

3. GENETICS AND BREEDING

COMMERCIAL BREEDING OF DAFFODILS

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Although I have grown Daffodils so far only as a hobby on a very modest scale, I would like to offer some experiences in breeding from the commercial point of view.

Commercial growers are necessarily specialized farmers who prefer to grow fewer varieties consistent in health and demand, as their object is primarily of a remunerative nature unlike that of an amateur who grows them purely for pleasure.

Great strides in development of a better flower have been made by breeders in the past, leaving us excellent material for continuation of their work. Literally thousands of varieties were introduced, only a few of which survived the test and reached popular commercial distribution. The reasons for this can be several. Many times sister seedlings of equal value were introduced under different names, one of which was very successful while the other soon disappeared. The man who controls the stock and launches them on their way has a great deal of influence. Large distributors naturally always push first the material they have most of, regardless of quality, and can popularize to some extent an inferior variety, but in the long run the sifting goes on and unless the new variety is better and possesses health and vigor beyond reproach the curtain goes down eventually.

Each year I notice some varieties disappearing from catalogs of specialists but more new ones showing up. Spectacular new advances are very rare—mostly they are slight improvements or variations of the old form, promising at best only a limited commercial run. The prices for novelties are usually high, being based on quality and scarcity, and the enterprising grower on the lookout for a good new variety is confronted with expensive trying out for himself which of the new varieties has the real goods. One cannot blame the majority for hanging on to the old standbys until competition forces them to do otherwise. A successful commercial variety must possess vigor and health which are the first and most important factors; heavy substance, good form, color and size are next in importance; the last perhaps are refinement and quality. The small garden amateur who is the chief ultimate consumer is not sufficiently educated to see much difference between so many varieties of identical color and form, as for instance yellow Trumpets. Many are more advanced and can afford to pay a higher price for better form, but there are only very few of those who can afford or will pay the high price of a recent novelty to enjoy its perfection. Since it takes a good twenty years from the time its maiden flower unfolded for a variety to be propagated on a sufficient scale to reach the general market, the graduation of price is necessary. During the

twenty years of the stock's passing from hand to hand many are left as casualties by the roadside.

As my education in Daffodils progressed I looked back upon times when I was enthused over a new variety, predicting its future only to change my mind in a season or two because of some factor overlooked in the first rush of enthusiasm. Experience is the only teacher, and one as he goes along becomes more and more critical before passing final judgment.

The most popular in demand and also most developed by breeders are the first five classes of Daffodils, namely Trumpets, Incomparabilis, Barriis, Leedsii and Poets. The English breeders who did most of the work maintained fairly strict rules as to form of the individual classes and strove mostly for perfection of form. This of course leads to the problem of great similarity, a complaint often voiced by growers. There is a decided necessity for more variation of form and color, however they should possess pleasing balance and maintain some resemblance to the Daffodil as a whole.

What constitutes good form is a matter of diversified opinion and depends on what one likes or dislikes. I have seen people go into ecstasy over a badly proportioned flower that I kept only for comparison as it had a huge cup with very poor perianth, while they passed up a lovely flower of smaller size near by. Great size has astonishing effects on the majority of people, breeders included; but unaccompanied by other qualities it has passing value only, as one soon gets tired of imperfection. Very large cups can be beautiful if they possess sufficient perianth for background.

Of present varieties in commerce a great many are beautiful and no doubt will enjoy a certain length of popularity before being superseded, but in the multitude there are only few flowers of first class breeding value from which the future progress will arise.

I have tested the majority of the best novelties in search for new and more promising parents. Some of these are very recent novelties, perhaps not sufficiently tried but nevertheless very outstanding.

California conditions of course are not perfect for growing Daffodils with the exception of the very early ones, but those that perform well in poorer conditions have more stamina and consequently are more promising as breeders.

