

Vireyas in a cool climate

by Graham Smith

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The Pukeiti Rhododendron Trust gardens are situated on the west coast of the North Island of New Zealand on latitude 39°S. This puts them slightly south of Melbourne and in the Northern Hemisphere on a latitude close to San Francisco, Athens and Seoul.

The gardens are 10km from the sea at an altitude of 500m, but adjacent to mountains ranging from 1000 to 2800m. The prevailing westerly winds sweep in from the Tasman Sea, bringing saturated clouds that release their rain as they rise over the high ground. The consequence is that Pukeiti has one of the highest rainfalls of any public garden in the world, 3500mm.

The cloud cover itself is one of the redeeming factors of gardening at Pukeiti. It has a tempering effect on the temperature, which is never very hot or very cold. 25°C (78°F) is a summer high and -5°C (23°F) a winter low. From the point of view of vireya cultivation, it is the winter lows that are most critical. The coldest nights are rarely more than two or three in a row, preventing a buildup of lowering temperatures. The lowest temperatures are always recorded in the open, away from tree shelter, and this is also an important cultivation consideration for vireyas.

So we are gardening in a warm temperate rainforest which has ample precipitation all year round. There are no dry periods - only drier ones, and these can be at any time of the year. The temperatures are lower than those experienced by vireyas in their natural surroundings but not by an amount that precludes any outdoor cultivation. However, optimum cultural conditions

demand a measure of winter protection, not only from low temperatures but excess moisture at the same time.

There are a number of different ways of supplying protection and each can be slotted into a situation to provide a certain level. This could range from a sheet of newspaper on the odd cold night to a full glasshouse. I have found that it helps to know something of the background of the particular plants and in this respect two visits to Papua New Guinea have been immensely helpful.

In Papua New Guinea, Borneo and other vireya areas the plants are found from low tropical elevations to high alpine peaks. It naturally follows that the high elevation plants are going to be more tolerant of colder temperatures and should be the first plants attempted where conditions are less than ideal. Not all cultivation techniques however are temperature related, and as I will mention later other factors play a part.

An important observation of high altitude vireyas was their relative situation and association with the surrounding flora and topography. Vireyas are natural colonisers and appear rapidly on disturbed land such as road cuttings and mine tailings. As other plants gain a foothold and eventually dominate an area the vireyas become marginal forest dwellers or epiphytes. They need good light to survive. The ability to colonise steep slopes is also a result of air movement which naturally drains down the hill. This air movement deposits the initial seeds, but more importantly drains cold night air away from the plants, thus avoiding frost. Vireyas will not be found in the grass valleys where frost regularly lies but will hug the higher slopes in the shelter of other plants.

An illustration of this point was clearly seen when camped on Mt. Giluwe, PNG's second highest peak, at 3300m. Our shelter was set up on the edge of the forest with a large grassland area in front. Around the margins we found large specimens of *R.culminicolum*, *R.blackii*, *R.commonae* and *R.yelliotii*. The next morning we awoke to a white blanket of frost over the grass but this stopped just three to four metres from the forest. Rhododendrons only grew in

this marginal zone, illustrating the small changes required to ensure survival. It was also noted that day temperatures rise rapidly and even above 4000m it was quite hot. This, coupled with regular rainfall through the year, means that growth was good and wood ripened rapidly to withstand the cold nights. It also ensured regular flowering for the light intensity at this altitude was very high.

