Optimization of Field Nursery Practices for Oyster Seed Cultivation at an intertidal site in Delaware Bay, NJ

Lisa Calvo[1] and Daphne Munroe[2]
[1]Sweet Amalia Oyster Farm, PO Box 475 Newfield, NJ 08344
[2]Haskin Shellfish Research Laboratory, Rutgers University, 6959 Miller Avenue, Port Norris, NJ 08349

Figure 1. Intertidal oyster farms in Delaware Bay, New Jersey, USA.

Introduction

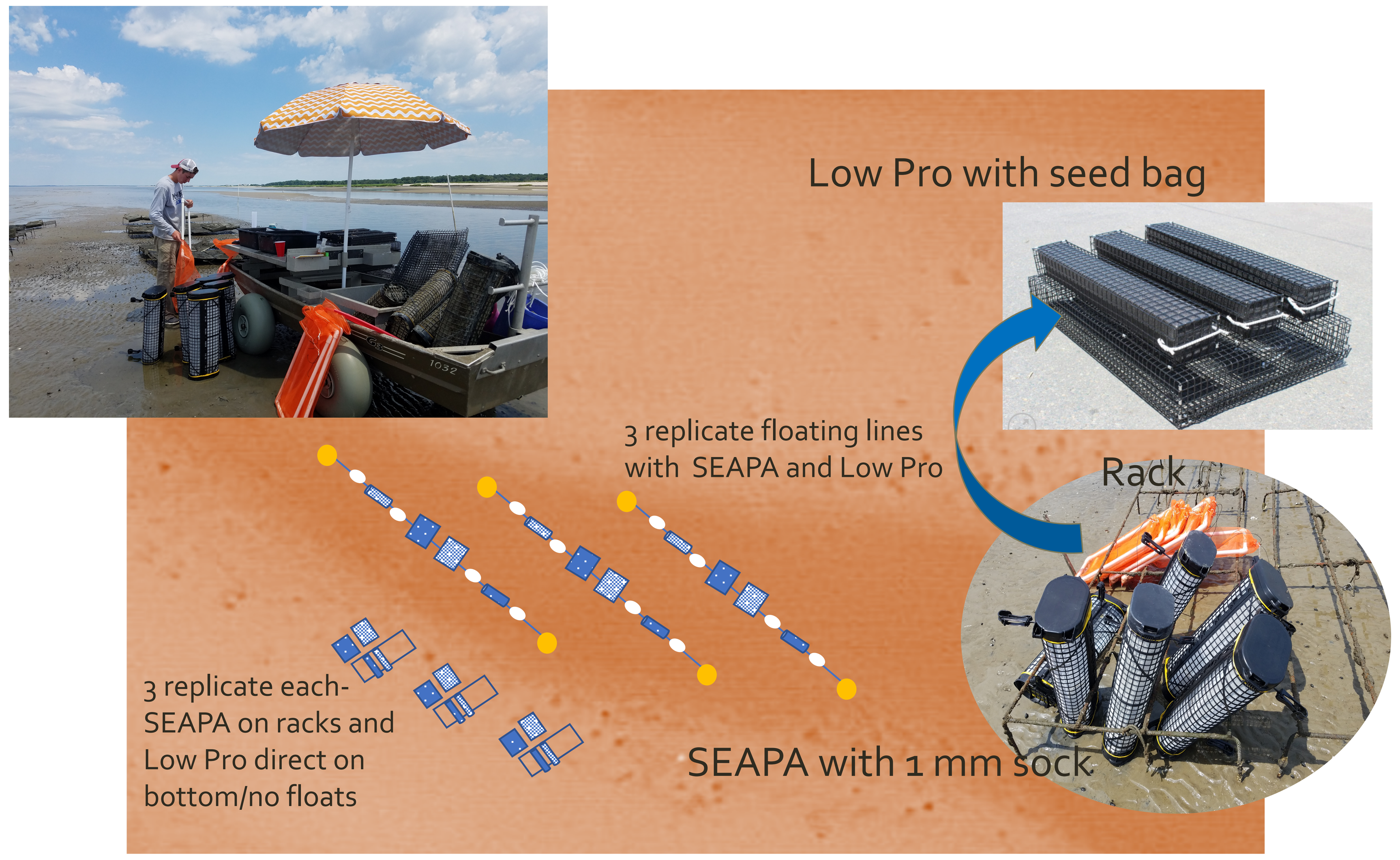
Limited hatchery and nursery capacity has constrained the growth and development of oyster aquaculture in New Jersey. Growers who do not have land-based nurseries, nursery their seed in the field where environmental control is not possible and many challenges persist. This is particularly difficult at high energy intertidal sites in the southern Delaware Bay. Little attention has been paid to the optimization of strategies for the field nursery of small (2-4 mm) oyster seed. Here, we evaluated the performance of various field methods for growing out 2 mm oyster seed in this particularly challenging environment.

Methods

- A crossed factorial experimental design was used to test the performance of cage type (Seed bag in Low Pro and SEAPA with 1 mm sock), position (rack or floating), and stocking density 2000 and 8000 seed per cage.
- Measured parameters included survival, growth, and shell morphology.
- Shell morphology assessments included calculation of fan and cup, and a qualitative rank of shell curvature extent and direction.
- Stocking densities were adjusted at two to three -week intervals, with restocking occurring at a standardized volume.

