

2002 Retic & Juno Bloom (draft)

By Alan McMurtrie P. Eng

Amazing! Incredible! Another banner year!

2002 was a significant year in many respects. I now have 57 gorgeous F2 *sophenensis* x *danfordiae* (sxd) hybrids (36 new ones). Three of these additionally involve the Çat Reticulata. There were of course also many other lovely new hybrids. A 4th Dutch bulb grower has started to test my hybrids. And I now have 11 hybrids being increased in a lab in Holland.

If you haven't already done so, check out www.Reticulatas.com. The web site has been improved and is much better organized. There are currently 490 pictures available on it. Many more articles are available in their original MS Word format, as well as in HTML, and PDF.

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Reticulatas (Iridodictyums)

visit www.Reticulatas.com

This year's bloom was a record: starting on February 23 and running right to April 21 (i.e. a full month early, until right when it would normally end). Flowers were opening almost every day during that time. In 2000 Reticulata bloom started about February 28th, but generally speaking it was on hold soon after that until close to the normal start. This year's was the mildest Winter in memory. I certainly can't complain. It made for easier drives to work, and virtually no snow shovelling. That's not to say that we didn't get any snow, it was just that when we did, it was light enough that I could get away without shovelling it. No doubt it was quite disappointing for people into snow sports.

This year the number of new F2 sxd hybrids jumped by 36, bring the total to 57! Of particular interest were: 'Sea Green' (some of you will find the colour of interest; some of you won't -- it becomes more blue as the flower finishes); 3 additional "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. As well there were 3 special clones involving an as-of-yet unnamed new purple species I collected near Çat, Turkey. One of the three 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 (8 more siblings are preparing to bloom next year). This brings the total to 3 creams / whites (as opposed to the 15 "whites with blue"). The third clone is a slightly lighter yellow than *danfordiae* with black markings on the fall and dark green style ribs.

I continue to be **absolutely** amazed at how beautiful the F2 *sophenensis* x *danfordiae* hybrids are.

You will find a complete list at the back of this article. In addition, my web site has pictures of each.

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 (97-BO-2). 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". In total I have eighteen: 15 have blue on their style arms with blue markings on the upper portion of the fall blade, 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.

Similarly there are 12 yellow-blue combinations. This is a bit easier since they don't quite stand out as being quite as lovely (i.e. different from *danfordiae*, or distinct from one-and-another), but it's still hard, because a couple are nice.

2002's Summer was "normal" hot and dry; with the grass turning brown from mid July until late August.

English Show

Last Fall I sent Tim Loe three F1 sxd hybrids that I had at least 6 bulbs to spare. On January 23 he was able to report:

"Well the show's over! The bad news is that they did not win any awards. The good news is that they generated a lot of interest! All went to plan in terms of getting them up to London, but by the time that they went before the judges a number of flowers were fading.

Apparently they didn't win any awards because the judges felt that there were more interesting things in the pipeline. Perhaps it was a mistake to show the F2 photos, but they were excited by them, so perhaps not.

I've only heard the above second hand and when I get a more comprehensive response I will let you know.

Have you tried to get one of the big-time journals to do an article on them - RHS The Garden Magazine, The Plantsman, Alpine Garden Society etc? Your hybrids are so photogenic - I am sure that they could be persuaded. If you would like, I would be happy to approach editors here on your behalf. When they see the F2 and F2 backcrosses photos they are sure to salivate uncontrollably! Now that I have formatted your photos it would be an easy job for me to send them around to the editors. But of course you would have to write the article!

With regard to the other hybrids they are just coming into flower now, but they haven't come up en masse and therefore are not really suitable for showing. I think that I have lost one bulb as there are six up in one pot and only nine in the other pot and there should be 6 and 10. I want to build up the number and will feed them heavily later in the season when we don't have to worry about too much moisture. The 89-AC-9 clone was picked up from the Show by Anne Blanco-White and she has put them outside so I hope that they cope alright with this damp muggy weather we are having. I will retrieve them on the 19th and will then put them back under cover."

The main goal in supplying bulbs for shows, writing articles, etc. is to promote my work and hopefully generate interest in my hybrids. Although I do sell some of my surplus bulbs I want others to do that so I can focus on other things like hybridizing. It's a bit of an up hill battle to say the least, but I am confident we will get there (me, myself, and I). My articles and web site allow me to share information and pictures with my friends.

'Reticulata Irises: A Whole New World' is set for publishing in the March 2003, Alpine Garden Society Bulletin.

F2 sxd Analysis

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 that bloomed 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 carotenes (fat soluble in the cell walls). True red is also an anthocyanin, but unfortunately Iris are not able to produce the chemical(s) that reflect 'fire engine red' back to our eye (as in geraniums and roses). If you know bearded Iris you'll know reds of a sort are possible, but 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 (on the darkish side).

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. 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 carotenes 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.

It's the exact shade of anthocyanins and carotenes that make 94-AT-2's falls appear dark brown. Similarly they give the green we see in *danfordiae*. Why then doesn't green show up in bearded Iris? Perhaps it's a matter of getting just the right shades. Sea Green (97-CQ-1) is in that direction. It would be interesting to see what the effect of lighter blues would be. I don't really think I want a wholly green Reticulata, but what about making 96-BN-1 more green?

