PAEONIA

Volume 14, No. 4 December, 1983

REQUIRED READING:

1. "The Peonies" by John C. Wister, $3.50 from American Peony Society, 250 Interlachen Rd., Hopkins, MN 55343
2. Bulletins of the American Peony Society.
3. History of the Peonies and their Originations.
4. The Best of 75 Years; 3 & 4 ed. by Greta Kessenich, and available from the American Peony Society.

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SEEDS FOR DISTRIBUTION

We now have an addition to our collection of lactiflora, hybrid, and tree peony seeds, a generous supply of herbaceous and suffruticosa seeds sent by John Simkins of Ontario, Canada. He had collected seeds from Gratwick plants and from his own collection.

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WE WISH ALL OUR READERS A MERRY AND BLESSED CHRISTMAS.

Lois and Chris

REPORT ON 1984 SEASON IN SHERWOOD, OREGON

Al Rogers

We had an extremely mild winter with steady rains all spring. The botrytis just loved it. Our bloom season was about two weeks advanced. '**Daystar**', as usual, was first, opened April 11, then '**Starlight**', '**Nova**', '**Early Windflower**' (on 1st year divisions), '**Early Scout**', '**Halcyon**', and '**Sunlight**' within a week.

'**Picotee**' (from Corsica, the only derivative of it I know of) set seed abundantly this year and is pollen fertile too. Used '**Scarlet Tanager**' pollen on it and got a few seeds from the reverse cross.

We are trying to concentrate our modest hybridising efforts on bicolors - particularly reverses. If any of you know of fertile Tet clones, please let me know.

'**Bess Bockstoce**' is a most interesting double bicolor. (*ed.: This cultivar has since been proven to be 'Rose Heart'. True 'Bess Bockstoce' is different.*) As the flower matures the outer edges of petals soften to blush with the center remaining deep rose. The effect is much more marked if it opens in the house. Indeed it is perhaps our favorite cut flower peony. Is there any knowledge of its possible parentage or fertility?

In rereading some back issues of PAEONIA, I realized Father Fiala has not been a recent contributor. According to the new International Lilac Newsletter, he's readying a book on lilacs. If he had to switch interests that's certainly a worthy one.

Since the bulk of our shipments are out by mid November, we've been digging and dividing the hybrids. It still hasn't frozen here! (December 7) We try to get a picture of the root structure of each variety - hopefully we'll be able to establish some sort of rough classification of roots and get the information into the literature. I find these roots fascinating and am attempting "extra eye" grafting on own root pieces according to Dr. Reath's article.

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A NEW APPROACH (Continued from page 10)

are infertile to their own pollen — since all seeds collected were heavy — sinking to the bottom of the pail filled with water. If this is true, I may have one or more plants that could result in the knowing of both pod and pollen parents. Of course, these plants would have to be isolated from contaminating pollens.

When almost half of a group of seeds that appear to be good start molding, it's time to investigate.

The reason for all this conjecture is the goal I have in mind, to wit, a fertile lutea hybrid race of seedlings that lend themselves to further hybridising. Don, how are your seeds doing?

- Chris

LETTER FROM: Don Hollingsworth
TO: Chris Laning
DATE: September 30, 1983

Sent seeds yesterday by parcel post, the only started seeds are some open pollinated *P. peregrina*. Plants nearby which are most likely to have supplied the pollen include the two clones of *peregrina* (several plants each), '**Good Cheer**', a '**Good Cheer**' seedling, and farther away, a lobata and an un-named Little Red. All-in-all it is probably best just to reference them as open pollinated *peregrina*. If someone reports a strange progeny, we can speculate on alternative parentage possibilities when the question arises!

