SYMPOSIUM

Grapevine Trunk Disease Research Findings in Oregon

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RESEARCH AREAS

- Identifying the major grapevine trunk disease problems in Oregon vineyards and the pathogens associated with each disease
- Understanding the timing of spore release by the most common pathogen(s) at critical stages of vine development
- Comparing the efficacy of pruning wound protection by biological control agents

Identifying the major grapevine trunk disease problems in Oregon vineyards and the pathogens associated with each disease

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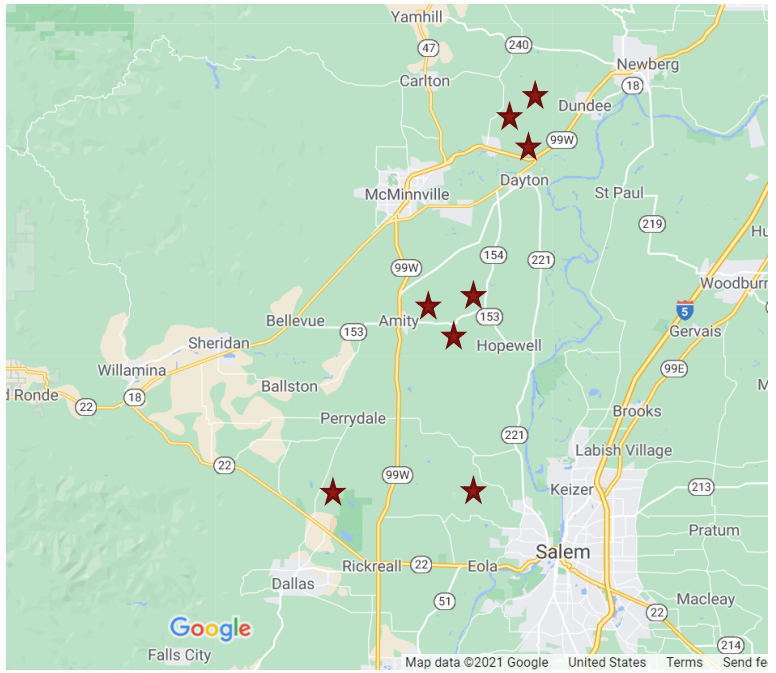
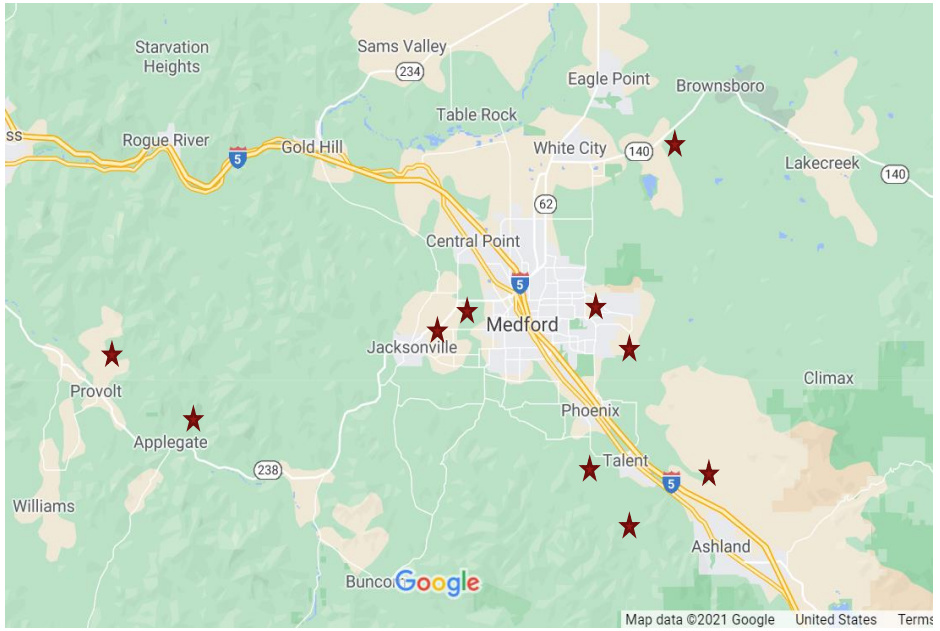
Surveyed regions

https://www.oregonwine.org



Northern Willamette Valley
(15 vineyard blocks)



Southern Oregon
(16 vineyard blocks)

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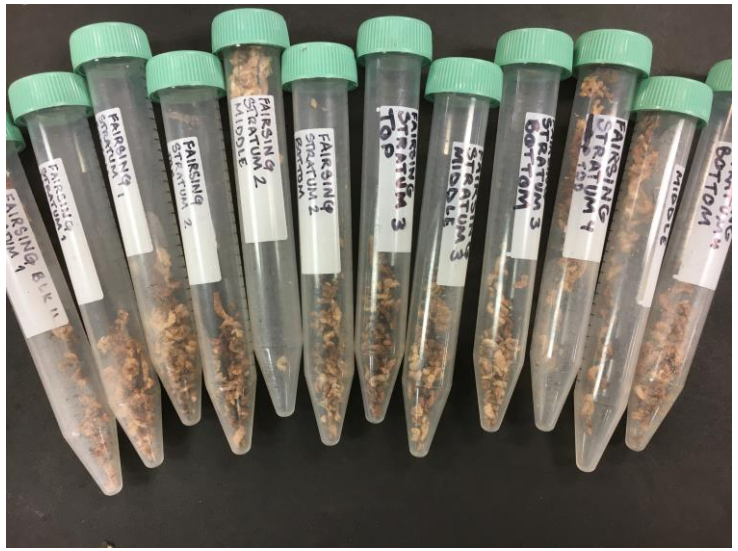
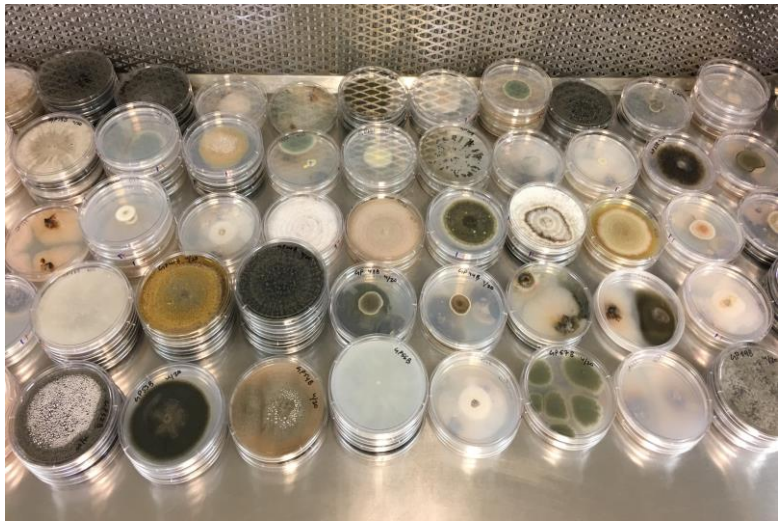
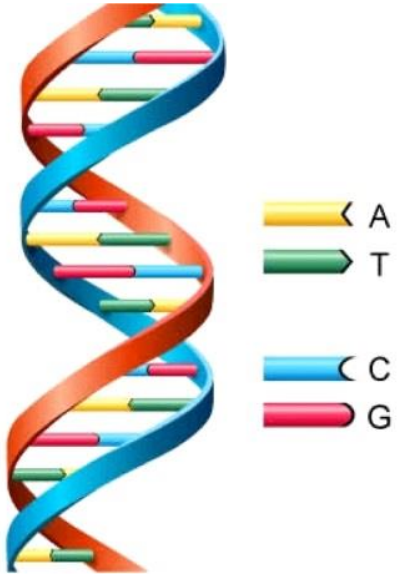
GTDs identification



