Measures of Diversity

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Simpson's index

Simpson's index is the first of a set of non-parametric approaches to determining sample heterogeneity. Simpson (1949) did not want to make assumptions about the distribution of the species abundance curve and so defined the following:

Simpson's index

$$D = \sum_{i=1}^{C} p_i^2$$

where ***D*** is Simpson's index and can be defined as the probability of two individuals in a random sample being the same category. P_i is the proportion of category ***i*** in the community ***c***.

Simpson's index = D ,
Range (1/categories to 1),
Maximum (1).
The probability that two randomly selected individuals in the community is of the same category.
Simpson's index of diversity = 1 - D ,
Range (0 to ~1),
Maximum (1 - 1/categories).
The probability that two randomly selected individuals in a community is of the different categories.
Simpson's reciprocal index = 1 / D,
Range(1 to number of categories),
Maximum (number of categories).
The number of equally common categories that will produce the observed ***D*** value. Also known as Hill's (1973) N_2

Peet (1974) suggested that Simpson's index is of a type that is more sensitive to the common species in your sample. Simpson's index values should be interpreted with this in mind.

Also see:
Chapter 10 - Species Diversity Measures pages 357-360 in:

Krebs, C. J. 1998. Ecological Methodology. Harper and Row, Publishers. New York. 620 pp.

Hill, M. O. 1973. Diversity and evenness: a unifying notation and its consequences. Ecology 54:427-432.

Peet, R. K. 1974. The measurement of species diversity. Annual. Rev. Ecol. Syst. 5:285-307.

Simpson, E. H. 1949. Measurement of diversity. Nature 163:688