

Programme SELAR 2018 MARMARES Bottom Trawl Selectivity Cruise

Cruise Report

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1.

OBJECTIVES

The overall objective of the selectivity cruise was the minimization of discards in the trawl, with special attention to the species subject to a TAC in relation to the new EU regulation on discard reduction.

With that objective a selective device designed specifically for this fishery was tested in several hauls within the cruise. During those selectivity hauls, the selective properties of the device were analyzed. In addition, behavior of different species within the tested selective device and other parts of the trawl was analyzed.

2.

Material and methods

2.1 Selectivity cruise

The selectivity cruise was carried out onboard the Spanish bottom trawler F/V “Mar Mares” (see table 1) during May 2018 and it was divided into two parts. The first one between 4th and 10th of May and the second between the 11th and 17th of May of 2018. The landings of the caught fish took place in the Scottish port of Lochinver. The cruises were performed in the ICES division 6a, this is, between 59°00’N and 57° 00’N in latitude and between 07° 38’W and 09° 00’W in longitude and out of the cod fishing exclusion areas.

Table1. F/V Mar Mares main characteristics

Name	MAR MARES
Nationality	Spanish
Total length	38.5 m
Draft maximum	4,2 m
Gross Tonnage	409.1 GT
Horse Power	964 HP
Call Signal	E.C.E.O.

2.2 Selectivity device

The tested selectivity device consists on a 6 meter cylindrical piece inserted between the extension piece (the trawl section before the codend) and the codend. This cylindrical piece was manufactured in 120 mm square mesh in the upper panel (all the upper panel) and 120 mm diamond mesh size in the lower panel (Figure 1). In addition, a 60 mm cover was fitted on the upper panel to collect all the fish scaping through the square mesh in order to measure, quantify and characterize the escapement. In the same way, the codend was blinded with a 60 mm inner net, the objective of this inner was to have the full control of all the sizes of fish arriving to the codend. The selective properties of the SMP were analyzed by size sampling of the individuals collected in the two different compartments.

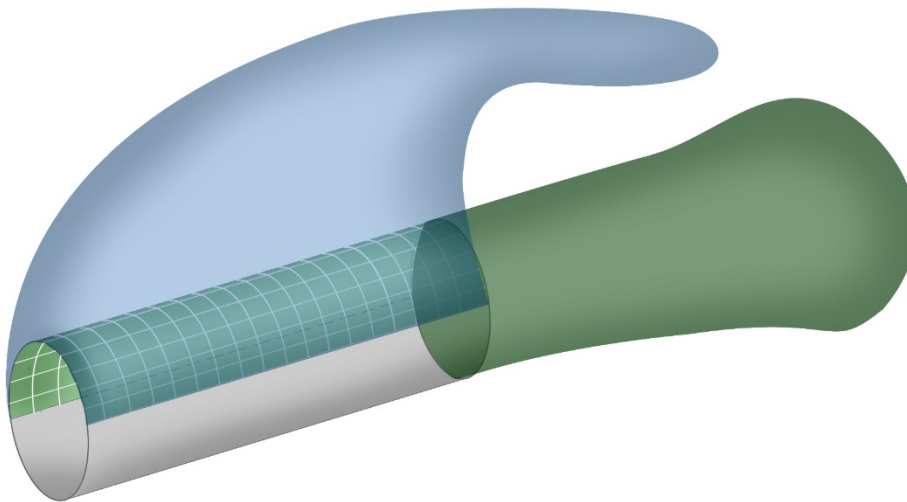


Figure 1. Scheme of the selection device with cover in the extension piece and blinded codend.

Underwater cameras were attached in different parts of the trawl to study the behavior of the fish inside the net, and in more detail in relation with the selective device.

3.

Results

3.1 Selectivity cruise

During the first fishing trip from a total of 25 hauls (table 2), only 4 were used for selectivity experiments due to rough sea conditions. While in the second fishing trip 33 hauls were carried out (table 3), 12 of them for selectivity experiments and an invalid haul because of the gear was broken. Plotted tracks for both fishing trips can be observed in figure 2.

