

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, UK

1995 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 11a/95

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DURATION: 24 October-7 November 1995

LOCALITY: Irish Sea

AIMS:

1. To survey the seabed and sample benthos at the experimental site off Anglesey (ref. 53.25.5N; 04.01.5W) fished intensively with a beam-trawl fitted with chain mat for the last time in October 1994.
2. To film predators attracted to baited camera frames/and/or a frame mounted video camera on the sea bed using various components of the by-catch.
3. To quantify the number of macro-epibenthic animals moving onto trawled tracks and control areas by sampling with a 3-m beam trawl.
4. To estimate scavenging amphipod abundance with baited traps.
5. To estimate scavenger populations at an intensively fished site off Fleetwood.
6. To compare damage rates of indicator species such as starfish in areas of different fishing intensity, ie off Anglesey and Fleetwood.
7. To collect live invertebrate scavenger species for experimental feeding and behavioural studies at Conwy.

NARRATIVE:

The scientific staff joined the ship at Lowestoft on 24 October. CORYSTES sailed at 0845 h that morning, arriving at the experimental site off the North Wales coast in the morning of the 27 October. A side-scan survey and RoxAnn survey of the experimental site was conducted to obtain information of the sediment type and bottom contour profile.

Epifaunal sampling of three experimental lines, as a prelude to fishing with the 4 m beam trawl, was made with 18 replicate 3.5 min tows with the 3 m beam trawl. In the evening, the experiment to study the behaviour of scavengers began by fishing a 1500 m long line, 10 times with the 4 m beam trawl to create a disturbance to the sea bed.

On the 28 October, the fished line and control lines were sampled with the 3 m beam trawl to detect changes in epifaunal abundance due to fishing activity. During the afternoon slack

water, three baited frames with attached stills cameras and a fleet of 10 pots designed to catch small scavenging species, were deployed in Red Wharf Bay. The pots, baited with either fish, crabs or echinoderms, were fished for 24 h. The cameras, baited with dragonets, were left on station for three days. Day grab sampling was continued on the experimental grid.

On the 29 October, further sampling of scavenger abundance on the fished line and control areas was made with the 3 m beam trawl. Day grab sampling was completed and a start made with benthos dredge sampling. The pots were hauled, rebaited and deployed for 48 h, since low catch rates suggested that a longer period of deployment would be beneficial.

On 30 October, final sampling of scavenger abundance on the fished line and control areas was made with the 3 m beam trawl. Benthos dredge sampling of the experimental grid was completed and in the evening, the video camera was deployed to obtain records of feeding behaviour of scavengers attracted to fish bait.

On the 31 October, effort was directed at completing the dredge sampling of the experimental grid, and recovering the pots and cameras from Red Wharf Bay. In the evening, the baited video camera was again deployed to fortify some good recordings obtained the previous evening of scavenger activity in the presence of dragonet bait. A single fish was used to record aggressive behaviour and competition between individuals and species of scavengers for a limited food resource. With the Welsh part of the programme completed, CORYSTES set sail for Fleetwood to undertake sampling on grounds currently heavily exploited by beam trawlers.

On 1 November, CORYSTES began an echo- and side-scan survey of fishing grounds 12 nm west of Fleetwood. It became apparent that the area had been heavily trawled, with substantial patches showing >90% coverage with recent, distinct trawl marks. Three experimental lines were established and surveyed by sledge fitted with stills and video cameras. The ground was muddier with fewer benthic invertebrates than that off Anglesey. Trial sampling with the 3 m beam trawl indicated that an increase in tow duration from 3.5 to 15 minutes was necessary to obtain sufficient catch. On the evening slack water, the baited video camera was deployed to determine scavenger activity on this ground.

On the 2 November, preliminary sampling with the 3 m beam trawl of the fished and control lines were completed. Two baited cameras and a fleet of 10 pots were deployed. In the evening, 10 tows along the fished line were made with the 4 m beam trawl to create a fishing disturbance.

On 3 November, sampling the control and fished lines with the 3 m beam trawl was completed. Scavenger diversity was quite low, with swimming crabs the most common species present. With a poor weather forecast, the pots and cameras were recovered ahead of time. The video sledge was towed along the control and fished lines revealing areas disturbed by our experimental trawling.

On 4 and 5 November, sampling with the 3 m beam trawl and a side-scan sonar survey on the fished and control lines continued. Deployment of the video sledge was not possible due to fresh winds. In the evening of the 5 November, CORYSTES steamed to a site off the Ribble Estuary and completed a side-scan search in a heavily fished area for evidence of recent fishing activity.

On 6 November, the 3 m beam trawl was used to collect starfish for assessment of arm damage rate as a response to fishing intensity. The video sledge, baited with dragonets, was deployed over a slack water period whilst at anchor. With the major and subsidiary aims of the programme completed, CORYSTES steamed to Liverpool, docking on the evening tide at 2200 h.

