CRUISE: CIRO 3_01

STAFF:

Part 1	Part 2
S Flatman (SIC)	S Flatman (SIC)
S Warnes (2IC)	S Warnes (2IC)
P A Large	P A Large
B D Rackham	B D Rackham
J Ellis	J Ellis
J Cotter	T Watson
T Watson	M W Easey
I D Holmes	M Parker-Humphreys
G Burt	K. Warr
	S.J. Moore (Ireland)
	R. Flatt (part-time)
	T. Hammond (part-time)

DURATION: Part 1: 26 February - 14 March. Part 2: 15 – 29 March

LOCATION: Celtic Sea, South-Western Approaches, western English Channel.

AIMS:

1. To carry out a trawl survey of the Celtic Sea, to obtain information on:
a) Distribution, size composition and abundance of all fish species.
b) Age - length distribution of selected species.
c) The spatial and temporal distribution of high concentrations of roundfish if encountered.
d) The detailed distribution of spawning cod in the NW of ICES Division VIIg (Celtic Sea)

2. To sample juvenile fish for recruitment studies.

3. To collect material for fish identification courses.

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

5. To continue the development and testing of electronic data capture equipment.

6. To monitor the distribution and abundance and to collect data on Ommastrephid squids.

7. To sample benthos with the 2 metre beam trawl and sediment data by grab in each ICES rectangle covered by the trawl survey.

8. To collect tissue samples from a wide range of species for stable isotope analysis (S. Jennings).

9. To collect mackerel ovaries for fecundity analysis (P. Witthames).

10. To collect additional biological data on elasmobranchs (J. Ellis).

11. To collect hake maturity and fecundity material (M. Pawson).

12. To collect plankton samples at selected stations on the Shelf edge (S. Milligan – triennial mackerel egg programme).

13. To carry out acoustic calibration tests on the 38MHz and 110MHz equipment.

NARRATIVE:

RV CIROLANA sailed from Lowestoft at 1400h 27 February having been delayed for one tide due to essential gear preparations, and two hours due to main engine electrical problems. The vessel made a good passage through the southern North Sea and eastern English Channel, but was forced to divert to Portland Bill after the Chief Engineer was injured at 1745h 28 February whilst working on the main winch. The injured man was put ashore by helicopter in order to receive hospital treatment, and CIROLANA anchored off Portland Bill. At 1120h 1 March the Chief Engineer was returned aboard by Searider, along with an engineer from Smit. Having completed winch repairs and a test mid-water tow, and put ashore the Smit engineer by Searider, at 1600h the vessel resumed steaming to the western Channel fishing grounds.

CIROLANA commenced work at the first trawl survey station, 40 nml. S of The Lizard, at 0545h 2 March. On completion of the station, the wind increased to over 40 knots, and the vessel was forced to dodge. Fishing recommenced at 0730 3 March, and continued south of the Scillies and into North Biscay until the early afternoon of 6 March. By this time CIROLANA had completed all of the standard survey stations in the French sector. Strong S-SW winds prevented occupation of the additional deep water tow in the area, so that was abandoned and the vessel ran north. During the period 7 – 12 March, the vessel worked in the Celtic Sea in a very uncomfortable SW swell, managing to complete a further 20 standard trawl stations. The final tow in the Bristol Channel sector was not worked due to the presence of a new underwater cable. On 13 March, a further three survey stations off the SE coast of Ireland were completed by 1700h, and CIROLANA set course for the short passage to Cork for the mid-cruise staff changes, arriving there at 2000h. On 14 March, 3 scientific staff disembarked, and 4 joined the ship. In addition, R. Flatt and T. Hammond joined the ship temporarily to carry out acoustic calibration trials during the first two days of part 2 of the cruise. A local diver was employed to carry out maintenance work on the instrument tube whilst the vessel was in port.

RV CIROLANA left Cork at 2200h 15 March, having been delayed for four hours by an electrical fault on the main engine. The vessel steamed to Bantry Bay and anchored at the eastern end in order to carry out the acoustic equipment calibration trials. Whilst on board, Mr Flatt was also able to repair the CTD profiler which had ceased functioning during the afternoon of 11 March. Acoustic calibration work was completed by 1745h 16 March, and Mr Flatt and Dr Hammond were landed at Bantry by Searider. CIROLANA weighed anchor at 1845h and steamed to the NW end of the survey grid overnight. The arrival of an easterly gale in the early hours of 17 March prevented work and the vessel sought shelter in Dingle bay. During 18-19 March, six survey positions were worked before another easterly gale intervened, and CIROLANA dodged in to Ballinskelligs bay. By 0800 21 March the severe gale force winds had abated, and the survey was recommenced.

Over the following five days a total of 21 survey stations were completed, working south along the shelf edge from 51^{o} 45'N to 48^{o} 20'N, then east and north-east to position 49^{o}10'N, 7^{o} 5'W. During this period the vessel worked in an uncomfortable swell, although winds were light. On 26 March CIROLANA completed the last two standard stations, including a successful repeat deployment of the PHHT gear on a previously-abandoned station when the trawl came fast. The vessel steamed north to the Trevose grounds and successfully worked the final standard tow having found clear ground between underwater cables. Two hauls were made off Plymouth in the Mackerel Box before CIROLANA set course for Lowestoft, docking at 2330h 28 March.

