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The Condition Factor of Cod

by

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INTRODUCTION

The general physical state of cod is often assumed from a condition factor based on the relation of the observed weight of a specimen to a weight derived from the relationship weight = length cubed. A number of length-weight relationships derived from samples taken in the Northwest Atlantic were examined to see if this assumption were reasonably accurate.

MATERIALS AND METHODS

Cod frozen whole at sea were subsequently examined in the laboratory to the nearest hundredth kilogram (Table 1). Samples were taken from various NAFO divisions and at various months since 1977. By means of common logarithmic transformations, straight line regressions were computed for each of 53 samples, some 10 of which were comprised of fewer than 50 specimens.

RESULTS

The slopes and intercepts from the 53 samples plotted in Fig. 1 show a decided inverse relationship both for whole weight and for gutted weight with respect to fork length as recorded at sea. In most cases the slope was >3. For whole weight the mean slope was about 3.15 and mean intercept (common logarithm) about -5.32. Corresponding values for gutted weight including gills were 3.07 and -5.25.

For the whole weight, the intercept = -1.795 slope + .3388 while for the gutted weight, the intercept = -1.796 slope + .2663. The R^2 were 0.985 and 0.991 respectively.

DISCUSSION

From these data, it would seem that a reasonable formula for condition factor would be such that the slope and intercept would fall on the straight lines described for whole or gutted weights. If the cubic relationship were chosen, it would appear that the appropriate intercepts would be in (logarithmic units) -5.05 for whole weight, and -5.12 for gutted weight.

Table 1. Parameters of fork length (nearest centimetre) - round or gutted weight (kg) for cod.

