Reticulata Iris – Creating A Rainbow

By Alan McMurtrie

I started hybridizing these wonderful early-blooming Iris in 1983. Since then I have opened up a whole new world that was never thought possible. I did this by crossing Iris *sophenensis*, a diploid form of Iris *danfordiae*, and an unnamed species that I collected near Çat, Turkey. All three species are notorious for "shattering": producing lots of little rice-grain size bulblets, along with main bulbs that are too small to bloom the following year. The new hybrids however, are showing hybrid vigor, in most cases blooming consistently year after year. As can be expected in any varied population, there are good doers and poor ones, but fortunately more of the former.

Reticulata Facts

?? bloom starts right as the snow disappears
?? traditionally used in rock gardens
?? produce a wonderful perfume on warm days
?? best if replanted and thinned out every 2 years
?? prevent ink spot by providing good drainage, particularly when the leaves are dying down
?? from eastern Turkey, Syria, Iran, and Caucasus mountains where it's very dry in the summer
?? flowers 2½-4½ inches tall (6.5-12 cm), typically 2¼ inches in diameter (6 cm)
?? leaves are square to octagonal in cross section
?? leaves grow to 18-24 inches (45-65 cm) by the time they die down in early Summer
?? bulbs have a netted covering (i.e. reticulate)
?? 5 years typically from seed to first bloom
?? most are 2n = 20
?? *histrioides* and *winogradowii* are 2n = 16, but they are genetically different
?? *danfordiae*, *sophenensis*, and the Retic from Çat, Turkey are 2n = 18

Until now, Reticulata Iris have mainly been available in shades of blue, violet, and purple. In the 1970s, William van Eeden produced the near-white 'Natasha', now grown commercially. Many find it weak, but to-date it is the best white available. The commercial clone of the lemon-yellow *Iris danfordiae* is a triploid, with three rather than the normal two sets of chromosomes, and thus is sterile. Many rock gardeners grow E. B. Anderson's famous hybrid 'Katharine Hodgkin', whose parents are the pale yellow *I. winogradowii* and blue *I. histrioides*. Its dark blue spotting on cream ground with yellow flash is stunning. The cross has since been repeated, and several other named varieties are now available, such as 'Frank Elder' and 'Sheila Anne Germany'. All are sterile even though both parents have the same chromosome count (2n = 16), so hybridizers can take them no further.

When Wim de Goede, a commercial bulb grower in Holland, saw my first generation hybrids between *sophenensis* and *danfordiae* in 1997, he said they were nice, but "just blues." I understood what he meant – that there are already lots of blues in commerce. Now, however, I have moved well beyond "just blues." Orange for example is just around the corner. I'd like to tell you how I got to where I am today, and why. I will give you an overview of my results so far and the color breaks obtained, along with what I'm doing to make these varieties available commercially, and finally give you a little cultural information.

For additional information, including numerous pictures, visit www.Reticulatas.com

A Door Starts To Open

In 1994 my first *sophenensis* x *danfordiae* hybrids (hereafter sxd), started to bloom –16 clones from 3 crosses. I expected them to be sterile because they were believed to have different chromosome counts. Nevertheless, I felt I had to try some crosses. My best chance was intercrossing them amongst themselves, so I did. To my pleasant surprise, I got 130 seeds from 11 successful crosses.

I knew fellow Iris enthusiasts like Brian Mathew would be skeptical. Although the seed appeared to be good, it might die when it tried to germinate owing to lethal genes. For example, out of more than 300 crosses and more than 4800 seemingly good seeds from diploid *danfordiae*, only 4 or 5 have produced blooming bulbs (with the exception of those involving *sophenensis*, Çat, and of course selfed *danfordiae*).

The first F2 hybrid bulbs flowered five years later, in 1999. 94-HW-1 ('Starlight') is white with lovely blue accents and a touch of yellow. I couldn't have asked for anything lovelier. I had expected *sophenensis*' veining would be a dominant "feature" that would take generations to eliminate. To top it off, 94-HW-1 is proving to be a good doer. The second hybrid was 94-GU-1, a small pale blue with a bit of yellow influence.

