

**THE CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE,
LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK, NR33 0HT**

2004 RESEARCH VESSEL PROGRAMME

PROGRAMME: RV CORYSTES 06/04

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DURATION: 1 – 14 June 2004

LOCATION: English Channel (VIIId,e)

AIMS:

1. To carry out a survey of scallops (*Pecten maximus*) in an area of the western English Channel (VIIe) to quantify sampling and spatial variability of scallop size and age structures in dredge catches.
2. To characterise sediment types at scallop survey stations using a remote acoustic seabed discrimination system (QTC).
3. To collect data on fish by-catch and epibenthos in scallop dredges.

ADDITIONAL AIMS:

4. To collect a sample of undersized scallops from the eastern English Channel (VIIe) for maturity studies.
5. To collect samples of crab (*Cancer pagurus*) larvae from the eastern and western English Channel for genetic analysis.

NARRATIVE (all times in BST):

CORYSTES departed from Lowestoft at 0900 on Tuesday 1 June and arrived at the first plankton survey position (Aim 5) in the Dover Straits (50° 54.245' N, 1° 10.450' E) at 1722. One 30 minute tow (53 cm HSTN with 20cm nose cone and 60 mpi mesh end bag) was conducted in about 30 m depth. No *Cancer* larvae were found in the sample.

CORYSTES arrived at the first scallop sampling position (Aim 4) near Beachy Head in the eastern English Channel (50° 39.782' N, 0° 05.319' W) at 2342 and deployed four standard Newhaven type spring-loaded scallop dredges and four fine-mesh (Queenie) dredges, towed for 30 minutes. A single scallop was captured during this time. In the absence of more specific information on the location of scallop beds in the area, no further tows were undertaken.

The vessel arrived at the start of the survey grid (50° 02.598' N, 1° 10.450' W) in the western English Channel at 1046 on Wednesday 2 June. Eight spring-loaded scallop dredges were deployed, each fitted with 'French'-style tooth bars at a tension of 10 m.kg – the gear configuration for soft (sandy) ground. The survey continued in calm conditions, completing 46 stations (including replicates at 8 stations) on the soft

grounds up to 0800 on Saturday 6 June. All tows were of 15 minute duration at 2.5 kt.

The gear was re-configured for hard ground before the next station – tooth bars with 5" round (peg) teeth at a tension of 6 m.kg. This configuration was first deployed at 0905 on Saturday 6 June close to the Hands Deep, west of the Eddystone (ship station 49, survey reference 77). Shortly after beginning the tow, a steep rock pinnacle was encountered (50° 12.582' N, 4° 24.652' W), causing loss of the starboard dredges and towing beam. The station was abandoned, and a replacement set of dredges and towing beam was fitted before the next station. For surveys in 2005 and 2006, consideration will be given to identifying a new station position on clear ground to the north of the original position.

The survey continued without further incident, and the grid of 105 stations was completed by 2230 on Friday 11 June. Conditions were mostly calm to very calm, with some light to moderate seas experienced on 10-11 June. The good conditions favoured fast and safe deployment of the gear, so that a greater than expected rate of progress was made. This allowed replicate tows to be made on most of the hard ground stations.

Three further plankton samples were taken off Land's End during 0600-0947 on Saturday 12 June (Aim 5) at positions 50° 00.510' N, 6° 00.690' W, 49° 59.947' N, 5° 46.265' W and 49° 59.964' N, 5° 30.665' W. Some suspected *Cancer* larvae were found (to be confirmed in the laboratory) and were preserved in 90% ethanol. The scallop dredges were then re-configured for soft ground, and replicate samples were taken at four stations on soft ground during the day, finishing at 2115 at survey reference 101 (50° 17.500' N, 2° 55.000' W).

Two plankton samples were taken close to Start Point between 0728 and 0918 on Sunday 13 June at positions 49° 59.980' N, 3° 31.610' W and 49° 59.440' N, 3° 15.940' W. Suspected *Cancer* larvae were preserved in ethanol for later confirmation in the laboratory. The vessel steamed westwards during the day, pausing in the Dover Straits between 0014 and 0304 on Monday 14 June to take a final three plankton samples (positions 50° 43.950' N, 0° 40.910' E, 50° 49.770' N, 0° 54.340' E and 50° 57.160' N, 1° 09.580' E). *Cancer* larvae were extracted and preserved as before.

On completion of the final plankton samples, the vessel continued through the Dover Straits and steamed northwards, arriving at Lowestoft at 1730 on Monday 14 June.

