HANNAH RIVEDAL

PLANT DISEASE DIAGNOSTICIAN AND FACULTY RESEARCH ASSISTANT
DEPARTMENT OF BOTANY AND PLANT PATHOLOGY
HERMISTON AGRICULTURAL RESEARCH AND EXTENSION CENTER

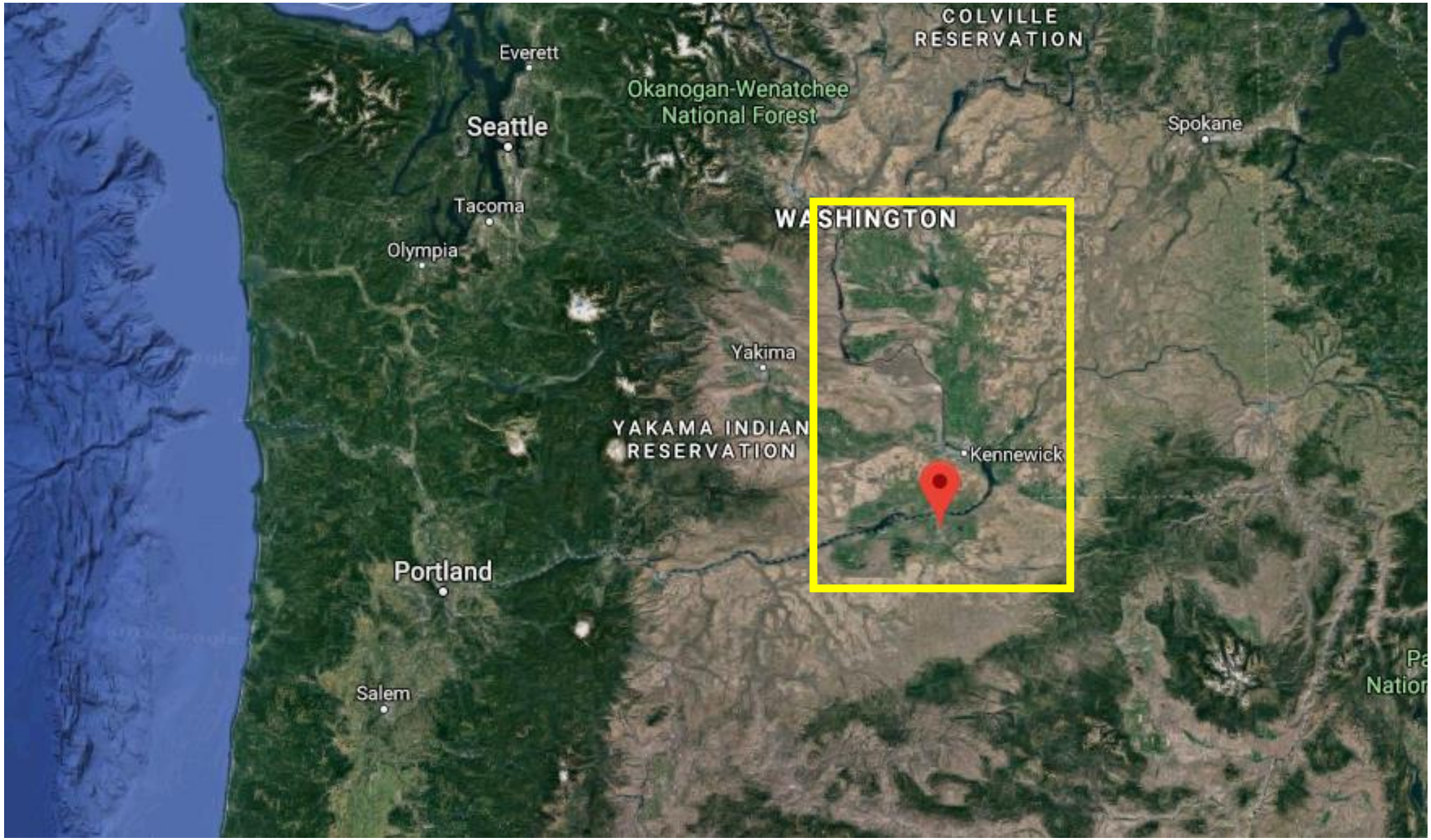
SOFT ROT SCRI UPDATE
NOV. 7-8, 2019

Oregon State University

To Discuss

Survey the diversity of soft rot causing bacteria in the Columbia Basin

Estimate economic loss associated with seed-borne infection


COLVILLE
RESERVATION
Everett
Okanogan-Wenatchee
National Forest
Seattle
Spokane
Tacoma
WASHINGTON
Olympia
Yakima
YAKAMA INDIAN
RESERVATION
Kennewick
Portland
Salem

