CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE
LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK NR33 OHT
2002 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 2

STAFF:

Part 1

S Warnes (SIC)
S Flatman (2 SIC)
J Ellis
T Watson
R Ayers
P Large
S Warne
M Brown
D Stokes (Marine Institute, Ireland)
J Coughlan
(University College Dublin, Ireland)

Part 2

S Warnes (SIC)
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J Ellis
T Watson
T Woods
D Brown
S Milligan
C Whittaker
R Higgins (UCD Ireland)
M Rajasedharan (UCD Ireland)

DURATION: Part 1: 4 – 19 March. Part 2: 21 March - 3 April

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 collect sediment data by Day grab in each ICES rectangle covered by the trawl survey.

8. To collect scad tissue samples for analysis (C. Fox).

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

10. To collect hake maturity and fecundity material (P. Whittames).

11. To obtain length distributions of mackerel within the Mackerel Box (C. Darby).

NARRATIVE:

RV CIROLANA sailed from Lowestoft at 1200h 4 March. A problem with the steering gear soon became apparent and CIROLANA remained off Lowestoft until 1300h on 5 March during which time repairs were completed. The vessel made a good passage through the southern North Sea and eastern English Channel until the morning of 6 March when progress was slowed due to the weather. One survey station was undertaken in the western Channel that evening and the vessel continued to work in the area on the 7 March before heading to the southern end of the grid to start work on stations in the French sector. The vessel continued working in strong southwesterly winds and swell until 0600 on 10 March when, with the wind gusting to 45 knots, work was terminated. Fishing started again in the evening, and after completing the stations in the French sector, CIROLANA proceeded to start work on the shelf edge on 11-12 March. Gale force winds prevented work on the 13-14 March, but trawling recommenced on 15 March and continued in poor weather with a strong, and often confused, SW swell. On several occasions during this period tow length had to be reduced as the conditions prevented CIROLANA remaining on the tow track, and opportunities to deploy the CTD were limited. In addition to 38 standard survey hauls, 3 tows were undertaken to obtain cod for genetic studies for UCD and the 2m beam trawl was deployed at 18 locations. CIROLANA docked in Cobh Ireland at 2100h on 19 March.
RV CIROLANA sailed from Cobh at 1112h 21 March and after an initial cod tow for UCD proceeded to the Northwest corner of the grid to commence work on the morning of 22 March. The remaining shelf edge stations were completed by the evening of 25 March, the moderate swell having fallen away. CIROLANA then completed work on the remaining stations in the Irish sector during the following 2 days before undertaking the remaining survey stations in the UK sector. The weather conditions enabled the vessel to make on average over 12 knots between stations and full advantage was taken of this to make up for time lost on the first half of the cruise. The increased number of new cables laid in the Celtic sea has resulted in reduced length of tow being available on some stations, and in some instances causing the tows to be unworkable due to broken ground. The good weather conditions enabled the final standard survey tow in the Celtic Sea to be completed at 1922 30 March. CIROLANA then proceeded to Mounts Bay to undertake an echo sounder survey within the Mackerel Box to map the distribution of pelagic species. Having surveyed Mounts Bay without finding any sizeable shoals, CIROLANA then continued the survey from the Lizard to Dodman point. The traces located on this grid were

identified as juvenile mackerel at 1830h on 31 March using the PHHT. Overnight the area from Dodman Point to the Eddystone was surveyed before the final 2 survey trawl hauls were undertaken, the survey being completed at 1357h 1 April. Shortly after completing the survey, while on passage home, CIROLANA stood by in answer to a distress call received by Brixham coastguard until the yacht in question was attended by Salcombe lifeboat, CIROLANA then continued on passage to Lowestoft docking at 0048h BST 3 April.

RESULTS:

1. The Portuguese high headline trawl was deployed on 74 occasions at standard survey positions (Figure 1a). Only 2 invalid tows were made, one of which was successfully repeated. All but one core station in the Trevose area were successfully undertaken. Only three deep-water stations were not attempted of the total station positions on the survey grid. Over the last two years numerous cables have been laid in the area of the Celtic Sea and have had a major impact on the known clear ground available to us for fishing purposes. In some areas tow length had to be reduced, especially off the Trevose head area, and in one instance the ground had recently been worked by a cable laying vessel which resulted in damage to the trawl. Apart from this instance trawl damage was relatively minor.
The trawl mounted Mini CTD was not available and a unit on loan from the Marine Institute appeared to work well. Unfortunately the unit suffered serious damage when the wind increased to 45 knots when hauling.
Deployment of the CTD profiler was limited to 9 occasions on the first half of the cruise due to the weather conditions. The CTD was not launched on the second half of the cruise in order to optimise the time available for trawling.
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 CEFAS electronic data capture system. The system was used to monitor and control otolith sampling levels. The new CEFAS 5 stage maturity key was used to provide data collected to be used to help meet the CEFAS sampling requirements under the new EU sampling regulation.
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*) at a low density were taken all over the Celtic Sea, and a spawning concentration was identified off the Southeast coast of Ireland. 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. Megrim (*Lepidorhombus whiffiagonis*) and concentrations of boarfish (*Capros aper*) were distributed along the shelf edge.

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. Initial

indications are that the 2001 yearclass of horse mackerel is significantly larger than in recent years.

3. A total of 60 species of fish were frozen for use in Royal Naval Fishery Protection Squadron fish identification courses.

