

**Table S2**

| Parameter             | MLE values | 95% CI         |
|-----------------------|------------|----------------|
| $\mu_{EI}^{(*)}$      | 24         | (—,—)          |
| $\mu_{IH}$            | 11.958     | (3.97,58.86)   |
| $\mu_{HI}$            | 1.690      | (1.437,2.073)  |
| $\mu_{IS}$            | 50.000     | (0, $\infty$ ) |
| $\mu_{IQ}$            | 11.527     | (0, $\infty$ ) |
| $\mu_{QS}$            | 67.511     | (0, $\infty$ ) |
| $q$                   | 0.001      | (0,1)          |
| $\tau$                | 7.38       | (3.6,14.04)    |
| $\rho$                | 0.033      | (0.01,1)       |
| $\sigma_{\text{pro}}$ | 0.124      | (0.096,0.179)  |
| $\sigma_{\text{obs}}$ | 0.205      | (0.175,0.254)  |
| $b_r$                 | 0.253      | (0.148,0.395)  |
| $S(0)$                | 0.379      | (0.01,0.834)   |
| $E(0)$                | 0.001      | (0.0002,0.007) |
| $I(0)$                | 0.011      | (0.003,0.093)  |
| $H_1(0)$              | 0.001      | (0,0.011)      |
| $H_2(0)$              | 0.001      | (0,0.009)      |
| $H_3(0)$              | 0.001      | (0,0.008)      |
| $Q(0)$                | 0.606      | (0.345,0.89)   |
| $\kappa_1(0)$         | 0.156      | (0, $\infty$ ) |
| $\kappa_2(0)$         | 0.045      | (0, $\infty$ ) |
| $b_1$                 | 2.458      | (1.415,4.435)  |
| $b_2$                 | 4.468      | (4.015,5.773)  |
| $b_3$                 | 3.987      | (2.791,5.218)  |
| $b_4$                 | 4.862      | (3.815,6.112)  |
| $b_5$                 | 3.695      | (2.346,5.022)  |
| $b_6$                 | 4.653      | (3.875,5.884)  |
| $1/\delta^{(*)}$      | 5          | (—,—)          |