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The Icelandic Shrimp Fishery (*Pandalus borealis*) in the Denmark Strait in 2002.

by

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Abstract

In this paper there are logbook information on the Icelandic fishery for the years 1990-2002 as well as nominal catches. The nominal catch of 2002 was 1 170 tons as compared to 130 tons in 2000 and 9 tons in 2001. The CPUE is the highest since in the period 1990-2002.

Age determination of the shrimp samples taken on the eastern side of the midline was assessed in 2002 using modal analysis. The growth of males from the assumed age 3 to 6 is found to agree with earlier findings for the northern area of Denmark Strait average. The change of sex starts at the age of 5 but is estimated to take mostly place at age 6. The oldest shrimp detected now were 7 years. But in most former years the oldest shrimp were calculated to be 8 years.

Introduction

In this paper there is an account of logbook information for the Icelandic fishery taking place on the eastern side of the midline between Greenland and Iceland.

The age of shrimp in Denmark Strait is assessed here in 2002 and the result of previous years are presented. This is done as before using the modal analysis.

Material and Methods

For most of the catch data there are logbook data which include catch and effort. Not all skippers send in the logbooks, but information on landings can be obtained elsewhere. Thus the equivalent to the nominal catch can be calculated for the effort. This is done by adding up all catch and effort by two periods of the year from the logbooks and calculating the CPUE. Whereupon the nominal catch for the same period is divided by the CPUE to get the corrected effort. Twin trawls were treated by doubling the effort of twin trawls.

The measuring of the shrimp was carried out using sliding calipers and measuring the carapace from the eye socket to the hind end of the carapace middorsally to the nearest half mm. After this every specimen in a length class is grouped by sexual character as done by Rasmussen (1953) as well as detecting the presence or absence of sternal spines (McCrary 1971). The sex groups detected are 9. Later the 9 sex groups are combined and grouped together in the three main groups males, primiparous females (with sternal spines) and multiparous females (without sternal spines). In the group primiparous females there are also transitionals.

The age determination was carried out using the method of Macdonald and Pitcher (1979). For detecting the age groups, each of the three aforementioned length frequency distributions (lfd.) of males, primiparous females and multiparous females was run separately. It was tried first to assign many age-groups to the lfd. and then reduce the number to find the best fit. For the more difficult lfds a constraint had to be put on the coefficient of variation of the so-called sigma (standard deviation of the age-class) to be fixed at 0.045. Trial values for the mean length were used as starting values. Moreover when assessing the age of the multiparous females the sigmas were kept equal in the years 1991-1998. But in 2002 a fixed coefficient of variation for the sigma of 0.045 was used.

Catch and Effort Data

In 2002 the fishery was carried out in the period April through June. But most of the catch was taken in April and May. The total annual catch was only 1 200 tons in 2002 (table 1). The mean CPUE for the year 1995 was the highest ever for Iceland, namely 309 kgs per trawling hour. In 1996 and 1997 the mean CPUE was 240 and 238 kg/hour, which was also rather high. The CPUE was lower in 1998 i.e. 175 kg/hour. After this the density of shrimp fell gradually to 153 kg/hour in 1999. After this there has been hardly any fishery til 2002. As usual shrimper went to the traditional banks on the east side of the midline but the shrimp appeared to be not available.

The average size of gear was about 3 400 meshes circumference of the belly in 1998, compared to 3 200 and 3 120 meshes in 1997 and 1996 respectively. In earlier years the size was about 2 400 meshes, so there has been a substantial increase in the size of gear. In year 2002 the size was around 3000 meshes.

Commercial Samples

The samples were obtained from shrimpers in 2002. The proportion of males was 50%. This is similar to most years except in 1996 when the proportion of males was very high, namely 70%. The percentage of females was 50% in 2002 as compared to 30% in 1996, 50% in 1997 and 40% in 1998 and 50% in 1999. In 2000 and 2001 there were no samples obtained as the fishery was at a very low level.

Of the multiparous females 45 % were carrying eggs in May 2002 as compared to 72% in 1998. As pointed out before a proportion of the females will spawn every second year as hinted by the high percentage of mature females not carrying eggs. As a comparison in 1996 and 1997 the proportions not carrying eggs were 28% and 17% respectively. Now 43% were preparing the next batch of egg most of which were not carrying eggs at the same time. As the hatching may have begun in May it is not certain those speculations are describing the events correctly.

Estimation of Age

The samples of 2002 were compiled and age assessed. There were four age classes of males detected being 3-6 years old. Compared to the ageing of samples in the years 1991 through 1998 this is very similar (Table 2). The shrimp seems to be mainly changing sex at the age of 6 about 27-28 mm CL. The primiparous females seem to be unimodal at the size of 27.5 mm. The multiparous females had 3 year-classes but the 6 and 7 year olds of 27.1 and 30.4 were numerous where as the 5 years old at 23.3 mm were only a tiny proportion of the multiparous females. This is similar to what has been found before in shrimp on the Icelandic side of the midline.

