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From the Editor

Dr. Glen Jamieson
Parksville, BC
Canada

Rhododendrons International (RI) is an online journal distributed free to all the world's known rhododendron associations for their internal distribution. It can also be accessed without charge on the American Rhododendron Society website at https://www.rhododendron.org/ri-index.htm. This eighth issue of RI includes eight articles, some modified slightly from those printed initially, that I have extracted from various rhododendron publications that I feel are worthy of wider world-wide distribution. Articles in this volume are from different publications, each specifically acknowledged at the beginning of an article. I regularly search botanical publications for worthwhile rhododendron articles I deem to be of international significance for wider distribution through RI issues. I also welcome submissions from authors of such material that I might not be aware of, so please feel free to bring such material to my attention at rhodojournal@gmail. com, and please put "Rhododendrons International" in the subject line.

Finally, I would like to express my big appreciation to Sonja Nelson, the volunteer layout editor, for all her hard work in producing each issue of Rhododendrons International. Without her involvement and support, this journal would not exist!

Subsection *Maddenia* Rhododendrons at Logan Botanic Garden

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Photos by Richard Baines

Logan Botanic Garden is a botanical garden near Port Logan on the Rhins of Galloway, at the southwestern tip of Scotland.

(Modified from the Scottish Rhododendron Society Yearbook 24, 2023)

Rhododendron subsection *Maddenia* has long been cultivated at LoganBotanic Garden, one of the three regional gardens of the Royal Botanic Garden Edinburgh. Over half of RBGE's Subsection *Maddenia* are located at Logan in SW Scotland where they grow outdoors in the soft, maritime climate.

Subsection *Maddenia* comprises both terrestrial and epiphytic shrubs which are native to south east Asia. Their distribution extends from north east India, Nepal and Bhutan eastwards across the Himalaya into China and southwards into Myanmar, Thailand, Laos and Vietnam. Generally regarded as tender in the UK, most come through all but the most severe winters at Logan unprotected. They have large, often fragrant flowers, making them very desirable as garden plants.

Rhododendon maddenii, first described in 1849 became the type species for Hutchison's *Maddenii* series, into which he grouped 39 species. Whilst most species are from smaller localised populations, the type species occurs across almost the full range. In their natural environment, plants in the subsection grow in temperate montane regions (600 – 4300 m, 2000 – 14,000 ft) of high rainfall and humidity and often at high elevations, where the subtropical climate is cooler by altitude.

S*ubsection Maddenia* species are typically 1 – 3 m (3-10 ft) in height, have an open habit and have evergreen leaves. Some species such as *Rhododendron nuttallii* have a real semitropical look and can produce very attractive plum-coloured new foliage. Their flowers are generally large, showy, often fragrant and coloured white, cream, yellow or pale pink. A number of species such as *R. walongense* and *R. dendricola* have attractive mahoganycoloured, peeling bark. Most are generally fairly easy to propagate from cuttings taken in autumn.

The majority of the *Maddenia* collection at Logan has been collected in the wild by notable collectors such as Forrest and Kingdon Ward, but in recent years the focus has been on northwest Vietnam where recent RBGE expeditions have resulted in a number of species entering the collection.

RBGE now leads Botanic Garden Conservation International's (BGCI) Global Conservation Consortium for Rhododendron. The Consortium aims to develop collaborative conservation strategies for threatened species such as *R. fleuryi* and *R. coxianum.*

Observations on individual species:

R. burmanicum:

Originating from Mt. Victoria in Central Myanmar, this is a very reliable free flowering species with pale yellow flowers in mid-April. It came through -10° C (14° F) at Logan in 2010 unscathed. The hybrid 'Elizabeth David' is smaller in all parts, hardier and never scented.

R. burmanicum.

R. ciliatum.

R. dalhousiae var. radbotum.

R. ciliatum.

R. excellens.

R. cilipes.

R. formosum var. formosum.

R. crenulatum.

R. formosum var. inequale.

R. carneum:

Originating from open, grassy hillsides in Myanmar at 2300 m (7500 ft), this species is a new introduction to Logan. It has very attractive pink flowers which are deeper coloured if grown outdoors. This has endured -8° C (17.6° F) untouched and is very easy to please. This species is only known from cultivated plants and may be an extreme form of *R. ciliicalyx/R. pachypodum*. Very easy from cuttings in autumn.

R. changii:

Only discovered in 1983 in the Jinfushan National Park, it is classified on the Red List of Rhododendrons as critically endangered. Hardy down to -9° C (15.8° F), this low growing species produces deep yellow, campanulate flowers in early April. Its new foliage has attractive purple markings around the leaf margin.

R. chunienii:

Originating in Hunan and Guangxi, China, this species has a very open and lax habit and is quite shy to flower. To date this has come through unscathed at -8° C (17.6° F). Its flowers are fairly large, slightly scented and appear in April. Very rare in cultivation.

R. ciliatum:

Widely distributed throughout the high forests of Nepal, Sikkim, Bhutan and Tibet, this is the parent of popular hybrids such as 'Cilpinense' and 'Praecox'. It is very variable in its flower colour, hardiness and even habit but overall is an excellent species. At Logan it has experienced -10° C (14° f) without damage. It's early flowering so can often be damaged by frost, therefore needs a sheltered spot.

R. cilipes:

Originating in Myanmar and Yunnan Province, China, known only from the type specimen, this is a relatively new introduction to Logan. To date it has encountered -6° C (21° F) without damage in light woodland and a soil with a high humus content.

R. crenulatum:

Originating close to the summits of the high mountains of N. Vietnam and also from the highest mountains in Laos, this species is the non-conformist of the *Rhododendron* genus, being the only species with a toothed (crenulate) leaf margin. In Vietnam it grows in full sun in moist soils with a high humus content. In cultivation we have found it very difficult to please and fully establish. It is a very dwarf alpine species, little known and enigmatic!

R. dalhousiae* var. *rhabdotum:

Classified as vulnerable on the Rhododendron Red List, this is one of the true gems of the *Rhododendron* genus. With fewer than ten small, fragmented populations remaining in the wild in Bhutan, China and India, this species is under increasing pressure due to habitat loss. In 2010 this species came through -10° C (14° F) in a very sheltered position. It often is quite straggly in habit, but its poor stature is vastly compensated for by its exquisitely striped trumpet like flowers that appear in midsummer. A must if you have a suitable climate!

R. dalhousiae var. dalhousiae:

Originating in Nepal, Sikkim and Bhutan, this species often grows epiphytically. The Logan form has ivory coloured, tubular flowers which are slightly scented and appear in June. We grow this in a very well drained position sheltered by a high wall where it flowers most years.

R. dendricola:

This is a very tender species which we would expect to lose during a hard winter such as 2010 but has come through -5° C (23° F) unscathed. With a wide distribution in Myanmar, Arunachal Pradesh, Tibet and Yunnan and a very wide altitudinal range of between 900 – 3000 m (2950 – 9850 ft), being both epiphytic and terrestrial, this is indeed a very variable species. At Logan it grows in a very sheltered border in the Walled Garden where it flowers most years in May. As a backup we take cuttings every other year!

R. excellens:

Most of the Logan collections have come from recent expeditions to Vietnam and to date have demonstrated an excellent degree of cold hardiness to -9° C (15.8° F). An upright and often straggly shrub in many respects, it is a smaller leaved and flowered version of *R. nuttallii.* Flowering in early summer it is a great plant for extending the flowering season but is not as reliable as *R. nuttallii.* Some of the forms are quite variable in relation to leaf size.

R. formosum var. formosum:

Classified as critically endangered and native to northeast India, this variety is hardier and easier to grow than *R. formosum* var. *inequale*. A prolific and regular flowerer, this species came through 2010 with minimal damage. This plant is easy to grow and propagate and can be a real show-stopper when seen at its best.

R. formosum* var. *inequale:

With larger flowers and a much stronger scent than *R. formosum* var. *formosum*, this variety requires a verysheltered spot with excellent drainage in light woodland.

