

Breeding miniatures

Presented by Graham and Helen Fleming (Keira Bulbs)

KEIRA BULBS

Breeding miniatures

Keira Bulbs has been breeding miniatures for around 30 years now. The propositions that represent some of what has been learnt during this period are:

1. Think small – obtain small breeding stock
2. Obtain fertile breeding stock unless you intend being the person who gets a few seed in many years of hybridizing.
3. Proportionality
4. Color
5. Fertility
6. Role of standards and intermediates

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At the outset I should point out that if you have trouble growing species like *N. cyclaminus* and NTT then the best option is to use fertile miniature hybrids to breed with. They are hardier than the species. Keira Bulbs is in the happy position where use of the species is not essential to many of our hybridizing programs because we have seedlings that have been bred from the species to work with. The best thing about working with hybrids is that they can produce diverse seedlings because of the complex parentage involved.

I have not gone into using autumn flowering species and their hybrids to produce spring flowering miniatures. Our climate is very marginal for some of these because of our heavy frosts. We would need a glass house to be further hybridizing in this area.

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There are three things that can greatly assist the hybridizer;

- The first is to time shift by putting pollen or flowers in the refrigerator and then using the pollen up to 6 weeks later.
- The second way of time shifting is by planting out late.
- The third way is for nature to get bulbs to flower unusually early or late.

Another way that I don't recommend and don't do is to take someone else's pollen without their permission.

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**The tools of trade for the
hybridizer**

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Division 1 – Miniature Trumpets

Breeding miniature trumpets is not overly difficult. First you need *N. asturiensis* or something equivalent like a version of Mini-cycla (*N. asturiensis* x *N. cyclamineus*). *N. asturiensis* will give short stems and small flowers which are key to breeding miniature. *N. cyclamineus* can grow quite tall and even the flowers on an old bulb can be quite large.

You then need something to cross with your *N. asturiensis*:

- *N. Minor* and any of the named clones of *N. minor*
- 'Gipsy Queen'
- 'Candle Power'
- and many more ...

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Division 1 – Miniature Trumpets

Most of these crosses that don't have standards or intermediates in their parentage will all give diploid seedlings which can be crossed with each other. Growers like us have lots of fertile seedlings so the need to use the species is greatly reduced. This is a good thing as the seedlings are more likely to have some hybrid vigor and will often be hardier than if the species is a parent.

To get color into your miniatures you need to have some small daffodils to cross with them. For white pink miniatures start with 'Pink China' or 'Brooke Ager' if you don't have access to one of Rod Barwick's miniature 1W-P's. The important thing to note is that crossing a diploid miniature with a standard daffodil that is a tetraploid will produce a triploid that will be difficult to breed with.

Miniatures are just like standards. Some are very fertile while others are simply a waste of time as a parent. Unfortunately, it is often a matter of learning over time although Daffseek.org can be useful in some cases.

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Division 1 – Miniature Trumpets

Timing is also a big issue with miniature. Most miniatures flower early season. You can refrigerate them so their pollen can be put on later flowering standards and poeticus. The last miniature species to flower here is our miniature N. poeticus but the last trumpet to flower is N. nobilis spp. primagenus dwarf form.

What characteristics do we want in our Division 1 miniatures:

- Small – 6-8 inches in height;
- Good texture and substance;
- Good petal coverage and form;
- Strong stem;
- Flower at 90 degrees to stem;
- Flower in proportion to stem –i.e. small;
- Multiplies well;
- Floriferous;

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Division 1 – Miniature Trumpets

Generally speaking we tend to produce miniatures that are at the smaller end of miniature rather than borderline miniatures.

At Keira Bulbs we also have produced a number of very good micro minis that are excellent for breeding down with . Some of these are shown below.

Another rule that applies to all miniature breed is to use quality parents. Bad x Bad will produce Bad seedlings. Put bluntly, you are wasting your time if you use rubbish parents. If it has widely spaced petals and there are flowers with much better petals use the one with the good petals.

A real challenge is the use N. alpestris to get standard miniatures! The way the flower holds its head is a hybridizing challenge. N. alpestris is very white so there are some reasons to use it to breed with.

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**KB 1W-Y MINIATURE
SEEDLING**



**KB 1W-W MICRO MINI
SEEDLING**



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**KB MICRO MINI 1W-W
SEEDLINGS**



**KB MICRO MINI 1Y-Y
SEEDLING**



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**N. NOBILIS SUBS.
PRIMAGENUS**



**SAD HUSSER FROM
GBF**



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**KB MICRO MINI 1Y-W
SEEDLING**



**KB MICRO MINI 1Y-Y
SEEDLING**



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**KB MINIATURE 1Y-Y
SEEDLING WITH GOOD
PETAL COVERAGE**



**KB MINIATURE 1Y-Y
SEEDLING**



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**KB MICRO MINI 1Y-Y
WITH GOOD PETAL
OVERLAP**



**KB MINIATURE IW-Y
WITH GOOD PETAL
COVERAGE**



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KB MICRO MINI 1Y-W



KB MICRO MINI 1Y-W



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Division 2 – Miniature Large Cups

Division 2 miniatures are more of a rarity than trumpets.

