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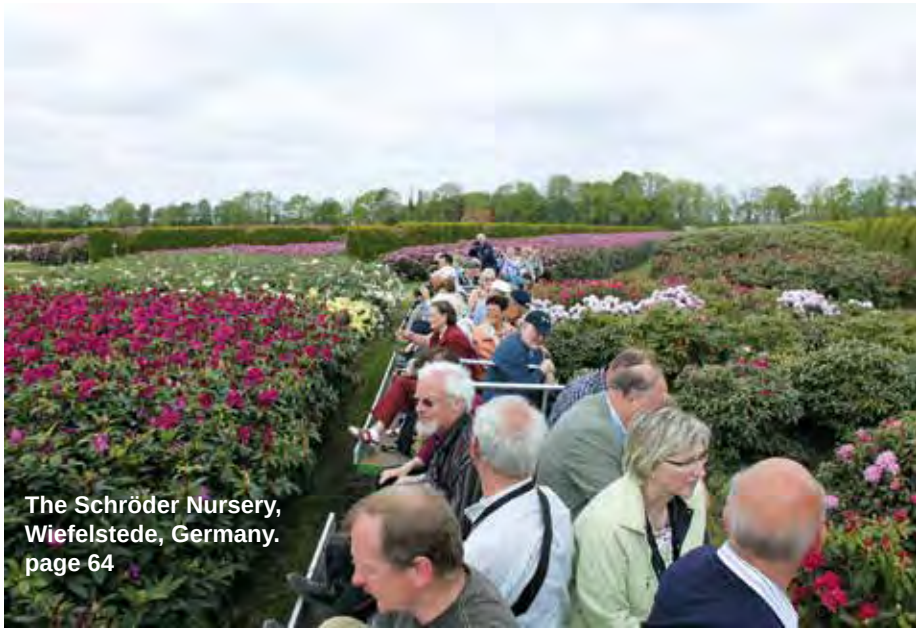

The Schröder Nursery, Wiefelstede, Germany. page 64

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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 conferences
- 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 (include proof if over 18)	$10.00
Regular	$40.00
Commercial	$90.00
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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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The Schröder Nursery, Wiefelstede, Germany. Photo by Hartwig Schepker

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From the President

Ann Mangels
Baltimore, Maryland

I want to thank the Eureka Chapter for sponsoring this year's Annual Meeting. Living in Eastern North America, we don't see all the beautiful plants you all can raise in the west! Seeing those wonderful *Meconopsis* poppies and the *R. occidentale* were a treat in themselves, and we enjoyed finally seeing the Humboldt Botanical Garden which Tim and June Walsh have carefully crafted. But, of course it is always great seeing so many friends as well!

Since returning home, the ARS has been spreading its wings into some other areas. They say all good things come to an end, and for us, it is sad that Sonja Nelson has announced that she plans to retire as Associate JARS Editor on March 1, 2018. You all know that it will be a very difficult task to find her replacement, since Sonja has been working with the JARS and Editorial Committee for nearly twenty years. Talk about an evolving publication that Glen and she have put together! A committee has been formed, chaired by Ken Webb, with Dave Banks, Jo Wright, Bruce Feller and me involved in discerning our next steps to replace her.

Also, Juliana Medeiros, a rhododendron scientist at the Holden Arboretum, presented in Eureka an idea for the establishment of a Rhododendron Research Network (RRN) for Board consideration, which was received well and approved for further study. Her hope is to bring ARS members and rhododendron hybridizers and growers together with the rhododendron scientific community to conduct and share international research. Juliana is co-chairing the RRN with Erik Nilsen, and Steve Krebs, Bob Weissman and Glen Jamieson are working with them to further the project, which is further described on page 24 in this issue. This initiative could open doors for endless collaborative possibilities and make rhododendrons one of the most studied woody plant in the world.

The ARS and Rhododendron Species Foundation have also been asked to collaborate with Ken Cox in the production of his new book featuring woodland gardens. We are still examining the potential benefits to the ARS for our support before making any commitment.

I hope you all had a fine summer and enjoyed working in your gardens and seeing the fruits of your labors! It will be fun to get together again in Richmond, Virginia, and I hope many of you can enjoy a nice fall trip to hear interesting speakers, see beautiful pictures and visit with old and new friends.

From the Editor

Glen Jamieson
Parksville, BC
Canada

I always seem to start off my column by mentioning the unusual weather these past few months, and I am coming to the conclusion that from now on, “unusual” is likely to be the status quo. Whether you attribute it largely to human-influenced climate change, which I do, or not, regardless, the average weather over the recent past few decades for many of us does not give much indication as to what the future will be. In the Pacific northwest, hotter summers and longer droughts (here on Vancouver Island, we’ve had eight mm (1/4 inch) of rain in the past two months, well below the expected average of about 80 mm (3.2 in)) is what we are experiencing. Gardening is becoming definitely more challenging! More extreme events like the flooding associated with Hurricane Harvey or drought and fire as in California and BC should be anticipated in many ARS members’ locales in the future!

What really is exciting me this quarter though, is the Research Rhododendron Network that is being established as a joint venture between the world-wide rhododendron scientific community and the ARS (see p. 24 for more details). This has the potential to make rhododendrons the woody plant model for almost all types of scientific plant research, just as fruit flies are a model for many insect studies. What makes this initiative particularly exciting for the ARS is that it will involve members in citizen science initiatives, where members will be able to become actively involved in the collection of relevant data for use by researchers. With ARS members spread world-wide and over a large latitudinal range, this collaboration has the potential to be very productive. *Rhododendrons International,* the new online journal being championed by the ARS, will be the venue where many research initiatives will be published, or at least reviewed and/or summarized.

A Summary of Twenty Years in the Field Searching for Wild Rhododendrons

Steve Hootman
Federal Way,
Washington

(Modified from an article published in The New Zealand Rhododendron *2016, 18-23)*

One of my responsibilities as Curator of the Rhododendron Species Botanical Garden (RSBG) is to build and develop the plant collections, primarily, the *Rhododendron* species collection. This provides me with opportunities to travel to some of the most remote, difficult and beautiful wild places on the planet since the majority of species *Rhododendron* occur in the mountains of southeastern Asia and south into the islands of the Indian and south Pacific oceans. The areas with the greatest concentrations of species are also those areas that have been the most thoroughly explored by the early plant hunters such as George Forrest and Frank Kingdon Ward, as well as by modern plant hunters in the late twentieth and early twenty-first centuries. These are well travelled regions with names familiar to all who study such things—Yunnan, Sichuan, Tibet, Taiwan, etc. Although most of the rhododendrons native to these regions have probably been "discovered" and are now well-known and widely cultivated, we are still finding new species even in these well-documented regions.

I have been lucky to have travelled widely in these regions during the course of my career and have learned a great deal from these experiences. Over the past few years, however, I have been focusing on some of the "fringe" areas of "rhododendron-country," i.e., regions away from the primary hunting grounds that contain far fewer species and of which we often have very little knowledge. A small sample of these would include places like Vietnam, Arunachal Pradesh in NE India and the provinces of Guangxi, Anhui and Guizhou in China. The rhododendrons native to these regions are relatively little-known and many have not been introduced into cultivation. In

R. titapuriense.

addition, many of these poorly documented species are rare and extremely vulnerable to extinction due to their tenuous existence as very localized and isolated populations that are under extreme pressure from human activities. Indeed, many are restricted to a single mountain.

For the purpose of this article, I will not discuss the many interesting areas and the plants found in them that have been well-documented in the past, such as Yunnan, but will instead focus upon some of the rhododendron highlights from the "fringe" regions of rhododendron distribution. In Arunachal Pradesh in the Indian Himalayas, for example, probably well over a dozen new species have been found in the past 15 years or so, including several big-leaf species in the Falconera and Grandia subsections. Most of these have yet to be scientifically described and named although a massive tree species recently found by Ken Cox has been named by him as *R. titapuriense*. This species has pure white flowers and a dense reddish-brown indumentum on the lower surface of the leaves. It is quite distinct from any other species and seems to inhabit only a single valley. It grows to around 100 ft (30 m) in height and may be the largest-growing rhododendron in the world. Another new big-leaf has been named *R. mechukae* A.A.Mao & A.Paul (2013) and is listed as critically endangered, with a small population limited to the type locality. A few other new big-leafs have also been found recently, as well as some interesting lepidote species. It may be many years before we

R. glanduliferum Baravalla.

have enough information on these new species to have proper descriptions and names.

Several exciting new species have recently been introduced from Guizhou and Guangxi Provinces in SW China, including a few members of subsection Fortunea which will almost assuredly become widely-grown and well-known garden plants as they are dispersed more widely into cultivation. Among these are *R. glanduliferum* with very large, somewhat hairy leaves and large, white or pink, fragrant flowers in mid-summer, as well as its close relative *R. magniflorum* that appears to be *glanduliferum* on steroids, reportedly having much larger foliage and flowers. A few years ago while exploring in the southern Chinese Province of Guangxi, we also managed to find the long known but never introduced *R. faithiae,* which is known from only two extremely isolated mountains. This species has large smooth foliage with a cordate leaf base and an undulate margin and is somewhat similar in appearance to *R. hemsleyanum* (native far to the north in Sichuan). Like this species, *R. faithiae* should have large fragrant white flowers in summer.

R. glanduliferum PW#041.

Another enigmatic species, this one native to northern Vietnam and adjacent southern Yunnan, has been called *R. hemsleyanum* affinity, *chihsinianum*, and *serotinum*. Its proper label still awaits the work of a botanist but, based on the suggestion of David Chamberlain, we have been calling it *R. serotinum*. Of course, it looks nothing like the "classic" *serotinum* that has been in cultivation for decades**,** but the name serves the purpose for the time being. The old, long cultivated forms of *serotinum* do not have any wild-collected data attached to them and, at least in the forms that we have grown at the RSBG, appear to simply be late-blooming hybrids of *R. fortunei* subsp. *discolor*. From basic morphological features this new introduction also appears to have affinities with *hemsleyanum*, a species endemic (as far as is currently known) to Emei Shan—several hundred miles (even further in kilometres) to the north in Sichuan. It differs from this well-known species in having a narrower leaf and a much more vigorously upright habit, almost fastigiate. It is a remarkably strong grower, with long extension growth, often flushing twice in a season. The new foliage is blue-green and the large fragrant white flowers are very similar to those of *hemsleyanum*, even appearing at the same time of the year, early summer. The flowers of the new introduction, however, are almost half again as large as those of *hemsleyanum*.

Only a few of the plethora of new species in subsection Fortunea that have recently

been named by Chinese botanists (see the *Flora of China* 2017) have been introduced into the west. Among these, we are cultivating the species *R. maoerense* and *yuefengense* at the RSBG, both from the Maoer Shan in southern China. The former has very lovely foliage of shiny green with a reddish-purple flush on the petioles that often extends onto the mid-ribs. It is obviously close to *R. fortunei* but with quite distinct foliage and much deeper colored flowers earlier in the season. Like that species it is an easily cultivated and vigorous species which will need some space in the garden.

The second new species we are cultivating from this southern Chinese mountain range is the stunning, dwarfish *R. yuefengense*, a relative of the rare *R. platypodum* and, probably, *orbiculare*. *R. yuefengense* has striking foliage quite similar to that of *platypodum* but a bit smaller and less leathery (still amazingly thick and firm). The leaves are suborbicular in shape and quite thick and leathery, with smooth surfaces and

R. maoerense P1120341.

R. yuefengense P1020503.

a short and wide, flattened petiole. It has pinkish bell-shaped flowers that hang from an upright, racemose inflorescence in early summer. The flowers are produced at a very young age, often even on a three-year old seedling and the plant has shown remarkable hardiness considering its native latitude. This species differs from *platypodum* primarily in its much smaller stature and in having glabrous stamens. Its native range is also quite disjunct from that of *platypodum* which is known only from the Jinfo Shan of southern Sichuan. *R. yuefengense* is relatively slow-growing and dwarfish in cultivation**.** The species *platypodum* itself has only recently been introduced from the wild. It is similar in foliage to its obvious close relative *yuefengense* differing in its larger leaves, more vigorous, upright habit and deeper colored flowers quite a bit earlier in the season. It remains quite rare both in its native habitat and in gardens.

R. platypodum. Glendoick, first flowering.

Within this same group of seemingly closely related species, the true *R. cardiobasis* (formerly *R. orbiculare* subsp. *cardiobasis*) has finally been introduced into cultivation from the Dayao Shan of Guangxi Province in southern China. This is in contrast to recent introductions that have been widely circulated of what was thought to be this taxon from the Maoer Shan, a bit further to the north which also have rounded "*orbiculare*-type" leaves but with flowers typical of *R. fortunei*. These should be named as a new subspecific taxon under the species *R. fortunei,* while the true *R. cardiobasis* (collected from the type location in the Dayao Shan) should be reinstated as a separate species and not placed within *R. orbiculare,* a species which is native far to the north in Sichuan on the other side of China. Plants grown under the name *R. cardiobasis* have been floating around for years but they always lacked data and appeared to be

garden-origin *R. orbiculare* hybrids of one sort or another. So far in the garden, this new introduction is proving to be a much more vigorous grower than *R. orbiculare***,** with a very different, much more upright habit. The foliage is much less leathery than that of *orbiculare* or *fortunei* and a very different shade of green.

Two more new species from subsection Fortunea grown at the RSBG are relatively widespread taxa that are well known to science but seem simply to have never been properly introduced and were apparently not in cultivation until the 1990s. The closely related species *R. huanum* and *davidii* occur in a similar range across southern Sichuan and into northeastern Yunnan and adjacent northeastern Guizhou. They are separated primarily by calyx size (large and usually cupular on *R. huanum*, quite small and rim-like on *davidii*). Also, *davidii* generally has larger and firmer leaves and a more upright inflorescence, flowering earlier in the season. In cultivation, both species are forming well-shaped rounded shrubs with attractive smooth green leaves. The new growth and foliage of *R. huanum* is particularly attractive as it emerges a glossy olive-green with bright, red-purple perulae and petioles. The flowers of these two fantastic introductions

R. huanum DSC03723.

R. dachengense P1040534.

are what really grab your attention however, being a strange (for this subsection) lilac or reddish-purple with darker nectar pouches. The color reminds me of some of the better forms of the early blooming species *R. ririei* more than anything else. The poise of the flowers adds to their charm**,** with *davidii* bearing a much more upright inflorescence while the flowers of *R. huanum* hang from their long pedicels to display the large and brightly colored fimbriated calyces most effectively. Like most members of this very garden-worthy subsection, these two species are quite amenable in cultivation**.** I would recommend light shade in most climates. They are not as vigorous or large as some of their giant cousins**,** and are easily accommodated in most gardens. Currently, *R. huanum* is much more common in gardens**,** although it is still relatively rare.

