

International Rock Gardener

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Alan Ayton gardens in North East Victoria, Australia. He loves to travel- especially to see plants - here he writes about *Veronica thomsonii* in New Zealand. Alan take super photographs which he is kind enough to share with those of us unable to make trips to see the plants in the wild – or to encourage us so to do.



Alan studied Horticulture at University of Melbourne, Burnley and lives with his wife and family in Tangambalanga, Victoria. Alan is active on both Facebook and YouTube.

Graham Ware, lives now on Gabriol Island, one of the Gulf Islands in the Strait of Georgia in British Columbia (BC), Canada. He is a writer, book reviewer, and carver who studied creative writing and communication studies at [Simon Fraser University](https://www.sfu.ca/).

In this issue, Grahame writes about the history of *Brodiaea* – a bulbous plant thought to originate in California.

Cover image: *Brodiaea elegans* JCA 13277 California, Shasta Co. Photo scan Mike Tucker. The SRGC is proud to maintain the Archive of the famous seedsman, James (Jim) Cartledge Archibald -this may be found on the SRGC website, [here](#). The cover image is contained in the [SRGC Forum pages of images being grown from of Archibald seed](#).



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--- New Zealand Gem ---

A Mountain dwelling Speedwell – Alan Ayton

Greetings,

Some of you may know I like to show the alpine flora of my country, Australia. In some ways it doesn't seem flashy and beautiful like some other regions around the world, but it is different and has a beauty of its own. However, this article is not about the Alpine flora in Australia but rather a plant I saw on a recent trip to New Zealand, *Veronica thomsonii*. (Thanks to Jiri Papousek, Zdenek Zvolanek and Margaret Young for reaching out to me to see if I would write a little something for the Czech Rock Garden Society and the IRG - of course the answer was yes!)

One of our destinations in New Zealand was the Remarkables, an interesting mountain range that rises sharply from the shores of Lake Wakatipu to its highest point called Single Cone (2319 metres) and is located just outside of Queenstown on the South Island of NZ. Lying underneath Single Cone is Lake Alta at 1800 metres, a glacial lake, this was our destination.



The Remarkables looming over Queenstown.

To get there requires driving up a very steep road for 13 Km with many hairpin bends and severe drop offs, the last 3 kilometres are gravel but fairly well maintained, the gradient in some parts was 15%, the average gradient was just under 10%, by the time you reach the end of the road at the Remarkables Ski Field, you will have gained 1296 metres in altitude. My only thought all the way up was, how were we going to get down safely in this campervan!! Well, we made it back down using low gear for the entire descent.

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Lake Alta is a 2.5 Km hike from the carpark, pretty steep but manageable, the sun was shining, the mountains were looming, it was a great day. The Lake itself is not large only 500 x 250 metres approximately, it is frozen solid during winter and skiers/snowboarders ski down the slopes and across it. Antarctica New Zealand also uses this lake for training dives for those people being deployed to Antarctica. During summer though some very exciting alpine plants can be seen around this lake and the surrounding mountains and what we are going to have a look at in a bit more detail now is one of the Snow Hebes, *Veronica thomsonii*. But first a very quick overview of this group of plants. They are mostly cushion forming plants or subshrubs which occur in the higher elevations of New Zealand and Australia, identifying the cushion forms is extremely difficult as morphologically they are similar.

The Snow Hebes were formerly known as *Chionohebe* but have now been put into *Veronica*, there are five species of Snow Hebe and two sub species, all of which are confined to the South Island of New Zealand except for two, *V. ciliolata* ssp. *fiordensis* which can be also be found in Tasmania and *V. densifolia* also in Tasmania and New South Wales. This change was outlined in a paper in 2008-

- Meudt, H.M. (2008). Taxonomic revision of Australasian snow hebes (Veronica, Plantaginaceae). Australian Systematic Botany 21: 387-421. [Cited as Veronica.]



Above and below photo's – the landscape around lake Alta in the Remarkables Range showing this dramatic location. I always feel its good to show the surrounding habitat which