In a similar sense there isn't a black Iris. You can only get "blue-black" and "red-black", meaning very, very dark blue, and very, very dark red. Again, black on it's own, especially in a low growing Reticulata, isn't of interest, but look at Storm (98-NP-2).

<u>Cross</u>	<u>Pod Parent</u>	<u>Pollen Parent</u>	<u>2nd Pollen Parent</u>	<u>Blue</u>	<u>White</u>	<u>Yellow-Blue</u>	<u>Spotted Light Blue-Green</u>	<u><i>danfordiae</i>-like</u>
<u>F1 x F1</u>								
94-AT	89-Q-4	89-AC-4			1	1		
94-DS	89-F-1	self	89-Q-2	1	2			
94-GU	89-Q-5	89-Q-3		1				
94-HW	89-Q-1	89-AC-4			1	1		
95-CS	89-AC-5	89-Q-7		1	1			
95-F-	89-AC-7	89-F-1		1		1		
96-FW	91-FC-1	91-FC-2			1			
96-TN	89-AC-12	89-AC-17		1				
97-AW	89-Q-3	91-FC-2		2				1
97-CC	89-F-2	91-FC-2		1	1	1		
97-CQ	89-F-4	89-F-3				1		
97-EP	89-AC-18	89-A-1			1			
97-TH	91-FC-1	91-FC-2			1			
Total: 23				8	9	5	0	1
<u>F1 x danfordiae (or reverse)</u>								
95-BF	89-Q-4	danfordiae Atilla			2	1		
95-BJ	89-F-4	danfordiae Atilla						1
95-unknown	?	(danfordiae Atilla)					1	
96-BN	89-AC-6	danfordiae Atilla			1	1	1	
96-CD	89-Q-9	87-DP-2 [likely danfordiae]			1			
96-CM	Turkish danfordiae	89-AC-9						1
96-DZ	91-FC-3	Danfordiae hybrid			1			1
96-SD	89-F-2	danfordiae Atilla						1
97-AG	91-FC-1	Turkish danfordiae		1	1	3		1
97-BO	Turkish danfordiae	91-FC-2			1	1		1
97-BP	89-Q-3	Turkish danfordiae				1		
97-CA	Turkish danfordiae	91-FC-1				1	1	
97-DP	91-FC-1	danfordiae Atilla					1	
97-DZ	91-FC-3	Turkish danfordiae			1		1	2
97-EK	89-Q-3	Turkish danfordiae				1		
Total: 29				1	8	9	5	8
<u>Compound: sopenensis, danfordiae, Çat</u>								
98-NP	91-FC-7	88-AX-3		1	1			
97-VS	88-AX-3	danfordiae Atilla	89-Q-3			1		
Total: 3				1	1	1	0	0

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whites in the second year, or the 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 carotenes (fat soluble in the cell walls). True red is also an anthocyan, but 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, but 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. 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 carotenes 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 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 29 with blue (34%), and 9 + 8 = 17 of 29 with yellow (59%). Note: I consider 'spotted light blue-green' to be a pattern that appears while both 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. Backcrossing 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): $\text{B}_1\text{b}_1\text{B}_2\text{b}_2$, where B_1B_2 is from *sophenensis*, and b_1b_2 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_1B_2	B_1b_2	b_1B_2	b_1b_2
B_1B_2	$\text{B}_1\text{B}_1\text{B}_2\text{B}_2$	$\text{B}_1\text{B}_1\text{B}_2\text{b}_2$	$\text{B}_1\text{b}_1\text{B}_2\text{B}_2$	$\text{B}_1\text{b}_1\text{B}_2\text{b}_2$
B_1b_2	$\text{B}_1\text{B}_1\text{B}_2\text{b}_2$	$\text{B}_1\text{B}_1\text{b}_2\text{b}_2$	$\text{B}_1\text{b}_1\text{B}_2\text{b}_2$	$\text{B}_1\text{b}_1\text{b}_2\text{b}_2$
b_1B_2	$\text{B}_1\text{b}_1\text{B}_2\text{B}_2$	$\text{B}_1\text{b}_1\text{B}_2\text{b}_2$	$\text{b}_1\text{b}_1\text{B}_2\text{B}_2$	$\text{b}_1\text{b}_1\text{B}_2\text{b}_2$
b_1b_2	$\text{B}_1\text{b}_1\text{B}_2\text{b}_2$	$\text{B}_1\text{b}_1\text{b}_2\text{b}_2$	$\text{b}_1\text{b}_1\text{B}_2\text{b}_2$	$\text{b}_1\text{b}_1\text{b}_2\text{b}_2$

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

	b_1b_2
B_1B_2	$\text{B}_1\text{b}_1\text{B}_2\text{b}_2$
B_1b_2	$\text{B}_1\text{b}_1\text{b}_2\text{b}_2$
b_1B_2	$\text{b}_1\text{b}_1\text{B}_2\text{b}_2$

b_1b_2 | $b_1b_1b_2b_2$

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 $B_1B_1B_2B_2YY$
danfordiae $b_1b_1b_2b_2yy$

This doesn't explain why three of the 56 F1s had yellow on their falls. 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.

