SFNMC Contact Meeting

Little Rock, Arkansas

July 22, 2024

2023 Vexis® Hardwood Trial Results

2024 Vexis® Hardwood Trial Updates

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2023 Vexis® Hardwood Trial Results

Purpose
Methods
Results
Conclusions

Purpose of trial

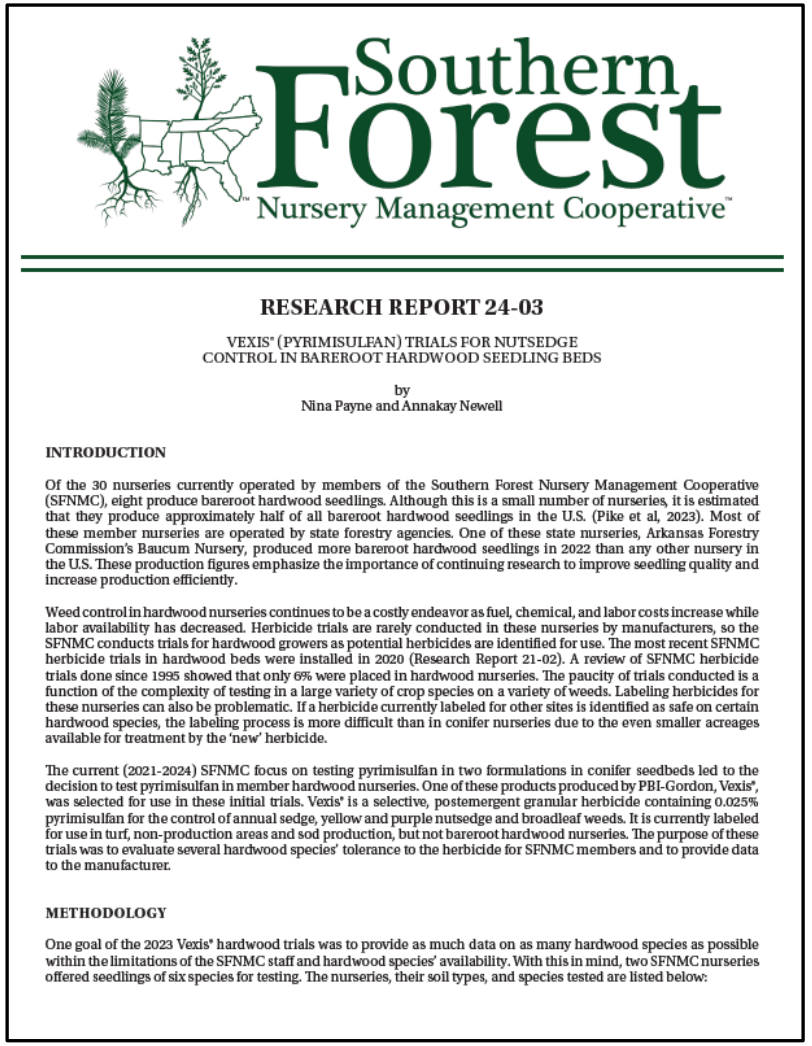
- To test Vexis® for its suitability for use in weed control in bareroot hardwood seedlings
- Vexis®:
  - Granular
  - 0.025% pyrimisulfan
  - Post-emergent
  - Annual sedge, purple and yellow nutsedge, rush, broadleaf weeds
  - Labeled for turf, sod production, non-cropland sites, *not conifer or hardwood nurseries*
  - PBI-Gordon has data on ornamental species' tolerance to Vexis® in **pots**, with 'oak' category showing good tolerance to both Vexis® and Arkon™

- SFNMC Vexis® history:
  - First SFNMC trial in bareroot hardwood in 2023
  - Three years of testing in bareroot pine (2021-2023)

