

Web blight on Christmas trees in the U.S. Pacific Northwest

Gary Chastagner

Washington State University

and

Chal Landgren

Oregon State University

Rhizoctonia Web Blight





Web blight on Douglas-fir

Photos provided by Alan Kanaskie, ODF





Web blight on Western Hemlock

Photos provided by Alan Kanaskie, ODF

A potential Complex of Pathogens

- Butin, H. 1995. Tree diseases and disorders. Causes, biology and control in forest and amenity trees. Oxford University Press. 252 pp.
- Hauptman, T. and Piskur, B. 2016. A new record of *Rhizoctonia butinii* associated with *Picea glauca* 'Conica' in Slovenia. *Forest Pathology*, 46, 259–263
- Hietala, A.M., Vahala, J., and Hantula, J. 2001. Molecular evidence suggests that *Ceratobasidium bicorne* has an anamorph known as a conifer pathogen. *Mycol. Res.* 105: 555-562.
- Oberwinkler, F.; Riess, K.; Bauer, R.; Kirschner, R.; Garnica, S., 2013: Taxonomic re-evaluation of the *Ceratobasidium*-*Rhizoctonia* complex and *Rhizoctonia butinii*, a new species attacking spruce. *Mycol. Prog.* 12, 763–776.
- Putnam, M.L. 1999. A new foliar blight of Douglas, grand and noble fir caused by a binucleate *Rhizoctonia*-like fungus. *Plant Disease*. 83:200.

Herpotrichia needle browning

Nematostoma parasiticum (syn. *Herpotrichia parasitica*)

Europe

Hosts: silver fir (*Abies alba*), but also Nordmann fir (*A. nordmanniana*), noble fir (*A. procera*), Veitch fir (*A. veitchii*), and Turkish fir (*A. bornmuelleriana*) under high disease pressure

North America

Not confirmed

Herpotrichia needle browning

Turkish fir (*Abies bornmuelleriana*)



Web Blight

Europe

- *Rhizoctonia butinii*
- Norway spruce (*Picea abies*) and other *Picea* spp.

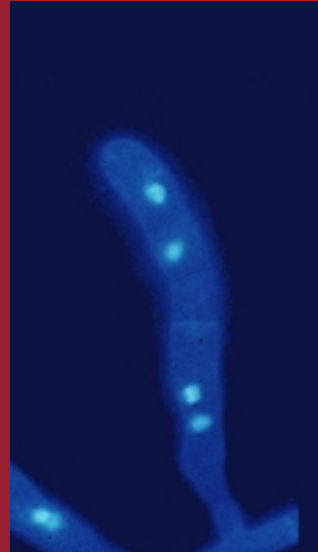
Pacific Northwest

- Unnamed binucleate *Rhizoctonia* species
- Douglas-fir, but has also been observed on grand and noble firs in Christmas tree plantations and western hemlock in the forest.
- Can kill buds and twigs on grand fir.

