

Benmore Botanic gardens Internship

20th May 2024 – 6th July 2024



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Peter Baxter- Curator, (RBGE) Benmore botanic gardens

Rob Sowden- Arboriculturist, RS Environmental

Special mention to the rest of the Benmore botanic gardens Grounds Staff from whom I have learned so much.

Introduction

During my placements out in the Netherlands I became fascinated by the world of botanic gardens, I visited numerous botanic gardens while working in the Netherlands which gave birth to the idea of undertaking a sabbatical to gain experience working within a living collection.

My current supervisor who started his career at Royal Botanic Gardens Edinburgh (RBGE) made me aware of Benmore Botanic gardens which caught my attention mostly due to my passion for woody plants and conifers. In applying for the internship programme at Benmore botanic gardens I hoped to gain a deeper understanding of the Procedures around the safeguarding of a living collection and increase my own horticultural knowledge based around plant propagation and species identification.

To make the most out of my internship at Benmore botanic gardens, I intend to visit other botanic and public gardens in the area, furthering my plant knowledge. visiting National trust for Scotland's Crerae woodland gardens And Royal Botanic Garden Edinburgh's Inverleith site.

Objectives

- Familiarize myself with the various methods of propagation- propagating from cuttings, seed's, Air layering and layering.
- Learn the techniques in ensuring the success of planting new species into the garden.
 - Gain a in depth knowledge of the pathogenic threats to the living collection.
 - An introduction to Royal Botanic Gardens Edinburgh's Plant records database.
- Understanding the vital role that Botanical Gardens play in conservation efforts of endangered Species.
 - Networking with likeminded individuals with who I share the same passion.
- Creating a report of my time during the internship at Benmore botanic gardens as a reference for myself and my colleagues at Van Den Berk nurseries.

Week 1

I arrived at the garden and took a walk around the 120-acre site, the views from around the gardens are breath-taking, it truly is an atmospheric garden.



Top Left- taken from Bhutanese temple.
Bottom left- taken from Chilean refuge. **Right**- looking out over the Chilean area.



Tasks-Week 1

- I was introduced to the wonderful gardens team and given a tour of the garden.
 - Potting up various plants in the nursery
 -
 - Watering the plants in the nursery
 - Preparing mulch bags for planting
- Planting climbers at the base of trees (*Nothofagus dombeyi*) in Chile
 - Strimming long grass around collection
 - Mulching around newly prepared areas
- Taking readings from the onsite weather station for the met office

Below- The on site met office weather station, this helps gather information relating to average annual rainfall and temperatures, the gardens receive an average of 3000 mm of rainfall per year.

Below- Pricking out *sorbus monbeigii* a rare sorbus variety native to southern and central China.



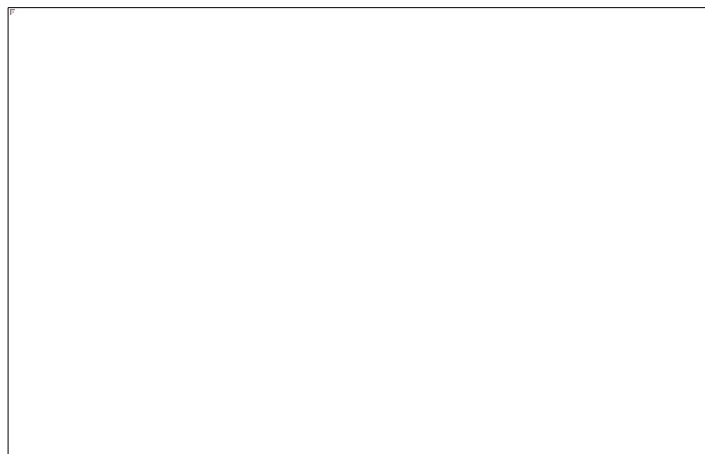
Tasks- Week 2

- Planting *arucarea arucana* in Chilean section.
- Spraying herbicides around plant collection and on invasive and undesirable species.
 - Learning how to mix the compost for nursery use.
- Removal of unwanted bamboo from banking and strimming back shrubbery.
 - Planting ferns in the fern gully.
- Watering the plants and mosses in the fernery and damping down the gravel to ensure an adequate humidity is maintained.

