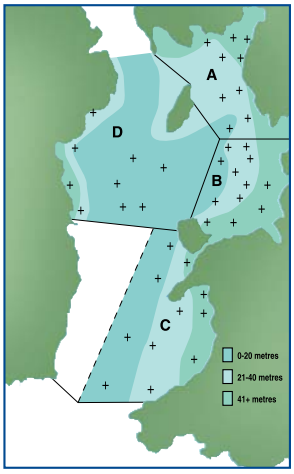
REGIONAL VARIABILITY IN THE DYNAMICS OF REPRODUCTION AND GROWTH OF FEMALE IRISH SEA PLAICE, PLEURONECTES PLATESSA L.

by Richard D.M. Nash[a], Peter R. Witthames[b], Emma Alesworth[a], Mike Pawson[b]



A = Cumbrian coast, B= Liverpool Bay C=Cardigan Bay, D=Western Irish Sea (WIS)

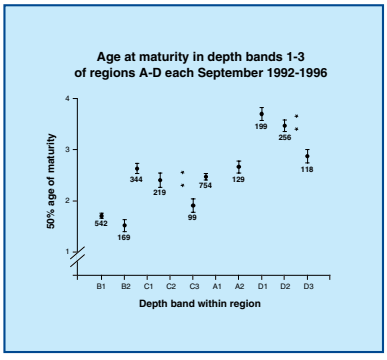
Introduction

Life cycle changes in somatic and reproductive investment associated with sexual maturity at length and age in relation to fishing mortality at age will profoundly influence the yield of a fishery. Do these aspects of plaice biology vary by region and why?

Methods

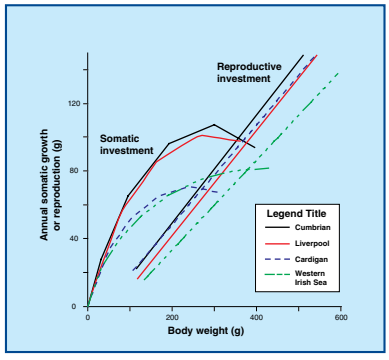
Female plaice were caught each September from 1992 to 1996 and in February and March 1995. A beam trawl was towed for 30 minutes at the same positions (+ see left) in three depth bands 1-3 (3 deepest) in each of four regions of the Irish sea by RV Corystes. Length stratified samples of fish were processed to obtain: whole body weight, otoliths to assess age and ovary maturity (7 stage Wimpenny scale). Fecundity (gravimetric method) was determined in selected ripe pre-spawning fish (confirmed by histology) from the cruise in February. Reproductive investment was the sum of ovary weight prior to spawning and the weight loss from the soma during spawning. Quadratic growth curves of the form $L=\alpha_R + \beta_R A + \gamma_R A^2$ were fitted to length (L cm) at age (A=1 to 7 years old) data for each region (R). Egg diameter was estimated in plankton samples from an extensive survey in 1995.

Results

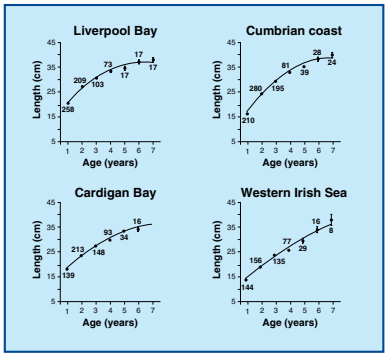


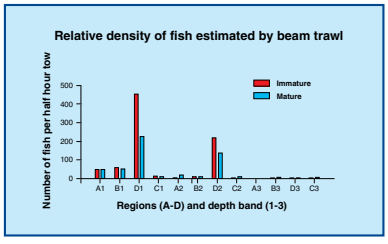
Significant differences (P<.05) were found between depths 1-3 and 2-3 as indicated (*) and between regions independent of depth. The number of fish sampled in September 1992-1996 are shown below each data point.

Somatic and reproductive investment varies by region as the fish grow older and become larger.

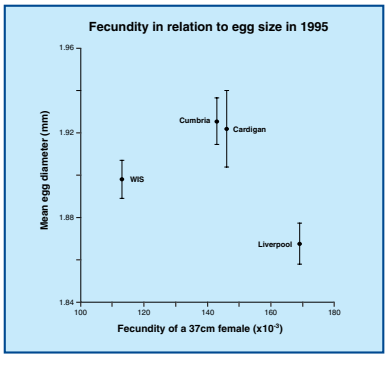


Growth rate (β) was initially significantly higher in regions A and B but it also declined faster (γ) with increasing age.





There were differences in plaice density in the four regions.



There was no significant trend in egg size with fecundity.

Conclusions

There are regional differences in life history and reproductive traits within the Irish Sea plaice population based on different somatic and reproductive investment with age. There is evidence of density dependence effecting these processes.

Acknowledgements

Provision of samples was EU funded under project AIR3-CT94-2263 jointly held by Queens University Belfast, Fisheries Research Centre Dublin, Port Erin Marine Laboratory Isle of Man, Institute of Marine Research Bergen and CEFAS Lowestoft. Special thanks to Martin Vince and Brian Harley (CEFAS) for provision of data on Irish Sea plaice ages and densities.

[a]School of Biological Sciences, Port Erin Marine Laboratory, University of Liverpool, Port Erin, Isle of Man IM9 6JA, British Isles
[b]The Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft Laboratory, Pakefield Road, Lowestoft, Suffolk NR33 0HT, UK http://www.cefas.co.uk

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science