4. The few scallops caught were frozen and returned to CEFAS.

5. The CEFAS 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 33 stations over the survey area (Figure 1b), including a series of five replicate tows in the Celtic Deep. The beam trawl was deployed down the ramp and fished successfully at depths of over 400 metres. Hauls were typically of 5 minutes duration, although deeper sites were fished for 10 minutes. Approximately 250 species of fish and invertebrate were recorded during the survey. The most commonly recorded species were the shrimps *Processa canaliculata* and *Pontophilus spinosus*, the anemone *Actinauge richardi* and the swimming crab *Macropipus tuberculatus*. Catches along the shelf edge were dominated by *A. richardi,* whereas catches from the slightly shallower banks in the area were generally dominated by the anemone *Paraphellia expansa.* Several species that had not been caught in the 2000 and 2001 surveys were recorded, including the deep-water whelk *Turrisipho fenestratus* and the bivalves *Limopsis aurita* and *Cuspidaria abbreviata.* The distribution of six invertebrates are illustrated in Figure 4.
The Day grab was deployed on 4 occasions, with only one sample being obtained.

8. Gill tissue samples, for genetics studies, were collect from 50 horse mackerel, 10, hake and 9 megrim (for C. Fox).

9. Additional biological data (length, weight, sex and maturity) were collected for several elasmobranch species, including *Squalus acanthias* and *Mustelus* spp. Unusual species recorded during the survey included a 35cm black-mouthed dogfish *Galeus melastomus* (station 98), and a few juvenile common skate *R. batis* (all frozen). Tissue samples from selected ray species were collected for Italian scientists working on phylogenetics.

10. Six samples of mature female hake gonads were collected for subsequent histological examination (P Witthames).

11. Echo sounder survey grids, with 2 miles between the survey lanes were undertaken in Mounts Bay, from Lizard Point to Dodman Point and Dodman Point to the Eddystone Rock. The only major traces found were in the area from 4 miles SE of Dodman Point to East of Mevagissy, these were identified as juvenile mackerel by

deploying the PHHT. No notable pelagic traces were found on the offshore legs of the survey grids.

12. Two experiments to study the development rates of fish eggs over a range of temperatures were undertaken. In the first the megrim (*L. whiffiagonis*) all died before developing into stage II. In the second cod were successfully reared to hatching from 13.1 °C down to 11.5 °C. The experiment was terminated at the end of the cruise when the remaining cod eggs had reached stage III at 5.5 °C and stage V at 11.0 °C.

13. 14 water samples for $\Delta\ ^{15}N$ ratio analysis to determine the source of the nitrate in the water column were collected over the survey area (D. Sivyer).

14. 6 half hour tows with the PHHT were undertaken to obtain cod samples from VIIg-j for genetics studies for UCD, morphometric measurements were collected from 17 individuals. In addition gill samples were taken from a further 46 fish.

15. Tissue samples from 71 monk (*L. piscatorius*) for genetics studies were collected for MARLAB Aberdeen.

16. 147 hake otoliths were collected for age determination studies (A. Payne).

Other Observations

11 observations of cetaceans were made during the survey. Ten of these were thought to be of the common dolphin in groups of 5 to 100 individuals. Most of these sightings were in around 200m of water, a depth in which the mackerel shoals were congregating. A group of 30 – 40 pilot whales was also seen. 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.
The first swallow was seen on board CIROLANA at 0711h 24 March.

General

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

S. Warnes
4 April 2001

SEEN IN DRAFT

R. McCurry (Master)

A. Lincoln (Senior Fishing Mate)

INITIALLED:

Dr R.S. Millner RM 8/4/02

DISTRIBUTION:

Basic list
Staff on Cruise
Devon SFC)
Cornwall SFC)
South Wales SFC)
Isles of Scilly SFC)
Ireland (via FCO)
France (via FCO)