RESULTS:

1. A total of 73 deployments were carried out using the modified Portuguese high headline trawl with standard polyvalent doors, rubber bobbins, 84 headline floats, and a codend liner. A bunt tickler was used on most of the deployments but was removed for designated tows in areas where the seabed is known to be very hard. Scanmar sensors were used on every deployment to monitor headline height and door spread throughout each tow. All 64 trawl stations in the standard core survey were completed (Figure 1). Five trawl hauls were declared invalid but successfully repeated and a further four deployments were made which were not included in the standard core survey; two in the mackerel box and two in deep water on the Shelf edge. Trawl damage was relatively minor.
   A CTD profile, from surface to near bottom was taken at each of the trawl stations, or groups of trawl stations that were less than 10 nml apart, resulting in a total of 47 deployments. The CTD failed on 11 March due to a cable problem and could not be repaired until 16 March during the work on acoustic calibration.
   At each trawl station the total catch was weighed by species and all fish, or an appropriate sample, were measured. Otoliths were taken from selected species over the length range caught for subsequent age determination. All fish sampling was carried out according to prescribed survey protocols and was input direct to the electronic data capture system. The system was used to monitor and control otolith sampling levels.
   Charts showing the distribution and relative abundance of a selection of species, mainly those of commercial interest, are attached (Figures 2, 3). These charts include the distribution of haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*) and hake (*Merluccius merluccius*), the major roundfish species encountered on this survey. Catches of cod (*Gadus morhua*) were small and no spawning concentrations were noted. The major concentrations of mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*) were associated with the shelf edge and inside the south-western mackerel box. Also distributed along the shelf edge were megrim (*Lepidorhombus whiffiagonis*) and large concentrations of boarfish (*Capros aper*).

2. Data on the distribution and abundance of juveniles of commercially important species were collected. These data will be provided to the appropriate ICES assessment working groups for inclusion in the relevant assessment models.
   Concentrations of very small (1-group) mackerel were found at the shelf edge off SW Ireland and in N Biscay, SW of Lands End, and off Start Point. Catches were much lighter than last year, when a large concentration (>5000 per hour) was observed south of Ireland.

3. A total of 59 species of fish were frozen for the Royal Naval Fishery Protection Squadron fish identification courses to be held in October 2001 and March 2002. In addition 6 crustacean and molluscan species were collected for this purpose. A sample of 23 species of fish and crustaceans was frozen for Mr Nichols, for fish identification and otolithing demonstrations in the local community.

4. Very few scallops (*Pecten maximus*) were caught. Beam trawl specimens were cleaned, dried and returned to CEFAS. No samples were frozen.

5. The electronic data capture system was used throughout the survey, and no major problems were encountered. Several suggestions for improvement were noted for consideration in the redevelopment of the Fishing Survey System.

6. Data on the distribution and abundance of Ommastrephid squids are now collected as a routine element of the standard survey procedure.

7. The 2 metre beam trawl was deployed at 31 stations over the survey area. The beam trawl was deployed down the ramp and fished successfully at depths down to 480 metres. Approximately 250 species of fish and invertebrate were recorded during the survey. Although catches of most fish species were sporadic, several flatfish species (e.g. thickback sole, imperial scaldfish and megrim) were routinely caught. The hermit crab *Pagurus prideaux* was common throughout the Celtic Sea (Figure 4), although it was less abundant at the deeper stations along the shelf edge. In contrast, the anemone *Actinauge richardi* was abundant along the shelf edge (Figure 4) and other species regularly observed at these sites included the sea pen *Funiculina quadrangularis* (Figure 4), the hermit crab *Pagurus variablis*, the sea spider *Pycnogonum littorale* and offshore bivalves of the genus *Cuspidaria*. The presence of sea pens in these deeper sites would be indicative of a "deep-water mud community", one of the habitats subject to Biodiversity Action Plans. Muddy habitats were also present elsewhere in the Celtic Sea, as indicated by catches of *Nephrops norvegicus* and other species characteristic of finer sediments. Elsewhere, much of the study area was composed of shell gravels, as indicated by the presence of the bivalves *Circumphalus casina*, *Astarte sulcata* and other bivalves. Scallop *Pecten maximus* were recorded in 7 catches, primarily in the southern parts of the study area (Figure 4). Large echinoderms were an important component of the faunal biomass at most stations, and species such as *Stichastrella rosea* and *Luidia sarsi* were widespread throughout the study area. In contrast *Porania pulvillus*, which typically occurs on hard ground, was observed less regularly (Figure 4).

8. During the course of the survey, a total of 19 stations were sampled for whole-catch (irrespective of species) muscle tissue analysis. At each station, stratified random samples of fish were selected for specified weight-classes, and muscle tissue was removed, macerated and frozen. Samples were collected for a total of 13 weight classes. In addition, 7 sets of whiting and 1 set of dab tissue samples from specific length classes were collected.

9. A total of 133 mackerel ovaries, stratified by approximately 1-degree latitude intervals along the Shelf edge, were collected for fecundity analysis. These samples were fixed in either formalin or Gilsons fluid, and form part of the triennial mackerel egg survey programme.

10. Additional biological data (length, weight, sex and maturity) were collected for several elasmobranch species. No unusual species were recorded.

11. A total of 60 hake were sampled for maturity and fecundity (M. Pawson, CEFAS).

12. A total of 10 plankton samples were collected at positions along the Shelf edge, using the 0.5m ring net. These were taken as part of the triennial mackerel egg survey programme.

13. Acoustic calibration tests were successfully completed on the 38 MHz equipment, but could not be completed on the 110 MHz gear.

