Apr 5th, 2:15 PM - 2:30 PM

Tipping the balance: the impact of eelgrass wasting disease in a changing ocean

Morgan Eisenlord
Cornell University, me367@cornell.edu

Colleen Amy Burge
University of Maryland at Baltimore, colleenb@umbc.edu

Phoebe D. Dawkins
Cornell University, pd298@cornell.edu

Reyn Yoshioka
University of Oregon, rmy@uoregon.edu

Tyler Tran
Western Washington University, tyler.tran@wwu.edu

See next page for additional authors

Speaker
Morgan Eisenlord, Colleen Amy Burge, Phoebe D. Dawkins, Reyn Yoshioka, Tyler Tran, Natalie Rivlin, Miranda Winningham, Clio Jensen, Kathy Van Alstyne, and Drew Harvell

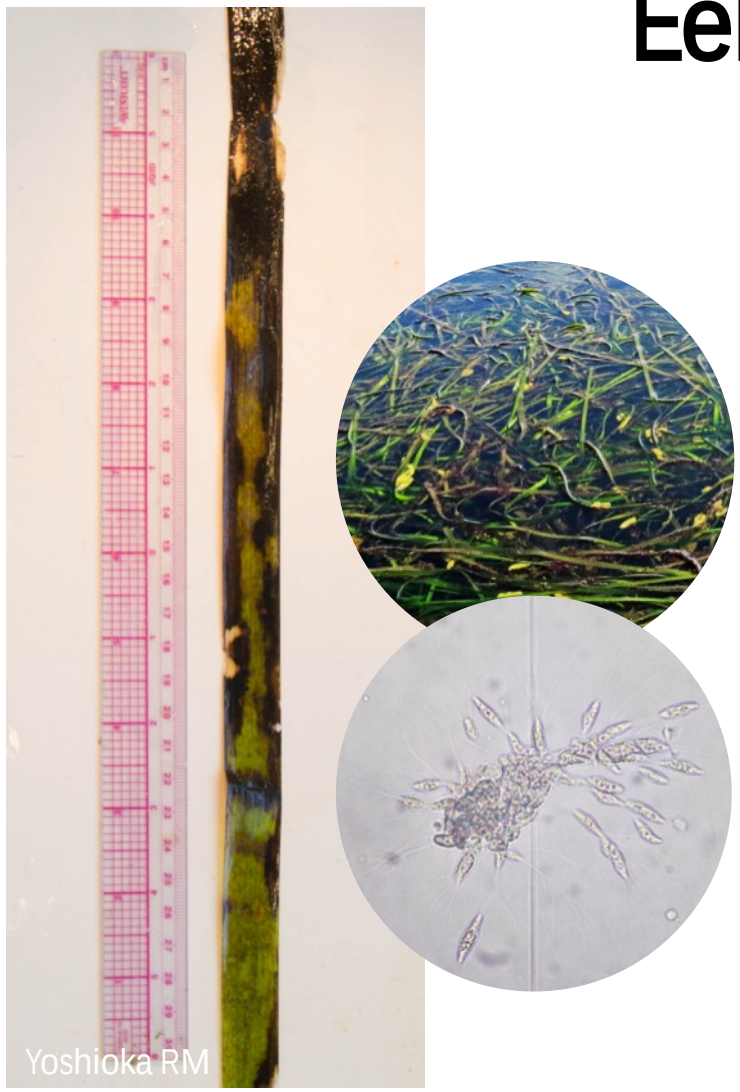
Tipping the balance: the impact of eelgrass wasting disease in a changing ocean

Salish Sea Ecosystem Conference
April 5, 2018

Morgan Eisenlord[1,2], Colleen Burge[3], Phoebe Dawkins[1], Reyn Yoshioka[4], Tyler Tran[5], Natalie Rivlin[3], Miranda Winningham[1], Clio Jensen[2,6], Kathy Van Alstyne[5], Drew Harvell[1]

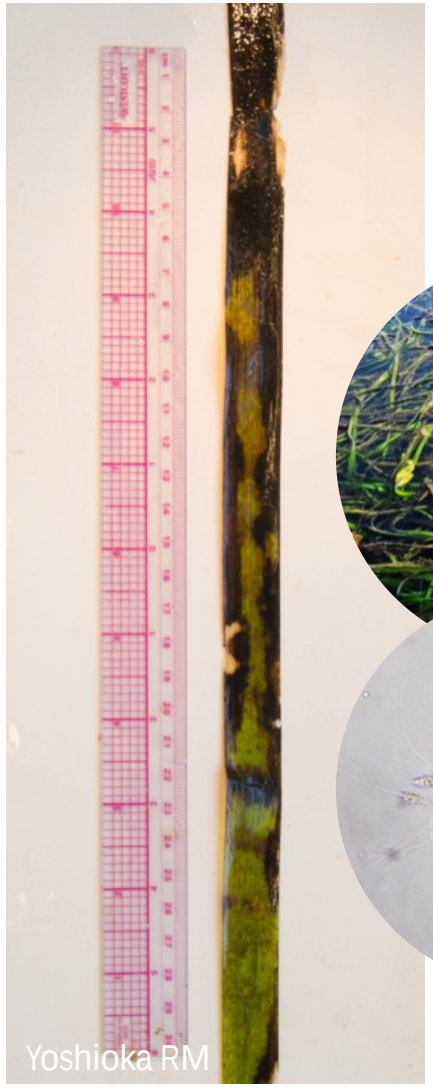
[1]Cornell University; [2]Friday Harbor Lab, UW; [3]Institue of Marine Environmental Technology, UMBC; [4]Oregon Institute of Marine Biology, UO; [5]Shannon Point Marine Center, WWU; [6]Bryn Mawr College

Eelgrass Wasting Disease

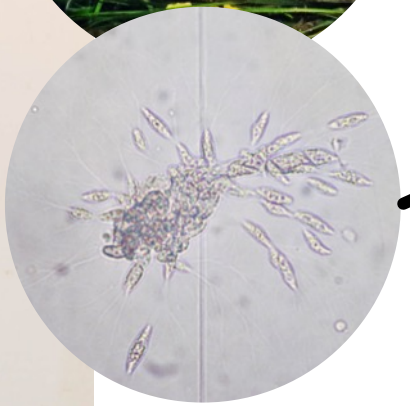


- Widespread, common disease
- Does not necessarily kill host*
- Affects a vital temperate foundation species
- Incredibly tractable marine disease system

