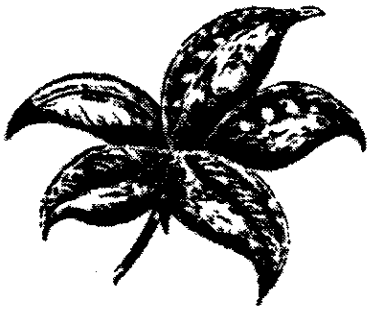

PÆONIA

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OBSERVATIONS OF A REVERSE CROSS INTERSECTIONAL SEEDLING

Donald Smith

In a previous issue of the newsletter I reported on my success in producing a true intersectional hybrid from the reciprocal cross (T.P. Lutea hybrid x p. lactiflora). Now that this first year seedling has matured, I can report on its characteristics with reasonable accuracy.

The seed was planted in a separate 4" plastic pot on 3/6/96 already showing an emerging plumule. The stem first appeared above the soil surface two days later and has grown into a very strong and vigorous looking young plant. It stands out from the other (normal) intersectional seedlings primarily because of its size and height. The foliage is the larger than any first year intersectional seedling that I have grown so far, measuring 4.5" x 4.5" across. At 5" high, this seedling is also among the tallest of the 1st year intersectionals. The leaves are dark green in color with a very heavy substance and a slightly bumpy texture. The foliage has a flat finish (non-glossy) typical of other "i" hybrids and appears to be quite healthy. The leaf shape is fairly broad with somewhat fewer and deeper cuts than is typical of normal "i" hybrid 1st year seedlings. The leaf tips are fairly rounded, not at all pointy like many of the other "i" hybrids, but also not unique among this group. Overall, I would say that the foliage is somewhat more herbaceous-looking (lactiflora) than the others,

but it is sometimes difficult to draw accurate conclusions regarding the mature foliage from the 1st year leaves. Generally, it is not until the 3rd year that the seedling foliage becomes truly representative of that of the mature plants. So, we will have to wait a little longer before we will know more about this one. However, based on what I have seen so far, I would guess that there is a good chance that this seedling is a tetraploid.

The cross producing this plant was *Age of Gold* x *Martha Washington*. *Age of Gold* is, of course, a first generation (F_1) Saunders shrub peony hybrid from the cross (p. lutea x p. suffruticosa). It is probably the most fertile seed parent of all the F_1 shrub peony hybrids. It produces nice, big, egg-shaped seeds; usually only one per pod. This cross is moderately difficult, producing about 0.5 seeds/cross. It seems curious to me that it is a relatively infertile F_1 lutea hybrid that is producing the only good seeds from this type cross. Although, the more fertile advanced generation lutea hybrids produce more than 10 times the number of seeds/cross, none of these seeds has shown even the slightest indication of germination. Maybe someone out there has an explanation or a theory for this. If so, I would certainly be very interested in hearing about it.

Based on where we are now with this cross, I would recommend that other F_1 lutea hybrids be tried as seed parents in the reverse "i" cross. I would first try those F_1s that have already demonstrated useful fertility by producing seeds and progeny in other crosses. A list such F_1 lutea hybrids was given in an article by the late David Reath in the March 1977 issue of the newsletter (Pæonia, Vol. 8, No. 1) entitled "Hybridizing of Lutea Hybrids". A similar list was also given by Don Hollingsworth in a report in Sept. 77 (Vol. 8, No. 3). In a third article (Vol. 17, No. 3, Sept. 86), Bill Seidl analyzed the parentage of the Daphnis Hybrids and listed all the Saunders F_1 tree peony hybrids which Daphnis used as seed parents to produce his numbered and registered advanced generation hybrids. By combining these lists, we find that there are at least 35 F_1 varieties that have produced seeds and/or F_2, BC or other advanced generation progeny. A list of these 35 "fertile" F_1 hybrids is given below. The most fertile of these varieties are indicated by a • before the name. A short list of these varieties would include *Age of Gold, Marchioness, Goldfinch, Stardust* and *Wings of the Morning*. Unfortunately, I have very few F_1 lutea hybrids to work with. *Banquet* has produce numerous seeds for me by *M. Washington* pollen, but none were firm enough to even warrant an attempt at germination. This year I will test *Thunderbolt* and perhaps one or two others. Someone who grows *Alice Harding* should definitely try it, as suggested by Bill Seidl back in 1975 (APS Bulletin No. 216).

