

Further North Sea fishing trials with the ‘Eliminator’™ trawl (2008)

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Executive Summary

In North Sea trials conducted during Nov /Dec 2008, the US designed Eliminator trawl caught 84% fewer cod while maintaining comparable catches of haddock, as compared to the catches of a control trawl (a standard industry demersal trawl). The comparative fishing trials were conducted with the aid of the Scarborough based pair-team (MFV’s *Carousel* and *Eagernoon*), skippered by Derek Tye and John Edmonds.

These results are similar to those obtained in previous North Sea trials, conducted by Cefas (2007), and support the findings of US workers, who indicate that the Eliminator trawl can be used to selectively harvest haddock in a mixed demersal fishery, while allowing cod and other species to avoid capture.

This work provides further evidence that the Eliminator trawl may have potential value as a selective gear within European demersal fisheries where cod protection is of management concern.

Background and previous trials

In December 2007, initial fishing-trials were undertaken in the North Sea to compare the catches obtained with the ‘Eliminator’™ trawl (Figs. 1-2) to those from a standard industry demersal trawl. In those trials both trawls were towed along parallel tracks by the fishing vessels MFV’s ‘*Our Lass II*’ and the ‘*Jubilee Quest*’. The subsequent analysis of the twelve paired hauls obtained indicated that the numbers of cod caught in the Eliminator trawl was reduced by 89% across the full length range. A summary of these trials is provided in appendix A to this report.

On the basis of the Cefas 2007 results and other trials recently undertaken in the USA¹, it was concluded that the Eliminator’ trawl (or a variant thereof) may have potential utility in the ongoing Northern European cod recovery programme, and that further investigations were warranted.

This report details a further North Sea comparative study on the Eliminator trawl conducted during Nov/Dec 2008

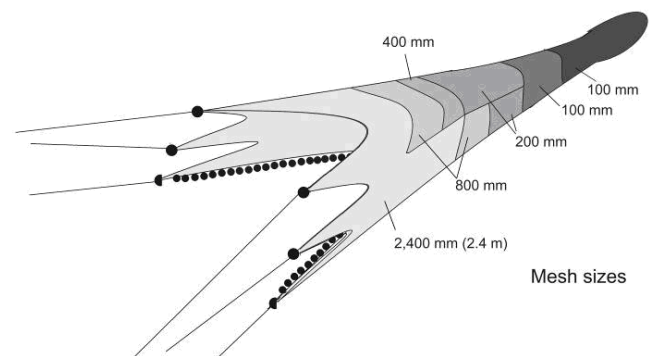

 Figure 1. Overview of the Eliminator™ trawl (Manufactured by Superior Trawls, R.I. USA²)


Figure 2. The large rope meshes (2.4m) at the front parts of the Eliminator trawl

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Figure 3. MFV *Eagermoon* GY 92
(Skipper John Edmonds)

This report details North Sea comparative fishing trials conducted during Nov/Dec 2008. In this study, the Eliminator trawl was compared to the commercial trawl normally used by the Scarborough based pair-trawling team MFV's '*Eagermoon*' & '*Carousel*' (Figs. 3-4).



Figure 4. MFV *Carousel* SH 298
(Skipper Derek Tye)



Figure 5. Demersal pair trawling
(Picture courtesy of FRS, Aberdeen)

Method

During these latest trials, both vessels (MFV's *Eagermoon* and *Carousel*) worked together as a pair-team, each towing one warp of a single trawl, while maintaining a steady

distance of 0.15 nautical miles apart from each other (Fig. 5).



Figure 6. Skippers and crew of both vessels working together as a single fishing pair-team

As only one trawl could be towed at any given time, the catches from both the Eliminator trawl and the industry control trawl (Table 1) were compared using the alternate haul method. One trawl was shot, towed for 4 hours and then hauled (Figs. 6-8). This process was then repeated using the other trawl.



