

Modelling biodiversity in R: the untb package

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The distribution of abundance amongst species with similar ways of life is a classical problem in ecology.

The Unified Neutral Theory of Biodiversity (UNTB), due to Hubbell, states that observed population dynamics may be explained on the assumption of per capita equivalence amongst individuals. One can thus dispense with differences between species, and differences between abundant and rare species: all individuals behave alike in respect of their probabilities of reproducing and death.

It is a striking fact that such a parsimonious theory results in a non-trivial dominance-diversity curve (that is, the simultaneous existence of both abundant and rare species) and even more striking that the theory predicts abundance curves that match observations across a wide range of ecologies.

The UNTB, being a statistical hypothesis, is well-suited to simulation using the R computer language. Here I discuss the untb package for numerical simulation of ecological drift under the unified neutral theory. A range of visualization, analytical, and simulation tools are provided in the package and these are presented with examples and discussion.