Figure 1a: Valid PHHT hauls Cirolana 2/02

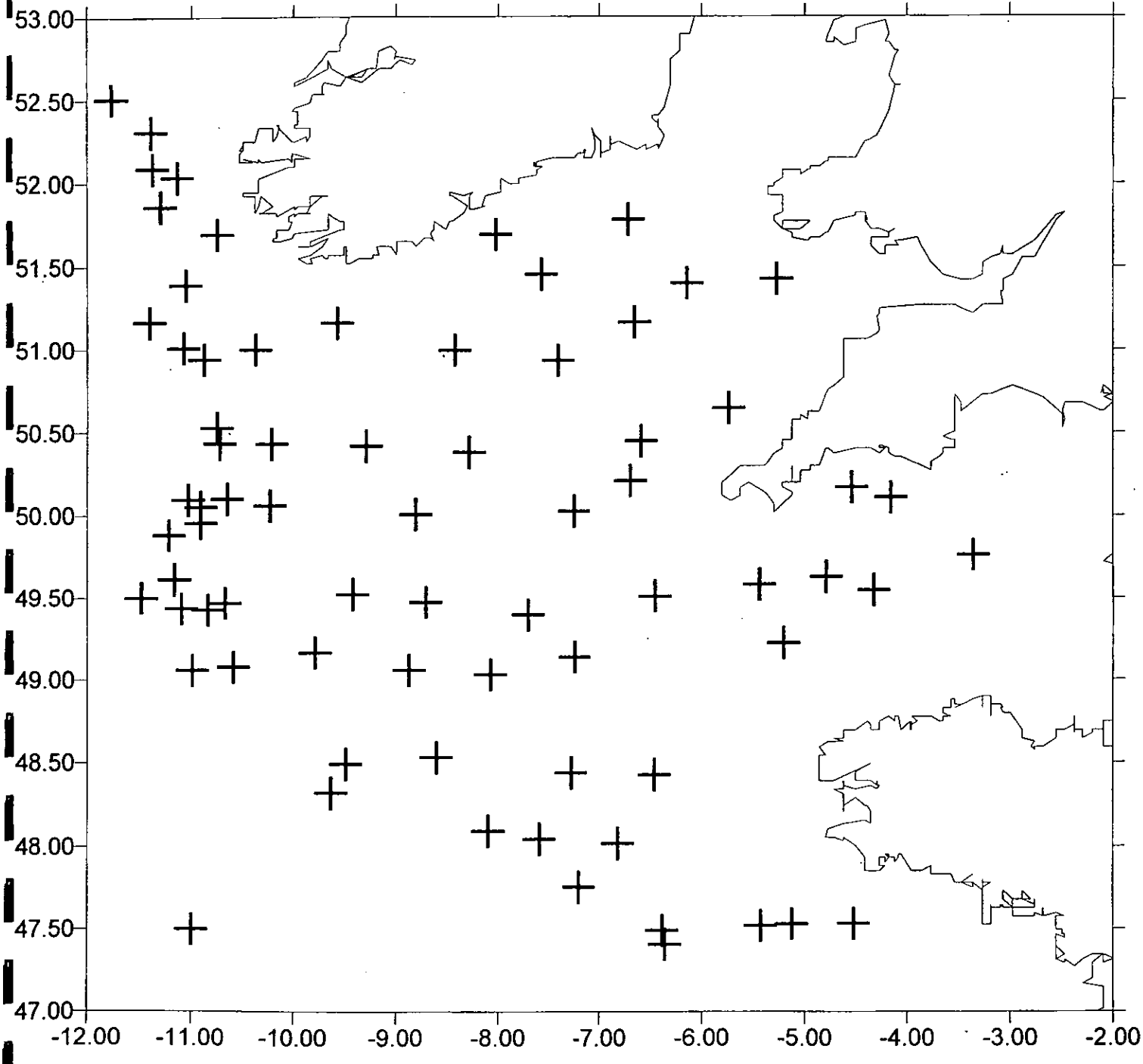
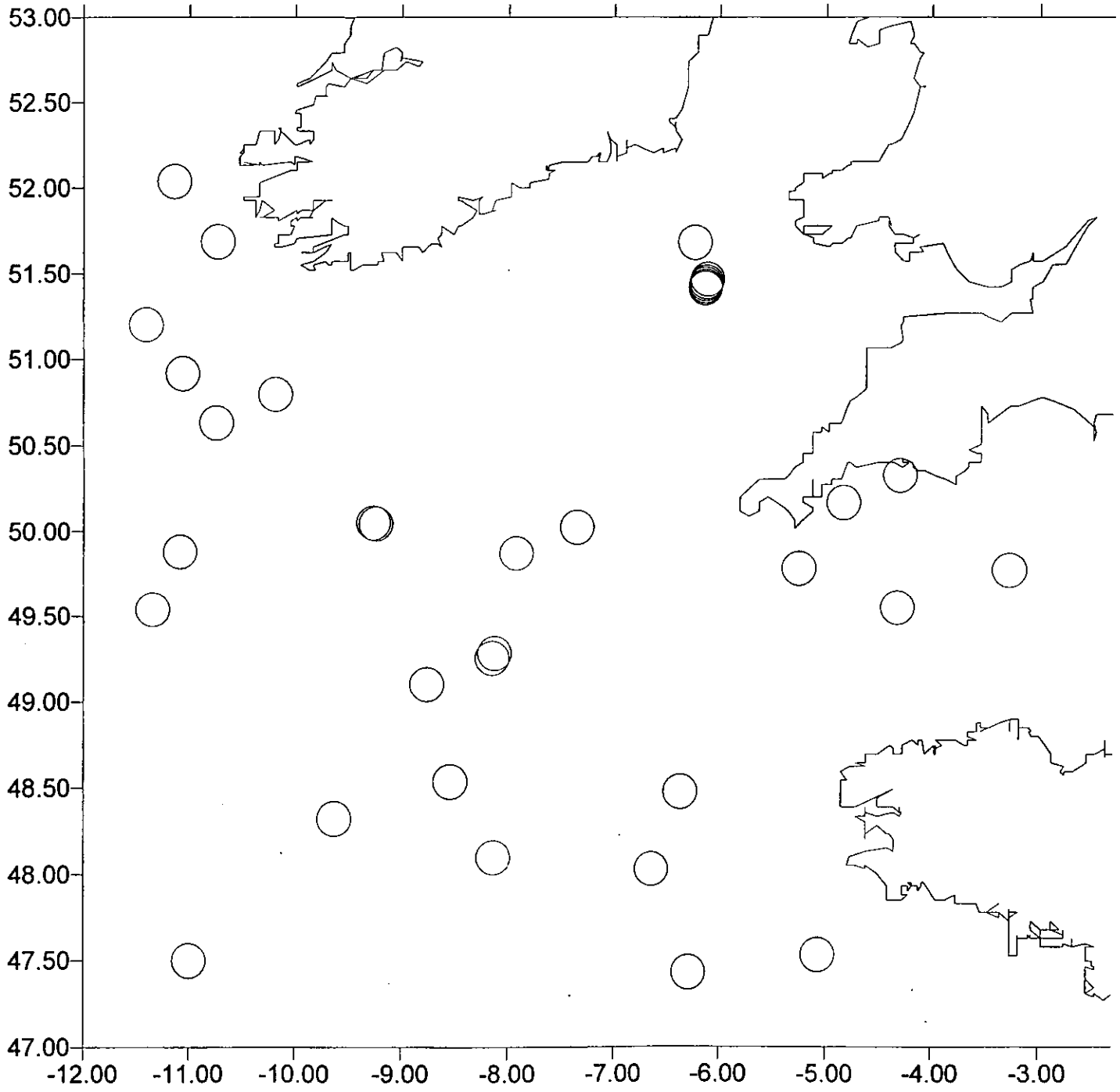
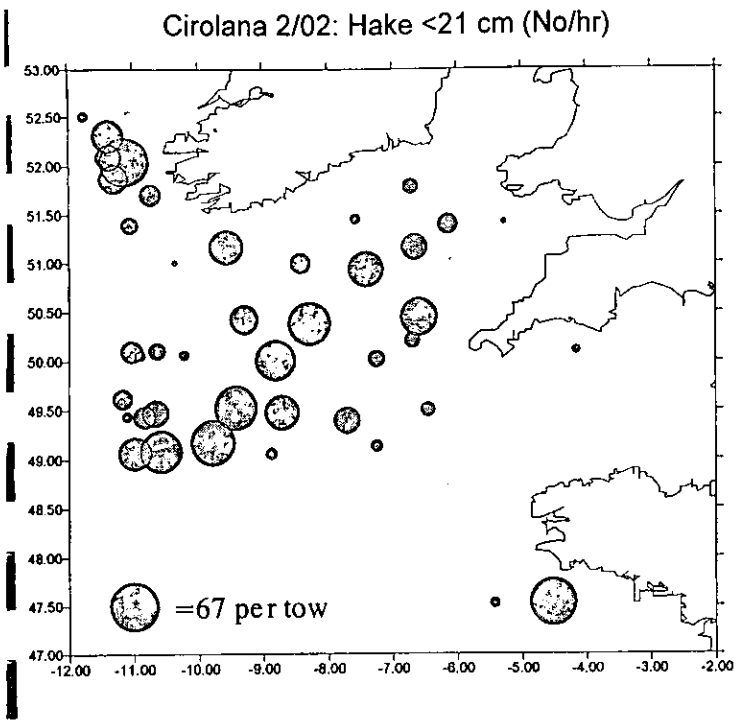
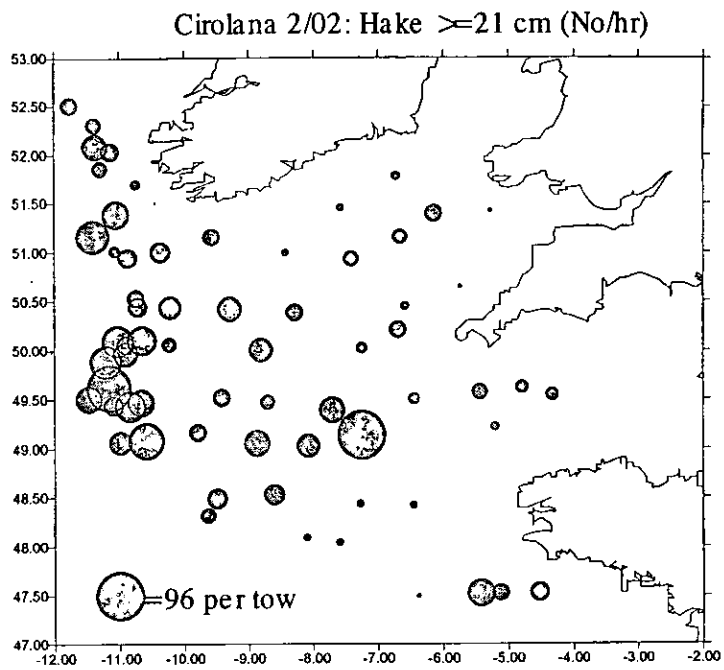
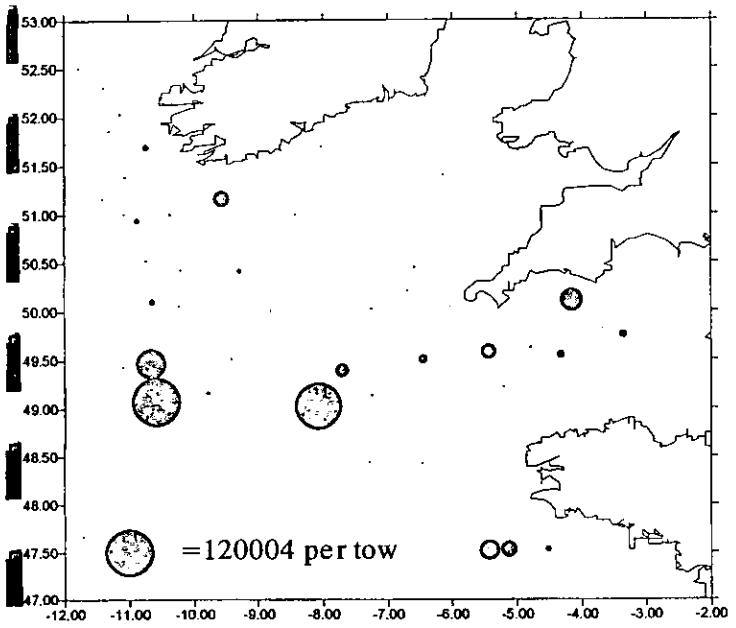


