

**CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE  
LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK NR33 0HT  
2000 RESEARCH VESSEL PROGRAMME**

**REPORT: RV CIROLANA: CRUISE 2**

**STAFF:**

Part 1	Part 2
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R Ayers	J Dann
T Watson	T Watson
M Easey	M Smith
M Etherton	T Mead
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D Maxwell	D Stokes (Ireland)

**DURATION:** Part 1: 29 February - 15 March. Part 2: 16 - 30 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:
  - The distribution, size composition and abundance of all fish species.
  - The age - length distribution of selected species.
  - The spatial and temporal distribution of high concentrations of roundfish if encountered.
  - 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 Onnastrephid squids.
7. To collect, deep frozen, specimens of selected species of six gilled sharks; to collect egg cases of dogfish attached to hydroids, fixed in 70% ethanol, and egg cases of rays, deep frozen, for the University of Swansea.
8. To collect 1 litre surface water samples at each trawl station for subsequent analysis of tritium.

9. To collect phytoplankton samples at selected stations in the Celtic Sea and west of Ireland (DANI)
10. To sample benthos with the 2 metre beam trawl in each ICES rectangle covered by the trawl survey.
11. To collect tissue samples from a wide range of species for stable isotope analysis (S. Jennings)
12. To collect samples of 50 individuals each of cod, haddock, whiting, megrim, and hake for genetic analysis of population variability (Dr Fox).
13. To collect random samples of 30 mackerel ovaries in the southern, central and northern parts of the survey area. (P.R. Witthames)
14. To collect three samples of 25 horse mackerel ovaries at the beginning, middle and end of the survey for fecundity analysis. (RIVO IJmuiden)
15. To collect otolith samples of plaice cod and sole to supplement the port based biological sampling programme for those species in ICES Divisions VII e.f.g.

#### NARRATIVE:

RV CIROLANA sailed from Lowestoft at 1630h 29 February having been delayed for one day by a scientific staffing problem. The vessel made a good passage through the southern North Sea and English Channel arriving at the first trawl survey station, 30nm SSE of Start Point at 0600h 2 March. The first two survey stations were completed by 1330h and the vessel then steamed to an anchorage inside Plymouth breakwater to pick up the 4<sup>th</sup> engineer. One further survey station was completed, in Start Bay, by 2145h. On the following day the start was delayed until 1130h by a strong to gale force SW wind which eventually abated allowing two survey stations to be completed that day. The vessel then steamed into the French sector of northern Biscay working west, towards the shelf edge and then returning east to the Cornish peninsula. The survey progressed at a steady rate in exceptionally fine weather, benefiting from a stationary anticyclone over the eastern Sole area. All survey stations south of latitude 50°N were completed by 2000h 12 March. A further six survey stations, in the eastern Celtic Sea and Bristol Channel area, were completed by 2045h 14 March. Course was then set for the short passage to Cork for the mid-cruise staff changes arriving there at 0736h 15 March.

RV Cirolana left Cork at 1118h 16 March and arrived at the first survey station of the second half at 1430h. The trawl was shot but after 20min we were asked to alter course by a fishing vessel in order to avoid her seine gear. Shortly afterwards the trawl came fast on what eventually turned out to be a wreck. The trawl was badly damaged and all the ground gear was lost on a feature that did not show up on the echo sounder and on a tow where no previous trouble had been experienced. Once the remains of the trawl, which fortunately included both headline SCANMAR units, had been recovered the vessel returned to within the outer limits of Cork harbour to pick up a deckhand who had been flown out from Lowestoft. Following the successful completion of that operation, a CTD cast was made at the earlier trawl position. Course was then set for a position 65nm to

the west whilst the crew continued the time consuming and meticulous task of bending on a completely new trawl net and ground gear.

Over the following seven days a total of 24 survey stations were completed working south along the shelf edge from 52° 40'N to 49°30'N. The weather continued to be exceptionally good until the afternoon of 23 March when the wind increased to over 15 knots for the first time since 3 March. The final station close to the shelf edge was completed at 1900h. Strong SW winds slowed progress on the following day as RV Cirolana moved back to the Celtic Sea to complete the remaining 10 survey stations. During the overnight steam 24/25 March a twin rigged scallop dredge was deployed to sample benthos on Haig Fras, an offshore reef, 60nm west of the Cornish Peninsula (50° 12.8'N to 07°55.9'W).

