

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

2007 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: SURVEY 2/07

STAFF:

I Holmes (SIC)
S Walmsley (2IC)
G Course
M Etherton
J Keable
B Mulligan
J Pettigrew

DURATION:

16 September – 6 October 2007

LOCATION:

Irish Sea (VIIa); Bristol Channel & Celtic Sea (VIIf&g)

AIMS:

1. To carry out a 4m beam-trawl survey of groundfish to i) obtain fisheries independent data on the distribution and abundance of commercial flatfish species, and ii) derive age compositions of sole and plaice for use in the assessment of stock size.
2. To collect biological data including maturity and weight at age of sole, plaice, lemon sole and other commercially important finfish species as part of CEFAS' requirements under the EU data regulations.
3. To determine the distribution and relative abundance of juvenile and adult sole and plaice.
4. To quantify epibenthos using 4m beam trawl by-catch.
5. To collect surface seawater samples for processing on return to Lowestoft for the analysis of caesium and tritium (AE001) (C Smedley EFS).
6. To collect fish samples in support of other CEFAS projects and training courses.

NARRATIVE: (All times GMT)

Cefas scientists arrived in Belfast at 2130h 15 September in order to join CORYSTES. On 15/16 September, all survey gear and associated equipment was loaded, assembled and tested prior to sailing. CORYSTES sailed from Belfast at 1237h on 16th September, but was forced to return to port due to a faulty autopilot system. CORYSTES re-berthed at 1342hrs. Once the faulty autopilot system had been fixed, CORYSTES sailed again at 1620hrs the same day.

Fishing commenced in the St Georges Channel (SGC) at prime stn 229 at 0654h. However this tow was considered as invalid. Major problems with the winch hydraulics meant that hauling took many hours. The vessel's engineering staff attempted to resolve this problem without success, so as nothing could be done onboard to increase the power to the winches the decision to return to Belfast was taken.

CORYSTES docked in Belfast at 0732h on 18 September and load testing on the winches began shortly after. It was discovered that each winch only had pulling power of 4.4 tonnes with the winch drum $\frac{3}{4}$ full of warp. The normally expected power was 5.1 tonnes with the drum $\frac{1}{2}$ full and 3.3 tonnes with a full drum. Various options for increasing this were explored but most would have had some impact on way the gear fished so these were disregarded. The decision was taken to reduce the amount of warp on the winch being used from 1200m to 500m (<1/2 full), as this would increase the pulling power of the winch without altering the way the gear fished. The result of this was an increase in the pulling power to 5.2 tonnes. This was considered adequate for this survey.

CORYSTES sailed from Belfast at 1855h and carried out a successful shooting/hauling test operation before heading to the first fishing station in Irish Sea North (ISN) in order to begin fishing the following morning. However, overnight changes in the weather meant that fishing these stations was impossible. CORYSTES returned to the Irish coast to begin fishing in Irish Sea West (ISW). Fishing commenced here at 0810h and continued until the first station in the Irish Sea South (ISS) sector on 'softer' ground. The winch struggled to get the beam to the surface as the cod-end contained over 5 tonnes of sand and broken shell. It was only due to the skill and determination of the fishing skipper and the deck crew that this haul was successfully recovered intact. This highlighted some serious safety issues, and after some discussion and further inspection of the gear, it transpired that the cod end liner had 30% more meshes around the circumference of the net than specified in the gear specification. This was the probable cause of the large haul as the number of meshes in the liner would have prevented sand and shell particles to pass through the net and this quickly built-up to the weight eventually hauled. After consultation with Cefas shore staff it was agreed to change the liner to the agreed specification.

Fishing continued in ISS on 20 September with the replacement liner being fitted to the net after the third haul of the day. Fine weather ensured that CORYSTES was able to complete the ISS and ISN surveys grids over the next 4 working days completing them at 1757h on 23 September. Two stations in ISN (prime stations 10 and 19) were fished for only 20 minutes as a precaution. These tows were over muddy ground and concerns regarding catching and landing large hauls remained.

On 24 September, CORYSTES began fishing the inshore stations off the Irish coast, heading southwards en-route to the Bristol Channel Inner (BCI) survey grid. Seven stations were successfully fished on 24th (5 in ISW and 2 in SGC) including the prime station off Dublin that produced the large catch on the first tow of the survey (station 229). It was agreed that as a precaution, this station would only be fished for 20 minutes but when the gear was hauled, the catch was much reduced and was clean. Due to continuing strong westerly winds CORYSTES remained inshore on 25 September, fishing a further 3 SGC stations before heading into the Bristol Channel. One BCI tow was completed at the end of the day.

Excellent weather ensured that between 26 and 28 September, 29 further tows were successfully completed in BCI, before CORYSTES headed to Swansea to take on board fresh water. CORYSTES docked in Swansea at 1758h on 28 September.

CORYSTES left Swansea at 1800h on 29 September and headed directly to the last 2 BCI survey positions. Fishing recommenced at 0608h 30 September. The BCI survey grid was completed at 0816h on 30 September and 4 Bristol Channel Outer (BCO) stations were also successfully fished. Overnight, CORYSTES steamed back into the Irish Sea in order to fish the remaining offshore ISW and SGC survey stations. These were completed at 1701h 3 October. Once completed, CORYSTES returned to the BCO sector in order to fish the remaining fishing stations in that grid. However, with just one BCO station left un-fished, and with a long steam to reach it, the fishing survey grid was deemed completed at 1632h 4 October.

With the fishing survey grid completed, CORYSTES proceeded into the Bristol Channel in order to begin a collection of water samples for the analysis of tritium H3. This collection began at 2122h 4 October and continued through the night and was completed at 0731h 5 October. CEFAS scientists also began the process of cleaning up and packing away of equipment in readiness for docking in Swansea while this sample collection was taking place.

CORYSTES docked in Swansea at 1120h 5 October and unloading took place on the morning of 6 October. Cefas scientists departed CORYSTES and returned to Lowestoft on 6 October.

RESULTS:

Aims 1, 2 & 3

The survey gear was the standard 4m-beam trawl (number 3) with chain mat, flip-up ropes and the net was fitted with a 40mm cod-end liner. All fish and selected commercial shellfish were identified to species, weighed and measured (large catches of an individual species were sub-sampled beforehand).