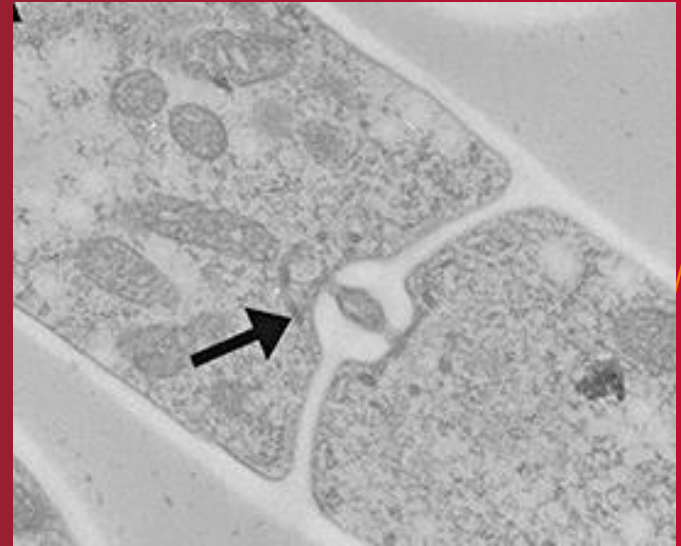
Diagnosis of Web Blight in the PNW



Slight constrictions
at the branch points
with acute to right
angle branching



Binucleate hyphae with dolipore septa

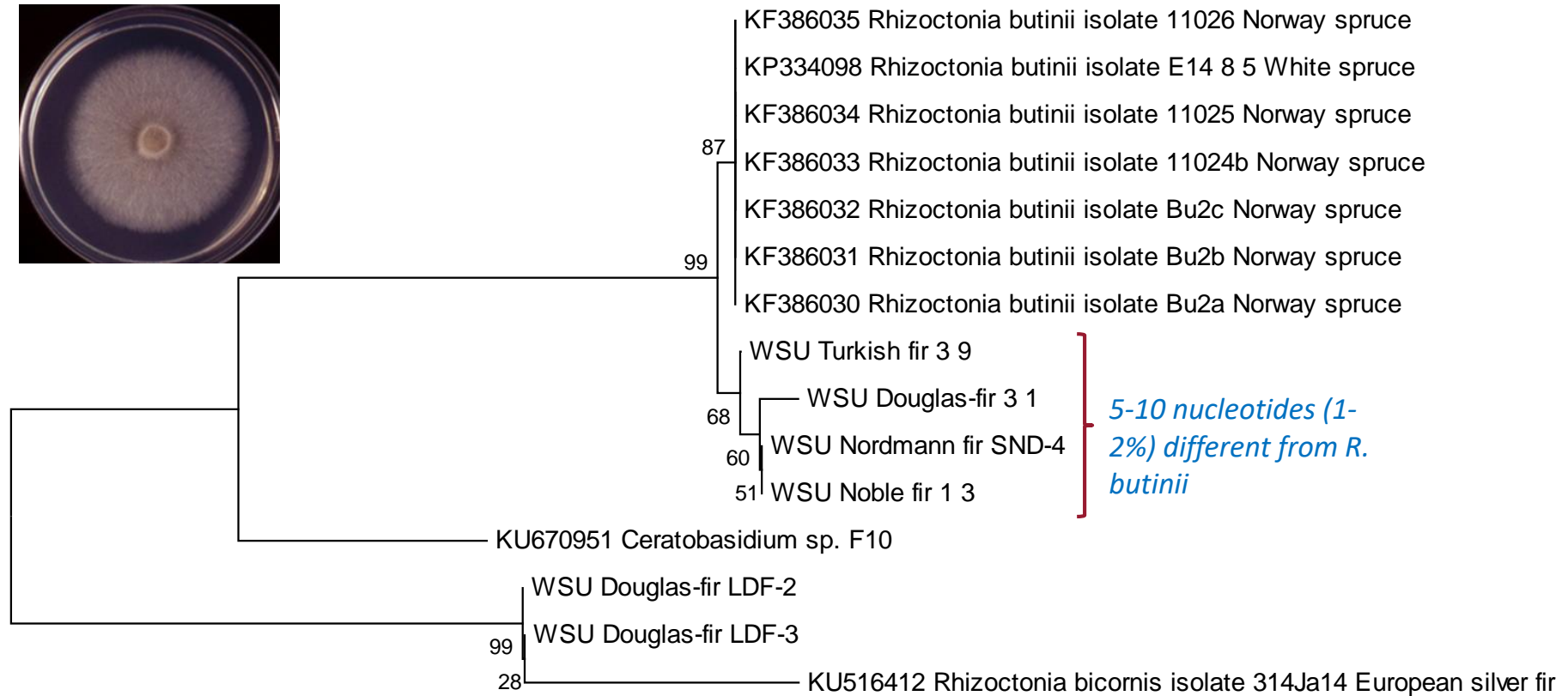


Ceratobasidium perfect state

2017 Web Blight

- A higher than normal incidence of web blight in some Christmas tree plantations in OR
- Disease was observed on:
 - Douglas-fir
 - Grand fir
 - Noble fir
 - Nordmann fir (new host)
 - Turkish fir (new host)

