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

1997 RESEARCH VESSEL PROGRAMME

REPORT: R.V. CIROLANA: CRUISE 3.

STAFF:

Part 1	Part 2
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T Watson	S P Milligan
R A Ayers	B J Fogg
C Lordan (Observer, Ireland)	P J Welsby

DURATION: Part 1 : 6 March - 21 March.
Part 2 : 21 March - 4 April.

(All times are GMT)

LOCALITY: Celtic Sea, South-western Approaches, western English Channel

AIMS:

1. To carry out a trawl survey of the western Celtic Sea to obtain information on:
   a) Distribution and abundance at length of all fish species.
   b) Age length distributions of selected species.

2. To sample juvenile fish for recruitment studies.

3. To collect material for fish identification courses.

4. To collect, and preserve frozen, any scallops that are caught.

5. To continue the collection of stomach content data begun on earlier cruises.

6. To continue the development of electronic data capture equipment.

7. To collect samples of herring for the study of the incidence of *Ichthyophonus* disease.

8. To monitor distribution and abundance and collect biological data on Ommastrephid squids (University College Cork, Ireland).

9. To monitor the distribution and abundance of whelks and whelk shells with hermit crabs. To freeze all whelks and whelk shells with hermit crabs for analysis at CEFAS, Conwy laboratory.

10. To sample the upper mid-water scattering layer, using the MIK-net, to investigate distribution and abundance of small prey items.

11. To trial the new Guildline CTDs on a plankton sampler and to test the prototype acoustic sensor flow measuring device.

12. To collect and freeze specimens of selected species of elasmobranchs: to collect egg cases of dogfish and rays fixed in 70% ethanol for the University of Swansea.

NARRATIVE:

CIROLANA sailed from Lowestoft at 1800h on 6 March and made a good passage to a position about 65 miles west of Land's End. The trawl survey commenced at 0814h on the morning of 8 March. Good progress was made in fair weather conditions and a total of 40 trawl stations and 20 associated CTD profiles were completed within the UK sector of the Celtic Sea and to the west of Ireland. RV. CIROLANA docked in Falmouth at 1340h 20 March to complete part 1 of the survey, and to exchange scientific staff. CIROLANA left Falmouth at 0920h on 22 March to resume part 2 of the fishing survey.

The trawl survey was continued with two hauls inside the western mackerel box and then into the French sector of the Western Approaches and northern Biscay. A total of 14 trawl and 11 CTD stations were completed in this area up to 2030h 26 March. The survey then progressed uninterrupted into the Celtic Sea and off the southern coast of Ireland where a further 17 valid trawl and 16 associated CTD stations were completed over the following six days.

As time permitted, during the trawl survey, trials were carried out with the 53 cm plankton sampler. Tows in the dark were also made with the Methot Isaacs Kidd midwater trawl, in the scattering layer, on an opportunistic basis.

On 24 March transmission problems were experienced with the Scanmar port trawl door sensor during the third haul of the day. At the end of the next haul it was discovered that the Scanmar unit was missing from its housing. Both the housing and the Scanmar securing clips were intact. It was subsequently noticed that the hinge pin for the securing lid was broken. This had obviously allowed sufficient movement for the unit to become detached from its housing during the tow.

On 28 March the trawl was badly damaged during the first haul of the day about 45 miles west of Lands End. The belly and part of the lengthening piece had to be completely replaced which took around five hours to complete. The haul in this area was successfully repeated on the morning of 1 April. The belly of the trawl was again torn during the second haul on 1 April at the same station where the trawl was lost on this survey in 1996. This tow was not repeated and it will be removed from the survey in future.

The main survey grid was completed, 60 miles south of Lands End, at 1900h 1 April (station 137). After completion of the last tow there was a total blackout of the vessel's power supply. In the absence of an uninterruptable power supply, which had failed on the day before sailing, there was a potentially serious problem with the shipboard computing system. Fortunately none of the data bases were open and being worked on at the time and consequently no data were lost. No damage appears to have been done to any of the shipboard systems or to the PCs.

The final fishing day, 2 April, was spent carrying out three extra trawl stations inside the western mackerel box. The final trawl haul and CTD station were completed 25 miles south-east of Start Point at 1930h. RV Cirolana then set a course for Lowestoft, where she docked at 0645h on Friday 4 April.

Exceptionally good weather conditions were experienced for the whole period of this survey and no time was lost for bad weather.

