

The Bulb Garden



~Gardening with Bulbs~

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Geissorhiza - Not Just a Pretty Flower

Evan Eiffler

Evan Eiffler, who is pursuing graduate studies at the University of Wisconsin, was the recipient of a Mary Sue Ittner Grant for Bulb Studies through the Pacific Bulb Society, and chose for his PhD thesis the evolutionary radiation of Geissorhiza using molecular phylogenetics.

I grew up in Southern Wisconsin where I spent much of my time exploring the abundant suburban wilderness my neighborhood afforded. My curiosity toward the natural world quickly grew and this insatiable appetite for nature is what motivated me to study abroad in Cape Town, South Africa, a city entwined with one of the richest and most unique floras on earth, and it's ultimately why I'm studying the evolution of *Geissorhiza* today. Working with *Geissorhiza* has been both impossibly frustrating and deeply rewarding. I'll spend the following article telling a little about myself and how I got involved in studying the Cape flora, and what I plan to discover about *Geissorhiza* through my dissertation work, including a short anecdote from my last trip to the field. Thank you to the Pacific Bulb Society and the Mary Sue Ittner Grant for Bulb Studies for supporting my work.

I first traveled to South Africa as a

study abroad student at the University of Cape Town. It was on this trip that I was first immersed in the spectacular natural landscape of the Cape Floristic Region (CFR) – a small area at the southwestern tip of Africa with a flora completely unique to that of anywhere else on earth. I became attached to renosterveld first, a sort of ugly duckling vegetation type that looks like a scraggly tangle of grey shrubs at first glance, but holds a treasure trove of botanical diversity. Renosterveld, meaning “rhino-field” in Afrikaans, is an extremely endangered vegetation type so after I finished my semester abroad and after securing funding from a National Geographic Young Explorers Grant and

a generously supported Kickstarter campaign, I returned to the Cape for a year to work with local conservation organizations to survey previously undocumented fragments of renosterveld throughout the Overberg, a largely

agricultural and under-

studied region east of Cape Town. This is when I came to appreciate the stunning wealth of diversity the iris family has on display in Southern Africa; geophytes (plants with underground storage

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Geissorhiza splendidissima

Geissorhiza - Not Just a Pretty Flower (cont'd)

organs) can comprise more than 40% of species locally in renosterveld; what looks like a patch of weathered grey shrubs for most of the year explodes every spring with color and a profusion of flowers fit for a well-manicured garden.

Following my year in the Overberg, I started graduate school in the Botany Department of the University of Wisconsin-Madison. I began with the idea that I would study the ecology and evolution of renosterveld vegetation but the scope of this project quickly became overwhelming. Still interested in the evolution of the Cape flora but looking to specialize, I searched for a diverse group of species that I could use to model the evolution of the Cape flora as a whole. That group is *Geissorhiza*.

Geissorhiza is a stunningly diverse and stunningly beautiful group of species that undoubtedly has a fascinating evolutionary story to tell. Most people are only aware of 81 species of *Geissorhiza* as described by Peter Goldblatt's monograph of the genus from 1985. However, in the time since that monograph was published, an additional 22 species have been discovered and described which brings the total number of known species to an impressive 103! These 103 species are almost entirely confined to the Western Cape of South Africa and occupy a great variety of habitats from soggy streambanks, to dry upland sites, to individual mountain peaks, and even perches next to waterfalls. Many species of *Geissorhiza* are confined to very small areas or are found in areas targeted for agriculture and/or urbanization and are thus of great conservation concern. Roughly 70% of *Geissorhiza* species are listed as Threatened to some degree, 16 of which are only known from a single location. The great range of habitats that *Geissorhiza* occupies in addition to the many localized and potentially highly specialized species makes *Geissorhiza* of great interest to evolutionary biologists. How did there come to be so many species? How did they get to where they are today?

Below: *Geissorhiza ovata*; Right: *G. setacea*; Bottom right: *G. inflexa*.



My PhD thesis aims to model the evolutionary spread of *Geissorhiza* using molecular phylogenetics in hopes that it will help us better understand the patterns and drivers of speciation in this biodiversity



hotspot. By this I mean I will use DNA to elucidate precisely how each species is related – in other words, to build a family tree. Once I am confident I know exactly how each species is related, I can look at differences between sister species (two species that are most closely related to each other)



to see what caused them to diverge into two species. For example, I know that *Geissorhiza A*

and *Geissorhiza B* are most closely related to each other, that *Geissorhiza A* is only found on clayey renosterveld soils, and *Geissorhiza B* is only found on sandy fynbos soils, so it's likely that the common ancestor of A and B was either found on both soil types or there was a switch from one soil to the other. In either scenario, populations on each soil type slowly (over hundreds of thousands of years) became specialized on their individual soil type and over time grew distinct to the point that they could no longer mate with one another. This progression of events could have triggered the split that generated the two species we observe today. If I extrapolate this process to the whole family tree of *Geissorhiza*, I can make broad statements about the drivers (habitat switching, pollinator switching, elevation switching, etc.) of speciation for the genus and even broader statements about speciation in the Cape flora as a whole. Once we have a better understanding of how the various species of *Geissorhiza* came to be, we'll have a better chance at conserving them for the future.

