

The Rhododendron

The Australian Rhododendron Society Inc.

Volume 57

2017

New Registrations 2016–2017 — see page 85



Above: 'Diana Manson'.

Below: 'Lucy Rouse'.



Front Cover: 'White Star'. Photograph by Andrew Rouse.



Above: 'John C. Gray'.

Below: 'Lynette Riley'.



The *Rhododendron*

Official Journal of the Australian Rhododendron Society

2017

Volume 57

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The Rhododendron, the journal of the Australian Rhododendron Society Inc., is published annually by the Society. Material for publication in *The Rhododendron* is welcomed and contributors are requested to note that the closing date for each issue is August 1.

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The Australian Rhododendron Society Inc.

Aims

The Society's objective is to encourage interest in and disseminate information and knowledge about the genus *Rhododendron* and to provide a medium by which all persons interested in the genus may communicate and co-operate with others of similar interest.

Membership

Membership of the Society is open to all persons interested in the objectives of the Society upon payment of the annual membership subscription. For further information contact Branch Secretaries or the National Secretary.

Subscriptions

Annual subscriptions cover the period 1 July to 30 June, and vary up to AUD\$25 (single member) and AUD\$35 (member & partner) depending on the Branch selected. (Branches set their own level, out of which an amount is paid to the national Society). The annual journal *The Rhododendron* is included as a benefit of membership. Overseas members may nominate for affiliation with any of the Branches. The base annual subscription for membership of the Victorian Branch is AUD\$35. This covers dispatch of *The Rhododendron* by airmail in the last quarter of the calendar year and other communications by email (if there is a preference for receipt of other communications in hard copy form, an additional subscription amount of AUD\$15 applies to cover airmail cost). The Victorian Branch accepts Visa or Mastercard payments. Overseas subscriptions to other Branches may vary from these rates and require to be paid by bank draft or cheque payable in Australian dollars. Contact the ARS National Secretary.

Contact details

Details of local Branches, along with Office Bearers of the Australian Rhododendron Society, are listed on page 52.

Editorial

ANDREW ROUSE

Many Society Members availed themselves of the opportunity to participate in the series of collection trips to North Queensland organised by the Australian Tropical Herbarium (ATH) for the project *Saving the unique plants of Australia's tropical mountaintops by understanding their threats*. In all, 15 discrete expeditions were organised by ATH culminating in the recollection of *R. viriosum* and *R. lochiaie* from nearly all known mountaintops. Funded by the Ian Potter Foundation, the Victorian Branch of the Australian Rhododendron Society and Simon and Marcia Begg, the project has been a huge success and provided a memorable experience for those Society members who participated in trips. Along with 10 other Society members, I was fortunate enough to participate in the trip organised in August last year where we visited Bell Peak North, Mt Lewis, Mt Spurgeon and the Windsor Tableland. The project and the expeditions were superbly organised by Professor Darren Crayn and Stuart Worboys of the Australian Tropical Herbarium, and on behalf of the Society, I would like to extend my thanks to Darren and Stuart for the opportunity to collaborate with them and for providing a truly memorable experience. Stuart Worboys has provided an article in this issue on the project and its findings, and Henry Hancock and I an article on our experience in participating on the trip to Mt Finnigan.

I'm delighted that this year's journal offers an article from Wayne Takeuchi, a botanist who provides his perspectives and insights from many years of observing and collecting vireyas in Papua New Guinea (PNG). Wayne has made an extraordinary contribution to our understanding of the distribution and ecological aspects of vireyas in PNG.

Our Members continue to be an intrepid bunch. This year we include a report from Prue and Francis Crome on a trip to Qinghai, China. Qinghai has much to offer for the plant and wildlife enthusiast, with Prue and Francis observing "217 species of birds, 26 species of mammals, plants of all sorts, magnificent forests and some of the most spectacular scenery imaginable."

A regular topic of conversation at Society gatherings is the demise of the specialist nurseries. It's a very sobering prospect indeed if the retail plant offering of the future is what we currently see at the big barn hardware stores. So, it is very pleasing to hear from two Society members running nurseries on how they are finding markets for *Rhododendron*, with James Pethybridge providing his insights on rhododendrons in the domestic Victorian market, and Neil Puddey on his collaboration with Enrico Ciarrochi, a nursery owner in Italy, on introducing vireyas into the European market.

We honour Barry Stagoll with Life Membership, a fitting tribute for decades of service to the Society, most notably as Head of the Editorial Committee of this journal from 2000 to 2016. As Simon Begg points out in the citation – and what I have learnt in taking over from Barry – the Editorial Committee is a committee of one! For 16 years Barry has nurtured our journal including using his considerable contacts to source articles and maintain a consistently high standard for the Society's main publication. Thank you Barry.

We include the annual report from each of the Branches. If you have thoughts on activities that may interest other Members, please contact your local Branch; the Society exists to serve its members!

Our registrar Lesley Eaton reports on this year's crop of new registrations. If you are interested in any of these new offerings, please contact the registrar or your local Branch contact (details at the back of the journal).

Finally, the Society is thrilled to offer our members the opportunity to participate in an expedition to Sabah. Society Member Dale Schubert has prepared an itinerary including a couple of days on Mt Kinabalu and Trus Madi, revisiting locales Dale scouted a couple of years ago. If you want to see vireyas in the wild, this is the trip for you! Places are limited so please contact Dale to book a spot.

As always, I'd welcome feedback on what you'd like to read about in your journal.

Barry Stagoll

SIMON BEGG

Most present members of the Australian Rhododendron Society know Barry Stagoll as one of a shadowy pair who have produced *The Rhododendron* each year from 2000; Barry as Chair of the Editorial Committee and Richard Francis as Editor. But the high quality of *The Rhododendron* defines the reputation of the Society internationally. In my memory, until this year, the editorial Committee was something of a myth. It was Barry. A number of us will remember being cajoled into producing articles befitting a learned journal. This year the cajoling has fallen to Andrew Rouse and for the first time in many years there is an Editorial Committee.

Barry and Gay were foundation members of the Fern Society of Victoria, and Bill Taylor joined that Society a few years later. Barry, Bill, and Gay were on the FSV Show committee together for many years, and Bill often tried to get Barry and Gay interested in joining the Rhododendron Society. They grew a few rhododendrons and azaleas and when they moved to “Mirrabooka” in Park Orchards they had room to grow more. While on a visit to the Olinda Rhododendron Garden in 1993 Barry and Gay did join the Society. That was about the time Marcia and I joined.

In 1994, during a conference associated with a National Council meeting, Val Marshall asked Barry if he would take on the position of National Secretary to succeed her husband Lionel, then National Secretary. Barry agreed and continued in that position, with distinction, from 1995 to 2002.

During that time he rewrote the rules of the Society at the request of National Council. Later, Barry originated the Society’s first National website, www.ausrhodo.asn.au, which served the Society for many years.

In October 2000 Barry was Convenor of the ARS International Conference “Rhododendrons Down Under” organised for ARS by its Victorian Branch. That was the first Rhododendron Conference Marcia and I attended. Speakers included George Argent, Peter Cox, Peter Valder, Hilary O’Rourke and Jack O’Shanassey. It was a grand affair, though at the end of the era where everyone in Melbourne grew rhododendrons and, consequently, rhododendron nurseries abounded.

From 2000 to the present he has had the role of Editorial Committee Chair of *The Rhododendron*, annual Journal of ARS. It is a distinguished journal rightly recognised worldwide.

Marcia and I met Barry and Gay at about this time. We visited “Mirrabooka”

and marvelled at Barry and Gay's efforts to create Gondwanaland in such inhospitable conditions little knowing we would later try on a much smaller scale at Montrose. Little did I know that I would, for a time, be ARS Secretary and President. Barry was for a time *de facto* President when Allan Grant Kerr was indisposed. I followed Barry, also, in rewriting ARS rules. Marcia did not know then that she would organise the Golden Anniversary Rhododendron Congress in 2010.

I recall Barry telling me that J.B. Were copied his house name "Mirrabooka" as the name for an investment vehicle.

Barry has served the Society with distinction, ably supported by Gay. It is fitting, as Barry steps down from his long held role as Chair of Editorial Committee, that the Society honour him with the Society Medal and Life Membership. ❀

President's Report

My report is brief as I have not been closely involved in the various activities associated with the Queensland expeditions to try and get definitive answers as to how many indigenous vireya rhododendrons Australia actually has. The initiation and completion of this project will always be associated in my mind with the enthusiasm and persistence and support of our previous president Simon Begg and his ability to generate the enthusiasm of all the other participants and to get it to actually happen.

I think we, as a Society with different branches need to get ourselves organised for the next part of our journey which I believe should be to know what Australian rhododendron hybridists have achieved and are achieving. We need to know our heroes by name, and have pictorial records and descriptions of their plants in an accessible form. Information is easily lost as nurseries have closed and hybridists have died. I would like to encourage the Branches to look in their own backyard and try and get their members to collect oral histories and photograph their Australian hybrids and progressively publish in their own journals and our website. This would be an ongoing project and an extremely useful one for all members.

I would like to strongly encourage each branch to have cutting days so we all share our rhododendron material to lessen the likelihood of lost hybrids and species and, also in the process, teach members to grow their own plants as the retail outlets have limited material available. In South Australia, we found that we gained new members as a result of our cutting days, and from selling inexpensive plants at our annual sale.

I would like to thank the other office bearers for their interest in our organisation and for all the work that has been undertaken as we have transitioned with new office bearers. I am sure that you will join me in thanking our new secretary Mr Graham Price for his hard work with all this.

Jeff Jenkinson

Reports – Australian Rhododendron Groups

Emu Valley Rhododendron Garden

To say that I found the 2016/2017 year a little daunting is somewhat of an understatement. In July of last year I really wondered where Emu Valley would be in twelve months time. Our Business Review was well under way and there was no crystal ball to say what was going to eventuate.

Well, as the financial year drew to a close, things seemed to start to come together. The appointment of a Board of Directors, the review and amendment of our constitution and some tweaking of the management structure were all heading towards completion. Special thanks must go to Braddon Business Centre for its financial assistance ensuring that we have been able to continue with the invaluable direction of Consultant Warren Moore. I also thank Robert Wood for spending so many hours pro bono working with me on the constitution (he showed remarkable patience with his father!).

Although mentioned in our monthly newsletter, I particularly wish to thank Jenny Chalk and Tony Simpson for the work they did over the years in the catering/hospitality and management of the membership database. Both areas would not be as good as they are today if it were not for their contribution.

In excess of 400 plants have been planted out this year, with Juanita, our horticulturist, making a comment that the garden is looking the best that she can remember in the seven years she has been employed, and especially so as far as the weed management control is concerned. The hills look fantastic, weed free, mulched and fertilised and some new steps help our volunteers to climb to the highest point which aids in easy access to plant, weed and enjoy the view!

The nursery tunnel upgrade is complete and a credit to all involved, including our Work for the Dole Participants. Work is well underway in identifying short, medium and long walks around the garden. We have the walks marked out on paper along with our new coloured markers to place, and are just waiting on our stylised map to complete the job.

To Business Manager Sue Johnson I say thank you for your support. I am continuously in the office changing things or suggesting new ideas and no doubt this adds to the pressure of the job.

A grant application was successful for funding a new chipper in 2017/18 and Burnie Council's financial assistance is much appreciated. With thanks to Burnie Rotary contribution, a second people mover arrived in June. How fortunate we are to see two people movers proudly sponsored by Rotary and Lions Clubs.

Financially, we have had a very successful year, with increases in revenue mainly due to increased visitor numbers and functions. Combined with prudent management of our operating expenses, the modest surplus gives the Garden a good start for the coming financial year.

However, we do need a lot more tour guides. With 32 cruise ships coming to Burnie this season and the expected increase in other visitors indicate that our current number of guides will not be able to meet the demand. Being a guide is lots of fun and you don't have to be a walking *Rhododendron* encyclopaedia!

There might still be a lot to do to ensure the garden's future however we have something going for us which must be the envy of many other organisations. Our members and volunteers are our most important clients, for if it were not for them, Emu Valley would not be what it is today. To Maurie, Pam and everyone else, a huge thank you.

Geoff Wood
Chairperson of the Management Group

South Australian branch

Stepping into the garden boots of Rob Hatcher was a bit of a daunting task, yet reassuring to have access to the guidance of his knowledge and expertise in the machinations of the National Society and its various branches. Taking on the presidency role is something I was prepared to commit to, not only because of Rob, but because of the wonderful encouragement and support from the members of the South Australian branch.

Over the past twelve months our group has consolidated and enjoyed successful outcomes in a range of activities and functions. Our annual plant sale at Mount Lofty Botanic Gardens was well supported by volunteer Society members resulting in very successful plant sales of both Toolangi supplied plants and our very own propagated locally bred Whibley hybrids. The sale also presented a wonderful opportunity to recruit interested customers into becoming members on a Spring day which was neither too wintry or summery but just right to encourage a steady stream of eager visitors. Collaborative efforts involving permission to gather cuttings from the MLBG Whibley collection, use of Milton Bowman's premises for preparing propagation boxes with these cuttings for caretaking by members, and the dedication and generosity of the Illmans in coordinating the whole process, have resulted in the streamlining of a process which has become an annual project with both educational and fundraising benefits.

A traditional annual event, the Grant Memorial Lecture, has unfortunately been omitted from our events calendar for the past two years due to a lack

of speakers with sufficient eminence who could be engaged for the purpose of addressing our Society on a topic closely relating to the interests of local *Rhododendron* enthusiasts. The staging of such an event usually involves the financial outlay to meet travel and accommodation requirements of the guest speaker so last year a similar amount was instead utilised to cater for a very convivial and successful end of year luncheon, held on a glorious summer's day in the magnificent garden of Peter and Rebecca Kennedy.