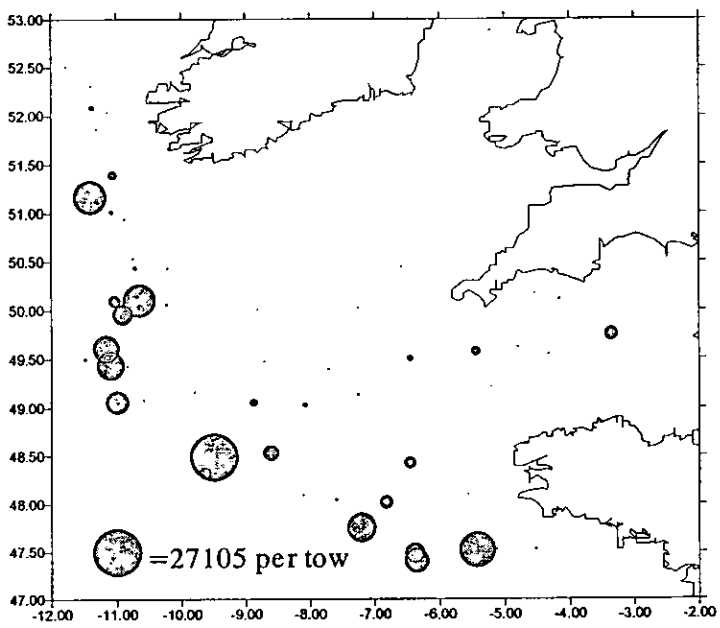
Figure 1b: Valid 2m beam trawl tows Cirolana 2/02

