

International Rock Gardener

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It is not likely that too many readers - at least in Europe - will be growing Proteas but of course others have more amenable climates for such plants. Robbie Blackhall-Miles is working in Wales on the study of such plants and hopes to discover in time that more are able to be grown in the UK than was previously imagined. Plants which are already popular and grown with success in many parts of the world are the Hepaticas - we are given tips by Sefi and Fritz Kummert in Austria and Michael Campbell in Co. Clare, Ireland of their methods of growing these plants - be inspired!

Cover: *Leucadendron album*, photo by Robbie Blackhall-Miles.

Proteas with Altitude: Robbie Blackhall-Miles.

The history of the Proteaceae dates to the mid-Cretaceous and it is their significance to the early history of the Angiosperms that led to an interest in growing these plants for me and my partner Ben Ram. Some members of this plant family are offered for sale in the UK but only by a small number of specialist nurseries and occasionally one or two species are found in mainstream garden centres. Often these are little suited to cultivation anywhere other than the mildest counties.

Rarely do you find South African species for sale and those that are offered are more suited to the Mediterranean climes of southern Europe. We believe, however, that there should be species more likely to cope with UK conditions, many of which are threatened in their wild state, growing high in the mountains of the Western Cape of South Africa.

So it was that in September 2015, [supported by The Scottish Rock Garden Club](#), eighteen months and over three hundred emails later, we landed in Cape Town – permits in hand and armed only with news reports by which to judge this country. The aim of the three week expedition was to:

- 1) Explore cold, high rainfall mountain areas, seeking those with a similar climate to the UK and particularly to our corner of North Wales.
- 2) Visit botanical gardens in the Western Cape, to gain further horticultural understanding.
- 3) Collect Seed of species currently in cultivation in the UK, but from higher altitude, as well as species not currently in cultivation in the UK.
- 4) Analyse growing conditions; including climate, soil structure and composition.



- 5) Record location, environment and altitude as well as what other species are growing nearby.
- 6) Assist in data collection for the [South African Red List](#) and botanical organisations within South Africa.

Robbie and Ben (fourth and fifth right) with the Southern Cape Herbarium team at the Garden Route Botanical Gardens.

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Our permit, issued by [Western Cape Nature Conservation Board](#), allowed us to collect a set number of seed from each of the species we had requested in a list we developed based on distribution and climate data. We were given individual quotas based on the red list status of the species and were not to collect [Endangered and Critically Endangered](#) species from the wild for obvious reasons. This did not, however, preclude us from sourcing seeds of these species from cultivation.

We first spent a couple of days finding our feet, and getting our 'eye' in, at South Africa's national botanic garden, [Kirstenbosch](#), and venturing into the natural Fynbos of Table Mountain. The simple yet effective nursery facilities of Kirstenbosch gave us assurance that our own protea propagation techniques were not too far from their mark and the mists of Table Mountain's Orographic 'table cloth' clouds affirmed our belief that Proteaceae will deal with far more moisture than is commonly believed.



It was here that we found the first species to really grab our attention, ***Leucadendron strobalinum*** (left), growing in the mists. A species already thriving in our North Wales garden, we were unable to collect seed as our CapeNature permit was not valid in a SANParks ([South African National Parks service](#)) reserve. These golden cone-bushes shone out of the grey like beacons and whilst considered near threatened its dense stands gave a false sense of safety for the species. However, the time we spent at Kirstenbosch, and visiting [Stellenbosch University Botanical Garden](#), was where the luxury of plant labels and tourist maps would end. We had mountains to visit and *Proteaceae* to see.

The Cape Fold Mountains run in a curve from the Cedarberg in the North West to the Tsitsikamma range in the East. This mountain range formed by the folding of the land as the Falkland Plateau, of over 300 million years ago, collided into the area of the super continent Gondwana that would eventually become South Africa. It is these ridges of mountain, not unlike a rucked up bedsheet, and a south-easterly wind that lead to the unique set of weather conditions found in the Western Cape. Subsequently these mountains, their geology and their weather (and the challenges these create), have led to the vast amount of speciation to be found in this region; sometimes individual species only being found on individual peaks or even individual areas of these peaks.

We travelled from the winter rainfall, 1055m peak, of Table Mountain in the west through to the more temperate environment of the 1578m Cradock Peak in the Outeniqua Mountains, with its even distribution of rain, in the east. We visited the mountain tops of the Hottentots Holland, Boosmansbos, the Garcia Pass, the Robinson Pass and the Swartberg along the way. Staying in mountain huts, our faithful tent and, on our rest days, the luxury of out of season bed and breakfasts, we covered some serious ground in pursuit of the high altitude wonders we sought. Oh boy did we find them!

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Above: Ben Ram on the summit of Somerset-Sneekop

Below: Robbie Blackhall-Miles in the Hottentots Holland



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Post-fire Fynbos regeneration

Our first foray into the untamed fynbos was a baptism of both fire and ice and took place in one of South Africa's wettest areas. With between 2500 and 3000mm of rain a year the mountains of the Hottentots Holland, between Jonkershoek and the Dwarsberg Plateau put our own 2000mm of rain a year to shame. It was in this heavy drizzle that we ventured up the Jonkershoek valley through the burned *Protea neriifolia* stands of the previous summers fires and spotting the seed heads of *Protea acaulos* at our feet.



Protea neriifolia



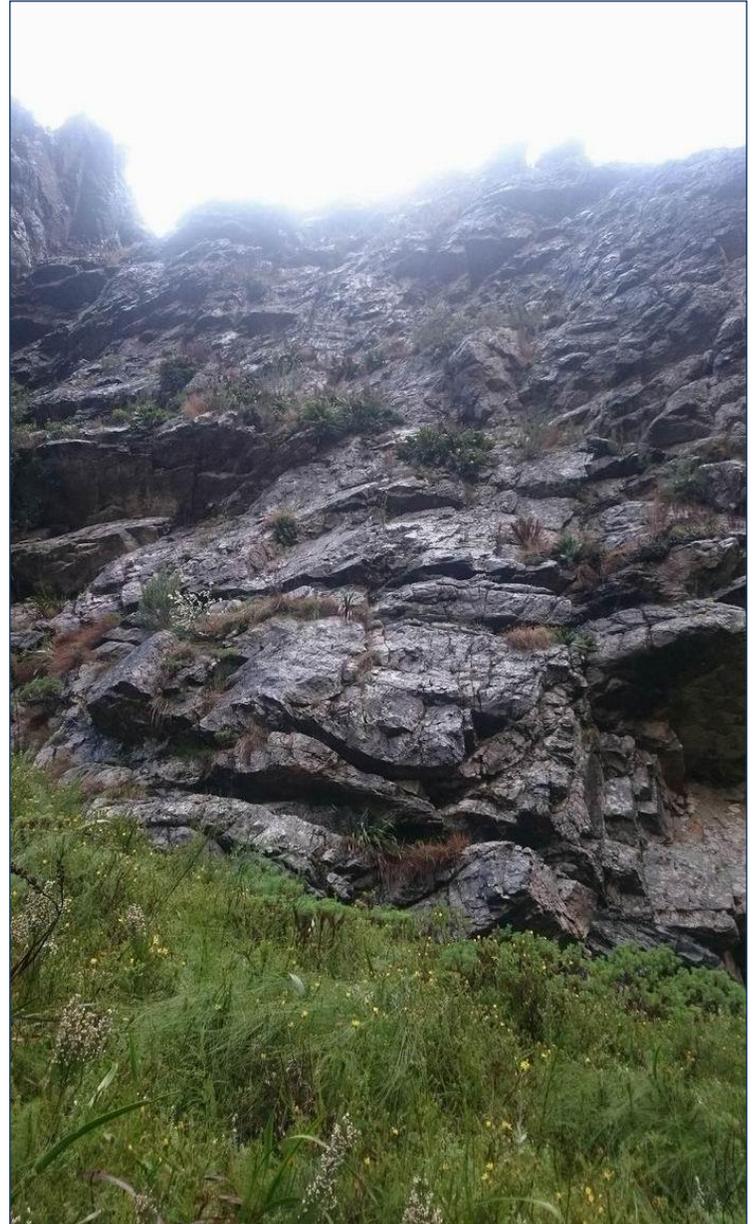
Protea cynaroides with below, its large leaf.

Too cold and wet to stop and take in much of the view we headed straight for the saddle of the valley where we found *Protea cynaroides*, *Protea grandiceps* and *Leucadendron spissifolium* subsp. *spissifolium* growing at just over 1000m. The weather had turned so bad at this point we made the decision not to go on.



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At just a few degrees above freezing and walking in the shade of a south facing cliff, not dissimilar to our own dank Clogwyn Ddu yr arddy in Snowdonia, we noticed plants we had walked straight past on our way up, most notably *Aulax cancellata* and the endangered *Protea laticolor*. We also stumbled upon plants of the unusual, and uncharacteristic of its genus, ***Aloe haemanthifolia*** clinging on in the torrent of water flowing down from high above.



Above left: Fallen leaf of *Aloe haemanthifolia*.

Above right: Dark dank cliffs on which *Aloe haemanthifolia* was growing.

We would visit the Hottentots Holland again toward the end of the trip but before that we had a lot of ground to cover. The next port of call, via a short sojourn on the Du Toits Kloof Pass, would see us find the most incredible species of our trip in the most unlikely of places to find a protea. At 1629 metres in altitude on a mountain called Grootberg we found the diminutive Medusa spoon, ***Spatalla nubicola***, growing on particularly steep south facing gullies and with its flowers almost permanently in cloud. The peaty, nutrient impoverished, soils here measured a pH (potenz Hydrogen) equivalent to that of malt vinegar. The 'Spoons' - *Spatalla* spp. are a group of plants that interest us greatly. Deemed difficult from seed the only ones to be found growing in gardens in South Africa are those from low altitude and even then only one, *Spatalla incurva*, really finds its way into general cultivation where it is more often grown from cuttings than seed. We recorded 6 different species during our trip; one coming as quite a surprise. Whilst walking out from our three day mission in the Boosmansbos wilderness we stumbled upon a plant unlike any of the more common species of *Spatalla* we had seen. Growing alone, in a very wet seepage line, amongst Restios and heathers, *Spatalla colorata* would have been completely missed had it not been in full flower. The last official record of this plant in this area had been made 18 years previously.