For the adventurous (weather-wise) types, another enjoyable garden visit activity was undertaken on a very wet October Sunday afternoon where two neighbouring gardens on Waverley Ridge Road in Crafers West were explored, at a time when the viewing of plenty of blooming rhododendrons and azaleas could be enjoyed. Enjoyment was further enhanced by the hospitality of the respective hosts providing cheese and red wine as we arrived with our boots and brollies, and then a sumptuous afternoon tea in the tennis pavilion at "The Chestnuts" after our second garden tour.

Individual Society members have reported back to our group either at meetings or in the newsletter with tales of overseas and interstate travels to various gardens, events and regions, broadening our collective minds with ideas for future exploration, one of the benefits of belonging to a group representing people with shared horticultural interests.

Along with improving our confidence and skills in propagation of rhododendrons, Richard Illman, who is our resident propagation expert, has been encouraging other exploits in propagation, namely the grafting of Japanese maples, the success of which we can look forward to witnessing in years to come ... hopefully! Membership education doesn't stop at propagation. Meeting speakers have included Tim Marshall, a renowned composting expert, addressing us on the art of composting and the ensuing benefits and uses of compost, specifically in relation to the cultivation of rhododendrons; and Uwe Stroehler, biologist and microbiologist, who is chief scientific researcher for Neutrog. He spoke about the importance and role of soil microbes in contributing to the health of our soil environments, and in turn our precious plants.

As Spring unfolds our meetings become a little more relaxed and informal without the presence of guest speakers, as much time is devoted to sharing the fruits of garden labours with the exhibition of *Rhododendron* blooms duly receiving great admiration and appreciation by all.

As I implied at the beginning, the South Australian branch of the Society continues to be well supported by a growing and enthusiastic band of members, some who deserve special mention for their efforts above and beyond others. Firstly, our dedicated committee members who facilitate the

smooth running of our Society branch and the monthly meetings we conduct.

Bronwyn Illman works in conjunction with Nataliya Popova to produce a fantastic monthly newsletter full of stories, reviews, reports, notifications and cultivation tips and advice from a number of regular contributors. The newsletter celebrated its one hundredth issue in August 2016 which is a wonderful feat and it needs to be acknowledged again, that the founding editor was Chris Thomas who performed this role for many years and was pivotal in enabling it to reach the standard we appreciate today. I would encourage all to read this publication which can now be accessed on the national Rhododendron Society website.

Outgoing vice-president, Rob Hatcher, is well known nationally amongst Rhododendron Society members for his ongoing commitment, generosity and support in so many ways but locally this includes meeting presentations, supply of raffle plants, enabling access to MLBG facilities and importantly fostering the valuable connection between the Rhododendron Society and the Mount Lofty Botanic Gardens.

Finally, I am pleased to report that under Rob's guidance and greatly assisted by our secretary, Milton Bowman, our constitutional rules have been reviewed and amended over the past few months with legal endorsement officially concluding the process in recent times. The amendments introduced reflect more appropriately our current conduct and executive arrangement.

I look forward to the next twelve months as your president, the ongoing ways in which our Society will continue to serve our membership, and exciting new developments which we can all look forward to in the coming months.

Bellinda Cullum

President

South Australian Branch

Victorian branch

This year the Victorian branch of the ARS continued its recent pattern of activities, whereby most of our time was spent propagating, making improvements to the Rhododendron Garden at Olinda and involving ourselves in the North Queensland project. The other business of the Society continues and the branch is very fortunate that its membership includes people with a wide range of skills that allow this to happen. We are lucky that we have Prue Crome to maintain the National website and provide drive for many aspects of Society business, Francis Crome to diligently produce a colourful and informative bi-monthly newsletter, Tom Noonan to update our plant database, Alex Pottage to organise the nursery, Andrew Rouse whose work

on the Journal and expertise on vireya rhododendron provides great depth to our society and many other contributors who bring lifetimes worth of accumulated knowledge and skills that enables our society to function smoothly, productively and enjoyably.

Our propagation efforts this year have been directed at growing species and cultivars of rhododendron plants not otherwise available for the general public, growing species at risk of being lost in the Garden at Olinda, propagating plant material as part of the North Queensland study and also growing plants for the ARS membership. We have for the last few years had a very successful stall, selling the rhododendrons we have propagated, at the Tesselaars April Plant Expo. This has been a great success at getting the Society and its activities noticed by a wide section of the gardening public. It has shown us that there is still a desire by the gardening public to grow rhododendrons both vireya and asiatics despite their current apparent un-fashionableness.

The Garden at Olinda is undergoing some significant changes at the present time. It is changing its name and has had a large and highly desirable extension added. The Garden has been recognised as a major asset to the state and its name is being changed to better reflect its importance, it will now be known as The Dandenong Ranges Botanic Garden. This name change does not unfortunately come with any better funding and so it remains for the Society to continue its political efforts to encourage Government to adequately support and protect this legacy of nearly 60 years of ARS activity. The extension provides the opportunity for, and demands a great deal of work by Society members to ensure that it becomes a great addition to the Garden. In this case as a conservation garden, highlighting both the vulnerability and beauty of endangered rhododendron species as well as making a contribution to the preservation of these rare species.

The North Queensland project continued this year with some field work by members and much propagation work. The project will continue for many more years and the plants propagated will become a prominent feature of the Garden in the future. This project remains an outstanding demonstration of how our Society and other groups can work together and achieve significant results.

John O'Hara
Victorian Branch President

Vireyas in New Guinea

Botanical perspectives from Papuan floristic exploration

W. TAKEUCHI

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From 1988–2015 the author was a fulltime resident botanist in Papua New Guinea, initially with the B.P. Bishop Museum in Honolulu and retiring as a tropical biologist for Harvard University. During a career including 37 multidisciplinary expeditions and many hundreds of smaller excursions, vireyas were often a priority target for botanical sampling and floristic assessment. The 27-year schedule yielded a final total of 21,000 personal collection numbers from Papua and Indonesia. In the following narrative some observations and thoughts from these collective experiences are briefly presented.

Historical Synopsis of Vireya Taxonomy

Despite the presence of differing systems, the modern classification of vireya rhododendrons clearly begins with the pioneering work of Hermann Otto Sleumer (1906–1993). An early model of practical interpretation, Sleumer's writings established the foundation for future progress, his treatment of the Ericaceae ranking among the most effective large-family revisions ever authored for the *Flora Malesiana*. In contrast to the oftentimes abstruse efforts of contemporaries, Sleumer's vireya keys were exceptional in their accuracy and functionality, no easy task given the size of the group involved.

Although the major components of Sleumer's taxonomy (1949, 1960, 1966, 1973) have survived the passage of time, all scientific summaries are eventually overtaken by accumulation of new data. As knowledge of vireya variation and distribution progressively improved, the need for a fresh synthesis also became increasingly apparent. A long awaited upgrade (in Argent 2006) featured expanded descriptions and extensive infrageneric rearrangements. While retaining much of their original character, many of Sleumer's subsections were elevated to sectional status within a newly defined subg. *Vireya* and his series in *Euvireya* became subsections. The most substantive changes involved the transfer of taxa from *Pseudovireya* into a reinstated *Discovireya*, the submersion of *Solenovireya* into *Euvireya*, and an acceptance of Copeland's subsection *Malesia*. Sleumer's species circumscriptions remained otherwise intact (with

few exceptions) and was refined mainly through the addition of more names. Vireyas have special significance as diversity indicators hence the modernized descriptions addressed an obvious deficiency in the older distribution accounts. With Argent's adoption of color imagery (181 color photos and 18 illustrations in the taxonomic section) the newer treatment is the definitive field guide to Malesian rhododendrons and a welcome contrast to Sleumer's textual work.

Argent (2006) noted that molecular sequencing had not provided a clear basis for phylogenetic classification and thus chose to accept the practical organization in Sleumer. Shortly after the appearance of Argent's treatment, Craven et al. (2008) presented a formal system based strictly on inferred evolutionary relationships. Drawing from existing DNA datasets, sect. *Vireya* sensu Sleumer (subg. *Vireya* sensu Argent) was dismantled and its members recast into a redefined subg. *Rhododendron*, removing perceived polyphyletic or paraphyletic groupings under the previous schemes. After further investigation all vireyas were subsequently moved into the resurrected sectional name *Schistanthe*, comprised of four subsections (Craven et al. 2011). With the latest revision the vireya name no longer exists as a formal taxonomic unit.

Irrespective of phylogeny, Argent (2006, 2015) remains the premier species guide for our region. The practical task of making identifications in large genera can proceed successfully without adoption of natural classifications. For its intended purposes, the Sleumer/Argent conceptual system is still useful and authoritative.

Prospects for Future Vireya Discovery

As one of the richest elements in the Papuanian flora, *Rhododendron* L. has long served as a principal source for new discoveries. Argent (2006) added 37 vireyas to Sleumer's already sizable conspectus, bringing the modern count to 164 species for New Guinea (NG) the fifth largest generic assemblage in its flora. Approximately half of the Malesian *Rhododendron* species initially treated by Sleumer (1966) were Papuanian endemics, thus the disparity in numbers of new taxa between Western and Eastern Malesia (28 vs. 9 respectively) ran counter to historical trends. Differences in exploration intensity are not necessarily responsible for this geographic reversal since Papua New Guinea (PNG) in particular has become well collected by vireya specialists and hobbyists. Even while many plant families remain poorly sampled, a complete inventory for PNG rhododendrons may be close at hand. Of the 12 Malesian species described since Argent's (2006) review, five are from West Malesia, six from Indonesian Papua, and only one from PNG. The current NG inventory stands at 171 (Argent 2015) amid signs of diminishing returns in its eastern half. Future discoveries on the ultradiverse mainland will almost certainly

originate in the Papuan ranges (Indonesia), where specimen collecting has been decidedly meager.

Owing to a low collections index, Papuan botanical monographs frequently mention the probable existence of unknown species. But at least with PNG vireyas the prospects for discovery are now limited by the numerous contributions from post-Independence enthusiasts. Despite a long botanical tenure in Morobe Province, the author was never able to identify a new vireya species among many hundreds of LAE-series and personal gatherings. Future novelties, while not discounted, will probably involve cryptic or rare species, and are unlikely to be made by investigators unfamiliar with the taxonomy.

Phenology of New Guinea Vireyas

In forest environments of New Guinea, floristic phenologies are usually sporadic and unpredictable, severely reducing the effectiveness of inventory surveys and specialist collecting. Especially in lowland habitats, erratic and ephemeral flowering periods are a normal pattern despite occurrences of mass flowering in some genera of Dipterocarpaceae, Fabaceae, Myrtaceae, Primulaceae, and Rubiaceae. Randomly episodic flowering is at least partly responsible for the poorly documented status of many lowland vireyas (e.g., *Rhododendron baenitzianum* Lauterb., *R. comparabile* Sleumer, *R. englerianum* Koord., *R. retrorsipilum* Sleumer, *R. vinkii* Sleumer; **Figs. 1, 2**). With most plant groups including Ericaceae, inconsistent phenologies also occur at higher elevations above the premontane transition at ca. 1,000 m, and into the lower montane interval. A pronounced change in vireya phenology appears in upland habitats near ca. 2,000 m, when flower/fruit sets become more repetitive and extensive. Mass flowering events are most frequent from ca. 2,500–3,500 m, often embellishing forest gaps with gaudy displays of color (**Figs. 3–5**). Even during down-times between peak sets, upper montane vireyas will generally have at least a few fertile individuals.

In the cloudswept communities at high elevations, myrtaceous-coniferous canopies are stunted, unstratified, limby, and festooned by mossy growth providing copious substrate for epiphytes. Vireya collecting is considerably facilitated by favorable phenology occurring in vegetation with good interior visibility and plant access (**Figs. 6, 7**). Botanical surveys at high montane bivouacs will typically achieve collections saturation of the immediate area within 3–4 days. This efficiency can be compared to lowland forests, where opposite conditions make it difficult to obtain any specimens at all, even in localities where vireyas are plentiful. Since montane PNG has been well searched by enthusiasts, the easy finds have already been made in that environment.

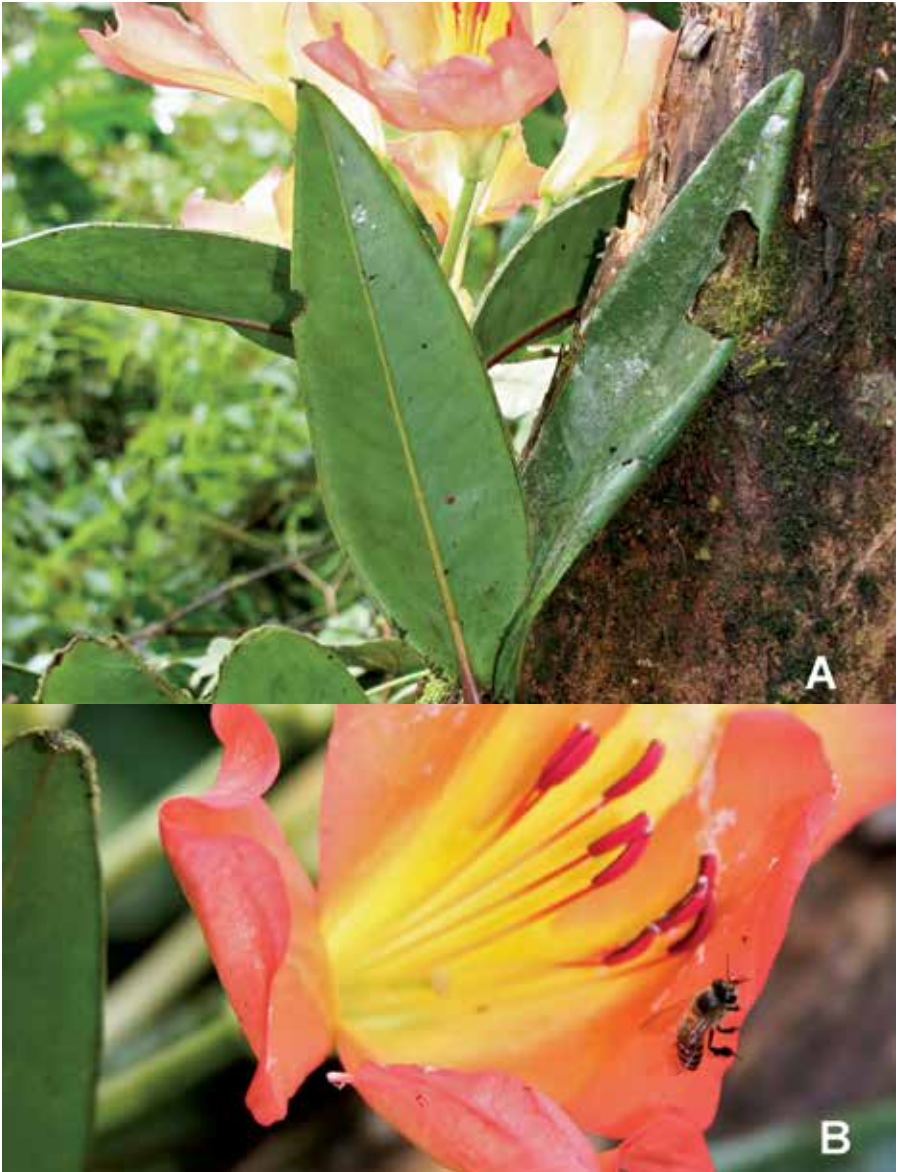


Figure 1: *Rhododendron englerianum* Koord. Compared to their high elevation congeners, lowland vireyas generally have larger and bell-shaped flowers, or (if cylindrical) with proportionally short corolla tubes in relation to the lobes. The distinctions may reflect trends in pollination biology. A, Flowering habit, 0.5 m epiphytic subshrub at 275 m, Juha North (Western Province). B, Close-up view of corolla and stamens.

