AtlanticRhodo

www.AtlanticRhodo.org

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Rhododendron Society of Canada - Atlantic Region

Positions of Responsibility 2003 - 2004

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Director - Communications	Christine Curry	656-2513	**May- Public Plant Sale**	Duff & Donna Evers	835-2586
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Membership

Fees for our local (Atlantic) Society for 2003 were due on January 1, 2003. If you have not renewed your membership please do so now. If you are not sure if you have renewed, please contact **Betty MacDonald** our **Membership Secretary at (902) 852-2779.** Dues are $ 15.00 for individuals or families. Send to **Atlantic Membership Secretary, Betty MacDonald 534 Prospect Bay Road, Prospect Bay, NS B3T1Z8**

When renewing your membership please include your telephone number. This will be used for Society purposes only (co-ordination of potluck suppers and other events) and will be kept strictly confidential. Thanks!

Information about membership in the **American Rhododendron Society** will be provided at a later date.

AtlanticRhodo is the Newsletter of the Rhododendron Society of Canada - Atlantic Region. We welcome your comments, suggestions, articles, photos and other material for publication. Send all material to the editor.

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Cover Photo:
R. 'Great Eastern'. See Plant Portrait on page 10. [Photo Stephen Archibald]

Calendar of Events

All R.S.C.A.R. meetings are held on the first Tuesday of the month, from September to May, at 7:30 p.m. in the Nova Scotia Museum Auditorium, 1747 Summer St., Halifax, unless otherwise noted. Paid parking is available in the Museum lot. Friends, guests and anyone interested in rhododendrons, azaleas or companion plants are always welcome at meetings or events.

2 September **Annual General Meeting.** Voting on proposed incorporation of our Society.

7 October **17th Annual Steele Lecture, part 1**: Jens Christian Birck "Growing and Propagating Rhododendrons".
See Special Notices in this Newsletter.

10 October (Friday) **17th Annual Steele Lecture, part 2** :Jens Christian Birck "Thirty Years with Rhododendrons". 7:30 p.m. in the Museum Auditorium.
See Special Notices in this Newsletter.

4 November **Meeting**: Heather Sanff "Living Fences".
Some years ago Heather journeyed to England and France to apprentice in the art of weaving with living willow wands and creating garden divisions that grow! She has a fascinating talk on the different types of willow and their uses, and slides of some of her projects including wattles made for the Japanese garden at the Montreal Botanic Garden.

2 December **Christmas Party and members' slides.**
See Special Notices in this Newsletter.

Please Note: Some members, who have environmental sensitivities, are asking their fellow members please to use no perfumes, scented soaps, etc., on the days or evenings of RSCAR events, in order to minimize the risk of allergic reactions.

A very warm welcome to our new and returning R.S.C. Atlantic Region members who have joined since the May 2003 Newsletter:

Annapolis Royal Historic Gardens	**Annapolis Royal NS**
Karin Ashfaq	**New Glasgow NS**
Mary Blanchard	**Halifax NS**
Sarah and Carol Cluett	**Dartmouth NS**
Debra Cole and Carolyn Pearson	**Dartmouth NS**
Erik Gustavsson	**Norway**
Martha Leary	**Halifax NS**
Ron and Norma McLean	**Hammonds Plains NS**

Special Notices

17th Annual Steele Lectures

Jens Christian Birck

Nova Scotia Museum of Natural History Auditorium
1747 Summer Street, Halifax

Tuesday 7 October "Growing and Propagating Rhododendrons"

Friday 10 October "Thirty Years with Rhododendrons"

Longtime American Rhododendron Society members will immediately recognize the name Jens Birck for his Journal articles and rhododendron crosses, which are amongst the most coveted offered by the ARS seed exchange. He is a native of Copenhagen, Denmark, and a grower of extraordinary abilities. About ten years ago he and Sven Hansen journeyed to northwest Yunnan and returned with seed of many species including *Taliensias* and *R. proteoides*: la crème de la crème. Many of these grow in his Copenhagen garden. Jens is a master propagator by seed and grafting and will teach us invaluable tricks in his hands-on talk "Growing and Propagating Rhododendrons." Be prepared to start successfully propagating your favourite plants after this one! His second talk, "Thirty years with Rhododendrons" will entrance you, teach you, challenge you, baffle you and leave you stunned with the beauty of our favourite genus.

We are honoured to welcome this legendary rhododendron expert and plantsman on his first visit to North America.

19th Annual Christmas Wine and Cheese Party

Nova Scotia Museum of Natural History Auditorium

2 December 2003, 7:30 p.m.

Come and enjoy an evening of good food, wine and conversation

There will not be a speaker. Members are encouraged to bring a few slides of their gardens, and interesting or favourite plants.

The Society will provide the wine due to Liquor License Board Regulations. Members are asked to bring finger food and sweets.

Passionate Plantsperson Award

By Sheila Stevenson

The Society's first-ever Passionate Plants Person award for a Nova Scotia Community College Kingstec student went this spring to Antigonish native Tony Tomlik. The award is designated for a student who demonstrates a passion for plants by excelling in such horticultural areas as plant identification and plant propagation during the one-year Horticulture-Greenhouse certificate program in Kentville. Program instructor Jamie Ellison says Tony really excelled this year. He has shown interest above and beyond required activities without even knowing there was an award in place.

Tony credits his passion for plants to his experience in a Kingston, Ontario greenhouse, and the motivation provided by former employer Henry Steeghs, nurseryman and proprietor of Pleasant Valley Nursery in Antigonish. That passion only increased at Kingstec where Tony met Jamie Ellison, whose botany and soils courses were Tony's favourites. "The way Jamie talked about plants made sense to me," says Tony.

"It was the greenhouse-nursery aspect of the Kingstec program that attracted me," says Tony. "Watching seeds germinate and grow, taking cuttings, producing life everyday, a nice warm environment. But now after the year at school, I've shifted to being a gardener. I've moved to working with plants in an environment that plants will thrive in. And it's an art form too. Receiving the award was a big boost, a sugar high. I had a really good year at school and then I got this award on top of it. Its a big deal." In addition to his required course work at Kingstec, Tony worked on a special project to create alpine plant material for the new rock garden at Nova Scotia Agricultural College in Truro.

This summer he is working as an assistant gardener at St. Francis Xavier University where he and his sister, a Nova Scotia Agricultural College student in environmental horticulture, are responsible for the many flower beds on campus. As to what's next, Tony says he's hooked for sure on plants. And when things are dormant here in Nova Scotia, he will head south to wherever there's a growing season. But he loves Nova Scotia and will back in the summers.

The Board of the Society decided that funding the award to a Kingstec student is one concrete way to support and promote the development and exchange of expertise and material in the practice of creating and maintaining year-round garden landscapes featuring rhododendrons.

The Kingstec program develops highly trained employees for the horticulture sector. The program introduces students to basic theories and practices in botany, soils, entomology, pathology, and propagation and gives them hands-on work experience in the extensive campus greenhouse facilities. Students come out of the program with practical and problem-solving skills in greenhouse production, nursery production, garden centre retail, and landscaping.