RESULTS:

Aim 1. A total of 74 valid trawl stations were completed, including six tows inside the Mackerel box five of which were in addition to the main survey grid stations. Trawling was carried out using a modified Portuguese High-Headline Trawl fitted with rubber bobbins, a bunt tickler chain and a codend liner. Sixty floats were attached to the headline and polyvalent doors were used. On some tows the bunt tickler chain was removed in order to minimise the risk of damage to the trawl in known areas of rough ground. A chart indicating the position of each trawl station is attached (Figure 1). Scanmar equipment was used to monitor headline height, door spread and near sea bed temperature. CTD profiles were taken whenever time permitted at each valid trawl station or group of stations.

At each trawl station the catch of each species was weighed and all fish, or an appropriate sample, were measured. Samples of otoliths for age determination studies were taken as required. Benthos and crustacea were identified to species wherever possible. The resultant data were input to computer database using the CEFAS Electronic Data Capture System, and preliminary summations and analyses were made.

A total of 2,883 otoliths were collected from ten species. Sampling for some species was split by ICES Division as required by the relevant Working Groups and as shown in the table below.

	Number of otoliths per ICES Division					
Species	VIIe	VIIf	VIIg	VIIh	VIIj	Total
Sole		1	2			3
Hake	-	-	-	-	-	377
Megrim	-	-	-	-	-	762
Lemon sole	28	75	179	18		300
Plaice	4	6	131	1		142
Anglerfish (L.pisc.)	-	-	-	-	-	53
Anglerfish (L.budeg.)	-	-	-	-	-	37
Herring	152		215		140	507
Mackerel	-	-	-	-	-	585
Cod	-	-	-	-	-	117
Total						2883

A total of 103 recordable species of fish, shellfish and molluscs were caught during the survey. Charts showing the distribution of the catches of some species are attached (Figures 2 and 3).

Catches of benthos in trawl were generally very small. All benthos was identified and the number of specimens in each haul recorded and stored on an Excel spreadsheet.

The exceptionally good weather with no loss of time allowed seven additional trawl stations to be worked for the first time in deep water (>300 metres). It also allowed additional trawl stations to be sampled inside the western mackerel box.

A CTD profile and near bottom salinity sample was taken at 52 of the 73 valid trawl stations. Copies of the all CTD profile data, taken in the waters under French jurisdiction, will be sent to the Service Hydrographique et Oceanographique de la Marine, Brest, as requested by them in response to our request to sample in that area.

Aim 2. Juvenile fish sampling for recruitment studies was included as part of the routine sampling programme. Recruitment indices for mackerel and hake will be calculated for the relevant Working Groups as part of the post survey data analysis routine.
Additional information was collected on the distribution and abundance of juvenile mackerel inside the western mackerel box on this survey.

Aim 3. Specimens from a total of 73 different fish species were collected and preserved, deep frozen, for the Laboratory's fish identification courses for the SFI. A number of deep water species plus specimens of the cuckoo wrasse, not previously used on these courses, were included in the collection.

Aim 4. A total of only four scallops were caught. They were preserved deep frozen and returned for further processing by the Shellfish Group at Lowestoft.

Aim 5. A selection of seven fish species were examined for stomach content analysis on six stations as time permitted. A high proportion of the stomachs examined were either empty or had regurgitated, for example all the haddock examined came into this category. Most of the fish with stomach contents were feeding on either benthic invertebrates or fish except the mackerel which were feeding on plankton.

Aim 6. At each trawl station all length and biological data from were recorded on the Electronic Data Capture (EDC) system and uploaded to FSS on the Vax. The new millimetre measuring system was tested and worked with no errors. Data from the fish room laptops was downloaded by serial transfer which, after a few teething problems, worked successfully. The new deckmaster system was trialled alongside standard paper recording. No problems were encountered with this system. In general the EDC system worked exceptionally well during this survey. It improves the quality of data recording and significantly reduces the labour requirements for sample processing.

Aim 7. All the herring sampled on board were examined for the presence of *Ichthyophonus* disease. No infected herring were found.

Aim 8. Distribution and relative abundance by length, sex, and maturity for all squid species was monitored by C Lordan (UCC, Ireland) on the first half of the survey. Data on stomach contents were also collected. On the second half of the survey all species caught were identified and entered on to FSS. All specimens were deep frozen and returned to the laboratory for further processing.