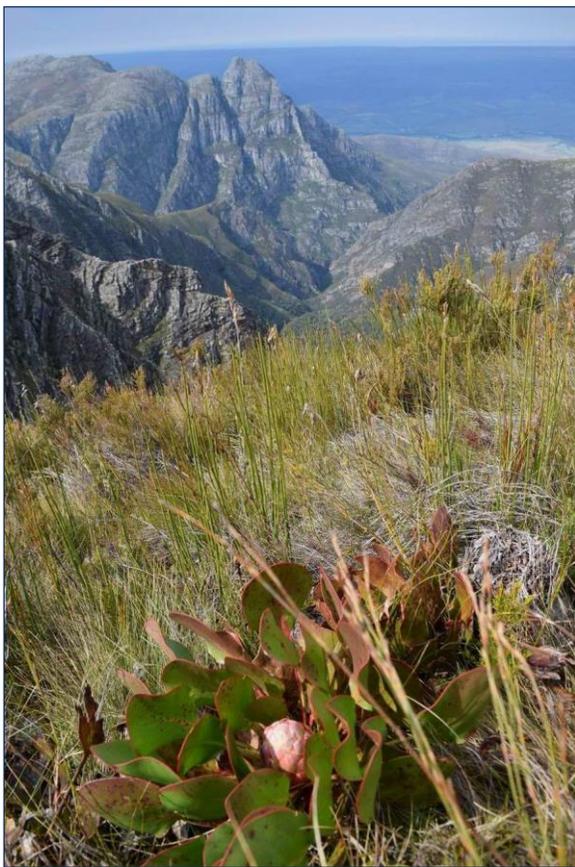
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Spatalla nubicola



Spatalla paralis



***Protea cynaroides* with Horingberg in the background.**

It was on Grootberg that we made our highest collection of the King protea, ***Protea cynaroides***, at the same altitude as *Spatalla nubicola*. We also discovered, amongst others, carmine red flowered plants of the more usually white *Protea aurea* ssp. *aurea* growing at 642m above their documented maximum altitudinal range and the low growing *Protea cordata* in the understory of these at its most easterly, and thus most temperate, end of distribution.

The range of wonders in the form of the genus *Protea* itself filled our trip. Originally named, due to its huge diversity, by Linnaeus for the Greek, shapeshifting, god Proteus it lends its name to the whole family Proteaceae; about 80 genera over 1600 species found across the Southern Hemisphere. It was in the Swartberg, a land of hot summers and snow-covered winters, which we found the largest diversity of this

genus. Little grown, and thus little known, due to their total unsuitability for the cut flower industry there is a whole range of *Protea* species that form small shrubs, creeping sub-shrubs and prostrate mats and we found a number of them, alongside larger more iconic species, in this area. The first we found of these was to be ***Protea montana***, a dense mat forming species we encountered on the route up to, burned by the unprecedented fires of the previous summer, and in fire safe refuges at the summit of Waboomsberg at 1929m above sea level. [Fire safe areas are areas that fire cannot get to, such as between big boulders and on scree slopes]



***Protea montana's* grass-like foliage.**

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Protea rupicola

It was on this summit that we also discovered, again in fire safe areas large mats of the endangered *Protea venusta*. It was however ***Protea rupicola*** that stole the show in the mountains of the Swartberg. This, one of the longest lived members of the genus, is little understood in its natural environment due in part to the inaccessibility of the cliffs on which it grows. Red-listed as endangered it is certainly a species that demands further study. Its continuing decline, due to increased fire brought on by the march of climate change, and fragmented populations surely place it high on the list of priority species. As a cultivated plant it performs poorly - begging me to question

whether that is due in part to inappropriate horticulture at low, and thus warmer, altitudes. It is certainly a species I would like to work with some day.



Left: ***Protea stokoei*** near Landdrooskop

Far left: ***Protea caespitosa***

Another highlight amongst the genus was a species we initially concluded (which confused us for quite some time) to be *Protea scolopendriifolia* but we soon realised it was the Critically Endangered ***Protea caespitosa***; this has since been confirmed. We were surprised to see this species growing on the slopes of Somerset Sneekop, the highest peak of the Hottentots Holland, at 1558m not least of all because we found it growing in vast numbers across a large area. It seems the Red List status of the species is based on one particular variant (that had previously been considered a distinct species) and whilst it is certainly threatened it is desperate for a review that takes these factors into consideration.

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Left: *Mystropetalon thomii* - a parasite of Proteaceae.



Above right: *Oldenbergia paradoxa* - a high altitude aster relative that likes to grow, mound-like, between the rocks.



Mimetes cuculatus



Mimetes pauciflorus

A group high on our list were the thirteen species of Pagodas, *Mimetes* spp., of which twelve are threatened with extinction. Already growing *Mimetes cuculatus* successfully we were intrigued by this genus, so dependent on fire and ants for its survival. These often short lived plants have developed an unusual method of continuity as a group; growing quickly they stand above the rest of the fynbos attracting their bird pollinators and producing copious amounts of ant-distributed seed long before the

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next murderous fire passes through. Luckily the ants drag the seed underground where it is out of harm's way and ready to start the process over again. Increased risk of too frequent fire, *Phytophthora* and a non-native ant from Argentina are severely breaking this natural cycle and putting this stately group of plants at serious risk. It was on the route up to the top of Craddock Peak that we found our target of *Mimetes pauciflorus*; a species currently uncultivated anywhere in the world, as far as we know. Only just beating the ants to its mature seed we will now have to wait a couple of years for the embryos to mature fully before we can work through the complicated process of breaking its three sequential seed coats, one for ants, one for scarification and the final one for fire, in order to break its dormancy. We luckily caught up with the rest of the *Mimetes* species, and their close relative *Orothamnus zeyheri*, in the garden of Robbie Thomas – amateur horticulturist and leader in the fight to save the Pagodas from extinction through cultivation. It is here that we saw *Mimetes stokoei* a species that has officially been declared extinct twice due to its complicated fire driven ecology. It was also here that we learned the secrets necessary to be able to grow these challenging plants. It was with dismay that later we would find a whole population of *M. argenteus* ravaged by *Phytophthora cinnamomi*, a blight spread in soil and water, on the side of the well-trodden path into the Landroskop hut back in the Hottentots Holland. It made us question what more could be done to ensure hiker's boots are clean before they enter these environmentally sensitive areas.



Orothamnus zeyheri in Robbie Thomas' garden

A genus that eluded us was *Leucospermum*, which produces nut seeds with an eliasome, just like *Mimetes* and thus also distributed by ants. The species we did come across were either in full flower or the seed was not ripe. We were however lucky enough to come across a large population of *L. oleifolium* on the Old Boland trail at 1214m, in driving rain, with seed already ripe and attracting the ants it requires for dispersal. It was hard going collecting the seed as the temperature was just 3°C, my hands were frozen and wet; at one point I very nearly took the top off my finger with my secateurs. Lucky we had alcohol wipes at hand - used for cleaning the very same secateurs - and lucky that we were on our way back to the car.

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Left: *Leucospermum calligerum*



Above right: The bonsai-like *Leucadendron radiatum* - growing on the summit of Grootberg.



Thick Fynbos in Krystalkloof.

In total during the course of three weeks we made 115 observations of Proteaceae at over 1000m covering 55 different species across 9 genera some of which were recorded as last being cultivated in the UK as long ago as the early 1800s. We gained data about altitude, weather, the species they were interacting with and temperature. We also explored areas that are certainly off the tourist trail and, thus, infrequently visited. We left South Africa with a deep longing to return and a renewed sense of urgency to do something real to assist its endangered flora. We left South Africa having formulated a plan to set up a unique nursery where we could study the intricate horticulture of the Proteaceae and other threatened plant species from around the world.

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Cape Sugarbird (*Promerops cafer*) on *Protea magnifica*.



The plant of *Leucadendron gandogerii* from which we made the highest altitude seed collection in the Hottentots Holland.

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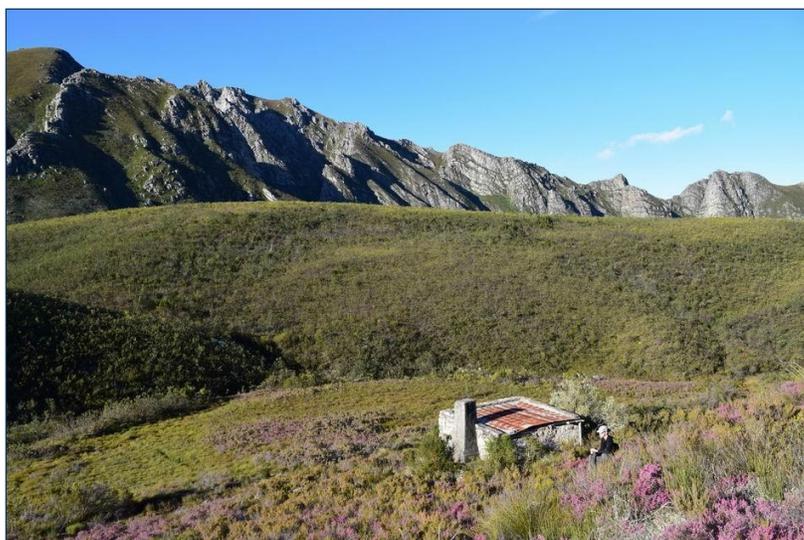


Leucadendron album

Since returning to Wales we have found a suitable piece of land with climate data almost identical to that from a weather station at 1000m in the Hottentots Holland and we have run a 'Crowdfunding' campaign to raise money to help us in setting up the research nursery facility and we are still accepting donations towards the scheme at www.blackhalls.co.uk. The process of sowing the seed we collected has started and we are already seeing good germination.

Our permits do not allow for commercialisation of the resulting plants but we do intend on distributing them to public gardens around the country where we will be able to see how they fare with our Great British weather.

R.B-M.



Hut in Boosemansbos with Grootberg behind.

