TARGETING NUTSEDGE IN A POST-EMERGENT HERBICIDE TRIAL 2021 INSTALLATION

SFNMC 2022 CONTACT MEETING

JULY 18, 2022

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SFNMC HISTORY WITH NUTSEDGE

- SFNMC started trials in 1975 targeting nutsedge

HERBICIDE WEED CONTROL RESULTS IN PINE SEEDBEDS 1/

David South, R. Hugh Crowley and Dean H. Gjerstad
Department of Forestry
Auburn University Agricultural Experiment Station

Abstract--Several pre- and post-emergent herbicides were tested throughout the Southeast from 1974 to 1976 in seedbeds of loblolly, slash, shortleaf, longleaf, and eastern white pine. Seedling tolerance, weed control, and relative costs are discussed.

Post-Emergent Herbicide Experiments

In 1975, a post-emergent herbicide that controls nutsedge was tested at one location on slash pine. Cyperquat applied at 1 and 3 lb **ai/A** resulted in no seedling injury.

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46 years and many herbicide trials later…..

- Read about Vexis® (pyrimisulfan) granular herbicide in late 2020
- Contacted PBI Gordon and Eric Reasor, SE Research Scientist, for product information and samples
- Contacted Paul Bartley in AU Horticulture Department for testing instructions
- Modified a proposed post-emergent herbicide trial in SFNMC 2021 Work Plan to a Vexis® trial specifically targeting nutsedge

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Vexis® (0.025% pyrimisulfan)

- Pyrimisulfan developed in Japan in 2010 for use in rice paddies
- Japanese developer partnered with PBI Gordon to bring product to U.S.
- EPA approved registration of pyrimisulfan as Vexis® in 2018
- Product manufactured in a granular formulation and sold in 15-lb bags and 2-lb shaker containers
- Vexis® labeled for use in turf, sod production, and non-cropland sites to target yellow and purple nutsedge, green kylinga, chickweed, henbit, dandelion, buttonweed, dollarweed
- Vexis® label rate is 2 lb product/500 sq ft – used in spot treatments

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Vexis® 2021 trial

- Built 4' X 5' PVC frame (20 sq ft)
- Measured herbicide for 1/2X, 1X, and 2X the labeled rate for 20 sq ft

- Installed at Georgia Forestry Commission Nursery
- Used in 2 species: loblolly and slash pine
- Made a single application made at 8.5 weeks post-sowing

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July 6 pre-treatment photos

- loblolly bed
- no nutsedge
- test for seedling tolerance

- slash bed
- high nutsedge population
- test for herbicidal activity on nutsedge and seedling tolerance

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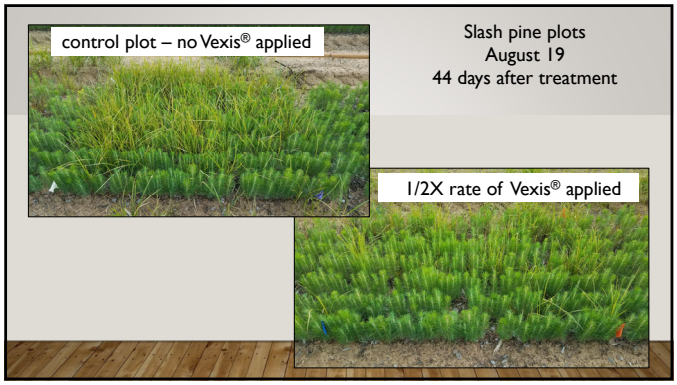
control plot – no Vexis® applied
Slash pine plots
August 19
44 days after treatment
1/2X rate of Vexis® applied