One of the most certain ways of producing miniature large cups is to cross a micro mini trumpet with a small intermediate large cup or small cup.

A lot of Division 2 flowers are single headed jonquil hybrids!

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**GBF INTERMEDIATE
3W-YOO SEEDLING**



**KB INTERMEDIATE 3W-
YYO SEEDLING**



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**SOME GBF
INTERMEDIATE 2Y-O
SEEDLINGS**



**KB INTERMEDIATE 2W-YYO
SEEDLING WITH EXCELLENT
PETAL COVERAGE**



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**GBF INTERMEDIATE
3W-O SEEDLING**



**GBF INTERMEDIATE
2W-YOO SEEDLING**



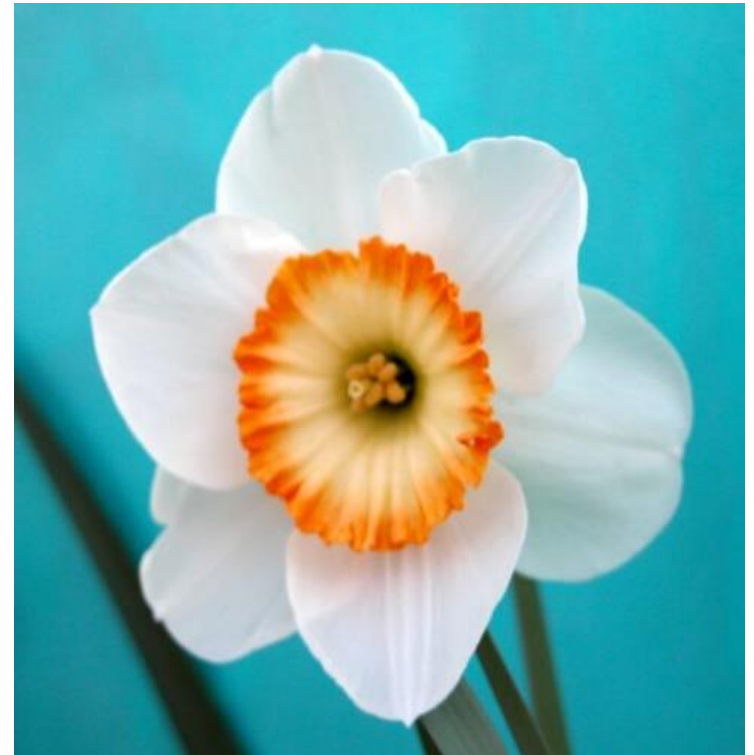
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**KB INTERMEDIATE 2W-
Y SEEDLING**



**KB INTERMEDIATE 2W-
YYO SEEDLING**



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Division 3 – Miniature Small Cups

Breeding Division 3 miniatures is all about having the right seed parents and then the right miniature or intermediate pollen parent. It should be easier with the increasing range of miniature poeticus becoming available.

Most of the Division 3 hybridizing has focused on *N. watieri*, *N. rupicola* and *N. atlanticus*. Most of our *N. rupicola marvieri* are not of good quality, so we have not used it for breeding. Does anyone have a really nice form of this species?

We have done some Division 3 breeding and hope to do more in the future using our miniature poeticus.

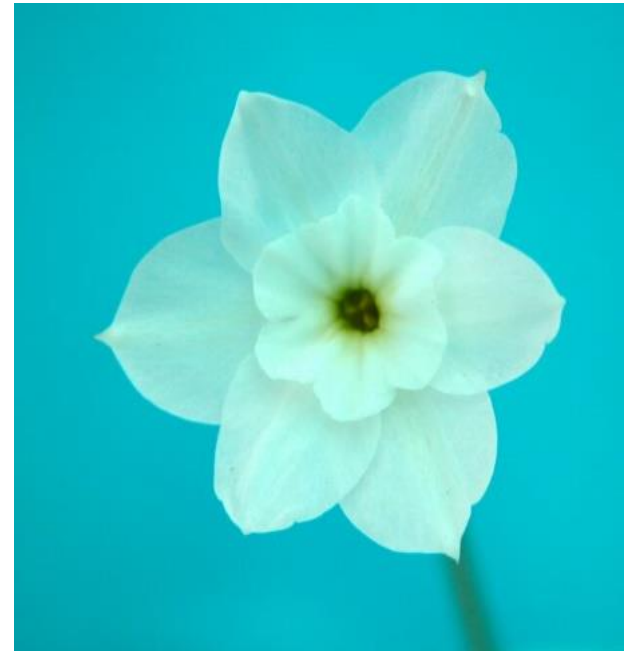
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**N. RUPICOLA
EXHIBITION FORM**



**N. WATIERI
EXHIBITION FORM**



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**N. ASSOANUS SSP
MINUTUS**



**Kb INTERMEDIATE 3W-
R SEEDLING**



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**N. RUPICOLA
MARVIERI**



N. ATLANTICUS



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Division 4 – Miniature Doubles

The key to breeding miniature doubles is having a good seed parent that is miniature and pollen from a small intermediate double. Years ago we have a Fortescue with pollen but did not realize that we should use it on our miniatures. Fortescue has not produced pollen that we could use since then! However, we keep trying with our own intermediates and we have flowered some doubles and lost a couple.