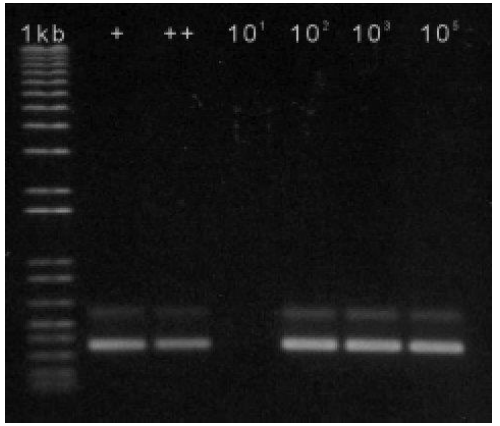
Culture based ID



PCR based ID



GTD pathogens identification



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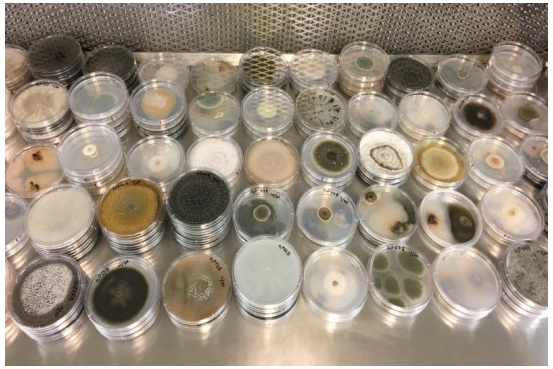
RESULTS

- 87 fungal species were isolated from culture based assays

Species	Isolated species (%)	Sites
Cladosporium spp.	17	A, B, D, E, F-2, G-1, G-2, I, J, L, N, P, Q, R, T-1, V
Alternaria spp.	16	A, B, D, E, F-1, F-2, G-2, I, J, P, S, V
Penicillium spp.	16	A, B, C-1, C-2, D, E, F-1, F-2, G-1, G-2, H-2, H-3, I, J, N, O, P, Q, R, T-2, W
Fusarium spp.	13	A, B, F-2, G-1, G-2, H-2, H-3, I, J, L, O, Q, T-2, U
Mucor spp.	8	C-1, C-2, F-1, H-1, H-2, H-3, I, K, M, N, O, P, R, T-1, T-2, U, V, W
Epicoccum sp.	7	B, E, G-1, H-2, H-3, I, J, N, Q
Aureobasidium pullulans	5	A, I, N, P, W
Seimatosporium lichenicola	5	G-1, J
Hormonema spp.	2	C-2, L
Phoma sp.	2	G-1
Truncatella angustata	2	F-2, G-2
Arthrinium sp.	1	E
Aspergillus niger	1	E
Circinomucor sp.	1	C-2
Curvularia inaequalis	1	J
Neosetophoma salicis	1	F-2
Pestalotiopsis sp.	1	G-1
Pithomyces chartarum	1	G-2
Trichoderma sp.	1	Q

(red: RV) (grey: WV)



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RESULTS

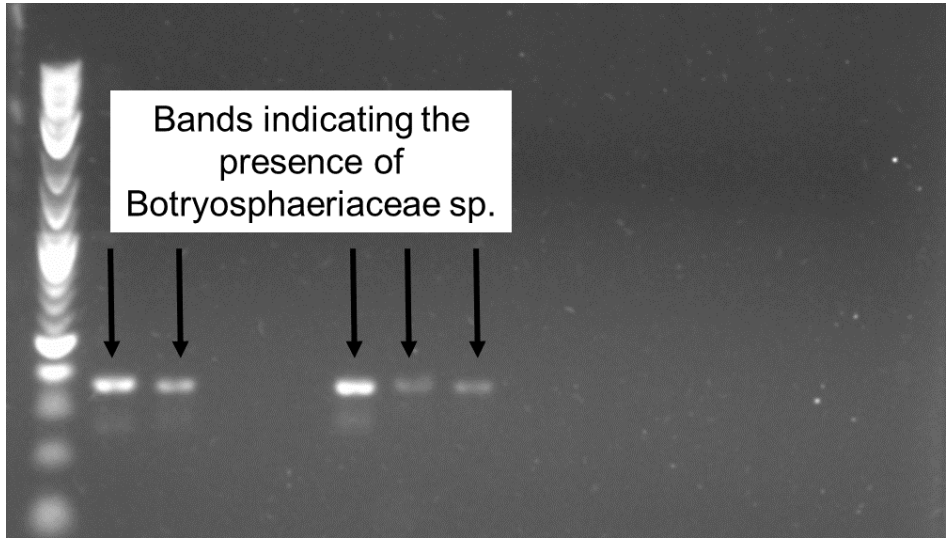
- Ten species specific primers were used for PCR based detection and only five were detected in the samples