The Horticulture-Greenhouse-Nursery program is described at
http://www.nscc.ca/Learning_Programs/programs/Horticulture_Greenhouse_Nursery.asp

Thanks to Jamie Ellison for proposing that we create and fund this award. And our best wishes to Tony in his pursuit of a horticultural career. ¤

Plant Portraits Wanted!

We need more Plant Portraits! If you enjoyed the Plant Portraits feature in this issue and want it to continue, please help by contributing a Portrait yourself. We hope to have Portrait features on other ericaceous plants, other shrubs, companion plants and of course more rhodos. To do this we need your help. Please contact Mary Helleiner at **cmhelleiner@ns.sympatico.ca** or send in the completed Portrait. Your suggestions are welcome.

Seed Exchange 2004

By Sharon Bryson, coordinator

Here we are in the autumn of 2003 and the time for planning, collecting, and cleaning of seed is upon us once more. At the risk of being repetitive, there are a number of reminders to pass on.

First, is to encourage more people to donate seed to the exchange… whether it is Rhododendron, Azalea or interesting companion plants. Seed for the exchange should be fresh, clean, labelled and sent to me by Dec. 31, 2003.

Second, we would like to hear from people who have been reluctant to try growing Rhododendrons or Azaleas from seed. Is this because of lack of growing information, lack of space or some other reason? Are there any suggestions anyone would like to make regarding the Seed Exchange? Failures? We think there ought to be some interesting stories out there. We need to hear your questions, comments or observations. If you have problems growing, I am sure we can find someone in the Society who could solve any problem. You know how gardeners love to spout off!

One important aspect of this information would be to give seed donors some well-deserved feedback regarding the fate of seed they gather and donate. For example, Bill grew seeds donated by Bob Pettipas from the 1995 exchange: seed exchange numbers 11 and 21. Plants from this sowing bloomed this year and both bloom and plants are quite nice. They are 'Yak-type', low growers, with pink blooms (some light, some dark) with a light indumentum on the new growth.

Remember seed growing information is available from past newsletters, the Atlantic Region website (**www.AtlanticRhodo.org**) and our 'Willow Garden' website (**www.infinitymedia.ns.ca/willowgarden**).

You can contact me by telephone (902-863-6307) or email (**sbryson@ns.sympatico.ca**)
Our mailing address is

407 Old Maryvale Road
RR#3 Antigonish NS B2G2L1.

2003 Seed Exchange Statistics

*discrepancy between amount ordered and amount sent out is due to substitutes and freebies.

No. of choices	No. of donors	No of purchases	No of pkts.	No. sent out	$ value
101	11	30	420	448*	$773.50
Most donations by one person	**Greatest $ value**	**Earliest order**	**Latest Order**	**No. of magnolia pkts.**	**Most popular seed**
56 pkts.	$102.00	Jan 29/03	March 18/03	46 pkts.	'July Jester' 12 pkts.

Clematis recta a 2004 Tissue Culture selection. [Photo S. Levy]

RSCAR 2004 Tissue Culture – Advance Sale

It's time again to order your tissue culture plants for spring 2004. This year again we have some new varieties and also some older ones that our newer members may not have. The cost to you for these plants will be approximately $5.00 each. We try to keep the price as low as possible.

DO NOT SEND ANY MONEY WITH YOUR ORDER. YOU WILL BE BILLED WHEN YOUR ORDER IS PICKED UP OR SENT (*Special shipping charges may apply.)*

These plants will be available for pick-up in early April. The time and location will be announced at a later date. All members will be advised of the date and location once confirmation is received of the plants' arrival date. In addition to your order you may be able to purchase leftover plants if any are available the day of pick-up.

An order form is included with this newsletter. Please make sure your phone number and if possible your e-mail address is included on the form. If your order cannot be picked up in Halifax please indicate this on the order form. Sorry, this sale is only available to our members in the Atlantic region.

Orders that are not picked up in Halifax on the pick-up date will be sent collect by the method indicated on the order form. Where shipping options are limited, the parcel will be shipped by Canada Post at your cost.
PLEASE REMEMBER TO MAKE A COPY OF YOUR ORDER.

The orders will be filled on a first in first filled basis. All orders should be in to me by 19 December, 2003.

Please send your orders to:

RSCAR
c/o Audrey Fralic
RR # 1
Port Mouton, N.S. B0T 1T0

Phone 1-902-683-2711

Remember that these plants have NOT been hardened off. We recommend that you give them a good watering and pot them up in 3 inch pots. You can use a mixture of one part commercial mix, one part peat and one part perlite. DO NOT OVERWATER. Keep them inside under lights in a cool place until all risk of frost is past. In June, gradually place them outdoors. Do not leave them in their pots. Plant them in the ground in a coldframe or some other well protected area. Mulch to keep the moisture and soil temperature stable and make sure they are watered as needed.

For the first winter provide some protection. Use a coldframe, burlap or conifer boughs and make sure you use some mulch. Do not use clear plastic as it will cause burning and may even kill them.

Good luck with your plants and make notes on how they do. We would appreciate some feedback on their performance.

Happy Gardening! -- Audrey Fralic

RSCAR 2004 Tissue Culture

Rhododendrons (All rhododendrons are elepidotes unless noted otherwise.)

Variety	Hybridizer	Description
Chionoides	Waterer	Tolerant of sun and cold, this compact hybrid has white dome- shaped trusses that are bright and numerous. Grows to 4 ft. Zone 6.
Cunningham's White	Cunningham	An attractive sturdy plant to about 4 ft. with white flowers enhanced by a green to yellow blotch. Full sun or part shade. Mid-late bloom. Hardy to –25 C.
Dorothy Amateis	Amateis	Large rose-purple flowers with a prominent purplish eye. Grows to 5 ft. and is hardy to –25 C.
Isola Bella	Brueckner	**Lepidote**. Pinkish to apricot in bud opening very pale purple and maturing to yellowish white with pink blush. Glossy dark green leaves with slight reddish tint in autumn. Hardy to at least –27 degrees C. Blooms early May.
Kabarett	Hachmann	A beautiful new plant from Hachmann. Purple-pink flowers with a touch of lilac spotting. Blooms mid to late May. Foliage is deep green and shiny with reddish stems. Grows to 4x4 ft. Zone 6.
Minnetonka	Motzkau	Compact ponticum hybrid grows to about 4 ft. Reddish purple flowers fade to light purple and are spotted vivid yellow green on upper petal. Very hardy to –25 degrees F.
Normandy	Leach	Wavy-edged bright rose-pink flowers with orange spotting. Broad rounded plant with dark green leaves. Blooms mid late and grows to 4 ft. Hardy to –20 degrees F.
Rangoon	Leach	Dark red flowers from dark red buds in a dome-shaped truss. Compact. Flowers at an early age. Grows to 3 to 4 ft. Blooms early May. Hardy to –25 degrees C.
Thunder	Mezitt	Deep purplish-red blossoms in early May. Foliage is glossy dark mahogany colour. Hardy to –20 F. Enjoys full sun and grows to about 3x3 ft. **Lepidote.**
Wojnar's Purple	Wojnar	Compact with emerald green leaves. Flowers are vivid reddish purple with a dark flare. Blooms mid-late . Grows 3x3 ft. Hardy to –20 degrees F.
	Deciduous Azaleas	
Millennium	Weston Nurseries	Fragrant deep red flowers with pale orange bloom in early to mid June. Foliage is blue-green and mildew resistant. Grows 3x2.5 ft. Hardy to Zone 5.
Yellow Cloud	Hyatt	Fragrant yellow flowers form huge trusses. Grows to 5x3.5 ft. Blooms early June. ARS Award winner in 1982. Hardy to Zone 5.
	Companion Plants	
Cimicifuga simplex "Brunette"		A great black-foliaged snakeroot. White fragrant flowers stand above the gorgeous glossy black-purple foliage. Blooms late summer and prefers shade. Grows to 6 ft. An award winner in 2002. Hardy to Zone 5.