Received the Delavay/lutea seeds and appreciate them very much. Your comments on the fact that they all have flowers containing red colors leads me to suppose the seedlings are the result of open pollination and reflect inter-crossing among the similar forms growing together or nearby, the facts that *delavayi* and *lutea* cross freely and that the seedlings are generally fully fertile has been used to support the merging of them into one species (Stebbins) and classifying the distinct forms as one of the sub-categories of sub-species, botanical variety or form. Stern appears to have disregarded the interfertility evidence, which left him a freer hand in separating the members of the group into different species. I find the interfertility evidence to be basic, in light of the genetic basis of the evolution of differences, and tend to be more comfortable with Stebbins' analysis. Just where the forms of *potaninii* for which names have been published may fit on the basis of interfertility (or lack of it) apparently awaits some trials of controlled crosses and observation of the fertility of any resulting progeny. Stern's placement of *ludlowii* as a variety of *lutea* seems even more questionable now that we have more information on its differences with the others.

Anyhow, because of the foregoing viewpoint, I am inclined to expect the flower colors of seedlings which we obtain from the seeds of your blend-flowered clones will reflect resegregation of the flower color genes so that the second generation will show a range from clear yellow through blends to reds, assuming we bring a sufficient number into flowering that the possible segregations are all expressed. Remember, the pigment for yellow is a carotene and not even in the same tissues as are those with red pigment. Thus we should expect two gene loci, at least, depending on number of alleles at each locus. The numbers necessary can be great!

Have enclosed a photo of part of a bulletin from the Oklahoma State University on container growing (remember I wrote that there is some good information that is coming out of research being conducted there by Dr. Carl Whitcomb and associated graduate students). I believe that what he is finding has considerable relevance to the problem of growing tree peonies in containers. (See reprint of Marinus Yander Pol, p. 42, Bull. 231, Sept. 1979).

The matter is not limited to tree peonies, of course, but is perhaps more meaningful in that we do not get as good results for customers from small divisions and small grafts of tree peonies as can be obtained by delivering divisions of herbaceous plants to customers.

Sincerely,

Don

REPLY TO DON HOLLINGSWORTH - by Chris Laning

Two species or sub-species of woody stem (T.P.'s) peonies that have failed to give us hybrids are *P. ludlowii* and *P. potaninii*. To my way of thinking, they don't belong in the same category with *P. lutea* and *P. delevayi* since they have properties differing sufficiently to set them apart. And these differences along with possibility of incompatibility, eliminate them from our hybridizing potentials.

Both *P. potaninii* and *P. ludlowii* winter kill (die back to the ground) here in Michigan, and since they apparently bloom only on old wood they fail to bloom. So if we should succeed in getting a flower from either of them and if seeds were obtained and then resulted in seedlings, they too very likely would have flowering difficulties.

Probably success in hybridizing with *P. ludlowii* and *P. potaninii* will be limited to regions with mild winters where there is little frost and no freezing weather.

If any of you Paeonians have any ideas on this matter, let me hear from you.
-Editor

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LETTER FROM: John E. Simkins, 1246 Donlea Crescent, Oakville, Ontario, Canada
DATE: November 4, 1983

Dear Chris,

Here are the 1983 seeds. We held them up so we could collect some at Gratwick's late in October. They are in separate envelopes showing the name or sometimes a number. I have the codes for Gratwick's if any are not named and the person receiving them wants it, so refer them to me for source information.

I was very interested in Don's letter keeping late grafts of tree peonies in plastic bags. I've been doing this myself for several years with variable success. I use sandwich bags for normal grafts and light-weight bags used for vegetables in supermarkets for the larger grafts. Five or six go in a bag which is tied and placed on the refrigerator top for about two weeks. Water appears on the inside top of the plastic. I turn them over every day or so to keep the moisture spread throughout the grafts. Sometimes a fungus will appear at the join or on the bud. Usually this is the finish of that graft although I have pulled a few through by dipping in Javex solution.

