My visit to Tresco Abbey Garden

View across Tresco Abbey Garden from the Top Terrace

A report for the Merlin Trust

Svenja Burckhardt, March 2011

Introduction

In early 2011 I was fortunate enough to visit Tresco Island and spent an amazing two weeks volunteering at Tresco Abbey Garden. Working surrounded by exotic plants, many of which previously had been unfamiliar, was a dream come true. On Tresco, Chilean myrtles (***Luma apiculata***) grow to many meters high, showing off their stunning bark in the sunset, Norfolk Island pines (***Araucaria heterophylla***) provide a strong architectural component to the garden while colour is provided by many of the large proteaceous shrubs at this time of the year.

Araucaria heterophylla and ***Leucadendron*** 'Safari Sunset' at Tresco Abbey Garden

Luma apiculata (Chilean myrtle)

The main aim of my visit was to learn more about these plants, which mainly come from the Mediterranean climate zones of the world. I was especially interested in finding out more about the members of the Proteaceae, their cultivation, propagation and morphology. Tresco Abbey Garden, with its vast plant collection and its experienced garden staff, proved to be the perfect place to do this.

A brief history of Tresco Abbey Garden

To fully appreciate Tresco Abbey Garden, one has to start with its history and the story of its controversial founder Augustus Smith, who, in 1834, took out a 99 year lease for the entire Isles of Scilly from the Duchy of Cornwall. Although the rent was insignificant, the crown stipulated that improvements had to be made to the islands' deteriorating economy, a task that was to become Augustus Smith's life work. Although Smith's approach was contentious and gained him few friends, he managed to provide employment for all those that wanted it and most famously introduced compulsory education, forty years before this occurred on the mainland.

Cupressus macrocarpa at the top of the Neptune Steps

Augustus Smith soon realised that the virtually frost-free conditions and the sheltered position of Tresco, in the middle of the Isles of Scilly, provided a unique opportunity to create an exotic garden. However, although the island has a mild climate, protection had to be provided from the strong, salt-laden Atlantic winds. Augustus Smith quickly found that ***Cupressus macrocarpa*** and ***Pinus radiata*** were salt tolerant and quick growing and he used these species to plant a shelterbelt. With the shelterbelt in place and growing tall, Smith set out collecting plants and the Abbey Garden and its plant collection developed rapidly from there on.

Although the climate on the Isles of Scilly, in general, is mild and benign, there have been a number of climatic disasters in the past, destroying large parts of the garden each time. First, much of the shelter belt originally planted was destroyed by a massive storm in 1929. More recently, snow in 1987 and the hurricane of 1990 caused great damage. Each time, however, the garden has been restored and replanted.

Today the garden displays many striking plants from areas such as Chile, California, South Africa, Australia, New Zealand, Macaronesia and the Mediterranean Basin. This is made possible by Tresco's microclimate which is characterised by the mild temperatures provided by the Gulf Stream and its sheltered position in the centre of the Isles of Scilly.

The plants of Tresco Abbey Garden

Tresco Abbey Garden's plant collection is unique to the British Isles and I imagine that most visitors will admire the vast range of plant species that can be found here. However, to get to know the garden and appreciate its plants fully, there is no better way than becoming part of the gardening team, even if it is for a limited time. And for me this is an experience I would not want to be without.

Tresco Abbey Garden has been built on a rocky, south facing slope overlooking St Mary's. The tall wind-breaks channel the weather upwards, over the three major walks of the garden: the Top Terrace, the Middle Terrace and the Long Walk. All three terraces run from east to west and are linked by a network of assorted paths, steps and enclosed spaces, including the Mediterranean Garden and the Old Abbey. The different sections of the garden provide a number of different microclimates, allowing plants from all corners of the globe to thrive.