ID of *Rhizoctonia* on conifer in the PNW



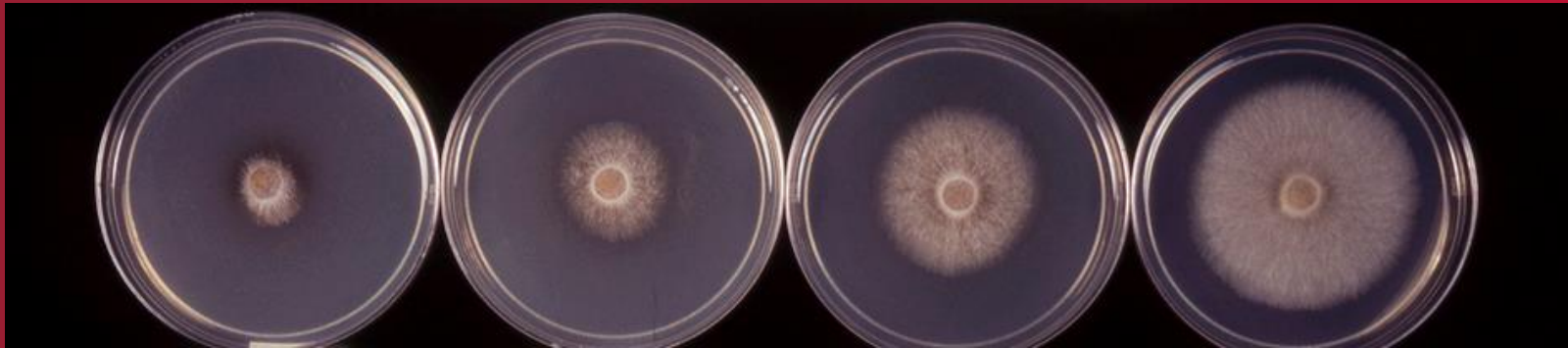
0.01

- DNA sequence analysis of the Internal Transcribed Spacer (ITS) region was performed using a direct PCR technique
- Sequences were compared to those published in GenBank
- Neighbor-Joining tree with 5000 bootstraps, analysis conducted in MEGA6

Lots of unanswered questions

- Life cycle of the pathogen?
- Factors affecting disease development?
- Pathogen survival and spread?
- Timing of initial infection?
- Limited information is available relating to the management of this disease.

Effect of Temperature on the Growth of *Rhizoctonia* from Douglas-fir on PDA (144 hrs)