When importing new stock from different localities some varieties do not perform normally often for several years until acclimatized, which is a bad factor from the commercial point of view, while others give normal flowers of their best under any conditions. Those of course are the real goods, having breeding value.

For practical purposes I group the large yellow Incomparabilis together with the Trumpets, as often very slight measurements in length of the trumpet assign their place in a group. The borderline flowers are better balanced usually than the full trumpets, and the majority of the best yellow flowers I choose for breeding are actually Incomparabilis although at first glance one would class them as Trumpets. Since they are the first to bloom of the larger forms, they herald spring and

to the majority of people they are the real Daffodils, which makes them the most important group of any.

After growing dozens of varieties for years I noticed that the class as a whole lacks sufficient substance and width of perianth to back most of the larger trumpets. Amongst the very early varieties none impressed me more than *St. Issey*, a borderline *Incomparabilis*, deep gold, of good form, fair substance and the tallest stem of any yellow of good quality. It is enormously vigorous and the fact that it is a week earlier than *King Alfred* makes it a strong contender for the first place so long occupied by this old favorite. I have chosen it as one of the best prospects for breeding yellows and the future will tell whether I was right.

Amongst the midseason varieties there are several possibilities. Both *Crocus* and *Trenoon* are of the deepest gold and heavy substance, the first rather short and inclined to stripe, the latter taller but not of as good a form. *Galway*, a newcomer I have had only for two seasons so far, impressed me most of any yellow. A borderline flower of very large proportions, fine form, tall stem and very thick substance, it is the most valuable addition I have yet for breeding yellows. It undoubtedly will make commerce as it is a magnificent garden plant. Another promising flower is *Golden Torch*. A flower with possible breeding value might be *Faithful*, a light yellow *Incomparabilis*, rather stiff looking but of enormous substance, a factor to be strongly considered.

Amongst the late varieties are the most refined show flowers, all rather short-stemmed and not too vigorous. *Cromarty*, in lighter yellow, and the deeper-colored *Kingscourt*, best of all the *Royalist* children, are perhaps the two finest of the group.

Of the short-cupped yellows the number one breeding prospect is unquestionably *St. Eguin*, as it combines great vigor, tall stem, large size, and beautiful form with the most refined quality of any yellow. Some excellent seedlings have come from it already, heralding a new giant race of *Incomparabilis* which will possess everything that it takes to make a good Daffodil.

Besides the above varieties I use a number of others for variation of form or other desirable characteristics they may have, but regard them as more or less of passing value only, although some of them may enjoy a certain commercial popularity for a time. Other breeders with different conditions certainly will form different opinions and select different varieties. How fortunate that we are not all doing the same thing as long as the goal remains the same, that of development of better varieties for the future.

White flowers are comparatively recent—little known by the general public but destined to be of great popularity once available in great quantities, and very valuable for florist work. *Beersheba*, the first white Trumpet of good quality, has now been superseded as a breeder; it also is a poor doer, and very short in California. *Tenedos* might still be worth using due to earliness and size, besides it has a tendency to breed pinks.

The most promising breeders are of course amongst the more recent and more advanced novelties. *Brunswick*, one of the earliest Leedsii, with good white perianth and cup edged with lemon ring, is a good prospect for breeding and a chance to succeed commercially, as it makes a beautiful and very lasting garden plant. *White House* may be worth using since it is tall, large and very smooth; if it had more substance it would be a first class variety. The best advance in early whites is perhaps *Zero*, a very large flower of fine form, good substance, and very white. A borderline Leedsii, with fine carriage, transmitting its whiteness to its progeny.

Of the midseason group I treasure *Polindra* a great deal because of its vigor, good form, stem and heavy substance. Performing perfectly season after season, it is an Incomp. with creamy white perianth and lemon cup, a very promising parent for strengthening the clearer whites, which are none too healthy. An intensely white flower of large size and good form is *Ludlow*, rather shorter of stem but certainly worth trying. *Broughshane*, the biggest of the White Trumpets, certainly impresses one with its size and enormous vigor and undoubtedly will have a great breeding value if reproduced in more refined editions.