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The Four Erythroniums of Vancouver Island

Paul Spriggs

Paul Spriggs has a passion for mountains and their flora. He has been the owner of Spriggs Gardens Landscaping Company in Victoria for 28 years. He is a rock garden builder with a specialty in the crevice style, having learned from innovators of that style, like Zdenek Zvolanek and Vojtech Holubec. Among his friends he counts Mike Kintgen and Kenton Seth (whom he assisted on the Apex Crevice Garden in Colorado). Paul is a long-time member of Vancouver Island Rock and Alpine Garden Society and is currently Vice President and one of VIRAG's programme coordinators. This article and accompanying photographs are reprinted here by Paul's permission.

Did you know that there are four species of *Erythroniums* growing wild on Vancouver Island?

Yes. It's true. That charming little wildflower, so cherished by woodland gardeners all over the world is well represented here on the island, yet they all come from very different habitats, presenting a welcome challenge for gardeners. The four species that occur on Vancouver Island are *Erythronium oregonum*, *E. revolutum*, *E. grandiflorum*, and *E. montanum*.

Erythroniums, one of our most beautiful spring ephemerals, belong to the lily family (*Liliaceae*). Like many lilies, they stem from a deep underground bulb. In the spring-

time (summer for the alpine species) this bulb pushes up a pair of basal leaves, clear and unmarked in some species, and heavily mottled in others. Following almost immediately after the appearance of the leaves, the flower bud then rises above to open into a beautiful, reflexed flower. There are roughly twenty known species of this genus. The great majority occur here in North America, with the greatest distribution in the West. Europe hosts three species, the best known being the Dog Tooth Violet (*E. dens-canis*), and Asia has only *E. japonicum*. They come from many different habitats, suggesting that one cannot assume they all want the same treatment. Like many bulbs, all *Erythroniums* have one common need: good drainage and varying degrees of humus if they are to survive in the garden. Gardeners may be familiar with the oft seen cultivars and selections 'Pagoda', 'White Beauty', and 'Lilac Wonder', but the purity of the true species is what enchants gardeners far



and wide.

Perhaps the most recognizable of the genus to Vancouver Islanders is the Fawn Lily (*E. oregonum*). The reason for its familiarity is because of its tendency to grow in the Mediterranean rain shadow of the island's south-east coastal plain, where most of the population lives. This lowland species can be so abundant that it is not uncommon to find natural colonies right in peoples' rural back yards! It is a plant associated with the Oak and Camas meadows of the island and so naturally it



Left: *Erythronium oregonum*; Above: *E. revolutum*

doesn't mind a slight drying period in the summer. That being said, the bulbs usually dig themselves so deeply into the meadow loam, that there is likely some moisture way down there. So they shouldn't be baked in summer. Like all bulbs, ample water during the growing season is a requirement. This plant has mottled leaves and a creamy-white flower, the inside of the petals, ringed with exquisite reddish-brown markings, and a yellow center at the base. Being native to where many of us garden, it is generally not difficult to grow, and with the right conditions of rich meadow loam, spring water and a summer rest, will thrive and even naturalize. Those lucky enough to be gardening on Garry Oak loam can have success by simply scattering seeds about and waiting. As mentioned above, this plant is so ubiquitous that it can be seen in almost any of our natural parks and roadsides along the dry east coast of the island during its bloom period which typically happens in early to mid-April.

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Who Needs Orchids?

Paul J. Oliver-Smith

Paul, a retired veterinarian, gardens in SE England where for 25 years his two-acre garden was open to the public twice a year under the National Gardens Scheme. His grandmother was a Scottish botany teacher who steadily gave him all her books, which triggered an interest in plants generally, and fostered by his father giving him his own patch when six years old. In later years he travelled to Kyrgyzstan, Yunnan, Sichuan, Bhutan and Costa Rica to study native plants in their own environment. Just occasionally he has managed to grow examples of some of them, whilst coping with the depredations of a rabbit colony.