Results of 2023 Vexis® Hardwood Trials

Methods

- Trials in Georgia Forestry Commission Flint River, GA Nursery and North Carolina Forest Service Goldsboro, NC Nursery
- Trials in catalpa, thuja, yellow poplar, persimmon, sawtooth oak, and white oak
- 3 rates: 0, 1X, and 2X label rate (same rates used in bareroot pine)
- Single applications made on each species, ranging from 5 to 23 weeks post-sowing
- 5-foot plots used for each rate; 3 - 5 replications per species
- Collected all seedlings within a 12-inch by 4-foot counting frame in each plot and took measurements of seedling quality
- Results in Research Report 24-03



Southern Forest Nursery Management Cooperative

RESEARCH REPORT 24-03

VEXIS® (PYRIMISULFAN) TRIALS FOR NUTSEDGE CONTROL IN BAREROOT HARDWOOD SEEDLING BEDS

by
Nina Payne and Annakay Newell

INTRODUCTION

Of the 30 nurseries currently operated by members of the Southern Forest Nursery Management Cooperative (SFNMC), eight produce bareroot hardwood seedlings. Although this is a small number of nurseries, it is estimated that they produce approximately half of all bareroot hardwood seedlings in the U.S. (Pike et al, 2023). Most of these member nurseries are operated by state forestry agencies. One of these state nurseries, Arkansas Forestry Commission's Baucum Nursery, produced more bareroot hardwood seedlings in 2022 than any other nursery in the U.S. These production figures emphasize the importance of continuing research to improve seedling quality and increase production efficiently.

Weed control in hardwood nurseries continues to be a costly endeavor as fuel, chemical, and labor costs increase while labor availability has decreased. Herbicide trials are rarely conducted in these nurseries by manufacturers, so the SFNMC conducts trials for hardwood growers as potential herbicides are identified for use. The most recent SFNMC herbicide trials in hardwood beds were installed in 2020 (Research Report 21-02). A review of SFNMC herbicide trials done since 1995 showed that only 6% were placed in hardwood nurseries. The paucity of trials conducted is a function of the complexity of testing in a large variety of crop species on a variety of weeds. Labeling herbicides for these nurseries can also be problematic. If a herbicide currently labeled for other sites is identified as safe on certain hardwood species, the labeling process is more difficult than in conifer nurseries due to the even smaller acreages available for treatment by the 'new' herbicide.

The current (2021-2024) SFNMC focus on testing pyrimisulfan in two formulations in conifer seedbeds led to the decision to test pyrimisulfan in member hardwood nurseries. One of these products produced by PBI-Gordon, Vexis®, was selected for use in these initial trials. Vexis® is a selective, postemergent granular herbicide containing 0.025% pyrimisulfan for the control of annual sedge, yellow and purple nutsedge and broadleaf weeds. It is currently labeled for use in turf, non-production areas and sod production, but not bareroot hardwood nurseries. The purpose of these trials was to evaluate several hardwood species' tolerance to the herbicide for SFNMC members and to provide data to the manufacturer.

METHODOLOGY

One goal of the 2023 Vexis® hardwood trials was to provide as much data on as many hardwood species as possible within the limitations of the SFNMC staff and hardwood species' availability. With this in mind, two SFNMC nurseries offered seedlings of six species for testing. The nurseries, their soil types, and species tested are listed below:

Results - catalpa

Table 1. Bareroot catalpa seedling characteristics treated with pyrimisulfan (Vexis®) at 5 weeks post-sowing on May 30, 2023, at Georgia Forestry Commission Flint River Nursery, Byromville, GA.

Treatment	Rate (lbs./ 500 ft^2)	Merchantable Density (seedlings/ft^2)	Culls (seedlings/ ft^2)[3]	Shoot height (cm)	Ground line diameter (mm)[1,2]	Shoot dry weight (g)	Root dry weight (g)
Control	0.0	4.43 ± 0.07	5.33 ± 2.33	92.9 ± 2.38	13.7 ± 0.6 b	21.2 ± 2.1	16.3 ± 1.2
1X label rate	2.0	3.00 ± 0.76	4.00 ± 2.31	94.2 ± 2.93	15.7 ± 1.0 ab	35.0 ± 13.0	30.9 ± 12.0
2X label rate	4.0	2.37 ± 0.43	2.33 ± 1.45	97.8 ± 4.05	**17.4 ± 1.3** a	38.9 ± 6.1	36.0 ± 7.1
p>f		*0.068*	*0.616*	*0.527*	*0.016*	*0.359*	*0.277*

[1]Bold within a seedling characteristic indicates significant difference between that rate and control.
[2]Different letters within a seedling characteristic indicate significant differences in rates.
[3]Culls = GLD<6.0 mm, height<60 cm.

