

# FLife: Operating Model Conditioning

Brill

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## Life history parameters

Life history parameters from Fish Base for the Von Bertalanffy growth model were  $L_{\infty}$  (41.8),  $k$  (0.437), and  $t_0$  (-0.929), for the length/weight relationship  $W = aL^b$  were  $a$  (0.0222) and  $b$  (2.92), and age at maturity ( $a_{50}$ ) was (1.22).

The values for the empirical Gislason natural mortality relationship  $m_1$  and  $m_2$  were (163.7) and (-1.61) respectively.

The fishery was assumed to only catch mature fish and so selection pattern is modelled by a double normal equivalent to the maturity ogive, parameters were  $a_1$ ,  $s_l$  and  $s_r$  were (2.22, 1, 5000) respectively.

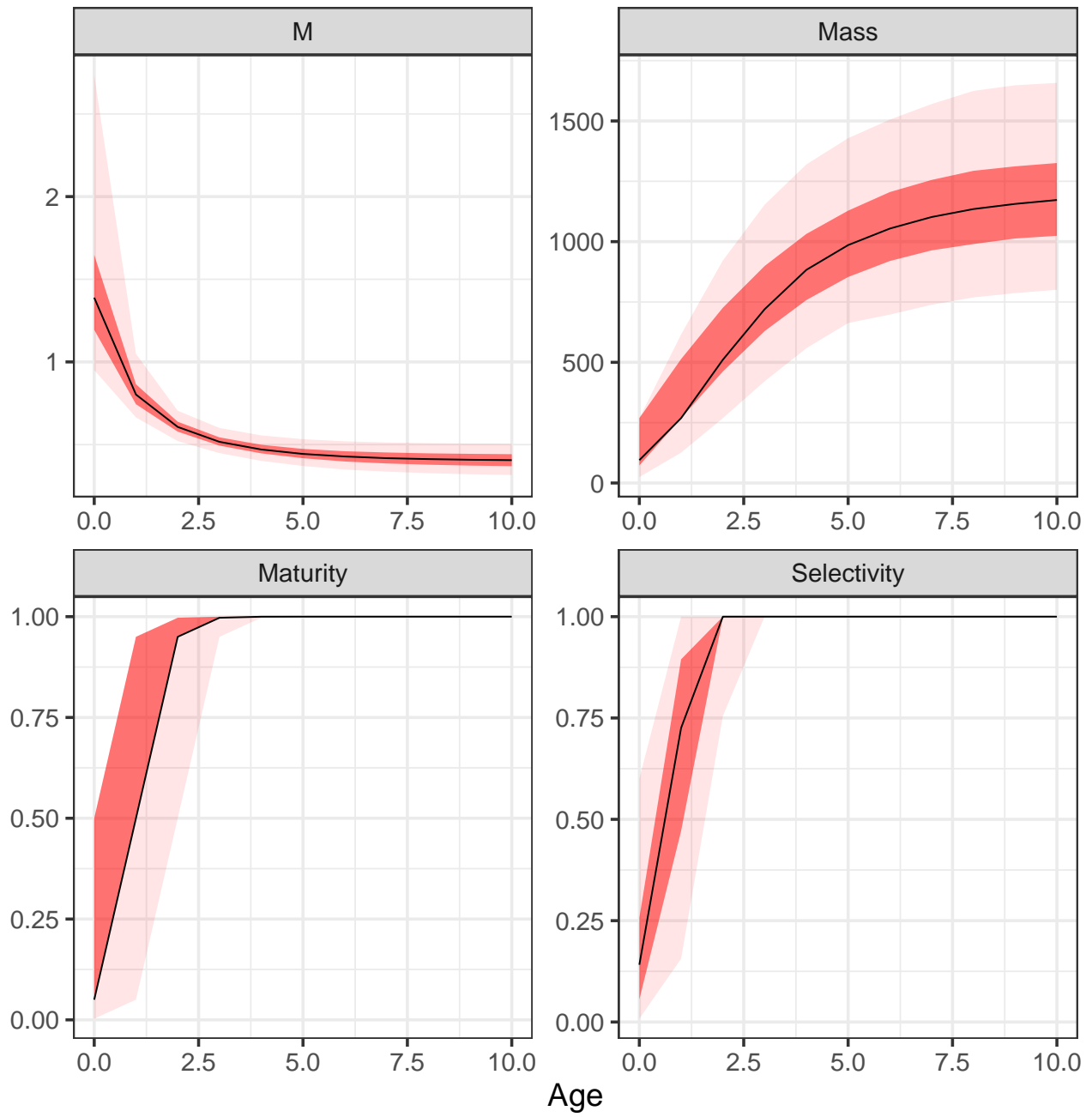
The stock recruitment relationship is assumed to be of a Beverton and Holt functional form with a steepness and virgin biomass of 0.8 and 1000 units respectively.



