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Selectivity experiments on the Grand Bank of Newfoundland in 1967

by

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In November 1967 the Fisheries Laboratory, Lowestoft chartered the side motor trawler ROSS RENOWN to carry out, amongst other work, selectivity experiments on the Grand Bank of Newfoundland. Part of the charter was devoted to studying the effect of a tight topside chafer on the selectivity of a polypropylene continuous multifilament cod-end, and part to the comparison of the selectivity of this cod-end with one made of polypropylene split fibre.

Gear

Specifications of the gear used are given in Table 1. The topside chafer consisted of an old cod-end and was lashed along all four edges to the cod-end.

Results

These are shown in Table 2 and Figures 1 and 2. The tight topside chafer reduced the mean selection factor by 11 per cent; the difference was significant; $t = 7.38$, $P < 0.001$ for 12 degrees of freedom. A very similar reduction was found by Holden (1966).

The mean value of the selection factor for the polypropylene split fibre cod-end lay within the 95 per cent confidence limits of that for the continuous multifilament cod-end. This result supports the conclusion drawn by Hylen (1969) that the selectivities of these two forms of polypropylene are the same.

References

HOLDEN, M. J., 1966. The effect of tight topside chafers on the selectivity of manila cod-ends. I.C.E.S. Coop. Res. Rep., Series B, 1966, 152-153.

HYLEN, A., 1969. Selectivity experiments with a cod-end made of polypropylene split fibres. I.C.E.S. Coop. Res. Rep., Series B, 1968, 51-55.