RSCAR 2004 Tissue Culture

Clematis recta "Purpurea Select"	Beautiful deep purple leaved clematis with green overtones. Elegant and airy in growth habit, the leaves deepen in color in more sun. White flowers complement the rich foliage. Can be used as a staked shrub. Grows to 4 ft. Hardy to Zone 2.
Hosta sieboldiana "So Sweet"	Fragrant snow white blooms appear in late summer. Polished green leaves are rimmed with white. Grows to 18x24 inches. Hosta of the year in 1996. Zone 3.

Plant Portrait: Rhododendrons

Rhododendron pachysanthum

Rhododendron pachysanthum is an elepidote in the subgenus *Hymenanthes*, subsection *Maculifera*. Other familiar species include *R. strigillosum* and *R. pseudochrysanthum*. *Rhododendron pachysanthum* is native to Taiwan growing above the tree line. It inhabits grassy, exposed meadows at elevations of 3,000 to 3,200 meters (9,800 to10,500 feet). Taiwan is an island situated 200 km. off the east coast of China. The climate of Taiwan ranges from sub-tropical to sub-alpine over approximately 2600 square km.

Rhododendron pachysanthum is a slow growing species that can get about 1 to1.4 m. at maturity. This species has possibly the most attractive foliage in the genus *Rhododendron.* The dark green leaves are oblong to lanceolate with pointed tips. Leaves widen at the base and are somewhat rounded averaging 3 inches in length and about 1 ½ inches wide. The overall appearance of the plant in an open site is one of a rounded irregular globe on a sturdy stout stem. The foliage is thick and leathery to touch with a soft brown indumentum. The colour of the indumentum can be described as rusty suede brown.

When new growth commences in the spring, the immature foliage is covered with a dense whitish-fawn coloured tomentum that also coats the developing stems. This persists well into the autumn and eventually wears off revealing shiny forest green foliage. The stem is pale grey in colour with a somewhat peeling texture. Flowers are funnel shaped and pale pink to white with some spotting.

This species is not commonly seen in cultivation along the eastern seaboard. I personally have two specimens; the oldest is around 10 years old. It is approximately 2 ft. across by 2 ft. high. The second specimen is about half the size. Both are growing in an open sunny and very hot part of the property in Upper Clements, Digby County, Nova Scotia. Considering the fact that it is native to Taiwan, it is surprisingly hardy. Neither has experienced any winter damage on the foliage after being exposed to a variety of winters. However, temperatures have not gone below –20 C.

R. *pachysanthum*. [Photo Jamie Ellison]

since these were planted.

Plants are slow to develop tomentum when they are young; the development of tomentum takes around four or five years based on my observations. Flower bud development seems to be very slow as well. The oldest plant is just starting to set buds. Summer heat does not seem to affect this species as long as it is somewhat established. Both plants have gone through extensive hot dry summers in Upper Clements without any problems. Rarely does the foliage sustain any notable weevil damage with only the occasional notch in the new growth. The thick indumented leaves offer a challenge for even the hungriest weevils.

This species is by far the favourite in my collection to date. Planted in the company of other top-notch foliage selections, *R. pachysanthum* is always the one that stops visitors in their tracks to take a second look or a photo. I personally see tremendous potential in breeding with this species for superb foliage selections with a great habit and pest resistance.

- **Jamie Ellison**

Rhododendron 'Great Eastern'

Rhododendron 'Great Eastern' was in bloom in Wendy and John Cornwall's garden during the YWCA Garden Tour on the second Sunday in June about six years ago. It had a big effect on everyone that day. We acquired one in anticipation of the same result. After two years it looked nothing like the Cornwalls' specimen, so we moved it from a sunny location to a shadier and more protected spot amidst Indian Pear (*Amelanchier canadensis*, also known as Shadblow), False Holly (*Nemopanthus mucronatus*), and Hobblebush (*Viburnum alnifolium*). Three years later, it's a much happier plant.

The 'Great Eastern' in our garden is quite dense in habit. The new growth is occurring uniformly and everywhere there are branches. It looks as though it may be broader than it is tall. It now is about five feet high, and it's about 8 to10 years old. Harold Greer, in *Greer's Guidebook to Available Rhododendrons*, third edition, suggests that a ten year old plant reaches about five feet. The smooth oblong foliage is an unexceptional-but-pleasing mid green. This plant is not in the high-performance foliage-plant category like a yak, *bureavii*, *oreotrephes* or 'Golfer', but during the period of bloom and new growth, it may be peerless in our garden.

It puts on a joyful show that runs for about a month. The pink funnel-shaped florets appear in a tight truss that sits upright on the leaves. The flowers are deep pink at the slightly ruffled edge and graduate to a light pink with a yellow green blotch in the throat. At one point in the show, the pink blooms and the pale new leaves appear together. As the petioles and leaves emerge, the red stipules fall away like ribbons, so that the overall effect is reminiscent of a be-ribboned female Ukranian dancer.

According to Greer,'Great Eastern' is a *Fortunea* subsection hybrid developed in 1943 by the Massachusetts hybridizer Charles Dexter but was only registered in 1983 by the Scott Horticultural Foundation. The bonus with this plant, given its *Fortunea* lineage, is its fragrance. 'Great Eastern' started to show colour this year (2003) on June 13, at the same time as 'Bikini', 'Nova Zembla', 'Janet Blair', 'Polaris', and *kiusianum*.

- **Sheila Stevenson**

Rhododendron 'April Mist'

This past winter brought not only the bitter winds that tear through our back garden every year, but also an unprecedented amount of snow. I had to seriously reconsider our title as the Banana Belt of Nova Scotia while I shovelled drifts as high as my shoulders to get to the hen house and woodshed! The layers of snow, ice, and more snow broke boughs, and trapped bent over branches until it all melted in late March.