Eelgrass Wasting Disease: The Players



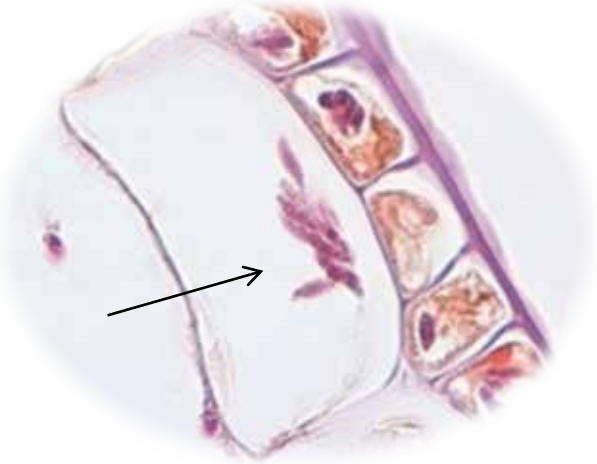
Host: **Eelgrass**
Zostera marina



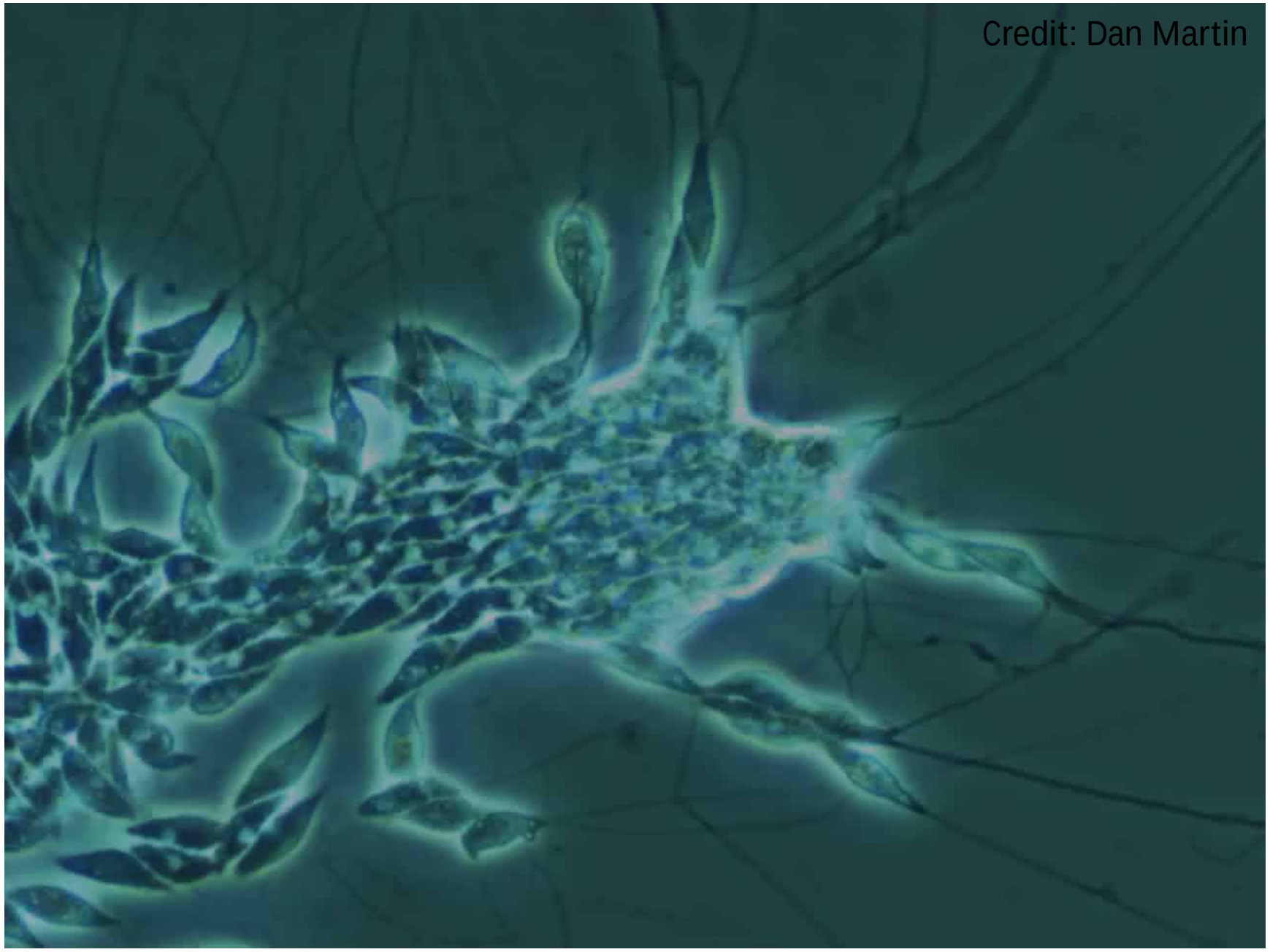
Pathogen: ***Lz***
Labyrinthula zosterae
Porter & Muehlstein