RESULTS:

Aim 1

The scallop survey grid was completed during the cruise, with 161 valid tows at 104 sampling positions (Figure 1). The average catch rate was 36.5 scallops per tow, with higher catch rates on the hard than the soft ground (Table 1). About 84% of the scallops were of commercial size (≥ 90 mm shell height), the proportion being slightly higher on the soft than the hard ground. Exceptionally high catch rates (peak 401 scallops per tow) were recorded on the Cornish inshore grounds (Figure 1), including good numbers of pre-recruit size-classes. More than 5,800 scallops were captured during the survey. Shell heights were measured and the flat shells were retained for later age-determination in the laboratory.

Aim 2

The QTC ground discrimination system (120 kHz transducer, reference depth 50 m) was run for all stations and for transits between stations. The system ran without problem for all stations at depths less than 100 m. Discrimination was unsuccessful at depths of 100 m and greater, which applies to a small number of stations in the south-west extremity of the grid. The purpose of the QTC calibration readings was to provide an improved basis for spatial interpolation of scallop densities across the western Channel grounds.

Aim 3

Qualitative abundance scores were recorded at each scallop survey station for 53 separately identified taxa of benthos (Table 2). Echinoderms and hydroids were the most consistently recorded groups, and it is expected that multivariate analysis will provide a basis for classification of ground type. Some physical characteristics of the dredge contents were also recorded qualitatively (dredge fullness, rocks, stones and dead shells).

A total of 25 fish species, 2 cephalopod species and 3 commercial crustacean species were identified in the dredge contents (Table 3). The commercial species were measured, and some otoliths retained. The most consistently occurring species were monkfish and brown crabs. Six species of rays were recorded, together with 11 species of flatfish (7 commercial).

Aim 4

Only a single scallop was retained in the sample taken off Beachy Head in the eastern Channel, so no assessment of size-at-maturity in this area could be undertaken. Further information on productive fishing locations will be sought before any future attempt to take a sample of undersized scallops in the area.

Aim 5

Plankton samples were taken in two areas of the western Channel (Land's End and Start Point) and in one area of the eastern Channel (Dover Straits). Early indications are that small numbers of *Cancer* larvae were taken, but this will need confirmation in the laboratory. In addition, two berried female *C. pagurus* were caught in scallop dredges in the western Channel. Samples of eggs were retained for future analysis.

Acknowledgements

It is a pleasure to acknowledge the professionalism of the officers and crew of RV CORYSTES whose support and flexibility throughout the cruise contributed greatly to the success of the programme.

M C Bell

14 June 2004

SEEN IN DRAFT:

Captain R McCurry, Master
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TABLE 1. Catch rates of scallops in the western English Channel.

(a) Catch per 15 minute tow

Ground type	N	Average	SD	Maximum
Hard	111	44.4	61.7	401
Soft	50	18.9	26.9	134
Total	161	36.5	54.6	401

(b) Catch per dredge km

Ground type	N	Average	SD	Maximum
Hard	111	4.79	6.66	43.28
Soft	50	2.04	2.91	14.46
Total	161	3.94	5.89	43.28

TABLE 2. Benthic species recorded in the scallop dredge catches.

Class	Species	% occurrence	Total abundance score [†]
DEMOSPONGIAE	<i>Amphilectus fucorum</i>	1.2	2
HYDROZOA	<i>Abietinaria</i> spp.	61.1	118
	<i>Diphasia</i> sp.	0.6	1
	Sertulariidae spp.	41.4	70
	<i>Nemertesia antennina</i>	41.4	79
	<i>Nemertesia ramosa</i>	46.9	92
ANTHOZOA	<i>Alcyonium digitatum</i>	39.5	72
	<i>Eunicella verrucosa</i>	2.5	4
	<i>Metridium senile</i>	1.2	2
POLYCHAETA	<i>Aphrodita aculeata</i>	3.1	5
	<i>Chaetopterus variopedatus</i>	7.4	12
	<i>Hyalinoecia tubicola</i>	6.2	10
CRUSTACEA	<i>Homarus gammarus</i>	0.6	1
	<i>Pagurus</i> sp.	12.3	20
	<i>Galathea</i> sp.	5.6	9
	<i>Maja squinado</i>	13.0	25
	<i>Macropodia tenuirostris</i>	4.9	8
	<i>Atelecyclus rotundatus</i>	1.9	3
	<i>Cancer pagurus</i>	42.6	80
	<i>Liocarcinus depurator</i>	2.5	5
	<i>Xantho pilipes</i>	0.6	1
	<i>Goneplax rhomboides</i>	0.6	1
MOLLUSCA	<i>Crepidula fornicata</i>	4.3	10
	<i>Colus gracilis</i>	2.5	4
	<i>Buccinum undatum</i>	2.5	5
	<i>Scaphander lignarius</i>	0.6	1
	<i>Glycymeris glycymeris</i>	4.9	11
	<i>Aequipecten opercularis</i>	21.6	40
	<i>Chlamys varia</i>	0.6	1
	<i>Astarte sulcata</i>	1.2	2
	<i>Arctica islandica</i>	0.6	1
	<i>Venus verrucosa</i>	0.6	1
BRYOZOA	<i>Cellaria fistulosa</i>	19.8	36
	<i>Eucretea loricata</i>	0.6	1
	<i>Pentapora foliacea</i>	1.2	2
	<i>Alcyonidium diaphanum</i>	14.8	26

[continued...]