Table 2. Hauls description in the first trip. Highlighted in yellow the hauls for selectivity experiments

Date	Haul N°	H start	Lat. Start	Long. Start	H. end	Lat. End	Long. End	depth (ft)	speed (kn)
05-may-18	1	8:30	58° 33,4	08° 13,0	12:15	58° 27,9	08° 31,1	162	3,1
05-may-18	2	13:15	58° 27,6	08° 33,7	17:15	58° 21,2	08° 52,1	174	3,1
05-may-18	3	18:00	58° 21,0	08° 54,2	22:00	58° 12,2	09° 10,9	173	3,1
06-may-18	4	22:50	58° 10,7	09° 13,2	2:50	57° 59,1	09° 23,0	160	3,1
06-may-18	5	3:45	58° 00,2	09° 21,8	7:20	58° 11,0	09° 12,3	159	3,1
06-may-18	6	8:05	58° 10,8	09° 14,1	12:05	58° 01,0	09° 26,6	177	3,1
06-may-18	7	12:55	58° 01,7	09° 25,5	16:45	58° 12,0	09° 15,7	184	3,1
06-may-18	8	17:30	58° 11,1	09° 16,0	21:30	57° 59,6	09:26,1	179	3,1
07-may-18	9	22:25	57° 57,3	09° 24,4	1:40	57° 48,2	09° 28,2	159	3,1
07-may-18	10	2:45	57° 46,9	09° 27,6	6:25	57° 57,8	09° 23,7	158	3,1
07-may-18	11	7:20	57° 58,0	09° 27,1	11:15	58° 10,1	09° 18,1	180	3,1
07-may-18	12	12:10	58° 09,8	09° 17,9	16:15	57° 57,5	09° 27,0	180	3,1
07-may-18	13	17:00	57° 57,5	09° 27,8	20:50	58° 09,1	08° 20,0	185	3,1
08-may-18	14	21:40	58° 08,2	09° 19,2	1:40	57° 58,2	09° 26,0	172	3,1
08-may-18	15	2:40	57° 58,7	09° 24,6	6:30	58° 09,8	09° 17,1	170	3,1
08-may-18	16	7:20	58° 09,0	09° 17,2	11:35	57° 56,6	09° 25,6	167	3,1
08-may-18	17	12:25	57° 58,4	09° 24,7	16:20	58° 09,7	09° 18,7	174	3,1
08-may-18	18	17:10	58° 09,5	09° 18,5	21:10	57° 57,5	09° 25,3	172	3,1
09-may-18	19	22:10	57° 58,9	09° 23,8	2:00	58° 10,1	09° 15,4	168	3,1

09-may-18	20	2:50	58° 11,9	09° 12,6	6:55	58° 20,2	08° 55,9	176	3,1
09-may-18	21	7:45	58° 20,1	08° 56,5	12:30	58° 10,2	09° 15,0	173	3,1
09-may-18	22	13:20	58° 09,3	09° 16,7	17:40	57° 57,7	09° 25,2	166	3,1
10-may-18	23	6:45	58° 10,7	09° 16,9	11:30	57° 57,1	09° 26,7	177	3,1
10-may-18	24	12:20	57° 58,0	09° 26,3	16:15	58° 09,7	09° 17,8	175	3,1
10-may-18	25	17:00	58° 11,0	09° 15,5	19:40	58° 17,1	09° 04,0	180	3,1

Table 3. Hauls description in the second trip. Highlighted in yellow the hauls for selectivity experiments. Highlighted in red nule haul.

