

International Rock Gardener

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We are pleased to introduce Peter Tallbo from Mora in Sweden who is redesigning his garden to make it a better place to grow and propagate plants as well as becoming a more aesthetically pleasing space. Gerrit Eijkelenboom from the Netherlands, returns with Part 2 of his report, with his wife Iep, of their travels to see orchids in Sicily. It seems that the terrestrial orchids of Europe continue to maintain their allure and mystique for many as they prove to grow so well in nature in places far from the tropical climes that were traditionally associated with these plants. It is the hardiness of so many rock garden and alpine plants, of course, which is one of the most appealing features of such apparently fragile, often diminutive plants! Finally this month, we are pleased to be able to publish a new species of rosulate Viola from the Chilean based duo of John M. Watson and Ana R. (Anita) Flores – *Viola farkasiana* sp. nova.

Cover photo: *Ophrys incubacea* by Gerrit Eijkelenboom

---Garden Project---

Peppesträdsgård - a personal garden in the north by Peter Tallbo



Saxifrage under snow - Peter's garden still had snow cover well into April.

ME, MY GARDEN AND ITS HISTORY

First of all I have to say that this was very difficult to write...it's all very obvious while you are talking with people about your garden but to put all this into words is really hard. My name is Peter and I live in a place in Sweden called Mora, it's about 350km northwest from Stockholm.

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I have my own house and an area of 1500m² (- the buildings). The land is on a hill so we have a colder climate than our surroundings. It is US zone 4-5 normally. I have made some rocky beds and other things to make better microclimates. I have been gardening my whole life but for many years, when we had children, gardening came in second place so lots of weeds got into my flower beds. During these years I mostly grew woodlanders. Three years ago we had to dig out to change the drainage around the house so I used that impetus to remove all the old beds and make a new start. None of the new materials that were brought in had any humus; only gravel, grit, loam and coarse sand are used in the new beds. So now I am in my 3rd year with this garden. Some beds are older and some are newer but the main part is that age. I also put up a glass-house, mostly to grow vegetables like cucumber, tomato, peppers and chilli-peppers. There are also new beds coming and other stuff but I will write about this later.



Rear bed and glasshouse



Views in summer and under snow

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Photos above: Work in progress on the bed near the house

PLANS FOR THE GARDEN

My plans for my garden hinge on the fact that I always have loved plants that are not common in the horticultural trade. New beds will be made and most of the time I plant these beds out using what is growing in the seedpots. My next big project is at the front of the house, with the lawn which is not used. There are also several trees there, apple, oak, Juglans and Castanea. Below the oak the ground gets dry during summer so I have planted lots of bulbs there.

I have some thoughts for the rest of the area but I am not ready yet to proceed. I am thinking of using corten steel plates to make fronts of the beds and make a path to walk through of small rocks, but these plans are still very vague. Another crevice bed is also planned. Since I have been growing almost only woodlanders before, it is a new thing to grow alpiners.

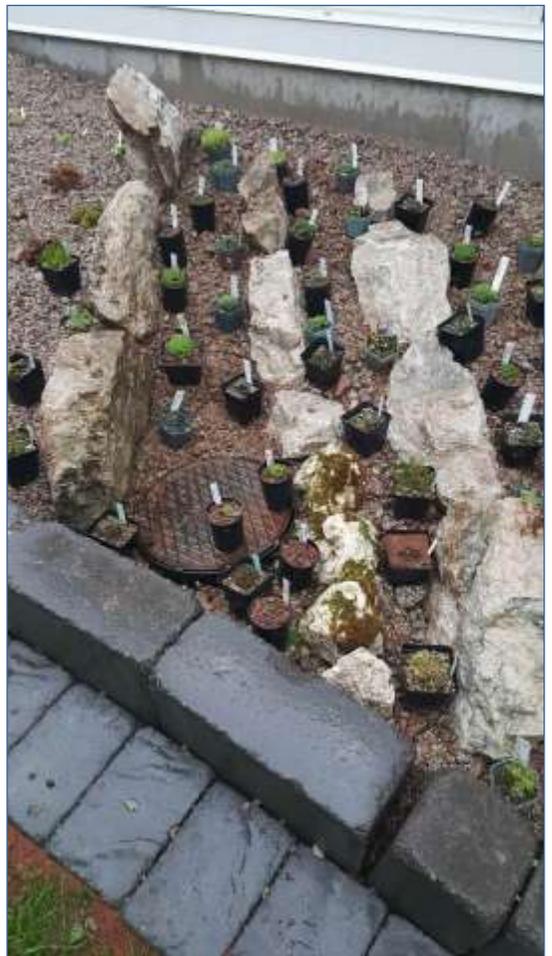
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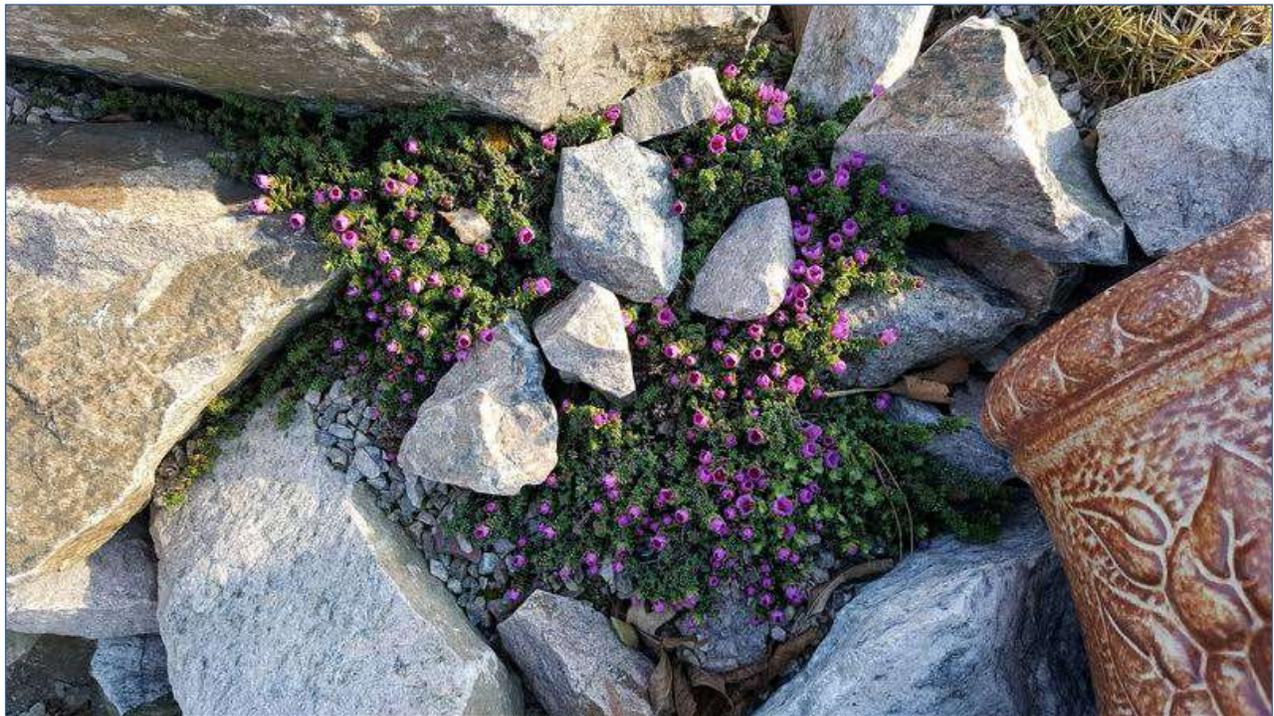
New bed for Saxifraga: this faces east, so left side of picture faces south. Here there is only grit and gravel below the surface grit. I removed the layer of grit, adding it into the mix of grit, gravel, loam and coarse sand that I use to fill the bed again.

Laying out the plants: in this bed there are only pure species of *Saxifraga* and a few other plants.

Below:
The plants and rocks arranged.



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Saxifrages in the new bed.

Left: *Saxifraga iranica* with *S. lilacina* behind.

Far left: *Saxifraga hirculus*

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SEEDS

Seeds from Kirgizstan and a book in Russian about some of the plants, I do not read Russian so need to ask when I want to know.

I sow a lot of seeds, mostly to try to build a stock of rare plant material so I can make cuttings and split them in the future.

I have always tried to get seed of wild plants from different areas in the world. Before the internet this was not easy but through some contacts and societies it was possible.

Most of the time there was no success with these seeds since it was hard to find information about them but then you start to learn by yourself. Today it is very easy to get these seeds. I try to get seed from rocky areas; favourites are Tien-Shan and the other former Russian states, Georgia, Armenia and so on.

Most of the seeds arrive in late November or December so they are sown and put out into the snow to germinate in spring.

The seeds mostly sprout in spring when we have cold nights and warm days. Could be 10-15°C during daytime and then -10°C during the night. This is a problem with species that do not like frost after germination: this is a new thing I found out from a friend. I have seen this mostly with bulbs; there are empty pots even after 2 years.

So now I try to grow some of them in (pots of them both inside and outside) the frost-free but cold garage, 2-6°C depending on outside temp. Alpine plants in growth seem to not have any problem with this, not as far I have seen of the species I have tried. There are, for sure, plant species that will need that but not that I have tried.

Another thing when spring arrives with its warm sun is that our ground is frozen so there is no water available for the roots. This means that when planting try to plant them where the early sun melts the



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ground or plant them in shadow of a rock. I have some plants in open ground and they will have a shading net next spring if needed. It is not that easy to find such material up here and that is the same with pots. Finding pots is really hard and if you find them they are expensive. I grow most of my seeds

in 7x7 cm and 9x9 cm square pots. I prefer deep pots since so many alpine plants develop really deep roots even as seedlings. The pots are always filled with roots all the way down when you split the seedlings.



Above: *Androsace ovczinnikovii* seedlings



Iris sari

I grow Iris (onco) from seed as well and they get 9x9 cm pots to start with and then are split into 9x9x18 cm pots. The reason for that is that they will be in these pots for 2 years and will be growing all year around in these pots. So I want them to have as many roots as possible to make them grow big. They are then supposed to be planted outside.

These are from bought bulbs but they have been outside in a bed during the winter, now the summer will tell if it will work or not to keep them without protection against rain. If they survive and flower next spring then they will have had a whole year's growth cycle.



