# BIOB480/BIOE548 notes 11/12/2024

## Introduction

- Quiz topics: $F_{ST}$ and $H_O/H_E$; 50/500 rule; concepts from invasion lecture (today); expected homozygosity at different loci in hybrids; admixture proportions / interpopulation ancestry. Will review on Tuesday (11/19).
- Tuesday will also feature a demo on how to access cluster and group project material—we will potentially have class time to work on this
- Quiz 3 and HW10 by end of weekend!

## Invasion Genetics

Invasive species are a perennial conservation concern. In conservation genetics, particular attention has been paid to the so-called **genetic paradox of invasive species**: since invasive species have disproportionately low genetic diversity due to the impact of founder effects (population bottlenecks associated with a colonizing population), why are they so successful at adapting to new environments? Multiple solutions to the paradox have been proposed:

- Often, invasive species show **no such paradox**: there may have only been a shallow bottleneck, or introductions from multiple sources; the new environment may pose no adaptive challenge

- A **spurious paradox** may occur when diversity loss at neutral genetic markers overestimates the loss of genetic diversity at ecologically relevant traits, or the loss of genetic diversity is instead associated with natural selection and successful adaptation.
- When the **paradox is genuine**, it may be that the initial founder effect has successfully raised population fitness, whether by increasing the frequency of certain traits, or purging deleterious mutations. Its also possible that de novo mutations are frequent enough to restore adaptive potential, or that adaptive phenotypic plasticity or epigenetic processes boose fitness in the absence of standing genetic variation.

Of the above explanations, the waiting time for new de novo mutations or multiple introductions with new genetic material have been offered as explanations for the **lag time** between introduction and proliferation seen in many invasions.