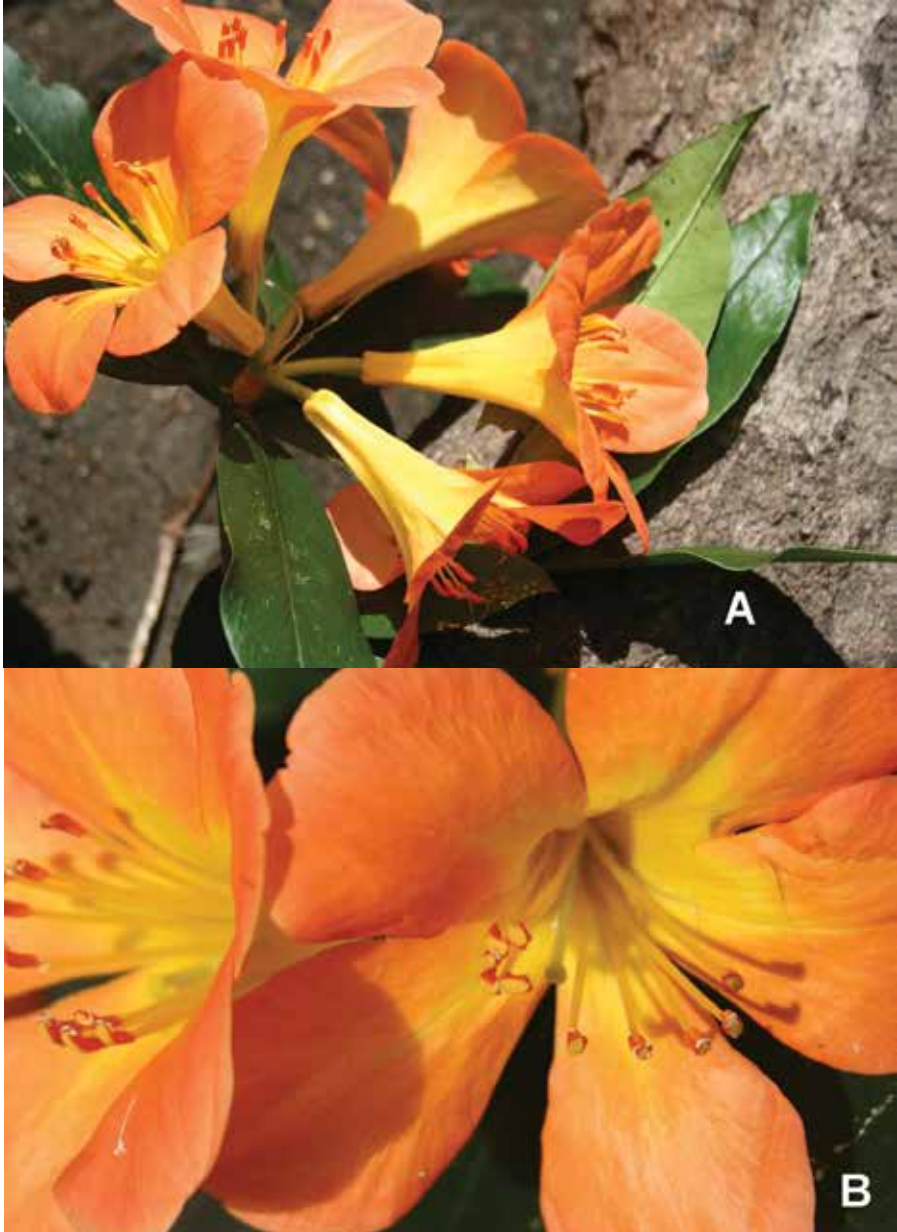


Figure 2: *Rhododendron zoelleri* Warb. A colourful species primarily of lower elevations starting at sea level. A, 1 m shrub on Tualapa limestone (Strickland basin) at 1140 m. B, Frontal view of campanulate corolla.



Above Figure 3: *Rhododendron inconspicuum* J.J.Sm. Profusely flowering during the Conservation International Muller Range expedition of September 2009 (Apalu Reke, 2900 m).

Below Figure 4: *Rhododendron inconspicuum* J.J.Sm. Anthetic flowers. Often seen in association with *R. herzogii* (following).





Figure 5: *Rhododendron herzogii* Warb. Fragrance from flowering populations pervaded forest margins at Apalu Reke. The 11–12 cm long flowers initially suggested a new subspecies but the unusual corolla length was not confirmed by other characters.



Above Figure 6: *Rhododendron dielsianum* Schltr. var. *stylotrichum* Schltr. An easily obtained vireya from regrowth clearings and forest margins.

Below Figure 7: *Rhododendron dielsianum* Schltr. var. *stylotrichum* Schltr. A, Flowers (lower left) are often holed by avian nectar theft. B, Immature fruits.





Above Figure 8: *Rhododendron pachystigma* Sleumer. A. Historically known by a single collection obtained in 1961 from the Snow Mts., the species was rediscovered in a sphagnum bog during the Conservation International Foja survey of 2005. Although typified as a terrestrial shrub, *R. pachystigma* is mainly a high epiphyte (30–50 m above the ground) in emergent *Nothofagus* Blume canopy. B. The perfumy flowers are nearly 10 cm wide.

Below Figure 9: *Rhododendron lindaueanum* Koord. var. *lindaueanum* as a 2 m shrub in the Foja summit bog. Epiphytic populations of this species are common in surrounding forests. Its bog associates (e.g., *Timonius caudatus* Valetton, *Vaccinium daphniphyllum* Schltr., *Xanthomyrtus cardiophylla* Merr. & L.M.Perry), also have no difficulty moving from mossy forest canopies directly onto sphagnum peat although the transition is accompanied by changes in plant architecture and growth form.





Figure 10: *Rhododendron macgregoriae* F.Muell. var. *macgregoriae*. By elevation and geographic distribution probably the most widely ranging of New Guinea vireyas. Terrestrial populations exemplified by this tree-sized stand at Porgera are the tallest rhododendrons in PNG. Subcanopy statures to 15 m have been reported in Sleumer (1966).



Above Figure 11: *Rhododendron macgregoriae* F.Muell. var. *macgregoriae*. Like other ecologically versatile plants, polymorphism is a characteristic feature of *R. macgregoriae*. Flowers are represented by yellow, orange, and reddish forms with highly variable corolla sizes and shapes. A, Yellow-flowered variant with narrow oblongish lobes from pandan savanna (Paiela, Enga Province) at 2300 m. B, Orange variant with shorter obovate lobes, from Porgera at 3100 m.

Below Figure 12: *Rhododendron beyerinckianum* Koord. Habit. The brown tomentum of congested dendroid-stellate scales is characteristic of section *Phaeovireya* (Kai-ingri, Enga Province at 3300 m).





Above Figure 13: *Rhododendron beyerinckianum* Koord. Anthetic flowers. A, Frontal view. B, Possible hybrid with *R. phaeochitum* F.Muell. (flowers at right) is suggested by the corolla tube with puberulent inner surfaces (Porgera, Enga Province at 3100 m).

Below Figure 14: *Rhododendron commonae* Foerster. A dominant terrestrial species in forest clearings at Waile Creek (Enga Province, 3350 m).

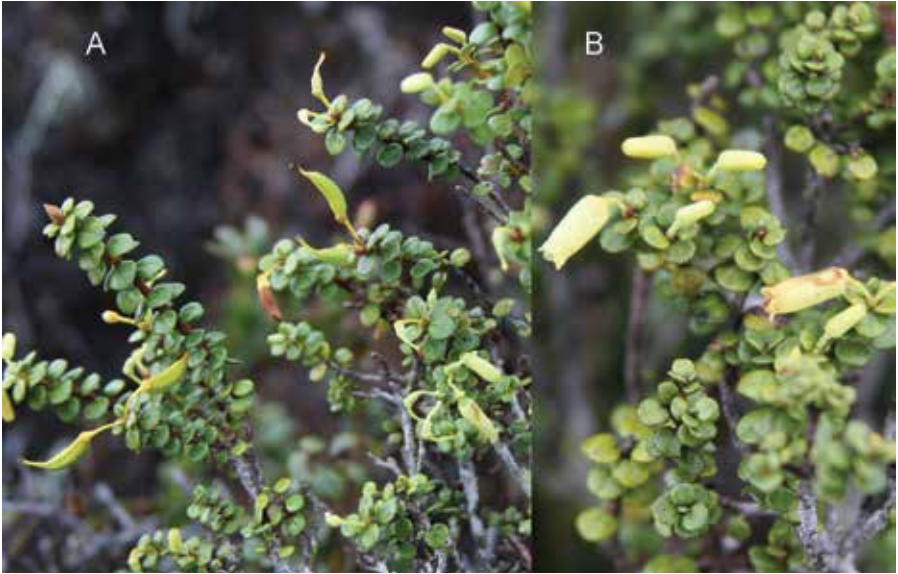




Above Figure 15: *Rhododendron commonae* Foerster. A, Anthetic flowers. B, Flower buds.

Below Figure 16: *Rhododendron nummatum* JJ. Sm. It is difficult to find a *Rhododendron* with smaller leaves than the petite *R. nummatum*. The rotund blades are a mere 3–4 mm long in Apalu Reke scrubland (Muller Range, 2900 m).





Above Figure 17: *Rhododendron nummatum* J.J. Sm. A, Immature fruits. B, The inconspicuous corolla (< 1 cm long) is easily overlooked. Flowers from Muller Range populations are atypically pale yellow on all parts.

Below Figure 18: *Rhododendron disterigmoides* Sleumer subsp. *disterigmoides*. Habit. The sparingly branched 2 m stems are straight-ascending from the ground.





Above Figure 19: *Rhododendron disterigmoides* Sleumer subsp. *disterigmoides*. A, Flowering aspect. B, Anthetic inflorescence consisting of 2–3 nodding flowers. Suborbicular leaves are ca. 5 mm wide.

Below Figure 20: *Rhododendron gracilentum* F.Muell. A, Habit. B, Mature inflorescence of pendant, solitary flowers. As in the related *R. disterigmoides*, the small leaves of *R. gracilentum* are a defining feature of subsection *Linnaeopsis*.





Above Figure 21: *Blechnum L. fernland* (2900 m), a fire regrowth formation covering large areas in the Muller Range. An irregular forest margin, typically configured as tongues and strips shaped by wind, are indicative of the fire etiology. Despite the appearance of a seemingly pristine environment, anthropogenic management of the *Pandanus L.f.* emergents (a valued source of edible nuts) may be responsible for their unusually high local frequencies.

Above Figure 22: Treefern savanna. A subalpine landscape endemic to New Guinea, the *Cyathea Sm.* community is a suspected artefact of high elevation forest burn (Porgera, 3200 m). As with Fig. 21, the open areas have considerably fewer vireyas than the adjacent forest, suggesting increased fire frequency would suppress *Rhododendron* diversity.





Figure 23: Fire-induced dieback at Waile Creek (3450 m). Widespread effects were recorded in PNG forests from the 1998 El Niño disturbance, including environments from sealevel to the high montane zone (Takeuchi 2003). The Waile vegetation has clear evidence of burn influence, with charred logs and blackened tree stumps scattered through the forest-grassland transition.

Some Ecological Features of New Guinea vireyas

Except for a few species, New Guinea *Rhododendron* are usually confined to upland forests where high elevation replicates the temperate zone conditions favored by the genus. However on everwet specialist substrates (e.g., Bowutu ultrabasics, P'nyang limestone) montane vireyas can unexpectedly descend to ca. 500 m as part of a general downward shift of the premontane boundary (Takeuchi 2003, 2007). The anomalous displacements are probably not substrate-determined and are more likely being induced by perhumid local conditions coincidentally occurring at certain sites. In the exceptionally wet Lakekamu basin for example, the presence of an entire montane assemblage (including vireyas) was recorded far below their previously known limits, despite the absence of serpentine or calcareous soils (Takeuchi 2000). The importance of rainfall as a controlling factor is also seen in the Raja Ampat district, where the limestone and ultrabasic communities have no lowland vireyas due to severe seasonal droughts (pers. obs.).