Snippets:

You can follow Robbie's Plant Conservation Research Nursery project and contribute, should you wish, via his [website and blog](#). Robbie and Ben's garden at home is, though very small, registered with the BGCI ([Botanic Gardens Conservation International](#)). Robbie is a member of the Linnaean Society and holds a National Collection of South East Australian Banksia Species.

We hope Robbie will later contribute a small article on the cultivation of *Protea* in Wales.

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Some Notes about Hepaticas: text and photos by Sefi and Fritz Kummert.

We have collected *Hepatica nobilis* in our garden for many years but not really in a frantic manner. We like the variable colours of these plants and also the variability of flower-forms. During the last years a lot of seedlings have been raised, to see which genetic potential is hidden in our material. We used only European material for the crosses, those which we had collected ourselves, had given to us by friends, or raised from seeds. We especially looked for nice flower-colours and the form and count of anthers and sepals.



A pure female form of lilac colour (above left), collected in the Pyrenees and given to us by Mr Stoffels, was crossed with **a semi-double blue (above right)** from Mt. Prácheň in Czechia, which came to our garden from Mrs Anna Jílková. It was my idea that such a combination would perhaps yield semi-double or double flowering seedlings.

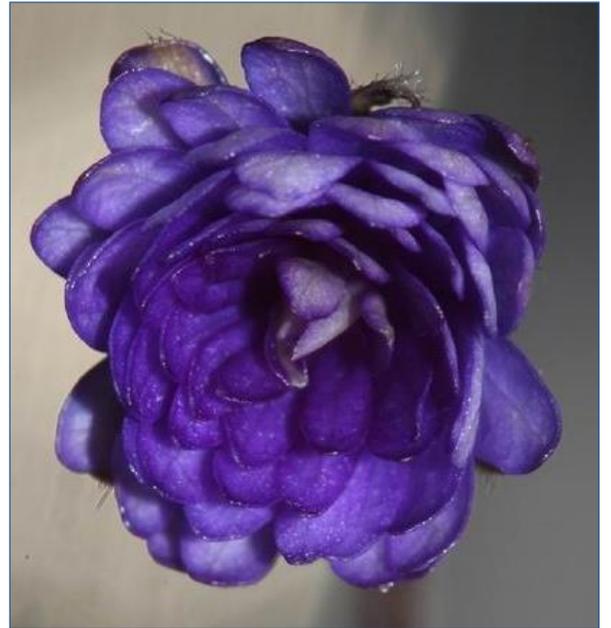
The seedlings of the F₁ were quite nice, some showed an enlarged count of sepals and were missing the anthers, like the mother plant. Because of lack of time we were unable to isolate and also to make specific pollinations of the F₁: the observed seedlings are therefore the result of open pollination within the F₁-seedlings.

The photos right and below, show a selection of the F₁-seedlings.



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Among the seedlings, which were the result of this circumstance of open pollination, my wife found in autumn 2015 a **double pre-blooming plant (right, in flower)**. During the spring 2016 we were able to find further double flowering plants



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At the end of the flowering time 2016 we found a **double flowering plant (right)** among other sister seedlings of the double flowering plants.

Progress:

At the moment we are unable to produce strains with 100% double or semi-double flowers: but we feel it quite interesting to have seedling-mixes with up to 20% plants showing double or semi-double flowers. In the meantime we have made crosses with plants in other colours, especially red or rosy-red and we hope also to be successful with these crosses in a comparable measure. It has to be said that an evaluation of the semi-double and double flowering plants at this moment is impossible. We have to wait at least one further blooming-time, until more about the quality of the seedlings can be said.



We know that many people don't like double flowers, but our predecessors liked them because of the longer lasting flowering-period. It seems to be wise and have this in mind when judging hepaticas. Raising many seedlings has given us information about the inheritance of certain characteristics in *Hepatica nobilis*; this makes it easier to combine certain traits to new plant-forms (so we hope). The next compilation shows some colour-banded seedlings, based on different mother-plants, mostly from France.

In Styria I found only once a **pink-white banded form (below)**, which is not very dramatic.



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Also of interest are forms with white or silver marks on the leaves. Such plants are quite common in the Pyrenees or in the Maritime Alps. Hermann Fuchs was so kind to give us such plants from different collections, like this one, below, from Andorra. They are often white-flowering.



Silver marked foliage – from Andorra



Our own silver forms were raised from a Carinthian plant from the Mussen.

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'Propeller'



'Crenatolobrid'



There are also forms of *Hepatica nobilis* with stalked leaflets in cultivation (e.g. 'Propeller') or with leaves with wedged margins ('Crenatolobrid'), as known from *Hepatica transsilvanica*. This, a species from Romania, has a creeping growth and the double count of chromosomes. Crosses between *H. nobilis* and *H. transsilvanica* are therefore sterile.

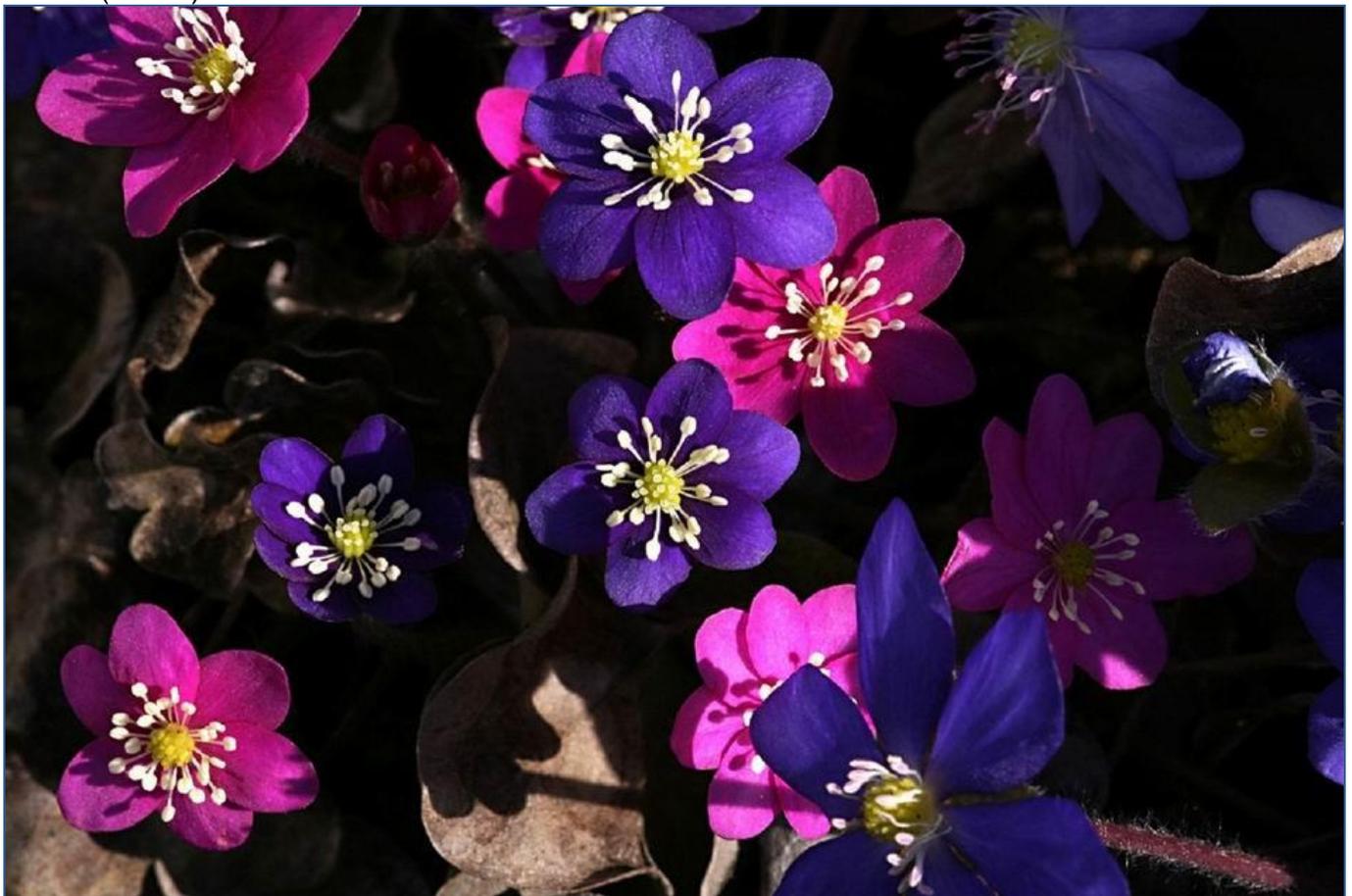
Last but not least we want to mention that we found very pretty colours among our seedlings. If you self-pollinate certain forms you can achieve very beautiful colour-forms.



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Such mixtures appear after selfing certain dark blue plants (above): a detail shows the compact red and blue ones (below).



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Other crosses give a high percentage of plants with more sepals and no stamens (above).

Sowing is simple: I fill pots with humus-soil, sow the seeds, cover them with soil, press this and give 0.5 to 0.8cm grit above. If the seeds arrive to you in winter, it is wise to soak them in water for about 24 hours. They need first moist/warm, then moist/cold (not colder than -3°C) and then again moist warm. Normally only the cotyledons are formed in the first year. I prick them out in trays (150 small pots) the following spring. Let them grow. Transplant in 7x7x9cm pots, time: depending on size. First flowers can be expected three and a half year after sowing. In my experience it is better to plant them singly when pricking out. Earlier I potted 5 seedlings 1.5 years after sowing together, but taking the 5 apart is so much work, it's useless. If you don't like small pots, prick 10 in a 10cm pot, spacing them out. This makes watering and later, their division, easier.

Nearly all plants seem self-fertile (perhaps really all?), so to make exact crosses you have to remove the anthers before opening (the flowers shed the pollen first) and protect them with small bags because you have cover them in any case, because the seeds drop green and it is hard to watch them every day.

As we are unable to raise all seeds we harvested 2016, surplus seeds will be made available through the seed-lists of the societies.

We wish you much pleasure and patience for seed-raising!

Sefi & Fritz Kummert.



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My way with Hepatica in Ireland: text and photos Michael J. Campbell.

