Input/output for diversity; Presentation of diversity information

PRIMER computes an extensive set of univariate diversity measures, covering most of the standard indices used in ecology. The active sheet is a data matrix for which the chosen indices are calculated for every sample. The measures are selected by ticking check boxes, so any combination of them can be computed in one run, and the results output either to the results window in a tabular format (which can be copied to the clipboard and pasted directly into Excel) or as a samples-by-variables matrix in a second worksheet. The latter can be saved, as usual, in text or Excel format, for transfer to a standard univariate stats package, but PRIMER 7 can now produce means and confidence interval plots for sets of univariate data, and the PERMANOVA+ add-on can perform permutation-based ANOVA on each variable (univariate being a special case of multivariate).

The facility to send the indices to a new worksheet also allows some interesting possibilities for further presentation, including multivariate analysis. For example, the indices can be superimposed, one at a time, on an MDS plot for the full species assemblage data (treat the diversity matrix like an environmental variables data file) or input the diversity matrix to a multivariate analysis itself (again treat the indices as an environmental array and calculate normalised Euclidean distances between samples for an MDS, or run a PCA). This will show the between-sample relationships obtained from the full range of diversity information extracted, and can be contrasted with the usual ordination exploiting the matching of species identities between samples (which is generally found to be more sensitive, since it exploits more of the available information). A PCA for a large set of diversity indices can also demonstrate how many genuinely different axes of information they have captured (i.e. how many PC axes explain most of the variability), since many standard indices are really just some weighted combination of two features: the total number of species (richness) and the extent to which the total abundance is spread equally amongst the observed species (evenness). An MDS plot of the variables, using (absolute) correlations between indices as the resemblances (an analysis mentioned previously for species, but considered likely to be too high a stress there to be useful) is now viable and shows which measures are essentially equivalent. Such analyses can be an incentive not to proliferate indices by defining yet further variations of the same information.

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