COMPOSITION, IDENTIFICATION AND TEMPORAL PATTERNS OF FISH LARVAE AT THE NAF RIVER ESTUARY, TEKNAF, BANGLADESH

Faijabul Afridi Fahim

Roll No.: 0120/09

Registration No.: 861

Session: January-June, 2020

A thesis submitted in the partial fulfillment of the requirements for the degree of Master of Science in Fisheries Resource Management

Department of Fisheries Resource Management

Faculty of Fisheries

Chattogram Veterinary and Animal Sciences University

Chattogram-4225, Bangladesh

JUNE 2022

Authorization

I hereby declare that I am the sole author of the thesis. I also authorize the Chattogram Veterinary and Animal Sciences University (CVASU) to lend this thesis to other institutions or individuals for the purpose of scholarly research. I further authorize the CVASU to reproduce the thesis by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

I, the undersigned, and author of this work, declare that the electronic copy of this thesis provided to the CVASU library, is an accurate copy of the print thesis submitted, within the limits of the technology available.

Faijabul Afridi Fahim

June, 2022

COMPOSITION, IDENTIFICATION AND TEMPORAL PATTERNS OF FISH LARVAE AT THE NAF RIVER ESTUARY, TEKNAF, BANGLADESH

Faijabul Afridi Fahim

Roll No.: 0120/09

Registration No.: 861

Session: January-June, 2020

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

----------	----------
Dr. Gous Miah	**Dr. Sk. Ahmad-Al-Nahid**
Supervisor	**Co-supervisor**

Dr. Sk. Ahmad-Al-Nahid
Chairman of the Examination

Department of Fisheries Resource Management

Faculty of Fisheries

Chattogram Veterinary and Animal Sciences University

Chattogram-4225, Bangladesh

June, 2022

Acknowledgements

All praises are due to Almighty Allah for blessing me with the strength, aptitude and patience and enabled me to pursue higher education and to complete the thesis for the degree of Masters of Science (MS) in Fisheries Resource Management under Department of Fisheries Resource Management, Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh.

The author expresses his gratitude and indebtedness to Vice-Chancellor, Professor Dr. Goutam Buddha Das and Dean, Professor Dr. Muhammad Nurul Absar Khan from the bottom of his heart for their immense administrative support to complete his research work.

The author would like to express his deepest sense of gratitude, profound regards and indebtedness to his research supervisor Dr. Gous Miah, Professor, Department of Genetics and Animal Breeding, Faculty of Veterinary Medicine, for his co-operation, constant inspiration and indomitable guidance throughout the period of research work.

The author finds it a great pleasure in expressing his heartfelt gratitude to his research co-supervisor Dr. Sk. Ahmad-Al-Nahid, Head and Associate Professor, Department of Fisheries Resource Management, Faculty of Fisheries, Chattogram Veterinary and Animal Sciences University, for his sympathy, sincere cooperation, inspiration and valuable suggestions for the completion of the research work.

The author is extremely glad to take the opportunity to express his heartfelt gratitude to his all other respected teachers of the Faculty of Fisheries, Chattogram Veterinary and Animal Sciences University, for their valuable teaching and encouragement.

Last, but not the least, the author expresses his heartfelt gratitude to his beloved parents for their selfless love, blessings, care, dedicated efforts, valuable prayers and continuous support during the academic life.

The Author

Faijabul Afridi Fahim

Table of Contents

Chapter	Title	Page No.
	Title Page	I
	Authorization	II
	Signature Page	III
	Acknowledgements	IV
	List of Tables	VII
	List of Figures	VII
	List of Appendices	VIII
	List of Abbreviations	VIII
	Abstract	IX
1	Introduction	1-3
2	Review of Literature	4-10
3	Materials and Methods	11-15
	3.1 Study site	11
	3.2 Sampling Procedure	12
	3.3 Fish larvae sorting	12
	3.4 Morphological identification of fish larvae	12
	3.5 Determination of Larval Abundance	13-15
	3.5.1 Number of larvae individual per 1000 m^3	
	3.5.2 Measurement of larval diversity	
	3.5.3 Measurement of larval richness	
	3.5.4 Measurement of evenness	
	3.5.5 Determination of the Spawning season	
	3.5.6 Statistical Analysis	
	3.5.7 Photo Gallery	
4	Results	16-24
	4.1 Total fish larvae and dominant families	
	4.2 Top three abundant families	
	4.3 Temporal variation of larval abundance	

	4.4 Diversity index, Richness, and Evenness	
	4.5 Spawning season	
	4.6 Identified Larval Families	
5	Discussion	25-27
	5.1 Fish larval Family and Abundance	25
	5.2 Temporal distribution and diversity indices	25-26
	5.3 Spawning season	26-27
6	Conclusion	28
7	Recommendation and future perspectives	29
	References	30-37
	Appendices	38-41
	Brief biography	42

List of Tables

Table No.	Title	Page No.
1	Abundance of marine larvae at Naf River Estuary	16
2	Spawning season of fish larvae with their frequency of occurrence and spawning month	22
3	Identified Larval Families	23-24

List of Figures

Figure No.	Title	Page No.
1	Map of the Naf River Estuary	11
2	Bongo Net	15
3	Bongo Net Operation	15
4	Sample collection and initial sorting	15
5	Identification of larval family	15
6	Abundance of Fish Larval Families	17
7	Percentage of Fish Larvae Abundance	17
8	Temporal abundance of top three families	19
9	Mean Abundance of larvae in each month	19
10	Shannon-Wiener index of diversity	20
11	Pieulo’s evenness index	21
12	Richness index of family	21

List of Appendices

Appendix No.	Title	Page No.
A	Temporal Abundance of Fish Larvae at Naf River Estuary	38
B	Total Identified families and Individual of Naf River Estuary	39
C	Diversity indices of each month at Naf River Estuary	39
D	Larval frequency and Spawning season of the identified families at Naf River Estuary	40
E	Statistical analysis of marine larvae at Naf River Estuary	41

List of Abbreviations

Acronym	Definition
mm	Millimeter
m^3	Cubic meter
km	Kilometer
m	Meter
µm	Micrometer
CVASU	Chattogram Veterinary and Animal Sciences University
TL	Total Length
SL	Standard Length
%	Percentage
sp.	Species

Abstract

To determine the marine larval family and their distribution, composition, and spawning season, the current study was carried out in the Naf River Estuary, Teknaf, from March 2020 to February 2021, over a 12-month period. A number of 1681 individual were identified under Clupeidae, Engraulidae, Ambassidae, Blenniidae, Sillaginidae, Gobiidae and Carangidae family; among which Clupeidae was the dominant family with 757 individuals; which was followed by Engraulidae (553) and Ambassidae (322). The highest larval abundance at Naf Estuary was recorded to be 704/1000 m^3 in August whereas the lowest abundance was 5/1000 m^3 in March**.** The month of August had the highest number of larvae, whereas the month of April had the most families (04). The highest Shannon-Wiener index was observed in the post-monsoon season while family richness and evenness were highest in winter. Identified families use the Naf estuary as a nursing ground. The spawning season was identified based on the larval frequency. Clupeidae and Ambassidae larvae have been recorded in seven distinct months, indicating that their spawning season was summer, pre-monsoon, monsoon and post-monsoon. The Naf river estuary is most productive in the summer (April to August), according to the identification of four (04) families as early summer spawners. This research would be useful for future researchers based on the Cox's Bazar coast and the Naf River Estuary.

Keywords: Fish Larvae, Abundance, Naf River Estuary, Spawning Season.