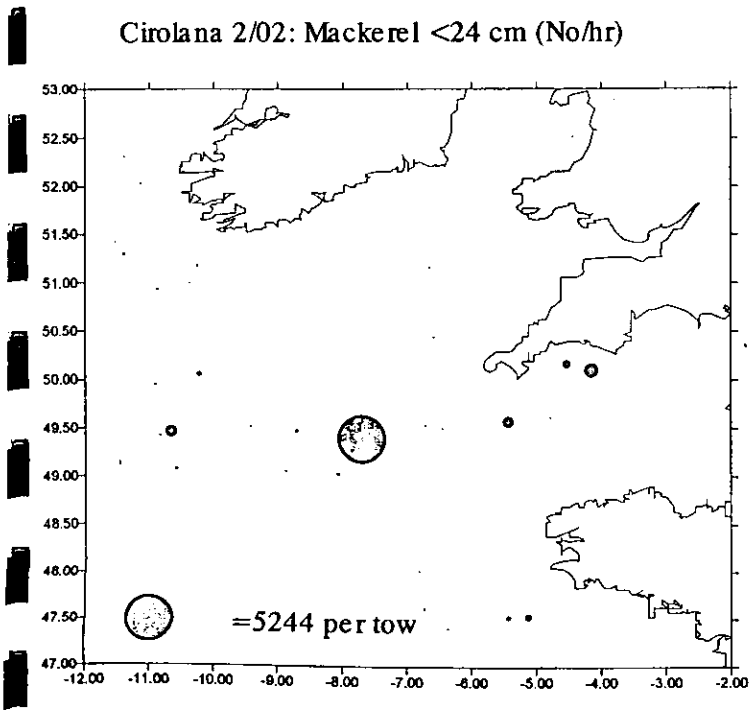



Cirolana 2/02: Hake <21 cm (No/hr)
=67 per tow


Cirolana 2/02: Hake >=21 cm (No/hr)
=96 per tow


Cirolana 2/02: Horse mackerel <15 cm (No/hr)
=120004 per tow


Cirolana 2/02: Horse mackerel >=15 cm (No/hr)
=27105 per tow


Cirolana 2/02: Mackerel <24 cm (No/hr)
=5244 per tow

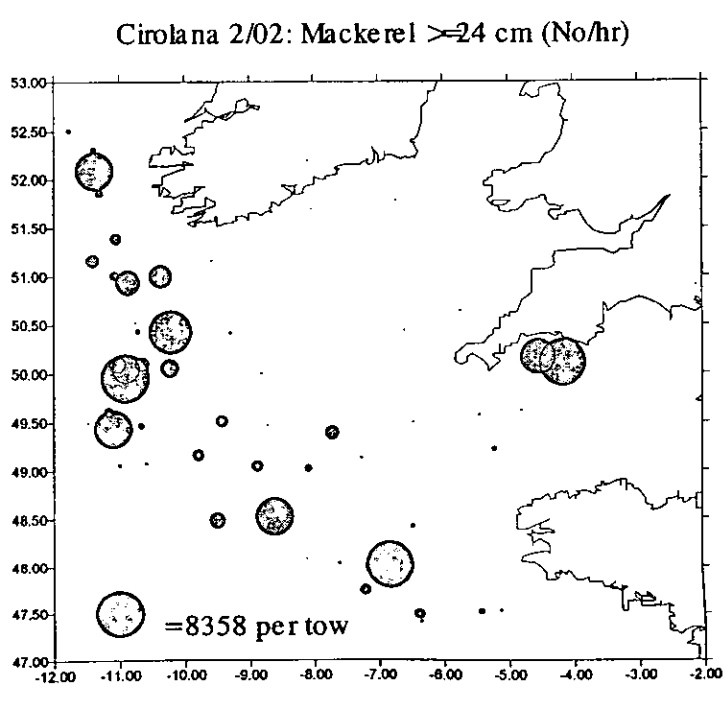
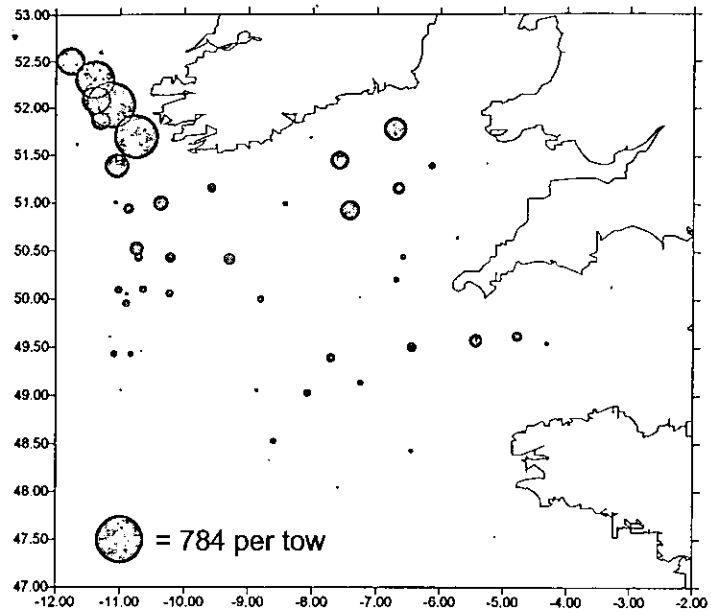
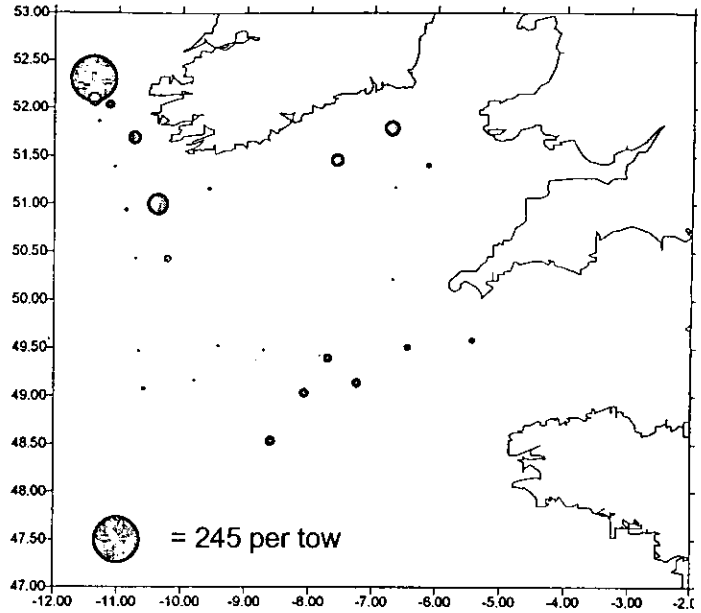