Results - thuja

Table 2. Bareroot thuja seedling characteristics treated with pyrimisulfan (Vexis®) at 5 weeks post-sowing on May 30, 2023, at Georgia Forestry Commission Flint River Nursery, Byromville, GA.

Treatment	Rate (lbs./ 500 ft^2)	Merchantable Density (seedlings/ft^2)	Culls (seedlings/ft^2)[3]	Shoot height (cm)[1,2]	Ground line diameter (mm)[1,2]	Shoot dry weight (g)[1,2]	Root dry weight (g)
Control	0.0	5.50 ± 0.76	5.00 ± 1.73 a	31.6 ± 1.11 a	5.06 ± 0.18 a	4.44 ± 0.82 a	2.13 ± 0.38
1X label rate	2.0	2.77 ± 1.46	**13.00 ± 1.20** b	27.8 ± 1.03 ab	**3.92 ± 0.17** b	2.53 ± 0.23 ab	1.70 ± 0.19
2X label rate	4.0	2.03 ± 1.13	11.30 ± 1.20 ab	**26.5 ± 1.27** b	**3.76 ± 0.14** b	**1.95 ± 0.20** b	1.45 ± 0.11
p>f		*0.162*	*0.021*	*0.009*	*<0.001*	*0.029*	*0.243*

[1]Bold within a seedling characteristic indicates significant difference between that rate and control.
[2]Different letters within a seedling characteristic indicate significant differences in rates.
[3]Culls = GLD<3.0 mm.

Results - thuja

Results – yellow poplar

Table 3. Bareroot yellow poplar seedling characteristics treated with pyrimisulfan (Vexis®) at 5 weeks post-sowing on May 30, 2023, at Georgia Forestry Commission Flint River Nursery, Byromville, GA.

Treatment	Rate (lbs./ 500 ft^2)	Merchantable Density (seedlings/ft^2)	Culls (seedlings/ft^2)[1]	Shoot height (cm)	Ground line diameter (mm)	Shoot dry weight (g)	Root dry weight (g)
Control	0.0	6.03 ± 1.95	22.00 ± 1.53	37.1 ± 1.17	6.36 ± 0.20	1.67 ± 0.35	2.58 ± 0.05
1X label rate	2.0	6.77 ± 0.79	22.70 ± 6.94	34.9 ± 1.20	6.67 ± 0.21	2.14 ± 0.33	3.47 ± 0.20
2X label rate	4.0	6.43 ± 1.59	26.70 ± 4.26	37.8 ± 1.20	6.14 ± 0.17	1.94 ± 0.20	2.76 ± 0.38
p>f		*0.944*	*0.766*	*0.269*	*0.138*	*0.577*	*0.091*

[1]Culls = GLD<4.0 mm, height<20 cm.

Results – sawtooth oak

Table 4. Bareroot sawtooth oak seedling characteristics treated with pyrimisulfan (Vexis®) at 10 weeks post-sowing on May 30, 2023, at Georgia Forestry Commission Flint River Nursery, Byromville, GA.

