

International Rock Gardener

ISSN 2053-7557



Number 173 The Scottish Rock Garden Club June 2024



Connor Smith, a Scot now working at the University of Utrecht Botanic Garden, shares some of the plants which took his eye on a January trip to Santiago, Chile that he undertook with his friend and fellow SRGC supporter, Luca Magi, from Australia. Connor began the [Scottish Rock podcast series](#). From the [Botanical Garden of the University of Tübingen](#) in Germany, Michael Mauser, gardener in the Ecological Alpine Centre brings an article on the propagation of *Dionysia* which is something of a speciality of the Botanic Garden.

The cover image is of a pollinator on *Nassauvia pyramidalis* - photo by Connor Smith.



Close up of *Tetraglochin alata*, in Valle Nevado, photo Connor Smith.

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--- A South American Trip ---

Mountains of Santiago by Connor Smith.

La parva

Very close to the capital of Santiago you can find snow capped mountains, across the border to Argentina towers Aconcagua, South America's highest mountain. I could see this from my small airplane window as I flew in at the early hours of the morning. Whatever delights those mountains held would soon be shared with us. Luca Magi, my friend, an accomplished plantsman, was my only companion. We had spent the last several months planning, getting the locations, familiarising ourselves with the flora and getting tips from friends who had been there before.

Driving to La Parva (a popular ski location) is around 1 hour and 20 minutes from the centre of Santiago. A busy city of some 7 million people. As we started to increase in elevation the plant life began to diversify from the inner city's exotic street trees to dry hillsides of *Puya alpestris* and *Trichocereus chiloensis*, a columnar cactus. Higher and higher you go on the hairpin roads, increasing steadily in altitude. The roadsides are alive, tempting you to get out to have a closer inspection to the treats that you will most likely see further up. Distracting from the rather important road and carefree drivers who would cut lanes and overtake on blind corners.



La Parva view with towering hotels.

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We couldn't help ourselves, along the road is *Alstroemeria pallida*, below, a low flowering species which is easily distinguished from *Alstroemeria exserens* due to its smaller stature, horizontal yellow band on the flower (as opposed to the vertical yellow band in *A. exserens*).



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If you stay strong and continue upwards you reach a rather incredible town built onto the edge of a mountain. Towering hotels are perched onto the steep slopes which lay bare normally seen filled with snow, as this is the main ski area of Santiago. Driving through and taking a bumpy side road you reach a parking area for one of the ski lifts.



Due to a hotel cancelling on us a week before the trip we had to find another hotel which was lower in elevation. This resulted in us travelling from around 500 m to 3,000 m at the parking spot in a rather short time period. The ski lift was only running for a short amount of time meaning we were time pressed to get it, increasing to around 3,600 m. I should not have to point out that this is not wise nor is it recommended. The effect took place slowly for me, walking at the altitude is difficult if not properly acclimatised. After a little seat to gather ourselves we walked some 20 metres and came across *Viola montagnei*, our first rosulate



Viola. I was shocked by the size, having ever only seen photos where they appeared much larger, in reality they are cupcake size. Small little reddish brown rosettes with tiny dark purple flowers arranged in a ring. Often single or when together typically smaller or unequal in

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size. The plants always grew on slopes. A long tap root was exposed in a dying plant anchoring the species from the wind.



Exposed thick root of dying *Viola montagnei*.

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Nassauvia lagascae is a gem of a plant. Tightly formed rosettes form a cushion which produces large satellite disc inflorescences of individual bilateral flowers. Not your typical Asteraceae flower but we are in the believed evolutionary epicentre of the family. Not only did the family originate from this area of the continent it has repeatedly diversified since resulting in a staggering diversity. Of which we saw every form.



Nassauvia lagascae



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Oxalis compacta a fingernail size plant was scattered among the gravel with eye catching yellow flowers.



The stone shaped leaves of the succulent *Cistanthe frigida* which was tight in bud.

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In large scree dense, compact plants of *Senecio crithmoides*, below, were catching my gaze, much more appealing than its European counterparts.



