



# Evaluation of Field Nursery Practices for Oyster Seed Cultivation in Delaware Bay

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Objective:  
Evaluate the performance  
of various field methods  
for growing out 2-4 mm  
oyster seed in this  
particularly challenging  
environment

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# Experimental design

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- *Three factors*
  - *Cage*
  - *Deployment method*
  - *Stocking density*
- *Crossed*
- *Field methods compared to seed grown in upwellers*



## Two Cage Types

- SEAPA with sock
- Low Pro with seed bag



## Deployment

- Floating
- On-Bottom



Two stocking densities

- 1000 ml (8000 oysters)
- 250 ml (2000 oysters)





# Evaluation Measures

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- *Equipment wear/loss*
- *Fouling*
- *Oyster Growth*
- *Oyster Survival*
- *Shell Shape*

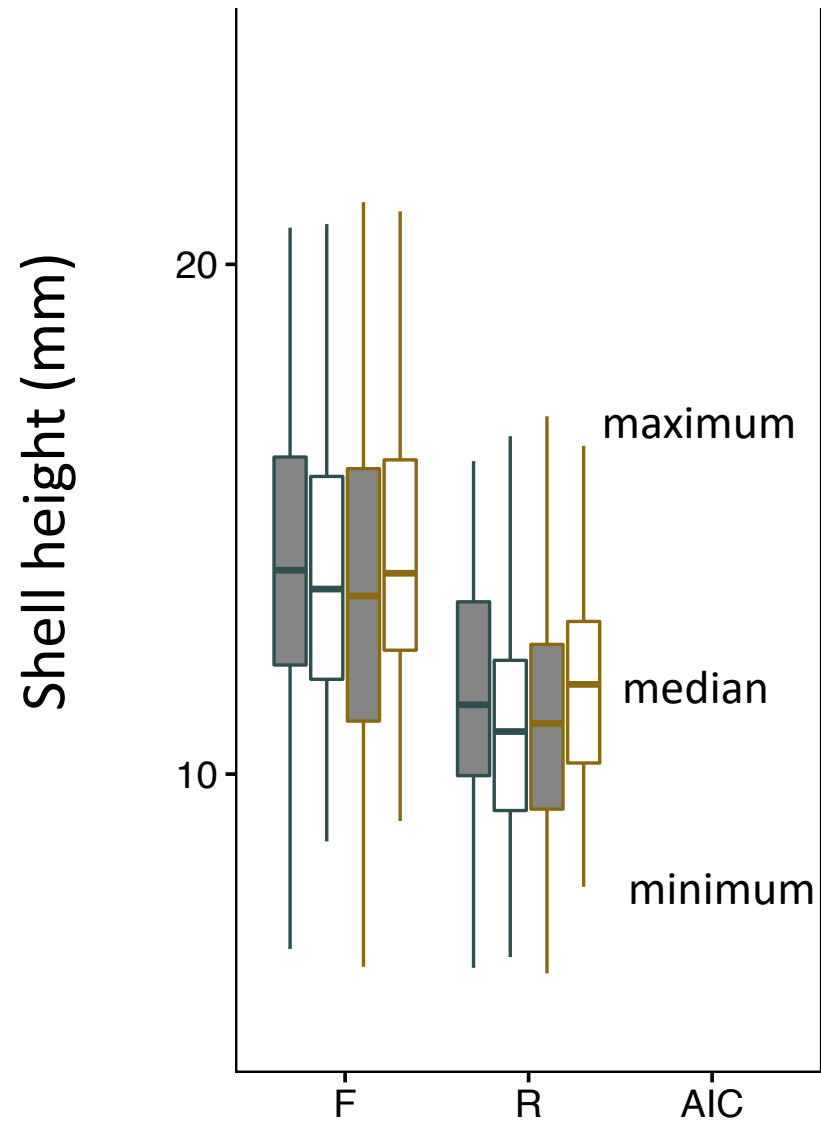
# Timeline

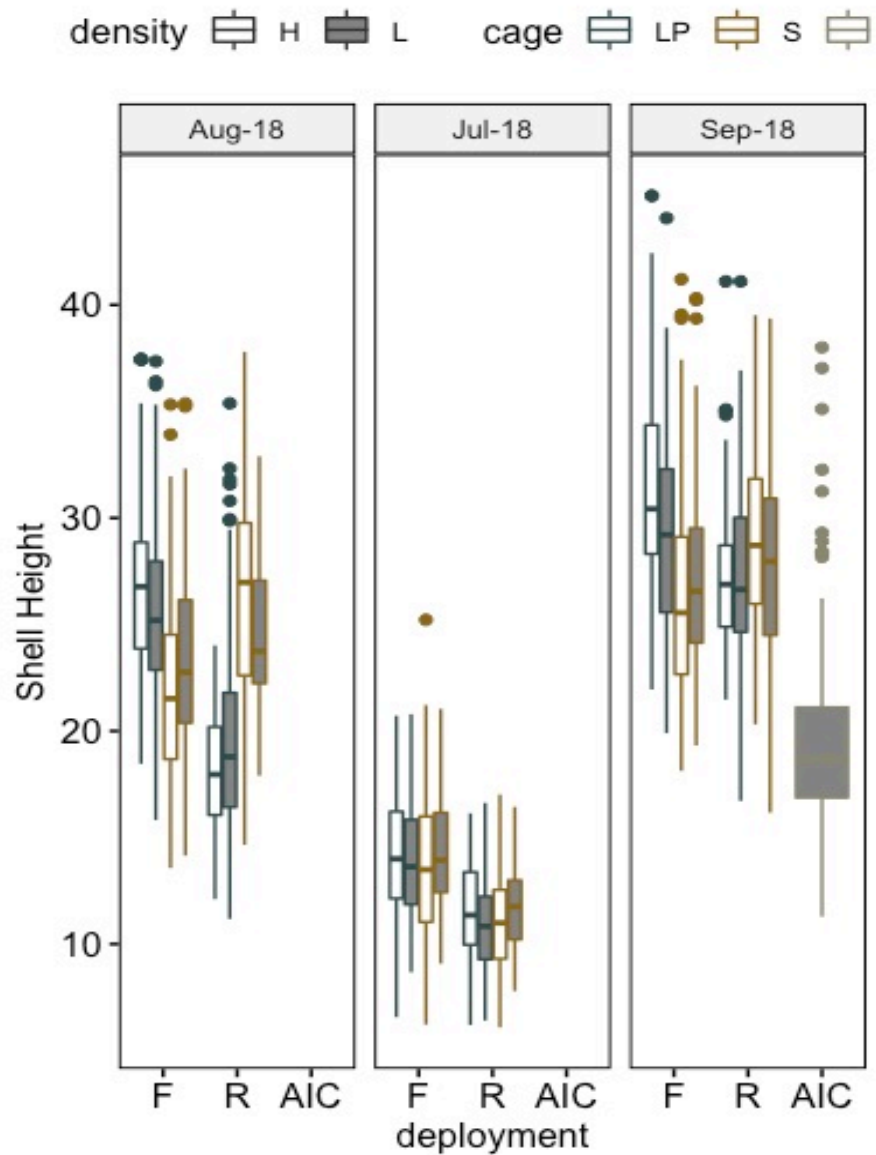
- 2 mm diploid LOLA was seed deployed on June 24, 2018
- Assessed in July, August, and September
- Each month seed split and redeployed at standardized volume 1:4 for light and heavy stocking densities





