth oak
12 weeks post-spray



White oak 12 weeks post-spray



Swamp chestnut oak 12 weeks post-spray

Germination density per square foot (at 8 or 12 weeks post-sowing) of 13 hardwood species treated with flumioxazin at sowing.

Species	Treatment	Germination Density/Sq Ft
Baldcypress	Control Treatment	0.0 0.0
Catalpa	Control Treatment	8.2 5.4
Chickasaw plum	Control Treatment	3.1 2.9
Crabapple	Control Treatment	5.0 0.6
Crepe myrtle	Control Treatment	13.2 0.0
Dogwood	Control Treatment	14.8 1.2
Persimmon	Control Treatment	3.6 3.2

Species	Treatment	Germination Density/Sq Ft
Redbud	Control Treatment	11.4 1.6
Yellow poplar	Control Treatment	0.6 0.3
OAKS: Northern red oak	 Control Treatment	 3.6 3.8
Sawtooth oak	Control Treatment	5.8 6.8
Swamp chestnut oak	Control Treatment	4.8 4.4
White oak	Control Treatment	2.0 1.4

Redbud seedlings at lifting

White oak seedlings at lifting

Of the 13 species treated:

~~Baldcypress~~ — poor germ or washed out

Catalpa

Chickasaw plum

~~Crabapple~~

~~Crepe myrtle~~

~~Dogwood~~

(~~Crabapple~~, ~~Crepe myrtle~~, ~~Dogwood~~) — no treated seedlings at lifting

Persimmon

~~Redbud~~ — samples collected but not measured/inadequate density in treated plots

~~Yellow poplar~~ — poor germ or washed out

Oaks – Northern red oak

Sawtooth oak

Swamp chestnut oak

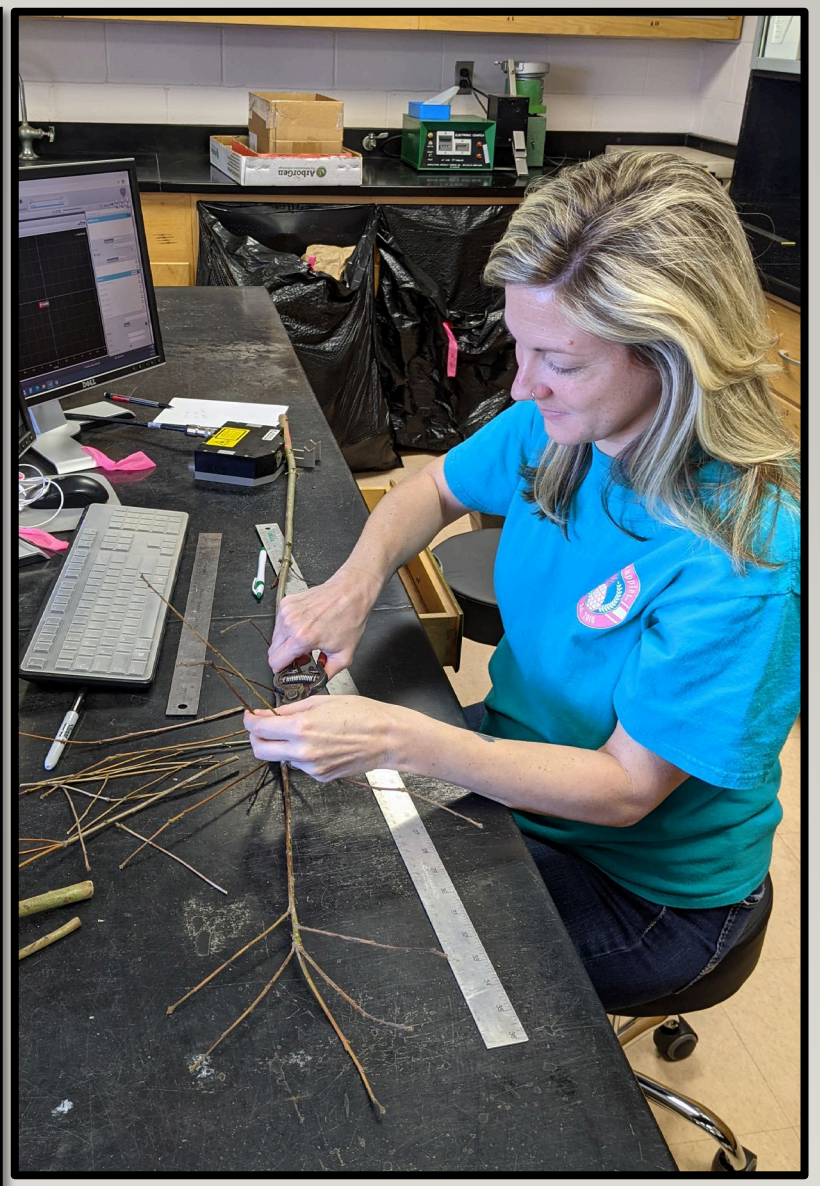
~~White oak~~ — samples collected but not measured/ inadequate density in treated plots