Iris elegantissima

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Meconopsis 'Lingholm'

Meconopsis integrifolia

The alpines too are in their pots for 2 years before splitting, some do get split the first year but most of the plants with rosettes, *Saxifraga*, *Androsace*, are given 2 years. When sowing plants I know have fragile or tap roots,

I only sow one or two seeds in each pot to allow them to grow in peace and not disturb the roots until year two or early spring the next year before they start growing. This is what I do with many *Meconopsis* from high altitudes/scree, most of the time they have big tap roots and many hate to be split or disturbed while in growth.

GROWING SEEDS

As I said, I sow the seeds into 7x7 or 9x9 pots. The mix I use is of grit, loam and coarse sand, in 4 parts grit and sand and 1 part loam. The grit is 2-8mm and sharp, coarse sand is natural sand with 0-8mm particles, there is not that much 0 material so it is necessary to remove it. This is mixed together and pots are filled almost to the top, this mix does not reduce in the pots when you water it since there is so much grit in there. Then I get the seeds in and add a layer of grit on the top. While sowing alpines I mostly put the grit there first and then the seeds, this makes the seed fall like in nature to an empty space in between the grit. Depending on species I use either 2-8mm or if bigger species or more of a scree



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species I use 4-8mm. I feel that this works better than putting the seeds on surface first and then the grit above. Maybe the seeds are getting more light and easier to find their way. When they are sown they get watered and then moved outside.

I also sow many species from high altitudes in China; *Meconopsis*, *Primula* and other plants. Previously I used a peat-based mix; lots of grit and peat. Now I have stopped that and use the same mix for them as well as the other alpiners. I feel that it works as well and maybe even better since the pots that need more than one year outside still have the same level of the soil in their pots when the ones with peaty mix have been sinking in the pots.

About using limestone or not depending on species while sowing: I never make any other mix for any limelovers. I feel that the mix of only mineral material makes that significant in one way, my loam is partly lime but even in the mixes with pure sand and grit there are no problems.

When the pots are sown they are moved out into the growing area and put into sand beds. These are beds filled with coarse sand in the bottom so the pots can get water from below while they are in growth, they also get water from above as long as they are seedlings. They are kept in these until big enough to split or longer if they need some extra time. They are covered by snow during the winter and when spring arrives the snow melts and goes down into the sand. Most of the time there is not enough humidity in the bottom, or the mix is not getting enough, so I always water the seeds during the summer if there is no rain in 3-4 days. Most of the time we have some rain but I think it's better to water them than let them dry. I have no automatic watering yet so I get the job done myself with a hose. Plans are to make it more automatic or at least with hoses and nozzles around the beds. This year I dug a pipe down into the lawn from the new growing area which is on the side near the house, since the water outlet is there. Then I dragged a small hose into that pipe and a valve so now I have water at this area as well. You can see it where the yellow hose is in the centre.



My first growing area became a bit crowded when it was time to split the seedlings.

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New frames – with fritillaries



I had moved some plants due to the digging and moved them here but this area was badly infested by *Equisetum* so I had to remove it all.



Most of the material removed.



Getting new material in. I also created a new area to the right in this picture. Right: First start of the new growing area.

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Getting closer, there are different *Magnolia* hybrids from Ledvina planted around.



Now with netting for shadow, the whole area is done.



Last thing this past autumn was to make roofing for two of the beds, this was to keep some plants away from too much winter wet. I have not tried any plants below a cover outside before so I hope they will do well. The pots are in sand so hopefully they will keep the moisture.

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We do have some snow and here they are more than buried into 60cm of snow in December 2017.

I have also made a roof on two of the beds to keep seedlings dry when spring arrives. After the snow melts in spring it can leave a lot of water in the pots since the snow melts before the pot thaws. This often kills lots of small plants. Now the plan is to keep these below covers and see if that works. It could be that it gets too cold for the pots instead, but it has to be tried; so this winter will be the first. I have moved some *Androsace*, *Saxifraga* and other alpines together with some *Meconopsis* that maybe do not like to be that wet in spring. They handle this much better while planted. I also planted a lot of the seedlings out into beds.

I also tried to plant seedlings/plants out into pure sand during the winter including several *Meconopsis*, to try to split them in early spring due to resting time; some of them hate to be split while in growth so I'm now testing this way. I also planted some *Saxifraga* and *Androsace* seedlings into the sand. This will get covered by snow

but the sand does not hold any water so they should not be standing in water. I also planted some of them in one of the beds with a cover.



Some of the young plants that will be given winter protection

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It is very easy to see when the roots of a plant escape through the pots, they grow much faster than the ones that are still inside the pots. I try to repot and split those that are moving out of the pot, but often it is already repotted plants that use the extra space in the pot and grow fast. Some species are worse than others.. :)

When the seedlings are split they mostly have their own 7x7 pot and are allowed to grow in that during the first summer and then hopefully be sold in the autumn. I prefer to sell any extra plants I have in autumn when they have been growing in my bed during the summer and I have control of their growth and condition. I also can provide much better quality for the buyers of my plants since they are bigger and I can tell if they have done well or not. The plants that are left are going to be sold next year or kept, this will show if they do survive in pots or need to be planted. I always plant some of the species that are left and kept in pots in case any die. I grow many bulbous plants and they need more than one year to mature into flowering bulbs. Usually we are talking more than 5 years from seed to flowering bulb. If the bulb seeds have germinated they get a coloured label that means that there is life in this pot, this makes it easier when you sort them out to tell which ones have grown and which need more time. The ones with growth maybe need some extra fertiliser and maybe need cover during the winter.

When I see growth in year two, I switch to another colour of label and that label stays until mature. Now I have not got that far towards mature bulbs yet but labels are in stock. When they reach maturity and flower it's time to split them into their own pots and hopefully make some offspring or to be sold or exchanged.

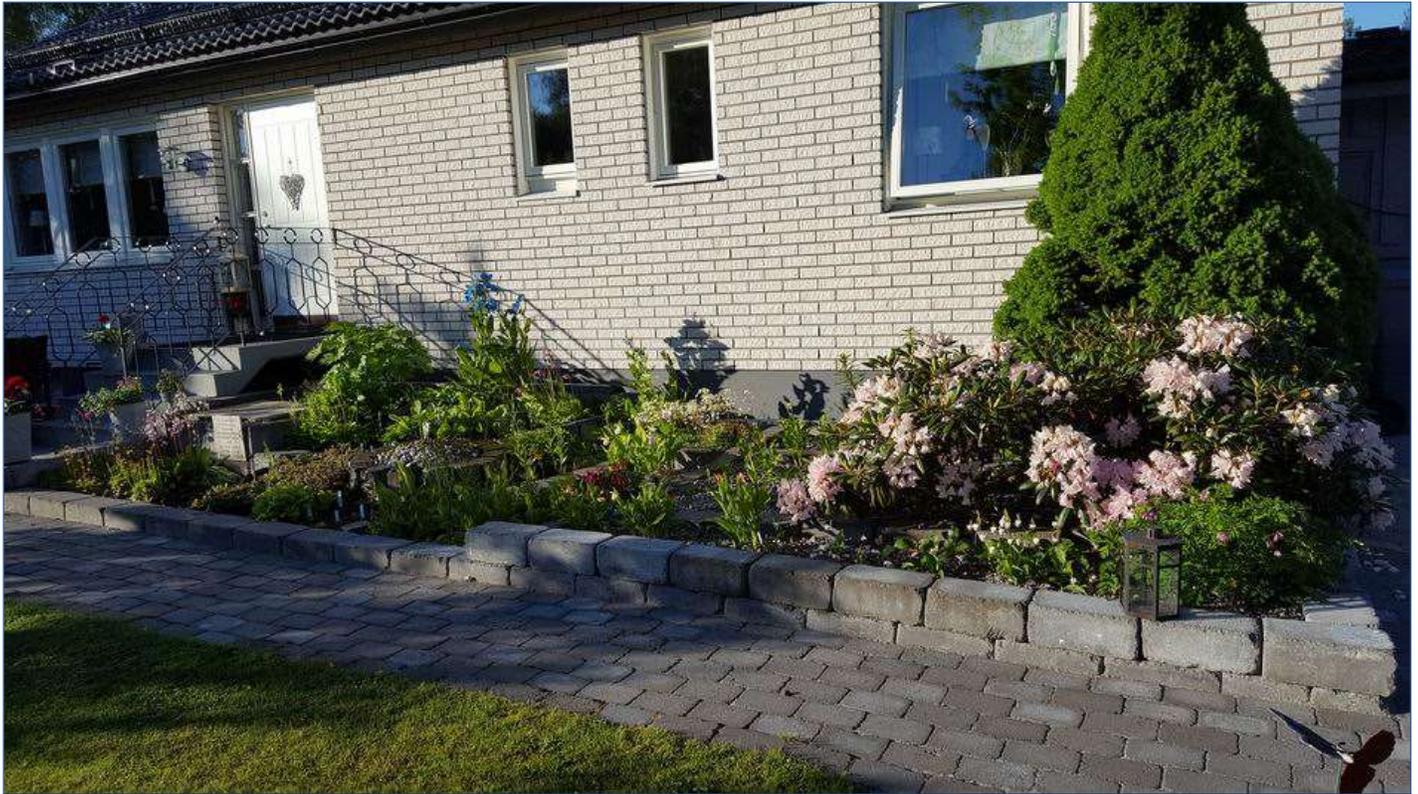
MAKING BEDS



When I make new beds I prefer to make them raised from the ground, not too high but about 20cm. First I dig out the lawn in the bottom one spade deep and remove it to another place or bed to be used later or as fertilizer. Many times I cut off the very top layer of grass and use the rest for loam and mix it into the coarse sand that mostly compose the beds. The reason to leave the loam and mix it with the sand and grit is that it contains lots of nutrients for the plants and it keeps some water. I didn't use loam before but begin to understand that it is a very useful material. It is not organic since it is more clayish, lots of different material mixed together.

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Here I have loam made mainly of limestone so that makes a good mix with the sand. I try to keep the mixes at about 4 sand + 4 grit + 1-2 loam. Most of the time this is enough to fill the planned bed with material but I make a layer of 10cm of coarse sand at the top, this is in case weed seeds get in, so they will be very easy to remove. I also plan to use a layer of grit as cover. So far I have not done this in my new bed but this is due to lack of right material. I want grey grit and we have almost only red, one can get some grey material in very small limited amounts but it needs the use of a strainer to filter out by hand the finer material you do not want.



