DO ENVIRONMENTAL CONDITIONS SHAPE THE CHEMICAL SIGNALLING SIGNATURE OF LACERTID LIZARDS?

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Animals rely on a variety of signalling systems to communicate with conspecifics. Because the efficacy of a signal (transmission, durability, detectability) may vary depending on the physical environment, Darwinian selection can be expected to cause signalling diversity along an environmental gradient. As opposed to the many studies on the effect of the natural environment on visual and acoustic communication systems, the role of the physical environment in the evolution of chemical signals is far less investigated. Chemical signals are essential for inter- and intrasexual communication in many animals, and lizards represent no exception. In lacertids, the femoral gland secretions are believed to be the main source of chemical signals involved in communication. The major factor determining chemosignal efficacy is thought to be the chemical composition of the femoral secretion, which directly affects the longevity, persistence and detectability of the secretion in the environment. Using phylogenetic comparative methods, we investigated whether and how the natural environment affects the chemical composition of the femoral gland secretions of lacertid lizards. First, we collected femoral gland secretions of 65 lacertid species and analysed their lipophilic chemical composition using gas chromatography-mass spectrometry. Second, we extracted climate data from the WorldClim and ECMWF database, based on the geographical coordinates of catch-localities of the examined species. A phylogenetic canonical correlations test showed — as hypothesized — a significant correlation between the environment that a species inhabits and the chemical composition of its femoral gland secretions. High proportions of heavy alcohols and fatty acid esters are characteristic for secretions of species from hot and arid environments. In comparison, species from humid, windy and high altitude localities have secretions with higher proportions of aldehydes.