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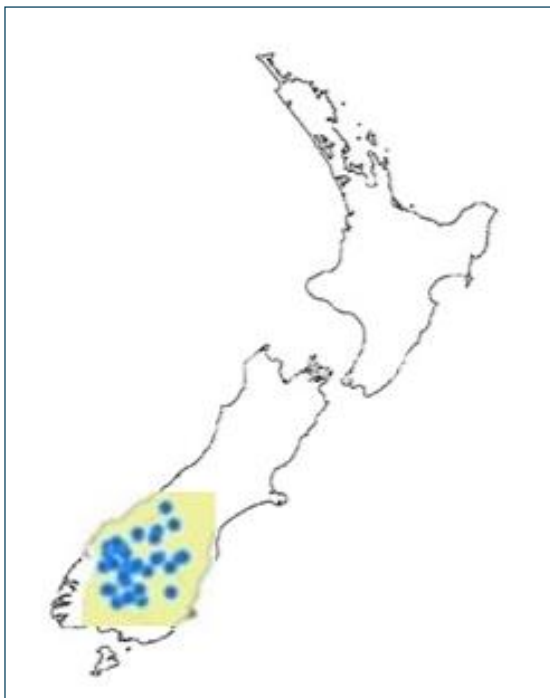
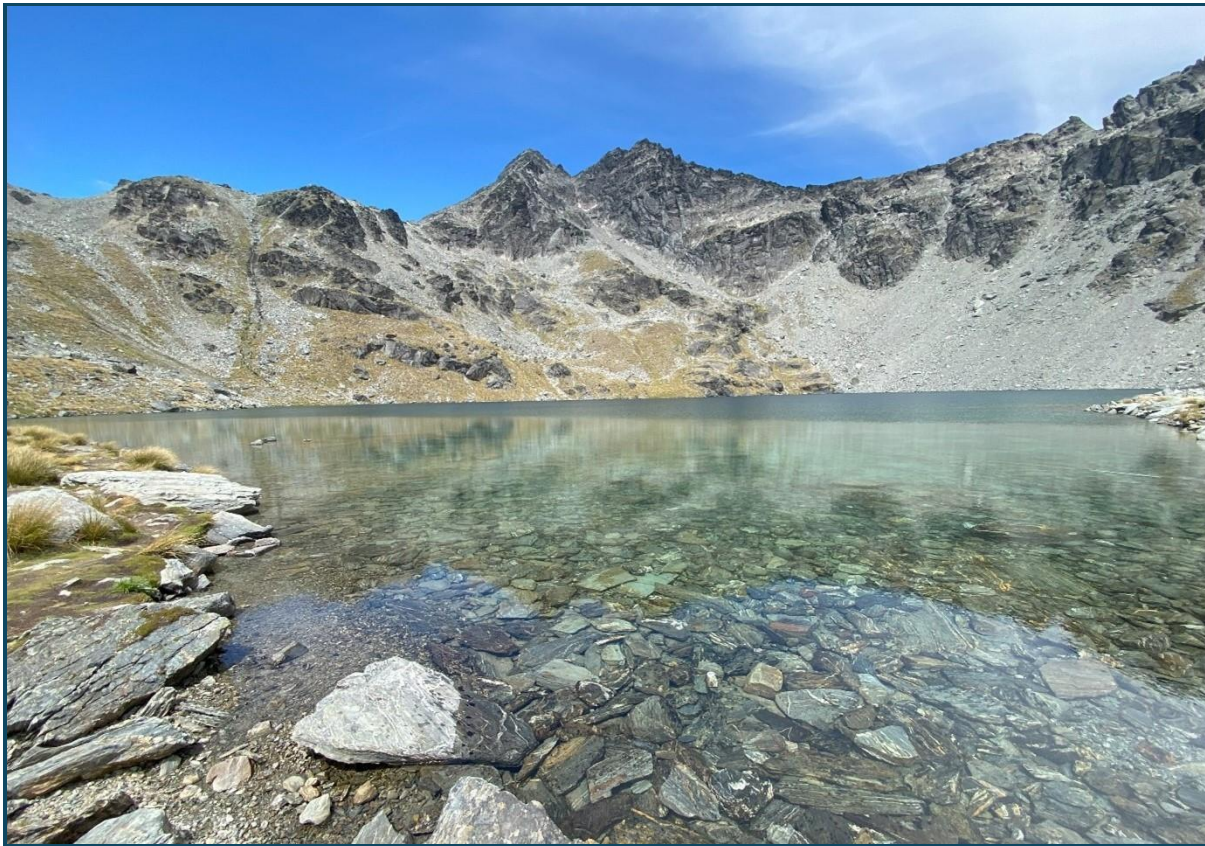
gives you a sense of where the plant resides and the conditions and pressures that it may face.



Above: A view of Lake Alta nestled under Single Cone and Double Cone. There is a track that follows the ridgeline all the way around the lake but no time for us to do that. Large steep scree fields can be seen centre and to the right of photo.

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Below: A closer view of the lake with its crystal-clear water showing the floor of the lake. The type of rock here is mostly metamorphic schist from Holocene glacier deposits which are undifferentiated till consisting of variably weathered, boulder gravel with minor sands in cirque moraines.



Veronica thomsonii

Location and Habitat:

This species is found on the South Island of New Zealand in the districts of Canterbury, central and eastern Otago which are situated in the lower part of the Island. See map left, the blue dots indicate recorded locations. It has been found between the altitudes of 1200-2400 metres. It inhabits rocky ground, rocky outcrops, rock tors, crevices and exposed ridges in the following habitats – alpine to high alpine herb field, fell field and cushion field.

Some of these environments can be seen in the previous four photos around Lake Alta.

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V. thomsonii at Lake Alta on a rock ledge.



Description:

A perennial, rigid to loose cushion with many erect branches up to 8cm in length with a woody base. Leaves are spirally imbricate-meaning they are spirally arranged around the stem and overlapping (see photo to the left - a very lax example

which shows this, photo by Ian Dench. Leaves are sessile and tightly to loosely appressed against the stems, becoming slightly suberect near the ends of the branches, mostly olive

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green to dark green in colour, mostly oblanceolate to obovate in shape, up to 5 x 2.5 mm in size or thereabouts. In the photo to the right, we can see a closeup of the leaves with a dense band of hairs across the middle of the leaf on the adaxial surface, this a diagnostic feature of this species of the Snow hebes, the rest of the upper leaf surface is mostly glabrous. Evident is also the overlapping(imbricate) nature of the leaves with each other.



Photo above by pdbellbutler



The flowers are white and about 5mm in diameter, it consists of a corolla tube which splits into 5 lobes which are spreading or erect, ranging in shape from narrow to broadly ovate or obovate to very obovate, the style is exerted a couple of millimetres above the corolla. Photo left by William Harland.

The flowers are present from November to March with fruiting from December to March depending on location. fruit is a capsule which can have up to 21 seeds in it.

Photo by: Joe Dillon



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Some more examples showing its form in habitat: above photo by John Barkla, location - near Mt Saint Bathans. Below photo by Chris Close, location - near Mt Cardrona.



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In the above photo, just below Lake Alta there are 5 plants of *V. thomsonii* on this rock ledge. Also, in this photo in the bottom left, the silver patch is *Raoulia hectorii* var. *hectorii*. Quite a beautiful landscape. Below - same location as above showing two specimens.



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In closing I will say that this is an incredible species that I stumbled upon in the Remarkables range just outside of Queenstown, I wish I had more time to spend with it and search more out as it definitely struck a chord with me, in fact the entire range of alpine flora I saw certainly resonated with me and only makes me want to go back again and explore more of it. I hope you have enjoyed reading about this species.

Cheers for now! Alan Ayton.

Photo on the right by John Barkla.



Acknowledgements.

All photos are by me except where noted in the text and a list with links is provided below.

Ian Dench - <https://inaturalist.ala.org.au/observations/194342402>

pdbellbutler - <https://inaturalist.ala.org.au/observations/106307461>

William Harland - <https://inaturalist.ala.org.au/observations/195530739>

Joe Dillon - <https://inaturalist.ala.org.au/observations/193110832>

John Barkla - <https://inaturalist.ala.org.au/observations/9775638>

Chris Close - <https://inaturalist.ala.org.au/observations/198939538>

John Barkla - <https://inaturalist.ala.org.au/observations/145771176>

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<https://creativecommons.org/licenses/by-nc/4.0/>

More information can be found on the following sites below.

