

International Rock Gardener

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---International Rock Gardener---

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My word, the months are passing at great speed - I must be getting really old! This month we present a wonderful photo essay by Frédéric Depalle of one of his favourite subjects - *Oncocyclus Irises*. Frédéric Depalle is a keen plantsman, a most accomplished photographer, both of plants and “land-based” subjects as well as another of his passions, underwater photography.

I believe even those of us unable to grow, or even source, these irises will be captivated by Fred’s photographs. This month’s cover image is “Green seedpods of *Iris lineolata* in Armenia” – photo by Frédéric Depalle.

One of the many good Czech friends of the Scottish Rock Garden Club, is [Zdeněk Řeháček](#) and he writes about the bright golden *Viola aetolica*. A little charmer of a plant that is not widely grown in the UK.

Final article for IRG 146 is on “Growing *Acantholimon* “ from the Scot, Connor Smith who has already been in the Netherlands for over a year, in his post at the [Utrecht University Botanic Garden](#). Connor instituted the [Scottish Rock Podcasts](#) and it is hoped these will soon be able to return.



Quick on the draw? Photography needs a quick mind and hand!

Frédéric Depalle and his son, Mathieu, at the ready to “shoot “!

IRG welcomes article submissions – please email to Editor@internationalrockgardener.net

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--- Photo Report ---

ONCOCYCLUS IRISES : A PHOTOGRAPHIC SURVEY by [Frédéric Depalle](#).

I started to grow *Oncocyclus* Irises when I was about twenty years old (which means many years ago...). I got a plant list from Tira Nurseries, in Israel, owned by the late David Shahak, from where I ordered my first species and hybrids, by post of course as internet was not yet born.

I used to grow them in my father's garden, in the south of France, and soon I understood two facts:

- 1- They were really fantastic flowers
- 2- They were really so difficult to grow and even to keep alive

I almost stopped growing them then, except for some easy species, until 2008 when a friend of mine gave me a piece of *Iris kirkwoodiae* ... then my problems began!

I bought some plants in Germany, England, ... started again a collection focused on this *Iris* section and believe me...there is no vaccine able to cure! The last thirteen years have been devoted to *Oncocyclus*: travelling, growing, sowing, taking pictures, but first of all, learning about these tricky plants...

I will try to share my passion with you, thanks to the IRG magazine, and to give you pictures of all of the species I've seen in nature, with a few in cultivation or pictures from friends of mine.

The genus *Iris* grows almost all over the Northern Hemisphere, except in the very cold areas, or very hot and dry deserts. In some locations we can find several species, while in others it is hard to find even one. About 300 species are described but taxonomy is still unclear for many of them, and even subgenus and sections classification differ according to botanists.

The *Iris* genus is always under investigations, and molecular analysis should help to clarify it,... or not...

We will stay focused on one section, belonging to the *Iris* subgenus, which is named *Oncocyclus*, from the Greek 'Onkos' meaning lump, and 'Kyklos' : a circle, referring to the seeds which have a round lump at the top, also called Aril, which is also one of their common names (*Aril Iris*), mainly shared with the closely related *Regelia* section.

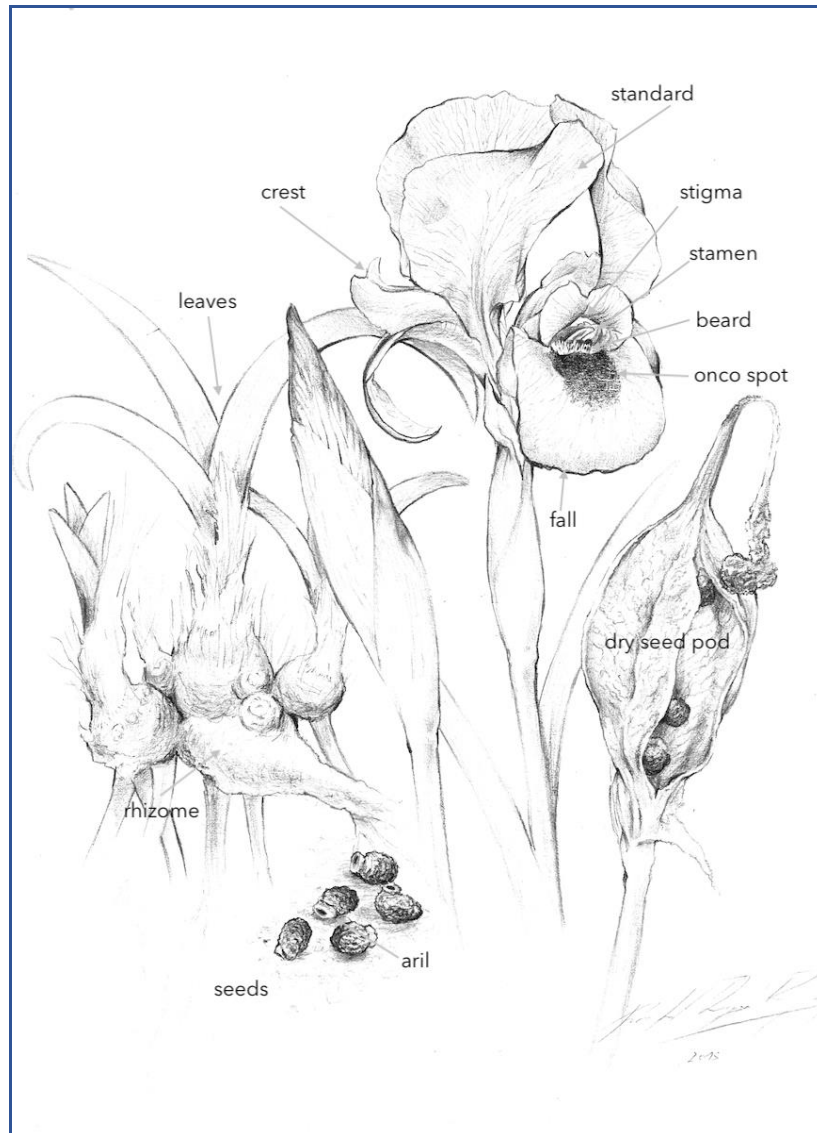
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Distribution map.