  - ***Botryosphaeriaceae* spp.**

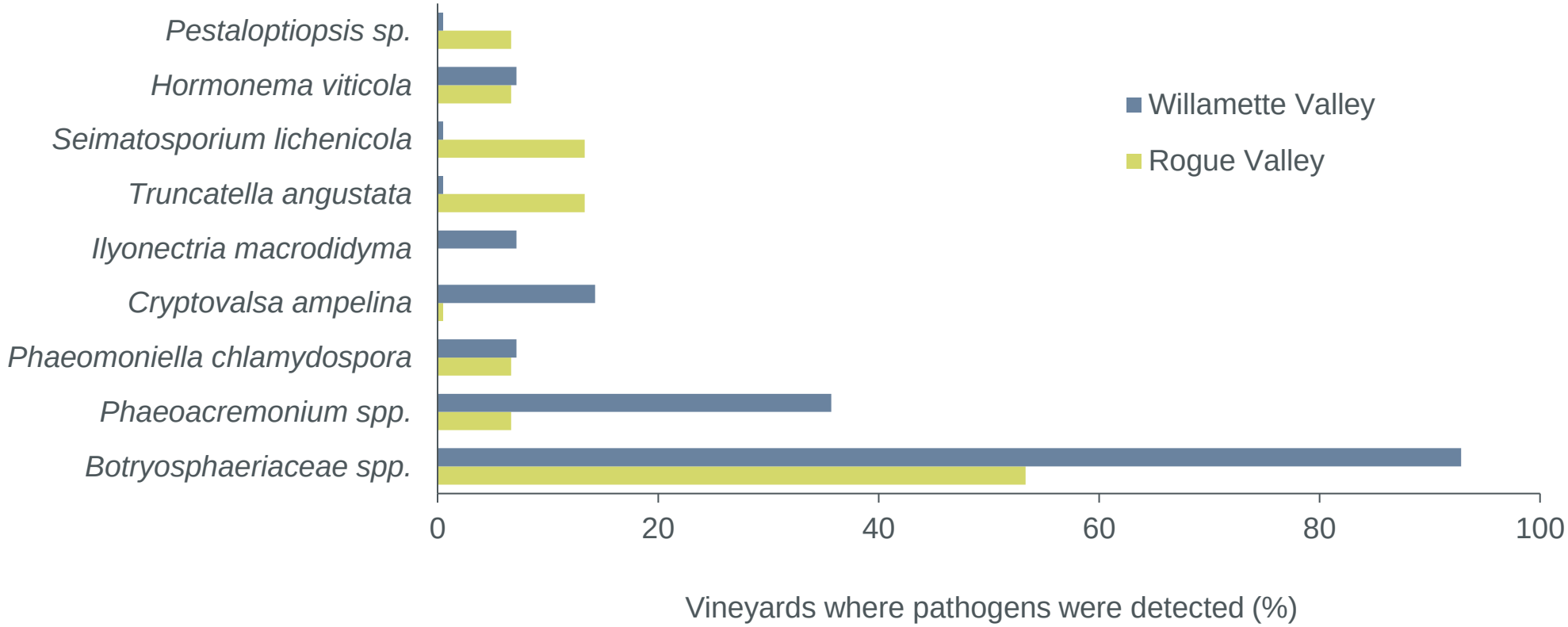
  - ***Cryptovalsa ampelina***
  - *Eutypa lata*
  - *Eutypella vitis*

  - ***Ilyonectria macrodidyma***
  - *Ilyonectria liriodendra*
  - *Cylindrocarpon destructans*
  - *Cylindrocarpon pauciseptatum*

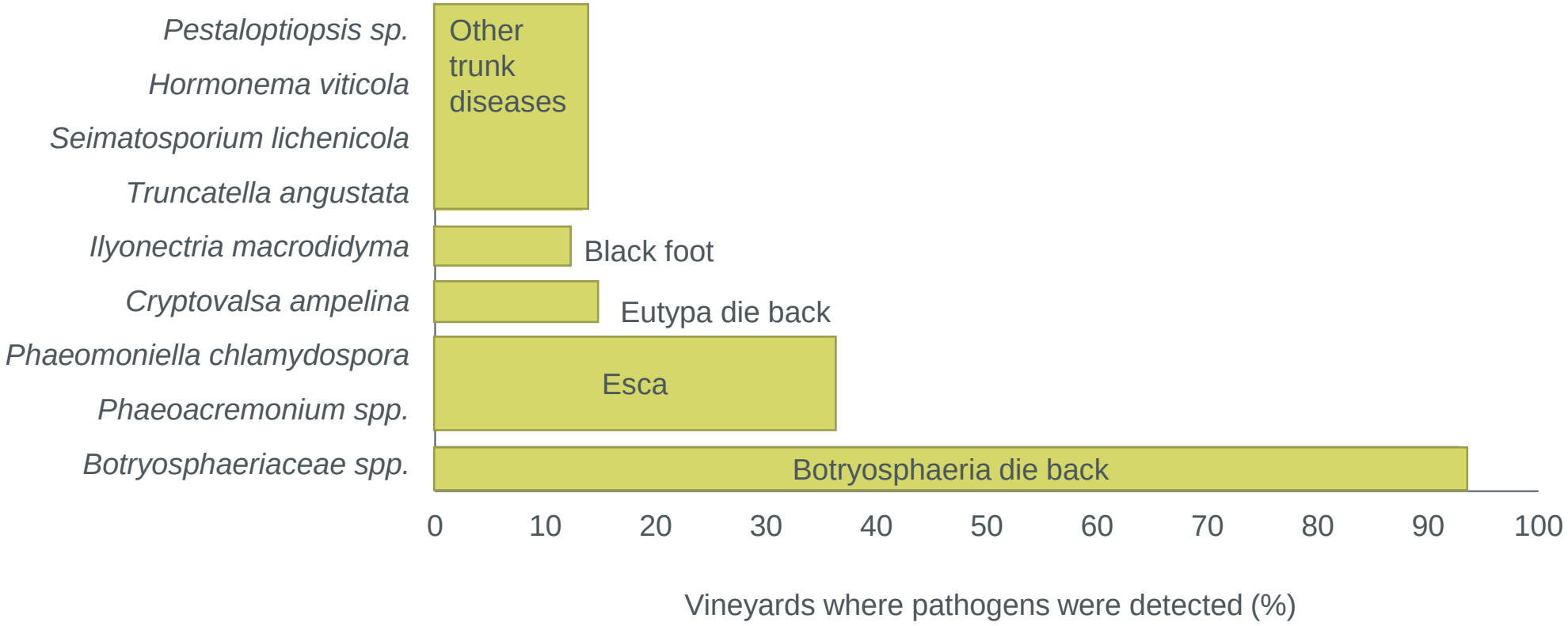
  - ***Phaeoacremonium* sp.**
  - ***Phaeomoniella chlamydospora***



