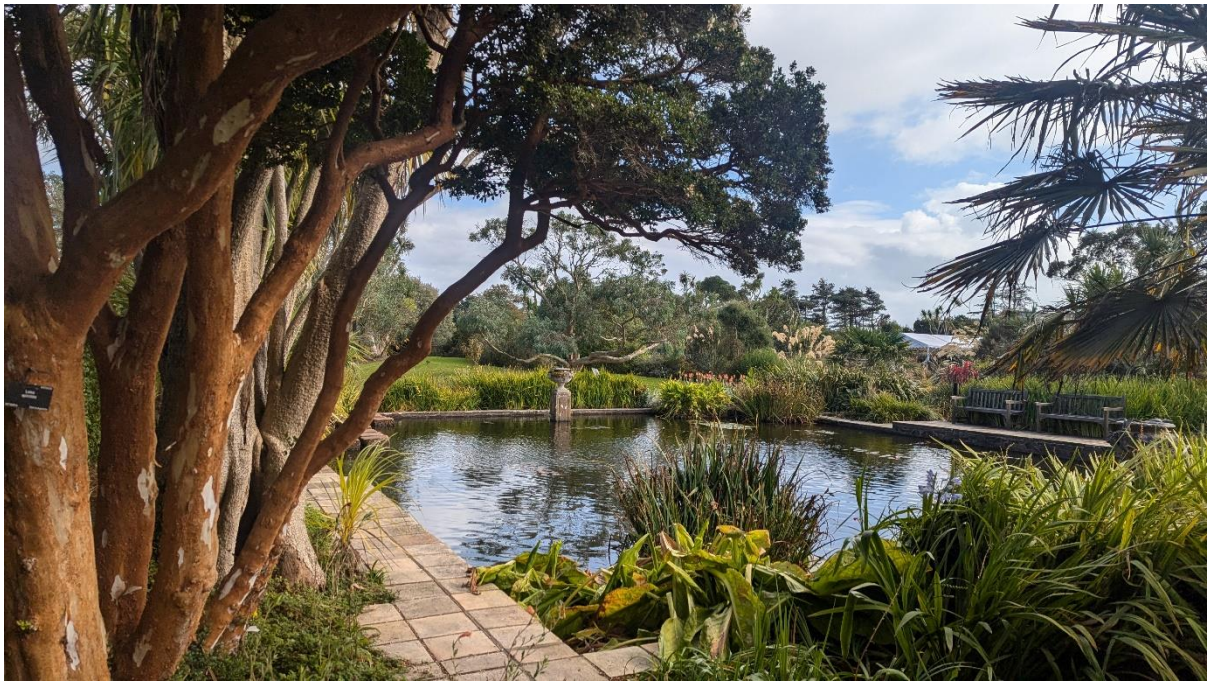
Understanding Chilean Flora Propagation



Picture of the pond at Logan Botanic, Scotland

Erin Carse

Scotland, 9th September – 13th September 2024

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Introduction

Author

The natural world has always been a keen interest of mine. In 2022, I applied for the National Trust apprenticeship to formally begin my studies in horticulture. After completing the program in early 2024 and earning a Level 2 in Horticulture and Landscaping, I was offered a position as a Grade 9 Gardener and Conservation Propagator at Nymans, National Trust. The role has allowed me to deepen my understanding of propagation and fuel my interest in unusual plants.

To support my learning, I have enrolled in additional courses and work placements such as completing a Field Studies Course on fungi and hands-on experience with the propagation team at Wakehurst.

One memorable moment from last year was working with Alice Livingstone at the Wakehurst Nursery, where we focused on potting up rare seaside plants from England's coasts. Alice was developing a propagation plan to ensure future propagation; I found this particular project fascinating. It inspired me to explore further how to propagate plants that are uncommon in cultivation.

