

# Proline Usage

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Southern Forest Nursery Management Cooperative

Research Toward Increasing Nursery Productivity

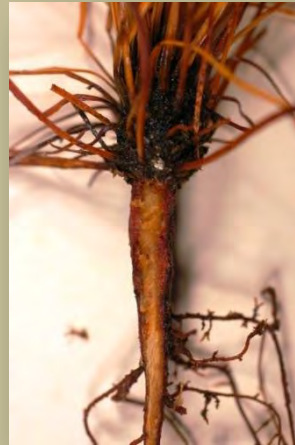


# The Nursery Cooperative has tested Proline<sup>®</sup> on.....

Fusiform Rust



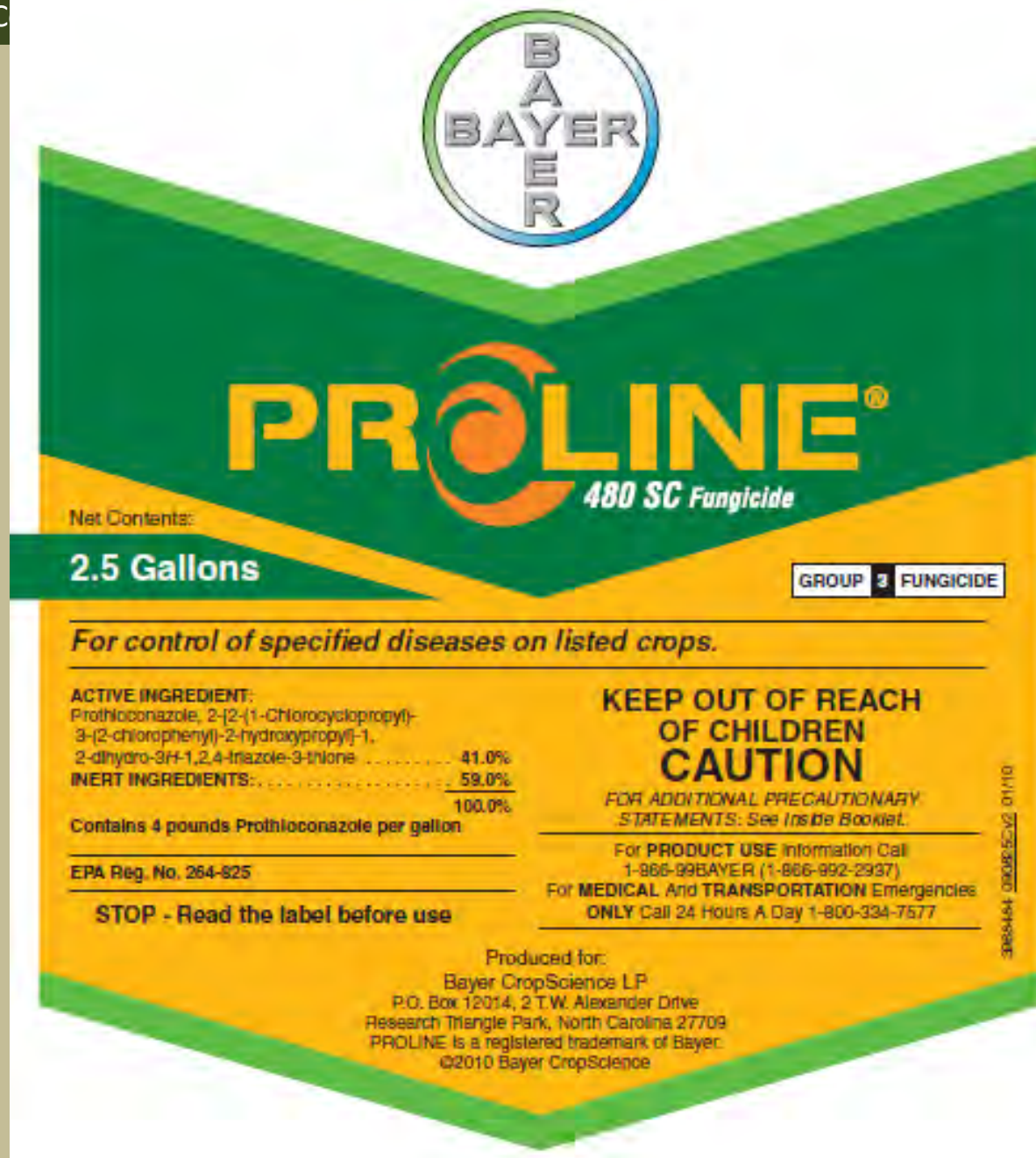
Pitch Canker



Rhizoctonia  
Foliar Blight



**5.0 – 5.5 fl. oz.  
per acre for  
foliar  
applications**



# Prothioconazole

- Prothioconazole is xylem and phloem systemic
- Long-term protectant on the leaf surface
- Unique greening effects not seen with other azoles
- Stops fungal appressoria and haustoria formation, mycelial growth and spore formation
- Has shown good fungicidal activity in the control of ascomycetes, basidiomycetes, and deuteromycetes