When people first see the Japanese doubles or even the single *Hepatica* flowers their first thoughts are, those must be difficult to grow. I don't know why this should be so as they are no more difficult to grow than other alpine or garden plant. They do have their requirements which are not difficult to provide, but then so do many other plants. Hepaticas are related to Anemones so, if you can anemones, you can grow Hepaticas.

***Hepatica japonica* 'Murasaki Shikibu' an out of season flower in August 2016.**

My gardening enthusiasm consists of specialising on one challenging species for a few years and when I have mastered that particular one I move on to another. I started out with *Allionii* primulas and when they lost their appeal I moved on to hybridising *Lewisia*, which lasted fifteen years. After the *Lewisias* came South African bulbs with the main emphasis on the genus *Morea* many of which I still retain, then it was on to *Daphne* and now *Hepatica*.

My fascination with growing *Hepatica* started about twelve years ago when browsing through a catalogue. When I reached the *Hepatica* section I said, wow! Those look nice; I must have a go at growing those. I hurriedly placed my order, worried in case those I had selected were sold out before my order arrived, but thankfully all my selections arrived five days later. I also requested whatever literature that was available on the care of the plants at that time. As I have only a small town garden the problem was where to grow them. As the Japanese double flowering plants were rather expensive I potted those up as instructed in the literature and planted the single flowered *H. nobilis* type in a shaded part of the back garden. Living in a 'Mediterranean climate' with little or no frost I was wondering if the absence of a cold spell in the winter would stop the plants going dormant or start them into growth too early in the spring. The latter has proved to be true and they can start to flower as early as December in some years however this does not appear to affect the plants in any way provided they are in an airy and well ventilated position.



The area chosen to plant them out does not get any sun from late September until late April and is the direct opposite of what it said in the literature was required by the plants. Always being of the opinion that plants can't read I watched with interest to see what would happen, and sure enough, they not only survived but thrived and flowered profusely. Just to test the durability of these plants I also planted some under a tree and a large Exbury azalea in the south facing front garden. This area gets full sun all summer and winter when the sun shines. Again the plants thrived and flowered very well, although the leaves were damaged and a little burnt around the edges but this didn't affect the flowering. Gaining in confidence now I decided to take the plunge and out into the shaded back garden went all the *Hepatica transsilvanica* including 'Mrs Elison Spence'.

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***Hepatica nobilis*, pink**

I live in a very high rainfall area and was a little concerned it might be too wet, but as they were planted just in front of some large Camellias facing west and in a slightly raised bed everything survived. Literature on *Hepatica*, especially in the English language, would appear to be in short supply, but any that I have obtained states that the Japanese doubles are not as hardy as the *H. nobilis*, however I have never found this to be the case. My Hepaticas are now all grown outside including those in pots and only brought under cover for flowering. Let's start the season just after flowering in spring. This can vary from mid-February to late April according to the weather and if the season is early or late.

As soon as the flowering has finished the pots are sorted according to the size of the plants and how many 'noses' (growth points) they have. Usually each nose means a new plant but not always. Those with only one nose are put aside for potting on, if required to a slightly larger pot and here it is important to note not to over-pot. I like to use deep long tom type pots as Hepatica have long roots like a good root run. While it is often stated that they like good drainage they also like a soil based compost that does not dry out too quickly. If a *Hepatica* dries out at any stage it is dead, no point trying to revive it as you would other plants; it won't work.



***Hepatica nobilis*, indigo strain**

The plants with more than one nose are then tipped out of the pots and the soil removed until all the roots are exposed (easier said than done) They have a very large tangled root system and sometimes it is difficult to sort out. At this point I usually cut about a third from the bottom of the root system with a pair of scissors, this leaves them easier to manage and also stimulates new growth when re-potted. I try to divide the noses with as much root as possible with my hands but sometimes it requires the careful use of a sharp knife but this should be avoided if at all possible. The plants are then potted into new compost and moved into a North facing shaded structure at the back of the potting shed to recover. It is important to keep the crown of the plant just level with the

top of the compost otherwise it could rot. My compost mix consists of: 1-part John Innes no.3, 1-part Coconut fibre, 1- part perlite, and 2g of dolomitic limestone per litre of mix.

Once growth has started again they are given a feed with a high nitrogen fertiliser to get them off to a good start. Every two weeks thereafter, until the end of May, they are given high nitrogen feed as they are growing very fast at this stage. In June and July, they are given a high Phosphate feed (Tomato feed) every two weeks to promote new buds. In August and September, they require an occasional feed of Potassium to promote new roots. It is important to check every day in the growing season for moisture levels because, as I said before, if they dry out they are dead.

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Hepaticas can also be divided in the autumn, about the end of September is a good time but I prefer the spring time and only divide in September when an emergency requires me to do so. Nothing much is happening in October and November just keep an eye out for any diseased or dead leaves as they can fall into the centre of the plant and cause problems.

Because of our dull and damp winter climate I usually remove all the leaves at the end of November to allow more air circulate round the crown of the plant and to help prevent botrytis from damaging the

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emerging flower buds. Once flower buds start to emerge they are brought into the glasshouse and kept well ventilated with roof lights and louvres open at all times except when frost is expected. On the few frosty nights that do occur here I close all vents and set a frost protection heater at zero which just about stops the plants from freezing but does not produce enough heat to promote any premature growth. The idea is to keep them dormant until early spring although it didn't work this year because of the very mild weather in the late autumn, when we had up to 15°C on several days throughout the month and nothing in the way of cold or frost. The plants started into growth and were producing flowers in the dank and dark days of December which resulted in elongated flower stems that were dangling over the side of the pots. I don't remember this ever happening before and it was something of a challenge to prevent them from getting botrytis. I had to inspect them very carefully every day to remove the dead flowers and stems.



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Obviously the genetic makeup of the plants and the original provenance has a lot to do with whether they are early or late flowering, as almost half of my plants stayed dormant and only started to show some signs of life at the beginning of February. While most of the *H. nobilis*, even those in the garden, were in full bloom at the beginning of February only about half of the Japonicas flowered early and

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some of them are only starting to show colour at the latter end of the month. This seriously curtailed any chance at continuing the breeding programme, as the cold overcast and damp weather in February made it difficult to ripen pollen, and with some of the required recipients either finished flowering or not yet in bloom, any chance of a decent seed harvest looked dismal.



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Collecting the seed is another task that poses some problems because when they are ripe they are inclined to fall at the slightest touch. If the pots are close together then you have no chance of keeping the seed from getting mixed. Another problem is that the seed on each pod does not ripen at the same time, so you have to continually examine each and collect the ripe seed. There are various methods to combat this such as using little perforated or organza bags, some people use empty tea bags, but because I have quite a few plants and very little space I would find it quite cumbersome. Therefore, I just do a thorough examination every day and remove the ripe seed. Those that fall before I get to them are sown in the garden as a mixed batch. Those pots used in a particular breeding programme are of course kept separate until the seed is collected.

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Hepatica seed must be sown immediately for best results although it can be packed in a little damp vermiculate and stored if desired. The seed are sown in 1ltr pots using John Innes seed compost with a little perlite and coconut fibre added. The pots are topped with grit and placed in the shaded area underneath where the mature plants spend the summer. They must be kept damp at all times because as with the mature plants, once dried out they are dead.

When the seedlings germinate the following spring they will require regular feeding to keep them growing strongly. Unlike the mature they can be fed a high nitrogen feed all summer and with proper management you can get a high percentage to flower the following spring, normally *Hepatica* don't flower until the second spring. When they are big enough to handle, that is when they have two mature leaves I prick them out and put ten in a three litre pot, they stay in that pot for two years and are then potted individually or planted in the garden.

Hepaticas are hardy and tough plants and will survive very well in the garden, they have survived -5°C here on one occasion, so don't let the delicate flowers or the price put you off trying them outside. Actually I am convinced that they do better planted out in the garden if you can provide a shaded area, although they will also survive a fairly sunny area if you can keep the soil damp. The weather doesn't bother the flowers on the *Nobilis* varieties but you may need to cover the double *Japonica* flowers if the weather gets very inclement as they are easily damaged by hail showers.

If you haven't tried growing *Hepatica* yet give it a go, they are easy really, and just because they look exotic and some are highly priced that doesn't say they are difficult. The high price on some of the *Japonica* is because of supply and demand. Some of the nicer ones are notoriously slow to reproduce and as they have to be vegetatively propagated and as demand outstrips supply this makes them

expensive. The simple answer is, of course, to share your plants with others who have the same interests, as gardeners have been doing for millennia.

M.J.C.