Surface temperature and salinity readings were logged at every station using the AFBI Seabird continuous logging system. A SAIV Micro CTD unit was attached to the 4m-beam trawl in order to record the temperature and salinity depth profile at each fishing station fished. In addition (and for the first time on this survey) Niskin bottom water samples were taken along with a CTD profile at the first and last fishing station on each working day.

All catch details and sample data was entered directly into the Electronic Data Capture (EDC) system and uploaded directly into the Fishing Survey System (FSS). Station details were manually entered into the FSS using information provided by the officer of the watch. The total number of otoliths/scales taken in each ICES Division is shown in Table 1 below. Table 2 shows the top 10 species by both weight caught (Kilograms) and numbers of individual caught.

Table 1. Numbers of fish otolithed by ICES division

	VIIa	VIIb	VIIg	Total
Anglerfish (<i>L.piscatorius</i>)	15	14	5	34
Anglerfish (<i>L.budegassa</i>)	0	0	0	0
Bass	0	11	0	11
Brill	27	22	2	51
Cod	26	25	0	51
Dab	234	226	8	468
Haddock	25	27	22	74
Hake	9	5	8	22
Lemon sole	66	87	8	161
Megrim	0	14	4	18
Plaice	1283	286	18	1587
Sole	388	352	38	778
Turbot	6	16	3	25
Whiting	151	37	21	209
Total	2230	1122	137	3489

Table 2: Summary of the main species caught over the entire survey

Weight caught (Kilos)			Total number caught		
Species	2007	2006	Species	2007	2006
Plaice	704	629	Dab	9782	11523
LSD	630	603	Plaice	7549	6639
Dab	471	536	Solenette	7179	5642
Sole	187	172	Poor Cod	6679	8105
Poor Cod	138	103	Dragonet	3014	2333
Dragonet	130	98	Grey Gurnard	1956	1297
Thornback Ray	129	134	Scaldfish	1866	1996
Solenette	86	77	Whiting	1854	2530
Whiting	68	58	LSD	1481	1320
Starry Smooth hound	65	14	Sole	1321	1240
TOTAL (All species)	3316	3043	TOTAL (All species)	50823	48792

The trawl survey covering the Irish Sea and Bristol Channel is divided up into six sectors consisting of 108 beam trawl tows, of which 107 were successfully fished (Figure 1), including all 65 ISN, ISS and BCI stations used for tuning data in the Northern and Southern Shelf assessment Working Groups. A total of 8 Prime stations – numbers 27 (Morecambe Bay), 40 (Red Wharf Bay), 313 (Tremadoc Bay), 203 (Dundrum Bay), 214 and 220 (north of Dublin), 233 (south of Wicklow), 501 (southwest of Milford Haven) were reduced from the standard 30-minutes to 15-minute tows because of expected large catches of weed, shell/small flatfish. In addition, 3 prime stations were reduced to 20-minute tows as a precautionary measure to avoid the problems encountered at the beginning of the survey.

A few other stations were moved short distances to avoid snagging undersea cables (an increasing problem in this busy sea area) or avoid static gear. Table 3 shows the number of gear deployments undertaken on the survey.

Table 3: Summary of gear deployments

Gear	Valid	Additional	Replicate	Invalid	Total
Standard 4m Beam trawl with cod end liner	107	N/A	N/A	1	108
Water sample for Caesium analysis	37	N/A	N/A	N/A	37
Surface salinity samples	108	N/A	N/A	N/A	108
Niskin sea-bed water samples	29	N/A	N/A	N/A	29

Abundances of pre-recruit and recruited plaice and sole in the Irish Sea and Bristol Channel are shown in Figures 2 and 3. Pre-recruit plaice were most abundant off the east coast of Ireland, in inshore waters off north Wales and northwest England. Pre-recruit sole were most abundant in the Bristol Channel and in inshore waters off north Wales and Liverpool Bay. Abundances of pre-recruit and recruited dab and lemon sole are shown in Figures 4 and 5.

Plaice: Numbers of plaice caught increased from the previous year's survey in all sectors except SGC and ISW where decreases were observed. In survey sectors ISN and BCO, the catch numbers and weights were the highest in the last seven years. However, in ISW, the catch numbers and weights were at the lowest observed level over the same time period (Figure 6). The largest increase was in survey sector ISN where increases of 61% (numbers of fish) and 30% (weight) compared to the previous year's survey were observed. This increase in catch numbers this year is mainly attributable to the large catches of small plaice in the depth-band 1 (0-20m) fishing positions.

Sole: Numbers of sole caught increased slightly in most survey sectors with the exception of sectors ISS and ISN where catches remained at the same level encountered last year. In most survey sectors, the current catch rates are at the lowest level in 7 years.

Dab: Moderate increases in catch rates of dab from the previous year's survey were observed in the survey sectors BCI, BCO and SGC. However, the northern most survey sectors (ISS, ISN and ISW) all showed small falls in the catch rates compared to the last year. Despite a fall this year, ISN catch rates remain close to the highest recorded level over the last seven years. However in both ISW and SGC, catch rates remain at survey 'lows' over the same time period – well below the high levels caught in 2003/4 (Figure 8). Recent trends in catch weights generally follow the same pattern as catch numbers.

Lemon sole: Catch rates of lemon sole remain low in all survey sectors, but this year saw moderate increases in BCI, BCO and (Figure 9).

Noteworthy changes to the catch rates of other main species were large increases in the numbers of lesser-spotted dogfish caught in BCI, BCO and SGC. Whiting catch rates shows large increases in BCI and BCO but in ISS and ISN large falls were observed. Other significant changes of note were smaller catches of all ray species, and heavier catches of haddock over the whole survey (catch weights almost doubled).

Aim 4 - Epibenthos

At 25 selected fishing stations, samples of the epi-benthic by-catches were sorted and 32 'core species' identified and quantified. A standard operating procedure (SOP) for the processing of this by-catch was provided. It was not possible to complete this additional work at one station due to all staff being fully employed in processing of the fish catch. At this station, a sample of the epi-benthic by-catch was labelled and frozen for subsequent analysis upon return to Lowestoft

At all fishing stations on the survey, catches of 9 sentinel taxa of benthic invertebrates were recorded. The total weight of the remaining by-catch of epi-benthic invertebrates was recorded on all except 6 stations where the by-catch was very heavy and had to be estimated. The weight of rocks caught in the trawl was also recorded at each station.