In lowland localities like Lakekamu, the amount of sunlight received by the forest is reduced by frequent thunderstorms and covering clouds. Diminished insolation apparently simulates some of the conditions found at higher elevations (e.g., lower temperatures, reduced evaporation), allowing normally allopatric species to combine in unusual lowland compositions. Bryophytes and liverworts in these ultramoist habitats can envelop trees to an extent recalling summit

environments, providing abundant habitat for epiphytic vireyas (pers. obs.). Brass (1938) reported an analogous situation in the Palmer River basin of Western Province, where mossy fagaceous–ericaceous forest was observed at only 100 m under conditions reminiscent of the mountain mist zone.

Low elevation vireyas are ?always epiphytic. After numerous visits into New Guinea’s wettest forests below 500 m, the author has never seen ground-rooted occurrences, a circumstance contributing to poor documentation of lowland populations. Although most *Rhododendron* above the premontane boundary are epiphytic, rooting behaviors are often facultative even for taxa described otherwise (**Figs. 8, 9**). Versatile species (e.g., *Rhododendron magregoriae* F.Muell., *Rhododendron beyerinckianum* Koord.; **Figs. 10–13**), are well represented by either growth habit but terrestrial individuals are typically taller and more robust, possibly owing to nutrient availability in the ground habitat as compared to oligotrophic aerial substrates. Ground vireyas are particularly prominent in high montane environments, where statures of 5+ m are not uncommon and species are often locally dominant (**Figs. 14, 15**). Like other plant groups, rhododendrons with reduced leaves and statures become more numerous at high elevations and New Guinea’s smallest vireyas can be found there in large numbers (**Figs. 16–20**).

Vireya Conservation

The future is not promising. In the most comprehensive conservation assessment to date (Gibbs et al. 2011, MacKay et al. 2016), 69 vireya taxa from New Guinea were regarded as Data Deficient, indicating a potential conservation problem which cannot be presently evaluated, and 91 were IUCN Red Listed. Based on multiple indicators, New Guinea (followed closely by Sumatra and Sulawesi) is the vireya source area of highest priority for ex situ conservation action (MacKay et al. 2016).

Ex situ measures will be difficult to enact in PNG given the present export constraints on living materials. And even if existing security issues could be successfully addressed, there are no in-country facilities with suitable conditions for cultivating montane vireyas. If El Niño events increase in frequency or severity, montane habitats will be exposed to higher rates of fire which would adversely affect at least some vireya species (**Figs. 21, 22**). Mossy cloud forests at Crater Mt. and Porgera experienced severe burns during previous El Niño related droughts (**Fig. 23**). Whether by intent or accident, hunter-gatherer parties transiting summit areas customarily set wildfires during dry periods. While PNG montane environments have not been destabilized to the same extent as the lowlands, longterm continuity of the high elevation flora will be problematic. ❀

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The relevance of rhododendrons in the modern garden: a nurseryman's perspective

JAMES PETHYBRIDGE

As a nurseryman, I sometimes get asked: how do you choose rhododendrons that will appeal to the public, especially those planting out a new garden? This question has a few different answers and is split into who we are selling the plants to and for what purpose the plants will be used.

My nursery is Blackwood Ridge Nursery (Figure 1), a small boutique nursery specialising in rhododendrons and maples. The nursery is set in the Wombat State Forest, 660 m above sea level on the southern slopes of the Great Dividing Range, just south of Trentham. With our acidic mountain soil, relatively high rainfall and cooler summers than nearby Melbourne, Blackwood Ridge is the perfect place to grow rhododendrons.

We have a good collection of hybrids in our garden with around 250 varieties on show mixed in with our plantings of maples, dogwoods, oaks, conifers and flowering perennials. Being able to display a wide range

Figure 1: Inside the author's nursery.



of rhododendrons gives visitors to the nursery a real sense of place and visual appeal and there is no better way of selling a rhododendron than when customers see them in the garden in full bloom.

There are many qualities that we look for at Blackwood Ridge for selecting which rhododendrons to grow and we balance the range that we grow every year between the two main customer types:

- the enthusiast – selecting their plants by variety or parentage; and,
- everyone else – selecting their plants by colour, size or impulse.

Both of these customer types have a range of end uses for their rhododendrons which can include keeping them in pots, for planting out in shaded areas of the garden, for Japanese gardens, rockeries, and evergreen screening, to name a few. Even with our climate in this part of the world, with a little bit of imagination and encouragement from retailers, we can guide the customer to many avenues of possibilities with rhododendrons, and as those that are familiar with the Genus, there are many varied forms, from dwarfs – for that special addition to the smallest of shaded gardens or that beautiful potted feature – to everything up to the large-leaf forms like *Rhododendron grande* that offer a stunning tropical-like feel.

We have selected rhododendrons to propagate and sell to assist in the pursuit of keeping rhododendrons in Australian gardens relevant.

Flower colour is the most obvious and predominant reason for selection by most customers. Some of the most popular varieties we grow are;

- *Rhododendron* ‘Titian Beauty’ (Deep red)
- *Rhododendron* ‘Purple Splendour’ (Royal purple)
- *Rhododendron* ‘Witchery’ (Bright red)
- *Rhododendron* ‘Midnight’ (Dark plum purple)
- *Rhododendron* ‘Lamplighter’ (Cerise) – see Figure 2

Foliage and form is for those that are seeking something more captivating and architectural adding a certain textural element to the landscape. Yak hybrids are the choice with many hybrids growing wider than tall that lends themselves for bordering a stone path, and are simply magnificent placed near the water’s edge of a pond. The new foliage is especially showy, almost dusted in fine cotton fading with age. Some of the most popular varieties we grow are:

- *Rhododendron* ‘Hydon Hunter’ (Pink)
- *Rhododendron* ‘Yaku Sunrise’ (Pink, white centre) – see Figure 3
- *Rhododendron* ‘Grumpy’ (Cream, tinged pink)
- *Rhododendron* ‘Teddy Bear’ (Soft pink)
- *Rhododendron* ‘Marion St’ (Soft pink blushed white)

The Hachmann hybrids are excellent all-rounders. Hans Hachmann



Figure 2 (above): *Rhododendron* 'Lamplighter'.

Figure 3 (below): *Rhododendron* 'Yaku Sunrise'.





JAMES PETHYBRIDGE

Figure 4: *Rhododendron* 'Silberglanz'.

(1930–2004) was a prolific *Rhododendron* breeder in Germany with an eye for the commercial qualities of growing truly beautiful plants for gardens with attributes of flower colour, form, foliage quality and hardiness. Some of the most popular varieties we grow are:

- *Rhododendron* 'Hachmann's Lagerfeuer' (Bright red)
- *Rhododendron* 'Ninotschka' (Deep pink edge, light pink centre)
- *Rhododendron* 'Claudine' (White edge, bright pink centre)
- *Rhododendron* 'Silberglanz' (White) – see Figure 4
- *Rhododendron* 'Tamarindos' (Deep violet blue with golden green centre)

There is no doubt that rhododendrons will always have a place in the landscape and incorporating them into modern design is not only easy, it's a necessity to maintain the interest in the Genus. With so many variations in their form and flower colour available, there is always a place for rhododendrons in almost any garden, whether planted in a beautiful pot in the courtyard, or to brighten up that lovely shaded corner of the garden.

For more information, please contact James Pethybridge, Blackwood Ridge Nursery, (03) 5368 6707, www.blackwoodridge.com.au. ☘

A collaboration between vireya nurseries in Australia and Italy

NEIL PUDDEY AND ENRICO CIARROCCHI

The Australian story (Neil Puddey)

In 2015, Enrico Ciarrocchi, a nurseryman from San Benedetto del Tronto, Italy, made contact hoping to expand his vireya collection. This was an exciting prospect and many emails later, Enrico decided to fly to Australia to visit our nursery to identify vireyas suitable for trials in his environment.

Enrico is the Director of a large family owned nursery, the principle activity of which is the propagation, growing out and marketing of Camellia throughout Europe. Several other lines of plants are also in his production system including the Vireya hybrid ‘Saxon Blush’ of New Zealand origin. ‘Saxon Blush’ is certainly responding beautifully to Enrico’s management, and by the end of 2017 Enrico will have in his nursery growing out area 20,000 plants of this hybrid (Figures 1 and 2). I must add, all perfectly uniform and wonderfully healthy, a sight to behold.



Figure 1: *Rhododendron* ‘Saxon Blush’ at Enrico’s nursery.



Figure 2: A specimen of *Rhododendron* 'Saxon Blush' at Enrico's nursery.

East coast central Italy has a Mediterranean climate that comes with quite a warm summer but of more interest/challenge to a vireya grower, a cold and often grey winter. Over a one-week period, Enrico and I, with some help from Andrew Rouse put together a selection of vireyas that may perform as well as 'Saxon Blush' in his region of Italy. There were several criteria used in making this selection, including:

- Species used in the original hybridising should be from high altitude, the idea being that some cold tolerance would be inherited (thank you George Argent for making this information available in your publications)
- The growth habit of the hybrid should be very compact. The European plant market demands that plants conform to specification. Open free form plants just do not make the grade and are not saleable.
- Free flowering and/or flower in response to fertiliser and water manipulation.
- Respond to pruning in a way that the resulting plant form will meet strict specifications set by the market such as height, width, number of branches and number of flower buds.

It will be obvious to the vireya enthusiast that the list of hybrids to choose from that meet the above criteria was becoming very short indeed! Fourteen different hybrids, and the species *R. loranthiflorum* were settled on and the propagation and export preparation began.

Italy, being a European Union member, required that plants imported comply with EU regulations. This, in short, states that plants are free of all pests and diseases and that all appropriate measures have been taken to ensure this. Geographic isolation from some exotic diseases not yet found in Australia does make compliance fractionally easier.

If the export is successful, these additions to Enrico's vireya collection will be assessed on their performance under Italian mediterranean conditions. The performance in Italy of the hybrids selected may well be quite different from the subtropical conditions of East coast NSW where I am based – only time will tell how they fare.

The hybrids shipped to Enrico include (please note, some new registrations and provisional names pre-registration):

'Andrew's Orange'	'Little Bo Peep'
'Charming Valentino'	'Mango Swirl'
'Happy Times'	'Magenta'
'Jimmy Sax'	'Martin John'
'Jimmy Sax 2'	'Saxon Glow'
'Just Peachy'	'Sarah Ormiston'
'Kisses'	'Vicky Griffith'

On the 1st of September 2016, the 264 vireyas arrived into Rome's Fumico Airport. The feedback from Enrico was a great relief, all but two were standing upright and looking good (Figure 3). It is a very long journey in a cardboard carton from Woolgoolga, NSW to Rome and then onto San Benedetto del Tronto on Italy's East coast.

The Italian story (Enrico Ciarrocchi)

I have set the following goals for vireyas I produce for the European market:

1. Cold tolerance. This is a very important criteria in selecting varieties. Our plan was to sell vireyas all around Europe, and the more they are resistant to low temperature, the better. Of course, in Northern Europe they will be considered "house plants", but in southern Europe they could be planted outside. At our nursery in Central Italy, we have been growing the Saxon hybrids outside (under shade) for seven years, so far without problems related to frost. Availability of varieties that can stand a few degrees below freezing point would be a great advantage.



Figure 3: Enrico Ciarrocchi with his newly arrived vireyas from Australia

2. Plant form. This is probably the most important criteria in selecting varieties. At the moment, we don't sell to hobbyists and collectors. We sell to wholesalers, and this is the reason why we need very uniform plants. We have very strict specification and no tolerance for low grade plants. Specifications set include: height, width, number of branches, number of buds, number of open flowers, number of plants per shelf and trolley (Figure 4).

3. Flower scheduling. Contracts with wholesalers are made months in advance. And wholesales want a shipment on a set date with a fixed flowering stage. It is not possible to sell vireyas "when they flower". This is the reason why we need varieties that can be scheduled to flower by managing tip pruning, fertilizer and temperature.

4. Crop time to flower. The longer the crop time, the higher the production cost. The market won't pay higher prices, as it's not a hobbyists market. This is a market that does not understand the difference between a slow growing variety and a fast growing one. Commercially, we need uniformly fast growing and quick to flower varieties.

Production Techniques

1. Substrate and water. I studied all the cultural information on vireyas concerning growing mixes, but when I started growing them, I just tried the substrates we used for our camellias and it seemed to work fine. The main ingredient is high quality peat moss from the Baltic countries, mixed with 30% perlite. It is a very loose substrate with a good drainage and it helps me to keep the plants always on the dry side. Our irrigation water comes from two excellent sources – from October to May we use rain water from the roof of our greenhouses and in summertime we use ground water. The groundwater is treated with two Reverse Osmosis Systems to remove excess salts resulting in very low salinity water. Soluble fertilizer is added to the water before irrigation.

2. Propagation. We propagate vireyas from cuttings, rooted under mist. The cuttings are set in propagation trays, filled with a substrate composed of 60% Peat Moss and 40% Perlite. Our schedule is to produce two batches of cuttings, one in May and one in August-September. Our success rate is high, even though we eventually experience some failure due to damping off of the cuttings under mist.

3. Growing on. Rooted plugs are transplanted the year following propagation, into a 15 cm pot and grown in a shadehouse with a 50% shading net. We have also tried to grow vireyas in our glasshouses but they don't like this environment as it is too hot, too dry, and not enough air flow. A percentage of the 15cm pots are grown on to larger plants in 19cm and 27 cm pots.

4. Forcing. In order to schedule the plants to flower at a fixed date, we 'force' the vireyas in the greenhouses in wintertime. The results are excellent, the plants can be manipulated to flower in the fixed week. The forcing has been with the *R. saxifragoides* hybrids, and as yet, we have not experimented with other vireya hybrids.

Problems and results

1. Shipping. In Spring 2017, for the first time, we shipped vireyas to several European countries: Spain, Italy, France, Belgium, Holland, Denmark and Germany. Plants left in excellent conditions with the buds starting to open. Feedback from our customers has been varied. Some of them experienced success, others failure. Two factors could be identified that resulted in success or failure – temperature and handling/facilities. The more successful customers of course were those in the warmer countries but interestingly the main difference was related to the type of infrastructure and their handling.

