

Temporal and spatial variation in fecundity of Irish Sea plaice

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There is an increasing need to have information on the biology of stocks to understand their population dynamics. In addition, quantification of the variability in biological characteristics within a management unit (possibly due to sub-stocks) and between years is essential. Irish Sea plaice (*Pleuronectes platessa*) are one such stock and are currently managed as a single unit whereas there is evidence that it probably consists of at least two semi-isolated stocks. In order to model these stocks accurately greater information is needed on the inter-annual variability in reproductive dynamics in each individual stock. The current study examined the reproductive investment (fecundity) over a number of years in the Irish Sea using fish caught during the spawning season in Liverpool Bay, Cumbrian coast and the western Irish Sea. Fecundity estimates were also made during September 2003 for the three areas and in September 2004 for Liverpool Bay. This is the period in which oocyte recruitment takes place.

There were significant differences in fecundity between years in both the western Irish Sea and in the Cumbrian coast; however there were no differences between years in Liverpool Bay. Fecundity appears to have changed very little in the Liverpool Bay and Cumbrian coast area in the past 50 years as fecundity was similar to estimations made in 1953. Fish weight within a group was the best indicator of fecundity with very little influence of condition on fecundity during the spawning season. A single fecundity-weight relationship could be used for all fish caught in September irrespective of area and year, this was not so for fish caught during the spawning season. The fecundity estimates taken in September were also significantly higher than estimates made during the spawning season and the recruitment of oocytes was still taking place as evident from the tailed follicle size distributions and the increase in fecundity index (actual fecundity/predicted fecundity) with mean follicle diameter. As there was a close correlation between weight and fecundity, and the fish are gaining weight at this time of year, it is evident that oocyte recruitment takes place over a period of time with oocytes being recruited in line with increases in fish weight. This implies that potential fecundity is determined by fish weight at the end of oocyte recruitment. During the period between the end of oocyte recruitment and spawning it is evident that down regulation of fecundity takes place, probably in response to available energy resources. This down regulation will probably be greater in fish that experience lower food availability during this period. Weight remained a good predictor of fecundity within a group during the spawning season as fish within a group will have experienced similar conditions and so weight and fecundity changes will be similar for all fish within the group. Fish from different areas will experience different feeding conditions and so will result in differences in the weight - fecundity relationship. The differences in fecundity between years in the Irish Sea were minimal when compared with plaice from the North Sea which show a much higher inter-annual variability in fecundity. It is suggested that feeding conditions for the plaice in the Irish Sea are much more stable than in the North Sea.

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