<https://www.nzflora.info/factsheet/taxon/Veronica-thomsonii.html>

<https://www.nzpcn.org.nz/flora/species/veronica-thomsonii/>

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--- Plant History ---

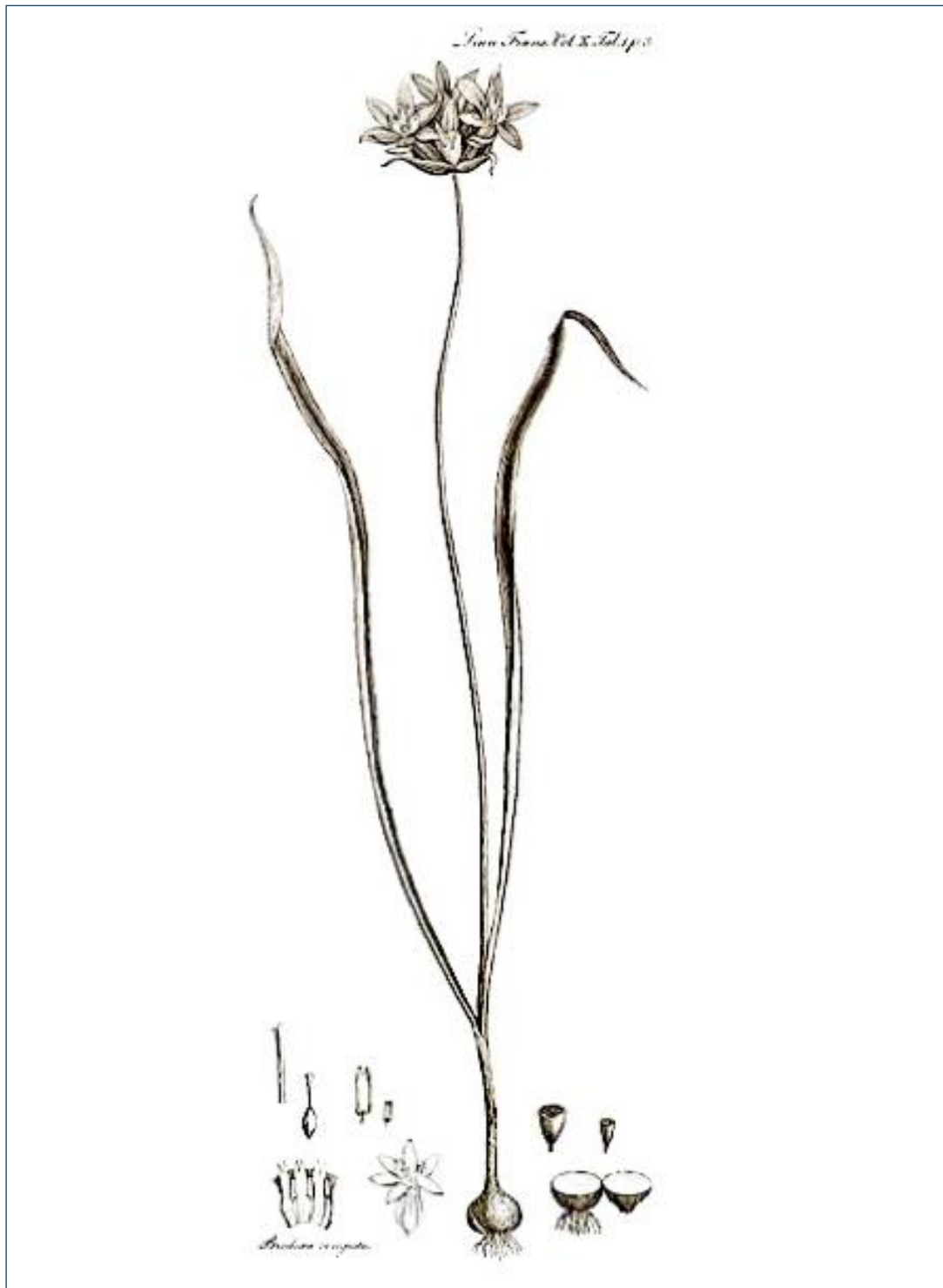
Brodiaea: Terrific Bulbs for the Rock Garden

By Grahame Ware



The first illustration of *Brodiaea coronaria* seen in publication 1806 in Salisbury's [Paradisus Londinensis](#). Drawing by William Hooker.

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The second illustration of *Brodiaea* as it first appeared in publication in the [Linnean Transactions of J.E. Smith](#), 1811. However, it was the first time that it was named *Brodiaea*. This specimen was collected by Scottish surgeon/naturalist Archibald Menzies from the British Columbia coast (quite possibly Gabriola island in the Strait of Georgia) in 1792 as part of the Captain George Vancouver expedition. This was before it became known as British Columbia. In fact, Smith refers to the place as New Georgia after the British king of the time, King George III. Illustrator unknown. This is the holotype.

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"The genus remains a nearly untapped resource for edaphic relationships, polyploidy and hybridization." Dr. Robert Preston, [NOVON 16](#), p. 254.

They may not have the charisma of *Colchicum*, the mystique of *Fritillaria* nor the often-outré beauty of *Lilium* but *Brodiaea*, if sited properly and grown well, can give those aforementioned geophytes a run for their money. *Brodiaea* are charming and easy corms that will turn heads in your early Summer garden and surprise you with their staying power. Nonetheless, even among bulb freaks, they are not high on 'must-have/must-grow' lists. They are often taken for granted in their centre of biodiversity, California, and to make matters worse, outside of the Golden State, they are generally looked upon (by non-Californians) as not worth the effort due to their supposed tenderness. This reaction might seem logical, but this Cal-centric genus radiated (as ecologists like to say) north into BC, Washington and Oregon and eastward, speciating in the process. These outliers are where it gets interesting and, as with most things in life, a deeper look overturns the assumptions and stereotypes. *Brodiaea* includes some excellent species that are tough, beautiful and come into flower when most other vaunted Spring bulbs have wilted. I have found that *B. terrestris* and *B. elegans* have real staying power when the sun shines strong and bright and I'm grateful for these sun warriors, a trait that stands them in good stead in the heat-spikes that are becoming commonplace in the climate emergency that is unfolding.

