JOURNAL

# American Rhododendron Society

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*R. calendulaceum* in bloom on Roan Mountain. Photo: Don Hyatt P-51.

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# American Rhododendron Society
# A GUIDE TO THE SOCIETY

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## Society's Purpose

To encourage interest in and to disseminate knowledge about rhododendrons and azaleas. To provide a medium through which all persons interested in rhododendrons and azaleas may communicate and cooperate with others through education, meetings, publications, scientific studies, research, conservation and other similar activities.

## Membership Benefits

- Chapter affiliation with scheduled meetings
- *Journal American Rhododendron Society* published quarterly
- Annual convention and regional con-ferences
- Seed exchange
- Listing of registration of names and descriptions of new rhododendron hybrids published in the Journal

## To Join the Society

Membership categories:
(January 1 – December 31)

| | |
|---|---|
| Student | $10.00 |
| (include proof if over 18) | |
| Regular | $40.00 |
| Commercial | $90.00 |
| Sustaining | $75.00 |
| Sponsoring | $150.00 |
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| Life family | $1,500.00 |

You can join the ARS through your local ARS chapter (check the website www.rhododendron.org for chapter contact info) or by sending a check or money order directly to the Office Administrator of the American Rhododendron Society at the above address. Checks must be in US funds. Make checks payable to the "American Rhododendron Society." Membership includes one year (4 issues) of the *Journal American Rhododendron Society* and affiliation with the chapter of your choice.**To receive the winter issue of the Journal, renewals must be postmarked no later than Dec. 1.**






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### ARS Digital Resources

**Website**: www.rhododendron.org

**Office**: www.arsoffice.org

***JARS* online:** www.arsoffice.org/protect/login.asp

***JARS* back issues**: http://scholar.lib.vt.edu/ejournals/JARS [to Vol. 63 2009]

**Archives**: www.lib.virginia.edu/small

**ARSStore**: www.ARSStore.org

**Blog**: www.rhododendron.org/blog/default.asp

**Plant Name Registration:** www.rhododendron.org/plantregistry.htm

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*R. calendulaceum* in bloom on Roan Mountain. Photo: Don Hyatt P-51


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# From the President

Ken Webb

Victoria, BC,
Canadada



I hope everyone is doing OK and surviving in this unbelievable situation that we find ourselves in. So many things have been cancelled, and our future is still quite unknown. At least, our members from Halifax are still planning on a Spring 2021 Convention in Nova Scotia. They are working tentatively, hoping that things will be opened up a little bit and people are not afraid to travel by then. They are trying to design a Convention where we can still practice the social distancing if we are allowed to get together in larger groups by then. It is still tentative, but at least it is something exciting to look forward to. The Canadian east coast is one of the most beautiful scenic places in the world and the people are very friendly.

After many years of talking about having a Board of Directors Meeting online, we finally had our first one last week. We used the Ring Central Meetings program, which is powered by Zoom. We had 26 Board members on the meeting and, surprisingly, it went quite well. We completely restructured the format that we have used in the past, so that we could get all the business work done at the very beginning. We just went with the Directors' reports as presented and didn't allow any updates to save time. It wasn't nearly as much fun as all getting together at a Convention, but it allows us to keep in touch and look after the business part of our Society when we are not allowed to travel.

It seems that we have all been lucky this year. The gardens have been spectacular this Spring. We had a really good bud set and the cooler weather made for huge flowers and good new growth. Many people are bragging that their gardens have never been in such good shape, as they have had to stay at home and have had lots of time to work in the garden. John Golab reports from Chicago that his garden is the best in 30 years, with many long-lasting blooms.

I have noticed that a lot of members have been branching out and trying new things when they were not able to travel around to visit other gardens. There are at least several chapters who have webpages to post pictures of your favorite flower that day. I know that they had a very successful "virtual" plant sale in Eureka and one of the Chapters on Vancouver Island had a plant sale online too. As we get through this pandemic and move to a more normal society again, it might be valuable to not forget about some of these modern ways to make our lives and our society better in the future.

So, stay safe and enjoy your garden.

# From the Editor

Glen Jamieson

Parksville, BC
Canada



Wow, what crazy times, and I'm not exactly sure what to say in this issue. Like everyone else, I and the other members of my ARS chapter, Mount Arrowsmith, have been self-isolating now for about ten weeks to minimise the spread of COVID-19, which has been very successful here in BC and particularly on Vancouver Island. As on May 30, there have been only 127 cases on the island, most in the Victoria area, and to my knowledge none in the central island area. The financial cost of this prevention, though, has been the cancellation of all chapter events by all five island chapters since late March, including the fund-raising spring plant sales and garden tours. More importantly, there has also been a substantial social cost, as with the cancellation of all meetings, members have not been able to get together and socialize, which is as important to many members as is the transfer of gardening information! If this carries into the fall, I can see real challenges in trying to keep our membership up, and can only hope that our past performance will keep people involved and ready to come back when times hopefully get better!

In the meantime, to try and maintain some momentum, we have initiated a few new virtual activities. With the cancellation of our truss show/plant sale, we instigated two virtual truss shows, one for April and one for May, with chapter members submitting images of uncut trusses from their gardens. Prizes are only bragging rights, but winning entries are displayed on our website, and it is nevertheless proving to be quite popular! Our normal truss show is in the third weekend of April, and so it only showcased April flowering plants, and so by having a May virtual show, we have been able now to showcase later flowering rhodo cultivars and species.

In addition, we have had a weekly "What's Blooming" virtual showcase, where members can submit images weekly of any flowering plants from their gardens, starting in late March, and this has proven very successful too, with even more members submitting images. All weekly submissions are maintained on our website (thanks to our great webmaster!), and not only does this show the huge variety of plants we can grow here on Vancouver Island, but is also shows the weekly time period in which they flower, for anyone interested in having an extended, ongoing flowering season.

Finally, I would be remiss for not acknowledging the great work our chapter newsletter editor is doing. She has provided members with instructions in how to participate in our many virtual garden shows, acknowledged the hard work of our rhodo propagation group, recognized some of our really active members, and has filled the remaining content with beautiful landscape and plant images from many of our gardens. So, even though we are not meeting in person this spring like usual, we are still very active, especially in maintaining our own gardens, many of which have never looked better! It's just a shame that others could not visit and walk through them!

# Recollections from Yunnan Expedition in 2018

Kristian Theqvist
Turku, Finland



Yunnan, a mountainous province in South West China, is known by plant hunters and many rhodoholics for its diverse nature with an abundant number of *Rhododendron* species, from small ones on mountain ridges to large-leaved elepidotes at lower elevations. I had read many captivating stories of expeditions to Yunnan and the neighboring Sichuan, written by modern age plant hunters such as Steve Hootman, Peter and Ken Cox, and Peter Hutchison, and also some from Scandinavia, including Ole Jonny Larsen, Bent Ernebjerg and Hans Eiberg. I have been specially intrigued by the expedition stories by Peter Cox and Peter Hutchison in their great book "Seeds of Adventure: In Search for Plants." I had dreamed of a day to be able to participate in a plant expedition to China, and in autumn 2018 I got that opportunity!

I will first give some basic information about the expedition before going into a more detailed summary. Planning for the expedition was done by Ole Jonny Larsen from Norway. He had been on previous expeditions in Yunnan arranged by "Dennis" (收件人, He Zhi Jian) who operates a local travel agency, the LiJiang Tiger Leaping Gorge Travel Service. I found that Dennis was an excellent organizer and a good guide. Unfortunately, Ole Jonny could not come on the expedition because of his not being able to obtain a Chinese visa in time. Ole Jonny thus gave leadership of the trip to Egil Valderhaug from Norway, also an experienced explorer, and who was a good leader on the tour.

Participants on our Scandinavian NW Yunnan Expedition 2018 were Bent Ernebjerg, Hans Eiberg and Sten Nørkjær from Denmark; Hans Schaefer, Jan Ole Westerhus and Egil Valderhaug from Norway; and Matti Huotari and myself from Finland. It was advantageous that several had been in Yunnan on earlier expeditions, and I had great respect for Bent Ernebjerg's experience and Hans Eiberg's excellent capabilities in identifying rhododendrons. I give special thanks to Hans, as we sometimes had wild discussions on the identification or taxonomy of some odd species that we encountered. Egil kept a daily diary and that helped us remember what plants we had seen. We were a good team, and Dennis was with us during the entire expedition and organized everything to perfection. "Tom" (和国政, He Guozheng) was our always smiling guide and cook.

The expedition was a great success in many ways. We found about 90 *Rhododendron* taxa during the three-week expedition, with some identifications difficult. It took several weeks after the expedition to organize photos and to discuss by emails the confusing identifications, and I would like to thank both Steve Hootman and Keith Rushforth who helped in the identification of several very difficult ones. The taxonomy used in this article for the *Rhododendron* species is based mainly on the Edinburgh revision (1997), first published in 1982. However, some species, subspecies and varieties described by H.H. Davidian, and later published in the "The Pocket Handbook to Rhododendron Species" by J.F.J. McQuire and M.L.A. Robinson (2009), were used in this expedition report.

Links to Google Maps, waypoints on Google Earth, list of species, and two photo galleries of the expedition can be found on the web page www.rhodogarden.com/Yunnan_2018/Yunnan.html.

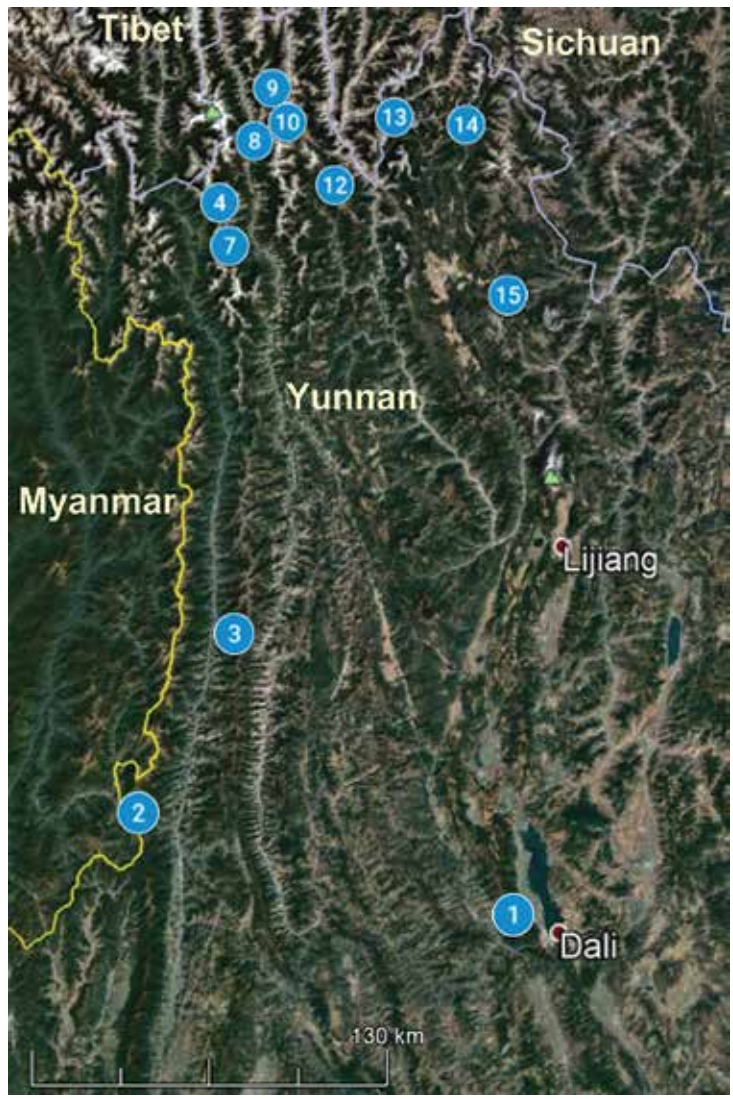



Fig 1. Expedition map. Marked places are 1. Cang Shan; 2. Pianma Pass; 3. Biluo Shan; 4. Peacock Pass; 7. Nanjieluo; 8. Tibetan home; 9. Gongkahu mountain; 10. Baima Shan; 12. Kari Pass; 13. Bala Gezong; 14. Xiaoxue mountain; 15. Xilianpen Pass.

**Planning phase**

Ole Jonny Larsen asked me in December 2016 whether I would be interested in joining an expedition to the Salween River valley in Yunnan in the autumn, 2018. It took me less

than ten minutes to think it over and have a compulsory short talk with my wife before answering Ole Jonny that I was in! From time to time, I received information from Ole Jonny about the planning, and in April 2017, I got the first sketch of the little over two-week expedition. The plan got better and longer as more information became available as to where it would be interesting to go in the mountains of NW Yunnan.

Three weeks before the tour, Dennis told us that a landslide had taken away 150 meters (500 ft) of road on our intended route, and so the plan needed to be changed for three of the days. The original plan included overnight stays in tents, but just a week before the tour, the plan had to be changed again when it started to snow in the mountains. Instead of some overnighting in tents, we were to be accommodated in guesthouses, Tibetan homes and hotels. However, we were advised to bring sleeping bags with us, as not all rooms had heating, and the outside temperatures could go well below freezing. We had a good plan that was flexible when needed, and we adjusted with a positive mood to necessary changes before and during the expedition.

Just over a week before the tour, I injured my right ankle when hustling about in my arboretum. My ankle could not support me walking and I became worried about how I could trek in Yunnan. I received a prescription for anti-inflammatory medicine and instructions from the orthopedist to use a tight ankle support. It helped, and fortunately my ankle healed enough during the first days in the mountains to not be an ongoing problem.

**Kunming**

I travelled to Yunnan ahead of the others and spent two prior days in Kunming, the capital of Yunnan. I stayed in a good hotel favored by the Chinese, and while English speakers were rare, luckily two young women at the hotel reception spoke some words of English using a mobile translation program. Many people helped serve me at the hotel restaurant when I tried to figure out how to get a gluten-free meal! Finally, I showed a photo of a menu at a Chinese restaurant in Helsinki, and one of the helpers smiled and apparently said "we can make Kung Pao." After lunch, I bought a map of Kunming and walked the streets to Green Lake Park, a few kilometres (miles) away. It was a beautiful city park on a man-built island, but its plantings were not botanically significant.

Traffic in Kunming looked very confusing, but the air was not polluted. Citizens drove electric scooters both in the scooter lanes and between cars at tremendous speed without using helmets. Some drove towards oncoming traffic, and some drove on the sidewalks, where you had to always watch out for silent cyclists and scooters. In some places, police pulled a rope across the scooter lane to force the scooters to stop at traffic lights.

I quickly noticed that Google or Google Maps apps did not work in China. Sometimes I counted on Baidu, the Chinese search engine, and I found some plant images with their scientific names using it, but the texts were of course in Chinese. Getting information was thus challenging! WhatsApp messages could be delayed for several hours, and I sometime received a response from my wife in the middle of the night. The cellphone worked well everywhere except in the mountains when we were hiking away from cell towers.

I have damaged several cameras on previous tours due to excessive moisture. The waterproof Olympus Tough TG5 was really handy in the mountains and you did not need to worry about getting this camera wet. Three of us on the expedition had this camera, and with the TG5's microscope mode, I got accurate images of the hairs and scales on the underside of the leaves. This significantly helped in the identification of species. (See Fig. 17 on page 123.)

I had downloaded the "GPS Data" app (EXA Tools) on my cellphone and documented the coordinates and altitude of each site by taking a screen photo with my cellphone. The TG5 had an altimeter, but it turned out to be very inaccurate at altitudes above 3000 m (9842 ft).

**Dali and Cang Shan**

We had arranged to meet Dennis, Tom and every one of our group in Dali Old Town in the evening of October 27, where we had a delicious Chinese dinner in a nice restaurant. We became acquainted with each other and had fun from the start. The plan was to start our expedition by exploring rhododendrons next day on the close-by Cang Shan (Shan = mountain in Chinese). Dali Town is at an altitude of 1970 m (6463 ft) on a plain between Lake Erhai on the east and the Cang Shan to the west, in a depression at the southern end of the Yun Mountains, part of the greater Hengduan Mountains.

Dennis had planned everything perfectly. He had arranged permits for areas that could not be accessed without official approval, and some roads had check points where permits and passports were examined. Yunnan is famous for its many minority ethnic people and you could often see people wearing traditional colorful dresses in the local villages. Dennis and Tom both belonged to the Nashi (Naxi or Nakhi) ethnic group.

During the 2016 Sikkim tour by the Finnish Rhododendron Society, we hiked over several days up to 4000 meters (13,123 ft) and so gradually became adapted to the thin air at altitude. In Dali, we took the cable car up the Cang Shan straight to almost 4000 m, and I quickly felt altitude sickness badly. I was gasping for air like a dying fish, and when climbing up the stairways, I often had to stop to regain my breath. During the expedition, I monitored my blood oxygen saturation that I measured from my fingertip, and it was initially alarmingly low (80%) at 4000 m but clearly improved over the subsequent

days. During the tour I did not get any other instances of mountain sickness, not even a headache, but hiking uphill always felt "heavy" at altitudes above 3500 m (11,483 ft).

On the Cang Shan, you had to walk only on wooden paths and stairways and you could not step off the trail to investigate nearby rhododendrons more closely. Luckily, many species grew adjacent to the stairway, and the most impressive were the numerous *R. taliense*, (Fig. 2) with their honey-like aroma from the leaves filling the air. I have several accessions of *R. taliense* in my species garden in Finland and I loved to see the species growing in its natural surroundings. Other elepidotes that we saw above 3900 m (12,795 ft) were *R. phaeochrysum* var. *agglutinatum*, *R. cyanocarpum* and *R. lacteum*.

Hans Eiberg and I had a debate and pondered as to whether the lepidotes we saw on Cang Shan were *R. fastigiatum* or *R. impeditum*. I was firmly in favor of *R. fastigiatum*, after it was first discovered on this mountain in 1883, and Peter Cox had previously made me aware of thousands of *R. fastigiatum* shrubs blooming on Cang Shan (Cox 1985). Hans was in favor of either *R. impeditum* or a *R. impeditum*/*fastigiatum* hybrid, basing his view on the color of the upper side of the leaves. However, the color of the leaves was very dark at the beginning of winter, as is the case with all lepidotes. Steve Hootman (Rhododendron Species Foundation) said that the species I had photographed was in his opinion *R. impeditum* (Fig. 3). The difference between the two species is almost hair splitting, and many collections, including two Cox collections from Cang Shan (0533 and 0557), have first erroneously been named as *R. fastigiatum*. In my opinion, these two species should be merged to one species!

On October 29, we drove by minibus west from Dali to Liuku (elevation 800 m (2625 ft)), located on the banks of the Salween River. We did no plant hunting and the highlights of the day were only a good lunch and dinner.

**Pianma Pass**

The next morning, we woke up well before 6:00 AM to many roosters crowing, as was the case for most of the subsequent mornings. I had chosen rooster crowing as the wake-up sound in my cellphone, and sometimes Matti, my roommate, woke to the rivalry of Chinese roosters with those on my phone. Tom had prepared a good and nourishing breakfast for us, and after a 2.5-hour drive west, we arrived at the Pianma Pass (3100 m (10,170 ft)), which looks west down on Myanmar.

Everyone was immediately eager to start going up the adjacent mountain slopes, and we almost ran on animal tracks through bamboo thickets. I soon realized that I was not able to maintain the pace of others, and I was afraid of becoming lost on the numerous tracks up the mountain, with bamboo thickets blocking my view. I reluctantly returned to the road and studied rhododendrons growing on the slopes of the roadside. I found a beautiful lepidote *R. sulfureum* on a steep rocky slope, but this yellow-flowered species from the *Boothia* subsection is unfortunately not hardy in Finland. I found also an interesting *Arisaema* species, from which I collected seeds and have now small plants growing to help later in its identification.

Others went through bamboo thickets up to about 3250 m (19,660 ft), and they found many elepidote rhododendrons: *R. dichroanthum* subsp. *apodectum*, *R. arizelum*, *R. basilicum*, *R. sidereum*, *R. protistum*, *R. sinogrande*, *R. fulvum* and *R. mallotum* (Fig. 4). After a well-prepared field lunch, we explored lower elevations (3000 m (9840 ft)) on the sides of the road. We saw the elepidotes *R. decorum* and *R. neriiflorum* subsp. *neriiflorum*, and the lepidotes *R. maddenii* subsp. *crassum*, *R. zaleucum* and *R. edgeworthii*. The identification of some species was challenging from photos afterwards and misidentifications could have



Fig 2. Matti Huotari on the stairways at Cang Shan. The majority of rhododendrons were *R. taliense*.