Reproduction of such conditions has to be the goal for vireya growers, and in particular for us at Pukeiti where the reputation for our collection has grown with the years. Early plantings of vireyas in sheltered, sloping sites proved to be reasonably successful, though occasional storms and cold snaps have taken a toll. The use of old tree stumps, and in particular tree ferns in our rain forest, is one of the special features. The ability to establish vireyas on these is made possible by the constant moisture. The fact that the plants are well above normal ground level and cold air is an important survival factor and mimics the plants' natural environment. Similar treatment has been attempted with *R.rarum* set into a vertical clay cutting about two metres above ground level. It is interesting to note that few plants have been killed by cold, and that recovery from basal shoots has accompanied warmer weather. However, an important collection cannot be maintained under such conditions and protective measures have to be invoked. To cope with a rapidly increasing vireya collection we had to resort to container culture, which in itself created its own problems. The type of container, its size, and the growing medium all had to be evaluated, and the idiosyncrasies of each species or hybrid learnt at the same time. The essentials of a very free-draining compost with maximum aeration at the roots is now well documented and the ways and means of achieving this depends much on available materials. It can be safely stated that naturally epiphytic plants such as *R.rarum*, *R.christi* and *R.stenophyllum* require the ultimate in free draining and we have found that these readily respond to hanging basket culture. A number of naturally terrestrial species which have proved difficult under pot cultivation have also enjoyed the freedom of a basket, such as *R.lochiaie* and *R.phaeochitum*.

Pot cultivation usually refers to plastic rigid or bag type containers, but if the old fashioned terra cotta pots are available then they are to be preferred for their own natural draining. We have found that by increasing the drainage holes in rigid PVC pots, extending up the side of the pot as well as around the base, we enhance the cultural conditions and they are then quite suitable. However, we also modify our watering regime to take account of our special conditions, which in the winter months can mean high humidity and very cool temperatures. Given 'normal' watering, we encourage root and stem rots which have resulted in heavy losses in the past. Restricted watering, particularly if pots are plunged in sawdust or similar material, has resulted in high survival rates, good health and better flowering. Restricted watering in essence means the plant is allowed to dry out before being thoroughly soaked again, and this can be at monthly to six week intervals. A newly potted plant requires less than a pot-bound one, remembering that generally containers should be on the small side for all vireyas.

The resulting lack of water most definitely increases the cold hardiness of the plants. A lushly growing, sappy plant will succumb quickly to frost and will also be susceptible to diseases such as botrytis which favour cool conditions. In essence, the bulk of the vireya collection at Pukeiti is held in containers and protected for a period of four to five months. That such treatment works can be illustrated by the oldest plants being in 30cm diameter plastic tubs for over ten years. Liquid feeding during the summer months is practised and the occasional top dressing of potting compost given. Some of these plants have been cut back to stumps at least once in their lifetime to refurbish them. A general lack of available space has meant that plants have been overcrowded and not allowed to grow naturally, but the packing-in during the colder months appears to be additionally protective.

Winter protection is provided by several shadehouses and a glasshouse. Because of the high winter rainfall a traditional timber slat or shade cloth roof is worse than no roof at all. In lower rainfall areas these are satisfactory but we have to have solid roofing, in this case rigid translucent fibreglass

sheeting. This ensures the watering regime is totally controlled. Shadecloth sides allow free air movement which is vital. Rigid clear sheeting is erected around the sides during the coldest months but the doors are opened each morning and all day to allow maximum ventilation. One such house contains about 150 specimens in pots, standing on gravel surfaced raised beds. The path is 20cm below the beds again to allow air to drain away. The second house has a plunge bed running along its length. This is filled with clean pine sawdust and plants in containers have been set in this with only the top 25mm above the surface. Some plants have been in this bed for 5 years and are well rooted into the sawdust and growing superbly as a result. We have even planted sick vireyas into the sawdust direct, after washing the roots clean of compost, and they have immediately improved in health and grown away well.

Where space allows, potted material should be stood outside in the warmer months. Natural light and moisture levels will be beneficial to the plants. All that will be needed is supplementary watering and liquid feeding, plus any normal cultural practices such as pruning and pest and disease control.

Seedlings, cuttings and young stock are held in our large propagation house until they are well established. This glasshouse is kept at a minimum of 10°C (50°F) which ensures good growth all year round. Low light conditions do cause some problems, with soft growth in winter being susceptible to fungus diseases, so once again we keep plants on the dry side. To ensure very young plants establish well, either from the cutting bench or as seedlings, we pot them in crushed tree fern fibre only. This provides a clean, aerated compost of epiphytic quality and very good root systems are produced. We do not move them on to a larger container, with a more dense, bark and soil based compost, until the pots are fully rootbound.

