



Hi Everyone,

Today I am going to do a presentation on **BREEDING ADVANCES IN DIVISIONS 5, 6, 7, 8 AND 10** here in Australia.

Most of the photos will be of my own flowers in areas that I am most interested in. I was keen to include other Australian breeders because the best flowers in some of these divisions are definitely not mine. I can't claim to have a grand overview of Australian daffodil breeding but I have done my best. I particularly want to thank those breeders who have trusted me with their photos and comments.



The lead photo was of one of Fred Silcock's paddocks. He did breed some division 6 and 7 flowers but I don't know them. The best homage I can pay to Fred is to show you some of his division 1 flowers. One suspects his 6's and 7's might not be too bad.

I plan to go through the divisions in the order 5, 6, 7, 10 and finishing with 8. We will be alternating between multi-headed and single headed flowers.





Sterile flowers are everywhere in division 5 because the most vigorous varieties are those with jonquil breeding. Unfortunately, for a breeder, these flowers are useless.



At the mid-September Canberra show my own “Sun Tiger” and “Moon Tiger” do well. Their jonquil breeding is from “Hillstar”: - a type of cross was pioneered by Grant Mitsch with “Petrel” 50 years ago. It may even be possible to breed autumn flowers of this type but such flowers will be highly sterile.



Meanwhile, for over a decade, Graham and Helen Fleming of Keira Bulbs have been quietly showing superior division 5's, and some of these have ongoing fertility.





These flowers remind me of the Mitsch/Havens "Silver Bells", "Mission Bells", "Ice Chimes" group of flowers, all of which have known fertility.



I have one of these treasures (left) and have been able to verify that it has good pollen and sets seed. I breed with it as if it is a tetraploid improved "Mission Bells".



Keira Bulbs have generously made available plenty of photos for me to use. I have selected a few to give some indication of their achievements.





Notice the 5W-YYW



I don't think these ones are fertile but they do hint at developments that are within reach



Keira bulbs have a variety of superb species available to them including one that is of comparable size to the hybrids. (See back of top photo).





Breeders interfere with the perfection of *N. triandrus* itself to give it the vigor substance texture and color of modern hybrids. Unfortunately this process involves losses in form and grace and fertility.

Most hybrids with main division flowers are completely sterile but perhaps as many as 1 in 20 have useful fertility.

Both these flowers have tried to set seed.

I outlined my approach to division 5 breeding in the RHS Daffodil Yearbook in 2019. And I gave an explanation of the genetic issues in a post on Daffnet.



The gist of the genetics is that, as Theo Sanders discovered, sterile hybrids can sometimes have fertility like fully fertile hybrids.

In division 5 some of the main division-triandrus crosses have enough useful fertility to give fertile hybrids when crossed with already fertile hybrids such as Mission Bells.

I have a suspicion that particular crosses are more likely to yield partially fertile hybrids. If this is right then repeating the crosses with the parents used here may be worthwhile.

Both these flowers have set seed but none of these hybrids has ever set open pollinated seed.



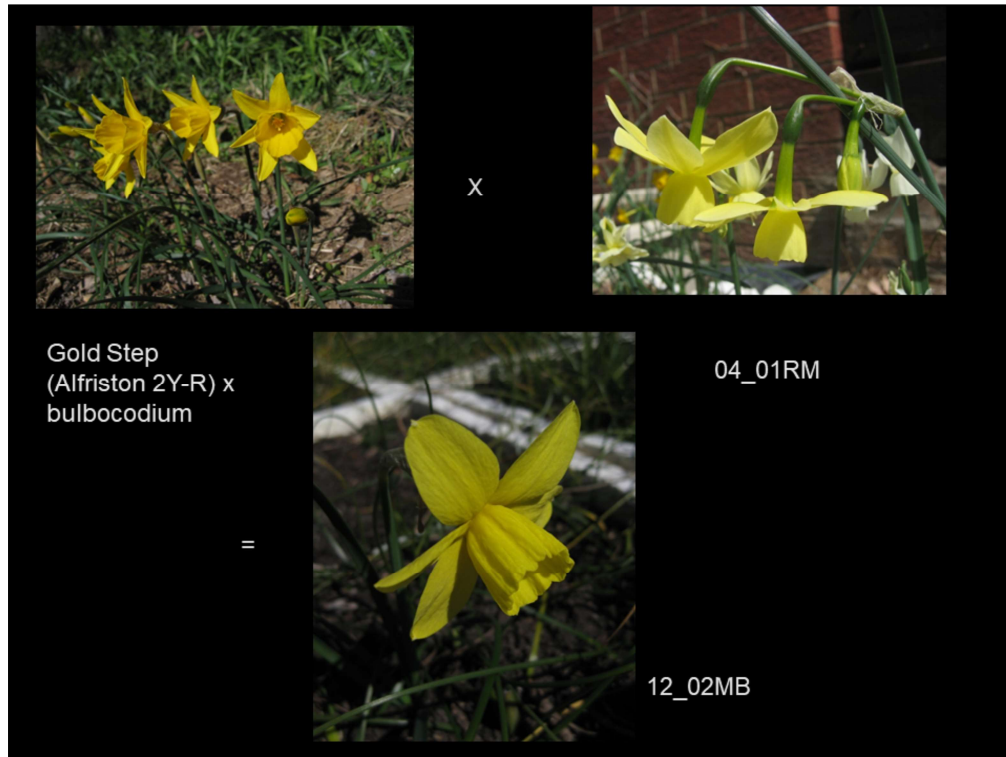
It seems obvious that the best main division flowers for triandrus breeding are those with neat cups, reflexed perianths, nodding poise and more than 1 flower to a stem, which is to say, NOT show flowers. It would be possible to breed division 5 without using *N. triandrus* at all just as it is possible to breed division 6 without *N. cyclamineus*.

It is easy to suppose that suitable cyclamineus hybrids would be good parents for triandrus hybrids.





There are plenty of genetic resources for multiheaded main division flowers. Poets can come multiheaded as can cyclamineus. (*N. nevadensis* and *longispathus* probably won't help.) I have not actively pursued this breeding but have a few seedlings. Merridee is bound to be useful parent, and perhaps Ashmore and Sea Dream, and maybe even Castle Dobbs.



The 2020 season here confirmed a few points.

The odd relationship between triandrus and bulbocodium is worth pursuing. Gold Step x 04\_01RM gave 12\_02MB. It doesn't look much like triandrus but it does have some fertility.



This seedling crossed with the triploid 14\_10RM has given a convincingly division 5 flower that has interesting fertility. It whitens to 5W-Y.

If this inherits Gold Step's vigor this will be an important step forward.



04\_01RM is a strange plant.

Mission Bells x 04\_01RM are not great seedlings but they have some fertility.





Crossing this seedling with 14\_10RM has produced a seedling that appears to have interesting fertility.



13\_56 has produced unusually hardy division 5 hybrids. One of these, 20\_10RM, has set seed. This reinforces my impression that it doesn't take huge numbers to successfully breed these flowers.



Finally, the strategy of crossing slightly fertile triploids with a fully fertile inter-sectional tetraploid really does look promising. 20\_16RM has signs of fertility.

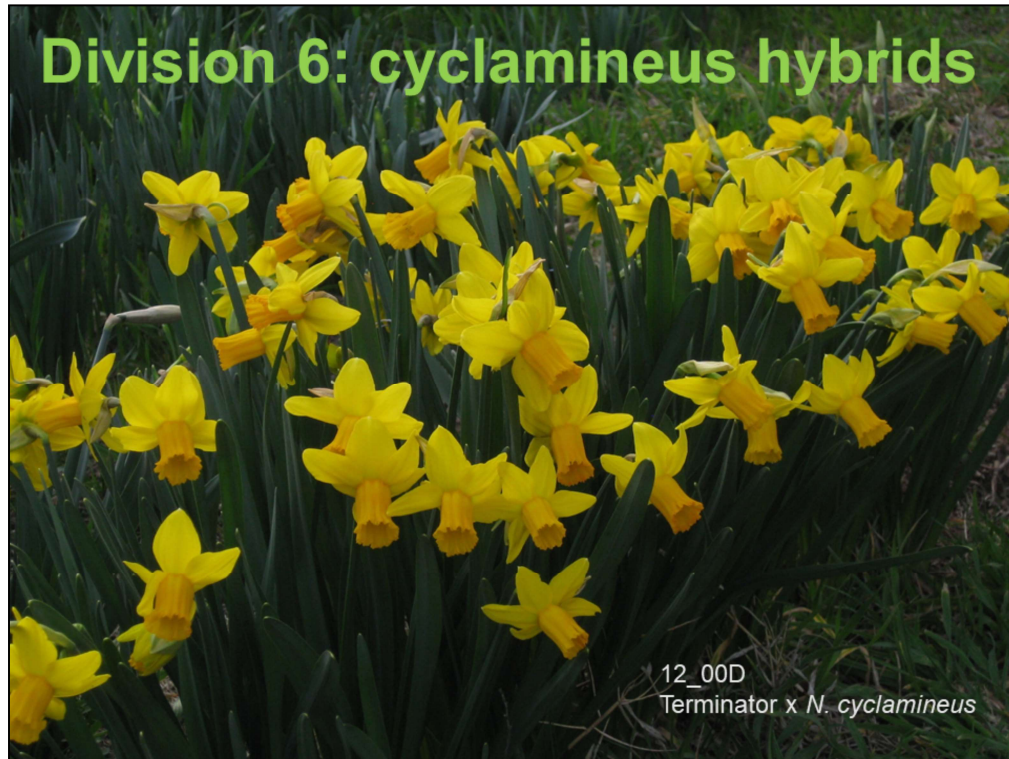
My conclusion is that it is possible to solve the fertility problems with division 5 inter-sectional hybrids although the absence of orange/pink is concerning.

Tazettas have orange coloring and can form nice hybrids with triandrus but I think it will be very much more difficult, perhaps impossible, to solve the problems of color and fertility in such hybrids.



In 2017 the future finally made it onto the Champion's Table at the Canberra Show.





This flower is a sterile triploid that reliably sets seed.



Miniature 6's are typically diploid and present no breeding difficulties (apart from introducing pink and orange from main division flowers, which is VERY difficult). Both Graham Fleming and Kevin Crowe are achieving advances in this area. Kevin says the pink may come from a Temple-Smith trumpet.



Keira Bulbs entries in Canberra Show

Over the years Keira Bulbs have shown some very nice flowers.



Keira Bulbs entries in Canberra Show

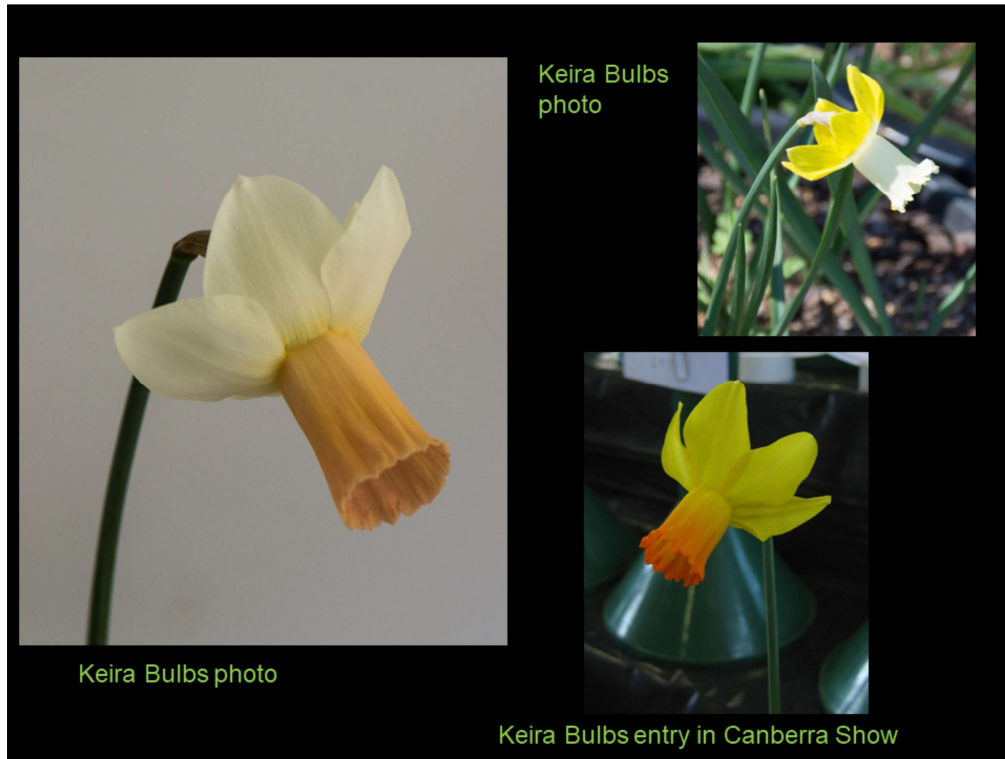




These are from Graham and Helen's garden: -



Some Keira Bulbs photos



Keira Bulbs  
photo

Keira Bulbs photo

Keira Bulbs entry in Canberra Show

Keira Bulbs also have nice non-miniature 6's.



As do Graeme and Tony Davis.





I expect that miniature 6's will come to be dominated by bred down tetraploids and so my main interest is in producing tetraploid division 6's with a view to obtaining good standard 6's, but eventually, also miniatures.