1C

5C

10C

15C



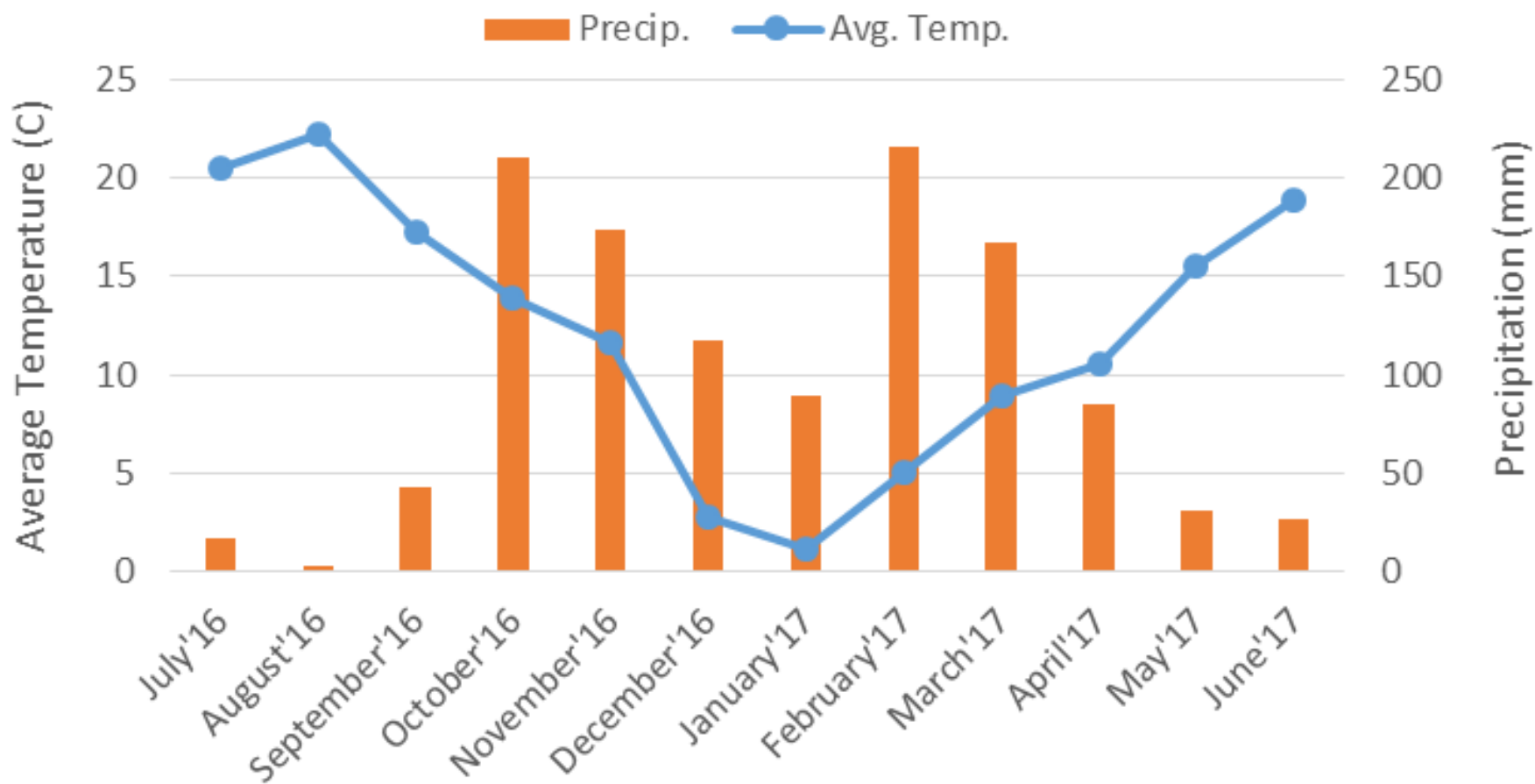
20C

24C

30C

35C (killed)