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. I often refer to this group as "white-blues" or "white with blue accents." The white of 96-DZ-1 is absolutely pure white. When light hits its petals they glisten just like fresh snow on a bright sunny day. I also like the soft blue on its style arms, and the way the blue veins merge with very pale yellow around its fall ridge. Unfortunately it doesn't appear to do quite as well as some others. That year my first yellow hybrid also bloomed, appearing rather like a more green-spotted *danfordiae*. Most amazing of all was a beautiful new pattern that I'm calling "spotted light blue-green," coming from a back cross to *danfordiae*. 96-BN-1 is 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. If you look carefully, you will see a pattern similar to Katharine Hodgkin's.

In 2001 another 13 new F2s bloomed, many of them yellow-blue combinations. One of special interest was 94-AT-2: its falls are dark brown on a rich yellow background. The yellow shows through mainly around the similarly colored central ridge. Its style arms are several shades of dark blue.

In 2002 the number of new F2 sxd hybrids jumped by 36, bring the total to 57. Of particular interest were: 97-CQ-1, which is sea green in color, becoming intriguingly bluer just as the flowers finish; three more "Spotted Light Blue-Green" (one without any yellow, making it a gorgeous spotted powder blue); and two cream hybrids without much blue influence. In addition, there were three special 2nd generation clones involving the yet unnamed new purple species I collected near Çat, Turkey. One of these I've tentatively named 'Storm' (98-NP-2) because its falls have dense black veins over a bright yellow background, and its style arms are dark blue. In sharp contrast, a sibling is cream with bright yellow around the fall ridge. The third clone is a slightly lighter yellow than *danfordiae* with black (or very dark green) markings on the fall and dark green style ribs (97-VS-1).

Colour Breaks Involving Çat

Last year 68 new F2 sxd hybrids bloomed, and then this year there were 100 more. Most amazing was the number of colour breaks that occurred. In the past I wrote, "I would classify my second most promising line as involving Çat x *danfordiae*: 88-AX. I believe their biggest potential is in intercrossing with *sophenensis* x *danfordiae* hybrids." 98-NP is realization of that potential. There are now eleven amazing clones covering a range from white, to plum, to pale yellow, to rosewood, and there's even one I can only describe as "chameleon." All are gorgeous, and of pretty good size too (50 to 60 mm from the tip of one fall to the tip of another) – gratifying because both the Çat parent and Iris *danfordiae* are small. And on top of all that, they all appear to be good doers. I have to keep pinching myself to make sure I'm not dreaming!

The potential is also embedded in about a dozen other crosses that have had a significant number of blooms to-date. In these cases the only drawback is the clones are on the small side. This means they are great for rock gardens. For the mass market, where it seems "bigger is better", it just means a few more bulbs are need for a "big", showy, display.

Of particular interest is the fact several of these hybrids are half way between yellow and orange. According to the RHS colour chart they are 23A (Yellow-Orange group). In many cases the colour lightens toward yellow as the flowers age. The most steadfast is 98-ND-2, who's fall is unmarked other than by a few light dots near the fall ridge. It's quite striking, and especially so blooming along side the bright yellow 98-ND-1. If you want something along that same line that is more than just a pure colour, then 98-00-4 fits the bill. Its falls are heavily marked with lots of dark brown dotting, as well as veining towards the outer edge. It, like most of the yellow-orange hybrids to bloom so far, has nicely complementing reddish-brown style-rib stripes. I personally quite like 98-OO-6, which is less orange, but has lovely dark-green style ribs, and nearly black variable-sized spots on its otherwise evenly colored fall blade.

It's incredible that yellow-orange has been accomplished in just two generations. The question is no longer "is orange possible?" Its, "how soon will we have a large flowered orange?"

Other unusual things starting to show up are: very dark colours, such as solid dark violet with yellow in the areas around the fall ridge that would typically be white. There's also a grey, yellow, black combination that I refer to as 'Evil' (98-GZ-3). You really need to see a picture to truly appreciate it and ensure you're not visualizing something different. As well, there are several different patterns of fall dotting, as well as dotting and veining.