of

Zostera marina



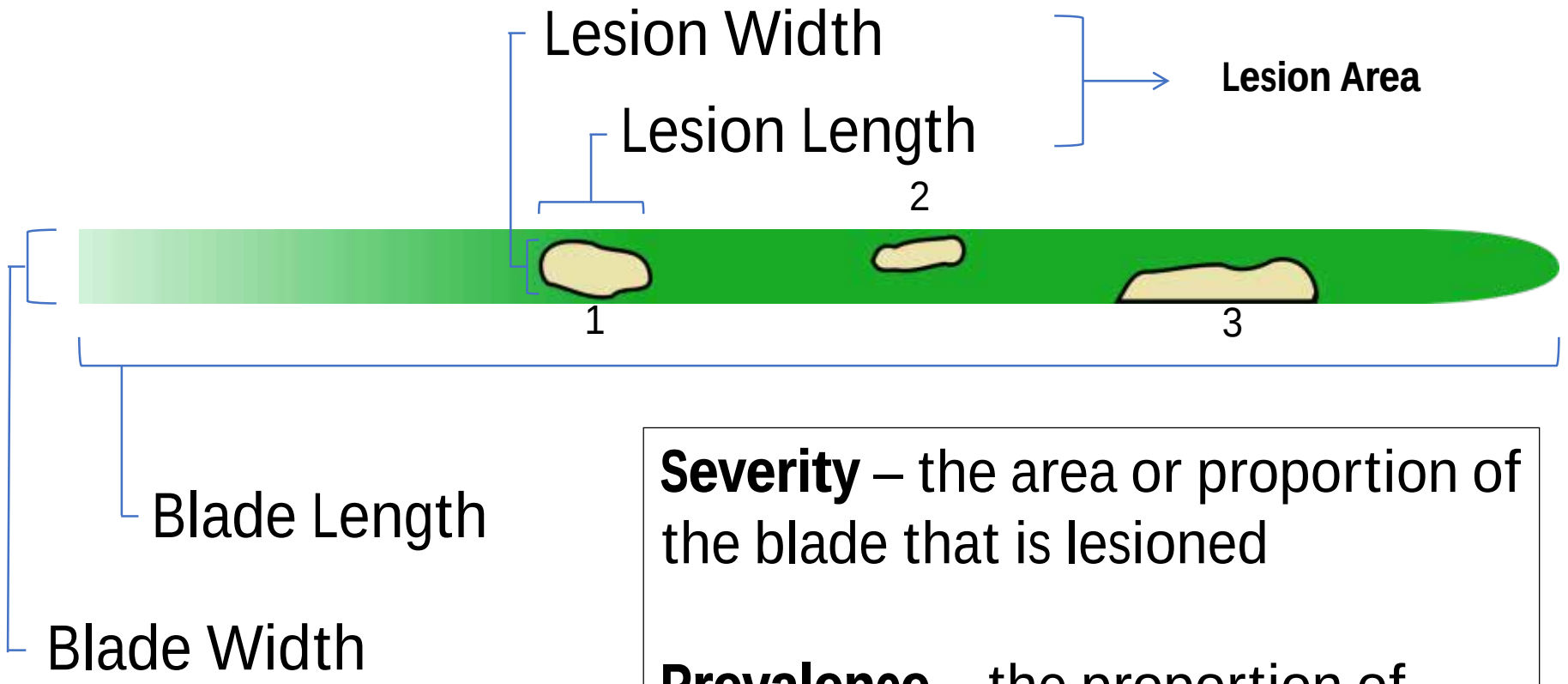
Labyrinthula zosterae



Research Questions

- What is the prevalence and severity of eelgrass wasting disease in the Pacific Northwest?
- What biotic and abiotic factor drive *Labyrinthula zosterae* virulence*?*
- How does eelgrass wasting disease impact *Z. marina* health*?*