Sampling at all the standard trawl survey stations was completed at 0810h on 27 March with a repeat of the trawl haul off Cork where damage had occurred during the deployment on 16 March. Following completion of the standard trawl survey, a further six deployments of the trawl were made in the area off south-east Ireland across to the Welsh coast, where some cod plaice and sole had been taken earlier. The final tow was completed, off Milford Haven, at 1125h on 28 March when course was set for the return passage to Lowestoft.

Additional surface seawater samples for salinity and tritium analysis were taken at 30nm intervals, through the English Channel and southern North Sea, on the return passage. After making slow progress into a strong north-easterly wind, RV Cirolana docked in Lowestoft at 1648h 30 March.

## RESULTS:

1. A total of 86 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, door spread and bottom temperature throughout each tow. All 78 trawl stations in the standard survey were completed (Figure 1). Two trawl hauls were declared invalid but successfully repeated and a further six deployments were made which were not included in the standard survey. Extensive trawl damage occurred on only two stations. Most of the damage was to the ground gear with two sets of rubber bobbins lost, both in the Ballycotton area, off southern Ireland.

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 10nm apart, resulting in a total of 67 deployments. For the first 23 deployments the EG&G software was producing a false impression of the depth and the deployments only covered the top half of the water column.

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. These charts include the distribution of haddock, whiting and hake, the major roundfish species encountered on this survey.

Catches of adult cod were small and no spawning concentrations were noted. The major concentrations of mackerel and horse mackerel were associated with the shelf edge and inside the south-western mackerel box.

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 off southern Ireland, at the shelf edge in the vicinity of Great Sole Bank and off Start Point. A catch of 5,800 fish in this size group was taken off southern Ireland.
3. A total of 53 species of fish, including 6 species from the deep-water stations, were frozen for the Royal Naval Fishery Protection Squadron fish identification courses to be held in October 2000 and March 2001. In addition a number of crustacean and molluscan species were collected for this purpose. The total catch of specimens of blue ling (*Molva dypterygia*) was also collected as this species infrequently appears in the catches on this survey.
4. A total of five scallops (*Pecten maximus*) were collected from the trawl and beam trawl hauls and frozen whole for subsequent analysis by Shellfish Group.
5. Evaluation of new electronic data capture system working practises, designed to reduce hardware failures, was undertaken. Preliminary results show a reduction in light-pen failures. The effects on the PCs will be evaluated on return to Lowestoft.  
Extensive trials were carried out using SQL as a data management tool to correct errors in the database caused by incorrect data input. By using SQL all errors that occurred on the cruise were rectified ensuring the integrity of the EDC database.  
New software to enable keyboard input of length sample data was also trialled.
6. Data on the distribution and abundance of Ommastrephid squids are now collected as a routine element of the standard survey procedure.
7. Only empty egg cases of *Scyliorhinus canicula* and *Raja naevus* were recorded during the survey, although recently hatched *S. canicula* were recorded in both the beam and main trawl. Tissue samples were taken from 22 spurdog (*Squalus acanthias*) for DNA analysis. Two six-gill sharks (*Hexanchus griseus*) were caught in the PHH trawl and tissue samples and biological data collected. Specimens of velvet-belly shark (*Etmopterus*) and rabbitfish (*Chimaera monstrosa*) were frozen whole.
8. A total of seventy-eight 1-litre surface water samples were taken for subsequent tritium analysis at the Tritium Laboratory, University of Miami, USA. Sixty-eight samples were taken on the trawl survey grid, one at each of the CTD stations plus one additional sample in the Bristol Channel. A further 10 samples were taken at 30 nml intervals along the course of the steam home along the English Channel and into the Southern Bight of the North Sea. The samples were taken at the request of Dr Pascal Bailly du Bois, Institut de Protection et de Sûreté Nucléaire.
9. A total of six plankton samples were taken in the Celtic Sea with the half metre fine mesh plankton net for phytoplankton analysis (DANI).

