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reference to the Laboratory

CRUISE REPORT

FRV GOLDSEEKER

3 - 26 September 1974

OBJECTIVES

1. To observe by diving the operation and efficiency of various gears used to catch scallops and queens and to prepare a photographic record.
2. To examine the effect of gears on the sea bed and its inhabitants.
3. To study the reaction of scallops and queens on the gears.
4. To study the escape of scallops and queens from the gears and the survival of captured, damaged and escaped animals.
5. To determine the densities of scallops and queens on commercial beds.
6. To undertake time-lapse camera studies of scallop behaviour.

NARRATIVE

Work commenced on 3 September and Goldseeker was based at Tarbert, Loch Fyne, for the entire cruise. All the diving work was carried out in association with dredging in Claonaig Bay, and other routine dredge hauls were made in other areas when conditions were too rough at Claonaig. Diving observations were made on the dredge and/or dredge tracks in 15 of the 50 hauls. Divers also made direct observations of scallop and queen density independently of dredging operations.

Work ended on 20 September and Goldseeker left on the 21st to make a passage to Buckie.

RESULTS

1. The only gear used was the commercial scallop dredge, with 3 in (76 mm) tooth spacing and mesh size and belly rings of 3 1/4 in (83 mm) diameter. The dredges were fished singly or in pairs and towed at 1-2 knots, usually for 5 minutes.

The dredge teeth dug only about one inch into the muddy-gravel of the sea bed. The mouth of the dredge became blocked for much of the haul by sediment pushed in front of the toothed bar and some scallops were pushed aside, being missed by the gear. After the haul divers collected the scallops left behind in the dredge track, and dredge efficiency was expressed as the ratio of scallops caught to total scallops disturbed by the dredge. The results are given in Table I for two size categories of scallops, ≥ 80 mm and < 80 mm long, 80 mm approximating to the tooth spacing and mesh and ring size of the dredge. In the larger size-group 25.9% of the scallops were caught but in the smaller group only 3.5%. The overall efficiency for all sizes ranged from 8 to 36%.

Table I

Summary of scallop dredge efficiency experiments
(data from 14 hauls combined).

Size group	Caught by dredge	Numbers of scallops		Total	Efficiency %
		Collected by divers			
<80 mm	8	218		226	3.5
≥80 mm	179	511		690	25.9
All	187	729		916	20.4

A few photographs of the dredge and track were taken by divers but water conditions for photography were poor during most of the cruise.

2. The toothed dredge marked a distinct track on the sea bed, narrow ridges of sediment being pushed aside by the gear. Damage to macrobenthic animals was observed, including Marthasterias and Cancer, and heart urchins which were dug out together with Laevicardium crassum. Hermit crabs and Buccinum were attracted to feed on organisms disturbed by the dredge, and a few plaice and dogfish were noted in the tracks.

3. The ability of queens to react to and avoid the dredge by swimming was noted again. The only scallops which reacted in this way were unrecessed individuals.

4. Scallops caught by the dredge in short (5 min) and two longer hauls, those disturbed by the dredge and collected from the track, and others collected by divers from unfished areas were marked and returned to the sea bed to test their survival. The results are shown in Table II.

Table II

Scallop survival studies

Origin of scallops	Number marked	Number dead after six days
1. Dredge-caught (2 long hauls of 60 and 80 min)	46	11
2. Dredge-caught (5 min hauls)	25	0
3. Collected from track by divers	25	0
4. Collected from unfished area by divers	29	1

The only significant mortalities occurred among animals caught in long hauls.

5. The densities of scallops were measured directly by divers and calculated from the catch data and dredge efficiencies. The average density over the whole area fished was one scallop per 10m², which agrees closely with densities found on commercial beds elsewhere.

In the south part of Claonaig Bay queens numbered 20 to 70 per 10m². Much higher densities of small queens (ca 35-45 mm) ranging from 100 to 650 per 10m², were found in the north part of the bay. Queens of this size group were abundant elsewhere and should make a useful contribution to the fishery next year.

6. Observations using the Telford time-lapse camera showed that scallops recessed into the sea bed remained stationary for several days, with no obvious changes in position in relation to currents.

7. Recently-settled spat of both scallops and queens were found attached to Laminaria fronds in depths of 8-12 m.

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2 December 1974