Population ecology assignment: Competition

Due at noon on Mon 12 Apr

1. (10 points in total) Two species of flour beetles have competition coefficients of $\alpha_{12} = 0.9$, $\alpha_{21} = 1.4$. 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 αs (using the course definition (see notes)). 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 always dominate. What will happen in this case?

e. (2 points) Use the R function `compPlot` documented at `http://bio3ss.github.io/competition/` 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.