

Experience at Tresco Abbey Gardens Can Inform UK Cultivation of Fynbos Species.

Bob Wooding, Merlin 599

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Part 1 – Introduction

Towards the end of June 2013 I travelled South West as far as roads could take me. Then, having boarded the Scillonian, a notoriously flat bottomed passenger boat, I was flung some 30 miles over notoriously choppy Atlantic waters to arrive in the Scilly Isles. The reason for my visit was to gain some insight into the growing techniques employed by UK based horticulturalists in the cultivation of Fynbos species of the Western Cape of South Africa. The South West of Cornwall, with its mild maritime climate provides suitable growing conditions for a broader range of the world's Mediterranean flora than elsewhere in the UK.

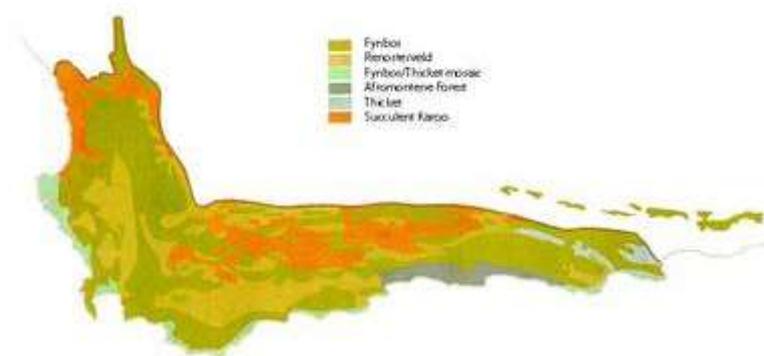


Figure 1- The Cape Floristic Region

The Fynbos is the dominant vegetation type of the Cape Floristic Region. Marked by Port Elisabeth on the East and Cape Town on the West, the area is shown in Fig. 1. The region contains roughly 9000 species and seven endemic families. It is one of the

most diverse floras on Earth. The flora has been extensively documented, John Mannings Field Guide to Fynbos provides a succinct introduction to its character. Of

particular relevance to this essay is that the Fynbos flora is broadly characterized by evergreen, hard-leaved shrubs and evergreen grass-like perennials growing on coarse, nutrient poor, acid soils. It is a famous example of a fire regulated eco-system, but this aspect is of greater relevance to propagation than cultivation. The disturbance offered by periodic fires is bound to be a significant factor relating to the diversity of the region, but I suspect most gardeners in the UK would agree that burning their collection every 7 years would be taking ecological imitation towards the realm of absurdity.

By way of introduction to Tresco Abbey Gardens I shall simply say that they were originally named and developed by Augustus Smith In 1834 and have been in the ownership of the family since then. Prior to the arrival of Augustus Smith the island was home to Benedictine monks, and then the monks of Tavistock Abbey until the reformation in the 16th century. The garden is currently managed by a staff of four, with additional students and Mike Nelhams as Curator. Andrew Lawson, the head gardener explains that the planting is neither taxonomic or phytogeographic in structure; plants are sited where they are suited. There are several thorough books published on the history of the gardens and I see no good reason for me to restate the case.

Of particular interest to me is the management of Fynbos plants. The gardeners at Tresco Abbey have had more experience than most with the cultivation of these plants, particularly when growing in an open environment, so it is to them that I have come to hear and witness their practice.

If good, rigorous science is the backbone of horticultural practice, then speculation and anecdote form the nervous system of our craft. Thorough trials in controlled



conditions can offer much as comparative exercises – assisting in the selection of strongly performing cultivars for example. But I would assert that all circumstances are unique and that the accumulation of experience of the growth habits of plants under various conditions can help to hone our instincts of pattern recognition and guide us towards the underlying variables affecting plant health and development.

This project has a practical function at its heart; the South African border at Cambridge University Botanic Garden is undergoing redevelopment and we have successfully germinated a host of Proteas, Restios, Ericas and bulbous plants. There is certain value in listening to the experiences of others, it has been my aim to return to

Figure 2 – *Geranium maderense* near Hugh Town, St. Marys

Cambridge Botanic and offer some of Tresco Abbey's experiences to the discussion of our current redevelopment.