There are plenty of main division flowers that nod and reflex. I select seedlings that do this and try to make a few crosses each year.



10\_650



13\_75



16\_105



16\_99



13\_53 is descended from Lilac Charm. Hopefully it will be useful.



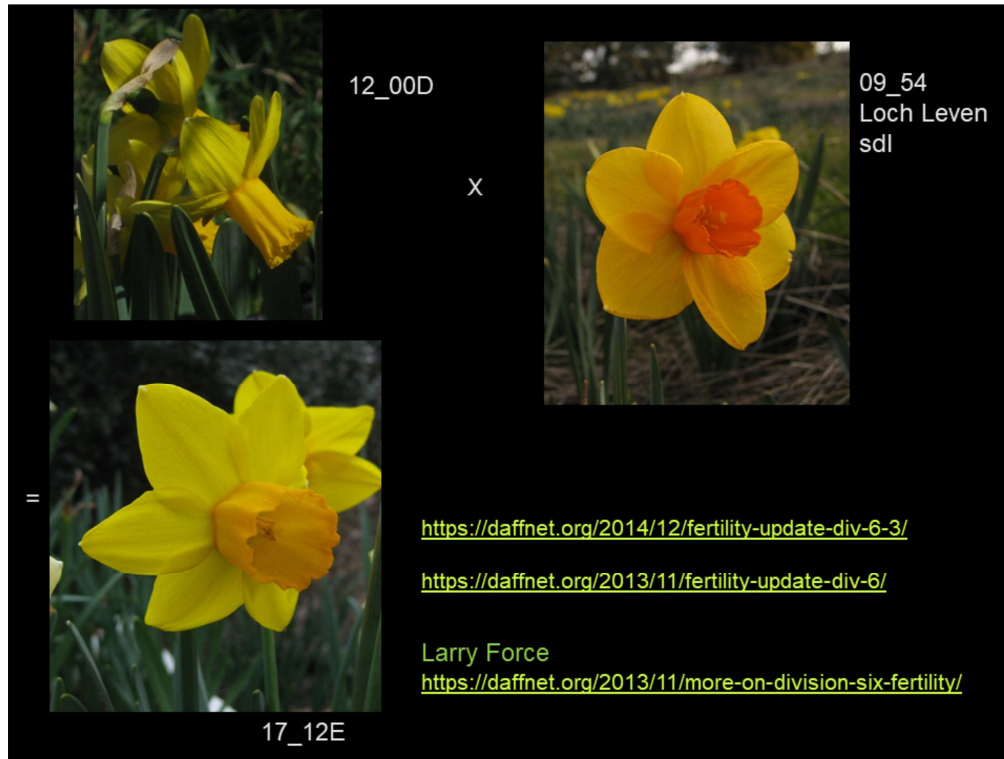
I don't think this breeding will produce perfect 6's any time soon. But I think it will help.



My most useful triploids, that set a little seed, are 12\_00D pictured at the start of this section and 07\_18D.

The best policy, I think, is to cross these with tetraploids in the hope of obtaining further tetraploids. I am sure the tetraploids are more hardy and more likely to survive such that seedlings that reach flowering are more likely to be tetraploid.





This approach has produced 17\_12E, which appears to be effectively tetraploid. It is an attempt at 6O-O.

For those who are interested I wrote a fertility update for division 6 on Daffnet back in 2014 on Daffnet.

And another one back in 2013

A reply from Larry Force to that post is well worth reading.



I have a few obviously tetraploid cyclamineus hybrids.

14\_19D fades to 6W-W. It is a result two occasions where a triploid (in yellow) has been crossed with a tetraploid to give a tetraploid. If Lemon Gentleman really has the refined smallish pink Dear Me in its parentage then 14\_19D should be a good parent for 6W-PS.

19\_23E has contributions from cyclamineus, reverse bicolor, W-O, Y-R and red pink. It is smaller but tall stemmed and vigorous. It may not look like a good division 6 but I rate this very highly as an interesting parent.



This is a cross aimed at a late 6W-W (and perhaps a triandrus parent).



08\_177 is nearly 1W-WWO so the aim here is for 6W-WWO



Just as with triandrus hybrids, division 6 has still quite a way to go to achieve the elegance of the species.



And yet, in the 2020 Canberra Show Graeme Davis put a marvel on the bench. There were plenty of fine flowers in the show but for me this was the finest of them. It has hints of 6Y-O and is bred from Turland Gold (Loch Hope x cyclamineus) x cyclamineus. Not only does it look tetraploid, examination of its pollen shows that it is. My prediction is that this flower will be the basis of a new generation of very fine division 6's.





The foundation flowers for division 5 come from Mitsch/Havens. The same is true for intersectional hybrids in division 7. To these have been added John Hunter's viridiflorus hybrid Emerald Sea, fernandesii hybrids and further viridiflorus hybrids. These hybrids can be inter-crossed to give flowering times across the entire daffodil season.

The links are to previous accounts I have given.



Flowering times can vary a lot according to conditions. Here, *N. viridiflorus* usually begins early April and the first intersectional hybrids are not far behind.



18\_03MJ whitens and becomes rimmed and is joined by further hybrids.

12\_03MJ has *jonquilla viridiflorus* and *fernandesii* in its ancestry. This is the flower that confirmed for me Theo Sander's comments about the potential of infertile hybrids. That was in 2012 and the evidence continues to mount.

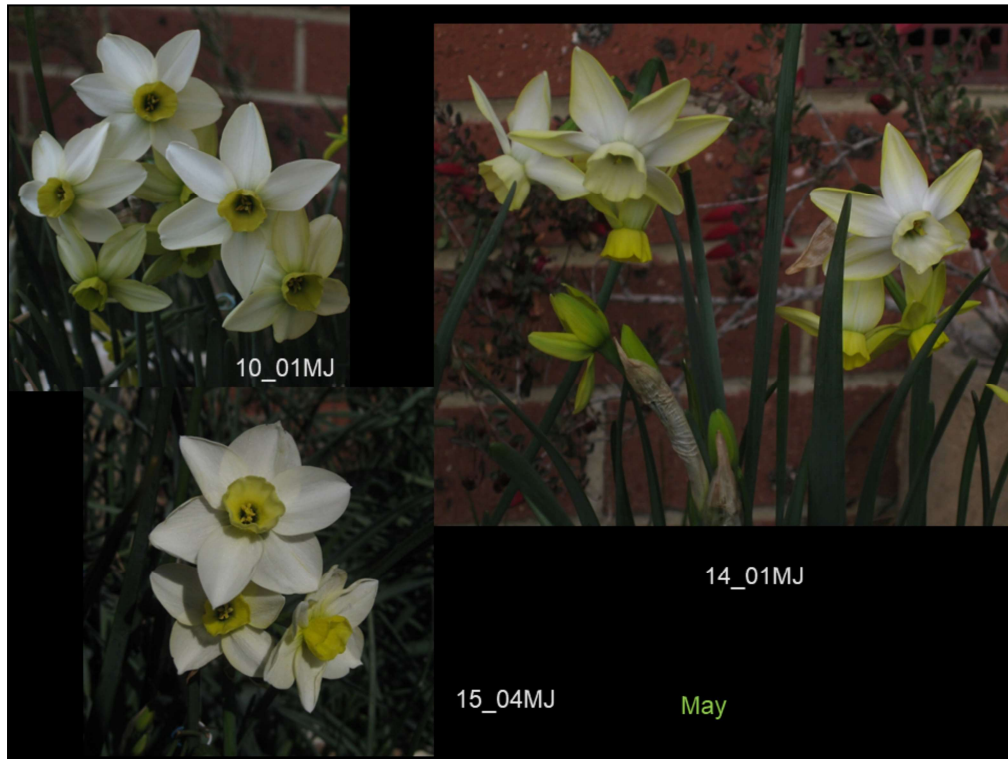


12\_03MJ whitens and is joined by further hybrids.





The high seedling number shows this was selected much later in the season at Yass. Just as dry conditions delay tazettas, so too do they delay jonquil hybrids. The flowering times given here really are a very rough guide.



This is a page of flowers that will probably all be named. The reverse 14\_01MJ makes up for its mild color with irrepressible vigor.

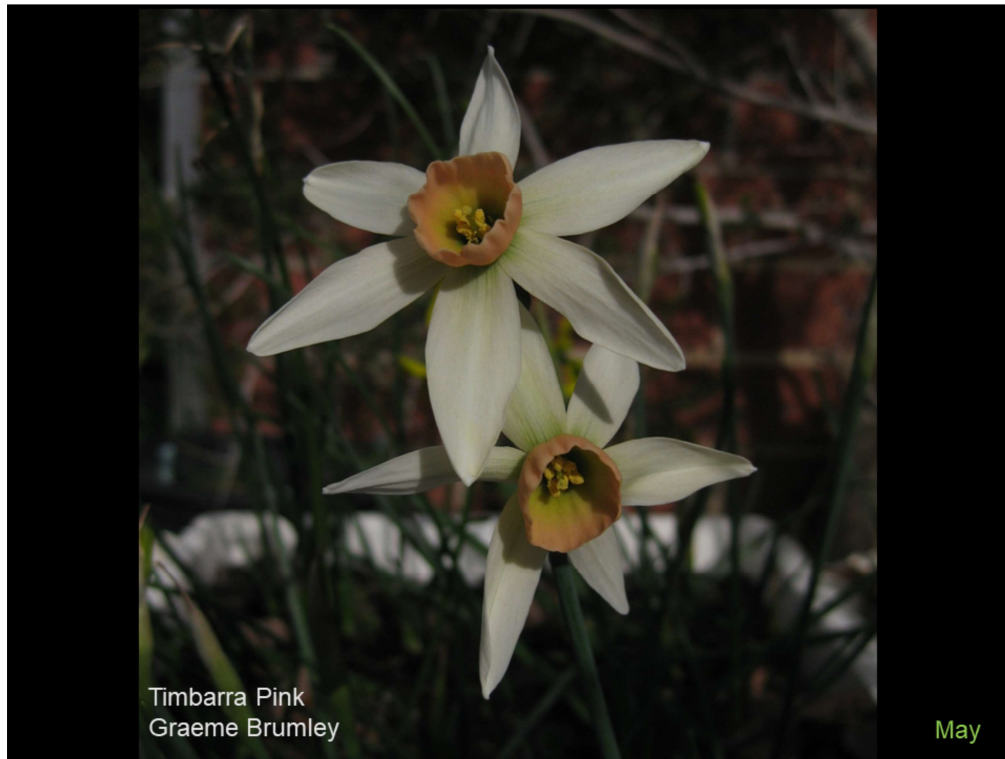




There is no doubt the reflex in these hybrids can be developed. It's also easy to see that they might produce very good triandrus hybrids.



There are interesting peachy colors. I imagine 14\_04MJ is 7W-O.



Timbarra Pink is a late autumn flowering fertile 7W-P. Here it is vigorous and repeat flowering. Needless to say I have crossed it with lots of things and hope to get a range of fertile pinks that flower even earlier and across winter into spring. This for me is a wonderful contribution to division 7. It can flower with 3 florets and it repeat flowers.



A cold paddock at Yass. These hybrids benefit from a small amount of protection from frost. They don't usually flower as well as this in the field.



10\_03MJ is another good hybrid from this cross. You can see that some of these flowers have been deanthered for crossing. This is to stop them from selfing which they readily do.



18\_08MJ is a huge sibling of 15\_04MJ shown earlier. It is meant to be Viriquilla x the 7Y-O 10\_10MJ, which we see shortly. The only evidence I can see that the cross is true is the hybrid vigor.





16\_10MJ is approaching 7W-O.



Flowers like 17\_35MJ are no longer unfashionable. This one is quite striking, and like many of the viridiflorus hybrids, has tremendous substance.



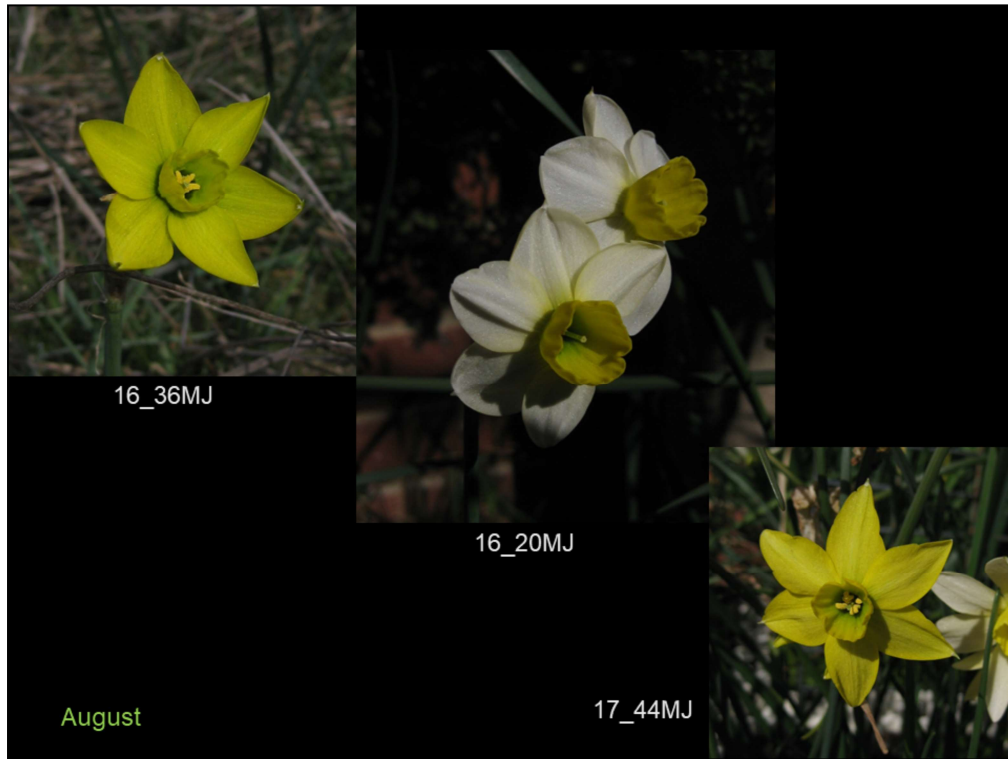
Not surprisingly flowers open more slowly mid-winter, but they also last a long time. Against the warm protected north wall of the house these flowers are a joy mid winter. And they have a powerful sweet scent.

