

# International Rock Gardener

ISSN 2053-7557



Number 118

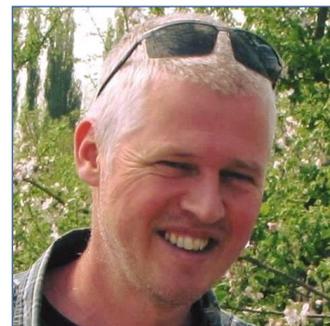
The Scottish Rock Garden Club

October 2019



Recently a collection of plant-lovers from around the world gathered in the Scottish highland town of Grantown on Spey for the SRGC annual Discussion Weekend (DWE). The range of talks from speakers from Scotland, through England, New Zealand, Sweden and the Ukraine was a sparkling selection which delighted those attending – the DWE in 2020 will again be held in October in the delightful Grant Arms Hotel – our advice would be to book early, or risk disappointment! All particulars will be published by SRGC to members, and on the website, in due course along with the details of other SRGC events for 2020. The final main Club “get-

together” for this year will be the [“Autumn Festival”](#) and Annual General Meeting on 9<sup>th</sup> November. There will be a number of short talks, and the Clark Memorial lecture will be given by Gerard van Buiten (right) about the Utrecht Alpine Garden.



Cover photo: *Linaria michauxii* in Western Iran, photo Dimitri Zubov.

IRG this month pays tribute to the SRGC DWE with an article on the propagation of narcissus and galanthus bulbs from one of the Speakers there, Anne Wright of [Dryad Nursery](#) in Yorkshire. Anne has tremendous success with her breeding programmes of these bulbs and is kind enough to share her tips for ‘chipping’ the bulbs to speed up their increase. Another of the speakers at the DWE was Dr Dimitri Zubov – we are delighted to present a photo essay by Dimitri and regular IRG author, Jānis Rukšāns of some of the plants they have seen in Iran.



Jānis finding the locus of a new species which was later named as *Allium kopsedorum* by R. M. Fritsch. Photo John Ingham.

# ---International Rock Gardener---

## ---World of Bulbs ---

### Chipping and Twin-scaling – a masterclass by Anne Wright of [Dryad Nursery](#).

1. Introduction
2. Timing
3. Selection of bulbs to chip
4. Equipment
5. Cleanliness
6. Cutting process
7. Fungicide and Boxing
8. Incubation
9. Potting
10. Using cut-off tops
11. Other cutting techniques
12. Saving damaged bulbs
13. Growing on
14. Potential Pitfalls

#### 1. Introduction

Despite the most skilful cultivation, some cultivars of bulbs such as snowdrops or daffodils resist our best efforts at getting them to divide naturally in order to increase the number of bulbs in the display. A good example of this is breeder Brian Duncan's multi-award winning miniature daffodil 'Pet Lamb' (right)

A very important and historic variety, it was awarded the Triple honour of the Ralph B. White Memorial Medal for innovation, Best Miniature and Best Seedling at the RHS early show in 2007. However, by 2014 it was still only one bulb with a tiny offset. Brian was persuaded to allow me to chip it. When it came time to cut the Lamb *chops* chips, I was more than a little apprehensive, but the tiny main bulb was cut into six pieces, which went on to make six little bulbs. One of these was chipped to carry on the process, and now five years later there is probably a grand total of almost 20 bulbs.

With species bulbs, seeds are the first option, but with named clones, the usual method used to ensure ending up with the same identical clone is chipping or twin-scaling (but see under Potential Pitfalls below). This is not as daunting or difficult as it first appears, needs no specialist equipment, and can be done by anyone with a steady hand and a bit of nerve.



# ---International Rock Gardener---

## 2. Timing

I usually aim to chip my bulbs as soon as possible after the bulbs lose their foliage – usually mid-May to mid-June here. It is said to be fine to chip at any time after flowering, simply cutting off any leaves, but I haven't tried this. It's probably OK to chip at any time during dormancy, but the earlier they are cut, the longer the young bulbils will have to grow on before they enter the next dormancy period. I have chipped bulbs which were sent from Australia in February/March with no problems of acclimatisation.

## 3. Selection of bulbs to chip

Ideally a full round bulb (with a circular horizontal cross-section) is best for chipping, as opposed to an offset, so these should be chosen if available. Only healthy bulbs true to name should be chosen (but see section 12 below).

## 4. Equipment



Note: I am usually chipping 100 or more cultivars at a time; you may get by with a simpler set of equipment than mine.

In the photo above:

1. Protective gloves – I use disposable gloves which allow for good dexterity. You will be handling fungicide and alcohol, and sap released from cut bulbs can also irritate the skin.
2. Cotton wool pads for swabbing.
3. Alcohol eg methylated spirit/surgical spirit (vodka if you feel generous) for swabbing.
4. Kitchen roll for general cleaning and to provide a disposable surface for initial peeling
5. Large covered bowl containing medium vermiculite, moistened with boiled water (9-10 parts vermiculite: 1 part water by volume – you want it to be just damp).
6. Magnifier, especially for tiny bulbs, unless you have excellent eyesight.
7. Tray for fungicide
8. Cups for fungicide, one per cultivar

# ---International Rock Gardener---

9. Fungicide made up to required strength. I use Fungus Clear Ultra with no problems.
10. Tip-out container and tea strainer (make sure the strainer is labelled 'fungicide only' – you don't want to be making tea with it later).
11. Supply of boxes with snap-on lids. I have a daughter who loves cream cheese so have a lot of these small rectangular boxes with clear lids. I also use 'chutney pots', takeaway boxes or similar. I buy these from ebay: eg [link for chutney pots](#).  
All these boxes can be reused every year after having been cleaned in water with bleach added.
12. Plate for cutting
13. Forceps for handling fiddly bits
14. Supply of single-sided razor blades. eg: [link for these](#) from ebay.  
A sharp craft knife or even a sharp kitchen knife can also be used, especially for larger bulbs. Ideally you should use a fresh blade for each cultivar to avoid virus transfer.
15. Labels – these are all important – and an indelible pen or pencil.

## 5. Cleanliness

When you are cutting up your precious bulbs the last thing you want is to lose the lot because of fungal attack or virus transfer. Cleanliness is all important here, which is why we have the alcohol and swabs. The process will go something like this:

Start with the dirty bulbs on a piece of kitchen towel which will act as a disposable work surface. Peel the outer scales off on here. Swab the cutting plate, the bulb and your gloved fingers with the alcohol and do the rest of the cutting on this clean plate. After you have cut each cultivar, swab your gloved fingers and plate again, and after every few bulbs, change the paper towel. You may find that the alcohol is not removing all the sap after a while, so at frequent intervals wash the plate and forceps in warm water, then proceed again.

I use a fresh blade for every cultivar, to avoid transferring viruses, especially when chipping varieties which have been around for a few years. Some people dip the blade into alcohol and pass through a flame. It has been suggested to me this might not be 100% effective against viruses, but for most purposes it would be sufficient.

Do not reuse the fungicide solution. Discard after each set of chips and start with a fresh cup of solution for the next set.

Keep your main bag of vermiculite tightly closed between chipping sessions, to prevent entry of spores etc. I have used a large bag over several years with no problems of contamination.

