

An Adventure With Reticulatas

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89-A1, 3, 2



88-AX2



87-BN-1



93-BA-1



89-A-3



94-HW-1



89-Q-3

The pictures on the facing page are of my Reticulata Iris hybrids. I could just as easily write an article about Junos, but I'll save that for a future Bulletin.

I'm sure some of you have grown Reticulatas for a couple of years only to find that all you have is leaves coming up and no flowers. The solution is to replant them every two years into new soil. In Holland they are treated as crops, and only grown in the same spot every few years. I did an experiment several years back. I planted 12 *danfordiae* (trade triploid form) and 12 *reticulata* hort. in sandy loam soil. The first year, as expected, there were 12 flowers. In the second year there were 24 in each case. In the third year, and essentially every year since, there have been only about 6 flowers of *reticulata* hort., and none of *danfordiae*.

I have limited garden space, so I'm forced to reuse the same spots. Last year as an experiment I replaced the soil some of my older hybrids had been in. Time will tell how much better the bulbs do. Certainly though, replanting does help - spread the bulbs out so they aren't too crowded.

What's special about Reticulata Iris beside their beautiful form and colours? One is the fact they have square leaves. One new commercial clone even has variegated leaves! The second is the fact they are one of the very first flowers to bloom every year. Retics are perfectly hardy, and due to cooler temperatures when they bloom, their flowers can easily last 7 days or longer.¹

Did you know Reticulatas can have two flowers per bulb? I had never realized this until I started growing my own hybrids. Since then, I have obtained larger bulbs of commercial clones from Holland, and they too have given two flowers. Commercial clones don't increase as well in size here (Toronto, Canada), so their two flowers per bulb is only a one time occurrence in my garden. Certain of my own hybrids do continue to occasionally give two flowers. Ideally you will be able to leave the bulbs in a given spot and they will continue to consistently bloom, just as some Junos like *bucharica* increase to an equilibrium number if left alone.

My goal with this article is to introduce you to "the wonderful world of Reticulatas.". What do you think of my first second generation (F2) *danfordiae* x *sophenensis* hybrid which bloomed for the first time

¹ You may not want to do this, but the flowers will stay their best if covered from rain and severe wind. I use upside down dishpans for this especially because of my hybridizing, with a rock on top to keep it in place. Bricks on their edge can be used to give the pans more height where necessary.

this year: 94-HW-1? (See inside back cover, April '99 Bulletin.) I've been growing these fellows for over 15 years and I continue to enjoy them immensely. I'll just add that I also particularly like Junos², a few of which bloom at the same time as Retics, but most start a week after the Retics finish. The Retics themselves last a bit over 3 weeks starting right when the snow disappears, and they are completely unaffected by freezing temperatures. In fact some years there are snowfalls a week or more after the Retics have started.

Dr Rodionenko back in the early 1960s separated these plants into their own genus: *Iridodictyum*. Since then he has additionally separated out *kolpakowskiana* and *winkleri* into genus *Alatavia*. Brian Mathew considers these to be Iris in Subgenus *Hermodactyloides*. Kew Garden's chromosome analysis, details of which still has to be published, supports the idea that they are indeed Iris. Personally I am happiest to call them *Reticulatas*, or Retics for short. When talking about *Reticulatas* as a whole I use capitalized "R". When writing about the species *reticulata*, I use lower case "r" and italics.

The species are all quite nice. I particularly like *bakeriana*, but am disappointed how the bulbs I've had have died out. I'm going to have to put in more effort into maintaining it and other species like diploid *danfordiae*, *sophenensis*, etc. I have been doing just that for the latter ones, but have sometimes run into some problems. In the case of *histrioides* I'm hoping one of my pure seedlings proves to be a better doer here than commercial clones or wild collected bulbs.

One theory suggests plants you raise yourself from seed will be more likely to do well in your garden than plants originating elsewhere. A nice theory, with perhaps a little bit of truth, but you could easily find yourself having wasted a lot of time. In terms of hybrids, you certainly can't expect to get anything as good as the commercial clones without putting in a significant effort. In my case I'm now up to planting several thousand seeds every year. What is of particular importance though is parentage!