Sophenensis x *danfordiae* Colour Breaks

I have been looking forward to the day when I could say with a certainty that *danfordiae*'s lemon yellow is actually made up of a number of different carotenes. This would increase the range of expression possible in the offspring. We know pale yellow is possible in Reticulata Irises because of I. *winogradowii*, but I want more. To increase the color range requires the genetic capability to produce the chemical compounds that give the other colors, along with the genes ("switches") to turn those expressions on (or off). You can cross two blue or two purple Reticulatas until you are blue in the face but you'll never get a yellow, because in all parents the yellow switches are off. Even though yellow is theoretically possible, it never has the chance to express itself. This is why my goal has always been to shake up the genes as much as possible by working with widely varying clones from the wild. To truly shake everything up and pull out recessive characteristics takes more than two or three generations. Then it's a matter of working to open the secrets which are locked away / hidden (to pull out the recessive characteristics). We'd all like to create the 'piece de resistance' right away, but I'm quite pleased with what I've achieved so far.

Carotenes are fat-soluble pigments in cell walls that give the yellows, oranges, and pinks we see. It seemed that a number of my hybrids hinted more was possible, but it hadn't come out and clearly hit me until last year. One of the first to do so was the ameona 98-MN-1. It's styles and standards are white (with pale greeny-yellow style markings), and it's fall is pale yellow. This isn't the rich colouring that will draw you all the way from one side of the garden to the other to see what it is, but it is lovely. There are only a limited number of colours / shades that will do this. Ones that are vibrant and vivid, like orange, or red. Yellow would also be included, but we already have *danfordiae*.

98-JI-2 bloomed this year and is similar. Its flowers have a slightly different shape, are smaller, and its falls have more dotting. As you might guess, I intercrossed the two and was rewarded with 54 seeds (an unusually high number).

97-CN-2 is pale yellow with blue accents: style-arm stripes and fall veining. It's small, 45 mm tip-to-tip, but has reasonable size standards (2/3 normal height) that narrow to a wisp. For a number of reasons it will probably just be for breeding purposes. It is striking and does increase well.

One other colour break that didn't involve the Çat Retic was 97-BG-1. Its overall colour is dark reddish brown. This contrasts nicely with its lemon-yellow ground, which shows on the fall between veins of the overall colour. It's of typical size, with standards that are half the normal width (4 mm). They are dull yellow, veined and shaded with the overall flower colour. This nicely accents the flower. The coloring and form are gorgeous, and it appears to be quite a good doer. I certainly hadn't been expecting anything like it.

Note Worthy

98-OK-1 (91-FC-1 x *danfordiae*) was the 6th "spotted light blue-green" to bloom. This pattern only occurs occasionally in back crosses to *danfordiae*. When my wife Lynda saw it she said it's "icy green." This lead me to giving it the name 'Green Ice', which rolls off the tongue easier than either 'Icy Green' or 'Ice Green'. Hopefully it conjures up ice cubes with pleasing green tones in them.

97-DZ-8 is a lovely white with green and blue accents, plus bits of yellow veining. It has a wide fall blade, but the flower doesn't open as much as it could; the falls and styles tend to be held upwards at high angle. As a result the flower only measured 47 mm from tip to tip. If it was flatter, another 10 mm could easily be added to its size. Of particular note, its flower had quite good substance. It remained fresh for quite a number of days; much longer it seemed than other Retics starting at the same time. I do hope this characteristic continues. It would be valuable for both its commercial success, and for use in hybridizing.

A couple of my yellow-blue hybrids are particularly interesting. One I call Tiger (97-AG-6), since it has nice dark green stripes on a lemon-yellow background. Not quite the black stripes on orange ground you might have been thinking, but close enough. There are green dots around the fall ridge, and the arm portion of the style arms is wholly dark green. Another of interest is 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 numerous shades of dark blue. Perhaps most interesting of all is Sea Green (97-CQ-1). I expect you are either going to love it, or hate it. It is an evenly coloured blue-green with yellow tones. The area beside the fall ridge is bright yellow with dark blue-green dots. Its style arms are much bluer. Just as the flower finishes it becomes bluer. Without question it's quite unique.

Bulblets, etc.