Diversity of Soft Rot Pathogens in the Columbia Basin

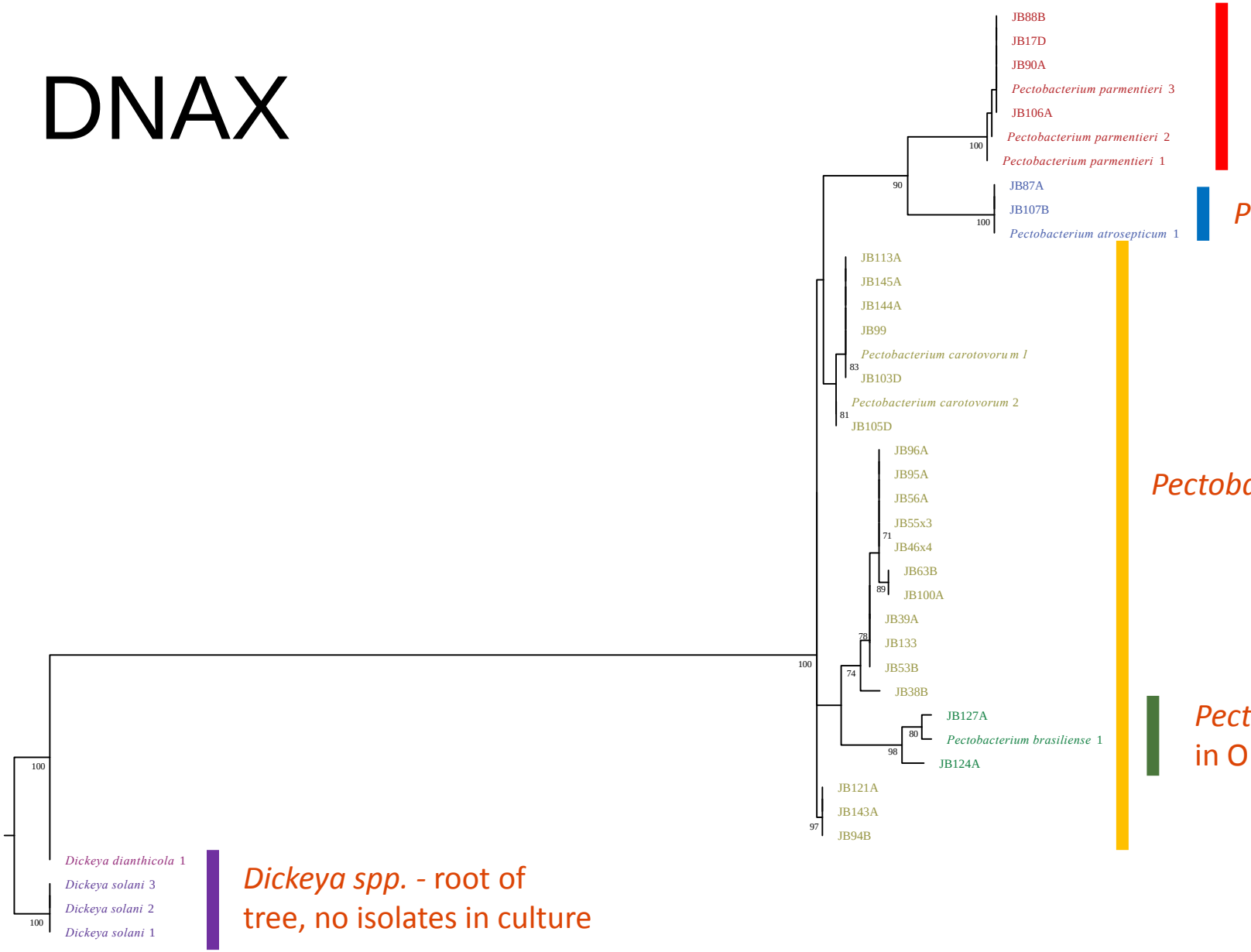
Collections from Plant Clinic, Seed Lot submissions, field visits