Brian Mathew has mentioned that he regards *hyrcana* as just an early blooming form of *reticulata*. I have seen a fair number of forms of Iris *reticulata* from the wild, and the fact that certain clones are earlier blooming, or have wider fall blades, etc. does not mean they are different species. Rather the variability of Iris *reticulata* is wider than that of many other species. This is not to say that there aren't other *Reticulata* species waiting to be found in the wild. For example, for certain specific reasons I think that the Çat *Reticulata* is a new species. This has yet to be verified by chro-

mosome analysis.

How many of you grow the gorgeous hybrid 'Katharine Hodgkin'? It is from *histrioides* x *winogradowii*. Unfortunately, in spite of both parents having chromosome counts of $2n = 16$ it is sterile. Individual chromosomes are different enough that ovules and pollen cannot form properly. Thus it, and others from this same cross, are a dead end from a hybridizing perspective.

Now is as good a time as any to mention how it's quite annoying to look in garden catalogs and see 'George' and 'Katharine Hodgkin' listed as forms of *histrioides*. They aren't! They are hybrids with one parent being *histrioides*. They are listed this way in hopes of giving people an impression that they have large fall blades like *histrioides*. The Armenian Caucasus Retic, which I happen to be using in many of my hybrids, also has wide falls. Other clones like 'Harmony' have wide blades, as well as *histrioides* as one of their parents, but are listed under the heading "reticulata". Note that in catalogs often a lower case "r" is used, which from my point-of-view is confusing, since many of the named varieties are hybrids with other *Reticulata* species.

The Royal General Bulb Growers Association has similar problems in their 'International Checklist for Hyacinths and Miscellaneous Bulbs.'

In 1985 and 1986 I went plant collecting in Turkey, hoping to find diploid *danfordiae*. I was lucky. Near the end of the first trip, with the help of several local Turks I did collect *danfordiae*. In later years a slightly larger diploid *danfordiae* became available. Over the years I have made a fair number of crosses with both. After seeing 'Katharine Hodgkin' you might expect I would have first tried to cross *danfordiae* onto *histrioides*. In fact only one of ten crosses I made the first year involved *histrioides*, and it didn't give any seed. In fact only 8 seeds were produced from two crosses, and none germinated.

In 1989 I made a number of crosses with *sophenensis* (previously known as Iris *histrioides* var. *sophenensis*). Sixteen of these from three crosses first bloomed in 1994. They were clearly true because their standards were extremely narrow (from *danfordiae*, which has short bristle-like standards). They ranged in width from 0.3 mm to 3.0 mm; all being 2.0 to 2.5 cm in length. Typical Iris *reticulata* standard width is 7 to 10 mm. Each of the three crosses were fairly consistent in their standard's width: in one case all 7 plants had approx 0.3 mm widths. Another telltale mark of their *danfordiae* heritage is faint wide greenish-yellow ribs on the back of their style arms; most, but not all had this. In one plant, the style arm lobe area was quite wide, as typical of *danfordiae*. Fall blade width varied from 10 mm to 14 mm. Their colours ranging from light blue to dark blue, and even a vio-

2 If you've never grown Junos (Juno Irises), I'll point out one neat thing is the taller species look like corn stalks! Up to 2 feet tall, with as many as 13 flowers!

let. A few had some yellow influence, but where it was more pronounced the flowers had a muddied appearance - *danfordiae*'s bright yellow carotenes "mixing" with blue anthocyanins (they don't actually physically mix).

I expected these would be sterile (ie. $2n = 20 \times 2n = 18$), but felt at the time that I had to be sure. If anything would work it seemed that intercrossing the progeny would be the most likely. To my pleasant surprise they set seeds - they were fertile! Now 5 further years later, two of these bloomed. As you can see, 94-HW-1 was worth the wait. Its bud was pale yellow like *winogradowii*! The overall colour when it opened was cream. Its style arms were white with wide greyed blue stripes on either side! There were blue veins on the fall, but they weren't on the fall blade itself, rather up by the style arm. There was a soft yellow highlight around the end of the fall ridge. It's quite nice. I couldn't have asked for a more special first F2 bloom! Now it's a matter of increasing stock to the point where there is enough to start introduction: possibly in 7 years time.

I wanted to be sure of getting seed so I selfed it, then a day later crossed it with the clone below, followed several days later with pollen from *danfordiae* as well as an F1 clone. Initially it appeared my efforts had been successful, but unfortunately the pod was turned out to be false. Hopefully next year's Its pollen was used successfully in many crosses, including back crosses to F1s and diploid *danfordiae*.