I have also made some new beds that are for my woodlanders, since I grow some of the Chinese species and make exchanges so I got some woodlanders in return. These are great plants as well and you need several different beds for your plants. In these beds there is a huge mix of species just planted where there was space. *Epimedium*, *Hepatica*, *Polygonatum*, *Jeffersonia*, *Paeonia*, *Primula*, *Meconopsis*, *Arisaema* and so on.

The plan is to arrange them in a better way when things are getting more organised and I also learn the size of the plants and how they like each situation. I have some different material in my beds. One of them has composted bark from pine and fir..... this makes a soil with lots of big pieces and sand so it is very open and suits many of these plants that want good drainage. Other beds are leaf mould mixed with loam, this bed too has good drainage and one with peat mixed with loam and leaf mould. This mix keeps humidity at a good level and the peat keeps the water and also lots of air in the mix. I am making another bed now of loam and leaf mould in between some trees, this will be a dry bed so my plan is to get some bulbs there and something else. I also have a big bed filled with the same huge fern...this is a bed in shadow from 11am and all the rest of the day. These ferns will be dug up and thrown away and it will be a bed for plants that like shadow; *Arisaema*, *Trillium* and the like.

Front garden with grass - the area to be redeveloped.



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I mentioned the front garden earlier, this is an area with lawn that is not used for anything, it's just an green space. The plans are to use it and make beds instead of lawn. There are some apple trees there and some other trees. It is also a place where all the snow goes from the drive-way in winter. This means that it's not possible to have shrubs there since it will be necessary to walk in these beds to move the snow as far away as possible to fit as much snow as possible. So some plans are as mentioned previously, use edging of steel in front and some other material in the back to raise it, another thing could be to just raise it a bit so it will be easy to go there with the big snow shovel. I have not decided how it will be yet so that will be another story. I also want to fit in a bigger area of rock garden there, either with flat rocks placed vertically to create shade or bigger rocks to do the same.



The new bed shown in front of the existing "house" bed, replacing some of the lawn.

WINTER IS COMING



Seed frames, left, with water-logged pots after snow melt and right, with new system.

Yes ..winter is coming. From middle of September we have risk of frost or even frozen ground, this means that most gardening outside is over. Frozen ground is good since if we have rain it does not get into the ground so plants are not affected by it. Maybe if you have plants in a flat bed there are problems but I always try to keep beds from being flat. Seedbeds are done and ready for winter, other beds in garden are ready. I do not do much to get all this done; my point is that they have to be able to

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take care of themselves. I have some plants that need and get extra care, maybe a small cover of plastic or just a flat rock but they are very few. When this is done then we can wait for the snow to arrive, most of the time this is late November or a bit into December. This year we got snow in the middle of November and so far we had 60cm. 50cm of this fell in 36 hours...so there was some time spent to remove the snow. When snow arrives it makes a great climate for the plants, the temp below snow are continuously about -2C to 0C or even around 1C. This means that it is possible to keep species that are not supposed to survive here due to cold. This is also a truth with modification, since there are very few who have tried plants that are not supposed to grow outside here. I have an example of *Crocus cyprius*, I bought these from a well-known bulbman and asked if they are frost tender? "Yes" he said but of course I had to try, so I planted some of the bulbs outside into pure grit and almost no cover from snow in autumn and in spring there were crocus in flower. This is our advantage up here while growing alpines as well. When we have the ground frozen and hopefully some snow, they are below ground and resting; waiting for spring to arrive. I do not worry if it rains or about the plants getting too wet. We can have temp going down to -35C or even more during the winter, then it is a bit cold outside. But these days are not so many anymore; before we might have several weeks of -20 to -25C, but that was a normal winter for us. That being said, this year we still had snow in April.



SPRING ARRIVES

Spring arrives in mid-April, this is when the sun starts to melt the snow, this time is most of the time no problem, but since I have lots of rocks and the rocks absorbs the warmth from the sun, the snow melts much faster in that area. The ground where the plants are planted does not thaw that fast so you need to cover the plants from the sun. I have tried to plant so they will have shade but I need to use shade-net to be a bit more safe. I have not used it so far but haven't got that many plants either but I have now got some net to use in spring. One thing that I forgot was to put some sticks in the ground to hold it in Spring. It is hard to get them into frozen ground. When the snow melts there is no problem, this is the time the ground is supposed to be filled up with water for the plants to use later.



Waiting for Spring

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SUMMER

In summer we have some rain showers from time to time. The temperature is most of the time around 20C. In July/August the temp can raise to 30C for some days. This happens more often these last years and we also have a lot more wind. The wind is due to more rain showers moving around or bad weather and later in the summer lots of thunderstorms. In some beds I have to give extra water. Beside my big rocks there is no problem with water since there is always moisture below the rocks and I have tried to get material all the way down to the bottom before planting the plants into the rocks. At the beginning I just filled some gravel and planted. Most of these plants died due to being too dry. Then I understood that they need connection to the bottom so I filled it all with sand and hopefully that will do the trick. This summer will tell if it works.

GETTING PLANT MATERIAL

This is how my suitcase always looks like after a visit down to Holland.



Some of the stuff that follows me home.

Living this far north and trying to get plant material is not as easy. We are only a few

alpine-growers here in Sweden and I am alone in a radius of 100km. This means that if I want to visit someone it is a small trip of 200km, if you travel that distance in Holland you almost crossing the country. But since the internet and Facebook arrived things have been much easier. You get some contacts both here and there and it is Facebook's fault that you are reading this...I found Gert Hoek there and with him I visited Bart Moerland and so it goes! I have got lots of contacts from different places and to get plants today is not a big problem.

It is also very easy to get lists of seeds when those are available from all around. I buy lots of seed

and try to grow them. Much of the material that is available in, for instance, Holland, has been around for a while so many people are growing the same stuff. I try to grow things that no one has grown before and make them available to others or even some botanical garden. When I send my plant list to some friends I get the reply.. "I want them all" - "Ok" I say, "what are you going to remove from your garden to fit all these in?" I think there are some species that will be introduced in some years from friends in Holland. I have no big stock since I'm new into this and during 3 years you do not manage to build a stock. I'm getting there day by day and year by year to get plants big enough to get seeds and possible to split to be able to have extras.



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Left: *Iris kuschakewiczii*

Far left: *Hyacinthoides x massartiana*, these are kept frost free until I have some more bulbs to test them outside.

Below: *Colchicum luteum*

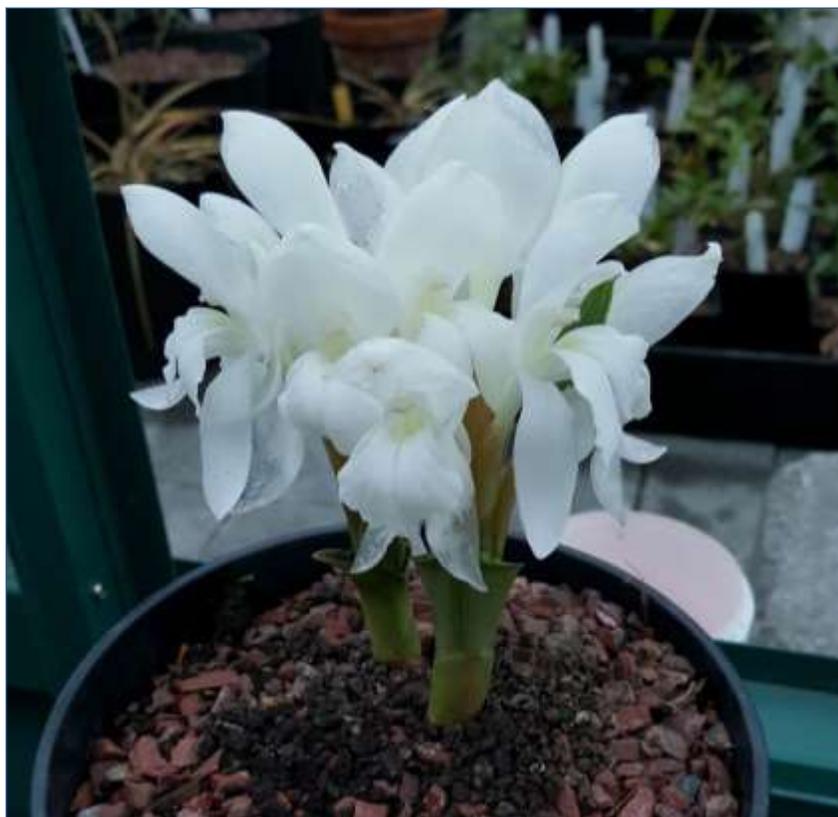


Left: *Iris rodeonenkoi* a new described species from near the river Naryn, it comes from the same valley as *Iris narynensis*. Right: *Primula algida*

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Left: *Narcissus rupicola*
Below: *Roscoea humeana alba*



Iris cuniculiformis, this is the true species, I have got help to key this out to be the right species. It is hardly found under its true name in cultivation and it is hardly possible to find a true picture on internet.

Iris cuniculiformis seed capsule, this is not described in the description of this plant.

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Left: *Colchicum kesselringii*

Below: *Corydalis hamata*



This season there are about 400 packets of seed that are to be sown. These are mainly cold-hardy species that should like the climate up here but as I wrote before very few have tried growing these species. Many of them are totally new into seedlists and to the people that try them. *Parrya* is one of these, I sowed some this past year and they did well except that they got attacked by cabbage butterfly larvae. They search for such plants when they do not find any cabbage, so next year these will be covered with some kind of fleece. They are supposed to be hard to keep so will see this winter if they survive in pots and there are, if I remember right, also some planted out into different beds.

PROBLEMS WITH MATERIAL OR LACK OF MATERIAL



Being an amateur grower in Sweden I am always hunting for material, from pots to whatever else, fertilizer, labels, seed and so on. Since there are very few commercial growers here compared to Holland there are much bigger problem to find what you want. I have been searching for a long time to find anyone that will sell pots to me without being a company with vat registration. Luckily I have ordered for long time from Meyers reseller here in Sweden so it is possible to get stuff there at a good price. But if you can't then you have to pay 20 cent for at 9x9 pot...and this is how it is with a lot of suppliers. Luckily the garden societies are aware of this so they buy full boxes of pots and sell them on to the members. I have found my own way to get these thing at almost the same price as Meyer.

Another thing is lack of growing media, we have lots of gravel pits but they only supply crushed gravel and that contains too much 0 sized material and becomes like concrete while dry.

