

Analysing ecological data with “R” statistical software

Course leader: Dr Rob Thomas, Cardiff University, UK

Course outline

The ability to understand, use and interpret statistics is one of the most empowering skills that a conservation scientist can possess, because it enables the researcher to address any kind of scientific question in a rigorous and quantitative manner. When using statistics, conservation scientists need to be sure that they are collecting the right sort of data in well-designed studies, using the most appropriate statistical tests, and interpreting the results properly. Statistical analysis does not necessarily come easily to many biologists, but it is an increasingly important and useful part of the toolkit of techniques that are available for understanding and conserving the natural world. For postgraduates, investing some focused time and effort in getting to grips with statistics will pay dividends for the rest of their scientific career.

In this 2-day course, we will build your capability and confidence in using the free-to-download “R” statistical software, which is becoming the software of choice for many conservation scientists around the world. Using the conceptual framework of the General Linear Model (GLM) and its various extensions (GLMMs, GAMs and GAMMs), we will develop your ability to apply this class of statistical models to analyse a wide range of ecological datasets.

No previous experience of either the R software, or of statistics, is assumed, but whatever your starting point we aim to improve your programming skills in R, your capabilities in visualising your data, and your confidence in choosing, using and interpreting statistical models. Along the way, we will explore and analyse a variety of real case studies, which illustrate the different graphical and statistical methods that we will cover in the course.

The structure of the course is outlined below:

Day 1

Session 1: Importing and exploring datasets in R

Session 2: Hypothesis testing using the General Linear Model (GLM)

Session 3: Extending the GLM –Poisson and Binomial GLMs

Workshop 1: Defining and visualising your own research questions

Day 2

Session 4: Generalised Linear Mixed Models (GLMMs)

Session 5: Generalised Additive Models (“wiggly-line models”; GAMS)

Session 6: Generalised Additive Mixed Models (“wiggly-line mixed-models”; GAMMs)

Workshop 2: Developing and reporting your own models

End of course forum: “Where do we go from here?”

All course participants will receive a free course guidebook, template R-script files and other teaching materials. <http://www.eco-explore.co.uk/data-analysis-consulting/data-analysis-guidebook/>

Free post-course support is offered through our popular Facebook group, “R-Space”.
<https://www.facebook.com/groups/308600982528221/>