



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

**Department of Animal Breeding
and Genetics**

2023-09-22

Short-term and long-term contributions to adaptation and evolutionary constraint

Goal

The project aims to use formal models of polygenic adaptation to understand when adaptation gives rise to a signal of evolutionary constraint and acceleration.

Background

Methods for detecting purifying selection (through constraint) and repeated adaptation (through acceleration) are well established in genome science. However, at the same time, models of polygenic adaptation suggest that non-adaptive fixations are common and that transient increases and decreases that may not lead to fixation are important determinants of rapid adaptation. It is an open question to what extent these perspectives can be reconciled, and whether there is anything in common between the short-term response and the signals that can be detected as constraint and acceleration.

Project description

This project will use established models of polygenic adaptation and computational modelling to quantify the contribution of loci with different effects and their substitution rate over time under different selection regimes—e.g., stabilizing selection with a single shift in optimum, with repeated optimum shifts, time-varying optima, or directional selection.

Useful previous knowledge: Some background in population, quantitative or evolutionary genetics. R programming. Interest in evolutionary adaptation.

Start time: Flexible

Contact

Martin Johnsson
Department of Animal Breeding and Genetics
SLU, Uppsala
martin.johnsson@slu.se