Cirolana 2/02: Mackerel >=24 cm (No/hr)
=8358 per tow

Figure 2

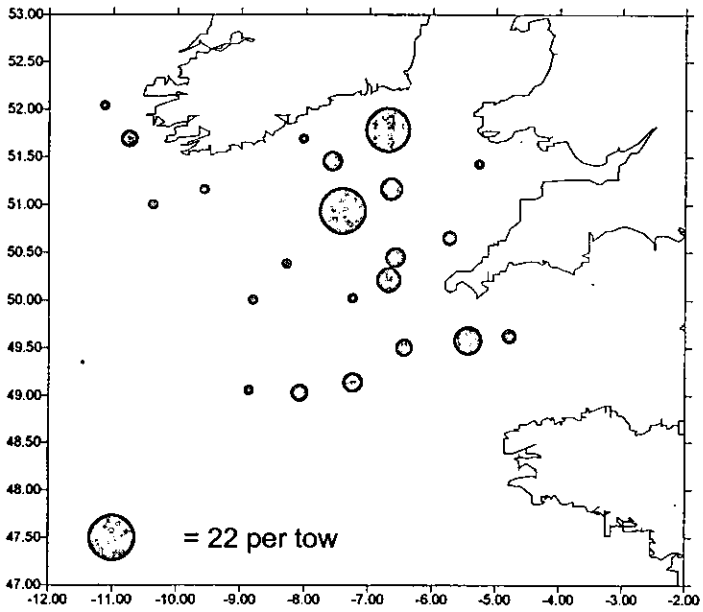
Cirolana 2/02: Haddock <25 cm (No/hr)



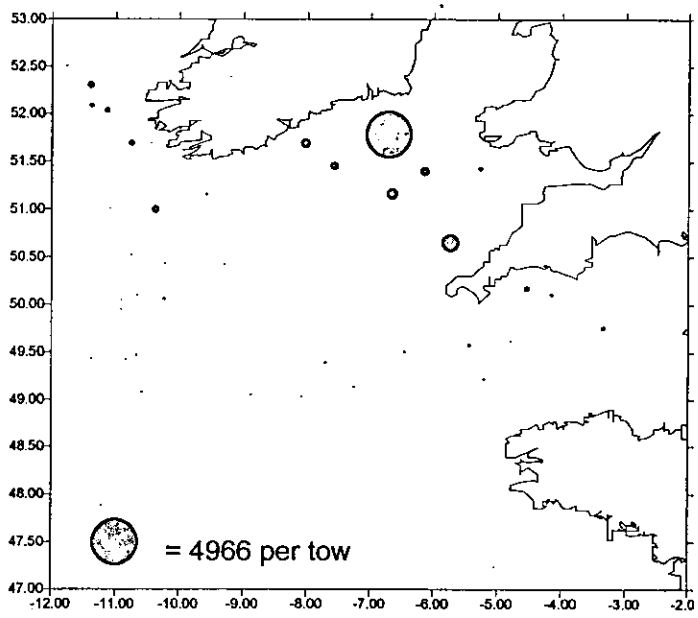
Cirolana 2/02: Haddock >= 25 cm (No/hr)



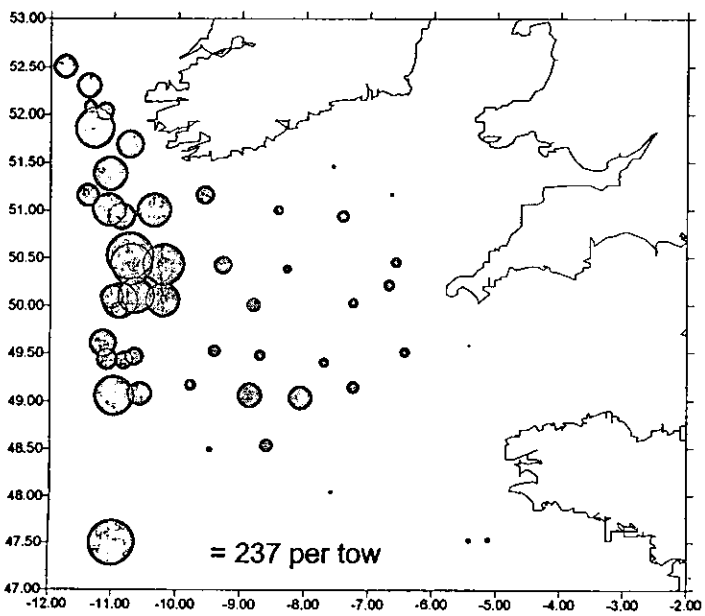
Cirolana 2/02: Cod (No/hr)



Cirolana 2/02: Whiting (No/hr)



Cirolana 2/02: Megrim (No/hr)



Cirolana 2/02: Boarfish (No/hr)