The white flower is Viristar. I have talked it down in the past as a reluctant parent. It turns out it is a vigorous plant and a superb parent giving flowers with good form and tremendous substance

There is also a strong tendency for these hybrids to repeat flower. Presumably this characteristic can be bred for, which will make them daffodils of choice in mild climates.



A sad frosted specimen of 15\_15MJ was picked. A week later it had developed into a strange greyed yellow. It looks as if brown coronas may be possible.



These flowers all have very heavy substance.



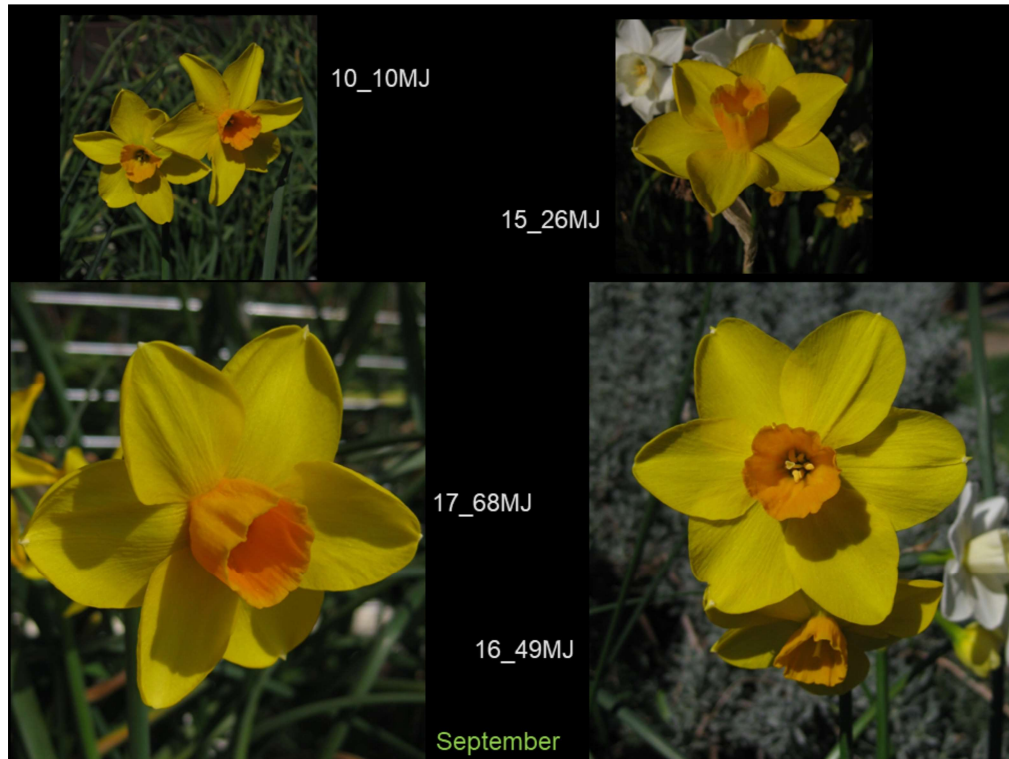


The fertile orange 10\_10MJ is starting to produce orange seedlings. The number of florets is still an issue but further breeding should solve the problem.





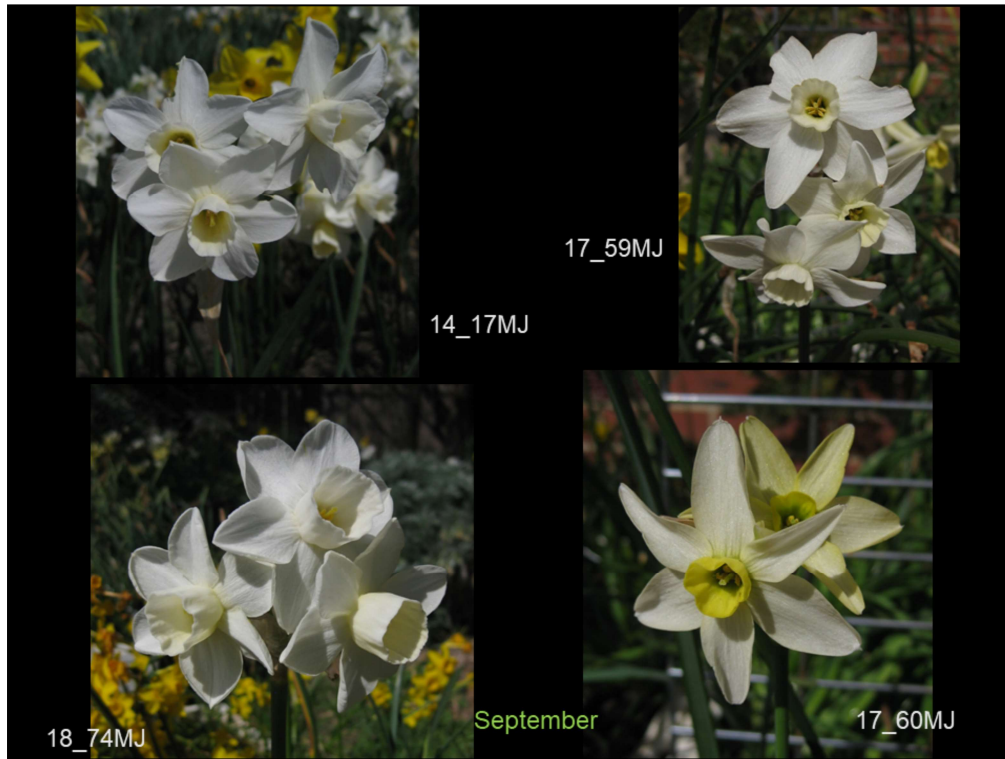
I think this has won best 7 in the Canberra show. Char is one of John Reed's intermediates.



Some more oranges with the main contributing parent 10\_10MJ in the top left corner. 10\_10MJ is one of the few flowers that I have bred from artificially doubling jonquilla chromosomes.



12\_39MJ has won best 7 at the Canberra Show.

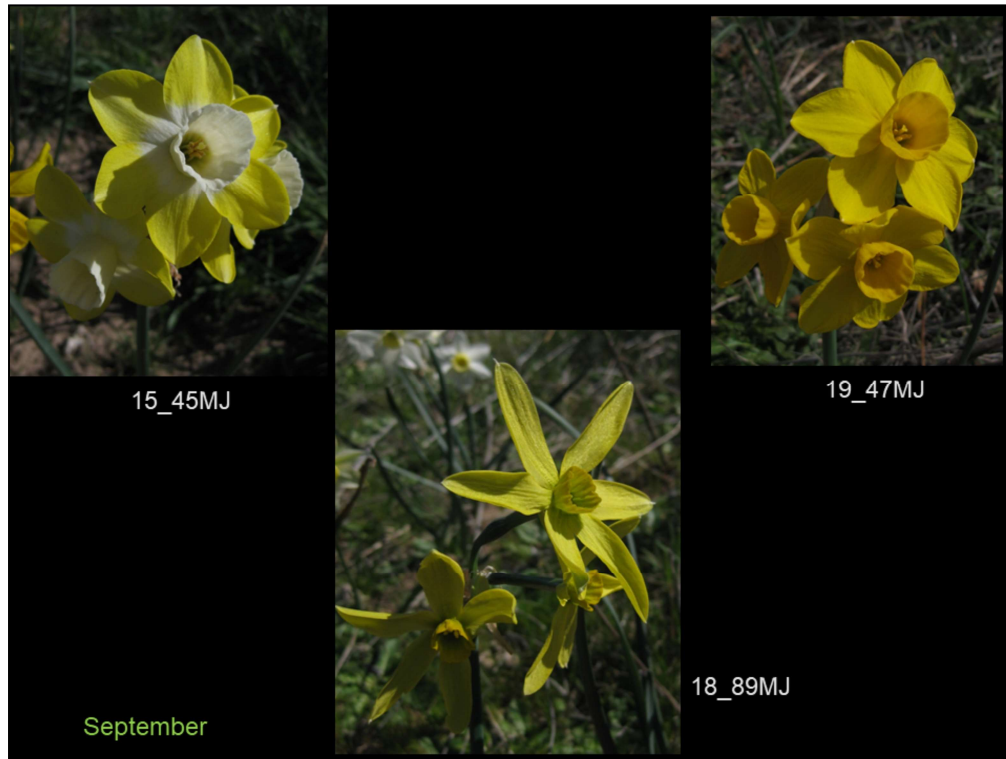


More whites and a bicolor that is a viridiflorus hybrid. The viridiflorus hybrids really are solid flowers.



17\_88MJ sets seed. It is from Yazquil Angel (Moomba x jonquilla) the only jonquil triploid that has ever set seed for me.

Just as infertile triandrus triploids can have useful fertility so too can division 7 triploids, possibly with a similar frequency i.e. about 1 in 20. Limequilla x Bell Song, for example, might be a very effective cross.

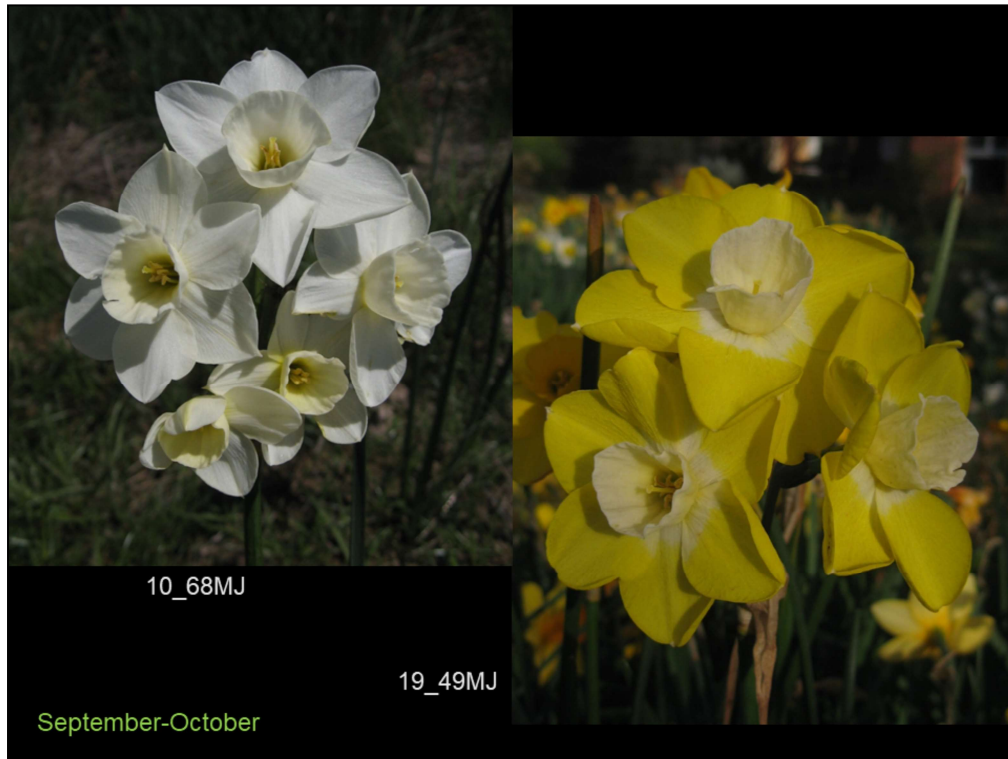


18\_89MJ is supposedly from Viriverse x Theoquil. I find it striking that fertile viridiflorus hybrids can be easily bred to flower in show season just by crossing them with each other.





These hybrids are mostly the product of Hillstar, Quick Step and Limequilla, except 12\_91MJ which is an end of season flower with an obvious contribution from *viridiflorus* (from Viriquilla).



I suspect 10\_68MJ gets its high number of florets from Quick Step.



In 2018 I put viridiflorus hybrids into the Canberra Show for the first time. These were not well grown or in good condition but they have superior substance and texture. I expect that in the future the best show flowers will be bred from flowers such as these.



Keira bulbs have very nice jonquil hybrids many of which are fertile. Not surprisingly smaller and miniature flowers are a speciality of theirs. This may be sterile dubius hybrid and it may be division 8, but I have included it anyway because it is so impressive.