Let's look at a few good *Brodiaea* species and the genus in general. The species that I am discussing here all have sufficient hardiness that they'll come skipping through harsh Scottish or Pacific Northwest coast Winters. They should also do well on the Continent with adequate drainage and by planting the corms sufficiently deep (about 4"/10 cm). But, please, read the cultural recommendations carefully.

Brodiaea was first collected on the dryish coast of Vancouver Island by Scottish surgeon and naturalist, Archibald Menzies, in 1792 when he was with the Captain Vancouver expedition. It would not be until 1796 that Menzies would return to England. *Brodiaea* then came into the hands of the young botanical draughtsman, William Hooker, a student of the great botanical illustrator, Franz Bauer. Hooker was very keen on this plant and his patron at the time, Richard Salisbury, named it *Hookera* in his honour. There it grew and flowered at Salisbury's place, Mill Hill, in the London area. Hooker's first botanical work, *Paradisus Londinensis*, included this bulb. Salisbury also authored the specific epithet *coronaria* in their 1806 publication, *Paradisus Londinensus*. However, Salisbury (who subsidized the publication) also wrote the descriptive text (or 'letterpress' as it is often named) for this book.

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Salisbury was a somewhat enigmatic botanist. In *Paradisus Londinensis* Salisbury says that the source of his Hookera/Brodiaea came from a Mrs. Haliburton of Halifax, Nova Scotia from an impounded Spanish vessel. This was in the immediate aftermath of the British territorial dispute with Spain that was settled with the Nootka Convention between Captains Vancouver and Quadra and their respective governments in 1794.

In the aforementioned publication, he concedes that it was originally found by Menzies but that the provenance was California. (But note that back then California was everything north of Mexico on the west coast (before hitting the privately Russian-owned area now known as Alaska) included the domain that would be known for most of the last half of the 19th C as British Columbia or BC).

In 1810, James Edward Smith, founder and President of the Linnean Society, preemptorily published and completely renamed it - *Brodiaea grandiflora* to gain authorship. Now it was *Brodiaea* Sm and published in the *Transactions of the Linnean Society*, London 10: 2. But that's not exactly 'cricket' old bean ! James Britten, longtime editor of the British Museum's *Journal of Botany, British and Foreign*, later publicly excoriated Smith for his behaviour in this matter and rightly so. ([Journal of Botany. 24:](#) pp 49–53 1886).



Brodiaea terrestris subsp. *terrestris* © Stan Shebs [CC BY-SA 3.0](#)

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Smith states that Menzies found it in “New Georgia”. This was a name given for the king that then became British Columbia. Smith, along with Robert Brown, got into many a tussle with Salisbury in the ensuing decades over what system should be used for taxonomic purposes. In fact, a case could be made where they colluded against Salisbury and succeeded in eventually marginalizing him. Smith, naturally, preferred the Linnean system. After all, Smith had a vested interest ever since he persuaded his wool baron Dissenter father from Norwich to pony up the £ 1000 to acquire Linnaeus library from his Linnaeus’ widow. Thus, armed with the Linnaeus’ herbarium, Smith started the Linnean Society. Salisbury was, however, one of the original seven people to form the club along with Sir Joseph Banks. Salisbury thought de Jussieu’s system the most intelligent. Salisbury had been trained in botany at Edinburgh— as was Smith— and his teacher was John Hope, the 4th Regius Keeper of the EdinburghBG and a devotee of de Jussieu’s natural families system. Although Hope is often described as someone who was an early supporter of Linnaeus’ system, it must have been very early as he studied with de Jussieu in Paris as a student. It was Hope that separated the ‘materia medica’ from botany at Edinburgh. In this regard, Salisbury was proven right, of course, but that didn’t stop the arguing and rancor between them at the time.

Smith named the species under discussion for James Brodie (1744–1827), a gentleman botanist with a deep interest in bryophytes. Brodie lived in a village/estate of the same name in Morayshire.



Brodiaea sp. Photo © Vernon Smith CC-BY-NC 4.0



Brodiaea elegans, ©Travis Owen, [Pacific Bulb Society](http://www.pacificbulbsociety.org) CC BY-NC-SA 3.0 US

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The shores of the British Columbia coast where *Brodiaea* was first collected are not blessed with an abundance of bulbous plants but there are *Allium*, *Camassia*, *Erythronium*, and *Lilium columbianum* to grace the landscape. In many ways, *Brodiaea* might be the best one of all for rock gardeners. It does, however, need heat to be coaxed into flowering.

A Brief Botanical Perspective

***Brodiaea* (Salis.) Engl.**

This genus has bounced around from Family to Family over the last 40 years starting out in the Amaryllidaceae (Niehaus), then placed in Liliaceae (Cronquist) and then Alliaceae (Dahlgren *et al*). But Salisbury would have his revenge as the currently accepted botanical family for *Brodiaea* is Themidaceae (Pires & Sytsma). They took their lead from Chase, so that *Brodiaea* is now included in the Themidaceae family which also includes *Triteleia*, *Dichlostema* and *Bloomeria*.

Professors Pires and Sytsma of the Univ. of Wisconsin ([American Journal of Botany 89](#)(8): 1342–1359. 2002.) in their groundbreaking work, **A PHYLOGENETIC EVALUATION OF A BIOSYSTEMATIC FRAMEWORK: BRODIAEA AND RELATED PETALOID MONOCOTS (THEMIDACEAE)**, have sorted out a "wealth" of historical misinformation in their study. The paper straightens out mistakes that have been made and remade over the decades. Using both morphology *and* molecular analysis, they have unravelled the contradictions of the various closely related groups (*Brodiaea*, *Triteleia*, *Dichlostema* and *Bloomeria*), to develop a strong taxonomic framework. The graphic below has been used to differentiate why it is not included in the other families of which it has been included over the years.

These findings have been integrated and published in the Second Edition of the Jepson Manual (February 2012). These nomenclatural changes are significant and *Brodiaea* taxonomy is now settled - changes that have been in the works for well over a decade based on research by many botanists.

