

# Stem and Root Diseases 2017

A. R. Chase



# Color, Strength, Development



# Fusarium Diseases







# Fusarium Wilt/Stem Rot



## What else attacks mums?



**Pythium alone and  
with Fusarium,  
Phytophthora,  
Erwinia/borer**

# What else attacks mums?

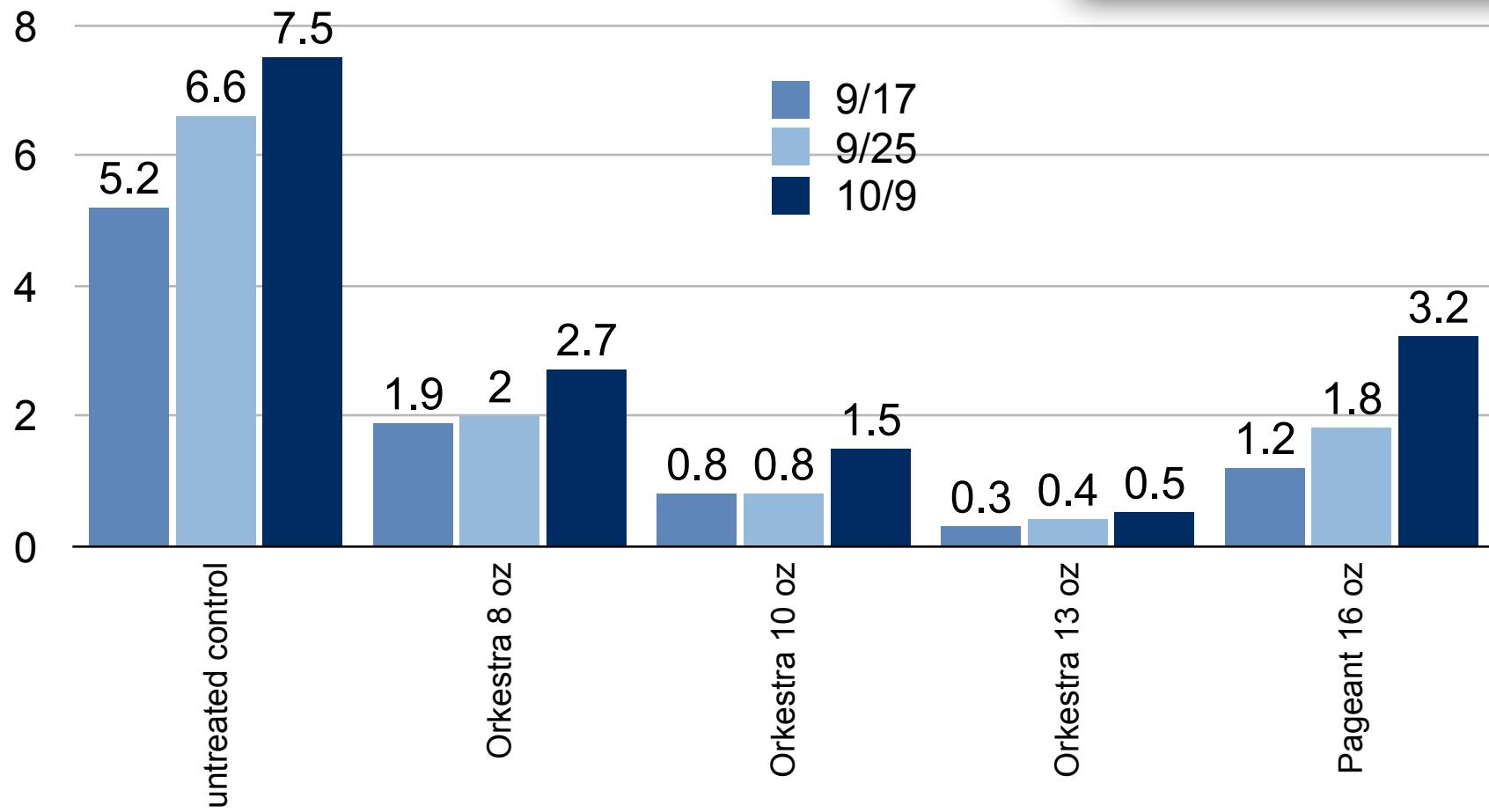


**Sclerotium rolfsii  
(Southern blight)**

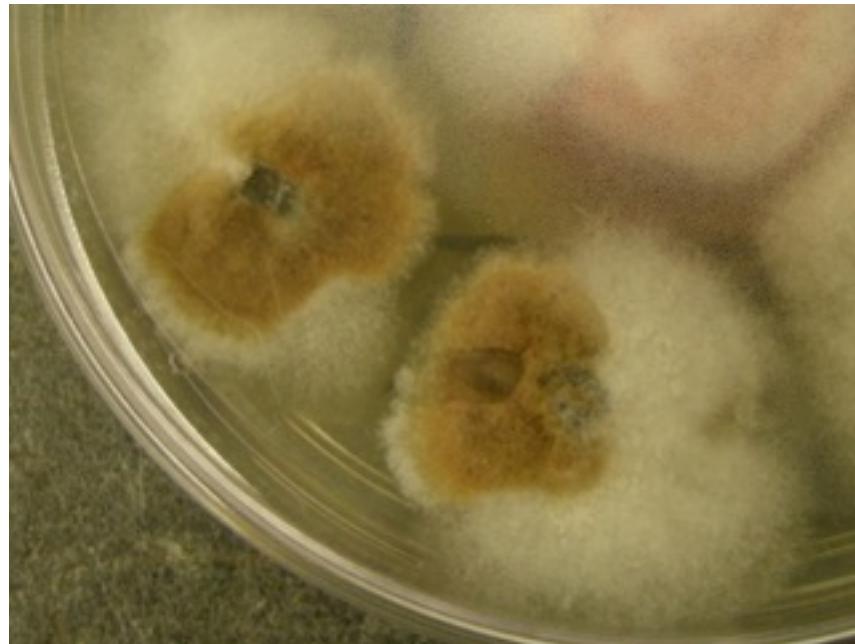




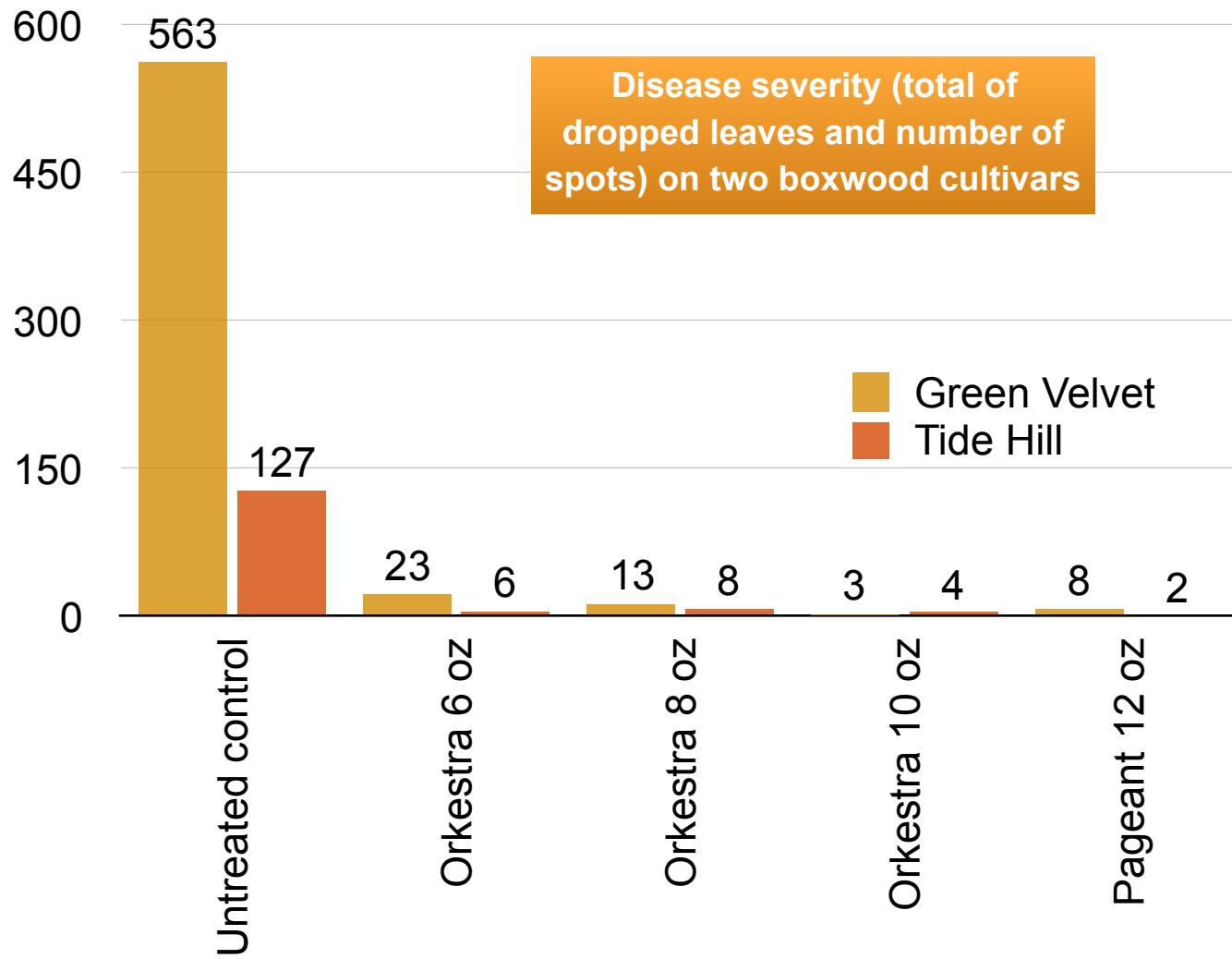
## Fusarium Crown Rot on Hosta

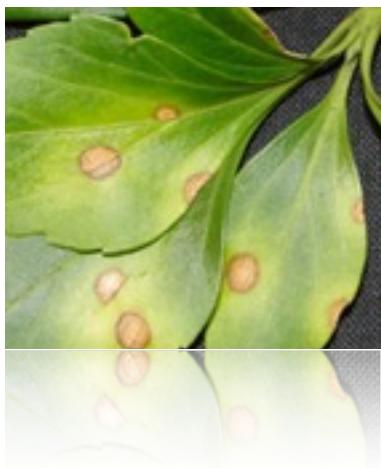


# Cylindrocladium Diseases



# Cylindrocladium - Boxblight





# Cylindrocladium Pachysandra Cultivars

Disease severity (total of dropped leaves and

Pachysandra identity	# spots/plant (with fungicide)	# spots/plant (no fungicide)
<i>P. axillaris</i> 'Windcliff'	10 b	143 b
<i>P. terminalis</i> 'Common'	75 a	340 a
<i>P. terminalis</i> 'Crinkled'	11 b	68 b
<i>P. terminalis</i> 'Green Carpet'	9 b	51 b
<i>P. terminalis</i> 'Green Sheen'	17 b	98 b
<i>P. terminalis</i> 'Variegated'	19 b	137 b

