

Description for the general public

Special location of the Middle Asia within the contact area of different geobotanical provinces as well as the greatest mountain ranges, high diversity of habitats, types of substratum, exposition, inclination of mountain slopes as well as varied macro- and microclimate, resulted in great richness and diversity of organisms. Thus, mountains of the Middle Asia are within 36 Earth's biodiversity hotspots. Due to the harsh climate and inaccessibility of the area, they still remain insufficiently explored and each research expedition in this area brings new scientific discoveries. Our preliminary studies have proved, that rocky habitats deserve particular attention since they harbor extremely diversified and rich vegetation with a high share of endemic species.

Endemics are species (or other taxa, e.g.: families, genera, subspecies, varieties) unique to defined geographic location, such as an island, mountains, country or other defined zone, or habitat type. This term can also be applied to vegetation and to plant communities. Endemics are often rare and endangered taxa. Endemism can be found all over the world, but particular regions of the world can significantly differ in endemic taxa concentration. In the end of the 1980s, Norman Myers created the definition of "hot spots" for biodiversity which was used for indicating places of greatest species richness and the highest proportion of endemics. The concept of "hot spots" is the answer to the need to designate research priority sites that could provide data relevant for nature conservation.

The planned studies have a multi-faceted character (phytogeographic, taxonomic, phylogenetic and syntaxonomic). Realization of the project will allow us to answer the following questions: (1) What is the richness and diversity of vascular plants occurring on rocky habitats in the mountains of the Middle Asia? (2) Are all of the mountain ranges in Central Asia equally rich in endemics and diverse in terms of rocky vegetation? (3) Is it possible to indicate the so-called micro- and meso-hotspots of diversity within the mountains of Central Asia (4) What factors are responsible for the diversity of rocky vegetation in the Middle Asia? Finally, with the use of modern molecular methods, we want to study the genus *Campanula* (bellflower), which in the Middle Asia is highly confined to rocky habitats to check (5) whether reported from particular mountain ranges, numerous endemic bellflowers are in fact discrete 'narrow' species (usually critically endangered), or are we only deal here with species of a wide geographical range, which have a high ability to adapt their phenotypic traits to variable environmental conditions?; (6) What are the phylogenetic relationships within particular Middle Asian bellflower taxa, and what is the genetic diversity in the narrow-endemic populations of *Campanula lehmanniana* species?

Global warming observed since the mid-twentieth century cause changes in the geographic ranges of species and consequently result in the biodiversity loss within particular areas of the Earth. Organisms that can not adapt to rising temperatures move into cooler areas. In the horizontal aspect, species migrate to higher latitudes, while in the vertical – to the higher parts of the mountains. It can be imagined that endemic species that are usually characterized by narrow range and often narrow ecological tolerance will be most vulnerable to the climate changes. Especially sensitive are high mountain species, which due to their limited migration possibilities are not able to "escape" from unfavorable conditions. An important aspect of our work will be estimating the threat to chasmophytic plants and endemic in the context of expected climate changes. With the help of computer modeling of the ecological niche, we want to test, how the ranges of these endangered species and communities can change and which group of taxa are the most threatened and need a special conservation methods.

Such comprehensive research has not been undertaken in this part of the world so far. The need for a thorough analysis of the species richness, endemism and the diversity of plant communities, and the estimation of their vulnerability, is an absolute priority for conservation biology within Middle Asian hotspot of biodiversity.