For a link to a very good service, the Jepson Interchange at the University of California, Berkeley, click here - <http://ucjeps.berkeley.edu/interchange.html>.

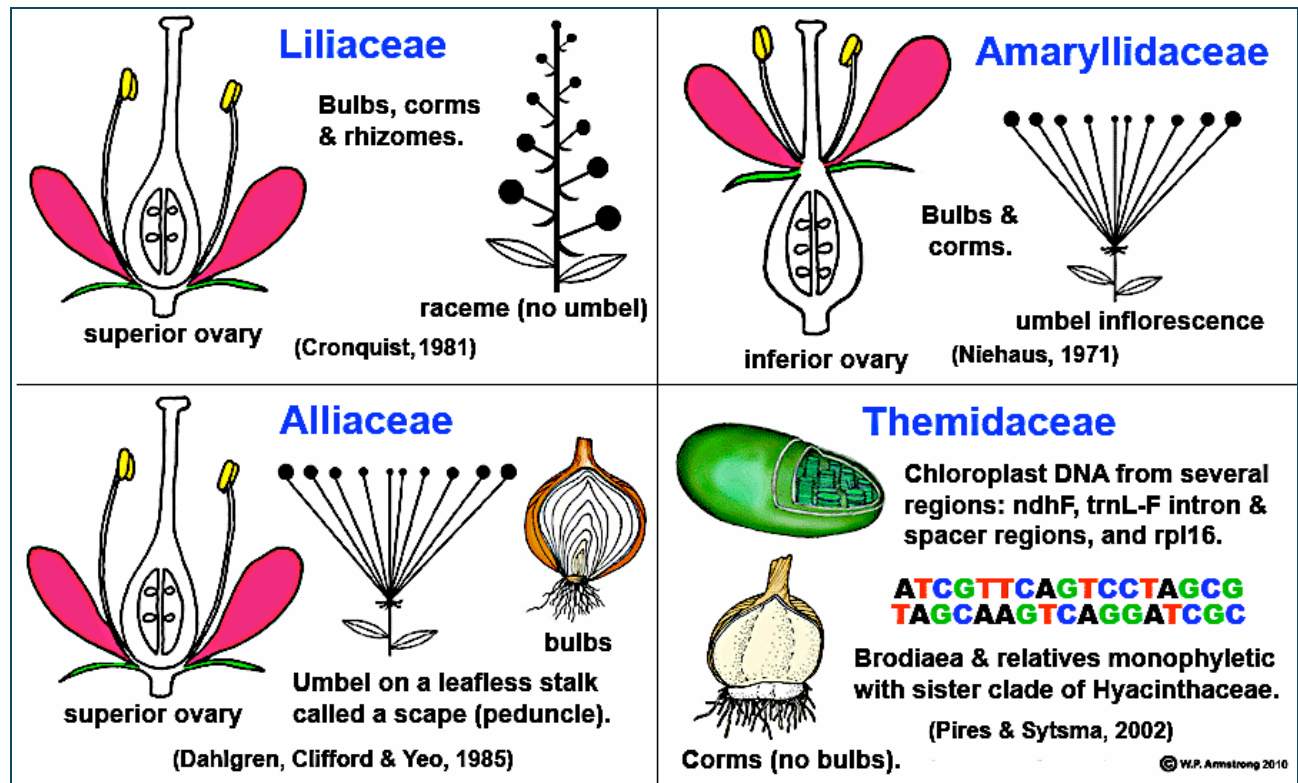
Unfortunately, the fairly recently published, [The European Garden Flora](#), etc, Volume 1, University of Cambridge, 2011, Cullen, Knees, Cubey (with the section on *Brodiaea* by Droop) is sadly out of step with current thinking by placing it in the Alliaceae family.

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Key Botanical Features of *Brodiaea*

- 1) they have a corm which is long-lasting (perennating),
- 2) one or two linear leaves
- 3) scapose, umbel-like inflorescence
- 4) three fertile stamens opposite the inner tepals
- 5) hypogeal germination

Brodiaea is a geophyte that science has now shown to have a much greater affinity to *Hyacinth* than *Allium*. The late California botanist, Wayne Armstrong, has provided an excellent graphic for the differences between the families and I thought that it was worth having a look at it.



Graphic courtesy of Wayne Armstrong.

The researchers, Pires and Sytsma, make another important point in their paper relevant to our rock gardening purposes:

"*Brodiaea* display a striking degree of ecological endemism, with species often restricted to serpentine outcrops, vernal pools, or marine terraces on islands off the coasts of southern California and Mexico."

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***Brodiaea* in the rock garden**

Their adaptability to serpentine rock/soils is important. I will look at a few species that will also thrive in basalt and limestone thus making them good neighbours for other alpines of the same mineral and pH persuasion such as *Saxifraga*. Many species are serpentine rock compatible. Serpentine is defined as a magnesium rich but calcium, potassium and phosphorus poor soil that develops on blankets of rock classified and named by geologists as a **regolith**. Serpentine is derived from ultramafic rocks. Half the battle in achieving success in the rock garden lies in synchronizing the minerality and pH of the soil and its constituents, both biochemical and organic. If it is skewed against you, there is no chance for success as pH is the most important factor in nutrient uptake and assimilation into the body of the plant. However, if you get these vectors right and in balance, your plants will thrive and you're rockin', so to speak. *Brodiaea* might well succeed where other bulbs have failed, and it could well be what you are looking for in property or sites that are lean with basalt scree and little grass cover in a maritime highbank terroir. This is what I and many others on the shores of Vancouver Island and associated islands have to deal with.

It is important to remember that, as ever, the provenance of seed is critical as the species under consideration and for yours, have wide areas of distribution. Plant geographers believe that *Brodiaea* spread out (radiated) from its centre of diversity in California and became isolated with the result that there are actually quite a few ecotypical variants. As a result, they have different chromosome counts denoting infraspecific variability that is not always noticeable morphologically. I will make mention of these particulars as we roll through the species and selection of species. Thus, it is very difficult to make judgements about certain species without knowing its provenance (altitude, soil type, etc.). Wild collected seed may yield wonders in our temperate bulb gardens. Keep your eyes open!

