

Testing causes of triploid oyster summer mortality across the northern Gulf of Mexico

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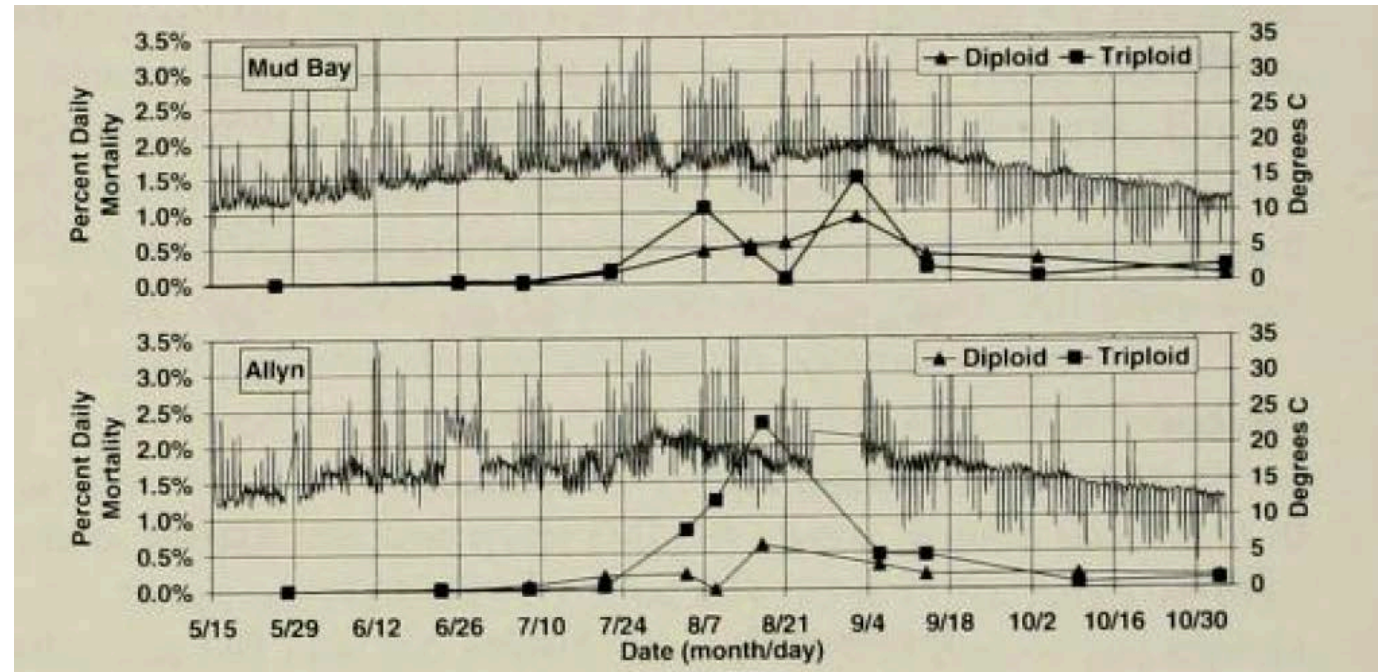
High Demand for Triploids

- ▶ Considered to have better summer meat quality & grow faster than diploids
- ▶ **In 2014, triploids made up 91% of growers' plantings in VA².**
- ▶ **In 2017, of AUSL orders, 36 million triploid seed was ordered for farms in the Gulf, compared to only 6 million diploid seed³**



