

Optimising functional diversity in restoration assemblages: a new quantitative solution

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Restoring resilient ecosystems requires a flexible framework for selecting assemblages that are based on the functional traits of species. However, current trait-based models have been biased toward algorithms that select species by optimising specific trait values, and could not elegantly accommodate the common desire among restoration ecologists to produce functionally diverse assemblages. We have solved this problem by applying a non-linear optimisation algorithm that optimises Rao's Q, a functional diversity index that incorporates species abundances, subject to other linear constraints. This framework generalises previous models that could only optimise the evenness of the community, and can actually optimise both functional diversity and evenness simultaneously. We will demonstrate how this model works, illustrate model results using simulated data, and discuss how to apply this model in the restoration of degraded ecosystems.