

Project Summary

Overview

Why is adaptation to historical environments usually accompanied by constraints in today's environment? Typically, low standing genetic variation in functionally relevant traits may be the key limiting factor in response to novel selection regimes. However, the genetic basis of adaptation appears more complex because the genotype to phenotype map shifts alongside environmental gradients, leading to difficulty in predicting population responses to new environments.

Balsam poplar (*Populus basamifera*) represents an economically and ecologically important tree species that displays complex relationships with

New techniques in quantitative genetic theory and genomic sequencing allow for unprecedented resolution of the genotype-phenotype map across different environments.

I propose to 1) identify genetic constraints in growth performance over varying growing season lengths and 2) identify the molecular basis of trade-offs.

Intellectual Merit

Broader Impact

No single scientist is an island.