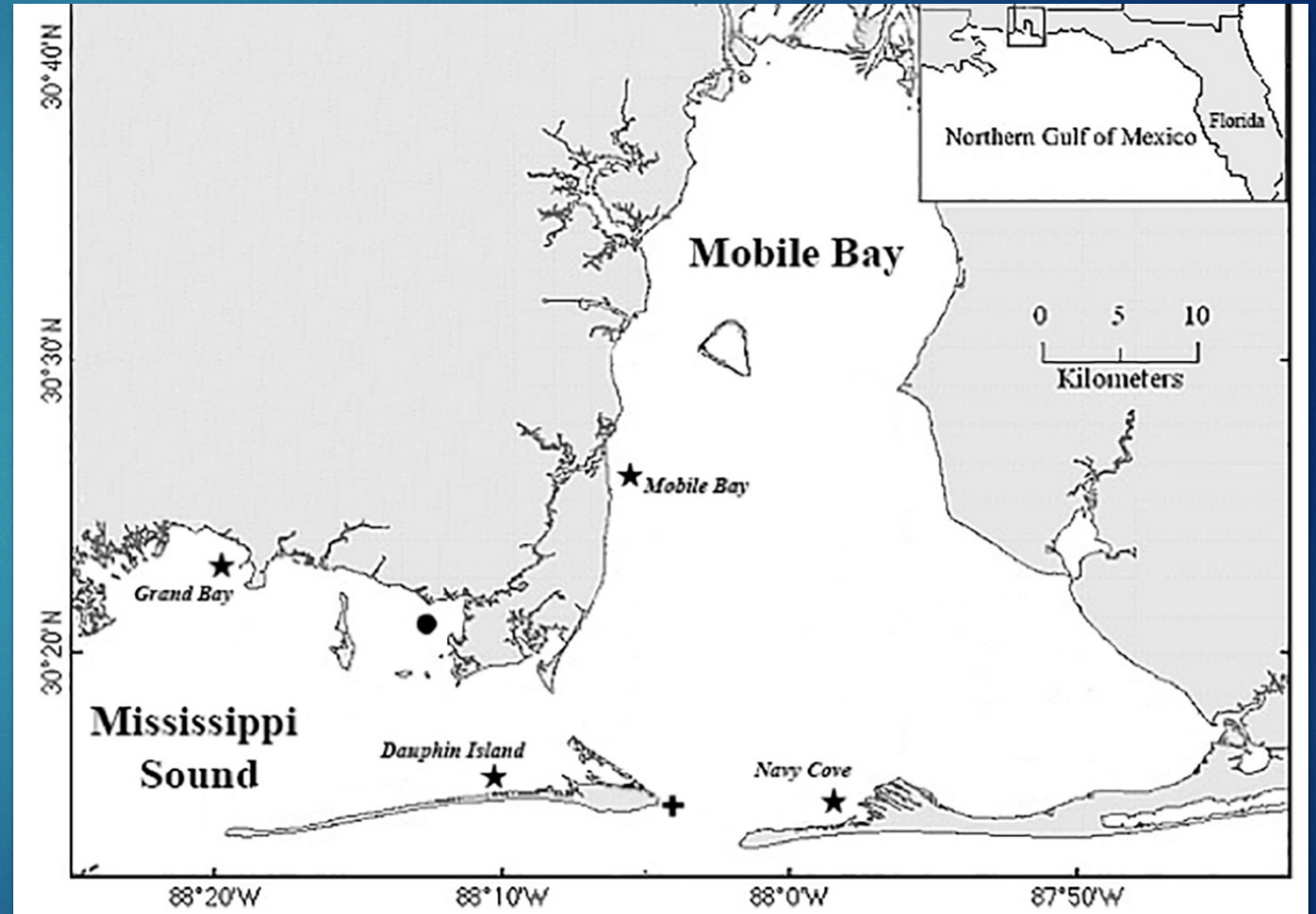
Growing Concern about Triploid Mortality in Oysters

- ▶ Joey Matt & Stan Allen have conducted several years of work evaluating triploid mortality in eastern oysters, *Crassostrea virginica*, in Virginia
- ▶ Cheney et al. (2000) found spikes of rapid summer mortality in triploids relative to diploids



Concerns in Gulf of Mexico

- ▶ In 2016, oyster farmers reported very high losses of oysters. Many associated this with triploids.
- ▶ Prompted a quantitative study in 2016-2017 (Wadsworth et al. (2019))





Given that Triploid Mortality Can Occur, Does a Farmer Affect That?

- ▶ Industry advice from Australia for *Crassostrea gigas* triploids was to 'baby the oysters through the summer'
- ▶ Oyster farmers routinely impose:
 - ▶ Grading/tumbling (to sort by size and help shape and clean oysters), and;
 - ▶ Desiccation to help control bio-fouling

Farmer-Imposed 'Stress': Grading

- ▶ Grading/tumbling is done periodically to sort oysters by size
- ▶ Also potentially helps shape the oyster and clean bio-fouling



