ICES Area VIIf Selectivity Trials
Single Boat Demersal Trawl

MFV Our Ocean Harvester
(PZ403)

Seafish Report No. 406

April 1992

SEA FISH INDUSTRY AUTHORITY

Seafish Technology

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SUMMARY

These trials took place in April 1992 in ICES Area VIIf to investigate the use of a square mesh panel to reduce discards of round fish in what is described as a multi-species fishery. It was reported in early Spring that considerable catches of small haddock and whiting could be found on certain grounds to the north and west of Trevose Head.

The *Our Ocean Harvester (PZ403)* is a 16.4m 330h.p. trawler built in France and normally works four day voyages. The trials commenced on 1st April 1992 from Padstow and finished on 9th April. During this period in excess of 30 hauls were accomplished.

To effect a comparison the alternate tow method was used by which tows over similar ground using the square mesh panel trawl were compared with the same trawl and conventional diamond mesh codends. The square mesh was 80mm and the diamond mesh 90mm. The target species were whiting, pouting, cod, haddock and hake. To make the trials as near to commercial practice as possible the *Our Ocean Harvester's* own trawl was used - a two panel design by Rod Barr of Coastal Fishing Supplies, Bridport. This was fitted with a French fork rig bridle arrangement and bottom chafers on the codend.

During the trials only whiting and pouting were encountered in sufficient quantities to justify subsequent statistical analysis. The square mesh panel indicated for these species that there were some benefits of increased catches of marketable fish and fewer discards but the results are not statistically significant. For the other round fish species there were insufficient quantities on the grounds to make any valid observations.

Of concern, although not part of the trials programme, was the high level of juvenile flatfish - dabs, lemon soles, flounders and plaice - which were discarded. This is apparently normal at this time of the year in Area VIIf and needs further investigation to see if some reductions can be made.

These trials have demonstrated the extreme difficulty of obtaining a statistically acceptable result by the alternate tow method and because of the high number of variables and the distortions introduced by any sampling method it is necessary to re-consider the approach to selectivity in multi speices fisheries. There are benefits of the square mesh in reducing discards of round fish but the problem would appear to be much more complex and with constantly changing variables.

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1. INTRODUCTION

Following the first stage trials of the ICES Area VII selectivity programme using a Looe based demersal pair trawling team (Seafish Internal Report No. 1419 and Seafish Report No. 401 refers), the intention was to conduct trials using a single boat demersal trawling operation from the Devon port of Brixham (representing ICES Area VIIe).

Unfortunately the proposed timing of the exercise coincided with poor fishing and an unsuitable species mix in the area under consideration.

It was decided to proceed to Stage III of the initial programme which was to examine a mixed species fishery in Area VIIf.

It was reported that during early Spring, certain grounds off the North Cornish coast in the area of Trevose Head produced considerable catches of whiting and haddock. These catches often consisted of high proportions of juvenile fish.

It was to this fishery that Seafish turned their attention. Using a square mesh 'window' configuration in a conventional trawl design, it was hoped that the numbers of juvenile whiting and haddock discards encountered in this fishery could be significantly reduced.

The vessel selected for the exercise was the Newlyn based ex-French trawler OUR OCEAN HARVESTER (PZ403).

Skippered by Mervyn Mountjoy and operated by a crew of four the vessel successfully fishes most of the inshore grounds in Area VIIf.

Skipper Mountjoy is an active and respected member of the southwest fishing community and was recommended for this work by NFFO southwest representatives.

2. VESSEL DETAILS

Vessel: MFV OUR OCEAN HARVESTER (PZ403)
Skipper/Owner: Mervyn Mountjoy
Port of Operation: Newlyn
Registered Length: 16.4m
Engine Make: Poyaud (French)
Engine Horsepower: 330
Gearbox Reduction Ratio: 5:1

MFV Our Ocean Harvester

The vessel operates as a stern trawler normally working 4 day trips.

3. TRIALS PROGRAMME

The aim of the exercise was to conduct comparative fishing trials using an alternate tow procedure to evaluate the use of an 80mm square mesh selector panel in a mixed species fishery.

The grounds targeted for the exercise were off the North Cornwall coast in the area of Trevose Head.

These grounds regularly produce consistent catches of whiting and haddock during the early Spring.

The catches are fairly typical of Area VIIe and f sectors in that they consist of a mixed variety of species. The problem only arises in the early Spring when large concentrations of juvenile whiting appear on the grounds resulting in considerable amounts of discards.

Fishing trials were arranged around two, four day trips commencing on Wednesday 1st April 1992. The trials vessel operated from Padstow for the duration of the exercise in order to be close to hand for the Trevose Head grounds.

The proposal was to conduct the fishing trials as a commercial operation with fishing to continue throughout the 24 hour period.

Using the alternate tow procedure this meant that the sequence and timing of the hauls incorporating the square mesh panel had to be varied to take into account any variations in catch rates attributable to various times of the day, i.e. daylight and darkness. On some days this meant a straight alteration haul by haul; on others the sequence was adjusted.

Towing times were kept at a constant length whenever possible. Four hour tows were the norm on most fishing days. However, on some occasions the tow was interrupted when the gear 'came fast' on the seabed. In these situations the gear would be hauled back for checking before shooting back and continuing the tow.

The aim was to concentrate effort on as small an area of ground as was possible in order that tows could be more comparable. Unfortunately, particularly during the first half of the trials, this was not possible as the vessel had to keep changing areas in order to locate sufficient quantities of the desired species mix; an almost inevitable problem in this type of exercise.

The result of these problems was that it was difficult to obtain matched tows, i.e. to obtain catch results from consecutive tows where the results could be compared with a high degree of confidence that similar populations had been sampled equally between each gear configuration.

Poor weather conditions throughout most of the trip also added to the difficulties.

The main species of interest from this trial were:-

Haddock
Whiting
Cod
Hake
Pouting

The catches from each haul were quantified as a bulk catch (by basket) and then the catch was broken down by species and each species quantified by basket and each individual fish of the main target species was measured to provide length/frequency data.

In addition, all discards including flatfish species, were quantified by number in most cases and by basket on the occasions when greater quantities were present.

It was the intention to back-up the statistical catch analysis with some visual observations from the self-contained underwater video camera placed in the extension of the net. However, only very limited film was obtained due to a technical problem with the camera and the fact that on most occasions the vessel was operating in depths beyond the scope of the camera unit.

4. FISHING GEAR

The vessel is currently working two different net designs. One net supplied by the former Net Tec Marine company of Padstow is a "Pioneer" four panel high lift net designed by Winston Phillips. The other net is of a two panel design by Rod Barr of Coastal Fishing Supplies of Bridport.

4.1 The Pioneer Trawl

The "Pioneer" trawl had a headline length of 17.75m rigged on 16mm ∅ combination wire. The fishing line also rigged on 16mm ∅ combination wire was 25.06m. The ground gear consisted of 12in rubber "rockhoppers" throughout.

The four panel design gave a fishing circle of 330 x 150mm in 3mm PE twine. In conjunction with the fork rig this four panel design rigged with 20-22 x 8in plastic floats provided a headline height at centre of approximately 15ft.

4.2 The Granville Trawl

The "Granville" trawl supplied by Rod Barr of Coastal Fishing Supplies was the net selected for the duration of the trials.

This two seam net had a fishing circle of 440 x 4½in 2.5mm twine (top) and 3.5mm twine (bottom).

As with the "Pioneer" trawl, the headline and fishing lines of the "Granville" net were rigged on 16mm combination. The headline length was 22.86m and fishing line 21.3m.

The ground gear consisted of a rockhopper rig with 10in and 12in discs with 4½in spacers. The floatation on this net was 20 x 8in plastic floats.

Trawl doors used with this gear were Net Tec cambered steel doors, size No. 10 heavy (5ft 6in long).

Both net types are designed to be operated using the French style "fork rig".

4.3 The French Fork Rig

Skipper Mountjoy has spent considerable time perfecting the use of this method based on information gathered from French fishing counterparts.

The fork rig configuration consists of the upper bridle being carried forward to a position on the main warp ahead of the door. In this position it allows for a greater headline height at the net and also produces a beneficial effect when towing on hard ground. By having the upper bridle well clear of the seabed it reduces wear and limits top wing damage on some of the grounds where this type of gear damage is common-place. Further details of the fork rig are given in Figure 1.

The fork rig arrangement consisted of an upper bridle section split into two lengths C and D (see Figure 1). Length D was made up of 180ft of combination wire. This corresponded with a similar length section D in the lower bridle arrangement but which consisted of two parts, 60ft of 13mm chain connected to the net via the adjuster chain E and 120ft of 20mm wire connected at the door backstrop end.

The length B shown on the diagram represents the length between the apex on the door towing chain and the 'G' link connector on the backstrop.

On the upper bridle arrangement the 180ft of combination was connected to the length C which represents a length of 16mm wire which effectively joins at a point 37.5ft up the warp. The length C is equivalent to lengths A + B.

The length of the lower fork A is determined from the headline height of the net. Using a coefficient of between 2.2 and 2.8 x height of the net at the headline centre, the net can be rigged to give either good ground contact (coefficient 2.2) or maximum lift (coefficient 2.8).

The critical lengths in this rig are those of the wingend adjuster chains E. These are determined by applying another coefficient to length A.

$$Length\ E = A \times 0.13 \rightarrow 0.15$$

The longer the adjuster chain is then the better the ground contact achieved and vice versa. This adjustment can only be made within a small range and must be determined by trial and error for each individual gear arrangement.

For the gear under consideration an adjuster chain length E of 5ft was used. This was used in conjunction with a warp:depth ratio of 3:1.

As can be seen from the diagram the warp:depth ratio is a major influential factor on the geometry of the gear when using this configuration. Since the angle of the warp (determined by the warp:depth ratio) influences the tensions in the upper bridle attached to the headline of the net it also influences the headline height.

4.4 Square Mesh Panel Arrangement

Since the alternate tow procedure was to be used for this exercise it was initially decided to use two identical codends which could be alternated to compare a standard net configuration with that of the net fitted with an 80mm square mesh panel. These codends are described in Figure 2.

The codends were supplied "clean", i.e. with no attachments, no lifting bags or chafers. In this way the influence of any such devices on the selectivity of the codends could be eliminated.

Since the net used during the selectivity exercise did not have any parallel extension section, the square mesh panel or window was attached directly to the last tapered panel section of the trawl, i.e. between the tapered net and the codend itself.

This arrangement meant that when using codends supplied by Seafish, the aft edge of the panel was in a position approximately 2.4m from the codend lifting becket.

In order to make both sets of codends used in the alternate tow procedure identical in all other aspects, a corresponding length of diamond mesh extension had to be added to the standard net configuration (see Figure 2).

During the first part of the trials, the consensus of opinion of the skipper and crew was that greater quantities of small fish would have been expected on some of the grounds that were initially fished. It was suggested that the "clean" codends were not producing truly representative catches compared to the more normally rigged codends.

It was common practice on the grounds being fished to use heavy chafing strips on the underside of the codends to protect them from seabed damage. It is reasonable to assume that the additional weight and corresponding drag of the extra heavy netting causes a more pronounced closing of the meshes thus reducing the release area for small fish.

Bearing these points in mind, a decision was made to continue the exercise using the vessel's own codends as being more representative of the fishery. Details of the vessel's codends are given in Figure 3 and shown in photographs in Appendix II.

A square mesh panel was inserted between the codend and last tapered section and alternated with the same codend with the panel replaced by a corresponding length of diamond mesh netting.

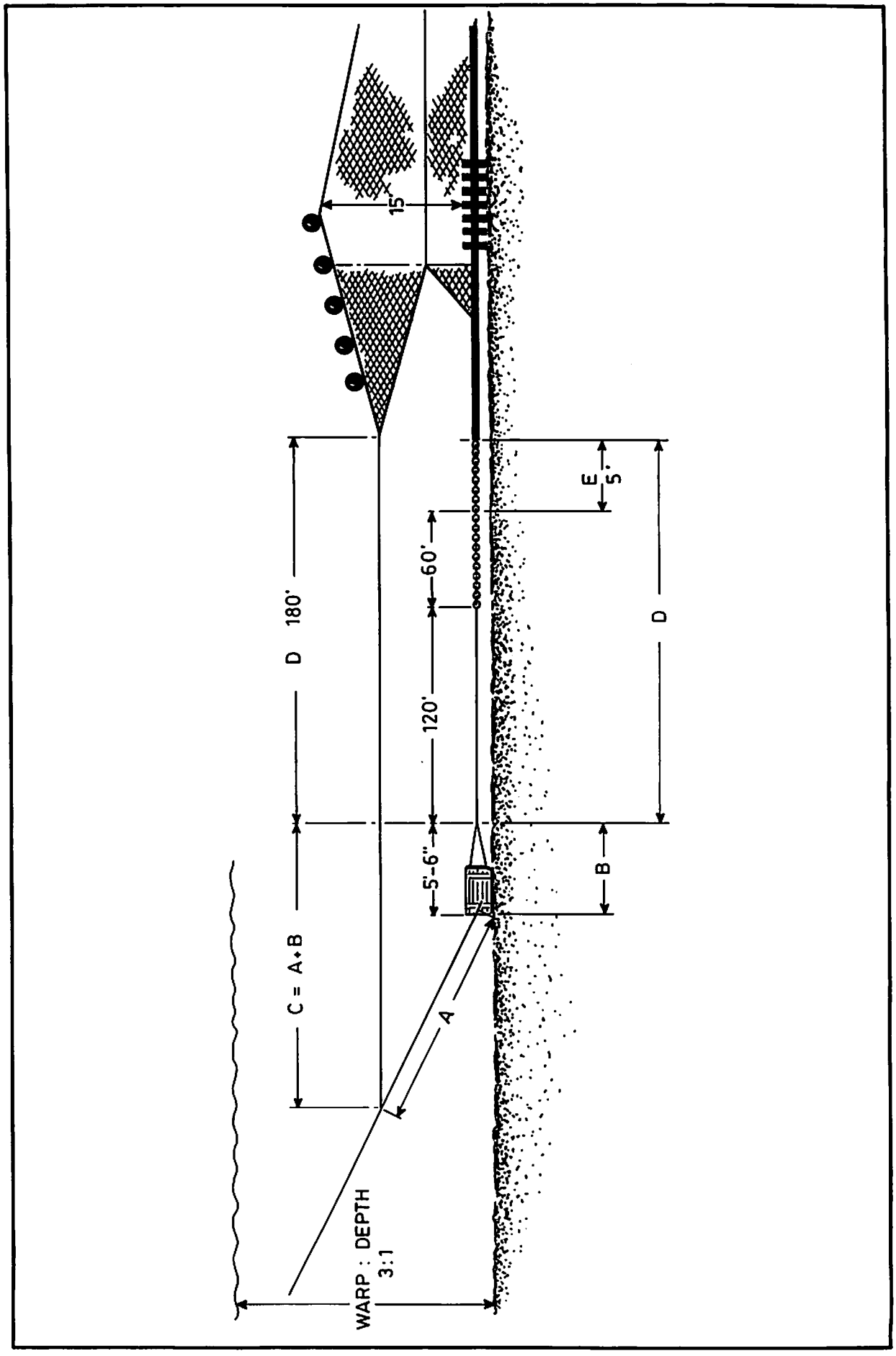
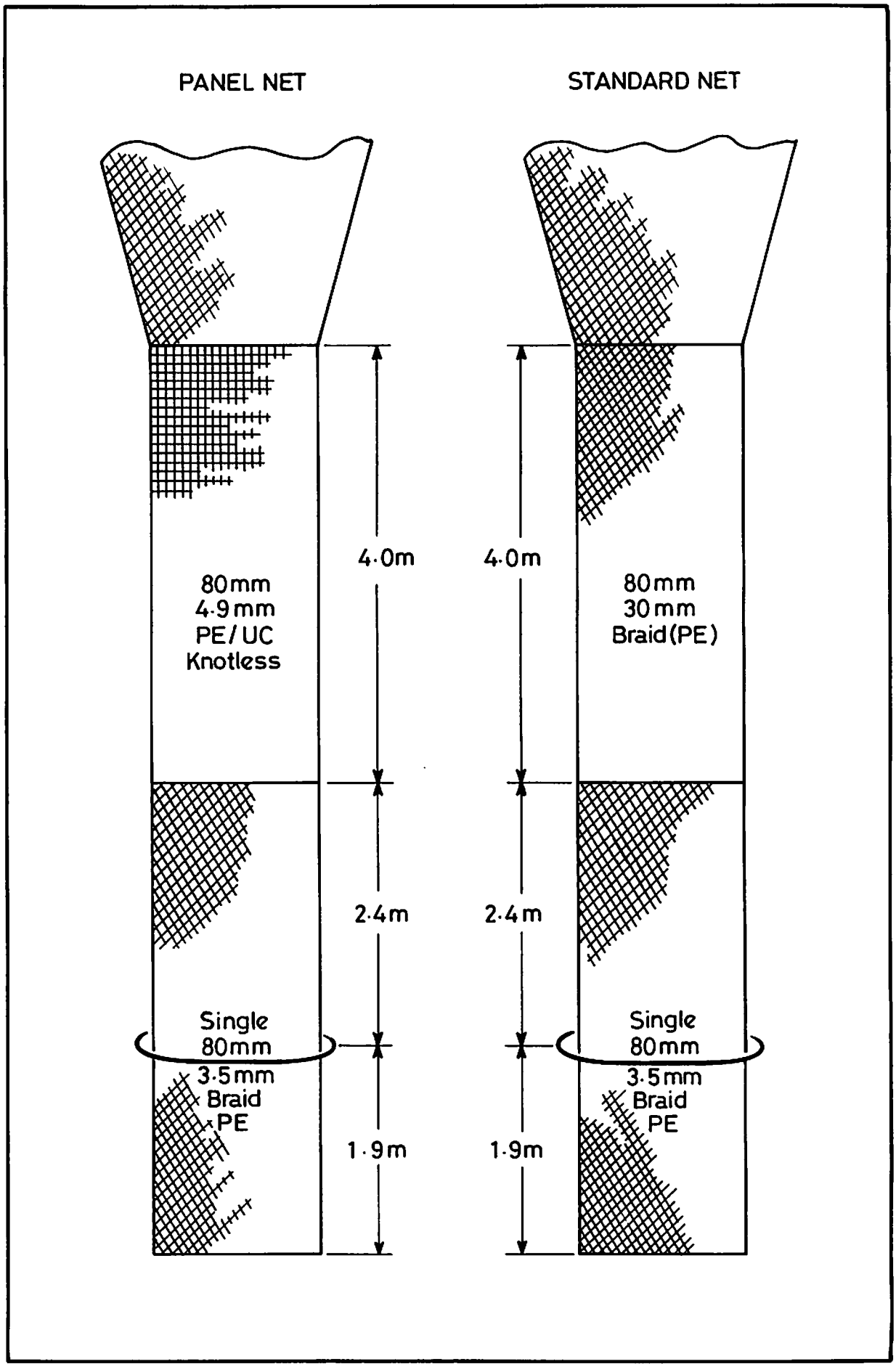
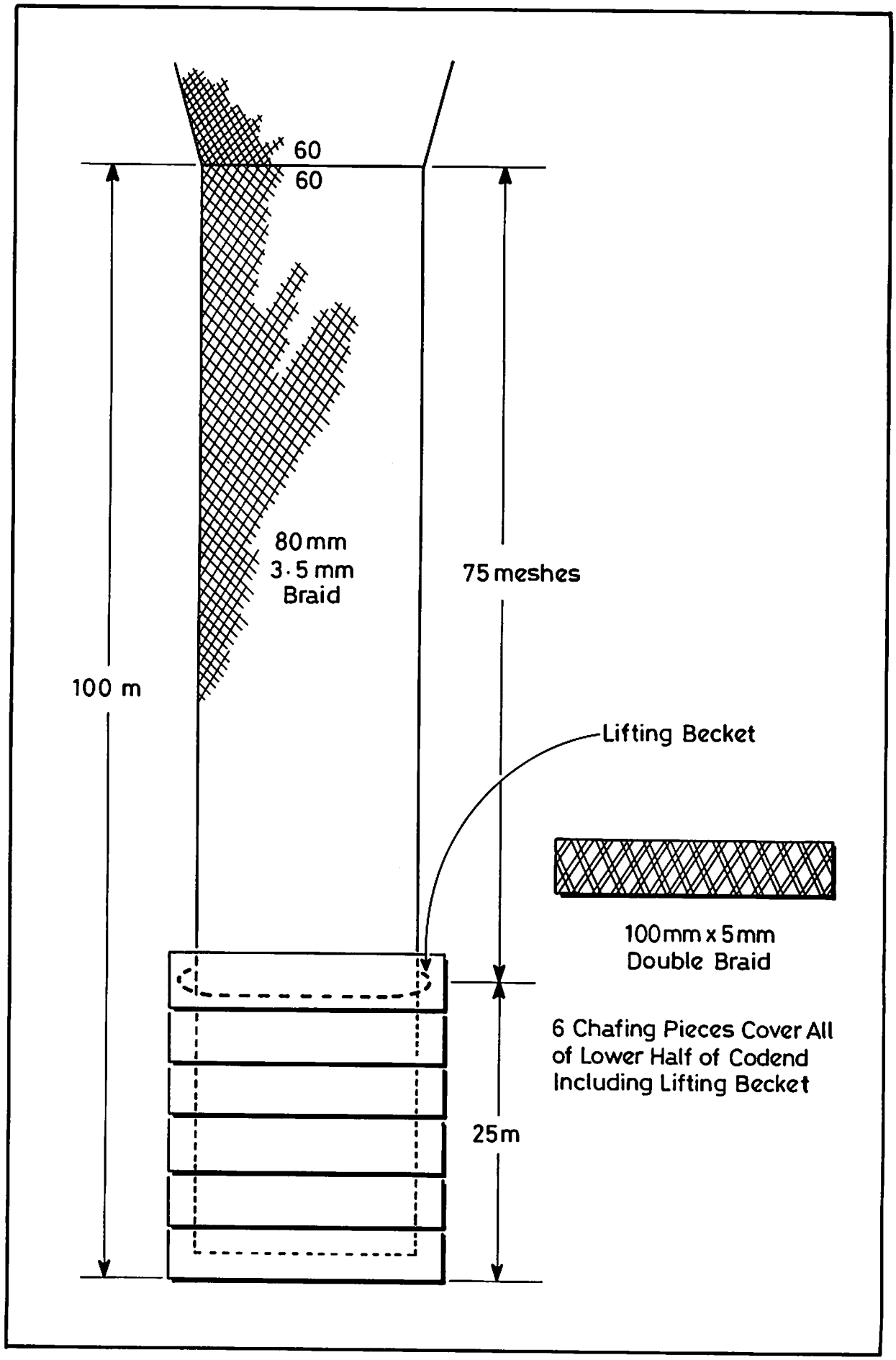


Diagram Showing French Style 'Fork-Rig Arrangement Fig.1



Panel Details Ref: 'Our Ocean Harvester' Selectivity Trials - Newlyn/Padstow. Fig.2



'Our Ocean Harvester' Standard Rigged Codend with 'Chafers' Fig.3

5. TRIALS NARRATIVE

Day 1 - 1st April 1992

The trials commenced on Wednesday 1st April 1992 with the vessel leaving Padstow at 0500. Fishing commenced on the Trevose Head grounds approximately 10 miles North of Padstow.

Using the two panel trawl supplied by Coastal Fishing Supplies, the square mesh panel was fitted for the first tow (shot 0715).

After towing for 2¾ hours the first haul produced a bulk of approximately 4 baskets consisting mostly of juvenile flatfish. On further analysis of the catch it was revealed that over half the bulk (2½ baskets) were undersize dabs.

Very few whiting, haddock, pout or cod were present in the catch make-up. The codend meshes were virtually obscured by flatfish "stickers".

The panel was changed to the standard codend for the second tow. Again towing time was 2¾ hours over the same ground. The bulk catch from this haul was 3 baskets with 1 basket of juvenile dabs, slightly more roundfish were present, mainly pout and gurnard.

For the third tow the standard codend was used again but the vessel had changed grounds moving a few miles to the north in an attempt to locate more fish.

The change of ground proved unsuccessful as the third tow produced only 2 baskets of bulk of which half was again small dabs which were discarded.

It was decided to move grounds in an attempt to improve catch rates. The same codend configuration was shot again and towing time was increased to 4 hours. This tow covered 3 hours of daylight and 1 hour of darkness.

Catch rates improved to 8 baskets of bulk of which 1½ consisted of juvenile flats, 2 of pouting and a number of large cod, some whiting, hake, gurnard and mixed rays made up the rest of the catch. This improved catch rate had been taken approximately 30 miles west of the start point of the exercise.

The standard codend was shot again for a full dark tow.

Day 2 - 2nd April 1992

The full dark tow produced only 4 baskets of bulk from the standard codend. The pouting had disappeared, the roundfish portion of the catch consisted of 1 basket of medium to large cod, some whitings, a few haddocks and a few gurnards. The main part of the catch was again juvenile flats, this time over 90% of them were lemon soles.

Catch rates to date were insufficient to produce any valid data for comparison. More consistent catches had to be achieved.

Another slight change of ground was made in freshening weather conditions. Tow 6 was hauled after 4 hours producing 3 baskets of bulk again consisting of small lemon soles, cod and a few whiting. The small flats made up a third of the catch which was discarded.

There were still insufficient quantities of whitings to produce valid comparative data. The standard net was shot once again. This was to be the first shot of a four tow daylight sequence consisting of a tow with a standard net followed by a tow with the square mesh panel which were then repeated.

A four hour tow from first light produced 4 baskets of bulk, half of which consisted of juvenile flatfish with a catch mix similar to previous tows. Considering the high percentage of flatfish in the catch, it was decided to break down the flatfish catch by species to further analyse the discards. Tow 7 produced 128 dabs, 178 plaice and 98 lemon soles which were discarded as undersize.

Discussions with the skipper and crew of the trials vessel revealed that the high level of flatfish discards was commonplace on these grounds and stressed the point that some areas were considerably worse. This appears to have been the accepted norm for many years. Current fishing effort does not appear to affect the catch rates of these juvenile flatfish.

The square mesh panel codend replaced the standard arrangement and the gear was shot again for tow 8.

Towing time remained at 4 hours and a bulk of 5 baskets was hauled onboard. There was a total of 2½ baskets of flatfish of which 1½ baskets were discarded. These discards consisted of 317 plaice, 36 lemon soles and 32 dabs. Two baskets of cod, some whiting, pout, gurnards and haddock made up the rest of the catch. There were few pout and whiting present in comparison with tow 7.

The third tow of the daylight sequence used the standard configuration. This tow was conducted on the same ground on which a number of French demersal trawlers were working which it was hoped indicated the presence of more fish.

Tow 9 produced slightly more fish than the previous tows. Fewer pout or whiting were present but the usual high percentage of flats were present. From a total of 1½ baskets only ½ basket was saved. The discards included 11 lemon soles, 457 plaice and 60 dabs. The numbers of small gurnards were increasing each haul and were beginning to make up a considerable proportion of the catch.

Day 3 - April 3rd

The square mesh panel was fitted for the 4th tow of this sequence which by now had run into the hours of darkness. A bulk of 5 baskets consisting of 2 of cod, 2 of flats (1½ of which were discards), ½ of whiting and ½ of pouting. The flatfish discards were 167 lemon soles, 460 plaice and 247 dabs.

The vessel steamed to grounds off St. Ives Bay, an area known as the "Radar Buoy", to try and encounter more whiting, pout and haddock.

The Seafish codends used for the first half of the trip were changed and it was decided to continue the trials using the vessel's own codend rigged with bottom "chafers" for reasons discussed earlier in Section 4.4.

Tow 11 was the first tow using the vessel's own codends. After a 4 hour tow on these new grounds the first haul produced 12 baskets of bulk. Unfortunately almost half the bulk was flatfish of which 5 baskets of dabs (approximately 2000 individuals) were discarded. However, the catch did consist of more roundfish, mainly whiting, pouting, cod and gurnard.

For tow 12 the 4m, 80mm square mesh panel was fitted into the net ahead of the vessel's codend.

The self-contained underwater video camera was fitted to the net in a position just at the forward end of the square mesh panel. In a depth of 40 fathoms it was thought to be close to the light limits of the camera.

Just after shooting the vessel stopped as the gear had snagged on the seabed. The gear was hauled to check for damage before shooting back again. The gear was hauled after a total of 4 hours towing time.

The bulk catch had dropped to 3 baskets with no whiting showing at all. The roundfish content was mainly very small pouting. The flatfish discards consisted of 33 lemon soles, 4 plaice and 198 dabs.

The crew commented on how much "cleaner" and in better condition the whiting, pout and haddock appeared in the catches from the square mesh panel tows compared to those from the standard net.

On reviewing the videotape from the camera in tow 12 it was revealed that a technical fault had caused the camera to stop recording after 1 hour 15 minutes. Very few fish were observed entering the net during the early stages of the tow apart from shoals of sprats. The fact that the gear had to be hauled back shortly after shooting also reduced the fishing time during which the camera was recording.

The square mesh panel was used again for haul 13 which produced 5 baskets of bulk of similar species mix to the previous tows. Pouting were the predominant round fish. Two baskets of dabs were discarded (approximately 800 individuals). Other fish discarded were 6 lesser spotted dogfish which were not marketable.

Day 4 - 4th April

The square mesh panel was removed for the last of this four tow sequence. The bulk catch increased to 10 baskets but 5 of them were discarded dabs/flounders (approximately 2000 individuals). Considerably more whitings were present during this tow which took place during darkness.

The vessel's codend was shot without the panel for a full dark tow for comparison with the following tow 16 which would be a first daylight tow.

Pouting made up the greatest percentage of roundfish in a haul of 6 baskets of bulk. Fewer whiting were present. Similar catches of juvenile flats as had been present on most hauls made up a third of the bulk. Approximately 800 individuals were discarded.

The first daylight haul of the day with the square mesh panel fitted (haul 16) produced more whiting. A total of 9½ baskets of bulk consisted of 5 baskets of discarded dabs and flounders, 1 of cod (large), 1 of pouting, 1 of whiting, ½ of gurnards, ½ of flatfish and ½ of mixed (rays, hake, monk).

The final haul of the first stage was conducted using the square panel during a full daylight tow. After four hours 7 baskets of bulk resulted. Again, a large percentage of the catch was discarded as undersize flats (approximately 1600 individual dabs). No pouting were present in this haul but 1 basket of whiting were caught. It was noticeable that the whiting and cod were in very good condition, most of them being still alive.

Our Ocean Harvester returned to Padstow to land the catch from this first half of the trials.

Day 5 - 5th April

The vessel sailed from Padstow at 1700 on Sunday evening to return to the fishing grounds to the west of the last position in an area of deeper water (50 fathoms) where it was hoped that greater concentrations of whitings could be located.

Day 6 - 6th April

The gear was shot (0100) with the square mesh panel fitted for a full dark tow. Weather conditions deteriorated during the first 4 hour tow. This first haul of the second half of the trials (haul 18) produced better results. From a total of 7 baskets of bulk 4½ were whitings. The usual undersize flats were still present, 102 dabs, 15 lemon soles and 5 plaice.

The poor weather and conditions prevented a second tow straight away. The vessel "lay to her gear" for four hours until the weather moderated. Fishing resumed at about 0900 with the square mesh still fitted in the net.

Despite fishing the same ground the daylight haul only produced 4½ baskets of bulk with only ½ basket of whiting. This suggested that the whitings were moving off the bottom during daylight. This was backed-up by indications on the echo sounder. Some very small pouting were caught which it was thought should have escaped through the panel. However, those retained may have only been a small percentage of a larger concentration that passed through the gear.

The square mesh panel was removed for tow 20. The gear was shot but had to be hauled back after "coming fast". After completing 4 hour towing time the gear was hauled. 4½ baskets of bulk resulted, 1 of cod, 1 of whiting and ½ a basket of discarded flats - 182 dabs, 37 lemon soles and 5 plaice. The rest of the catch was made up of a mixture of gurnards, pouting, haddocks, ling and mixed rays.

The standard codend was again used for tow 21. This time although similar bulk was taken, 3 out of 4½ baskets were whiting. This tow being conducted mainly in the dark again suggested that the whitings were more accessible to the gear at night.

A gear change was made replacing the square mesh panel for a full dark haul.

Day 7 - 7th April

The gear was shot at 0100 but was hauled back short of 4 hours towing time when the doors "dug in". This resulted in a parted shackle on the port side door's backstrap chain. The gear was re-shot to complete the towing time. A total bulk of 3½ baskets was caught of which there was 1 basket of whiting. A heavy swell was effecting the fishing performance of the gear.

