



The NEW ZEALAND
Rhododendron

PUKEITI RHODODENDRON TRUST INC.

Current Board Members 2016 – 2017

Board Chairman

Gordon Bailey (Wanaka)

Deputy Chairman

Lynn Bublitz QSO (New Plymouth)

Board Members

John Eagles QSM (New Plymouth)

Marion MacKay (Palmerston North)

Heather Robson (New Plymouth)

Neville Stewart (Auckland)

Doug Thomson (Dunedin)

Pukeiti Trust Fund

Chairman

John Eagles QSM (New Plymouth)

Secretary/Accountant

Grant Sarten (New Plymouth)

Trustees

Michael Brooke (New Plymouth)

Antony Burn (New Plymouth)

Michael Regan (New Plymouth)

Stuart Robertson (New Plymouth)

Members' Committee

Chairperson

Heather Robson

Secretary

Diane Jordan

Committee

Lynn Bublitz

Annette Cameron

Rene Duncan

Margaret Hodges

Bev Moratti

George Moratti

Brian Palmer

Graham Smith

Life Members

Mrs B Brown

Mr L Bublitz

Mrs W Cassie

Mr G Collier (Patron)

Mr A Duncan

Mr J Eagles

Mr E Frankham

Mrs A Gibbison

Mrs E Gill

Mr D Harrop

Mr A Hodder

Mr M Hudson

Mr A Hutchinson

Mr A Jellyman

Mrs D Jordan

Mrs E King

Mr J Lovell

Mrs M Lovell

Mrs B McConnell

Dr G Mason

Mrs J Mitchell

Mr P Morpeth

Mr B Palmer

Mr G Smith

Mr R. Stead

Mr W Still

Mrs M Ward

Ms M Wilson

Mr TJW White

Patron

Gordon Collier MNZM (Taupo)

NEW ZEALAND RHODODENDRON ASSOCIATION INC.

List of Officers 2016 – 2017

President

Dr Tony Fitchett (Dunedin)

Immediate Past President

Dr Susan Davies (Palmerston North)

Vice President

Rob Singleton (Cambridge)

Vice President

Joy O'Keefe (Geraldine)

Secretary

Christine Wilson (Te Kuiti)

Treasurer and Membership Secretary

Mike Wagstaff (Te Kuiti)

Other Council Members

Ward 1. Northern

Robyn Bridgman QSM (Auckland)

Ward 2. Western

Jeff Johnston (Te Kuiti)

Ward 3. Bay of Plenty

Rob Singleton (Cambridge)

Ward 4. East Coast

Joy Gavin (Napier)

Ward 5. Central

Sue Davies (Palmerston North)

Ward 6. Wellington Region

Richard Nanson (Wellington)

Ward 7. Nelson, Marlborough, Westland

John Clayton (Ikamatua)

Ward 8. Selwyn, Waimakariri, Hurunui

Helen Coker (Christchurch)

Ward 9. South Canterbury – North Otago

Joy O'Keefe (Geraldine)

Ward 10. Dunedin – Clutha

Tony Fitchett (Dunedin)

Ward 11. Southland – Wakatipu

Noeline Smith (Gore)

Patrons

Mr D Hughes

Mrs J McB Kerr

Honorary Life Members

Mr J Howard

Mr D Hughes

Mrs J McB Kerr

Mrs K Millar

Past Presidents

Mr G Bailey

Mrs S Davies

Mrs K Millar

Mr R. Nanson

Mr A G Trott

Mrs P Turnbull

Web Manager

Sandra Nichelsen - Geraldine

Archivist

Brian Coker - Christchurch

Accounts Reviewer

Lionel Smith – Te Kuiti

Registrar

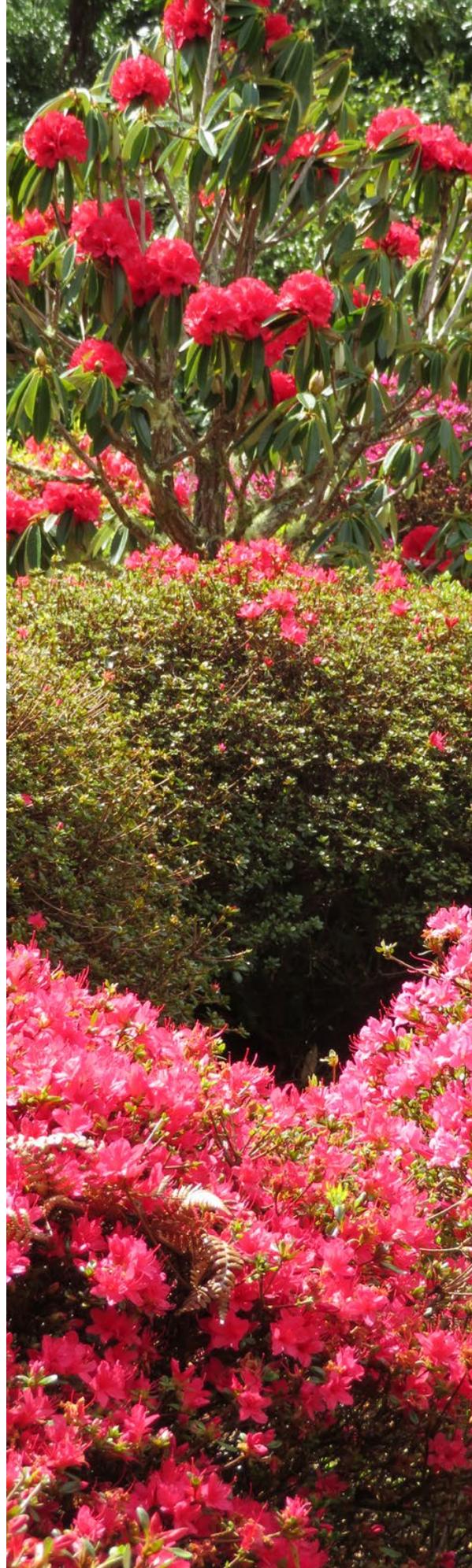
Brian Coker - Christchurch

Website

www.rhododendron.org.nz

Email

secretary@rhododendron.org.nz



Goodwin Dell at Pukeiti

FOREWORDS

I thought I would start with something both Pukeiti and NZRA have discussed over recent years. That is, where each organisation sees itself heading in the medium term. This is a serious question and one we need to ask again. Last time we discussed this matter together this fine publication was a tangible outcome and now something we all look forward to receiving.

“Why bring it up again, when everything seems to be running smoothly?” one might ask. The simple fact is that in both organisations, membership numbers are falling rapidly and the average age of members is increasing. There is nothing inherently wrong with the latter but it’s the former that is of more concern. The fewer members we have the less income we have. But the costs don’t diminish, they have to get spread across an ever decreasing funding base.

How sustainable is that? For how long can we continue as we do currently? If we think we can merrily continue on as we are then we have our heads in the sand in my opinion.

“What is the answer?” I hear you ask. Well strangely enough I don’t have a silver bullet, and we certainly aren’t the only two organisations in this situation. What I do think though, is that our respective management Boards need to start talking

again and with a serious strategic view of where we are heading, as clearly the status quo isn’t an option for too much longer.

Maybe the catalyst for both organisations is the development of the ex-situ Rhododendron Conservation Strategy, recently kicked off with an agreement between Massey University and Pukeiti Rhododendron Trust Board. The first stage of this strategy is due for completion by March 2018, and involves identifying key collections within NZ and internationally.

Later stages will involve more in-depth analysis of these collections, determining where certain species will grow best, their optimum propagation methods, distribution and much more. Work by NZRA on iconic hybrid identification, preservation and propagation already shows promise.

The point I am trying to make, if it isn’t clear, is why aren’t we all working together on this and the list of other things we both have on the boil that we can mutually progress.

Let’s stop procrastinating and start visioning where we can go together as a joint group with a shared vision to enhance the genus *Rhododendron* in NZ and further afield.

Once again we have a joint bulletin that is a first class read for all those interested in rhododendrons and related garden activities. A huge vote of thanks to our Editor Lynn Bublitz, his willing helpers, and of course the article contributors.

Finally, if you haven’t been to Pukeiti for a while I urge you to plan a visit. A lot has happened in a positive way, with our partners the Taranaki Regional Council completing a number of capital development projects, the main ones being

- The Vireya House and walkway completed to the Waterwheel Lookout
- The new Misty Knoll garden to explore
- The new front entrance-way completed, and
- The new staff facilities and depot area upgrade completed.

Gordon Bailey, Chairman Pukeiti Rhododendron Trust Board



Staff planting the Mystery Knoll at Pukeiti

Drought still affects North Canterbury (and, no doubt, other areas); wind and rain have damaged the Auckland area recently; ground water in South Dunedin (once the most densely populated part of New Zealand) is rising; anthropomorphic climate change is already with us, and will get worse before, if ever, it gets better.

The theme of this issue of NZ Rhododendron is choosing the plant for the site, and the nature of many sites is likely to change with the climate. So such choosing involves looking ahead as well as experience. Happy planting!

And while we’re planting, let’s think about ways to persuade our laissez-faire government to become proactive, rather than just reluctantly reactive, in reducing New Zealand’s appalling level of carbon emissions.

Tony Fitchett President, NZ Rhododendron Association.



Gordon Bailey photographs R. ‘Ilam Cream’ in the Fitchett Garden

CONTENTS

Front Cover
A star hybrid (unknown) of
Rhododendron yakushimanum.

INTRODUCTION CHOOSING THE RIGHT RHODODENDRON FOR YOUR GARDEN LYNN BUBLITZ	5	EARLY RHODODENDRON COLLECTIONS IN NEW ZEALAND SPECIES COLLECTED BY DOUGLAS COOK MARION MACKAY	38
ILAM THE CREATION OF EDGAR FRASER STEAD KATHRYN MILLAR	7	EARLY FLOWERING RHODODENDRONS PHOTOS BY LYNN BUBLITZ	46
REGISTERING HISTORY ANDREW BROOKER	11	THE RHODODIRECT STORY MARINA SHEARER	48
GWAVAS WOODLAND GARDEN THE PLANT COLLECTION GRAHAM SMITH	14	RHODODENDRON YAKUSHIMANUM AN ICONIC PUKEITI PLANT LYNN BUBLITZ	50
TWENTY YEARS IN THE FIELD SEARCHING FOR WILD RHODODENDRONS A SUMMARY STEVE HOOTMAN	18	GARDENS BY THE BAY THE 'CLOUD FOREST' SINGAPORE LYNN BUBLITZ	54
PUKEITI'S PLANTS REACH THE WORLD LARA COXHEAD	24	PROVIDING THE VIREYA COLLECTION FOR THE CLOUD FOREST GARDENS BY THE BAY NEIL PUDDEY	57
DEVELOPMENT OF AN <i>EX SITU</i> CONSERVATION PLAN FOR RHODODENDRON SPECIES IN NEW ZEALAND MARION MACKAY	26	HERITAGE PARK HISTORY JIM HOWARD	60
'OMAHURI' PLACE OF YOUNG TREES SUSAN DAVIES	28	VIREYAS FROM WEST AND EAST DIVERSITY AND DISTRIBUTION OF VIREYA RHODODENDRON, <i>RHODODENDRON</i> SUBGENUS <i>VIREYA</i> MARION MACKAY	64
A SHADY BUSINESS RHODODENDRON SUCCESSES AND FAILURES IN A DUNEDIN WOODLAND GARDEN TONY FITCHETT	33	LISMORE CASTLE GARDENS ROB SINGLETON	70
THE REDEVELOPMENT OF THE PEAT GARDEN AT DUNEDIN BOTANIC GARDEN DOUG THOMSON	35	RHODODENDRON REGISTRATION BRIAN COKER	73

THE RHODODENDRON VOLUME FOUR 2016

The NZRA Council and the Pukeiti Rhododendron Trust Board are pleased to make material in this publication available for reprinting, with acknowledgement, in other horticultural publications.

Credit must be given to both the author and this journal.

Financial assistance has been provided by the Taranaki Regional Council through the partnership agreement with the Pukeiti Rhododendron Trust. Thanks are extended to all the contributors, authors and those who have provided photographs and advice.

Back Cover

Leaving the garden at 27 Durham Avenue, New Plymouth

Editor: Lynn Bublitz

Special thanks to Gordon Bailey for accessing articles and to previous editors for their help and advice.

Designed by: Sam Design, New Plymouth

Printed by: Wickliffe Solutions

INTRODUCTION

CHOOSING THE RIGHT RHODODENDRON FOR YOUR GARDEN

Lynn Bublitz

Featured in this year's edition of the Journal are articles on gardens, nurseries and people involved in promoting rhododendrons which have become and will continue to be valued ornamentals in our gardens. Over the years garden styles have changed, and so have our preferences for colours and growth habits of our chosen garden plants. This is particularly so today with the trend towards smaller, easy-care city gardens, whereas in the heyday of rhododendron popularity gardens were bigger and often associated with large rural properties. These, though, in many cases still proudly display wonderful rhododendron collections. Such is the range of plants available that there are types for all gardens in most regions of the country.

Selecting the right rhododendron for your garden, however, involves more than consideration of just the colour and growth habit of the plant. Aspect, soil types and local climate

have always influenced the success of a chosen specimen. How many of us on seeing a beautiful plant, in a garden in a different part of the country have purchased one, only to be disappointed with it in our own garden? Local climate is one of the key factors to be considered. It is little wonder though that varieties that do well in Auckland differ from the successful set in Dunedin. In Auckland *R. 'Sir Robert Peel'* and '*Virginales*' in the early years were planted as street trees, and still flourish, but many of the other well-known hybrids do not. Vireyas, more and more, are becoming the favourites, giving a tropical feel to plantings. You can even see some, such as *R. 'Flamenco Dancer'* sticking up above the fences on a drive through the leafy suburbs. In Dunedin while vireyas are rare, the old favourites such as '*Sappho*' and '*White Pearl*' among others seem to grace every corner of the city. A generous bequest has ensured plantings on banks, street intersections and corners here and there have been established and will be continued. They contribute enormously to the attractiveness of the city in spring.

In New Plymouth the milder climate also restricts the range. *Maddenia* do well (*R. nuttallii* even self-seeds in some places) along with a selection of New Zealand raised hybrids such as '*Homestead*', '*Kaka*' and the locally raised '*Lemon Lodge*'; large-leafed types, hybrids raised in climates with colder winters such as '*Lem's Cameo*' do not thrive. These do well at Pukeiti only a few miles away but at a higher altitude, and of course with a greater rainfall it is therefore cooler and has less humidity. The vireyas there are grown under cover where some aspects of the environment can be controlled. In New Plymouth, however, some of the more hardy hybrids such as '*Simbu Sunset*', '*Saxon Glow*' and the species *R. macgregoriae* grow well in protected gardens.

We all have favourites in our own gardens and often they have had to be shifted around to find the best place for their successful growth and display. Most garden plants are hybrids as it is more difficult to find a range of species that suit the narrow environmental conditions of our gardens. This is not surprising when the distribution of plants in the wild shows that species



R. 'Wedding Day'



R. 'Ina Hair'



R. 'Chrysomeanicum'



R. veitchianum Cubittii group in the Bublitz Garden

often occupy only a narrow range of climatic conditions. In the Cangshan Range in Yunnan, China, for instance, altitudinal zonation is marked. Below an altitude of 2000m *R. arboreum* ssp. *delavayi*, *R. decorum* and *R. yunnanense* thrive; at 3000m *R. edgeworthii* can be found and above that is the red *R. neriiflorum*. Higher again this is replaced by *R. lacteum* and *R. rex* ssp. *fictolacteum*, and at the top, at 4000m *R. haematodes* and *R. fastigiatum* form carpets. These along with the others which grow here each occupy a narrow altitudinal and therefore climatic range. No wonder we can't grow many in our gardens. We must be selective.

In the late 19th century as hybridisation gathered momentum parent plants which suited the climate of the area were chosen. Early and late frosts were often defining - the early ones destroying the flower buds, the late the new growth on some species. Not surprising then that rhododendrons were often grown in wooded areas, the trees offering some protection. The resulting hybrids flowered in a narrow time span. May was the month in the northern hemisphere and October here. Pukeiti and Tupare were considered at their best at Labour Weekend and attracted thousands of visitors. Now, using parent species

which, while often considered tender or in need of protection in colder climates, flower for a longer period, hybrids can be produced which bloom over a six month period, and in the case of vireyas, almost all year.

At the Wellington Conference the key-note address was on 'Climate Change'. Few, now, would be climate change deniers. The on-going effects of such belief could be devastating. Too often, however, the emphasis is on the future. Changes are apparent now and will continue to further affect our gardens and the choice of plants we grow. It is not average temperatures, humidity etc. that determines plant distribution but minor changes at the ends of the climatic range of each species and hybrid. These are the limiting factors. While early frosts have always restricted the flowering of some rhododendrons, the number of 'cold days' in the winter determines the blooming in spring of others. *R. 'Lem's Cameo'* flowers well at Pukeiti but in New Plymouth, particularly in sheltered gardens flowering is delayed by months, especially after warm winters. In some years the flowers do not open and the buds abort. More of our hybrids will be affected as the climate warms. Increased humidity will also increase fungus diseases. Mildew is becoming more predominant on new

growth in the spring. Already old favourites such as *R. 'Fragrantissimum'* have been infected. In the past 'rust fungus' has precluded the growing of *R. cinnabarinum* and its hybrids, and the disease will become more predominant. Drier summers will also increase the range of that leaf-greying pest, thrips. This has devastated many rhododendron varieties in New Zealand and has been one of the reasons that these plants have lost popularity in northern regions. Over the last couple of years with drier summers thrips have become more obvious at Pukeiti. A few years ago they would rarely be seen.

The organic approach to gardening is taking hold, too, which means that spraying with fungicides and insecticides is becoming frowned upon and thus many of the popular varieties which are prone to pests and diseases will be culled from our gardens as climate changes continue.

Fortunately the range of plants available is large and will be supplemented from time to time with new hybrids, some originating from new species which are being discovered particularly in the SE Asia region.

There is much to consider when choosing a suitable rhododendron for your garden.

ILAM - THE CREATION OF EDGAR FRASER STEAD

Edgar Fraser Stead is one of New Zealand's best known rhododendron enthusiasts. His garden, Ilam, is now the garden of the University of Canterbury Staff Club.

This article was compiled by Kathryn Millar, who thanks Brian Coker, the late Dr Colin Knight, Adrian Bliss and Denis Hughes for their response to her invitation to contribute to these notes.

Edgar Stead [1881 – 1949] purchased the already historic Ilam property of 55 acres in 1917: the story of the thirty two years that followed, and the development of world class rhododendrons and azaleas has been told many times.

Years later, visitors to Ilam are unaware that the garden has continued for almost twice the number of years that it did in the innovative exciting period under the care of Edgar, in the hands of the University of Canterbury. The plantings have matured, and the garden now surrounds the University Staff Club, previously the residence of the plant breeder who through friendships in the United Kingdom, had access to the cutting edge of plant raising, receiving gifts of rhododendrons and azaleas which contributed to a breeding programme respected and valued within gardens worldwide to this day.

Colin Knight wrote in a publication for an Ellerslie Christchurch Garden Show, "The Avon River flows through the grounds of the Ilam Homestead with magnificent beds of rhododendrons and azaleas along its banks. The gardens are admired throughout the world and are a significant part of our city's heritage."

Roland Stead, the son of Edgar, has also kept a quite extraordinary contact with the University, and

with the garden's international and local visitors, and in my view his dedication and love for Ilam is also without measure.

Now in his mid-nineties Roland still takes an active interest in the garden, and is deeply involved with not only horticulture but the wider aspects of the natural environment, as was his father. He is a staunch supporter of biological and medical research and a philanthropist of significance. The

University of Canterbury Newsletter of 2011 notes "a generous donation of \$110,000 establishing the Roland Stead Gardens Fund". The Registrar, Jeff Field, noted that "the money will ensure the gardens are maintained and enhanced as per the commitment the University made when it acquired the site in 1950." Roland also funded the purchase and installation of seven new garden seats so all can enjoy the idyllic spot restfully. In 2010



R. 'Ilam Cream'



R. Azalea Mollis hybrids

Roland joined the Prime Minister John Key in opening the University's new Biological Sciences Research Building, with its central entrance-way named 'The Edgar Stead Atrium'.

The story of Ilam began in 1850, with the arrival in New Zealand of John Charles Watts-Russell, who early in the 1850s won the opportunity to purchase balloted land in Canterbury for livestock farming. This he funded by selling his regimental commission. The original family cottage built on land that was to become part of the Ilam Estate was replaced in 1858 by an expansive 8-bedroom mansion, built along English lines using imported bricks. It was set amongst 10 acres of garden and lawn through which the Avon River wound. Watts-Russell named Ilam after his English birthplace of Ilam Hall in Staffordshire.

In 1866 Watts-Russell sold Ilam, and it was about this time that another early settler, Sir John Cracroft Wilson began importing seeds from India,

where he had served in the Indian Civil Service. Among them was a seed of a very good red *R. arboreum*. From the offspring he selected two plants with flowers of a deep blood red colour and exceptionally large trusses of about 23 flowers. It was one of these plants that many years later Edgar Stead would use for hybridising [despite the fact that he had to wait 12 years for the first flowers to appear in his initial progeny!] Edgar noted later that the original plant was probably a form of *kingianum* as its blooms did not open for three weeks after all his *arboreums* were over. The leaf has a silver under-surface with yellowish midrib and veins; flowering is slow and progressive over 3 to 4 weeks. (Syn: *kingianum* = *zeylanicum*)

When Edgar was a child, 20 years after Sir John's early importation, rhododendrons growing along the drive of his parents' home, Strowern, now the site of St. Andrew's College, stimulated his interest, and so

began his lifelong passion for things botanical. At the same time his fascination with birds arose and this too was to last throughout his lifetime.

Edgar Stead was later educated at Christ's College and Wanganui Collegiate School. He studied electrical engineering at Canterbury College, followed by three years of research in New York. Following his father's death Edgar returned from New York and worked in Canterbury, developing a significant reputation in both zoological and botanical fields, and especially as an ornithologist.

In 1908 Edgar purchased the 26.5m long Blue Whale washed up on the beach at Okarito. Over a period of a month the bones were extracted under less than pleasant conditions and eventually shipped out to Canterbury Museum, where they were put on view. More recently the bones have required restoration before going on display once more.

That Edgar's interest in ornithology obviously survived the impact of the rhododendron passion, was evidenced in their book 'Edward's Legacy: The Elworthy's of South Canterbury', where David Elworthy and Ros Henry recorded Edgar Stead's search for Cook's petrel, *Pterodroma cookii* during Stewart Island expeditions of 1930 and 1938. Eggs were subsequently sent to Alaska for a re-establishment programme, and Edgar's book '*The Life histories of New Zealand Birds*' is a classic. And the late Joanna Martin used to recall the occasion when Edgar sent a truckload of mature rhododendrons to Peel Forest in exchange for one broken bush canary's egg! [*Timaru Conference Booklet* 1973]

In 1915 Edgar married Irene Mary Phillips [for whom he later named his famous Loderi cross *R. 'Irene Mary Stead'* [*fortunei* x *griffithianum*] (= 'Irene Stead'), which along with *R. 'Ilam Cream'* continue to be favorite plants at Ilam with their heady perfume a bonus to the heavily textured flowers.

In 1917 Edgar purchased the 55 acre Ilam Estate. He rebuilt the house which had been destroyed by fire in 1910, and built extensive aviaries where he treated injured native birds.

At about this time he was given seed of North American rhododendrons and began experimenting with various propagation techniques – grafting, layering and hybridizing.

Edgar and Irene's son Roland, in '*Ilam Revisited*', [which he wrote for the 1994 50th Jubilee Bulletin of the NZRA, at the request of then editor Kathryn Millar] writes "My father travelled to England in the 1920s and 30s and became a frequent visitor to some of the well-known rhododendron gardens of the time, and stayed at Caerhays Castle, Bodnant, Muncaster Castle, Leonardslee and particularly Exbury. He shared a common and exciting interest in rhododendrons with the owners of these properties, and was asked to judge at the RHS show – a singular honour for a colonial in those days. With the importation of rhododendrons in the 1920s and 30s the garden at Ilam was rapidly being

filled. In addition a large number of hybrid plants were being raised, *R. griersonianum* and *R. griffithianum* being amongst the species used." (One must remember this was long before the days of 'Yak' etc.)

Roland grew up at Ilam during these exciting years of importation and hybridization, however he recalls that as during the war he was in the merchant navy, and that his father died shortly after in 1949, there was little time for him to become involved with the garden whilst Edgar was alive. However Roland's love of the garden and subsequent involvement has been hugely significant.

In the *RHS Yearbook* of 1947, Edgar Stead wrote, re Exbury "in 1930 I was able to make some crosses among Exbury azaleas, and when the seed was ripe it was forwarded to me. So I had good stock to begin with and have done considerable crossing with it and Waterer's plants, using some large flowered Mollis as an out-cross, but mainly keeping to a plan of crossing similar colours." The azaleas were *R. calendulaceum* Mollis and Ghent hybrids – they flowered later and had stronger colours than the popular Mollis, and the flamboyant colours of the deciduous varieties still produce dazzling displays in the beds bordering the University playing fields. Fred C. Galle in '*Azaleas*' writes, "Mr. Stead recombined the 'Knap Hills' with *R. calendulaceum* (from eastern USA), *R. viscosum* (the swamp azalea or swamp honeysuckle of eastern USA), and *R. molle* in the early development of the Ilam hybrids. The ancient Ghent azaleas used in the hybridizing, which were shifted to Ilam from another Christchurch garden, are still there today."

Brian Coker writes "a walk through the gardens at Ilam continues to be a testament to the breadth of the hybridizing that Edgar Stead undertook over the years that he was establishing the garden. The *R. 'Scarlet King'* group provides many wonderful reds, eg *R. griersonianum* x '*Ilam Alarm*' (*griffithianum* x *zeylanicum*), '*Homestead*', '*Ilam Red Glow*', '*Kaka*', '*Orchard*' and



R. 'Homestead'



R. 'Ilam Violet'



R. 'Irene Mary Stead'



R. 'Steads Best'

'Pines'. Some of the names indicate the location of a growing seedling e.g. 'Kaka' – by the parrot's cage.

Even more arresting though from a fragrance perspective is *R. 'Stead's Best'*, being the first New Zealand cross of *R. nuttallii* x *R. lindleyi*. The original plant is still in the Ilam garden, not far from the homestead at the junction of two paths, and causes all who pass by it to stop in their tracks". (A similar plant, *R. 'Tupare'* was a gift to Sir Russell Matthews.)

Brian recalls that according to information recently received by him as NZ Rhododendron Registrar, early Ilam registrations noted in the 1998 Handbook of New Zealand Raised Rhododendrons 'Crossing the Rubicon', were included by the RHS itself, rather than by Edgar Stead.

Roland tells us that "In 1944 Dr Yeates came down from Massey College (later University), to persuade my father to form a New Zealand Rhododendron Society. My father showed little interest in this proposal but eventually with some reluctance he was elected its first President."

Edgar died in 1949. Roland relates that "his estate was valued at £66,000 – death duties were £55,000. With my father's death my mother and I had neither the funds nor the wish to retain such a large property so it was sold to the University of Canterbury for £33,000. The government obtained the whole of Ilam, and £2,000 in death duties.