Aim 5 – Water sampling

1 litre surface seawater samples were collected from 37 stations in the Bristol Channel & Severn Estuary for Tritium H-3 analysis for Carol Smedley. (Cefas, Lowestoft).

Aim 6 - Additional sample collection

Additional samples were taken in support of other CEFAS projects:

A) No rare or unusual fish were caught on the survey, although a common triggerfish (*Balistes carolinensis*) was caught in the Irish Sea for the first time on this survey.

B) Samples of dab (*Limanda limanda*), lesser spotted dogfish (*Scyliorhinus canicula*), mixed ray (*Raja spp.*), lobster (*Homarus gammarus*) and edible crab (*Cancer pagurus*) were collected for the radiological monitoring programme from the northern part of the Irish Sea. No specimens of cuttlefish (*Sepia officinalis*) or spider crabs (*Maia squinado*) were caught in the required sea areas. P Rumney (CEFAS, Lowestoft).

C) No specimens of 'berried' edible crab were observed or collected. D Eaton (CEFAS, Lowestoft).

D) All monkfish (*Lophius piscatorius*) had illicia taken. S Warne (CEFAS, Lowestoft).

E) A total of 215 measurements of jellyfish caught were taken. These were identified to species and measured across the 'umbrella' disc. D Righton (CEFAS Lowestoft)

F) Three samples requiring confirmation of species identification at Lowestoft were frozen. J Ellis (CEFAS, Lowestoft)

H) Ninety specimens of sole (*Solea solea*) were individually bagged and frozen for the Marine Fisheries Agency (MFA).

I) Photographs were taken of 13 different species for the Cefas photo fish identification catalogue.

Micro CTD

The SAIV Micro CTD unit number 488 was attached to the 4m-beam trawl in order to record the temperature and salinity depth profile at each station fished and this was successful in recording data on all fishing days. A total of 108 successful CTD data collections out of a total of 108 valid fishing stations were made.

Niskin water sample collection

The starboard gantry was used in the collection of bottom water samples with a SAIV Micro CTD unit (number 596) and a niskin sampler attached to the warp. The sample was routinely taken at around 5m off the seabed. A total of 29 niskin bottom water samples and associated CTD data were collected.

Continuous CTD data collection

The on-board Seabird continuous monitoring system was used to collect surface temperature and salinity. This successfully collected data on all survey fishing and water collection days.

Cetacean Observations

A total of nine sightings of Cetaceans were recorded during the survey. Details of location, date/time and identification were noted on each occasion. Most sightings were of common dolphin (*Delphinus delphis*), with one sighting of bottlenose dolphin (*Tursiops truncatus*) and one probable sighting of a minke whale (*Balaenoptera acutorostrata*). Details were collected for the Sea Watch Foundation.

Fish ID quality control tests

During the survey, three fish identification tests were carried out. For each test, 15 species were randomly selected from the catch and all scientists on-board were asked to identify them (common name, Latin name and FSS code). Any wrongly identified species were discussed detailing specific identification aspects.

In addition to these standard tests, Grant Course participated in a sponsored 'blind-fold' fish ID test in aid of the RNLI. This exercise managed to raise a total of £145 for this worthy cause, having identified all species presented. Our thanks go to Grant for agreeing to do this and to all the sponsors for their contributions.

Finally, our thanks once again go to all the officers and crew of CORYSTES for their help, support and advice during this survey. It is largely due to their dedication and expertise that all of the survey aims were once again achieved. In addition, our thanks go also to the CEFAS staff from SIGS section for providing an excellent service in setting up the EDC and associated sample collection equipment prior to sailing.

I D Holmes
17 October 2007

INITIALLED: B Harley

SEEN IN DRAFT: Master: Capt S McBride
Senior Fishing Mate: A Lincoln

DISTRIBUTION:
Basic List +

I Holmes
S Walmsley
G Course
J Keable
M Etherton
B Mulligan
J Pettigrew

R S Millner
S Flatman
B Harley
R Briggs (AFBI NI, Belfast)
P Connolly (DOM, Dublin)
FCO (for Republic of Ireland)
Sea Fisheries Committees:
Cumbria
North Western and North Wales
South Wales
Devon
Cornwall