Scoring Eelgrass for Disease…

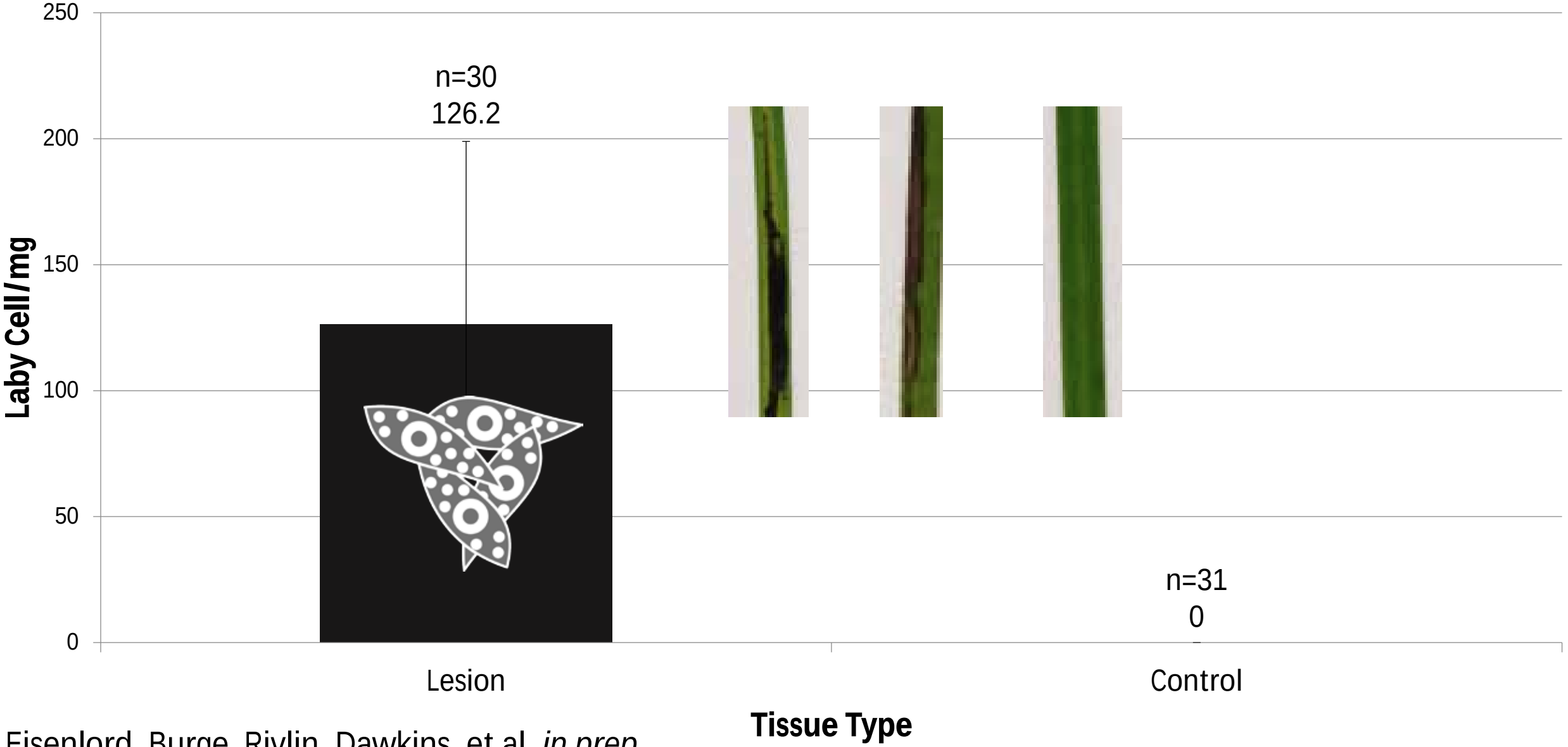


Severity – the area or proportion of the blade that is lesioned

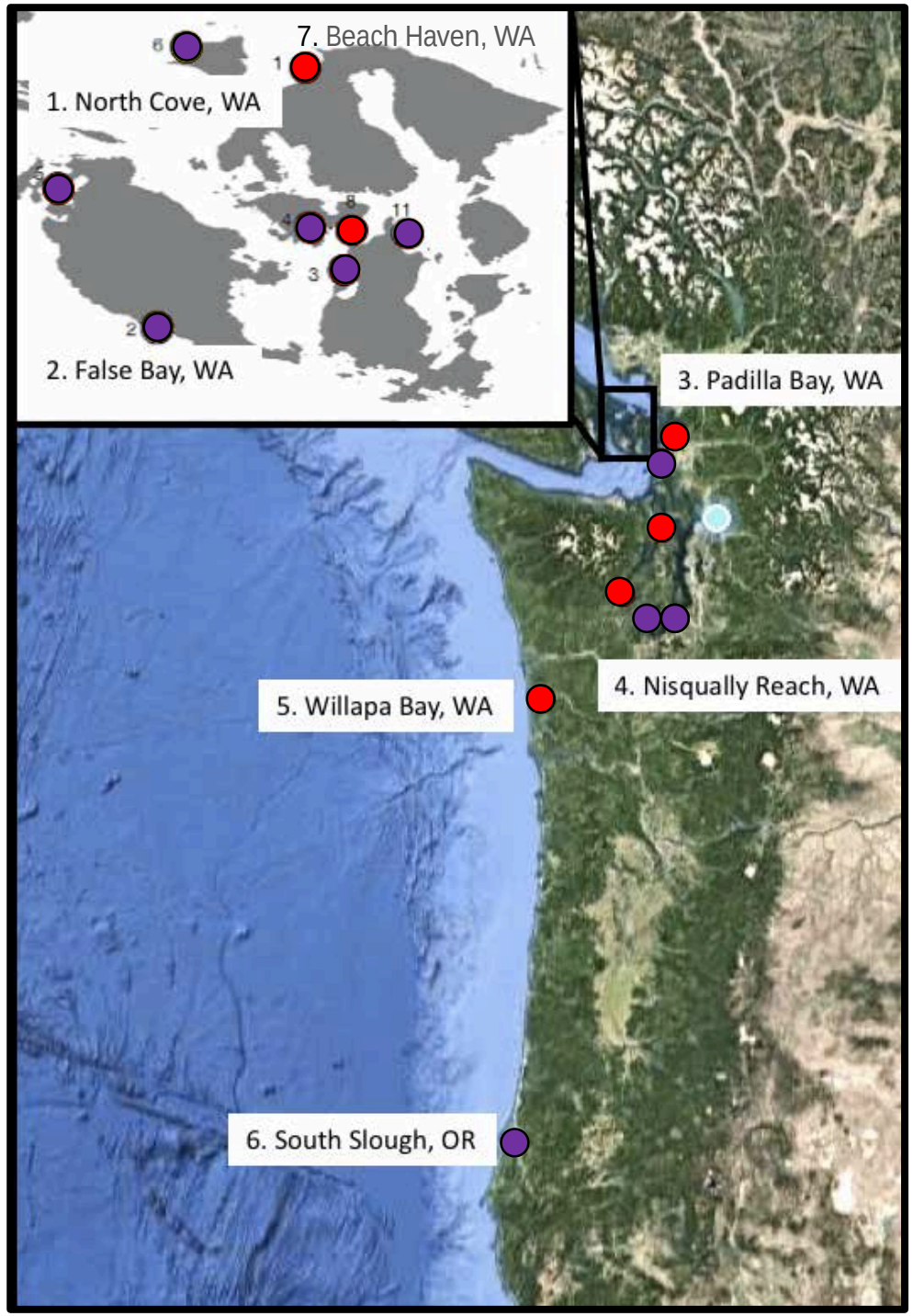
Prevalence – the proportion of blades that have a lesion