In 1949 the Ministry of Works wished to acquire land in the Ilam area for the new University site. In making the sale I had a clause put in the sale terms that the garden be maintained as a park."

In 1968 the Wahine Storm damaged some of the old trees, and particularly misshaped the oaks on the lawn. Colin Knight, writing in 2015, notes that much of "the companion flora such as black and red beech, kauri, chestnuts, ginkgo, acers and paulownias is currently being cut down to allow light to get to the rhododendrons. There were three gardeners at Ilam in 1949; today there is one, who has other areas of the university gardens to care for as well."

It was inevitable that as the years passed, knowledge about the plantings would become less well known by those working in the garden. Following the transfer of Ilam to the University of Canterbury, a Garden Advisory Committee was set up. There have been many additional plantings either of seedlings grown by grounds staff or named varieties purchased or donated; such challenge the visitor looking for Stead's plants. As a rough guide one could say that along the creek is a good place to look for the originals, and of course the azalea walks are truly splendid, the plants having responded well to occasional cutting back. On the Homestead Lane side of the garden many of the reds can be found. These plants, now veritable antiques, provoke much comment from those who wish to see severe pruning and those who have been to mature UK gardens and enjoyed the sight of the huge trunks of mature rhododendrons. (The writer is of the "leave well alone" camp. However she acknowledges that the recent pruning of 'Stead's Best' promoted excellent growth and flowering.) Of course many of his treasures have been gifted, and splendid plants can also be seen at places such as the

R.K. Ireland Garden at Wainakurua, (now home of granddaughter Anne Sim); No 1 Chapman Street, Leeston, (home of the Scott Family); and of course The Point, Windwhistle (childhood home of Irene Stead).

The writer farms on the banks of the Rakaia, a few miles from a famous fishing lagoon; local legend has it that Edgar Stead planted rare natives along the banks near his fishing hut. Lo and behold during the 1980s along came a MAF field officer, 'discovered' the patch and wrote a report about the wide range of species not usually found in the southern Ellesmere or Rakaia River mouth area. She does not know what happened next, but reports that the plants are on David Turner's Rakaia Island, and quite safe!

Kathryn Millar is a Past President of the NZ Rhododendron Association.

Bibliography.

The Rhododendron Year Book of 1947 is published by The Royal Horticultural Society. The Canterbury Rhododendron Society (NZ) is currently seeking permission from the RHS Rhododendron Group, and Mr Roland Stead for permission to reprint in full the article mentioned in these notes, and to make it available to all NZRA and regional rhododendron groups.

Crean, Mike, '*Salvage of a Blue Whale*' Christchurch Press 19.01.2008.

Elworthy, David and Henry, Ros. '*Edwards Legacy: The Elworthys of South Canterbury*' p 367. 2011

Stead, Edgar F. '*The Life Histories of New Zealand Birds*' London 1932.

Stead, Roland. '*Ilam Revisited*' The NZRA 50th Jubilee Bulletin, 1994.

Canterbury University Magazine. Winter 2007.

NZRA Jubilee Bulletins and Histories 1994 & 2004.

Te Ara Encyclopedia of New Zealand. Reference Edgar Fraser Stead.

Further Reading

Graham, Peter. '*So Brilliantly Clever*'.

'A Life of Strenuous Leisure' Miskelly, Colin, Dr.



Ilam University Staff Club

REGISTERING HISTORY

Andrew Brooker



R. 'Gordon Collier'

The Pukeiti Rhododendron Collection which we enjoy today began with the careful selection and importation of choice hybrids and species from the great gardens of the United Kingdom. As time went on these horticultural treasures were shared through mainstream propagators and nurseries with the gardening public of New Zealand, and in the 1980s and 1990s the Pukeiti Rhododendron Trust released a plethora of registered

hybrids which we still enjoy today, such as *Rhododendron* 'Lemon Lodge', R. 'Coconut Ice' and R. 'Spiced Honey'.

Now into its sixth year as a public garden Pukeiti is carrying on the tradition of registering and releasing a range of rhododendron hybrids and choice clonal forms, thus celebrating not only the redevelopment of the garden under the Taranaki Regional Council but also the foundation work carried out by the Pukeiti Rhododendron Trust.

Some will already know a few of these

plants, as small quantities have been made available from time to time. Names of others were announced as part of the Trusts' Golden Jubilee Year celebrations – and it is now time to embark upon registering and releasing these to be enjoyed by others.

First up is *Rhododendron* 'Barbara Hayes'. This particular plant was gifted to the garden by Des Hayes in the 1990s. Collected as wild seed in Nepal on one of the Ron Gordon tours, and later identified as a natural hybrid of *hodgsonii* x *grande*, the plants were grown in Dunedin where a sister seedling now blooms at Tannock



R. 'Jack Anderson'

Glen. Named for Des' wife Barbara, this magnificent specimen stands on the edge of the Valley of the Giants Walk. Here it towers above the path, the rich pink flowers delighting all during the early spring days. The name will have to be modified slightly, as it has been used recently for another hybrid and cannot be registered with exactly the same wording.

During the 1950s and 1960s the sources of rhododendron seed were limited to a handful of established gardens in Scotland and England, from which Pukeiti was able to introduce both true species and natural hybrids to the collection. Graham Smith certainly understood the potential for hybrids to arise during those early years, and as the collection grew with more and more wild sourced plants added to the mix he started experimenting. The first step was crossing the species he presumed to be the parents of plants we had. His thoughts were that they were likely to be *macabeanum* x *magnificum* crosses

of some sort, and as the resulting plants proved once the first blooms were seen, this was very much the case. The best of the seedlings was named *Rhododendron* 'Jack Anderson', honouring a former Secretary of the Trust. It is now a respectable 5m high, resplendent in rich pink flowers with a yellowish tube giving a bi-colour effect.

Another source of early seed was the gardens of the United States, but this exercise was not always straight-forward. What was grown as *R. protistum* most definitely was not. Its pale creamy yellow flowers did not meet the expectations of the gardeners, it was thought to be more *macabeanum*, and the foliage was telling yet a different story. But again the product gives us the opportunity to honour someone whose contribution was invaluable. This plant became known as 'Geoff Broker'.

Regular visitors will know how readily the large-leaf species of the genus have made Pukeiti their home, and the next hybrid we are to register demonstrates

just how at home they are. A chance seedling of *R. protistum* 'Pukeiti' x *R. magnificum* tucked up on a log is now 'Gordon Collier' in honour of the Trust Patron. The large cerise-coloured flowers aptly complement the thin fawn indumentum on the leaves.

The final two plants which will be registered are both vireya, one the result of a deliberate cross with definite desired outcomes, the other the result of a lasting friendship of wild origin.

Rhododendron 'Beverly McConnell' is the result of the deliberate cross of *R. konori* and *R. 'Gilded Sunrise'* in 1990. The aim of this cross was to get a large scented yellow flower with handsome foliage. But the results, as is often the case, were quite varied. The strongest plant of the three better seedlings, 'Beverly McConnell' definitely has bold handsome foliage resembling that of the parent *konori*. Her large blooms also are more *konori* in size, and perfume, with 'Gilded Sunrise' lending a goldy hue, not completely yellow but certainly present.



R. 'Geoff Brooker'
(protistum x)

R. archboldianum 'Starburst' was grown from cuttings brought back from Mount Gahavisukar in Papua New Guinea. This great plant's clonal name 'Starburst' aptly describes the shuttlecock - shaped trusses which cover the aromatic foliage as if they were fireworks. Originally rescued from the wild in the NE Highland regions of PNG by Norman Cruttwell to be planted out at his sanctuary garden near Goroka, *R. archboldianum* was introduced to the collection in 1986 by Graham Smith and Michael Cullinane. It is now thought to be a natural hybrid due to some marked differences from the type.

With the redevelopment of the garden as a rhododendron repository and visitor destination, it is important to be able to continue this work during the hectic stages of upheaval and change we find ourselves in. All the described hybrids have been grown now for a number of years, some having already been distributed within New Zealand, and are testament to

the ongoing work of Pukeiti within the realm of the rhododendron. A propagation plan now in place will see the eventual release of all these strong hybrids, so that not only the name but the plants will live on.

Andrew Brooker is the Pukeiti Garden Manager.



R. 'Sir Russell Matthews'



R. 'Beverley McConnell'

GWAVAS WOODLAND GARDEN

THE PLANT COLLECTION

Graham Smith



Gwavas Homestead and R. 'Sunspray'

The first plantings at Gwavas, situated in central Hawke's Bay near the village of Tikokino on SH 50, were made in 1860 by Major George Carlyon. They consisted of trees for shelter such as *Pinus radiata*, *Quercus robur* and *Pseudotsuga menziesii*, many of which still exist and form the shelter, backdrop and canopy of the garden today. The first homestead had already been built in 1858 using totara from the remaining natural forest on the estate. Whilst breaking in the land for farming sheep and beef was the priority in the early years, second son Arthur Carlyon started planting in the 1880s the garden area that we see today, mainly with plants and seed sourced from the family's Cornish estate of Tregrehan. The importation was not just one way, with numbers of NZ plants being sent back to Tregrehan, where many still survive as large specimens. Not content with just developing

the garden, a fitting homestead, designed by C.T. Natusch, started to rise up at the top of the 9 hectare site in 1888, with a second storey being added in 1900. The house was all heart totara.

The early plantings from the UK reflected what was available in woodland gardening at the time and covered trees and shrubs from Europe, Asia and the Americas, plus herbaceous material, bulbs and climbers. It was of course a time when there was little restriction on what and how plants could be imported. From this early era notable plants that still survive include *Quercus suber*, Cork Oak from Portugal planted in 1894, 11m tall now and leaning elegantly; raspberry 'Semper-fidelis', more than 100 years in the same fruit cage and still cropping well; and huge clumps of Solomon's Seal (*Polygonatum odoratum*) of the same age growing as ground cover. Indeed one of the joys of early spring at Gwavas is the carpets of primroses, violets, bluebells and daffodils followed by aquilegias, trilliums, iris and liliun species in large drifts under the deciduous trees.

Having plenty of space and a climate that generally encourages longevity of plants is a distinct advantage in establishing a woodland garden. The central Hawke's Bay is almost Mediterranean with its long hot dry summers and frosty winters but it has the real challenge of getting plants to establish. Trees and shrubs require additional watering in their early years until their root systems get deep enough into the fertile soil and even then need constant monitoring to assess stress levels. As the canopy established, providing some shade and cooling, it became easier to introduce surface rooting plants such as rhododendrons and azaleas. However the hosepipes are never far away at Gwavas and an underground network of pipes and taps ensures water gets to the key plantings, often over 8 months of the year.

Michael Hudson is the fourth generation of the Carlyon family at Gwavas and from the late 1950s has been responsible for the rapid proliferation of plantings to produce the garden we see today. He sourced plants from all over New Zealand and many top nurserymen would contact Michael when they had something special. It was the heyday of real plantsmen running nurseries and thankfully taking advantage of being able to import new material into the country and make it available. In many ways the garden reflects the industry and the waves of new plants that occurred. Areas of the garden include large numbers of *Camellia x williamsii* hybrids and *Camellia reticulata* forms from the 1960s and they showcase the work being done at that time by NZ and overseas breeders. Camellias have strong root systems and can survive dry conditions better than rhododendrons so Michael sited them accordingly. Today you walk under these trees where they form their own mini-forest, flowering from late winter and bringing tui and bellbirds from all around. The camellia collection numbers nearly 300 different types with many rare species that extend the season to nearly six months and provide fine foliage, amazing bark and in some cases wonderful fragrance.



Acer fabri

Magnolias have been another key plant for Michael and again he has tapped into all the sources in the country to amass a major collection. With space to plant he has concentrated on the arboreal species and hybrids, which get up into the canopy so that they provide some shade for under-plantings. One of the dominant trees is the original *Magnolia doltsopa* 'Rusty' given to him by W. Douglas Cook of Eastwoodhill in November 1950, when Douglas was canvassing support for a place called Pukeiti. Michael planted it the same day, probably making it the first to be planted in the country. It is now about 28m tall with a 1m diameter trunk and huge roots snaking across the ground all around. Another outstanding evergreen species is *M. insignis* from seed collected in China, a 15m column of glossy leaves and scented cream flowers from reddish buds in late spring. Picking a winner from the deciduous species is hard but it is difficult to go past the Mexican *M. macrophylla* var. *dealbata*, with leaves up to 60cm long, grey-white below, and huge floppy cream flowers all summer on an open spreading tree. In a good year, unaffected by drought and hard frosts, the late winter through

spring garden is alight with pink, white and cream magnolias of every shape and size – an unforgettable sight.

The largest plant group is rhododendrons, ranging from early English hybrids sent across from Tregrehan to large-leaf species from more recent collections in NE and Southern Asia. Careful siting of these has been paramount to ensure that they have as much moisture available as possible and it is remarkable how long some of these have survived and how big they have grown. Anything with *R. arboreum* in its make-up is bullet proof and they make handsome trees with outstanding early spring flowers, again attracting nectar seeking birds. The *Maddenia* section



Michael Hudson examining *Michelia doltsopa*



Acer saccharum ssp. *leucoderme*

is also very well represented, which probably relates to the epiphytic nature of the plants in the wild. It is interesting to compare the same plants at Pukeiti with its 4m rainfall. They are mainly growing well but with different habits. If anything, some certainly do better at Gwavas with less rain. A prime example is the old hybrid *R.* 'Fragrantissimum' which is represented by a huge 1913 plant in fine health. Deciduous azaleas also perform very well and large drifts of Mollis hybrids from the King's Nursery in Wanganui light up the spring display under the new foliage of maples, cherries and oaks.

Michael was involved with the NZ Rhododendron Association in its formative years and knew all the key growers and hybridisers, acquiring plants as they came along. He also grew as many of the species as were on offer, from early seed collections. Michael was a Founder Member of Pukeiti, an active Board member for many years and shared many of his plants with the developing Taranaki garden. Gradually he turned his attention to hybridising, choosing the best parents that were doing

well to produce even better plants. There are many examples of these in the garden with half of them from the scented *Maddenia* section, often producing drifts of pastel colours through the understory. Some are outstanding and deserve naming but as yet none have been registered.

I have mentioned maples, of which there is an extensive collection from all the Northern Hemisphere regions, but especially SE Asia. Amongst these are a number of evergreen maples that are rarely seen in cultivation, coming from the warmer southern or lower elevation regions. They do not have the wonderful autumn colour but have attractive shiny foliage, often greyish-white underneath and with colourful keys [winged fruits]. *Acer coriaceifolium* has greenish brown ones like delta moths, *A. fabri*'s are like red helicopters and *A. paxii* keys are in globular green heads – all fascinating. The Sugar Maple from USA has good autumn colour and the form *A. saccharum* ssp. *leucoderme* had magnificent yellow and red colour this year when many others missed out. Autumn colour is generally a good feature at Gwavas

but recently several years of low rainfall has curbed the displays.

Many other deciduous genera help make up the bulk of the trees and include rare and interesting forms of *Betula*, *Cornus*, *Malus*, *Sorbus* and *Styrax*. The latter is usually only seen in nurseries as *Styrax japonica*, an attractive small tree with hanging white star-like flowers along the undersides of the branches in early summer. Gwavas has a number of species from Asia that are uncommon and illustrate the diversity of this and many other genera that we really do not know much about and yet which make ideal small-garden trees. It is disappointing that there are so few nurseries today that are interested in growing the rare and unusual trees and shrubs. However that has to be countered by the limited population that is really interested in buying, and a nursery has to be viable to succeed.

Conifers are well represented and there are many *Pinus* species besides *P. radiata*, a large number of which were planted 80 or more years ago, along with *Abies*, *Cupressus* and the rare *Cathaya argyrophylla* and *Fokienia hodginsii*, both from S

China. Southern hemisphere genera include *Araucaria*, *Athrotaxis* - all 3 species from Tasmania are here - and *Austrocedrus chilensis* from S America. One of the most exciting looking conifers is *Keteleeria evelyniana* from SW China, which has grey-green thick needles on a dense conical shrub in its early years, and also when young, beautiful tall yellow-green cones which later turn brown. It will eventually make a tall slender tree but is strikingly attractive in its early years.

The shrub layer below the canopy is made up of a broad spectrum of deciduous and evergreen plants, many of which have been there for a very long time and are rarely seen today. The early spring is greeted by the scent of *Hamamelis mollis* and other forms of Witch-Hazel, followed by the sublime *Corylopsis* spp. with their dangling, sweetly scented yellow flower tassels displayed on many different species. Old fashioned *Deutzias* perform well in many parts as does the rarely available *Dipelta floribunda*, 100 years old and full of character with flaking bark and beautiful tubular white and orange flowers in late spring. Hydrangeas are represented by many diverse plantings, mostly of species in groups but with some old-fashioned hybrids filling in under the trees. *Pieris*, *Kalmia* and roses are all well represented and some of the species and varieties are no longer in commerce. One of the unique sights at Gwavas is a stand of tall *Cordyline australis* near the Homestead, each with climbing or rambler roses tied up the trunks. I have never seen this done before and these have been there a long time and are most successful in a very New Zealand way. Other icon plants are the Tree Paeonies, *Paeonia lutea* and *P. delavayi*, which were originally planted a very long time ago in groups but have now spread by seed into delightful drifts through the long grass and wild flowers. The yellow and deep red species exist side by side but are now mixed into all manner of hybrid sunset shades between the two – think peach, auburn, russet, orange and bicolours like a fruit salad! These are truly Michael's 'Elegant Weeds'.

Strolling through this treasure trove

of woody plants, following the mown paths or whatever your eye draws you to because this is a garden without formality, it is difficult to take it all in. You are aware of the immense height of the canopy trees and their majestic trunks and the under-story layers below them, but few would give a thought to how this has been achieved. Trees just don't self-prune as they grow and from the 1960s onwards, every year Michael has had a few specimens limbed up to his exacting standards. This is serious stuff with the operators up 10-25m above ground, roping, cutting and lowering big limbs without causing damage to plants or buildings below. The end result is a cathedral-like top cover which allows filtered light through and under the canopy without compromising the light factor or reducing the shelter.

At ground level 'the wild plants' that provide so much interest all year round are actually managed in a way that ensures nothing really dominates to the detriment of others. The balance is skilfully achieved by the selective cutting back of some areas at critical times, usually by Carola Hudson on the end of a line-trimmer, after ensuring that seed is ripened for next year's display. This is the key to Michael's mantra for Gwavas, which has always been "The hand of man should not be seen". This attention to detail that implies a totally natural environment is illustrated by my having spent two and a half years with Alan Jellyman and Michael going over every plant in the collection, yet I can still get lost trying to find something I know

we noted – even with a plan!

In 1986 the garden was assessed for the NZ *Notable Tree Register*, and 17 trees were recorded in that category. Of those, at that time 10 were between 35-50m tall and they would have added a bit more growth since then, mostly in the trunk girth to support such height. To say they are majestic is an understatement, but because the whole environment is interwoven, the garden is one large woodland. You can see only a small part of it from anywhere on the ground, so you have to explore. Hours later you might still be exploring and have no idea where you are. There are no signs, no maps, but nowhere is more than 100m from the driveway between the gate and the Homestead.

In 2009 The International Dendrology Society awarded Gwavas the prestigious 'Distinguished for Merit' plaque, recognising the outstanding plant collection and the environment created by the garden. It is also a Garden of National Significance with the New Zealand Gardens' Trust.

Gwavas is open every day but it pays to check that nothing is going on that might restrict entry. Bring a picnic, because an hour or two is not enough and you can book to stay overnight in the Homestead for that extra special experience. Contact Phyllida Gibson, Michael and Carola Hudson's daughter, at info@gwavasgarden.co.nz for details. Enjoy!

Graham Smith is the former Director of Pukeiti Rhododendron Trust.



Dipelta floribunda

TWENTY YEARS IN THE FIELD SEARCHING FOR WILD RHODODENDRONS

A SUMMARY

Steve Hootman



R. huanum

One of my responsibilities as Curator of the RSBG is to build and develop the plant collections, primarily, the Rhododendron Species Collection. This provides me with the 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 SE 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’ - 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 often little-known and many have not been introduced into cultivation. In 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 plants and areas such as Yunnan that have been well-documented in the past but will instead focus upon some of the highlights from the ‘fringe’ regions. 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



R. maoerense

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. in height and may be the largest-growing rhododendron in the world. Another new big-leaf has been named *Rhododendron 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-leaves have also been found recently as well as some interesting lepidote species. It may be many years before we have enough information on these 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* which appears to be *glanduliferum* on steroids, reportedly having much larger foliage and flowers. A few years ago while exploring 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.

Another enigmatic species, this one native to N Vietnam and adjacent S



R. platypodum, Glendoick, first flowering

Yunnan, has been called *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 *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 RSF, appear to simply be late-blooming hybrids of *R. fortunei* ssp. *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 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 fastigiata. 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’) have been introduced into the west. Among these, we are cultivating the species *maoerense* and *yuefengense* at the RSBG, both from the Maoer Shan in S 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 coloured 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 mountain range is the stunning, dwarfish *yuefengense*, a relative of the rare *platypodium* and, probably, *orbiculare*. *Rhododendron yuefengense* has striking foliage quite similar to



R. yuefengense



R. glanduliferum PW#041



R. glanduliferum

that of *platypodum* but a bit smaller and less leathery (but still amazingly thick and firm). The leaves are suborbicular in shape and quite thick and leathery, with smooth surfaces and 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 Jinpo Shan of S Sichuan. *Rhododendron 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 coloured flowers quite a bit earlier in the season. It remains quite rare both in its native habitat and in gardens.

Within this same group of seemingly closely related species, the true

orbiculare ssp. *cardiobasis* has finally been introduced from the wild. This is in contrast to recent introductions of this supposed 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 *R. fortunei* while the true *cardiobasis* (collected from the type location) should be reinstated as a separate species and not placed within *R. orbiculare* which is native far to the north in Sichuan. Plants grown under the name *cardiobasis* have been floating around for years but they always lacked data and appeared to be garden-origin *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 *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 *huanum* and *dauidii* occur in a similar range across S Sichuan and into NE Yunnan and adjacent NE Guizhou. They are separated primarily by calyx size (large and usually cupular on *huanum*, quite small and rim-like on *dauidii*). Also, *dauidii* 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 *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 are what really grab your attention however, being a strange (for this subsection) lilac or reddish-purple with darker nectar pouches. The colour reminds me of some of the better forms of the early blooming species *ririei* more than anything else. The poise of the flowers adds to their charm, with *dauidii* bearing a much more upright inflorescence while the flowers of *huanum* hang from their long pedicels to display the large and brightly coloured 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, *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 *roxieoides*, *dachengense* and *shanii*, are little-known relatives of those famous but difficult alpine species such as *proteoides*, *prunum*, *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 E 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 *Rhododendron 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 S China was more than enough to grab, and firmly hold, my attention. The plants were

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 this particular plant 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 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

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 *dachengense*, was my next goal. What did this basically unknown plant 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 *Rhododendron 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* (W 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?

Steve Hootman is the Executive Director and Curator of the Rhododendron Species Foundation and the Rhododendron Species Botanical Garden, USA. He is also a plant collector and author.



Steve Hootman



R. dachengense



R. shanii



R. glanduliferum baravalla



R. titapuriense

growing on vertical cliffs and some of them 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* (Repens group). The species was quite common in that particular location and I wondered

taxonomically? 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

PUKEITI'S PLANTS REACH THE WORLD:

Lara Coxhead

The quest to tell the world about Pukeiti's plant collection began seriously in 2008 when Graham Smith, who had recently retired as Director, was employed to 'empty his head' into a newly purchased database, BG Base. I began to learn how to use BG Base in 2010 and my role was changed from 'Gardener' to 'Plant Collections Officer' in 2013, with the aim of getting the entire plant collection documented, labelled with aluminium accession tags and available on a website for everyone to access.

The documenting was completed in 2014 and labelling was completed last year. My focus then shifted to bringing the information to the public. I was initially trying to work out how to do it using BG Base, but it became clear that this wasn't the best database for the job. It has been

a really useful tool, but it didn't offer what we needed in the way of an attractive user- friendly website.

After much consideration and research, we have purchased a new database called Iris BG, and all the relevant information from BG Base has been transferred to the new system. It is very flexible, includes regular updates and an easy-to-use search function. It offers, as part of the package, a website called 'Garden Explorer'. Within the database, I can easily add photos and maps and plot the position of every plant in the garden. The photos and plant data are periodically uploaded to the website for everyone to view. I am in the process of arranging aerial photographs to help map the plant locations and it will be an ongoing project to get photos of every plant.

In researching our plants, I have found that there are many species and cultivars that have very few, or even no, images on the internet.

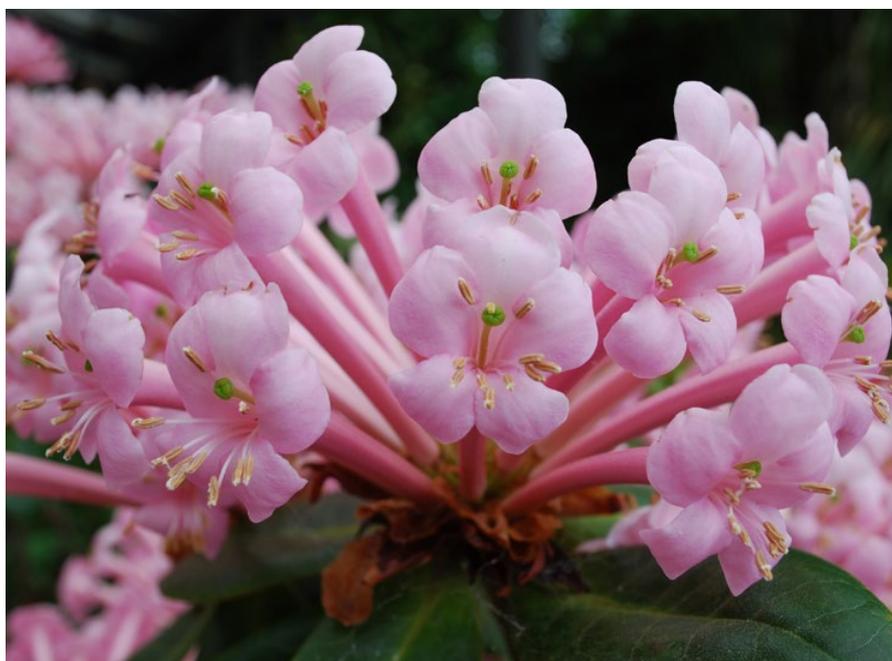
Now, gardeners, researchers and botanists all over the world who are searching for information about any plants that we have, particularly the rarer ones, will be led to our 'Garden Explorer' website. This will be a fantastic way to spread the word about what Pukeiti has to offer.

The Rainforest Centre (the new name for The Gatehouse after its current refurbishment) will feature a 'Plant Hunters' Station' with a computer loaded with Pukeiti's 'Garden Explorer'. Visitors will be able to use it before their walk to find the position of a plant that they wish to see, or after their walk to find out more about an interesting plant they have seen. If they haven't found its named accession tag, they'll at least know the location of their plant of interest, and what is growing around it, and will be able to search for it on the aerial photograph which will have all the plants named.

