

Reticulata Irises -- A Whole New World

By Alan McMurtrie P. Eng

A Whole New World

I have opened up a whole new world for Reticulata Irises. I did this by crossing *Iris sopenensis*¹ with a diploid form of *Iris danfordiae*. Both of these are notorious for "shattering": producing lots of little rice-grain sized bulblets, along with main bulbs that are too small to bloom the following year. Fortunately the new hybrids are showing hybrid vigour, so in most cases they are blooming consistently year-after-year. As you would expect with any population, there are good doers and poor doers. Largely these hybrids are good doers.

Until now Reticulata Iris were mainly just blues, violets and purples. In the 1970's William van Eeden was able to produce the near-white 'Natasha', which is now grown commercially in reasonable quantities. And of course there is the well-known lemon-yellow *Iris danfordiae* (the commercial form of which is a triploid -- it has 3 sets of chromosomes and thus is sterile). Hopefully you grow E.B. Anderson's famous Katharine Hodgkin which is from *winogradowii* (egg shell-yellow) x *histrioides*. Its dark blue spotting on cream ground with yellow flash is stunning. The cross has since been repeated and several other named varieties now exist. All are sterile even though both parents have the same chromosome count (2n = 16), so that's it, dead-end, you can't go any further.

At this year's early spring show Tim Loe was able to start to give you a glimpse of my accomplishments: 89-AC-9, a first generation hybrid: blue with a bit of yellow influence. I understand the flowers were a bit past their best at the beginning of the show. What generated interest though were pictures of my F2 clones: whites, yellow-blue combinations, spotted light blue-greens, etc.

When Wim de Goede saw my first generation hybrids in 1997 he said they're nice, but "they're just blues." I understood what he meant. However, they are good blues, which do well here in Toronto, Canada. Hence I feel they should at least be marketed in North America.

I would love to show some of my F2s however it will be a few years before I get their numbers up to the point where I have sufficient to spare. It's a bit like a chicken and egg situation: when I do show them it will get people's interest up, but I still won't have any for sale for several years after that. At the same time I need Dutch bulb growers to see that there is a demand for my hybrids, and that they should be keen to get them to market. They tend to believe there isn't room in the market for many new varieties. I in fact have quite a few that are unlike any available today. The good news is I now have access to a lab in Holland with proven results for increasing Reticulatas using tissue culture techniques. I have initially engaged them to make small increases of a dozen clones (100 to 250 bulbs of each).

How can I convey my achievement to you... well the best way is to let the pictures speak for themselves. Have a look at the pictures in the Bulletin and at www.Reticulatas.com

Overview of Results

First Generation = F1 "Just blues": more than 56 blues from 8 crosses over the course of 6 years. They're light blue to dark blue; 3 or 4 with yellow influence, which generally gives them a muddied appearance. In one, the yellow appeared as streaks or blotches on the fall (may lead to interesting effects in the future).

Second Generation = F2 The following generalized categories can be used:

	<u>Blue</u>	<u>White</u>	<u>Yellow-Blue</u>	<u>Spotted Light Blue-Green</u>	<u>danfordiae-like</u>
F1 x F1	8	9	5	0	1
F1 x <i>danfordiae</i>	1	8	9	5	8
involving Çat	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total to-date:	10	18	15	5	9

Reticulata Facts

- from eastern Turkey, Iran, and Caucasus mountains where it's very dry in the summer
- bloom right when the snow is melting
- produce a wonderful perfume on warm days
- best if replanted and thinned out every 2 years
- 5 years typically from seed to blooming plant
- most are 2n = 20
- *histrioides* and *winogradowii* are 2n = 16, but they are genetically different
- *danfordiae*, *sopenensis*, and the Retic from Çat, Turkey are 2n = 18

¹ Formally *Iris histrioides* var. *sopenensis*

Sceptical

Stop for a moment and put yourself in my shoes. Let's turn back the clock to 1994 when the first *sophenensis* x *danfordiae* (hereafter referred to as: sxd) hybrids started to bloom. There were 16 clones from 3 crosses. These were expected to be sterile even though they produced what appeared to be nice fluffy pollen. I knew that making crosses with things that weren't expected to work was a waste of time. In this case I felt I had to try. If anything might work it would be by selfing them, so that's exactly what I did. Low and behold I got 130 seeds from 11 successful crosses.