The square mesh panel was removed for the first daylight tow.

Towing time remained at 4 hours. At this time the vessel was now operating in an area approximately 50 miles North of the Longships. There was a deep swell running across the ground which continued to effect the fishing.

A similar bulk and species mix resulted from tow 23 for comparison with tow 22. The condition of the fish was suffering due to the heavy swell causing them to be churned about within the codend during towing. The flatfish discards for this haul were 115 dabs, 15 lemon soles and 5 plaice.

After replacing the panel the gear was shot once more and towed for 4 hours producing 2½ baskets of bulk, most of which was cod. The whiting catch from the gear fitted with the panel continued to show better condition when compared with the standard codend, showing fewer signs of scale loss etc.

Flatfish discards were mainly dabs, 125 in all, with 11 lemon soles, 3 plaice and in addition 11 lesser spotted dogfish were discarded.

The panel was removed for the next two hauls. The first being a daylight haul, the next through hours of darkness. The daylight haul (haul 25) produced poor results (2 baskets of bulk) of similar species mix as previous hauls. Flatfish discards were reduced in proportion with the total bulk - 64 dabs, 33 lemon soles and 5 plaice.

Day 8 - 8th April

The dark haul produced better results. Again more whiting were caught in the dark, a total of 3 baskets from a bulk of 5. Flatfish catches were reducing, discards were 85 dabs, 118 lemon soles, 15 plaice and 6 witches.

The square mesh panel was replaced for a tow covering daylight and dark conditions. A number of French vessels were working in the same area but catch rates were reported as poor.

Whiting and cod made up the greatest percentage of the next haul. From 6 baskets of bulk, 2½ were whiting and 2 were cod. Flatfish discards were 98 dabs, 28 lemon soles and 20 plaice.

The next daylight tow with the square mesh panel produced 5½ baskets of bulk, continuing to catch similar species mix but in varying proportions. Along with the flatfish discards for this tow which consisted of 70 dabs, 32 lemon soles, 15 plaice and 3 witches, there were 37 lesser spotted dogfish. The mixed fish from this haul included a variety of rays, ling and hake. A consistent element of the catch throughout the trials were small gurnards.

The panel was removed for the next daylight tow and for the following tow which covered daylight and dark.

This haul produced similar bulk and species mix to haul 28. More dogfish were taken this haul (79 in total), these were discarded along with the following flatfish - 30 lemon soles, 63 dabs and 21 plaice.

Tow 30 was conducted using the standard codend without the panel. The discarded fish from this haul were flatfish - 80 dabs, 17 plaice, 22 lemon soles, 3 witches and 7 megrims.

Day 9 - 9th April

The first dark tow of day 9 was carried out using the square mesh panel. Over half the catch consisted of very small whitings and small pout.

The square mesh panel was used again for the next half dark/half daylight tow. From a bulk of 5½ baskets, 2 baskets were small whitings with a lot of very small pouting.

Some debris had been picked up during the tow and had lodged in the area of the square mesh panel. This may have affected the panel's performance.

The flatfish discards for this haul were - 234 dabs, 31 lemon soles and 8 plaice.

The final tow was conducted using the standard codend arrangement and was carried out in full daylight. Four hours towing produced 3 baskets of bulk with 1 of very small pout, very few whiting were present in this haul. Flatfish discards were - 97 dabs and 8 lemon soles.

This completed the exercise and the vessel steamed into Newlyn to land.

6. RESULTS

One of the most difficult problems encountered in a comparative fishing exercise of this type using an alternate tow procedure, is to obtain results from consecutive hauls that can be compared with confidence.

Since variations in ground, time of day, sea conditions, fish population and many other variables can effect the catch results, valid results can best be obtained by repeating similar tows as many times as possible. In this way it is hoped that the repetition will even out many of the variables allowing comparable data to be obtained.

In this exercise many of the tows conducted during the initial stage of the trial were not really comparable as considerable ground changes were made in an attempt to locate sufficient quantities of fish. This was lost time during the trials.

The varying behaviours of different species of fish in relation to time of day proved to be another problem in this exercise. Since fishing time was limited it was difficult to allow for variations in concentrations of fish on the ground with respect to daylight and darkness. For example, on a number of occasions, it was apparent that more whiting were accessible to the gear during darkness and vice versa for pouting. Using the alternate tow procedure it is very difficult to allow for this bias without a very large number of hauls.

Bearing this and other limitations in mind, the results contained in this report can only be read as an indication as to the performance of the square mesh panel in this fishery. The results cannot be considered as conclusive.

The data collected from this trial are presented in tables and in graphs shown in Appendix I. The tables contain the numbers and frequency of fish for each size class (cm) for whiting and pouting caught during the trials for each haul. Insufficient data were collected for the other target species of cod, haddock and hake to warrant presenting them for this report.

Based on the minimum landing size of 27cms the whiting tables also display the percentage of the catch which were discarded and the percentage which were retained for both the standard (control) gear and the net when fitted with the square mesh panel.

Also included in the tables are figures representing a reduction in the numbers and percentage of discards and also numbers and percentage for the loss of marketable catch associated with the use of the panel.

In some instances negative numbers are displayed against a reduction in discards or loss in marketable. In this case the negative numbers represent an increase and a gain respectively.

The tabulated data are displayed in two graphical forms for both whiting and pouting (Appendix I).

The first group shows the actual numbers of fish against fish length and the second group is a length frequency distribution. This shows the percentage of the total catch of the particular species represented by each size group.

6. RESULTS

One of the most difficult problems encountered in a comparative fishing exercise of this type using an alternate tow procedure is to obtain sufficient consecutive hauls that can be compared with confidence.

Since variations in ground, time of day, tide conditions, fish population and many other variables can effect the catch results, valid results can best be obtained by repeating similar tows as many times as possible. In this way it is hoped that the repetition will even-out many of the variables allowing comparable data to be obtained.

In this exercise many of the tows conducted during the initial stage of the trial were not really comparable as considerable ground changes were made in an attempt to locate sufficient quantities of fish. This was lost time during the trials.

The varying behaviours of different species of fish in relation to time of day proved to be another problem in this exercise. Since fishing time was limited it was difficult to allow for variations in concentrations of fish on the ground with respect to daylight and darkness. For example, on a number of occasions, it was apparent that more whiting were accessible to the gear during darkness and vice versa for pouting. Using the alternate tow procedure it is very difficult to allow for this without a very large number of hauls.

Bearing this and other limitations in mind, the results presented in this report can only be used as an indication as to the performance of the square mesh panel in this fishery. The results cannot be considered as conclusive.

The data collected from this trial are presented in tables and in graphs shown in Appendix I. The tables contain the numbers and frequency of fish for each size class (cm) for whiting and pouting caught during the trials for each haul. Insufficient data were collected for the other target species of cod, haddock and hake to warrant presenting them for this report.

Based on the minimum landing size of 27cm for whiting tables also display the percentage of the catch which were discarded and the percentage which were retained for both the standard (control) gear and the net when fitted with the square mesh panel.

Also included in the tables are figures to indicate the reduction in the numbers and percentage of discards and also numbers and percentages in the loss of marketable catch associated with the use of the panels.

In some instances negative numbers are displayed against a reduction in discards or loss in marketable. In this case the negative numbers represent an increase and a gain respectively.

The tabulated data are displayed in two graphical forms for each whiting and pouting (Appendix I).

The first group shows the actual numbers of fish against fish length and the second group is a length frequency distribution. This shows the percentage of the total catch of the particular species represented by each size group.

To simplify the analysis of the data and for ease of description, the hauls have been grouped and labelled as Tests 1-14 for whiting and 15-33 for pouting. In some cases a Test may only contain one pair of hauls and in others a number of pairs of alternate hauls may be grouped depending on their compatibility.

6.1 Whiting Results

As previously mentioned, the early stages of the first trip of the trials proved difficult in that very few fish of the target species could be located. This can be seen from the results from the first few tows. Test 1 represents the comparison of hauls 1 and 2. This demonstrates that very low numbers of fish mean that nothing can be gleaned from these tows.

The next tows to be considered were 8 and 10 against 7 and 9 (Test 2). Here again numbers of fish were relatively low but were plotted to try and obtain some indication of the panels performance. Ideally a minimum sample of 200 individuals is required in order to obtain a reasonable result.

The graphs for Test 2 show that there has been a slight shift in the size class of whiting compared to the net when fitted with the square mesh panel. The size class shift is approximately 5cms to the right suggests an improved selection. A reduction in discards of 54% with a loss of marketable catch of 15% is indicated for the net when fitted with the panel. However, the low numbers mean that the data is not statistically significant.

Test 3 represents the point in the trials where the codends were changed from the Seafish test codends to the vessel's own fitted with chafers.

The first hauls using this configuration are compared and grouped in Test 3 as hauls 12 and 13 and 11 and 14.

It can be seen that the fish numbers increased considerably for the net when rigged without the panel for these tows with the heavier codend. This may well have been coincidental with improved catch rates at the time. It cannot be solely attributed to the change in codends as such a large difference was not repeated on consecutive hauls. However, it was noticeable that the change in codends did produce more fish than prior to the change.

When comparing these tows, the square mesh panel produced a reduction in discards of 87% but with a massive loss in marketable fish (93%). This was attributable to the fact that over 44% of the whiting catch was in the size group 26-30cms, i.e. of a size more capable of passing through 80mm square mesh.

The length/frequency plot gives a better comparison of the horizontal distribution of the catch between the two gear types.

The results for Test 4 for a one-to-one comparison of hauls 15 and 16 shows similar results for both gear types. No reduction in discards is seen but an increase in the marketable catch of 63% occurred.

Hauls 18 and 19 were compared against 20 and 21 in Test 5. These were the first tows of the second half of the trip. Generally the results from the second half were more consistent than those from the first half.

Greater numbers of fish were sampled for these tows but the size run of fish was generally smaller with over 75% of the catch being below 30cms.

The results from the net fitted with the square mesh panel indicated an increase in the number of discards of 23% and also an increase in the number of marketable fish of 20% over the standard net.

All the other hauls from haul 22 to haul 33 are shown in the results from Test 6 to Test 11. This series of hauls are more consistent in that they all show a shift in the curves to the right in favour of the square mesh panel and all show a reduction in discards albeit with a variation of between 3% and 87%.

The shift of the curve for the results representing the square mesh panel indicates an improved selectivity. All but one test in this series also shows an increase in the marketable catch. It is difficult to suggest any reasons why the net when fitted with the square mesh panel should retain more marketable fish in comparison to the standard configuration. Needless to say, this would be a beneficial effect in the eyes of the fishermen!

In order to try and even-out some of the variations from tow to tow in this series of hauls (11-33, Tests 6-11). Test 12 has been produced which compiles all the results from tows 11-33. Test 11 representing the final two hauls shows some anomalies due to the sample sizes taken in these two consecutive hauls being so different (in the square mesh sample 448 fish were measured compared to 19 in the control sample).

The compilation of hauls 11-33 produced a reasonable result and overall indicated a shift in the curve representing the square mesh panel to the right by approximately 1-2cms. Discards were reduced by 15% with a gain in the marketable catch of 59% for the square mesh panel configuration.

It must be stressed again at this point that because of the limitations of this particular exercise and the variables involved and the relatively low sample sizes used, that the results should be considered carefully. They cannot be considered as conclusive. However, the indications are that the panel produced beneficial effects for whiting.

In order to examine any variation in the performance of the square mesh panel between daylight and darkness comparable daylight and dark hauls using the square mesh panel were compared in Test 13. This result indicated that discards were reduced by a slightly greater percentage in the dark than daylight (a result opposite to what would be expected) and that the panel retained more marketable fish in the dark. However, it can be clearly seen that more whiting were encountered during darkness than daylight, this is reflected by the sample sizes of 1338 compared to 352 respectively.

The final graphs shown in Test 14 represent the total number of hauls combined. Not all are directly comparable and there is a bias in number of tows in favour of the standard configuration (16 square mesh hauls : 18 standard hauls). However, this has been produced as an overall view of the hauls. The overall result shows two very similar curves representing a reduction in discards of 7% and a gain in marketable catch of whitings of 5% in favour of the square mesh window.

6.2 Pouting Results

The results for the pouting element of the catch are shown in the data Tests 15-28. The haul groupings are the same as for the whiting catch for comparison.

No information on level of discards is presented here as there is no minimum landing size for this species. In commercial terms the fish that are discarded are done so on the criteria of market suitability, i.e. they will ony be retained if they are of a size that can be expected to be sold for a worthwhile price.

The first few hauls of the trials produced so few pouting that the results were not valid. Tests 15 and 16 show the results from such hauls.

Test 17 represents two pairs of hauls, 12 and 13, against 11 and 14. With good sample sizes, these graphs show a result which would not have been expected. The net, when fitted with the panel, retained more pouting below 27cms compared to the standard net. Above 27cms the square mesh panel retained less. An increase in the pouting catch of 52% across the full size range resulted. Almost all the catch was below 30cms in length.

Test 18, representing a comparison of hauls 15 and 16, showed a reversal of the results obtained in Test 17. From the four hauls compared in Test 18, three were conducted in daylight and one across darkness. In Test 18 one haul was made in daylight and one in darkness. The difference in the results may be attribuable to this factor. It was noticeable that more pouting were taken during the daylight hauls (see Test 27). Test 18 showed that the square mesh panel hauls reduced the pouting catch by 36% across a size range where over 70% of the catch were below 30cms.

In Test 19 a similar result to Test 17 was obtained but numbers of fish were low from two pairs of hauls with most of the pouting only coming from one pair of hauls.

Very low numbers of fish encountered in hauls 22-26 meant that no meaningful results could be obtained although data did show an overall reduction in the pouting catch for the square mesh panel hauls with most of the pouting being in the lower size ranges <25cms.

Three pairs of hauls represented by Tests 23, 24 and 25 contained slightly larger sample sizes but once again no consistency with the overall outcome. Test 23 showed an increase in the pouting catch for the panel tow of 57% (over 90% of catch below 30cms), whereas Tests 24 and 25 showed a reduction of 22% and 32% respectively. Here again, the bulk of the catch being very small fish (below 25cms).

As with the whiting results hauls 22-33 were compiled as the hauls for best comparison in order to try and even out any bias. This is represented in Test 26. The length/numbers plot shows that the majority of the catch were very small fish of 25cms and below and that there is an overall reduction in the number of pouting retained when the square mesh panel was fitted. This reduction is in the order of 19%.

The caution with which the whiting results are to be viewed must also apply to the pouting results since even with all the hauls combined in Test 26 the sample numbers are relatively low. However, it can be seen as an indication as to the performance of the panel with respect to pouting in this fishery.

The comparison of daylight and dark hauls for tows using the square mesh panel described in Test 27 shows the difference in the numbers retained. Generally throughout the trials more pouting were encountered during daylight tows.

It would have been expected that the panel would have been more effective at releasing fish during daylight, all things being equal. Since the poutings behaviour with respect to light conditions seemed to favour daylight in terms of being more accessible to the trawl gear, it is difficult to demonstrate any difference in the effectiveness of the panel between light and dark conditions.

The final test, Test 28, is a combination of all hauls for pouting. This clearly shows two principle size groups or year classes of pouting encountered during the trials.

The indication from the results is that the square mesh panel tows appeared to be retaining more pouting in the lower size ranges with a change over at about the 24cms point when the panel then shows a reduction in the retained catch. It would have been expected that more of the smaller size ranges would have been released. The overall reduction in the pouting catch with the use of the panel was 8%. It must be remembered that this combination of all hauls is limited in value due to the incompatibility of many of the hauls during the early stages of the trials and that there is a bias towards the standard net in the number of hauls used (16 square mesh to 18 standard hauls).

6.3 Discards of Flatfish

Note should be made of the numbers of juvenile flatfish encountered during the early stages of the trials. The flatfish discards have been summarised in Table 1.

On some hauls the very large numbers of small flatfish retained in the codend and in particular those meshed in the codend should be considered as a possible influencing factor on the selectivity of the codend. The extent to which the codend meshes can be "blocked" can be seen from the photographs in Appendix II.

In fisheries were this situation is a common occurence, the use of a square mesh panel of the correct mesh size as a means of improving selectivity of a fishing gear has obvious benefits over a straight increase in codend mesh size. The object of these trials however was to assess the benefits for round fish.

TABLE 1

OUR OCEAN HARVESTER - FLATFISH DISCARDS

Date	Haul	Dabs	Lemon soles	Flounders	Plaice	Witch	Megrims
2/4/92	7	128	98	-	178	-	-
	8	32	36	-	317	-	-
	9	60	11	-	457	-	-
3/4/92	10	247	167	-	460	-	-
	11	◇2000	◇ 30	◇ 60	-	-	-
	12	198	33	-	4	-	-
	13	◇ 800	-	-	-	-	-
4/4/92	14	◇2000	-	-	-	-	-
	15	◇ 800	-	-	-	-	-
	16	◇2000	-	-	-	-	-
	17	◇1600	-	-	-	-	-
6/4/92	18	102	15	-	5	-	-
	19	183	24	-	19	-	-
	20	182	37	-	5	-	-
	21	105	37	-	5	-	-
7/4/92	22	64	-	-	-	-	-
	23	115	15	-	5	-	-
	24	125	11	-	3	-	-
	25	64	33	-	5	-	-
8/4/92	26	85	18	-	15	6	-
	27	97	28	-	20	-	-
	28	70	32	-	15	5	-
	29	63	30	-	21	4	-
	30	80	22	-	17	3	7
9/4/92	31	148	21	-	4	1	2
	32	234	31	-	8	-	-
	33	97	8	-	-	-	-
Total Hauls	**27**	**11679**	**737**	**60**	**1563**	**19**	**9**

7. SUMMARY OF FINDINGS

Despite numerous problems encountered during the trials the results have shown some indications as to the effectiveness of the square mesh panel when applied to the fishery in question.

Poor weather conditions and lack of sufficient quantities of target species further added to the difficulties in carrying out the trials. The aim had been to gather data on cod, haddock, whiting, pouting and hake. Although cod, haddock and hake were encountered, their irregular presence and numbers in the catch make-up prevented any valid data being collected for these species.

It became apparent that the addition of codend attachments in the form of chafing strips added to the lower side of the codend increased the retention of marketable and discard fish within the codend. The changeover to the use of the vessel's own codend during the early part of the first trip meant that the results obtained would be more representative of the commercial situation.

From a point fairly early in the exercise it was also apparent that variations in the behaviour of the different fish species would have a strong bearing on the outcome of the results. The most noticeable example of this was the fact that on many occasions whiting were more accessible to the gear during the dark tows and pouting during the daylight tows. This really increased the necessity for a large number of tows to be carried out in order to try and accommodate this type of variability.

Considering the limitations of the exercise the indications from the results showed a favourable performance of the square mesh panel. The results however cannot be taken as statistically significant.

For whiting, the square mesh panel showed improved selectivity, with a slight shift in the length/number curve of 1-2cms to the right being indicated.

Discards were reduced over the course of the trials but it would be difficult to state by what amount due to the variations in reduction levels of between 3% and 87% from test to test.

The net, when fitted with the square mesh panel, produced a result that is not easily explained. More marketable whiting were retained in many of the tows examined. Again, this varied considerably in the amount by which it increased but it occurred consistently enough to be noticeable. Clearly this is a beneficial situation and one which cannot easily be explained outside of being due to variations in populations sampled that have been biased towards the square mesh tows. However, a similar result has also been experienced in other exercises of this type. Trials conducted in Stage I of this programme with a pair trawling team from Looe (Seafish Report No. 401 refers) produced increases in the marketable catch of whiting and hake of 24% and 27% respectively when compared to a standard trawl. This would appear to be a situation that warrants closer investigation and would justify longer commercial use of the panel in the Area VII fishery.

It is more difficult to evaluate the effectiveness of the square mesh panel with respect to the pouting element of the catch since there is no minimum landing size for pouting and therefore no legal demarcation between discards and retainable fish.

For this exercise, the level to which the square mesh panel effected the overall pouting catch was monitored with a close eye kept on the size range of fish encountered. This gave an idea of the effectiveness of the panel and its value at releasing the smaller size ranges that would not be marketable.

The haul to haul results for the pouting catch were less consistent in comparison to the whiting catches. The pouting catches were predominantly made during dark tows.

As in the case of the whiting results, the overall effect of the square mesh panel in the net was to reduce the pouting catch. Since the greatest percentage of the pouting catch was below 25cms this indicates a valuable saving of juvenile fish.

Again it is difficult to give a representative figure for this reduction as the haul to haul variation is considerable. A figure of between 8% and 20% would not seem unreasonable based on these results.

Attention should be drawn to the flatfish discards encountered throughout the trials, in particular during the first half of the exercise.

Considerable numbers (Table 1 refers) of dabs, plaice and lemon soles were discarded on some areas of ground. Apparently this is not an uncommon situation on some grounds at particular times of the year in this area.

8. ACKNOWLEDGEMENTS

Seafish would like to extend their gratitude to the skipper and crew of the charter vessel *Our Ocean Harvester* for their assistance and cooperation in conducting this exercise.

I would like to thank Assistant Fishery Development Ofifcer Julian Swarbrick for his assistance with the computer processing of the data from these trials.

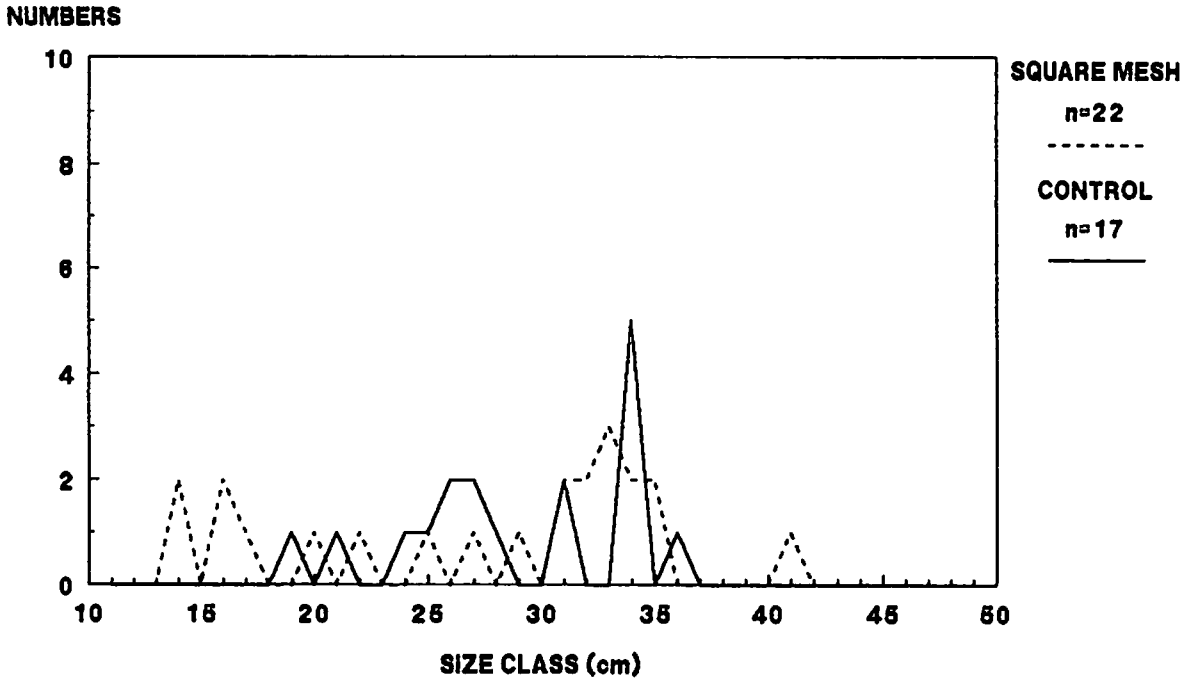
K Arkley
Fisheries Development Officer
April 1992

APPENDIX I

TESTS 1 TO 14 - WHITING

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel



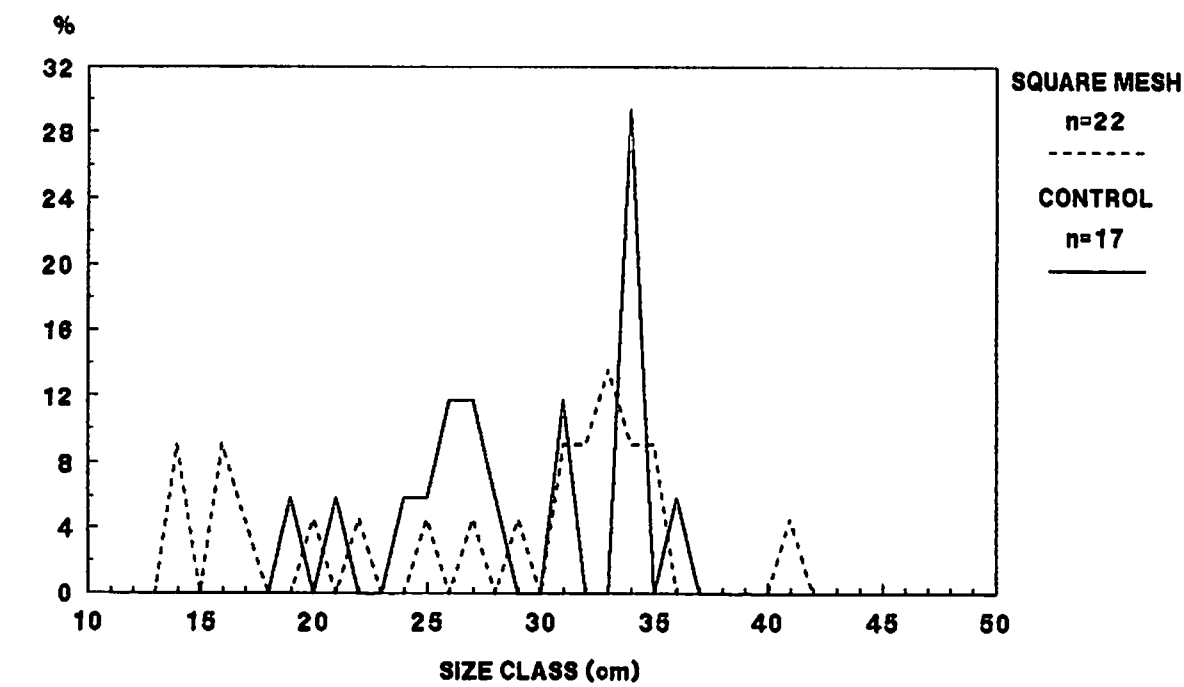
MFV Our Ocean Harvester PZ 403

Haul 1 (sq) v 2 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403

Haul 1 (sq) v 2 (dia)

SEAFISH

WHITING TEST 1

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	22	SAMPLE TOTAL:	17	(PERCENT AND NUMBERS)		
RAISED TOTAL:	22	RAISED TOTAL:	17		%	n
MLS (cm)	27	MLS (cm)	27	REDN. DISCARDS:	-33	-2
% DISCARDS	36	% DISCARDS	35	LOSS MARKETABLE:	-27	-3
% RETAINED	64	% RETAINED	65			

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

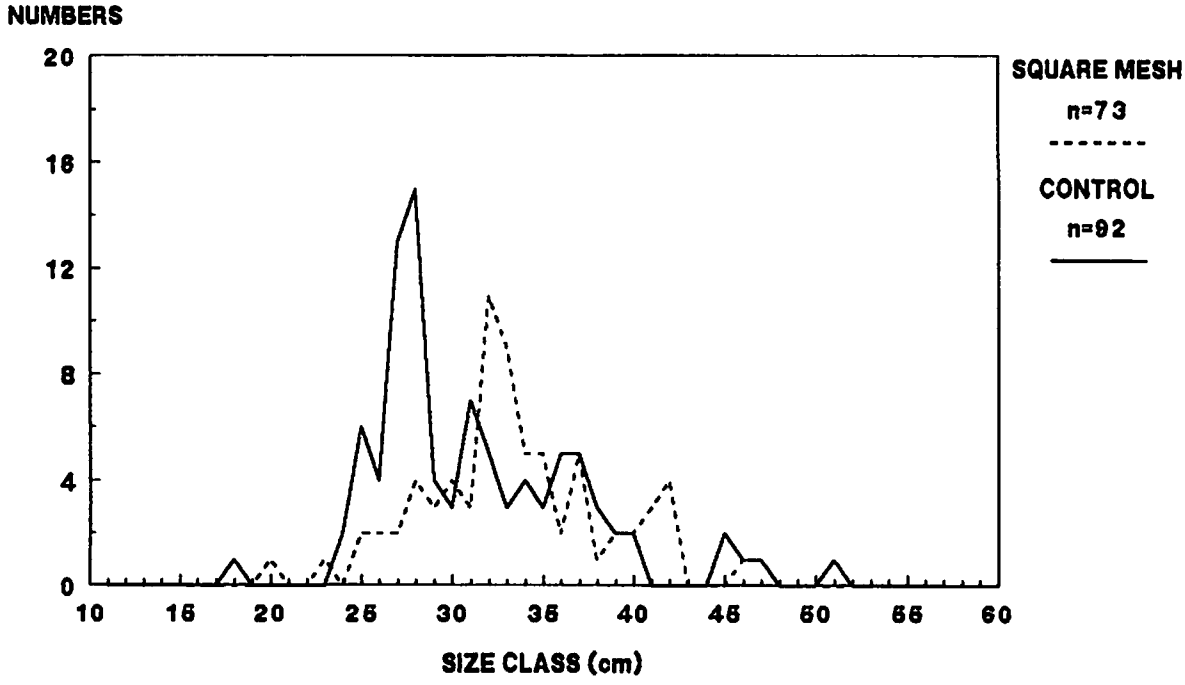
CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	2	9.09	14	0	0
15	0	0	15	0	0
16	2	9.09	16	0	0
17	1	4.54	17	0	0
18	0	0	18	0	0
19	0	0	19	1	5.88
20	1	4.54	20	0	0
21	0	0	21	1	5.88
22	1	4.54	22	0	0
23	0	0	23	0	0
24	0	0	24	1	5.88
25	1	4.54	25	1	5.88
26	0	0	26	2	11.7
27	1	4.54	27	2	11.7
28	0	0	28	1	5.88
29	1	4.54	29	0	0
30	0	0	30	0	0
31	2	9.09	31	2	11.7
32	2	9.09	32	0	0
33	3	13.6	33	0	0
34	2	9.09	34	5	29.4
35	2	9.09	35	0	0
36	0	0	36	1	5.88
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	1	4.54	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

Size Groupings:					DIFFERENCES	
SQUARE MESH			CONTROL		(CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	9.1	2	0	0	-9.1	-2
16-25	27.3	6	23.5	4	-3.8	-2
26-30	9.1	2	29.4	5	20.3	3
31-35	50	11	41.2	7	-8.8	-4
36-40	0	0	5.9	1	5.9	1
41-45	4.5	1	0	0	-4.5	-1
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -29.4 %
Number of fish represented by this: -5

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel



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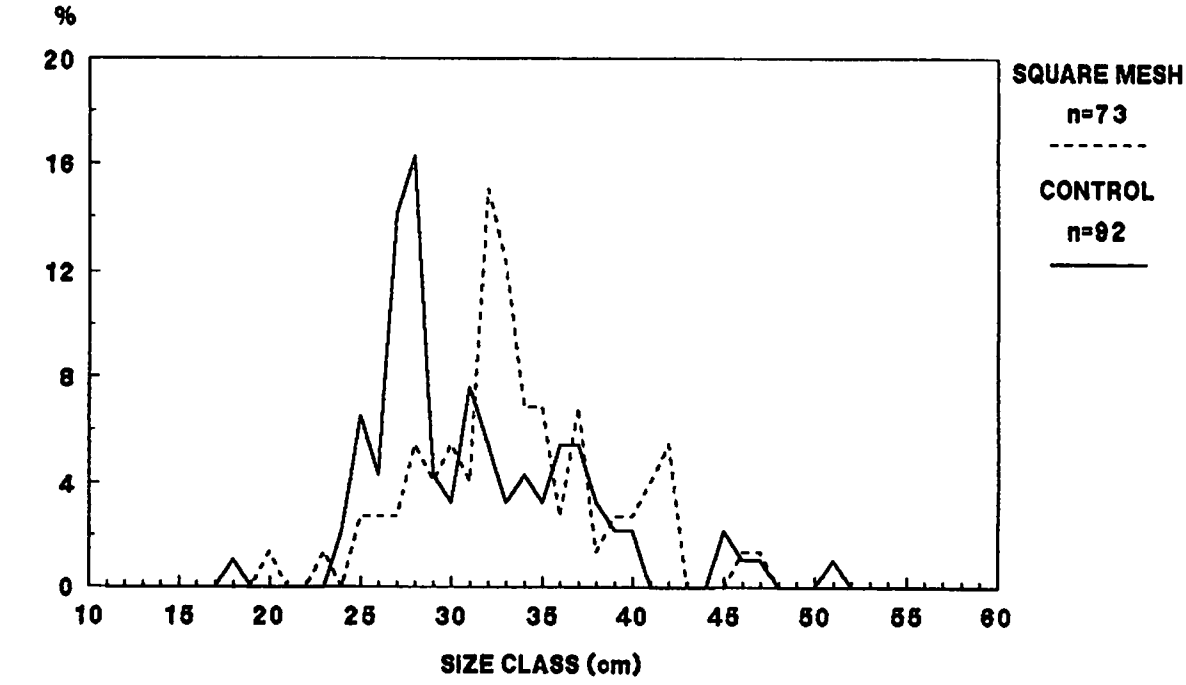
Haul 8& 10 (sq) v 7&9 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403

