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FRV CLUPEA

Cruise 14/79

REPORT
5-29 November 1979

Objectives

1. To survey the distribution and abundance of young herring and sprats in the Clyde with an echosounder and a mid-water trawl.

2. To investigate the biological composition of young herring in the Clyde.

3. To investigate the residue burden of organic pollutants in herring and sea water samples and bottom sediments.

Narrative

Scientists and crew joined CLUPEA, in Buckie on Monday 5 November but sailing was delayed until the following morning due to gale-force winds. Persistent bad weather delayed passage through the Pentland Firth until midday on Wednesday but no further delays were experienced and CLUPEA reached Campbeltown at 2200 on Thursday. An echosounder watch was maintained during the passage. On Friday two trial hauls were made in Kilbrennan Sound to test the fishing gear and netsonde and then a brief echo survey was carried out in the vicinity of Brown Head to search for reported shoals of spawning herring. One trawl was made through plume shaped traces during the late afternoon but further search that evening revealed no more traces to shoot on.

During the weekend two visiting scientists, one from Pitlochry and one from France, joined CLUPEA in Campbeltown. On Monday two more trawl hauls were carried out in the vicinity of Brown Head in a further attempt to catch spawning herring before starting the main survey later that day. For the rest of the week mid-water trawling was carried out at listed stations and the echosounder was run continuously and annotated at regular intervals. Seventeen trawl stations were completed in the areas to the south and west of Arran, in the Loch Fyne and Inchmarnoch areas and in Kilbrennan Sound while water and sediment samples were collected in the four areas specified on the programme as well as at one additional station in the Inchmarnoch area. On Friday afternoon contact was made with the Royal Navy in order to obtain permission to work in the Loch Long area the following week. The two visiting scientists left CLUPEA on Friday afternoon from Campbeltown. On Saturday 17, C Whitworth joined the ship. The midwater trawling and echo survey were continued on the following Monday. The remainder of the listed trawl stations with the exception of station 11 were completed by Thursday evening despite a failure in the radar during the week. On Friday an additional haul was made on a large herring-type trace off Holy Island and two replicate hauls were made south of Arran, to investigate inter-haul variation in catch rates before CLUPEA returned to Campbeltown for the weekend. During the weekend the radar was fixed and a visiting scientist from the Overseas Development Administration joined the ship.

In the last week three additional short-term objectives were set: 1. To investigate inter-haul variation in an area of known herring abundance over a period covering both daylight and darkness hours. 2. To investigate differences in catch composition associated with different types of traces within a relatively small area and 3. To delimit the distribution of 0-group herring in the Irvine-Ayr Bay area.

On Monday an echo survey was carried out in the Kilbrennan Sound-N Arran area to delimit an area of herring abundance suitable for carrying out replicate hauls. Such an area was located off Skipness but repeated problems with the netsonde prevented more than three hauls being made that day. On Tuesday an echo survey was carried out in the Irvine-Ayr Bay area and three mid water hauls at different positions were made before increasing winds prevented further work that evening. On Wednesday a brief investigation of different types of traces was carried out by making three mid water hauls in an area to the east of Arran. CLUPEA then sailed for Troon and scientists and crew left the ship on Thursday morning.

Results

Herring were taken at 26 out of the 28 fixed stations during the survey with an average catch rate of 362 per one hour haul. This catch-rate represents a considerable increase compared to earlier surveys, carried out between 1970-1974. This may be partly due to small differences in gear but some genuine increase in abundance is suggested by the magnitude of the increase in catch rate and the relatively greater abundance of echo traces observed. Characteristic plume shaped traces of small size were relatively common while several large plumes were also observed during the survey. In addition a relatively dense mid-water layer, found in several areas, was usually associated with catches containing high proportion of herring.

During the cruise a number of herring samples were worked up racially and otolith requirements for most of the length range were met. A preliminary analysis of the length compositions indicated a strong predominance in the catches of I-group herring (estimated at 69%) with about 25% 0-group and 6% older fish. Investigation of the maturity composition of the older herring indicated a mixture of spring and autumn spawning herring including some fish which had spawned very recently. A number of ovaries were fixed and returned to the laboratory for further examination. With regard to geographical distribution 0-group herring were taken in greatest numbers in the sea lochs and in Irvine Bay, I-group herring had a more general distribution and older herring appeared to be most abundant in deeper water around Arran.