## 6. Cutting process

I strongly recommend that you practice your cutting technique before you start chopping up your prized bulb, so start on something simple – practice on your onions while cooking! In the pictures following each stage is demonstrated on an actual bulb, in this case a snowdrop, and also on my pet red "stunt onion" for clarity.

Before you start, prepare a cup containing a few cm of fungicide solution, and select your bulb.



**Left: snowdrop bulb**

**Right: "stunt onion"**



## ---International Rock Gardener---

1. Remove the papery outer scales from the bulb to leave a clean shiny layer – please note your snowdrop will not be bright pink – that’s just the onion showing you how it’s done!



**Peeled snowdrop bulb and peeled stunt onion**

2. Now remove any dead roots and trim off the bottom of the bulb – making sure you leave the solid part that joins all the layers of the onion/bulb together. This is the *root (or basal) plate*.



**Trimmed base of snowdrop and stunt onion**

3. Now trim off the top of the bulb. This is not for any fancy reason such as to remove apical dominance (that’s not where the apical meristem is) but simply to provide a flat surface to sit the bulb on for the next bit. Swab clean the whole bulb.



**“Topped” snowdrop and stunt onion**

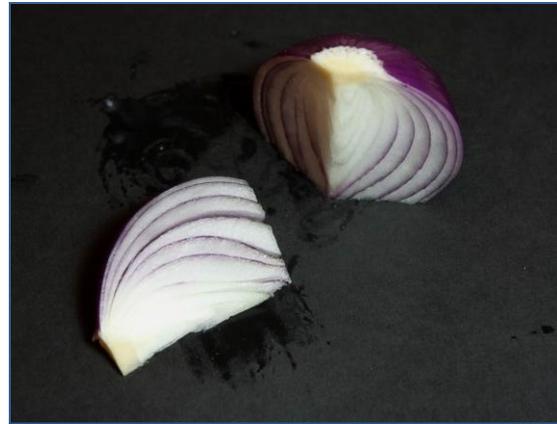
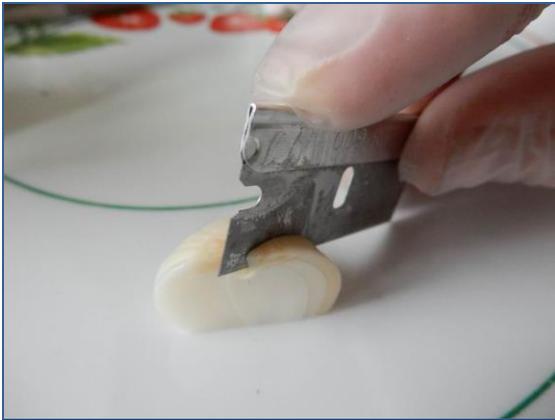
## ---International Rock Gardener---

- Cut the bulb in half vertically. Now you can see the structure of the bulb.

### Stunt onion – halved vertically

- Now begin to slice segments (think satsuma) from the halved bulb. Each segment is a CHIP.

If you are dealing with snowdrops, you will probably just make more chips, as snowdrop bulbs have only a few layers of fleshy scales. With other types eg narcissi, there are multiple layers of thinner scales, and so these can be *twin-scaled*.



Snowdrop and stunt onion

- To make twin-scales, put the tip of your blade between two of the scales and make a gap between. You will be separating off scales in groups of two or more. Now put your knife into the bottom of the gap and cut down into the solid root plate (see red line). You will now have a pair (or more) of scales joined at the bottom. This is your twin-scale. On the stunt onion, I would probably only take the one pair of scales off, or possibly one more pair, to make 2-3 twin-scales from that one chip.



Snowdrop and stunt onion

# ---International Rock Gardener---

7. Carry on with the rest of the bulb, putting each chip or twin-scale into the fungicide as they are cut. From now on we will refer only to chips for simplicity. Twin-scales are treated in the same way.

## Snowdrop chips



## 7. Fungicide and Boxing

**As soon as you are finished cutting**, swirl round the contents of your fungicide cup and pour through the strainer.

### Straining the chips

Other people will tell you to soak the chips in the fungicide for 30 minutes or so. Bear in mind that the fungicide is systemic, and you will not be rinsing it off the chips, so they go into the vermiculite coated in the fungicide solution and will continue to absorb it until it is gone.

Another point is that some bulbs, especially daffodils, exude a sap when cut that rapidly turns the fungicide solution into a semi-gel similar to wallpaper paste – **you do not want this!** It sticks the bulbs together and makes it very difficult to place them separately into the vermiculite. If you leave it too long and get “gloop”, you will have to rinse it all off with clean water then do the fungicide dip again.



No “gloop”



“Gloop”

## ---International Rock Gardener---

Quickly put a 1cm layer of moist vermiculite into an appropriately sized box. Using the forceps place each chip individually onto the vermiculite so that none of the chips are touching each other. When one layer is full, cover those chips with another layer of vermiculite and carry on until all the chips are in, finishing with a layer of vermiculite.



**First layer**



**More layers**

You should aim to end up with a cm or so of empty space once the lid is on, but before you do that – don't forget the label! Finally, check the cup that they were in to make sure there are no chips left at the bottom (been there, done that – look closely the 'gloop' photos above).

### **Ready for incubation**

#### **8. Incubation**

When all your bulbs are cut and boxed, they are ready to go into an incubator. The beauty of using boxes instead of the old-style plastic bags is:

- An air space is retained at all times. The chips need to breathe.
- The chips are separated from each other during incubation – in my experience it is usually the chips that were touching that go mouldy, and even if they don't, touching chips will fuse together with callus tissue which make potting on more awkward.
- Multiple boxes can be stacked in your incubator so many chipped cultivars can be incubated in a relatively small space.
- Moisture content can be checked during incubation by looking to see if there is condensation on the underside of the lid – if it is dry, add a little cool boiled water and reclose.
- The boxes can be washed and reused for several years, whereas the bags are single-use.



# ---International Rock Gardener---

The classic incubator is an airing cupboard, but not many of us have those anymore so an ordinary electric propagator is ideal – preferably thermostatically controlled. Place an open black bin liner or piece of blackout fabric in the propagator then stack up the boxes inside. If you have a stack more than 20cm or so high, you might like to swap around the boxes at the top and bottom of the stack occasionally as there will be more heat at the base. My favourite propagator is a Vitopod, which can be virtually flat packed and stored in the loft for the rest of the year. Enclose the whole lot in the blackout to exclude light, put on the lid and set the thermostat to about 22°C. Place the propagator where it will not get any sun – you want the temperature to remain steady. Now go on holiday for 6 weeks!



**Loading the Vitopod**



**Fully loaded**

## 9. Potting

After 6 weeks check a few of your boxes to see if there are any bulbils appearing. Early signs are the individual scales being pushed apart, even before the bulbils appear between them at the base. Note in the images below the difference in the thickness and number of scales between narcissi and galanthus:



**Bulblets appearing on narcissus**



**Bulblets appearing on galanthus**

In some cases, for instance bulbocodium type narcissi, some may be well advanced and even have roots. In this case pot them as soon as possible. If roots are present and stuck together by the tiny root hairs, do not try to separate them. Gently tip the contents of the box into a potting sieve and, again gently, wriggle the sieve to remove most of the vermiculite, then tip the chips onto the potting mix en masse, and finish off the pot as described below.