Tucked into rock cracks was *Adesmia glomerula*, a genus I knew only from photos, a low growing species of pubescent pinnate foliage with yellow pea flowers.



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Galium eriocarpum

A familiar friend or foe, was *Galium eriocarpum*. This, I quickly grew to appreciate, often grew in crevices. As they begin to grow, they remain compact, flowering low and producing



an abundance of seed which had a much softer snowflake-like burr to be caught by passing animals or shoes. As our heads began to get sore we began our decline walking, stopping and quickly getting sidetracked by what was on offer.

Galium eriocarpum
in seed

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I spotted some large rocks and saw a nearby creak bring snowmelt into the centre. As a general rule, any change of habitat, aspect and resources is worth an investigation. We were rewarded with *Viola philippii* which was here in flower, a smaller species with pink flowers.



Viola philippii



Close to this there was an excellent slope filled with yellow. These were compact cushions of *Oreopolus glacialis*. A good form better than we would later see.

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Oreopolus glacialis

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Nearby there were rosettes of a curious plant *Gamocarpha scapigera* in the Calyceraceae, closest related to Asteraceae. I had longed to see this family, rosettes with some broccoli like inflorescence on top.



Gamocarpha scapigera



Gamocarpha scapigera, close up



Viola atropurpurea

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We were stepping carefully to avoid all the little treasures that could be trampled on without proper focus when I heard a yell. The third rosulate viola on the first day. I had only wished to see one so had been spoiled. *Viola atropurpurea*, the most succulent of the three species. A more tower forming plant with armour plated leaves which look like snake scales, neatly arranged like chainmail.

Small rosettes of various members of Asteraceae could be found. *Chaetanthera* and *Oriastrum* (recently split from the former) are both full of fine species.

Oriastrum dioicum with torpedo shaped buds and *Cerastium* like flowers.



Oriastrum chilense, a tiny hairy daisy which spread as far as you could see.

Chaetanthera lycopodioides was usually seen along with dense clumps of *Loasa (Pinnasa) nana*, below.



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Chaetanthera lycopodioides

As we walked closer to the parking area there was a noticeably wetter area due to snow melt and a flowing pipe. *Calandrinia affinis*, *Cerastium humifusum*, *Calceolaria* and *Ranunculus peduncularis* grew there. Surrounding the car park along there is enough to see. *Nassauvia pyramidalis* formed large colonies with *Sanicula graveolens* and *Melosperma andicola*.



Plants in wetter area.

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Calandrinia affinis



Nassauvia pyramidalis

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Melosperma andicola

As we processed everything by the car we slowly made our way down. On the ascent we had noted the locations of places that we needed to stop. *Tropaeolum sessilifolium* was a species I had not heard of and I am unsure why. A cheerful plant that filled the roadside with white flowers.



Tropaeolum sessilifolium

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As we were taking photos I noticed a *Pozoa* sp, that seemed to me to be growing differently from all other species that we saw. Perhaps one of the 22 described but not accepted species. It was growing prostrate with a spreading habit, this couple be due climatic factors, so I cannot be sure.

Compact shrubs covered in small five lobed light blue flowers of *Junellia spathulata*, below, easily caught the eye. The first being just by the sign for La Parva.



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Tropaeolum polyphyllum, above, was sprawling over the rocks on slopes, a few *Schizanthus coccineus* were sporadically found along with the ever-present *Collomia biflora*.



Schizanthus coccineus



Collomia biflora

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Chuquiraga oppositifolia

Chuquiraga oppositifolia became a favourite plant, large mounds of glaucous foliage could be seen all over the landscape with bright orange flowers, mostly just emerging. The buds became an instant favourite.





Oxalis squamata an annual species I have grown successfully, it grows with ease however I have found it germinates quickly after flowering before winter which is problematic as they do not overwinter. Therefore, they are best to plant out each year.



Tetraglochin alata, was on north facing slopes in full sun, this small compact shrub was growing in poor soils. I think we (in Utrecht BG) are one of the few gardens to have cultivated this species, unfortunately, as with many plants from Chile - Southern hemisphere and high alpine species also - it grows uncharacteristically in less intense UV light and higher rainfall.