Southern Forest Nursery Management Cooperative

6 species measured at end of trial

Southern Forest
Nursery Management Cooperative

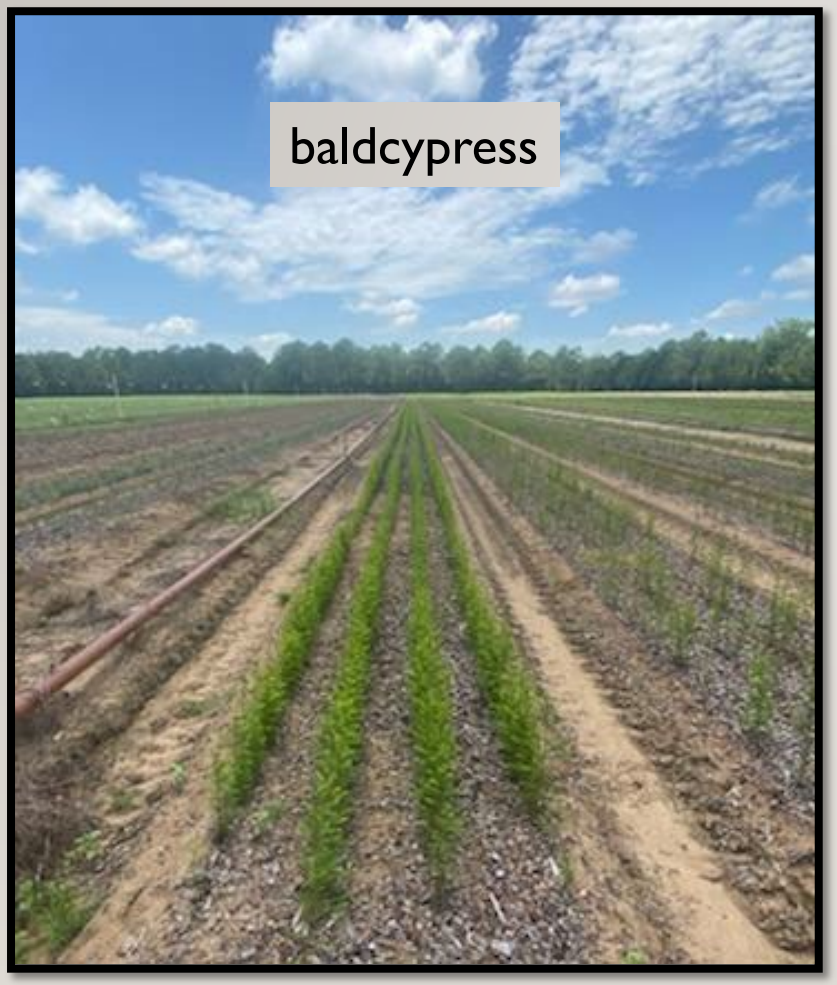
CTRL
REP 3
CTRL
REP 4



Hardwood seedling characteristics (measured at 10 or 13 months old) treated with flumioxazin at sowing.