Date	Haul N°	H start	Lat. Start	Long. Start	H. end	Lat. End	Long. End	depth (ft)	speed (kn)
12-may-18	1	8:25	58° 34,0	08° 15,6	12:20	58° 27,9	08° 36,6	188	3,1
12-may-18	2	13:10	58° 27,1	08° 38,5	17:20	58° 20,2	08° 55,8	180	3,1
12-may-18	3	18:00	58° 19,9	08° 57,5	22:00	58° 10,8	09° 13,2	179	3,1
13-may-18	4	22:50	58° 09,4	09° 15,2	2:50	57° 58,6	09° 24,4	163	3,1
13-may-18	5	3:45	58° 01,6	09° 23,6	7:30	58° 11,0	09° 13,7	168	3,1
13-may-18	6	8:20	58° 11,2	09° 14,7	12:20	58° 00,8	09° 25,4	175	3,1
13-may-18	7	13:20	58° 02,6	09° 25,0	17:15	58° 13,2	09° 13,2	182	3,1
13-may-18	8	18:00	58° 12,3	09° 12,2	22:15	58° 01,0	09° 23,0	168	3,1
14-may-18	9	23:30	57° 59,7	09° 23,7	3:00	57° 47,1	09° 28,4	161	3,1
14-may-18	10	3:55	57° 49,9	09° 27,4	7:25	58° 00,5	09° 22,4	158	3,1
14-may-18	11	8:20	58° 02,0	09° 21,0	12:15	58° 12,9	09° 10,5	163	3,1
14-may-18	12	13:00	58° 11,7	09° 11,5	17:00	58° 01,5	09° 21,7	163	3,1
14-may-18	13	17:50	58° 01,5	09° 25,3	20:15	57° 54,9	09° 30,5	187	3,1
15-may-18	14	21:00	57° 52,7	09° 31,9	0:30	57° 42,4	09° 32,7	207	3,1
15-may-18	15	2:45	57° 31,4	09° 29,3	6:45	57° 20,2	09° 24,6	198	3,1
15-may-18	16	8:30	57° 19,4	09° 24,1	11:30	57° 10,6	09° 19,6	199	3,1
15-may-18	17	12:30	57° 11,4	09° 20,0	16:30	57° 23,2	09° 27,5	223	3,1
15-may-18	18	17:25	57° 25,2	09° 28,6	21:15	57° 37,2	09° 32,6	228	3,1
16-may-18	19	22:10	57° 36,1	09° 31,9	2:10	57° 24,0	09° 27,7	219	3,1
16-may-18	20	3:05	57° 25,3	09° 28,8	7:05	57° 37,7	09° 32,8	230	3,1
16-may-18	21	8:00	57° 36,8	09° 31,8	1:00	57° 25,1	09° 28,0	215	3,1
16-may-18	22	12:55	57° 25,6	09° 28,0	16:30	57° 36,5	09° 31,1	213	3,1
16-may-18	23	17:35	57° 35,1	09° 31,9	21:25	57° 23,7	09° 27,5	223	3,1
17-may-18	24	22:15	57° 25,2	09° 28,3	2:30	57° 38,1	09° 32,3	218	3,1
17-may-18	25	3:25	57° 36,5	09° 32,2	7:35	57° 25,0	09° 28,5	227	3,1
17-may-18	26	8:30	57° 24,6	09° 28,5	12:30	57° 37,2	09° 32,7	232	3,1
17-may-18	27	13:25	57° 35,8	09° 32,0	17:25	57° 24,6	09° 27,8	218	3,1
17-may-18	28	18:30	57° 24,0	09° 28,0	22:30	57° 37,2	09° 32,9	231	3,1
18-may-18	29	23:30	57° 36,4	09° 32,7	3:30	57° 24,4	09° 28,4	234	3,1
18-may-18	30	4:30	57° 26,5	09° 28,4	8:25	57° 38,5	09° 32,5	215	3,1
18-may-18	31	9:20	57° 40,5	09° 33,2	13:15	57° 53,0	09° 32,6	217	3,1
18-may-18	32	14:15	57° 54,5	09° 24,9	18:15	58° 05,7	09° 22,0	180	3,1
18-may-18	33	19:15	58° 06,5	09° 18,5	22:10	58° 13,2	09° 05,1	161	3,1

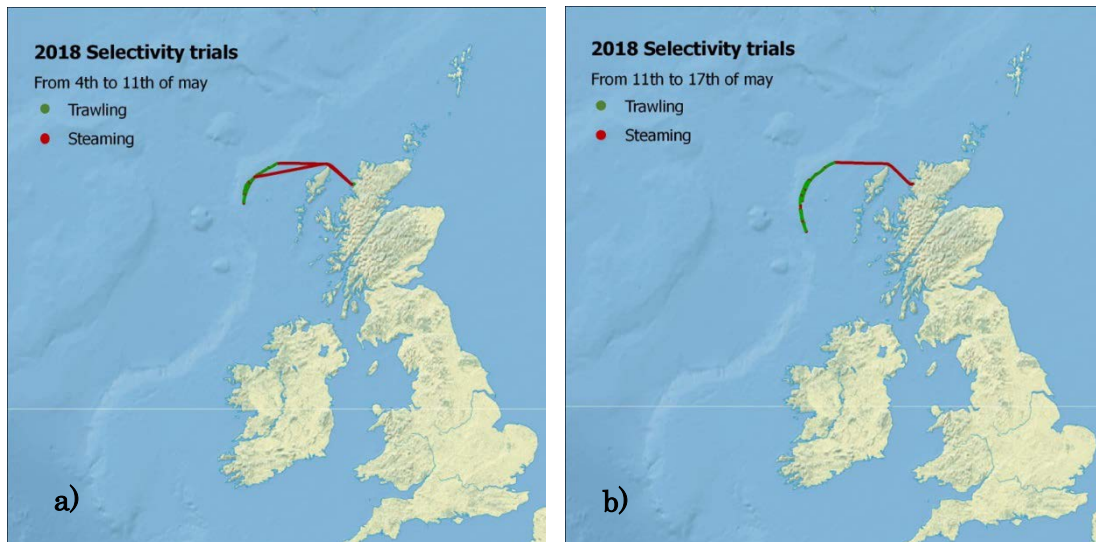


Figure 2: Plotted tracks of the F/V “Mar Mares” during the selectivity cruises. In red color we can see the track when the vessel was steaming and in green color when the vessel was fishing.