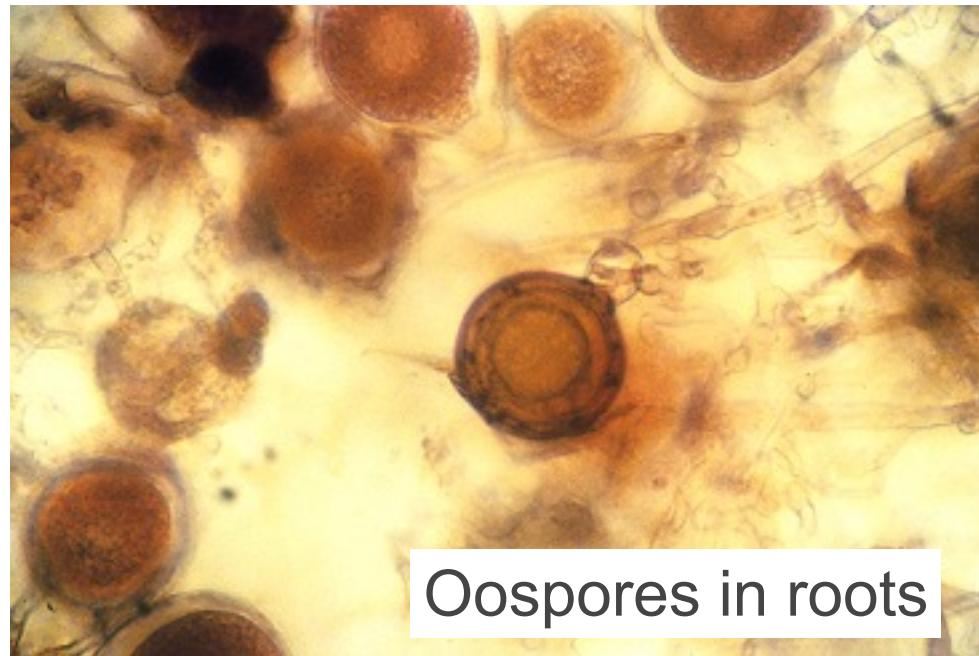
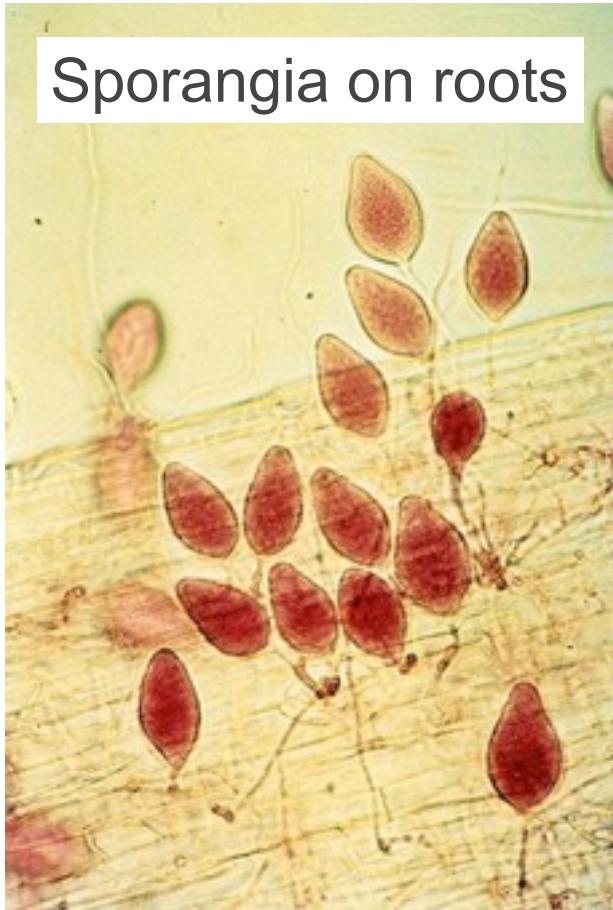
# FUSARIUM ROTATION

- **Medallion** (12-fludioxonil)
- **Heritage** (11-azoxystrobin) or **Mural** (11-and 7), **Empress Intrinsic** (11-pyraclostrobin), **Pageant Intrinsic** (11-pyraclostrobin and 7-boscalid) or **Orkestra Intrinsic** (11-pyraclostrobin and 7-fluxapyroxad)
- **Terraguard** (3-triflumizole)

# **Pythium and Phytophthora Characteristics**



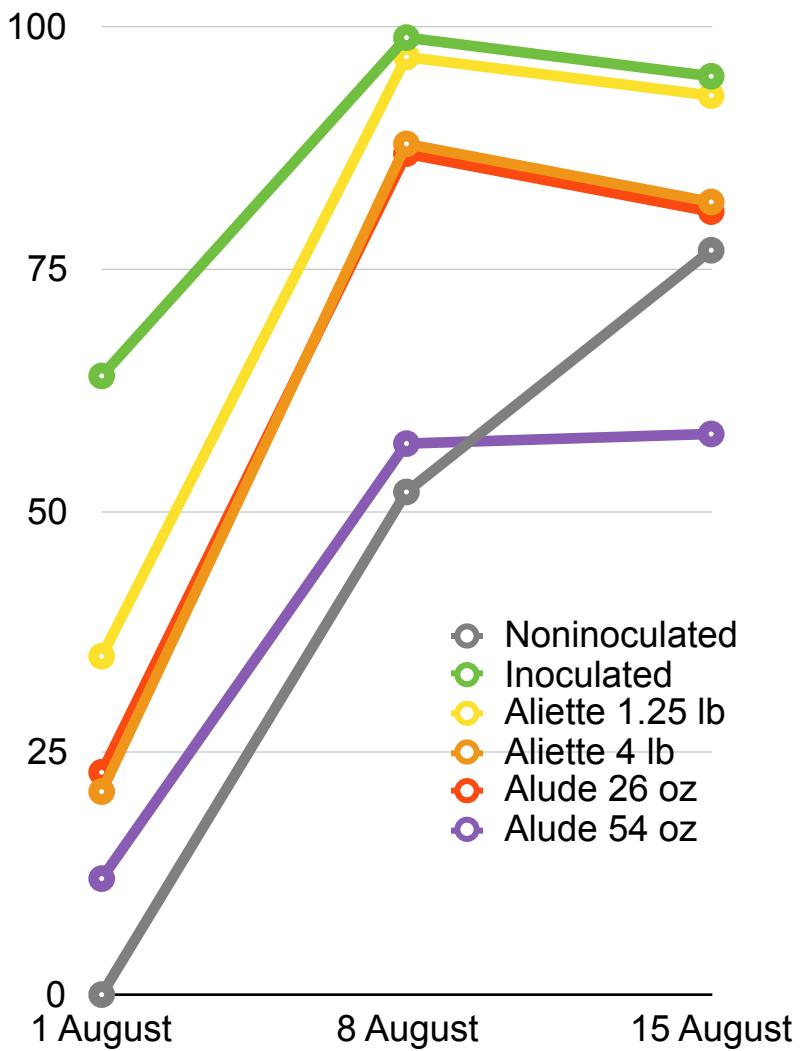
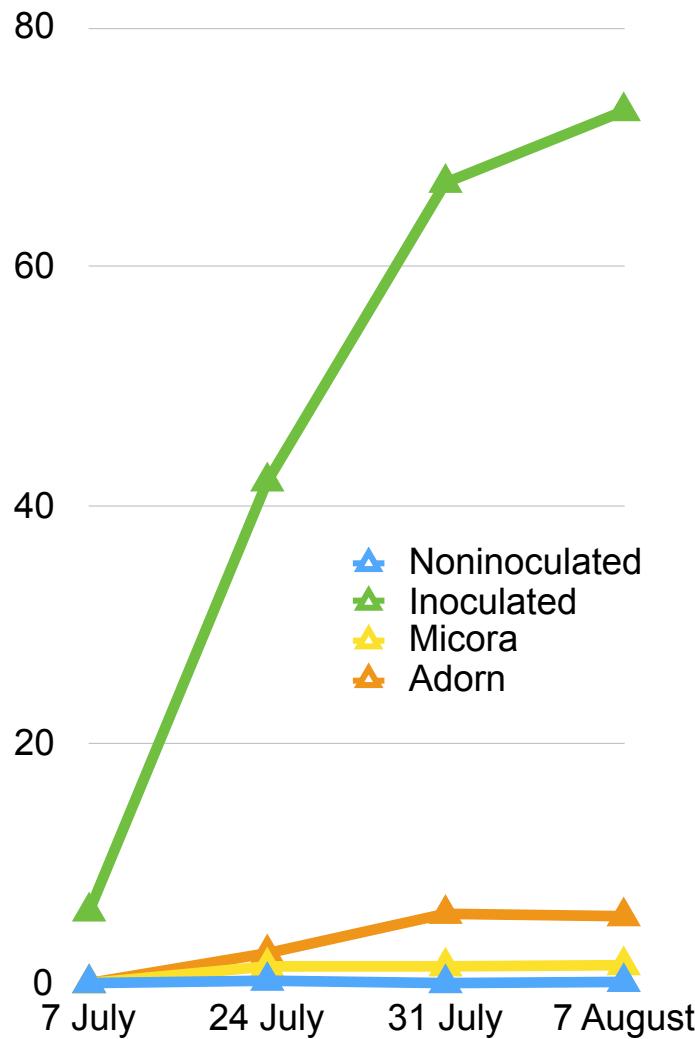
**Spread easily by water  
Require water to spread  
and infect  
Multiply quickly  
Long-lived resting spores  
Flagella on zoospores  
*Pythium* spp. can be good  
saprophytes**