Figure 7. Hauling

Two complete 4-hr commercial hauls were undertaken each day (one with each trawl). The trawl used for the first haul of each day was alternated on a daily basis to eliminate any diurnal bias (i.e. a.m./p.m. effect). In total, five paired hauls were obtained. Poor weather conditions prevented the collection of further data.

The study was undertaken in the North Sea, off the Yorkshire coast (Location 54-55°N, 001°W-001°E, ICES rectangles 37E9, 38E9 & 37F0). Both trawls were fitted with rock-hopper ground-gear, new and identical cod ends, each with a mesh size of 100 mm. Summary details are provided in Table 1.

Table 1: Vessel and fishing gear details used in the pair team sea trials

Date of trials	26 Nov – 3 Dec 2008
Pair team vessels	MFV <i>Eagernoon</i> (GY 92) HP 350HP (261 kW) LOA 14m
	MFV <i>Carousel</i> (SH 298) HP 360HP (268 kW) LOA 15m
Control trawl	90ft Jackson pair trawl, Jackson Trawls, Scotland
Test trawl	Eliminator trawl Superior Trawls, R.I., USA
Ground gear	Rock-hoppers
Towing speed	2.5 – 3 knots
Cod end mesh size	100 mm (5mm double)

The catches of fish were measured to 1cm below (by onboard Cefas scientists) from both trawls. The resultant data was analysed and are presented in the results section.



Figure 8. Emptying the cod end

Results

Whiting: Catches of whiting were overall lower in the Eliminator trawl than the industry control trawl, particularly with fish, smaller than 30 cm (Fig. 9 and Table 2). The limited number of repeat hauls and the variability in whiting catch data restricted the opportunity for further meaningful statistical analysis.

Haddock: The Eliminator trawl caught haddock (across the full length range) in similar quantities to those obtained with the industry control trawl (Fig. 9 and Table 2).

Cod: Cod catches were reduced by 84% in the Eliminator trawl (Figs. 9 and Table 2). This reduction was consistently observed across the full length range and was statistically confirmed by GLMM modelling³ of the data (not shown here).

Other commercial species: Alongside cod, catches of other commercially important species of fish were also reduced in the Eliminator trawl (Table 2).

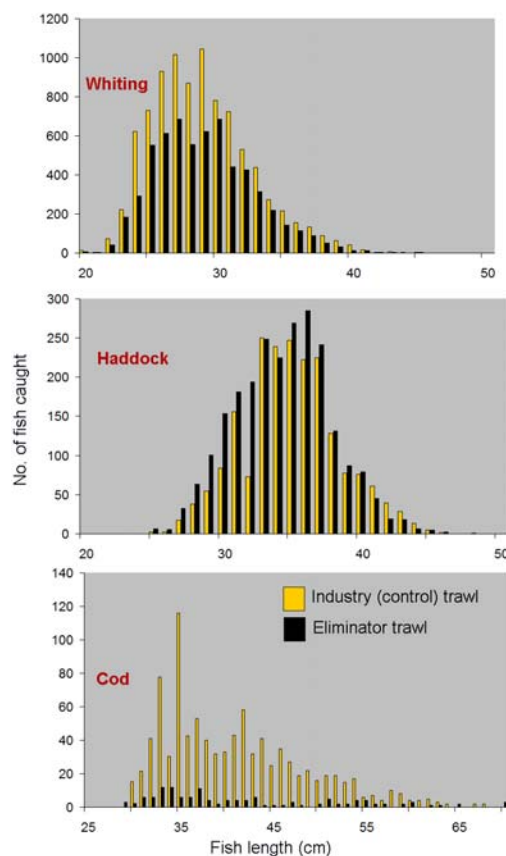


Figure 9. The numbers and lengths of cod, haddock and whiting caught by both trawls during the trials

Fish (Common and *Latin* names)