A link has just recently been set up to get to the Pukeiti 'Garden Explorer' page from the Pukeiti website. You can also find it by typing *pukeiti.gardenexplorer.org*. You will find instructions on how to use it on the website. More details, photographs and an improved map will all be added over time. For now, please take a look. There's plenty more work to do but you will get a good idea of what's to come. There will be some mistakes, I'm sure, so please be patient, but feel free to let me know if you spot anything major. 'Garden Explorer' will also be available for Hollard Gardens in a few months and for Tupare in about a year.

I hope you enjoy seeing this exciting stage in our quest to bring Pukeiti to the world and then, hopefully, the world to Pukeiti.

Lara Coxhead is the Taranaki Regional Council Gardens Collections Manager.



R. archboldianum 'Starburst'



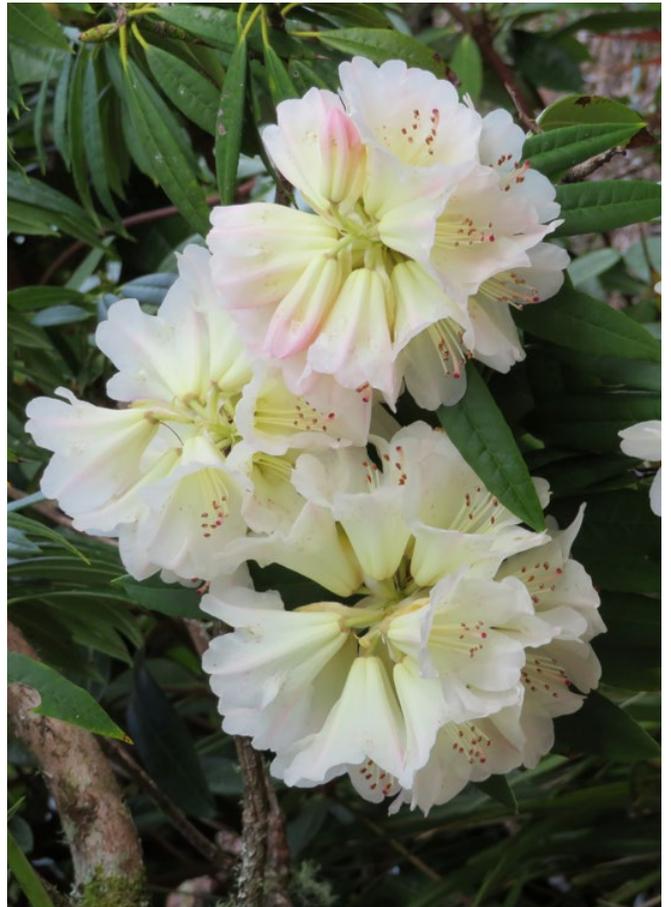
R. irroratum 'Polka Dot'



R. irroratum ssp. *pogonostylum*



R. irroratum grown at Hollard Gardens



R. irroratum grown from seed collected in Yunnan

DEVELOPMENT OF AN *EX SITU* CONSERVATION PLAN FOR RHODODENDRON SPECIES IN NEW ZEALAND:

Marion MacKay

An exciting recent development for Rhododendron in New Zealand is the initiation of the project 'Development 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 NZRA. 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 members can be involved, if they so wish.



Marion MacKay and Graham Smith discuss the plan.

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 (criteria can be found in Gibbs

et al. 2011). 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 8 of the Global Strategy for Plant Conservation stating that 75% of Red List species should be in cultivation by 2020 (IUCN 2011; Sharrock 2012). A recent analysis found that only 56% of Red List Rhododendron species are in cultivation, and some have very limited representation (MacKay & Gardiner unpublished); it is therefore important to have good knowledge of 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 (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 on a national scale.
- Determination of collection-holder roles, for those who wish to participate in the project. For example, certain collection-holders may agree to hold

certain sections 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 where, how many there are, and of what source (wild-collected material being of most interest) – so data collection and analysis is the main activity of this first phase of the project. I have 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 21 New Zealand collections (including contributions from several Pukeiti and NZRA members), species in cultivation at Edinburgh and Kew (RBGE 2013, RBGK 2015), species in cultivation in 1400 botanic gardens world-wide as recorded by Botanic Gardens Conservation International (BGCI 2015), 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, in this project the team will be working with 5-7 additional New Zealand collections, and two international collections to expand the data set (gathering data on presence of species, and the age and source of those species). 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 will be identified.

An important element of the analysis is that individual collections are not named in the aggregate analysis, and individual collections will not be named in any publications or reports. Because the aggregated data set has many components, individual collections are not 'visible' in the data summaries that are created in the analysis. Members should also note that I have given the undertaking to NZRA that collections would only be identified in the data-set by a code number, and that I am the only person who will know the codes (even members of the project team who have contributed data will 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 my Head of Institute at Massey University (to represent me 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, I 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; then the two components will be used to propose an *ex situ* plan for *Rhododendron* in New Zealand (containing the elements described in paragraph three). The plan 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 myself and the project team as the data gathering and analysis takes place. As the project progresses there will be several opportunities



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

for members to be involved if they wish to participate. Some of these opportunities include members

- 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, and
- 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 project will get underway from October 2017, and I would be pleased to hear from any members 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.



R. hyacinthosmum (Edinburgh Botanic Garden), a species from Papua New Guinea, which is present at limited sites in New Zealand.

Dr Marion Mackay is a Senior Lecturer in Environment Management, Institute of Agriculture and Environment, Massey University, NZ. Marion leads the Pukeiti ex situ Rhododendron Conservation Project.

Bibliography

- Argent G. 2015. *Rhododendron of the subgenus Vireya*. 2nd edition. Royal Botanic Garden, Edinburgh, in association with The Royal Horticultural Society.
- Blackmore S, Gibby M, Rae D. 2011. Strengthening the scientific contribution of botanic gardens to the second phase of the Global Strategy for Plant Conservation. *Botanical Journal of the Linnean Society* 166: 267-281.
- BGCI 2015. Botanic Gardens Conservation International: Plant Search. Online at: https://www.bgci.org/plant_search.php. Searched on 9-10 October 2015.
- Fang MY, Fang RC, He MY, Hu LZ, Yang HB, Chamberlain DE. 2005. *Rhododendron. Flora of China* 14, 260-455.
- Gibbs D, Chamberlain D, Argent G. 2011. *The Red List of Rhododendrons*. Botanic Gardens Conservation International, London. Available online at bgci.org.
- IUCN 2011. The Global Strategy for Plant Conservation 2011-2020. IUCN *Plant Conservation Committee Fact Sheet* February 2011.
- MacKay MB, Gardiner SE. Unpublished. A model for determining *ex situ* conservation priorities in 'big genera' is provided by analysis of the subgenera of *Rhododendron* L. (Ericaceae). Paper submitted to Biodiversity Conservation on 22.04.2016.
- Rae D. 2011. Fit for purpose: the importance of quality standards in the cultivation and use of live plant collections for conservation. *Biodiversity Conservation* 20: 241-258.
- RBGE 2013. Royal Botanic Gardens Edinburgh: Catalogue of the Living collections. On-line at <http://elmer.rbge.org.uk/bgbase/livcol/bgbaselivcol.php>. Searched 9-10 October 2015.
- RBGK 2015. Royal Botanic Garden Kew: Electronic Plant Information Centre (EPIC). On-line at <http://epic.kew.org/searchepic/searchpage.do>. Searched 29 October 2015.
- Sharrock S. 2012. *Global Strategy for Plant Conservation. A guide to the GSPC: all the targets, objectives and facts*. Botanic Gardens Conservation International, London.

'OMAHURI'

PLACE OF YOUNG TREES

Susan Davies

Lindsay and I moved to our property in Aokautere on the banks of the Manawatu River opposite Palmerston North in 1986, from a town garden that had grown too small for our increasing collection of rhododendrons and gardening aspirations. We had both grown up with these fascinating plants, Lindsay at 'Centrewood', near Waimate where his father was employed while I had long helped my mother with propagation in our family garden at 'Woodchester'. Ron Coker had taught me how to take cuttings and graft and my mother's garden certainly benefited from this, as has our own. Our new site seemed ideal, close to 10 acres on silt over river gravel and had proved its garden potential as part of a tree and shrub nursery. The area forms a long strip from east to west where it

abuts the Manawatu River and at purchase was divided at 20m intervals with substantial shelter belts. The inclusion of the former nursery propagation facilities at the far east end was a bonus and we had access to the bore used by the nursery for house water supply and irrigation.

We had our house built on a high spot among the former river channels near a grove of old growth totara and being aware of flood risk raised it 2m above ground level, which meant that our floors were 1m above the 100-year flood level. The area in front of the house was landscaped to make it appear that the house was built on a mound. Our goal was to develop a garden around the house so that we could view it from every room. The first priority was to remove all the poplar shelter belts with their particularly aggressive roots and most of the phlebalium trees, as these were both untidy and unstable in the wind. A redwood shelter belt trimmed as

a high hedge remained as a feature immediately to the east of the house and a western red cedar belt remained near the east boundary. Early on we planted a replacement shelter belt in between, using seedlings from the old growth totara. We started developing the area around the house with large planting beds surrounded by lawn, where the lawn provided an informal structure. The beds were planted with trees and accompanying rhododendrons and shrubs, to the horror of notable NZRA member Ron Gordon, who took the view that we should have developed the shelter for shade first and then planted. The rhododendrons at this stage were largely a collection propagated as cuttings and grafts from 'Woodchester', and they thrived. We also started the development of a *Rhododendron* species garden (Block 3) to the east of the property, again to the mutterings of our old friend from Taihape, who in spite of his misgivings allowed us to access his garden for propagation material. We developed a planting of 'big-leaf' rhododendrons on the south side of the totara, which mollified Ron to an extent. This part of the garden contains some material sourced from his garden at 'Rongoiti' and from the 1992 Pukeiti trip to Yunnan.

All was well until a morning in February 2004, when we woke to the sound of the roaring Manawatu in flood and water very near the bedroom. The 100-year flood had arrived! We rushed around moving the ride-on mower, garden tools and other stored items from the garage under the house, to the deck at a higher level, in front of the house. The car was nosed up onto the lawn close to the house as high as possible, as the old river channel to the east of the house had cut off our exit by road from the property. By this stage, the water



Gravel beds against the redwood hedge



R. morii

was close to 1m from floor level and we opted to call for help from Civil Defence, as we were unsure how much worse the situation would get. A big red helicopter arrived, hovered above our deck with a hoist and lifted Lindsay and me along with our fox terrier and two Burmese cats to safety. We had a novel view of our garden, with trees peeking above the flood water. On our return the next morning the water had largely disappeared, but the garden was covered in a substantial layer of fine silt. Now it was time to rebuild!

We managed to scrape the silt away from the roots of the more valuable plants. This was partially successful, but we probably lost three quarters of the rhododendrons around the house over the next 10 years due to root problems. We learnt that rhododendrons are tough and die slowly, whereas magnolias die faster. Notable rhododendron survivors include now sizeable specimens of *R. 'Mrs George Huthnance'*, *R. 'Sir Robert Peel'*, *R. 'Roseum Elegans'*, *R. praevernium*, *R. arboreum* ssp. *zeylanicum*, *R. 'Loderi King George'*, *R. 'Joy Bells'*, the little known Coker hybrid 'White Ice', as well as *R. arboreum 'Rubaiyat'* and *R. arboreum 'Kermesinum'*. The many gaps were viewed as 'planting opportunities' and have been filled, with a range of cultivars, including a well clothed

example of *R. 'Ben Moi Bessie'*. This replanting has had the upside that the house garden now contains plants of a range of ages. I have progressively re-developed ground cover and perennial plantings in this area to provide year-round interest.

We achieved our goal of having garden views from every window in the house, and the house garden is now intensively planted with trees, rhododendrons, bulbs and perennials. This garden includes specimens of rhododendrons that I have hybridized and grown myself. Providing contrast, is a narrow bed of succulents, dwarf irises and South African bulbs against

the dry north wall of the house and on the other side of the path, an unstructured planting of irises, poppies, lilies, dahlias, foxgloves and hollyhocks provides colour for nine months of the year. To the west of the house the garden seemed irretrievably soggy after the flood and we abandoned any thoughts of rhododendrons. Lindsay has developed this area with a more formal structure, consisting of a round central bed edged with small river stones surrounded by a gravel path. Beyond this are more informally shaped beds. Plantings in the Round Garden area are informal and feature a range of water loving irises, many raised from seed, candelabra primulas, hostas, the strange *Lobelia deckenii* from Mt Kilimanjaro, along with orange geum seedlings, red *Schizostylis coccinea*, white lilies, roses, and *Anemone hupehensis*, all of which thrive and provide a succession of colour. Lindsay and I have both developed a love of irises and this area is a godsend for us. Our other iris plantings are in the house garden and include Lindsay's tall bearded collection and my ever increasing number of seed-raised Pacific Coast hybrids. The Pacific Coast strain demands drainage and seems to enjoy the raised beds covered in gravel that we have developed over the past six years. However they are still not the greatest survivors and we treat them as visitors that stay for 3 years or so, then depart. I hope to develop a strain that is longer lived,



Large *R. smirnowi* specimen is planted with rootball above ground level



R. 'Lalique'

using our garden to impose selective pressure. The raised beds have proved a wonderful environment for growing a range of small bulbs, iris species and other 'wee treasures'. I raise many of the bulbs from seed, profiting from membership in seed exchanges and from commercially available seed of the South African species that are permitted imports into New Zealand. There is a fascinating array of flower colours and forms among the South African bulbs, which start to flower in mid July, about the same time as *R. arboreum* KW form opens its first blooms and invites one to explore the still wintery garden. Of course these first flowering forms of *R. arboreum* are situated at the other, far east end of the garden, in the Block 3 species garden and there are displays of *Narcissus obvallaris* (Tenby daffodil) and *Galanthus* species to be discovered in between! A recent planting of proteas on the north boundary exploits a gravel ridge that is near to the surface and provides further late winter interest.

Ongoing issues in our garden include the lack of drainage caused by the layer of fine silt from the 2004 flood, which is being constantly amended by mulching. Rhododendrons are now

planted on mounds of soil augmented with organic matter, however this means that they need to be watered during their first two summers. The same flood brought us all the weeds that we had not already inherited from the previous shrub nursery. Because of this garden history, we have a much greater range of weeds than is found in most gardens and we combat it with



R. 'Pineapple Delight' x 'Rubicon' hybridized by Sue Davies

mulch, ground cover and constant surveillance with spot spraying of herbicides to prevent seeding. Other 'weeds' are seedlings of our beloved totara, as well as *Pittosporum* species, both distributed by birds. Thrips are a menace in dry summers and require to be kept at bay with spraying. The river is a constant threat, but with

low probability of a return visit and, we trust our memorial to the flood, located beside the totara hedge, mollifies the river gods. Rabbits and possums are at least kept at bay by our current young fox terrier and a new generation of Burmese cats.

Over the past three years, we have started to develop a second rhododendron species garden, to deal with overflow from Block 3. This garden is imaginatively named Block 2 and again we have planted trees and shrubs simultaneously. However, this time we started by planting a few big specimens of both. This garden joins the Block 3 species garden through a gap in the totara hedge, integrating the two gardens. These two areas accommodate both plants raised from seed and others propagated by cuttings and grafts as a rhododendron species conservation initiative, linking into the NZRA and Pukeiti initiatives. We are very grateful to other species growers who share our interest in conservation and have allowed us to propagate material from their collections. Our recently developed *Rhododendron* species database contains a total of 187 taxa (species and subspecies), a number of which have several different



R. alutaceum

plants. There are 50 taxa in our garden that are indicated as critically endangered, endangered or vulnerable in the wild on the 2012 Botanic Gardens Conservation International Red List of Rhododendrons.

Lindsay has recently taken on a project in the area north of the totara, developing the area with plantings of native trees with timber potential. These are still young, but very attractive. My own new venture in this area is a pond, which will set off the clump of matai. It is still very much under development with the liner to be installed in spring.

Our more eye-catching trees include the 50 old-growth totara trees on one-third of an acre near the southwest boundary. To the north of these is a row of closely planted rose sheoak, *Allocasuarina torulosa*, planted by the previous shrub nursery for the cut foliage trade. Not only is the foliage interesting, but the corky bark is a real feature, providing a backdrop to the west side of the house garden. Adjacent to the totara are some of the planting of 30 year old kauri that we grew from seed and which extend up into the north end of the main garden. A grafted weeping swamp cypress has progressively extended its 'skirts' to extinguish all planting in the bed around it. The Chinese fir in the main garden looks as distinctive as specimens I have seen in the wild and forms a group with three *Cupressus sempervirens* 'Swaines Gold' trees we inherited from the previous nursery owners. Near the redwood hedge to the east is an *Abies spectabilis* which always draws attention from garden visitors, as does the *Abies firma* further down the drive. By a miracle the nearby fine specimen of *R. falconeri* from Sikkim collected



Pacific Coast iris hybrid

seed came through the 2004 flood unscathed, in spite of its roots being under two metres of water in an old river channel for about 24 hours.

A bank of double deciduous azaleas on the other side of the road provides a splash of vivid colour in late October. These are my own raising, developed from crosses between a double form raised from ARS seed and various semi-double and single forms. *Liriodendron tulipifera* 'Aureomarginatum' flowers reliably behind the azaleas in November. Opposite it at the end of Block 3 is a densely planted former nursery hedge of 'Salmon Girl' and 'Dream

Girl' camellias. This is now about 6m in height and from early June is a banqueting hall for the horde of squabbling tui and bellbirds who make good use of the nectar. Further into Block 3 is one of our two thirty-year old seed-grown specimens of *Ginkgo biloba*, which provides vivid butter yellow autumn colour. Nearby, the extremely large leaves of the Mexican *Magnolia dealbata* draws attention in the summer months. The rhododendrons in Block 3 range from established 25 year-olds to young plants. There is a major planting of *R. arboreum* on the hill, which provides an early splash of colour, a



An unnamed seedling of *R. 'Pukeiti'* raised by Ron Gordon



Small irises and South African bulbs flourish with succulents in gravel bed

number of species from Subsection *Fortunea* and several forms of *R. yakushmanum*, two raised by Mrs Boswell from wild collected seed. One of these has especially small leaves. The Tower Court form of *R. balfourianum* imported by Brian Morris forms a dense mound and flowers regularly, with a display of new foliage in November. Another treasure from the same source is *R. metternichii* var. *kyomaruense*, which is distinguished by its very thick furry indumentum. The first of these plants is classified as vulnerable in the wild, the second as endangered, making them especially precious to us. Two vigorous plants of *R. suoilenhensis* first flowered in 2002 from wild collected seed.

Development of our garden at 'Omahuri' has filled our last 30 years, and it is not finished yet; it is still truly a 'place of young trees'. We welcome NZRA Conference 2017 attendees to share the pleasure we have in our garden.

Dr Susan Davies is a Plant and Food Research scientist and a former President of the NZ Rhododendron Association.



Irises



New growth on *R. balfourianum*



Planting of Sue Davies' double azaleas on the drive at 'Omahuri'

A SHADY BUSINESS

RHODODENDRON SUCCESSES AND FAILURES IN A DUNEDIN WOODLAND GARDEN

Tony Fitchett

It was on page 41 of the first book on rhododendrons that I bought: "... few rhododendrons like full exposure to the sun, except in places where light intensity is not high, ... as in Scotland and British Columbia, and the Dunedin area of New Zealand." I was rather irritated by I.F. La Croix's seeming denigration of the Dunedin climate – perhaps the Dunedin-born get a bit sensitive about others' assumptions regarding our climate.

But he (? she) was right. Experience with the effects of our second-growth bush creeping closer to our rhododendrons, large-leafed or small, and the effects of planting trees too closely, has led me to concur with Kenneth Cox's maxim, heard at the 2010 Deutsche Rhododendron Gesellschaft Jubilee Symposium in Bremen, that "the woodland gardener's best friend is the chainsaw".

Shade versus exposure to sun has been a major factor in the success of a wide range of rhododendrons at Lindenfield. High top-shade can be helpful in summer (yes, we do sometimes get one) but 'too much spoils the flavour'. A plant of *R. luteiflorum* did well initially, planted in the area whence we had first cleared gorse in our gully. As the bush crept closer and taller the rhododendron grew progressively less happy, but it revived when moved to a more exposed site, and has flowered prolifically since. And its relatives, such as *R. glaucophyllum*, *R. tsangpoense* and *R. charitopes* have done well, in

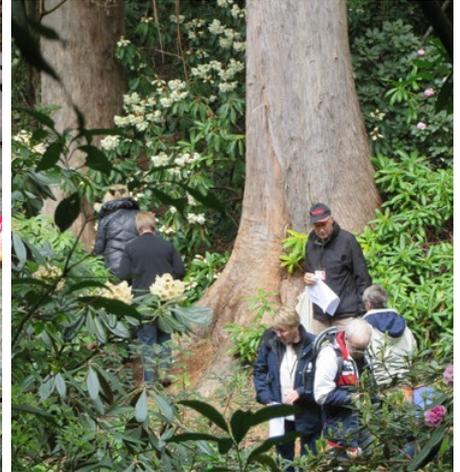


R. zelanicum

pots or open ground, so long as they've had plenty of light. *R. williamsianum* is reluctant to flower unless it's in pretty well full sun, and *R. maddenii* does better fully exposed, though plants of the Ciliicalyx and Dalhousiae alliances, and their hybrids, seem to cope well with partial, but not dense, shade. But *R. megacalyx* does best in full light.

I think our enthusiastic planting of trees, and reluctance to remove many of them, is responsible for our lack of success, generally, with azaleas. That's our problem, rather than Dunedin's – a visit to the upper part of the Dunedin Botanic Garden shows what can be achieved with deciduous azaleas where they get adequate light.

At 500 ft altitude, and on sloping ground, frost is generally not a problem for us – the Germans who visited Lindenfield at the time of the 2014 International Conference were envious of our ability to grow the *Maddenia* outdoors. Their problem was perhaps exemplified by the local at the 2010 meeting in Bremen, who told me his hobby was breeding rhododendrons



Woodland Garden

that would withstand -20 degrees C.

Our worst problem has been powdery mildew. When we first moved to Lindenfield it had not reached Dunedin. When it arrived, in the mid 1980s, it wiped out all our species of the *Cinnabarina* subsection, and most of their hybrids. *R. campylocarpum*, and several plants of *R. wardii* also succumbed, though a later planting of a Kingdon Ward form of *R. wardii* has been successful. With a large garden, and being reluctant to use toxic chemicals, we decided against spraying, so tried to limit the mildew's effect by ensuring good air circulation and not stressing the plants. Interestingly, with both *R. 'Alison Johnstone'* and *R. 'Ilam Canary'*, brutal cutting back, to only one or a few basal shoots, has produced growth that seems much more resistant to the disease. I recently tried another plant of *R. cinnabarinum*, planting it in a site with good air circulation: it's still alive, but couldn't be described as vigorous. Surprisingly, our original plant of *R. griersonianum*, said to



Cherry walk at Lindenfield

be susceptible, though growing in significant shade, above a creek, and surrounded by other, bigger plants, has shown no sign of the disease.

Large-leaf rhododendrons, of the *Grandia* and *Falconera* subsections, seem to thrive in Dunedin – it's not unusual to see *R. macabeianum* growing in private gardens, as well as in parks and other public spaces, even where exposed to strong winds. We've lost some of these, due mainly to excess shade, or changes in the course of streams, and we have found several large-leaf seedlings: the first of these, possibly *grande* x *sinogrande*, flowered last year, producing six magnificent blooms.

Plants from the *Triflora* and *Helirolepida* subsections do well here too. We have many plants of *R. augustinii* in a variety of situations, and they all seem to flourish (apart from one plant of the *Medlicott* form, about 2 ft high, within sight of the house, being dug up and stolen – the thieves didn't even fill in the hole). Plants of *R. triflorum*, both the *Mahogani* and the *Bauhiniflorum* groups, have produced open-pollinated seedlings which appear to be true to type.

Some species of the *Fortunea* subsection do well too, even in shade – our first plant of *R. griffithianum* flowers generously in spite of now being heavily shaded. *R. calophyllum*, on the other hand, produced only occasional flowers until a large lacebark that shaded it was removed: since then it has flowered heavily every

year. We have several plants of *R. decorum*, growing happily in a variety of situations, and have had a number of seedlings which look to be hybrids of *ssp. decorum*, and several, which look to be true, from *ssp. diaprepes*.

R. auriculatum does well in plenty of indirect light, and it's good to have it flowering in February.

Two attempts at growing *R. succothii* have failed, but other members of the *Barbata* subsection seem happy, and *R. argipeplum* has flowered.

One subsection that we have been uniformly unsuccessful with is the *Glishra* – every plant has eventually died, though some have flowered first.

The *Neriiflora* have proved difficult at times, with a number of losses: it may be that I haven't been careful enough with regard to drainage. I recently planted *R. pocophorum* almost completely above ground level on a gentle slope, and it looks happy at present – time will tell. Our original *R. mallotum* was, I believe, shaded to death, but a planting three years ago, in better light and raised above ground level, looks happy. A couple of plants of *R. dicrananthum*, one in part shade, and another which fights through other, taller, plants for light, seem healthy and flower regularly.

Back to theft: that has been a significant hazard. One winter, many years ago, we headed off with the children, as usual, to Erewhon, for a week's skiing. However, the snow was inadequate, and after a couple

of days commuting to Mt Hutt (and my being slammed into from above by another skier) we came home two days early. A walk in the gully that evening to check on recently planted rhododendrons showed that not only had a number vanished, but some more had been put into planter bags and were sitting in a clearing waiting to be taken away. It was the best ones (including our first plant of *R. pachysanthum*, from Pukeiti) that had been chosen: clearly the thief knew their rhododendrons, our garden (we had had several group visits to the garden by then), and our movements. The bagged plants went into the vegetable garden close to the house for a couple of years, until larger, and were then replanted in the gully.

Even vireyas can have a place, although it's a limited one. A Dunedin couple living closer than us to the sea had a garden with many vireyas – some needed to be moved under shelter during the winter. I tried, many years ago, planting some at the edge of our bush, but they died. Then, thinking of suitable conditions for epiphytes, I tried one in a hanging basket. It was obviously unhappy, and eventually I dumped the basket in a south-east facing corner behind the garage, and forgot it. A couple of years later, having had no attention whatever, it was flowering vigorously. Since then I have grown a few vireya hybrids successfully in baskets, in the same area, where they get no direct sun, and are protected by the building and a broadleaf from frost and the wintry souwester.

Dunedin is a place where a wide range of rhododendrons can be grown – Kenneth Cox, some years ago, described it as one of the three best parts of the world for this. We've found that plants from most temperate subsections of the genus, from the large-leafed giants such as the *Grandia* and *Falconera* to tiny-leafed species such as the *Campylogyna*, *Lapponica* and *Pogonanthum* grow well here, providing that they aren't afflicted by inappropriate conditions or disease.

Tony Fitchett is President of the NZ Rhododendron Association.

THE REDEVELOPMENT OF THE PEAT GARDEN AT DUNEDIN BOTANIC GARDEN

Doug Thomson

Historically, one of the first references to peat gardens in horticultural literature was in the 1927 Royal Horticultural Society Journal, with an article discussing the use of peat walls at Logan Garden near Stranraer on the west coast of Scotland. Peat walls were used at Logan to support terraces of soil for dwarf rhododendrons, lilies, primulas and meconopsis grown from seed sent home by plant hunters George Forrest and Reginald Farrer.