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Flowing water was coming from further up the mountain and arriving at our feet.



Lobelia oligophylla, left, was in flower as we hopped over the stream to get to the other side. A small prostrate species in a diverse genus. From the towering African species to a 3cm tall plant which is easy to please in cultivation: division and cuttings from laterally growing shoots are super simple.

On the other side there was an overhang filled with *Erythranthe lutea*.

We continued down the mountain to call it a day, we would return the next taking a different turn at the top bringing us to Valle Nevado.



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Valle Nevado

The neighbouring mountain from La Parva is Valle Nevado. It is seemingly drier and in warm north facing (south facing in northern hemisphere is north in southern hemisphere) slopes rich diversity could be found on the drive along to the start of the hike. We drove on the same route seeing the plants from yesterday along the roadside. This time there was a cycling tournament which mean there was countless bikes alongside us which added stress but also more time to have a better look at the plants.

Malesherbia was growing in abundance, a super plant in the *Passiflora* family although not a climber but a short dry adapted shrub.





Alstroemeria ligtu subsp. *simsii* a ruddy orange flower of the typical pink was in a shady spot as we crept over a one-way bridge.

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As we reached the top we took the turn towards Valle Nevado and stopped after a couple minutes by a mound in full sun. *Mutisia sinuata*, below, formed an incredible mat of low green blue foliage which was covered in pale yellow flowers. *Tetraglochin alata* and *Chuquiraga oppositifolia* were more advanced here in the sunny aspect.



Abundant on slopes was *Schizanthus hookeri*, a charming oddity in the Solanaceae family. In flower it looks much more like an orchid than a potato but in seed little tomato like pods form on this typically, but not always, annual genus.

Forming in cracks and mat forming was *Haplopappus anthylloides* and *Calceolaria arachnoidea*; the latter an attractive silver leaved species.



Haplopappus anthylloides

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Calceolaria arachnoidea

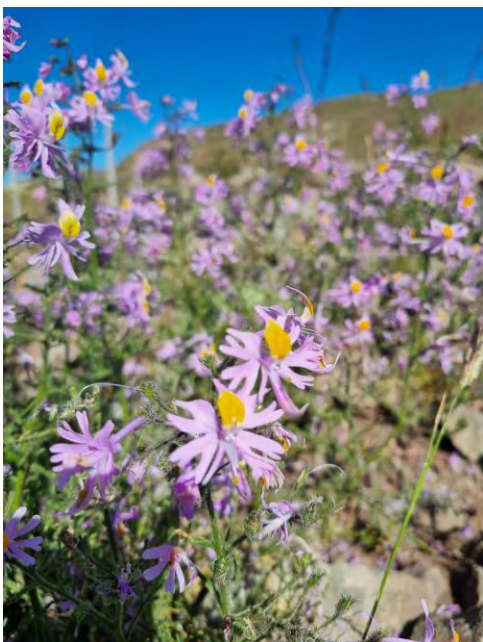


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As we continued on we began to start with the hairpin turns as we increased in elevation. Mounds of *Azorella monantha* (*A. ruizii* is also possible) was forming cushions in the mats and in full flower. Small yellow flowers filled each rosette which was more lax than those we had seen in the higher elevations.



Perezia carthamoides was sporadically found along with the occasional *Montiopsis andicola*. *Quinchamalium chilense* was everywhere, a fun plant in the Schoepfiaceae family. It is recorded as a hemiparasite although we had a hard time figuring out what it was growing on. It did not seem picky at all being found around many different plants (such as grasses, Amaranths) and environments.



As we pondered this question, we looked off into the distance to see hillsides filled with pink from *Schizanthus hookeri*.

