

Logbook 6 (from 04/11/23)

Stefan, we are coming!

Polarstern is extremely busy breaking sea ice up to 3 meters thick – the last 150 nm to our „home floe“ seem to be the most difficult ones – but a lot of people on board are looking forward to meeting Stefan Longfoot. His exact, scientific name is *Stephos Longipes* (SL), a 1 mm long copepod. Since SL does unbelievable things, he is one of the main scientific subjects which will be investigated during this expedition.

Sigi Schiel from the *Alfred Wegener Institute*, the Grand Dame of the under-ice zooplankton, was able to show that SL prefers different strata in the water and in the ice during various stages of life. A tiny creature which changes habitats not even eschewing the brine channels within sea ice. For „normal“ animals these channels are uninhabitable like hot desert sand, because of the high salinities. Water would be sucked out of their cells to dilute the high concentration outside. The expert calls it osmosis, a process to reduce strong gradients similar to what we know from the atmosphere where winds transport the air from areas of high to low pressure.

Osmosis...to know its name does not mean that one understands the process and, even more complicated, to understand those who resist, who like SL survive in such habitats. *Rainer Kiko* from the *Institute of Polar Ecology at the Christian Albrecht University Kiel* searches as a PhD student for genetic sequences which enable SL to avoid his salinization. The hypothesis: SL runs a anti-salinization program already known from other creatures by incorporating organic molecules (sugar and amino acids) to the cells. In addition, this trick works against the freezing of the cell as SL lives in an environment well below freezing temperatures. Double efficiency thanks to biochemical adaptation and a perfect way to hide for the predators who cannot stand high salinity in narrow channels.

Sigi Schiel and *Rainer Kiko*, customers of the ice cores drilled on the floe, hope to catch SL and bring him to the wet-labs on *Polarstern*. However, a lot of sea ice still has to be broken between the „mite“ and the lab. Its thickness was kept secret to us because the satellite well above measures only surface roughness.

Well, with the details already known one would not send a ship to the end of the World which runs at roughly 40 000 Euro per day.