Figure 1 - Station Positions

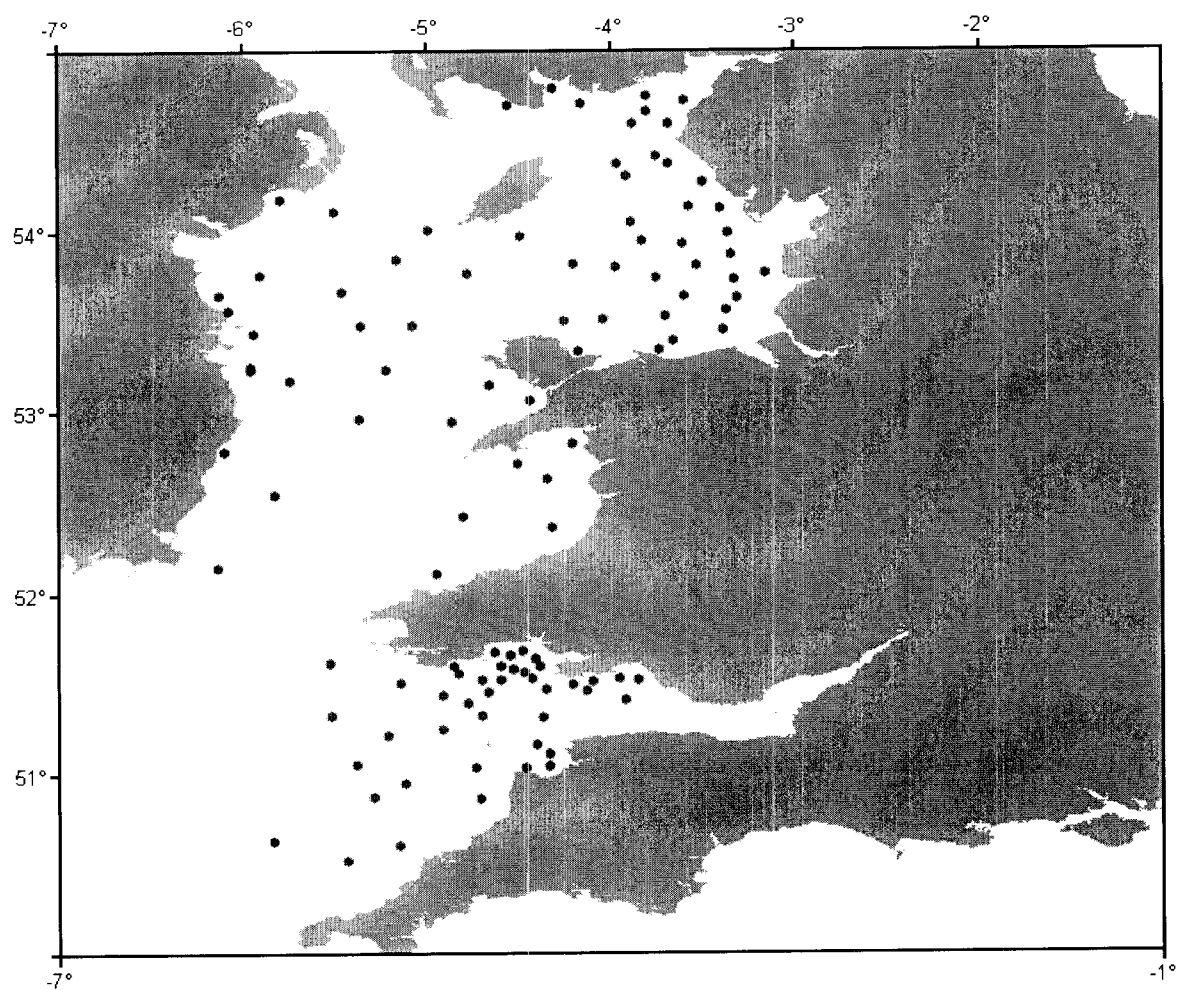
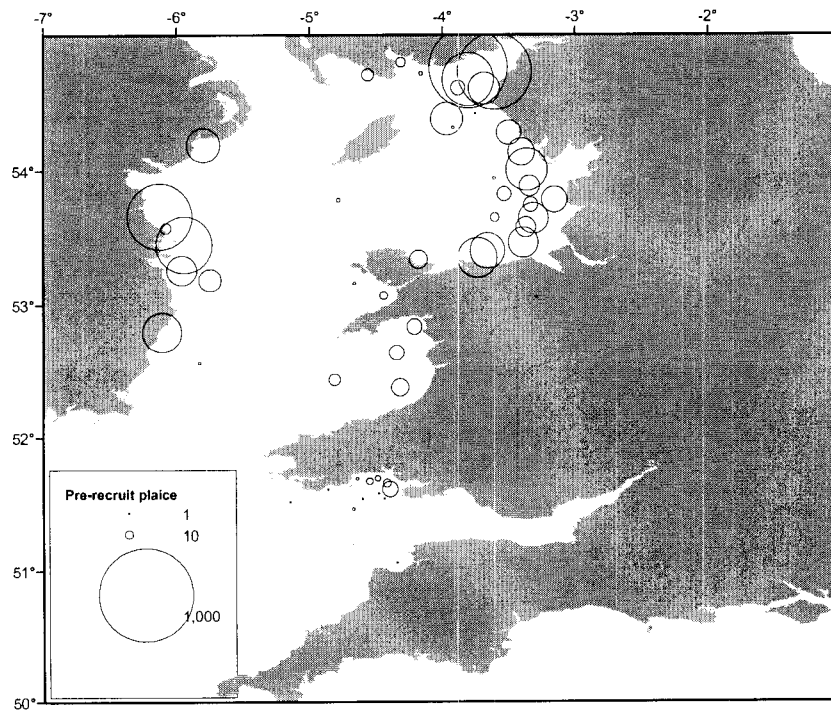


Figure 2 - Abundance of pre-recruit (a) (<21 cm TL) and recruited (b) (≥ 21 cm TL) plaice.
a)



b)