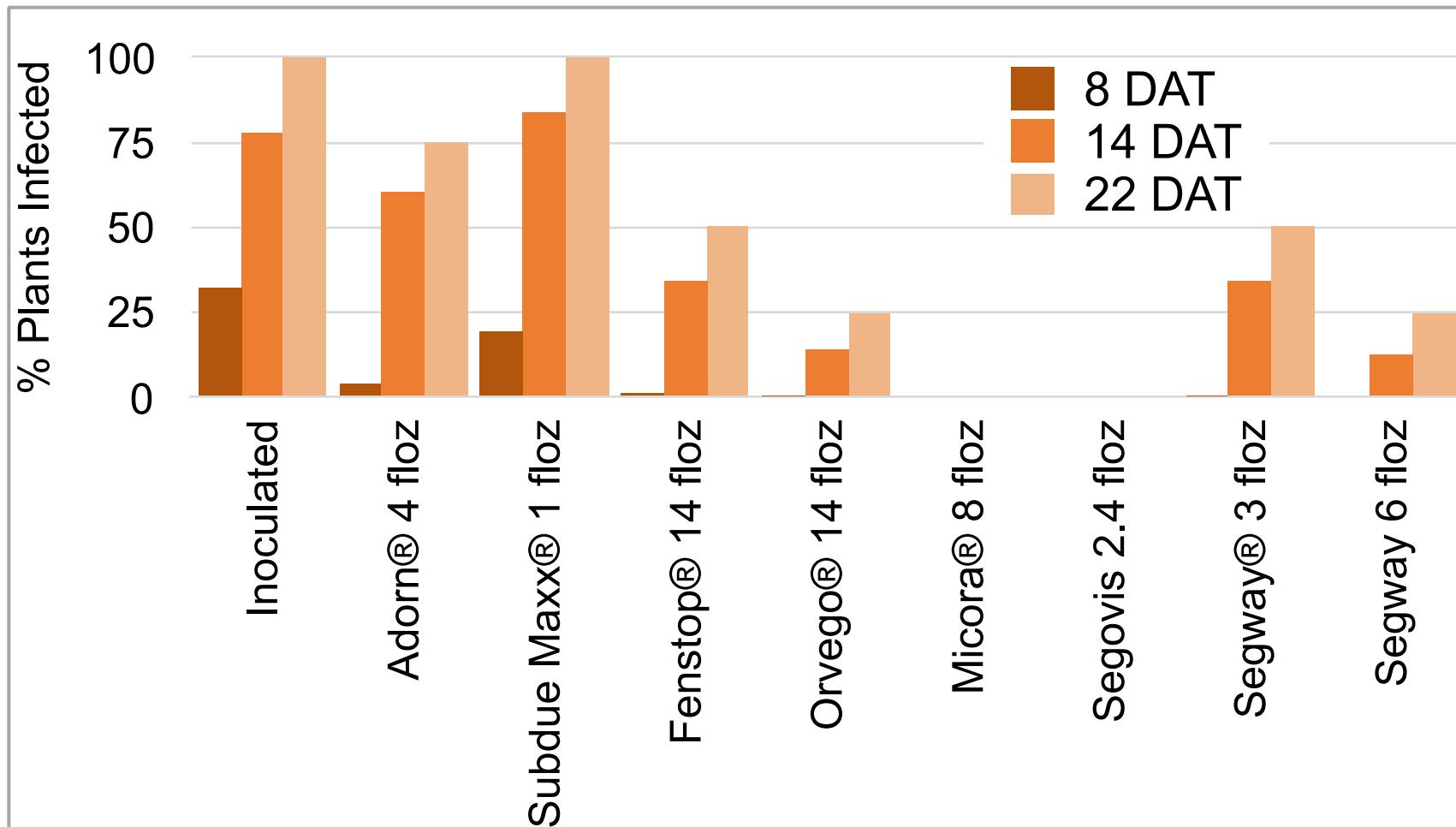
# Phytophthora Diseases



# Phytophthora aerial blight on vinca



# Control of Aerial Phytophthora on Vinca (Aggressive, Mefenoxam-resistant Florida Strain)



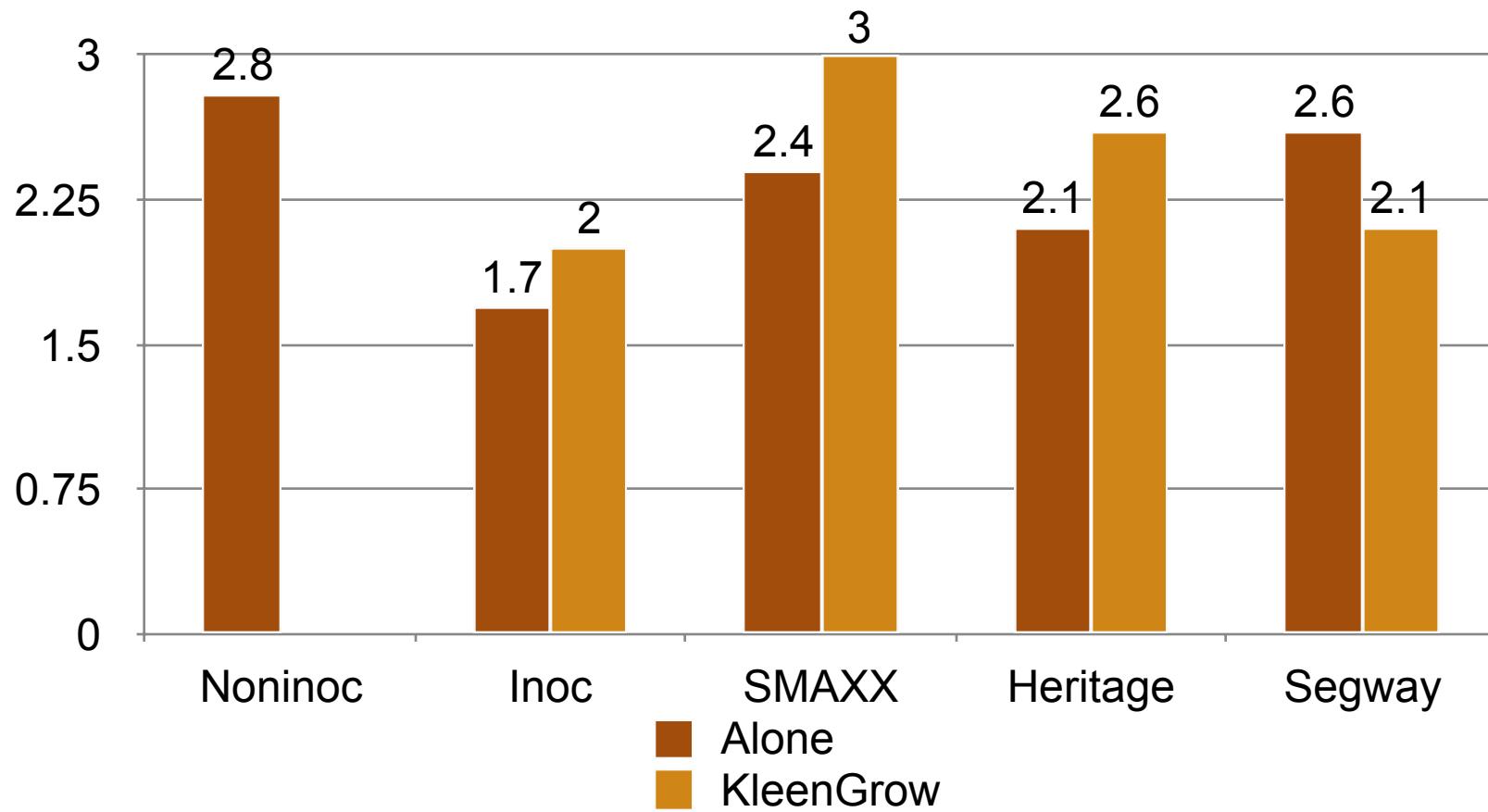
# PHYTOPHTHORA ROTATION

- **Aliette** (33-fosetyl aluminum) and many others
- **Adorn** (43-fluopicolide) (tank-mix as directed)
- **Subdue MAXX** (4-mefenoxam)
- **Stature SC**(40-dimethomorph) OR **Orvego** (40 and 45-ametoctradin) OR **Micora** (40-mandipropamid)
- **Terrazole** or **Truban** (14-etridiazole)
- **FenStop** (11-fenamidone) or **Empress** (11-pyraclostrobin)
- **Segway O** (21-cyazofamid)
- **Segovis** (49-OXTP-solatenol)