Table 1. Specification of gear used

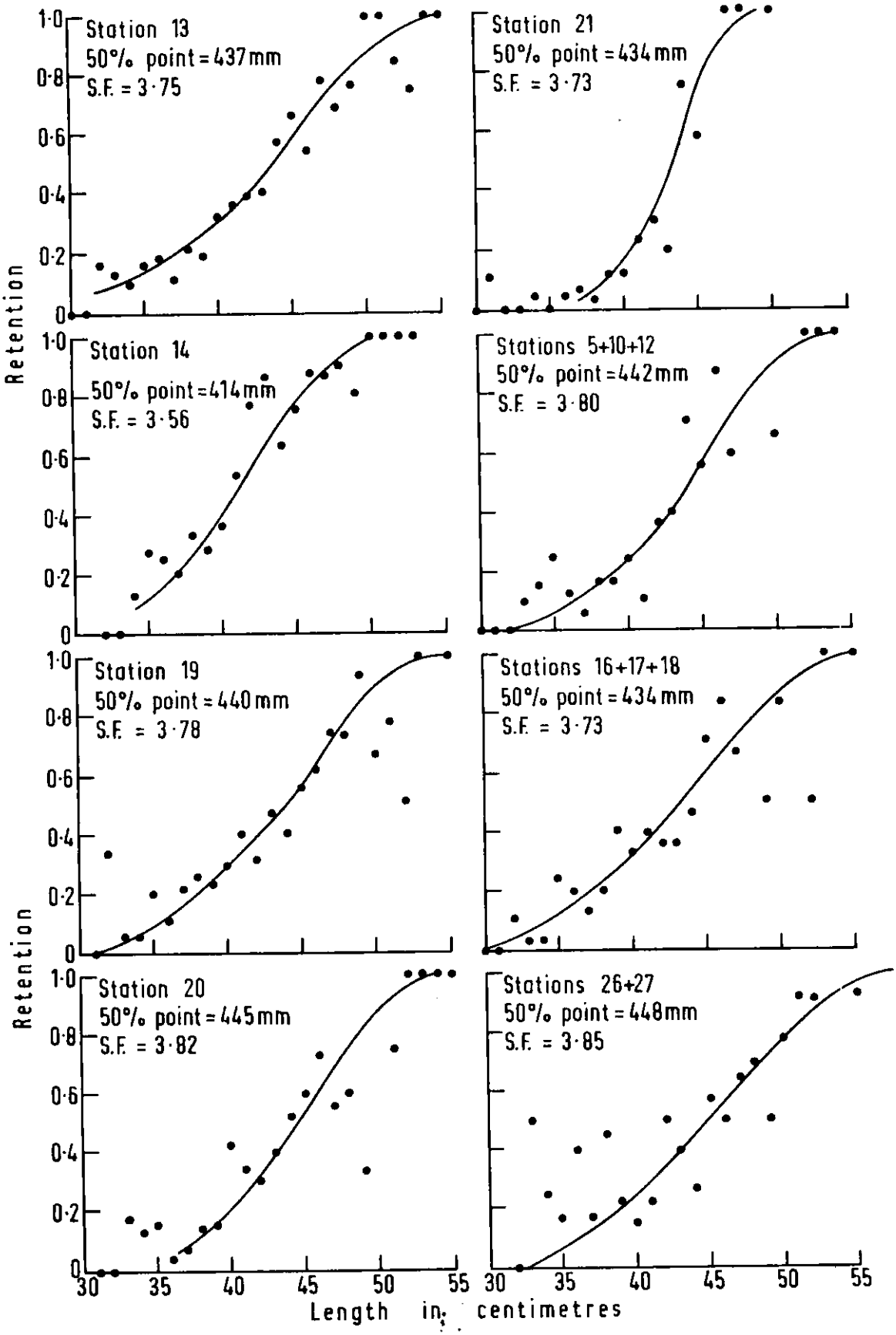
Ship	M.T. ROSS RENOWN; 59.8 m overall length; 1500 h.p.; 700 gross tons.		
Gear	Small Granton Trawl; 24 m headline, 16 m footrope.		
Species studied	Cod.		
Experimental method	Topside cover with blinders on lower side of cod-end.		
Date	15 November 1967 to 27 November 1967.		
Speed of tow	3.5 to 4.0 knots.		
Type of mesh gauge	ICES; 4 kg pressure.		
Cover	ICES specification		
Material	Polyethylene continuous filament		
Runnage (m/kg)	545		
Tex.	R 1838 tex.		
Braiding	Single twine		
Twine construction	Twisted		
Mesh size (mm)	70 mm		
Cod-ends			
Material	Polypropylene continuous filament		Polypropylene split fibre
Runnage (m/kg)	201.8		161.5
Tex.	R 5012 tex.		R 6203 tex.
Braiding	Double		Double
Twine construction	Plaited		Twisted
Mesh size ± s.e. (mm)	(i) 116.4 ± 0.42 (St. 13-27)		130.6 ± 0.61
	(ii) 115.9 ± 0.36 (St. 31-40)		
	(i) 100	(ii) 125	70
	(i) 110-128	(ii) 108-128	120-146
Chafer			
Material	Polyester		
Runnage (m/kg)	201.8		
Tex.	R 5000 tex.		
Braiding	Double		
Twine construction	Plaited		
Mesh size ± s.e. (mm)	112.4 ± 0.47		
No. measurements	50		
Range (mm)	110-119		

Table 2. Summary of results of selectivity experiments on the Newfoundland Grand Bank. N.B. For grouped stations the numbers caught are the sums of the catches