Plants from all corners of the globe (clockwise from top left corner): self-seeded ***Aeonium*** sp. (Canary Islands) growing on the trunk of a palm; ***Fascicularia bicolor*** (Chile); ***Furcraea longaeva*** (Mexico); ***Banksia*** 'Giant Candles' (Australia); ***Polygala myrtifolia*** (South Africa); aerial roots of ***Metrosideros tomentosa*** (New Zealand); ***Dasylirion*** sp. (Mexico)

The Top Terrace must be my favourite area of Tresco Abbey Garden. In addition to stunning sea views, it is also the part of the garden where some of my favourite plants thrive. The Top Terrace best suits those plants from hotter and dryer climates. The soils are free draining, nutrient-poor and the conditions are windy with high light levels, reflecting the hot dry conditions found in South Africa and Australia. A large number of members of the Proteaceae family grow here, including those belonging to the genera ***Banksia***, ***Protea***, ***Grevillea***, ***Dryandra*** and ***Leucadendron***. And even though this year's winter has been harsh, bringing some snow to Tresco, I was lucky enough to see many of the proteaceous species in flower during my time at the garden.

View from the Top Terrace towards St Mary's

Lower down at the heart of the garden is the Middle Terrace. The more protected slopes here provide shelter for a quite different group of plants, chiefly those from the Canary Islands, Mexico and Chile. For example, at the eastern end of the Middle Terrace you can see ***Fascicularia bicolor*** (Chile) and ***Agave*** sp. (Mexico) clinging to a rockery, while further down you can find ***Phoenix canariensis***, ***Echium*** sp. and ***Aeonium*** sp., all of which are native to the Canary Islands. Near the Old Abbey there is also one of the huge ***Quercus ilex*** hedges, which are so typical for this garden and crucial for providing shelter. I remember one of this year's students telling me how they gave this hedge its annual trim earlier in the season. Ten metres up a ladder with a hedge cutter, secured by a rope - a challenge I am glad I didn't need to face during my time at Tresco Abbey Garden!

Quercus ilex hedge flanking the Middle Terrace

The Old Abbey

The Long Walk

At the bottom of the south-facing hillside at Tresco Abbey Garden is the Long Walk. The soil here, and in the lower parts of the garden, is deep and the large, mature trees which have been allowed to grow here provide a shady environment with good water retention. This area thus is suited to many species which usually require higher rainfall than experienced on Tresco and include many species from New Zealand. Huge ***Metrosideros excelsa*** trees provide shade to species which best grow out of direct sunlight, including ***Rhopalostylis sapida***, ***Cyathea medullaris*** and ***Dicksonia*** sp. When working in this area, I also noticed that a number of plants native to the temperate rainforests of Chile were growing here, including ***Mitraria coccinea***, ***Lapageria rosea*** and ***Philesia magellanica***. Andrew Lawson, Tresco Abbey Garden's head gardener, explained to me that the shady conditions are perfect for these plants, which prefer growing out of direct sunlight. To ensure they receive enough moisture and nutrients, the soil had to be enriched with fish, blood and bone and large amounts of compost and water retaining gel had to be added. Although neither of these three stunning plants was in flower during my visit, I was able to admire the bloom of two other beautiful plants native to South America: ***Brugmansia sanguinea*** and ***Bomarea caldasii***.

Brugmansia sanguinea

Bomarea caldasii

Proteas - cultivation, propagation and morphology

Tresco Abbey Garden has the perfect conditions to grow proteas* and these plants are therefore very well represented throughout the garden. Proteas generally favour a sunny and open position and an acidic soil that is low in nutrients. Fertilisers, especially those containing phosphates, can be detrimental to proteas, scorching their proteoid roots. Hoeing and other cultivation techniques should also be avoided, as the proteoid root system can be found mainly near the surface of the soil. It is often believed that proteas do not like water, as they come from dry climates. However, while most proteas are not tolerant of water logging, they usually thrive on quite large amounts of water provided the soil is free draining. In fact, plentiful water is thought to help wash away salts that otherwise may accumulate in the soil. Good air circulation is also crucial, as these plants are prone to fungal infections in humid conditions. It is therefore not surprising, that proteas thrive on the Top Terrace of the garden, while they seem to struggle in the lower parts of the garden.

