

GENERAL ECOLOGY AND THE ECOLOGY OF AN INDIVIDUAL WITHIN POPULATION GROUP

Ecological, morphological and molecular variability of oribatid communities (Acari, Oribatida) along microclimatic environmental gradients.

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study form: full time

Annotation: The aim of the Thesis is to analyze changes in abundance, diversity, and morphological and genetic variability of soil oribatid mites along environmental microclimatic gradients. The study will test two hypotheses: 1. In the colder parts of the gradients (cave entrances), oribatid mite communities are formed with lower abundance and diversity than in the warmer parts of the gradients; 2. Oribatid mite populations inhabiting caves have lower genetic, morphological and ecophysiological (temperature tolerance) variability in comparison with species in surface habitats. The variability in genetic, morphological and ecophysiological traits positively correlates with fluctuations of microclimatic environmental factors (temperature).

The aim of the Thesis is to analyze changes in abundance, diversity, morphological and genetic variability of soil oribatid mites along environmental microclimatic gradients. The study will test following hypotheses: 1. in the colder parts of the gradients (cave entrances), microarthropod communities are formed in higher abundance and lower diversity than in the warmer parts of the gradients (in front of caves); 2. oribatid mite populations from the cave environment have lower genetic and morphological variability in comparison with species in surface habitats. We expect that variability of genetic and morphological traits positively correlates with fluctuations of microclimatic environmental factors (temperature); 3. thermal span of populations differs in contrasting habitats (caves, surface). In cave habitats with stable temperature, narrower thermal span is expected than in surface habitats with high fluctuation of microclimatic factors.

Goals:

To study the changes in abundance, dominance and species diversity of oribatid mite communities in different habitats along microclimatic gradients in the environment.

To clarify the ecological requirements of the dominant species of oribatid mites due to the different microclimatic conditions along the microclimate gradients.

To study the differences in genetic and morphological variability of selected cave and surface oribatid species.

To compare the ecophysiological characteristics (temperature resistance and thermal span) of selected species of oribatid mites from microclimatically contrasting habitats.

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Molecular genetic of terrestrial arthropods along microclimatic gradients.

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study form: full time

Annotation: Specific conditions of habitats along microclimatic gradients influence population structure and genetic diversity of terrestrial arthropods. Specific microclimate of habitats may result in selective pressure leading to isolation of the local populations. In arthropods, there is considerable cryptic diversity on both large geographic (regional) and small (local) scale. Application of DNA barcoding (COI) and nuclear genes is a useful approach for proper delimitation of new or cryptic species. Phylogenetic study of arthropods inhabiting microclimatically different habitats remains mostly unknown, and this study has an ambition to contribute to comprehensive knowledge in the field of evolutionary genetics, molecular ecology and population genetics. Goal of the thesis is to analyse genetic diversity/variability of populations of selected arthropods along urban-natural and epigean-subterranean microclimatic gradients.

Goals:

1. to identify nuclear markers for evaluation of the genetic variability among populations of arthropods,
2. to analyse genetic diversity of populations of ubiquitous species of family Isotomidae (Collembola) along urban - natural gradient,
3. to assess phylogeny of selected taxa of family Atemsiidae (Diplopoda) along epigean -subterranean systems.

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Macroecology of bats on the example of the Eastern Mediterranean and the Middle East.

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study form: full time

Annotation: The Eastern Mediterranean and the Middle East are biogeographically extremely valuable areas of high diversity, including cryptic; the territory also includes glacial refuges. Regarding bats, there has been an unprecedented increase in knowledge in these areas about the distribution and ecological traits of individual species. The aim of the study is to compile the obtained data and their macroecological analysis focused on spatial aspects of selected traits (echolocation signals, habitat, geographical position, morphological aspects) and their possible interactions in order to understand the distribution of species in a wider ecological context.

Goals:

1. To compile a structured dataset of bats of the target area
2. To study and clarify macroecological relationships of the dataset based of selected traits

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Tiny Wetland Areas (TWA) animal diversity as a base for Other Effective Area-Based Conservation Measures (OECMs).

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study form: full time

Annotation: Diversity of invertebrate and vertebrate fauna of tiny wetlands (oxbows, gravel pits, temporary wetlands) on the example of the East Slovakian lowlands and Košice basin in order to analyze their relationships as a network of local biodiversity centers and as a basis for applying management by IUCN principles of Other Effective Area-Based Conservation Measures (OECMs).

Goals:

To determine the animal diversity in the model system of tiny wetland areas in the conditions of the East Slovakian lowland and Košice basin

To study and clarify the identified diversity within the network of local landscape diversity centers with the aim of IUCN Other Effective Area-Based Conservation Measures (OECMs) management proposals

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