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 have now been tested and shown to provide optimum activity

Rates of fungicides tested on seedlings

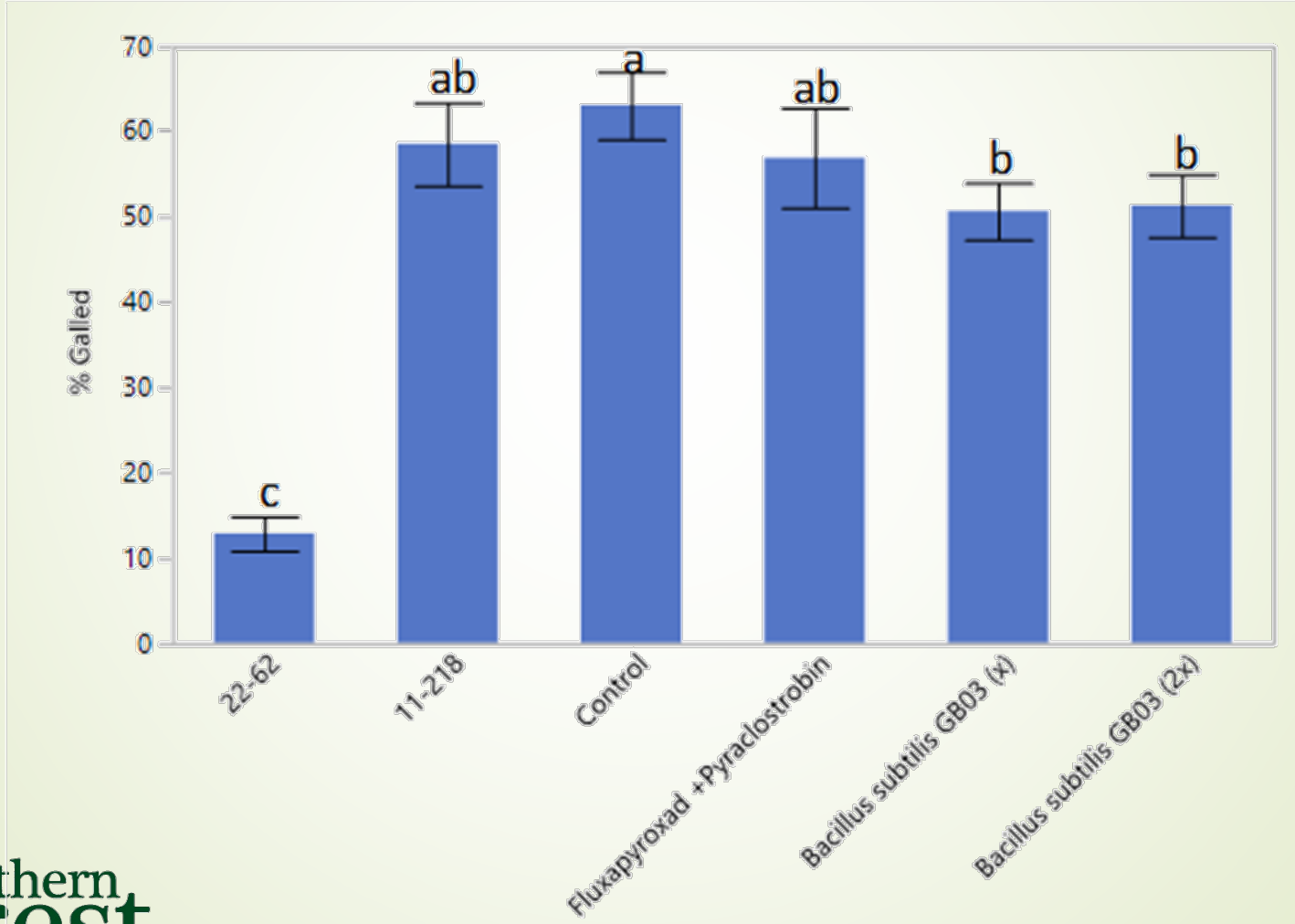
Fungicide	Manufacturer	Active Ingredient	Rate/s tested	Fungicide	Manufacturer
Companion® Biological Fungicide	Growth Products	*Bacillus subtilis* GB03 – 0.03%	16 fl. oz. / acre in 22 gal water (x) 32 fl. oz. / acre in 22 gal. water (2x)	Companion® Biological Fungicide	Growth Products
Orkestra™ Intrinsic	BASF	Fluxapyroxad - 21.26% Pyraclostrobin – 21.26%	8 fl. oz./ 100 gal	Orkestra™ Intrinsic	BASF

