

In Confidence: Not to be quoted without
reference to the laboratory

Cruise Report

FRV Goldseeker

5 - 21 December 1972

Objectives:

1. To carry out an echosounder and midwater trawling survey for sprats and immature herring in the inner Moray Firth.
2. To investigate the population structure and diurnal variation in behaviour of sprats and immature herring.
3. To investigate the distribution of sprats in relation to water temperature and turbidity.
4. To carry out trials with the small purse-seine to catch sprat and small herring.

Narrative:

The Goldseeker sailed from Buckie at 0445 on 5 December and, after a short echosounder survey in the Lossiemouth-Burghead area, was forced back to port by strong winds. On 6 December Goldseeker left Buckie at 0755 for Nairn Bay. Sprat echo-traces were located only in Nairn Bay where a fleet of pair-trawlers was working, and after an echosounder survey Goldseeker made for Invergordon. Three trawl hauls were made in Nairn Bay the following morning. The remainder of the day was spent on an echosurvey in the approaches to the Inverness Firth before docking in Invergordon. Leaving at 0320 on 8 December an echosounder survey was carried out from the Sutors of Cromarty to the east of Tarbat Ness and thence to Buckie, where Goldseeker docked at 0915.

Goldseeker sailed from Buckie at 1145 on 11 December, but after reaching Burghead was forced back to Buckie by increasing winds. Another attempt to work on 12 December was similarly thwarted and the whole of 13 December was spent stormbound in Buckie. On 14 December the boat sailed at 0245 and after trawling in the Nairn Bay area returned to Buckie by 1630. On 15 December a short echosounder survey was carried out north of Buckie. Some pair-trawlers were working in an area of good marks 12 miles NNW of Buckie, but two trawl hauls were unsuccessful.

On 18 December Goldseeker sailed at 1115 and turbidity measurements were made at five stations en route to Invergordon. Further turbidity measurements were made on 19 December in the inner reaches of the Moray Firth and the Cromarty Firth, and on 20 December in the Inverness and Beaully Firths. The final day was spent on an echosounder survey between Invergordon and Buckie, where the Goldseeker docked at 1400 hours.

ECHOSOUNDER AND TRAWLING SURVEY

In the first week "sprat" traces were restricted to the area between Nairn Bay and the Cromarty Firth, both areas where a pair-trawl fleet was operating. Three hauls with a Gourock midwater trawl in good "sprat" traces in Nairn Bay obtained up to 8 baskets of sprats, with a small admixture of young herring. The sprats ranged in length from 4-12.5 cm, with a mode from 8-9 cm; the herring from 8.5-15.5 cm. During the daytime the traces consisted of tall plumes often extending throughout much of the water column. Before dawn, the traces were much more dispersed and at dawn coagulated into discrete marks. There also seemed to be day-to-day variation in the degree of concentration. Whereas the pair-trawlers were fishing amongst concentrated marks over a relatively small area of Nairn Bay on 6 December, by the next day the traces were more scattered and distributed over a wide area. The sprats thus appeared to be very mobile, but whether their dispersion was affected by fishing activities is impossible to say.

Weather considerably affected work the second week, but concentrations of sprats were again located in Nairn Bay and to the northwest of Buckie. Four trawl hauls in Nairn Bay yielded up to 2 baskets of sprats similar in length composition to those obtained the previous week. Compared with the previous week, echo-traces in Nairn Bay were more dispersed. Particularly good traces about 12 miles NNW of Buckie indicated the presence of a shoal several hundred metres in diameter, extending from about 3-30 fathoms depth.

During the last week of the survey "sprat" traces were again widely distributed in the Nairn Bay and Cromarty Firth areas, and in addition traces were found in the Inverness and Beaully Firths and along the coast north of the Sutors of Cromarty, areas not previously investigated. In the last area large flocks of gannets were seen diving for fish. A single trawl haul in this area contained only 113 sprats, some of which had "thumb-nail" lesions on their back or abdomen. Since some of the lesions appeared to be in the process of healing, they may have been caused by natural predators, or possibly earlier net damage.

TURBIDITY MEASUREMENTS

At 23 stations, turbidity measurements (percentage transmission of light through 1 m of sea-water) were made at depths of 2 fathoms and either at 8 fathoms or 2 fathoms above the bottom. In the area from Buckie to Burghead values ranged from 57-61%, but further west values were progressively lower, reaching minima of 23% in the Cromarty Firth and 8% in the Inverness Firth, where tidal and estuarine effects were most marked. No detailed comparison of sprat abundance and turbidity was possible, but in general sprats were absent from areas of low turbidity.

No opportunity was found to use the small purse-seine.

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30.1.73