Aim 9. Only one specimen of whelk was taken in the 73 trawl hauls. This was preserved, deep frozen, for Dr M. Kaiser at Conwy. It was caught close to the shelf edge (station 87), in 195 metres depth at latitude 48°N. No whelk shells with hermit crabs were found in any of the trawl hauls.

Aim 10. Night-time samples of the upper mid-water scattering layer were taken on an opportunistic basis using a MIK-net. Time-constraints and failure of the cable winch resulted in only two samples being taken on the first half of the survey and a further four samples were taken during the second half. The samples were examined on board, fresh, and roughly quantified by species present. The samples were dominated by crustacean zooplankton with various stages of euphausids generally being the most abundant. On one station, towards the shelf edge at latitude 48°30'N, unidentified decapod zoea were very abundant. At a station in The Smalls area high numbers of *Nephrops* larvae were present in the sample.

Aim 11. New hardware, both mechanical and electronic has been incorporated into the 53 cm. Lowestoft plankton sampler to enable the new model Guildline to replace the original shallow water Guildlines. The modifications were trialled at sea for the first time during this cruise. The new Guildlines were given a thorough testing and proved to be reliable in operation on the plankton sampler. The changes will now be incorporated into a new user manual.

The software supplied was not satisfactory for routine deployment of the plankton sampler and in its present form represents a retrograde step from the EG&G software used previously. This question must be addressed urgently if a satisfactory system is to obtained, tested and made fully operational before the proposed mackerel egg surveys in 1998.
The opportunity was taken to trial a new non intrusive acoustic flow measuring device, concurrently with the Guildline tests. The acoustic system was developed by Spartel Ltd. as a result of the EU Concerted Action project to study the performance of high speed plankton samplers. The new device, which was being tested at sea for the first time, worked exceptionally well although it has not yet been sufficiently refined to be ready for calibration and use.

Aim 12. Approximately fifteen specimens of seven different species of elasmobranchs and two egg cases of either dogfish or rays were collected and deep frozen for Swansea University (J. Ellis).

MISCELLANEOUS:

1. Tissue samples were taken from four gadoid species for an EU funded genetic studies project (C945C071) on stock discrimination of gadoids. A total of 100 samples of muscle, liver, and gill were taken from cod, blue whiting and poor cod. Sixty three samples were taken from hake and a further 37 small hake were deep frozen at -40°C for later sampling. Biological data, including otoliths for age determination where appropriate, were collected for each individual fish.

2. Two whole specimens of hake, two ling and two megrim plus tissue samples from two cod were deep frozen for Dr C. Fox. The material is required for the development of genetic probes to aid in the specific identification of the planktonic stages of fish eggs.

3. All specimens of *Asterias rubens* taken in the trawl hauls were examined to identify individuals which had regrowth of limbs.
A total of 34 specimens was caught throughout the survey one of which was classified as "one armed" having five re-growing arms and one original arm. Three "four armed" specimens with one re-growth were caught at stations 19, 117 and 144.

3. A digital camera was successfully used to record survey activities, specimens caught (to aid identification) and gear configurations for future reference.

J. Casey and J.H. Nichols
4 April, 1997.

SEEN IN DRAFT:

R Williams (Master)

R Graham. (SFM)

INITIALLED:

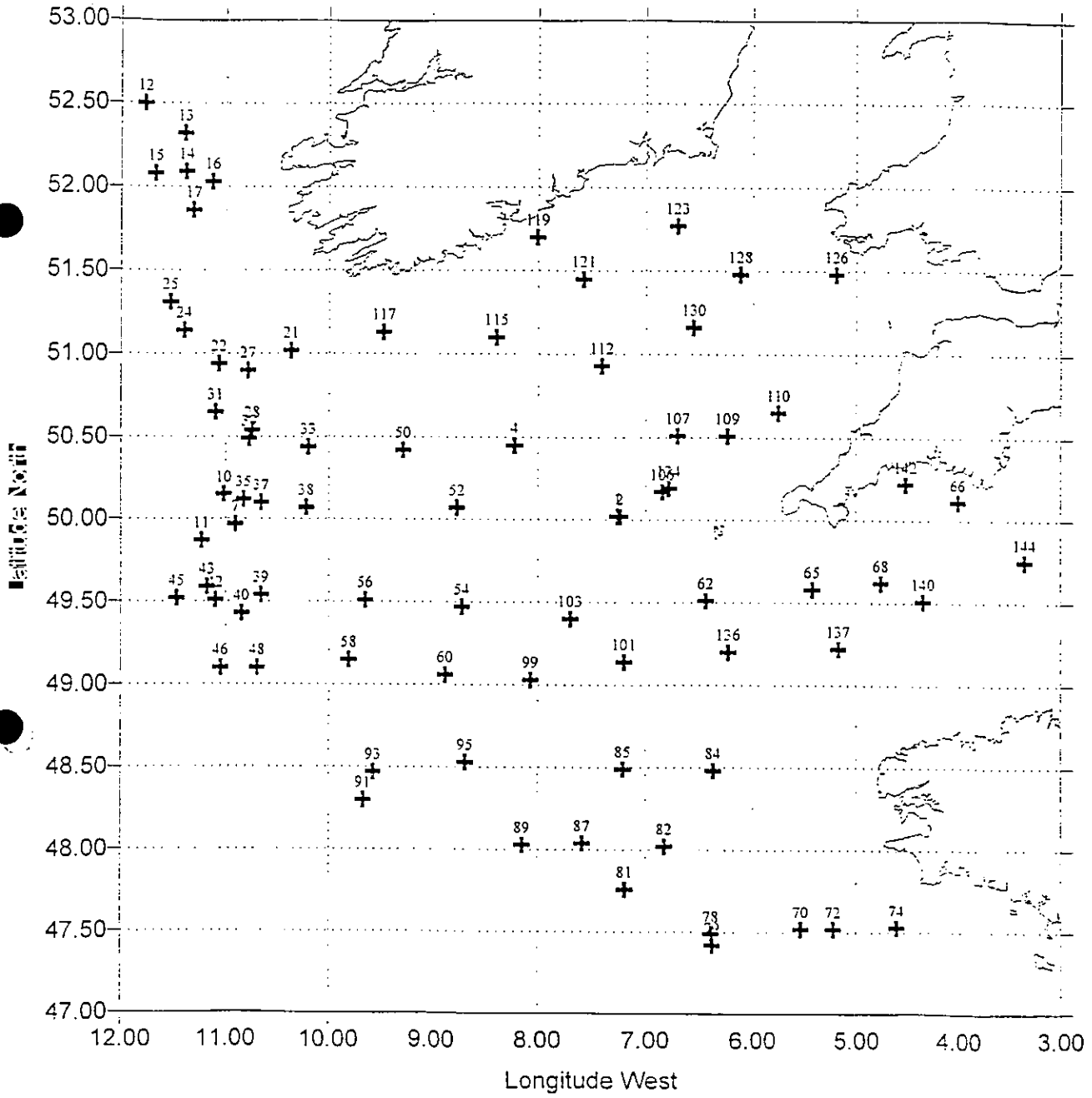
DISTRIBUTION:

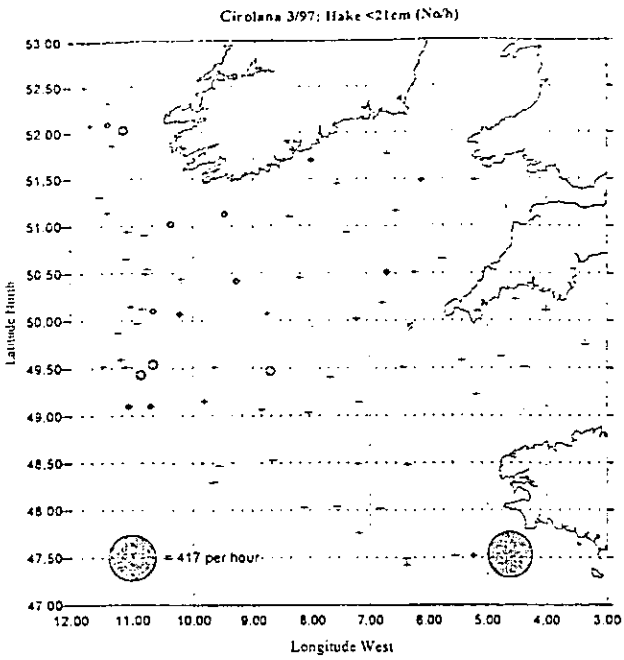
Basic list +

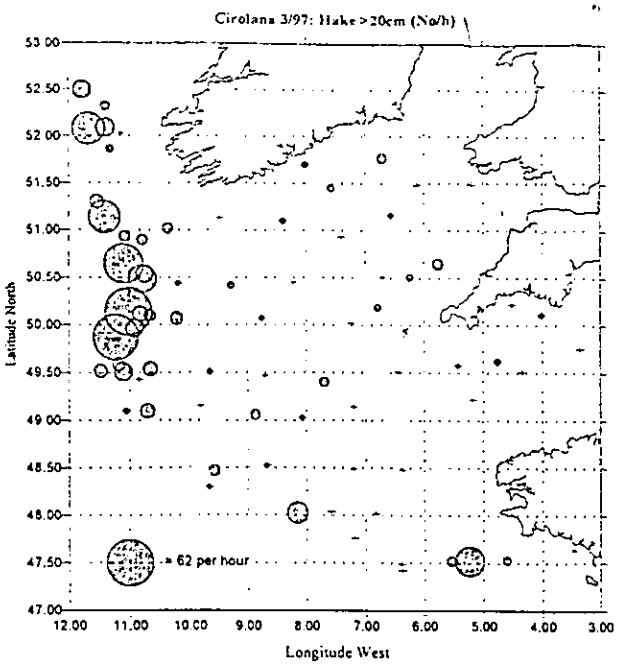
A. R. Child

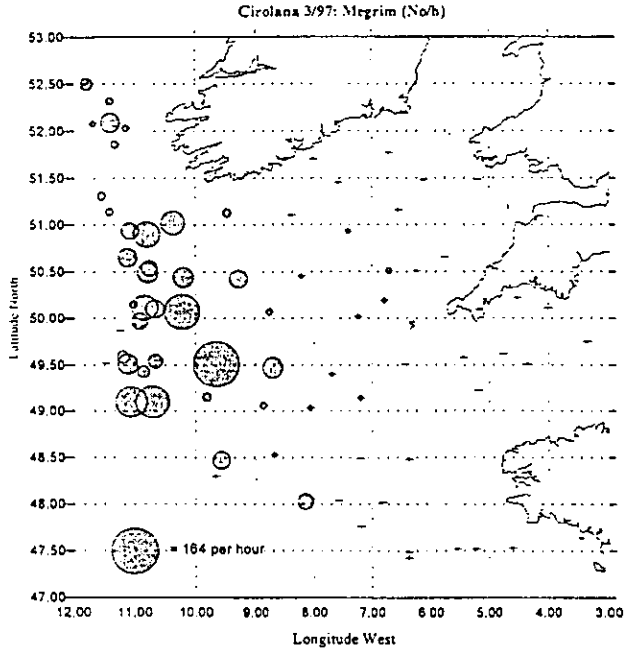
J. Dann
T. Watson
S. Warnes
R. Ayers
D. Brown
M Basson
P A Large
S P Milligan
B J Fogg
P A Welsby
C. Lordan (University College, Cork, Observer, Ireland)
Cornwall Sea Fisheries Committee
Devon Sea Fisheries Committee
Isles of Scilly Sea Fisheries Committee
Eire, via Foreign Office
France, via Foreign Office

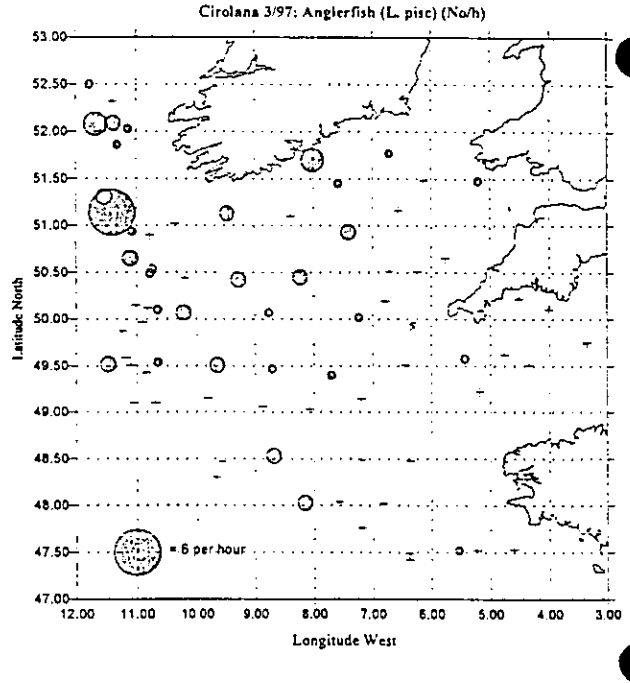
Figure 1 Cirolana 3/97: Trawl station positions