***Brodiaea* Species for the Rock Garden**

Brodiaea coronaria* var *coronaria

Brodiaea coronaria var *coronaria* is commonly called the Crown Brodiaea. It is worth noting that it is quite likely also the hardiest. They are a heavenly violet colour that will take your breath away. As you can see from the above photo, *B. coronaria* var *coronaria* has a bell-shaped tube with flowers curving upwards and white (sometimes violet) staminodes that lean inwards and around the fertile stamens.



Brodiaea coronaria var. *coronaria* near Powell River, BC. Photo Rod Innes.

Brodiaea elegans

This is my favourite of all the *Brodiaea* species that I've utilized in my gardens. Growing near the foot of a large Douglas fir in poor, [podzolized](#) alkaline soil, it merrily returned each year in my previous garden. It has more stature than the others and more presence as well. The flowers open bit by bit in an upward-facing candelabra and are larger than either *B. terrestris*, *coronaria* or *minor*. One of the nicest forms of this species can be found in the Siskiyou area of Oregon, that has long been famous as the epicentre for the *Lewisia* "revolution" that took place in alpine gardens post WW2. (Siskiyou Rare Plant Nursery was started by Lawrence Crocker and Boyd Kline. The nursery was later sold and the pair are both deceased.)

As a quick aside, this is where pioneering women botanizer/gardeners Clarice Nye and Mary Byman homesteaded and produced catalogues in the 1930's and 40's whilst corresponding with the RHS, Will Ingwerson, etc. The best solid colour break forms poured out of here such as 'Carroll Watson', 'Nye's Dwarf', 'Apricot Queen', etc. This area north of Medford, Oregon is

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also where the alpine plantsman, Marcel Le Piniec retired to after being seduced by mountainsides of *Lewisia cotyledon*.



Brodiaea elegans. Photo courtesy of Suzie Savoie of klamathsiskiyouseeds.com

Some more botany on this species

The current thinking botanically however, is to roll the subspecies into the species. As a result there is no longer a subspecies that has been known and called *variety* or *subsp.* (subspecies) *coronaria*. Still, it should likely continue to be used (with an asterisk at the ready) if for no other reason than to trace the continuum of that species/subspecies. In this article, I am following the extensive work of botanists working on and for the all-important Second Edition of the *Jepson Manual* (Flora of California, 2012).

There is an interesting note attached to the online edition of the New Jepson Manual (2nd Ed.) The current experts on *Brodiaea*, Pires and Preston, say, "*Brodiaea coronaria* subsp. *coronaria* has been misapplied to plants with tightly inrolled staminodes that are appressed to

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the stamens. At least 2 such groups are morphologically, and ecologically distinguishable, one in the montane meadows in Klamath Ranges, Cascade Ranges, Modoc Plateau, S Oregon, and the other in grassland in Sacramento Valley and the north San Joaquin Valley.

In addition, California plants morphologically similar to *Brodiaea coronaria* from the Pacific Northwest **differ in chromosome number** and may represent separate lineages of hybrid origin. More study will be needed." (Jepson Manual Online version).

Not surprisingly, they have established 3 different chromosome counts (12, 24 and 42) with their study. This is pure speculation, but I would not be surprised to learn that the local species here on the east coast of Vancouver Island is a triploid because it does not set seed easily but develops daughter corms with great profusion. Compared to the mountainous California species, there are some marked differences in size and form especially those tribes found along the dryish, basaltic coastline of eastern Vancouver Island and outlying islands such as Gabriola, Lasqueti, etc. as well across the Georgia Strait to the Sunshine Coast north of Vancouver on the mainland side. We'll keep track of what unfolds scientifically in the ensuing years. This tribe is more likely to adapt to N Britain, Scotland, etc. than most of those species collected from the more southerly Pacific coast sites.

The dark violet colour of the flowers is especially dazzling in this species and one that has been traditionally difficult to capture on film. But with the wide use of digital cameras, we are now seeing *en masse* great pics of this species as the one above.

The following morphological description is directly from the Jepson Manual 2nd Ed.

Daughter corms often present.

Leaf: generally 1–6, linear, generally crescent-shaped in x-section, glabrous, entire, often withered at flower.

Inflorescence: open; scape 2–70 cm, generally slender, generally straight, cylindrical; bracts scarious; pedicels generally > flowers, generally < 13 cm.

Flower: perianth tube bell- to funnel-shaped, green-white, lobes erect to spreading, violet to lavender, occasionally pink, midribs purple or green; staminodes (0)3, generally ± erect, opposite outer lobes, white to violet or lavender, lateral margins flat, incurved, or inrolled; stamens 3, equal, fused to perianth, opposite inner lobes, **filaments occasionally winged or appendaged, free or fused basally to staminodes, generally not forming crown-like tube,**

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anthers attached at base, appressed to style, abaxially papillate; style 1, stigma lobes 3, spreading and recurved.

Fruit: sessile, ovoid.

Seed: oblong, black, lined, angles ridged.



Brodiaea elegans var. *elegans* seen at Mission Trails Park, California. Photo courtesy of Wayne P. Armstrong.