Finally, I have been focused on some of the enigmatic "outlying" species in subsection Taliensia. These species, including *R. roxieoides*, *dachengense* and *shanii*, are little-known relatives of those famous but difficult alpine species such as *R. proteoides*, *pronum*, *bureavii*, *lacteum* and *roxieanum,* all native far to the west in the high mountains adjacent to the mighty Himalayas. I have been very intrigued as to the origins and very existence of these widely disjunct, extremely isolated "relict" species.

Several years ago Jens Nielsen managed to finally locate a small population of *R.*

roxieoides in the wild jumble of mountains and canyons of eastern Chongqing Province. It was a stunning find of a plant with fantastically indumented, shiny foliage and deep pink flowers. Then, in 2012, after years of searching, my friends (including New Zealand native Tom Hudson) and I finally located the rare and enigmatic *R. dachengense* in the remote mountains of Guangxi Province, China. The very existence of this dwarf and prostrate member of subsection Taliensia in the low elevation subtropics of southern China was more than enough to grab, and firmly hold, my attention. The plants were growing on vertical cliffs and some of the plants were several feet across and must have been ancient. The small elliptic leaves were coated beneath with a very dense red-brown indumentum, and the plant had the same prostrate and creeping habit as the familiar species *R. forrestii* subsp. *forrestii* (previously var. *repens*). The species was quite common in that particular location and I wondered how widespread the population was. I carefully worked my way up the cliff for the next several minutes, looking for variations and anything else I could learn about this long-searched-for species of which we knew so little. It was my fourth attempt at finding the species and I was going to make the most of my time with it! That turned out to be the only population of this incredibly rare species we would find although there must be more of it about on the

R. shanii.

mountain, hopefully growing in even more inaccessible locations. My thoughts were swirling—how did this species end up in this incredibly isolated location? What were its closest relatives, both geographically and taxonomically, and was this one of the "original" species or just an enigmatic and outlying small population that had adapted to local, geologically temporary conditions and that was now probably fading out of existence?

I began researching other "outlying" and little-known, seemingly remnant species in the genus *Rhododendron*, specifically members of subsection Taliensia, many of which had never before been seen by western botanists and about which very little was known even in their native countries. The species *R. shanii* from the eastern coast of China, even further from its closest relatives than *R. dachengense*, was my next goal. What did this basically unknown species actually look like? Like *dachengense*, was it really a member of subsection Taliensia? If so, why were there so many highly disjunct species in this single subsection?

In the autumn of 2015 my friends and I finally tracked down the elusive *R, shanii*. It actually existed! Once I was able to examine the foliage I realized that it was definitely a distinct species. The leaves were quite large and rounded and quite deep green and shiny on top. They were covered with a thick, felted, deep brown indumentum beneath with unusual, perfectly round flower buds. In foliage and habit the species reminded me of both *R. lacteum* (western Yunnan and Sichuan) and *R. campanulatum* (Himalayas) and the overall impression that it made on us all was that it was a great stout beast of a plant. Having finally found both *R. dachengense* and *R. shanii,* I realized I was now more confused and curious than when I had started this quest several years earlier. What is the story of these outlying species? How did they get there and how have they managed to survive all of these millennia? Did I have the *Wollemia nobilis* of rhododendrons in my bag?

Reference

Flora of China, 2017. 1. *Rhododendron subsect. Fortunea* http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=316406

Steve Hootman is a member of the Seattle Chapter, and is the Executive Director and Curator of the Rhododendron Species Botanical Garden in federal Way, WA.

You Can't "Leaf Out" the Importance of Water

Sharon Danielson
and Juliana Medeiros
Kirtland, Ohio


S. Danielson


J. Medeiros

One aspect that makes rhododendrons so interesting is their immense variety of leaf shape, size and texture, which provide pleasing aesthetic diversity long after the flowers have faded. But, why are rhododendron leaves so diverse? Given that rhododendrons hail from a wide variety of habitats around the globe, we hypothesized that different leaf forms could reflect adaptations to climate stress, and that leaf diversity could be one factor allowing different species to grow and thrive in different environments. Here, we provide an in-depth look into our research on water use in *Rhododendron* leaf function. Though you are well aware that water is a resource plants need to grow, this article will tell the fascinating story of how leaves use water, where the water goes, and the important role leaf water use plays in determining what kinds of plants can grow in a particular habitat. Our study provides evidence that many leaf traits interact to determine leaf water use, and that a trade-off between staying hydrated and growing faster could be an important factor driving both leaf and climatic diversity among Rhododendrons.

How do Leaves use Water for Plant Growth?

Most of the water plants use actually evaporates into the atmosphere during the process of photosynthesis. In the presence of light, green chlorophyll inside the leaf cells (Fig. 1A) captures light energy, then passes that energy through a chemical chain reaction that makes sugar for plant growth. This process requires access to carbon dioxide (CO_2) from the atmosphere. As part of this process, small pores on the leaf, called stomata, will open up to provide cells access to atmospheric CO_2. Opening stomata intentionally exposes cells inside the leaf to the air, but air is typically much drier than the humid conditions inside of the leaf. So, when the dry air touches the cell surfaces, water evaporates from them and exits the stomata in the form of water vapor.

Atmospheric conditions play a major role in determining how much water evaporates

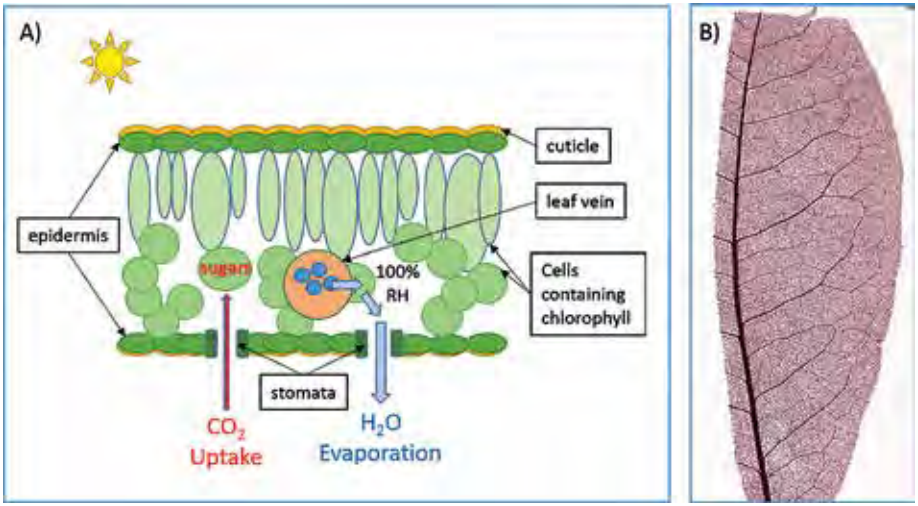

Fig. 1. A) Diagram of a leaf cross-section showing the link between leaf water use and plant growth. Leaves face a trade-off between carbon uptake and water loss. The red arrow shows the path of CO2 as it passes through the stomatal pore and enters the cells containing chlorophyll, where CO2 is converted to sugars to fuel plant growth. The blue arrows show the path of water (H20) evaporation. Water arrives at the leaf via veins, which replace the water lost through stomata by evaporation. If the veins are working properly, then the relative humidity inside the leaf is maintained at 100%. B) Leaf vein network of *Rhododendron austrinum*. The chlorophyll has been removed from the leaf and the veins have been stained red.

from the leaf during photosynthesis. The greater the difference in humidity between the inside of the leaf, which is at 100% humidity, and the air outside of the leaf, the greater the evaporation will be. Just as dry air can increase evaporation from leaves, when it is warmer the relative humidity of the air is lower, so in hot climates the water evaporates from the leaf more readily. On average, plants "spend" six molecules of water for every one molecule of CO_2 that is converted to sugar.

Thus, photosynthesis comes with a large water cost. A wide variety of leaf traits may function to maintain proper leaf hydration to reduce this water cost impact. For example, some rhododendron leaves have a thick epidermis and cuticle (Fig. 1), a waxy coating that seals the leaf much like lotion is used to prevent dehydration of our skin. These traits help plants perform a delicate balancing act: they need open stomata so that they can gain the CO_2 needed for photosynthesis, but keeping stomata open for too long could lead to desiccation. On the flip side, if they close their stomata to avoid drying out, they risk starvation. Just like you and me, plants need to keep their cells hydrated to stay alive, so they must invest in structures that replace the water they lose through their stomata.

That is where leaf hydraulic conductance (K_{leaf}) comes in. This is essentially a

measure of how easily water can flow through a leaf to replace the water evaporating from the cell surfaces. Water is supplied by leaf veins (Fig. 1A), and you can think of these as tiny straws that provide a low resistance pathway for water to move all the way from the roots to the leaf cells. Each and every cell in the leaf is supplied through the vein network (Fig. 1B). Some cells are close to the veins, so they receive water quickly and efficiently, while other cells must get their water second hand, as it slowly passes from cell to cell to reach those farthest away from the veins. Increased vein density increases leaf hydraulic conductance by providing more easy opportunities for water to flow, but traits like a thick cuticle can decrease the conductance of water because wax is resistant to water moving through it. Leaf hydraulic conductance is also affected by environmental factors - warm temperatures, low humidity, and high light levels will all contribute to higher conductance. So, the research question we asked was whether *Rhododendron* species from different climates differ in their leaf hydraulic conductance.

We measured the leaf hydraulic conductance of eight *Rhododendron* species, including five evergreen species whose results we will discuss here - *R. ponticum*, *R. hyperythrum*, *R. catawbiense*, *R. minus*, and *R. keiskei*. We used the method of Sack and Scoffoni (2012), of which a video description is available at doi.org/10.3791/4179. Theoretically, rhododendron species that are native to warmer climates (Fig. 2) should experience higher evaporation from leaves, and therefore would have higher maximum leaf hydraulic conductance (Table 1).

Fig. 2. The native range for the five evergreen species we examined in our study of leaf hydraulic conductance. The ranges of *R. catawbiense* and *R. minus* in North America overlap considerably, while the ranges of the other three species are quite distinct. *R. ponticum* is native to Turkey and the Iberian Peninsula, and invasive populations in the United Kingdom are also depicted. Location data were retrieved from the Global Biodiversity Information Facility at www.gbif.org. These location data were used to generate an estimate of the mean annual temperature in the native climate using the method of Hijmans et al. (2005).

Table 1: The evergreen species measured in our study, the estimated mean annual temperature in their native climate, along with the expected K_{leaf}, and the actual K_{leaf} measured.

Species	Mean annual temperature in native climate °C	Expected K_{leaf}	Measured K_{leaf}
R. hyperythrum	14.9	Highest	Mid
R. minus	12.7	Mid	Mid
R. keiskei	11.2	Mid	Lowest
R. ponticum	9.2	Mid	Highest
R. catawbiense	8.3	Lowest	Mid

Unexpected Results - Plants are Always More Interesting than We Imagine

As often happens in science, the results of our study were not what we expected. Instead of seeing the predicted pattern of higher conductance in species from warmer climates, we saw the opposite, and thus were left scratching our heads for an explanation. *Rhododendron ponticum*, originating from climates with some of the lowest mean annual temperatures, had the highest K_{leaf} (Table 1). On the other hand, *R. keiskei*, expected to be somewhat in the middle compared to the other species, had the lowest K_{leaf}. The last three species fell out in the middle, having approximately similar K_{leaf} values. So, why might this be?

The first thing to consider is that this was a greenhouse study in which all the plants were grown under similar conditions. This technique should make features that represent adaptations to native climate more prominent, to understand how the species' "native climate" affects leaf hydraulic conductance. If the leaf hydraulic conductance is correlated with conditions in the plant's native climate, then it is an inherited trait passed down through generations. However, all plants regardless of where they are from can likely exhibit a range of physiological responses to their environment. For example, it would be detrimental for a plant to function only at one precise temperature, because natural environments vary in their temperature. Thus, one reason for our results may be that leaf hydraulic conductance could be a very flexible trait in *Rhododendron*. In this case leaf traits could be adjusted to their environment as plants grow, rather than having genetic differences between species. We plan to test this hypothesis in our future work by growing plants under different conditions and seeing how the leaf hydraulic conductance changes. But leaf hydraulic conductance is a complex trait that is affected by many different factors, so there are other possible reasons why we obtained unexpected results.

Saving versus Spending – a Wide World of Leaf Traits Reduce the Water Cost of Photosynthesis

One of the most fascinating aspects of plant physiology is that there is no "silver bullet," no single trait that will make a plant grow well in all habitats. Plants have

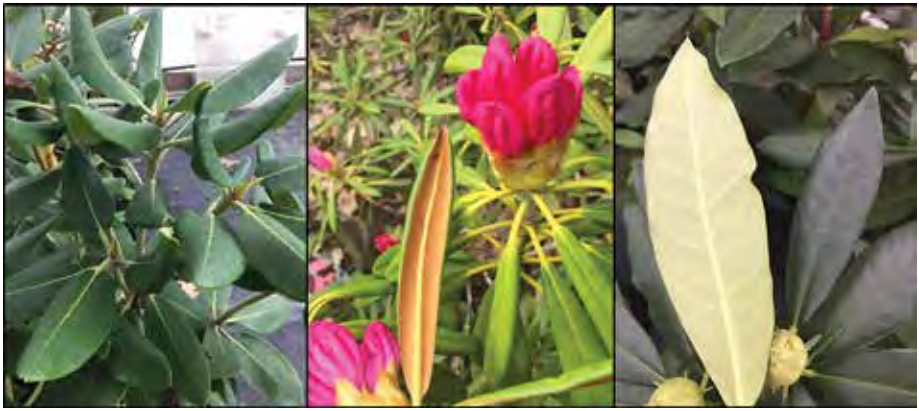

Fig. 3: (Left to right) Curled leaves of *R. catawbiense* and *R. hyperythrum*, contrasted with *R. ponticum* leaves showing no curling.

complex suites of traits that solve complex environmental problems, and let's face it, not everyone can be good at everything. In fact, the leaf vein network is very expensive to build, and in some cases it may be wise to invest in traits that provide a water savings, rather than increasing the investment in water supply. Here we discuss two leaf features, leaf curling and leaf scales. We suggest that these traits may change the cost-benefit ratio of investing in leaf hydraulic conductance, and we relate this to our unexpected results.