Treatment	Rate (lbs./ 500 ft^2)	Merchantable Density (seedlings/ft^2)	Culls (seedlings/ ft^2)[3]	Shoot height (cm)[1,2]	Ground line diameter (mm)[1,2]	Shoot dry weight (g)[1,2]	Root dry weight (g)[1,2]
Control	0.0	5.97 ± 0.60	1.33 ± 0.67	49.6 ± 1.38 a	6.56 ± 0.19 a	4.20 ± 0.18 a	13.20 ± 0.68 a
1X label rate	2.0	6.10 ± 0.21	3.67 ± 2.67	**54.6 ± 1.22** b	7.21 ± 0.25 ab	5.80 ± 0.68 ab	15.40 ± 0.44 a
2X label rate	4.0	5.27 ± 0.37	0.67 ± 0.33	**59.6 ± 1.24** c	**7.85 ± 0.25** b	**7.69 ± 0.48** b	**18.10 ± 0.40** b
p>f		*0.389*	*0.431*	*<0.001*	*<0.001*	*0.007*	*0.002*

[1]Bold within a seedling characteristic indicates significant difference between that rate and control.
[2]Different letters within a seedling characteristic indicate significant differences in rates.
[3]Culls = GLD<4.0 mm, height<20 cm.

Results – white oak

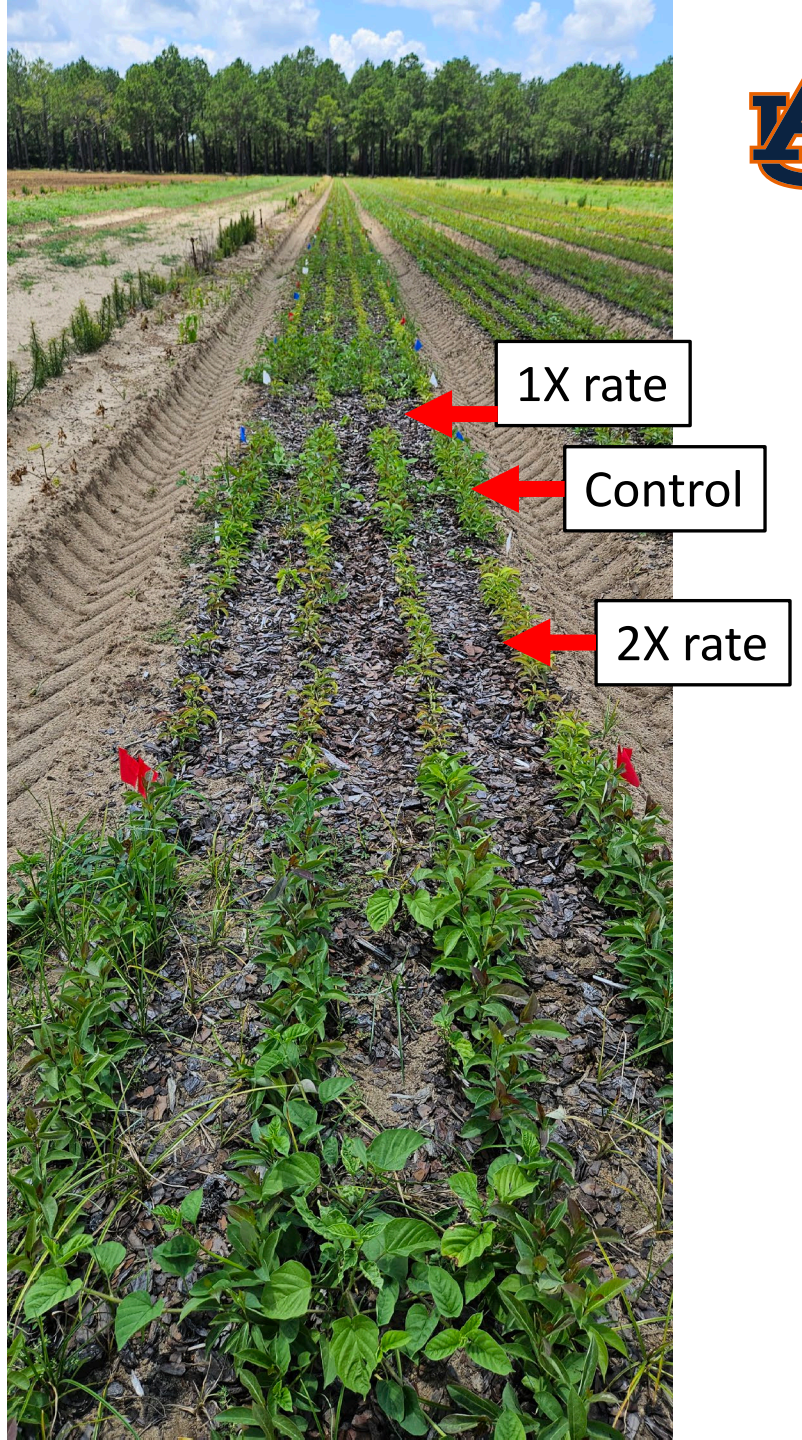
Table 5. Bareroot white oak seedling characteristics treated with pyrimisulfan (Vexis®) at 23 weeks post-sowing on June 21, 2023, at North Carolina Forest Service Claridge Nursery, Goldsboro, NC.

