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CRUISE REPORT

F.R.S. "EXPLORER"

2nd-23rd April 1969

Narrative

"Explorer" sailed from Aberdeen at 1300 hours on Wednesday 2nd April. As a result of rough weather, no work was possible until the 4th April. The period until 0130 hours on 7th April was spent on a plankton and trawl survey of the northern part of Rockall Bank to search for concentrations of Blue Whiting eggs. In no area was there any evidence of the dense concentrations found in the previous year. On the hypothesis that spawning had barely begun, and to avoid the worsening weather, "Explorer" steamed south to continue the plankton and trawling survey on the southern part of Rockall Bank.

Between 7th and 11th April the ship worked a series of trawls and plankton stations but gale-force winds forced temporary stoppages from 0430 to 1800 on 8th April, from 0500 to 1315 on 9th April and from 1330 on 11th April to 1030 on 12th April.

"Explorer" returned to the north of the Bank at 1500 hours on 12th April to continue the plankton survey and to reexamine the maturities of Blue Whiting in that area. By 13th April most Blue Whiting were spent and large concentrations of their larvae were present in the plankton. In consequence, trawling was discontinued and the remainder of the first part of the cruise was devoted to a plankton survey which included some stations occupied earlier on the cruise. "Explorer" left Rockall Bank at 1040 on 15th April, but through lack of time the plankton line across Rockall Channel was abandoned. The ship arrived in Stornoway on 16th April.

Mr. J.A. Graham joined the ship in Stornoway. Some delay was caused to her departure by repairs to the log but "Explorer" eventually left Stornoway at 2200 hours on 17th April. Immediately after sailing, word was received of a distress signal seen north of the Butt of Lewis. A course was set to investigate, and only after a fruitless search was it learned that the signal had been made by an aircraft during an exercise.

On arrival at Rockall Bank at 1700 hours on 19th April, a short intensive plankton survey was carried out to examine more closely the area where Blue Whiting larvae were most abundant on the first part of the cruise. The first creeling position was reached at 0930 on 19th April and a single fleet was laid. The rest of that day was spent nearby trawling and working a series of vertical hauls with a closing plankton net. The creels were hauled in the evening and another fleet put down. The following day "Explorer" steamed to another position in shallower water; but soon after laying another fleet of creels, Captain Baxter received news of a bereavement in his family, and the ship left Rockall Bank at 1300 on 20th April. Captain Baxter left the ship in Stornoway and, in view of the gale force winds in the area, "Explorer" remained there until 1100 hours on 22nd April. Aberdeen was reached at 1800 hours on 23rd April.

Trawling survey

A total of 21 trawl hauls were made between 4th and 13th April on Rockall Bank and two more on 19th/20th April. Since the results of the first trawls suggested that Blue Whiting were almost confined to deep water, trawling was concentrated in depths between 350 and 450 m. A number of hauls

were made in much shallower water (165-230 m) but none in intermediate depths which are known from previous surveys to be covered in coral. Approximately equal numbers of hauls were made in the north, south, east and west sectors. Though most trawling was carried out in daylight, hauls were repeated in some areas to compare day and night catches. The only area revisited during the trip was on the eastern edge of the Bank at about 57°25'N, where trawls were shot on the 4th, 13th, 19th and 20th April.

Ovaries were taken for fecundity estimation from 92 Blue Whiting, 87 Gadiculus and 30-50 each from Argentina sphyraena, A. silus and Haddock. A basket of Chimaera monstrosa was brought back for investigation of the toxic properties of this fish.

Catch rates were, on average, little different from those obtained at the same time in 1968; the highest catch being 162 baskets per hour.

Only small catches were obtained in shallow water and the largest catches were made on the eastern and western edges of the Bank at the latitude of the rock. Catches on the southern half of the Bank averaged less than half those in the north.

In agreement with the April 1968 results, Blue Whiting were largely confined to the deep water (over 350 m) around Rockall, and in these depths it was the most abundant fish in most hauls. The largest concentrations were found on the eastern and western edges of the Bank and it was in the latter area that the largest haul of 162 baskets per hour (estimated at 36,000 fish) was taken.

Recruits of the 1968 year-class appeared to be almost absent from the south of the Bank, and scarce elsewhere except for one haul at the northern end of the Bank. This scarcity of young fish confirms previous results.

By 4th April most females were either ripe or ripe-running; males were relatively more retarded in sexual development. Repeat samples in the eastern sector showed little advance by 13th April, except that there was a small percentage of spent fish but, on 19th/20th April, most fish of both sexes were spent. Even at that date there were a few adult fish at early stages of gonad development.

Like Blue Whiting, Gadiculus was largely confined to the deep water over 350 m around Rockall Bank. The largest catches (maximum 58 baskets per hour) were on the east of the bank, and most trawls there gave more than 9 baskets per hour. Catches were generally smaller in the west and particularly in the area where Blue Whiting were most abundant.

Gadiculus ranged in size from 8-18 cm, with males between 11 and 16 cm. In the samples taken, the large fish were consistently females, the small ones males. On arrival at Rockall, the females were mostly ripe, whereas the males were on average only a quarter to half ripe. East of Rockall, where sampling was repeated, the maturity of females progressed little between early and mid-April, and while most males had become half ripe by 13th April, there was no obvious further development by 19th/20th April. From this evidence, Gadiculus spawn at Rockall significantly later than Blue Whiting.