I naturally drifted towards the plants with little or no existing propagation data, which aligns with my work at Nymans, particularly in relation to the Chilean Collection. Many of these specimens, were brought back by Harold Comber in the early 1900s, and are endemic to Chile. Although these plants have been grown at Nymans for over 100 years there is still limited data available on how to grow and maintain them outside their native environment.

Acknowledgement

At the encouragement of my Line Manager, Charlene Chick-Seward, I travelled to Edinburgh to collaborate with the Royal Botanic Garden's propagation team. I would work alongside Graeme MacDonald whose experience with difficult to propagate species would be invaluable. During my time there, I had the opportunity to work with experts like Martin Gardner and Sabina Knees, whose extensive knowledge of Chilean I found to be educational as well as interesting.

Project

The Royal Botanic Gardens Edinburgh (RBGE) in Scotland is world-famous for its leadership in plant science, horticulture and conservation. I was lucky enough to be working with Graeme Macdonald, who has been part of the propagation team at RBGE for six years. Earlier this year, Graeme travelled to Chile to collect plant material, worked with experts on Chilean flora and gain an understanding on the natural habitat of the plants. Working with him was an incredible experience as he passed on his firsthand experience to.

In addition, I was given a tour of Logan Botanic, led by Martin Gardner, a leading authority on Chilean flora. Martin has made countless trips to Chile and devoted much of his career to studying the plant life there. Logan has an incredible Chilean collection, and the area has its own microclimate. Martin was able to explain the necessary requirements for most of the plants.

Visiting these gardens not only gave me the chance to observe the plants firsthand but also gain a deeper understanding of the growing conditions required. Many of the plants I am currently trying to grow from seed have limited images and data available online, so seeing them in person has greatly enhanced my knowledge and cultivation efforts.

Aims and Objectives

- Work with experts in propagating difficult or rarely cultivated plants
- Deepen understanding of the importance of plant records and adding to the genetic variety of plant collections
- Learn from Chilean flora experts such as Martin Gardner
- Volunteer with a world class botanic garden that is the leader in growing many of the Chilean flora
- Visit Logan Botanics which has an impressive Chilean collection and works with the RBGE to protect the genetic variety of the collection
- Gain practical knowledge on propagation
- Share knowledge with others including colleagues, other horticulturists and hobbyists

Itinerary

Monday –

- Fly from Gatwick Airport to Edinburgh Airport.
- Arrive at RGBE, meet the team, have a tour of the garden and facilities and help with processing cuttings

Tuesday –

- Travel to Logan Botanic.
- Tour by Martin Gardner – learning the importance of correct naming of plants
- Take cuttings of Chilean Flora
- Went back to Martin and Sabina's house and stayed the night.

Wednesday –

- Visit Threave, National Trust of Scotland.
- Travel back to RBGE and process cuttings taken the day before.

Thursday –

- Re-sow seed Graeme collected from his trip to Chile in March. Adding the new accessions on IrisBG.
- Walk around the South America area in the garden and take cuttings of Chilean plants to process back at the nursery. Also, adding these to IrisBG.

Friday –

- Tour of tropical glasshouses and remaining facilities that were missed on Monday. Re-potted Embothrium coccineum 'Yellow Flame' and Lomatia hirsuta. Checked cuttings and watered. Tidied work area.
- Travelled to Edinburgh Airport to catch flight at 21.05pm back to Gatwick.

Problems

Monday flight from Gatwick Airport was cancelled. Found another flight from Luton Airport so had to buy an additional train ticket that wasn't a part of the original budget. Also, arrived at RBGE much later than originally planned.

Tuesday train from Edinburgh Waverley Station to Lockerbie Station was cancelled. The train service provided a taxi to the station. We left later than we expected, and the journey is longer by car than train, so we spent less time at Logan Botanic than planned.

Friday flight from Edinburgh Airport was delayed by two hours but this didn't affect any further travel.

Report

Monday – 9th September

The beginning of my trip wasn't going to plan. I woke up at 3.30 am, ready to catch my flight from Gatwick at 6.25 am to see that my flight had been cancelled. Fortunately, I was able to switch my flight to leave from Luton, but this meant that I was arriving later than planned. The original plan involved me arriving at RBGE at 9.00 am to have a tour of the garden and facilities and then help with potting some cuttings.