As we stopped by a waterfall to check what the additional moisture would give rise to, we were rewarded with more *Tropaeolum polyphyllum*. *Astragalus* aff. *cruckshanksii* was growing on a south facing slope with *Stachys* which ironically proved to be the most difficult genus to ID to species level. As we were nearing the ski resort we were stopped in our tracks by *Alstroemeria*

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umbellata. A true gem, a low growing rosette which was succulent. The colours ranged from deep pink to light pink. A desirable species which must be attempted in cultivation.



As we reached the ski resort at around 3,000 m, we were impressed with the cycles that had made it up to the top. I have no idea what would possess you to do such a thing.

Yet they gave equally confused expressions as we scoured the hillsides and hotel surrounding for plants. As we walked to the beginning of the trail we could begin spotting *Astragalus arnottianus*, right, *Gamocarpha* and masses of *Viola phillipii*.



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Some exquisite lumps of *Anarthrophyllum gayanum*, above, were in flower, a blaze of orange. After much searching we found *Rhodolirium montanum*, below, in flower as we had only gotten leaves beforehand. The large lily like flower with red speckles is charming.



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Dense mats of tightly packed leaves were *Azorella madreporica*, slightly hairy on the leaves and silverish from a distance. We found a tremendous specimen more than a metre in diameter which was just delightful. They would begin to flower and produced these mosaic patterns in the plants.



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In a wetter spot we found *Calandrinia affinis* and *Discaria nana* an odd Rhamnaceae which was tiny and filled with white square flowers.



Discaria nana



On a grassy wet embankment which was dripping with water we found *Caltha saggitata* and *Plantago barbata*, left. Even the *Plantago* are nice here I thought!

Continuing higher we began to come across some more choice species. *Viola atropurpurea* which were in better condition and larger than at La Parva. *Tropaeolum nubigenum* was blueish silver and edges; it was the nicest in the genus for me. *Caiophora coronata* was growing around on the slopes. I had grown this in the Netherlands, it grew emphatically and flowered

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very well. It unfortunately exhausted itself and didn't survive more than a year; a problem common with some species from South America. Thankfully it produced a lot of seed and is easy to grow again.



Tropaeolum nubigenum



Caiphora coronata

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Oxalis penicillata was a dense compact species growing in cracks in a few spots. Along the path we were fortunate to spot *Knowltonia major*, below, on the way back. Sadly, not in flower but like quite a few of the genera they blend into their surroundings expertly making it a challenge to find them.



If you ever get the chance to go to Santiago I recommend these two locations. We also missed a few very high up species such as *Nototriche* and *Nassauvia pinnigera*. There are also a few species I have had to omit so the article doesn't get longer than it already is.

C.S.

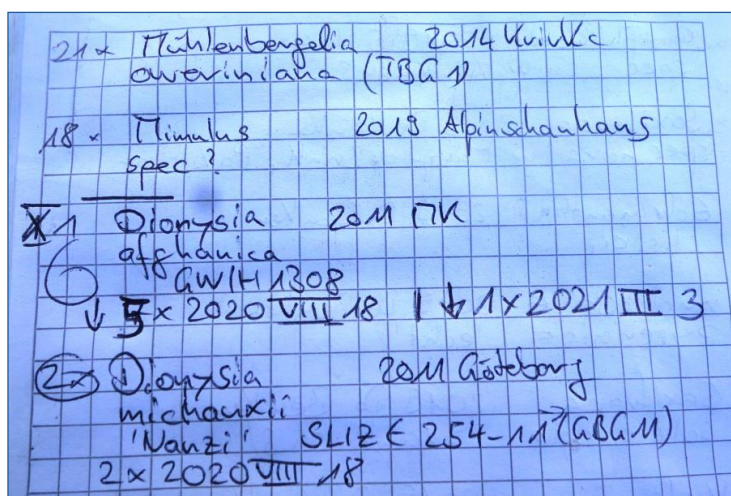
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--- How to ---

Dionysia – propagation by cuttings: Michael Mauser of Botanischer Garten der Universität Tübingen.

I was asked to show how we are propagating Dionysias here in Tübingen Botanical Gardens. As spring was really early this year the plants are much more in growth than usual. So this year the propagation by cuttings also starts earlier as usual. Most of the plants are finished with flowering.