At Logan, it is not as free flowering as var. *formosum* but when grown well it is even more stunning.

R. horlickianum:

Resembling *R. carneum*, all cultivated plants are derived from the original introduction by Kingdon Ward, collected in Myanmar in 1931. Named after Sir James Horlick from Gigha, this is very rare in UK collections but is more common in the western USA. It successfully came through the hard winter of 2010 although it was quite badly damaged. It has very attractive pink flushing on the corolla but unfortunately does not have a scent.

R. johnstoneanum:

One of the hardiest in the subsection which survived -10° C (14° F) in 2010 unscathed. Originating in Manipur and north east India, its high altitudinal range of 1800 – 3000 m (5900 - 9850 ft) would suggest a reasonable degree of hardiness. Easy to please and a reliable flowerer, there is also a double form called 'Double Diamond' which is rather unsightly. A backbone of the Logan collection.

R. leptocladon:

Originally introduced into cultivation in the early 1990s, several collections are now growing at Logan from recent expeditions. To date it has experienced -7° C (19.4° F) without damage and appears to be fairly tough. This is a great plant with large lemon-coloured flowers that deserves to be grown much more widely along the Atlantic Coast.

R. liliiflorum:

At Logan this is an upright and straggly shrub which is greatly compensated by its large trumpet-shaped, white/ ivory coloured, scented flowers. A recent collection at Logan from Tam Dao Mountain in Vietnam collected at a fairly low altitude is proving to be incredibly hardy.

R. lindleyi:

This is another straggly shrub which is thriving in a well-drained sheltered spot at the foot of a wall. We should really try growing it epiphytically, which it does in the wild. Widely distributed from east Nepal east to Arunachal Pradesh, south east Tibet and Manipur, it is often epiphytic and grows to 3400 m (11,150 ft) The plants at Logan are reliably hardy but some of the young plants don't have great root systems and can be blown over.

R. ludwigianum:

This is another straggly shrub but which develops an attractive peeling bark

with age. Originating in Thailand, this is a very tender species which was killed by -10° C (14° F) in 2010 but survived -5° C (23° F) in 2022. Rarely grown in UK collections, this species has a spectacular flower.

R. lyi:

Widely distributed in south east Asia, this species has funnel shaped white flowers. We have made several collections from Vietnam and all have come through our recent -5° C (23° F) unscathed. Rarely observed in cultivation, our plants are fairly young and only starting to flower. An established plant in the Walled Garden is fairly shy flowering.

R. maddennii* subsp. *maddenii* and *R. maddenii* subsp. *crassum:

Logan has a very large collection of both of these taxa, all of which have proved reliably hardy. This species is very variable in flower size and shade of colour and have a fantastic scent. Some of the Polyandrum Group have truly enormous flowers complimented by a pleasant scent.

R. megacalyx:

Easily recognised when in bloom by the large calyx and the bullate upper leaf surface, this species has proved to be reliably hardy, surviving -9° C (15.6° F). With its nutmeg like scent, this is a showy plant that always produces a number of trusses but never in abundance. It seems to like a fairly well lit site and the plant at Logan probably needs more light.

R. nuttallii:

This was slightly damaged in the winter of 2010 but has sprouted away strongly and was unaffected by -5° C (23° F). In my opinion, probably one of the "best value for money" species in the genus if you have a relatively mild climate, as it has huge ivory-white, trumpet-shaped flowers with a yellow blotch at the base. Its plum purple new growth in early summer which is truly stunning.

R. pachypodum:

Originating from Yunnan and Guangdong, China, and Myanmar, this species grows at a wide altitudinal range of 1800 – 3700 m (5900 – 12,125 ft). Our clone at Logan is tender and outdoor plants were killed by -10° C (14° F) but have survived without damage the recent -5° C (23° F).

R. pseudocilipes:

Generally epiphytic, originating in Yunnan, China, and Myanmar, this species has proved to be reliably hardy. It is easily recognised at flowering by its one or two-flowered inflorescences.

R. rufosquamosum:

Outdoor plants were killed off by -10° C (14° F) but have survived the recent -5° C (23° F) with small amounts of damage. Although quite tricky to grow, this species is worth the extra effort for its magnificent, slightly scented flowers.

R. scopulorum:

Originating in Tibet, this species came through -10° C (14° F) in a very sheltered position with a small amount of damage. At Logan it is a reliable flowerer and always produces a mass effect along with a fine fragrance. One specimen in the Walled Garden is almost four metres (13 ft) tall!

R. valentinianum* var. *valentinianum:

Originally introduced from Yunnan in 1917, it has very ciliate leaves and funnel-campanulate yellow flowers. Recent collections of *R. valentinianum* var. *valentinianum* collected on Phan Xi Pang mountain, Vietnam, appear to be establishing well.

R. valentinioides:

Introduced into cultivation in the mid 1990s, outdoor specimens were killed by -10° C (14° F) in 2010. Thankfully they appear unscathed by -5° C (23° F). *R. valentinioides* has almost wax-like, golden yellow flowers and has much larger leaves than *R. valentinianum.*

R. veitchianum:

Our outdoor specimens were killed by -10° C (14° F) but were unaffected by -5°C (23° F). (but located in a very protected spot!) It is really spectacular when grown well. We also grow it as a back-up plant, training it on a cane framework in the conservatory where its frilly, scented flowers are a glory to behold!

R. walongense:

A new introduction to the Logan collection, this often epiphytic plant originates in Arunachal Pradesh, India. Its greatest attribute is its deep mahogany-coloured bark which is quite spectacular. In early summer it produces spicy scented, showy white flowers. It was unaffected by the recent cold snap of -5° C (23° F).

R. scopulorum.

R. vietchianum.

R. valentinianum var. valentinianum.

R. walongense.

R. valentinianum var. oblongilobatum.

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Helen McMeekin is a Trustee of Scotland's Gardens Scheme and RBGE alumna. Her student project "Missing Maddenia", published in Sibbaldia, can be found at https://doi.org/10.24823/ Sibbaldia.2022.1927

Collecting with Lao Chao [ZhaoChengzhang]: Decolonising the Collecting Trips of George Forrest

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(Modified from https://natsca. blog/2020/07/16/collecting-with-laochao- zhao chengzhang-decolonisingthe-collecting-trips-of-george-forrest/)

This is the essence of a talk that was recently presented at the virtual conference of the US-based Society for the Preservation of Natural History Collections (SPNHC). Inspired by Das and Lowe in their 2017 Natural Sciences Collections Association (NatSCA) conference talk and subsequent paper (Das and Lowe 2018), in a similar way mentioned by Machin (2020) in her recent blog, I have started looking at stories by and about some of our revered plant collectors, or rather, hunting for small clues about their escapades from the perspective of others on their teams. This is with the aim of decolonising narratives for present and future interpretation, having finally opened my eyes and realised that current interpretation for living collections can fall way short of acknowledging what really happened and where credit should lie. This includes being mindful of different concepts of decolonisation, discussed by Gelsthorpe (2020) in an earlier blog.

Fig. 1. George Forrest © The Royal Horticultural Society and Royal Botanic Garden Edinburgh..

For years, the curators of museums and living collections, and their visitors have been programmed to respond to and expect talks of the grand, death-defying adventures of our collectors—so much so that we appear to have closed our minds to the realities and injustices of what really happened on expeditions.

The main focus here is on George Forrest (Fig. 1), born in 1873, the Scottish plant collector whose collections still have a huge impact on what is grown in our gardens today. Son of a draper's shop assistant, Forrest had an interesting earlier career after leaving school at 18—he worked in a pharmaceutical chemist's office prior to getting a small inheritance that gave him the opportunity to travel to Australia where he undertook a few jobs including sheep shearing and gold-mining (McLean 2004). On his return to the UK, through a serendipitous stroke of luck in discovering a rare archaeological find whilst out botanising, he landed a job as an assistant in the herbarium of the Royal Botanic Garden Edinburgh in 1903—gaining curatorial skills and insights necessary to make him an ideal plant collector in the field.