Instead, I arrived at midday and as I walked through the East Gate of the Royal Botanic Garden of Edinburgh, I noticed there were boot mats. The same mats are used at Nymans but only at gateways into the nursery. The mats prevent any contaminants from entering the garden via boots. I liked the fact that these were used in visitor entrances as it is everyone's responsibility to prevent the spread of viruses and diseases. Both RGBE and Nymans suffered from biosecurity issues as a few years ago, RBGE had Phytophthora and Nymans still have Phytophthora-infected sites.

Pictured are cuttings of Cotoneaster ambiguus, Ilex opaca and Deutzia monbiegii and many others.

Graeme MacDonald, who I would be shadowing for the rest of the week, met me at the gate and then went to the nursery. At the nursery gate, there was a boot bath that I needed to dip my shoes in. This showed me how seriously biosecurity was taken here. I was given a quick tour of the glasshouses and Graeme began to tell stories of the trip to Chile he took earlier in the year. It was fantastic to hear about the wonderful country from someone who had been there. I then met a few other members of the propagation team and started to help process cuttings. The cuttings weren't specifically Chilean plants, but it was a good way to meet the team and learn their way of processing cuttings.

One litre square pots were used for most of the cuttings unless the cutting material was rather large it would then go up a size. The cutting compost that was used was an on-site made mixture which consists of Melcourt with John Innes No.2, bark chip and perlite. This mixture allows for good moisture retention and aeration. The lower leaves and buds would be removed from the node and Clonex gel is used on the last node to help promote root growth. Two to three nodes are placed underneath the compost and if the leaves are rather large then they are cut in half. After each plant, the secateurs would be disinfected to reduce further risk of cross-contamination.

At Nymans, we use Jiffy, a premade cutting compost, which is a mixture of compost and perlite. We do not add additional nutrients to the propagation mix but other materials may be introduced to help tweak the properties of the compost, such as woodchip to break up the mixture so that it is aerated. Additionally, the mixture is firmly tampered but at RBGE and done by hand, this is not the case at Nymans. A Clonex gel is only used with the hydro-propagator material at Nymans and not with ordinary cuttings. I may try this with all cuttings to see if this will increase cuttings' success. Finally, it would be beneficial to put into practice disinfecting the secateurs between each plant and so I will be looking at the logistics of introducing this to Nymans.

Tuesday – 10th September

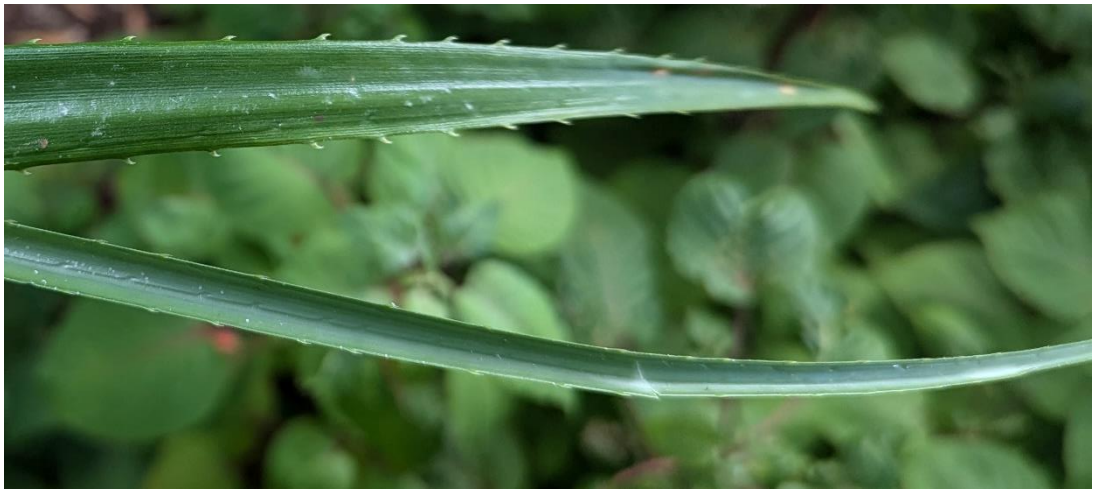
The next day, Graeme and I met at the train station and started our journey to Lockerbie, which is where we would meet Martin Gardner and Sabina Knees and continue the journey to Logan Botanic. Martin Gardner is a research associate at RBGE focusing on the conservation of Chilean flora. Before his retirement in 2021, Gardner worked for RBGE as a co-ordinator of the International Conifer Conservation Program (ICCP). Sabina Knees has dedicated much of her life to plants from the Middle East and has also joined Martin on many trips to Chile.