Station no.	13	14	19	20	21	5, 10, 12	16, 17, 18	26 & 27	31	33	34	35	37	38, 39, 40	42, 43, 44, 46	47, 48, 49, 50
ICNAF region	3N	3N	3N	3N	3N	3N	3N	3L	3L	3L	3L	3L	3L	3L	3L	3L
Mean size (mm)	116.4	116.4	116.4	116.4	116.4	116.4	116.4	116.4	115.9	115.9	115.9	115.9	115.9	115.9	130.6	130.6
Cod-end material	Polypropylene continuous multifilament								Polypropylene continuous multifilament						Polypropylene split fibre	
Chafer	YES								NO						NO	
50% point (mm)	437	414	440	445	434	442	434	448	504	482	496	465	504	485	570	561
Selection factor	3.75	3.56	3.78	3.82	3.73	3.80	3.73	3.85	4.35	4.16	4.28	4.01	4.35	4.18	4.36	4.30
Selection range (mm)	385–475	377–446	390–475	405–478	412–451	401–473	384–474	398–492	457–544	396–515	452–540	405–505	466–532	446–522	543–602	524–588
No. of cod in selection range																
Cod-end	144	53	190	63	19	37	80	61	129	648	124	398	88	59	34	51
Cover	180	44	267	72	40	56	129	83	136	1150	194	597	99	91	35	49
Total number of cod																
Cod-end	239	253	303	151	105	157	183	827	433	1574	414	708	474	552	427	471
Cover	309	87	423	216	281	167	341	139	977	2290	1122	1455	1068	1669	189	315
Catch of other species* (kg):																
Cod-end: Macrurids	300	1050	90	2750	150	210	360	–	–	–	–	60	–	–	–	–
Sebastes	60	150	60	–	–	–	30	–	–	–	–	15	30	150	105	30
Dabs	30	–	900	–	3000	1110	900	270	–	–	–	15	30	360	2460	870
Rays	–	–	–	–	–	–	–	1050	600	–	–	60	120	60	60	–
Cover: Sebastes	30	60	30	600	300	–	–	–	–	–	–	–	15	210	60	–
Dabs	–	–	15	–	–	–	15	–	–	–	–	–	15	30	225	75
Duration of tow (minutes)	160	180	195	175	180	160*	190*	185*	180	120	110	150	180	180*	200*	180*
Mean selection factor	3.75								4.22						4.33	
Variance	0.0079								0.0173						–	
Standard deviation	± 0.089								± 0.132						–	
95% confidence limits of selection factor	3.68–3.83								4.08–4.36						–	

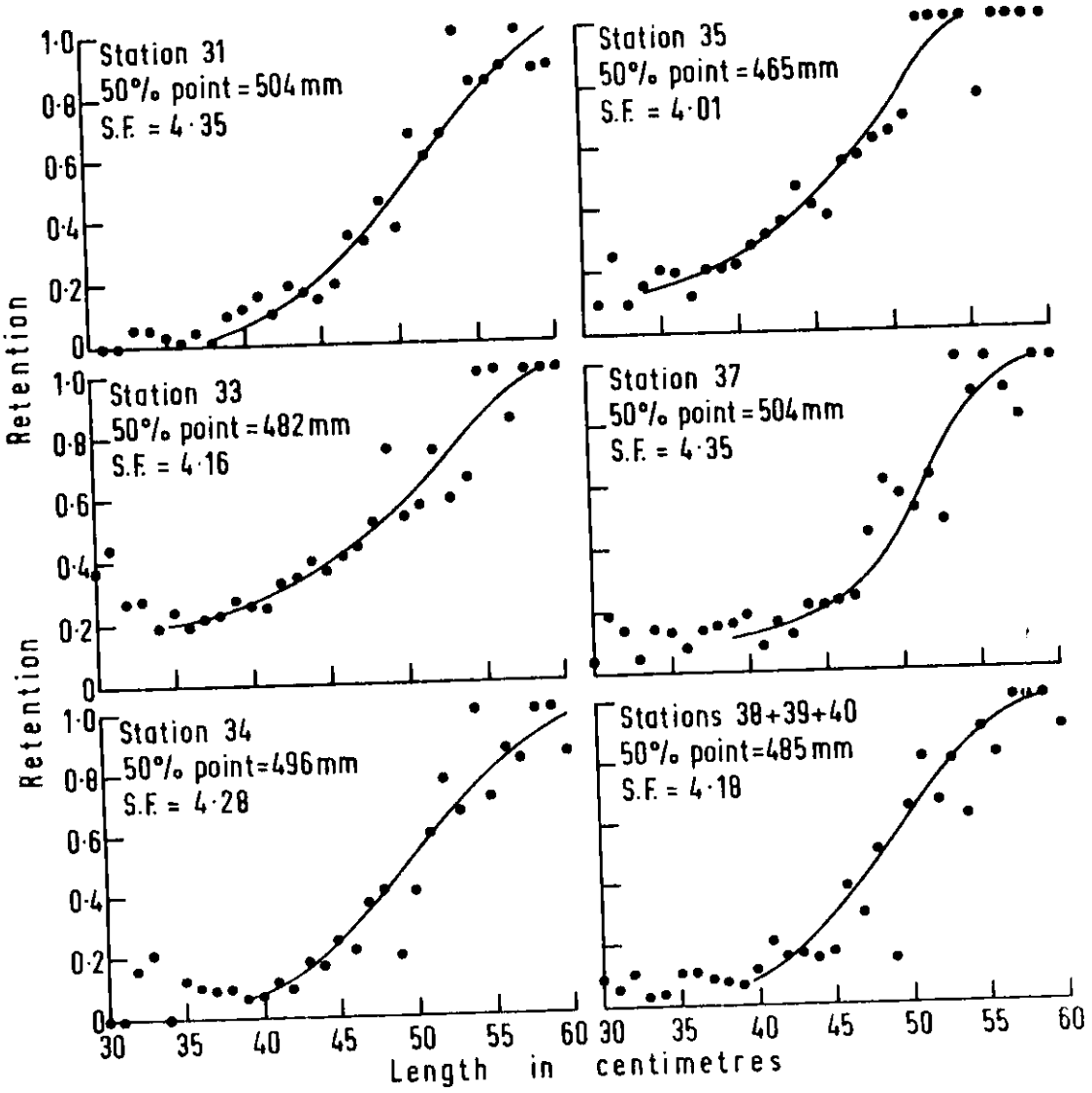
* Macrurids = Nezumia bairdii; 'Dabs' = American plaice (long rough dabs), Drepanopsetta platessoides and Yellow-tail flounders, Limanda ferruginea; Rays = mainly Raia radiata. Other main species caught: Lycodes, Amerrhichas, Reinhardtius hippoglossoides