My wife and I travelled from damp cold United Kingdom (UK), equivalent to U.S. Zone 8, to tropical Costa Rica on an orchid hunt, with dreams of jungle trees festooned with exotic blooms cascading from their branches. Well the orchids were there, but way up in the canopy tucked away many feet above our heads. However, as we drove up through the cloud forest along a steep twisting road, suddenly like a beacon, a dense nine-inch ball of bright orange flowers of *Bomarea* hung out of the deep green shrubs. I was smitten - who needed orchids!



Bomarea edulis

As soon as we got home I tried to locate sources of seeds or plants of *Bomarea* (climbing relatives of *Alstroemeria*) in the U.K. In the era of the internet it should have been a simple matter, although after more than a year of searching I had managed to get just three different plants and two different lots of seeds. It explained why I had no success in finding the species; virtually nobody grew them.

I discovered a lot though, as apparently there are nearly two hundred species of *Bomarea*. For example, *Bomarea edulis*, also commonly *B. hirtilla*, has over a dozen other alternate names, which illustrates

my first difficulty in building up a collection. The nomenclature is in a mess as there are actually more synonyms than there are named species: a nightmare for taxonomists. Broadly the genus is distributed throughout Central and South America from the grassy savannas of Patagonia to the deep jungles of the Amazon and high icy passes of the Andes, so once sourced there should be a number of species that could be grown within most climate zones. But the problem is trying to locate a vendor or collector prepared to share plants or seeds.

Once obtained, the relatively large seeds seem straightforward to germinate, provided that the protective layer of jelly is rubbed off. Planted in normal moist seed compost in the autumn they germinate lustily within five or so months if kept frost free, although seeds that have dried naturally take slightly longer. The seedlings are robust and can be pricked out easily provided the initial root is protected. The plant ultimately develops a clump of fleshy roots amongst which will develop large tubers, and the whole can easily occupy a three gallon container. Disappointingly those tubers seem to be only for nutritional storage to enable the plant to remain alive during seasonal dry periods and not for propagation. I have tried various methods in an attempt to provoke regeneration: applying different strengths of growth hormone or gibberellic acid and using high and low humidity composts, all without a sign of new roots or shoots even after a full year.

Once established most species are robust physically and seem to be free of diseases, although the root ball can burst a plastic pot if too small, and of course they climb, some as much as 20 feet if well fed. My own plants are contained within square tubs, which provide anchorage for bamboo poles I've wired into the corners and then pulled together four feet higher, making a support cage for the mass of anticlockwise growth of the shoots. I bring them all into a cold house for the winter to dry off and collect seeds before they drop; the plants are soaked with liquid feed before putting outside in the spring because they are definitely gross feeders.

There are no special features to enable the shoots to attach themselves; they twine anticlockwise with vigour, wrapping each other around any support. Almost uniquely all species carry their leaves inverted, so that the stomata are uppermost, a condition known as resupinate, although no authority gives an explanation of the benefit to the plants, other than

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Geissorhiza - Not Just a Pretty Flower (cont'd)

Assembling the family tree is the most grueling part of the project and takes a lot of time in the lab. I have to spend months extracting the DNA, cleaning the DNA, analyzing the DNA, identifying portions of the DNA that are appropriate for my study, and comparing the DNA from every species using highly specialized, statistical computer programs that will ultimately tell me who's who and who's whose sister. I could put you to sleep with the details, but I'd rather spend some time talking about my favorite part of my studies, fieldwork.

The fieldwork for my study might sound straightforward –

collect as many species of *Geissorhiza* as possible – but is easily the most unpredictable and often the most frustrating.

Simply finding each species is difficult enough as most species are uncommon locally, but each species must be collected in flower so that I can keep a pressed specimen on file to

prove each species is the one I say it is. Predicting when a wild species of *Geissorhiza* will be in flower adds another layer of difficulty as flowering time varies from year to year, so I have spent many days scouring rocky hillsides and soggy wetlands for some of the more elusive species, only to come away with sunburns and bug bites.

Last year I only had the month of August to spare for fieldwork which was unfortunate because most species flower in September. I spent many days looking for species that just weren't flowering yet (Try finding a *Geissorhiza* in a patch of grass before it flowers - it's im-



Geissorhiza corrugata, above and below.



possible.). After being skunked on multiple occasions, I thought I'd try for some of the more inland species in the hope they would be flowering a bit earlier. I decided to hunt for *Geissorhiza corrugata*, my favorite species.