Pictured above is the UK & Ireland Champion Tree of Polylepis australis

Logan Botanic Garden is in the Southwest of Scotland, not a place where you would think tropical plants would not only survive but thrive, but due to the unique layout of the garden Logan has its own micro-climate. The garden is located less than a mile from the Irish Sea and in the east is Luce Bay so it would be rather exposed to the salt winds from every direction. However, a dense layer of woodland creates a shelterbelt around the garden shielding it from the harsh elements. These features create a microclimate which ensures that the gardens only endure a couple days of frost a year whereas the surrounding areas experience far more. This makes it a great location for tropical plants such as the filo pastry tree *Polylepis australis*.

Much of the day was spent looking around the fascinating garden and taking cuttings to later process back in Edinburgh. Material was taken *from Escallonia myrtoidea* 20130304*J, *Azara dentata* 20110496*F, *Corynabutilon vitifolium* 19980549*G, *Antirrhinum australe* 19813342*C, *Petteria ramentacea* 20091506*A.

Also, I was shown the differences between plants that often get confused with one another. These include *Fascicularia bicolour ssp. bicolour*, *Fascicularia bicolour ssp. canaliculate* (pictured below) and *Azara serrata* and *Azara dentata*. The key differences between the two fascicularias are the bicolour has short, wide leaves that typically have more pronounced spikes, whereas canaliculate has long, slender leaves with spikes that aren't as prominent. This encounter demonstrated to me the importance of witnessing plants in person to further my understanding of key identification factors and the importance of the differences between the plants that are being propagated.



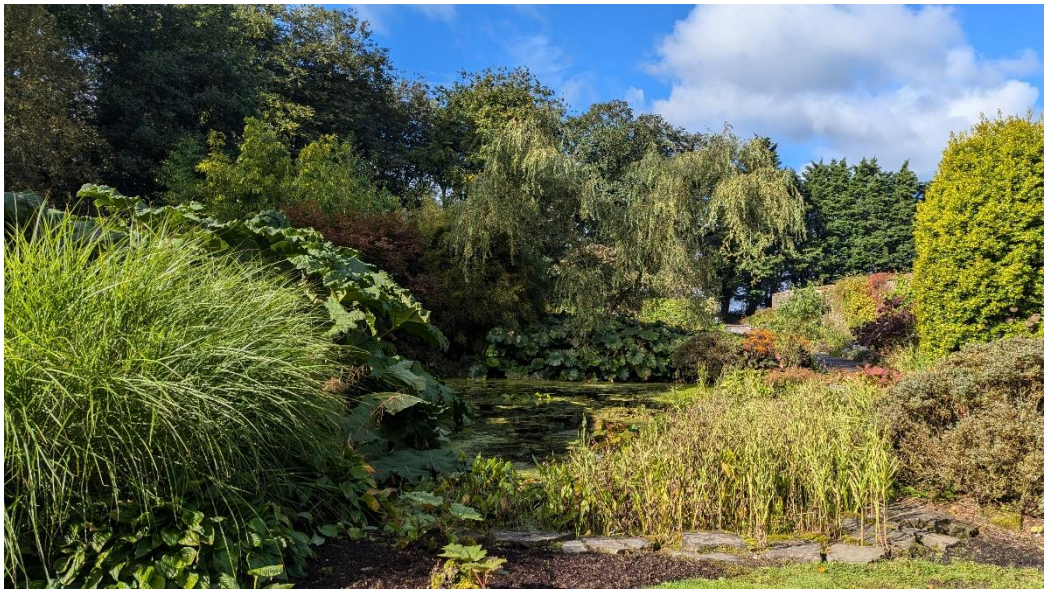
Fascicularia bicolor ssp. bicolour (top) and Fascicularia bicolour ssp. canaliculate (bottom)