As mentioned in the first paragraph of this article, a common characteristic of Irises *danfordiae, sophenensis*, the Çat Reticulata, and their hybrids, is that each bloom-size bulb typically produces about 8 bulblets. If left alone many of these will simply die because they can't get their leaf above the soil surface – they use up all their energy trying. It's best to replant the bulblets close to the soil surface. In four years they will bloom. Thus, they can be used to increase a given clone faster than most other Reticulatas. The problem with the species themselves is their main bulbs bulbs (which dwindle to almost nothing during the flowering phase of their annual cycle) don't regenerate large enough to bloom in subsequent years. This is why people say *danfordiae* "shatters": they find only bulblets and medium-size bulbs (at best) when they dig up ones planted in previous years. What's needed is plants that regenerate bloom-size bulbs year after year. The optimum practice is to plant several bulbs widely spaced, leave them to form clumps. These would reach an equilibrium giving perhaps 5 or 6 blooms year after year. This is exactly what happened with one of my F1 hybrids left behind in a replanted seedling patch. When I finally dug up the clump in 2001, it contained 6 bloom-size bulbs, 5 medium, 23 small, and 163 bulblets.

Occasionally the number of bulblets produced by a bloom-size bulb can be as high as 25. The main difference between Holland and Toronto is bulblets get up to bloom-size much faster. They will bloom in just three years, with some in just 2 years depending on the size of the bulblet. Rate of increase of a given hybrid is not really an issue in your and my garden – the clone just needs to give consistent bloom year after year. Before you know it, a couple of years have gone by and now you have a nice large display. Rate of increase is an issue for a new hybrid when you want to have enough bulbs to give some to a Dutch bulb grower for testing, and still have enough for use in hybridizing. It is also an issue if you want to have some for entry in a show. It is much more of an issue if you want to build up stock to be able to sell a variety commercially; especially on the scale of Dutch bulb sales where I hear 25,000 bloom-size bulbs are needed before starting sales.

Some of you may have noticed the standards are "missing" on some of 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. Two F2 hybrids have 8 mm widths. In terms of length, most F1 standards are 30 mm in length compared to a more typical ~40 mm. Some are only 20 mm. F2 hybrids are much more variable: from 5 mm to 35 mm. This is of

course due to *danfordiae*, which only has short bristles for standards. The tips of few F2 standards narrow to a wisp. Personally I don't really care whether a flower has standards or not; I'm more concerned with how it looks overall.

Other Hybrids

97-DG-1 is a unique purple with blue tones. What makes it so striking is a blue flush around its yellow fall ridge. The purple and blue contrast is quite distinct. This characteristic comes from a Reticulata I collected near Van, Turkey. On other hybrids the effect isn't nearly as intoxicating since the main flower colour is typically only a slightly different shade of blue or violet.

One colour break outside sxd breeding was 98-YS-1. It's an ameona: white standards and styles, with coloured falls (in this case light blue with a medium blue halo). The YS row was 1998's catch all for crosses with 3 or less seeds (which typically don't germinate), or ones orphaned while being counted. A number of other outstanding hybrids have bloomed over the past 3 years. I can't possibly take time or space to describe them all here, nor could words do them justice. I would encourage you to take a look at www.Reticulatas.com

A Goal for the Garden

My goal is to create interesting new hybrids that do well in many North American gardens. I've often 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, after buying 25 bulbs in 1999. More than six years ago I bought a dozen bulbs each of *danfordiae* and I. *reticulata* hort. (that is, the purple clone sold under the species name) from a local garden centre. As expected they all bloomed. 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. Buyers likely end up disappointed and won't buy more irises; instead, they'll buy something else that lasts longer.

I really don't know exactly where I'm going with all of my crosses. I just know the general direction (actually directions, since there are a number of lines I'm pursuing). It takes 5 years to go from a seed to a flowering bulb, so, like the captain of a huge cargo ship, I need to make course corrections well in advance of when I want them to happen. If I wait, it will be too late. This is why I make the number of crosses that I do. Of course you could easily make thousands upon thousands of crosses and get absolutely nowhere. The key is to know the theory behind the practice, then work in several directions at once; you never know exactly which is going to be the most important. Starting with widely different clones from the wild is critical. Currently available commercial clones are too similar to one and another genetically.

