

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Biogeografija in filogeografija
Course title:	Biogeography and Phylogeography

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Okoljske in regionalne študije, doktorski študij 3. stopnje	Biodiverzitetna in ekologija	/	/
Environmental and Regional Studies, doctoral study 3rd cycle	Biodiversity and Ecology	/	/

Vrsta predmeta / Course type

Izbirni/ Elective

Univerzitetna koda predmeta / University course code:

DIB09-26

Predavanja / Lectures	Seminar / Seminar	Vaje / Tutorial	Klinične vaje / Clinical work	Druge oblike študija / Other study forms	Samost. delo / Individual work	ECTS
5	15	10			150	6

Nosilec predmeta / Lecturer:

Red. prof. dr. Matjaž Kuntner

Jeziki /

Predavanja / Lectures: Slovenski, angleški / Slovene, English

Languages:

Vaje / Tutorial: Slovenski, angleški / Slovene, English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Končana druga bolonjska stopnja ustrezne smeri ali univerzitetni študij VII stopnje. Zaželeno je razumevanje biologije, ekologije ali sorodnih naravoslovnih ved.

Prerequisites:

Second-cycle Bologna degree in the relevant track or a university (level VII) degree. Understanding of biology, ecology, or related natural sciences is recommended.

Vsebina:

- Geografski vzorci razširjenosti organizmov.
- Vikarianca kot zgodovinski vzrok razširjenosti.
- Disperzija in disperzivnost kot lastnost organizmov.
- Globalne spremembe in posledično spreminjanje razširjenosti organizmov.
- Otoška biogeografija.
- Genski pretok, speciacija, izumiranje.
- Endemizem.
- Filogeografija kot interakcija mikro- in makro-evolucijskih raziskav.

Content (Syllabus outline):

- Geographical patterns of organismal distribution.
- Vicariance as historical reason for distributions.
- Dispersal and dispersability as organismal trait.
- Global changes and consequential organismal distribution shifts.
- Island biogeography.
- Gene flow, speciation, extinction.
- Endemism.

- Pregled modernih biogeografskih in filogeografskih pristopov.
- Seminarsko delo v obliki znanstvenega članka.

- Phylogeography as interaction of micro- and macro-evolutionary research.
- Overview of modern biogeographical and phylogeographical approaches.
- Seminar work resulting in a scientific paper.

Temeljni literatura in viri / Readings:

- Lomolino, M. V., Riddle, B. R., Whittaker, R. J., Brown, J. H. (2010). *Biogeography*. Fourth Edition. Sinauer Associates, Inc.
- Avise, J. C. (2000). *Phylogeography: The History and Formation of Species*. Harvard University Press.
- Izbrana primarna literatura.

Cilji in kompetence:

Namen predmeta je seznaniti študente z biogeografskimi koncepti. V prvem delu bodo študenti skozi predavanja spoznavali osnove moderne biogeografije, ki je v šestdesetih letih prejšnjega stoletja prešla iz opisne v preverljivo znanost. Spoznali bodo vzorce razširjenosti organizmov, od najpreprostejše dihotomije 'vikarianca proti disperziji' do kompleksnih mešanic obojega. Spoznali bodo tudi vzroke za raznolike vzorce razširjenosti organizmov, ki so direktno povezani z disperzijsko zmožnostjo organizmov ter v novi dobi tudi z globalnimi spremembami. Z biogeografskimi vzorci so povezani tudi genski pretok, endemizem, speciacija in izumiranje. Študenti bodo spoznali osnove biogeografije otokov in razvoj filogeografije, moderne znanosti, ki povezuje mikro- in makro-evolucijske raziskave biogeografskih vzorcev. V praktičnem delu bodo študenti postavili biogeografska in/ali filogeografska vprašanja o izbranih skupinah organizmov, iz literature pridobivali genetske in geografske podatke ter jih analizirali v modernem filogenetskem kontekstu. Seminarski del predmeta bo potekal skozi študij primarne literature in pisanje znanstvenega članka, v katerem bo študent testiral konkretno hipotezo s pomočjo analiziranih podatkov.

Objectives and competences:

The course aims to familiarize students with biogeographical concepts. In the first part of the course students will learn through lectures about modern biogeography that has undergone a shift in the 1960s from a descriptive to a predictable science. They will learn about patterns of organismal distribution, from the basic 'vicariance versus dispersion' dichotomy to complex mixes of both. They will start to understand the causes of such distribution patterns that are directly linked with dispersal ability of organisms, and lately also with accelerated global changes. Gene flow, endemism, speciation, and extinction are also linked with biogeographical patterns. Students will become familiar with island biogeography research and with the evolving field of phylogeography, a modern science that links micro- and macro-evolutionary research of biogeographic patterns. In the practical part of the course students will pose biogeographical and/or phylogeographical questions on selected organisms, search the literature for genetic and geographic data, then analyse these data in a modern phylogenetic context. The seminar portion of the course will involve studying primary literature and writing a scientific paper discussing the original results and testing specific hypotheses.

Predvideni študijski rezultati:

Poznavanje metod in konceptov v biogeografiji.

Intended learning outcomes:

Understanding of methodology and concepts in biogeography.

Pridobivanje podatkov potrebnih za moderne biogeografske in filogeografske analize.

Uporaba modernih analitičnih metod za reševanje konkretnih biogeografskih hipotez ter seminar v obliki znanstvenega članka.

Acquisition of data needed for modern biogeographical and phylogeographical analyses.

Application of modern analytical methods for answering specific biogeographical hypotheses, and a seminar that will be presented as a research paper.

Metode poučevanja in učenja:

Oblike dela:

- Frontalna oblika poučevanja
- Delo v manjših skupinah oz. v dvojicah
- Samostojno delo študentov

Metode (načini) dela:

- Razlaga
- Razgovor/ diskusija/debata

Learning and teaching methods:

Types of learning/teaching:

- Frontal teaching
- Work in smaller groups or pair work
- Independent students work

Teaching methods:

- Explanation
- Conversation/discussion/debate

Načini ocenjevanja:

Daljši pisni izdelki

Delež (v %) /
Weight (in %)

100

Assessment:

Long written assignments

Reference nosilca / Lecturer's references:

- Kuntner, M. & Turk, E. 2022. Towards better-informed dispersal probabilities in historical biogeography: Arachnids as a model lineage. *Frontiers in Arachnid Science* 1: 1058676.
- Čandek, K., Agnarsson, I., Binford, G. J. & Kuntner, M. 2021. Biogeography of long-jawed spiders reveals multiple colonization of the Caribbean. *Diversity* 13: 622.
- Turk E., Čandek, K., Kralj-Fišer, S., Kuntner M. 2020. Biogeographical history of golden orbweavers : chronology of a global conquest. *Journal of biogeography* 47: 1333-1344.
- Turk, E., Bond, J.E., Cheng, R.-C., Čandek, K., Hamilton, C.A., Gregorič, M., Kralj-Fišer, S. & Kuntner, M. 2021. A natural colonisation of Asia: phylogenomic and biogeographic history of coin spiders (Araneae: Nephilidae: Herennia). *Diversity* 13, 515. <https://doi.org/10.3390/d13110515>
- Xu, X., Su, Y.-S., Ho, S. Y. W., Kuntner, M., Ono, H., Liu, F., Chang, C.-C., Warrit, N., Sivayyapram, V., Aung, K. P. P., Pham, D. S., Norma-Rashid, Y., Li, D. 2021. Phylogenomic analysis of ultraconserved elements resolves the evolutionary and biogeographic history of segmented trapdoor spiders. *Systematic Biology* 70: 1110-1122.