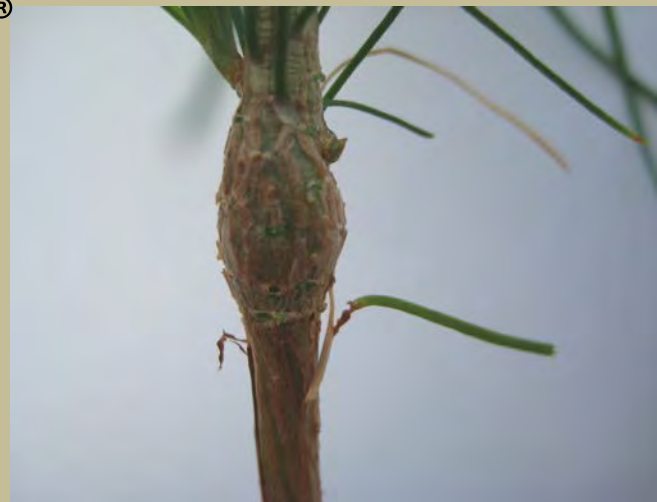
# Fusiform Rust

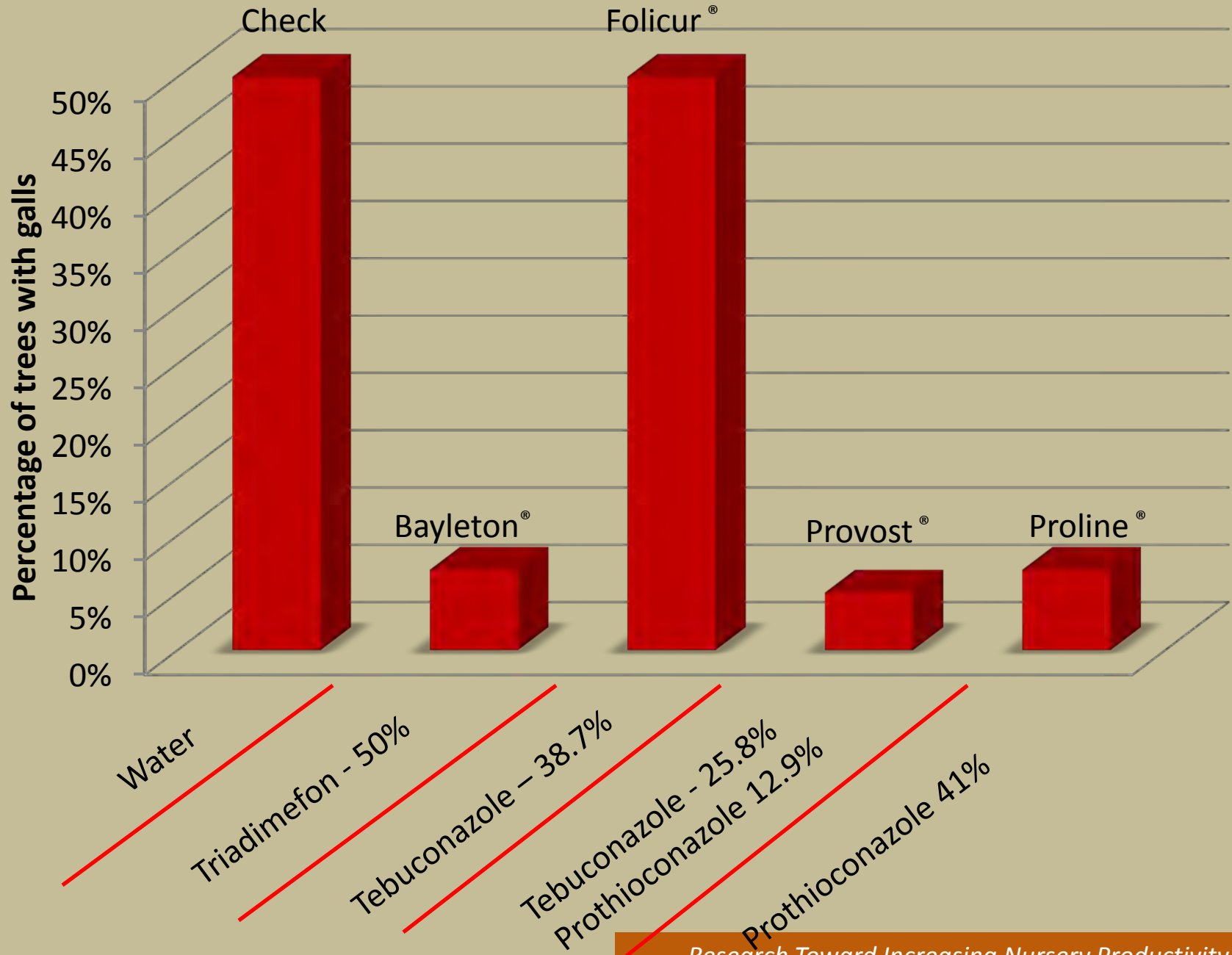
*Cronartium quercum*  
f. sp. *fusiforme*



# Fusiform Rust - Nursery Trials

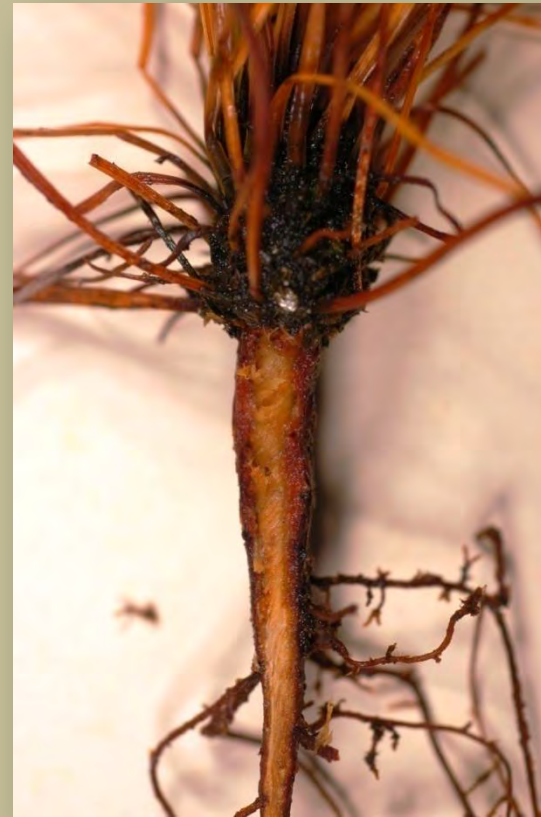
- Proline<sup>®</sup> has been tested for 3 years in commercial nurseries using full riser sections and standard nursery spray equipment on both loblolly and slash pine.
- Bayleton<sup>®</sup>, Provost<sup>®</sup> & Proline<sup>®</sup>