# Pythium Root Rots

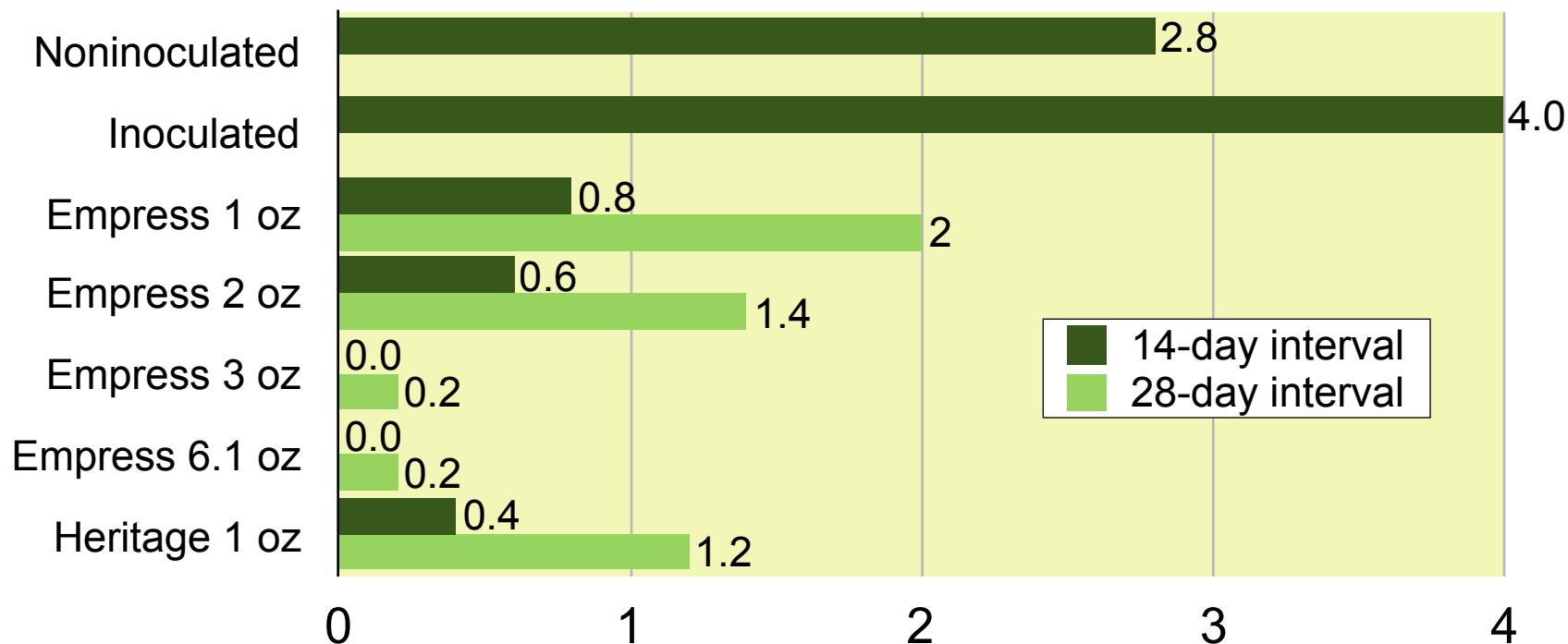


## Effect of fungicide treatment with and without KleenGrow on Pythium root rot of New Guinea Impatiens (Daughtrey-Cornell)



# Efficacy of Empress 250 FS on Pythium Root Rot on Poinsettia

A J Palmateer, Univ. FL



Poinsettia root rot severity in 6 inch pots. Root rot ratings were taken using the following scale: 0= no symptoms, 1= <10%, 2= 10-30%, 3= 30-50%, 4= 50-75% and 5= >75%.

# Effect of Plant and Pythium Species on Disease Severity

(Hausbeck, Michigan State University)

Fungicide treatment	<i>Pythium aphanidermatum</i>	<i>Pythium irregularare</i>	<i>Pythium ultimum</i>
Non-inoculated control	40	40	40
Actinovate	50	54	63
Adorn	108	108	89
Fenstop	98	95	96
Heritage	104	93	72
RootShield	68	102	89
Segway O	129	138	66
Subdue MAXX	67	92	45
Terrazole	108	94	64
Vital	105	100	84
Inoculated control	151	126	66

Fungicide treatment	<i>Pythium aphanidermatum</i>	<i>Pythium irregularare</i>	<i>Pythium ultimum</i>
Non-inoculated control	40	40	40
Actinovate	125	157	83
Adorn	99	156	43
Fenstop	83	111	62
Heritage	145	139	87
RootShield	95	68	90
Segway O	122	136	90
Subdue MAXX	85	126	43
Terrazole	92	168	52
Vital	121	95	110
Inoculated control	98	148	90

Results of trials on geranium (left) and snapdragon (right) for control of Pythium diseases. The numbers are the area under the disease progress curve. Boxes in green were the best in each column.

# PYTHIUM ROTATION

- **Subdue MAXX** (4-mefenoxam) consider adding KleenGrow to control resistant strains)
- **Segway O** (21-cyazofamid)
- **Terrazole** or **Truban** (14-etridiazole)
- **RootShield Plus** (nc-*Trichoderma harzianum* and *Trichoderma virens*)
- **Empress Intrinsic** (11-pyraclostrobin)