The best results achieved were with garden centres that placed the plants on display as soon as they received them. Plants that suffered more were those that spent additional time on trucks, trolleys or in warehouse conditions, with low light and low airflow (cash & carry and wholesalers). Our company will work on this issue, but one thing is certain, vireyas have great potential as a viable crop to ship.

2. Climate in different countries. Vireyas have their origin in tropical highlands which experience vastly different climatic conditions to that of the climatic zones of Europe. Vireya must be marketed as “indoor plants” in Holland and “garden plants” in Spain. Customers must be informed on vireya’s requirements as their success is also related to the information growers can provide to the retail nurseries.

3. Period of sales. For the first year, we proposed vireyas available from April 1st to May 15th. It is a very important period spanning from Easter to Mother’s Day. For the future, we will try to widen this period of availability. This could be challenging as plants in bud is a market requirement and we will be attempting to force plants to flower during this period. Also, sales tend to drop off during the summer months (June to September). ❁

Figure 4: *Rhododendron* ‘Saxon Blush’ packed on trolleys ready for distribution to retail outlets.



Rhododendrons at the limit

– a journey through Qinghai

F.H.J. AND P.K. CROME

The rhododendron-rich provinces of Yunnan, Sichuan and Xizang (Tibet) form the southern part of the great upland massif – the Qinghai–Tibet Plateau – the roof of the world – an area of vast vistas of high plains surrounded by snowy peaks (Figure 1). This approximately 2.5 million square kilometre plateau averages over 4,000 m in elevation and is roughly bounded to the south by the Himalayas, to the north by the Kunlun and Qilian Mountains, to the west by the Karakorums and to the east by the Hengduan mountains of Yunnan and Sichuan. The plateau has been formed by a succession of at least four major uplifts events (25–17, 15–13, 8–7 and 3.5–1.6 million years ago) brought about by the continuing slow collision of the Indian plate into the Eurasian plate. This caused extensive habitat fragmentation and speciation by isolation and together with climate oscillations, hybridisation, pollinator-mediated isolation and polyploidy has produced a massive radiation of plants (Jun Wen et al. 2014). More than 12,000 species of vascular plants in 1,500 genera are known from the plateau with particularly high diversity in the southern portion (Jun Wen et al. 2014).

Figure 1: Iris studded plain surrounded by snowclad peaks on the Qinghai–Tibet Plateau.



Yunnan and Sichuan, not Tibet, are now relatively accessible for tourism and areas with high rhododendron and plant diversity can be readily visited. However, opportunities to travel and botanise in the huge province of Qinghai, which forms the northern part of the plateau, are rare so we took the opportunity to join a bird and mammal-watching excursion in May/June 2016 led by the intrepid Jesper Hornskov (goodbirdmail@gmail.com). Jesper is a Danish born ornithologist who organises and leads natural history tours of China. He has lived in China for 28 years, is married to a Golmud lady, and knows Qinghai and many other places in China like the back of his hand. As a fluent Mandarin speaker, he is able to go where others cannot and he has superb knowledge of birds and mammals. He is also great company and an entertainer and can carry on simultaneous conversations in Danish, English and Mandarin.

Qinghai is north of the major centres of plant diversity and has a much smaller flora than for example Yunnan, particularly in the north of the province which is arid scrubland and desert but it has great diversity in scenery and has wild places. Prior to heading out we checked the rhododendrons we might see. There is a flora of Qinghai in Chinese but we didn't have it so we checked

Figure 2: Qinghai, showing our route in red. The Qinghai-Tibet Plateau is shown in green on the inset.



		<i>Red List status</i> ¹
<i>R. aganniphum</i> I. B. Balfour & Kingdon Ward		LC
<i>R. anthopogonoides</i> Maximowicz		LC
<i>R. cephalanthum</i> Franchet		LC
<i>R. praeteritum</i> Hutchinson*		DD
<i>R. primuliflorum</i> Bureau & Franch.	possible	LC
<i>R. przewalskii</i> subsp. <i>chrysophyllum</i> W. P. Fang & S.X. Wang*	endemic	DD
<i>R. przewalskii</i> subsp. <i>przewalskii</i> Maxim.		LC
<i>R. qinghaiense</i> Ching ex W.Y. Wang	endemic	DD
<i>R. rufescens</i> Franchet		LC
<i>R. rufum</i> Batalin		LC
<i>R. trichostomum</i> Franchet		LC
<i>R. tubulosum</i> Ching ex W.Y. Wang**	endemic	DD
<i>R. vellerum</i> Hutchinson ex Tagg in J.B. Stevenson (?= <i>R. principis</i> Bureau & Franchet)		EN
<i>Small purple/blue flowered alpine shrubs</i>		
<i>R. bamaense</i> Z. J. Zhao	endemic	DD
<i>R. capitatum</i> Maximowicz		LC
<i>R. gologense</i> C. J. Xu & Z. J. Zhao	endemic	DD
<i>R. impeditum</i> I. B. Balfour & W. W. Sm.	possible	LC
<i>R. intricatum</i> Franch.	possible	LC
<i>R. nivale</i> J. D. Hooker		LC
<i>R. orthocladum</i> I. B. Balfour & Forrest	possible	LC
<i>R. thymifolium</i> Maximowicz		LC
<i>R. yushuense</i> Z. J. Zhao*	endemic	DD
<i>R. zekeense</i> Y. D. Sun & Z. J. Zhao	endemic	DD

1 – LC=least concern, DD=data deficient, EN=endangered (Gibbs *et al.* 2011)

* Taxonomic debate exists around the status of this species.

** Only known from the type specimen.

Table 1: *Rhododendrons* of Qinghai

the *Flora of China*. It lists 19 rhododendrons in Qinghai and the online *Atlas of the Flora of China* suggests four more are close enough to possibly occur there (Table 1). A disproportionate number of these, ten, are small purple/blue flowered alpine shrubs that would appear very difficult to distinguish in the field. To make up for that, the province has over 450 bird species and lots of big mammals including 19 species of ungulates and the snow leopard.

Our journey (Figure 2) started in Beijing where the group gathered, then on to Xining, the capital of Qinghai, by plane. We got into 4WDs straight away at the airport and headed north towards Huzhu County and the Huzhu forest (technically the Beishan Mountain Forest Park). Our first stop was the high snow-covered Huzhu Pass at 3,200 m in the Datong Range (Figure 3), where we stopped to look for Blue-eared Pheasant (*Crossoptilon auritum*). We found the pheasant, gawked at the views and located three species of rhododendrons – *R. przewalskii* (Figure 4), correctly pronounced “shevalskii” according to Jesper, and two of the purple-flowered shrubby ones – *R. nivale* and *R. thymifolium* (Figures 5 and 6). We saw our first *Daphne* here, *D. retusa*, (Figure 7) as well as having great views of the gorgeous Chinese white-browed rosefinch (*Carpodacus dubius*). This is where we saw our first Himalayan marmot (*Marmota himalayana*), a species of burrowing giant ground squirrel that grows up to 10 kg and that we kept encountering throughout our travels in the south of Qinghai (Figure 8).

Figure 3: Huzhu Pass 3,200 m.





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Figure 4: *Rhododendron przewalskii* at 2,910 m in Huzhu Pass.

Figure 5: *Rhododendron nivale* at Huzhu at 2,910 m in Huzhu Pass.



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Figure 6: *Rhododendron thymifolium* at 2,910 m in Huzhu Pass.

Figure 7: *Daphne retusa* at 2,910 m in Huzhu Pass.



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F.H.J. AND B.K. CHONG

Figure 8: Himalayan marmot on the way to Yushu.

Our base for the next two days was an excellent hotel in the Beishan Mountain Forest Park at 2,369 m. The forest was Likiang spruce (*Picea likiangensis*), Tibetan juniper (*Juniperus tibetica*), poplars (Figure 9) and a birch with spectacular red papery bark (Figure 10), probably *Betula albosinensis* (= *B. utilis albosinensis*). The only *Rhododendron* we found here was *R. przewalskii* spp. growing commonly among the birches and poplars (Figure 11).

We returned to Xining on 25 May and took a side trip to the loess hills outside town looking for Pale Rosefinch (*Carpodacus stoliczkae*) and finding it and an eagle owl (*Bubo bubo*). Loess is soil built up from wind blown dust from Mongolia and, at least around Xining, is botanically bereft and famous for its fertility and erosivity. Nonetheless we found flowering shrubs of *Stellera chamaejasme* (Figure 12), which is used as a medicinal herb to treat tumours, TB and psoriasis.

From Xining it was southwest towards the roof of the world with a visit to the fabled Lake Koko Nor (=L. Qinghai) on the way, looking for waterbirds at 3,200 m. Koko Nor is a saline lake and the largest lake in China. When we were there the cold and wind were bitter and the lakeside seemed to be only populated by herders (Figure 13) but on our way back here in later weeks the banks had transformed into gaily coloured tented holiday camps with thousands of Chinese holidaymakers enjoying sitting around, Tibetan horse rides, archery and dune buggy races. This lake is a great place for the bar-headed goose (*Anser indicus*).



F.H.J.A.N.D.P.K.C.R.O.M.I.E

Above Figure 9: Forest with *Picea likiangensis* and *Juniperus tibetica* at 2,500 m in Beishan Forest Park.



Left Figure 10: The beautiful bark of *Betula albosinensis* at 2,500 m in Beishan Forest Park.

F.H.J.A.N.D.P.K.C.R.O.M.I.E



F.H.J.A.N.D.P.K.G.R.O.M.E

Figure 11: *Rhododendron przewalskii* and birches at 2,500 m in Beishan Forest Park.

Figure 12: *Stellera chamaejasme* in the loess hills north of Xining at 2,650 m.



F.H.J.A.N.D.P.K.G.R.O.M.E



Figure 13: Tibetan herders at Lake Koko Nor.

From Koko Nor we made our way slowly southwards to acclimatise ourselves to the altitude, crossing the Er La Pass at 4,500 m (Figure 14). At this altitude there was only scree and, for us, unidentifiable cushion plants peeking out from beneath the snow but we were on the lookout for, and found, the Qinghai endemic Roborowski's Rosefinch (*Carpodacus roborowskii*), and walking up to 4,600 m where we startled a Tibetan gazelle (*Procapra picticaudata*) (Figure 15). Over-nighting at a less than salubrious truck stop we drove south on 29 May crossing the formidable Bayankala Pass at 4,820 m (Figure 16) and the Ximu Pass at 4,560 m then down to the Yangtze at Yushu. The landscape here is snow covered mountains, scree slopes and shrubberies of *Rhododendron nivale*. There may have been plants of the other purple *Rhododendron* species amongst them but it was too hard to tell. Flowering alpines were uncommon and a trip later in the season would have produced more but the pretty *Androsace mariae* (= *A. tibetica* var. *mariae*) (Figure 17) was quite common as was the cushion plant *Arenaria qinghaiensis* (Figure 18).



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Figure 14: Er La Pass at 4,500m.

Figure 15: Tibetan gazelle (*Procapra picticaudata*) 180 km NW of Qmarleb at 4,500 m.



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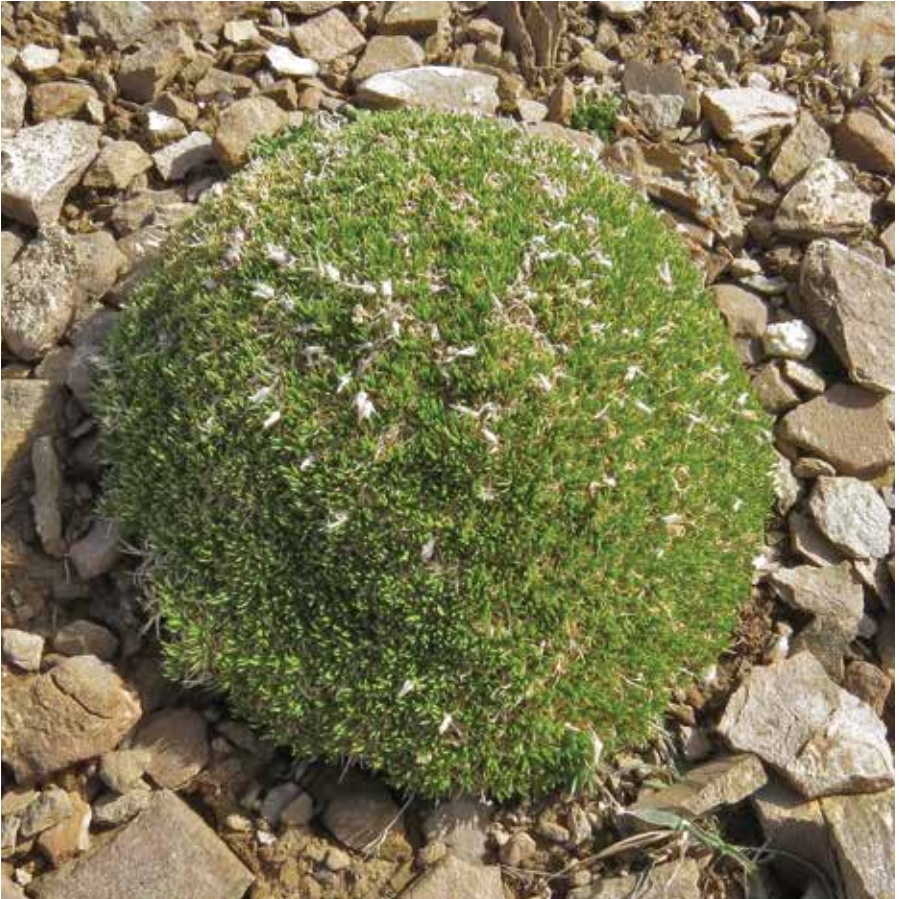
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Figure 16: Prayer flags at Bayankala pass at 4,824m.