14. Gill arch and muscle tissue samples were preserved in ethanol from 50 specimens of four-spot megrim (*Lepidorhombus boscii*) for AZTI, Spain. The material will be used for genetic identification of fish eggs by species-specific DNA markers for use in stock biomass assessments and species misreporting.

15. A sample of approximately 100 *Beryx splendens*, caught in deep water on the Shelf edge, was frozen for biological studies at CEFAS.

Other Observations

Only 4 observations of cetaceans were made during the survey. These were thought to be mainly of the common dolphin in groups of 2 to 12 individuals. The observations will be sent, together with details of cetacean behaviour and sea conditions, to Dr P.G.H. Evans of the Sea Watch Foundation, Cetacean Monitoring Unit. We are grateful to the watch-keeping officers of RV Cirolana for their observations and keen interest in this voluntary programme.

General

All main objectives were successfully completed, despite the poor weather conditions encountered during much of the cruise, and the efforts of the ship's officers, crew and scientific staff in achieving these aims are much appreciated.

S. Flatman
28 March 2001

SEEN IN DRAFT

A. Reading (Master)

B. Salter (Senior Fishing Mate)

INITIALLED:

Dr R.S. Millner

Fig 1. Cirolana 3/01 valid PHHT hauls

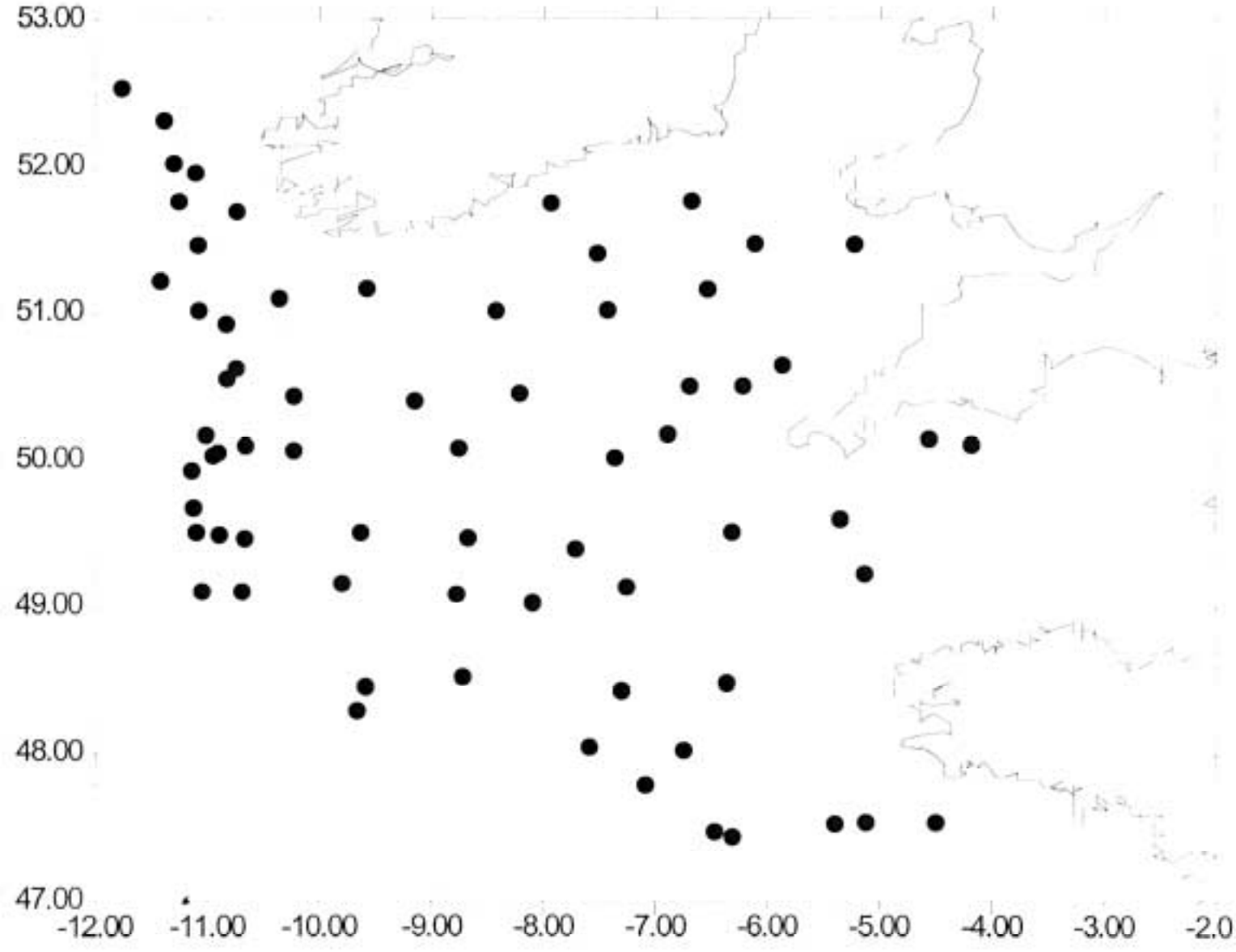
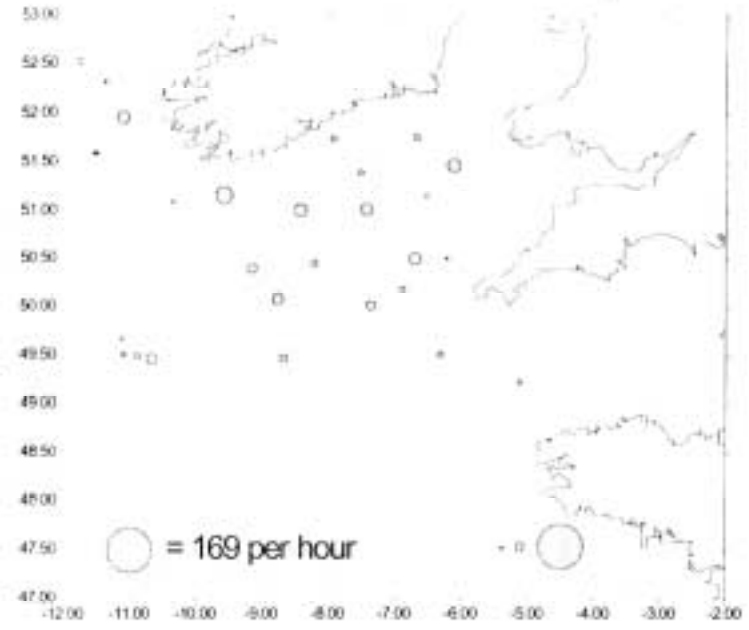
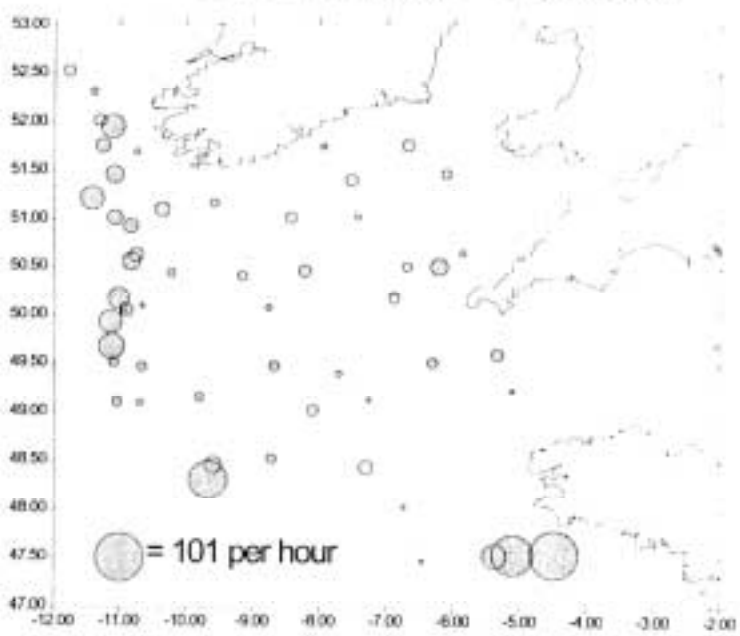