[†] Sum over stations of qualitative abundance indices, where 1=present, 2=moderate numbers and 3=very abundant.

TABLE 2 (continued). Benthic species...

Class	Species	% occurrence	Total abundance score [†]
ECHINODERMATA	<i>Astropecten irregularis</i>	43.8	83
	<i>Luidia sarsi</i>	7.4	12
	<i>Luidia ciliaris</i>	35.2	67
	<i>Porania pulvillus</i>	12.3	21
	<i>Anseropoda placenta</i>	3.1	6
	<i>Crossaster papposus</i>	6.8	11
	<i>Henricia oculata</i>	6.2	11
	<i>Asterias rubens</i>	32.1	65
	<i>Marthasterias glacialis</i>	31.5	67
	<i>Ophiura ophiura</i>	16.7	27
	<i>Ophiothrix fragilis</i>	5.6	9
	<i>Psammechinus miliaris</i>	2.5	4
	<i>Echinus esculentus</i>	24.1	47
	<i>Echinus acutus</i>	5.6	9
	<i>Spatangus purpureus</i>	8.6	16
ASCIDIACEA	<i>Ascidia virginea</i> (?)	2.5	4
	<i>Botryllus schlosseri</i>	2.5	4

[†] Sum over stations of qualitative abundance indices, where 1=present, 2=moderate numbers and 3=very abundant.

TABLE 3. Commercial crustaceans and cephalopods and all fish species recorded in scallop dredge catches.

Species		% occurrence	Total number caught	Mean number per tow	Maximum number per tow
Lobster	<i>Homarus gammarus</i>	0.6	1	0.0062	1
Spider crab	<i>Maja squinado</i>	13.0	37	0.2284	5
Brown crab	<i>Cancer pagurus</i>	42.6	109	0.6728	6
Curled octopus	<i>Eledone cirrhosa</i>	3.7	6	0.0370	1
Cuttlefish	<i>Sepia officinalis</i>	3.7	6	0.0370	1
Lesser spotted dogfish	<i>Scyliorhinus caniculus</i>	0.6	1	0.0062	1
Shagreen ray	<i>Raja fullonica</i>	1.2	3	0.0185	2
Undulate ray	<i>Raja undulata</i>	1.2	2	0.0123	1
Cuckoo ray	<i>Raja naevus</i>	4.9	8	0.0494	1
Spotted ray	<i>Raja montagui</i>	2.5	5	0.0309	2
Thornback ray	<i>Raja clavata</i>	2.5	5	0.0309	2
Blonde ray	<i>Raja brachyura</i>	0.6	1	0.0062	1
Bib	<i>Trisopterus luscus</i>	1.9	3	0.0185	1
Poor cod	<i>Trisopterus minutus</i>	0.6	1	0.0062	1
John Dory	<i>Zeus faber</i>	0.6	1	0.0062	1
Scad (probable discard)	<i>Trachurus trachurus</i>	0.6	1	0.0062	1
Tompot blenny	<i>Blennius gattorugine</i>	0.6	2	0.0123	2
Turbot	<i>Scophthalmus maximus</i>	2.5	5	0.0309	2
Brill	<i>Scophthalmus rhombus</i>	1.2	2	0.0123	1
Megrim	<i>Lepidorhombus whiffiagonis</i>	12.3	24	0.1481	3
Scaldfish	<i>Arnoglossus laterna</i>	1.2	2	0.0123	1
Imperial scaldfish	<i>Arnoglossus imperialis</i>	1.2	2	0.0123	1
Dab	<i>Limanda limanda</i>	1.9	3	0.0185	1
Plaice	<i>Pleuronectes platessa</i>	11.7	36	0.2222	5
Lemon sole	<i>Microstomus kitt</i>	6.8	12	0.0741	2
Sand sole	<i>Pegus lascaris</i>	0.6	1	0.0062	1
Sole	<i>Solea solea</i>	10.5	23	0.1420	3
Thick-backed sole	<i>Microchirus variegatus</i>	1.2	2	0.0123	1
Clingfish	<i>Lepadogaster</i> sp.	0.6	1	0.0062	1
Monkfish	<i>Lophius piscatorius</i>	25.9	58	0.3580	4