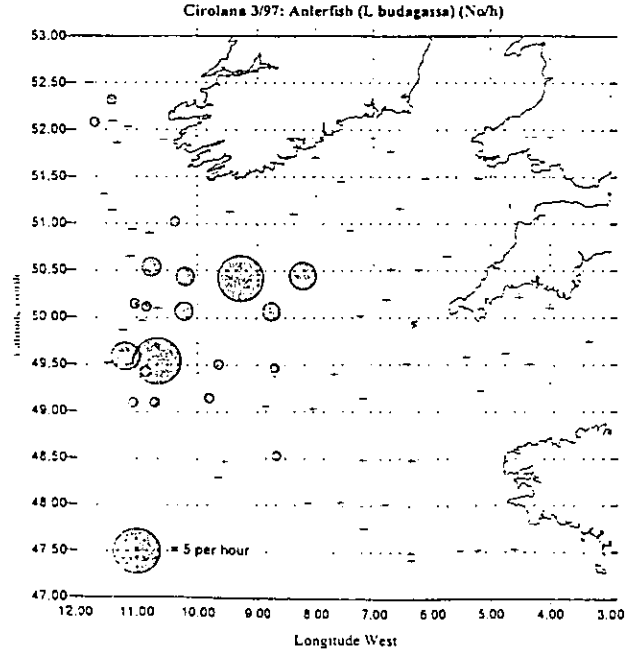












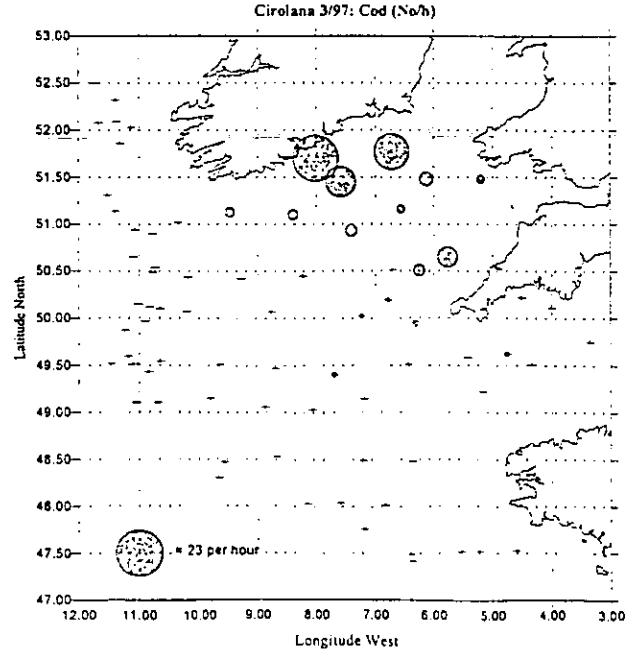
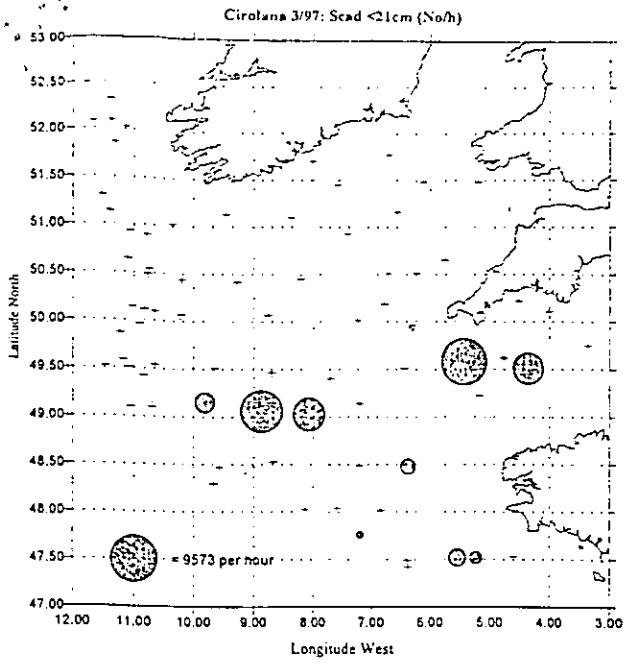
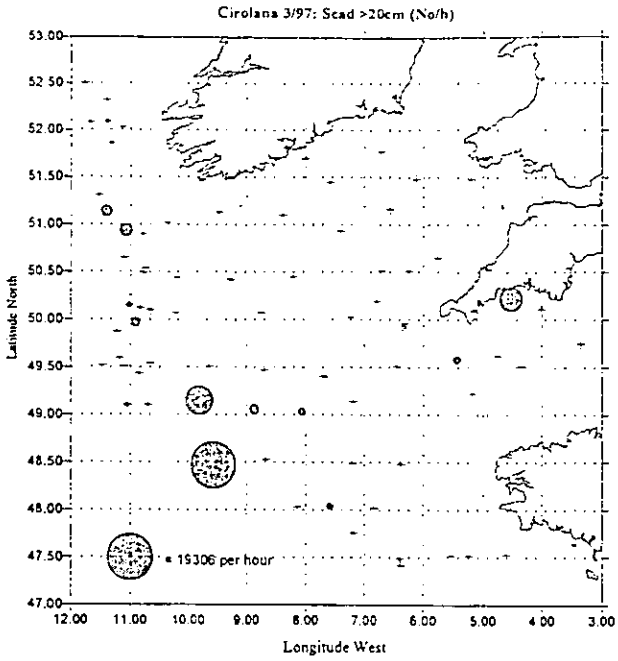
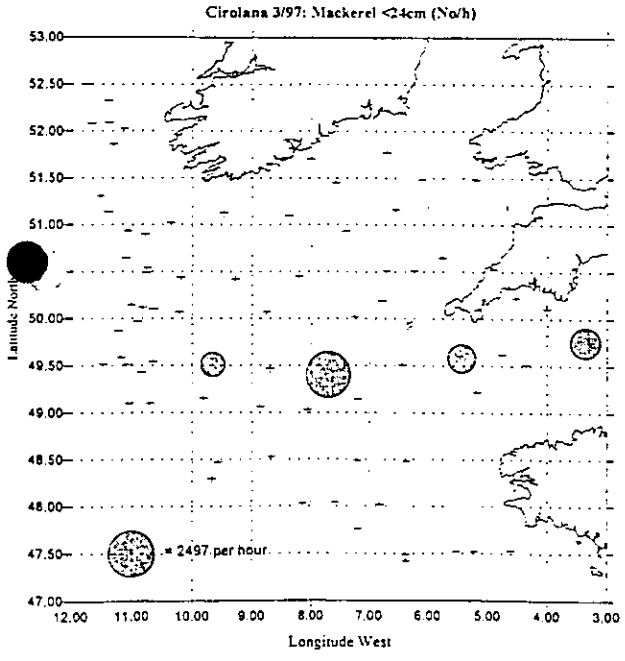


