BIM Ireland's Seafood Development Agency

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Assessment of the Dual Codend on the Galway Aran Fishing Grounds

Fisheries Conservation Report

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Key findings

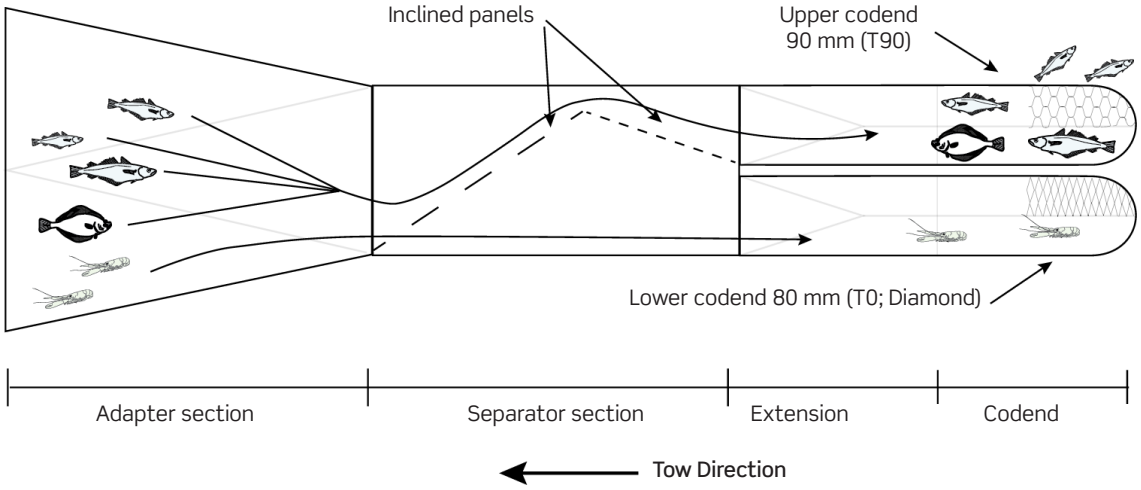
Good separation of gurnard into the upper codend

Substantial reduction in catch sorting times

Substantial increase in catches of market sized fish

Substantial improvement in quality of fish and *Nephrops* landings

Major potential to increase catch value for vessels targeting *Nephrops* and fish species



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Introduction

Fishers targeting *Nephrops* and mixed demersal fish species on the Galway Aran fishing grounds occasionally experience issues with large catches of gurnard. This makes it difficult to sort catches and negatively affects the quality of landings. Commonly used to minimise fish catches of all sizes in the *Nephrops* fishery, fishers report that the 300 mm square-mesh escape panel in the top sheet of the codend is ineffective in reducing gurnards, possibly because they are a more benthic-orientated species.

The dual codend effectively separates most fish catches into an upper codend where T90 mesh is used to reduce catches of small fish and retain market sized fish (Cosgrove et al., 2019). Following the successful BIM post-capture survival study on Nephrops (Oliver et al., 2017) this gear option can be used by any Irish vessel availing of the Nephrops survival exemption in ICES sub area 7. Here, we assess the effect of the dual codend on catches of gurnards and other species in the Aran ground fishery.

Methods

Fishing operations and gear

BIM conducted a catch comparison trial in May 2021 on board the MFV Kittiwake, a 21.95 m twin-rig trawler targeting Nephrops and mixed demersal fish on the Aran grounds in ICES Division 7b (Figure 1). The vessel fished a standard twin-rig trawl configuration which comprised a three-warp system with centre clump weight (Table 1). The standard gear consisted of an 80 mm diamond mesh (T0) codend and 300 mm square mesh panel (SMP). The dual codend comprised 90 mm mesh turned 90 degrees (T90) in the upper codend and 80 mm T0 in the bottom codend (Figure 2).