F_1 Lutea Hybrids
Useful as Seed Parents

•Age of Gold
Alice Harding
Amber Moon
Arcadia
Artemis
Black Panther
Black Pirate
Chinese Dragon
Coronal
•Corsair
Countess
Demetra
Falcon
Gauguin
Golden Bowl
Golden Hind
Golden Isles
•Goldfinch
Gold Sovereign
Harvest
•Marchioness
Mystery
Princess
Red Cloud
Red Current
Red Jade
Roman Gold
Renown
Segovia
•Stardust
Summer Night
Thunderbolt
Tria
Vesuvian
•Wings of the Morning

MARTHA W. x LUTEA HYBRID AND OTHERS

Chris Laning

Martha W. is an excellent pod parent when considering the number of seeds produced when using *Golden Era* as pollen parent. Really though, we can know nothing about the quality of the flowers these seedlings will be producing until the blooms are evaluated over a few succeeding years. Itoh intersectional plants and flowers are the standard by which new seedlings are to be judged -- Unless, of course, fertility is found eventually in one or more of them!

The late Roy Pehrson used mostly the Japanese type flowers since they produce no pollen and were easy to pollinate with various lutea hybrid pollens. Seed production was small but acceptable so I followed in his footsteps. Results were not good since the blooms were and are very inferior, though the color range was excellent. This line is not recommended! Will *Martha W.*, being a fertile single flower, offer the same problem?

Full double flowered lactiflora clones of various colors as pod parents and lutea hybrids with many petals, such as *Golden Era* and *Alice Harding* as pollen parents, can be expected to produce desirable clones. But what about seed production? Very few are produced, but probably of high quality. Let me say, though, big doubles are not the only beauties we hope to obtain since singles can be considered on a par with the doubles.

Advanced generation tetraploid peonies with flowers that are doubles such as *Sunny Girl* and *Lois' Choice*, would offer a possibility of fertility when used as pod parents. Also their seedlings would probably bloom earlier than we now have, extending forward, the blooming season of the Itoh intersectionals.

Pollen plants, e.g., *Golden Era* and *Alice Harding*, will be forced into earlier blooming by the use of a plastic tent, a Plastic-A-Frame, unless someone from a more southern area can send me some.

It is easy for me to comprehend the great extension of the gene pool of this cross! Tetraploids contain two to six species (wild) or more in their various clones. WHAT A TERRIFIC GENE POOL!!

"Dark Eyes" by Laning -- This Itoh intersectional clone was registered in the June issue (1996) of the American Peony Society Bulletin. An Itoh hybrid, parentage probably "Mikado x P. delavayi". No seedling number since it was included in a batch of Itoh seed from Roy Pehrson about 12 years ago. The plant is vigorous and of dark green foliage that stays green until killing frost in the Fall. Its flower is dark purple, almost black, of medium size, and has a bright yellow center of stamens. Pollen viability is unknown. It sets no seeds. It is prolific and a great increaser.

Editorial Comments:

Certainly the question of the quality of the intersectional offspring from *Martha Washington* using the pollen of A-199/*Golden Era* has already been answered. Although accurate estimates are not available to me, Roger Anderson has surely bloomed more than a few hundred intersectional seedlings up to this point. I am quite certain that the majority of these have been from the *M. W.* x *Golden Era* mating which he first discovered back in 1980. It is my understanding that a high percentage of these hybrids exhibit complete (normal) flowers. Many of these have been judged good enough to be named and propagated for distribution. I have nearly a dozen of these plants in my garden along with *Yellow Emperor* (Itō) and Don Hollingsworth's *Garden Treasure*; and they are of high quality even when compared to the standard that you suggest. Although, Roger has reported some seedlings with incomplete flowers, it is my understanding that the overall

number is small and that the majority of these have come from crosses using pollen other than *Golden Era*. It is true that many of the *M. W.* x *Golden Era* progeny are singles, which may be of considerably less interest to some, but a number of these are, nevertheless, quite beautiful in their own right; certainly no less so than the bulk of the many excellent single lutea hybrids produced and introduced by Saunders and Daphnis. My experience has shown that this combination (*M. W.* x *G.E.*) produces ~4-10X more true hybrids than any other mating discovered thus far. This is true, not only because there are many more seeds produced, but also because these seeds germinate better (have a higher germination rate) and the progeny are generally healthier (a higher percentage survive to maturity).