Below- the planting of ferns in the fern gully (*Blechnum spicant*, *Dryopteris arguta*) using ferns grown in the nursery at Benmore.



Below- The fern gully with the fernery at the very top and the area I planted to the left.



Tasks- Week 2



Above- Planting *arucaria arucana* on the Chilean hillside, these trees were propagated from seeds collected in Chile, and form part of the garden's conservation efforts providing genetic information of the species from their native provenance.

Week 3 Tasks

- Planting trailing geraniums in herbaceous beds on the Younger Walk.

- Removal of a *Peiris japonica* infected with phytophthora. Burning of branches and stump on site and collection of leaf litter to prevent spread of spores.
 - Planting ferns in fern beds near the pond.

- Trimming formal hedges and rose bushes in the courtyard.

- Planting *Coriaria nepalensis* on the steep slopes in the Bhutanese section

- Removing *Paris polyphylla 'yunnanensis'* collected by George Forrest, the infamous plant collector of the early 20th century. We potted them on in the nursery with the view to plant them in a more prominent area of the garden in proceeding years.

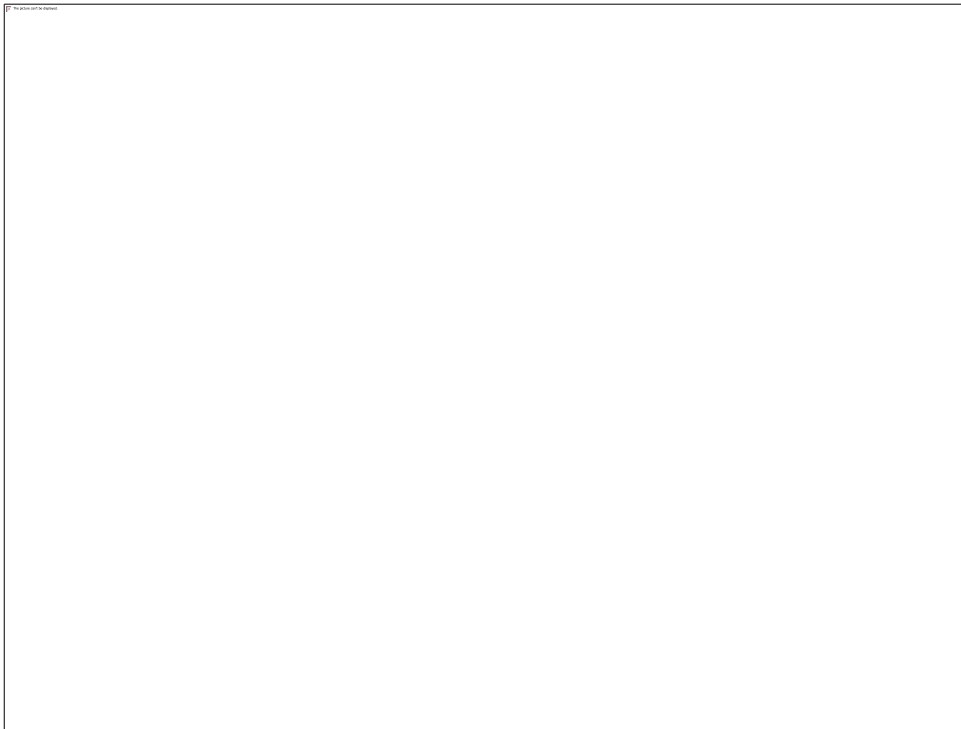
- Spraying weeds and undesirable native shrubs in the Bhutanese section.

- Visit to Forestry Scotland's Kilmun arboretum site with colleagues.