The *Oncocyclus* section is restricted to Caucasus and Middle-east area and can be found in Georgia, Azerbaijan, Dagestan, Turkey, Armenia, Iran, Lebanon, Israel, Palestine, Jordan, Syria, Iraq, Turkmenistan and extreme north-east of Egypt.

They always grow in open meadows, from sea-level to 3000 m, usually in clayish soils, but also sometimes in almost pure sand. Growing period usually starts around the end of autumn (October) and, according to species and locations, flowering time occurs from February to June.



Oncocyclus morphology - drawing by Rafael Diez Dominguez.

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The morphology of *Oncocyclus Iris* is quite unique, making them readily recognizable among all other sections.

Rhizomatous plants – glaucous leaves (often curved) – one single flower per stem – ‘Onco’ spot, which is a dark mark on the falls – seeds with aril.

The taxonomy of this section is not very clear, as many botanists gave names according to geographical locations prior to morphological characters, and to add some more trouble, botanists from former USSR gave names to plants already described by western botanists.

According to Kew world plants checklist, there are 49 species, subspecies, forma... but as I wrote, things are not so clear: in my opinion, based on field knowledge, some subspecies should be combined in one, some other or forma are really different and should be named as species, and some plants still need to be described.

DNA analysis has been conducted by several academics (Nour Abdel Samad, Carol A. Wilson, Yuval Sapir, Sergei Volis...) and, although it gives some answers, nobody has given, at this time, a new and complete phylogenetic tree for all *Oncocyclus* taxa. In fact, for several species, it's almost impossible to give a name without knowing the origin as they are so close morphologically.

Irises have been grown for centuries and are well-known as garden plants, and *Oncocyclus* species are no exception to the rule. The only small problem is that they don't really like our North European climate: too wet during summer. The goal of this article is not cultivation, but you only need to know, before trying to grow them, that basic requirements are: well drained compost, full light, watering from winter to spring (October- April), and completely dry rest of the year. They are so prompt to rot... but their flowers are worth the effort!

In nature, they are mainly threatened by sheep and goats, eating everything, from leaves to flowers. As seeds do not germinate easily, some populations could disappear quickly. Another pressure is from humans, mainly when building on areas where Irises are growing; during the last 10 years, I've seen some populations completely destroyed.

My choice was to show the plants mainly in nature, a few times in cultivation when on site pictures were not available, and to sort by country. Sometimes, I didn't have a photo from the country's locations, but you will find same species later in another place !

Well! enough to read, let's travel to Oncoland !

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TURKEY

Eleven *Oncocylus* species grow in Turkey of which five are strictly endemic.

Cappadocia - the hoodoo valley (of “fairy chimneys” as the locals say.)

Iris sari Schott ex Baker – Endemic to Turkey.





Iris gatesii Foster – Endemic to Turkey, and probably Northern Iraq – Plant in cultivation, this is one of the biggest flowers of the section.



Iris sprengeri Siehe – Endemic to Turkey – Stoloniferous rhizome.



Iris kirkwoodiae Chaudhary – Turkey and Syria – Some subspecies are described, but are doubtful, like *Iris kirkwoodiae* subsp. *calcareae* Chaudhary.



Iris barnumiae Foster & Baker – Endemic to Turkey. This one is the regular purple form; the yellow form was described as *Iris barnumiae f. urmiensis* (Hoog) B.Mathew & Wendelbo which is certainly a different species. – Photo Oron Peri.