Figure 2.

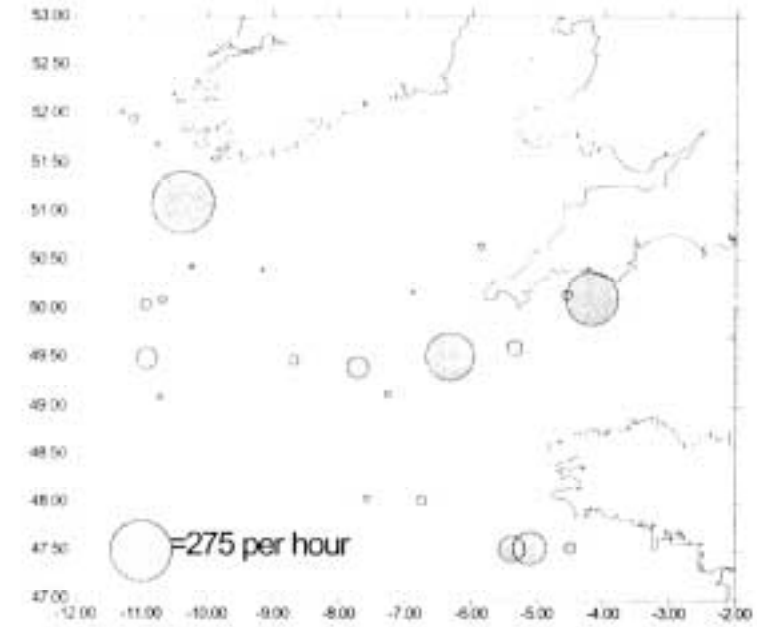
Cirolana 3/01: Hake < 21cm (No/h)



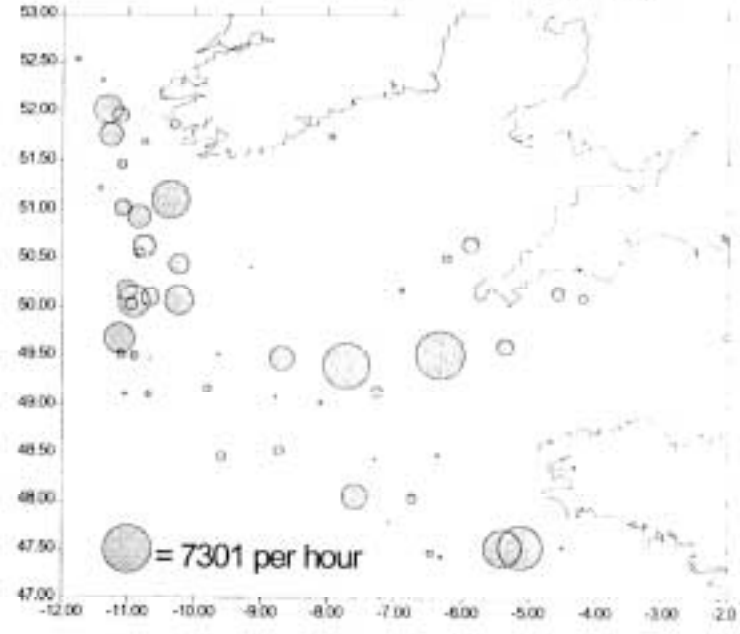
Cirolana 3/01: Hake >= 21 cm (No/h)



