

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

1982 RESEARCH VESSEL PROGRAMME

REPORT: R V CIROLANA: CRUISE 4

(PROVISIONAL: Not to be quoted without prior reference to the author)

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DURATION: Left Grimsby 0950 h 1 April
Arrived Grimsby 0330 h 5 May
All times are Greenwich Mean Time

AIMS:

- 1 To carry out a fishing survey, principally for mackerel, scad and pilchard but taking particular note also of blue whiting, hake, saithe, monkfish and megrim.
- 2 To obtain samples of whole mackerel from each area for studies of stock separation by parasites by Dr McKenzie (Aberdeen).
- 3 To obtain mackerel tissue samples for Dr Jamieson's stock separation studies.
- 4 To obtain otolith samples to supplement the regular commercial vessel sampling programme.

NARRATIVE:

CIROLANA sailed from Grimsby at 0950 h 1 April and after approximately one hour at Humber Light Vessel calibrating DF equipment course was set for the position 57° 20' N 03° 20' E, some 45 miles due north of the Ekofisk Oilfield. Fishing began here at 0900h 2 April and during the following 3 days the area surveyed was extended without interruption, northward to the level of 61° N. During this time the survey was concentrated generally to the eastern side of the Northern North Sea between the oil and gas fields and the 200 metres edge of the Norwegian Deep Water. Both bottom and mid water trawl hauls were made in this area. During the night of 4/5 April a move was made to the western side of the oil and gas installations and the grounds immediately to the east and north of Shetlands were investigated on 5 April. A short excursion was made next day into deep water to the northwest of Shetlands in order to run off all the main trawl warp and re-lay it under tension. The fishing survey was resumed that same afternoon off Muckle Flugga. Only one haul was possible on the morning of 7 April before NE'ly gales prevented any further work. Gales persisted until 23.00 h 8 April when a move was made to grounds west of Papa Bank where fishing was resumed at dawn 9 April. Thenceforth until the mid-cruise break the weather stayed fair and work proceeded uninterrupted until 0800 h 21 April when course was set for Santander. During the intervening 13 days the survey was continued, taking in grounds at Rona, Sule Skerry, Flannans, St Kilda, Stanton Banks, Tory Island, Eagle Island, Porcupine Bank, off from Galway, Bantry Bay, Fastnet, Celtic Sea/Bristol Channel and Nymphe, Labadie, Cockburn, Great Sole, Little Sole and La Chapelle Banks. Santander was reached at 1230 h 21 April. Staff from the Spanish Oceanographic

Institute were met that afternoon and again formally the following day when the Director, Dr Cendrero and some 25 of his staff were entertained aboard at a lunch-time reception. Aspects of CIROLANA were demonstrated to the visitors. Members of the staff visited the Spanish Laboratory later that afternoon. CIROLANA sailed from Santander at 0700 h 24 April steaming to SW of Cape Finisterre where the survey was resumed at 0515 h 25 April. Only one early morning haul was completed before the strong NE'ly breeze freshened further to 40+ knots. Dodging was begun at 0900 h and continued throughout the day. A slight lull next morning at 0900 h 26 April allowed a single haul but gales soon returned necessitating a further period of dodging. A general easing of the weather occurred that evening and from then onward throughout the period 27 April to 2 May there was no further interruption. During this time grounds along the north coast of Spain were worked from 8° West Longitude eastward to the Franco/Spanish border. Subsequently grounds in the French sector of Biscay were worked in a general northwesterly direction following the shelf edge but with some hauls in shallower water closer toward the French coast. La Chapelle was reached and fished a second time on 30 April after which on 1 May a series of hauls was made across the mouth of the Channel ending in Mounts Bay for the dusk haul. Grounds between the Lizard and Start Point were worked on 2 May, the final haul having to be abandoned because of SW'ly gales at 1830 h that evening. With a strong following wind course was set for the Dover Straits, CIROLANA passing there at 1230 h 3 May. With the gales slightly moderated it was decided to go to the Brown Ridges to see if mackerel were present at these Dutch coastal grounds. A good passage was made throughout 3 May and the intended fishing area was reached at 2330 h. The gales of the previous 30 hours had moderated sufficiently to permit fishing and a single two-hour haul was made at 0430 h 4 May on the east side of the Brown Ridges. With this completed, course was set for Grimsby where CIROLANA docked at 0330 h 5 May.