Kew Gardens in England has done some chromosome analysis of my hybrids and they have some interesting news to publish, hopefully in the not-too-distant future.

The s x d hybrids all have a reasonable number of bulblets, which is not surprising, since both parents are well known for producing a fair number themselves. Often people refer to *danfordiae* and *sophenensis* as having "shattered." This is particularly apt since their new parent bulbs are generally not large enough to bloom the following year, and because of all the rice-grain sized bulblets. Fortunately in many cases the F1 progeny are proving more robust, with at least one bulb being large enough to bloom.

Typical Reticulata clones are talked about as having "split". This is because if you were to dig them up in the summer you find two large bulbs where there had been one. They don't actually split. In fact blooming bulbs use up all of their energy (the old bulb) putting up their flower(s) and leaves. At the base of each leaf a new bulb develops. This means early on you can count how many bulbs you should have in the fall. The leaf diameter and length can give you a good sense of how big its bulb will be. Bulbs that don't bloom simply push up a leaf, then form a new (hopefully larger) bulb at its base. Rice-grain bulblets don't put up leaves until the following

year, assuming they are not buried too deep. If they are, the bulblet runs out of energy before its leaf reaches the soil surface, and it dies (which is why I replant them closer to the soil surface).

I have the late Frank Kalich to thank for sending me *Iris sophenensis*.

Generally s x d clones are the earliest Reticulatas to bloom. This year there were over 340 F1 blooms from 52 clones, representing 9 crosses spanning 6 years; up from 262 last year. This doesn't count 20 boom-sized bulbs given out for testing.

In 1995, 7 years after being hybridized, one of my 1988 *danfordiae* hybrids bloomed: Çat³ ANM2175 x *danfordiae* ANM2325. It is a nice dark red similar to its Çat parent, with a bit of orange on its fall from *danfordiae*. Three clones have now bloomed, all similar in appearance. They're nice, but not stunning, and are slow increasers. What is most AMAZING: they're fertile! What does this say about the Çat clone? I have suggested to Kew, via Brian Mathew, that they take a close look at the Çat clone. I am actually quite hopeful that these will intercross with my s x d clones AND continue to be fertile! Unfortunately I've still got a bit of a wait for that since it was only in 1997 that I was first successful with crosses along this line. I am looking forward to seeing a back cross onto *danfordiae* next year. Like *danfordiae* and *sophenensis*, the Çat clone also produces lot of bulblets.

In 1995 the first of four 1989 *hyrcana* x *danfordiae* hybrids bloomed.. As expected it was pod sterile, but surprisingly its pollen has been used successfully on a few crosses (a big question is, are they true?; 3 have germinated). Last year two more bloomed. They were exciting by comparison, and of particular importance, they showed that *danfordiae* had the ability to express more than just a single shade of orange-yellow. One had light yellow in it, and the other was orangish perhaps an orange Reticulata is possible one day!

A 'Cantab' x *winogradowii* hybrid bloomed this year. It was definitely true! It was cream overall with a "masked" blue fall blade (ie. very subdued). The flower had *winogradowii*'s shape. Its bud was pale yellow.

Have you ever thought of hybridizing Reticulata Irises? The reason I've been doing so much is both: to create cultivars that will do better in my garden; and to create new colours, patterns, etc. One of my goals early on, was to get wild collected clones in order to bring new genes into the limited pool available from commercial clones. In the wild *bakeriana* is somewhat variable, and some of those clones are nicer than others.

You can't expect to take ordinary parents and get something exceptionally good. I say this thinking that 1) it's probably already been done e.g. William van Eeden's crosses such as "George", and 2) the fertile commer-

3 Collected near Çat in eastern Turkey.

cial clones are too similar to each other, plus they are close to the species level.

If you cross two similar parents, the progeny will understandably be similar. This suggests that the best thing is to make wide crosses, plus use parents that are different from those used by anyone else. If you cross two pure species then the first generation expression will be very limited. This is quite understandable because the genes contributed by each parent are very uniform (each, after all, is a pure species, with limited variability). The expression opens up tremendously in the second generation; particularly when intercrossing the F1 hybrids. If you want to bring out recessive characteristics you should self a given clone. I tend to intercross clones and should do more selfs.