I prefer to use these plastic buckets to load material on to the trailer, this makes it easy if you want to get different materials in the same trailer load.

---International Rock Gardener---

Suppliers may have the coarse sand that is 0-8mm but that's it, it is not possible to get any other material. Crushed material 2-4mm or 4-8mm is better to use with alpines than natural grit since these stay more stable in the mix and do not move to the top since they have rough sides that attach well to the sand or in the mix.

I load and unload using a sack barrow.



NAMING

There can be problems with names when you buy unknown species and some fun to find the correct name. I mostly try to buy seed and plants that are relatively unknown. I have got some and also manage to give them a name after some help to key them out. This small *Saxifraga* is little bit of a challenge since it depends on some hairs here and there and their location so here are some pictures used in the key. It started with seed from Trillium.no *Saxifraga* sp. yellow BO14-184.



This is how they grow, now there are many plants in one spot, I also got only one flower stem with flowers but sacrificed it to try determine the species.

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Left: The plant in question, right: another species from the same seed packet.

It all ended up that we manage to key out the following species *Saxifraga tsangchanensis* and *Saxifraga gonggashanensis*. I have more cushions with different looking leaves that I hope will flower next year and hopefully they are different species and that these two survive the winter and gives some more flowers and hopefully some seeds.

Thank you very much for reading this far, here is a photo of me showing that there is no bad weather only bad clothing.

If you are interested in more info or to see more of how I have and what I am doing, and if you have stuff for sale or exchange, please have a look at www.facebook.com/peppestradgard and if you have some question it's also ok to send me an email on ptalibo@gmail.com If you do not use Facebook and have interest in my seed or plantlist, please send me a mail and I'll send you a list when there is anything available. I will close with some photos of the beauty that is Sweden. P.T.



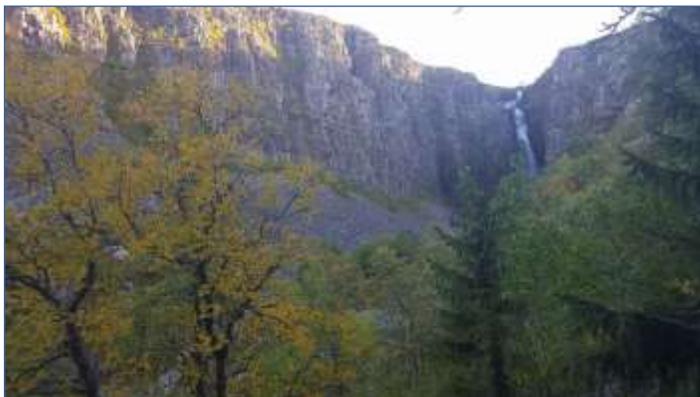
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I live close to the most southern mountains here in Sweden, I have about 2 hours of driving to get here.



Natural rockgarden



Many unusual mosses thrive in the mist around the waterfall. Mosses have no roots and must take in water from the air.

Due to the waterfall mist, it is always damp at Njupesjär, which is the main explanation for the site's remarkable flora. This is also the southern limit for mountain sorrel and alpine brook saxifrage.

During the winter, the water of Njupesjär freezes to an impressive ice-fall that is a popular challenge to climbers. It is regarded as one of Sweden's best ice-climbing objectives. Ice-climbing is permitted from 1 December to 31 March. Due to the risk of landslide, no one is allowed on the canyon walls during the period from 1 April to 30 September.

The dipper is a little bird that lives in and alongside running water. It can be seen perching on stones and the edges of ice, bubbling and bowing until it suddenly plunges down into the water. It swims with its wings and runs along the bottom on the hunt for worms.

The highest waterfall in Sweden, Njupesjär

---International Rock Gardener---

---Plants in habitat---



Orchids of Sicily, part 2 - Gerrit & Iep Eijkelenboom

In 2016 my wife and I spent 2 weeks on the island of Sicily, the last week of April and the first week of May, in order to find wild terrestrial orchids. Actually it was too late, but in the north and especially in the mountains we have found a lot of the most beautiful species. But in the south all orchids were gone, due to drought and heat. A new trip, to find the missing species was necessary to complete the article that began in [IRG 84](#).

From the 27th of March until the 3rd of April 2018, we have found those missing species. Not all, two of them come into flower a week or two later. But generally I may present a rather complete overview of the orchids occurring on Sicily.

After landing on Catania Airport, we turned north, in the direction of Mount Etna. This mountain is home of a very special orchid.

***Ophrys sphegodes* subsp. *grassoana*.**

There is a small population growing in lava at the foothills of Mount Etna. It is special indeed, because orchids normally do not grow in lava. Most plants do not grow in it, maybe after several hundreds of years in eroded fields, but in this case, these orchids grow in a lava-field from an eruption in 1926, so a young lava-field.

On the picture you see a huge lava-bolder behind the orchid, *Ophrys sphegodes* subsp. *grassoana*.



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It is a beautiful orchid. The sepals are green with darker green lines. The 2 petals are large, broad, undulate and sometimes darker than the sepals. On one of the photos even red-brown. There is a large marking on the lip, covering almost the entire surface, glossy. A band of long white hairs on the edges and mostly a broad yellow margin completes the third sepal (the lip).

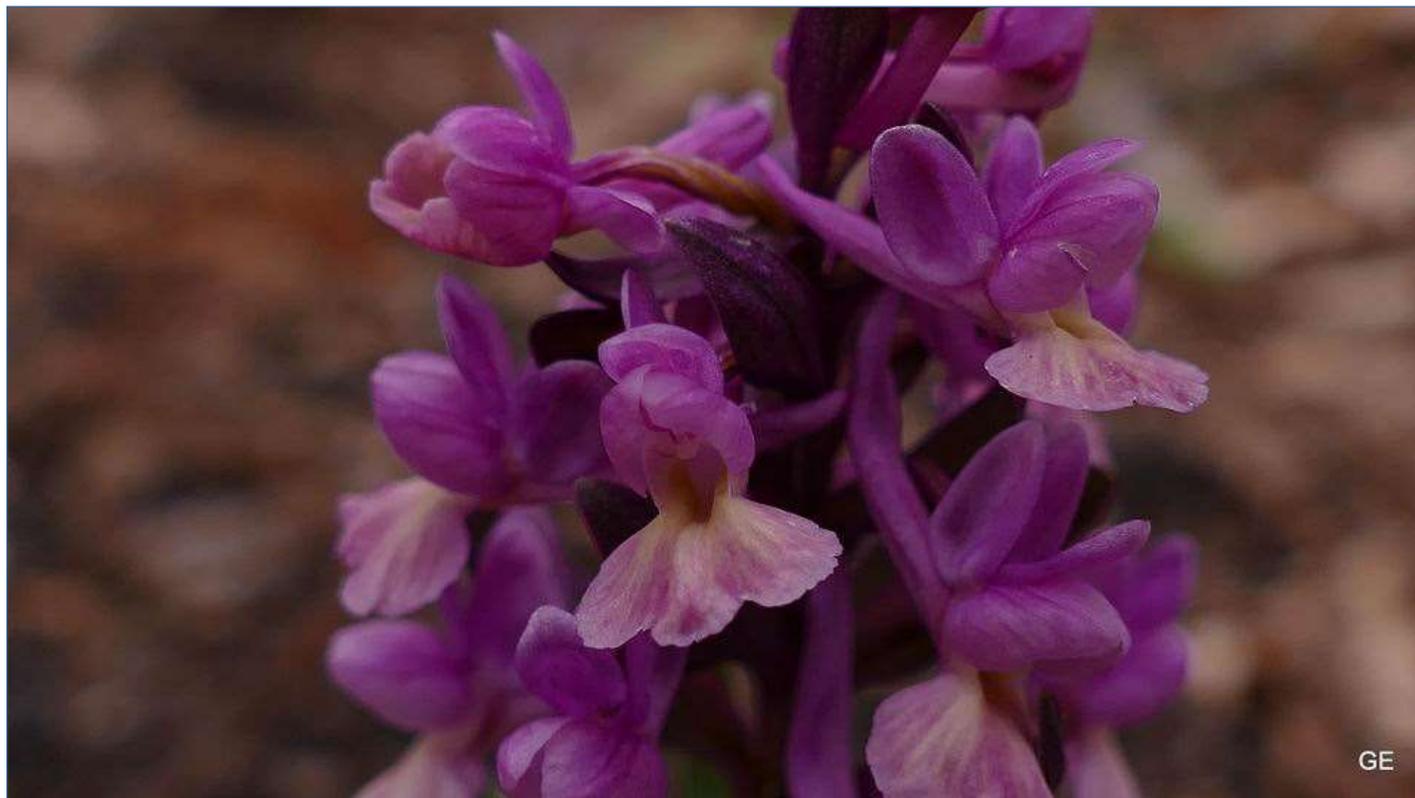


Ophrys sphegodes subsp *grassoana*



Perhaps 20km from this findspot, not in lava, but in a pine wood, we found *Dactylorhiza romana*. This species occurs in two colours, yellow and magenta, but also in many intermediate colours. The side lobes are folded down.

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Dactylorhiza markusii

In a pine wood not far from it, we met with the *D. romana* look-alike ***Dactylorhiza markusii***. The side lobes are held horizontally. [In the first article of orchids of Sicily, there are remarkable pictures of *Dactylorhiza markusii* in the snow. Page 36 [IRG 84](#)]

After this we headed towards the south of Sicily to our hotel in the centre of the old town of Ragusa Ibla, a hundred metres from the cathedral (Il Duomo). There we have experienced a procession because of the Holy Week.



Procession at Il Duomo

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Ragusa-Ibla



Ophrys lunulata

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Ophrys lunulata

Ophrys lunulata is an endemic species. The lip is pendent, appearing oblong, reddish-brown, with a submarginal band of hairs, long and dense. On the middle of the lip there is a marking, blue, like a drop or a horseshoe, sometimes in the shape of an **H**.

The next two species belong to the *Ophrys exaltata* group within the *Ophrys sphegodes* complex. The members of a group like this, share common characteristics: Green pseudo-eyes. ***Ophrys exaltata***, is endemic to Calabria and Sicily.



Ophrys exaltata



On the sepals we see clear green lines. The lip is reddish-brown, appearing small and narrow. The marking on the lip is rather simple, forming an **H** or **X**. There is a submarginal band of hairs around the labellum. The pseudo-eyes are green.