Portland, OR 2016/17 Weather Data

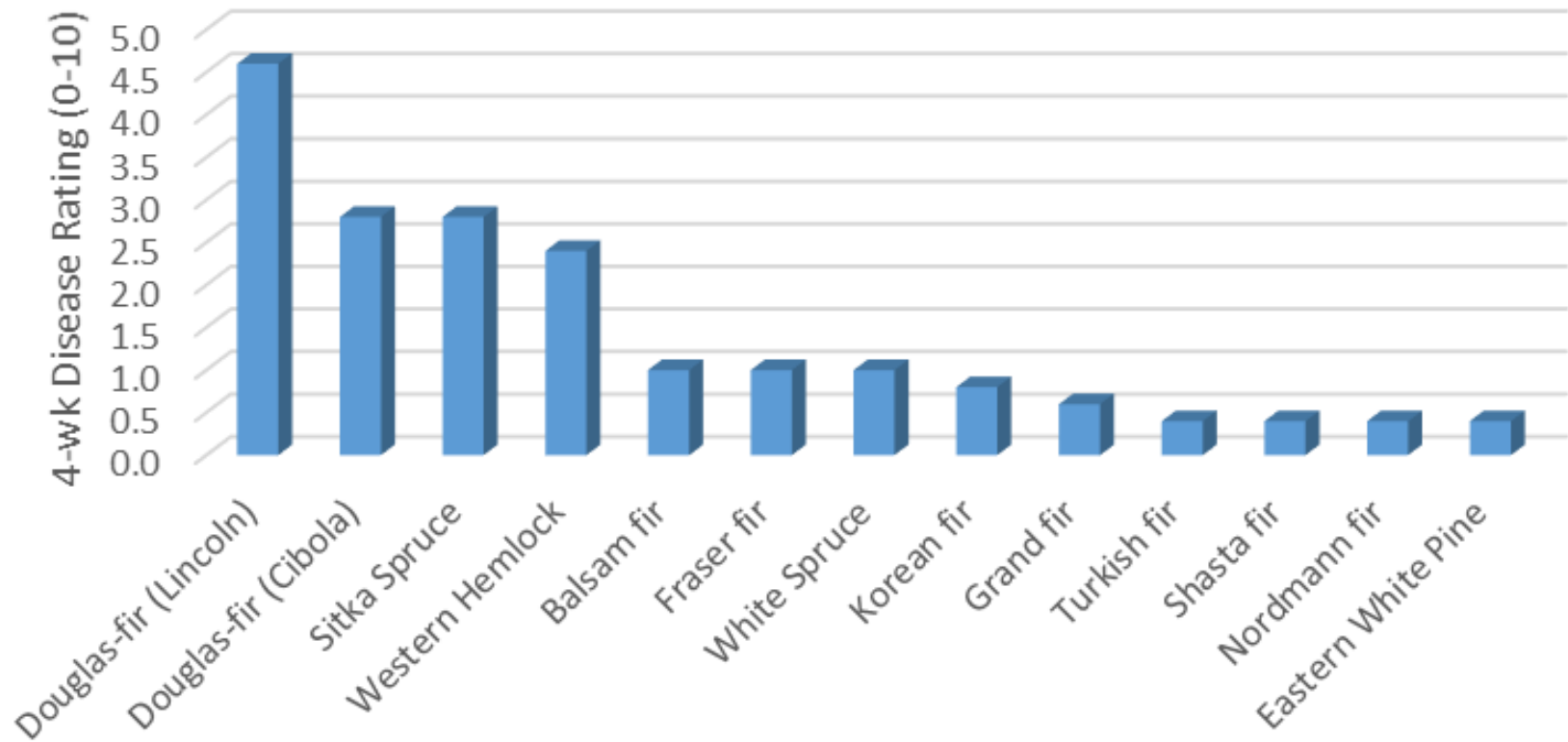


144 days of rain between Oct. and April