You only realize the clones you have aren't terrific when you see something better (number of flowers, flower shape, shade of colour, rate of bulb increase, etc.). For example I originally thought there was essentially only one form of Juno *bucharica* - the commercial one you get from Dutch sources. Now I have at least 10 distinct ones, collected in the wild by many different people, the majority of which are equally nice for varying reasons. I'm sure the same is true of Reticulata Irises species. It's just a matter that not as many forms have been collected from the wild. Martyn Rix's book "Bulbs" for example shows an ameona (white standards and coloured falls) clone from Iran. I'd love to use it in my hybridizing.

Some other hybridizing goals in no particular order are: strongly scented flowers; variegated leaves; amoena flowers (white standards with coloured falls); tri-tones / tri-colours; new colours and patterns; large showy flowers; and ability to normally produce two flowers per bulb in average gardens. Ideally all hybrids should include the following characteristics: resistance to disease; good bloom year after year without requiring special conditions to do so. The following aren't currently a problem, but still need to be given consideration: strong stems that won't break or fall over in the wind; thick petals to stand up well to rain; long lasting flowers.

One characteristic to breed out is weak flower to stem attachment. This is a characteristic of a number of collected Turkish clones! There's nothing more frustrating than removing anthers and tearing the flower off in the process. It's especially true when they're special flowers that you're particularly wanting to set seed.

When the pods ripen they are put into the baby food jars and then allowed to dry in the garage for a number of days. From here information about each cross and the number of seeds produced is entered into my computer; along with information about unsuccessful crosses. Metal tags, which are more expensive than plastic, but longer lasting, are then made up.

I usually plant my seeds by late September. Planting earlier might be better, but I'm typically sending plants off to people over the prior 3 or 4 weeks. Because of limited garden space, I have to squeeze the seeds into as small a space as possible. In recent years this has meant "double planting": Reticulata rows 3.5 cm apart, with Juno seeds planted in-between. The seeds themselves are 1 cm or less apart within a row. An effort to plant the seeds shallower than I originally had, seems to have paid off, particularly for Junos. The only drawback is some of the baby bulbs get heaved out of the ground by mother nature's daily spring freeze-thaw cycles (in spite of being covered a thin layer of straw).

As I'm planting the seeds I make up a map showing where each cross is, and listing its parentage. This is just in case the tags get disturbed, plus the map is an invaluable reference for finding a given cross. Afterwards I put down a two to three inch layer of straw, and then a plastic net in order to minimize any problems with curious squirrels looking for nice easy soft places to dig in order to bury their winter food supply. A layer of straw should continue to be used every winter, since it helps prevent the seeds / seedlings from starting into growth during winter warm spells. A week of warm weather would start their cell sap flowing and in the process raise its freezing point. A sudden cold snap back to -25°C (-6°F) would have deadly consequences. The straw acts like a blanket and keeps the ground frozen under the straw so the seeds / seedlings are oblivious to the warm spell (large bulbs are deeper in the ground and consequently aren't as effected).

Over the years I have found that roughly 40% of my crosses are successful. Note: be sure you are working with fertile clones. Any with *histrioides* parentage are sterile. Only about 30% of the seeds germinate on average, with about 5% losses leaving a net 25%. After seeing 94-HW-1, I wouldn't be the least bit surprised if the percentage of truly special clones increases significantly over the next few years.

If you look at the math, you quickly realize there's not a lot success for all of the work. Of course when working with over 400 successful crosses that produce 5,000 or more seeds, I still end up with a fair number of hybrids each year. Several years ago William van Eeden wrote, "there is one comfort, a cold comfort: natural selection. Only the strongest, the most adapted and tolerant to your climate will survive — survival of the fittest. Even in the years after germination there can be many losses. Under the best conditions it takes 4 to 5 years for seeds to flower."

Typically germination starts after the 2nd winter. This year something about the conditions, winter, etc. was just right since quite a few of last year's seeds have germinated.