The leaves of *R. catawbiense* and *R. minus* droop and curl at cold temperatures. This is thought to prevent leaf damage during freezing, but there is an interesting link to leaf hydraulic conductance because the proposed mechanism for this revolves around water (Nilsen 1991). Turgor pressure, caused by water pushing on the cell wall, allows leaves to maintain their structure and rigidity. When the temperature is very cold, some species allow their leaf turgor pressure to decline, causing the leaves to droop and curl (Nilsen 1991). Leaf curling in rhododendron leaves can also occur regardless of the temperature. For example, cultivated plants of *R. hyperythrum* have curled leaves, while in the wild leaves of this species tend to be flat (Cox and Cox 1997). In this case, the mechanism and benefit of curling are not known. Interestingly, all three leaf curlers we examined had very similar leaf hydraulic conductance, even though they may curl under different circumstances.

One reason for this result might be that leaf curvature could limit how fast water evaporates from the leaf surface. Recall that the relative humidity makes a big difference in how quickly water evaporates from the leaves. This is true even at a very fine scale. The fine-scale environment is sometimes referred to as the microclimate. This microclimate can be altered by traits that may seem inconsequential to the naked eye. The stomata, which are typically located on the underside of the leaf, respond to changes in the microclimate. If the leaf is curled, it could act as a buffer, increasing

the humidity underneath the leaf. If humidity near the stomata is increased this will result in lower evaporation rates. In this case, investing in more veins to increase leaf hydraulic conductance could be wasteful, as those resources may be better spent on building more leaves to do more photosynthesis. This type of cost-benefit calculation is a pervasive feature of plant physiology, as plants must juggle limited resources to allow the highest growth rate possible, while still remaining resistant to climate stress.

R. keiskei is interesting from this perspective, as our data suggests that it may have an entirely different approach to water savings. Our climate data indicates that this species experiences warm mean annual temperatures, so our finding that it had the lowest leaf hydraulic conductance was certainly surprising. Though not a leaf curler, this species is a lepidote rhododendron. Lepidotes, in contrast to elepidotes (*R. ponticum*, *R. hyperythrum*, and *R. catawbiense*), have small scales on the surface of their leaves (Fig. 4), which could increase the humidity on the leaf surface, resulting in less water

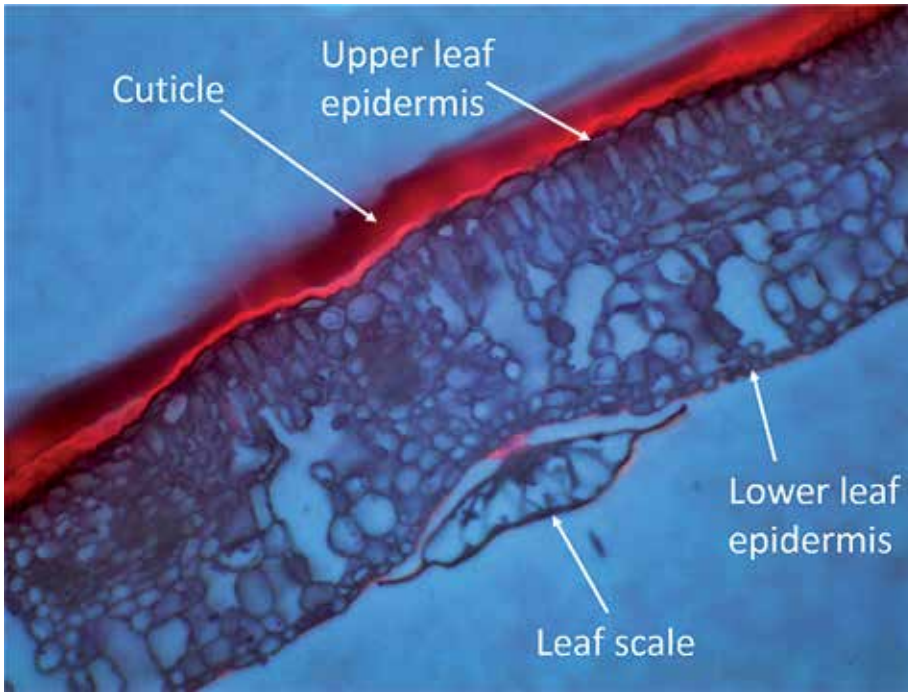

Fig. 4: Cross Section of a *R. keiskei* leaf under UV light at 20x magnification showing a leaf scale, the small "umbrella" structure at the bottom center. The upper and lower epidermis protect the inside of the leaf from the dry air. The stomata, which open to provide access to carbon dioxide for photosynthesis, are typically located on the lower side of the leaf. The cuticle on the upper surface of the leaf adds a waxy layer of extra protection. The UV light makes this cuticle glow red, but other colors are possible depending on the chemical composition of the cuticular wax.

evaporation. Though leaf scales are typically thought to be important in reducing herbivory, this feature could also allow the plant to save water while still getting the same growth benefit. Interestingly, *R. minus* is also a lepidote, in addition to being a leaf curler, highlighting the possibility that many traits interact to determine leaf water use. By reducing the amount of water that a leaf must trade for carbon, these plants might actually be able to grow faster than a plant that chose to invest more resources in their leaf vein network.

Sometimes a Risk is Worth the Reward

One of the species we examined, *R. ponticum,* had much higher leaf hydraulic conductance than expected based on its native climate. This elepidote species has non-curling leaves, and we did not find any features that could limit evaporation from its leaves. However, this species has a fascinating ecology that may help explain our findings. *R. ponticum* plants originating from the Iberian Peninsula have escaped from cultivation in the United Kingdom, and it and some hybrids of it have become a serious invasive pest there (Milne and Abbott 2000; K. Cox https://www.glendoick.com/Why-so-called-Rhododendron-x-superponticum-is-nonsense). This plant is well known for aggressive growth and for forming nasty thickets. So, how does this relate to our findings on leaf water use? It all comes down to risks and rewards.

Though we have talked extensively about saving water, some plants take the opposite approach, and spend water fast and grow fast. Ultimately, though, the amount of water a leaf can use will be limited by soil water availability. Plants that maintain very high leaf hydraulic conductance will deplete soil water more quickly and thus may create drought conditions around their roots. In negotiating the trade-off between staying hydrated and growing faster, some plants take the risk of drying out on the chance that they will complete their growth before stressful conditions come along. We have seen the two sides of this in our work comparing red maple and white oak trees (Medeiros et al. 2016). Oaks grow slowly, and they don't take any risks with their water supply, spending a lot of resources to make larger, stronger veins and tough leaves. Maples, on the other hand, use a lot of water to grow fast, and do not invest in infrastructure like strong leaves or veins. Instead, they push their physiological limits more closely and risk dehydration. This risky strategy is particularly common among weedy invasive species. Thus, we suggest that the high rate of leaf hydraulic conductance we observed, combined with a lack of water saving traits, is consistent with a high risk water use strategy in *R. ponticum*.

Another interesting aspect of *R. ponticum* in this respect is that the physiological traits of this species have been shown to be highly flexible (Niinemets et al. 2003). Flexibility could allow this species to adjust more closely to the current growing conditions and maximize growth. In the case where a more risky strategy is employed, it makes sense that closer fine-tuning is needed, because a small miss-step could place plants in a dire

situation if the soil water supply runs out. If this can be managed just right, a risky plant will grow much faster than a more conservative plant. For *R. ponticum*, it looks like the perfect amount of risk may have led to great rewards, as this species continues to expand aggressively beyond its ancestral range. In the future, we look forward to exploring the hypothesis that such risky behavior and high leaf hydraulic conductance have played a role in the invasion success of *R. ponticum*.

More Questions keep *Rhododendron* Researchers in Business

Though we learned a lot about rhododendron leaf physiology in this study, further research still needs to be conducted to address the seeming mismatch we detected between leaf hydraulic properties and a plant's native climate. Currently, we are determining how leaf hydraulic conductance changes throughout the seasons to better understand how flexible this trait is in rhododendrons. Furthermore, the relationships between leaf curling, leaf scales and leaf hydraulic conductance need to be emprically tested. Another trait that we have not touched on here, but which is very prominent in rhododendrons, are leaf trichomes. These are tiny hairs, often found on the underside of the leaf where stomata are located, where they form an indumentum or tomentum, and are most common on elepidotes. Just like leaf curling and leaf scales, trichomes could alter the microclimate around the leaf, and change the rate of evaporation. Finally, future projects will examine the effects of freezing, heat waves and drought on leaf hydraulic conductance, providing insight into the role of water in the performance and survival of *Rhododendron*.

With a better understanding of how plants manage climate stress from day to day, we can hope to better understand rhododendron leaf diversity, and more practically, how to best choose plants for our specific gardens. Over the long term, climate change is predicted to significantly increase the frequency of stressful climate events, including changes in the timing of seasons, hotter summers, and longer droughts. These shifts could have profound impacts on the stresses imposed on plants, and the type of physiological data we present here can better help us predict which species may be most at risk. On the flip side, we may also find that some species, like *R. ponticum*, will benefit from climate change. No matter what, our study shows that we can't "leaf out" the importance of water research, which provides us with valuable information on plant hardiness, allowing us to plant sustainable gardens for specific areas and help conserve rare species for the future.

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Announcing the Newly Established Rhododendron Research Network

Juliana Medeiros
Kirtland, OH

A Rhododendron Research Network has been established in a collaboration between the ARS and an international group of *Rhododendron* researchers. Three goals have been identified for this collaboration: 1) promote *Rhododendron* as a model woody plant system for research, 2) promote ARS and botanical garden member participation, and 3) create opportunities for collaboration and communication both among researchers and between the research community and ARS members.

As one of the most speciose and diverse genera of plants on earth, *Rhododendron* has been a rich study system for addressing a wide range of biological questions. The 1000+ species in the genus offer opportunities to investigate a range of ecological roles. Some *Rhododendron* species form the predominant component of native floras, others are members of dwindling endangered populations, and some are even aggressively invasive alien species. These characteristics are associated with diversity in their habitats, their climate preferences, plant habits, morphology and stress tolerance levels, with the result that *Rhododendron* is proving to be a fascinating choice for studies in horticulture, evolutionary biology and plant physiology. This type of work is expected to be even more fruitful in coming years, when recent efforts to fully sequence the first *Rhododendron* genome are finalized. As there are relatively few woody plant genomes available for study, *Rhododendron* is now poised to become a preeminent study system in genetics as well. In addition, species within the genus can boast great value to human society, including a wide variety of local ethnobotanical uses, some of which are being explored for their potential in medicinal chemistry. As a result, the popularity of the genus *Rhododendron* as a research study system has the potential to grow significantly over time.

Now, through the combined efforts of activities within our now-established rhododendron research network, we expect that the genus *Rhododendron* will assume even greater scientific relevance: discoveries in one subject area will drive innovations in other areas, and a steady accumulation of knowledge will draw further interest and the engagement of a surging number of new scientists.

Why are rhododendron research scientists and the ARS joining hands in this project? There is a great deal that the ARS has to offer to the *Rhododendron* research community in terms of knowledge and scientific resources. Many members have a lifetime of collecting *Rhododendron* observations, ranging from creating detailed hybrid pedigrees, conducting genetics studies, making evaluations of climate performance, monitoring rhododendron phenology [phenology is the study of periodic plant and animal life cycle events and how these are influenced by seasonal and inter-annual variations in climate, as well as habitat factors (such as elevation)], and undertaking conservation-minded field collecting expeditions. This resource collection is rare in the scientific world, where immense efforts are currently being made to compile the scant information generally available for most plant genera.

We also expect ARS membership to benefit from this partnership. First, increasing the number and kinds of researchers working in *Rhododendron* should increase the speed of scientific discoveries of interest to ARS members, such as by providing new relevant data for the breeding of desired characteristics for plants for horticulture, supporting conservation efforts, and solving disease problems, just to name a few. Second, we all love to learn new and interesting things about our favorite plants, but only a few of us are interested in wading through incomprehensible jargon-filled talks or papers. We look forward to promoting enhanced awareness of international research on *Rhododendron*, and doing so in a way that makes scientific information accessible and understandable to people from all backgrounds.

Toward these objectives, we have planned a range of activities to start better communication across research disciplines and between scientists and ARS members. We are currently in the process of developing an internet webpage that will host information and tools in support of our network. As one of the primary avenues of communication today, internet searches are now the first ways most people investigate a new topic, and this is true in the scientific community as well. You can now visit our homepage at www.rhodo-research.net. Initially, this site will house a network member directory and describe network activities. Over time we are planning to develop more in-depth content, including a bibliography of published rhododendron research by discipline, a discussion forum, and a database where scientists can share data.

Last but not least, collaborative experiments are the hallmark of a robust research network. We plan to provide opportunities for scientists to engage in interdisciplinary projects that would otherwise be out of reach. This also highlights another great opportunity afforded by partnering with the ARS, namely the potential to engage ARS

members in citizen science projects. Citizen science is, simply put, the involvement of the public in scientific experiments. Citizen scientists have great potential to contribute to scientific understanding by collecting relevant data, such as species spatial distributions, local climate and habitat characteristics, and phenological data (the seasonal timing of events such as flowering, etc.). This collaborative participation can provide unique scientific insight, because it can address problems that are too big in scope to be accomplished by any typically small scientific team. For example, we are currently planning an experiment for which ARS members will be invited to collect data in their own gardens using straightforward methods, after which researchers will analyze the data provided from these gardens and publish their results in forms suitable for both scientific and general audiences.

In summary, and speaking for the overall rhododendron research community, I look forward to initiating future studies involving ARS members, to collaborating with other researchers to initiate new studies on rhododendrons, and to communicating our results to rhododendron enthusiasts throughout the world both through JARS and the new online journal *Rhododendrons International,* accessible through the ARS website and sent to other rhododendron societies world-wide.

Juliana Medeiros is a researcher at the Holden Arboretum, part of a team establishing the Rhododendron Research Network and a member of the Great Lakes Chapter.