# Pitch Canker

*Fusarium circinatum* = *F. subglutinans*



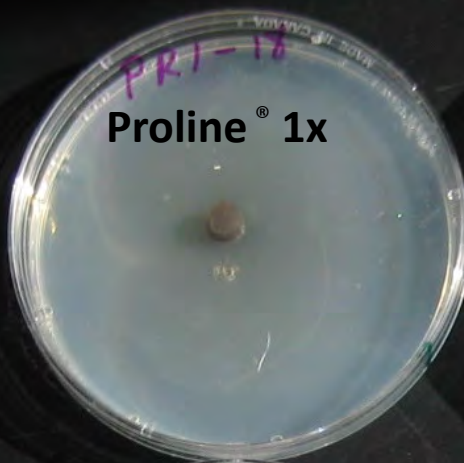


*Fusarium circinatum*

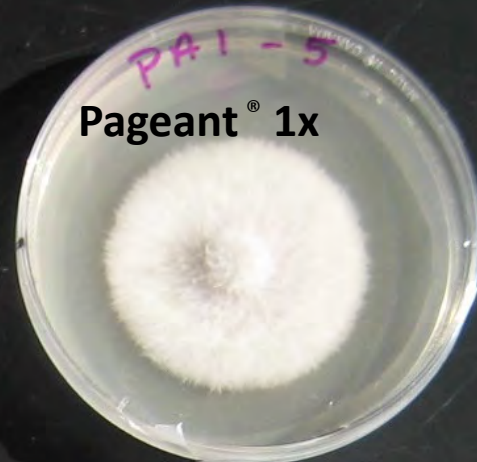
Control



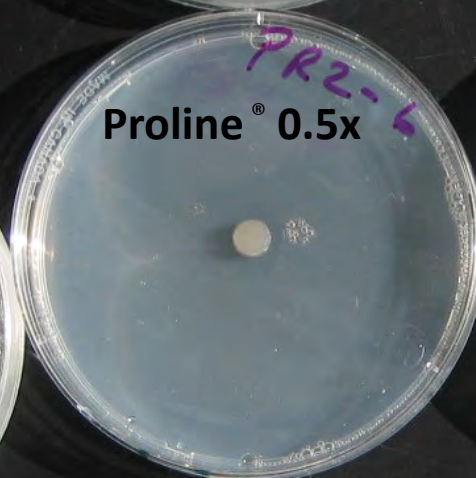
Proline<sup>®</sup> 1x



Pageant<sup>®</sup> 1x



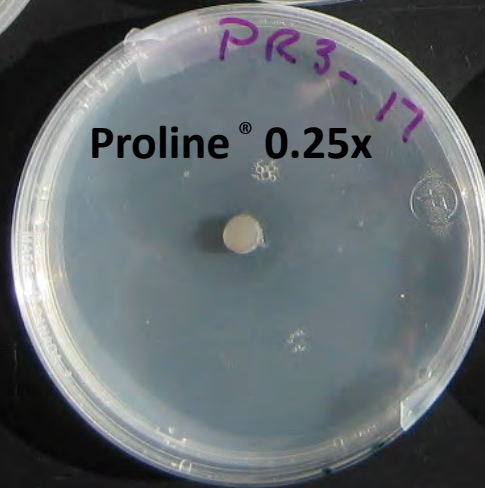
