Population differentiation of the protist *Synura* (Chrysophyceae, Stramenopiles)

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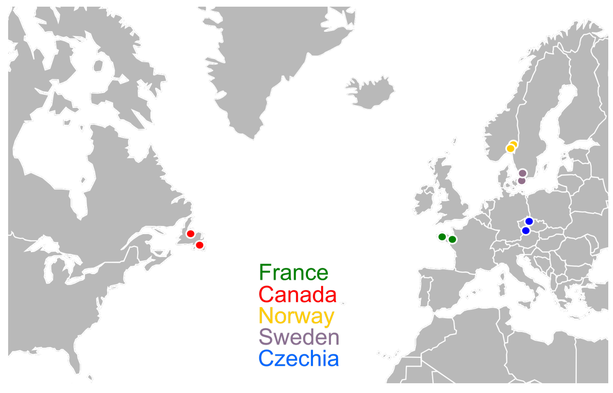
Introduction

- Factors driving speciation are still enigmatic, especially among protists.
- In macrobes, geographical barrier was considered as the most important factor.
- On the contrary, microbes are often thought to have unlimited dispersal, therefore speciation would takes place in sympatry.

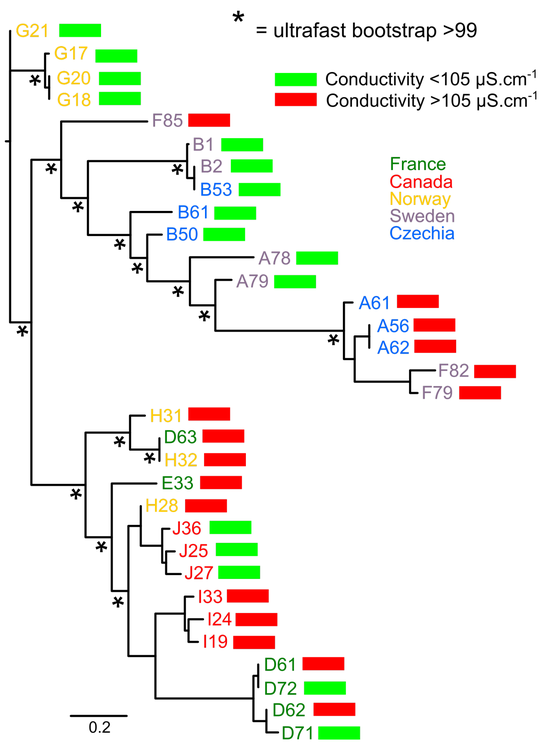
Goals

- **To infer population structure of *Synura petersenii* using RADseq**
- **To evaluate importance of geographical and ecological factors shaping the population structure using environmental data and gradient experiments with cultured strains**

Sample map

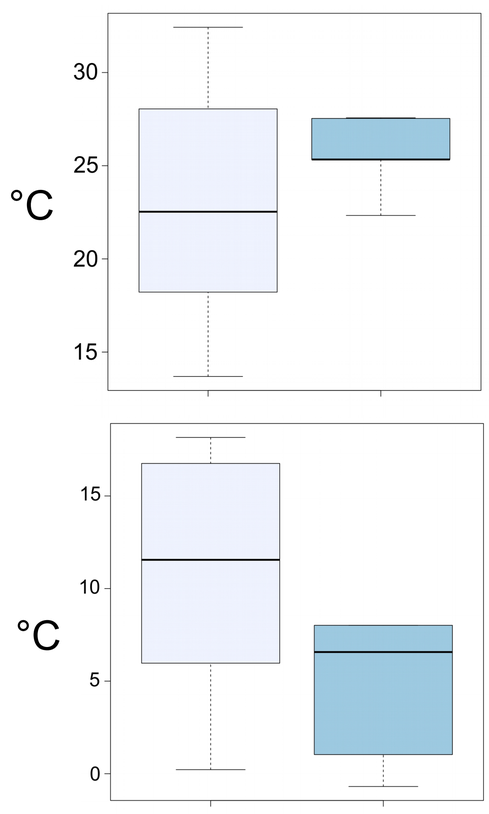


Phylogeny IQTREE, 85626 positions

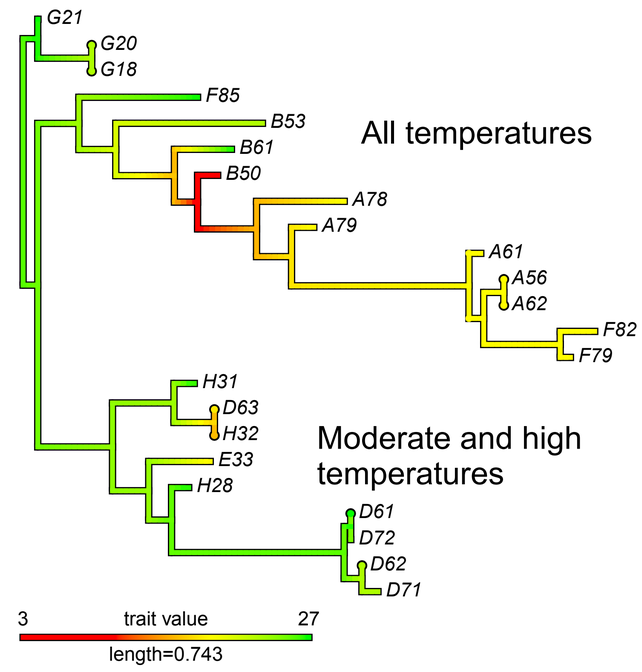


- **Populations cluster by their geographical origin rather than conductivity.**
- Strains from the same regions can prefer different values of conductivity.
- Conductivity was measured at the time of sampling.