Atlantic cod: *Gadus morhua*
 Haddock: *Melanogrammus aeglefinus*
 Whiting: *Merlangius merlangus*
 Dover sole: *Solea solea*
 Brill: *Scophthalmus rhombus*
 European sea bass: *Dicentrarchus labrax*
 Hake: *Merluccius merluccius*
 Plaice: *Pleuronectes platessa*
 Lemon sole: *Microstomus kitt*
 Squid: *Loligo* species
 European monkfish: *Lophius piscatorius*
 Dab: *Limanda limanda*
 Flounder: *Platichthys flesus*
 Gurnard: *Trigla* species
 Ling: *Molva molva*
 Poor cod: *Trisopterus minutus*
 Pollack: *Pollachius pollachius*
 Rays: *Raja* species
 Bib: *Trisopterus luscus*
 Bull rout: *Myoxocephalus scorpius*
 Starry smooth hound: *Mustelus asterias*
 Twaite shad: *Alosa fallax*

Table 2: Raw catch components from the two trawls

Day	Quantity of fish caught (Kg)											
	Total catch		Cod		Haddock		Whiting		Other commercial species*		Non commercial species**	
	Control	Eliminator	Control	Eliminator	Control	Eliminator	Control	Eliminator	Control	Eliminator	Control	Eliminator
Day 1	988	860	149	12	580	483	166	272	12	48	81	45
Day 2	324	344	89	58	54	81	140	183	27	11	14	11
Day 3	560	386	96	9	89	174	220	173	51	16	104	14
Day 4	1189	700	111	13	170	248	815	370	82	30	11	39
Day 5	1033	352	387	45	1	4	540	286	26	1	79	16
Total (1-5)	4094	2642	832	137	894	990	1881	1284	198	106	289	125
Eliminator / Control (%)	65%		16%		111%		68%		53%		43%	

* Dover sole, brill, bass, hake, lemon sole, plaice, squid, monkfish

** Dab, flounder, gurnards, ling, poor cod, pollock, rays, bib, bull rout, starry smooth hound, twaite shad

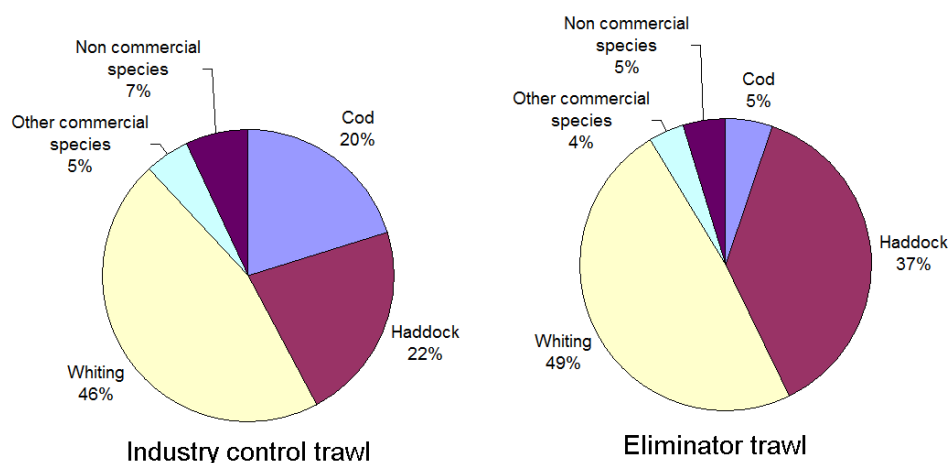


Figure 10: Comparison of raw catch components from the two trawls (all hauls combined)

Conclusion

These trials produced very similar results to those obtained previously in 2007 (see appendix A). Cod constituted 5% (by weight) of the total catch in the Eliminator trawl, contrasted with 20% in the industry control trawl (Fig. 10).

These trials provide further evidence on the performance of the Eliminator trawl as a selective haddock trawl within a mixed demersal fishery in the North Sea.