Seedling treatment study

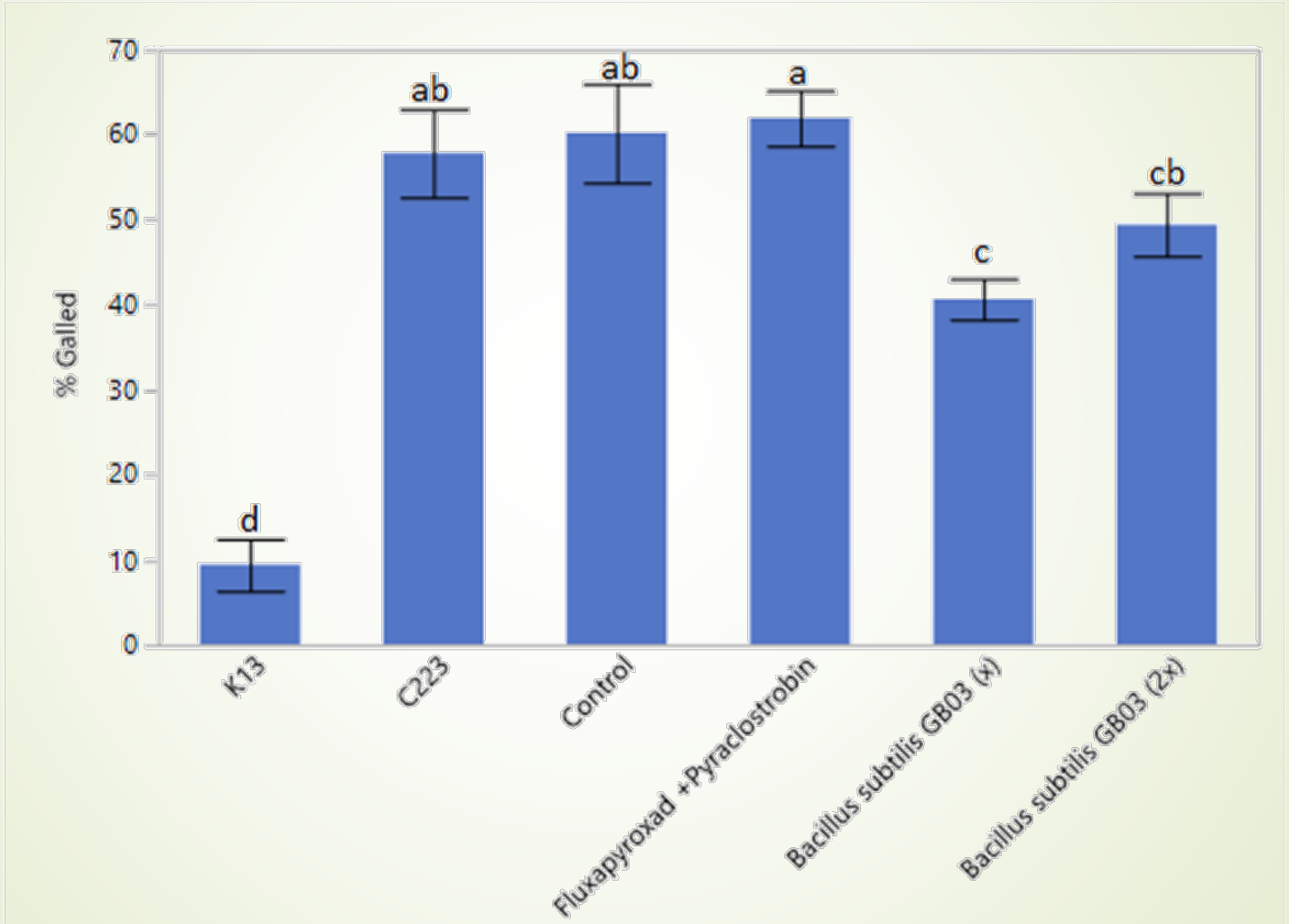
- Fungicide treatments applied to seedlings at Auburn Laboratories at 2 weeks post germination
- Seedlings sent to Asheville, NC Rust Lab
- Seedlings challenged with rust spores at 3 weeks post germination
- 3 and 6 month evaluations made by NC Rust Center