*Mean values.

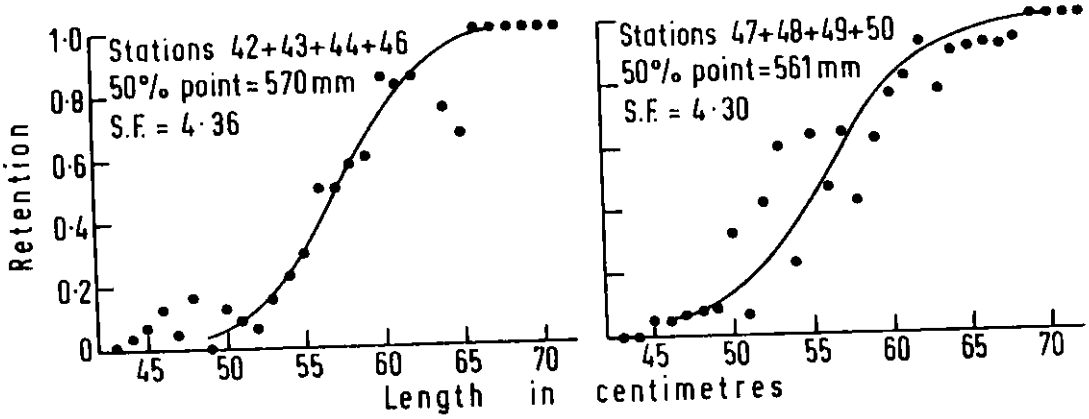


Polypropylene continuous filament cod-end with tight top-side chafer.

Figure 1. Selection ogives for a polypropylene continuous multifilament cod-end with a tight topside chafer.



Polypropylene continuous filament cod-end without chafer.



Polypropylene split-fibre cod-end without chafer.

Figure 2. Selection ogives for a polypropylene continuous filament cod-end and a polypropylene split-fibre cod-end, both