				Round weight				Gutted weight		
Ship	Date	Trip	Div.	Slope	Intercept	No.	R2	Slope	Intercept	R2
Cameron	Feb. 78	273	3Ps	3.077349	-5.208652	86	.992	2.976095	-5.093065	.993
	May 78	276	3L	3.122625	-5.257290	111	.994	3.043111	-5.202099	.994
	June 78	277	3NO	3.157022	-5.340824	178	.992	3.110476	-5.322806	.994
	Oct. 78	283	3Pn4RS	3.241529	-5.453812	24	.978	3.133771	-5.332633	.983
	Nov. 79	284	3M	3.158729	-5.337324	86	.993	3.089159	-5.279197	.995
	Feb. 79	287	3Ps	3.222665	-5.485762	117	.991	3.131947	-5.378717	.993
	Apr. 79	289	3NO	3.233962	-5.460808	104	.990	3.129545	-5.335944	.993
	June 79	291	3NO	3.186770	-5.444684	34	.989	3.122067	-5.386550	.992
	Sept. 79	294	3Pn4RS	3.180227	-5.387471	107	.992	3.112795	-5.333124	.993
	Mar. 80	302	3Ps	3.189720	-5.422500	140	.994	3.104746	-5.334788	.995
	Apr. 80	303	3NO	3.291049	-5.583550	57	.992	3.195261	-5.474801	.994
	May 80	304	3NO	3.293183	-5.577253	82	.991	3.173197	-5.431784	.994
	May 80	304	3L	3.088997	-5.156441	8	.906	3.127650	-5.347131	.927
	May 80	305	3L	3.211044	-5.465288	112	.991	3.108988	-5.351449	.994
	Sept. 80	309	3Pn4RS	3.074867	-5.198901	117	.992	3.005248	-5.138070	.994
	Mar. 81	316	3Pn4RS	3.154972	-5.330072	110	.993	3.036277	-5.189543	.994
	Mar. 81	316	3Ps	3.187498	-5.401547	129	.995	3.090290	-5.285016	.996
	Apr. 81	317	3L	3.104772	-5.227358	127	.993	3.026108	-5.165074	.994
	May 81	318	3NO	3.179752	-5.360498	95	.991	3.100217	-5.296750	.994
	Apr. 81	318	3L	3.196562	-5.349318	9	.960	3.209759	-5.482528	.945
	May 81	319	3NO	3.337660	-5.632438	131	.993	3.242593	-5.536028	.994
	Oct. 81	324	3NO	3.102956	-5.235057	100	.993	3.041121	-5.186889	.993
Shamook	Jan. 81	70	3L	3.119624	-5.221560	46	.991	3.020962	-5.128918	.992
Gadus	Nov. 77	3	2J	3.089544	-5.121670	59	.992	3.011035	-5.074593	.995
	Jan. 78	4	3Pn4RS	3.195067	-5.414577	110	.993	3.126680	-5.355050	.993
	Feb. 78	5	3M	3.205289	-5.396628	161	.992	3.104974	-5.284825	.994
	Aug. 78	12	3NO	3.157053	-5.293014	22	.971	3.018879	-5.149961	.974
	Aug. 78	12	2J	2.808555	-4.701957	10	.993	2.841938	-4.833613	.995
	Aug. 78	12	3K	2.951940	-4.962927	10	.993	2.928966	-4.992421	.994
	Aug. 78	12	3L	3.027819	-5.137598	15	.989	3.008281	-5.159797	.997
	Sept. 78	13	2GH	3.132186	-5.255491	167	.988	3.044337	-5.192692	.991
	Nov. 78	15	3K	3.140963	-5.311198	113	.993	3.052060	-5.220381	.994
	Jan. 79	16	3Pn4RS	3.206937	-5.429205	122	.995	3.122846	-5.342958	.996
	Feb. 79	17	3M	3.166008	-5.333552	117	.993	3.083478	-5.257692	.996
	Mar. 79	1	3K	3.155067	-5.343580	63	.987	3.054581	-5.234319	.988
	Mar. 79	19	3M	3.190230	-5.416432	134	.988	3.124213	-5.358178	.991
	May 79	20	3M	3.115735	-5.280597	215	.991	3.065320	-5.251746	.986
	May 79	21	3L	3.202710	-5.427652	92	.989	3.138666	-5.385161	.993
	Aug. 79	24	2GH	3.087210	-5.223337	85	.991	3.040068	-5.211617	.992
	Nov. 79	29	2J	3.178938	-5.338202	109	.992	3.102896	-5.291914	.995
	Nov. 79	29	3K	3.106117	-5.234603	117	.993	3.029184	-5.177293	.995
	Jan. 80	30	3M	3.262950	-5.510608	123	.994	3.138024	-5.360493	.995
	Feb. 80	31	3Pn4RS	3.255983	-5.517538	124	.992	3.174747	-5.440987	.995
	Mar. 80	34	3K	3.043747	-5.118662	70	.987	2.890399	-4.927722	.991
	Apr. 80	35	3M	3.157275	-5.365411	47	.992	3.075373	-5.277201	.993
	Apr. 80	37	3M	3.101480	-5.266457	98	.991	3.032397	-5.193729	.992
	Oct. 80	42	2J	3.086892	-5.186429	78	.989	3.025717	-5.164664	.992
	Nov. 80	44	2J	3.169171	-5.322825	123	.990	3.056301	-5.211994	.994
	Nov. 80	44	3K	3.109504	-5.244284	137	.990	3.058966	-5.229047	.992
	Jan. 81	45	3M	3.215916	-5.396471	133	.994	3.101486	-5.274187	.997
	Jan. 81	46	3Pn4RS	3.118134	-5.256612	132	.993	3.058994	-5.217857	.995
	Mar. 81	48	2J	3.292889	-5.553925	65	.979	3.036948	-5.189072	.984
	Mar. 81	48	3K	3.107122	-5.230289	79	.991	3.020730	-5.148083	.992