Species	Treatment	Final density/ sq ft (#)	Shoot height (cm)	Ground line diameter (mm)	Shoot weight (g)	Root weight (g)
Catalpa	Control Treatment	8.0 6.0	78.0 84.5	10.25 11.93	11.69 15.23	10.22 13.79
Chickasaw plum	Control Treatment	3.2 2.3	63.8 76.0	6.56 8.74	8.64 20.40	6.57 14.92
Northern red oak	Control Treatment	2.2 2.2	83.0 71.5	13.00 12.11	25.88 20.32	47.76 42.71
Persimmon	Control Treatment	3.6 3.2	52.9 64.6	7.51 8.55	5.34 8.04	15.71 20.63
Sawtooth oak	Control Treatment	4.6 4.4	92.5 94.0	10.50 10.46	15.59 15.94	37.87 41.91
Swamp chestnut oak	Control Treatment	2.6 2.1	77.9 49.6	12.40 10.08	19.01 10.60	23.49 18.47

2021 hardwood beds treated with flumioxazin (8 oz/ac) at sowing



2021 bed with no flumioxazin applied

What's next?

- Flumioxazin is labeled for hardwood nurseries
- Did not repeat this study in 2020, nursery manager currently using it as pre-emergent in certain species
- Interested nurseries should use this in small test plots prior to operational use
- Some nurseries have experienced or expressed concerns about carryover effect (not seen at 2020 trial site)

"Flumioxazin soil persistence and mineralization in laboratory experiments" by J. Ferrell, W. Vencill

Half-life for flumioxazin in sandy clay loam = 16-18 days; loamy sand = 12-14 days

QUESTIONS?

Southern Forest
Nursery Management Cooperative

BAREROOT Post-Emergent Herbicide Screening Trial – 3 herbicides

Background

- Nurseries have toolbox full of pre-emergent herbicides

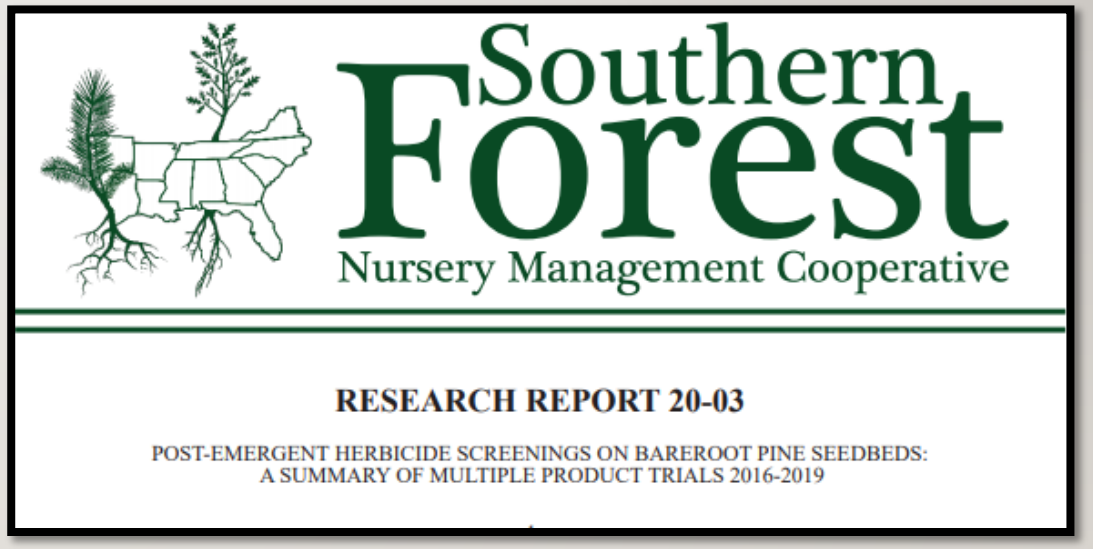
- Not much in the toolbox for OTP spraying when weeds appear during the growing season

especially for nutsedge control

	No.	Subject
Nina's calls	9,412,223	nutsedge
Nina's emails	46,120,002	nutsedge
Nina's texts	965,784	nutsedge