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, but that certainly isn't one of my priorities.

Strategy, make wide crosses for diversity, and to shake the gene pool up. Then intercross progeny to get at recessive characteristics. Which is why I inter-crossed 98-NP-1 and 98-NP-2 this year. Only one of the three worked giving ___ seeds. Then closer crosses to focus in on improving certain traits.

2003 will be an exciting year. Eight more 98-NP hybrids should bloom for the first time. If you take a look at 98-NP-1 and 98NP-2 you will understand why this is so exciting.

Other Retic Hybrids of Note

Sometimes it's interesting how a particular hybrid doesn't catch your eye until a year or two after it first bloomed. When I was looking around and considering what I should send Dutch growers, a couple of clones caught my eye. Perhaps it's a matter that now that there are a few more bulbs of a variety it tends to stand out.

94-BA-1 'Smile' open marks

92-BH-1

Dark

94-AU-4

92-CG-1

Pinkish

94-R-5

Three colours

96-TF-1

96-AC-1

Large flowers

93-F-1A

93-F-2

94-AN-2

Large bicolour

96-VZ-1

94-DR-1

93-histrioides Good Doer

95-CL-1 'Surreal'

96-WR-1

Where do we go from here?

Out of the over 80,000 seeds that have been planted to-date, some 40,000 are set to bloom over the next 5 years. It's interesting to look back at what I've accomplished so far, and then think of the potential we have to look forward to. Key of course is the quality instilled in that past hybridizing effort. A guess would be that ~15% of those seeds will bloom.

Hopefully it's not simply a case of getting more of the same in terms of the types of F2 sxd hybrids we've seen to-date. Off hand the F2s can be separated into just a handful of groups: blues, yellows (similar to *danfordiae*), yellow-blues, and white with blue (in reference to blue style rib, along with fall blade markings by its ridge). Back crosses onto *danfordiae* have produced two others: spotted light blue-green, plus white (yellow flush plus minimal blue).

When the F2s first started to bloom, the primary hybridizing goal was to create F3s. The secondary goal was to use F2 pollen on F1s, and *danfordiae*. A third but lesser goal was to use F2 pollen on other hybrids; this is a dead end, plus it appears to be somewhat fatal (very, very low germination). It could yield very interesting results though. Last year a new secondary goal emerged: to use Çat hybrid pollen on F2s (specifically that of 88-AX hybrids and 97-VS-1). The only drawback is, these parents aren't as vigorous as most sxd hybrids. Involving Çat has been a priority in the past, but last year's 98-NP and 97-VS results reinvigorated it.

What types of crosses should I be making now? In part this requires trying to understand what has happened so far. I expect this will drive refinement of my future F3 crosses. Other crosses should continue as previously, with slight priority to F2 hybrids that may have carry some characteristic of interest.

Question: What is Possible?

Katharine Hodgkin gives some idea of switches that are available. Genetic incompatibility of its parents (*histrioides* & *winogradowii*) means that path is a dead end; though it can be pursued to extract a little more breadth and width in F1 expression.

What needs to be done is to tweak those same switches from a different angle, using compatible parents, then we can go further. 96-BN-1 is an example of doing just that. Compared to Katharine Hodgkin one would say we just need to give 96-BN-1 wider flower parts. Standards are optional. They seem to be missing when carefully comparing the two, but I don't think it stands out. 96-BN-1 is "neat & clean" without them.

It's interesting to look at 96-SD-1 and realize it's a yellow 96-BN-1. In and of itself 96-SD-1 looks too similar to *danfordiae* to be of much interest. Ideally the two should be intercrossed (once 96-SD-1 recovers from nearly being lost in 2001).

Another area of inspiration is my 89-A hybrids. 89-A-3 shows that having yellow on the falls, but not standards and styles, should be possible.

In looking at what has been created so far, and now that analysis of genes for yellow & blue

The one path for larger flowers is simple to work towards that characteristic as a desirable, but secondary characteristic.

Second Question: What would look nice?

Which is the right path?

That's hard to say. The same thing was true roughly 15 years ago when I happened to intercross *danfordiae* and *sophenensis*. Who would have guessed what a monumental cross that would turn out to be. Key is to try several different things -- to work on several different paths.

'Spotted Light Blue-Green' is a pattern unlocked by backcrossing onto *danfordiae*. I'm not expecting anything similar would occur by backcrossing onto *sophenensis* (certainly not in the first generation of such a backcross)

Is there something more recessive that could be unlocked?

Don't want to dwell on this too long; just long enough to come up with a reasonable and prudent direction.

What other conclusions can we reach?

Look at the whites with blue, come to the conclusion these are simply danfordiae with its yellow turned off

So where should I aim?

