Exam: Population Ecology

Develop a 4-year long PhD project on the topic of: population ecology and evolution. Specifically, consider a plant or animal species that interests you and design a project that asks how evolution by natural selection might rescue the population from decline. This can be hypothetical. I want to see that you understand the population models well enough to justify decisions you make in how you design your data collection and create your population model. Consider the paper by Knight et al. (2008) as potential inspiration for your approach. In this paper, we considered how evolution of flowering time might reduce the amount of herbivory plants experience and improve their population dynamics.

What is your study species and why did you choose it?

What is the threat that causes decline, and which traits are under strong selection?

How do you design your research to address your question? For example, will you work in the field or in a greenhouse/laboratory? What treatments will have? Will these be natural or experimental treatments? What will you measure each year?

I assume you will use a structured population model to examine demography and to predict population size through time with and without evolution, as most plant and animal populations have some sort of age/stage/or size structure. Will you use a matrix population model or an integral projection model? Why?

Draw a hypothetical example of what results of your study might look like and interpret them.