10. The 2-metre beam trawl was deployed at 61 stations throughout the survey area. The beam trawl was deployed down the ramp using the standard warp on the starboard drum of the main cable winch. The trawl was fished successfully at depths down to 300 metres. Minor damage to the net occurred only occasionally, although one beam trawl was severely bent at one station. Over 250 species of fish and invertebrate were recorded during the survey. The hermit crab *Pagurus prideauxi* and the thickback sole *Microchirus variegatus* were common on shelly-gravel sediments throughout the survey area. The anemone *Actinauge richardi* was abundant in deeper waters and the sea spider *Pycnogonum* was often found in association with this anemone. Sea pens were also regularly recorded at these sites, which would indicate that finer sediments occurred in these areas. The Celtic Deep is one area known to be muddy and catches here were dominated by *Nephrops* and the shrimp *Alpheus*. Temperature is also an important factor influencing the structure of epibenthic assemblages and catches in the more southerly sites often included Lusitanian species, including the crab *Parthenope*. Invertebrate material collected included *Crangon allmanni* and *Epizoanthus* sp.
11. During the course of the survey, a total of 141 muscle tissue samples, from 49 different species were collected and deep-frozen. These were mostly within the prescribed length ranges. When fish of suitable size were not available, tissue from closest to the range was preserved. In addition length, weight, sex and maturity were noted.
12. Over the area of the Celtic Sea and Bristol Channel, covered by the survey, sections of gill arch were taken from 50 specimens each of haddock, whiting, hake and megrim and from 40 specimens of cod. The material was preserved in ethanol and will be used in developing species specific gene probes for use in identifying the eggs of these species. Just prior to the start of the cruise a request for similar material was received from P. Alvarez (AZTI Fundacion, Spain). Gill arch and muscle tissue samples were preserved in ethanol from 50 specimens each of mackerel, hake and megrim and from 20 specimens of horse mackerel. 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.
13. Mackerel ovaries were collected, and fixed in either formalin or Gilsons fluid, from the Mackerel Box and on the shelf edge where significant catches of mackerel were taken. In addition 20 whole fish were collected from each of the northern, central and southern areas of the survey (a maximum of 5 fish per station) for further analysis at Lowestoft. These samples were taken as part of a study into the effect of fish condition on mackerel fecundity and form part of the triennial mackerel egg survey programme.
14. A total of 142 horse mackerel ovaries were removed and fixed in formalin for subsequent analysis by Dr Eltink, RIVO, IJmuiden. The samples were taken in four sampling periods; 2/3 March (30 ovaries), 5/9 March (46 ovaries), 17/18 March (32 ovaries) and 23 March (34 ovaries). The samples will be used to observe the progression of oocyte development, and in particular *de novo* vitellogenesis, as part of the ICES mackerel and horse mackerel egg survey programme.
15. The six additional trawl hauls, carried out after completion of the standard survey, were used to supplement the CEFAS biological sampling programme for ICES Divisions

VIII.f.g. A total of 72 plaice, 2 sole and 8 cod were sampled. No additional sampling was possible in Division VIIe.

Other Observations

A total of 22 observations of cetaceans were made during the survey. Most of these were of the common dolphin mainly in groups of around 5 to 15 individuals. One group of 50 to 100 individuals was noted in very calm weather at the shelf edge off south-west Ireland, where one dead common dolphin was also seen floating at the surface. Two sightings of groups of pilot whales and one unconfirmed identification of white-sided dolphins were recorded. All the observations will be sent, together with details of their 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.

J H Nichols  
30 March 2000

SEEN IN DRAFT

R. Mc Curry (Master)

A Lincoln (Senior Fishing Mate)