Fig 3. The underside of the leaves of *R. impeditum* are densely covered with brown-speckled or rust-colored scales, one-half their own diameter apart.

happened. It would have been better if we had spent more time on making detailed identifications in the field, but we did take leaf and bud samples of several species and had an identification session every evening after dinner. The "Pocket Handbook to Rhododendron Species" was in hard use.

**Biluo Shan**

On October 31, we went 50 km (30 miles) north on the road following the Salween River in four-wheel drive SUVs, and up the winding and bumpy dirt roads on the mountains. On Biluo Shan, we stopped at a farm house at 2700 m (8860 ft) elevation as further up the mountain road was inaccessible, being closed to prevent illegal logging in the nature reserve.

We divided into two groups, Matti, Sten and Jan Ole hiked fast for two hours up to 3530 m (11,580 ft) and started botanizing. The actual pass was a bit higher at 3750 m (12,300 ft). Bent was hiking at his own pace as on most days, he was familiar with the area from his previous expeditions. Egil, Hans E., Hans S. and I took a slower pace at the lower elevations. We found this a good procedure as a team because we were able thus to explore a wider range of habitat at different elevations on the mountain slopes.

The vegetation was lush and you couldn't go more than a meter to the sides because of the steep slope. Rhododendrons found on that day were the elepidotes *R. sinogrande*, *R. facetum*, *R. rex* subsp. *fictolacteum*, *R. glischrum*, *R. anthosphaerum*, *R. lukiangense* and *R. stewartianum*, and the lepidotes *R. edgeworthii*, *R. rubiginosum* subsp. *desquamatum* and *R. xanthostephanum*. The most impressive here were many *sinogrande* plants, with huge leaves, at best over half a meter (20 in) long (Fig. 5). Osmo Jussila is raising *sinogrande* in large pots in Finland, and he hauls the almost two meter (7 ft) high plants into his guesthouse for winter protection. I have small seedlings from seeds that I collected at Biluo Shan, but no good plan on what to do with them after two years.

On November 1, we had a too long travel day by minibus from Fugong to Gongshan on the main road that followed the Salween River. The distance was only 113 km (70 mi), but it took 9 hours! The whole road was under construction, and it was terribly rough. In many places, we had to wait to pass oncoming traffic as there was only one lane available. A stop came 20 km (12 mi) before our destination, and we first thought it was because of road work, as a truck passed loaded with rocks. However, we were told that a little further up, the main road had fallen into the river and while the road was being rebuilt, there was no information on when it would be in drivable condition. We then arranged with the drivers of two vans waiting in the line behind us to take us on a detour to our destination. We transferred our luggage to the vans, drove on a narrow bridge over the river, and continued on back roads on the other side of the river to Gongshan. The main road was still impassable the next morning, so we were lucky that we found a route on the other side of the river to our hotel.



Fig 4. Jan Ole Westerhus showing the cinnamon-brown indumented leaves of *R. mallotum* at Pianma Pass. The rhododendron with larger leaves is from subsection *Falconera*. Photo by Sten Nørkjær.

**Peacock Pass**

On November 2, we reached considerably colder regions in NW Yunnan, closer to the Tibetan border. You can reach the Mekong River valley from the Salween River valley (Fig. 6) by



Fig 5. Kristian Theqvist with *R. sinogrande* at Biluo Shan.



Fig. 6. Muddy waters of the Salween River.



Fig. 7. Building the road on the mountain slopes to the Peacock Pass has killed trees and exposed the slopes to landslides.

travelling over the mountains at the Peacock Pass (3820 m (12,530 ft)). A new asphalt road was being built across the pass and in the past, you had to drive more than 200 km (120 mi) south to get over the mountains or else hike for a few days over the pass. The paving work on the road caused us sometimes to wait an hour or two, as problems also occurred with rocks and debris collapsing down onto the new road. Building a road on a steep mountain slope affects soil stability and inevitably causes landslides, and we saw frequent slope collapses as we traveled along the mountain roads (Fig. 7).

*R. beesianum* from the *Taliensia* subsection grew commonly in the mountains surrounding the Peacock Pass up to 4000 m (13,125 ft). The shrubs had two different colored flower buds, green and dark purple. I cut some flower buds open with my knife and found that the green ones contained white buds and the dark purple ones red-violet buds. I collected seeds from the both color forms of *beesianum*, and I hope that we can get *beesianum* to thrive in Finland, although previous attempts to grow it have not been very promising (Fig. 8).

Low bushes from the *Neriiflora* subsection grew abundantly on the mountainsides at the Peacock Pass. Identification was challenging, but we identified *R. sanguineum* subsp. *didymum* and *R. eudoxum*, and with question marks *R. dichroanthum* and *R. neriiflorum* var. *appropinquans*. Surprisingly, many of the flower buds that I cut open were dead, brown buds, as apparently the *Neriiflora* species are growing at their extreme environmental limit, and late autumn frosts before the snowfall had caused damage (Fig 9).

We overnighted in a nice Tibetan home at Dimaluo village and returned next day to explore more plants at the Peacock Pass. We had problem in getting up to the pass as tens of tons of big rocks had fallen the previous night off the mountain slope onto the road. It took two hours for a front loader to arrive to the site and to clear one lane for the waiting vehicles. After that, we waited an additional hour further up the mountain road for a break in ongoing road work.

Trekking on the mountainside was captivating and we saw a lot of new species as we went to higher altitudes than the previous day. It was snowing a bit but not disturbingly (Fig. 10). *R. rupicola* (Fig.11) grew on the rocky slopes and the species grows in Yunnan as two color varieties, the dark purple flowered var. *rupicola* and the yellow-flowered var. *chryseum*. I did not remember to cut flower buds to identify the species down to variety level. Hans E. and Egil thought that they were var. *chryseum*, but evidence was missing. Only on the Xilianpen Pass nine days later did I cut one flower bud of *R. rupicola* and found from the yellowish buds that it was var. *chryseum*.

On the second day at the Peacock Pass, we saw, in addition to the already mentioned species, the elepidotes



Fig. 8. *R. beesianum* with dark purple flower buds at the Peacock Pass (3845 m (12,615 ft)).



Fig. 9. Cut flower bud of *R. sanguineum*. Two of the buds are dead caused by night frosts.



Fig 11. *R. rupicola* can be identified from its bicolored pale and dark scales, overlapping or nearly contiguous.

*R. phaeochrysum* var. *levistratum*, *R. callimorphum*, *R. selense* subsp. *selense*, *R. forrestii*, *R. roxieanum* and *R.* x *pyrrhoanthum* (*R. forrestii* X *R. eudoxum*), and the lepidotes *R. eclecteum*, *R. saluenense* subsp. *chameunum*, *R. mekongense*, *R. campylogynum*, and *R. cephalanthum* subsp. *cephalanthum*.

Our drivers had gone to get fuel from the Mekong River valley, but they could not return as planned because the road had been blocked due to roadwork. We decided not to stay and shiver in the cold in the approaching evening at the Peacock Pass, and so hiked down the winding mountain road, finally in complete darkness, relying only on the light of our cellphones. We walked for two hours for about ten km (six miles) on the road before our cars finally arrived and took us to the village of Dimaluo. According to my mobile app, I walked over 27,000 steps that day, which is about 19 km (11 miles). I felt no pain or fatigue in my legs, and after a good dinner, I slept in my sleeping bag in a chilly (10° C (50° F)) room of the Tibetan home until the roosters outdoors and my cellphone crowed early in the morning.

On November 4, we drove for the third time up to the Peacock Pass, as our purpose was now to explore the eastern slopes facing the Mekong River Valley. It was snowing at the pass but the weather cleared up when we drove some hundred meters (325 ft) down on the Mekong River side. A herd of yaks came to meet us when we stopped at a promising looking mountain slope at 3400 m (11,150 ft). The handsome herd leader with scary horns was jogging towards me and seemed to want to make a closer acquaintance, but to my relief, Dennis stepped in front of the yak and ordered it off!

Hans E. and Egil were with me as we studied rhododendrons on a moist and lush slope at an altitude range of 3400 to 3600 m (11,155 to 11,810 ft). *R. praestans* from the *Grandia* subsection stood out with its magnificent trunks and 40 cm (16 in) leaves. Other new species of the expedition that we saw here were *R. wardii*, *R. fulvum* subsp. *fulvoides*, *R. sperabile* var. *weihsiense* and possibly a cross of *R. fulvum* subsp. *fulvoides* X *R. anthrosphaerum*. *R. heliolepis* was the only lepidote that we saw.



Fig. 10. The mountain peak (4360 m (14,305 ft)) at the Peacock Pass. The rhododendrons in the field are *R. beesianum* and different species from subsection *Neriiflora*.

**Nanjieluo**

Over the next days, we explored mountains along the Mekong River. On November 5, we went by four-wheel drive SUVs up on the west side of the river along a narrow winding mountain road, through the small village of Nanjieluo to the local border station (2915 m (9565 ft)), where there was a guesthouse next to the office building.

Our expectations were high as Dennis had visited the mountain ten days before our expedition and sent us photos of *R. proteoides* growing on mountain slopes surrounding a lake at 3900 m (12,795 ft). It was raining when we left the guesthouse in the morning, and unfortunately the rain changed to heavy snow when we reached 3300 m (10,825 ft). We got with our cars up to 3500 m (11,480 ft) but it started then to be unsafe to drive on the slippery snow-packed narrow road. After some discussion, we decided to trek up, but pretty soon we found that exploring snow covered plants



Fig. 12. Group photo at Nanjieluo.

was not fun. However, we took a group photo in heavy snow and Hans S. made a snowman!

A handsome, 3 m (7 ft) high rhododendron with reddish-brown indumentum was standing in the snowy landscape (Fig. 13). The identification of the plant aroused much debate and speculation. Hans E. told me that on some earlier expedition the plant had been named as *R. fulvum* var. *fulvoides* aff., as the true identification had been problematic. After getting home, Keith Rushforth, a well-known and respected arboriculturist from the UK, had a look at the plant photos and he wrote that it was by no means *R. fulvum* from subsection *Fulva*. He suggested that it could be *R. rex* subsp. *fictolacteum* var. *miniforme* from the *Falconera* subsection. I agreed it was a *Falconera* because of its cup-shaped indumentum, but the structures were not fimbriated (fringed) which made it more difficult to identify (Fig. 14). Keith suggested that we could ask Steve Hootman to look on the indumentum of *R. rex* subsp. *fictolacteum* plants growing at the Rhododendron Species Botanical Garden (RSBG). Steve examined under microscope the indumentum of plants of different origins, including "var. *miniforme*" from BH#116 and CNW#731, and a couple of other clones including F#25719 from the Royal Botanic Garden Edinburgh (RBGE) that look very similar. Steve found that there is a tremendous amount of variation in the degree of fimbriation, some not being fimbriate at all (or barely anyway) and some remarkably so, with everything in between. In his opinion, the rhododendron we saw was *R. rex* subsp. *fictolacteum*, albeit without any fimbriation in the indumentum.

Other new species of the expedition that we saw at Nanjieluo were the elepidotes *R. uvariifolium*, *R. floccigerum*, *R. fulvum* subsp. *fulvoides* and *R. anthosphaerum*, and the lepidotes *R. rubiginosum* f. *desquamatum* and *R. yunnanense*.

The next day was a down day. We couldn't go to the snow-covered mountain and so we did just a couple of hours of leisurely walking from the border station up on the mountain road and back. After that, we returned to the city of Badi to the same hotel where we had already been.

**Viewing Kawakari and exploring Gongkahu**

Driving on November 7 from Badi to Deqen, we visited a Tibetan home and a Tibetan Buddhist monastery. This was



Fig 13. Sten Nørkjær investigates the mystery plant that later was identified as *R. rex* subsp. *fictolacteum* (Nanjieluo 3560 m (11,68-0 ft)).

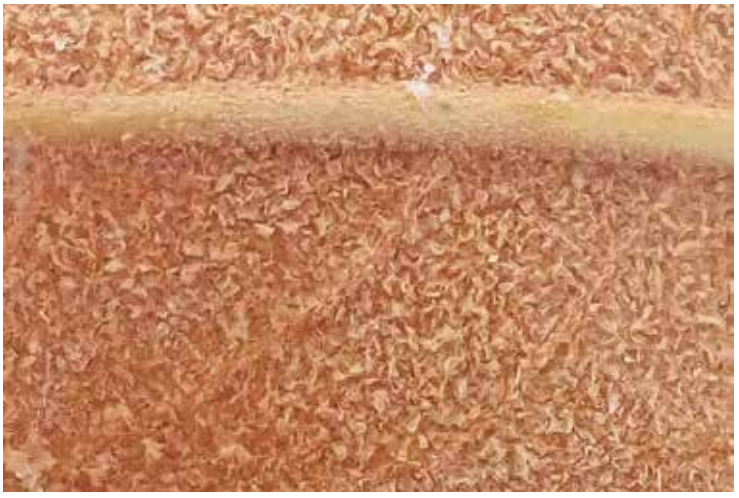


Fig 14. Cup-shaped indumentum without any fimbriation of *R. rex* subsp. *fictolacteum*

a nice change after trekking in the mountains and we learned something about the local pace of life and religion. The Tibetan home was located in a small village in a lush valley. Dennis was a friend of the host of the handsome home, but I think the actual boss in the house was the lively, always smiling housewife that had two "husbands" (**Note**: The social system is matrilineal and matrilocal, i.e., parentage is by the mother and all children—men and women—live in the house of the mother, from birth until death. Their family system is different from the one we know in the West since marriage—that is to say the recognition of a union of individuals by an institution—does not exist. The children are raised by the inhabitants of the household, the maternal uncles assuming the role of "father" as we envision it in the West.) The old grandmother, still living in the house had four "husbands," though one of them already deceased. There, we were served a delicious hot lunch with yak butter tea.

In the evening we went to a nice hotel on the outskirts of Deqen (3420 m (11,420 ft)). The scenery was spectacular from the loft of the luxury room to the snow-covered Kawakari Mountain (6740 m (22,112 ft)). There was no heating in the hotel and we noted that the waitresses in the hotel restaurant used winter jackets and caps while serving us. We also dressed warmly as we went to dinner, and we spread our sleeping bags over us on the beds at night. I did not sleep well at this high altitude, or perhaps I just had eaten too much at the generous dinner.



Fig. 15. Hans Eiberg examining *R. x chlorops* on Mt. Gongkahu.

In the morning it was pretty cold, with the outside temperature at -12° C (10° F). After breakfast, we took a minibus to the foot of Gongkahu Mountain at 3500 m (11,480 ft), the northernmost mountain of our expedition and close to the Sichuan border. The mountain slope was full of yellowish-green bushes that Dennis said were oaks. The oaks with spiky leaves were later identified as *Quercus aquifolioides*, and local women were gathering oak branches for firewood while we were exploring for plants.

Matti and Sten hiked as high as 4600 m (15,090 ft), but I did not feel well enough to join them after a bad night's sleep. I and Hans E. turned back down at an altitude of 3850 m (12,630 ft), and we found an interesting natural rhododendron hybrid, apparently between *R. wardii* and *R. vernicosum* called *R.* x *chlorops*. Whether the offspring have yellowish flowers remains to be seen, and I have been a bit confused on the purple-colored underside of the leaves on some of my vigorous seed-grown plants. The purple color is usually an indication of indumentum at later stages. In addition to *R. wardii* and *R. vernicosum,* we saw *R. phaeochrysum* and that could explain the indumentum. We also saw the lepidotes *R. nivale* subsp. *boreale* and *R. cephalanthum* subsp. *cephalanthum*.

**Baima Shan**

Baima Shan (or Beima Shan) is perhaps the most famous destination of the early explorations in northwest Yunnan. I have had 86 seed lots from the Baima Shan over the years, so I was really looking forward to getting there. We had reserved two days for the Baima Shan mountain area and we spent the time effectively exploring for rhododendrons.

A good asphalt road went up to 4200 m (13,780 ft), which was a good starting altitude to trek higher. Matti, Sten and Jan Ole climbed up to the ridges of the mountain at 4600 m (15,090 ft), but I was satisfied with altitudes below 4400 m (14,435 ft). The slopes were full of rhododendrons and on the lower levels they made an almost impassable tangled mass.

We found on Baima Shan a lot of rhododendron species, e.g., *R. phaeochrysum* (var. *phaeochrysum*, var. *agglutinatum*, and var. *levistratum*), *R. aganniphum* (var. *aganniphum* (f. *glaucopeplum*), var. *schizopeplum*, and a nameless form that had thick bluish tomentum on the upper surface of the leaves), *R. beesianum*, *R. wardii*, *R. proteoides*, a *R. proteoides* X *R. phaeochrysum* cross, *R. roxieanum* (var. *roxieanum* and var. *oreonastes*), *R. rupicola* (var. *chryseum*), *R. cephalanthum* subsp. *cephalanthum* and *R. saluenense* subsp. *chameunum*. There were also many low growing lepidotes apparently from subsection *Lapponica* that we did not have time to identify. The most exciting thing for me was to find *R. proteoides* at an altitude of 4370 m (14,337 ft), and I flopped down on my back in the snow among these bushes and enjoyed the moment of ecstasy (Fig. 16).

**Kari Pass and Bala Gezong**

We next over-nighted in a hotel in Benzilan and on the morning of November 11, we drove about an hour to Niding village at 3365 m (11,040 ft). From there we walked an hour on a forest road to a mountain meadow where we had a field lunch before trekking up on the mountain towards the Kari Pass at 4100 m (13,450 ft). We had an official Chinese guide with us for



Fig. 16. *R. proteoides* at Baima Shan.



Fig. 17. The leaf underside of *R. saluenense* is densely scaly; diameter of scales is approx. 50 to 70 µm. Photo taken on the field with Olympus Tough TG5 camera.

the next two days, possibly monitoring us, as he did not guide us in anyway. Dennis and Tom kept him company so we could botanize in peace far away from the guide.

Compared to previous days, the day at Kari Pass was not so good for me as I felt quite tired. I found myself enjoying lying down on meadows looking at large seed capsules of *Iris* rather than studying rhododendrons, perhaps because I had over-exerted myself too much in previous days and needed some rest! Despite my fatigued mood, I took photos of rhododendrons such as *R. decorum*, *R. wardii*, *R. uvariifolium*, *R. selense* subsp. *dasycladum* and *R. heliolepis*. Matti and Sten also brought me samples from above 4000 m (13,125 ft) to be photographed and identified.

On November 12, we started early in the morning, and Dennis was uneasy because a huge landslide had blocked the flow of the Yangtze River in Tibet and had made a temporary lake. The river was now almost dry and we did not want to be alongside the river or on any of the bridges when the natural dam collapsed. Some days later, it did break, and there was a huge water flow that destroyed many bridges.

After leaving the Yangtze valley, we drove alongside the Gangqu River (Blue River) in a canyon to the Bala Gezong Scenic Area, a famous tourist attraction for the Chinese; it's also known as the Grand Canyon of Shangri-La. The tourist center was huge and there were green tourist busses taking people up to the mountain.

We did not enjoy the loud Chinese narration of the guide nor the numerous long stops in parking lots on the way up. We asked Dennis what we could do about it and he arranged our own green tourist bus. After that we went quickly to the mountain top at 4120 m (13,520 ft). After a short field lunch, we went exploring for rhododendrons while our official Chinese guide stayed closer to the bus with Tom. We saw several low growing lepidotes, *R. cephalanthum* subsp. *cephalanthum*, *R. saluenense* and *R. rupicola*, and the elepidotes *R. aganniphum* and *R. sanguineum*, and also some hybrids between *R. sanguineum*, *R. aganniphum* and *R. phaeochrysum*.

In the late evening, we came to Deqen, where we stayed in the old town of Shangri-La, in a small log-built hotel with the special name of E-outfitting Boutique Hotel. A magnificent view opened from its balcony towards the evening-lit temple (Fig. 18). Shangri-La was a typical tourist town with numerous tourist shops, but I saw there one Western tourist, the only one on our whole expedition. I did not regard us as tourists!

**Xiaoxueshan and the Xilianpen Pass**

On November 13, we went by four-wheel drive SUVs to the Xiaoxueshan Pass at 3870 m (12,700 ft) and then a few km towards Hongshan on a rough and narrow road. We spent only 15 minutes at the pass as we did not see much interesting on the rough ground except for some *R. phaeochrysum*. Driving towards Hongshan, we stopped close to a mountain peak and studied the area for about 90 minutes at 3500 m (11,480 ft). We saw the elepidotes *R. vernicosum* and *R. phaeochrysum* and the lepidotes *R. yunnanense*, *R. racemosum*, *R. nitidulum*, *R. nivale* subsp. *boreale*, *R. trichostomum* and the interesting newly introduced small-leaved *R. xiaoxueshanense*.

