

Madeira Bursary Report

By Elizabeth Richards

Table of Contents

1. Introduction	2
1.1 Background	2
1.2 Aims & Objectives	3
1.3 Itinerary	4
2. Visits.....	5
2.1 Monte Municipal Garden and Santa Catarina Park	5
2.2 Field Trip Across Natural Biomes	6
Pico do Arieiro	6
Laurisilva	7
Ribeira Brava	8
2.3 Monte Palace Tropical Garden and Funchal Botanic Garden	9
Key insights:	10
2.4 Palheiro Gardens	10
2.5 Private Gardens Visit	11
2.6 Quinta Vigia Gardens	12
3. Conclusion	14
3.1 Summary - What have we learnt?	14
3.2 Threats and challenges for Madeiran horticulture:.....	14
3.3 Applying our findings to a UK context:.....	14

1. Introduction

1.1 Background

Madeira, an archipelago in the Atlantic Ocean, is renowned for its rich and diverse flora. Its mild, subtropical climate, combined with varied temperatures and complex topography, including steep mountains and deep valleys, creates multiple microclimates. These conditions have significantly contributed to the island's unique biodiversity and continue to influence its plant development. In April 2024, the Horticultural Apprentices at RHS Wisley completed a six-day trip to the Madeira, visiting various botanical and public gardens and participating in a field trip to observe native and endemic plants across different biomes. The primary focus of the trip was to investigate how microclimates affect plant growth across the island, and to understand how different plants thrive in specific environmental conditions. Where appropriate, we also wanted the opportunity to apply some of these findings to a UK context, particularly in relation to various gardening styles at Wisley. We believe this will allow for more informed decision-making when selecting plants for a changing climate.



1.2 Aims & Objectives

We developed a series of research questions to refer to when observing different parks, gardens and landscapes:

1. Sustainable horticulture practices

Have any gardens implemented practices aligned with sustainable horticulture, such as resource efficient irrigation and reduced use of pesticides?

2. Objectives of planting styles

What are some of the primary objectives influencing planting styles in parks and gardens? Are styles mainly driven by aesthetic goals, ecological considerations, or a combination of both?

3. Threat and Impact of pests and diseases

How are individual gardens addressing the impact of pests and diseases on plant life? What strategies are in place to mitigate these challenges?

4. Plant conservation

How are efforts directed towards the conservation of native and endemic species?

5. Exploring cultivation methods

What similarities and differences emerge with cultivation methods across the gardens, particularly when compared to practices in the UK?

1.3 Itinerary

Monday 22nd April

Monte Municipal Garden- A public garden situated at a higher altitude, between 543 and 586 metres above sea level. Characterised by its natural surroundings and has a diverse botanical collection, comprising of indigenous species and centennial trees.

Santa Catarina Park- One of Madeira's most popular parks, used as a multi-purpose green space for locals and tourists. Includes wide variety of trees, shrubs and flower beds.

Tuesday 23rd April

Field Trip • Field trip to explore different biomes with horticulturist Michael Benedito, including temperate forests, 'alpine' zones, and coastal areas.

Wednesday 24th April

Monte Palace Tropical Garden- Showcases temperate plants that are endemic to the region, as well as a collection of ferns, Bamboo and ornamental grasses

Funchal Botanic Garden- One of Madeira's main Botanic Gardens with more than 2000 exotic plants, which includes indigenous and endemic collections, a tree garden, succulent area as well as an extensive medicinal and edible collection

Thursday 25th April

Palheiro Gardens - Set in the Hills of Funchal around 500m above sea level and has a range of temperate trees as well as a Camellia collection. Incorporates both traditional English garden, and South African planting styles.

Friday 26th August

Quinta Jardim du Lago- An ornamental garden situated in the hills with open areas and sheltered zones. The garden has a diverse range of epiphytic and aquatic plants, as well as a collection of old and rare tree species.

Tour of private gardens with Michael Benedito

Saturday 27th August

Boa Vista Orchids (Cancelled due to unforeseen circumstances) An extensive orchid collection including Cymbidiums, Cattleyas and Paphiopedilums. As well as other genera such as Passiflora, Hibiscus and Bromeliads (All of which can be found in Wisley's glasshouse).