Haul 8& 10 (sq) v 7&9 (dia)

SEAFISH

WHITING TEST 2

SQUARE MESH	
SAMPLE TOTAL:	73
RAISED TOTAL:	73
MLS (cm)	27
% DISCARDS	8
% RETAINED	92

CONTROL	
SAMPLE TOTAL:	92
RAISED TOTAL:	92
MLS (cm)	27
% DISCARDS	14
% RETAINED	86

DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)	%	n
REDN. DISCARDS:	54	7
LOSS MARKETABLE:	15	12

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

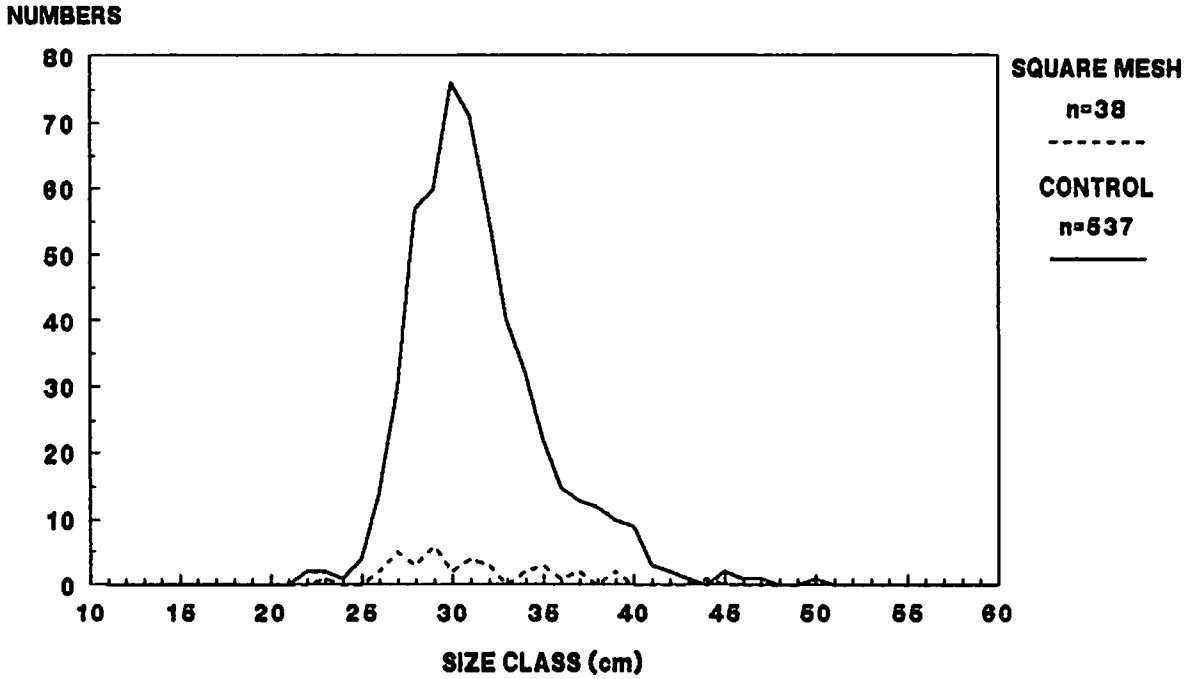
CLASS cm	SQUARE MESH RAISED NUMBERS	SQUARE MESH FREQ. %	CONTROL RAISED NUMBERS	CONTROL FREQ. %
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	1	1.08
19	0	0	0	0
20	1	1.36	0	0
21	0	0	0	0
22	0	0	0	0
23	1	1.36	0	0
24	0	0	2	2.17
25	2	2.73	6	6.52
26	2	2.73	4	4.34
27	2	2.73	13	14.1
28	4	5.47	15	16.3
29	3	4.10	4	4.34
30	4	5.47	3	3.26
31	3	4.10	7	7.60
32	11	15.0	5	5.43
33	9	12.3	3	3.26
34	5	6.84	4	4.34
35	5	6.84	3	3.26
36	2	2.73	5	5.43
37	5	6.84	5	5.43
38	1	1.36	3	3.26
39	2	2.73	2	2.17
40	2	2.73	2	2.17
41	3	4.10	0	0
42	4	5.47	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	2	2.17
46	1	1.36	1	1.08
47	1	1.36	1	1.08
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	1	1.08
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	5.5	4	9.8	9	4.3	5
26-30	20.5	15	42.4	39	21.9	24
31-35	45.2	33	23.9	22	-21.3	-11
36-40	16.4	12	18.5	17	2.1	5
41-45	9.6	7	2.2	2	-7.4	-5
46-50	2.7	2	2.2	2	-0.5	0
51-55	0	0	1.1	1	1.1	1
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 20.65 %
Number of fish represented by this: 19

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

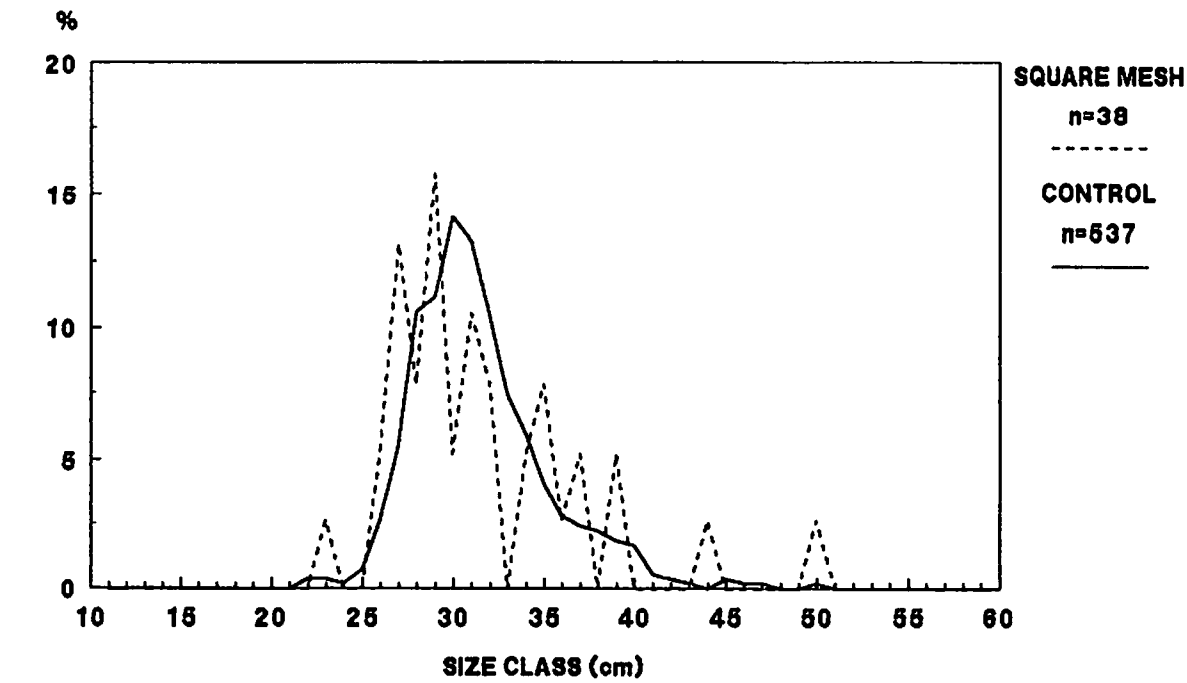


MFV Our Ocean Harvester PZ 403
Haul 12&13 (sq) v 11&14 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 12&13 (sq) v 11&14 (dia)

SEAFISH

WHITING TEST 3

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)		
SAMPLE TOTAL:	38		SAMPLE TOTAL:	537			%	n
RAISED TOTAL:	38		RAISED TOTAL:	537		REDN. DISCARDS:	87	20
MLS (cm)	27		MLS (cm)	27		LOSS MARKETABLE:	93	479
% DISCARDS	8		% DISCARDS	4				
% RETAINED	92		% RETAINED	96				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	0	0	19	0	0
20	0	0	20	0	0
21	0	0	21	0	0
22	0	0	22	2	0.37
23	1	2.63	23	2	0.37
24	0	0	24	1	0.18
25	0	0	25	4	0.74
26	2	5.26	26	14	2.60
27	5	13.1	27	30	5.58
28	3	7.89	28	57	10.6
29	6	15.7	29	60	11.1
30	2	5.26	30	76	14.1
31	4	10.5	31	71	13.2
32	3	7.89	32	56	10.4
33	0	0	33	40	7.44
34	2	5.26	34	32	5.95
35	3	7.89	35	22	4.09
36	1	2.63	36	15	2.79
37	2	5.26	37	13	2.42
38	0	0	38	12	2.23
39	2	5.26	39	10	1.86
40	0	0	40	9	1.67
41	0	0	41	3	0.55
42	0	0	42	2	0.37
43	0	0	43	1	0.18
44	1	2.63	44	0	0
45	0	0	45	2	0.37
46	0	0	46	1	0.18
47	0	0	47	1	0.18
48	0	0	48	0	0
49	0	0	49	0	0
50	1	2.63	50	1	0.18
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

SPECIES: WHITING
GEAR: std. v 80mm sq.

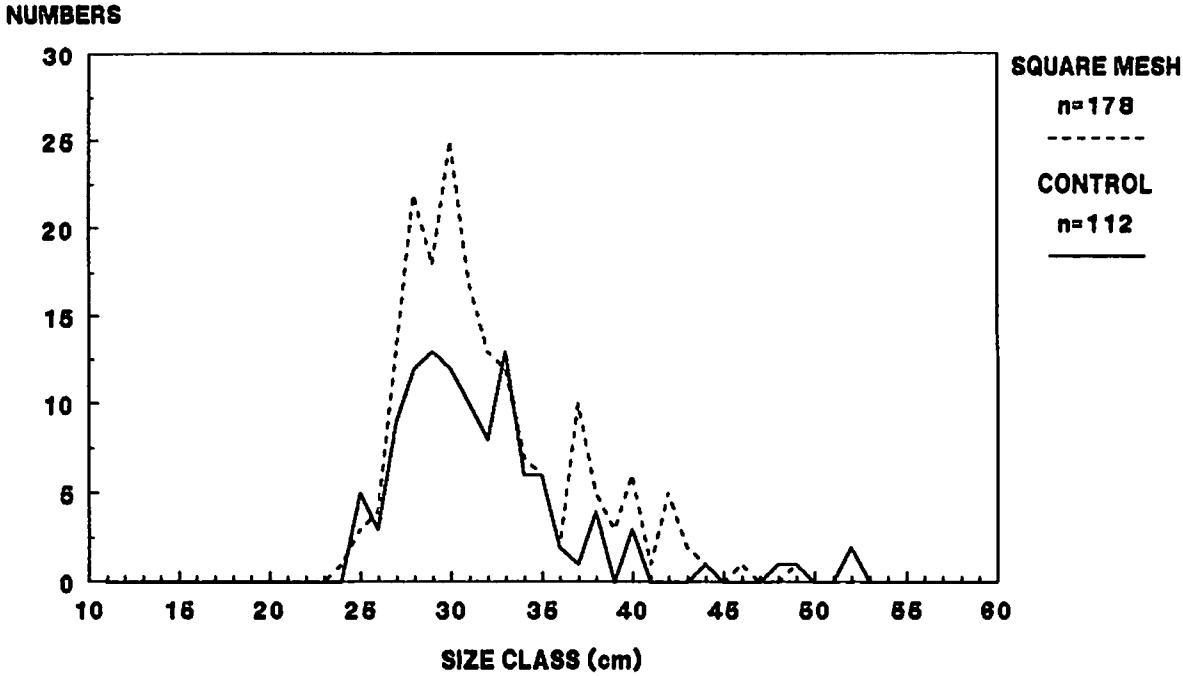
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	2.6	1	1.7	9	-0.9	8
26-30	47.4	18	44.1	237	-3.3	219
31-35	31.6	12	41.2	221	9.6	209
36-40	13.2	5	11	59	-2.2	54
41-45	2.6	1	1.5	8	-1.1	7
46-50	2.6	1	0.6	3	-2	2
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 92.92 %
Number of fish represented by this: 499

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel



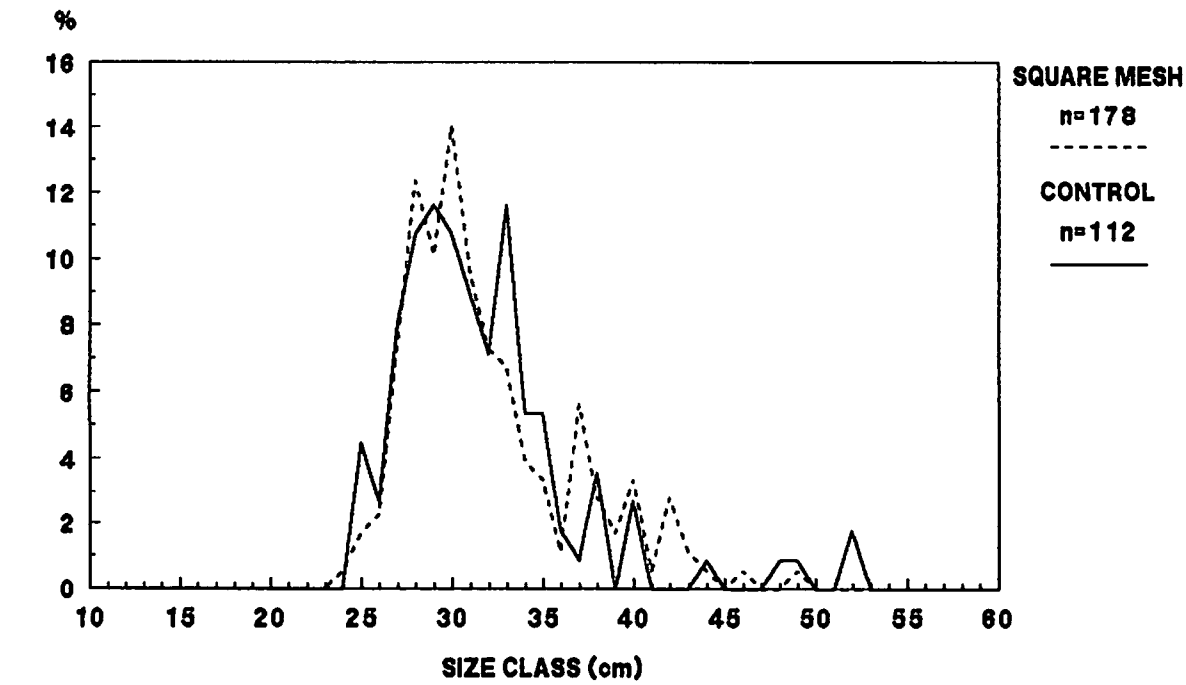
MFV Our Ocean Harvester PZ 403

Haul 16 (sq) v 15 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403

Haul 16 (sq) v 15 (dia)

SEAFISH

WHITING TEST 4

SQUARE MESH	
SAMPLE TOTAL:	178
RAISED TOTAL:	178
MLS (cm)	27
% DISCARDS	4
% RETAINED	96

CONTROL	
SAMPLE TOTAL:	112
RAISED TOTAL:	112
MLS (cm)	27
% DISCARDS	7
% RETAINED	93

DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)	%	n
REDN. DISCARDS:	0	0
LOSS MARKETABLE:	-63	-66

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	0	0	19	0	0
20	0	0	20	0	0
21	0	0	21	0	0
22	0	0	22	0	0
23	0	0	23	0	0
24	1	0.56	24	0	0
25	3	1.68	25	5	4.46
26	4	2.24	26	3	2.67
27	13	7.30	27	9	8.03
28	22	12.3	28	12	10.7
29	18	10.1	29	13	11.6
30	25	14.0	30	12	10.7
31	17	9.55	31	10	8.92
32	13	7.30	32	8	7.14
33	12	6.74	33	13	11.6
34	7	3.93	34	6	5.35
35	6	3.37	35	6	5.35
36	2	1.12	36	2	1.78
37	10	5.61	37	1	0.89
38	5	2.80	38	4	3.57
39	3	1.68	39	0	0
40	6	3.37	40	3	2.67
41	1	0.56	41	0	0
42	5	2.80	42	0	0
43	2	1.12	43	0	0
44	1	0.56	44	1	0.89
45	0	0	45	0	0
46	1	0.56	46	0	0
47	0	0	47	0	0
48	0	0	48	1	0.89
49	1	0.56	49	1	0.89
50	0	0	50	0	0
51	0	0	51	0	0
52	0	0	52	2	1.78
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

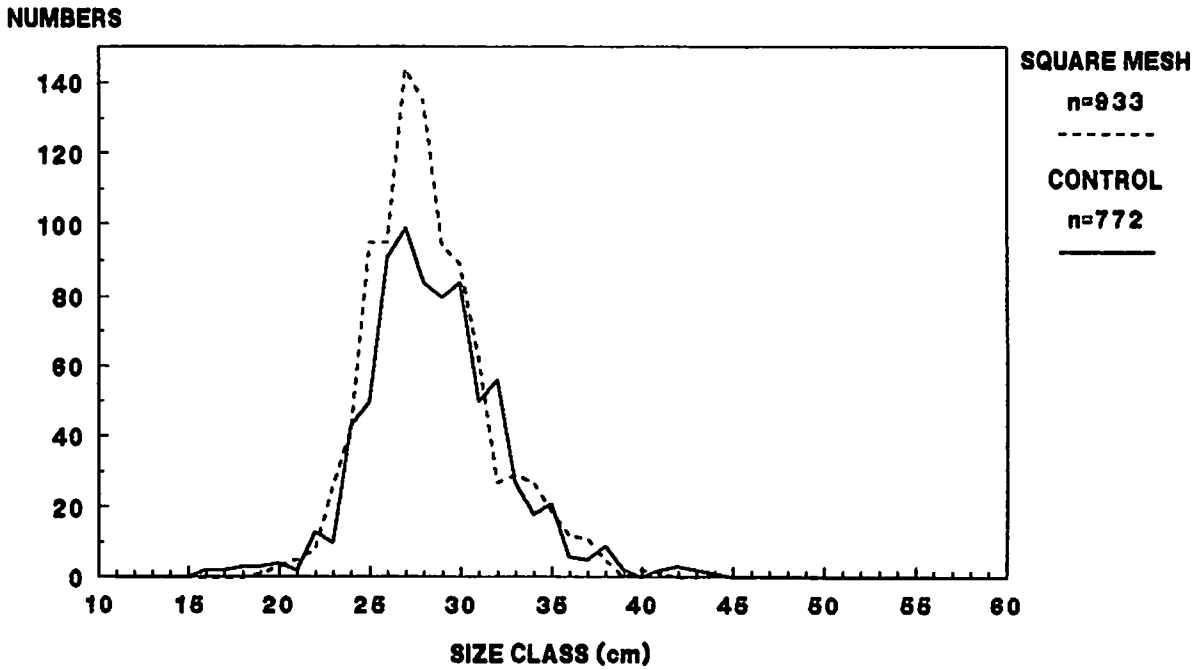
Size Groupings:

Group (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	2.2	4	4.5	5	2.3	1
26-30	46.1	82	43.8	49	-2.3	-33
31-35	30.9	55	38.4	43	7.5	-12
36-40	14.6	26	8.9	10	-5.7	-16
41-45	5.1	9	0.9	1	-4.2	-8
46-50	1.1	2	1.8	2	0.7	0
51-55	0	0	1.8	2	1.8	2
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -58.9 %
Number of fish represented by this: -66

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

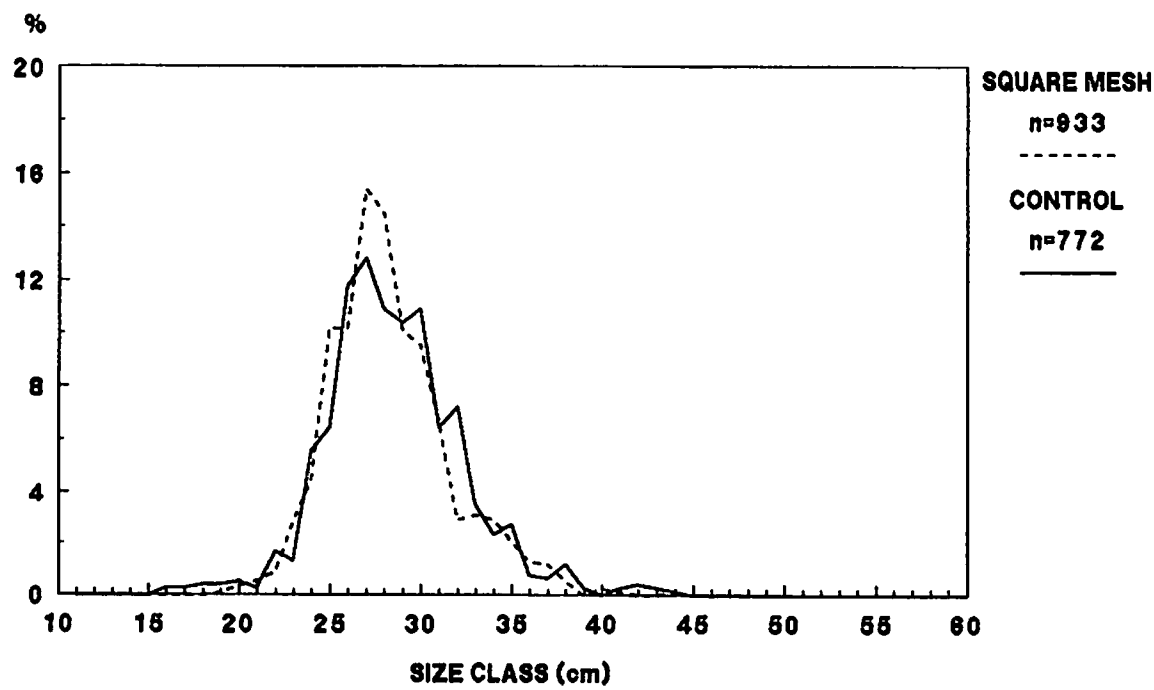


MFV Our Ocean Harvester PZ 403
Haul 18&19 (sq) v 20&21 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 18&19 (sq) v 20&21 (dia)

SEAFISH

WHITING TEST 5

SQUARE MESH	
SAMPLE TOTAL:	933
RAISED TOTAL:	933
MLS (cm)	27
% DISCARDS	29
% RETAINED	71

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	1	0.10
20	3	0.32
21	5	0.53
22	8	0.85
23	26	2.78
24	42	4.50
25	95	10.1
26	95	10.1
27	144	15.4
28	135	14.4
29	94	10.0
30	89	9.53
31	62	6.64
32	27	2.89
33	29	3.10
34	27	2.89
35	19	2.03
36	12	1.28
37	11	1.17
38	5	0.53
39	0	0
40	2	0.21
41	1	0.10
42	0	0
43	0	0
44	1	0.10
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

CONTROL	
SAMPLE TOTAL:	772
RAISED TOTAL:	772
MLS (cm)	27
% DISCARDS	29
% RETAINED	71

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	2	0.25
17	2	0.25
18	3	0.38
19	3	0.38
20	4	0.51
21	2	0.25
22	13	1.68
23	10	1.29
24	43	5.56
25	50	6.47
26	91	11.7
27	99	12.8
28	84	10.8
29	80	10.3
30	84	10.8
31	50	6.47
32	56	7.25
33	27	3.49
34	18	2.33
35	21	2.72
36	6	0.77
37	5	0.64
38	9	1.16
39	2	0.25
40	0	0
41	2	0.25
42	3	0.38
43	2	0.25
44	1	0.12
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	-23	-52
LOSS MARKETABLE:	-20	-109

SPECIES: WHITING
GEAR: std. v 80mm sq.

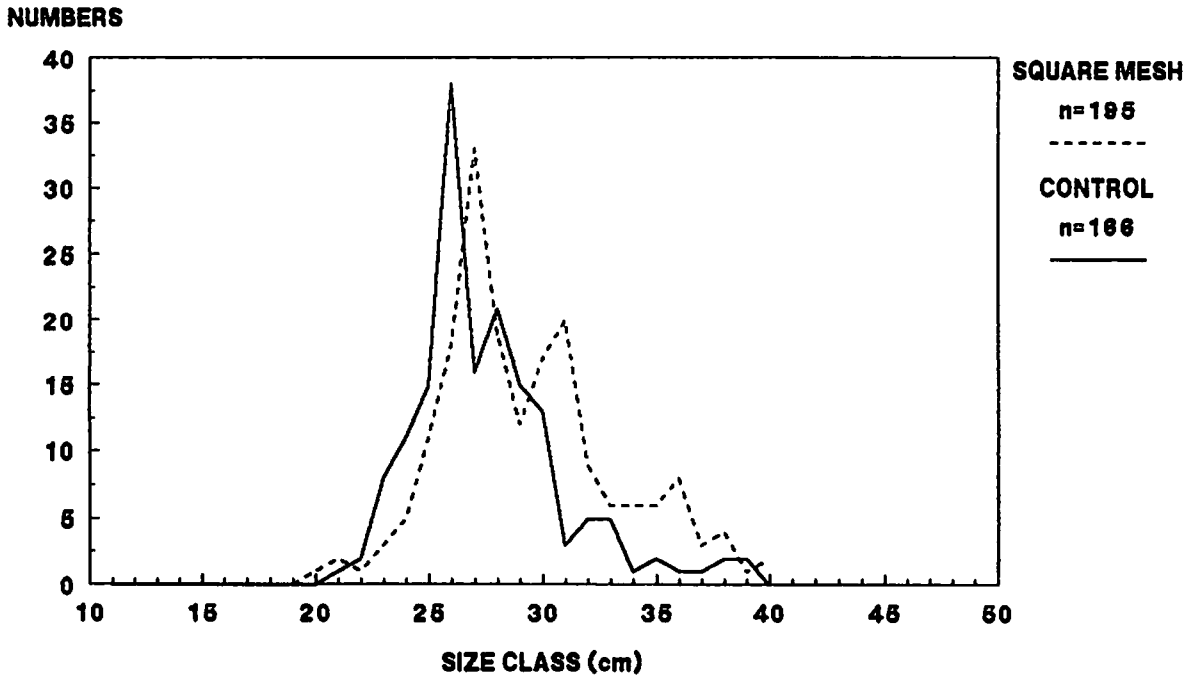
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	19.3	180	17.1	132	-2.2	-48
26-30	59.7	557	56.7	438	-3	-119
31-35	17.6	164	22.3	172	4.7	8
36-40	3.2	30	2.8	22	-0.4	-8
41-45	0.2	2	1	8	0.8	6
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -20.8 %
Number of fish represented by this: -161

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

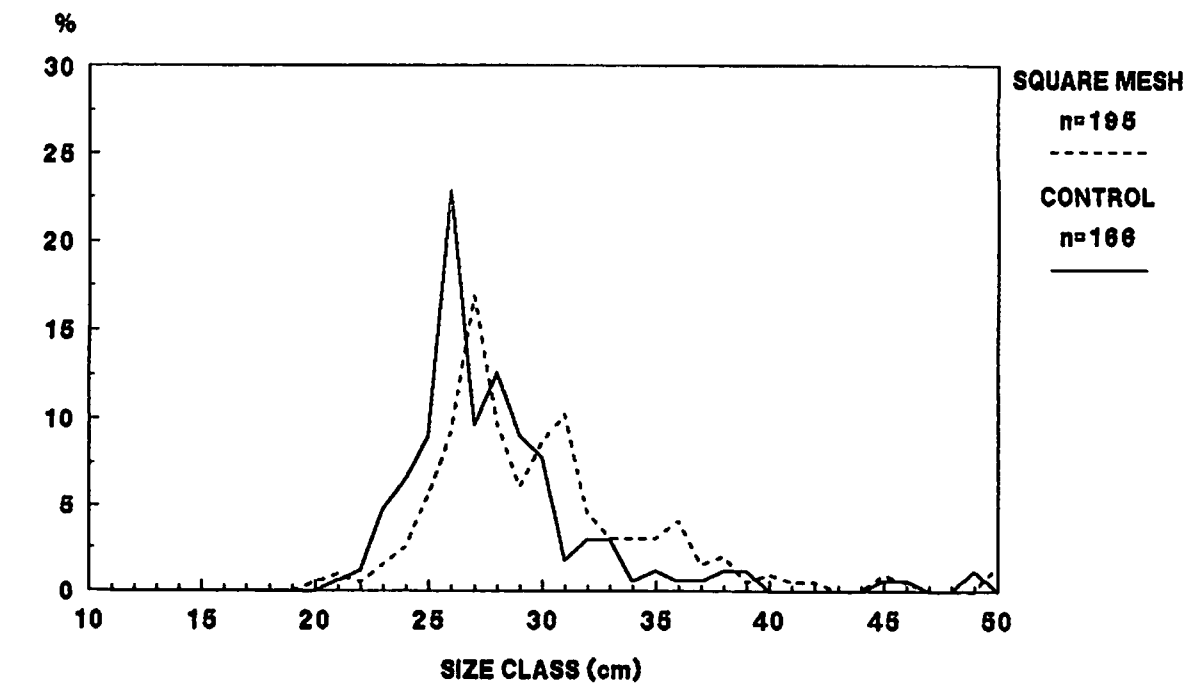


MFV Our Ocean Harvester PZ 403
Haul 22 (sq) v 23 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 22 (sq) v 23 (dia)

SEAFISH

WHITING TEST 6

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	195		SAMPLE TOTAL:	166		(PERCENT AND NUMBERS)		
RAISED TOTAL:	195		RAISED TOTAL:	166			%	n
MLS (cm)	27		MLS (cm)	27		REDN. DISCARDS:	45	34
% DISCARDS	21		% DISCARDS	45		LOSS MARKETABLE:	-69	-63
% RETAINED	79		% RETAINED	55				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	0	0	19	0	0
20	1	0.51	20	0	0
21	2	1.02	21	1	0.60
22	1	0.51	22	2	1.20
23	3	1.53	23	8	4.81
24	5	2.56	24	11	6.62
25	11	5.64	25	15	9.03
26	18	9.23	26	38	22.8
27	33	16.9	27	16	9.63
28	19	9.74	28	21	12.6
29	12	6.15	29	15	9.03
30	17	8.71	30	13	7.83
31	20	10.2	31	3	1.80
32	9	4.61	32	5	3.01
33	6	3.07	33	5	3.01
34	6	3.07	34	1	0.60
35	6	3.07	35	2	1.20
36	8	4.10	36	1	0.60
37	3	1.53	37	1	0.60
38	4	2.05	38	2	1.20
39	1	0.51	39	2	1.20
40	2	1.02	40	0	0
41	1	0.51	41	0	0
42	1	0.51	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	2	1.02	45	1	0.60
46	1	0.51	46	1	0.60
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	2	1.20
50	3	1.53	50	0	0