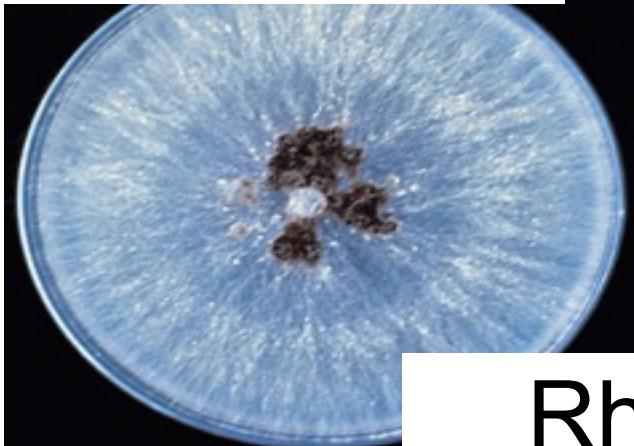
# Rhizoctonia Diseases



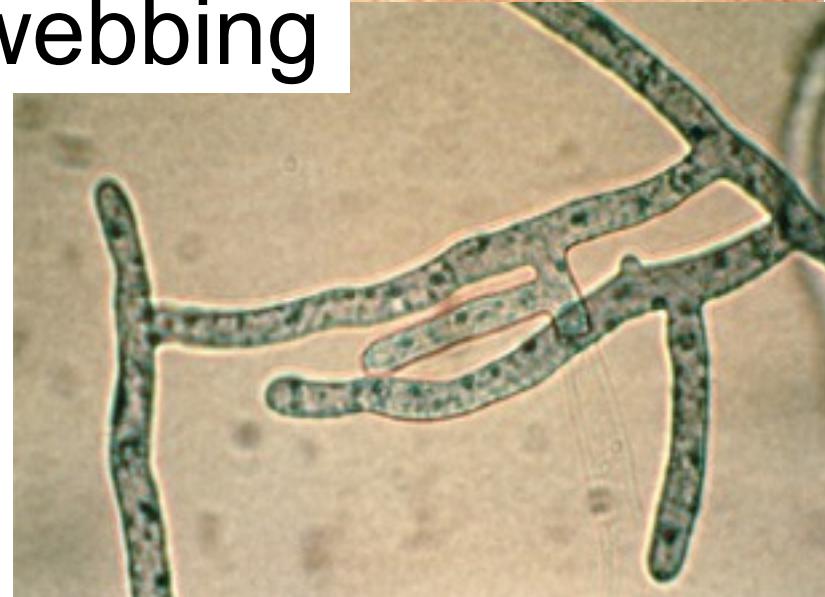


## Rhizoctonia attacks stems, leaves and roots

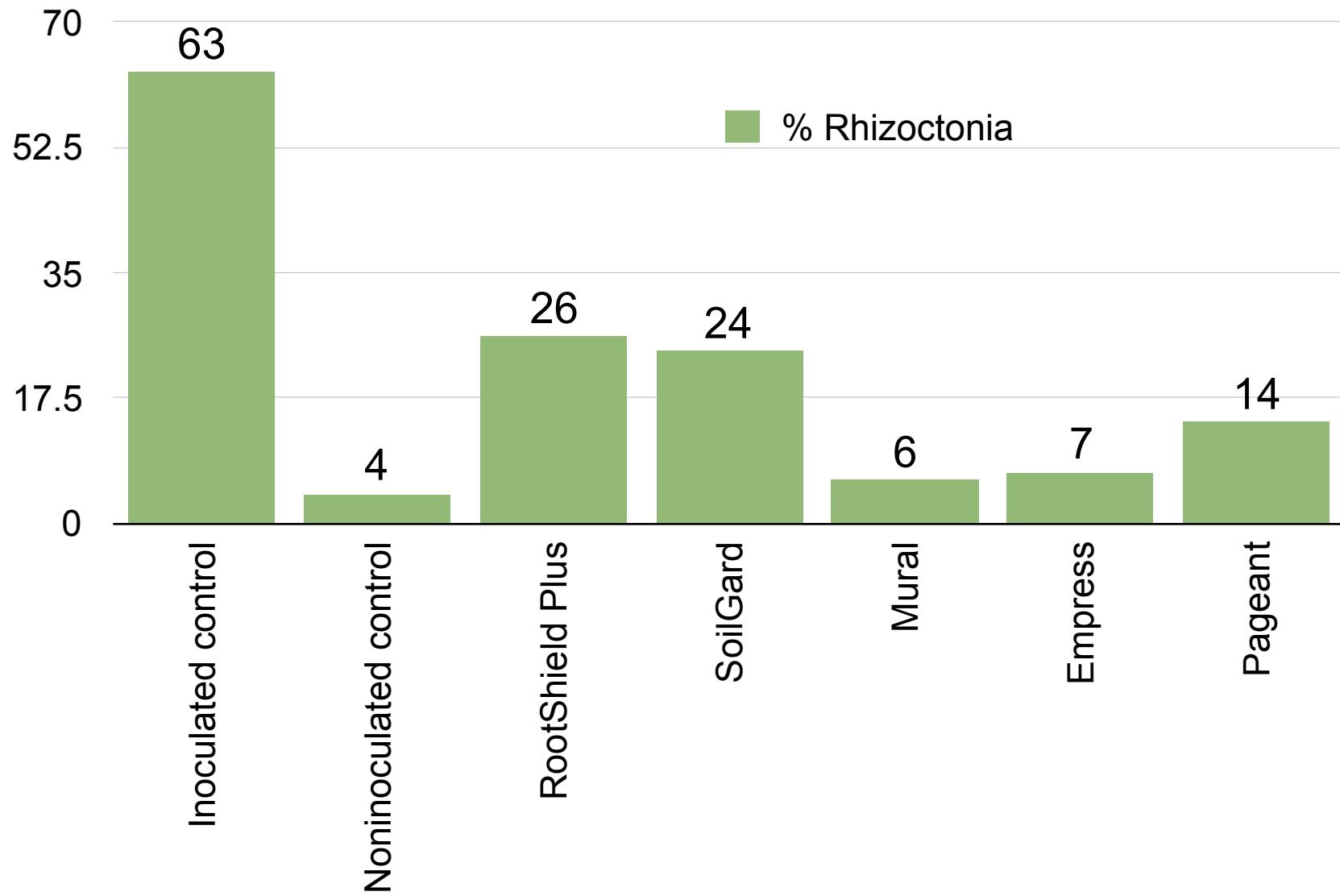




Rhizoctonia  
creates webbing

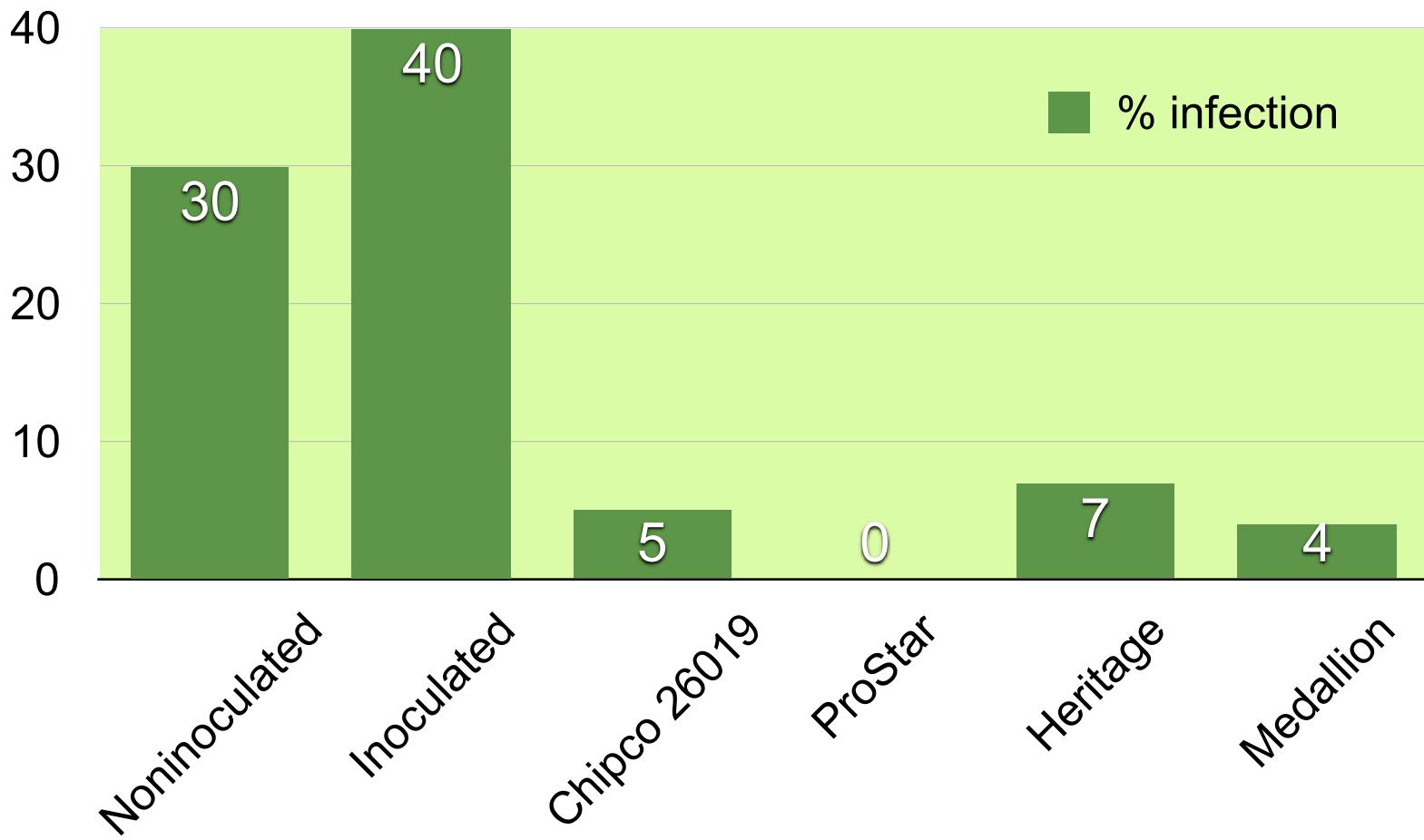


# Rhizoctonia Root Rot on Viburnum



# Controlling Rhizoctonia Blight on Boston Fern

by Dr. Aaron Palmateer



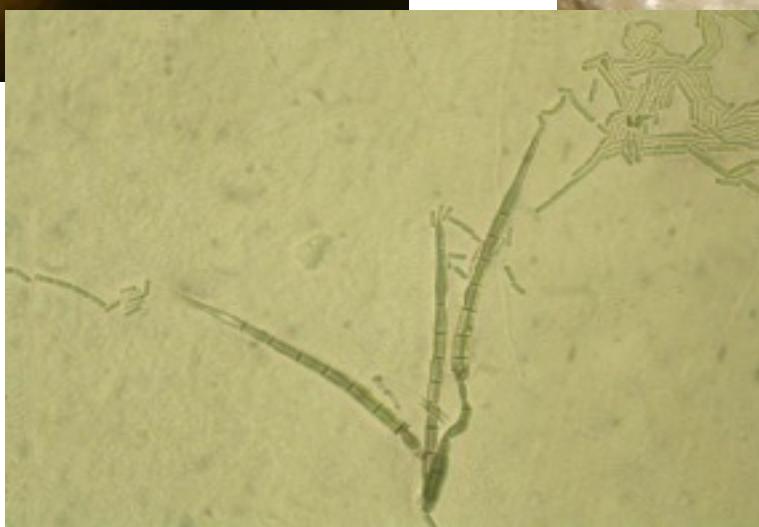
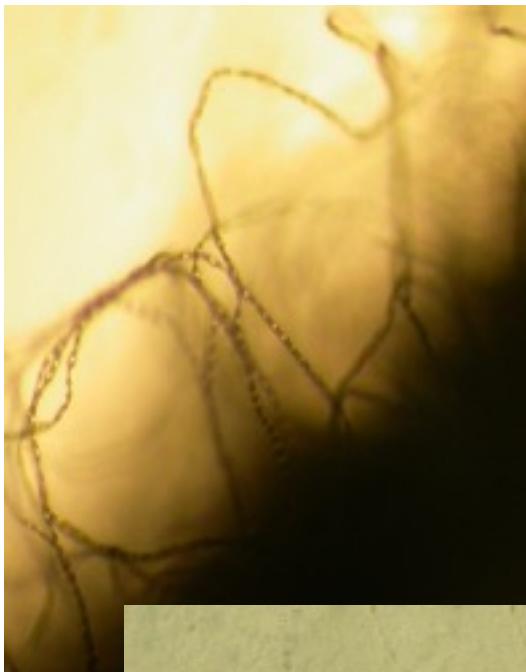
# RHIZOCTONIA ROTATION

- **Medallion** (12-fludioxonil) or **Palladium** (12-fludioxonil and 9-cyprodinil)
- **Heritage**, or **Mural**, **Empress Intrinsic** or **Pageant Intrinsic** (11 strobilurins)
- **3336**, **Fungo**, **OHP-6672** (1-thiophanate methyl)
- **Affirm** (19-polyxin-D)