Background

- 5 years of trials for safe (seedling tolerant) & effective (controls targeted weeds) post-emergent herbicide
- 2016, 2017, 2018, 2019, 2020
- 17 herbicides
- 9 manufacturers
- 10 Cooperative nurseries
- 111 loblolly pine installations and 36 slash pine installations



2020 RETESTING – 3 PRODUCTS

- ShieldEx ® (tolpyralate) – corn herbicide

lists grasses and broadleaf weeds, no nutsedge
1 oz/ac

- Strada ® (orthosulfamuron) – rice herbicide

lists **rice flatsedge and yellow nutsedge**
1.7 oz/ac

- Tenacity® (mesotrione) – turf herbicide

lists grasses, broadleaf weeds, **yellow nutsedge**
4 oz/ac

Summer 2020 Trial Installations

MON	TUES	WED	THURS	FRI
June 29 GFC	June 30 IFCO Pine Hill	July 1 IFCO White City		
				July 10 K&L

AT 9 WEEKS POST-SOW

4 NURSERIES

4 LOBLOLLY TRIALS
2 SLASH TRIALS

ShieldEx® (tolpyralate) results on loblolly pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control ShieldEx®	26.9 27.6	25.5 25.2	4.45 4.37	0.46 0.44	2.19 2.20
K & L	Control ShieldEx®	31.9 30.3	25.0 24.7	4.89 4.85	0.58 0.56	2.49 2.51
IFCO Pine Hill	Control ShieldEx®	29.6 31.3	30.6 31.0	4.82 4.76	0.45 0.45	2.91 2.79
IFCO White City	Control ShieldEx®	26.7 26.8	29.1 28.5	5.24 5.33	0.55 0.56	3.01 3.06

ShieldEx® (tolpyralate) results on slash pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control ShieldEx®	20.0 23.5	26.2 26.4	4.38 4.24	0.54 0.49	2.70 2.54
IFCO Pine Hill	Control ShieldEx®	31.5 33.5	27.6 26.1	4.49 4.34	0.40 0.38	2.57 2.34

Strada® (orthosulfamuron) results on loblolly pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control Strada®	26.9 25.7	25.5 25.3	4.45 4.39	0.46 0.47	2.19 2.17
K & L	Control Strada®	31.9 29.4	25.0 24.3	4.89 4.91	0.58 0.60	2.49 2.61
IFCO Pine Hill	Control Strada®	29.6 28.8	30.6 30.9	4.82 4.82	0.45 0.45	2.91 2.87
IFCO White City	Control Strada®	26.7 25.6	29.1 29.5	5.24 5.30	0.55 0.56	3.01 3.20

Strada® (orthosulfamuron) results on slash pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control Strada®	20.0 19.5	26.2 27.0	4.38 4.54	0.54 0.58	2.70 2.87
IFCO Pine Hill	Control Strada®	31.5 34.3	27.6 25.6	4.49 4.20	0.40 0.35	2.57 2.19

Tenacity® (mesotrione) results on loblolly pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control Tenacity®	26.9 27.3	25.5 25.1	4.45 4.39	0.46 0.47	2.19 2.21
K & L	Control Tenacity®	31.9 30.5	25.0 24.7	4.89 4.86	0.58 0.57	2.49 2.44
IFCO Pine Hill	Control Tenacity®	29.6 28.5	30.6 30.7	4.82 4.80	0.45 0.45	2.91 2.94
IFCO White City	Control Tenacity®	26.7 25.2	29.1 28.4	5.24 5.34	0.55 0.56	3.01 3.06

Tenacity® (mesotrione) results on slash pine

Nursery	Treatment	Density/ sq ft (# trees)	Shoot height (cm)	Root collar diameter (mm)	Root weight/ seedling (g)	Shoot weight/ seedling (g)
GFC	Control Tenacity®	20.0 20.8	26.2 25.8	4.38 4.19	0.54 0.48	2.70 2.17
IFCO Pine Hill	Control Tenacity®	31.5 33.6	27.6 25.2	4.49 4.23	0.40 0.37	2.57 2.10

What's next?