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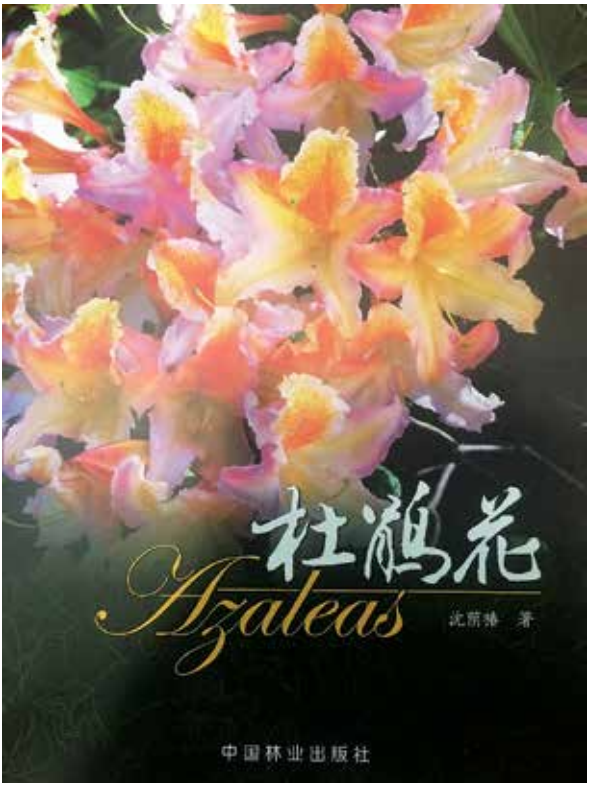
Book Review

Azaleas (in Chinese). Shen, Yin-chu. 2017. 569 pp.



I just received this impressive large (and very heavy) book on azaleas for the ARS JARS Editor's library, written by Y.C. Shen, an ARS California Chapter member. Unfortunately for most western peoples, it is written almost entirely in Chinese, with only a brief one page Forward and a few basic rhododendron facts, i.e., short articles on what is the difference between rhododendrons and azaleas by Ken Cox, Harold Greer and Peter Valder, in English. However, the countless, and I really mean countless (some pages are all photos, with up to 12 photos per page), images on all aspects of azalea morphology, leaves and of course flowers and flower components are something to behold. Each page is printed on heavy paper and the images are beautiful, detailed and vibrant in their colour and composition. Image plant names are in Chinese, and English when known, and along with an index in Chinese, there is an English index with page numbers of all the azaleas with English names referred to, i.e., for about 830 plants. For those really interested in azaleas, I suggest this is a worthy addition to their library.

Glen Jamieson

I See Red!

Rhododendron 'Black Magic'.

Alan Trott
Ashburton,
South Island,
New Zealand

Gardens must change and evolve. On a hot sunny boundary, there were a large number of rhododendrons in my garden which did not thrive, partly because it was hot where they were planted and often too dry. They never provided that "WOW" factor I was looking for. However, over the years, I had always been fascinated by red and purple gardens, and I had seen pictures of some red gardens in books and have visited the famous red border at the National Trust's "Hidcote Garden" in Gloucestershire, England.

In the winter of 2005, nearly all the 50 rhododendrons were thus removed , giving me a complete blank canvas of about 6 by 60 m (20 x 200 feet) to start my new Red Garden. Where did I start? Well I wrote down the names of as many red leaved and red flowered plants as I could find and wow, there were many!

I wanted a small hedge in the front and *Berberis thunbergii atropurpurea* 'Little

Favourite' has proved a winner. This dwarf form of *Berberis* remains very compact and has a wonderful deep purple foliage.

I planted small plants from tubes at about a 40 cm (16 in) spacing, and for the first and second years, I tipped them regularly to promote a nice bushy hedge. I now keep it at about 40 cm high. Some say "Oh, a red *Buxus?".* Red leaved plants must have full sun or they become bronze, or as the saying goes, they go "greeny bronze." I then planted the main structure plants in the background. I placed both *Sambucus nigra* 'Guincho Purple' and 'Stormcloud' and three *Acer* 'Red Falcon' in a group. *Fagus* 'Purple Fountain' and the purple leaved Hazelnut, *Corylus Maxina* 'Purpurea,' were also planted together. Another new shrub I used was *Physocarpus* 'Shady Lady'. I clip it each winter, as this promotes a nice new growth which is black purple. I also planted some red rhododendrons for early spring colour.

However, I believe that *Berberis* 'Helmonds Pillar' are probably the "Star of the Show.". I planted nine in a square, 1.3 m (4.3 ft) apart, and keep them staked and tied to keep them looking like sentinels, although they naturally do grow very upright. These have a real "WOW" factor, and in all seasons make a real statement.

To the side and behind the 'Helmond Pillar,' I have planted *Berberis atropurpurea* which I have trimmed into large balls to give a new dimension to the upright 'Helmond Pillar' dislpay. Canna lilies form a wonderful contrast and background. I have used both 'America,' which has a vibrant red flower over the summer with dark purple leaves, and

Rhododendron 'Black Magic' in the author's Red Garden.

Berberis thunbergii 'Helmond Pillar', *Berberis thunbergii atropurpureum* 'Little Favourite', *Ligularia dentata* 'Britt Marie Crawford'.

Acer palmatum 'Deep Secret'. Front *Berberis thunbergii atropupureum* 'Little Favourite' and Adam & Eve. Background *Corylus maxima* 'Purpurea'.

'Wyoming', which grows up to 2.5 m (8.2 ft), to provide bold purple foliage. Both have flowers are a little on the orange side of the colour spectrum.

Sunflowers also make a stunning display. 'Moulin Rougue' has dark mahoghany red flowers and the plants can grow over two m (6.6 ft) in height and when they flower, they are just splendid. However, they must be staked if they are planted in a windy position.

I also use *Dahlia* in the Red Garden, which are the stars for summer colour. They dance in the breeze, and come in in all shapes and sizes. The new deep black leaved forms, which are propagated by Dr. Keith Hammett, a well known plantsman in Auckland, are impressing gardeners from all over the world.

Dahlia, Persicaria amplexicaulis ‘Fire Tail’, *Canna* ‘America’.

Helianthus ‘Moulin Rouge’.

There are some very good medium decorative ones too. I like to plant the same variety in an odd number of tubers. It is obvious I have become a fan of dahlias, and in the red garden, the 'Bishop of Llandaff' and 'Ayrlies' planted *en masse* form a great background.

Until the first frosts, they just keep flowering, and after a good frost, the clean up is so easy—just cut them down to about 12-15 cm (5-6 in) above the ground. Dahlias have been on the outer circle, i.e., sometimes bypassed by many gardeners, for a number of years for no good reason, except perhaps that our grandmothers grew them. However, they are easy to grow, require no pruning, have no prickles or spines, and have just splendid flowers and foliage. I suggest everybody should plant some!

To introduce an area with a difference,

My painted tree, *Berberis thunbergii atropurpureum* 'Little Favourite' as an edge and *Berberis thunbergii* 'Helmond Pillar'.

Phormium 'Jester', *Dahlia* 'Murdoch' and obelisk in background.

Malus Ballerina® 'Samba', *Acer palmatum* 'Red Dragon', *Crocosmia* 'Lucifer', *Dahlia* 'Velvet', *Lathyrus odoratus* 'Little Red Riding Hood, and my painted tree.

I have planted 21 *Malus domestica* Ballerina® 'Samba' in a circle. This cultivar grows upright and has purplish red leaves. In the summer, big bright crab apples appear which are a rich purple in colour. In the circle I plant beets, yes beets, a variety known as 'Bulls Blood', which have deep shinny purple black leaves and a root that is large and is black red. They create a wonderful effect! Vegetables may be planted anywhere in a garden to create both interest and colour.

To screen the other part of the garden I have used the smoketree *Cotinus coggygria purpureus* 'Velvet Cloak', and they are stunning in the summer with their big dark glossy purple leaves and their fluffy plumes. If the branches are tipped, in the winter this promotes new strong whips in the spring which in turn produce larger leaves to emphasize their beautiful autumn colour.

Cumicufuga 'Hill Side Black Beauty' is another amazing black purple, feathery foliaged perennial. I use it in front of the border as it commands the dress circle. I love it and it and it may be considered for any sized garden.

Near to this I have the onion *Allium sphaeracephalon*, which produces amazing small purple red ball-like flowers on the end of long wispy stems, which when they sway in the wind is breathtaking. Behind the alliums I have *Lilium speciosum* 'Black Beauty', whose bulb produces spider-like flowers in a rich red colour. It will grow up to 1.2 m (three ft) tall and flowers for many weeks.

Allium sphaerocephalon.

Monarda 'Jacob Cline'.

Eupatorium 'Chocolate' is a new comer, which forms into a nice clump of dark purple leaves, and is very easy to grow. It forms an attractive plant growing up to one metre (1.25 ft) tall.

Among herbaceous perennials, *Astrantia* 'Hadspen Blood' is a good border plant with its deep red flowers in the summer. It looks best planted *en masse*, and it needs dividing in the early spring to get the maximum effect. *Monarda* 'Jacob Cline' also makes an amazing show during the summer, and it may grow up to over a metre (3.25 ft) in height. The bracts or flowers are big and bright red, and it too will grow into a large clump quite quickly.

Monarda 'Mahogany', not often seen but worth growing, is shorter than *M.* 'Jacob Cline' and also has wonderful purple wine coloured flowers.

Phlox paniculata 'Star Fire' is another plant that can be used to good effect. This form has dark purple black leaves in the spring and later in summer, red flowers grace this plant, which does not need staking.

Rheum palmatum 'Atrosanguineum' is a real gem. It has the most striking foliage and in the early spring, its rhizomes send out shiny new red buds that soon open up to huge rhubarb-like leaves and later spectacular flower stems. This rheum provides both stature and structure to the border. I feed it with compost and this assists its growth in the spring. However, wood slaters, or wood lice (isopod crustaceans), do like to have a nibble at it during the winter if given the opportunity. The rhizome needs to be exposed in the winter to deter these nasty little creatures. I believe this plant is a winner, so give it a go.

Heucheras are becoming very popular and new cultivars have stunning colours. The deep purple leaved form I have chosen for the red border is *Heuchera* 'Obsidian', which has dark black leaves and the bonus is that it is evergreen. However, watch out for grass grubs, the larvae of dark brown shiny scarab beetles, as they love the roots, and it is

sometimes necessary to treat the ground to kill them to prevent the death of this plant!

Ligularia 'Britt Marie Crawford' is a must for all gardens. It is one of the most dramatic of foliage plants. Dark purple leaves appear in early spring which later turn black purple. However, it does have yellow flowers which in my Red Garden I remove, and it also prevents it from seeding. To retain its genetic purity, propagation needs to be done by divisions and I have planted a group of three in one area and a swath of them in another area.

Papaver somniferum 'Danebrog Laced'.

Annuals are wonderful fillers and they are easy to use if best planted after the last frost.

Cosmos 'Red Gazebo' is a good red with feathery foliage, and it may be used to fill blank spots.

Phormium 'Jester', *Acer palmatum* 'Red Dragon', *Lilium speciosum* 'Black Beauty' and hedge *Berberis thunbergii atropurpureum* 'Little Favourite'.

Rhododendron 'Marshmallow', *Acer palmatum* 'Shirazz' and *Syringa reticulata.*

Geraniums make a splendid show in the late summer and into the autumn, and their foliage and the red of the flowers are show stoppers. If they are dead-headed, they will flower longer. They can be dug up for overwintering or have frost cloth put over them in the ground in the hope that they may come up the following spring.

Azalea in autumn.

Sweet peas on wire cylinders are also a winner. I plant the seed in early spring so that they flower during the summer. The secret is to keep picking the flowers to allow the flowering season to go on all summer. Just a little work but worth it when a big bunch of flowers appears on the table with their exquisite perfume. The seed can be harvested when it has matured to be used the following year.

Dianthus make a great show for many weeks and if the dead flowers are removed, they too will flower again. They are vibrant and have no diseases. The red stalked form of Swiss chard (Silverbeet) is dramatic with its big green leaves, but it is the stalks that have a wonderful red

Prunus serrula, left, *Percisicaria amplexicaulis* 'Fire Tail', and a trunk of *Quercus suber* in Red Garden.

colour, and of course they can be eaten. During the winter when the majority of the other plants have been pruned or died back, the Swiss chard is brilliant.

Amaranthus 'Red Spike' grows very upright with deep red spikes and creates a statement, as did the old variety that weeps, often referred to as the rat's tail plant. The other form called 'Velvet Curtains' is stunning with its almost blood-red leaves.

Celosia 'New Look' has bronze green foliage and brilliant red plumes, flowering well until the first frost arrives. This is a good new addition to the plant world.

Helechrysum is another good plant for filling those spare places. It is often known as the straw flower and its daisy-like flowers dry well when they have reached their peak. These plants are really hardy and flower over a long period.

Pennisetum 'Purple Majesty' and *P.* 'Jester' are two new additions to my garden. I plant the seed in tubes and when the ground temperature warms up, I plant them out in the garden. The leaves turn a wonderful black purple, and then in mid summer, almost black poker-like heads appear, creating another *WOW* factor, just what any garden needs.

The big oriental poppy *Papaver somniferun* are a star early in the spring, and they fill a gap when little else is flowering. The seed heads look splendid if they are left after flowering, and if the seeds are allowed to fall, it will be next year's crop. I use 'Danebrog Lace' which has rich red flowers with a dramatic white eye.

Lilium are wonderful, and they grow through other plants and stand tall. Sometimes

Springtime Walk from the Red Garden.

they need staking but if they are surrounded by other plants this isn't usually necessary. There are some very good, almost black asiatics. Their flowering is generally in the early summer which can be good as there in not a lot of red at that time of the year. The oriental lilies are magnificent and can flower for a considerable length of time. Their scent is a bonus around the garden.

Penstemon are worth growing because they also flower over a long period. 'Garnet' is a deep purple and 'Rubicunda' I like, as it has huge trumpets of red.

Imperata cylindrica rubra is a good red grass which grows up to 25 cm (one ft). The new foliage is red and as the summer progresses, the foliage become even redder, making it well worth trying as is also not invasive.

Eucomis 'Sparkling Burgandy,' the pineapple lily, has large strappy leaves which are tinged purple and later in summer, large spikes appear which are purple red and last well until the autumn.

Phormium, or flax, makes an impressive show all year and there are some wonderful new cultivars available. The pinky form 'Jester' makes a good contrast, while 'Dark Delight' is dark purple, almost black. All have a wonderful form and tend to be on the medium size. Some of the larger forms can be over powering, and *Phormium* have a spiky but weeping foliage effect which adds a new dimension to the garden.

Lobellia cardinalis is a perennial in spring that has new purple red foliage. Bright red flowers form on the 50 cm (two ft) stems for weeks in summer, making it a really good

foliage plant.

Cosmos atrosanguineus, a tuberous perennial plant with a chocolate scented flower with dark red-brown, sometimes almost black, velvety flowers on long, slender, reddish brown stems, blooms from early summer to autumn. I like to lift the tubers when there are hard frosts as they can be a little tender, but it is well worth growing.