Geissorhiza corrugata is one of only a few species of *Geissorhiza* that spill out of the winter-rainfall region of the Cape and into the semi-arid region that borders it to the north and east and is perhaps the most derived species of *Geissorhiza*, meaning it is most unlike its ancestors. Instead of long, linear leaves and pink or purple flowers, *G. corrugata* has bright yellow flowers, is only a few inches tall, and the leaves are curled into corkscrew shapes - a common trait for plants sharing this dry environment. It's thought to aid in the capture of fog and dew during the few months that the plant is aboveground before it retreats into its bulb to avoid the searing heat and drought. I had only ever seen photos of *G. corrugata* on the internet and pressed specimens at Kirstenbosch National Botanical Garden in Cape Town. From the pressed specimens I gleaned two GPS points, the only information I had to go on to find them. I was already planning to travel about four hours north of Cape Town to Nieuwoudtville, the self-proclaimed wildflower capitol of the world, but to get to the disjunct population of *G. corrugata* was going to be another hour drive east. *Is it worth it to drive that far for a single species? I'm not even sure it will be in flower when I get there.* I decided to take the risk.

As I drove north from Cape Town, the lush spring-time vegetation of the Cape slowly gave way to a drier and more rugged landscape, eventually spitting me out onto the edge of the semi-arid Succulent Karoo. After stopping in Nieuwoudtville, a small town worth an entire article on its own (roughly 300 bulb species can be found

Spring flowers in Nieuwoudt



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Geissorhiza - Not Just a Pretty Flower (cont'd)

within 10 km (6.2 miles) of the town center), I made the additional trek into the interior. At this point the landscape was totally unrecognizable from the lush vegetation of the Cape and more closely resembled what I imagine the surface of Mars to look like. Even in early spring, which is just about the wettest time of year for the Cape, this landscape looked barren and dry save for one gritty shrub that carpeted the ground and a few low-growing succulents. Without much confidence to begin with after a dubious start to my field season, at this point I had pretty much lost hope. It seemed impossible to me that a delicate little *Geissorhiza* could possibly survive in this sort of environment. But since I had already started the trip I thought I may as well finish it. I turned south down the long dirt road connecting two distant farming towns that the GPS point appeared to be on. I drove 10 km down the road, becoming more hopeless with every kilometer, to the point on my GPS unit. As I got closer, however, I started to pick out a few tall yellow spikes of *Bulbinella* scattered throughout the otherwise barren landscape. It was quite a shock to see these large yellow bulbs waving in the wind, but soon after I saw a whole suite of species reminiscent of the lush Cape flora I thought I'd left behind miles ago. I coasted to a stop where the GPS told me, a small depression in the gently sloping landscape. I took one step out of the car and sure enough, the ditch on the side of the road next to my feet was packed full of bright yellow flowers. I had not only found *G. corrugata*, I had found a whole bunch of them and in stunningly full

bloom. Their sunny disposition was enough to brighten my dusty face and made the whole trip worth it.

By the end of August, I left having seen 16 species including *Geissorhiza ovata*, a relatively widespread, small, but beautiful species, *G. setacea*, a tiny and very endangered species found only in



Geissorhiza heterostyla

fragmented patches of native vegetation around Cape Town, and *G. splendidissima*, the splendid *Geissorhiza*, found only on heavy clays around Nieuwoudtville. Pooled with my previous collections and greenhouse grown individuals, I have sampled roughly 30 species. This is still a fraction of my goal, but a good start considering the inopportune timing of my initial fieldwork. I still haven't been to Darling at the right time of year to see the stunning displays of wine cups (*G. radians*), so that's top of my shopping list for my next trip along with some of the high elevation species that bloom much later in the year. I'm currently seeking funding to support a trip

back to the Cape in September but funding for this sort of study is hard to come by. Depending on funding availability, this study will take me another year or two to complete so, unfortunately, you will have to wait for the results, but I'll be sure to send an update after my next field season. Thanks again to the Pacific Bulb Society and the Mary Sue Ittner Grant for Bulb Studies for supporting this important work.

Ed.: Questions, comments, extra bulbs of Geissorhiza? Email Evan at eeifler@wisc.edu.



ATTENTION PBS Members

This is a call for applications for the 2017 Mary Sue Ittner Grant for Bulb Studies.

This grant is set up to support anyone interested in learning more about bulbs. It may be used to support any type of research, including field-work, and education. It is available to paid PBS members world-wide, and you may apply for membership when you submit your application.

Last year we awarded three applications to study South African *Geissorhiza*, South American *Ha-branthus*, and Namibian *Ledebou-ria*. You will find the reports of these studies in future issues of *The Bulb Garden*. For more information, visit the link to the grant page below.