The next day our objective was to go to the Tianchi Mountain lake at 3800 m (12,470 ft). At the beginning of the bumpy road, there was a locked gate, but we were able to remove the warning signs and logs placed at the side of the gate and so continued to drive. Unfortunately, this did not help us, as our journey stopped shortly afterwards as there were huge boulders piled up on the road. The road had been closed for the winter for the Chinese tourists!

We then changed the objective and drove northwest from Shangri-La towards Haba Shan for over an hour, before stopping at



Fig. 18. Evening view from our hotel balcony in Shangri-La.

the Xilianpen Pass at 3650 m (11,975 ft) to explore the area there. The terrain was open and there were many 0.5-1 m (1.5-3 ft) high lepidotes, and we identified *R. oreotrephes*, *R. hippophaeoides*, *R. rupicola* var. *chryseum* and *R. rubinigosum*. We could have spent more time there, but everyone began to feel the strain of the past three weeks, so we drove just to the other side of the pass to see if there would be any species not yet seen. We did not find any and after a field lunch, we returned to the hotel for our farewell dinner (Fig. 19).

**Kunming Botanical Garden**

After saying goodbye to my old and new friends, I flew from Shangri-La to Kunming and spent two extra days there. I did not visit common tourist attractions, but walked in the city streets, watching the way of life and visited the Kunming Botanical Garden run by the Kunming Institute of Botany. I was a bit confused as to the location of the Botanical Garden, as there is also a Kunming Botanic Garden in the city. The actual Botanical Garden is in Panlong, on the outskirts north of Kunming. I had printed out a Chinese web page of the Botanical Garden and it helped the taxi driver to get me there.

The Botanical Garden was really interesting with many beautifully layout plant groups, but as for rhododendrons, it was disappointing. The Rhododendron Garden was not established until 2009 and the species selection was very limited. Rhododendrons mainly from milder climates and evergreen azaleas were being grown there to attract local people. The most common species was *R. decorum*, planted in several places, and most of the elepidotes seemed to suffer from the heat at this lower altitude, i.e., below 2000 m (6560 ft).

Several hundred children had come by the busload to celebrate the botanical activity day and the noise in the park was absolutely horrible. One school group besieged me and the kids kept asking my name, my age and where I came from. A new generation is learning English in schools from their childhood and their enthusiasm was huge. I almost panicked as I did not know how to escape the children surrounding me. In the end, I asked if I could take a photo of them. Everyone pushed in front of me, leaving me an escape route to the back!



Fig. 19. Having a rest after our last field lunch.

## Epilogue

The trip to Yunnan was a wonderful and unique experience. For more than ten years I had dreamed of such an expedition and it was great to finally get to the mountains of Yunnan. I am getting older, but still I think I would be tempted to join a future expedition to Sichuan or Shaanxi as rhododendrons growing there should have a hardiness better suited to the climate of Finland.

Last, I would like to thank my companion travelers on the expedition again, as you all made it a great expedition for me!

The index page of the expedition is at www.rhodogarden.com/Yunnan_2018/Yunnan.html, and rhododendron species found on the expedition can be seen at www.rhodogarden.com/SNWYE_2018_Plants/. There are also many good photos from the expedition on Hans Eiberg's site at www.rhododendron.dk/alfabet.html.



Fig. 20. Schoolchildren on the botanical activity day. The teacher is the young woman with glasses in the back.

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*Love is like a beautiful flower which I may not touch, but whose fragrance makes the garden a place of delight just the same.*

–Helen Keller

# Companion Plants – Eastern North American Ferns

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(Reprinted from *Azalea Blooms*, the January 2020 newsletter of the ARS Azalea Chapter)

My first exposure to ferns was as a child living in a home where ferns were placed in containers and used as hanging baskets. Ferns are admired by many and these types of arrangements are fairly common today. In some cases the ferns are artificial, allowing decorative arrangements that do not require much care. I don't recall seeing ferns in the wild during my youth in Missouri. As an adult living in Georgia, I have seen many ferns in natural areas. Participating in the Georgia Native Plant Society's (GNPS) plant rescue program, I have had the opportunity to see many in their natural locations and to learn something about their growth habits.

I conducted a search of the ARS Journal archives and was somewhat surprised to find at least five articles which discussed the use of ferns as companion plants for rhododendrons and azaleas. One lady writer started using ferns as companion plants for her rhododendrons. After a period of time, she became so enamored with the ferns that she changed her plant focus to ferns and now considers rhododendrons as good companion plants for her ferns. While in this age not all of those interested in growing rhododendrons and azaleas have areas that can be classified as gardens, areas can be found around most homes for growing plants and the use of companion plants, including ferns, is appropriate.

There are several factors that determine whether a plant is a suitable companion for other plants.

**a) Environmental compatibility:** A companion plant should be able to thrive in the same environment as the host plant. This includes such factors as shade, soil acidity, moisture and drainage. Rhododendrons and azaleas grow best in moist fertile soil that is acidic and drains well. Most ferns thrive in such environments. On many GNPS plant rescues, ferns were found growing in close proximity to native azaleas.

**b) Focus:** Some plants such as floriferous shrubs put on blooms that take away focus from host plants. Such plants have limited use in a rhododendron or azalea garden. Mountain laurel, *Kalmia latifolia,* and peris, *Peris japonica,* both are considered excellent companion plants for rhododendrons but their bloom form and time do not compete with the rhododendrons in most cases. Ferns, while exhibiting good form, are not scene stealers. They complement other plants.

**c) Height:** Variation in height of the various plants in a garden serves to provide pleasing contrast. Plants with different heights permit better visibility. Ferns can be the same height as some lower growth forms of azaleas and rhododendrons. There is enough variability in the height of the various ferns used in cultivated areas to achieve pleasing height variance.

**d) Contrast:** To achieve textual contrast in garden plants, the practice of using plants with different sized leaves or plants with relatively large distances between blooms is frequently used. The leaves of many rhododendrons are quite large and generally have an elliptical shape. While the fronds (leafs) of many ferns are large as well, they provide contrast in shape to elliptical forms and the pinna (leaflet) portions of the frond add additional contrast. While azaleas have much smaller leaves in general, the same contrast exists.

**e) Color:** The use of plants with pleasing color combinations is critical in planning garden design. I recall, several years ago in the springtime, driving through some residential areas in the city I live near and observing the flora in bloom in the various yards. Springtime in the south offers the opportunity to see lovely southern azaleas in many locations. One home was surrounded by mass plantings of evergreen azaleas. They were all in bloom and apparently they were all the same cultivar as there was only a single color visible. Individually, the plants and color were beautiful but the masses of a single color left one feeling that the plants needed some variation in color. Most gardeners know that azaleas planted in mass are usually spectacular but there has to be some variation in color if planted in a large area. Most ferns are green in color and, as such, they provide some color variation to colorful azalea blooms. Many azaleas, when in bloom, have blossoms that completely cover their green foliage. This is not to say that the yard with the single color azaleas could be rescued with fern plantings but their use and the use of differently colored azaleas would definitely improve the scenery.

Ferns are different than the majority of plants. They are considered pteridophytes, a plant form that reproduces by spores. They have neither flowers nor seeds. There are over 10,000 species of ferns found worldwide with 400 species found in the US.

Over 80 fern species are native to Georgia. A group of plants known as fern allies also reproduce by spores but have distinctly different physical features. Ferns are described as vascular plants. A vascular plant is one with conducting tissue, which it uses to move essentials such as water and minerals to parts of the plant.



*Asplenium rhizophyllum.* Photo: Choess, Wikipedia.

The reproductive processes of ferns are complicated. They reproduce by both sexual and asexual means. The sexual method is by spores which in most cases form on the underside of fronds. Most ferns have two types of fronds. In many cases these two types of fronds, sterile and fertile, resemble each other. In many cases the fertile fronds are much narrower than the sterile frond. On some ferns the fertile frond is a leafless stalk. After the spores ripen they fall to nearby ground or are blown away to sites further away. In falling on favorable sites, the spores germinate, starting a process where both male and female organs are formed. Fertilization occurs between these organs and young new ferns are formed. Some authorities are of the opinion that the majority of the reproduction of ferns is vegetative with new plants being formed by rhizomes and other methods.

Fern rhizomes spread slightly above or below ground level. They form roots below and grow plants above. Some ferns form new plants on their fronds. These small plants fall to the ground and take root. Some species have fronds that produce bulblets that on reaching the ground grow into new plants. The walking fern, *Asplenium rhizophyllum,* creates new ferns from its frond's tips. When the tips touch the ground, new ferns develop. Thus the fern walks, hence its common name. The article following this one details how one can propagate ferns with spores.

Scientists report that ferns originated over 360 million years ago. While many of the current ferns don't date that far back, they have existed for millions of years in their present form. Most ferns are found in moist areas. It is estimated that 70% of the world's ferns are indigenous to tropical areas and the majority of the remaining 30% are found in temperate areas. Very few are found in arctic type areas. The diversity of ferns is present in tropical rainforests where hundreds of species can be found in relatively small areas. Several species live only in tropical areas but some live in both tropical and temperate areas. Ferns are diverse in size and other physical features as well as habitat. Some ferns are as small as a half of an inch( one+ cm) in length while some tree ferns grow to a height of 80 feet (24 m). Some ferns are climbing vines, some are epiphytes and live on trees and some float on water surfaces. Some even grow on rocks.

Being able to reproduce by spores has resulted in a wide distribution of some fern species. Some disjunct populations of ferns are likely the result of spores riding prevailing winds. This has resulted in small populations being found hundreds of miles away from larger populations. There are several of these disjunct populations in the US. Large populations of some ferns are found in west coast areas but only small populations of the same ferns are found in eastern states. Other such disjunct distributions including between different continents are found in the world, both north to south and east to west.



Sun loving ferns at Perimeter College. Photo: Author.

Some ferns that grow in open areas are called sun ferns. The late George Sanko, who was a professor at Perimeter College in Atlanta (now a college of Georgia State University) developed an extensive fern garden at the Perimeter College Native Plant Botanical Garden in DeKalb County. His fern garden has ferns from all over the world. One set of this population is a group that grows in sunny areas.

While ferns have limited economic value, their diversity results in some of them being used as food, medicine and soil conditioners. In the US, they are used extensively as ornamentals both indoors and outside in landscapes. In Asia, a small fern is used in rice paddies to convert nitrogen to a usable form by rice plants, increasing productivity.

There are many ferns of the world that have exquisite forms and growth habits.



*Osmunda cinnamomea.* Photo: Physics Major, Wikipedia.

The ferns used in supplementing host garden plants are somewhat limited in practice. This is likely because many gardeners prefer to use native plants which are more likely to thrive. Not all native ferns are adaptable as companion plants. The following set of ferns includes some of those used as companion plants for azaleas and rhododendrons. Most of these are native to Georgia and grow in natural areas near Atlanta.

### 1. Cinnamon Fern - *Osmunda cinnamomea*

Cinnamon fern is found in large areas of North and South America and Asia. It is found in most Georgia counties. It is a deciduous fern that gets its name from its cinnamon-colored fertile fronds. Its sterile fronds give the fern a statuesque appearance. As such, its usage is best as a specimen plant planted between or among comparable sized host plants. The frond's height range from a foot to five feet (-.3-1.5 m), with a width from 6 to 8 inches (15-20 cm). Plants in ideal settings will exceed these numbers. The fertile fronds are erect but shorter, growing up to 30 inches (76 cm). The natural habitat for cinnamon ferns are wet areas frequently near streams, so cultivated plants need to be monitored closely for adequate moisture.

### 2. Royal Fern - *Osmunda regalis*



*Osmunda regalis.* Photo: Christian Fischer, Wikipedia.

Like some other plants, the taxonomical classification of a set of ferns known as royal ferns has changed in recent years. Originally the species designated as *Osmunda regalis* consisted of four varieties, two of which were plants found in the Western World. These two have been reclassified as a new species, *Osmumda spectabilis* and *Osmunda spectabilis* var. *brasiliensis.* The latter, as its epithet would suggest, is found in Central and South America. The new designations do not have universal acceptance as most references continue to specify *Osmunda regalis* for the royal fern species found predominately in the eastern US. It is found in most Georgia counties.

Regardless of its designation, the ferns deserve the designation of royalty. Royal ferns are similar to cinnamon ferns in stature and habitat. It is one of the largest North American ferns found in non-tropical areas but not as large as the cinnamon fern. Fertile and sterile fronds found on royal ferns are similar but the fertile fronds are smaller at their ends where their spores appear. After the spores are released, this portion of the frond turns brown. The size and contrast to the lower portion of the frond results in an appearance of flowers. Because of this, the species is frequently referred to as a flowering fern.

The form and texture of royal ferns are unique, with large, rounded leaflets. The foliage is said to resemble plants in the pea family (*Fabaceae*) or leaves of locust trees. Use of royal ferns as companions for rhododendrons and azaleas is similar to cinnamon ferns. Its elegant leaf structure offers pleasant contrast to many shrubs. Royal ferns Should be grown is areas with more sun than most ferns but require adequate moisture.



*Adiantum pedatum.* Photo: Author.

### 3. Northern Maidenhair Fern - *Adiantum pedatum*

The most sought-after fern by GNPS plant rescuers is the northern maidenhair fern. This attractive deciduous fern grows naturally in the northern part of Georgia and throughout areas north to Canada. It has adapted to various environments but is found mostly in rich, moist, well-drained locations. The manner which its fronds grow is unique for ferns. The fronds grow up to 30 inches (76 cm) high and spread horizontally in a circular pattern. The fronds have a fine texture, frilly and delicate in nature. Its stems are wiry in form and are purple to black in color. The fern should be used in shady areas, perhaps in front of taller growing plants. Their fine texture enables good contrast to larger plants.

The southern maidenhair *Adiantum capillus-veneris* is found mostly in southwest Georgia and a few mountainous counties. Its range is mostly southern states across the entire US. It too is an attractive fern used in garden settings but its appearance differs from northern maidenhair ferns.



*Polystichum acrostichoides.* Photo: Author.



*Athyrium filis-femina.* Photo: Author.

**4. Christmas Fern - *Polystichum acrostichoides***

Christmas fern is a popular fern for several reasons. Perhaps the prime reasons are that it is evergreen, plentiful and grows in a lot of different areas. This fern is found across the eastern US, west to Texas and north to Minnesota. Large numbers of this fern are found in north Georgia and it is fairly abundant throughout the state but not in sandy areas in the southwestern counties. It is found in moist shady areas and frequently in less habitable areas. Its rugged constitution makes it one of the most common ferns in the areas where it is found. It is one of the most drought tolerant Georgia ferns. While considered an evergreen, only the sterile fronds remain green through the winter. Its lance-leaved fronds grow up to 3 feet (90 cm) in length and 4 inches (10 cm) wide under ideal conditions. Many plants found in the wild are much smaller. While many ferns exhibit delicate form, Christmas fern has a tough nature. Its fronds are described as having a leathery appearance. The fertile fronds form the central portion of the plant and are supported by a short stalk which is brown at its base but green at its ends. The shorter sterile fronds form a circle around the center of the plant. The plant's spores form on the upper third of the fertile frond.

Christmas ferns can grow in large groupings in the wild but are usually found in small groups of two or three plants. They can be used as border plants or plants fronting larger plants in gardens.

**5. Lady Fern - *Athyrium filix-femina***

This wide-ranging, deciduous fern is found throughout most of the temperate Northern Hemisphere. In North America, three species are recognized. The one found in abundance in the South is *Athyrium asplenioides,* designated as Southern lady fern. It is a 2 to 4 foot (0.6-1.2 m) plant described as lacy or lady-like. It is found in abundance in acid wet areas throughout Georgia and in states from New York to Texas and in between. It is called Lady fern, perhaps because of its feathery and graceful appearance, but its original feminine description was because of the inconspicuous way its spores grow on the frond.

Lady ferns make good garden plants because they are attractive and easy to grow. The make good border plants, can be used as understory plants for shrubs and do well in woodland settings. One source suggests using them as ground cover. Another use is in garden areas which get little attention and maintenance as they will persist without a lot of care. They will stand some sun but are best grown in light shade. They seem to withstand dry conditions better than other ferns. Forms with dark red stems are found on occasion but this does not appear to be a universal feature.



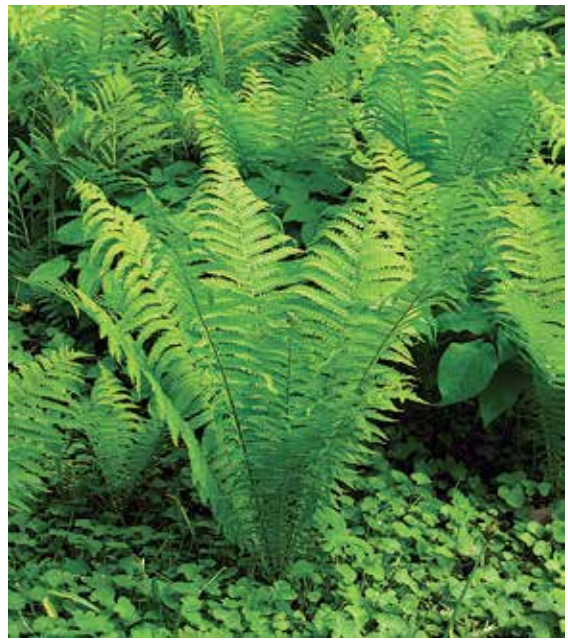
*Thelypteris noveboracencis.* Photo: Wasp32, Wikipedia.

**6. New York Fern - *Thelypteris noveboracencis***

New York fern is found in large numbers throughout our eastern states. Its distribution extends north into several Canadian provinces. In Georgia it is found mostly in northern areas. The ferns are also found in counties south to mid Georgia. In some areas large populations completely cover the ground and shut out the growth of other plants including trees. The fern releases a chemical that can kill other plants. The fern is said to be less aggressive in southern areas. The species is not a large fern. Its deciduous fronds range in 8 to 25 inches (20-64 cm) in length and up to 6 inches (15 cm) in width. The fern is used in woodland gardens, garden borders and the understory of larger plants.

It is often mistaken as lady fern because the two ferns have common growth areas and similar physical features. Their fronds have similar leaflets. Shortly after

becoming active in GNPS plant rescues, my mentor, the late Jeane Reeves, explained how to distinguish the two. The leaflets on the fronds of New York ferns taper significantly at both ends. She said the way to remember this feature is to recognize that "New Yorkers burn the candle at both ends."



*Matteuccia struthiopteris.* Photo: Wikipedia.

**7. Ostrich Fern - M*atteuccia struthiopteris***

Some of the *JARS* articles surveyed for this article indicated that the Ostrich fern is a popular companion plant for rhododendrons and azaleas. This fern is not native to the south. Distribution maps indicate that its natural range only goes as far south as Virginia and Missouri and that the majority of the plants range from Pennsylvania and Wisconsin north and west into Canada. The fern is also found in Europe and Asia.

It is an attractive fern that grows up to 4 feet (1.2 m) in cultivated areas and up to 6 feet (1.8 m) in ideal areas. It prefers wet areas in partial to full shade. It has green feathery fronds that resemble the plumes of ostriches. It is said to be intolerant of the heat and humidity of the South.

**8. Japanese Painted Fern - *Athyrium niponicum***

This fern, also known as Japanese lady fern, is native to eastern Asia. It offers some features that have made it popular in the US. A variety, *pictum,* is deciduous and has an arching habit and is widely marketed and used. It grows to a height of 18 inches (46 cm). Its fronds, which grow slightly longer, are triangular in shape. The outstanding feature of the fern is its variegated coloration. The fronds are grayish-green to blue green with maroon ribs that fade to a silver color at the ends of the leaflets. This unusual coloration appears in the spring but the fronds become greener as warm temperatures arrive. The ferns short stature and outstanding color make this fern an excellent companion plant. It is used in foregrounds and edges and is said to be an excellent container plant.



*Athyrium niponicum.* Photo: Derek Ramsey, Wikipedia.

**9. Goldie's Fern - *Dryopteris goldieana***

This fern, sometimes called giant wood fern, is native to Georgia but it is found only in the northeast corner of the state. Most natural populations of the fern are further north. The range extends into the provinces of Canada and extends in the west to Minnesota and states to the south to Arkansas. This fern has also been lauded in some *JARS* articles. It and the Ostrich fern are considered to be the largest ferns in the eastern US. This deciduous fern has thick textured fronds that have dark green coloration. Like the New York fern, Goldie's fern has fronds whose leaflets taper at both ends. The stem connecting the leaflets to the main stem are short. The frond's leaflets are divided into multiple parts that are oblong or elliptic in shape with a pointed tip and toothed edge. The fertile and sterile fronds are identical in shape. Spores form along the mid section of the fertile fronds.