RESULTS

General. The total number of hauls made during the cruise was 94 of which 89 were with the Portuguese high headline demersal trawl and 5 with the 1600 Engel mid-water trawl. The only damage sustained by the gear was with a single haul at La Chapelle Bank when the port side wing was torn out on a fastener. The shrimp netting cod-end liner became excessively worn and was replaced after station 73.

The winding on gear of the ELAC cable winch failed on one occasion causing the cable to pile up on the drum and necessitating hauling a considerable amount of cable by another winch, to lie loose on the deck. After repair by the engineers the winch worked satisfactorily but halfway through a subsequent haul with the midwater trawl, the headline transducer failed, undoubtedly due to stresses suffered during the cable man-handling. The midwater trawl was not used after Station 63.

For each haul the total catch was separated by species and the weight of each determined. Record was also kept of the number of baskets of each of the major species caught. At each station the length distribution of almost all species was determined either by sampling or measurement of the total catch. All data of weight of each species and length measurements were input to computer file on board immediately following each station.

Aim 1

- a. Mackerel. (see attached chart of mackerel sampling areas for convenience of reference)

No North Sea mackerel were found in the area between the gas and oil fields and the Norwegian Deep Water. Nine demersal hauls and three in mid-water in this area failed to catch a single specimen. The only fish caught in the North Sea or indeed in the whole of sampling area 2 were taken from two hauls to the north east of Muckle Flugga, one being of only 6 fish but the other yielding $2\frac{1}{2}$ baskets (73 kg) for one hour at 160 m. None were found in the area to the west of Shetlands and Orkneys but cover here was limited to some extent by bad weather.

In area 4 traces of mackerel were found near Rona where two hauls each yielded 19 fish, but mackerel in quantity were first found at Flannans where 4 baskets were taken in two hours, and slightly further south at St Kilda where 19 baskets resulted from a one-hour tow. Subsequently mackerel were taken in quantity at almost all the other more southerly grounds in area 4. Most of the fish were large - mean lengths in excess of 40 cm were commonplace - and in spawning condition.

In area 5 three hauls at Porcupine Bank all yielded fair quantities of very large spawning mackerel at an average rate of 3.6 baskets/hour. Much larger quantities were taken further to the east where, some 50 miles west of Galway Bay, 121 baskets were taken for one hour. Other catches of $12\frac{1}{2}$, 8, $6\frac{1}{2}$ and 5 baskets/hour were made in the same general area off Galway Bay. These fish were also mostly large and spawning.

In area 7 good catches continued to be made close to the SW coast of Ireland where they appeared to be an extension of those fish found in area 5. The only other place in area 7 where mackerel were found in quantity was around Little Sole Bank where the average catch rate was almost 15 baskets/hour. Elsewhere, notably Labadie, Cockburn and Gt Sole Banks, few mackerel were caught.

Only four hauls were made in area 11 and the effectiveness of three of these was questionable due to bad weather. At the fourth, however, after conditions were improved, 63 baskets were taken for a two hour tow. The length distributions of these fish showed three distinct modes at approximately 22 cm, 30 cm and 41 cm. More than 80% (by numbers) of the fish were less than 35 cm total length.

The hauls along the north Spanish coast in area 10, excepting one of doubtful validity, yielded an average of 7 baskets/hour. At one of these there was a preponderance of small fish but at the others larger fish predominated. Turning northward through Biscay, fewer mackerel were found in the central part of area 10 but in the area around La Chapelle Bank and to its southeast, greater quantities were caught. The best haul here was one of 16 baskets for one hour. Finally in the west, in area 8, mackerel were only caught in quantity south of the Wolf Rock and in Mounts Bay. Hauls here produced 8 baskets and 5 baskets respectively each for one hour. At the Wolf the entire catch comprised fish less than 35 cm total length with modes at 20 cm and 29 cm; in Mounts Bay 94% (by numbers) of the catch were less than 35 cm with a single distinct mode at 29 cm.