Bioclimatic variables

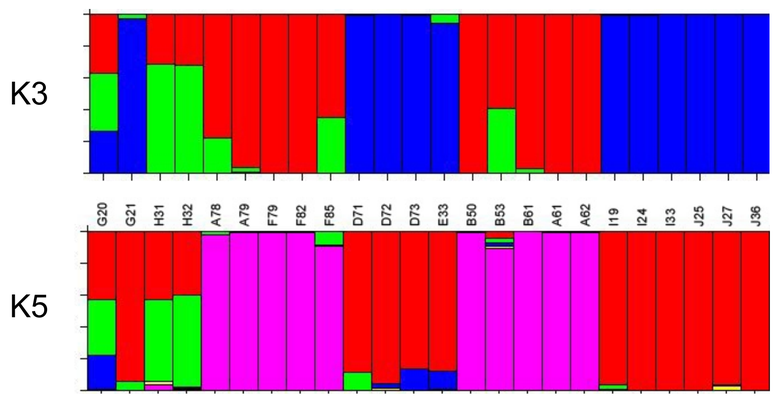


Max growth rate - temperature



- **Ancestral state reconstruction of maximal growth rate of cultures in a gradient of temperature.**
- Two groups – first adapted to all temperatures and second adapted to moderate and high.

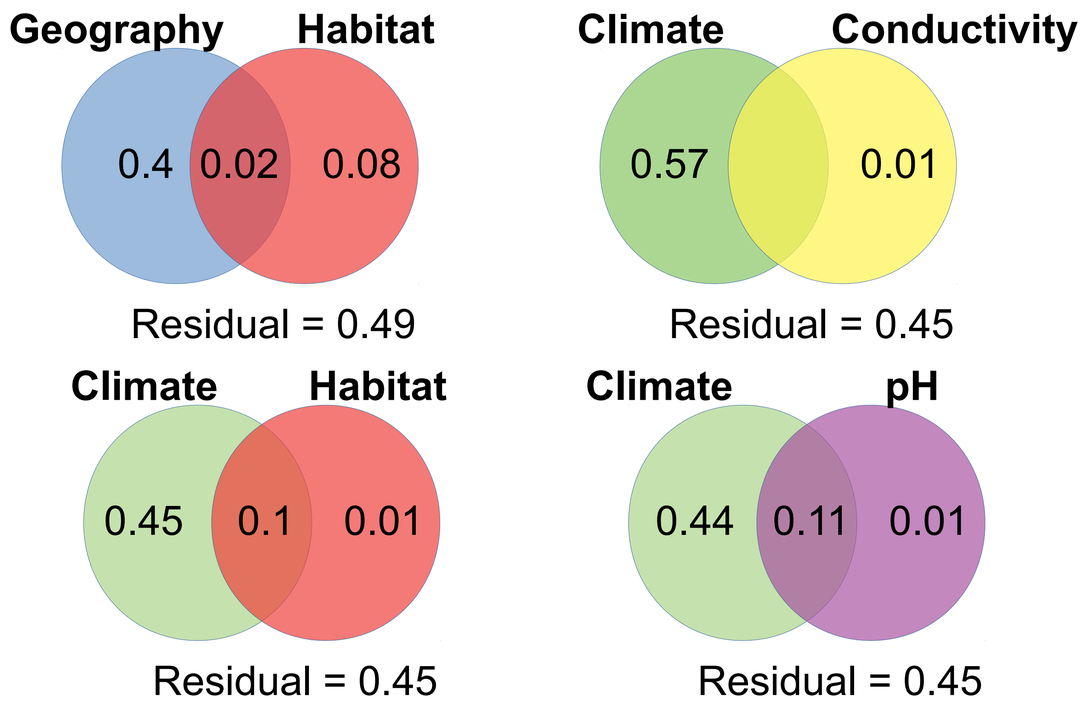
Structure – population structure



- Similar pattern revealed for both assumed numbers of populations (K).
- Strains were mostly separated into two populations.
- Few strains had mixed origin, which suggests a possible gene flow among them.

Variation partitioning - sampling site data

- How much of a variability is explained by each factor or together?



Conclusions

- There are two major groups within *S. petersenii*
- Group 1 – Czechia and Sweden and group 2 – France, Canada and Norway
- Both groups contain samples with high and low conductivity. Variation partitioning showed that climate and geography are the most important.
- Gradient experiments with cultures revealed that group 1 is adapted to all temperatures, while group 2 is adapted and moderate to high temperatures.

Methods

- Organism – *Synura petersenii* (Chrysophyceae, Stramenopiles)
- Sampling, environmental condition measurement – conductivity, pH, temperature
- Culturing in gradient of conductivity and temperature – growth rate.
- RADseq
- Phylogeny, Structure and ancestral state reconstruction