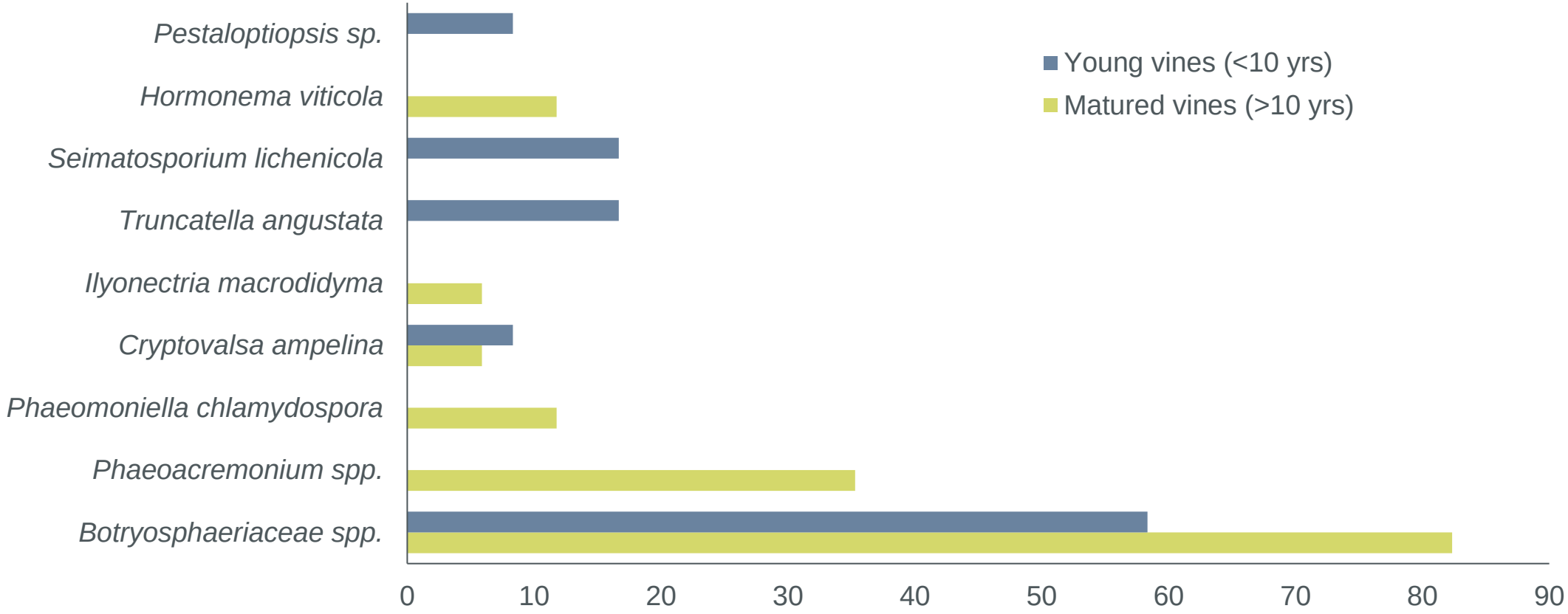
RESULTS


Pestaloptiopsis sp.
Hormonema viticola
Seimatosporium lichenicola
Truncatella angustata
Ilyonectria macrodidyma
Cryptovalsa ampelina
Phaeomoniella chlamydospora
Phaeoacremonium spp.
Botryosphaeriaceae spp.
Willamette Valley
Rogue Valley
0
20
40
60
80
100
Vineyards where pathogens were detected (%)

RESULTS


Pestaloptiopsis sp.
Hormonema viticola
Seimatosporium lichenicola
Truncatella angustata
Ilyonectria macrodidyma
Cryptovalsa ampelina
Phaeomoniella chlamydospora
Phaeoacremonium spp.
Botryosphaeriaceae spp.
Other trunk diseases
Black foot
Eutypa die back
Esca
Botryosphaeria die back
0
10
20
30
40
50
60
70
80
90
100
Vineyards where pathogens were detected (%)

RESULTS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Hormonema viticola
Seimatosporium lichenicola
Truncatella angustata
Ilyonectria macrodidyma
Cryptovalsa ampelina
Phaeomoniella chlamydospora
Phaeoacremonium spp.
Botryosphaeriaceae spp.
Young vines (<10 yrs)
Matured vines (>10 yrs)
0
10
20
30
40
50
60
70
80
90

Main takeaways

- *Botryosphaeriaceae* spp. and *Phaeoacremonium* spp. (Botryosphaeria die back and Esca disease, respectively) were the most prevalent pathogenic species identified in OR vineyards

- All Esca pathogens were associated with matured vines whereas Botryosphaeriaceae spp. were detected in both young and old vines.

- The youngest vines in which Botryosphaeriaceae spp. were detected were 2 years old whereas Esca were detected in 12 yrs and older vines

Understanding the timing of spore release by the most common pathogen(s) at critical stages of vine development

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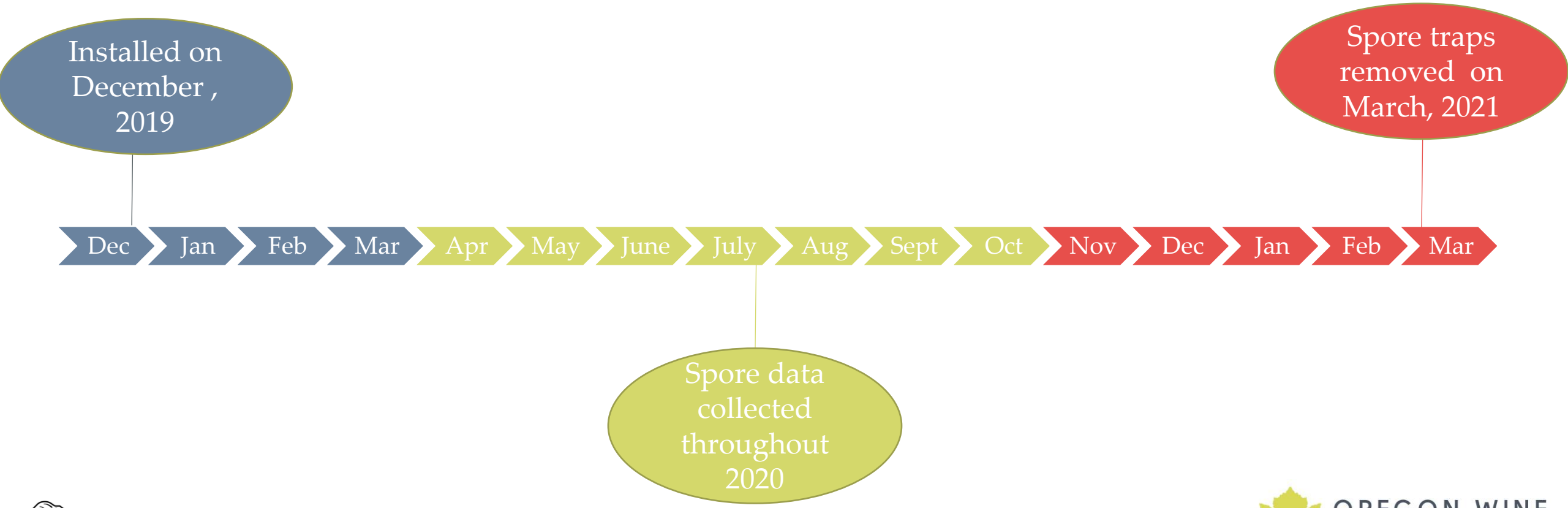
Spore trapping sites