-orange (97-BO-2)

-"Katharine Hodgkin"

-with yellow blotch

-candy stripe

self vs. intercross siblings

because of (genetics) intercrossing sxd is close to selfing

remind self to pull out recessive; wide to broaden the scope

At the beginning of this section I commented, "Hopefully it's not simply a case of getting more of the same in terms of the types of F2 sxd hybrids we've seen to-date." Carefully thinking about this, I have concluded it actually will indeed be a case of "more of the same." The distinction however is to move into the depths of these categories rather than simply stay at the surface. In doing so new possibilities will emerge.

For example I need to get different yellows (carotenes) to be produced, then get those mixed in with blue. The progeny will still be yellow-blues, but the expression will be different

Dutch Bulb Growers, etc.

I had two important contacts in mid July, both from Dutch One was

In August I got prices and towards the end sent 1000 Euro moneyorder

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 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, but 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 sell 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?

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.

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. Up hill battle to create the demand... to make people aware of what's available.

One of the growers has been testing for 5 years. Unfortunately there was a falling out between the principles of the company after some 30 years in business. It took possibly 2 years for all of this to transpire and now they have separated. My test agreement was with the firm, however my contact was with the principle who was bought out. He has all of my hybrids with the exception of the pure white *Iris reticulata* Caucasica Alba. Some how in the legal wranglings a decision was made, presumably by the other principles of the firm, that they were interested in it. Unfortunately they didn't see fit to contact me... what were they thinking?

I hired a lawyer and requested that they return all of my bulbs that they had under test, including any mutations. As expected they claimed innocence, suggesting they thought the bulbs belonged to the firm. They made an offer to buy exclusive rights to them, but it was not really fair considering the likely potential market. I have now sent a bulb into the lab. I expect

	<u>End 1994</u>	<u>End 1995</u>	<u>End 1996</u>	<u>End 1997</u>	<u>End 1998</u>	<u>End 1999</u>
Bloom-sized ¹	2	5	7	25 ²	21 ³	12 ⁴
1 year away	?	1	16	37	81	361
2 years away	?	8	27	82	309	801
3 years away ⁵	<u>8</u>	<u>36</u>	<u>67</u>	<u>249</u>	<u>807</u>	<u>1845</u>
Total:	?	50	117	393	1211	3019

¹ Bloom-sized are > 10 mm; 1 year away are > 7 mm; 2 years away are <= 7 mm; 3 years away are bulblets. Note: keep in mind that sizes may be different for other hybrids. Where appropriate, the actual number of blooms are shown, and the '1 year away' numbers were adjusted accordingly.

² 21 bloomed here in 1988, but 4 which were given out for testing should also have bloomed. I had predicted only 17 in total would bloom. This means that 8, which were about 10 mm in diameter, also bloomed.

³ Includes 10 sent to Berney that were potentially large enough to bloom in 1999. Originally I predicted only 4 would be left here to bloom. There were in fact 11 blooms.

⁴ I had been expecting 26 blooms, but there were only 14; 6 bulbs from Wim gave 8 blooms. Includes bulbs returned by Wim: 6, 15, 1, and 32 respectively. Several were 17 x 22 mm in diameter. My largest were only 10 mm in diameter, which I have found to be just large enough to bloom. There is a good chance that Wim's largest bulbs will produced up to three flowers per bulb, with the last being much smaller, and blooming quite late. So far I've only gotten single blooms on all of my sxd clones, but then I've never gotten the bulbs up to the size of Wim's.

⁵ In some clones, from time to time a few bulblets are quite small. By the following year they are only up to being considered large bulblets. On average bloom-size and 1 year away bulbs produce 8 and 4 bulblets respectively. Note: 91-FC-4 bloom-sized bulbs can have as high as 25 bulblets: all of reasonable size.

	If Doubling	2	4	8	16	32	64
		<u>End 2000</u>	<u>End 2001</u>	<u>End 2002</u>		<u>End 2003</u>	<u>End 2004</u>
				<u>Actual</u>	<u>Predicted</u>		
Bloom-sized		68			2,485	5,700	17,375
1 year away		279			3,215	11,675	35,225
2 years away		2,138			11,675	35,225	98,000
3 years away		<u>3,147</u>	<u>3,1</u>		<u>32,740</u>	<u>92,300</u>	<u>279,900</u>
Total:		5,632	5,	est.	50,115 est.	144,900 est.	430,500 est.
If Doubling		128	256		512	1024	2048

Figure 1: 89-Q-3 (*sophenensis* x *danfordiae*) Bulb Count

As you'll see on my separate 2002 Hybridizing Statistics page, in spite of doing a record number of crosses (1314), I was only able to produce 7476 seeds. This is about 200 more crosses than the previous record. Only 39% were successful, down from a typical average of about 55%. I wouldn't say that this was anything to do with the types of crosses I made, it was more likely due to the weather. Naturally I was most disappointed that a number of F2 crosses didn't work. They are the ones I consider most exciting. In addition there were virtually no bee seed. This clearly tells you something about temperatures -- it wasn't warm enough for the bees, so they simply stayed indoors.