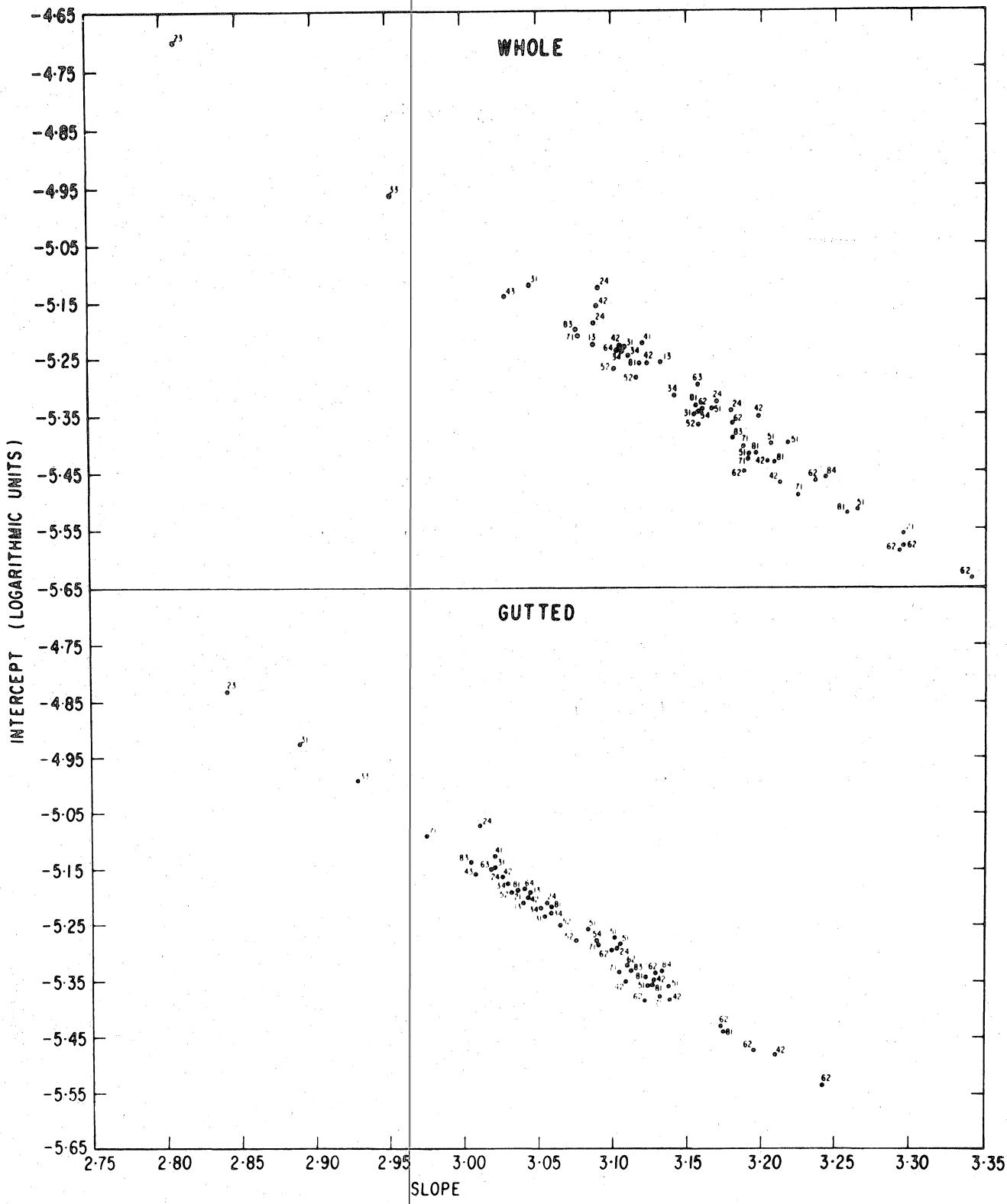

Fig. 1. Relationships between slopes and intercepts of length-weight regressions for 53 samples of cod from Flemish Cap.