Joclyn Newman is a nice Keira Bulbs 7W-P.





7W-O has been difficult but it is looking very possible. The mixed colored flower, Keira Harlequin, reliably flowers in this odd way.



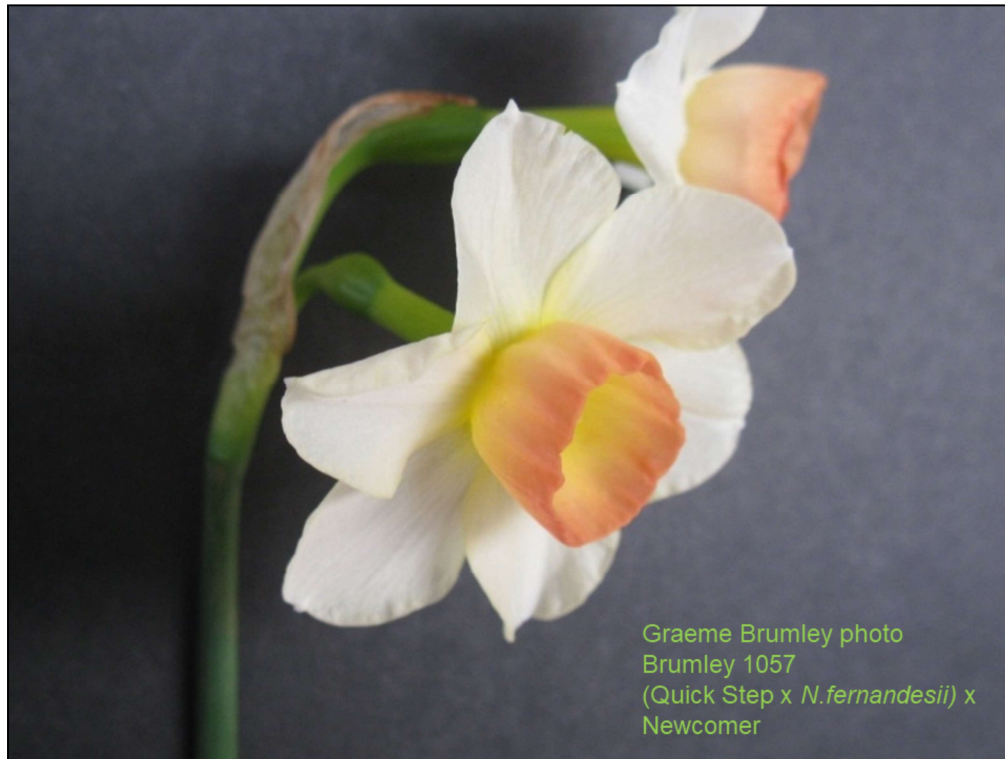




This is probably a dubious hybrid also, but again, it is worth taking some time to admire it.



Graham provided this photo of his pinkest division 7.



Graeme Brumley photo  
Brumley 1057  
(Quick Step x *N.fernandesii*) x  
Newcomer

I would like to conclude this section with Graeme Brumley's 1057 (Quick Step x *fernandesii*) x Newcomer. The seed parent is a Glenbrook seedling. 1057 is presumably sterile but it may nevertheless have enough fertility to be a very interesting parent.



Gold Step, a cross between the 2Y-R Alfriston and a bulbocodium, is a superb plant . It is floriferous, hardy, vigorous and fertile, yielding seedlings that retain these characteristics. In this section I'm going to start with a look at pure bulbocodiums and conclude with developments that Gold Step has made possible.





For me, bulbocodiums are winter daffodils. They are more hardy and more capable of recovering from frost than any other kind of daffodil.







I mainly breed bulbocodiums in the autumn and winter but do have them lingering into September and October.



In the paddock mid winter.





and 20<sup>th</sup> of August .



By the time show season arrives they are well past their best and I concentrate on other things.





Graham and Helen Fleming nearby at Keira Bulbs have miniscule bulbocodiums. The photos they have supplied for this division, however, mainly show their interest in breeding bigger flowers, which they mark with the name 'Pilgrim'.





24<sup>th</sup> July



14<sup>th</sup> August

Keira Bulbs photos



18<sup>th</sup> July



18<sup>th</sup> July



Keira Bulbs photos  
Pilgrims

Pilgrim Jason

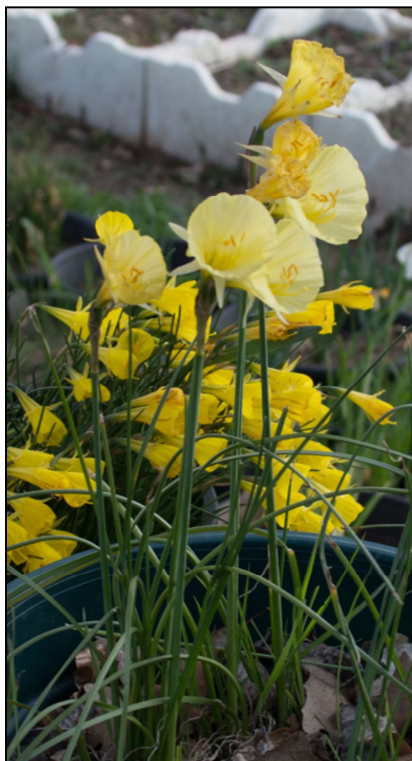


Pilgrim Kirby



Pilgrim Helen

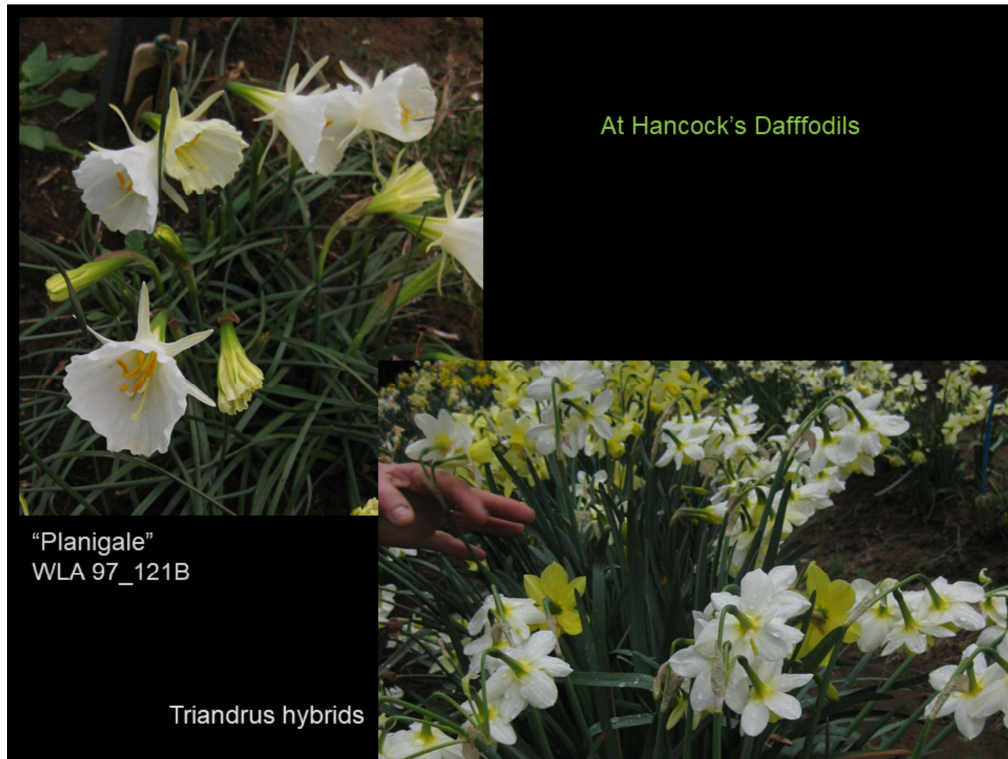




Keira Bulbs photos

tall  
late  
split





Hancock's Daffodils have a very nice late white bulbocodium that has just been released.

It's worth mentioning that they also have really nice division 5 seedlings. Unfortunately these appear to have only slight pollen fertility.



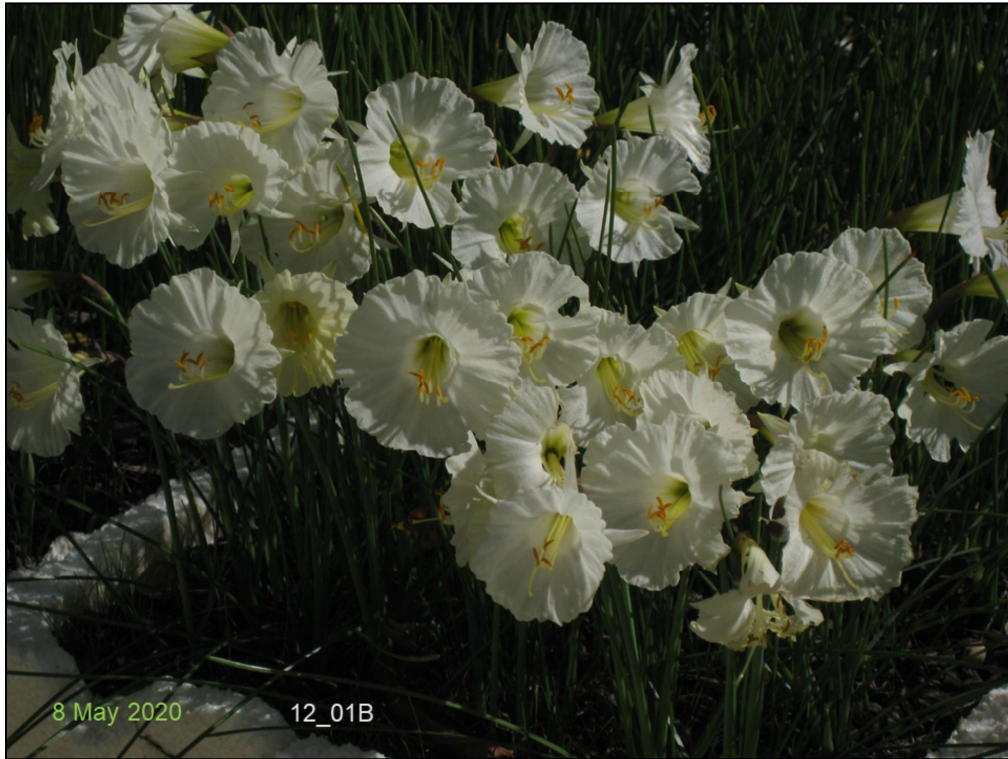


12\_01B

8 May 2020

My season starts in May. Of these 12\_01B is establishing itself as an exceptional variety.







It takes generations of breeding but early strongly colored yellows are very possible.

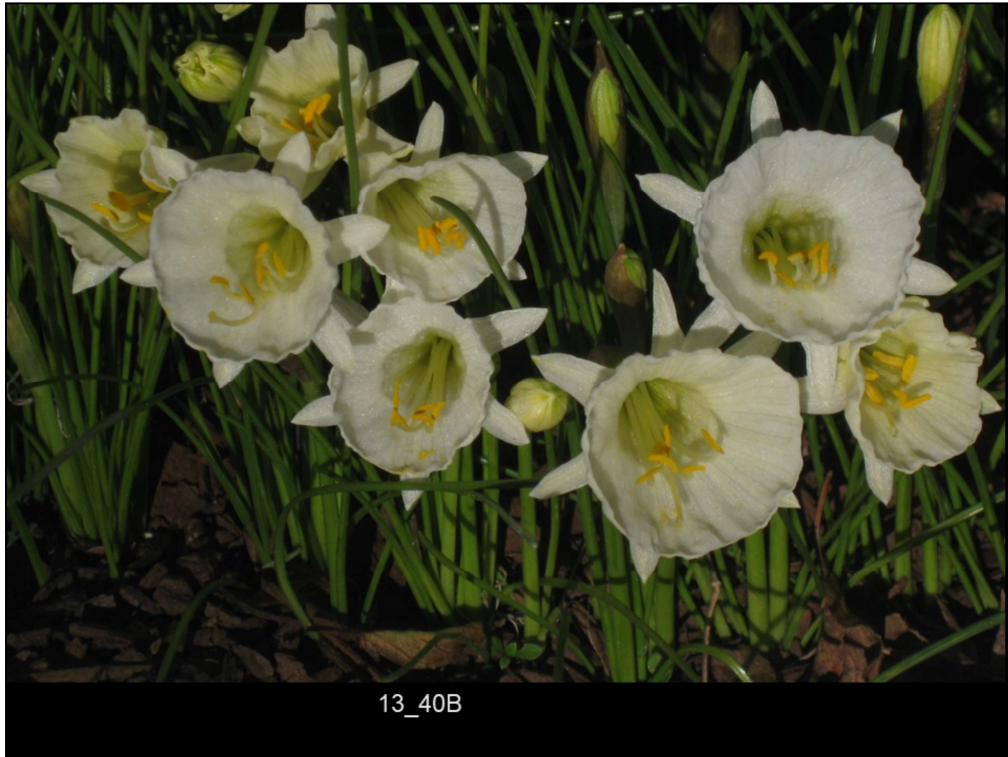


I have allowed myself just one indulgent photo of a mass of bulbocodiums.