Fig. 2. Bee's Ltd advertisement within the 1914 RHS Chelsea Flower Show catalogue. Note the reference to Forrest's collections © RHS Lindley Library.

When the alpine plant enthusiast Arthur Bulley came looking for someone to collect seed in the newly accessible Yunnan province in China, George leapt at the chance. Mr Bulley was a cotton broker based in Liverpool, who had recently acquired land to make the Ness Botanic Garden. He was also the founder of Bees Ltd, a seed company. He had an enthusiasm and fascination for introducing new plants to the public and frequently showed his collection, even at Chelsea (Fig. 2). At this time Yunnan was largely unexplored with the exception of Père Jean Marie Delavay, a missionary based in the region during the 1880s, whose collections inspired Bulley's yearning to place a full-time collector in Yunnan.

Up until shortly before the start of Forrest's collecting trips, China had been mostly closed to "foreigners." The story of how China opened up rarely features in any plant collecting narratives, especially how Yunnan became so accessible, and yet this adds considerable dimension to the overall picture.

We always hear of the Royal Horticultural Society's (RHS) Robert Fortune being the first real western collector in China, made possible by the opening of coastal China in 1843. This came from the Treaty of Nanking, opening up more trading areas along the coast to the British following the Qing Dynasty's defeat in the Opium Wars [in a nut-shell, a war triggered by the Dynasty's campaign against illegal imports of opium sold by the English-owned East India Company to smugglers based in Canton]. Yunnan

was inaccessible to foreigners until 1860 when the Chinese were forced to lessen the restrictions placed on foreign travel to missionaries who were then able to establish missions where they chose. In their spare time, many of the missionaries botanised—and Père Delavay was just one of them. Yunnan became accessible to British traders in 1886 when the "conquering" British forces made Burma [Myanmar] a province of India and in so doing, freeing a path into eastern China.

Forrest's China was towards the end of the Manchu-led Qing dynasties, when Imperial control had been weakened. The remote south-west region of Yunnan had many ethnic minority groups, each with their own traditions and cultures, but even so, all travellers had to pay respects and dues to Yunnan's Chinese civil official. Forrest travelled up the Irrawady by steamer, alighting at Bhamo in Myanmar, the limit of the steamer service, just 50 km shy of the border with China, continuing his journey on mule.

The first walled town beyond the border was Tengyeuh (Tengchong) and it was here that he encountered Mr Litton, the British Consul who provided him with a Chinese passport and accompanied him on his first botanical trip, across the gorges of the Salaween and Mekong rivers to Tali, within the vicinity of Père Delavay's former collecting areas. Forrest later commemorated Litton by naming a Primula after him. Primula vialii (= P. littoniana, Fig. 3) has endured in cultivation—the white flowered form, 'Alison Holland' was one of the competitors for the Chelsea Plant of the year in 2016. As Primula *littoniana*, a plant from Bees Nursery was awarded the First Class Certificate

Fig. 3. Primula vialii 'Alison Holland' RHS/ Sarah Cuttle © The Royal Horticultural Society.

Fig. 4. Herbarium specimen made by E.K. Janaki Ammal of a cross between *R. griersonianum* and *R. auriculatum*.

Fig. 5. Lao Chao (left) and team. McLean (2004) wrote that Forrest called Lao Chao his "best card in this business". © The Royal Botanic Garden Edinburgh.

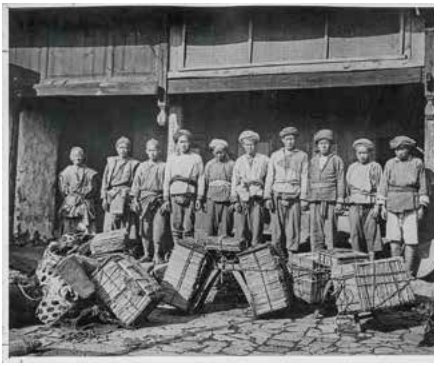

Fig. 6. Forrest's collecting team with stacks of drying papers roped to wooden saddles ready for mule transport. Lao Chao is seen here, fifth from the right. © The Royal Horticultural Society and Royal Botanic Garden Edinburgh.

in 1909.

Between 1904 and his eventual death in 1932, Forrest's collections number in the tens of thousands. After a few years of being the plant collector of individual patrons, and following societal changes caused by the Great War, Forrest quickly adapted to the problems imposed by rapid inflation and syndicated his collecting trips, allowing members of the syndicate an opportunity to share in his new finds. His 1917-1919 trip was part sponsored by the RHS amongst others—and, as we have already seen, his finds still influence the plants we see in our gardens today. The top sponsor of the 1917-1919 trip was J.C. Williams of Caerhays Castle

Fig. 7. Camp in the Lichiang Range (Yulong Shan) © The Royal Horticultural Society and Royal Botanic Garden Edinburgh.

Fig. 8. Preparing and sorting seed © The Royal Horticultural Society and Royal Botanic Garden Edinburgh.

Fig. 9. Some of the many collecting boxes destined for Caerhays Castle, leaving China via Rangoon. The RHS still has some of the boxes that returned laden with seed for RHS Garden Wisley and is able to use them for interpretation. © The RoyalbHorticultural Society and Royal Botanic Garden Edinburgh.

Fig. 10. *R. sinogrande* © The Royal Horticultural Society.

in Cornwall [his name is prominent on the collection boxes being returned to Cornwall via Rangoon, see Fig. 9]—still famed for its fine living collection of *Rhododendron, Magnolia* and *Camellia.*

Newly discovered, the rather sumptuous *Rhododendron griersonianum* was introduced to cultivation by Forrest in 1917, and gained the award of First Class Certificate in 1924. Forrest named this find in honour of a British customs official who had helped him export his specimens. Over 340 hybrids made with either a seed or pollen parent of *R. griersonianum* have been registered— one of the last being named 'Hot Flash' (Fig. 4).

But how can a man on his own manage to collect tens of thousands of plants—making herbarium specimens and duplicates whilst collecting tonnes of seed? The answer is seen in the image taken by Forrest of some of his collecting team with stacks of drying papers roped to wooden saddles ready for mule transport (Fig. 6). Forrest had an extensive collecting team divided into numerous subteams to cover wide areas during all seasons. After botanising with Litton, Forrest realised that he couldn't achieve his goal working alone and whist staying in Snow Mountain Village in 1905/6, employed a team of local Naxi people. Forrest's team included women; his letters describe their toughness and practicality for the task of collecting. His 1905/06 team formed the core of future collecting teams until his death in 1932. Seen five from the right (Fig. 6) is Lao Chao [Zhao Chengzhang], the head of the teams.

We also have images of the team in action (Fig. 7), although it is a little hard to see owing to size. Note the presses being weighed down by rocks in the middle foreground of the tented images (Fig. 7), and Lao Chao and members of his team processing some of the thousands of seeds to be sent to the UK (Figs. 8, 9); the A numbers that are encountered on the Forrest specimen labels refer to seed collections].

During periods when Forrest suffered from illness, or absences during the winter months, even when he had returned to England, the teams continued collecting under Forrest numbers.

The specimens and their duplicates have proven invaluable for naming the plants. All are in Forrest's name and there is no acknowledgement of any additional collectors. Forrest processed all the specimens—and provided a translation of the notes written by the collectors before discarding them (Leonie Paterson, pers. comm.). There is but a small handful of specimens with the original notes, and duplicates have even fewer transcribed notes. One of the rare ones is Codonopsis chimiliensis. There is Chinese writing on the Edinburgh syntype specimen, including extensive notes in English that were not transcribed on the isotype's label.

As mentioned above, many specimens were collected during periods of Forrest's absence and here is a case in point. During a visit to Bhamo, Forrest sent his collectors back to Tengyueh ahead of him. The collecting teams returned from the Shweli-Salween Divide with a mule-load of seed, including a specimen of a 6-9 m (20-30 ft) *Rhododendron* with huge leaves up to 76 cm (30 in) in length. Named *R. sinogrande* (Fig. 10), it caused a sensation back in the UK and Forrest was celebrated for "his" find (McLean 2004).