Iris nectarifera Güner – Turkey and Syria – Plant in cultivation, almost extinct in nature and very rare in cultivation.

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ARMENIA

Four
Oncocyclus
species grow in
Armenia.

Armenian church



Iris elegantissima Sosn. – Armenia, Turkey, Iran: The accepted name, according to Kew, is *Iris iberica* Steven in F.A.F.Marschall von Bieberstein, but, in my opinion, this is a different species, growing in Georgia and Azerbaijan only.

A synonym is *Iris iberica* subsp. *elegantissima* (Sosn.) Fed. & Takht., Fl. Erevana: 331 (1972) which makes sense, but I really think that we need to keep it as a separate species.



Iris lycotis Woronow – Armenia, Turkey, Iran – a very compact form. This species has a very wide range (more than 1200 km) and colours are changing from North to south: dark brown in the north moving to violet – purple in the south.



Iris lineolata (Trautv.) Grossh. – Wide distribution including Armenia, Azerbaijan, Iran, Turkmenistan- the accepted name is *Iris acutiloba* subsp. *lineolata* (Trautv.) B.Mathew & Wendelbo, Fl. Iranica 112: 32 (1975), but it clearly deserve to get a full species status.



Iris paradoxa Steven – Wide distribution including Turkey, Armenia, Azerbaijan, Iran – dark form, sometimes called ‘var. atrata’; these plants are growing with regular colour forms.



Iris paradoxa Steven – regular colour form

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Sometimes, plant hunting can be stressful
...Land mines from this area were removed...
let's trust them and hope so ! ☺



Green seed pods on *Iris lineolata* plants.

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GEORGIA

One *Oncocyclus* species grows in Georgia



Iris iberica Steven – Georgia, Azerbaijan – This is a tall plant while *Iris elegantissima* is always very compact, and falls are paler, standard from pure white to blue. Photo Hendrick Van Bogaert.

AZERBAIJAN

Seven *Oncocyclus* species grow in Azerbaijan. 3 of them are strictly endemic.

Mud volcano in Gobustan national park – Gas erupting with oil and water on clay ground.



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Iris lineolata was growing here - Sheep taking care of last leaves.



Iris acutiloba C.A.Mey. – Endemic to Azerbaijan and Daguestan – Here is a very compact form above Baku.

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Iris acutiloba C.A.Mey. – more standard plants in Golestan.



Iris camillae Grossh. – many colour forms exist; we could take hundreds of photos, none will have same colours.



Iris camillae Grossh. – Endemic to Azerbaijan – A very variable species which was given many forma names – I think it has a hybrid origin, maybe between *Iris schelkownikowii* and *Iris iberica*.



Iris camillae Grossh. – a white and yellow forma, genetic mutation.

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Iris camillae habitat in Azerbaijan.



Iris paradoxa Steven – nice colour form.



Iris iberica Steven – white form, but its status is not clear as it also could be a hybrid.

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Iris schelkownikowii (Fomin) Fomin – Endemic to Azerbaijan – Close to *Iris camillae*, may be one of its parents and quite stable in colours and shape.



Iris iberica Steven – Azerbaijan and Georgia – form with blue standards

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Natural hybrid between *Iris paradoxa* and *Iris lineolata* is found in some locations where the two species are growing together.

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Iris lineolata (Trautv.) Grossh. – Typical clump in low grass.



Iris paradoxa f. *choschab* (Hoog) B.Mathew & Wendelbo or *Iris medwedewii* Fomin –Azerbaijan, Iran, Turkey – I would prefer to give it a species status, like Fomin, as it never grows with *Iris paradoxa* Steven, and has very stable features; Taxonomy has made a different choice ;-)
Photo Philippe Geniez.

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LEBANON

Seven *Oncocyclus* species grow in Lebanon, from North to South. Two of them are strictly endemic.



Emblematic Cedar forest in Lebanon

Iris susiana L. – Endemic to Lebanon - Taxonomy for Lebanese *Oncocyclus* is complicated as several botanists gave different names on more or less similar plants. *Iris sofarana* Foster, *Iris kasruwana* Dinsm., *Iris grandiflora* Salisb. are all synonyms of what is now accepted as *Iris susiana* L., which is the oldest and most popular *Oncocyclus Iris* as it has been described in 1753 and widely grown in Europe since 1573 !





Iris susiana L. – another location, different form.

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Iris cedreti Dinsm. ex Chaudhary – Endemic to Lebanon – Growing close to the one of last Cedar forests in Lebanon.



Iris westii Dinsm. – Endemic to Lebanon and Mt Hermon in Israel.

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Iris antilibanotica Dinsm. – Endemic to Anti-Lebanon mountains in Lebanon and Syria – The populations in Lebanon maybe originally came from Syria and were planted by humans.



Iris bismarckiana E.Dammann & Sprenger – Lebanon, Israel, Jordan – This species has a stoloniferous rhizome.