05\_112B is one of my favorites. It is hardy enough to survive but is it is not explosively vigorous. It can form nice seedlings, with Gold Step (top) and other bulbocodiums so hopefully something more horticultural will come of it.





In the next few slides I have selected just a few photos of pure bulbocodiums. Some of these have broad enough perianths to be mistaken for inter-sectional hybrids.







17\_04B



17\_40B

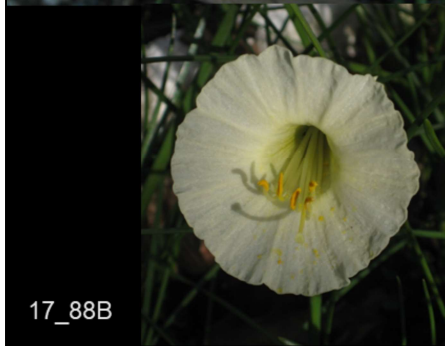




20\_26B



17\_81B



17\_88B



19\_02B









13\_78VB

Sterile  
*N. cantabricus*  
hybrids



03\_77B

These flowers get their broad perianth from *N. cantabricus*. Very few *bulbocodiums* are sterile but these are both sterile. Surprisingly 13\_78VB set seed last season in spite of being highly pollen sterile, so perhaps there is a way forward with such hybrids.



There are frills



And splits.

Some of these are showing hints of reasonable vigor.



The frill on 14\_05VB appears in the next generation. It is obviously a dominant characteristic and therefore easy to breed.

bulbocodiums x Gold Step hybrids



20\_44B



20\_53B

Bulbocodiums crossed with Gold Step hybrids can look a little different. They are not all perfectly fertile but I treat them as if they are pure bulbocodiums anyway.

Even Gold Step hybrids crossed with each other can produce seedlings that look like pure bulbocodiums and that have the fertility of pure bulbocodiums.





18\_13B



20\_28B



20\_45B



20\_27B



20\_56B

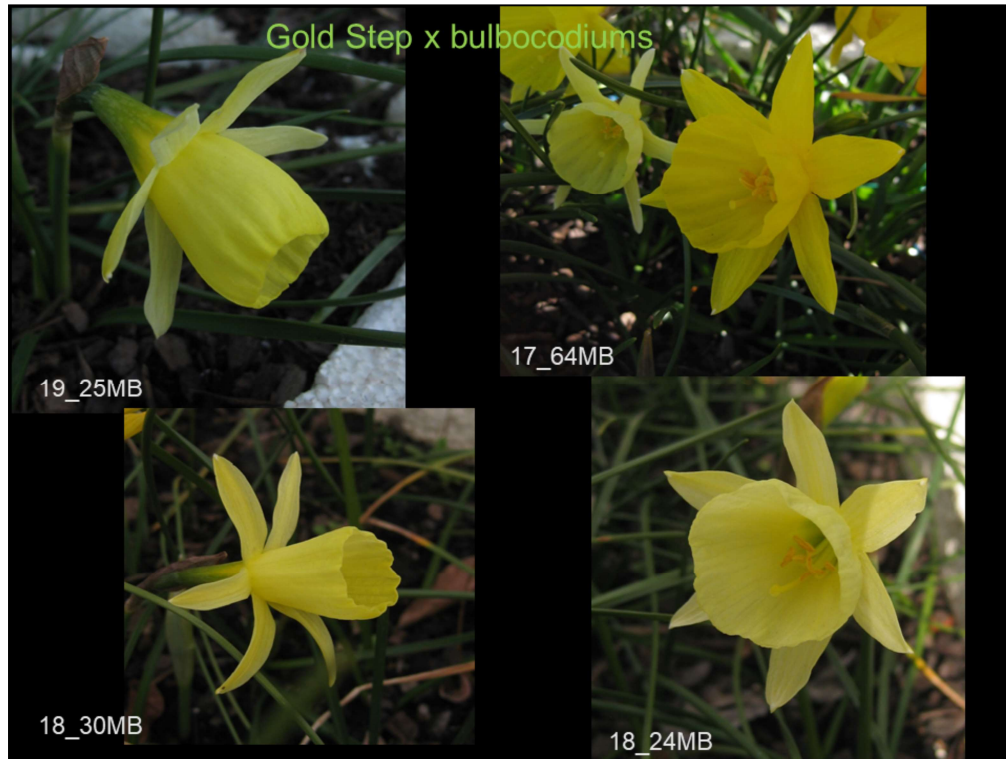


18\_59MB  
Gold Step x *N.*  
*hedreanthus*



18\_13MB  
Gold Step x *N.*  
*hedreanthus*

Graham Fleming reports problems with the fertility of *N. hedreanthus* hybrids. I put some of his pollen onto Gold Step and its hybrids and there are hints that some may have some slight fertility.



Gold Step crossed with bulbocodiums can produce fine flowers with workable fertility. When bulbocodiums with broad perianths are used one can obtain plants that are barely recognizable as bulbocodiums.



They can be big or miniature.





Bulbocodium genes seem to suppress orange but there are hints that orange bulbocodiums may be possible.

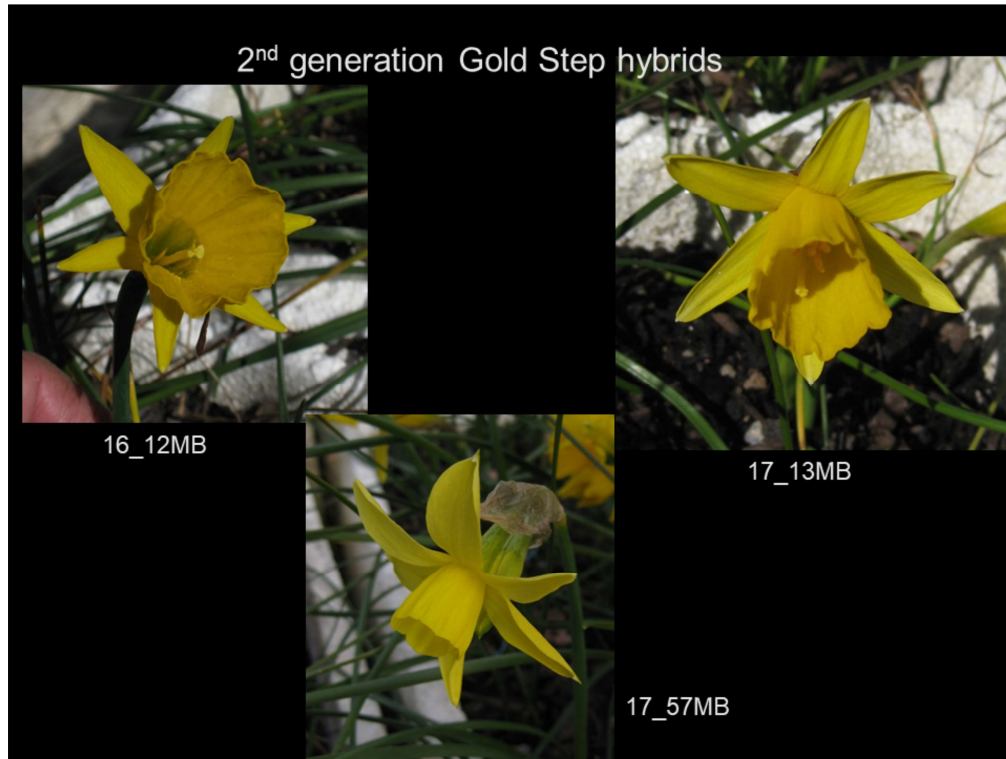


19\_48MB



19\_36MB





Second generation Gold Step hybrids are variable. Some are indistinguishable from bulbocodiums, except perhaps for their better substance. I think we can expect these hybrids to take over the show bench.

The pedigree doesn't say so but I expect 17\_57MB has triandrus breeding.



18\_01MB has flowered in June and behaves like a normal bulbocodium. Pushing these kinds of hybrids into the autumn looks very possible.





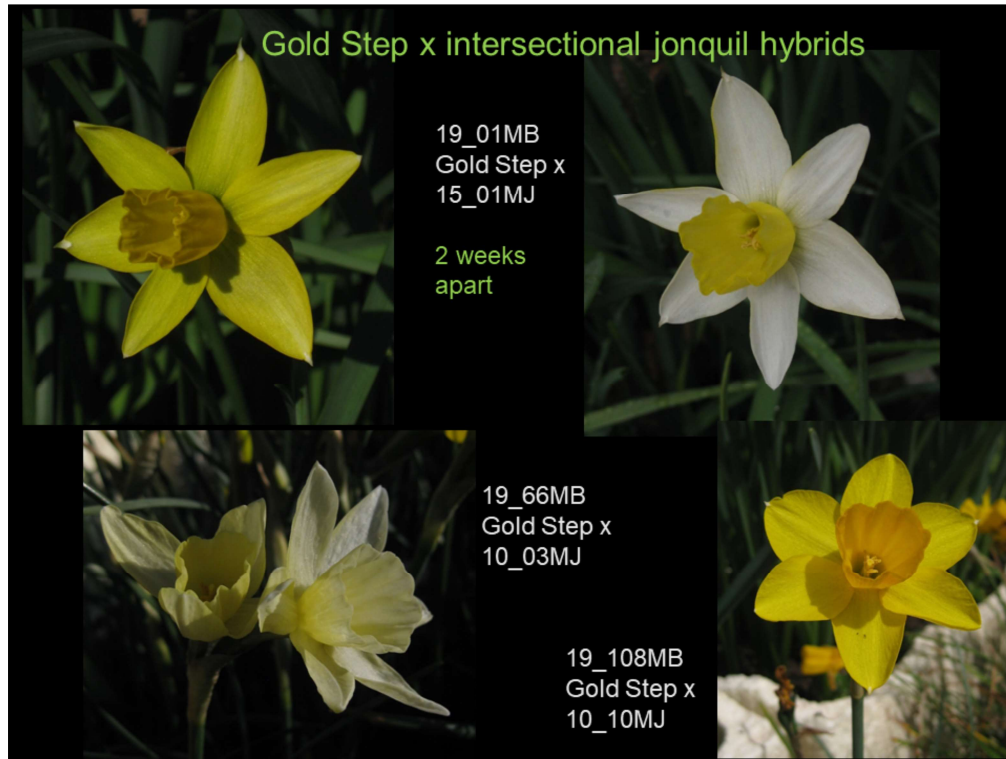
The hybrids can be uniformly yellow.



They can be pale to white.



To very white.



Gold Step can be crossed with lots of things. But there are hints that, apart from *N. triandrus*, it doesn't like diploids. *N. cyclamineus*, for example, repeatedly fails, as have the apodanthae.

Gold Step crossed with the intersectional jonquil hybrids produces flowers with wonderful vigor, sometimes orange, and inexplicably, there are hints some will try to set seed. This is a very unexpected and odd departure.

Gold Step x main division hybrids



13\_27MB



15\_26MB

When Gold Step is crossed with division parents the main division parent dominates.





15\_03MB reliably sets seed. Gold Stride is fully fertile - probably Gold Step selfed.



I treasured and pampered 18\_78MB only to cook it in storage in a tin shed. There are hints here that Gold Step might be used to breed hardy miniature doubles.



18\_06VMB



18\_10VMB

Intermediate 1W-Y and 1W-O seem possible.

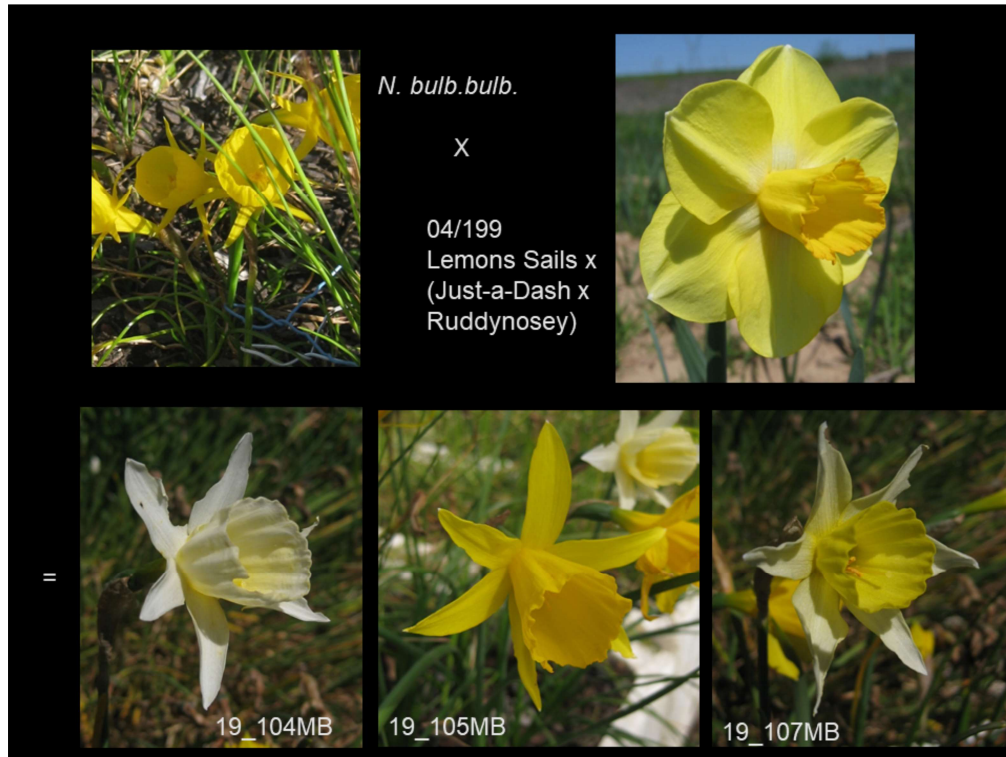


I don't yet have good reverses or pinks.

