



SCIENTIFIC COUNCIL MEETING – JUNE 2009

ESTONIAN RESEARCH REPORT FOR 2008

by

S.Sirp and T.Saat

Estonian Marine Institute, University of Tartu, Tallinn, Estonia

This Report contains information for Estonian fishing vessels excluding vessels targeting shrimp. Analysis of by-catch in shrimp fishery is included. All catch, effort and length distribution information are from NAFO observers on board. In Estonia, NAFO observers are employed by the Estonian Marine Institute, and they are specially trained to collect also basic scientific data. In 2008 information from 142 fishing days (2089 fishing hours with 1 fishing vessel) was available which corresponds to the total effort of the Estonian fleet in NAFO Regulatory Area (100% coverage) (Table 1). Fishing effort has decreased in recent years (Figure 1).

Observer estimated catches and discards (shrimp fishery excluded) by species and Division in 2008 are presented in Table 2.

In area 3L main directed species is GHL (231 tons) followed by RHG (103 tons). CPUE of GHL has decreased in 2008 compared to 2007 (Kruskal-Wallis test $H(2, N=504) = 24.9$ $Z=3.97$ $p=0.00$). (Figure 2). In GHL fishery in 3LMN the main by-catch species is RHG and vice versa. It has not changed in last 3 years.

In area 3M and 3O main directed species is RED (catch 951 and 42 tons respectively). CPUE of RED in 3M has not changed in 2008 compared to 2007 (Kruskal-Wallis test $H(2, N=278) = 87.03$ $Z=1.44$ $p=0.44$) (Figure 3). Main by-catch species in 3M RED fishery was COD in 2008, ~4% of the total catch. Otherwise it is clean fishery with minimal by-catch. In 2006 the main by-catch species were CAT (~4% of the total catch) and COD (~3%).

In 3N, the main fishery is for SKA and GHL. In SKA directed fishery in 3N there are 5 main by-catch species: PLA, WIT, YEL, RED and COD (each ~4% of total catch). In 2006 and 2007, the main by-catch species and the amount were the same. GHL directed fishery has less by-catch compared to SKA directed fishery.

In addition to effort and discard information, specifically trained NAFO observers collected length, age and sex data. The list of collected data is in Table 4. All lengths are TL and length group (LG) 10 means lengths from 10.0 to 10.9 cm. Mesh size of trawls in codend was mostly 139-145 mm, for skates 286 mm. Length distributions are presented as sampled number of fish and numbers boosted to total catch. Length distribution of *Gadus morhua* (COD) by division and sex is shown in Table 6 and Figure 5. Length distribution of *Reinhardtius hippoglossoides* (GHL) by division and sex is shown in Table 7 and Figures 6, 7, 8. Length distribution of *Hippoglossoides platessoides* (PLA) by division and sex is shown in Table 8 and Figure 9. Length distribution of *Sebastes* sp. (RED) by division and sex is shown in Table 9 and Figures 10, 11, 12.

Observer estimated catches of shrimp and discards in shrimp directed fishery in 3L and 3M are in Table 3. Main discarded species in shrimp fishery are redfish in 3M (0.61% of shrimp catch) and capelin in 3L (0.36% of shrimp catch). Length distribution of *Sebastes* sp. by-catch in shrimp fishery in 2008 is given in Table 5 and Figure 4.

Table 1. Fishing effort (fishing days and hours) of the Estonian bottom trawl (OTB) fleet, by month and Division in 2008 (directed fishery for redfish, Greenland halibut, skate).

Division	3L		3M		3N		3O		Total	Total
Month	Effort, days	Effort, hrs	Effort, days	Effort, hrs	Effort, days	Effort, hrs	Effort, days	Effort, hrs	days	hrs
JAN									0	0
FEB									0	0
MAR	6	129	4	11	3	27			13	167
APR	14	257	13	124	3	26			30	407
MAY	7	116	2	13					9	129
JUN	16	322	10	102	2	9	1	4	29	438
JUL	24	403	4	53	3	17	1	3	32	476
AUG	19	299	1	20	9	152			29	471
SEP									0	0
OCT									0	0
NOV									0	0
DEC									0	0
Total	86	1527	34	324	20	230	2	8	142	2089

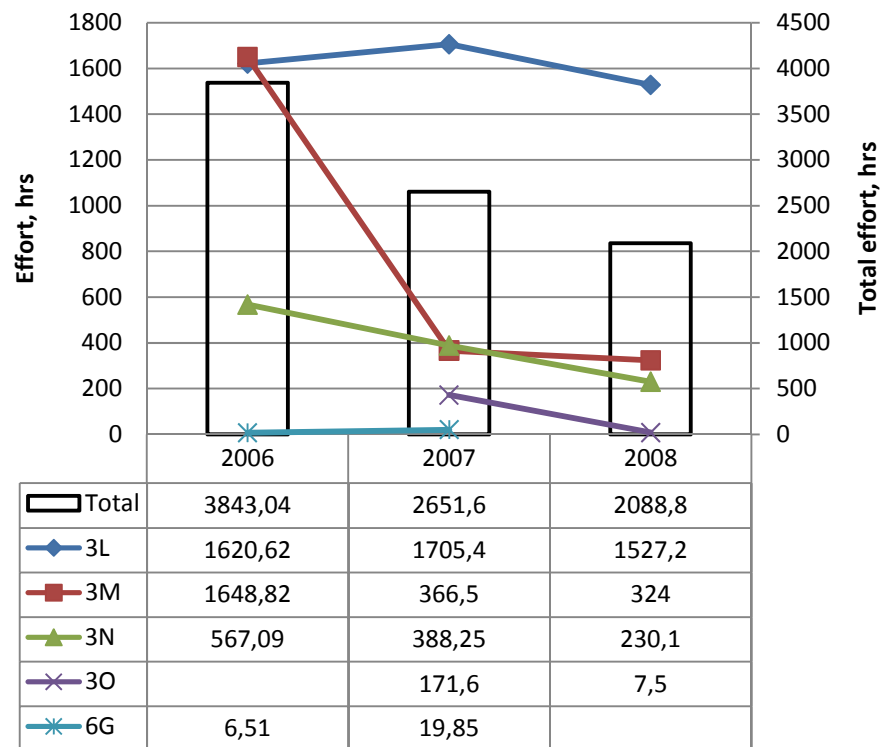


Figure 1. Fishing effort of the Estonian fleet in NAFO in 2006, 2007 and 2008. Shrimp fishery excluded.