Although never acknowledged on the labels, his teams were mentioned in correspondence. Seen here (Fig. 11) is an excerpt from a letter received by Mr Chittenden (first Director of the RHS). That his affection for, and equally the support and affection from his team is undisputable. But taking a quick look at the names of taxa described by Forrest—of the 418 records not a single one commemorates Lao Chao—and yet he named many after Bulley, his wife, children, his friend Litton and the useful customs clerk, Grierson. One is left wondering how many of the 285 taxa given the epithet "forrestii's" were actually

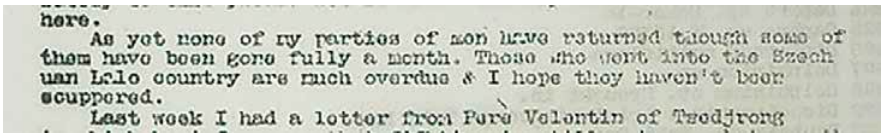
here.
As yet none of my parties of men have returned though some of them have been gone fully a month. Those who went into the Szech uan Lolo country are much overdue & I hope they haven't been scuppered.
Last week I had a letter from Pere Valentin of Tsedjrong

Fig. 11. Excerpt from a letter sent to Mr Chittenden by George Forrest 20.vi.1918. © The Royal Horticultural Society and Royal Botanic Garden Edinburgh.

collected directly by George Forrest. Mueggler (2011) gives a more in depth look at Forrest's teams and also discusses his rival, Joseph Rock's collecting team. Regrettably a Google search can't produce the names of Forrest's collecting team, and neither are they all listed in McLean's (2004) 239 page biography of George Forrest. It is hard when looking at this with a "modern" non-ethnic eye to recall how things were done right up until the recent past. Forrest's knowledge of collecting was gained from his experience of curating older specimens, when only the lead collector was acknowledged on labels. He was of an era where paid staff were seen as working under instruction—in fact, even in talks and papers today some authors are still just giving praise to "my team" or to "my lab technician" implying nameless servants. Ironically, Forrest was in a similar position as he too received a wage.

Whilst still pondering on the injustices, I am very excited to give a voice to the wonderful Zhao Chengzhang and the additional team members, acknowledging their incredibly valuable work and tenacity. As we (curators) access our archives, and more are available online, I look forward to reading many more decolonised narratives.

Acknowledgements

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Subsection Rhodorastra, the Pink Trees of Siberia

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(Photos by the author unless otherwise noted)

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Before becoming closely acquainted with the world of plants, it would have been strange for me to assume that rhododendrons could grow in such a cold region as Siberia. After all, most of them are moisture and relatively heat-loving plants, however the botanical evolution in Siberia has produced some beautiful species of rhododendrons, which eventually became the hallmark and tourist card of Siberia. Anyone who has ever visited here in the spring will never forget its colorful splendor. These picturesque landscapes have been painted by artists, sung by singers in songs and described in books by writers. Of course, we are talking about rhododendrons of section *Rhododendron,* subsection *Rhodorastra,* with its species, *Rhododendron dauricum, R. ledebourii, R. sajanense, R. mucronulatum* and *R. sichotense.*

Fig. 1A, B, C.: The Western Dauria and the peak of Mt. Munku-Sardyk, Republic of Buryatia, in April 2013

Fig. 2a. The author next to *R. dauricum* in a birch forest, Irkutsk, 2013.

Fig. 2b. *R. dauricum* in a birch forest, Irkutsk, 2013.

Fig. 3: The Russian Republic of Buryatia (red), east and to the south of Lake Baikal, the deepest lake in the world.

1. ***Rhododendron dauricum***

I first saw one of them, *Rhododendron dauricum*, blooming in the wild in 2013, and it is this species that I primarily address here since its geographical range is the widest among these species.While I have been to Siberia before, it had never been in the spring. In April 2013, we had a mountaineering trip, and my group and I traveled about 3500 km (2200 mi) by train to reach Lake Baikal. We had a spring climb on Mount Munku-Sardyk (Fig. 1, 3491 m, 11,450 ft), the highest mountain in the ridge of the same name and in the entire Sayan Mountain system. The first ascent to the peak was made by the Russian geographer and naturalist Gustav Radde in 1858, and since then the mountain has become popular among both amateur and professional climbers.

Our climb was successful and on the way back, when in Irkutsk, a city 70 km (44 mi) from Lake Baikal, I was walking through a forest park and saw the flowering of *R. dauricum* for the first time (Fig. 2). It was a forest almost entirely of birch trees, and the pink rhododendron flowers created a beautiful contrast against the black and white trunks. Considering that there are not many spring-flowering shrubs in Siberia at all, this sight impressed me very much. The bushes were completely devoid of leaves and the flowers were in full bloom (Fig 2).

Fig. 4A, B, C.. Spring landscapes in Dauria.

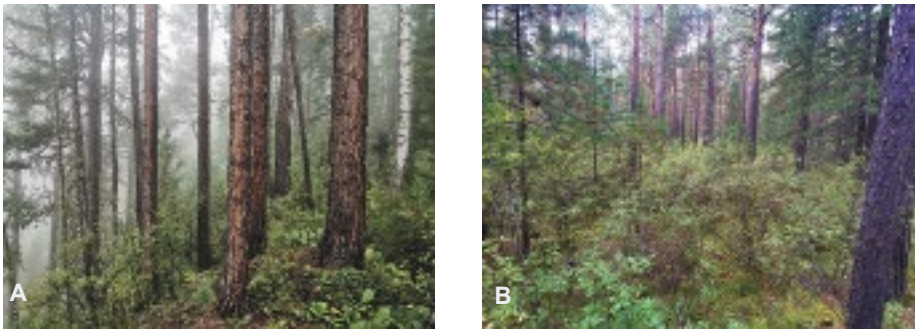

Fig. 5A, B. A pine forest with a predominant understory of R. dauricum, in the foothills of the Eastern Sayan Mountains, 2020.

Making a slight digression, it should be noted that Dauria (Fig. 3), or the Daurian land, from which R.dauricum get its name, is a historical and geographical region within the modern Russian Republic of Buryatia (Fig. 3), the Trans-Baikal Territory and the Amur Region. This toponym was given by Russian explorers after the name of the Daur people who inhabited the region until the mid-17th century,

Fig. 6. Olkhon Island (dotted boundary) in Lake Baikal.

which first became widely known after the expedition of Yenaley Bakhteyarov in 1640. Here is also the Daursky ridge of the same name—a system of mountain ranges stretching in the north-east direction about 300 km (185 mi) in the central part of Transbaikalia, from the headwaters of the Dzhila River to the sources of the Uldurga River. Mid-mountain terrain prevails there. [**Editor's note**: The Russian Daurian land is just to the north of the Daurian steppe of East Asia, which is a vast temperate grassland scattered with wetlands, rivers and pockets of forest. Extending over one million square kilometres (386,000 square miles), this transboundary ecoregion stretches across eastern Mongolia and north-eastern China and also reaches into Russian Siberia. The region is one of extremes—subject to severe winters, massive temperature fluctuations, and scarce and fragile water resources. The

Fig. 7a - f. Locations of growth and bizarre forms of *R. dauricum* on Olkhon Island in Lake Baikal, 2015. Photos by Boris Slepnev and the author. (7e and f on next page)

Daurian steppe is one of the largest areas of indigenous temperate grassland that remains on our planet.]

Here, in the mountains of Southern Siberia, R. dauricum is an integral part of high-mountain plant communities and is found in both forest, subalpine and alpine zones (Figs. 2, 4, 5). It often dominates the shrub layer of coniferous and mixed forests. The unpretentiousness and high ecological plasticity of this rhododendron have ensured its wide distribution in the mountains. The temperature difference from minimum in winter to maximum in summer is about 90° C (162° F) in some areas. In the summer there can be a high temperature of 45° C (113° F), and in winter there are frosts with piercing winds down to –45° C (-49° F). Typically, thickets of *R. dauricum* grow at altitudes from 450 to 1100 m (1475-3600 ft) above sea level in the undergrowth of coniferous and mixed forests (cedar, pine and birch).

