

Morphological Markers and the Population Structure of Icelandic Cod

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Abstract: Recent genetic studies of Atlantic cod (*Gadus morhua*) around Iceland show that what has traditionally been considered as a single stock shows a diverse population structure. Behavioural studies of adult cod using data storage tags have also shown different classes of behaviour (coastal versus frontal feeding) within geographic regions. These two aspects of diversity within the population are linked, as the frequency of the B allele at the pantophysin (Pan I) locus is greater in the fish that exhibit frontal feeding behaviour.

We had an opportunity to photograph freshly caught adult cod from several spawning sites around Iceland in spring 2008. The same fish were genotyped at the Pan I locus. Several differences in shape were found between fish from different locations, and between different Pan I genotypes. Although it was not possible to directly observe the behaviour of the photographed fish, this evidence strongly suggests that Icelandic cod which behave differently also look different. Some of the morphological differences can be easily measured on fish in market condition, and may provide a means to estimate the proportion of each genotype and behavioural pattern in the catch.

This work demonstrates that the diversity within the cod population around Iceland has consequences on morphology as well as genetics and behaviour. It further reinforces the view that diversity in behaviour maintains distinct sub-populations of cod. It also suggests that morphology may be a tool for assigning commercially caught fish to sub-stocks.