The single haul at Brown Ridges (Area 1) produced only 11 small mackerel for two hours.

b. Scad. (NB. for this species only, sampling areas 5 and 7 are combined to form a single area)

Scad were absent from all hauls in areas 2 and 4 and the first time that they were caught was at the southwest corner of Ireland. In area 5/7 the fish were found in quantity only at the Shelf edge, following roughly the 200 m depth contour. Those hauls made across the Celtic Sea toward the Bristol Channel produced no scad at all. At the shelf edge fishing for this species was very variable. Two hauls off SW Ireland yielded 4 baskets and 27 baskets each for an hour; two at Gt Sole Bank gave 2 baskets and 5 baskets for two hours and one hour respectively; and two at Little Sole Bank $8\frac{1}{2}$ baskets and 2 baskets for an hour. Other hauls in similar depths in the same areas produced a few single fish. One catch of 5 baskets at Gt Sole Bank was taken by midwater trawl, the remainder all being with the demersal gear. Most of the fish taken in area 5/7 were within the size range of 32-40 cm total length.

Few scad were found at Cape Finisterre in area 11 the best haul being only one basket for two hours. Further eastward along the Spanish coast in area 10 the fish were more abundant and $10\frac{1}{2}$ baskets were taken off Gijon in one hour and 35 baskets off San Sebastian in 90 minutes. Scad taken in this part of area 10 were generally smaller than those from area 5/7. Moving northward through Biscay scad were present along the shelf edge in depths between 125 m and 150 m where catches of 14, 10 and 7

baskets/hour were recorded. One haul was made in 280 m which yielded only a few fish. A notable feature of these scad catches in central Biscay was that very small fish of less than 20 cm total length were present in quantity in all the major catches. Further north in area 10, toward La Chapelle and on the bank the largest catches of scad were recorded with hauls of 51 baskets for 2 hours and 76 baskets (2.3 tonnes) for one hour. This latter included many small fish but the very small, < 20 cm total length, were not present.

The only noteworthy catches of scad on area 8 were at the Wolf Rock where 48 baskets/hour was recorded and south of Eddystone with 4 baskets/hour. At both of these stations all the fish were small - under 26 cm total length - and the very small, < 20 cm total length, were also present in quantity.

The one haul at Brown Ridges produced a useful sample of 43 fish.

c. Pilchard

Very few pilchard were caught during the entire cruise and these were all taken at 6 stations in south Biscay - area 10, and 2 stations off the Cornish coast in area 8. The largest single catch in area 10 was off Gijon where $\frac{1}{2}$ basket was taken in one hour. Mounts Bay yielded $\frac{2}{3}$ basket and Eddystone $\frac{1}{2}$ basket each for one hour.

d. Blue Whiting

This species was present in catches from most of the demersal hauls made to the west of the British Isles and through Biscay including the north coast of Spain. Length distributions were measured for almost all these catches and otolith samples were obtained for each sampling area. Catches were generally fairly consistent at about $1\frac{1}{2}$ baskets/hour, the largest single haul being one of $9\frac{1}{2}$ baskets for one hour off from Santander.

e. Other species

For all of the other species of special interest to the survey, all the fish caught were measured and where appropriate otoliths were obtained. Very good sampling levels were achieved for mackerel, scad and pilchard for various studies including age/length, maturity, fecundity and electrophoretics. This performance is summarised in Table 1 below.