Both species of silver smelt were caught in relatively small numbers, A. sphyraena mainly in the shallow hauls (less than 250 m), A. silus in the deep ones. Maximum hauls were 1600 A. sphyraena and 230 A. silus per hour. Whereas the former were mostly ripe or ripe-running, A. silus were mainly at an earlier maturity stage, though some ripe females were caught towards the end of the cruise.

As on previous surveys, Haddock predominated in the catches in shallow water, and a few were caught in most trawls. Other prominent species were Chimaera monstrosa, Ling, Scorpaena dactylatra and Megrin. Less common fish included two species of Macruridae (Coelorhynchus atlanticus and Malacocephalus laevis), Blue Ling (three hauls contained 40-50 fish on the southern part of Rockall Bank), Phycis blennoides, three-bearded Rockling and Fierasfer. Single

specimens of Centrolopus niger and Epigonus telescopus were also caught. A number of the less common species were collected for investigation of sound-producing musculature.

Artificial Fertilisation of Blue Whiting

Spawning products from a number of ripe-running Blue Whiting taken on the eastern edge of Rockall Bank on 4th April were artificially fertilised and placed in an apparatus through which sea-water from the plankton pump was passed. Samples of eggs were taken every 24 hours, and although most eggs died or failed to develop, a small percentage hatched and some larvae lived until almost the end of the yolk-sac stage. At three days the embryos were already well-developed, and the pigmentation pattern was identical to that found on planktonic eggs in 1968, confirming the identity of the latter as eggs of Blue Whiting. At four days, some but not all of the eggs had hatched. At nine days old the eyes were pigmented and the definitive pigmentation of the post yolk-sac larva had been assumed.

Similar attempts to rear the eggs of Argentina sphyraena failed, and the cruise was too early to obtain Gadiculus for this purpose. Nevertheless, ripe-running eggs of the latter species have been preserved for measurement.

Egg and Larval Survey

In an attempt to plot the distribution of spawning products of Blue Whiting, a Gulf III and W.P.3 survey was carried out over Rockall Bank and to a lesser extent over the deep water of Rockall Channel. A total of 51 hauls were made with the Gulf III sampler and 33 with a W.P.3 net. From eye estimates it is possible to summarise the distribution of larval Blue Whiting and of eggs thought from their size to be those of this species.

Between 4th and 8th April planktonic eggs were scarce, never more than about 100-150 per haul being collected, and these mainly at the northern end of Rockall Bank and along its eastern edge. Their paucity and the maturities of the fish trawled at this time, indicated that spawning had barely started, so it was significantly later than in 1968.

By 13th April considerable numbers of larvae were present over deep water off the eastern edge of Rockall Bank and an intensive survey from then until 15th April showed the concentrations of larvae (up to 500 per haul) to be situated at the north-eastern corner of Rockall Bank, mainly over deep water, though the southern and northern limits of their distribution could not be investigated in the time available. On a short repeat survey from 18th-19th April, the concentrations appeared to be in the same area. Since few larvae were caught before 13th April and apparently no eggs after that date, it seems likely that most of the spawning, and the subsequent development to larvae, took place between 4th and 13th April.

Plankton Investigations

From a rough analysis of the samples from W.P.3 oblique hauls, it was clear that the total number of planktonic organisms in the Rockall area was small for the time of year, though a small increase was apparent by the end of the survey. Calanus finmarchicus, the predominant copepod, was most numerous along the eastern edge of Rockall Bank. Euphausiids were confined to the Bank and were most abundant on its western side. Salps appeared at the southern perimeter of the survey grid and one haul contained a number of Cyclosalpa virgula, previously taken off western Scotland only in 1953, a year when the Lusitanian fauna was especially prominent.

Decapod larvae, mostly Munida zoea, were present over most of the area, and were concentrated around the 250-300 m contour. Tows of a W.P.3 net through a prominent scattering layer contained vast numbers of this zoea.

Trawling and Trapping for Lobsters and Crabs

The trawling survey for Blue Whiting incorporated a number of trawl stations within the area chosen for an investigation of the distribution of lobsters and other large crustaceans at Rockall. The only species caught regularly was Paramola cuvieri, although never more than four were taken in a haul. Other species caught included a swimming crab Bathynectes superba, Nephrops and a species of spider crab, Rochinia carpenteri.

In the two completed fleets of creels that were laid in a depth of 370 m east of Rockall, a number of crabs of three species, Paramola cuvieri, Geryon affinis and Cancer bellianus, were caught.

All the crabs taken at Rockall have hitherto been considered rare, so these new records may mean that they are more abundant than previously thought.

Echo-sounder Survey

The Marconi echo-sounder was run continuously throughout the cruise. Bottom traces were localised and appeared to be best developed between 350 and 450 m, that is the depths in which large numbers of Blue Whiting and Gadiculus were caught. There was no clear relationship between catch rates and the intensity of the bottom trace, however.

Mid-water traces were fairly generally distributed at Rockall, though there was no evidence of the well-marked trace over deep water found in October 1968.

A more detailed analysis of the traces will be carried out.

R. S. BAILEY
7th May 1969