Table 2. Observer estimated catches and discards (ton) of Estonia in NAFO areas in 2008 by division. (shrimp fishery excluded).

Area		3L			3M		
Species	Latin name	kept	disc	Total	kept	disc	Total
CAA	<i>Anarhichas lupus</i>	11.686	0.100	11.786	1.054	0.005	1.059
COD	<i>Gadus morhua</i>	5.400	0.000	5.400	39.120	0.000	39.120
DGX	<i>Squalidae</i>	2.720	0.005	2.725	0.112	0.000	0.112
GDE	<i>Gaidropsarus ensis</i>	16.365	0.190	16.555	1.201	0.005	1.206
GHL	<i>Reinhardtius hippoglossoides</i>	231.069	0.000	231.069	6.961	0.000	6.961
HAL	<i>Hippoglossus hippoglossus</i>	1.120	0.000	1.120	0.880	0.000	0.880
PLA	<i>Hippoglossoides platessoides</i>	7.489	0.000	7.489	32.472	0.000	32.472
RED	<i>Sebastes sp.</i>	5.874	0.000	5.874	949.501	1.825	951.326
RHG	<i>Macrourus berglax</i>	101.037	1.880	102.917	9.484	0.040	9.524
SKA	<i>Raja sp.</i>	11.730	0.085	11.815	23.600	0.275	23.875
WIT	<i>Glyptocephalus cynoglossus</i>	5.886	0.000	5.886	17.993	0.000	17.993
YEL	<i>Limanda ferruginea</i>	1.551	0.000	1.551	0.396	0.000	0.396
MZZ	Marine species not specified	0.000	0.360	0.360	0.000	0.225	0.225
Total		401.927	2.620	404.547	1082.774	2.375	1085.149

		3N			3O		
		kept	disc	Total	kept	disc	Total
CAA	<i>Anarhichas lupus</i>	1.690	0.075	1.765	0.000	0.000	0.000
COD	<i>Gadus morhua</i>	26.250	0.000	26.250	1.920	0.000	1.920
DGX	<i>Squalidae</i>	0.299	0.005	0.304	0.000	0.000	0.000
GDE	<i>Gaidropsarus ensis</i>	1.727	0.005	1.732	0.000	0.000	0.000
GHL	<i>Reinhardtius hippoglossoides</i>	61.176	0.000	61.176	0.000	0.000	0.000
HAL	<i>Hippoglossus hippoglossus</i>	0.460	0.000	0.460	0.000	0.000	0.000
PLA	<i>Hippoglossoides platessoides</i>	34.551	0.000	34.551	2.013	0.000	2.013
RED	<i>Sebastes sp.</i>	5.478	0.015	5.493	42.130	0.185	42.315
RHG	<i>Macrourus berglax</i>	21.359	0.805	22.164	0.000	0.000	0.000
SKA	<i>Raja sp.</i>	86.326	0.095	86.421	1.505	0.035	1.540
WIT	<i>Glyptocephalus cynoglossus</i>	12.135	0.000	12.135	1.848	0.000	1.848
YEL	<i>Limanda ferruginea</i>	29.832	0.000	29.832	0.297	0.000	0.297
MZZ	Marine species not specified	0.000	0.260	0.260	0.000	0.005	0.005
Total		281.283	1.260	282.543	49.713	0.225	49.938

Table 3. Observer estimated catches of shrimp (excluding shrimp discards, tons) and discards (tons and % of shrimp catch) in shrimp directed fishery in 3L and 3M in 2008.

AREA	3M		
PRA catch ton	10212.868		
Species	Scientific name	discards, ton	disc_%
RED	<i>Sebastes sp.</i>	62.454	0.61
MZZ	Marine species not specified	54.615	0.53
PRA	<i>Pandalus borealis</i>	42.296	0.41
LAX	<i>Notoscopelus sp.</i>	3.080	0.03
GPE	<i>Urophycis chesteri</i>	1.409	0.01
CAA	<i>Anarhichas lupus</i>	0.906	0.01
CAS	<i>Anarhichas minor</i>	0.683	0.01
RHG	<i>Macrourus berglax</i>	0.507	0.00
GHL	<i>Reinhardtius hippoglossoides</i>	0.130	0.00
CAP	<i>Mallotus villosus</i>	0.095	0.00
ELZ	<i>Lycodes sp.</i>	0.063	0.00
SKA	<i>Raja sp.</i>	0.043	0.00
RJR	<i>Amblyraja radiata</i>	0.016	0.00
RJT	<i>Leucoraja ocellata</i>	0.001	0.00

AREA	3L		
PRA catch ton	1452.887		
Species	Scientific name	discards, ton	disc_%
MZZ	Marine species not specified	5.866	0.40
CAP	<i>Mallotus villosus</i>	5.245	0.36
PRA	<i>Pandalus borealis</i>	5.210	0.36
RED	<i>Sebastes sp.</i>	1.321	0.09
GHL	<i>Reinhardtius hippoglossoides</i>	0.247	0.02
SKA	<i>Raja sp.</i>	0.033	0.00
PLA	<i>Hippoglossoides platessoides</i>	0.030	0.00
CAS	<i>Anarhichas minor</i>	0.024	0.00
CAA	<i>Anarhichas lupus</i>	0.016	0.00
RHG	<i>Macrourus berglax</i>	0.010	0.00
ELZ	<i>Lycodes sp.</i>	0.009	0.00
GPE	<i>Urophycis chesteri</i>	0.007	0.00
RJR	<i>Amblyraja radiata</i>	0.005	0.00

Table 4. The list of biological samples from the NAFO area in 2008. All gear was OTB and Type of sample OC. All discards sampling is in shrimp fishery. All bycatch sampling is in GHL, RED or SKA directed fisheries.

