Southern Forest Nursery Management Cooperative

FUNGICIDES FOR FUSIFORM RUST CONTROL

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Fusiform Rust

- Caused by the fungal pathogen *Cronartium quercuum* f. sp. *Fusiforme*
- Problem in loblolly and slash pine production
- The use of fungicides is the most effective control strategy
- The Nursery Cooperative spearheaded the registration of Bayleton® and Proline® for control of the disease
- Ongoing program to identify new chemistries

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Fusiform Rust

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Why test new chemistries?

- EPA regulations require the reregistration of pesticides after a certain time has passed.
- Companies may discontinue pesticides
- Pesticides may become unavailable or hard to source
- Pathogens may become resistant to chemistries that are used continuously
- Proline is the only fungicide currently registered for the control of fusiform rust

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Proline

- Used as a seed treatment (10 fl oz./50 lb of seed)
- Used for foliar applications on seedlings (5 fl oz./acre at 14–21-day intervals)
- Labelled for the control of fusiform rust, pitch canker, Rhizoctonia and foliar blight in conifer and hardwood nursery production

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Greenhouse screening for rust control

- Slash and loblolly pine seeds are sown and germinates treated with fungicides to be tested at two weeks post germination.
- Seedlings are then sent to the Bent Creek Experimental Forest Resistance Screening Center in Asheville, NC for screening.
- Screening involves challenging seedlings with rust spores at 3 weeks post germination and assessing whether seedlings have galls at 3 and 6 months.

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Field screening for rust control

- Fungicides that show good control of fusiform rust in greenhouse trials are tested in the field.
- Slash and loblolly pine seedling beds are divided into treatments with an initial application 21 days after sowing. Four additional applications are done at 14-day intervals.
- Each trial has an untreated control, Proline® as an operational control, and fungicides to be tested.
- Measurements of seedling quality including root collar diameter (RCD), height, shoot weight, root weight and root weight ratio (RWR) were taken at the end of the growing season.

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Fungicides tested

Fungicide	Manufacturer	Active Ingredient
Companion® Biological Fungicide	Growth Products	Bacillus subtilis GB03 – 0.03%
Orkestra™ Intrinsic	BASF	Fluxapyroxad – 21.26% Pyraclostrobin – 21.26%
BanBanner Max II®	Syngenta	Propiconazole – 14.3%
Hurricane®	Syngenta	Fludioxonil – 32% Mefenoxam – 16%
Compass®	Bayer Cropscience	Trifloxystrobin – 50%
Stratego®	Bayer Cropscience	Propiconazole – 11.4% Trifloxystrobin – 11.4%
Protect® DF	Nufarm	Mancozeb – 75%

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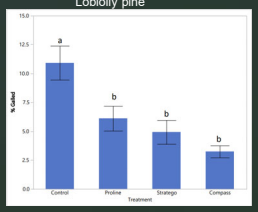
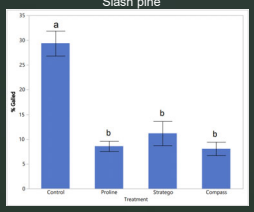
Incidence of rust galls on loblolly and slash pine in 2019 after fungicide treatments

Loblolly pine



Slash pine



Compass® and Stratego® were effective in reducing fusiform rust in greenhouse and field studies (2019-2020)

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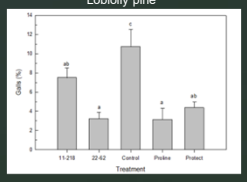
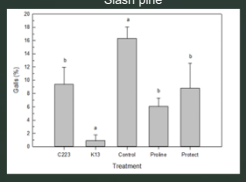
Incidence of rust galls on loblolly and slash pine in 2021 after fungicide treatments

Loblolly pine



Slash pine



Protect® DF was effective in controlling fusiform rust in greenhouse studies in 2020 and 2021. Currently testing its efficacy in field studies.

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Current studies

- Field studies to test the efficacy of Protect® DF
- Greenhouse studies to test the efficacy of three new fungicides

Postiva™ Fungicide syngenta

Miravis® Neo syngenta

Mural™ Fungicide syngenta

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Acknowledgments

- Resistance Screening Center USDA Forest Service, Asheville, North Carolina
- ArborGen, Shellman Georgia

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