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

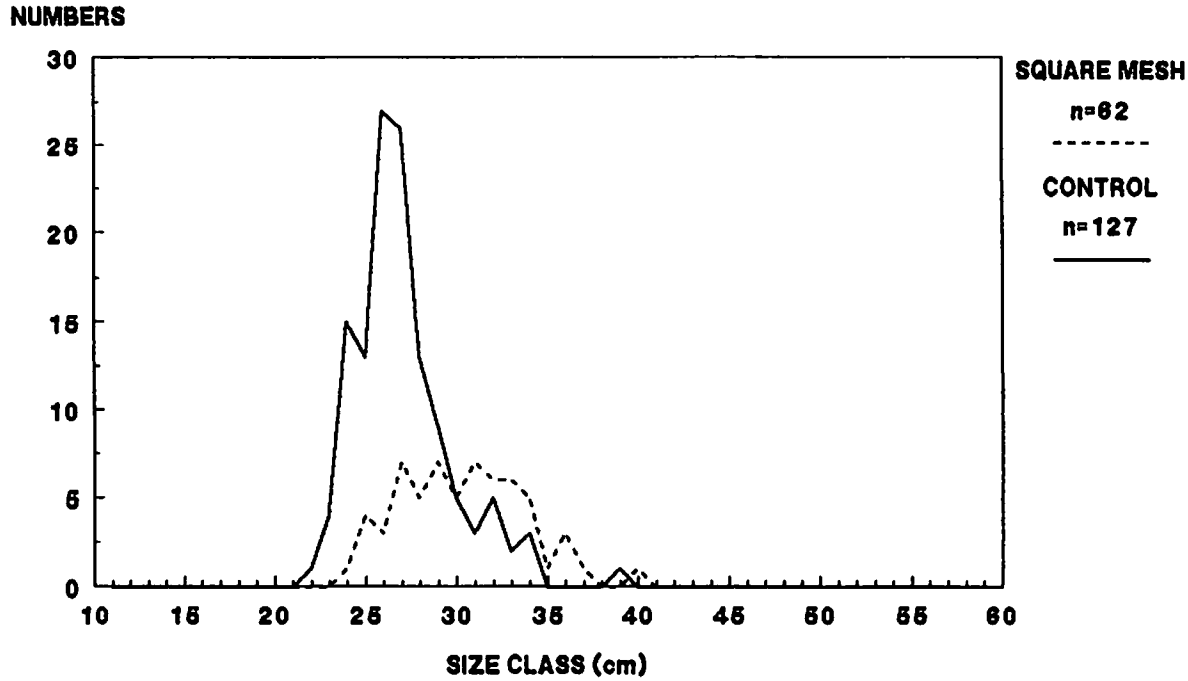
Size Groupings:

SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	11.8	23	22.3	37	10.5	14
26-30	50.8	99	62	103	11.2	4
31-35	24.1	47	9.6	16	-14.5	-31
36-40	9.2	18	3.6	6	-5.6	-12
41-45	2.1	4	0.6	1	-1.5	-3
46-50	2.1	4	1.8	3	-0.3	-1
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -17.4 %
Number of fish represented by this: -29

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

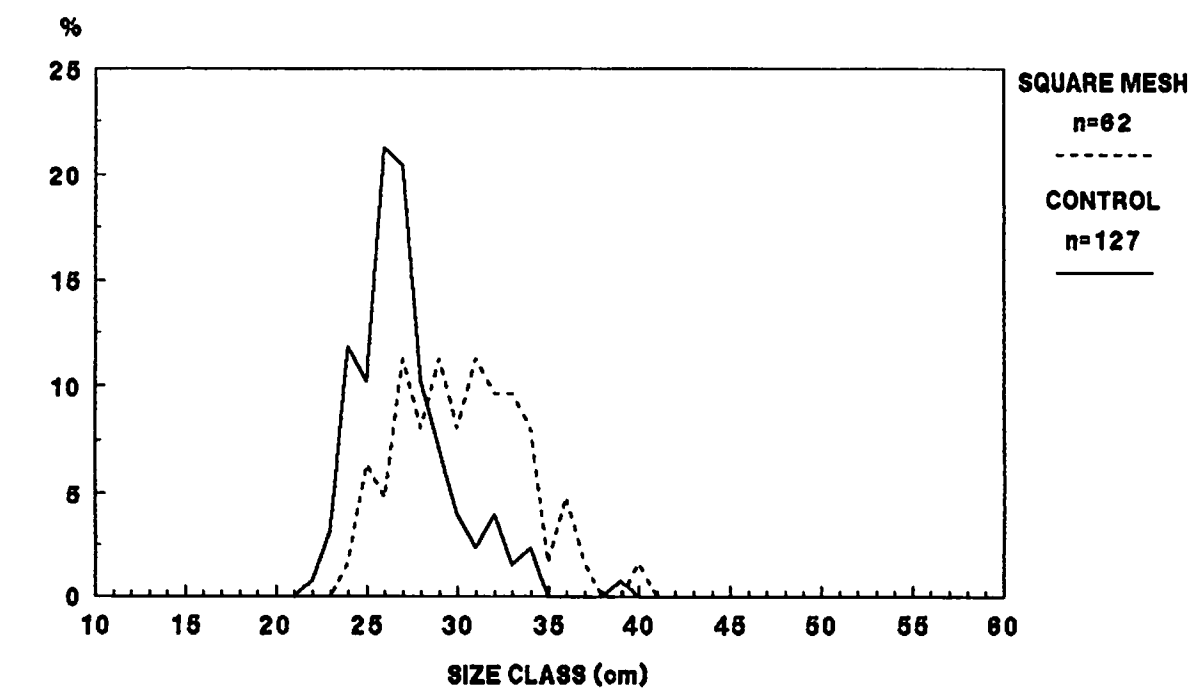


MFV Our Ocean Harvester PZ 403
Haul 24 (sq) v 25 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 24 (sq) v 25 (dia)

SEAFISH

WHITING TEST 7

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)		
SAMPLE TOTAL:	62		SAMPLE TOTAL:	127			%	n
RAISED TOTAL:	62		RAISED TOTAL:	127		REDN. DISCARDS:	87	52
MLS (cm)	27		MLS (cm)	27		LOSS MARKETABLE:	19	13
% DISCARDS	13		% DISCARDS	47				
% RETAINED	87		% RETAINED	53				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	0	0	19	0	0
20	0	0	20	0	0
21	0	0	21	0	0
22	0	0	22	1	0.78
23	0	0	23	4	3.14
24	1	1.61	24	15	11.8
25	4	6.45	25	13	10.2
26	3	4.83	26	27	21.2
27	7	11.2	27	26	20.4
28	5	8.06	28	13	10.2
29	7	11.2	29	9	7.08
30	5	8.06	30	5	3.93
31	7	11.2	31	3	2.36
32	6	9.67	32	5	3.93
33	6	9.67	33	2	1.57
34	5	8.06	34	3	2.36
35	1	1.61	35	0	0
36	3	4.83	36	0	0
37	1	1.61	37	0	0
38	0	0	38	0	0
39	0	0	39	1	0.78
40	1	1.61	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

SPECIES: WHITING
GEAR: std. v 80mm sq.

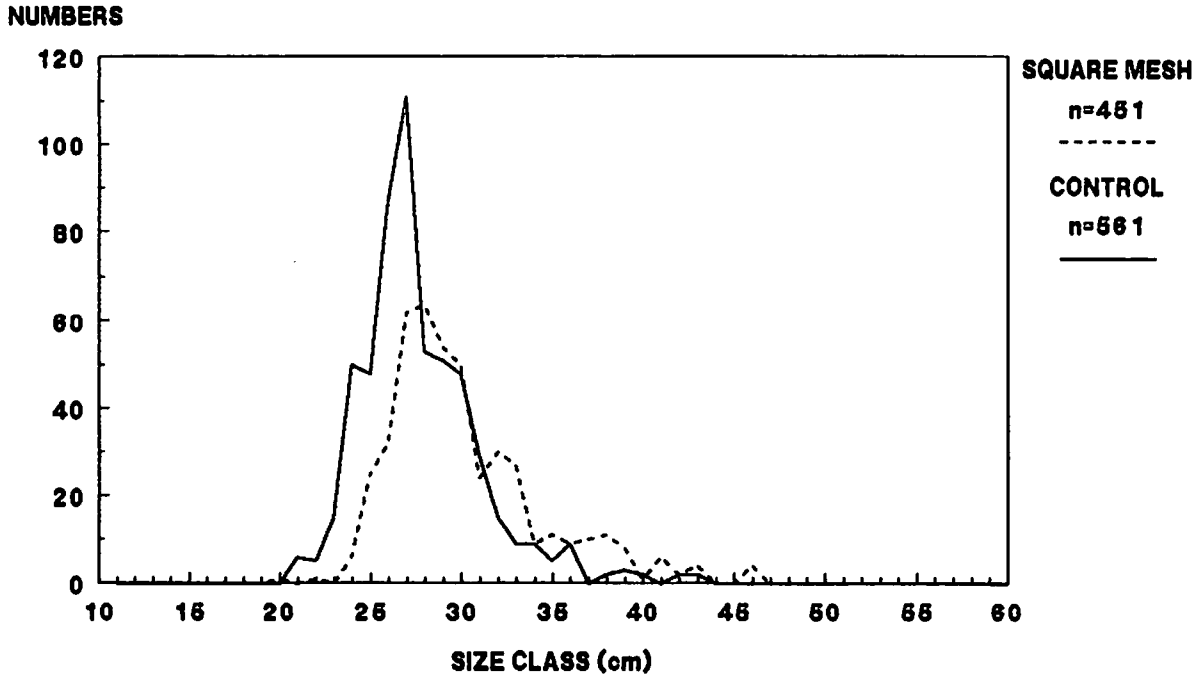
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	8.1	5	26	33	17.9	28
26-30	43.5	27	63	80	19.5	53
31-35	40.3	25	10.2	13	-30.1	-12
36-40	8.1	5	0.8	1	-7.3	-4
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 51.18 %
Number of fish represented by this: 65

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

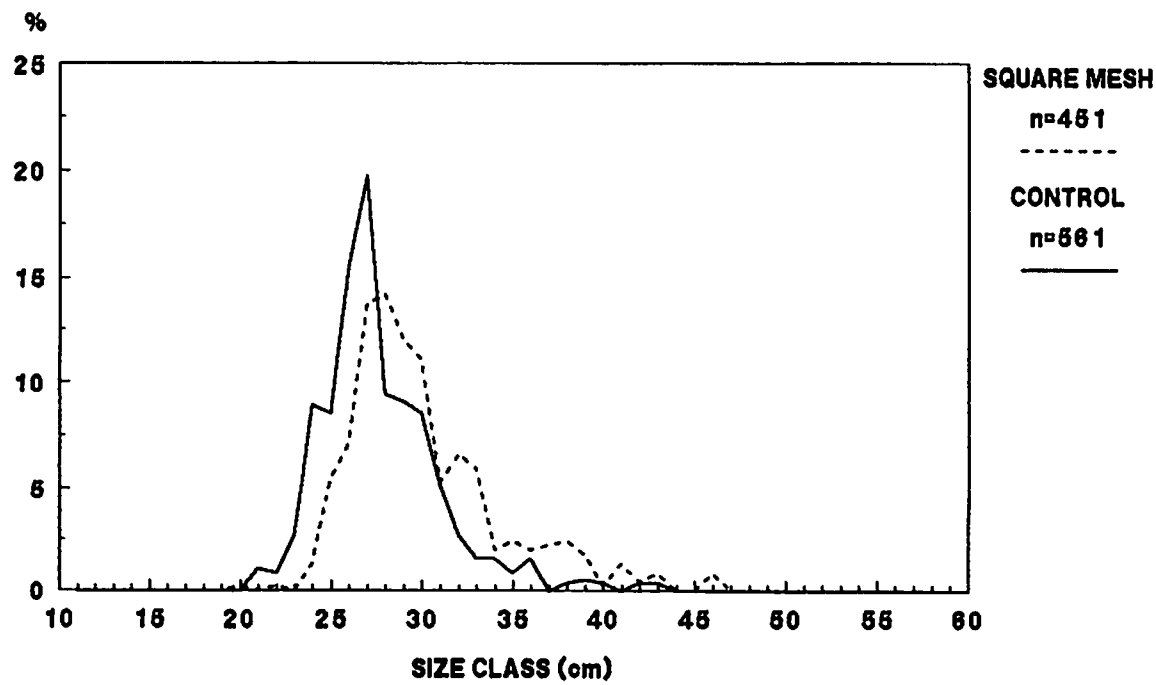


MFV Our Ocean Harvester PZ 403
Haul 27 (sq) v 26 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 27 (sq) v 26 (dia)

SEAFISH

WHITING TEST 8

SQUARE MESH	
SAMPLE TOTAL:	451
RAISED TOTAL:	451
MLS (cm)	27
% DISCARDS	14
% RETAINED	86

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	1	0.22
21	0	0
22	1	0.22
23	0	0
24	6	1.33
25	25	5.54
26	32	7.09
27	62	13.7
28	64	14.1
29	54	11.9
30	50	11.0
31	24	5.32
32	30	6.65
33	27	5.98
34	9	1.99
35	11	2.43
36	9	1.99
37	10	2.21
38	11	2.43
39	8	1.77
40	1	0.22
41	6	1.33
42	2	0.44
43	4	0.88
44	0	0
45	0	0
46	4	0.88
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

CONTROL	
SAMPLE TOTAL:	561
RAISED TOTAL:	561
MLS (cm)	27
% DISCARDS	38
% RETAINED	62

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	6	1.06
22	5	0.89
23	15	2.67
24	50	8.91
25	48	8.55
26	87	15.5
27	111	19.7
28	53	9.44
29	51	9.09
30	48	8.55
31	29	5.16
32	15	2.67
33	9	1.60
34	9	1.60
35	5	0.89
36	9	1.60
37	0	0
38	2	0.35
39	3	0.53
40	2	0.35
41	0	0
42	2	0.35
43	2	0.35
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)	%	n
REDN. DISCARDS:	69	146
LOSS MARKETABLE:	-10	-36

SPECIES:	WHITING
GEAR:	std. v 80mm sq.

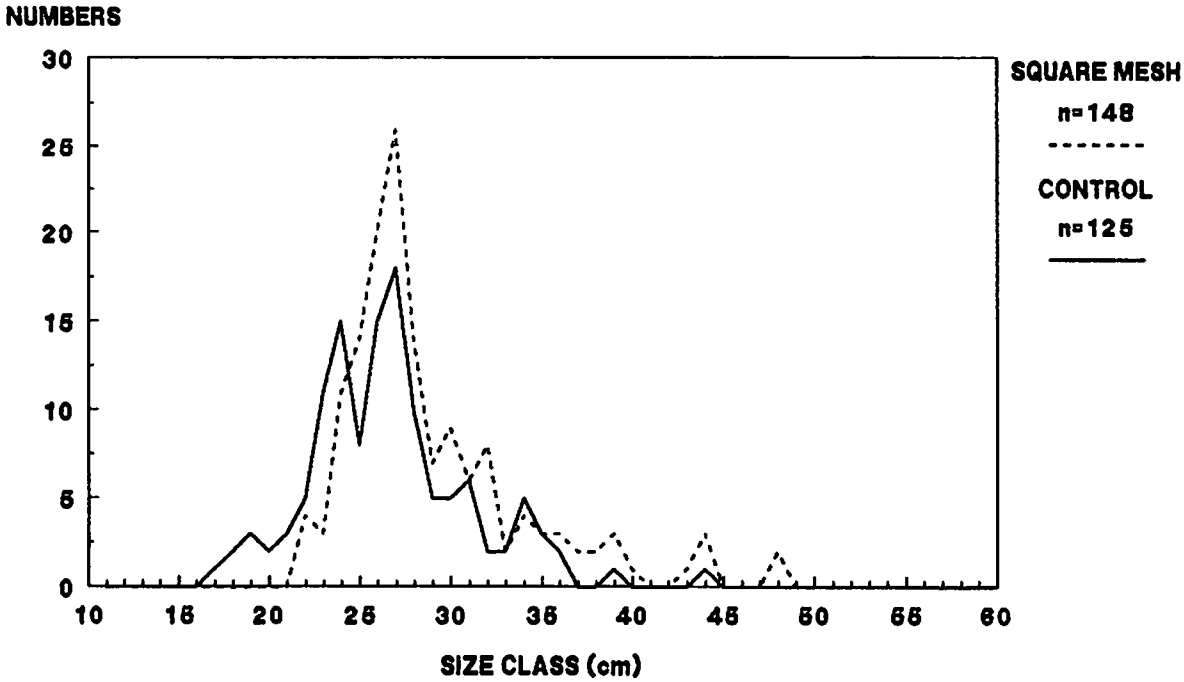
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	7.3	33	22.1	124	14.8	91
26-30	58.1	262	62.4	350	4.3	88
31-35	22.4	101	11.9	67	-10.5	-34
36-40	8.6	39	2.9	16	-5.7	-23
41-45	2.7	12	0.7	4	-2	-8
46-50	0.9	4	0	0	-0.9	-4
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 19.60 %
Number of fish represented by this: 110

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

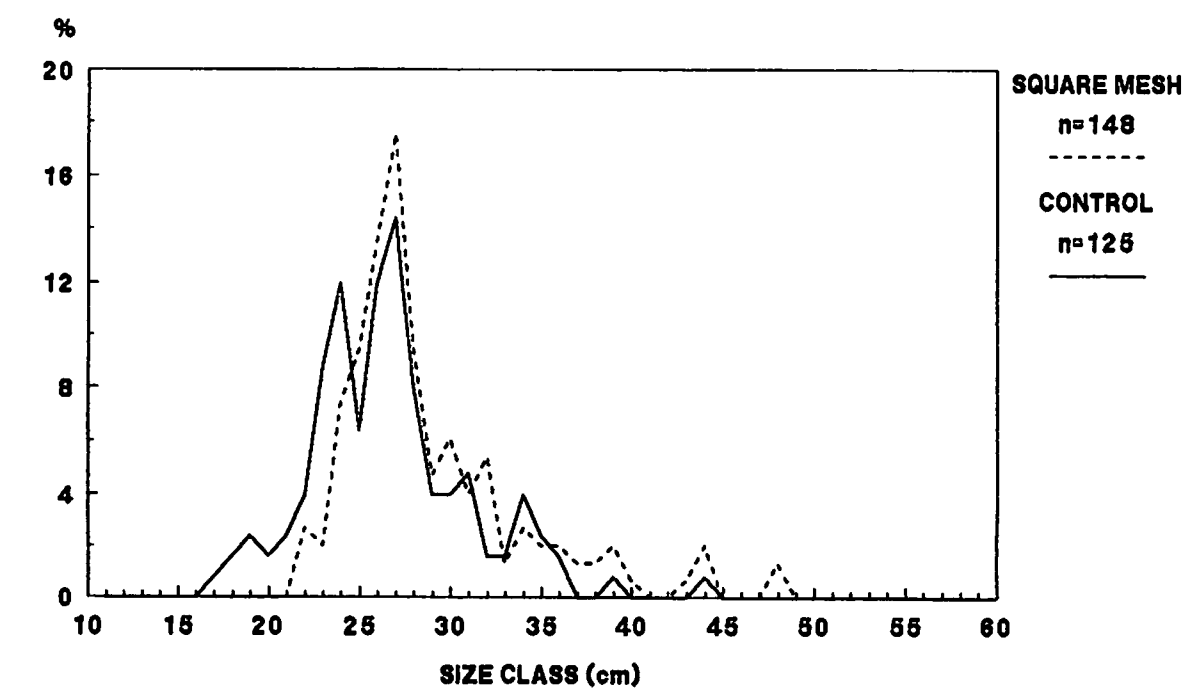


MFV Our Ocean Harvester PZ 403
Haul 28 (sq) v 29 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 28 (sq) v 29 (dia)

SEAFISH

WHITING TEST 9

SQUARE MESH	
SAMPLE TOTAL:	148
RAISED TOTAL:	148
MLS (cm)	27
% DISCARDS	35
% RETAINED	65

CONTROL	
SAMPLE TOTAL:	125
RAISED TOTAL:	125
MLS (cm)	27
% DISCARDS	52
% RETAINED	48

DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)	%	n
REDN. DISCARDS:	20	13
LOSS MARKETABLE:	-60	-36

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

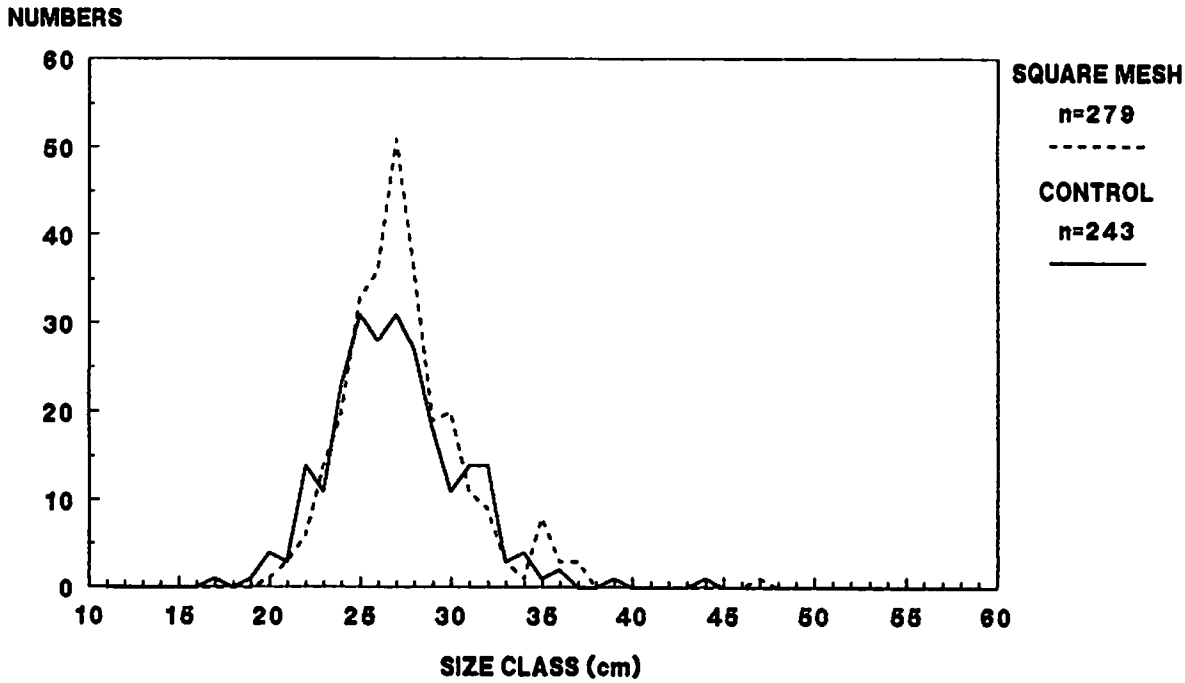
CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	1	0.8
18	0	0	18	2	1.6
19	0	0	19	3	2.4
20	0	0	20	2	1.6
21	0	0	21	3	2.4
22	4	2.70	22	5	4
23	3	2.02	23	11	8.8
24	11	7.43	24	15	12
25	14	9.45	25	8	6.4
26	20	13.5	26	15	12
27	26	17.5	27	18	14.4
28	14	9.45	28	10	8
29	7	4.72	29	5	4
30	9	6.08	30	5	4
31	6	4.05	31	6	4.8
32	8	5.40	32	2	1.6
33	2	1.35	33	2	1.6
34	4	2.70	34	5	4
35	3	2.02	35	3	2.4
36	3	2.02	36	2	1.6
37	2	1.35	37	0	0
38	2	1.35	38	0	0
39	3	2.02	39	1	0.8
40	1	0.67	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	1	0.67	43	0	0
44	3	2.02	44	1	0.8
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	2	1.35	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

Size Groupings:	SQUARE MESH		CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	21.6	32	40	50	18.4	18
26-30	51.4	76	42.4	53	-9	-23
31-35	15.5	23	14.4	18	-1.1	-5
36-40	7.4	11	2.4	3	-5	-8
41-45	2.7	4	0.8	1	-1.9	-3
46-50	1.4	2	0	0	-1.4	-2
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -18.4 %
Number of fish represented by this: -23

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

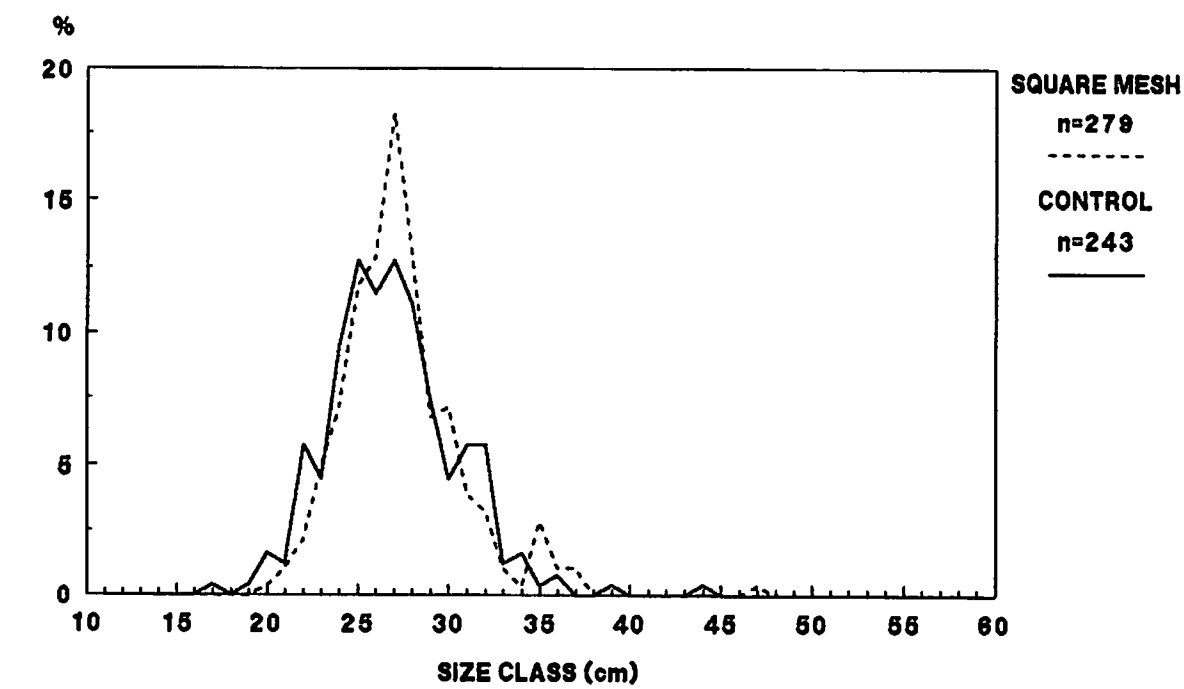


MFV Our Ocean Harvester PZ 403
Haul 31 (sq) v 30 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 31 (sq) v 30 (dia)

SEAFISH

WHITING TEST 10

SQUARE MESH	
SAMPLE TOTAL:	279
RAISED TOTAL:	279
MLS (cm)	27
% DISCARDS	41
% RETAINED	59

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	1	0.35
21	3	1.07
22	6	2.15
23	14	5.01
24	20	7.16
25	33	11.8
26	36	12.9
27	51	18.2
28	36	12.9
29	19	6.81
30	20	7.16
31	11	3.94
32	9	3.22
33	3	1.07
34	1	0.35
35	8	2.86
36	3	1.07
37	3	1.07
38	0	0
39	1	0.35
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	1	0.35
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

CONTROL	
SAMPLE TOTAL:	243
RAISED TOTAL:	243
MLS (cm)	27
% DISCARDS	48
% RETAINED	52

CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	1	0.41
18	0	0
19	1	0.41
20	4	1.64
21	3	1.23
22	14	5.76
23	11	4.52
24	23	9.46
25	31	12.7
26	28	11.5
27	31	12.7
28	27	11.1
29	18	7.40
30	11	4.52
31	14	5.76
32	14	5.76
33	3	1.23
34	4	1.64
35	1	0.41
36	2	0.82
37	0	0
38	0	0
39	1	0.41
40	0	0
41	0	0
42	0	0
43	0	0
44	1	0.41
45	0	0
46	0	0
47	0	0

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	3	3
LOSS MARKETABLE:	-31	-39

SPECIES: WHITING
GEAR: std. v 80mm sq.

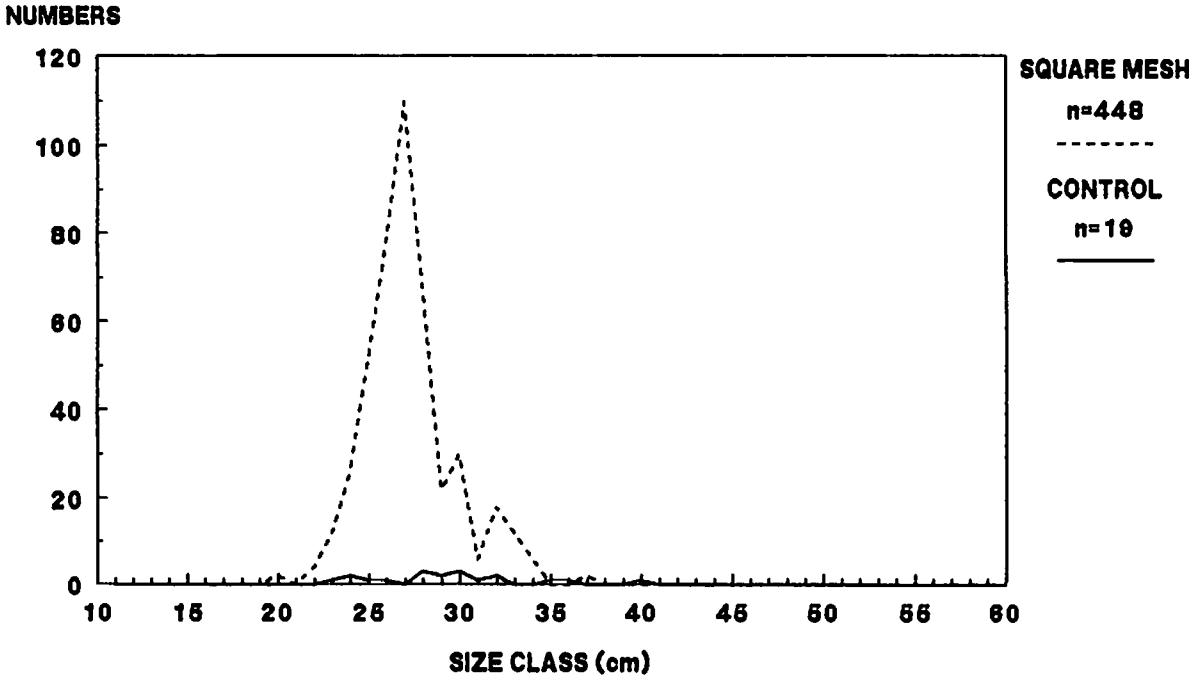
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	27.6	77	36.2	88	8.6	11
26-30	58.1	162	47.3	115	-10.8	-47
31-35	11.5	32	14.8	36	3.3	4
36-40	2.5	7	1.2	3	-1.3	-4
41-45	0	0	0.4	1	0.4	1
46-50	0.4	1	0	0	-0.4	-1
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -14.8 %
Number of fish represented by this: -36

WHITING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

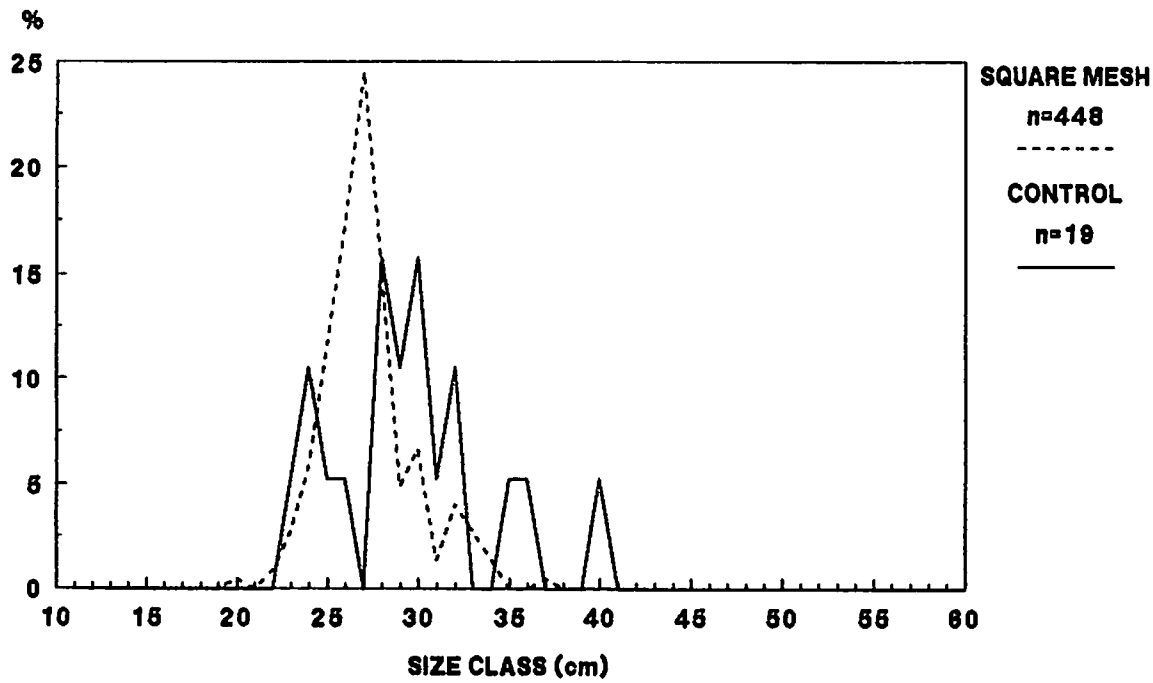


MFV Our Ocean Harvester PZ 403
Haul 32 (sq) v 33 (dia)

SEAFISH

WHITING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 32 (sq) v 33 (dia)

SEAFISH

WHITING TEST 11

SQUARE MESH		CONTROL	
SAMPLE TOTAL:	448	SAMPLE TOTAL:	19
RAISED TOTAL:	448	RAISED TOTAL:	19
MLS (cm)	27	MLS (cm)	27
% DISCARDS	39	% DISCARDS	26
% RETAINED	61	% RETAINED	74

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	0	0	19	0	0
20	2	0.44	20	0	0
21	0	0	21	0	0
22	4	0.89	22	0	0
23	12	2.67	23	1	5.26
24	26	5.80	24	2	10.5
25	52	11.6	25	1	5.26
26	78	17.4	26	1	5.26
27	110	24.5	27	0	0
28	68	15.1	28	3	15.7
29	22	4.91	29	2	10.5
30	30	6.69	30	3	15.7
31	6	1.33	31	1	5.26
32	18	4.01	32	2	10.5
33	12	2.67	33	0	0
34	6	1.33	34	0	0
35	0	0	35	1	5.26
36	0	0	36	1	5.26
37	2	0.44	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	1	5.26
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	-3380	-169
LOSS MARKETABLE:	-1857	-260

SPECIES: WHITING
GEAR: std. v 80mm sq.