Country	Species Code	NAFO Division	Month	Directed/ Bycatch/ Discard*	No. of samples	No. Measured	No. Sexed**	No. Aged***	No. Weighed
EST	PRA	3L	1	DIRECTED	17	2799	2799	0	0
EST	PRA	3M	1	DIRECTED	32	5775	5775	0	0
EST	PRA	3L	2	DIRECTED	17	2676	2676	0	0
EST	PRA	3M	2	DIRECTED	28	4993	4993	0	0
EST	GHL	3L	3	DIRECTED	6	301	300	169	301
EST	PRA	3L	3	DIRECTED	29	4915	4915	0	0
EST	HAL	3M	3	BYCATCH	1	3	3	1	1
EST	PRA	3M	3	DIRECTED	47	9797	9797	0	0
EST	RED	3M	3	DIRECTED	2	131	128	82	131
EST	GHL	3N	3	DIRECTED	1	10	9	10	10
EST	RHG	3N	3	DIRECTED	1	2	1	2	2
EST	YEL	3N	3	BYCATCH	1	2	2	2	2
EST	GHL	3L	4	DIRECTED	8	386	386	271	386
EST	PLA	3L	4	DIRECTED	1	2	2	2	2
EST	RED	3L	4	DIRECTED	1	15	15	15	15
EST	WIT	3L	4	BYCATCH	1	2	2	2	2
EST	GHL	3M	4	DIRECTED	2	100	100	71	100
EST	HAL	3M	4	BYCATCH	1	1	1	1	1
EST	PLA	3M	4	DIRECTED	1	4	4	4	4
EST	PRA	3M	4	DIRECTED	96	20832	20832	0	0
EST	RED	3M	4	DIRECTED	2	136	132	80	136
EST	RED	3N	4	DIRECTED	1	70	69	42	70
EST	GHL	3L	5	DIRECTED	3	150	148	95	150
EST	PRA	3M	5	DIRECTED	78	18626	18626	0	0
EST	RED	3M	5	DIRECTED	1	65	64	42	65
EST	PRA	3M	6	DIRECTED	73	12052	12052	0	0
EST	COD	3M	6	BYCATCH	3	71	71	28	71
EST	GHL	3L	6	DIRECTED	9	469	467	305	469
EST	GHL	3M	6	DIRECTED	1	52	52	30	52
EST	RED	3M	6	DIRECTED	6	344	325	182	344
EST	COD	3M	7	BYCATCH	1	25	25	15	25
EST	GHL	3L	7	DIRECTED	7	359	359	254	359
EST	PLA	3N	7	DIRECTED	1	31	31	29	31
EST	RED	3M	7	DIRECTED	2	119	110	89	119
EST	RED	3O	7	DIRECTED	1	69	65	40	69
EST	WIT	3N	7	BYCATCH	1	5	5	1	5
EST	PRA	3L	7	DIRECTED	4	551	551		
EST	PRA	3M	7	DIRECTED	71	11341	11341	0	0
EST	COD	3M	8	BYCATCH	1	20	20	15	20
EST	GHL	3L	8	DIRECTED	6	301	301	189	301
EST	GHL	3N	8	DIRECTED	2	102	102	73	102
EST	RED	3M	8	DIRECTED	1	62	59	47	62
EST	PRA	3M	8	DIRECTED	56	11001	11001	0	0
EST	PRA	3L	8	DIRECTED	2	265	265	0	0
EST	PRA	3M	9	DIRECTED	57	11023	11023	0	0

EST	PRA	3L	9 DIRECTED	5	718	718	0	0
EST	PRA	3M	10 DIRECTED	50	9705	9705	0	0
EST	PRA	3L	10 DIRECTED	14	2175	2175	0	0
EST	PRA	3M	11 DIRECTED	59	11586	11586	0	0
EST	PRA	3L	11 DIRECTED	23	3712	3712	0	0
EST	PRA	3M	12 DIRECTED	44	7988	7988	0	0
EST	PRA	3L	12 DIRECTED	21	3017	3017	0	0
EST	CAP	3L	1 DISCARD	10	1133			
EST	RED	3L	1 DISCARD	4	297	5	26	26
EST	RED	3M	1 DISCARD	28	2847	30	194	194
EST	CAP	3L	2 DISCARD	1	71			
EST	RED	3L	2 DISCARD	9	252	0	26	77
EST	RED	3M	2 DISCARD	34	2793	22	121	286
EST	RED	3L	3 DISCARD	2	349			
EST	RED	3M	3 DISCARD	45	5460	225	225	423
EST	CAA	3M	4 DISCARD	3	14			14
EST	ELZ	3M	4 DISCARD	2	3			3
EST	GPE	3M	4 DISCARD	3	7			7
EST	LAX	3M	4 DISCARD	1	2			2
EST	PLA	3M	4 DISCARD	1	1			1
EST	RED	3M	4 DISCARD	59	9261	61	61	61
EST	RJR	3M	4 DISCARD	3	6			6
EST	Snakeblenny	3M	4 DISCARD	3	13			13
EST	CAA	3M	5 DISCARD	11	31			31
EST	CAP	3M	5 DISCARD	3	4			4
EST	CAS	3M	5 DISCARD	3	6			6
EST	GHL	3M	5 DISCARD	2	2			2
EST	GPE	3M	5 DISCARD	4	7			7
EST	LAX	3M	5 DISCARD	6	10			10
EST	RED	3M	5 DISCARD	82	11732	55	55	67
EST	RJR	3M	5 DISCARD	5	6			6
EST	CAA	3M	6 DISCARD	6	16			16
EST	GPE	3M	6 DISCARD	4	10			10
EST	LAX	3M	6 DISCARD	4	11			11
EST	RED	3M	6 DISCARD	18	2623	2	2	12
EST	RJR	3M	6 DISCARD	3	4			4
EST	RED	3L	7 DISCARD	1	201			
EST	RED	3M	7 DISCARD	26	837	0	0	353
EST	RED	3M	8 DISCARD	29	210	24	27	210
EST	RED	3L	9 DISCARD	1	3	3	3	3
EST	RED	3M	9 DISCARD	15	54	33	37	54
EST	RED	3M	10 DISCARD	31	5404	0	0	0
EST	CAP	3L	10 DISCARD	2	216			
EST	RED	3M	11 DISCARD	40	6767	192	192	192
EST	CAP	3L	11 DISCARD	7	958			
EST	RED	3L	11 DISCARD	4	768	0	0	0
EST	RED	3M	12 DISCARD	17	1069	14	14	418

*Sampling of discard in shrimp fisheries

**Number of sexed fish

***Only age structures collected, fish not aged yet

Table 5. Length distribution of *Sebastes* sp. (RED) by-catch in shrimp fishery in 2008. LG – length group; ind – unsexed individuals; 0 – female, 1 – male.

