

## **Collecting New Vireyas for Cultivation in a Milder Climate**

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As you probably gather from my introduction, most of my experience is totally irrelevant to rhododendrons, and I always claim that I came into rhododendrons by the back door. I'm not a grower. I travel about too much to be involved in the growing of rhododendrons, but we have excellent growers back at the Royal Botanic Gardens who, fortunately, look after and keep alive most of the things I manage to bring back.

I'm going to talk about vireya rhododendrons, the rhododendrons which occur more or less in South East Asia. There are just one or two that occur in the Himalayan region and a handful in Vietnam, but the vast majority of the 300 species (a third of the genus rhododendron), occur in the archipelago of islands in the tropics of South East Asia, and down to your indigenous species in Queensland.

I've travelled very widely in South East Asia, not always after rhododendrons. Even now my travels take me to South East Asia and not necessarily directly to find rhododendrons. I do claim to be a scientist, but Taxonomists are often considered very lowly forms of scientists, but we do like to think of ourselves as scientists, and so my interest in rhododendrons is not primarily with introducing them to milder, or other climates. As a Taxonomist, I am involved in trying to understand relationships. People very often mistakenly think that Taxonomists are just interested in describing new species, but this is a terribly poor aim for any Taxonomist. My aim is to understand the relationships between species and the behaviour of individual species as they occur in the wild. Obviously we can do this best in the wild but there are certain things that

we can understand very much better by bringing them back into cultivation where we have them under close scrutiny.

I was told that this Conference is about "Rhododendrons for a Milder Climate". This is not Edinburgh and I wondered what a milder climate meant - whether this was milder than Edinburgh. The first slide of snow is only 400 miles from the equator, towards the summit of Mount Wilhelm, and where I gave up climbing any higher. It wasn't that I was exhausted, but I just couldn't stand the sight of my guide walking barefoot in the snow, and so very soon after he posed for this picture we descended back below the snow line. This extreme environment just illustrates that although these rhododendrons occur within the tropics the vast majority of them are very temperate in their requirements because of the altitude at which they grow. In fact my experience is that the very high altitude ones are difficult to grow because we in Scotland, at any rate, cannot reproduce the sort of very high levels of light that they get in the daytime, and then the winter cold at night. Our alternation of a long, dark, cold winter is totally alien to the plants, and getting them through the winter is usually our biggest problem.

The lowland species have been very much cultivated in the tropics from time to time; they seem to come in and go out of fashion. I will leave it to the hybridizers to say what wonderful things are now being done and what wonderful hybrids are now being produced for cultivation. I have lots of problems that I want to clarify and I took the opportunity en route to the Conference to chase up one particular species, *Rhododendron variolosum*, which I think we have now collected as living plants for the first time. It is better known from the Kinabalu form which we have been cultivating for several years in the Edinburgh Botanic Garden, but I have suspected for some ten years now that what we call *Rhododendron variolosum* on Kinabalu is in fact a totally different species which will require a new name, but I have never been able to get to the type locality of the old Italian collector Beccari. When I was in Sarawak ten years ago the type locality was in a security area and we weren't allowed in. That security is no longer necessary and en route here I collected from this locality.

Another of our most recent acquisitions, *Rhododendron renschianum*, is superficially very similar but comes from the Lesser Sunda Islands, and was collected by a colleague of mine and is now growing strongly from seed.

I deliberately didn't want to talk about the same thing that I presented at the Wollongong Conference as I suspected that there would be a significant overlap in the audience. At that Conference I presented a different arrangement of the groupings within vireya rhododendrons to that which has long been usefully and very successfully employed from Professor Sleumer's work.

My main aim in this talk is to describe an expedition we made two years ago to Irian Jaya on the western end of the island of New Guinea. As I have said, the vireyas include about 300 species in the archipelago of South East Asia as a whole. New Guinea has half of them. Paul Kores' count was 167 species which remains more or less correct within a species or two for the island. I will also take you, very briefly, to the Philippines, where I've looked at four localities, and also briefly talk about some of the species concepts with relation to other field work which I have done in Borneo. We've now done field work, collecting vireyas and bringing them into cultivation in the Malay Peninsula, Sumatra, Java, Bali, Borneo, Philippines, Seram, and the island of New Guinea, as well as in the north of Australia with *R.lochiaae*. Nobody, to my mind, has collected any living material from the island of Sulawesi, so that still remains a gap in our coverage of living species.

It has for a long time been very difficult to get into Irian Jaya. The political and logistic problems are considerable, and particularly if you go in on a large expedition, for which there are pluses and minuses. A plus was that all the logistic work and most of the political negotiations were done for us. Minuses were that you have to put up with a lot of chaos and you don't always get precisely where you want to go, when you want to go. The expedition was about two years in the planning to get all the relevant permissions with approaches to Indonesian Government Departments starting fifteen months ahead of our starting date. It is not especially easy to go to Irian Jaya if you want to do it privately either.

We set out two years ago and had to walk in from Wamena to a small village, Pabililo. The walk in was very pleasant with a lot of bridges en route, some of which were good, and some not so good. From Wamena, which is in a very broad valley, you pass things like the small red flowered *Rhododendron gaultheriifolium*, the yellow *R.macgregoriae*, well known in cultivation but interesting to see this species being pollinated by butterflies which massed all over it. I must say I hadn't realised that it was such a significant butterfly plant until I saw this. Red forms of *R.macgregoriae* occasionally turned up and this was exciting to me as I had never seen them in Papua New Guinea. I know they were in cultivation in other parts, in fact I think they are in cultivation here in Australia and in New Zealand, but we hadn't one in Edinburgh. I have always suspected that these colour forms are hybrids with other species. I still suspect hybridization is involved but they behave quite clearly as species and we had populations of the red form in some areas, but always less common than the yellow form. We walked through open areas of 'kerangas' (heath forest). This is very poor vegetation on pure white sand with a few peaty deposits. It was full of rhododendrons but rather poor in the number of species, but included the beautiful *Rhododendron inundatum*.

Now most of you who are familiar with vireya rhododendrons will be familiar with *R.herzoggii*. This to all intents and purposes looks exactly like *R.herzoggii* but has shorter flowers. It is a beautifully perfumed species with a rather spicy, aromatic perfume, and like *R.herzoggii* the foliage is aromatic in a very distinctive way. It is a really lovely species from which we collected seed and now hope we will have it in cultivation. The technical distinctions, as with so many of Sleumer's species depends on hairs on the ovary and it will be quite interesting to have it in cultivation alongside *R.herzoggii* to actually assess the variation and growth patterns side by side. Occasional pink forms of this species exist and one of the wonderful things about getting into the field is actually recognizing natural hybrids such as this. Natural hybrids occur in different circumstances quite commonly in the field particularly where there is disturbance, but they occur even in undisturbed areas. To my mind it is one of the elements that makes *Rhododendron* a successful genus. This very dramatic pink form of *R.inundatum* you can see has a broader corolla than in

the white form, but it has the perfume of the white plants. The probable other parent which is growing alongside it there is the red flowered *R. wrightianum*. It's quite interesting, of the *R. wrightianum* which is in cultivation there is a red form and a very dark red, often called the black form, both of which occurred in this area, but the red form was very much more common than the so called black form. It was the red form growing alongside *R. inundatum* here that I am pretty certain was the other parent of the very attractive pink plants.

We went up to Pabililo and slept in very thin tents which were exceedingly cold, but the local people sleep in huts which are thatched with grass. The huts actually have a double wall of timber and an upper floor, below which the villagers light a fire. They have no chimneys, and so inside these huts one's eyes tend to weep and one coughs a bit but on a cold night up at 11,000 feet the local people are very snug sitting above their fires with their double walled insulation. We got wonderful helpers from the villages. I found in Papua New Guinea and Irian Jaya people were much the same and were wonderful helpers. Two young helpers were brother and sister and often appeared when we were collecting locally around the village. The little girl was quite delightful and both had very sharp eyes. We caught sight of this girl one day, (you can't do anything terribly privately in a village in New Guinea), she had obviously observed what was going on around her and seen that people had curious garments that she hadn't come across before. She had a black polythene bag that had been discarded by the expedition and had torn out the corners and was very demurely, without lifting her skirt trying on her first pair of knickers - black and very sexy!

As I mentioned, some of the garments worn by the local people were quite extraordinary and penis gourds were worn in a very relaxed fashion. There were two young boys who helped us carry, and very early on I tried to pass coins to them as we'd been told to take small money. In Papua New Guinea coins were the thing. One always took coins because traditionally they buried their money in the ground or they carried it around their necks, and either way that was fine. The local people here found coins useless. They weren't interested in coins, they wanted paper money because these penis gourds

also double as purses. For obvious reasons, keeping notes is much more comfortable and stable than keeping coins.

One of our very exciting finds was a yellow flowered species with a curved corolla tube, very slightly hairy on the outside. It was *R.curviflorum* as described in Sleumer's account. As far as I can recall it has only been collected twice before, maybe three times. The original material was pickled in formalin in Bogor and Sleumer obviously tried to check this with the original description because in J. J. Smith's original diagram the illustrations don't match his description in terms of measurements. Sleumer found the pickled material was useless and so he has elected to change the type specimen. The original *R.curviflorum* was a pink species but this uniformly yellow species conforms with Sleumer's new type. So our plants agree with Sleumer, but whether they actually agree with the original Smith material still remains an open question. This is a species I have high hopes for in cultivation because it comes from moderate altitudes and occurs in the rain forest area. We brought considerable quantities of seed back and I am hoping that it is going to be a really dramatic introduction into cultivation. The stamens all cluster to one side and it has very distinctive foliage as well. It is a really lovely species.

*Dimorphantheras* are always a feature in New Guinea, and my interest as a taxonomist has spread to these plants as well. *D.decoccii* was a very dramatic, dark red flowered species, a wonderful thing, a beautiful, attractive garden plant you might think, but the flowers have the wonderful scent of rotting cabbages.

*Rhododendron christi*, very familiar to a lot of people, was a very common plant in the *Nothofagus* forests around Pabililo village. The village area is carved out by felling the forest, and from there we climbed up through these dark mossy forests. *R.beyerinckianum* was a very common species but disappointingly poor colour forms, in contrast to the very good reds from Papua New Guinea which are already in cultivation. We have even got a much more attractive white form, with the brown scales showing up on the outside, which I think is already in cultivation in Australia.

Climbing further one breaks out of the *Nothofagus* forests and come into lovely high sub-alpine valleys full of treeferns. These get quite heavily frosted in the valley bottoms and, after clear weather, frost lies in these valleys which kills tree seedlings. It will blacken the tips of rhododendrons and kill flowers on exceptional occasions. It is one of the reasons that the valley bottoms remain relatively open and clear of trees, although the trees cling to the valley sides much higher up.

Some very odd plants were growing in this region, like the curious ant plants, *Mermecodia*, with its large tuber full of holes which the ants inhabit. If you start interfering with the plant they are inclined to come out and bite you. There were certainly some of the largest and weirdest *Mermecodia* plants that I have ever seen.

We weren't just collecting rhododendrons, we had people with different specialist interests. One of the other research interests of the Botanic Gardens in Edinburgh is *Dendrobium* section *Oxyglossum* and these are very much sought after horticultural gems. They are wonderful plants that we appear to grow exceedingly well in Edinburgh and they have the tremendous advantage over rhododendrons in that these are the longest lasting flowers of anything that I know in horticulture. We boasted some years ago that the individual flowers would last six months, but a grower in New Guinea boasted that his lasted nine months. Whether this is true or not I don't know, but without pollination they are some of the longest lived flowers that there are; from the point of view of show plants you can take the same plants with the same flowers to show after show after show, and you can do a whole year very often with the same individuals.

Another thing which everyone who goes to the high alpine areas of New Guinea is impressed with is *Tecomathe volubilis* and we've got these plants growing now in Edinburgh. They are very rank and they haven't produced a flower yet, but we are just interested to see if we can produce these dramatic flowers.

We approached but weren't allowed to climb Mount Trikora. This was the area that the famous American Archbold expedition came to in 1939. It based itself for a large part of that expedition around Lake Habema and this area is now

becoming a tourist spot. Since the expedition two years ago they now have a road so you can actually drive up to Lake Habema. Mount Trikora is the second highest mountain in Irian Jaya which, interestingly, had a permanent snow-cap, or permanent ice on the top when Brass (the Archbold botanist) was there in 1938-39. Some time since then the ice has all melted and although it gets intermittent snow, as with the snow I showed you on Mount Wilhelm, it never lasts.

There are a lot of bogs to traverse in the lower tree-fern area, and we couldn't have done what we did without the tremendous help and support of the wonderful flamboyant New Guineans who all love to decorate themselves. They didn't have to be encouraged to put rhododendrons in their hair but they usually use orchids. They all know the lasting qualities of orchids compared with rhododendrons, but knowing that we were collecting rhododendrons on this occasion they decorated their hair with rhododendrons.

Tree ferns are one of the media on which vireya rhododendrons are grown. I'm not going to talk about the cultivation of rhododendrons as it is not my field, but we do grow some of the more difficult species on blocks of tree fern trunk, and it was quite fascinating there to find what must be the smallest of all rhododendrons in the world, *R.caespitosum* growing on these tree fern trunks up on the valley sides. This is a species well described in Sleumer's account but you can see from the finger-nail illustrated the size of the flowers. There is a fruit just above the flowers amongst the tiny leaves. This plant just creeps on the vertical tree fern trunks and we now have it growing - just - in Edinburgh at the present time but I must say its not growing too prolifically.

Lake Habema is very beautiful and is obviously going to be a very attractive tourist place. We camped there for several days but realized that even going in with a small party (it wasn't the full expedition or anything like that), one still has quite a destructive impact on the region. The men all slept in these houses which were made with *Papuacedrus* bark roofs. This is fine, but we had a very dramatic reminder of the way things go. It gets very cold at night and they build a big fire to keep warm. When we left they obviously didn't put the fire out properly and when we came back after going up Gunong Trikora we found the hut had been burnt to the ground. Our porters claimed that other

tribespeople had been and had wrecked the hut but I suspect that they didn't put the fire out. Of course they immediately set about building a new hut which they erected remarkably quickly in three or four hours. In the course of doing this, they ringed and stripped the bark from maybe 50 or 60 large mature and very attractive *Papuacedrus* trees which were probably several hundred years old, growing very slowly in that montane climate. With people moving around with tourists the way they are, and fires getting out of control in dry periods, this stripping of the bark to build shelters means the trees are retreating as everywhere else. They are of a beautiful candelabra form and although they do regenerate perfectly well, when they are in their small early stages they are very vulnerable to grass fires and the amount of burning that goes on now means that regeneration is extremely difficult.

As mentioned, we were not able to climb to the summit of Gunong Trikora although we got to within a few hundred feet of the summit. I was quite glad that we didn't have permission, it was getting very steep and dangerous in the upper parts. One tends to take pictures on fine and sunny days and give a totally distorted view of the scene but it is not always fine and sunny and it is then that one is quite glad that one is able to have proper sweaters and anoraks and boots and everything else, as not all the helpers do.

Up in these valleys there is *R.saxifragoides*, very well known to a lot of growers here. It is extremely difficult in cultivation everywhere. I was very impressed to see it flowering in Dr. John Rouse's garden in Melbourne as I came through this time. He seems to grow it remarkably well. What I found very exciting when I was in New Zealand a few years ago was to see the wonderful hybrids that Os Blumhardt is producing using *R.saxifragoides* as a parent to donate short internode length and so getting some very compact bushes in some of the hybrids he is producing.

Accommodation wasn't always the best, the men all camped up in this cave as they called it, which was just an overhanging rock, and overhanging rocks are not my idea of an ideal place to sleep. In Papua New Guinea I slept in caves like these but with New Guinea suffering from an earthquake every two minutes on the seismographs with some larger shakes being quite common,

one is always worried about being entombed forevermore under a rock like these, and I never find it very comfortable.

*R.correoides* is one of the high level species. It occurs in two colour forms, a yellow form which was probably more common than a darker orange form. It is one of the *Albovireyas* with its complete silvery covering of scales over the leaves, and I think it is going to be very difficult in cultivation. Again we brought material back but I think it is struggling. We certainly find the very high altitude species the most difficult to grow in Edinburgh.

*R.versteegii* is a magnificent thing. I am very impressed to find that Graham Snell is claiming to grow this species in Queensland. He didn't have flowers on it to prove, but I've got a cutting from him to see whether it turns out to be the same thing. This again is another *Albovireya*. It tends to be very high altitude and I suspect that it is going to be difficult, and not a great introduction into horticulture. This is probably just as well because I consider it the "Mickey Mouse" of *Vireya* rhododendrons. The colour distribution on the flowers is curious in that the red colouration seems to be developed during the bud stage of the flower on exposed parts, and yellow is only developed where the flower is protected until it finally opens. This gives rise to the extraordinary irregular patterning of these bi-coloured flowers. I suspect that growing in Scotland we will probably have entirely primrose yellow flowers given the lack of sun that we have.

*R.haematophthalmum* is an absolutely awful name for a most beautiful rhododendron with lovely pink hanging flowers. It is a *Phaeovireya*, and very scaly in the young stages, with beautiful curved, large, pink flowers. Again, I rather suspect it is going to be difficult because it grew in the open areas where it was in very high light indeed.

Another plant that we haven't satisfactorily identified yet is very close to the recent description of *R.rosiflorum* which Dr. Peter Stevens described from Irian Jaya, but these flowers were pure white, unlike his plants which were pink. We are still waiting to see what this really is.

We visited some other areas such as the Beli Valley which was the next valley over from the Pabililo river system. Here there was a lot more limestone, and some other different interesting plants. The limestone produces richer soils,

with a lot more cultivation of mostly sweet potato, the fields rising up on very steep slopes. The interest for me was that this was the type locality of *R.gardenia* which has a neo-type designated because of the loss in Berlin of the original type material. It is interesting that Lyn Craven has just written a recent article about the hybrid that was called *R.gardenia* and is now called R.'Gardenia Odyssey'. There is still some dispute about what precisely *R.gardenia* is because the original Berlin plant type specimens have been lost and we want to try to rediscover this in its original location. We found many beautiful, large, white flowered species, but they all keyed out to *R.superbum* in this valley and we never really found what we were looking for. A variant with a slightly smaller flower, and a longer, thinner tube was easily recognisable as a hybrid between *R.superbum* and *R.inundatum* which we considered earlier. Both of the parents being beautifully scented, the hybrid is beautifully scented also. It is easy to pick out in the field as a hybrid as there were vast quantities of both the parent species and it is also very easy to recognise this situation. However, often the plants have been pressed and dried by a collector who hasn't observed what's around him, and trying to interpret the plant in the herbarium is virtually impossible, and it is very difficult to identify hybrids except when you are in the field.

It was a great event for the villagers to host our expedition, and so they killed and cooked a pig for our farewell party. We were never quite sure how well the pig was cooked but the vegetables were certainly delicious. They cooked for several hours in an enormous heap and it is a very spectacular and great celebration, not only for the village of Pabililo, but also several of the villagers from close by who are all related and had trooped across, and a lot of people misbehaved terribly badly by not wishing to eat their pig. We were very sorry to leave the villagers, they had been very helpful, very charming, wonderful company, and absolutely interested in everything we had done, but we had to leave them to their own lives and go on with our own.

I visited the Philippines because I was very interested in the relationships of the Philippine species from a taxonomic point of view. The first mountain we went up was Giting Giting on Sibuyan Island which is ultra-basic, and very poor for rhododendrons. We collected one very nice species *R.vidalii*. This

from a growers point of view is proving quite exciting as several growers have commented on the very strong textured flowers. For a white flowered vireya the flowers last a very long time. Unfortunately they have no scent whatsoever. From a breeding point of view, this species looks like a good potential plant.

I was very keen to see *R.taxifolium* which occurs on Luzon. It is only known from a single locality on Mt. Pulog. This is rather like a white flowered form of *R.stenophyllum* with its curiously narrow leaves, it is a very exciting looking species. It is the nearest thing I have seen in vireyas to a species on the verge of extinction, and we are very glad to have this back in Edinburgh from where we hope we can distribute it and if necessary, reintroduce it back to its native area. There is felling going on from beneath the habitat, even though it is a national park. This is to create land for cabbage growing. Cabbages are the great threat to rhododendrons as far as I can see in the Philippines, they grow at high altitudes, the people love to eat them and they fell more and more of the montane forest every year to plant cabbages, even within the national park boundary. From above, burning is the threat to the montane forest habitat of *R.taxifolium*, and people every year climb Mt. Pulog, and every year they get cold camping on the top, and they have camp fires. These fires in the dry season very easily get out of control and burn over the grassland. You can see the grassland, as with the New Guinea grasslands it is expanding and expanding because of the extra activity of man. In between the felling and the burning, the montane forest is being squeezed both from above and below, and it is now a very small remnant.

We were lucky on another expedition to the island of Palawan that we met local people in the forest. Here I was after a species, *R.acrophilum*, described as having dirty white flowers. *Acrophilum* means "summit loving", and this species was described as living on the summit. In actual fact we found a dirty white flowered species on the summit but the weather was so poor I haven't got a picture of it. This species didn't key out to *R.acrophilum* at all, but coming down in the rain forest well below the summit, we collected cuttings of another bicoloured orange and yellow species, which keyed out perfectly to *R.acrophilum* but it obviously didn't have the dirty white flowers. This puzzled

me for quite a long time until I realised that other collectors are probably as bad as me in muddling their specimens, and the original collectors had been up to the top and collected this dirty white flowered species that we had found and they had collected this other species further down. They had probably put them into alcohol, so that they couldn't tell their colours at all after they were dried, and they had labelled up their specimens after they got back. So this attractive species now has this wonderful name, "the summit loving rhododendron", and it occurs nowhere near a summit and in fact has these orange and yellow flowers despite the type description saying they are dirty white. In fact it is a very delightful small species and again is a beautiful plant in cultivation. It flowers very freely with us and covers itself in flowers about twice a year in Edinburgh.

A lot of people got very upset because in my *Rhododendrons of Sabah* book I sank *R.brookeanum* into *R.javanicum*. As botanists, what we are doing is trying to understand relationships and the names reflect our understanding of these relationships with the knowledge we have to hand. Botanists don't agree among themselves about species and species relationships, and we had quite a fiery discussion in Edinburgh recently when I clashed very strongly with another Taxonomist who wanted species very cut and dried so that he could talk about numbers of species to politicians. I very firmly said that this is total rubbish, species weren't for politicians, they were for biologists to talk to each other about. In fact I think I found this *Rhododendron javanicum* classic form from Java, and if we go to *R.brookeanum*, it is very closely related to javanicum, and at the time that I wrote the book, I couldn't find any single character, let alone more than one character, to divide *R.javanicum* from *R.brookeanum* and hence it was reduced or made a synonym of the older name. I now think that I've got one reasonably good character, a bud scale character which I think will actually separate them and I'm inclined to separate them again. But, *R.javanicum* in its strict form is not very variable, but if you include the Philippine forms it is pretty variable, and *R.brookeanum* is extraordinarily variable. If we run through some of the forms, we have the Kinabalu form, given the cultivar name of 'Mandarin' by Mr. Allen which has a pronounced yellow star in the throat. There is the Gunong Alab

plant, also from Sabah, with golden yellow flowers and glabrous ovaries. This is a Buket Silam plant which actually has a fine tomentum on the stems, although otherwise doesn't look very significantly different. A beautiful primrose yellow form which we cultivated for a year or two before we lost it, from the Gunong Mulu National Park in Sarawak. A distinctive leaved form with golden, overlapping lobes from a different limestone mountain, Gunong Api, in the Gunong Mulu National Park. A beautiful soft, peachy coloured form from Sumatra. And something quite the opposite of the Kinabalu form with a red eye, and orange lobes, this was the plant cultivated by the American, Swisher, in Florida, collected from the Bako National Park in Sarawak at sea level. This is a lowland species that is extremely variable with different populations exhibiting the same sort of characters in different combinations. My attitude to this situation has been to keep the species concept very broad. Being a lowland, there is a sea of forests where this species can occur as an epiphyte in high trees and you never know what intermediates you might have, as you potentially have intermediate habitats, virtually between all these forms. So it seems the best way of dealing with this distribution pattern is to keep this a very widespread, very variable species and not to divide it up. The last form shown was actually subspecies *cockburnii*, a brilliant red and a very rare plant.

In contrast to *R.javanicum* we've got things like *R.chamaepitys* which is a point endemic occurring only on the summit of Buket Lambia and nowhere else. It occurs quite high up and is very closely related to *R.jasminiflorum* and if you wanted to broaden the species concept of *R.jasminiflorum* then you could probably take this in as a subspecies, but Sleumer has adopted it as a species and I haven't looked at it sufficiently closely, so we keep it as what I would call a relic point endemic. Buket Lambia is an old mountain which is eroding and declining and this species is just about clinging to the top. It is quite common, but only in the top few square metres of the one summit and it is unlikely to be found elsewhere.

Another contrast is *R.buxifolium*, which to my mind is what we would call a neo-endemic which occurs towards the summit of Kinabalu. Some of you will have seen this species in abundance, but it is one which to my mind has

come into existence very recently, probably since the last ice-age, as it occurs high up in an area which has only been available for colonisation at that altitude on Kinabalu very recently. A lot of the Kinabalu endemics have turned up elsewhere, particularly on Gunong Trus Madi and on some of the other Crocker Range areas. These have hopped across, but I think this is unlikely for *R.buxifolium* for a number of reasons. I think this is a 'new' population, probably of hybrid origin, having developed as a species in its own right, again only occurring on the one mountain, but very recently, in contrast to *R.chamaepitys*.

A different pattern again is shown by *R.bagobonum* which habitually self-pollinates its flowers. This has a very wide distribution, but because of its different reproductive behaviour it occurs as a very uniform species although it is very widely distributed, in Borneo, Seram, and the Philippines. Here we have a very uniform species very widely spread but with a very different reproductive biology from that of *R.javanicum* which gives rise to much less variation than in that species.

These examples illustrate my point that species are not always the same. They are not always the same to different people, but even within one section of one genus to my mind, species are not directly comparable, and one needs to know quite a lot about the biology of things if we are going to talk about them as equal units.

I do understand that these plants are very attractive, and particularly in this part of the world they have great potential. We have very successfully displayed quite a number of these. I have taught student gardeners ever since I've been at Edinburgh, and one of the first student gardeners ever to go out collected *R.polyanthemum*. This has been growing in Edinburgh now for 20 years and its always a show stopper when it comes out; not only are those flowers brilliant orange, but it has a very powerful scent and fills the whole greenhouse with this wonderful perfume when it flowers.

*R.longiflorum* should be much better known. It is a species that comes down to sea level, one of only a few that come down to that level in the tropics, and this species was used extensively by Professor Holtum in hybridizing experiments which were curtailed most unfortunately during the second world

war when he was in the Singapore Botanic Gardens. It shows tremendous potential as a parent if you want to grow Vireyas right down to sea level in tropical gardens.

So vireyas are grown very successfully in the cold, admittedly with glass protection, in Edinburgh. They make very nice cool conservatory or cool greenhouse plants for people in temperate regions who don't want to spend a lot on greenhouse heating. I'm very impressed at the way they are grown here in both temperate and sub-tropical regions of Queensland, and although I am a botanist and not a horticulturist I would certainly like to see them more widely grown and more widely used.

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