The phases in which parameters were estimated for MARAM IWS/DEC15/Sardine/P3

C.L. de Moor*

Correspondence email: carryn.demoor@uct.ac.za

Table 1. Assessment model estimable parameters, showing the ADMB phase in which parameters were estimated for the initial results in MARAM IWS/DEC15/Sardine/P3.

Parameter / Variable	Description	Units / Scale	Fixed Value / Prior Distribution	Phase
I_y	Proportion of uninfected west stock sardine that are infected with the endoparasite in year y (two stock hypothesis only)		$I_y = I \sim U(0,1)$	N/A Currently just a fixed value
$move_{y,a}$	Proportion of west stock sardine of age a which move to the south stock at the beginning of November of year y (two stock hypothesis only)	-	$=0,\ y_1 \le y \le 1993$ $move_{y,1} \sim U(0,1),$ $move_{y,2+} = \phi \times move_{y,1},$ $\phi \sim U(0,1),$ $1994 \le y \le y_n$	Phase 2 ($\phi = 0$)
$L_{j,\infty}$	Maximum length (in expectation) of stock j	Cm	$\sim U(10,30)$	Phase 3
κ_j	Somatic growth rate parameter for stock j	Year^{-1}	$\kappa_j \times L_{j,\infty} \sim U(0,10)$	Phase 3
t_0	Age at which the length (in expectation) is zero	Year	$\sim U(-4,4)$	Phase 3
$\vartheta_{j,a}$	Standard deviation of the distribution about the mean length for age a of stock j	-	$\sim U(0.01,3),\ a=0,1,2+$	Phase 4
S_{50}	Length at which survey selectivity is 50%	Cm	$\sim U(2.5,7)$	Phase 3
δ	Slope of survey selectivity-at-length ogive when selectivity is 50%	-	$\sim U(0.1,1)$	Phase 3
χ_j	Height of the near-normal curve component for stock j relative to the height of the near-lognormal component	-	$\sim U(0,1)$	Phase 4

* MARAM (Marine Resource Assessment and Management Group), Department of Mathematics and Applied Mathematics, University of Cape Town, Rondebosch, 7701, South Africa.

Table 1 (Continued).

Parameter/ Variable	Description	Units / Scale	Fixed Value / Prior Distribution	Phase
$\bar{l}_{1,j}$	Mean of the near-normal distribution for stock j	Cm	$\sim U(5,15)$	Phase 3
$\bar{l}_{2,j}$	Median of the near-lognormal distribution for stock j	Cm	$\bar{l}_{2,j} - \bar{l}_{1,j} \sim U(0,15)$	Phase 3
$\left(\sigma_1^{sel}\right)^2$	Variance parameter of the near-normal distribution	Cm	$\sim U(2,7)$	Phase 4
$\left(\sigma_2^{sel}\right)^2$	Variance parameter of the near-lognormal distribution	Cm	$\sim U(0,2)$	Phase 4
a_j^S	Maximum recruitment of stock j in the hockey stick model	Billions	$\ln\left(a_j^S\right) \sim U(0,5.6)$	Phase 3
b_j^S	Spawner biomass below which the expectation for recruitment is reduced below the maximum for stock j	Thousand tons	$b_j^S / K_j^S \sim U(0,1)$	Phase 3
$\varepsilon_{j,y}^S$	Lognormal deviation of recruitment of stock j in year y	-	$\varepsilon_{j,y}^S \sim N\left(0,\left(\sigma_{j,r}^S\right)^2\right)$	Phase 1
$\left(\sigma_{j,r}^S\right)^2$	Variance in the residuals (lognormal deviation) about the stock recruitment curve of stock j	-	$\sim U(0.16,10)$	Phase 2
k_{ac}^S	Multiplicative bias associated with the hydro-acoustic survey	-	$\sim N\left(0.714,0.077^2\right)$	Phase 1
k_{cov}^S	Multiplicative bias associated with the coverage of the recruits by the recruit survey in comparison to the 1+ biomass by the November survey	-	$\sim U(0.3,1)$	Phase 1
k_{covS}^S	Multiplicative bias associated with the coverage of the south stock recruits by the recruit survey in comparison to the west stock recruits during the same survey	-	$\sim U(0,1)$	Phase 2
$N_{j,1983,a}^S$	Initial numbers-at-age a in stock j	Billion	$N_{j,1983,a}^S \sim U(0,50)$ for $j=1$, $0 \leq a \leq 2$ and $j=2$, $a=0$	N0 in Phase 2, N1 and N2 in Phase 3
$Finit_j$	Rate of fishing mortality assumed in the initial year for stock j		$\sim U(0,1)$	Phase 3
$\left(\lambda_{j,N/r}^S\right)^2$	Additional variance (over and above $\left(\sigma_{j,y,Nov/rec}^S\right)^2$ and $\left(\phi_{ac}^S\right)^2$) associated with the November/recruit surveys of stock j	-	$\sim U(0,10)$	N/A. Currently fixed = 0