Linking biodiversity and ecosystem services: Can the difference in functional traits of introduced plants be used to estimate potential changes to ecosystem services?

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Abstract

Better understanding the relationships between biodiversity and ecosystem services will provide key insights into the impacts of changing species communities at a landscape scale. Little is known about the processes by which introduced species affect the delivery of ecosystem services, and the degree to which they do. Given that ecosystem processes are largely governed by the combinations of species traits within communities, impacts may be better understood by the relationship between the traits of native and non-native species. In this study, we aimed to understand the impact of introduced plants, used for commercial purposes, on ecosystem functioning using plant functional traits. We used three leaf traits (leaf dry matter content, leaf nitrogen content and leaf phosphorous content) to characterise the functional composition of natural communities to determine functional diversity within an ecosystem service hotspot in Eastern Cape, South Africa. These were used to compare changes in species composition across four different land-use types. Using some of the newest approaches to link functional traits with ecosystem services we provide a test case using data from our study. The results indicate that understanding the per capita effect of individual species is important to determine overall contributions to ecosystem service provision. We discuss the merits and challenges of these approaches and provide a key insight into the methods available to researchers. Furthermore, we highlight the potential to assist decision makers by assessing potential tradeoffs in ecosystem service provision.

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