Treatment	Rate (lbs./ 500 ft^2)	Merchantable Density (seedlings/ft^2)	Culls (seedlings/ ft^2)[1]	Shoot height (cm)	Ground line diameter (mm)	Shoot dry weight (g)	Root dry weight (g)
Control	0.0	2.78 ± 0.25	8.00 ± 1.10	29.1 ± 1.6	8.37 ± 0.30	4.97 ± 0.92	15.30 ± 1.73
1X label rate	2.0	2.88 ± 0.55	8.20 ± 1.74	28.4 ± 2.0	8.33 ± 0.31	4.43 ± 0.40	14.30 ± 0.61
2X label rate	4.0	3.28 ± 1.32	11.20 ± 4.47	24.4 ± 1.6	7.86 ± 0.24	3.48 ± 1.11	12.10 ± 2.72
p>f		*0.906*	*0.680*	*0.125*	*0.362*	*0.490*	*0.492*

[1]Culls = GLD<6.35 mm, height<36 cm.

Results – persimmon

- No living seedlings present in treated plots at the end of the growing season
- Damage to seedlings was evident shortly after herbicide applications



Persimmon 5 weeks after herbicide application

Conclusions

- Vexis® should not be used on thuja or persimmon
- Vexis® should be tested again in catalpa, yellow poplar, sawtooth oak, and white oak
- Future Vexis® trials should be limited to species of highest quantity and/or profit in SFNMS member nurseries