You mentioned the importance of finding fertility in the F_1 hybrids of this group. I couldn't agree with you more on this point. In fact, I believe this is the key issue. In my view, it is of the utmost importance to produce a large population of F_1 intersectional progeny to increase the chances of finding those rare F_1s with enough fertility to allow us to progress to the next generation (F_2). This is especially true in wide crosses, such as an intersectional cross, where the F_1 offspring are usually extremely sterile both ways. So, there is a real advantage in producing as many first generation clones as possible, even if most of these clones are never judged good enough to be named and introduced. For, as you know, it is only in the advanced generations that we can begin to realize the full potential of this or any other interspecies cross. However, I am convinced that *Martha W.* will produce at least a few more very fine F_1 "children" along the road to the future. And, with a little luck, "she" might also sire a few fine (reverse cross) intersectional children as well.

OPEN REPLY TO CHRIS LANING'S ARTICLE

You make a number of very interesting and valid points. I too would like to try the cross that you refer to in this article (Advanced generation herb. tetraploid x T.P. lutea hybrid) for all the reasons that you have mentioned. However, I am not very optimistic about the chances of success with this line of breeding, having made a few similar crosses with no seeds produced. Nevertheless, we should keep trying, using as many different clones as we can. Personally, I think the reverse cross (T.P. lutea hybrid x Fertile herbaceous tetraploid) has a slightly better chance of succeeding, since the cross in this direction has at least produced some seed for me. Either way, this will be a difficult cross, but one well worth the effort if even a single hybrid plant could eventually be obtained.

I would really like to help you in this effort if possible. Maybe, we could work together on this project, if you would like. I would be happy to send you pollen from A-198 and/or A-199 next spring assuming it would be early enough to be of some use to you. Unfortunately, I am not sure how early your early double advanced generation tetraploids bloom. Therefore, I have enclosed a list of the dates on which I collected pollen this year from various plants including *Golden Era*. My plant of A-198 is in a very warm sunny location so I always have this pollen ~3-5 days before that from *Golden Era*. Over the years, I have found this pollen to be just as effective as *Golden Era* in intersectional crosses. However, I should point-out that this year's pollen collections were all several days earlier than usual due to a warmer than normal spring. If necessary, we could save an extra day or two by using overnight mail. Let me know if these dates are compatible with your needs. In exchange, maybe you could provide me with pollen from *Sunny Boy* and *Sunny Girl* so that I could try the reverse cross here. My lutea hybrids normally bloom from about 25 May - 10 June, give or take a few days. Better yet, maybe you could sell me divisions of these two plants for this fall. Hopefully, one or both of these would bloom next spring for me and I could collect my own pollen. I would like to start "fooling around" with a few fertile A. G. herbaceous tetraploids anyway, (just for the fun of it) and this might be a good way to get started. Please send me information and prices on these and other fertile advanced generation tetraploids which you may have available for delivery this fall. I look forward to your response.

Don Smith

After observing the growth habit and flowers of my intersectional seedling IC-89-01 for a third year, I have decided to name this plant *Evelyn Marie* after my mother Evelyn M. Smith who died last summer after a short but difficult fight with cancer. My mother loved peonies very much and I know she would have been pleased to have such a beautiful flower named in her memory. A brief description of this new peony hybrid follows:

Intersectional Hybrid Seedling Description

Seedling No.: IC-89-01

Type: Intersectional Hybrid (Herbaceous P. lactiflora x Tree P. lutea hybrid)

Parentage: Lactiflora var. *Martha Washington* X T.P. *Golden Era* (Reath's A-199)

First Bloomed: 1994

Description: Light yellow, semi-double flower with big plum colored flares and a nice fragrance. The 5" flowers have 20-28 petals and are carried on strong, stiff stems 28-30" tall. Excellent light green foliage is of typical tree (shrub) peony form and lasts well into autumn. In the fall of 1994 the foliage turned a brilliant beautiful scarlet red before dropping, but this effect was not repeated in the fall of 95. Grows primarily from below ground buds, but has above ground buds on short woody stems that winter over if protected.

The following article was submitted by Harold Entsminger of Cut-Bank, Montana.