We have bred 2 miniature 4W-P seedlings and managed to lose both of them. The technique we used was to cross an intermediate 4W-P with *N. fernandesii*.

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**KB DOUBLE SEEDLING
THAT IS LESS THAN
50MM IN DIAMETER**



**THE DOUBLE IS ON A
MINIATURE STEM**



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**GBF 42-2007 (PINK
CHINA X SWAGGER)**



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**KB INTERMEDIATE 4W-
WOW SEEDLING**



**KB SEMI-DOUBLE
MINIATURE SEEDLING
THAT HAS POLLEN**



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**KB INTERMEDIATE 4W-WOW
SEEDLING THAT IS VERY
FULL AND HAD POLLEN**



**KB INTERMEDIATE 4Y-
YOY SEEDLING WITH
PISTIL**



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**KB INTERMEDIATE 4Y-
Y SEEDLING**



**N. NARCISSUS
PSEUDONARCISSUS
MOSCHATUS PLENUS**



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**JACK RIPPER BRED BY
GBF**



**KB MINIATURE 4W-WPW
THAT HAS BEEN LOST**



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**KB'S BEST
INTERMEDIATE DOUBLE**



**SIDE VIEW OF KB'S
BEST INTERMEDIATE
DOUBLE**



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**N. JONQUILLA FLORA
PLENA**



**KB MINIATURE 4W-WPW
SEEDLING THAT HAS GONE
TO DAFFODIL HEAVEN**



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Division 5 – Miniature Triandus

To breed miniature triandus you need to be able to grow Narcissus Triandus Triandus (NTT) and Narcissus triandus concolor. The NTT should be a particularly small form if you want to breed miniatures as there are quite large forms of NTT. We are fortunate enough to have particularly small forms of NTT and Narcissus Triandus concolor.

We are working to miniaturize our standard fertile 5W-Y seedlings by crossing them with our smallest NTT and NTT concolor. This will be a long slow process but should result in increased hardiness. A lot of people have trouble growing the species so hybrid vigor would be of assistance.

We have produced a lot of Division 5 miniatures but so far, no high quality 5Y-R, 5W-P or 5W-O seedlings but we are working on it.

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**KB MINIATURE
TRIANDUS SEEDLING**



NTT



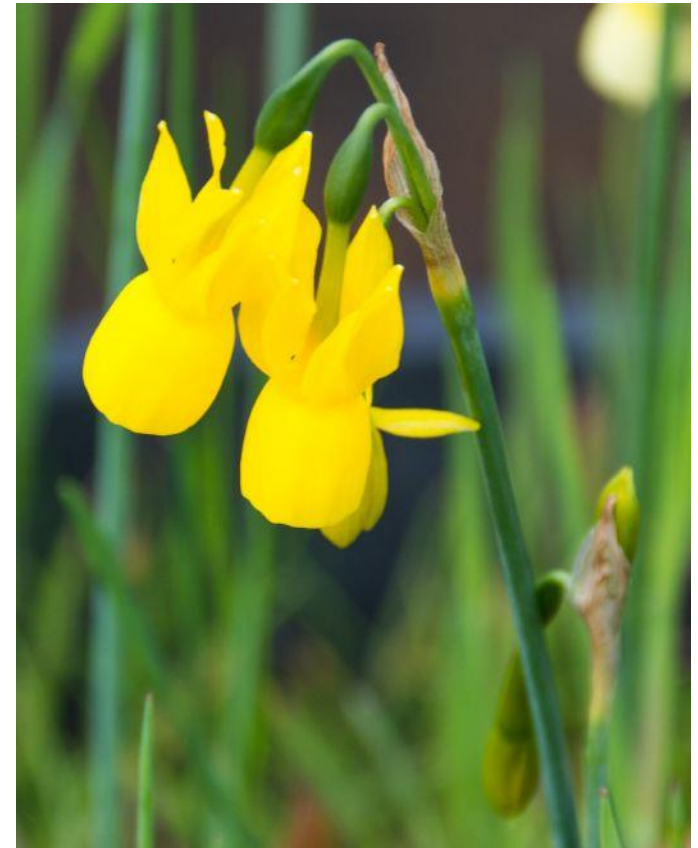
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**TINY KB 5Y-Y
SEEDLING**



**N. LUSITANICUS (SYN.
N. T. CONCOLOR)**



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KB-M-64-91-1ZR



**LOTS OF KB MINIATURE
TRIANDUS HYBRIDS IN
FLOWER**



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N. T. SSP PALLIDULUS



LATE FLOWERING NTT



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**KB 5W-W MINIATURE
SEEDLING**



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Division 6 – Miniature Cyclamineus Hybrids

Breeding miniature cyclamineus hybrids can be approached by the following means:

- First cross a miniature cultivar such as 'Gipsy Queen' with N. cyclamineus. This will result in a miniature seedling that will be fertile as parents are both diploids.
- Cross a Division 6 cultivar such as 'Turland Gold' with N. cyclamineus. As 'Turland Gold' is fairly fertile this will most likely result in a fertile miniature, but size and height may be a problem as N. cyclamineus does not miniaturize seedlings.
- Cross a Division 6 cultivar such as 'Turland Gold' with Mini-cycl.

