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Interim Report on the Selection by Trawl Codend Meshes made of Various Materials

by
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The results of investigations into the mesh selection of seine nets compared with that of trawls (published Journal du Conseil, 1954) indicated that, as Jensen had suggested (Rapp. et Proc. Verb., CXXV), the type of material used in making the meshes of a net might be expected to influence its mesh selection. To test whether this was so a series of experiments has been made comparing the selection of cotton and sisal codends used on the full-sized standard commercial sisal trawls fished by the 90 ft. motor trawler PLATESSA .. and the 125 ft. steam trawler SIR LANCELOT. In all the experiments the covered codend technique was employed and hauls were of 2-3 hours duration. The fish on which the comparisons were based were whiting and haddock.

Some of the experiments were more satisfactory than others, but here the results of all of them have been summarised in table form. Fish of lengths less than 20 cm. and greater than 32 cm. were caught, but for convenience have been omitted from the table. The reliability of each experiment which involved a separate voyage can be judged with the aid of the following comments.

Gear.

In experiments A and B the cotton codend used was of heavy ~~twine~~ braided double and treated with cuprinol to produce netting which, to the touch, was not noticeably much more or less flexible than the double sisal. The runnage of both the cotton and the untreated sisal twines was about 150 yds. per lb.

In experiments C, D, and E, the double sisal was untreated and of runnage 125 yds. per lb., and in experiment F it was as in A and B. In experiments C to F the single cotton was tanned and of runnage 180 yds. per lb., and the double cotton was also tanned and of runnage 224 yds. per lb. Experiments C and D employed the very same codends; experiments C and E employed 'sister' cotton codends, and experiments E and F employed the very same cotton codends.

In all experiments the meshes were measured with a simple wedge-shaped metal gauge of 2mm. thickness. This was pushed into the mesh, in all experiments but E, with a force of about 5 lb. by one of a pair of observers whose measurements were matched. In experiment E another observer made the measurements, using the gauge with less force. To align experiment E with the others, therefore, about 3 mm. should be added to the mesh measurements recorded.

Results.

During the course of experiments A and B both codends seemed to be selecting satisfactorily. The length distribution of whiting available was almost unimodal, and the apparent selection bands were rather above this mode so that most of the fish went into the covers. The cotton codend was, for a few hauls (included in the tabulated total), fished on a trawl made entirely of cotton, but its selection then did not appear to be different from that on the sisal trawl. These two experiments showed the double cotton to have a markedly higher selection than had the double sisal.

In experiments C and D, the codends seemed to be selecting satisfactorily. The sizes of whiting in C were such that the selection band of the sisal codend coincided with the mode of the length distribution. The selection by the single cotton was distinctly higher than that by sisal, and both ogives extended fairly smoothly between 10 % and 95 % points. The selection bands for haddock were both well below the modal length of the unimodal length distribution. The cotton codend showed the upper half of a selection ogive, but the sisal codend showed no selection; this indicates that the selection by the cotton was distinctly higher than that by sisal.

The data from experiment D are poor. Two groups of fish were trawled on different grounds but numbers in the apparent selection band were very small indeed. The factor relating the doubtful 50 % point to the size of the cotton mesh was more of the order of magnitude as that of the sisal mesh in earlier experiments.

In experiment E the apparent selection bands were rather below the modal length of the fish available and thus embraced rather small numbers. In all three cases the upper halves of the selection ogives (from 40 % to 100 % retained and involving the larger numbers of fish) were reasonably smooth, but the lower halves, based on small numbers are not reliable. These results indicate there to be little or no difference between the selections of sisal and cotton codends. The proviso about mesh measurement, mentioned above, should be remembered. In the subsequent experiment F it was found that the covers fitted to the cotton codends in E were too tight. This may have affected their fishing.

In experiment F, for many of the hauls the cotton codends did not seem to be fishing satisfactorily. Although the apparent selection bands coincided well with the modes of the length distributions, too many of the fish which might have been expected in the cover were found in the codend; thus the selection ogives were approximately smooth only from the 40 % point upwards. Even when considering only those hauls after adjustment of the too-tight covers, this experiment shows no very marked difference in selection between double sisal and single and double cotton codends, although the selection by the single cotton is apparently rather higher than that by the sisal.

From the whole series of experiments, although exceptions are recorded, the 50 % length: mesh size factor, for whiting in double sisal codends, as found by covered codend technique, is 3.7.