On the whole these hybrids are not as hardy as crosses with bulbocodiums, they are slower maturing and are not as fertile. This means I spend very little time with this kind of breeding.

I wrote a detailed article in the September 2019 ADS Journal on my bulbocodium hybrids. And also in 2018 on Daffnet.

The Theo Sanders link is to his June 2018 report that *N. bulbocodium graellsii* is a reliable parent for inter-sectional hybrids.



I was not able to confirm Theo's observation but was surprised to find a set of fertile end-of-season hybrids from *N. bulbocodium bulbocodium* crossed with a main division flower. It looks as if Gold Step will soon have lots of company, and division 10 breeding will explode in all directions.





I want to conclude with a flower that I think is my best development so far in bulbocodium breeding. The seed-parent 14\_44MB (probably Gold Stride selfed) looks like an unexceptional inter-sectional hybrid. The pollen-parent 13\_15MB (Gold Step x bulbocodium) is a high quality inter-sectional hybrid.

Combined they have produced seedlings that look like bulbocodiums.



The anthers and stigma are bulbocodium like, as is the plant and bulb. They are fertile, but have the substance and texture of well-bred main division flowers. It is my guess that this is the next step in bulbocodium breeding.



No headline is needed for this section. Bill Welch, who passed away a little over a year ago, is synonymous with division 8.

He had a lifelong passion to collect distribute and promote tazettas and there is no doubt he succeeded.

As a result of his efforts tazetta breeders around the world have a wealth of material available to them.

He used to rail in his letters about people wasting their time doing things that didn't matter when they could be doing important things like breeding tazettas. He was, of course, quite right.

The following slides are of things of his and I would like to mark them with silence.



09\_21T  
Autumn Colors



98\_18T  
Autumn Colors



19\_111T  
Welch tetraploid



16\_28T  
Welch tetraploid



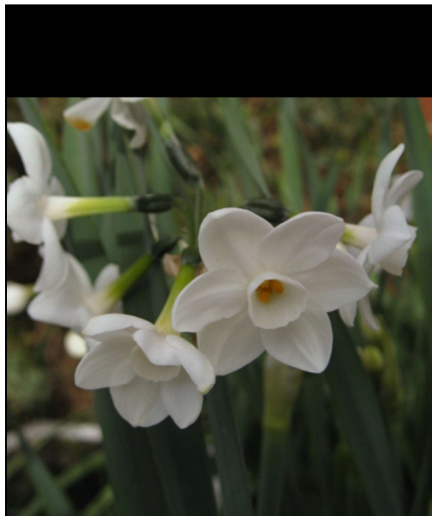


12\_09T  
"Frills Bills"



98\_25T  
Autumn Colors





98\_37W

Welch tetraploid paperwhites



14\_07W



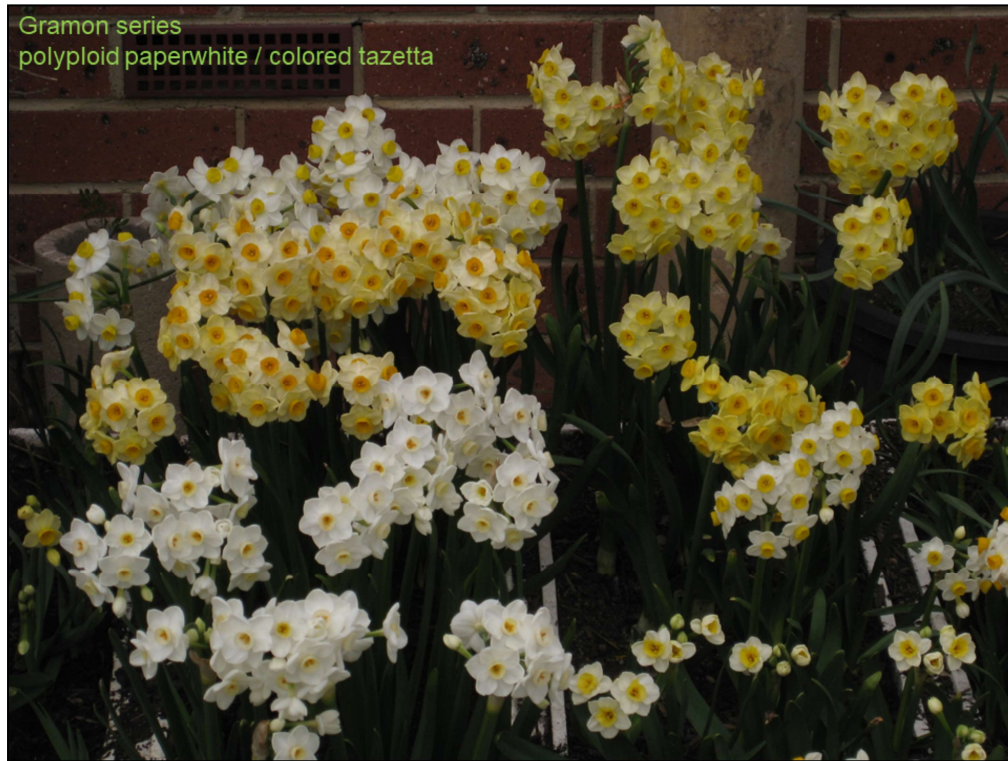
The tazettas are, in effect, 2 distinct sections with different chromosome numbers: - the all-white paperwhite group; and the group I will refer to as the “colored tazettas” (meaning yellow and orange).



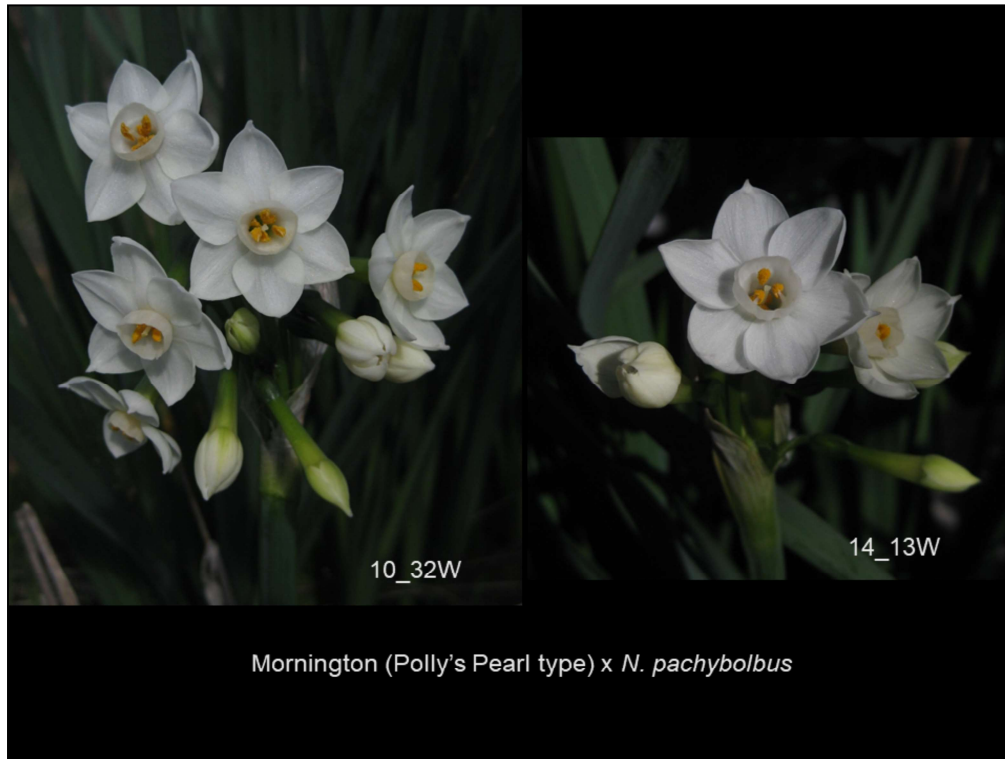
Hybrids between the two groups are highly sterile. Stars/Straws/Minor Monarch is an example, as are these new hybrids.

The effect of paperwhite is interesting. You can see that the intense elegans orange is almost completely suppressed and the color fades as the flowers age.





Some of the finest tazettas, however, are polyploid hybrids between the two groups. And these can have interesting and erratic fertility.



The mixed polyploid Polly's Pearl usually breeds like a normal paperwhite but sometimes some colored tazetta genetics slips through. The foliage can be green or the flowers not so white.



Taztep is a highly fertile mixed polyploid but it doesn't like paperwhite pollen. It is interesting that it has accepted pollen from the hybrid shown in the previous slide.

Goldate is an all yellow tazetta.

If white cups can be established in the colored tazetta group then the complete color palette would be available that enabled the breeding of pinks and the **fading** coronas of reverse bicolors in main division flowers, excepting that tazetta orange has the advantage of being sunproof.

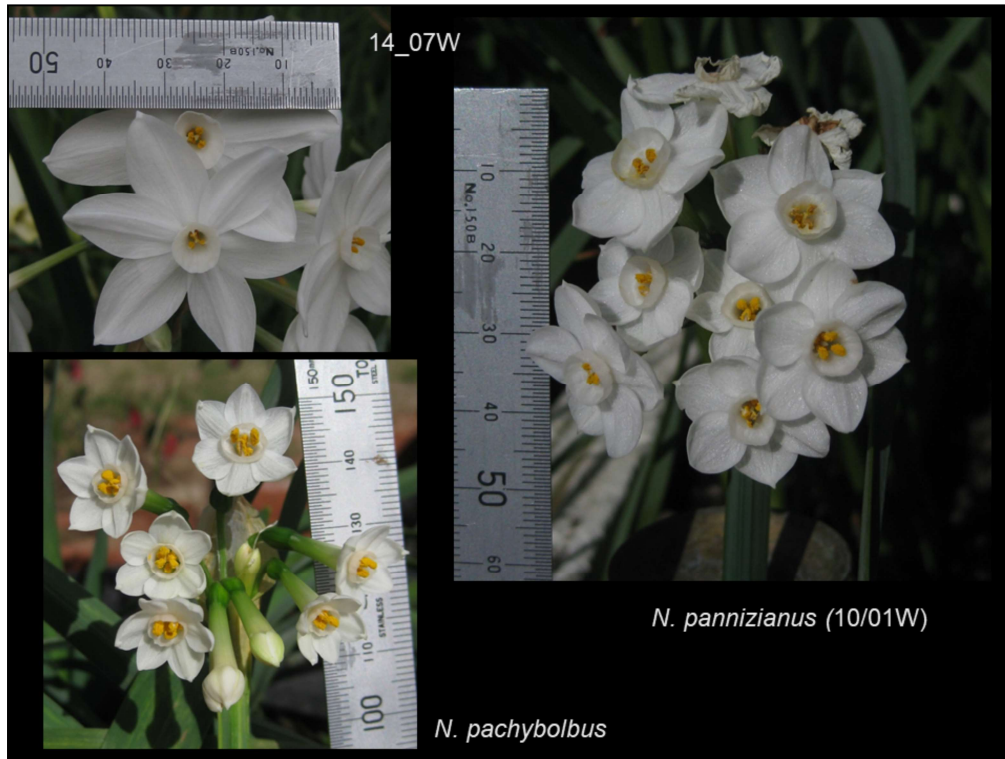


So my aim is to mix up the whites and yellows to see what happens.  
This hybrid is very mixed and may also include *broussonetii*.



Using polyploids to mix up paperwhite and colored tazetta genes is producing some very odd daffodils. There is no telling what will come of it.





All of which is to say: - the paperwhites are wonderful flowers and they matter.  
The range in size is huge.