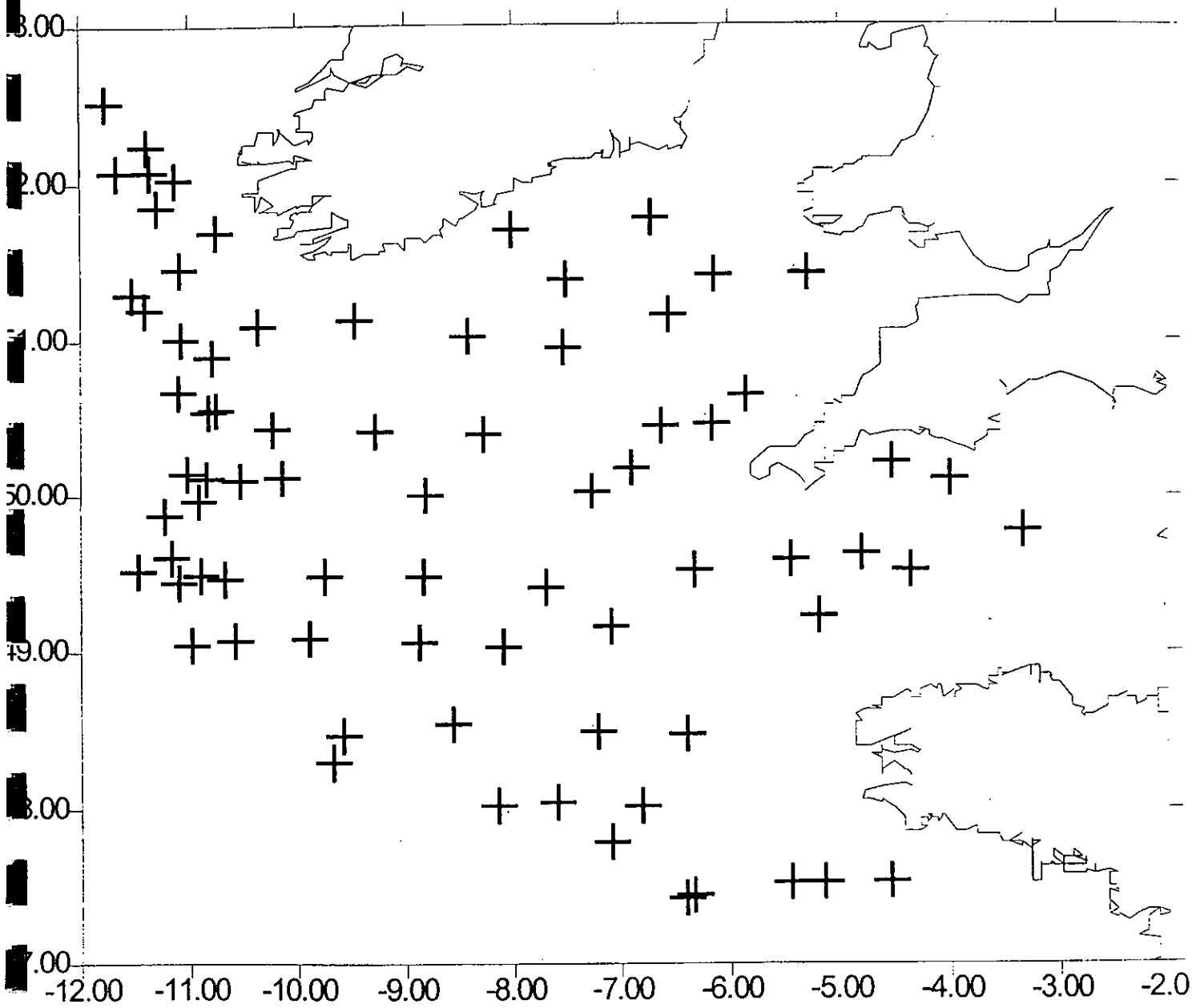
INITIALLED:

Dr G.P. Arnold (Chairman FSMG Board)