Proline<sup>®</sup> 0.5x



Pageant<sup>®</sup> 0.5x



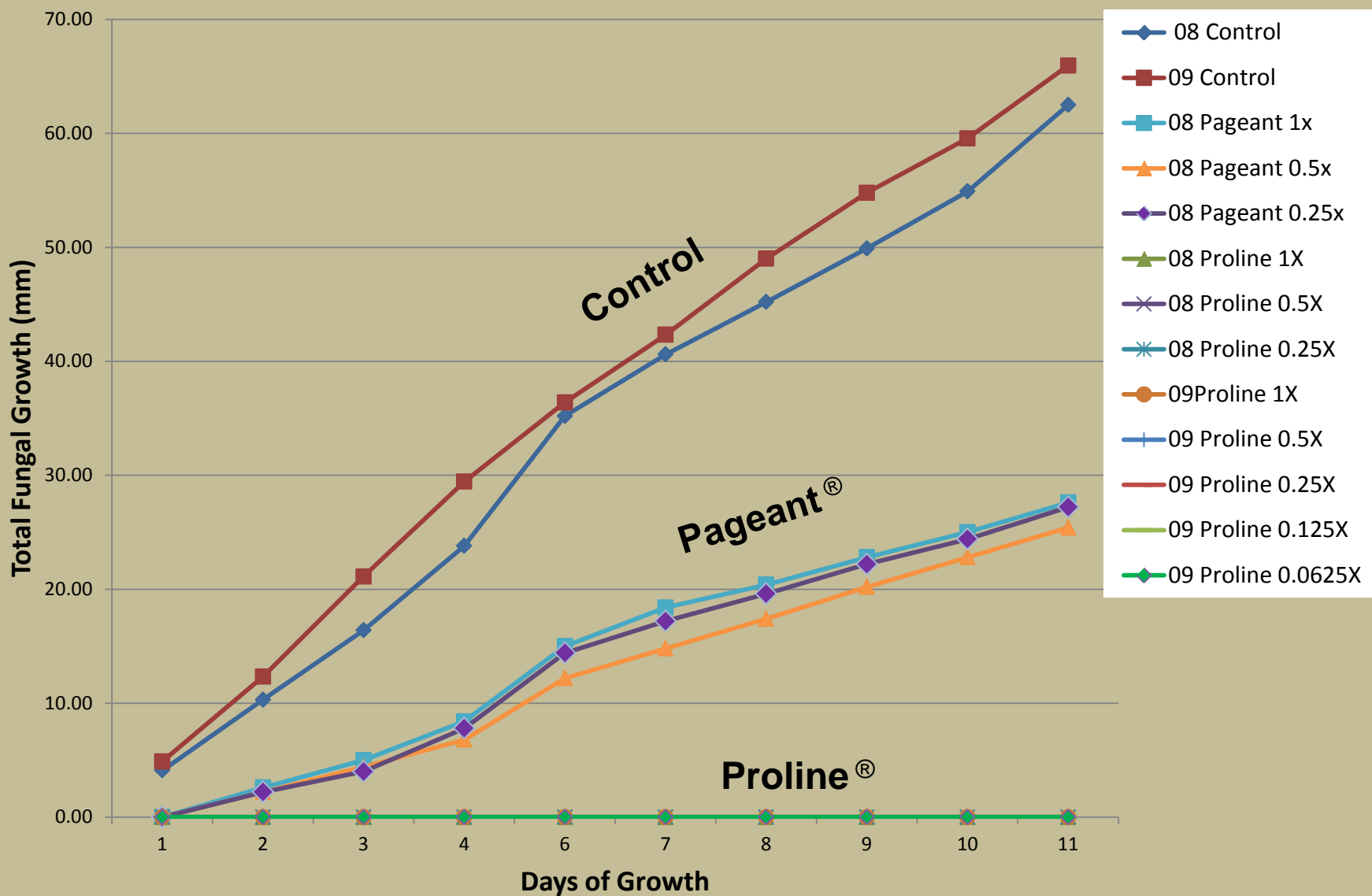
Proline<sup>®</sup> 0.25x



Pageant<sup>®</sup> 0.25x



## Growth of *Fusarium circinatum* on Amended Media 2008 & 2009





# Rhizoctonia Foliar Blight





*Control*