# ---International Rock Gardener---

Most bulbs will produce visible bulbils by 12 weeks. Some may take longer, so if the chips still look healthy, put them back and check at 2 week intervals. If you are lucky, there will be several bulblets on each chip.

## Chips with early roots



## Chip with multiple bulblets

An example of a cultivar which always takes at least 16 weeks with me is the snowdrop Trym, so don't be too hasty to give up on it. Occasionally the chips will develop quite thick callus (scar) tissue without any visible bulblets. In this case, as long as they look healthy, box them as usual, and they will generally form young bulbs.

## Chips with callus growth

If the chips are ready to pot, tip the contents of the box into a potting sieve and shake it gently to separate the chips from the vermiculite. Hopefully you will have something like these below (note the typical fleshy scales of snowdrop bulbs):



## Chips ready for potting

The potting process is identical to my standard potting procedure for adult bulbs. I use clay pots, but you can use plastic if that's what you are used to. I prefer clay because I plunge them up to the rim in sand and it makes keeping an even moisture content much easier, and also buffers the temperature.

# ---International Rock Gardener---



I place a piece of plastic mesh over the drainage hole, then half fill with compost (current favourite is a 50/50 mix of Singleton's John Innes compost no2 and coarse perlite). On top of this goes 1cm of coarse washed sand, and then the chips are placed individually, close together and right way up, onto the sand. If you only have a few chips, choose a small pot and put all the chips close together in the middle. You can also partition a larger pot using bits of cut-up plastic bottles, so you can put several different cultivars in one pot.

## Chips potted

Cover the chips with more sand (at which stage I usually settle them in with a drizzle of fungicide solution) then fill to 1.5cm of the brim with more compost, finally finishing with a layer of grit **and your label**. Plunge your pot and lightly water in to establish capillary contact with the plunge sand. Shade during hot weather, and await leaves! Water well at the beginning of September, and again in October, as recommended by Ian Young, as then the bulbs will be starting to root and grow. The bulbils will generally start into leaf about the same time as the parent bulbs do.

## 10. Using cut-off tops

Remember the bit you chopped off the top of your bulb at the beginning? Don't throw it away! Make sure it is clean and dip and incubate it with the other chips. Sometimes adventitious buds will appear and develop into bulbils for an extra haul of babies. For some reason, yellow snowdrops seem particularly willing to do this.

The little bulbils may be slower to reach flowering size, but eventually you will get quite normal flowering sized bulbs.



Chips from cut off tops

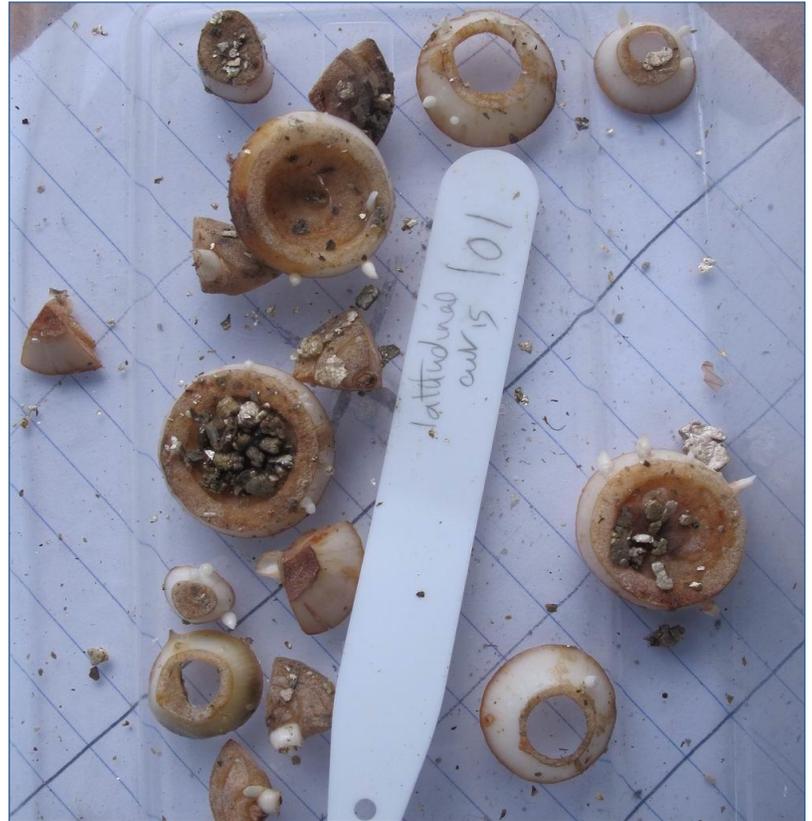


Resulting bulbils

# ---International Rock Gardener---

Following the idea of the cut-off tops producing bulblets, I experimented with cutting a bulb latitudinally into rings, using a yellow snowdrop. Each ring produced a few adventitious bulbils. This is purely for curiosity, as larger bulbils would have been formed cut in the normal way, but it goes to how that an absence of the root plate is not an obstacle to formation of new bulbs – see section 12 - Saving Damaged Bulbs.

## Bulbils formed on a latitudinally-cut bulb



**Bulbils formed on a cross-cut bulb**

## 11. Other cutting techniques

If you are not brave enough for the full chipping process, you might like to try cross-cutting. To do this you simply cut a cross in the base of the bulb, cutting through the root plate in each direction. Then the cut bulb is incubated as before in vermiculite, or even just replanted into the ground. A few bulbils will hopefully form on the surface of the cuts.

I just saw on Facebook an interesting post by Falk Rühle, a grower who experimented with a modified chipping technique by only removing portions of the bulb. Imagine a chocolate orange (yum!). Now imagine eating every other alternate segment but leaving the rest attached. This way something similar to the illustration results (photos courtesy of Falk Rühle):

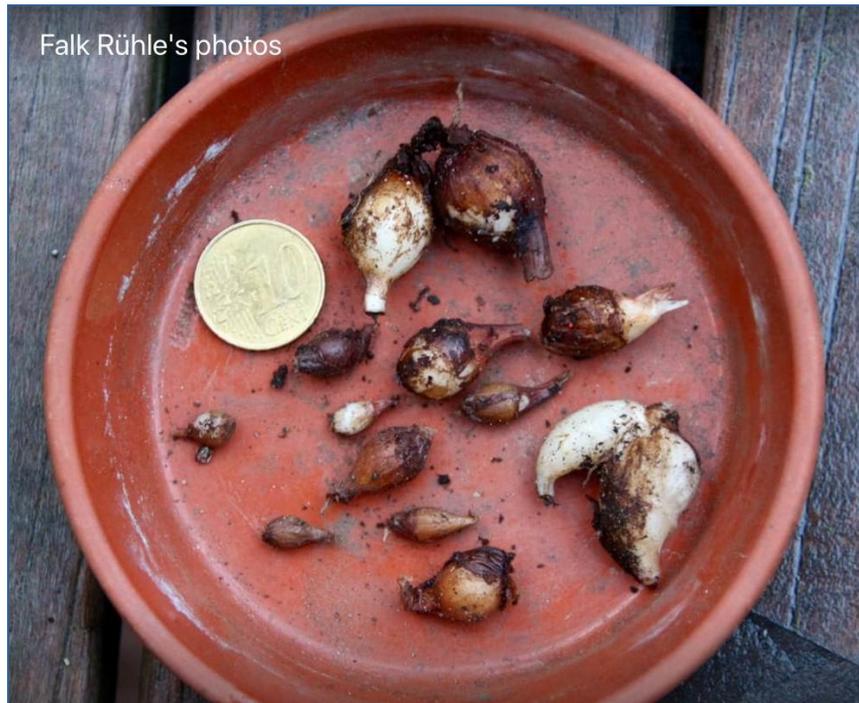


**Falk Rühle's cutting method**



**Resulting bulbils**

# ---International Rock Gardener---



**Resulting bulbs (smaller ones from the cut out wedges)**

The cut-out sections are also incubated as normal.