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Iris lortetii
Barbey –
South
Lebanon,
North
Israel.



Iris basaltica Dinsm. – Syria,
Lebanon –This species was recently
described from Lebanon and was
originally described from Syria near
Krak des Chevaliers castle.
Photo Ali Adnan Taleb.

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SYRIA

There are eleven *Oncocyclus* species growing in Syria, from North to South. Six of them are strictly endemic.



Palmyra archeological site



Rosa damascena in Aleppo Market.

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Iris aurantica Dinsm. – Endemic to Southern Syria. This is the only yellow gold *Oncocyclus* and is also called the lava *Iris* as it grows on volcanic hills in the Hauran area, in a very restricted area.



Frédéric Depalle with *Iris antilibanotica* at Bloudane, Syria.

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Iris bostrensis Mouterde – South Syria, Northern Jordan – when going to the south (Jordan), this species starts to cross with *Iris nigricans* then we can find some intermediate forms.



Iris swensoniana Chaudhary – Endemic to Syria in a very restricted volcanic area; may be the species with the smallest distribution range.

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Iris damascena Mouterde - Endemic to Syria – Above Damascus city.



Iris damascena Mouterde - Endemic to Syria.



Iris yebudii Dinsm. ex Chaudhary - Endemic to Syria – in cultivation, quite close to *Iris damascena*, but would need some more studies about its status.



Iris assadiana Chaudhary - Endemic to Syria. Very short stoloniferous species, growing in the desert. Photo Thomas Fietz.

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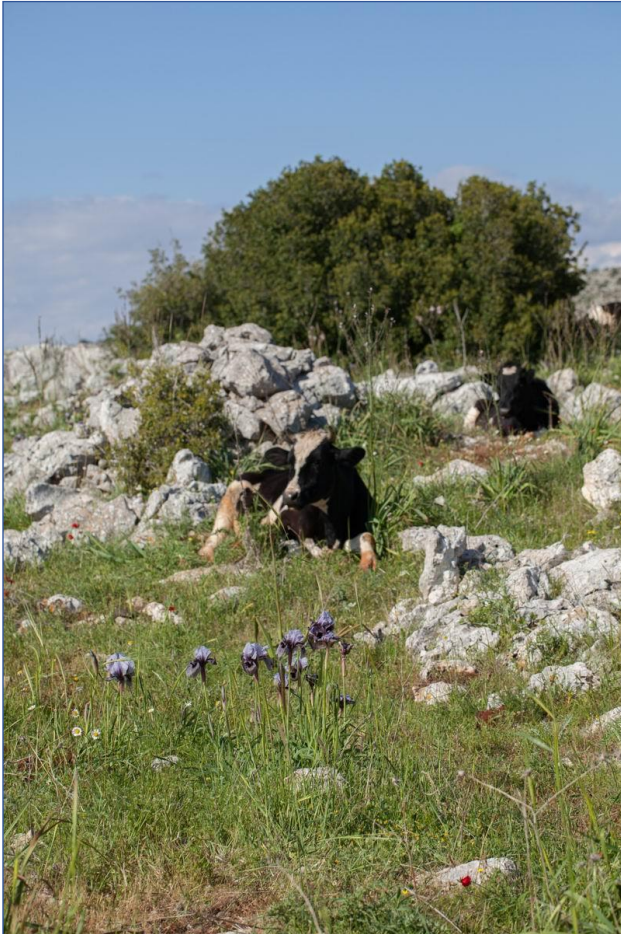
Iris antilibanotica
Dinsm. – Syria,
Lebanon.



Iris basaltica Dinsm. – Syria,
Lebanon — From the *locus*
classicus, Krak des chevaliers
castle. (Castle of the Knights.)
Photo Thomas Fietz.

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Iris kirkwoodiae Chaudhary – Syria and Turkey.