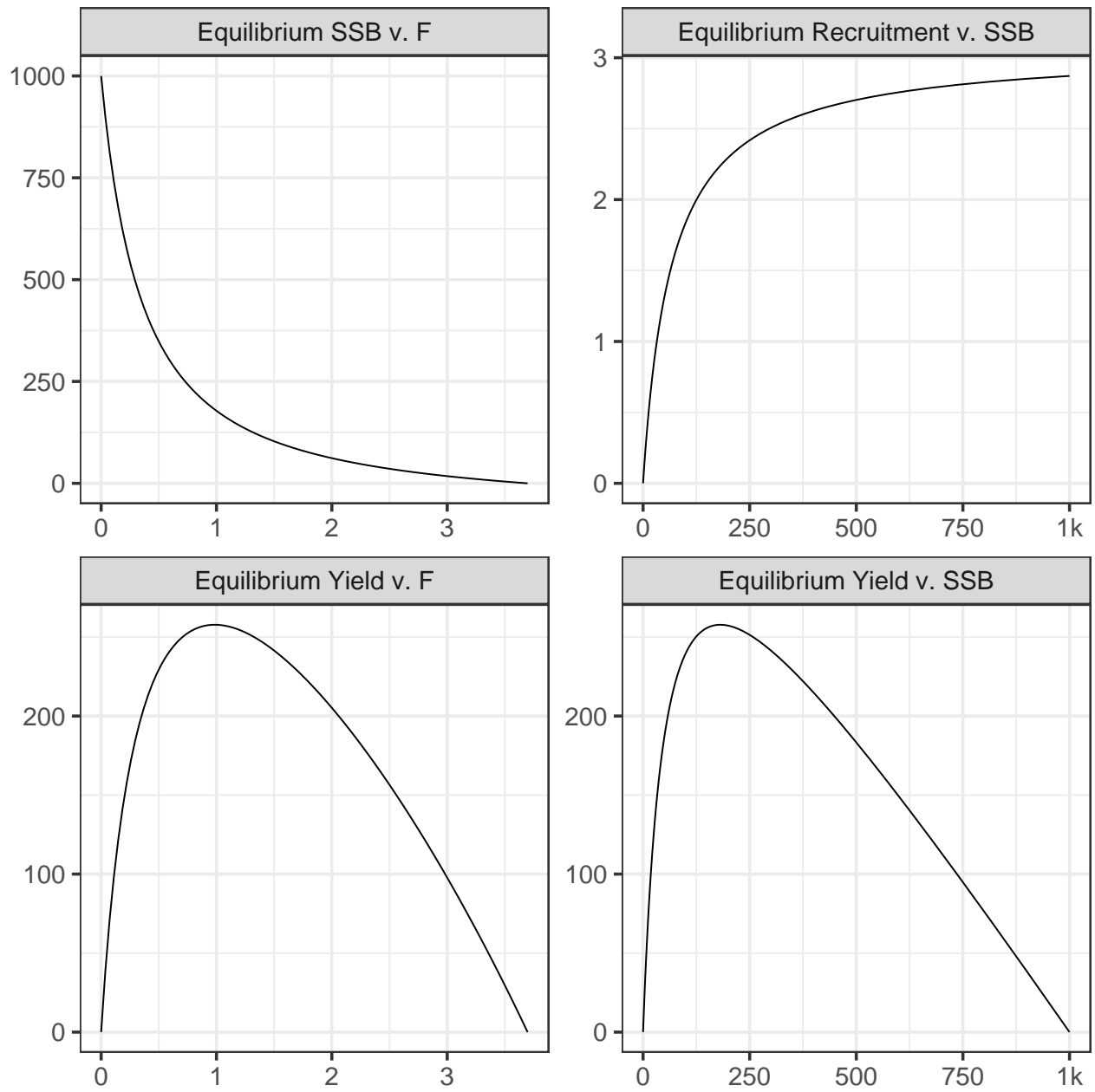
**Figure 1** Pairwise scatter plots of life history parameters.

