Rhododendrons of Subgenus Vireya as Epiphytes and Lithophytes

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For some years I had known that Rhododendrons grow not only as terrestrials (in the ground) but also as epiphytes (growing in the branches of tall trees where they get plenty of light, but not growing as parasites) and lithophytes (growing on rock surfaces or actively penetrating into the rock). I had never tried to cultivate Vireyas as epiphytes or lithophytes as I was happy to grow them in container culture.

I became enthusiastic about Vireya epiphytes when I attended the International Vireya Seminar in Hawaii in 2003. While staying there, we visited several private gardens belonging to Hawaiian Vireya lovers. In these gardens, the Vireyas grew not only as terrestrials but also as epiphytes in the branches of trees covered with moss or in *Platycerium* sp. (Staghorn ferns). These Vireyas looked very healthy and well fertilized. This therefore seemed to be a real alternative, if one has the available growing space. They grew there with companion plants, as in nature, of ferns and orchids. Not only trees were used as new habitats but also the Hawaiian native tree fern *Cibotium splendens*. Vireya cuttings could be placed in *Platycerium* sp. and would form roots in the specialized micro climate. All these impressions were stored but I never believed I would soon need to recall them.

Back in Bremen I thought about what I had seen but did not really consider epiphytic culture. All this changed in April 2003 when I started a new job with the Rhododendron Park GmbH. From now on I had to take care of the Borneo and New Guinea area of the green science centre *botanika*. This greenhouse area opened new ideas of Vireya culture as it was possible to cultivate them under their “natural” conditions. These “natural” conditions consist of man-made rock formations, which symbolise Mount Kinabalu in Borneo, and the enormous trees and tree ferns which were integrated in the plantings at the outset to give a more natural look. This manmade natural habitat was the beginning of the epiphytic and lithophytic culture of Vireyas.

Before one cultivates Vireyas as epiphytes, one must consider several factors. The root system of the chosen plant should not be too large to place onto the branch of a host tree. A small root system is also necessary with tree ferns if they have a slender trunk – you cannot position a root system from a two litre container on a thin trunk. One has to be a designer; one has to create a ‘natural look’. It is necessary for the Vireyas get plenty of light if they are to grow successfully. The most important thing is that the new epiphyte can be handled like a terrestrial, i.e. that it can be watered – it is no good if it is high in the trees where one cannot water it! The plants should be positioned where they will catch the eye of the visitor, but this depends on the branch structure of the trees and of the tree fern trunks. One has to take what nature gives and make the best of it for the visitors.

Now the question arises about the type of growing medium to be used and how to fix the plants in place while maintaining a natural look. Here at the Rhododendron Park, the Vireyas grow in our own substrate mix, which holds water but also has good aeration, both of which guarantee survival of the roots. The growing mix consists of 20% orchid substrate from the Wichmann Orchid Company, 10% long gramofibre,

10% coarse peat (particle size 5-25mm) from Gnarrenburg, 10% broken Lecadan (2-8mm), 40% pine bark (20-40mm) and 10% lava (8-16mm).

The first Vireya epiphytes in the Borneo greenhouse area of *botanika* were planted in man-made tree branches. These consisted of a flexible plastic fabric with a rough surface. This material was used by the company as the base on which the concrete was applied when building the rock formation in *botanika*. This material was bound around the stem of the tree to form a small pocket. The pockets were filled with our growing substrate and into this selected Vireyas were planted. The plastic pockets, being black, did not look natural and so moss was used to cover the pockets which gave a more natural appearance.

The bad thing with these plastic pockets was that the moss was not in contact with the substrate and so the roots could not secure the plant by growing into it. A new solution was needed. At that time I thought that plenty of substrate was required for successful epiphyte culture but over the years have found that less is better and, once established, the plants flower better.

I decided to use commercial 40 x 40cm root-ball cloths. The Vireyas were planted in these with some substrate and placed in the branches of suitable trees. This version looked a little more natural. Moss was fixed around the cloths using green rubber bands. Unfortunately, the root ball still looked too heavy, so I had to think of something more satisfactory.

I asked myself, what will happen if I only cover the roots with moss and fix it with rubber bands to the branches? I tried it out and found this solution worked well and have used this method ever since. The general impression is quite natural. The Vireyas roots can grow into the moss and the moss is able to grow on the branches of the tree. As the moss grows, new areas are formed for the cultivation of other epiphytes, such as ferns or orchids.

