Fusiform Rust Control Fungicides

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Fusiform rust

- *Cronartium quercuum* f. sp. *fusiforme* the causal agent of Fusiform rust is still of major concern to many loblolly and slash growers
- Both genetic and cultural options are available to reduce the risk of this disease but the most effective control is the use of fungicides
- The Nursery Coop in 1980 was instrumental in the registration of Bayleton ® with the incidence of rust fell from 2.5% to 0.1% due to the use of this compound. Fungicide usage fell from 4 lbs/ac/yr to less than 1lb/ac/yr due to the reduced number of applications
- The Nursery Coop continued to look for alternative chemistries to assist with Fusiform control and was instrumental in the registration of Proline ® in 2011

Proline ® as a seed treatment

- As a seed treatment, current labelled rate is 10 fl oz./50 lb of seed
- These labelled rate are based on the use of Bayleton® activity
- The ability to identify the lowest effective rate of Proline ® for use on conifer seed will help decrease fungicide

Seed treatment study

Fungicide	Manufacturer	Active Ingredient	Chemical Class
Bayleton®	Bayer Cropscience	Triadimefon - 50%	Triazoles
Proline® 480SC	Bayer Cropscience	Prothioconazole – 41.0%	Triazoles

Rates of Proline ® tested

	Rate				
Active ingredient	**1x (recommended)**	**0.5 x**	**0.25 x**	**0.125 x**	**0. 0625 x**
Control (water)	N/A				
Triadimefon -50% Bayleton®	8 oz/ac				
Prothioconazole Proline®	10 fl oz/ac	5 fl oz/ac	2.5 fl oz/ac	1.25 fl oz/ac	0.625 fl oz/ac

Seed treatment study

- Fungicide treatments applied on seed at Auburn Laboratories
- Seed sent to Asheville, NC Rust Lab
- Seed sown
- 3 weeks post germination seedlings challenged with rust spores
- 3 and 6 month evaluations made by NC Rust Center

