



## SCIENTIFIC COUNCIL MEETING – NOVEMBER 2003

The Icelandic Shrimp Fishery (*Pandalus borealis*) in the Denmark Strait in 2003

by

U. Skúladóttir  
Marine Research Institute, Skúlagata 4,  
P.O. Box 1390, 121 Reykjavík Iceland

### Abstract

In this paper there are logbook information on the Icelandic fishery for the years 1990-2003 as well as nominal catches. The nominal catch of Iceland was 703 tons in 2003, as compared to 1 231 tons in 2002, 130 tons in 2000 and 9 tons in 2001. The unstandardized CPUE is rather high or 279 kg/hour in 2003 as compared to 384 in 2002 which was the highest in the series.

### 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 biological samples are also presented.

### 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 from the Fisheries directorate. 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. The effort of twin trawls was doubled before combining with the effort of the single 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.

### Catch and Effort Data

In 2003 the fishery was carried out in the period April through June. But most of the catch was taken in April and May as usual. The total annual catch was only 700 tons in 2003 (Table 1). The mean CPUE for the year 2002 was the highest ever for Iceland, namely 384 but fell to 279 kg/hr in 2002. Before that the highest catch was in 1995, 307 kg/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 shrimpers went to the traditional banks on the east side of the midline but the shrimp appeared not to be 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. The proportion of males was 55% in 2003 as compared to 50% in 2002. This is similar to most years except in 1996 when the proportion of males was very high, namely 70%. The percentage of females was 45% in 2003 as compared to 50% in 2002, 30% in 1996, 50% in 1997, 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 54% were carrying eggs in May 2003 as compared to 45% in May 2002 and 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 42% were preparing the next batch of eggs and none of those were carrying eggs at the same time.

### References

- Macdonald, P. D. M., and Y. J. Pitcher. 1979. Age-groups from size-frequency data: a versatile and efficient method of analyzing distribution mixtures. *J. Fish. Res. Board Can.*, **36**: 987-1011.
- McCrary, J. A. 1971. Sternal spines as characteristic for differentiating between females of some Pandalidae. *J. Fish. Res. Board Can.*, **28**: 98-100.
- Rasmussen, B. 1953. On the geographical variation in growth and sexual development of the deep sea prawn (*Pandalus borealis* Kr.). *FiskDir. Skr. Ser. Havunders.* **10** (3) : 160 p.
- Skúladóttir, U. 1998. The Icelandic Shrimp fishery (*Pandalus borealis*) in the Denmark Strait in 1997- 1998, and some reflection on age groups in the years 1991-1996. NAFO SCR Doc. 97/103. Serial No. N4029, 12 p.

Table 1. Catch rates (kg per hour trawling) and corresponding effort (tr. hrs) and catch (tons) from the shrimp fishery in Denmark Strait, north of 65°N, by Iceland.

