Morphometric Variation of Hilsha Shad (*Tenualosa ilisha*) from Different Aquatic Population of Bangladesh

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Master of Science in Marine Bio-resource Science

Department of Marine Bioresource Science

Faculty of Fisheries

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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.

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Abbreviations and Symbols

Abbreviations		Full
G	:	Gram
SD	:	Standard Deviation
%	:	Percentage
Cm	:	Centimeter
SPSS	:	Statistical Package for Social Science
DM	:	Dimension
GDP	:	Gross Domestic Product
DoF	:	Department of Fisheries
FAO	:	Food and Agriculture Organization
°	:	Degree
PCA	:	Principal Component Analysis
PC	:	Principal Component
DFA	:	Discriminant Function Analysis
DF	:	Discriminant Function
sp.	:	Species
>	:	Greater than
<	:	Smaller than
et al.	:	Associates

Abstract

The morphometric character plays an important role in management of Hilsha shad in the aquatic habitat of Bangladesh. Fish samples were collected from 6 regions as Kuakata (Sea), Meghna Estuary (ME), Meghna River (MR), Lower Padma River (LPR), Upper Padma River (UPR), Upper Jamuna River (UJR) of Bangladesh. Landmark-based morphometric characters were examined to evaluate the population status and variation among these six regions. The observed characters suggest that there are morphologic differences among the Hilsha fish due to their geographical distribution, availability of food, difference in various water quality parameters, and also for their variation in habitats. The discriminant functions analysis (DFA) showed an overlapped in all the stocks of *T. ilisha*. Discriminant functions 1, 2, 3, 4 and 5 accounted for 47.3%, 24.6%, 12.7%, 9.1% and 6.3% of the variation which indicates variation among the stocks. The principal component 1 to 5 accounted for 27.16%, 20.08%, 13.17%, 8.136% and 6.616% of variation. Wilk's Lambda test also indicates highly significant characteristics among stock. The discriminant function analysis showed that 93.05% original grouped populations correctly classify their populations whereas in the cross-validation test exhibited 86.23% correctly classify their populations. Discriminant function scores of sample centroids; MR was isolated in truss distance and combination of all morphometric characters. The Biplot analysis showed that the maximum diversified populations were UPR, Sea and MR and much variation has seen in HL and D3-9 for morphometric and truss distances. For the first and second principal component maximum contribution in variance were in D2-9, D3-9 and HL. Dendogram analysis also displayed that the individual Hilsha population of ME was the greater homogeneity with LPR and UJR and UPR and MR showed the higher heterogeneity. In future this research finding will be help policy makers to initiate future policy and researchers for the management and conservation of Hilsha population. Nevertheless this research requires further effort in particular, the integration of molecular methods which may help to realize on the taxonomy of Hilsha.

Key words: Biplot, dendrogram, discriminant function, morphometric measurements, *Tenualosa ilisha*, truss distance.