Timeline of spore trap installation



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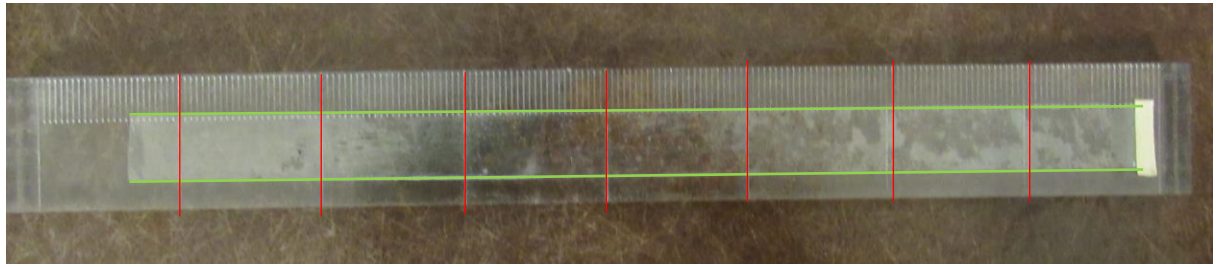
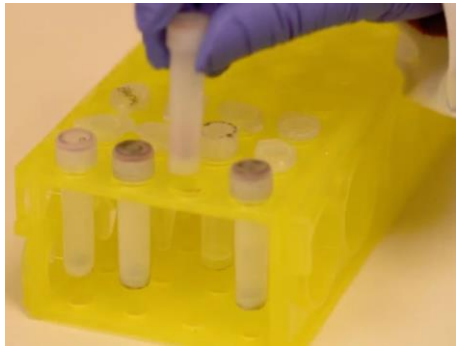
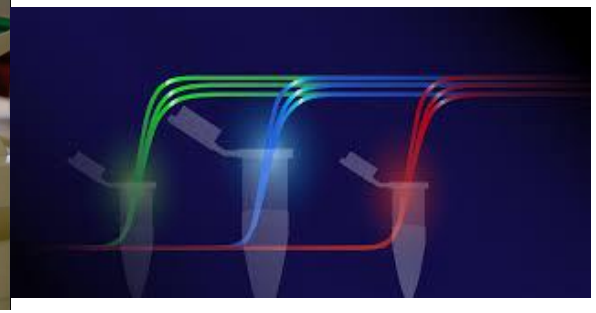
SPORE TRAPS PROCESSING AND QUANTIFICATION



