

A molecular study of the tardigrade *Echiniscus testudo* (Echiniscidae) reveals low DNA sequence diversity over a large geographical area

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ABSTRACT

*In the present study we investigate the genetic diversity within the asexually reproducing tardigrade *Echiniscus testudo*. The present study is the first to sample a tardigrade species for comparison of DNA sequence diversity between widely separated samples. *Echiniscus testudo* was sampled at 13 localities spanning three continents. DNA sequences of the mitochondrial COI gene and the nuclear ITS2 sequence were used to investigate the genetic diversity and phylogeographic structure of the various asexual lineages. Terrestrial tardigrades with the capability of entering a cryptobiotic state are assumed to have a high passive dispersal potential through airborne transport. Our results show moderate (ITS2) to high (COI) haplotype diversity and low sequence diversity that indicate evolution of haplotypes within distinct asexual lineages and a high dispersal potential. No isolation by distance was detected by Mantel tests. Different phylogeny inference methods (neighbor-joining, maximum parsimony, maximum likelihood and Bayesian inference) revealed little topological resolution, but minimum spanning networks showed some phylogeographic patterns. The COI and ITS2 minimum spanning networks show patterns that indicate dispersal of several haplotypes from founding populations. In conclusion our data show a low genetic diversity and a relatively high haplotype diversity indicating that *E. testudo* is a young species with a high dispersal potential.*

Key words: terrestrial Tardigrada, asexual lineages, sequence diversity, COI, ITS2