As a final caveat I should say that while I may have left Cambridge with a clearly defined purpose, I may have encountered other noteworthy experiences over the course of the week. Sometimes what I offer here will have only the most oblique relationship to the subject at hand, I shall try to minimize these dalliances and to those readers whose purpose is fixed, I apologize in advance.

Part 2 – A Brief Introduction to the Flora of the Archipelago

There are many reasons a keen horticulturalist may wish to visit the Isles of Scilly; the warm temperate climate supports a confusing array of naturalized exotics, of particular note in this regard is *Aeonium cuneulatum*, a Canary island endemic known locally as the Scilly Cabbage which proliferates in the granite stone walls throughout the islands, as does *Oxalis megalorhiza* an unusual and attractive South American caucidiform member of the genus. Shrubby hybrid *Echium* species and hybrids are a common feature of parks and gardens and *Geranium maderense* (fig. 2) appears to have found a niche in the rock armour which defends the backs of many of the islands beaches.

The problematic invasive flora of the islands is also unusual to the visitor. On several occasions while walking around the islands I was confronted with dense tussocks of *Mulenbergia complexa* (Fig.3) a New Zealand species of Polygonaceae, the knotweed family. It was to be found ascending cliff faces and consuming *Escalonia* hedges. The Invasive Species Compendium lists this plant as invasive and present in the UK, though detailed distribution information is not available. I think it is likely we shall be seeing rather too much of this plant in the coming years.



Figure 3 – *Mulenbergia complexa* near Hugh Town, St. Marys

There are a couple of rare endemics to the archipelago, though they remained elusive; our arrival was a few weeks too late for the dwarf pansy, *Viola kitaibeliana* and after spending rather too long scouring the dune slacks for the rare shore dock *Rumex rupestris*, a plant which can most politely be described as ‘of botanical interest’ I looked up from my toil and realized the error of my ways. It takes a particularly obsessive person to hunt for a diminutive dock after being confronted with a broad silver horizon punctuated by Atlantic storm swell exploding on to the Western Isles. I am unashamedly not that person, and nor it seems are some of the residents who had the good sense to lash up a hammock of fishing nets in a leggy stand of *Pittosporum* which faced this mesmerizing scene. One of the more interesting plants encountered was *Pedicularis sylvatica* a hemi-parasite which was widespread over the heathland of the islands.



Figure 4 – *Pedicularis sylvatica* near Hell Bay, Bryher

Part 3 – A Summary of Fundamentals



It was my intention to gain some insight into the cultivation of Fynbos species while working on Tresco Abbey Gardens and to this end I shall summarise the conditions which prevail on the island.

GEOLOGY – The geology of Tresco is broadly similar to that of the other islands of the archipelago. A simple picture is of an island with a heart of granite, this decays to form a substrate of ‘head’ or ‘rab’; a granular mineral medium, an early stage of granite’s journey towards clay. This is surrounded by accumulations of wind blown sand which give the islands their spectacular beaches and provide a range of growing environments. In certain areas irregular, cemented deposits can be seen which were deposited around 25000 years ago, this conforms to the

Figure 5 – exposed soils at the back of a beach, W. Bryher

last glacial maximum. From a horticultural perspective the essential aspect of this geology is that it tends to form free draining soils, and due to the often exposed position of the islands, little humus has accumulated resulting in an essentially mineral soil.

The Abbey Gardens conform to this general picture; the lower terraces are essentially planted on sand dunes. The soil is incredibly free draining and certain areas are only suitable for plants typical of arid or semi-arid environments; the gardens contain the NCCPG national collections of *Acacia* and *Eucalyptus*. As a counterpoint to this some sections of the lower terraces are so thoroughly protected from the relentless, desiccating winds that they contain lush understory vegetation. In these areas the growth and decay of plants has increased the organic content of the soil and improved its water holding capacity, the result is that some very disparate experiences can be had from one side of a hedge to the other, I think this is what may be meant when the gardens are referred to as exotic.