When the join swells a little, it has started to take and I then plant them in an aquarium half filled with sand and place this in the greenhouse with a piece of plastic on top. The temperature of the greenhouse is about 40° F at night rising to 60° F in the daytime if the sun comes out. The sand must not completely dry out but it must not be wet so watering is tricky. When the watering is done carefully I have got over 60% through to the spring when they have been planted in the field.

Watering makes sand quite firm and I think the pressure of moist sand may cause the root to rot. I have tried to stir it up with a screwdriver to allow more air in but some grafts are usually disturbed by this activity.

This fall I changed one aquarium to perlite to see if this will work any better. I am also thinking of using a hydroponic method with Haydite stones in a tall pot. If one could locate the right moisture zone this should give a balanced moisture and oxygen and reduce root rotting.

I've tried putting the grafts in pots in the cellar but they dried out even with plastic covers. I also tried an aquarium with sand and grafts under a fluorescent light for the winter; about 5 out of 20 came through but there were no roots on the understock when I put them out in June. I lost track of them in the garden so don't know if they survived or not.

It seems the roots need cool soil before they will start into growth. I think that late grafts of the lutea hybrids succeed more frequently than the suffruticosa. It certainly is a challenge.

Yours truly,

John E. Simkins

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MORE INFORMATION FROM DON HOLLINGSWORTH - Dated October 13, 1983

Dear Chris,

Thanks very much for the plants of Lutea Hybrid F_2A and its seedlings which you have raised. It appears from the Seaman lists and from the registrations of Gratwick seedlings, that Both F_2A and F_2B have quite useable fertility. However, Gratwick wrote that they were not self-fertile (in the Brooklyn Botanic Garden booklet on plant breeding—Plants and Gardens, Vol. 15, No. 2). If they are absolutely self-sterile (which is unlikely to be true, in my estimation, just highly self-infertile), then one would not expect to ever get seeds from them except by pollination with out-cross pollen.

Concerning the relative breeding merits of F_2A and F_2B, it would appear from the seedling information which I have (the registrations information, Bull. #224, Dec. 1977, and the two lists of advanced generation hybrids which Gary Seaman sent out to offer them for sale) that a substantial number of seedlings were produced from both A and B. Of 16 seedlings registered, 4 had A as pollen parent and 2 had B as pollen parent. B was the pod parent of one of the "A-pollen-parent" varieties, (This analysis assumes that the person who wrote .the descriptions and Gary's data follow the convention of stating female (pod) parent first times (x) pollen parent second, which is used widely in breeding science.)

Of the non-registered seedlings shown on Gary's lists plus a few of other numbered seedlings which were sent out at the same time and on which I have pedigree information, A was the pod parent of 2 and B the pod parent of 6. A was the pollen parent of 23, B pollen parent of 10 and another 16 were listed as "from A or B" (pollen).

As to the possible availability of F_2B, it seems that someone once quoted to me a statement by Gary Seaman to the effect that B is a poor propagator. Your experience with A would suggest that it is an easy propagator. This probably means that a plant of it the same age as one of B would produce more flowers and therefore more opportunities for crossing, and a larger number of progeny. Regarding the apparent mixed labels I have on the plants from Roy's scions, the one which is my number 1332 may very well be F_2A. Having the plant you have sent me for a reference, this question will be cleared up in due time.

Regarding your question whether fertile plants will ever be developed from the lutea hybrid line, my answer is a resounding YES! When I say this, I mean we should expect to get full-pod seed production in numbers per flower head somewhere between those seen on the lutea species at one end of the range (fewer per pod) and the numbers seen in suffruticosas at the larger end of the range. There are several steps between that point and where we are now, however. As I see it, how rapidly we move in that direction is going to be a function of how much deliberate effort is applied to the task. We can leave it to nature and just sit around and wait, or, we can take deliberate steps. The consequences of leaving the task to nature, I believe, is that the goal may not be reached until someone else's lifetime. To say "leave it to nature" is to say, "leave it to accident." The chances for this accident to occur very soon is limited by the conditions which happen to occur in growers' gardens, including which clones, whether insects happen to be active when the flowers are opening, whether they happen to visit the more compatible and fertile of the lutea hybrids (and in succession, rather than visiting a lactiflora or some herbaceous hybrid in between), whether the people who have access to the garden leave the flower heads on, harvest the seeds, plant them, grow them, evaluate the offspring for fertility, etc., etc., etc.

