General Ecology and Ecology of Individuals and Populations

Diplopoda – an exclusive terrestrial invertebrate group for study of biogeography of the Western Carpathians.
supervisor: doc. RNDr. Ľubomír Kováč, CSc.
consultant: RNDr. Andrej Mock, PhD.
study form: full time
Annotation: List of millipedes (Diplopoda) of Slovakia involves roughly 80 species dwelling in the soil and underground habitats. Numerous species are endemic, others occur in isolated sites with relictual distribution. This is the characteristic distribution pattern of the Western Carpathian millipede fauna within the Central Europe. Moreover, many phylogenetic lines reach here their northern limits in Europe. Recently, new descriptions and regional first records of taxa have confirmed unexhausted potential of the area. Some other taxa are waiting for descriptions and claryfing. The distribution of endemic millipedes is still not clear as well as its origin, age and colonization routes. Overlap of the Western and Eastern Carpathian fauna has not been studied satisfactorily. Combination of the field, laboratory and molecular approach will be applied to study taxonomy, phylogeny (including the influence of *Wolbachia* endosymbionts), biogeography and ecology of millipedes.

Relict forms of Collembola (Hexapoda) in subterranean ecosystems of the Western Carpathians.
supervisor: doc. RNDr. Ľubomír Kováč, CSc.
consultant: RNDr. Natália Raschmanová, PhD.
study form: full time
Annotation: Recently the biological investigations of caves and shallow subterranean habitats in the Western Carpathians revealed wide spectrum of relictual arthropods (Arthropoda). Collembola belong to the dominant arhropod groups dwelling in the subterranean habitats. Several collembolan relicts have remained taxonomically and phylogenetically unresolved, their population ecology is unknown, obligate cave forms including. The study is aimed at the detailed ecological study of these relicts to specify their populational traits. The study will focus on the phylogeny of the selected collembolan taxa based on molecular markers. Finally, it is expected that this study will confirm the hypothesis that some obligate cave arthropods occupying the Western Carpathian caves are old Tertiary relics.

Altitude as a complex of ecological factors in relation to the Lepidoptera
supervisor: doc. RNDr. Ľubomír Panigaj, CSc.
study form: full time
Annotation: The effect of altitude on the insect, particularly in the high mountainous area, is manifested by a set of abiotic factors, such as temperature, exposure, geological base, the type of vegetation etc. The objective of a doctoral thesis is a determination whether these effects are manifested at the phenotypic or genotypic level of the studied species of Lepidoptera, by using a semi-natural breeding of selected lepidopteran species. Primarily we will test the hypothesis that euhypsometric species in higher altitudes have a smaller body as well as smaller body appendages in comparison to individuals in lower altitudes. Fertilized or laid eggs of Erebia medusa from lower altitudes will be transferred to higher elevation and vice versa. Butterflies will be raised in freely placed insectaries. Subsequently, the size of their bodies, copulation organs, wings etc. will be statistically compared with free individuals from the same altitude. In addition, we will monitor also color and wing drawings. To our analysis, we will include museum specimens.