The upper terraces really stretch the definition of soil, some areas being composed of partially rotten bed rock exposed to form steep bluffs. Where the slope is less severe, through landscaping or by circumstance, some aggregates and organic matter have accumulated. It is into this medium that many Fynbos shrubs are planted.



Figure 6 – ‘soils’ of the upper terraces at Tresco Abbey Gardens

WIND – On Tresco wind is a resource which must be tempered; in 1990 128mph winds destroyed 600 trees from the windbreaks, leaving the collection more exposed and at risk of further wind damage. In early 2013 a 103mph salt laden easterly caused much cosmetic damage to the collections, particularly *Leucodendron* species which were exhibiting tip scorch at the time of our visit. This was widely attributed to this wind by the garden staff. But the effects of wind are also positive; Andrew Lawson, head gardener at Tresco Abbey is clear that the difficulties many gardeners experience when growing species of *Leucodendron* under glass can be attributed to the absence of strong wind circulation. I have seen gardens where the battle against wind has been won so decisively that fungal problems have proliferated in the still, heavy air. At Tresco the outer



Figure 7 – tip scorch

windbreak of *Pinus radiata*, combined with giant internal hedges of *Quercus ilex* create a broad range of growing conditions, it is a nuanced approach which serves to maintain balance and diversity.

Levels of wind exposure on the island are obviously linked to topography. Within the abbey gardens, the upper terraces contain the bulk of Fynbos species; many genera such as *Protea*, *leucadendron*, *Leucospermum* and *Erica* appear to favour these conditions and are growing exceedingly well, producing a staggering quantity of flowers. Other species are less capable of coping with the wind and are prone to lodging, many flowering monocots with their leggy and often top heavy inflorescences succumb to the wind unless supported by more robust shrubs.

The air quality of the islands is, as one would expect, good. The rich and diverse flora of lichens illustrates this for all to see. And these plants while a beautiful addition to the garden are also suspected culprits in the premature demise of *Leucodendron*. I find this explanation hard to swallow as there is nothing in the biology of lichens which causes harm to trees, they do not rob the plant of much moisture and do not provide openings for viruses, there are a couple of examples of lichens providing habitats for bothersome moths but these are exceptions. Another explanation of premature death in *Leucadendron* spp. is that rapid growth is followed by rapid decay, this is a widely observed phenomenon, but despite searching I have not yet had it explained with any precision.



Figure 8 – Lichen growing on *Leucodendron argenteum*

WATER – The Scilly Isles receive roughly half the rainfall of Penwith, closest mainland tip of Cornwall. The rainfall on the archipelago, roughly 700mm per year, when combined with the mild temperatures provides the conditions for unchecked growth throughout the year of many Fynbos species. The winters are, as one would expect, the wettest period but the summer rain continues to moisten the ground to

such a degree that many species continue to grow through what would be a dormant period in their natural habitats. The result is that woody shrubs grow to an impressive stature in a surprisingly short period of time. Fig. 9 shows a Silvertree, *Leucodendron Argenteum*, one of an avenue of trees which were planted as saplings only five years ago.



Figure 9 – A 5 year old *Leucodendron argenteum*

Part 4 – Composition and Management

As I have already said, plants at Tresco Abbey are positioned within the garden according to their needs rather than the whims of scientists or designers, the corollary of this method is that borders are often pleasing to the eye; we are well versed in seeing what makes ecological sense, I suppose the planting may be said to have a basis in the notion of ‘niche’. The photographs which follow show plants from distant reaches of the world growing as neighbors, the visual effect is less disjointed than the geographical reality of their origins.



Figure 10 – Continents collide on the upper terraces of Trecco Abbey Gardens



Figure 11 – fresh wood chip around new planting

nitrogen. Proteaceous species are particularly susceptible to nutrient overloading but it is phosphorous which must be limited, not nitrogen. The results in the garden speak for themselves, areas planted several years ago are now well established and healthy, but does this justify the practice of applying raw mulch which we are told may harbor fungal pathogens and lead to slower development? The low nutrient requirement of proteaceous species is a broad brush stroke, the evidence on the ground is of a fine and healthy garden but the practices employed have a confused scientific foundation.