The following Vireyas grow as epiphytes on trees at *botanika*: *Rh. acrophilum, Rh. album, Rh. apoanum, Rh. aurigeranum x intranervatum, Rh. 'Carillon Bells', Rh. celebicum pink form, Rh. crassifolium, Rh. culminicola hybr., Rh. dianthosmum, Rh. edanoi ssp. pneumonanthum, Rh. gardenia, Rh. goodenoughii, Rh. herzogii, Rh. hellwigii, Rh. jasminiflorum, Rh. jasminiflorum var. oblongiflorum, Rh. javanicum hybr. Rh. kawakamii, Rh. konori, Rh. leptanthum, Rh. leucogigas, Rh. loranthiflorum, Rh. orbiculatum, Rh. pauciflorum, Rh. x planecostatum, Rh. praetervisum, Rh. suaveolens hybr., Rh. superbum, Rh. taxifolium, Rh. verticillatum.*

Cultivating epiphytes on tree ferns is more complicated in a way as tree ferns have only a single, slender trunk which can grow tall very fast. One advantage of this rapid growth is that within a year a new area for cultivation of 30-60cm can develop!

As tree ferns have only a single trunk, what is the best way to position and fix Vireyas, orchids and ferns for them to grow successfully? The tree fern must have a trunk at least 2 metres in height as this allows sufficient light through to the trunk and the large fronds do not cover the trunk. (If you have fast growing tree ferns it is necessary to prune the fronds to ensure plenty of light gets through to the epiphytes; leave only four fronds and prune the rest.) As the tree fern grows so fast, one should

cultivate from bottom to top. With larger tree ferns one can use the whole trunk to position epiphytes. Planting on the black trunks of tree ferns optimizes the natural look of the epiphytes and invites the visitor to find out what is growing there. Placing and fixing the epiphytes is exactly the same as for cultivating in trees, using moss and elastic bands, but one has to look at the root system of the chosen Vireyas. It has to be small because of the slender trunk and it has to look natural – you do not want a ball on your tree fern!

The following Vireyas grow successfully on tree ferns (Cyathea leichhardtiana) in the Bremen glasshouse: *Rh. apoanum, Rh. bagobonum, Rh. brookeanum, Rh. burttii, Rh. curviflorum, Rh. dianthosmum, Rh. fallacinum, Rh. goodenoughii, Rh. gracilentum, Rh. multicolor, Rh. nieuwenhuisii, Rh. orbiculatum, Rh. pauciflorum, Rh. praetervisum, Rh. suaveolens, Rh. taxifolium, Rh. wrightianum*.

The root system should not be larger than that from a 3 inch pot as this will be easier to attach to the trunk. The fast growth of the moss and the roots of the tree fern ensure that it very soon looks natural. It is also possible to place unrooted Vireya cuttings in moss on the trunk. It is important that these are watered regularly so that the cuttings do not dry out however this method takes somewhat longer than using a dedicated propagating unit.

There is, however, a limit to cultivating epiphytes as the tree ferns can grow too tall and the epiphytes need looking after on a daily basis – water and fertilizer must somehow find their way to the plants - so do not hang them too high!

The small Mt. Kinabalu at *botanika* has not only rock pockets, in which the Vireyas grow, but also a few terraces and ledges – new habitats for the plants. Over the years, due to the high humidity, the moss quickly covered the rock giving it a natural patina. This was an indication to me that I could start cultivating more plants. If moss can cover man-made rocks then there will be other plants that can also grow in it, if one is tricky! So far, the following Vireyas grow as Lithophytes in the displayhouse: *Rh. apoanum, Rh. brookeanum, Rh. christianae 'Sunset', Rh. culminicola hybr., Rh. dielsianum, Rh. emarginatum aff., Rh. goodenoughii, Rh. 'Hot Tropic' x saxifragoides, Rh. leptanthum, Rh. nervulosum, Rh. pauciflorum, Rh. phaeochitum, Rh. rarum hybr., Rh. stolleanum aff., Rh. superbum, Rh. verticillatum*.

When one is choosing a substrate for lithophyte culture, one has to remember that plants have differing requirements. If planting plants with different cultural requirements near each other, these must be skillfully combined so that each plant finds its niche. So, for example, *Paphiopedilum* sp. are planted in pure mineral substrate while, alongside, the Vireyas are growing in a man-made substrate. This has to be borne in mind when attending to the daily needs of the plants as an error can result in the loss of the plants.

When starting work on a new planting, the substrate is spread generously over the rock. Then the chosen plants are planted. After that, more substrate is distributed around the plants in order to get a more harmonious look. Then moss is used to totally cover the substrate. The moss can now grow on the substrate and further on to the rock. When the planting is complete, it needs to be watered. So, a new living space is developed in which the following companion plants can grow together:

Rhododendron Subgenus Vireya, Dendrobium sp., Vaccinium sp., Coelogyne sp., Hemigraphis repanda, Pratia nummularia, Bulbophyllum sp., Lilium philippinense and other plants. If everything grows well together, further cultivation is straightforward. It is important that the moss is not allowed to dry out as only living moss can grow on the rock and expand the planting habitat.