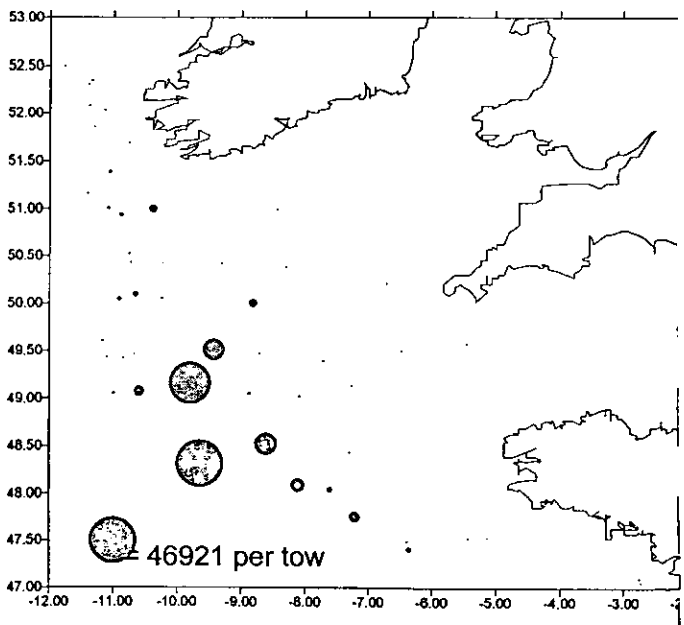
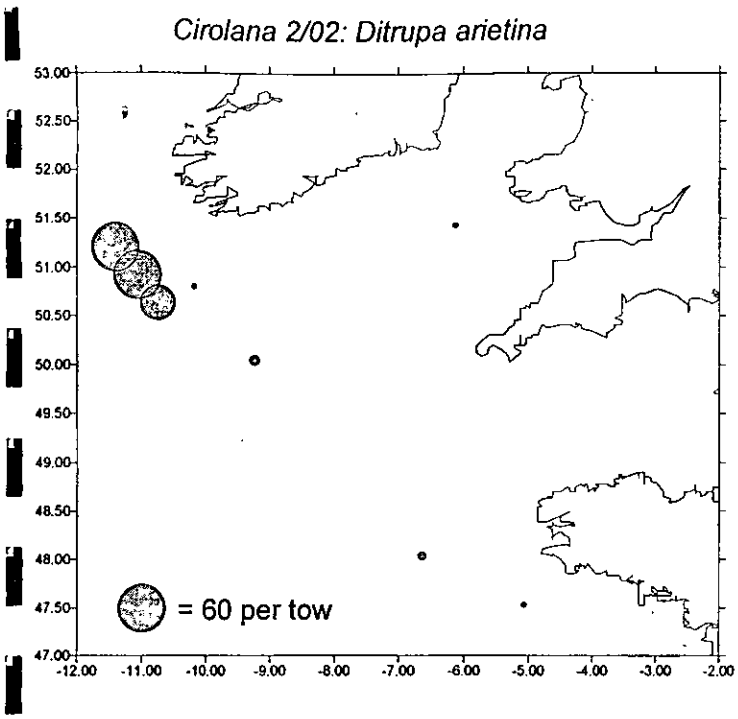
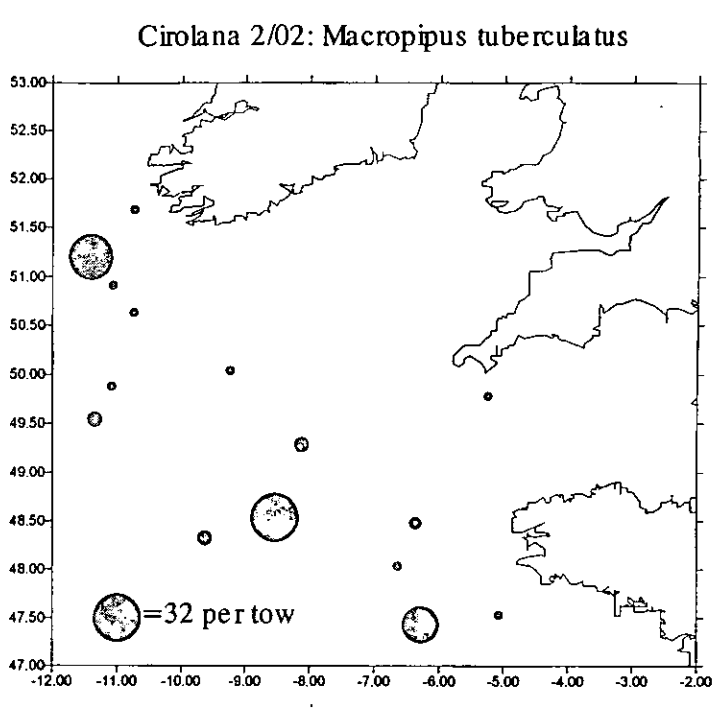
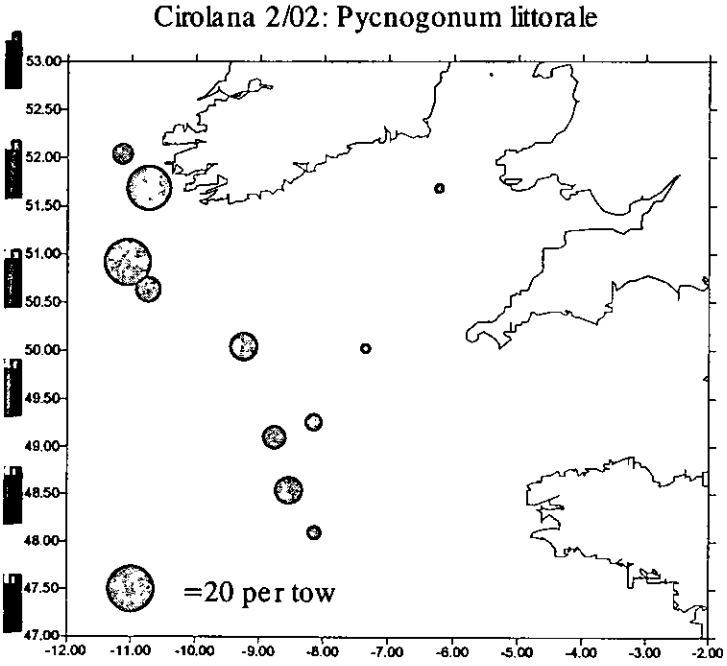
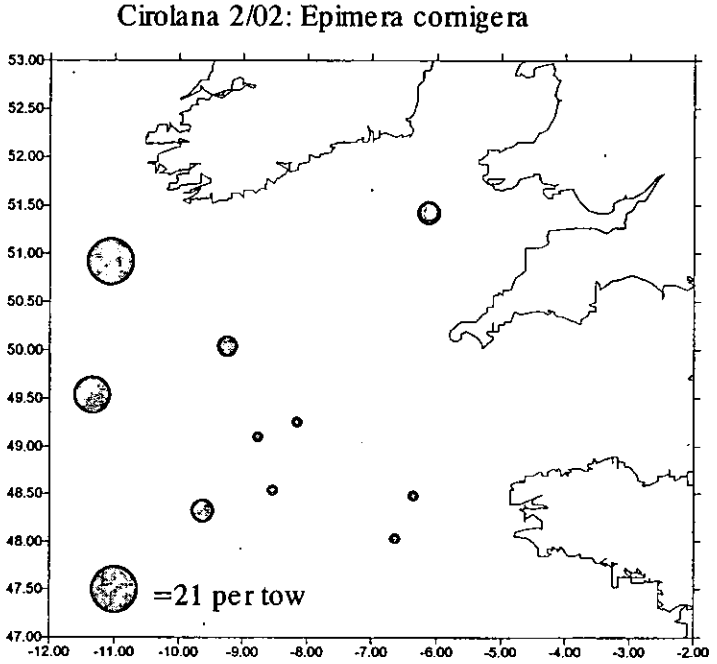