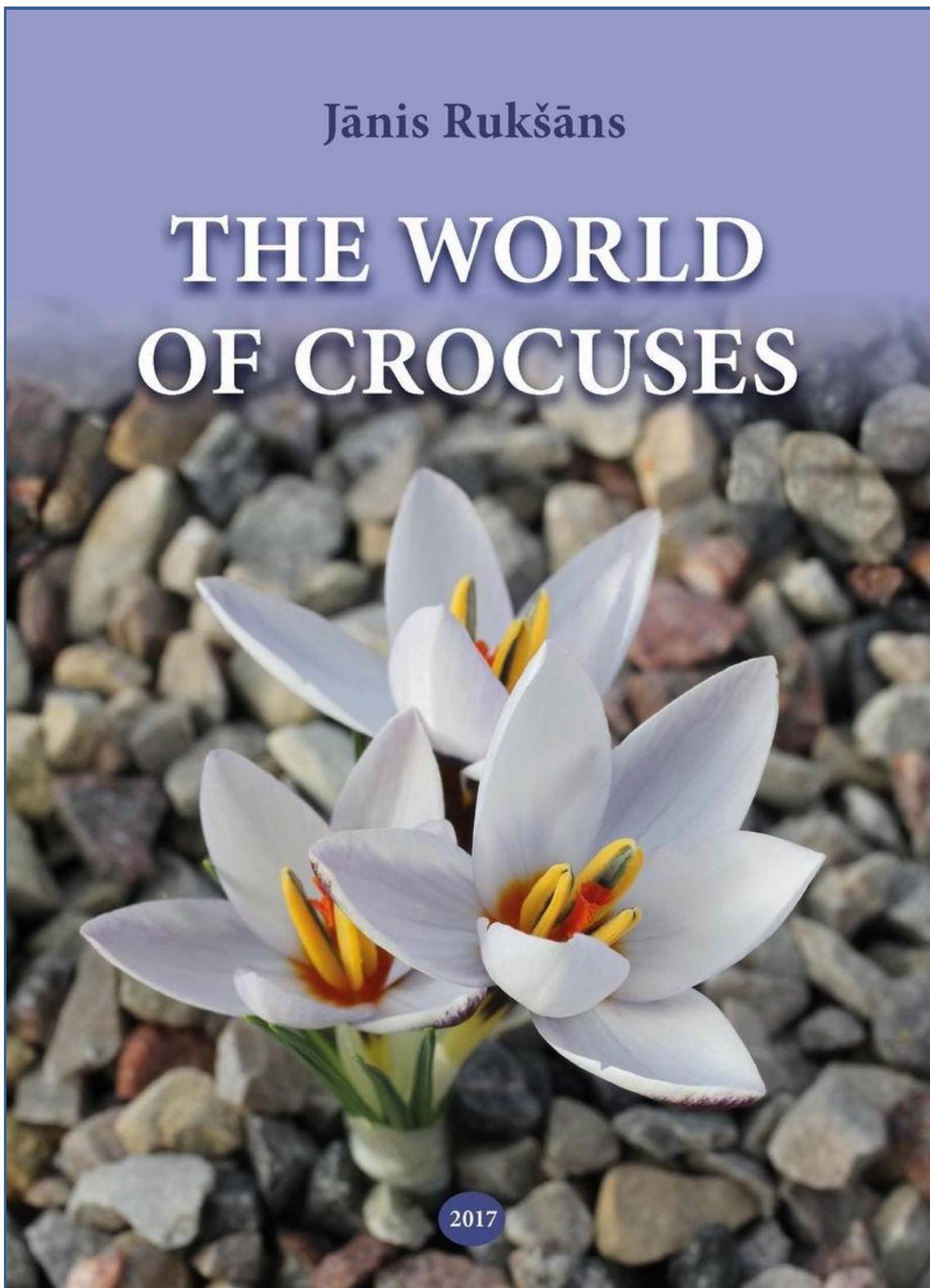


Hepatica japonica 'Akane'

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And now for “something completely different!”

Jānis Rukšāns

THE WORLD OF CROCUSES

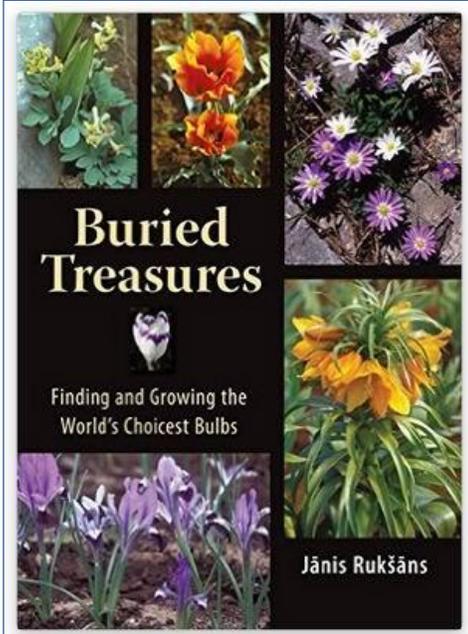


Jānis Rukšāns, author and grower, is a world renowned expert on hardy bulbs and no stranger to readers of the IRG or members of SRGC or any of the other horticultural organisations to whom he has delivered lectures over many years.

Born in Latvia on 5th September 1946, Jānis is about to celebrate his 70th birthday. His interest in gardening started when he was 12. From 1961 to 1966 he studied in gardening college. His diploma work was about alternative products of bees - and nowadays he has 15 bee hives! In 1973 his

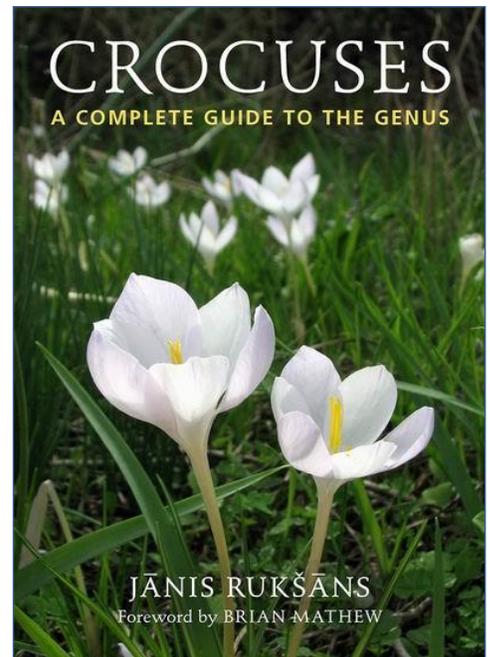
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graduation work from the Latvian Agricultural University was “The Use of Wild Tulip Species in Tulip Breeding”. Later he worked in the National Botanical Garden of Latvia as assistant in the Laboratory of Plant Systematic and Seed Exchange, where he worked on the project “Dendroflora Baltici”. From 1972 he worked at the National Gardening Magazine, at first as editor, but since 1977 as editor in chief. At the end of the nineteen-eighties he was one of leaders of the independence movement which resulted in restoring the Latvian Republic after 50 years of occupation. Since 1991 he headed his own nursery of rare and unusual bulbs, retiring only last year.



In 1976 his first book was published, with a second edition in 1978. The total number sold reached 100,000 copies and this book was also translated to Lithuanian. In 1981 he wrote the monograph “Crocuses” (in Latvian), where most of crocus cultivars grown at that time are described. In 1979 he was the editor of “Daffodils”, where he wrote sections about growing, breeding, cultivars and plant protection. From 2001 till 2010 he continued to publish; he wrote a new book about daffodils and two books about small bulbs (all in Latvian).

His first book in English, “Buried Treasures” was edited in the USA in 2007. Now in its 2nd edition, it was nominated as one of the 10 best publications by Members of the Latvian Academy of Science in 2007. Australian Gardening



Magazine wrote: “Up to now there were two books “needed” for each gardener’s bookshelf, now we have the third - Buried Treasures”.

In December, 2010 Timber Press edited a new book by Jānis: “Crocuses, A complete Guide to the Genus” – this is a popular book for every gardener where Jānis partly followed the style of the famous E. A. Bowles “Handbook”. He has written many hundreds of articles for gardening periodicals in Latvian, Russian, and English. Every year he lectures in many countries - UK, Sweden, Holland, USA, Canada etc.



He organized his first expedition to Soviet Central Asia in 1975 and since then he has gone almost every year to the mountain districts of former USSR from W. Ukraine to Vladivostok in Far East. In 1982 he discovered new *Corydalis* species in Tajikistan which later was named in his honour as ***Corydalis ruksansii*** by Swedish botanists from Gothenburg Botanical Garden. In 2002 he took part in the first expedition to Turkey organized by Gothenburg B.G. and to date has been going there several times a year. During those expeditions he discovered many new species of bulbous plants. In 2008 he made a month-long trip through the mountains of Iran (resulting in finding some 6 new species, four of them later published) and again visited Iran in 2016, when at least 2 new species of bulbous plants were found.

Corydalis ruksansii, grower/photo Bob Nold.

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Tulipa vvedenskyi x *T. mogoltavica* 'Girlfriend', photo Jānis Rukšāns.

Since the 1960s he has worked on bulb breeding. His first tulip variety 'Lord's Supper' was internationally registered in 1982 – at that time it was the only variety from “behind Iron Curtain” to be internationally registered. In 2002 his *Tulipa* hybrid 'Girlfriend' won a diploma in the world exhibition Floriade in Holland. He started a new style of breeding using as one of parents *Tulipa vvedenskyi*. He raised hundreds of Daffodil cultivars, amongst them the first white multi-flowering split-corona *Narcissus* 'Freedom Stars' (AM 2004, AGM 2007) and some uncommon colour combinations which were most unusual at the time.

Below left: *Narcissus* 'Freedom Stars' grown by Ian Scroggy of [Bali-Hai Nursery](#).



Below: *Corydalis solida* forms in Jānis' field, photo by Sandy Leven.



Jānis and his wife, Guna.

Jānis' greatest successes came in breeding small bulbs. He raised more than half of all known *Corydalis* cultivars and now his collection of *Corydalis*, many of unique colour combinations, is one of the largest in the world. He has raised many new *Crocus* cultivars several of which are unique, and described more than 30 new *Crocus* species from Turkey, Iran, Greece and Portugal. At present his *Crocus* collection exceeds 1500 samples and is the largest in the world but in total his collection of bulbous plants exceeds 5500 samples, all grown by him in his garden.

In 2005 he was awarded an honorary degree of Doctor of Biology from the Latvian Academy of Sciences (Latvijas Zinātņu akadēmija) for his work with plant exploration, introduction of new species to cultivation and plant breeding. He has also received outstanding honours such as the “Three Star Order”, the “Cross of Recognition” and “Prime Minister's Award” from the Latvian State.

---International Rock Gardener---

Now Jānis has finished work on the manuscript of a new crocus book - *The World of Crocuses*. It is a résumé of his 50 years of work with Crocus, his researches on them in the wild and in the garden and it will be dedicated to the 100th Anniversary of Latvian State, which will be celebrated in 2018.

The new book will include chapters with general information and cultivation of crocuses, their morphology and keys for all species recognised at the moment of completion of the manuscript. The greatest part is dedicated to detailed information of the (in excess of) 230 known species of crocuses with details about their requirements in cultivation according to Jānis' experience. Almost all species (with very, very few exceptions) are supplied with distribution maps, richly illustrated with pictures from wild and cultivation.



