

Spatial distribution of genetic diversity within Labrador Tea

AUTHORS

Laura D Serrato
Dr. Diana Wolf



01. Introduction

Arctic plant species are great model organisms for understanding climate change as they are some of the first to experience its effects. DNA sequencing and analysis of Labrador Tea species, *Rhododendron groenlandicum*, *R. tomentosum* and *R. subarcticum* will provide an overview of their population ranges and possible changes in parts of Alaska, Canada and Russia. Additionally, the project will delve into the possible hybridization of these species in Alaska as previously seen in Canada, or possible environmental reasons for its lack thereof.

02. Objective

To determine whether the three *Rhododendron* taxa are distinct within Alaska, and if hybridization and/or speciation has occurred and where.

References

- Amada, G., Iwahana, G., Noguchi, K., Matsuura, Y., Kim, Y., Lee, B., and Kobayashi, H. 2024. Permafrost conditions influence the abundance, distribution, and leaf traits of two closely related shrub species (*Rhododendron* subsect. *Ledum*) in interior Alaska. *Polar Biology*. DOI: <https://doi.org/10.1007/s00300-024-03284-4>.
- Iltusova, D., and Polezhaeva, M. 2024. A review of Labrador tea diversity in Northeast Asia. *Botanica Pacifica. A journal of plant science and conservation*. DOI: 10.17581/bp.2024.13202

Acknowledgements

- Dr. Diana Wolf for allowing me to jump into this project.
- Stefanie Ickert-Bond, for providing samples from UAF herbarium.
- Denali Crawford and James Phillips for collecting tissues from herbarium species
- Gaku Amada for the original project idea, and for collecting tissues from The University of Helsinki herbarium.
- IAB Genomics Core Lab for use of equipment.
- Alaska INBRE for supporting the IAB Genomics Core Lab
- URSA for financial support.
- Thankful for the support of my husband and family.

Rhododendron tomentosum (*Ledum palustre*), *R. subarcticum* (*L. palustre* ssp. *decumbens*)
&
R. groenlandicum (*L. groenlandicum*)

03. Methodology

Sample Collection

- The majority of the samples from Alaska and Canada (and some from Russia) were collected from the Museum of the North herbarium.
- The majority of the samples from Finland were collected by Dr Gaku Amada from the University of Helsinki herbarium.
- Most samples included the date and location they were collected from in the wild. Additionally, all samples were preserved dried.

DNA Extraction

- The DNA extraction was done using the Puregene DNA Extraction Kit and protocol.
- Most of the materials were of standard grade, with the exception of the DNA Hydration Solution, which was made in-house.

DNA Quality and Purity Assessment

- DNA Quality and Purity Assessment was performed using the Thermo Scientific Nanodrop One Spectrophotometer.