R. 'April Mist' [Photo Christine Curry]

We all wondered how our plants would fare through the ice and wind, and temperatures approaching –30 C, but all in all we had relatively little damage. Our lepidote rhododendrons, which live in annual peril from the cold northwesterlies, were fine. My favourite, 'April Mist', had spent the winter encased in a snow drift with the tips of its branches poking out, but bloomed as profusely as always in early May.

I got my plants of 'April Mist' from the 1996 RSCAR tissue culture sale and they bloomed for the first time in 1999. Although we are technically in zone 6b here in southwest Nova Scotia, the usual winter combination of no snow cover and bitter winds has taught us to plant hardier plants in the open. 'April Mist', a Gustav Mehlquist hybrid ((*minus* Carolinianum group x *mucronulatum* 'Cornell Pink') x (*dauricum album* x *dauricum*)) is reportedly hardy to –32 C. in Newfoundland, temperatures we are not likely to see here. It is upright in its growth habit, but low growing, reaching less than a meter in ten years, and compact enough to be at home in a mixed border that includes *ericas* and *callunas*, dwarf conifers, and some larger deciduous shrubs.

The flowers are beautiful–double, wide funnels in the softest pink–and seem to float above the foliage. "Mist" is a perfect description of the effect. The ARS and Greer describe the summer foliage colour as sage green, but I think it is greener than that, and through the fall and winter the leaves take on a rich dark colour which I can't quite describe: not purple, perhaps more a burnished mahogany.

To date the plants have shown no signs of stress from either heat and lack of rain (they live in full sun, mulched with a combination of leaves, composted bark, and dead pine needles), or fog and too much rain! The foliage is clean and the plants don't seem to be bothered by any pests.

This is truly a wonderful rhododendron, an easy and lovely addition to any garden.

- **Christine Curry**

Rhododendron schlippenbachii

Thirty years ago, in the mid 1970s, we planted a lot of rhododendrons in our Halifax garden. Not many varieties were available locally, but we brought in a good selection of small lepidotes from British Columbia and some other types from Ontario. At the time we knew nothing about growing rhodos except that they required acid soil. The lepidotes were planted in deep shade (I thought all rhodos needed shade) and the others, mostly *catawbiense* hybrids and other similarly tough types, were planted in badly drained spots and too much shade. And in the 1970s and 80s there were some vicious winters. At that time the plants came balled and burlapped; it was before the era of getting everything in pots.

Well, thirty years later three of those early plants are still with us in spite of all the mistreatment: 'Ramapo', and *RR. russatum* and *schlippenbachii*. 'Nova Zembla', 'Catawbiense Album' and all the rest are long gone, which seems to say that the three survivors must be really tough. Of these, *schlippenbachii* is by far my favourite.

"The Royal Azalea" is the name sometimes given to *R. schlippenbachii;* it's easy to see why. Apart from being almost unpronounceable, *schlippenbachii* stands out as a spectacular and unusual plant, different from all the other azaleas that we grow. It is deciduous, with soft light green leaves, usually in whorls of five. When it blooms in late May the leaves are just starting to appear, but by the time it finishes, the flowers are surrounded by half grown leaves. The flowers themselves are very large and open for an azalea; they are usually pale pink, but some clones are pinker than others and some are nearly white. I have to say with regret that the flowers are not particularly long lasting. A bonus: the leaves turn orange and red in the fall.

Our plant grows in dappled shade under red oak trees; the amount of shade varies somewhat depending on how recently we have limbed up the oaks, but bright sunshine rarely reaches it except in May when it flowers, since at that time the oaks have barely started to leaf out. It is mulched with a deep layer of naturally fallen leaves from the oak trees. We grow massed snowdrops under *R. schlippenbachii* and they flourish; they get lots of sun under the bare branches and have made their growth by the time the leaves begin to shade them. After some thirty years our *schlippenbachii* is about seven feet high and across, and still growing slowly.

Rhododendron schlippenbachii is native to Korea, Manchuria and east Russia. It is put in section *Azalea*, subsection *Schlippenbachii* in one classification; it falls into subgenus *Pentanthera*, section *Sciarhodia* in another. The other members of this group are rarely grown, though there is a picture of one, *R. quinquefolium,* in *Greer's Guidebook to Available Rhododendrons.*

Just remember, it's easier to grow it than to say it.

- **Mary Helleiner**

R. 'Normandy' is offered in the 2004 Tissue Culture selections. [Photo Don Craig]

Fifty Years of Testing and Breeding Rhododendrons in Nova Scotia

By Donald L. Craig

A permanent printed record of the history of the Kentville Research Station's rhododendron breeding programme does not exist. As I am the only one that has the information I hope that this article will document its beginning in 1952 and step by step development up to my retirement in 1983. Over time our project revealed much new information about the diversity of the genus Rhododendron - its forms, habits, adaptability and great spectrum of colour. The endorsement of our work by the public and media was a source of inspiration. I hope that this report will be useful to the home gardener and anyone contemplating a similar programme, be it large or small. John Weagle's very generous contribution to the organization and presentation of this article is acknowledged with sincere thanks. Don L. Craig

Conclusion

My Favorite Kentville Cultivar

You might ask me to name my favorite Kentville bred rhododendron. Without question it is 'Minas Peace'. 'Minas Peace' was entered as a numbered seedling in the Canadian Society 1976 Montreal flower show. The plant is semi-compact, leaves dark green, leaf underside covered with thick grey-orange indumentum, flower buds rosy red opening to white suffused pink with light rose stripes on the back of the corolla, flower quality superb, compact trusses borne above the foliage. If there were no flowers it would still be worth growing because of its form and foliar quality. 'Minas Peace' is more comfortable in Zone 6 than 5B. It was judged 'Best' in the Montreal show.

The first cultivars released received their names from Longfellow's poem Evangeline. The poem tells the story of the 1755 expulsion of the French Acadians from the Grand Pré area some 16 km. east of Kentville.

The 3000 Acadians were herded onto British sailing ships; 900 homesteads in Grand Pré alone burnt to the ground. They sailed out of the tidal Minas Basin, which is part of the Bay of Fundy and only a short distance from Grand Pré. They were dispersed from New England to the West Indies. The most fortunate were put off at Louisiana where they were welcomed by their own race.

There were only a few names in the poem so to keep the historical connection the prefix 'Minas' was used. Minas was a community not far from Grand Pré.

R. luteum

Rhododendron luteum is a highly desirable deciduous azalea species. Its yellow tubular/funnel shaped, long-lasting flowers have an exquisite sweet fragrance which permeates the whole garden. Hailing from the Caucasus, Turkey and several rather nearby areas it is no surprise that the experience of RSCAR members is that many luteums are not terribly winter hardy including most wild collected seed and the Rhododendron Species Foundation's named cultivar 'Golden Comet'. Our good fortune was that Nova Scotia hardy luteums came from the Lindquist seed received in 1953. Twenty-five seedlings were produced. A few were planted along the top of the north facing banking in the pond area. Being over-shadowed they nonetheless flowered regularly but not well. Three more were planted in a small bed fully exposed on the crest of the hill leading to the picnic grounds; these flowered well but one was outstanding in flowering, growth, vigour, plant quality and both bud and stem hardiness. And so this "outstanding luteum" was a very valuable addition to Nova Scotia gardens. A few years ago seeds of these good luteums were sent to the RSCAR Seed Exchange and hopefully they have grown and flowered as well as those in my own garden. I cannot comment on the fate of all twenty-five original seedlings: the time lapse of 50 years is the culprit.