Figure 17: *Androsace mariae* at 4,560 m in the Xiwu Pass.



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Figure 18: *Arenaria qinghaiensis* at 4,560 m in the Xiwu Pass.

From Yushu we drove south and had a few days at lower altitude amongst forest and viewing blood pheasants (*Ithaginis cruentus*), rhesus macaques (*Macaca mulatta*), wolves, woodpeckers and Tibetan fox (*Vulpes ferrilata*). Botanising here was good although there were few rhododendrons. We had a full day walk at 3,900 m through a wooded valley about 70 km southwest of Yushu in search of Tibetan partridge (*Perdix hodgsoniae*) (Figure 19). This same valley yielded *Podophyllum hexandrum* (Figure 20), *Androsace tapete* and *Incarvillea compacta* (Figure 21). Up until now we had seen no gentians in flower but were rewarded with *Gentiana ?gilvostriata* (Figure 22). It was then over the 4,650 m high Kandashan Pass close to the Tibetan border (Figure 23). Vegetation here was *R. nivale* shrubberies.



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Figure 19: Tibetan Partridge (*Perdix hodgsonii*) near Yushu at 3,900 m.

Figure 20: *Podophyllum hexandrum* near Yushu at 3,900 m.



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Figure 21: *Incarvillea compacta* near Yushu at 3,900 m.

Figure 22: *Gentiana ?gilvostrata* near Yushu at 3,900 m.



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Figure 23: *Rhododendron nivale* shrubberies at 4,650 m in the Kandashan Pass.

We backtracked from the Tibet border back to Yushu then drove across the roof of the world to Golmud via Qumarleb. The plains northwest of Yushu were studded with areas of beautifully flowering *Androsace tapete* looking like flowering rocks (Figures 24 and 25). This was the Tibetan high plain, mostly between 4,200 and 4,500 m surrounded by snow-capped mountains and home to herds of kiang (*Equus kiang*) (Figure 26), wild yaks, Tibetan gazelles, and Tibetan antelope (*Panthalops hodgsonii*) (Figure 27). We searched here for the elusive Tibetan sandgrouse (*Syrrhaptes thibetana*) and found it against the unforgettable backdrop of the Tibetan Himalayas. There were no rhododendrons here but we enjoyed finding *Iris* and *Androsace* amongst the scree (Figure 28). The next day we drove to the Kekexili Nature Reserve 125 km southwest of Golmud and climbed to our highest point reached (4,900 m). This Reserve is a World Heritage Area and it supports most of the world's population of the Tibetan antelope which was poached to near extinction for its ultra-fine breast and bellies wool. The reserve has a monument to the murdered leader of the Wild Yak Brigade, a local anti-poaching antelope protection conservation team made famous in the Golden Globe awarded movie “Kekexili: Mountain Patrol”.



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Figure 24: Landscape of “flowering rocks”, *Androsace tapete*, 127 km northwest of Yushu, at 4,200 m.

Figure 25: Close-up of *Androsace tapete*.



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Figure 26: Kiang (*Equus kiang*) west of Qumarleb at 4,500 m.

Figure 27: Tibetan antelope (*Panthalops hodgsonii*) west of Qumarleb at 4,500 m.



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Figure 28: *Iris* and *Androsace* west of Qumarleb at 4,500 m.

We exited *Rhododendron* country once we got to the city of Golmud the western most point of our journey. From then on we drove through the southern edge of the arid Quaidam basin (Figure 29). This is scrub and semi-desert, still high and with plenty of infrastructure development mostly new highways. We were still finding plenty of large mammals and birds including herds of, admittedly domestic but nonetheless impressive, Bactrian (two-humped) camels (*Camelus bactrianus*) (Figure 30). Our last days were spent around Xining and Beijing. In the three weeks of the journey we had driven over 3,000 km and walked more than 250 km, mostly above 3,000 m. We only saw three species of rhododendrons, the rest must be all down towards the Sichuan and Gansu border, but made up for it with 217 species of birds, 26 species of mammals, plants of all sorts, magnificent forests and some of the most spectacular scenery imaginable. ❀

Figure 29: The southern edge of the Quaidam basin, 120 km east of Golmud at 2,700m.



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EHLAND P.K. GROBE

Figure 30: Bactrian camels 120 km east of Golmud at 2,700m.

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The Australian Tropical Herbarium and ARS expedition to Mount Finnigan, North Queensland

ANDREW ROUSE AND HENRY HANCOCK

Background

R. viriosum from Mount Finnigan is of particular interest as it is the northernmost and most disjunct population of the species. In cultivation, the Mt Finnigan form can be reliably identified by the more marked raised lateral veins on the upper surface of the leaf.

The first record of collection of *R. viriosum* from Mount Finnigan is by Leonard Brass in 1948 (AQ NR 188746), and was first introduced into cultivation from the 1979 Australian Rhododendron Society expedition.

Re-collecting *Rhododendron* from the mountain-tops of North Queensland

The Australian Rhododendron Society has supported the Australian Tropical Herbarium project *Saving the unique plants of Australia's tropical mountaintops through understanding their threats*. This project, led by ATH Botanist Professor Darren Crayn, has surveyed the plant communities of nine North Queensland mountaintops over a 12-month period. ARS Members have participated in some of the expeditions, and all *Rhododendron* cuttings collected are being propagated at the Society's facilities at the National Rhododendron Gardens Olinda (see article in this journal).

Mount Finnigan

Mount Finnigan was visited by this project in early June 2017. The four-day trip was led by Australian Tropical Herbarium botanist Stuart Worboys and we were most fortunate to have Louis Roberts OAM, a local landholder and renowned amateur naturalist as our guide. The party also included Dr Matt Renner, a bryophyte expert with Royal Botanic Gardens Sydney, Thomas Houghton, a local Jabalinga Ranger, and two Australian Rhododendron Society members, Andrew Rouse and Henry Hancock.

There are no roads up Mount Finnigan so the ascent is by foot, a day's hard climb with packs. The trip commenced at Louis Roberts' cattle property at the base of the mountain and involved a steady climb through open Eucalypt forest (with the occasional *Agathis robusta*) to an altitude of about 800 m where the montane rainforest commenced. The boundary between the Eucalypt forest and rainforest is extraordinarily abrupt, and within five to six paces you walk from fire-scarred open woodland into dense rainforest (Figure 1).



Figure 1: Louis Roberts at woodland-rainforest border:

Figure 2: Camp site.





Figure 3: Henry Hancock with the first specimen of *R. viriosum* found on the expedition.

Figure 4: *R. viriosum* growing amongst boulders on NW Summit.



Mount Finnigan is an escarpment with a series of rocky outcrops forming a U-shape around a creek. Camp was established close to the creek (Figure 2) and we set out to explore the montane forest and rocky outcrops. The first population of *R. viriosum* was found about 80 m above the creek (en route to the NW peak), growing above the forest line amongst rocks and low growing shrubs (Figure 3). The species turned out to be locally common and occurring wherever there were rocks, including on the summit of the north-west peak where they grow out of cracks in the rocks and are fully exposed to the elements (Figure 4). The only plant in flower observed was one miserable truss on a plant on the NW peak!

On days 2 and 3, further populations were found on rocky outcrops within the montane forest alongside the creek where the microclimate is more sheltered and lower light than on the exposed peaks. Here the plants are very leggy with much larger leaves than the stunted specimens above the forest line where they are exposed to the elements. These field observations support the significant affect of the microclimate on shaping the plants; large, leggy plants were observed on the edge of the montane forest just meters away from small, stunted plants in the exposed boulder field on the summit of Mount Finnigan.

R. viriosum was only observed growing on rocks, consistent with the populations found on other peaks in North Queensland. Growing alongside *R. viriosum* on rocky outcrops and escarpments were other mountain-top endemics including *Dendrobium finniganense* (Mount Finnigan cane orchid), *Dendrobium Jonesii* (oak orchid), *Borya septentrionalis* (resurrection plant), and *Uromyrtus metrosideros* (mountain malletwood) (Figure 5).

We were very lucky to have a break in the clouds whilst on the summit and experience the stunning view; south towards the main range and Thornton Peak (Figure 6), east out to the reef (Figure 7), and north towards Cooktown.

Cuttings of *R. viriosum* were collected from a range of locations across the mountain and these will be maintained as part of the vireya collection at the National Rhododendron Gardens Olinda. Leaf samples will be part of the DNA analysis to be conducted by Plant and Food Research NZ that we hope will shed light on genetic variability within and between populations of *R. viriosum*. ❀

Acknowledgements

The authors would like to thank the Ian Potter Foundation for funding the project. We would also like to express our appreciation to the Australian Tropical Herbarium for a superbly run expedition and highly successful project. Finally we'd like to thank Stuart Worboys, Matt Renner, Thomas Houghton and Louis Roberts for their excellent company.



Figure 5: *Boyra septentrionalis* (resurrection plant) and *Dendrobium finniganense* (Mount Finnigan cane orchid).

Figure 6: View from summit of Mount Finnigan to the south towards Thornton Peak (Andrew Rouse, Henry Hancock and Dr Matt Renner).





Figure 7: View from summit of Mount Finnigan to the east out to the Great Barrier Reef.

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ARS Tour of Sabah and Mount Kinabalu, May–June 2018

The ARS is seeking Expressions of Interest from ARS Members to participate in an eight day (nine night) tour of Sabah, Borneo. The itinerary has been prepared by ARS Member, Dale Schubert, who has previously visited the highlights of our Sabah Tour.

Sabah and Mount Kinabalu

The Malaysian state of Sabah in northern Borneo is a hotspot for vireya *Rhododendron* diversity, from the minute *R. ericoides* to the statuesque *R. lowii*. The ARS is seeking Expressions of Interest from Members for an 8 day/9 night tour to three mountains of Sabah. The 2018 tour will be scheduled to coincide with the expected flowering of most species (May–June). In addition to *Rhododendron*, you will experience wonderful local cuisine and you may be lucky enough to see some iconic Bornean wildlife or even *Rafflesia* – the world’s largest flower.

Proposed Itinerary

Arrive at Kota Kinabalu (KK) transfer to hotel and gather for lunch/dinner. Spend night in KK.

Mt Kinabalu (Day 1 and 2):

After an early departure from our accommodation in KK we travel to Mount Kinabalu National Park office. Rising to 4,101m Mount Kinabalu is the highest mountain in Borneo, providing every variety of habitat for thousands of plant species, from lowland dipterocarp forest to stunted vegetation at 3,300 m. Climbing Mount Kinabalu allows the opportunity of sighting many of the 26 *Rhododendron* species recorded from this World Heritage Listed site. After meeting our guides we begin our ascent at 450 m and spend the day slowly ascending the mountain. There are many opportunities to rest and explore the vegetation along the summit trail.

We will arrange to spend two nights upon the mountain, where we will traverse between two of the three guesthouses. An early morning ascent to the summit for a spectacular sunrise is a priority for most visitors.

Mt Kinabalu to Poring Hot Springs (Day 3):

After descending Mount Kinabalu we travel for a late lunch to the town of Ranau. Along the way we may be fortunate enough to chance upon the world's largest flower *Rafflesia pricei*. *Rafflesia* flowers only last several days, so sighting them is a chance event only!

From Ranau we descend to spend the night at Poring Hot Springs, a close-by resort. Originally established by the Japanese during the WWII occupation, the thermal springs offer the opportunity to observe low altitude flora/fauna while rejuvenating tired muscles between mountains.

Poring to Mamut (Day 4)

From Poring Hot Springs we travel on to the former Mamut copper mine site. The site has been reclaimed by at least 11 species of *Rhododendron* and many spectacular pitcher plants. Unlike the undisturbed forest on Mount Kinabalu, all rhododendrons at this site are growing terrestrially and can be easily observed. Species recorded from this site include *R. javanicum* v. *brookianum*, *R. orbiculatum*, *R. suaveolens*, *R. stapfianum*, *R. praetervisum*, *R. crassifolium*, *R. polyanthemum* and *R. verticillatum*. This site offers simply unforgettable evening sunsets across Mount Trus Madi/Mount Mentapok and sunrise views of Mount Kinabalu. We will spend a night in basic accommodation at Mamut.

Mamut - Trus Madi (Day 5 & 6):

Far less travelled is Borneo's second highest mountain Trus Madi. Rising to 2,642 m, Trus Madi is a naturalist's delight. Draped in spectacular mossy forest the mid montane forest is punctuated by a plethora of *Rhododendron*, orchids and two of Borneo's most spectacular pitcher plants, easily observed along the upper trails. The summit presents majestic views across Sabah, punctuated by Mount Kinabalu. One night will be spent in basic accommodation on the mountain.

Trus Madi-Mt Alab (Day 7):

After our descent from Trus Madi we will travel to Mount Alab, where we will search the numerous trails for *Rhododendron*, including the rarely observed *R. lambianum*. Night will be spent in accommodation on Mount Alab before departing for Kota Kinabalu.

Kota Kinabalu (Day 8):

Our final night will be spent in KK, allowing a relaxed late departure from Mount Alab. We will enjoy a final group dinner on the waterfront and return to Australia the following day.

Tour Details

Cost: The tour will be at each participant's cost. Costing is yet to be finalized and will be subject to change which may be required or expressed by the group. A deposit will be required to confirm your place on the tour.

Group size: The tour is for a minimum of five and maximum of eight people. We must receive deposits from a minimum of five participants before confirmation that the tour will proceed.

Flights: Participants will be responsible for making your own flight arrangements to and from Kota Kinabalu (capital city of Sabah).

Accommodation in Sabah: All accommodation during the tour will be pre-booked on your behalf. All accommodation bookings will be for shared rooms unless you request your own room. Participants should note that accommodation on Mount Trus Madi and at Mamut is shared and rather basic. Accommodation on Kinabalu is likely to be dormitory style.

