

**Department of Agriculture and Rural Development (Northern Ireland)**  
**Agriculture and Environmental Science Division**

**Cruise Report:** LF 4504

**Vessel:** RV *Lough Foyle*

**Dates:** 30<sup>th</sup> October – 3rd November 2004

**Area:** Irish Sea (north); ICES div. VIIa

**Survey Type:** Irish Sea Larval Herring

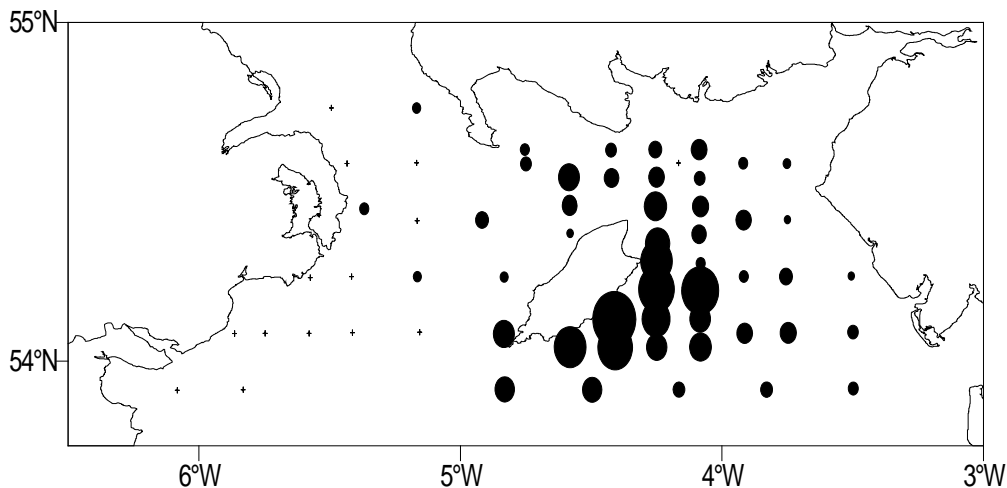
<b>Personnel:</b>	Michael McAliskey	DARD	SIC/SO
	Simon Bloomfield	DARD	SO
	John Peel	DARD	ASO
	Peter McCorriston	DARD	ASO

**Objectives:**

- i. To estimate the production of larvae herring in the Irish Sea in 2004 as part of the time series of biomass indices used by ICES for the assessment of herring in VIIa (N).
- ii. To collect and fix larvae for otolith extraction and growth analysis.

**Cruise Narrative:**

The vessel sailed at 10:00 on 31 October, and upon leaving the mouth of Belfast Lough it soon became apparent that deployment of the sampler would be unsafe due to the sea state and gale force winds. The first station was sampled in marginal conditions, with each subsequent deployment carried out on the judgement of the watch leader and bridge officer. All 63 proposed stations were completed over the next three days and the vessel returned to Belfast on the morning of the 3rd November.



**Figure 1.** Stations sampled on LF4504 and the abundance of larval herring (per m<sup>2</sup>) on 31 Oct -3 November 2004. Areas of circles are proportional to larva abundance. (maximum = 315 per m<sup>2</sup>).

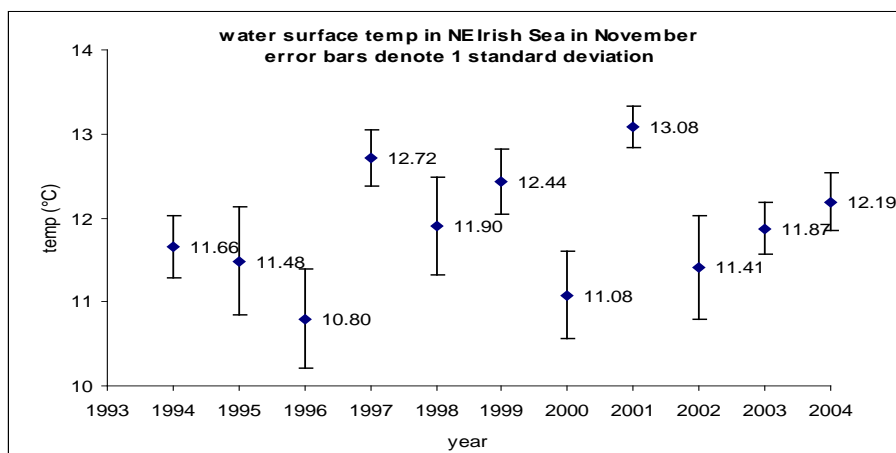
## Methods:

The grid of sampling station was predetermined and based on the spatial distribution of larval herring in the Irish Sea in the 1990s. The ichthyoplankton survey was carried out using the Gulf VII high speed plankton sampler, fitted with a 280 $\mu$ m net (Nash *et al.*, 1998). The sampler depth, temperature, salinity and flows were monitored using the Pronet sensor system. The onboard thermosalinograph was run throughout the cruise. This recorded the sea-surface temperature and salinity every 1 minute.