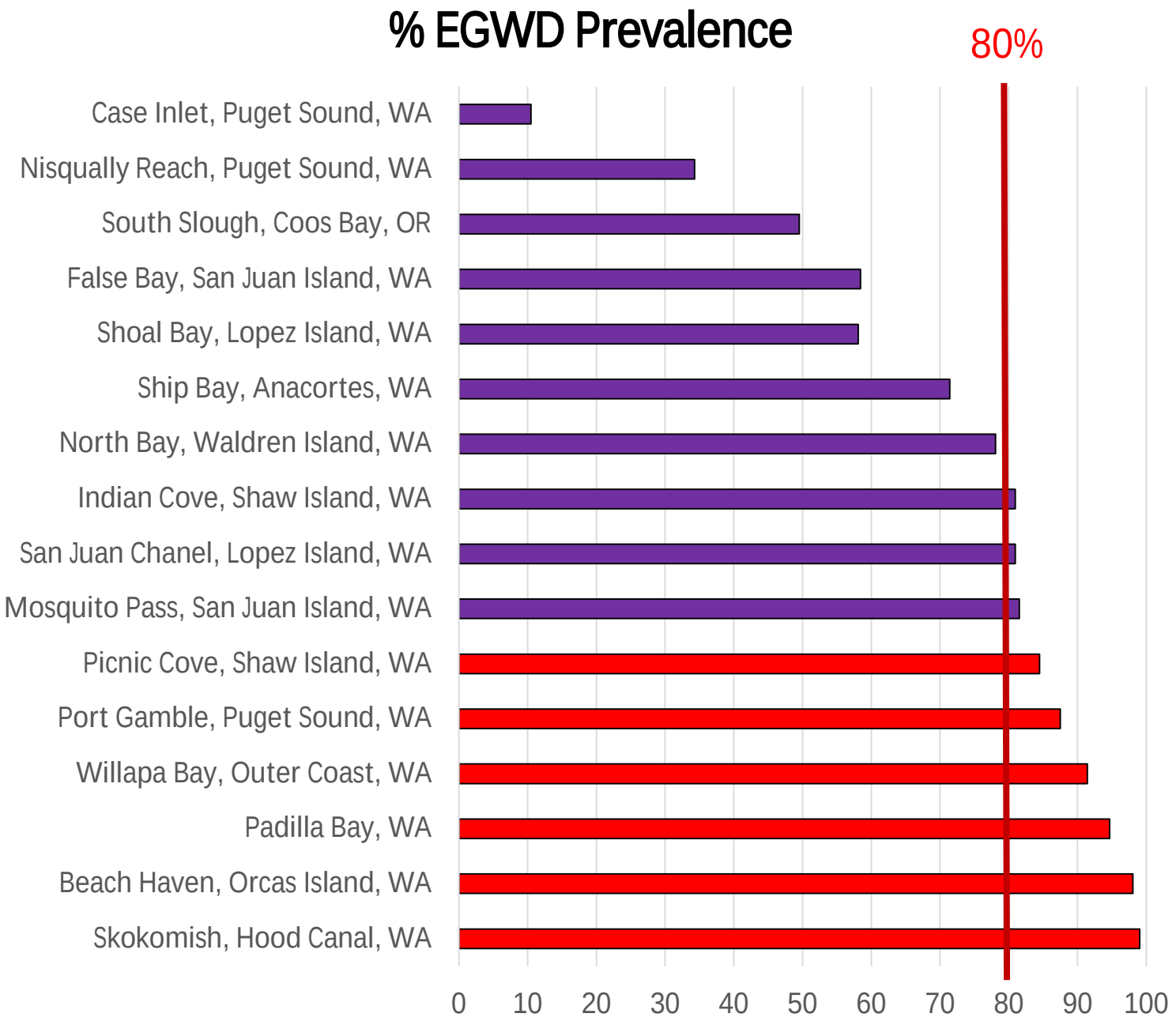
Figure: Reyn Yoshioka

Quantitative PCR of *Labyrinthula zosterae:* pathogen cells/mg



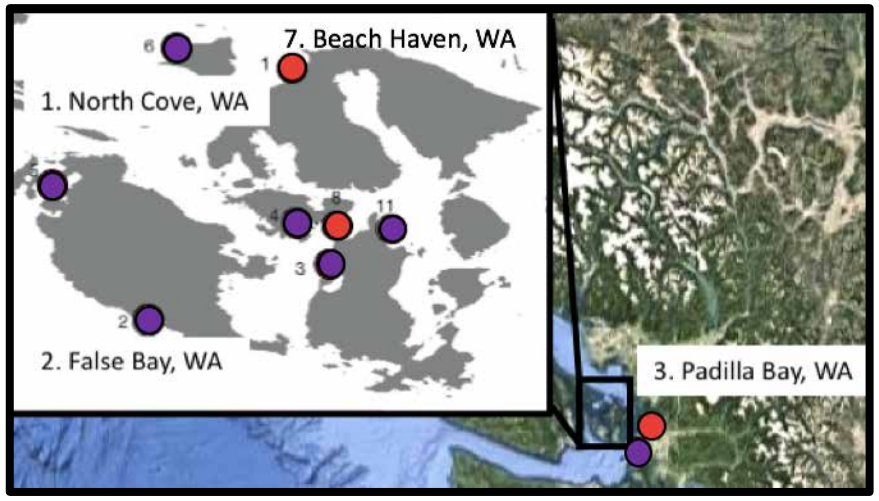
Eisenlord, Burge, Rivlin, Dawkins, et al. *in prep*