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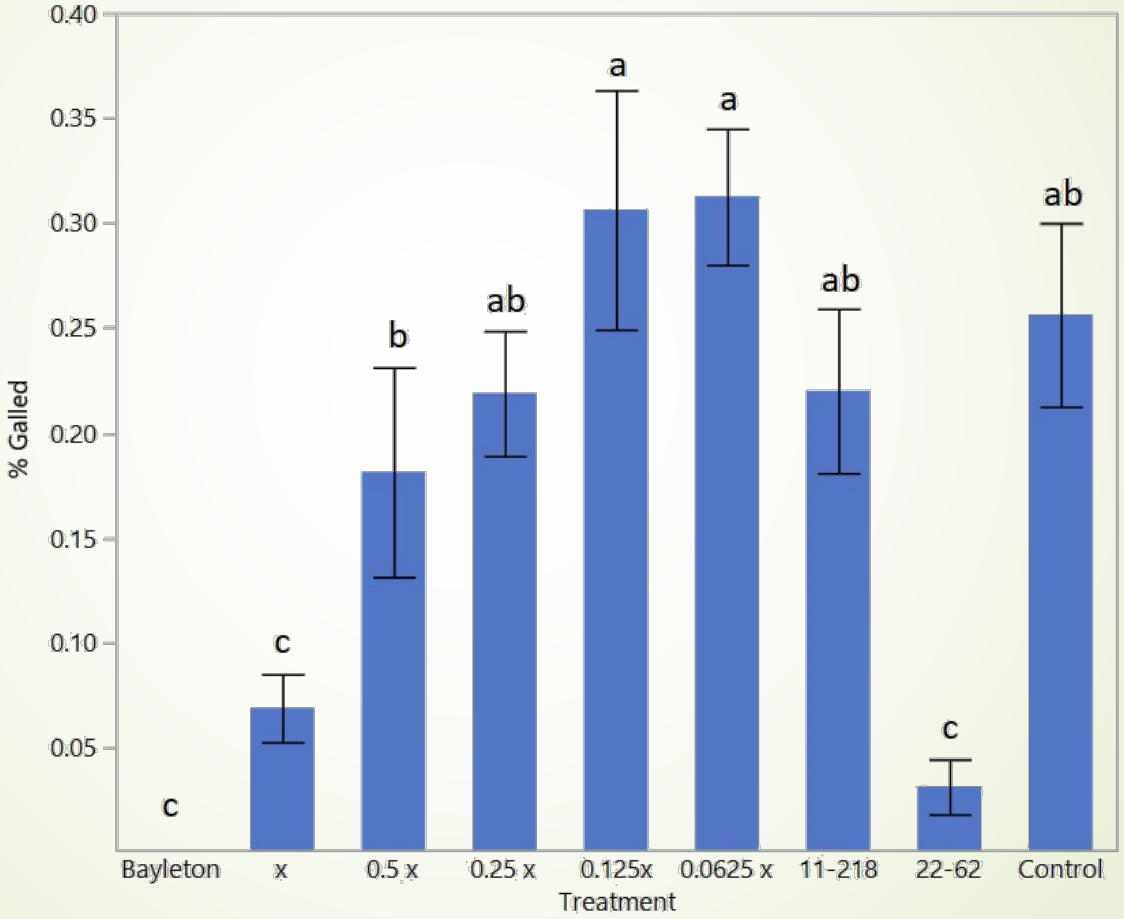
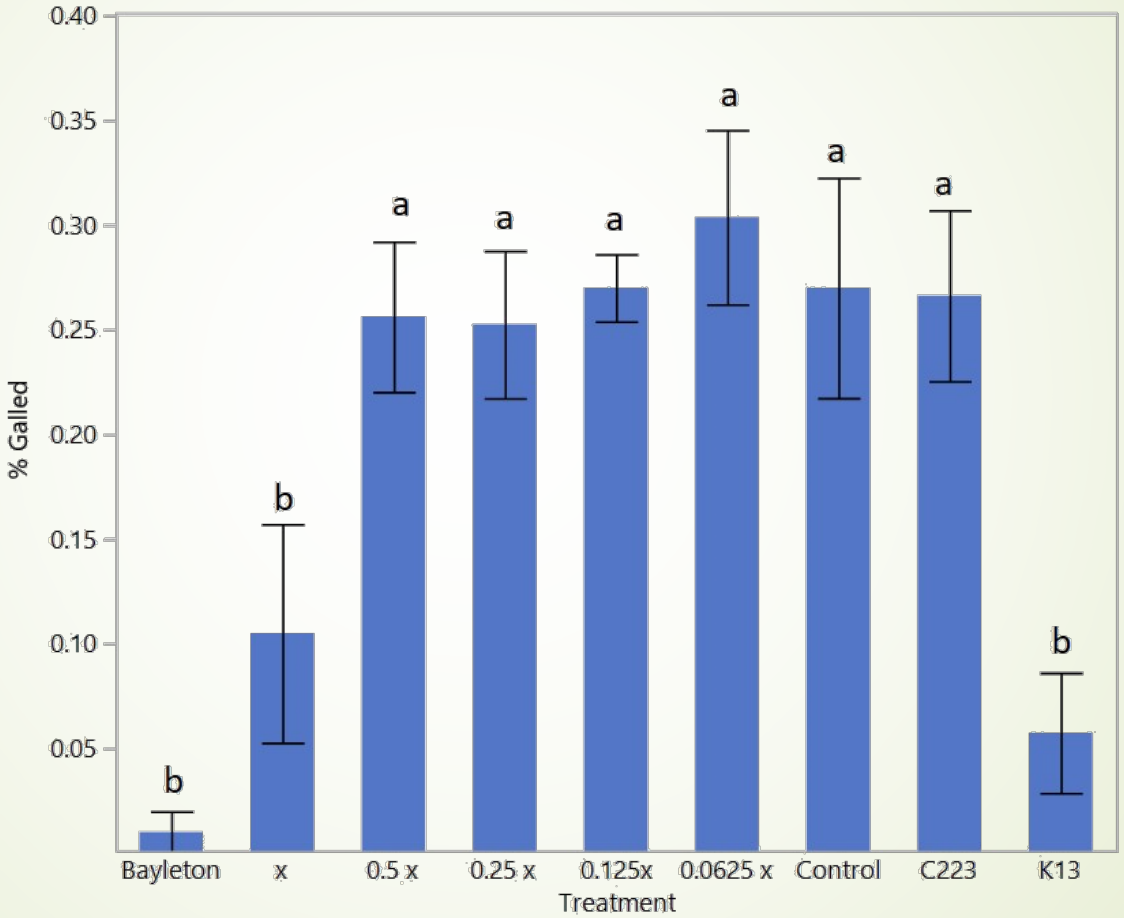
Loblolly seed treatment results



Slash seed treatment results



Proline ® as a seed treatment

- For seed treatment, the labelled Proline ® rate was most effective in controlling Fusiform rust infection.
- Reducing the rate of Proline ® resulted in significant increases in Fusiform gall incidence
- The recommended seed treatment resulted in galling incidence equivalent to seed treated with Bayleton® and that of seed from Fusiform tolerant families

Active ingredients tested for foliar spray

Fungicide	Manufacturer	Active Ingredient	Chemical Class
Bayleton®	Bayer Cropscience	Triadimefon - 50%	Triazoles
Compass®	Bayer Cropscience	Trifloxystrobin – 50%	Oximino acetates
STRATEGO® 250EC	Bayer Cropscience	Propiconazole – 11.4% Trifloxystrobin – 11.4%	Oximino acetates + Triazoles

