

Phylogenetic dependence of plant-soil feedback promotes rare species in a subtropical forest

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Abstract

The widespread observation that rare species have stronger conspecific plant-soil feedback (PSF) than common species raises more questions than answers on how rare species can possibly win the dance with abundant species. Here, we test soil feedback effect of phylogenetically related species on seedlings of contrasting local abundance in a subtropical forest. The results showed that although rare species suffered strong negative PSF in soils of conspecifics or phylogenetically close relatives, no such feedback was found in the soils of distant relatives. In contrast, although common species had weak conspecific PSF, they suffered consistently strong heterospecific soil feedback. These mechanisms ensure that rare species would fare well in the neighborhood of phylogenetically distant heterospecifics but do poorly under their close relatives, while common species perform relatively well in their own neighborhood but poorly in others'. This phylogenetic conservatism in PSF facilitates the persistence of rare species in a community.

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