

## Experimental design & statistical analysis

### Experimental design

Any kind of pseudoreplication is not permitted (e.g. repeated samples from the same plant or the same quadrat do not constitute replicates). See: Hurlbert (1984) Pseudoreplication and the design of ecological experiments. *Ecological Monographs* 54, 187-211.

Hurlbert's paper can be viewed at the JSTOR website:  
<http://uk.jstor.org/about/biosci.list.html>.

### Statistical analyses

In the **Materials and methods** section, authors must state which statistical analyses they applied (e.g. ANOVA, mentioning also the type of post-ANOVA test used). It is not acceptable for the authors to state only the type / brand of statistical package / software used, e.g. 'SAS', 'GLIM', 'R'.

Tests for treatment effects: authors must test their data for homogeneity of variances and normality of errors, and then apply the appropriate data transformation (if required). A non-parametric test (e.g. Kruskal-Wallis) should be used if transformation failed to normalise the data. See Fry, J.C. (1993) One-way analysis of variance, in *Biological Data Analysis* (ed. J.C. Fry), IRL Press, Oxford.

In the **Results** section, authors must give parameter values e.g.  $F$ -values, degrees of freedom (e.g.  $F_{1,14}$ ), in addition to  $P$ -values, unless these are given elsewhere in the manuscript (in a table or a figure).

Do not give  $P$ -values in the **Abstract** of the manuscript.

Duncan's Multiple Range Test is considered *invalid* as a post-ANOVA test, and should never be used in that context. Fishers' LSD test is valid as a post-ANOVA test only in the case of planned (*a priori*) comparisons. See Day, R.W. & Quinn, G.P. (1989) Comparisons of treatments after an analysis of variance in ecology. *Ecological Monographs* 59(4) 433-463 (this paper discusses the pros and cons of post-ANOVA tests generally).

Day & Quinn's paper can be viewed at the JSTOR website:  
<http://uk.jstor.org/about/biosci.list.html>.

If the data comprise a time-series, then a repeated measures ANOVA may be required e.g. when quantities are compared on successive dates. See Gurevitch, J. & Chester, S.T. (1986) Analysis of repeated measures experiments. *Ecology*, 67, 251-255, and Crowder, M.J. & Hand, D.J. (1990) *Analysis of Repeated Measures*. Chapman & Hall, London.

Gurevitch & Chester's paper can be viewed at the JSTOR website:  
<http://uk.jstor.org/about/biosci.list.html>.