

Biogeography

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Lecture 14

Outline

Taxonomy

- Methods

- The structure of diversity

Taxonomy

Methods

How to describe the natural order: principles of classification

- ▶ Traditional method (mind model), phenetic (multivariate statistics), and cladistic (phylogenetic, now mostly molecular—objective but based on few samples)
- ▶ Results: ranked classifications, cloud ordinations, trees (dendrograms)
- ▶ Conversion from clouds to classification: hiatus
- ▶ Conversion from tree to classification raises the problem of monophyletic, paraphyletic and polyphyletic groups
- ▶ Time estimation from fossils and molecules might replace ranks

How to describe hierarchy

► With ranks

Simple, efficient, practical. However, for every name you will need to remember a rank*. Also, number of ranks is restricted so some potentially useful information will be ignored. Last but not least, no clear definition of any rank exists. The working definition is “*we call this genus because in the neighbor family we apply the genus rank to similarly segregated groups*”.

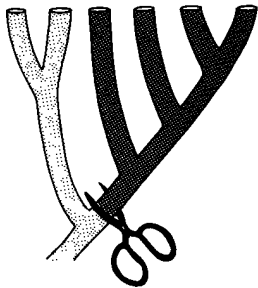
*There are multiple workarounds, e.g. endings and numerical ranks.

► With trees

More objective, no need to remember rank, no restrictions for numbers of levels. However, you should remember the graphic object instead of text, interpretation is not easy, conflicts are not simple to resolve. As a result, it is much easier to become lost with trees than with ranks.

Many current approaches try to cross ranks and trees.

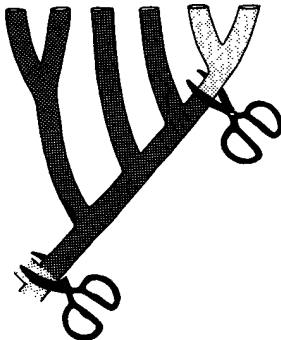
Monophyly, paraphyly, polyphyly



Monophyletic

one and
only one cut

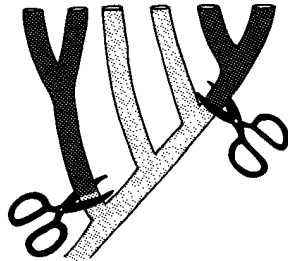
One branch



Paraphyletic

one cut below the
group and one or more
cuts higher up

A piece of a branch



Polyphyletic

more than one cut
below the group

More than one
piece of a branch

Taxonomy

The structure of diversity

Overview: the “pyramid” and treemap (Latin names)

http:

//ashipunov.info/shipunov/os/os-en.htm

Closer view: the treemap (English names)

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http://ashipunov.info/shipunov/school/  
biol_330/intr_biogeogr_trop_biol/  
images/src/synat_en.svg
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For Further Reading



A. Shipunov.

Biogeography [Electronic resource].

2014—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_330



A. Shipunov.

Introduction to Biogeography and Tropical Biology [Electronic resource].

2017—onwards.

Mode of access: [http:](http://ashipunov.info/shipunov/school/biol_330/intr_biogeogr_trop_biol/intr_biogeogr_trop_biol.pdf)

[//ashipunov.info/shipunov/school/biol_330/intr_biogeogr_trop_biol/intr_biogeogr_trop_biol.pdf](http://ashipunov.info/shipunov/school/biol_330/intr_biogeogr_trop_biol/intr_biogeogr_trop_biol.pdf)