04. Results & Analysis

Spatial distribution of genetic diversity within Labrador Tea

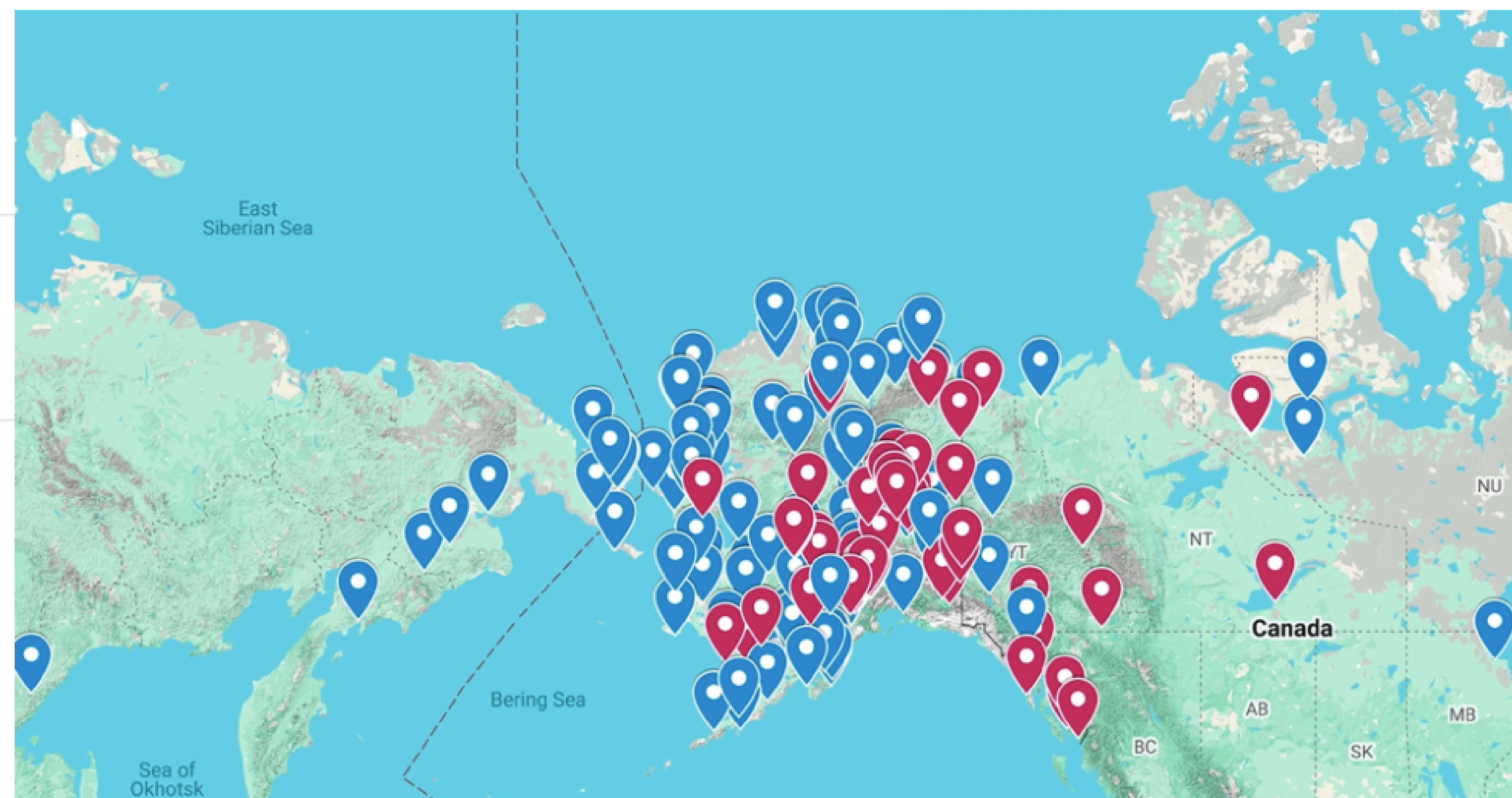
R. groenlandicum

All items

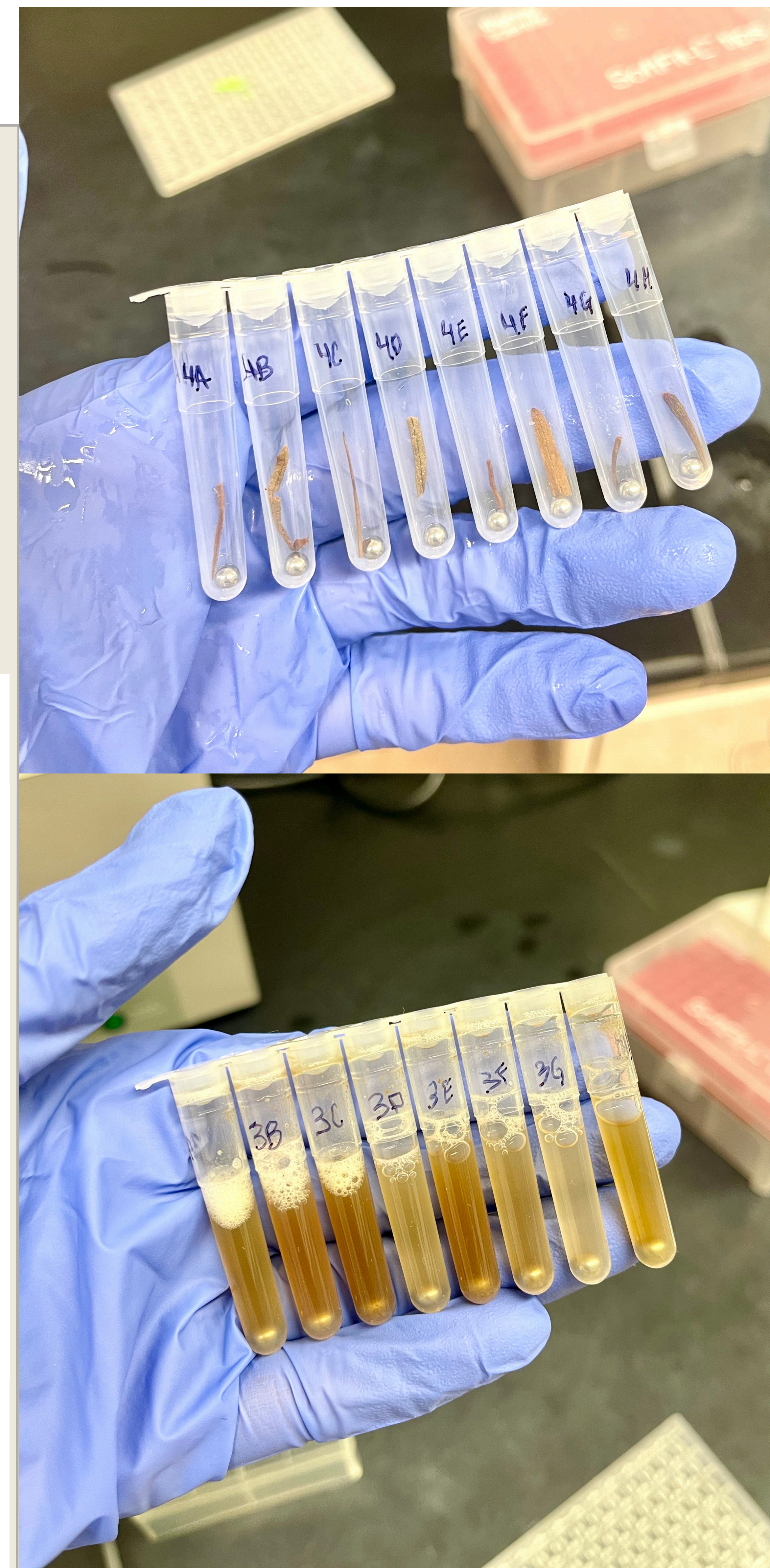
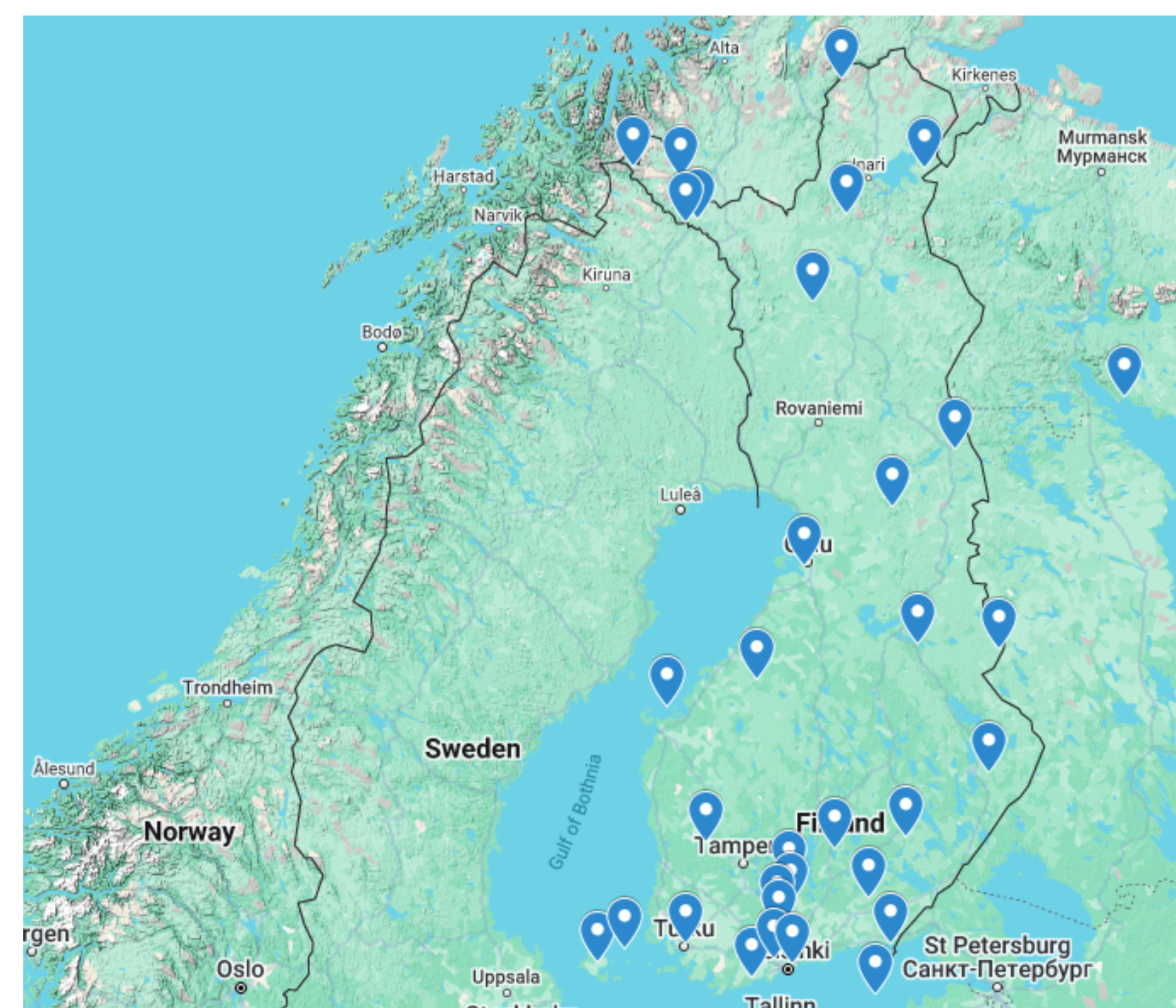
R. tomentosum

All items

This map depicts where *Rhododendron tomentosum*, and *R. groenlandicum* are distinct.



R. tomentosum was found to be more predominant in higher arctic latitudes. Whereas *R. groenlandicum* was mostly found in higher altitude clusters in the center region of interior Alaska, and northwestern Canada.



05. Future Methods

- Send DNA extraction samples to Texas Tech for Sequence Capture.
- Data analysis will be performed by Dr Naoki Takebayashi at UAF.