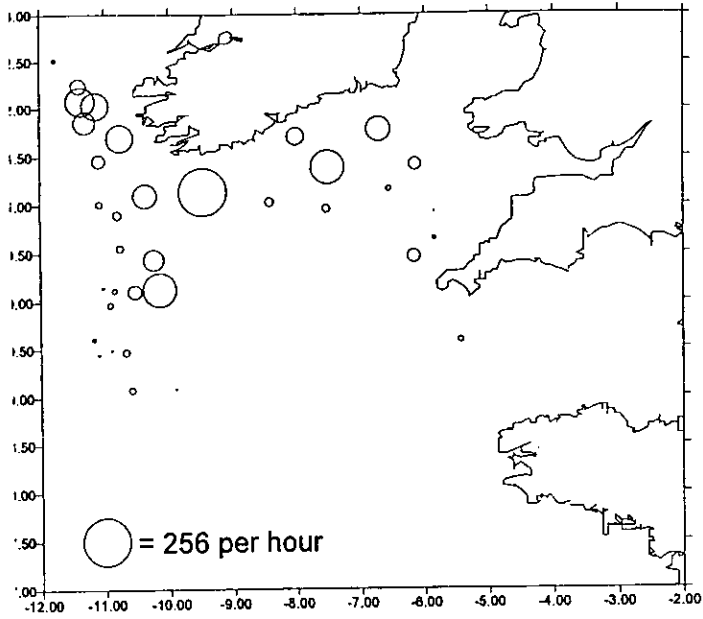
DISTRIBUTION:

Basic list  
Staff on Cruise  
Devon SFC )  
Cornwall SFC )  
South Wales SFC )  
Isles of Scilly SFC)

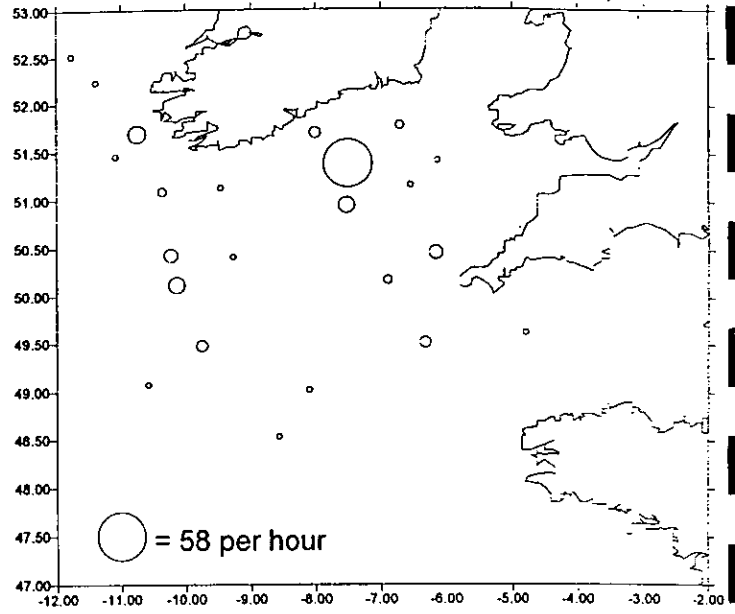
# CIROLANA 2/2000 : VALID SURVEY PHHT HAULS



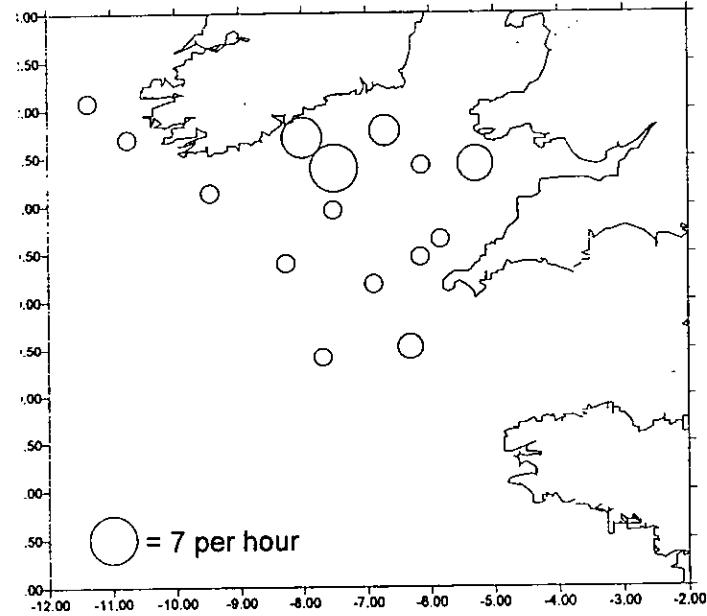
Cirolana 2/00: Haddock <25 cm (No/h)



