

# Improving scallop larvae collection by assessing varied collector materials at multiple depths

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## Introduction

Demand for sea scallops (*Placopecten magellanicus*) in the US is high and is predicted to remain strong, but the US scallop fishery cannot meet current demand (Hale Group 2016). With Maine's cold, clean, and nutrient-rich water, there is potential to farm scallops, and provide year-round and abundant supply.

Collaborations between Maine and Japanese aquaculture groups have brought new techniques to Maine over the last 10 years. Current work is focused on adapting Japanese methods to Maine, including wild spat (i.e., larvae) collection. Optimizing the efficiency of spat collection by maximizing the number of scallops collected while minimizing costs will benefit farmers.

## Questions

1. Will alternative mesh types (1/8", 1/4", or 1/2") collect scallop spat as effectively as the industry standard, Netron?
2. Which combination of mesh type and depth yields the highest number of scallop spat with the fewest numbers of other bivalve species?



Left: Young adult sea scallops (*Placopecten magellanicus*) at the Darling Marine Center. Right: Sea scallop spat (approx. 9 months old) collected from spat bags. A 50 mL sample was removed from the spat bag and all scallops and other bivalves were counted, and the shell height of 50 haphazardly chosen scallops was measured.

## Methods

- Four lines of spat collectors deployed near Cape Elizabeth in Fall 2016 and retrieved in June or July 2017 (n = 48 total).
- Collectors at three depths: surface, mid, and bottom
- Each depth had 4 collectors, made of 4 different mesh types: Netron (industry standard), and 1/8", 1/4", or 1/2" agricultural netting.
- The total number of scallops and other bivalves in each collector was estimated, and the shell height of 50 haphazardly chosen scallops was measured.
- Conducted t-test to test for effect of RETRIEVAL DATE
- Used ANOVA to test for effect of MESH and DEPTH on average shell height and total number of scallops and other bivalves

## Results

- Estimated number of scallops per collector and mean shell height per spat collector were not affected by RETRIEVAL DATE (t-test, p > 0.05), but the number of other bivalves was (t-test, p < 0.05).
- Mesh type did not influence the number of scallops or other bivalves, nor the size of scallops collected.
- However, depth matters. More scallops were collected in the collectors at mid depths.
- FIGURE 1: Estimated number of scallops per collector was not affected by MESH (ANOVA, p = 0.07), but was influenced by DEPTH (ANOVA, p < 0.001).
- FIGURE 2: Estimated number of other bivalves per collector influenced by DEPTH (ANOVA, p = 0.027), but not MESH (p > 0.05)
- FIGURE 3: Settlement of mussels significantly greater near surface (ANOVA, p = 0.001).
- No difference in average shell height of scallops, either by MESH, DEPTH, or the interaction of MESH and DEPTH (ANOVA, p > 0.9 for all factors).