2. Visits

2.1 Monte Municipal Garden and Santa Catarina Park

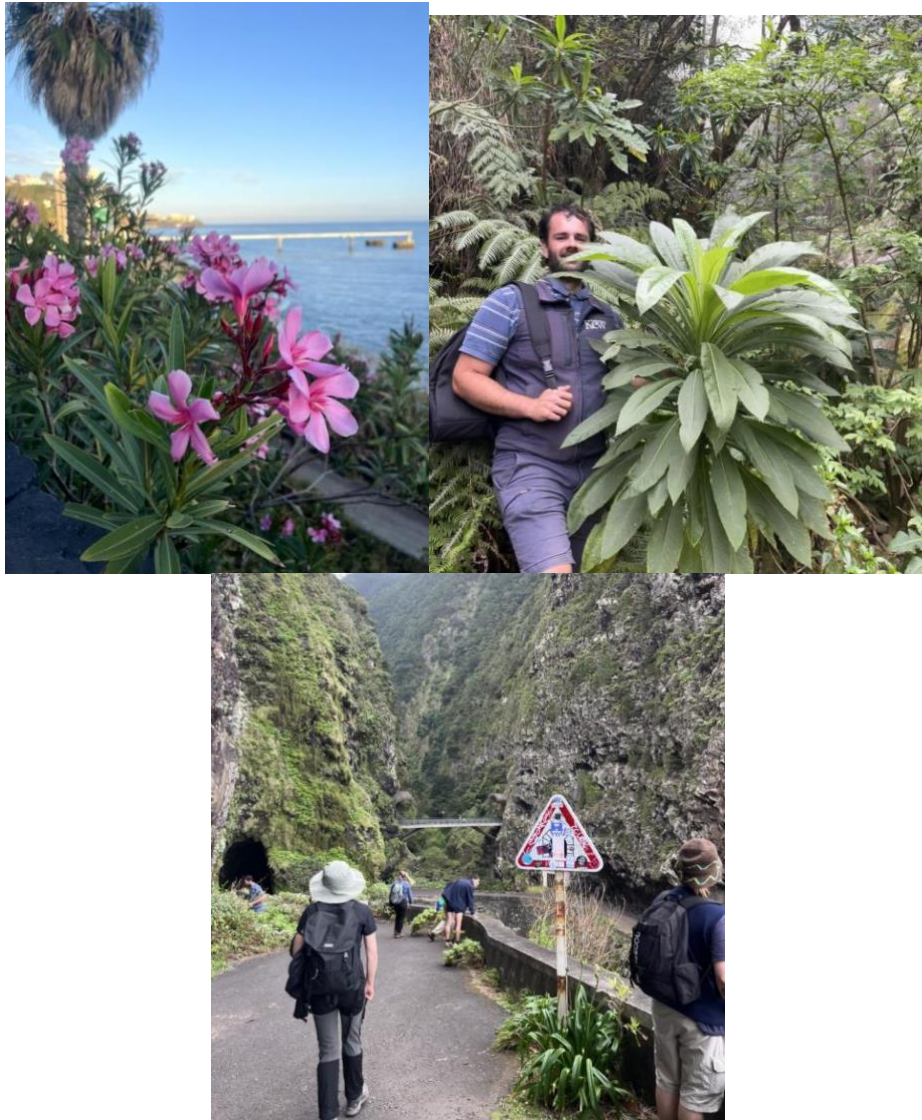
On the first day of the trip we explored two of the urban parks in the centre of Funchal. The first garden we went to was Municipal Gardens, this was around 8,300 square metres and was situated surrounded by buildings. The garden had a range of beautiful flowers. Plants and mature trees were seen, some were indigenous to Madeira and some weren't. Although we went in April we saw a whole range of plants in flower such as salvias, begonias, echium and Strelizia, these were in full flower due to Maderia's warm climate which starts much earlier in the year compared to the UK. Madeira does not need to consider the risk of frost on plants as they never get it.

The second garden we visited was more exposed and was on the edge of the centre overlooking the sea. The planting reflected these conditions with more dry plants such as agave, cactus and yuccas. The planting style for this was very pleasing as they planted in normally big groups, rows, shapes or with borders, which compared to the tropical cottage garden we get in the UK was very striking and made an instant impact. The planting really ranged in exotic foliage and colours. Both the gardens were very well looked after and maintenance work was seen taking place in both gardens. The biggest thing which stood out to me was how the majority of the plants in the public parks had plant labels showing their latin name, common name and where the plant originates from.



