An study of the effects of salinity on *Phytophthora ramorum* mycelium growth

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Phytophthora ramorum

- First observed in European nurseries in 1993 (Dobbelaere et al. 2010)
- Spread from nurseries to forests
- Threatens forest systems in western U.S.
- 45 proven plant hosts

Not a fungi after all

(Rossman and Palm 2006)

- Oomycete
- Cell wall- cellulose
- Mycelium-diploid
- Sexual reproduction-oospores and chlomydospores
- Flagella-either anterior and posterior

- Fungi
- Cell wall-chitin
- Mycelium-diploid/haploid
- Sexual reproduction-zygospores, ascospores and basidiospores
- Flagella-posterior

Phylogenetically: closer relation to plants than fungi

Dispersal mechanisms

- Water, wind, rain, and soil
  - Can be spread by humans via soiled shoes (Cushman and Meentemeyer 2008)
- When in the presence of water
  - Swimming zoospores
- Ability to go dormant
  - Chlamydospores provide protection in unfavorable conditions

Impacts in Washington

- Present in Western WA since 2006 (Goheen et al. 2006)
- Effects Pacific Rhododendron (*Rhododendron macrophyllum*)
  - Concerns over dispersal via stream/rivers
  - Concerns if salinity effect mycelium growth

Hypothesis

We hypothesized that mycelium growth rate would decrease as salinity increased.

This prediction is based on our prior research of other Phytophthora species and their growth in salt water.

(Duniway 1979)

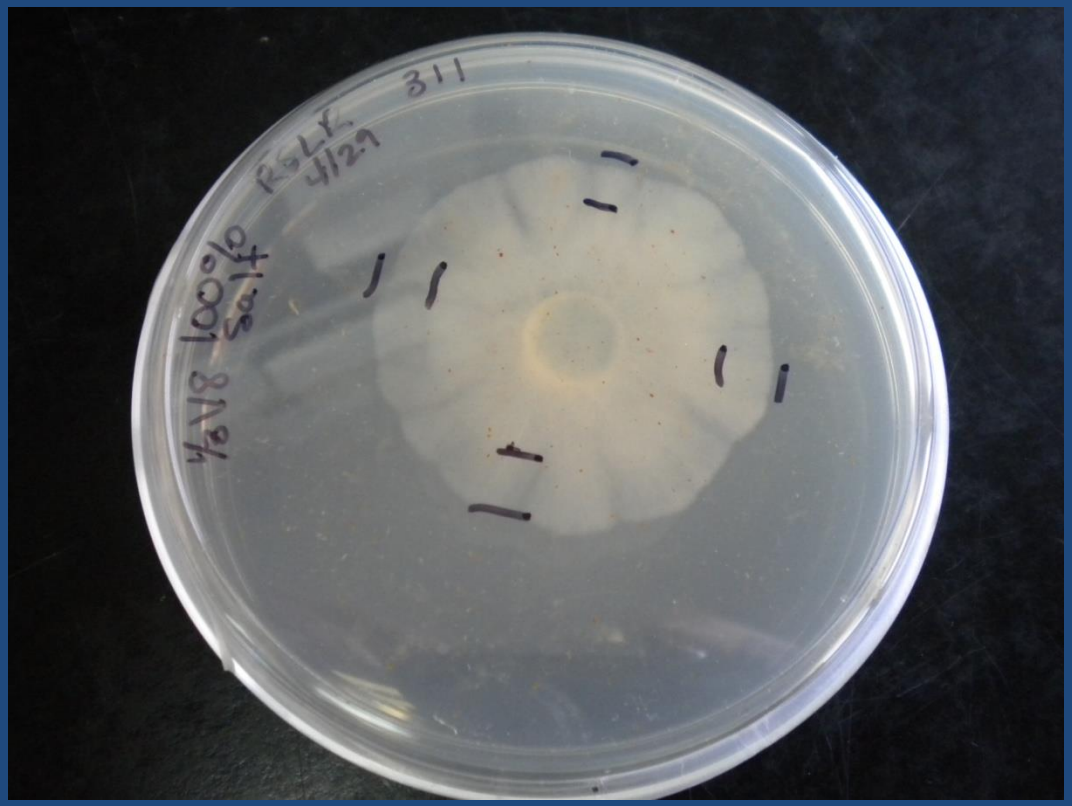
Methods

- WSU Puyallup Research and Extension Center
- 160 acre campus
- Laboratories, offices and state-of the-art greenhouses
- Addresses local issues through research and education