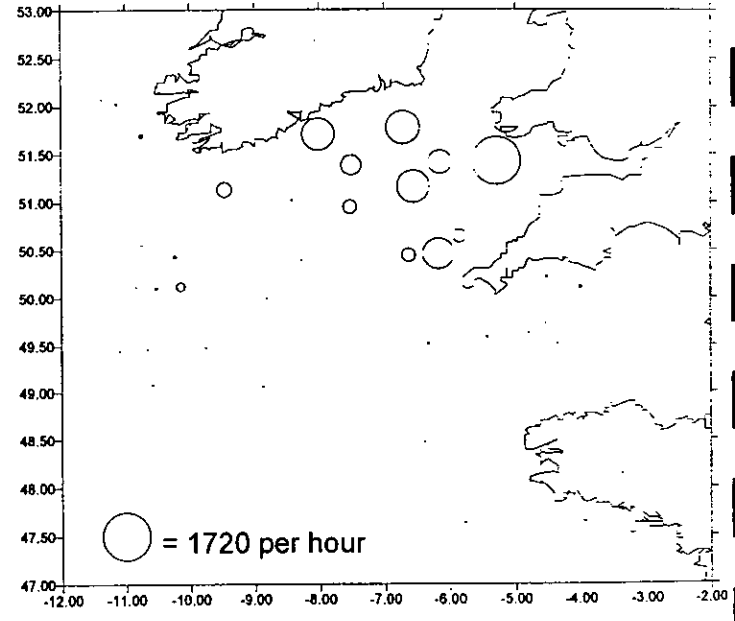
Cirolana 2/00: Haddock  $\geq 25$  cm (No/h)



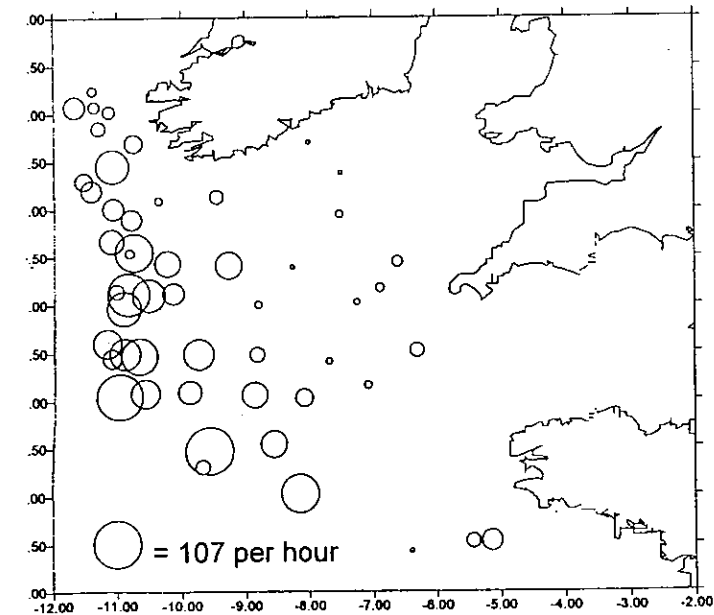
Cirolana 2/00: Cod (No/h)



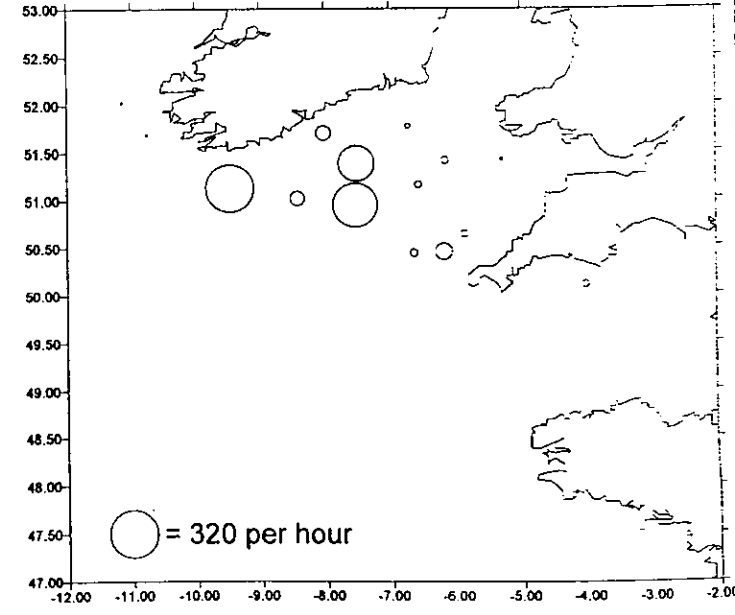
Cirolana 2/00: Whiting (No/h)