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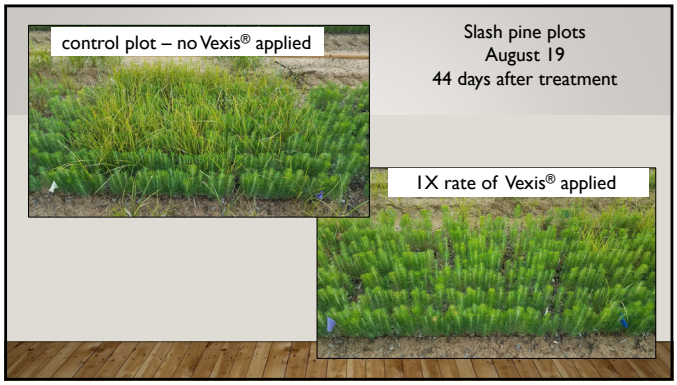
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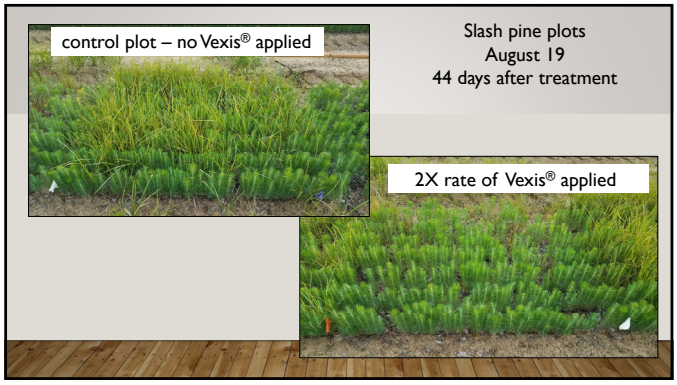
control plot – no Vexis® applied
Slash pine plots
August 19
44 days after treatment
2X rate of Vexis® applied

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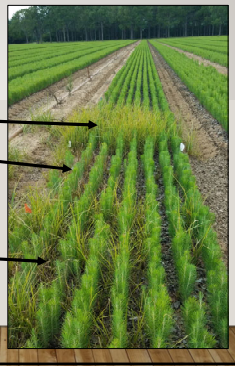
Slash pine bed
August 19
44 days after treatment



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Vexis® 2021 trial – end of growing season

- Collected seedling samples from each plot for quality measurements

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2021 Bareroot loblolly pine seedling characteristics
treated with pyrimisulfan (Vexis®) at 8.5 weeks post-sowing

Treatment	Rate (lbs./500 ft²)	Density (seedlings/ft²)	Shoot height (cm)	Root collar diameter (mm)	Shoot dry weight (g)	Root dry weight (g)
Control	0.0	24.3 ± 0.64	22.1 ± 0.56	4.59 ± 0.04	2.36 ± 0.09	0.82 ± 0.03
1/2X label rate	1.0	26.5 ± 1.35	22.2 ± 0.52	4.53 ± 0.04	2.34 ± 0.05	0.84 ± 0.02
1X label rate	2..0	25.8 ± 0.42	22.2 ± 0.54	4.57 ± 0.03	2.34 ± 0.03	0.91 ± 0.03
2X label rate	4.0	24.3 ± 3.20	20.9 ± 0.92	4.62 ± 0.14	2.36 ± 0.12	0.95 ± 0.10
p>f		*0.793*	*0.342*	*0.877*	*0.993*	*0.406*

No statistical differences between treatments in any characteristic measured

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2021 Bareroot slash pine seedling characteristics
treated with pyrimisulfan (Vexis®) at 8.5 weeks post-sowing

Treatment	Rate (lbs./500 ft²)	Density (seedlings/ft²)	Shoot height (cm)	Root collar diameter (mm)	Shoot dry weight (g)	Root dry weight (g)
Control	0.0	23.4 ± 0.78	24.1 ± 1.75	4.10 ± 0.07 b	2.36 ± 0.10 b	0.74 ± 0.04 c
1/2X label rate	1.0	21.7 ± 2.03	23.7 ± 2.04	**4.45 ± 0.10 a**	**2.81 ± 0.06 a**	0.83 ± 0.06 bc
1X label rate	2..0	20.4 ± 1.46	**21.6 ± 1.17**	**4.61 ± 0.13 a**	**2.87 ± 0.13 a**	**0.93 ± 0.07 a**
2X label rate	4.0	23.9 ± 1.13	23.2 ± 0.95	**4.46 ± 0.95 a**	2.69 ± 0.09 a	**0.89 ± 0.01 ab**
p>f		*0.387*	*0.052*	*0.009*	*0.021*	*0.012*

Bold means within a seedling characteristic indicates a significant difference between that rate and control.
Different letters within a seedling characteristic indicate significant differences in rates.

