## Biological parameters Lobster (Homarus gammarus) and Crab (Cancer pagurus)

### Lobster Biological Parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | **Parameter** |  |  |  | | Female | Male | Source |
| Weight length a | 0.001086 | 0.000447 | Bannister *et al*. (1983) |
| Weight length b | 2.896 | 3.01 | Bannister *et al*. (1983) |
| von Bertalanffy k | 0.1088 | 0.0913 | Bannister *et al*. (1983) |
| **von Bertalanffy L∞** | 168.71 | 209.25 | Bannister *et al*. (1983) |
| Natural mortality   |  | | --- | |  | | 0.1 | 0.1 | Best assumption on basis of current knowledge |

Von Bertalanffy growth parameters for lobsters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | Location | Sex | **L∞** | K | Comments |
| Hepper, 1978 | Yorkshire | m | 110.5 | 0.31 | L∞ low |
| f | 105.3 | 0.33 | L∞ low |
| Cornwall | m | 202.1 | 0.15 |  |
| f | 125.8 | 0.47 | L∞ low |
| f | 138.6 | 0.3 | excluding 85mm females, L∞ probably low |
| Simpson, 1961 | North Wales | m | 202.2 | 0.122 |  |
| f | 118.2 | 0.313 | L∞ low |
| Hepper, 1978 |  | m | 176.7 | 0.11 | Calculated |
|  | f | 143.4 | 0.14 | Calculated |
|  | m | 172.9 | 0.17 | Mean |
|  | f | 123.2 | 0.31 | Mean (excluding row 5), L∞ low |
| Yorkshire, Cornwall & N. Wales | m | 196.2 | 0.12 | All data |
| f | 160.3 | 0.17 | All data |
| **Bannister *et al*., 1983** | Northumberland & Yorkshire | m | 209.25 | 0.0913 |  |
| f | 168.71 | 0.1088 |  |
| Norfolk | m | 150 | 0.2397 | L∞ fixed *a priori* |
| f | 150 | 0.2105 | L∞ fixed *a priori* |
| South Coast | m | 175 | 0.126 | L∞ fixed *a priori* |
| f | 175 | 0.1071 | L∞ fixed *a priori* |
| Southwest & South Wales | m | 200 | 0.0914 | L∞ fixed *a priori* |
| f | 200 | 0.0689 | L∞ fixed *a priori* |
| Cardigan Bay | m | 175 | 0.0965 | L∞ fixed *a priori* |
| f | 175 | 0.0775 | L∞ fixed *a priori* |
| North Wales | m | 175 | 0.1191 | L∞ fixed *a priori* |
| f | 175 | 0.11 | L∞ fixed *a priori* |
| Hewett, 1974 | Suffolk |  | 171.7 | 0.065 | Combined sexes |
| Gibson, 1967 | Ireland |  | 174.3 | 0.1213 | Combined sexes |
| **Tully *et al.*, 2006** | Ireland (Clare & Galway) |  | 172 | 0.12 | Combined sexes |
| Conan & Gundersen, 1976 | Norway | m | 126.33 | 0.259 | Tagging studies |
| f | 162.31 | 0.08 | Tagging studies |
| m | 128.79 | 0.197 | Corrected for moult cycle |
| f | 156.93 | 0.1 | Corrected for moult cycle |
| **Uglem *et al*., 2005** | Norway |  | 179.308 | 0.117 | Hatchery reared micro-tagged recaptures |
| **Sheehy *et al.,* 1999** | Yorkshire | m | 216.3 | 0.997 | Logistic model (Ts∞/2=11.89) |
| **Sheehy *et al.,* 1999** | Yorkshire | f | 202.3\* | 0.789 | Logistic model (Ts∞/2=15.64) \*: S∞ constrained |

Mean growth increment at moulting for lobsters of 80mm initial carapace length (from Hepper, 1978)

|  |  |  |  |
| --- | --- | --- | --- |
| Authors | Location | Moult Increment (mm) | |
|  |  | Male | Female |
| Hepper, 1967 | Yorkshire & Cornwall | 9.8 | 8.4 |
| Hepper, 1972 | North Wales | 12.3 | 10.3 |
| Gibson, 1967 | Ireland | 8.5 | 7.5-7.6 |
| Simpson, 1961 | North Wales | 10.1 | 10.7 |
| Thomas, 1958 | Berwickshire | 12.3 | 10.1 |
| BIM/MI 2002-2007 | Ireland |  | 6.88 |

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### Crab biological parameters

#### Moult increment by a range of pre-moult sizes for edible crabs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | Location | Pre-moult size inches (mm) | Moult increment inches (mm) | |
|  |  |  | Male | Female |
| Edwards & Martin, 1963 | Yorkshire | 3.7 (94) | 1 (25) |  |
| Edwards & Martin, 1963 | Yorkshire | 4.1 (104) | 1.2 (30) |  |
| Edwards & Martin, 1963 | Yorkshire | 4.6 (117) | 1.3 (33) |  |
| Edwards & Brown, 1967 | Norfolk | 3.5 (89) | 1 (25) | 1 (25) |
| Edwards & Brown, 1967 | Norfolk | 4.0 (102) | 0.9 (23) | 1.1 (28) |
| Edwards & Brown, 1967 | Norfolk | 4.5 (114) | 0.9 (23) | 1 (25) |
| Edwards & Brown, 1967 | Norfolk | 5.0 (127) | 0.9 (23) | 1.1 (28) |

#### Alternative von Bertalanffy growth parameters for edible crabs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Area | Sex | K | L∞ | Source |
| Shetland | M | 0.188 | 234.3 | Tallack, 2002 |
| Shetland | F | 0.224 | 212.2 | Tallack, 2002 |
| North Sea | M | 0.196 | 240 | Addison & Bennett, 1992 |
| North Sea | F | 0.191 | 240 | Addison & Bennett, 1992 |
| English Channel | M | 0.252 | 209 | Moult model in range of observed length data (Smith, 2004, unpubl.) |
| English Channel | F | 0.144 | 198 | Moult model in range of observed length data (Smith, 2004, unpubl.) |
| English Channel | M | 0.181 | 240 | Constrained fit to moult increment data (Smith, 2006, unpubl.) |
| English Channel | F | 0.069 | 240 | Constrained fit to moult increment data (Smith, 2006, unpubl.) |
| English Channel | F | 0.168 | 240 | Constrained fit to first 3 moult increment points only (Smith, 2006, unpubl.) |
| French Channel | M | 0.39 | 232 | Latrouite& Morizur, 1988. |
| French Channel | F | 0.25 | 210 | Latrouite& Morizur, 1988 |
| English Channel | F | 0.24318 | 211.7 | MF1103a (Defra, 2011), Gulland & Holt (1959) method |
| English Channel | F | 0.32519 | 203.1 | MF1103b (Defra, 2011), Ford (1933), Walford (1946) method |
| English Channel | M | 0.38 | 238.5 | Sheehy & Prior, 2008. Cubic von Bertalanffy model, lipofuscin studies (t0=-0.6) |
| English Channel | F | 0.46 | 203.4 | Sheehy & Prior, 2008. Cubic von Bertalanffy model, lipofuscin studies (t0=-0.54) |

L∞ is in the range 210-212mm and K in the range 0.224-0.25. Estimates of von Bertalanffy growth parameters for females mainly suggested L∞ was either just over 200mm or just above 210mm, with the latter seeming more plausible given frequencies of large crabs in sampled landings. Corresponding K values for this group were between 0.224 and 0.25.

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