Cirolana 2/00: Megrin (No/h)

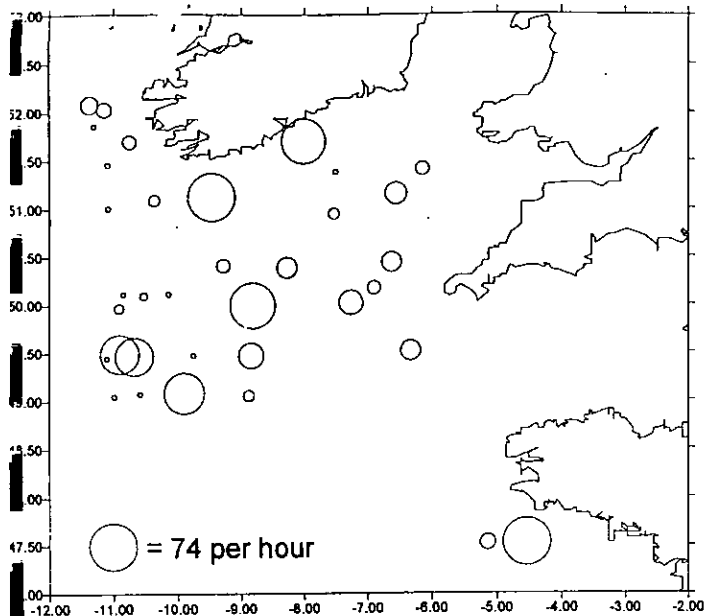


Cirolana 2/00: Herring (No/h)