Host Susceptibility

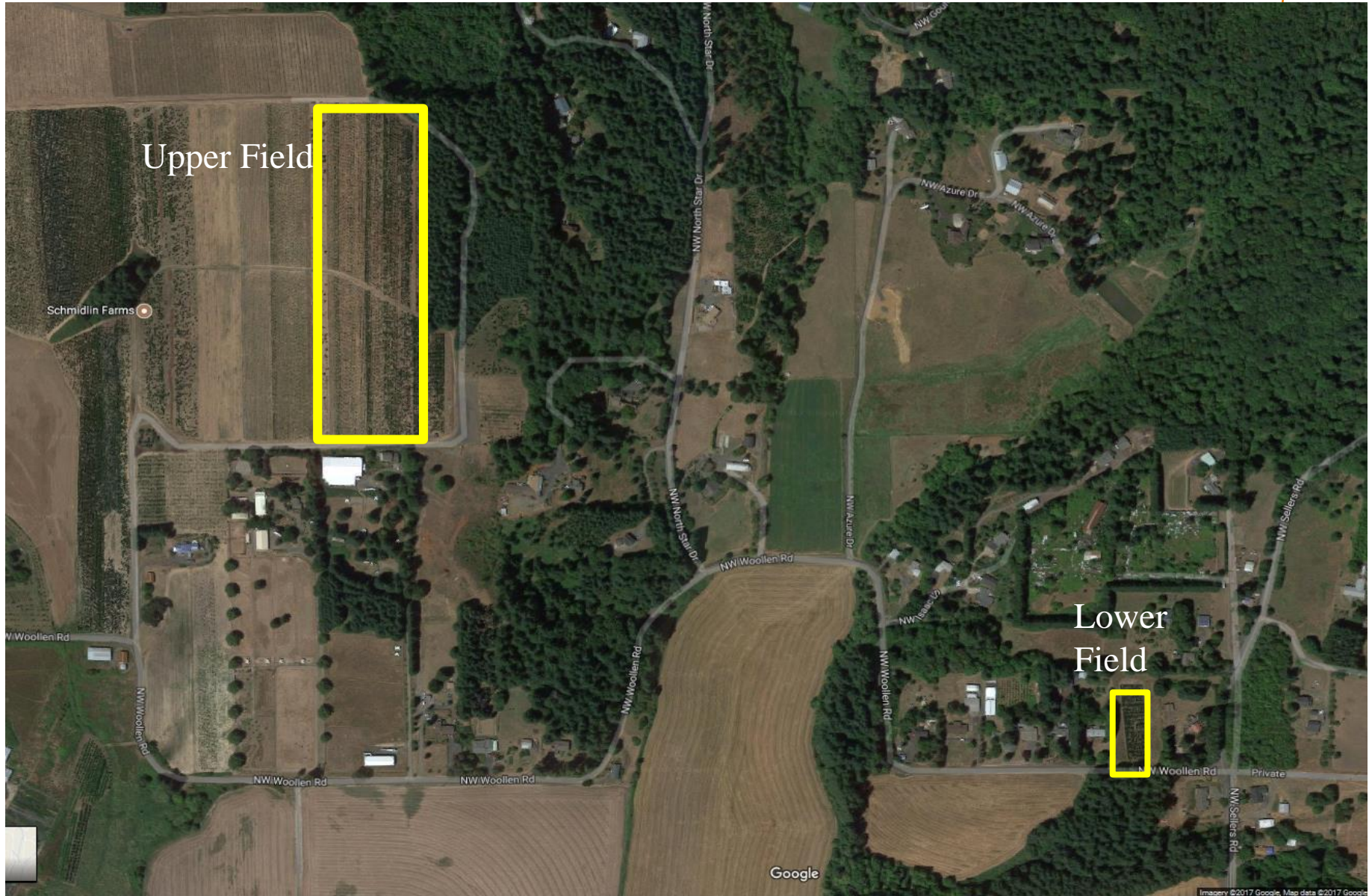
Susceptibility of Conifers to Web Blight



Disease Spread?