References

- (1) David Beutel, Laura Skrobe, Kathleen Castro, Philip Ruhle Sr., Philip Ruhle Jr., James O'Grady, Jonathan Knight. Bycatch reduction in the Northeast USA directed haddock bottom trawl fishery. *Fisheries Research*, 94, (2008), 190-198
- (2) Jon Knight, Superior Trawls, 74 Table Rock Road, South Kingstown, RI 02879 Rhode Island, USA
- (3) Holst R., Revill A. A simple statistical method for catch comparison studies. *Fisheries Research* 95 (2009) 254-259

Acknowledgements

Defra (SFCD), London & Scarborough MFA, NESFJC, John Hingley (Brixham), Gary Dunlin (Hull), Skipper, crew and owners of the MFV's Carousel and Eagermoon, Jon Knight (Superior Trawls, R.I., USA)

Summary of initial North Sea (Dec 2007) fishing-trials comparing catches with the US designed ‘Eliminator’ trawl to those from an industry standard demersal trawl.

Method

These trials were the first known testing in European waters of the Rhode Island (USA) ‘Eliminator’ trawl. The data collected was obtained from a catch comparison study undertaken in the North Sea (Location 54-55°N and 001°W-001°E) during 2-8 Dec 2007. The catches of fish (measured to 1cm below) from both the Eliminator trawl and from a typical N. Sea demersal fish trawl (Control trawl) are compared.

The parallel hauls method was used to collect the data, whereby two vessels towed the trawls along parallel tracks, keeping as close together as was practicable and safe (usually within 0.5 nautical miles). Both trawls were fitted with rock-hopper ground-gear, new and identical cod ends, each with a mesh size of 80 mm. The data from the twelve consecutive paired hauls, (4-5 h in duration) were analysed. Basic details on the sea trials and catches are provided in the Table and Figures contained within this appendix.

Results and conclusion

The results support the findings of US workers¹ in that the Eliminator trawl has the potential to selectively harvest haddock and whiting in a mixed-demersal fishery while allowing cod and other species to escape. In these North Sea trials, the number of cod caught were reduced by 89% and accounted for 2% (weight) of the marketable fish caught in the Eliminator, contrasted by 10 % weight in the control trawl (see figures in this appendix).

As North Sea stocks of cod are overexploited and at risk of being fished unsustainably, whereas haddock stocks have full reproductive capacity with a biomass above precautionary limits, the eliminator trawl (or a variant thereof) may have potential utility within the ongoing Northern European cod recovery programme.

NB: A more comprehensive report on these trials can be obtained directly from the author on request. Contact E mail: andrew.revill@cefass.co.uk

Vessel and fishing gear details used in the 2007 catch comparison study

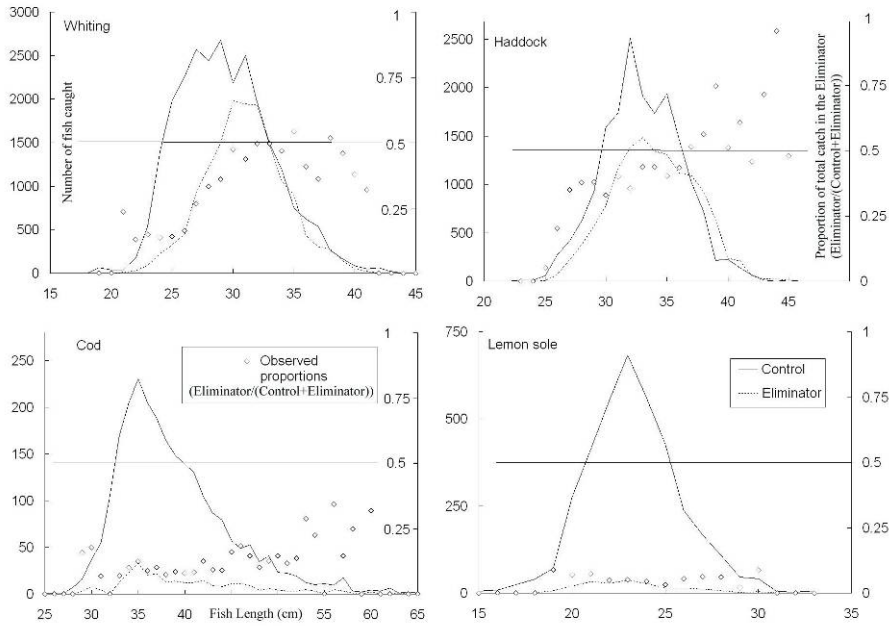
	Eliminator trawl	Control trawl
Vessel	Our Lass II (WY 261)	Jubilee Quest (GY 900)
Vessel overall length	21.5 m	21.2 m
Usual home port	Whitby	Grimsby
Main engine power	480 kW	347 kW
Trawl type	Eliminator trawl	108 foot Jackson trawl
Trawl manufacturer	Superior Trawls, R.I., USA	Jackson Trawls, Scotland
Otter boards	3m NETS	88 inch Perfect Patent B
Door spread	28 fathom	30 fathom
Headline height	5-6 fathom	3 fathom
Towing speed	2.5 – 3 knots	2.5 – 3 knots
Cod end mesh size	80 mm	80 mm