Seed treatment study

- Fungicide treatments applied to seedlings at Auburn Laboratories at 2 weeks post germination
- Seedlings sent to Asheville, NC Rust Lab
- Seedlings challenged with rust spores at 3 weeks post germination
- 3 and 6 month evaluations made by NC Rust Center

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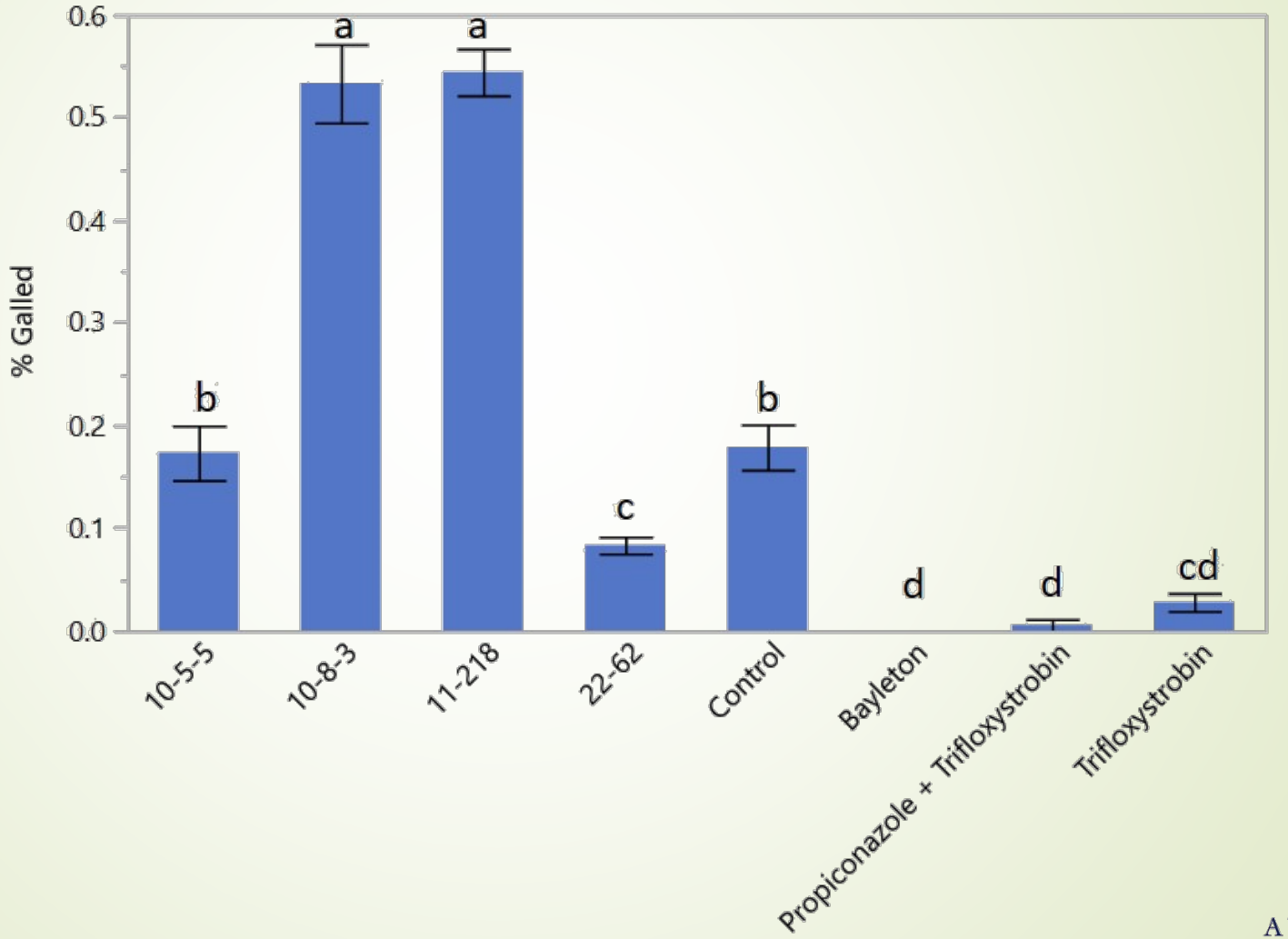
Loblolly pine seedlings treatment results