When I let friends like Brian Mathew know, I was well aware they would be sceptical. Even though I had what appeared to be good seed, there was a chance it would die when it tried to germinate (lethal genes). For example, out of the more than 300 crosses I've made with diploid *danfordiae*, which produced over 4800 seemingly good seeds that should have bloomed by now (1997 & prior seed) only 1, possibly 2², have produced blooming bulbs other than the hybrids with *sophenensis*, Çat, and of course *danfordiae* selfs.

Five years later, in 1999, two F2s bulbs bloomed. The first was 94-HW-1. Boy, was I pleased! I couldn't have asked for anything lovelier. I had expected *sophenensis*' veining would be a predominant "feature", which would take years to get rid of. Instead I got what I had been hoping for: something just as lovely as 'Katharine Hodgkin'. I'm glad to report it's proving to be a good doer giving 1, 3, 7, and 13 blooms to-date, with 20 to 22 expected next year. The second hybrid was 94-GU-1, a small pale blue.

The next year, more of the 1994 F2s bloomed, along with a couple from 1996. Surprisingly many of these were whites with a similar pattern to 94-HW-1: blue style-arm with blue and yellow markings beside the fall blade's ridge. 96-DZ-1 is quite amazing because it's white is absolutely snow-white. I also like the shade of soft blue on its style arms, plus the way the blue veins merge with very pale yellow around its fall ridge. For the first time a yellow hybrid bloomed, in this case looking like a more spotted *danfordiae*. Most amazing of all, I got my first glimpse into a beautiful new pattern that for the moment I'm calling the "spotted light blue-green" world: 96-BN-1. It was breathtaking: large blue-green spots on its fall blade, with a predominant yellow blotch in the middle. The style arms have a blue ridge, with the inner portion being light yellow-green. In total there were 6 new F2s that year.

In 2001 another 13 new F2s bloomed. Many of these were yellow-blue combinations. Of particular interest was a hybrid that wasn't growing where it should have been; presumably I dropped the seed when it was being planted: 95-unknown. It's unusual pattern would have baffled me had I not seen last year's 96-BN-1. Clearly it's a sxd back crossed onto *danfordiae*. Even looking at my records for 1995 I still can't figure out exactly which cross it is from. It's similar to 96-BN-1 except in 95-unknown, the yellow blotch is almost non-existent.

Another of special interest that year was 94-AT-2. Its falls are a lovely dark brown on a rich yellow background. The yellow shows through mainly around the similarly coloured ridge in the middle of the fall. Its style arms are several shades of dark blue. Unfortunately that year a slug bit the flower off its stem, so I didn't get to see it in all of its glory until this year when it gave 3 blooms. I don't have many problems with slugs; it was just quite disappointing that, out of all the flowers I have, that was one that got damaged.

This year the number of new F2 sxd hybrids jumped by 36, bring the total to 57! Of particular interest were: a 'Sea Green' (some of you will find the colour of interest; some of you won't -- as the flower finishes it becomes more blue); 3 more "Spotted Light Blue-Green" (one didn't have any yellow, so it was actually a gorgeous spotted powder blue); and 2 cream hybrids without much blue influence (unfortunately one of these beauties appears to be a poor doer). In addition there were 3 special 2^d generation clones involving an as-of-yet unnamed new purple species I collected near Çat, Turkey. One of these I've tentatively named 'Storm' because its falls have dense black veins on a bright yellow background, and it's style arms are dark blue. In sharp contrast a sibling is cream with bright yellow around the fall ridge. This brings the total to 3 creams. Eight more siblings are preparing to bloom next year. The third clone is a slightly lighter yellow than *danfordiae* with black markings on the fall and dark green style ribs.

I'm not sure what will happen in the long term, but one of this year's yellow-blue hybrids had a distinctive orange cast to it. I expect it will take a number of generations to pull that characteristic out, assuming it is possible at all. Can you picture it, an orange Reticulata!

I can now smile and say, "whites are easy". I have 15, most of which have blue style arms, and blue markings on the upper part of the fall, and I have another 3 which are creams with a yellow flush. How can I pick the best one(s) for introduction? Answer: it's difficult given that a number are quite lovely. In part it will be a matter of seeing over the course of several years, which are the best doers. My favourites are 94-HW-1 and 96-DZ-1, plus the cream 96-BN-3.

