A TALK GIVEN BY MICHAEL SALMON TO THE INTERNATIONAL BULBOUS SYMPOSIUM ON
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IRVINE, CALIFORNIA.

A few comments on the species Narcissus and particularly the less well known ones and also on some of those that have been recently described.
Of recent years there has been a considerable amount of work done on the genus Narcissus both here (United States) and in the United Kingdom and to a lesser extent in Spain and Portugal where they tend to be rather parochial, with respect, towards their own species.
As a result of increased field work many more colonies of known species and some new species and varieties have been discovered.
Quite alot of cytological investigation has gone on and this has thrown light on the genetical constitution of many of the species and some of the natural hyorids and this has, in most cases, confirmed the morphological evidence.
For the past twenty years or so I have been working towards a monograph of the genus Narcissus. To start with I looked at all the available literature and herbarium material and then proceeded to get maps of all the areas of the countries in which narcissus grew. I drew circles around the sites of potential species and over the years I have gone to as many of these sites as possible to verify first, that the flowers are there and secondly that they are what they are supposed to be. I have built up the distribution maps for each species. I initially used blank circles, and as each one has been verified I filled the circles in. Unfortunately as the years have gone by, I have now started to blank out some of the circles again as the sites of various species I found originally, have now been lost.
Early on, when I was doing drawings for the proposed work, upon sectioning a leaf of the specimen I was drawing, I discovered that it had a very distinctive pattern. The arrangement of the vascular bundles and the vacuoles within the leaf had a specific pattern and on investigating a few others I discovered that these patterns were specific to particular sections.
To give you an example here is a drawing. I hope you can all see this.

SHOWS DRAWING OF
N. HUMILIS

All Narcissus leaves have a main bundle in the center of the leaf. This is common to all of them and then they have primary and secondary bundles scattered equally to either side of the central one, in various patterns. In this case this is Narcissus humilis. This is one of the simplest ones.

SHOWS DRAWING OF

PSEUDONARCISSUS SP.

This is what a member of the Pseudonarcissus (section) is like. They have a vast number of bundles arranged in rather complicated patterns.
If I can give you a couple more exa mples.

SHOWS DRAWING OF
NARCISSUS BULBOCODIUM.

This is Narcissus bulbocodium.
These tend to be arranged in an equatorial pattern with a couple of outside ones. Whenever these occur around the rim of the leaf they make little dimples in the leaf which produce the raised ridges on the stems and on the leaves.
This equatorial pattern is common only to the Bulbocodium group.

SHOWS SLIDE OF
NARCISSUS CANTABRICUS.

Here is another example. We have the Cantabricus group here, which are arranged semi-radially.
Now, if two of these species are crossed the vascular bundles do their best to arrange themselves in their original pattern and are not necessarily able to do so. They form a new pattern. It is possible to find a potentially new Narcissus out of flower, and by taking a section of a leaf you can assign it to a particular section within the genus. By doing this over a number of years and on all the material I collected, I have been able to change the classifications slightly. I have separated out the North African white Bulbocodiums into a new scetion which I call Albidae because the Cantabricus ones have a half radial display and the Albidus have an equatorial display.
Now, in a few sections, notably Tazetta, Jonquilla and the Pseudonarcissus man has confused the distribution system by transporting one species into the domain of another, so that it leads to hyoridization, because unfortunatey Narcissus, having a limited numoer of chromosome numbers, will interbreed with virtually indecent enthusiasm giving a confused pattern of hybrids.
By natural increase the Narcissus spread their range and they can also move into the domain of another species, so that you may get naturally produced hybrids. Some of these hybrids by their nature or by doubling of their chromosomes can form new species which are fertile and therefore self-replicating and in these cases you have to consider them as a species in their own right.
If I can give you the first slide as an example.

SHOWS SLIDE OF NARCISSUS DUBIUS

This is Narcissus dubius. Now at one time it was considered to be just one hybrid between N. papyraceus and N. requienii, ((I call it requienii still. I believe the latest name is assoanus. I prefer to keep that epithet for the botanist who described it!)), because the forms that are found in Spain are typically this plant. The plants found in southern France have a different nature. From the leaf section, it would seem likely that this plant is a hybrid between requienii and papyraceus, whereas the southern French ones are requienii possibly crossed with N. pachybolbos. sp?