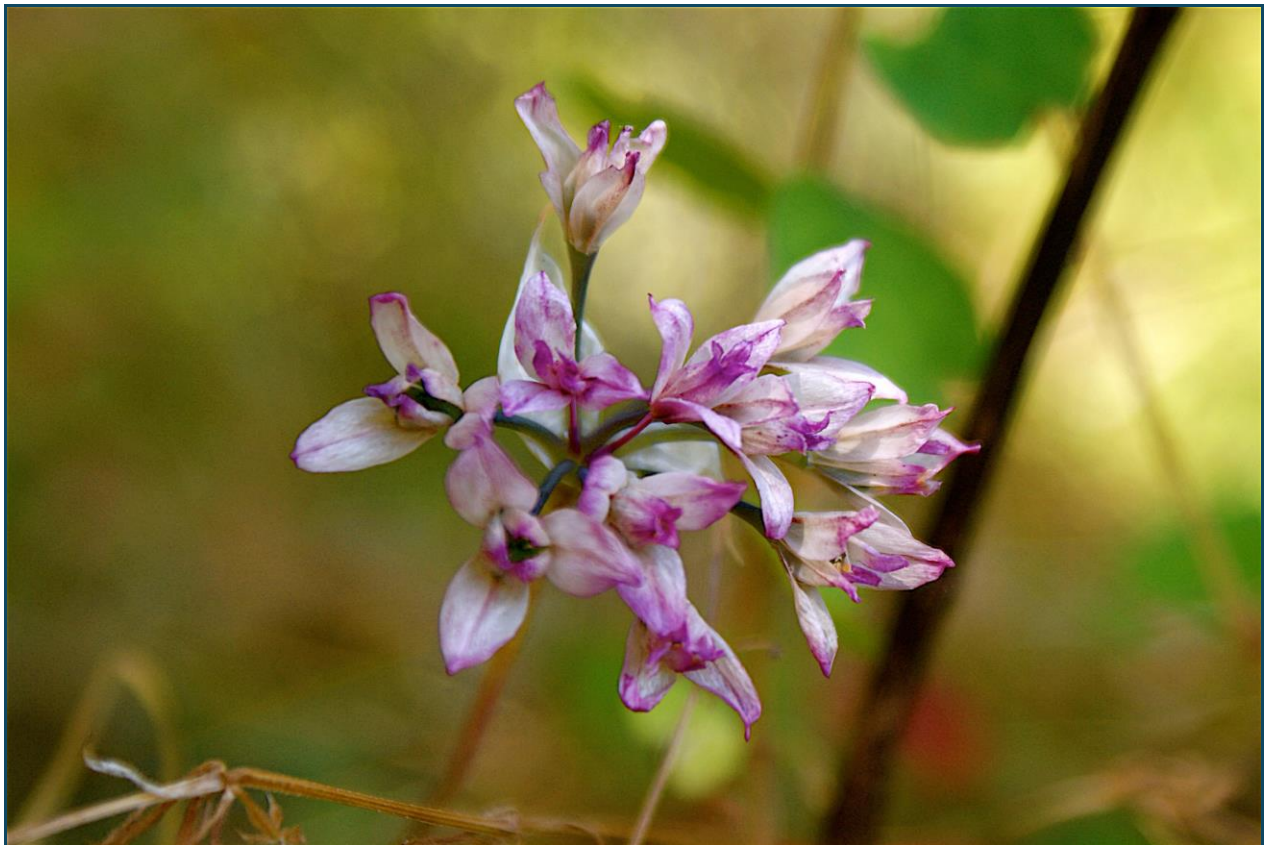
Gardening and cultural aspects- know your context

Any plant that can be *sympatrico* with iron and magnesium excesses due to basalt is a high-fiver in my book. Locally, there are some nice, smaller forms of this species whilst some are lanky characters. Why is this? Well, basically, it depends on the context of the habitat. In other words, it is not always in the DNA. In my experience, the poorer and rockier the situation, the less growth i.e. height. Hey...tough love works with plants too! The other main factor is exposure. I've noted that our *Brodiaea coronaria* seem to prefer an eastern aspect and this results in a fairly short plant of 6"- 8". So, what factors make some forms of this species taller? Looking again to the wild, I note that deeper shade often results in etiolation making them lanky. Full sun in silty, grassland seashore edges also results in taller plants as they compete for light with the grass and keep growing and growing. Full sun in the wild is often the result of logging or trees that get blown over in windstorms. They will grow larger as a result.

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They adapt and will, like most bulbs, pull themselves further down into the ground with their contractile roots. The result is that they will still be relatively short because they are slower to come out of the ground and then the whole process of growth and flowering is accelerated. The result is a shorter plant. Besides growing them in pots in small clumps, I believe that in the open garden, they are best planted *en masse* where their delicacy can be enhanced by the numbers.

This species is most definitely an early summer flowering type. In a poor summer, they might well be found still in flower come August (as it was recently here on the coast). And, there's more good news, when the flowering fades it takes on exquisite pink hues as seen in the picture. This is one floral *dénouement*— not unlike some bearded iris— that I can get excited about.



Brodiaea coronaria seen in blossom climax, Gabriola Island. Photo Grahame Ware.

Brodiaea terrestris* var. *terrestris

Rick Lupp of the much-missed Mt. Tahoma Nursery in Washington state, says about *B. terrestris* var *terrestris*, commonly known as the Dwarf Brodiaea, "*From a genus of easy going North American bulbs for pot cultivation, this is certainly one of the best and certainly the smallest. Easy from seed and very worthwhile to prolong the bulb season into Summer.*"

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Indeed, this one is maybe a tad less hardy than the previous species but still is very hardy. It is also very amenable to pot culture and, like most *Brodiaea*, will increase quickly from corm offshoots. I've had some in a 5" pot for years and they impress every year. They last and last when others will fade. The two-toned colour of the flowers is very striking. Again, it is an easy doer (i.e. not a heavy 'feeder') and like most *Brodiaea* does not require a lot of fertilizer. It also has a wide range (Oregon to C. California) and you will find different colour forms that have very little to do with minerals in the soil. I think I can safely state that with all *Brodiaea*, try to grow them from seed that has been collected from the extremes of altitude and range for the best possibilities of hardiness, novelty and compactness. Remember, many species grow on the coastal plains of California.



Brodiaea terrestris Jim Almond's photo taken at an AGS Show June, 2005.

Brodiaea terrestris var. *terrestris* at the Salt Point State Park, Sonoma coast, California.



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Brodiaea terrestris var. *terrestris* in San Luis Obispo Co. Photo courtesy W.P. Armstrong
The American penny depicts the proportions of the plant.



Brodiaea nana.
Photo courtesy W.P. Armstrong.

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Brodiaea nana

Wayne P. Armstrong has done a tremendous amount of work (and great work at that!) in regards to *Brodiaea* especially in S. California. Check out this link for some fabulous pictures showing flower sizes and other things with *B. terrestris* var. *terrestris* compared to *Brodiaea terrestris* var. *kernensis*. Great stuff. For much more on this especially for hard core botanists, click on this link: <https://www.waynesword.net/brodiaea.htm> I give thanks to Professor Wayne P. Armstrong for not only educating me on his extensive website but for giving me permission to use his many photos as well as that great graphic.