- **RootShield** or **RootShield Plus** (44-*Trichoderma harzianum* and *T. virens*) preventatively and root rot mainly

# **Thielaviopsis root rot**



# **Thielaviopsis spores**



# Black Root Rot Control on Pansy (Daughtrey, Cornell University)

TREATMENT	RATE/100 GAL	DRY TOP WEIGHT (G)
Untreated control	-----	0.6 e
Inoculated control	-----	0.2 ab
Veranda O	4 oz	0.4 c
Veranda O	6 oz	0.4 cd
Veranda O	8 oz	0.5 d
		0.2 ab
		0.3 b
	oz	0.2 a
		0.6 e



# Black Root Rot Control on Vinca (Daughtrey, Cornell University)

Treatment	Rate/ 100 gal.	% healthy roots 9-1-11
Water Noninoculated	-----	64.0 d
Water Inoculated	-----	47.0 bc
Cleary's 3336	16 oz	65.0 d
Veranda O	8 oz	63.0 d
Affirm	8 oz	61.1 d

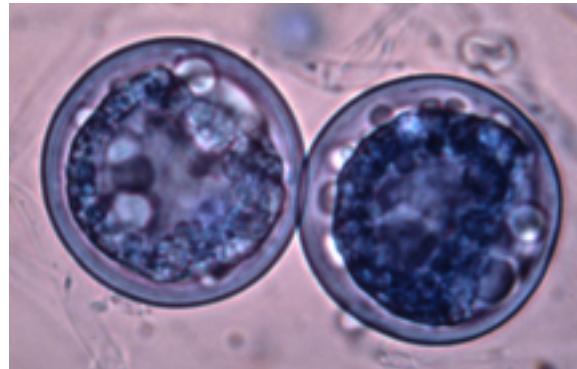


# Black Root Rot Rotation

- **OHP-6672, Fungo, 3336** (1-thiophanate methyl)
- **Affirm** (19-polyoxin D)  
to a lesser degree
- **Heritage** (11- azoxystrobin), **Orkestra Intrinsic** (11-pyraclostrobin and 7-fluxapyroxad)
- **Terraguard** (3-triflumizole)
- **Medallion** (12-fludioxonil)

# Steaming and Control of Soilborne Pathogens (thirty minutes)

PATHOGEN	NO TRT	113F	122F AND ABOVE
<i>Cylindrocladium scoparium</i>	97%	56%	0
<i>Phytophthora ramorum</i>	85%	7%	0
<i>Pythium irregularе</i>	98%	23%	0
<i>Thielaviopsis basciola</i>	98%	63%	0



# KEYS TO OPTIMAL DISEASE CONTROL

- Get an accurate diagnosis
- Use IPM
- Choose effective products
- Apply to the right site
- Use the right rate and treatment interval
- Rotate products for resistance management
- Know when to quit



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....There is always  
a practical solution

QUESTIONS???