## **12. Saving damaged bulbs**

I have been told at least twice that chipping and twin-scaling is unnatural and an abomination... Please consider what happens when, for instance, a bulb is attacked underground by a Narcissus Fly, and the centre of the bulb is destroyed.

The plant's natural survival strategy then comes into force and the last of the energy stored in the remains of the bulb is sacrificed to power the formation of tiny bulbils on the fragments as a last-ditch effort to carry on living into the future. Next spring you might notice, if observant, that where there was a mature bulb last year, there has now appeared a little clump of fine grass-like leaves. Your bulb has chipped itself! Nothing unnatural about it.

A modification of the chipping process can be used to save damaged bulbs if they are valuable enough to warrant taking a little care to do it. Peel the bulb as before, then cut away as much as the diseased or damaged tissue as you can. Don't worry if there is no root plate left. Cut into chip-sized pieces if wished, then incubate in vermiculite as before. With a bit of luck the remnants will produce adventitious buds and can be grown on into new bulbs.



**Diseased bulbs before cleaning**



**Diseased bulbs after cleaning**

# ---International Rock Gardener---



**Bulbs being cleaned**



**Cleaned bulbils after incubation**



**Resulting cleaned up bulbs**



**Bulbils saved after narcissus fly attack**

## 13. Growing on

Once your potted bulbils are into growth, they should be kept actively growing for as long as possible. Keep supplied with water until they naturally start to die back, then withhold the water, but leave the pots plunged and shaded through the summer. Allow them a further season growing in the same pots, feeding with a weak liquid feed at regular intervals until the second summer. The bulbs are then repotted and are either grown on or planted out, if large enough. Some will flower in the next season. Most will have flowered by the fourth season.



**This image shows *Narcissus* 'Jim Lad' twin-scales in their (left to right) first, second and third season after twin-scaling.**

Now, although (like Mary Poppins – the nanny not the daffodil) I am Practically Perfect in Every Way, I never underestimate my capacity for surprising myself with a flash of stupidity. For this reason, I always keep the chipped bulblets separate from the parent bulbs until they have flowered, and I can be sure that no

# ---International Rock Gardener---

labelling mishap has occurred. There is another good reason, even if you feel you are *actually* Perfect in Every Way, and that is that the parent stock may have a low-level fungal infection, whereas the chipped babies should have been cleaned of any fungal disease, so you don't want to allow the parents to infect the new bulbs.

## 14. Potential Pitfalls

An important factor to understand is the potential for instability in the flower form after chipping. I have never noticed any instability in chipped or twin-scaled miniature daffodils, although I have heard anecdotal accounts of it being seen in standard height narcissi some years ago. However, from my own experience there are some forms of snowdrops which are frequently unstable when chipped, and I would not advise chipping your only bulb if it is one of these types, until you can find out if it is likely to revert to a normal form (or even worse become completely confused). The list below details the different types, noting those you might potentially have trouble with:



**Normal-form snowdrops** (examples – ‘Magnet’, ‘Bill Bishop’) are completely stable when chipped, never showing any variation from the normal form.

**Poculiform snowdrops** (examples ‘E. A. Bowles’, ‘The Bride’) are completely stable, in those cultivars I have tried.



## ---International Rock Gardener---



**Virescent snowdrops** (examples 'Rosemary Burnham', 'Virescens', and several other ones I grow) are completely stable, so far.



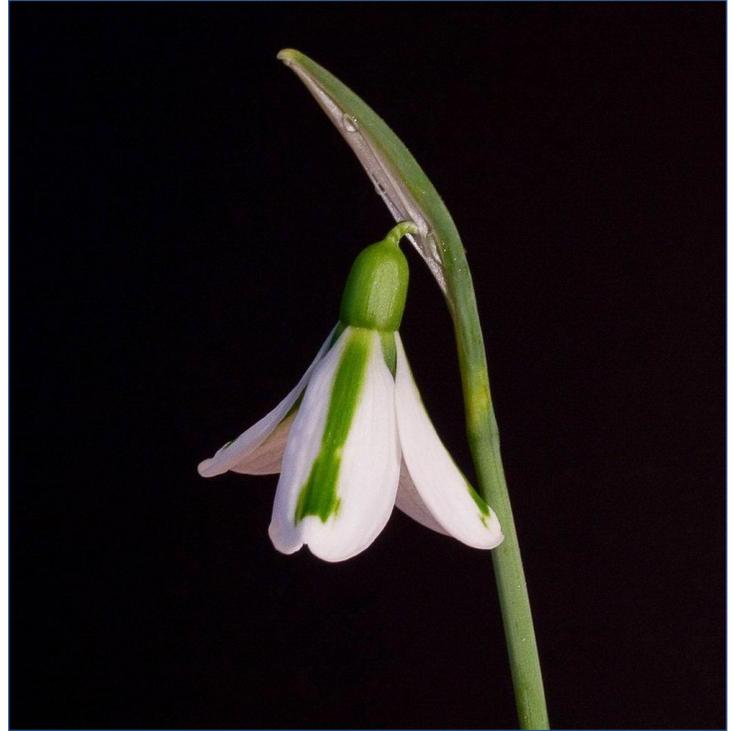
**Yellow snowdrops** (examples – 'Sandersii', 'Wendy's Gold' ) are completely stable when chipped, never showing any variation from the normal form.



**Green-tipped snowdrops** (examples 'Modern Art', 'Jessica') can be unstable - many losing the green markings on the outer segments. I don't know whether this is permanent. As they flower in the open ground, it seems that the majority may regain the green tips. In Jessica's case every chip except one has no green tips, and after several years has not regained its marking.

## ---International Rock Gardener---

**Inverse poculiform snowdrops** (examples 'Trimmer', 'South Hayes') show some instability and can completely, and irreversibly, revert to the normal form. Seemingly stable are 'Corrin', 'Trymlet' and 'Trym'. Definitely unstable are 'Trimmer', 'David Baker', and sometimes 'South Hayes'. The original 'South Hayes' that I bought, that turned out to have a normal flower, had not shown any sign of converting back after 7 years.



**Snowdrops with green ovary, and yellow inner marks** (examples 'Blonde Inge', 'Lady Elphinstone') can lose the yellow marks, reverting to green. I don't know whether this is permanent. A whole batch of 'Blonde Inge' flowered without yellow marks.