A review of mesh selection experiment results, including the present somewhat controversial data, has been made for the purpose of the ad hoc Advisory Committee to the Permanent Commission; in this the figure of about 4.1 is suggested for the comparable factor for codends made of cotton and hemp.

Experiment	A				B				C							
	Platessa March 1954				Platessa March 1954				Sir Lancelot November 1954							
Species	Whiting				Whiting				Whiting				Haddock			
Codend	Double Sisal		Double Cotton		Double Sisal		Double Cotton		Double Sisal		Single Cotton		Double Sisal		Single Cotton	
Mesh mm.	73.3		70.8		70.8		70.2		72.1		72.3		72.1		72.3	
Hauls	8		9		7		8		5		8		4		8	
Length cm.	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover
20	26	332	14	514	8	313	16	324	–	1	–	–	–	–	–	–
1	40	344	33	506	12	366	28	405	–	4	–	–	2	–	–	–
2	47	235	36	392	19	301	34	475	1	12	–	–	1	–	1	1
3	69	190	41	255	32	240	70	391	3	14	–	6	2	1	5	1
4	80	137	43	214	47	185	78	430	9	29	–	7	10	1	6	6
25	94	64	64	144	62	122	97	408	20	25	2	13	36	–	28	19
6	83	33	47	78	64	65	92	294	37	43	10	18	78	1	83	29
7	63	7	45	35	66	23	113	233	44	38	12	30	127	6	152	27
8	37	2	29	13	46	9	106	171	44	16	13	26	153	2	221	18
9	16	–	29	11	36	6	110	109	57	11	25	25	177	1	184	15
30	21	–	20	–	19	2	132	67	39	3	31	18	119	1	137	7
1	11	–	9	–	14	–	93	34	40	–	24	15	83	–	104	4
2	8	–	7	–	8	–	88	11	23	1	31	9	48	–	80	–
50% length	25.0		27.1		26.4		29.2		26.7		30.1		23		24.8 ?	
50% length: mesh	3.4		3.8		3.7		4.2		3.7		4.2				3.4 ?	

Experiment	D Sir Lancelot Dec. 1954		E Sir Lancelot December 1954						F Platessa August 1955											
Species	Whiting		Whiting						Whiting						Haddock					
Codend	Single Cotton		Double Sisal		Single Cotton		Double Cotton		Double Sisal		Single Cotton		Double Cotton		Double Sisal		Single Cotton		Double Cotton	
Mesh mm.	71.7		65.7		64.3		65.5		69		68		69		69		68		69	
Hauls	3		5		10		5		5		5		12		5		5		12	
Length cm.	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover	Codend	Cover
20	1	57	10	13	17	24	9	15	4	9	3	4	3	7	–	3	1	2	–	2
1	1	22	3	2	4	4	3	6	25	44	9	15	8	29	6	13	6	3	2	8
2	1	11	4	6	2	7	–	5	44	88	16	36	21	48	25	52	17	28	40	13
3	1	1	12	13	14	22	5	10	58	106	30	40	42	52	137	119	51	56	126	34
4	–	1	44	42	79	85	36	33	26	112	15	39	37	49	295	165	116	96	297	35
25	1	6	138	90	231	160	84	66	38	71	19	45	42	29	319	90	171	72	260	28
6	5	2	158	67	407	148	147	69	93	90	26	30	72	22	252	24	126	33	161	10
7	3	2	216	49	445	107	178	48	180	98	79	50	128	23	108	4	53	5	88	3
8	5	–	158	21	392	51	135	35	242	74	86	48	137	15	25	1	13	–	30	1
9	11	2	122	12	279	19	105	14	236	36	125	35	154	10	14	–	14	–	17	–
30	12	3	94	3	227	11	76	8	198	26	127	13	136	5	42	–	16	–	35	–
1	32	4	56	–	110	2	55	1	196	7	100	3	94	3	52	–	26	–	36	–
2	30	2	32	–	64	–	22	–	138	1	65	1	93	3	61	–	36	–	57	–
50% length	26. ?		24.3		24.6		24.9		26.5		26.8		24.8 ?		23.5		23.8		21.5 ?	
50% length: mesh	3.6 ?		3.7		3.8		3.8		3.8		3.9		3.6 ?		3.4		3.5		3.1 ?	