And if we can have the next slide please you will see the difference between the two.

SHOWS SLIDE OF FRENCH NARCISSUS DUBIUS

This is a much smaller plant with smaller leaves and of course this different leaf section where it tried to rearrange a different set of vascular bundles, so it is possible now to distinguish between these two, not only by habitat but also morphologically from the sections of the leaves. They are both fully fertile and self replicating. Therefore they have to be considered as species in their own right.

Now, some sections have spread very widely and by adaption and small genetical changes they have colonised a variety of habitats where different ecological pressures act upon them, so they tend to speciate.

SHOWS SLIDE OF N. BULBOCODIUM NIVALIS

This is N. bulbocodium nivalis as it occurs in north central Spain and northern Portugal. It is an extremely small plant, about 3/4 inch in length in flower overall and about 3/8 inch diameter over the rim of the corona. It almost invariably produces a pair of opposing and rather succulent leaves. The flowers appear almost immediately the snow melts. The bulbocodium group as a whole is very confusing. It is very fluid at the moment and still, I think, speciating. There is a vast number of chromosome counts among them. You can say they are hexaploid and onwards, where they are actually going into infertility rather than improving themselves, but they have colonised quite a range of habitats.

May we have the next slide.

SHOWS SLIDE OF NARCISSUS GRAELLSII

The basic number of these bulbocodiums is 2n = 14, in this case we have 2n = 28 in Narcissus graellsii. This is a plant that has colonised the mountains of the Sierra de Gredos and the Sierra de Guadarrama in north central Spain. As you can see it is a pale one and it is intermediate in effect between the yellow bulbocodiums of the southwest and the southeast and the pale yellow bulbocodiums of northern Spain and western France. Most of these bulbocodiums occupy very acid soils and normally seasonally wet areas.

SHOWS SLIDE OF NARCISSUS HEDREANTHUS

Narcissus hedreanthus from the leaf section appears to be a very ancient hybrid between cantabricus and a so far unidentified parent. It has a very localised habitat on limestone in the Sierra de Cazorla and Sierra de Segura in south-eastern Spain. I say most of the bulbocodiums are confined to acid soil, but it would seem that the hybrids between the species tend to occupy limestone soils rather than acid, even if both of the parents come from acid soil situations. They have this propensity to move onto lime, such as N. hedreanthus. It is a very small plant. Here in actual fact it is growing in virtually pure marble chippings. The sections of its solitary leaf indicate that cantabricus is at least half its parentage.

SHOWS SLIDE OF NARCISSUS BULBOCODIUM ECTANDRUM

Here we have a recently described species which is on the extreme edge of the range of the bulbocodium group, approaching the Pyrenees. This is Narcissus bulbocodium ectandrum, which indicates that it has got all the naughty bits sticking out far from the corona. It is a very local plant, again on extremely acid soil. I think it has potential as a breeding plant for garden purposes. In some respects it parallels Narcissus romieuxii from North Africa which is very similar in appearance to this one.

SHOWS SLIDE OF NARCISSUS CANTABRICUS CLUSII

Quite early in their evolution, the white flowered bulbocodiums probably arose in North Africa and they were able to spread to southern Europe and down towards the Sahara before the Sahara became as arid as it presently is and also before the Mediterranean basin was flooded. This is actually N. cantabricus clusii which has a very limited distribution in south-eastern Spain on lime-stone. It is to my mind one of the most handsome of the cantabricus group.

SHOWS SLIDE OF NARCISSUS ALBIDUS ALBIDUS

Here we have Narcissus albidus albidus. You might say,'What is the difference then between albidus and cantabricus'? Well we shall start from the base and work upwards. Invariably the leaves of cantabricus are pale green and rather thin and slender, whereas the leaves of albidus are upright, quite stiff and gray. The tube is inflated in cantabricus, in other words it comes out narrow and inflates towards the corona, whereas in albidus it is a narrow trumpet shape. Almost invariably in all the albidus the stamens are arranged in a sort of scattered position, whereas those of cantabricus are compressed, normally quite tightly around the style. The bulbs themselves have slight differences and of course the leaf sections are quite different. The vascular bundles of the leaves of albidus are arranged equatorially across the leaf, and those of cantabricus are arranged radially around the leaf.