To ensure participants meet at and depart from the same location, a night's accommodation upon our arrival and return to KK will be included in the quoted price. Should you wish to extend your stay in Borneo, you will need to book your own accommodation prior to, or upon completion of the tour.

Guides & Porters: An experienced local guide will accompany us for the entire tour. Guides generally do not carry clients' packs, although porters for Mount Kinabalu and Mount Trus Madi can be arranged for an additional fee.

Transport: All transportation from accommodation in KK will be provided within the package quoted. Airport transfers are not included.

Meals: All meals will be provided during the tour. Meals in KK are not included. Please note that meals on both mountains will be cooked by our guides. Meals between destinations are generally sourced from local vendors. Should you have any special dietary requirements, please advise well in advance.

Fitness level: The combination of gradient and altitude make climbing Mount Kinabalu challenging for many trekkers. Porters will be available for hire, however participants must be able to hike for several hours carrying their own daypacks.

Insurance: All participants will be responsible for providing their own travel and personal insurance.

Equipment list: A suggested list will be provided to those who submit an expression of interest.

Further Information: To book a spot of the tour, or for further information, please contact Dale Schubert on blackbean@iprimus.com.au. ❁



DALE SCHUBERT

Figure 1: *Rafflesia pricei*.



DALE SCHUBERT

Figure 2: *Rhododendron javanicum* ssp. *brookeanum* var. *kinabaluense*.

Figure 3: *Rhododendron* sp.



DALE SCHUBERT

Botanical exploration of Australia's tropical mountains

*How the hunt for Australian rhododendrons
turned into a major win for conservation in
North Queensland.*

STUART WORBOYS
AUSTRALIAN TROPICAL HERBARIUM

Overview

Over the last two years, the Australian Rhododendron Society, together with the Ian Potter Foundation, has sponsored a series of expeditions to the high mountains of Queensland's Wet Tropics. The expeditions, conducted by the Australian Tropical Herbarium (ATH), have had as their core aim the establishment of the most extensive and carefully provenanced living collection of Australian rhododendrons. But the expeditions have provided a unique opportunity for additional survey and research in the rarely visited tropical mountain habitats of far north Queensland. With the funding provided, they were able to address a much larger and more significant research question: what is the extinction risk to Australia's unique tropical mountain flora from climate change, and are there measures to mitigate these risks?

To get things underway, an expert workshop was convened in March 2016 with the goals of creating a list of plants restricted to the high mountains of the Wet Tropics bioregion and prioritising survey locations. A 2015 paper by ATH and CSIRO researchers had identified 19 species that would lose most, if not all, of their cool wet mountain habitat to global warming. Building on this foundation, the workshop identified 73 flowering plant species, two conifers and 12 ferns whose only known habitat occurs almost entirely above 1,000 m in Queensland's Wet Tropics.

This project has welcomed the participation of stakeholders and expert volunteers in fieldwork, including participants from the Wet Tropics Management Authority, Queensland National Parks, New South Wales and Queensland Herbaria, and the Australian Rhododendron Society (ARS). Importantly, a good working relationship was established with the Jabalbina Yalanji Aboriginal Corporation who represent the Traditional Owners of much of the country we worked on.

In the field

The expert workshop led to the development of a plan for a field survey program. The plan involved visits to several mountains, from Mount Bartle Frere in the south to Mount Finnigan in the north (Figure 1) for endemic mountain flora surveys, establishment of monitoring plots, and targeted sampling. The ARS and Ian Potter Foundation funding supported planning and logistics, including helicopter transport of scientific gear. Although simple in conception, the surveys proved gruelling, with much of the country steep, very densely vegetated, and rugged. Four of the mountain localities (Mount Finnigan, Thornton Peak, Main Coast Range and Mount Bartle Frere), were only accessible on foot. Poor weather and abundant leeches added to the challenge, with low cloud and wind preventing helicopter support for most localities. At all times, safety of personnel was paramount, so that despite the cost and inconvenience, we cut short several trips when incessant rain made hiking dangerous. Fortunately, weather did not affect our primary goal of *Rhododendron* collection. Samples were taken from all populations visited, and 49 collections from almost all known Australian populations are being propagated at the National Rhododendron Garden Olinda (Table 1).

The field work on remote, rarely visited tropical mountains attracted the enthusiastic collaboration of several experts and field naturalists. Their knowledge and observations contributed significantly to the discoveries made during this project (see the unexpected discoveries and other notable outcomes in Table 1), and consequently it's expected that scientific publications arising from their work will exceed the number originally anticipated. All the mountains and highlands identified in the expert workshop (Table 1) were visited over 18 months. Surveys made 831 precisely-located observations of 53 target species, greatly improving the dataset available for future climate impact and extinction risk modelling. Not only did the surveys find new locations for threatened and endemic mountaintop plant species but excitingly, they rediscovered 'presumed extinct' species and discovered species new to science (Table 1).

The Australian Tropical Herbarium engaged with the Jabalbina Yalanji Aboriginal Corporation (Jabalbina) as a stakeholder in this research. Lands managed by the Eastern Kuku Yalanji people through Jabalbina include Mount Finnigan, Thornton Peak, and parts of the Carbine Tableland. Ongoing knowledge sharing and engagement is critical to the success of this research (and all other current and future herbarium research on Eastern Kuku Yalanji lands), and we are working towards the development of a Memorandum of Understanding that will formalise the relationship and facilitate future access to these localities.

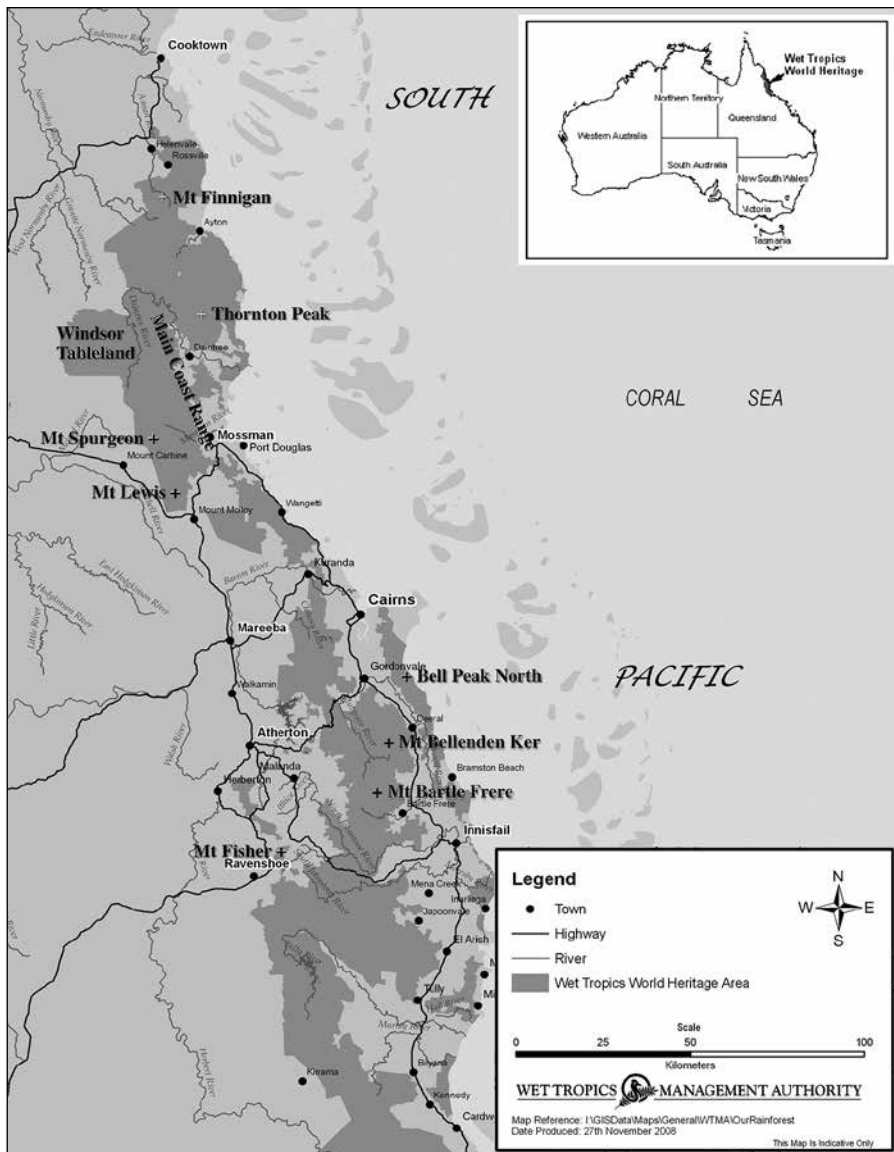


Figure 1: Map of the area in which the field survey was undertaken.

A lot of data was generated by the work, and data entry and analysis continues. Tasks yet to be completed include:

- Survey data will be fed into distribution modelling for future climate change impact studies.
- The Australian Tropical Herbarium will continue accessioning specimens collected during field surveys so that their information is available to researchers and the general public through web portals. This distribution and habitat data can be reviewed via the Atlas of Living Australia (www.ala.org.au); the data entry process is about 50% complete.
- The Queensland Herbarium will incorporate vegetation site data into its “CORVEG” database, and it will be used to improve the quality of its vegetation mapping.
- Bryologists (moss and liverwort experts) will publish new species and add to existing checklists.
- Genetic analysis of the *Rhododendron* collections by researchers in New Zealand will allow development of a family tree, or genealogy, of Australia’s *Rhododendron*, addressing questions regarding how many species are native to Australia, their origin and evolution.

What’s next?

The goals of this project have largely been achieved: native rhododendrons have been collected from across their known distribution, and through field survey, we have greatly improved our knowledge of the distribution of the Wet Tropics’ endemic mountain flora.

However, as with most scientific studies, the results raise more questions and generate more opportunities. This project has highlighted a number of areas in which further work is required:

- Further and more extensive field surveys are needed, particularly on Mount Bellenden Ker, Mount Bartle Frere and the Main Coast Range, where rain disrupted field work.
- Studies on the biology of the climate-threatened mountaintop endemics.
- Establishment of *ex-situ* conservation collections (of non-rhododendrons) in well managed botanic gardens.

Table 1: mountains visited, specimens collected and significant discoveries.

<i>Location</i>	<i>Date</i>	<i>Achievements</i>
Expert workshop, JCU Cairns Campus	3–4 March 2016	
Mt Bellenden Ker	8–9 March 2016	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16100, N16099 and N16101. • First specimen collected of <i>Rhododendron lochiaie</i> from Mt Bellenden Ker in 130 years (Figures 2 & 3).
Mt Lewis, Carbine Tableland	16–20 May 2016	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16102, N16103 and N16104. • 12 vascular plant specimen collections. • 44 observational records of target mountain flora species.
Bell Peak North	7–9 June 2016	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16105, N16106, N16107, N16108 and N16109. • 9 observational records of target mountain flora species. • First record of <i>Bulbophyllum wadsworthii</i> and <i>Bulbophyllum lilianae</i> (both target mountain flora species) from the coastal Malbon Thompson Range (Figure 4). • 1 vascular plant species possibly new to science.
Bell Peak North (Figure 5)	7 Aug 2016	<ul style="list-style-type: none"> • Participation of ARS members. • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16113, N16114, N16115 and N16116. • 5 vascular plant specimen collections. • 2 observational records of target mountain flora species

<i>Location</i>	<i>Date</i>	<i>Achievements</i>
Mt Lewis, Carbine Tableland	8–9 Aug 2016	<ul style="list-style-type: none"> • Participation of ARS members.
Mt Spurgeon, Carbine Tableland	9–11 Aug 2016	<ul style="list-style-type: none"> • Participation of ARS members. • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16117, N16118 and N16119.
Windsor Tablelands	11–13 Aug 2016	<ul style="list-style-type: none"> • Participation of ARS members. • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16120, N16121, N16122, N16123, N16124 and N16125. • 18 vascular plant specimen collections. • Probably the northernmost Australian record of the fern <i>Oleandra neriformis</i> and the herb <i>Peperomia tetraphylla</i>.
Mt Bellenden Ker	15–19 Aug 2016	<ul style="list-style-type: none"> • Participation of ARS member. • 20 vascular plant specimen collections. • 213 observational records of target mountain flora species. • Northernmost record of <i>Polyosma</i> sp. Mt Bellenden Ker (B.Hyland 2524RFK), a target mountain flora species. • Bryophyte collections include five species new to Australia, and four species new to science.
Main Coast Range, Carbine Tableland	12–14 Sep 2016	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N16126, N16127, N16128 and N16129 (Figure 6). • 29 vascular plant specimen collections. • 79 observational records of target mountain flora species.
Mt Bellenden Ker	26–28 Oct 2016	<ul style="list-style-type: none"> • 17 vascular plant specimen collections. • 138 observational records of target mountain flora species.

<i>Location</i>	<i>Date</i>	<i>Achievements</i>
Mt Fisher	18 Dec 2016	<ul style="list-style-type: none"> • Queensland's fourth highest peak. • No <i>Rhododendron</i> recorded at this location. • 4 vascular plant specimen collections.
Mt Fisher	22 Apr 2017	<ul style="list-style-type: none"> • 3 observational records of target mountain flora species. • Southernmost record of <i>Parsonsia bartlensis</i>, and the first record of the species from this peak.
Mt Bartle Frere	22–24 May 2017	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N17145, N17143, N17142 and N17144.
Mt Finnigan (Figure 7)	5– Jun 2017	<ul style="list-style-type: none"> • Participation of ARS members. • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers N17147, N17149, N17146, N17148, N17150, N17151 and N17152. • 54 observational records of target mountain flora species. • Collection of the “vulnerable” fern, <i>Oreogrammitis leonardii</i>, not recorded since it was first discovered in 1948. • Northernmost record in Australia of the tree fern genus <i>Dicksonia</i>. • First record of the fern <i>Hymenophyllum reinwardtii</i> in Australia. • Bryophyte collections include nine species new to Australia and one new to science.
Mt Pieter Botte	23 Jul 2017	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nurdery number N17167.