density  H  L      cage  LP  S  U

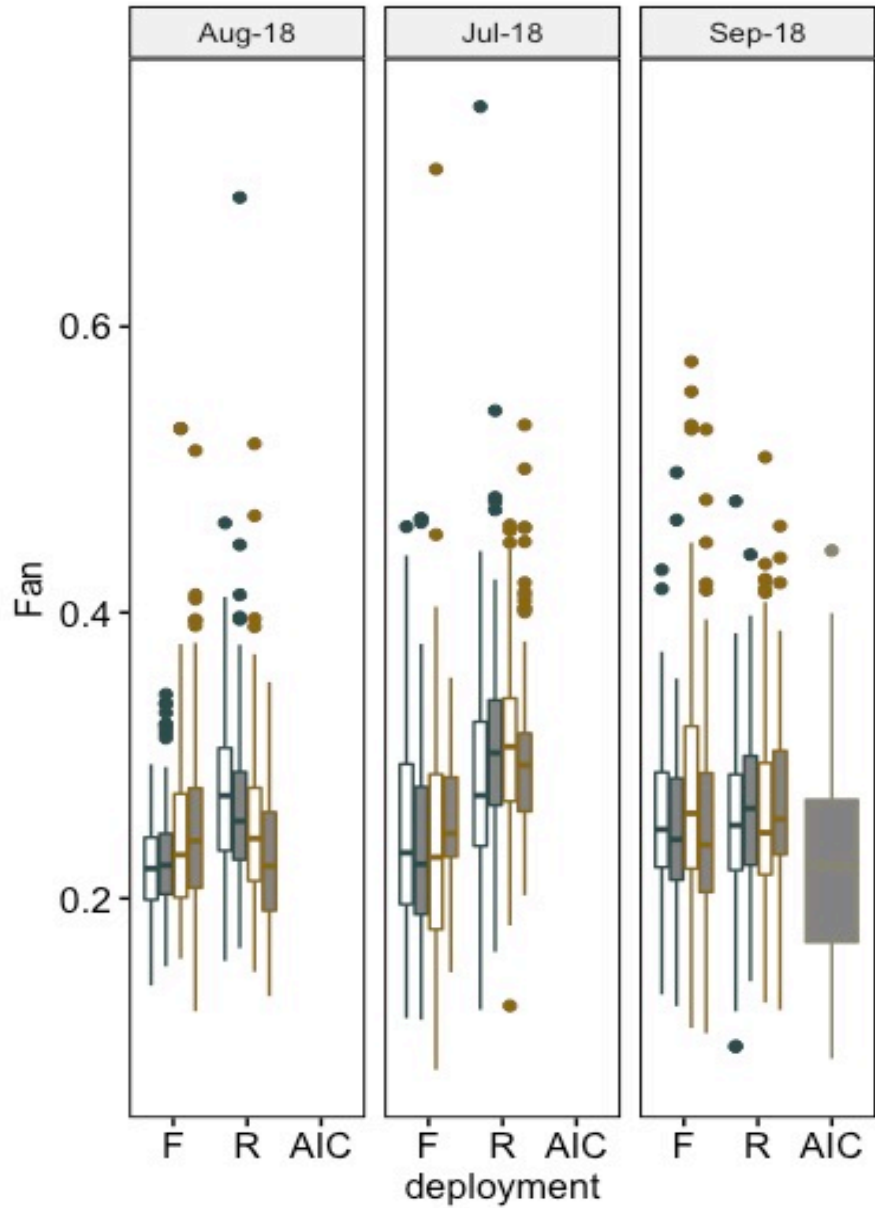




# Shell Height

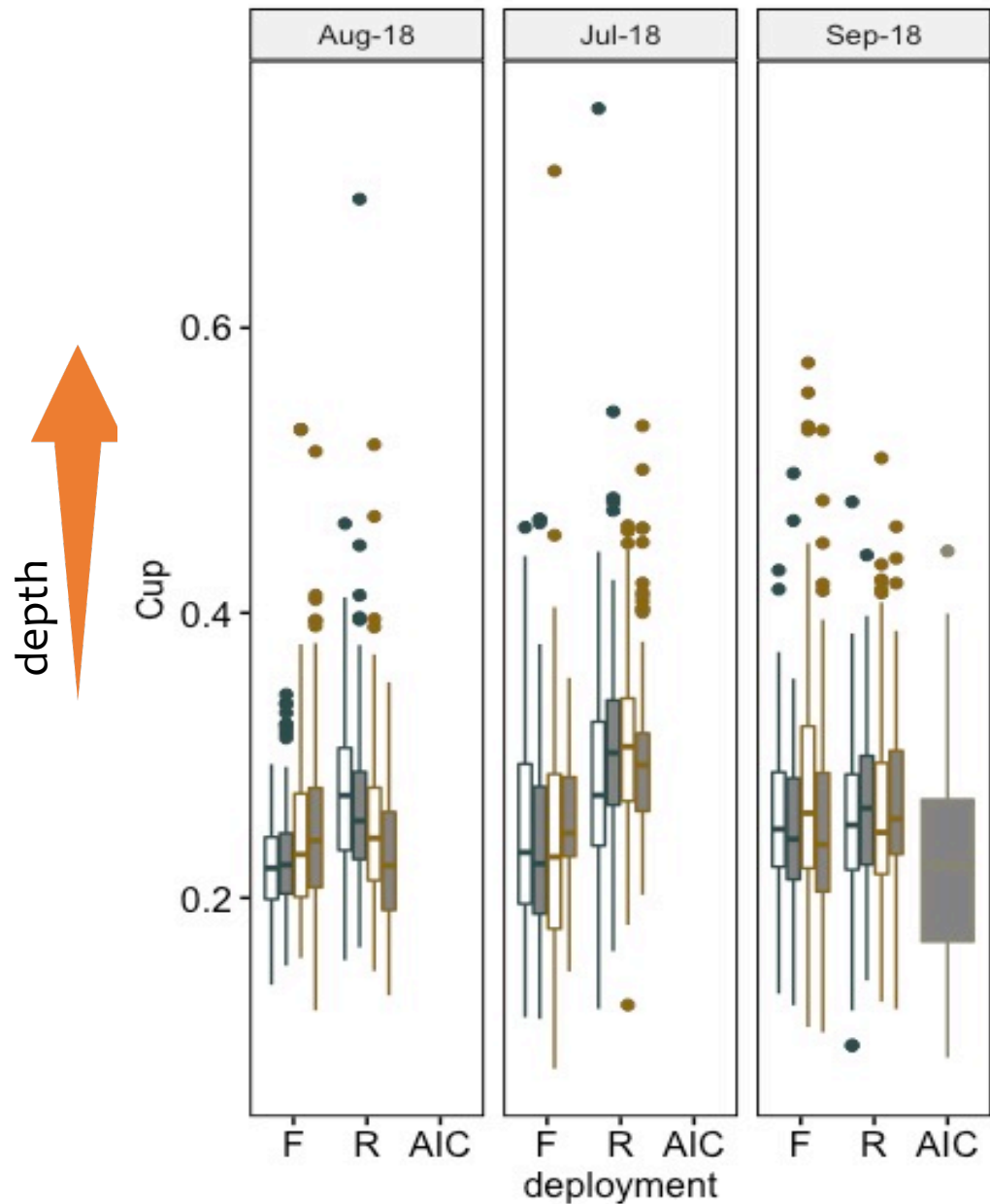
Significant effect	
JUL	Deployment, Density x Cage
AUG	Cage, Deployment, Cage x Deployment, All
SEPT	Density, Cage, Deployment, Cage x Density, All