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Another member of the same *Ophrys exaltata* group is ***Ophrys panormitana***. A species, easy to be recognised by its green pseudo-eyes. But further, difficult to determine because of the variability of the lip. Sometimes rounded, sometimes quadrangular-rounded. Sometimes with and sometimes without lateral lobes. On the lip you will see small swellings. The speculum, is blue or reddish with a large **H**.



This page: *Ophrys panormitana*



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Ophrys incubacea (also cover image)

Ophrys incubacea is a common species in great parts of Europe. From Portugal to Albania. A very dark coloured orchid with prominent triangular swellings. The speculum with a large marking on it, forming an **H**, is blue and glossy. The edges of the lip are with dense hairs.

Ophrys garganica is now considered as a new taxon, not a subspecies of *Ophrys passionis* anymore. It belongs to the *Ophrys incubacea* group. Although the name suggestst its origin is from the Italian peninsular of Gargano, this orchid occurs in Italy from Tuscany to Calabria in the south and in Sardinia and Sicily. The petals of this variable orchid are very large and broad and often in another colour and undulate, very showy as you can see on the next pictures.

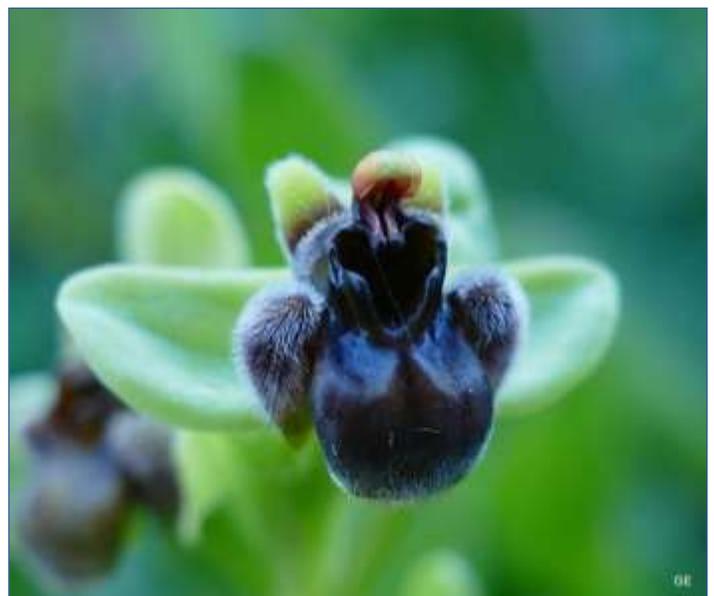


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The undulate margins at the tip of the labellum of *Ophrys gargarica* often turn from red to yellow, when aging. Large pseudo-eyes are clearly present, but black and not green.



Ophrys gargarica

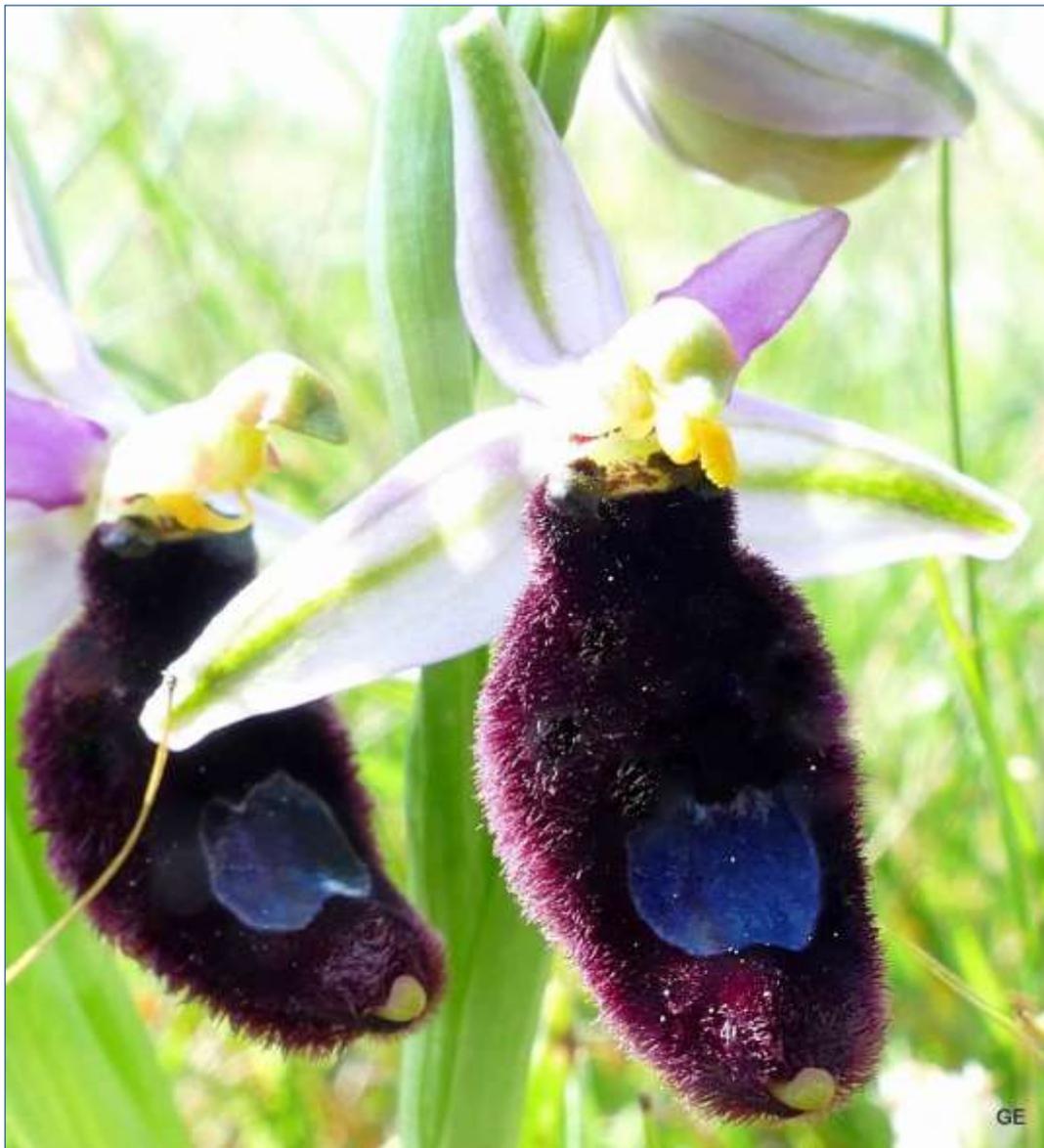


The next one, above, is *Ophrys bombyliflora*, the cute and tiny bumblebee orchid. This widespread species does not need any introduction, so just the pictures.

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Ophrys bertolonii, above, was a species described in part 1 of this article.



Ophrys explanata

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Ophrys explanata, is a species almost similar to *Ophrys bertolonii*, but the lip is broadest towards the base and not like *O. bertolonii* broadest at the tip.

In part 1 of *Orchids and other species of Sicily*, I showed a lot of species of the *Ophrys fusca*-complex. Now the remaining species except *Ophrys mirabilis*, unfortunately, which was not in flower at that time.



Ophrys caesiella

Ophrys caesiella: A species growing on Malta and Sicily. Difficult to distinguish, like almost all members of the *Ophrys fusca* complex. The marking on the lip is rather drab. The speculum is elongated, reaching the sinusses. The speculum is bluish-grey, sometimes marbled with indigo. The sides of the lip are turned down and under. The border of the lip is yellowish.

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The last representative of the *Ophrys fusca* complex is ***Ophrys gackia***, above, endemic to the calcareous massifs of southern Sicily. Named after C.Gack, a German biologist. Not a spectacular species, in fact, rather dull. The speculum is milky, the margins of the lip bright yellow.



Ophrys grandiflora (*tenthredinifera*) was described already in part 1, but I had not seen such a robust plant as this one before.

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The last orchid is a very special one. ***Ophrys biancae***, the supposed hybrid of *Ophrys oxyrhynchos* and *Ophrys tenthredinifera*. The influence of *Ophrys oxyrhynchos* is obvious. I was astonished when I saw this orchid for the first time. I did not realize it was so small. And because of that, so difficult to find between the other plants. The reader will certainly doubt, that these pictures belong to the same species, but is definitely correct. No flower is equal to another, unless of the same plant. Probably due to its hybridogene origin. The lip is quadrangular to trapezoid. velvety and reddish-brown, often with a broad yellow edge. On the shoulders you will see two small rounded, near pointed swellings. Very importantly for reasons of determination, there is a complete band of marginal hairs. This is not the case for *Ophrys oxyrhynchos*. The margins of the lip are spreading and mostly reflexed.

The speculum, glossy bluish-grey forms an **X**, sometimes with lateral branches, sometimes forming a central ocellus. The appendage is prominent, like *O. oxyrhynchos*, directed upwards, inserted into a deep notch. Endemic to Sicily..

***Ophrys biancae* hypochromatic**

All pictures by the author, Gerrit Eijkelenboom.

Books:

P.Delforge: Orchids of Europe, North Africa and the Middle East. Edition 2006

P.Delforge: Orchidees de l'Europe, d'Afrique et du Proche-Orient. Edition 2016.

Websites: [Orchids of Britain & Eastern Europe](#)
[Günther Blaiich's site.](#)



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---Species description---

A new species of rosulate viola (*Viola* sect. *Andinium*. *Violaceae*) from the mid-southern Andean sector of Chile and Argentina

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Abstract

We introduce and describe the new species *Viola farkasiana*, providing details of its discovery, eventual recognition as different, and its probable evolutionary origin. Aspects of its narrow distribution, ecology, including conservation situation, as well as the background to the specific epithet are discussed. The taxonomic history of the novelty and its close relatives is also outlined.

Key words: alliance, misidentification, mutualism, natural hybrid, Patagonia, rare, vulcanism, vulnerable status, *Yramea* butterflies.



Fig.17: The bare volcanic cinder and ash western foreshore of Laguna del Laja, the habitat of the type site. (John Watson, 2 December 2009)

Resumen

Se introduce y describe la nueva especie *Viola farkasiana*. Proporcionamos detalles de su descubrimiento, su eventual reconocimiento como diferente, y su probable origen evolutivo. Se discuten aspectos de su distribución restringida, ecología, incluyendo situación de conservación, así como los antecedentes del epíteto específico. También se detalla la historia taxonómica de la novedad y sus parientes cercanos.