The local population of Siberia is well acquainted with this rhododendron. In Russian folk medicine, its raw materials were used as a diaphoretic, sedative and cardiovascular remedy. In addition, young shoots and leaves of *R. dauricum* contain up to 0.1% of an essential oil, which is actively released in hot weather. This is where the popular name for this species, Siberian wild rosemary or Bagulnik, comes from. The word Bagulnik comes from the ancient verb "bagulit", which means "to poison", and the now forgotten derivative of it, the adjective "bagulny", means poisonous, stupefying, tart, or strong. The Russian name of this shrub thus reflects the characteristic feature of this rhododendron—a strong smell.

When discussing *R. dauricum*, one cannot fail to note the variety of habitats in which this rhododendron can be found. This was well demonstrated in 2015, when, among other locations, I was lucky enough to visit Olkhon Island in Lake Baikal (Fig. 6). When you first find yourself on the sand dunes of Nyurgan Bay on Olkhon Island, you get the impression that someone mercilessly tore off the flowers of the Daurian rhododendron and then scattered them across the sand (Figs 7, 8, 9). A closer look reveals the most amazing thing —the flowers are on growing plants! Imagine for a moment your reaction when, instead of dense thickets up to 1.5 m (5 ft) high, you find growth only 3-4 cm (1.2-1.6 in) high. These rhododendrons resemble seedlings or when children playing in a sandbox pick grass and plant it at their own discretion. Individual branches are also associated with these "bonsai" plants.

Constant winds from the lake can carry sand along the coast, forming dunes, and surviving plants are forced to adapt to difficult conditions, with their shape and size the result of many years of struggle for survival. There is also an ancient larch species that grows on the island, with one tree recently recognized as the oldest tree in the Baikal region. It's hard to imagine, but when it was still a young tree, it lived the era of the Mongol Empire and the famous campaigns of the grandchildren of Genghis Khan. Scientists, usingmodern technology, have

Fig. 8. *R. dauricum* (including a white form) on the shore of Lake Baikal.

Fig. 9 a, b. *R. dauricum* on Olkhon Island in Lake Baikal.

Fig. 10. The Khamar-Daban in the Slyudyanka region, south of Lake Baikal.

established its exact age at 780 years! In addition to the amazing landscapes, this island is famous for its climate. The Olkhon Island is distinguished by a long total duration of sunshine, with only 48 cloudy days a year. The amount of precipitation per year on average does not exceed 140 mm (5.5 in). Olkhon Island weather is thus similar to some very arid regions in Central Asia, and local residents have to use artificial irrigation for their garden and hay crops. Another feature of Olkhon is the very prevalent occurrence of soil erosion. The island has a weak, easily

destroyed soil-vegetative layer and frequent strong winds contribute to the rapid removal of humus and the drifting of sand. It's amazing how ecologically resilient the rhododendrons here are, as moving to the west along the coast of Lake Baikal, the climate becomes diametrically different. Around the west coast of Lake Baikal in the northern part of Khamar- Daban in the Slyudyanka region (Fig. 10), the climate is more moderate and humid, with a precipitation of up to 1300 mm (51.2 in) per year.

But let's return to the object of our story. One of the characteristics that distinguishes *R. dauricum* from its close relatives has always been considered to be the complete deciduousness of this species. However, in 2014, even before

Fig. 11. Trekking along the icy mountain rivers of the Eastern Sayans, April 2014.

Fig. 12. Many leaves still on R. dauricum bushes on the Munku-Sardyk Ridge near the icy bed of the Buguvek River by the Mongolian border, April 2014.

Fig. 13. The typical spring landscape in the eastern Sayan Mountains, Southern Siberia, 2014.

my close acquaintance with other species of the Dauricum group, I had the opportunity to doubt this. We once again arrived in the vicinity of Lake Baikal, and we were treated to excellent weather. One of the goals of the trip was trekking in the mountains and walking to the icefalls of mountain rivers (Fig. 11), which at that time were still safe and the ice on them quite strong. Of course, for this we needed climbing crampons. One of these rivers was the Buguvek River on the border of the Okinsky district of Buryatia. The spring sun was mercilessly hot and we had to use sunscreen to prevent our skin from burning. These places were notable, first of all, for the presence here of a rather rare white form of *R. parvifolium*, but there was still a whole month before it bloomed, so we were just enjoying nature and our daytime walks. There were many rhododendrons growing along the banks of the river, and I was surprised to notice that the *R. dauricum* bushes here still had many leaves on them (Fig 12). This surprised me greatly, since complete deciduousness was considered key to identifying this species in the domestic literature. It must be noted that due to the features of land relief, proximity to lakes, and slope exposure, plants here can be variable in their characteristics. In any case, those that grow lower are much less likely to experience repeated spring frosts and the other "delights" of winter weather in the mountains. On returning in our trek, we ourselves experienced episodes of the return of winter. We stayed in a small mountain resort where mineral waters flowed from the mountains and we observed thickets of rhododendrons covered with freshly fallen snow (Fig. 13). It seemed to me that all plants here should have a protective mechanism in case of such weather change. I had often visited these mountains before and since, and knew well that even the July snowfalls here were not something surprising. here were not something surprising.

Fig. 14. Foothills of the Altai Mountains, June 2021.

2. Rhododendron ledebourii

In the following years, we traveled many times through the mountains of southern Siberia until we finally came across a close relative of the Daurian rhododendron, *R. ledebourii* (previously known as *R. dauricum* var. *sempervirens*). Until 1952, *R. ledebourii* was considered to be *R. dauricum* and Russian botanists did not distinguish them in any way. In 1952, one of the leading authors of the 30-volume publication "Flora of the USSR", Antonina Poyarkova (1952),

Fig. 15. R. ledebourii on the slopes of the Altai Mountains in the spring. Photos by the author and Svetlana Kazina.

identified the plant as a separate species, which she gave the name *R. ledebourii.* It was believed that *R. ledebourii* is endemic to Altai Mountains (Fig. 14), the Western Sayan Mountains and the adjacent mountains and does not extend into the distribution area of the Daurian rhododendron. In the wild, *R. ledebourii* is as a rule found at higher altitudes than is R. dauricum, which is predominantly a forest species. For this reason, the spectacle of the spring flowering of this species, for example, in the Altai Mountains, is even more stunning (Figs. 15, 16). Many of these plants grow here above the forest zone, and there are many hiking trails in this area that are entirely dedicated to observing the blooming of *R. ledebourii.* From the literature we know that among the characteristics taken into account, the greatest diagnostic value in the separation of species, among other things, are: leaf shape, flower diameter and leaf lifespan. The authors distinguishing *R. ledebourii* as a separate species noted that its key feature is that it's semi-evergreen, in contrast to the deciduous Daurian rhododendron. *R. ledebourii* also has a somewhat larger corolla, with its diameter of 3.7–4.8 cm (1.45-1.9 in), while that of *R. dauricum* is 2.8–3.5 cm (1.1-1.4 in) (Poyarkova1952, Semenyuk

Fig. 17. The Republic of Khakassia outlined with red dots, west of Lake Baikal.

1976). However, more recent research has clearly established that populations of *R. ledebourii* and *R. dauricum*, conventionally divided by place of growth, differ little in length, leaf width, flower size and color. In addition, within populations we could see considerable individual variability of the traits, and in all populations there are both deciduous and semi-evergreen plants. For example, the average values of the deciduous trait for the species were 1.45 years for the Ledebur rhododendron and 1.63 years for the Daurian. The absolute values of the trait ranged from one to three years, but plants with a leaf lifespan of three years are very rare and were found in only two populations of *R. ledebourii* in the Western Sayan Mountains. It should be noted though that populations of *R. ledebourii* are characterized by a wider range of individual character variability between populations, which may be due to the greater diversity of growing habitats of this species as it grows as far west as Finland. Researchers (Tikhonova et al. 2012) observed the greatest cytogenetic instability among all related species in *R. ledebourii.* As for the morphological structure of the studied populations based on the set of diagnostic characters, it is obvious that *R. dauricum* and *R. ledebourii* do not form independent colonies, so identifying *R. ledebourii* as an independent species may be unfounded. Most modern researchers (Tikhonova et al. 2012, Koropachinsky 1983, and Kras-

Fig. 18. Location of the Sayan Mountains.


