Table 1. Life history parameter Values from Ono et al., (2015) and Hurtado-ferro et al., (2015).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Estimated** | **Cod** | **Flatfish** | **Sardine** |
| Natural Mortality | *Mr* | Y | 0.2 | 0.2 | 0.4 |
| Start age | *a1* | N | 0 | 0 | 0 |
| Plus group age | *a+* | N | 25 | 25 | 15 |
| Length at *a1* (cm) | *L1* | N | 20 | 12.7 | 10 |
| Length at *a+* (cm) | *L∞* | N | 132 | 47.4 | 25 |
| Growth rate (year-1) | *K* | N | 0.2 | 0.35 | 0.4 |
| Length-weight scaling (kg cm-3) | α | N | 6.8e-6 | 1.0e-5 | 1.7e-5 |
| Allometric factor | β | N | 3.1 | 3.0 | 2.9 |
| Maturity slope (cm-1) | Ω1 | N | -0.27 | -0.42 | -0.9 |
| Length at 50% maturity (cm) | Ω2 | N | 38.2 | 28.9 | 15.9 |
| Log mean virgin recruitment | *ln(R0)* | Y | 18.7 | 10.5 | 16 |
| Steepness | *h* | Y | 0.65 | 0.76 | 0.59 |
| Recruitment variability | σr | Y | 0.4 | 0.7 | 0.73 |
| Mean fishery length-at-50% selectivity (cm) | S1 | Y | 38.2 | 28.9 | 15.9 |
| Fishery length selectivity slope (cm) | S2 | Y | 10.6 | 7 | 3.3 |

Table 2. Updated parameter values from the most recent stock assessments.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Estimated** | **Cod** | **Flatfish** | **Sardine** |
| Natural Mortality | *Mr* |  |  | (0.405, 0.336, 0.296, 0.275, 0.256, 0.2311) | 0.5852 |
| Start age | *a1* | 0 |  |  | 0 |
| Plus group age | *a+* | 6+ |  |  | 8+ |
| Length at *a1* (cm) | *L1* |  |  |  | Same |
| Length at *a+* (cm) | *L∞* |  |  |  | Same |
| Growth rate (year-1) | *K* |  |  |  | Same |
| Length-weight scaling (kg cm-3) | α |  |  |  | Same |
| Allometric factor | β |  |  |  | Same |
| Maturity slope (cm-1) | Ω1 |  |  |  | Same |
| Length at 50% maturity (cm) | Ω2 |  |  |  | Same |
| Log mean virgin recruitment | *ln(R0)* |  |  |  | 14.7309 |
| Steepness | *h* |  |  |  | 0.3 |
| Recruitment variability | σr |  |  |  | 1.2 |
| Mean fishery length-at-50% selectivity (cm) | S1 |  |  |  | Same |
| Fishery length selectivity slope (cm) | S2 |  |  |  | Same |

**Sardine**

Kept growth, maturity, and selectivity the same as the new model uses empirical WAA and I am not privy to that data.

**North Sea Cod**