Palabras claves alianza, identificación errónea, mutualismo, híbrido natural, Patagonia, rareza, vulcanismo, estado vulnerable, mariposas del genero *Yramea*.

Introduction

With new species being found regularly, and some uncertainty existing regarding various identifications, the current provisional total of known species for the genus *Viola* is calculated approximately at 610-650, based on latest figures by its leading authorities with the addition of subsequent newly described taxa (Wahlert *et al.* 2014, Watson & Flores 2015, Capelo *et al.* 2015, Fan *et al.* 2015, Chen & Jin 2015, Tomović *et al.* 2016, Knoche & Marcussen 2016, Gonzáles & Cano 2016, Watson & Flores ined.). This number includes a significant percentage of natural hybrids, known technically as nothospecies (The Plant List 2013), a significant aspect in the present context.

Viola is reckoned to have evolved in the geographical area where the new species of sect. *Andinium* W. Becker described here is situated, i.e. what is now the south of temperate South America (Clausen 1929, Ballard *et al.* 1999, Marcussen *et al.* 2012, Marcussen *et al.* 2015). The genus is aged at 30 Ma, and sect. *Andinium* divided from the rest of *Viola* at ca. 29 Ma (Marcussen *et al.* 2015). This long period of separation and evolution, coupled with the section's relative isolation within South America

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below the equator, as well as its specialized adaptation to Andean conditions, explains some of its remarkable life-forms, so completely different from the rest of the genus. Principal among these is the rosette development, as exemplified by this newcomer. A likely sequence for the section's evolution has been advanced by ourselves (Watson & Flores 2012b, 2013a, 2013b). However, this informal and conjectural review lacks any content relating to hybridization, which is currently in the process of being discovered as a critical and still active factor (Watson & Flores, 2012c, ined.).

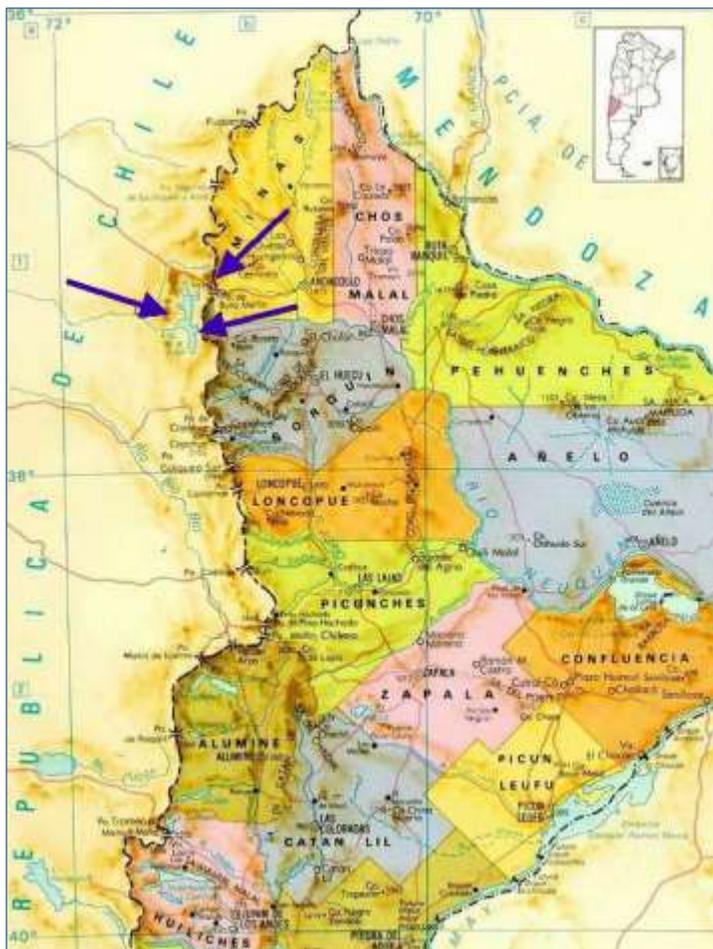


Fig.1: The known and recorded distribution (arrowed) of *Viola farkasiana* from an Argentinian perspective, showing coordinates.

Section *Andinium*, which was first formally recognised by Reiche (1893), then studied, legitimately named and amplified by Becker (1925b), is large and poorly understood. It is currently numbered by ourselves at 96 described species we accept, with 48 more known, including the taxon presented here (Watson & Flores ined.). This infrageneric group is distributed from the equator to southern Patagonia in the Andes, also along sectors of the adjacent Pacific coast and at intermediate elevations. The main centre of distribution lies in the central temperate area of Argentina and Chile, more or less between 30°S and 41°S, and contains this new species near its southern extreme. [Fig.1] Secondary, lesser centres are situated in NW Argentina and Peru.

The novelty here has been the subject of misidentification, both in literature (e.g. Rossow 1988) [Fig.2] and in the field.

We detail this history below. Our own first encounter was in 2002, when we also failed to recognise its distinctiveness. In 2008 however, on finding it again elsewhere, at the type site, we had no doubt that it was different from all other species of the section, including those to which it was most closely and confusingly related.

Fig.2, right: R.A. Rossow *et al.* 2007. *Viola farkasiana* (as *V. vulcanica*). Neuquén. a) Plant. b) Underside of leaf with glands. c) Inferior petal. d & e) Style crest. (Courtesy of M.N. Correa & INTA)

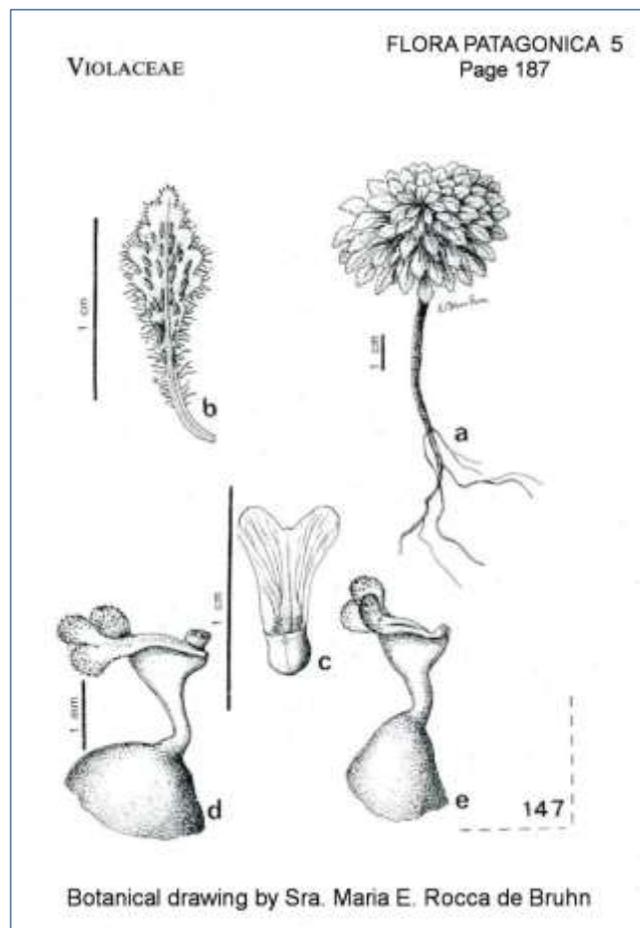




Fig.3: *Viola farkasiana* en masse on the ashy western upper foreshore, seen from the lakeside of the Laguna de la Laja. (Anita Flores, 24 January 2008)



Fig.4: A closer view of the type colony of *Viola farkasiana*. The predominant solitary rosetted habit may be observed, as also a number of immature plants. (Anita Flores, 24 January 2008)



Fig.5: F.& W.11612 *Viola farkasiana* A flowering specimen on the scoria at the type locality. (Anita Flores, 24 January 2008)



Fig.6: Plants of *Viola farkasiana* out of flower, scattered over fine gravel at the higher Pichachén pass. Note, among those arrowed, the 3 green rosettes; a form not seen elsewhere. (John Watson, 23 January 2008)



Fig.7: *Viola farkasiana* flowers earlier at Epulafquen. This post-anthesis shot was taken at the same time the Laguna de la Laja colony is in full flower. (Anita Flores, 25 December 2002) F. & W.10639

Fig.8, right: Happily, we found a single late flower of *Viola farkasiana* at Epulafquen. Other individuals there have lilac flowers too, although many are also white. (Anita Flores, 25 December 2002) F.& W.10639

Taxonomic results

***Viola farkasiana* J.M. Watson & A.R. Flores, sp. nov.** [Figs.3-13]

Type:- CHILE. VIII Region of Bío Bío, Antuco Province, central sector of the west shore of the Laguna de la Laja, 1400 m, 37°22'20"S 71°19'40"W, 24 Jan. 2008, F.& W. 11612 (holotype CONC; isotypes SGO, herb. Flores & Watson).

Diagnosis:- The new species presented here belongs in sect. *Andinium* W. Becker of *Viola* L., being very closely related morphologically and geographically to *Viola congesta* Gillies ex Hook. & Arn., also to *Viola rosulata* Poepp. & Endl. It differs from the former in leaf outline and texture: also by its reduced number and size of marginal sinus glands. *V. rosulata* possesses entire leaves lacking marginal glands, which serves to distinguish it from *V. farkasiana*.



