



COMPARISON OF SPAT (*Crassostrea* spp.)
SETTLEMENT RATE, NUTRITIONAL COMPOSITION,
AND ECONOMIC VIABILITY AMONG DIFFERENT
SITES IN COX'S BAZAR COAST

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Roll No.: 0119/02

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**A thesis submitted in the partial fulfillment of the requirements for the degree of
Master of Science in Aquaculture**

**Department of Aquaculture
Faculty of Fisheries
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JUNE 2020

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Tashrif Mahmud Minhaz

June 2020

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This is to certify that we have examined the above Master's thesis, and have found that it is complete, and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made

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List of Publications

Publications	Status
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List of Abbreviations

Acronym	Definition
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
AOAC	Association of Official Analytical Chemists
CD	Chowfoldandy
CDR	Chowfoldandy River
DHA	Docosahexaenoic Acid
EPA	Eicosapentanoic Acid
FAME	Fatty Acid Methyl Esters
GCMS	Gas Chromatography and Mass Spectrophotometry
HTWD	High Tide Water Depth
IORA	Indian Ocean Rim Association
LTWD	Low Tide Water Depth
MUFA	Mono Unsaturated Fatty Acids
NC	Nunia Chara
NCC	Noa Chira Canal
OB	Oyster Broodstock
PUFA	Poly Unsaturated Fatty Acids
SAFA	Saturated Fatty Acids
SI	Sonadia Island
Sqrt	Square Root
TFA	Total Fatty Acids
TUFA	Total Unsaturated Fatty Acids

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Abstract

The spat settlement (spat density, recruitment, and mortality) of edible oyster *Crassostrea* spp. was estimated for the three sites (Nunia Chara– NC, Chowfoldandy– CD, and Sonadia Island– SI) located at Cox’s Bazar coast in Bangladesh, from February 2019 to January 2020, deploying shellstring. Field observations were made every 15 days to understand the monthly variation of oyster spat settlement more precisely. A number of 50 live oysters were collected randomly from each farms located at the three sites to assess proximate composition and fatty acid contents. Income, and expenditure data of the three farms were collected from District Fisheries Office, Cox’s Bazar to analyse economic viability of the farms. Both spatial, and temporal variability in spat settlement along with their interaction effect, as a function of prevailing environmental conditions were observed ($p < 0.05$). Highest spat density, and recruitment were observed at NC with a comparatively lower mortality ($p < 0.05$). On the other hand, temporal variability shows that spat recruitment, and mortality varied monthly with environmental fluctuations resulting in higher spat density from late October to mid-May. Distinct environmental gradients (salinity, temperature, pH, high tide, and low tide water depth, total suspended solids), and fouling organisms (seaweeds, sponges, marine macrophytes and bush like organisms, mussels, barnacles, other oysters, polychaetes, and oyster drills) were observed during the study, which affected the spat settlement. Spat density, recruitment, and mortality were significantly ($p < 0.05$) related to the environmental gradients. On the other hand, substrates at NC was mostly affected by seaweeds, sponges, other oysters, and sponges; CD was mostly affected by marine macrophytes and bush like organisms, mussels, barnacles, and polychaetes; SI was mostly affected by marine macrophytes and bush like organisms, other oysters, polychaetes, and oyster drills. Oysters of all the three farms had adequate quantity of proximate composition for human consumption, although protein, and carbohydrate content varied among the farms. All the fatty acid groups, and ratios were significantly different among the farms; however, omega-3 fatty acids were adequate at CD, while omega-6 fatty acids were much higher than the recommended level at NC, and SI. Out of the three oyster farms, SI was not economically viable for commercial oyster farming. Therefore, this study concludes that NC has higher potentiality of allocation for spat collection avoiding late May to mid-October both for commercial farming, and oyster restoration efforts; oysters of all the three farms have good quantity of proximate composition; fatty acids of oysters of CD farm shows better health benefits; NC, and CD farms will be economically viable for commercial oyster farming.

Keywords: Oyster, spat settlement, shellstring, proximate, fatty acids, economic viability, Cox’s Bazar coast