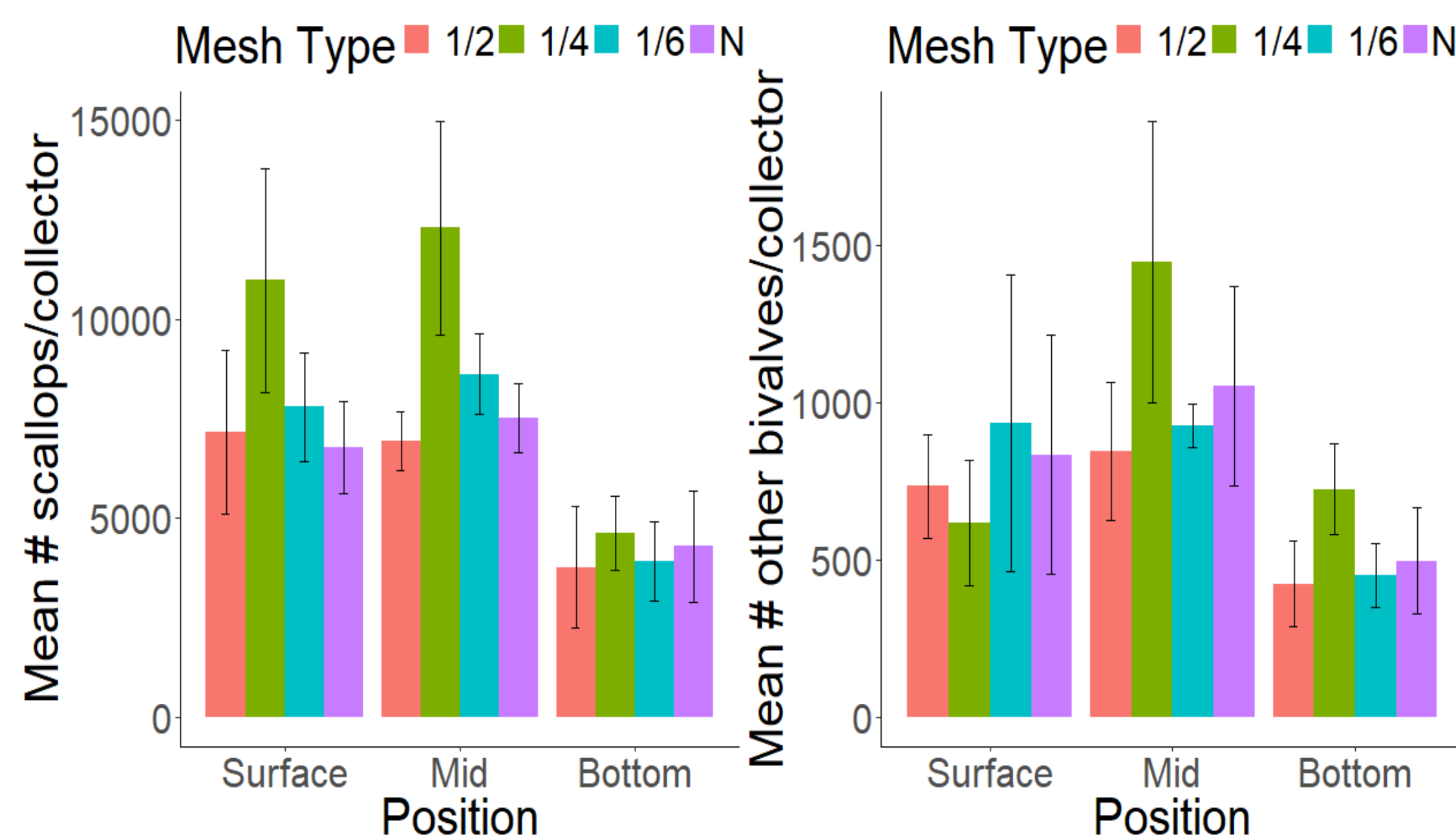
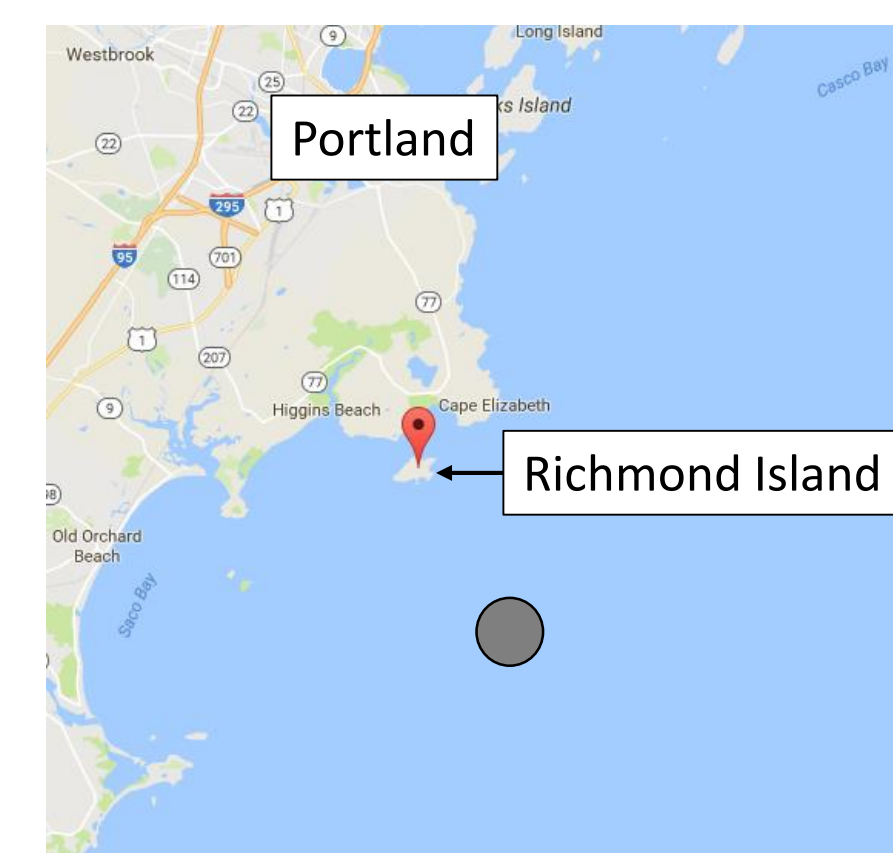


Figure 1: Mean total number of scallops (+ SEs) by DEPTH and MESH types. Collectors made of 1/4" mesh and deployed at mid depths collected the most scallop spat.

Figure 2: Mean total number of other bivalves (+ SEs) by DEPTH and MESH types. Collectors made of 1/4" mesh and deployed at mid depths collected the most larvae of other bivalves.



