

Stock vs. environmental effects? Recruitment of gadoids at Iceland

Jónas Páll Jónasson^{1,*} and Guðrún Marteinsdóttir¹
¹Institute of Biology, University of Iceland, Reykjavik
*jonajon@hi.is

Abstract: Understanding the role of environmental factors in promoting or inhibiting recruitment of commercially exploited species has become increasingly important during recent years due to rapid changes in climate driven factors associated with global warming. In Icelandic waters, recruitment of the gadoid species: cod, haddock and saithe has fluctuated in somewhat similar manner during the last decades. All of these species utilize the same spawning grounds at the SW coast of Iceland, however in a sequential manner with saithe spawning in February-March, cod in March-April and haddock in April-May. Several attempts have been made to describe the recruitment of gadoid species in Icelandic waters. Most of them have focused on cod. In this study, we have revisited and updated some of these model simulations in an attempt to evaluate the integrating effects of the stock and environment on recruitment. The relationship between biomass and recruitment was strongest for cod compared to saithe and haddock. This is perhaps related to the fact that cod has been under higher fishing pressure than the other two species and has been historically severely depleted. Former studies on cod have also shown that the size and age composition of the stock is correlated with formation of strong year classes. This relationship, between age diversity and recruitment, has strengthened in recent years. In terms of environmental effects, both cod and haddock, and to a lesser extent saithe, show positive links to river runoff and measured freshwater thickness in coastal areas. The sea surface temperature during early life stages was also significantly correlated with recruitment. In cod, the correlation was negative while in haddock the correlation was positive, but in saithe it was negligible.

Aldursbreytileiki eða umhverfisbreytur ? Nýliðun þorskfiska við Ísland

Ágrip: Aukinn skilningur á áhrifum umhverfispáttá á nýliðun nytjastofna verður æ mikilvægari og ekki síst nú þegar miklar breytingar eiga sér stað í tengslum við hnattræna hlýnun. Sveiflur í nýliðun hjá þorski, ufsa og ýsu hafa verið nokkur líkar. Meginhrygningarstöðvar þessara tegunda er að finna við Suð-vesturströnd landsins en ufsinn hrygnir í febrúar-mars, þorskurinn í mars- apríl og ýsan í apríl – maí. Fram til þessa hefur verið fjallað mun meira um sveiflur í nýliðun þorsks heldur en ýsu og ufsa. Í þessari rannsókn var lögð áhersla á að skoða nýliðun hjá þessum þremur tegundum með því að meta samtvinnuð áhrif stofnstærðar og umhverfis. Helstu niðurstöður sýndu að samband stofns og nýliðunar var sterkast hjá þorski og samband stærðar og aldurssamsetningar hrygningarstofns og nýliðunar hefur styrkst á undanförunum árum. Hvað varðar umhverfispætti þá voru jákvæð tengsl milli nýliðunar og afrennslis ferskvatns og ferskvatns-þykktar á grunnsævi hjá þorski og ýsu en í minna mæli hjá ufsa. Áhrif yfirborðs hitastigs fyrsta sumars á nýliðun var neikvætt hjá þorski, vart merkjanlegt hjá ufsa en jákvætt hjá ýsu.