

SUMMARY

The systematics and taxonomy of tree frogs of the family Hylidae has undergone turbulent changes both at higher (subfamilies, genera) and lower (species) level during the last decades. The original approach used morphological characters to distinguish tree frogs. It has been completed by bioacoustics, since the advertisement calls of the males were in some cases found to represent an important behavioural reproductive barrier and therefore useful for systematic evaluations. However, a completely new impulse was given to systematics by the introduction of modern genetic methods. These methods have allowed to distinguish not only morphologically but even acoustically cryptic taxa. The most reliable method to distinguish tree frogs at present is a combination of data from the different disciplines.

The present dissertation thesis aims to evaluate the systematics of tree frogs of the genus *Hyla* from Eastern Europe and the Middle East as well as the systematics of the Amazonian genus *Osteocephalus* using a combination of morphological, bioacoustic and molecular approaches. The thesis is composed of a general introduction, three published papers, two manuscripts under reviews and a conclusion chapter.

The first three papers deal with the phenotypic (morphological plus bioacoustic) approach in systematic research. The first paper describes the variation in the colour pattern between Cypriote and adjacent mainland (Turkish, Syrian, Lebanese) populations of *Hyla savignyi*. It quantifies discovered differences in frequencies of different colour patterns and discusses their possible importance for taxonomy. The second paper attempts to solve a question of geographic morphological variation in parapatric tree frogs *H. savignyi* and *H. arborea* (and also *H. orientalis* according to the current taxonomy). It aims to test the hypothesis that climatic factors influence the body shape of the frogs. Originally, this project aimed to present a morphological intraspecific taxonomic evaluation of different tree frogs' populations, but morphology alone turned out to be inconvenient for that purpose. In contrary, the project brought up the new hypothesis about evolutionary-ecological interpretations of the morphological data in the similar, but acoustically and genetically distant Mediterranean populations of *H. savignyi* and *H. arborea* (and *H. orientalis*). The third paper provides the first record of a second species of tree frog from Iran, from where only *H. savignyi* had been reported before using acoustic methods.

The fourth paper is a phylogeographic study of tree frogs from the Middle East using sequences of mitochondrial and nuclear DNA. Using the molecular approach, a new species was discovered from the region from Yemen to southern Levant. Subsequently, this species was distinguished also by distinct acoustic characteristics and to a lesser degree also by morphology. The new species will be described in the forthcoming paper in the official way (validity of the description within the thesis is disclaimed according to the ICZN). Beside this result, the fourth paper is also discussing the validity of the taxa *H. arborea schelkownikowi* and *H. arborea gumilevskii* on the basis of a phylogenetic approach. Demographic analyses of particular populations of the three species (*H. savignyi*, *H. orientalis*, and the new species) were carried out to gain insights into the evolutionary history of the species.

The fifth paper is a description of a new species of Amazonian tree frog of the genus *Osteocephalus* based on a combination of morphological, ecological (reproduction) and genetic approaches. The paper also brings a preliminary report on the phylogeny of the genus, which is briefly commented with respect to the evolution of different modes of reproductive strategies within the genus.

For more details, see abstracts of particular chapters below.