

## Publication

## A measure for assessing functional diversity in ecological communities

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Functional diversity is regarded as a key in understanding the link between ecosystem function and biodiversity, but its measurement is rather problematic. The two widely used continuous measures are the dendrogram-based measure (DBM) and the functional attribute diversity (FAD). In contrast to DBM, FAD does not require the knowledge of the entire species pool before the analysis, and hence FAD is a more ideal tool for measuring functional diversity. However, the original form of FAD and its variants have several undesirable properties. Here, we suggest a modified FAD (denoted by MFAD), which-as illustrated by artificial and actual data sets-allows calculating functional diversity without violating the twinning and monotonicity criteria such that the number of species collected is compensated for. These requirements are met by replacing the original species by so-called functional species and then by dividing FAD by the number of functional units. Accordingly, MFAD measures the dispersion of species in the functional traits space so that MFAD values for different communities can directly be compared if the same set of functional traits is used. Finally, using data of two freshwater communities (caddisfly and riverine fish), we evaluate the change of species richness and functional diversity in relation to sampling effort (sample unit size). We found that functional diversity is a better and more reliable community descriptor than species richness in a sense that it converges to the maximum faster in the function of sampling effort.

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