These walls were built on a bank of poor stony soil and back-filled with richer soil mix which eventually supported a number of large-leaved rhododendrons as well as South American, New Zealand and Australian plants. The article in the RHS Journal mentioned, in particular, the ability of peat walls to retain moisture but also allow suitable drainage.

However, it was the natural germination of seeds from these plantings that revealed the potential of the peat garden as a style of gardening in its own right. This encouraged a visit by staff from the Royal Botanic Garden in Edinburgh who were impressed enough to decide to develop a peat garden in Edinburgh as a new and separate feature. Given such a high profile, it was inevitable that peat gardens were soon being developed in many other gardens around the country, such as Savill Garden, Windsor Great Park, RHS Wisley and Liverpool Botanic Garden. This established the peat garden as a valid form of horticulture.

Peat gardens offer those of us who are interested in growing rhododendrons and associated plants a

set of growing conditions with definite advantages for many plants in a style that can arguably be described as a blend of woodland and rock garden.

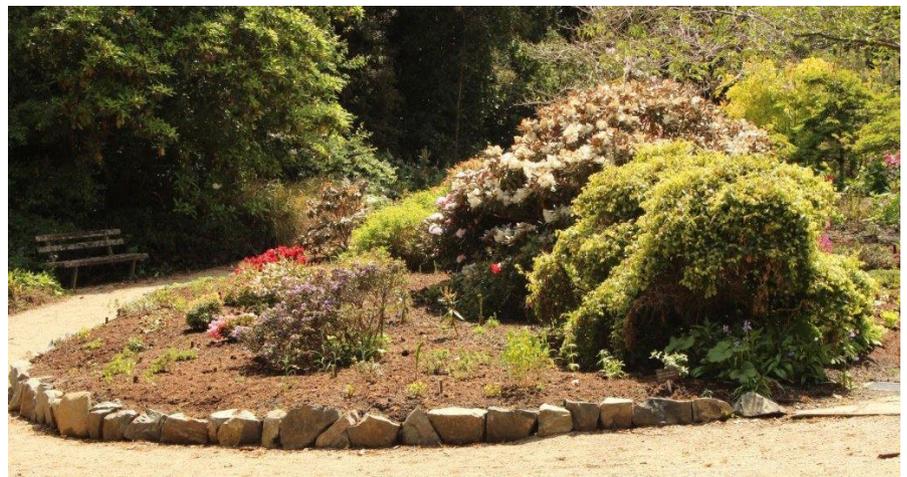
In the Rhododendron Dell at Dunedin Botanic Garden the peat garden has been in place since the spring of 1992. Before that the site it occupies, at the south end of the Cherry Walk, was host to a group of *Rhododendron yakushmanum* and some of its hybrids, dominated by a background of big old *R. fortunei* and *R. decorum* hybrids. In 1987, as a similar stand of hybrids stood on the east side of the Cherry Walk, management decided to remove the hybrids behind the *R. yakushmanum* bed to open the area up to more light and allow space for more diverse plantings.

A couple of years afterwards though, the *R. yakushmanum* began to show signs of die-back. It transpired that with the removal of the old hybrids, an underground flow of water which had previously been sucked up by them was now seeping into the yak bed and causing root rot. The immediate solution was to relocate the *R. yakushmanum* to a better site.

Doing that, I discovered that the

site where they had been growing consisted of a relatively thin layer of reasonable soil over heavy, boggy clay which didn't recommend itself for any kind of ericaceous planting. For the next few years therefore, I simply filled it with *Primula pulverulenta*, which were attractive in late spring and summer, but provided no impact through the rest of the year. At that time, I was also studying for the National Diploma in Horticulture, for which I was asked to suggest and outline a new feature for the garden I worked in. Having recently emigrated from Scotland, where peat gardens were accepted and familiar, and come to New Zealand where I had not seen any, this seemed a good idea for the assignment.

Having completed the assignment, the idea remained and presented a good solution both for the drainage problems in the old yak bed as well as establishing a strong feature in what was essentially the heart of the Dell. Another motive in creating the peat garden was the prospect of having at least one area where I was not continually working against Dunedin's heavy loess/basalt clay soil, but would instead be able to provide



The Peat Garden

an area with ideal growing conditions for a range of more choice plants.

The concept proved to be a success, displaying a good selection of dwarf rhododendron and other shrubs. A diversity of herbaceous perennials also vied for attention with their small size or more unusual features, and intrigued passers-by.

Since its establishment the peat garden has been renovated to further improve growing conditions and extended further along the edge of the track to the west of the Cherry Walk, the last time being in 1999.

By 2012 though, the plantings were in need of refreshing again as some had died out and others such as *Leiophyllum buxifolium* had pushed smaller plants aside. The plants at the back of the peat garden still grew well and formed a curving swathe of healthy growth from one side to the other. At the front though, growth was much more variable. During the process of excavating the original heavy clay, the base layer was graded at an angle, sloping down to encourage drainage from the back to an existing subsoil drain at the front where the bed met the surrounding track. Over the years, the original layer of peat blocks that formed the base of the peat garden had gradually collapsed, bringing the root zone closer to the clay below. The result was reduced vigour.

At the same time, the border to the rear of the peat garden was also in need of renewal. Two old *Cornus amomum* had taken over the west side of the border and although they gave good autumn colour, were unremarkable for the rest of the year. They were also out of scale with the surrounding plants and made the area look congested. A yellow tree peony on the same side also looked out of place, whilst the soil in that area behind the peat garden had never been renovated, so was clayey, poorly drained and dipped in the centre. Herbaceous plants in the area were predominately self-sown *Hyacinthoides hispanica* (*Scilla hispanica*), *Primula pulverulenta*, *Cardocrinum* and a few hostas.

So it was clear that if I was to renovate the peat garden, the area behind it would also need to be tackled. With that in mind I saw the opportunity for introducing more rhododendron species as an evergreen frame to the rear. That in turn prompted the need to shift two *Corylopsis glabrescens*, three *Enkianthus campanulatus* and one *Eucryphia cordifolia* (*E. glutinosa*) further up the border to form a more cohesive block of deciduous plants.

To do that, the first step, as ever in the Dell, would be to install more drains – 5 more in fact, totalling 50m, whilst also digging out about 10m³ of clay from between the drains. We also added a layer of fine gravel



R. huanum

to improve water flow between the drains. Unlike the original peat garden development however, there wasn't the luxury of using a mechanical digger, because the only access to the area was via the grassed Cherry Walk. So my apprentice and I did all the work by hand and although I do enjoy digging, I have to say that I had had more than my fill of Dunedin's dense volcanic underlay by the end of that phase.

We cleared out the front of the peat garden, heeling-in healthy plants and discarding anything that was beyond help. Out went *Rhododendron fastigiatum*, *R. 'Goosander'*, *R. 'Egret'*, *R. 'Kazan'* ('Rukizon') plus three of the *Leiophyllum buxifolium* and a *Vaccinium moupinense*. To be replanted were two specimens of *R. pachysanthum*, two specimens of *R. williamsianum*, *R. simsii*, *R. keleticum*, *R. trichostomum* plus *Gaultheria procumbens*, *Trillium pusillum* (*T. ozarkanum*), *Anemone × lipsiensis* (*A. × seemanii*), and *Epimedium ×*

youngianum 'Yenomoto'. In the centre of the peat garden a 3m tall *Eucryphia milliganii* had outgrown its position so was shifted up to join the *Corylopsis*, *Enkianthus* and other *Eucryphia*. We also extended the peat garden even further up the western flank to tie in with the renovated area behind it.

The original peat garden construction was edged by punga logs as they blended beautifully with the colour and texture of the peat mix behind them. Over time these had disintegrated, but now I couldn't find them available anywhere. So, forced to reconsider and recognising that other borders in the vicinity were now edged by rocks, I opted for those instead. Not only would they unify the adjacent borders, but by using larger rocks, I could gain more depth above the clay at the front of the peat garden.

I also found that I could no longer buy peat blocks, which had been originally used to form terraces and the base layer in the garden. Instead I changed tack and went for a free draining but moisture-retentive mix of 20% soil, and 80% mix of peat, ground bark, sand and compost which would also supply ample nutrition. Given that peat is effectively a non-renewable resource, building up in nature by only 2-3mm per annum, I investigated the possibility of using coir, the processed husks of coconut, or what is known as 'coco-peat', instead. However I was advised that it could contain detrimental salt levels that hindered growth, so rather than take that risk, I continued with peat, but will experiment with coco-peat as a mulch in small areas to gauge its suitability for more extensive use long term.

It was very satisfying to apply the new mix and see the area steadily transform from what had been an area with quite limited planting options to one with much more versatility.

I have to say there was a disappointing range of dwarf rhododendron species available for purchase which must reflect resistance by the general growing public to their fussier requirements. It would have been rewarding to replicate some of the original planting scheme, such

as the compact little blue flowered *R. fastigiatum* from the Subsection *Lapponica*, or its contrasting cousin *R. orthocladum* var. *microleucum* – its albino flowers accentuate the prominent stamens that lend a spidery appearance to their display. One of my favourites was the neatly mounded *R. megeratum* whose yellow flower buds studded the plant like jewels and opened out to reveal contrasting brown stamens. Others were different colour forms of *R. campylogynum* Myrtleoides Group, with their little thimble like flowers, in dusky pink, yellow or brick orange, *R. saluenense* with its relatively large pink flowers lighting up the scaly, dark green and aromatic leaves and *R. calostrotum* ssp. *keleticum* whose forms from the Radicans Group I was able to plant out to present the smallest species in the genus.

I was pleased to find *R. keleticum*, but rather than its prostrate variation, this is the larger mound-forming plant that will grow up to 40cm instead of spreading out in a low mat. However, it will still have the deep purplish crimson flowers that sit upright above the foliage like small saucers as an enticement to any passing pollinator.

Three years ago I had a request for some material that would be suitable for the Dunedin Chinese Garden, so I took some cuttings of *R. forrestii* Repens Group and one pink form of *R. campylogynum* and still had 16 *R. forrestii* and 22 *R. campylogynum* left over. I took full advantage of those and planted them all in groups in and around the peat garden. Although that does not give variety of display, it conveys the alpine glade effect I was aiming for with the peat garden and forms a foundational planting for other dwarf species we acquire in the future.

Dwarf rhododendron hybrids play their part though. The bright yellow cross *R. 'Curlew'* (*R. ludlowii* × *R. fletcherianum*) should do well as long as it can cope with the hotter summers we seem to be getting now. A couple more reds are *R. 'Debbie'* (*R. 'May Day'* × *R. 'Carmen'*) and *R. 'Ruby Hart'* (*R. ['Carmen']* × *R. 'Elizabeth'*) × *R. elliottii* which will get to about 1m and 1.5m respectively. Larger still is the yak

hybrid *R. 'Little Jack Horner'* which can get up to 2m, and will eventually vie for attention with the large established *R. yakushimanum* that has been growing behind it since the original peat garden development in 1992.

The larger rhododendron species that went into the newly drained area behind the peat garden are a selection with mostly narrower or longer leaves. This gives a lighter texture to the planting scheme and also provides a contrast to the low mounded forms of the peat garden. Colours range from white to light or deep rose pink, complementing the pinks and reds of the dwarf forms around them.

R. tricanthum and *R. siderophyllum*, both from Subsection Triflora, unlike many larger rhododendrons, have smaller flowers, similar to the flowers on some of the dwarf forms, making a subtle connection between the two groups. *R. hunnewellianum* from Subsection Argyrophylla has narrow, dark green quite ribbed foliage with whitish, woolly indumentum and should eventually produce white flowers edged with pink and decorated by pink spots. It does seem to be a bit temperamental wherever I try it with a tendency to die back at the leaf tips and according to Scottish rhododendron authority, Peter Cox, is prone to chlorosis. However, he also says when grown well it makes quite a nice plant, so I live in hope.

Three species from Subsection Fortunea, *R. huanum*, *R. praevernium* and *R. glanduliferum* continue the long-leaved theme. *Rhododendron huanum* is quite rare in cultivation and has 8.5 -14.5cm long leaves. The rose pink flowers form quite a lax truss with an open centre that reveals the large darker coloured calyces whose lobes can be as long as 10mm.

R. praevernium has even longer leaves between 10 – 21.5cm and a fuller flower truss of white florets suffused with pink.

Rhododendron glanduliferum is similar in leaf, and tends to have a still larger truss of white florets with yellow shading in the throat. There is a certain irony in returning three species from

Subsection Fortunea to an area where several *R. fortunei* and *R. decorum* hybrids were removed nearly 30 years ago. However these are more widely spaced so will not dominate the area in the same way, but as they grow into flowering maturity they will restore a visual link with the related hybrids on the other side of the Cherry Walk.

Complementary plantings of low growing shrubs in the peat garden itself, include *Pieris japonica* 'Bisbee Dwarf', *Gaultheria pyrolloides* (*G. miqueliana*), *Andromeda polifolia* 'Alba', *Arctostaphylos* × *media* 'Wood's Red', *Sarcococca hookeriana* var. *digyna* (var. *humilis*), *Vaccinium delavayi* and *Leptospermum rupestre*. I was also able to find a good selection of smaller perennials including irises, gentians, fritillaries, meconopsis and primulas to fill and soften the planting scheme.

As you approach the peat garden now, the most obvious difference from the original peat garden construction is the sweeping curve of the rock retaining edge around the front of the garden. This edge is a strong feature and makes a satisfying contrast with the soft appearance of the peat mix it retains. The most significant impact of the edge though is the greater depth of mix it has allowed behind, which I have been able to increase from around 15cm to as much as 50cm.

More significant still, is the extensive new drainage throughout the area behind the peat garden. This allows much greater versatility of planting across the whole border. Whereas before I was limited to those plants that could cope with the heavy clay, I can now select those that might be more delicate and fussier in their requirements, whilst still choosing larger more robust plants that suit the surrounding landscape. So now, nearly a year later, the plants have settled in and look ready to begin filling out the garden once growth resumes in spring.

Doug Thomson is a Pukeiti Board Member and Curator of the Rhododendron Collection at Dunedin Botanic Gardens.

EARLY RHODODENDRON COLLECTIONS IN NEW ZEALAND: SPECIES COLLECTED BY DOUGLAS COOK

Marion MacKay

One of the fascinating aspects of New Zealand Rhododendron collections is the number of keenly enthusiastic people who have amassed substantial collections of species. Douglas Cook was one of those

dedicated collectors and from about 1940 to 1965 he built the collection at Eastwoodhill (about 7000 taxa of woody plants in total), including some 670 species and cultivars of *Rhododendron* (MacKay 1996).

Yet, as we know from the stories of Eastwoodhill and Pukeiti (Berry 1997; Greenfield & Smith 1997), the rhododendrons were not successful at Eastwoodhill and by the 1990s many were either 'not found' or had completely disappeared (MacKay 1996). Today, when species conservation is a topical issue, looking back to some of those early collections can be of considerable interest. Which species did Douglas Cook bring to Eastwoodhill? Are they all still in cultivation or in collections? Were there any particularly rare or unusual types in his collection? Are any of the species applicable to conservation today? In this article I examine the range of *Rhododendron* species that Douglas Cook collected and highlight some that have apparently been lost to cultivation in New Zealand, and others that are found only in limited locations. Some of these are rare species, and if they were 'rediscovered' this would assist in any future conservation plan.

In recent years *Rhododendron* has undergone two international conservation assessments (Gibbs et al. 2011; Argent 2015), where 1215 species were assessed for scarcity and threat in their native habitat (using a set of international criteria), and 715 species (58%) were determined to have some degree of conservation issue. In those assessments, species were assigned to a Red List category,



Visitors to the cathedral planting, Eastwood Hill

which indicates the degree of threat and also the need for conservation action. The Red List categories, with decreasing level of severity are: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), and Near Threatened (NT). For example, there are two vireya species that are Extinct, and the azalea *R. kaniherae* is Extinct in the Wild, although it is still alive in cultivation and is held in a number of collections. *R. formosum* is Critically Endangered in its habitat, and *R. macbeanum* is Endangered (although it is relatively secure in cultivation). The Data Deficient category (DD), is used for species for which experts believe there is a problem, but which cannot presently be quantified. High numbers of Data Deficient species indicate a paucity of field knowledge, for example, many species from New Guinea were assessed as Data Deficient (MacKay & Gardiner unpublished). Finally, species which are common and which have no conservation issue are placed in the Least Concern (LC) category.

Following a conservation assessment, one conservation approach is to hold species in cultivated collections (*ex situ* conservation (Blackmore et al. 2011; IUCN 2011; Rae 2011; Sharrock 2012)), however this approach relies on knowledge of which species are present in which collections, and in which countries (Cires et al. 2013). Given the enthusiasm of some of the early New Zealand collectors like Douglas Cook, might some of his early acquisitions be of conservation interest today?

The rhododendrons that Douglas Cook brought to Eastwoodhill included 247 species, and 905 cultivars and hybrids of rhododendrons and azaleas (MacKay 1996). He obtained the species from a range of sources; many from British nurseries such as



R. macbeanum, Pukeiti. An Endangered species from India

Hillier & Sons, Slocock, and Bodnant, while others came from New Zealand sources such as Duncan and Davies (MacKay 1996). To determine which of the Douglas Cook species are still in cultivation in New Zealand and world-wide, and which might be of conservation interest, the list of species was compared to the species on my research database. That database, constructed for other rhododendron projects, lists species that are currently in cultivation world-wide, and also in New Zealand (MacKay & Gardiner unpublished; MacKay et al. unpublished). Some of the data elements include surveys of commercial trade in New Zealand over several years, data from 23 New Zealand collections (to which several members of NZRA and Pukeiti have kindly contributed), geographic origin for each species, Red List assessments

for each species, presence of each species at Edinburgh and Kew, presence of wild source material, and the number of records for each species on the Plant Search Database at Botanic Gardens Conservation International (BGCI, 2015).

The aforementioned institution is the world body for botanic gardens, and over many years they have built a database of plant species in cultivation, which now has 1,363,723 entries of 496,775 taxa from 1147 botanic gardens world-wide (bgci.org, accessed 2.5.2016), and is the most comprehensive description of plants in cultivation world-wide. The number of records for a species on that database indicates the scarcity in cultivation; any species with 3 or fewer records is at some risk not only due to numerical scarcity but due also to the possibility of error. A plant

may have died, or been incorrectly named or recorded. For example, vireya species have an average of only 2 records per species on the BGCI database (MacKay & Gardiner unpublished), indicating that they are poorly represented in cultivation internationally. For individual species, the number of records at BGCI is hugely variable, ranging from zero to several hundred per species; those species with fewest records should take top priority for propagation and distribution to other collections, particularly if they are Red List species.

Returning to Douglas Cook's rhododendrons, when the 1996 list (MacKay 1996) of 247 species was re-examined and several synonyms and unconfirmed names were removed, a total of 230 species remained. When checked against my database of species in New Zealand and internationally, it transpires that some of Douglas Cook's rhododendrons are quite common in cultivation in New Zealand and internationally, while others are rather scarce (Appendix 1). Species listed in Appendix 1, where the row has blue shading, are those which presently have no New Zealand record on my database, while the rows with grey shading are species with only 1-2 New Zealand records. All other entries have 3 or more New Zealand records. The right side column shows the number of records for each species at BGCI; anything more than 10 records is quite secure in cultivation internationally, anything fewer than 3 is not secure in cultivation.

There are 17 species that presently have no New Zealand record (blue shading in Appendix 1). Of these, two are azaleas (*R. canadense* and *R. pentaphyllum* from subgenus *Pentanthera*) while the rest are from subgenera *Hymenanthes* and *Rhododendron*. Of the 17 species, 11 have their origin in China, 5 are from other parts of Asia, and 1 each are from Europe and North America. *R. canadense*, the species from North America, has 95 records at BGCI and is quite secure in cultivation. Most of the other species are also secure in cultivation world-wide, except for *R. edgarianum* (5 records), *R. sanguineum* ssp. *didymum* (6 records), *R. glaucophyllum* ssp. *glaucophyllum* (4 records) and *R. hunnewellianum* ssp. *rockii* which has only 1 record at BGCI. The latter 3 are Red List species, along with *R. coriaceum*, *R. cuneatum*, and *R. pubescens*. Of the Red List species, 5 are from China, and 1 is from Nepal and Bhutan (*R. glaucophyllum* ssp. *glaucophyllum*). There is some possibility that *R. glaucophyllum* ssp. *glaucophyllum* is present in 1 New Zealand collection; a complicated set of synonyms leads to some ambiguity, and physical inspection of the plant is needed to confirm the identity. It would be great to find that these species are still in New Zealand, and it would be particularly good to find that someone has Douglas Cook's *R. hunnewellianum* ssp. *rockii* as he had two wild sources (KW158 and KW184), which would be of particular interest for conservation.

Douglas Cook also had wild-source

accessions for 3 other species. *R. rex*, for which he had KW4504, is common in cultivation, but that KW accession is not recorded at either BGCI or at Edinburgh. *R. formosum* var. *inaequale* KW20301 is a similar case; the species itself has 9 records at BGCI, but that wild source is not reported anywhere else, and this is a Red List species, so wild-source material is of considerable interest. Douglas Cook also had the Red Listed *R. elliottii* KW20303, which was sold by Duncan and Davies; it is still at Pukeiti, and probably in other collections as well.

Returning to Appendix 1, in addition to the species that presently have no record in New Zealand, there are another 49 which Douglas Cook acquired and which are now recorded in only one or two collections in New Zealand (grey shaded rows in Appendix 1). This group of species is at risk; when there are limited collection locations there is some danger that storm, disease, or unexpected events may kill the species, so such species should have high priority for propagation and dispersal to other sites. The 49 species cover the whole spectrum of *Rhododendron*, 6 are from Section Ponticum Subsection Neriiflora, 5 are from Section *Rhododendron* Subsection Lapponica, 5 are deciduous azaleas (subgenus *Pentanthera*), 3 are evergreen azaleas (subgenus *Tsutsusi*) such as *R. simsii*, 2 are vireyas (subgenus *Vireya*), and the rest come from a range of sections. Of the 49 species, 32 are of Chinese origin, although many of those species are also found in other nearby



R. formosum, Kew. A Critically Endangered species from India



R. glaucophyllum ssp. *glaucophyllum*, Edinburgh Botanic Garden. A Data Deficient species that is found in Nepal, Bhutan, India and China.



R. simsii KW22036, Pukeiti A common species with a wide distribution, coming from Burma, China, Hong Kong, Taiwan, Thailand, Japan, and Laos.

countries. Only 8 species are from outside Asia; 4 are from Europe and the other 4 are from North America.

Fourteen of these (grey shaded in Appendix 1) species are Red List species. *R. longistylum* (1 record at BGCI) is the scarcest in cultivation, followed by *R. uniflorum* var. *imperator* (5 records) and *R. hookeri* (6 records). In comparison, *R. ungeronii* (43 records) is secure in cultivation; this species is from Turkey, and species from Europe are often well represented in cultivation. The other 13 Red List species are of Chinese origin (although 7 of those are also found in other nearby countries such as Burma, India and Nepal). The 14 Red List species vary in their conservation assessment; at the less severe end of the scale, *R. yedoense* was rated Data Deficient and 4 species were rated as Near Threatened (*R. annae*, *R. hemitrichotum*, *R. pruniflorum*, *R. uniflorum* var. *imperator*). More at risk in their native habitat are the 9 Vulnerable species, which include *R. hookeri*, *R. longistylum* and *R. venator*.

The remainder of the grey shaded species (in Appendix 1) are common (Least Concern) species, which vary from 156 records at BGCI for *R. viscosum*, to 4 records for *R. virgatum* ssp. *oleifolium*. The only Least Concern species with 3 or fewer records at BGCI are *R. vaccinoides* (nearly all vireyas are poorly represented in cultivation (MacKay et al. unpublished)), and *R. latoucheae* var. *latoucheae*, however this may



R. griersonianum

be an anomaly. *R. latoucheae* raises the issue of 'lumping' or 'splitting', i.e., is *R. latoucheae* var. *latoucheae* a synonym for *R. latoucheae*, or are they distinct taxa? On the collections databases at Edinburgh Botanic Garden and BGCI they are recorded separately; taking that cue, the list for this article has been split. If the list had been 'lumped', *R. latoucheae* var. *latoucheae*, and several others, would disappear from the list as the base taxa are relatively common in New Zealand and in cultivation in general.

Considering now the entire list in Appendix 1, most of the species come from China (174), however many of Chinese origin are also found in nearby countries such as Burma and Bhutan. Seventy three species are found only in China, such as the Red Listed *R. aberconwayi*, or common species such as *R. davidsonianum*, *R.*

rigidum, and *R. vernicosum*. Of the 70 species from India, 7 are found only in that country; many readers will be familiar with *R. macabeanum*, *R. formosum* and *R. johnstoneanum*. Other Asian countries account for most of the rest of the species, with old favourites *R. ciliicalyx* and *R. nuttallii* from Vietnam, and *R. maddenii* from several countries including Thailand. Europe accounts for 8 species including the rare *R. ungeronii* from Turkey, the common *R. luteum*, and the unmentionable *R. ponticum* (the invasive form of *R. ponticum* in Britain is a hybrid which contains genes of the North American species *R. catawbiense* and *R. maximum* (Milne & Abbott 2000)).

Douglas Cook's species encompass most sections of the genus. He had 18 species from Pontica: *Neriiflora*, including *R. dicroanthum* ssp.



R. hookeri a South Island collection
A Vulnerable species from India and China



R. hemitrichotum, Edinburgh Botanic Garden
A Near Threatened species from Yunnan and Sichuan in China.



R. venator, Pukeiti A Vulnerable species
from the Xizang area of China

apodectum (VU) and *R. neriiflorum*. The Maddenia group was another favourite and he had 17 of those, including *R. dalhousiae* and *R. johnstoneanum*. He also had 16 species from *Rhododendron*: Lapponica; those small shrubs from often cold environments, such as *R. orthocladum microleucum* and *R. hippophaeoides*. He had about 14 species azaleas (subgenus *Pentanthera*), of which are common in cultivation; even the Red Listed North American species, *R. vaseyi*, has 98 records at BGCI and is quite secure in cultivation. The rest of the species are scattered across the sections and include common species like *R. fortunei* and *R. decorum*, as well as some of the big-leaf species like *R. sinogrande*. There were only 3 vireya species (not many were in cultivation at that time), including the common but most attractive *R. macgregoriae*, which are found in Papua New Guinea.

Readers may notice that *R. maddenii* ssp. *maddenii* appears to be listed 3 times in Appendix 1. Douglas Cook acquired *R. crassum*, *R. calophyllum*, and *R. maddenii*, which were all 'lumped' into *R. maddenii*; I believe there is a reasonable chance that, one day, the taxonomy will be revised again and several species may 'reappear', so I have kept the listings separate. The list in Appendix 1 also contains some cultivars of species, which have been included because they appear to be scarce in New Zealand, and represent some early variants of the species in question. Interestingly, some of those cultivars are scarce in cultivation world-wide, for example *R. aucklandii* 'Rubrum' and *R.*

augustinii 'Rothschild Best Blue', both of which have zero records at BGCI.

Among the 230 species in Appendix 1 are 71 Red List species, for which the Red List category can be seen in the right side column of Appendix 1. Some entries are blank because the species was not considered in the Red List assessment. In short, Least Concern (LC) species are common, while the other codes indicate some form of conservation problem. I have already referred to a number of these species; however the Red List species of most interest are those which we have here in New Zealand, but which have a low number of records at BGCI, such as *R. arboreum* ssp. *nilagiricum*, *R. hookeri*, and *R. sperabile*. If readers are aware of wild-source accessions of these species, propagation material from those accessions would be useful for the conservation project in due course.