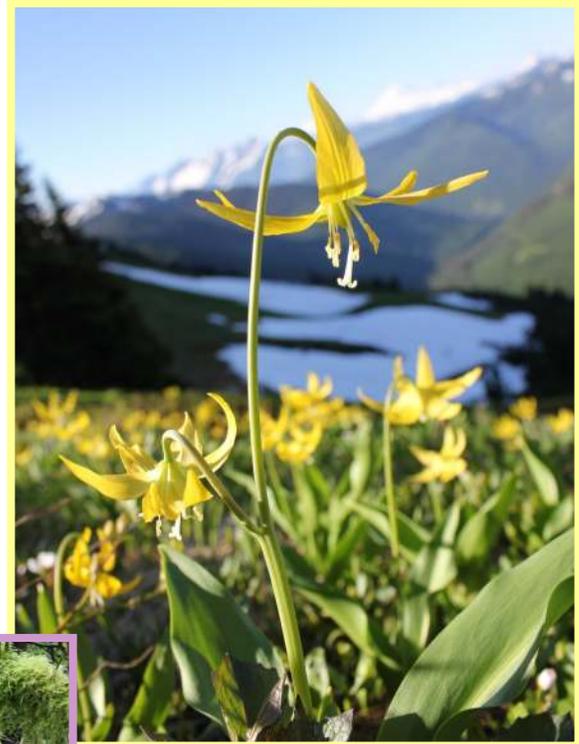
The award amount is \$500 USD. The deadline for this year is May 1, 2017.

The complete announcement, conditions, and additional information are found here:

<http://www.pacificbulbsociety.org/grant.html>

The Four *Erythroniums* of Vancouver Island (cont'd)

Another *Erythronium*, and probably the second best known to local gardeners is the exquisitely beautiful Pink Fawn Lily (*Erythronium revolutum*). This is also a lowland species, but contrary to the above *E. oregonum*, this species inhabits the other side of the island, typically on its rainy and wild west coast, rarely far from the ocean. On Vancouver Island, this is most commonly found in valley bottoms along the riparian zones of rivers and streams. Gardeners can take a cultivation clue from this. These areas are much wetter than the east side habitats, often flooding in winter, and never really drying out in summer. This is a plant for irrigated gardens where it will naturalize freely in gravelly, almost sandy soil with some humus that stays wet all year. Allow it to dry out in the summer and you will certainly lose it. I am aware of one colony in a Victoria garden where it has naturalized on the screenings of an irrigated pathway! Here the colony has increased quite rapidly. If the irrigation system was not covering the path, this would never have



Left: *Erythronium revolutum*; Above: *E. Grandiflorum*.



happened. Last year I found a surprise, deep down in an almost inaccessible canyon of a remote West Coast river, a colony of pure white *E. revolutum*! Here it was growing alongside pink ones, and they had hybridized, resulting in all shades of white, pink and everything in between. One of the best places to see this on the island is in the Honeymoon Bay Wildflower reserve, ten kilometers past the village of Lake Cowichan. Here you will see acres of it carpeting the valley floor of the Sutton Creek watershed in late April.

As easy as the above two *Erythroniums* are to grow, the other two Islanders are sadly not so easy. This is mainly because they come from mountain habitats that are difficult to re-create in the garden. That the two hail from the

mountains is reflected in their names: Avalanche Lily (*E. montanum*), and Glacier Lily (*E. grandiflorum*).

Glacier Lily is the most widespread of all four of our *Erythroniums*, ranging all the way from British Columbia south and east to the central Rockies of Colorado. This one is different because it is our only pure yellow species and unlike the aforementioned, its leaves are not mottled, rather a pure, shiny green.

Island forms also tend to be smaller than mainland forms, with usually only one flower per stem. It is a snowmelt species, inhabiting south facing slopes and appearing immediately after the retreat of the snowpack. Like the above species, it can grow in great numbers, often carpeting the ground. The difficulty in cultivating this species is due to its habitat requirements, dry, cold, snow covered ground in winter, and hot, dry summers. It is not common on Vancouver Island, and many of its localities are difficult to get to during its bloom period since it blooms so early. So often I have seen the ripening seed heads and withering foliage of this plant peppering the herbaceous subalpine meadows and wish I had visited a month earlier. The steep, south facing meadow leading

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Who Needs Orchids? (cont'd)

that the shoots can run horizontally as well as vertically.

The leaves are alternate and canoe-shaped with their veins parallel to the midrib and are all broadly similar, not greatly helping identification, though some are narrower than others. Some species, however, have deep red brown or mottled stems and petioles which can help with identification, and some, largely those from arid pampas regions, flower before the summer, then die down till midwinter, whilst others flower almost



Above: *Bomarea* seeds; Above right: *B. pardina*; Bottom right: *B. glaucescens*.

continually throughout the year. All flower masses are terminal to each shoot, none of which branch, in common with all members of the Alstroemeriaceae.

