Statistical Methods in Ecotoxicology Using R

Abstract

The open source statistical environment R (http://www.r-project.org) has become the lingua franca of data analysis among statisticians and is also in widespread use in many applied sciences. Many advanced or recent statistical and graphical/visualisation techniques are only available in R. Therefore, it is an extremely powerful all-in-one alternative software to specialised commercial data analysis software currently used by many ecotoxicologists. Moreover, it encourages collaborative and reproducible research.

The focus will be on giving the participants practical experience with the software. The course material will be a blend of introductory lectures on R (before lunch) and case-studies based on real toxicological data, from recent publications in ET&C and elsewhere (after lunch).

ANOVA methods, linear, non-linear regression (including dose-response analysis), and logistic and Poisson regression models will be introduced. There will also be case-studies on more advanced topics such as automation/simulation, hormesis models, mixture modelling, random effects models, analysis of data with non-detects, and time-to-event methods. Expert teachers will provide guidance and assistance throughout the course.

The course is intended for PhD students, researchers, and scientists in toxicology and environmental sciences. An elementary understanding of statistical concepts (including ANOVA and regression) is a prerequisite.

Participants are encouraged to bring their own data.

Course objectives

- Review state-of-the-art statistical methods for analysis of toxicological data
- Demonstrate the power of open source statistical software
- Provide hands-on experience for standard data analysis (cookbook)
- Enable participants to use the software on their own problems (take-home software)

Course level Advanced