Farmer- Imposed Stress: Desiccation

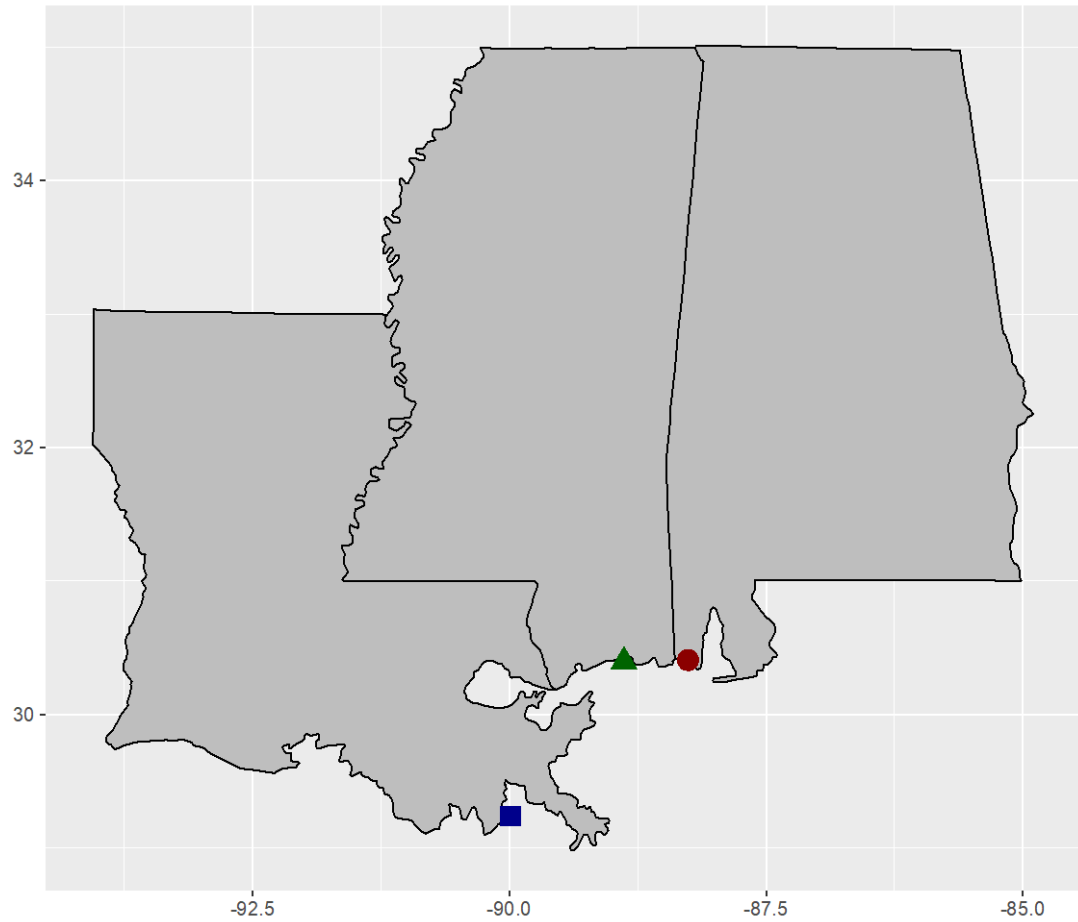
- ▶ Routine desiccation is a method used to control bio-fouling
- ▶ AUSL recommends drying for 24-hours once per week under typical conditions



■ Grand Isle

▲ Deer Island

● Grand Bay



For this Study,
Established
Three Field
Sites in 2018

SELECTED TO REFLECT VARIABLE
GROWING CONDITIONS AND AREAS
USED BY CURRENT INDUSTRY

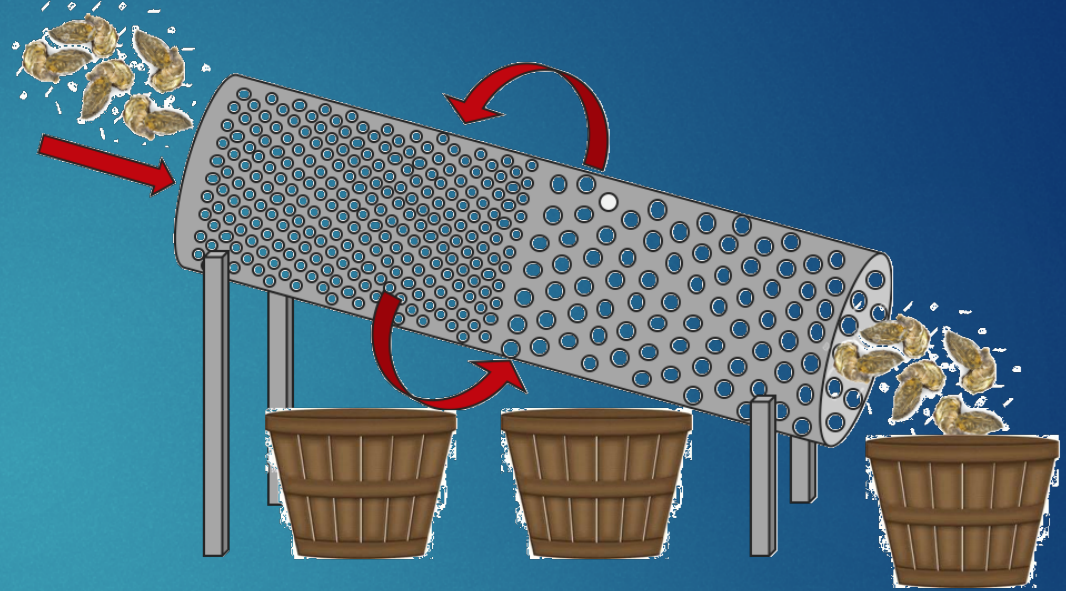
Experiment Started April 2019

- ▶ Seven cages per site
- ▶ Six bags per cage
 - ▶ Three were diploid,
three were triploid
- ▶ Stocked 75 live oysters
per bag