Bomarea flowers and seed pods are all divided into three equal parts. Thus individual flowers consist of three brightly coloured sepals, often the same size as the three petals, which in some species are significantly different hue; they form a narrow tube leading to a coloured ovary with copious nectar. The tips of the sepals often have a single protuberance: a vestige of the original protective bud, again to various degrees depending on the species. In the wild most flowers are pollinated by hummingbirds although one or two species appear to be self-fertile, especially *B. edulis*. In view of that, theoretically hand pollination with a small paintbrush should be straightforward. So far after several attempts over a number of years between different and the same species, I have had not one success.

The seed pods are large, sometimes as much as

an inch across, are distinctly triangularly box-shaped, and contain a mass of large sticky seeds. Those too are an attractive feature, the pods colouring various shades of red as they mature, to finally split, showing the bright orange mass within them.



Examples of those species which do seem to be in cultivation are as follows:
***Bomarea edulis* (syn. *B. hirtella*)**: Unusually for most of the family the individual flowers are displayed on four-inch-long splayed stems. I find this the most robust and tolerant of the species, happily growing at the foot of a wall in this area of southeast England. I have not tried to eat its

tubers; however, it is said to be a Peruvian staple.

***B. multiflora* (syn. *B. caldasii*)**: This has the usual cluster of flowers, variously scarlet on the outside and orange on the inside, and heavily marked



with spots: quite a show stopper. It needs space as it can grow as tall as 15 feet on dark stems.

***B. carderi* (syn. *B. allenii*)**: Less hardy and needing cold house protection over the winter, it can reach 12 feet with terminal bunches of pink flowers heavily spotted internally.

B. salsilla: Though smaller than most at some five feet tall with thin rather lazy stems, it is disinclined to climb. It is reasonably hardy here, although it is one of those that die back in high summer. Its flowers are a distinctive purplish pink with deep blue spotting and, rather more open than most.

B. petraea: This is one of the shorter species, at most four feet, but with a globe of orange flowers strongly spotted with maroon.

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Treasurer's Report for 2017

	1st	2nd	3rd	4th	Year end 2016
BALANCE 1/1/16	\$ 39,128.01				\$ 41,398.50
U.S. Members	\$ 940.00	\$ 580.00	\$ 660.00	\$ 1,560.00	\$ 3,740.00
Contributions	\$ 25.00	\$ -	\$ 35.00	\$ -	\$ 60.00
Overseas Members	\$ 875.00	\$ 625.00	\$ 425.00	\$ 750.00	\$ 2,675.00
BX Receipts	\$ 1,889.00	\$ 2,698.53	\$ 4,054.82	\$ 2,525.29	\$ 11,167.64
Investment results	\$ 54.73	\$ 305.31	\$ (96.17)	\$ 676.65	\$ 940.52
INCOME	\$ 3,783.73	\$ 4,208.84	\$ 5,078.65	\$ 5,511.94	\$ 18,583.16
BX/SX Postage	\$ (335.22)	\$ (1,373.65)	\$ (2,061.22)	\$ (759.90)	\$ (4,529.99)
BX/SX Supplies	\$ -	\$ (166.85)	\$ (79.67)	\$ -	\$ (246.52)
BX Support	\$ (72.85)	\$ -	\$ (27.05)	\$ (63.69)	\$ (163.59)
Board Conference call	\$ (16.62)	\$ (76.12)	\$ (92.90)	\$ -	\$ (185.64)
Treasurer's Supplies	\$ (29.48)	\$ (66.85)	\$ (69.45)	\$ (105.35)	\$ (271.13)
Mary Sue Ittner Grant	\$ -	\$ (1,050.00)	\$ -	\$ (500.00)	\$ (1,550.00)
Publications Printing	\$ (1,475.00)	\$ -	\$ (1,945.00)	\$ (1,440.00)	\$ (4,860.00)
Publication postage	\$ (597.97)	\$ (162.79)	\$ (375.00)	\$ (613.96)	\$ (1,749.72)
Bulb Garden editing	\$ (500.00)	\$ (500.00)	\$ -	\$ (500.00)	\$ (1,500.00)
PayPal Fee	\$ (140.12)	\$ (157.97)	\$ (217.41)	\$ (220.02)	\$ (735.52)
Domain registertration	\$ (86.70)	\$ -	\$ -	\$ -	\$ -
The Bulb Newsletter scanning	\$ -	\$ -	\$ -	\$ (520.56)	\$ (520.56)
EXPENSES	\$ (3,253.96)	\$ (3,554.23)	\$ (4,867.70)	\$ (4,723.48)	\$ (16,312.67)
Net Change in Account	\$ 529.77	\$ 654.61	\$ 210.95	\$ 788.46	\$ 2,270.49