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Vexis® 2021 trial – end of growing season

- Collected additional seedlings from each plot for outplanting in February 2022, will measure seedling quality characteristics in early fall 2022 to quantify any effects of Vexis® on treated seedlings after one growing season

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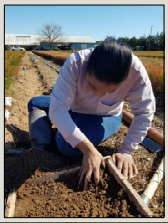
Vexis® 2021 trial – end of growing season

- Collected nutlets from each plot for planting in pots of nursery soil at SFNMC greenhouse



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- 5 nutlets per pot planted on February 11, 2022; photos taken on March 11, 2022


from control plot nutlets


from 1/2X rate nutlets


from 1X rate nutlets


from 2X rate nutlets

- Does Vexis® kill the nutsedge? delay germination? reduce nutlet production?

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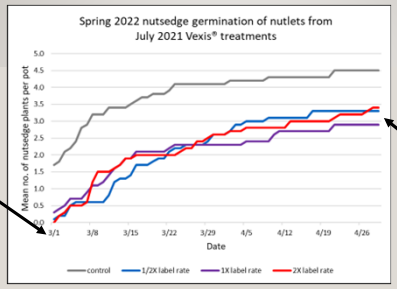
Germination over time of nutlets obtained from Vexis® treatment plots of July 2021

Vexis® treated nutlets had delayed germination



Vexis® treated nutlets had fewer nutlets germinate, but still had germination (did not kill them) *herbistatic*

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- Nutlets collected in July 2022 from nutsedge grown in pots by treatment

new nutlets grown from control and 2X rate

- Visible difference in quantities of new nutlets from non-treated control pots and 2X-treated pots

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Celebrating 50 Years 1972-2022

Southern Forest Nursery Management Cooperative

RESEARCH REPORT 22-03

THE EFFICACY OF PYRIMISULFAN ON NUTSEDGE CONTROL AND THE TOLERANCE OF LOBLOLLY AND SLASH PINE IN BAREROOT SEEDLING BEDS

by

Nina Payne, Tom Stokes, Annakay Newell, Jeff Fields, and Russell Ayres

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Vexis® 2022 trial – field portion

- At 4 nurseries: Georgia Forestry Commission, IFCO Pine Hill, IFCO White City, Rayonier

- In 2 species: loblolly and slash pine
- With 4 treatments : 0X rate, 1/2X rate, 1X rate, 2X rate
- At 2 timings : single applications made at 7-weeks post-sow
  double applications made at 7- and 12-weeks post-sow

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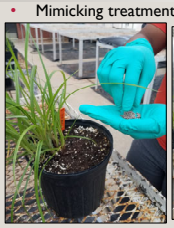
Vexis® 2022 trial – greenhouse portion

- Growing yellow nutsedge from purchased nutlets
- Mimicking treatments from the 2022 field portion: 4 treatments : 0X rate, 1/2X rate, 1X rate, 2X rate



2 timings : single applications made at 7-weeks post-sow

double applications made at 7- and 12-weeks post-sow

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Future of Vexis® Use in Conifer Nurseries

- In continued communication by phone and email with PBI Gordon's SE Research Scientist
- Eric Reasor reports that the company is considering adding other crops to the Vexis® label
- PBI Gordon research shows:
  - Vexis® reduces number of purple nutlets by ~70%
  - a single application of Vexis® reduces viability of purple nutlets by ~30%
  - a double application of Vexis® reduces viability of purple nutlets by ~50%
- Eric Reasor reports that our trial results are similar; approved the study design for our 2022 trial; noted that a 2X product rate for crop safety data is typically acceptable for professional (not homeowner) crop tolerance testing

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QUESTIONS?

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