Aqua Info
AQUACULTURE NOTES

AIN 08.2001

Evaluation of Floating Bags in Off Bottom Oyster Culture

Background

Off bottom production of oysters (Crassostrea virginica) is becoming an integral part of the oyster industry on PEI. Within the last several years, various off bottom grow out methods have been employed to improve the growth rate, survival rate and the shape of market sized oysters. One method being used is the floating bag. (Figure 1). Research trials were conducted in 1998, which compared the growth and mortality of oysters grown in floating bags with oysters grown in bags on rebar racks. These trials, comparing floating bag culture with rack and bag culture, were conducted on oysters during their first, second, and third years of growth.

Figure 1. Floating bags used for the study.

Methods

For the experimental group, modifications were made to bags enabling them to float on the surface of the water, while holding a full complement of oysters. Pieces of styrofoam were placed inside the bags and fastened to both sides with cable ties. Stocked bags were then fastened by the ends to two longlines which were securely anchored at each end by cement blocks. Each set of longlines accommodated fifty floating bags (Figure 2). For the comparison group, bags of oysters were placed on racks in an intertidal area adjacent to the floating bags. Oyster seed collected during the summers of 1995, 1996 and 1997 was used in this trial which was conducted in 1998 from May to October.

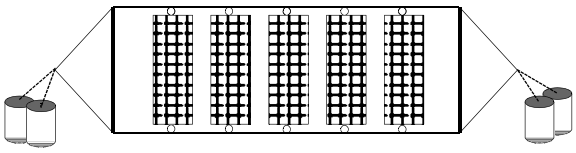

Figure 2. Schematic diagram of a floating bag system.

The oysters were measured initially and again at study end. Initial lengths were determined by measuring one hundred randomly selected oysters from each year class, and using the mean of these measurements as a baseline from which to compare growth. These lengths were 27.3 mm (first year), 48.7 mm (second year), and 65.8 mm (third year).

Oysters of each year class were placed in bags at densities of one thousand for 1997 seed (first year growth), four hundred and thirty for 1996 seed

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(second year growth), and two hundred for 1995 seed (third year growth). Tags were attached to each bag to insure continuity of identification and to provide a means to conduct the trial as a blinded study. Bag maintenance , which included, flipping and cleaning with a bristle brush when necessary, was conducted every two to three weeks throughout the study period. At study end a random sample of twenty-five oysters was collected from each bag and measured. Mean oyster lengths were determined from this data. Mortality estimates were also determined at this time and expressed as a percentage of the total number of oysters in the bag.

Results

Growth

There was no significant statistical difference in growth observed between oysters grown in floating bags and those grown intertidally in bags on racks (Table 1).

Table 1. Growth by method and year

Grow-out Method	Growth (mm) by Year			
	1st	2nd	3rd	Average
Floating	22.4	20.4	13.6	18.8
Intertidal	23.1	21.1	13.8	19.3

No significant statistical difference

Mortality

Oysters grown using the rack and bag method in their first year of growth experienced a statistically significantly higher mortality rate than those grown using the floating bag method, however, biologically the difference was insignificant. No other differences in mortality were noted for the remaining year classes of oysters (Table 2).

Table 2. Mortality by method and year

Grow-out Method	Mortality (%) by Year			
	1st	2nd	3rd	Average
Floating	1.1 [a]	3.3	5.7	3.4
Intertidal	2.7 [b]	2.0	4.9	3.2

[(a , b)] Significant statistical difference

Conclusions

In theory, the advantages of growing oysters in floating bags include: a) accessing the water column highest in food supply on a continuous basis resulting in increased growth rates and superior shaped oysters, and b) less maintenance required for control of bag fouling flora. Fouling decreases the flow of water through the bag, resulting in decreased exposure to phytoplankton and subsequently a decreased growth rate. Similar maintenance regimes, which included regular flipping and cleaning of bags, eliminated any effect fouling may have had on growth and survival rates on both culture methods used. Once bag fouling is accounted for, it does not appear that continuous exposure to feed, as in the floating method, has a growth or survival advantage over intermittent exposure to feed, as in the intertidal rack and bag method. Lease maintenance regimes may influence production levels more than the culture method employed.

This information sheet was made possible by the following partners:

- University of Prince Edward Island (AVC)
- PEI Department of Fisheries, Aquaculture and Environment
- PEI Aquaculture Alliance
- PEI Aquaculture and Fisheries Research Initiative

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