- None of these 3 herbicides are labeled for our nurseries
- Will need to test at 2X and 4X rate and show no toxicity to crop before approaching manufacturer to add nurseries to label
- Keep searching for post-emergent herbicide specifically for nutsedge

QUESTIONS?

Southern Forest
Nursery Management Cooperative

TRIALS INSTALLED IN 2021

- BAREROOT Post-Emergent Nutsedge Herbicide Trial
- CONTAINER Post-Emergent Herbicide Trial

Southern Forest
Nursery Management Cooperative

BAREROOT Post-Emergent Nutsedge Herbicide Trial

Southern Forest
Nursery Management Cooperative

Background – RERUN!

- Nurseries have toolbox full of pre-emergent herbicides

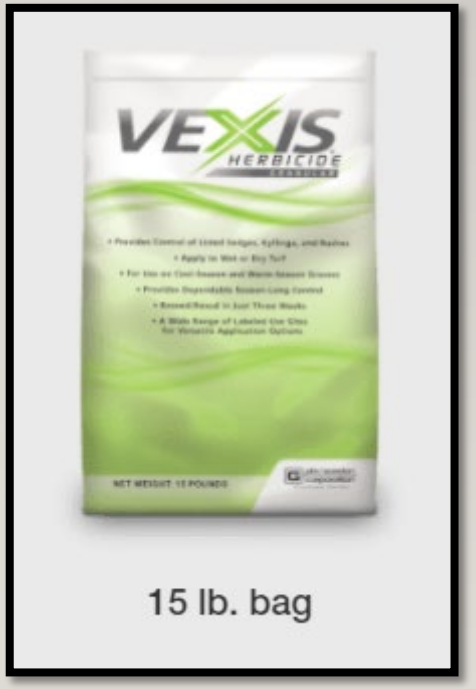
- Not much in the toolbox for OTP spraying when weeds appear during the growing season

especially for nutsedge control

	No.	Subject
Nina's calls	9,412,223	nutsedge
Nina's emails	46,120,002	nutsedge
Nina's texts	965,784	nutsedge

BAREROOT Post-Emergent Nutsedge Herbicide Trial

- 1 herbicide: Vexis (pyrimisulfan) granular
- Specifically marketed for control of yellow and purple nutsedge
- 1st post-emergent granular herbicide tested since BN
- 3 rates: label rate is 2 lb product/500 sq ft
  used 1/2X, 1X, 2X as treatments
- 1 timing : 8.5 weeks post-sowing
- 2 species: loblolly and slash pine
- 1 nursery: Georgia Forestry Commission Nursery



15 lb. bag

Vexis® Herbicide Granular

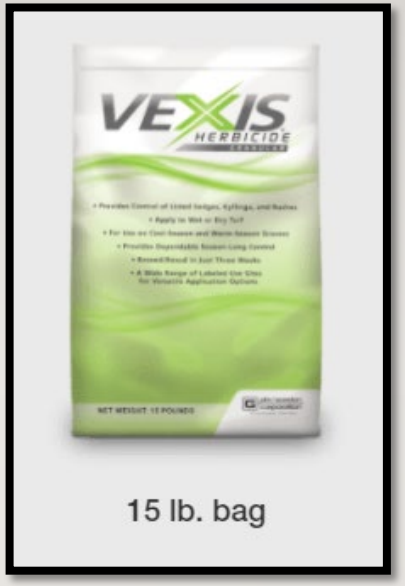
A powerful weapon against sedges and kyllingas

What it is

Vexis® Herbicide Granular uses the proprietary new active ingredient pyrimisulfan to deliver exceptional control of sedge and kyllinga species, plus listed broadleaf weeds. The granular formulation reduces the potential for drift or off-target application and can be applied to wet or dry turf. And Vexis is labeled for use on listed cool-season and established warm-season turfgrasses, including improved varieties of St. Augustinegrass.

