

## Scholarship Report

Scholarship Report to NordGen Forest in relation to the project:

**Which tree species have survived in the Greenlandic Arboretum?**

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(in as far as the budgetary follow up, this report concerns Anders Ræbild)

## Overall purpose of the project

The overall purpose of the work in the Greenlandic Arboretum is to improve our knowledge on the adaptability of tree species to subarctic climates through recording survival, health and growth of tree species from known locations (origins and provenances) with the aim to identify patterns of adaptation and pinpoint provenances with a particularly good performance.

## Goal of the 2022 fieldwork

Through fieldwork in 2013-2021 we have covered approximately 50% of the tree collection in the Greenlandic Arboretum. The goal of the work funded by the NordGen Forest Scholarship was to make solid progress by registering approximately 200 new trees and thereby reaching a coverage of approximately 60%. In addition, we aimed to present results of the work at the annual meeting of the Nordic Arboretum Committee in August, where dendrologists and geneticists from the Nordic and Baltic countries participated. The title of the meeting was "What future for our tree collections?" Finally, popular dissemination through the Danish science website videnskab.dk was planned.

## Time schedule

At the application stage we planned to conduct the fieldwork over a 10-day period in May-June. However, when we received the grant letter in April it turned out that it was no longer possible to get flight tickets for the planned time period and we therefore had to postpone the activity to the next possible time period, which turned out to be the 26 July – 4 August. The daily activities were as follows:

- 26/7: Morning: Travel to Narsarsuaq. Late afternoon: walk through the southern part of the arboretum and dinner with Kenneth Høegh who has been responsible for planting activities since 1999.
- 27/7: Follow-up identification of trees in sub-compartments A4-A8 together with Kenneth Høegh, registration in B compartments, starting outside the hostel and covering sub-compartments B17, B10 and B12 on the northern side of the Suluaqqap Qaqqaa hill.
- 28/7: Continued registration on the northern side of the Suluaqqap Qaqqaa hill (B sub-comp.). Meeting with Ole Guldager at the museum and further registrations in B sub-compartments.
- 29/7: Morning: Download of temperature data from data loggers, failure to download dendrometer data using Anders' computer. Afternoon: further registrations in B sub-compartments (B2, B3)
- 30/7: Morning: Downloading dendrometer and temperature logger data using Henrik's computer. Afternoon: Further registrations in B sub-compartments on the northern side of the stream and the southeastern side of the small hill northwest of the hostel.
- 31/7: Morning: Final registrations in B sub-compartments (completed). Afternoon: Installation of new dendrometers on 4 *Picea glauca*, 4 *Picea engelmannii* and 4 *Abies lasiocarpa* in sub-compartment A8. Data management at the hostel.
- 1/8: Registrations in sub-compartments C3, D6, D5, D3 on the slopes above the valley, inspection of *Populus sp.* individuals in D5 (considered for installation of dendrometers), registrations in sub-compartment D6 at 210 m.a.s.l., registrations in line plantings in sub-compartment D3

- 2/8: Removal of dendrometers from 3 *Pinus sylvestris*, revisiting and checking trees registered in sub-compartment A1 and A5-A7 in 2016-2017. Rephotographing the sites north of the water reservoir also photographed in 2007 and 2018.
- 3/8: Rephotographing sites previously photographed in 2016 and 2018. Installation of dendrometers on 3 *Populus balsamifera*/*Populus trichocarpa* in sub-compartment A7, registration in C5, data entry, measuring trees in A7 that were registered temporarily on the 27 July. Rain in the afternoon: Data management at hostel.
- 4/8: Rain in the morning. Travel back to Copenhagen. Arrival after midnight.

### **Evaluation of goal achievement**

We managed to register and identify a total of 148 trees. These include about 40 species, sub-species and species hybrids and about 60 accessions. The number of trees is a bit lower than what we had hoped (approx.. 200), but they increase the total list of registered trees by 12 %, and we managed to complete the work in the B sub-compartments on the northern side of the Suluaqqap Qaqqaa hill, an area which turned out to be a demanding place to work, with tall and dense birch scrub and a low density of planted trees. We also managed to get some work done in the C and D sub-compartments and assume that we are now very close to having completed the work in the rich and complex A sub-compartments. In addition, we managed to download data from all data loggers, set up 12 additional dendrometers and move 3 others. We returned from Narsarsuaq four days before the meeting of the Nordic Arboretum Committee and therefore included only more general results of this particular fieldtrip in the presentation. The presentation is enclosed. The dissemination through videnskab.dk is planned for 2023 upon completion of data analysis.

### **Scientific benefits and possible results**

The study is part of an ongoing effort to make a full evaluation of the Greenlandic Arboretum. As stated in the introduction, the aims are to clarify which species and origins (provenances) that perform best, and to improve our understanding of the ecology of trees in subarctic environments. The data collected therefore represent an important contribution to fulfill our ambition of completing the evaluation of introduction successes and failures in the Greenlandic Arboretum. Once finished, we will be able not only to tell which tree species and accessions that seem most promising, but also to place results in a wider biogeographical context, suggesting which factors that are critical for assisted migrations of species to Greenland. As such, they have potential to profoundly influence future tree plantings in Greenland.

### **Budgetary follow-up**

The signed budgetary follow-up is attached and shows

Travel: 10449 DKK

Food: 2329 DKK

Various small purchases for field work: 1965 DKK

Total: 14743 DKK