

Population ecology assignment: Competition

Due at 11 AM on Mon 28 March

1. (10 points in total) Two species of flour beetles have competition coefficients of $\alpha_{12} = 0.8$, $\alpha_{21} = 1.5$. These remain more or less constant, while their values of r_{\max} and K change in different experimental conditions.
 - a. (2 points) Explain the meaning of the α s. Assuming we are counting population size by individuals, which species do you think has bigger individuals?
 - b. (2 points) Do these beetles have a tendency for coexistence, or for mutual exclusion (i.e., founder effects)? Explain.
 - c. (2 points) Use a calculation of effective competition coefficients to find parameters for which you would expect species 1 to dominate.
 - d. (2 points) Use a calculation of effective competition coefficients to find parameters for which you would not expect one species to dominate. What will happen in this case?
 - e. (2 points) Use the R function `compPlot` documented at http://yushan.mcmaster.ca/theobio/3SS/index.php/Competition_models to verify your answers above. Playing with this function may also help you find answers to the questions above, or to check your thinking. You can increase `MaxTime` if the simulations seem to stop in the middle. Show your plots.