- I didn't keep a record of the temperatures
- snow both in early and late April

There were again over 1000 F1 blooms. I didn't make any attempt to count them. The one thing of note is there were very few 89-Q-3 blooms. Hopefully last fall's move of the larger bulbs from their long term growing spot in bed 11 to bed zero will provide good bloom next year. Bulblets were left almost exclusively in the bed 11 area. I think the main problem is with the bulbs being planted too close together.

As you would expect I again made a lot of crosses with the F1 sxd hybrids; about the same number as last year. However there was a significant shift in the types of crosses that I made. Last year there were a lot with non-sxd pollen, as well as F2s (F1 x F1), where as this year those were almost nil, and the number using F2 pollen onto F1 parents went from 226 to 606, a 170% increase. Unfortunately the number of seeds produced only went up marginally 2255 from 1778, a 27% increase.

The number of F2 blooms increased from about 28 to roughly 70. Surprisingly none of the 94-HW-1 pods set seed.

This year I wrote articles for the Alpine Garden Society, the North American Rock Garden Society (NARGS), and submitted an update about my F2 hybrids to the Species Iris Group of North America (SIGNA).

Junos

visit www.Juno.ca

snow April 22

The weather wasn't as kind to the Junos this year. They started off quite well, but then I began to notice rot developed in the leaf axil generally about a third of the way down from the top. At least 50% of the plants were hit, and it could have easily been as high as 80%. I can understand the idea that the Junos were in growth, so their cell sap was thinner and thus didn't have the one of the cold snapsre was something about the temperatures that somehow allowed the Junos to grow fairly tall, then it hit most of them,. Normally Junos are quite hardy.

97 hybrid involving albomarginata.

seem to be surprisingly few 98 Junos

Some Junos seem to be doing well, but others didn't bloom. Could there be something that they need which my conditions are lacking?

One variety that has proven to give interesting progeny (children), is *orchioides* Mojmir. It didn't bloom this year, and seems to be dying back.

Potpourri

Web Sites

This year saw a tremendous change in my online presence. Previously I had 5 separate sites hosted for free by www.Freeservers.com which gave me a total of 100 Megs of space (20 Megs each). The main problem with this was anyone viewing my pages had to put up with banner ads. Understandably nothing is really "free", but the ads were a whole lot better than my paying \$5 U.S. per month for a mere 20 Megs of space. The cost for 100 Megs might have been \$15 to 20 per month, which adds up over a year, and becomes even more when it's converted into Canadian dollars.

20 Megs is enough to post 3 sizes each of just over 100 pictures, as well as associated html pages, and some of the articles I've written. The largest picture size was 1024 x 768 (originals were 1712 x 1368). Clearly what I needed was at least 1 Gig of space. Around December 1st 2001 www.Freeservers.com reduced their free space to 12 Megs. Apparently they weren't getting the same ad revenue they previously had been. This strategy was aimed at getting people to convert to paid web hosting.

About that time I found out about e-Bay and began to use it for a couple of purchases. One day I did a search on "web hosting." There were a number of companies with various plans. Some told you to beware of firms promising you unlimited space, etc. I went with a company offering 1 Gig for \$30 U.S. per year. I then found out I could get another Gig for \$20, and that I could host all of my sites separately within that. I ended up going with 3 Gigs of space for \$70 U.S. Unfortunately a little later that web hosting company was bought, and the new owners decided they didn't want to be in "that part of the business". They gave customers only 3 days notice that their sites would be shut down. (I never did get the promised refund for the unused portion of my payment).

I was able to find another web hosting company on e-Bay within a week. Now I have 5 Gigs available at a cost of only \$15 U.S. per year. I figured that even if there was a problem, \$15 wouldn't be much of a loss. At the moment I'm using only 1.8 Gigs, but I do have more pictures to post, and that number will continue to grow every year. The only difference with the new company is all of the sites are hosted together, meaning they all go through the same front door. You'll find the first thing you have to do is choose a topic of interest, then everything looks like it did before.

Around Christmas I uploaded changes to the Reticulata section which I had been working on for the previous two months. These included better organized pictures (with links to additional pictures and information), and more of the articles I've written (MS Word, HTML, and PDF formats). As well as the content changes, software used to produce the HTML pages was updated so that future changes can be "easily" made [it still takes quite a bit of time to sort through pictures, produce difference sizes of ones to be posted, enter the necessary database titles, links, and description].

Soon after I gave the other sections a similar look & feel. I plan to work on improving the content of those sites in early 2003. There will be more work to do on the Reticulata section next Winter. Slowly but surely improvements are being made.

A hobby gone a little "insane."

-I haven't had time to post any videos re: addition of motion and sound will be a nice touch.

-didn't get Quicktime Virtual Reality put together. Had made one in the winter. Did buy used tripod and backdrop plus lights

Didn't put together a CD as I had anticipated I would, but that was superceded with my web presence.

Felt Dutch growers weren't all going to my website as I might have expected, so I put together 6 pages. One is whites, one is yellows (realized afterwards some show danfordiae-like clones. Really need one page of Yellow-Blues, and one of danfordiae-like. Another reason for doing this is because the pictures on the web site are shown in the order they bloomed. So there was no place to go and clearly see all the whites, etc. That's something I hope to fix this winter.