This new book will be more than 500 pages long and will include more than 1500 colour pictures. The species are arranged in alphabetical order, making it easy to find them without special searching by Index. For the front cover a picture of *Crocus mawii* is used - by way of making link with the first great Monograph about the genus Crocus in 1886, by **George Maw** (right). The significance of this new book by Jānis has been appreciated by Latvian Academy of Sciences and it will be published by the Academy. Publishing costs are quite high and the Latvian Academy is short of finances, so money to cover printing costs must be raised by Jānis himself. He can partly cover those from his savings, but he still is short of 15,000 Euros.



This is where bulb-lovers around the world can become involved in the process of bringing this book, which will surely become a “must-have” reference, to the public by pre-order and donation:

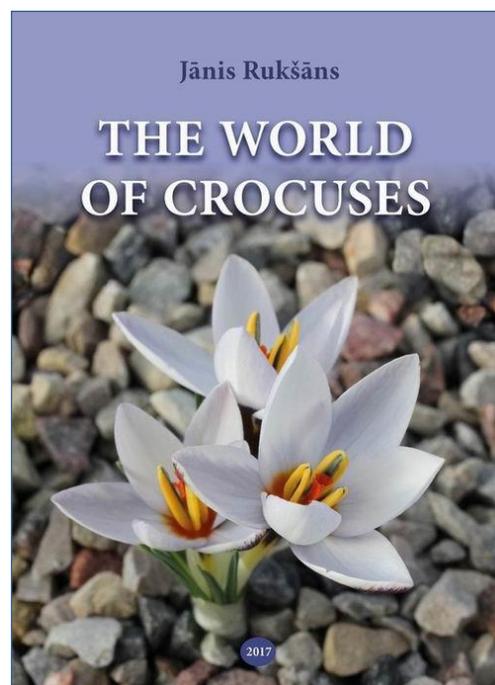
Jānis is offering:

Everyone who will donate at least 50 Euros (plus postage costs for delivery) for the printing of his Monograph (more will be specially appreciated!) will receive a **free copy of book, with the personally addressed signature of author**. Everyone who will donate at least 500 Euros will be mentioned in the book's "Acknowledgments" chapter with full information about donors, according to their wishes and will receive three signed copies without any additional payments. Donations must be received before 1st of February, 2017 when manuscript must be forwarded to be typeset. To receive detailed information about sponsoring the project, please write to Jānis via e-mail: janis.bulb@hawk.lv

Please consider getting involved with this project!

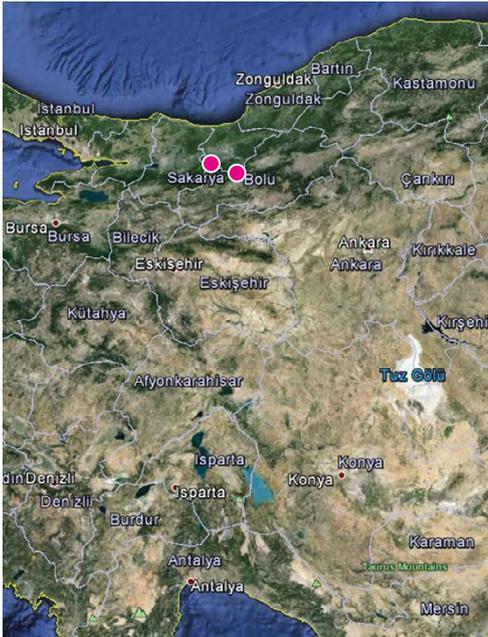
We include a few low-resolution pages from the book here as a sample of what can be expected from the book.

[More sample pages are available to download [via this link.](#)]



1. *Crocus abantensis* T.Baytop & B.Mathew

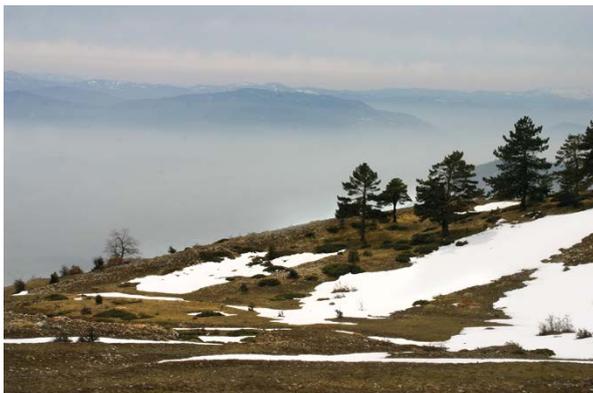
Kew Bull. 30(2): 243 (1975). Type: Turkey, Bolu Province, slopes near Lake Abant. 11.04.1973. Holo: K, Iso: ISTE. Ic.: B. Mathew. *Crocus*, t. 42; J. Rukšāns. *Crocuses*, pl. 263-265.



Localities from where *C. abantensis* is known.



C. abantensis corms.



C. abantensis habitat near Lake Abant.



Meadow with *C. abantensis*.

- **Habitat and distribution** – until recently it was known only from the *locus classicus* where it blooms near melting snow on mountain meadows amongst prostrate *Juniperus* and in open spots in low pine forests together with *Crocus ancyrensis* s.l. at 1100-1350 m altitudes. Not long ago this species was discovered by Turkish amateurs on the heights W of Abant over Sakarya (I. Sözen).

- **Flowering time** – April.
 - **Corm** – subglobose, up to 10 mm in diameter (in cultivation up to 22 mm).
 - **Tunics** – finely fibrous and conspicuously reticulated.
 - **Prophyll** – absent.
 - **Cataphylls** – papery, white, usually 2-3.
 - **Leaves** – 5-10, glabrous, green, up to 1 mm wide, lateral channels without ribs, the white stripe around 1/3 of the leaf diameter or slightly less; shorter than the flowers at blooming time.
 - **Perianth tube** – white, bluish or yellowish, sometimes at the top darker striped, rarely dark bluish (in darker forms).
 - **Bract and bracteole** – silvery white, membranous, subequal, broad and peaky at the top.
 - **Throat** – glabrous, dark yellow, rimmed with an indistinct lighter or whitish zone, although well separated.
 - **Filaments** – 5 mm long, scabrid, yellow.
 - **Anthers** – 8-14 mm long, yellow.
 - **Connective** – somewhat lighter than the anthers.
 - **Style** – orange, divided into three branches, usually ends below the tips of the anthers, rarely equal or slightly surpasses them.
 - **Outer segments** – 22-37 mm long, 7-15 mm wide, obovate to oblanceolate, obtuse to subacute, mid to deep blue, sometimes violet tinted both on the outside and inside.
 - **Inner segments** – more or less equal to outer segments.
 - **Capsule** – cylindrical, up to 15-20 mm long and 6-8 mm wide, buff, staining purple at the top, carried at ground level at maturity.
- Seeds** – distinctly elongated, acute, 3 to 4 mm long and 1-1.5 mm wide, dark reddish brown, even blackish, with an inconspicuous or very small caruncle and without raphe.

$2n = 16$.

Etymology – named after Lake Abant, near which it was found.

*C. abantensis*.*C. abantensis* – white form.*C. abantensis* 'Azkaban's Escapee'.

Crocus abantensis is quite distinct from all the other species with blue flowers and reticulated corm tunics. Close by grow the bright yellow *C. ancyrensis* and the autumn-blooming *C. bolensis*. In the same area are distributed (although I haven't seen them growing together) the similarly coloured species from the *C. biflorus* group earlier regarded as *C. pulchricolor*, later described as *C. zetterlundii*, and one other golden species – *C. olivieri*. Just the overall resemblance to "*C. pulchricolor*" was the main reason why *C. abantensis* was for such a long time overlooked in this well-visited area, but any doubts about their identity disappear as soon as corms are seen, because their tunics are very dissimilar. The closest locality where I observed *C. zetterlundii* was in the same ridge some 30 km further, at approximately the same altitude, but no *C. abantensis* was seen there.

It flowers shortly after the snowmelt and at this time the weather can be very changeable. In spring 2007 I visited the heights over Lake Abant on the 11th of March and then *Crocus abantensis* and *C. ancyrensis* were in full bloom, though on the slopes there was still much snow. Two weeks later I again visited these places and this time everything was in deep snow, with only here and there some crocus "noses" pushing through. In 2008 our team happened to be there on the 20th of March, at the very beginning of flowering.

There are spots where *C. abantensis* dominates, in other places only *C. ancyrensis* grows, but mixed groups are not a rare occurrence. Regardless of the differing chromosome numbers, both sometimes hybridize (but that happens very rarely) and their offspring were described as *C. x paulineae*. In 2008 after a very long search I spotted only one plant, and another I got in cultivation, hand-pollinating both species, as the seed parent using the lilac form of *C. abantensis*.

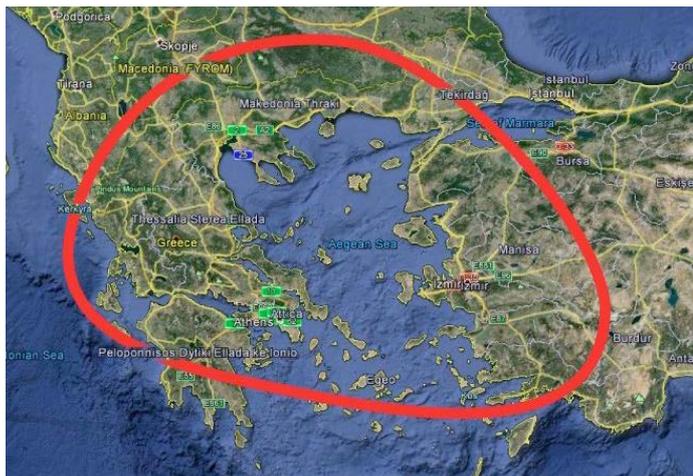
In colour *Crocus abantensis* is quite variable, although blue-coloured forms prevail; rather rare are white-blooming specimens; violet shaded flowers occur more often. One very unusual form with striped flowers, which appeared among my seedlings from wild-collected seeds, I named after a character from the Harry Potter series as 'Azkaban's Escapee' for the resemblance with the prisoner pyjamas in the past.