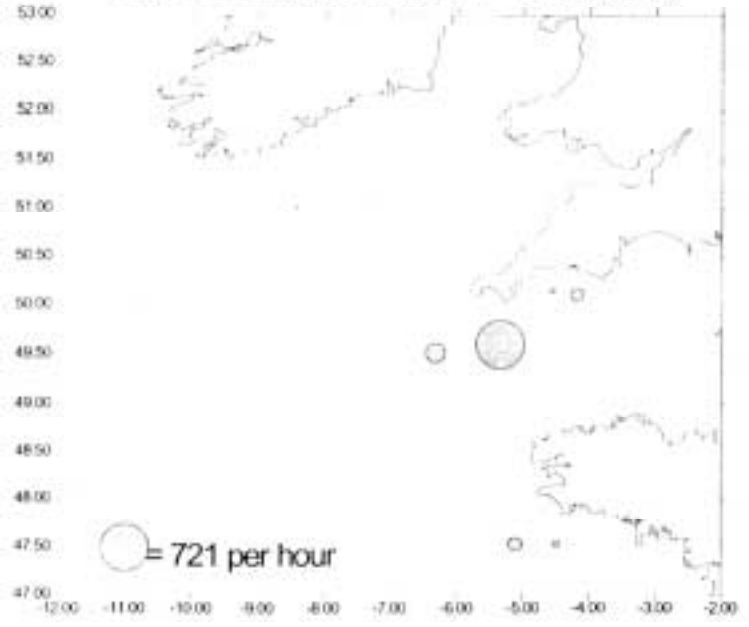
Cirolana 3/01: Mackerel < 24 cm (No/h)



Cirolana 3/01: Mackerel >= 24 cm (No/h)



Cirolana 3/01: horse mackerel <15 cm (No/h)



Cirolana 3/01: Horse mackerel >= 15 cm (No/h)

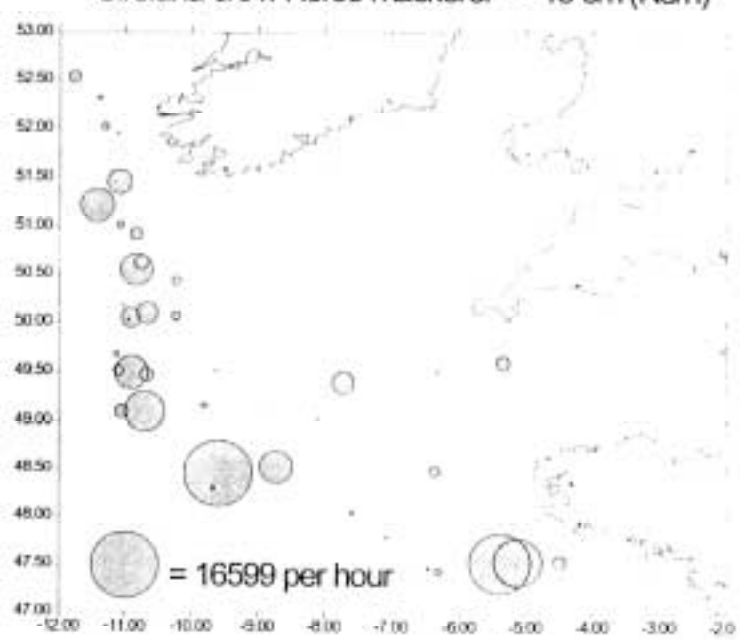
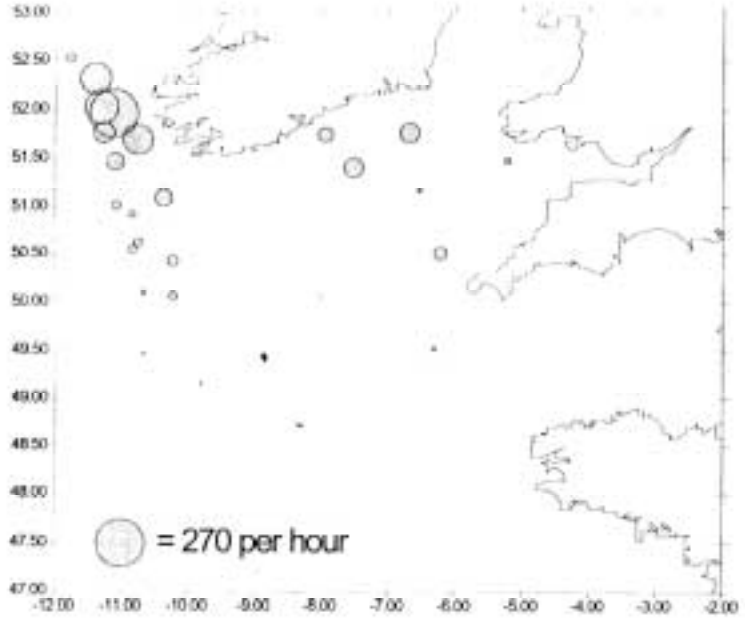
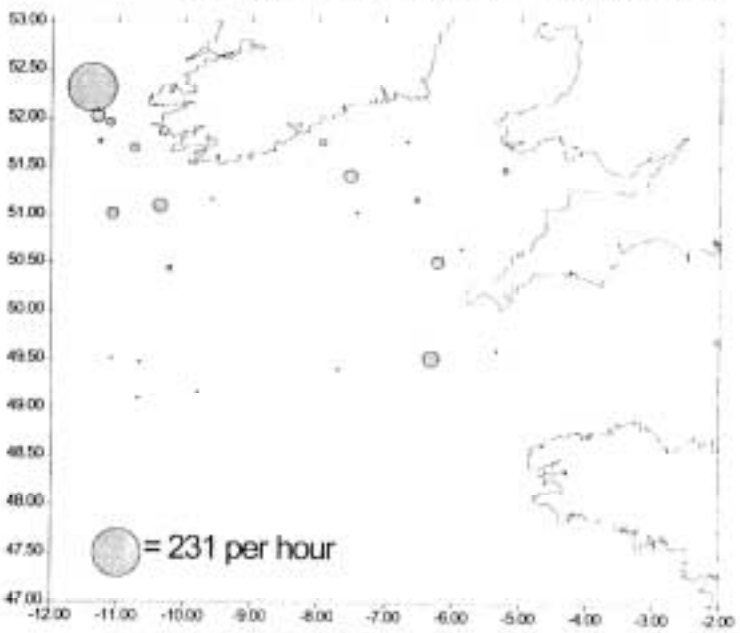