Loblolly seedling treatment results



Slash seedling treatment results



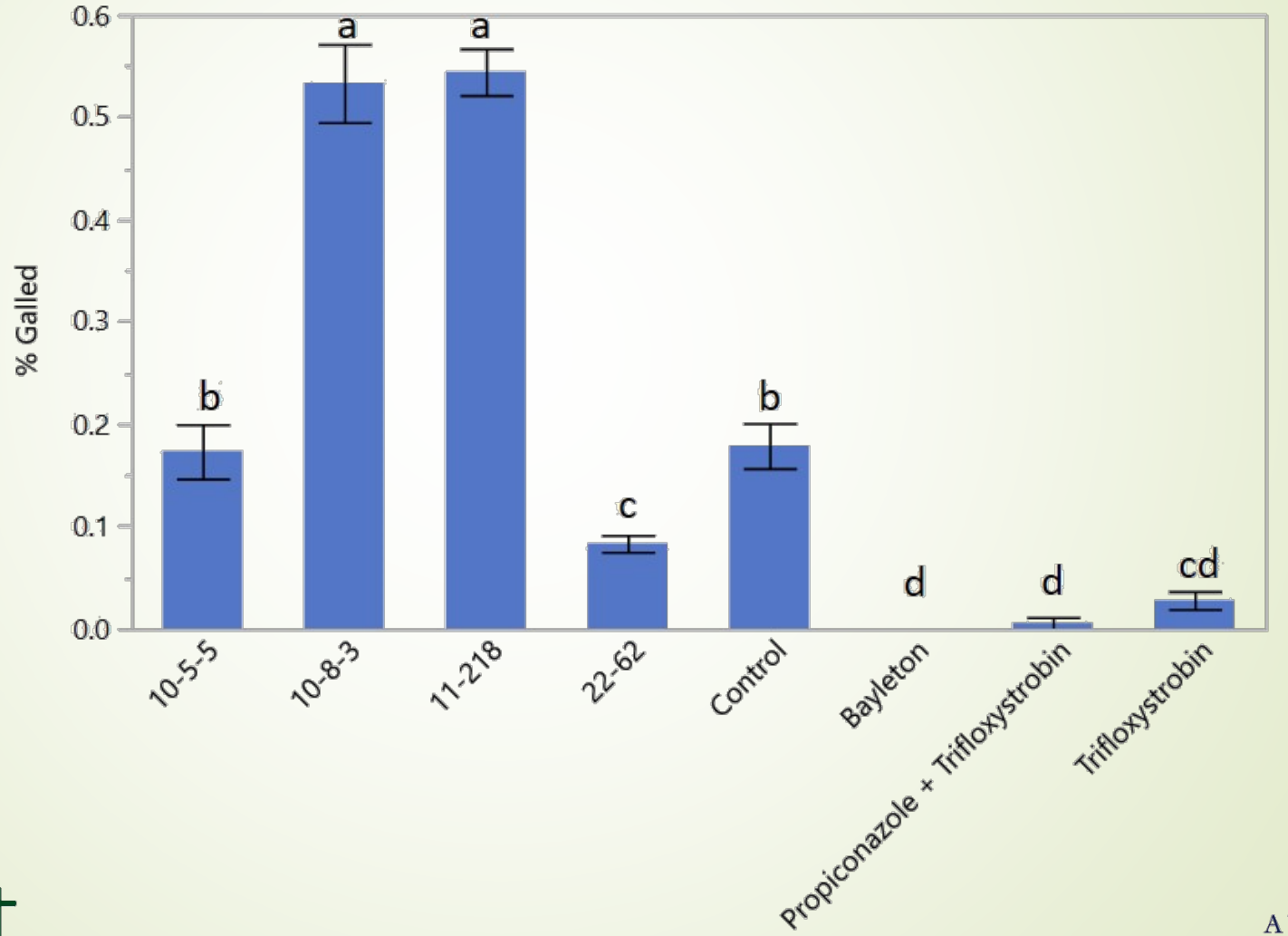
Seedling treatment results

- Results from this study indicate that the active ingredients Fluxapyroxad + Pyraclostrobin were found to give similar results to that of the untreated controls and are therefore ineffective in reducing the incidence of Fusiform galls.
- The biological fungicide (a.i. *Bacillus subtilis* GB03) although producing fewer galls than the untreated controls, levels were still too high to be considered providing protection against fusiform rust.
- *Bacillus subtilis* GB03 applied at both the recommended and double the recommended rate did not reduce the galling incidence to resistant family levels.