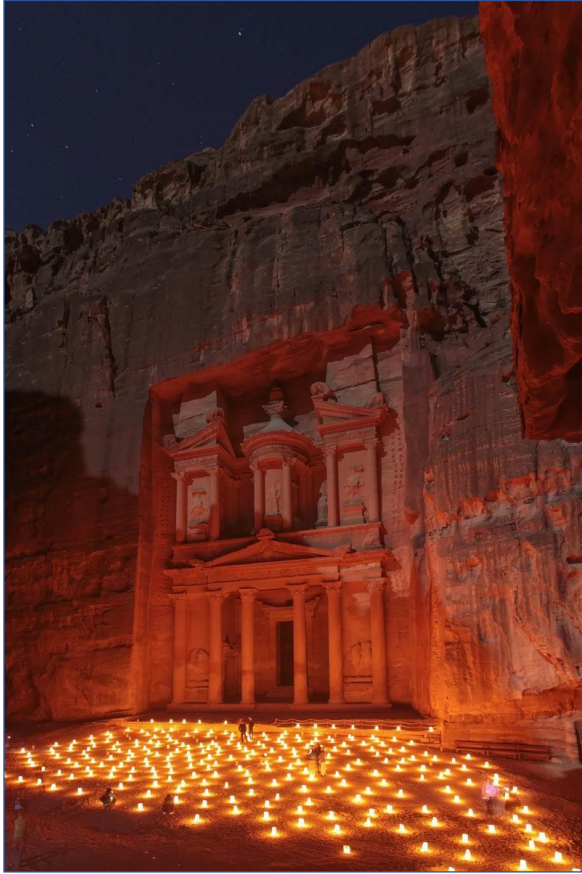


Cows
also really like *Iris kirkwoodiae* in Syria.

Iris hermona Dinsm. –
Endemic to the Golan
Heights.



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JORDAN

Five *Oncocyclus* species grow in Jordan, from North to South but nothing on the east desert area. Two of them are strictly endemic.

Petra, 'The Khazneh' by night.



Iris nigricans Dinsm. – Endemic to Jordan. – The 'black Iris' Jordan's national flower !

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Iris petrana Dinsm. – Endemic to Jordan. Mountain species, completely different from what is called *Iris petrana* in Israel.



Iris bostrensis Mouterde – South Syria, Northern Jordan – There is also a natural hybrid, in Jordan, between *Iris nigricans* and *Iris bostrensis*.



Iris haynei Baker – Jordan, Palestine – Used to be called *Iris jordana* Dinsm; but not a different species.

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Iris bismarckiana E.Dammann & Sprenger - Lebanon, Israel, Jordan.

ISRAEL & PALESTINE

Nine *Oncocyclus* species grow in Israel and Palestine, from North to South. Six of them are strictly endemic.



Jerusalem, The
Dome of the Rock
(Qubbat al-Sakhra).



Iris bismarckiana Dammann & Sprenger – Israel, Jordan, Lebanon – Stoloniferous rhizome.

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Iris yeruchamensis – Endemic to Israel – This species is not officially described and named; seems to be a natural hybrid between *Iris atrofusca* and *Iris mariae*. It was also named *Iris petrana*, which is a completely different species, growing in the Jordan mountains.



Iris atrofusca Baker – Endemic to Israel and Palestine.

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Iris atropurpurea Baker – Endemic to Israel – Often growing by the sea in sand dunes, with many colour variations.



Iris mariae Barbey – Endemic to Israel, Palestine and Egypt (Sinai) – Grows in the sandy desert; eye catching plants when blooming, purple flowers on yellow sand !



Iris lortetii Barbey – Israel, Palestine, Lebanon.

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Iris lortetii var. *samariae* (Dinsm.) Feinbrun – Endemic to Palestine – *Iris samariae* Dinsm. was a species, but is now accepted as a form of *Iris lortetii* Barbey.



Iris westii Dinsm. – Israel (Mt Hermon) and Lebanon – Photo Rafael Gilad Mor.



Iris haynei Baker – Israel, Palestine, Jordan – this species also had several names like *Iris jordana* Dinsm. or *Iris giladensis* Dinsm. but only one is accepted now.

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David Shahak in his Tira nurseries *Oncocyclus* fields – My first *Oncocyclus* Iris supplier, *In Memoriam*.



Great meeting in Tira with people loving *Oncocyclus*: Miriam Sason, David Shahak, Oron Peri.

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IRAN

At least eleven *Oncocyclus* species grow in Iran, from West to East but nothing in the southern, desert area. Five of them are strictly endemic. Some species still need to be described, and one more, *Iris ferdowsii* Joharchi & Memariani, part of the *Regelia* section, is very close to *Oncocyclus* and will be included here. I consider it like the link between the two sections, in eastern limit for *Oncocyclus*, and western for *Regelia*.



Naqsh-e Jahan
Square, Isfahan

Iris lineolata

(Trautv.)

Grosch. – Iran,

Azerbaijan,

Armenia,

Turkmenistan –

In some

populations,

this species

does have

narrow sepals

(falls) while in

others, like

here, wider

ones.



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Iris polakii Stapf – Endemic to Iran – Dwarf form.



Iris meda Stapf – Endemic to Iran – It's a quite variable species



Iris medea Stapf – another colour form.



Iris paradoxa f. *choschab* (Hoog) B.Mathew & Wendelbo or *Iris medwedewii* Fomin – Iran, Turkey, Azerbaijan.

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Iris urmiensis Jekyll & E.T.Cook – Iran, Turkey – also described as *Iris barnumiae* f. *urmiensis* (Jekyll & E.T.Cook) B.Mathew & Wendelbo, but we should keep it's species status.