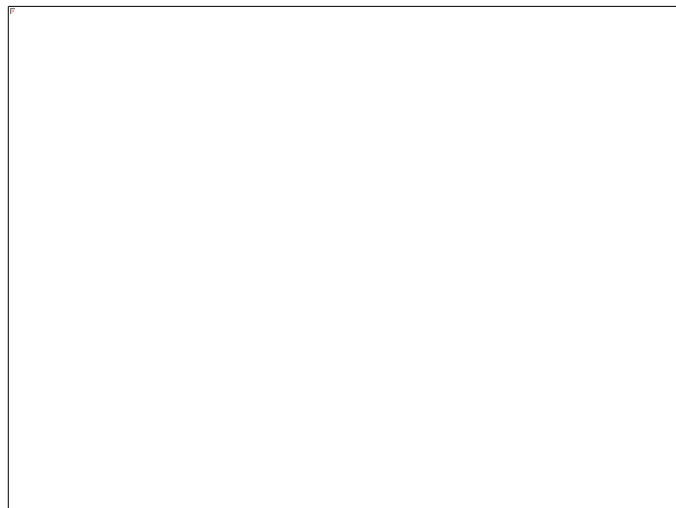
- Celebration of the completion of the Redwood avenue soil amelioration project.

Week 3 Tasks

Below- The redwood avenue at Benmore is Europe's longest and oldest row of giant redwoods (*Sequoiadendron giganteum*). Planted in 1864, by the then owner of the Benmore estate James Piers Patrick who was a wealthy sugar magnet. The trees in recent years began to go into decline due to ground compaction and climate change. In 2022 the avenue project commenced, the entire avenue was subject to Geo injecting and air spading to combat the effects of ground compaction. A meal was rewarded to the staff and I celebrating the completion of the project, after which we gathered at the end of the avenue for the photo below.



Below- Ferns planted in an area that forms part of the botanical gardens lichen trail.



Week 3 Tasks

Below- One evening I visited Kilmun Arboretum with colleagues. The site is owned by Scottish forestry. Established in the 1930s by the forestry commission to trial exotic tree species viability as timber produce in the local environment. The site has continued to remain relevant and is now home to over 150 tree species. Pictured in the photo below is a *Cryptomeria japonica* in the Kilmun arboretum with a virulent canker that causes obscure pointed burs to protrude out of the trunk.

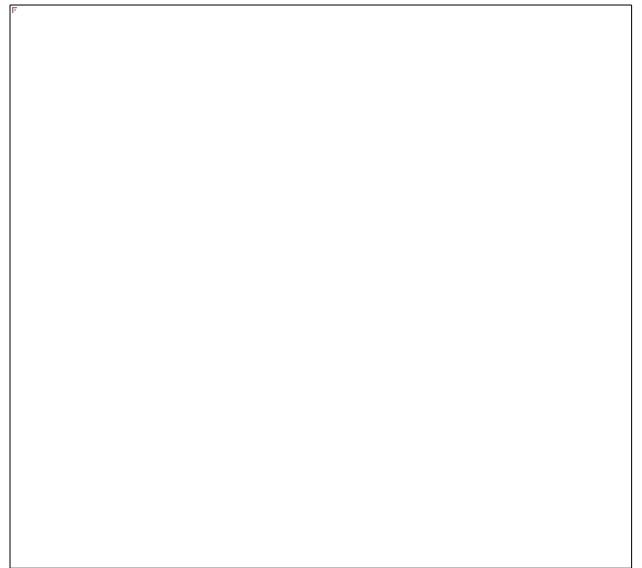
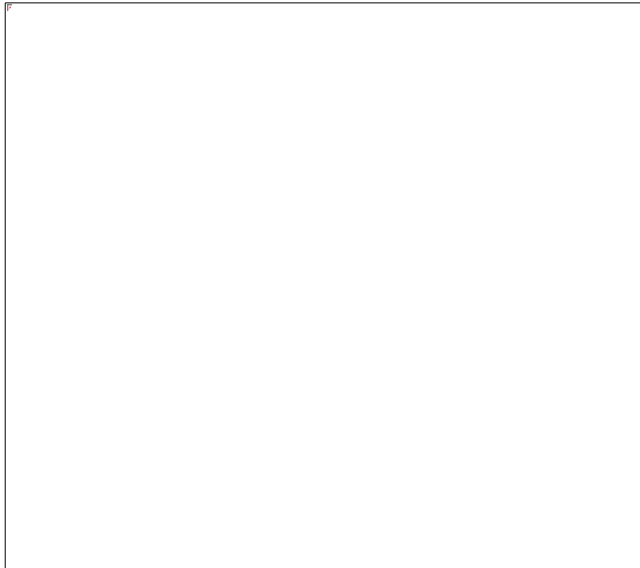