**10. Interrupted Fern - *Osmunda claytoniana*** (Photo p22)

This fern is native to several northern counties in Georgia and is also said to have been found in Forsyth and Fulton Counties further south. Its North America range stretches from Georgia in the south to provinces in eastern Canada. It too, is a fern praised in some *JARS* articles. Its fronds grow up to 40 inches (one m) in length and spread to 8 inches (20 cm) wide. Its fronds are unusual in that the fertile leaflets occur in the middle of the frond, and hence the common name. In all other aspects the fronds resemble cinnamon fern sterile fronds. The fern is used in natural gardens as specimen plants. They are also used in habitat restoration projects. They have a colonizing habit that is useful in stabilizing slopes and controlling erosion.



*Dryopteris goldieana*. Photo: Wasp32, Wikipedia.



*Osmunda claytoniana.* Photo: Wikipedia.



*Onoclea sensibilis.* Photo: Emily B. Sessa.



*Woodwardia areolata.* Photo: JK Marlow.

**11. Other ferns worthy of consideration**

Several other ferns that grow that naturally in Georgia are interesting and some could possibly be considered for use as companion plants. Some of those found on GNPS plant rescues include:

a) **Sensitive fern** - *Onoclea sensibilis.*

This coarse, deciduous fern can grow to 4 feet (1.2 m) but is usually about 2 feet (0.6 m) tall in the wild. It has leathery triangle shaped leaflets with netted veins. Its fertile fronds are shorter and stand erect. Use sensitive fern either as a specimen in a mass planting or as a groundcover around water or in wet areas. It grows in many locations, but it prefers wet soils and partial sun. It can be aggressive.

b) **Netted Chain Fern** - *Woodwardia areolata.*

Netted chain fern and sensitivefern have very similar fronds and are sometimes difficult to distinguish from each other. Sensitive fern has wavy blade margins, while netted chain fern has tiny teeth along its margins. Also, sensitive fern frond segments are opposite along the stalk while those of netted chain fern tend to be alternate. Netted chain fern pops up quickly in the spring. It is a good choice for a moist, partially shaded garden. It spreads slowly and is easy to keep within bounds.

c) **Ebony Spleenwort** - *Asplenium platyneuron.*

This fern is very adaptable and easy to cultivate. It grows equally well in clay soils, woodlands, dry forests, or in rock crevices**.** It is a pioneer plant, easily establishing in cleared sites. This evergreen fern is found throughout Georgia.

d) **Broad Beech Fern** - *Thelypteris hexagonoptera.*

It prefers dappled sunlight to medium shade, moist to dryer conditions, and a somewhat acid soil with abundant organic matter. Broad beech fern makes a large 3' (0.9 m) wide deer-resistant clump in just a few years. It is easily recognized because its fronds which are wide spread at the base.

e) **Hairy Lip Fern** - *Myriopteris lanosa.*

Its leaves and stem are lightly covered in hairs hence its common name. It is frequently found in shallow, dry, soil, often in rocky habitats. Its rocky growth habit makes it a good candidate for rock gardens.

f) **Resurrection Fern** - *Pleopeltis polypodioides.* (Photo p23)

This fern grows on oaks and other trees with rough bark. It also grows on rocks, building roofs, and rotten wood. While considered an evergreen, in dry periods its fronds dry up and remain comatose until rains occur.

g) **Rattlesnake Fern** - *Botrypus virginianus.* (No photo.)

This fern's color is light green. It comes up in early spring and lasts until late fall.



*Asplenium platyneuron.* Photo: Richard and Teresa Ware:



*Thelypteris hexagonoptera.* Photo: JK Marlow



*Myriopteris lanosa.* Photo: Emily B. Sessa



*Pleopeltis polypodioides.* Photo: Author.

Its leaves are triangular shaped up to 10 inches (25 cm) long and 12 inches wide (30 cm). It gets its common name because it frequently grows in places where rattlesnakes are found.

h) **Grape Fern** - *Botrychium biternatum.* (No photo.)

This evergreen fern is found in thickets, stream banks and drier woodsand fields. It sends up a new frond in fall which then dies back in spring. Rattlesnake fern, which looks similar to grape fern, comes up in the spring and dies back in winter. It turns a bronze color after frost.

**Another fern**

Any discussion of ferns should mention the bracken fern, *Pteridium aquilinum.* This fern has the widest distribution of any fern. It is found on all continents except Antarctica and all habitats except deserts. It is a pioneer plant that adapts to diverse environments and spreads rapidly at the expense of other plants, as it releases a chemical which prevents other plants from establishing. The primary way that bracken ferns spread is by underground rhizomes that can be up to 3 feet (91 cm) in depth. It also spreads by spores.

At one time this fern was considered a valuable plant, and was used as fertilizer, bedding for animals and in the making of soap and glass. It has since lost favor as it is toxic to livestock and other life forms, and may cause cancer in humans. Nevertheless, it is used for food in some places in the Orient, and it has been suggested that its use in Japan accounts for the Japanese having a high level of stomach cancer. It is not recommended for cultural uses.

*Ken Gohring is a member of the Azalea Chapter and a frequent contributor to JARS.*

*"We treat plants like pieces of jewelry, fine dresses, and designer shoes…Instead of celebrating plants as part of the global community, highlighting what each can do for life beyond our own visual pleasure, we focus exclusively on a new leaf color or a new bloom….plants are far more than a visual commodity. Simply put plants are not art. What we do with them, how we honor their life processes as part of creating ecological function—that is art."*

~Benjamin Vogt, *A New Garden Ethic*

# What can a Rhododendron Teach Us About Robotics?

Laura Castañón
Senior Science Reporter
News @ Northeastern
Boston, MA

Photos by Matthew Modoono,
Northeastern University

(Reprinted from News @ Northeastern Homepage, March 27, 2020)

On a chilly winter day, Moneesh Upmanyu took a walk with his son near their home outside of Boston. They passed a rhododendron bush, its thick green leaves curled up into thin tubes dangling limply from their stems. It looked dead or dying.



Moneesh Upmanyu, professor of mechanical and industrial engineering at Northeastern University.

But when Upmanyu, a professor of mechanical and industrial engineering at Northeastern, walked past the spot a few days later, on a warmer day, the plant seemed to have revived. The leaves were spread out flat and lifted upwards towards the sun. His son had one question: Why?

"I didn't have an answer," Upmanyu says. But he decided to find out.

Upmanyu studies the structural properties of different materials and how they respond to stimuli, for use in things like microelectronics or robotics systems. In a recent paper featured on the cover of this month's "Journal of the Royal Society Interface," Upmanyu and his colleagues examined the mechanical aspects of how rhododendron leaves curl and droop.

"In robotics, with microelectronic devices, you want to design switches which can make contact and disconnect just based on some stimulus, like temperature, light, or even touch," Upmanyu says. "This sort of understanding is quite important for designing smart, active structures."

In this particular instance, it comes down to the movement of water, Upmanyu says. When temperatures drop, water moves from the petiole into the leaf, causing the stem to droop. The water is distributed through the leaf unevenly, and as it freezes, it causes the top of the leaf to expand and the underside to contract. This makes the leaf start to curl.

If that were the end of it, though, the leaf would curl uniformly downwards, resulting in an upside-down cup shape. What causes the leaves to roll into a tight cigar are their stiff spines, or midribs, that run down the center of the leaf, says Hailong Wang, lead author on the study and a professor at the University of Science and Technology in China.

"The leaf cannot bend in a dome-shaped hemispherical structure—it has to bend only along one direction, which the stiff midrib picks," says Wang, who received his doctorate from Northeastern in 2010. "The curvature develops only along one



Rhododendron leaves roll into a tight cigar shape when temperatures drop in winter.



Understanding why these leaves curl could help researchers design smart, folding structures and electronics that respond to temperature changes or other stimulation.

direction, but it's amplified."

When the researchers cut strips from rhododendron leaves, separating them from midrib, they curled and twisted loosely in all directions. But with curling restricted by the midrib, those forces are redirected into just one direction, causing a much tighter curl.

"That was a surprise to me," says Erik Nilsen, an ecologist at Virginia Tech who collaborated on the study. "I thought the motor force for moving was horizontal on the leaf, because the leaf curls from the edges down."

The biological reason for this curling, Nilsen says, is to help these plants survive in winter.

Rhododendrons retain their green leaves throughout winter, despite growing in tough, alpine conditions. As the deciduous trees around them lose their leaves, extra sunlight reaches the rhododendrons. But in the coldest weather they can't use it—their metabolism shuts down.

"So they're taking in radiation and they don't have the biochemical mechanisms to shuttle that radiation into photosynthesis," Nilsen says. "They have a lot of energy coming into the leaf and nothing to do with it."

That radiation can damage the leaves. By curling and drooping, rhododendron leaves drastically reduce the amount of sunlight hitting them when they can't use it.

This may also help them thaw slower after a frost, Upmanyu says. If the leaves thaw and uncurl too quickly, frost needles could puncture and damage the surface of the leaves.

Understanding how these mechanisms work in rhododendrons could potentially help scientists to engineer crops that are more resistant to cold weather. But Upmanyu is also interested in how these same principles can be applied to engineering.

"I'm interested in how sheets change shape and how we can program smart structures, and nature often offers robust strategies waiting to be exploited," Upmanyu says. "This was a beautiful example of a reversible shape-change, where water movement driven by temperature was a stimulus.

**Reference**

Wang, H., E.T. Nilsen and M. Upmanyu. 2020. Mechanical basis for thermonastic movements of cold-hardy Rhododendron leaves. *J. Royal Society Interface*, 11 March 2020 https://doi.org/10.1098/rsif.2019.0751

https://news.northeastern.edu/2020/03/27/what-can-a-rhododendron-teach-us-about-robotics/

*Dr. Moneesh Upmanyu, professor of mechanical and industrial engineering, is studying how and why the leaves of rhododendron plants*

**Support Rhododendron Research by Contributing to The Research Foundation of the American Rhododendron Society**

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- **Please include your name, address, and contact information.**

**Please mail all of the above information to:**

**Perc Moser, Treasurer, ARS Research Foundation, 301 Caversham Rd, Bryn Mawr, PA 19010**

# Society News

## Awards

### Niagara Region Chapter of the RSC

### Bronze Medal: Wanda Yarmoshuk

For over a decade, Wanda Yarmoshuk independently fostered the social aspect of Niagara Chapter meetings. By expanding the complementary coffee at meetings to a full-on refreshment bar, she cultivated a warm and welcoming milieu that encourages mingling and conversation, new friendships and networking. She has been an unfailing support to her husband, Nick, in his various Chapter functions and with their beautiful rhododendron garden. Less known is Wanda's role as the Chapter's hostess; for years "Hotel Yarmoshuk" hosted the overnight stays for guest speakers, arranged tours and dinners. We honour Wanda Yarmoshuk for her unstinting and gracious contribution to the Chapter's well-being and success as we award her the Chapter's Bronze Medal for 2020, the highest award the Chapter may confer independently.

## In Memoriam

### Scotland

**Tricia Cox**

Tricia Cox, wife of Peter Cox, died in May, 2020. She was born in Cork, Ireland, and was studyied horticulture there and in England. She ran an apple orchard in Douglas, Cork, during her formative years and gained her interest in horticulture from her uncle, Geo Sherrard, a respected figure in the Irish horticultural world. His collection of rhododendrons at the family home at Maryborough House brought her to Glendoick in the early 1960s as she searched for plants and advice. There she met her husband-to-be, Peter Cox, who ran the Glendoick nursery along with his father, Euan.

Tricia and Peter were married and moved to Scotland in 1963, where their family grew with two sons, Kenneth and Raymond. In the early 1970s after much research, Tricia and Peter opened one of Scotland's first gardening centers, Glendoick, which opened first as a small shop. Their business expanded over the years, and Tricia ran the garden center as well as enjoying a career advising and designing gardens all over the east of Scotland. She also travelled with Peter on several plant hunting expeditions to India, China, Chile and again back to India.

Her semi-retirement occurred in the late 1980s and many of the garden duties were turned over to Kenneth, although Tricia continued designing gardens, among which was the popular Pagoda Garden at the Glendoick Nursery. She is survived by her husband, Peter, two brothers, her sons Ken and Raymond, and five grandchildren.

### Olympia

**Paul Marvin Rogers**

Paul was a hard-working, genial man who treated people fairly and thoroughly enjoyed talking to people, especially if they were buying his rhododendrons and Japanese maples. People loved his sense of humor, and the only thing that caused him to show any anger were those pesky root weevils. He would always say that it was Art Zabel's "fault" that he became interested in rhododendrons, because Art would open his Olympia rhododendron garden to the public the whole month of May.

Paul was able to bring his love of rhododendrons to others in various projects associated with the Olympia Chapter. He participated in numerous chapter-sponsored community events, such as the show at Tumwater Falls Park and the planting of rhododendrons at the Thurston County Fairgrounds. When our Olympia Chapter took the lead in hosting the 2013 ARS Convention in SeaTac, Washington, Paul coordinated the tours. He was also responsible for bringing many new members into the Olympia chapter and had a definite love of species. He was a generous giver of plants for the chapter auctions and raffles, and he delighted in talking about rhododendrons, introducing himself to newcomers and making them feel welcome

To say Paul will be missed is an understatement. He did it "His Way"!

Connie Klein

### Eugene

**Leonard Frojen**

The Eugene Chapter lost a valued long-time member with the passing of Leonard Frojen on April 13, 2020. Leonard was born and raised in Portland, Oregon and served in the Army before attending the University of Oregon in Architecture. He was interested in everything, including sports cars, sailing, and, eventually, gardening, joining the ARS in about 1980. At one time or another Leonard served on all the committees of the Eugene Chapter of the ARS and was a long serving Board member and Show Chair (and often a winner!). In 2005, he was awarded the Bronze Medal in recognition of his work on behalf of fellow members and rhododendrons. He was a fixture at all the meetings and, with his wife Carmen, attended many of the ARS Spring Conventions and Fall Regional Conferences. Throughout his chapter membership, Leonard sought to learn as much as he could about the genus *Rhododendron* through study groups, reading, attending programs, and he loved to share his passion with fellow members. Leonard will be missed by all his friends in District 4 and our condolences go out to Carmen.

## Research Foundation Update

The Research Foundation announces changes in its Board of Trustees.

At its meeting on May 27, 2020 via videoconference the Board of Directors of the ARS approved the reappointment of Mike Stewart and Karel Bernady, as trustees for terms ending May 2023.

With these appointments the Board of Trustees will be constituted as follows:

1. Harold Greer, for term ending May 2021
2. Perc (Percival) Moser, Treasurer of the Research Foundation, for the term ending May 2021
3. Harold Sweetman, Chairman of the Research Committee, for term ending May 2022
4. H.C. (Bud) Gehnrich, for term ending May 2022
5. Mike Stewart, for term ending May 2023
6. Karel F. Bernady, Chairman, for term ending May 2023
7. Ken Webb, President of ARS, *ex officio*, for term ending 2021

We welcome to the Board our two returning members.

Karel F. Bernady, Chairman
June 2, 2020

## American Rhododendron Society
## Board of Directors Meeting
## Wednesday, May 27, 2020 via Videoconference.

**Brief Summary of Discussions and Decisions**
Update: June 3, 2020

President Ken Webb welcomed us to the first videoconference of the ARS BOD that included 27 members and guests from Canada, the US and Denmark.

Jim Sharpe of the Nova Scotia 2021 Convention Planning Group gave an overview of plans for June 2021. He welcomed suggestions to address the possibility of the virus still being active and how attendees would manage physical distancing.

The Board of Directors approved the following:

- **Financial Statements and Budget** for 2020-2021

- **Second Reading of a Bylaw Amendment** replacing the term “Executive Director” with the term “Office Administrator”

- An amendment to the **Honors Committee Policy** of the Board that would clarify the number of silver and gold medals that may be awarded in any given year. Nominations that exceed the limit will be forwarded to the following year for consideration. In response to a concern that very deserving members may be missed, we were assured that the Executive Committee may increase the number of medals on the recommendation of the Honors Committee.

- **First Reading of a Bylaw Amendment (now known as the Covid-19 Amendment)**
  That in Article VI, Section D, we remove the words “*Not more than one Board Meeting per year may be held by electronic means*” and replace with “*Board Meetings may be held by electronic means at the discretion of the Executive Committee”.*

- **Research Foundation Appointments:** Mike Stewart for a term ending May 2023
  Karel F. Bernady, Chairman, for the term ending May 2023.

- **Endowment Committee** Recommendations to award $3,300 US to the Brueckner Test Program and $3,000 to the Victoria Chapter for the Jim Barlup Display Garden and Norman Todd Propagation Centre.
- **ARS Next-Gen Project** approval of the name “ARS-Next Gen” and Logo.

**Seed Exchange Program**
With the retirement of Norm Beaudry, the ARS is in discussions with a group to take over this important work.

**Hirsutum Website**
Efforts are still underway to assume the information and data of the *hirsutum* website.

**Hybridizer Project**
Several members will explore possibilities to protect the notes and information of hybridizers.

**Chapter Newsletter Editors** and others were commended for providing the “virtual glue” that is holding us together with photos, contests, etc.

**ARS Fall Conferences:** Chapters are needed to organize Fall 2022, 2023 and 2024.

The **Report of the Rhododendron Research Network** has a wealth of useful information and resources that is available to all.

Linda Derkach, Secretary

# Ladybug, Ladybug, Don't Fly Away Home

Don Smart
Carnation, WA



First of all, ladybugs are not bugs, which are hemipterans, but beetles in the family *Coccinellidae*. They are known by various names-lady beetles, ladybug—beetles, and ladybird beetles.

The reason why you do not want them to fly away home is because they are voracious eaters of aphids and other soft-body insects many of which are plant pests. If they can't find other food, they are even cannibalistic and may eat each other. During their lifecycle, as larvae and adult, a ladybug can eat as many as 5000 aphids. Adults can live two to three years.

Ladybugs progress through a four-stage life cycle known as "complete metamorphosis":

1. Embryonic Stage (Eggs)

An adult female ladybug, (yes, there male and female ladybugs, but the males are not called manbugs), will lay 10-50 eggs on the underside of a leaf on a plant that has food for her offspring.

2. Larval Stage (Larvae)

Three to four days after the eggs are laid, the larvae emerge and look like miniature alligators. Right away, they begin eating soft-shelled insects. If food is not readily available, they may eat some of the unhatched eggs. During their 3-4 weeks as larvae, they will eat up to 300 aphids.

3. Pupal Stage (Pupae)

During the pupa stage, which lasts several days, they attach themselves to the plant and are inactive. During this stage, the larvae are going through a metamorphosis into an adult ladybug.

4. Imaginal Stage (Adult Beetles)

Adult ladybugs are not all red with black spots. In North America, alone, there about 500 different species, each with a different coloration and/or spot patterns. An example is the photo above of a "Twice-stabbed ladybird beetle" *Chilocorus stigma*.

So, if you are lucky enough to have these hungry little beetles in your garden, welcome them whether they are larvae or adults.



Ladybug getting ready to eat aphids. Photo: Caren Keshishian.



Ladybug larvae. Photo: *The Advocate*.



'Twice-stabbed ladybird beetle' Photo: Diane Timmons.

**References**

Hadley, Debbie. "The 4 Stages of the Ladybug Life Cycle." ThoughtCo, Feb. 17, 2020, thoughtco.com/the-life-cycle-of-ladybugs-1968141. https://ladybugplanet.com/what-do-ladybugs-eat-in-the-wild-or-in-homes-a-helpful-guide/

https://dengarden.com/gardening/Ladybugs-They-Can-Keep-Your-Flowers-and-Plants-Pest-Free

Source: https://www.theadvocate.com/baton_rouge/entertainment_life/home_garden/article_6a78e220-68c8-11e7-905b-2b980716d33b.html

'Garden News: They're not pretty, but don't kill the ladybug larvae.'
By Lee Rouse | Special to *The Advocate* JUL 20, 2017
Contributed photo.

*Don Smart is a member of the Seattle Chapter and is the Associate Editor of JARS.*

# A Seed Growing Primer

Sharon Bryson
Maryvale, NS,
Canada



Photos by author.