'Lady Elphinstone' is a curious case. My original plants used to produce about 5% of flowers with yellow inner marks, even though they have been undisturbed (the usual reason given for reversion) for 15 years. In 2009 I bought 3 new bulbs from a seller on ebay who assured me his came yellow every year. Despite my scepticism, I planted 2 and chipped one. The planted ones have increased and now have about 15 flowers, all yellow-marked. Of the chipped ones, 1 of the 3 flowers so far is green-marked. Of course, I don't

know whether the ebay bulbs were descended from chipped bulbs, or from natural division.

To finally confuse things, one bulb of a seedling of 'South Hayes', which looked similar to the parent, one year split naturally into 7 daughter bulbs. I potted them all together, and each one had a separately different flower the following year....

The morals of this story: If you are chipping a susceptible cultivar, do not rechip the daughter bulbs until they have reached flowering size and you can confirm that they are still true to type. Just as importantly, do not buy bulbs of a reversion-susceptible type unless they are guaranteed flowering-sized and have been verified as true to name.

So have a go – it is a (sometimes the only) way to get that impressive clump of flowering bulbs you would love to see in your garden. Turn your problem bulbs into a challenge!

A. W.

# ---International Rock Gardener---

## ---In Habitat---

### Iranian Bulbous Plants – a photo essay by Jānis Rukšāns and Dimitri Zubov

Jānis Rukšāns and Dimitri Zubov have made several trips together. In Iran they found and named *Fessia olangensis* (description published in [International Rock Gardener \(IRG 113\)](#), and here they share with us photos of some of the (mostly) bulbous plants they have encountered there. We have here the opportunity to show several photos of most of the featured plants, which we hope gives a good idea of their characteristics in habitat.



*Allium* and *colchicum* desert habitat at the Iran-Turkmenistan border, North Khorasan Province, NE Iran. D.Z.



*Allium helicophyllum* in a desert habitat at Iran-Turkmenistan border North Khorasan Province NE Iran. D.Z.

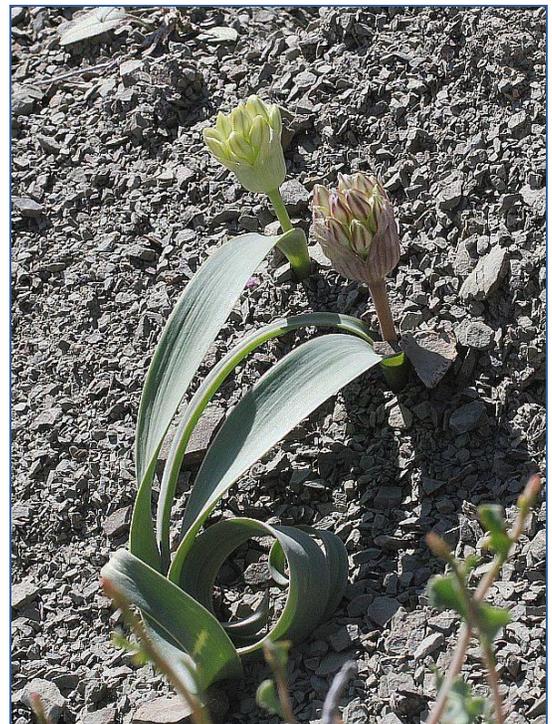


*Allium brachyscapum* in seed. J.R.

---International Rock Gardener---



*Allium brachyscapum* - flowers and bud, in Iran. J.R.



---International Rock Gardener---



*Allium brachyscapum* D.Z.



*Allium bungei* within desert habitat with *Stipa* sp. W Iran, Qom Province. D.Z.

---International Rock Gardener---



*Allium helicophyllum* D.Z.



*Allium kopsedorum*, named by R.M. Fritsch in 2013. D.Z.

---International Rock Gardener---



*Allium kurdistanicum*, W Iran, Kurdistan, Marivan vicinities, mid May 2018, D.Z.

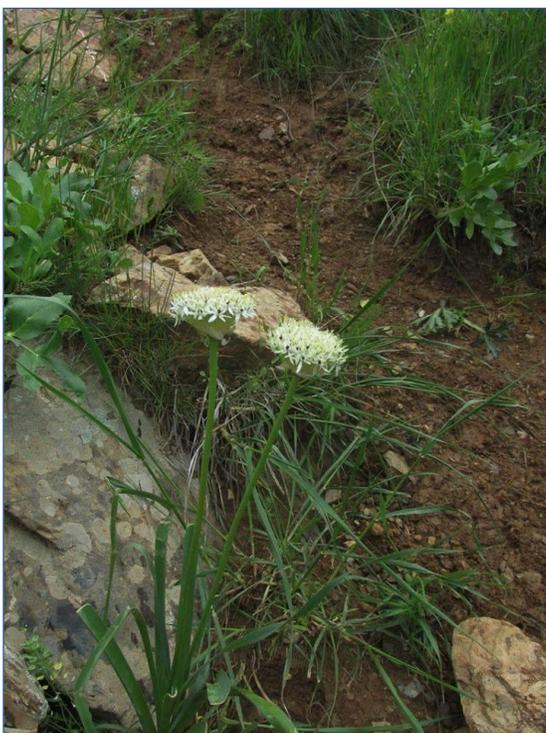
Note: R.M. Fritsch supposes that the correct name of this allium could be *A. ubipetrense*.



# ---International Rock Gardener---



*Allium saralicum* habitat. W Iran, West Azerbaijan province, Urmia vicinities. D.Z.



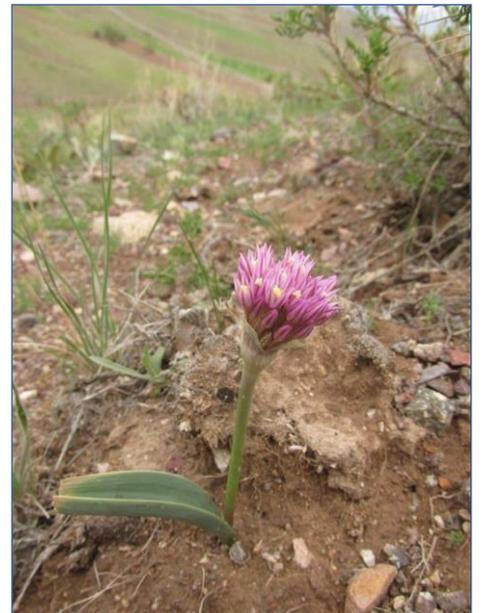
*Allium saralicum*



# ---International Rock Gardener---



*Allium shelkovnikovii* and habitat. W Iran, West Azerbaijan province, Urmia vicinities. D.Z.



---International Rock Gardener---



*Anemone biflora* aff., Iran, Markazi Province. D.Z.



Field with *Anemone coronaria* along the road from Marivan to Saqqez. J.R.

---International Rock Gardener---



*Colchicum raddeanum* in its locus classicus. W Iran, Kuhha-ye Sabalan. D.Z.



*Colchicum raddeanum* in its locus classicus. W Iran, Kuhha-ye Sabalan. D.Z.