SHOWS SLIDE OF TRIANDUS PALLIDULUS FORMALLY KNOWN AS TRIANDUS PALLIDULUS

Now, in one or two places where Narcissus albidus grows in south-eastern Spain, you find this narcissus which I think has long been called triandus albus but in actual fact it is triandrus pallidulus. It varies from white to quite deep yellow. It is the commonest form of triandrus in Spain and occupies about 3/4 of Spain, only to be absent from the far south-east and the Pyrenees. Where you get this one and albidus growing together you get (the next slide) this naturally occurring hybrid which is N. munozii-garmendiae. Unfortunately named after a Spanish gentleman with too many letters in his name!

SHOWS SLIDE OF NARCISSUS X MUNOZII-GARMENDIAE

It is an interesting fact, that when you get two species interbreeding that are quite widely separated in the sections, on occasion, they can only intermingle their chromosomes in one set pattern, so that the one hybrid is constantly reproduced and it will not be found in isolation. To find this plant and to name it separately as a good species would be quite wrong, because it is sterile and cannot replicate itself. It is only constantly produced by the sympatric parents. This is N. X munozii-garmendiae which I think is a superb garden plant.

SHOWS SLIDE OF NARCISSUS ALBIDUS ZAIANICUS

Here we have the first of the Albidus group. These, other than the one small

colony that occurs in south-eastern Spain, are really plants of North Africa and are found throughout Algeria and Morocco right down into the edge of the Saharan sands. This particular one is N. albidus zaianicus from the Zaian mountains in central Morocco. It is a limestone loving plant as are all the Albidus.. It is not generally in cultivation as yet. It has a large flower about 3 inches long and 2 1/2 inches in diameter. All the Albidus have large flowers in comparison to others of the Bulbocodium group.

SHOWS SLIDE OF NARCISSUS ALBIDUS TANANICUS

This is another localised one. We are now going further towards the Sahara down to the very edge of the western half of the south-west High Atlas. This is N. albidus tananicus. It is distinguished by the very thin segments which in some facets corresponds to N. bulbocodium conspicuus in Spain.

SHOWS SLIDE OF NARCISSUS ALBIDUS KESTICUS

Now we have one of the most magnificent ones and one of the most southerly occurring of all Narcissus. This is N. albidus kesticus. The flowers are actually about 2 1/2 inches in diameter which is very impressive. They literally go right down to the pre-Saharan sands. So it is surprising that it has proved to be perfectly hardy in the United Kingdom and obviously it should do well over here. (Southern California).

Another group which occurs in North Africa is the Apodanthae which is characterized by the next species, Narcissus watieri.

SHOWS SLIDE OF NARCISSUS WATIERI

This is possibly the highest occurring Narcissus of any. It is found up to about 13.500feet in the High Atlas on the Tischka Plateau and on the Oukaimedan, where you can actually walk with some difficulty because one fears of crushing so many flowers. It literally occurs in the millions. A lot of people have asked how do you grow this one? I think we tend to treat it as most other Apodanthe and we cook it. It does not want that, it grows in very acid virtually permanently wet soil and at most it only needs a very short period of gentle drying. It sets seed with great freedom. I am surprised that having been grown for thirty or forty years that it is not a more common plant. This is as it occurs in the wild at a fairly low altitude of 9000 feet on the Tischka Pass.

SHOWS ANOTHER SLIDE OF NARCISSUS WATIERI

It is a supero crystalline white flower and in hybrids it tends to pass on this beautiful crystalline appearance, smooth petals and neat corona.