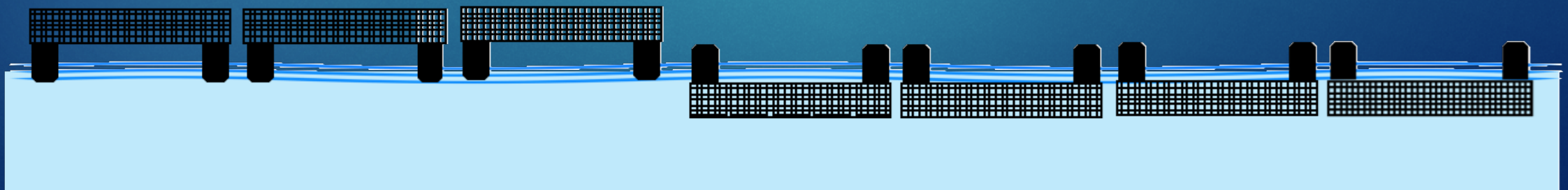
Stress Treatments

**Tumbling
X
Desiccation**



Drying position

Submerged Position



Stress Imposed Twice: May and July

Tumbling



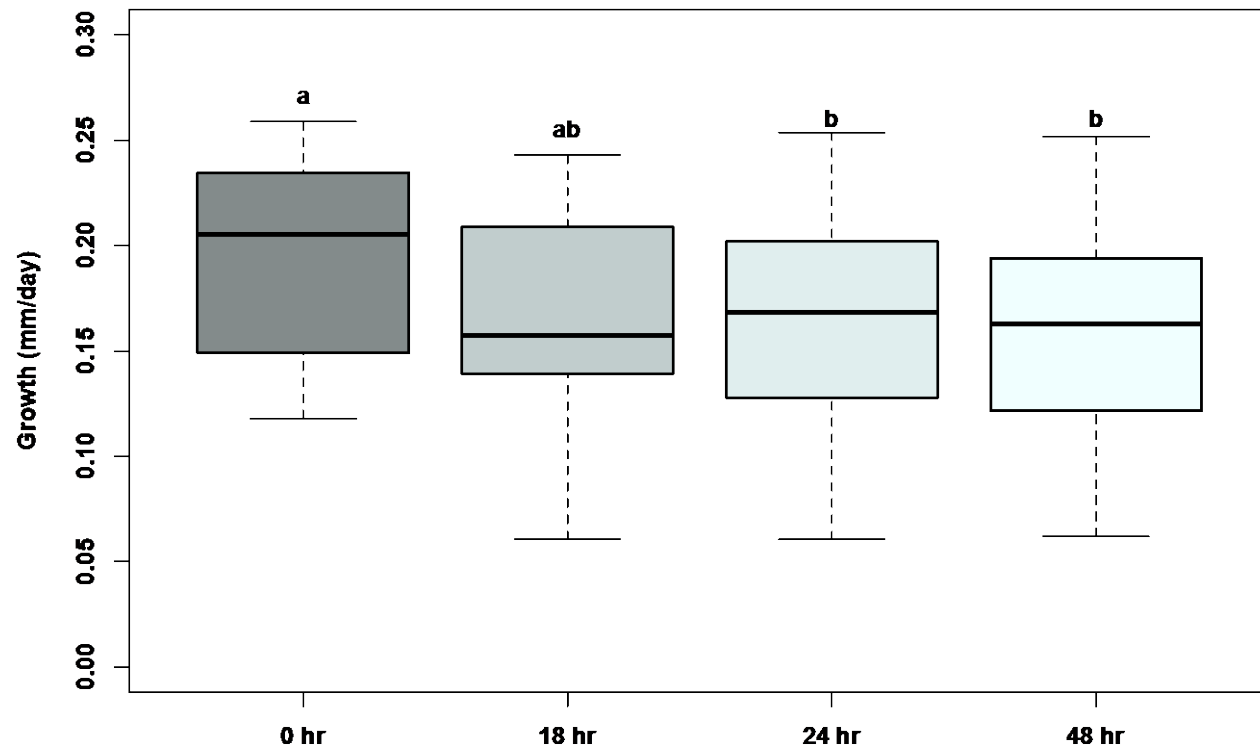
Tumbled **Not Tumbled**

Desiccation



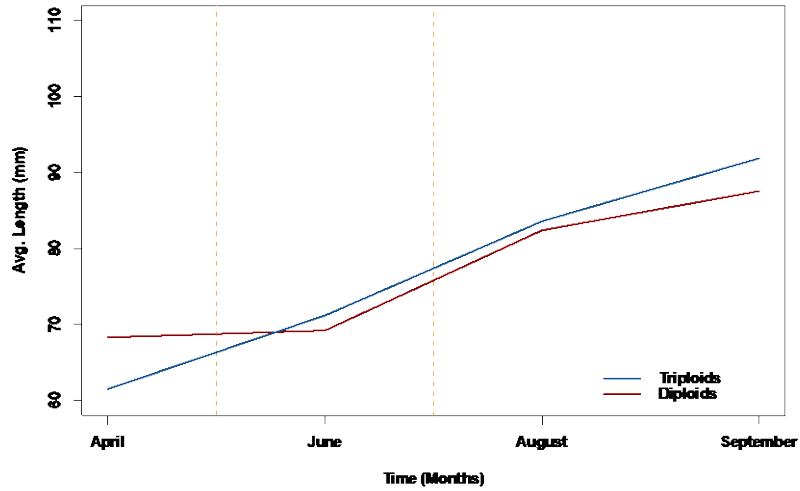
0 hrs. **18 hrs.** **24 hrs.** **48 hrs.**

