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Melinda D. Smith
Editor-in-Chief
Climate Change Ecology

Dear Dr. Smith,

Please consider our paper entitled, "Comparisons in the native and introduced ranges reveal little evidence of climatic adaptation in germination traits" for publication as an Original Research Paper in *Climate Change Ecology*.

Plant invasions profoundly transform natural communities, agricultural systems, and ecosystem services. Recent evidence suggests that invaders will be aided by anthropogenic climate change and phenological flexibility. Furthermore, plant invasions can serve as natural experiments to investigate how plants may react to climate change, where the climate change experienced when a plant colonizes a new environment is a proxy for the anthropogenic climate change that plants are experiencing now. However, the underlying mechanisms that underlie plant invasions and responses to climate change remain disputed. While some studies suggest rapid evolution after reaching a new habitat determines invasion success, other studies suggest habitat generalists can immediately flourish in a range of habitats.

We address this controversy by leveraging the power of three key study design features: 1) native and nonnative populations of the same species planted under multivariate environmental conditions, 2) multilevel Bayesian modeling, and 3) multiple species. First, we used growth chambers to test if populations from species' native versus non-native ranges responded differently to multivariate environmental cues—equivalent to winter crossed with spring temperature regimes. Second, we used multilevel Bayesian modeling to control for local population, parent plant, and species, thus integrating over these complex factors in a united model. Our experimental design combined with our modeling approach enabled us to study seven highly invasive species (both dicots and monocots) at once, thereby providing more general estimates. Multi-species studies, such as ours, are critical to understanding the generality of findings, but still rare today given design hurdles; we suggest our approach may be a useful template for future studies.

Our results show that post-invasion rapid evolution of germination and growth traits is unlikely to be essential for invasion success. Instead, broad environmental tolerance can be key. Furthermore, current estimates of invaders' responses to climate may be useful for forecasting responses to future climate change. However, we did find limited evidence that our study species have adapted to shorter winters $\times$ warmer springs. This suggests that plants may evolve in response to specific seasonal climate regimes that are not commonly tested today, but may be important for range expansions under climate change.

We believe this work is well-suited for publication in the growing forum that *Climate Change Ecology* provides, and hope you will agree.

Sincerely,

Harold N. Eyster