It seems that *Crocus abantensis* is one of the very few species that do not like growing in the greenhouse. There I have never gotten as large and good quality corms as I would have liked. It feels much better in the garden where excellently sets seed and abundantly self-seeds on the paths between beds, so with me it had become almost like a weed, until I completely lost the garden stock during the winter when a very mild January was followed by two weeks with hard black frosts (in 2006). Survived only potted seedlings and small stocks in the greenhouse. Therefore I don't risk anymore. I try to bring all the pots outside as early as possible because this alpine species from NW Turkey does not like high temperatures. It well increases by splitting.

A deep lilac form of *C. abantensis*.

130. *Crocus mazziaricus* Herbert

Edwards's Bot. Reg. 31(Misc.): 3. 1845. Type: Greece, Lefkada (Lefkas), A.D. Mazziari (K).
 Ic.: G. Maw. Monogr. Crocus: pl. 31; B. Mathew. Crocus: t. 39c.



The area where the crocus regarded as *C. mazziaricus* s.l. is distributed according to the Atlas of the Aegean Flora and Flora of Turkey.

- **Synonyms** – *C. spruneri* Boiss. & Heldr.; *C. schimperi* J.Gay ex Baker.
- **Habitat and distribution** – grows from sea level up to 1500 m altitude, in open woods or scrub, on rocky hillsides based on limestone formations, often in terra rossa. According to B. Mathew (1982), distributed in the southern part of the former Yugoslavia, in mainland Greece, the Peloponnese, the Ionian Islands, Euboea, Naxos, and in the south-western Turkish provinces of Denizli, Muğla and Aydın, but most likely in this area occur several still unrecognised species.

130a. *Lefkada (locus classicus) and the Peloponnese.*

Red dots mark the localities where *C. mazziaricus* s.l. has been observed in Greece (according to A. Strid), the red circle marks the area where typical *C. mazziaricus* occurs.

- **Cataphylls** – 3-4, white.
 - **Leaves** – 4-5, greyish green, glabrous, up to 3 mm wide, with 3 ridges in widely open lateral channels, the white stripe around 1/3 of the leaf width; usually emerge only after anthesis and remain very short until spring, or show up only in spring.
 - **Bract and bracteole** – unequal, the tip of the bracteole exerted and visible without dissection.
 - **Perianth tube** – white to greenish, striped purple to brownish throughout or only below the perianth.
 - **Throat** – nude, from greenish white to light yellow, but always in a “cooler” shade, never orange.
 - **Filaments** – 3-6(-7) mm long, glabrous, whitish to pale yellow.
 - **Anthers** – up to 22 mm long, bright yellow.
 - **Connective** – of the same colour as the anthers.
 - **Style** – lemon yellow to lighter or darker orange, divided into many branches around the tips of the anthers and usually overtops them. The degree of branching and the length of the branches vary widely even within one population.
 - **Flowers** – fragrant, vary variable in colour – those from the *locus classicus* and the Peloponnese mostly white or pale lilac (in mainland Greece, on the islands and in Turkey mostly lighter or darker lilac, although in mainland Greece among lilac individuals appear whitish coloured ones as well).
 - **Flower segments** – (25-)30-50 mm long and 10-17 mm wide, obovate or oblanceolate, obtuse to acute.
- **Flowering time** – September-November.
 - **Corm** – 15-25 mm in diameter, in cultivation larger.
 - **Tunics** – in typical specimens coarsely fibrous, fibres distinctly reticulate.
 - **Tunic neck** – like a bunch of strong fibres, reaching up to 25 mm in length.
 - **Basal rings** – absent.
 - **Prophyll** – absent.

- **Outer segments** – outside plain-coloured or with darker stripes of varying widths, inside slightly striped, stripes or veins more prominent in the lower part and they sometimes spread out onto the throat.
- **Inner segments** – outside base with a yellowish blotch that shines through from the throat, lined with short greyish stripes continuing from the tube.
- **Capsule** – ellipsoid, up to 25 mm long and up to 8 mm wide, usually purplish tinged, carried a little above ground level to 2(-4) cm high at maturity.
- **Seeds** – ellipsoid, up to 4 mm long, dark brown to reddish brown, with the raphe of the same colour and a prominent, paler caruncle.
- **2n** = 16 (according to Brighton, 1977 – as *C. cancellatus* – in the area where *C. mazziaricus* s.l. is distributed).
- **Etymology** – named after Alessandro Domenico Mazziari (*-1857), who collected the species on Lefkada.

Although *Crocus mazziaricus* is a well-known and widely distributed species, its taxonomic status, or rather, just to which populations its specific epithet can be applied, is still debatable. At present it is regarded as occupying a vast territory and as an extremely variable species. After having collected a quite representative material throughout its range, which begins in the *locus classicus* on Lefkada (there it grew side by side with *C. hadriaticus* in mixed populations), moves through the Peloponnese into mainland Greece where it goes northwards through Thíva and Larissa as far as the Athos peninsula, then shifts southwards to Samos and Ikaria and turns eastwards into W Turkey, I noticed a very interesting tendency – the dominating colour in the observed populations gradually transformed from almost invariably white to quite deep lilac, with almost no whites in Turkey (although some whitish ones there were seen). Similarly changed the corm tunics: in Lefkada and the Peloponnese they were distinctly finer fibrous than those to the east, and the length of the tunic neck varied greatly, from very short up to 5 cm long.

Certainly, in such a large region several species might be hiding under the common name “*C. mazziaricus*” because until now, when a sample of an autumn-blooming crocus with reticulated tunics was collected in the designated area, it, in accordance with Mathew and Flora of Turkey, was automatically labelled as *C. mazziaricus*. The description here is based on my own observations on the plants collected during several trips



Herbarium sheet of *C. mazziaricus* from the *locus classicus*.



Corms of a typical *C. mazziaricus* from Lefkada.



C. mazziaricus near Stemnitsa, Peloponnese.



C. mazziaricus on Lefkada.



C. mazziaricus from Akarnanika Mountain near Moni Romvou (near Lefkada).



C. mazziaricus from near Tripoli, Peloponnese.

to the Peloponnese and in 2014 to Lefkada. The first exemption from the general viewpoint is the very special *C. dilekyarensis* (see) from a small isolated population on the western coast of Turkey. Further research, with the inclusion of DNA analyses, is still needed in the other area. Here are included some pictures from several observed populations of this region, starting in Thíva in Attica, moving northwards through Thessaly to Macedonia, turning south to Samos and SW Turkey, that will allow you to form your own ideas of the variation within this group.

130b. Greece, surroundings of Thíva (Attica).



C. mazziaricus s.l. habitat near Thiva.

This population was accidentally spotted in 2011 when I with my wife Guna were rushing to the airport, so there was time only for a brief look and the recording of the geographical coordinates. It grew in sparse grass in clearings between dwarf spiny shrubs and had just started to bloom. I returned to the locality together with my Czech friends in autumn 2014 when the crocus in the first spot had almost finished flowering, but we found another beautiful location near Ancient Thera, where it was abundantly blooming between dense shrubs and in small clearings. There light lilac individuals dominated, although whitish ones were not rare, we even saw one in a distinctly pinkish shade. The leaves of this second population in their lateral channels had (3-)4-5 ribs, the corms for the most part were with longer necks, though this feature varied greatly, the tunics were more coarsely fibrous than those on the Peloponnese.



C. mazziaricus s.l. from near Thiva - corms



C. mazziaricus s.l. near Thiva – flowers.

130c. Greece, near Larissa (Thessaly).

This population I have not seen. Its pictures were sent to me by George Papapolymerou – a great Greek crocus enthusiast. The population (judging by the pictures) is very uniform, lilac, and looks very distinct, certainly worthy of an in-depth research. According to George, the leaves in 10-15% of the observed plants had emerged already during anthesis.



C. mazziaricus s.l. near Larissa. Photo George Papapolymerou.

130d. Greece, the Athos peninsula (Chalkidiki).

Crocuses from the *mazziaricus* group were seen growing there only in deep limestone rock splits alongside footpaths to the top of Mt. Athos at the southern end of the peninsula. Only very few corms had to be dug to realize that it was not the searched *C. athous* so no special attention was paid to this species anymore. At home all of them bloomed with bright lilac-blue flowers. Corm tunics were very coarsely fibrous-reticulated, with a comparatively short fibrous and bristly neck. On the attached picture the remnants of the old tunic give the impression of a very elongated corm, but in reality it is subglobose with a flattened bottom and is around 10-12 mm in diameter. It has very wide leaves (the widest among all of the observed ‘*mazziaricus*’) that are almost nude to very sparsely papillose or hairy, with (2-)3-4 ribs in their lateral channels.



C. mazziaricus s.l. – Mt. Athos – corm.



C. mazziaricus s.l. from Mt. Athos – flower.

130e. Greece, Samos.

On Samos, too, only very few corms were collected. All the plants had invariably blue blooms and their throats were of the deepest yellow seen in the specimens of this group observed in Greece. Corm tunics were very coarsely reticulated. Cataphylls are straw yellow, whilst in other samples white or whitish. Seedpods are carried 5-7 cm above ground at maturity, seeds are distinctly elongated – 5 mm long and 2 mm wide, dark purplish red.



C. mazziaricus s.l. from Samos – corms.



C. mazziaricus s.l. from Samos – flower.

130f. SW. Turkey.



C. mazziaricus s.l. from Honaz Dağı, Denizli Province – corms.

I grow many gatherings of the so-called *Crocus mazziaricus* from Turkey, but most of them have been collected in spring, with no flowers, so it is impossible to judge on the variability of this crocus there. But at least they can be regarded as very indiscriminate – no preferences to a particular flower type are of any significance when collecting corms in leaves. And all the Turkish plants invariably are more or less blue. Even the most light-hued forms would have something bluish on the flower segments.



C. mazziaricus s.l. from Gölçük, Muğla Province.



C. mazziaricus s.l. from Honaz Dağı, Denizli Province – flower.



C. mazziaricus s.l. from near Üzümlü, Konya Province.

130g. SW Turkey, Çamköy, Denizli Province.

