Plant growth strategies determine routes to coexistence

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Résumé

Although decades of research have shown that differences in the ability of species to grow and respond to resource addition and natural enemies structure ecological communities, their effects on promoting biodiversity through stabilizing and equalising processes remains unknown. Here, we quantified the routes that determine coexistence for a set of 18 perennial plant species (306 pairs) with contrasted growing strategies exposed to a factorial manipulation of nitrogen and fungal foliar pathogens. Our results showed that species consistently exhibited highly structured communities far from neutrality across all treatments. In addition, species interactions were key to increase coexistence by promoting an equal importance of both routes. Stabilizing processes acted through a reduction in interspecific competition, while equalizing processes reduced species' asymmetries in their tolerance to withstand competition. Contrary to expectations, fast growing species showed higher niche differentiation than slow growing species. Our results establish a direct connection between species' growing strategies and the maintenance of biodiversity.

Mots-Clés: modern coexistence theory, functional traits, plant communities, nitrogen addition, leaf fungal pathogens

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