The effects of different gear types on farming Atlantic Sea Scallops (*Placopecten magellanicus*)

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Introduction

The Atlantic sea scallop *(Placopecten magellanicus)* has a long-standing commercial fishery in Maine and as Maine's aquaculture industry continues to grow, there is interest in developing innovative and cost-effective techniques for sea scallop aquaculture. Typically, lantern nets are used for the grow out stage, however, these nets are highly susceptible to biofouling, increasing the labor and cost involved in farming scallops (Davidson et al. 2014). This project aims to compare the growth rate of sea scallops in lantern nets with three other types of aquaculture gear: bottom cages, dark sea trays, and floating nursery bags. This will also serve to test sea scallop growth in the top, middle, and bottom of the water column, as sea scallops are sensitive to changes in temperature and salinity (Morse et al. 2019). Lastly, the economic efficiency of using each gear type will be compared, specifically the capital cost and labor involved in deployment and maintenance.

Figure 4: Measuring the live weight of a sea scallop.

Citations

Davidson, L-A., Nowlan, R., & Niles, M. 2014. Open-ocean sea scallop culture trials in Chaleur Bay, Canada: Comparing gears and husbandry practices. *Canadian Technical Report of Fisheries and Aquatic Sciences.*

Morse, D., Cowperthwaite, H. S., Perry, N., & Britsch, M. 2019. Methods and Materials for Aquaculture Production of Sea Scallops.

Maine Department of Marine Resources. 2021. Table of Standard and Experimental Aquaculture Leases. Accessed from: https://www.maine.gov/dmr/aquaculture/leases/decisions/table.html

Acknowledgements

Methods

Figure 1: Bottom cages.

Figure 2: Dark sea tray.

Figure 3: Lantern net.

The four types of aquaculture gear that we used were floating nursery bags, bottom cages (Fig. 1), dark sea trays (Fig. 2), and lantern nets (Fig. 3). Three replicates of each gear type were used (Table 1). The scallops were measured for shell height, shell width, shell inflation, and live weight (Fig. 4) in groups of 30 before deployment (Fig. 5). ANOVA tests were used to determine if there was any significant difference between the groups.

After deployment, each gear type will be monitored regularly. Any biofouling of the gear will be recorded and removed. Shell height and live weight will be measured for each sea scallop monthly until late fall.

Table 1: Gear types, stocking densities, and total number of scallops for gear deployed at the Darling Marine Center.

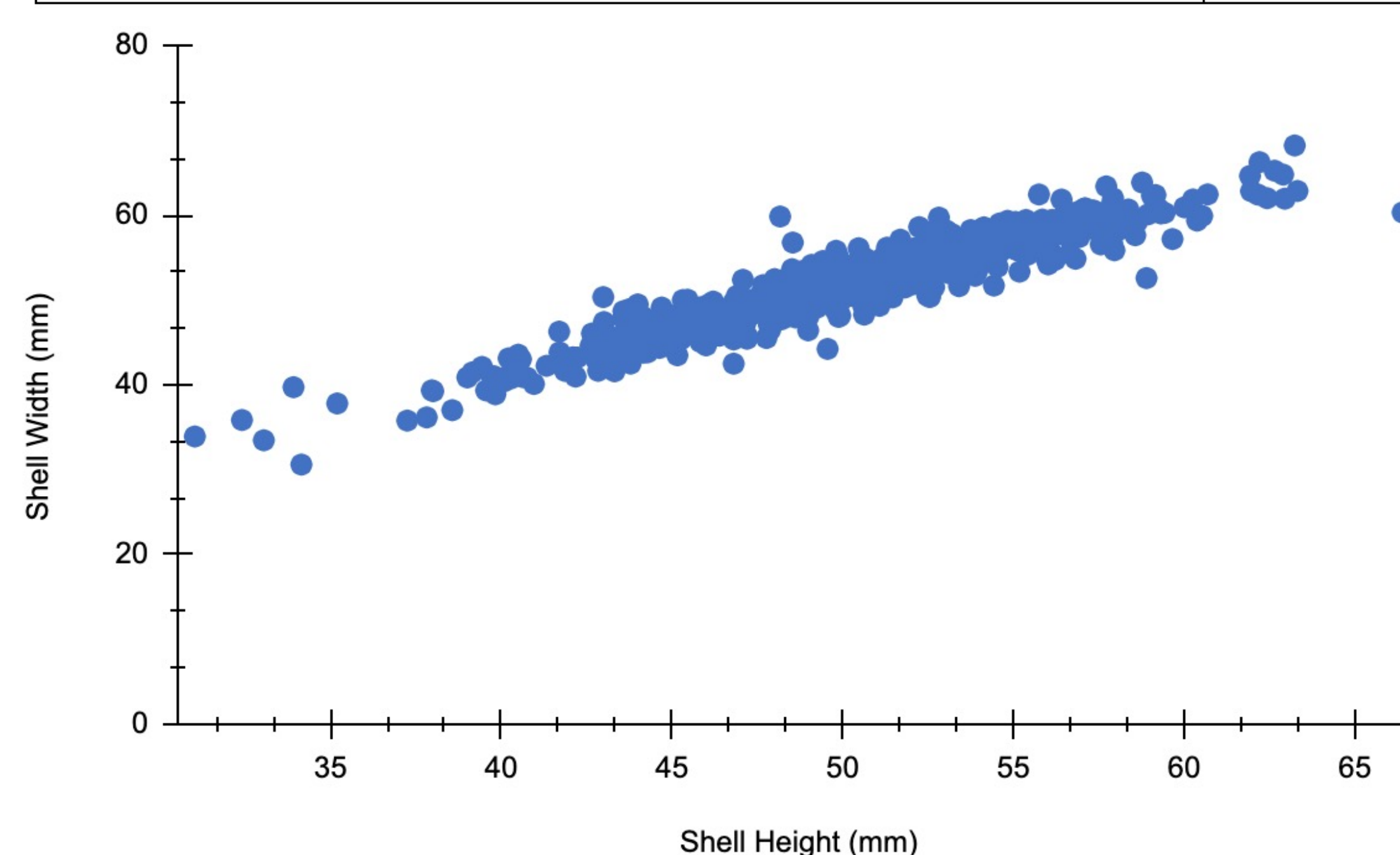| Gear Type	Stocking Density	Number of each gear type	Tag #s	Total Number of Scallops
Lantern nets	30 scallops/tier; 90 scallops/net	3	1-9	270
Bottom cages	30 scallops/cage	3	10-12	90
Dark sea trays	30 scallops/tray	3	13-15	90
Floating nursery bags	60 scallops/bag	3	16-18	180
TOTAL				630

Figure 5: Initial measurements of shell height and shell width of sea scallops deployed at the DMC on July 16, 2021.

Significance

Currently, there are 32 standard and experimental aquaculture leases along the coast of Maine that are growing sea scallops (Maine DMR, 2021). This interest in sea scallop aquaculture demonstrates a need for science-based best practices for growing Atlantic sea scallops in Maine. The information gained from this study on survival and growth rates will help inform potential and established sea farmers on the costs and benefits of using different gear types to culture sea scallops.