

# The Establishment of a Species Collection of *Vireya* *Rhododendrons*®

**D. Mitchell**

Royal Botanic Garden, Edinburgh EH3 5LR Scotland

## INTRODUCTION

The first vireya rhododendron cultivated at the Royal Botanic Garden Edinburgh (RBGE) was *Rhododendron javanicum*, originally introduced from Malaysia via England during the Victorian era. However it was not until much later that the collection really began to expand, starting with the introduction of *R. beyerinckianum* from New Guinea in 1949 by Capt. R. Stonor. From these small beginnings, the present collection has grown to become the largest assemblage of vireya species in cultivation anywhere in the world. The foundation for this was firmly laid down by two RBGE botanists, Mr. Burt and Mr. Woods during the years 1962 to 1968, with many new introductions of wild source material directly from Sarawak and New Guinea.

During the past 25 years the most significant contribution to the expansion of living collection has been made by Dr. George Argent, aided by former members of horticultural staff: Assistant Curator, Mr. R. Kerby and Garden Supervisors, Ian Sinclair and John Sandham. Following on from them, since 1992 the horticultural management of the collection has been the responsibility of the author, and Garden Supervisor, Mr. Paul Smith and more recently horticulturist, Miss Louise Galloway.

Throughout the past 8 years scientific and horticultural staff have undertaken research and collecting expeditions to Brunei, Sabah, New Guinea, Irian Jaya, Philippines, Sumatra, and most recently Sulawesi. All of these expeditions have been carried out in conjunction with the host nations, it is this spirit of cooperation which has allowed the collection to grow in an unprecedented way. During this time living material has also continued to flow into the collection from a wide network of other institutions, and collectors who work on our behalf. Without question a species collection as diverse as the one at RBGE can only be built up through team work and cooperation. What we see today, is a good example of what can be achieved with true cooperation between scientist and horticulturists.

## COLLECTION ESTABLISHMENT FROM LIVE PLANTS OR SEED

Despite the difficulties, live plants have been the main method of establishment for vireyas within the RBGE Living Collection.

**Collection and Transport of Live Plants.** Having arrived in the field with the required permissions, the greatest challenge for the horticulturist is to keep the young plants discovered alive throughout the course of the expedition, while remaining on the move. From experience, this is best achieved by wrapping each plantlet in damp moss placed within small canvas bags or plastic sheet. The former is preferable as it allows the roots to breathe and prevents overheating. When this technique is combined with shading and misting-over with water several times a day, also to prevent over-heating, successful transportation is generally achieved. If the specimens collected have a large leaf area, then the excess foliage should be reduced by half, keeping to a minimum water loss through transpiration. Overall we

have found that these methods generally work well in the field, especially when collecting at higher altitude.

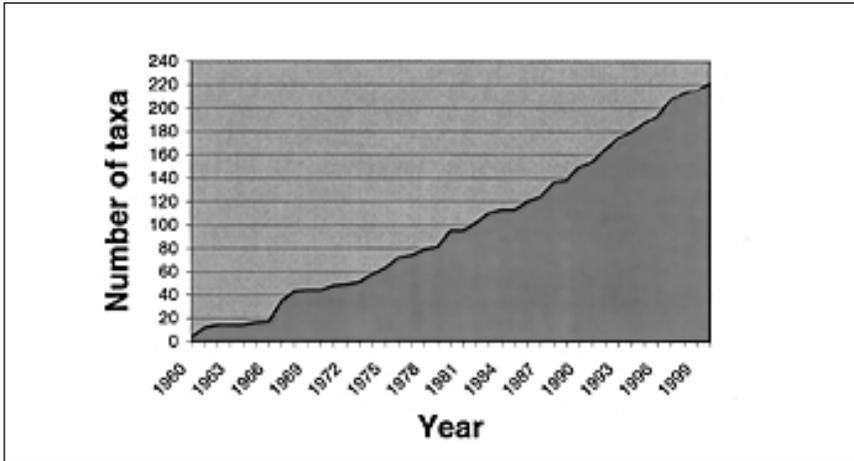
The main problems arise upon return to lower altitude, where the temperatures and the humidity are much higher. Here great care must be taken to prevent the living material from drying out, especially within air conditioned environments. In general, experience has shown that successful establishment of living material increases considerably the more rapidly plants arrive at the port of entry quarantine station, from the point of collection. As part of this process it is advisable when returning by air, to try if at all possible to take living plants on board as hand luggage, that way they avoid chilling (which can be fatal) in the hold.

**Plant Establishment.** Upon arrival in quarantine, the living material must be inspected as soon as possible for any pest and disease problems. After inspection it should be refreshed and allowed to re-hydrate, before receiving the appropriate treatment. Generally, bareroot plants are potted into a light well drained potting mix, before being placed in a closed case held at 17°C, using bottom heat. Supplementary lighting with day-light fluorescent tubes is particularly beneficial in the northern hemisphere during the period October to April. Depending on local conditions you should lightly mist the foliage of establishing plants with tepid water, twice or three times daily, until rooting takes place and new growth appears. At this point, the plants may be weaned out of the case, and inspected again before release to the main collection.

Even with high standards of care, occasionally we incur a high percentage of loss with living material introduced in this way. The main problem is that the material is often highly stressed upon arrival after a long time in transit, making it difficult to refresh for rooting. Despite this difficulty, live plants are a very successful method of introduction, with the added advantage that they often flower much sooner than those raised from seed. This provides science staff with improved opportunities for study within a shorter time frame, an increasingly important factor in many cases today.

**Use of Seed.** In Edinburgh the steady growth of the collection throughout the past 40 years can be clearly seen (Fig. 1). However, less obvious is a comparison of successful introduction by living plant material against seed. A recent analysis of the *vireya* living collection indicates that 48% was established from live plants, 20% from cuttings, and 10% from small seedlings. The remaining 22% was established from seed, and this mainly in the past 10 years, through the improvements in germination techniques achieved with an adapted propagation case, originally designed by Mr. J. Rouse from Australia.

Constructed from aluminum shop fittings, Perspex and twin-wall polycarbonate sheeting, the case provides a constant air temperature of 21°C, combined with a high level of relative humidity. This is achieved through evaporation from a tank of water, which covers the base of the case. At 100 mm deep, it is held at 25°C using a large aquarium heater and is topped up occasionally as required. After sowing, the seed pots are placed on a rack 150 mm above the surface of the water, they remain here after germination, until the seedlings have developed true leaves which are large enough to handle. Seedlings which have just been pricked out, are generally returned to the case for a few days until they re-establish themselves. Condensation in the case is reduced to a minimum by a fan, which constantly draws a gentle flow of air into the case. Supplementary lighting is essential. It consists of two warm-



**Figure 1.** Taxa count for vireya rhododendron 1960-2000

white and two daylight fluorescent tubes, suspended 250 mm above the lid of the case, to avoid overheating. The lighting runs continually throughout each 24-h period as we have found that this is more effective for germination, than increased day length.

This improvement in propagation from seed is vital not only for the overall long-term health of the collection, as it creates a broader genetic base, but it is also increasingly important for molecular research. In the coming years I would expect to see the percentage of material established from seed increase considerably.

### RECENT DEVELOPMENTS IN VIREYA GROWING MEDIA

Much has been accomplished in the past 12 years to reduce our reliance on peat as the major growing-medium constituent. In fact all our current vireya media are now peat-free. Like other alterations to our cultural practices these changes have been based on microclimatic and substrate studies, carried out during expeditions at various locations in the field.

Previously, seed was germinated in pure peat, which had been put through a 6-mm riddle. However, recent experiments with growing media consisting of 100% Melcourt Industries Grow Bark have produced excellent germination rates, with improved rooting. Continuing the move away from peat, the resultant seedlings are now pricked out into a peat-free mixture, containing Grow Bark and propagation bark (75 : 25, litre/litre) with 120 g of magnesium limestone, and 60 g fritted trace elements 253A per 100 litres. This provides a free-draining, moisture-retentive mix, in which the young seedlings establish rapidly making excellent root growth before being finally potted into the general vireya potting mix.

Resulting from extensive compost trials carried out in cooperation with Melcourt Industries we have now developed a new general vireya potting mix which is completely peat free. This is a considerable advancement on our previous vireya compost which consisted of peat and bark (3 : 1, v/v). The new potting mix contains 450 litres of Grow Bark, 375 litres of propagation bark, 375 litres of potting bark, 960 g magnesium limestone and 240 g fritted trace elements 253A. The main collection is potted into this on a yearly cycle during May and June.

## GENERAL CULTURAL MATTERS AND LIQUID FEEDING

Although not hardy in the U.K. most vireya species are tolerant of low temperature regimes. As a general rule of thumb all species collected above 1200 m can be cultivated within the following parameters: night temperature 7°C, day temperature 10°C, ventilation temperature 17°C. However, species collected below 1500 m perform better when these temperatures are each increased by 10°C. The use of shading in the summer months is advisable, to avoid leaf scorch. Growth can also be improved by maintaining higher levels of humidity in the summer, through the use of overhead spray lines. However this can encourage liverwort and weed problems.

A recent trial of eight commercially available liquid fertilisers revealed Vita Feed 1 : 1 : 1 (Vitax) to be the most suitable liquid fertilizer for healthy growth and flower bud formation. Currently we apply this at the rate of 1 : 200, every 14 days from April to September.

## SOME CHOICE VIREYA SPECIES

***Rhododendron anagalliflorum***. This is a delicate small-leaved species from the montane forest of New Guinea (2000 to 3500 m) often found as an epiphyte on fallen logs. It has been used successfully as a parent in the production of hanging-basket selections.

***Rhododendron brookeanum* var. *kinabaluense***. This superb terrestrial or epiphytic species from Gunung Kinabalu, Sabah (1000 to 1800 m) produces orange or red flowers with yellow centres. It is more low-temperature tolerant than other *R. brookeanum* subspecies.

***Rhododendron christi***. This delightful yellow and red bicoloured epiphytic species from New Guinea (1200 to 3000 m) enjoys shade and is easily cultivated on tree fern trunk.

***Rhododendron goodenoughii***. A beautiful terrestrial or epiphytic species, endemic to Goodenough Island, New Guinea, producing delicate white sweetly scented flowers.

***Rhododendron himantodes***. This mainly epiphytic, slow-growing species from Borneo (1300 to 2000 m) deserves to be more widely known, with its delicate foliage, white flowers, and distinct bronze scales. It is always a real talking point in any collection.

***Rhododendron jasminiflorum***. This species has been in cultivation since Victorian times, producing nodding flowers with a slight fragrance. Originally from Malaysia, it has also been found in the Philippines (1000 to 3100 m).

***Rhododendron konori***. This large, generally terrestrial shrub from New Guinea (750 to 2500 m) requires space, however, it is well worth cultivating for the mass of white waxy scented flowers it produces on several occasions throughout the year.

***Rhododendron phaeochitum***. A variable epiphytic species from New Guinea (2100 to 2600 m) with pink or cream flowers, which contrast against the rusty brown scales.

***Rhododendron polyanthemum***. A wonderful vireya producing fragrant red flowers, which are complemented by excellent young foliage. It can be found growing as an epiphyte or a terrestrial in Sabah and Sarawak (1300 to 2300 m).

***Rhododendron taxifolium***. This unusual epiphyte from the Philippines occurs in

moss forest at 2700 m, where it produces delicate white flowers above fine needle-like foliage.

Vireya rhododendrons a rewarding group of plants to cultivate, especially regarding their mid-winter to late-spring flowering season in the Northern Hemisphere.

#### RECOMMENDED READING

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