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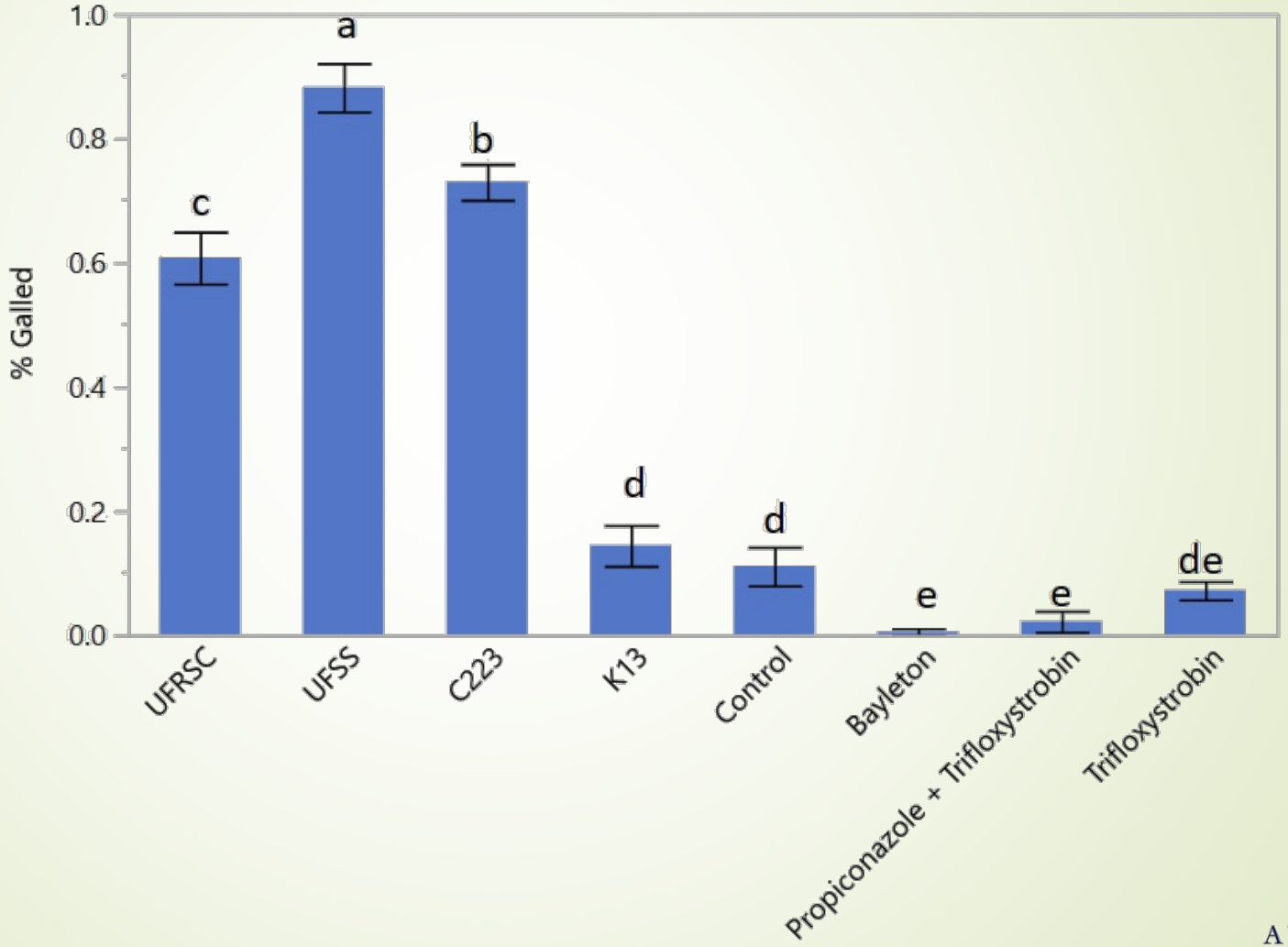
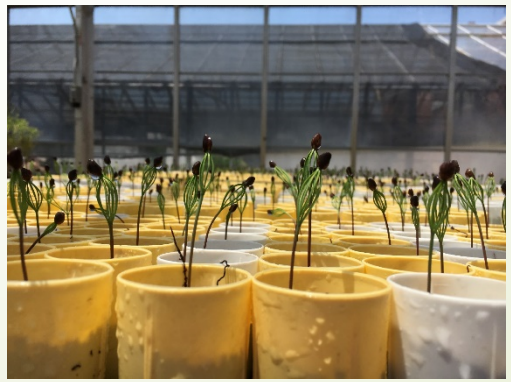
Slash pine seedlings treatment results



Seedling treatment

- The new chemistries tested as a seedling control were found to be effective in reducing Fusiform rust
- The active ingredients Trifloxystrobin (Compass®) and Propiconazole + Trifloxystrobin (STRATEGO®) were found to be as effective as Triadimefon (Bayleton®)
- New chemistries show promise to potential alternatives as a Fusiform rust seedling treatment. These chemistries, however, require registration prior to being used commercially



Next steps

- Undertake field performance trials to assess alternative chemistries that show promise
- Will assess:
  - Seedling quality
  - Number of rust galls
  - Root morphology

Acknowledgements

- We wish to thank the staff of the Resistance Screening Center USDA Forest Service, Asheville, North Carolina for their assistance with this study