Board of Directors Meeting, January 2017

Board members present for the January 22, 2017 meeting: President Nhu Nguyen, Vice President John Wickham, Secretary Kathryn Andersen, Treasurer Arnold Trachtenberg, Directors Dell Sherk, Jane McGary, Director and Co-editor Jennifer Hildebrand, Editor Robin Hansen. Minutes of the January 2017 meeting were approved as read by electronic vote March 17, 2017.

Trachtenberg reported that more renewals have been coming in recently. UBS has \$10,000 in cash and the rest in fixed income and equities. Upon switching to UBS, Trachtenberg instructed the account manager to keep \$10,000 in cash and the rest in fixed income and equities. We can transfer funds from PayPal at no charge. Wickham agreed serve as a backup. A number of people are in arrears with their dues payments and/or have large outstanding BXSX balances and will be reminded. The next issue of *The Bulb Garden* is in progress. Extra issues of TBG, bookmarks and coupons for \$5 off from BXSX are available for new members.

Sherk reported that the BX and SX have been running well; as is usual for this time of year, there are no offerings at this time.

McGary reported 173 members have renewed or just joined which is less than 50% at this time. After the Bulb Garden goes out, postcard reminders to pay dues will be sent.

McGary reported that Hibert Huaylla from Bolivia is working on a revision of *Hippeastrums of Bolivia* containing text, maps and pictures. Huaylla would like to have the book published in English. McGary could translate descriptions of the species but could not format the book. Trachtenberg urged the Board to accept this project to be published electronically or with a soft cover. David Pilling, who manages the PBS Wiki, has had 100 to 200 downloads on each of Brian Mathew's newsletters.

Google could be used to publish the translated edition, but the publication could not be password protected. For print on demand, the Society should be able to make money. Some of the proceeds could go to the author and some to PBS. Photos of each species and distribution maps will need to preserve formatting. This matter will be explored and a proposal obtained. This publication could be the first one in a series of papers.

Sherk mentioned the Brazilian Plant Support Club as a

(continued page 10)

Board of Directors Meeting (cont'd)

possible source of seeds for PBS. A botanist by the name of Peixoto has been running the Brazilian Plants website. Nguyen said that Peixoto is doing a good job of introducing wild plants into cultivation. Sherk said that a U.S. Department of Agriculture Small Lots of Seed permit would not be necessary to bring these seeds into the U.S. Sherk moved to subscribe to the service, second by Trachtenberg. Motion carried.

Nguyen stated that there is a large balance in the PBS account which should be spent to further our mission. Last year two grants were made for research. Nguyen asked about spending money on the website. If Ibiblio breaks down one more time, we may have to go to a new platform. Pilling will need money to buy more space - \$200 to \$300 per year. If he has problems, he can ask Trachtenberg for support money. The possibility of a new platform was tabled for future discussion.

The meeting was adjourned at 12:47. The next meeting was set for April 30, 2017.

Respectfully submitted,
Kathryn S. Andersen,
PBS Secretary

Erythroniums (cont'd)



to the saddle between Mt. Cokley and Mt. Arrowsmith is a relatively accessible location for this plant. However, its bloom time can vary greatly depending on the snow-pack, (but is) usually in June or July.

The last of our four island *Erythroniums* is the Avalanche Lily (*E. montanum*). This is another un-mottled leafed species, and the only one (of) the four with a pure white flower. So pure is its whiteness, and so dense the colonies, that when it blooms, the ground can appear to be covered in snow! The center of the flower is ornamented with yellow, similar to the lowland Fawn Lily. Like the Glacier Lily, this is also a plant of the mountains, and consequently is difficult in cultivation. Though common in the mainland ranges of the Cascades and the Olympics, the Avalanche Lily is only known to occur in one place on Vancouver Island: the San Juan

ridge behind Port Renfrew. Although only 1000 meters (3900 feet) high, this ridge receives an immense amount of snow, creating sub-alpine conditions at a fairly low elevation. What's interesting here is that it grows in the clear cuts

leading to the ridge, and the openings left by the tree harvesting have improved its habitat. Further up the ridge, where it grows in the mottled shade of the forest, each plant hosts only a single flower. However, in the clear cuts, some incredibly robust plants can be found, some with as many as ten blooms per specimen!! If only we could re-create this in our gardens. But alas, attempts to tame this wild child of the hills have proven to be fruitless, at least in my experience. Perhaps success may be had in highland gardens that experience colder winters, but for lowland Island gardens this one is a no-go. Fortunately, the colonies are easily accessed by car thanks to the logging roads that penetrate their hilly haunts.