The earliest paperwhite is the autumn flowering *N. broussonetii* (Harold Koopowitz). It is not that close to paperwhite but, unlike most things, it easily hybridises with paperwhites to produce seedlings that, to my knowledge, have some fertility. The advantage

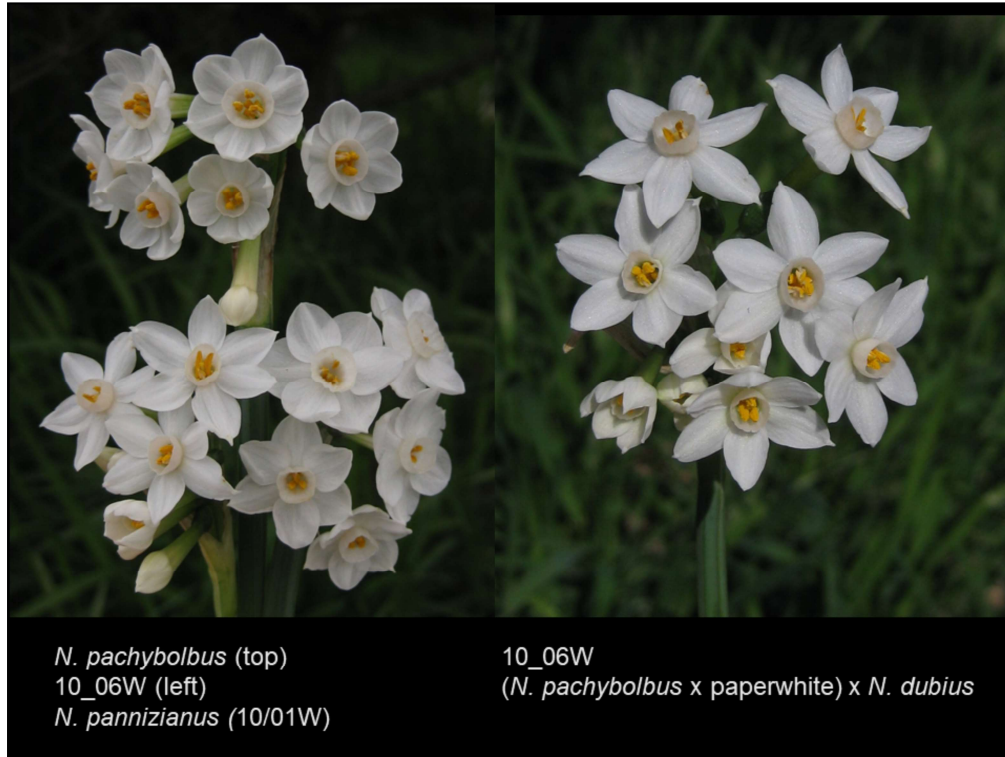
of *broussonetii* is that it is decidedly autumn flowering and it has a sweet perfume not at all like paperwhites.



Autumn Quartz 07\_01W is quite sterile, but my guess is that it is also triploid.



A cross between two perfect species gives a perfect hybrid.



Paperwhites also readily hybridise with *N. dubius*. Whereas *panniziannus* and *pachybolbus* are doubtfully miniature when well grown in a climate that suits them, it is my guess that some *dubius* hybrids can be consistent miniatures.





These hybrids are presumably genetically similar to *N. tortifolius*. It seems unlikely they will be useful for producing fertile intersectional hybrids, but crosses with small pinks might give very nice flowers



Most of my small tazettas are autumn winter flowering  
This is a sibling to Harold Koopowitz's Autumn Sprite.



06\_03T is another Autumn Sprite sibling. 19\_98T is small but it is too soon to know if it is miniature.



14\_03T is very close to being a green tazetta. It has reasonable vigor and is proving an interesting parent.



19\_08T is definitely miniature. I try to avoid inbreeding but this is from inter-crossing siblings from a Gold Stanza cross.

The is especially interesting because Fred Silcock once quoted Tim Jackson (David's father) as saying "You haven't got the best out of a cross until you've intercrossed siblings from that cross".





These are probably dwarf rather than miniature.



This is bred from a very nice dwarf tazetta from Will Ashburner (Hancock's) and a miniature autumn-flowering tazetta lacticolor – the parent of the Autumn Sprite group.



01\_01T one of the few things I have from Canaliculatus and it seldom flowers. It's pollen suggests it is diploid. It was crossed with Taztep with a view to producing superior miniatures. The pollen of 19\_33WT looks too good for the cross to be true, but perhaps this is a step forward.



12\_30T is a poor miniature, probably from *Odoratus*. It was grown in the 1990's and given one last chance in 2012. It looks approximately diploid. It too was crossed with Taztep. Perhaps this too may have its uses.



I'm not sure how many fertile hybrids Keira Bulbs have near or in show season but I think it likely they are much closer to this goal than I am. They have a lot of very nice dubious hybrids but I have tried not to include them because I assume they are not breeding flowers.





Keira Bulbs photos



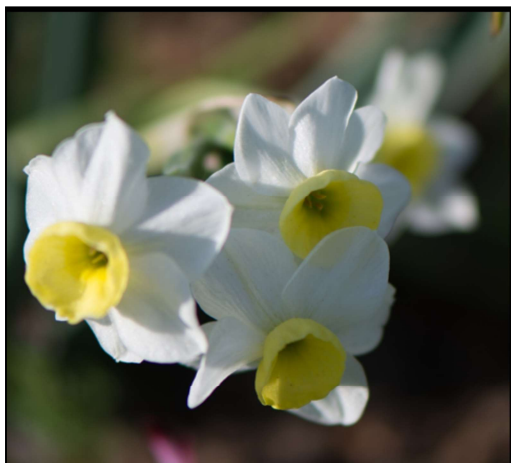


From Bill Welch seed

Keira Bulbs photos



Keira Bulbs photos  
Dwarf species



Keira Bulbs photos



A miniature fertile tazetta at this time of year is, for me, unheard of.





My tazetta season begins 6 months earlier in the autumn with elegans and the Autumn Colors hybrids.



Tazettas don't usually flower in February unless they are forced by putting them in the shade and watering them, or they are triggered by a summer hailstorm.

Elegans hybrids usually flower first but non-elegans hybrids can flower earlier if it is cool and wet.



I have put the month in which the photo was taken. This gives a rough idea of when they flower.



Feb

15\_03T



16\_01T









The hybrids are getting very close to 8O-O.





18\_30T was a poor plant. It has been crossed with things that should improve this color break.



To my eye, even though the coloring is not uniform these are very attractive. These are the sorts of parents that have been used to improve the flower in the previous slide.





Mar

19\_05T

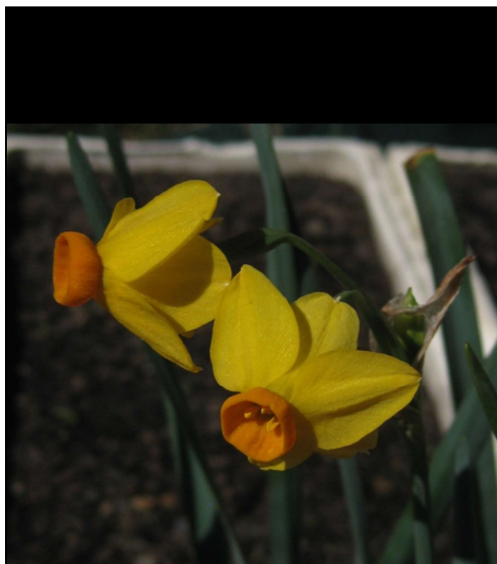


19\_12T





Just as reflex is common in division 7, so too is it common in division 8.



19\_15T

Mar



20\_16T









Mar

20\_35T



19\_109T



Mar

20\_07T



20\_29T



Mar

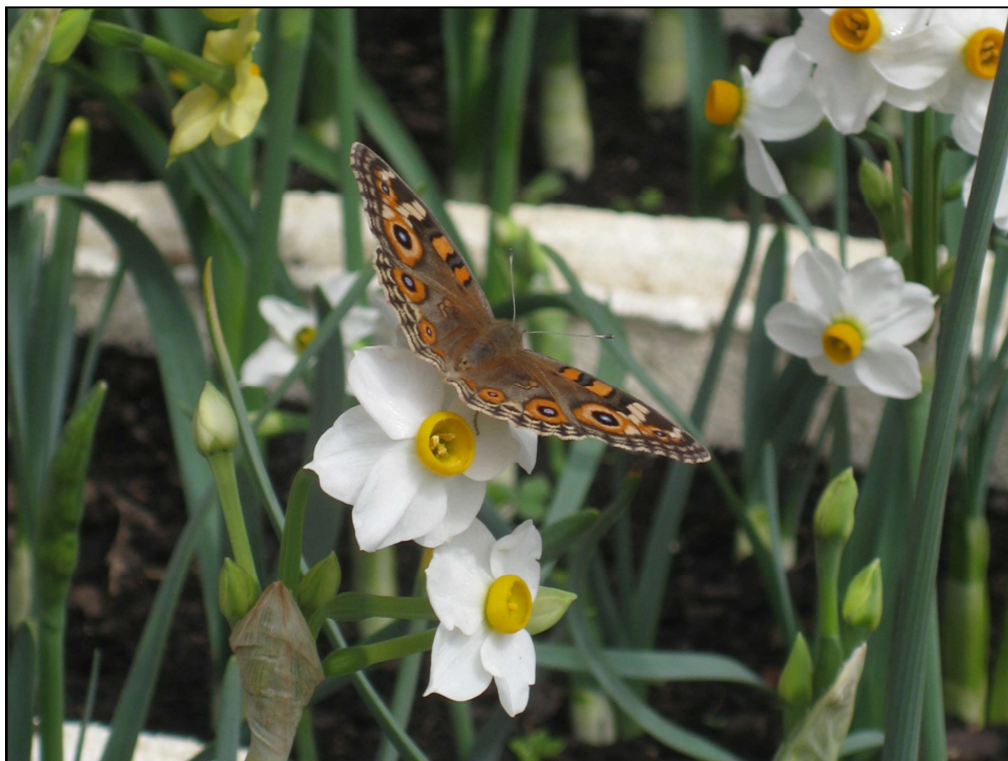
19\_11T



19\_72T









These are April photos. The broad petals on Bill's 17\_15T are just wonderful.



Elegans hybrids can naturally reflex. 18\_42T is one of Bill's long cups made earlier and more intense using elegans. (A very fine autumn cyclataz looks possible).



Apr

18\_58T



18\_42T  
Tanz 10\_47T









The frill that produced Frills Bills is clearly a dominant characteristic that appears in each generation.

The first seeds ripen in April. These can be planted immediately and a good percentage will sprout in the same season.





16\_18T is one of my favorites and I look for it each season but as a plant it is too modest to be a really good variety.



I almost threw this away. It took years to flower, it had muted color and it was not true to cross. Jane liked it and convinced me to keep it. It added one floret at a time to an ever increasing cluster until it became one of the most impressive tazettas in my collection.





For me March April are peak season. As a rule of thumb crosses after mid April will be destroyed by frost. In milder climates a much wider range of flowering times would be possible.

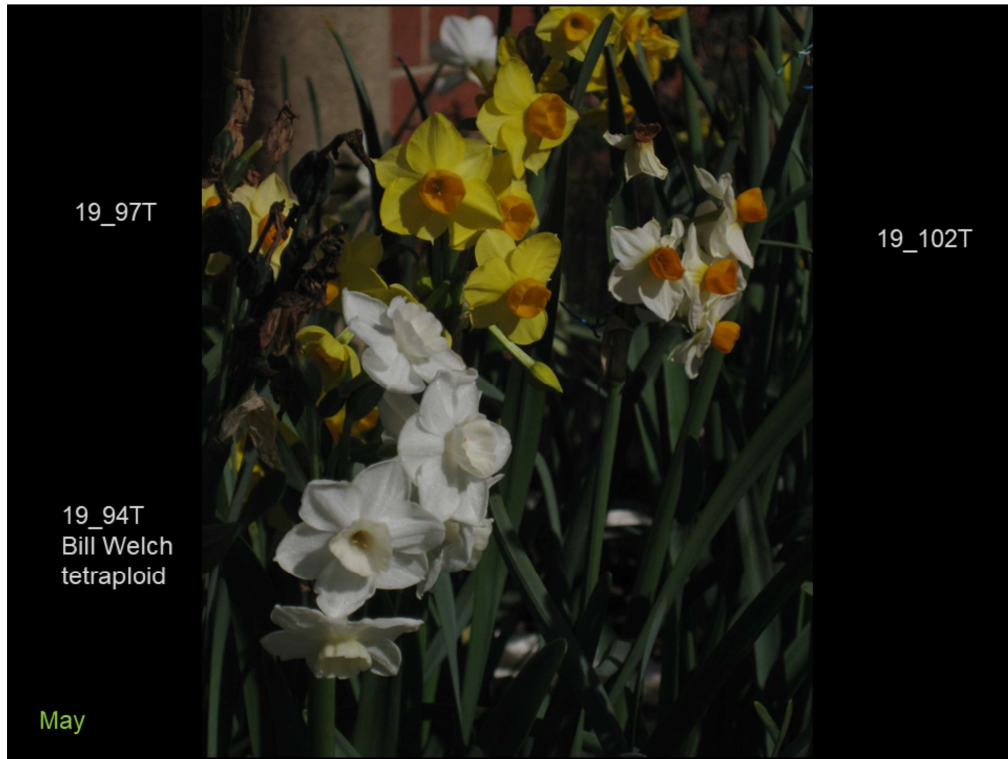




May 17\_35T Bill Welch tetraploid



17\_36T



19\_97T

19\_102T

19\_94T  
Bill Welch  
tetraploid

May



19\_82T

May



15\_23T









09\_35T is a sibling to 09\_29T which can flower in February. This one can just as easily flower in March.





Most of Bill Welch's Autumn Colors will not flower in the autumn if it is dry. Here it often **is** dry in the autumn. As a result they flower mid-winter, get badly frosted, and do poorly.





I have produced a couple of sterile cylataz from flowers such as these. They certainly look different.



I have a special affection for Goldate because self yellows are so rare. And, of course, I want to breed a reverse bicolor from it.



In 2001 Wilf Hall sent me some tazetta seed. These flower in winter and it was not until 2013, which must have been a mild year, that I was able to select many of them.