Table 1. PELAGIC FISH SAMPLING RECORD

. Mackerel

Type of Sample Sampling area	Otoliths	Maturities	Tissue for Electro- phoretic analysis	Gonads for fecundity
N North Sea Area 2	137	137	40	
N West Scotland Area 4	345	749	80	-
West of Ireland Area 5	310	544	40	48
Celtic Sea Area 7	350	577	40	29
S West Eng. Channel Area 8	137	137	40	-
Biscay Area 10	362	867	80	27
W Biscay/Finisterre Area 11	321	388	75	-

TABLE 1 (CONTINUED)

b. SCAD

Type of sample Sampling area	Otoliths	Maturities	Tissue for Electro- phoretic analysis	Gonads for Fecundity
W Ireland/Celtic Sea Area 5/7	100	100	-	-
S West Eng. Channel Area 8	48	48	-	-
Biscay Area 10	80	80	-	24
c. PILCHARD				
S West Eng. Chan. Area 8	110	155	-	-
Biscay Area 10	54	54	-	-

NB. Samples of whole scad, deep frozen for further biological sampling at Lowestoft Laboratory, were taken from Areas 5/7, 8, 10, 11 and 1.

Aim 2

Samples of whole mackerel were obtained and quick frozen for Dr McKenzie's parasite studies, from each sampling area. With the exception of area 2 (Northern North Sea) all these samples fully covered the entire size range.