roundness ↑



# Fan

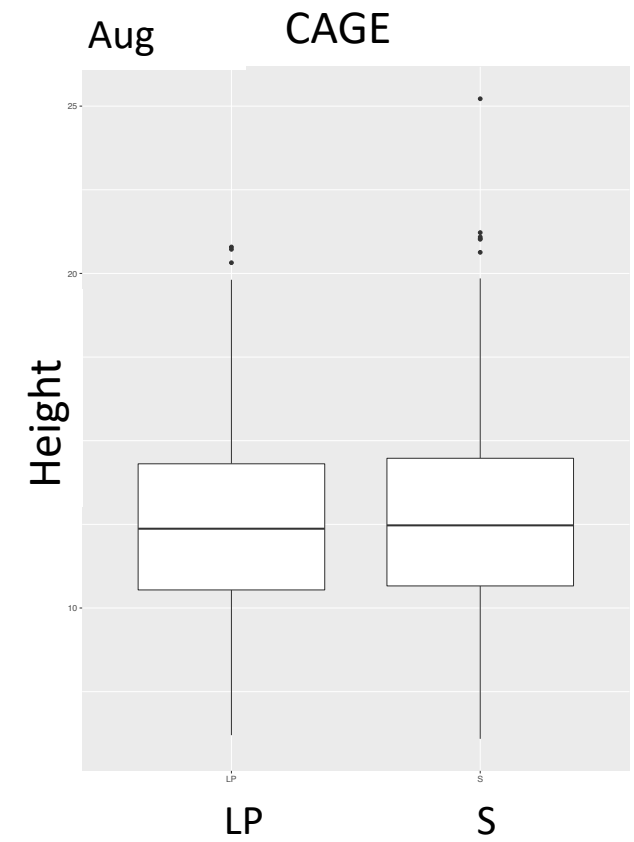
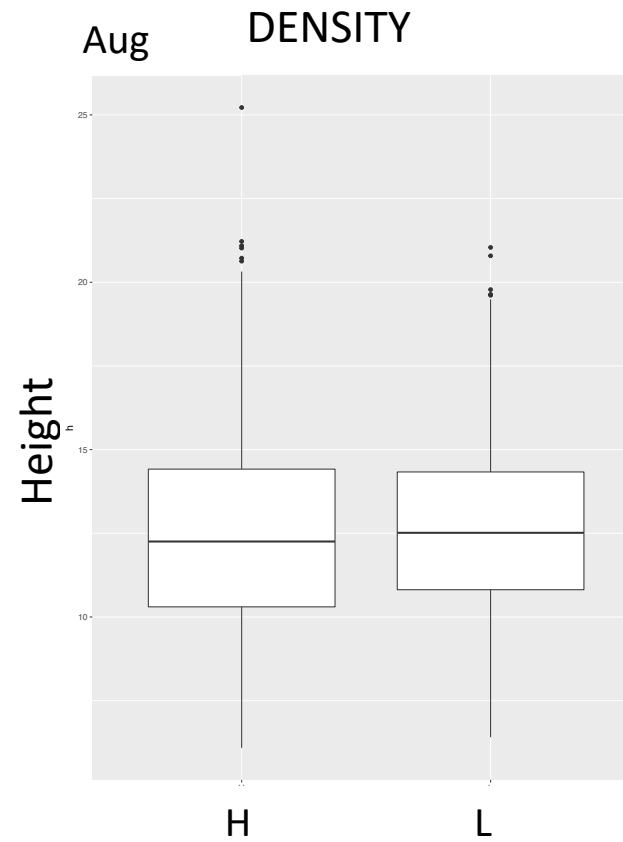
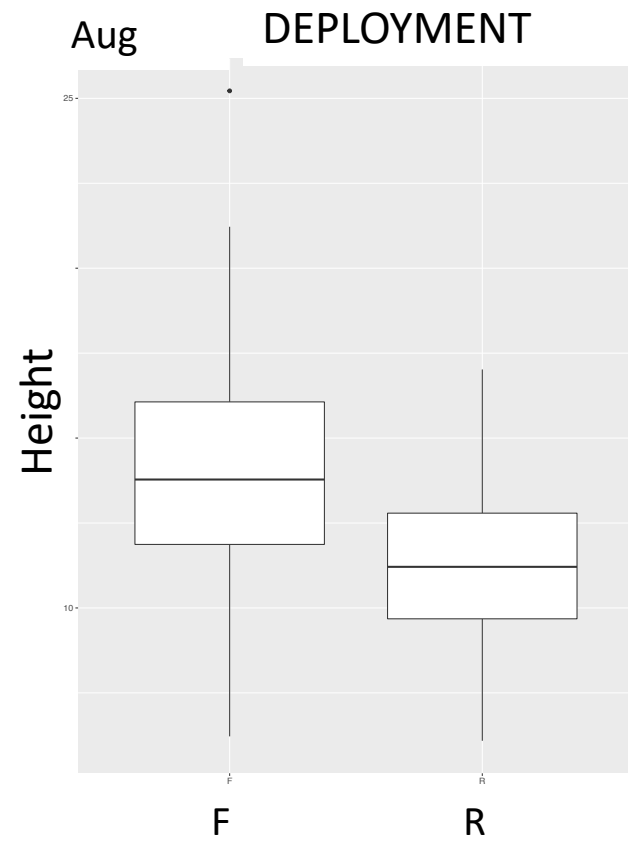
Significant effect	
JUL	Density, Cage, Deployment, Cage x Deployment, All
AUG	Density, Deployment
SEPT	Density, Deployment