F2 sxd Hybrids – 57 To-date

<u>Blue</u>	<u>Yellow – Blue</u>	<u>Yellow</u>	<u>White with Blue</u>	<u>White</u>	<u>Spotted Light Blue-Green</u>	<u>Other</u>
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-high level
-description
-year of first bloom

94-DS-3: white
 95-BF-1: 89-Q-4 x danfordiae Atilla white
 95-BF-2: 89-Q-4 x danfordiae Atilla yellow-blue
 95-BJ-1: 89-F-4 x danfordiae Atilladanfordiae-like
 95-CS-2: 89-AC-5 x 89-Q-7 blue
 95-F-2: 89-AC-7 x 89-F-1 yellow
 96-BN-3: 89-AC-6 x danfordiae Atilla white
 96-CD-1: 89-Q-9 x 87-DP-2 [likely danfordiae] white
 96-CM-1: Turkish danfordiae x 89-AC-9 danfordiae-like
 96-DZ-2: 91-FC-3 x danfordiae hybrid danfordiae-like
 97-AG-4: 91-FC-1 x Turkish danfordiae
 97-AG-5: 91-FC-1 x Turkish danfordiae
 97-AG-6: 91-FC-1 x Turkish danfordiae
 97-AG-7: 91-FC-1 x Turkish danfordiae
 97-AW-1: 89-Q-3 x 91-FC-2 blue
 97-AW-2: 89-Q-3 x 91-FC-2 blue
 97-AW-3: 89-Q-3 x 91-FC-2 danfordiae-like
 97-BO-1: Turkish danfordiae x 91-FC-2
 97-BO-2: Turkish danfordiae x 91-FC-2
 97-BO-3: Turkish danfordiae x 91-FC-2
 97-BP-1: 89-Q-3 x Turkish danfordiae yellow-blue
 97-CA-1: Turkish danfordiae x 91-FC-1 'spotted light blue-green'
 97-CA-2: Turkish danfordiae x 91-FC-1 yellow-blue
 97-CC-3: 89-F-2 x 91-FC-2 striking veined dark blue
 97-CQ-1: 89-F-4 x 89-F-3 ('Sea Green') yellow-blue
 97-DP-1: 91-FC-1 x danfordiae Atilla 'spotted light blue-green'
 97-DZ-1: 91-FC-3 x Turkish danfordiae
 97-DZ-2: 91-FC-3 x Turkish danfordiae
 97-DZ-3: 91-FC-3 x Turkish danfordiae 'spotted light blue-green'
 97-DZ-4: 91-FC-3 x Turkish danfordiae
 97-EK-1: 89-Q-3 x Turkish danfordiae
 97-EP-1: 89-AC-18 x 89-A-1 (more likely was another sxd) white
 97-TH-1: 91-FC-1 x 91-FC-2 white
 97-VS-1: 88-AX-3 x danfordiae Atilla yellow
 98-NP-1: 91-FC-7 x 88-AX-3 cream
 98-NP-2: 91-FC-7 x 88-AX-3 black / yellow & blue

2002 Web Postings

Feb 24, 2002

6 Reticulas are in bloom!

This is incredible. Normally bloom starts at the end of March here in Toronto Canada.

On Friday (22nd) I had been looking at the garden and found 3 hybrid Talish selfs were fully up but not yet open. Naturally I figured they would be the first to bloom (they were last year). However 89-F-5 has taken that honor. By the afternoon two 89-F-5 were open at the front of the house, along with a miscellaneous red-purple hybrid. Two new F2 sxd hybrids were later discovered already open in another bed (97-AW-1, a dark blue; 97-EP-1, a white). About that time one of the Talish hybrids had started to open. A while later 95-CS-1 was discovered with its bud almost fully up.

Without a doubt this is going to be a banner bloom year - both for new blooms, and to see increased numbers of exciting hybrids from recent years.

My web sites are coming along, but 2 weeks ago my 1¼-year-old iMac died. Turns out the unknown problem is on the logic board. It would cost more to fix than get a new computer. Technology these days is such that you can't just desolder a bad component and put a new one in. I didn't get the 3-year Apple Care renewal because I had gone 6 years so far with my previous Apple 7100 without a problem. I had felt the money was better spent on more memory... such is life.

The memory and hard drive are salvageable. I'm evaluating a used G4 tower at the moment, and putting in a fair bit of time tracking PowerBook prices on eBay (my sons could make good use of one).

I am in the process of making over 1000 pictures available on my various sites. Some 300 are of Reticulata Iris, 250 are Juno Iris, etc.

Feb 27, 2002

3 cm of snow fell this evening. Needless to say there weren't any new blooms.

Monday the 25th had been a gorgeous warm Spring day. I only found a couple of new blooms at the front of the house when I got home from work (I had been expecting more). However to my surprise there were more than a dozen F1 sopenensis x danfordiae hybrids open. Quite a few others were showing colour.

Yesterday was wet and cool. Not a whole lot of change, but 97-AG-1 opened, as did a few more sxd F1's in the backyard.