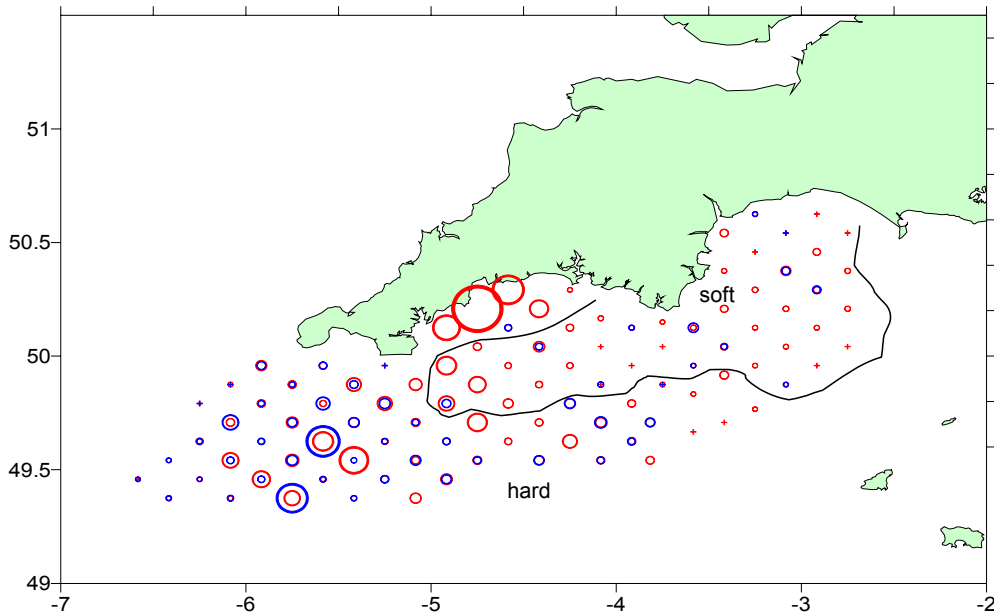


FIGURE 1. Station positions and catch rates of scallops in the western English Channel. Circle diameter is proportional to catch rate. Superimposed circles of different sizes indicate replicate samples differing in catch rate.

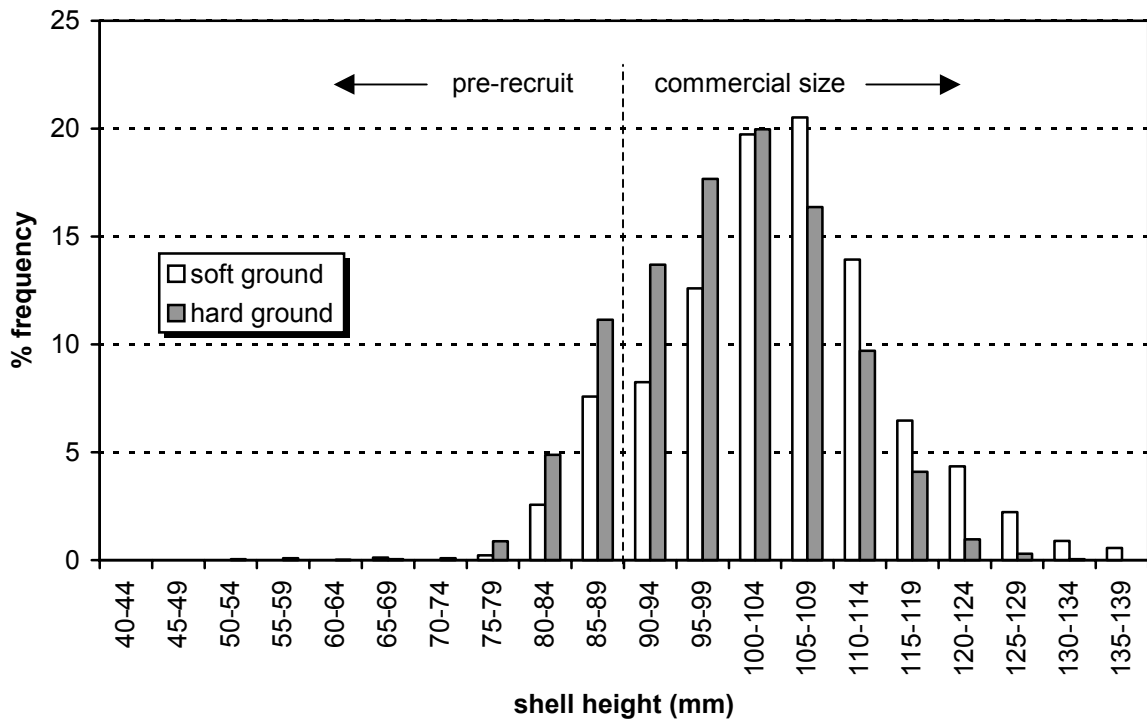


FIGURE 2. Size-frequency distributions of scallops caught on 'soft' and 'hard' ground in the western English Channel.