I thought I would put a little fun into the red garden, so I made two silhouettes—of Adam and Eve. I have painted them a bright red, and they engender a lot of comments. Sometimes something bizarre makes one look at gardening in a different way, but one needs to be careful and not over do it

Adam and Eve and dahlias.

The potential plant list is really endless and it is always fun looking for and trying new red plants. Some work out and some don't, but that's gardening and you can always just say "It will be better next year!" Having the Red Garden has for me created a new interest in gardening, as sometime we tend to focus only on the spring, and the Red Garden lifts the garden from early summer right through till the first frosts. We now get vistors to see the garden in summer, and then they also see the garden's rhododendrons in a new light, as they are then clothed only in green. So think beyond the square, and try a RED GARDEN, be it large or small, and you too may be smitten by it!

Alan and Catherine Trott started Trotts Garden on a four ha (ten acre) paddock in 1984 in Ashburton, South Island, New Zealand. It started as a predominantly woodland garden with rhododendrons, camellias and magnolias, and now has a formal garden with a 1916 Chapel, which was moved there in 1998. The New Zealand Gardens Trust awarded it six-stars (its highest category) and designated it as a NZ Garden Of International Significance, as it is considered to be outstanding for its horticultural value in plant material, cultivation, design, construction, and maintenance. It combines formal and informal elements with a collection of unusual and striking trees that provide structure and interest. The scale of this garden is impressive with three key areas, a woodland, bog garden and pond, plus a striking formal garden and a knot garden, and it displays unusual plant combinations that provide all-year-round colour and interest.

*Alan joined the ARS in 1968, is now a life member, and is a member of the Eugene Chapter. He is a past president of the New Zealand Rhododendron Association, and he was awarded A Queens Service Medal for Horticulture in 2017 and recently, a Fellow of the Royal Institute of Horticulture. He has also written two books on his garden, one in 2012 (*From Pasture to Paradise*) and more recently in 2016 (*Paradise Through the Seasons*).*

AMERICAN RHODODENDRON SOCIETY
STATEMENT of FINANCIAL POSITION
AUGUST 31, 2016 and 2015
SEE ACCOUNTANT'S REVIEW REPORT

3

ASSETS

Current assets:	2016	2015
Cash and cash equivalents	$ 40,367	$ 31,898
Money markets accounts	53,008	38,036
Accounts receivable- Chapters	-	4,337
Inventories	4,197	4,036
Prepaid expenses	6,773	7,717
Investments in Mutual Funds	877,988	891,014
Total Current Assets	982,333	977,038
Property and equipment:		
Office equipment	15,240	15,240
Less: Accumulated depreciation	15,240	15,240
Net Property and Equipment	-	-
Total Assets	$ 982,333	$ 977,038

LIABILITIES and NET ASSETS

Current liabilities:		
Accounts payable	$ 2,792	$ 4,851
Accounts payable - Chapters	-	-
Deferred dues 2011 - 2020	32,454	33,185
Total Current Liabilities	35,246	38,036
Net Assets:		
Unrestricted - General Fund	(52,761)	(43,228)
Unrestricted - Designated Life Member Fund	125,554	122,364
Unrestricted - Designated Endowment Fund	612,298	604,694
Unrestricted - Designated Seed Exchange Fund	31,551	28,757
Total Unrestricted Net Assets	716,642	712,587
Temporarily Restricted - RDC Start-Up Fund	7,117	7,117
Total Temporarily restricted Net Assets	7,117	7,117
Permanently Restricted - Endowment Publications	102,417	102,417
Permanently Restricted - Endowment Other	120,911	116,881
Total Permanently Restricted Net Assets	223,328	219,298
Total Net Assets	947,087	939,002
Total Liabilities and Net Assets	$ 982,333	$ 977,038

See Accompanying Notes and Accountant's Review Report

ARS Endowment Fund Update

Bill Mangels
Endowment Fund Chair
Baltimore, Maryland

Outside of dues income from our membership, one of the most important sources of income helping to sustain the Society has been its endowment income. This has been and will likely continue to be an important tool in the work shed. The Endowment Fund was established with the purpose of offsetting dues increases and to help subsidize the cost of publishing the Journal. At one time it was the hope for it to reach a million dollars before it was tapped. It hasn't worked out that way and yet, happily its income has been available to assist the Society to function. At the spring Board meeting Treasurer Dave Banks reported the endowment balance to be $864,762. This is the highest it's been since its inception. And it is the result of good management and many gifts and bequests received.

When the Society received Dr. John Swisher's bequest of $320,000 the Board placed the money in the Endowment Fund and considered options as to how endowment income could be used to further the purpose of the Society. The most appealing suggestion that was accepted was the startup of an endowment program that focused on the basic aim of providing education opportunities and creating interest in rhododendrons. The Board has awarded grants essentially every year since 2003. We have given money to arboretums for special collections, establishing or improving gardens, and purchasing equipment to encourage native azalea growth. This year grants were awarded to three applicants: Planting Fields Arboretum on Long Island NY to refurbish the garden of New York hybridizers that had been storm damaged along the way ($1,000); the Friends of the Laurelwood Arboretum in Wayne, NJ to publish a brochure of the history of the arboretum and the role of Dorothy and John Knippenberg in hybridizing rhododendrons ($2,580); and the Brueckner Hybrid Test Project to assist participants in their plant evaluations(C$1,010). These were all worthy projects meeting objectives of the Society.

We have been purposely asking that grant requests be no more than $3,000 to enable the likelihood of helping more applicants. The Endowment Fund Committee would like to increase this amount in the future to see what projects would be forthcoming. This would be accomplished with an increased endowment.

In each JARS there's an advertisement to encourage contribution to the Endowment Fund (see next page). There are numerous ways to contribute to the Society and its endowment. For example those over 70½ can contribute up to $100,000 from a traditional individual retirement account (IRA) and may also utilize the required minimum distribution (RMD). Also the ARS would consider a named endowment fund if you are interested. Together we can make the Society a stronger force in promoting rhododendrons.

Society News

Awards

CASCADE CHAPTER
Bronze Medal: Dianna Davis

The Cascade Chapter is proud to award Dianna Davis the highest honor that any Chapter can bestow upon Chapter members, the Bronze Medal. This medal is awarded to Dianna to show the Chapter's great respect and its gratitude for her work on behalf of our members that has kept our Chapter together.

Dianna has been a Chapter member for 10 years. From the very beginning, she jumped right in and was a force for the general betterment and the enrichment of our Chapter. She has served as Chapter Vice President, and two terms as President. She has served as chair of our Annual Chapter Flower Show for just as many years. She always presents a warm, positive, and gracious attitude, particularly in greeting and making welcome both old and new members alike.

Further, she encourages the dissemina-tion of rhododendron knowledge and appreciation which is the reason we exist.

Thank you, Dianna Davis, for your many contributions to the Cascade Chapter.

GREAT LAKES CHAPTER
Bronze Medal: Chas and Karen Wagner

The Great Lakes Chapter, American Rhododendron Society, presents the Bronze Medal to Chas and Karen Wagner. You have often volunteered to host Chapter

meetings, as well as making arrangements to visit private gardens. The Truss Shows have seen you as host and hostess many times. Chas, you have served as Vice President and President of the Chapter, and most recently, as Chairman of the GLC/ARS Annual Convention in 2014! You are currently serving on the Board as Past President. Karen, in addition to serving as co-chair of the very successful Plant Sale at our Annual Convention, you are currently serving as Secretary of the Chapter. You are both Charter members of the Erie, Pennsylvania Rhododendron garden group. You have served in many capacities at meetings, as well as plant auctions.

We are indeed grateful for all of the foregoing, as well as for the many other tasks that you have performed for the benefit of this Chapter. The Great Lakes Chapter of the American Rhododendron Society is pleased to present to you the Bronze Medal, which is the highest award a Chapter can bestow.

Bronze Medal: Dr. Stephen Krebs

The Great Lakes Chapter, American Rhododendron Society presents the Bronze Medal to Dr. Stephen Krebs. You have hosted many visits to Leach Research Station. You have served with distinction as our President during the fast-paced time of the Annual Convention. You arranged for storage and care of plants to be sold at the Annual Convention. Since then you have done likewise for plants purchased from a nursery having a clearance sale. You arranged for a plant sale in conjunction with Holden Arboretum of remaining plants purchased at WW Nurseries. You have made some significant changes to keep our Chapter together. You continue to serve the Chapter as Treasurer. You share your vast store of rhododendron knowledge readily. You have been a speaker at a number of our meetings.

We are indeed grateful for all of the foregoing, as well as for the many other tasks which you have performed for the benefit of the this Chapter. The Great Lakes Chapter of the American Rhododendron Society is pleased to present to you the Bronze Medal, which is the highest award a Chapter can bestow.

In Memoriam

Joan Bengough

Joan Bengough, a dedicated rhodo-dendron gardener and long-time member of ARS chapters of Vancouver, Peace Arch and Fraser South, passed away on July 6, 2017, at age 85. She was president of the Vancouver Rhododendron Society in the mid-1990s, and conference convener of the highly successful 1997 ARS convention in Vancouver, where Joan and husband Len were awarded the Bronze Medal. Clive Justice related that because Joan did not like public speaking, others stood in for her at the convention podium, but she was always thoughtful, knowledgeable and expressive. Joan subsequently became an active member of Peace Arch and Fraser South chapters, as both venues were closer to her home in south Surrey. She had a small but delightful garden, full of rhododendrons, fruit trees, perennials, a raised vegetable patch and bird feeders. Joan was predeceased by her husband Len and is survived by three daughters Jean, Janet and Hillary, their children and grandchildren, in Surrey, Port Alberni and Toronto.

Gardens and Lectures of the 2018 ARS Convention in Northwestern Germany

Hartwig Schepker
Bremen, Germany

For the second time in the history of the ARS, the annual convention will be held across the Atlantic in Europe. In May 1996, the first ARS convention outside the US and Canada was in Oban in western Scotland, where famous Scottish rhododendron gardens were visited and an impressive list of international speakers was presented. Twenty-two years later in May 2018, Bremen in northwestern Germany will host the second overseas annual convention.

The German Rhododendron Society (DRG) is using its own regular annual meeting to organize a combined ARS/DRG conference with garden visits, lectures, social events and sightseeing. The overall program is voluminous (and complex), and is being complemented with three pre-excursions and one post-excursion. The result is that rhododendron aficionados if they so desire can easily spent more than three full weeks in Europe visiting some of the best public and private gardens in mainland Europe and Scandinavia. The ARS chapters in The Netherlands, Denmark, South-Sweden and Finland are working closely together with the ARS organizing team in North America and the German Rhododendron Society to present the ARS members worldwide a once-in-the-lifetime-chance.

From May 20 to May 26, 2018, Bremen will be the venue for the central part of the overall program. A few days earlier, a pre-conference German tour from May 13-14 has its starting point also in Bremen. This old Hanseatic City on the shores of the Weser River is the hometown of a huge and very diverse rhododendron collection. A whole day in the Bremen Rhododendron-Park and Botanic Garden and several visits to nurseries and gardens in the nearby County Ammerland, the world's largest rhododendron producing area, will provide an intense insight into German rhododendron cultivation.

A map of the locations of the German tour sites in north-west Germany around Bremen. (Zoom in to read text text)

Some of the most spectacular displays of cultivated rhododendrons in the world are those in northern Germany in May.

A series of talks given by an array of international speakers during the two conference lecture-days are themed "From the wild. . . " and ". . . into your life." The talks will be presenting not only explorations for and gardening of rhododendrons, but also the introduction and usage of rhododendrons in medicine, daily life and the arts.

Reporting about rhododendron surveys in the wild is a classic and enjoyable part of any meeting. Hartwig Schepker from Bremen will give an introduction into rhododendron expeditions of the past and today, and Rama Lopez-Rivera from England will talk on his travels in Taiwan, Korea and Japan, where he visited fantastic populations of *Rhododendron pachysanthum* and *R. degronianum* subsp. *yakushimanum*. Steve Hootman, Director of the Rhododendron Species Botanic Garden in Federal Way, WA (USA), will describe his sensational new finds of rhododendron species in the central areas of China. Ulrich Pietzarka, Curator of the Forest Botanic Garden

in Tharandt, Germany, will lead the audience to the Far East of Russia into amazing rhododendron landscapes and a different culture. Ole Jonny Larsen from Norway, head of the Norwegian Rhododendron Society, will talk about both Lapponicas and lamas that he encountered during his travels in Sichuan, China. Last but not least, Seamus O'Brien from Ireland, manager of the Kilmacurragh Arboretum, travelled in the footsteps of both Augustine Henry in China and J.D. Hooker in Sikkim. Descriptions of his research journeys and the impacts of Henry's and Hooker's plants on Irish gardens will link the first day of talks with the second, which will have "how to best use rhododendrons" as the theme.

It will start with Jürgen Schlenz, Managing Director of a horticultural consultancy company in Westerstede, Germany, who will give an overview of the hundreds of nurseries in the Ammerland area producing every second rhododendron plant sold in European garden centers. Ken Cox from Glendoick, Scotland, will speak on woodland gardening with rhododendrons, surely an informative presentation peppered with many garden maintenance details. Nils Blatt, a garden architect from Bremen, will consider how rhododendrons are being incorporated into contemporary gardening in Germany. Matthias Ulrich, a professor at Jacobs University in Bremen, will report on his current research to find new antibiotics in rhododendrons, followed by Ken Cox, who will discuss how rhododendrons have been utilised in art, music, and daily life. The banquet speaker will be Don Hyatt, a well-known storyteller from the Washington, DC, area, who will give an entertaining multimedia program called "The Crazy World of Rhododendrons." Be surprised! More details about the program available at www.ars2018.org

Descriptions of the gardens that will be visited during the main part of the convention are the following:

Rhododendron-Park and Botanic Garden, Bremen

The Bremen Rhododendron-Park began in the late 1930s at the initiative of the German Rhododendron Society. In 1937, it started as a test and display garden on just 2 ha (4.9 acres), and today it compromises 46 ha (114 acres), consisting of a broad range of garden sections, including a large conservatory containing non-hardy rhododendrons. The garden holds the world's second largest collection of rhododendrons and azaleas with about 600 species and subspecies (including vireyas) and more than 3300 cultivars, and all of them are labelled. The older part of the garden is a well-maintained park in the style of a woodland garden, with old oaks, pines, beeches and ashes. Long vistas and large lawns alternate with intensive rhododendron beds planted along ponds and streams. Hundreds of different Mollis, Knap-Hill, Gent and Rustica azaleas are coordinated either by color or historical background.