Number of sampled specimens									
RED	3L		3L Total		3M		3M Total		Grand Total
LG	0	1	ind		0	1	ind		
6							1	1	1
7			5	5			67	67	72
8			6	6			114	114	120
9			4	4			76	76	80
10			2	2			240	240	242
11							494	494	494
12							1214	1214	1214
13						5	1708	1713	1713
14			48	48		2	2276	2278	2326
15			171	171		2	2593	2595	2766
16			228	228		6	1593	1599	1827
17			44	44	1	4	530	535	579
18		1	2	3	1	5	156	162	165
19	1	3		4	3	4	91	98	102
20	2			2	10	15	47	72	74
21	1			1	14	13	27	54	55
22					11	9	11	31	31
23					3	8		11	11
24					4	1		5	5
25					1			1	1
26					3	2		5	5
27					3			3	3
28					1			1	1
29					1	1		2	2
30						1		1	1
31						2		2	2
32					2			2	2
33					3			3	3
34					1			1	1
35					1			1	1
Grand Total	4	4	510	518	63	80	11238	11381	11899

Table 6. Length distribution of *Gadus morhua* (COD) by division and sex in 2008. LG – length group; ind – unsexed individuals; 0 – female, 1 – male.

Number of sampled specimens					Numbers boosted to total catch				
COD	3M		3M	Grand	COD	3M		3M	
LG	0	1	Total	Total	LG	0	1	Total	
40	1		1	1	40	171	0	171	
41	3		3	3	41	513	0	513	
42	1		1	1	42	171	0	171	
43	2		2	2	43	342	0	342	
44	1	1	2	2	44	171	171	342	
46	1	2	3	3	46	171	342	513	
48	2	1	3	3	48	342	171	513	
49	2		2	2	49	342	0	342	
50	2	1	3	3	50	342	171	513	
52	3		3	3	52	513	0	513	
53	3	3	6	6	53	513	513	1026	
54	3	2	5	5	54	513	342	855	
55	3	3	6	6	55	513	513	1026	
56	4	3	7	7	56	684	513	1197	
57	1	3	4	4	57	171	513	684	
58	1	3	4	4	58	171	513	684	
59	4		4	4	59	684	0	684	
62	1	2	3	3	62	171	342	513	
63	8	1	9	9	63	1368	171	1539	
64	1	3	4	4	64	171	513	684	
65	2	1	3	3	65	342	171	513	
66	1		1	1	66	171	0	171	
67	4		4	4	67	684	0	684	
68	3	1	4	4	68	513	171	684	
69	5	1	6	6	69	855	171	1026	
70	1	3	4	4	70	171	513	684	
71	3	1	4	4	71	513	171	684	
72	2		2	2	72	342	0	342	
73	1	4	5	5	73	171	684	855	
74	2	1	3	3	74	342	171	513	
75	1		1	1	75	171	0	171	
78	2		2	2	78	342	0	342	
80		1	1	1	80	0	171	171	
81	1		1	1	81	171	0	171	
Grand Total	75	41	116	116	Grand Total	12828	7013	19841	
Total weight of samples, g	147000	81710	228710		Total weight of samples, g	147000	81710	228710	
Total weight of samples, kg	147	81.71	228.71		Total weight of samples, kg	147	81.71	228.71	
Total catch, kg			39120		Total catch, kg			39120	
Ratio			171.05		Ratio			171.05	
No. of samples			5		No. of samples			5	

Table 7. Length distribution of *Reinhardtius hippoglossoides* (GHL) by division and sex in 2008. LG – length group; ind – unsexed individuals; 0 – female, 1 – male.

Number of sampled specimens												
GHL	3L			3L Total	3M		3M Total	3N			3N Total	Grand Total
LG	0	1	ind		0	1		0	1	ind		
33											1	1
35	1	1		1								3
36	3			1								4
37	2			1				2	1		3	6
38	4	1		1				1	1		2	8
39	14	5		1	1		1	4	4		8	29
40	15	9			2		2	2	2		4	30
41	41	19			2		2	2	1		3	65
42	47	19			4	2	6	3	6		9	81
43	62	26			7	2	9	4			4	101
44	70	36			7	4	11	5	4		9	126
45	84	55			4	7	11	3	2		5	155
46	97	83			5	4	9	5	7		12	201
47	115	90			4	7	11	4	5		9	225
48	100	52			7	4	11	2	1		3	166
49	82	60			4	8	12	6	2		8	162
50	78	38			6	6	12	4	3		7	135
51	105	57			7	3	10	3	1		4	176
52	95	51			4	3	7	1	4		5	158
53	71	35			7	6	13	4	3		7	126
54	60	30			6	1	7	3	1		4	101
55	29	3			3	2	5					37
56	26	5				1	1	2	1		3	35
57	17	8			1		1					26
58	17	4			2	1	3					24
59	9				2		2					11
60	5							1			1	6
61	8				1		1	1			1	10
62	8											8
63	3											3
64	1				1		1					2
66	1											1
67	1	1			1		1					3
68	1				2		2					3
71	1											1
72					1		1					1
Grand Total	1273	688	5	1966	91	61	152	62	49	1	112	2230
Total weight of samples, g	1239170	624220	1920	1865310	98220	58580	156800	53840	39220	300	93360	
Total weight of samples, kg	1239.17	624.22	1.92	1865.31	98.22	58.58	156.8	53.84	39.22	0.3	93.36	
Total catch, kg				231036			6961				61176	
Ratio				123.859			44.3941				655.27	
No. of samples				39			3				3	

Table 7. continued...