DNA extraction



Botryosphaeriaceae spp. specific primers



Quantify *Botryosphaeriaceae* spp. by qPCR

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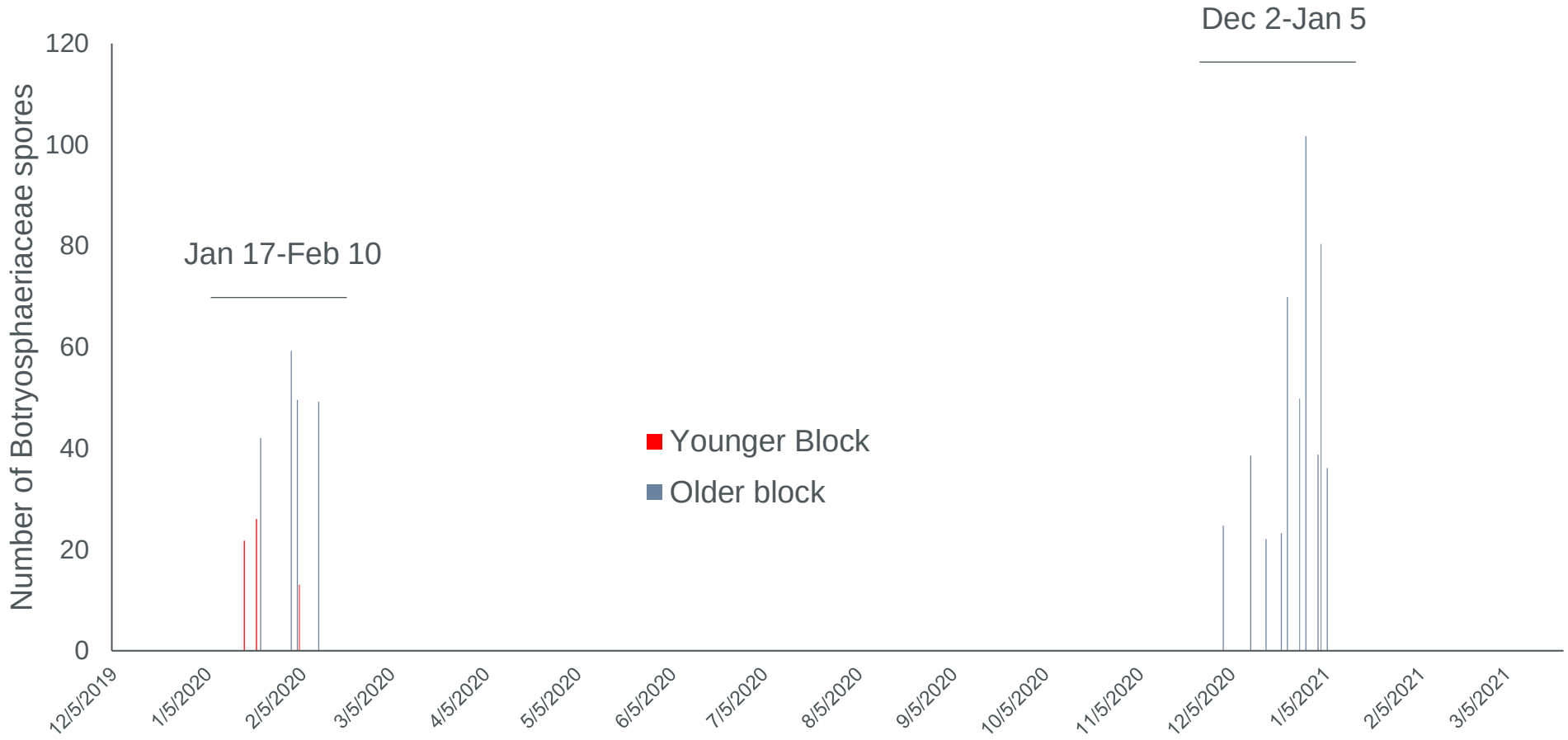
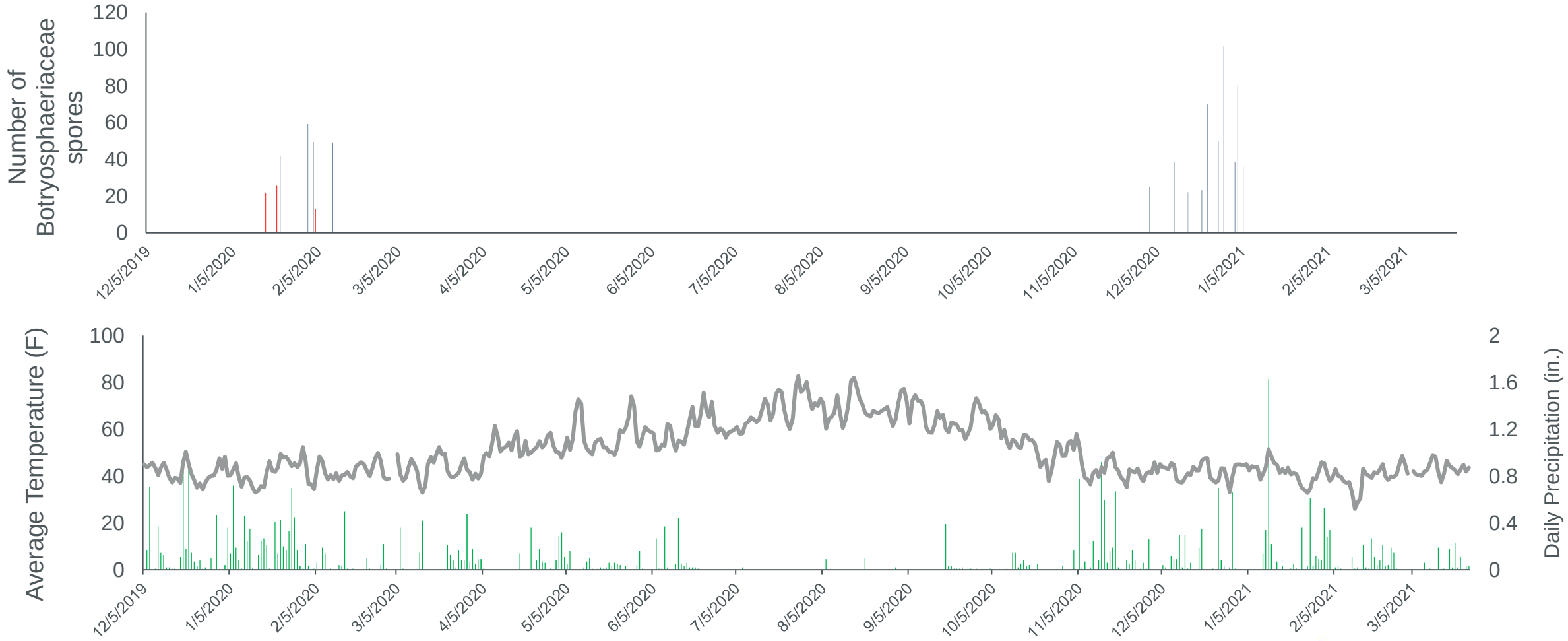
RESULTS – Willamette Valley



