Is climate suitability a useful predictor of population dynamics?

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Questions
How much, and by what demographic mechanisms does climate determine where populations go locally extinct or remain viable?

Correlative species distribution models assume a relationship between climate suitability and population performance, but the generality of this assumption is poorly understood.

We asked:
1. How does population growth rate vary with climate suitability?
2. Do populations in unsuitable climates have elevated risk of extinction?
3. What are the underlying demographic mechanisms of climate suitability effects on population fitness and persistence?

Methods
Demographic data: published matrix projection models of 45 trees and herbaceous perennials with 113 populations

Climate suitability of Compadre populations: correlative species distribution models (ensemble of GLM, GBM, RF, MAXENT in BIOMOD 2)

Discussion & Conclusions
We are still fighting with a lack of generality in the urgent question of whether and how plant populations respond to macroclimate changes.

1. A lot of demographic data is collected in suitable habitats: we need to design demographic studies to encompass species’ whole ecological niche space.
3. We cannot rely on assumptions of oversimplified relationship between habitat change and extinction processes.