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Abstract

Otolith Shape Variation in Bluefish (*Pomatomus saltatrix*) Along the Brazilian Southeast–South Coast Assessed Through Elliptical Fourier and Wavelet Transformed Descriptors †

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Abstract

Introduction: Understanding population structure is essential for effective fishery management, and otolith shape analysis provides a robust framework for detecting spatial variation in marine fish populations. The bluefish (*Pomatomus saltatrix*), a commercially important and widely distributed species along the southeastern and southern Brazilian coast, may exhibit subtle population structuring that is still not fully resolved. **Methodology**: Otolith contour variation was analyzed using two complementary approaches: Elliptical Fourier Descriptors (EFD) and Wavelet Transformed Descriptors (WTD). A total of 75 individuals (25/site) were sampled from Rio de Janeiro, São Paulo, and Santa Catarina, with total lengths ranging from 33.2 to 45.5 cm. Multivariate analyses included Permutational Multivariate Analysis of Variance (PERMANOVA), pairwise Hotelling's *t*-tests (HT^2), Flexible Discriminant Analysis (FDA), and jackknife reclassification matrices (JKC). **Results**: For the EFD approach, PERMANOVA showed no significant differences among localities, while FDA revealed partial overlap among groups and a JKC overall reclassification accuracy of 46%. In contrast, the WTD approach detected significant spatial differences, with PERMANOVA indicating overall variation among localities and HT^2 identifying significant differences between Santa Catarina and the other regions. FDA improved visual separation of Rio de Janeiro samples, although the JCK accuracy decreased to 35%. **Conclusion**: The combined results suggest the presence of weak to moderate spatial structuring in *P. saltatrix* along the studied coastline. However, inconsistencies among analytical approaches and relatively low reclassification success rate to the original site indicate that the observed differentiation is insufficient to conclusively define distinct population units, remaining compatible with either a single stock exhibiting spatial heterogeneity or weakly differentiated subpopulations.

Keywords: fish stocks; Atlantic South-West; natural tags; geometric morphmetrics

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