SHOWS SLIDE OF NARCISSUS MARVIERI

This is Narcissus marvieri. This is another North African one. It has quite a wide range in the central and eastern end of the High Atlas. It was only thought to occur in one place on the Tizi-n-Ait Ouirra. I have now located quite a lot of colonies, in fact it is quite a common plant. It is a much larger flower than watieri. It actually does cross with watieri in the wild. It is very distinct in as much as it has a three lobed corona as you can see and it passes this characteristic on into the hybrids. It has a potential here I suppose for those people growing split coronas possibly to produce some Intermediates using this species, which will enhance the corona splitting and further folding back against the segments.

SHOWS SLIDE OF NARCISSUS ATLANTICUS

This is the mystery plant. This is Narcissus atlanticus. This was discovered by a gentleman named Seligman (literature credits E.K.Balls) in about the early 1930's when he was unfortunately incapacitated in the High Atlas with some local disease and in his recuperation from that disease he took little walks in the area around Amizmiz. So the story goes, he discovered a capsule of seed which he collected and popped in his top pocket. Much later when he returned to the United Kingdom he discovered this capsule in his pocket and handed it to one Colonel Frederick Stern who raised it and produced this plant Narcissus atlanticus. I and several colleagues who are interested in Narcissus have been to North Africa now, many times and searched the area with a fine tooth comb without any success what so ever. The area around Amizmiz is extremely acid and one would imagine that a Narcissus of this group would more likely be found on limestone. So either Mr Seligman was delirious when he collected it or he was just forgetful and forgot where he actually did collect it. The High Atlas is a vast range of mountains, it could be vitually anywhere. So this one, I am afraid, I have no specific site for. It is a superb little plant. It is quite easy to grow and raise from seed.

SHOWS SLIDE OF NARCISSUS SCABERULUS

Now in Portugal the Apodanthae have done rather well with quite different species there. This is Narcissus scaberulus. Having said that most of the group grow on limestone soil, immediately I am going to contradict myself

and say this one actually grows on extremely acid soil and in habitats that get exceedingly hot. This is growing in about a half inch layer of moss on a granite boulder, so during the summer months it tends to sit in a temperature of about 100 degrees for literally weeks on end. So this is a species that will toerate very much drying and cooking and it needs it to flower well. In the wild it forms solid clumps like this. I have seen clumps that are almost a foot wide with a hundred bulbs. It seeds freely. It has proved to be a good garden plant. I know quite a few hybridizers have now used it and it has produced some interesting small plants.

SHOWS SLIDE OF NARCISSUS BAETICUS

This is a more recently described one. This is Narcissus baeticus. In effect it is half way between N. gaditanus and some of the larger Jonquils. It has a very distinct appearance, as you can see, with its pointed segments. Where it initially was thought only to inhabit one or two localities it is in fact quite widespread in central and southern Spain. It is about 6 inches high overall. I have seen hybrids produced from it. It produces beautifully smooth little flowers. This is Narcissus baeticus.

SHOWS SLIDE OF NARCISSUS GADITANUS

Now we have perhaps one of the smallest of all the Apodanthae, this is Narcissus gaditanus. This one has proved to be rather difficult in cultivation. I myself have vast numbers of it, not because I have tried to collect vast numbers, but because I have raised it from seed. Unfortunately the bulbs break up into a multitude of small bulbs annually and you are very rarely able to get a bulb large enough to flower. I can give no answer to this because in the wild, as you can see, it flowers quite freely. It must be something to do with its habitat or local ecology. Just before I left to come here I had a box or two of this with perhaps a thousand bulbs in. I noticed with some glee that I had three spikes of flowers. This one has been used with a number of other species to make hybrids. In its natural area it possibly involves plants like Narcissus jonquilloides as well.

SHOWS SLIDE OF NARCISSUS HENRIQUESII

This is a fairly recently described one, Narcissus henriquesii. It has a very limited distribution in central Portugal. It is a typical Jonquil. The Jonquils are usually associated with rushes, that is the Juncus species and their leaves mimic this plant. Because of the leaf section, I have been able to separate away from this section a small group which I call the Planifoliae.

Instead of having round leaves with a radial distribution (vascular bundles) it has leaves with a flat surface with an equatorial distribution. This is Narcissus henriquesii, which is actually growing in 5 inches of water here. All the Jonquils grow in seasonally wet places which later dry out and become quite hot.