Aim 3

Samples of mackerel tissue from all sizes of fish were obtained from each sampling area. In all nearly 400 samples were obtained. These were deep frozen for Dr Jamieson.

In addition samples of tissue were obtained from Phycis blennoides, Molva dypterygia, and Molva macrophthalma and from four species of macrourids.

Aim 4

Otoliths were collected to supplement the regular North Sea and West of Scotland commercial market sampling for roundfish. Species and sampling areas together with numbers of otoliths collected are listed below in Table 2.

Table 2

Area \ Species	Cod	Haddock	Whiting	Saithe
N Sea Roundfish Area 1E	19	27	70	
" " " 1W	-	18	-	19
" " " 2	13	20	17	
" " " 6	-	-	18	
W Scotland Roundfish Area 1	32	58		} 22
" " " 2	7	40		

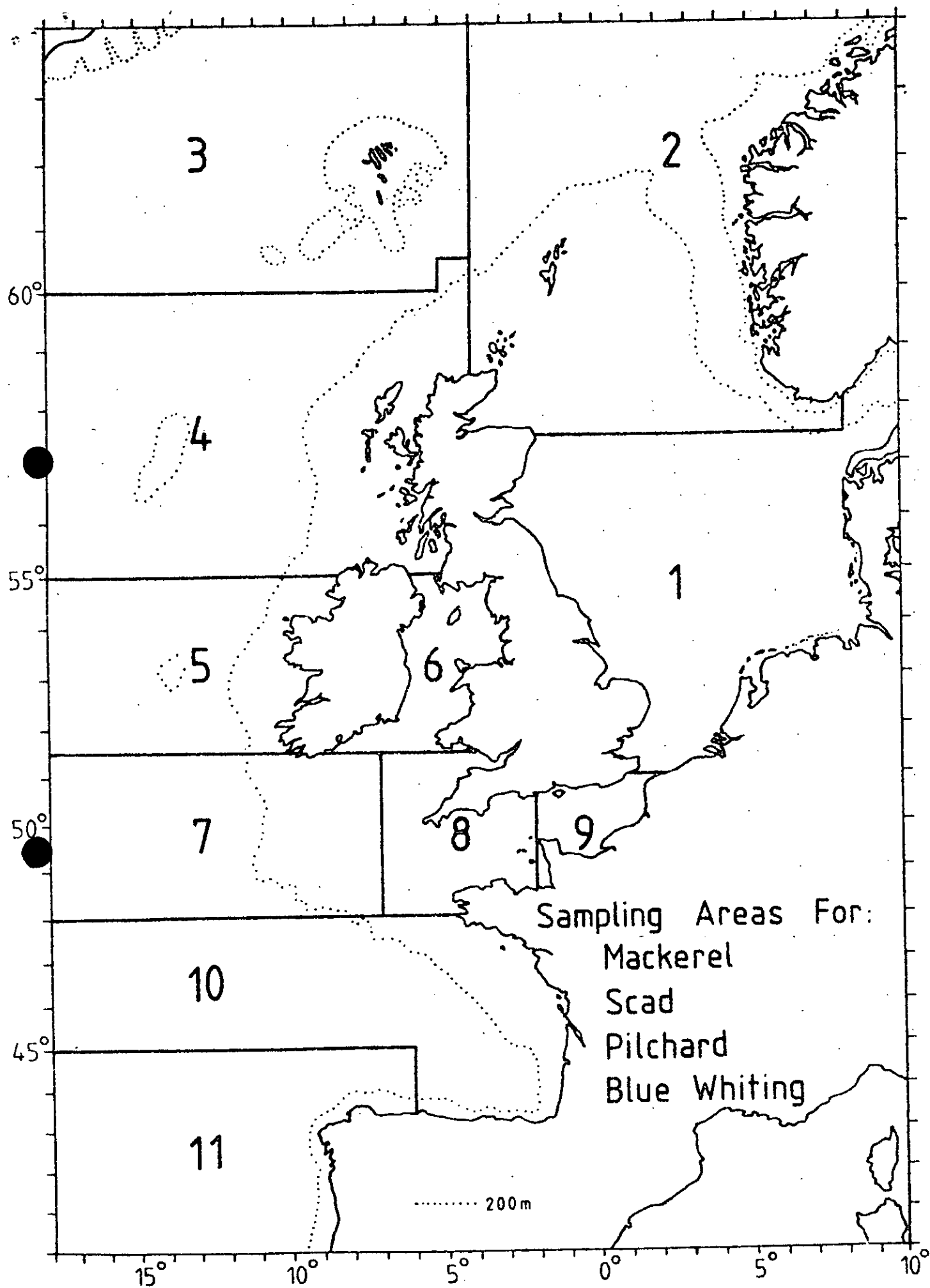
As well as the above a request from Dr Brander (too late for inclusion in the cruise programme) for similar material from ICES areas VIIefgh and VIIjk was also met. Details of these samples are shown below in Table 3.

