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Conference Abstract

Naturalized alien plants maintain competitive dominance under soil-legacy effects of co-acting global change factors

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Abstract

Alien plant invasions and the many other global change factors (GCFs) are increasingly reshaping ecosystems by leaving persistent legacy effects in the soil. However, it remains unknown how soil-legacy effects of alien species that interacted with an increasing number of co-acting GCFs might drive growth of and competition between subsequent native and alien species. To investigate this, we conducted a two-phase experiment using a total of eight native and eight naturalized alien plant species. In the training phase, soil was conditioned by five native or five alien species grown singly and exposed to diverse numbers (0, 1, 3, 6) of co-acting GCFs. In the testing phase, another three native and three alien plant species were grown alone or in all nine possible alien-native species pairs (i.e. in interspecific competition) in the soil from the training phase. We found that the soil legacy of an increasing GCF number generally reduced plant growth, and that this was more pronounced for alien species. Nevertheless, alien species consistently maintained stronger growth than native species across both native- and alien-conditioned soil for most GCF-legacy treatments. However, the increasing GCF number reduced the relative neighbor strength for alien species while increasing it for native species, consequently leading to overall competitive dominance for alien species. Our findings highlight the necessity of considering multifactorial global environmental changes when studying plant competition and soil legacy effects.

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Keywords

Plant-soil feedback; plant-soil interaction; plant-plant interaction; interspecific interaction; competitive outcome; competitive advantage; simultaneous factors; factor richness

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Author contributions

HJ and MvK designed the study; HJ conducted the experiment; HJ and MvK analyzed the data; HJ wrote the first draft of the manuscript with further inputs from MvK.

Conflicts of interest

The authors have declared that no competing interests exist.