Numbers boosted to total catch												
GHL	3L			3L Total	3M	3M Total		3N	3N Total		Grand Total	
LG	0	1	ind		0	1		0	1	ind		
33	0	0	0	0	0	0	0	0	0	0	655	655
35	124	124	124	372	0	0	0	0	0	0	0	372
36	372	0	124	495	0	0	0	0	0	0	0	495
37	248	0	124	372	0	0	0	1311	655	0	1966	2337
38	495	124	124	743	0	0	0	655	655	0	1311	2054
39	1734	619	124	2477	44	0	44	2621	2621	0	5242	7764
40	1858	1115	0	2973	89	0	89	1311	1311	0	2621	5682
41	5078	2353	0	7432	89	0	89	1311	655	0	1966	9486
42	5821	2353	0	8175	178	89	266	1966	3932	0	5897	14339
43	7679	3220	0	10900	311	89	400	2621	0	0	2621	13920
44	8670	4459	0	13129	311	178	488	3276	2621	0	5897	19515
45	10404	6812	0	17216	178	311	488	1966	1311	0	3276	20981
46	12014	10280	0	22295	222	178	400	3276	4587	0	7863	30557
47	14244	11147	0	25391	178	311	488	2621	3276	0	5897	31777
48	12386	6441	0	18827	311	178	488	1311	655	0	1966	21281
49	10156	7432	0	17588	178	355	533	3932	1311	0	5242	23363
50	9661	4707	0	14368	266	266	533	2621	1966	0	4587	19487
51	13005	7060	0	20065	311	133	444	1966	655	0	2621	23130
52	11767	6317	0	18083	178	133	311	655	2621	0	3276	21671
53	8794	4335	0	13129	311	266	577	2621	1966	0	4587	18293
54	7432	3716	0	11147	266	44	311	1966	655	0	2621	14079
55	3592	372	0	3963	133	89	222	0	0	0	0	4185
56	3220	619	0	3840	0	44	44	1311	655	0	1966	5850
57	2106	991	0	3096	44	0	44	0	0	0	0	3141
58	2106	495	0	2601	89	44	133	0	0	0	0	2734
59	1115	0	0	1115	89	0	89	0	0	0	0	1204
60	619	0	0	619	0	0	0	655	0	0	655	1275
61	991	0	0	991	44	0	44	655	0	0	655	1691
62	991	0	0	991	0	0	0	0	0	0	0	991
63	372	0	0	372	0	0	0	0	0	0	0	372
64	124	0	0	124	44	0	44	0	0	0	0	168
66	124	0	0	124	0	0	0	0	0	0	0	124
67	124	124	0	248	44	0	44	0	0	0	0	292
68	124	0	0	124	89	0	89	0	0	0	0	213
71	124	0	0	124	0	0	0	0	0	0	0	124
72	0	0	0	0	44	0	44	0	0	0	0	44
Grand Total	157673	85215	619	243507	4040	2708	6748	40627	32108	655	73390	323646
Total weight of samples, g	1239170	624220	1920	1865310	98220	58580	156800	53840	39220	300	93360	
Total weight of samples, kg	1239.17	624.22	1.92	1865.31	98.22	58.58	156.8	53.84	39.22	0.3	93.36	
Total catch, kg				231036			6961				61176	
Ratio				123.859			44.3941				655.27	
No. of samples				39			3				3	

Table 8. Length distribution of *Hippoglossoides platessoides* (PLA) by division and sex in 2008. LG – length group; ind – unsexed individuals; 0 – female, 1 – male.

Number of sampled specimens										
PLA	3L		3L Total	3M	3M Total		3N	3N Total		Grand Total
LG	0	1		0	1		0	1		
38					1	1				1
40							3		3	3
41							1	1	2	2
42		1	1	2		2	3	2	5	8
43								2	2	2
44				1		1	2	2	4	5
45							4		4	4
46							1	2	3	3
47							1		1	1
49							1		1	1
52								1	1	1
53								1	1	1
54	1		1				3		3	4
57								1	1	1
Grand Total	1	1	2	3	1	4	19	12	31	37
Total weight of samples, g	1840	700	2540	2200	480	2680	15580	10760	26340	
Total weight of samples, kg	1.84	0.7	2.54	2.2	0.48	2.68	15.58	10.76	26.34	
Total catch, kg			7491			32472			34550	
Ratio			2949			12116			1312	
No. of samples			1			1			1	

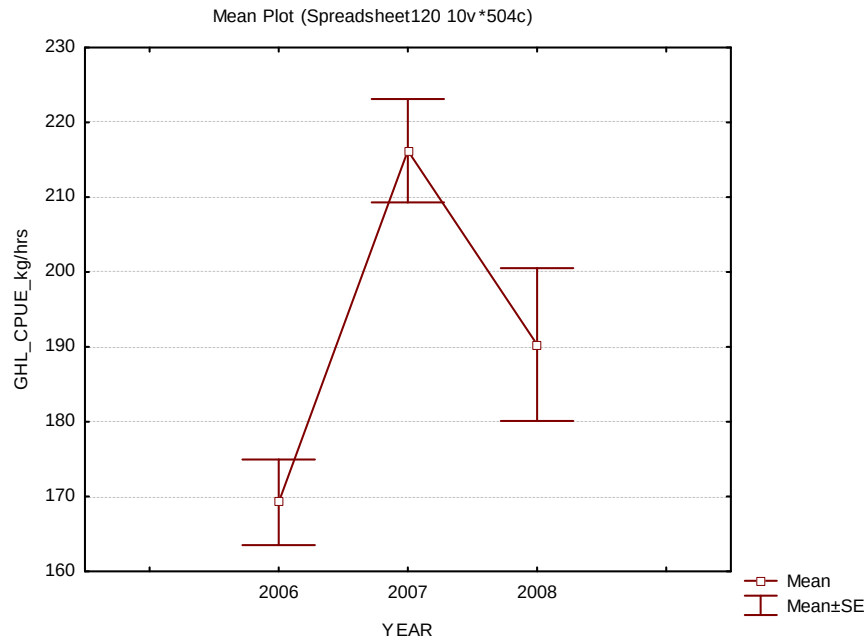
Numbers boosted to total catch										
PLA	3L		3L Total	3M	3M Total		3N	3N Total		Grand Total
LG	0	1		0	1		0	1		
38	0	0	0	0	12116	12116	0	0	0	12116
40	0	0	0	0	0	0	3935	0	3935	3935
41	0	0	0	0	0	0	1312	1312	2623	2623
42	0	2949	2949	24233	0	24233	3935	2623	6558	33741
43	0	0	0	0	0	0	0	2623	2623	2623
44	0	0	0	12116	0	12116	2623	2623	5247	17363
45	0	0	0	0	0	0	5247	0	5247	5247
46	0	0	0	0	0	0	1312	2623	3935	3935
47	0	0	0	0	0	0	1312	0	1312	1312
49	0	0	0	0	0	0	1312	0	1312	1312
52	0	0	0	0	0	0	0	1312	1312	1312
53	0	0	0	0	0	0	0	1312	1312	1312
54	2949	0	2949	0	0	0	3935	0	3935	6884
57	0	0	0	0	0	0	0	1312	1312	1312
Grand Total	2949	2949	5898	36349	12116	48466	24922	15740	40662	95027
Total weight of samples, g	1840	700	2540	2200	480	2680	15580	10760	26340	
Total weight of samples, kg	1.84	0.7	2.54	2.2	0.48	2.68	15.58	10.76	26.34	
Total catch, kg			7491			32472			34550	
Ratio			2949			12116			1312	
No. of samples			1			1			1	