² I have 4 clones from *hyrcana* x *danfordiae* (89-A-1 thru 4). It's clear when you see them that it was indeed that cross. As well, I have a strange *histrionides*-like hybrid that may actually be a cross with *danfordiae* (92-X-1). It is sterile.

Similarly there are 15 yellow-blue combinations. This is a bit easier since they don't stand out as being quite as distinct from their *danfordiae* parent. It's still hard, because a couple are nice.

So why is it that I have been successful hybridizing *danfordiae* and other people haven't? It's not just a matter of my using diploid *danfordiae*, it's the fact that *sophenensis* and the Çat Reticulata have the same chromosome count as *danfordiae*: 2n=18. It's also the fact I saw beyond the F1 blues, because I knew crossing two pure species would initially result in similar progeny, but that their expression would potentially open up significantly in the 2nd generation and beyond. And lastly, I was lucky that the high level genetic switches worked the way they do for turning on and off the blues/purples and yellows. The significance of all of this is can be seen by simply looking at what I've created so far.

It will likely be 2005 when I see the first 3rd generation sxd hybrid (F3), since intercrossing the initial second-generation hybrids in 1999 was unsuccessful.

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

Patience Is A Virtue

Creating new cultivars is a slow process. It takes 5 years to go from a seed to a flowering bulb. At that point you have only one flower. If the bulbs are doubling, then in 5 more years there will be 32 flowers. In a sense this number increases significantly to 1024 in a further 5 years. In commercial terms of millions of bulbs, that's insignificant. Like their parents, these hybrids do produce bulblets. By replanting them close to the soil surface every year, they can be used to dramatically increase the number of blooming bulbs as illustrated below (this is where producing bulblets pays off). If the bulblets aren't moved up to the soil surface many will simply die out because they are too deep to get a leaf up the following year.

<u>End of:</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
Bloom-sized	3	7	12	25	108	268	825	2,437	7,077	20,950
1 year away	4	5	13	83	160	557	1,612	4,640	13,873	40,493
2 years away	5	13	83	160	557	1,612	4,640	13,873	40,493	119,185
3 years away	<u>10</u>	<u>76</u>	<u>148</u>	<u>532</u>	<u>1,504</u>	<u>4,372</u>	<u>13,048</u>	<u>38,056</u>	<u>112,108</u>	<u>329,572</u>
Total:	22	101	256	800	2,329	6,809	20,125	59,006	173,551	510,200
Doubling:	2	4	8	16	32	64	128	256	512	1024

94-HW-1 Projected Increase If Grown In Toronto

<u>End of:</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
Bloom-sized	3	15	47	195	741	2,989	11,679	46,515	183,221	726,405
1 year away	4	10	76	228	1,084	3,876	16,292	62,220	251,228	981,764
2 years away	5	7	25	123	423	1,825	6,865	27,971	108,735	434,449
3 years away	<u>10</u>	<u>76</u>	<u>228</u>	<u>1,084</u>	<u>3,876</u>	<u>16,292</u>	<u>62,220</u>	<u>251,228</u>	<u>981,764</u>	<u>3,910,532</u>
Total:	22	108	376	1,630	6,124	24,982	97,056	387,934	1,524,948	6,053,150

94-HW-1 Projected Increase If Grown In Holland

This chart was originally made at the end 1999 based on typical rates of increase I had been experiencing for sxd hybrids up to that point, as well as on actual rates of F1 increase in Holland. In subsequent years the bulblet production in Toronto has been much less than previously experienced. The 20 to 22 bloom size bulbs I have at the end of 2002 is not far off the projected 25, but this year's total bulb count is only 144, with 81 being bulblets (the actual totals are slightly higher since 94-HW-1 is under test in Holland). None the less the key point illustrated above is that bulblets can be used to significantly increase the number of blooming bulbs in subsequent years. It also illustrates the advantage of getting bulbs to Holland for commercial production as soon as possible, rather than first trying to build up stock in Toronto.

