Darwin's naturalization conundrum reconciled by changes of species interactions

Wang Jiang[1], Shao-peng Li[2], Yuan Ge[3], Xiao-Yan Wang[1], Song Gao[1], Tong Chen[1], and Fei-Hai Yu[1]

[1]School of Life Science/Zhejiang Provincial Key Laboratory of Plant Evolutionary Ecology and Conservation, Taizhou University, Taizhou 318000, China
[2]East China Normal University
[3]State Key Laboratory of Urban and Regional Ecology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

April 05, 2024

Abstract

Although phylogenetic distance between native and exotic species has a close link with their interactions, it is still unclear how environmental stresses and species interactions influence the effect of phylogenetic distance on biological invasion. Here we assessed the effect of invader-native phylogenetic distance on the growth of the invader (Symphyotrichum subulatum) under three levels of drought (no, moderate or intensive drought). We found the effect of communities with closely related natives on the invader shifted from negative (supporting Darwin's naturalization hypothesis) to positive (supporting the pre-adaptation hypothesis.) with increasing drought intensity, which could be largely explained by the shift of species interactions from competition to facilitation by mutualism with arbuscular mycorrhizal fungi. Therefore, our results provide a new angle to resolve Darwin's naturalization conundrum from the change of species interactions along a stress gradient, and provide important clues for invasion management in the changing environments.

Hosted file

`manuscript.docx` available at https://authorea.com/users/618484/articles/711755-darwin-s-naturalization-conundrum-reconciled-by-changes-of-species-interactions