I see much different consequences from deliberate efforts by the current generation of peony hybridists. Because of the work of Gratwick, Daphnis and others, we know something about the gains in fertility which have already been made. Some of these gains have come in mediocre plants which have not been registered; others have come in stunning forms---'**Hephestos**', for example? (D-240) ('**Thunderbolt**' x F_2A). The Gratwick registration descriptions give information on fertility. There are others. You have one of the non-registered plants which has already shown good seed-production ability, D-222, which has a very acceptable flower for breeding use; some would register it.

When D-222 and many of the other F_2 and many of the F_1 clones are pollinated deliberately, seed production is much improved. Some of these seeds grow. The parents of these plants are automatically selected for fertility, because they only produce seeds if there is at least some fertility. Those with the most fertility produce the most offspring and tend to dominate the selection of future parents, to the extent that numbers have the advantage. (We realise, of course, that large numbers of poor flower producers will not

dominate when a breeder is making deliberate crosses—a breeder will tend to go for the best fertility within acceptable horticultural quality.)

The point is, mass production of seedlings techniques of breeding are not yet appropriate for Lutea Hybrids. These techniques are appropriate only when there is sufficient fertility present in suitable quality plants for the mass production of seeds. There have to be some more developments among the Lutea Hybrids before we get there. These developments can be accelerated significantly through a program based upon the deliberate pollination of every Lutea Hybrid flower available. Present indications are that the pollen should be from a different clone than the one pollinated. By using clones known to have produced seeds and progeny, the results should come faster. Lists of these have been reproduced in previous issues of Paeonia, e.g., March and September 1977. My 1983 Lutea Hybrid seeds were produced using pollen of Reath's A-199 and the clone mentioned above which may be F_2A (my accession number 1332). In the absence of these one might use '**Tria**', '**Alice Harding**', '**Thunderbolt**', and others of the F_1 Lutea Hybrids which have been used to produce Itoh hybrids — this being the evidence that they have useable fertility.

Of other questions you had — you mention Choni and its purple color. Leo Armatys used to mention something called Little Rock's. I came to associate this with Choni, but apparently this was wrong. Seems like I raised this question either directly to David Reath or indirectly through Paeonia. Anyway, it is my recollection that David offered some explanation which found its way into Paeonia. You might get some satisfaction by going through some back issues for information.

Of this I am certain, Choni is a suffruticosa. I suppose the purple color comes the same way as any other purple flowered suffruticosa, the plant is apparently small statured. I have a small graft of it now and the leaves seem a little narrower than average for the species and the stems short, although the leaves are dark green and healthy, suggesting it is growing normally. I have a plant of D-67 (F_2B x Choni) that had a nice pink flower once (in ten years) and makes very short stems. It is now growing under the influence of a walnut tree and it may do better when I move it to an open location. (It is just one of several tree peonies growing in that area, few of which have grown well.)

When you mention the matter of having a lot of "outdated seedlings", this strikes a chord with me. I have retained quite a few seedlings far past the point in time when I could classify them for future prospects, in spite of the fact that I have been forced by circumstances to move major plantings twice in the past 8 years. I am becoming more selective. This year I dug a bunch of Little Red and '**Good Cheer**' hybrids which have been evaluated for two years (some crosses longer). Last spring during flowering, I determined upon a culling scheme that has allowed me to severely reduce the number which are being replanted. I marked as "Multi petal" any which had flowers with more than 15 petals (or about), "smooth singles" any which had acceptable flowers with 12 or less petals, and cut down the others. This fall the Multi-petals and any doubles go back to the Field. Most of the singles get distributed or trash dumped and those which have not flowered get dumped. Cutting down those to be discarded allowed the space advantage to the ones which would be saved or given out. Any of the singles which spontaneously formed seeds will be kept also, for these are generally quite infertile, as you know. Also of the singles which have extra good plant habit or extra persistent foliage will also go

back to the field for another look. However, this has, all-in-all, given me a much needed system for screening plants.