The best time to make new epiphytic or lithophytic plantings is in the autumn. Due to the cooler weather between October and March the small plants have time to establish and grow. After this time they are strong enough to withstand the warmer months.

The type of moss used should be carefully considered as not all mosses are suitable for this method of cultivation. For example, mosses of the Sphagnaceae family are only suitable for lithophyte culture if grown in shade and are heavily watered. They then show fast new growth and have to be pruned regularly during the growing season otherwise they will cover and overgrow other plants. Mosses of the Dicranaceae family are not suitable for epiphyte or lithiphyte culture as they need warmer temperatures and are sensitive to drying out. They are only suitable for cool, mossy forest situations. Mosses of the Bryaceae family are suitable for lithophyte culture but only if sufficiently well watered and grown in high humidity. Mosses of the Lepidoziaceae family can undoubtedly be used for both epiphyte and lithophyte culture. They are more robust and can tolerate not being watered for a day.

When cultivating mosses, it is important to ensure the root system of the moss is intact so it is able to grow into the substrate. All the mosses mentioned are also suitable for forest situations. The well known moss cushions found in forests are not suitable for this type of culture as they do not tolerate heat and dry air. Growth of the moss starts quickly and tender new green shoots will soon be seen. If kept moist, lots of new growth is produced and the moss establishes very quickly. Autumn is the best time to ‘plant’ moss, for the same reason as epiphytes and lithophytes already mentioned.

Moss is very easy to establish on a non-natural undersoil. A small amount of substrate is spread over the area where the moss is to grow then the moss with a good root system is placed on this and watered in. It is important that the moss is watered regularly so that it grows strongly. Once this area is covered by the moss it will continue to grow across the rock thereby creating new spaces for other plants to grow. One has to experiment with different types of moss to see which one is most suitable for one’s own growing environment.

Dead tree stumps have also proved suitable for the cultivation of epiphytes. Small notches were cut in the stump using a power saw to create pockets into which Vireya Rhododendrons were planted. In *botanika*, one *Rh. jasminiflorum* hybrid and one *Rh. rarum* hybrid grow as epiphytes in tree stumps.

Also, the following epiphytes growing in other epiphytes (e.g. *Platycerium bifurcatum*) can be found in the *botanika*: *Rh. aurigeranum x intranervatum, Rh. jasminiflorum, Rh. loranthiflorum.*

Fertilizing, for both methods of cultivation, should be carried out from March to October. Before fertilizing make sure the plants are well watered first so that the

fertilizer does not burn the moss or the fine roots of the Vireyas. Morning is the best time to apply so there is plenty of time for the plants to dry out before nightfall. Epiphytes and lithophytes can be fertilized through their roots although generally it is easier to apply fertilizer to epiphytes over their leaves. The application of fertilizer to the roots and leaves should alternate to provide the best care. The following fertilizers are used in Vireya culture: Wuxal Super (8-8-6), Flory 1 (25-10-15), Flory 3 (15-10-15) and Flory 4 (8-16-24). It is advisable to start with Wuxal in the spring to gently stimulate the plants. In the summer alternating between Flory 1 and Flory 3 is optimal. In the late summer and autumn, Flory 3 and 4 should be used to get the wood and flower buds to ripen. Flory 4 is only to be used at most four times up to the end of autumn. Fertilizing at 2% strength is carried out at two-weekly intervals using a dosage machine.

Supporting the plants with a plant tonic is advisable as they are growing in more extreme conditions than plants growing in normal conditions in the ground. Biplantol has proved good so far, with the plants getting healthier and more robust. Biplantol is applied once a month throughout the year following the manufacturer's recommended dosage. It is again necessary to water the plants first to ensure the Biplantol reaches right down to the roots where it can be taken up by the plant. It can also be watered over the leaves in the case of epiphytes.

In summary: This type of culture takes a lot of time and patience. One must give the plants time to establish and adapt. A high degree of care is needed at the outset so the plants thrive in their new habitat. The plants mostly put on new vegetative growth in the first few years before they commence flowering. Vireyas sometimes start flowering in their second year in these conditions but it depends on whether they are a species or a hybrid and a seedling or a cutting. Orchids need more time to establish, taking up to five years to start flowering. Depending on the type, ferns can take up to two years before new fronds grow. If they all survive this time, a new habitat is established with its own small ecosystem in a large greenhouse.

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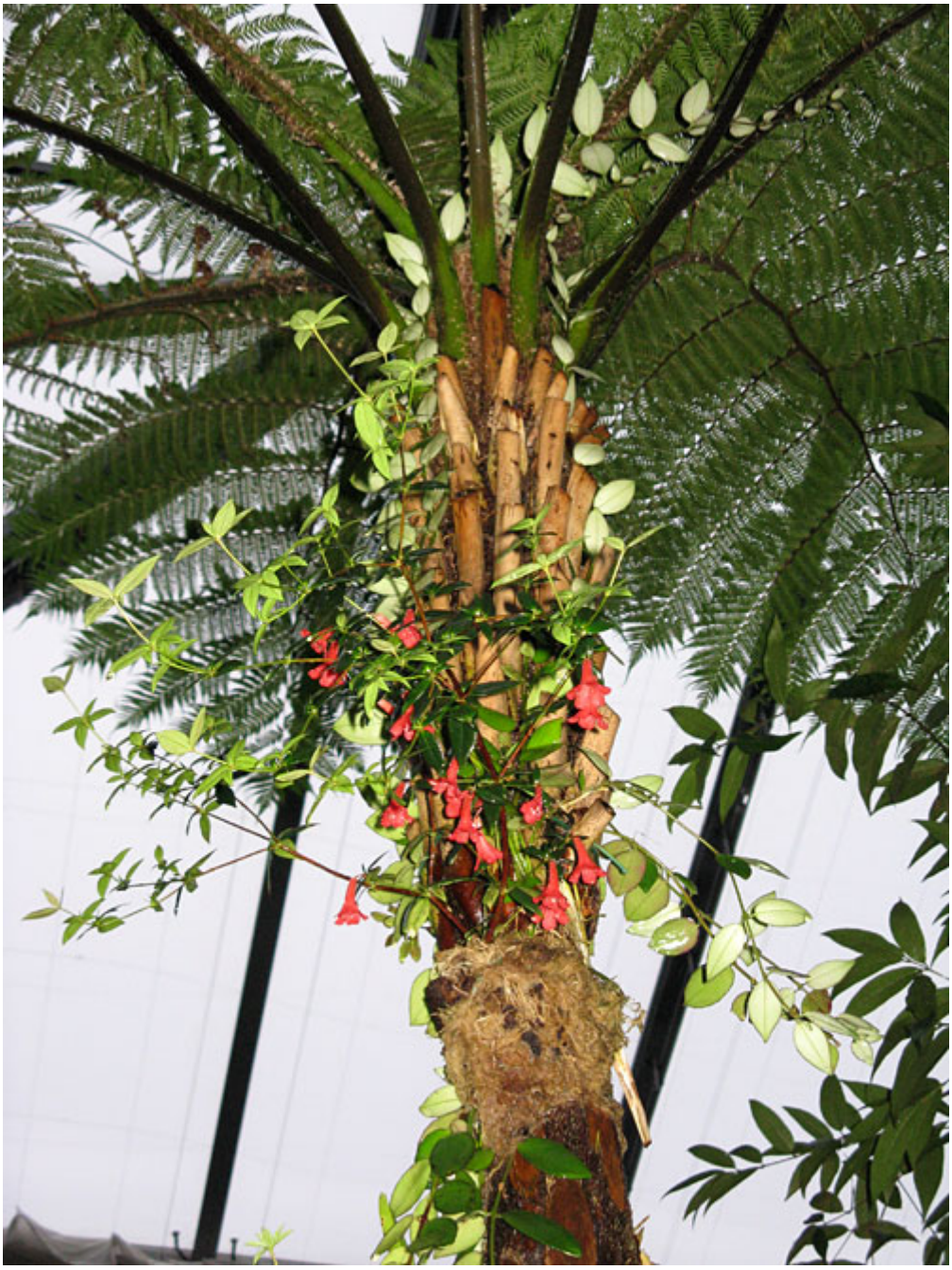
Rhododendron burttii flowering as an epiphyte on a *Cyathea* sp. tree fern

Rhododendron culminicola hybrid flowering as a lithophyte



Rhododendron gracilentum flowering as epiphyte on *Cyathea* sp. tree fern

Rhododendron ‘Hot Tropic’ x *saxifragoides* growing as lithophytes on the top of “Mount Kinabalu”

Rhododendron emarginatum aff. and *Paphiopedilum* sp. growing as lithophytes

Rhododendron loranthiflorum flowering as an epiphyte in *Platycerium bifurcatum* on *Canarium pseudosumatranum*

Rhododendron pauciflorum flowering as an epiphyte on *Syzygium jambos*

Rhododendron taxifolium growing in a “pocket”

Vireyas growing as epiphytes in *Platycerium bifurcatum* on *Canarium pseudosumatranum*