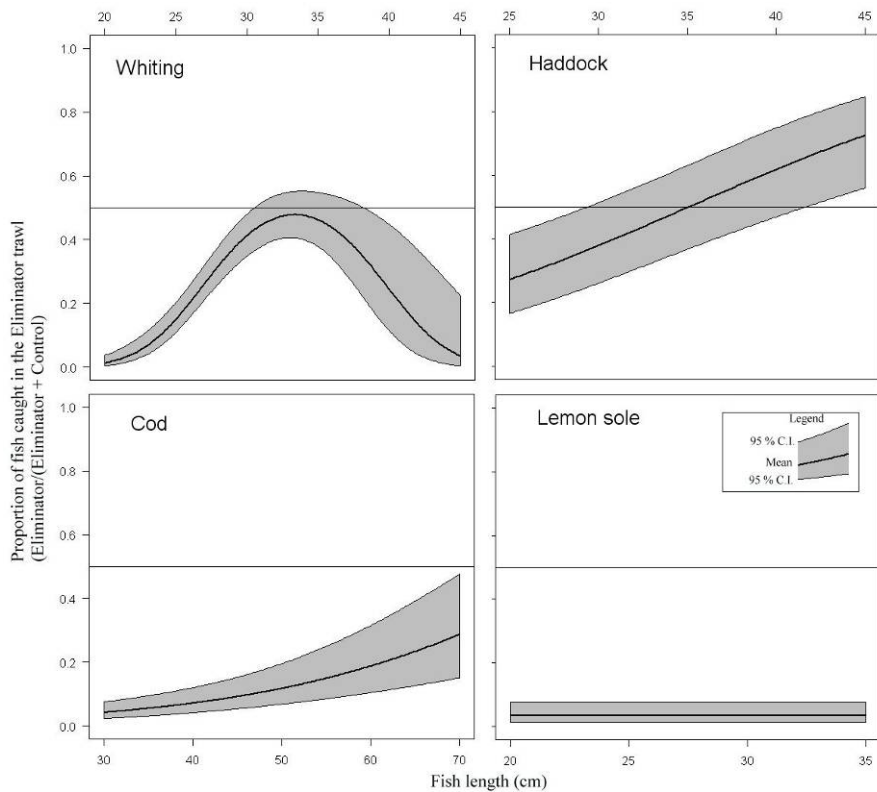
Catch from the Eliminator trawl showing predominantly (89%) haddock and whiting (2007)



The industry (control) trawl, showing a more mixed demersal catch (2007)



Pooled catch length-frequency distributions and the observed proportions of the total catch caught in the Eliminator trawl



Modelled proportion* of the total catches caught in the Eliminator trawl

* How to interpret: A value of 0.5 indicates an even split between the two trawls, i.e. No difference, whereas a value of 0.25 indicates that 25% of the total fish at that length were caught in the Eliminator trawl and 75% were caught in the control trawl.