

Table S2. Species and functional diversity indices

Index	Acronyms	Formula or mathematical interpretation	Ecological interpretation	Ability to detect*		Disturbance**	References
				Trait convergence due to habitat filtering	Trait divergence due to interspecific competition		
Species diversity indices							
Species richness	Sp_richn	It is the number of species found (counted) within the respective community	Represents only one aspect of community diversity, namely the number of species	Low	Low	–	(Magurran, 2021)
Gini-Simpson diversity index	GSimpson	$GSimpson = 1 - \sum_{i=1}^S p_i^2,$ where: S is a total number of species (species richness), p_i is a proportion of individuals belonging to species i calculated as $p_i = n_i/N$, n_i is a number of individuals of species i , N is a total number of individuals in the community.	Represents two aspects of community diversity, namely the number of species and the evenness of their quantitative distribution. Species richness and evenness are considered as drivers of ecosystem resilience and health (Downing & Leibold, 2010).	Low	Low	–	(Simpson, 1949)
Functional diversity indices							
Functional richness	(Fric)	It is a multidimensional measure defined as the volume of the convex hull occupied by a community	Determines the size of functional space. This measure of functional diversity, which is based on the volume of a convex hull, is sensitive to the degree of habitat filtration (Cornwell et al., 2006; Villéger et al., 2008). Notably, this aspect of functional diversity is insensitive to the distribution of species abundance, treating rare and common species equally, although common species typically play a more significant role in ecosystem functioning (Karadimou et al., 2016). The Fric index is commonly used to quantify the extent to which a species occupies a specific niche space (Schleuter et al., 2010). Additionally, the index is responsive to the productivity and buffering capacity of ecosystems in relation to environmental fluctuations and their vulnerability to invasion (Mason et al., 2005). Functional richness	High	Low	Eroded after disturbance	(Petchey & Gaston, 2002)

			is appropriate for detecting trait convergence (Botta-Dukát & Czúcz, 2016).				
Functional evenness	(Feve)	Functional evenness describes the evenness of abundance distribution in a functional trait space. FEve is not biased by species richness and is constrained between 0 and 1. FEve is also independent of the convex hull volume.	Functional evenness is an indicator which has several critical conceptual and practical shortcomings (Gaëlle & Jean-Claude, 2018; Kosman et al., 2021). Underdispersion of functional diversity occurs when environmental filtering favours species with specific trait values, thereby limiting the number of species that can thrive in a particular habitat. Even spacing within functional space highlights the significant role of interspecific competition, or biotic sorting, which inhibits the coexistence of species with similar trait values (A. B. Smith et al., 2013). The functional evenness (Feve) indices describe how the feature space is filled (Schleuter et al., 2010). These indices of functional evenness are sensitive to the community's potential for productivity, reliability, and vulnerability to invasion (Mason et al., 2005).	Low	Low	Decreases after disturbance	(Villéger et al., 2008)
Functional divergence	Fdiv	Functional divergence (Fdiv) refers to the deviation of species abundance from the centre of gravity of the vertices that define the convex hull of the studied assemblage	Fdiv indicates the extent to which the distribution of species abundances in trait space is maximized towards the extreme points or concentrated around the centre of the occupied trait space (Mouchet et al., 2010). Fdiv indices describe how the feature space is filled (Schleuter et al., 2010). These indices can be utilized to assess the degree of competition among species within a community (Mason et al., 2005) and may also reveal the	Low	High	Decreases after disturbance	(Villéger et al., 2008)