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Division 6 – Miniature Cyclamineus Hybrids

The range and quality of true intermediates (ones that have short stems as well as small flowers and these are not usually failed standards) has greatly increased. The ones to use for hybridizing are 2W-P's 2W-O and 2Y-R's that have a great depth of color as this is more likely than not to carry through to your seedling's. They should be crossed with short trumpet cyclamineus hybrids like 'Little Yoshiko' (see photo below).

Miniature cyclamineus hybrids are often very early or early flowering so refrigerating flowers can provide pollen for those desirable mid-season or late season flowering intermediates.

There are some miniatures that flower much later than the norm and these are like gold for the keen hybridizer. The last of the miniature 6W-W's to flower for use is often 'Swagger'. It should be used as a pollen and seed parent. It should be noted that you are more likely to end up with a miniature when it is used as a seed parent than when used as a pollen parent unless the pollen is being put onto a miniature or very small intermediate.

Another late flowering miniature that should be used for hybridizing is 'Snook'. 'Snook' has complex breeding in its parentage so that means you can get a range of flowers from it.

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**VERY NICE KB 6W-Y
MINIATURE SEEDLING WITH
NICE PETAL OVERLAP**



**KB 6Y-O MINIATURE
SEEDLING**



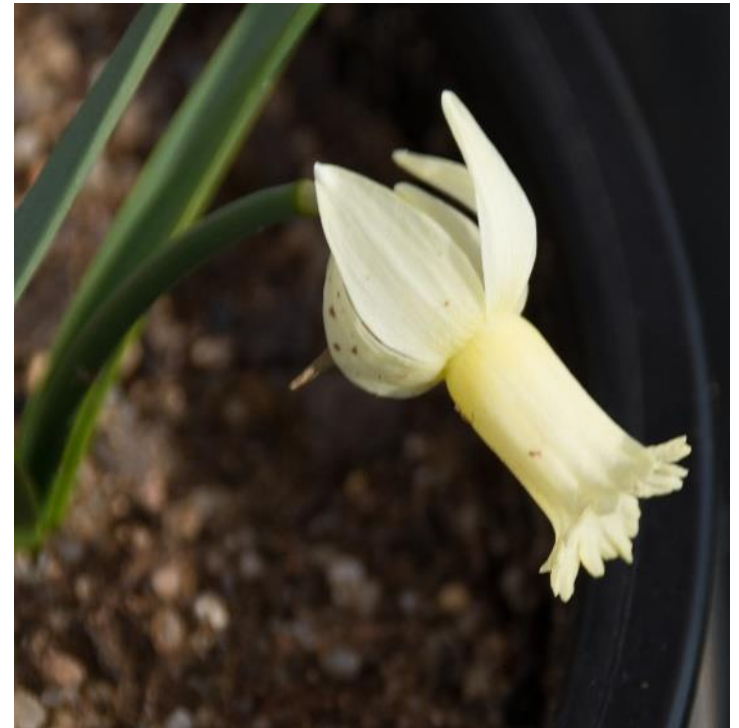
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LITTLE YOSHIKO



GOOD FRIEND



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**KB MINIATURE 6Y-W
SEEDLING**



**KB MINIATURE 6W-WPP
SEEDLING OF GOOD
COLOUR**



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Division 7 – Miniature Jonquilla Hybrids

Keira Bulbs has done lots of miniature jonquilla hybridizing over the years. A good selection of species is a good starting point. Some of the following are a good start:

- *N. dubius* small form
- *N. fernandesii*
- *N. cordubensis*
- *N. scaberulus*
- *N. gaditanus*
- *N. Calcicola*
- *N. Jonquilla* (as many different forms as possible)
- *N. rupicola*
- *N. atlanticus*
- *N. watieri*
- *N. Wilkommi*
- *N. assoanus*

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Division 7 – Miniature Jonquilla Hybrids

It also helps if you have a lot of fertile hybrids to work with. We have developed a lot of fertile jonquilla hybrids, so we have plenty of flowers to work with. Very few of our fertile Div. 7 hybrids are in commerce so it is not easy to replicate our hybridizing in this area. However, Some of the small cultivars that are available are:

- 'Regeneration'
- 'Perpetuation'
- 'Quickstep'
- 'Hillstar'
- 'Intrigue'
- 'Pink Step'
- 'Sighing'
- 'Deuced'
- 'Weary Dearie'
- 'Whetstone Tribute'
- 'Acceleration'
- 'Hatdance'
- 'Pequenita'
- 'Quickstep' x *N. fernandesii*

We have a lot of our own fertile jonquilla seedlings, and these have been used to produce a range of small and miniature seedlings.