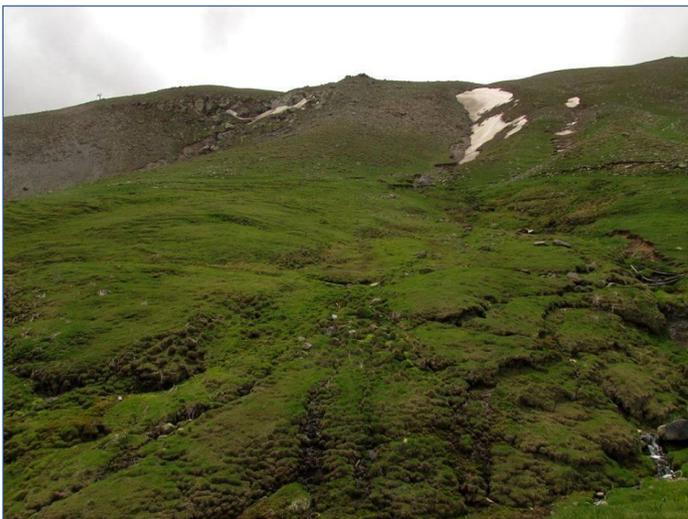
# ---International Rock Gardener---



*Colchicum robustum* in fruit. D.Z.



*Colchicum szovitsii* W Iran, Kuhha-ye Sabalan. D.Z.



*Colchicum szovitsii* and habitat. W Iran, Kuhha-ye Sabalan. D.Z.

# ---International Rock Gardener---



*Colchicum szovitsii* between Ardabil and Kuh-e-Sabalan, altitude 2700 m. Wet flood-meadow below melting snow. J. R.



Left above: *Corydalis verticillaris* subsp. *parviflora* near Khansar, altitude 2800 m. J.R.

Right above: *Corydalis verticillaris* subsp. *boissieri* - at an altitude of 2150 m. J.R.



*Crocus gunae* at its locus classicus, altitude 2400 m, Mazandaran, between Astaneh and Fulad Mahalleh. Often blooms through water from melting snow at bottoms of gullies. This crocus, named for Janis' wife, was described in [IRG 61 of January 2015](#).

---International Rock Gardener---



*Crocus gunae* at its locus classicus. J.R.



## ---International Rock Gardener---



Here is an interesting crocus, growing along road near Qahreman Kandi at an altitude of 2200 m in very wet habitat, just near melting snow together with *Colchicum szovitsii* and *C. triphyllum*. It seems that it belongs to *Crocus adamii* group (most likely it is a new species) and has very strongly sweet honey-like scented flowers. From the few plants collected for herbarium use, our whole bus was filled with its fragrance. J.R.



# ---International Rock Gardener---

*Crocus inghamii* N end of Kuh-e Sendan Dagh, between Dizejabad and Sorkheh Diza, Iran. J.R.



*Crocus inghamii* - which was described in [IRG 89 May 2017](#). A species named after John Ingham, traveller and nature lover, who was the first to spot and photograph this beautiful crocus on the slopes of Kuh-e Sendan Dagh in 2008. J.R.



# ---International Rock Gardener---



*Fritillaria atrolineata* and its habitat - alt. 1820 m, along road from Ourumiyeh to Oshnaviyeh. J.R.



Blossom seen near *F. atrolineata*. J.R.



*Fritillaria atrolineata* habitat – altitude of 1820 m, along road from Ourumiyeh to Oshnaviyeh J.R.

# ---International Rock Gardener---



Near Khansar, altitude 2800 m - *Fritillaria imperialis* J.R.



*Fritillaria imperialis* flowers vary in colour and shape – all have the species' grace and style! Their dark stems are especially attractive.

---International Rock Gardener---



*Fritillaria imperialis* J.R.



*Fritillaria imperialis* D.Z.

# ---International Rock Gardener---



*Fritillaria kotschyana* subsp. *grandiflora*, altitude 2100 m - Kuhha-ye Talesh Talysh Mountains between Nav and Khalkhal, also the locus classicus of *Crocus archibaldiorum*. J.R.





*Fritillaria kotschyana* subsp. *grandiflora*, altitude 2100 m - Kuhha-ye Talesh Talysh Mountains between Nav and Khalkhal. J.R.

---International Rock Gardener---



Stoloniferous *Fritillaria kotschyana* subsp. *kotschyana*. W Iran, Kuhha-ye Tales, Asalem pass area - Khalkhal Rd. D.Z



# ---International Rock Gardener---



Stoloniferous *Fritillaria kotschyana* subsp. *kotschyana*. W Iran, Kuhha-ye Tales, Asalem pass vicinities - Khalkhal Rd. D.Z



---International Rock Gardener---



*Fritillaria kurdica*, N of Lake Urmia. J.R.



## ---International Rock Gardener---



*Fritillaria persica* along the road from Saqqez to Marivan, altitude 1600 m. J.R.



Habitat shared by *FF. poluninii*, *strausii*, *crassifolia* and *imperialis*. At the same locality, only on the opposite slope, is *F. avromanica*. On both sides one may see *Iris avromanica* and dwarf *Puschkinia scilloides*. D.Z.

---International Rock Gardener---



*Fritillaria poluninii* D.Z.

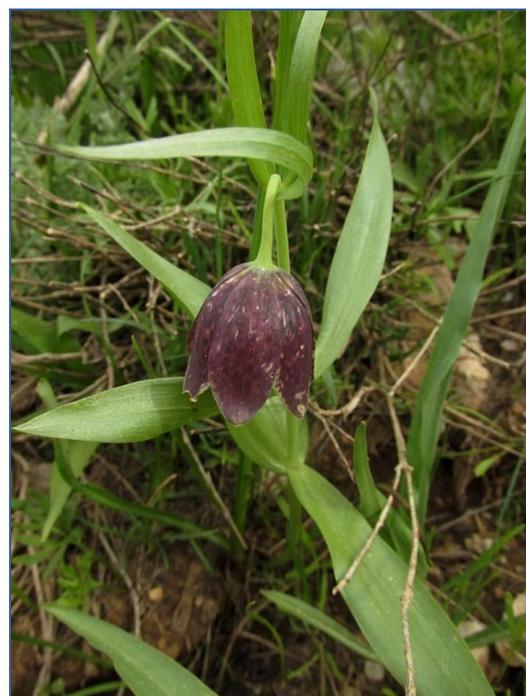


# ---International Rock Gardener---

*Fritillaria reuteri* , near  
Khansar, altitude 2800 m.  
J.R.



Below: *Fritillaria straussii* and  
*F. straussii*, melanistic form.  
D. Z.



---International Rock Gardener---



*Fritillaria straussii* in mixed fritillaria population area, W Iran, Kurdistan, Marivan area. D.Z.



# ---International Rock Gardener---



Tamar Galstyan taking photos of *Fritillaria zagrica* in habitat along the road from Khalkhal to Tabriz near turn to Shams Abad. J.R.





*Hyacinthus litwinowii* - Kopet Dag mountains. J.R.

---International Rock Gardener---



*Iris acutiloba sensu lato.* W Iran, Kuhha-ye Sabalan. D.Z.



# ---International Rock Gardener---



*Iris acutiloba* within *Onobrychis cornuta* foothills. W Iran, from Kurdistan to Talysh. Dima D.Z.



## ---International Rock Gardener---



It is easy to see how the iris can find some protection amongst the *Onobrychis*!



*Iris acutiloba* subsp. *longitepala*. W Iran, Zanzan province. D.Z.