During my visit to Tresco Abbey Garden I was fortunate enough to spend some time with the garden's propagator, David Inch, who has worked at the garden for many years and for the last decade or so has been in charge of propagation. I soon realised that his knowledge of propagation and cultivation of proteaceous plants (and aeoniums and eucalyptus, for that matter!) is second to none. Basically, what David doesn't know about proteas is probably not worth knowing! I was keen to draw on his knowledge and fortunately enough David was more than happy to talk to me about his work. He explained that the garden is using a proprietary protea compost mix, which in addition to peat, perlite, fine bark and grit also contains garden soil. The addition of garden soil allows young proteas to get established more quickly upon being planted out in the open ground. This compost mix is also used for propagation purposes in form of the so called "protea plugs", which minimise root disturbance when transplanting young plants.

Protea plugs

These protea plugs can be used for growing plants from seed, but are best suited for propagation by cuttings. For this the cutting material is inserted into the protea plugs, which are then transferred to the heated mist propagator. In the case of proteas with hairy leaves, misting can be detrimental and lead to fungal infection. These cuttings are struck with bottom heat only and are watered manually. Young plants are usually grown on for two years before being planted out or sold in the garden's shop.

* For simplicity, the term 'protea' is used here to refer to the members of the family Proteaceae, a terminology which has the approval of the International Protea Society. When referring to the genus, the word ***Protea*** will be capitalised and italicised.

Propagation of proteas from cuttings (left to right): new cuttings in protea plugs on the heated mist bench, one year old plants and two year old plants

Dave also explained to me how to successfully grow proteas from seed. For this it is important to know that many proteas have evolved specialised survival techniques in response to bush fires, but that fire and smoke also provide the major trigger in the wild for the seeds of these plants to start the germination process. In cultivation these conditions can be emulated by using smoke solutions prepared from smoke primer discs, a method which is also employed at Tresco Abbey Garden. Other requirements which need to be met for successful germination of protea seeds are absorption of water and oxygen by the seed and exposure to a temperature difference of at least 12°C between day and night. For proteas with nut-like seeds, like leucadendrons, germination can be improved by soaking the seeds in a 1% hydrogen peroxide solution for 18 to 24 hours. This softens the outer layer of these seeds and allows it to be removed prior to smoke treatment (although David said that good germination can be achieved without smoke treatment in the case of leucadendrons). This hydrogen peroxide treatment is not necessary for those proteas which have winged or serotinous seeds. For the following smoke treatment seeds should be soaked for 24 hours in a smoke solution made by dissolving one smoke disc in 50 ml of water. This quantity should be enough to treat around 100 seeds. It is also best to finally dip the seed into some fungicide before planting. At Tresco Abbey Garden the seeds are sown into their proprietary protea mix. An alternative mixture can be made from, for example, river sand, peat or decomposed pine needles and perlite. It is important that the medium is free draining, but at the same time is not allowed to dry out. Finally, the seeds should be kept at 5-8°C at night and 15-20°C during the day until germination has occurred.

As my visit came early in the season, after a harsh winter, I did not expect to see many proteas in flower. And even though I did not see a ***Protea cynaroides*** in flower, I was amazed by the number proteas which actually were in bloom! Amongst the ***Proteas***, there were ***P. neriifolia***, whose pink inner bracts are nicely offset by the dark purple and white hairs, and ***P. repens*** with its open, cream coloured inflorescence. Also, ***P. longifolia*** flowering and the cultivar ***P.*** 'Pink Ice' looked magnificent.

Proteas at Tresco Abbey Garden (left to right): ***P. neriifolia, P. repens, P. longifolia, P.*** 'Pink Ice'

However, I was most fascinated by ***P. aurea***. Its inflorescence consists of a single whorl of flowers which have styles that are much longer than the surrounding bracts. This species is also named the long-bud or common shuttlecock sugarbush and looking at the picture below it is easy to see why.