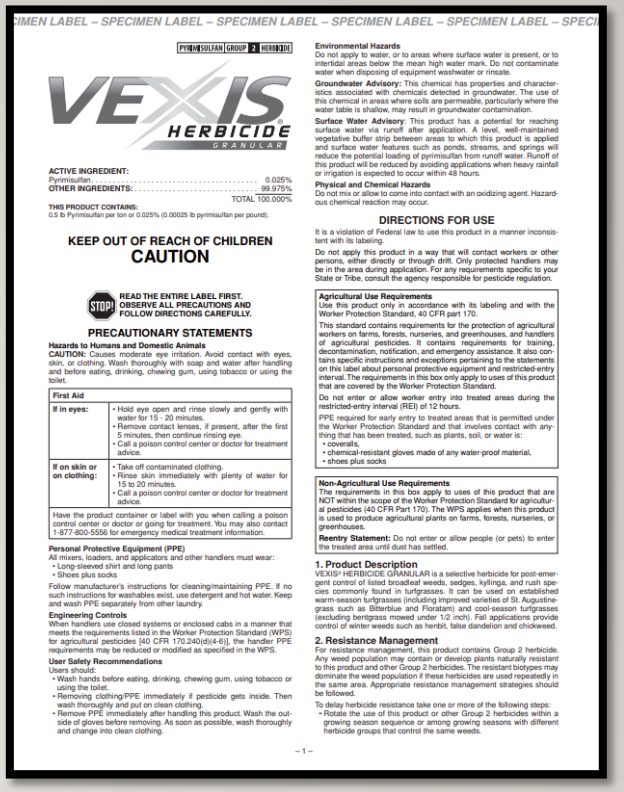
Show More

pbi/gordon corporation



15 lb. bag

2 lb. shaker can



SPECIMEN LABEL – SPECIMEN LABEL – SPECIMEN LABEL – SPECIMEN LABEL – SPECIMEN LABEL – SPECIMEN LABEL

PYRIMISULFAN GROUP 2 HERBICIDE

VEXIS HERBICIDE GRANULAR

ACTIVE INGREDIENT:
Pyrimisulfan 0.025%
OTHER INGREDIENTS: 99.975%
TOTAL 100.000%

THIS PRODUCT CONTAINS:
0.5 lb Pyrimisulfan per ton or 0.025% (0.00025 lb pyrimisulfan per pound).

KEEP OUT OF REACH OF CHILDREN
CAUTION

STOP! **READ THE ENTIRE LABEL FIRST. OBSERVE ALL PRECAUTIONS AND FOLLOW DIRECTIONS CAREFULLY.**

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals
CAUTION: Causes moderate eye irritation. Avoid contact with eyes, skin, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

First Aid	
If in eyes:	• Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If on skin or on clothing:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-877-800-5556 for emergency medical treatment information.	

Personal Protective Equipment (PPE)
All mixers, loaders, and applicators and other handlers must wear:
• Long-sleeved shirt and long pants
• Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls
When handlers use closed systems or enclosed cabs in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations
Users should:
• Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
• Removing clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
• Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards
Do not apply to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

Groundwater Advisory: This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Surface Water Advisory: This product has a potential for reaching surface water via runoff after application. A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of pyrimisulfan from runoff water. Runoff of this product will be reduced by avoiding applications when heavy rainfall or irrigation is expected to occur within 48 hours.

Physical and Chemical Hazards
Do not mix or allow to come into contact with an oxidizing agent. Hazardous chemical reaction may occur.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170.

This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:
• coveralls
• chemical-resistant gloves made of any water-proof material,
• shoes plus socks

Non-Agricultural Use Requirements
The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Reentry Statement: Do not enter or allow people (or pets) to enter the treated area until dust has settled.

1. Product Description
VEXIS® HERBICIDE GRANULAR is a selective herbicide for post-emergent control of listed broadleaf weeds, sedges, kyllinga, and rush species commonly found in turfgrasses. It can be used on established warm-season turfgrasses (including improved varieties of St. Augustinegrass such as Bitterblue and Floratam) and cool-season turfgrasses (excluding bentgrass mowed under 1/2 inch). Fall applications provide control of winter weeds such as henbit, false dandelion and chickweed.