- 145 samples
- 51 positives via Multiplex PCR (Potrykus et al. 2014)
- Pba (23.3%), Pcc (58.3%), Dsp (6.7 %), Pp (3.3%) and Unknown Pb (1.7%)
- Multiple bacterial species from same sample (i.e. tuber, stem, etc.) Pcc + Pba (2.0%), Pba + Dsp (2.0%), Pcc + Dsp (2.0%), and Pba + Pcc + Dsp (2.0%)

28 isolates in culture

- Additional verification of identity with sequencing of
  - PelY
  - DNAX

DNAX



Pectobacterium parmentieri - 4 isolates, new in OR

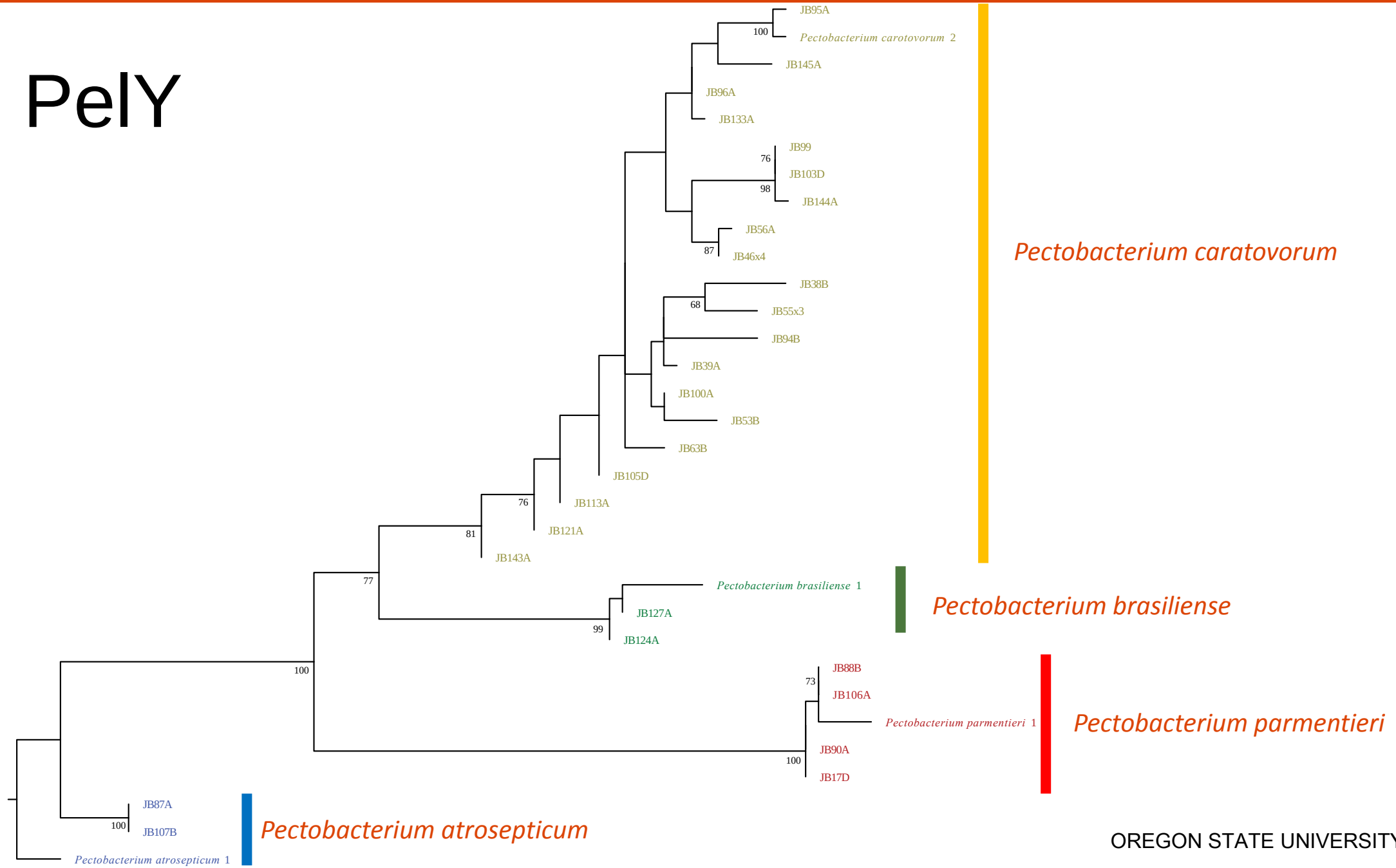
Pectobacterium atrosepticum - 2 isolates