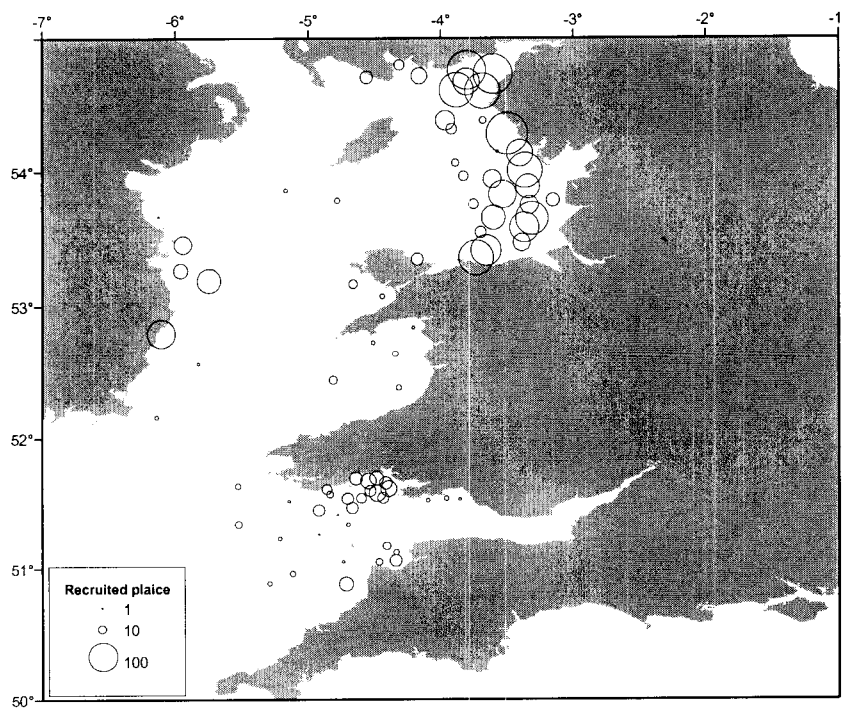
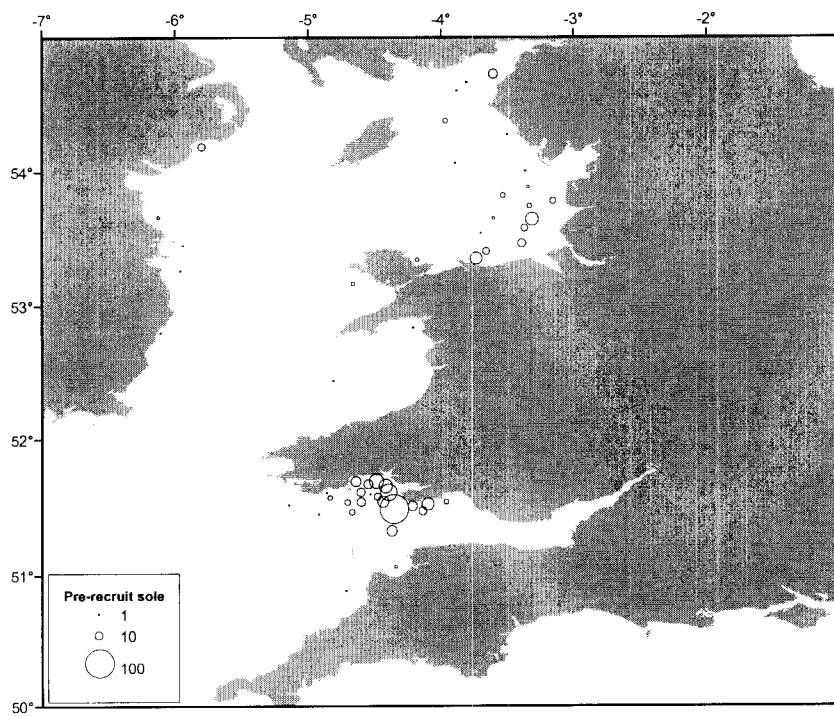


Figure 3 - Abundance of pre-recruit (a) (<21 cm TL) and recruited (b) (≥ 21 cm TL) sole.

a)



b)

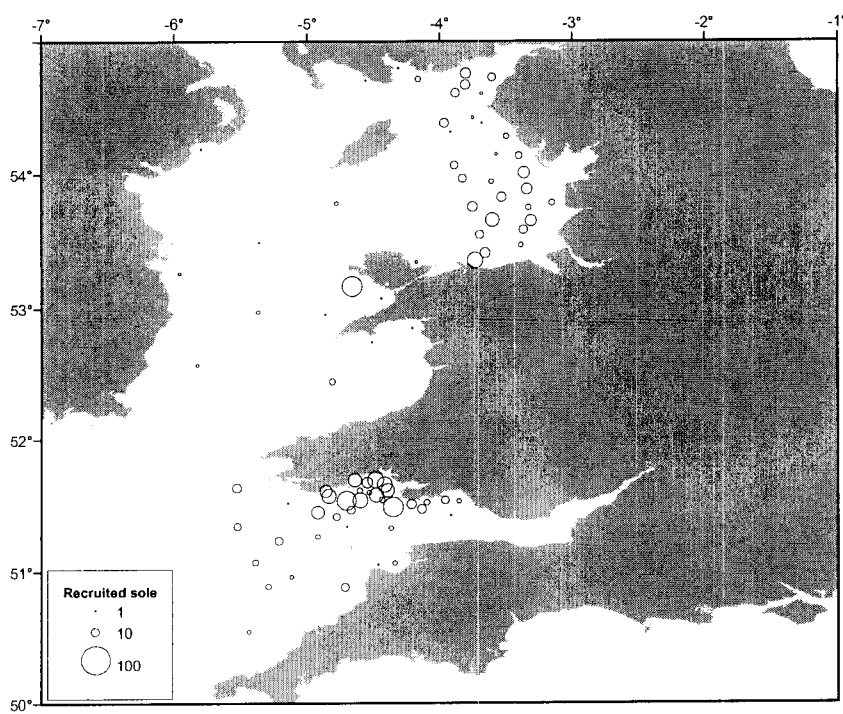
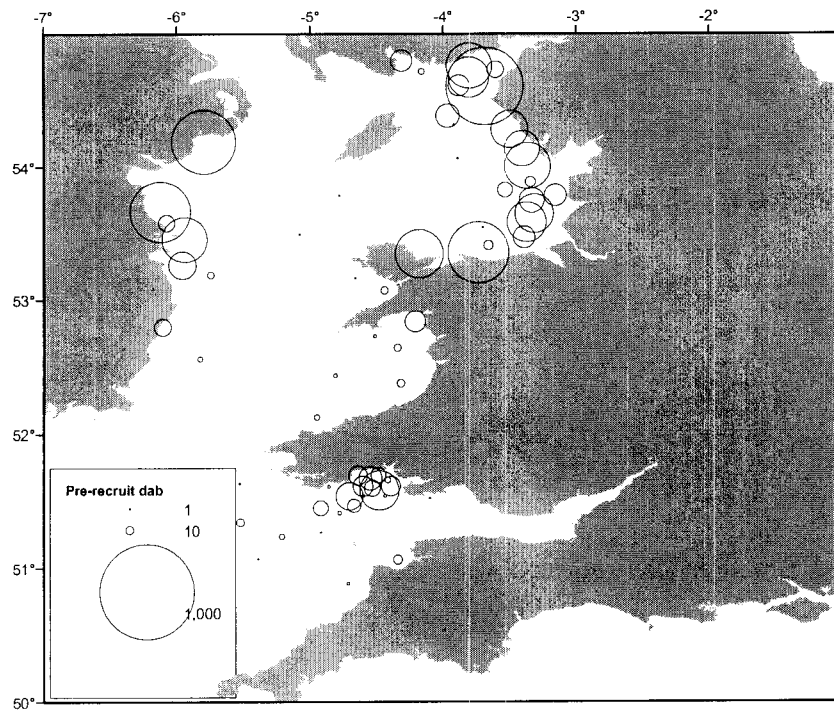