A Fundy - Bellefontaine Cultivar Comparison

The KRS cultivars Fundy and Bellefontaine were derived from the same cross and so it is not surprising that they are similar in general appearance. Members who have lost labels can easily confuse the two. Here are a few distinguishing characteristics. Twenty-five to thirty year old plants of both cultivars have reached a height of nearly 5 meters at the KRS and elsewhere. Their plant forms are equally pleasing. The main difference is that Bellefontaine is in full bloom 5 to 7 days earlier than Fundy. As well the new growth stems of Bellefontaine have a rose colour epidermal colouring whereas Fundy's stems are always green. The flower colour of Bellefontaine is a lighter pink than Fundy's. Bellefontaine's stigmas are dark red, Fundy's are yellow. The yellow brown blotch of both is much smaller on Bellefontaine.

The mature height and form of these cultivars are ideal for spacious landscapes but not for home foundation plantings. Properly presented they are of exceptional beauty.

Looking Back, Positive and Negative Comments

In 1983, the Kentville rhododendron programmes like similar programmes in Canada e.g. Vineland, Ontario, the rose breeding programme at the Central Farm Ottawa, came to a halt because of economic constraints, a shortage of

money and labour and because of the need to prioritize the region's most pressing horticultural needs. Breeding was terminated and the display beds relegated to very minimal maintenance.

Positive

- It was demonstrated that with very minimal cost to establish and maintain, the Kentville rhododendrons became an excellent public relations asset. Widely known in Canada and the US by lectures, visitations, press and TV, it brought pleasure and knowledge to thousands of people.

- Rhododendron Sunday held first in 1967. It is a very positive annual event providing the public the opportunity to view the great varieties in plant form and quality, season of flowering, flower colour, etc.

- It helped stimulate interest in rhododendrons so that today plant purchases in Nova Scotia are at an all time high.

- The great value of deciduous azaleas such as the *Knaphills* was demonstrated. When compared with rhododendrons the obvious thing is their superior ability to survive in challenging winter climates.

- Having world experts such as Edmund de Rothschild and Robert Seleger visit the Station to view the plantings and take part in discussions was a great pleasure.

Negative

- How unfortunate it is that, as of 1983, the Kentville programme ceased to function in a meaningful way.

- Rhododendron Sunday is no longer the major attraction it was.

- The very large number of new and improved rhododendrons are not on display for the public.

- A much-needed re-organization and re-vitalization of the Kentville display beds is still in limbo.

Do We Need a Breeding Programme?

Had I known in 1952 what I knew in 1975 following 23 years of extensive testing of cultivars and species I would not have become involved in a breeding programme. In 1952 I did not know with certainty the names of the cultivars in the Station's lone planting. By 1975 there were 174 cultivars and 81 species that had been or were still being tested. Many of these proved to be good performers (Agriculture Canada Pub. 1303 revised 1981).
Breeding with commercial aspirations is anything but easy especially for the breeder with limited resources. The

Dr. Craig and Edmund de Rothschild viewing rhododendron seedlings, Kentville Research Station.

Kentville programme was very small. The naming of 14 selections pales in comparison with that of the late Weldon Delp who has registered 301 cultivars and the late David Leach 85. Both, like Kentville, were breeding for winter hardiness. Leach's facilities for breeding in terms of land, laboratories, manpower and money were more than adequate; Kentville is very limited in comparison (Leach, ARS Jour. Vol. 41, No. 4, 1987).

The sheer number of introductions by Delp and Leach is mind-boggling. How does one adequately test so many? In my mind the numbers are excess beyond reason. Adequate testing for regional adaptability was a real constraint for breeders, especially small breeders such as the late Joseph Brueckner of Mississauga, Ontario, and others.

Reporting in his article "The Quest" (ARS Jour. V 36, No. 1) Leach states "There followed next a group of hybrids of which too many were named perhaps because they represented a success after so many failures". Now that the market is inundated with an endless number of new cultivars, I too realize that we were in too big a rush to apply names to at least a few of our introductions. Surely from among the many cultivars from Delp, Leach and others there are new rhododendrons to more than satisfy most gardeners.

For the moment the important thing is to have the public realize the wide range of rhododendrons available for Zones 5 and 6. There are so many plant forms to choose. Bloom dates can vary from May until mid July. The range of flower and foliage colours has increased dramatically. There is now a degree of winter hardiness in some species and cultivars to make it possible to have success even under very severe winter conditions.

Having retired from the Research Station in 1983 I returned to the Station from time to time until 1987 in order to evaluate seedlings, especially 1200 azaleas I produced from seed sent to the Station from Exbury in England. The seed origin was "seed from the very best Exbury plants mainly the deep red and yellows". Only 16 were selected due to the high incidence of foliar mildew. None were named.

More Breeding and Testing at Sunny Brook Farm

In 1987 my daughter (Sue Gunn) and I initiated rhododendron plantings at her 232 year old home 9 km north of Kentville. One acre of the 13 acre homestead is devoted to the plantings in 28 beds containing 52 azalea cultivars and 88 rhododendron cultivars plus many companion plants such as Kalmia, Pieris, Calluna and dwarf evergreens. We have also practised my "hobby" by growing 2816 seedlings from 73 parental combinations. Currently (2001) we are evaluating 113 selections from these crosses; 'Mist Maiden' and 'Besse Howells' were common contributors in many instances because of their winter hardiness, plant form and quality. The same can be said of 'Calsap', 'Janet Blair' and 'Scintillation'; indeed our first step was to cross 'Janet Blair' with 'Calsap' and 'Scintillation' with 'Calsap'. We grew 90 seedlings of each cross, selected the four best from each and then inter-crossed them. By back-crossing with 'Calsap' its hardiness was added,and the quality of 'Janet Blair' and 'Scintillation' were apparent in the progeny. One resembling 'Mrs. Furnival' was a highlight of Spring 2002. Shammarello's 'Besse Howells' has attributes worthy of consideration - hardiness,compactness and semi dwarfness. From 18 yak x 'Besse Howells' seedlings we have four selections. Similarly 13 of 95 seedlings of a cross of 'Minas Rose Dawn' x 'Besse Howells' are on trial including my best red to date. SEL75-31, a 1971 cross of ('Red Head' x yak) x (catalgla x 'Elizabeth') has a nice compact truss, the colour of Nova Zembla, but measures only .9m high x 1.4m wide in 28 years. Several years ago John Weagle was impressed with selection S.94-04 from our cross of [('Bellefontaine' x *degronianum*) x 'Goldsworth's Yellow'] S.80-07 x (*aureum* x 'Prelude') BPT#80-5. The seed parent is an old KRS hybrid, very compact and a pale yellow; the pollen parent is Captain Steele's best early yellow. The hybrid is a compact mound sporting dark yellow flowers and is now on trial. As well a sibling which I feel is superior is being tested. We are not very concerned about registration. The joy is in having them in our own garden.