Tasks- Week 4

- Visit to crarae gardens
 - Strimming grass in the open spaces between trees.
- Digging drainage ditches and unblocking pipes. (incredibly high rainfall even in July at the gardens)
- an introduction to the history of the site and to the iris system which records all the plant data for the gardens.
 - Watering plants in the nursery.
- Climbing and crown lifting a sitka spruce (*Picea sitchensensis*), to allow more light to get break through the canopy to accommodate for the newly planted plants underneath.
- Use of a chipper, to chip branches that had snapped out of trees during the high winds.
 - Mixing a batch of potting mix for the nursery.

Tasks- Week 4

Below- At the weekend Michal and I (The supervisor at Benmore) visited National Trust for Scotland's Crarae gardens on loch fyne. The gardens which are set into a gorge are a fantastic example of a woodland garden and offers astounding views of Loch Fyne and the surrounding countryside. Established in 1912 by The Aunt of the English plant hunter Reginald Farrer, who brought plants back from Nepal, China and the Himalayas. Thus, Crarae Gardens has a great collection of rare plant species, including Wollemi pines and rare Rhododendrons. The most notable of plants however is the *Fagus Sylvatica* 'Crarae' which was discovered within the estate grounds by gardeners in the mid-20th century. The leaves of the tree are remarkable, as they are deeply serrated and conduplicate.



Below- *Fagus Sylvatica* 'Crarae' leaves as described in the above text.



Tasks- Week 5

- Visit to RBGE Inverleith in Edinburgh.
 - Propagating cuttings.

- Collecting leaves to press for my personal herbarium project.

- Discovered *austrocedrus chilensis* in a hidden corner of the garden.
 - Watering the plants in the nursery.

- Strimming the grass in the nursery between the glasshouses.
 - Built and fitted the new hose reel for the nursery.

Tasks- Week 5

Visit to Royal botanic Garden Edinburgh (Inverleith)

The other intern Jess and the Benmore apprentice Seb and I were kindly taken to Edinburgh for the day by the senior gardener David Gray. We were given a tour of RBGEs Herbarium collection, The library/RBGEs historic horticultural references and a tour of the botanic garden at Inverleith.

Below- bottom left shows the temperature controlled environment that the samples are kept in in order to preserve them. Bottom right depicts the general lay-out of how specimens are collected and stored.



Below- Bottom left is the storage facility of the rare and delicate books. Bottom right is a plant collectors diary dated from the 16th century.



Tasks- Week 5

Below- Michal and I went around the garden collecting cutting material from *Taiwania cryptomeroides* and *Cunninghamia lanceolata*. here I am propagating the material and then placing them in the misting units for up to 6 months.