After the insightful walk around Logan Botanic Garden, we all headed back to Martin and Sabina's home and had a tour of their garden. The two had collected many interesting plants throughout the years and wanted to display their passion in their garden. There are plans to create *Temu crockshankii* and *Podocarpus sp.* hedges, a filo pastry plant and many more that are sure to make their home in Scotland feel a bit more tropical.

Martin explained that much of Chilean flora prefer to be waterlogged due to the conditions of their native environments, except for *Crinodendrons*, *Eucryphias* and *Azaras*.

Wednesday – 11th September

On Wednesday, we had some spare time before our train back to Edinburgh, so we visited Threave Garden which is part of the National Trust of Scotland. This was very different from Logan Botanic but was still very inspiring. There was only enough time to visit the Walled Garden which is a productive kitchen garden with apple trees and other produce. I admit to being envious of the amount of produce that was evident in the kitchen garden, as I try to grow food myself unfortunately often with little success.



Pond at Threave Garden, Castle Douglas

On the walls, there were plaques stating the aspect, the amount of sunlight it gets in the summer, the average summer temperature of the wall and what plants are growing alongside it. The level of detail was fantastic and presented in a way that was pleasing but informative. In the walled garden there was a glasshouse filled with warm loving tropical plants but beside it was an *Azara* that Martin and Sabina gifted to Threave Garden.

After our trip to Threave Garden, Graeme and I travelled back to RBGE and began to process the cuttings taken at Logan Botanic the day prior. The same method is used as on Monday.

While processing the cuttings, Graeme instructed me on how new cuttings are recorded. At RBGE, the program IrisBG is used to catalogue all plant material be it planted, grown from seed or cuttings. Nymans also uses IrisBG, however, cataloguing is much more of a manual task compared to RBGE. In the propagation house at RBGE, there is enough space for processing cuttings, potting up plants, sowing seeds and much more. In addition to this, there are computers on each bench so that the propagators have access to the plant records. When a plant is propagated it is instantly logged onto IrisBG, and a label is then produced that contains all information about the specimen.

Graeme shared tips and tricks about IrisBG, including what information is most vital to add to a new accession and key shortcuts so that data entry wasn't too time-consuming. I have taken this knowledge back to Nymans and shared it with the team to improve our user experience of the program.