Working with two parents that are widely different is like opening up the potential expression of a 2-dimensional plane, as shown in Figure 1. If the two parents are species, then the first generation progeny will all be very similar (the "X" in between) because each parent's genes are essentially uniform. In the second and future generations, by intercrossing the children plus backcrossing to the parents, the possible range of expression is the whole plane. It's up to skill of the hybridizer to bring out this full expression. For example, a recessive gene from one species and a dominant gene from the other will always give a dominant expression in the first generation. In the second generation there's a ¼ chance the recessive characteristic will be expressed. In the case of *sophenensis* x *danfordiae*, the first generation hybrids are all "just blues." The second generation yielded whites, yellows, blues, yellow-blues[1], and "spotted light blue-greens." Now other expressions are starting to appear such as pale yellow (98-MN-1, 98,JI-2, 97-CN-2), and brown (97-BG-1).

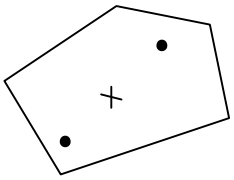

Figure 1 Two Species

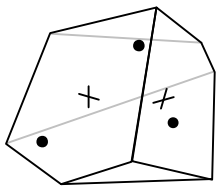

Figure 2 Three Species

With three widely different species, the range of expression opens up tremendously. Comparatively speaking, it's 3-dimensional, as illustrated in Figure 2. These simplified models give you some idea of how much more is possible using three species instead of just two. Now if I could find a fourth species with the same chromosome count (2n = 18), yet distinct from the others…

Flower Size

Until last year I hadn't ever paid attention to flower size when I was hybridizing. It wasn't a characteristic I was concerned about. My highest priority has always been to work with clones I thought were the most interesting or had the

[1] Yellow-blues involve a variety of expressions with yellow and blue pigments. So far the yellow has tended to be lemon yellow, and generally the blues are medium to dark. In some cases the result is olive-green.

greatest potential, especially with regard to flower color. After that I would look around to see what other crosses I should make. If the flowers were a bit small that wouldn't have stopped me from working with them. Last year I did specifically intercross some of the larger clones (85 mm tip to tip). I don't really expect much from those crosses. They will likely give large hybrids looking similar to existing ones.

I did manage to measure about 100 of my hybrids last year (a sampling of these are shown). Normally I'm too busy taking pictures and hybridizing to have time for something like that (I need to retire). However I felt it was important. Bob Pries had asked me the previous summer what size the flowers were. This was for several descriptions, but I couldn't tell him because I didn't know. Now I have the grounding to say which hybrids are indeed small (35 mm tip to tip[2]), which are typical (50 mm), and which are large (85 mm). This translates to diameters of 40 mm, 58 mm, and 98 mm respectively. Interestingly three small flowers would fit in the area of one large flower. As alpine plant growers will be the first to acknowledge, larger is not necessarily better, its all a matter of proportion. Small flowers are daintier, and simply require more to fill the same space.

One thing to keep in mind about flower size is that it does vary somewhat. The main factor is bulb size. Bulbs that are borderline as to whether they large enough to bloom or not, understandably give the smallest flowers. The figures quoted are for the largest flowers. Generally bulbs that are of a reasonable size will produce flowers of that size. Since I was measuring many of my newer hybrids, in a lot of cases I had only one flower to measure, in others there were no more than three. It was in populations such as 94-HW-1 which I have more bulbs, and hence a wider variation in bulb sizes, that differences in flower size could be observed.

	Çat ANM2175	danfordiae ANM2325	danfordiae hort.	sophenensis	histrioides - collected	winogradowii	J.S. Dijt	White Caucasus	87-BB-1	94-HW-1 (Starlight)	97-CQ-1 (Sea Green)	97-BG-1	97-DZ-8	97-DG-4	97-EQ-3	98-MN-1	98-NP-4	98-NP-10 (Chameleon)	98-OK-1 (Green Ice)	98-OO-1
Diameter tip to tip	38	33	45	70	68	70	50	60	70	60	50	50	47	60	85	45	55	50	47	45
Standard - width	6	-	0.5	9	10	14	8	7	10	0.5	<0.5	4	<0.5	10	15	3	8	5	<0.5	-
Standard - length	30	-	5	55	43	45	45	30	45	15	20	32	7	45	50	25	30	33	10	-
Style lobe width	8	11	17	15	12	20	10	10		15	13	15	20	13	20	15	16	9	20	13
Style arm length	30	25	35	43	35	40	38	35	40	40	35	40	35	35	45	31	35	35	36	27
Fall blade width	9	11	13	15	16	21	12	13	16	19	14	13	16	13	20	15	17	14	16	10
Fall length	35	29	35	51	43	53	45	40	45	45	38	45	40	43	55	32	45	42	36	30
Flower - highest point	90	75	95	110	100	115	140	85	150	80	85	60	110	125	120	85	100	95	100	65
Flower - base	58	50	60	65	60	55	95	55	100	50	55	85	80	80	75	55	65	60	65	35
Leaf (longest)	60	25	20	55	50	70	80	100	120	45	30	45	75	95	125	45	55	90	50	25

