NESARE FARMER GRANT PROJECT RESEARCH NOTE

Evaluation of Elevated Rack Height to Control Biofouling on an Intertidal Oyster Farm: Efficacy and Economics

Lisa Calvo[1], Daphne Munroe[2] and Kevin Sullivan[2]
[1]Sweet Amalia Oyster Farm
[2]NJAES Rutgers University

Relevance
Mud worms are recognized as important pest on shellfish farms worldwide. This project, conducted on the east coast of the U.S. in the southern Delaware Bay, New Jersey sought to establish a strategy to control two mud worm species – *Polydora cornuta* and *Polydora websteri* on an intertidal oyster farm employing rack and bag oyster culture methods.

Core questions
1. Can I reduce biofouling, and the cost of mitigating biofouling, by using higher racks?
2. What are the production economic costs and or benefits that might be associated with employing higher racks?

Research approach
During the study oyster production and cost data was collected for oysters grown at each rack height (15", 20" and 30") in an experimental field trials. This information along with past business records for the rack and bag farm operation was used to develop an economic cost model. The economic assessment included a producer-level enterprise cost of production budget for a typical “rack-and-bag” oyster operation using standard height (15”) racks. This served as a baseline for comparing the costs and benefits of changing to one of the other rack heights evaluated in the trial.

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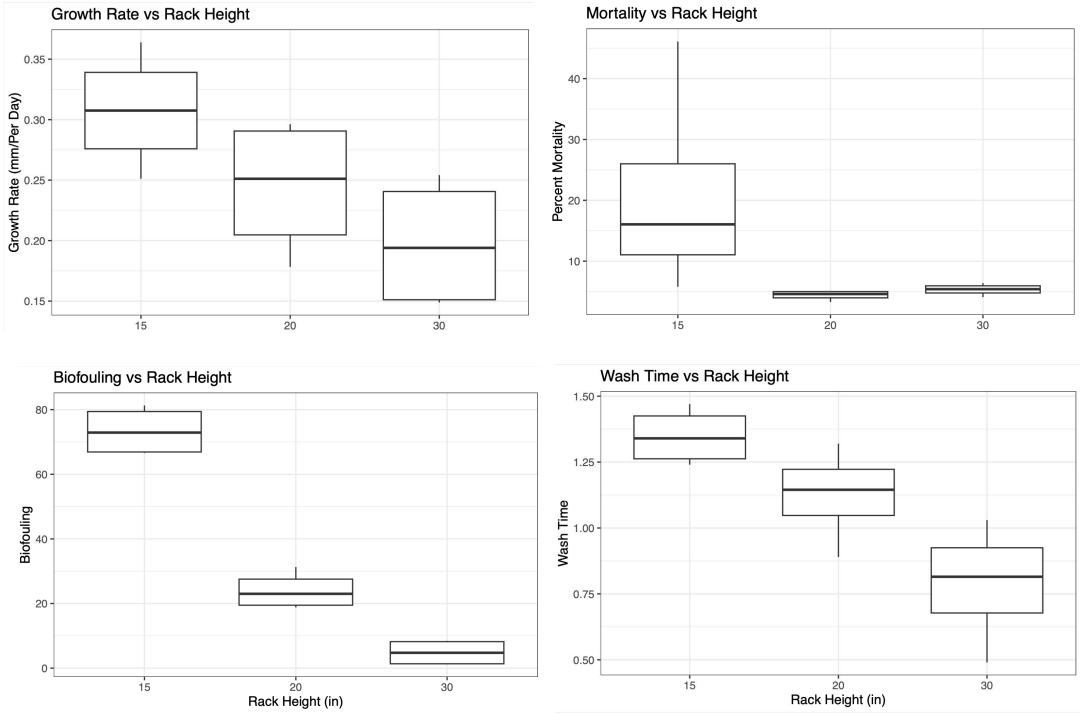

Fig 1. Box plots of growth rate and mortality of oysters grown on 15, 20, and 30"racks (top) and mud biofouling associated with the mud worm *P.cornuta* (%coverage) and wash time in average minutes per rack/per wash of oysters grown at each rack height.

Findings

- Rack height had a significant effect on growth during the course of the experiment with higher rates of growth occurring with decreasing rack heights (more time out of water = less growth).. Extrapolating growth rates to yield market size oysters an addition 2 and 8 weeks of growing time was needed for oyster grown at 20" and 30" relative to the lower 15" rack height (Fig1).
- Oyster mortality was higher at a 15" (21%) rack height than at 20", and 30," which remained at or below 5% through the 12-week field trial (Fig 1)
- Biofouling associated with *P. cornuta* (mud worms) significantly increased with decreasing rack height resulting in increases in time (labor) spent washing.
- *P. websteri* prevalence and coverage increased with decreasing rack height.
- Oyster condition, shell strength, shell height, shell width, and shell depth did not significantly differ among rack heights.

The numbers ($$$)

- A producer-level enterprise cost of production budget was developed for a rack and bag oyster farm.
- Higher costs and lower growth rates associated with higher rack heights were offset by significant increases in survival, thus increasing overall profits.
- Sensitivity analysis shows that methods to reduce biofouling dramatically shift profit margins.
- Even small improvements in survival can greatly improve profitability. Conversely, even small reductions in survival could lead to serious cash flow problems.
- In this instance gross revenues increased for 20" and 30" racks by $61,794 and $55,708, respectively; representing a significant profit increase for a small farm (< 500,000 oysters in annual production).

Learn more about this work

Reach out to lisa@sweetamalia.com. Visit our report which will soon be live at https://northeast.sare.org/ Farmer Grant Project **FNE23-038.** Stay tuned for a publication and presentation at 2026 NACE.