Garden Entrance at 'Sunny Brook Farm' [Photo D. Craig]

Testing

During my years at the Research Station one of my main interests was the evaluation of any rhododendron or azalea cultivar or species that by definition should be suitable for Zone 5A or 5B. I have now obtained a range of new material, which was not tested at Kentville plus old standards for comparison purposes. The so-called "news" are cultivars such as Leach's 'Golden Gala', 'Normandy', 'Swansdown' and 'Cyprus'; the Mezitt hybrids 'Henry's Red', 'Jane Abbot', 'Olga' and 'Aglo'; Beasely's 'Top of the Mountain', 'Cherokee' and 'Curahee'; others such as 'LeAnn' and Bosley 1016.

Many of the 'new' cultivars were obtained at the American Rhododendron Society plant sales at the annual meetings at Eugene, Oregon, Williamsburg, Virginia and Cape Cod, Massachusetts.

Our garden has much greater exposure to sun and wind than the Kentville planting thus another opportunity to rate winter damage to flower buds. This we did for five consecutive years (1993-97) using scores of 4 for full flowering; 3 good flowering; 2 for scattered flowering and 1 for all buds killed.

Thirteen cultivars had perfect scores of 4, 24 were 3 or better which is satisfactory; the remainder had variable scores per year from 4 to 1 suggesting that in some years they would be less than satisfactory. None of the azaleas scored less than 3; most were 4 or slightly less. *

Winter temperatures for Dec., Jan., Feb., and Mar. for the 5 years were no lower than -24.9°C (-13°F) suggesting that all of the cultivars would fall within the hardiness rating of H_2 yet there was significant bud damage to some cultivars in 1995 and 1996. It is worth noting that none of the deciduous azaleas were seriously damaged.

The rhododendron cultivar 'Scintillation' is acclaimed by many to be the premier elepidote in the New England States. Its hardiness rating is H_2. Its performance at my summer cottage Sunnybrook, at the Research Station and elsewhere suggested it is over rated, an indication that rating hardiness involves complex plant and climatic functions**.** At Sunnybrook near Chester Basin, Nova Scotia, my 'Scintillation' growing within 50 meters of the Atlantic Ocean performs very well when compared to another in my home garden in the Annapolis Valley. Hardiness ratings assigned to many other rhododendrons cannot be assumed to be totally accurate. Pellet and Holt of Vermont state (Vermont News Release: 1-2, Dept. of Plant and Soil Science, Burlington) that "the selection of hardy rhododendrons should not be based solely on mid-winter cold hardiness because the rate of hardiness development is an important consideration. The hardiest evergreen rhododendron may be injured when minimum temperatures are below -15°C (5°F) in November and early December".

R. 'Golden Gala'. [Photo Don Craig]

Rhododendron cultivar evaluations at Sunnybrook have been very productive. We are now aware of the value of numerous new cultivars in our garden as well as a number that are not fully satisfactory. Among my favourites are 'Henry's Red', 'Golden Gala', 'Swansdown', 'Normandy', 'Melusine La Fée', Bosely 1016, 'Olga', 'Aglo', 'LeAnn', 'Francesca' and of course my own introductions. The data on date of full bloom are useful and the minimum winter temperature information helps us to understand that low temperatures in mid-winter are not the only factors causing damage to rhododendron tissues.

We take great pride in our garden, especially in view of having done it all by ourselves. We are the gardeners. For 50 years the beauty of rhododendrons and azaleas has surrounded me. I simply can never get enough.

N.B. Various Kentville hybrids can be purchased at Bayport Plant Farm, Bayport, Lunenburg, NS. 'Minas Grand Pré' (aka 'Grand Pré') is available in small sizes at Blomidon Nurseries, Greenwich, NS, Lakeland Plant World, Dartmouth, NS, Gerry's Nursery, Centreville, NS and Murray's Garden Centre, Portugal Cove, NF. ¤

*Reported in RSCAR Newsletter May 1999.

The Evolution of "The Willow Garden"

By Sharon Bryson

A view from "The Hollow". [Photo Sharon Bryson]

This garden was started in the late 1970s when Bill and his late wife retired to Nova Scotia from Ottawa. During the first years there was quite a concentration on vegetable growing with the addition of many beds containing spring bulbs, lilies, perennials, roses and a variety of shrubs. The area is very natural and by no means formal. Most of the existing trees are those that were originally growing on the property. The best of the lot are some good groupings of white birch.

The name "The Willow Garden" has been a fairly recent addition; it is the literal translation of Wilgenhof from the Dutch and seemed an appropriate moniker. For those unfamiliar with our garden, we are located about 15 km. outside Antigonish. Our garden is a semi-woodland area (approximately three acres) with good shelter from wind, but the planting areas still have more sun than shade. The soil here is pure sand. This presents a continuous need for soil enhancement to maintain fertility and moisture retention. Drainage is certainly never a problem! Copious quantities of composted horse manure are incorporated each year.

The garden today represents the efforts of both Bill and Sharon, who officially joined forces in 1999. They still have some elements of the original garden beds with considerable additions and renovations. Part of this addition is the recent clearing and preparation of a one acre section which is to become a botanical forest. We hope this will provide an area to plant trees, some of which we already have growing as seedlings. The plan is to add red oak and some species of pine as a backbone. It is inevitable that there will also be some plantings of azaleas and rhododendrons.

We have often dubbed our garden a "grower's" garden because so much of what is here has been grown from seed or cuttings. This propensity to collect and grow seeds of many plants leads us to incorporate nursery bed areas into the overall plan of the garden. We have to use the word plan a bit casually because sometimes it seems we do not have one… interesting plants are grown and somehow get fitted into the landscape, most often with rather satisfactory results.

Interest in rhododendrons and azaleas came about in the late 1980s. Based on past experience, Bill assumed they could be grown from seed as so many other things were. A considerable amount of trial and error has led to a very successful approach to the growing of rhododendrons from seed. The rhododendrons and azaleas now cover an age range from one to twelve years. The last year or two has witnessed a fair

degree of maturity in plant growth and bloom from many seed lots ranging back to 1992. It is difficult to judge the quality and uniqueness of many of these seedlings as they bloom, but needless to say they provide a lot of excitement.

One of the most beautiful plants has come from ARS92#765 ('Barbara Cook' x 'Janet Blair'). It is a very nice plant with frilly pale pink blooms with magenta freckles and a dark red throat. We have affectionately dubbed it 'Sproeten'; whether we actually go through the performance of officially naming it remains to be seen. Another group of seedlings from ARS92#608 (a complex cross from the Andersons of New Jersey) has given several very good yellows. Two of these have been exceptional in their non-fading blooms and winter hardiness. Each season certainly becomes more complex relative to keeping records of the performance of the many plants in bloom.