Overall, most of the 230 *Rhododendron* species that Douglas Cook acquired for Eastwoodhill are still in cultivation in New Zealand, although a small number have apparently been lost to cultivation. Given that the 23 collections included in my rhododendron database is not a complete coverage of New Zealand, it is likely that some of the apparently 'lost' species are still present; finding some additional collections, particularly for the rare species, would be useful for any future conservation plan. If readers hold any of the 'lost' species, or the Red List species, or have any of the wild-source material, and are willing to share either plant material or information, I would be very pleased

to hear from you. In due course, as the New Zealand *ex situ* conservation plan for *Rhododendron* is developed, a programme of propagation and dispersal will be formulated, to ensure that rare species are secure in our collections. Development of this plan is some way off yet, however, as considerable data gathering and analysis must be undertaken first.

Rhododendron collections in New Zealand have their beginnings with people like Douglas Cook, a keenly enthusiastic plantsman, who developed one of New Zealand's larger *Rhododendron* collections and, even though it is no longer held at Eastwoodhill, most of the species remain in cultivation in New Zealand. Through development of his collection, Douglas Cook made a significant contribution to the cultivation of *Rhododendron* species in New Zealand. He also acquired hundreds of cultivars, and many of those also now appear to be scarce in cultivation in New Zealand – however that is a story for another time.

Acknowledgements

This article is part of a *Rhododendron* conservation project being undertaken by the author and a group of associates. The project has been supported by the New Zealand *Rhododendron* Association, Pukeiti *Rhododendron* Trust, Taranaki *Rhododendron* Council, Massey University and individual collection holders, and the contributions of these parties is gratefully acknowledged.



R. aberconwayi, a South Island collection. A Vulnerable species from Yunnan and Guizhou in China.



R. ciliicalyx KW20280, Pukeiti. A Data Deficient species from India and the Yunnan area of China



R. luteum, Edinburgh Botanic Garden. A common species from Europe and eastern Europe, including Turkey, the Caucasus region, and the western end of Russia

Appendix 1:

Rhododendron species obtained by Douglas Cook for Eastwoodhill (MacKay 1996), with geographic origin, Red List category, and number of records for that species at Botanic Gardens Conservation International (BGCI). According to the MacKay database, blue shaded rows have no current record in New Zealand, grey shaded rows have 1-2 records in New Zealand, and all other rows have more than 3 records in New Zealand.

Species	Origin	Red List category*	No. of records at BGCI
<i>aberconwayi</i>	China	Vu	24
<i>albrechtii</i>	Japan	LC	55
<i>annae</i>	China	NT	25
<i>anthopogon</i>	China, Nepal, India, Bhutan, Burma	LC	8
<i>anthosphaerum</i>	China, Burma	LC	17
<i>arborescens</i>	North America	LC	93
<i>arboreum</i>	China, Nepal, India, Bhutan	LC	58
<i>arboreum</i> 'Kermesinum'	China, Nepal, India, Bhutan	-	2
<i>arboreum</i> 'Rubrum'	China, Nepal, India, Bhutan	-	1
<i>arboreum</i> ssp. <i>zeylanicum</i>	Sri Lanka	LC	24
<i>arboreum</i> ssp. <i>cinnamomeum</i>	China, Nepal, India, Bhutan	LC	20
<i>arboreum</i> ssp. <i>cinnamomeum</i> var. <i>cinnamomeum</i>	China, Nepal, India	LC	4
<i>arboreum</i> ssp. <i>delavayi</i> var. <i>delavayi</i>	India, Burma, Thailand	LC	4
<i>arboreum</i> ssp. <i>nilagiricum</i>	India	EN	6
<i>argyrophyllum</i>	China	LC	46
<i>argyrophyllum</i> ssp. <i>hypoglaucom</i>	China	LC	10
<i>arizelum</i>	China, Burma	LC	26
<i>aucklandii</i> 'Rubrum'	India, Bhutan	-	0
<i>augustinii</i>	China	LC	53
<i>augustinii</i> 'Rothschild Best Blue'	China	-	0
<i>augustinii</i> ssp. <i>chasmantum</i>	China	-	16
<i>augustinii</i> 'Tower Court'	China	-	1
<i>aureum</i>	China, Korea, Japan, Mongolia, Russia	LC	42
<i>auriculatum</i>	China	Vu	49
<i>baileyi</i>	China, Bhutan, India	LC	7
<i>barbatum</i>	China, India, Nepal, Bhutan	Vu	32
<i>barbatum</i> 'Meteor'	China, India, Nepal, Bhutan	-	1
<i>basilicum</i>	China, Burma	NT	22
<i>bauhiniiflorum</i> (<i>R. triflorum</i>)	India	-	3
<i>beanianum</i>	China, Burma, India	Vu	11
<i>beesianum</i>	China, Burma	LC	17
<i>brachyanthum</i> var. <i>hypolepidotum</i>	China, Burma	LC	12
<i>calendulaceum</i>	North America	LC	102
<i>callimorphum</i>	China	Vu	19
<i>calostrotum</i>	China, Burma, India	LC	28
<i>calostrotum</i> 'Gigha'	China, Burma, India	-	8
<i>calostrotum</i> ssp. <i>keleticum</i>	China, Burma	Vu	53
<i>calostrotum</i> ssp. <i>keleticum</i> var. <i>radicans</i>	China	-	3
<i>calostrotum</i> ssp. <i>riparium</i>	China, Burma, India	-	6
<i>camelliiflorum</i>	China, Nepal, Bhutan, India	LC	6

Species	Origin	Red List category*	No. of records at BGCI
<i>campanulatum</i>	China, Nepal, Bhutan, India	LC	66
<i>campanulatum</i> 'Knaphill'	India: Kashmir, Bhutan	-	9
<i>campanulatum</i> var. <i>aeruginosum</i>	Nepal, Bhutan	-	28
<i>campylocarpum</i>	China, Nepal, India, Burma	LC	37
<i>campylogynum</i>	China, India, Burma	LC	40
<i>campylogynum</i> var. <i>cremastum</i> 'Bodnant'	China, Burma, India	-	2
<i>camtschaticum</i>	Alaska, Russia, Japan	LC	49
<i>canadense</i>	North America	LC	95
<i>catacosmum</i>	China	Vu	9
<i>cephalanthum</i>	China, India, Burma	LC	3
<i>cephalanthum</i> ssp. <i>cephalanthum</i>	China, India, Burma	LC	4
<i>chamaethomsonii</i>	China	Vu	13
<i>charitopes</i>	China, Burma	Vu	11
<i>charitopes</i> ssp. <i>tsangpoense</i>	China, India	LC	13
<i>ciliatum</i>	China, Nepal, India, Bhutan	LC	31
<i>ciliicalyx</i>	China, Vietnam	DD	16
<i>cinnabarinum</i>	China, Nepal, India, Bhutan	LC	33
<i>cinnabarinum</i> ssp. <i>cinnabarinum</i>	China, Nepal, India, Bhutan	LC	17
<i>cinnabarinum</i> ssp. <i>xanthocodon</i>	China, India, Bhutan	LC	30
<i>coriaceum</i>	China	NT	12
<i>cowanianum</i>	Nepal	LC	0
<i>cuneatum</i>	China	Vu	13
<i>dalhousiae</i>	China, Nepal, Bangladesh, Bhutan, India	LC	15
<i>dalhousiae</i> var. <i>rhabdotum</i>	China, Bhutan, India	Vu	13
<i>davidsonianum</i>	China	LC	44
<i>davidsonianum</i> 'Exbury Pink'	China	-	2
<i>decorum</i>	China, Burma	LC	80
<i>decorum</i> ssp. <i>diaprepes</i>	China, Burma	LC	34
<i>degronianum</i>	Japan	LC	28
<i>dendricola</i>	China, India, Burma	Vu	18
<i>dichroanthum</i>	China	Vu	22
<i>dicroanthum</i> ssp. <i>apodectum</i>	China, Burma	Vu	10
<i>dicroanthum</i> ssp. <i>scyphocalyx</i>	China, Burma	LC	19
<i>edgarianum</i>	China	-	5
<i>edgeworthii</i>	China, India, Bhutan	LC	35
<i>elliottii</i> KW20303	India	Vu	7
<i>facetum</i>	China, Burma, Vietnam	LC	13
<i>falconeri</i>	Nepal, India, Bhutan	LC	31
<i>falconeri</i> ssp. <i>eximium</i>	India, Bhutan	Vu	23
<i>fastigiatum</i>	China	LC	36
<i>ferrugineum</i>	Europe	LC	79
<i>ferrugineum</i> var. <i>album</i>	Europe	-	0
<i>ferrugineum</i> var. <i>majus</i>	Europe	-	0
<i>flavidum</i>	China	Vu	12
<i>floccigerum</i>	China	LC	14
<i>floribundum</i>	China	LC	32
<i>formosum</i>	India	CR	17
<i>formosum</i> var. <i>inaequale</i> KW20301	India	DD	0
<i>forrestii</i> ssp. <i>forrestii</i>	China, Burma	LC	10

Species	Origin	Red List category*	No. of records at BGCI
<i>fortunei</i>	China, Burma	LC	101
<i>fortunei</i> ssp. <i>discolor</i>	China	LC	63
<i>fulgens</i>	China, Nepal, India, Bhutan, Burma	LC	23
<i>glaucophyllum</i> ssp. <i>glaucophyllum</i> var. <i>glaucum</i>	Nepal, Bhutan	DD	15
<i>glischrum</i>	China, India, Burma	LC	7
<i>grande</i>	China, India, Nepal, Bhutan	LC	24
<i>griersonianum</i>	China, Burma	CR	20
<i>griffithianum</i>	China, Nepal, India, Bhutan	LC	22
<i>haematodes</i>	China	NT	30
<i>haematodes</i> ssp. <i>chaetomallum</i>	China, Burma	LC	12
<i>hanceanum</i>	China	Vu	13
<i>hanceanum</i> var. <i>nanum</i>	China	-	5
<i>heliolepis</i>	China, Burma	LC	23
<i>hemitrichotum</i>	China	NT	18
<i>hippophaeoides</i>	China	LC	51
<i>hippophaeoides</i> var. <i>hippophaeoides</i>	China	LC	8
<i>hirsutum</i>	European Alps, Slovenia	LC	73
<i>hodgsonii</i>	China, Nepal, India, Bhutan, Burma	LC	35
<i>hookeri</i>	China, India	Vu	6
<i>hunnewellianum</i> ssp. <i>rockii</i> KW158, KW184	China	Vu	1
<i>hyperythrum</i>	Taiwan	DD	46
<i>impeditum</i>	China	LC	71
<i>insigne</i>	China	Vu	50
<i>intricatum</i>	China	LC	16
<i>irroratum</i>	China, Burma, Vietnam	LC	31
<i>johnstoneanum</i>	India	LC	26
<i>keiskei</i>	Japan	-	48
<i>keysii</i>	China, India, Bhutan	LC	15
<i>kiusianum</i>	Japan	LC	62
<i>lanatum</i>	China, India, Bhutan	DD	17
<i>lapponicum</i>	Scandinavia, North America, Greenland, China, Japan, Korea, Russia	LC	32
<i>latoucheae</i> var. <i>latoucheae</i>	China	LC	2
<i>lepidotum</i>	China, Nepal, India, Bhutan, Burma	LC	19
<i>leucaspis</i>	China	LC	19
<i>lindleyi</i>	China, Nepal, India, Bangladesh, Bhutan, Burma	LC	17
<i>longistylum</i>	China	Vu	1
<i>lutescens</i>	China	NT	49
<i>luteum</i>	Turkey, Caucasus, Europe	LC	150
<i>macabeanum</i>	India	EN	39
<i>macgregoriae</i>	Malesia: West Papua, PNG	LC	15
<i>maddenii</i>	China, India, Bhutan, Burma, Thailand, Vietnam	LC	19
<i>maddenii</i> ssp. <i>crassum</i>	China, Burma	LC	21

Species	Origin	Red List category*	No. of records at BGCI
<i>maddenii</i> ssp. <i>maddenii</i>	China, India, Bhutan, Burma, Vietnam	LC	22
<i>makinoi</i>	Japan	Vu	66
<i>mallotum</i>	China, Burma	EN	16
<i>meddianum</i>	China, Burma	Vu	7
<i>megacalyx</i>	China, India, Burma	LC	7
<i>megeratum</i>	China, India, Burma	NT	11
<i>mekongense</i> var. <i>mekongense</i>	China, Burma	LC	11
<i>micranthum</i>	China, Korea	LC	78
<i>minus</i>	North America	LC	61
<i>molle</i> ssp. <i>japonicum</i>	Japan	-	108
<i>moupinense</i>	China	NT	20
<i>mucronatum</i> var. <i>mucronatum</i>	Japan	-	46
<i>mucronulatum</i>	China, Korea, Japan, Russia	-	119
<i>neriiflorum</i>	China, Burma	LC	15
<i>neriiflorum</i> ssp. <i>neriiflorum</i>	China, Burma	-	11
<i>nivale</i> ssp. <i>boreale</i>	China, Tibet	-	14
<i>niveum</i>	China, India, Bhutan	Vu	26
<i>nuttallii</i>	China, India, Burma, Vietnam	NT	15
<i>nuttallii</i> var. <i>stellatum</i>	China	-	0
<i>obtusum</i>	Hort	-	30
<i>occidentale</i>	North America	LC	82
<i>orbiculare</i>	China	Vu	46
<i>oreodoxa</i> var. <i>fargesii</i>	China	-	52
<i>oreotrepes</i>	China, Burma	LC	45
<i>oreotrepes</i> 'Exquisitum'	China	-	1
<i>orthocladum</i>	China	LC	9
<i>orthocladum</i> var. <i>microleucum</i>	China	LC	6
<i>pemakoense</i>	China, India	Vu	24
<i>pentaphyllum</i>	Japan	LC	13
<i>periclymenoides</i>	North America	LC	91
<i>planetum</i> (subject. <i>fortunea</i> hybrid)	China	-	13
<i>pocophorum</i>	China, India	Vu	6
<i>polycladum</i>	China	Vu	26
<i>ponticum</i>	Europe: Spain, Portugal, Asia minor, Russia	LC	84
<i>protistum</i> var. <i>giganteum</i>	China	-	12
<i>pruniflorum</i>	China, India, Burma	NT	8
<i>prunifolium</i>	North America: SE USA	LC	66
<i>pseudochrysanthum</i>	Taiwan	Vu	36
<i>pubescens</i>	China	Vu	10
<i>pulcherinum</i>	Japan	-	3
<i>pulchrum</i>	Hort?	-	10
<i>pumilum</i>	China, Nepal, India, Bhutan, Burma	LC	8
<i>quinquefolium</i>	Japan	LC	27
<i>racemosum</i>	China	LC	74
<i>rex</i> KW4504	China	LC	rex 58
<i>rex</i> ssp. <i>fictolacteum</i>	China	NT	48
<i>rigidum</i>	China	LC	27
<i>rubiginosum</i>	China, Burma	LC	54
<i>rupicola</i> var. <i>chryseum</i>	China, Burma	-	14
<i>russatum</i>	China, Burma	LC	48

Species	Origin	Red List category*	No. of records at BGCI
<i>saluense</i>	China, Burma	LC	19
<i>saluense</i> ssp. <i>chameunum</i>	China	-	16
<i>sanguineum</i>	China, Burma	LC	17
<i>sanguineum</i> ssp. <i>didymum</i>	China	Vu	6
<i>sargentianum</i>	China	NT	8
<i>scabrifolium</i>	China	DD	18
<i>scabrum</i> 'Red Emperor'	Japan	LC	1
<i>schlippenbachii</i>	China, Korea, Russia, Japan	LC	128
<i>selense</i>	China	LC	9
<i>sidereum</i>	China, Burma, India	NT	11
<i>simsii</i>	China, Burma, Taiwan, Laos, Thailand, Japan	LC	43
<i>sinogrande</i>	China, India, Burma	LC	35
<i>smirnowii</i>	Turkey, Georgia	Vu	96
<i>souliei</i>	China	Vu	25
<i>sperabile</i>	China, Burma	Vu	7
<i>sperabile</i> var. <i>weihsiense</i>	China	Vu	6
<i>stenophyllum</i> ssp. <i>angustifolium</i>	Malesia: Borneo	LC	5
<i>stewartianum</i>	China, India, Burma	LC	8
<i>strigillosum</i>	China	LC	24
<i>sutchuenense</i>	China	LC	47
<i>sutchuenense</i> var. <i>geraldii</i>	China	-	8
<i>telmateium</i>	China	LC	15
<i>tephropeplum</i>	China, India, Burma, Vietnam	NT	10
<i>thomsonii</i>	China, Bhutan, India, Nepal	LC	55
<i>trichostomum</i>	China	LC	16
<i>tsariense</i>	China, India, Bhutan	NT	16
<i>tschonoskii</i>	Japan, Korea, E Russia	LC	31
<i>ungernii</i>	Turkey, Georgia	Vu	43
<i>uniflorum</i>	China	NT	6
<i>uniflorum</i> var. <i>imperator</i>	China, Burma	NT	5
<i>vaccinoides</i>	China, Nepal, India, Bhutan, Burma	LC	3
<i>valentinianum</i>	China, Burma	NT	16
<i>vaseyi</i>	North America: E USA	Vu	98
<i>venator</i>	China	Vu	10
<i>vernicosum</i>	China	LC	55
<i>virgatum</i>	China, Nepal, India, Bhutan	LC	7
<i>virgatum</i> ssp. <i>oleifolium</i>	China	LC	4
<i>viscosum</i>	North America: E USA	LC	156
<i>wallichii</i>	China, Nepal, Bhutan, India	LC	24
<i>wardii</i>	China	LC	47
<i>wardii</i> var. <i>wardii</i>	China	LC	32
<i>wasonii</i>	China	Vu	18
<i>wightii</i>	China, India, Nepal, Bhutan	LC	30
<i>williamsianum</i>	China	Vu	61
<i>yedoense</i>	China, Burma	DD	26
<i>yedoense</i> var. <i>poukhanense</i>	Korea	LC	81
<i>yunnanense</i>	China, Burma	LC	63

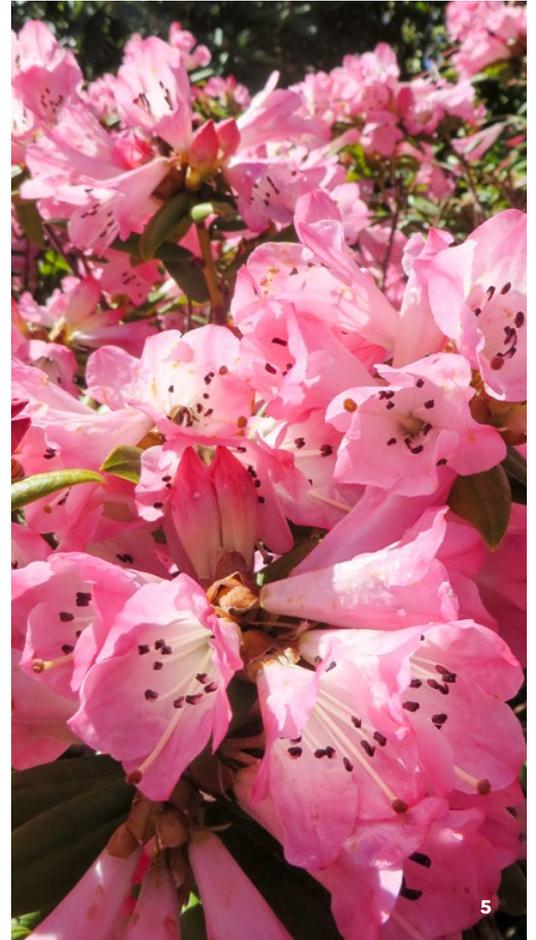
*Red List categories used in this Appendix, in decreasing order of threat: Critically Endangered (CR), Endangered (EN), Vulnerable (Vu), Near Threatened (NT), Data Deficient (DD), Least Concern (LC)

Bibliography

- Argent G 2015. *Rhododendron of the subgenus Vireya*. 2nd edition. Royal Botanic Garden, Edinburgh, in association with The Royal Horticultural Society, UK.
- Berry J 1997. *A man's tall dream: the story of Eastwoodhill*. Eastwoodhill Trust Board, New Zealand.
- BGCI 2015. Botanic Gardens Conservation International: Plant Search. Online at: https://www.bgci.org/plant_search.php. Searched on 9-10 October 2015.
- Blackmore S, Gibby M, Rae D 2011. Strengthening the scientific contribution of botanic gardens to the second phase of the Global Strategy for Plant Conservation. *Botanical Journal of the Linnean Society* (2011) 166: 267-281.
- Brockerhoff E, Given D, Ecroyd C, Palmer J, Burdon R, Stovold T, Hargreaves C, Hampton J, MacKay M, Blaschke P 2004. Biodiversity: conserving threatened introduced species. *Final report for MAF operational research 2003-4*. Centre for Sustainable Management and Forest Research, Ministry of Agriculture and Forestry, New Zealand.
- Cires E, De Smet Y, Cuesta C, Goetghebeur P, Sharrock S, Gibbs D, Oldfield S, Kramer A, Samain M 2013. Gap analysis to support *ex situ* conservation of genetic diversity in Magnolia, a flagship group. *Biodiversity Conservation* 22: 567-590.
- Dawson M (ed.) 2010. Documenting New Zealand's cultivated flora: A supermarket with no stock inventory. Report from a TFBIS-funded workshop held in Wellington, New Zealand 09.09.2009. Downloaded on 28.07.2010 from: http://www.landcareresearch.co.nz/publications/researchpubs/Report-documenting_New_Zealands_cultivated_flora.pdf
- Dawson M 2015. Creation of the New Zealand Plant Collections Register. *New Zealand Garden Journal* 18(1): 9-14.
- Gibbs D, Chamberlain D, Argent G 2011. *The Red List of Rhododendrons*. Botanic Gardens Conservation International, Richmond, UK.
- Greenfield P, Smith GF 1997. *Pukeiti. New Zealand's finest Rhododendron garden*. David Bateman, New Zealand.
- IUCN 2011. The Global Strategy for Plant Conservation 2011-2020. IUCN Plant Conservation Committee Fact Sheet February 2011. Online at: http://cmsdata.iucn.org/downloads/guide_gspc_english.pdf
- MacKay MB 1996. Management of the plant collection at Eastwoodhill Arboretum. Unpublished PhD Dissertation, Massey University, New Zealand.
- MacKay MB, Gardiner SE Unpublished. A model for determining *ex situ* conservation priorities in 'big genera' is provided by analysis of the subgenera of *Rhododendron* L. (Ericaceae). Paper submitted to Biodiversity Conservation on 22.04.2016.
- MacKay MB, Smith GF, Gardiner SE Unpublished. Analysis of geographic and taxonomic groups informs conservation of *Rhododendron* L. subgenus *Vireya* (C.B. Clarke) H.F. Copel. (Ericaceae). Paper submitted to Blumea on 27.05.2016.
- Milne RI, Abbot RJ 2000. Origin and evolution of invasive naturalised material of *Rhododendron ponticum* L. in the British Isles. *Molecular Ecology* 9: 541-556.
- Rae D 2011. Fit for purpose: the importance of quality standards in the cultivation and use of live plant collections for conservation. *Biodiversity Conservation* 20: 241-258.
- Sharrock S 2012. *Global Strategy for Plant Conservation. A guide to the GSPC: all the targets, objectives and facts*. Botanic Gardens Conservation International, Richmond, UK.



EARLY FLOWERING RHODODENDRONS





1. *R. protistum*
2. *R. 'Ina Hair'*
3. *R. moupenense*
4. *R. 'Snow Lady'*
5. *R. 'Seta'*
6. *R. 'Ambrosia'*
7. *R. 'Ivery's Scarlet'* at Tupare
8. *'Boddaertianum'*
9. *R. 'Kaponga'* the original plant at Hollard Garden observed by Gordon Bailey



THE RHODODIRECT STORY

Marina Shearer



The garden at Rhododirect

All I knew about gardens was weeding. I'd wake up on a Sunday morning and Mum would have a list of jobs, \$5, \$10, \$15, \$20 – it all equalled weeding. Either a little garden or half the driveway, it didn't matter, it was money, and I wanted money. I knew what a lily was and a rose and a camellia but I have no idea if I even knew what a rhododendron was back then. I don't remember them in our home garden and I don't remember ever having prior knowledge of this plant until I was in my 20s.

My husband purchased 140 acres when he was 19. It's a strange thing to do when other 19 year olds are travelling overseas and kicking up their heels. But he was always going to be a farmer and when the opportunity arose he wanted to "own his own" piece of farmland.

I was 25 and he was 26 when we married; we discussed the living situation, a small cottage on a small piece of the farm; I said "no gardening", he

agreed; we were satisfied.

But that jolly cottage needed iceberg roses and a buxus hedge. I'd seen photos of cottages and they all had white roses and little hedges. So we agreed that we would beautify the cottage. Then one day I was at the dump and hollyhocks of all kinds were flowering. On my next visit I took my spade and dug up one of every kind and replanted them. I think the 'cottage gardener' was emerging. I liked my little cottage garden, it was the garden of my early years of marriage. It represented an identity that was all my own, it made me smile and enjoy gardening for the first time in my life and I weeded for the first time without being paid.

It was a couple of years later that a garden of renown in our community opened its gates for a garden tour fundraiser. Craig and I found ourselves wandering the pathways of Woodchester and falling in love with these enormous plants called rhododendrons! I don't know who was bitten more, but I certainly couldn't see myself forging out a garden like this. But Craig could. He came home and paced his way around our cottage and said "let's go find us some

RHODODENDRONS!". This began a regular journey to Christchurch nurseries, almost an obsession actually. We laughed that every time we seemed to spend the same; about \$500. Neither of us smoke or drink, we had no children and so our pleasure money was being sunk into this new hobby. And it fast became addictive. One of us, and neither of us can remember who it was, but it was probably me because I am a born entrepreneur, decided that our gardening addiction could be handled in a slightly more effective way. If we purchased five of something we could buy at wholesale, so we decided to buy wholesale, keep two or three and sell the rest. In the early days we were called 'Waiau Woodland World' and we sold a bit of everything; trees, natives, grasses, shrubs and a few rhododendrons. Plants were lined up beside our garage in neat rows, and a few people would come and choose from our tiny collection. The enterprise grew over 5 years and we built a real nursery with pathways and a car-park and thought ourselves very progressive. But Craig was losing his mojo, it was an uphill slog to be fair, not that many customers and not really the return for the input. He was ready to fold up shop, the only thing he hadn't lost his passion for was the mighty rhodo!