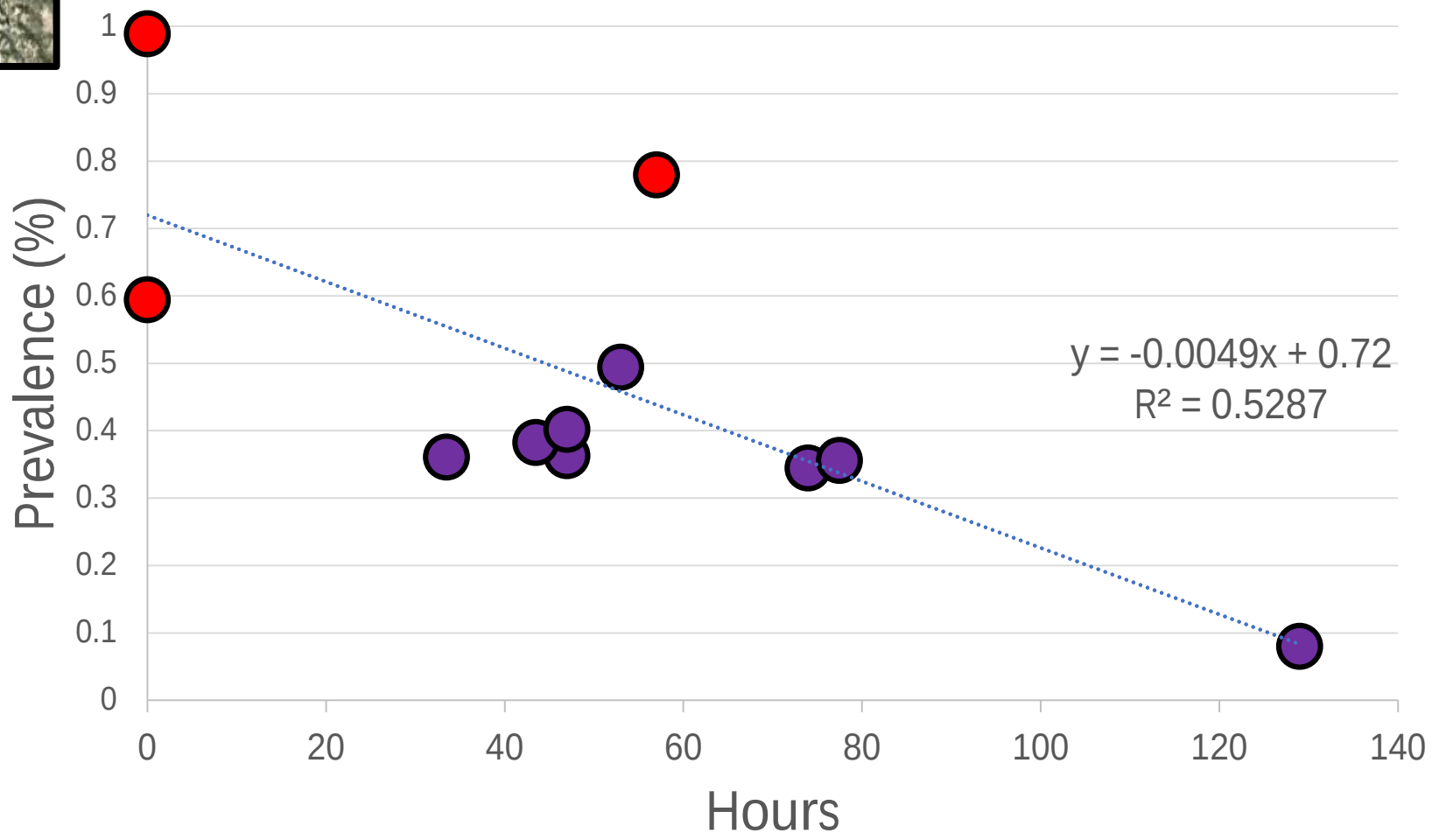




Eisenlord, Yoshioka, et al. *in prep*

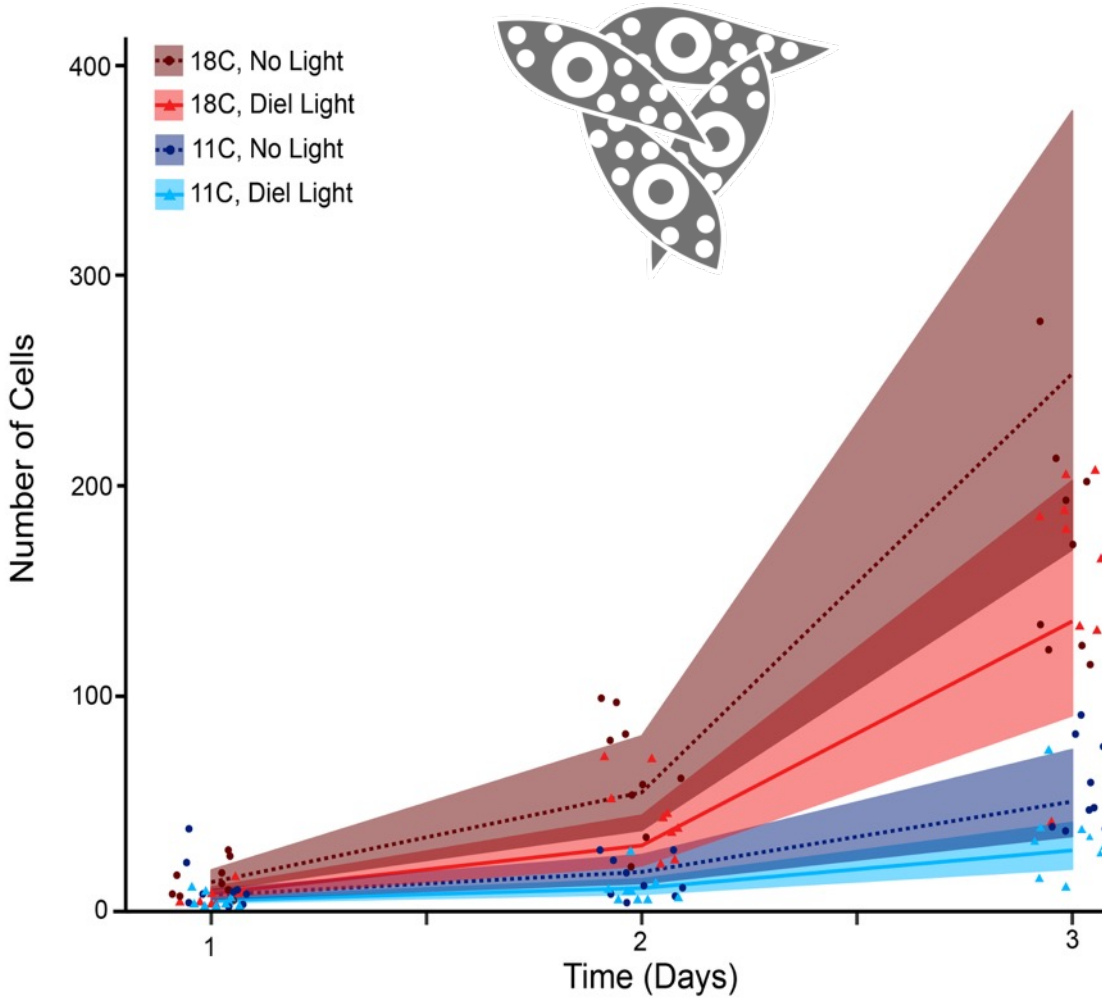
Hours spent under 11C during June and July decreased EGWD disease prevalence and severity in the wild



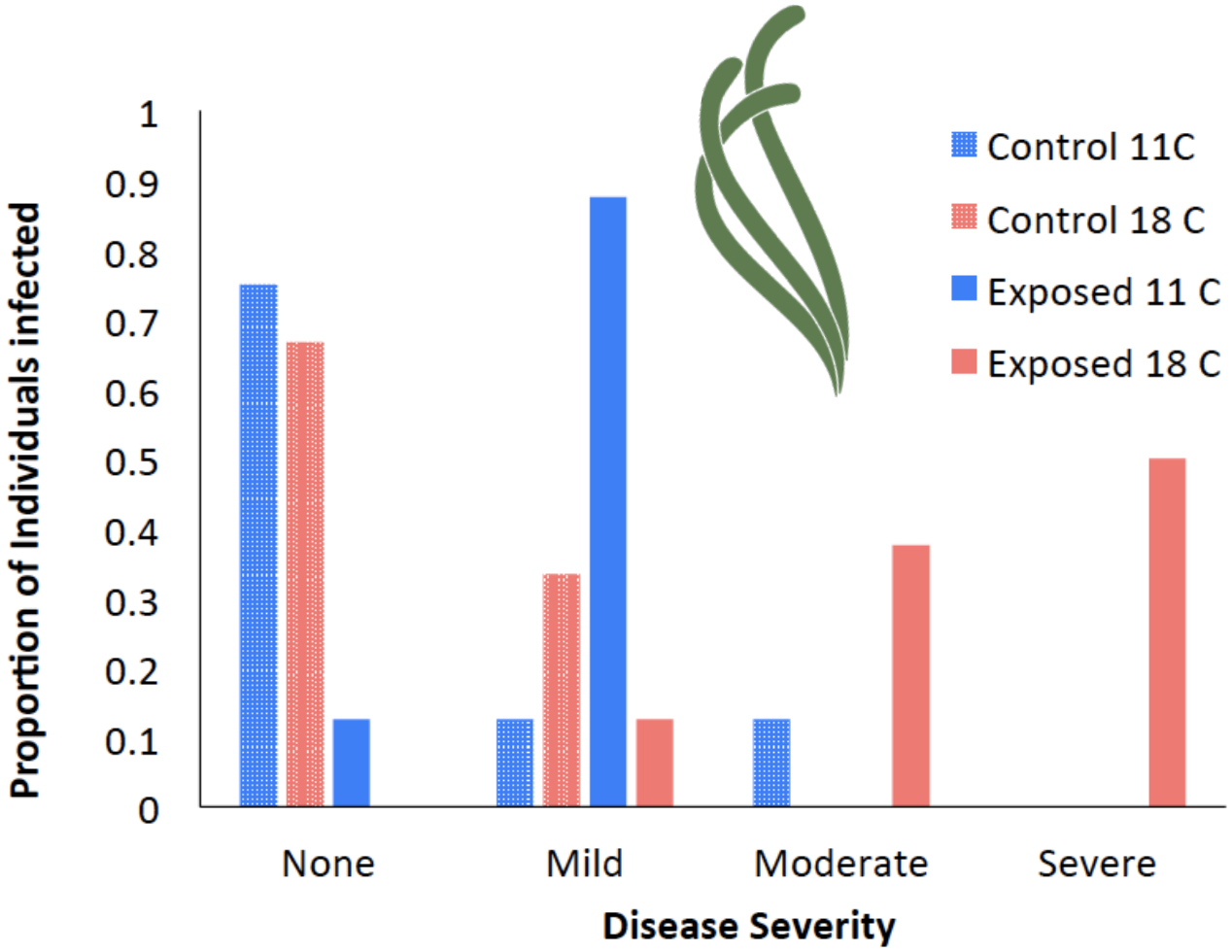


Eisenlord, Yoshioka et al., *in prep*

In lab studies, Labyrinthula zosterae cell growth and virulence is moderated at 11C