---International Rock Gardener---



*Iris acutiloba* subsp. *longitepala*. W Iran, Zanzan province. D.Z.



# ---International Rock Gardener---



Along the road from Saqqez to Marivan at an altitude of 1600 m – the habitat of *Iris aucheri* and *Fritillaria persica*. J.R.



---International Rock Gardener---



*Iris aucheri* at the same locality as *Fritillaria atrolineata* - along the road from Ourumiyeh to Oshnaviyeh. J.R.



---International Rock Gardener---



*Iris aucheri* with *Tulipa humilis alba*. J.R.

---International Rock Gardener---



*Iris bakeriana* and an albino form - all pictured W of Lake Urmia, altitude 1800 m. J.R.



---International Rock Gardener---



*Iris hymenosptha* subsp. *leptoneura*, near Sultaniyeh, altitude 2200 m. near *Corydalis verticillata* and *Iris reticulata*. J. R.



---International Rock Gardener---



*Iris iberica* subsp. *lycotis*. W Iran, Kurdistan, Marivan area. D.Z.



---International Rock Gardener---



*Iris iberica* subsp. *lycotis*. W Iran, Kurdistan, Marivan area. D.Z.



# ---International Rock Gardener---



At an altitude of 2150 m – an unpublished Juno section *Iris* sp. J.R.



*Iris* sp. (Juno section), Iran, Semnan province. D.Z.

---International Rock Gardener---



*Iris* sp. (Juno section), Iran, Semnan province. D.Z.



*Iris kopetdaghensis* - large plants from Golestan National Park. J.R.

---International Rock Gardener---



*Iris kopetdaghensis* J.R. *Iris kopetdaghensis* (Juno section), Iran, North Khorasan province. D.Z.



Dwarf *Iris kopetdaghensis* WHIR-058 -07

# ---International Rock Gardener---



*Iris marivanica* habitat. J.R.



*Iris marivanica* was described in [IRG112](#). It is named after Marivan, a city in Iranian Kurdistan, not far from where this iris was observed. J.R.

---International Rock Gardener---



*Iris reticulata* J.R.



*Iris reticulata* growing with *Crocus inghamii*. J.R.

---International Rock Gardener---



*Iris reticulata* variability at locus classicus of *Paeonia wendelboi* - blue resembles *I. hyrcana*. J.R.

# ---International Rock Gardener---



*Iris reticulata* with white flowered *Colchicum trigynum*



*Iris reticulata* variability at locus classicus of *Paeonia wendelboi*. J.R.

# ---International Rock Gardener---



*Iris zagrica* J.R.

*Linaria* habitat with *Stipa* D.Z.



*Linaria michauxii* within deserted habitat with *Stipa* sp. W Iran, Qom Province. D.Z.

---International Rock Gardener---



*Ornithogalum bungei*. NE Iran, Golestan Province forests. D.Z.



Sheep at the location of *Paeonia wendelboi*. J.R.

# ---International Rock Gardener---



Sheep crossing the road. J.R.



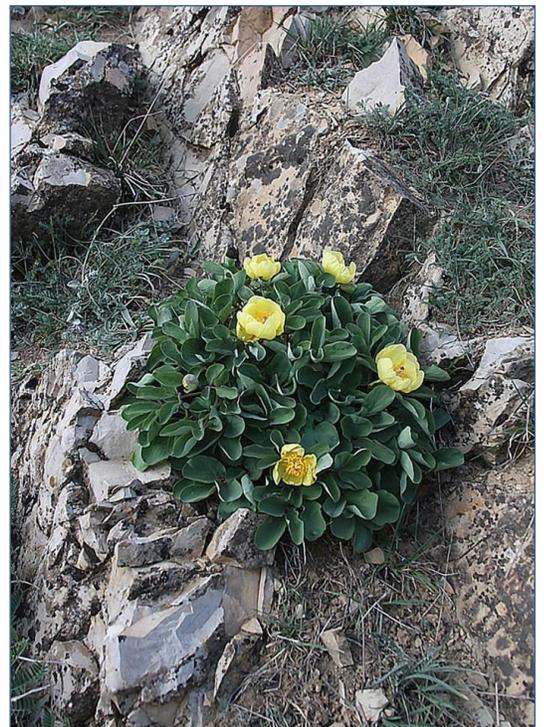
*Paeonia wendelboi* D.Z.

---International Rock Gardener---



*Paeonia wendelboi* W Iran, Kuhha-ye Tales. D.Z.

*Paeonia wendelboi*: there is *Iris hyrcana* nearby. J.R.



*Paeonia wendelboi* D.Z.

---International Rock Gardener---



*Puschkinia peshmenii* J.R.



*Puschkinia scilloides* J.R.



*Puschkinia scilloides* and *Gagea* sp. Between Ardabil and Kuh-e-Sabalan, altitude 2700 m. Wet flood-meadow below melting snow. J. R.

## ---International Rock Gardener---



*Puschkinia scillooides*. Between Ardabil and Kuh-e-Sabalan, altitude 2700 m. Wet flood-meadow below melting snow. J. R.



Shared habitat for *Puschkinia* cf. *scillooides*, *Ornithogalum oligophyllum*, *Gagea* sp. and *Ranunculus* sp. W Iran, Kurdistan, at pass around Marivan. D.Z.

---International Rock Gardener---



*Ornithogalum oligophyllum*, *Gagea* sp. and *Ranunculus* sp. W Iran, Kurdistan, at pass around Marivan. D.Z.



*Puschkinia* cf. *scilloides*, D.Z.



*Fessia gorganica* J.R.

---International Rock Gardener---



*Fessia olangensis* J.R.



*Fessia gorganica* J.R.



*Zagrosia (Scilla) persica*. W Iran, Kurdistan, Marivan area. D.Z.



*Zagrosia persica*. W Iran, Kurdistan, Marivan area. D.Z.

# ---International Rock Gardener---



*Tulipa humilis* habitat. W Iran, Kuhha-ye Zagros, Aligudarz area. . D.Z.



*Tulipa humilis* in its habitat. W Iran, Kuhha-ye Zagros, Aligudarz vicinities. D.Z.

## ---International Rock Gardener---



Variouly coloured population of *Tulipa humilis* in its habitat. W Iran, Kuhha-ye Zagros, Aligudarz area. D.Z.



---International Rock Gardener---



*Tulipa humilis* J.R.



# ---International Rock Gardener---



This is most likely a new species of Tulip, altitude around 3000 m. J.R.



# ---International Rock Gardener---



A most attractive little tulip, found at an altitude of 3000 m, which is probably a new species.



*Tulipa micheliana* J.R.



# ---International Rock Gardener---



*Tulipa montana flava*. Richard Wilford calls it *T. montana* var. *chrysantha* in his book 'Tulipa, Species and Hybrids for the gardener'. J.R.