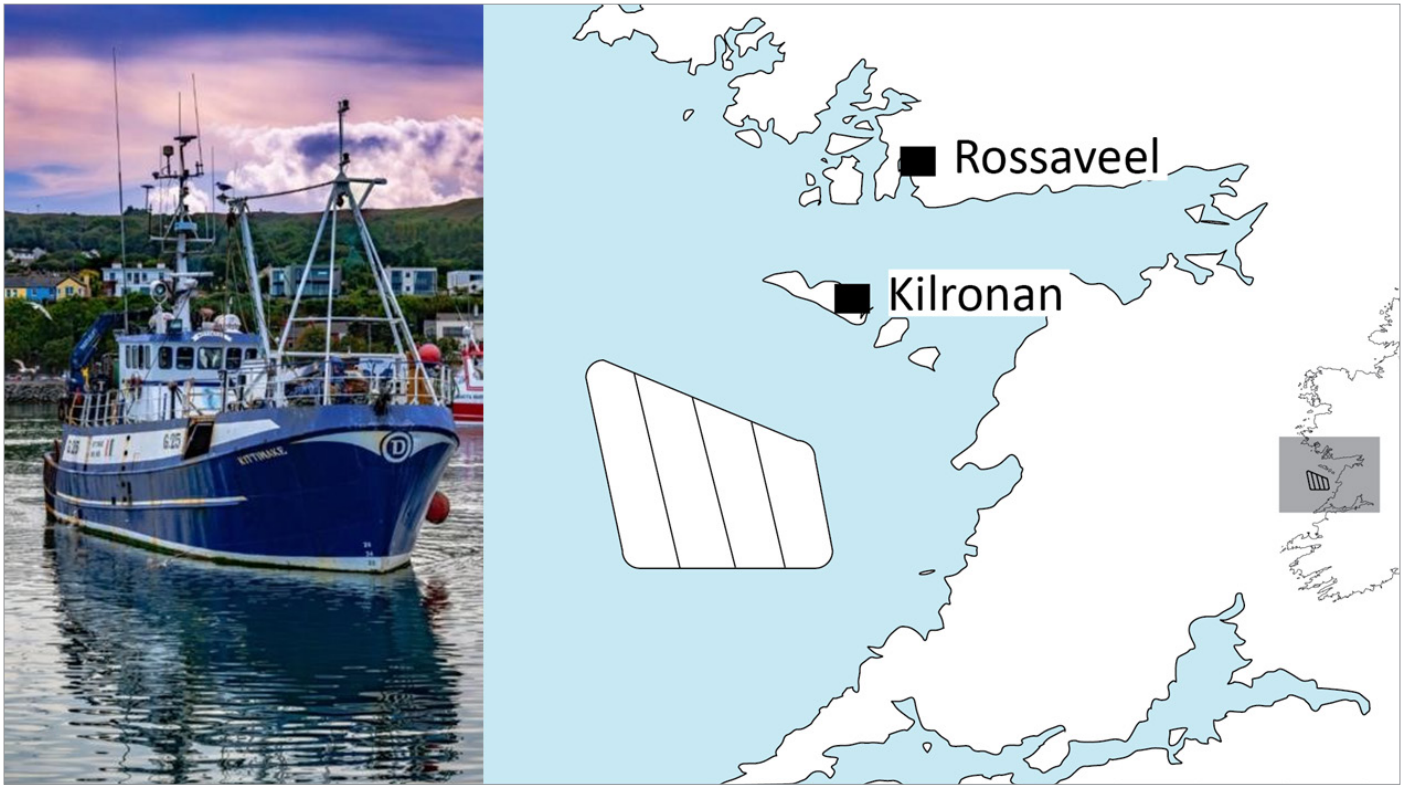

Table 1. Gear characteristics

Gear configuration	Twin rig
Trawl manufacturer	Pepe Trawls Ltd
Door type	Dunbar
Door weight (kg)	350
Clump weight (kg)	450
Warp length average (m)	306
Warp diameter (mm)	16
Headline length (m)	40
Number of floats on headline	11
Fishing circle (meshes x mm)	520 x 80
Fishing line length (m)	46
Ground gear	Rubber discs (2")
Twine thickness (mm)	5.5

Sampling and analysis

Simplified catch sampling was completed by the skipper and crew in line with COVID-19 protocols. Catch weights of the main species and species categories were obtained for the standard gear, and separately for the upper and lower parts of the dual codend. Combined catches from the ttwo codends provided the total catch weight in the dual codend. The main species were Nephrops, gurnard and lesser spotted dogfish. Market sized catches of hake, monkfish, pollack, flatfish and other commercial species were combined as wanted fish. Undersize commercial and non-commercial species were combined as unwanted fish. Mean catch weights per haul were compared using tables and histograms with standard error bars.