Slowly but surely this web site is getting up dated. 350 Retic pictures are now available. Go to the Photo Index page and click on a link to find a that specific clone. You can click your browser's back button to return to the index and be able to quickly to another photo.

Last night into the wee hours I managed to get our Scout web site up: www.Wonderful.ca. I've got pictures from the Winter camp to post, but that will be later in the week. I should try to first restore the other sites then work on improving them. Your suggestions are most welcome.

To say the least, his is a labour of love.

March 4, 2002

97-AG-6 started to open for the first time yesterday.

As you can see it looks quite interesting in terms of its veining, and colouring. Of particular interest is comparison of it to a *danfordiae*-like hybrid which is also starting into bloom nearby. 97-AG-6 appears to be a true lemon yellow, where as the *danfordiae*-like hybrid is distinctly orange-yellow.

We'll see if this continues to be the case

It turned quite cold over night. It was a blustery cold -10°C this morning, but felt much colder throughout the whole day. I made a handful of crosses on Sunday, particularly with flowers that had been open from the previous weekend.

March 11, 2002

The weather has been a bit like a yo-yo: most of last week was below freezing, then it jumped up to a lovely Spring-like 13°C on Saturday, now it's back below freezing. As predicted it rained Saturday afternoon, which turned to snow overnight. The wind makes it bitterly cold at the moment though it is a bright sunny day.

As you can see from Saturday's pictures a few more spectacular F2 sxd hybrids opened. It looks like 97-AG-6 should be called '**Tiger**'. 97-CQ-1 has nice sized flowers. The blue-green colour isn't stunning, but it is certainly is different! 94-EP-1 and 97-AG-5 are both nice whites. 97-BO-1 is small due to its parentage (my collected diploid *danfordiae*: ANMc2325, vs. Ahmet Atilla's larger form)

Did you know it takes a while to process pictures you see here. I start off by going through pictures taken that day, tossing the bad ones, cataloging the rest, and determine which ones to post on the web. The different sizes need to then be generated. Then the pictures need to be linked into the pages they are to appear on, and Title & Description need to be added. Text needs to be added about the day's results, and the test pages need to be generated using relative addressing, then reviewed for errors. The web version can then be generated. Both new pictures and the new/revised web pages need to be uploaded. A final test is done to make sure that everything works properly.

March 13, 2002

A second warm spring-like day in a row has again produced a number of new exciting new hybrids. These are all F2 sxd clones. 97-CC-3 is different from all other sxd blues because it appears to be veined like it's *sophenensis* parent. The other blues have veining; it's just that the blue blends all together on the fall blade.

Isn't it quite something how dark 94-AT-2 is! To really show it off requires a white background (i.e. bright white stones).

The lovely 94-HW-1 opened today. My estimate of 12 to 15 blooms is proving correct with 13 buds/flowers showing, in this, its 4th year of bloom. It continues to be a good doer. I have high hopes for it commercially.

It's amazing to look at a number of F1 sxd clones that weren't replanted in the last year of two. They seem to be putting up a reasonable number of flowers. In many cases there are two flowers emerging from the same spot. Rather than one bulb producing two flowers, it's a case of the original bulb splitting and now there are two bulbs large enough to bloom. The amazing part is the fact I tended to find bloom reached a maximum and then started to decline when I kept replanting them back into the same area (over crowded). I guess one distinction is I don't have the number of bulbs I could have had if they had been replanted. The bulblets simply tend to die since they're too deep. Hence the over crowding isn't as severe as it would have been.

March 19, 2002

More beauties!!!

98-NP-1 and 98-NP-2 are from 98-FC-1 x 88-AX-3. This is *danfordiae* x *sophenensis* crossed with «at, Turkey x *danfordiae*. It would appear in 98-NP-2, that both *sophenensis*' blue and «at's wine red are combining to give a near black. In 98-NP-1 the anthocyanins are suppressed.

I'm expecting these are fertile! -- Remember it's in the 2nd generation and beyond that expressions really open up for crosses between two pure species.

I quite like the pale blue markings of 97-DP-1 on its white background.

Still to come: two more whites, a pale yellow, and two *danfordiae*-like clones.

The past number of days have been on the cold side, so growth has been slow. I have been keenly looking around the garden each day to see what's new. In a sense I'm disappointed that things aren't just popping out. In truth I should be glad; otherwise I'd be going crazy taking pictures and hybridizing. As it is I can take things at a reasonably relaxed pace. The only trouble is both Sunday and Monday it was so cold and windy that it was hard to get a lot done. My hands tended to quickly get lethargic.

It was only today that these three became fully open.

Note: pictures with spaces in their names are appearing as broken links in Netscape 4.7 and lower. Netscape Communicator 6 and MS Internet Explorer 5.5 work fine.

March 24, 2002

Day-time temperatures have continued to be around freezing for the past several days. *Reticulata* bloom has been almost at a stand still. A couple of new flowers are not yet fully open, but I thought I'd share them with you.