Brodiaea nana is found high up in Butte County in the Sierra Nevada of California. It is a type that thrives in serpentine rock. It often goes by the common name of Vernal Pool Brodiaea. It has a fairly wide range and can be found in several places above 3500'. This provenance makes them good candidates for northern temperate gardens.



Brodiaea nana a good form from El Dorado Co., California. Photo Steve Tyron.

It was originally thought by botanists to be a smaller variant of *B. coronaria* var. *coronaria*. These are

some of botanists' previous synonyms: 1) *Brodiaea grandiflora* var. *minor* 2) *Brodiaea minor* var. *nana* 3) *Hookera minor* and, 4) *Brodiaea purdyi*.

The most recent synonym was *B. minor*.

Culture

Taking a cue from Nature, it is clear that another key horticultural vector for *Brodiaea* (besides alkaline substrates) is drainage. Raised beds, troughs or crevice culture are good vehicles for

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success in this regard. Some people extol the virtues of cold frames/bulb beds as a way of reducing moisture and increasing heat. This is certainly a good option in the maritime Pacific Northwest or any maritime climate for that matter. Where I live, they do just fine in a pot without any protection at all. In the open garden, lean *soil* is essential as is sloping ground and a minimum of standing water. Amend the native soil with shale chips and Perlite if necessary to get as much alkaline minerality and porosity into the earth or substrate. Next consider the amount of rain and/or heat that it will get as a result of where you plant it. In a word - exposure. It is hard to mimic the rhythms of montane California as the snow provides a pretty good shot of vernalization that maritime climates might not be able to do. Thus, if you want your young seedlings and plants to flower, letting them get cold might be the best thing that can happen. In a cold frame this could mean leaving the frame open to cold rain and the odd clear, frosty night.

Remember, plants, like people, respond to the instinct for survival by flowering (reproducing).

Propagation from offsets (cormlets)

This is a pretty straight forward process. Carefully remove pieces clinging to the outside of the corm making sure to keep a piece of the root (or apical) meristem. Clean with clean water and immediately establish in a small pot of a soil mix as described below. If planting out is your intention (i.e. it isn't too late in the season), keep them in the pot for at least 10 days so they get their legs underneath themselves and stake it for ID purposes. Remember to plant them at least 2" deep and, if deemed tender, another 1" at least. If keeping in a pot, top dress with limestone or shale chips as this will provide micronutrients as they slowly break down in the pot. More importantly, shale or limestone chips will ameliorate and skew the pH in the alkaline way that *Brodiaea* prefers. The same principle applies to the newly planted cormlets outside. A top dressing of shale will do wonders over the winter acting as a kind of 'slurpee' as it slowly breaks down in the rain and freeze and, in the process, make available just the right nutrients with its natural Winter 'IV drip'. This could, of course, apply to many other lime-loving genera as will the following practical approaches.

Soil Mix

- a) Coarse sand, b) Perlite and c) a little peat moss (or composted fir bark- or both) in a ratio of 3:2:1(a:b:c). Pumice is nice if you can get it reasonably. Use pumice in a 1:1 with the coarse or masonry sand. This is a very lean soil mix that does not predispose the bulbs to any rotting. Thus, it is incumbent on the grower to compensate with nutrients in a liquid form when it comes into active growth. Alkaline mineral nutrients are, however, their 'food'

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so they should only be offered liquid feed that is light in nitrogen. See watering regime below.

- b) It is also important to remember that when you pot them up that you squeeze the soil and firm down to remove air before using your dibber to make their “nest” before making them tight in their pots. Then add the shale chips to a depth of about 1/2”-1” and then soak well once.

Prop from seed

Anything grown from seed is better and none more so than with *Brodiaea*. Fresh seed planted out in pots (with a very porous soil mix as above) and covered with limestone grit should be a Fall ritual. You might also like to use a soil mix in zip-lock bags in the fridge and wait for them to pop. This way you can ensure that only those that pop will be potted up. Germination should take place in April/May depending on the weather. I recommend leaving them *tight* in the pots for at least a full year— maybe two— before breaking them down into nice, small groups of 3-4 per 4”-6” pot. I always double pot them for not just better Winter protection but Summer protection as well. Then it’s off to a plunge bed with afternoon shade but a good blast of morning light.

Having a plunge bed is a good idea for growing them on as well as for *Narcissus*, *Tulipa*, *Ornithogalum*, *Lewisia*, etc. If you live in a really rainy winter zone, one with a 'bonnet on it', is a good idea to prevent excessive moisture and thus the potential rot. However, if your soil in the open garden is right from a drainage point of view, this shouldn't be a necessity. Liquid feed regularly in the late Winter/Spring and early Summer and then stop fertilizing completely. I’ve found that even smaller bulbs like a good baking too otherwise they might rot. *Brodiaea* should flower in the third year from seed. They’ve lived for several years undisturbed in the same 6” deep Teku pot and every year they get better.

Watering regime

Spring and Fall only with rainwater or good well water.

Sources : Plants

Diane Chapman is a leading figure in all things bulbous in the Golden State and her selection of *Brodiaea* is superb. She runs **Telos Rare Bulbs**. [Check it out here](#).

Currently, she lists several species as well many suitable *Triteleia*. She ships from August to October. Yes, they do ship internationally. See [this link](#) for those terms.

[Fraser’s Thimble Farms](#) in BC has bulbs of *B. coronaria*.

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Seeds

The best way to get seed is likely through the seed exchanges of these societies. Many types are available from year to year.

NARGS seedex

AGCBC seedex

SRGC seedex

To get a better idea and feel of the ecology of *Brodiaea* and its tribe, [follow this important link](#) for a detailed explanation of the ecological/geographical subdivisions of California.

I give thanks to Professor Wayne P. Armstrong for not only educating me on his extensive website but for giving me permission to use his many photos as well as a great graphic.

Happy *Brodiaea* botanizing and growing!

G. W.

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[Brodiaea on Wikipedia](#)

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Other links included in text.



B. elegans, left, and *B. minor*, right. Photos Robert Barnard, California.