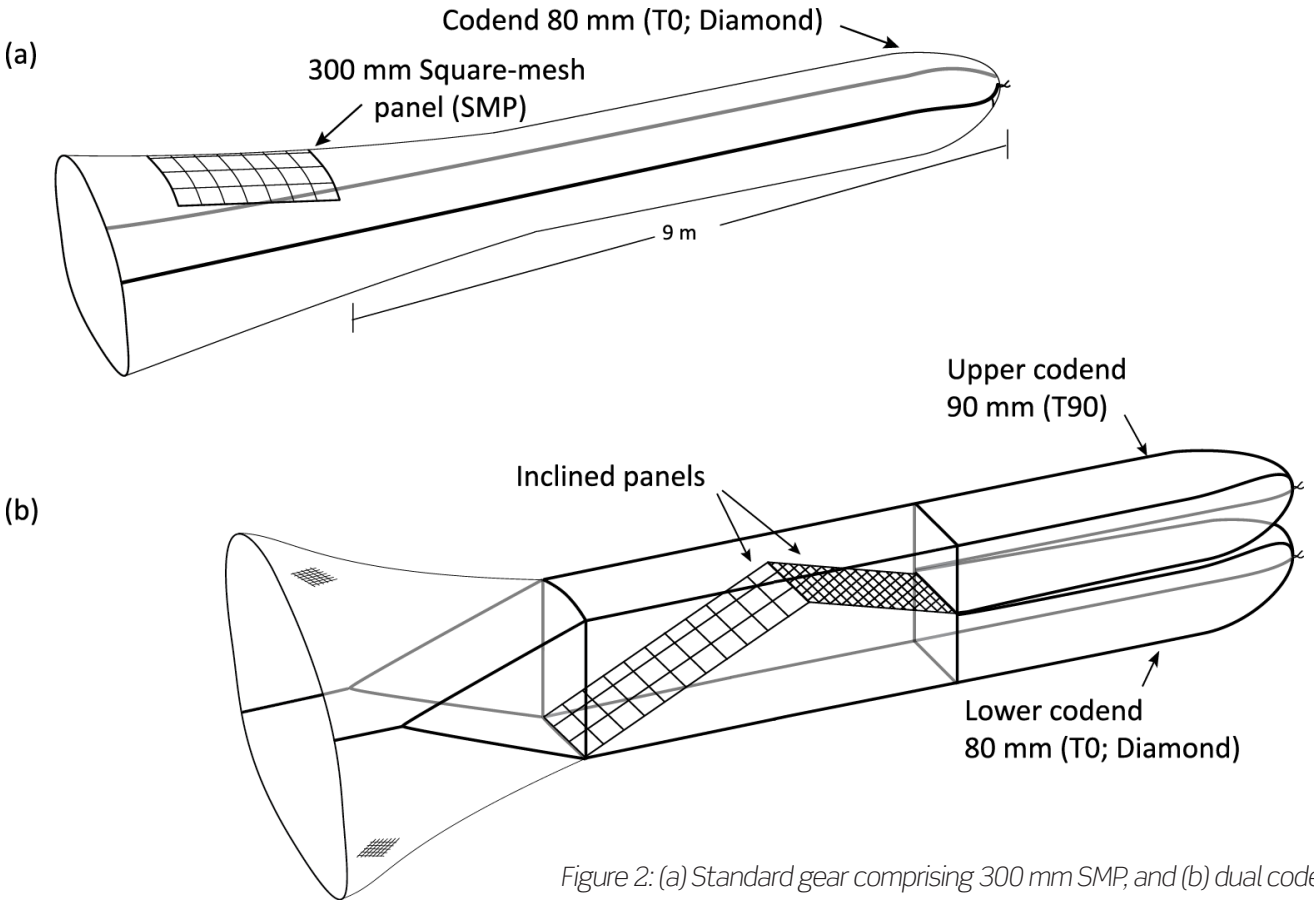

Figure 2: (a) Standard gear comprising 300 mm SMP, and (b) dual codend

Results

A total of 13 hauls were carried out over a five-day period commencing 6th May 2021. Haul duration, towing speed and fishing depth averaged 04 hr 40 min, 2.6 kn and 99 m, respectively.

Little difference occurred in catches of gurnard between the two gears. The main difference was for wanted fish with over twice as many marketable fish retained in the dual codend compared with the standard gear (Figure 3, Table 2).

Most fish catches including gurnard were separated into the upper part while most Nephrops were retained in the lower part of the dual codend (Figure 4, Table 3).