My late husband Bill Wilgenhof and I have been growing from seed for many years, rather a daunting number when tallied, but we had been tapering off our efforts in the last few years. After years of administering the annual Atlantic Rhododendron and Horticultural Society (ARHS) Seed Exchange, we thought it might useful to describe our seed propagation procedures. We realised that many ARS members are very accomplished growers, so some of the following may be "preaching to the converted."

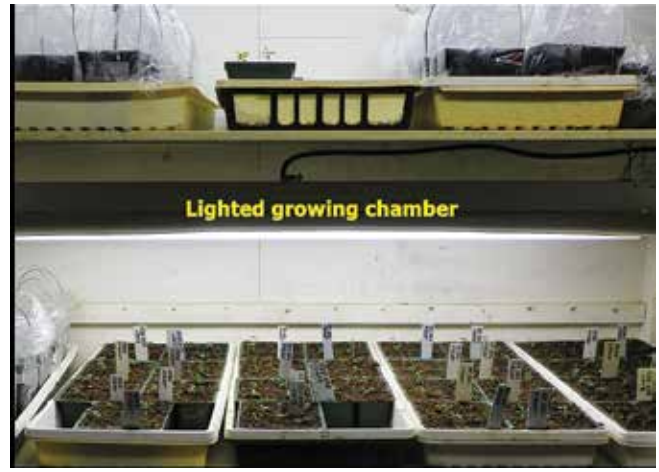



Fig. 1a. Setup for the seedling growth.

Growing a wide range of plant material from seed serves many purposes which might not be immediately appreciated. In particular, there is certainly a great sense of pride and satisfaction in being able to produce your own plants, not to mention the economic aspect of saving money by not having to buy already established plants. Seed sources can be quite varied. Our own ARHS Seed Exchange and the ARS Seed Exchange are obvious sources, but many others exist. Over the years we had acquired many interesting seeds from other societies, specialty seed houses and personal collecting, and everyone can also do this.

Seed growing requirements are fairly basic.

- A modest indoor lighting set up (Fig. 1a). Propagation trays and seed packs, standard sizes optimize space.
- A quality soil-less starting mix, pre-done or custom mixed. (Fig, 1b)
- Garden nursery bed space for growing on outdoors. (Fig 1c)
- A modicum of patience.




Fig. 1b. Growing mix.

**Understanding Seeds**

Not all seeds are created equal, There are huge variations in the way seeds of various species perform, and so we needed to emulate "Mother Nature" as much as possible to get the best results. There are the ephemeral seeds which ripen very early in the season and need to be planted right away. The typical warm germinators that will stand storage are the easiest to grow. Then there are many that require a period of cold stratification, which requires the seed to be sown in damp medium, be maintained in a humid environment, and then be held for a period of a few to many weeks in the refrigerator to simulate a winter. Germination is then expected after bringing the seed pack out of the cold and exposing it to warmth and light. However, there are again, many variations in the actual time to realise germination.

Germination information is now very accessible, and there are a variety of online data bases which cover almost every variety of seeds one would wish to grow. Those of worthy mention are from the Ontario Rock Garden & Hardy Plant Society, the Missouri Botanical Garden and Gardens North. Many commercial seed catalogues also come with quite good germination information.




Fig. 1c. Nursery bed.

**Record Keeping**

One aspect of growing plants from seed which might be neglected is the importance of record keeping. Knowing what was planted, when and the subsequent result is very useful if the results are to be either improved or repeated. Documenting data in computer files, an old-fashioned notebook, or a printed list are all ways to keep track. My favourite for many years has been an Excel file which I title "Planting Calendar," with the year attached. In Excel it is possible to have successive years all

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| grow | cold / warm | Planting Calendar 2006 | | | | | | | | |
| ± | Plant Date: | Planted | | To Transplant Next * | | | NEXT | | | |
| | ' week of ' | Name | Treatm't | Germination Notes | Transplant Date | ~ No. | Harden Off Record | Plant'g Site | Source | |
| 19 | warm | Lilium philadelphicum var. philadelpohicum | Press into soil at 20C. Germ. In ~ 2-12 wks & more | to fridge ~Apr15 | | | | Nursery Bed Annex | Gard.North | |
| 20 | warm | Lilium pumilum | Press into soil at 20C. Germ. In ~ 1-3 wks & more | up Feb19 | | | red bloom, 2007 | Nursery Bed Annex | Gard.North | |
| 21 | warm / cold | Lilium speciosum album | Delayed HYPOGEAL- warm for ~3 mos. Then cold for ~3mos. Back to 20C for shoots | sprouted! | | | bloom, late 2007 | Nursery Bed Annex | Gard.North | |
| 22 | warm / cold | Lilium superbum | Delayed HYPOGEAL- warm for ~3 mos. Then cold for ~3mos. Back to 20C for shoots | to fridge ~Apr15 | | | | Nursery Bed Annex | Gard.North | |
| | Feb12th / cold | Aquilegia bertolonii(Blue Berry) | 8 wks cold( -4 to +4) or outdoors overwinter | sunporch, few sprouted. Neglected! | | | | | Gard.North | |

2012 Plant'g | 2011 Plant'g | 2010Planting | 2009Plant'g | 2008Plant'g | 2007Plant'g | 2006Plant'g | 2005Plant'g | 2004Plant'g | 2003Plant'gCel...

Fig. 2. Planting Calendar.

in the same file, or a new worksheet for each year. Each worksheet is easily customized with as much information as you require (Fig. 2).

An extension of this record keeping is actually labelling plants once they go into the nursery area or garden beds. We had labels for in ground use comprised of strips of vinyl siding cut to desired sizes and labelled at both ends (Fig. 3). Writing on the end that resides in the ground will resist fading should writing on the upper part fade in the sun. Finding a fade proof marker has been an ongoing challenge. The labels used on the plant as it gets larger are wired aluminum tags that are embossed with a pen. These last almost indefinitely, but may need to be moved on the plant as it gets larger. We have sometimes coupled them with a piece of vinyl to help their visibility in the tree or shrub.

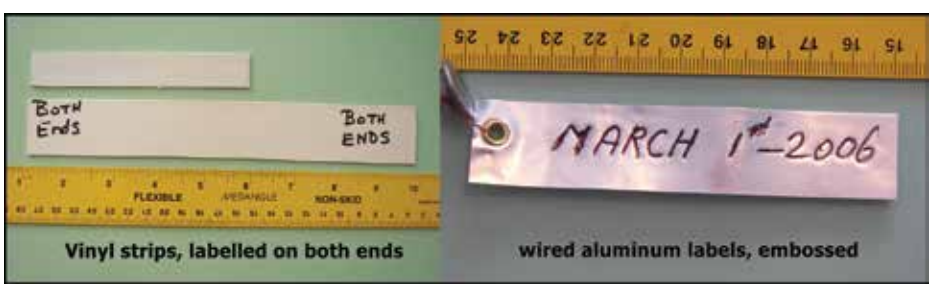



Fig. 3. Labels.

**Seed Selection**

Choosing what seeds to grow always involves a bit of decision making. Looking at the choices typically available from our Seed Exchange list, I will outline a few procedures for the various categories.

**Rhododendrons and Azaleas**

Seeds will be available either as species or hybrids. Species seeds usually give progeny very similar to the seed parent, while seeds of hybrids are infinitely variable and results can reflect qualities from both parents. Knowing the objectives of the hybridizer that produced the seed is often useful, if available. Open-pollinated seed, where pollen source is unknown, is again quite variable, but may produce fine plants. As a rule, azaleas will be a bit quicker to grow and flower than rhododendrons.



Fig. 4. *R. maximum* seedpod.

**Seed Collection and Sowing**

- Seed pods are dark when ripe.
- Dry them inside in a container.
- Dry pods may split naturally, but if not, split them manually.
- Separate seed from chaff (pod husks).
- Store the seeds in a sealed, leak proof envelope.
- Sowing seed in late autumn ensures plants will be big enough for their transfer to the outdoors by late spring.
- Surface sow seeds on damp peaty soil in an enclosed environment.
- Maintain 100% humidity in the enclosed container until there are one to two sets of leaves present.
- Transplant the small plants to small pots or cell packs.

- A second transplant of the plants may be necessary as they grow larger.
- Harden off the little plants that have one to two sets of leaves in June.
- Move the potted plants to a nursery bed or cold frame, mulch them and keep them damp.
- Shade the rhododendron and azalea seedlings throughout the summer to prevent their overheating and sunburning the leaves.
- Provide some protection during their first winter, as necessary.

**Spring Duties In The Second Year**

- Add more mulch around the seedlings (Fig. 5).
- Redo the labels, if necessary.
- Throw out poorly performing plants.
- Fertilize modestly.
- Nip the tops of baby azalea plants to encourage their branching.
- Pinch off the top vegetative shoot of elepidote rhododendrons to encourage their branching.
- Maintain appropriate moisture levels

Four species that have given us very good results. (Fig. 6)

The feature characteristics of growing rhododendrons that are hybrids are only partly predictable. Species X species, hybrids X species and complex hybrid X hybrid crosses often create pleasant surprises in their progeny. One of the very best new plants we grew resulted from *R. degronianum* subsp. *yakushimanum* 'Exbury' X *R. pachysanthum* RSF 78/064, which we dubbed 'Blue Heaven'* (Fig. 7). Often a cross between a hybrid and a species will produce a plant with some of its species characteristics as well as some features of the hybrid seed parent. Such is the case where *R. pachysanthum* is used as the pollen parent (Fig. 8, a-c). Here in northern Nova Scotia, the species isn't hardy enough to survive, but the offspring of several crosses with it have proven to be very hardy, with all exhibiting some of the characteristics of both parents.



Fig. 5. The small rhododendron nursery.

Another propagated plant which is of our particular favourites is one we called 'Sproeten'* (Fig. 9), from the cross 'Barbara Cook' X 'Janet Blair', and while we weren't sure of the hybridizer's desired objective, we loved the result. This seed



Fig. 7. aka 'Blue Heaven'* 1686



Fig. 8a. 'Henry's Red' X *R. pachysanthum* cross.



Fig. 8b. 'Janet Blair' X *R. pachysanthum* cross.



Fig. 8c. 'Calsap' X *R. pachysanthum* cross.



Fig. 6. (left-right) *R. dauricum* var. *nana*, *R. minus*, *R. luteum*, *R. cumberlandense*.



Fig. 9. aka 'Sproeten'*.

grown plant was propagated by Van Veen and subsequently was made available to our ARHS members.

Hybridizers' objectives in their crosses are often mentioned in a Seed Exchange's information, or are at the very least implied by the characteristics of the parent plants used. The objective to make better yellow hybrids (hardy with a clear yellow) has been a favourite theme by hybridizers for many years. Both hardiness and regional dependability are qualities hoped for, and here are four of many that have materialized over the years that do well in the Canadian Maritimes (Fig 10).

Growing from Open Pollinated (OP) seed is sometimes frowned upon, but like all OP seed grown plants, there are sometimes nice surprises (Fig. 11).



Fig. 10. (L-R) 'Janet Blair' X 'Sun Spray', a complex 'Cat's Pajama' cross, ARS 96#887, and one of several from ARS 92#608.



Fig. 11. Four surprises - (L-R) 'Peaches OP', Moonshot (OP), Jenny Tabol (OP), "608"(OP) aka "Big White".



Fig. 12. *R. arborescens* X *R. cumberlandense*.

Azaleas grow faster than elepidote rhododendrons, and often bloom about their third year.

We have often said there is no such thing as an ugly azalea, so growing almost any azalea seed is liable to yield lovely plants. One can, of course, narrow the choice for color, time of bloom and so on. The native azalea species provide an interesting selection to give plants which extend bloom time much later than the typical June bloom season.

One lovely plant we grew is *R. arborescens* X *R. cumberlandense*. (Fig. 12)

* - not registered.

*Sharon Bryson has been gardening in Nova Scotia for the last 46 years, and as a member of the RSC Atlantic Region ARS Chapter, has administered the Atlantic Rhododendron & Horticultural Society's Seed Exchange for over 17 years. With her late husband Bill Wilgenhof, they have grown many rhododendrons and azaleas plus a myriad of other plants (mostly from seed) at their "Willow Garden" property, where visitors are invited to visit either in person or on the web (https://willowgarden.net).*

# "Rhododendrons Down East: Exploring the Atlantic Region"- The ARS Spring 2021 Convention

Jim Sharpe
Co-Chair,
ARS 2021
Convention



Come to the American Rhododendron Society 2021 Convention, titled "Rhododendrons Down East: Exploring the Atlantic Region," which will be held at the Old Orchard Inn near Wolfville, Nova Scotia, Canada, June 2-6, 2021.

It has been a very challenging time for convention planning as all planning meetings with more than five people have been disallowed due to current Covid-19 State of Emergency rules. We are continuing with the planning though, as we expect travel restrictions to be lifted later this year and hopefully everyone will feel comfortable travelling again by the Spring, 2021.

Several international speakers are confirmed, including Ken Cox from Glendoick Nursery in Scotland to speak on the history of Glendoick and woodland gardens; Kristian Theqvist, President of the Finnish Rhododendron Society to speak on "Hardy Rhodos and Gardens in Finland"; and Joe Bruso from New England to speak on "Breeding Hardy Rhodos". We also will feature talks on rhodo cultivation in the Atlantic Provinces with John Weagle speaking on the history of rhodo culture in Nova Scotia and a panel discussion on what makes successful rhodo gardens in both Newfoundland (Todd Boland) and New Brunswick (Dianne McLeod).

We are busy propagating rare and unusual rhodos for our plant sale. Tours being considered include visits to local gardens, including the Kentville Research Station and the Grand Pre UNESCO World Heritage Landscape, and trips farther afield to Annapolis Royal and the Peggy's Cove coastal barrens. We will also have a welcoming lecture from a Mi'kmaw educator Gerald Gloade on the Kluscap Legends, which explain the landscape of Mi'kma'ki, the traditional and current territories of the native indigenous Mi'kmaq people.

We welcome you to join us for our East Coast Hospitality and meals, which will include local food, cider, wine and seafood, including a lobster banquet. Please consider coming to Nova Scotia from June 2-6, 2021.



Annapolis Valley, Nova Scotia.



Old Orchard Inn.

*Nature will bear the closest inspection. She invites us to lay our eye level with her smallest leaf, and take an insect view of its plain.*

-Henry David Thoreau

# Rhododendrons for Beginners: Elepidotes in Subgenus *Hymenanthes*, *Section Ponticum*, Subsections *Argyrophylla*, *Neriiflora*, and *Pontica*

Glen Jamieson
Parksville, BC,
Canada



(Photos other than those from Harold Fearing are from Hirsutum.info.)

Species of *Rhododendron* in subgenus *Hymenanthes*, section *Ponticum*, are the plants that most people recognize as rhododendrons, being evergreen with relatively wide, leathery leaves. In previous articles, I discussed species in section *Ponticum* subsections that had relatively large numbers of cultivated species (*Fortunea, Falconera, Grandia,* and *Taliensia*), and here I discuss species in the remaining subsections that also have a relatively large number of species in them, i.e., *Argyrophylla, Neriiflora,* and *Pontica.* Species in these subsections are not particularly closely related, with species in first two found in southeast Asia and species in *Pontica* very widely distributed, being found from Japan across Siberia to Turkey and in both eastern and western North America.

There have been no JARS articles written specifically about most of the species in each of these three subsections, although some articles (e.g., Hardy 1985) have singled out species in the different subsections for some of their desirable features, notably their indumentum, hardiness, small size and resistance to weevils in hybridizing. Other articles (e.g., Smith 1994) showcase specific gardens, or at least parts of gardens, that are dedicated to specific subsections, such the Younger Botanic Garden at Benmore, Scotland, which has most of subsection *Neriiflora's* 26 species. Other articles (e.g., Blake 1987) point out how many species such as those in the *Neriiflora*, *Pontica* and *Taliensia* subsections, which while they may take a long time to reach flowering size, reward the discerning gardener with magnificent foliage, particularly in the spring when their young leaves unfurl.

Species descriptions in this article were derived from McQuire and Robinson (2009), Cox and Cox (1997) and the RSF website. Species in red font are those more commonly available and cultivated.

## Subgenus ***Hymenanthes***

Section ***Ponticum*** (24 subsections, about 304 species (McQuire and Robinson 2009))

1. *Arborea* (4 species)
2. ***Argyrophylla*** (20 species)
3. *Auriculata* (2 species)
4. *Barbata* (6 species)
5. *Campanulata* (2 species)
6. *Campylocarpa* (7 species)
7. *Falconera* (14 species)
8. *Fortunea* (27 species)
9. *Fulgensia* (one species, *R. fulgens*)
10. *Fulva* (2 species)
11. *Glischra* (11 species)
12. *Grandia* (15 species)
13. *Griersoniana* (one species, *R. griersonianum*)
14. *Irrorata* (16 species)
15. *Lanata* (6 species)
16. *Maculifera* (14 species)
17. ***Neriiflora*** (44 species)
18. *Parishia* (5 species)
19. ***Pontica*** (19 species)
20. *Selensia* (8 species)
21. *Sherriffii (*3 species*)*
22. *Taliensia* (49 species)
23. *Thomsonia* (15 species
24. *Williamsiana* (one species, *R. williamsianum*)

Section ***Pentanthera*** (2 subsections, 19 species)

1. *Pentanthera* (18 species)
2. *Sinensia* (one species: *R. molle*)

### A. Subsection *Argyrophylla* (20 species, 8 described)

Species in this subsection are shrubs or trees, have rugose, mostly lanceolate leaves that are mostly shiny above and with prominent veins and a yellowish midrib. Trusses are lax with long pedicels, and the corolla does not have nectar pouches, except for *R. ririei*. McQuire and Robinson (2009) divided species into two groups, those having a thin-plastered indumentum and

those with a thick wooly indumentum.

**1.** Thin-plastered indumentum.
- *R. argyrophyllum*
- *R. formosanum*
- *R. insigne*
- *R. ririei*

**2.** Thick wooly indumentum.
- *R. adenopodum*
- *R. coeloneuron*
- *R. denudatum*
- *R. pingianum*

## Species Details

**Group 1:** Thin-plastered indumentum.

***R. argyrophyllum*** (Epithet: with silver leaves)

This 1-12 m (3-39 ft) species is from Yunnan and Sichuan, China, and there are three main subspecies, subsp. *argyrophyllum, hypoglaucum* and *nankingense*. Subsp. *omeiense* differs little from subsp. *argyrophyllum* and may best be considered a variety of it. Subsp. *hypoglaucum* has a blue-grey underside to its leaves and unlike *argyrophyllum*, glandular pedicels; and *nankingense* has broader leaves, shiny and rugose on the upper surface, with usually deep pink flowers. Leaves on the first two subspecies are less rugose and their flowers are typically white, white flushed rose, pink or rose, with or without deeper pink spots. Inflorescences have 6-16 flowers and the species flowers in May. The white to silvery indumentum is the chief characteristic that separates this species from its allies.

***R. formosanum*** (Epithet: from Formosa (now Taiwan))

This 1.9-5.5 m (6-18 ft) Taiwanese species has trusses of 7-20 white or pink flowers with purple-brown spots and flowers in June, and although moderately hardy, is relatively rare in cultivation. It closely resembles *R. argyrophyllum* subsp. *omeiense* and should perhaps be considered as a subspecies of *R. argyrophyllum.*

***R. insigne*** (Epithet: remarkable)

This 1.6-6 m (5-20 ft) compact species (in sun) from Sichuan, China, has trusses of 6-16 flowers with pale to deep pink, red or white-flushed rose to red down the



*R. argyrophyllum* subsp. *argyrophyllum.* Photo: Coen Zonneveld.



*R. argyrophyllum* subsp. *hypoglaucum.* Photo: Coen Zonneveld.



*R. argyrophyllum* subsp. *nankingense.* Photo: Hank Helm.



*R. formosanum.* Photo: Dr. Stefan Bubert.



*R. insigne.* Photo: Jens Birck.



*R. argyrophyllum* subsp. *omeiense.* Photo: Dr. Stephan Bubert.

middle of the lobes, with or without crimson spots. The upper surfaces of leaves are dark green and shiny, while the lower surfaces have a shiny, plastered tawny-grey to copper indumentum, which make it quite distinctive. It is a great garden species that flowers in June. Horticulturally, it is the best of the section with excellent foliage and generally fine flowers.

***R. ririei*** (Epithet: after Rev. B. Ririe of the Chinese Inland Missions)

A 3-12 m (10-40 ft) species from Sichuan, there are 5-10 flowers per truss, with flowers purple, lilac-purple or reddish purple with uniquely for this subsection, five deep purple nectar pouches. The lower surface of leaves is characterized by a thin, compacted silvery-white indumentum, and the growth buds are long, thin and pointed. It is a great plant, but because it flowers early (February to April), being one of the earliest elepidote species to bloom, it can have its flowers damaged by possible winter frosts.



