

IS THE EUROPEAN EEL SLIPPING AWAY TOWARDS EXTINCTION? A REVIEW OF RESEARCH AND MANAGEMENT CHALLENGES

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Marine organisms experience a broad range of intrinsic and extrinsic influences during their lives, which impact their population dynamics and genetic structure. Subtle interpopulation differences reflect the continuity of the marine environment, but also pose challenges to those wishing to define management units. The catadromous European eel (*Anguilla anguilla*) is no exception. Its spawning habitat in the Sargasso Sea and long migration across the North Atlantic qualify it as marine. However, the synergy between hydrographic variability, changing climate, and the impacts of habitat degradation and overfishing in continental waters has negatively affected stock sizes. Its protracted spawning period, variance in age-at-maturity, parental contribution and reproductive success, and the difficulty in sampling the spawning region together may mask a weak geographical genetic differentiation. Recent genetic data report evidence for spatial as well as temporal differences between populations, with the temporal heterogeneity between intra-annual recruitment and annual cohorts exceeding the spatial differences. Despite its common name of 'fresh-water eel', the European eel should really be managed on a North Atlantic scale. The fishery may have to be curtailed, migration routes kept open and water quality restored if it is to survive. Eel aquaculture has to focus on efficient rearing in the short term and controlled breeding in the long term. Future research on eel genetics should focus on (i) sampling and analysing spawning populations and recruitment waves to detect spatio-temporally discrete groups, and establishing a biological baseline from pre-decline historical collections for critical long-term monitoring and modelling of its genetic composition; (ii) the analysis of adaptive genetic polymorphism (genes under selection) to detect adaptive divergence between populations, perhaps requiring separate management strategies; and (iii) improving artificial reproduction to protect natural stocks from heavy exploitation, especially now the species has been categorized as endangered (Maes and Volckaert, 2007).

References

Maes G.E. and F.A.M. Volckaert. 2007. Challenges for genetic research in European eel management. *ICES J Mar. Sci.* 64:1463–1471.