## Equilibrium dynamics

The parameters are then used by `1hEq1` to simulate the equilibrium dynamics by combining the spawner/yield per recruit relationships with a stock recruitment relationship.

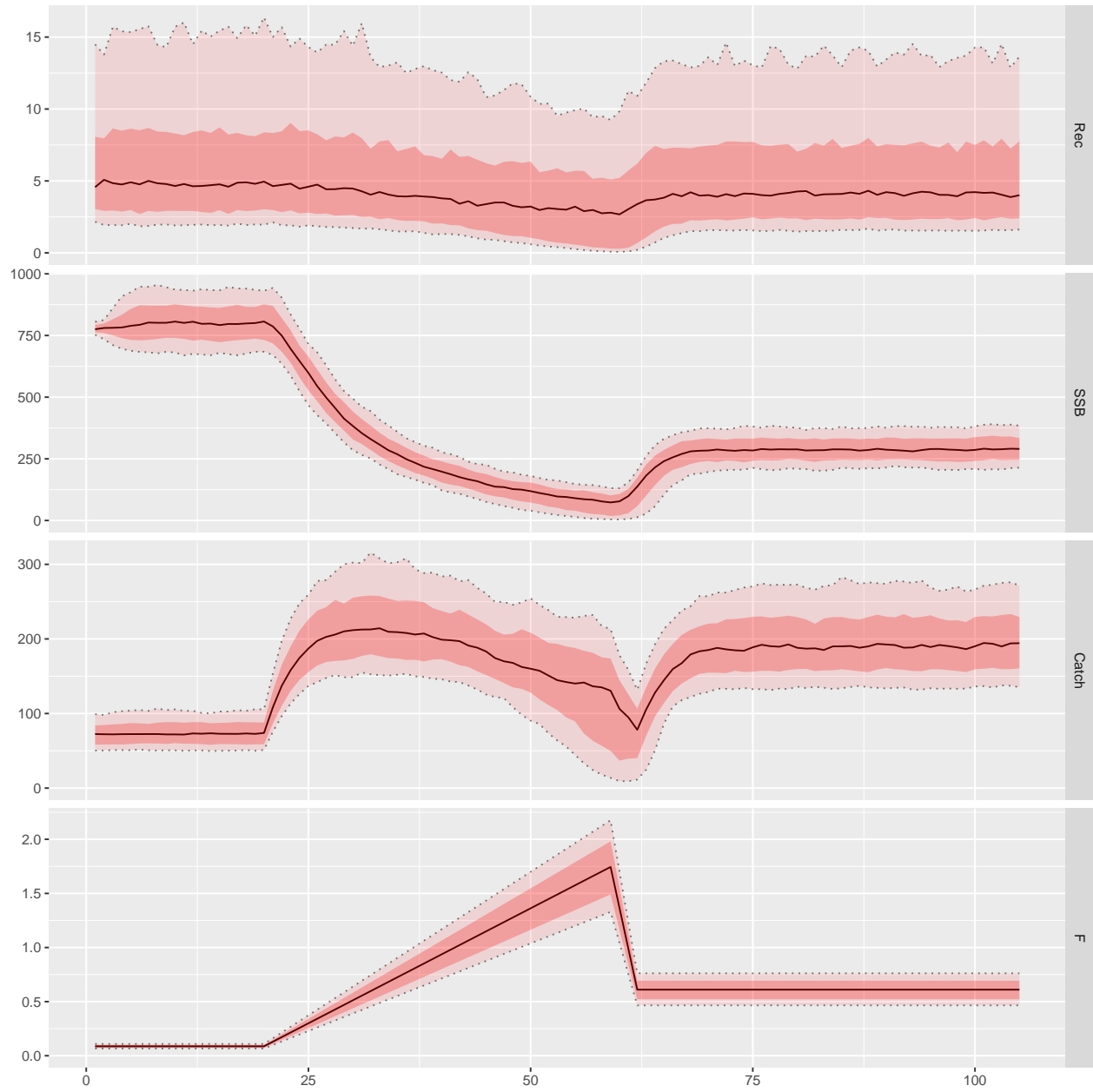


**Figure 2** Vectors.



**Figure 3** Example equilibrium Curve.

## Population dynamics



**Figure 4** Time series.