To keep the true species of our collection of Dionysias the only way for propagation is a in a vegetative way, so that one creates genetical identical plants. Cuttings are usually processed after flowering, when the new growth has started, normally from May to June, and the new rosettes have a little stem but you can try cuttings throughout the year.

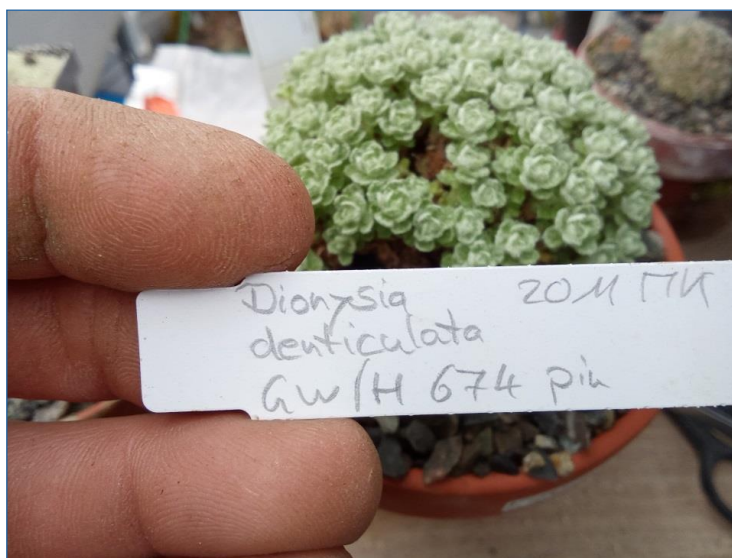


The cutting book - here I note all the cuttings. When are they made, when are they potted up, how many made roots. It's for checking the rooting rate and to learn more about the best time for taking cuttings. Some species are always a challenge for taking cuttings, so I try cuttings at different times of the year. But there are a lot of factors that

influence the rooting rate. An important thing is the condition of the plant, where you take the cutting from - you need a healthy plant with a good new growth.

The first plant for propagation this year is *Dionysia denticulata*, a species native to Afghanistan.

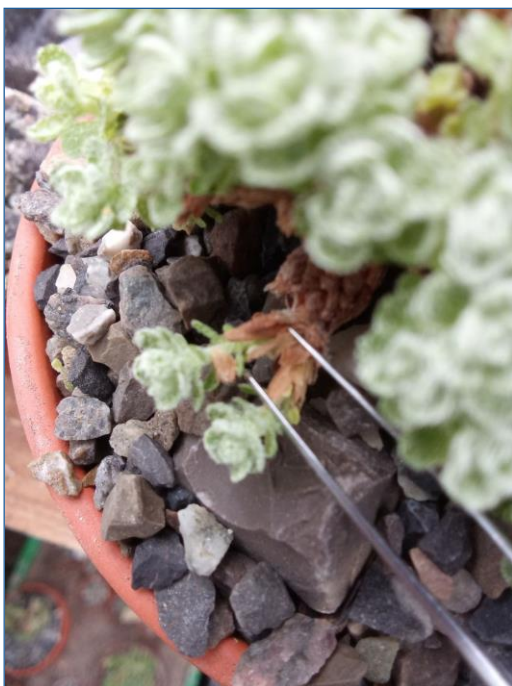
It's necessary to copy all the information about the collection, it's number and the style of flowers (pin or thrum) on the label for the cuttings. On the reverse of the label I write when I did the cuttings, so it's easier when checking the pots with cuttings how long they are already in the pot.



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Choose a healthy plant with a good new growth. The best area for taking the cuttings is at the rim of the cushion. There you normally have the longer stemmed rosettes, also you don't destroy the habit of the cushion too much.



This is what I choose to take as a cutting.



For removing the cutting I use sharp scissors, because they are easier to handle than razor blades and give also a good result.

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After taking away any dead foliage, I make a clean cut with the scissors - don't touch the cut point with the fingers.