2024 Vexis® Hardwood Trials Update

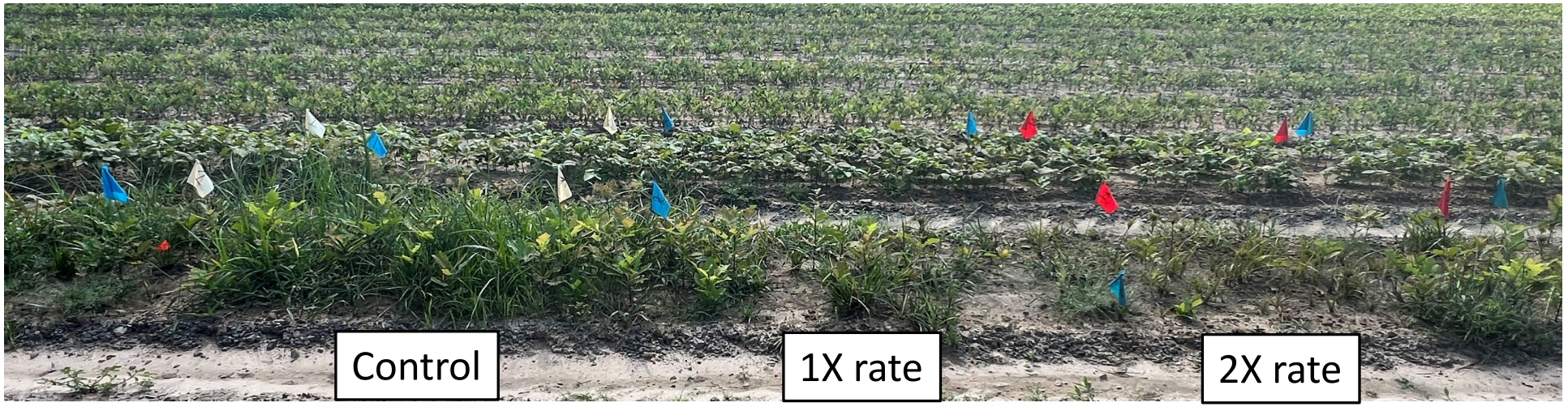
Purpose

Methods

Purpose and Methods continued from 2023 trials

- SFNMC Vexis® history: Second SFNMC trial in bareroot hardwood
- Trials in ArborGen Selma, AL Nursery and Arkansas Forestry Commission Baucum Nursery, N. Little Rock, AR
- Trials in water oak, willow oak, Shumard oak (2), white oak (2), Nuttall oak (2), cow oak, and bur oak
- 3 rates: 0, 1X, and 2X label rate (same rates used in 2023)
- Single applications made on each species, ranging from 7 to 36 weeks post-sowing
- 5-foot plots used for each rate; 3 - 5 replications per species
- Seedling samples will be collected from within a 12-inch by 4-foot counting frame in each plot and measured for seedling quality in late 2024/early 2025
- Research report follows data analysis (2025)