# Cup

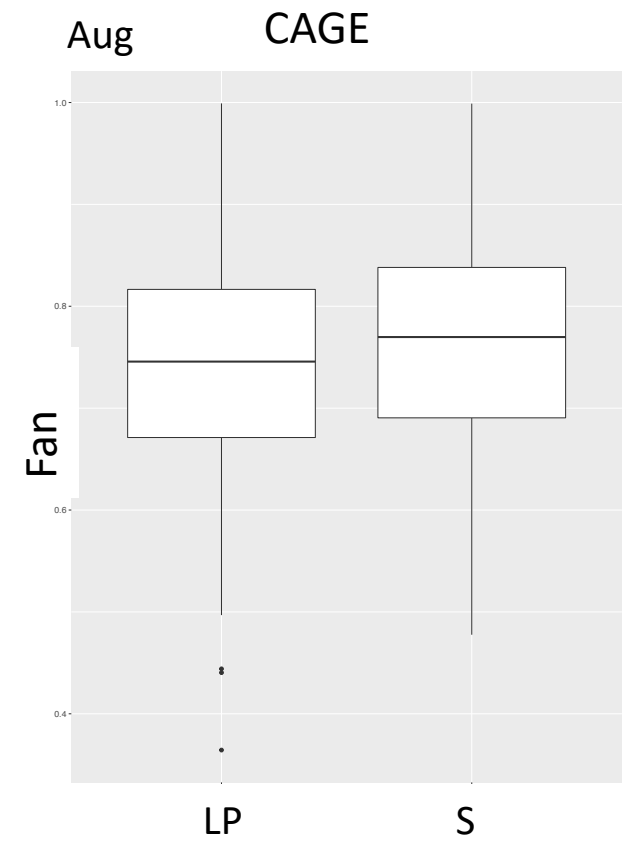
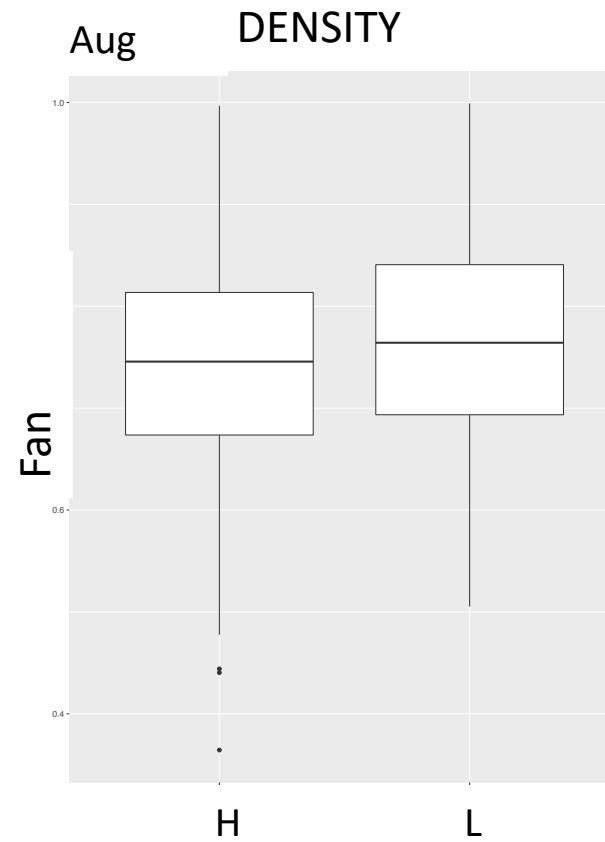
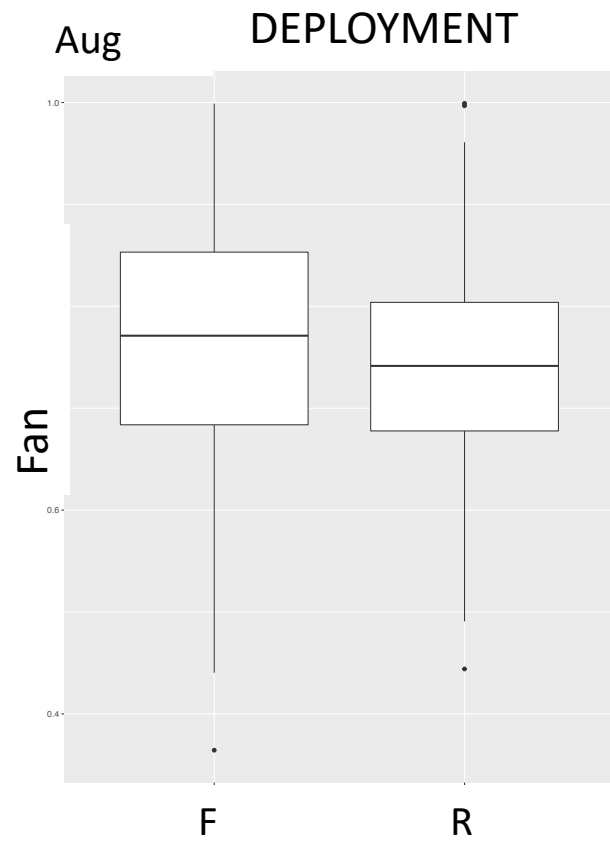
Significant effect	
JUL	Deployment, All
AUG	Deployment, Density x Deployment, Cage x Deployment
SEPT	Deployment, Density x Deployment





