

# PEONY BREEDING PHILOSOPHY

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My “philosophy” or “way of thinking” about peony breeding is guided by a number of principles and factors.

I think I have seen fairly strong evidence that peonies generally do better with outcrossing, i.e. the crossing of two different parents. This is true of many plants but not necessarily all. With two different chromosomes in heterozygosity, there is a much better chance of a “good” allele covering for a “poor” or mutant allele and hence the organism to retain health. Of course, inbreeding, i.e. creating homozygosity, can exaggerate a characteristic whether good or bad. However, in peonies, wherever I have noted self pollen on stigmata (sometimes flowers shed their pollen before opening) before going on to pollinate with a desired, different pollen, I have often noted a reduced yield of seed at harvest compared to the same cross where there was no self pollen. Similarly, some varieties like Lemon Chiffon, seem to readily set seed without artificial help. However, on a number of occasions, the hand-pollinated Lemon Chiffon, seemed to grow normal seedlings, whereas the unaided Lemon Chiffon would generally grow a batch of very stunted “poor do-er” seedlings. My interpretation of this was that the unaided Lemon Chiffon was self-pollinating!

Because heterozygosity is generally healthier, I like to try and get as wide a diversity of seedlings as possible as I head toward a particular goal, i.e. I am trying to bring a population of seedlings along from widely varied sources. This will help to maintain fertility and health from generation to generation. I try not to get too fixated on a particular “magic” cross, which is like putting all your money on one particular horse race! I have done this in my efforts to get an early white double. It could have been a winner as there were desired characteristics in both parents, but in this case, just a disappointing number of mediocre seedlings!

The pod parent for the 'Early White Double' crosses, early and very white, but a slow grower

The pollen parent, even earlier, but too floppy

The result, a large number of mediocre seedlings

Another important consideration is that time is short (!), and that I will only achieve a few generations in my time. For a number of reasons, I find deciding on the suitability of a new variety a slow process. Firstly, I find peony flowers tend to alter over the first few years of flowering. One incident that I remember vividly, was to rogue all the plants of a particular cross that produced a single-type flower in their first year, in a bid to be “efficient”. However, despite lifting a lot of rejects, I failed to remove them all, due no doubt to some other call on my time, or perhaps laziness. Imagine my surprise that all, everyone, of the plants noted as single in their first flowering, but unintentionally left to flower again, turned into doubles in the following year.

Secondly, seasons vary from year to year, giving different results. One yellow double seedling I had, had a particularly good year. The colour was strong, clear yellow, the double flower shape was very refined and symmetrical, and the bush was neat and strong. I felt strongly that this was the plant that all my hybridizing efforts would be remembered by. However, in the last three years since then, it has never looked particularly good.

So, because time is short, I tend to co-opt new seedlings into the breeding programme, even before I have made final decisions about their worth as a possible named variety.

When it comes to the actual crosses I make year by year, some are planned because of previous years’ results, but quite a lot is decided on the day as and when I see the flowers opening. I have the overall goals, e.g. early white, late true red, in my mind, but I also have a mental check list of attributes that I am looking for in individual parent plants. In approximate order of importance from most important to least is:

1. Interesting colour, beautiful shape. This is slightly vague because colour, and beauty, can jump around a lot from generation to generation. For instance, crossing a pure white with blueish red (both herbaceous hybrids) may not sound particularly interesting with probably many doubtful pinks, but such a cross, I have found, can throw pure whites and true reds as well as all those unwanted shades. Similarly, beautiful shape is serendipitous because many different elements make up beauty.
2. Strong stems
3. Sealed buds
4. Reasonably productive (which I tend to correlate with healthiness – but not necessarily)
5. Large size of flower (I tell myself that flower size is not especially important but there is a definite preponderance to larger flowers in what I choose!)

Ideally I want the parent plants to be strong in all features but of course they often aren't. My golden rule for deciding on a cross is that a weakness of one attribute in one parent must be matched by strength in the same attribute in the other parent. In other words, I would never want to cross two parents that are both weak in, say, stem strength, i.e. both flop when open. If I did, it would have to be for some other very compelling attribute. Regarding colour, I tend to think in a colour blending sort of way i.e. I tend to pick parents in a population of similar coloured flowers. I guess I am hoping for additive effects in some of the offspring whereby each parent adds more than its 50% of the colour to bring about a stronger colour in the offspring.

Yellow herbaceous hybrids have a true but light shade of the colour. If you cross them and look at enough offspring, hopefully a few will have stronger colour than either parent – which I have found to be the case. As I illustrated above, though, crossing unrelated colours can produce a whole spectrum of results and I think this bias of mine to cross like with like colour has been somewhat unimaginative.

In my earlier years of hybridizing, I was interested in crossing lactifloras (diploid) with tetraploids, undoubtedly because of the quality of the lactiflora

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flowers. The biggest effort I did was with Good Cheer pollen (tet) onto Mikado (lacti), a repeat of the cross that created Christmas Velvet. I found it yielded one good seed per 7-10 pods pollinated. Of the approximately 120 seedlings that I grew, about 5-6 (from memory) were double and worthy of further consideration. In other words, useful yield was low. All of the seedlings were sterile, i.e. I have never seen a seed produced, and are presumed to be triploid. Other presumed triploids produced were from the use of Old Faithful (tet) pollen and yellow tetraploids, including Lemon Chiffon. Although pleasant, none of these latter crosses had any special virtue and I have now lost interest in triploids. The main reason for this is that it is essentially a dead-end laneway. I do not have a population of seedlings as I mentioned earlier, with which I can cross for another generation

One of the triploid seedlings from the 'Christmas Velvet' cross, still being assessed

A late and large true red, unfortunately with stems not strong enough to support the open flower

Similarly, after meeting Peter Waltz when he visited New Zealand on holiday, I have tried to use triploids as pod parents with tetraploid pollens. Despite many efforts, involving large numbers of pods (100+ in any one year of, say, Etched Salmon) and trying out many different tetraploid pollens in a bid to find the more fertile tetraploid pollens, yield of viable seed was extremely low. I only ever got one seedling off Etched Salmon (completely non-descript and unhealthy) and although I got about 15 seeds that looked good off Coral Sunset, none ever grew. (I plant seeds in the ground.) Obviously I was chasing colour in these crosses. I have found it quite easy to get salmon colours but Coral Sunset has a vividness and inner glow, plus a wonderful change of colour in the cut flower as it ages, that has been hard to find in the tetraploid seedlings I have generated.

'Eternal Love', a peony registered by the author Paul Simmons, showing his weakness for 'big flowers',  
it opens up to about 20 cm (8") in diameter on the bush.

With these experiences in mind, I stick to working with tetraploids. I think there are plenty of suitable doubles to choose from, they are very fertile, and more vivid stronger colours are starting to appear. Some shapes, such as the Red Charm type of bomb double, are not readily available in the tetraploids I have, but I have proved to myself that Rubra Plena is fertile with tetraploid pollens.

Well this has been a little lengthy, but I hope it conveys an idea of how I think about peony breeding.

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