

Subject Area: **Advanced Methods in Biotechnology and Biodiversity**
Subject: **Advanced methods in animal biodiversity (research)**
Level: **PhD** Year: **I - IV** Semester: **S**
Speciality: **N/A** Status: **Facultative** ECTS: **2**

Department: **Zoology Dept.**

Staff:

SUBJECT COORDINATOR:

LECTURE/CONVERSATORIA: Ewa Mróz PhD, Łukasz Depa PhD

PRACTICALS: Ewa Mróz PhD, Łukasz Depa PhD

Contents:

LECTURES:

Aim of the course: Becoming familiar with the possibilities of the use of molecular methods in taxonomy.

The presentation of possibilities of the use of molecular markers in zoology (paleontology, archaeozoology, zoogeography, molecular taxonomy, phylogenetics of animals) with a special regard of phylogenetic studies of insects.

The introduction of phylogenetic problems and the explanation of some basic concepts related to them.

The discussion of the possibilities of using proper molecular markers, such as EF1- α , COI, COII, 16S rRNA, 18S rRNA, cytochrom b, to reconstruct ancestral relationships of trees on different taxonomic levels (species, genus, tribe, subfamily and higher). The comparison of molecular analysis results with the classic classification based on morphological characters.

PRACTICALS:

Aim of the course: The practical use of molecular data in phylogenetics of insects.

Becoming familiar with molecular databases. Processing of DNA sequences achieved after isolation with the usage of programmes, such as: Chromas, ClustalX, BioEdit.

The reconstruction of phylogenetic trees basing upon different methods (UPGMA, Neighbor-Joining, Maximum Likelihood, Maksymalna Parsymonia) and the evaluation of their reliability. The trees' visualization (TreeView) and interpretation of achieved results.

Methods and forms of teaching: Computer analysis of the data.

Requirements: The Report from prepared analyses

References (*maximum 5, preferably recent sources, all in English*):

1. AVISE J. C. (2004). Molecular markers, natural history, and evolution. Sinauer Associates, 684 pp.

2. Graur D., Wen-Hsiung Li .(2000). Fundamentals of Molecular Evolution, Second Edition. University of Chicago, 439pp
3. Hall B. G. (2004). Phylogenetic Trees Made Easy: a How-to Manual, Second Edition (With Cd-Rom). Sinauer Associates, Inc 221pp.
4. Nei M., Kumar S. (2000). Molecular Evolution and Phylogenetics ,Oxford University Press, USA, 333pp
5. Online manuals and guides available at different web pages, such as:
<http://www.ncbi.nlm.nih.gov/>
<http://evolution.genetics.washington.edu/phylip/software.html>
<http://www.technelysium.com.au/chromas.html>
<http://www.clustal.org/>
<http://www.mbio.ncsu.edu/BioEdit/BioEdit.html>
http://taxonomy.zoology.gla.ac.uk/rod/treeview/treeview_manual.html
<http://www.megasoftware.net/mega41.html>

Remarks (*if necessary*):