Table 9. Length distribution of *Sebastes* sp. (RED) by division and sex in 2008. LG – length group; ind – unsexed individuals; 0 – female, 1 – male.

Number of sampled specimens																
RED	3L		3L Total	3M	3M Total		3N	3N Total		3O	3O Total		Grand Total			
LG	0	1		0	1 ind		0	1 ind		0	1 ind					
	18					4	4								4	
	19			4	1	8	13								13	
	20			8	5	12	25					1	1		26	
	21			20	8	6	34		1	1	4	2	2	8	43	
	22			29	14	6	49	1		1	3	3		6	56	
	23			50	37	1	88	2		2	3	5	1	9	99	
	24			48	50	2	100	6	2	8	5	4		9	117	
	25			53	37		90	3		3	7	2		9	102	
	26			46	37		83	1	3	4	5	3		8	95	
	27	1		1	50	36	86	6	1	7		2		2	96	
	28	4		4	48	38	86	3	3	6	3	2		5	101	
	29	2	2	4	40	27	67	3	3	6	3			3	80	
	30	1	3	4	33	10	43	7	4	11	1	1		2	60	
	31	1		1	26	7	33	6	3	9	1	2		3	46	
	32				13	9	22	5	2	7	1			1	30	
	33				6	3	9	4		4	1			1	14	
	34				6		6				1	1		2	8	
	35		1	1	5		5								6	
	36				2	1	3	1		1					4	
	37				3		3								3	
	38				1		1								1	
	39					1	1								1	
	40				1	1	2								2	
	41				1		1								1	
	42				1		1								1	
	44				1		1								1	
	45				1		1								1	
Grand Total	9	6	15	496	322	39	857	48	21	1	70	38	27	4	69	1011
Total weight of samples, g	2860	2360	5220	137810	82280	4560	224650	17580	7020	140	24740	9680	6600	540	16820	
Total weight of samples, kg	2.86	2.36	5.22	137.81	82.28	4.56	224.65	17.58	7.02	0.14	24.74	9.68	6.6	0.54	16.82	
Total catch, kg			34550				951323				4525				42315	
Ratio			6618.77				4234.69				182.902				2515.76	
No. of samples			1				14				1				1	

Table 9. continued...

Numbers boosted to total catch																
RED	3L		3L Total	3M		3M Total	3N		3N Total	3O		3O Total	Grand Total			
LG	0	1		0	1 ind		0	1 ind		0	1 ind					
18	0	0	0	0	0	16939	16939	0	0	0	0	0	0	0	0	16939
19	0	0	0	16939	4235	33878	55051	0	0	0	0	0	0	0	0	55051
20	0	0	0	33878	21173	50816	105867	0	0	0	0	0	2516	2516	108383	
21	0	0	0	84694	33878	25408	143979	0	0	183	183	10063	5032	5032	20126	164288
22	0	0	0	122806	59286	25408	207500	183	0	0	183	7547	7547	0	15095	222777
23	0	0	0	211734	156684	4235	372653	366	0	0	366	7547	12579	2516	22642	395660
24	0	0	0	203265	211734	8469	423469	1097	366	0	1463	12579	10063	0	22642	447574
25	0	0	0	224439	156684	0	381122	549	0	0	549	17610	5032	0	22642	404313
26	0	0	0	194796	156684	0	351479	183	549	0	732	12579	7547	0	20126	372337
27	6619	0	6619	211734	152449	0	364183	1097	183	0	1280	0	5032	0	5032	377114
28	26475	0	26475	203265	160918	0	364183	549	549	0	1097	7547	5032	0	12579	404335
29	13238	13238	26475	169388	114337	0	283724	549	549	0	1097	7547	0	0	7547	318844
30	6619	19856	26475	139745	42347	0	182092	1280	732	0	2012	2516	2516	0	5032	215610
31	6619	0	6619	110102	29643	0	139745	1097	549	0	1646	2516	5032	0	7547	155557
32	0	0	0	55051	38112	0	93163	915	366	0	1280	2516	0	0	2516	96959
33	0	0	0	25408	12704	0	38112	732	0	0	732	2516	0	0	2516	41360
34	0	0	0	25408	0	0	25408	0	0	0	0	2516	2516	0	5032	30440
35	0	6619	6619	21173	0	0	21173	0	0	0	0	0	0	0	0	27792
36	0	0	0	8469	4235	0	12704	183	0	0	183	0	0	0	0	12887
37	0	0	0	12704	0	0	12704	0	0	0	0	0	0	0	0	12704
38	0	0	0	4235	0	0	4235	0	0	0	0	0	0	0	0	4235
39	0	0	0	0	4235	0	4235	0	0	0	0	0	0	0	0	4235
40	0	0	0	4235	4235	0	8469	0	0	0	0	0	0	0	0	8469
41	0	0	0	4235	0	0	4235	0	0	0	0	0	0	0	0	4235
42	0	0	0	4235	0	0	4235	0	0	0	0	0	0	0	0	4235
44	0	0	0	4235	0	0	4235	0	0	0	0	0	0	0	0	4235
45	0	0	0	4235	0	0	4235	0	0	0	0	0	0	0	0	4235
Grand Total	59569	39713	99282	2100406	1363570	165153	3629129	8779	3841	183	12803	95599	67925	10063	173587	3914801
Total weight of samples, g	2860	2360	5220	137810	82280	4560	224650	17580	7020	140	24740	9680	6600	540	16820	
Total weight of samples, kg	2.86	2.36	5.22	137.81	82.28	4.56	224.65	17.58	7.02	0.14	24.74	9.68	6.6	0.54	16.82	
Total catch, kg			34550				951323				4525				42315	
Ratio			6618.77				4234.69				182.902				2515.76	
No. of samples			1				14				1				1	