Jul-Aug

13\_66T

From Wilf Hall seed



12\_20T



07\_19T

Jul-Aug

From Wilf Hall seed



07\_30T





Jul-Aug

13\_96T

From Wilf Hall seed



13\_94T



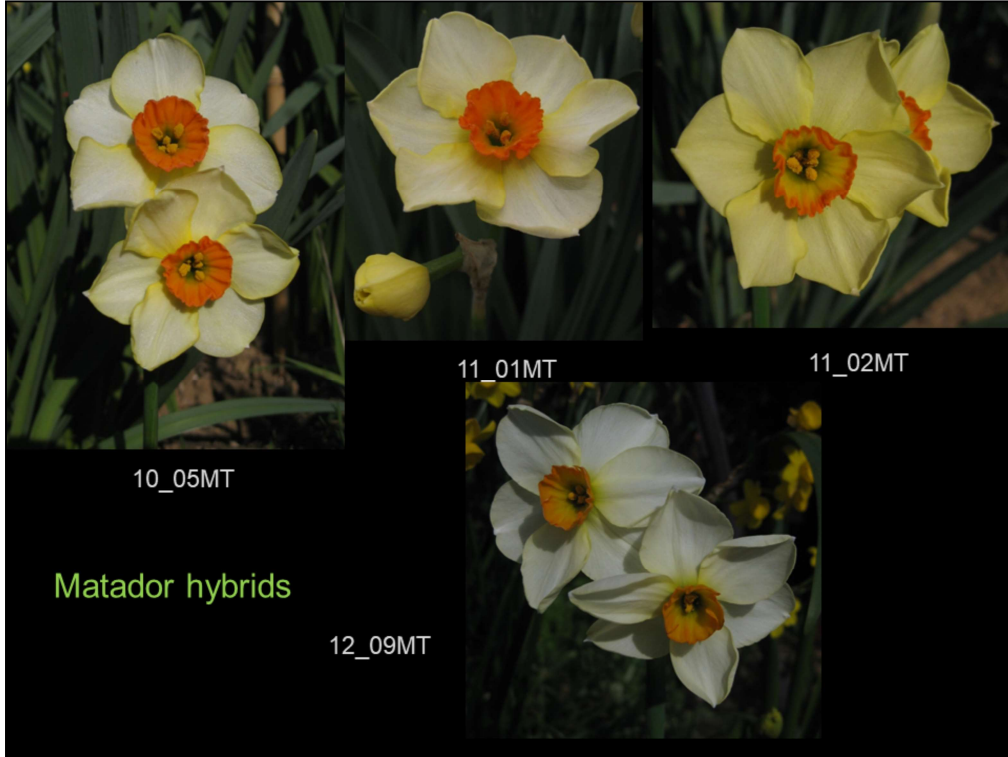
13\_107T

Jul-Aug

From Wilf Hall seed



My best fertile intersectional tazetta hybrid is Nomatta. Genetically it is like Matador but here it is more vigorous and sunproof. I have had no success with tetraploid paperwhites so all my fertile intersectional tazetta hybrids are of this type.



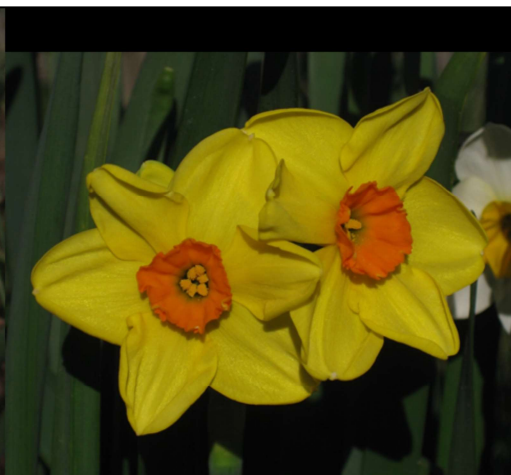


These are probably true to cross and have some fertility but I don't have much success with them and the seedlings take a long time to flower.

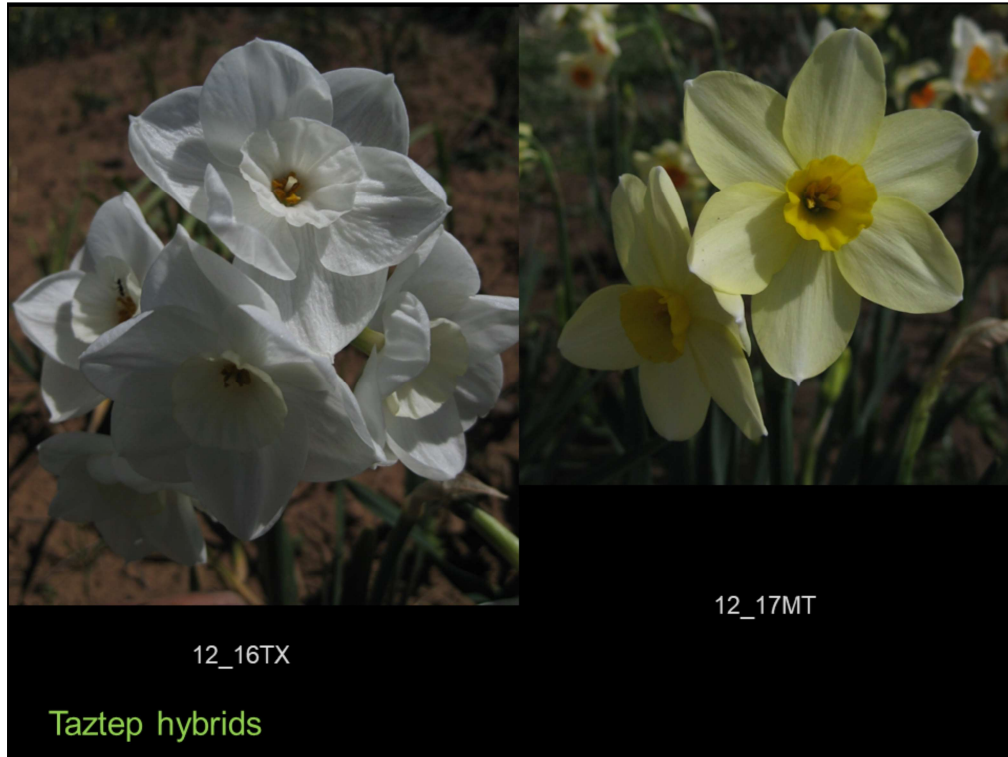




08\_08T  
Matador x  
Welch 95/1



12\_18MT  
Welch 95/1 op (Bill Welch seed)  
Matador x [(Autumn Sol x Ballymarlow) op]



I used the code TX instead of MT for hybrids when I thought they were sterile. This hasn't proven to be a good system. The Taztep hybrids shown here have faint fertility

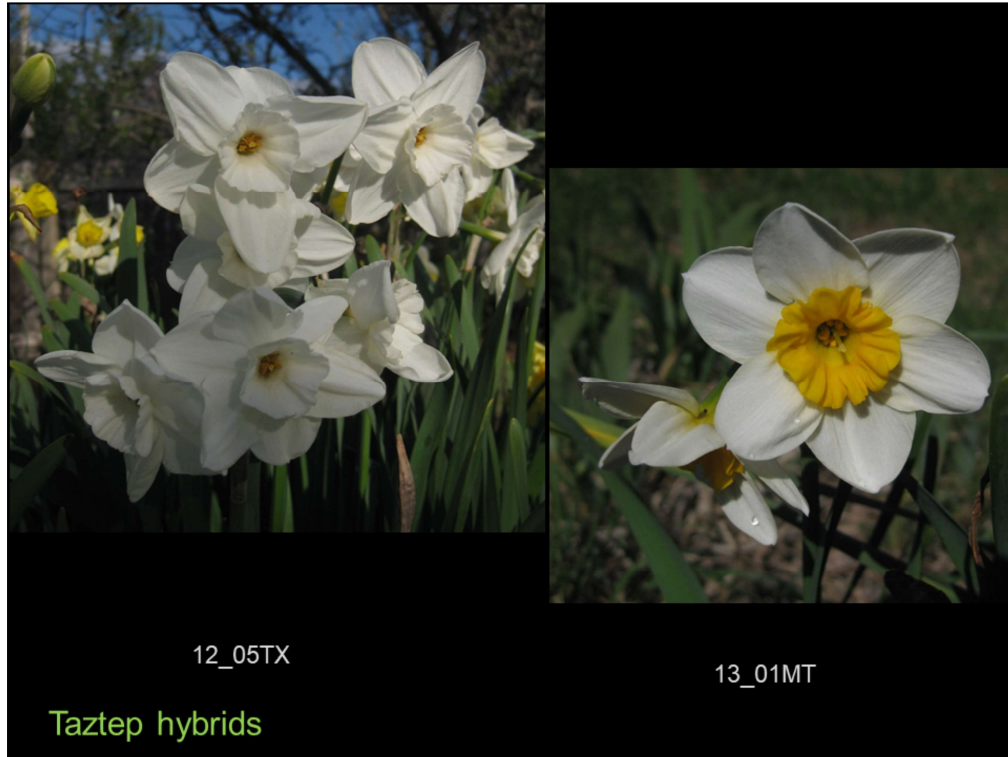


13\_13MT



11\_01TX

Taztep hybrids



By far the most fertile Taztep/main division hybrid is 13\_01MT, so good fertility is possible but this is the only example.



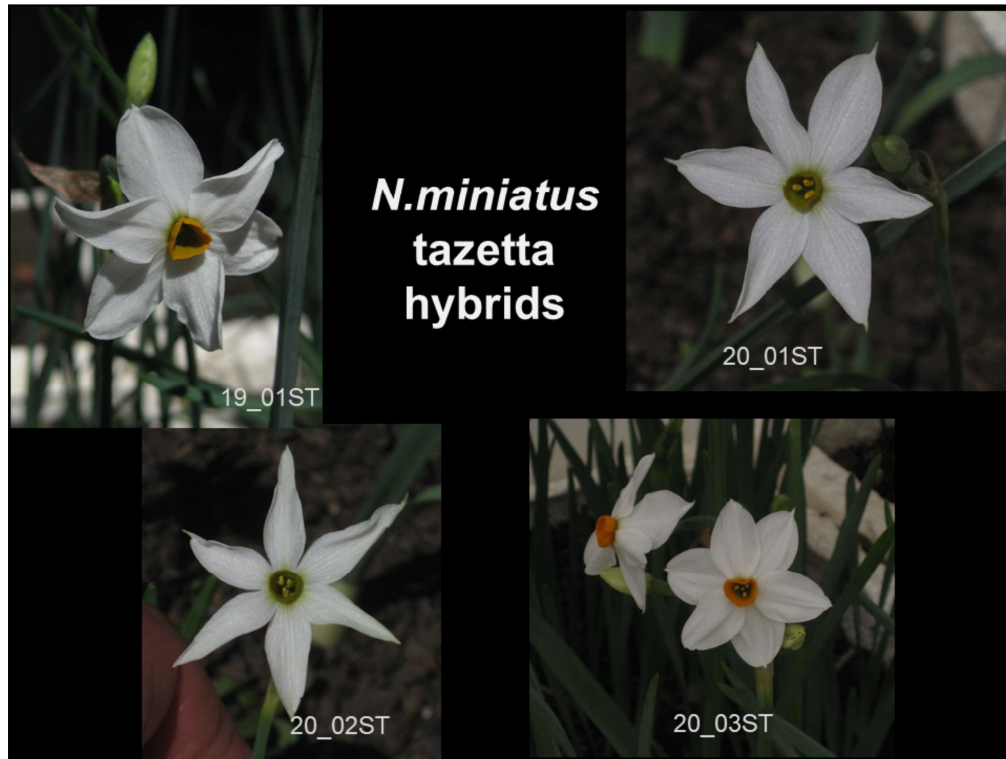
13\_01MT was crossed with Matador types in the hope of fertile hybrids. So far this has been a resounding failure. These hybrids are nice plants but they are highly sterile. Taztep is not a miracle parent for breeding fertile intersectional hybrids.





A couple of amusing things happened last season. I managed to convince myself that the pink genetics had given faint purple inside the tube of 19\_19MT.

And finally a Taztep hybrid appeared that really did have some pink. Unfortunately just one pollen grain “sprouted”. I don’t think Taztep is going to produce fast growing fertile intersectional hybrids any time soon. Growers who have tetraploid Newton would be well advised to use it for this purpose.



One of the problems with breeding Matador type hybrids is the high chromosome number. They are slower growing and slower to mature.

The autumn flowering *N. serotinus* is not technically a tazetta, but it may be the answer to this problem.

I don't have *N. serotinus* but it is present in *miniatus*. And in 2019 some *miniatus* tazetta hybrids flowered that, to my surprise, showed some fertility. Presumably these hybrids are 2 parts tazetta and one part *Narcissus serotinus*. They look like they may be quite vigorous, perhaps even more so than *miniatus* itself.



Just as *N. elegans* and *bulbocodiums* have had valuable contributions to make to daffodil breeding, so too might *serotinus*. With its much lower chromosome number it may be the best means of obtaining vigorous tazetta-like autumn flowering intersectional hybrids. Crossing main division flowers with *N. serotinus* may an important new adventure in daffodil breeding.



I want to finish by thanking the ADS for giving me this opportunity and for the support they have given me.



19\_02ST

I particularly want to thank Lynn Slackman who has been my trusty pilot through this presentation.





And thanks to everyone who has shared this adventure with me.



Thank you.