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The medium to place the cuttings in is a fine pure pumice, this can hold a lot of moisture and has also air in between the single particles. So you have water and air around the cutting stem. This will prevent the stem from rotting.

The cutting is placed in a little hole made with fine tweezers. For placing, just hold on at a

leaf, not on the stem - as this can be damaged very easy.

Last step is to flush some water around the stem to give it connection to the pumice.

That's it. After 6 weeks the first little roots can be formed - but sometimes it needs much more time.





Dionysia iranshahrii with dead flowers.

There are some species of *Dionysias* with very tiny little rosettes, so taking cuttings of these is a bit more tricky and needs more fine work. Here we have *Dionysia iranshahrii*, native to Iran, a beautiful species that is very hairy, and has very nice violet flowers.

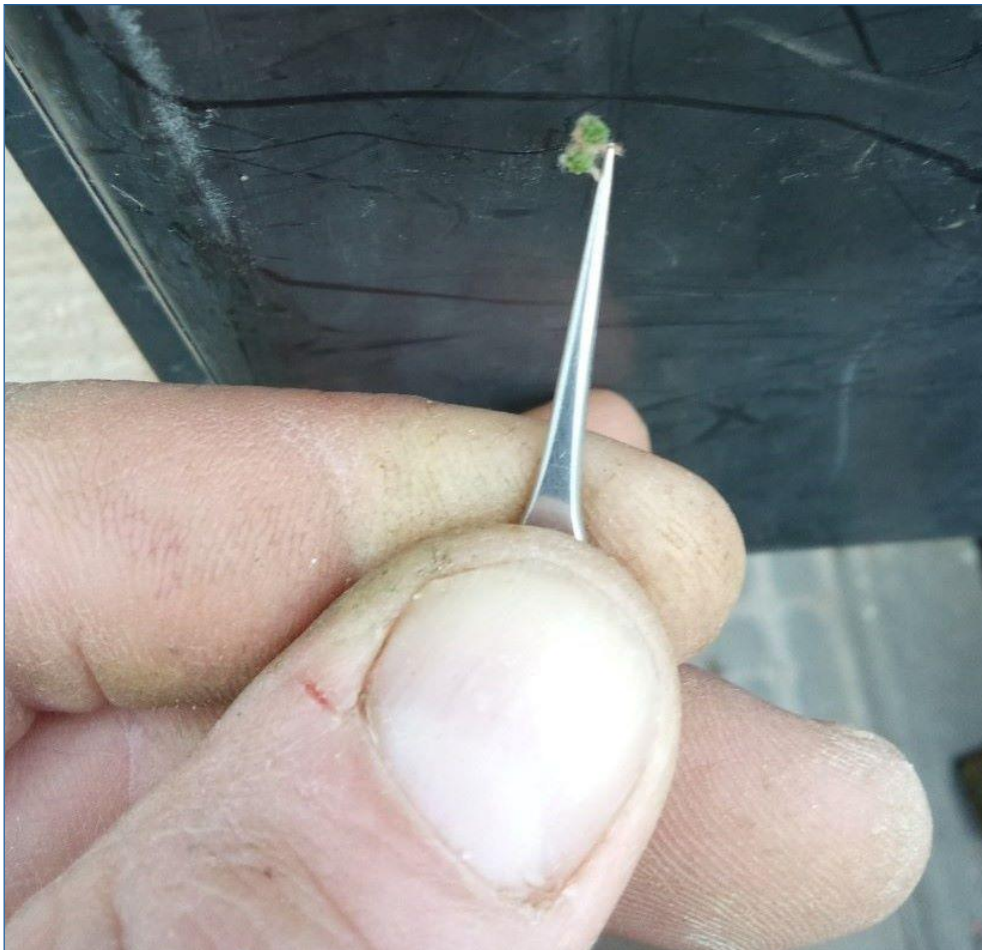
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For cuttings I normally take a larger piece of the plant, a branch from the rim. But be careful when cutting, be sure to see where your scissors are working (or you will cut through the main stem - but then you will have many cuttings!)



