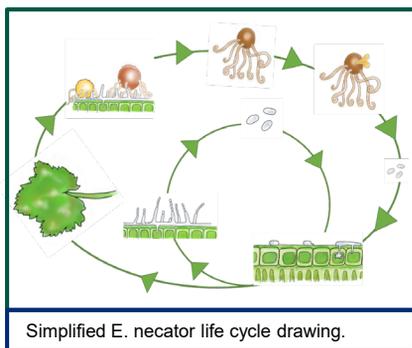


# Resistance Isn't Futile After All

Chelsea Newbold



Chelsea attending a research day at PSU's Southeast Research and Extension Center.



Simplified *E. necator* life cycle drawing.

I joined Oregon State University in 2018 and conducted my Master's research under Dr. Walt Mahaffee. My project looked at the growth and developmental effects of quinone outside inhibitor (QoI), a group of fungicides used in agriculture, resistance in the grape powdery mildew (GPM) pathogen, *Erysiphe necator*.

GPM is one of the most important diseases of grape in the world, and in the Western U.S. management of this disease previously relied on the use of QoI's. Unfortunately, the Mahaffee lab identified extensive QoI resistance in local *E. necator* populations following severe field losses in 2015 and 2016 due to uncontrolled GPM. Field sampling also showed equivalent presence of QoI resistant and sensitive *E. necator* on leaves but decreased presence of resistant spores in the air. This suggested a possible decrease in spore production or spore number associated with QoI resistance.

My master's project sought to understand these observed differences by comparing *E. necator* growth and developmental parameters between sensitive and resistant isolates. I also exposed isolates to continuous temperature stress to further exacerbate potential differences that might have been difficult to detect. My work showed no evidence that QoI resistance

was associated with reduced growth and development in *E. necator*, suggesting that resistance may persist in a population even if fungicides are not being applied. Additionally, I found that resistant individuals may experience some benefits at cooler temperatures, including increased germination and shorter latency (time from spore landing to maturity), indicating that early season sprays should be avoided to further reduce the persistence of resistance in the field.

Following my time at Oregon State I joined Pennsylvania State University's Plant Pathology and Environmental Microbiology department where I will pursue a PhD in plant pathology under the guidance of Dr. Sharifa Crandall and Gretchen Kuldau. I look forward to my new adventures in Pennsylvania and would like to thank everyone at the USDA-ARS-HCRL, our growers, and stakeholders for your support during my Master's program.

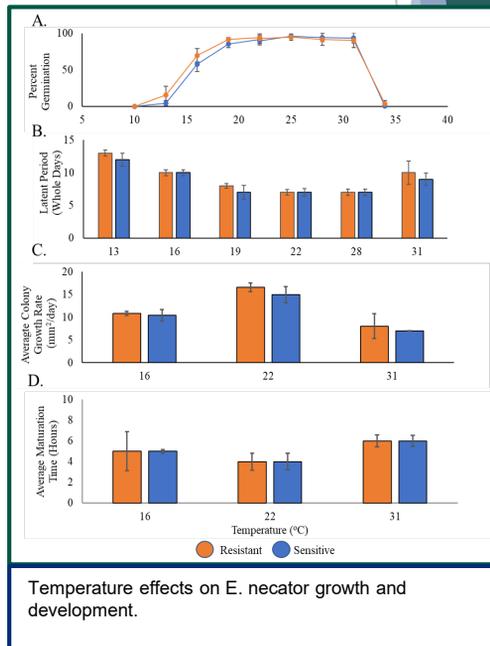
Chelsea was an Oregon State University Botany and Plant Pathology graduate research assistant in the Mahaffee (walt.mahaffee@usda.gov) Foliar Pathology lab.

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Temperature effects on *E. necator* growth and development.