Amongst the late whites *Cameronian* should have possibilities, being quite large, of fine quality and form. *Samite*, a little smaller, is the finest of the *Mme. Krelage* seedlings, possessing fine form, good substance and very beautiful texture. Since its pollenparent was *Beersheba* it is free from the blood both of *Askelon* and *Naxos*, from which two parents the majority of the finest whites were bred, transmitting a tendency to basal rot to their progeny. It may therefore be a good parent for offsetting this factor.

Mr. Wilson sent me a seedling bred by *Samite* pollen which is the nearest and whitest Leedsii I have yet seen, with a beautiful perianth of substance as heavy as one could wish. Unfortunately the cup is sometimes imperfect, and it is not a good doer so will probably never be introduced, but it is an example of *Samite's* possibilities as pollenparent.

I have omitted a number of good white varieties which either had too many defects or were not sufficiently tried; my object was to mention those which are very white or others possessing vigor, stem, size, etc. which may contribute factors for producing whites with more resistance to basal rot.

Coming to colored flowers, which too are less known since the better examples are quite recent, we have a field which offers great versatility. The yellow *Incomparabilis* and *Barrii* with orange and red cups boast a very large number of varieties. *Fortune*, one of the earliest and largest, has undoubtedly a good commercial future since its constitution is quite faultless. As a breeding plant it has not given anything startling—itself it has only a fair quality, and the cup at best is only coppery orange. What we need is flowers with sharp contrast between the color of perianth and cup, both being of solid tone without fading a great deal. A few are here already and more are coming, but the field has great possibilities for the breeder. Of the *Fortune* seedlings the best I have

seen so far is *Hong Kong*. As large as *Fortune* itself, with shorter but better formed cup, quite orange red, it should have breeding possibility and a commercial future. With the advent of *Carbineer* came thick substance, and although itself it has not much color in its cup it gives excellent seedlings with very strong color and is still a good flower to work with. Mr. Richardson produced a series of brilliant seedlings from it, the best of which today is *Narvik*, not a very large flower but quite faultless in form, with tall stem and perianth of deep yellow with the reddest cup, bordering on crimson. The pollenparent was *Porthilly*, which has one of the reddest cups but rather weaker substance in the perianth. It was a happy combination as *Narvik* certainly inherited the best quality of both.

Other varieties which might have breeding value are *Diolite*, *Trevisky*, *Rustom Pasha*, *Market Merry*, *Royal Mail* and *Royal Ransom*.

The most difficult part of course will be to produce perianths of solid color, not of the transparent fading type of which we have so many now, with cups equally solid whether light orange or darkest red, and sunproof as much as possible. In cups too there is possibility for great variation of form and also frilling, which greatly enhances their value.

The colored flowers with white perianths including *Incomparabilis*, *Barriis*, *Leedsii*s and *Poets* as a class offer perhaps the greatest possibility of color variation and new forms to be developed.

Pink cups, the newest advance in Daffodils, are still very rare and of inferior quality when compared with other classes. The first of its kind, *Mrs. R. O. Backhouse*, has been in commerce for quite a while but its breeding value is quite limited. To Australian breeders goes the prize for development of better pinks, of which *Pink o' Dawn* and *Dawn-glow* are the best so far introduced. The chief defects of the present pinks are insufficient substance and muddiness of the white color in the perianth.

Perhaps by combining the finest, whitest *Leedsii*s of today with the *Poet* class one could produce a better base for future pinks. In most cases the pink is of coppery tone; to get real rosy pink one first has to eliminate all yellow, consequently only the whitest flowers, such as *Zero*, *Ludlow*, etc. should be used. From *Poets* or close relatives like the short-crowned *Leedsii*s which have icywhite perianths there are bound to come colored *Leedsii*s of good quality and exceptional whiteness, some of which should have the tendency to produce pink. It is a long-drawn-out process but the results should be worth it, and I can't think of any more beautiful combination than snowywhite perianth with clear rosy pink cup.