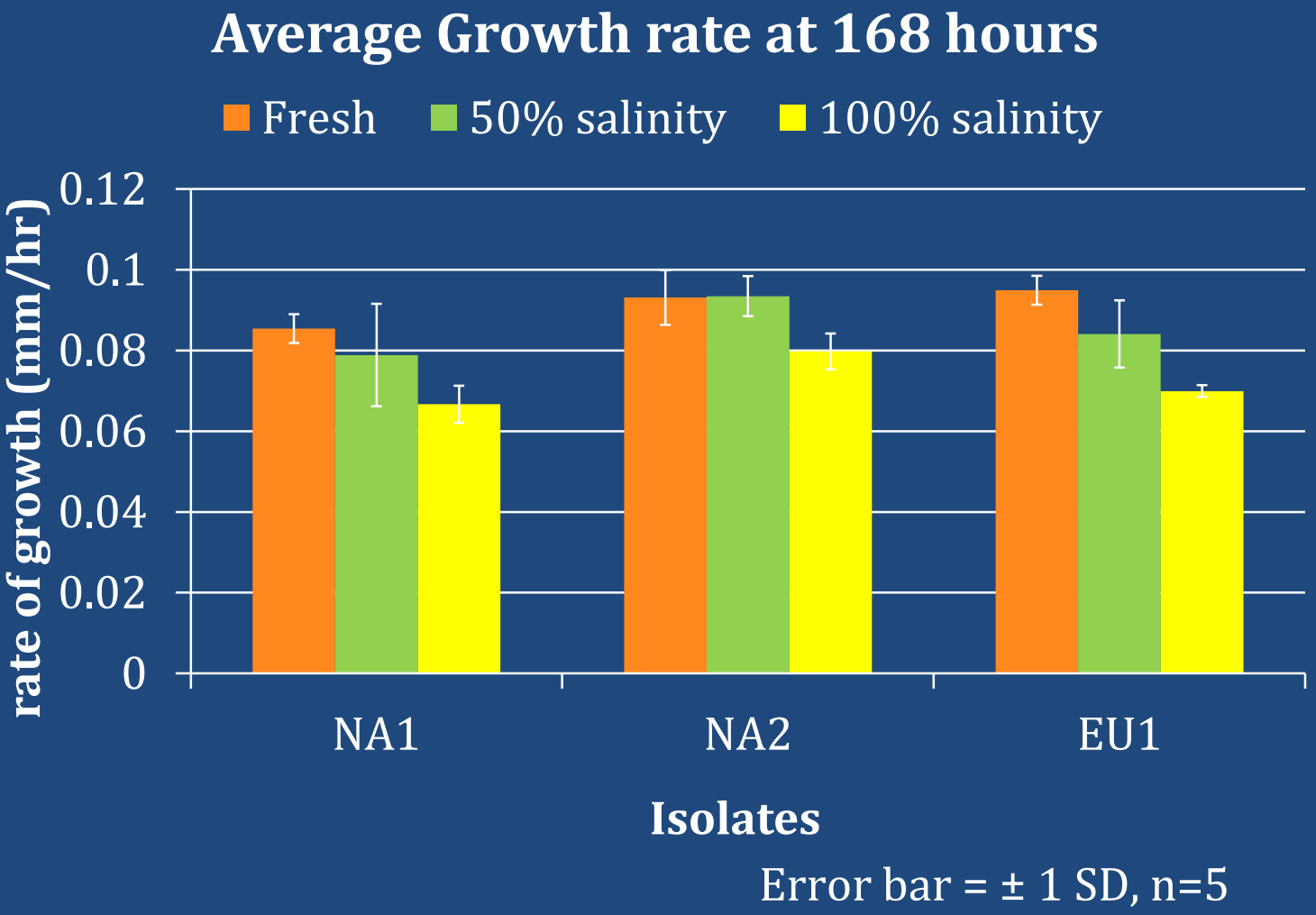
Methods

- Three V-8 agar treatments
  - fresh water
  - 50% seawater
  - 100% seawater
- 3 distinct lineages- NA1, NA2, and EU1
- 5 replicates/treatment
- Incubation for 11 days
  - 2 measurements taken: 168 hrs (Day 7) and 265 hrs (Day 11)