18 hrs. **24 hrs.** **48 hrs.** **0 hrs.** **18 hrs.** **24 hrs.** **48 hrs.**
Tumbled **Tumbled** **Tumbled** **Not Tumbled** **Not Tumbled** **Not Tumbled** **Not Tumbled**

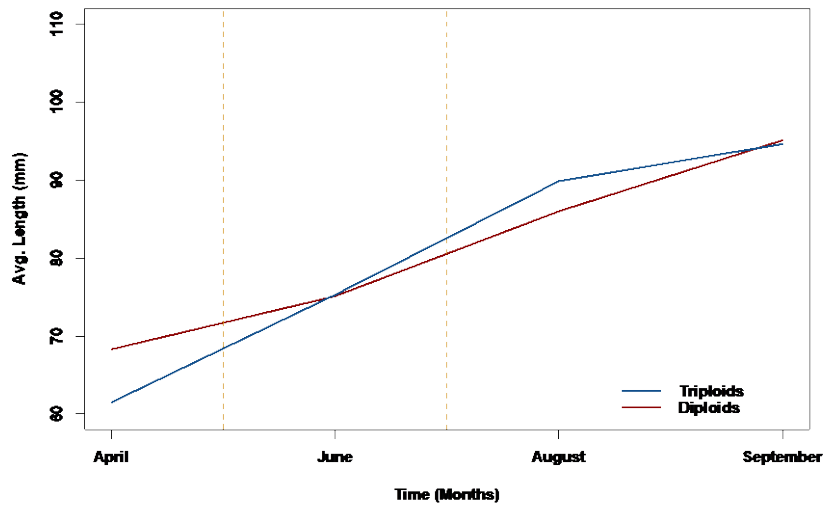


At all sites,