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

Loblolly pine seedlings treatment results



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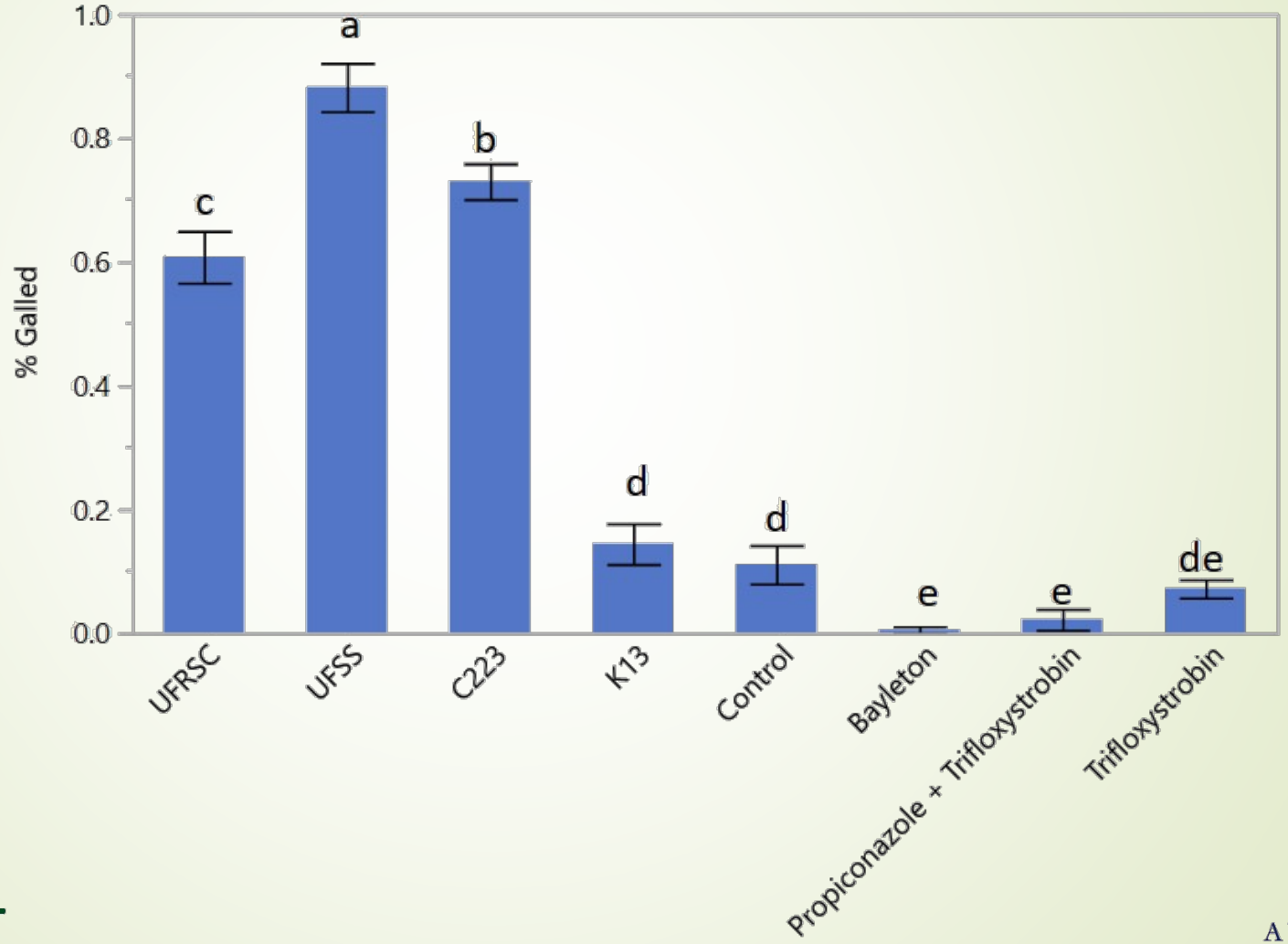
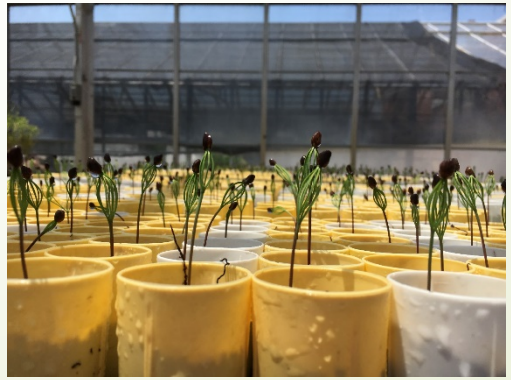
Slash pine seedlings treatment results



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



2019 Field tests

- 2019 undertake field performance trials to assess alternative chemistries that show promise
- Will assess:
  - Seedling quality
  - Number of rust galls
  - Root morphology

2019 Active ingredients tested for foliar spray in greenhouse study

Fungicide	Manufacturer	Active Ingredient
Banner Max II®	Syngenta	Propiconazole - 14.3%
Mural®	Syngenta	Azoxystrobin - 30% Benzovindiflupyr - 15%
Proline®	Bayer Cropscience	Prothioconazole – 41%

Acknowledgements

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