Another color combination amongst *Leedsii*s are cups of cheesy buff tone. A good example of it is *Penrose*, with nice frilled trumpet-like cup. *Gertie Millar* produces this coloring some seasons. *Bread and Cheese* is perhaps the best flower of this class, having decided possibilities. Unfortunately the color is dependent on climatic conditions; in moist warm weather it is very good, in dry cold weather it is conspicuously absent. Some day varieties with strong buff trumpets retaining

the color are bound to appear, adding greatly to the variation of the Daffodil as a whole.

White flowers with orange or red cups are represented by a large number of varieties, many of very high quality with good commercial future, but only a small handful have top priority as breeding plants. The improvement most pending is the whiteness of the perianth and resistance to sunburn of the color in cups.

Since they are closer related to the Poets, the majority are late-flowering, with the exception of the Australian *Jean Hood*, which is very early. It is a good flower with fairly white perianth and nicely frilled orange red edged cup. Its breeding advantages are earliness combined with vigor and extremely long stem. Itself it may not make much of a commercial flower but its progeny certainly should. Of midseason flowers, *Hades*, with creamy perianth and cherry red cup, has proved a most valuable pollenparent for color and might still be worth using.

Amongst the late varieties are of course the best advances. *Coronach* and its child, *Matapan*, are the two varieties with the whitest perianths I have yet seen. The whiteness in both is even more intense than in most Poets, perhaps because of heavier substance giving it solidity and offering striking contrast to cherry red cups. *Limerick*, with nice white perianth and flat red corona, is perhaps the best of its type, with a good commercial future, since the color in the cup does not fade or burn.

Amongst the shortcrowned Leedsii's there are several excellent flowers with high breeding value. My favorite is *Dreamlight*, much like a Poet, with white flat corona edged rosy red; since the yellow is eliminated from the base of the corona it should have a tendency to produce more delicate colored edges with an eventual goal of pinks and rosy red.

One of the most astonishing flowers ever produced, which in combination with Poets and colored flowers should have enormous value is *Green Island*. It has the most symmetrical and finest perianth yet produced, fairly white, of good substance, so wide that it forms an almost perfect circle. The large flat corona is ivory white with a lemon yellow edge. Quite stiff looking itself, nevertheless it offers great possibilities for developing an entirely new race of large flowers with large, flat colored coronas.

Conclusion: On the whole I have mentioned only a few varieties in each class, a decision I arrived at by eliminating point by point and considering every characteristic. The future advance no doubt will come from a very few parents, those that have what it takes to make a first class variety, and breeding the have-nots will give always only secondary quality slated for a very short run when introduced.

I dug my bulbs before I finished this article and after examining them carefully I had to eliminate a number of hopefuls as seedparents and confine them as pollenparents only, and then in a limited way. The White Trumpets and Leedsii's have large soft scaly bulbs in most cases, subject to basal rot and other diseases. The mortality is high and the

tendency is apparent in their seedlings a great deal. Over half of them disappear during the four to five years after germination before they even bloom. The best smooth and hard bulbs are amongst the flowers with yellow perianths, especially of the earlier group. Breeding a hard smooth bulb should be a cardinal point for those who want to produce good commercial varieties. Personally I decided to use as seedparents only varieties which have the smooth and resistant bulb, and confine the doubtful to pollen only, as the progeny on the average inherits health more from the mother than the father.

The future certainly should bring us more vigorous, healthier and more beautiful varieties than we have now, as was the case in the past. The possibilities are unlimited; some day we shall have all those combinations of which we dream today. All it takes is imagination, lots of hard work, and long waiting—then when you get it, it will be already obsolete, because by that time you certainly will want something better, again created by your imagination.