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ESTIMATED DENSITY OF SHRIMPS IN THE DISKO  
BAY BY MEANS OF BOTTOM PHOTOGRAPHY

by

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INTRODUCTION

Bottom photography of the trawling grounds in the Disko Bay, West Greenland was carried out in 1975 and 1976 to study the density of the Pandalus borealis population as part of the research program to estimate the stock size of this species.

MATERIAL AND METHODS

The material was sampled in two periods, October 1975 and May 1976, the first period being the end of a fishing season of at least 7 months, while the latter was the very start of the following season after about 5 months with ice cover. The material analysed in this paper covers two grounds, viz. 'Porsild grund N'. around 69°20'N 51°45'W, and 'Godhavn rejefelt' around 69°15'N 53°15'W. The photographic material so far obtained does, however, cover all the 9 grounds in the Disko Bay, which are commonly fished, but the material has not yet been completely worked up.

The technique and methods have been described earlier by the author (1976) for a smaller number of photographic readings. The material in this paper includes 1095 photographs, 714 of which were taken in 1975 and the rest 381 in 1976.

RESULTS

The density as calculated from the photographic readings was at average 1.37 shrimp/m<sup>2</sup> in October 1975 and 1.51 shrimp/m<sup>2</sup> in May 1976 (Tables 1 and 2). The distribution of observations (i.e. photographs with 0, 1, 2 etc shrimps per photograph) is given in Figs. 1 and 2 for 1975 and 1976 respectively. The material from both periods is combined and shown in Table 3 and Fig. 3.

In order to test the possible diurnal variations of that part of the population which is situated on the bottom, the material has been grouped into 30-minute periods. It is obvious that there are considerable fluctuations in the density figures, but only the samples from October 1975 shows the expected picture of higher densities in the day time than in the night time (Fig.4). Later sampling of photographs at various depths in the water column, together with analysis of that part of the material which has not yet been worked up, will presumably give a more clear picture of the possible diurnal variations.

REFERENCE:

Kanneworff, P. 1976. Density of shrimp (Pandalus borealis) in Greenland waters observed by means of photography. ICES Special Meeting on Population Assessments of Shellfish Stocks. No. 27.

TABLE 1. Density of shrimp as counted on photographs. The material is from two shrimp grounds in the Disko Bay, October 1975. The limit between the size groups 'small' and 'medium' is around 18-20 mm carapace length, and the limit between the 'medium' and the 'large' shrimps is around 26-28 mm.

**PANDALUS BOREALIS**

PHOTO DISKOBUGT OCTOBER 1975

4 STATIONS COMBINED

TIME PERIOD	NO. OBS	NO. SHRIMPS	AV NO. SHRIMPS/OBS	AV NO. SHRIMPS/SQM	O/O SMALL	O/O MEDIUM	O/O LARGE
930 - 959	3	28	9.33	2.75	53.6	46.4	0.0
1000 - 1029	25	180	7.20	2.12	28.3	63.9	7.8
1030 - 1059	21	137	6.52	1.92	26.3	73.0	0.7
1100 - 1129	29	141	4.86	1.43	20.6	78.0	1.4
1130 - 1159	42	193	4.60	1.36	24.4	73.6	2.1
1200 - 1229	59	284	4.81	1.42	23.2	74.6	2.1
1230 - 1259	58	269	4.64	1.37	26.8	70.3	3.0
1300 - 1329	43	160	3.72	1.10	33.7	61.9	4.4
1330 - 1359	30	178	5.93	1.75	35.4	60.1	4.5
1400 - 1429	43	223	5.19	1.53	26.0	70.0	4.0
1430 - 1459	47	253	5.38	1.59	21.3	72.3	6.3
1500 - 1529	50	233	4.66	1.37	23.6	71.7	4.7
1530 - 1559	60	299	4.98	1.47	27.4	67.6	5.0
1600 - 1629	59	249	4.22	1.24	30.9	63.5	5.6
1630 - 1659	45	182	4.04	1.19	31.9	65.4	2.7
1700 - 1729	2	5	2.50	0.74	40.0	40.0	20.0
2030 - 2059	2	10	5.00	1.47	30.0	70.0	0.0
2100 - 2129	30	120	4.00	1.18	28.3	63.3	8.3
2130 - 2159	29	84	2.90	0.85	22.6	73.8	3.6
2200 - 2229	30	80	2.67	0.79	18.8	73.7	7.5
2230 - 2259	7	15	2.14	0.63	20.0	80.0	0.0
TOTALS AND AVERAGES	714	3323	4.65	1.37	26.9	68.9	4.2

**TABLE 2.** Density of shrimps as counted on photographs. The material is from a shrimp ground in Disko Bay, May 1976. For explanation of the size groups, see text to Table 1.