We don't have the tetraploid version of *N. jonquilla*, but it may not assist in breeding dwarf cultivars because generally speaking tetraploids are more vigorous.

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**KB MINIATURE 7W-P WITH 6
FLORETS – THE GOLD
STANDARD FOR MINIATURE
7W-P'S**



N. SCABERULUS



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**KB MINIATURE 7Y-0
SEEDLING**



**NICE FORM OF N.
ATLANTICUS**



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N. ATLANTICUS



**N. WATIERI
EXHIBITION FORM**



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**N. CORDUBENSIS WITH
GOOD SCALLOPING AND
GOOD PETAL COVERAGE**



**KB APODANTHE HYBRID
WITH 3 FLORETS**



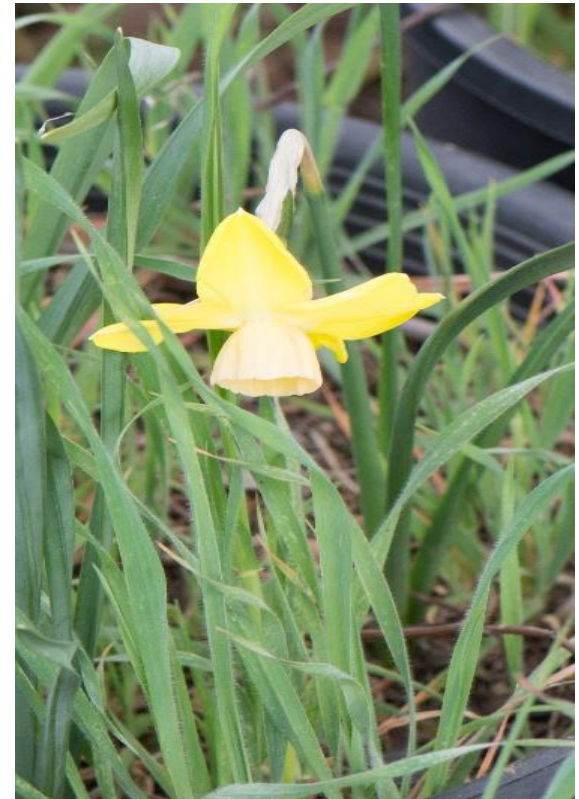
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**N. RUPICOLA LATE
FLOWERING FORM**



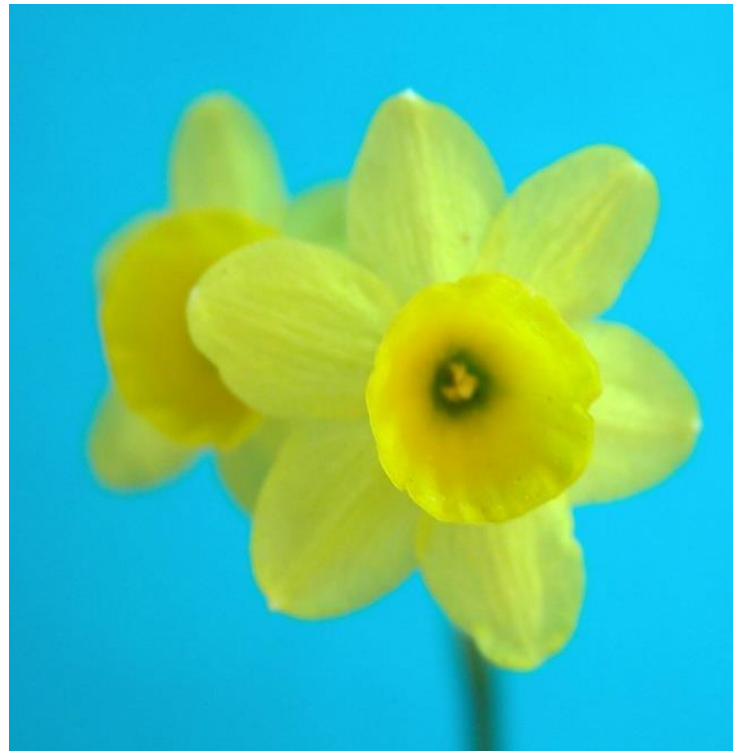
**SINGLE HEADED KB
MINIATURE 7Y-P
SEEDLING**



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**N. ASSOANUS SSP
MINUTUS**



**N. RUPICOLA WITH NICE
PETAL COVERAGE AND
NICE SCALLOPING**



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**KB MINIATURE DIV 7
SEEDLING THAT IS
UNUSUAL-Keira's Harlequin**



**Keira's Harlequin in
2019 when it first
flowered**



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**ANOTHER UNUSUAL
COLOURED DIV 7
SEEDLING**



N. CUATRECASASII



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**NEW KB MINIATURE
7W-W SEEDLING**



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Division 8 – Miniature Tazetta Hybrids

Keira Bulbs has an extensive range of miniature tazetta hybrids. It is all a question of having the right breeding material and knowing what to do with it. Breeding small or miniature tazettas is not all that difficult if you start with miniature species. We have a lot of miniature 8Y-O seedlings that have quite a few florets. We also have some very good breeding material that we should take advantage of but have not.

