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MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1986 CRUISE PROGRAMME

REPORT: RV CLIONE: CRUISE 6
(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

R G Houghton
B R Howell
A R Child
C G Brown
T Watson
Miss R T Harrop

DURATION

Left Lowestoft at 1030 h 14 May
Arrived Lowestoft at 0030 h 29 May
(All times are Greenwich Mean Time)

LOCALITY

Southern North Sea

AIMS

1. To measure the incidence of unfertilised eggs in the Thames Estuary sole spawning.

2. To measure the specific gravity of wild sole eggs in different development stages.

3. To determine the time of sole spawning.

4. To measure the non-predatory mortality of sole eggs.

5. To identify predators of sole eggs.

6. To catch spawning female sole for the measurement of egg composition.

7. To catch live polychaetes to provide the basis of a living food supply for sole rearing.

8. To obtain mackerel samples for stomach analysis (Mrs Dawson).

9. To obtain 20 live lesser spotted dogfish, 20 flounders and 12 sole more than 20 cm for UEA (Mr Scholes).

10. To obtain 40 to 50 live dabs for experimental work on fecundity.

11. To exchange stomach samples with RIVO, Ijmuiden (Mr Harding and Drs Daan).

NARRATIVE

CLIONE left Lowestoft at 1030 h on 14 May for the Thames area. The 2m ring net was rigged aft with a depth transducer and hauled vertically every 5-10 miles through the Barrow and Black Deeps. Good hauls of sole eggs were obtained and these were counted and staged accurately from hourly hauls in the Knock Deep during 15-16 May. A trawl haul of the Portuguese high headline trawl (PHHT) was completed and potential egg predators examined. Ring netting commenced again on 17 May in the Black Deep and the various experiments on sole eggs were set up. The ring net flowmeter was calibrated.

A 56 hourly sampling with the ring net in the Black Deep took place 18-20 May, followed by exploratory sampling in the inner Thames. The weather worsened and CLIONE anchored off Margate before leaving for Ijmuiden. Ijmuiden was reached at 0700 h 22 May. CLIONE left at 0930 h 23 May and fished for mackerel with the PHHT off the Dutch coast before returning to the Thames area. A further final 56 hour ring net sampling took place 24-26 May followed by flowmeter calibration, and fishing for livefish with the PHHT.

CLIONE returned to Lowestoft at 0300 h 29 May with all aims successfully completed.

RESULTS

1. The incidence of unfertilised eggs was measured during 3 periods of hourly sampling with the 2 m ring net; preliminary analysis suggests that less than 1% of Thames estuary sole eggs are unfertilised but that unfertilised eggs probably do exist in the wild although in low numbers. (In excess of 16000 sole eggs were examined live for this aim and aim 3).

2. Over 100 measurements of the specific gravity of wild sole eggs were carried out. Measurements covered all stages of development from 'globular' to hatched larvae. The results appear to largely confirm the pattern of changes in density found for laboratory reared sole eggs and for other species.

3. The time of sole spawning was determined over four 24-hour periods (ie excluding the Knock Deep sampling when the techniques were not fully advanced). Each pair of 24-hour periods covered different tidal phases and showed no difference in timing. Spawning in the Black Deep (centred on 51°40'N ± 5 n.m.) commenced as early as 1100 h GMT and continued during the afternoon and evening, ceasing at 0200 h. The peak production of recently fertilised ('globular') eggs occurred at about 2000 h and coincided with sunset on each of the four occasions. The day's spawning could be followed through the 2, 4, 8, 16-cell stages to the 32-cell stage (ie about 7-8 h after fertilisation) and the occurrence of this stage also showed a diurnal rhythm, delayed by 8 h (1900 to 1000 h).

4. Two rearing experiments on 100 blastodisc stage sole eggs were carried out; 95 and 96% of the eggs were successfully reared to hatching or near hatching between 17 and 22 May showing that, without predators, a large proportion of wild sole eggs will survive the egg stages (as compared with the 50% mortality per day measured by plankton surveys in the wild).

5. No sole eggs were found in the stomachs of herring, sprat, whiting, horse mackerel, gurnard, poor cod, sandeel, lesser weaver, dabs or pout whiting. One definite sole egg was found, however, in the gastric cavity of a recently caught Pleurobrachia. This species quickly voids its gut on handling. Predation experiments with Pleurobrachia Jellyfish 'A' and Sagitta showed that Pleurobrachia at least can consume sole eggs (60-80% mortality in 36 h) compared with controls without predators (no mortality). It seems likely that Pleurobrachia, which were extremely abundant in the Thames area, are significant predators of sole eggs. Other, more active, planktonic predators such as small fish and fish post-larvae, were not sampled.

6. The gonads of 6 ripe female sole were preserved in chloroformethanol for analysis of fatty acid content and 6 gonads were frozen whole.

7. Quantities of live sedentary and errant polychaetes were caught in the Barrow and Middle Deeps and returned to the laboratory.

