Soil nutrient limitation and natural enemies promote the establishment of alien species in native community

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September 25, 2023

Abstract

The invasion of alien plant species poses a threat to native community's composition and diversity. However, the invasiveness of alien plants and invisibility of native communities should be depended on the interactions between biotic and abiotic factors, such as natural enemies and nutrient availability. In a study, we simulated the invasion of nine invasive plants into native plant communities with two levels of nutrient availability and natural enemies suppression. We explored how the biotic and abiotic factors affect the response of alien target species and the resistance of native communities to invasion. The results showed that enemy release (i.e., presence of enemy) increased biomass proportion of alien plants and decreased that of native community under without nutrient addition. Furthermore, we also found that the negative effect of enemy suppression on the evenness of native community and the root-to-shoot ratio of alien target species was greatest under nutrient addition. Therefore, nutrient deficiency and natural enemies might promote the invasive success of alien species in native community, whereas nutrient addition and enemy suppression can better enhance the resistance of native plant communities to invasion.

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