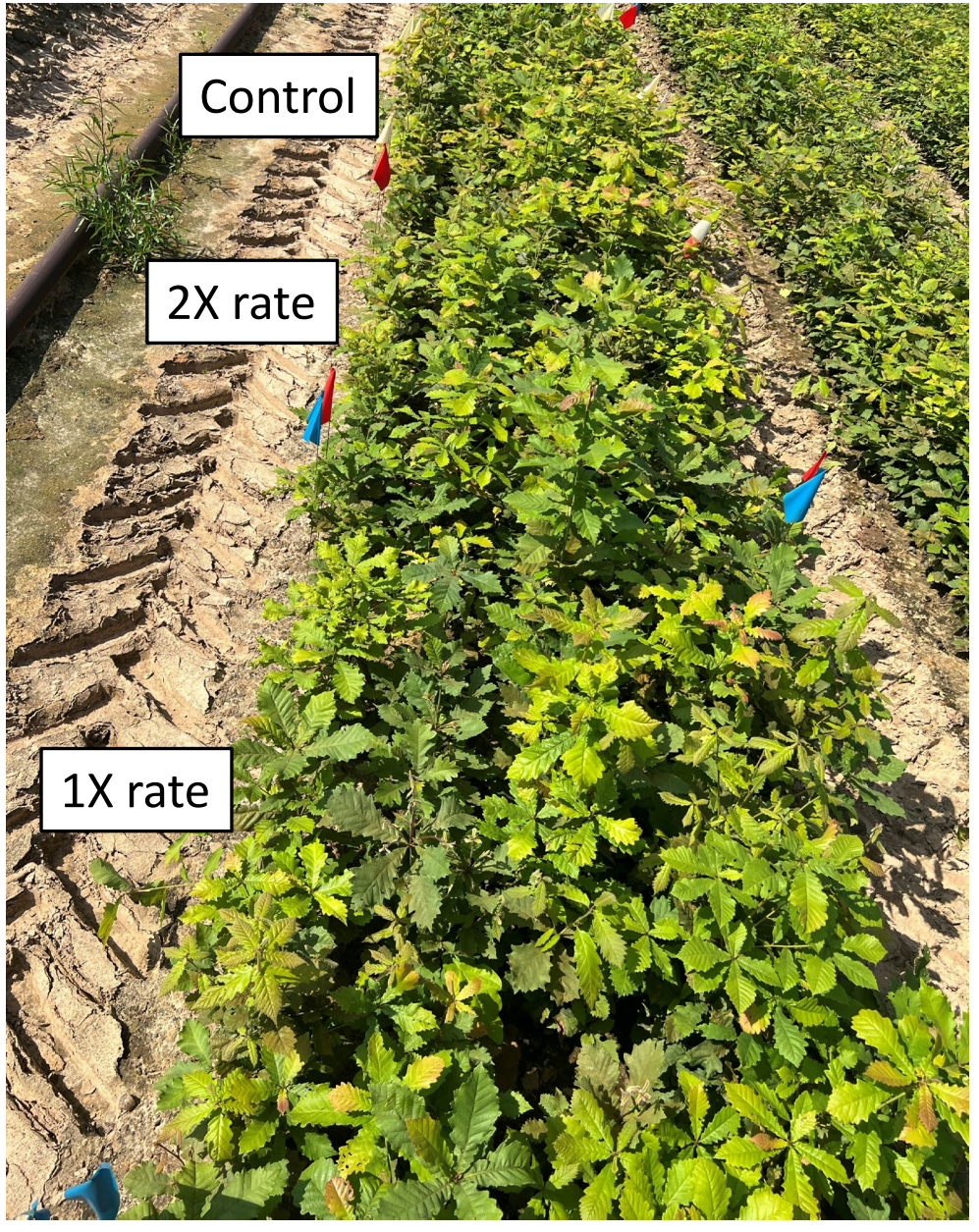
2024 Vexis® Hardwood Trials



Bur oak – 5 weeks after treatment

2024 Vexis® Hardwood Trials

Cow oak – 5 weeks after treatment



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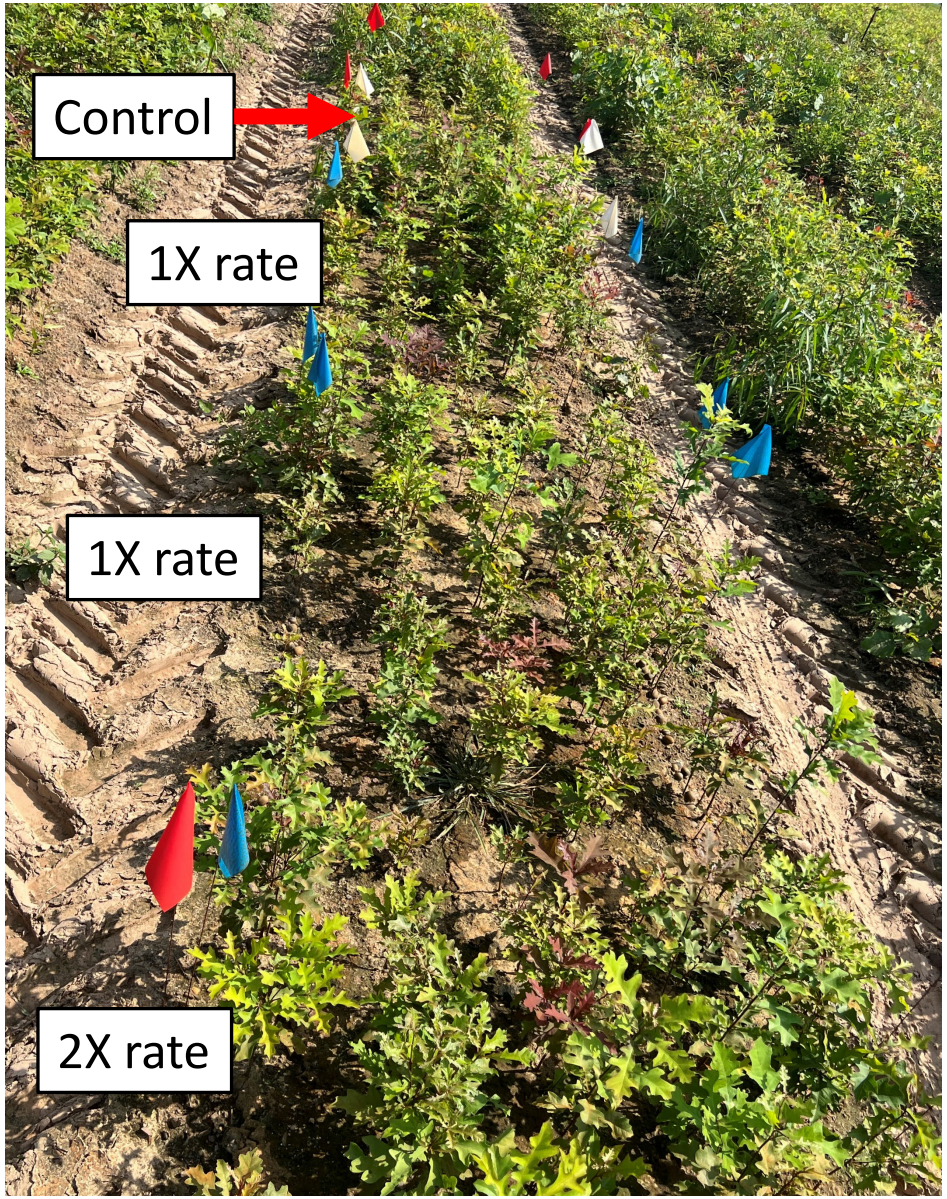
Nuttall oak – 5 weeks after treatment