Methods

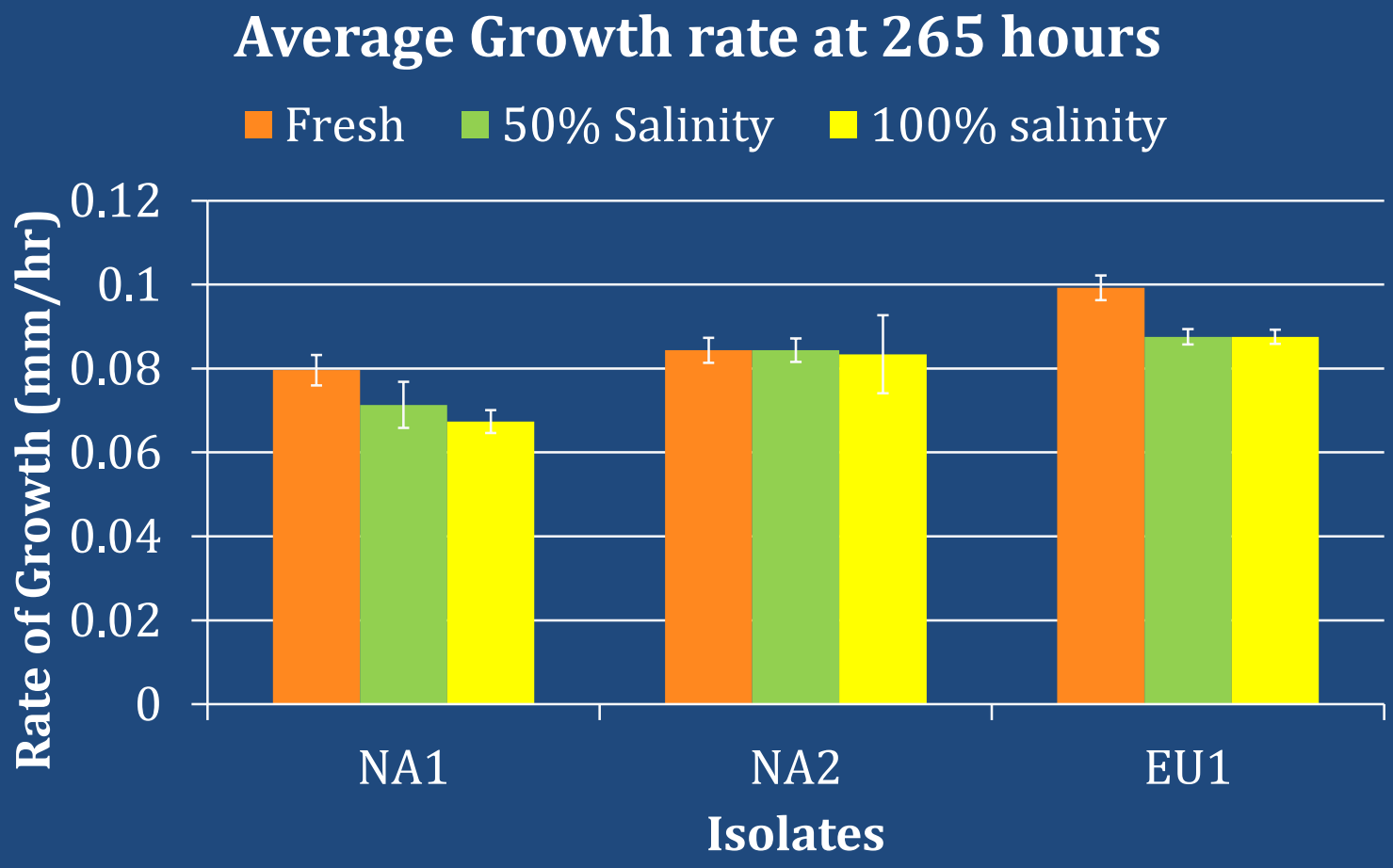


Results



Error bar = ± 1 SD, n=5

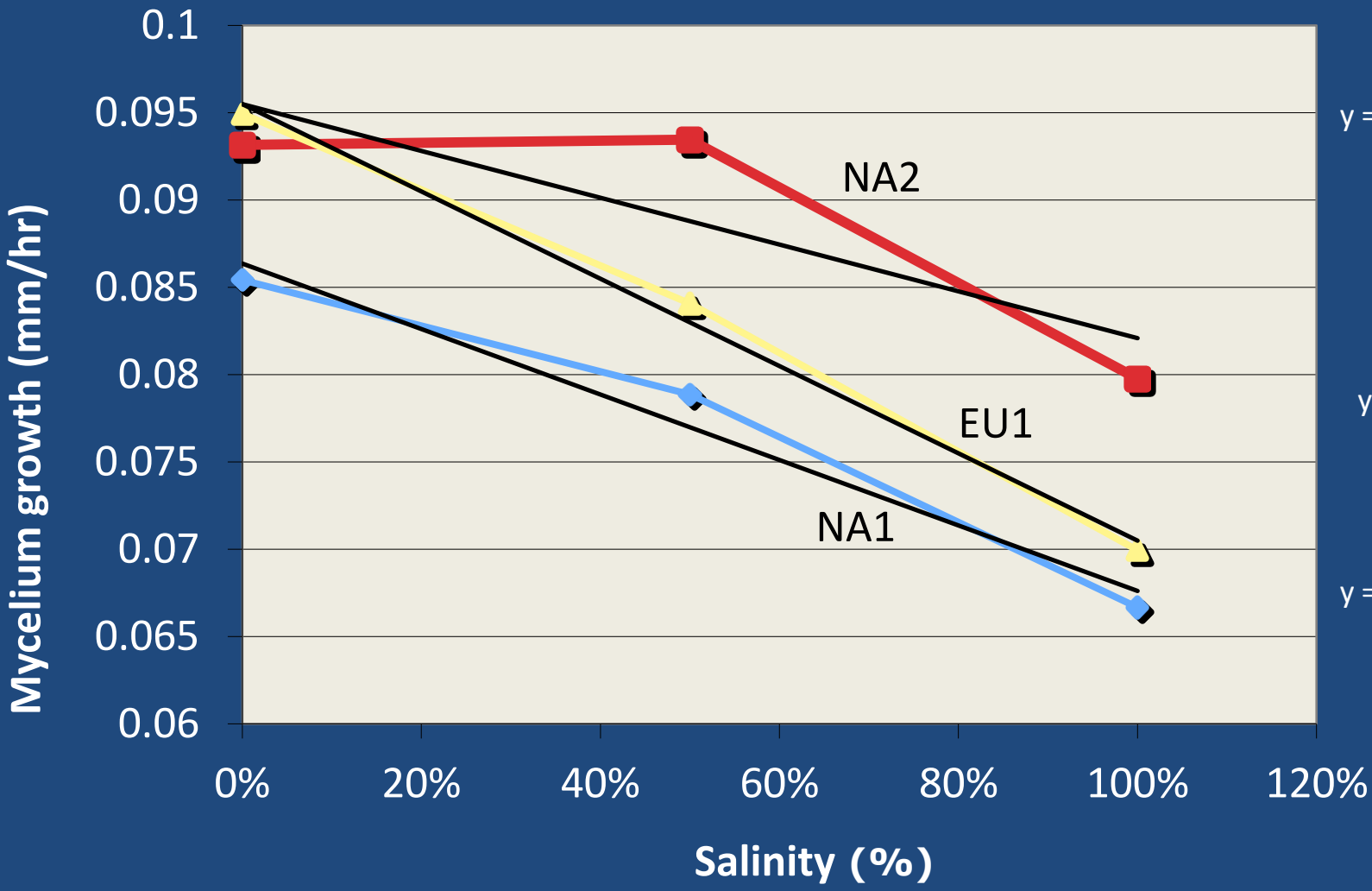
Results



Error bar = ± 1 SD , n=5

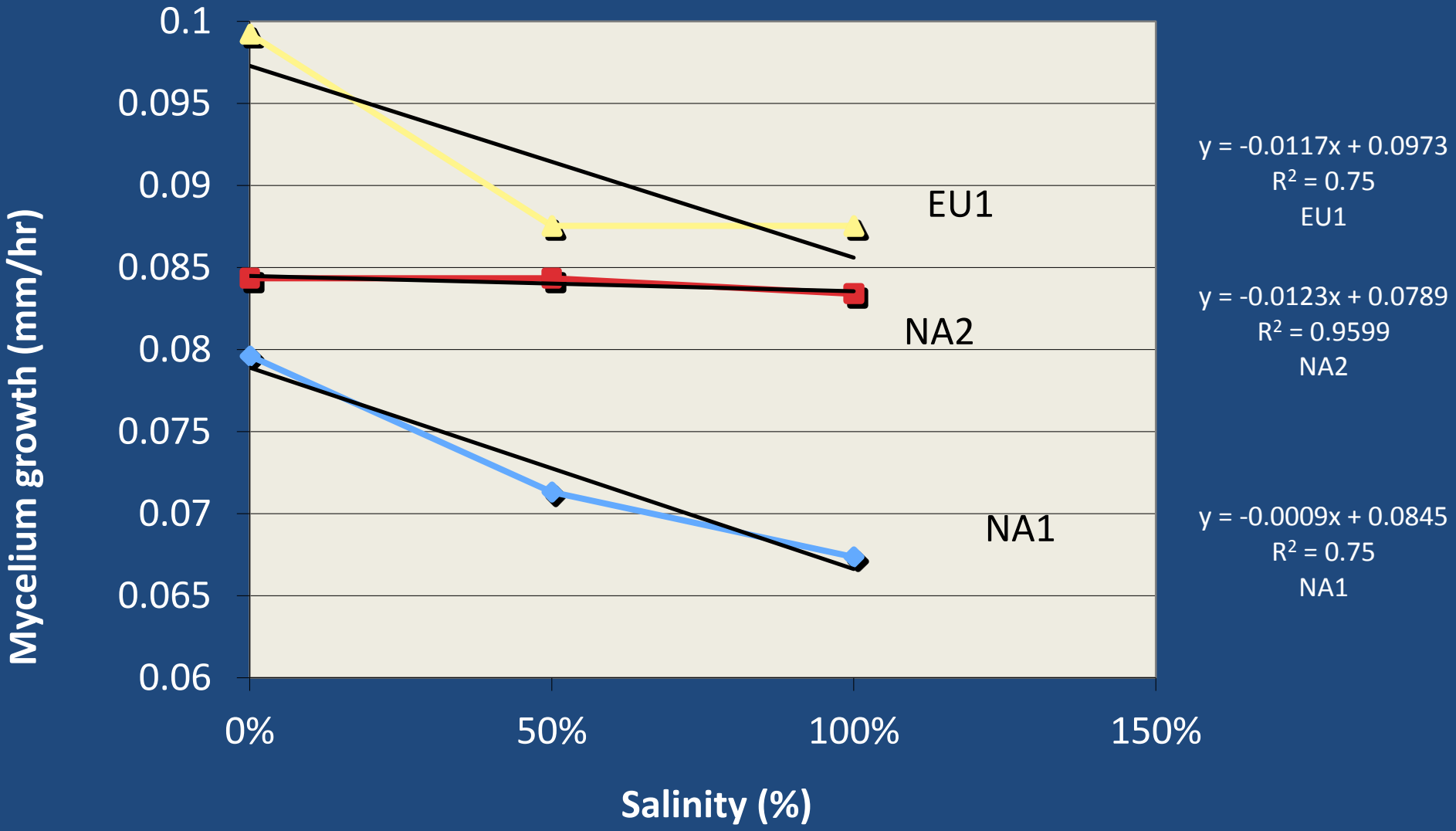
Results

P. ramorum growth rate by salinity after 168 hrs



Results

***P. ramorum* growth rate by salinity after 265 hrs**



Discussion

- Mycelium growth rate decreases slightly with increased salinity
  - » NA1 had the slowest growth rate at all salinity levels
  - » NA2 growth rate stabilized in all salinities at 265hrs
  - » EU1 growth rate increased in fresh and 100% salinity treatments at 265hrs

Discussion

Salinity may have little effect on oomycetes

(Padgett 1984)

Salinity levels have little or no effect on many *Phytophthora* spp.

(Duniway 1979)

Many *Phytophthora* spp. can be found in mangrove forests

(Wilkens and Field 1993)

Works Cited

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