			predominance of species that exhibit extreme ecological characteristics within the community (Schleuter et al., 2010).				
Functional originality	Fori	Functional originality is the weighted mean distance to the nearest species from the global species pool, which helps detect the isolation of a species within the functional space occupied by a given community.	Changes in functional originality quantify how variations in species abundances modify the functional redundancy among species (Mouillot et al., 2013).	Medium	Medium	Decreases after disturbance	(Mouillot et al., 2013)
Functional specialization	Fspe	Functional specialization refers to the abundance-weighted mean distance of species from their mean position within the global pool. High FSpe values indicate that the functional objects in the studied pool are far from the gravity center and have extreme combinations of traits compared to the global pool.	Functional specialization pertains to the extent to which the functional role of a particular species diverges from that of other species. This phenomenon is influenced by both the size and the position of the species' ecological niche in relation to the niches of other species (Dehling & Stouffer, 2018). Succession theory posits that habitat complexity and resource availability will enhance over the course of restoration, resulting in greater functional specialization among coexisting species (Lechêne et al., 2018).	Low	High	Decreases after disturbance	(Bellwood et al., 2006).
Functional dispersion	Fdis	Functional dispersion is closely related to Rao's quadratic entropy and is calculated as the weighted deviation from the centre of gravity, defined by the Fide values, of species within the assemblage. Larger FDis values indicate a community that is more functionally dispersed within the multivariate trait space, thereby reflecting a greater level of functional diversity.	Ecosystems characterized by high FDis are presumed to exhibit enhanced ecosystem functioning (Clark et al., 2012).	Low	High	Decreases after disturbance	(Laliberté & Legendre, 2010).
Rao's quadratic entropy	FunRao	Rao's quadratic entropy incorporates both the relative abundances of species and a measure of the pairwise functional differences between	Rao's quadratic entropy represents the average functional dissimilarity between two randomly selected individuals (Botta-	High	High	Decreases after disturbance	(Rao, 1982)

		species. When the species are completely different in terms of their traits, Rao quadratic entropy is equivalent to the Gini-Simpson index.	Dukát, 2005). Rao's quadratic entropy demonstrated superior efficacy in identifying both habitat filtering, characterized by trait convergence, and limiting similarity, which is defined by trait divergence (Botta-Dukát & Czucz, 2016).				
Functional redundancy	FunRed	Functional redundancy is defined as the difference between species diversity and Rao's quadratic entropy, which is based on functional dissimilarity (Bello et al., 2007).	Functional redundancy can be defined as the decrease in biodiversity that arises when the interrelationships among species traits are taken into account in diversity assessments. It can be posited that functional redundancy plays a significant role in enhancing ecological resilience and stability. This assertion is based on the premise that ecosystems characterized by a higher number of redundant species – defined as species that fulfil analogous ecological roles – are more effectively safeguarded against the adverse impacts associated with the loss of individual species (Biggs et al., 2020).	Medium	High	Decreases after disturbance	(Ricotta et al., 2018)
Functional mean pairwise distance	Fmpd	Functional mean pairwise distance refers to the average weighted distance between all pairs of species.	Fmpd serves as a general indicator of the volume of trait space occupied and may be sensitive to trait overdispersion or underdispersion (Weiher et al., 1998). Competition, along with the evolution of the species pool under competitive conditions, is a likely cause of overdispersion (Cavender-Bares et al., 2004). Ecological filtering is a significant driver of the reduction in the morphological volume of a community, leading to the exclusion of species that lack certain traits (Southwood, 1977).	Medium	High	–	(Webb et al., 2002)
Functional mean nearest	Fnnnd	The functional mean nearest neighbour distance (Fnnnd)	The Fnnnd can be used to quantify the packing of trait	High	Low	–	(Weiher et al., 1998)

neighbour distance		refers to the weighted distance to the nearest neighbour within a given assemblage.	space and the extent to which species occupy dissimilar niches (Magneville et al., 2022). The Fnnnd is usually negatively correlated with species richness (Swenson & Weiser, 2014).				
Functional identity	Fide	Functional identity refers to the weighted average position of a species within an assemblage along each functional axis, or the mean trait values for the assemblage along each axis of the studied functional space.	The Flde index quantifies to which level a species has similar functional traits with a community and how these traits are distributed among species (Magneville et al., 2022).	High	Low	—	(Garnier et al., 2004).

Note: * – according to Botta-Dukát & Czúcz (2016); ** – according to Mouillot et al. (2013)