Each year sees the addition of 500 to 1000 new seedlings grown from seed obtained from the ARS Seed Exchange and that from the Atlantic Region. This, of course, demands that space be made available. Ruthless weeding out of the less desirable helps a little. A thousand yearlings can be accommodated in a much smaller space than those same plants two or three years later. The problem of space is ever present! Many of our mature plants are still suffering somewhat because they are too crowded. Throughout the garden you will encounter nursery bed areas each representing a seed-year grouping of seedlings. Interspersed with the many seedlings from those years are a fair number of named varieties from tissue culture acquisitions or plants brought in by the Rhododendron Society.

The very first planting of Rhododendrons at the north end of our house has some rather old standbys such as 'Nova Zembla', 'Chionoides', 'Ramapo', 'Catawbiense alba', to name a few. They are a bit crowded, but plug along each year. One rather cheery spring show is provided by a mass planting of 'PJM' in the front yard under a stand of spruce trees. This spring color is accompanied by a mix of 'April Rose' and 'PJM' directly in front of the house. The variety in early bloomers is enhanced by both pink and white *R. dauricum* and *R. mucronulatum* grown as seedlings and acquired plants. Keeping all of these rhodies company are thousands of spring blooming bulbs. These front yard beds give way to plantings of impatiens and tuberous begonias for summer interest.

One of our favorite early rhodies is 'Azuray' which puts on a great display of lovely violet bloom along with 'PJM'. The plants seem to be at maturity, and are now about six feet tall. This same bed is home to *R. bureauvii* and *R. albrechtii* as well as a few known varieties such as 'Malta', 'Henry's Red', 'Edith Bosley', 'Nova Zembla', 'Swansdown' and the worst specimen of 'Hong Kong' ever seen. There are a few more *catawbiense* types plus a fine showing of the azalea 'Spicy Lights'. Late season bloom is always brilliant because of several 'July Jester' azaleas and a few kalmias. There are relatively few seedlings in this bed, but there is one group. They have been nicknamed "The Steele Bastards" since seed came from Dick Steele who had no exact knowledge of the cross. They have grown to be quite big plants, probably showing some *R. fortunei* in their parentage, blooming in various shades of white and pink. They exhibit beautiful new growth, but a very harsh winter can cause some distress.

Azaleas have proven to be rather a simple plant to grow from seed and we have a large number scattered throughout the property. We don't always know the exact source, but they provide a brilliant addition to our June garden. Most of the plants are seed grown and are a range of salmon and coral shades, yellows and white. One group of seedlings grown from seeds via the RSCAR Seed Exchange (1995) has given us an interesting collection of pink plants which have the azalea 'Homebush' as the seed parent. Other known varieties of azaleas include 'Homebush', plus 'Spicy Lights' and 'Golden Lights' from the very hardy Northern Lights series. We have been trying several seed lots from some of the species azaleas over the last two years, so some of these ought to bloom in a year or two. We have been trying to encourage our gardening cohorts (or anyone who will listen) to give azaleas a chance in their gardens. Whether from seeds or from purchased plants, they often give a gratification that is missed if only rhododendrons are tried.

The garden has enough areas of mixed perennial plantings to be of interest throughout the gardening season. One bed we call the gully has a very beautiful naturalized planting of spring bulbs plus a share of rhododendrons: 'Scintillation', 'Elviira', 'Crete', 'Percy Wiseman', '*carolinianum*', 'Sue Gunn', 'Azuray', 'Charme-La', *grandiflorum*, 'Isola bella', 'Angel Powder' and a couple of unknowns. The season extends into good shows of many perennials including peonies, oriental poppies, lilies (both Asiatic

R. 'Sproeten' ARS92#765 ('Barbara Cook' x 'Janet Blair'). [Photo Sharon Bryson]

A view of the garden and arbour. [Photo Sharon Bryson]

and Oriental) and a late season of dayliles, phlox and coneflowers.

One section here has a trial planting of the clumping umbrella bamboo, *Fargesia murielae*, which have grown from seeds sown in 1999. Plants from this seeding have been planted in a few places to see where they are happiest; most are 3-4 feet in height. They are planted in the shadiest end near some pine trees and share the bed for a time with Hostas and Astilbe.

One of the focal points of the garden is the large central perennial bed which greets one as you enter the driveway. Like so many of our garden areas it is an eclectic mix of bulbs, rhododendrons, roses, daylilies and many other perennials which hopefully see us through from very early spring until fall. It is hard to pinpoint when is its best time. Our "front-side" garden has had a bit of a face-lift this summer with the addition of a new rose arbor and some rather large rhododendron seedlings (eleven years of age, moved from a crowded area in the back) and several azaleas. This garden area has had a planting of peonies as the focus for quite a number of years. Peonies have become a favorite seed-grown item during the past five or six years. They are mostly seedlings from open pollinated seed collected from a large number of cultivars. Many of these plants are now of blooming size. Some are still in nursery bed areas, while others have been moved to garden beds.

Our back garden is partly dominated by a huge white birch directly behind the house. We suspect it also tries to dominate the garden beds here in terms of root invasion and competition for moisture. Leading down the hill towards these plantings is a rose arbor which is home to the rose 'Dorothy Perkins', a very vigorous rambling rose which blooms in late summer. There are a variety of perennials in the area surrounding the arbor. It is quite sunny and dry so various thymes, Russian sage and several heathers are doing well. Part of this bed merges with another nursery area with some shrub cuttings, seedlings of magnolia and February daphne plus many other things.

One large bed is composed of some rhododendrons and azaleas, but also has many bulbs, peonies, daylilies and a lovely beauty bush (*Kolkwitzia* sp.). As this is being written there is a great display of phlox, lilies and monkshood. An adjacent bed was created for transplanting rhododendron seedlings after their first years in a nursery bed. Some of the spaces are shared by a Japanese maple and a selection of lilies. Two beds at the far bottom of the garden have rhododendrons, azaleas and some specialty trees grown from seed. Several *Catalpa ovata* (Chinese catalpa), which bloom at a very young age, are doing well here.

Adjacent to our official beds are several areas we use as combination nursery beds and vegetable garden. We seem to have almost mastered the art of growing enough garlic for a year's supply! Mid-summer sees a large sea of rudbeckia in various parts of the garden; these have either volunteered or were really planted. We are too kind-hearted to weed them out!

This concludes a rather rambling sketch of our garden. It is ongoing, ever-changing and a source of great joy and satisfaction. Part of the joy we get from our garden is in the ability to share, therefore we welcome anyone who would like to come for a visit. This can be done in person or online at our website(**www.infinitymedia.ns.ca/willowgarden**). There you can see that a picture, is indeed, worth a thousand words. ¤

Cold Stress Induced Leaf Movements

By Willem Morsink, Toronto, Canada.