Protea aurea

In addition, a number of ***Banksia***, ***Dryandra*** and ***Grevillea*** species were in flower. This provided me with the opportunity to study and compare their flower structures in more detail. As can be seen from the pictures below, there is great diversity in form between these three genera and within the Proteaceae in general. The inflorescence of ***Banksia spinulosa***, for example, is a tall spike, while in ***Dryandra sessilis*** the flowers are arranged in a cone-shaped cluster. In both cases the inflorescences can carry several hundred individual flowers. In ***Grevillea*** 'Clearview David' on the other hand, the individual flowers are arrange in small clusters. Although the arrangement of the individual flowers varies considerably within this family, the underlying floral structure is distinct. All three genera have bisexual, zygomorphic flowers with a single perianth which is made up of four petaloid tepals. These tepals are valvate in bud, but get more or less separated at anthesis. The flowers have four stamens, which are epitepalous and one carpel which is enclosed in the four tepals in the immature flower. In many genera the pollen is shed on the style-end, also known as pollen presenter, before the flower opens. The stigmatic area, which is in the middle of the pollen presenter, only becomes receptive some time after anthesis and when the pollen from that flower has dispersed.

Banksia spinulosa (left to right): inflorescence, close-up of inflorescence and close-up of individual, immature flowers

Dryandra sessilis: inflorescence (left) and close-up of individual flowers at different stages of opening

Grevillea 'Clearview David : inflorescence (left), front view of flower (centre) and close-up of individual flowers at different stages of opening (right)

I finally would like to mention one of the most prominent species of Tresco Abbey Garden: ***Leucadendron argenteum***, the silver tree. These beautiful trees thrive on this island like nowhere else in Britain. The upright branches are covered with large lance-shaped, overlapping leaves, concealing the thick branches. These leaves are covered on both surfaces with thousands of tiny, soft, silvery hairs, giving the tree its characteristic silver sheen. Like all members of its genus, ***L. argenteum*** is dioecious. The flowers are in dense heads at the branch tips and are surrounded by involucral leaves. Apparently the male trees are more

showy with the involucral leaves shining bright silver and the flower heads seeming to glow inside these silver leaves. The female flower heads, on the other hand, are quite hard to find as they tend to be higher up on the tree and concealed by the involucral leaves. The female cones are formed by overlapping bracts, which, after pollination swell and become ovoid. The fruits remain in the cone and on the tree until it dies, although a small percentage of the cones open and release their seeds in hot, dry weather.

Leucadendron argenteum (clockwise from top left corner): open and closed woody cones on a female tree; close up of foliage showing hairs; immature fruit; male flower bud; male tree

L. argenteum seed

And this is what must have happened at Tresco Abbey Gardens. Andrew Lawson noticed a few seeds scattered on the ground. We soon got the ladder out to reach the top of the female trees and collect a few of the opened cones and the seeds within. The structure of these seeds is quite remarkable. Each seed is a large nut which is equipped with a parachute-like appendage, the dried remains of the flower. This is thought to aid seed dispersal. However, we found that the seeds tend to drop straight to the ground.

Hopefully David Inch will manage to germinate as many of the collected seeds as possible, ensuring there always will be silver trees glowing on Tresco!

Conclusion

My visit to Tresco has been quite a journey. And by that I don't only mean a night on the sleeper train followed by one of the most memorable helicopter flights (the views that morning were amazing - blue sky, bright sun and a hoar frost on the main land!)! Coming to Tresco was like stepping into another world. Island life definitely is not for everyone, but I thoroughly enjoyed my time. Also, Tresco Abbey Garden is like no other. Exotic plants, most from Mediterranean climates, thrive like nowhere else in Britain. Working in such surroundings is an experience in itself. However, being able to learn from an experienced and enthusiastic gardening team completed my experience.

My plant knowledge has definitely benefited from this trip, as has my understanding of the cultivation, propagation and morphology of proteas. However, I also would not want to be without the new friends I made during time on Tresco - thanks for making my visit unforgettable!

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Declaration

All photographs used in this report are my own.

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