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David J. Gibson
Executive Editor
Journal of Ecology

Dear Dr. Gibson,

Please consider our paper, entitled "Germination traits largely do not evolve post-invasion: Comparisons in the native and introduced range of seven herbaceous plant species" fo publication as a "Research Article" in *Journal of Ecology*.

Plant invasions profoundly transform natural communities, agricultural systems, and ecosystem services. The magnitude of these effects motivates interest in understanding the underlying mechanisms that enable some plants to invade. Furthermore, plant invasions can serve as natural experiments to address theoretical questions in ecology and evolution. Despite substantial research effort, the underlying mechanisms for plant invasions 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 combined features of our study design: 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 allowed us to study seven highly invasive species (both dicots and monocots) at once, thereby providing estimates of effects across species. Multi-species study, 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 other 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. Thus, to predict what plants may pose an invasion risk, managers should focus on species that are already weedy and widespread in their native ranges. However, we did find limited evidence that our study species have adapted to shorter winters x 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 high-visibility forum that *Journal of Ecology* provides, and hope you will agree.

Sincerely,

Harold N. Eyster