Disease Distribution in Two Fields in OR in 2017



Lower Field



Disease Rating

0 = no disease

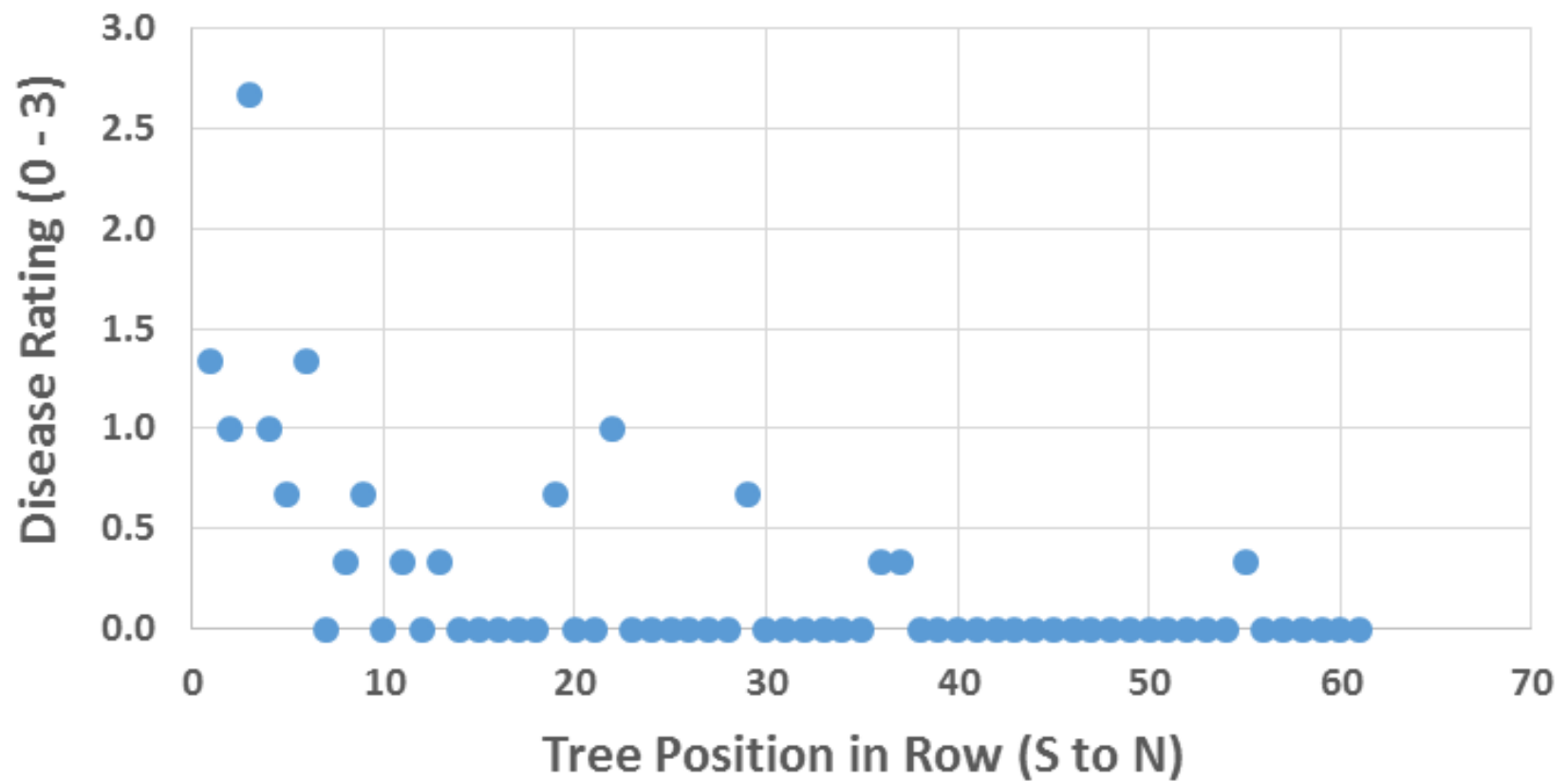
1 = slight

2 = moderate

3 = severe

Nordmann fir

'17 Web Blight Rating on Trees In Lower Field



Disease Management



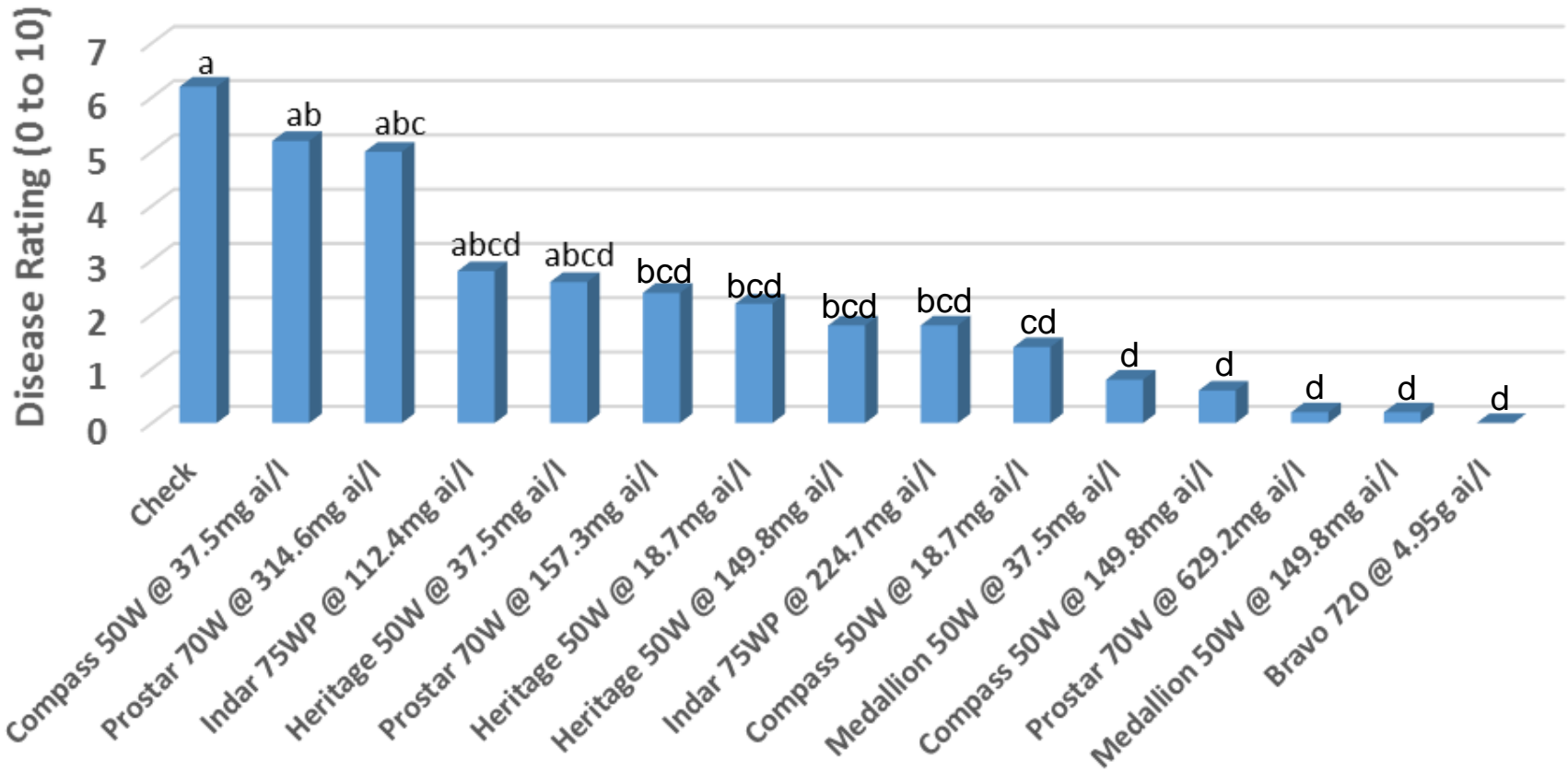


Fungicidal Control

Fungicides tested on Douglas-fir

Product	Common Name	FRAC Group	Rate	
			Product/ 100 gal	ai/L
Prostar 70W	flutolanil	7	3 oz.	157.3 mg
Prostar 70W	flutolanil	7	6 oz.	314.6 mg
Prostar 70W	flutolanil	7	12 oz.	629.2 mg
Bravo 720	chlorothalonil	M5	5.5 pt	4.95 g
Compass 50W	trifloxystrobin	11	0.5 oz.	18.7 mg
Compass 50W	trifloxystrobin	11	1 oz.	37.5 mg
Compass 50W	trifloxystrobin	11	4 oz.	149.8 mg
Heritage 50W	azoxystrobin	11	0.5 oz.	18.7 mg
Heritage 50W	azoxystrobin	11	1 oz.	37.5 mg
Heritage 50W	azoxystrobin	11	4 oz.	149.8 mg
Medallion 50W	fludioxonil	12	1 oz.	37.5 mg
Medallion 50W	fludioxonil	12	4 oz.	149.8 mg
Indar 75WP	febuconazole	3	2 oz.	112.4 mg
Indar 75WP	febuconazole	3	4 oz.	224.7 mg
Check

Protection of Douglas-fir with Fungicides



Future Studies

- Examine the diversity of Rhizoctonias associated with web blight on Christmas trees
- Examine over summering of pathogen
- Examine the effectiveness of fall applications of fungicides in controlling disease development

Thank You

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- Pacific Northwest Christmas Tree Association

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- Annie DeBauw
- Kathy Riley

Questions