One cannot help but be charmed by this magnificent wildflower, coveted by gardeners the world over. Whether growing in a garden, ornamenting a wild meadow, streamside or mountainside, it never fails to impress. It catches the eye of the casual passerby, its enchanting blooms calling out to be admired. How lucky we should be that our island hosts such a fine representation of the genus, and that we can visit with relative ease such a treasure.



Above: *Erythronium montanum*.
Left: *E. grandiflorum* with *E. montanum*.

Who Needs Orchids (cont'd)

B. glaucescens: Unusually, the uppermost leaf is covered with a greyish waxy layer which helps with identification, and though attractive, the floral mass of deep pink with yellow spotted petals is similar to many others. That said, the seeds are very sweet and are eaten by children in Ecuador.

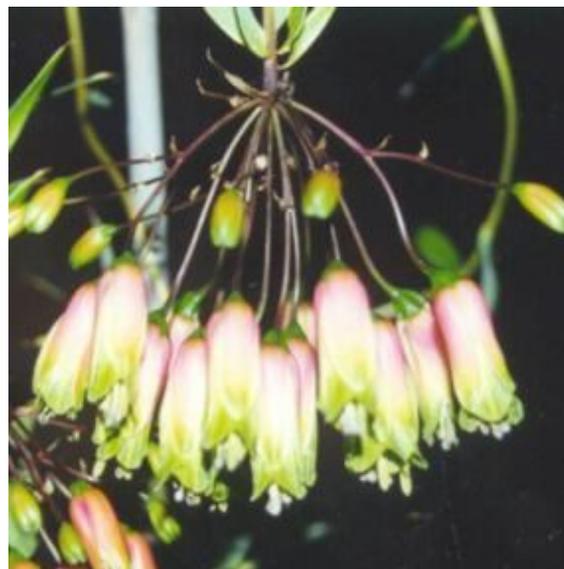
***B. patacoensis* (syn. *B. conferta*)**: Another reasonably hardy species which, in spite of its name, comes from Colombia and Peru. It has scarlet sepals and although the petals start yellow, they darken to spotted red and are as much as 12 feet above the soil.

***B. pardina* (syn. *B. brachypus*)**: This has

a greater difference in its blooms than most species in that the sepals are deep red whilst the petals are white with deep blue spots. I have spent several fruitless years trying to source this gem.

Many *Alstroemeria* and *Bomarea* contain a tuliposide, a substance that acts as a fungicide, but to which some people are sensitive. Those with allergic tendencies should perhaps wear gloves when handling the plants.

Finally it should be mentioned that in New Zealand a National Pest Plant Accord exists that identifies pest plants that are prohibited from sale and commercial propagation and distribution and includes some species of *Bomarea*.



Clockwise top left: *Geissorhiza petraea*, *G. species*, *G. lobbiana*, *G. engleriana*.



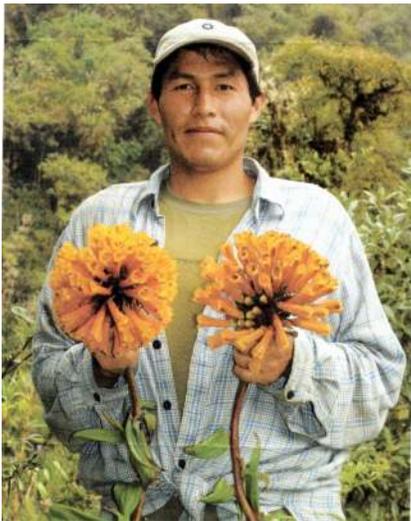
Ed.: As Paul notes, nomenclature is a mess and photos on the web are often not named. To say that *Bomarea* is not a well-known genus is probably an understatement. There are about 110 to 122 species and the list of synonyms is nearly as long as the species list. It is to be hoped that we may see seeds of these gorgeous vines on the PBS exchange so that we can learn more about them. Contact Paul for further information PJOSPUX@aol.com.

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Gardening with Bulbs



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Island *by Paul Spriggs*

Who Needs Orchids?

by Paul J. Oliver-Smith

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The Bulb Garden is the newsletter of the Pacific Bulb Society (PBS). It is published, if enough articles are submitted, around the third week of each quarter and is available to PBS members. This newsletter provides gardening or bulb related articles, news of interest to members, and announcements of the PBS organization.

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