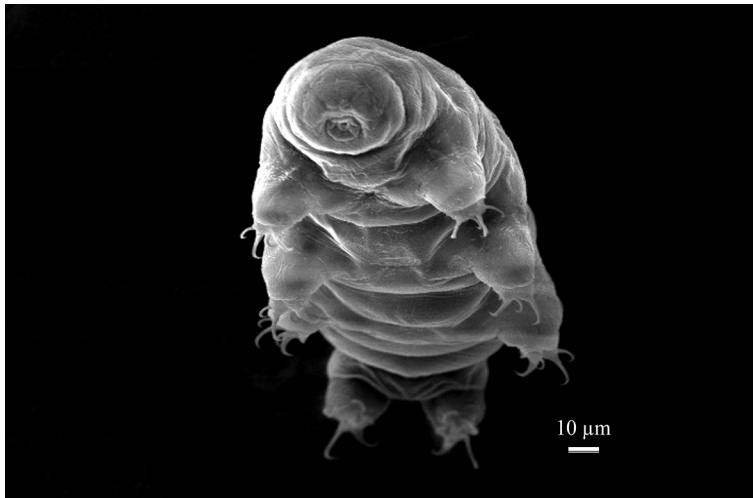


INSIDE JEB

Antarctic water bears should cope with climate change



An *Acutuncus antarcticus* tardigrade. Photo credit: Roberto Guidetti.

Tardigrades, otherwise known as water bears, are famed for their hardiness. Inhabiting every continent on Earth, the minute creatures even survived when they were blasted into space for 10 days in 2007. However, despite their famed resilience, it is not clear how the tiny creatures will fare in the face of global climate change. Concerned about the combined impact of increasing temperatures and ultraviolet exposure – which can cause sunburn – on all of the invertebrates that make Antarctica their home, Lorena Rebecchi and colleagues from the University of Modena and Reggio Emilia, Italy, investigated how adult Antarctic tardigrades (*Acutuncus antarcticus*) and their eggs cope during super-hot simulated summers.

After collecting the small creatures from a temporary freshwater pond near the Mario Zucchelli base in Victoria Land, Antarctica, Rebecchi, Ilaria Giovannini, Tiziana Altiero and Roberto Guidetti investigated how well the hydrated adults survived after turning the heat up to 41°C and increasing their exposure to burning UV rays. As the animals are also capable of going into a form of suspended animation when they dry out, the team also tested how well these desiccated tardigrades handle heat and sunburn.

Impressively, the hydrated mini animals all survived 1 h heatwaves of up to 33°C, although their survival plummeted at higher temperatures, and the dry tardigrades were slightly more resilient

under intense UV rays than the active hydrated animals. However, when the team combined the stresses, they were surprised to see that the desiccated tardigrades were far more vulnerable: only 5% survived at 8°C when sunbathing in very intense UV, whereas 42% of the active hydrated tardigrades survived the same UV dose. And when the team analysed the effects of a simulated super-summer on eggs at the early and late stages of development, less than a quarter of the eggs hatched. In addition, the eggs in the early stages of development were particularly vulnerable to the UV rays, and their children and grandchildren suffered more deformities than the descendants of eggs that had not been sunburned.

However, Rebecchi and colleagues point out that the high temperatures and intense UV rays that the tardigrades received in the lab were significantly higher than those in the climate scientists' predictions for Antarctica, so even though the combination of stresses could reduce the animals' chances of survival, the scientists are hopeful that the future is optimistic for Antarctica's tardigrade residents.

10.1242/jeb.177105

Giovannini, I., Altiero, T., Guidetti, R. and Rebecchi, L. (2018). Will the Antarctic tardigrade *Acutuncus antarcticus* be able to withstand environmental stresses related to global climate change? *J. Exp. Biol.* **221**, doi:10.1242/jeb.160622.

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