desiccation
over 18 hrs.
significantly
decreased
growth

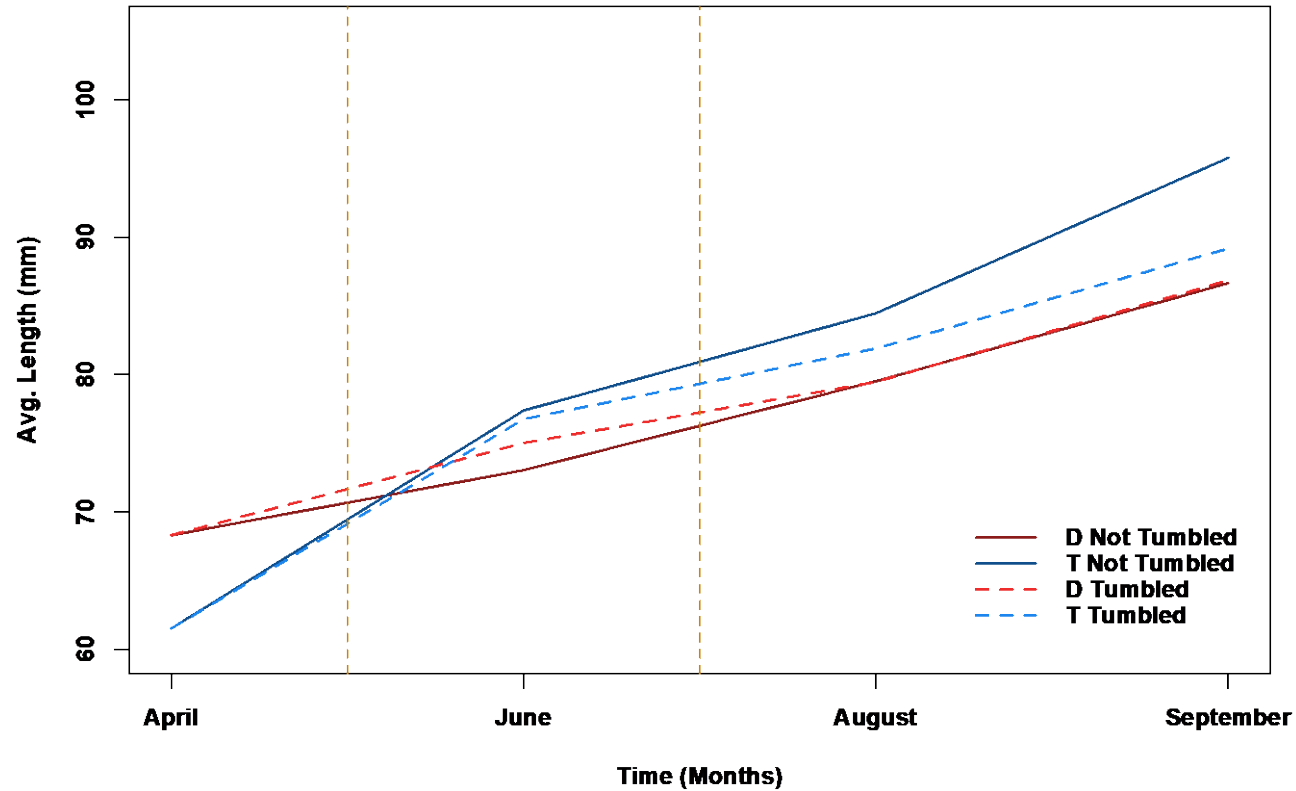
MS



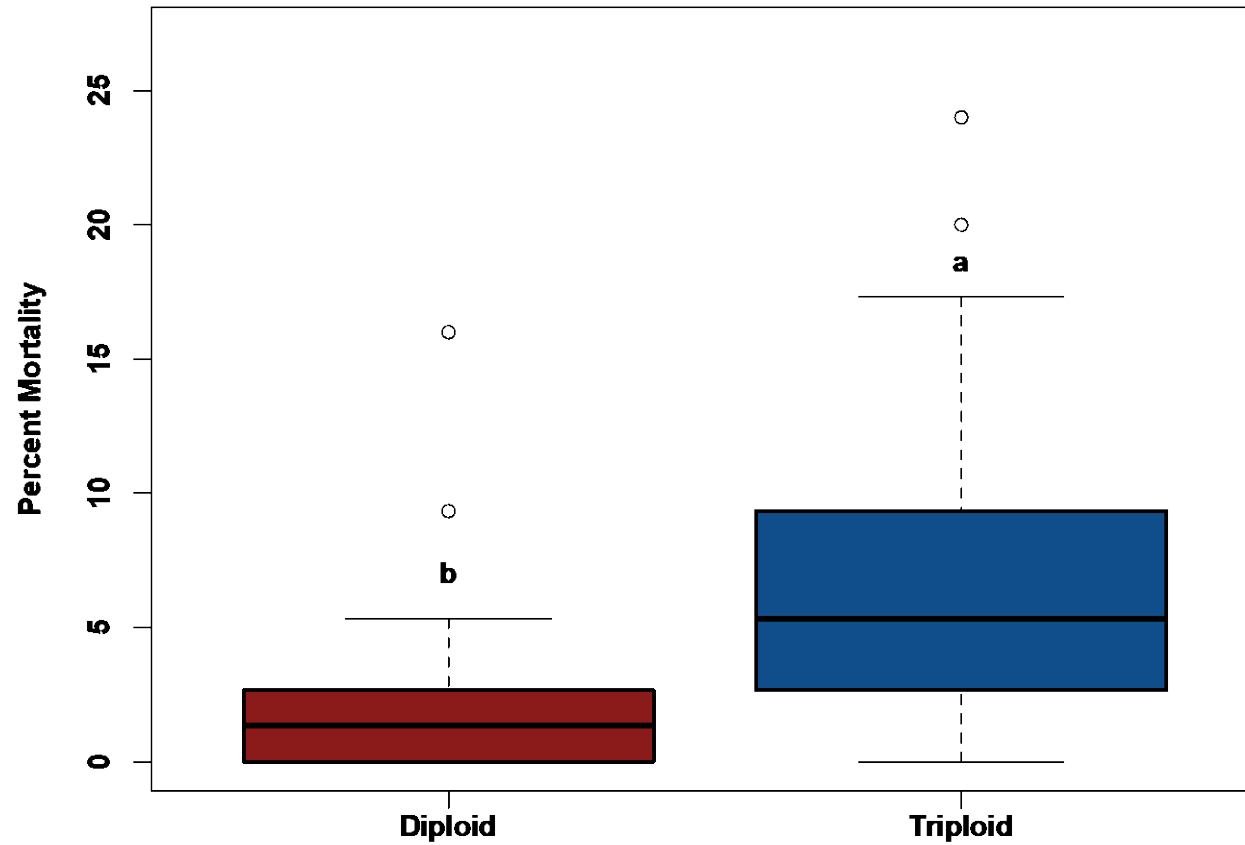
LA



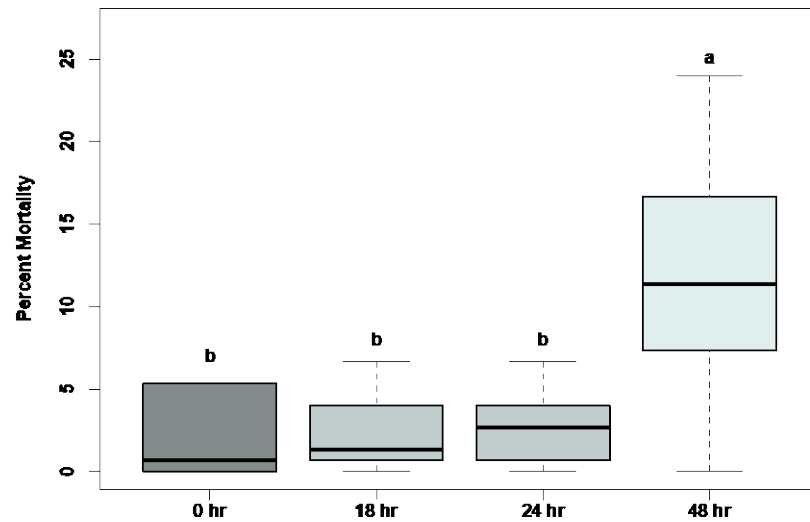
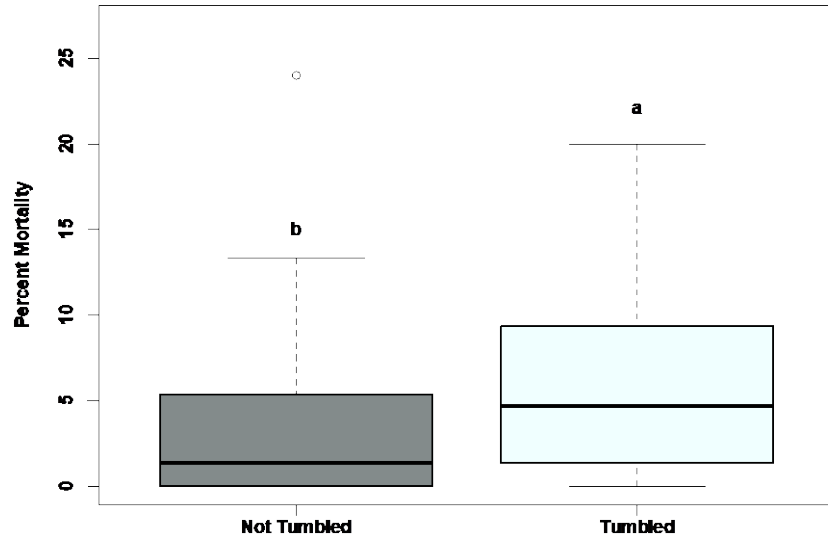
At Two Sites,