<i>Location</i>	<i>Date</i>	<i>Achievements</i>
Thornton Peak	13–18 Aug 2017	<ul style="list-style-type: none"> • Rhododendrons in cultivation at the National Rhododendron Gardens Olinda: nursery numbers unknown. • 52 vascular plant specimen collections. • 170 observational records of target mountain flora species. • Discovery of a previously unknown population of the “endangered” fern, <i>Chingia australis</i>. This is now the only known living population of this short-lived fern. • Rediscovery of the presumed extinct fern, <i>Hymenophyllum whitei</i> (Figure 8). • Possible new genus of snail. • Discovery of two new populations of the recently named herb, <i>Geosiris australiensis</i>, previously only known from one population discovered in January 2017.
Windsor Tableland	5–6 Sep 2017	<ul style="list-style-type: none"> • 8 observational records of target mountain flora species.

Figure 2: First specimen collected of *Rhododendron lochiaie* from Mt Bellenden Ker in 130 years.





STUART WORBOYS

Figure 3: Professor Darren Crayn and Stuart Worboys, Australian Tropical Herbarium, at the site of the collection of *Rhododendron lochiaie* on Mount Bellenden Ker.

Figure 4: First record of *Bulbophyllum* sp. on the Malbon Thompson Range.



STUART WORBOYS



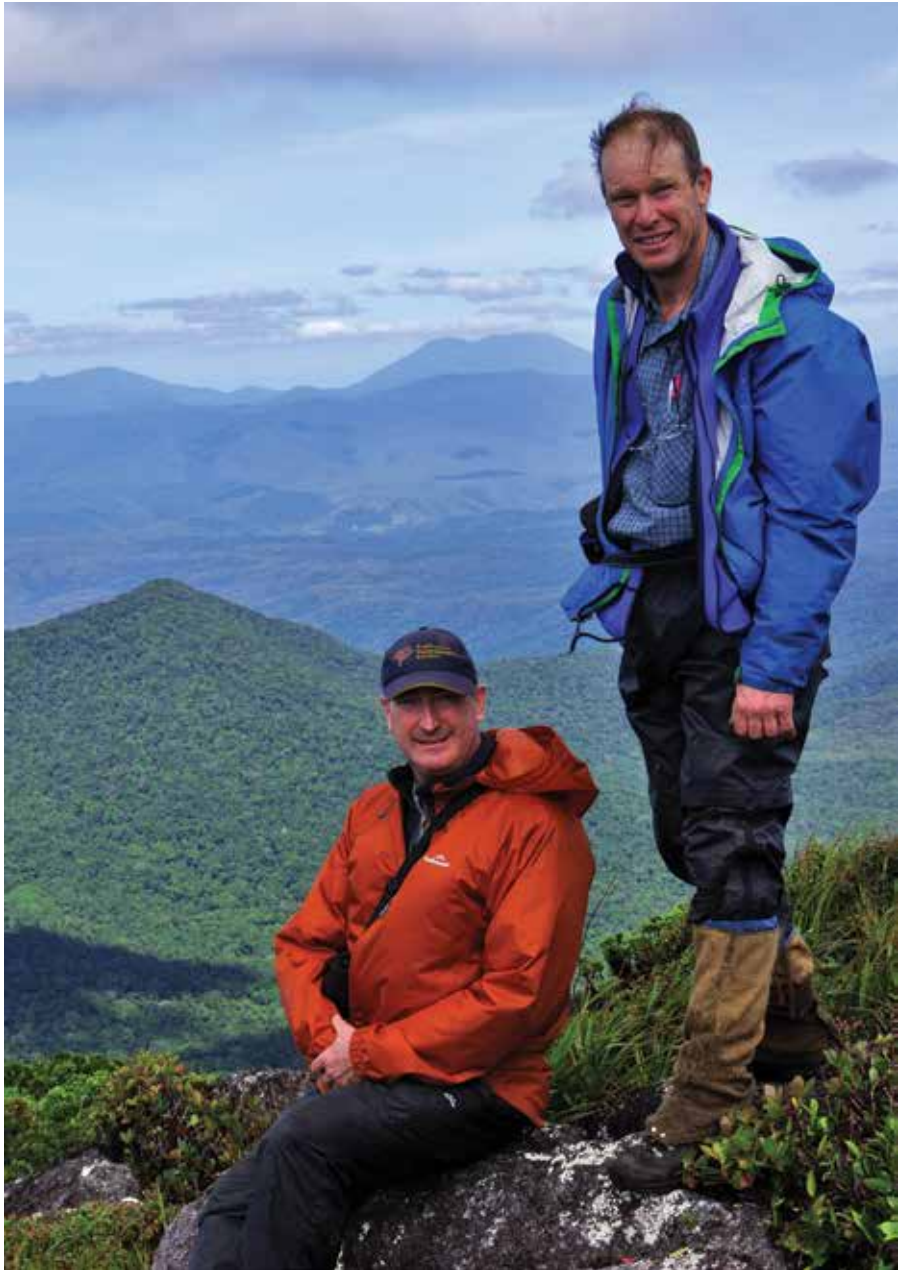
STUART WORBOIS

Figure 5: Bell Peak North.

Figure 6: *Rhododendron viriosum* collected on Devil's Thumb, Main Coast Range.



STUART WORBOIS



STUART WORBOYS

Figure 7: ARS members Andrew Rouse and Henry Hancock on the summit of Mount Finnigan, with Thornton Peak in the distance.



STUART MORRIS

Figure 8: The presumed extinct fern *Hymenophyllum whitei* rediscovered on Thornton Peak.



Rhododendron occidentale

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New Registrations 2016–2017

LESLEY EATON

The following is a listing of registrations submitted by the Australian Rhododendron Society Plant registrar, and approved by the Royal Horticultural Society during the year 2014–2015.

Colour numbers refer to the R.H.S. Colour Chart. Accompanying colour names are taken from *A Contribution Towards Standardization of Color Names in Horticulture*, R.D. Huse and K.L. Kelly, edited D.H. Voss (ARS 1984).

Parents of plants are reported in the conventional order – seed parent × pollen parent.

Abbreviations used: H hybridized by
G grown to first flower
S selected by
N named by
I introduced by
R registered by

Included in the description are broad colour definitions after the RHS Colour Chart numbers. This will enable members without access to the chart to have some idea of the colour of the flower.

‘Diana Manson’ Vireya hybrid of (*viriosum* × *jasminiflorum*) × ‘Simbu Sunset’. H: Andrew Rouse (2004). G: Andrew Rouse (2011). N & R: Andrew Rouse (2017). Truss: open consisting of 5–7 tubular–campanulate flowers. Corolla: 35mm–55mm × 20mm–30mm. Lobes: 5, very wavy. Buds: Pale green. Corolla: Inside 62B (pink) flushed to 62A (pale pink) on lobes. Outside 62D (light pink) gradating through 62C (mid-pink) to 62A (bright pink) on the very fringe of corolla lobe. Very fine 61D (deep pink) lines along length of tube. Leaves: Elliptic 35mm–55mm × 20mm–30mm. Leaf Margin: Flat. Upper surface: Glossy. Height: 1m × 1m in 13 years. Flowering time: April/May. Slightly scented, hardy in full sun. *See picture inside front cover.*

‘John C Gray’ Elepidote hybrid of ‘Colehurst’ × *arboretum* (Jack O’Shannassy’s red form). H: L Begg (2003). G: John C Gray (2010). N & R: Sylvia Gray (2016). I: Brindabella Country Gardens (2016). Truss: ball consisting of 14 campanulate–shaped flowers. Corolla: 55mm × 65mm. Lobes: 5, wavy. Buds: 52D (salmon pink). Corolla: Inside 52D (salmon pink). Outside 50D (pale dusky pink). Leaves: Elliptic 170mm × 60mm. Leaf margins: Flat. Upper surface:

Matt. Height: 1.2m X 1m in 10 years. Flowering time: Sept. Free flowering, vigorous, heat tolerant. *See picture inside front cover.*

‘Little Lotsky’ Vireya hybrid of (*macgregoriae* X *rubineiflorum*) X (*rubineiflorum* X *anagalliflorum*). H: Andrew Rouse (2001). G: Andrew Rouse (2010). N & R: Andrew Rouse (2016). Truss: open, consisting of (1) 2–3 short tubular campanulate shaped flowers. Corolla: 20mm X 20–25mm. Lobes: Wavy. Corolla: Inside. White (with pink filaments). Outside. Base of tube 36D (yellowish pink) gradating to white be end of tube, white lobes. Leaves: narrowly elliptic, 8–12mm X 4–5mm. Upper surface: Matt. Leaf margins: Flat. Height: 20cm X 25cm in 15 years. Flowering: October. Miniature, much-branched shrub, unscented. *See picture on front cover.*

‘Lucy Rouse’ Vireya hybrid of *goodenoughii* X ‘Simbu Sunset’. H: Andrew Rouse (2003). G: Andrew Rouse (2013). N & R: Andrew Rouse (2016). Truss: Upright, then open, consisting of 12–18 trumpet/trumpet-ventricose shaped flowers. Corolla: 55mm–60mm X 50mm–60mm. Lobes: Slightly wavy, notched at apex. Corolla: Inside. 37D (white flushed to yellowish pink). Outside. Very pale yellowish–white. Leaves: Obovate 40mm–100mm X 30mm–55mm. Upper surface: Glossy. Leaf margins: Flat to slightly upcurved. Height: 1.2m X 0.8m in 13 years. Flowering time: Early Spring. Upright branching shrub, slightly scented. *See picture inside front cover.*

‘Lynette Riley’ Elepidote hybrid from unknown parents. H: Emu Valley Rhododendron Garden (2010). G: Emu Valley Rhododendron Garden (2015). N: Graham Riley and Family (2016). I: Emu Valley Rhododendron Garden. (2016). R: Juanita Wood (2017). Truss: compound umbel consisting of 12 campanulate shaped flowers. Corolla: 30mm X 100mm. Lobes: 6, wavy. Buds: 25D (pale apricot). Corolla: Inside and outside 5D (lemon). Spots of 168B (light tan). Leaves: Linear 110mm X 42mm. Leaf margin: Decurved. Upper surface: Matt. Indumentum fawn when young then light tan when older. Height: 1m X 1m. Flowering time: October/November. *See picture inside front cover.*

‘Pamela Friend’ Elepidote hybrid of *fortunei* X unknown. H: Unknown. G: Emu Valley Rhododendron Garden. (2000) N: Her Excellency the Governor Professor The Honourable Kate Warner AM (2015). I: Emu Valley Rhododendron Garden (2005). R: Juanita Wood (2016). Truss: Ball consisting of 8–10 funnel-shaped flowers. Corolla: 60mm X 35mm. Lobes: 7, very wavy. Buds: 66C (light rose). Corolla: Inside and outside 75B (pale mauve). Small amount of colour 3D (lemon) in throat and spots of 26C (apricot) in throat and on two lobes. Leaves: Oblong 115mm X 42mm. Leaf margin: Decurved.

Upper surface: Matt. Height: 2.5m X 2m in 10 years. Flowering time: Early October. Fragrant. *See picture inside back cover.*

‘September Fragrance’ Lepidote hybrid of *ciliicalyx* X unknown. H: unknown. G: Emu Valley Rhododendron Garden (2000). N: Emu Valley Rhododendron Garden (2014). I: Emu Valley Rhododendron Garden (2010). R: Juanita Wood (2016). Truss: Lax consisting of 6 tubular-funnel shaped flowers. Corolla: 60mm X 30mm. Lobes: 5 wavy. Buds: 52B (bright dusky rose). Corolla: Inside 69D (pale purplish pink). Outside 62C (pink). Spots of 150B (lime green) on dorsal lobes. Calyx: 5mm 150B (lime green). Leaves: Elliptic 75mm X 34mm. Leaf margin: Flat. Height: 1.5m X 2m in 10 years. Flowering time: Early September. Fragrant. *See picture inside back cover.*

‘Sheer Magic’ Elepidote hybrid of ‘Bambi’ X ‘Morning Magic’. H: the late Noel Sullivan (1990). G: Emu Valley Rhododendron Garden (2006). N: the late Noel Sullivan (1995). I: Emu Valley Rhododendron Garden (2006). R: Emu Valley Rhododendron Garden (2016). Truss: Ball consisting of 10 openly campanulate flowers. Corolla: 45mm X 25mm. Lobes: 5 flat. Buds: 54A (deep rose). Corolla: Inside and outside 159D (cream). Spots of 13B (rich yellow) on some lobes. Calyx: 35mm 159D (cream). Leaves: Broadly elliptic 74mm X 42mm. Leaf margins: Upper surface: Glossy. Hairy fawn indumentums when young, light tan when mature. Height: 1m X 60cm in 10 years. Flowering time: October. *See picture inside back cover.*

‘Stonehaven’ Vireya hybrid of *goodenoughii* X (*javanicum* X *rarilepidotum*). H: Andrew Rouse (2006). G: Andrew Rouse (2015). N & R: Andrew Rouse (2016). Truss: Upright initially then half upright, consisting of 10–12 trumpet-shaped with slightly curved tubed flowers. Corolla: 60mm–70mm X 40mm–50mm. Lobes: 4–5, wavy. Corolla: Inside (strong yellowish pink). Outside white fused with 18D (pale yellow) along the tube then flushed to 32C (strong yellowish pink) for lobes. Leaves: Broadly elliptic obovate 50mm–100mm X 30mm–55mm. Upper surface: Glossy. Height: 1.0m X 0.8m in 10 years. Flowering time: Early spring. *See picture inside back cover.*

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NEW SOUTH WALES

Blue Mountains Rhododendron Society

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New Registrations 2016–2017 — see page 85



Above: 'Pamela Friend'.

Below: 'Sheer Magic'.



Above: 'September Fragrance'.

Below: 'Stonehaven'.