Collector filled with scallop spat  
Photo: Dana Morse



Scallop spat were collected from the shaded area, 3 miles south of Richmond Island, ME

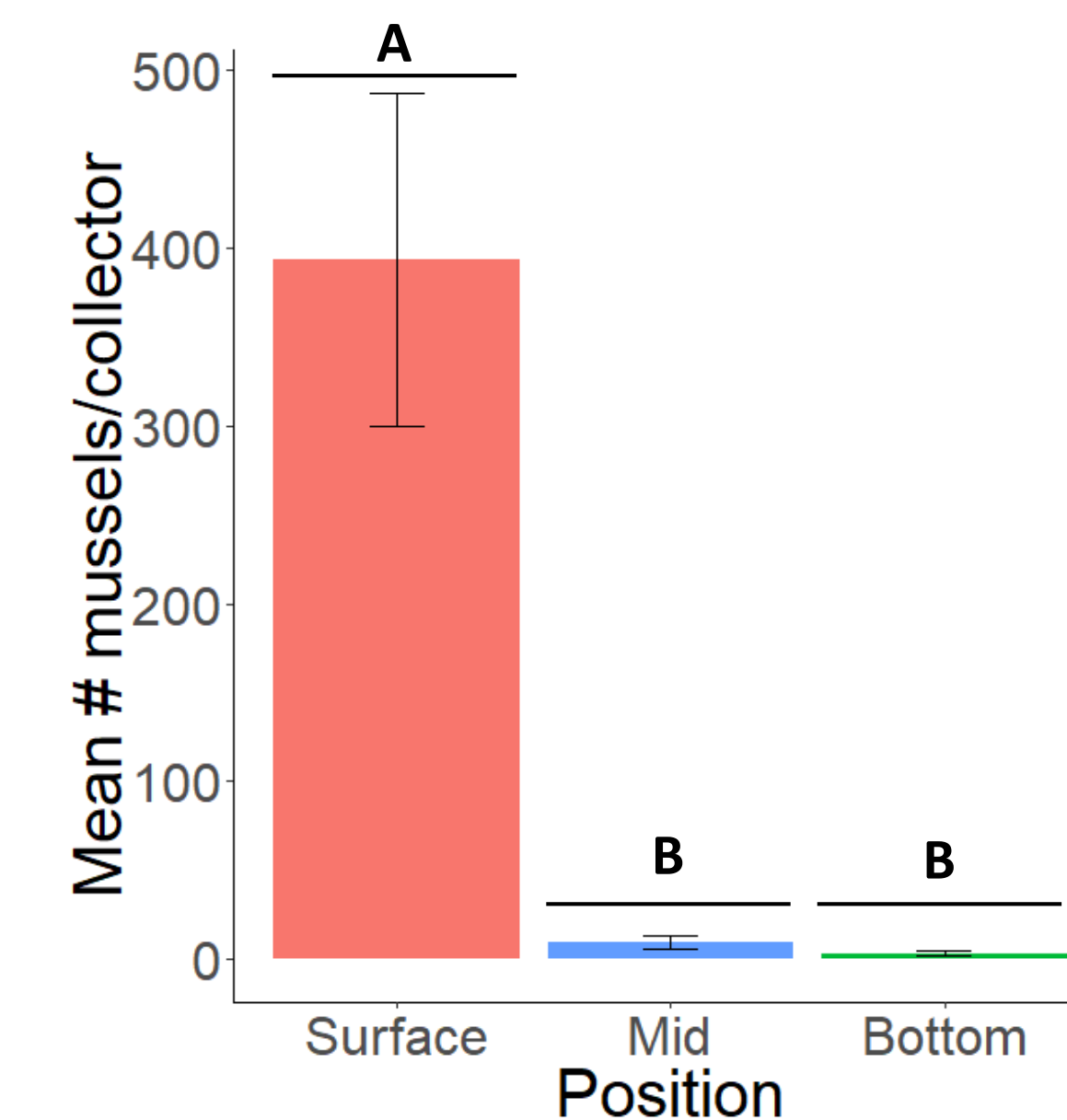


Figure 3: Mean number of mussels (+ SEs) by DEPTH. Collectors placed near the surface collected significantly more mussels.



Photo: Dana Morse

## Conclusions

- Collectors made of different materials performed equally well, suggesting that Netron is not a necessary element of successful scallop spat collection.
- Depth matters: putting collectors in the middle of the water column (rather than at the surface or bottom) may yield more scallop spat and fewer mussels and other non-targeted bivalves.

## Next Steps

- We need to deploy these collectors at more sites to test the generality of our findings and to gain understanding of broad-scale larval dispersal and settlement in coastal Maine.
- Frequent sampling of collectors deployed at multiple sites would provide information on the 'sweet spots' for collecting spat, and whether or not it varies geographically.
- Linking of these spat collector data with data on abundances of adult scallops would provide much needed information for sustainable harvest and ultimately, culture, of Maine sea scallops.

## References

- The Hale Group, LTD. 2016. Maine farmed shellfish market analysis. Report for the Gulf of Maine Research Institute
- Cole, A., A. Langston, and C. Davis. 2016. Maine aquaculture economic impact report. Report for the University of Maine Aquaculture Research Institute

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