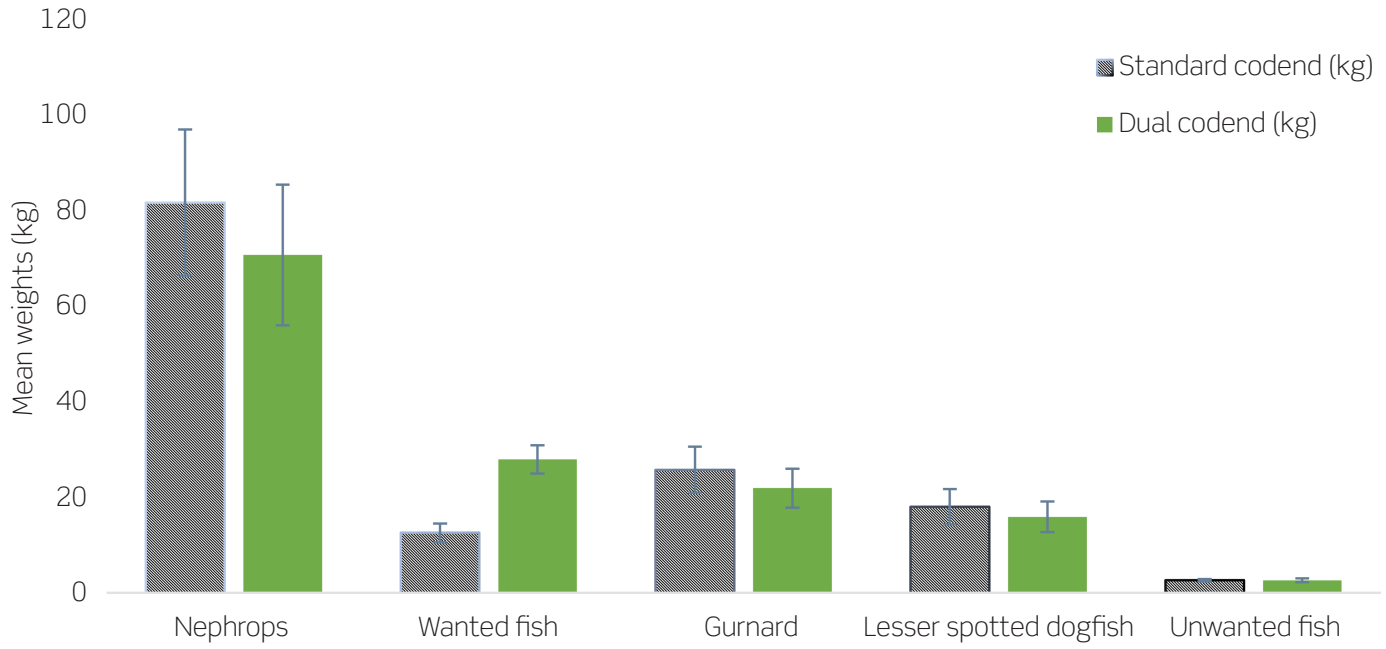

Figure 3: Mean catches with standard error bars

Table 2. Mean catches with standard error (SE)

	Standard codend (kg ± SE)		Dual codend (kg ± SE)		Difference (%)
Nephrops	82	15	71	15	-13
Wanted fish	13	2	28	3	>100
Gurnard	26	5	22	4	-15
Lesser spotted dogfish	18	4	16	3	-12
Unwanted fish	3	0	3	0	0