**PANDALUS BOREALIS**

PHOTO PORSILD GR. N MAY 1976

2 STATIONS COMBINED

TIME PERIOD	NO. OBS	NO. SHRIMPS	AV NO. SHRIMPS/OBS	AV NO. SHRIMPS/SQM	O/O SMALL	O/O MEDIUM	O/O LARGE
630 - 659	9	57	6.33	1.87	35.1	63.2	1.8
700 - 729	27	127	4.70	1.39	32.3	66.9	0.8
730 - 759	30	120	4.00	1.18	30.8	66.7	2.5
800 - 829	30	168	5.60	1.65	21.4	74.4	4.2
830 - 859	3	23	7.67	2.26	26.1	60.9	13.0
1900 - 1929	25	208	8.32	2.45	17.3	76.0	6.7
1930 - 1959	30	222	7.40	2.18	22.5	69.8	7.7
2000 - 2029	28	139	4.96	1.46	18.7	77.7	3.6
2030 - 2059	29	81	2.79	0.82	21.0	74.1	4.9
2100 - 2129	30	115	3.83	1.13	39.1	60.0	0.9
2130 - 2159	30	134	4.47	1.32	29.9	67.2	3.0
2200 - 2229	29	127	4.38	1.29	32.3	63.0	4.7
2230 - 2259	30	142	4.73	1.40	29.6	69.0	1.4
2300 - 2329	30	142	4.73	1.40	42.3	56.3	1.4
2330 - 2359	21	147	7.00	2.06	27.9	70.7	1.4
*****							
TOTALS AND AVERAGES	381	1952	5.12	1.51	27.6	68.8	3.7
*****							

**TABLE 3.** Density of shrimps as counted on photographs. The table sums up Tables 1 and 2.

**PANDALUS BOREALIS**

PHOTO DISKOBUGT 1975+1976

TIME PERIOD	NO. OBS	NO. SHRIMPS	AV NO. SHRIMPS/OBS	AV NO. SHRIMPS/SQM	O/O SMALL	O/O MEDIUM	O/O LARGE
630 - 659	9	57	6.33	1.87	35.1	63.2	1.8
700 - 729	27	127	4.70	1.39	32.3	66.9	0.8
730 - 759	30	120	4.00	1.18	30.8	66.7	2.5
800 - 829	30	168	5.60	1.65	21.4	74.4	4.2
830 - 859	3	23	7.67	2.26	26.1	60.9	13.0
930 - 959	3	28	9.33	2.75	53.6	46.4	0.0
1000 - 1029	25	180	7.20	2.12	28.3	63.9	7.8
1030 - 1059	21	137	6.52	1.92	26.3	73.0	0.7
1100 - 1129	29	141	4.86	1.43	20.6	78.0	1.4
1130 - 1159	42	193	4.60	1.36	24.4	73.6	2.1
1200 - 1229	59	284	4.81	1.42	23.2	74.6	2.1
1230 - 1259	58	269	4.64	1.37	26.8	70.3	3.0
1300 - 1329	43	160	3.72	1.10	33.7	61.9	4.4
1330 - 1359	30	178	5.93	1.75	35.4	60.1	4.5
1400 - 1429	43	223	5.19	1.53	26.0	70.0	4.0
1430 - 1459	47	253	5.38	1.59	21.3	72.3	6.3
1500 - 1529	50	233	4.66	1.37	23.6	71.7	4.7
1530 - 1559	60	299	4.98	1.47	27.4	67.6	5.0
1600 - 1629	59	249	4.22	1.24	30.9	63.5	5.6
1630 - 1659	45	182	4.04	1.19	31.9	65.4	2.7
1700 - 1729	2	5	2.50	0.74	40.0	40.0	20.0
1900 - 1929	25	208	8.32	2.45	17.3	76.0	6.7
1930 - 1959	30	222	7.40	2.18	22.5	69.8	7.7
2000 - 2029	28	139	4.96	1.46	18.7	77.7	3.6
2030 - 2059	31	91	2.94	0.87	22.0	73.6	4.4
2100 - 2129	60	235	3.92	1.16	33.6	61.7	4.7
2130 - 2159	59	218	3.69	1.09	27.1	69.7	3.2
2200 - 2229	59	207	3.51	1.03	27.1	67.1	5.8
2230 - 2259	37	157	4.24	1.25	28.7	70.1	1.3
2300 - 2329	30	142	4.73	1.40	42.3	56.3	1.4
2330 - 2359	21	147	7.00	2.06	27.9	70.7	1.4
*****							
TOTALS AND AVERAGES	1095	5275	4.82	1.42	27.1	68.9	4.0
*****							

### DISTRIBUTION OF SHRIMPS/OBSERVATION

PHOTO DISKOBUGT OCTOBER 1975

SHRIMPS/GRS	NO.	PERCENT					
		0	5	10	15	20	25
0	14	****					
1	40	*****					
2	93	*****					
3	120	*****					
4	121	*****					
5	91	*****					
6	90	*****					
7	45	*****					
8	49	*****					
9	19	*****					
10	16	*****					
11	2	*					
12	4	**					
13	5	**					
14	2	*					
15	1	*					
16	1	*					
17	0	*					
18	0	*					
19	0	*					
20	1	*					

MEAN: 4.65  
VARIANCE: 6.86

RUN: 761118 / 1010

Fig. 1. Distribution of photographs with different amount of shrimps. The material corresponds to Table 1.

### DISTRIBUTION OF SHRIMPS/OBSERVATION

PHOTO PORSILD GR. N MAY 1976

SHRIMPS/GRS	NO.	PERCENT					
		0	5	10	15	20	25
0	10	*****					
1	14	*****					
2	44	*****					
3	50	*****					
4	57	*****					
5	55	*****					
6	48	*****					
7	31	*****					
8	26	*****					
9	19	*****					
10	9	*****					
11	9	*****					
12	1	*					
13	3	**					
14	2	**					
15	3	**					
16	0	*					
17	0	*					
18	0	*					
19	0	*					
20	0	*					

MEAN: 5.17  
VARIANCE: 8.11

RUN: 761118 / 1024

Fig. 2. Distribution of photographs with different amount of shrimps. The material corresponds to Table 2.