Once you do have something that seems good, it takes a couple of

years to fully evaluate it. In the first year you of course get a clear idea of how beautiful its flower is. Slight differences show up between clones in terms of numbers of bulbs and their size, but this becomes magnified significantly after several years. At the same time you are starting to building up stock. Five years out it's nice to see a clump of 16 blooms. The next step is to test it in other peoples gardens, develop commercial interest in it, all the while continuing to build up stock. In my case some of my hybrids are being evaluated by Wim de Goeede, a Dutch grower. He will only be interested in just a couple for his market, which I believe is the wholesale European trade. I really need to also partner up with growers selling into North American markets, as well as with smaller speciality bulb firms selling to "connoisseurs."

Every year the amount of work required to build up stock keeps increasing. Ideally in order to get maximum increase I should replant all of the bulbs. Just to give that a little perspective, last year I replanted my 1989 hybrids the majority of which are now *sophenensis* x *danfordiae* bulbs. I actually managed to count a large portion of those bulbs (this continued to allow me to see exactly how well each clone is doing). I estimated there were 26,000 bulbs (2/3 rice-grain sized bulblets), all crammed into an area approx. 4' x 15'. When I say crammed they're planted up to 3 layers deep: large bulbs at the bottom (bloom-size and 1 year away), then 4 to 6 mm bulbs followed by the bulblets. By the end of this summer there could be up to 70,000 bulbs (remember this doesn't count all of my other Retic hybrids). Clearly it won't be long before I can't handle all of the bulbs.

Reticulatas can be grown in many different soil types. I have grown them in coarse sand, but would say in the long run sandy loam soil is better. All of my soil is "imported" since the area where I live is "rich" in clay. As a result, when I make a new garden, it's simply a matter of taking up the grass and dumping sandy loam soil on top to a height of 20 cm (8 inches), and voilà, a raised garden. One important factor though: the bed should be kept moderately moist in late spring when bulbs for next year are forming. You don't want it too wet, but on the other hand, if it dries out too quickly, then the bulbs don't have a chance to get as big as they otherwise would. If you look carefully you will observe various microclimates in your garden. It took me a couple of years to realize that beds at the back of the yard, though wetter in early spring, dry out sooner than ones up near the house.

I have started watering my seedlings every couple of days during dry spells in late spring since they are closer to the soil surface and therefore more prone to drying out. Hopefully this will give them a chance to get a bit bigger than they otherwise would.

I do fertilize, but tend to put only a bit on in the fall and spring.

It's a trade off between wanting the bulbs to do well on their own, and wanting to get a good increase (number-wise), while recognizing my bulbs are quite tightly packed and need a little boost as a result of all of the competition. I use either 7-7-7 or a fall 4-8-12, which are ones I've found I can get reasonably cheaply.

I have been finding the Armenian Caucasus Retic to be an important parent. Another good parent because of its variable characteristics is a collected form from Ahmet Atilla. Unfortunately it, like a number of species, is dying out in my garden for unknown reasons. I have also been using Janis Ruksan's *hyrcana* Talish which is slightly variable. It appears to be a good parent. This year a couple of very light hybrids bloomed: very light mauve; very light blue.

I have a very nice pure white Armenian Caucasus Retic. It just showed up in a batch of collected bulbs a couple of years after I received them. Unfortunately it's extremely slow to increase and I've had some problems with trying it in another spot in the garden.


The commercial clone "*Iris reticulata* Alba" which has become available recently is a misnomer. From the name you would think this is a white form of *Iris reticulata*. It is actually a hybrid from the same breeding as 'Natascha'. Like 'Natascha' it has pale blue fall blades.

Incidentally there is also a clone making the rounds called *winogradowii* Alba. It isn't. It's a *winogradowii* hybrid possibly with *hyrcana* 'Talish'.

My Reticulata hybrids 87-BN-1 ('Gordon' x Armenian Caucasus) and 87-BB-1 (Armenian Caucasus x {'J.S. Dijt' & 'Purple Gem'}) have done quite well. Both are good increasers, and have showy flowers. I have a number of other good hybrids coming along. One interesting note were two or three tri-tone hybrids: falls, styles, and standards all slightly differently coloured. It seems that style arm colour and standard colour are very tightly coupled, but the coupling can be broken. It will be very interesting to see what shows up in 2nd generation hybrids.