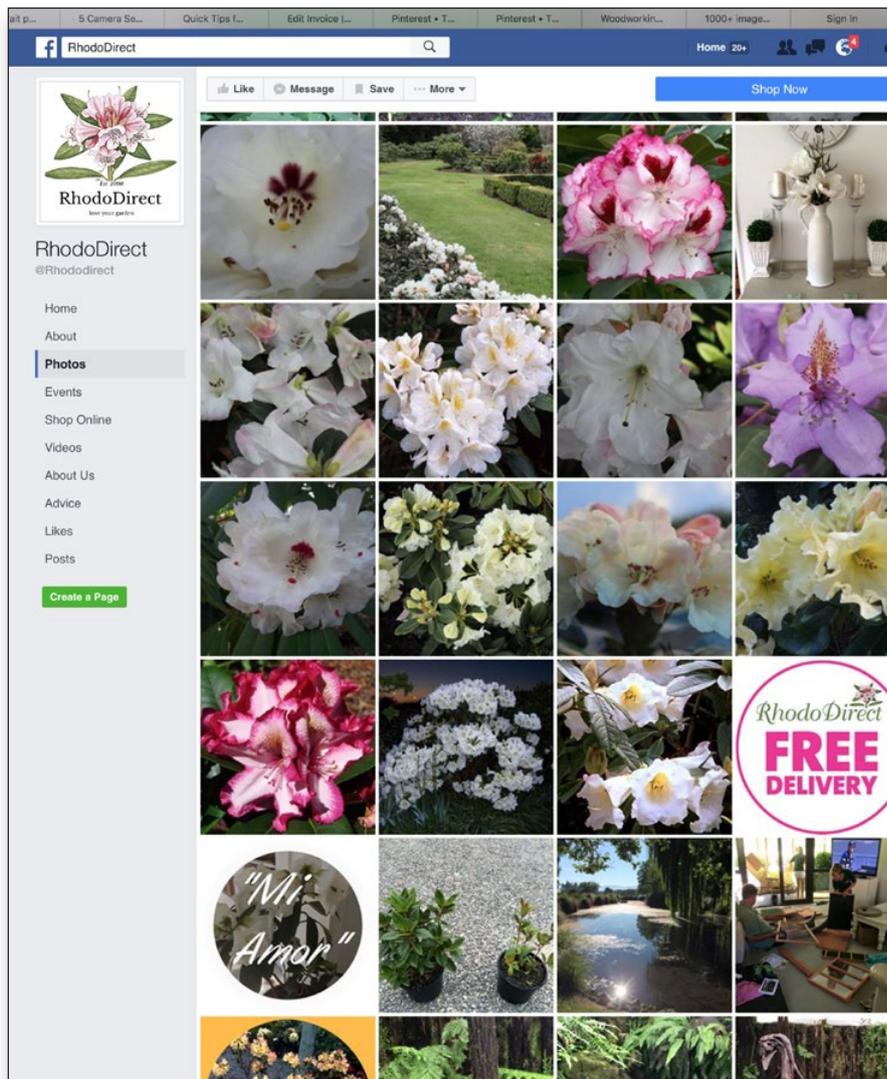
At the time I was working for CLEAR Communications and I was right in the midst of the launch of the internet. My training within a telecommunications company was excellent. I could see the potential of this 'www' machine that was set to change our lives. Could it be that people might buy rhododendrons online? I started my research, looked around at what was on the NZ landscape and decided to launch 'RhodoDirect' with our very first website. We were delighted when the orders started rolling in. It wasn't too long before our website was not coping with the demand, so we upgraded and then we upgraded again and then 5 years ago we took

a huge leap to join one of NZ's largest online companies 'ZEALD', who took our online capability to a whole new level of operation.

Now when people come and ask the question "what made you get into rhododendrons?" the answer still struggles to form in my mouth. The fact that a corporate trainer with a degree in Psychology, now runs one of NZ's largest online rhododendron nurseries still staggers me. I prefer to call RhodoDirect an obsessive 'Hobby'. If we calculated the hours of work that we do and paid ourselves an hourly rate the business would be bankrupt. Try explaining this to the accountant. The fact is that every night I sit relaxing on the couch with my laptop on my knee, fiddling on the website, adjusting information, changing the numbers of availability. And while I'm doing that, Craig (the farmer) is outside in the nursery, pruning, fertilizing, watering, potting up – and all this after he has already done a full day's work on his father's sheep and cattle farm. Craig hangs up his boots at about midnight each night, because after dinner he rests for half an hour and then he is off. Always something needs to be done. Without him there is no way that I could sustain this business.

And what do we do for fun? Well, right now 'date night' is spent dead-heading our 5 acre rhodo garden.

We get to talk to each other over a rhodo, and it is amazing how much enjoyment you can get when you are working together. Our children are learning the ropes too, our nearly 18 year old son who is at boarding school has spent years on the ride-on lawnmower propping up his financial independence. And fortunately we now have 10 year old twins who can finally reach the pedals of the lawnmower and who are vying for the job. They have been hanging out to be the new lawnmowers. Can you imagine?



The Rhododirect Facebook Page

The garden continues to grow and develop; we are often asked if we have finished and the reality is that we just don't know. We are currently working on a new development and we "think" that might be the last of the garden, but ask us in 2 years' time, I'm sure that we will have thought up another plan.

The secret to having a lush green oasis in the middle of Norwester North Canterbury territory is 'water'. Water water water, and when other farmers are irrigating their farms, this farmer is equally as passionate about keeping the grass and the garden watered. Lucky me!!! Water is no longer free though; like everyone else we are now on a water meter and the days of just recklessly watering are over. Every drop of rain is like gold!!! Free water is the best kind, and I always say a prayer of thanks when the heavens

open and the free stuff pours out.

Now that our name is growing and visitors are increasing, the challenge is to manage the spring season. It is a very busy time of year and we are still just a 2 person band; and to be honest, we actually like it this way. We know that people who come here want to speak to someone who knows about rhododendrons and can advise them and share their knowledge. It's hard to recruit these kinds of people where we live. So we do our best to manage the season together.

RhodoDirect is open by appointment Sunday to Friday all year.

During mid- October to mid-November the nursery is open Sunday to Friday each day from 10-5pm.

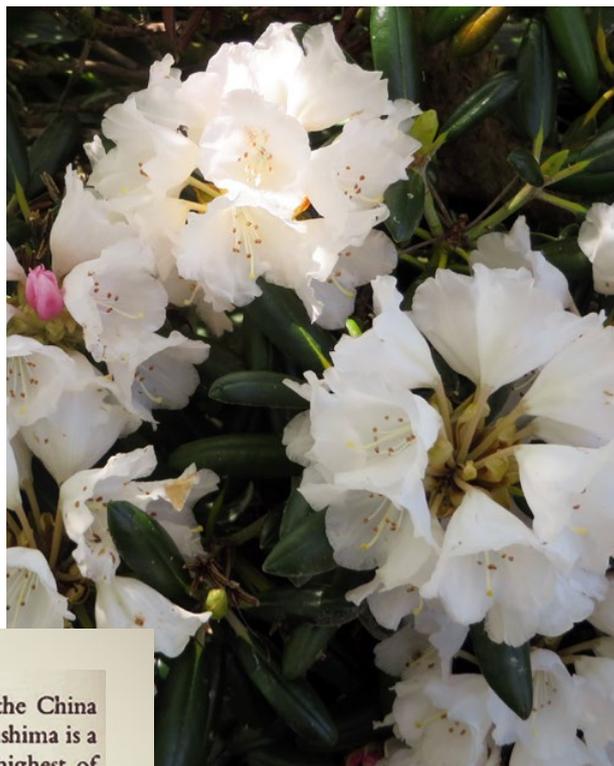
Please call for more information on 0800 315 6555 or visit www.rhododirect.co.nz

RHODODENDRON YAKUSHIMANUM

AN ICONIC PUKEITI PLANT

Lynn Bublitz

I remember on one of my first visits to Pukeiti the wonderful *Rhododendron yakushmanum* growing on the lawn ridge. There were two plants each a metre high. Their rounded small edge-curved leaves were covered with a thin white indumentum, which on the underside of the leaves was thick, tawny and felt-like. This remains on the underside but disappears as the new leaves mature and the flower buds appear. These open to form rounded trusses of up to 10 white flowers fading from pink in the bud. The plants at Pukeiti were grown from cutting material of the FCC form grown by Duncan and Davies Nursery, which in the early 1950s imported many new rhododendrons. *R. yakushmanum* is slow growing and the rounded compact shape with tightly packed leaves is floriferous and makes an ideal ornamental plant. It soon became popular even though it is slow growing, and in 1972 it was reported that Duncan and Davies exported 3000 plants to Japan where the species comes from. The story of how it came into cultivation is well recorded in the book *The Rothschild Rhododendrons - A record of the Gardens at Exbury* by Phillips and Barber 1967.



R. yakushmanum flowers and leaves

"*R. yakushmanum* was found on the small island of Yakushima in the China Sea, 120 miles south of the southern tip of the Japanese mainland. Yakushima is a rain-forest island, consisting almost wholly of three mountains, the highest of which rises to 7,100 feet. It has an exceedingly heavy rainfall and is almost continuously shrouded in mist. Besides "Yak", the island has given us two others described in America as *R. yakushmanum montanum* and the azalea *R. yakuinsulare*, which grows on all the three mountains at 4,000 feet and above.

R. yakushmanum was first formally described by Professor Nakai, a Japanese botanist, in *Trees and Shrubs Indigenous in Japan Proper*. It was placed in the series Ponticum, sub-series Caucasicum—not a category in which one would expect to find a rhododendron of pre-eminent merit and beauty. It is closely related to three other species that share certain of its characteristics—*metternichii*, *degronianum* and *makinoi*. Indeed, the recent *Flora of Japan* classifies it as a variety of *R. metternichii*, but its status as a separate species is elsewhere widely accepted.

In 1934 Lionel de Rothschild wrote to Mr K. Wada, a nurseryman of Numazushi, Japan, who had been a source of many garden treasures, asking him to supply any plants he could of unusual character and high quality. In response, Wada sent him, among other things, two very small plants of *R. yakushmanum* and two or more of the true form of the rare *R. metternichii*. In the same year Rothschild tersely described Yak in the year book of the British Rhododendron Association.

The two small Yaks grew on slowly at Exbury, putting out their white tufts of foliage and their large snowballs each year, but not in a very prominent position and seemingly escaping close notice. After the war, however, one of the two plants was translated to the Royal Horticultural Society's Garden at Wisley.

In 1947 the Wisley plant was exhibited at a RHS show, was acclaimed with a storm of enthusiasm and won an unquestioned First Class Certificate. Three years later the Exbury plant was exhibited at Chelsea by Edmund de Rothschild with an equally devastating effect."



The two plants were of course genetically different – like two children in the same family, and clones grown from each and from the species as a whole, flourish in a wide range of habitats.

The specimens growing at Pukeiti for 50 years, while not having gained much in height have spread their outer branches, layered and look like you would imagine them to be in their native habitat.

The species is an ideal parent and has been used extensively in hybridisation programmes. Over two hundred different hybrids have been named and registered. Among them are the ‘Seven Dwarfs’ raised by Water, Sons and Crisp, along with the popular ‘Percy Wiseman’. Graham Smith whilst Curator at Pukeiti, dabbled too. ‘Coconut Ice’ and ‘Frosted Ice’ hybrids of *R.*

yakushmanum and *R. aberconwayi* have been named and registered.

This year, to mark the centenary of the RHS Rhododendron Society, a survey of the most popular rhododendrons was carried out by Sally Hayward, honorary editor of the RHS Rhododendrons Camellias & Magnolias Year Book. In 2015, 258 enthusiasts from 17 countries throughout the world submitted their top 10 favourites. The most popular was *R. degronianum* ssp. *yakushmanum*, better known to us as just *R. yakushmanum* or just plain ‘Yak’. Most on the list, surprisingly, were species but among the popular hybrids was the ‘yak’ hybrid ‘Teddy Bear’. Of interest too, the fourth most popular hybrid, but number 41 on the list, was *R.* ‘Rubicon’. Andrew Brooker also reports that of the 100 on the list 94 are grown at Pukeiti.

References

Cox, Kenneth. *Rhododendrons and Azaleas - A colour Guide*. The Crowood Press 2005

Hayward, Pamela. *Rhododendrons Camellias & Magnolias RHS Yearbook*. Editor, Royal Horticultural Society 2016

Jellyman Alan. *The Growing World of Duncan and Davies - A Horticultural History 1899-2010*. Sir Victor Davies Foundation 2011

Phillips C E Lucas and Barber Peter. *The Rothschild Rhododendrons - A record of the Gardens at Exbury*. Cassell-London 1967



R. yakushmanum grown as standards at Crosshills



THE TOP 100 RHODODENDRONS

CHOSEN BY MEMBERS OF THE RHODODENDRON, CAMELLIA & MAGNOLIA GROUP IN 2015

1	<i>yakushimanum</i> 'Koichiro Wada' AGM 1993	51	<i>vaseyi</i> AGM 1993
2	<i>macabeanum</i> AGM 1993	52	<i>pseudochrysanthum</i> AGM 1993
3	'Loderi King George' AGM 1993	53	<i>yuefengense</i>
4	<i>augustinii</i> AGM 1993	54	<i>campanulatum</i>
5	<i>falconeri</i> AGM 1993	55	<i>oreodoxa</i>
6	<i>cinnabarinum</i> ssp. <i>cinnabarinum</i>	56	<i>griersonianum</i> FCC 1924
7	<i>bureavii</i> AGM 1993	57	'Sappho' AM 1974
8	<i>arboreum</i>	58	'Lem's Cameo' AGM 1993
9	<i>pachysanthum</i> AGM 1993	59	<i>lutescens</i>
10	<i>sinogrande</i> AGM 1993	60	<i>montroseanum</i>
11	<i>edgeworthii</i> AGM 1993	61	'Lem's Monarch' AGM 1993
12	<i>schlippenbachii</i> FCC 1944	62	<i>argyrophyllum</i>
13	'Polar Bear'	63	'Lady Chamberlain' FCC 1931
14	<i>calophytum</i> AGM 1993	64	<i>cerasinum</i> AM 1938
15	<i>thomsonii</i> AM 1973	65	<i>viscosum</i> AGM 1993
16	<i>auriculatum</i> AM 1922	66	<i>dauricum</i>
17	'Fragrantissimum' AGM 1993	67	<i>calostrotum</i>
18	<i>williamsianum</i> AGM 1993	68	'Crest' FCC 1953
19	<i>maddenii</i> ssp. <i>crassum</i>	69	'Elizabeth' FCC 1943
20	<i>mallotum</i> AM 1973	70	<i>grande</i> FCC 1901
21	<i>luteum</i> AGM 1993	71	'Phyllis Korn'
22	<i>niveum</i> AGM 1993	72	<i> davidsonianum</i> AGM 1993
23	<i>barbatum</i> AM 1954	73	<i>irroratum</i> 'Polka Dot' AM 1957
24	<i>lindleyi</i>	74	'Mi Amor' AM 1975
25	<i>roxieanum</i>	75	'Hotei' AM 1974
26	Sir Charles Lemon' AGM 1993	76	'Hydon Velvet'
27	<i>yunnanense</i>	77	'Yellow Hammer' AGM 1993
28	<i>fortunei</i> AGM 2012	78	<i>platypodum</i>
29	<i>rex</i> AGM 2012	79	<i>protistum</i>
30	<i>decorum</i> AGM 2002	80	<i>excellens</i>
31	<i>campylogynum</i>	81	<i>oreotrephe</i> s AGM 2012
32	<i>nuttallii</i>	82	<i>mucronulatum</i>
33	<i>dalhousiae</i> AM 1930	83	'Cilpinense' AGM 1993
34	<i>hodgsonii</i>	84	'Point Defiance' AM 1992
35	<i>wardii</i>	85	'Queen of Hearts' FCC 1986
36	'Nancy Evans' AGM 2002	86	'Horizon Monarch' AGM 2002
37	<i>sinofalconeri</i>	87	'Teddy Bear'
38	<i>orbiculare</i> AGM 2002	88	'Fortune' FCC 1938
39	<i>kesangiae</i>	89	<i>fulvum</i> AM 1933
40	<i>souliei</i> FCC 1909	90	<i>elliottii</i> FCC 1937
41	'Rubicon'	91	'Cornish Cross'
42	<i>trichostomum</i> FCC 1976	92	'Markeeta's Prize' AGM 1993
43	<i>lacteum</i> FCC 1926	93	'Countess of Haddington' FCC 1862
44	'Taurus' AGM 1993	94	'Matador' FCC 1946
45	'Loderi Venus' AGM 1993	95	'Loder's White' AGM 1993
46	'Lady Alice Fitzwilliam' AGM 1993	96	'Seta' FCC 1960
47	<i>quinquefolium</i> AM 1931	97	<i>sutchuenense</i>
48	'Alison Johnstone' AM 1945	98	<i>neriiflorum</i>
49	<i>keysii</i>	99	'Nobleanum'
50	<i>griffithianum</i> FCC 1866	100	<i>recurvoides</i> AM 1941

The entries in grey are those not grown at Pukeiti. Some of the species listed could be of different clones.



R. yakushmanum The original Pukeiti plants now self layer as they do in the wild.

TWO POPULAR 'YAK' HYDRIDS



R. 'Percy Wiseman'



R. 'Coconut Ice'

GARDENS BY THE BAY

THE 'CLOUD FOREST' SINGAPORE

Lynn Bublitz



Floral and Cloud Forest Domes

On a recent visit to Singapore a second visit to 'Gardens by the Bay' was a must. This incredibly expensive addition to the tourist attractions underlines the city state's ambition of rather than having a garden in the city, having Singapore become a city in a garden. Since the formation

of the state, millions of trees have been planted across the whole island; the tall apartment towers, a feature of the city, like vertical streets each set in a park of trees. City streets are tree and palm lined and the walls, balconies and rooftops of some of the new buildings are covered

with growing plants. 'Gardens by the Bay', built on reclaimed land, extend the park theme and attract many of the locals and tourists alike. Education is one of the key emphases promoting a sustainable future and the lessening of the carbon footprint by demonstrating nature as an integral part of the urban landscape. The gardens are well designed too, themed to the style of various countries, and have an aesthetic appeal which in places, as in many good gardens, touches the soul.

Of course this is not the only garden of international importance in Singapore, as the Botanical and associated Orchard Gardens have long been recognised as something special, and they are as wonderful as ever and regarded by some as among the foremost in the world. The 'Gardens by the Bay', too, will no doubt come to be recognised as one of the world's leading public gardens.

The gardens cover an area of 101 hectares on the city centre waterfront. Designed to be ecologically sustainable, they have at their centre 18 towers called 'Supertrees', each 50m tall, their canopies holding photovoltaic cells from which the electricity produced supplements that obtained from the burning of green waste to illuminate the trees at night, cool the glasshouses and pump water for irrigation maintaining the glasshouse environments. Unlike those in temperate areas where glasshouses provide heat for successful growing and displaying of tender plants, in this tropical climate of Singapore these glasshouses need cooling and humidity control. The tree trunks' skins which cover the outer framework



Some of the Supertrees

of these 'Supertrees' are made up of panels 40m high, housing a total of nearly 163,000 plants, including bromeliads, orchids and tropical climbers sourced from over 30 countries. Great as the 'Supertrees' and the gardens that surround them are, it is the two huge climatically controlled glasshouses, the Floral Dome and the Cloud Forest, which are the main attractions.

The Cloud Forest covers 1.8 hectares and is 50m in height. The inside environment simulates the climate of a tropical montane forest at an altitude of between 1000 - 3000m. At the centre of the conservatory is a 'Crystal Mountain'. A waterfall emerges from its 45m peak and the water cascades to the floor. The walls of the mountain are covered with an array of plants, the species of which vary at different heights. Among them at the bottom are tree-ferns and near the top are a great collection of vireya rhododendrons dotted amongst a thick cover of other plants, orchids, bromeliads, begonias, lycopods, musaendas, ferns and pitcher plants. Many of the vireyas were in bloom but, like all plants in the conservatory, unnamed, so as to enhance the natural appearance of the environment. Some looked familiar, others were hybrids unknown to me. The visit to the other conservatory, the Floral Dome with its collection of xerophytic plants, English garden and display of dahlias



Dahlia displays in the Floral Dome. Displays are changed with the seasons.



Pitcher Plants growing at the edge of the pond at the top of the Cloud Forest

did nothing to dampen my interest in those vireyas. The photos I took kept the interest going until I arrived home. I then contacted the Director of 'Gardens by the Bay', sending photos of some of the plants I had seen, and was rewarded with their names and origins in an email from Irene Wong, Senior Executive. The photos I took were of *R. 'Coral Seas'*, *R. 'Fireplum'*, *R. 'Dixie'*, *R. 'Archangel'*, *R. 'Superfleur'* and *R. zoelleri*. They were supplied by Neil Puddey, who owns a small nursery, Jagera Wholesale Nursery, in Australia. He has since communicated a number of times and agreed that his account of supplying the vireyas for the 'Cloud Garden', which had been published in the Australian Rhododendron Journal, could be included in this edition of our journal. It makes interesting reading and indicates the enormous research and undertaking involved in making the 'Gardens by the Bay' special, even unique.



Cloud Forest Waterfall



Cloud Forest Walkway



R. 'Archangel'



Planting on the cliff face of the Cloud Forest.

PROVIDING THE VIREYA COLLECTION FOR THE CLOUD FOREST GARDENS BY THE BAY

Neil Puddey

In 2007 I reported on a project in Singapore called 'Gardens by the Bay'.* In this report I described a project that was at that stage still essentially on the drawing boards and in the hearts and minds of the project team. The Floraculture Manager was importing some vireya to cultivate in a prototype glasshouse to experiment with, and increase his knowledge of, vireya culture with a view to importing larger numbers at a later date for display.

In 2008 the project displays and models were completed and open for viewing. Kathy and I were overwhelmed with the grandeur and complexity of design. Not only were these gardens going to be spectacular in terms of horticulture and architecture but they were to incorporate ecologically sustainable features as well. To quote again from their brochure, 'A horticultural fantasia, the gardens will showcase horticultural craftsmanship and floral artistry at its finest'.

In 2011 I visited the site and was again overwhelmed, as what seemed an almost impossible project when viewed as a display was well under construction. Marina Bay had been closed from the sea and was now a freshwater lake, the enormous 'Supertrees' of concrete with colourful exterior frames were built and creating the ambience of forest giants and the conservatories, no longer models, were now stunning glass and steel landmarks.

The 1.2 hectare Flower Dome Conservatory will replicate mediterranean conditions and include

a semi-arid subtropical climate. This conservatory was then up to the stage of planting - that is, if you can call the placement of five mature Baobab trees planting!

The 0.8 hectare Cloud Forest Conservatory will maintain a cool tropical mountain climate and feature an artificial mountain with a suspended walkway spiralling around it. To look outwards through the glass you view the sights of Singapore. To look inwards you see waterfalls and mist-forest plants festooning the exterior of the mountain. It is within this conservatory that the vireyas will be displayed. It should be noted that a large biomass boiler utilising greenwaste from the gardens will be used to supply energy for the project, including cooling of this conservatory.

Jagera Wholesale Vireya has now exported vireya to 12 different countries, mostly as small plants in 90mm pots still in their perlite propagation mix. Singapore

was a very different exercise involving a large number of 3 to 6 year old semi-mature plants.

A selection of 855 vireya were chosen, 800 plants in 200mm pots, 50 in 300mm pots and 5 plants up to 1.6m in height in 400mm pots. To ship plants to Singapore there is no Import Permit requirement as with many countries but a Phytosanitary Certificate issued by Australian authorities with a mandatory additional declaration must accompany the plants. The additional declaration is certification by DAFF (Department of Forestry and Fisheries, once called AQIS) for which I as the exporter have complied with a set of endorsements developed by DAFF from the Singapore Government's Plant Protection Agency AVA (Agriculture and Veterinary Authority) in preparing the plants for export.

Singapore has a number of general, and one specific, treatment endorsements that DAFF had to



R. 'Dixie'

* The article was in *The Australian Rhododendron Journal* 2007

sign off on and include that

- The consignment is to be free from pests, soil, weed seeds and extraneous material.
- If plants are to be exported with growing media they must be fumigated with methyl bromide, steam sterilised or treated with approved nematicide, and evidence of this treatment is to be submitted to the inspector at the time of inspection.

Depending on your locality fellow growers of vireya rhododendron will know that the above general statement –“Free from pests” and the specific treatment with nematicide, comes down to chemical warfare. In the subtropics it requires sprays of fungicides for the root fungal diseases phytophthora and leaf rust, insecticide sprays to exclude mealy bug, lacebug, mites, thrip and scale, plus nematicide dips to prevent nematode infection of roots and earthworm invasion of potting medium. So many potential stowaways and untold hiding places are provided by large bushy plants.

Physical inspection looking for small rainforest snails, the magnificent large pink slugs that love to hide in the lush foliage and the microscopic bugs that live in mosses that grow on the pot medium is also a must. The potential for these freeloaders requires that the surface of each pot be cleaned of all traces of moss. A find

of one living organism is all it takes for those dreaded words from a DAFF /AQIS Inspector to be heard - “It’s moving, would you like to book a second inspection?” The prospect of taking the plants home and applying yet another treatment then re-presenting does cause a little anxiety.

For weeks in the lead up to export of these vireya I could be found plucking, scraping, spraying and dipping, moving through the plants, suited up like a moon walker.

The 855 large plants presented a packing and transport challenge as well as a freedom-from-pest-and-disease one! Each plant has a final elevated inspection and the pot is wiped clean and placed in an individual plastic bag prior to packing into its carton. The challenge is related to time, as the first plant inspected and packed was going to be in its carton for 3 days before the last one. Plants do not look so good after too many days in the dark, so to reduce the plants’ time in their cartons to a minimum, 500 went in one shipment and 355, including the 55 largest plants, one week later. Shipping in two lots also improved the handling and transport logistics. There were 190 cartons with the dimensions of H-900mm L-560mm W-375mm and 5 at H-1.6m which was a lot to deal with.

The vireya for Singapore included 92 different hybrids and 16 species. The variation in growth habit, of leaf

colour, scales, shape and size, and of flower hue, shape and size of this selection should provide an insight into the morphological variations within subgenus Vireya. An ongoing project is to provide additional species for the collection to further enhance the story of vireya diversity and the beauty of the subgenus.

Favourable inspections both prior to shipping and on arrival in Singapore resulted in the plants, one week after packing, being in a glasshouse on site at ‘Gardens by the Bay’. At the time of writing I can report that the Floriculture Manager was very happy with the vireya and they were looking forward to displaying them. The Gardens and Conservatories were open to the public on the 29th of June, 2012. I can only visualise, having not seen the result, but be assured these gardens are world class and truly a horticultural fantasia. I am confident that a wonderful vireya experience will be had by all those who visit.

Neil Puddey with his wife Kathryn owns and run the Jagera Wholesale Vireya Nursery in Woolgoolga, Northern NSW. They grow over 200 different vireya species and hybrids and have exported plants to 12 different countries.



R. zoelleri



Begonia



R. 'Superfleur'



R. 'Kisses'



R. 'Fire Plum'

HERITAGE PARK HISTORY

Jim Howard

The first time I visited Heritage Park was in the late 1980s, soon after Diana and I had shifted down to the old garden at Westoe, where there were a number of old rhododendrons which my father had planted in the late 1940s. We were keen to get some names for them, and had heard of this garden at Kimbolton with a great collection of rhododendrons. We picked branches of the rhodos whose names we wanted to find, and headed over to what we now know as Heritage Park. We were wandering around enjoying the lovely garden, and spotted two men working lower down on the property. They approached us rather suspiciously, and we realised that they thought we were picking their flowers. After we had corrected that misunderstanding, we expressed our admiration for the garden and the older man, who we now know was Trevor Lind, explained that he was the leader of the group of local folk who were looking after the property on behalf of the New Zealand Rhododendron Association. They were struggling with manpower because many of their supporters had left the district or become too old for regular work input, but they “could probably keep it going for another season”.