Catch 22: you want the number of bulbs to build up quickly, but when the numbers are small they are fairly manageable. After a number of years the work gets out-of-hand. In 1999 I replanted my 1989 sxd hybrids into a 135 sq. ft. area. The following year just to keep up I should have increased that to 270, or in actual fact 400 sq ft since the overall count had been tripling. Reality is I don't have that room, though I was able to give them some more space. Now in 2002 I should be at a minimum of 1080 sq. ft, but that's out of the question. Keep in mind the time required for doing all of the work increases at a similar rate. The larger area of course means I have a tremendous number of flowers: over 1000.

This is a hobby gone a little overboard. For each of the past 5 years I have planted more than 10,000 seeds. It's a job that takes 6 days to complete, and that's when all of the aluminium tags used to mark the rows have already been prepared. At the same time that I plant out each row I make up a map of the area. This can come in handy if a tag gets

accidentally pulled out, and it also makes finding where a particular cross is in the bed reasonably quick. In order to keep the space used each year to a reasonable amount, the rows are only 1½ inches apart, and the seeds themselves are roughly ¼ of an inch apart. Yes, this is "tight", but when you take into account that overall germination is only 30% at most, and there's about 8% losses, there is enough room.

It's taken quite a number of years to get to this point, and will still be a number more before these hybrids are available commercially, but one day they will be! I now have 4 Dutch growers evaluating them. It's a process that takes at least 3 years. The first Spring only a very few of the clones bloom. There are several reasons for this. In many cases I'm now sending them varieties that only just bloomed for the first time this year, or last year. Hence I keep the largest bulbs so that I can use them in hybridizing and give out ones that should be able to increase to bloom size in one growing season. It's then the second spring that they should bloom in Holland for the first time. At the end of the second growing season they should have increased enough that a bulb can be potted up for testing pot culture.

Originally it seemed like the best thing would be to grow the new hybrids myself for 4 or 5 years in order to see which were the best doers, and then offer them to Dutch bulb growers for testing. This would also give time to build up their numbers so several large bulbs of each variety could be sent to the growers, and during that time I would have all of the flowers available for hybridizing. However, I came to realize I actually needed to get them into the grower's hands as soon as possible so the evaluation could be done in parallel. Now I'm expecting it will turn out I should first have the lab increase the most promising clones in order to relatively quickly provide extra bulbs for testing, for hybridizing, and for showing. This sounds nice, however it's somewhat expensive, especially when there's no money coming in to cover the costs.

One of the things I need to find out is whether the lab's bulbs are large enough to bloom a year later, or whether they need an additional growing season to get up to bloom size. This will influence my strategy. It will also be interesting to see how the rate of increase for sxd clones in the lab compares to that of other Retics. Also, we need to gain experience hardening the finished bulbs.

So far I have not yet signed a commercialization agreement. I'm hoping / expecting that will come in the not too distant future. What I have done this year is re-doubled my efforts to see that each of the growers has several things I believe would be successful commercially. I am using the John Nash approach (movie: A Beautiful Mind). By working together with several growers we can be more successful than if I was to work with just one grower exclusively. Each is being given varieties different from the others, and which generally speaking, don't overlap with what the others have. It will be up to each grower to decide which ones they believe will sell well. Then they'll need to put their best foot forward and "make it so!"

One difficulty is to get them to see beyond the idea that another grower has possibly been given something better. Better is relative not absolute. My goal is to partner with each of them. If they are successful, then I'm successful. If they aren't, then I'm not. They also need to realize that although I will possibly have even better things next year or the year after that, what I have today is pretty darn good, and we should do our best to start selling those, then go from there. I particularly like the two whites 94-HW-1 and 96-DZ-1. Which is the best? I tend to favour 94-HW-1, but maybe the market will favour 96-DZ-1. I would like to see them both introduced. Which do you like?

One of the growers has the five 'spotted light blue-green' clones. I particularly like 96-BN-1, but 95-unknown may be a slightly better increaser. The spotted powder blue 97-DP-1 is gorgeous; should it be introduced to? I'm looking forward to hearing what the Dutch grower recommends in a couple of year's time... too bad it can't be sooner!