RESULTS

1. All four lines at the experimental grid off Anglesey were sampled successfully with the Day grab, benthos dredge and 3 m beam trawl.
2. Stills cameras baited with dragonets were deployed for up to 3 days at sites off Anglesey and Fleetwood. Deployment of the towed video sledge on fished and unfished lines provided some good records of sea bed condition and scavenger presence. A wide variety of scavenging species were attracted to the dragonet bait at Anglesey. This contrasted to the low abundance of scavengers off Fleetwood.
3. Sampling with the 3 m beam trawl at the offshore site at Anglesey, showed that the scavenging hermit crab (*Pagurus bernhardus*) increased in density by about 2 times within 12 h of fishing with the 4 m beam trawl (Table 1). Its density remained high for 24 h and began to diminish after a further 24 h.
4. The baited traps, deployed off Anglesey on two occasions, caught whelks (*Buccinum undatum*), hermit crabs (*Pagurus bernhardus*) and amphipods with the former two species attracted to crab and fish baits respectively. Amphipods were preserved for later identification and estimation of abundance. The traps deployed off Fleetwood caught whelks, swimming crabs (*Liocarcinus depurator*) and edible crabs (*Cancer pagurus*).
5. Sampling with the 3 m beam trawl at the offshore site off Fleetwood showed an impoverished epifaunal community. Some species, notably hermit crabs and swimming crabs, were depleted by 4 m beam trawling. Their abundance, however, was restored 2 days after trawling.
6. Side-scan sonar surveys of three areas suggested a hierarchy of fishing activity. It is hypothesised that the damage rate to starfish (loss of arms) is reflected by this fishing activity and is greatest in the more heavily fished areas off Fleetwood and least off Anglesey (Figure 1).
7. Live starfish and hermit crabs were collected for experimental work at Conwy.

B E Spencer
6 November 1995

SEEN IN DRAFT:

B A Chapman, Master
W May, Senior Fishing Mate

INITIALLED:

JS.

DISTRIBUTION:

Basic list +
B E Spencer
S D Utting
M Kaiser
D B Edwards
R P Flatt
K Ramsay
K Radford
P Diamond, NWNW SFC

Table 1 The mean abundance (n=6 x 3 m beam trawl tows) of scavenging species found on control and fished lines at various time intervals before and after fishing with a 4 m commercial beam trawl.

Offshore Anglesey site

tow duration=3.5 min		24 h before		12 h after		36 h after		60 h after	
		C	T	C	T	C	T	C	T
<i>Asterias rubens</i>	Common starfish	49	53	86	22	67	64	68	59
<i>Ophiura ophiura</i>	Brittlestar	13	25	25	28	32	24	21	14
<i>Ophiura albida</i>	Brittlestar	54	41	65	121	54	92	107	35
<i>Buccinum undatum</i>	Whelk	3	4	2	6	6	3	8	2
<i>Neptunia antiqua</i>	Whelk	9	10	13	16	9	8	13	4
<i>Colus gracilis</i>	Whelk	4	4	1	12	3	10	2	2
<i>Pagurus bernhardus</i>	Hermit crab	27	37	58	103	41	168	46	78
<i>Pagurus prideauxi</i>	Hermit crab	23	39	57	41	60	43	57	23
<i>Liocarcinus depurator</i>	Swimming crab	6	8	16	26	6	15	5	10
<i>Liocarcinus holsatus</i>	Swimming crab	6	8	8	11	4	6	3	4
<i>Hyas araneus</i>	Spider crab	13	19	14	26	12	17	7	9
<i>Macropodia</i> spp.	Spider crab	105	154	139	102	103	138	101	92
<i>Inachus dorsettensis</i>	Spider crab	13	28	30	22	24	22	30	20

Offshore Fleetwood site

tow duration=15 min		24 h before		12 h after		36 h after		60 h after	
		C	T	C	T	C	T	C	T
<i>Asterias rubens</i>	Common starfish	18	19	24	16	20	12	22	13
<i>Ophiura ophiura</i>	Brittlestar	96	92	145	133	201	73	148	125
<i>Astropecten irregularis</i>	Starfish	30	27	38	44	43	33	35	21
<i>Buccinum undatum</i>	Whelk	8	7	8	7	13	4	7	3
<i>Pagurus bernhardus</i>	Hermit crab	36	46	56	20	36	18	35	19
<i>Liocarcinus depurator</i>	Swimming crab	139	192	221	146	168	87	196	106
<i>Liocarcinus holsatus</i>	Swimming crab	41	63	65	57	38	47	50	44
<i>Pleuronectes platessa</i>	Plaice	5	4	6	2	3	2	5	3
<i>Limanda limanda</i>	Dab	51	49	41	30	51	37	69	79
<i>Solea solea</i>	Sole	3	3	4	4	1	2	3	1
<i>Triglidae</i>	Gurnards	9	10	12	10	13	9	13	12
<i>Callionymus</i> spp.	Dragonets	8	6	9	3	6	2	5	3

Common starfish, *Asterias rubens*