8. 163 mackerel, consisting of up to 10 fish per 1 cm group (length range 20 to 45 cm) were caught off the Dutch coast, frozen and returned to the laboratory for feeding studies.

9. 3 lesser spotted dogfish, 19 flounders and 7 sole more 20 cm were caught in the Thames area and returned to the laboratory for UEA.

10. 59 live dabs, captured in the Thames area, were returned to the laboratory for fecundity experiments.

11. 6 crates of stomach samples were delivered to RIVO and 16 crates returned to the laboratory.

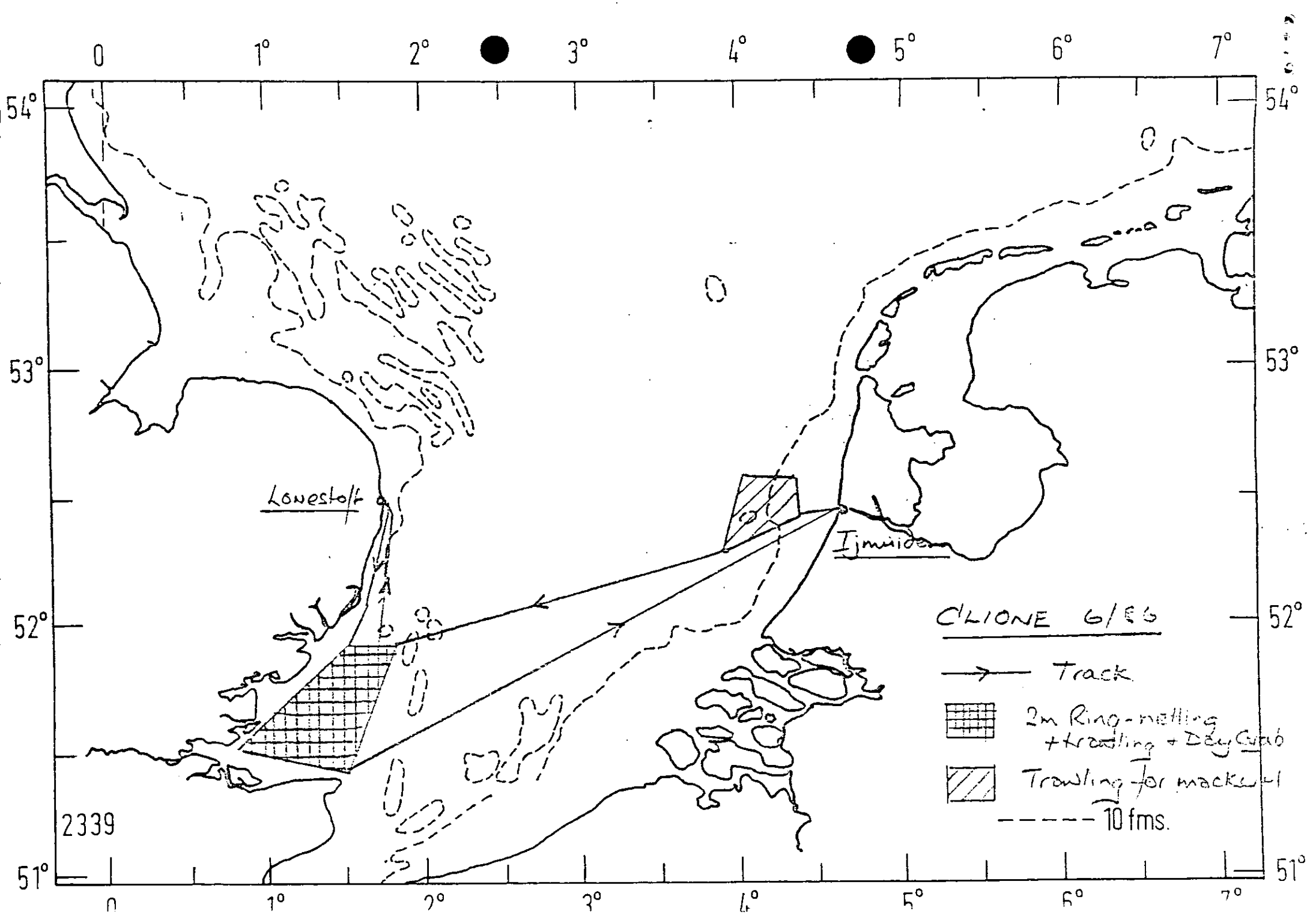
R G Houghton
1 July 1986

SEEN IN DRAFT: Master - Captain French
Fishing Skipper - W Pearson

INITIALLED: DJG

DISTRIBUTION:

Basic List +
R G Houghton
B R Howell
A R Child
C G Brown
T Watson
Miss R T Harrop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1°
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51°
Lowestoft
Ijmuiden
CLIONE 6/66
Track
2m Ring-netting + trawling + Day Cuts
Trawling for mackerel
10 fms.
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