

## ***PINNULARIA BOREALIS*: DISENTANGLING THE EVOLUTIONARY HISTORY OF A TERRESTRIAL DIATOM USING GENETICS, FOSSILS AND ECOPHYSIOLOGICAL DATA.**

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*Pinnularia borealis* Ehrenberg is a terrestrial diatom, commonly found in moist soils and temporary freshwater habitats all over the world, including the (sub)Antarctic. Given the widespread (pseudo)cryptic species diversity in diatoms and the restricted distribution patterns of many (sub)Antarctic diatoms revealed by dedicated morphological studies, we asked whether *Pinnularia borealis* is indeed a single species and started reconstructing the evolutionary history of this cosmopolitan diatom. We observed that, unlike freshwater diatoms, resting cells of *P. borealis* are tolerant for at least short periods of desiccation, suggesting that airborne dispersal is possible which may limit opportunities for allopatric speciation. Nevertheless, molecular phylogenies based on the plastid gene *rbcL* and the nuclear 28S rDNA (D1-D3 region) revealed that *P. borealis* consists of multiple lineages, including a distinct continental Antarctic lineage. Ongoing work includes the addition of isolates from the maritime Antarctic and the (sub)Antarctic Marion Island. A molecular clock for *Pinnularia* estimates the age of *P. borealis* at 35.8 (30-47) million years (Ma), and the continental Antarctic lineage at 7.8 (2-15) Ma. Compared to the lineages from non-polar regions, the continental Antarctic lineage of *P. borealis* has a lower optimal growth temperature and upper lethal temperature, indicating niche differentiation. The distinct molecular lineages, the old age of these lineages and the (partial) thermal niche differentiation suggest that long-distance dispersal is not common enough in *P. borealis* to prevent speciation, despite the desiccation tolerance of the resting cells, and indicate that besides freshwater diatoms, also terrestrial diatoms are not as ubiquitous as previously thought.