I hear that to at least some degree the growers all sell into the same market. My vision is that you will be able to buy my hybrids from your local garden centre. Here in Toronto most garden centres only sell *danfordiae* along with a blue variety, such as Harmony or *I. reticulata* hort. Even speciality mail order bulb firms only have the same few varieties available year-after-year. I don't expect all of my hybrids will become widely available, but I believe there is a lot of room in the market for them. The general public needs to see what's available... to see there are exciting new hybrids.

If I partnered with just one grower they might be willing to introduce one or two varieties. This way I may be able to get six, eight, or more marketed initially. Yes, they will take away some market share from existing varieties... what's wrong with that. However they should also create additional demand from people buying who wouldn't have otherwise. Then perhaps they'll buy more a year or two later if those one did well. I expect even more of my hybrids will be introduced over time. Look at what I've created so far, then realize half of the 80,000 seeds I've planted to-date still have to bloom over the next 5 years.

As stock is built up, a point will be reached when some of the bulbs can be drawn off in order to develop the market. It's an up hill battle to create the demand... to make people aware of what's available.

Did you know that in Holland large bulbs tend to give two blooms per bulb? Some of my F1 bulbs I got back from Wim in 1999 were even large enough to give three, though the third flower was much, much smaller than the first two.

Hybridizing Goal

My goal is to create interesting new hybrids that do well in the average North American garden. On a number of occasions I've heard people complain that they've bought named varieties, only to have just a few leaves come up after a couple of years. I've now just about lost 'George' again: the 25 bulbs I bought in 1999 are just about gone (including a couple of the blue form).

More than six years ago I did an experiment: I bought a dozen bulbs each of *danfordiae* and *I. reticulata* hort. from a local garden centre. As expected they all bloomed. I left them alone and the following year they each produced 24 flowers. In the third year, and essentially every year since, there have been only about 6 flowers of *reticulata* hort., and none of *danfordiae*. This might seem good from a bulb growers' perspective because it essentially means people have to buy more bulbs, but in truth it isn't. Those people likely ended up disappointed and won't buy more bulbs. Instead they'll buy something else that lasts longer. If they had been happy with their purchase, and an "eye-popping, mouth-watering" new variety showed up, there's a good chance they'd get it.

My experience with daffodils is some will do well, and some won't. It's just a matter of finding the ones that like my conditions. On a couple of occasions I've imported a dozen or more from Ireland. They all do well at first. Invariably a couple will vanish, one or two won't do as well as the others, but the remainder will flourish and form large clumps. I get to enjoy them year-after-year, and I'm happy to buy more because I know I will be well rewarded.

Ideally you should be able to plant Reticulata Iris, leave them alone, and have them bloom consistently year after year. In theory each would form a clump -- an equilibrium point in terms of number of bulbs and flowers. I've seen this happen when the bulbs are initially spaced well apart, but not when they are in close proximity. I tend to either have my bulbs tightly spaced, or I replant them year after year to get maximum increase.

Genetic Switches

Now that I have a reasonable number of F2 sxd progeny, I'm at the point where I can start to analyse the high level genetic switches that are at work. Originally if I had tried this I would have been coming to the wrong conclusions (re: all of the whites in the second year, or the high number of yellow-blues in the third year). The first thing you must know if you don't already, is that blues and purples are anthocyanins (water soluble in the cell's vacuole), and yellows, oranges and pinks are carotenoids (fat soluble in the cell walls). True red is also an anthocyanin. Unfortunately Iris are not able to produce the chemical that reflects 'fire engine red' back to our eye (like geraniums and roses). If you know bearded Iris you'll know reds of a sort are possible. This comes from combining the right shades of purple and yellow. To our eye at the distance we are from the flower, these combine and give the illusion of red. This is what makes 94-AT-2's falls appear dark brown.

Another point to realize is that there are various shades of blues and purples contributing to the exact colouring we see. Each is controlled by one or more switches. Think of the flower as a chemical factory. The genetic switches control what compounds are produced, and hence what colours are reflected back to our eyes, from light to dark blue light waves, to violet, through various shades of purple. Similarly with yellows, there are a number of switches at work, though with *danfordiae*'s yellow-orange being so dominant one might think there was only one. It's a nice colour, but the dominance does need to be broken so I can get at the others. A beautiful pink Reticulata or rich orange would certainly be nice (perhaps I'm dreaming, but it turned out to be possible in bearded Iris). If these anthocyanins and carotenoids don't combine just the right, all you end up with is a muddy mess. I'm amazed every time I think of all the beautiful things I've created so far.