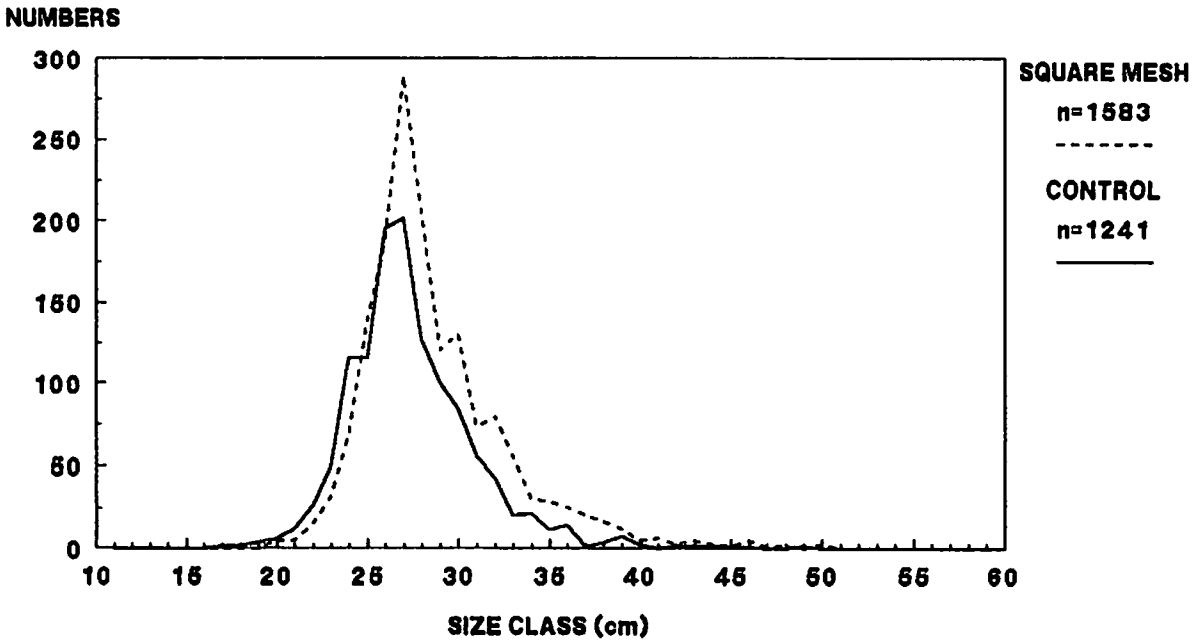
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:

Group (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	0	0	0	0	0	0
16-25	21.4	96	21.1	4	-0.3	-92
26-30	68.8	308	47.4	9	-21.4	-299
31-35	9.4	42	21.1	4	11.7	-38
36-40	0.4	2	10.5	2	10.1	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -2257 %
Number of fish represented by this: -429

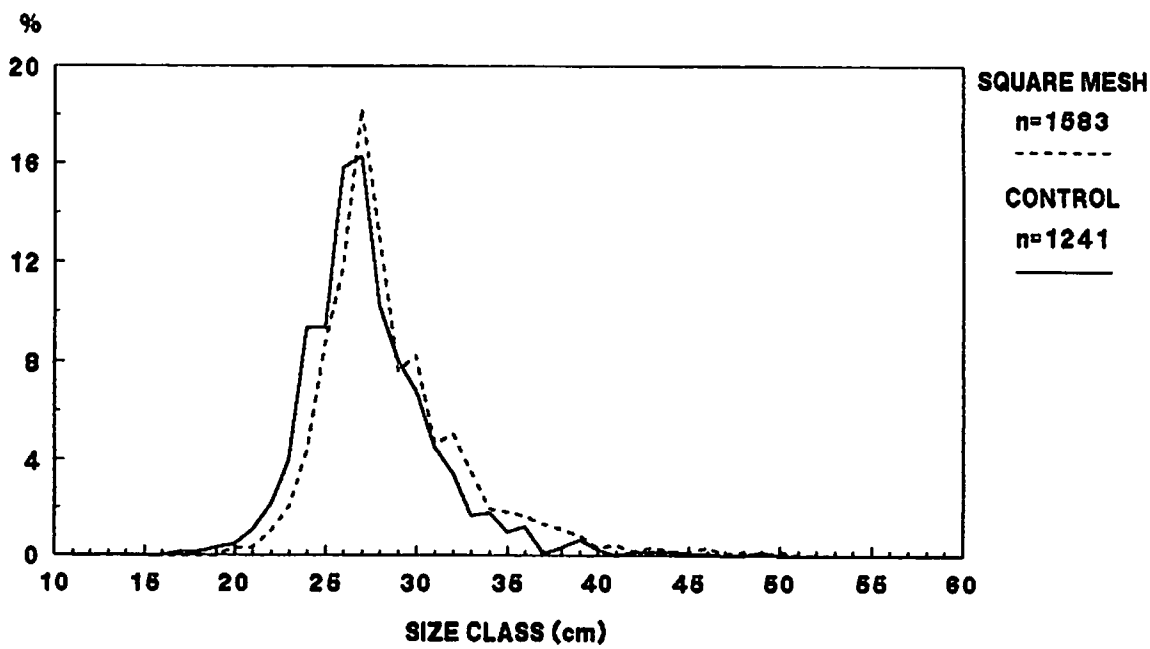
WHITING: Length-Numbers Plot
Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 22,24,27,28,31,32 (sq) v
23,25,26,29,30,33 (dia)

SEAFISH

WHITING: Length-Frequency Plot
Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 22,24,27,28,31,32 (sq) v
23,25,26,29,30,33 (dia)

SEAFISH

WHITING TEST 12

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS
SAMPLE TOTAL:	1583	SAMPLE TOTAL:	1241	(PERCENT AND NUMBERS)
RAISED TOTAL:	1583	RAISED TOTAL:	1241	
MLS (cm)	27	MLS (cm)	27	REDN. DISCARDS: 15 % 79 n
% DISCARDS	29	% DISCARDS	43	LOSS MARKETABLE: -59 % -421 n
% RETAINED	71	% RETAINED	57	

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	2	0.16
18	0	0	18	2	0.16
19	0	0	19	4	0.32
20	5	0.31	20	6	0.48
21	5	0.31	21	13	1.04
22	16	1.01	22	27	2.17
23	32	2.02	23	50	4.02
24	69	4.35	24	116	9.34
25	139	8.78	25	116	9.34
26	187	11.8	26	196	15.7
27	289	18.2	27	202	16.2
28	206	13.0	28	127	10.2
29	121	7.64	29	100	8.05
30	131	8.27	30	85	6.84
31	74	4.67	31	56	4.51
32	80	5.05	32	43	3.46
33	56	3.53	33	21	1.69
34	31	1.95	34	22	1.77
35	29	1.83	35	12	0.96
36	26	1.64	36	15	1.20
37	21	1.32	37	1	0.08
38	17	1.07	38	4	0.32
39	13	0.82	39	8	0.64
40	5	0.31	40	3	0.24
41	7	0.44	41	0	0
42	3	0.18	42	2	0.16
43	5	0.31	43	2	0.16
44	3	0.18	44	2	0.16
45	2	0.12	45	1	0.08
46	5	0.31	46	1	0.08
47	1	0.06	47	0	0
48	2	0.12	48	0	0
49	0	0	49	2	0.16
50	3	0.18	50	0	0
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

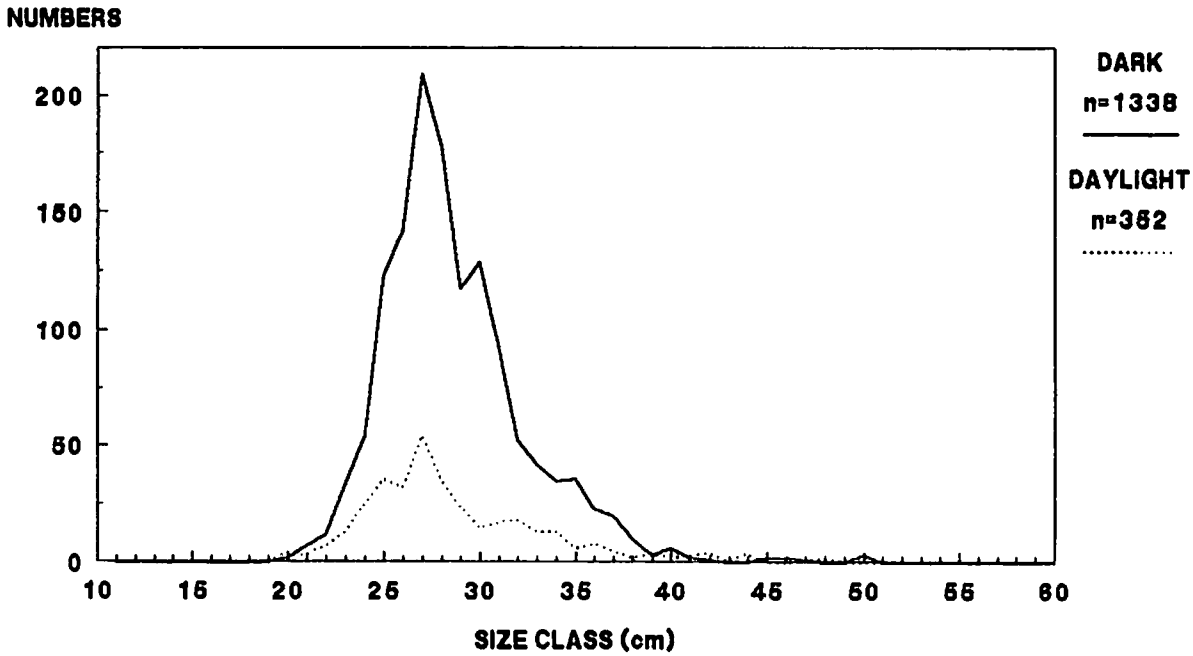
SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:	SQUARE MESH		CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	16.8	266	27.1	336	10.3	70
26-30	59	934	57.2	710	-1.8	-224
31-35	17.1	270	12.4	154	-4.7	-116
36-40	5.2	82	2.5	31	-2.7	-51
41-45	1.3	20	0.6	7	-0.7	-13
46-50	0.7	11	0.2	3	-0.5	-8
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -27.5 %
Number of fish represented by this: -342

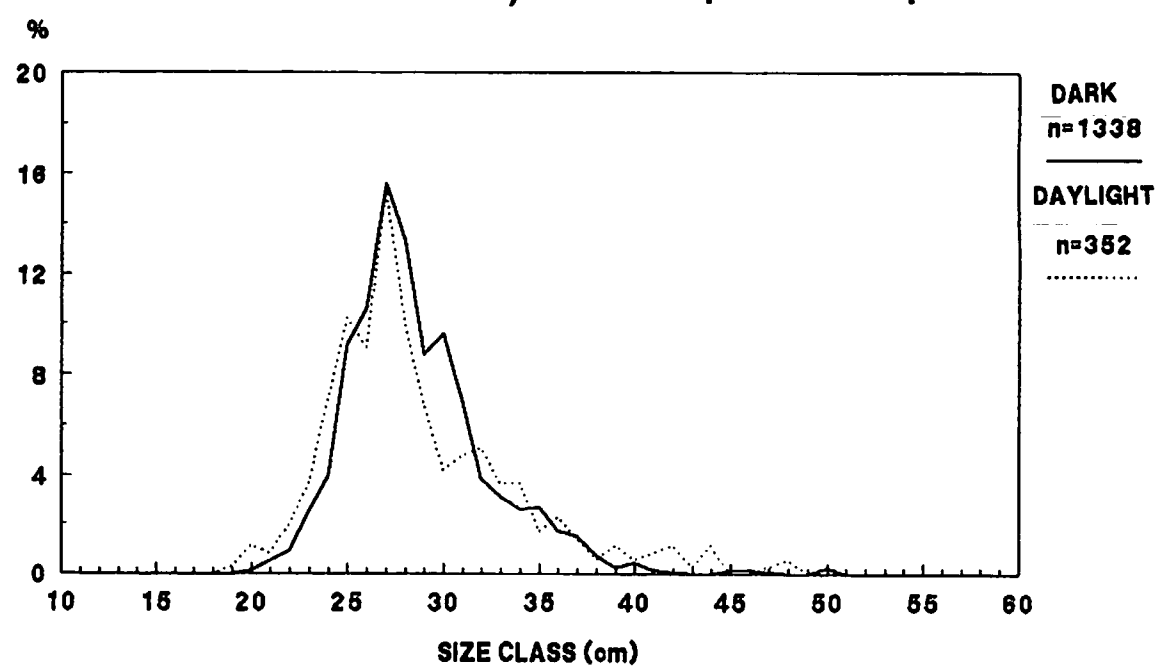
DARK HAULS VS DAYLIGHT HAULS
WHITING: Length-Numbers Plot
Standard 90mm diamond / 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 10,18,22,31 (DARK), 8,19,24,28 (DAYLIGHT)

SEAFISH

DARK HAULS VS DAYLIGHT HAULS
WHITING: Length-Frequency Plot
Standard 90mm diamond / 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 10,18,22,31 (DARK), 8,19,24,28 (DAYLIGHT)

SEAFISH

WHITING TEST 13

DAYLIGHT HAULS			DARK HAULS			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	352		SAMPLE TOTAL:	1338		(PERCENT AND NUMBERS)		
RAISED TOTAL:	352		RAISED TOTAL:	1338			%	n
MLS (cm)	27		MLS (cm)	27		REDN. DISCARDS:	68	253
% DISCARDS	34		% DISCARDS	28		LOSS MARKETABLE:	76	733
% RETAINED	66		% RETAINED	72				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	0	0	18	0	0
19	1	0.28	19	0	0
20	4	1.13	20	2	0.14
21	3	0.85	21	7	0.52
22	7	1.98	22	12	0.89
23	13	3.69	23	34	2.54
24	25	7.10	24	54	4.03
25	36	10.2	25	123	9.19
26	32	9.09	26	142	10.6
27	54	15.3	27	209	15.6
28	35	9.94	28	178	13.3
29	24	6.81	29	118	8.81
30	15	4.26	30	129	9.64
31	17	4.82	31	92	6.87
32	18	5.11	32	52	3.88
33	13	3.69	33	42	3.13
34	13	3.69	34	35	2.61
35	6	1.70	35	36	2.69
36	8	2.27	36	23	1.71
37	5	1.42	37	20	1.49
38	2	0.56	38	10	0.74
39	4	1.13	39	3	0.22
40	2	0.56	40	6	0.44
41	3	0.85	41	2	0.14
42	4	1.13	42	1	0.07
43	1	0.28	43	0	0
44	4	1.13	44	0	0
45	0	0	45	2	0.14
46	0	0	46	2	0.14
47	1	0.28	47	1	0.07
48	2	0.56	48	0	0
49	0	0	49	0	0
50	0	0	50	3	0.22
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

SPECIES: WHITING
GEAR: std. v 80mm sq.

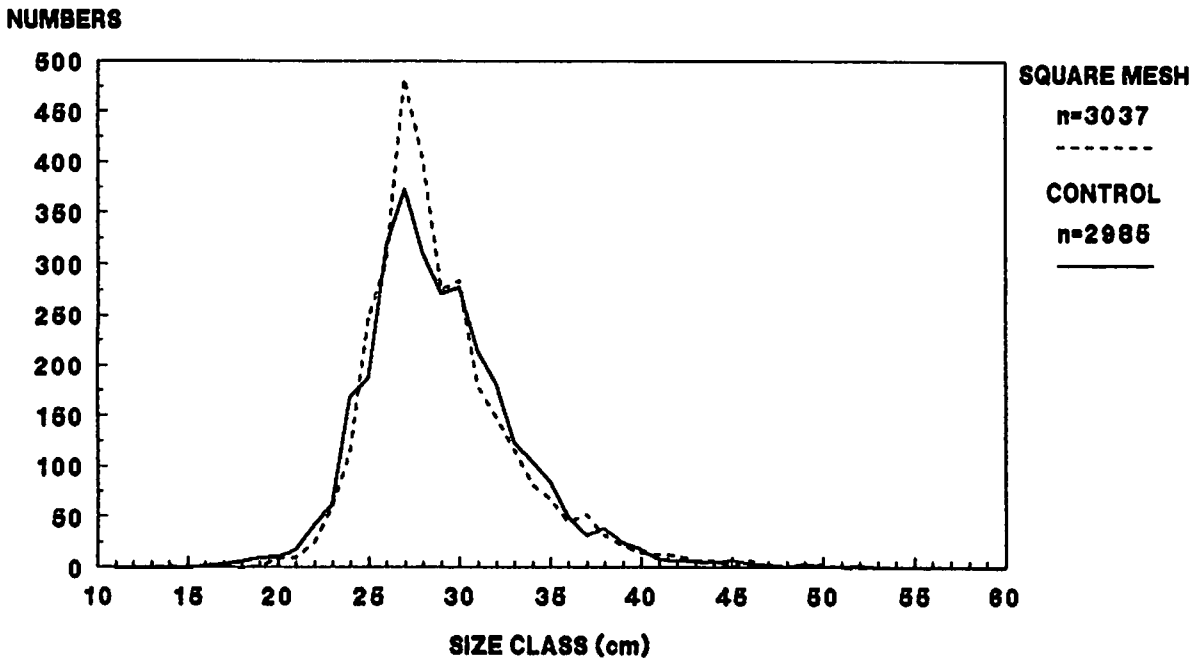
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
DARK vs DAYLIGHT TOWS
ALL GEAR 80mm SQUARE MESH
APRIL 1992

Size Groupings: (5cm)	DAYLIGHT TOWS %	n	DARK TOWS %	n	DIFFERENCES (DK-DL) %	n
11-15	0	0	0	0	0	0
16-25	25.3	89	17.3	232	-8	143
26-30	45.5	160	58	776	12.5	616
31-35	19	67	19.2	257	0.2	190
36-40	6	21	4.6	62	-1.4	41
41-45	3.4	12	0.4	5	-3	-7
46-50	0.9	3	0.4	6	-0.5	3
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch 73.69 %

Number of fish represented by this: 986

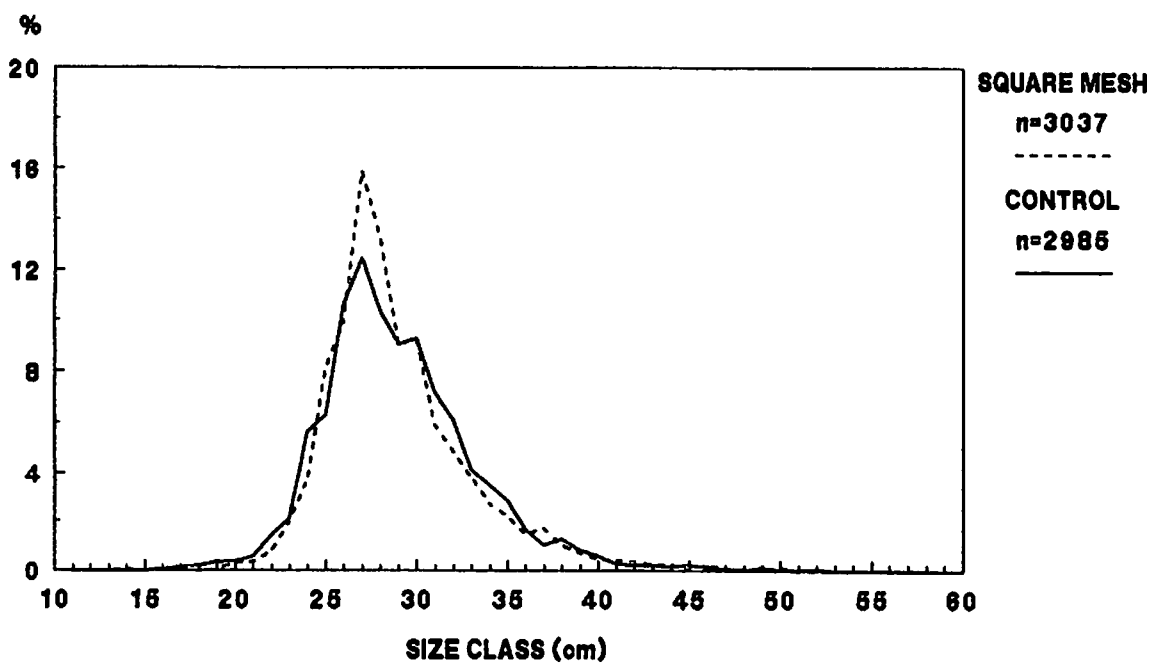
WHITING: Length-Numbers Plot
Standard 90mm diamond v. 80mm square mesh panel
ALL HAULS COMBINED



MFV Our Ocean Harvester PZ 403
All hauls (16 square; 18 diamond)

SEAFISH

WHITING: Length-Frequency Plot
Standard 90mm diamond v. 80mm square mesh panel
ALL HAULS COMBINED



MFV Our Ocean Harvester PZ 403
All hauls (16 square; 18 diamond)

SEAFISH

WHITING TEST 14

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	3037		SAMPLE TOTAL:	2985		(PERCENT AND NUMBERS)		
RAISED TOTAL:	3037		RAISED TOTAL:	2985			%	n
MLS (cm)	27		MLS (cm)	27		REDN. DISCARDS:	7	58
% DISCARDS	25		% DISCARDS	28		LOSS MARKETABLE:	-5	-110
% RETAINED	75		% RETAINED	72				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	2	0.06	14	0	0
15	0	0	15	0	0
16	2	0.06	16	2	0.06
17	1	0.03	17	4	0.13
18	0	0	18	6	0.20
19	1	0.03	19	10	0.33
20	10	0.32	20	11	0.36
21	10	0.32	21	18	0.60
22	25	0.82	22	43	1.44
23	60	1.97	23	63	2.11
24	113	3.72	24	169	5.66
25	248	8.16	25	188	6.29
26	302	9.94	26	318	10.6
27	483	15.9	27	373	12.4
28	405	13.3	28	310	10.3
29	275	9.05	29	271	9.07
30	283	9.31	30	277	9.27
31	179	5.89	31	214	7.16
32	148	4.87	32	181	6.06
33	117	3.85	33	124	4.15
34	82	2.70	34	104	3.48
35	68	2.23	35	85	2.84
36	45	1.48	36	50	1.67
37	52	1.71	37	32	1.07
38	32	1.05	38	39	1.30
39	22	0.72	39	25	0.83
40	15	0.49	40	19	0.63
41	13	0.42	41	8	0.26
42	12	0.39	42	7	0.23
43	7	0.23	43	6	0.20
44	7	0.23	44	5	0.16
45	2	0.06	45	7	0.23
46	7	0.23	46	4	0.13
47	2	0.06	47	3	0.10
48	2	0.06	48	1	0.03
49	1	0.03	49	4	0.13
50	4	0.13	50	1	0.03
51	0	0	51	1	0.03
52	0	0	52	2	0.06
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

SPECIES: WHITING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:

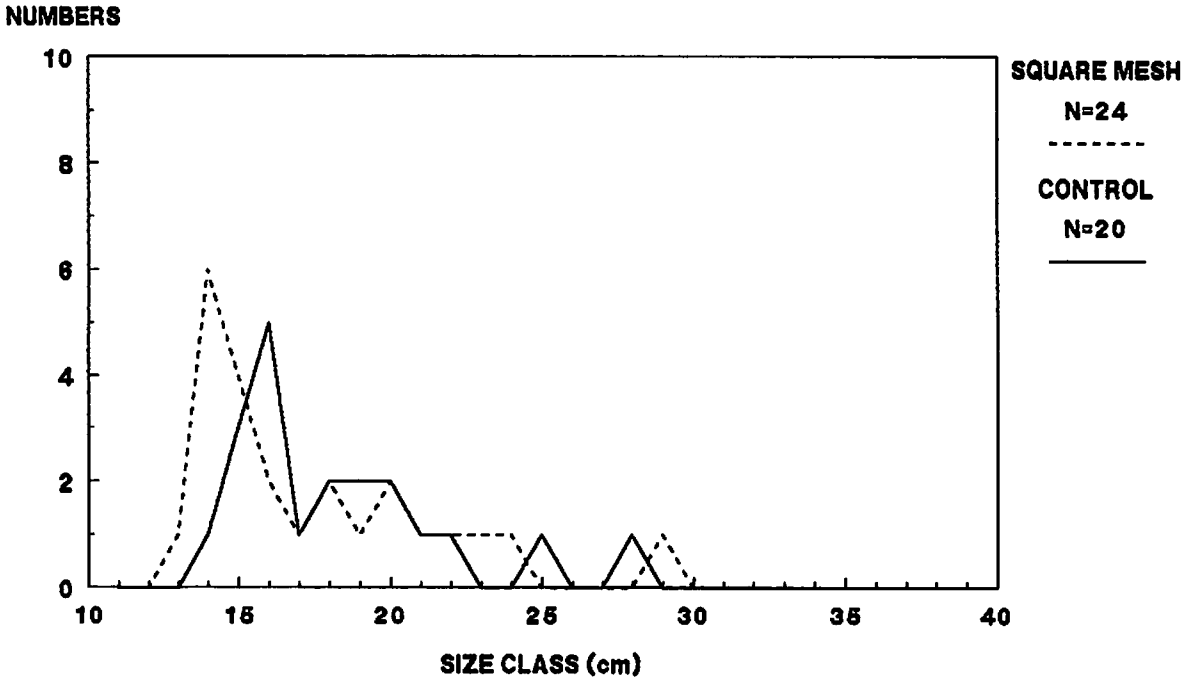
SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0.1	2	0	0	-0.1	-2
16-25	15.5	470	17.2	514	1.7	44
26-30	57.6	1748	51.9	1549	-5.7	-199
31-35	19.6	594	23.7	708	4.1	114
36-40	5.5	166	5.5	165	0	-1
41-45	1.4	41	1.1	33	-0.3	-8
46-50	0.5	16	0.4	13	-0.1	-3
51-55	0	0	0.1	3	0.1	3
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -1.74 %
Number of fish represented by this: -52

TESTS 15 TO 28 - POUTING

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

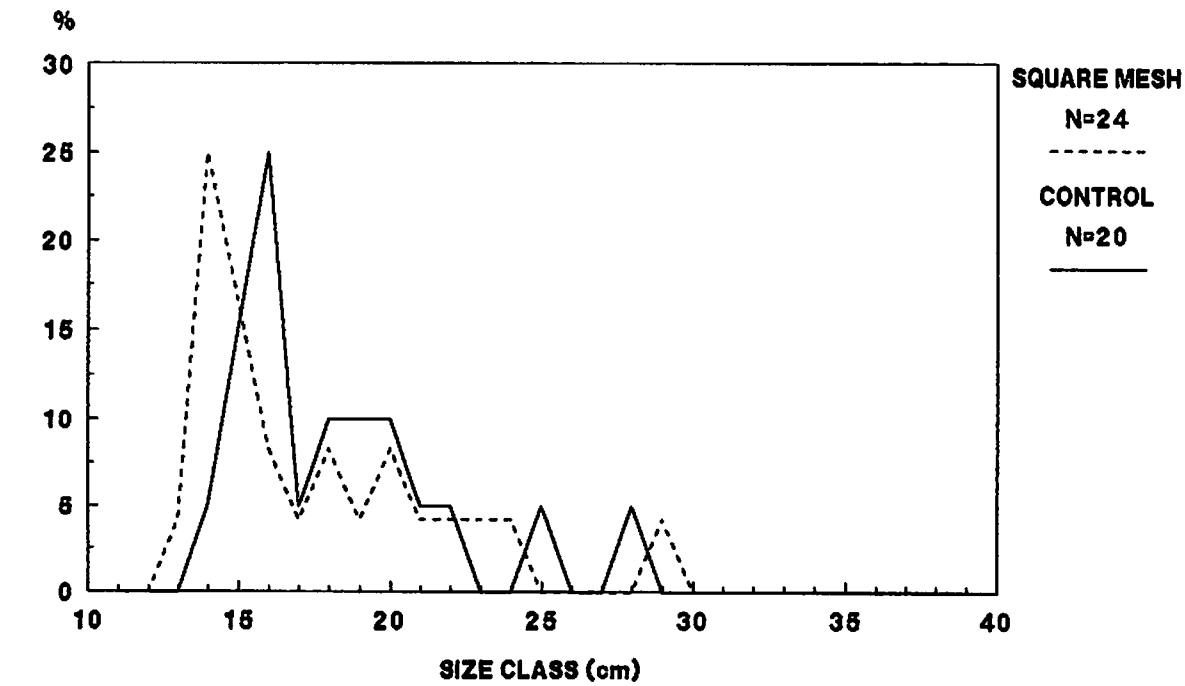


MFV Our Ocean Harvester PZ 403
Haul 1 (sq) v 2 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 1 (sq) v 2 (dia)

SEAFISH

POUTING TEST 15

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS
SAMPLE TOTAL:	24	SAMPLE TOTAL:	20	(PERCENT AND NUMBERS)
RAISED TOTAL:	24	RAISED TOTAL:	20	
MLS (cm)	0	MLS (cm)	0	
% DISCARDS	N/A	% DISCARDS	N/A	
% RETAINED	N/A	% RETAINED	N/A	

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	1	4.16	13	0	0
14	6	25	14	1	5
15	4	16.6	15	3	15
16	2	8.33	16	5	25
17	1	4.16	17	1	5
18	2	8.33	18	2	10
19	1	4.16	19	2	10
20	2	8.33	20	2	10
21	1	4.16	21	1	5
22	1	4.16	22	1	5
23	1	4.16	23	0	0
24	1	4.16	24	0	0
25	0	0	25	1	5
26	0	0	26	0	0
27	0	0	27	0	0
28	0	0	28	1	5
29	1	4.16	29	0	0
30	0	0	30	0	0
31	0	0	31	0	0
32	0	0	32	0	0
33	0	0	33	0	0
34	0	0	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

	%	n
REDN. DISCARDS:	N/A	N/A
LOSS MARKETABLE:	N/A	N/A

SPECIES: POUTING
GEAR: std. v 80mm sq.