Less productive crosses, such as '**Paula Fay**'-'**Moonrise**' seedlings, have not yet been much subjected to this more rigorous selection. However, when they get transplanted again, it will be a logical time to make some choices. They have more fertility and in another year or so I'll have pretty good data on which are producing viable seedlings. The plants are good enough that I'll keep only introducible clones unless they show good fertility. As you know, number of apparently good seeds at harvest is not the final test of fertility, for some of these don't come up very well. So, I give preference to those which produce viable seedlings in the greatest numbers. When seedlings of your good doubles (here) are ready to evaluate, they will have their screening criteria, too. I just don't have the room to give them all.

Best wishes,

Don

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REPORT FROM NORTH DAKOTA - Ben Gilbertson, Kindred, ND.

The '**Alice Harding**' - Hakus Jishi Tree Peony offspring that I first reported on in 1980 is proving quite interesting. It is very similar to its pollen parent, '**Alice Harding**', in appearance but very different in its general makeup.

The plant is not stoloniferous like Harding is, all close-in sprouts that come up around it are directly connected to the main stem as branches and have no root growth on them whatever. It has no running root stems such as Harding has. Increase can only be made by grafting on common peony roots which is very successful. The foliage is very much like the typical tree peony foliage in general.

In hardiness, it is at least as hardy as '**Alice Harding**' and may be equal to Hakus-Jishi which has proved to be one of the most hardy Tree Peony plants that I have grown. I have several plants of Hakuo-Jishi and Rock Variety close by and it seems to suffer no more winter injury than these plants do. I have only the original seedling of this cross of blooming age growing and this coming season I will do some pollinating on it to determine its fertility and capability to produce seed.

One other difference is that the offspring will make a neat regular Tree Peony bush while Harding makes a small thicket of plants, all connected below ground. The most noticeable difference in these two peony plants is the way they carry their bloom. '**Alice Harding**' bloom faces generally downward so that you have to tilt the flower half-way around to look it squarely in the face. This new offspring faces outward at about 90° to the stem, making it highly visible. Color-wise they are very much alike. So far, we have not had blooms quite as large on this plant as well established '**Alice Harding**' has.

I started making grafts of this plant on Lacti roots as soon as I had enough buds to make it worthwhile and now have quite a few young plants coming very nicely. I still have

quite a few seedlings growing that have not bloomed yet and the late blooming seedlings are sometimes the best and most of the plants that have not bloomed yet are of the tenuifolia species. I have been trying for some time to get a better double red in this species than the clone that is on the market today. I have five new plants that have a full double bloom but none of them is good enough to enter into the trade

- Ben Gilbertson

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POTENTIALS FOR FERTILITY

Chris Laning

I wanted Don Hollingsworth to corroborate my belief that lutea hybrids will always be more or less infertile, instead he refutes it!! Well, you will get my view on the matter notwithstanding.

I am not willing to settle for just outstanding clones of excellence in or from any one cross; fertility is my goal. Since I take the “Burbank” approach to hybridizing (selections from large populations), many seeds and seedlings from any specific cross are required. For me, this means the following lines are excluded:

1. Lutea hybrids
2. Itoh hybrids
3. Back crosses of tetraploids and triploids on to lactifloras.

The “Burbank” method of hybridising has these shortcomings:

1. It is an exceedingly long range program.
2. The very many plants involved necessitates using considerable land.
3. Not a profitable venture. (Lots of work and no pay!)