*R. ririei.* Photo: Rinus Manders.

**Group 2:** Thick wooly indumentum.

***R. adenopodum*** (Epithet: with a glandular pedicel)

This 1.2-3 m (4-10 ft) hardy Sichuanese species has remarkedly long and narrowly oblanceolate leaves, glandular pedicels, and a candelabra-type inflorescence of 4-8 shallowly-lobed, pale rose flowers, with or without deeper spots. Its ovary is also densely glandular. It was initially placed in subsection *Pontica* but was moved to this section because of its native geographical location. It looks rather like a narrow-leaved *R. degronianum* but differs because of its glandular ovary and shallowly-lobed flowers. This species is great for more severe winter climates, as it is hardy and free-flowering, although rather slow growing. It flowers in April to May.



*R. adenopodum.* Photo: Jens Birck.

***R. coeloneuron*** (Epithet: with impressed nerves)

This 3-8 m (10-26 ft) species from SE Sichuan and N. Guizhou, China, has leaves whose upper surface is somewhat shining and rugulose with impressed veins, and a lower surface with a dense bistrate (two-layered) indumentum. It loose, 4-9 flower trusses have long, pink to purplish, spotted flowers. Initially placed in subsection *Taliensia* because it appeared similar to *R. wiltonii,* which has a unistrate (one layer) undumentum, recent introductions suggest it is better placed in subsection *Argyrophylla.* It's quite similar to *R. floribundum,* and is a hardy handsome plant.



*R. coeloneuron.* Photo: Harold Fearing.

***R. denudatum*** (Epithet: naked)

Growing to 2-7 m (6.5-23 ft), this species from central and southern Sichuan, China, has leaves with an upper surface that is olive-green and bullate (puckered), and a lower surface with a white to greyish, woolly indumentum. Its 5-12 flower trusses have flowers that are pink to purplish- lavender, with a large blotch and spots. It is distinct from other species in this subsection because of its convex, bullate olive-green leaves and its blotched and spotted flowers.



*R. denudatum.* Photo: Douglas Justice.

***R. pingianum*** (Epithet: after Prof. C. Ping, Director of Biol. Science, Science Society of China) (Photo on next page.)

A 4-7 m (13-23 ft) Sichuanese species with olive-green leaves that have a white, matted, thick, woolly indumentum on their lower surface. There are 8-20 flowers in a truss, and flowers are pale purple to pink and are without a nectar pouch. It is similar to *R. argyrophyllum*, differing in its broader leaves, more intensely coloured flowers and its eglandular (not glandular) ovary.

**B. Subsection *Neriiflora*** (44 species, 7 described)

This is a complex subsection with plants that are prostrate shrubs to small trees;

with thin, tomentose branchlets; often peeling, brownish bark; a loose inflorescence often hanging between the leaves; a fleshy flower with five nectar pouches, and ten stamens. This subsection has many species that often grow together in the wild, merging and hybridizing freely, creating a confusing and uncertain taxonomy. The subsection is allied to subsection *Thomsonia* but the species are generally smaller in all their parts. Many species here make good garden plants for cooler areas, but they dislike hot summers, need excellent drainage, and dislike being fertilized. Cox and Cox (1997) group the species into alliances, *Haematodes, Mallotum, Sanguinneum, Forrestii,* and *Neriiflorum*, whereas McQuire and Robinson (2009) suggest four main groups, *Forrestii, Haematodes, Neriiflorum* and *Sanguineum,* with *R. mallotum* in the *Haematodes* group. Here I utilize the latter classification.



*R. pingianum.* Photo: Garth Wedemire.

1. ***Forrestii* Group** (3 species, 1 described)
   (dwarf creeping or compact shrubs less than 70 cm (26 in) high, with small, glabrous leaves or with a thin discontinuous indumentum)

   ***R. forrestii***

2. ***Haematodes* Group** (9 species, 3 described)
   (leaves with a thick, woolly brown or cinnamon indumentum and usually broadly or oblong obovate)

   ***R. haematodes***
   ***R. mallotum***
   ***R. piercei***

3. ***Neriiflorum* Group** (5 species, 1 described)
   (shrubs or small trees, ovary slender and usually tapered into the style, leaves small and mostly glaucous (have a bloom), papillate (pimpled) beneath.

   ***R. neriiflorum***

4. (***Sanguineum Group*** (9 species, 2 described)
   (ovary impressed, i.e., not tapered into the style, with a thinner indumentum than the *Haematodes* Group)

   ***R. dichroanthum***
   ***R. sanguineum***



*R. forrestii* Repens Group. Photo: Jens Birck.

## Species Details

**1. *Forrestii* Group** (3 species, 1 described)

***R. forrestii*** (Epithet: after George Forrest)

Growing to 45 cm (1.5 ft) high and with lateral stems to 60 cm (2 ft), this prostrate species from SE Tibet, NW Yunnan and NE Myanmar has dark green, rigid, leathery rounded leaves 0.6-3.2 cm (0.25-1.25 in) long, that on the underside may be green or a deep purple-pink (a form of persistent immaturity). Flowers are solitary or in pairs, and are fleshy and scarlet to crimson with a densely glandular ovary. This is a magnificent species but is requires careful siting for success, such as a steep bank away from the sun but not in shade or it will not flower. There is considerable variability in freedom of flowering and quality of flowers between clones. Some growers distinguish between the Repens Group (prostrate) and Tumescens Group (mound-forming).



*R. forrestii* subsp. *forrestii.* Photo: Susan Lightburn.

**2. *Haematodes* Group** (9 species, 3 described)
(leaves with a thick, woolly brown or cinnamon indumentum and usually

broadly or oblong obovate)

***R. haematodes*** (Epithet: blood-like)

This species from NE Myanmar and NW Yunnan is 0.3-1.2 m (1-4 ft) high and has two subspecies, *haematodes* and *chaetomallum*. The bark is light to red-brown, and the former has tomentose branchlets, while the latter subsepecies' are bristly. Leaves are smooth on top with a dense, bistrate woolly, fawn to rufous indumentum. Trusses have 4-12 flowers, which are fleshy and scarlet to crimson. Subsp. *haematodes* is generally hardy, low and prostrate and is one of the finest and most popular low-growing species, but requires good drainage and a site away from hot sun for best results. Subspecies *chaetomallum* has somewhat rugulose (somewhat wrinkled) leaves with their upper surface with some persistent tomentum, and is often taller with a looser habit and paler and rougher leaves than subsp. *haematodes*. It is not as good a garden plant, and tends to be shorter-lived.



*R. haematodes* subsp. *haematodes*. Photo: Coen Zonneveld.

***R. mallotum*** (Epithet: woolly)

Growing to 1.5-4.6 m (5-15 ft), this NE Myanmar and W Yunnan species has roughish, flaking, purplish-grey to grey-green bark and large, stiff leaves that are dark green and rugose (wrinkled) on their upper surface and with a unistrate dense woolly cinnamon-brown indumentum beneath. Trusses have 7-15 flowers, which are fleshy, crimson to cherry-red, with nectar pouches. Blooming is in March-April. This species is so distinctive from the other *Neriiflora* species that its taxonomic placing is sometimes questioned, as it has similarities to plants in subsection *Falconera*, namely its early flowers, a tree-like habit, and large, rugose, thickly-indumented leaves. It is an excellent foliage plant, but flowering early, its flowers may be frosted in colder areas. The RSF states "A species known for its stunningly beautiful foliage. …one of the finest species in the genus. Best in light shade with good drainage."



*R. mallotum*. Photo: Everard Daniel.

***R. piercei*** (Epithet: after Mr. and Mr. Lawrence Pierce, Washington, USA)

This 1.2-1.5 m (4-5 ft) high Tibetan species tends to be a spreading, straggly shrub with leaves that are shiny and rugulose at maturity, with a thick, woolly, brown, continuous, bistrate indumentum beneath. Trusses have 6-8 fleshy crimson flowers with nectar pouches in March-April. These features make it quite distinctive, and the bistrate indumentum and lack of bristles on its branchlets and petioles separate it from *R. beanianum,* where it was once known as *R. beanianum* var. *compactum*.



*R. piercei*. Photo: Garth Wedemire.

**3. *Neriiflorum* Group** (5 species, 1 described)

(shrubs or small trees, ovary slender and usually tapered into the style, leaves small and mostly glaucous papillate beneath)

***R. neriiflorum*** (Epithet: with flowers like *Nerium* oleander)

This 0.6-6 m (2-20 ft) species from W Yunnan, S Tibet and N Myanmar is a compact to loose shrub or small tree with trusses with 5-12 flowers, which can vary in colour from bright scarlet, crimson, rose, straw yellow or tawny orange. It is an attractive species of variable hardiness and is widely planted. There are three recognized subspecies, *neriiflorum, agetum* and *phaedropum*. Subsp. *neriiflorum* has flowers in shades or red, and differs from the other species in the group in its usually glabrous (without hairs), glaucous leaf underside, and from subsp. *phaedropum* in its shorter, wider leaves and the absence of glands on the pedicel, calyx and ovary. Subsp. *agetum* has pits and papillae on the lower leaf surface and may not be in cultivation. Subsp. *phaedropum* has red, rose to straw yellow or tawny orange flowers and being a bit more tender than subsp. *neriiflorum*, is not as widely cultivated.



*R. neriiflorum* subsp. *neriiflorum*. Photo: Garth Wedemire.

**4. *Sanguineum* Group** (9 species, 2 described)

(ovary impressed, i.e., not tapered into the style, with a thinner indumentum

than the *Haematodes* Group)

***R. dichroanthum*** (Epithet: with flowers of two colours)

This 0.3-2.4 m (1-8 ft) high species from W Yunnan and N Myanmar has four subspecies: *dichroanthum, apodectum, scyphocalyx,* and *septentrionale.* Subsp. *dichroanthum* has leaves with a compacted silvery or sometimes fawn indumentum underside with a dark green upper surface. All subspecies have trusses that have 3-8 yellowish-rose, orange, orange-red or pinkish-red flowers with five nectar pouches. Subsp. *apodectum* has the shortest leaves, up to 2.4 times as long as broad, and a somewhat thicker silvery to fawn indumentum. Subsp. *scyphocalyx* has matt obovate leaves and a distinctive cup-shaped calyx, while subsp. *septentrionale* has the longest leaves, more than three times as long as broad. The species flowers from May-late June and is hardy.



*R. dichroanthum* subsp. *apodectum.* Photo: Jen Birck.

***R. sanguineum*** (Epithet: blood-red)

A 0.3-1.5 m (1-5 ft) species from S Tibet and NW Yunnan with narrowly winged petioles; leaves with a thin, continuous, compacted, silvery to grey indumentum; and trusses of 3-6 blackish-crimson, crimson, pink, yellow, or white flowers, with sometimes a mixture of several colours. There are two subspecies, *sanguineum* and *didymum*, with the former having five varieties. Botanical differences between all are slight, differing primarily in flower colour, and so are difficult to separate out of flower. Some plants may even be hybrids. Between the subspecies, *sanguineum* flowers are deep crimson, carmine to scarlet, with a densely hairy, eglandular ovary, blooming from March to May, whereas *didymum* flowers are black-crimson to dark crimson with a densely glandular ovary and blooming from June to July.



*R. sanguineum* subsp. *sanguineum* var. *didymoides.* Photo: Coen Zonneveld.

**C. Subsection *Pontica*** (19 species, 10 described)

Species here are prostrate, compact and bushy shrubs to open and upright small trees to 12 m (39 ft), with leaves fairly smooth and not rugose. Trusses are 5-30 glowered, with an unusually long rachis, resulting in a tall truss. Flowers have a corolla that is deeply lobed to half its length, with ten stamens, except for *R. degronianum* var. *heptamerum* which has 14. This subsection has the widest distribution of the genus, stretching from W and E North America to Europe and W and E Asia and Japan. The tall truss and erect pedicels and capsules are the subsections most distinctive features, and the subsection is most closely related to subsection *Argyrophylla* through *R. adenopodum*. The subsection has several of the hardiest, most heat-tolerant and most easily grown rhododendrons, with the result that they have been used extensively in hybridizing.



*R. sanguineum* subsp. *sanguineum* var. *sanguineum.* Photo: Gerdy Van der Lans.

**Group A.** (leaf underside always glabrous)
***R. catawbiense***
***R. hyperythrum***
***R. macrophyllum***
***R. ponticum***

**Group B1.** (Leaf underside not glabrous, indumentum thin)
***R. brachycarpum***
***R. maximum***

**Group B2.** (Leaf underside not glabrous, indumentum thick)
***R. degronianum***
***R. makinoi***
***R. smirnowii***
***R. ungernii***



*R. sanguineum* subsp. *didymum.* Photo: Rinus Manders.

## Species Details

**Group A.** (leaf underside always glabrous)

***R. catawbiense*** (Epithet: after the Catawba River, North Carolina, USA)

This 1-3 m (3-10 ft) shrub from North Carolina and Virginia, USA, has an 8-20 flowered, usually compact truss with flowers usually lilac-purple but occasionally pinkish or white with faint olive-green spots, flowering from May-June. It has a more domed growth than its relatives *R. macrophyllum, R. maximum* and *R. ponticum*, and while similar to *R. brachycarpum*, the latter has much more pointed growth buds. It is very hardy and has been used to create a range of "ironclad" hybrids suitable for severe climates.



*R. catawbiense* 'Boursault'. Photo: Harold Fearing.

***R. hyperythrum*** (Epithet: reddish below)

This is a distinct species not closely related to other species in this group. Coming from northern Taiwan, it grows 1-2.5 m (3-8 ft) high and has recurved leaves whose undersides have minute brownish punctuations (dots). Its 7-12 flowers truss has white and rarely pinkish flowers, with or without purple spots. It flowers in April-May, and is an attractive, free-flowering species that is both cold and heat tolerant.



*R. hyperythrum.* Photo: Harold Fearing.

***R. macrophyllum*** (Epithet: with big leaves)

This is the only large-leaved (6.5-17 cm (2.6-6.7 in) rhododendron species found in western North America, where it grows 1.8-3.7 m (6-12 ft) high and occurs from coastal California to British Columbia, Canada. It has 9-20 white, pink, rose or rose-purple flowers with reddish-brown or yellowish spots in its truss, and flowers from May to June. Unfortunately, many have found it is not an easy plant to grow, even in gardens in its native range, but the RSF states "Great in the woodland or in areas that are hard to keep irrigated. Tough and easy once established in the woodland garden."



*R. macrophyllum.* Photo: Harold Fearing.

***R. ponticum*** (Epithet: form the Pontus, Asia Minor)

This 2-5 m (3-15 ft) species is native chiefly to the Caucasus and northern Turkey, but also Lebanon and a few isolated sites in Spain and Portugal. Its trusses are 6-20 flowered, usually upright and compact, with flowers in June-July of pale to deep lilac-pink to pinkish-purple to lavender or mauve, greenish-yellow spotted or blotched. It is easily distinguished from its American relatives by being almost completely glabrous, and with no indumentum. This species is a serious problem in the UK where it has naturalized extensively, especially in wetter areas, and because it is capable of regrowth from the roots and stems, it is proving extremely difficult to eradicate, which has led to rhododendrons in general receiving bad publicity there. Outside the UK, this species is rarely a problem as it does not tolerate severe weather well and is susceptible to *Phytophthora* root rot. There are quite a few selected extreme and atypical forms in cultivation which are likely hybrids, as the species crosses easily with many other garden rhododendrons.



*R. ponticum.* Photo: Hans Eiberg.

**Group B1.** (Leaf underside not glabrous, indumentum thin)

***R. brachycarpum*** (Epithet: with short fruit)

This 1.2-3 m (4-10 ft) high species from Japan and Korea forms a round and compact shrub in sun, and is distinguished by its yellow or pale green petiole and midrib and its pointed vegetative buds. The 8-21 flower truss has white or flushed pink flowers with green spots in June-July. Its leaves have a thin brown or fawn continuous indumentum, and while a hardy species, its new growth comes early and is easily damaged by frost. The flowers are usually small compared to

the size of the leaves, which may be somewhat hidden in the young new growth. There are two subspecies, *brachycarpum* and *fauriei,* but they overlap extensively in range and may not be justifiable. Included in subsp. *brachycarpum* is the cultivated Tigerstedtii Group, which has a greater stature, faster growth, larger leaves and its wider corolla. These plants are among the hardiest of all rhododendrons, having tolerated -45° C (-49° F) in Finland.



*R. brachycarpum* Tigerstedtii Group. Photo: Harold Fearing.

***R. maximum*** (Epithet: maximum)

This 1.2-3.7 m (4-12 ft) high hardy species (sometimes a tree to 12 m (40 ft)) from eastern Canada south along the Appalachian Mountains to Georgia, USA, is distinctive because of its large, comparatively narrow leaves, usually with a thin indumentum; its glandular branchlets, petioles and flower parts; and its late flowering in June-July. Its 12-30 flowered truss has flowers of white, pink, rose or rose-purple, usually blotched yellow or greenish-yellow. It is commonly cultivated in eastern North America. **Note:** See the "Red Max" article on P. 48 for an unusual cultivar.



*R. maximum.* Photo: Harold Fearing.

**Group B2.** (Leaf underside not glabrous, indumentum thick)

***R. degronianum*** (Epithet: after M. Degron, Director of the French Posts in Yokohama in 1869)

From central and southern Japan, this 0.6-2.5 m (2-8 ft) shrub has recurved leaves deep green glabrous on their upper surface, with a felted fawn to rufous indumentum on their lower surface. Trusses are 6-15 flowered, with five or seven lobed, soft pink to rose, occasionally white, flowers. There are three subspecies, *degronianum* (five-lobed corolla), *heptamerum* (seven-lobed corolla) and *yakushimanum* (five-lobed corolla), with the former differing from subsp. *yakushimanum* by having a less persistent indumentum, which in the latter is thicker on the stems, midrib, and entire lower leaf surface. Subsp. *heptamerum* is a variable form from isolated mountains, with three recognised varieties.



*R. degronianum* subsp. *yakushimanum.* Photo: Harold Fearing.

***R. makinoi*** (Epithet: after T. Makino, a Japanese botanist)

This 1-2.4 m (3-8 ft) high Japanese species has densely woolly branchlets, persistent perulae (leaf bud scales that cover the leaves before their emergence), and distinctive, linear, lanceolate, recurved leaves retained for 4-5 years that have on their upper surface a loose, white tomentum at first, later glabrous, and on their lower surface, a dense, tawny, bistrate indumentum. Trusses in April-May have 5-8 pink, rose or off-white flowers, with or without crimson spots. *R. roxieanum*, especially var. *oreonastes*, can have equally narrow leaves but *R. makinoi* differs in having persistent perulae, young growth with tomentum on its upper leaf surface, and paler indumentum on its lower leaf surface. Although not the easiest species to grow, it has unusual foliage and is an attractive garden plant.



*R. makinoi.* Photo: Harold Fearing.



*R. makinoi* leaves. Photo: Harold Fearing.

***R. smirnowii*** (Epithet: after M. Smirnow, a friend of the discoverer)

This very hardy 0.5-6 m (1.8-20 ft) high species from NE Turkey and adjacent areas of the Caucasus in Georgia and Russia has branchlets with a white, felted tomentum, perulae



*R. smirnowii.* Photo: Harold Fearing.



*R. ungernii.* Photo: Harold Fearing.

that is persistent for some years, a dense, whitish, woolly tomentum on the upper leaf surface of new growth, and a thick, woolly fawn or pale brown indumentum on the lower leaf surface. Trusses are 6-15 flowered with pink to rose-purple flowers, with or without brown to yellow spots, in May-June. Closely related to *R. ungernii*, from which it differs in its smaller leaves, a deeper-coloured indumentum, deeper-coloured, earlier flowers fewer to the truss and a smaller calyx. It is one of the hardiest rhododendrons and is particularly suitable for NE North America and Scandinavia.

***R. ungernii*** (Epithet: after Baron F. von Ungern-Sternberg, Professor at Dorpat)

This 1-6 m (3-20 ft) high species also from NE Turkey and adjacent areas of the Caucasus in Georgia and Russia differs from *R. smirnowii* as described above, with which it often hybridizes in the wild. Its trusses have 12-30 pale rose, pink or white flowers, with or without pale green spots, in June-July. It is a fine foliage plant useful for its late blooming, and unlike *R. smirnowii*, thrives and flowers well in shady locations.

