

Syllabus

Species Data: Use and Re-use in Systematics, Evolution and Ecology

Campbell Webb, 24–27 October 2017

This short course will address issues of the management and standardization of species data, while reviewing and critiquing core concepts in systematics, phylogenetics and community ecology. A goal is to share useful software tools, primarily in the form of R packages. An underlying theme is the re-use of data, by sharing our own data, and accessing others' data.

- Lecture 1 (24 Nov, AM): **Introduction to Lecture Series**
 - Course introduction; biodiversity informatics; student self-introductions.
- Lecture 2 (24 Nov, PM): **Tools**
 - ‘R’ installation, basic operation, basic statistical functions; the text editor; regular expressions.
- Lecture 3 (25 Nov, AM): **Species names**
 - The nature of species; the work of taxonomists; names; types; synonyms; the importance of taxon concepts; namebanks and GUIDs; e-taxonomy; parallel taxonomic approaches.
- Lecture 4 (25 Nov, PM): **Traits**
 - Data matrices; dangers of the spreadsheet; individual vs. species traits; DELTA, Nexus, Morphbank; aligning characters; species identification; GENBANK data.
- Lecture 5 (26 Nov, AM): **Phylogenies**
 - ape; phylogeny reconstruction (MP and ML); Comparative Biology: traits on trees; tree re-use: Treebase, Phylomatic, Open Tree-of-Life.
- Lecture 6 (26 Nov, PM): **Observations: biogeography**
 - The geography of species; making maps; dispersal, vicariance, extinction; Species distribution modeling; biogeographic inference: DIVA; event-based biogeography.
- Lecture 6 (27 Nov, AM): **Observations: community ecology**
 - Community ecology basics; `vegan`; phylodiversity and phylogenetic community ecology; `picante`
- Lecture 8 (27 Nov, PM): **From small data to big data**
 - Sharing biodiversity data; Observations of individuals and the problem of identification; ‘i2i’-approaches; The power (?) of big data; iNaturalist; photos and AI; TDWG; Darwin Core Archive; Linked Open Data

The course language will be English, but with an awareness that levels of English fluency will vary among the students. Students will be expected to participate actively in discussions, R exercises, and short presentations of their own work. Each lecture will be 90 mins (including rest breaks). Please bring a laptop computer to all classes.