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Conference Abstract

Desiccation resistance in Central European carabid species: effects of body size and habitat preferences

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Abstract

Water is the limiting factor for all organisms. Due to global climate change, prolonged drought periods are predicted and the importance of drought-related research is increasing. Water, together with temperature, determines the abundance and spatial distribution of animals. In this study, we investigated the effects of body size and habitat preference on desiccation resistance of carabid beetles under controlled laboratory condition. Firstly, we measured the longevity of 641 carabid individuals belonging to 18 species. These beetles were exposed to extremely low relative humidity (ca. 15-20%) using silica gel bags within experimental Petri dishes. Secondly, the rate of water loss was measured for 236 individuals belonging to eight carabid species. Rate of water loss was measured using exposition to the same extremely dry conditions, but only for 12 hours. Body size was represented by elytron length and live weight was also measured to analyse effects of body condition (weight corrected for structural size). Experimental beetles were collected in different habitats ranging from extremely dry to very wet conditions. Carabids were provided with food and water ad libitum for at least 7 days prior to the experiments. All experiments were performed using a climatic chamber set to a long day (16L:8D) and the constant temperature of 20°C. The preliminary results show that species from wet

habitats were more sensitive to desiccation and larger species were more resistant (survived for a longer time) compared to smaller species. Species from wet habitats had higher water loss rate compared to species originating from dry habitats. At the intraspecific level, individuals with larger body size (elytron length) survived longer than smaller individuals. Interestingly, the rate of water loss was affected by initial body condition and sex but not by structural body size at the intraspecific level. The most resistant species was *Pseudoophonus rufipes*. This species was not superior to other species with respect to water loss rate but it had the highest relative water content. It is also possible that *P. rufipes* has some other physiological or behavioural adaptation enabling a better survival under stressful, dry condition. This issue could be investigated in a future study.

Keywords

Carabidae, Coleoptera, desiccation, survival, water content, water loss

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