Iris elegantissima Sosn. – Iran, Armenia, Turkey



Iris lycotis Woronow – Iran, Armenia, Turkey – synonym of *Iris iberica* subsp. *lycotis* (Woronow) Takht., but once again, it deserves a full species status.

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Iris paradoxa f. *mirabilis* Gavr. – Endemic to Iran – We could discuss about full species status or not; it has a very restrictive area, many differences from *Iris paradoxa* and very few variations in populations.



Iris acutiloba subsp. *longitapala* B.Mathew & Zarrei – Endemic to Iran – Once again, I believe taxonomy is not accurate about the *Iris acutiloba* complex; The actual *Iris lineolata* (Trautv.) Grossh. and *Iris acutiloba* C.A.Mey. used to be subspecies of *Iris acutiloba* and are now clearly distinct, what should also happen to *Iris longitapala* which is completely different from *Iris acutiloba* C.A.Mey.. I could understand the subspecies status, but only from *Iris lineolata* (Trautv.) Grossh..



Iris demawendica (Bornm.) Dykes – Endemic to Iran – today, the accepted name is *Iris barnumiae* subsp. *demawendica* (Bornm.) B.Mathew & Wendelbo, but right now I prefer to keep the species status, waiting for more studies. In the background, Mount Damavand volcano, 5605 m.

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Sometimes we can find some colour variations in one population; I would call this one *Iris paradoxa* f. *choschab* (Hoog) B.Mathew & Wendelbo var. *ochroleuca*... and distinctive from *Iris paradoxa* f. *mirabilis* Gavr.



Iris paradoxa forma *choschab*.

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Iris sp. – This plant has been well-known for many years and is usually called the ‘Moleskin iris’, as the beard is as soft as Mole’s skin... but it has never been officially described and named. Work in progress...It was supposed to be a hybrid between *Iris meda* and *Iris polakii* or something else; maybe it could have ancient hybrid origin, like several other *Oncocyclus* species, but for sure it’s now a well-established species.



Iris ferdowsii
Joharchi &
Memariani –
Endemic to Iran.
This new species
was described in
2017 as part of the
Regelia section
(bearded
standards) but I’d
like to include it
here as it’s also
close to the

Oncocyclus section (single flower). It’s the only *Regelia* representative in Iran.

[F.D.](#)

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--- Plant Portrait ---

Interesting Viola: by Zdeněk Řeháček

In 2004, I received seeds marked *Viola aetolica* from an Austrian friend.

I planted the resulting seedlings in a silicate rock garden and over the next two years I found that it was a lovely little flower which, when in bloom, was visible from a distance with its bright yellow flowers. And that it blooms for a long time, like few others.

Viola aetolica Boiss. and Heldr. comes from the mountains of Albania, Macedonia and Greece where it grows at altitudes of 1200–2000 m, mostly on limestones. It creates low clusters of narrowly lanceolate to spoon-shaped, finely ciliate leaves. The rosettes grow slowly, and from them on short stalks the buds emerge and are enveloped by narrow calyx leaves. The petioles of the buds gradually elongate so that they are 5-10 cm long and erect when the flowers are fully open. Flowers are bright yellow, about 2 cm across.



The first flowering in April tends to be more abundant, but the plant continues to flower throughout the rest of spring and summer, sometimes into September. For a long time on its still-developing stems are the remnants of the seedpods from the seeds that have been released ...and at the same time the flowers are fully open and the new buds are starting. It does have one fault though - it is not very long-lived, two or

three years and that's enough. But it still produces new seedlings so it's self-sustaining (but it's far from weedy). It appears in various places that it chooses for itself. Only once did we think we had lost it. After about three or four years in the silicate rock garden, it was gone after the winter. It didn't show up the following year, but to our surprise, it did return the year after that. Only in a tuff rock that's quite distant from the silicate rock. That was in 2010 and it's still there today, whereas it never re-appeared in the silicate one. Reproduction is only by seeds, which usually I send to our club exchange.

Z.R.

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--- Propagation ---

Propagating *Acantholimon* at Utrecht Botanic Garden

By Connor Smith. Photos by Gerard van Buiten



Acantholimon glumaceum - an accession dating back to 1964 in the Utrecht Botanic Garden. It has formed a large carpet of spiky foliage which is graceful when in flower.

Turning out a pot to uncover small white roots brings a moment of joy like no other. It brings a happiness required in the cold depths of winter when many of us are secluded in our glasshouses. While this feel-good factor is often sought, some species are not so eager to please us. As we tip the pot, we find rot, callusing but no rooting or sometimes remnants of a cutting once there. This often results in new methods, at new times, sometimes with new species. Sometimes fairing better, sometimes, not so much.