Figure 2. Distribution of hake (<21cm & >20cm), megrim, anglerfish (2 species) and cod as numbers of fish caught per hour.







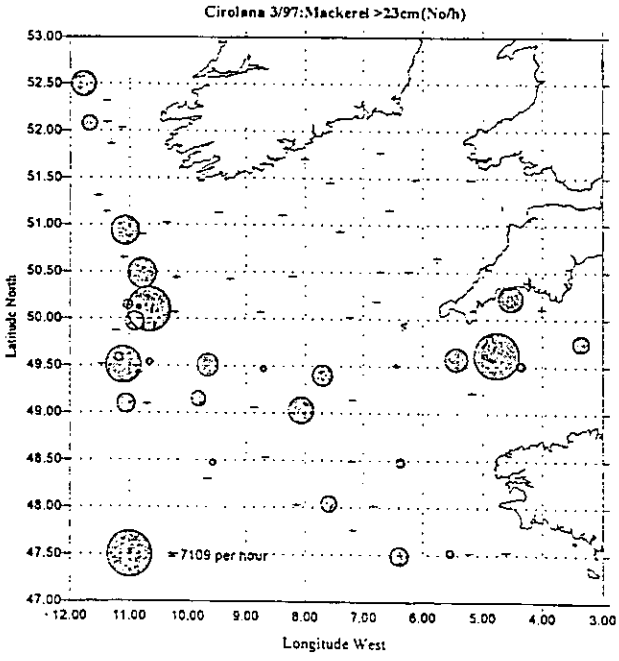


Figure 3. Distribution of scad (<21cm & >20cm) and mackerel (<24cm & >23cm) as numbers of fish caught per hour