RESULTS – Willamette Valley



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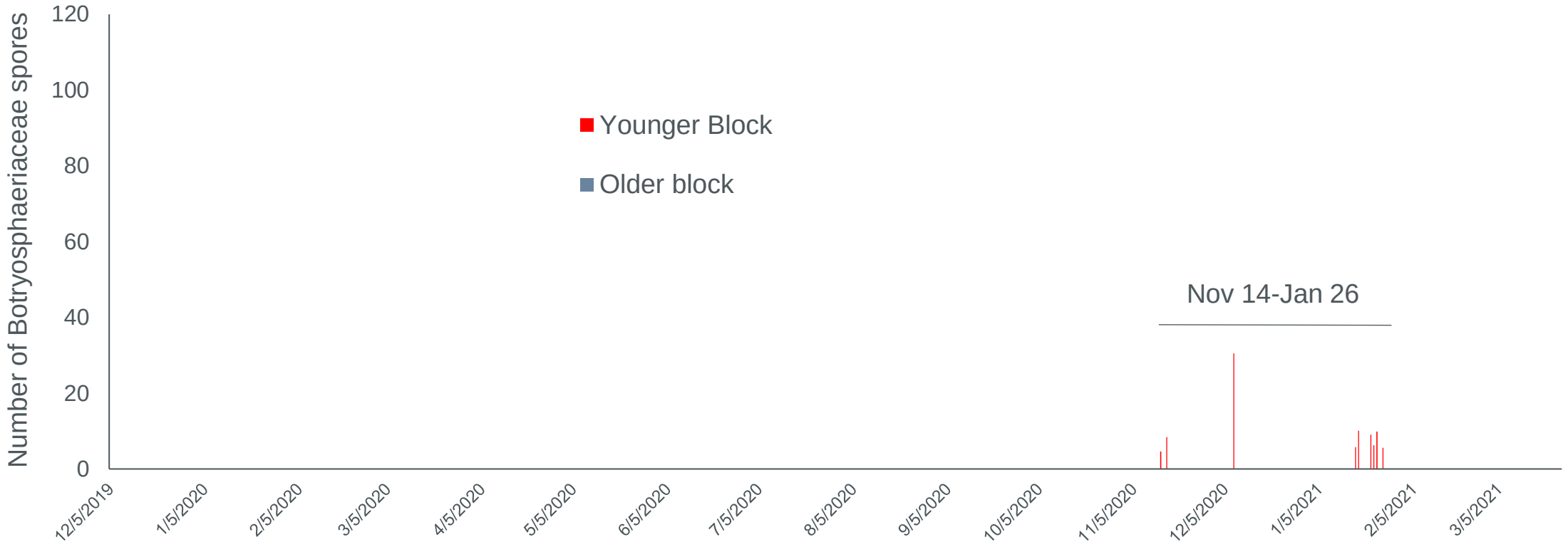
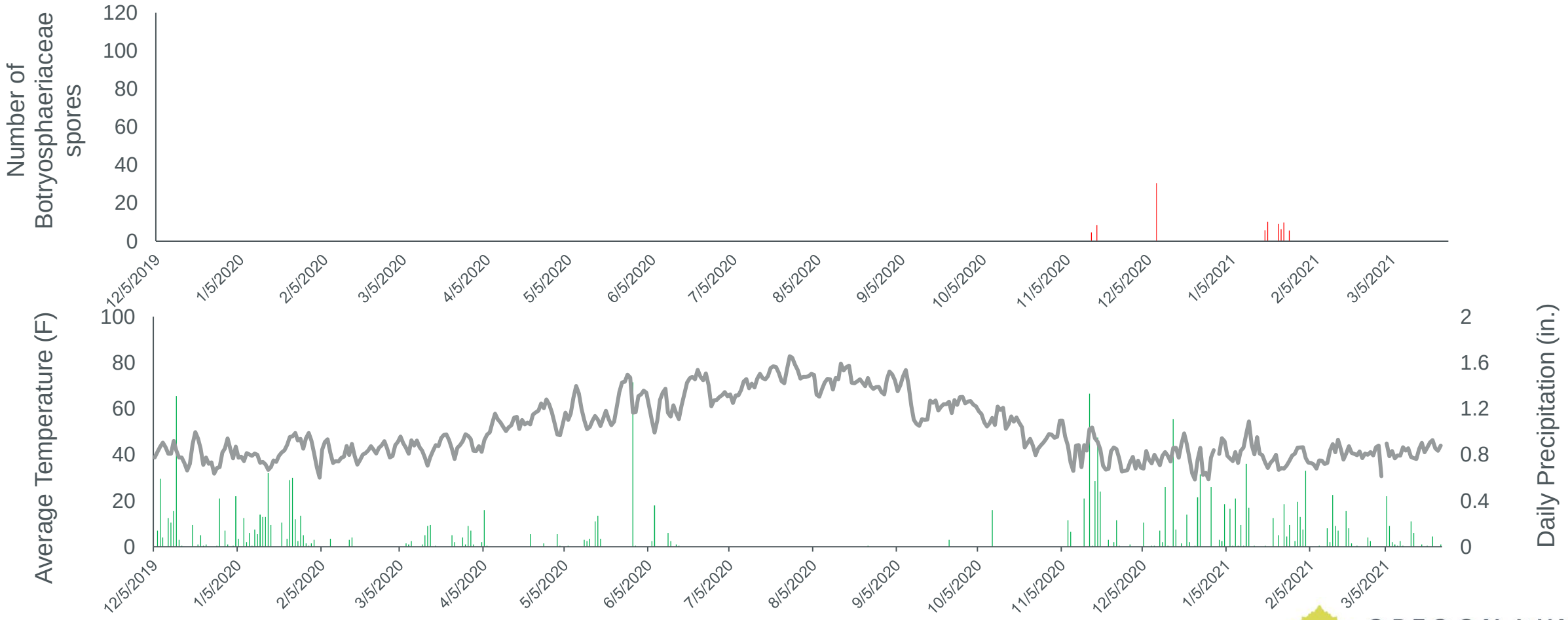
RESULTS – Applegate Valley



RESULTS – Applegate Valley



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Main takeaways

- In Willamette Valley, at the younger block, *Botryosphaeriaceae* spp. spores detection occurred between January and February. At the older block, it occurred between December and February.

- In Applegate Valley, at the younger block, *Botryosphaeriaceae* spp. spores detection occurred between November and January.

- Under favorable weather conditions, the maximum spore release of *Botryosphaeriaceae* spp. in Oregon vineyards occur between early December to Early February

Comparing the efficacy of pruning wound protection by biological control agents

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Recovery of *Trichoderma* spp.

1) Bio-Tam soil application @1 lb per acre

Bio-Tam:
Trichoderma asperellum
Trichoderma gamsii

2) Bio-Tam pruning wound application @1 lb per acre

Recovery of *Trichoderma* spp.

Bio-Tam soil application @1 lb per acre

Bio-Tam wound application @1 lb per acre

Treated brush samples were collected on the day of application (3/5/2021) and every other week until 5/6/2021

Treated wound tissue samples were collected on the day of application (2/25/2021) and every other week until 5/6/2021

