



Investigating the relationship between biodiversity and ecosystem multifunctionality: Challenges and solutions

Jarrett E. K. Byrnes, Lars Gamfeldt, Forest Isbell, Jonathan S. Lefcheck, John N. Griffin, Andrew Hector, Bradley J. Cardinale, David U. Hooper, Laura E. Dee, J. Emmett Duffy

(Submitted on 9 May 2013)

Extensive research shows that more species-rich assemblages are generally more productive and efficient in resource use than comparable assemblages with fewer species. But the question of how diversity simultaneously affects the wide variety of ecological functions that ecosystems perform remains relatively understudied, and it presents several analytical and empirical challenges that remain unresolved. In particular, researchers have developed several disparate metrics to quantify multifunctionality, each characterizing different aspects of the concept, and each with pros and cons. We compare four approaches to characterizing multifunctionality and its dependence on biodiversity, quantifying 1) magnitudes of multiple individual functions separately, 2) the extent to which different species promote different functions, 3) the average level of a suite of functions, and 4) the number of functions that simultaneously exceed a critical threshold. We illustrate each approach using data from the pan-European BIODEPTH experiment and the R multifunc package developed for this purpose, evaluate the strengths and weaknesses of each approach, and implement several methodological improvements. We conclude that a extension of the fourth approach that systematically explores all possible threshold

Download:

- [PDF only](#)

Current browse context:

q-bio.QM

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1305](#)

Change to browse by:

[q-bio](#)

[q-bio.PE](#)

[stat](#)

[stat.AP](#)

References & Citations

- [NASA ADS](#)

Bookmark([what is this?](#))



values provides the most comprehensive description of multifunctionality to date. We outline this method and recommend its use in future research.

Comments: This article has been submitted to Methods in