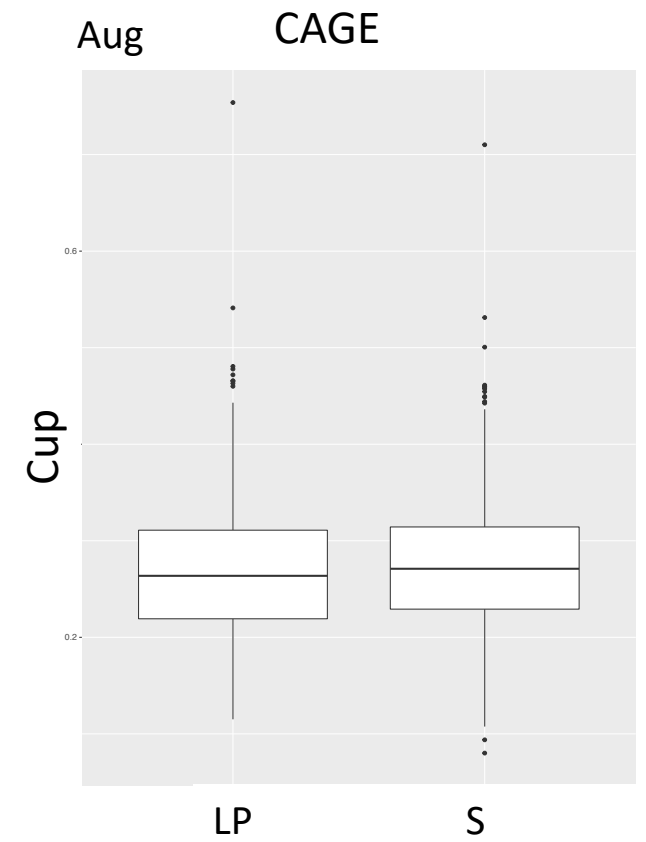
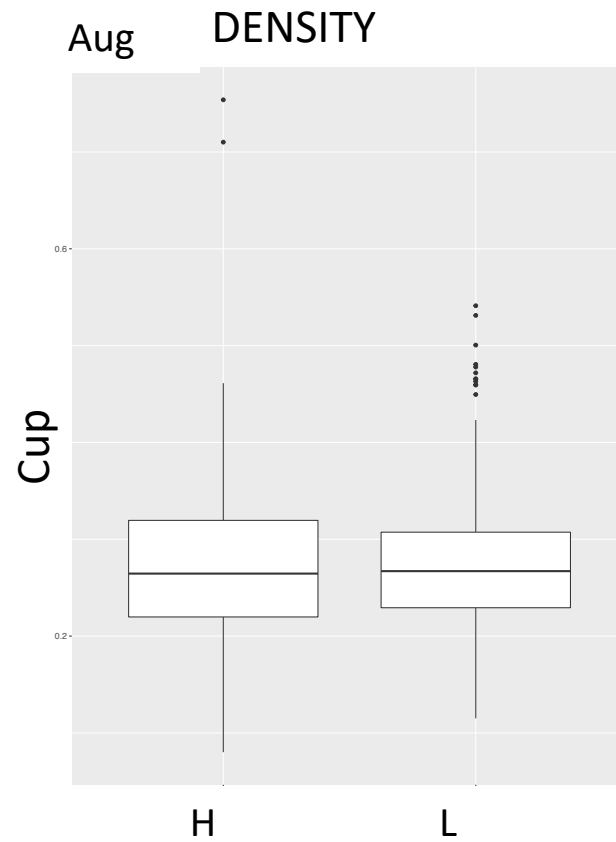
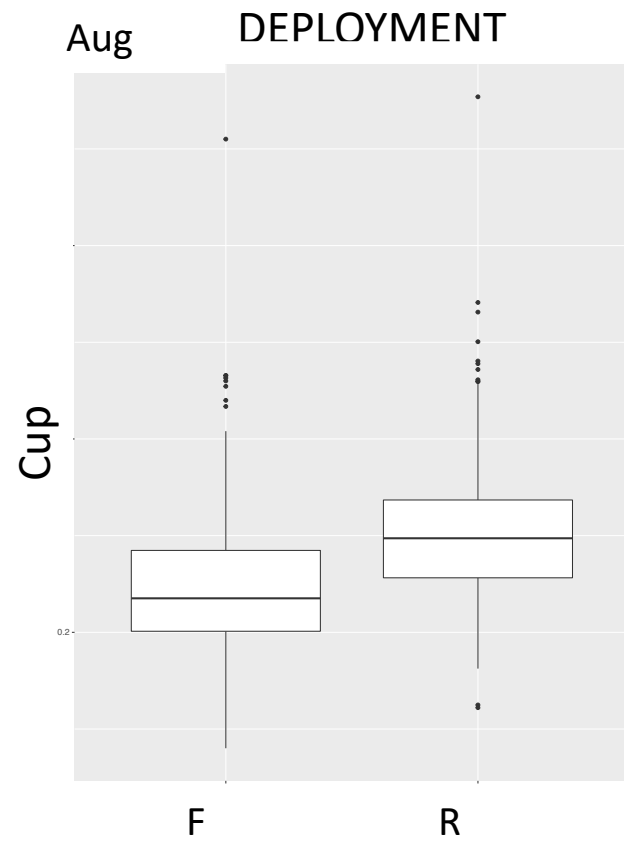
Height –  
Best Outcome