Fig. 19. Northern spurs of the Western Sayan Mountains, the habitat of *R. sajanense*, 2021.


20A


20B


20C


20D


21A

noborov 1976) believe that Ledebur's rhododendron is an ecotype or phenological form of *R. dauricum*. One way or another, both rhododendrons are easy to grow in the garden and are not very demanding on planting conditions, including the mechanical composition of the soil. Both species have been growing in my garden for a long time and delight me with their annual flowering.


21C


22A


22B


22C


22D

3. Rhododendron sajanense

To get acquainted with another rhododendron, in June 2021, my group and I went to a part of the Western Sayan mountain system near the Main Reservoir. To do this, we arrived in the city of Abakan, from where we went further to the south of the Republic of Khakassia (Fig. 17). We ended up in the Shushensky Bor National Park, which is located near the centre of Russia, far from the oceans. Its geography determines its climatic features, in particular, rather high temperatures with features of sharp continentality in the mountains and moderate continentality in the flatter areas. In summer, the air temperature here can rise to 40° C (104° F), while in the in winter it can drop to -50° C (-58° F), and there is little precipitation. We settled into a large house with a stove, and this allowed us to finally dry our clothes after the rains and snowy fields encountered in the first part of our trip. Climbing the picturesque Borus ridge (2318 m, 7600 ft), we noticed a distant blooming plant, which we determined was *R. sajanense.* This species is isolated and named relatively

recently and is an endemic of the Western Sayan Mountain system west of Lake Baikal (Figs. 18. 19). It grows only on the Borus Ridge and in the vicinity of the Sayano-Shushenskoye reservoir. R sajanense is a tall semi-evergreen shrub up to five m (16.5 ft) tall. The diameter of its trunk can reach ten cm (four in). It can be distinguished from the related *R. sichotense* and *R. ledebourii* by its bare young shoots, large size, brownpink bark; and from *R. ledebourii* by its shape, size, mesophilic nature [i.e., grows or thrives best in an intermediate temperature environment], varying degrees of glandular coverage of the upper and lower sides of the leaves, the shape of the cells of the lower epidermis of the leaf, and a slightly incised corolla. *R. sajanense* (Fig. 20) is particularly large, growing up to 5 m (16.5 ft) tall, much greater than the 1.5-2 m (5-6.5 ft) of *R. ledebourii,* and in addition to size, differences were noted in the glandular coverage and leaf size, the color of both the bark and young shoots, and the size of the fruit. In the Dauricum group, this is probably the largest species. It is interesting that the Far Eastern species (*R. sichotense*) is most similar to it in terms of the totality of characters, which includes shape, the size of the leaves (large, broadly oval), the extent of the corolla cut (1/2, not 3/4 to 4/5, as in *R. ledebourii*), the bunching of the branches, the size of the fruit, and so on. *R. sajanense* occurs in habitats that do not include *R. ledebourii* due to different preferred environmental conditions. This includes in the undergrowth of the pine forests of the Usinsk depression (Fig. 20, 21), as well as in the Sayano-Shushensky Biosphere Reserve. The leaves of this rhododendron have the most mesophilic features compared to the geographically closest species, *R. ledebourii* and *R. dauricum.* The thickness of the leaf blade is on average 20-30% thinner, the columnar and spongy mesophyll have

Fig. 23. The Primorsky Territory (dotted boundary) north of Vladivostok, Russia, by the Sea of Japan.

Fig. 24. The Sikhote-Alin ridges in the Primorsky Krai.

Fig. 25. *R. sichotense* on the coast of the Sea of Japan.

approximately equal proportions, the cells of the lower epidermis are relatively thinwalled and slightly or mastoid protruding, the degree of coverage of the leaf blade with glandular scales on the top of the leaf is 5-10 times less than on the underside. Related rhododendrons have a thicker leaf blade, a ratio of columnar and spongy mesophyll of about 3:7, the degree of scale coverage of the leaf blade is almost the same above and below. For *R. ledebourii*, the cells of the lower epidermis are smaller, their membranes are thicker, and the outer membranes protrude tubularly and are very close together. *R. dauricum* on the other hand, has mastoid shaped cells in the lower epidermis in comparison to the more tubular

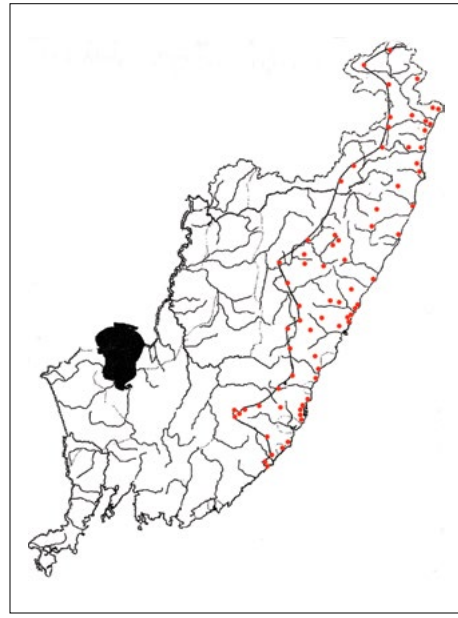

Fig. 26. Locations of *R. sichotense* in Primorsky Krai (indicated by dots).

cells in *R. ledebourii. R. sajanense* grows not only under the canopy of the forest, but in the
highlands it can also be found in open areas.

We were glad that we managed to observe *R. sajanense* in flower, and the higher we climbed, the more flowering plants were found.

4. *Rhododendron mucronulatum*

In order to find the next species in the Dauricum group, we had to travel to the easternmost borders of Siberia, to the Russian Far East. It is no accident that rhododendrons in eastern Siberia have become a symbol of spring, as their flowering is one of the most striking signs of the awakening of nature after a long winter (Fig. 22). In the Primorsky Territory (Fig. 23), under monsoon climate conditions, rhododendrons bloom from late April to the first half of May.

We are talking now about *R. mucronulatum*, which decorates the mountains there with a cloud of pink flowers in the spring. Even within the city limits of Vladivostok you can find thickets of this rhododendron, and we are not talking about carefully planted bushes in the courtyards of houses, but about its occurrence in natural wild places. In Vladivostok these are at the tops of hills and in rocky areas along the sea coast. One of these places is the Kholodilnik Hill (height 258 m, 850 ft). While there is no high-rise construction on the slopes of the hill, the view of the city is not blocked by anything except blooming rhododendrons. Another area where these rhododendrons are located is in the nearest suburb. i.e., on Russky Island, where rhododendrons grow along the rocky shores around Novik Bay. This species usually flowers without leaves, but as with *R. dauricum*, this is not the rule. The flowers are lilacpink, purple, and occasionally white.
According to my observations, *R. mucronulatum* has the largest number of natural color variations among the Dauricum group. *R. mucronulatum* differs from *R. dauricum* in having larger flowers with a less open corolla, cut only to the middle into wide, almost rounded lobes, overlapping each other with their edges; larger seed pods attached to longer stalks, and more pointed leaves, which are almost always dotted with at least sparse (and sometimes frequent) long bristly hairs.

R. mucronulatum was defined as a species distinct from *R. dauricum* by N. Turchaninov, who noted some differences in the morphology of the vegetative and generative organs and the different habitats of both species. However, a number of botanists, including S.I. Maksimovich, V.L. Komarov, E.A. Bush, continued to consider *R. mucronulatum* not an independent species, but only a variety of *R. dauricum*. Currently, N. Turchaninov's point of view is considered most convincing.