Pectobacterium caratovorum - 20 isolates

Pectobacterium brasiliense - 2 isolates, new in OR

Dickeya spp. - root of tree, no isolates in culture

PelY


JB95A
100
Pectobacterium carotovorum 2
JB145A
JB96A
JB133A
JB99
76
JB103D
98
JB144A
JB56A
87
JB46x4
JB38B
68
JB55x3
JB94B
JB39A
JB100A
JB53B
JB63B
JB105D
76
JB113A
81
JB121A
JB143A
77
Pectobacterium brasiliense 1
JB127A
99
JB124A
100
JB88B
73
JB106A
Pectobacterium parmentieri 1
JB90A
100
JB17D
JB87A
100
JB107B
Pectobacterium atrosepticum 1
Pectobacterium caratovorum
Pectobacterium brasiliense
Pectobacterium parmentieri
Pectobacterium atrosepticum

Diversity of Soft Rot Pathogens in the Columbia Basin

Takeaways

- *Dickeya spp.* are rare in the Columbia Basin and often detected with other soft rot species (i.e. 1/4 of our Dsp detections was Dsp alone)
- New finds
  - *P. parmentieri* - First Report
  - *P. brasiliense*

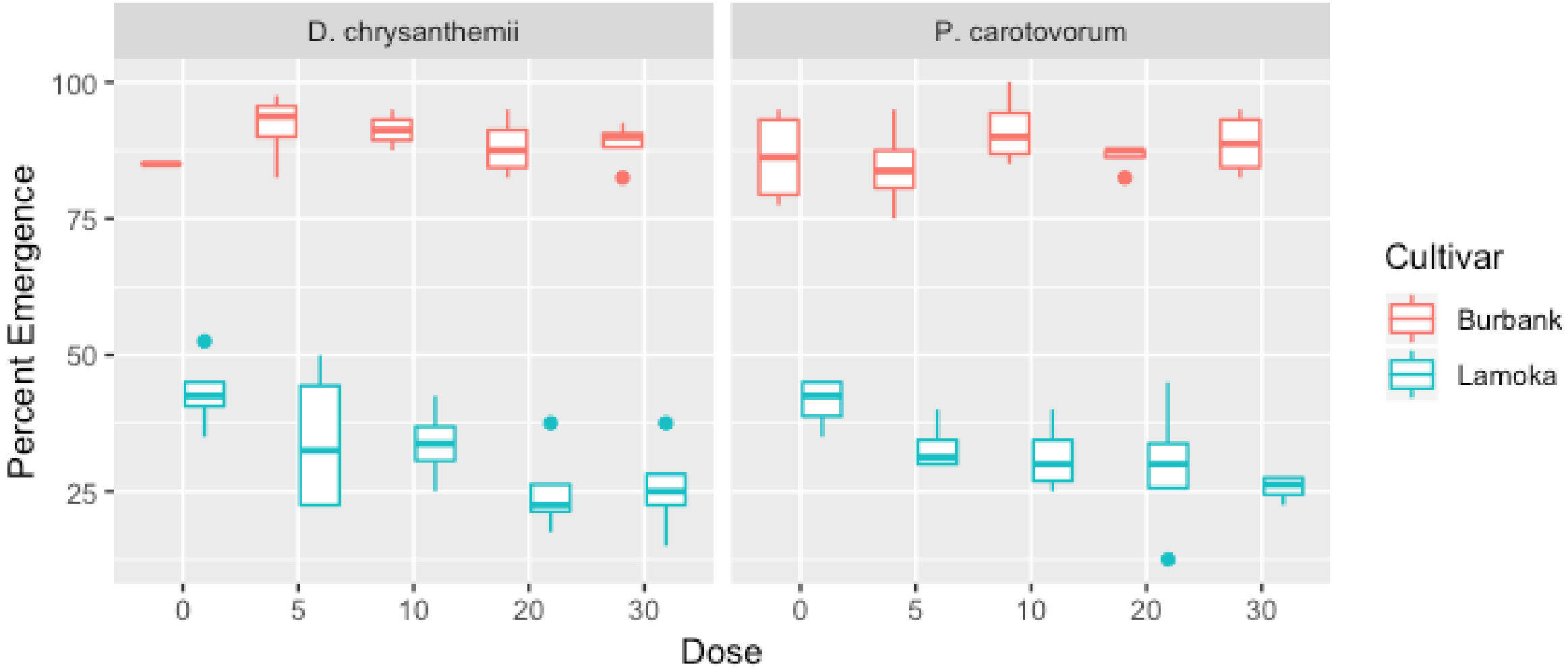
Future Directions

- Pathogenicity testing
  - Potato, other rotation crops
- Whole genome sequencing, diagnostics by sequencing ?
  - Is this a possibility?

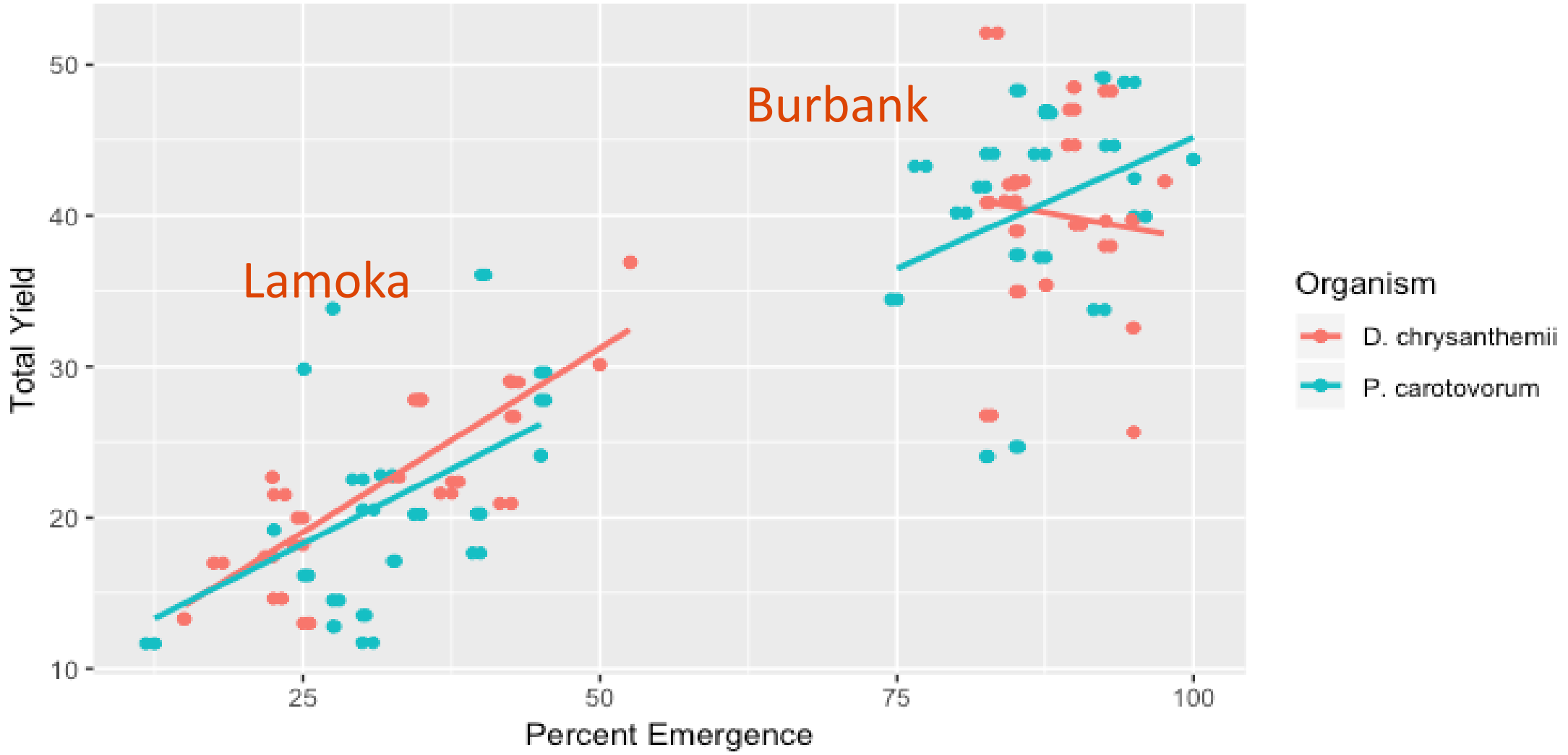
Economic Losses associated with Soft Rot Inoculum