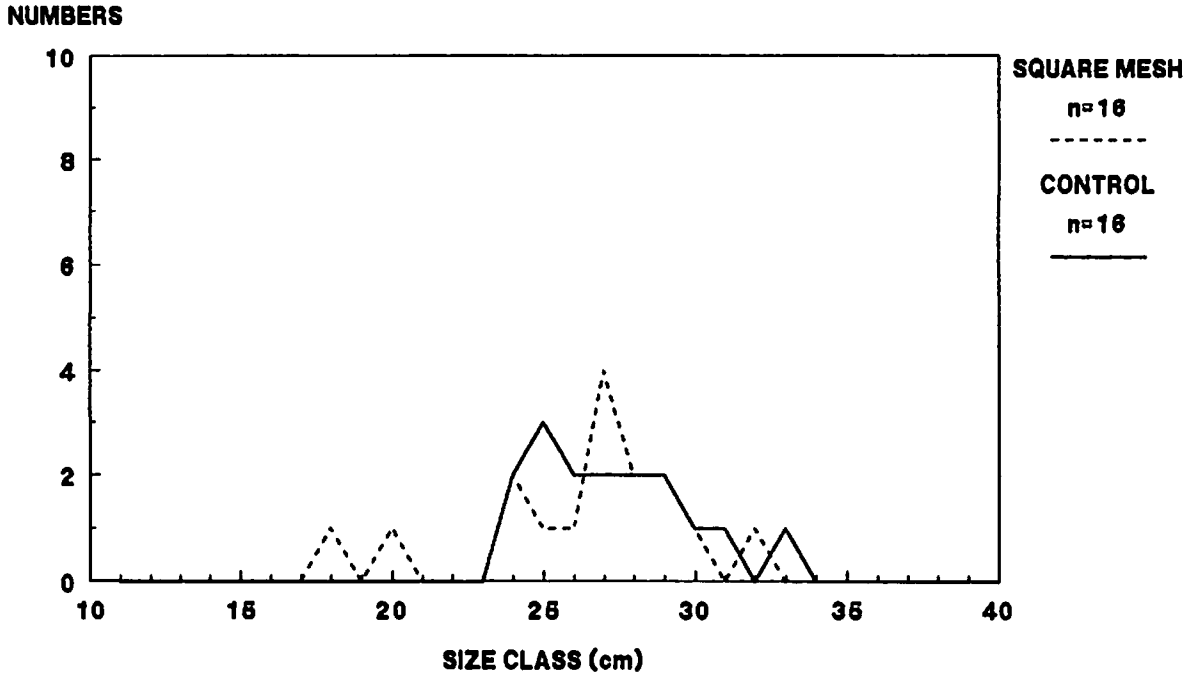
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	45.8	11	20	4	-25.8	-7
16-25	50	12	75	15	25	3
26-30	4.2	1	5	1	0.8	0
31-35	0	0	0	0	0	0
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -20 %
Number of fish represented by this: -4

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel



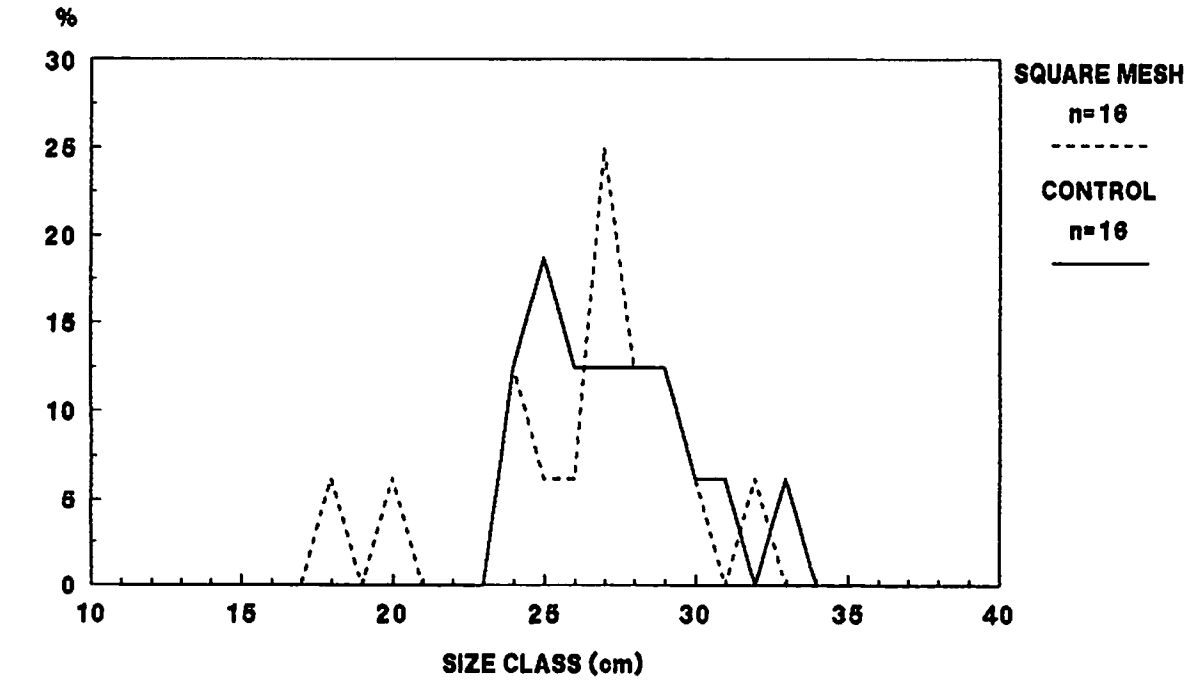
MFV Our Ocean Harvester PZ 403

Haul 8& 10 (sq) v 7&9 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403

Haul 8& 10 (sq) v 7&9 (dia)

SEAFISH

POUTING TEST 16

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	16		SAMPLE TOTAL:	16		(PERCENT AND NUMBERS)		
RAISED TOTAL:	16		RAISED TOTAL:	16			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A		% RETAINED	N/A				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	0	0
15	0	0	15	0	0
16	0	0	16	0	0
17	0	0	17	0	0
18	1	6.25	18	0	0
19	0	0	19	0	0
20	1	6.25	20	0	0
21	0	0	21	0	0
22	0	0	22	0	0
23	0	0	23	0	0
24	2	12.5	24	2	12.5
25	1	6.25	25	3	18.7
26	1	6.25	26	2	12.5
27	4	25	27	2	12.5
28	2	12.5	28	2	12.5
29	2	12.5	29	2	12.5
30	1	6.25	30	1	6.25
31	0	0	31	1	6.25
32	1	6.25	32	0	0
33	0	0	33	1	6.25
34	0	0	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0
51	0	0	51	0	0
52	0	0	52	0	0
53	0	0	53	0	0
54	0	0	54	0	0
55	0	0	55	0	0
56	0	0	56	0	0
57	0	0	57	0	0
58	0	0	58	0	0
59	0	0	59	0	0
60	0	0	60	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

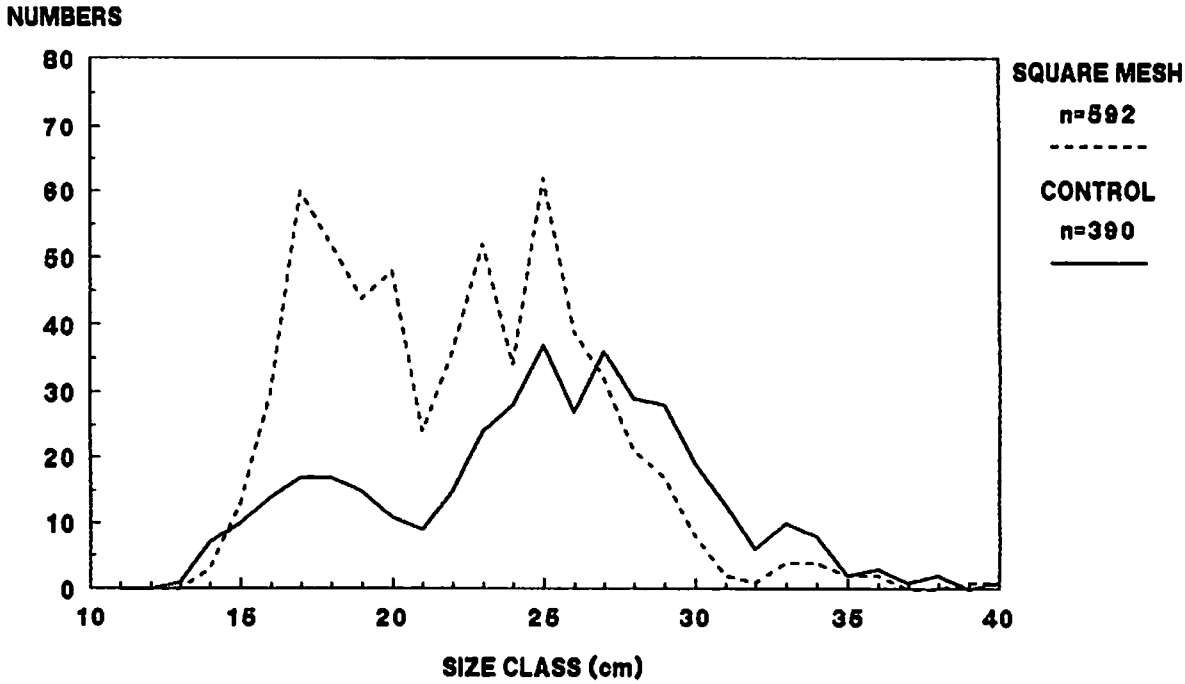
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:	SQUARE MESH		CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	31.3	5	31.3	5	0	0
26-30	62.5	10	56.3	9	-6.2	-1
31-35	6.3	1	12.5	2	6.2	1
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 0 %
Number of fish represented by this: 0

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

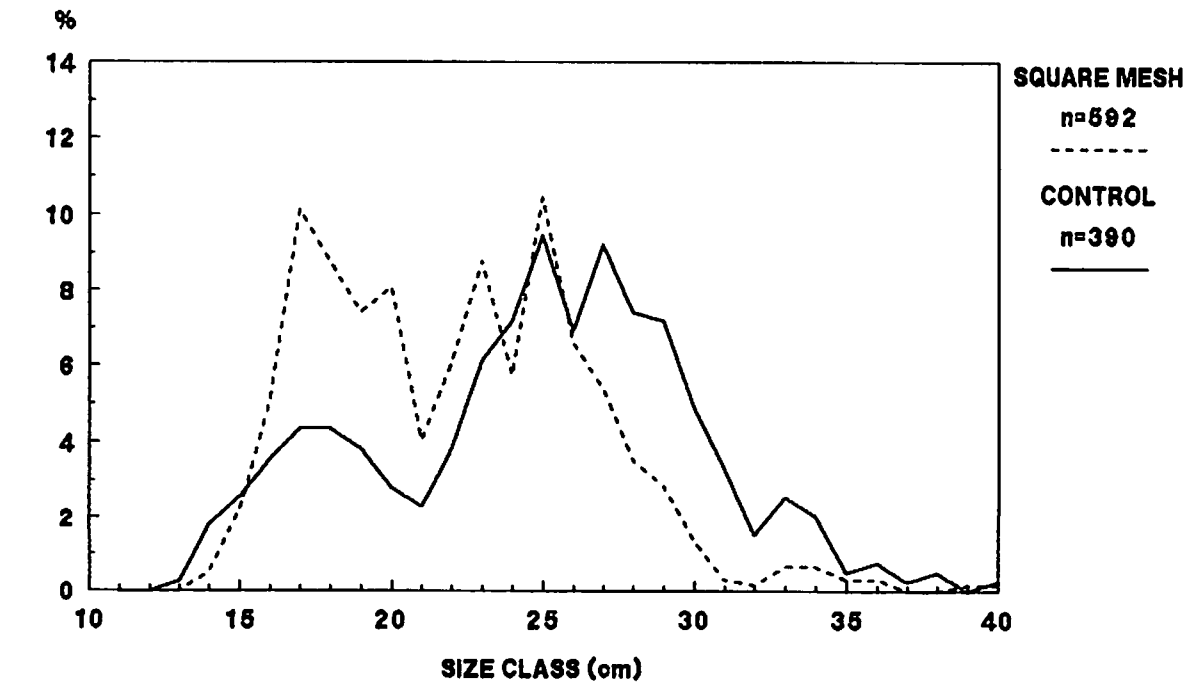


MFV Our Ocean Harvester PZ 403
Haul 12&13 (sq) v 11&14 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 12&13 (sq) v 11&14 (dia)

SEAFISH

POUTING TEST 17

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	592		SAMPLE TOTAL:	390		(PERCENT AND NUMBERS)		
RAISED TOTAL:	592		RAISED TOTAL:	390			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A		% RETAINED	N/A				
						SPECIES:	POUTING	
CLASS	RAISED	FREQ.	CLASS	RAISED	FREQ.	GEAR:	std. v 80mm sq.	
cm	NUMBERS	%	cm	NUMBERS	%			
11	0	0	11	0	0			
12	0	0	12	0	0	MFV OUR OCEAN HARVESTER		
13	0	0	13	1	0.25	PADSTOW/NEWLYN		
14	3	0.50	14	7	1.79	ALT. TOW (SQUARE/DIAMOND)		
15	13	2.19	15	10	2.56	APRIL 1992		
16	30	5.06	16	14	3.58			
17	60	10.1	17	17	4.35			
18	52	8.78	18	17	4.35			
19	44	7.43	19	15	3.84			
20	48	8.10	20	11	2.82			
21	24	4.05	21	9	2.30			
22	36	6.08	22	15	3.84			
23	52	8.78	23	24	6.15			
24	34	5.74	24	28	7.17			
25	62	10.4	25	37	9.48			
26	39	6.58	26	27	6.92			
27	32	5.40	27	36	9.23			
28	21	3.54	28	29	7.43			
29	17	2.87	29	28	7.17			
30	8	1.35	30	19	4.87			
31	2	0.33	31	13	3.33			
32	1	0.16	32	6	1.53			
33	4	0.67	33	10	2.56			
34	4	0.67	34	8	2.05			
35	2	0.33	35	2	0.51			
36	2	0.33	36	3	0.76			
37	0	0	37	1	0.25			
38	0	0	38	2	0.51			
39	1	0.16	39	0	0			
40	1	0.16	40	1	0.25			
41	0	0	41	0	0			
42	0	0	42	0	0			
43	0	0	43	0	0			
44	0	0	44	0	0			
45	0	0	45	0	0			
46	0	0	46	0	0			
47	0	0	47	0	0			
48	0	0	48	0	0			
49	0	0	49	0	0			
50	0	0	50	0	0			

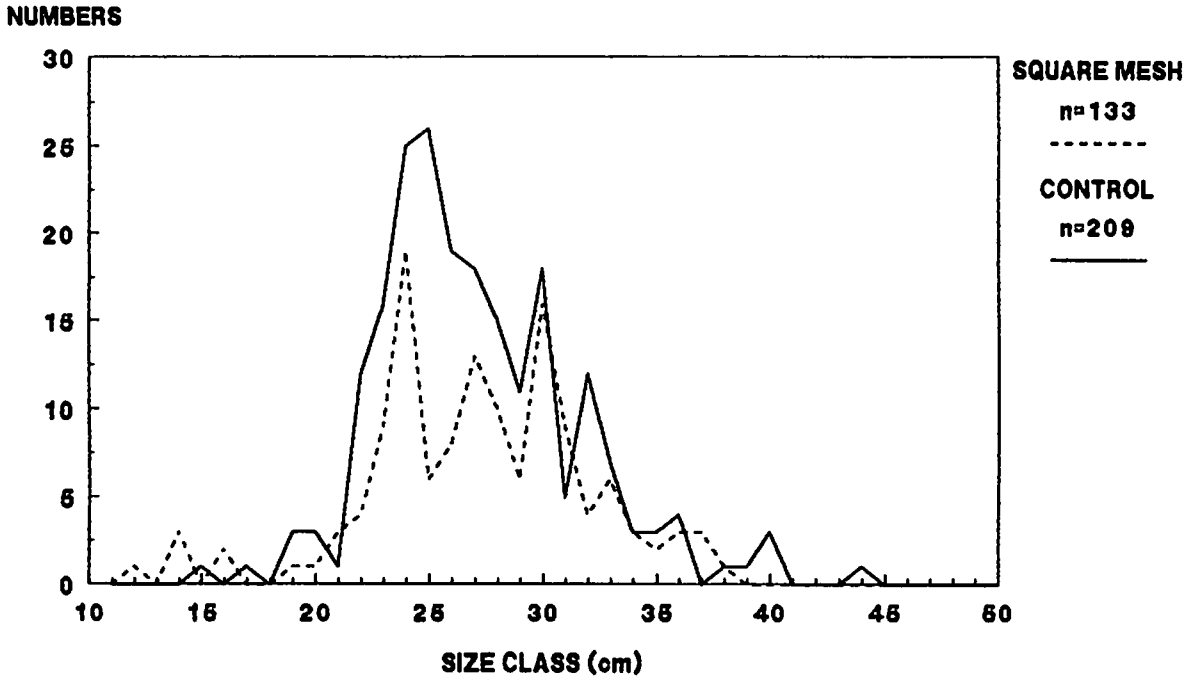
Size Groupings:						DIFFERENCES	
SQUARE MESH			CONTROL			(CON-SQU)	
Group	%	n	%	n		%	n
(5cm)							
11-15	2.7	16	4.6	18		1.9	2
16-25	74.7	442	47.9	187		-26.8	-255
26-30	19.8	117	35.6	139		15.8	22
31-35	2.2	13	10	39		7.8	26
36-40	0.7	4	1.8	7		1.1	3
41-45	0	0	0	0		0	0
46-50	0	0	0	0		0	0
51-55	0	0	0	0		0	0
56-60	0	0	0	0		0	0
61-65	0	0	0	0		0	0
66-70	0	0	0	0		0	0
71-75	0	0	0	0		0	0
76-80	0	0	0	0		0	0
81-85	0	0	0	0		0	0
86-90	0	0	0	0		0	0

% Reduction in catch attributable to the square mesh panels: -51.7 %

Number of fish represented by this: -202

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

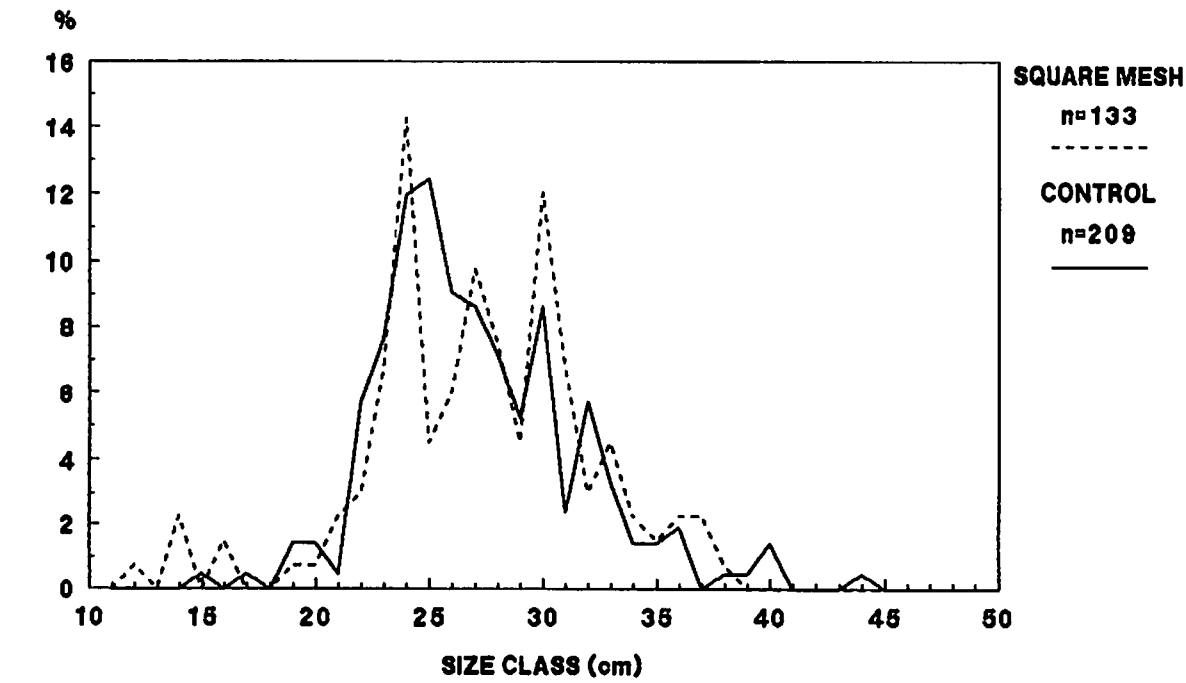


MFV Our Ocean Harvester PZ 403
Haul 16 (sq) v 15 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 16 (sq) v 15 (dia)

SEAFISH

POUTING TEST 18

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	133	SAMPLE TOTAL:	209	(PERCENT AND NUMBERS)		
RAISED TOTAL:	133	RAISED TOTAL:	209		%	n
MLS (cm)	0	MLS (cm)	0	REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A	% DISCARDS	N/A	LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A	% RETAINED	N/A			

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	1	0.75	12	0	0
13	0	0	13	0	0
14	3	2.25	14	0	0
15	0	0	15	1	0.47
16	2	1.50	16	0	0
17	0	0	17	1	0.47
18	0	0	18	0	0
19	1	0.75	19	3	1.43
20	1	0.75	20	3	1.43
21	3	2.25	21	1	0.47
22	4	3.00	22	12	5.74
23	9	6.76	23	16	7.65
24	19	14.2	24	25	11.9
25	6	4.51	25	26	12.4
26	8	6.01	26	19	9.09
27	13	9.77	27	18	8.61
28	10	7.51	28	15	7.17
29	6	4.51	29	11	5.26
30	16	12.0	30	18	8.61
31	9	6.76	31	5	2.39
32	4	3.00	32	12	5.74
33	6	4.51	33	7	3.34
34	3	2.25	34	3	1.43
35	2	1.50	35	3	1.43
36	3	2.25	36	4	1.91
37	3	2.25	37	0	0
38	1	0.75	38	1	0.47
39	0	0	39	1	0.47
40	0	0	40	3	1.43
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	1	0.47
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

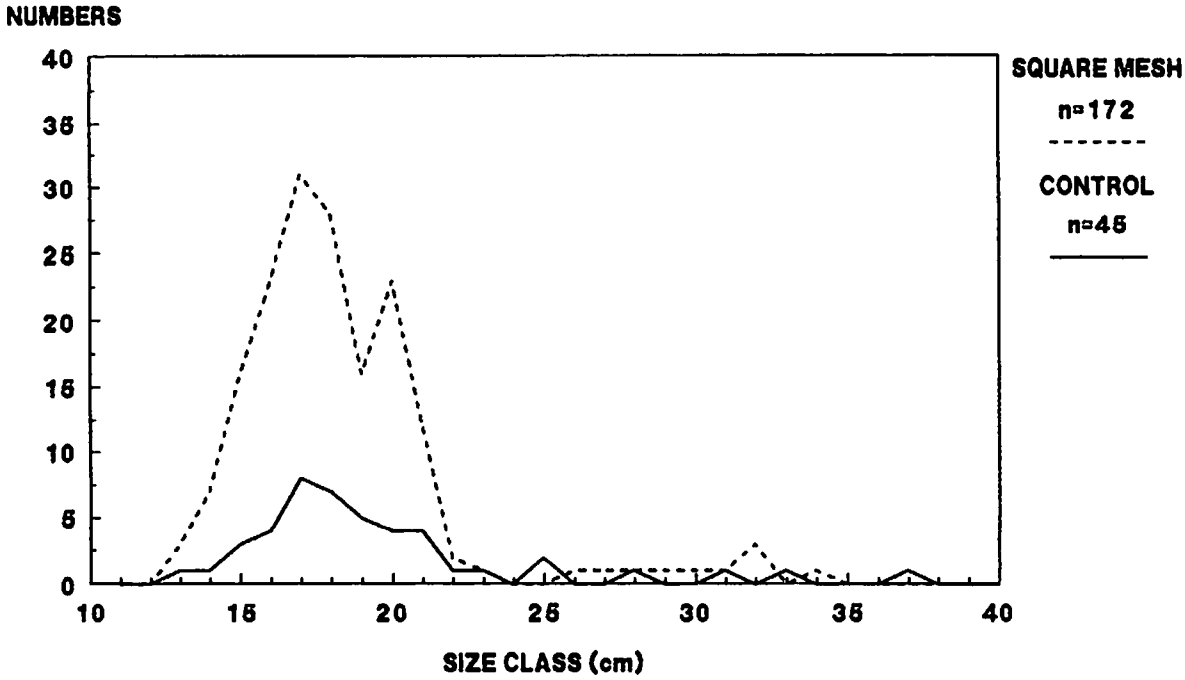
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	3	4	0.5	1	-2.5	-3
16-25	33.8	45	41.6	87	7.8	42
26-30	39.8	53	38.8	81	-1	28
31-35	18	24	14.4	30	-3.6	6
36-40	5.3	7	4.3	9	-1	2
41-45	0	0	0.5	1	0.5	1
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 36.36 %
Number of fish represented by this: 76

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

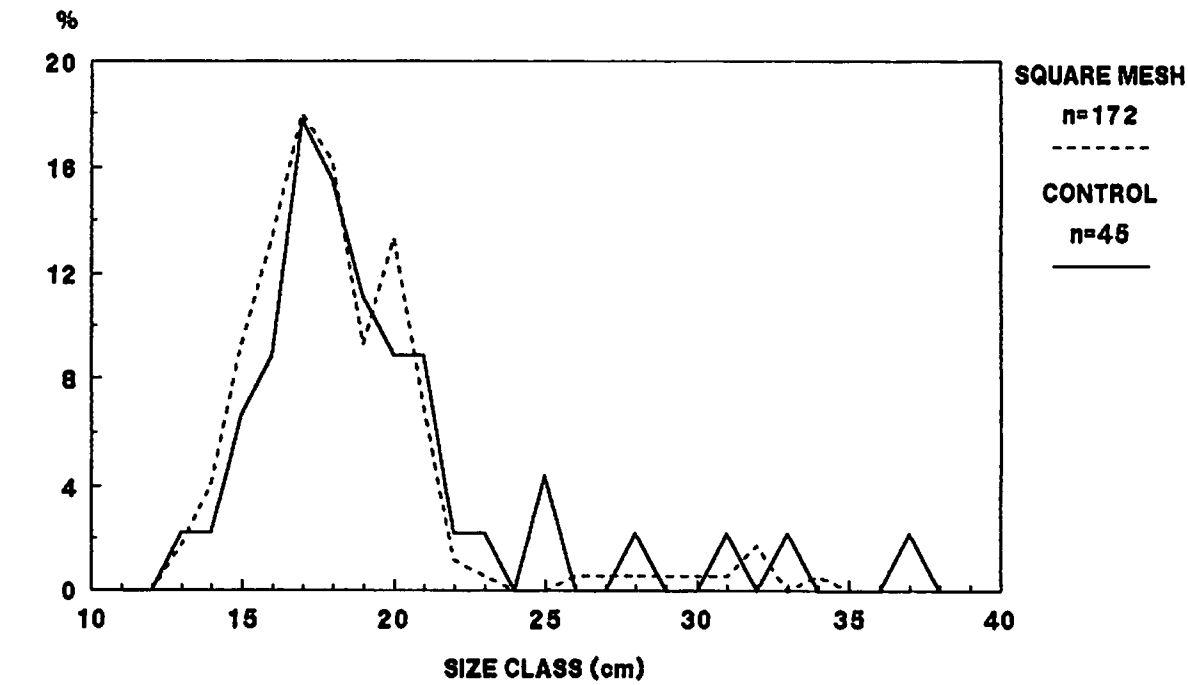


MFV Our Ocean Harvester PZ 403
Haul 18&19 (sq) v 20&21 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 18&19 (sq) v 20&21 (dia)

SEAFISH

POUTING TEST 19

SQUARE MESH		CONTROL	
SAMPLE TOTAL:	172	SAMPLE TOTAL:	45
RAISED TOTAL:	172	RAISED TOTAL:	45
MLS (cm)	0	MLS (cm)	0
% DISCARDS	N/A	% DISCARDS	N/A
% RETAINED	N/A	% RETAINED	N/A

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	3	1.74	13	1	2.22
14	7	4.06	14	1	2.22
15	16	9.30	15	3	6.66
16	23	13.3	16	4	8.88
17	31	18.0	17	8	17.7
18	28	16.2	18	7	15.5
19	16	9.30	19	5	11.1
20	23	13.3	20	4	8.88
21	12	6.97	21	4	8.88
22	2	1.16	22	1	2.22
23	1	0.58	23	1	2.22
24	0	0	24	0	0
25	0	0	25	2	4.44
26	1	0.58	26	0	0
27	1	0.58	27	0	0
28	1	0.58	28	1	2.22
29	1	0.58	29	0	0
30	1	0.58	30	0	0
31	1	0.58	31	1	2.22
32	3	1.74	32	0	0
33	0	0	33	1	2.22
34	1	0.58	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	1	2.22
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	N/A	N/A
LOSS MARKETABLE:	N/A	N/A

SPECIES: POUTING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

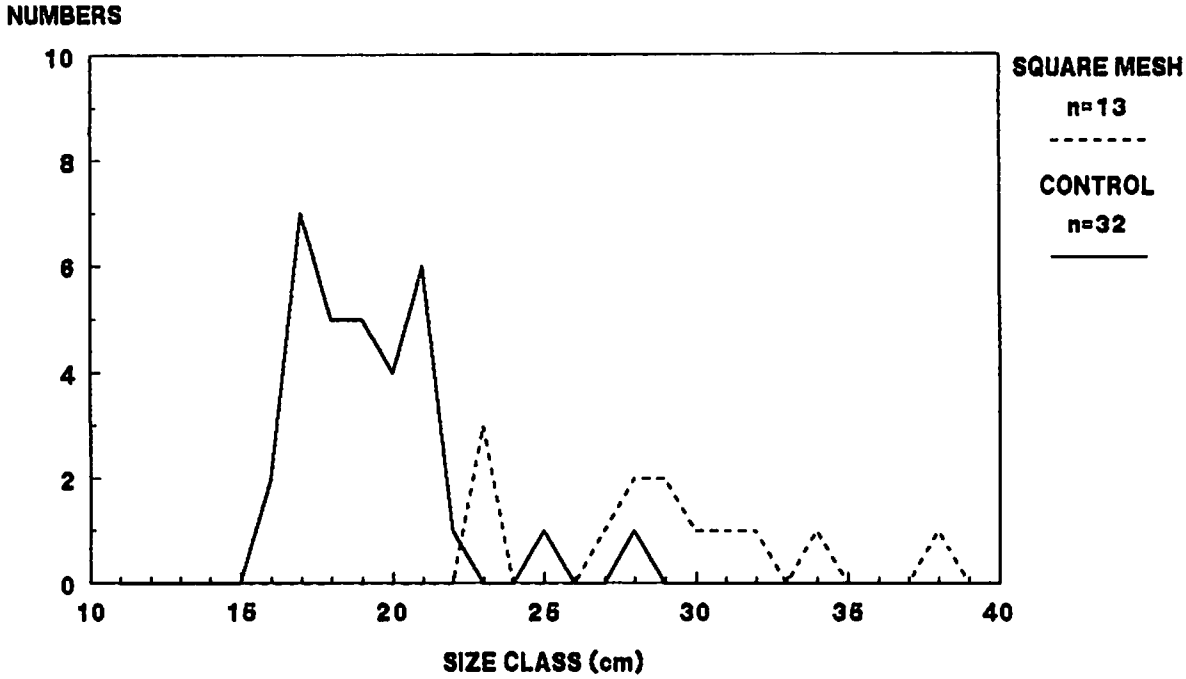
Size Groupings:

SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	15.1	26	11.1	5	-4	-21
16-25	79.1	136	80	36	0.9	-100
26-30	2.9	5	2.2	1	-0.7	-4
31-35	2.9	5	4.4	2	1.5	-3
36-40	0	0	2.2	1	2.2	1
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -282. %
Number of fish represented by this: -127

