**The predictable sequence of adaptive radiation in subterranean amphipod: glass half empty or half full?**

Špela Borko, Ester Premate, Florian Altermatt, Ole Seehausen, Cene Fišer

Adaptive radiation (AR) is an evolutionary phenomenon when ancestral species colonizes the predator-free environment of unexploited resources, and proliferates into a large number of ecologically divergent species. The initial high rates of speciation and diversification slow down as ecological niches fill up. Theoretically, ecological diversification within AR unfolds predictably, with the emerging species initially exploiting habitat diversity, and subsequently diversifying in trophic niches. We tested this hypothesis using AR of the subterranean amphipod *Niphargus*. The genus adaptively radiated in the southeastern Europe 20-15 Mya, in a series of ARs that assembled into a large AR. Multiple ARs within a single genus are an excellent model system to test the hypothesis that habitat diversification preceded diversification of trophic niches. Using functional morphological traits as surrogates for habitat and trophic components of ecological niches, we analysed the sequence of diversification of each habitat and trophic niche traits over time. We performed analyses on a genus-wide AR, and on four speciose clades. Two clades diversified predominantly in karst areas with high habitat diversity. Two control clades adaptively radiated predominantly in interstitial, where habitat diversity is low. Genus-wide analysis indeed suggested that diversification of traits related to habitat preceded diversification of traits related to trophic niche. However, clade-level analyses provided mixed results. Genus-wide pattern of sequential ecological diversification was recovered in both karstic clades, but not in the interstitial ones. We concluded that sequential ecological diversification is predictable but habitat-dependent, and might misleadingly amplify on a higher taxonomic level.