R. williamsianum-, *wardi*-, *insigne*- and *repens*-hybrids are grouped together, as are more special plantings with American, Czech or German hybrids. The garden also

Rhododendron-Park, Bremen. Photo by Axel Oehler.

Rhododendron-Park, Bremen. Photo by Hartwig Schepker.

holds one of the largest collections of the historic Seidel hybrids which were bred in the late 19th century mainly for cold hardiness. In recent years, almost a hundred hydrangea cultivars have been added to create more color during the summer time in the otherwise mostly green surrounding.

The newer part of the park, opened to the public in 2002, contains modern rhododendron hybrids from the last 30-40 years. They are either grouped together by the leading species in the parentage or by color. In the "Yakushimanum Valley," more than 100 German Yakushimanum cultivars are combined to produce a massive pink to white blooming experience in May. In the "Hedge Garden," modern elepidotes are organized in red, pink, violet and yellow-orange groups. A "Novelty Garden," renewed every four years (the next time in Spring 2018), contains the newest German cultivars that are combined with many different shrubs, grasses and perennials. This latter garden is both a test and display garden at the same time, introducing new hybrids and giving inspiration for gardeners. A German novelty is the planting of rhododendrons in an alphabet sequence, with more than 300 Japanese azaleas and almost 1000 elepidotes hybrids planted from A to Z, an easy way to find certain cultivars.

Rhododendron-Park, Bremen. Photo by Hartwig Schepker.

Hybrids play an important role in the Bremen collection, but the species assortment is similarly extensive. The non-hardy species like the vireyas, the Maddenias, etc., are shown in the botanika greenhouses, the only part of the garden which is not entrance

free. Here, simulated natural conditions with artificial rocks, waterfalls and large companion trees and shrubs have been created for Himalayan or Bornean growing conditions. Many of the smaller growing lepidote species grow in the "Rhododendron Rock Garden" with its peak bloom in late April and early May. One of the newest additions is the "Species Garden." One hectare (2.5 acres) has been set aside since 2012 to showcase around 200 hardy rhododendron species, from big-leaf species like *R. sinofalconeri* and *preptum* to the colorful members of the Triflora section and the newest finds from China like *R. yuefengense* and *magniflorum*.

The newest specialty collection is the "foliage rhododendrons," descendants of *R. pachysanthum*, *bureavii*, *makinoi*, *degronianum* subsp. *yakushimanum* and others, which are combined to create a "second bloom." Flowers are welcome, but the focus there lies clearly on the beauty of the new foliage in the summer.

The tour program in the Bremen Rhododendron-Park concludes with a vespertine buffet dinner in the greenhouse.
www.rhododendronparkbremen.de.

Park der Gärten (Park of Gardens), Bad Zwischenahn

The central exhibition area of the Park of Gardens measures roughly 14 ha (35 acres) and was created in 2002 as the first Lower Saxonian horticultural exhibition. Today

Park of the Gardens. Photo courtesy Park of the Gardens.

Park of the Gardens. Photo courtesy Park of the Gardens.

it consists of more than 90 theme gardens, plant collections and other contributions with thousands and thousands of spring and summer flowers that offer a range of stimuli and information which provide fascinating insights into the world of gardens. Everywhere in the park you will find areas reserved for special plant communities arranged according to their origin or their habitat needs, ranging from the "Alpinum" with its alpine plants, to an extensive collection of bamboos to the "Arboretum," the recently created area of ornamental coppice.

The rhododendron park presents a collection of more than 2000 cultivars and species of rhododendrons and azaleas, forming together with the Bremen Rhododendron-Park and the large collection at the Schröder Nursery the backbone of the "German Genebank Rhododendron," a network of more than 50 partners that have joined to conserve rhododendrons in Germany. The hybrid collection goes back to the late Walter Schmalscheidt, Germany's foremost expert on cultivars, who collected for many decades even the rarest hybrids. In May it is a burst of color with old, several meters (yards)-high deciduous azaleas and a broad range of evergreen cultivars from historic to modern.

The Park of Gardens is the horticultural centre of Lower Saxony and the showcase of Lower Saxonian horticulture, but also an extracurricular place of studying, where groups of children and school classes of all ages can choose from about 30 different educational programs and where in-service programs for teachers can be held.
www.park-der-gaerten.de

Park of the Gardens. Photo courtesy Park of the Gardens.

Schröder Nursery, Wiefelstede

The Schröder Nursery in Wiefelstede near Oldenburg, today owned by Timo Schröder, the son of its founder Fredo Schröder, specializes in producing young plants of rhododendrons and azaleas. Every year, 1.5 million plants are raised for further cultivation on a seven hectare (17.3 acre) production area. A specialty of the nursery is the propagation of large-flowered, elepidote hybrids by grafting scions on unrooted cuttings of 'Cunningham's White'. The graft union and the rooting process happen simultaneously. Grafting gives the cultivars a stronger root system, making them less prone to diseases on less optimal soil conditions. Grafts and cuttings are grown in endless rows of tunnels and in large greenhouses, before they are potted and moved on to the container fields.

The highlights of every visit in May to Schröder are the stock plant displays. The flowering of hectares of square blocks of color is simply spectacular. Around 2000 different cultivars and species are grown to satisfy the demand of the small plant trade for well-tried, rare or modern varieties. Well-known cultivars are grown as thousands of mother plants, the culture areas of some hybrids extending up to a hectare (2.5 acres).

On the contrary, new cultivars or unnamed test-plants are evaluated from at least 20-40 plants. A ride through 12 ha (30 acres) of mother plants on trailers while sitting on bales is an unforgettable experience.
www.schroeder-rhododendron.de

Schröder Nursery. Photo by Hartwig Schepker.

Schröder Nursery. Photo by Hartwig Schepker.

Schröder Nursery. Photo by Hartwig Schepker.

Bruns Nursery & Rhododendron-Park, Gristede

Over the past 140 years, the family business "BRUNS Pflanzen" has developed from a market gardening firm to one of Europe's leading tree nurseries for the landscape trade and garden centres throughout the continent. A team of more than 300 trained staff cultivate more than 4000 plant species and cultivars on 500 ha (1.9 miles^2). Their specimen trees and topiary displayed in perfect lines are an amazing sight to see and are worth a tractor tour ride. Well-pruned *Ilex* and conifers from Japan are potted in wooden boxes, while large trees are containerized in SpringRing® container [in a SpringRing® container, roots are directed into outwardly pointed open ended cusps, preventing spiraling and air pruning the tip of the root. The response of the plant to the air pruning is to send out more roots to compensate for the loss, leading to the build up of a dense, fibrous, outwardly pointing root system], making them available for planting even in the summer. The state of horticultural art in this nursery is outstanding.

The systematic planting of the 25 ha (62 acre) Rhododendron Park in the shelter of tall pines was started by Erich and Wilhelm Bruns in 1950. Today, you can still find specimens imported from England that have grown into 7-8 m (23-26 ft) high bushes. The collection comprises more than 1000 different rhododendron species and cultivars, most of them clearly labeled, as well as deciduous and Japanese azaleas. The park also serves as a show garden of cultivars, and to date, about 200 cultivars have been bred by Bruns over the last six decades. A special group of Bruns rhododendrons are the

cultivars named after the wives of German presidents—the naming procedure always creating a big public response! Fortunately, hybridizing at Bruns is still going on and will result into promising new cultivars in the coming years, facing challenges like increasing resistance to powdery mildew and trying to achieve superior foliage.

Since 1985 a new garden with a large pond and great vistas has been added, which is surrounded by Japanese maples, dogwoods, magnolias and many other solitary trees, which offer interesting focal points amidst the fascinating rhododendron collection. The pavilion, opened in 2009, will be the venue for the final social event during the conference, a big garden party in a wonderful surrounding. www.bruns.de

Bruns Nursery. Photo courtesy Bruns Nursery.

Bruns Nursery. Photo courtesy Bruns Nursery.

Van der Berk Nursery. Photo courtesy Van der Berk Nursery.

Van der Berk Nursery. Photo by Hartwig Schepker.

Van den Berk Rhododendron, Rastede

Van den Berk Rhododendron GmbH, a subsidiary of Van den Berk Nurseries in Holland since 2006, is located in Ipwegermoor near Rastede, Northern Germany. Rhododendrons and azaleas of exceptional quality are produced here on the 50 ha (124 acre) site of drained moorland. Even outside the flowering season, the sight of hundreds of meters (yards) of rhododendrons fields in an otherwise almost treeless surrounding is impressive. The plant assortment offered by the Van den Berk rhododendron nursery includes over 160 species of large-flowered rhododendrons, Yakushimanum Hybrids and azaleas. The plant sizes vary in height and width from 70 cm to 4 meters (2.3 to 14 ft). Van den Berk is one of the leading rhododendron nurseries in Europe with regard to quality, size and range of species offered. Large consignments for the planting of large surface areas or eye-catching solitary plants are both available in large quantities. Specialties are old rhododendron plants that have been limbed up to create umbrella-like sculptures—a fashion which seems to be more and more popular.
www.vdberk-rhododendron.com

zu Jeddeloh Pflanzen Nursery, Jeddeloh

The zu Jeddeloh family has been cultivating the land in the town of Jeddeloh near Oldenburg for 15 generations. zu Jeddeloh Pflanzen was founded 85 years

zu Jeddeloh Park. Photo courtesy zu Jeddloh Nursery.

ago (in 1932) by Johann-Diedrich zu Jeddeloh, one of the world's most respected conifer specialist and collector. The nursery is a pioneer in container cultivation. The son of the company founder, Jan-Dieter zu Jeddeloh, started this business in 1978 after studying this new method of cultivation during his time at university and in countries such as The Netherlands, France and the USA. Today, zu Jeddeloh Pflanzen is one of Germany's leading nurseries with some 150 employees, and the license holder of the American hydrangea brand "Endless Summer"® and the berry brand "BrazelBerry"®.

Surrounding the old and beautiful Ammerland style house of the zu Jeddeloh family is a spacious, park-like estate that has grown over the years to cover some two hectares (five acres). It is lovingly tended and constantly expanded by Sabine zu Jeddeloh and her team. Together with the English garden expert and author Adrian Bloom, they have created five themed gardens over the last ten years: the unique "Blooms Hills" with the impressive Rozanne River from Rozanne® geraniums; the year-round garden with lots of grasses, a pond and a gazebo; the Alpinum with a small viewing platform; the hedge garden which forms the heart of the conifer collection; and the new walled garden with conifers and perennials arranged according to their geographical origins. Sabine is also the vice-president of the German Rhododendron Society and is happy to welcome conference participants to tea and coffee in her garden.
www.jeddeloh.de

zu Jeddeloh Park. Photo courtesy zu Jeddloh Nursery.

German Pre-Conference Tour

The pre-conference tour from May 13 to May 14 consists of two garden visits and one big rhododendron show.

H. Hachmann Nursery, Barmstedt

The third-generation Hachmann Nursery in Barmstedt offers the broadest range of rhododendron cultivars in Europe, with 640 different varieties. On 20 ha (49 acres), about 30 staff produce rhododendrons and azaleas, rare conifers and deciduous trees, Japanese maples, heathers and dwarf conifers. Over the years, the breeders Hans and Holger Hachmann have created more than 500 rhododendron cultivars, elepidotes as well as deciduous and Japanese azaleas. Their catalogue, weighting almost half a kilo (one pound), is a fantastic tribute of the firm and a sought after source of information.

Hachmann Nursery. Photo courtesy Hachmann Nursery.

Hans and Holger belong surely as some of the world's leading rhododendron breeders. Their breeding program is unmatched in its longevity and breadth of material. Since 1951, more than six million rhododendron seedlings have been tested and strictly selected. Many species, formerly not appearing in German hybridization, were used here for the first time to create new cultivars. Almost 50% of the Hachmann plant assortment originates from their own hybridization work. Their hybrids are presented in the nursery's impressive display gardens together with heather, conifers and maples. Holger releases new hybrids almost every year, concentrating not only on the flower but also on foliage. Several new cultivars with very narrow leaves, fantastic new foliage

Hachmann Nursery. Photo courtesy Hachmann Nursery.

or in case of Japanese azaleas, with superior leaf retention, can be seen. There is a good chance that some unnamed cultivars, not yet named or introduced, will be displayed. www.hachmann.de

Hobbie Rhododendron-Park, Linswege

The Rhododendron-Park of the Hobbie family will turn 90 next year. With 70 hectares (173 acres), it is one of the largest rhododendron parks in Europe. Founded by Dietrich Gerhard Hobbie, it is now run by its next generation, Volker, grandson of Dietrich, and his wife Birgit Hobbie. Dietrich G. Hobbie started the nursery in the 1930s under the shade of an already existing tree cover, with some trees then already 200 years old. He is most known for his many *R. repens* und *R. williamsianum* hybrids, which he created in the 1940s and 50s. The original of these so-called dwarf hybrids are

Hobbie Rhododendron-Park. *R. fortunei* subsp. *discolor.* Photo by Hartwig Schepker.

Hobbie Rhododendron-Park. *R. luteum*. Photo by Hartwig Schepker.

now towering specimens of 3-5 m (10-16 ft).

A 2.5 km (1.6 mile) loop path leads through what has become in the last nine decades a rhododendron forest. In recent years, Volker has spent lots of energy opening the understory, creating new vistas, and removing competitive plants to highlight the rhododendron record holders: a 7 m (23 ft) high *R. rubiginosum*, a 10 m (33 ft) high *R. fortunei*, both planted in 1928, and a *R. rex* from 1930. The *R. campanulatum* hybrid

'Susan' can be seen in specimens easily expanding to 7-8 m (23 -25 ft) width. There is also a long path leading through a pure stand of *R. luteum*, a spectacular site for both the eye and the nose.

