

Insights into the population structure of *Plagioscion squamosissimus* from northeastern Brazil using morphological and otolith traits

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INTRODUCTION & AIM

The primary objective of this study was to investigate the population structure of *Plagioscion squamosissimus*, a species harvested by three fishers' associations (Colônias de Pescadores) located in Petrolândia (Pernambuco State), Rodelas (Bahia State) and Olhos D'água do Casado (Alagoas State), within the sub-middle and lower stretches of the São Francisco River basin in the northeastern Brazil. To achieve this, geometric morphometrics analyses of body shape and otolith morphology were applied. Additionally, this study compared alternative methods for detecting variation in both body (truss networking and Procrustes coordinates) and otolith (elliptic Fourier descriptors and wavelet transform coefficients) shape, assessing their discriminatory power in the context of fish stock differentiation. The ultimate goal was to generate insights that support fisheries agencies and decision-makers in the rational and sustainable management of this resource.

METHOD

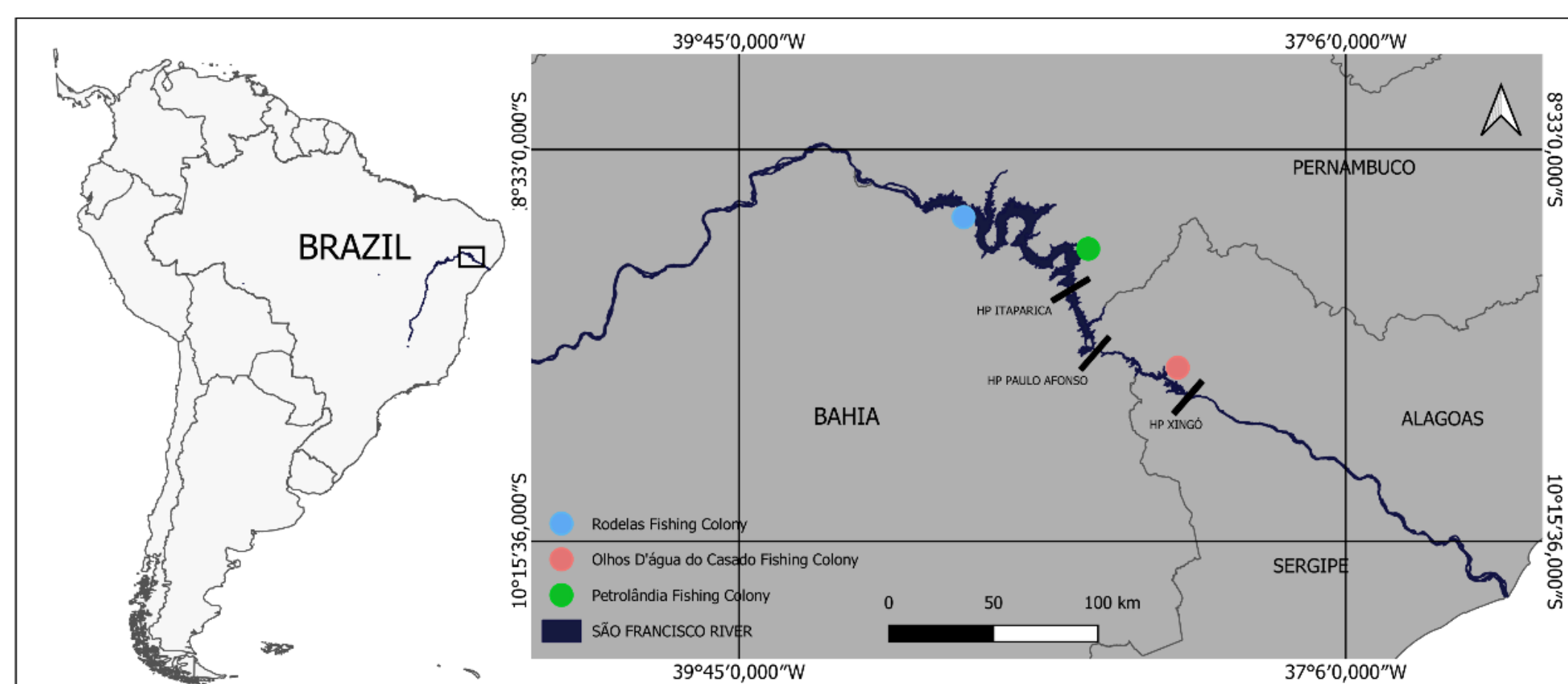


Figure 1. Map showing the three sampling sites of *Plagioscion squamosissimus* caught from September 2023 to March 2024 in the sub medium and lower courses of São Francisco River (Rodelas: Bahia State, Petrolândia: Pernambuco State and Olhos D'água do Casado: Alagoas State), in the northeast region of Brazil.