2. Resistance Management
For resistance management, this product contains Group 2 herbicide. Any weed population may contain or develop plants naturally resistant to this product and other Group 2 herbicides. The resistant biotypes may dominate the weed population if these herbicides are used repeatedly in the same area. Appropriate resistance management strategies should be followed.

To delay herbicide resistance take one or more of the following steps:
• Rotate the use of this product or other Group 2 herbicides within a growing season sequence or among growing seasons with different herbicide groups that control the same weeds.

– 1 –

3. Weeds Controlled

VEXIS HERBICIDE GRANULAR will control the following weeds:

Sedges, Kyllinga, and Rushes (including ALS resistant annual sedges): Yellow Nutsedge, Purple Nutsedge, Green Kyllinga, False Green Kyllinga, Cockscomb Kyllinga, and Path Rush.

Broadleaf Weeds: Common Chickweed, Hairy Bittercress, Henbit, Buckhorn Plantain, Dollarweed (Pennywort), False Dandelion, Florida Betony, Ground Ivy, and Virginia Buttonweed.

4 foot by 5 foot PVC frame (5 foot plots)

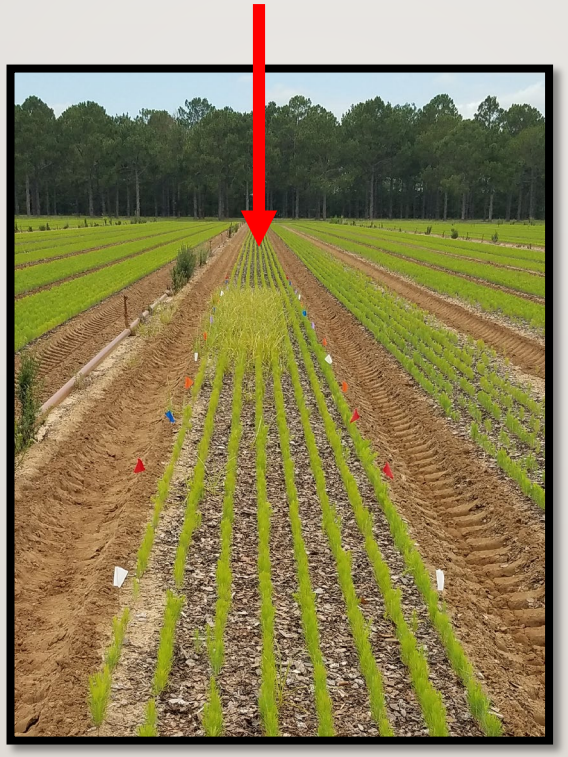
½ rate
Vexis

1 X
rate
Vexis

2X
rate
Vexis

loblolly bed
no nutsedge
test for seedling tolerance

What I like to see!



slash bed
lots of nutsedge
test for herbicidal activity on nutsedge
and seedling tolerance

What's next?

- If we find no seedling damage + good nutsedge control, then we will retest
- Vexis is not labeled for our nurseries
- Will need to test at 2X and 4X rate and show no toxicity to crop before approaching manufacturer to add nurseries to label
- Keep searching for post-emergent herbicide specifically for nutsedge

QUESTIONS?