| Year     | January - June |       |        |          | July - December |      |        |          | Year   | January - June |        |          |        | July - December |        |        |        |    |     |
|----------|----------------|-------|--------|----------|-----------------|------|--------|----------|--------|----------------|--------|----------|--------|-----------------|--------|--------|--------|----|-----|
|          | Month          | CPUE  | Effort | Catch    | Month           | CPUE | Effort | Catch    |        | Month          | CPUE   | Effort   | Catch  | Month           | CPUE   | Effort | Catch  |    |     |
| 1990     | Jan            | 5     | 8      | 0.0      | Jul             | 84   | 40     | 3.4      | 2000   | Jan            |        |          |        | Sep             |        |        |        |    |     |
|          | Feb            | 44    | 11     | 0.5      | Aug             | 69   | 168    | 11.7     |        | Feb            | 173    | 257      | 44.6   | Oct             |        |        |        |    |     |
|          | Apr            | 12    | 9      | 0.1      | Sep             | 65   | 835    | 54.2     |        | Mar            | 46     | 58       | 2.7    | Nov             |        |        |        |    |     |
|          | Jun            | 81    | 2347   | 190.2    | Oct             | 62   | 47     | 2.9      |        | Apr            | 60     | 43       | 2.6    | Dec             | 280    | 275.7  | 77.1   |    |     |
|          | Subtotal       | 80    | 2375   | 190.8    | Subtotal        | 66   | 1090   | 72.2     |        | May            | 47     | 6        | 0.3    | Subtotal        | 280    | 275.7  | 77.1   |    |     |
|          | Total          | 80    | 2538   | 203.9    | Total           | 66   | 1165   | 77.1     |        | Total          | 138    | 364      | 50.1   | Total           | 280    | 288.5  | 80.7   |    |     |
| 1991     |                |       |        |          | Aug             | 24   | 9      | 0.2      | 2001 * | Jan            | 25     | 30       | 0.8    | Jul             | 100    | 12     | 1.2    |    |     |
|          | May            | 252   | 1536   | 387.7    | Sep             | 68   | 64     | 4.4      |        | Feb            | 55     | 14       | 0.8    |                 |        |        |        |    |     |
|          | Jun            | 85    | 394    | 33.4     | Oct             | 112  | 350    | 39.2     |        | Mar            | 249    | 22       | 5.4    |                 |        |        |        |    |     |
| Total    | 218            | 1930  | 421.1  | Total    | 104             | 423  | 43.7   | Apr      | 104    | 6              | 0.6    | Subtotal | 105    | 72              | 7.6    | Total  | 100    | 12 | 1.2 |
| 1992     | Apr            | 326   | 2839   | 926.0    | Jul             | 110  | 90     | 9.9      | 2002 * | Apr            | 792    | 648      | 513.0  | Dec             | 140.6  | 9.6    | 1.35   |    |     |
|          | May            | 127   | 3908   | 494.7    | Sep             | 17   | 6      | 0.1      |        | May            | 291    | 1759     | 512.4  |                 |        |        |        |    |     |
|          | Subtotal       | 211   | 6747   | 1421     | Oct             | 78   | 13     | 1.0      |        | Jun            | 223    | 633      | 140.9  | Subtotal        | 384    | 3040   | 1166.3 |    |     |
| Total    | 211            | 8232  | 1733.3 | Subtotal | 101             | 109  | 11     | Total    | 384    | 3206           | 1230.0 | Total    | 384    | 3206            | 1230.0 |        |        |    |     |
| 1993     | Mar            | 329   | 688    | 226.4    | Sep             | 220  | 15     | 3.3      | 2003 * | Apr            | 316    | 1432     | 452.7  |                 |        |        |        |    |     |
|          | Apr            | 193   | 7296   | 1405.9   | Oct             | 200  | 4      | 0.8      |        | May            | 230    | 806      | 185.7  |                 |        |        |        |    |     |
|          | May            | 147   | 4381   | 644.3    | Subtotal        | 216  | 19     | 4.1      |        | Jun            | 150    | 111      | 16.6   | Subtotal        | 279    | 2349   | 655.0  |    |     |
| Subtotal | 184            | 12394 | 2279.9 | Total    | 216             | 21   | 4.6    | Total    | 279    | 2521           | 703.0  | Total    | 279    | 2521            | 703.0  |        |        |    |     |
| Total    | 184            | 13854 | 2548.4 |          |                 |      |        |          |        |                |        |          |        |                 |        |        |        |    |     |
| 1994     | Feb            | 364   | 14     | 5.1      | Aug             | 179  | 14     | 2.5      | 1997 * | Jan            | 29     | 7        | 0.2    | Oct             | 71     | 236    | 16.8   |    |     |
|          | Mar            | 350   | 1533   | 536.2    | Sep             | 55   | 56     | 3.1      |        | Feb            | 245    | 785      | 192.5  | Nov             | 14     | 7      | 0.1    |    |     |
|          | Apr            | 70    | 86     | 6.0      | Oct             | 104  | 77     | 8        |        | Mar            | 262    | 4278     | 1120.4 | Dec             | 108    | 931    | 100.1  |    |     |
|          | May            | 265   | 2045   | 542.3    | Nov             | 90   | 20     | 1.8      |        | Apr            | 286    | 2700     | 772.1  | Subtotal        | 100    | 1174   | 117.0  |    |     |
|          | Jun            | 149   | 263    | 39.2     | Subtotal        | 92   | 167    | 15.4     |        | May            | 134    | 1189     | 159.5  | Total           | 100    | 1388   | 138.3  |    |     |
|          | Subtotal       | 286   | 3941   | 1128.8   | Total           | 286  | 5233   | 1498.9   |        | Jun            | 25     | 8        | 0.2    |                 |        |        |        |    |     |
| Total    | 286            | 5233  | 1498.9 |          |                 |      |        |          |        |                |        |          |        |                 |        |        |        |    |     |
| 1995     | Feb            | 383   | 1339   | 513.2    | Sep             | 171  | 7      | 1.2      | 1998 * | Jan            | 58     | 66       | 3.8    | Sep             | 41     | 17     | 0.7    |    |     |
|          | Mar            | 209   | 983    | 205.6    | Oct             |      |        |          |        | Feb            | 173    | 314      | 54.2   | Oct             | 30     | 10     | 0.3    |    |     |
|          | May            | 10    | 4      | 0.0      | Subtotal        | 171  | 7      | 1.2      |        | Mar            | 90     | 39       | 3.5    | Nov             | 60     | 243    | 14.5   |    |     |
|          | Subtotal       | 309   | 2326   | 718.8    | Total           | 309  | 3721   | 1150.0   |        | Apr            | 219    | 3507     | 766.5  | Dec             | 117    | 47     | 5.5    |    |     |
| Total    | 309            | 3721  | 1150.0 |          |                 |      |        | May      | 130    | 3148           | 408.8  | Subtotal | 66     | 317             | 21.0   |        |        |    |     |
| 1996     | Feb            | 198   | 1249   | 246.8    | Jul             | 500  | 7      | 3.5      | Total  | 175            | 8010   | 1400.4   | Total  | 66              | 317    | 21.0   |        |    |     |
|          | Mar            | 229   | 359    | 82.3     | Aug             | 164  | 14     | 2.3      |        |                |        |          |        |                 |        |        |        |    |     |
|          | Apr            | 341   | 618    | 210.9    | Sep             | 123  | 40     | 4.9      |        |                |        |          |        |                 |        |        |        |    |     |
|          | May            | 58    | 12     | 0.7      | Subtotal        | 175  | 61     | 10.7     |        |                |        |          |        |                 |        |        |        |    |     |
|          | Subtotal       | 242   | 2238   | 540.7    | Total           | 175  | 61     | 10.7     |        |                |        |          |        |                 |        |        |        |    |     |
|          | Total          | 242   | 2297   | 555.0    |                 |      |        |          |        |                |        |          |        |                 |        |        |        |    |     |
| 1997 *   | Jan            | 29    | 7      | 0.2      | Oct             | 71   | 236    | 16.8     | 1999 * | Jan            | 174    | 310      | 54.0   |                 |        |        |        |    |     |
|          | Feb            | 245   | 785    | 192.5    | Nov             | 14   | 7      | 0.1      |        | Feb            | 119    | 114      | 13.6   |                 |        |        |        |    |     |
|          | Mar            | 262   | 4278   | 1120.4   | Dec             | 108  | 931    | 100.1    |        | Mar            | 311    | 327      | 101.6  |                 |        |        |        |    |     |
|          | Apr            | 286   | 2700   | 772.1    | Subtotal        | 100  | 1174   | 117.0    |        | Apr            | 144    | 2156     | 311.0  |                 |        |        |        |    |     |
|          | May            | 134   | 1189   | 159.5    | Total           | 100  | 1388   | 138.3    |        | May            | 122    | 1107     | 135.6  |                 |        |        |        |    |     |
|          | Jun            | 25    | 8      | 0.2      |                 |      |        |          |        | Jun            | 100    | 33       | 3.3    |                 |        |        |        |    |     |
| Subtotal | 250            | 8967  | 2244.9 |          |                 |      |        | Subtotal | 153    | 4047           | 619.1  |          |        |                 |        |        |        |    |     |
| Total    | 250            | 10856 | 2717.8 |          |                 |      |        | Total    | 153    | 4896           | 749.0  |          |        |                 |        |        |        |    |     |