A display garden gives a good overview of the available species and hybrids, presenting a broad range of color and foliage. A new addition is the 2015 Species Garden that will be expanded in the next few years. In 2016, three new theme gardens were opened: a Yakushimanum Garden displaying the most compact and sun-tolerating cultivars; an Azalea Garden with a selection of species, rarities and hybrids; and the "path of the trunks," where undergrowth has been removed and old plants have been limbed up to enable a closer inspection of the trunks of both rhododendron hybrids and species. A nature trail has also been created to showcase the area's many introduced and native trees. The combination of a forest atmosphere with a colorful assortment of old and modern rhododendron cultivars topped with some very impressive old specimens is unique and well worth a visit. www.hobbie-rhodo.de

RHODO 2018

The RHODO in Westerstede, Europe's largest rhododendron show, is held every four years. Hundreds of rhododendrons and azaleas provided by more than 70 nurseries turn the city center into a sea of colors over two hectares (five acres). It is a mini Chelsea Flower Show with rhododendrons as the main actor, but similarly crowded. Next to the open-air ground displays, the Rhododendron Halls host the competitive exhibition of the regional nurseries, and experts provide advice to visitors. For most of the rhododendron growers in northwestern Germany, the RHODO is the main event and a perfect opportunity to present their newest cultivars. Like in 2014, the RHODO in 2018 will be designed by Nils Blatt, a young landscape architect and one of the speakers at the ARS conference in Bremen.
www.rhodo.de

Hartwig Schepker is the German coordinator of the Bremen ARS/DRG conference, the Director of the Bremen Rhododendron-Park and Botanic Garden and the Managing Director of the German Rhododendron Society.

A Project to Develop an *ex situ* Conservation Plan for *Rhododendron* Species in New Zealand Collections

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(Modified from The Rhododendron *4, 2016: 26-27, a publication of the NZRA and the Pukeiti Rhododendron Trust)*

An exciting recent development for *Rhododendron* in New Zealand is the initiation of the project "Develop-ment of an *ex situ* conservation plan for *Rhododendron* species in New Zealand." The project is being led by the author (and a project team, which is still under development), with Pukeiti Rhododendron Trust as lead sponsor, and in association with New Zealand Rhododendron Association. The purpose of this short communication is to describe the first stage of the project (data collection and analysis, and development of a proposed plan) and outline how collection holders can be involved, if they wish to do so.

Rhododendron species conservation is a topical issue, following the recent international conservation assessments of the genus (Gibbs et al. 2011; Argent 2015) in which 715 of 1215 species were deemed to have some form of conservation problem. These species are referred to as Red List species and are assigned to a Red List category based on an assessment of the status of the population and the level of risk in the wild (assessment criteria are found in Gibbs et al. 2011). Categories are, with decreasing level of severity: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, and Least Concern (for species deemed to have no conservation issue). Following a conservation assessment, *ex situ* conservation is the approach where species are conserved in cultivated collections (Blackmore et al. 2011; Rae 2011), with Target

R. sanguineum subsp. *sanguineum* var. *haemaleum,* with some magnolia leaves (at Edinburgh Botanic Garden), a Least Concern species from China that is not yet located in cultivation in New Zealand.

R. hyacinthosmum (at Edinburgh Botanic Garden), a Least Concern species from Papua New Guinea, which is found at a few sites in New Zealand.

8 of the Global Strategy for Plant Conservation stating that 75% of Red List species should be in cultivation by 2020 (IUCN 2011; Sharrock et al. 2014). A recent analysis found that 56% of Red List *Rhododendron* species are in cultivation, although some have very limited representation (MacKay & Gardiner 2016); it is important to know which Red List species are in cultivation and to propagate and distribute those that are in limited locations. Knowing that New Zealanders are keen plant collectors (NZRA 2003), with New Zealand collecting expeditions often gathering different material to that of Northern Hemisphere expeditions, New Zealand collections may be of interest for *Rhododendron* conservation.

The overall aim of the project outlined in this article is to develop an *ex-situ* conservation plan for *Rhododendron* in New Zealand, with national coverage, and which will include elements such as:

- Identification of priority species for propagation, focussing on rare species (those assessed as threatened in their native habitat by the conservation assessments (Gibbs et al. 2011; Argent 2015)), or, those held in limited collections in New Zealand.
- Identification of key collection sites in New Zealand, and identification of priorities for further collection development at a national scale.
- Determination of collection roles, for those collections that wish to participate in the project. For example, certain collections may agree to hold certain sec-

tions of the genus that suit their climate zone.
- A proposed programme of propagation and dispersal among participating sites.

Achieving these outcomes relies on data—knowledge of which species are in which collections, where, how many, and of what source (wild-collected material being particularly important, to represent the wild species (Blackmore et al. 2011; Rae 2011))—so data collection and analysis is the main activity of this first phase of the project. The author has an existing database on *Rhododendron* species, built up over several years, which contains data such as: species in commercial trade in New Zealand over several years, species in about 20 New Zealand collections (including contributions from several Pukeiti and NZRA members); species in cultivation at Edinburgh and Kew in 2013 and 2015 (RBGE 2013, RBGK 2015); species in cultivation in about 1400 botanic gardens world-wide as recorded by Botanic Gardens Conservation International

R. suoilenhensis, a Red List species (Data Deficient) from Vietnam, for which there is wild-collected material in New Zealand.

R. taxifolium, a Red List species (Critically Endangered) from the Philippines, for which there is wild-collected material in New Zealand.

R. excellens a Red List species (Vulnerable) from North Vietnam and adjacent parts of China.

R. pseudochrysanthum is a Red List species (Vulnerable) that is endemic to Taiwan.

in 2013 and 2015 (BGCI 2015); the presence of wild-source accessions in New Zealand or in the international collections that were examined; the conservation assessment for each species (Gibbs et al. 2011; Argent 2015); and geographic origin and taxonomic data for each species (Chamberlain et al. 1996; Fang et al. 2005; Gibbs et al. 2011; Argent 2015). These data provide a strong basis for analysis; however, they do not cover all New Zealand collections, and there are other international collections that would strengthen the international part of the analysis.

To this end, the research team will be working with five to seven additional New Zealand collections, and two international collections to expand the data set (gathering data on presence of species, and the source of the accessions). The new combined data-set will be analysed with respect to presence in collections of Red List species, groups of species from relevant geographic origins, and groups of species from the various taxonomic groups within *Rhododendron*. The distribution and characteristics of collections will also be analysed, to determine those collections which contain the aforementioned groups of species. From this analysis key sites and species in New Zealand will be identified.

An important element of the analysis is that privately owned collections (where owners have provided us with unpublished collection data) are not named in the aggregate analysis, and will not be named in any publications or reports. (Publicly owned collections may be named, with agreement from the collection owner. Collections which have publicly available online databases will be

appropriately cited in any publications.) Because the aggregated data set has many components, individual collections are not "visible" in the data summaries that are generated by the analysis. Collection holders should also note that collections will only be identified in the data set by a code number, and the codes will not be disclosed beyond the research team (even members of the project team who have contributed data may not know the code assigned to their own collection). For those collection holders who require a more formal arrangement in relation to data, a Memorandum of Understanding has been developed—this would be signed by the Head of Institute of Agriculture and Environment at Massey University (to represent the author as holder of the database) and the collection holder. Should it transpire that your collection contains important species that the analysis indicates should be propagated, the author will contact you and seek your permission for any further action in that regard.

Returning to the analysis, once that is complete the knowledge gained will be combined with a literature search on best practice for *ex situ* conservation; the two components will be used to propose an *ex situ* plan for *Rhododendron* in New Zealand (containing the elements described in paragraph three), which will be published in due course. This first phase of the project will be conducted from late 2016 to about mid 2018; for much of that time the project will involve "behind the scenes" work by the author and the project team as the data

R. madulidii (at Edinburgh Botanic Garden) is a point endemic from Philippines that is Endangered. It is not in cultivation in New Zealand.

R. aberconwayi is a Vulnerable species from China. It is relatively common in cultivation in New Zealand but there is no wild-collected material present.

gathering and analysis takes place. As the project progresses there will be several opportunities for collection holders to be involved if they wish to participate. Some of these include:

- Collection holders contributing data on their own collection;
- Using their expertise to identify plants in other collections and assisting the owner with documenting and reporting the collection;
- Noting and reporting wild-source plant material;
- In due course (once priorities have been identified), gathering propagation material and propagating priority species, and assisting with dispersal of that plant material to designated sites.

The New Zealand project will get underway from October 2016, and the author would be pleased to hear from any collection holders who are interested in participating. We of the project team think this is an exciting project, which we hope will make a useful contribution to conserving *Rhododendron* species in cultivation, and we look forward to working with you on this initiative.

Postscript: While the project described here focuses on New Zealand, our approach to development of an *ex situ* conservation plan could also be applied in other countries. Key elements are (i) development of a national data-set of species, (ii) preliminary analysis of national holdings in relation to species in cultivation world-wide (e.g. MacKay et al. 2017) and (iii) use of the analysis to target additional data gathering and to develop an *ex situ* strategy (which is our current project). We encourage others to analyse *Rhododendron* collections in their own countries; with the ultimate aim of developing an international programme for *ex situ* conservation for *Rhododendron*.

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Bremen 2018 Convention Pre-tour to Denmark and Sweden

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The Danish and Swedish Rho-dodendron Societies of the ARS are both participating in the organisation of an eight-day pre-convention tour before the ARS Convention in Bremen, Germany, in May 2018, and are inviting ARS members to visit Scandinavian gardens, parks and arboreta. The tour to Denmark will start from Bremen early in the morning, and the first stop will be a visit while still in Germany to the Hachmann Nursery in Barmstad, where we will have lunch.

After lunch, we will cross the border into Denmark, which is of interest for the following. First, we will be going into another country; and second, we are crossing a boundary into Scandinavia, which is characterized by a common ethno-cultural North Germanic heritage and mutually intelligible North Germanic languages, where the cultures and living styles between Germany and Denmark are quite different.

Denmark is a lovely country in which to grow rhododendrons. Areas have USDA Hardiness Zones 8a to 9a, which means that the more tender rhododendron species cannot be grown unless they are held over the winter in a cold greenhouse. There are some really fantastic gardens in both Denmark and Sweden that will be visited during the tour, and there will also of course be some cultural events.

The first garden in Denmark to be visited will be that of Jørgen Jørgensen in a small town called Rens. Jørgen's garden is a show garden that contains both rhododendrons and big-blossom azaleas, a fantastic garden that attracts people to Rens from all over. After visiting this garden, we go to the Hotel Dagmar, a renovated 16th-century building (Denmark's oldest hotel, built in 1581) located on the town's main square. Ribe is known both for its cathedral and for Queen Dagmar, a princess who arrived in the late 1100s. Ribe is one of the oldest cities in Denmark, and it is said that the Czech Princess Drahomira, Dagmar in Danish, sailed into Ribe to meet the Danish King

Map of the pre-tour Scandinavian garden locations in Denmark and Sweden. (Zoom in to read text)

Valdemar Atterdag, the Conqueror, whom she married in 1205. Shortly thereafter, the couple came to Ribe where they resided at Riberhus Castle on Slotsbanken. Queen Dagmar was the people's queen, where according to legend, she died in 1212 in Ribe while giving birth, and is buried in Ringsted. There is a statue of Queen Dagmar showing her in the stern of a ship looking both for the new country and for the king that she is destined to marry.

Ribe Cathedral is the best pre-served Romanesque building in Denmark, but reflects a plethora of different architectural styles and artistic traditions. It was founded in the Viking Age as the first Christian church in Denmark, and ranks amongst the biggest Danish tourist attractions. We will have dinner at the hotel and after dinner for

The Ai Xin Garden in Farsø, created by Finn and Linda Glerup.

those who want to know more about Ribe, there will be a guided night walking tour through the city.

The next morning we will travel up through Jutland (Jylland) where we will enjoy Danish forest and moor landscapes, with its hills and valleys. We will next go to the town of Farsø where we will visit the Ai Xin Garden, created by Finn and Linda Glerup. The Ai Xin Garden is a large farmhouse property covering 1.2 ha (three acres) that was founded in 2001. The garden hosts a rich plant collection of predominantly Asian species and was inspired by Chinese garden art, culture and nature as a result of trips both owners have made to China over recent years. They have adopted some of the elements typical of Chinese gardens, but it is not a traditional Chinese garden. A typical Chinese garden consists of four elements: houses and yard connected in a box system; stone mosaics, path patterns and rocky outcrops/mountains; basins with bridges; and finally plants, some in pots like penjing (bonsai). To get from one garden to the next you often pass through a round, so-called moonport. The owners decided that the entrance to the garden instead should be a moonport and that the patterns on the paths should contain stone mosaics with image motifs. The ideas were implemented using hard work, a concrete mixer and a lot of sand and cement. A professional mason helped with the moon gate, and the mosaic image motifs include famous ones like the Bird Phoenix, Ying Yang, the Nine Fish, Dragon, the Five Bats, etc., while the trail system is decorated with transverse mosaic bands and floral motifs. A balustrade with eight-edge

holes contributes to the mood, and there are two granite Chinese guardian lions—one of each sex—that guard the garden's inner entrance by a pergola covered with wisteria. In the garden there are rhododendrons both collected in China and also grown from seed, along with other seldom seen plant species. The property also has other different gardens, as well as being a functional sheep farm.

Our next stop is east to the town of Hadsund where we will visit Maren and Søren Tang's garden, called the "Viveterp," but first Søren will provide a Danish lunch. Viveterp was founded in 2002 and is a country garden of about two ha (five acres) that contains mostly rhododendrons, but also a vegetable garden, an orchard and some rare trees.

The Tangs joined the Danish Rhododendron Society in 2010, and now have 250-300 types of rhododendrons and azaleas, species as well as hybrids. During the last few years, they have started to graft and today their garden counts about 50 home-grafted plants. Their garden, located in a beautiful forest of pine and oak, is rather hilly, has incorporated a lot of stones, and has as a small part inspired by Japanese garden design. The garden has a number of the famous hybrids from the German Hachmann Nursery, including 'Fantastica', 'Denise', 'Goldkrone' and *R. wardii* 'Goldsprenkel'.

Our next stop is to the last garden park before we cross the Kattegat, a strait between Jutland and Sweden that is 64–113 km (40–70 miles) wide, by ferry to Sweden. This is the Bangsbo Botanic Garden in Fredrikshavn, which has several gardens, one of which

Maren and Søren Tang's garden, called the "Viveterp."

Water feature in the garden of Torsten Nilsson in Mölle. Photo by T. Nilsson.

is of rhododendrons and azaleas. It also has the world's largest crevice garden, which is a big rockery where huge oblong limestone stones have been placed vertically close together. This leaves deep, vertical crevices where the plants roots can find moisture and shade, replicating how alpine plants grow in many places. There are many rhododendron species and hybrids, but it is also worthwhile to visit its herb garden, where there are many herbs that were used by monks in olden times to make medicines. There will be a 5 p.m. dinner, after which we will catch the ferry for Sweden, which departs at 8 p.m. It arrives in Gothenburg at midnight, where we will overnight before visiting the Gothenburg Botanical Garden the next day.

