Climate Impacts on Epidemiological Dynamics of a Plant-Pathogen System

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Introduction
- Climate change will have unknown and varying impacts on disease dynamics
- I carried out a field study using the co-evolved flax-rust plant-pathogen system
- Sites at three different altitudes represented different climate scenarios

Objective
I will use a data-based approach to model how climate will impact disease transmission, and ultimately determine how temperature increases will drive the coevolution of the system.

Methods
- Monitored weekly the spread of disease between plants within 40x60 m and 10x20 m transects at the three sites
- Marked the location of newly diseased plants
- Measured the heights, the number of diseased stems, and the estimated surface area diseased

Results
- Spore production was increased at lower elevation (higher temperature) sites
- Despite increased spore production, higher elevation sites showed generally lower prevalence of disease (see figure)

Discussion
- Our results support previous research that has shown that higher temperatures correlate with higher reproductive rates for fungal pathogens
- Lower altitudes most likely showed lower disease prevalence because plants have had time to develop resistance

Future Directions
- Collecting mortality data for individuals over multiple years
- Using transmission and density data to simulate disease spread given different resistance structures of plant populations
- Cross-inoculation greenhouse experiment to determine plant resistance and spore virulence

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