Triploids Outgrew
Diploids



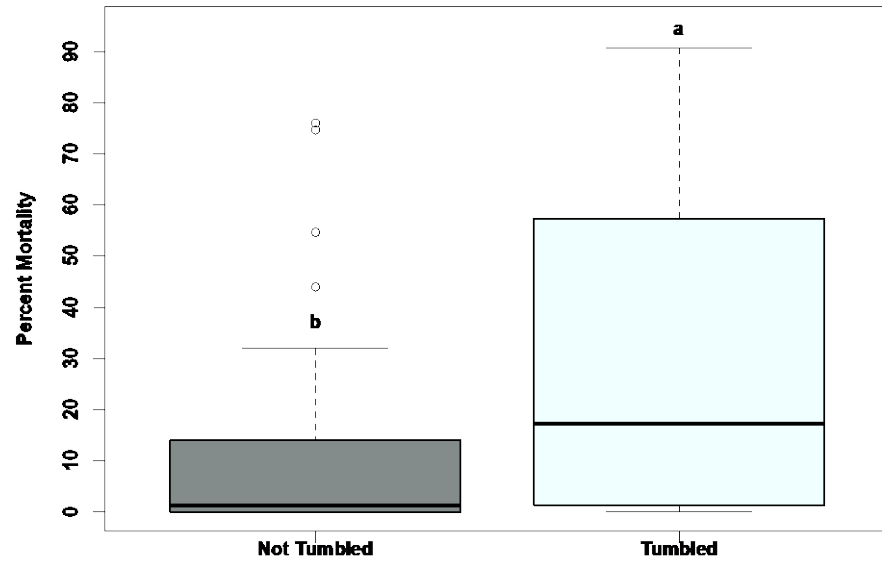
In Alabama,
Grading
Reduced
Growth only
in Triploids



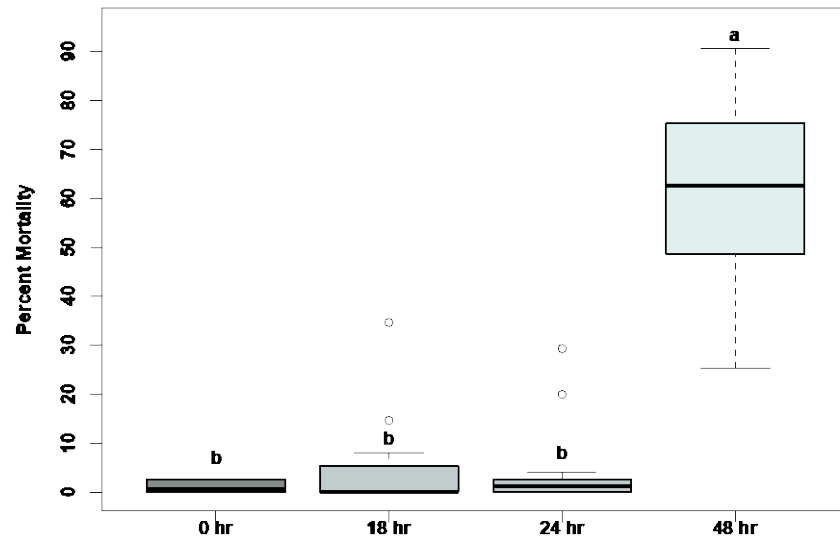
In LA, Triploids Had Statistically Higher Mortality than Diploids