GHL in SA 3

Year	No. of hauls	Mean	SE
2006	148	169.2	5.72
2007	200	216.2	6.90
2008	156	190.3	10.21

Figure 2. CPUE (kg/hrs) of GHL and descriptive statistics of CPUE in SA 3 in GHL directed fishery. CPUE has decreased in 2008 compared to 2007 (Kruskal-Wallis test $H(2, N=504) = 24.9$ $Z=3.97$ $p=0.00$). Hauls with 0 catch are excluded from the analysis. Includes only hauls when GHL catch was at least 50% of total catch of that haul – assures that in the analysis only hauls when targeting GHL are used; otherwise hauls with GHL by-catch when targeting other species will reduce the actual GH_L_CPUE value.

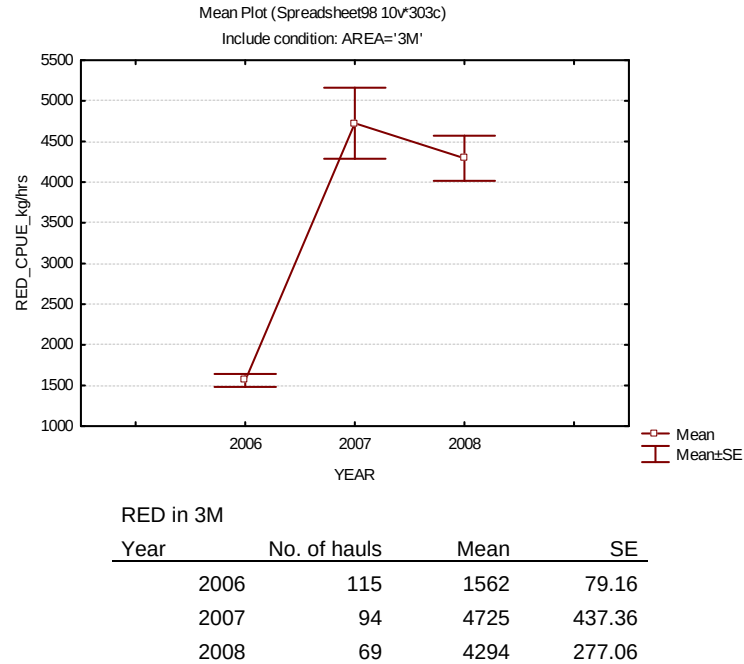


Figure 3. CPUE (kg/hrs) and descriptive statistics of RED directed fishery in 3M. CPUE of RED in 3M has not changed in 2008 compared to 2007 (Kruskal-Wallis test $H(2, N=278) = 87.03$ $Z=1.44$ $p=0.44$). Hauls with 0 catch are excluded from the analysis. Includes only hauls when RED catch was at least 50% of total catch of that haul – assures that in the analysis only hauls when targeting RED are used; otherwise hauls with RED by-catch when targeting other species will reduce the actual RED_CPUE value.

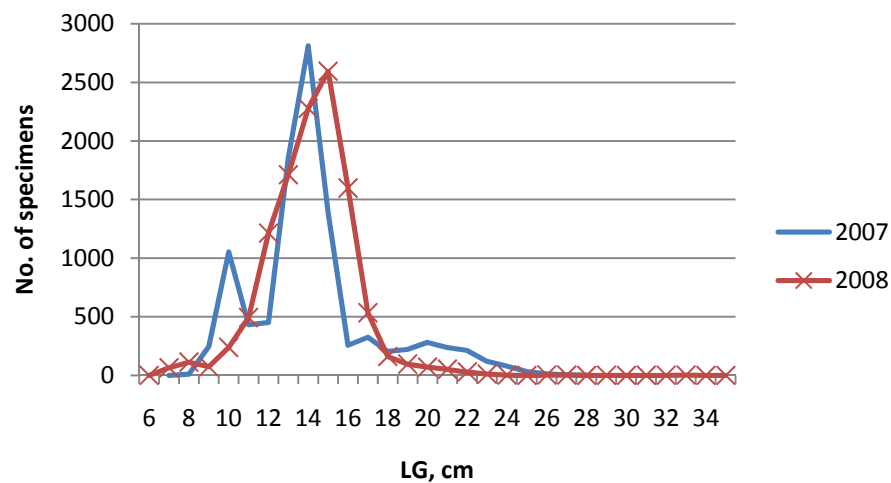


Figure 4. Redfish bycatch length distribution in Div. 3M Estonian shrimp fishery in 2007 and 2008.