Dawkins, Eisenlord, Winningham et al. *in revision*



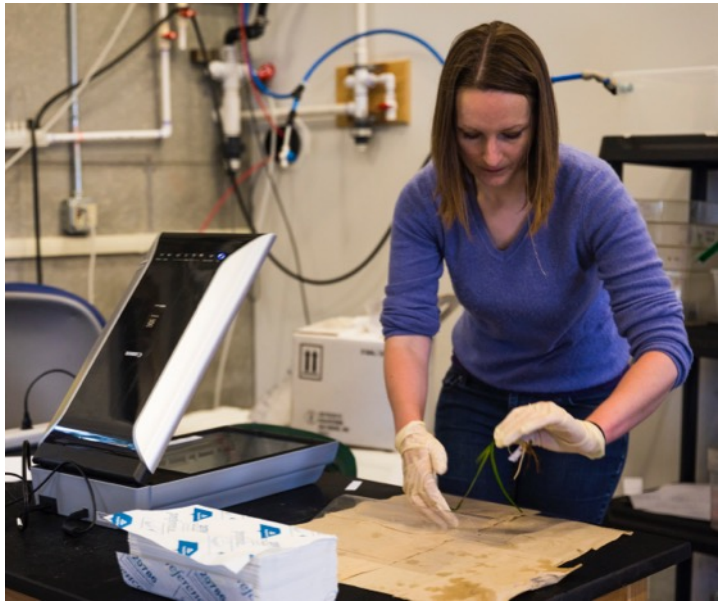
Groner, Eisenlord, Burge, et al. *in prep*

Impact of LZ infection on *Z. marina* growth and phenol production

- Mesocosm experiment conducted in experimental units in the University of Washington Friday Harbor Lab's ocean acidification lab

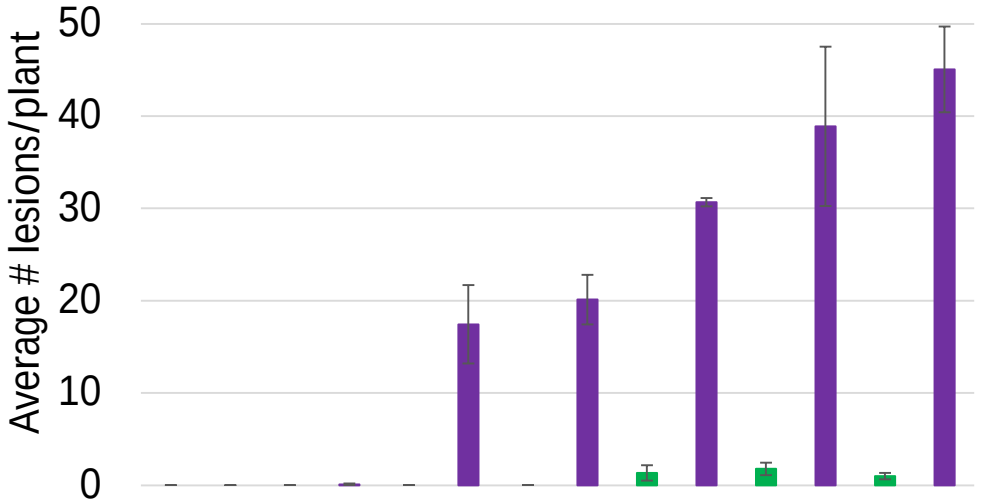
- Wild-collected *Z. marina* kept in 11° C flow through, filtered sea water for 20 days. Half individuals exposed to $1*10^4$ cells/ ml *L. zosterae* for 24 hours (N=144)

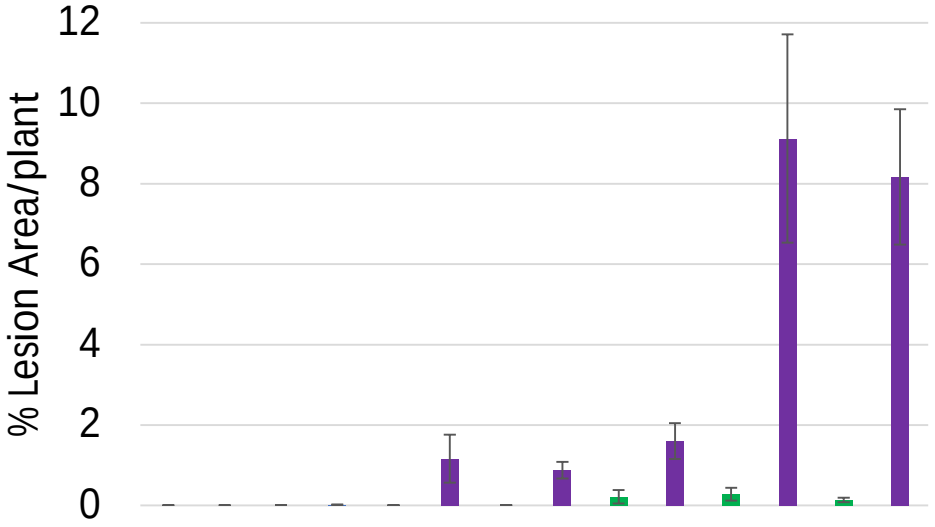
- Shoots sampled at 7 time points after initial exposure: 4 hours, 24 hours, 48 hours, 3 days, 6 days, 12 days, 20 days