2.2 Field Trip Across Natural Biomes

We met up with Horticulturist Michael Benedito. Michael, who is a local to Madeira, took us on a field trip to explore three different biomes on the island. Key sites of interest included temperate forests, ‘alpine’ zones, and coastal areas. It was an opportunity for us to observe native and endemic species in the wild, compare plant development across different climatic zones, identify invasive plant species and understand how they impact ecosystems.



Pico do Arieiro

Our first stop was to Pico Arieiro, the third highest peak on the island, with an altitude of 1,818 metres. Its high altitude means there are cooler temperatures and more exposed conditions.

Here we observed many of the endemic alpine plants to the island that are able to grow at this high altitude including; *Plantago malato-belizii*, *Viola paradoxa*, *Dactylorhiza foliosa*,

Ranunculus cortusifolius, and *Echium candicans*. We also observed some of the non-native species which have naturalised here such as Gorse and Pines, and *Woodwaria radicans*, which is a fern that is considered to be a living fossil



Laurisilva

Our next stop was a Levada trail through an area of the Laurisilva Forest. The Laurisilva forest is a UNESCO world heritage site. It is a 20-million-year-old, sub-tropical rainforest with cool, humid conditions, and evergreen trees. These forests cover around 20% of the island's surface at varying altitudes. They are dominantly Laurel with a lush understory comprising of different ferns, mosses, and lichen.

We observed the native Laurel and endemic blueberry (*Vaccinium padifolium*). The native Holly (*Ilex canariensis*) has no spines due to there being no natural herbivores on the island.

Michael pointed out that many of the endemic plants, that may have otherwise been herbaceous plants, have adapted to form long woody trunks to help them compete for light in the forest.

Ribeira Brava

Our final stop was to visit the coastal areas in the Ribeira Brava region of the island. The soil's fertility in this region means that there is much agricultural activity, and the conditions allow for cultivation of bananas and sugar cane. The coastline is home to many succulent type plants which are adapted to the free draining, exposed conditions.

Along the coastal cliffs we observed many of the plants endemic to Maderia growing out of the rock faces. We observed the endemic Geranium, which is critically endangered on the island, and this colony is thought to be one of the few remaining. We also saw the *Euphorbia piscatoria*, which is a semi-succulent shrub, and is known as the 'fish-stunning spurge.' This is because the latex within the plant was used by fishers to stun fish and make them easier to catch. We also noted many of the non-native species along the coastline that thrived in those conditions such as the Agave, Nasturtium, cacti, and palms.

2.3 Monte Palace Tropical Garden and Funchal Botanic Garden

Monte Palace, 600m above sea level, is a historic and picturesque garden with a large collection of Cycads and endemic species. The steep slopes and landslide-prone ground make gardening intensive, and tree ferns exacerbate these issues as they are invasive in Madeira. Despite challenges, horticulturists create stunning displays, with UK plants like Wisteria thriving alongside tropical species such as *Monstera deliciosa*. Cycads are hand-pollinated, and efforts to conserve endemic species include the Lily of the Valley tree (*Clethra arborea*), Madeira Geranium, *Echium candicans*, and *Scilla madeirensis*. Seeds are often donated to the forest service for conservation.



Funchal Botanical Garden, established in 1960 from a former private residence, is located 200-300m above sea level. It features an arboretum, succulent, tropical, agricultural, and medicinal gardens, along with an area for endemic plants and South American bromeliads. The garden is essential for climate change monitoring, with Madeira's climate averaging 70% humidity and 16°C, dropping 0.7°C per 100m altitude gain. Highs can reach 27°C, with a 3.5°C annual increase. Strong winds have reduced humidity recently. The volcanic soil is nutrient-rich but heavy, with a pH of 5-7. Surprisingly, pesticides and insecticides are still heavily used due to invasive pests, likely from imported food.



Key insights:

- Bananas and sugar cane are grown for export, while avocados, mangoes, and papayas are for local consumption.
- Apples and oranges are imported from South America and the Algarve.
- Madeira relies heavily on imports from Europe and South America.
- High tourism demand increases produce costs.
- Terraced and high-altitude agricultural land requires hand labor, making it costly and leading to abandonment.
- Former agricultural workers have shifted to service and tourism industries.



2.4 Palheiro Gardens

On our 4th day we attended Palheiro Gardens, set in the hills to the east of Funchal. Upon arrival, we were met with the feeling of a typical English/ Cottage aesthetic with a vast variety of impactful plants, a true testament to the islands fertile soil.