The Gothenburg Botanical Garden first opened to the public in 1923 and has a garden proper of about 40 ha (100 acres) with about 16,000 different species. Sights worth seeing are the Rhododendron Valley, the Japanese Glade and greenhouses with about 4000 various plants, including some 1500 orchids, a remarkable tufa apartment and the endemic Easter Island tree, *Sophora toromiro* [called Toromiro; it had been extirpated, but has now been reintroduced there]. Our guide here will be Björn Aldén, who was responsible for the rhododendron collection for many years, and there will also be some Swedish society members present.

Later in the day we will travel south three hours to Helsingborg, where there will be a visit to a private garden in Mölle not far from Helsingborg. The owner, Torsten Nilsson, a member of the Swedish Rhododendron Society, has a beautiful garden on

Rhododendrons in the garden of Torsten Nilsson in Mölle. Photo by T. Nilsson.

a hillside with a fantastic view facing the sea. He established his garden relatively recently, but has had really remarkable results. His collection holds both rhododendron species and hybrids.

The night will be spent at a nice hotel in Helsingborg and the next day, the main attraction will be Sofiero Castle in Helsingborg. Along with the Gothenburg Botanical Garden, the Sofiero Garden holds the most interesting rhododendron collections in Sweden. Sofiero is a garden established by the late king Gustav VI Adolf at the beginning of the 20th

Sofiero Castle. Photo by Jorgen Schwarzkopf.

Azaleas at Sofiero. Photo courtesy of Sofiero.

century. Sofiero Palace was until the 1970s a summer residence for Swedish royalty. The magnificent heritage of thousands of rhododendrons, beds, borders and kitchen gardens continues to be carefully tended by a team of dedicated experts. In 2010, Sofiero was voted "Europe's Most Beautiful Park." The rhododendrons (more than 10,000 plants of 500 different varieties) are planted in two valleys facing the sea with a view over Öresund to Denmark. At Sofiero we are hoping to again meet some Swedish Rhododendron Society members. Our guide at Sofiero will be one of the pre-tour organisers and co-author of this article, Stefan Salomonsson. Later in the day, we will leave Sweden on a ferry to Helsingör, Denmark, to spend some more time in Denmark.

Our first stop in Denmark will be a cultural visit at Kronborg Castle. Kronborg is known to many as "Elsinore," the setting of William Shakespeare's famous tragedy "Hamlet, Prince of Denmark," though "Elsinore" is actually the anglicized name of the surrounding town of Helsingør. The castle's story dates back to a fortress, *Krogen* (lit. "the Hook"), built in the 1420s by the Danish king, Eric of Pomerania. The king insisted on the payment of "sound dues" by all ships wishing to enter or leave the Baltic Sea passing through the Sound [a narrow stretch of water forming an inlet or connecting two wider areas of water], and to help enforce his demands, he built a powerful fortress at the narrowest point in the Sound. At the time, the Kingdom of Denmark extended across both sides of the Sound, and on the eastern shore the Helsingborg Castle had been in existence since the Middle Ages. With the two castles and guard ships it was

possible to control all navigation through the Sound. From 1574 to 1585, Frederick II had the medieval fortress rebuilt into a magnificent Renaissance castle, unique in its appearance and size throughout Europe. However, during the Dano-Swedish War of 1658-60, Kronborg was besieged, attacked and conquered by a Swedish army, and as a result of the Swedish occupation, Kronborg was deprived of many of its most precious art works, including the richly decorated fountain in the castle courtyard, Frederick II's canopy and a number of the large ceiling paintings commissioned by Christian IV for the ballroom.

The Swedish conquest of Kronborg in 1658 demonstrated that the castle was far from impregnable, and so afterwards, its defences were strengthened significantly. From 1688-90, an advanced line of defence was added called the Crownwork and later, a new series of ramparts were built around it. After their completion, Kronborg was considered the strongest fortress in Europe.

At the castle, we will have a very special meeting with the "Hofmesterinde" Beate Bille, the mother to Thyge [Tycho] Brahe, the famous 16th century Danish nobleman and astronomer known for his accurate and comprehensive astronomical and planetary observations. He was the last of the major naked-eye astronomers, working without telescopes for his observations. Beate Bille will show us around in the Castle and tell about 16th century life at the Danish Kings Court, take us to the different rooms and explain how each was used, before ending the tour in the Kronborg Castle church.

The day's tour will end at Nivågård Park. Edvard Glæsel laid out the park in 1901–1902 and today, the park and its rhododendrons are looked after by Svend Hansen, who established the new rhododendron garden there in 2007.

After an exciting day, we will go to the Wakeup Hotel in Copenhagen, which will be our base for the next three nights. We begin our garden tour of Zeeland by first going to visit Kjeld Didreksen, a member of the Danish Rhododendron Society for many years and a member of the ARS. Kjeld has been a long-time seed collector from his own plants and has more than 180 rhododendron species and hybrids. His plants are cataloged by name, time of blooming and so forth, and Kjeld and his wife are also well known breeders of corgis.

Our next stop will be at the Zen Garden, a 2.4 ha (six acre) garden filled with plants (many rhododendrons) and a mountain landscape, consisting of more than 6000 tons of granite. The owners Jørgen and his wife Jakobine Nielsen have build their garden from the ground up, and there are many ponds with big koi. We will have a Danish open sandwich lunch, in Danish a smørrebrød, here, followed by a short coffee break with home-baked cakes.

The last visit on this day will be at Henning and Eva Andersen's big garden and nursery where they produce rhododendrons from both seed and from cuttings, after which we will return to our hotel.

Eva Andersen's garden at Henning.

The next day we will visit three very different gardens. First, we will visit Mogens and Kirsten Bendix in their garden in Lyngby. These two elderly people, both over 80, have a big garden that they maintain themselves. The garden is near an old fortress, meant to protect Copenhagen and built from money collections by the Women for Peace. If we have time, the Mogens will also give us a tour of the fortress.

After leaving this garden, we will have lunch at Svend and Birgit Hansen's garden at Kernehuset. Svend, together with his good friend Jens Christian Birch, both collected seed in China, and along with rhododendron cutting obtained from the RHS Botanic Garden in Edinburg, have established them in a park at Kernehuset. It is very big, impressive and can't be easily explained. Sven and Jens Christian are the people behind the selection of the DANE rhododendron series—'Great Dane', 'What a Dane', 'Sticky Dane', etc., which Hachmann is now propagating.

After the Hansen's garden, we will visit our last garden on Zeeland, Lulu Tøpholm's big rhododendron garden, or park. In its 2.5 ha (6.2 acres), there are some 800-900 rhododendron beside a lake of about 5 ha (12.4 acres) and a woodland connected to the park by an old stone bridge. We then return for one last night in Copenhagen.

On our way back to Bremen to the Convention, we will pass the island of Fuen where we will first visit Jørgen Halse's garden. Jørgen was one of the founders of the Danish

Eva Andersen's garden at Henning.

Rhododendron Society and he has a great garden with many different rhododendron species. Our final stop will be to Asperupaard Garden in Asperup, which is a "wild garden" with about 400 rhododendrons, 250 different magnolias and more than 500 other plants. We might have lunch at Asperupgaard, or else on the way as we travel south to Bremen.

I hope that you have enjoyed reading about the Scandinavian rhododendron tour and that you will be able to join it.

Moore images can be seen on a Powerpoint pdf at http://ars2018.org/home.php#anchorDENMARK-SWEDEN

Jens H. Hansen is the Chairman of the Danish Rhododenron Society and Stefan B. Salomonsson, former chairman of the South Swedish Society and the Swedish ARS Chapter.

Index

Index (online version)
Journal American Rhododendron Society, Volume 71, 2017.

The names of species and hybrid rhododendrons and azaleas occurring within the text of articles are not listed in the index. Reference to plants with colour images is made for the following entries: (AZALEA HYBRIDS, AZALEA SPECIES, RHODODENDRON HYBRIDS, RHODODENDRON SPECIES, VIREYA HYBRIDS, VIREYA SPECIES, and INSECTS).

Rhododendron cultivar names not registered in the International Register of Plant names and Checklist are marked with an *.

‘Cannon’s Double’. 2:88.
‘Carlson Calendulaceum’*. 1:67.
‘Choeiraku’. 3:5.
‘Daidhuhai’. 3:5.
‘Don’s Variegated Austrinum’*. 2:91.
‘Edward W. Collins’. 3:6.
‘Elizabeth Frances’. 3:83.
‘Fashion’. 2:86.
‘Geisha Girl’. 3:6.
‘Girard’s Fuchsia. 2:83, 87.
‘Girard’sVariegated Hot Shot’ 2:93.
‘Golden Oriole’. 2:86.
‘Gumpo Fancy’. 3:6.
‘Gunrei. 3:7.
‘Hosei’. 3:7.
‘Judith Quarrington’. 2:99.
‘Kusadama’. 3:7.
‘Linda’s Star’. 3:85.
‘Mansaku’. 3:8.
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‘Silver Sword’. 2:92.
‘Totally Awesome’. 2:85.

ARS SEED EXCHANGE

Seed donations accepted through December.

The 2018 Seed Exchange will be open to ARS members in January, non-members on March 1st. At that time the list and ordering information will be posted on the US and Danish web pages (www.rhododendron.org/seedexchange.htm) and http://www.rhododendron.dk/ARS-seed.htm.

A special group of species seed from the Rhododendron Species Foundation will be offered this year.

Norman Beaudry, Chairman
ARS Seed Exchange

Insects

Monthofer, Martin. The Beginning of Vireya Culture in Europe with Special Consideration of James Veitch & Sons Nurseries in Chelsea - Part . 2:32-43.

Nilsen, Eric. T., and Tatpong Tulananda. A Layman's Summary of our Study on "The functional significance of leaf idioblasts in acessions of Schistanthe (Ericaceae): A focus on leaf water relations." 3: 71-78.

Palmer, Bruce. The Word: Epiphyte. 1:77-79.

Pfenningwerth, Alix A., and Jennifer A. Schweitzer. The Great Survivor: *Rhododendron maximum* Varies across Gradients in the Southeastern USA. 2:28-31.

PLANTS OTHER THAN RHODODENDRONS

PUBLICATIONS

Book Review: *Azaleas.* 4:27.
Index *Journal American Rhododendron Society,* Vol. 71, 2017, online version, 90-102.
Newly Registered Cultivar Names. Michael Martin Mills. Winter 2017 1:81-87; Spring 2017 2:94-105; Summer 2017 80-90.

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'Amber Gold' 2:95.
'Anah Kruschke' 2:88.
'April Glow' 2:25.
'Autumn Orange' 3:80.
'Balta'. 2:87.
'Best of Times'. 2:96.
'Bill Miller'. 2:97.
'Black Magic'. 4:28, 29.
'Blaney's Blue' 2:81.
'Bob Furman's Julianne'. 3:81.
'Bob Furman's lady Luck'. 3:82.
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‘Catawbiense Boursault’ 2:24.
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‘First Blush’. 2:98.
‘Floda’ 2:80.
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‘Little Vixen’. 2:100.
‘Marshmallow’. 4:36.
‘Meerkerk Morning Grace’. 1:83.
‘Mellow Sun’. 2:101.
‘Midnight Sun’. 1:66, 72.
‘Patricia Marie’. 2:88.
‘Pioneer Silvery Pink’ 2:83.
‘Quiet Journey’. 3:86.
R. bureavii cross. 1:70.
‘Raspberry Spirit’. 2:102.
‘Razorbill’. 2:84.
‘Sandra Leigh Moser’. 1:84.
‘Shorty’. 2:85.
‘Silk Sunshine’. 3:86.
‘Simply Sunny’. 2:103.
‘Splendor’. 3:52.
‘Summer Dreams’. 3:87.
‘Sunny Day’. 3:38.
‘Sunset Dancer’. 2:104.
‘Sweet Talk’. 3:88.
‘True Blue. 2:84.
‘Variegatum’ 2:91.

RHODODENDRON SPECIES AND SELECTED SPECIES FORMS

SOCIETY NEWS

VIREYA HYBRIDS

VIREYA SPECIES

New Members from 5/16/2017 through 8/15/2017

CALIFORNIA
Janice Huang, Lily Journal & Book Co. Ltd
Y.C. Shen
CASCADE
James Hunter, Naoko Yasuda
COWICHAN VALLEY
Lynn Clark
Duane Fox
Lisa Greig
Wendy Johnston
Dorothy Kennedy
Surinder K. Mann
Janice & Laurie Moseley
Mary Pike
Elisabeth Zoffman
DANISH
Carsten Moellenbach
EUREKA
Harold Johnson
Wayne Ledbetter
GREAT LAKES
Jean Burns, Case Western Reserve University
Phyllis Mihalik
GREATER PHILADELPHIA
Chris & Stacey Antar
Andreas Muenchow
Alec & Stefanie Shoenberger
HAWAII
David J. Hertzberg
Gillian & Jeffrey Jenkinson
Stephanie Williams
JUAN DE FUCA
John Petrotta
MASON DIXON
Dave & Laura O'Callaghan
MASSACHUSETTS
Sukumar Desai
Betty Anne Donnelly
Marcia Rounsville, Samuel W. Perry
MIDDLE ATLANTIC
Randall Heise
MIDWEST
William Bigler
Cheryl Philstrom
MT ARROWSMITH
Lyle & Anna Campbell
NANAIMO
Paula Bernard
Sandy Ferguson
NON-CHAPTER
Richard & Bronwyn Illman
Michihiro Shida
Ian & Robyn Wall
PORTLAND
Cara Fitzpatrick
Mark/Lisa Kimball/ Volpel
Larry Joseph Kirby
Neil Ritson
POTOMAC VALLEY
Dr. Hartwig Schepker, Deutsche Rhododendron-Geselschaft e.V.
SIUSLAW
Carol Barron Dan & Dina Pavlis
Margaret Sorenson
SOUTHEASTERN
Chip & Cathey Gilbert
Danny Little
SUSQUEHANNA VALLEY
William Uber
SWEDISH
Birgitta Thorell Samuelsson
TENNESSEE VALLEY
Robert & Mary Ann Mize
Susan & Robert Philips
Julia & Keith Sanford
Susan Speraw
VALLEY FORGE
Patrick J. Logan
Roland Wedgwood
VICTORIA
Gordon Leask

Deceased Members from 5/16/2017 through 8/17/2017

McCarthy, Eris
McIlwaine, Henry, W.

Chapter/District/Special Donations from 5/16/2017 through 8/15/2017

Donor	Amount	Source
General Fund		
Eureka Chapter	$2,000.00	Proceeds from 2017 Convention
Endowment Fund		
Middle Atlantic Chapter	$100.00	In memory of Ray Doggett

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