ORANGES FROM PEACHES OR BEST SHOTS IN PEONY HYBRIDIZING

To have success in hybridizing peonies your best shot is to do your homework first. Most important, is to establish your hybridizing goal before you begin. Say it is to hybridize a true orange colored peony.

Carotenoids make the orange color in flowers. Flavinoids are the yellow pigments believed to intensify carotenoids. If we can find one or two varieties carrying each factor and we slap them together we should get orange, right? Well, being a firm believer in the old saying, "He's the one who did it, that didn't know he couldn't", I'd say right! So let's get out our microscopes and/or peony books and start studying genetic composition trying to find where those little carotenoids are hiding. First we look for a peony that has produced some peachy colored offspring, such as the Saunders T.P. hybrid F_2-A. So we take it to the Lab. and have it tested for the presence of carotenoids. Bingo, they are present. So there's one! Maybe we could try selfing this one, but further homework indicates that this plant is self sterile. So, what else? Let's try a good pollenating yellow, maybe *Golden Era* or the herbaceous hybrid *Prairie Moon*.

Hybridizers say that they rarely get what they expect from a cross. Is that because they fail to do their homework first? Home work can help to take some of the shock of genetic variation out of hybridizing for us. That's why there are genetic laws, right? Laws of dominance, recessiveness, incomplete dominance, oh ya, and then there are mutations. That's what other hybridizers get, not us. Double crossovers, not good! We'll just do like Mendell and his peas. Peony seeds are a lot like peas, don't you agree at least the phenotypes? That's it, we will use phenotypes! What looks orange? What else might have carotenoids and what other orangy plants may have come from these?

Tessera, it's metallic copper, can look like a new copper penny or at least has an orange cast. Unknown parentage though, and also no pollen, but does produce seeds. We probably won't be able to self this one, so let's try crossing it to some of the others.

Ariadne, it's peachy (BC-2 x *Impomon*) it's got some Saunders F2-A in it I bet. It has pollen and sets seed. Let's try some of its pollen on *Tessera*, that's a good shot!

Terpsichore (*Amber Moon* x Saunders F2-A) has pollen and seeds. It's a good shot, but with what? Don't you find the seed parent more often gives you the color whereas the pollen parent gives the plant and flower type; all according to variation under the laws of genetics, of course? I think so, just study the bulk of crosses. If this is so, then let's try *Terpsichore* pollen, on *Tessera*, a double shot of carotenoids, one from each parent. This could be orange in the making! At least it's a good shot. And, let's try selfing that one too. That's another good shot. Let's do it! And maybe soon we can say " Hum, I love the orange peonies , don't you? Oh yes, especially the fragrant ones with the big bomby blooms, or do you prefer the smaller semi-double herbaceous ones, oh yes, still with the lovely fragrance. I do love orange!"

Editorial Note:

Those interested in hybridizing orange-colored peonies are referred to an article by Don Hollingsworth in the Dec. 79 issue of *Pæonia* (Vol. 10, No. 4) entitled "The Quest for Orange Peony Flowers".

Sources for Peony Breeder Plants

Some have inquired as to where to obtain several of the breeder plants used in the intersectional cross. The advanced generation tree peony hybrids with fertile pollen (A-198, A-199/***Golden Era***) are available from Reath's Nursery where they were originated. The lactiflora variety ***M. Washington*** is available from Roger Anderson (Callie's Beaux Jardins) and also from Don Hollingsworth. Other herbaceous varieties used as seed parents (***Gertrude Allen***, ***Alice Roberts***, ***Miss America***, ***HP1-61***, and ***Carr East #2***) are available from Hollingsworth Nursery. The addresses for these sources are listed below.

Reath's Nursery
N-195 County Rd. 577
Vulcan, MI 49892

Callie's Beaux Jardins
W6658 Sunset Lane
R 4, Box 276B
Fort Atkinson, WI 53538

Hollingsworth Nursery
RR 3, Box 27
Maryville, MO 64468

Two clones that have proved to be among the best of the F_1 shrub peony hybrids as seed parents are ***Stardust*** and ***Wings of the Morning***. Unfortunately, these two Saunders (lutea) hybrids seem to have fallen-out of commerce and may, therefore, now be very difficult or impossible to obtain. I would appreciate hearing from anyone who grows either of these varieties, as I am quite interested in obtaining either of these plants.