Figure 3.

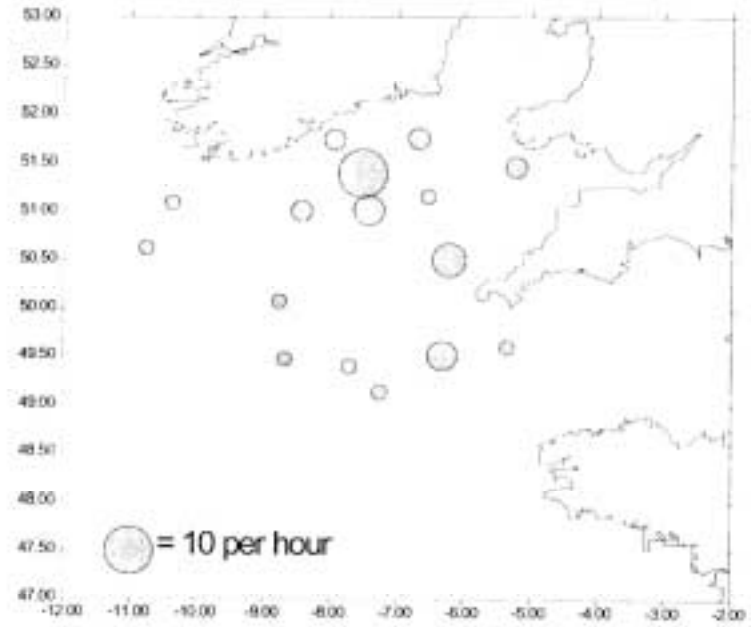
Cirolana 3/01: Haddock < 25cm (No/h)



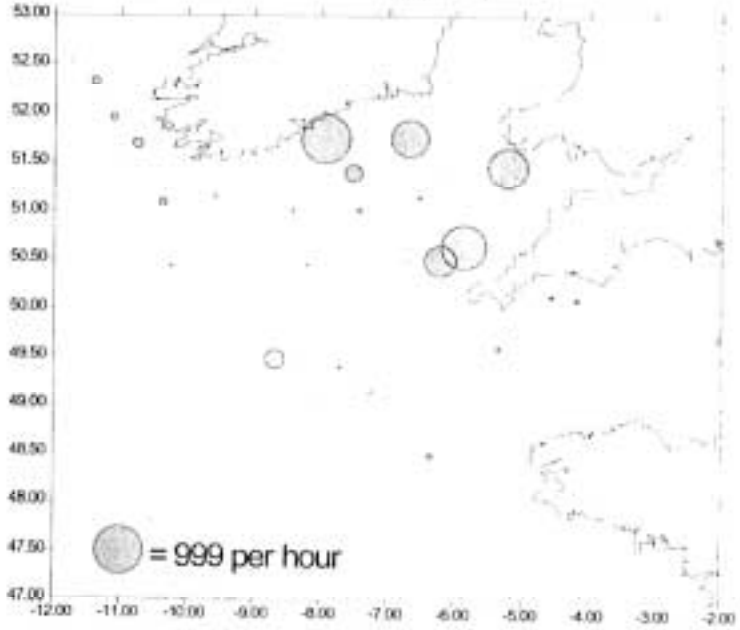
Cirolana 3/01: Haddock >= 25 cm (No/h)