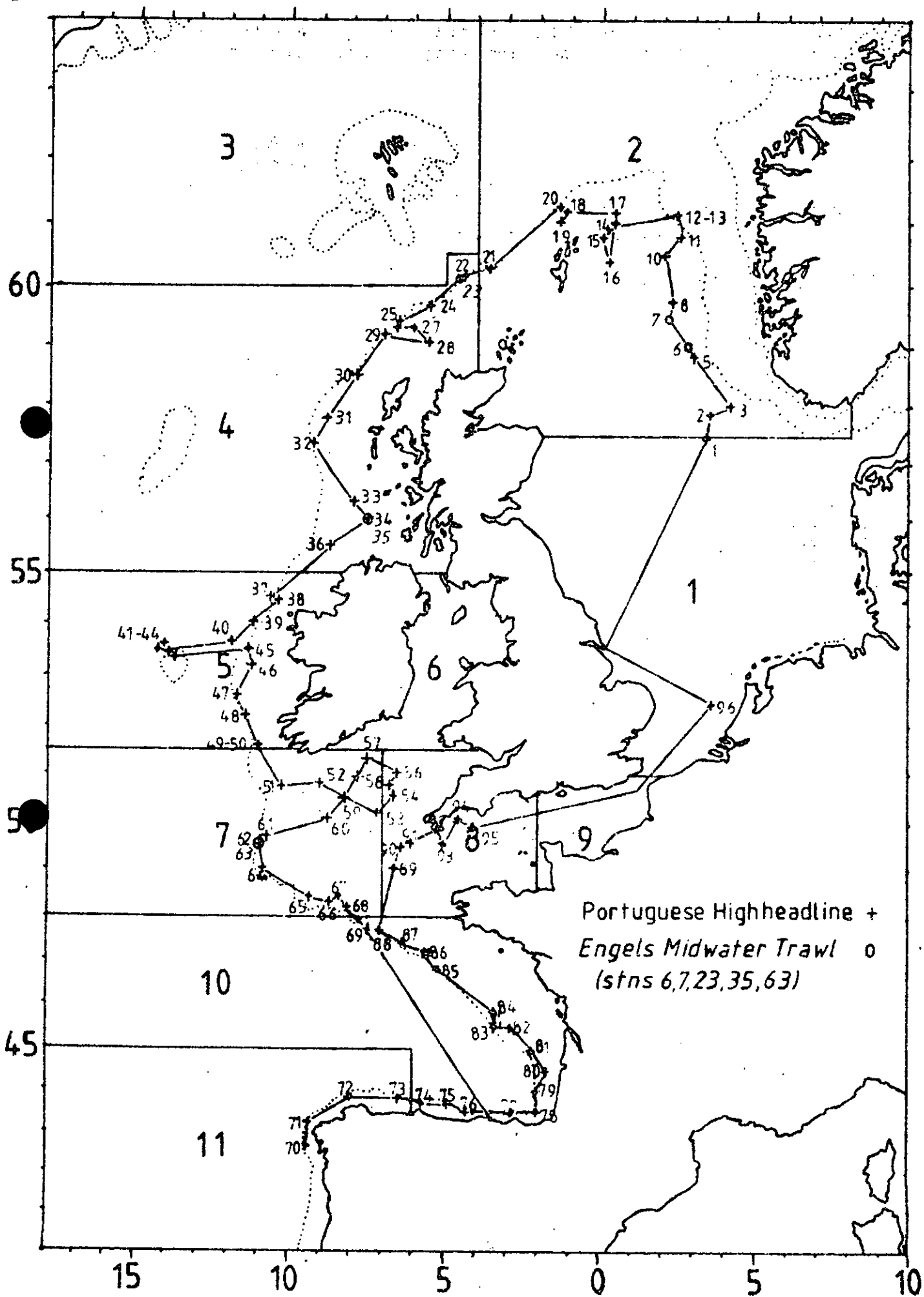
Table 3

Area \ Species	Cod	Ling	Whiting	Pollack	L Sole	Megrim	Plaice
VIIe f g h	14	4	4	7	34	17	10
VII j k	1	2	4	2	10	42	-

Miscellaneous

- 1 A sample of Northern North Sea herring was collected from a catch at the Bressay Ground, East Shetlands and deep frozen for Mr Wood. A similar sample from a catch of 44 baskets made with the mid-water trawl at Stanton Banks was also collected and frozen.
- 2 Small gadoids, T. esmarkii and T. minutus were frozen in 10 kg boxes for FCG.
- 3 Specimens of various small flatfish and various small roundfish were frozen for Dr Johnson's next fish identification course.
- 4 Examples of 12 different species were frozen for the University of York, Archaeology Dept collection (Mr P Walker).
- 5 171 pairs of otoliths covering much of the size range of 53 different species, were collected as a start for a demonstration board of otoliths.
- 6 Opportunity was taken to obtain more material for the whole weight/gutted weight project and specimens covering the commercial length range were collected of cod, haddock, coalfish, ling, catfish (all from the Norwegian sector of the North Sea), megrim, hake, monkfish and John Dory.
- 7 A few adult specimens of John Dory, Zeus faber, were found in spawning condition at stations 66 and 77 and the opportunity was taken to attempt artificial fertilisation. Two trials were successful, and batches of eggs were kept at temperatures of 5°C, 9°C, 15°C and 20°C. Only the eggs at 15°C were reared to larvae, the remainder dying at Stage 1 in their development. Diagrams were made of each developmental stage. Six Spanish mackerel, Scomber japonicus, were caught at station 80 in south Biscay. Only one adult running male was present in this group so that artificial fertilisation for this species could not be attempted. However, experimental cross fertilisation of mackerel eggs (from the same station) with milt





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from this one adult was successfully achieved. The eggs were kept at 15°C and several hybrids were reared to the larval stage. It was proposed that they be termed "Spangels" (WAD & MJB).

B.C. Bedford
20 May 1982

Seen in draft: M. J. W. Master

W. J. S. Skipper

Initialled: J. G. (DDFR)

DISTRIBUTION:

Basic List

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P. D. Wallace
Ms. W. A. Dawson
Ms. M. J. Boon
R. V. Perkins
J. Olaso
P. Fox