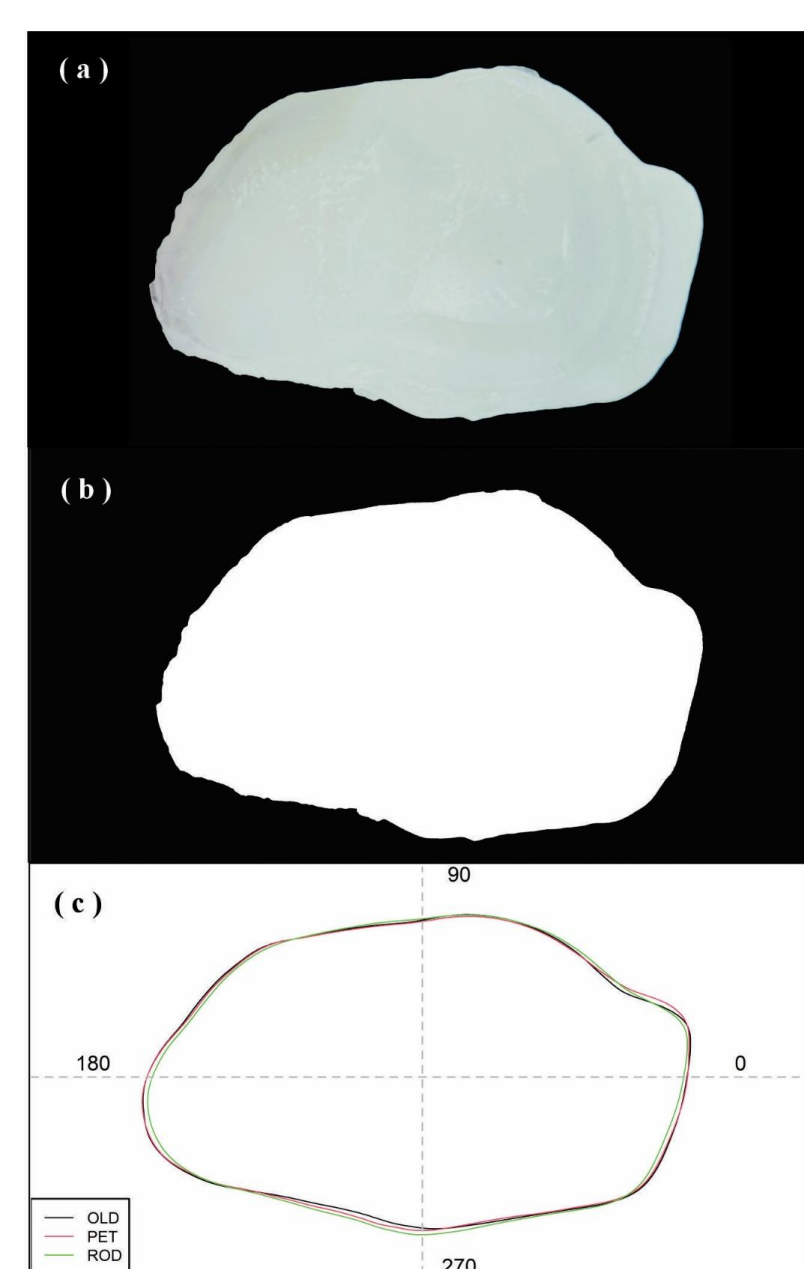


Figure 2. Medial side of a right sagitta from *Plagioscion squamosissimus* for the different sampling sites in the São Francisco river (Olhos D'água do Casado: OLD, Petrolândia: PET and Rodelas: ROD), showing (a) the original photograph, (b) the binary black and white digital image and (c) the otolith averaged outline contour for each site.