Acantholimon is one of these species. Predominantly an evergreen shrub (I have seen some with an interesting bronze colour normally followed by some loud cursing) growing in harsh conditions in the arid, high elevation areas of Eastern Europe to Central Asia. It grows from densely packed cushions which are tightly formed to laxer mat forming carpets which creep over the ground or are found clinging to rock faces. Despite an incredibly large range of species, the

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AGS list states approximately 120 species while Kew states 312, it is clear the true names and species are not agreed upon and often far from accurately described. Despite their range they remain relatively unexplored, with only a small array of species available in commerce, seen in people's gardens or in botanic gardens.

***Acantholimon* at Utrecht Botanic Garden**

Many of the *Acantholimon* have been well placed with their preferred area of colonisation. With the larger species allowed to grow rampantly and the smaller denser species given protection in the alpine house away from the rain. These are mostly the easier species like *Acantholimon acerosum* which have established well and flower regularly.

We have grown some of the following species:

A. acerosum, *A. alatavicum*, *A. pamiricum*, *A. knorringianum*, *A. kotschyi*, *A. caesareum*,
A. venustum, *A. armenum*, *A. sarytavicum*, *A. saxifragiforme*, *A. hedinii*, *A. caryophyllaceum*,
A. capitatum, *A. litvinovii*, *A. calvertii*, *A. ulicinum* and *A. echinus*.

Propagation methods

A range of cuttings were taken in order to test which was the best for us and for this tricky plant. Short cuttings of approximately 3 inches were taken with a single tuft and with multiple tufts. We also took longer cuttings approximately 6 inches long to see if the length was a factor.



Showing above: left, small single rosette cuttings, with the smaller multiple rosette cuttings on the right side of the right hand image.

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The final technique was inspired by a conversation with Gerard (Head Gardener at Utrecht BG) who told me when redesigning a bed, a number of years ago he removed a large *Acantholimon* species. He covered it with some soil and left it outside, unprotected. He was concerned that it would have rotten after a rainy cold spell, but, much to his surprise he found many small roots which formed all over the plant.

This is what gave me the idea to do “mounded” cuttings. Long sections of the plant are taken as cuttings and placed in a large, deep pot. Two to four cuttings are spaced into the pot and then backfilled with soil. The soil mix was then filled to the neck of the cuttings. All cuttings were placed in a glasshouse, no bottom heat, only a heater fan to prevent the conditions from dropping below freezing. The cuttings were taken in November, I think they can be taken from October to February depending on your climate and conditions.



Showing the ideal length of the cutting and the growth habit.

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Results

Despite many of the cuttings (3 inches and 6 inches) looking healthy there was no root development on any of them. A few had rotten at the base and were beginning to turn brown. This is a common case when I have spoken with people about trying to root plants of *Acantholimon*. Talking with other plant people has shown some species which are easier than others (*Acantholimon acerosum*, *ulicinum* and *trojanum*) but still not reliable nor consistent with results.

When the pot with the mounded cuttings was turned over it had a different story to tell. All of the cuttings had rooted at the bottom of the cuttings. This is quite similar to *Erigonum* species and other desert adapted genera which have these forms of adaptations. To explain, plants in desert environments have adapted to an environment in which the presence of water is scarce. Therefore, root formation, especially the fine roots which *Acantholimon* produce need to be kept moist in order to establish. It makes sense as to why the cuttings rooted lower down where there is more water, cooler root zone temperature and better anchorage against wind. This also makes sense when you think about how the plant forms in its native habitat. As soil builds up around the neck of the plant it will form new roots in the soil.



Acantholimon acerosum - mounded cuttings in the pot which have rooted and started to develop new growth.

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This is a similar adaptation to forest plants like *Viola* which are mounded by the fresh leaf litter on the forest floor. This will then cover the plant, allowing the roots to form in the new conditions. A similar technique has been established to propagate the equally challenging species of *Cassiope*. Soil is mounded onto the main stem covering part of the lower limbs to allow new roots to form - quite similar to a form of layering, but instead of bringing the branch of the plant down to the soil you are bringing the soil to the plant.

One cutting which had the best roots had started rooting further up the stem. Logical conclusions are then easy to jump to. As the cutting forms roots and is better established, and now can form additional roots further up the stem if a satisfactory volume of soil and water is present.