---International Rock Gardener---



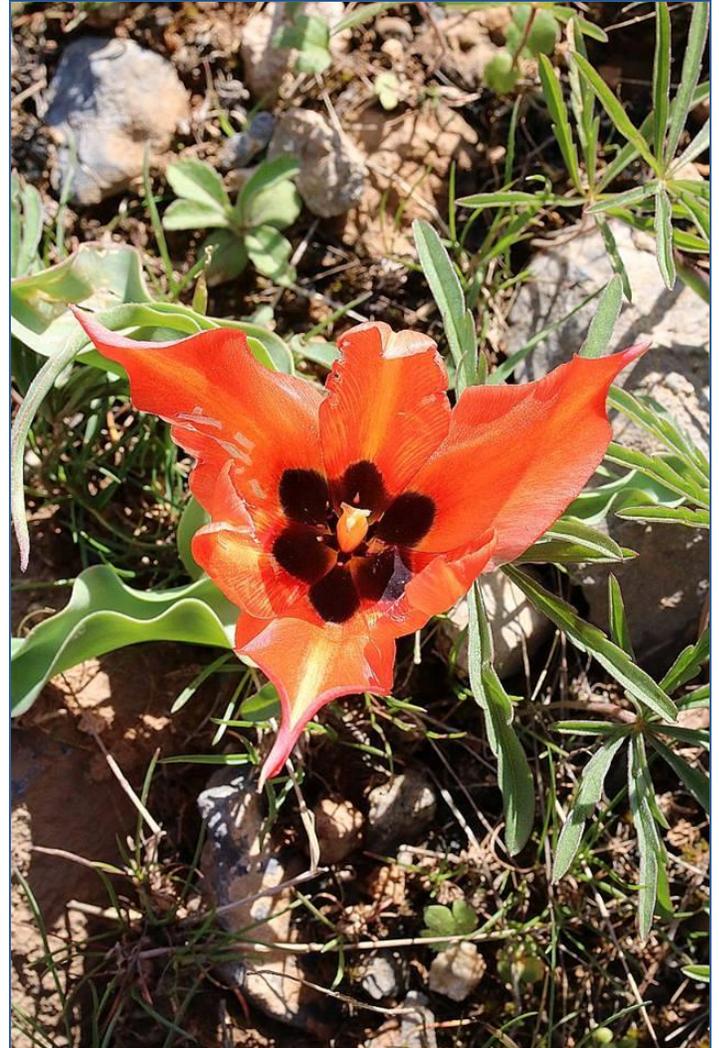
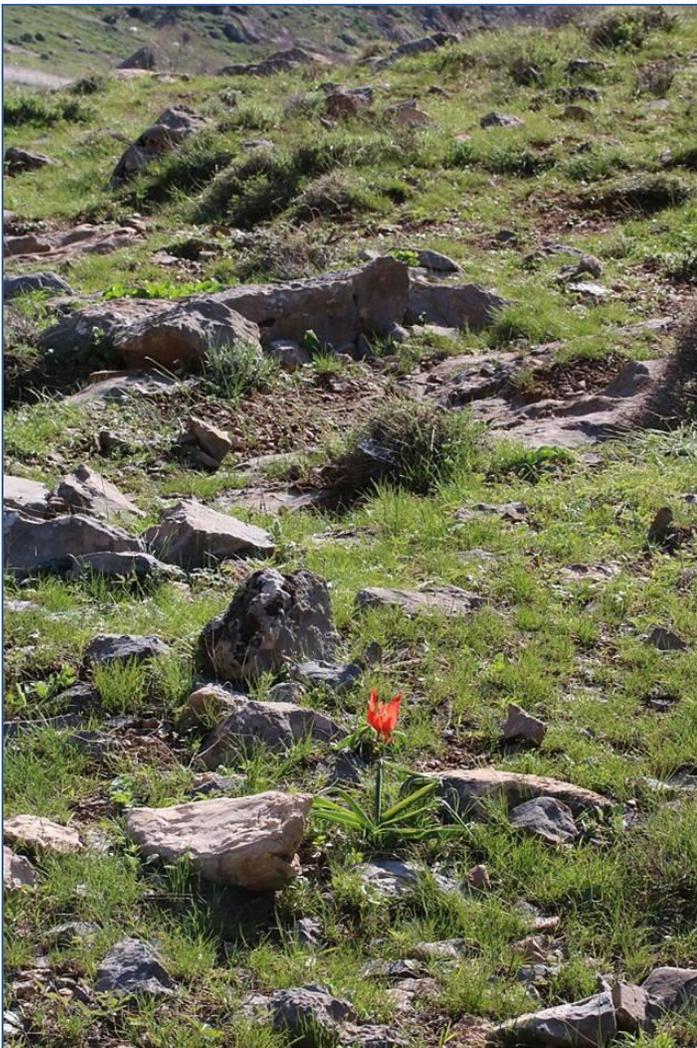
*Tulipa polychroma* J.R.



---International Rock Gardener---

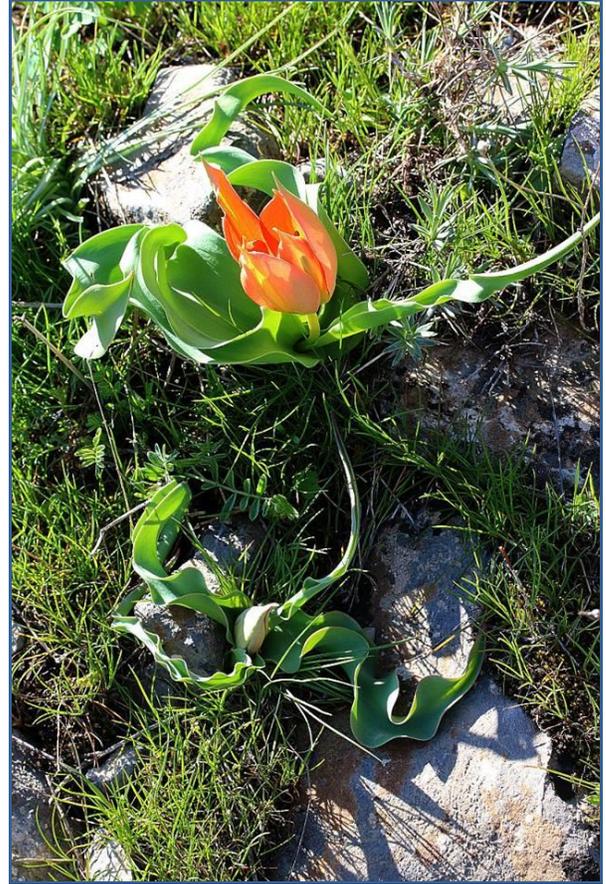


*Tulipa polychroma* J.R.



*Tulipa systola* from a slope along the road from Ourumiyeh to Oshnaviyeh. J.R.

# ---International Rock Gardener---



*Tulipa systola* near Lake Urmia - on meadow between roadside and cultivated field, near pass.  
Altitude 2100 m. J.R.

# ---International Rock Gardener---



*Tulipa systola*  
from near  
Lake Urmia.  
J. R.



*Tulipa ulophylla*, Iran, Golestan Province.  
D.Z.



---International Rock Gardener---



*Tulipa ulophylla* J.R.



---International Rock Gardener---



*Tulipa ulophylla* J.R.



---International Rock Gardener---



*Tulipa wilsoniana* - colour forms, Golestan National Park. J.R.



# ---International Rock Gardener---



*Tulipa wilsoniana* - colour forms, Golestan National Park. J.R.

The IRG Team expresses thanks to Dimitri Zubov and Jānis Rukšāns for sharing with readers here these photos of some of the floral gems of Iran.

