Quantifying taxonomic richness in terms of the level of rarity assessed by a fixed count

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ABSTRACT

A common measure of taxonomic richness used in freshwater macroinvertebrate inventories is numerical taxonomic richness (NTR), i.e., the number of taxa observed for a fixed (usually small) number of individuals subsampled from a larger collection. However, rare taxa tend to be excluded from the metric for smaller subsamples due to their low inclusion probabilities. NTR, then, essentially targets the number of non-rare taxa, rather than the total number of taxa. The level of rarity assessed by the metric depends on the size of the subsample. By specifying the target parameter that NTR is actually estimating, researchers may understand more precisely what is being assessed and compared. Furthermore, determining a target parameter allows the consideration of alternatives for estimation that may be used to increase resolution or to reduce cost. Here, we provide a means for determining the parameter targeted by NTR. Specifically, we show that for a fixed count of size n, NTR is nearly unbiased for the number of taxa that occurs in the collection with relative frequency $\geq 1/2n$. Further, the jackknife adjustment to observed taxa count is shown to enhance the level of rarity assessed by NTR for the same-sized subsample.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2001_02AnnualReport/40_ar11-kerry.pdf