Field nursery methods were evaluated using a crossed factorial design with three factors —

- ***Deployment position: floating vs on-bottom***
- ***Cage: SEAPA/ with sock vs Low-Pro/ with seed bag***
- ***Density: High (8000 seed) vs low (2000 seed)***



Results

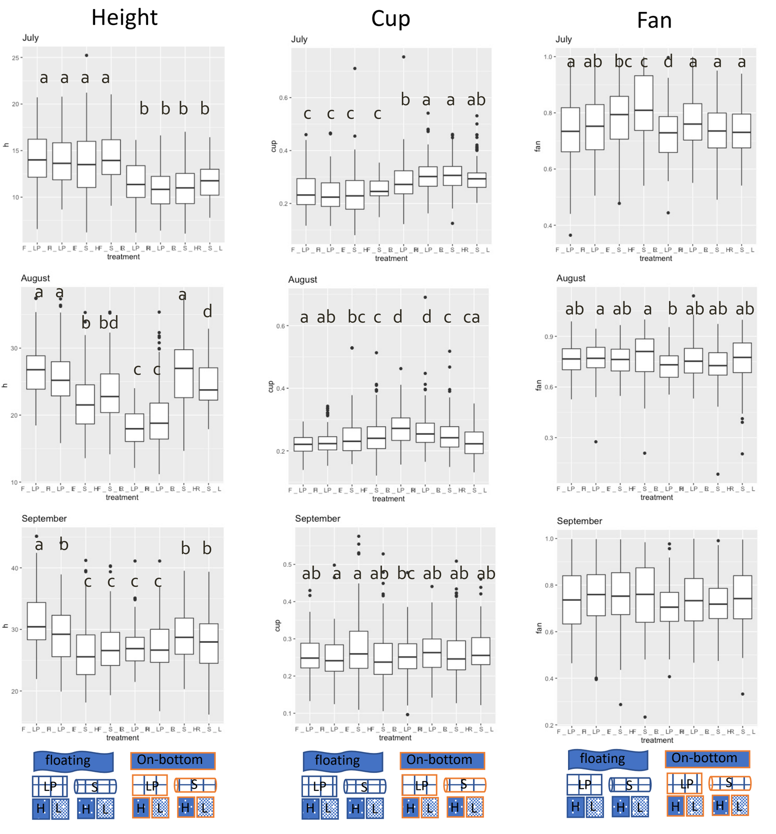


Figure 2. Box and whisker plots of shell height, cup, and fan of seed sampled in July, August and September. Grow out treatments included two deployment factors- floating (F) and and on-bottom racks (R), two cage types- Low Pro (LP) and SEAPA (S) and two Densities- high (H) and low (L). Shared letters indicates no significant difference between treatments.

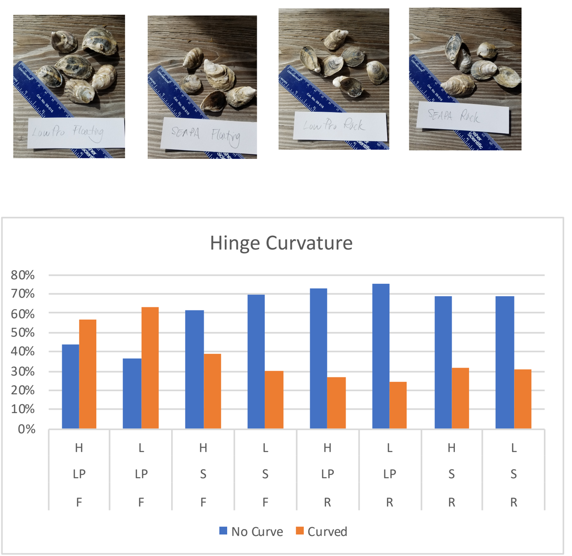


Figure 3. Comparison of percent of seed with curved hinges vs normal, non curved hinge for samples collected in September. Grow out treatments included two deployment factors- floating (F) and and on-bottom racks (R), two cage types- Low Pro (LP) and SEAPA (S) and two Densities- high (H) and low (L).

- The effects of cage and deployment were statistically significant on all treatment dates, while the effect of stocking density was not significant.
- Overall, seed grown in floating cages experienced faster growth than that grown on-bottom.
- In general, seed grown in floating cages had a wider fan than that grown on-bottom, while deeper cups were observed in seed grown on-bottom.
- Treatment had a significant effect on hinge curvature with seed grown in floating cages having a significantly higher proportion of curved back hinges than those grown on-bottom.
- Survival at 12 weeks was estimated to be on average 84%.
- Seed escape losses occurred in seed bags that tore during deployment and careful examination was necessary to detect mudding inside the cages. SEAPA socks proved to hold up better than seed bags.
- Little fouling occurred in the first 4 weeks of the experiment, after that careful attention was necessary to control fouling.
- All evaluate evaluated methods performed well, but on-bottom conditions had the advantage of reduced proportion of curved hinges.

Acknowledgements: Thanks to Joe O'Reilly for project assistance. This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research & Education Farmer Grant program under subaward number 18-888-32231.

Sweet Amalia OYSTER FARM CAPE MAY · NEW JERSEY

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

NORTHEAST SARE Sustainable Agriculture Research & Education