We have been to the Primorsky Territory several times, both for tourist purposes and with a group of botanists. This is the land of endless mountain expanses on the shores of the Sea of Japan. More than 70% of the territory of the Primorsky

Territory is mountainous, being part of the Sikhote-Alin Mountain system (height up to 1932 m (6340 ft), with Mount Anik its highest point in the Primorsky Territory). Its eastern slope is steep and deeply dissected, with landslides and scree widespread.

5. ***Rhododendron sichotense***

The Sikhote-Alin is primarily known as the homeland of Amur tigers, the largest representatives of the cat family. The description of the nature of the Middle Sikhote-Alin Mountain system was first made at the beginning of the 20th century by the Russian explorer of the Far East, traveler and writer V.K. Arsenyev. Based on the results of a number of expeditions in 1902-1910, the mountainous region of Sikhote- Alin, previously considered a "blank spot" on the geographical map, was explored (Fig. 24). Arsenyev noted the uniqueness and diversity of the mountain forests of Sikhote-Alin, which he defined as the "Great Forest". Here, another representative of the Dauricum group grows, R. sichotense (Fig. 25).

Most authors of the mid-20th century, following the ideas of V. Komarov, adhered to the monotypic concept of the species *R. dauricum*. However, A.I. Poyarkova (1952), while describing the genus *Rhododendron*, recognized another species for the Far East, which she described as new, namely *R. sichotense.* This species is closest to *R. dauricum* and to *R. mucronulatum*, from which it differs by having leaves that remain during the winter and fall off after the development of young shoots. According to her data, in *R. sichotense* the number of leaves can be from three to ten, in *R. mucronulatum* from one to five, and in *R. dauricum* from two to seven. Thus, at present there is no consensus on the systematic position of this species. Some botanists consider the geographical isolation of *R. sichotense* sufficient to designate it as an independent species. So, V.N. Voroshilov (1982) defined it at the subspecies level—*R. dauricum* subsp. *sichotense*, which occupies the eastern part of the range of *R. dauricum*. This allocation is based on the fact that the subspecies *R. dauricum* subsp. *sichotense* has a similar leaf structure to *R. dauricum*, but the leaves of the former are more covered with discshaped glands below than those of the latter, and these can often be rusty due to pubescence. Later, Khokhryakov and Mazurenko (1991) classified this species as *R. mucronulatum* subsp. *sichotense*. In their opinion, this subspecies only has more durable, relatively wider leaves than *R. mucronulatum*, and it is distributed within its range along the eastern slope of the Sikhote-Alin Mountains. *R. sichotense* is more similar in flower shape and capsule size to *R. mucronulatum* than is *R. dauricum*. Subsequently, Nedoluzhko (1995) put this rhododendron back as a *R. dauricum* subspecies—*R. dauricum* subsp. *sichotense*. He believed that *R. sichotense* has an independent range and a zone of transition to other *R. dauricum* forms, which reflect mainly its altitudinal character.

Regardless of the above, *R. sichotense* is still officially considered endemic to

the eastern slopes of the Sikhote-Alin Mountains (Fig. 25). The northern border of the range of *R. sichotense* is located in the Khabarovsk Territory and reaches Sovetskaya Gavan. This species is quite common in the Olginsky, Dalnegorsky, Kavaleravek, Terneysky districts of the Primorsky Territory. The distribution limit of *R. sichotense* in the south are the surroundings of the village of Valentin (in the northern part of the Lazovsky district). The shape of the range of *R. sichotense* is thus in the form of a strip along the eastern macroslope of the Sikhote-Alin ridge (Fig. 26). The conducted studies show that the center of the species range is the Dalnegorsky district of Primorye, where *R. sichotense* grows in the undergrowth of pine and broadleaf forests, forming a continuous carpet during flowering. *R.* sichotense, growing in the Dalnegorsk Pass area, has a spreading form, with its leaves almost round, oblong-elliptic, broadly elliptical, dark green and with a characteristic odor. It is believed that the evolution of this species from more western (relative to Primorye) regions was natural. The modern ranges of species of the Dauricum group, which together represent a continuous chain of three closely related species in the south of the Far East, likely once had a single range of a common ancestral species. It may have been a species more similar to *R. dauricum*. It is assumed that the features of the Sikhote-Alin ridge during the Pleistocene period led to the separation of part of the range of the ancestral species and its genetic isolation, as a result of which *R. sichotense* evolved. The diversity of form we encountered in *R. sichotense* shows that it is extremely variable.

Concluding this review of the Siberian species of the Dauricum group, subsection *Rhodorastra*, it must be noted that most of these species occupy a prominent place in modern gardens and have given rise to some beautiful hybrids. Personally, I have always tried to collect as many of these hybrid plants as possible for my garden. Still, in addition to the resistance of their flowers to spring frosts, these species also make an excellent contribution to the overall winter hardiness of hybrids in my difficult climate (USDA zone 4). In my garden, such beautiful varieties thrive and delight every spring: PJM Group, 'Cornell Pink', 'Weston's Pink Diamond', 'April Reign', 'April Gem', 'April Rose', 'Joachim Reich'*, and 'Anna Baldsiefen', to name a few (Fig. 27 A-H). These hybrids are not at all like the plants we see here in nature. All these beautiful plants wake up in early spring, as soon as the snow melts, and bloom at the same time as snowdrops. And if you are in the garden at this time, they serve as a reminder that somewhere far in the Russian East, in the land of harsh winters and icy winds, the mountains and forests are slowly turning lilac and purple. The longawaited Siberian spring is coming! This event has been beautifully captured in paintings, as shown in Figs. 28 and 29.

* = not registered.

Fig. 27A. ‘Weston’s Pink Diamond’.

Fig. 27B. ‘April Gem’.

Fig. 27C. ‘Weston’s Pink Diamond’.

Fig. 27D. ‘Weston’s Pink Diamond’.

Fig. 27E. ‘Weston’s Pink Diamond’.

Fig. 27F. ‘Weston’s Pink Diamond’.

Fig. 27G. ‘Weston’s Pink Diamond’.

Fig. 27H. ‘Weston’s Pink Diamond’.

Fig. 28. Painting by artist Yana Kiverskaya (A) and a photograph of *R. Iedebourii* in the Altai mountains where it was painted (B).

Fig. 29. Painting by artist Natalia Safronova (A) and a photograph of R. Iedebourii in the Altai mountains where it was painted (B).

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Konstantin A. Cherezov lives west of the Ural Mountains, about 950 km (590 miles) northeast of Moscow. He is a plant collector and keeps a large collection of rhododendrons and other plants in his dacha garden, which is located at a considerable distance from the city in an ecologically clean area on a river bank. He devotes the warm season to the garden, as well as trips and expeditions to various remote corners of Russia to study local plants and nature in general. He has a profound knowledge about trees, shrubs, perennials, and ferns and is a donor of seeds to the Finnish Chapter's seed list, mostly of rare plants not often available for collectors.

The Pukeiti Vireya Collection – Its World-class Conservation Value

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(Photos by G.F. Smith unless otherwise noted.)

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Pukeiti garden is nestled in a lush setting of montane rainforest growing on the foothills of Mount Taranaki. Within the 25 hectares (61 acres) of established garden sits our vireya collection with public displays under an expanse of steel and

Fig. 1. The redeveloped covered walk. Photo A. Brooker.

Fig. 2. 'Jean Baptiste'.

Fig. 3. 'Watermelon Dream'. Photo A. Brooker.

Fig. 4.'Fairy Dancer'.

Fig.5a and b. *R. gracilentum.*

Fig. 6. *R. cruttwellii.* Photo P. Catt.

Figs. 7. *R. commonae* cream color form.

Figs. 8. *R. commonae* red color form.

Figs. 9. *R. commonae* pink color form.

Fig. 10. *R. commonae forms* with Bob Cherry, Kain Swamp.

glass and on the margins of garden beds in sheltered pockets (Fig. 1). A back- up collection of taxa reside in the nursery and collectively these groupings all form a conservation collection of world value.

When we think of vireya they can be, to some, the most evocative of all rhododendrons, the hybrids especially (Figs. 2-4). With the combinations of glorious scent, pastel colours, large flowers for some, or the small very floriferous displays on dwarf plants there—are attractions for all tastes. All have their place in our hearts and gardens, and for Pukeiti anchor a display that share the species vireyas with our visitors.

