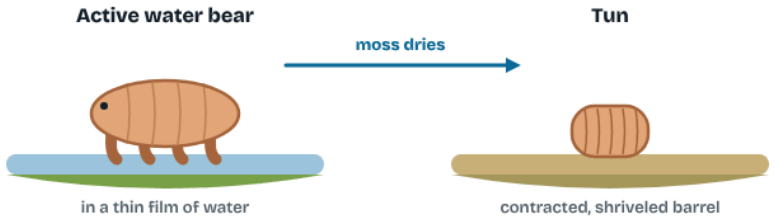
That is why

Why can tardigrades survive almost anything?

They dry out and switch off: almost no water, glassy cells, protected DNA, metabolism nearly stopped.

A Drying into a tun



1 Water out

Keeps only 2-3% of the water it had when active.

2 Glassy inside

CAHS proteins turn glassy and hold cell parts in place.

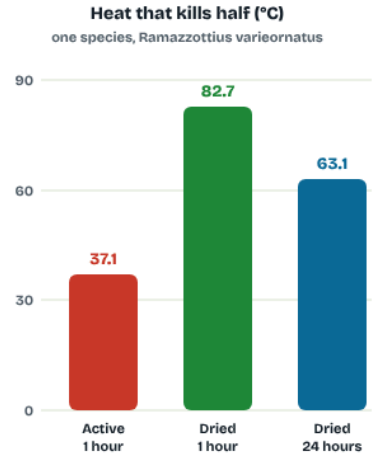
3 DNA shielded

Dsup sticks to DNA. In human cells: about 40% less X-ray damage.

4 Switched off

Oxygen use near zero: metabolism almost or completely stopped.

B Tough asleep, fragile awake



37.1°C is about body temperature.

From a roof gutter

Collected in Nivå, Denmark. It lives in temporary freshwater spots, like this gutter.

C How long it can wait

1 Ten days in space

About 270 km up, 2007. Vacuum barely hurt. Full space radiation: over 2% of one species still survived.

2 30+ years frozen

Moss kept at -20°C. A leg moved on day 1, eating in 2 weeks, 19 eggs, 14 hatched.

3 Not a sugar trick

Trehalose: at most 2.9% of dry weight.

Dry out, hold still, switch off, and wait for water.

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Diagram: https://thatiswhy.com/diagrams/why-tardigrades-survive-almost-anything/ · Full guide: /why-tardigrades-survive-almost-anything/