
Summary of Terms

Table A1
Summary of terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d$</td>
<td>Set of richness levels</td>
<td>Set of levels of species richness used in the experiment</td>
</tr>
<tr>
<td>$M$</td>
<td>Species composition</td>
<td>No. species compositions in the experiment; this source of variance is important because it is the denominator for the $F$-test of the species-identity effects</td>
</tr>
<tr>
<td>$n$</td>
<td>Replicates</td>
<td>No. times each of the $M$ species compositions is replicated</td>
</tr>
<tr>
<td>$P$</td>
<td>Partitions</td>
<td>No. times the species pool is divided without replacement at each richness level</td>
</tr>
<tr>
<td>$Q$</td>
<td>Partitioned species pools</td>
<td>No. unique sets of experimental units, each of which is composed of $P \times R$ compositions; these are the “partitioned species pools.” This source of variance is important because it is the denominator for the $F$-test of nonlinear richness</td>
</tr>
<tr>
<td>$R$</td>
<td>Richness</td>
<td>Species richness of a particular composition; we distinguish between linear richness (richness treated as a continuous variable) and nonlinear richness (richness treated as a categorical variable). If the experimental design and analysis method that we describe are employed, we interpret the effect of nonlinear richness as the effect of interactions among species</td>
</tr>
<tr>
<td>$S$</td>
<td>Total richness</td>
<td>No. species in the pool of available species</td>
</tr>
<tr>
<td>$y$</td>
<td>Ecosystem functioning</td>
<td>Response variable, some measure of ecosystem functioning</td>
</tr>
<tr>
<td>$f(S)$</td>
<td>Experiment size</td>
<td>Total no. experimental units</td>
</tr>
<tr>
<td>$\beta$</td>
<td>Coefficient</td>
<td>Linear model coefficient associated with $\cdot$</td>
</tr>
<tr>
<td>$SS_0$</td>
<td>Sums of squares</td>
<td>Sums of squares associated with $\cdot$</td>
</tr>
<tr>
<td>$SS_1$</td>
<td>Species identity</td>
<td>Sums of squares associated with the presence/absence of each species summed across all species</td>
</tr>
<tr>
<td>$x_i$</td>
<td>Predictor variable</td>
<td>Predictor variable associated with $\cdot$</td>
</tr>
<tr>
<td>$e$</td>
<td>Error</td>
<td>Normally distributed random error</td>
</tr>
</tbody>
</table>

Note: A schematic of the experiment design is provided in figure 1.
Figure A1: Relationship between species richness and ecosystem functioning for data generated according to equation (4) and where the experiment is designed according to figure 1. These data are analyzed in figure 2. See appendix B for instructions on how to reproduce this figure.

Figure A2: Relationship between the strength of the interaction between species 1 and species 2 ($b_{1 \times 2}$) and the coefficient for the nonlinear richness linear model coefficient. There is a linear increase in nonlinear richness as interactions become increasingly important. The ecological interaction is described in scenario 3 of the main text. The figure can be reproduced using the methods described in appendix B.