Some areas of the garden are undergoing redevelopment and in these areas some interesting practices are employed. The planting strategy is one which I have seen employed in the European Mediterranean; young shrubs are either planted in hollows to preserve water around their roots or surrounded by rocks. In addition the whole area is covered with fresh wood chip in order to limit the available



Figure 12 – A magnificent display of Fynbos species



Figure 14 – Sooty mould



Figure 13 – Scale insects

It is interesting to see the different pest and disease problems encountered on Tresco. Armoured scale is a problem on Protea and Correa, while soft

scale attacks *Rhododendron*. In both cases they cause sooty mould to develop. Thrips are also present. While under glass it is possible to establish populations of predatory bio controls, management of these pests is difficult in an open environment, the only options available on Tresco are canopy fogging or acceptance.

Training of plants is nominal within the garden and this is made both possible and desirable by the planting schemes and topography. On the upper terraces shrubby species and small trees such as *Corymbia ficifolia*, and species of *Leptospermum* and *Hakea* form a backdrop on to smaller representatives of these genera as well as *Protea*, *Leucodendron* and *leucospermum* species. While working I learn from Assistant Head Gardener John that while many *Protea* species will not tolerate much pruning, those such as *P. cyanaroides* which grow from a lignotuber will happily re-sprout when cut back hard. These shrubs are combined with species from the Restionaceae and succulents such as the magnificent *Aloe barberae*. This shrubby layer is often punctuated with the scapes of *Watsonia* 'Tresco Hybrid' and adorned with the delicate, scrambling *Helichrysum foetidum*. In some areas violent rosettes of *Fasicularia bicolor*, *Puya chiliensis* and *Occagavia elegans* form an impenetrable mass, while in others great swathes of *pelargonium* form a weed suppressing base layer.

The 'weeds' of the garden also differ from those of the mainland, *Crassula coccinea*, *Chrysocoma coma aurea*, *Helichrysum felinum* and *Senecio glastifolius* are the chief problems. They are often maintained as part of the borders on the grounds of beauty and inevitability and are to be considered weeds only in-so-far as they are accidentally widespread.



Figure 15 – The bizarre flora of Appletree Banks

To the south of the abbey gardens lies Appletree Banks, this dune complex was once a centre of cut flower industry, providing *Agapanthus* blooms to the mainland. Now it exists as a fascinating example of the edge effects of horticulture, typical grey dune genera such as *Ligustrum* and *Lornicera* are present, but they are accompanied by swathes of *Chrysocoma coma aurea*, *Agapanthus* sp., *Watsonia* 'Tresco Hybrid', and *Carpobrotus edulis*.

Part 5 - Bringing It All Back Home

A FINE SELECTION OF FYNBOS SPECIES

Offered here is a small selection of photographs showing some of the Fynbos plants growing so well in the gardens of Tresco Abbey, they are included as aids to plant selection. I shall spare the reader any irksome verbiage, but I wholeheartedly recommend getting to know these plants.



Figure 16 – *Brunia albiflora*



Figure 17 – *Cunonia capensis* (image below showing growth tip)