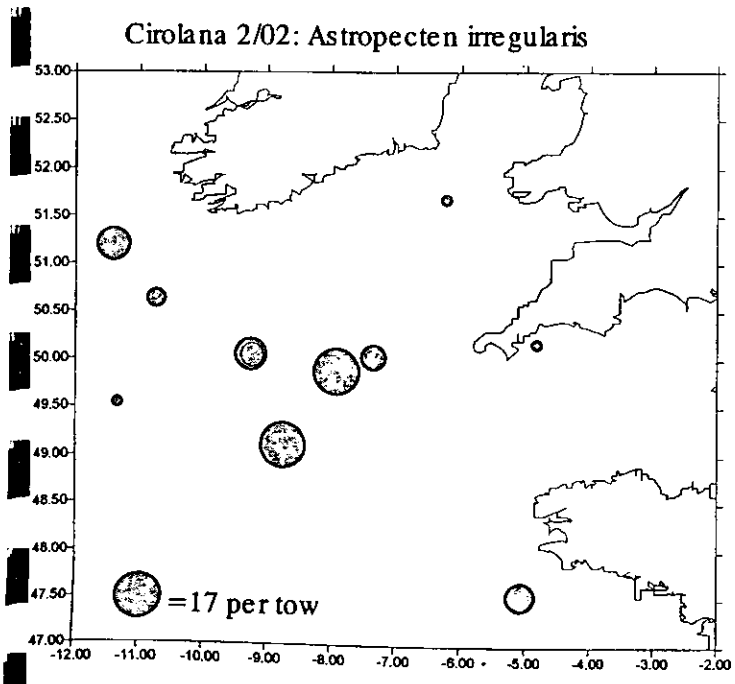
Figure 3


Cirolana 2/02: Ditrupa arietina
= 60 per tow


Cirolana 2/02: Macropipus tuberculatus
=32 per tow


Cirolana 2/02: Pycnogonum littorale
=20 per tow


Cirolana 2/02: Epimera cornigera
=21 per tow


Cirolana 2/02: Astropecten irregularis
=17 per tow

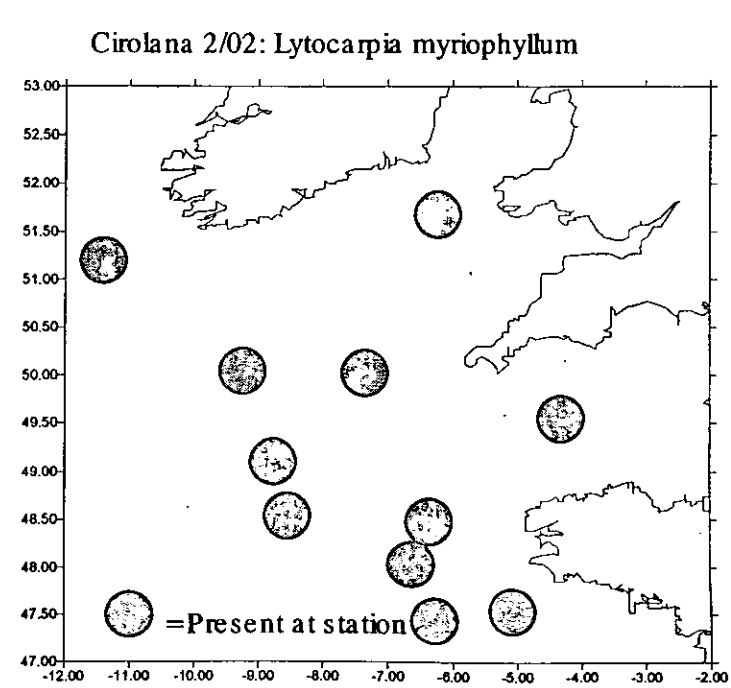

Cirolana 2/02: Lytocarpia myriophyllum
=Present at station

Figure 4