It was the fourth of February, 2001. I was looking at the curly-leaf rhododendrons growing in my North Toronto garden.

Cold stress induced leaf movements provide winter entertainment for northern rhododendron gardeners like me. To rhododendrons, however, these movements are major mechanisms for surviving cold stress. Erik Nilson (3), who authored many papers on rhododendrons (review by Vainola, 5), presented results, and observations, on two physiologically distinct leaf movements, i.e. leaf curling and changes in leaf angle. Changing leaf angle from a horizontal to a vertically downward position, may serve to protect the photosynthetic apparatus from high light intensity damage under cold temperature conditions. Freeze leaf curl involves reversible cell dehydration within a leaf to prevent cells from rupturing, if ice crystals were allowed to form inside cells. How is this possible?

Cold hardening

During the growing season, living cells inside rhododendron leaves, may become swollen, firm, and turgid, due to water uptake necessary for photosynthesis. A plasma membrane inside the cell, controls water movement into and out of the cell (4). Turgor pressure of the cells, results in full extension of the leaf blade and extension of the leaves horizontally, while loss of turgor pressure accounts for leaf curling, and leaf movement downward from a horizontal leaf position.

During the period of cold hardening in the fall, the cell membranes of hardy rhododendrons become increasingly permeable to water movement into or out of the cell. Permeability of the cell membrane, allows the cells to dehydrate with decreasing temperatures, to prevent ice crystal formation inside the cells. Careful examination of plant tissues (4), showed that dormant season acclimated living plant cells contract rather than expand upon freezing.

Rhododendron antifreeze

Furthermore, the phenomenon of reversible dehydration, or maintaining vapour pressure equilibrium (1), to prevent internal cell ice crystal formation, is made possible through super cooling of cell water. Temperature conditions during a later stage of fall hardening induce a considerable change in metabolism of cells, when starch is converted back into various sugars. Sugars together with amino acids and other substances play a major role in increasing the concentration of cell fluids and thus they depress the freezing point of water in the cells. This allows the super cooling of cell water several degrees (-7 to -13 C for leaves) below the freezing point of water 3).

Leaf curling

During the dormant season, cold hardy rhododendrons with intense cold induced leaf curling, lose cell water and cell turgor pressure easily, starting at small water deficits (3); and conversely, cold sensitive species with little or no leaf curling and leaf angle movement retained more cell water, together with more turgor cell pressure under water stress conditions. This process is reversible in cold hardy rhododendrons with rising temperatures, as long as cooling or warming occurs at rates at about 1 to 3 degrees C/hour. With faster cooling or warming rates, freeze-thaw damage may result. Solid ice or ice crystals are almost never observed within the living cells of plant tissues that freeze at natural freezing rates between 1 to 3 degrees C per hour.

Rapid freeze curling species were noted as *R. catawbiense, R. maximum, R. minus. R. micranthum, and R. brachycarpum* (3). In Toronto, I observed species and cultivars as shown in Table 1, for rapid leaf curling. Nilsen (2), further observed that tender cultivars only started to curl slightly at -20 C, whereas hardy hybrids exhibited strong curling starting from temperatures ranging from 0 C(32F) to -2 C(28F).

Anti-desiccants

Anything that interferes with the cold induced curling of evergreen rhododendron leaves, may cause morphological stress of the leaf tissues; this can occur when freezing rain lays down a coating of ice over the leaves, followed by rapid freezing. The coating of ice prevents the proper curling of such leaves, and may cause damage to the leaf cells, as I once observed.

John Weagle, who lives in Halifax, Nova Scotia, wrote in the Atlantic Rhodo newsletter, Volume 26: Number 3, October 2002, and reprinted in our newsletter, November, 2002, that "there are plenty of anti-desiccant/anti-transpirant sprays on the market.

“In a word avoid them, because in my experience these sprays seem to restrict their ability to roll somewhat and this can result in increased injury.”

Finally, since freeze-leaf-curl can easily be measured by rhododendron gardeners, I decided to have a look at these cold stress induced leaf movements.

How to determine cold stress leaf width-reduction (curl)

I placed two household thermometers about 50 cm. above ground level, near my rhododendrons, to obtain a temperature at the time of measuring.

Leaf curling or uncurling is as sensitive to changes in freezing

temperatures, as the mercury in a thermometer. Therefore, I always measure at dawn when there is enough light to see, but well before the sun would strike the rhododendrons to eliminate sun heating and uncurling of the leaves. I also measured during periods of steady freezing temperatures, not during warming or cooling periods. I selected two leaves per plant from the top shoots for repeated measurements throughout the dormant season. I measured residual leaf width with a ruler (cm) at the mid point of the leaf blade at freezing temperatures from +1 C to -17 C. The leaf width measurements do not measure curl overlap of leaf blade edges, as in (3). The residual leaf measurement at a particular freezing temperature is expressed as a ratio of residual leaf width divided by the fully extended leaf blade width.

All rhododendrons shown in the Table 1, curled and uncurled their leaves without any observable damage, time after time to temperatures of -12 C and once to -17 C from the middle of December well into April. The data shown, however, does not offer very conclusive differences between hardy *R. maximum*, and not so hardy R.'Anah Kruschke'. Also the hardiness ratings of hybrids, as reported in references (3), did not consistently correlate with the rate of curling. Leaf angle changes appear to correlate much better with hardiness ratings than the leaf curl measurements. Leaf angle changes will be left for a future write-up. In the meantime go out there and have some fun measuring your rhododendrons.

Acknowledgement

Thank you, Tony Grinevicius for printing the Vainola reference (5) from the Internet.

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Table 1. Residual leaf widths at freezing temperatures of, -1 C, -9 C, and -15 C as compared to leaf width at +1 C

Temperature	+1C	-1C	-9 C	-15 C
Rhododendron	Leaf Width		Residual leaf-width	
species/cultivars	cm	%	%	%
'P.J.M.'	2.3	89	22	22
'Dora Amateis'	2.3	89	39	22
'Olga Mezitt'	2.2	100	41	24
'Faisa'	1.8	93	57	43
'Calsap'	4.6	86	22	17
'Swansdown'	4.3	94	21	18
'Cadis'	5.0	95	25	20
'Roseum Elegans'	4.3	100	26	24
'Yak' hybrid	3.0	92	25	25
'Lodestar'	6.6	85	27	26
'Dexter's Champagne'	4.3	88	29	26
'Janet Blair'	4.8	89	37	21
'Nova Zembla'#2	3.9	97	35	29
Catawbiense 'Boursault'	5.1	100	35	30
'Anah K. Kruschke'	5.0	95	40	40
R. brach.'Tigerstedtii'	2.9	83	35	26
R. metternichii	2.3	89	33	33
R. smirnowii	3.8	93	40	30
R. makinoi	2.5	80	35	35
R. max..'Mt Mitchell'	4.3	94	44	29
R. maximum (Virginia)	4.1	88	41	34