Fig. 11. *R. saxifragoides*.

Now we need to step back a little, to 1960 when the young Pukeiti Rhododendron Trust received a letter from a Mr. John Womersley in Papua, New Guinea. In this he talked about his delight at being able to send a plant of *Rhododendron gracilentum* (Figs. 5a,b) to Pukeiti. This first small plant signalled the relationship between these Malesian rhododendrons and the Trust, arriving in good condition via air mail to the home of then Pukeiti's Honorary Superintendent, Mr John Goodwin. This, along with other such generous contributions, became a catalyst from which a collection of predominantly wild sourced taxa grew. Relationships with international plantsmen/ institutions which started then and carried on to the present allowed for a steady growth of both material and knowledge that has continued the legacy that started with a small plant.

Fig. 12. 'Saxon Glow'.

By the 1980's the Curator, Graham Smith, had decided that to be able to grow these plants to their potential, he needed to experience the habitats they came from and so joined with two Australian Rhododendron Society trips to

Papua New Guinea to absorb, learn and collect material himself. Both of these trips returned a wealth of knowledge, material and furthered personal relationships. One in particular was with the Reverend Norman Cruttwell who was stationed at Goroka on the slopes of Mount Ghavisukar. Norman Cruttwell was to become a strong supporter of and supplier to the Pukeiti collection over the following years, and a species was named agfter him (Fig. 6).

Treasures abounded on these adventures offering up a wealth of plants for the Pukeiti collection including three different colour forms of *R commonae* in red, cream and pink (Figs. 6-10). Accompanying Graham on one

breeder Oswald Blumhardt. Os was a breeder with great vision and in fact his nephew recently said of him "that the desired hybrid was already in his mind when looking at the species..." One of his most successful crosses produced the Saxon series using the diminutive *R. saxifragoides* (Fig. 11), a small growing

species found on a log in the Kain swamp. One successful cross added size and vigour to *R saxifragoides* robust, compact form resulting in more than one registered hybrid (Fig. 12).

As with all plant collecting, there was meticulous record keeping and careful packaging to ensure that plants and notes reached their ultimate destinations intact, having spent time in quarantine on their journey to the garden. Up until this time Pukeiti had relied on others to supply material but the success of these early trips delivered such a wealth of wild collected plant material that it first filled the original display house, then a shade house and so on. The expansion into open sided display gardens (Fig. 1), covered only with a roof to protect the plants from Pukeiti's overly reliable rainfall, continued into the twenty first century with other plantsmen contributing from

Fig. 13. *R. himantodes.* Photo P. Catt.

Fig. 14. *R. stenophyllum* var. *stenophyllum*.

Fig. 15. *R. bagobonum*. Photo P. Catt.

Fig. 16. *R. rarilepidotum.*

their expeditions to build a collection that now holds 110 representations of the known 300 taxa in the world of Malesian rhododendrons. One other such collector was Keith Adams. Keith was a Taranaki nurseryman and Pukeiti Trust member who preferred to explore solo in the wilds of Sabah and Sarawak in Malaysia. From the depths of these tropical places, he would send cutting material back to establish another branch of the collection—the vireyas of Borneo. His contribution was enormous in terms of the quantity of wild sourced material that he provided, such as *R. lowii, R. himantodes* (Fig. 13), *R. burtii, R. polyanthemum, R crassifolium* and the bizarre looking *R. stenophyllum* var. *stenophyllum* (Fig. 14), to name but a few of a seemingly endless list. With wild provenance this added even more value to the plants themselves. Keith kept doing this for many years and the subsequent plants populated a glasshouse solely dedicated to the vireyas of Borneo where we could provide the warmth they required to grow to their full potential. Plants from Sulewesi, Indonesia, were added in the late 1990's and early 2000's as more New Zealand collectors showed an interest in other parts of

Fig. 17. *R. taxifolium*.

Fig. 18. 'Beverley McConnell'.

the vireya landscape, offering up other treasures such as *R. rarilepidotum* in three colour forms of orange, yellow and red. Again accompanied by collection records that added immense value to a growing collection.

By now you should see the pattern emerging, wild sourced material accompanied by good records are slowly building a small but valuable collection of living material in our corner of the world (Brooker 2011.) Within this collection we now have some representatives of the more at risk taxa known, and none more so than *R taxifolium* (Fig. 17). Listed as Critically Endangered in the ICUN Red List of Rhododendrons in 2011, it is now thought to be extinct in the wild. A short time for such as disastrous outcome to occur. Risks to its habitat which had included agricultural expansion have now included tourism. On 26 February 2020, it was recorded in a Philippines newspaper that a portion, some 600 ha (1482 acres), of Mount Pulag was engulfed in a fire suspected as being accidentally started by a hiker's cooking stove. This was the only known habitat for *R. taxifolium*, thus making any plants of this taxa grown in an *ex-situ* collection all the more valuable.

A direct result of the knowledge acquired by growing vireyas in the living collection, the cultural practices required for their care have been fine tuned. Our evolution in growing media from the days when we used to make our own blends with sterilized top soil progressed through to peat-based or composted pine bark mixes, and even shredding tree fern logs to add sharp drainage. At present in New Zealand, commercial media blends now exist that are perfect for the plants we grow.

We also needed an appropriate understanding of both the airflow required and desired light levels for plants that being natural forest margin dwellers, seek out light. All of this gradually acquired knowledge has made for a much better outcome for our plants and gardens.

A recent step in our conservation thinking for the Pukeiti collection, again driven by our understanding of the threats to habitat both in and ex-situ, has been the development of a network of host gardens spread throughout New Zealand

Fig. 19. 'Super Duper'.

Fig. 20. 'Rangitoto Dawn'. Photo A. Brooker.

to mitigate the risk of localised catastrophic habitat destruction and/or plant loss. For vireyas, this has meant disseminating taxa to the northern parts of New Zealand to be appropriately cared for by others. Warmer and at times wetter microclimates, where the plants can thrive without the need for overhead protection, have provided other showcase areas for the gardening public to enjoy vireyas for a long time now and are the ideal locations for our conservation project to expand into.

Summary of the Red List status for vireya taxa held at Pukeiti.

Critically Endangered 2
Endangered 1
Vulnerable 10
Data Deficient 7
Least Concern 90

The growing of young propagules through tissue culture by a commercialcontract grower, utilising facilities andskillsets of others, has also enhanced oursuccessful outcomes while reducing costin our facility. Hand pollinating keytaxa, when vegetative propagation failsto meet our needs, also provides seeds of known provenance for our purposes and to disseminate to global partners.

This all adds value to what we are doing and how we can play our part in an international conservation context.

Our focus on hybrids has also grown, for although it is understood that without species hybridizing, would never have been possible, it is the often showier flamboyance of hybrids that drives the popularity of this section of rhododendron in our country and around the world. Our target is to propagate New Zealand-created hybrids, developed by skilled plantsmen and enthusiastic amateurs alike, as many of the latter's work have failed to be adopted in the nursery plant market. These represent a valuable period of our horticultural history and as such, now play a part in the Pukeiti collection. Growing these plants in one place is no

guarantee of successful conservation, so they too become part of our ex-situ distribution project, albeit for a different purpose.

Pukeiti and its vireya collection adds value on many levels locally, nationally and internationally. By growing networks based on common conservation goals, we are helping ensure not only the future of vireya taxa here in our small part of the world but worldwide for generations to come.

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Bibliography

Andrew Brooker is currently the Rhododendron Collection and Projects Officer with the Pukeiti Rhododendron Trust, where he been working for thirtyfour years. As such, he has responsibilities for both the living collection and the exsitu project work, and he is instrumental in building a small but growing list of satellite gardens throughout New Zealand. Previously, Prior to this, he has been Head Gardener, taking on the responsibility for the day-to-day tasks in the garden, and Gardens Manager, which blended the administrative and the hands-on gardening.

End Part 1