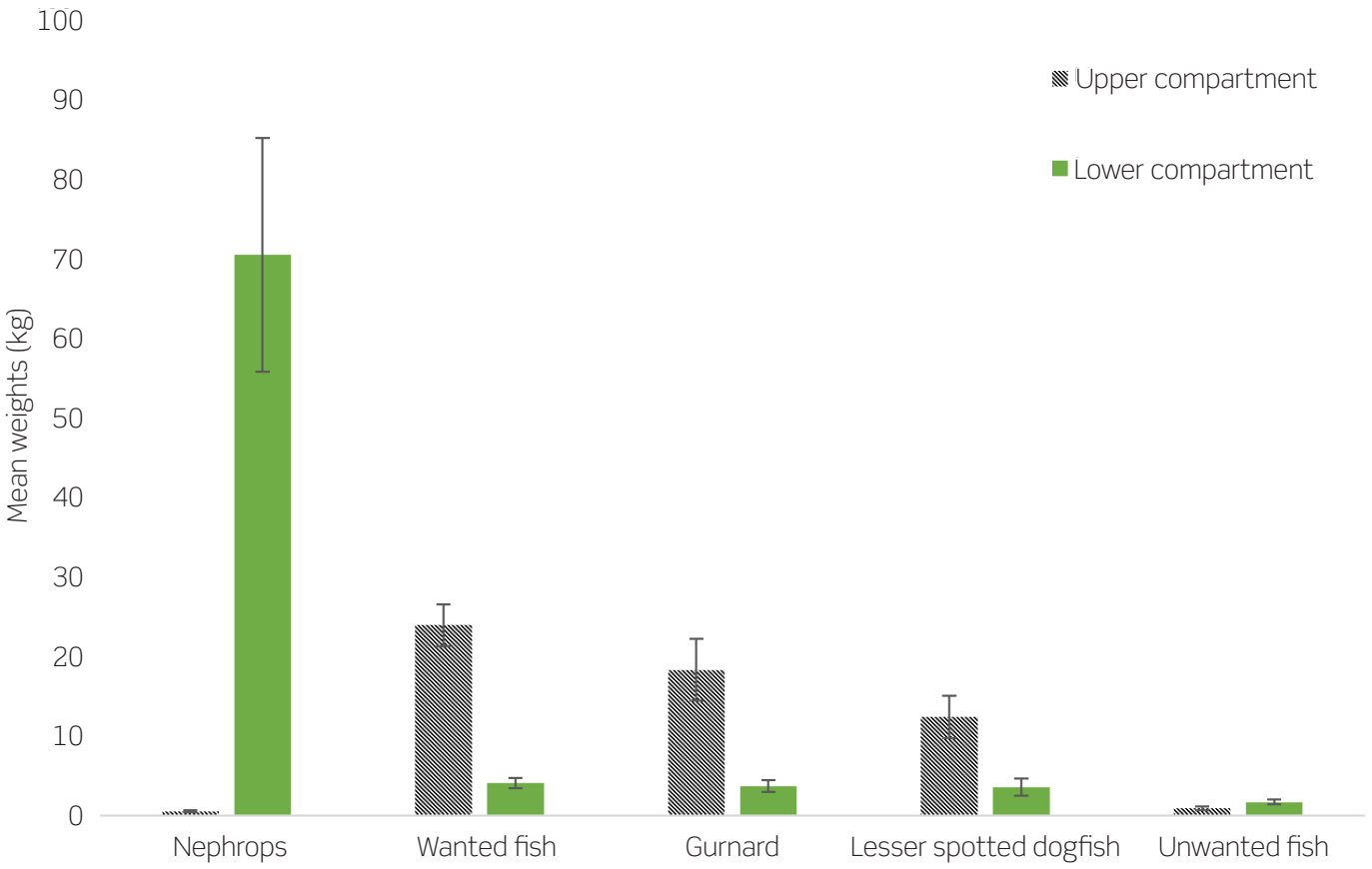

Figure 4: Mean catch weights with standard error bars in the upper and lower parts of the dual codend

Table 3: Quantities and proportions of total catches in the dual codend

	Upper (kg)	Proportion (%)	Lower (kg)	Proportion (%)
Nephrops	7	1	916	99
Wanted fish	311	85	53	15
Gurnard	238	83	48	17
Lesser spotted dogfish	161	78	46	22
Unwanted fish	12	35	22	65

Discussion

Effective separation of gurnard into the upper codend was a positive result. The skipper reported that he was happy with gear performance in relation to greatly reduced sorting times, increased quantities of market sized fish species and greatly improved quality of all landings.

Relatively large quantities of gurnards retained in the upper part of the dual codend suggest that 90 mm T90 mesh may be ineffective in reducing such catches. This may be due to morphological characteristics such as relatively large bony fins, spines and course skin. Another Irish vessel has recently started using 120 mm T90 mesh in the upper part of the dual codend to maximise quality of monkfish and other fish species. Larger T90 mesh sizes might assist in reducing gurnard catches.

A marginal reduction in *Nephrops* catches is consistent with previous work (Cosgrove et al., 2016) and is likely due to some *Nephrops* passing into the upper codend and out through the 90 mm T90 mesh. This loss can be offset by substantial increases in quantity of market sized fish and quality of fish and *Nephrops* landings. The dual codend has major potential to increase catch value for vessels targeting *Nephrops* and fish species.

Acknowledgements

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References

Cosgrove, R. Browne, D., Tyndall, P., McHugh, M., Oliver, M., Minto, C., Burke, B., and Montgomerie, M., 2016. Assessment of a dual codend with net separator panel in an Irish Nephrops fishery. Irish Sea Fisheries Board (BIM), Fisheries Conservation Report, December 2016. 12 pp.

Cosgrove, R., Browne, D., Minto, C., Tyndall, P., Oliver, M., Montgomerie, M., and McHugh, M. 2019. A game of two halves: bycatch reduction in *Nephrops* mixed fisheries. Fisheries Research, 210: 31–40.

Oliver, M., McHugh, M., Browne, D., Murphy, S., and Cosgrove, R. 2017. *Nephrops* survivability in the Irish demersal trawl fishery, Irish Sea Fisheries Board (BIM), Fisheries Conservation Report, September 2017. 14 pp.

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