**Acknowledgements**

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*Glen Jamieson is the current president of the Mount Arrowsmith Chapter and the editor of JARS.*

# Drought, Fire, Flood and COVID-19 Challenges in Southeast Australia

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Australia



Photos by author.

The past year has been an extremely challenging one for rhododendron culture in south-eastern Australia, as illustrated here by the trials and tribulations at the Campbell Rhododendron Gardens (CRG) at Blackheath, New South Wales (NSW). First there was a multi-year drought, then a major bush fire followed by flooding caused by torrential rain, and finally our self-isolation in response to disease that has severely impacted our collective ability to rebuild the gardens! Here, I describe events to date, and how the CRG is slowly beginning to recover.

The land that the Campbell Rhododendron Gardens occupies is Government Land which was gazetted for use by the Blue Mountains Rhododendron Society (BMRS) in April 1970. It is situated 127 kilometres (78.9 miles) west from the centre of Sydney, NSW, in a town called Blackheath which is 1070 metres (3510 feet) above sea level (Fig 1). This area of land was selected because its geology is Triassic Sandstone, which produce sandy loams which when enriched by decaying humus from the eucalyptus trees, ferns and heaths, provide the acidic conditions that the rhododendron family of plants enjoy growing in. The CRG was then immediately established and covers an area of 18 hectares (45 acres), of which 8 hectares (18 acres) is utilised to grow rhododendrons and other exotic trees and shrubs. The remaining 10 hectares (27 acres) has a caveat on it and must be left as native bush. The unique aspect of the Gardens is that the planted exotics grow amongst native plants and under Eucalyptus trees. The Gardens is situated in a valley which has smaller side valleys, and the main valley floor has an intermittent water course which feeds a reflection lake. The valley's shape allows for a viewing platform which was constructed well above the valley floor (Fig 2).

Temperate rhododendrons are grown mainly in the cooler climate areas of the Blue Mountains, NSW; Dandelong Mountains, Victoria; South Australia and in Tasmania, and vireya species grow in our warmer climates. There are two recognised Australian endemic rhododendron species, both of which are vireyas, *R. lochiae* and *R. viriosum*, having a bright, deep red inflorescence. They both are found in the warm forests on some of Queensland's east coast mountains, which were recently botanically re-explored (Worboys and Rouse 2020). The public rhododendron gardens situated in Victoria, Tasmania and Wollongong, NSW, are owned by local Councils and while volunteers work there, they do not depend solely on this work force to maintain the gardens. In contrast, the Campbell Rhododendron Gardens during their 50 years of existence have been developed and continue to be maintained only by volunteers, although with the occasional involvement of specialised contractors for major projects. The

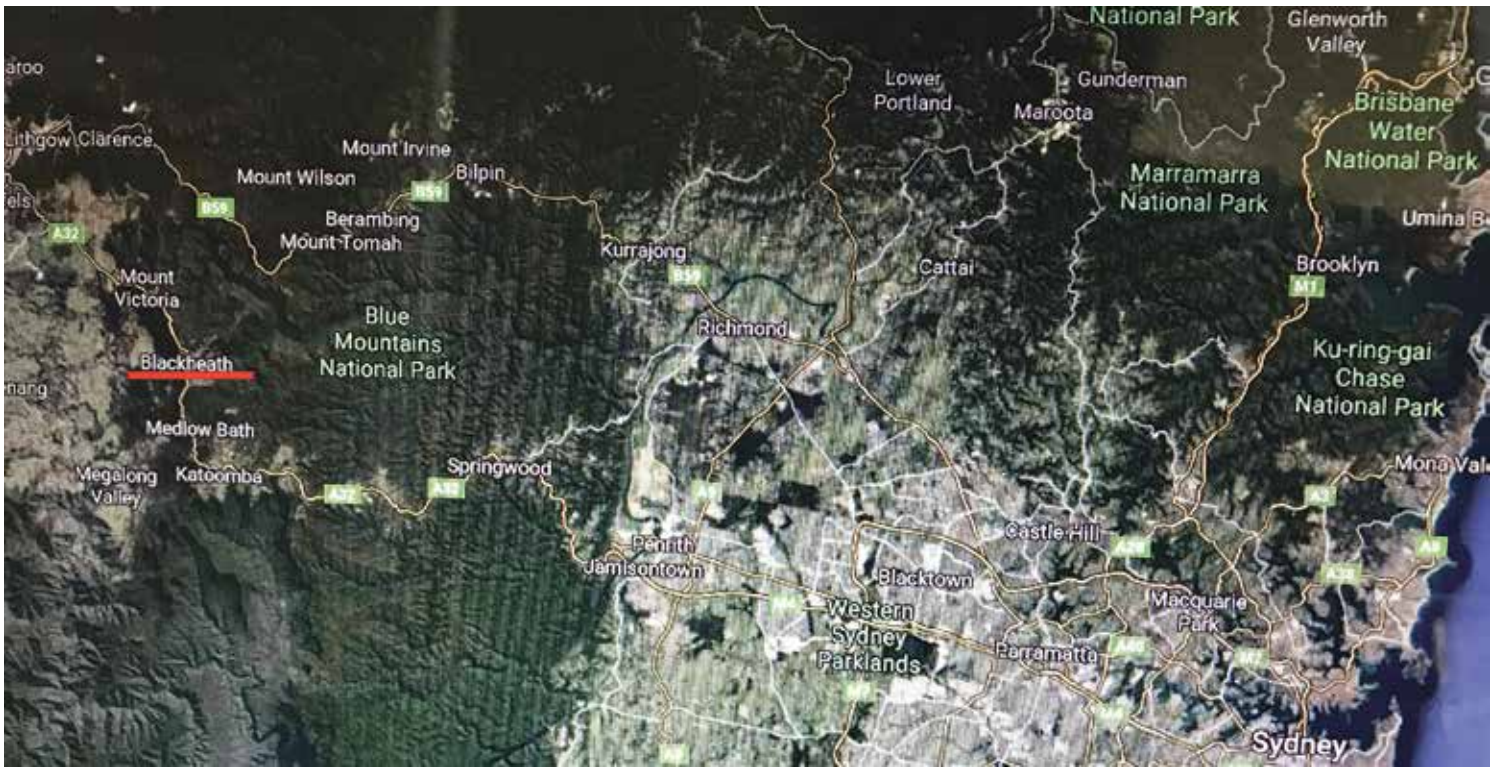



Fig 1. The Campbell Rhododendron Gardens at Blackheath occupy an area which is Government Land and was gazetted for use by the Blue Mountains Rhododendron Society (BMRS).



Fig. 2. The view from the reflection lake to the lookout before the fire.



Fig. 3. Rhododendrons and gum (eucalyptus) trunks in the valley before the fire.

funding for the maintenance of the CRG comes from donations and the occasional bequests. The CRG is also unique in that they have a very natural environmental setting (Fig. 3), rather different from the more cultivated presentations in the gardens maintained by local Councils.

It was the part of the Campbell Rhododendron Gardens reserved for the native Australian bush plants which was burned in the December 21, 2019 fires, with rhododendrons planted on the lower side of this area mostly badly singed, although some closest to the main fire face were actually burnt. The end result that about 1/3 of the Gardens was actually damaged (Figs. 4 & 5) and looking across the valley now, there is a line of green rhododendrons but just beyond that is black ash, brown soil and charcoal tree trunks (Fig. 6). The whole burnt area is bare ground, but there are now signs of at least some of the native vegetation returning. After low temperature fires, Australian natives can often regenerate from lignotubers at the base of their trunks, while eucalypts can grow from their base and also from nodes on their trunks (Fig. 7).

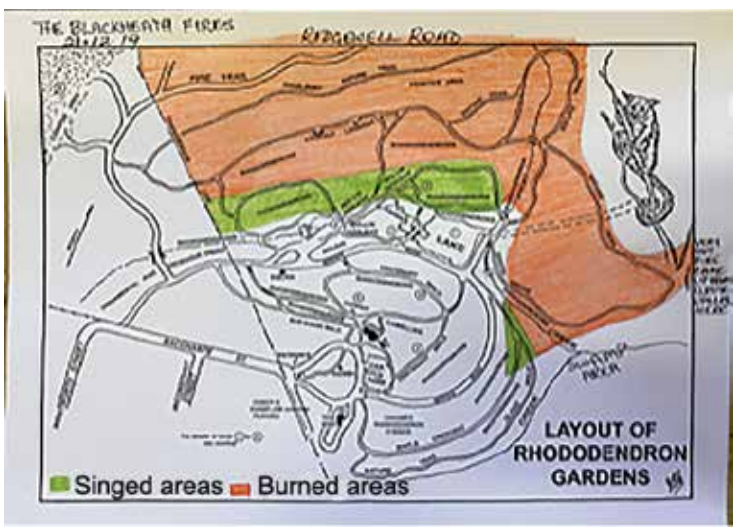



Fig. 4. The burnt area of the Campbell Rhododendron Gardens.



Fig. 5. The Crying Tree in mid-January.

Prior to the fire, the rhododendrons in the CRG were already stressed due to a lack of moisture from an on-going drought, and we were already assisting many of our trees and shrubs in the entrance part of the Gardens by making holes in the ground at the drip line, placing hydrophilic water crystals in the



Fig. 6. The view in mid-Aprill 2020 looking across the lake to the burnt area.



Fig. 7. Lignotuber and ecalyptus regrowth.



Fig. 8. Pruned burnt rhododendrons.

hole, and then covering them over and watering. A transpirant minimiser ["Agrobest Envy," a frost protectant and anti-transpirant that can substantially reduce moisture losses by up to 50%, eliminate sun and windburn damage as well as increase frost tolerance by an additional 4° C (7.2° F). Envy will not impede plant growth or photosynthesis, is non-toxic, pH neutral and will biodegrade in sunlight.] was also applied to their leaves in a spray form to help reduce plant water loss.

The burned rhododendrons on the other side of the valley from the entrance area are being treated by pruning them back to viable nodes, sealing the cut, fertilising and applying the water conservation procedures described above to try and increase water availability to their shallow root systems. Some are responding, but unfortunately many are not. (Fig 8). Some rhododendrons are re-sprouting from their base, which is encouraging as our plants have not been grafted and were all grown from cuttings (Fig. 9). This work is very slow, as we have only a few people working consistently, especially now with all the movement restrictions and social distancing requirements due to the COVID-19 virus. The tree ferns and eucalyptus are also beginning to recover (Figs. 10, 11).



Fig. 9a. Burned rhododendron before trimming in February, 2020.

The problems caused by the drought were alleviated a little by a sudden storm in early January 2020 (Fig. 12). The nearly dried-up lake refilled with water, but much of the top soil in the burned area was washed down the valley sides and into the water course. Trees which were burned and were deemed unsafe have now been felled, and their trunks placed across channels where the water rushed down to help slow any future run-off. We have since had some on-going, more minor rains which have helped in the regeneration of



Fig. 9b.Some regrowth on burnt rhododendron in late February, 2020.



Fig. 10a. Tree fern with rhododendrons behind in mid-January, 2020.



Fig. 10a. Tree fern regenerating with rhododendrons behind.

both the native plants and rhododendrons.

Currently, the CRG is being maintained by a small band of volunteers, many of whom are over 75 years old. We often joke that we are all fit and healthy because we live at such a high elevation! The volunteers, while trying to save as many of the burned rhododendrons as possible and planting new rhododendrons to ensure banks of beautiful colour in years to come, also need to attend to the on-going maintenance of the paths to ensure they are clear of debris and all are safe for walking. While the CRG is technically "closed," it is public land and many people still walk there. We have received some Government Grants to help fund the replacement of plants, the clearing of unsafe burnt eucalyptus, the restoration of burnt areas and the provision of animal/bird shelters.

We look forward to the forthcoming Southern Hemisphere Spring in October when the surviving rhododendrons, azaleas and kalmias in the "Garden's" entry area will burst into flower, and re-invigorate all the volunteers and encourage them to continue their care of the burned rhododendrons so that as many as possible can be "nursed" back to health.



Fig. 11a. Some burned area with tree fern and eucalyptus regeneration.



Fig. 11b. Burned rhododendrons and regenerating eucalyptus.



Fig. 12. The flood through the CRG on February 9, 2020.

For more information visit our website at www.rhodogarden.org.au.

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*Julia Hanley is the Vice-president of the Blue Mountains Rhododendron Society.*

# Gardening Tip: How Tall Will My New Rhododendron Grow?

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McKinleyville, CA

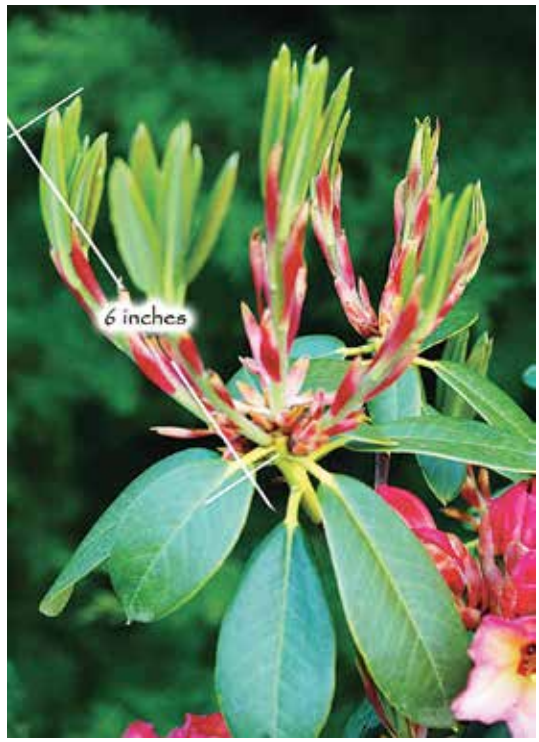


Photo by author.

(Reprinted from the First Week of June 2020 E-mail edition, Singing Tree Gardens Nursery.)

Rhododendrons grow in flushes. This means that, usually, they push out new growth every spring after they bloom. Once this growth has finished extending, maybe one month later, you can measure this growth. As in the figure to the right, the growth flush is six inches (15 cm). Multiply that by a number of years...say ten, and you can then say that this plant will grow 6 inches x 10 = 60 inches (150 cm), or five feet (1.5 m). This formula works quite well for the height. The width may be more, as the flush will go in both directions horizontally. This comes in handy when looking at a small rhododendron and rather than believing the label, use this calculation based on the length of a typical one-year growth flush.

*Don Wallace is a member of the Eureka Chapter and owner of Singing Tree Gardens and Nursery.*




Using a measurement of new growth to estimate rate of growth and size of plant.

# The Mystery of the "Red Max"

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Photos by author unless noted.

The "Red Max" is a rare red form of our native species *Rhododendron maximum.* The "Red Max" has some very unique properties. The flowers are red, at least most of the time, instead of the white to blush pink we associate with the species. However, the plant is very distinctive, in or out of bloom. It has red sap the color of cranberry juice that saturates its stems, leaves, and flowers. The sap does not reach the leaf edge so the margins will be green while the rest of the leaf is red. The foliage is quite striking, especially when backlit by the sun.

We are not sure what causes that plant to produce its red sap. David Leach suggested that it may be temperature related and noted that grafts and rooted cuttings he made had sap that were not as deep in color as the original plant in the wild had. [4]

Dr. August Kehr ("Augie"), one of the Potomac Valley chapter's founders, was fascinated by the "Red Max" and wrote several articles (Kehr 1994, 1998) on the "Mysterious Red Maximum." He proposed several theories but none were found to be satisfactory. At first, he favored one suggesting the plant was a chimera composed of both red and white cell layers. In later years, he tended toward a theory of "moveable genes" that could cause the plant to sport differently depending upon where the genes were located. He ultimately admitted that more research was needed to understand what was really happening.

In a garden situation, clones of the "Red Max" can be unpredictable in their sap color, and that the red sap is not always uniformly distributed. Branches that contain red sap will have that unique foliage, red buds, and will produce red flowers. Other branches on the same plant may not have any red sap at all, so they will look like the typical *R. maximum* with large, dark green leaves, light green flower buds, and white to blush pink flowers. Sometimes, the sap may appear only in part of a flower truss, so there can be a mixture of red and white blossoms, or even some flowers that are bicolored.



"Red Max" stem showing red sap.

What can be confusing is that red sap production in the "Red Max" can also be capricious. The late Dr. Thomas Wheeldon, a founder of the Middle Atlantic Chapter ARS, was one of the first to root cuttings of "Red Max" from the wild plant. People were very eager to get the rooted cuttings, but then were furious when their plants had white blossoms. Dr. Wheeldon was embarrassed and assured them he was



White *R. maximum.*



Blush pink *R. maximum.*



Pink *R. maximum.*



*R. maximum* "Red Max" floiage showing reddish sap. Photo: John Weagle.



Light shining through *R. maximum* "Red Max" foliage. Photo: John Weagle.



Upper surface of *R. maximum* "Red Max" foliage. Photo: John Weagle.



Flower variations on *R. maximum* 'Mount Mitchell'.



Variations of "Red Max" buds.

not trying to cheat anyone. The red sap is now known to sometimes not develop until plants become older. Yes, it is a very strange and mysterious plant!

The original "Red Max" in the wild was not easy to find. It grows in a remote location not far from Mount Mitchell, the highest mountain in the eastern United States, with an elevation of 6684 ft (2037 m). The region is very heavily forested and difficult to traverse except on a few roads, and its primary access is via the Blue Ridge Parkway.

It is the region of North Carolina where we see the greatest diversity of variations of *R. maximum*. The Parkway from milepost 330 to the entrance to Mount Mitchell State Park at milepost 355 and beyond to milepost 360 seems to be exceptionally rich in *R. maximum* variations. There are typical white to blush pink forms, but also stronger colored pinks and picotee forms with white blossoms bordered in deeper pink to light red. The "Red Max" is not visible from the Parkway but grows on a forested hillside near Curtis Creek about milepost 347. Access is via the Parkway, then on a dirt road, followed by a hike on a trail, and finally blind-faith bushwhacking through a dense thicket.

The man credited with finding the "Red Max" was Mr. Clayton, one of many people involved in laying out the Parkway. According to legend, he was following a bear trail through the dense forest and encountered a population of about 15 to 20 plants of *R. maximum* that had crimson red flowers. He was not a botanist but immediately recognized their significance and brought others to the site (Kehr 1994).

Unless someone takes you to the "Red Max", it is unlikely that you can find it on your own, as it is located in a dense "rhododendron hell" and is not really noticeable until one is standing in close proximity to the plant. It is easy to get disoriented and lost in such overgrown areas, and GPS technology is rarely useful since satellite signals are often blocked by the overhead tree canopy.

David Leach (1958) colorfully described a meeting he attended in 1957 which included a trip to the "Red Max." Many East Coast rhododendron experts had gathered for a week-long program of the newly formed Southeastern Chapter of the ARS, which was held in June at the Biltmore estate in Asheville. For many attendees, it was their first trip to see native azaleas and rhododendrons in the wild. We are still similarly inspired, and our annual treks go to many of those same places, with our recent digital newsletter having some photos from this year's trip. In 1957, they visited hybrid swarms of native azaleas on the balds and both remarked at the wide variations in color and smelled *R. arborescens* on Wayah Bald. They admired large, brilliantly colored flame azaleas and were in awe of the vistas on Roan Mountain with *R. catawbiense* in bloom. Leach wrote eloquently



Karel Bernday photographing the dense underbrush we have to bushwack through to get to the "Red Max" plant.



The "rhododendron hell" where the "Red Max" grows.



"Red Max" seedpods.



Red *R. maximum* 'Curtis Creek' in the wild.

of his Roan experience: "No advance description could equal the magnificent spectacle of lavender-pink flowers in a vast billowing sea reaching out to the misty violet horizon of the mountains. Surely this is one of the great floral scenes of the nation, a vista of immense drama in a majestic setting."

The 1957 meeting's final activity was a pilgrimage to see the rare "Red Max" near Mount Mitchell. We went there this year, too, and I find it interesting to read that the access approach in 1957 seemed basically unchanged from what we still go through today. Leach wrote "As we slowly made our way toward the site, Dr. Ernest Yelton, one of our guides, exhibited his fantastic ability to pass through the all but impenetrable underbrush at a fast gallop, an exhibition of split-second writhing that would blench [*sic* blanch] the cheek of either an All-American fullback or a fan dancer." Joe Gable made several trips to the "Red Max" including the one described by David Leach. He returned again in 1960 with Dr. Skinner, Director of the U.S. National



*R. catawbiense* in bloom on Roan Mountain.