Early the following year, 1990, Phillipa Grigg, who had just taken on the presidency of NZRA, and with whom I had been involved earlier on the Pukeiti Board, called in and asked me if I would join a new committee which the Association had formed to “help them to look after the Kimbolton garden”. Little did I know what lay ahead! This was the time when the Association decided to take back control of the property from the ‘Kimbolton Rhododendron Society’, which had been leasing the garden from the Association for the preceding five years. The new committee was chaired by Michael Cullinane, a prominent vireya

grower from Northland who had shifted down to Levin, and included Lindsay Davies and Lindsay Chadwick from Palmerston North, Joyce Waters from Wellington as Secretary, Ron and Ian Gordon from Taihape, Caretaker Larry Holland and myself. Unfortunately the transfer from the former K.R.S. to the new committee was not well handled, and considerable tension developed between the former committee and local community, and the new committee, which took some time to settle down.

Michael Cullinane, as Chairman, led a very positive new development plan, with good support at that time from NZRA. The large group of big, overgrown macrocarpas on the flat toward the northern end of the garden were removed, (some of the large pieces of root from the explosives just missing the chalet); four further dams were formed on the small creek



Irises in the mixed border

running through the valley; the chalet was re-painted inside and out; many new trees and, of course rhodos, were planted and a major move was made to update the naming and labelling of many of the rhodos which had been lost during the years of transition. I was enjoying my involvement with the garden, without a great deal of input, physical or otherwise, until at a meeting early in 1995 Michael announced that he was moving back to his son-in-law's

property in Northland, and that the chairmanship of the committee was over to me. How quickly life can change! The first meeting of the NZRA Council which I attended, ex officio as Chairman of the Kimbolton Garden Committee, had in front of it a letter from former President, John Commons, recommending the sale or disposal of the garden, our garden.

The history of the Kimbolton Garden had followed the roller coaster of the garden visiting phenomenon which burst on the N.Z. leisure activities scene in the mid-1980s and sadly disappeared just about as abruptly within ten years. The Kimbolton report for 1985 records that “whereas some 4000 people visited the gardens in the 1983 season more than 6000 came through during the same period in 1984”. The President's report for 1991 reported that “the sub-committee plans that within two or three years Kimbolton Gardens will pay its own way being on the garden tourist circuit of the central North Island”, but the committee Chairman's report of the same year says that “unfortunately visitor numbers last year were down on expectations”, and in 1992 “current economic conditions combined with simply atrocious weather to reduce visitor numbers by 65%”.

The relationships between the various committees looking after the garden, and the N.Z.R.A., followed much the same roller coaster ride. The 1988 report from the Kimbolton Rhododendron Society starts with the comment that “The K.R.S. year finished with some mixed feeling as some of the committee members wanted only to administer and socialise; this left just four members to keep the grounds in order”. Next year, “The Society (K.R.S.) seemed to be concerned that the N.Z.R.A. may consider disposing of the gardens and this was undermining their willingness to spend monies on



Heritage Park 1970

improvements. It was unanimously felt that the Kimbolton property should be retained and that the Association had no intention of disposing of the gardens in the near foreseeable future.” In 1990, Michael Cullinane’s first report of the newly formed Kimbolton sub-committee of the N.Z.R.A, noted “It is a sad but well known fact that the very existence of the gardens does not meet with the approval of all the N.Z.R.A members, so the need for the gardens to become self supporting is evident”. And “currently it is hoped the self sufficient stage is only a year away”. By 1993, “At every autumn Council meeting, the question of their continued existence is raised and discussed and their reprieve comes, albeit grudgingly”. By 1996 “This year’s autumn council meeting was decision time for the five-yearly review of the Association’s continuation of funding for the garden. In 1991 the Council had agreed to support the garden by a funding of \$5000 per annum for five years. A strong move had been made at the previous October council meeting for the Association to cease funding the garden, and to sell the property”.

Finally the Council agreed to continue the present funding for the next year. In May 1997 a special meeting of the N.Z.R.A. Council was held at the Kimbolton Garden to discuss the Association’s finances and the future of the garden. That meeting recommended that “a referendum be held on the future of Kimbolton; that it be sold or retained”. Council had agreed that a 66% mandate was required before the property be sold. The outcome of the referendum, by postal vote, was 56.6% in favour of selling and 43.4% in favour of retention. So it was retained, by the skin of its teeth “and its future will again be decided in five years time”. In five years’ time, in 2001, Council resolved “to discontinue the Association’s \$5000 annual grant to Heritage Park from March 2003, and that if the Heritage Park committee is not prepared to continue on this basis, the Council will give notice to the 2002 A.G.M. that Heritage Park be sold”.

The committee was determined that the garden would not be sold and, although obviously very unhappy

with this situation, resolved to carry on. Several new members joined the committee in response to the challenge, and we set about discussions with the Association to see if the garden could be transferred to an independent trust, which we would set up, for a sum less than current market value, which the Association had said they would require. A formal negotiation was set up by the President in Christchurch, with three negotiators from each party, having circulated papers amongst both parties in advance. Although the committee had no funds of its own, we were prepared to canvass for funding to enable retention of the garden. After much hard talking we agreed on a figure which we would offer. That figure was totally inadequate, and I was sure we would be unsuccessful. After a few hours of to-ing and fro-ing, the Association’s negotiators said, effectively, “if you’ve got no money, we can’t expect you to pay anything”. And we hadn’t even put our minimal offer on the table! So it was that Heritage Park, as it had become known, was transferred to the new Heritage Park Rhododendron Charitable

Trust for the nominal sum of \$5 to make the deal legal. The Association felt it had got rid of a liability, and we knew we had obtained an asset, so both parties were reasonably happy.

When the Board of the new Heritage Park Rhododendron Charitable Trust took on the running of the garden we realised, from the experience of recent years, that we would be unable to rely solely on income from garden visitors and plant sales. We set about working to establish an Endowment Fund, the interest from which would provide sufficient extra income for us



R. 'Kit Collier'

to maintain and develop the garden. A few of the very loyal long-time supporters responded very generously, but not sufficiently for the purpose. Our saviour for this project was the late Robin Worboys. Robin was a retired civil servant from Wellington, whose family lived in the Manawatu district. He found his way to Heritage Park and fell in love with the garden, as many of us have done. He spent much time doing voluntary work around the property, until failing health no longer permitted that. When he died, he left a one-third share in his estate, which included his house in Feilding, to Heritage Park. With this very substantial input, the Endowment Fund currently stands at \$184,000, the interest from which provides a very useful supplement to our annual income, and enables us to progress positively into the future. There is still room to move to our original target of \$250,000, and we will continue to try to meet that objective.

Through all these administrative

ups and downs, the garden continued to develop very satisfyingly. Whereas in the late 1980s the emphasis was almost exclusively on the October – December flowering season, with a pre-season weed spray in advance, we gradually moved to a more year-round maintenance programme, which has really come into its own over recent years. The western boundary, from whence the prevailing winds come, had been dominated by an old and increasingly decrepit macrocarpa shelter belt, inherited when the property was purchased. This had come to the end of its useful life, so with the agreement



Hybrid R. nuttalli x megacalyx in the trial bed

of the neighbours, we cut back the overhanging branches on their side to the trunks, and planted a new shelter belt of eucalypts (*E. nitens* and *E. obliqua*). When these were of sufficient size a few years later, the remains of the old macrocarpas were removed and an inner row of *Cryptomeria japonica* was planted as a lower level draught stopper. With the extra space opened up, the opportunity was taken to re-design the entrance, to be much more bus-friendly, and with a much enlarged parking area. The only problem is that the parking area is seldom full. The front border across from the chalet was also re-aligned and re-planted.

The Hawke's Bay Rhododendron Group had always been very supportive of Heritage Park through its somewhat turbulent history. They organised regular annual week-end working visits to Kimbolton, which became a highlight of the year for both very valuable work input and also very enjoyable social time with an evening

dinner at the Cheltenham pub where they stayed. These week-ends became major heavy pruning exercises, with the old, overgrown rhodos cut back to the stumps, to the consternation of many. The resultant regrowth, accompanied by limbing of low hanging branches on the major trees by professional arborists, resulted in a major rejuvenation. We are now into the second round of this heavy cutting back.

The dams are a major landscape feature, but their steep sides have been a real challenge to plant satisfactorily. We have tried many different approaches, and are finally getting some good results. As weed control becomes much better throughout the garden, more opportunities are taken to introduce appropriate ground cover plants, but we are ever mindful that for practical reasons we continue to be dependent on herbicide for weed control and must adapt such plantings accordingly.

From the start Heritage Park has been very keen to work in with the N.Z.R.A. with its programme to establish trial grounds for new rhodos in each of the major rhododendron growing regions of the country. We developed a substantial area for this purpose, which has borne good fruit. Unfortunately the original aim of establishing such trials around the country did not eventuate, with only a few starting and most of these now having faded out. The back-up from the Association in sourcing a continuing supply of appropriate varieties for the programme has also faltered, but we are continuing to carry on to a limited extent on our own. Two of our current rhodo gurus, Sue Wagstaff and Lindsay Davies, have recently been doing great work in rescuing a number of valuable N.Z. bred hybrids from oblivion, by visits particularly to Ron Gordon's garden at Rongoiti, Taihape, and to Doff Tombleson, Tapuae, Te Kuiti, who also has a number of Ron Gordon's hybrids, as well as many others. Lindsay and wife Sue are currently propagating them for us.

Recent work is focussed very much on fine tuning the garden development. A number of older trees have been removed, and new smaller growing trees and shrubs, better associated



Heritage Park Lake

with rhodos and their flowering season, have been introduced.

The Gordon legacy lives on. The original rhododendron twins, Ron and Ian, founder members and, in their turns each presidents of N.Z.R.A, came to Heritage Park after being Association representatives on the Kimbolton Rhododendron Society. Their input into

the early years of the Heritage Park Committee was invaluable. During those early years their niece, Sue Wagstaff, joined the Garden Committee, which she still chairs. At the first round of elections for the Heritage Park Board, after the original Board had served their two by three year terms, Sue's husband, Mike Wagstaff, accepted the role of chairman, which he continues

to fill very positively. Ron's younger son, Douglas, bought a property just five minutes down the road, and has become a regular participant at working bees, so there may be another generation still to become involved.

Jim Howard is a former Pukeiti Board Member with farm forestry interests and many years of input into Heritage Park.



Three volunteers: Lindsay Davies, Rodney Wilson, Douglas Gordon



Deciduous azalea hybrids

VIREYAS FROM WEST AND EAST:

DIVERSITY AND DISTRIBUTION OF VIREYA RHODODENDRON,

RHODODENDRON SUBGENUS VIREYA

Marion MacKay

Vireya rhododendrons, *Rhododendron* subgenus *Vireya*, are native to the Asian mainland, throughout South East Asia, southwards at the top of Australia, and eastwards to Bougainville and the Solomons. The 384 taxa (Argent, 2006; MacKay, 2013c) in the subgenus are not evenly spread across that range with high concentrations in some geographical areas. What is the nature of the distribution and how does it relate to diversity and conservation of this group of plants? This article gives an overview of the distribution of subgenus *Vireya* and highlights some of the interesting features.

The 'centre' of *Vireya* distribution is South East Asia, and *Rhododendron* is one of the largest plant genera found in that area. (Webb and Ree, 2012). This region is of considerable biogeographical interest because of its

complex geology (where at least three tectonic plates meet) and the flora being derived from eastern, western and gondwana sources – creating a significant biodiversity hotspot with a high level of endemism (van Welzen et al., 2005; Webb and Ree, 2012). Such hotspots are of inherent conservation interest (Bickford et al., 2012), but the vireya group is highlighted by recent conservation assessments which determined 201 taxa (of 400 taxa assessed) as under threat or as Data Deficient (the latter indicating there is a conservation issue but that there is insufficient data to quantify the assessment) (Argent, 2015; Gibbs et al., 2011). Thus 50% of vireya taxa are of conservation concern, and the problem is more acute than in other recently assessed genera (MacKay et al., 2010).

Furthermore, conservation action is confounded by taxonomic complexity (Ennos et al., 2005) where species boundaries are uncertain, and common species are not always clearly

distinguished from rare species. (For example, a rare species that is distinct would have a higher conservation priority than one that is not clearly distinguished from a common species.) Indeed *Rhododendron* is a 'big genus' (Frodin, 2004), typified by a large number of species which are divided into groups, a large number of taxonomic queries, on-going active speciation, and frequent occurrence of natural hybrids (Argent, 2015; Crutwell, 1998; Danet, 2011; Ennos et al., 2005; Milne et al., 2010). In 'big genera', conservation decisions should be based on an understanding of the relationships between conservation species and their near relatives (Frodin, 2004), an approach that has been employed in the New Zealand research programme (Fayaz 2012; MacKay et al., 2010, 2012; MacKay, 2013a,b). In addition, recent molecular studies indicate geographical factors in species relationships in vireyas (Brown et al., 2006; Craven et al., 2011; Fayaz, 2012; Goetsch et al., 2011), so examining the spatial distribution of the subgenus will inform the understanding of this group of species.

One interesting aspect of spatial distribution is the biogeographic boundaries in the SE Asian region (see Figure 1), which indicate locations where many species distributions stop or start and allow floristic regions to be defined (Raes and van Welzen, 2009; van Welzen and Raes, 2011; van Welzen et al., 2005; Webb and Ree, 2012). The Van Steenis boundaries define the SE Asian floristic region, and this region covers most but not all of the vireya distribution. Within the SE Asian region other boundaries have been proposed such as the Merrill-Dickerson/Huxley, Wallace



R. christii, a common species from New Guinea.



Figure 1: Area of distribution of vireya (white bubbles) and tropical non-vireya (orange bubble), with the van Steenis boundaries of the SE Asian floristic zone (aqua lines) and biogeographical boundaries within the SE Asian zone (red lines). Boundaries from Van Welzen and Raes (2011), vireya distribution from Argent (2006). Map from Google maps.

and Lydekker Lines. These boundaries divide the region into a western zone (Malayan Peninsula, Sumatra, Java, Borneo), a middle zone that is often called Wallacea (Sulawesi, Moluccas, Lesser Sunda), and an eastern zone (New Guinea and eastwards). The placement of the Philippines varies; the Wallace definition puts it in the western zone while the Merrill-Dickerson/Huxley definition puts it in the central zone. Other recent work on flora places Java and Philippines in the central zone rather than the western zone (van Welzen and Slik, 2009; van Welzen and Raes, 2011). Given that *Rhododendron* is one of the biggest plant genera in the region, how does its distribution relate to these zones?

Distribution data for vireya rhododendron was examined using the geographic range information in Argent (2006). Each vireya taxon was attributed to a mainland area or one or more islands in the region. To gauge the extent of overlap between vireya and non-vireya taxa, the distribution of tropical non-vireya species listed by Valder (1983) was also considered. Data were organised in a chart where

each taxon was listed for the relevant island or area, and then taxa for each area were organised according to the vireya sections (detail not shown). Using a map of the region, each taxon was marked on the island(s) or mainland area of origin (detail not shown). Those data were summarised on a map that shows the boundaries and the distribution range (Figure 1). Figure 1 shows the extent of the vireya distribution (white bubbles), the extent of the tropical non-vireya species (orange bubble), the boundaries of the SE Asian floristic region (aqua lines), and the boundaries within the region (red lines). Some fascinating patterns are revealed.

The map shows that the vireya distribution is disjunct with a large physical gap between Pseudovireya and the other sections. Pseudovireya is the western-most group of vireya and is spread from Himalaya, China, N Vietnam, N Burma, N Thailand and Taiwan - well outside the SE Asian floristic region. The next nearest vireya species are found about 900km south in southern Vietnam; *R. triumphans* and *R. chevallieri*. These two species are

spatial outliers; there is another gap of approximately 700km to the south before the outer edge of the main distribution is encountered. Why is there such a large gap? How can one section of vireya be so remote from the rest? This pattern could fit with a mode of speciation where there was once a widespread ancestor, and over time various influences resulted in speciation in some parts of the range and extinction in other parts, leaving a gap in the distribution (Heads, 2014). If this theory is accepted, which part represents the widespread ancestor and which part represents the later speciation? Some recent research suggests that *Rhododendron* is of laurasian origin and has radiated eastward from mainland Asia to SE Asia (Landis et al., 2013; Schwery et al., 2014; Webb and Ree, 2012). If this is so, is Pseudovireya the ancestor of the rest of the vireyas and is it the link between vireya and non-vireya? Some molecular studies indicate that Pseudovireya is 'most different' from the rest of the vireyas and, of all the vireya sections, is 'most like' non-vireya species (Brown

et al., 2006; Fayaz, 2012), but the analyses show difference, not lines of ancestry, so the nature of any evolutionary link remains unknown.

Curiosity about the link between vireya and non-vireya is further prompted by the fact that the geographical gap in the vireya distribution does not lack rhododendrons; there are non-vireya species in the gap which come from a range of sections (62 tropical non-vireya species, from 14 sections or subsections (Valder, 1983)). In southern Vietnam there are 9 taxa from a mix of Subsections Maddenia, Irrorata, and Taliensia, and Sections Tsutsusi, and Choniastrum. Along the southern coastal parts of China are several species from Subsections Maddenia and Argyrophylla, and 10 species from subgenera Azaleastrum and Tsutsusi. Nine species from subgenera Azaleastrum and Tsutsusi, and Subsections Maculifera and Arborea are found in Taiwan. All of these are still outside the SE Asian floristic region, but five non-vireya species are found inside the region and within the main vireya distribution. Two Chionastrum species (*R. taiense* and *R. leiopodum*) and one from Subsection Irrorata (*R. wrayii*) are found on the Malayan Peninsula; two from Subsection Irrorata (*R. korthalsii* and *R. irroratum* ssp. *kontumense*) and one from Subsection Maddenia (*R. vanderbiltianum*) are found further south-east on Sumatra. *R. subsessile* (Section Tsutsusi) is found on Luzon in the Philippines.

What is the relationship between non-vireya and vireya in these areas where they overlap? While it is tempting to think that the geographical proximity would make

them more likely to be related this is not necessarily so, as the work on temperate Subsection Pontica shows (Milne, 2004). (Milne found that, because of relict distributions, certain taxa were more closely related to those some distance away than those nearby.) It is also interesting that the tropical non-vireya taxa listed by Valder (1983) are from 14 different sections of the genus, although about a third are from Sections Chionastrum and Tsutsusi and Subsection Irrorata. Molecular research has the capacity to investigate relationships between vireya and the tropical non-vireya but there has been limited comparison between these two groups. A study that included *R. subsessile* found that it was not closely related to the vireya group (Brown et al., 2006b). Another study using *R. vanderbiltianum* (Goetsch et al., 2011) concluded it was intermediate between subgenus Vireya and subgenus Rhododendron (which is intriguing as it was initially placed in the Pseudovireya section but later changed to Maddenia). This is a fascinating clue about relationships and more research is needed, but as yet nobody has examined a set of species that would answer the question of the connection between the two groups and so it remains unknown.

Returning to the vireya distribution, the main area of the distribution starts in southern Thailand (within the SE Asian floristic region) where *R. longiflorum* and *R. malayanum* are found. These species occur further up the Peninsula than any others, but both are also found on other islands in the region. In total, eleven species are found on the Malayan Peninsula, including *R. jasminiflorum* which is well known in cultivation and a

parent of many garden hybrids, and the less common *R. jasminiflorum* ssp. *oblongifolium*. In fact there are several subspecies and one is red-listed (*R. jasminiflorum* ssp. *copelandii*, from Philippines) but the others are not. Is that subspecies distinct enough to warrant a high priority for conservation? As yet we do not know because that subspecies has never been included in a molecular study; but Fayaz (2012) found that *R. jasminiflorum* ssp. *oblongifolium* is distinct from *R. jasminiflorum*, so might the others also be distinct? Again the curiosity is prompted.

The Malayan Peninsula is in the biogeographical western zone (west of the Merrill-Dickerson/Huxley Line) along with Sumatra and Borneo. The island of Borneo has the highest number of species in this zone, particularly in the northern part (Sabah and Sarawak) which is geologically younger and more active than the other parts of the island (Hall, 2012). Some of the more common species from Borneo that are in cultivation are *R. fallacinum*, *R. praetervissum*, *R. suaveolens*, and *R. javanicum* ssp. *brookeanum*. Borneo also has the highest number of rare species in the western zone, such as *R. alborugosum*, *R. maxwellii*, *R. ericoides* and *R. baconii*. A critical issue with many rare species is that they are also scarce in cultivation. Effective *ex situ* conservation relies on presence of 'enough' accessions (of different wild sources and not vegetative clones) to represent the species (Blackmore et al., 2011; Rae, 2011; Maunder et al., 2001), although opinion varies on how many is 'enough'. For many *Rhododendron* species there are insufficient examples



R. rhodopus, Data Deficient, Sulawesi.



R. maxwellii, Data Deficient, Borneo.



R. fallacinum, a common species from Borneo.

in world collections to achieve that representation, for example the average number of accessions of red-list vireya taxa in world collections was 0.7 (MacKay, 2013a, 2013b), with any number below three indicating that the taxon is not secure in cultivation (Lowe, 1988).

Rare species are also found in the middle biogeographical zone (Wallacea), on the islands of Sulawesi, the Lesser Sundas and the Moluccas. The total number of species in this zone is lower than in the other zones, possibly because the islands are of variable geographic origin and the zone is geologically younger than the other two zones (Hall, 2012). Some of the rare species from this zone are *R. renschianum* from Lesser Sunda and *R. rhodopus* and *R. arenicolum* from Sulawesi. The latter was assessed as Data Deficient in the 2011 assessment, suggesting a need to gather more data on the species but, conversely, the research by Fayaz (2012) indicated a close relationship with the common species *R. lagunclicarpum*, which might lessen the need. If the Philippines are considered part of the middle zone, some additional rare species are *R. taxifolium* and *R. acrophilum*, and if Java is placed in the middle zone *R. album* is also included.

Further east, and in the eastern biogeographic zone, is the island of New Guinea and several smaller islands further east again. New Guinea is a centre of diversity for vireyas with 195 vireya species native to that island (Argent, 2015; MacKay, 2013c). New Guinea is built from more than 30 plate fragments (Heads, 2006) and some biogeographers believe the high level of geological activity is responsible for stimulating speciation on this island. Of the species found there, some are common and spread across the island (*R. zoelleri*, *R. macgregoriae*, *R. culminicola*, *R. commonae*); most of the more common species are in cultivation, such as *R. rarum* and *R. christii*. Others are of more limited distribution and 91 have been red-listed (Argent, 2015; Gibbs et al., 2011; MacKay, 2013b). Two of the rare species that



R. rarum, a common species from New Guinea.

are in cultivation are *R. archboldianum* and *R. baenitzianum* which both come from Papua New Guinea.

The New Guinea species highlight two further conservation problems. First, of the 91 Red List taxa from New Guinea, 67 (74%) are not in cultivation, so *ex situ* approaches to conservation cannot be used. (Overall 60% of Red List vireya taxa are not in cultivation (MacKay, 2013c)). Should resources be spent on field work to obtain a genetically representative sample of each species, or should resources be used on those species that are already in cultivation? Second, of the 91 Red List taxa 69 were assessed as Data Deficient (most of these are not in cultivation either) indicating a huge deficit of knowledge about this group of species. To what extent should resources be spent to undertake research on Data Deficient taxa? These questions illustrate the problem of priority-setting in conservation (Oldfield, 2010), which is a matter of on-going debate.

The vireya distribution continues east of New Guinea and species are found on islands as far east as Bougainville and the Solomons. The distribution then ceases and does not extend any further south-east, a pattern that is also observed in other Ericaceae (Heads, 2014). Five of the eastern-most species are found on both New Guinea and the islands further east; three of those (*R. armitii*,



R. praetervissum a common species from Borneo.

R. superbum and *R. konori*) are in cultivation. Another seven species are found only on the smaller eastern-most islands, with four of the seven present in cultivation. *Rhododendron loranthiflorum* is one of the more common species from this area (New Britain and Solomons) while two rare species are *R. goodenoughii* from Goodenough Island and *R. luraluense* from Bougainville.

Two species also 'went south' and are found in Australia – *R. viriosum* Craven sp. nov. and *R. lochiaie* F. Muell. These two are a classic case of taxonomic complexity and conservation – two closely related species where *R. lochiaie* F. Muell. (syn. *R. notiale* Craven) was red-listed and *R. viriosum* Craven sp. nov. was not. At first glance these two species look similar but *R. viriosum* has a straight corolla tube and the ovary and style have hairs and scales, whereas *R. lochiaie* has a curved corolla tube and only scales on the ovary and style. Due to a most unfortunate taxonomic confusion (described in Craven, 2002, 2003), much material in cultivation that is labelled as *R. lochiaie* is actually the straight tubed *R. viriosum* Craven sp. nov. and not the curved tubed *R. lochiaie* F. Muell. This highlights the importance of correct identification and labelling in collections – conservation is not achieved if accessions labelled *R. lochiaie* turn out to be the wrong taxon - so each accession should be



R. macgregoriae yellow form, a common species, New Guinea

verified and labelled (Blackmore et al., 2011; Rae, 2011). It also highlights the importance of using an integrated approach where morphological study is combined with molecular approaches (Blackmore et al., 2011; Coleman et al., 2000; Goodall-Copstake et al., 2005; Kozłowski et al., 2012; Leadlay et al., 2006). For example, Fayaz (2012) found that 4 accessions of *R. viriosum* did not group together in his study of DNA sequence data (suggesting variation among those accessions) and this was mirrored by morphological variation in the samples, even though they all keyed to *R. viriosum*. More research is needed to explain these results.

The same need for research is evident for many vireya species from throughout the geographic range. Is *Pseudovireya* the link between vireya and non-vireya groups? Are there any close relationships between vireya and tropical non-vireya from the same area? What should be done to find out more about the Data Deficient taxa? What of those rare species that are thought to be closely related to a more common species – could some conservation assessments be altered if more was known about relationships? Molecular research is very useful, but can also generate many new questions. For example, although some molecular studies show *Pseudovireya*

to be the nearest group to non-vireya rhododendron (Brown 2006a, 2006b; Fayaz, 2012), others put *Discovireya* in that position (Craven et al., 2011; Goetsch et al., 2011). How can the differences in these results be explained? What additional data is needed? More research, of all kinds, (field studies, molecular lab studies, analysis of collections) is needed to better understand this group of species and their relationships.

Vireya rhododendrons are found from Himalaya to the Solomons and from Taiwan to Australia, and there are rare species throughout that range. *Rhododendron* is a complex genus, and its conservation is made more challenging by the web of relationships between species and groups of species. There is so much more to learn about this group of plants!

Acknowledgements

This paper is part of a wider project on Rhododendron Conservation. Participants include Marion MacKay and Ahmed Fayaz of Massey University, Sue Gardiner and Claudia Wiedow of the Plant & Food Research Institute of New Zealand Ltd, Sara Oldfield of the IUCN/SSC Global Tree Specialist Group (Cambridge, UK), staff at Pukeiti Gardens (Taranaki, New Zealand), and members of the Pukeiti Rhododendron Trust (Taranaki, New Zealand).