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**N. DUBIUS SMALL
FORM**



KB 8Y-O SEEDLING



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**KB MINIATURE 8Y-O
SEEDLING WITH 6
FLORETS**



**KB TAZETTA SEEDLING
THAT CHANCES COLOUR. It
is probably too big for a
miniature.**



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**KB's dwarf form of
Tazetta**



**Miniature form of N.
papyraceous**



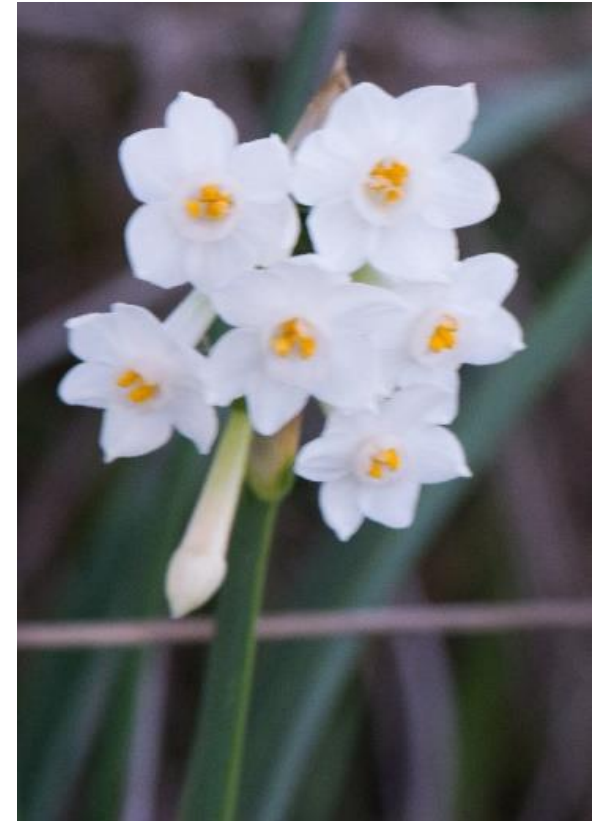
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**KB form of *N. tazetta*
that is probably
miniature in size**



N. pachybolbus



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**KB TAZETTA SEEDLING
WITH 2 FLORETS**



**POT OF KB MINIATURE
TAZETTA SEEDLINGS**



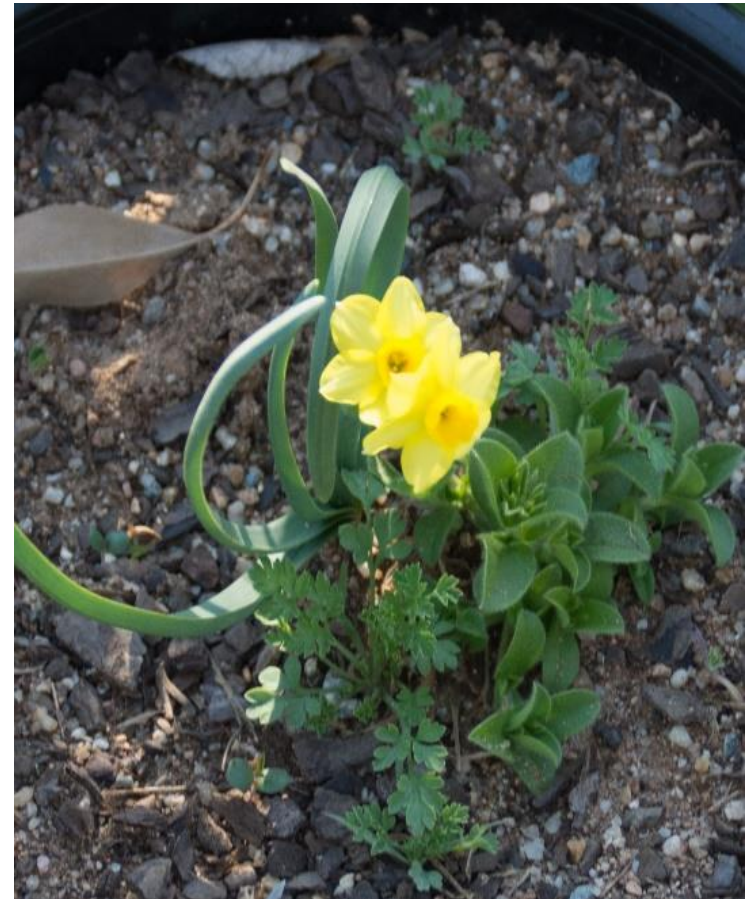
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N. TORTIFOLIUS



**KB MINIATURE 8Y-Y
SEEDLING**



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**N. TAZETTA SSP
TAZETTA – DWARF
FORM FROM ITALY**



**KB 8W-Y SEEDLING
WITH 4 FLORETS**



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Division 9 – Miniature Poeticus Hybrids

