

1 Calculation of the expected slope for growth rate versus release rate

2 When resource level S reaches a steady state, the population grows at a constant rate. Setting $dS/dt=0$ in

3 Eq (3), we get $\beta_{ij}(1-N/\kappa) - \gamma b_{ij}(S) = 0$ for a pure population of ancestral or evolved cooperators.

4 At a population size significantly below the carrying capacity, this becomes $b_{ij}(S) = \beta_{ij}/\gamma$.

5 Thus, the net growth rate is $\beta_{ij}/\gamma - d$. When the net growth rate is plotted against β_{ij} , we obtain a

6 line with slope $1/\gamma$ and intercept $-d$. Since $\gamma = 5.5$ units/cell, the predicted slope is 0.1818 cells per unit

7 of resource, which falls in our 95% CI of 0.180 – 0.182.