Flower Measurements in mm

About 12 years ago, when I had only a few hybrids, I had time to sketch their flower petals, look them under a microscope, etc. Now I have a hard time keeping up, even if I stay up to 1 or 2 in the morning. I now understand why as the bloom season progresses I get further and further behind. It's not just simply due to the cumulative effects of getting a bit more behind each day. It's also because of the additional daylight hours, which translate into working outside longer, resulting in less time to process digital pictures, update my web sites, send E-mails, etc.

Genetic Switches

Now that I have a reasonable number of F2 sxd progeny, I can start to analyse the high level genetic switches that are at work. If I had tried this earlier, I would have come to the wrong conclusions. Fundamentally flower colour is made up of anthocyans (blues and purples), which are water soluble pigments in each cell's vacuole, and carotenes (yellows, oranges, and pinks), which are fat soluble pigments in the cell's walls. True red is also an anthocyan. Unfortunately it doesn't appear that Iris have the capability to produce the chemical compounds that reflect fire-engine red back to our eyes (such as in Geraniums or Roses) – specifically, the compounds Paeonidin (crimson), Pelargonidin (scarlet), and Rosinidine (crimson). Reds of a sort are possible in bearded Iris; these maroon or brownish reds come from combining the right shades of purple and yellow. To our eye, they combine and give the illusion of red. This is what makes 94-AT-2's falls appear dark brown. It's interesting to look at a fall petal under a microscope to see this.

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[2] Figures are for bulbs grown in Toronto, Canada. Bulbs from Holland may initially give larger flowers.

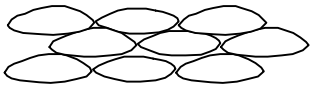
Moreover, various shades of blue and purple contribute to the exact colouring we see. Each is controlled by one or more switches. Think of the flower as a chemical factory. The genetic switches control what compounds are produced, and hence what colours are reflected back to our eyes, from light to dark 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 I'm now starting to break its dominance 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 anthocyans and carotenes don't combine just the right, you end up with a muddy mess. I'm amazed every time I think of all the beautiful things I've created so far.

Detailed analysis of my hybrids has shown that 2 dominant genes are required to turn blue on, and a recessive gene is required to turn yellow on:

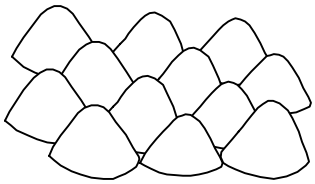
sophenensis	$B_1B_1B_2B_2$ ~~YY~~
danfordiae	$b_1b_1b_2b_2$ yy

This doesn't explain why three of the 56 F1s had a reasonable amount of yellow on their falls. 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 seen on some clones. Of course by that time there will be other mysteries.

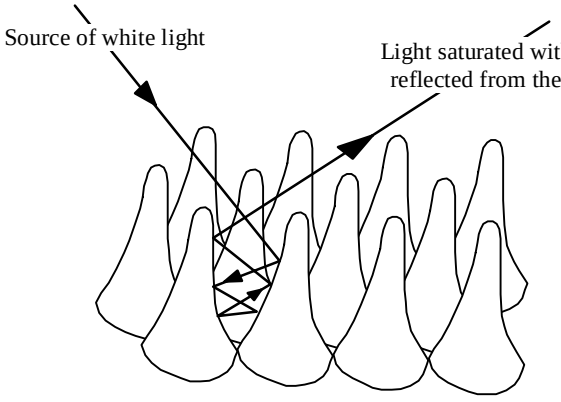
The velvety effect that seems to go along with some Reticulata colours, particularly dark ones, is due to papilla-shaped epidermal cells (figure 3). It is a physical, not a chemical phenomenon. If you take a velvety fall blade such as *bakeriana*'s and turn it, it shows pure colour at every angle. You never see any solid white light bouncing off it as you would if the surface were flat. With Iris petals, you do see a glistening effect when each of a multitude of cobblestone-shaped cells reflects white light. The glistening on the back of a fall is noticeably dull; by comparison, the front of the fall is "alive". This is due to the fact that the depth of the cobblestone cells is less on the back of the fall, where as the front has "hills". Additionally, the light we see is saturated with colour. Before reaching our eyes it has been bounced around several times due to the papilla-shaped cells, in the process "picking up" more and more colour. This can be seen by the fact that the intensity of colour changes as you change the angle of the blade.