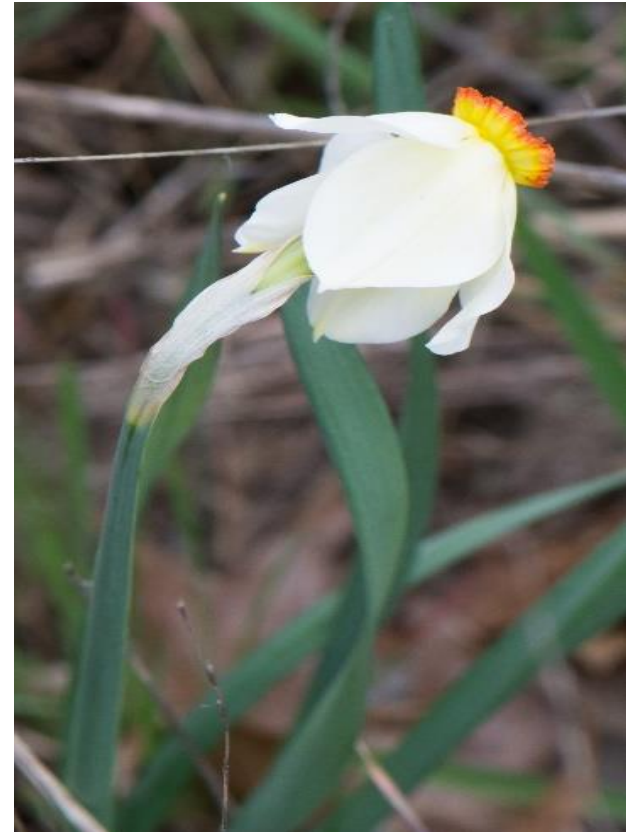
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**KB MINIATURE
POETICUS SEEDLING
THAT MEASURES 45MM**



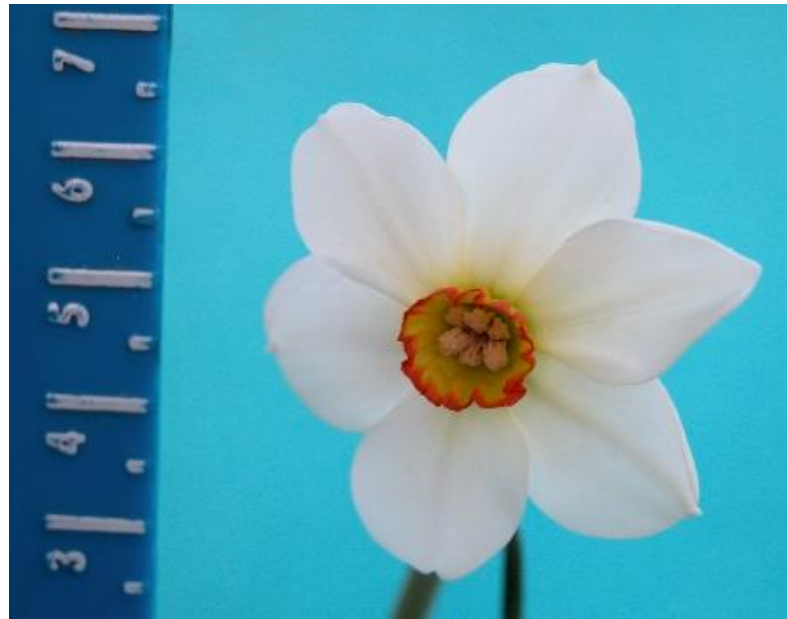
**KB POETICUS
SEEDLING THAT IS
MINIATURE**



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**KB MINIATURE
POETICUS SEEDLING**



**KB MINIATURE
POETICUS SEEDLING**



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Division 10 – Miniature Bulbocodium Hybrids

We grow a lot of bulbocodiums. We have been growing *N. tenuifolius* for many years but probably have not used it as much as we should have for breeding.

The biggest issue for breeding miniature bulbocodium hybrids is one of timing. You want them to flower in show season not in mid-winter. To get your timing right you need to acquire parents that flower during show time.

The next thing to work out is your goals. Are you going to hybridize for white petunioid flowers in show season or do you want to develop petunioid bicolors.

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N. TENUIFOLIUS



**KB BULBOCODIUM
HYBRID WITH LOTS OF
SCALLOPING**



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**A NICE KB BH
SEEDLING**



**BOX OF KB BH
SEEDLINGS**



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**KB BH SEEDLING WITH
ROLLED RIM**



**A REALLY TOP QUALITY
KB BH SEEDLING**



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**KB BH SEEDLING WITH
NICE SCALLOPING**



**N. HEDREANTHUS SSP
LUTEOLENSIS**



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**A KB miniature
bulbocodium seedling
with lots of scalloping**



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Division 11 – Miniature Split Cups

We are developing split cup miniatures by breeding with small intermediate split cups.

Our second technique is to use species that are naturally split like *N. cordubensis* and *N. watieri*.

Our third technique is to identify seedlings that have splits in them. This is particularly the case with bulbocodiums and some of our miniatures.