This is one single isolated rosette, with many dead leaves. I always try to take



away most of the dead leaves. If you will bring in dead plant material into the moist pumice this will rot, and possibly the cutting whole will die.

To clean the cutting it's best to hold it just by some dead leaves - not on the stem, because it can be easily damaged.

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As all this work is in a very small scale, for me it's more comfortable to work with these magnifying glasses.



Here we have the cleaned-up rosette, ready to be placed into the pumice.



Small cutting - thick fingers.
And don't touch the cutting point!

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Hole in the pumice



Placing the cutting into the hole.



Watering around the cutting to bring the stem into contact with the pumice.



And always have the label with all the information on it.

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This is a pot of some cuttings from last year, it took some time until a few of them got roots. These pots have to be checked regularly for dead plant material - one has to take it out before Botrytis can attack the cuttings.

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There were only two cuttings with roots from this species, it is *Dionysia zschummelii*. They could be detected very easily because they started with new growth.

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This one was dipped into water to float away the pumice, just to show the new roots. Often the new roots start from the cutting point.

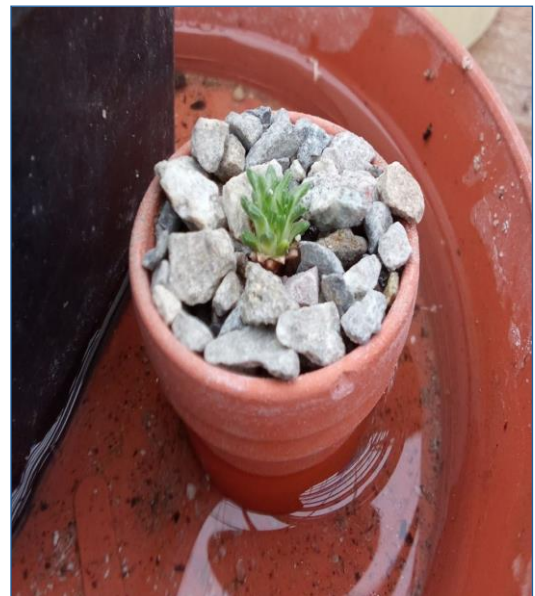


Now it's potted up in a small clay pot (because space is always rare I use 3 cm pots in the beginning). The medium for potting is a mixture of fine pumice, lava and Zeolithe. It's bought from a German company. You can see it in another picture. The pot is filled up with leaving 0,5 - 1 cm up to the rim.



The rest is filled with Granite grit. It's to allow the cushion to lie on a surface that dries out after watering to prevent rotting.

After potting the pots are place into a tray with water, so that the potting medium can soak up water. Leave it for half an hour, then bed the claypot into sand.



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Our potting mix:

Pumice, lava and Zeolithe, as sold by Vulkatec.de

Approximate mix is 30 % pumice, 35 % lava and about 35 % Zeolithe.

Storing the cuttings.

For me the best place to store the pots with the cuttings is on the floor of the propagation house. There it is shady and much cooler than on the sandbeds.

The cuttings are left open, with no cover. As alpine plants are used to save water in their organs, and often have hairs to prevent them from drying out, it's not good to cover them, as they will easily tend to rot.

The pots are placed in a tray with holes. To water the pots the tray is placed in a tray with no holes. Water is added in, about 1-2 cm, and all the pots can soak up water from the bottom. When the pumice is moist again you can remove the complete tray. This way I also water fresh potted Dionysias.



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We leave the cuttings uncovered on the shady cool ground of the alpine house.



Trays on the ground.



One must check the cuttings regularly and take out dead parts or moss etc.



This way you can multiply your plants.

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Propagation of some species is more difficult than others... propagation of *Dionysia afghanica* is always a challenge....



Right:

Dionysia afghanica GW/H 1308, the original clone from Afghanistan - and the mother of all the *afghanica* hybrids. Collected, only once, in NW Afghanistan in 1971 by C. Grey-Wilson and T. Hewer in the Darreh-Zang gorge near Belcheragh.

All photos, Michael Mauser.