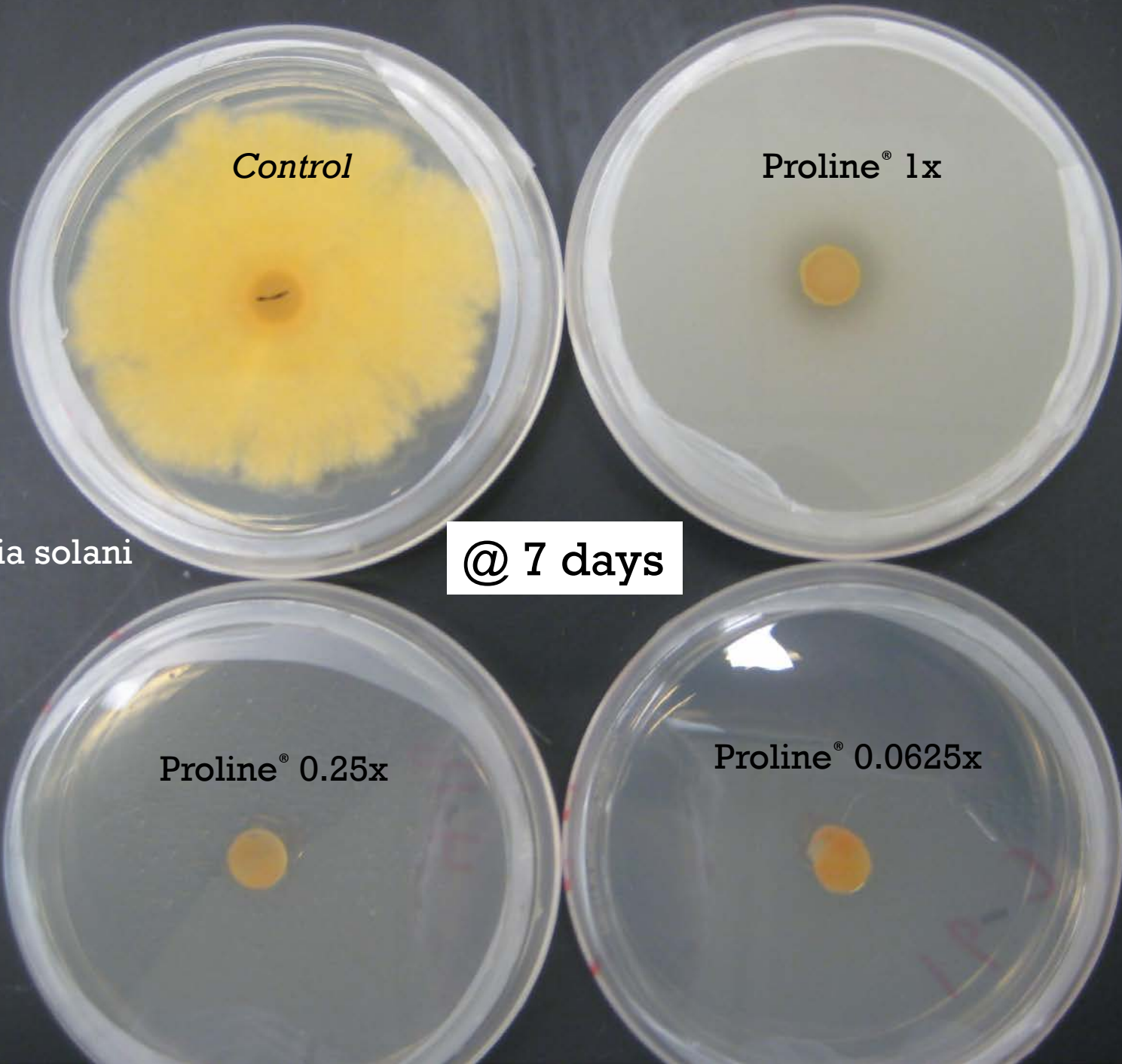
Proline<sup>®</sup> 1x

*Rhizoctonia solani*

@ 7 days

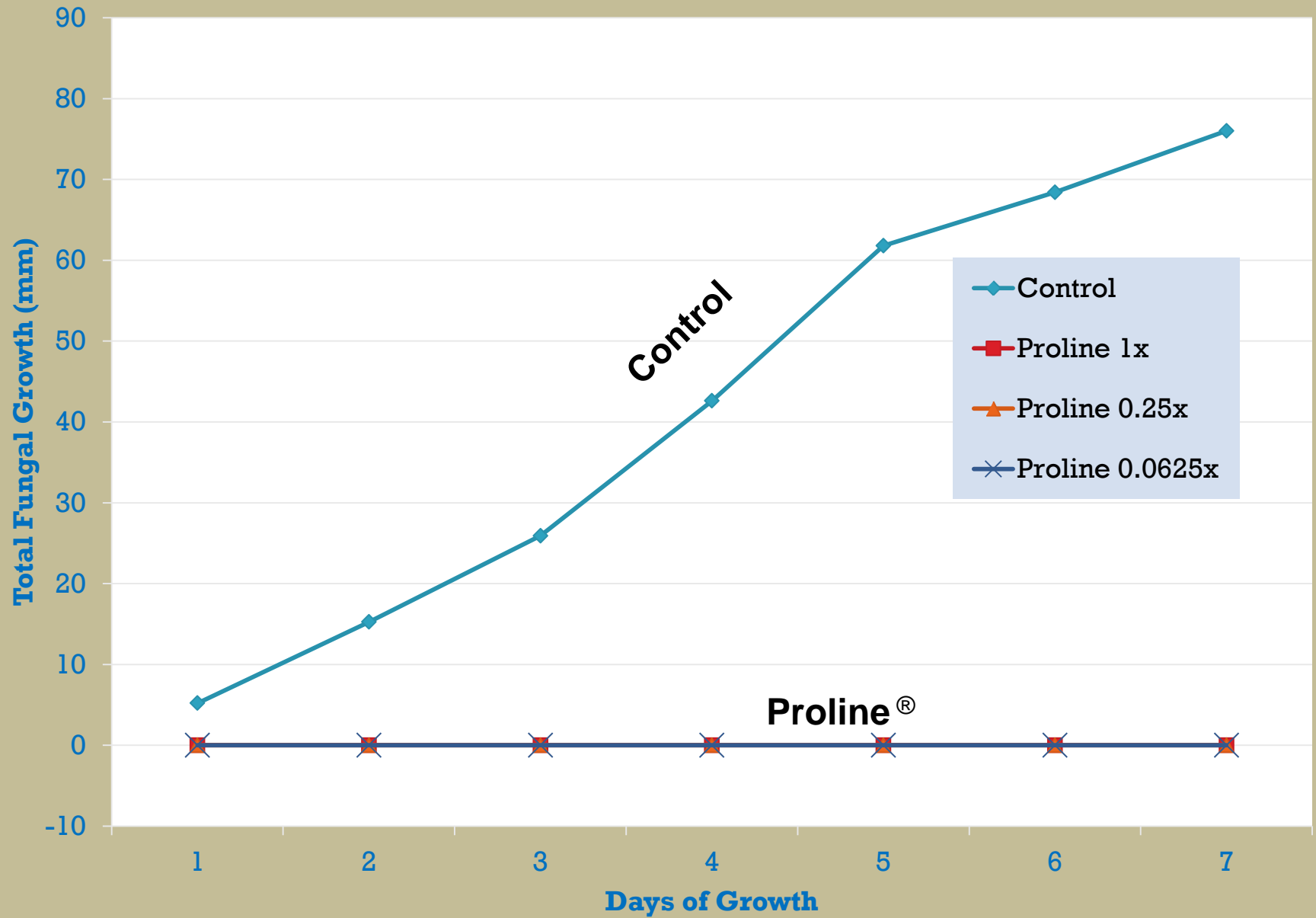
Proline<sup>®</sup> 0.25x

Proline<sup>®</sup> 0.0625x





## Growth of *Rhizoctonia solani* on Amended Medai 2009







Control

9/26/08





Abound<sup>®</sup>



9/26/08





Proline®

9/26/08



# Bayleton/Proline study plots

- April 2011 – Proline and Fusiform Rust on Slash Pine

Check	Check	6'
Proline	Bayleton	114'
Bayleton	Proline	120'
Proline	Bayleton	120'
Bayleton	Proline	120'
Proline	Bayleton	120'
Bayleton	Proline	120'
Unit A	Unit B	