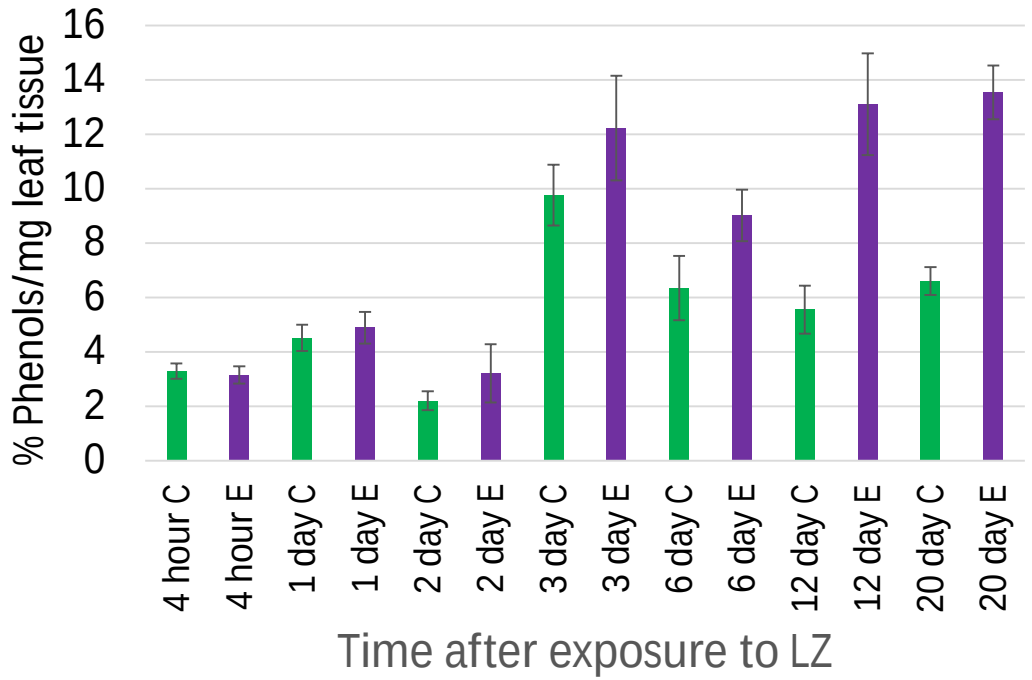
Exposed

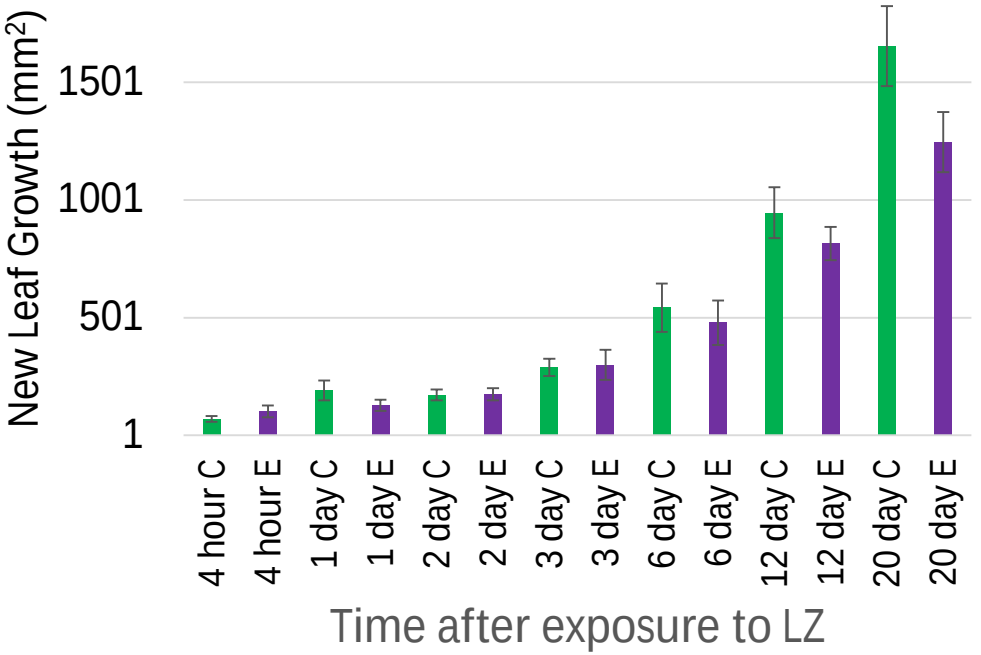
Control



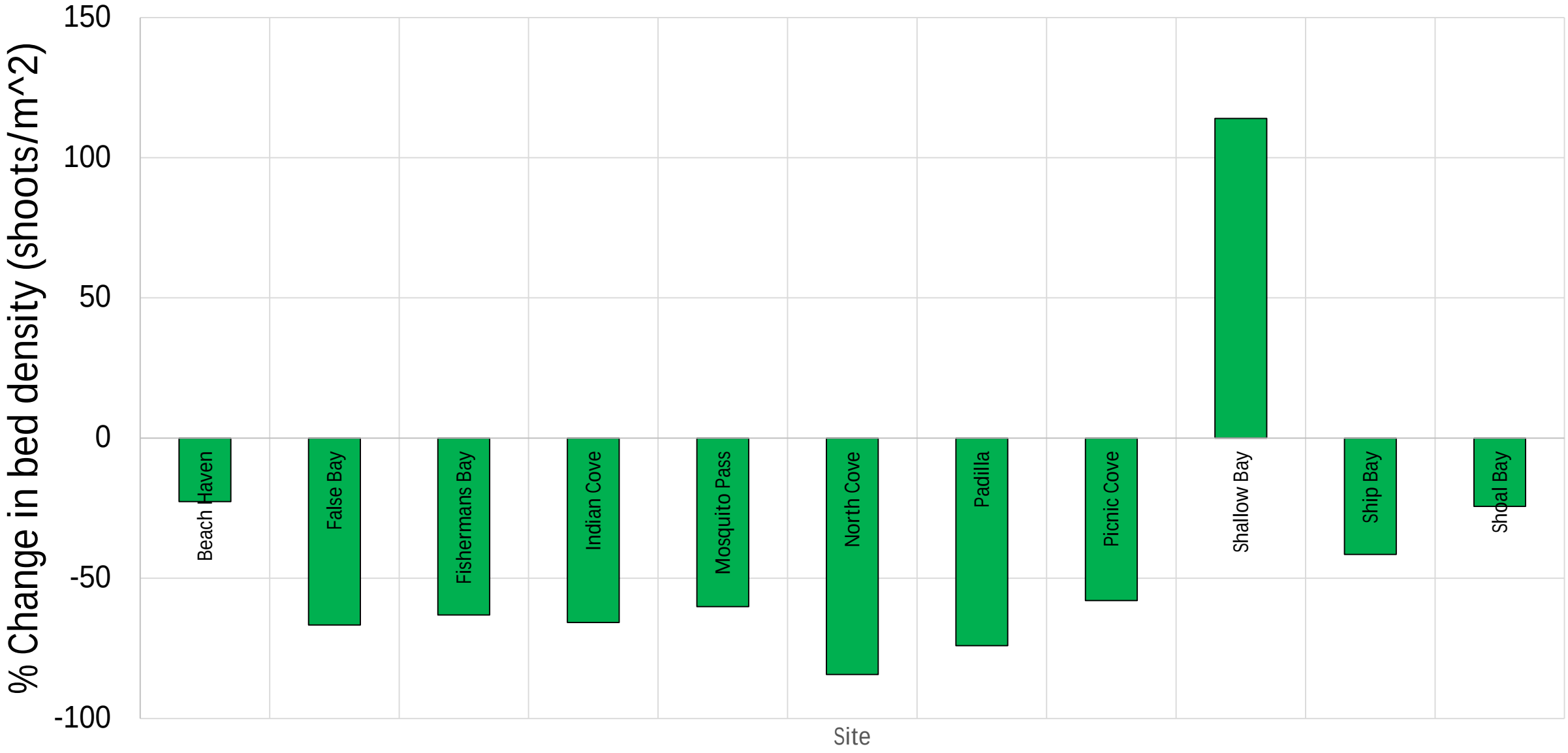


Eisenlord et al. *in prep*





% Change in bed density 2013-2015



Conclusions to date...

- Eelgrass wasting disease is widespread in pacific northwest eelgrass beds - found at every site surveyed

- High variation in eelgrass wasting disease impact between sites – but ~3rd of surveyed sites had >80% prevalence

- Evidence of a low temperature threshold moderating infectivity and virulence

- Lab experiment shows infection reduces shoot growth and increases phenols

Thank you!

Drew Harvell

Colleen Burge

Natalie Rivlin

Allison Tracy

Miranda Winningham, Olivia Graham, Francesca Giammona, Evan Fiorenza, Morgan Eisenlord, Bella Bledsoe, Maya Groner, Phoebe Dawkins, Reyn Yoshioka, Clio Jensen

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