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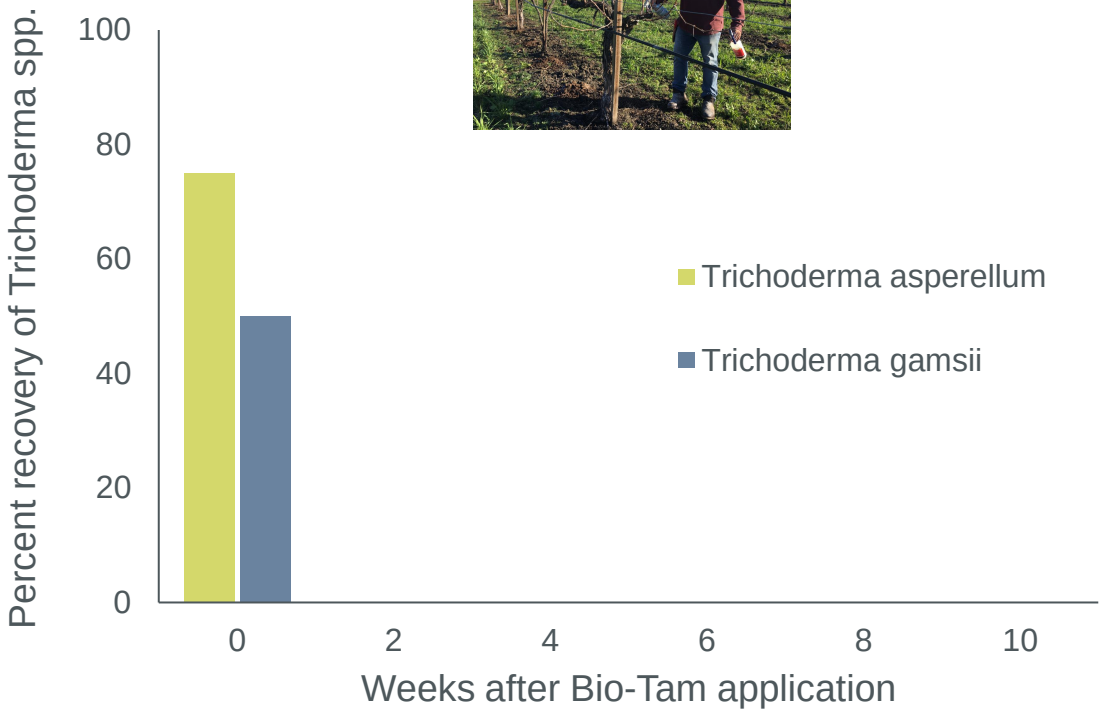
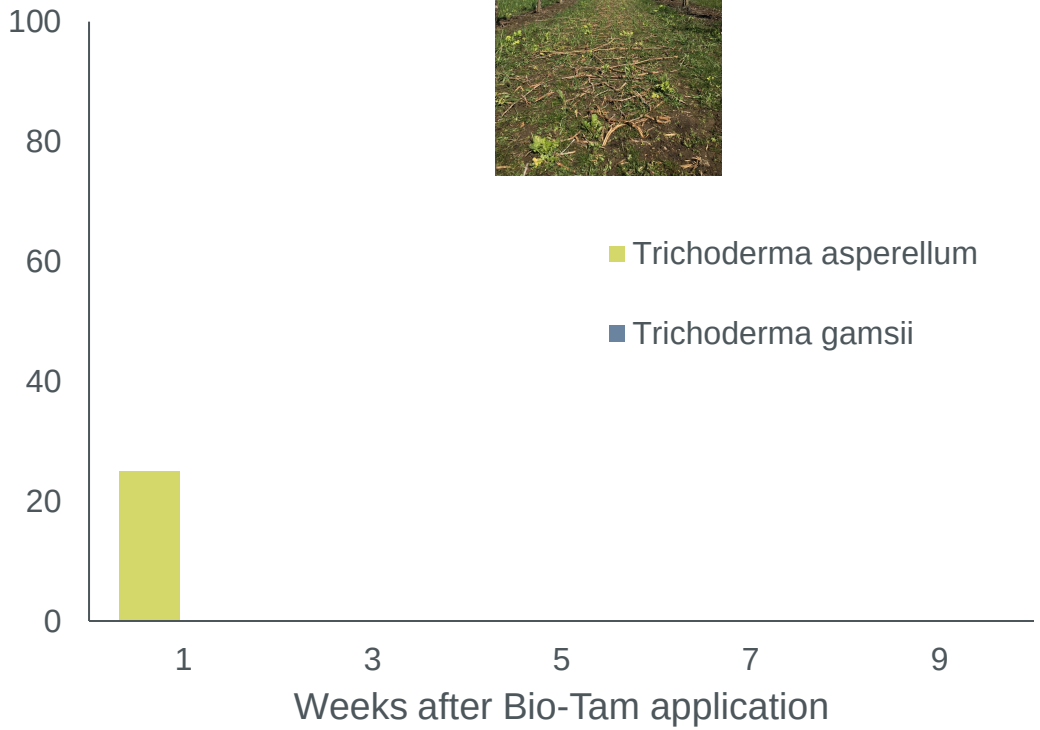
RESULTS





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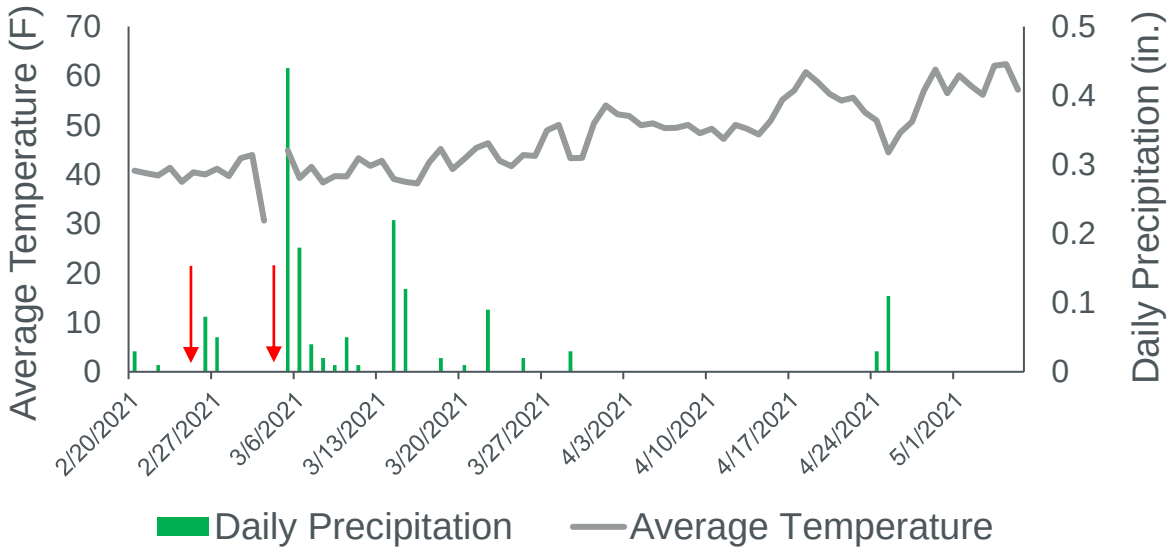
Weather and application timing



Sap flowing out of the wounds

These could have washed off the applications!!

Acknowledgement

- **Collaborators**
  - Jay Pscheidt (OSU)
  - Patty Skinkis (OSU)
  - Melodie Putnam (OSU)
  - Walt Mahaffee (USDA)
  - Leigh Bartholomew (Results partners)
  - Brynn Bradley (Results partners)
  - Jason Cole (Pacific Crest Vineyard Services)
  - Willamette Valley growers
- **SOREC plant pathology lab members**

Dr. Monica Hernandez

Quan Luong

Joseph DeShields

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