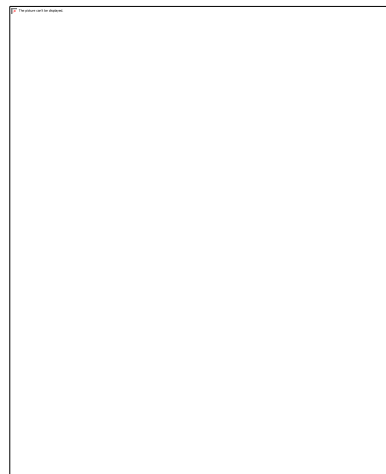


Tasks- Week 6

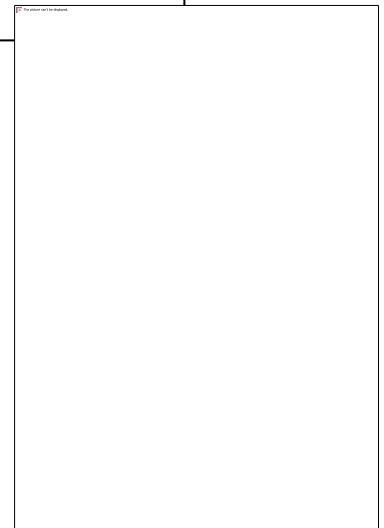
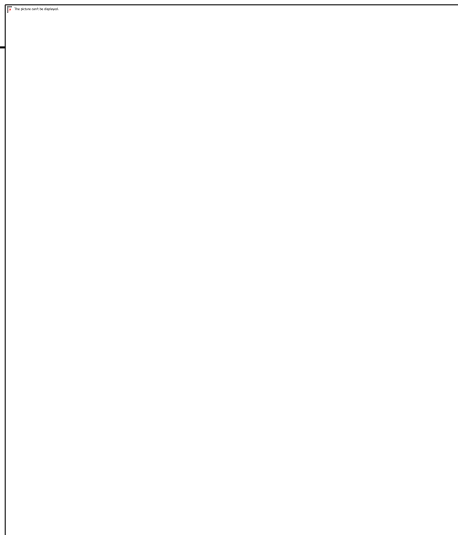
- Milling wooden stakes for use in making deer protection cages for trees.
 - Creating ramp into polytunnel.
 - Mulching around newly planted trees.
 - Air layering endangered trees in the garden.
- Geo injecting compacted and boggy ground around trees (*Picea amorika*)

Tasks- Week 6

Below- The new Polytunnels didn't have ramps in the entrances which meant that the plants would fall over when transporting between tunnels which really irritated me. The team allowed me to construct ramps into the polytunnels to allow hassle free passage.

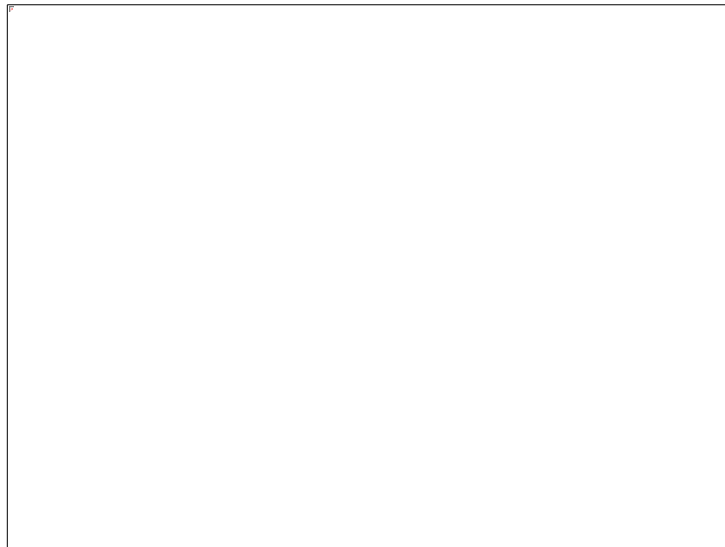
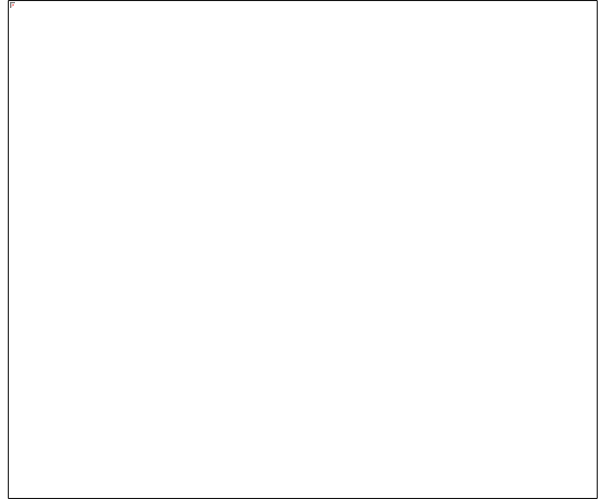


Below- Billy and I milling wooden posts from timber which had been felled in the gardens (mainly *Tsuga canadensis*), in the middle is the machine used to put a point on the stakes.