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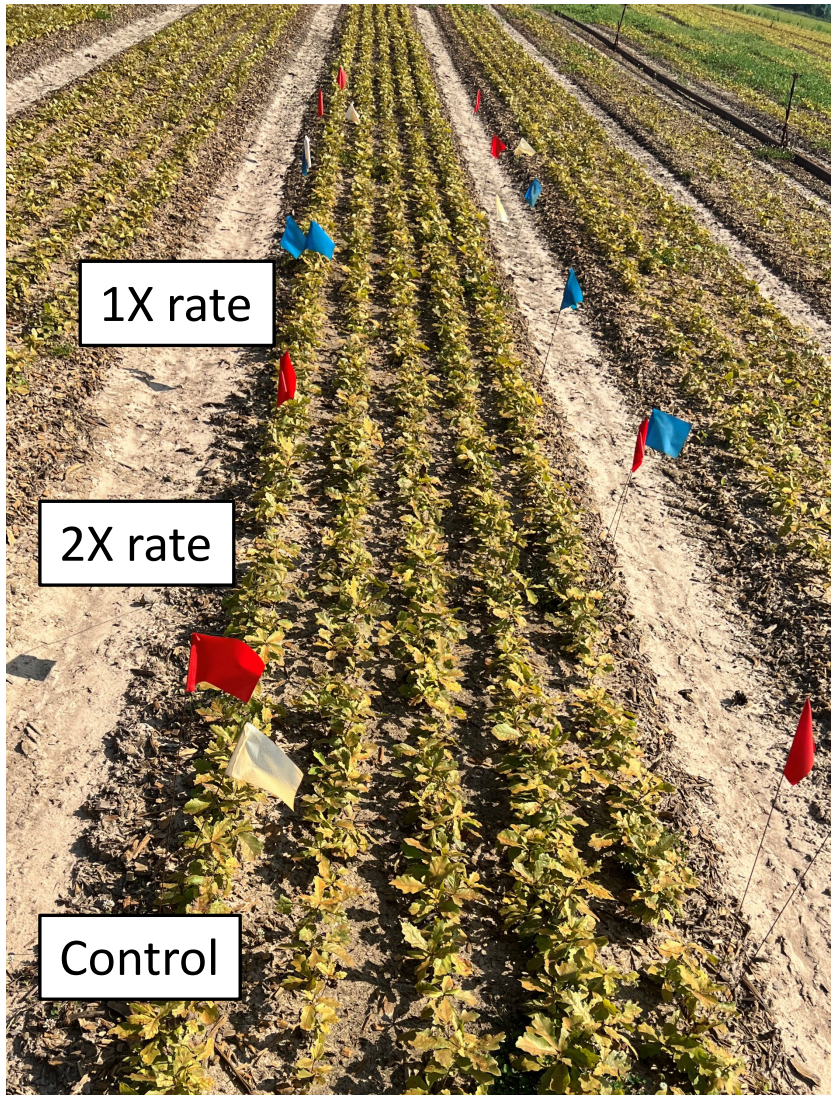
White oak – 5 weeks after treatment



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