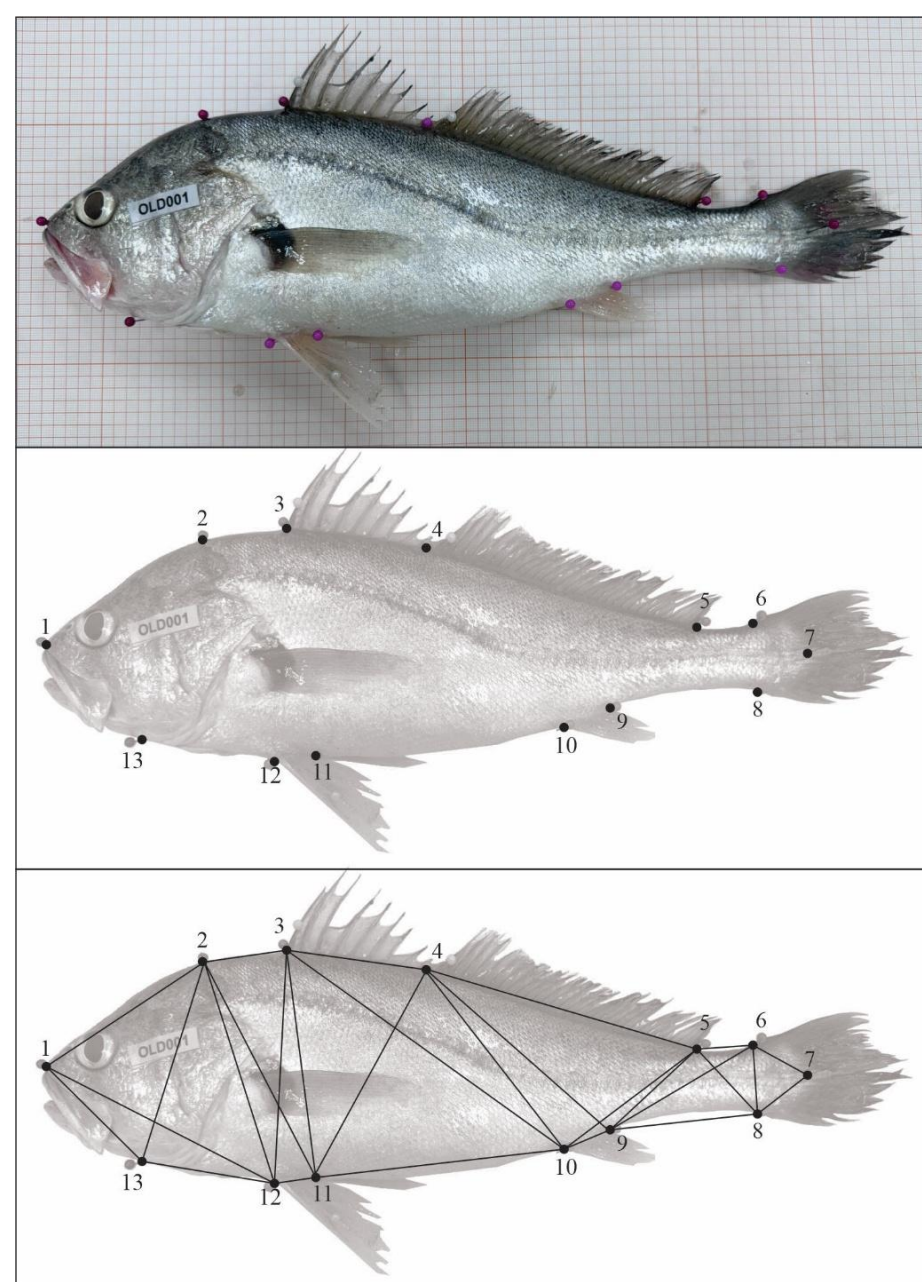


Figure 3. *Plagioscion squamosissimus* personal photograph from a specimen collected from São Francisco River (with a standard length of 33.0 cm) in September 2023 (a), an illustration with the location of the 13 selected body landmarks (b) and the generated body morphometric distances (c).