The major development in cultivation of vireyas at Pukeiti came with the building of a special Display House to house a permanent collection. We are blessed with a free draining, acid, volcanic soil which is ideal for rhododendron culture, so it was decided to use a natural sloping site to build

on. The house, which is 14m x 7m (40 x 20ft), is glass covered and was designed with extra high sides to give plenty of room. It sites on a slope of 35° and the back wall was built of concrete blocks which were covered with tree fern logs. Several terraces were cut out of the slope and these were faced with more tree fern logs. It was hoped, and indeed proved successful, that vertical banks could well provide homes for some species.

The house is freely ventilated with permanent louvres along one side, two large sliding doors and ridge vents which can be closed in cold or windy conditions. It has air-fan heaters, thermostatically controlled to operate when the temperature drops to 3°C (38°F) and in most winters they only switch on four or five times. The house was built in the bush and surrounding trees provide protection and filtered light. No artificial shading is necessary.

Although the humidity levels are always high it was decided to install a water feature of three ponds and a stream to increase moisture levels and provide a landscape focal point. These were most successful but the need for more growing room has meant the stream and one pond have been removed. Overhead sprinklers provide all necessary irrigation and once again a dry winter regime is practised. As this is a peak flowering period, keeping the flowers dry ensures that they last for many weeks.

Young vireyas from pots were planted directly into the soil with little modification except for a bucket of peat into each hole. Some, such as *R.christianae*, *R.javanicum* and *R.rarum*, were set in the vertical walls and have obviously relished the free drainage. Several natural features were left in the house, including mature tree ferns, old stumps and a hollow log. Many rhododendrons were planted on these to achieve a realistic scene. These features tend to require more frequent watering but since plants become established they have flourished.

Overall, the growth in this house has been extraordinary and this has been achieved with a very low maintenance schedule. Within two seasons of

planting most specimens had filled their allotted space. It has been necessary to prune or remove some plants to allow the choicest varieties to develop properly. Regular spraying in the warmer months ensures aphid and thrip insects do not build up to epidemic proportions. The naturally airy, good light conditions have so far kept disease problems to an absolute minimum.

The Pukeiti Display House has probably done more for the promotion of vireya growing in New Zealand than any other factor. It provides a twelve month display of bloom which tends to have peaks out of the traditional rhododendron season. It shows that a modicum of protection in a cold climate can produce magnificent splashes of tropical colour. Above all it has enabled Pukeiti to introduce some very rare plants to the gardening public, and they can now be seen from one end of the country to the other. Having learnt from our experience that these special plants do not need tropical conditions, New Zealanders are growing them in containers in conservatories, under the eaves of their houses, and in the open garden. They have learnt that in many situations a blanket or newspaper placed over plants at night is sufficient to ensure full frost protection. In others, the shelter of a lath house is necessary. The most important aspect is that vireyas are rapidly becoming very popular and are going to be major commercial plants in the future.

The next development at Pukeiti is an extension of the Display House in the form of a covered bush walk. It will be a roof over the bush with open sides and will extend the protected area by 400sq.metres. Forest trees and shrubs will provide additional shade and shelter and it is hoped that the majority of our collection will be able to be viewed by the public. Lowland species and hybrids requiring warmer conditions will be housed in the glasshouse, whilst the greater majority will be in the cooler section. This will ensure that we can look forward to more excitement as the first flower opens of species such as *R.hellwigii* or *R.solitarium*, or that new hybrid that you have raised and have waited many years to see the results. So much for so little protection!

*Graham Smith, Director of the Pukeiti Rhododendron Trust Gardens,
presented this paper at the Fourth International Rhododendron Conference.*

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