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

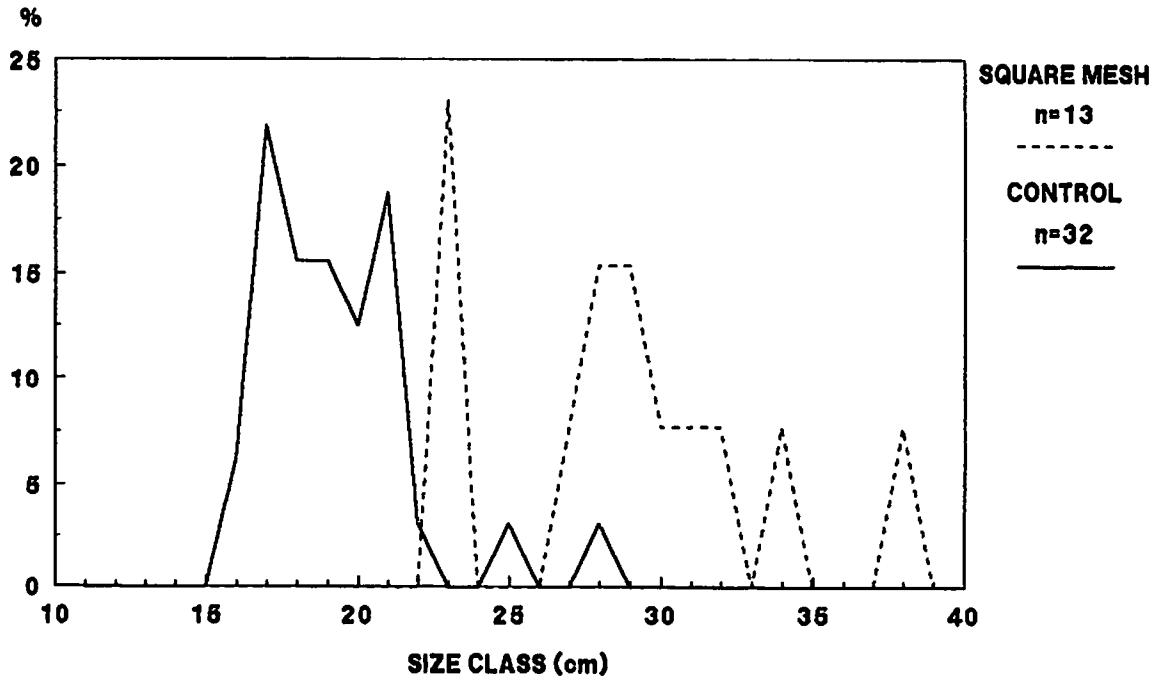


MFV Our Ocean Harvester PZ 403
Haul 22 (sq) v 23 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 22 (sq) v 23 (dia)

SEAFISH

POUTING TEST 20

SQUARE MESH	
SAMPLE TOTAL:	13
RAISED TOTAL:	13
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

CONTROL	
SAMPLE TOTAL:	32
RAISED TOTAL:	32
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	N/A	N/A
LOSS MARKETABLE:	N/A	N/A

SPECIES: POUTING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

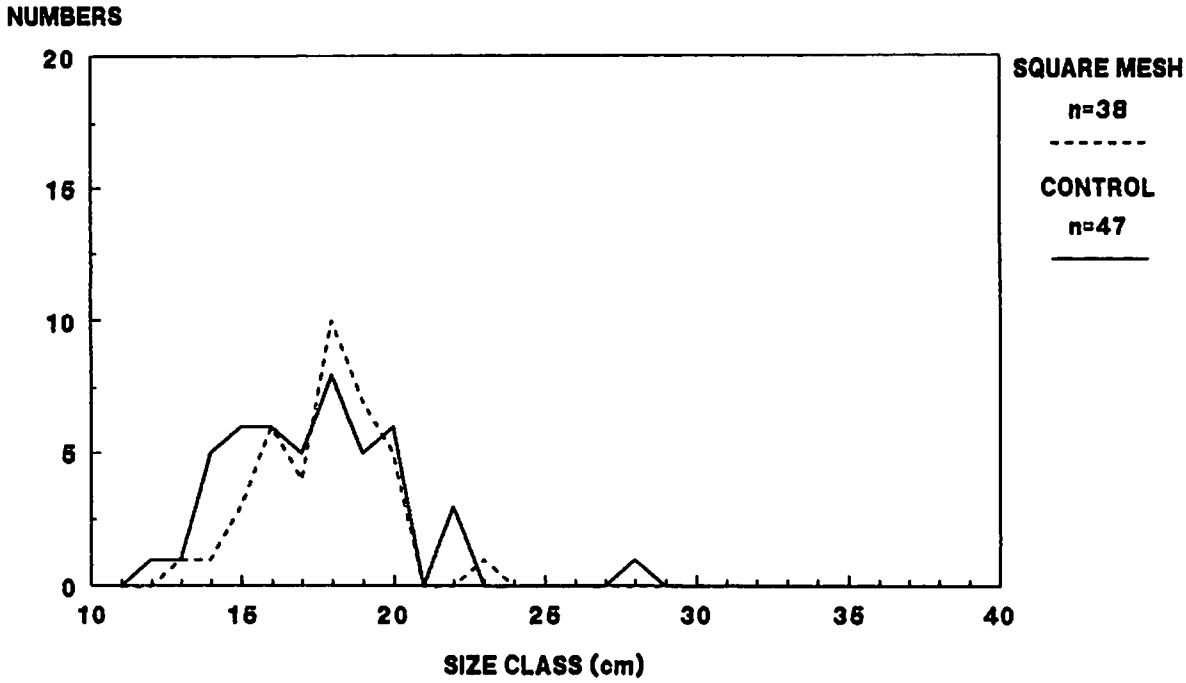
CLASS cm	RAISED NUMBERS	FREQ. %	RAISED NUMBERS	FREQ. %
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	2	6.25
17	0	0	7	21.8
18	0	0	5	15.6
19	0	0	5	15.6
20	0	0	4	12.5
21	0	0	6	18.7
22	0	0	1	3.12
23	3	23.0	0	0
24	0	0	0	0
25	0	0	1	3.12
26	0	0	0	0
27	1	7.69	0	0
28	2	15.3	1	3.12
29	2	15.3	0	0
30	1	7.69	0	0
31	1	7.69	0	0
32	1	7.69	0	0
33	0	0	0	0
34	1	7.69	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	1	7.69	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	0	0	0	0
16-25	23.1	3	96.9	31	73.8	28
26-30	46.2	6	3.1	1	-43.1	-5
31-35	23.1	3	0	0	-23.1	-3
36-40	7.7	1	0	0	-7.7	-1
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 59.37 %
Number of fish represented by this: 19

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

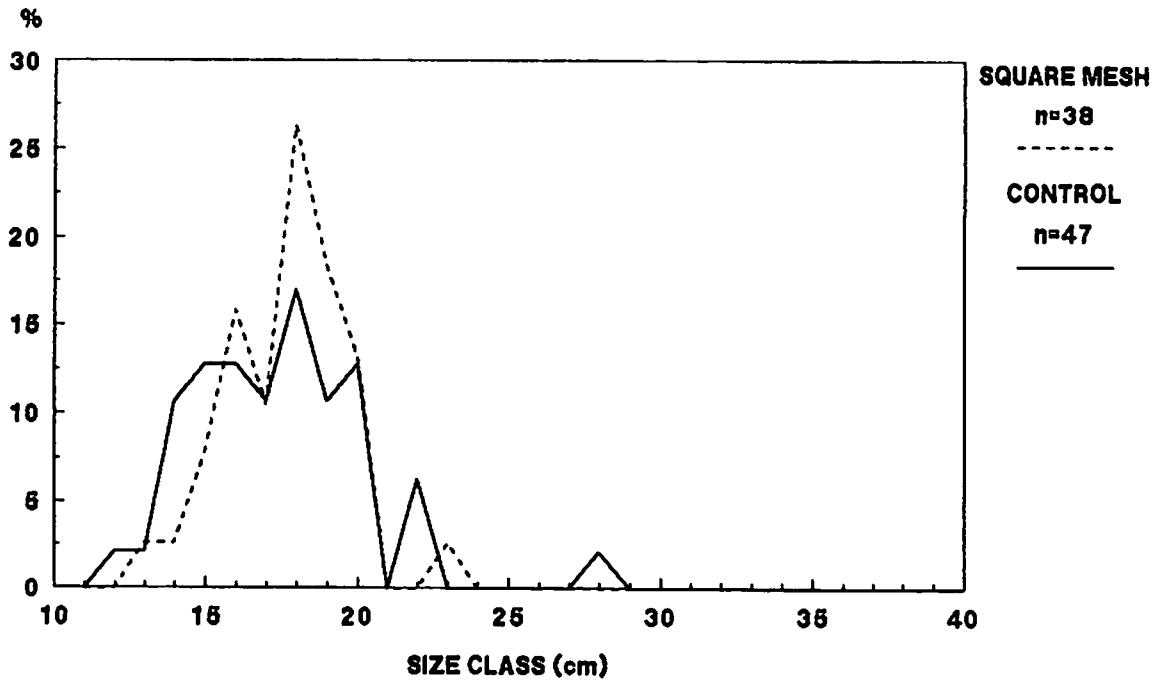


MFV Our Ocean Harvester PZ 403
Haul 24 (sq) v 25 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 24 (sq) v 25 (dia)

SEAFISH

POUTING TEST 21

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS
SAMPLE TOTAL:	38	SAMPLE TOTAL:	47	(PERCENT AND NUMBERS)
RAISED TOTAL:	38	RAISED TOTAL:	47	
MLS (cm)	0	MLS (cm)	0	REDN. DISCARDS: N/A N/A
% DISCARDS	N/A	% DISCARDS	N/A	LOSS MARKETABLE: N/A N/A
% RETAINED	N/A	% RETAINED	N/A	

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	1	2.12
13	1	2.63	13	1	2.12
14	1	2.63	14	5	10.6
15	3	7.89	15	6	12.7
16	6	15.7	16	6	12.7
17	4	10.5	17	5	10.6
18	10	26.3	18	8	17.0
19	7	18.4	19	5	10.6
20	5	13.1	20	6	12.7
21	0	0	21	0	0
22	0	0	22	3	6.38
23	1	2.63	23	0	0
24	0	0	24	0	0
25	0	0	25	0	0
26	0	0	26	0	0
27	0	0	27	0	0
28	0	0	28	1	2.12
29	0	0	29	0	0
30	0	0	30	0	0
31	0	0	31	0	0
32	0	0	32	0	0
33	0	0	33	0	0
34	0	0	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

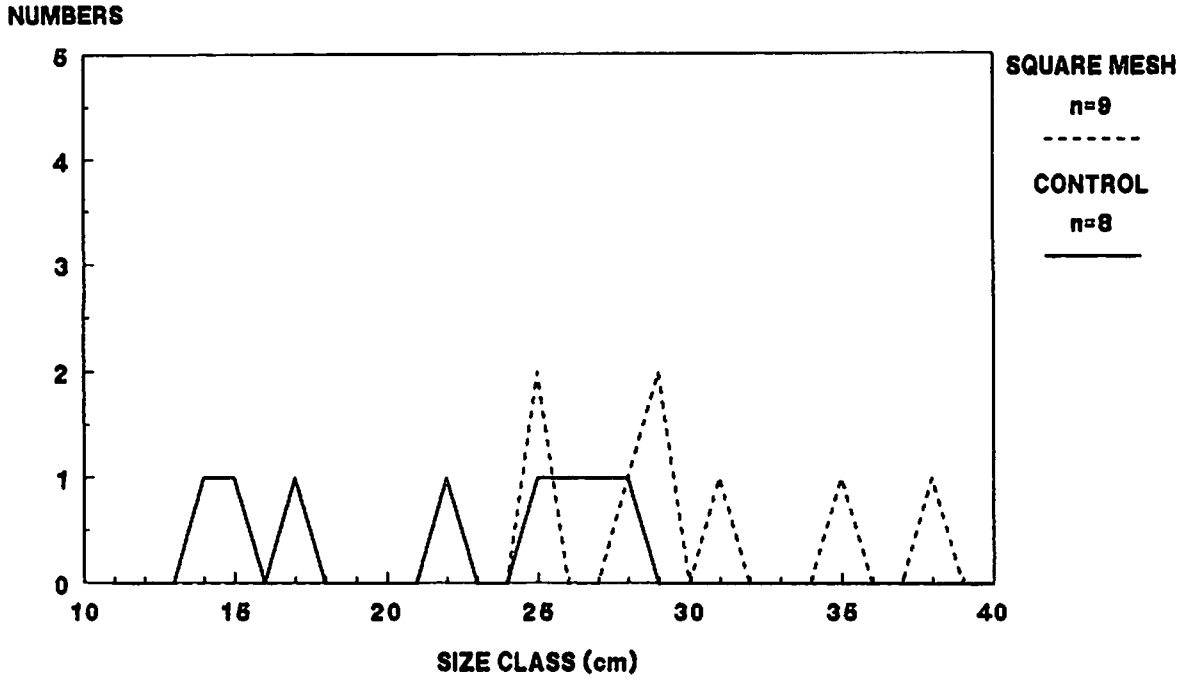
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	n	CONTROL %	n	DIFFERENCES (CON-SQU) %	n
11-15	13.2	5	27.7	13	14.5	8
16-25	86.8	33	70.2	33	-16.6	0
26-30	0	0	2.1	1	2.1	1
31-35	0	0	0	0	0	0
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 19.14 %
Number of fish represented by this: 9

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

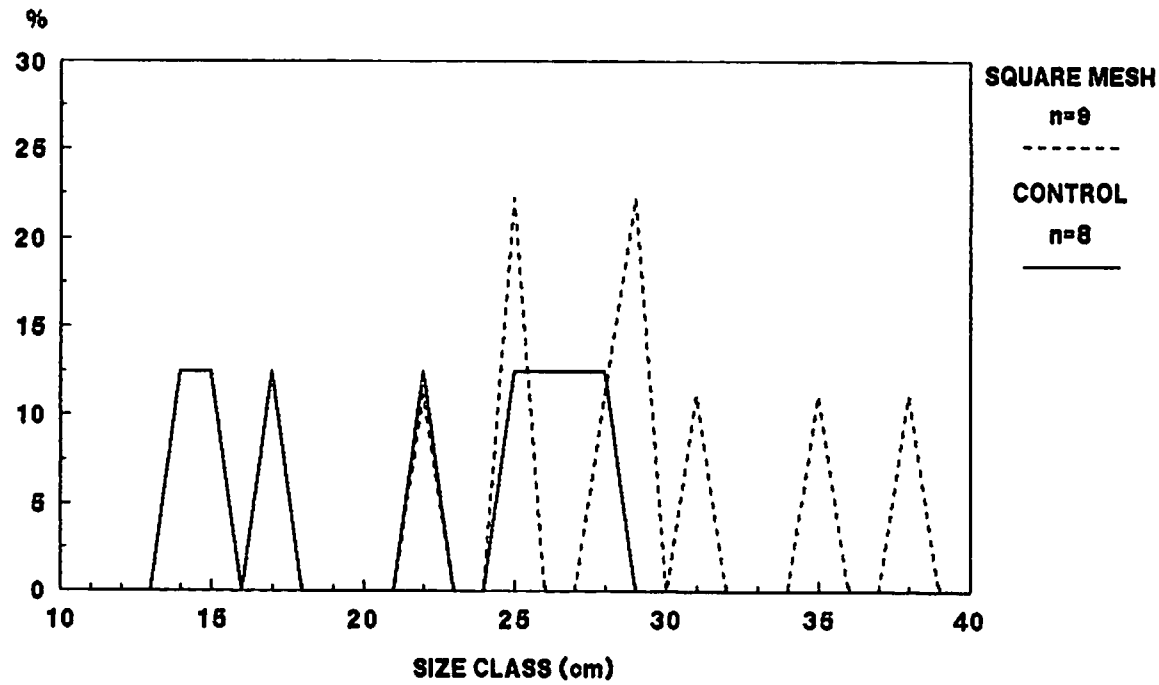


MFV Our Ocean Harvester PZ 403
Haul 27 (sq) v 26 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 27 (sq) v 26 (dia)

SEAFISH

POUTING TEST 22

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	9		SAMPLE TOTAL:	8		(PERCENT AND NUMBERS)		
RAISED TOTAL:	9		RAISED TOTAL:	8			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A		% RETAINED	N/A				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	0	0	14	1	12.5
15	0	0	15	1	12.5
16	0	0	16	0	0
17	0	0	17	1	12.5
18	0	0	18	0	0
19	0	0	19	0	0
20	0	0	20	0	0
21	0	0	21	0	0
22	1	11.1	22	1	12.5
23	0	0	23	0	0
24	0	0	24	0	0
25	2	22.2	25	1	12.5
26	0	0	26	1	12.5
27	0	0	27	1	12.5
28	1	11.1	28	1	12.5
29	2	22.2	29	0	0
30	0	0	30	0	0
31	1	11.1	31	0	0
32	0	0	32	0	0
33	0	0	33	0	0
34	0	0	34	0	0
35	1	11.1	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	1	11.1	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

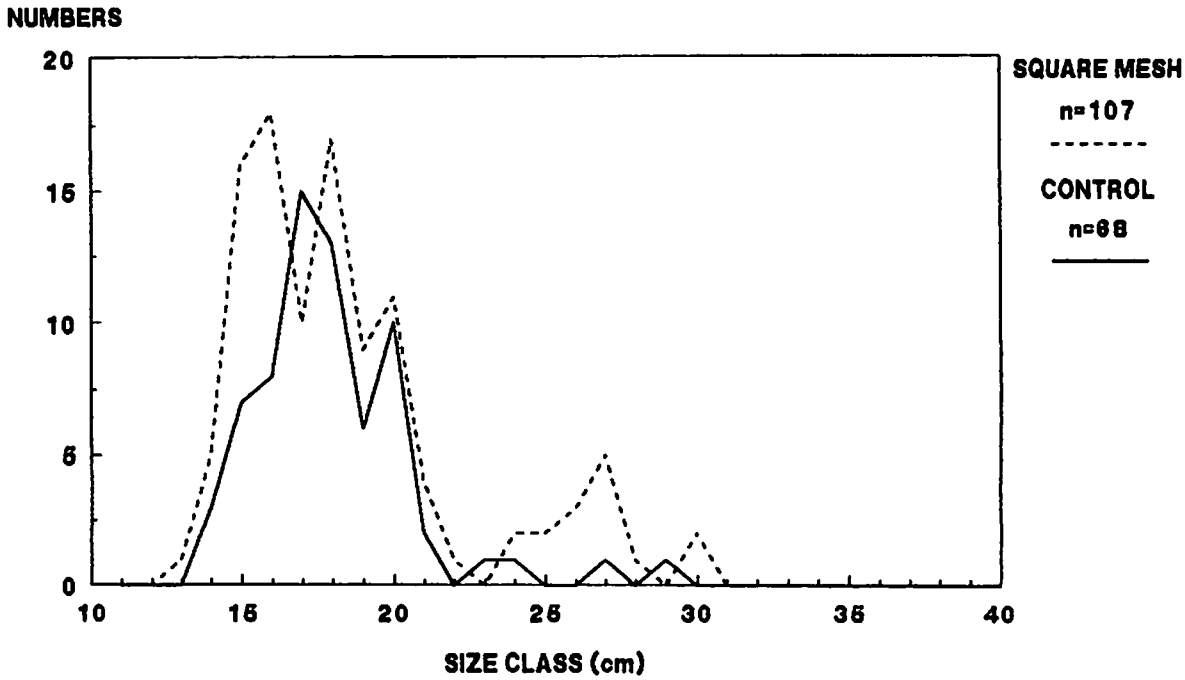
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	0	0	25	2	25	2
16-25	33.3	3	37.5	3	4.2	0
26-30	33.3	3	37.5	3	4.2	0
31-35	22.2	2	0	0	-22.2	-2
36-40	11.1	1	0	0	-11.1	-1
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -12.5 %
Number of fish represented by this: -1

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

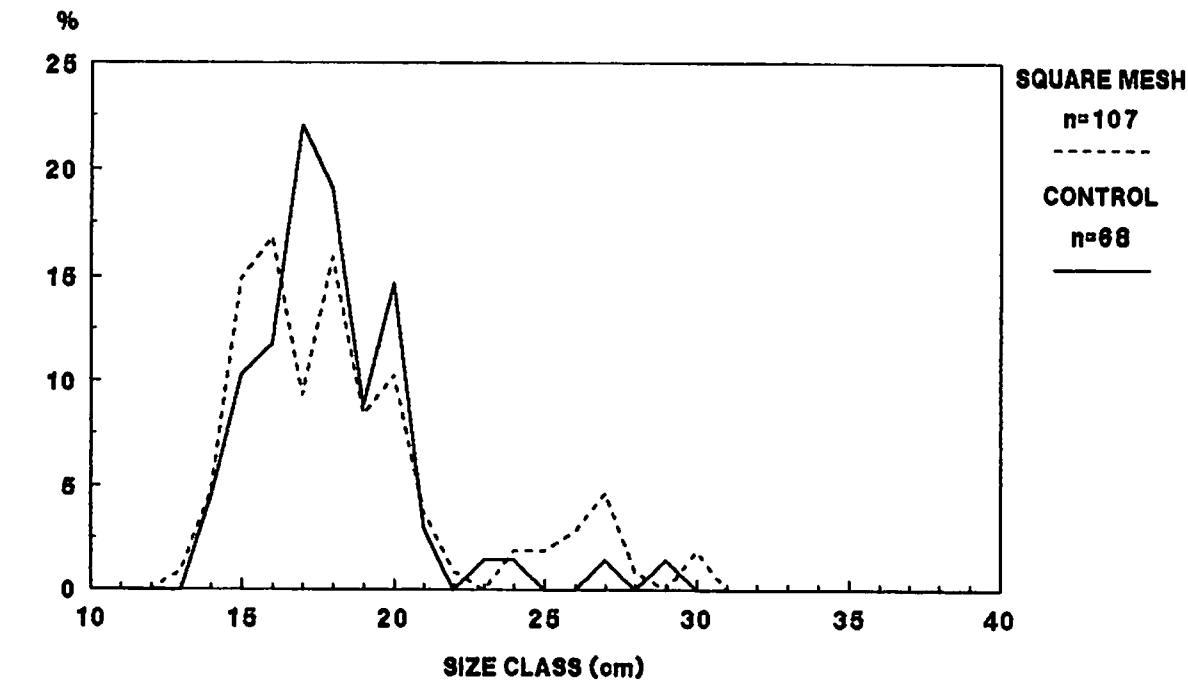


MFV Our Ocean Harvester PZ 403
Haul 28 (sq) v 29 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 28 (sq) v 29 (dia)

SEAFISH

POUTING TEST 23

SQUARE MESH	
SAMPLE TOTAL:	107
RAISED TOTAL:	107
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

CONTROL	
SAMPLE TOTAL:	68
RAISED TOTAL:	68
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

DIFFERENCES BETWEEN GEARS (PERCENT AND NUMBERS)	%	n
REDN. DISCARDS:	N/A	N/A
LOSS MARKETABLE:	N/A	N/A

SPECIES: POUTING
GEAR: std. v 80mm sq.

HFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

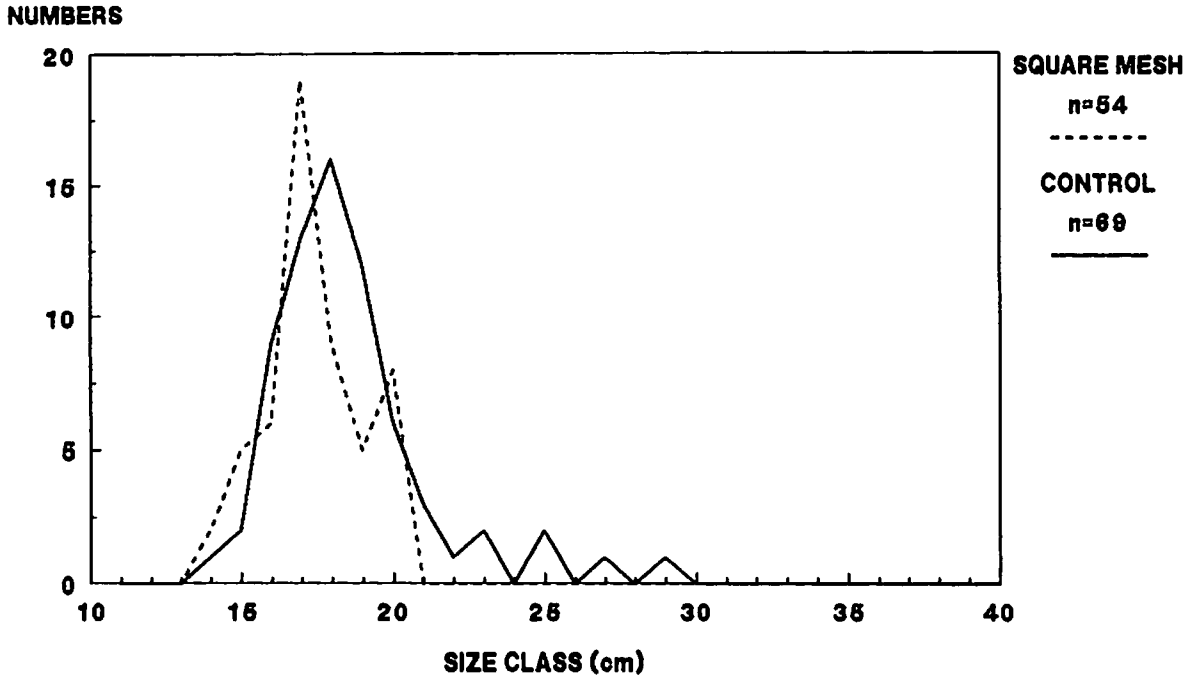
CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	1	0.93	13	0	0
14	5	4.67	14	3	4.41
15	16	14.9	15	7	10.2
16	18	16.8	16	8	11.7
17	10	9.34	17	15	22.0
18	17	15.8	18	13	19.1
19	9	8.41	19	6	8.82
20	11	10.2	20	10	14.7
21	4	3.73	21	2	2.94
22	1	0.93	22	0	0
23	0	0	23	1	1.47
24	2	1.86	24	1	1.47
25	2	1.86	25	0	0
26	3	2.80	26	0	0
27	5	4.67	27	1	1.47
28	1	0.93	28	0	0
29	0	0	29	1	1.47
30	2	1.86	30	0	0
31	0	0	31	0	0
32	0	0	32	0	0
33	0	0	33	0	0
34	0	0	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

Size Groupings: SQUARE MESH			CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	20.6	22	14.7	10	-5.9	-12
16-25	69.2	74	82.4	56	13.2	-18
26-30	10.3	11	2.9	2	-7.4	-9
31-35	0	0	0	0	0	0
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -57.3 %
Number of fish represented by this: -39

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel



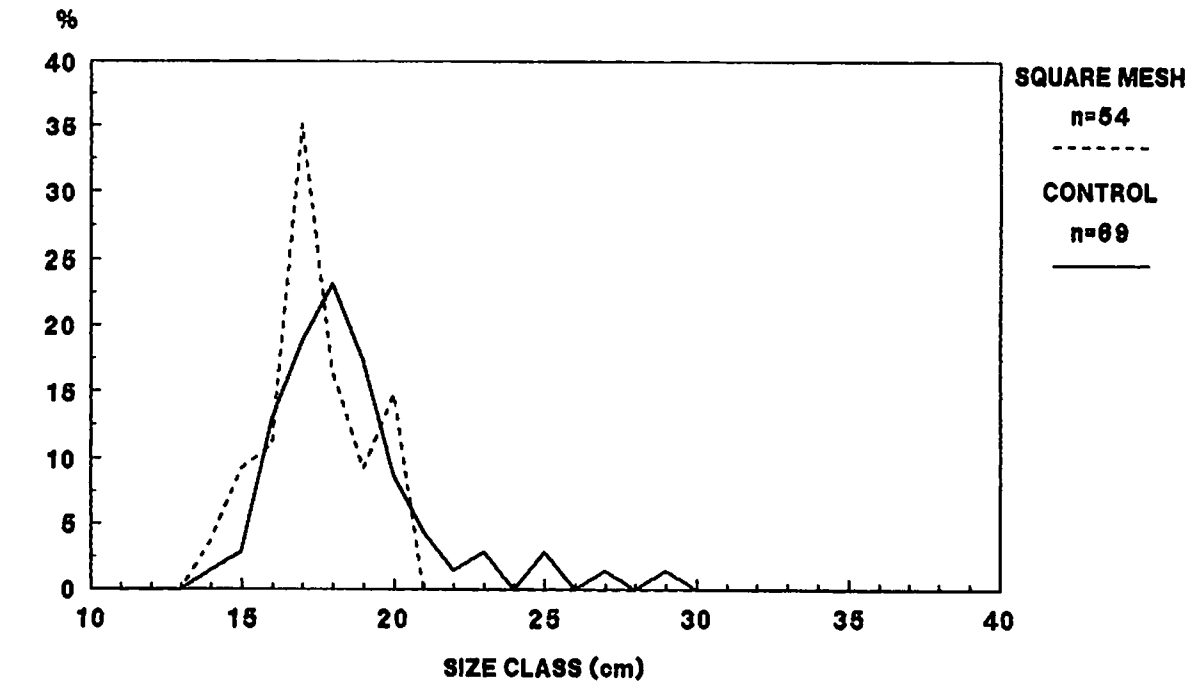
MFV Our Ocean Harvester PZ 403

Haul 31 (sq) v 30 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403

Haul 31 (sq) v 30 (dia)

SEAFISH

POUTING TEST 24

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	54		SAMPLE TOTAL:	69		(PERCENT AND NUMBERS)		
RAISED TOTAL:	54		RAISED TOTAL:	69			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A		% RETAINED	N/A				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	0	0	13	0	0
14	2	3.70	14	1	1.44
15	5	9.25	15	2	2.89
16	6	11.1	16	9	13.0
17	19	35.1	17	13	18.8
18	9	16.6	18	16	23.1
19	5	9.25	19	12	17.3
20	8	14.8	20	6	8.69
21	0	0	21	3	4.34
22	0	0	22	1	1.44
23	0	0	23	2	2.89
24	0	0	24	0	0
25	0	0	25	2	2.89
26	0	0	26	0	0
27	0	0	27	1	1.44
28	0	0	28	0	0
29	0	0	29	1	1.44
30	0	0	30	0	0
31	0	0	31	0	0
32	0	0	32	0	0
33	0	0	33	0	0
34	0	0	34	0	0
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

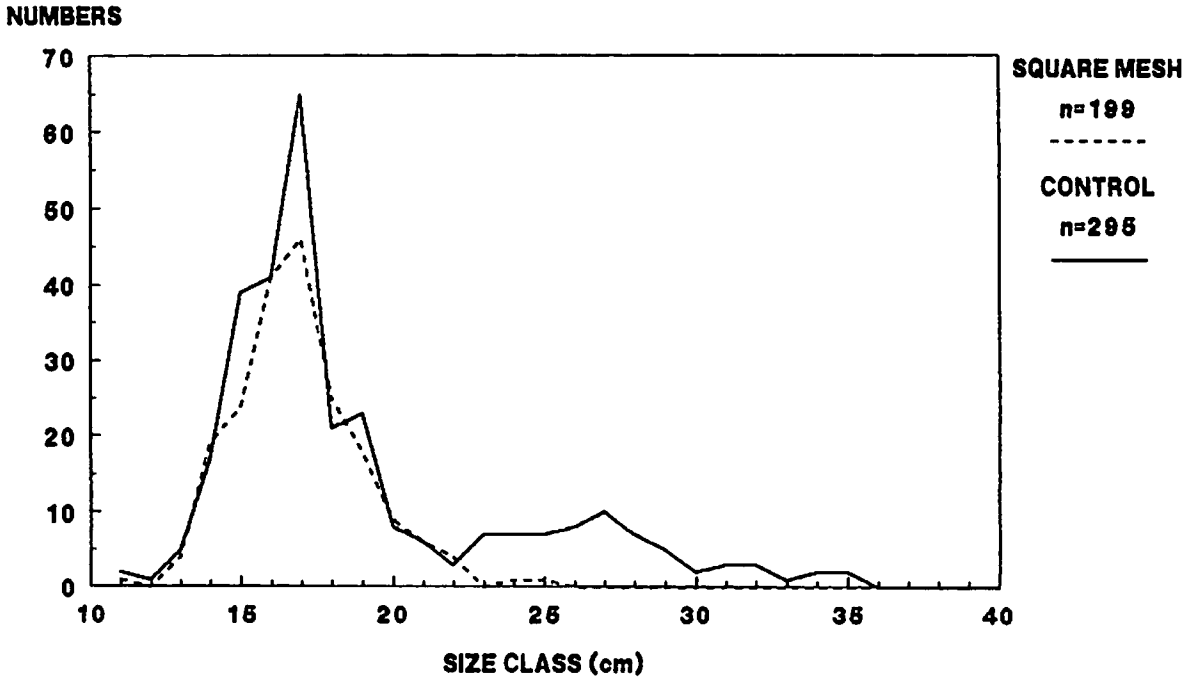
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	13	7	4.3	3	-8.7	-4
16-25	87	47	92.8	64	5.8	17
26-30	0	0	2.9	2	2.9	2
31-35	0	0	0	0	0	0
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 21.73 %
Number of fish represented by this: 15

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

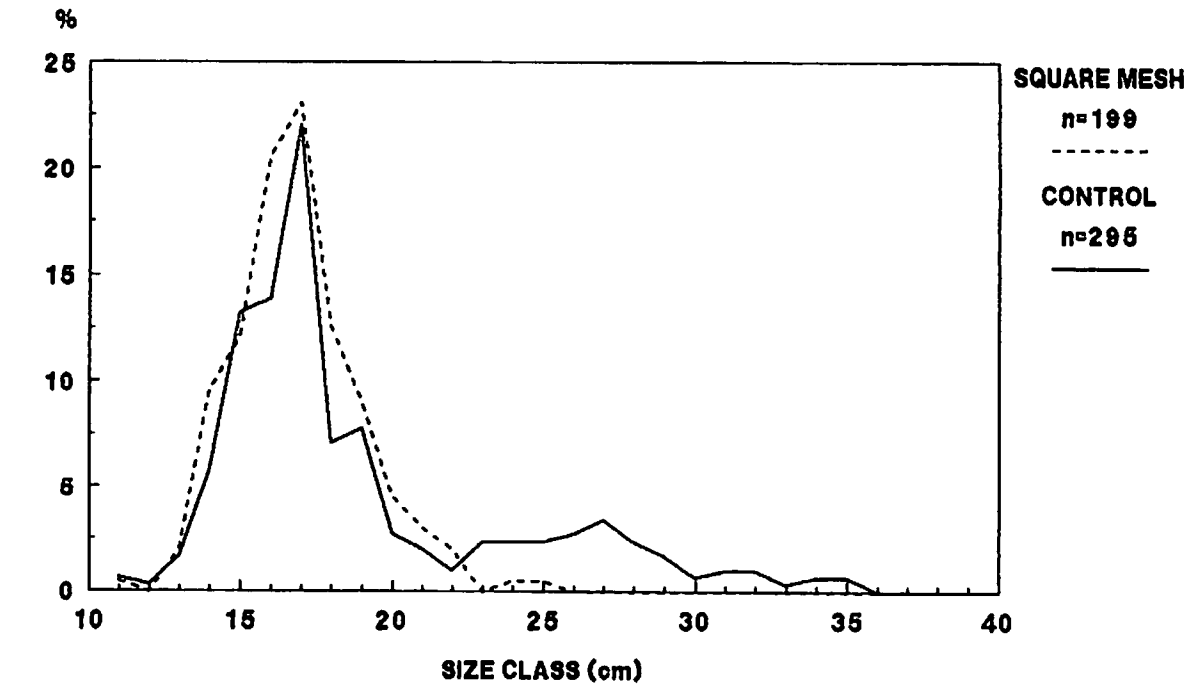


MFV Our Ocean Harvester PZ 403
Haul 32 (sq) v 33 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 32 (sq) v 33 (dia)

SEAFISH

POUTING TEST 25

SQUARE MESH	
SAMPLE TOTAL:	199
RAISED TOTAL:	199
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

CONTROL	
SAMPLE TOTAL:	295
RAISED TOTAL:	295
MLS (cm)	0
% DISCARDS	N/A
% RETAINED	N/A

CLASS cm	RAISED NUMBERS	FREQ. %
11	1	0.50
12	0	0
13	4	2.01
14	19	9.54
15	24	12.0
16	41	20.6
17	46	23.1
18	25	12.5
19	18	9.04
20	9	4.52
21	6	3.01
22	4	2.01
23	0	0
24	1	0.50
25	1	0.50
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0

CLASS cm	RAISED NUMBERS	FREQ. %
11	2	0.67
12	1	0.33
13	5	1.69
14	17	5.76
15	39	13.2
16	41	13.8
17	65	22.0
18	21	7.11
19	23	7.79
20	8	2.71
21	6	2.03
22	3	1.01
23	7	2.37
24	7	2.37
25	7	2.37
26	8	2.71
27	10	3.38
28	7	2.37
29	5	1.69
30	2	0.67
31	3	1.01
32	3	1.01
33	1	0.33
34	2	0.67
35	2	0.67
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0

DIFFERENCES BETWEEN GEARS
(PERCENT AND NUMBERS)

	%	n
REDN. DISCARDS:	N/A	N/A
LOSS MARKETABLE:	N/A	N/A

SPECIES: POUTING
GEAR: std. v 80mm sq.