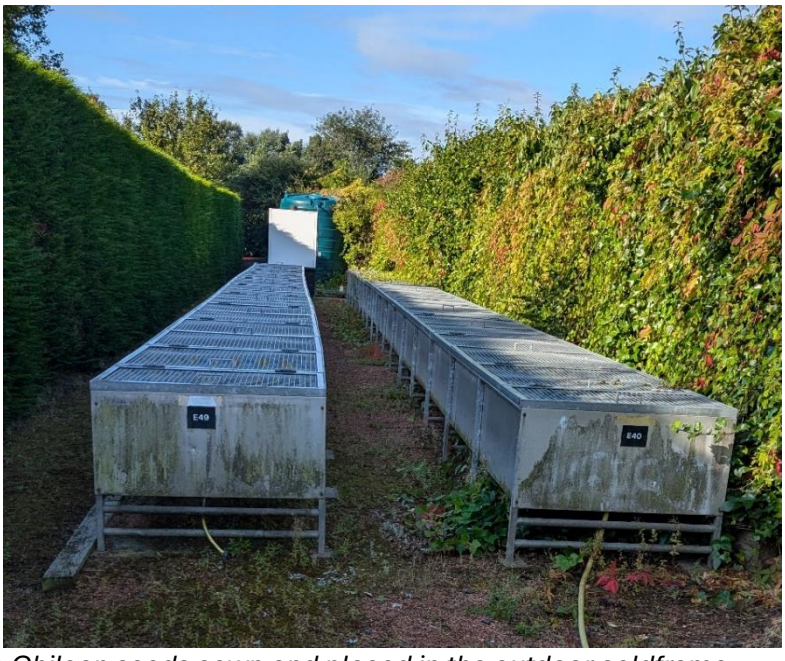
Thursday – 12th September

My first full day working at RBGE was on Thursday. The day began with seed sowing, these were seeds and material that Graeme collected from his trip to Chile in March.

The seed sowing compost mix consisted of Melcourt peat-free growing mix with the addition of bark chips to make the mixture more aerated. The compost was tamped by hand and then the seed was scattered over the compost with a layer of horticultural grit on top. These were placed outdoors in a raised cold frame that has an irrigation system through the centre, that is essentially a hose pipe with holes throughout it so when the water is turned on everything is watered evenly.

List of the seeds sown:

- *Senecio bahioides*
- *Lathyrus magellanicus*
- *Cistanthe laxiflora*
- *Puya gilmartiniae*
- *Solenomelus peduncula*
- *Cisanthe grandiflora*
- *Berberis actinacantha*
- *Senecio sp.*
- *Drimys winteri*
- *Sisyrinchium cuspidatum*
- *Lepechinia salviae*
- *Ercilla spicata*
- *Berberis microphylla*



Pictured above are the Chilean seeds sown and placed in the outdoor coldframe.

Every time a seed is sown, it is recorded onto IrisBG, and a new accession number is created. Accession numbers are an additional way to identify individual plants. For example, a *Taxus baccata* hedge isn't just one plant created into a hedge, it is often many of that one type of plant. By giving each *Taxus baccata* plant, in the hedge, an accession number the process of identifying the individual plants will be easier in the future. So, if part of the hedge dies and is replaced that plant can be recorded as dead rather than stating that the entire hedge died. It's also a great way to identify plants that are wild collected and those that are propagated from that plant in the garden.

I was taken on a tour of the South American beds at RBGE. It was eye-opening to see more examples of established plants that I was trying to propagate back at Nymans. These sightings were invaluable to me as I gained a true understanding of the plant's preferred climate and positioning and the habits of the genus.

*Legrandia concinna ESCOB – 19990656*E from RBGE*

During the tour, cuttings were taken from:

- *Myrceugenia lanceolata*
- *Legrandia concinna*
- *Gomortega keule*
- *Acrisione cymose*
- *Lardizabala funaria*
- *Myrceugenia colchaguensis*
- *Berberis negeriana*
- *Aextoxicon punctatum*
- *Citronella mucronata*
- *Clinopodium gilliesii*
- *Nothofagus alessandrii*

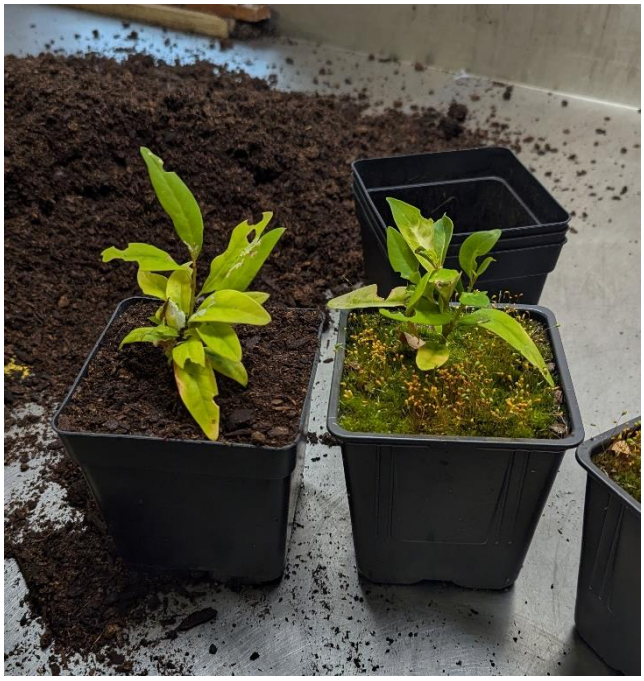
Berberis negeriana and *Aextoxicon punctatum* are plants that we are trying to propagate at Nymans. Berberis is a particularly tricky species to successfully propagate. According to RBGE, it is best practice not to keep berberis cuttings on heat and instead keep them outside in a