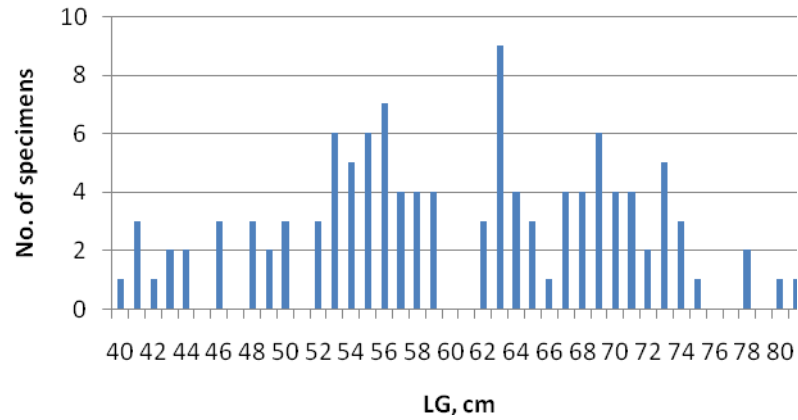
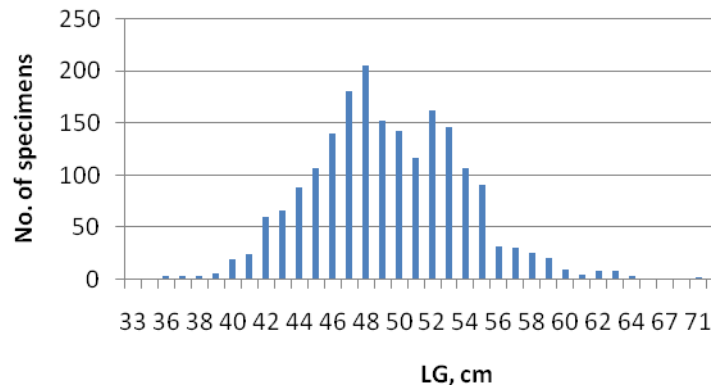
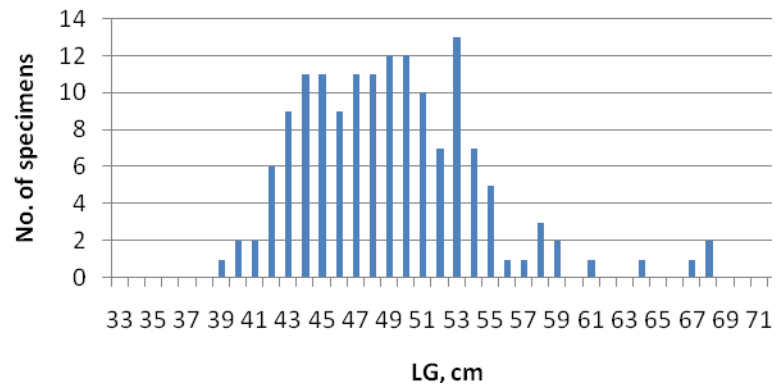
Fig. 5 COD length distribution in 3M 2008**Fig. 6 GHL length distribution in 3L 2008****Fig. 7 GHL length distribution in 3M 2008**

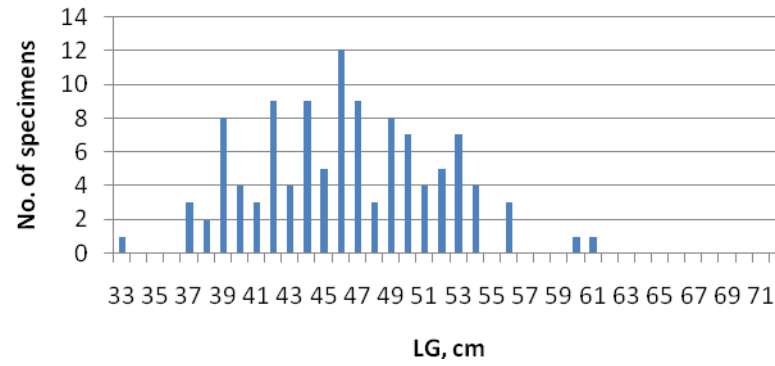
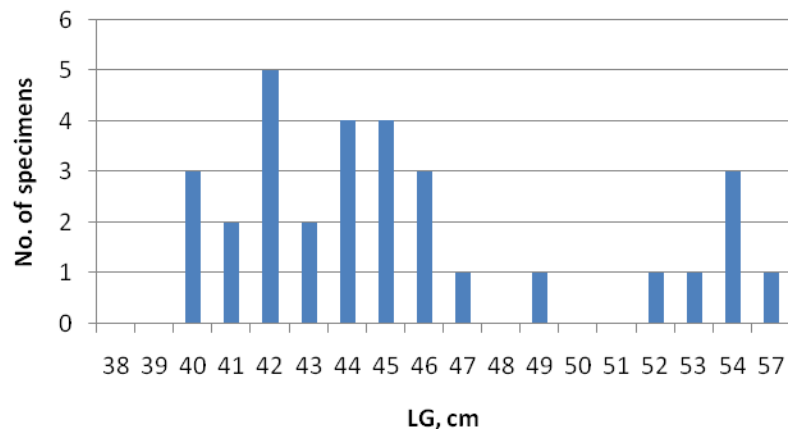
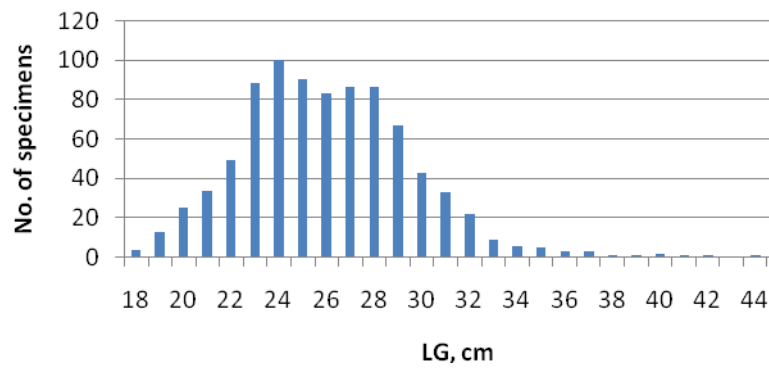
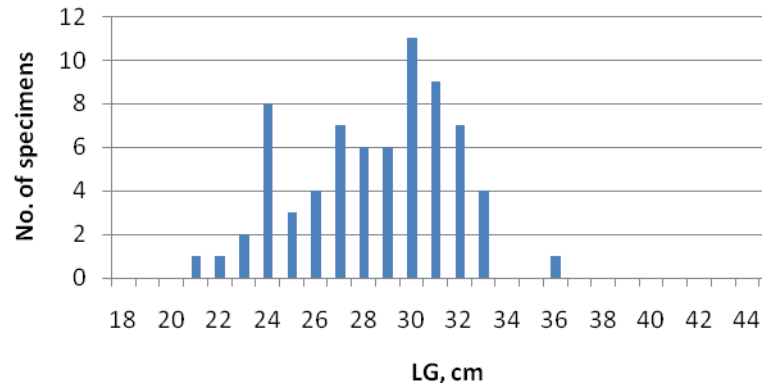
Fig. 8 GHL length distribution in 3N 2008**Fig. 9 PLA length distribution in 3N 2008****Fig. 10 RED length distribution in 3M 2008**

Fig. 11 RED length distribution in 3N 2008**Fig. 12 RED length distribution in 3O 2008**