



Conference Abstract

Comparison of thermal tolerance in Collembola (Hexapoda) inhabiting soil and subterranean habitats

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Abstract

We hypothesized that troglonexes inhabiting surface habitats, thermally fluctuating environment, would tolerate wide temperature ranges. We expected that the temperature tolerances would diminish over categories troglonexe - subtroglophile - eutroglophile - troglobiont as a result of the degree of adaptation to subterranean environment that is characteristic with thermally stable conditions. We also assumed that body size may play crucial role in tolerance of Collembola to high and low temperature. Eighteen species of all four categories were exposed to one-hour survival laboratory test. The impact of temperature, species and species-temperature interaction on the cold and heat survival was statistically significant. The species heat tolerance significantly increased with increasing cold tolerance. In general, decrease in cold and heat tolerance was shown from troglonexes, over subtroglophiles and eutroglophiles to troglobionts. Cryptic species *Folsomia* sp. among troglonexes and *Ceratophysella sigillata*, *Hypogastrura crassaegranulata* among subtroglophiles were highly heat- and also cold-resistant, showing wide ecological plasticity. Subtroglophilous *Tetradontophora bielanensis* and *Lepidocyrtus violaceus*, eutroglophilous *Heteromurus nitidus* and troglobiont *Protaphorura janosik* were the most cold-sensitive species, and all troglobionts and eutroglophilous *Pygmarrhopalites pygmaeus* as the most heat-sensitive species. Species belonging to ecological groups not

or less associated to cave environment (trogloxenes and subtroglaphiles) showed wider range of temperature tolerance in comparison with more cave adapted species (eutroglaphiles and troglobionts), tested by ANOVA. Cold resistance decreased significantly with increasing body length, indicating that body size plays an important role in temperature tolerances of arthropods inhabiting soil and subterranean habitats.

Keywords

thermal tolerance, Collembola, soil, subterranean habitats, life forms, body size

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