Of particular interest is 96-CD-1. It's a lovely pale yellow said to be from a cross of 89-Q-9 and 87-DP-2 (a *bakeriana* hybrid). In one sense I hope this isn't true, because I'd like to go further with it. But it may indeed be correct since it breaks the F2 sxd mold by not having any blue in its style arm; similar to 98-NP-1. Of course there's a very, very remote chance 88-AX pollen got on it.

96-DZ-3 is interesting, but isn't "clean" like 96-BN-1, 95-unknown, 97-CA-1 or 97-DP-1.

95-BF-2 is a nicely spotted yellow.

March 28, 2002

I was quite surprised to find 97-VS-1 in bud this morning: 88-AX-3 x {*danfordiae* + 89-Q-3}. I hadn't noticed it previously because it was hiding off to the side under straw. By mid afternoon it had opened. At this point it's hard to say which of the pollen parents worked. Regardless, it along with the other three 88-AX hybrids, represent a significant milestone.

It's exciting, yet hard to imagine what beauties the future holds.

The trick in part is to make crosses today that five years from now I can hopefully say, yes I made the right choice. Three years ago I could only intercross 94-HW-1 and 94-GU-1. Today there are many possibilities, though some are already spoken for this year (e.g. 96-CD-1 and 98-NP-1 are already hybridized). One thing is clear, if at least initially, I want to stay away from blues & purples, then I should work with the "whites."

97-TH-1 has been open for a number of days, but it hadn't been fully open until now. The same is true with 95-BF-5.

Apr 1, 2002

Wonders never cease! 96-BN-3 bloomed today for the first time - another gorgeous F2 sxd hybrid.

The answer to the 96-CD-1 mystery has been solved. 96-CD-1 is actually a backcross to *danfordiae*. This pattern hadn't show up previously. Effectively it's like taking 96-BN-1 and removing almost all blue (spotting still show on the fall). 96-BN-3 doesn't go quite as far, since some blue is left in its style arms.

The weather hasn't been cooperating as much as I would have hoped. Temperatures continue at or below normal. Today was bitterly cold, and 5 cm of snow is promised overnight. I did manage to get some hybridizing done, but my hands got lethargic after a little while. Sunday had been a much nicer day, and I managed to make quite a few crosses.

I haven't taken quite as many pictures as I had hoped. When the weather is reasonable my main goal is hybridizing. I had intended to take time off work while the Retics were in bloom, but so far there haven't been any nice enough days to do so. On other days, like today I took a fair number of pictures, but the sun was hiding behind clouds much of the time.

Apr 3, 2002

As you can see, we did get the snow the weatherman had been predicting. Much of it melted by the end of the day, but there were large flakes coming down late tonight; however it didn't amount to much.

Apr 7, 2002

I'm still waiting for a nice Spring day! The temperature wasn't much above freezing over the past couple of days, but I did manage to do a reasonable amount of hybridizing.

There's more to do, but the weatherman is predicting rain starting overnight and continuing through much of tomorrow.

Apr 9, 2002

It seems like spring may finally be here!

There are a number of interesting eye-catching hybrids in bloom. Some are new, and others are standing out now that they have three to four flowers.

...how are we ever going to figure out which ones to introduce?

Apr 12, 2002

Another 35 pictures have been added, bringing the total to 460.

Of particular note is 96-CN-2, sibling of the equally interesting 96-CN-1. Their parentage is said to be *histrion ssp histrion* x {self + *danfordiae*}. It would seem that something is a-miss with that.

Apr 15, 2002

I was quite pleased to find 96-SE-1 popping into bloom this evening. It has a unique pink and blue colour. I don't think I've seen anything quite like it; a few light pinky colours, yes, but this one's kind of unique.

It was quite humid today, after a whole weekend of rainy, drizzly weather. The temperature soared to over 24°C. Many of the Retics, which had been open for a couple of days, simply melted. I did do a bit more hybridizing tonight, but virtually none on the weekend.

Tomorrow the temperature is expected to hit 29°C. This makes me appreciate all the cool days we had which allowed me to take my time hybridizing.

Apr 16, 2002

The last few Retics have just started into bloom. One I noticed today was 94-R-5. Its unique colour comes from the Armenian/Azerbaijan species. Its wide fall comes from 87-AB-?, which is an Armenian Caucasus hybrid. .

Apr 22, 2002

Most of the snow that fell overnight disappeared by the end of the day. Only a bit was left on rooftops in some parts of the city.

As you can see (if you click on the picture), it was falling at 6:30 AM when I went off to work (right-hand picture).

...and to think a couple of days last week were so hot, that it felt like the middle of Summer. In fact, people were wanting to go into air conditioned buildings!

I can tell that a number of important crosses didn't work. This is disappointing, but of course that doesn't mean by any stretch of the imagination they all didn't work. For example, only one of the two 98-NP-1 crosses worked (using 98-NP-2 pollen), and the 98-NP-2 cross didn't work. All five 97-CC crosses failed, but others such as 97-DP-1, and 97-CA-1 appear like they'll set seed (both did).

The disappointment comes from the fact that I believe the 3rd generation will open things up significantly further. Naturally I want as many seeds as possible, and especially so from some of the "doubly special" hybrids.