Southern Forest
Nursery Management Cooperative

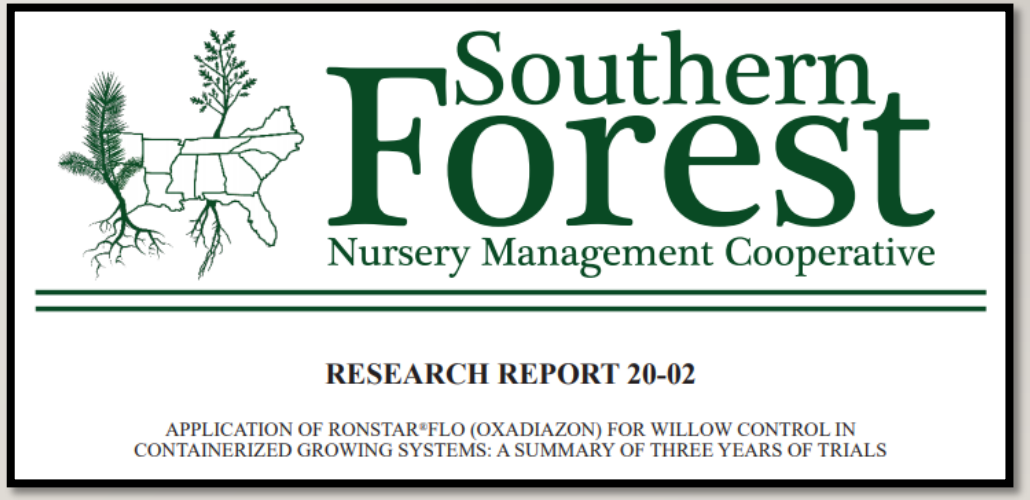
CONTAINER Post-Emergent Herbicide Trial

Southern Forest
Nursery Management Cooperative

Background

- not many options for OTP spraying of containers when weeds appear during the growing season

- SFNMC tested RonstarFlo (oxadiazon) for 3 years in at-sowing applications in containers with good results of willow control and seedling tolerance



CONTAINER Post-Emergent Herbicide Trial

- 1st trial of post-emergent herbicide in OTP application in container seedlings
- 1 herbicide: RonstarFlo (oxadiazon)
- 1 rate: 40 oz/ac
- spray applications made on:
  - 8 week old loblolly
  - 8 week old slash
  - 9 week old longleaf
  - 10 week old longleaf
- 1 nursery: Meeks Farm and Nursery
- target weed is oxalis (appears in containers around 9-10 weeks post-sowing)

loblolly at 8 weeks old

slash at 8 weeks old

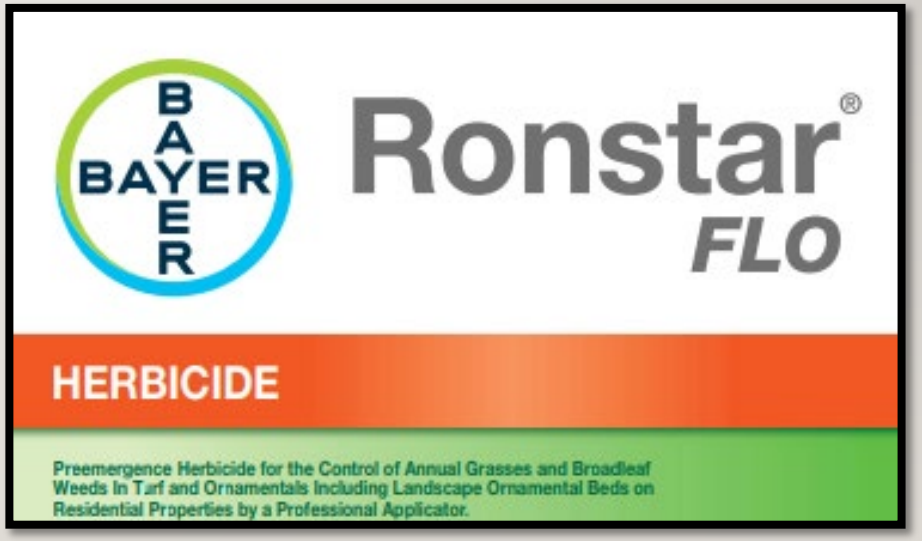
longleaf at 9 weeks old

longleaf at 10 weeks old

What's next?

- If we find no seedling damage + good weed control, then we will retest at different rates, times of application, species, nurseries
- RonstarFlo is labeled for our nurseries

"Pre-emergence Herbicide" on label = apply prior to **weed seed germination**



QUESTIONS?

Southern Forest
Nursery Management Cooperative

CONTACT

Nina Payne
334-844-4917
nina.payne@auburn.edu

Southern Forest
Nursery Management Cooperative