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Fig.9: *Viola farkasiana*. The white-flowered form at the Lagunas de Epulauquen. (Kees Jan van Zwiennen, 16 January 2010)



Fig.10: F.& W. 11612. *Viola farkasiana*. A standard-sized lead pencil beside a flowering specimen to indicate scale. (Anita Flores, 24 January 2008)

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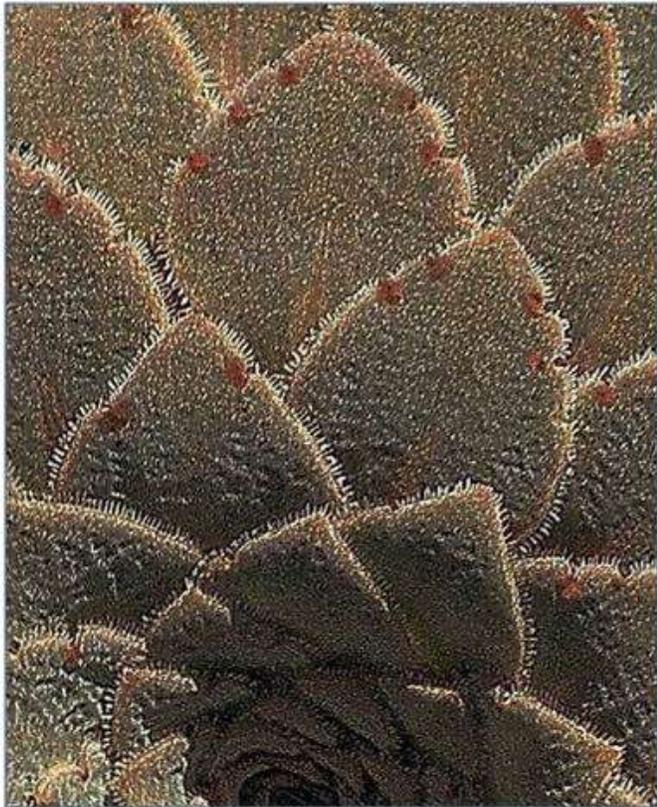


Fig.11, above left: F.& W.11612. *Viola farkasiana*. Foliage of an individual at the Laguna de la Laja type site with smooth upper leaf surface devoid of raised venation. (John Watson, 24 January 2008)
Fig.13, above right: A close up of a lilac flower of *Viola farkasiana* taken at a different but unknown location in Chile. The style crest is very evident. (Sergio Ibañez, 1 February 2010)



Fig.12: F.& W.11612 *Viola farkasiana*. A flower at the Laguna de la Laja type site showing the style crest and swellings at base of the lateral petals. (Anita Flores, 24 January 2008)

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Description:-

Life form perennial hemicryptophyte, rosulate, evergreen, prostrate or very rarely mounded. *Rootstock* slender to stoutish axial, to ca.18 cm long at junction with caudex. *Caudex* ca. 2 - 3 cm, usually simple, more rarely branched*¹ *Plant* usually as solitary rosette, at times branching to several*¹. *Rosette* ca. 5 cm dia. average on maturity, but exceptionally to 7-8 cm, 1-3 cm high, densely imbricate, usually cryptic, rarely green*², slightly depressed towards centre of face. *Leaves* ca. 2.5 - 3.2 cm long when mature; *stipules* ca 3 mm, lanceolate-subulate to ovate with a mucro, herbaceous with hyaline margin to all-translucent-hyaline, equipped overall with several short, small reddish-brown gum-glands; *pseudopetioles* 1.5 - 2 cm x 1 - 2.5 mm; *lamina* 1 - 1.5 cm x 5 - 8 mm, elliptical to rhomboid, cuneate, margin short-ciliate, 3-incised-crenate per side, rarely 1-, 2- or 4-crenate, or entire, each sinus with a red or pale brown gum-gland, upper surface minutely hirsute, smooth or with faintly to somewhat raised reticulate venation, undersurface covered more or less densely by very small, dark glands, otherwise without indumentum, apex acute or subacute. *Anthesis* more or less consecutive. *Flowers* ca. 1.2 - 1.5 cm high x 1 cm wide, axial, solitary, integral with foliage, facing obliquely outward and forming a broken circle within outer circumference of rosette face. *Peduncles* ca. 1 - 1.5 cm, shorter than leaves; *bracteoles* 3 - 6 mm, situated from base to shortly below mid-point, linear-lanceolate with acute-subulate apex, translucent-hyaline, equipped overall with several small, short, reddish-brown gum-glands. *Calyx* 3 - 5 mm; *sepals* ovate-triangular to linear lanceolate, acute, densely covered in small, dark glands, margins hyaline. *Corolla* glabrous, white or lilac, inferior petal with yellow base speckled red if petals white, or black if lilac, all petals with short, dark blue-violet basal veins, these denser and more prominent on inferior petal, lateral petals with pale basal tumours; *superior petals* 5 - 8 mm x 1.5 - 1.8 mm, obovate, apex rounded; *lateral petals* 7.5 - 9.2 mm x 2.3 - 3.5 mm, obovate, apex obtusely rounded; *inferior petal* 9 - 10 mm x 6 - 8.5 mm, broadly obovate to obtriangular, apex rounded-emarginate, rarely entire, with or without point in apical sinus or at apex; *spur* 1.2 - 2 mm, stoutly cylindrical, apex rounded. *Anthers* ca. 1 - 1.5 mm, lower pair with filiform nectar spurs; connectives of similar length to anthers; *style* geniculate, clavate; *stigma* as short frontal beak; *style crest* apical, retrorse, fan-shaped, trilobed at the apex, the lobes rounded. *Fruit* 7 - 8 mm, orbicular, tri-valved capsule; *seeds* 2 - 2.45 x 1.2-1.5 mm, tear-shaped, black.

^{1*}Solitary rosettes were totally predominant at two of the locations, with very few individuals multi-rosetted [Fig.4]. At the northernmost location most plants consisted of clusters of rosettes [Fig.8].

^{2*}Green foliated plants were only recorded from one of the four populations [Fig.6]. This bimorphism is also known for *Viola congesta* [Figs.14, 15].

Fig.14: Green forms also exist rarely in other species related to *Viola farksiana*. Here F.& W.10596, *V. congesta*, at Altos de Lircay, Vilches, Maule Region. (Anita Flores 16 December 2002)





Fig.15: For comparison, typically coloured rosettes of F.& W.12619, *Viola congesta*, on the approach to the Planchón pass, Curicó, Maule Region. (John Watson, 17 December 2013)



Fig.16: The Laguna de la Laja and Volcán Antuco, Bío Bío Region, Chile, the setting of the *Viola farkasiana* type site. The birds in the shallows are Andean gulls. (John Watson, 5 March 2008)

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Other data: F.& W. 9602

Field note: 'Open exposure of dark scoria and fine volcanic ash, otherwise almost bare of vegetation, gently and evenly sloping down to the Laguna de la Laja at the foot of the east exposure of Volcán Antuco [figs. 3, 16, 17]. The population was fairly confined, but extremely abundant and dotted with regularity within its limits, where many small, immature plants were also observed [Figs.18, 19]. The slopes behind were fairly well covered by low, shrubby Andean steppe vegetation, including *Acaena*, *Berberis empetrifolia*, *Mulinum spinosum* and *Mutisia oligodon*, inter alia.



Fig.18: *Viola farkasiana* has a highly effective succession rate from seed at the Laguna de la Laja, as may be seen here. (John Watson, 24 January 2008)

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Fig.19: F.& W.11612 *Viola farkasiana*. Two juvenile plants with another flowering specimen at the type site. Seeds remain in the two capsules at 12 and 3 o'clock. (John Watson, 24 January 2008)

Further specimens examined or recorded: ARGENTINA. Neuquén Province, Ñorquín Department, Pichachén pass at the border with Chile, 2050 m, 19 Feb. 2001, F.& W. 9697 ! (herb. Flores & Watson). CHILE. VIII Region of Bío Bío, Antuco Province, Pichachén pass at the border with Argentina, 2050 m, 18 Dec. 2002, F.& W. 10609 ! (herb. Flores & Watson). *Ibid.* 22 Feb. 2003, F.& W. 10744 ! (herb. Flores & Watson). ARGENTINA. Neuquén Province, Minas Department, NE upper margin of westernmost of the two Lagunas Epulauquen, 1480 m, 25 Dec. 2002, F.& W. 10645 ! (herb. Flores & Watson). *Ibid.* 15 Feb 2003, F.& W. 10732 [Figs.7, 8].



Fig.20: Bío Bío Region, central southern Chile, and adjacent Neuquén Province, Argentina, with the 4 known *Viola farkasiana* populations marked. The type site is yellow ringed red. (Map by Turistel)

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Distribution: The species classifies as a very narrow endemic, being only known for certain from four localities in Bío Bío Region VIII of Chile and Neuquén Province, Patagonia, Argentina. Its north-south range stands at 60 km, with 26 km as the longest lateral distance between its clustered eastern and western populations [Figs.1, 20-22].



Fig.21: A view towards Argentina across the Laguna de la Laja and the Pichcachén pass, another *Viola farkasiana* location. It crosses the ridge the other side of the lake. (John Watson, 2 December 2009)

Overall environment and habitat: The environments and habitats of the four known populations vary considerably, but share certain aspects in common. One of these facets, lack of immediate vigorous and competitive vegetative cover, is also an evolved ecological requirement of most section *Andinium* taxa. This limitation is apparently owed to their evolution as pioneers of open, volatile volcanic landscape and upper Andean limits, to which they are ideally adapted (Watson & Flores 2013b).

Accordingly, they may be found as actual or near monocultures on otherwise bare ground; as an integral part of ecosystems of separated plants with a similar physical constitution to their own; or in clearings between more continuous cover, including at times between scattered shrubs or under dispersed tree cover. In the totality of its range, *Viola farkasiana* occupies all of these niches. It is always, however, found exclusively on terrain of volcanic origin. These include open shallow slopes or steeper inclines of ash and scoria in the immediate neighbourhood of more or less active volcanoes [Figs.3, 16, 17], and more dispersed and ancient surfaces of weathered gravel and rock and pale, fine sand [Fig. 6]. The ecosystems on the latter have been established much longer and are more variable in heights and content.



Fig.22: Looking southwest. A general view of the Lagunas de Epulafquen, Neuquén Province, N Patagonia, Argentina, the fourth known location of *Viola farkasiana*. (John Watson, 21 January 2008)

Phenology: Flowering has been observed from the beginning of November up to the first days of February, depending on seasonal weather conditions and location. Mature fruiting follows approximately a month after anthesis and continues until the end of February.

Etymology: *farkasiana*. The specific epithet commemorates Leonardo Farkas (b. 1969), a Chilean businessman—mainly in the mining sector, and sometime professional musical performer. He is renowned and highly popular on account of his outstanding philanthropy. Apparently farkas is the Hungarian name for wolf, which perhaps makes Sr. Farkas a benevolent sheep with wolf's naming!

We are pleased to dedicate this native species of his own country after him as an expression of our unbounded admiration for his humanity and generosity.

To paraphrase and augment his Wikipedia (2018) entry, he is the son of Jewish Hungarians who emigrated to South America in 1939 as a result of the rise of anti-Semitism in Europe. After a university course in engineering, he left for the United States, where he played the piano for a living, next returning to Chile and taking up his business operations. He is a real man of the people who will help anyone in need: sick children, those down in their luck on the streets, amateur sportspeople and others. Holocaust survivors and their families are a special cause of his. J.W. can relate to this, having seen a newsreel of the liberation of Auschwitz in the cinema as a child in 1944, when he shared the openly shocked emotion of those around and on the screen, and was unable to hold back the tears.