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**KB SPLIT CUP
MINIATURE**



**SPLIT CUP FORM OF N.
WATIERI**



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**KB INTERMEDIATE 11W-
YOO SEEDLING THAT
HAS A SHORT STEM**



**KB INTERMEDIATE
11W-Y SEEDLING**



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**MINIATURE SPLIT CUP
TAZETTA**



**BORDERLINE
MINIATURE SPLIT CUP
SEEDLING**



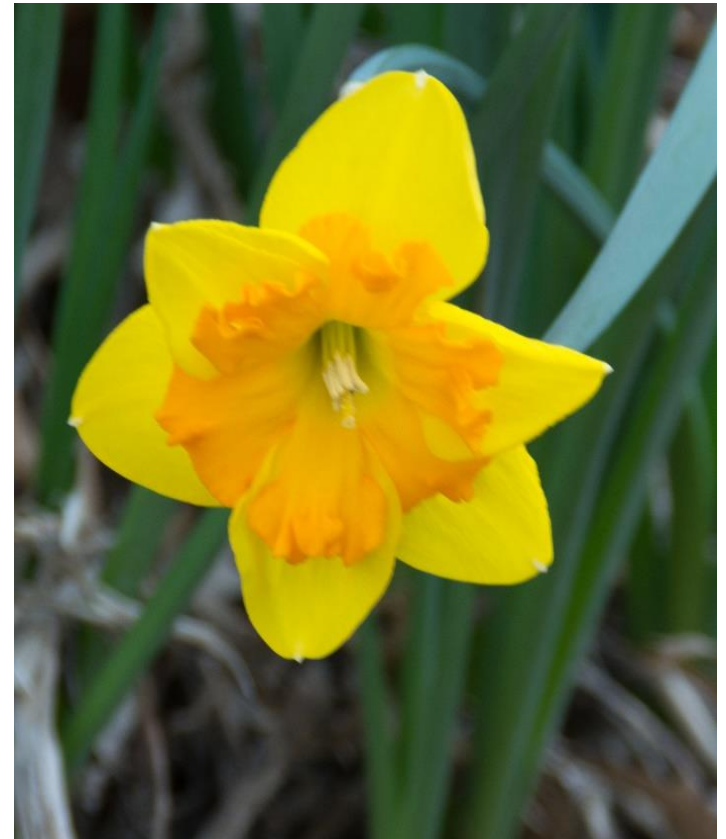
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**KB SPLIT CUP BH
SEEDLING**



**KB SMALL
INTERMEDIATE 11Y-YOO
SEEDLING**



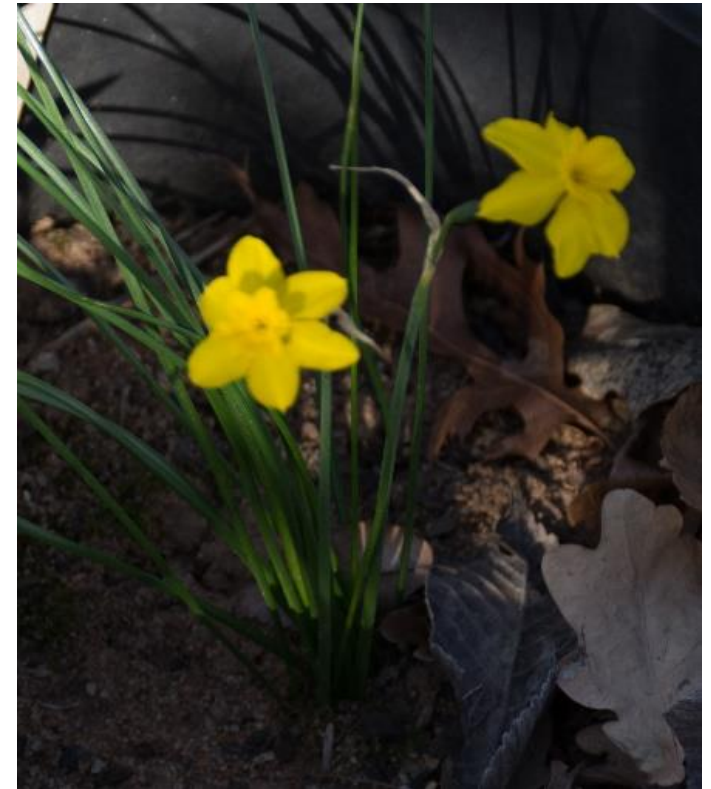
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**KB-I-11W-P-1-18 THAT
HAS A VERY SHORT
STEM**



**WHAT USED TO BE N.
CORDUBENSIS WITH NICE
SCALLOPING THAT SUITS
SPLIT CUP BREEDING**



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A KB seedling that is just a little too big for miniature but comes on a miniature stem



An outstanding new intermediate 11W-P that is being used for miniature hybridising



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Division 12 – Miniature

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**3 HEADED KB
APODANTHE HYBRID**



**K6-95 ANOTHER BULB
THAT HAS BEEN
AROUND FOR 25 YEARS**

