

R1/10

5GR77

Cruise Report

FRV 'Goldseeker'

23 May - 3 June 1977

Objectives

1. To measure burrow densities of Nephrops and other species in the Moray Firth.
2. To observe the behaviour and survival of 'discarded' Nephrops.
3. To study the survival of tagged Nephrops.

Narrative

Scientific equipment and creels were loaded at Invergordon on the evening of 23 May. The R.N. Oil Fuel Depot kindly provided storage for diving gear. The cruise ended at Invergordon on the evening of 2 June and "Goldseeker" returned to Buckie. Most time was devoted to objective 2.

Results

Survival of Nephrops in cages

The following categories of Nephrops were placed in cages on the sea bed and their survival recorded over several days:

- a) Creel caught during the day and maintained for 60-90 mins in water at sea surface temperature (13-14°C) prior to transfer to cage on sea bed.
- b) As a) but caught at night.
- c) As a) but maintained on deck in cold sea water pumped from below the thermocline (8-9°C).
- d) As a) but only 30-40 mins in sea water on deck.
- e) As c) but caught by commercial Nephrops trawler at night.

Apart from b) and e) the Nephrops were landed on deck in bright sunlight sufficient to damage the eyes and cause blindness. Divers visited the cages periodically to record numbers surviving. The results are summarised in Table I.

Table I Survival of Nephrops in cages as percentage of original number after different times (to nearest ½ day)

Category*	Original Number	Days									
		½	1	1½	2	2½	3	3½	4	4½	5
a)	41		51		46				44		42
b)	37			70				62		60	
c)	33		100		100						
d)	31		77								
e)	64	97									

* experiments c) - e) were continued during part I of next cruise (6 GP 77).

The main feature of these results is the improvement in survival obtained by holding the Nephrops in cold sea water (8-9°C) on deck prior to transfer to a cage on the sea bed. Temperature measurements at different depths showed a pronounced thermocline around 10 m depth. The sea bed temperature was 7.9°C and it seems that survival of Nephrops is adversely affected by prolonged exposure to sea surface temperatures. The initial survival of trawl caught Nephrops (e) was high.

12 discarded Nephrops (creel caught) were followed from surface to the sea bed and their behaviour described. The rate of descent was about 10 m/minute. Most Nephrops 'swam' down in a shallow glide using the pleopods. Each animal was observed for about 10 minutes on the sea bed. Nephrops which had been shielded from sunlight immediately after capture were generally more active on the sea bed than those fully exposed to surface light intensity. Only one Nephrops entered a burrow within our short period of observation. No tagging of Nephrops was carried out.

Creel catches

Two fleets of 25 prawn creels were fished daily about 5 miles ENE of the entrance to the Cromarty Firth. This area is relatively unexploited and good catches of 'large' Nephrops were obtained (average of 3 animals per creel) using salt herring bait. The size and sex compositions are given in Table II. Females accounted for 32% of the catch and 32% of them were berried. Measurements of carapace and total lengths, total, tail and head weights were taken from 100 Nephrops of each sex for biometric analysis (objective carried over from a previous cruise).

Table II Length and sex composition of creel catches

Carapace Length (mm)	20 /24	25 /29	30 /34	35 /39	40 /44	45 /49	50 /54	55 /59	60 /64	Total
No. Males	1	2	27	81	112	129	105	60	14	531
No. Females		2	22	49	68	23	3	1		168
No. Females berried		1	17	18	31	10	1			78

Burrow densities

Only limited time was devoted to this aspect. In the area of creel fishing the density of burrows was about 1 per m². The density of Nephrops was not determined. Some in situ shear stress measurements on the mud sediment were obtained using a shear vane probe.

C J Chapman
13 July 1977

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