Clearly there are some high level switches at work controlling whether blues overall are turned on, and similarly, whether overall yellows show up. The table above giving an overview of F2 results shows F1 x F1 crosses have $8 + 5 = 13$ of 23 with blue (56%), and $5 + 1 = 6$ of 23 (26%) with yellow. While back crosses onto *danfordiae* have $1 + 9 = 10$ of 31 with blue (32%), and $9 + 8 = 17$ of 31 with yellow (55%). Note: I consider 'spotted light blue-green' to be a pattern that appears while both high level yellow and blue are absent. The white category includes both whites with blue style arms, and the couple with no blue.

Since both *sophenensis* and *danfordiae* are pure species, we can assume their genes are for the most part homogeneous dominant, or recessive. From the fact all F1s were blue it's clear blue is dominant, and yellow is recessive. Let's first take a look at yellow. If the F1s were Yy , where yy is required for yellow and Y signifies not yellow, then you would expect 25% of the F2s to be yellow. Back crossing to *danfordiae* should give 50% yellows. Indeed, that's what I got.

	Y	y
Y	YY	Yy
y	Yy	yy

F1 x F1 = 25% Yellow

	y
Y	Yy
y	yy

F1 x danfordiae = 50% Yellow

Blues are more complicated. If the F1s were Bb, where B is dominant you would expect 75% of the F2s to be blue. However, that wasn't the case. The simplest explanation is that two genes are required (think of it as a two step chemical process): B₁b₁B₂b₂, where B₁B₂ is from *sophenensis*, and b₁b₂ is from *danfordiae*. Intercrossing two F1s would be expected to give 9/16 blues (56%), while back crossing to *danfordiae* would give 25%. That's essentially what I got.

	B ₁ B ₂	B ₁ b ₂	b ₁ B ₂	b ₁ b ₂
B ₁ B ₂	B ₁ B ₁ B ₂ B ₂	B ₁ B ₁ B ₂ b ₂	B ₁ b ₁ B ₂ B ₂	B ₁ b ₁ B ₂ b ₂
B ₁ b ₂	B ₁ B ₁ B ₂ b ₂	B ₁ B ₁ b ₂ b ₂	B ₁ b ₁ B ₂ b ₂	B ₁ b ₁ b ₂ b ₂
b ₁ B ₂	B ₁ b ₁ B ₂ B ₂	B ₁ b ₁ B ₂ b ₂	b ₁ b ₁ B ₂ B ₂	b ₁ b ₁ B ₂ b ₂
b ₁ b ₂	B ₁ b ₁ B ₂ b ₂	B ₁ b ₁ b ₂ b ₂	b ₁ b ₁ B ₂ b ₂	b ₁ b ₁ b ₂ b ₂

F1 x F1 = 9/16 Blue (56%)

	b ₁ b ₂
B ₁ B ₂	B ₁ b ₁ B ₂ b ₂
B ₁ b ₂	B ₁ b ₁ b ₂ b ₂
b ₁ B ₂	b ₁ b ₁ B ₂ b ₂
b ₁ b ₂	b ₁ b ₁ b ₂ b ₂

F1 x danfordiae = 25% Blue

Conclusion: at this point it looks like 2 dominant genes are required to turn blue on, and a recessive gene is required to turn yellow on:

sophenensis B₁B₁B₂B₂YY
danfordiae b₁b₁b₂b₂yy

This doesn't explain why three of the 56 F1s had yellow on their falls. According to the above none of them should have had any. Is there a second path for synthesising yellow involving several genes? At some future point hopefully I'll be better able to understand what's behind the 'spotted light blue-green' pattern, as well as the yellow streaking or blotching effect. Of course by that time there will be other mysteries. Somewhere hidden in the genes is *sophenensis*' veining that I had expected would be extremely hard to get rid of. The only F2 hybrid it's shown up in directly is this year's striking dark blue 97-CC-3.