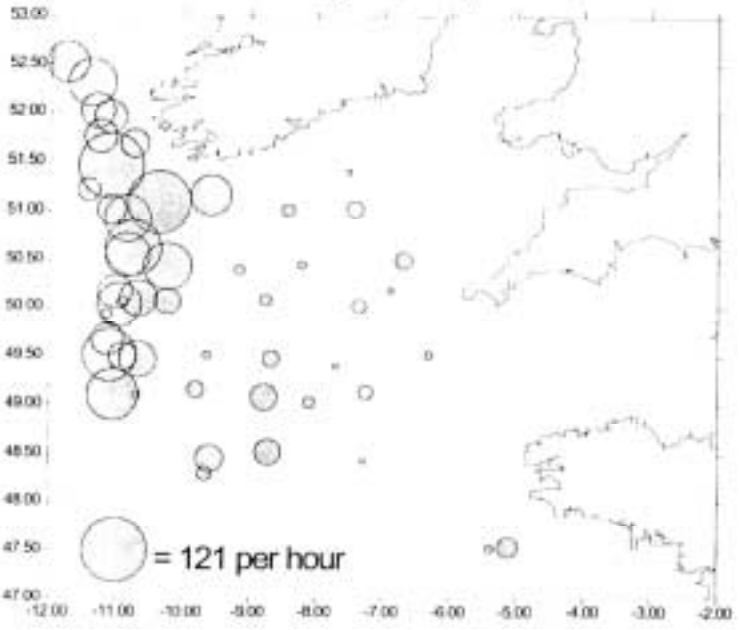
Cirolana 3/01: Cod (No/h)



Cirolana 3/01: Whiting (No/h)



Cirolana 3/01: Megrim (No/h)



Cirolana 3/01:Boarfish (No/h)

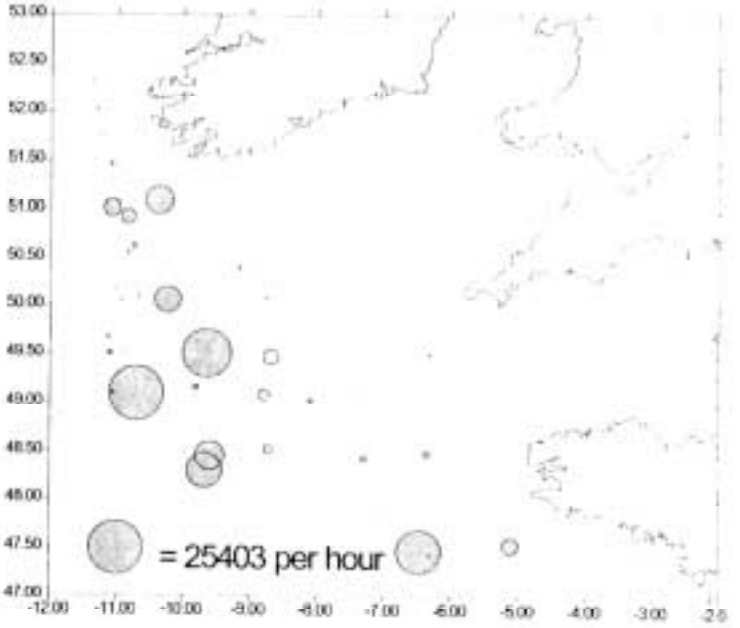
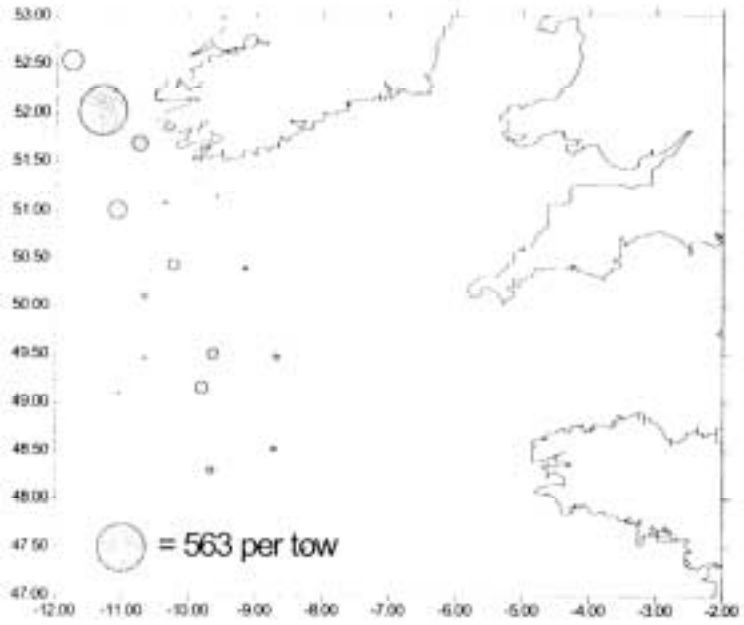
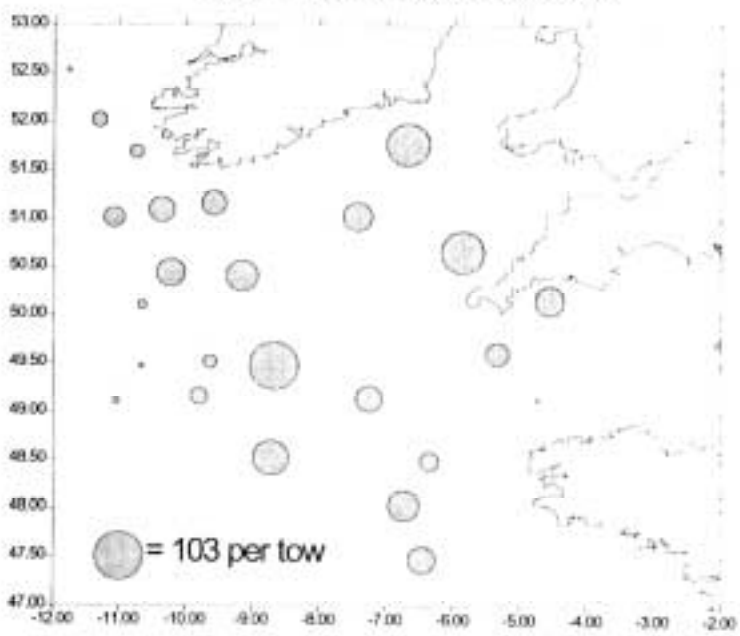


Figure 4.