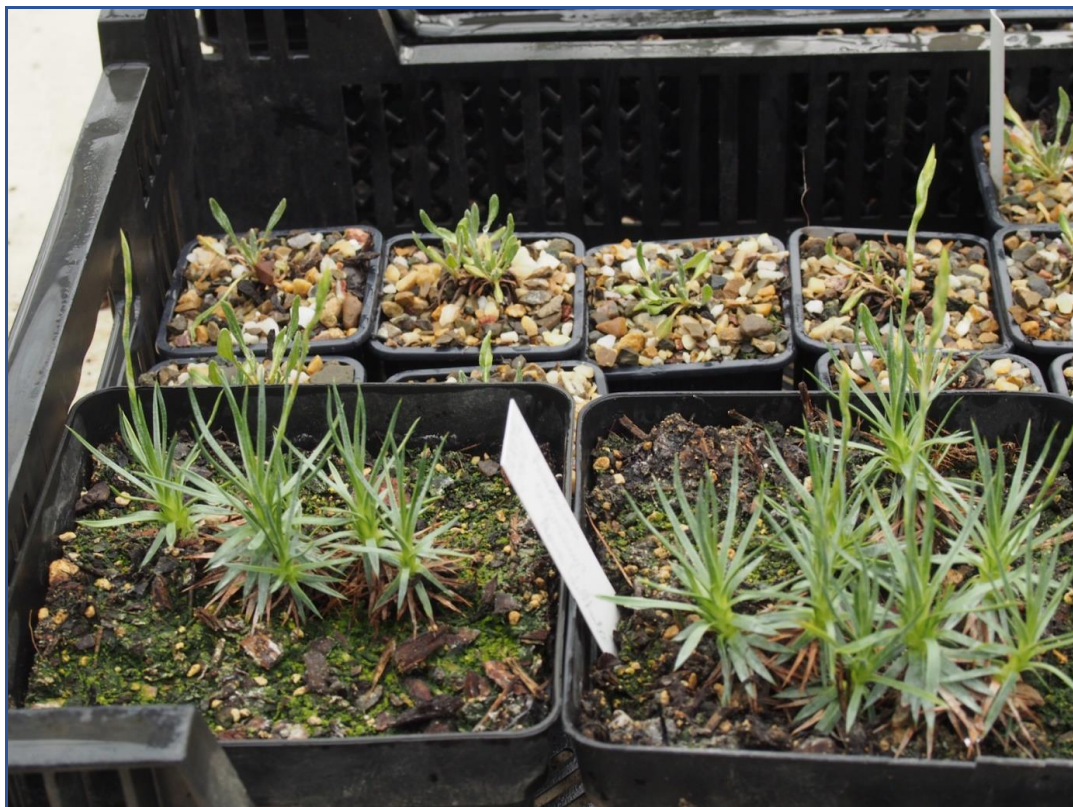
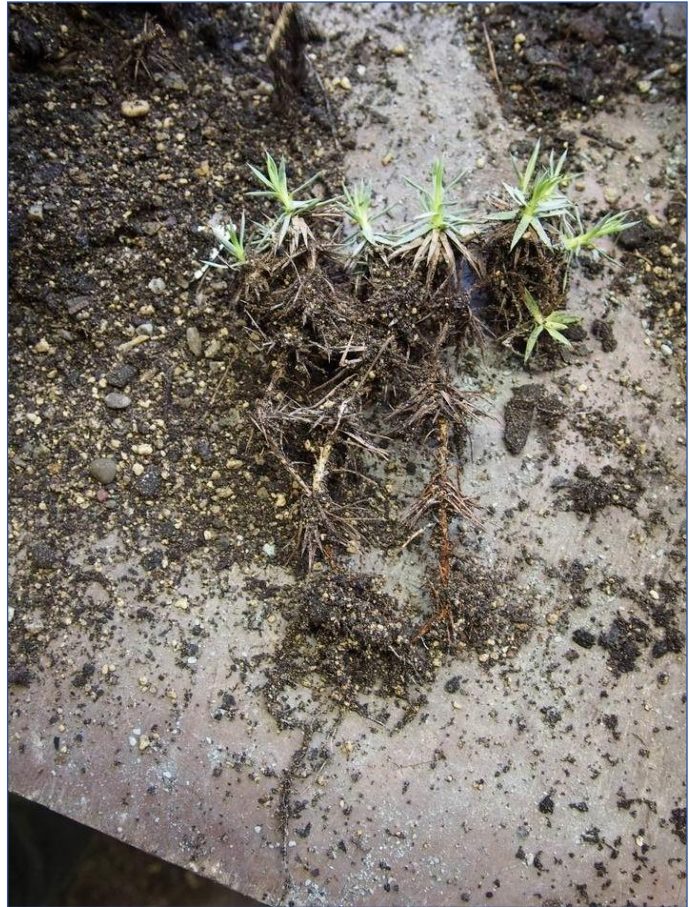


The unpotted *Acantholimon acerosum* cuttings.

---International Rock Gardener---

Showing the placement of the root growth on the cuttings

The biggest problem for this technique is finding the material, seed should be the primary method in order to grow a few plants. Then sacrifice one plant in order to get enough material for multiple cuttings. These are essentially fully grown plants due to the size of the cuttings required, therefore, they can be planted out into the garden much faster. Best of luck!



Two of the four *Acantholimon* mounded cuttings. These plants are only 4 months after the mounded cuttings were taken and have established well, and are keen to flower.

---International Rock Gardener---

To complement Connor's article, the following two images of *Acantholimon tianshanicum* in flower and seed were sent to Zdenek Zvolánek by David Horák.