Keep in mind that these plants have 18 chromosomes, so while there may be 9 hybrids that look like *danfordiae*, there's a good chance they many have one or more chromosomes from *sophenensis* -- just not ones affecting their appearance. Also remember that for something to be possible the potential has to be there. Then it's a matter of needing a number of generations to pull the characteristic out. Some of you may have noticed the standards are "missing" on the sxd hybrids. If you look carefully you will see them, it's just that they've been reduced significantly in width: 0.3 to 3.0 mm, verses typical *Iris reticulata* standard width of 7 to 10 mm. This is of course due to *danfordiae*, which only has short bristles for standards. Perhaps one day I will have sxd hybrids with "normal" standards, however that certainly isn't one of my priorities.

Tip of the Iceberg

The Retics we know of are just the tip of the iceberg. There are many new strains of *Iris reticulata* sitting unknown in the wild. Unfortunately I tend to find wild forms only survive a few years in my garden. By using them in hybridizing their genes do carry on in clones with hybrid vigour.

The Future

What does the future hold? As I have come to learn, it holds wonderful, unexpected surprises. It's been amazing to see the unimaginable new beauties as they unfold each spring. I'm keen to break away from *danfordiae*'s singular lemon-yellow. Doing so should add a whole new dimension to my hybrids. I'm also expecting a lot from the injection of the Çat Reticulata's genes: not only adding purple into the current mix of blue and yellow, but more importantly, unlocking potential hidden patterns. Its not that the genes for those patterns aren't in *sophenensis* and *danfordiae*, it's just that they might be homogeneous, and thus couldn't otherwise be turned on (benefits of genetic diversity). The only catch is that it, like the diploid *danfordiae* I collected, is a bit on the small side. Incidentally, it was my *danfordiae* that Kew Gardens

did the cytological study on in late 1980s and laid to rest the mystery of what *danfordiae*'s chromosome count really was³.

Polyploides (more than 2 sets of chromosomes) can be created in the lab for a moderate price. Their benefits are larger flowers, thicker petals, and sturdier stems.

Hybrids with other Reticulatas should prove to be very interesting, however they'll be sterile dead ends. I tend to sense that, although I have been able to produce good seed, only a small percentage will germinate and form blooming bulbs. My hybridizing statistics web page gives a breakdown of all the various types of F1 and F2 crosses I've made. Off hand I can't say whether or not any of the ones from 1997 and prior should bloom soon, or if they have even germinated. I do have a lovely set of hybrids from *I. reticulata* Talish x 88-AX-1 (cross 95-D), where 88-AX-1 is Çat ANM2175 x *danfordiae* ANM2325. 95-D-1 for example is a mixture of blue and purple shades with a number of similarly coloured large spots around its orangish ridge. Their only fault is they have small flowers.

Reticulata Culture

Reticulata Irises like well-drained soil (e.g. sandy loam / sandy topsoil), with lots of moisture in the early Spring (i.e. snow melt). However the soil should be fairly dry around the time the leaves are starting to turn brown. They should have at least half a day of sun. It's a good idea to replant them every two years or so, and it's best if it's into a new spot in the garden. In Holland they are treated as crops, and only planted in the same area every 10 years. This is a luxury I can't afford. I don't have the space that would require, nor the time.

In Toronto Canada Reticulata Iris generally start blooming at the end of March. They last for about three and a half weeks, with individual flowers lasting seven days or longer, depending on temperatures. *Sophenensis* x *danfordiae* hybrids tend to bloom at the beginning of the season. This year's bloom was a record: starting on the 23rd of February and running right to April 21st (right when it normally would). Flowers were opening almost every day during that time.

I suggest planting several varieties both where snow first melts, and in a shaded area where it's the last to leave. That way, you'll extend your bloom season, and even get to enjoy those particular hybrids twice.

Remember, the bulbs need to regenerate, so the last thing you want to do is disturb them while they're in growth. I know some people find daffodil leaves messy so they either cut them shorter or tie them up. I certainly don't advise that for Reticulatas. Wait until the leaves start to turn brown, then do what you will. Otherwise you're only ruining next year's bloom!

A little bit of low nitrogen fertilizer at the beginning of the bloom season is good for bulb regeneration.

Flowers form in late summer.

To Find Out More

Visit www.Reticulatas.com

³ The Identity Of Iris 'Katharine Hodgkin' - A Cytological And Morphological Approach, by Margaret A. T. Johnson & Brian Mathew, published in Kew Bulletin Volume 44, #3 (1989).