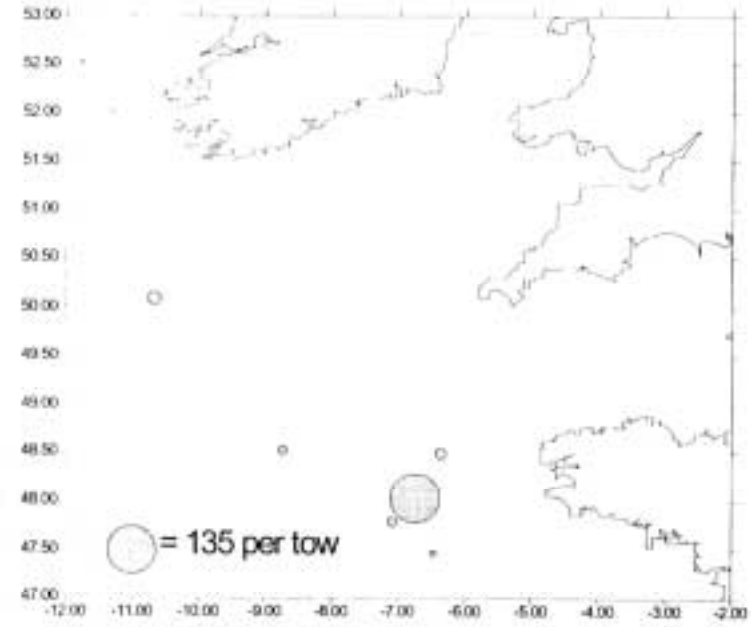
Cirolana 3/01: Actinauge richardi



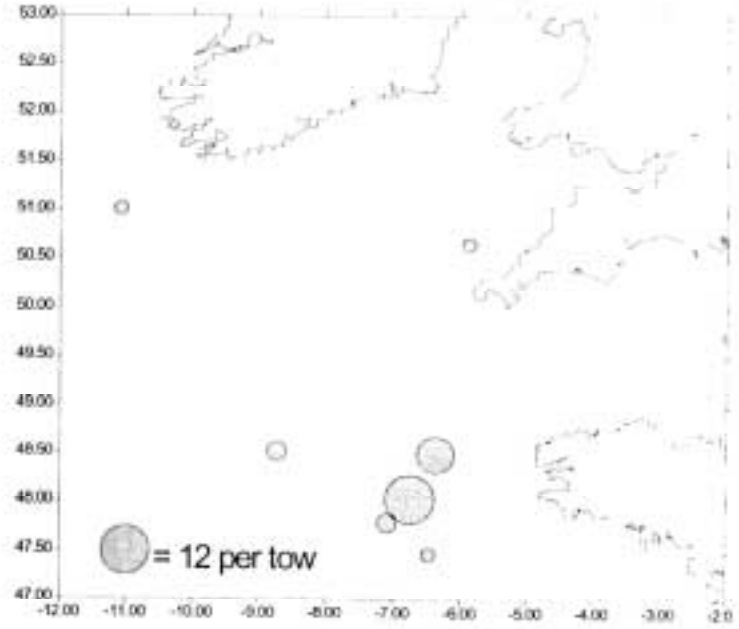
Cirolana 3/01: Pagurus prideaux



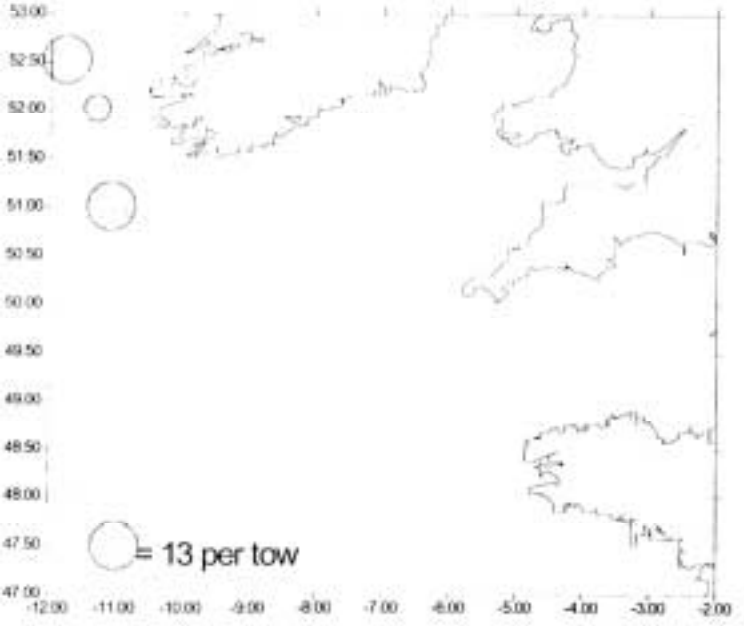
Cirolana 3/01: Porania pulvillus



Cirolana 3/01: Pecten maximus



Cirolana 3/01: Funiculina quadrangularis



Cirolana 3/01: Aporrhais pespelecani