Unfortunately *winkleri* appears to be just as difficult as *kolpakowskaiana*. People's first impression is likely that it's simply a "dwarf" *kolpakowskiana*. Too bad it doesn't have dark cherry red falls as literature seemed to suggest - that would have nicely complimented *kolpakowskiana*'s velvety purple / violet. Comparing the two you would even probably say *winkleri* is inferior, since *kolpakowskiana* is bigger, and its colours are more vivid. I did self *winkleri* successfully, as well as intercross it with *kolpakowskaiana*. In the past I have raised a number *kolpakowskaiana* bulbs from seed, only to have them disap-

pear a few years later.

I hope that I've encouraged you to try growing some *Reticulatas*. You will definitely enjoy the burst of colour and relief from "the winter blahs" they provide just as the snow disappears. 

<u>Species</u>	<u>Count</u>	<u>Pollen Colour*</u>
bakeriana	2n = 20	orange
Çat Retic	2n = ?	white
danfordiae (diploid)	2n = 18	white
histrio	2n = 20	white
histrioides	2n = 16	white
hyrcana	2n = 20	white
kolpakowskiana	2n = 20	white
pamphylica	2n = 20	orange
reticulata	2n = 20	orange
sophenensis	2n = ?	white
vartanii	2n = 20	white
winklerii	2n = ?	white
winogradowii	2n = 16	white
Armenian Caucasus Retic	2n = 20	white

The commercial form is a triploid (3n = 27) and therefore sterile.

Only crosses with itself and winkleri

Only crosses with itself

Commercial clone. Wild collected forms have olive, orange, or yellow pollen

Only crosses with itself and kolpakowskiana

Note: different chromosomes from histrioides

Collected form with wide fall

Hybrids Available Commercially In Recent Years

<u>Name</u>	<u>Overall Colour</u>	<u>Registered by & Date</u>	<u>Parentage</u>	<u>Sterile Or Fertile</u>
'Alida'	light blue	?	sport of 'Harmony'	S
'Blue Veil'	blue	Hoog (R'55)	reticulata x histrioides 'Major'	S
'Cantab'	light blue	Bowles (R'14)	?	F
'Clairette'	blue	Hoog (R'53)	reticulata x bakeriana	F
'Edward'	blue	van Eeden (R'73)	'Cantab' x ?	F
'Frank Elder'	blue & pale yellow	Elder (R'78)	histrioides 'Major' x winogradowii	S
'George'	dark wine red	van Eeden (R'73)	histrioides 'Major' x 'J.S. Dijt'	S
'Gordon'	blue	van Eeden (R'71)	bakeriana x 'Cantab'	F
'Harmony'	blue	C.J.H. Hoog (R?)	reticulata x histrioides 'Major'	S
'Hercules'	"red black"	Van Der Berg Gzn (R'33)	histrioides x reticulata	poor
'Hercules II'	violet	?	histrioides x reticulata	S
'Ida'	blue	van Eeden (R'73)	'Gordon'? x ?	F
'J.S. Dijt'	wine red	Dijt (R'38)	(supposedly reticulata x histrioides)	F
'Jeannine'	violet	Van Tubergen (R'58)	?	F
'Joyce'	blue	Hoog (R'43)	reticulata x histrioides 'Major'	S
'Katharine Hodgkin'	blue & pale yellow	Anderson (R'60)	histrioides 'Major' x winogradowii	S
'Marguerita'	blue	?	sport of 'Clairette' w/variegated leaves	F
'Michael'	dark blue	van Eeden (R'73)	Springtime? x ?	F
'Natascha'	almost white	van Eeden (R'73)	Cantab' x self	F
'Pauline'	wine red	Hoog (R'53)	reticulata x bakeriana	F
'Pixie'	dark blue	?	Sport of 'Harmony'	S
'Purple Gem'	wine red	Van Tubergen (R'52)	bakeriana x ?	F
'Royal Blue'	blue	Hutley (R'36)	?	S
'Springtime'	blue	Hoog (R'50)	reticulata x bakeriana	F
'Violet Beauty'	violet	Hoog (R'53)	reticulata x histrioides 'Major'	S

Reticulata Species And Named Hybrids

*Pollen colour can be separated into essentially three groups: white, orange/yellow and olive green. There is a clear tendency for parents with white pollen crossed with orange ones to give progeny with somewhat yellow pollen; a diluting effect so-to-speak. Note: some sterile varieties have essentially no pollen (ie. no complete pollen grains). In these cases the colour is of the pollen grain "garbage".