RESULTS & DISCUSSION

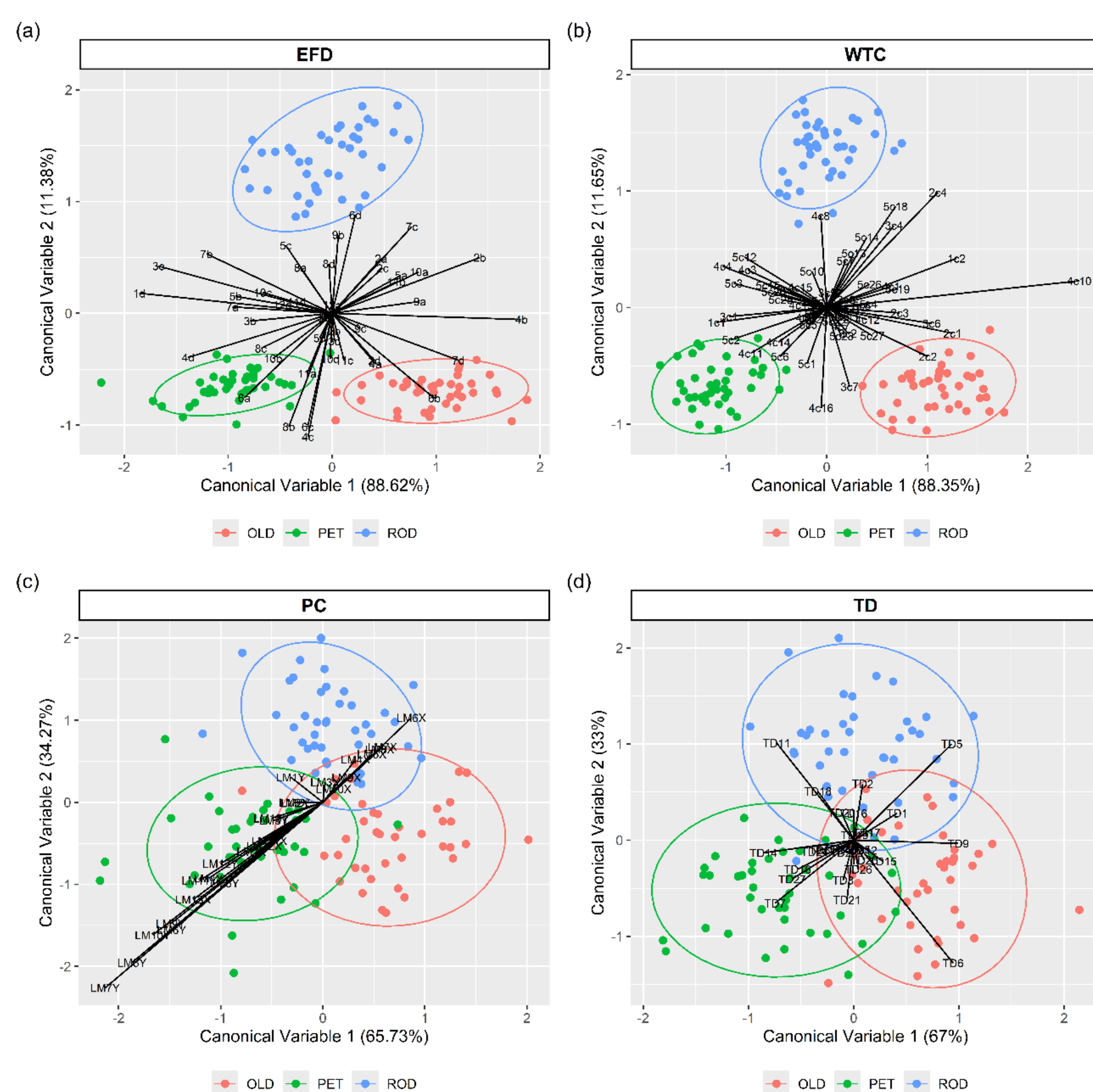


Figure 4. Canonical variable plots showing the differences for otolith contour shape [(a) elliptic Fourier descriptors (EFD) and (b) wavelet transform coefficients (WTC)] and body geometric morphometrics [(c) procrustes coordinates (PC) and (d) transformed distances (TD)] of *Plagioscion squamosissimus* for the different sampling sites in the São Francisco river (Olhos D'água do Casado: OLD, Petrolândia: PET and Rodelas: ROD). Ellipses represent 95% confidence intervals around the data, and points represent individual fish.

CONCLUSION

The phenotypic differentiation observed among populations appears to reflect spatially heterogeneous environmental conditions, likely influenced by habitat fragmentation resulting from the construction of two hydroelectric dams that disrupted longitudinal connectivity within the São Francisco River. Overall, the findings indicate that *P. squamosissimus* populations inhabiting the sub-middle and lower river reaches constitute distinct population units, a conclusion that bears significant implications for the design and implementation of effective management and conservation strategies for the species.

FUTURE WORK / REFERENCES

This implies that further research is needed to clarify the roles of abiotic and biotic factors in shaping the population structure of *P. squamosissimus* within the São Francisco River basin.