A very special population and most likely a new species was found by our team during one of the rare autumn trips to Turkey, near village Çamköy in Denizli Province. Here crocuses were growing in a small spot amidst ploughed fields in grazed grass between low trees. The population was extremely variable from very light to medium lilac flowers with nearly invariably deep bluish purple throats; the branching of the style varied enormously from almost trifid or with branches that were only slightly subdivided at the top to practically typically many-branched. One of the pictured plants in flower was so close to *Crocus mathewii* that only the coarsely reticulated corm tunics prompted to regard it as belonging to the *C. cancellatus* group and refrain from announcing a “new locality” for *C. mathewii*. In the attached pictures you can see this plant and its corm. This population is now under research by Turkish botanists.



New species from *C. mazziaricus* group near vil. Çamköy in Denizli Province - flowers.



New species from *C. mazziaricus* group near vil. Çamköy in Denizli Province – corm.

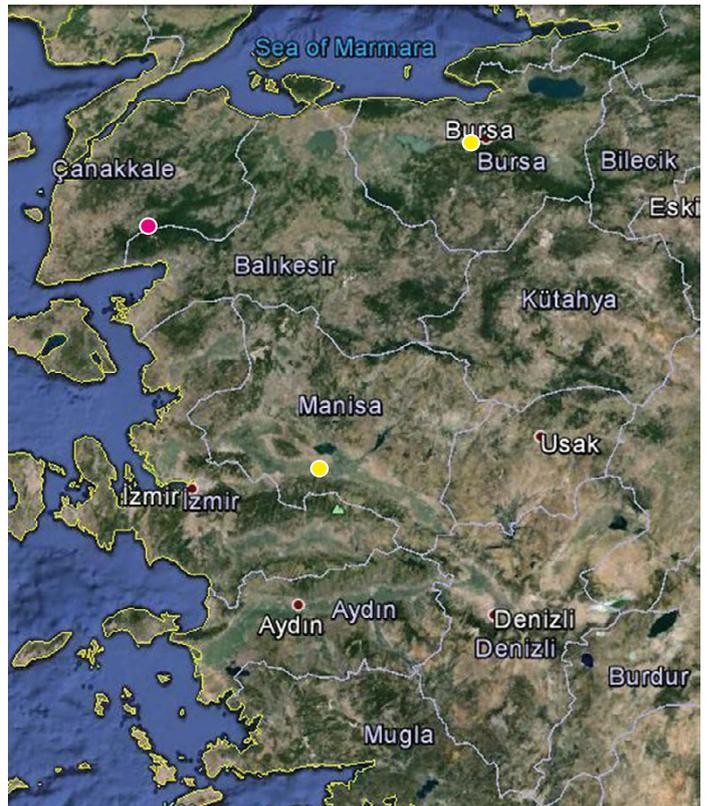
204. *Crocus thirkeanus* K.Koch

Linnaea 21: 633 (1848). Type: Ulu Dağ, Bursa Province. Ic.: J. Rukšāns. Crocuses: pl. 172, 237, 238.

- **Synonyms** – *C. gargaricus* subsp. *herbertii* B.Mathew; *C. herbertii* (B.Mathew) B.Mathew.
- **Habitat and distribution** – moist open meadows, at forest edges and in sparse pine woods, observed by me at altitudes of 900-1600 m, may be situated at higher altitudes, too; together with *Scilla bifolia*, *Crocus pulchricolor*, *C. chrysanthus*, etc., on Uludağ, Bursa Province and Boz Dağ, Manisa Province, Turkey. It is possible that the population from Kaz Dağı in Balıkesir Province belongs to *C. thirkeanus* as well.
- **Flowering time** – March-May.
- **Corm** – globose to subglobose, 5-7(-12 – in cultivation) mm in diameter, forming small rice-grain like (1-2(-4) mm wide and up to 4-5(-8) mm long) cormlets at the ends of 5-10 cm long side-growing stolons.
- **Tunics** – distinctly finely parallelly fibrous (in the very similar *C. gargaricus* – distinctly reticulated).
- **Tunic neck** – very short, only 2(-3) mm long, formed by elongated fibres of the main tunic.
- **Basal rings** – absent.
- **Prophyll** – absent.
- **Cataphylls** – 3, white, with brownish or greenish upper edges, hidden under ground or only slightly exerted (in cultivation).
- **Leaves** – 2-3(-4?), glabrous, green, in plants from Göktepe up to 2 mm wide, on Uludağ can reach even 4 mm (in cultivation), lateral channels widely open with down-turned edges of the lamina and without ribs, the white stripe around 1/4 to 1/3 of the leaf width; in the wild positioned mostly below flowers, rarely reaching their bases and only occasionally the tips of the segments, in cultivation just emerging or reaching the base of the flowers at anthesis.



C. thirkeanus corms with stoloniferous cormlets.



Yellow dots mark the localities where *Crocus thirkeanus* has been observed on Uludağ and on Boz Dağ, the red dot marks an unchecked population on Kaz Dağı.



C. thirkeanus and *C. pulchricolor* blooming side by side on Uludağ.

- **Bract and bracteole** – silvery with greenish veins, well exerted from the cataphylls, bracteole absent.
- **Perianth tube** – light yellow to slightly greenish yellow.
- **Throat** – glabrous, deep yellow to orange-yellow, darker than the segments, with a radiated edge.
- **Filaments** – 3-5 mm long, glabrous to slightly papillose, of the same colour as the throat.
- **Anthers** – 5-9 mm long, yellow, broad at the base and tapering towards the pointed tips, with short basal lobes, or parallelly edged with rounded tips.
- **Connective** – slightly lighter yellow or indistinct.
- **Style** – divided into three yellow to orange branches of various lengths or rarely almost undivided, slightly expanded and minutely fimbriate at the apex, mostly ending below the tips of the anthers, not so often equal to them.
- **Flowers** – paler or brighter deep yellow to orange-yellow, exteriors not veined or striped.
- **Flower segments** – obovate to oblanceolate, with obtuse or subacute tips, of the same colour in both whorls and on both sides, only the inside with very insignificant, slightly darker veining near the throat.
- **Outer segments** – 26-30-32 mm long and 10-12-15 mm wide.
- **Inner segments** – 24-27-30 mm long and 8-10-14 mm wide.
- **Capsule** – small, almost rounded to elongated, 10-12 mm long and 4-6-8 mm wide, gradually widening from the base to the middle and then in the same way narrowing to a pointed tip, buff, carried around 2-3 cm above ground at maturity.
- **Seeds** – nearly spherical, up to 2-3 mm long and 1.5-2.5 mm wide, dark brown, distinctly rugose, with a small, but prominent darker caruncle, and an almost indistinct or even absent raphe.
- **2n** = 30.
- **Etymology** – named after Dr. Thirke who collected the first corms of this crocus.



C. thirkeanus (Uludağ) blooming in the author's collection.

A paler yellow-coloured specimen from Uludağ

Crocus thirkeanus is much better known under the name of *C. herbertii*. It was used by gardeners to refer to the stoloniferous form of the crocus previously regarded as part of the *C. gargaricus* complex. Well separable from the latter by its corm tunics and the stoloniferous habit it is practically indistinguishable by flowers from *C. gargaricus*. Only if planted side by side, the flowers of *C. thirkeanus* seem to be slightly smaller, but the difference is so subtle that it becomes unidentifiable if seen alone. There is a small variation in the intensity of the flower colour. Plants from Uludağ seem to be generally slightly darker and more orange-shaded than those from Boz Dağ. W. Herbert used the name var. *citrinus* for the lemon-yellow forms but it is unclear to which of the two lookalike species this epithet was applied. Until recently albinos were unknown in any of them, and *C. thirkeanus* was known only from Uludağ. In spring 2013 our small group travelled across the provinces of Izmir and Manisa looking for the recently described crocus species from this region. On the damp slopes of Boz Dağ, close to the border of Izmir Province, we stopped to take a picture of beautiful groups of *C. chrysanthus* and great was our surprise when nearby we saw blooming another, albeit very similar crocus. Only the checking of its corm tunics confirmed that we had found a new location of *C. thirkeanus* around 200 km to the south from the type locality. When somewhat higher up the slope I noticed some crocuses with white flowers, my first impression was that it was one of the new “*biflorus*” species, but it turned out that it was the first pure albino in this uniformly yellow, as it was supposed before, species. The stoloniferous habit had allowed this mutation to spread and it was possible to collect a couple of corms without causing much

damage to the habitat, and I hope that in due course this form will find its way into our gardens. The flowers are white throughout and only the anthers have retained the yellow colour.

Plants from Kaz Dağı in Balıkesir Province geographically are situated midway from the populations in Uludağ and in Boz Dağ, so most likely they belong to *Crocus thirkeanus*, too, although B. Mathew in his monograph and in Flora of Turkey regards them as *C. gargaricus*. Field research is needed to confirm this approach.

The taxonomical position of *Crocus thirkeanus* is still somewhat unclear. According to G. Petersen & al. (2008), it is placed next to two beautiful blue-coloured species from the former series *Biflori* – *C. leichtlinii* and *C. kerndorffiorum*, but *C. gargaricus* is put in another well-supported clade together with *C. cancellatus*, species of series *Speciosi* and others, confirming its distance from *C. herbertii*. D. Harpke (2012) still positions them side by side, but close to *C. leichtlinii* and *C. kerndorffiorum*, and confirms that the two species have identical chromosome numbers.

Crocus thirkeanus is very easy in the garden but not too convenient for a nurseryman, just because of its stoloniferous habit and the production of very small cormlets, which are nearly impossible to collect at harvesting time. What is a problem for nurserymen is a great gain for home gardeners. Once planted on a rockery or anywhere else, it can stay there for years and the spot will slowly grow in size. When after a very hard winter I lost my stock that was planted on open beds, I revisited the long abandoned garden of my youth where I had planted my first corms of *C. thirkeanus* under an old apple-tree more than 30 years ago and it still was thriving there. Not that easy is it in pots either as it needs more frequent watering than most of other crocuses and I would recommend moving them out of the greenhouse in summer, but it had not suffered even when left inside during the hottest months. It regularly sets seed though not very abundantly, but excellently multiplies by cormlets well compensating the aforementioned “fault”.



C. thirkeanus on Boz Dağ.



Albino form of *C. thirkeanus* on Boz Dağ.



Corms of *C. thirkeanus* (Boz Dağ) showing side-growing stolons.



Crocus thirkeanus habitat on Boz Dağ.