"Cobblestone"
This is the most common structure. It is found on the back of falls as well as on standards.



"Hills"
These cells are higher than the "cobblestones." They are found on the front of a fall's blade, and make the colours look more "alive." This "alive" look can be seen by comparing with the back of the blade which has a "cobble stone" surface.



Papilla-shaped cells
They are prevalent on fall blades, particularly on and around the end of the ridge. As a group they give the velvety appearance and texture to varieties like *bakeriana*, 'Violet Beauty,' etc. In these examples the whole blade's surface is made up of papilla-shaped structures. This velvety effect is not really noticeable with light colours.
Papilla-shaped structures are actually multicelled (~up to 3)

Figure 3 Cell Structures

Currently there are over 40 hectares of Reticulatas under cultivation in Holland, which produce some 50,000,000 bulbs for sale annually. In 1989 there were only 27 hectares, with over 10 hectares each of *danfordiae* and Iris *reticulata* hort., followed by 'Harmony' with 3½. Iris *reticulata* hort. has dropped below 6 hectares, while Harmony is about 12, followed by William van Eeden's 'George' at just over 6. Pauline and Purple Gem account for another 3½. My understanding is

sales for cultivation in pots has become a significant portion of the market, and hence separates the varieties that sell in large numbers from those that sell significantly less.

I now have 6 Dutch bulb growers testing my hybrids. One is solely interested in Juno Irises, which I also experiment with –a hobby gone overboard, effectively a second job. It would be nice to get something back for all of my hard work and expenses. Following the 2003 bloom, Wim de Goede proposed to introduce four of my hybrids. It will still be a few years before enough stock is built up to begin sales. It will then be a number of years beyond that before you'll be able to buy my hybrids in your local nursery, but one day you will be able to!

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. In my own garden I find I get just one flower per bulb. There was a point-in-time when I did get two blooms per bulb from some of my typical Reticulata hybrids. These days my bulbs are planted too close together, plus I never give the soil a rest from growing the same the same type of bulbs over and over. I don't have the space to practice crop rotation. In Holland Reticulatas are planted in the same soil about every seven years.

I'm pleased to announce my pure white Reticulata was registered last year as 'White Caucasus' (photo, p. XX). It's from the lake Sevan region of the Armenian SSR, hence the reference to the Caucasus mountains. The typical form is purplish; I tend to refer to it as pinkish-purple since various clones contain differing hues and tones. It will still be a number of years before there is enough stock to introduce my lovely white form commercially. In order to make this happen sooner, rather than later, I started increasing it in a lab late in 2002. A few hundred bulbs were delivered at the beginning of this year, with an additional 2-3,000 ordered for early next year.

Reticulata Culture

Reticulata Irises like well-drained soil (e.g. sandy loam / sandy topsoil), with lots of moisture in the early Spring (in the wild and in the colder parts of North America, this is provided by 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.

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.

If your garden has reliable winter snow cover, 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 each variety twice.

Remember, the bulbs need to regenerate, so the last thing you want to do is disturb them while they're in growth. 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. Robin Bell would advocate even more fertilizer.

To Find Out More

Visit www.Reticulatas.com

Which are your favorites?
Which would you like to be able to one-day pick up at your local garden centre?

Alan lives in Toronto, Canada and has been hybridizing Reticulata Iris for more than 20 years. In 1985 and 1986 he traveled extensively in Turkey studying both Reticulata and Juno Irises. Alan is an Electical Engineer with more than 25 years experience in computer software applied to the Electrical Utility industry. During the summer he can be found canoe camping in Algonquin Park with his two sons.