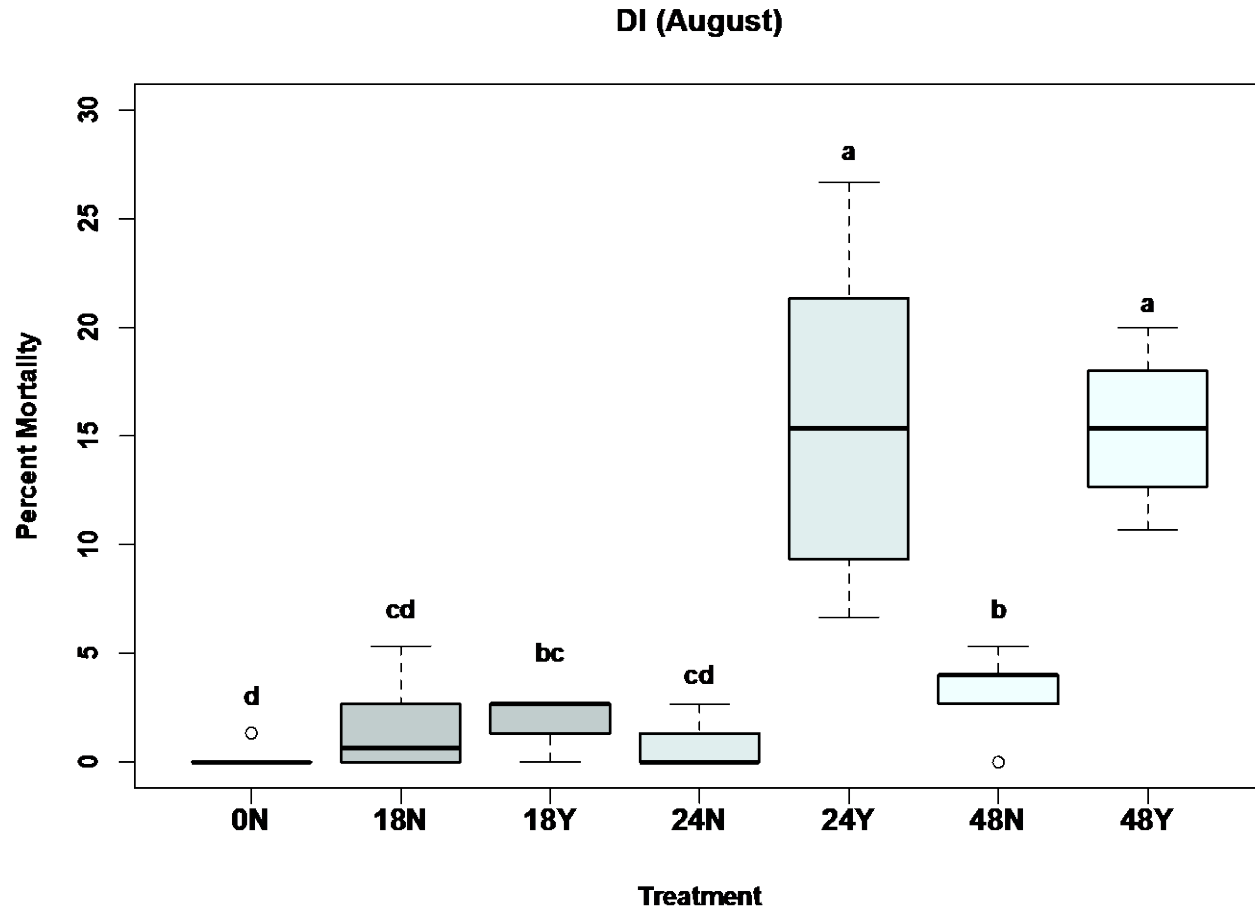
In LA, Stressors
Affected
Mortality but
Did Not
Interact with
Ploidy



GBOP (August)



In AL, Stressors
Affected
Mortality but
Did Not
Interact with
Ploidy



In MS, Significant Interaction between Grading & Desiccation, again with No Effect of Ploidy

Conclusions: Growth

Triploid oysters had a growth advantage over diploid oysters, though this was affected by grading at one site

Desiccation stress of 48 hours reduced growth rates regardless of ploidy

Conclusions: Mortality

Triploids experienced higher mortality than diploids only at one site (Grand Isle, LA)

- Ploidy had no interaction with either stress treatment

At each of the three sites, farmer-imposed stress treatments did affect oyster mortality, but there was no difference between ploidies.

- At two sites (LA and AL), grading and desiccation each increased mortality
- At the other site (MS), an additive effect of stress was seen where the combination of grading and desiccation increased mortality