Thanks to Steve Trewick, Massey University, for his helpful review of this paper. The Rhododendron Conservation project has been supported by Pukeiti Rhododendron Trust and Taranaki Regional Council, Sir Victor Davies Foundation, New Zealand Rhododendron Association, George Mason Charitable Trust, Peter Skellerup Plant Conservation Award, American Rhododendron Society, Sibbald Trust (UK), Botanic Gardens Conservation International, The Plant & Food Institute of New Zealand Ltd, and Massey University.

Dr Marion Mackay is a Senior Lecturer in Environment Management, Institute of Agriculture and Environment, Massey University, NZ. Marion leads the Pukeiti ex situ Rhododendron Conservation Project.

Bibliography

- Argent, G. (2015). *Rhododendrons of Subgenus Vireya*. 2nd edition. London, UK: Edinburgh Botanic Garden and Royal Horticultural Society.
- Argent, G. (2006). *Rhododendrons of Subgenus Vireya*. London, UK: Royal Horticultural Society.
- Bickford, D., Poo, S. and M.R.C. Posza. (2012). *Southeast Asian biodiversity crisis*. Chapter 17 in: Gower, D. (ed.). (2012). *Biotic evolution and environmental change in Southeast Asia*. Cambridge University Press, UK.
- Blackmore, S., Gibby, M. and D. Rae. (2011). Strengthening the scientific contribution of botanic gardens to the second phase of the Global Strategy for Plant Conservation. *Botanical Journal of the Linnean Society*, 2011, 166: 267-281.
- Brown, G. K., Nelson, G. and P.Y. Ladiges. (2006). Historical biogeography of Rhododendron Section Vireya and the Malesian Archipelago. *Journal of Biogeography*, 33(11): 1929-1944.
- Brown, G. K., Craven, L. A., Udovicic, F. and P.Y. Ladiges. (2006a). Phylogenetic relationships of Rhododendron Section Vireya (Ericaceae) inferred from the ITS nrDNA region. *Australian Systematic Botany*, 19(4): 329-342.
- Brown, G. K., Craven, L. A., Udovicic, F. and P.Y. Ladiges. (2006b). Phylogeny of Rhododendron Section Vireya (Ericaceae) based on two non-coding regions of cpDNA. *Plant Systematics and Evolution*, 257(1): 57-93.
- Chamberlain, D., Hyam, R., Argent, G., Fairweather, G. and K.S. Walter. (1996). *The genus Rhododendron: its classification and synonymy*. Royal Botanic Garden Edinburgh, Edinburgh.
- Coleman, M., Hollingsworth, M.L. and P.M. Hollingsworth. (2000). Application of RAPDs to the critical taxonomy of the English endemic elm *Ulmus plotii* Druce. *Botanical Journal of the Linnean Society*, (2000), 133: 241-262.
- Craven, L. A. (2002). A new name for an Australian Rhododendron (Ericaceae). *Edinburgh Journal of Botany*, 59(03): 447-450. DOI: 10.10M/S0960428602000276
- Craven, L. (2003). Playing with names: Rhododendrons *lochiae* and *viriosum* and the dark side of taxonomy. *Journal of the Australian Rhododendron Society*, 43: Downloaded from vireya-net.
- Craven, L.A., Danet, F., Veldkamp, J. F., Goetsch, L.A. and B.D. Hall. (2011).

Vireya *Rhododendrons: their monophyly and classification* (Ericaceae, Rhododendron Section Schistanthe). *Blumea*, 56(2): 153-158.

Craven, L. A., Goetsch, L. A., Hall, B. D. and G.K. Brown. (2008). *Classification of the Vireya group of Rhododendron* (Ericaceae). *Blumea*, 53(2): 435-442.

Crutwell, N.E.G. (1988). Natural hybridization among Rhododendrons in Papua New Guinea. *The Rhododendron*, Vol.27, No.3, March 1988.

Danet, F. (2011). On some poorly known hybrids of *Rhododendron herzogii* in New Guinea. *The Rhododendron*, Vol 51: 11-21.

Ennos, R.A., French, G.C. and P.M. Hollingsworth. (2005). Conserving taxonomic complexity. *Trends in Ecology and Evolution*, 20(4): 164-168.

Fayaz, A. (2012). Biodiversity of Rhododendron in New Zealand and its potential contribution to *ex-situ* conservation. Unpublished PhD thesis, Massey University.

Frodin, D.G. (2004). History and Concepts of Big Plant Genera. *Taxon*, Vol. 53, No. 3 (Aug., 2004), pp. 753-776.

Gibbs, D., Chamberlain, D. and G. Argent. (2011). *The Red List of Rhododendrons*. Botanic Gardens Conservation International, London.

Goetsch, L., Eckert, A. J., and B.D. Hall. (2005). The molecular systematics of Rhododendron (Ericaceae): a phylogeny based upon RPB2 gene sequences. *Systematic Botany*, 30(3): 616-626.

Goetsch, L. A., Craven, L. A. and B.D. Hall. (2011). Major speciation accompanied the dispersal of Vireya Rhododendrons (Ericaceae, Rhododendron sect. Schistanthe) through the Malayan archipelago: Evidence from nuclear gene sequences. *Taxon*, 60(4): 1015-1028.

Goodall-Copestake, W.P., Hollingsworth, M.L., Hollingsworth, P.M., Jenkins G.I. and E. Collin. (2005). Molecular markers and *ex situ* conservation of the European elms (*Ulmus* ssp.). *Biological Conservation*, 122(2005): 537-546.

Hall, R. (2012). Sundaland and Wallacea: geology, plate tectonics and paleogeography. Chapter 3 in: Gower, D. (ed.). (2012). *Biotic evolution and environmental change in Southeast Asia*. Cambridge University Press, UK.

Heads, M. (2014). *Biogeography of Australasia. A molecular analysis*. Cambridge University Press, UK.

Heads, M. (2006). Biogeography, ecology and tectonics in New Guinea. *Journal of Biogeography*, (2006) 33: 857-958.

Kozłowski, G., Gibbs, D., Huan, F., Frey, D. and J. Gratzfield. (2012). Conservation of threatened relict trees through living *ex situ* collections: lessons from the global survey of the genus *Zelkova* (Ulmaceae). *Biodiversity Conservation*, (2012) 21: 671-685.

Landis, M.J., Matzke, N.J., Moore, B.R. and J.P. Huelsenbeck. (2013). Bayesian analysis of biogeography when the number of areas is large. *Systematic Biology Advance Access July 2013*, 0(0): 1-6.

Leadlay, E., Willison, J. and P. Wyse-Jackson. (2006). *Taxonomy: the framework for botanic gardens in conservation*. Ch 19 in: Leadlay, E. and S. Jury. (eds.). 2006. *Taxonomy and plant conservation*. Cambridge University Press, UK.

Lowe, R.A.W. (1988). The National Council for the Conservation of Plants and Gardens (NCCPG). *Royal New Zealand Institute of Horticulture Annual Journal*, 15:29-31.

MacKay, M.B. (2013a). *Ex situ* conservation of Rhododendron: New Zealand perspective. Oral presentation at the International Rhododendron Species Conservation Conference, held at Royal Botanic Gardens Edinburgh, 20-21 April 2013. (On-line at http://www.bgci.org/ourwork/rhododendron_conference2013/).

MacKay, M.B. (2013b). Data management for conservation planning: the example of Rhododendron. Oral presentation at the 5th Global Botanic Gardens Congress, 21-25 October, 2013, Dunedin.

MacKay, M.B. (2013c). Unpublished data set on vireya rhododendron in New Zealand and world collections. Massey University.

MacKay, M.B., Fayaz, A., Wiedow, C., Reddy, S., Smith, G. and S.E. Gardiner. (2012). Vireya Rhododendron in New Zealand: potential for international conservation. *New Zealand Garden Journal*, 15(1): 23-29.

MacKay, M. B., Fayaz, A., Gardiner, S. E., Wiedow, C., Smith, G., and S. Oldfield. (2010). Meeting target eight: Rhododendron subgenus Vireya in New Zealand as an example of *ex situ* conservation. In *Proceedings of the Fourth Global Botanic Gardens Congress* (pp. 1-14). London: Botanic Gardens Conservation International. Online at http://www.bgci.org/resources/proceedings_past/

Maunder, M., Higgins, S. and A. Culham. (2001). The effectiveness of botanic garden collections in supporting plant conservation: a European case study. *Biodiversity and Conservation*, 10:383-401.

Milne, R.I. (2004). Phylogeny and

biogeography of Rhododendron subsection Pontica, a group with a tertiary relict distribution. *Molecular Phylogenetics and Evolution*, 33 (2004): 389-401.

Milne, R.I., Davies, C., Prickett, R., Inns, L.H. and D.F. Chamberlain. (2010). Phylogeny of Rhododendron subgenus Hymenanthes based on chloroplast DNA markers: between-lineage hybridisation during adaptive radiation? *Plant Systematics and Evolution*, (2010) 285: 233-244.

Oldfield, S. (2010). Plant Conservation: Facing Tough Choices. *BioScience*, Vol. 60, No. 10 (November 2010), pp. 778-779.

Paton, A. (2009). Biodiversity informatics and the plant conservation base line. *Trends in Plant Science*, 14(11): 629-637.

Rae, D. (2011). Fit for purpose: the importance of quality standards in the cultivation and use of live plant collections for conservation. *Biodiversity Conservation*, (2011) 20: 241-258.

Raes, N. and P.C. van Welzen. (2009). The demarcation and internal division of flora malesiana: 1857 – present. *Blumea*, 54, 2009: 6-8.

Schwery, O., Onstein, R.E., Bouchenak-Khelladi, Y., Xing, Y., Carter, R.J. and H.P. Linder. (2014). As old as the mountains: the radiations of the Ericaceae. *New Phytologist*, (2014): 1-13.

Valder, P. (1983). Tropical rhododendrons. *Journal of the American Rhododendron Society*, 37 (1): 9pp. Downloaded from VirginiaTech Digital Archive.

Van Welzen, P.C. and N. Raes. (2011). The floristic position of Java. *Garden's Bulletin Singapore*, 63(1&2): 329-339.

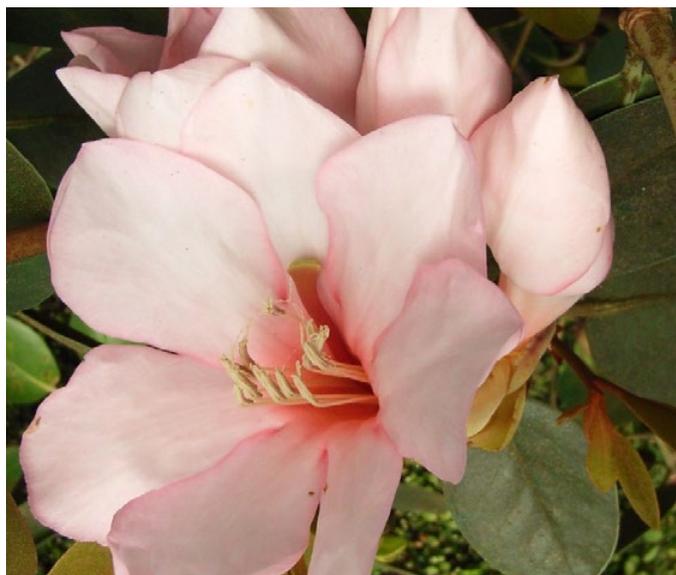
Van Welzen, P.C. and J.W.F. Slik. (2009). Patterns in species richness and composition of plant families in the Malay Archipelago. *Blumea*, 54, 2009: 166-171.

Van Welzen, P.C., Silk, J.W.F. and J. Alahuhuta. (2005). Plant distribution patterns and plate tectonics in Malesia. Pp 199-217 in: Friis, I. and H. Balslev. (2005). Plant diversity and complexity patterns: local, regional and global dimensions. *Proceedings of an international symposium held at the Royal Danish Academy of Sciences and Letters*, Copenhagen 25-28 May 2003. *Danske Videnskabernes Selskab*.

Webb, C.O. and R. Ree. (2012). Historical biogeography inference in Malesia. Ch. 8 in: Gower, D. (ed.). (2012). *Biotic evolution and environmental change in Southeast Asia*. Cambridge University Press, UK.



R. suaveolens, a common species, Borneo



R. superbum Pink Form, a common species from New Guinea

LISMORE CASTLE GARDENS

Rob Singleton

Lismore Castle, in the Irish Republic's County Waterford, north-east of Cork is a castle with a long and varied history. Built by Prince John in 1185 it is set in a magnificent position on top of cliffs overlooking the Blackwater River. In the 1500s it was acquired by Sir Walter Raleigh who sold the castle to Richard Boyle, the Earl of Cork in 1602. In 1773 the castle and other properties were acquired by the Cavendish family when the Lady Charlotte Boyle, heiress of the 4th Duke of Cork, married William Cavendish, 4th Duke of Devonshire. The castle is still in their descendants' ownership today. The Duke of Devonshire also owns Chatsworth House

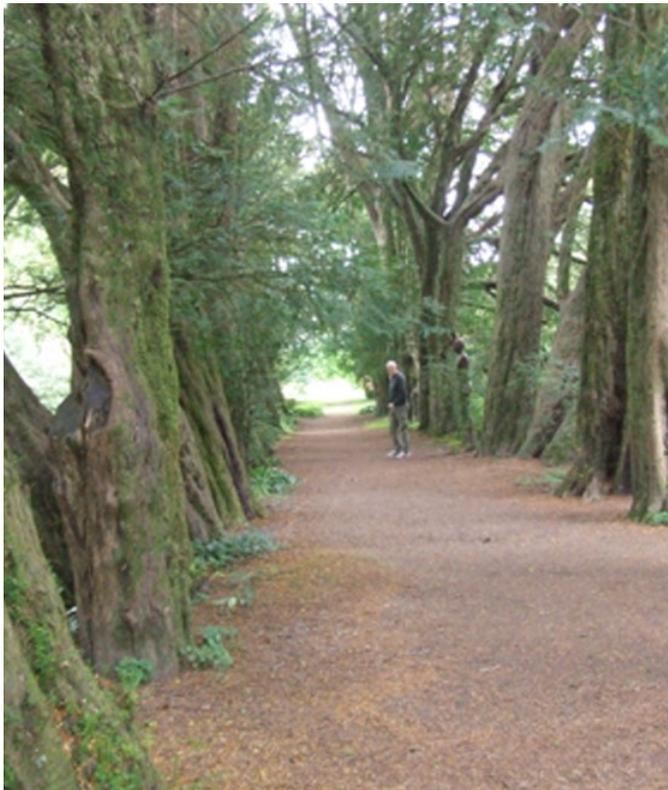
in Devon, England. Lismore Castle Gardens is set over seven acres consisting of the Upper Garden, a historic 17th century Walled Garden and the Lower Garden, also walled, mostly created in the 19th century.

On a trip to Ireland to visit our daughter and family during the previous northern hemisphere summer my wife unfortunately had an accident 5 days into a 90-day trip, suffering a hip fracture. After enduring the Irish health system for a bit of metalwork therapy and subsequently having suffered cabin fever for some time, we decided to attempt a garden visit with crutches to the fore. Lismore Castle Gardens was our choice for the visit.

Access to the gardens is via twin fortified towers and linking bridge, one tower connecting to the Lower Garden,

the other tower via stairs and bridge to the Upper Garden. We were graciously given the option of entering the Upper Garden via the Stables Courtyard, alleviating the pain of negotiating steep, narrow stairs on crutches.

Entry was through massive arched wooden gates in the brick and stone walls surrounding the Upper Garden. The garden consists of various levels connected by paths and steps and separated by hedges; conifer and beech to name a couple. The garden is made up of multiple colourful herbaceous borders and shrubs with lawn, paved and gravel paths between, with strategically placed works of art dotted around as focal points. Near the Lismore Castle Arts Centre in the West Wing of the Castle is a large formal lawn with seating placed on and around the lawn for use by patrons of the small on-site café and those just



Yew Avenue



Herbaceous Border

wanting a rest, reflection or as in our case watching their grandchild romp on the grass, surrounding walls and paths. Visiting children are catered for in the form of a sheet of items to find in the garden, and on the subsequent presentation of this at the Arts Centre, received a small prize, a nice touch to involve the young ones.

The planting in the Upper Garden is very colourful, with some particular favourites for us Waikato gardeners. *Alchemilla mollis*, a hopeless struggle at home, was in abundance, seeming to love the Irish climate. Indeed it appears almost to be a noxious weed in Ireland having been seen happily growing in paving in our daughter's parking area. There are outstanding hydrangeas obviously enjoying the climate as well.

The borders are varied and colourful in their planting with perennials, wild flowers, creepers, shrubs and pleasant little surprises such as a New Zealand *olearia* happily flowering away. On the top level of the Upper Gardens there are extensive and impressive vegetable plots growing brassicas, corn, pumpkins, parsley and borage, to name a few. Elderly apple trees are dotted about the garden with some limbed-up versions in front of border planting giving a very effective view past the moss-laden trunks to the colourful border behind.

There are old glasshouses in the Upper Garden that are soon to be restored and according to the Lismore Castle website these were designed by Joseph Paxton, the designer of Crystal Palace.

The Lower Garden is entered through one of the gateway towers, and slopes away to a rich planting of mostly trees and shrubs forming



Lismore Castle

large woodland areas. Again this is a walled garden with some great trees, rhododendrons, camellias, ferns, astilbes, hostas, hydrangeas and other perennials. There were a few rhododendrons in flower and although there was a considerable collection of rhododendrons our visit was too late for the peak flowering. There were however still a lot of

planting to hold the gardener's interest. There were even several ubiquitous NZ cabbage trees.

A magnificent, over 300 year old, Yew Avenue is said to be where Edmund Spenser wrote 'The Faerie Queen'. I suspect given the Irish weather's propensity for rain it would probably have inspired him. Other notable trees in the lower area of the gardens were a large *Magnolia delavayi* and a beautiful *Myrtus luma*. The *Myrtus* seems to be a popular feature in Irish gardens.

It was a great day out visiting this garden and I would highly recommend it to fellow gardeners if they happen to be in this part of Ireland.

Rob Singleton is Vice President of NZ Rhododendron Association.



Hydrangeas in the Upper Garden borders.



Rhododendron 'Noyo Brave'

RHODODENDRON REGISTRATION

Brian Coker

The New Zealand Rhododendron Register was commenced in 1975 with the first entry being *R. 'Irene Bain'*, documented on 9 June 1975 by the first New Zealand Registrar, Graham Smith.

Over the past 42 years there have been a total of 377 cultivars added to the New Zealand Register. For this to happen it is necessary to complete a simple registration form and submit that to the New Zealand Registrar. This is then submitted to the International Registrar, currently Dr Alan Leslie of Cambridge, England, who undertakes this role for the Royal Horticultural Society as the International Cultivar Registration Authority (ICRA) for the genus *Rhododendron*.

In addition to the 377 cultivars on the local register there have been other New Zealand cultivars registered directly with the International Registrar.

A perusal of the New Zealand Register shows a list of hybridisers which is a veritable 'who's who' of the New Zealand rhododendron scene over the past fifty years. Early hybridisers such as Edgar Stead and Dr J S Yeates, were followed by Mollie Coker, Gwen and Lachie Grant, Mr A G Holmes, Ron Gordon, the Jury family, the King family, George Huthnance and Graham Smith on behalf of the Pukeiti Rhododendron Trust. Later hybridisers have included Barry Sligh and Tom Garbutt and of course in regard to vireyas, Os Blumhardt and Michael Cullinane registered many cultivars.

There have however been no new local registrations over the past two years. In part this is possibly because there are not the same number of enthusiasts actively hybridising – after all it takes time and a considerable



R. 'Irene Bain'

amount of room if you are to trial a large number of seedlings, but there also seems to be a perception that the registration process is either onerous or difficult, which is not the case.

Formal registration is important as it becomes an official record of the details of the cultivar, including parentage (if known), details of the hybridiser, grower, introducer and registrant, and specific details of the cultivar such as plant habit, leaf and flower.

Where plants are introduced commercially it also ensures that names are not duplicated, thus avoiding confusion, and for this reason alone it is important that a proposed name is checked before a plant is distributed.

There is quite a large number of cultivars in New Zealand which are reasonably widely available but have never been formally registered. *R. 'Stead's Best'* is one such example which has been around for many years but registered only comparatively recently. If you have your own cultivars which fall into this category or you are associated with such

plants then now is the time to register them. A very attractive certificate of registration is provided by the RHS on completion of the registration.

Registration forms are available on the NZRA website (www.rhododendron.org.nz) under the Registration tab, or can be obtained from the Registrar.

An RHS colour chart for determining flower colours accurately is available on loan from the Registrar, although RHS colour chart references are not essential for registration purposes.

The Registrar also holds a copy of the RHS Rhododendron Register and Checklist (together with updates) which lists all formally registered rhododendron cultivars together with other named but unregistered rhododendrons. You are welcome to contact the Registrar if you have any queries, such as parentage or formal description regarding any rhododendrons.

New Zealand Rhododendron Registrar
Brian Coker
'Stoneycrop'
8B Barnsley Crescent, West Melton 7618
Phone: 03 347 0010, Email: b.hcoker@xtra.co.nz

PUKEITI TRIP

Into the middle of the world

A THREE WEEK JOURNEY - SEPTEMBER 2017
INCLUSIVE COST (APPROX) NZD \$6,900

Guan Kaiyun who has arranged many tours for Pukeiti has organised a 3 week adventure to the outer reaches of China in the Xinjiang Province, visiting historical sites and travelling through the desert and into the surrounding mountains.

Guan is presently the Deputy Director of Science in the province of Xinjiang and is based in Urumqi.

If you are interested in sharing in this unique adventure search 'Google' for a look at the cities and places that will be visited including Urumqi, Fuyun, Yining, Kashgar and Turpan, and places which were on the old silk route which we follow for part of the journey.

We plan to fly to Urumqi via Guangzhou. Travelling in Xinjiang will be by comfortable bus and plane. You will be staying in good quality hotels. All meals will be provided.

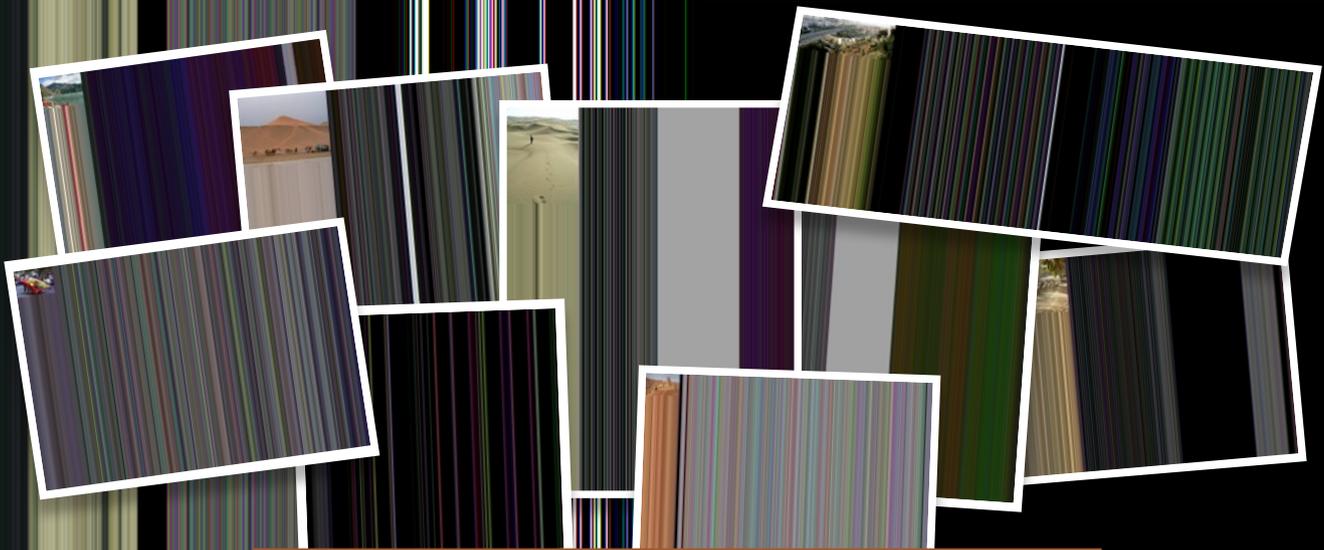
The trip will be led by Lynn and Robin Bublitz

Contact them for further details at

Email lrublitz@xtra.co.nz

Phone (06) 7582903

NB. Due to overseas travel, apologies if you do not receive a reply to your enquiry until the week before Christmas.



Faces and places Xinjiang

This trip was postponed in 2014 because of troubles in the area. These have abated and we have been advised it is now safe to travel. There are a few places still available and Rhododendron Association members are welcome to join the tour.

NEW ZEALAND RHODODENDRON ASSOCIATION INC.

You are invited to join the New Zealand Rhododendron Association

We publish an annual Journal in association with the Pukeiti Rhododendron Trust and newsletters twice a year.

A Conference is held annually. The venue of the 2017 Conference will be held at Heritage Park, Kimbolton, Feilding.

The annual subscription is NZ\$40 for an individual and NZ\$45 per couple.

Dues should be sent to: Mike Wagstaff, 35 Awakino Road, Te Kuiti, 3910, New Zealand. Email: nzratreasurer@slingshot.co.nz

Secretary: Christine Wilson
President: Dr Tony Fitchett
Email: secretary@rhododendron.org.nz

www.rhododendron.org.nz

THE RHODODENDRON CAMELIA AND MAGNOLIA GROUP

If you love these plants join us!

Benefits include a Yearbook and Newsletters. Visit www.rhodogroup-rhs.org



YOU ARE INVITED TO JOIN THE AMERICAN RHODODENDRON SOCIETY



Benefits: Quarterly Journal, Seed exchange and conventions.

Annual Subscription US\$40.
Executive Director, PO Box 525
Niagara Falls, NY 14304-0525 USA
www.rhododendron.org



Rhododendron Species Foundation

... dedicated to the conservation and distribution of species rhododendrons

Go to www.rhodygarden.org and browse through the mail-order catalog for a wide selection of rare and unique rhododendrons and plants including new introductions.
Remember - anyone can order!

Become a member today and receive great benefits!

R. spinuliferum
PO Box 3798 Federal Way, WA 98063 ~ 253-838-4646



Pukeiti

Pukeiti Rhododendron Trust Inc.

PUKEITI RHODODENDRON TRUST INC.

New Members Welcome

www.trc.govt.nz/gardens/pukeiti/pukeiti-rhododendron-trust/

Postal address	PO Box 1066, New Plymouth 4340
Location	2290 Carrington Rd. RD4
Secretary - <i>to be appointed</i>	Email: pukeiti@pukeiti.com
Chairperson	Gordon Bailey Gordon.Bailey@asplundh.co.nz
Members' Committee Chairperson	Heather Robson
Subscription \$35 per household.	



TARANAKI REGIONAL COUNCIL

www.trc.govt.nz

Office hours	Mon-Fri 8am - 5pm
Postal address	Private Bag 713, Stratford 4352
Location	47 Cloten Road, Stratford 4332
Phone	0800 736 222 (06) 765 7127
Email	info@trc.govt.nz
Environmental hotline	0800 736 222

Regional gardens	regional.gardens@trc.govt.nz
Greg Rine	Phone: (06) 765 7127 Mobile: 027 240 2470
Andrew Brooker	Phone: (06) 765 7127 or Phone (06) 752 4141 Mobile 0210 264 4060