- Var. Lamoka and Russet Burbank
- Vacuum infiltrated to inoculate
- Treatments created including 70, 80, 90, 95, and 100 % clean seed
- Rows were opened with Admire, Ridomil, and Quadris in-furrow and experiment was hand planted and rows closed

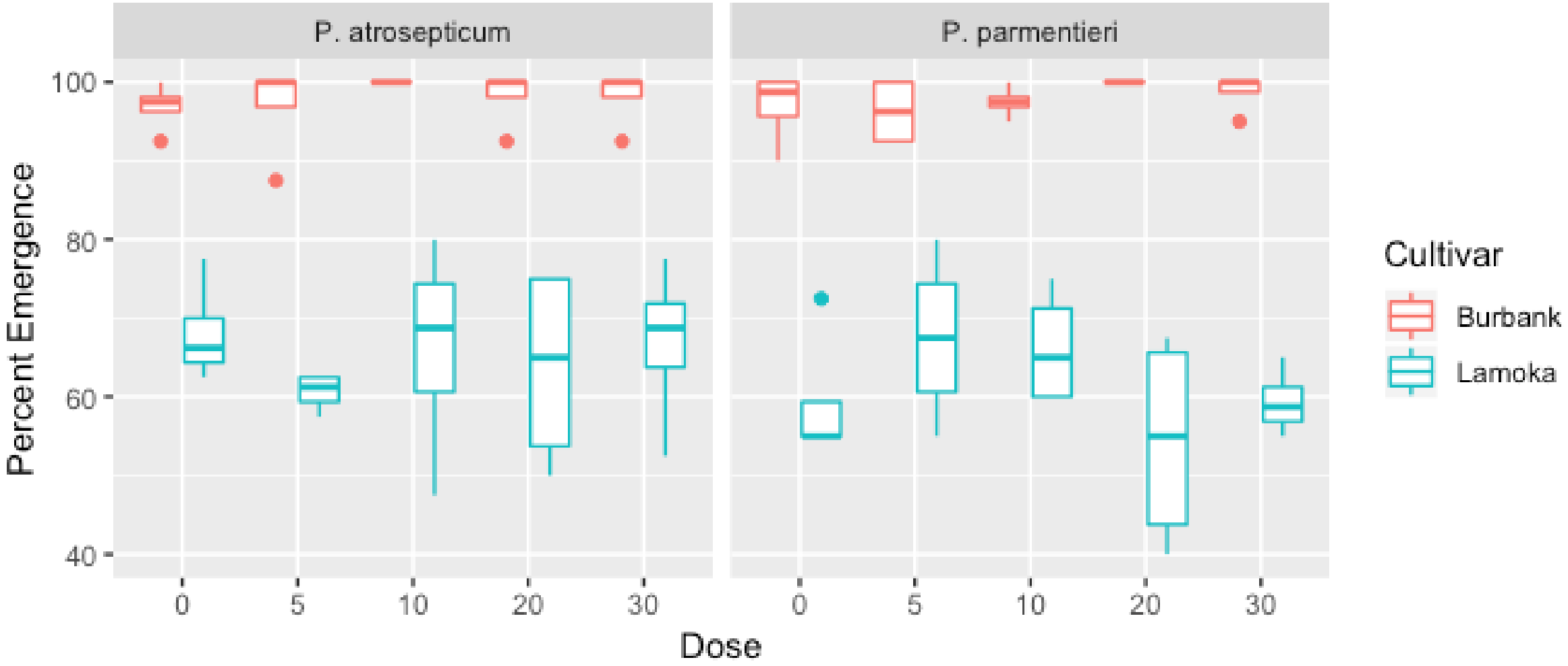
2018 final emergence compared to dosage



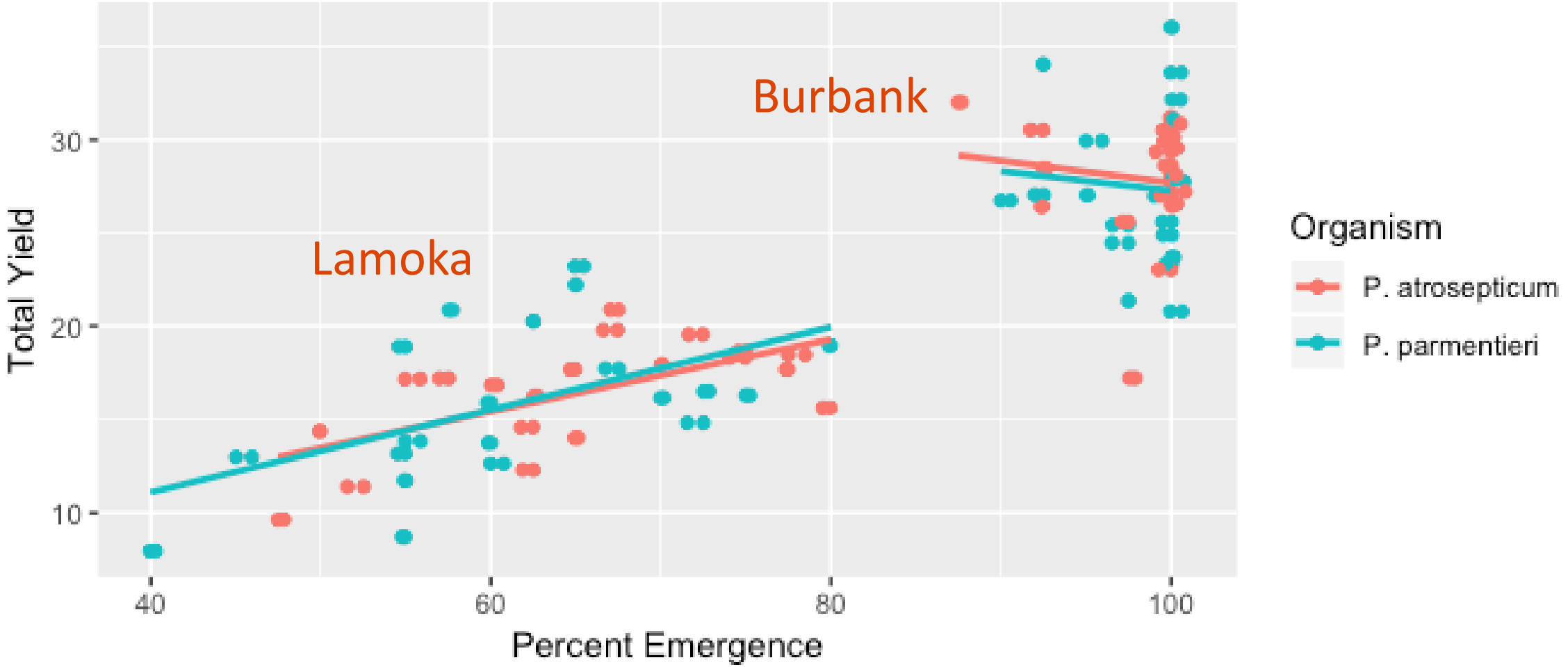
2018 yield compared to emergence



2019 final emergence compared to dosage



2019 yield compared to emergence



Economic Losses associated with Soft Rot Inoculum

Takeaways (at least in the Columbia Basin)

- Blackleg was observed in 2018, at a very low incidence (i.e. 2 plants total in the experiment), and was not observed in 2019
- Increased bacterial infection in the seed (Higher dosage) → Lower emergence
- Lower emergence → Lower yield (and likely skewed the size distribution but we have not analyzed that yet)
- Lamoka (susceptible variety) is not widely grown in PNW, variety tends to rot after planting if not adequately suberized