References

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Table 2. Mean carapace length mm of northern shrimp in the area north of 65°N as estimated from the Icelandic samples in the Denmark Strait in First half of the year.

MALES							
Year/"Agegroups"	2	3	4	5	6	7	8
1991	15,0	18,5	21,0	24,0	27,0		
1992		18,0	21,1	23,8	25,6		
1993		17,8	20,1	22,7	25,1		
1994	14,0	18,1	20,3	23,0	25,6		
1995		19,7	21,0	24,0	26,2		
1996	16,3	19,4	21,9	24,5			
1997		18,1	21,9	24,1	25,6		
1998	13,8	18,4	20,4	23,2	25,8		
2002		17,1	20,3	22,9	25,3		
Mean	14,8	18,5	21,0	23,7	25,8		
Primiparous females							
1991				25,6	28,6		
1992				25,1	27,9		
1993				24,2	27,6		
1994				23,9	27,0		
1995					27,3		
1996				24,1	27,1		
1997				23,8	27,7		
1998				23,3	27,9		
2002					27,5		
Mean				24,3	27,6		
Multiparous females							
1991					26,1	30,2	32,0
1992					26,0	30,1	32,7
1993					25,2	29,7	
1994				22,9	26,3	28,8	31,4
1995					25,6	28,9	31,6
1996				24,0	27,2	29,5	31,3
1997				24,2	27,4	29,6	32,3
1998				23,5	27,2	29,5	31,7
2002				23,3	27,1	30,4	
Mean				23,6	26,5	29,6	31,9

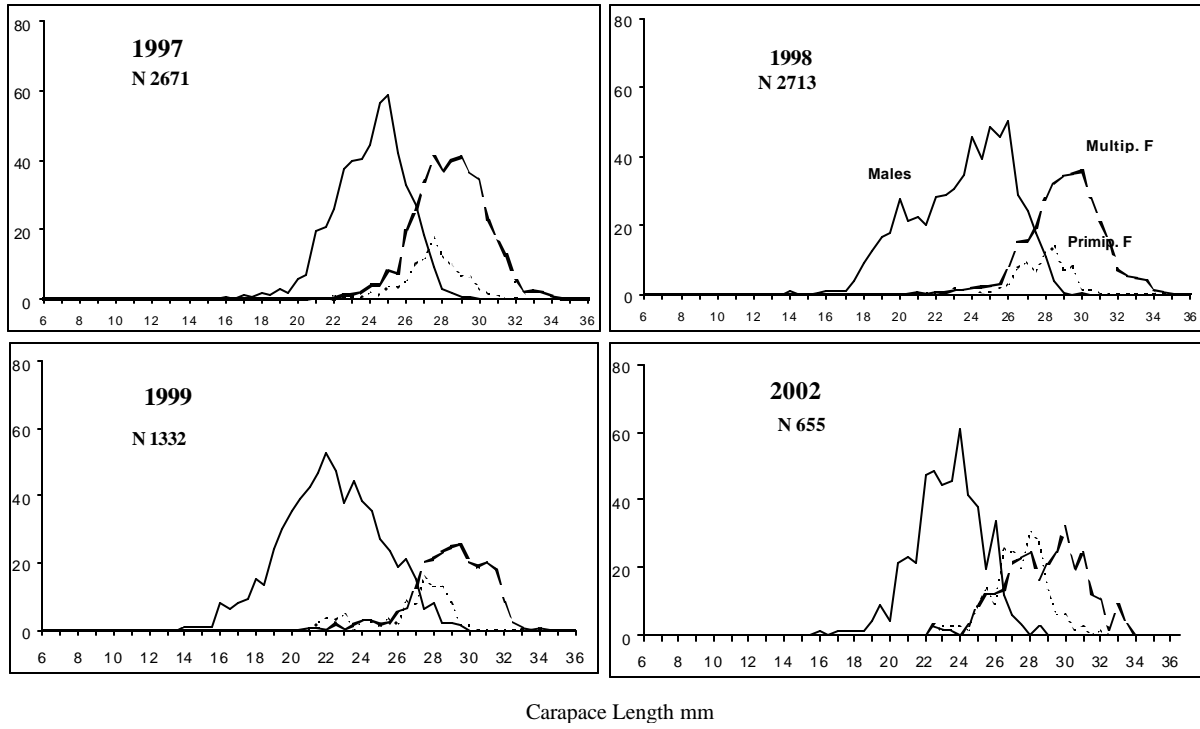


Fig. 1 The Icelandic samples in 1997, 1998, 1999 and 2002. All samples are taken in the first half of the year.