Figure 4 - Abundance of pre-recruit (a) (<16 cm TL) and recruited (b)(≥6 cm TL) dab.

a)



b)

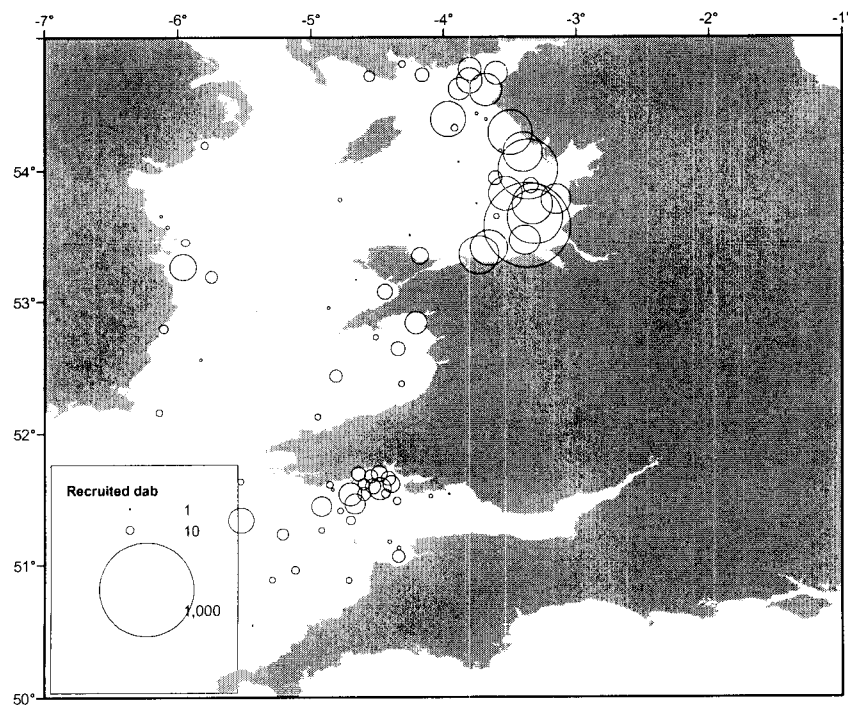
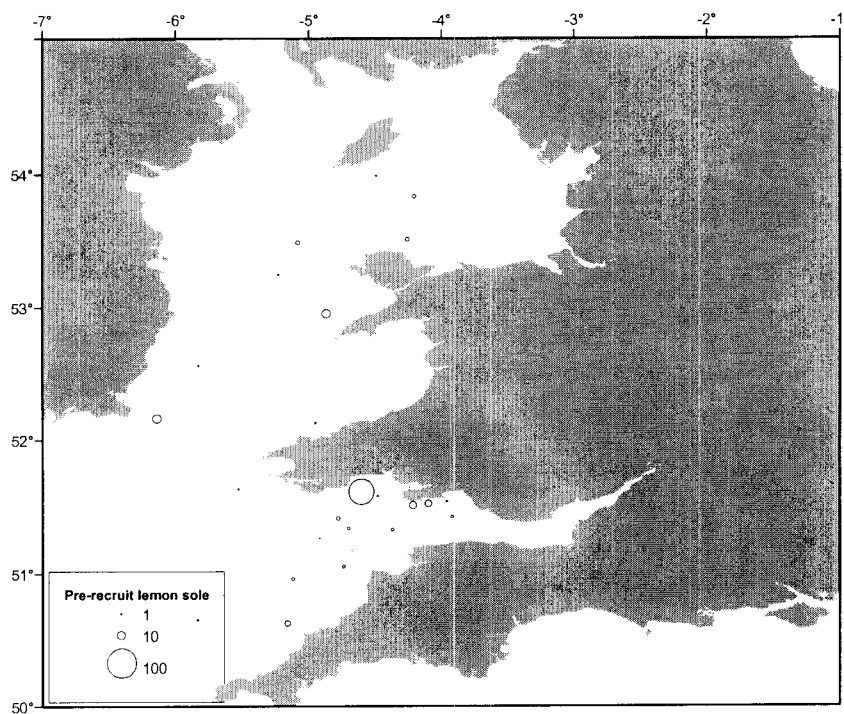


Figure 5 - Abundance of pre-recruit (a) <19 cm TL) and recruited (b)(≥ 9 cm TL) lemon sole.

a)



b)

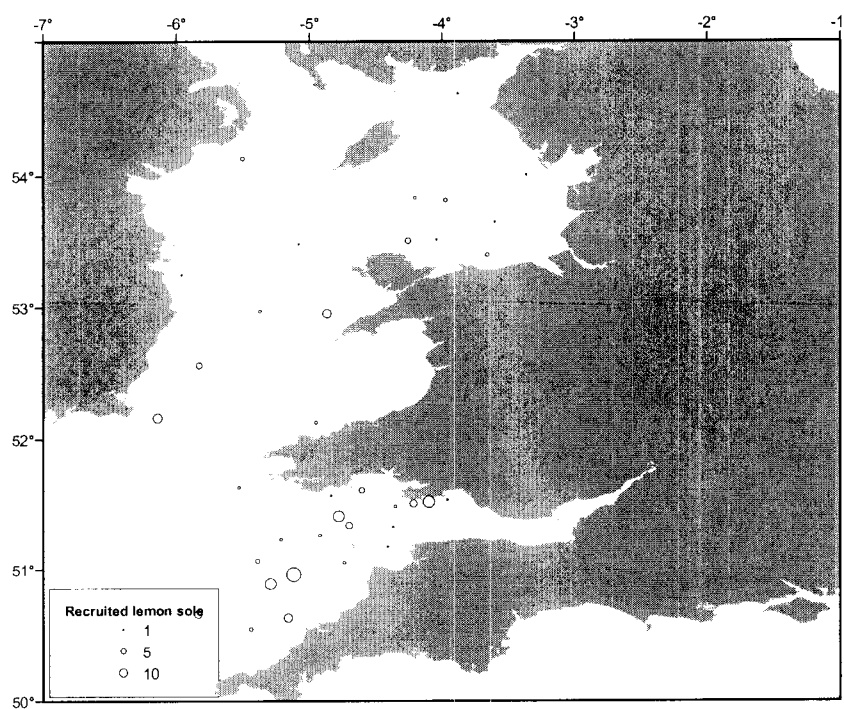


Figure 6 - Corystes 2/07 mean number and weight of plaice caught per 30-minute tow by survey area