Arboretum, and several others (Kehr 1994). Some people brought back cuttings or layered branches that time. Henry Yates took some wood of the "Red Max" to fashion six gavels that were given to some of those in attendance. I would like to know if they still exist!

They dug up a larger plant at the site, estimated to weigh 100 lbs. (45 kg), dragged it down the trail, and gave it to Joe Gable to plant at his nursery in Stewartstown, PA. Gable was disappointed when it first bloomed. The flowers were white until 1965 when it sported its first red blossoms, five years later. He indeed had the 'Red Max.'



*R. calendulaceum* in bloom on Roan Mountain.

Gable and the late Captain Dick Steele of Nova Scotia made another trip in 1966. Captain Steele brought back a flower truss, grafted the stem onto 'County of York' and planted it at his first home at Boulderwood in Halifax, Nova Scotia. I saw that plant in 2006 and remarked it was the finest specimen I had ever seen. John Weagle tells me it is even better today. I have wondered if it might be a piece of the original plant in the wild, which did eventually die in 1992.

Gable's daughter Caroline sent cuttings of their "Red Max" at Stewartstown to the Rhododendron Species Foundation, and named it 'Mount Mitchell.' Plants have been distributed by the RSF as *R. maximum* 'Mount Mitchell' with the accession number 75/137.

The RSF received a second accession from David Leach that also carried the same name *R. maximum* 'Mount Mitchell' (Leach 1965), now renamed as "Leach's Mounty Mitchell'. The RSF gave it a different accession number, 77/646, since the two forms are genetically different. Accession 77/646 was the best red selected from plants that Warren Baldsiefen raised from Gable's seed.

There was yet another red *R. maximum,* which was registered by Weldon Delp. His plant was a fourth-generation selection from seed originally from the Gable plant, and he called his 'Delp's Red Max.'

The original "Red Max" in the wild died, likely due to excessive competition from other plants and dense shade. It was a sad loss, since that plant was estimated to be at least 100 years old and had spread 35 to 40 ft (10.5-12 m) across. It had five trunks to six inches (15 cm) in diameter.

At that time, some Southeastern Chapter members including Ed Collins became stewards of a lone plant remaining in the wild. It was pitiful, with one spindly trunk that leaned at a 45° angle. It might have been a layer of the original plant or else a seedling. They were not sure so they called it the 'Curtis Creek' form. They cut down trees to provide more light and it slowly began to recover. When I first saw it a decade later, the plant was still small but seemed to be thriving.

The "Red Max" has been notoriously difficult to root. We grafted some cuttings of the 'Curtis Creek' form and took one west to the Rhododendron Species Foundation. Having studied the plants at the RSF and the plant in the wild, I think they are all genetically different. Dick Steele's plant could be different too.

I remember my first trip to the "Red Max" in the fall of 2003. Ed Collins and Bob Stelloh took me there and I must admit that I was anxious that we might get lost in the heavy vegetation. We did make it though, and I collected its seeds. I raised 500 seedlings that we gave away at the 2006 Joint ARS/ASA Convention in Rockville, MD.

Over the years, people have shared images of their seedlings as they bloomed, which I find that very exciting. Some plants have had red flowers, but others have not. Carol Segree's plant has red flowers, but part of her plant does have white blossoms, while Jeanne Hammer's plant is a lovely strong pink. Beautiful!

I have made the pilgrimage to the "Red Max" many times since 2003 to check on the plant and occasionally have collected seeds to share. I also like to refresh my memory on how to get there. Since most of the original people who coaxed that plant back to health have passed on, we now need a new group of stewards who will look after that plant into the future.

When I hear of adverse weather in North Carolina, I do worry about the "Red Max." The winter of 2009-2010 was very rough in much of the eastern United States, with relentless heavy snows and serious ice storms. Many mountainous regions, especially those near Mt. Pisgah and Mt. Mitchell, seemed to be particularly hard hit. Most deciduous trees lost large branches,




*R. maximum* "Red Max". Photo: John Weagle.

and many were completely broken off.

Interestingly, very few rhododendrons showed any snow or ice damage. Since ice storms are relatively frequent in the mountains, the loss of the canopy in this manner must be one mechanism by which rhododendrons that had stopped blooming due to excessive shade get a new moment in the sun. With the canopy gone, they get more light and will bloom more heavily for several years until it closes over again.

I was concerned that the "Red Max" might have had trouble that winter because it still had that single trunk leaning at an angle. As I set out on the trail, I became concerned for a different reason, since I saw evidence of fire. The closer I got to the "Red Max," the worse the damage was. Rhododendrons, kalmia, and trees along the trail were badly burned, and while some were regenerating from the base, others were not.

When I cut into the dense "rhododendron hell" to work my way up a slope to see the 'Curtis Creek' plant, I could see that the fire had been even more intense there. Huge old *R. maximum* plants were completely charred and I saw no signs of regeneration. I was certain that the sole surviving red *R. maximum* in the wild had met a similar fate. It was upsetting to think that such a rare specimen might join the ranks of other plants lost in the wild, like *Franklinia*.

As I neared a small clearing near the "Red Max," I suddenly spied some red color through the dense snarl of branches. I actually had chills, as not only was the plant alive and well, it was in full bloom! Its solitary trunk was now at a 30° angle, probably from snow, and I could see where flames had been within a few feet of the trunk, but miraculously, I saw no sign of damage! How that fire managed to avoid this rare specimen still baffles me! All I could think of is that the spirits of past great rhododendron leaders like Joe Gable, David Leach, Augie Kehr, Ed Collins, Bob Stelloh, and other admirers over at least the last half century must have gathered round to deflect the flames.

Later I learned that the Forest Service set that fire on Easter weekend to burn some of the forest's broken tree branches. Since that time, I have been spreading seed of the "Red Max" around in the wild on nurse logs near the original plant and in places that were burned, as it would be nice to rebuild its population in the wild.

For years I had mused about crossing two forms of the "Red Max." In 2015, it was not in bloom when we visited it but J. Jackson and his wife Lindy Johnson went back when it was in flower to gather pollen from the 'Curtis Creek' form. They sent it to me and I forwarded it to Bruce Clyburn in Nova Scotia, who happened to have a budded plant of the 'Mount Mitchell' form that had not opened yet. He crossed the two and sent seed of that cross in the 2016 ARS Seed Exchange, cross #16-22. It quickly sold out, so we hope many people around the world are now growing seedlings from this cross. Even if the remaining plant suffers some catastrophe, hopefully its genes will live on.

The "Red Max" is indeed an oddity. The truth is that we really don't know what causes it to behave the way it does. It is comforting to know that for nearly 90 years, enthusiasts have been trying to preserve this rare mutation for future generations. Let's hope we can continue to save such rare treasures in the wild. Who knows? There may be even stranger plants out there in the wild we have yet to discover.

For pictures and commentary on the "Red Max" from the late Bob Stelloh, check out the ASA Picture Archives at https://pbase.com/bstelloh/curtis. Expert photographer Jim Fowler also has beautiful images in a blog he posted in July of 2015 at http://www.jfowlerphotography.com/?p=5497.

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*Don Hyatt is a member of the Potomac Valley Chapter and is a frequent contributor to JARS.*

# Rhododendron Calendar

| | |
|---|---|
| **2020** | ARS Fall Regional Conference, Cancelled. |
| **2020** | New Zealand Rhododendron Association's 76th convention, Timaru, Postponed until 2021. Dates to be determined. |
| **2020** | Australian Rhododendron Association's conference, Upper Burnie, Tasmania. Postponed until 2021. Dates to be determined. |
| **2021** | ARS Spring Convention, Wolfville, Nova Scotia, Canada, June 2-6, 2021. |
| **2021** | ARS Western Regional conference, Florence, OR, October 13, 14 and 15, 2021. |
| **2022** | ARS 75th +2 Anniversary Convention, Vancouver, Washington. Board Meeting. April 27 - May 1, 2022. |
| **2022** | Fall - Eastern North Anerica - Open |
| **2023** | ARS Spring Convention, Atlanta, GA. Joint ARS/ASA meeting. Dates to be determined. |
| **2024** | ARS Spring Convention, Pacific Northwest. Dates and location TBD. |

If you can help in the future, please contact Ann Mangels at wamangels@aol.com.

*Gardening simply does not allow one to be mentally old, because too many hopes and dreams are yet to be realized.*

– Allan Armitage

# Garden & Pot Friendly Vireya

Neil Puddey
Woolgoolga,
NSW, Australia



Photos by author unless noted.



Fig. 1. Neil Puddey among *R. viriosum* growing on Mt. Spurgeon, North Queensland, Australia. Photo: A. Rouse.

Vireya rhododendron with few exceptions have beautiful, vibrant and sometimes perfumed flowers but sadly nature did not consider human preference for bushy, compact growth habits, pest and disease resistance and continual flowering for garden plants. There are obvious variations in both the species and hybrid vireyas but generally a lot of vireyas have a tendency towards open growth habits that are inclined to be top heavy and can also suffer a number of environmental insults.

Considerable variation can be seen in the growth habit of *R. viriosum,* depending on the specific mountain population and the situation in which it grows. *R. viriosum* on Mt. Spurgeon grew as an understory plant and were quite open bushes, whereas the plants of *R. viriosum* on Mt. Finnigan are more compact and growing with greater exposure to the elements. *R. viriosum*'s Australian cousin *R. lochiae* grows on Bell Peak on rocky outcrops overlooking the ocean, and these plants were compact.

The adaptations of vireya species that allow them to best utilize their surroundings are vital to their survival in a montain setting. For example, they extend branches to capture light, which is often scarce in the understory, and branches may extend up to two metres (6.5 ft) sideways to reach a shaft of light breaking through the overhead canopy. The seedlings of *R. viriosum* growing on Mt Spurgeon in North Queensland, Australia (Fig. 1) germinate on moss covered boulders and send roots out like a strangler fig to the mulch-covered ground below. However, from a horticulturalists point of view, these adaptations often result in rather unattractive bushes.



Fig. 2. 'Haloed Gold' *



Fig. 3. 'Princess Alexandra'



Fig. 4. Superfleur'. *



Fig. 5. 'Coral Flare'.

Over the last 20 years, I have grown over 200 hybrid and species vireyas, many of which have been discarded and composted because the traits that served them well in their natural habitat were not those desirable in culture. Shameful I know, but some hybrids were non-conformers regardless of the intervention. In more recent years, I have tried to present for sale vireyas that have the commercial characteristics of repeat flowering, compact growth habit and disease resistance. The task has been challenging, since the more traits you select against, the fewer vireya varieties remain in your stock population.

The 200+ plants I had were soon reduced to approximately 40, and they included some that did not make the grade on all three criteria but produced flowers that were exceptional and so had to remain as part of the collection. Here is my list of hybrid vireyas that I have found to be most successful in a garden setting in the sub-tropics: 'Haloed Gold', 'Kisses', 'Fireplum', 'Arthur's Choice', and 'Andrews Orange'. The traits that confer their garden and pot friendliness also translate into being commercial assets. However, it is worth noting that these hybrids may perform differently in other environments, but these six cultivars required little or no intervention and fit my selection criteria at almost 100%. I absolutely acknowledge that there are hybrids not in my collection that may well outperform these vireya hybrids, including those suggested for pot culture.

The remaining varieties in my list are all considered performers and I would also classify them as garden friendly, but they match my selection criteria to only about 80%. I am not suggesting that vireya hybrids that did not make my short list are not worthy of cultivating, and in fact, many others have more spectacular blooms and are beautifully perfumed. I continue to grow and propagate a large range of vireyas that I have not listed as garden friendly. In my selection, I have tried to assess the vireyas I market for ease of growing to increase success for the gardener. The intervention required by the above mentioned vireyas is reduced to achieve a marketable product.

I acknowledge my nursery issues are not those of every gardener's or collector's problem and that other criteria for selection do exist. Vireyas for export to the islands of La Reunion and Tahiti were selected for large vibrantly-coloured flowers, and growth habit was not so important. A cut flower producer that wanted to include vireyas in his catalogue requested vireyas with large flowers on long stems, and as this seller wanted and selected vireya hybrids that produce flowers on sticks, a compact growth habit was not a criteria in this instance.

In discussion with gardeners that have chosen a specific vireya hybrid for the beauty of its flower, I do suggest that the growth habit should then be used to determine its placement in the garden. Plant compact and bushy types in the front of the garden bed and tall, open growth habit types to the back. Similarly, a shy flowering vireya can bring a great deal of joy when that precious truss finally opens. A lack of repeat flowering is also not a reason to exclude a particular hybrid vireya or species from the garden.

Disease susceptibility in the subtropics is however a sound reason for leaving a plant on the shelf and removing its name from the propagation list. These hybrids cost extra time and money to reach the same standard, and so are not worth it. Commercial production for sale into a retail garden market should consider the above and save unwitting gardeners from disappointment when their new vireya reaches for the sky on leggy canes and becomes unsightly with mildew, anthracnose and or rhododendron rust.



Fig. 6. *R. loranthiflorum*.



Fig.7. *R. viriosum.*

The vireyas listed below are my next preferred choices for gardeners as they generally exhibit good growth habit and will repeat flower.

'Superfleur'*, 'The Trophy'*, 'Joy Lenore'*, 'Susan Maree'*, 'Sunny Coast Harry'*, 'Saint Leu Sunset'*, 'Bob's Daughter'*, 'Solar Flare', 'Pink Swan'*, 'Jimmy Sax'*, 'Coral Flare' and 'Princess Alexandra'.

Two of the many vireya species I have grown that have proven to be "garden friendly" and "pot friendly" include *R. loranthiflorum* and *R. viriosum.*

Many gardeners due to a lack of available space, difficult environmental conditions or simply by preference grow their vireyas in pots. This works very well as vireyas generally have fibrous root systems and adapt quite well to life in a container. Many species grow naturally as epiphytes on moss covered branches with relatively small root systems so adapt well to pots,



Fig. 8a. 'Saxon Blush'*.



Fig. 8b. 'Magenta'* grown by Enrico Ciarrocchi in Italy.



Fig. 9. Andrew Rouse in Melbourne, Australia, with one of his vireya hanging baskets.

hanging baskets and when attached to tree fern trunks. Hanging baskets and tree fern trunks both offer excellent drainage but when growing vireyas in pots, some consideration must be given to a vireya's requirement for excellent drainage. To achieve a situation where water can move through the pot mix freely, use an open orchid type mix, avoid small plants in large pots and if using a drip tray, elevate the pot in the tray.

As with your garden, choose vireya hybrids most suited to the situation. Vireyas with compact, bushy and/or hanging growth habit lend themselves to pot and hanging basket culture. Most hybrid vireyas will perform equally well in pots and hanging baskets but from a landscape design point of view, the compact and cascading types will be aesthetically more pleasing. I have found the following vireya hybrids in my collection suitable for pot culture:

'Arthur's Choice'*, 'Just Peachy', 'Lochmin', 'Diana Manson'*, 'Joan McLellan'*, 'Littlest Angel', 'Kisses', 'Fireplum', 'Magenta'*, 'Saxon Glow'*, 'Saxon Blush'*, 'Happy Times', 'Saint Valentine', 'Charming Valentino' and 'Jimmy Sax'*.

Finally, vireya rhododendrons are a large and varied group and hybridisers have introduced a fantastic selection into cultivation. From my many years of experience of growing vireyas in the garden and nursery, I have found that not all are equal and I suggest greater importance for future breeding be directed towards considering growth habit and disease resistance as well as flower beauty.

* = not registered.

*Neil Puddey operates the wholesale Jagera Wholesale Vireya Nursery in Australia, from which he propagates about 2000 vireyas a year, 50% of which are exported and the remainder sent mail order around Australia. He started propagating small numbers of vireyas in 1990 for his shady garden, but was encouraged by a local nursery owner to propagate more, and has now exported vireyas to 14 different countries, developed new hybrid vireyas, and has formed many new friendships along the way. He has enjoyed some success in developing new vireya hybrids that he calls "garden friendly," having less disease susceptibility, a bushier growth habit and repeat flowering.*


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## ARS 2020 SEED EXCHANGE

Rhododendron, azalea and companion plant seed donations will be accepted for the 2021 seed list per insructions below. We accept and list:
Hand pollinated (h.p.) rhododendron and azalea hybrids and species;
Open pollinated (o.p.) or collected in the wild (c.w.) rhododendron and azalea species;
Companion plant seed.

**As of June 15th, the 2020, seed list was closed for sales. The 2021 edition will open in mid January accepting seed donations from rhododendron, azalea and companion plants. The 2021 list will be available at both the ARS and Danish chapter web sites in early 2021. Donations should be submitted by December 15th , 2020***

Norman Beaudry, Chairman
ARS Seed Exchange,
7921 Deepwell Drive,
Bethesda, MD 20817-1927 USA
ARSseed@gmail.com

Note to members: Plans are now being made for the gradual transition for a new seed chairman to take on this position, but until then everything remains the same.

**Late donations are always accepted, but may not be listed in the hard copy version of the catalog.*

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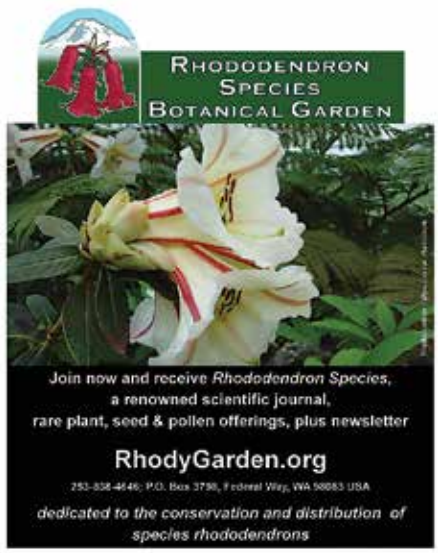
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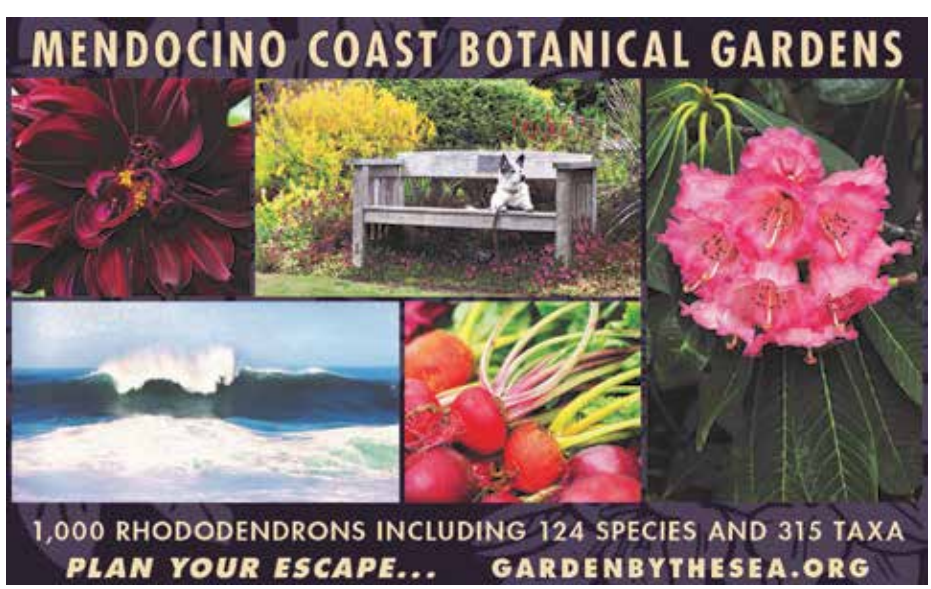



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ARS Office
PO Box 214
Great River, NY 11739
Email: member@arsoffice.org
Fax: 866-883-8019 (toll-free)

J**OURNAL (JARS) SUPPORT:** Associate Editor Donald Smart now takes care of ALL JARS mailing support including missed or damaged copies.
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**FINANCES:** Bills and payments--other than membership checks--should be sent to ARS Treasurer Dave Banks. This includes Endowment and chapter payments for medals and insurance. Checks can be mailed, otherwise contact Dave for EFT transfer details.
American Rhododendron Society
PO Box 6414
Williamsburg VA 23188-6414
Email: arstreasurer1@gmail.com
Phone: (h) 757-258-8632; (c) 757-561-9444; Fax: manual, by arrangement.

Donations to the Research Foundation should be sent to Perc Moser, Treasurer, ARS Research Foundation, 301 Caversham Rd., Bryn Mawr, PA 1901

If you aren't certain whom to contact--contact either Katherine or Dave! This is an evolving new structure and I'm certain there are things that we haven't thought about.
Dave Banks
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