Figure 18 – *Elegia capensis*



Figure 19 – *Protea susannae*



Figure 20 – *Protea oleifolium*



Figure 21 – *Protea nerifolia*

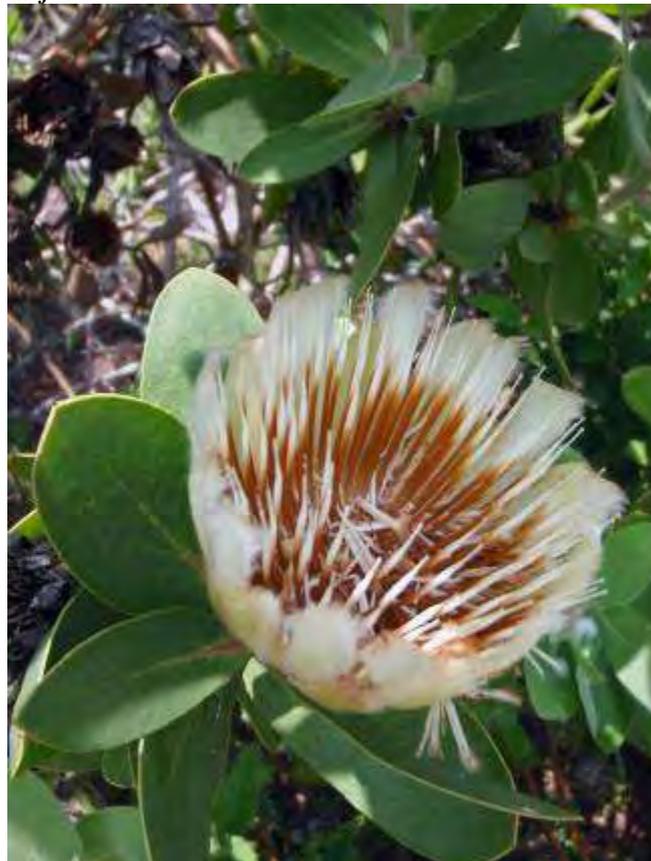


Figure 22 – *Protea mundii*



Figure 23 – *Protea longifolia* with *Corymbia ficifolia*



Figure 24 – *Protea lepidocarpodendron*



Figure 25 – *Protea laurifolia*



Figure 26 – *Protea laticolor*



Figure 27 – *Protea grandiceps*



Figure 28 – *Protea aurea*



Figure 29 – *Aristea thyrsoiflora*



Figure 30 – *Erica gracilis*



Figure 31 – *Erica sp.*

TRANSFERABLE LEARNING

In the Western Cape of South Africa experiences a few annual winter frosts (three in the Cape Flat Sands Fynbos). The annual temperature range is sufficiently similar to the Isles of Scilly for good plant growth to occur. Cambridge regularly experiences winter low temperatures exceeding -10°C . Clearly this is a profound slide in temperature and poses the most significant obstacle to growing Fynbos plants in much of the UK. Andrew Lawson is rightly proud of the condition and diversity of the collection at Tresco Abbey Gardens, but stresses that ‘there is no point in pushing boundaries if it results in poor plants.’ It is possible to display these plants outside on mainland England but it becomes increasingly challenging when moving away from the south coast, Sheffield Botanic Garden exhibits Fynbos flora as part of its Mediterranean display though I must assume all perennial species are lifted and stored

under glass during the cold winter months. This is one option for growers who insist on an outdoor display, fleecing may also work further South where the temperatures are milder, though this method is always associated with pathogen problems and as is apparent on Tresco many proteaceous species are susceptible to fungal problems in the wetter UK climate. Otherwise we are limited to a glasshouse display, as is the case at Cambridge University Botanic Garden, and for the sake of clarity I shall list the lessons which travel well between two startlingly different circumstances:

1. Very free draining soils with a high mineral content and little humus support strong growth at Tresco Abbey Gardens. Here they are based on a granite substrate, in the Western Cape the geology is more complex, but the soil pH in the fynbos region is neutral to slightly acid.
2. Wind is considered to be an essential factor to good growth in woody perennial species, this hypothesis is based on observed differences between plants grown outside and under glass on Tresco. Fans may be required under glass.
3. Given the wind requirement, bulbous species with long scapes should be planted through a framework of shrubby plants in order to avoid lodging.
4. Pest and disease problems are likely to be variable from glasshouse to glasshouse, but experience at Tresco shows that proteaceous species are susceptible to thrips, scale and sooty mould.
5. The plants at Tresco survive regular winter minimum temperatures of $\sim 1^{\circ}\text{C}$, this information could save some heating bills and carbon emissions.
6. While the fynbos flora is characterized in part by a summer dormancy, this is perhaps not a necessity for plant health and growth.

Acknowledgments

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