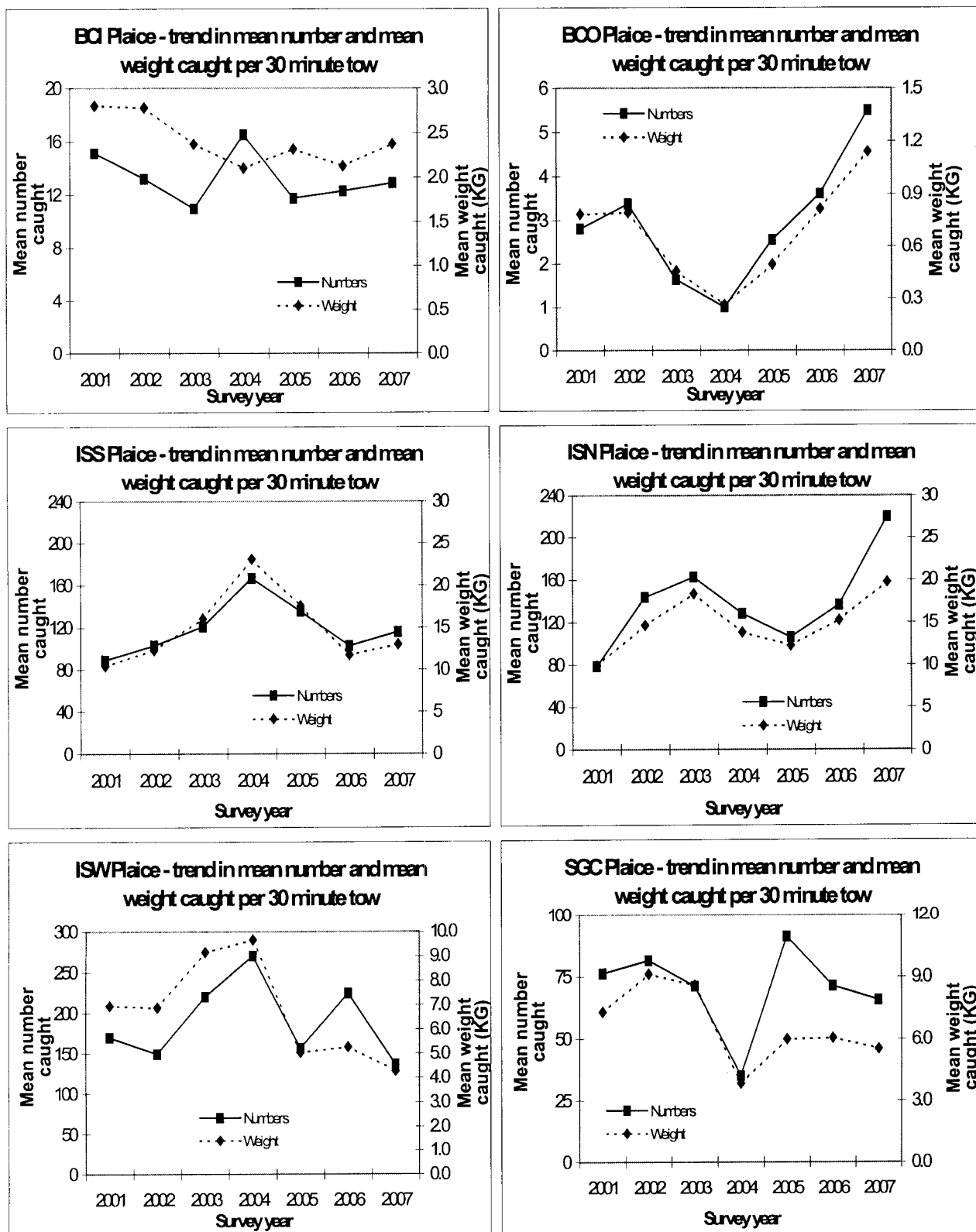


Figure 7 - *Corystes* 2/07 - mean number and weight of sole caught per 30-minute tow by survey area