- Floating, Light Density, SEAPA



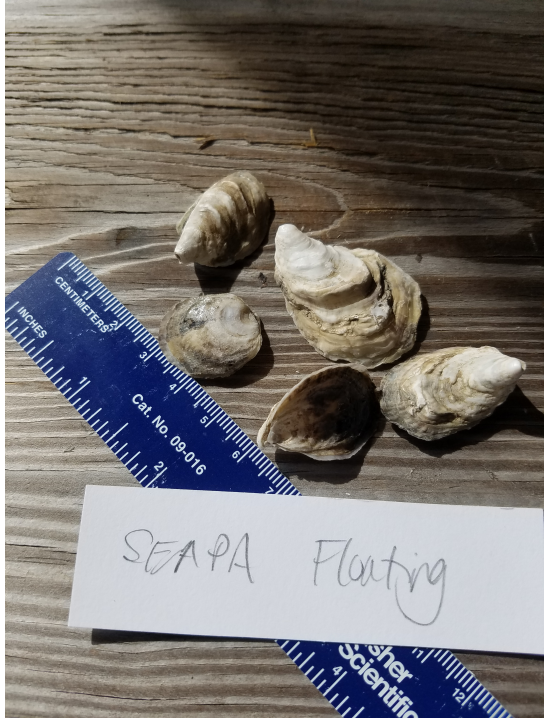
Fan – Best Outcome

- Floating, Light Density, SEAPA

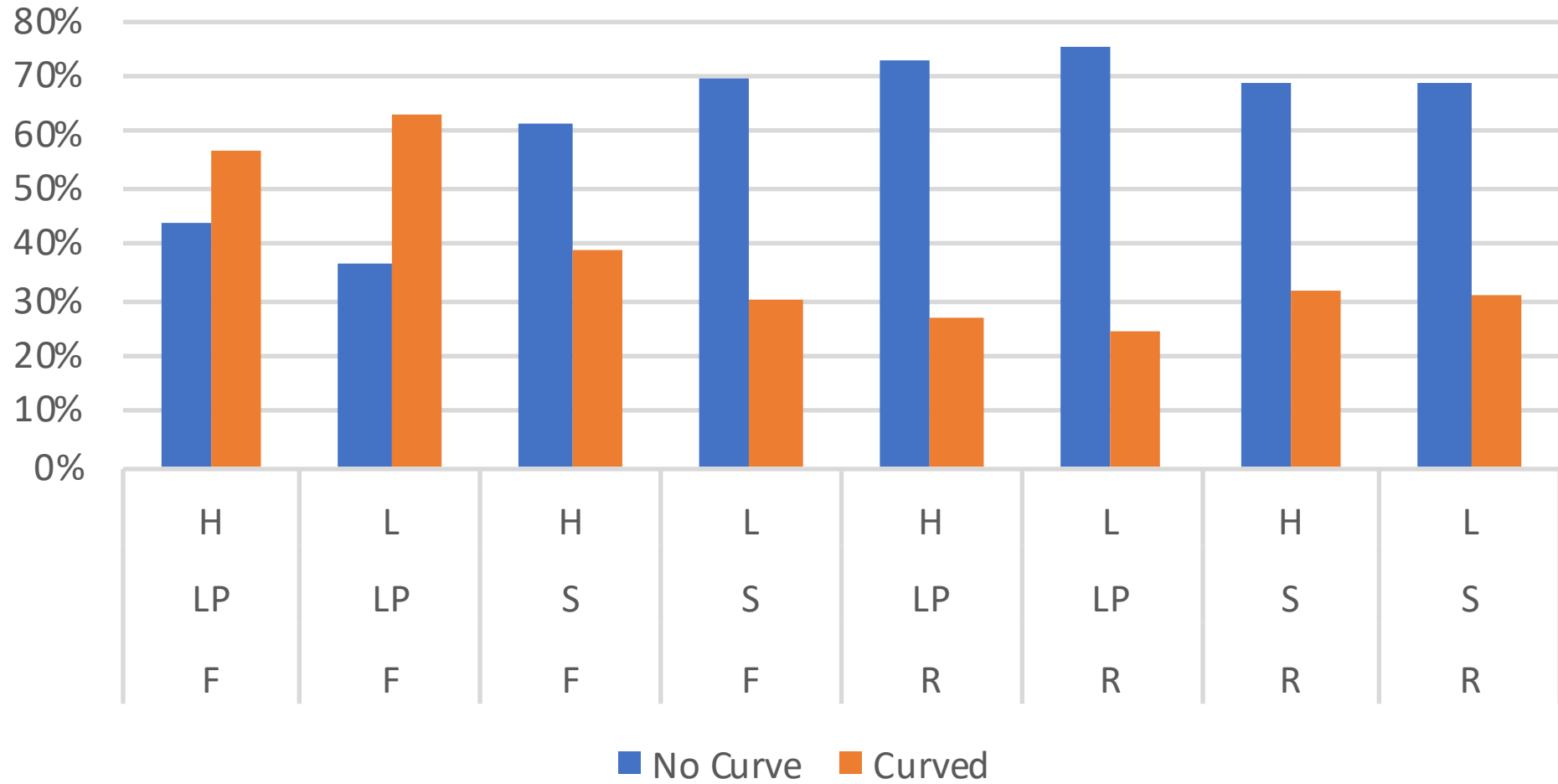


Cup – Best Outcome

- Rack



# Hinge Curvature



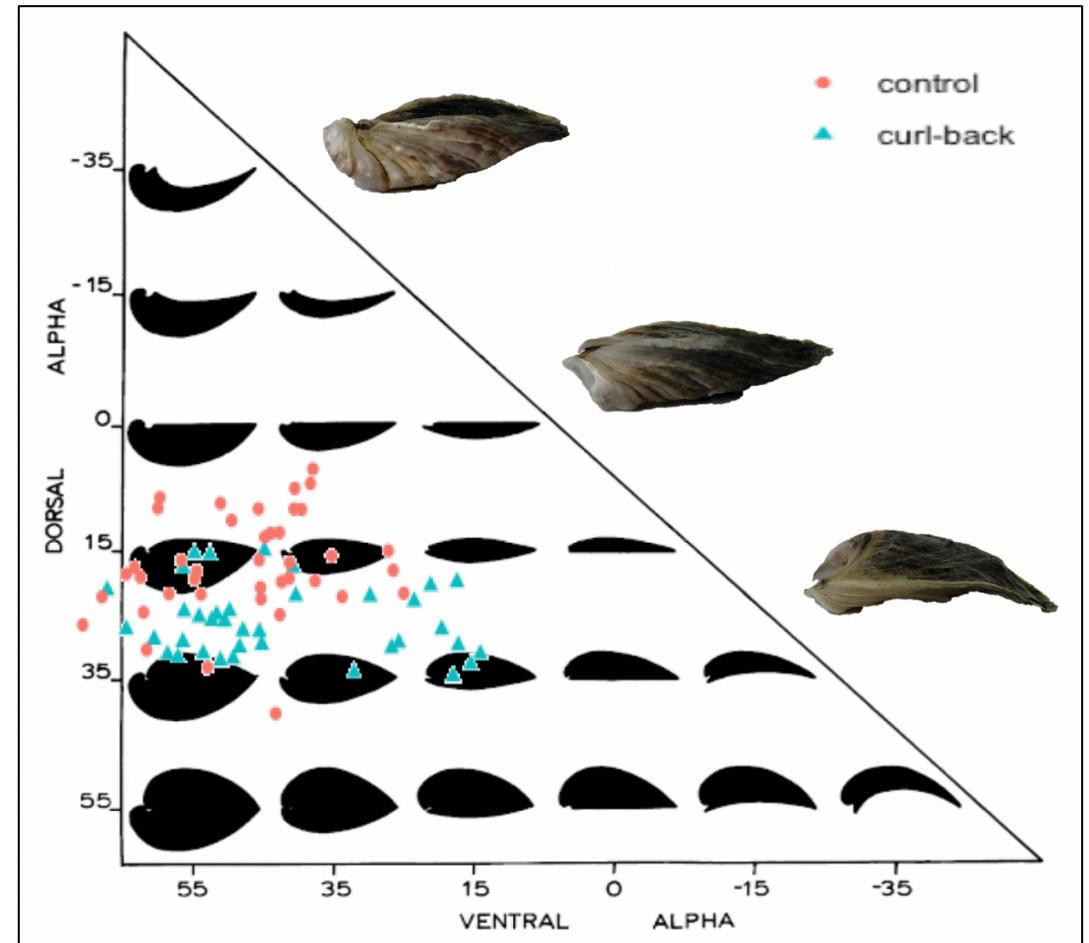
# Heritability of Curl-back Abnormality \*\*

- Produced two generations of offspring from oysters with curl-back trait and from those with normal curvature
- The effect of selection between selected and control cohorts was significant indicating the trait is heritable

Control



Curl-back



Genetic selection visualized by plotting individuals in a theoretical morphospace based on a logarithmic spiral model (McGhee 1999)

\*\*Mike Whiteside, 2019



## Fouling

- Fouling was not an issue during the first 4 weeks
- Non of the evaluated growout methods prevented fouling or outperformed other treatments in respect to fouling



## Survival

- Losses associated with escape and mudding
- At 12 weeks mortality averaged 16%
- Higher mortality in floating than in on-bottom cages





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## Summary

- All methods were effective for the field nursery of seed, survival averaged 84%
- Overall, seed grown in floating cages grew faster than seed grown on-bottom
- All methods out-performed upweller nursery systems in respect to growth rate
- Shell shape was influenced by cage type, deployment method, and sometimes density
- Fan index tended to be higher in seed grown in floating cages, while cup index tended to be higher in seed held in on-bottom SEAPA cages
- Seed grown in floating cages had a higher proportion of non-normal hinges than those grown on-bottom
- SEAPA socks were more resistant to wear than seed bags
- Careful attention was necessary to control fouling



# Acknowledgements

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