Conservation status: Although only four localities are known for sure [Figs.1, 20], and the overall range and number of populations of *V. farkasiana* are extremely narrow and low respectively by formal standards, three of its populations inhabit national parks or reserves in Chile and Argentina. It also extends very prolifically over at least two of its locations with much evidence of heavy germination [Figs.3, 4, 6, 18], and is not underpopulated in any. As a provisional assessment: it should therefore be regarded as vulnerable due to its confined range, but apparently no population is critical, or even less endangered.



Fig.23: F.& W.11612 *Viola farkasiana*. A type site specimen showing its probable hybrid origin morphology as midway between *V. rosulata* and *V. congesta*. (Anita Flores, 24 January 2008)

Discussion and conclusions

Hybrid origin and taxonomic confusion: *Viola farkasiana* was first recorded publicly as differing from *V. congesta* (syn. *V. 'vulcanica'*) by Sheader *et al.* (2013), when illustrated and identified as "An undescribed species from Lagunas de Epu Lauquen (Neuquén) and adjacent Chile."

Recently the Sheaders (2018) have amplified this concept, arriving at the same conclusion as ourselves: that the new species is of almost certain hybrid origin, and with identifiable parents. We have discussed this with them in detail by e-mail a few years ago (Watson & Shearer in litt.). In fact the concept should be evident enough for anyone who knows the viola flora of this geographical sector reasonably well, as *V. farkasiana* [Fig. 23] bears a very close resemblance in habit and morphology to both of its considered progenitors, *V. rosulata* [Fig. 24] and *V. congesta* [Figs.14, 15, 25]. All three species share an overall coverage of small glands on their underleaf surfaces.

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Fig.24: F.& W.10672
Viola rosulata at Shangri
La, Chillán, Bío Bío
Region. Chile. As a likely
parent it shares smooth
upper surfaced elliptical
leaves. (Anita Flores, 2
January 2003)

V. rosulata, a Chilean
endemic, is fully
sympatric with *V.*
farkasiana. Its type
specimen was collected
by Poeppig from Cerro
Pico de Pilque by
Antuco, just 17 km west
of the *V. farkasiana*
Laguna de la Laja site
(Poeppig 1838) and has



been found in the sector again recently (M. Aldunate pers. comm.). The only other location known for the species, where it covers a wide range of horizontal and vertical ground, and occupies diverse habitats, is at the Nevados de Chillán, directly opposite the Lagunas de Epulauquen.



Fig.25: F.& W.12619 *Viola*
congesta below the Plachón pass,
Curicó. Maule Region. As with *V.*
farkasiana, it has gum-glands
in the sinus of each leaf crenation.
(John Watson, 17 December 2013)

As already noted, on account of the
distinctive shiny sinus glands of
both species, *V. farkasiana* has
until now been misidentified as *V.*
congesta. The southernmost limit
of the latter taxon is also level with,
or a little more northwards than the
Epulafquen lakes [Fig. 28]. *V.*
congesta has also been recorded
from the Nevados de Chillán, but
the population in question there
may in fact also be distinct in

particular aspects, an uncertainty requiring careful study. Even if different, it might equally be a potential parent. Otherwise the nearest population of *V. congesta* known to ourselves is a mere 50 km distant, at the upper NW border of Neuquén Province.

Another species of this alliance, *Viola truncata* Meyen, also bears an obvious resemblance to *V. farkasiana*, if less closely so. Although unlikely to be a parent, it is probably part of the reticulate hybrid evolution we suspect includes all taxa of this group, and which leaves several populations impossible to identify precisely as yet.

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Confusion by the authorities who have studied these species has existed almost from the moment of their discovery. After Hooker (1833) had clearly described *Viola volcanica* Gillies ex Hook. and Arn. and *V. congesta*, Gay (1846), the next to consider the rosulate group in any quantity, misidentified *V. truncata* as *V. volcanica*, treating the latter as a synonym of the former. Despite being unclear about the overall concept of *V. congesta*, he did at least describe the defining sinus glands, although as white, not coloured, which in fact they always are.

The third specialist to describe the violas concerned was Reiche (1893). In his foundational monograph of the Chilean *Viola* flora, he not only partly followed Gay in his interpretation of *Viola truncata*, but also critically reversed the identifications of *V. volcanica* (as *V. congesta*) and *V. congesta* (as *V. vulcanica*, sic).

It is worth noting that neither Gay nor Reiche had any experience of these species in Argentina, either in herbaria or growing wild, even though they were described from that country (Hooker 1833). Indeed, true *V. volcanica* has only recently been recorded for certain in Chile (Sheader & Sheader 2018). Yet Argentinian botanists have also followed their interpretations until the last few years (e.g. Rossow 1988) [Fig.2].

With the exception of Becker, until recent times nobody, it seems, took the trouble either to refer to, or interpret correctly Hooker's protologues and explicit drawings. Becker (1925a) corrected Reiche, but as no more than a footnote in German to one of his new species. Later in the same year he provided an accurate drawing of the *V. volcanica* style crest (Becker 1925b). These two clues passed unnoticed.



Fig.26: *Viola x blaxlandiae*, the first natural hybrid of sect. *Andinium* to be described. This one located in the Copahue sector, Neuquén Province, Argentina. (Kees Jan van Zwiene, 13 January 2010)

Eventually, in the early 2000s, Kim Blaxland examined Hooker's publication, identified the confusion, and informed us. We then published a correction twice (Watson & Flores 2007, 2012a).

It also became clear that due to the former reversal of identities of *V. volcanica* and *V. congesta*, the species which is now *V. farkasiana* had been considered to be a variant of the latter.

When we undertook our latest major investigations of *Viola* in Chilean herbaria during 2005 and 2006, we were unable to find a single certain specimen of *V. volcanica* which had been collected in Chile. All labelled as such were misidentified *V. congesta*. Nor had we as yet recognised *V. farkasiana* as a distinct taxonomic entity, so do not know whether specimens of it exist under another name in those collections, which seems more than probable.

Their physical near-similarities and the consequent confusion surrounding these *Viola* species and others in sect. *Andinium* leaves it as hardly surprising that hybrids between them are likely to be found in the wild and among their herbarium representations. In fact, considering the wealth of hybrids in other sections of the genus (The Plant List 2013), the only explanation for why it has taken so long to recognise the phenomenon is the almost total lack of study of sect. *Andinium* between the death of Becker in 1928 and renewed modern interest, which began in the mid-1990s. Even so, despite our growing suspicion, nothing was published until the natural hybrid (nothospecies) commemorating Kim, *Viola x blaxlandiae* J.M. Watson & A.R. Flores (2012c) [Fig. 26]. Since then we have indicated our belief that *Viola lologensis* (W. Becker) J.M. Watson is of known hybrid origin (Watson & Flores 2011).

---International Rock Gardener---

Much on this subject remains uninvestigated in depth, or if known is still unpublished. We have one definite and a probable hybrid recorded (Watson & Flores ined). *Viola petraea* W. Becker and various populations related to *Viola dasyphylla* W. Becker are also due to feature in our future studies of the phenomenon. All these factors strongly support the likelihood of hybrid origin for *V. farkasiana*.



Fig.27: *Viola farkasiana*. Leaf damage of this plant is probably caused by viola predating *Yramea* butterfly caterpillars.

Fig.28: A plant from slightly further north in Maule, Chile similarly damaged, including to a flower (at upper left). Despite the few glands, it might be a *Viola farkasiana* form. (Dick Culbert, 14 January 2007)



Mutual evolution: As far as was immediately apparent, rosettes of the viola seen everywhere by ourselves were in perfect condition, with the exception of one, where the tips of leaves, particularly the more tender, younger foliage had evidently been consumed by an insect. [Fig. 27]. Interestingly, we found a photograph on a website of what might be a form of *V. farkasiana*, or if not, then an extremely close relative. That too shows similar damage, including to a flower [Fig. 28].

---International Rock Gardener---



Fig.29: The fritillary butterfly *Yramea lathonioides*

We strongly suspect this may have been caused by a caterpillar of one of the three species of fritillary butterflies present and common in Chile belonging to the genus *Yramea* (Peña & Ugarte 1997) [Figs. 29, 30]. These lepidoptera are symbiotic *Viola* specialists, both feeding on and pollinating violas, that genus being the exclusive host plant of their larvae.

On various occasions we have observed and occasionally photographed these butterflies while studying rosulate violas



in habitat, rarely seeing other damaged plants as well, and once or twice the actual caterpillars (Watson & Flores 2014, pers. obs.) [Fig.29]. They sometimes overfly in small numbers the area where violas grow and settle on the ground, which is a very useful indication for us in the field—we know we're getting hot! The caterpillars mostly feed at night and usually eat-off lowermost leaves so as not to leave a clue of their presence for predators. We have the violets *Viola odorata* L. and *Viola sororia* Willd., also the little pansy *Viola tricolor* L. seeding around freely in our Chilean garden. As a result *Yramea cytheris* (Drury), which inhabits lower elevations, is seen fluttering all around them in springtime, and sunning on the driveways and paths (Watson & Flores 2018), but we have never seen a larva.

Fig.30: The fritillary *Yramea lathonioides*, a *viola* mutualist, here on *V. escarapela* in northern Coquimbo Region, is the likeliest 'culprit' of its small genus. (John Watson, 27 November 2010)

As stated in the Introduction above, the genus *Viola* is calculated to have evolved in southern South America. Fritillary butterflies have the same geographical origin (Simonsen 2006), leaving both the rosulates and our local fritillaries as of primitive ancestry. The relationship between them built up early, and the butterflies have followed the violas to almost every part of the world they have colonised, with both evolving as they went. This has meant seasonal changes and a gap between the early flowering violets and pansies of the Northern Hemisphere and the emergence of adult winged fritillaries there. Consequently, those fritillaries cannot pollinate the plants and so have become pure predators. By contrast, down here where they originated, both reach their reproductive state simultaneously, and their convenient mutual 'arrangement' still exists.

Mutualism has been frequently defined and discussed (e.g. Bronstein 1994). But it is evidently most unusual for an animal (an insect here) to consume a plant selectively, avoiding its vital organs, so as not to affect its basic survival, and also to pollinate it, thus ensuring an enduring future food supply. So unusual in fact that this aspect is seldom - if at all - covered in the literature as compared with regular pollination syndromes.

---International Rock Gardener---

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---International Rock Gardener---

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