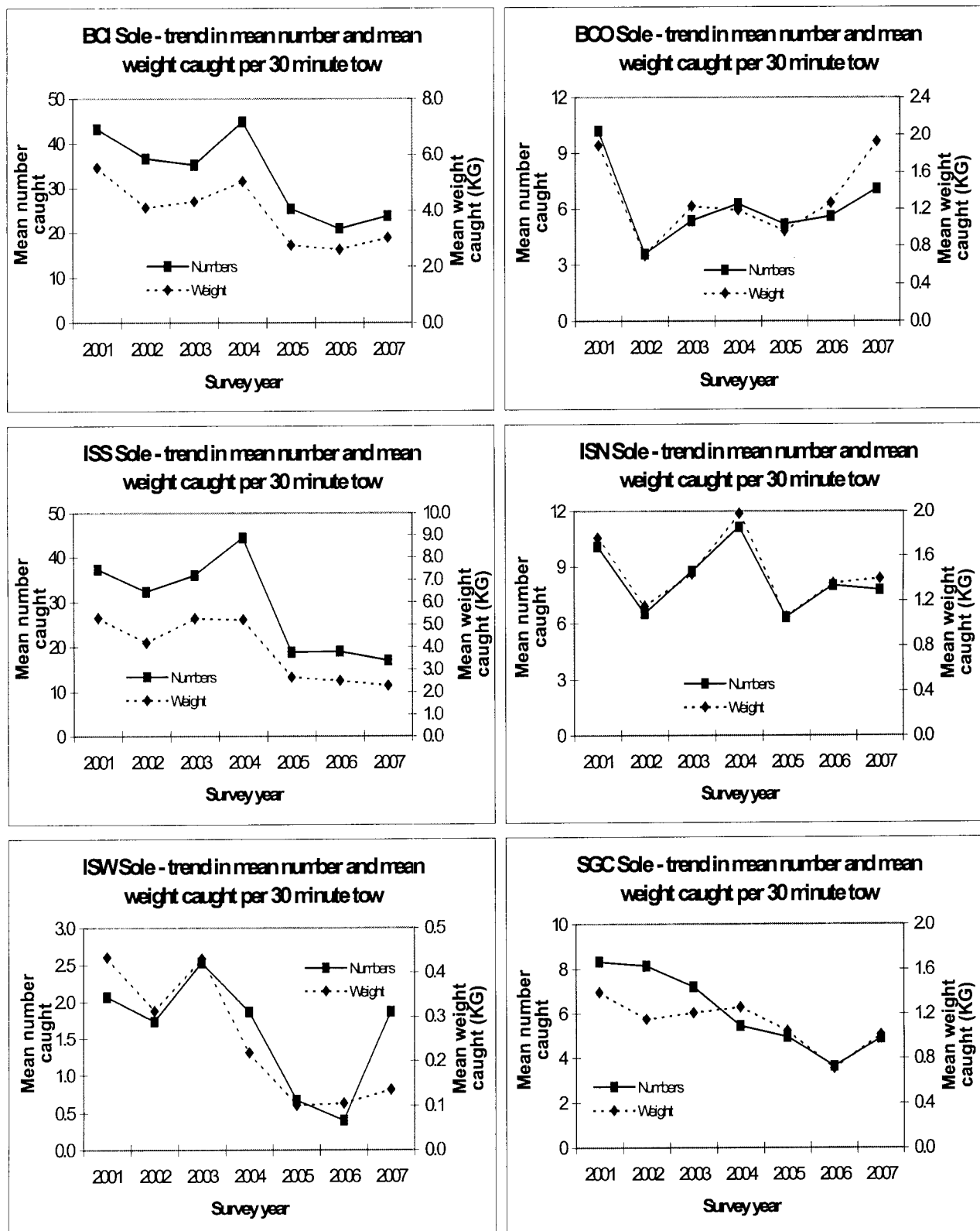


Figure 8 - Corystes 2/07 - mean number and weight of dab caught per 30-minute tow by survey area

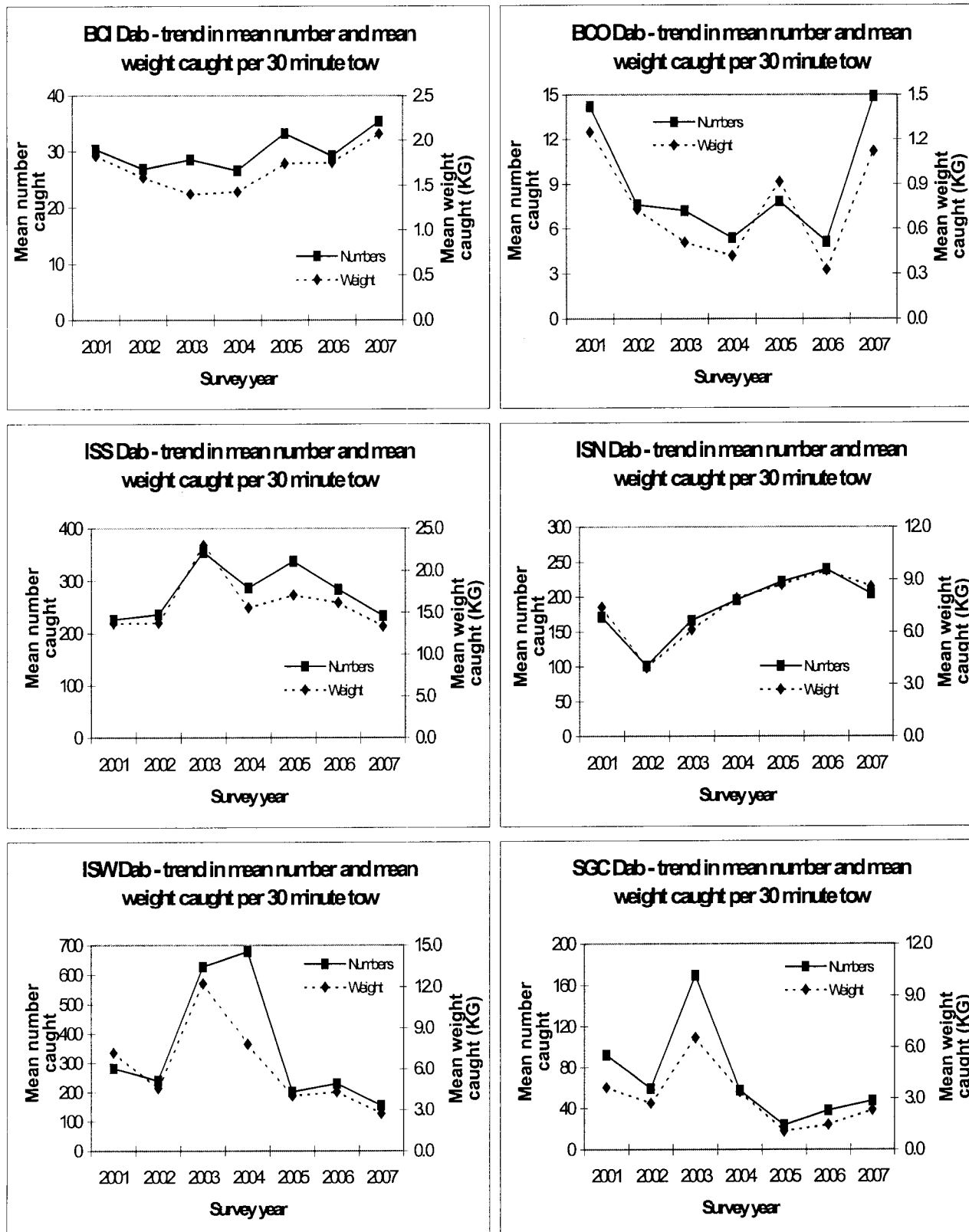


Figure 9 - *Corystes* 2/07 - mean number and weight of lemon sole caught per 30-minute tow by survey area