Tasks-Week 6

Below- The other interns and I were taught how to use the Geo-injecting machine. The machine violently pumps a burst of high pressure air combined with perlite and fertiliser into the ground in order to create more available oxygen in the soil to prevent roots rotting, the perlite prevents the fissures made by the air from closing up.



Tasks- Week 7

- Mulching around rhododendron species in Bhutanese section of the garden.

- Helping to remove a dead tree with David Gray, moving the logs and creating habitat piles.

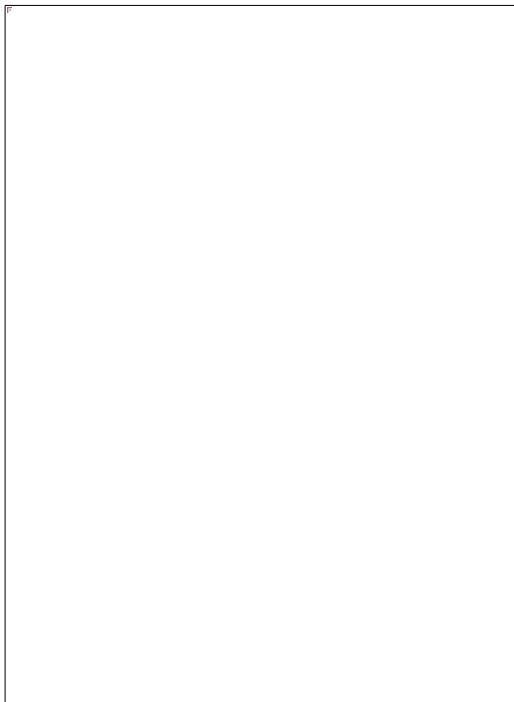
- Digging a new drainage ditch that will help relieve some of the upper parts of the garden from waterlogging.

- Clearing undesirable woody saplings of tsuga and larix to remove competition for light and nutrients to the plants in the collection.

- Weeding herbaceous beds in the 'Golden Gates' area of the garden.

Tasks- Week 7

Below- Air layering is used on species that are typically hard to grow from cuttings or seeds are not consistently viable or at high risk of cross- pollination. Below the team and I are air-layering on a rhododendron species and *Picea mexicana*, a rare conifer endemic to only 2 mountainsides in northwestern Mexico. The process of air layering involves wounding or girdling a scion branch, dabbing rooting hormone along the wound and wrapping a Layer of damp moss around the branch, finally sealed with plastic sheeting. The tree should react to the dark and Damp conditions and create roots in the area, this typically takes 6 months to a year (species dependant) after which the branch may be cut off and planted.



Conclusion

I am most thankful to the merlin trust for enabling the opportunity to undertake the internship at Benmore Botanic Gardens. I thank dearly all the staff at Benmore who invested their own time in teaching and passing on their own expertise.

I have gained vast amounts of horticultural knowledge from this experience, which I will utilise throughout my career in the sector. During the internship my general horticultural knowledge has broadened, I now have a more in depth understanding of plant propagation, handling of cuttings and seeds, Plant pests and diseases and the impacts of such.

Since going back to work at van den berk after the internship I have noticed that my species identification is much better, and my understanding of tree physiology has vastly improved. I can now share my knowledge with my colleagues.

If I had the chance to do the internship again, I would have liked to have gone for a longer period and allowed for more free time to visit other botanical gardens of interest. Unfortunately, I was unable to visit Inverewe gardens due to illness, however I was able to visit other gardens which were equally as intriguing.

I would recommend anyone within the horticulture sector to undertake a sabbatical or something similar. It is a wholly enriching experience and is key to horticultural development. Meeting and engaging with other enthusiastic and like-minded people has been life changing for me. I would strongly advocate for other young horticulturists to undertake the internship with Royal Botanic Gardens Edinburgh Benmore.