3.2 Selectivity of the device

Six were the selected group of species for size selection analysis: Hake (*Merluccius merluccius*), Megrim (*Lepidorhombus spp.*), Haddock (*Melanogrammus aeglefinus*), Saithe (*Pollachius virens*), Ling (*Molva molva*) and Greater Silver smelt (*Argentina silus*). All the individuals from these species were measured during the sampling of each compartment, except the Megrim and Greater Silver smelt when great amounts were caught. When that situation occurred, subsampling was required.

The preliminary results (see table 4) shows moderate escapees through the square mesh upper panel in hake (15%), while ling and greater silver smelt show higher escapees with 25% and 38% respectively. Megrim, as we could predict due to its bottom contact behavior, shows the lowest escapees with 3.4% in average. The data for haddock and saithe are not robust enough to be considered due to the low number of individual involved in the catches, there were hauls where

no individuals were found. A more detailed analysis will be performed in order to obtain the selectivity curves and the contact probability of the selectivity device.

Table 4. Results on retention percentage by haul and compartment for the six species analyzed.

Trip	Haul Nº	Towing speed	HAKE		MEGRIM		HADDOCK		SAITHE		LING		GREATER SILVER SMELT	
			HKE SMP	HKE codend	LEZ SMP	LEZ codend	HAD SMP	HAD Codend	POC SMP	POC Codend	LIN SMP	LIN Codend	ARU SMP	ARU Codend
1	9	3,1	25,0%	75,0%	1,7%	98,3%	12,5%	87,5%	0,0%	100,0%	41,2%	58,8%	52,6%	47,4%
	10	3,1	51,1%	48,9%	7,1%	92,9%	35,1%	64,9%	33,3%	66,7%	27,8%	72,2%	48,7%	51,3%
	14	3,1	17,1%	82,9%	3,8%	96,2%	0,0%	100,0%	0,0%	100,0%	7,0%	93,2%	47,9%	52,1%
	15	3,1	21,1%	78,9%	2,6%	97,4%	87,5%	12,5%	0,0%	100,0%	20,6%	79,4%	31,9%	68,1%
2	4	3,1	14,0%	86,0%	2,9%	97,1%	50,0%	50,0%	0,0%	100,0%	45,5%	54,5%	46,7%	53,3%
	5	3,1	21,5%	78,5%	3,8%	96,2%	20,0%	80,0%	0,0%	0,0%	31,1%	68,9%	67,4%	32,6%
	9	3,1	19,9%	80,1%	1,8%	98,2%	39,3%	60,7%	25,0%	75,0%	21,4%	78,6%	36,8%	63,2%
	10	3,1	26,1%	73,9%	3,8%	96,2%	32,8%	67,2%	0,0%	0,0%	28,0%	72,0%	48,1%	51,9%
	16	3,1	2,9%	97,1%	1,7%	98,3%	0,0%	100,0%	0,0%	100,0%	23,1%	76,9%	22,7%	77,3%
	20	3,1	7,9%	92,1%	11,6%	88,4%	0,0%	100,0%	0,0%	100,0%	14,1%	85,9%	30,4%	69,6%
	22	3,1	20,9%	79,1%	1,5%	98,5%	0,0%	100,0%	0,0%	0,0%	28,2%	71,8%	36,4%	63,6%
	24	3,1	0,0%	100,0%	4,2%	95,8%	0,0%	100,0%	0,0%	0,0%	33,4%	66,6%	23,9%	76,1%
	25	3,1	3,7%	96,3%	2,8%	97,2%	0,0%	100,0%	0,0%	100,0%	28,9%	71,1%	23,5%	76,5%
	27	3,1	0,0%	100,0%	1,2%	98,8%	0,0%	100,0%	0,0%	0,0%	11,1%	88,9%	31,8%	68,2%
	29	3,1	4,5%	95,5%	1,6%	98,4%	0,0%	100,0%	0,0%	0,0%	19,5%	80,5%	30,1%	69,9%
32	3,1	8,3%	91,7%	1,5%	98,5%	40,0%	60,0%	50,0%	50,0%	18,2%	81,8%	35,6%	64,4%	
Average			15,3%	84,8%	3,4%	96,7%	19,8%	80,2%	6,8%	55,7%	24,9%	75,1%	38,4%	61,6%

Acknowledgements

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