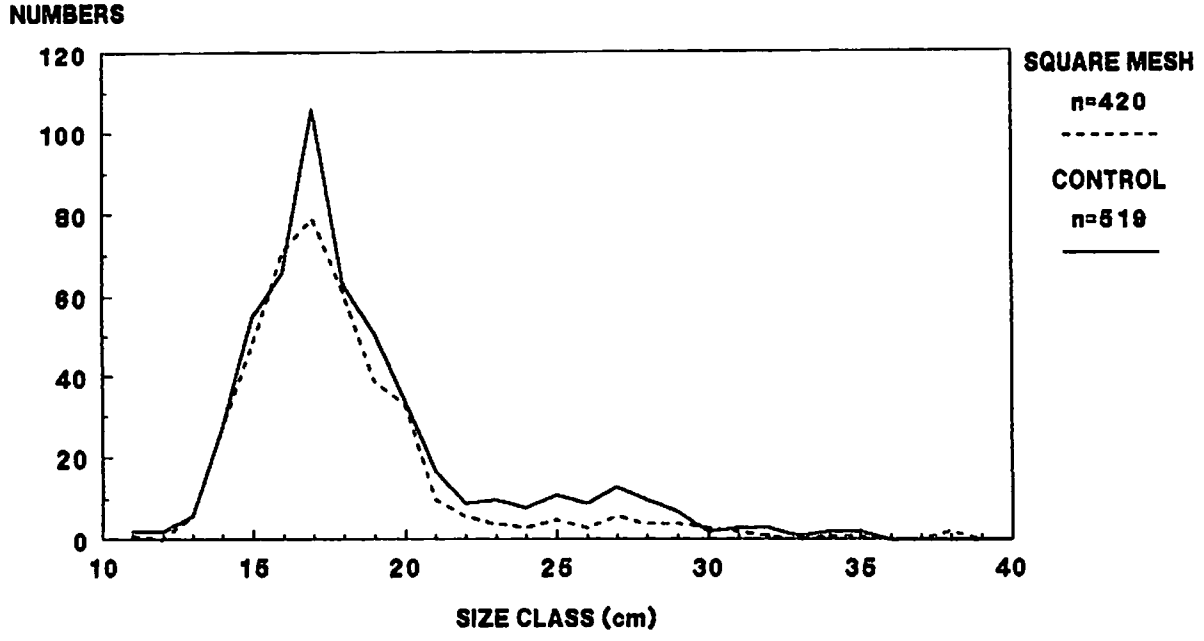
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings: (5cm)	SQUARE MESH Group %	n	CONTROL %	n	DIFFERENCES (CON-SQU) %	n
11-15	24.1	48	21.7	64	-2.4	16
16-25	75.9	151	63.7	188	-12.2	37
26-30	0	0	10.8	32	10.8	32
31-35	0	0	3.7	11	3.7	11
36-40	0	0	0	0	0	0
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 32.54 %
Number of fish represented by this: 96

POUTING: Length-Numbers Plot

Standard 90mm diamond v. 80mm square mesh panel

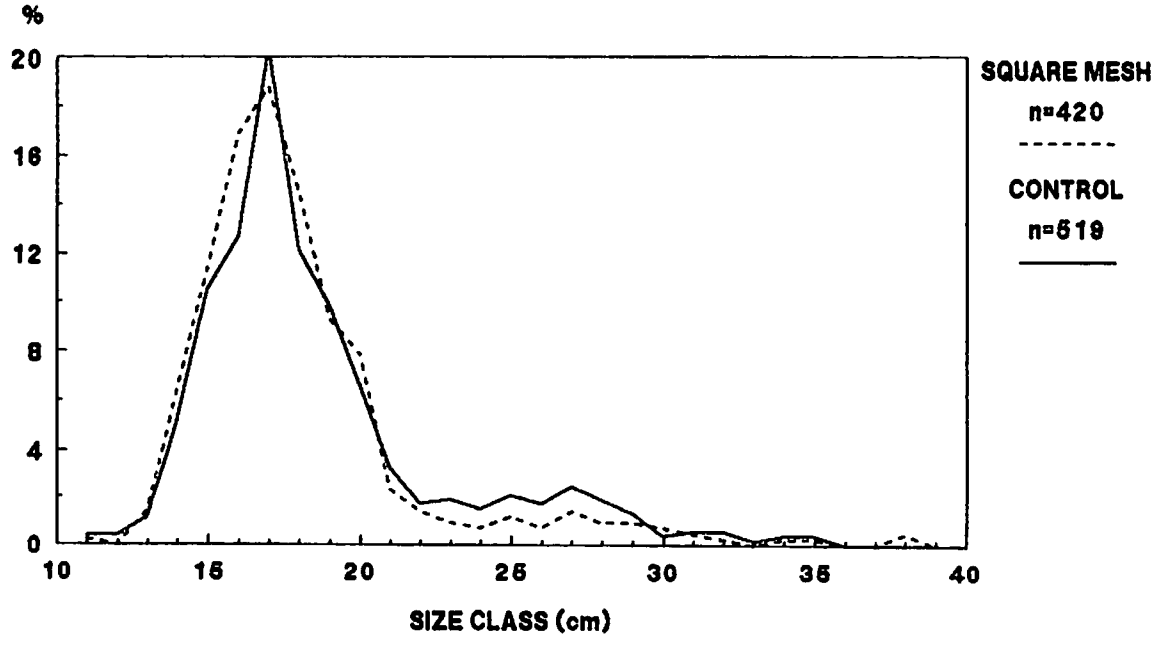


MFV Our Ocean Harvester PZ 403
Haul 22,24,27,28,31,32 (sq) v
23,25,26,29,30,33 (dia)

SEAFISH

POUTING: Length-Frequency Plot

Standard 90mm diamond v. 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 22,24,27,28,31,32 (sq) v
23,25,26,29,30,33 (dia)

SEAFISH

POUTING TEST 26

SQUARE MESH		CONTROL		DIFFERENCES BETWEEN GEARS
SAMPLE TOTAL:	420	SAMPLE TOTAL:	519	(PERCENT AND NUMBERS)
RAISED TOTAL:	420	RAISED TOTAL:	519	
MLS (cm)	0	MLS (cm)	0	
% DISCARDS	N/A	% DISCARDS	N/A	
% RETAINED	N/A	% RETAINED	N/A	

			DIFFERENCES BETWEEN GEARS		
			(PERCENT AND NUMBERS)		
				%	n
			REDN. DISCARDS:	N/A	N/A
			LOSS MARKETABLE:	N/A	N/A

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	1	0.23	11	2	0.38
12	0	0	12	2	0.38
13	6	1.42	13	6	1.15
14	27	6.42	14	27	5.20
15	48	11.4	15	55	10.5
16	71	16.9	16	66	12.7
17	79	18.8	17	106	20.4
18	61	14.5	18	63	12.1
19	39	9.28	19	51	9.82
20	33	7.85	20	34	6.55
21	10	2.38	21	17	3.27
22	6	1.42	22	9	1.73
23	4	0.95	23	10	1.92
24	3	0.71	24	8	1.54
25	5	1.19	25	11	2.11
26	3	0.71	26	9	1.73
27	6	1.42	27	13	2.50
28	4	0.95	28	10	1.92
29	4	0.95	29	7	1.34
30	3	0.71	30	2	0.38
31	2	0.47	31	3	0.57
32	1	0.23	32	3	0.57
33	0	0	33	1	0.19
34	1	0.23	34	2	0.38
35	1	0.23	35	2	0.38
36	0	0	36	0	0
37	0	0	37	0	0
38	2	0.47	38	0	0
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

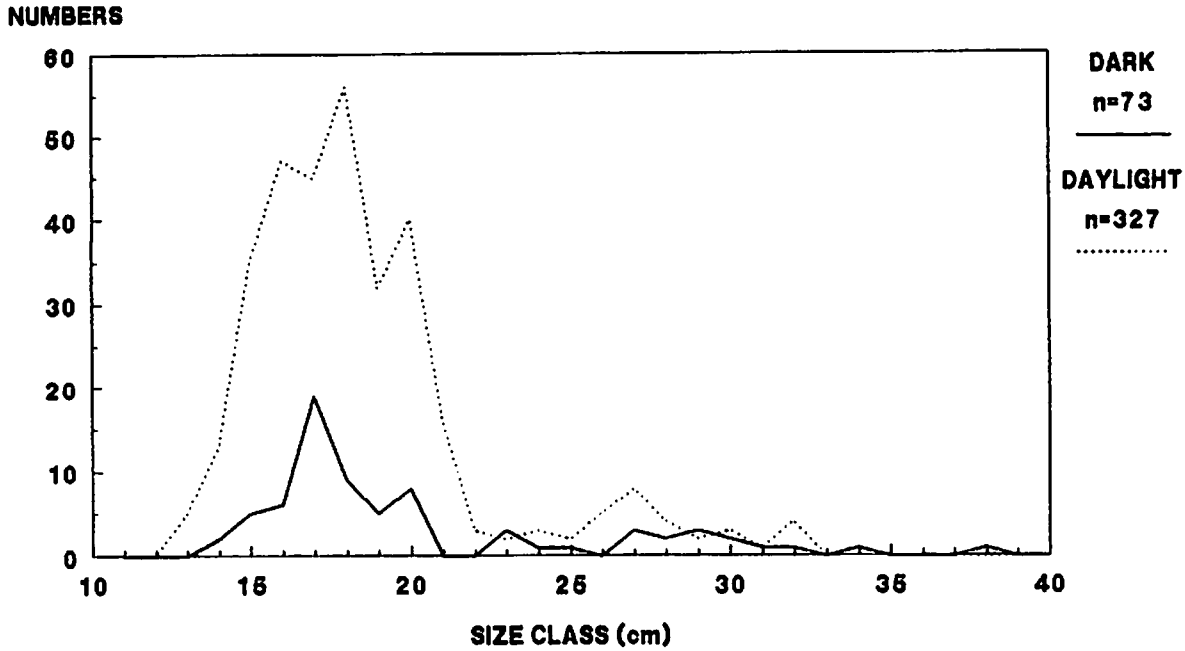
SPECIES: POUTING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:	SQUARE MESH		CONTROL		DIFFERENCES (CON-SQU)	
Group (5cm)	%	n	%	n	%	n
11-15	19.5	82	17.7	92	-1.8	10
16-25	74	311	72.3	375	-1.7	64
26-30	4.8	20	7.9	41	3.1	21
31-35	1.2	5	2.1	11	0.9	6
36-40	0.5	2	0	0	-0.5	-2
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 19.07 %
Number of fish represented by this: 99

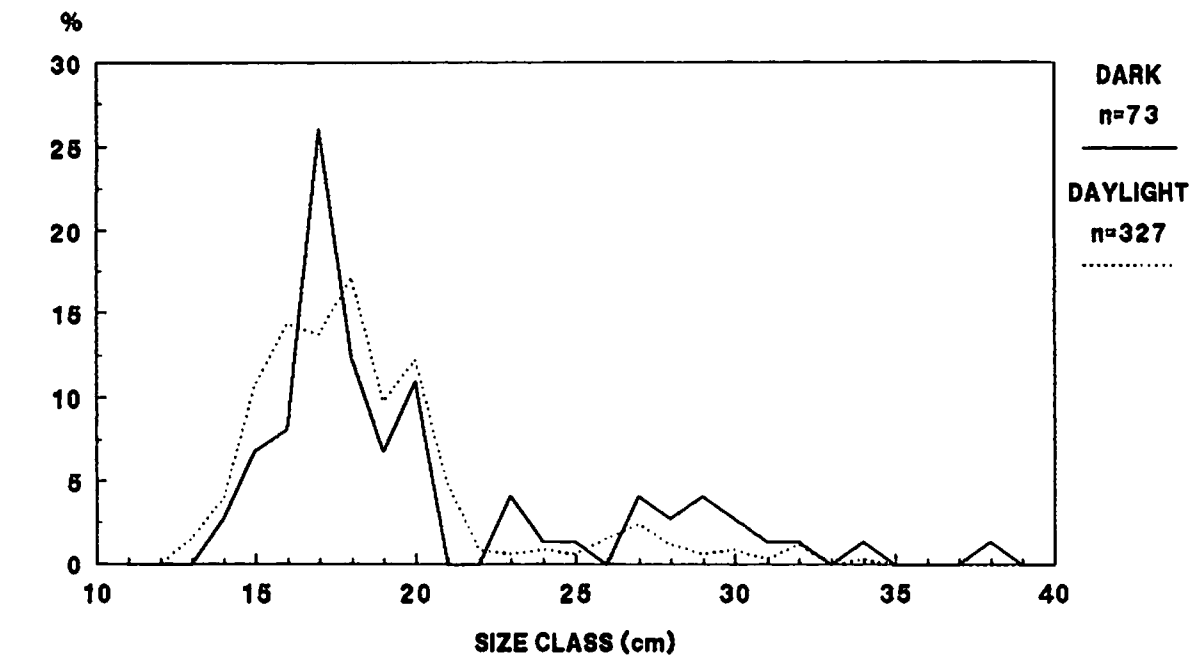
DARK HAULS VS DAYLIGHT HAULS
POUTING: Length-Numbers Plot
Standard 90mm diamond / 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 10,18,22,31 (DARK), 8,19,24,28 (DAYLIGHT)

SEAFISH

DARK HAULS VS DAYLIGHT HAULS
POUTING: Length-Frequency Plot
Standard 90mm diamond / 80mm square mesh panel



MFV Our Ocean Harvester PZ 403
Haul 10,18,22,31 (DARK), 8,19,24,28 (DAYLIGHT)

SEAFISH

POUTING TEST 27

DAYLIGHT HAULS			DARK HAULS			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	327		SAMPLE TOTAL:	73		(PERCENT AND NUMBERS)		
RAISED TOTAL:	327		RAISED TOTAL:	73			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	0
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	0
% RETAINED	N/A		% RETAINED	N/A				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	0	0	11	0	0
12	0	0	12	0	0
13	5	1.52	13	0	0
14	13	3.97	14	2	2.73
15	35	10.7	15	5	6.84
16	47	14.3	16	6	8.21
17	45	13.7	17	19	26.0
18	56	17.1	18	9	12.3
19	32	9.78	19	5	6.84
20	40	12.2	20	8	10.9
21	16	4.89	21	0	0
22	3	0.91	22	0	0
23	2	0.61	23	3	4.10
24	3	0.91	24	1	1.36
25	2	0.61	25	1	1.36
26	5	1.52	26	0	0
27	8	2.44	27	3	4.10
28	4	1.22	28	2	2.73
29	2	0.61	29	3	4.10
30	3	0.91	30	2	2.73
31	1	0.30	31	1	1.36
32	4	1.22	32	1	1.36
33	0	0	33	0	0
34	1	0.30	34	1	1.36
35	0	0	35	0	0
36	0	0	36	0	0
37	0	0	37	0	0
38	0	0	38	1	1.36
39	0	0	39	0	0
40	0	0	40	0	0
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	0	0
44	0	0	44	0	0
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

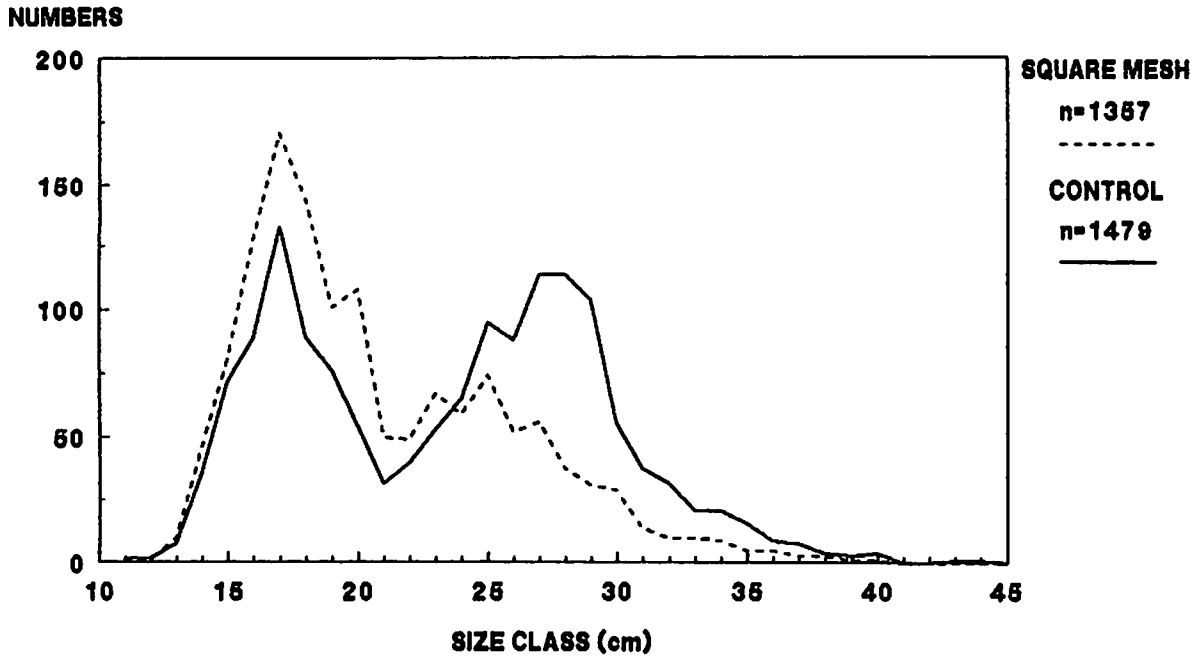
SPECIES: POUTING
GEAR: std. v 80mm sq.

MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
DARK vs DAYLIGHT TOWS
ALL GEAR 80mm SQUARE MESH
APRIL 1992

Size Groupings: (5cm)	DAYLIGHT TOWS %	n	DARK TOWS %	n	DIFFERENCES (DK-DL) %	n
11-15	16.2	53	9.6	7	-6.6	-46
16-25	75.2	246	71.2	52	-4	-194
26-30	6.7	22	13.7	10	7	-12
31-35	1.8	6	4.1	3	2.3	-3
36-40	0	0	1.4	1	1.4	1
41-45	0	0	0	0	0	0
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: -347. %
Number of fish represented by this: -254

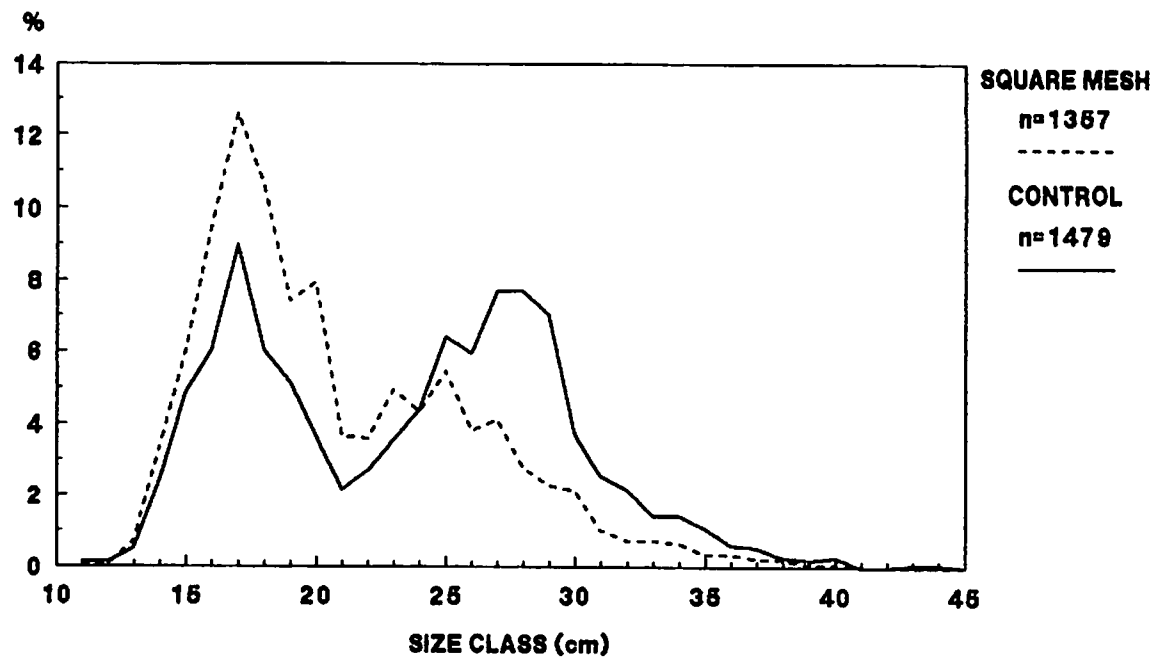
POUTING: Length-Numbers Plot
Standard 90mm diamond v. 80mm square mesh panel
ALL HAULS COMBINED



MFV Our Ocean Harvester PZ 403
All hauls (16 square; 18 diamond)

SEAFISH

POUTING: Length-Frequency Plot
Standard 90mm diamond v. 80mm square mesh panel
ALL HAULS COMBINED



MFV Our Ocean Harvester PZ 403
All hauls (16 square; 18 diamond)

SEAFISH

POUTING TEST 28

SQUARE MESH			CONTROL			DIFFERENCES BETWEEN GEARS		
SAMPLE TOTAL:	1357		SAMPLE TOTAL:	1479		(PERCENT AND NUMBERS)		
RAISED TOTAL:	1357		RAISED TOTAL:	1479			%	n
MLS (cm)	0		MLS (cm)	0		REDN. DISCARDS:	N/A	N/A
% DISCARDS	N/A		% DISCARDS	N/A		LOSS MARKETABLE:	N/A	N/A
% RETAINED	N/A		% RETAINED	N/A				

CLASS cm	RAISED NUMBERS	FREQ. %	CLASS cm	RAISED NUMBERS	FREQ. %
11	1	0.07	11	2	0.13
12	1	0.07	12	2	0.13
13	10	0.73	13	8	0.54
14	46	3.38	14	36	2.43
15	81	5.96	15	72	4.86
16	128	9.43	16	89	6.01
17	171	12.6	17	133	8.99
18	144	10.6	18	89	6.01
19	101	7.44	19	76	5.13
20	108	7.95	20	54	3.65
21	50	3.68	21	32	2.16
22	49	3.61	22	40	2.70
23	67	4.93	23	53	3.58
24	59	4.34	24	65	4.39
25	74	5.45	25	95	6.42
26	52	3.83	26	88	5.94
27	56	4.12	27	114	7.70
28	38	2.80	28	114	7.70
29	31	2.28	29	104	7.03
30	29	2.13	30	55	3.71
31	14	1.03	31	38	2.56
32	10	0.73	32	32	2.16
33	10	0.73	33	21	1.41
34	9	0.66	34	21	1.41
35	5	0.36	35	16	1.08
36	5	0.36	36	9	0.60
37	3	0.22	37	8	0.54
38	3	0.22	38	4	0.27
39	1	0.07	39	3	0.20
40	1	0.07	40	4	0.27
41	0	0	41	0	0
42	0	0	42	0	0
43	0	0	43	1	0.06
44	0	0	44	1	0.06
45	0	0	45	0	0
46	0	0	46	0	0
47	0	0	47	0	0
48	0	0	48	0	0
49	0	0	49	0	0
50	0	0	50	0	0

SPECIES: POUTING
GEAR: std. v 80mm sq.

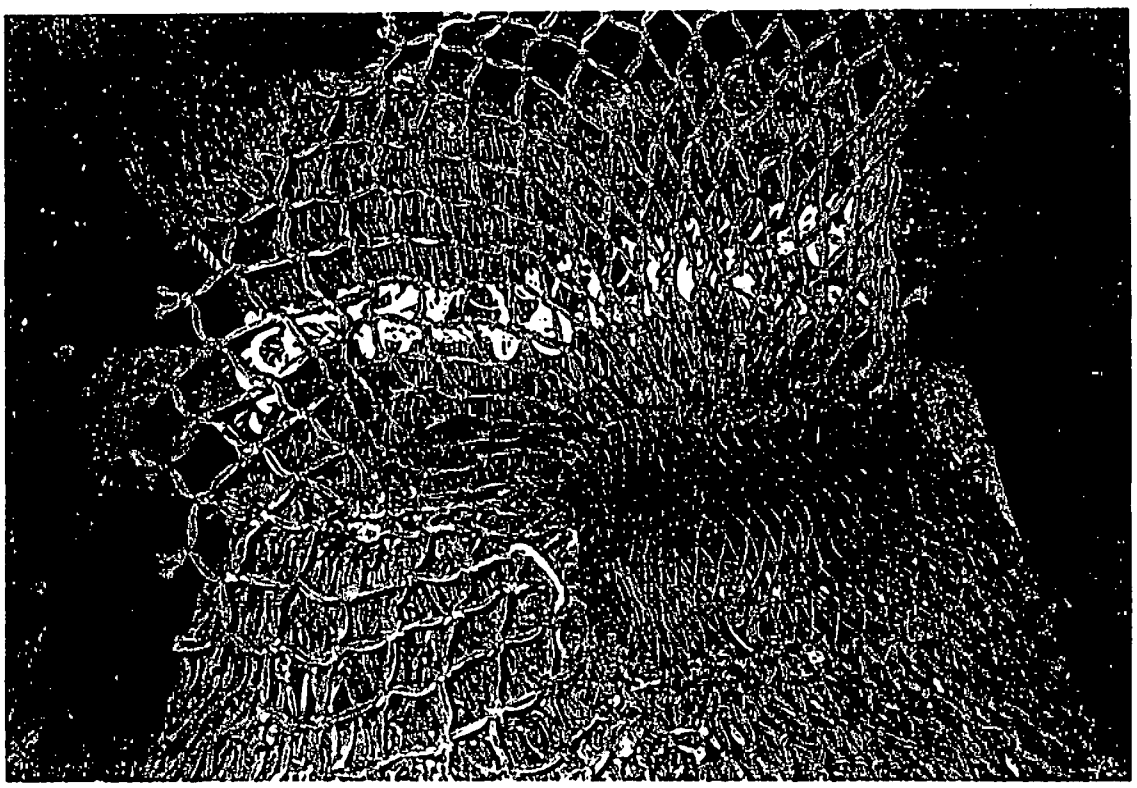
MFV OUR OCEAN HARVESTER
PADSTOW/NEWLYN
ALT. TOW (SQUARE/DIAMOND)
APRIL 1992

Size Groupings:

Group (5cm)	SQUARE MESH %	SQUARE MESH n	CONTROL %	CONTROL n	DIFFERENCES (CON-SQU) %	DIFFERENCES (CON-SQU) n
11-15	10.2	139	8.1	120	-2.1	-19
16-25	70.1	951	49.1	726	-21	-225
26-30	15.2	206	32.1	475	16.9	269
31-35	3.5	48	8.7	128	5.2	80
36-40	1	13	1.9	28	0.9	15
41-45	0	0	0.1	2	0.1	2
46-50	0	0	0	0	0	0
51-55	0	0	0	0	0	0
56-60	0	0	0	0	0	0
61-65	0	0	0	0	0	0
66-70	0	0	0	0	0	0
71-75	0	0	0	0	0	0
76-80	0	0	0	0	0	0
81-85	0	0	0	0	0	0
86-90	0	0	0	0	0	0

% Reduction in catch attributable to the square mesh panels: 8.248 %
Number of fish represented by this: 122

APPENDIX II



Photographs showing the heavy twine "chafing strips" attached to the underside of the codends.

Photographs showing catches of juvenile flatfish taken on a number of hauls during the trials.

Photographs showing the large numbers of juvenile flatfish present on some hauls and their potential effect on codend selectivity.

2. VESSEL DETAILS

Vessel: MFV OUR OCEAN HARVESTER (PZ403)
Skipper/Owner: Mervyn Mountjoy
Port of Operation: Newlyn
Registered Length: 16.4m
Engine Make: Poyaud (French)
Engine Horsepower: 330
Gearbox Reduction Ratio: 5:1

MFV Our Ocean Harvester

The vessel operates as a stern trawler normally working 4 day trips.