sheltered but sunny area. Previously, I have been keeping berberis cuttings on heated benches but now learning about tried and tested techniques I will update my methods and hopefully see much more success with rooting.

Friday – 13th September

The final day at RBGE included a tour of the tropical glasshouses and the remaining facilities that were missed on Monday, this included the quarantine area that is in the process of being built.

The rest of the day was spent re-potting *Embothrium coccineum 'Yellow Flame'* and *Lomatia hirsuta*. The reason for re-potting these plants was to change the compost as it seemed to be holding onto a lot of moisture and preventing the plants from growing at their usual rate.



Pictured are Embothrium coccineum 'Yellow Flame'

We finished the day by watering the newly re-potted plants, cuttings and seeds from the previous days. Also, tidying all work surfaces to keep the workspace clear and free from any possible cross-contamination.

Later, I travelled to Edinburgh Airport to catch a flight at 21.05 pm back to Gatwick Airport.

Conclusion

To review, the working experience at RBGE and the trips to Logan Botanic Garden and Threave Garden were incredibly valuable to me in the early stages of my horticultural career. The people that I met on this trip were experts in their field and well-educated on all sorts of methods of propagation. I was able to absorb as much knowledge from them as I could and much of the information will help not only back at Nymans but in my future in the horticultural industry.

Furthermore, my interest in plant recording, collections, and genetic information has bloomed during my time at Logan Botanic Garden and RBGE as I now have a deeper understanding and appreciation for plant history and genetic variety. Without these, there would be a lack of purpose and importance as to why these collections and plants should be protected.

I believe plant record programs, such as IrisGB and Floria, should be easily accessible to other gardens and the public so that history and plant identification information isn't locked away and potentially lost. To add to this point, I strongly believe that gardens should work together more often, to share material, especially of significant plants, to prevent the potential loss of the species altogether. Ideally, plants that are in the Harold Comber collection (and other collections) at Nymans would be propagated regularly and anything spare should be gifted to nearby gardens that had connections with Nymans or sent to the National Trust PCC (Plant Conservation Centre) so that propagation methods can be studied, and the material is in a bio-safe environment.

Future Plans

This trip and the people that I met have truly inspired me to continue the momentum of plant conservation and propagation. Therefore, I will share all the knowledge I absorbed from this trip with the propagation team at Nymans and the Chile Flora group that visited Nymans earlier in the year. This includes propagation techniques, compost mixtures, helpful features on IrisGB and other information from records that will help us identify plants.

Additionally, I would like to try new forms of propagation, such as grafting and micro-propping, and compare the difference in success rates and viability. Potentially, the training for this could be done either via National Trust by going to the PCC and learning from the team or finding something externally.

Finally, the goal is to travel to Chile to work with local horticulturalists and see the plants in their natural habitats.

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Appendices

Appendix 1: Budget

ITEM	COST
Flights	£134.94
Train Fare	£58.84
Bus Fare	£15.00
Accommodation	£719.00
Food	£126.17
TOTAL	**£1053.95**
Merlin Trust – Merlin 857	£625.00
RHS Bursary Award	£325.00
Personal Contribution	£103.95