Don and I are probably not at variance with each other, rather it’s a geneticist's versus hybridist's point of view.

An article presented by the late Roy Pehrson in the March, 1979 issue of Paeonia, entitled "Synthetic Tetraploids" is included here:

I don’t hesitate to declare that at sometime in the future these plants and their derivatives will be used, almost to the exclusion of everything else in peony breeding. Someone of more scholarly bent will, hopefully, use this information to write a more definitive treatment for publication in the Bulletin. In this account I will give only a “bare bones” step-by-step outline of how it works.

Step No. 1: Gather pollen from a tetraploid species, or from any other tetraploid in the genesis of which the species lactiflora has played no part. Use this pollen on seed-bearing lactis. If seeds are obtained, the resulting seedlings will be very sterile triploids. Examples: The Saunders’ lobata hybrids, the Quads, etc.

Step No. 2: Such a sterile triploid may very rarely produce a well formed self-set seed. When grown on it may very well produce a fertile tetraploid of great breeding promise. For the purpose of this account I have dubbed these "syn-tets" because of that unorthodox origination as F_2 plants from triploid parents. They also behave in an odd manner when an attempt is made to backcross them to lactis. Examples: '**Moonrise**', Quad F_2, '**Archangel**', '**Sanctus**', etc.

SOME OBSERVATIONS: Thus far, whenever an attempt has been made to back cross one of these original F_2's to lactiflora, the result has always been the same. Large, apparently well filled seed pods are formed, but when these are opened at harvest time they are found to contain hollow seeds, with only an occasional good one among them. This trait does not disappear in succeeding generations, whether these result from selfing or from intercrossing. Even the use of pollen from a more conventional type of tetraploid, ('**Silver Dawn**' F_3) did not eliminate or dilute this trait. This peculiarity should be no obstacle. The influence of lactiflora's genes will remain constant from generation to generation in any event. Considered as a single strain, these syn-tets possess an easy growing habit which has never before been realized in any tetraploid strain or in the diploids either. Hybridizers should pay them their fullest attention.

DON'T FORGET! MAKE THIS CROSS — MIKADO X GOOD CHEER!
IT'S THE CROSS OF THE CENTURY.

Take a look at the list of seeds offered for distribution in the September, 1978 PAEONIA. Numbers 1, 2, 3, 4, 6, 7, 8, 9, 10, 13, 16, 17 and 19 are all "syn tets". That's 13 of the 19 or 2/3 of the total. If 12, 13 and 14 are eliminated from consideration because they are not hybrids at all, then the proportion, rises to 13 of 16 <— even more impressive. I think you will agree that this little exercise illustrates in a dramatic way how hybridizers are being led, unintentionally, to the conversion of a large segment of the herbaceous peony list to the tetraploid condition. This is really a remarkable development, even though it has been completely unplanned.

- Roy Pehrson

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A NEW APPROACH!

It was five years ago that Mr. C. Graham Jones sent, upon my request, a few packets of T.P. seeds - *lutea*, *delavayi*, *potaninii*, *ludlowii*, and seed labeled T.P. by ludlowii. Whether they were species or not, I cannot tell since all except T.P. by *ludlowi*i had been open pollinated. From this collection about 20 plants finally grew to maturity, some of which set seed. I can't give a really good description of the various blooms since I was out of town during that season, but a few late bloomers indicated that *delavayi* and *lutea* parentages were in their makeup.

Nothing was gotten from *potaninii* nor T.P. x ludlowii, but from the plants that bloomed a few seeds, less than 1000, were gotten, About 100 seeds of this group were sent to Don Hollingsworth and the rest held in moist vermiculite. Many seeds rotted or molded and were removed. This continued until about 450 good seeds remained (that is, 450 out of about 900 were good). This percentage of good seeds is meaningful to me and has me wondering if a plant or a few plants (continued on page 2)