The Gulf VII was deployed in a double oblique manner from the sea-surface to 2m off the seabed. It was lowered at approximately 10 seconds  $m^{-1}$  and the ship steamed at approximately 3 knots through the water. Sampling occurred around the clock. All nets were washed upon recovery and the samples fixed in 4% formaldehyde solution buffered with sodium acetate trihydrate. Prior to fixing, the samples were sorted for fish larvae. The herring larvae were fixed in 99% ethanol. Sampling and preservation followed DARD standard operating procedures.

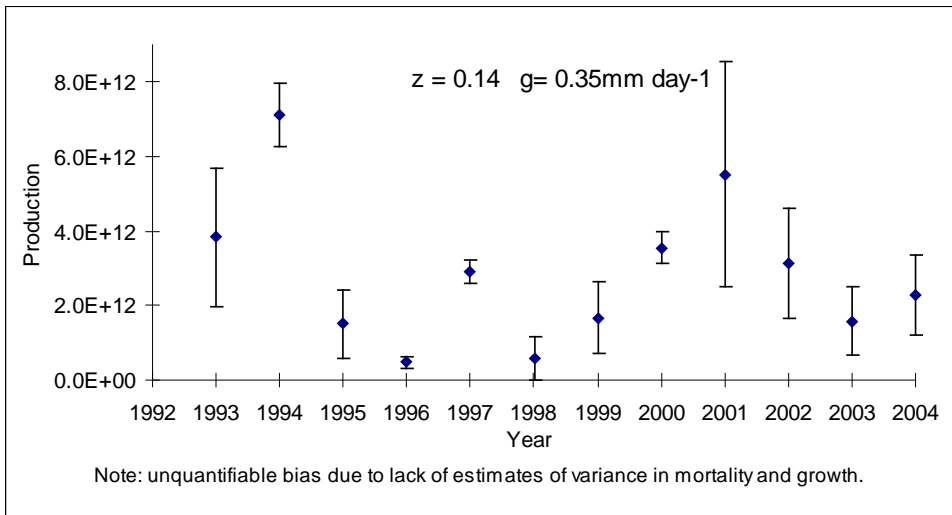
## Results:

Over  $3.5 \times 10^6$  liters of water were filtered with the Gulf VII sampler. A total of 2958 herring larvae were caught, mainly from the north-eastern Irish Sea (Figure 1). Mean sea surface temperature in the north-eastern Irish Sea was close to the average for the survey series (Figure 2).



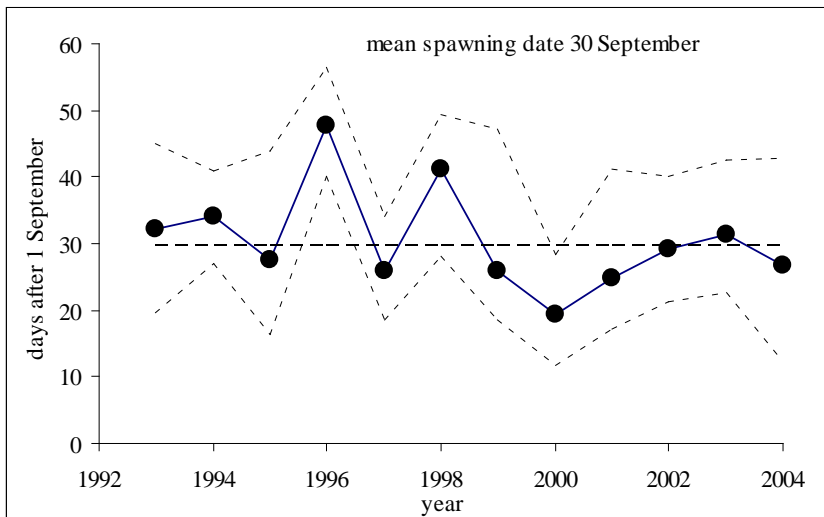
**Figure 2.** Mean sea surface temperature of the NE Irish Sea during the first week in November: 1994 - 2004.

The abundance of larvae in the Irish Sea in 2004 was the highest in the series. The larvae ranged in size from 5.7-21 mm. Total larval production in the NE Irish Sea was calculated from abundance of larvae in different size classes, taking into account the expected rates of mortality and growth obtained during surveys in 1993 and 1997. The point estimate of larval production for cruise LF4504 was below the series average of  $2.9 \times 10^{12}$  larvae (Figure 3), although the confidence limits for the surveys tend to be quite wide. The coefficient of variation of the mean in 2004 is the average of the series.



**Figure 3.** Estimates of larval herring production in the NE Irish Sea from 1993 to 2004. Error bars denote 1 standard error in the estimation of abundance.

The estimated mean spawning time for larvae caught during LF4504 was 26 September, slightly earlier than the average of the series (30 September) (Figure 4). Ninety percent of the spawning took place over a 30-day period, which is the longest in the series.



**Figure 4.** Central spawning date of Irish Sea herring estimated from larval herring catches. Dotted lines denote the period over which 90% of the larvae caught during the survey were produced.

**Acknowledgments:**

The scientists, officers and crew are thanked for their hard work and cooperation during the cruise.

**Signed:**

SIC:

Head of Aquatics:

Date:

Date: