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E. White Smith, Editor

Because many of us grow Vireyas, we have also become interested in the South Pacific islands where they are native to. Here is a good book about Nature and Man in the Pacific. 'A Fragile Paradise' by Andrew Mitchell. ISBN 0 00 217942 3 . The book starts in the Solomon Islands and works up and down and ends at Easter Island. Nothing about Borneo, New Guinea, Indonesia or the Philippines but much about the smaller islands including Hawaii. To a degree the book is about how man has messed up some of these beautiful islands. It is also about the history of the islands. Good read. EWS

From Peter Cox Scotland, UK
Dear VV, November 26, 2007
I thought it is about time I gave a little contribution to the Vine, seeing I am due a payment and you are always short of articles. *(Yes, and thank you very much, Peter, we always need people to write something, just anything at all EWS)*

Pseudovireyas

There seems to have been little written on section Pseudovireya, and I thought readers might be interested in my experience seeing them in the wild and cultivating them.

Dr. George Argent has now placed Pseudovireya in its own section which makes good sense, especially from a hybridiser's point of view as it is apparently impossible to cross this section with any other vireyas. Dr. John Rouse of Australia tried over a number of years and failed completely.

I have seen three species of this section in the wild and cultivate these three *R. vaccinioides, R. santapaui* and *R. emarginatum plus* cultivating *R. kawakamii* and the newly discovered and named *R. rushforthii.* Of these five, I have only attempted to grow *R. kawakamii* and *R. rushforthii* out of doors here in east Scotland and in the west at my shared garden Baravalla. I have also grown so-called *R. sororium* from Vietnam but doubt if it is distinct from *R. emarginatum.*

I have also grown *R. kawakamii* outside for many years at Glendoick, having received it from John Patrick of California who introduced many Taiwanese Rhododendron species in the *1970s.* The severe winters killed all efforts outside during the *1970s* and early *1980s* but since then the winters have been mild and it has done well in raised beds with really good drainage as all vireyas require. It flowers well most years with a mass of yellow flowers in late summer. At Baravalla there are a number of rocky outcrops covered with moss which are ideal for growing pseudovireyas and other epiphytic rhododendrons. I just peal back the moss, flatten out the root ball and replace the moss, usually adding a little extra.

I have not flowered *R. rushforthii* yet but I recently saw a plant in Tom Hudson's garden in Cornwall covered in flower buds. Its glaucous foliage is both attractive and distinctive and the flowers look from illustrations to be similar to R. *kawakamii.* I lost the plant I put out at Glendoick two years ago but the drainage might have been faulty; at Baravalla it is doing fine so far. I planted out *R. sororium* at Glendoick two years ago and it has been in full flower in October early November *2007.* The yellow flowers are so small to make it hardly worth growing. *R. emarginatum* was collected in northwest Yunnan on the Irrawaddy- Salween divide and makes

a better-looking plant than *R. sororium* with slightly bigger and very bright yellow flowers, solitary or in pairs, in late summer.
George Argent came over to Glendoick and confirmed it is this species. It is vigorous in a clay pot.

R. santapaui was discovered and collected by Peter Hutchison (who shares Baravalla with me and my wife) and me in the Subansiri Division of Arunachal Pradesh, northeast India in 1965. It has flourished in Australia and in fact I have to admit we lost it ourselves and had to get it back from Australia.
It has dark little leaves and attractive small fleshy white flowers in late summer. I did try it once outside at Baravalla but it was devoured by either mice or slugs and has so far not been retried. It seems to be rare in the wild; we found it hanging from the trunks of large trees at the low altitude of 5,400ft. and my son Kenneth re-found it in the Siang Division of Arunachal. George Argent mentions in his book that there is a possible hybrid grown in New Zealand of *R. santapaui x R. lochiae.*

R. vaccinioides is a widespread species in the wild but not of great horticultural value owing to its tiny leaves and very small white or flushed pink flowers. I have found it quite easy to grow in both a clay pot and even more successfully in a hanging basket. They keep losing it in the Royal Botanic Garden, Edinburgh. I have found it several times in Bhutan, Arunachal and Yunnan where it is often hard to tell it apart from some *Vaccinium* species.

All grow naturally as epiphytes at relatively low elevations in moist areas in forest on trees, cliffs and rocks but some have been found growing terrestrially where the forest has been destroyed.

Peter A. Cox, West Lodge, Glendoick, Perth, Scotland, UK

OK, people. Here are some different ideas that I find interesting. We actually use some of these ideas and agree with others. E White Smith

Beer as a slug killer: Placing a saucer of beer beside your plants to protect them from slugs is one of the best-known homemade pest-control measures. The idea is that the slugs are attracted to the beer filled container. They fall in and drown. **The real story:** beer traps really do work – in fact scientists use them to measure slug populations. However, some types of slugs are attracted to beer more than other types, And if the trap is poorly designed, it will attract a slug with-out actually trapping it. **What it means to you:** To make sure slugs are caught and not just attracted, make sure the top of your trap is even with the soil surface. The beer in the container should be 5 or 6 inches deep and about 1 inch below the top, so that the slugs have to extend their bodies to reach it. And they extend, they fall in. *(well, poof, 5 or 6 inches wastes a lot of beer if you ask me. We use cat food cans sitting on the surface with an inch or so in them and they work great EWS)*

Does gravel improve container drainage?: We all know that plants like good drainage. If water sits around the plant roots too long, root rot will damage and possible kill the plant. To prevent this some gardeners cover the bottom of containers with gravel, pieces of pottery, and other nonabsorbent materials. The theory is that more water will drain out of the container, keeping the plant roots moist instead of wet. **The real story**: Here's a good way to understand why gravel in the base of a container doesn't improve drainage. Lay a rectangular sponge flat on your hand and saturate it with water. Wait until the excess water has dripped out (maybe 15 seconds). Now turn the sponge 90 degrees so it is upright. What happened? Water leaked out again, right? That's because the shape of the container has a lot to do with how much water it holds. A shallow container filled with media will hold more water per unit area that a tall, narrow container, which means that longer container will drain better.

When you add gravel or other items to the bottom of containers you're in effect making that container shallower, because the water in the upper portion of the container doesn't move

easily from a layer of finer-textured material to a layer of more course-textured material. Although this container will hold less total water than a container filled with media, the top section of the container, where there should be root growth, will actually hold more water per unit than if it was filled with just media.

What this means to you: Water drainage is better is you fill your container all the way with potting mix. Don't use gravel of other non asborbent materials at the bottom of your containers. If you feel you need better drainage, buy or use better draining material. If you still feel that you need better drainage, add some perlite, an amendment available at most garden centers**.**

Does baking soda wipe out fungal diseases? Concoctions containing baking soda are advertised as being effective on a wide variety of diseases, especially powdery mildew. Baking soda is supposed to disrupt fungal spores that land on the leaf surface, making them unable to infect the plant. **The real story:** Baking soda controls powdery mildew in a wide variety of plants, including euonymus, strawberry, cucubrbits (cucumbers and related plants), and others. There is not much research on baking soda's ability to control diseases besides powdery mildew. In 1992, a study tested baking soda alone and in combination with oil on powdery mildew in cucubits. The study showed that baking soda alone was ineffective at controlling this disease. Once oil was added, however, the mixture became very effective. Besides needing oil to make it effective, the baking soda also need to be applied at an early stage of infection – or even before you see and infection – to get the best results.

What this means to you: To help control powdery mildew, add 1 tablespoon of baking soda, 1 or 2 teaspoons of dish soap, and 1 or 2 teaspoons of vegetable oil to a gallon of water. However, once you start adding soaps and oils to the baking soda, you're greatly increasing the chance that you will damage your plants. Baking soda has the potential to burn plants all by itself, so be sure to test this concoction on a small portion of a plant to see if it has negative effects.

Does dish soap kill aphids? Dish soaps are common ingredients in home-brewed concoctions recommended by garden gurus for getting rid of soft bodied insects such as scale and aphids. Some gardeners use soap as antifungal agents also.

When mixed with water and oil and sprayed on a plant, soap destroys the wax cuticle that surrounds soft-bodied insects. The insect in then unable to retain its body moisture and will die. For fungal diseases, soap supposedly disturbs the integrity of the membrane surrounding the diseases spore, causing it to split open and die. You can buy insecticidal soaps at most garden centers. These soaps, however, are expensive compared to everyday dish soap. Why not use dish soap if it does the same job for a fraction of the cost?

The real story: When researchers tested insecticidal soap and dish soap in a side-by-side comparison, both reduced the numbers of whiteflies on tomatoes. In fact, the dish soap actually did a better job than the insecticidal soap. Unfortunately, the dish soap also caused significant damage to the plants.

How can soaps injure plants? Plants have wax cuticles, just like insects do, and soap removes that wax just like it does on an insect cuticle. It does not kill the plant outright, but allows water to be lost from the leaves. Water loss leads to leaf drop and can weaken and kill the plant. Insecticidal soaps are formulated to preserve the plant's wax cuticle. Therefore, these products may sacrifice some effectiveness in killing pest for the benefit of not killing the plants. Nonetheless, research shows that with proper application methods, insecticidal soaps are very effective on aphids and other pest. Some dish soaps have done a good job controlling powdery mildew. In a 2002 study, Palmolive was quite effective for controlling this disease on dogwood, as were Ajax and Equate. Unfortunately, Palmolive was found to be quite damaging to the plants.

What this means to you: Commercially available insecticidal soap is safe for the environment, effective on the pest it targets, and usually safe for the plant. Dish soap may kill the pest more effectively, but it may harm the plant. If you are willing to experiment (and damage some plants in the process), then try using 1 to 4 tablespoons of dish soap per gallon of water. Don't use

antibacterial soaps, as these tend to be more harmful to plants. But for the everyday gardener, it's a better idea to spend the extra $2.00 and buy soap formulated specifically to kill insects without harming your plants.

Vireya of the Year – 2008
'Great Scent-sation'
R. konori X R. viriosum (formerly R. lochiae)
Hybridized, Grown, Named, & Introduced by Graham L. Snell, Australia
Introduced by Shrublands Nursery, Australia
Color: deep purplish pink, fading to center.
Fragrant, fairly compact grower, large flowers (3+ inches across), frequent bloomer.

And then, R. 'Great Sent-sation' looks very much like Dick Chaikin's hybrid 'Cape Cod Cranberry'(vireya of the year 2007) which is the same cross. Maybe the only difference is that 'Cape Cod Cranberry" makes a nice hanging pot plant. EWS

MOLECULAR STUDIES OF FLORAL EVOLUTION IN VIREYA RHODODENDRONS

Anne F. Mullenniex U of Washington Seattle

Floral asymmetry, or zygomorphy, is thought to have arisen independently multiple times as a specialized mechanism for pollinator interactions and may have promoted speciation and diversification (Endress, 1999; Sargent, 2003). In Papuasia, the majority of species of *Rhododendron* L. section *Vireya* Sleumer that occurs above 3000m are zygomorphic with the following characteristics: red tubular flowers with spreading corolla lobes, obliquely offset mouth with abaxial curvature of the tube, and adaxially-located stamens with style. It has been suggested that this combination of flower structure and orientation is advantageous for bird pollination; the oblique mouth protects the abaxial corolla lobes from damage and the curvature situates the reproductive structures in the optimal position for ornithophilous pollination (Stevens, 1976). In contrast to the rest of the Asteridae, all zygomorphic *Rhododendron* corollas also appear to be "upside down" in orientation. Instead of two dorsal petals, two lateral petals, and one central ventral petal, one sees the opposite conformation. This orientation has been postulated as being resupination, a developmental feature typically caused by gravitation (Donoghue, Ree & Baum, 1998). As a selective rather than gravitational feature, however, this orientation might also contribute to ease of access for the pollinator while preventing damage to the flower.

Representatives of four nectar-eating genera of birds, of the family Meliphagidae, occur above 3000m in Papuasia (Stevens, 1976), and the curvature of their beaks and tongues mimic this structure of corolla; a hypothesis for coevolution of these species will be discussed. Our preliminary phylogenetic analysis of *RPB2-d* gene sequence data divides the New Guinea Vireyas into two well-supported clades, and provides evidence for at least two instances of independent origin of asymmetry. The vast majority of zygomorphic species belong to *Vireya Rhododendron* sub-section *Phaeovireya* Sleumer; zygomorphy appears to have arisen separately within sub-

section *Euvireya* Sleumer. With the goal of relating floral structure and function to phylogeny, we identify three major forms of *CYC*-like genes in *Rhododendron*—TCP transcription factor genes known to contribute to floral asymmetry (Luo *et al*, 1996; Hileman, Kramer & Baum, 2003; Citerne, Pennington, & Cronk, 2006; Howarth & Donoghue, 2005). Using a gene-walking method along with RT-PCR of cDNAs, we have characterized the complete sequences of one copy each of *RhCYC*L1 (i.e., *Rhododendron CYCLOIDEA*-like 1) and *RhCYC*L3 and two copies of *RhCYC*L2. We use RT-PCR to determine spatial and temporal expression of these *CYC*-like genes. The evolution of this *CYC*-like gene family in New Guinea *Phaeovireyas* is being investigated.

Acknowledgements:
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Here are some interesting items that were on the Rhododendron Yahoo Internet site.

On Tue, Feb 26, 2008 at 1:20 PM, **Mike Creel** <mikeacreel@yahoo.com> wrote: I was reading the PRINTED copy of the ARS journal this week and just finished the article on Rhododendron species native to India. I was surprised by the number of species we grow in our gardens that are now rare to nearly extinct in the wilds of India. Most interesting to me was the remark that there are NO rhododendron species active to Africa, Central America, or South America, implicitly Mexico.
Rhododendrons and azaleas will grow well in gardens of those countries, and they all have Ericaceous plant species. How does one explain that there are NO Rhododendron species there? I have a friend in Brazil who grows azaleas and evergreen Rhodies, also deciduous azaleas with NO problems. Oh, I have also enjoyed the local color in part two of the article on the origins of the Vancouver chapter. I understood the nurseryman who talked to visitors from his balcony.
Mike Creel, SC

Mike, It has to do with Plate Tectonics, the way the Pangean super continent broke up. During the crostaceous period, Europe, Asia and North America formed one contiguous land mass and Africa and South America were separated from that by oceans. So, rhododendrons were prevented from migrating to those continents by a water barrier. Go to:
http://www.scotese.com/pangeanim.htm
for a nice animation of how these land masses moved around. **Werner Brack**

On Tue, Feb 26, 2008 at 4:17 PM, **Mike Creel** <mikeacreel@yahoo.com> wrote:
Werner, how would continental drift account for the absence of Rhododendrons in Mexico, Central America and South America, when there are rhododendrons wild in southern California? Does the proximity to the Equator and heat have anything to do with that? I can understand better the lack in Africa and attached areas. I think a lot of wild places remain underexplored. From things I hear, I predict that within the next few years we will have two additional American native azalea species. Would it be correct to say that there are NO rhododendrons native to the British Isles? Both luteum and ponticum are now naturalized there from early introduction, Roman times possibly? **Mike Creel, SC**

Werner Brack <wbrack1@gmail.com> wrote: Mike, There was no land bridge between North and South America during the crotaceous period, which prevented the Rhododendrons from migrating to Central and South America and yes, there are no native Rhodendrons in the British Islands. I don't think heat was the determining barrier, because rhododendrons successfully migrated to the tropics along Malaysia into Sumatra and from there populated most of the Islands in Indonesia and even Northern Australia. There is one major adaptation that occurred along the way, which has to due with the seed dispersion mechanism. Vireya seed is designed to be dispersed by water rather then by wind, which helped the migration over the relatively short distances between the islands in the Indonesia. **Werner**

Wonder what the joining point of the Americas in today's terms would be. I certainly think that Mexico would have been attached to the North American side of the drifting continents and therefore a possible site for dispersal of perhaps occidentale, which occurs not too far north of the California - Mexico border in San Diego County. I know the Mexico question has been discussed before, but I think occidentale, perhaps other species will be found in the northernmost mountain ranges one day. **Mike Creel, SC**

From Henry Helm; Werner, You may be correct, however, this is the first I have ever heard of vireya seed being designed to be dispersed by water rather than wind. The seed of vireyas are winged and very light which lends itself to dispersal by wind. The spread of these plants is not clearly understood, although much study is taking place to explain the distribution and in fact the classification which undoubtedly will change from what is commonly thought. White Smith and Lyn Craven. would be very interested in your comments on this subject.

Please see photos of seed of R. impositum, a plant John Farbarik and I brought back from Sulawesi, Indonesia in 1997. The photos were taken by Rollo Adams at the RSF. These photos clearly show this characteristic.

The extreme wings of vireya seed clearly indicate (at least to me) that they are most likely spread by wind! I do not know where the idea of dispersion by water comes from. I would certainly like to see that source. I can not find it in Argent's book. Sleumer talks about dispersal by wind but makes no mention of water!

Henry R. (Hank) Helm, Bainbridge Island, WA

From **Lyn Craven in Australia**

It is not just plate tectonics that one must consider. Plain old, boring, "long"-distance dispersal is perhaps more important. As more molecular clock work is done, it is becomingly increasingly evident that many plant lineages are much younger than the tectonic barriers that have been advanced as the explanation for contemporary distributions. This has caused the plate tectonics people to scurry across to the other side (that they had been ridiculing for the past 3 decades). [Note that I am not talking about the distribution of dinosaurs or gingkos; there is only one extant species of Gingko but fossils are known from Tasmania, an island just S of Australia. Tectonics surely had a role here, but for rhododendrons probably not. Remember that the Arctic and

Antarctic ice caps were not always there. Man even, is thought to have pretty much walked into the Americas, although there might have been some short sea crossings involved ---I'm not familiar with the Beringian water levels.]
Possibly, there has long been a major arid region in northern Mexico that rhododendrons could not get across. I don't know if Vaccinium is in South America; if so, it's fleshy, animal- (and here we put a focus on birds) dispersed fruit would be expected to explain why Vaccinium (and other fleshy-fruited Ericaceae) crossed the barrier. Also, one must always consider movement in either direction. Hence a South American-centred group could have had representatives move to the N. Consider the rich biota in the Hawaiian Islands. Apparently, all dispersed there, some groups from North America, others from East Asia or the SW Pacific (from especially the New Guinea-New Zealand-Australia area). With Erica, it is presumably southern African in origin but a few species found their way to the southern European area. Again, aridity was probably a factor. As more molecular studies are done, we will have a much clearer picture.
I venture to suggest that, if Ericaceae were salt tolerant, then some species would indeed be growing in saline soils, but I don't know of any that do. Sleumer records one????, epiphytic species from mangrove but I don't have the time to go through his Flora Malesiana account (was it javanicum??). At any rate, there is a difference between being epiphytic at the seaward side, and being epiphytic in the interzone before one gets into a freshwater environment, and I don't think a precise ecology was given. There are freshwater mangroves, too, by the way. Best wishes, **Lyn Craven**
The question of tails on rhododendron seed. EWS

Is Rhododendron arborescens then the ONLY Rhododendron species with UNWINGED seeds. I can't believe that. How about R. albiflorum? How do its seeds spread, perhaps in melting snow? **Mike Creel**

Henry R. Helm hrhelm@bainbridge.net wrote: See Lyn Craven's post. He answers the speculation about floating on saltwater very well. It is, of course, impossible to know for certain how plants have spread. Speculation abounds. I choose to stick to the facts that can be fairly well proven and that are based on the best science available. Seeds might also stick to animals and birds. Another fairly well known fact is that viability of vireya seeds is very short. Most luck with seedlings of vireyas comes with getting the seed sown quickly after harvesting. Some success can be had if the seed is stored at cold temperatures, but that would hardly be the case with seed floating in tropical waters. **Hank Helm**

Hi Mike, There are quite a few vireyas and discovireyas that lack tails on their seeds. In the case of one, R. eymae, from Sulawesi, I believe that this represents a loss of tails. Eymae grows on rocky, treeless knolls and is a dwarf shrub. Were it to have tailed seeds, the periodic strong winds would be likely to blow the seeds away where they would settle out on rainforest, and I doubt this diminutive plant would grow even as an epiphyte in rainforest (insufficient light/too much crowding out by larger epiphytes). Lacking tails, the seeds fall around the parent plants, that already are growing in a habitat suitable for the species (else the plants would not be producing seeds) There are several other species from somewhat similar exposed rocky sites, that also lack, or have very short, tails.
Cheers, **Lyn**

Mangrove ancestry of Malesian Ericaceae. The occurrence of Rhododendron and other Ericaceae in the mangroves of W Malesia (but not E Malesia) is usually assumed to have resulted from a secondary invasion of the mangrove after the evolution of the group. However, many Ericaceae seem quite at home there. R. brookeanum (photos at www.vireya.net/R.brookeanum.htm) and R. longiflorum (there is a plant growing in the Royal Botanic Gardens Sydney) even look like mangroves, with long, elliptic, acute, coriaceous leaves like, say, a Bruguiera. The mangrove and coastal Ericaceae species do not comprise a related group, but may retain traces of an ancestral ecology. Gentry (1987) criticised the common misconception in which "Mangrove epiphytes are implied to be basically plants from nearby terrestrial communities that transgress into the mangroves", and emphasized that many epiphytes, such as the entire genus Tuberostylis Steetz. (Compositae), seem unique to mangroves.
Steve Henning in Reading, PA USA Visit my web pages at:
http://rhodyman.net/rasite.html

OK enough of that stuff. If you people would write to the Vireya Vine once in a while then maybe we could have more interesting things. I will come right out and say "I don't think that there is any way vireya seed is carried by salt water and then washes up on a salty sand beach and grows." Vireyas do not like bad water at all.

Just for your information I must note that my friend Lyn Craven is a plant scientist with the Australia Government. Lyn grows Vireyas at home and has done a lot of plant hunting in the South Pacific islands. EWS

See Chris Callard's wonderful Web site at www.vireya.net (it has been redone and is very nice. Good job Chris. Get into this group and let's talk about Vireyas www.groups.yahoo.com/group/vireya

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