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Investigations of the By-Catch in Herring  
Trawl Fisheries in the North Sea during 1962

by  
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The material gathered was taken during the five cruises of M/T "Birkut" in the North Sea in May, July, August, September and October 1962. Catches were taken in the North Sea region according to squares:- 7F, FG, FH, 7K, 8-9C, 8-9E, 9F, 10H, 10-11F, 11-15D, 12-16D, 13-18E. On the whole, the contents of 58 hauls were analysed according to quantity and composition of species. Mass measurements were made of whiting, haddock, cod, plaice, hake, witch and lemon sole, in total of 12.066 individuals.

Table 1. Species composition of experimental catch (data in kg and %)

Species	kg.	%	% of undersized
1. Herring	17.776	65,7	-
2. Whiting	4.403)	16,3)	1,95)
3. Cod	1.306)	4,8)	0,56)
4. Haddock	1.217) 7.256 kg	4,5) 26,8%	2,03) 5,40%
5. Remaining protected species	330)	1,2)	0,86)
6. Remaining non-protected species	2.009	7,5	-
Total	27.041	100 %	5,40 %

As seen from Table 1. 65,7% of the total catches are represented by herring, 26,8% by protected species and 7,5% by non-protected species. The quantity of undersized fish is 5,40% of the total catch, of which 4,54% are the catches of whiting, cod and haddock and 0,86% are protected species.

Table 2. Species and quantitative composition of "remaining" protected fish

Species	kg.	% of total catch
1. Plaice	235	0,86
2. Hake	27	0,10
3. Witch	23	0,08
4. Sole	22	0,08
5. Turbot	11	0,04
6. Lemon Sole	8	0,02
7. Brill	3	0,01
8. Dab	1	0,01
Total	330 kg.	1,20 %

Table 3. Species and quantitative composition of non-protected fish

Species	kg.	% of total catch
1. Mackerel	450	1,68
2. Horse-mackerel	191	0,72
3. Skates	140	0,53
4. Sea-scorpions	64	0,25
5. Norway lobster	54	0,21
6. Sprat	46	0,17
7. Coalfish	42	0,16
8. Ling	35	0,13
9. Catfish	5	0,02
10. <u>Gadus esmarki</u> ) <u>Drepanopsetta platessoides</u> ) Lesser spotted dogfish )	982	3,63
Total	2.009 kg.	7,50 %

Plaice occurs most numerous in "remaining" protected species making 0,86% of the total catch. The majority of the catches of the group of non-protected fish is Gadus esmarki, Drepanopsetta platessoides and lesser spotted dogfish (in all 3,63%) and mackerel (1,68%).

Table 4. Particular species in total quantity of caught and protected fish expressed in kg and % (total catch of experimental protected fish = 100,0%).

Whiting	Haddock	Cod	Plaice	Remaining protected fish	kg and % together
4.403	1.217	1.306	235	95	7.256 kg
60,7	16,8	18,0	3,2	1,3	100,0 %

It is seen from Table 4. that the main mass of the protected fish is represented by whiting (60,7 %).

Table 5. Percentage of particular protected, full-sized fish species in comparison with total catch

1. Whiting	> 20 cm	3.875 kg	14,33 %
2. Haddock	> 27 cm	667 kg	2,47 %
3. Cod	> 30 cm	1.152 kg	4,26 %
4. Plaice	> 25 cm	2 kg	0,01 %
5. Remaining protected fish	> cm	91 kg	0,33 %
Total		5.787 kg	21,40%

Among protected fish species full-sized whiting is dominating in the total catch by 14,33%

Apart from the weight analysis of total experimental catch, measurements of samples taken from these catches were made; the samples contained some whiting, haddock, cod, plaicem hake, witch and lemon sole.

The following quantities of fish were measured:

1. Whiting	7.555 indiv.	62,6%
2. Haddock	3.110 "	25,8%
3. Cod	578 "	4,8%
4. Remaining protected	823 "	6,8%
total	12.066 indiv.	100,0 %

In 1962 a total of 12.066 individuals of protected fish were measured. The data involving percentage participation of full-sized and under-sized fish of particular protected species on the basis of the measurements made are as given below:

1. Whiting	< 20 cm	16,4 %
	> 20 cm	83,6 %
	total	100,0 %
2. Haddock	< 27 cm	60,6 %
	> 27 cm	39,4 %
	total	100,0 %
3. Cod	< 30 cm	37,9 %
	> 30 cm	62,1 %
	total	100,0 %
4. Plaice	< 25 cm	97,3 %
	> 25 cm	2,7 %
	total	100,0 %
5. Hake	< 30 cm	-
	> 30 cm	100,0 %
	total	100,0 %
6. Witch	< 25 cm	14,8 %
	> 25 cm	85,2 %
	total	100,0 %
7. Lemon sole	< 28 cm	-
	> 28 cm	100,0 %
	total	100,0 %

Table 6. Length composition of whiting, haddock, cod and plaice

Length groups	Whiting		Haddock		C o d		Plaice	
	indiv.	%	indiv.	%	Indiv.	%	Indiv.	%
10	20	0,2	-	-	-	-	3	0,4
11-15	718	9,5	40	1,3	1	0,1	221	28,2
16-20	1.229	16,3	729	23,4	58	10,0	496	63,3
21-25	4.160	55,1	196	35,2	99	17,2	52	6,7
26-30	1.206	16,0	628	20,2	58	10,0	4	0,5
31-35	202	2,7	281	9,0	59	10,2	6	0,8
36-40	20	0,2	243	7,8	60	10,4	1	0,1
41-45	-	-	74	2,4	33	5,7	-	-
46-50	-	-	16	0,5	46	8,0	-	-
51-55	-	-	2	0,1	26	4,5	-	-
56-60	-	-	1	0,1	22	3,8	-	-
60	-	-	-	-	116	20,1	-	-
Total	7.555	100,0 %	3.110	100,0 %	578	100,0 %	783	100,0 %

According to the number of individuals, whiting is occurring most numerously belonging to the 21-25 cm length group (55,1 %). The second and third place is taken by whiting 16-20 cm length group (16,3 %) and 26-30 cm length group (16,0 %).

Haddock as well as whiting were most numerous represented by individuals in length groups 21-25 cm (35,2 %), 16-20 cm (23,4 %) and 26-30 cm (20,2 %).

The main catch of plaice according to number of individuals is dominated by length group 16-20 cm (63,3 %).

Table 7. Percentage of undersized whiting, haddock and cod in particular months

Month	<u>Whiting</u>	<u>Haddock</u>	<u>Cod</u>
	< 20 cm	< 27 cm	< 30 cm
May	26,7 %	-	55,5 %
July	6,9 %	60,5 %	28,4 %
August	11,7 %	60,2 %	51,0 %
September	20,0 %	65,4 %	39,2 %
October	29,7 %	-	68,2 %
Total	16,4 %	60,6 %	37,9 %

As is seen from Table 7. the highest numbers of undersized whiting and cod are in experimental catches in October and May. Undersized haddock were most numerous in catches from September.