

## Sympatric divergence in Atlantic cod

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**Abstract:** There is increasing recognition of intraspecific diversity and population structure within marine fish species, yet there is little direct evidence of the isolating mechanisms that maintain it or documentation of its ecological extent. We analyzed depth and temperature histories collected by electronic data storage tags retrieved from 84 Atlantic cod at liberty  $\geq 1$  year to evaluate the isolating mechanisms maintaining population structure within the Icelandic cod stock. This stock consists of two distinct behavioural types, residential coastal cod and migratory frontal cod, within two geographically distinct populations. Despite being captured together at the same spawning sites, the behavioural types are reproductively isolated by fine-scale differences in spawning habitat selection. Additionally, the different groups occupied distinct thermal and bathymetric niches that generally demonstrated low levels of overlap. This ecological differentiation seems to place different demands upon the reproductive physiology of these populations, as evidenced by the migratory and reproductive phenologies as measured in degree-days. Yet the behavioural types within each geographically distinct population exhibit considerable temporal overlap during spawning. Our results indicate that isolating mechanisms, such as differential habitat selection during spawning, may contribute to the maintenance of fine scale population structure and high levels of local adaptation in a broadcast-spawning marine fishes.