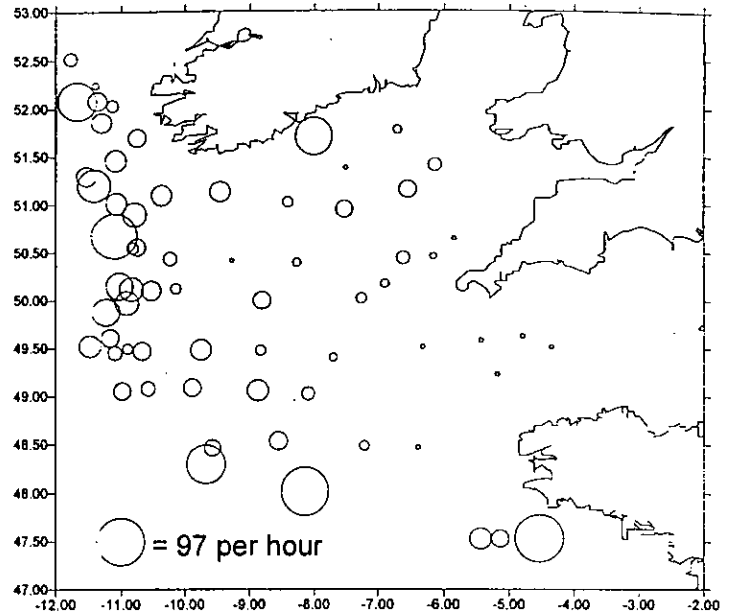




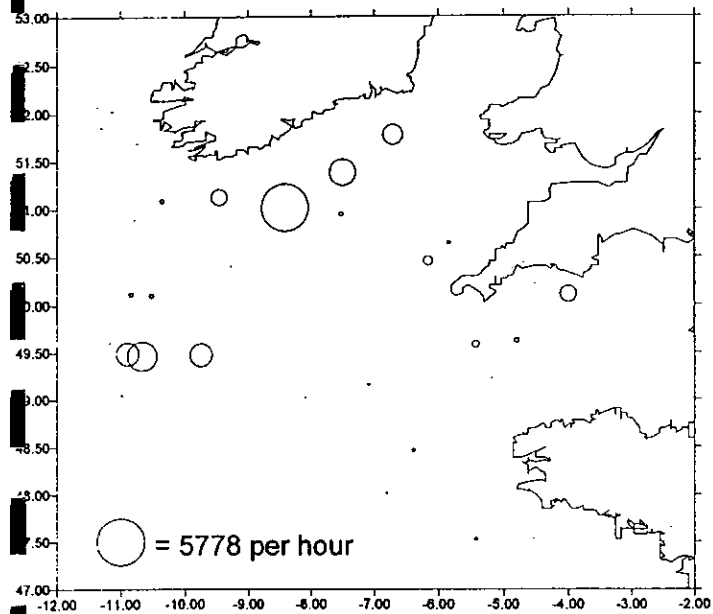
Cirolana 2/00: Hake < 21cm (No/h)



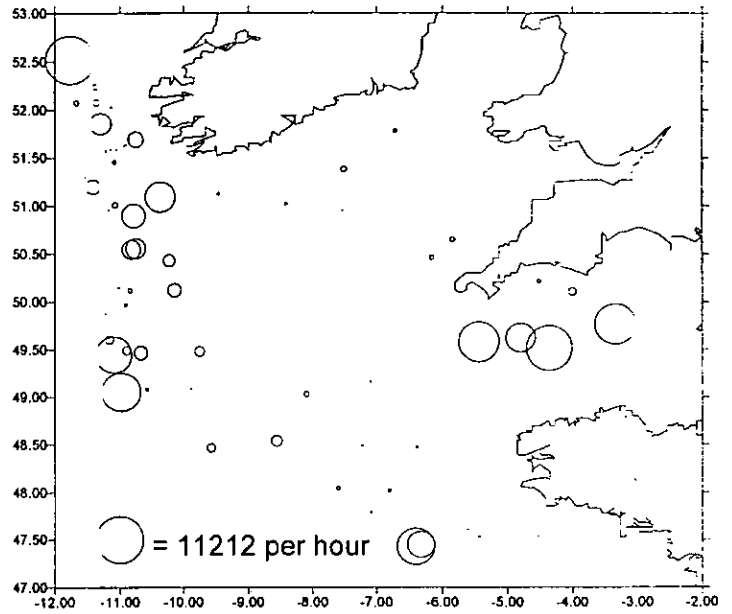
Cirolana 2/00: Hake >= 21 cm (No/h)



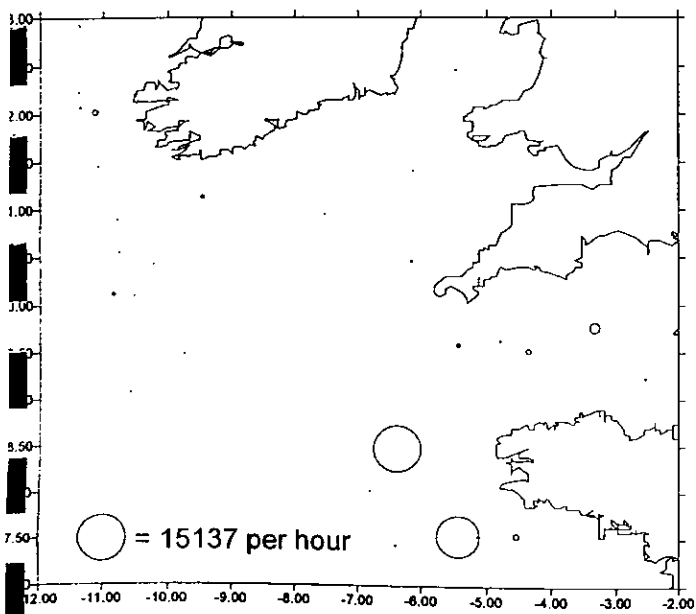
Cirolana 2/00: Mackerel < 24 cm (No/h)



Cirolana 2/00: Mackerel >= 24 cm (No/h)



Cirolana 2/00: horse mackerel <15 cm (No/h)



Cirolana 2/00: Horse mackerel >= 15 cm (No/h)

