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# Tardigrades in hypomagnetic conditions – further studies

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## Abstract

Space is a hostile environment due to high radiation, low pressure, and extremely low temperature, and hypomagnetic conditions. Terrestrial lifeforms seem to be too fragile and ill-adapted to survive in such conditions. However, astrobiologists suggest that extremophiles are organisms which have the greatest chance of success in such conditions. Water bears (Tardigrada) are small invertebrates (50-2100 microns) which can be found widely around the world and are considered to be one of the most resistant of metazoans on Earth. They show significant resistance to a number of environmental stressors, also they are able to survive the exposure to the space vacuum, but the influence of the hypomagnetic conditions on their fitness has not been addressed for a long time.

In our previous studies on tardigrades of species *Hypsibius exemplaris* (recently disambiguated from a closely related species *Hypsibius dujardini*), we have shown, that hypomagnetic conditions increasing the mortality of this species, when it entering into anhydrobiosis or when it returning to active life. On the basis of the obtained results, we may hypothesise that at least some metabolic processes associated with anhydrobiosis could be disturbed or impaired by hypomagnetic conditions. But we also observed relatively high mortality of *H. exemplaris* of more than 70%, even in the control groups. This was probably due to the fact that *H. exemplaris* is an aquatic species, and has a relatively low tolerance to dehydration. Because of that, we decide to compare the impact of hypomagnetic conditions on terrestrial tardigrades, with higher tolerance to dehydration.

The main aim of our newest studies was to answer how different species of tardigrades with different ecology and belonging to different classes, would react on hypomagnetic condition. Tardigrades belonging to two genera: *Milnesium* (Eutardigrada) and *Echiniscus* (Heterotardigrada) both well know form their high resistance to dehydration, were tested in these studies. Like in our previous studies we conducted three experiments: a) with specimens in anhydrobiosis, b) with specimens entering anhydrobiosis, and c) with specimens returning to active life. The obtained results were compared to the results of our previous studies.

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