The formal garden had many design elements that you would expect in such a garden, such as topiary, lawns, crisp edges and water lily canals dotted around. Unlike some of the more ecological initiatives of the other gardens visited on the trip, this garden was packed full of plants from all over the world and wasn't limited to those native to Madeira, but was there more as a visual showcase.

When looking into the history of the gardens, we learnt about its predecessors which gave us an insight into why the garden contains the range that it does. In 1912 the property was passed onto John Ernest Blandy, whose wife Elinor, born in Washington looked after the grounds, bringing in trees from America - notably Sequoias and Liriodendron's. In 1930, the garden was then inherited by Graham who married Mildred, born in South Africa, a passionate gardener who imported many plants from different parts of the world - notably Proteas from South Africa.



2.5 Private Gardens Visit

As a way to contrast public parks and gardens, we visited the hotel Quinta Jardin du Lago and a private garden in Funchal's busy center, both managed by Michael Benedito but with different aesthetic goals. The private garden was experimental, reflecting an English garden feel desired by its owner. It featured a wildflower meadow and mixed border with plants like Achillea, Salvia, and Cosmos. Some plants, like Peonia and Convallaria majalis, are stored in fridges to meet their cold needs, while succulents and Tillandsia adorned a pergola.

Conversely, the hotel's garden housed rare plants from around the world, such as Platycerium bifurcatum and Cinnamomum camphora, and aimed to diversify further. It also included a cut flower and vegetable garden for the hotel kitchen. Both gardens are irrigated regularly, with composting areas and log piles. The consistent climate eliminates a main pruning season, and

plant competition is a key concern. Lawns mix with clover for its nitrogen-fixing benefits. Native plants are propagated onsite due to limited land in Madeira.

This visit highlighted how a warmer UK climate may impact pruning and planting, with certain plants outcompeting others. Sustainable irrigation methods and alternative grass mixes are crucial for future gardening practices.



2.6 Quinta Vigia Gardens

We intended to visit Quinta do Boa Vista, which is a small orchid garden and nursery. Due to the prominent orchid collection at Wisley, we were keen to compare cultivation practices between the two locations. However, upon arrival, the garden was unexpectedly closed, and we couldn't reach the curator.

With this visit no longer an option, we decided to visit Quinta Vigia Gardens, which is the official residence of the president of the regional government, located in central Funchal.

This garden reflected similar to what was seen in the public parks, a range of striking foliage and flowers. They had citrus trees planted with big circles of built up soil around the tree to stop the water from running away (a bit like a rubber ring around the plant) which we also do in the UK. The beds had irrigation running through them, as they plant for the heat but not for the drought so they are required to water a lot.



3.Conclusion

3.1 Summary- What have we learnt?

It has been interesting to learn about endemic plants and how they adapt and become unique to their specific areas over time due to the process of evolution. It has also been interesting to see the interplay between the native plants and the non-native plants which have been introduced by humans. We have learnt that the main threat to the survival of these endemic plants is from the non-native plants and human activity.

Additionally, the impact of human activity was apparent across Madeira, with just the introduction of Eucalyptus causing landslides, forest fires, and the extinction of plant species. Plant conservation will become even more vital if the UK climate warms. We now have a greater understanding of the complexities of managing trees in a sloped garden, and the importance of onsite propagation when managing private gardens. We will continue to draw on what we have learnt from this trip throughout our careers.

3.2 Threats and challenges for Madeiran horticulture:

- **Monocultures**- not much emphasison sustainable growing for local consumption
- **Invasive species**- Affecting Madeira's ecology
- **Pesticide** still heavily used in parks and gardens
- **Landslides** affecting soil erosion, fertility and drainage-
- **Plant conservation** not regarded as a government priority
- **Pests and diseases** are threats to endemic and native species
- **Decline** in local produce due to the island's role in growing crops for international exports



3.3 Applying our findings to a UK context:

- Focus on **heat tolerant**, not just drought tolerant planting
- Incorporate cacti and hardy succulents to planting schemes
- Possibility of us gradually moving away from 'traditional' English garden styles (as demonstrated at Palherio Gardens)
- Monitor specimens frequently for evidence of climate damage
- Prioritize and protect our endemic species
- Continue to improve biosecurity measures, as pest numbers could drastically increase with temperature changes