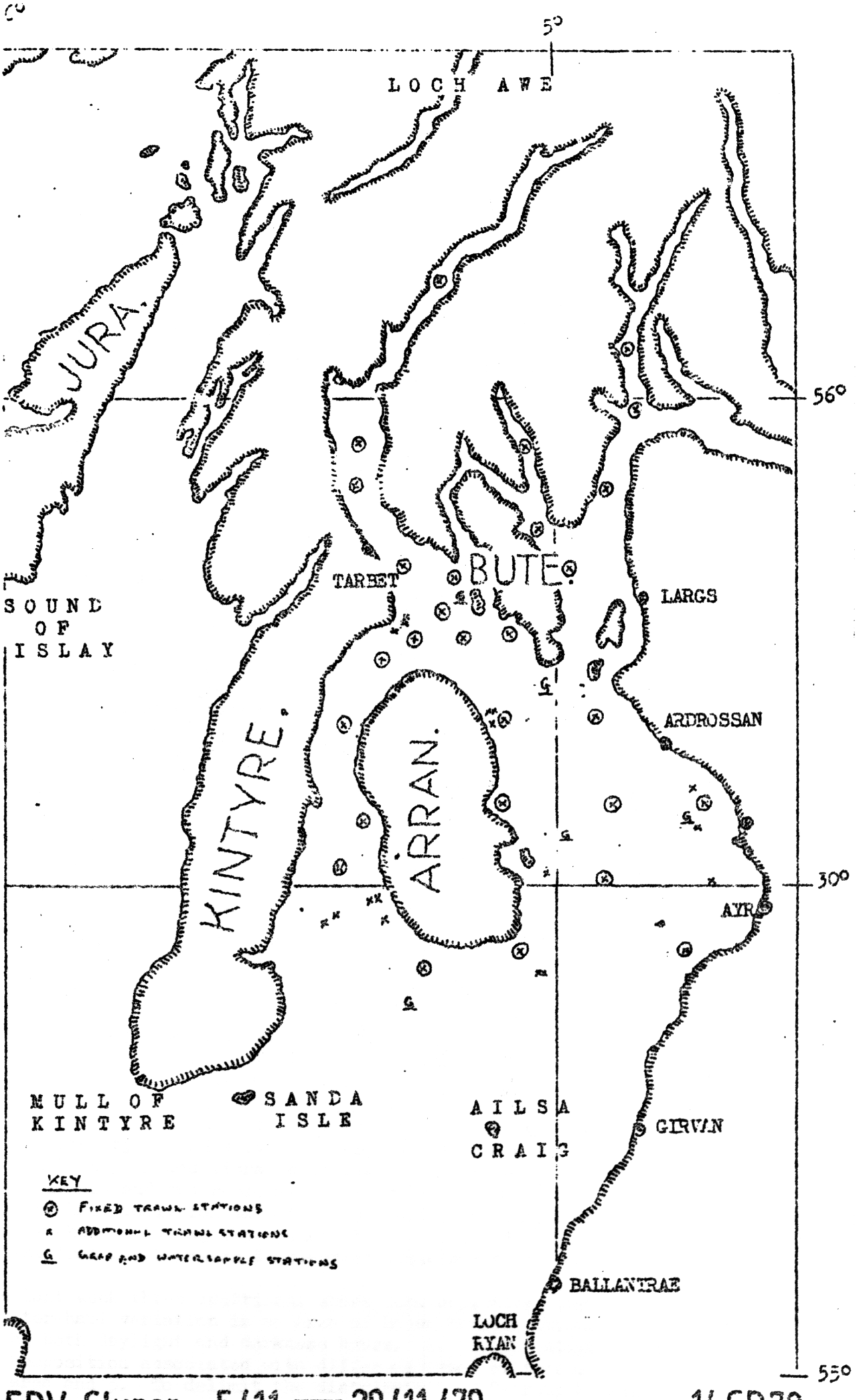
Sprats constituted the major component of other species taken during the survey, with large numbers also of small whiting, Norway pout and saithe. Sprats were taken at every listed station, with the largest catch rates being taken in the outer Clyde, south of 59°40'N. At least three modal sizes were evident in the sprat length distributions.

Samples for pesticide analysis were collected from all programmed areas, and from at least three different year-classes of herring, as well as from several other species.

A good deal of progress was made in the successful identification of echo traces due to the abundance of marks, and the effectiveness with which the gear was used during the survey.

M Walsh
12 December 1979

Seen in draft: G Geddes



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