

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

1981 RESEARCH VESSEL PROGRAMME

REPORT: RV CORELLA: CRUISE 5.

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

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 P Hudson  
 S P Milligan  
 Mme Arbault (ISTPM, France)

DURATION

Left Lowestoft 1700 h 31 March  
 Arrived Lowestoft 0645 h 14 April

LOCALITY

English Channel

AIMS

1. To catch spawning sprats (*Sprattus sprattus*) and to rear artificially fertilised eggs over a range of temperature. To observe and record their development photographically and provide a relationship between temperature and rate of development for use in calculating the seasonal production of sprat eggs.
2. To conduct a survey with the 30 inch high speed plankton sampler, of the western and eastern English Channel, aimed at describing the distribution and abundance of the eggs of the sole (*Solea solea*).
3. To collect twelve x 25 litre water samples for  $^{137}\text{C}$  analysis by AEP 1.

NARRATIVE

RV CORELLA left Lowestoft at 1730 h 31 March and steamed to Lyme Bay (Lat.  $50^{\circ}28'N$  Long  $2^{\circ}49'W$ ), arriving at 1930 h 1 April. Two 800 Engels trawl hauls were made at 1950 h and 2135 h, at a position where sprat eggs were most abundant in early April 1979. Only a few sprats were caught in each haul, none of which were ripe adults suitable for artificial fertilisation. An echo sounder search for spawning sprat shoals was begun at 0730 h 2 April and ended at 1830 h on the same day. During the search two hauls were made with the 2m ring net in an attempt to locate sprat egg concentrations. Two hauls with the 800 Engels trawl, at dusk and after darkness in an area where promising echo traces had been seen, both yielded ripe sprats of both sexes, suitable for artificial fertilisation. Successful artificial fertilisation produced about 10,000 fertile eggs which were used to set up an incubation experiment between  $4^{\circ}\text{C}$  and  $20^{\circ}\text{C}$ , using the portable aluminium block incubator in the dry laboratory on board CORELLA. One further Engels trawl haul was made in the same area during darkness (2000 h - 2100 h) 3 April. A further 5,000 fertile sprat eggs were obtained from the fish in this haul, which were used to supplement the incubation experiment already in progress.

During the morning of 4 April, CORELLA was re-rigged in Lyme Bay, to operate the 30" Lowestoft high speed plankton sampler. After calibrating this sampler, the sole egg survey of the English Channel was begun at 1159 h 4 April, and proceeded uninterrupted until 0630 h 6 April when course was made for Cherbourg to embark Mme Arbault and to take on more water. CORELLA docked in Cherbourg at 1030 h 6 April and departed 0815 h 7 April.

The sole egg survey was continued at 1159 h 7 April to the west of the Cherbourg peninsula. It proceeded uninterrupted, in spite of poor visibility particularly in the Dover Straits, until the last station was completed at 1226 h 13 April. The dense fog caused the abandonment of three inshore stations, one in the Solent and the other two off Littlehampton and Dungeness, where there were large numbers of lobster pots.

Mme Arbault was disembarked by pilot boat at 1200 h 13 April at Boulogne. Three further plankton stations planned in the southern North Sea were abandoned at 1800 h in deteriorating weather conditions, and a course was set for Lowestoft. CORELLA docked at Lowestoft, after a rough passage through a north easterly gale, at 0645 h 14 April.

## RESULTS

1. Sprat eggs from the artificial fertilisation were successfully reared to hatching at approximately  $1^{\circ}\text{C}$  intervals over the range  $4^{\circ}\text{C}$ - $20^{\circ}\text{C}$  using approximately 700 eggs at each interval. At  $20^{\circ}\text{C}$  the 50 per cent hatching point was reached in approximately 42 hours, whilst at  $6.5^{\circ}\text{C}$  it took 189 hours. Hatching was not complete at  $4.5^{\circ}\text{C}$  and  $5.5^{\circ}\text{C}$  by the end of the cruise, and observations continued after docking in Lowestoft. Development of the eggs was observed and recorded photographically at six hourly intervals throughout the experiment. This will provide sufficient data for the temperature/development relationship to be established for all egg development stages, once the photographs and samples have been analysed.

Egg mortalities were high at  $19^{\circ}\text{C}$  and  $20^{\circ}\text{C}$ , 87 and 96 per cent respectively, and over 70 per cent at both  $4.5^{\circ}\text{C}$  and  $5.5^{\circ}\text{C}$ . Over the remaining temperature range mortality varied between 32 per cent and 64 per cent, with approximately 250 to 400 larvae hatching at each temperature.

A provisional relationship for development time to 50 per cent hatch, against temperature using the regression of  $\log_e$  duration in hours (Y) on  $\log_e$  temperature  $^{\circ}\text{C}$  (x) was calculated. The equation  $\log_e Y = A \log_e X + B$  gave constants of  $A = -1.32$   $B = 7.66$  and a correlation coefficient of 0.997.

A random sample of the catch of sprats in Lyme Bay, used for the artificial fertilisations was returned, deep frozen, to the laboratory for age, length and maturity stage analysis.

2. A total of 99 hauls was made with the 30" plankton sampler (fig 1). Some problems of net logging were encountered in the western Channel and off parts of the French coast. This was caused mainly by thick phytoplankton, but only produced a serious drop in volume filtered by the net at five stations. The plankton samples were not examined at sea, therefore no early conclusion can be drawn on the distribution of sole spawning. Large numbers of sprat eggs were, however, noted in many of the samples, generally coinciding with thick midwater echo traces during the hauls.

A temperature/depth profile from each haul with the sampler, was recorded, and a salinity sample taken for subsequent laboratory analysis.

3. Twelve 25 litre water samples were taken, at the position marked on fig 1, for subsequent Cs 137 analysis by AEP1.

J H Nichols  
22 April 1981

SEEN IN DRAFT: G Sinclair - Master  
R C Newrick - Fishing Skipper

INITIALLED: DJG

DISTRIBUTION

Basic List  
J H Nichols  
Dr B M Thompson  
P Hudson  
S P Milligan  
Mme S Arbault  
K Steele