SHOWS SLIDE OF NARCISSUS HENRIQUESII IN CULTIVATION

This is what it can do in cultivation. It is proving to be a supero plant with no problems what so ever to grow and should produce some very fine hyorids when it gets into general use by the hybridizers.

SHOWS SLIDE OF NARCISSUS FERNANDESII

Narcissus fernandesii when originally described was thought to be a purely Portuguese plant with again a ver limited distribution but over the years I have been able to find this plant in most of southern Spain as well in some rather scattered colonies. The leaf section would indicate it is not a pure species as such, but must be considered a species because it replicates itself. The leaf section indicates that it has Narcissus jonquilla as one parent and some other as the other parent. I have not been able to ascertain which one.

SHOWS SLIDE OF NARCISSUS ALPESTRIS

This is Narcissus alpestris. There has been much talk while I have been here about Narcissus cernuus which is another pale cream one which I have never been able to find in the wild. Whether it is extinct or not or whether it actually did occur in the wild or was a man made product or a natural hybrid which somebody managed to find somewhere I do not know. This is the true Narcissus alpestris. It was said at one time that the Dutch had virtually collected it out of the Pyrenees but in actual fact it is still quite common there. I know of large colonies there. It is a delightful little plant only about 6 inches high with its permanently nodding flower. From its leaf section it proves to be quite an ancient member of the Pseudonarcissus section.

SHOWS SLIDE OF NARCISSUS EUGENIAE

This is a more recently described species of the Pseudonarcissus section, particularly belonging to the subsection Hispanicus. It is Narcissus eugeniae and it is interesting that this was only discovered very recently.

Growing with it would appear to be a new Galanthus species as well, which is rather unusual for Spain, which is not too thick with snowdrops.

SHOWS SLIDE OF NARCISSUS NOBILIS

Another recently described species is Narcissus nobilis promagenus. This a very high alpine one. It is confined to the Cantabrian mountains in north Spain. It is 6 inches high again. Grows in quite large colonies and is probably the progenitor of the rest of the Nobilis group like nobilis nobilis and nobilis leonensis. N. nobilis leonensis incidentally, is the largest Daffodil you can see either in cultivation or in the wild with flowers which are frequently 5 inches in diameter. I am surprised the variety leonensis has not been used more in hybridization programs because it is an extremely strong plant that can tolerate a variety of soils and also a variety of altitudes. So they should be easy to grow.

SHOWS SLIDE OF NARCISSUS TRIANDRUS TRIANDRUS

Just as a matter of interest, I showed you a slide earlier of Narcissus pallidulus which I consider to be what is normally called N. triandrus albus (The Angels Tears). N. triandrus is found throughout Spain but in the north is what I consider to be the true Triandrus albus which I call triandrus triandrus. This is triandrus triandrus. It is a magnificent plant which grows 12 to 15 inches high with large flowers and it should be brought into general cultivation for hybridization programs. The distinguishing feature is apparent as soon as you look at the slide in that it has wide flat leaves, similar to most of the pseudonarcissus group rather than the leaves of most of the others of the Triandrus group which are circular in section. This is Narcissus triandrus triandrus.

SHOWS SLIDE OF NARCISSUS HUMILIS

Because so many people have mentioned them to me since I have been here, just a quick glance at some of the Autumn flowering Narcissus which are from North Africa and which are now coming into cultivation. This is what used to be called Tapeinanthus humilis which actually is now Narcissus humilis.

SHOWS SLIDE OF NARCISSUS X PEREZLARAE

This is N. x perezlarae, a hybrid between N. humilis and N. serotinus.

SHOWS SLIDE OF NARCISSUS VIRIDIFLORUS

N. viridiflorus which always facinates people. I now understand that it has been used in a number of programs and has produced some interesting hyorids over here (In California).

SHOWS SLIDE OF NARCISSUS ELEGANS

N. elegans which has a potential and ought to be used for early flowers.

SHOWS SLIDE OF NARCISSUS BROUSSONETII

Just because it has caused such a furore, Narcissus broussonetii which I shall supply so that it can be used in breeding programs.

Thank you.