Sandy textured soil

5 Proline sprays for rust

4 Bayleton sprays for rust

Nov 2011 samples collected from all treatment areas

No difference in RCD or Height or biomass

# Bayleton/Proline study plots

- April 2012 units sown in loblolly pine

Check	Check	6'
Proline	Bayleton	114'
Bayleton	Proline	120'
Proline	Bayleton	120'
Bayleton	Proline	120'
Proline	Bayleton	120'
Bayleton	Proline	120'
Unit A	Unit B	

Bayleton used in 2012 on all units for rust  
 2 Proline sprays in Aug & Sept  
 on all units for *Rhizoctonia*  
 Normal fertilization and management on units  
 Fertilization program stopped earlier than usual  
 since target seedlings size was achieved.

October 2012

Pattern did not appear until  
after fertilization was stopped.  
Rainfall Aug. & Sept. 2011 – 3.5”  
Rainfall Aug. & Sept. 2012 - 11.3”

Check	Check
Proline	Bayleton
Bayleton	Proline
Proline	Bayleton
Bayleton	Proline
Proline	Bayleton
Bayleton	Proline
Unit A	Unit B



Proline area



Bayleton area



# Test Results

- Sample of each plot were taken Oct 2012.
- No differences in RCD, dry weight top, dry weight roots
- No difference in root morphology (root length, root diameter, root volume, root tips and root forks (a measure of mycorrhizae)).

# Southern Forest Nursery Management Cooperative

	FOLIAGE					SOIL	Lbs/a	
			SIG					SIG
	Bay.	Proline				Bay.	Proline	
N%	1.94	1.32	<.0001		Nitrate N	0.91	0.77	
P%	0.28	0.22	0.0002		P	59.67	55.17	
K%	0.93	0.93			K	63.67	72.33	
Mg%	0.11	0.12			Mg	22.67	19.00	
Ca%	0.34	0.36			Ca	162.33	147.50	
S%	0.14	0.11	0.0002		S	55.50	52.83	
Bppm	5.83	6.00			B	0.20	0.20	
ZNppm	63.00	61.17			Zn	1.30	1.25	
MNppm	827.67	787.00			Mn	37.17	19.00	0.06
Feppm	171.17	160.33	0.03		Fe	66.50	48.50	0.04
Cuppm	6.67	6.17			Cu	0.60	0.63	
Sample analyzed 10/29/12 Waters Agric Lab					pH	5.37	5.37	

# Possible explanations for patterns

- We know that Proline can result in a greening up in seedlings.
- In our greenhouse tests (not top pruned), Proline resulted in greater height growth (and biomass) in slash but not loblolly.
- If the slash at the nursery in 2011 increased in height growth, top pruning may have been the reason why we did not find any differences between the Bayleton and Proline.



# Possible explanations for patterns

- In 2012 patterns were not observed until normal fertilization was stopped.
- Excessive rainfall in Aug & Sept 2012 leached nutrients from soil which contributed to the pattern.

## Current label implications for nurseries

- We are comfortable with current label rate of (**5 fl oz/a**) for foliar applications on southern pines.
- The label seed treatment rate of 10 fl oz per 50 lbs of seed is probably higher than it needs to be.
  - Compared to other crops it is 66X more than needed.

## Potential label applications for nurseries

- Other diseases listed on label (for other species) but not tested by SFNMC – *Cylindrocladium*, Powdery Mildew, *Septoria*.
- *Blotch, leaf spots, leaf blights, mold, rusts*
- Proline® is an extremely efficacious fungicide.
- For other non-conifer species – test for phytotoxicity
- Use label rate (5.0 fl oz/a) or lower.



# A few closing comments....

- Don't stop using Bayleton
  - We need as many fungicides as possible
  - Bayleton has proven to be effective in nurseries
- Proline and Bayleton are in the same fungicide resistance class (3)
  - Growing season application alternates – Proline and Cleary's 3336