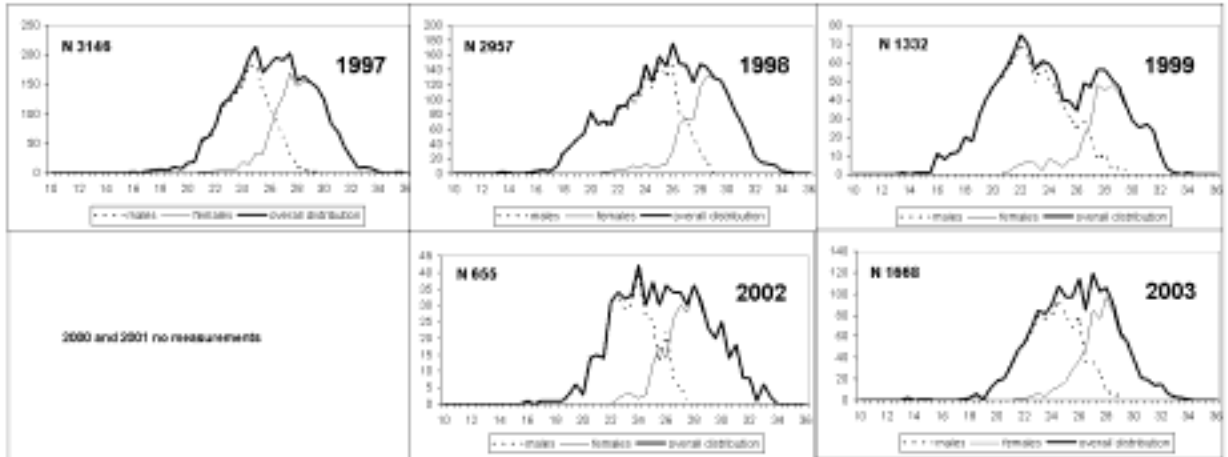


Fig. 1. The length frequency distributions of shrimp north of 65 degrees north in the years 1997 to 1999 and again in 2002 and 2003.