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The conversion factor for lumpsucker (*Cyclopterus lumpus*) from roe to whole fish at West Greenland

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ABSTRACT

In order to improve the statistic of the fishery at West Greenland the conversion factor from roe to whole weight of females is found to be 3.25. An overall conversion factor from roe to the total nominal catch of females and males is estimated to be 3.31.

MATERIAL

The material used is given in Table 1. This includes five samples, three from commercial catches (Nos. 1, 2 and 3) and two from research catches (Nos. 4 and 5). Samples 1 and 2 represent each a total landing of females, and in these two samples, the total weight of females is taken before the roe is removed, and the corresponding total weight of roe is also given. Sample 3 (Tables 1 and 4) is also taken from a commercial landing, 77 females of 94 in this sample were measured and weighted individually, but unfortunately they were first weighted after the roe had been removed. It looks like if these weights are too low, probably because some blood, body liquid etc is lost when the roe is removed.

Samples 4 and 5 were taken from research catches, and both males and females were measured and weighted individually as whole fish.

The research samples and the commercial samples were taken by two different meshsizes, 90 mm and 114 mm (knot to knot) respectively. Therefore, the length frequency from the research samples is not representative for the commercial catches.

Tables 2, 3 and 4 give the length/weight relationship; Tables 2 and 3 (Samples 4 and 5) give the relationship between length and total weight for females and males respectively, whereas Table 4 gives the relationship between length and weight when the roe is removed.

METHODS AND DISCUSSION

The conversion factor is directly calculated from the commercial samples (1 and 2) as $\frac{426 + 577}{134 + 175}$, i.e. the total weight divided with the corresponding weight of roe, resulting in a value of 3.25. The reason for using these two samples is that these are expected to be the most representative for the total commercial landings. Since the conversion factor varies with the length and weight of the females (Table 5), it is necessary to aim at a size distribution in the material used close to the size distribution in the landings. The mean weights in Samples 1 and 2 are 3492 grammes and 3925 grammes respectively, the mean length from the third commercial sample is 39.6 cm. By using the length/weight relationship estimated from the research sample (4) given in Table 2 it is possible to estimate the corresponding weights and lengths. The mean weights, 3492 and 3925 grammes correspond with the mean lengths 39.1 and 40.8 cm respectively, and the mean length 39.6 cm correspond with a mean weight of 3614 grammes. As shown the mean lengths in the three samples are very close, and therefore the conversion factor estimated from Samples 1 and 2 should be representative for the total landings.

Even when the weight given in Table 4 is too low - due to the extra lost in weight, when the roe was removed - this sample, together with the research sample given in Table 2, can be used to demonstrate that the conversion factor is depending on the length. The length/weight relationship estimated from Tables 2 and 4 and used on different lengths will show the variation of the conversion factor, Table 5. As shown in this table, the conversion factor depends very much on the length. The variation in length from 33 to 45 cm corresponds with a variation in the conversion factor of 8.37 to 2.29.

It is possible to have males included in a conversion factor, so that the landings of lumpsucker can be estimated. The males used for local consumption. The catch ratio between males and females in the observed material is 1 to 15. The explanation for this difference in number caught is likely to be due to the difference in size between the two sexes combined with the big meshsize used. When the ratio in the catches between the two sexes is known and the average weight for males is known too (Table 3), then the overall conversion factor can be calculated. With the material here used the overall factor is 3.31.

Table 1. The material used for estimation of the conversion factor for lumpsucker roe to whole fish.

Reference number.	Type of samples and meshsize x) used.	Number of fish examined.	Sex		Total weight of whole fish kg	Total weight when the roe is removed.	Total weight of roe.	Number of fish measured.	Number of fish weighted individually.	
			♀♀	♂♂					Whole fish.	Roe removed.
1	Comm. 114mm	122	X		426		134			
2	Comm. 114mm	147	X		577		175			
3	Comm. 114mm	94	X		332	220	112	77		77
4	Res. 90mm	38	X		125		40	38	38	
5	Res. 90mm	40		X	46			40	40	

x) knot to knot (bar length)

Table 2. Length and weight for females (Sample 4), and the length/weight relationship.

Length cm	Mean weight of whole fish ♀♀ g.	Standard deviation g.	Number of fish.
42	4150	71	2
41	3800	560	4
40	3740	230	5
39	3580	507	5
38	3080	516	10
37	3150	351	6
36	2730	404	3
35	2800	-	1
34	2500	-	1
⋮			
31	1700	-	1
$\bar{l} = 38.2$	$\bar{w} = 3289$	489	38

$$w_1 = a_1 \times l^{b_1}$$

$$a_1 = 0.15222$$

$$b_1 = 2.73868$$

Table 3. Length and weight for males (Sample 5), and the length/weight relationship.

Length cm	Mean weight of whole fish ♂♂ g.	Standard deviation g.	Number of fish.
32	1470	58	3
31	1350	129	4
30	1270	166	9
29	1130	156	11
28	1100	100	3
27	1030	111	7
.			
25	850	71	2
24	600	-	1
$\bar{l} = 28.9$	$\bar{w} = 1162$	174	40

$$w^1 = a \times l^{b^1}$$

$$a^1 = 0.11746$$

$$b^1 = 2.73052$$

Table 4. Length and weight of fish when the roe is removed.

Length cm.	Mean weight of fish when the roe is removed, g.	Standard deviation g.	Number of fish.
45	3300	141	2
44	3150	212	2
43	2400	346	3
42	2530	298	7
41	2490	277	17
40	2400	225	16
39	2260	167	9
38	2200	216	4
37	2330	315	7
36	2150	191	4
35	2080	164	5
.			
.			
32	2000	-	1
$\bar{l} = 39.6$	$\bar{w} = 2402$	238	77

$$w_2 = a_2 \times l^{b_2}$$

$$a_2 = 20.39499$$

$$b_2 = 1.30162$$

Table 5. The estimation of the conversion factors at different lengths, estimated from q_1 and q_2 and b_1 and b_2 in Tables 2 and 4.

Length cm.	Mean weight estimated for whole fish. g.	Mean weight estimated for fish when the roe is removed, g.	Weight of the roe g.	Conversion factor.	Weight of the roe in percentage of the whole weight.
45	5130	2893	2237	2.29	43.6
42	4247	2645	1602	2.65	37.7
39	3466	2402	1064	3.26	30.7
36	2784	2164	620	4.40	22.3
33	2194	1932	262	8.37	11.9