

PAEONIA

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SEED DISTRIBUTION (Additional selections)

From A & D Peony Nursery, Snohomish, Washington:

1. 'Airaway'
2. 'Carrara'
3. Early White
4. 'Gay Paree'
5. 'Glowing Candles'
6. 'L'Etincelante'
7. 'Lotus Queen'
8. 'Love Bird'
9. 'Sanctus'
10. 'Shell Pink'
11. 'Terry Grudem'
12. 'Winterthur'
13. # 14992

From Larry Wier, Buchanan, Michigan:

1. 'Kate Barry'
2. 'Gay Paree'
3. 'Moon of Nippon'
4. 'President Lincoln'
5. 'Virginia Dare'
6. A red jap

## CONVERSATIONS WITH PETER HUGHES

Twice during the 1985 season Peter Hughes visited my garden. During his visits and the sidetrips we took together I had ample opportunity to learn of his interests, experiences, and aspirations. I took no notes and am trying now to put down on paper some of the things I learned and experienced with him for my own future reference and for whatever ideas they may stimulate in other readers.

Peter was widely traveled, having visited some 70 countries and all but two of the states in his lifetime. In the last several years he was becoming a French connection and a Japanese connection with respect to peonies, especially tree peonies, and it is difficult to imagine anyone of comparable abilities, enthusiasm, and means ever filling his shoes.

I had two or three phone conversations with Peter prior to meeting him for the first time at the Champaign-Urbana show, June 7-9. From there Scott Reath took him to the Reath Nursery where I met him again the following Thursday to take him to Manitowoc (2½ - 3 hour drive). That was the beginning of his first visit. A summary of both visits:

FIRST. Thurs. June 13: Vulcan to Manitowoc. June 14: to Milwaukee (via Kohler) to prep for District V show. June 15: District show, then to Milwaukee airport early evening.

SECOND. Sunday, June 30: met Peter at Green Bay airport; visited a magnolia breeder in GB; returned to Mtwc. Monday, July 1; to Sturgeon Bay, visited a private tissue-culture lab; returned to Mtwc. July 2: to Milwaukee and Whitnall Park, then to Ft. Atkinson and visit with Roger Anderson family; return to Mtwc. July 3; mid-day, Peter departed by bus for Green Bay and Iron Mountain, MI, near Vulcan, visit with the Reaths.

While at the Reath's home Peter met (Wed, June 12) two area persons involved with horticulture who had traveled together from GB to visit the Reath Nursery. One was Glenn Spevacek from DePere (southern suburb of GB), Director of the GB Botanical Garden, and John Greene, Kohler, former Director of the Paine Arboretum, Oshkosh, and presently a landscape architect and PR man for the American Club in Kohler. Knowing of our plans, John asked Peter to stop in Kohler on our way to Milwaukee, which we subsequently did. Kohler is a small community 30 miles south of here and just west of Sheboygan and I-43, formerly a "company town" organized by the Kohler Company (famous for bathroom fixtures) for its employees. The company also built the American Club (a hotel, restaurant, and conference-center complex) and an athletic club with a nature-exercise trail around a nearby lake; an 18-hole golf course is being laid out, and restoration of a National Historical Trust home and grounds is being planned. When Peter saw the facilities he thought it a great place to hold an APS show and John said he'd be glad to host it and send transportation to Milwaukee for those making plane connections there. However, I don't think either person understood the logistics and planning involved, especially with no local APS membership. John is an excellent landscape designer and wants to feature tree peonies and lilacs in some of his new schemes, so the area may become a future attraction to APS members living near or passing thru the area.

One cannot write about Peter for long without discussing his idea for creating a blue peony. It seemed to be on his mind a lot, almost an obsession, and I gather his plan for achieving this goal was inspired by things learned during his cancer research. He first explained it to me on the return trip from Vulcan despite my warnings that I had no education in organic chemistry or the biological sciences to adequately appreciate his explanation. He was nevertheless bent on my understanding the "general idea" if not the "specifics". At home the next day he put down on paper the diagrams for the chemical structure of various pigments (pelargonidin, etc.) and explained how only a small molecular addition to one would give it the potential for producing a blue color. Peter said he had explained it to Roy Klehm and that university (Illinois ??) professor had verified that all the steps were theoretically possible. I heard Peter explain it to various other people including Roger Anderson and Bill Radler (rose hybridizer and Director of Boerner Botanical Garden at Whitnall Park, Milwaukee), and a young couple we met Saturday afternoon at the District V Show. They had expressed an Interest in TP's and Peter tentatively brought up his blue peony idea. "Give up, Peter," I wanted to say, "These people will not understand those scientific terms, especially when complicated by an Aus-try-lyan accent." But I almost dropped my partial plate when the young man not only understood but asked questions and made suggestions. I departed the scene for a while and eventually the young man's wife intervened and broke up the two. With apologies to scientists everywhere, here seems to be the general idea:

There exist certain microscopic virus-like "life forms", or sub-life forms, that can invade a wound in plant tissue and spread a cancerous disease by invading the nuclei or the cells and changing the DNA by becoming a part of it. One of the best examples is some life form found in certain plant galls. Peter believed it possible to replace the cancer-causing virus by one that would contain the necessary molecules which, when introduced to the cells' DNA, would give it the gene to produce blue flower colors. The most difficult step in the process was screening the "treated" life-forms for the one that had accepted the blue-producing molecular addition. It would require many inoculations of agar plates and analysis of resulting colonies. Peter estimated 5-6 years as the span for the project, with no assurance of success and admittedly come dependence on luck. In the December, 1985 issue of American Horticulturist is an article titled "Plant Galls" with a paragraph, page 34, about a gall-forming bacterium which injects some genetic material, called a plasmid, into a plant cell, and by "remote control" develops the host gall. Excited scientists conjecture that perhaps "a human-designed plasmid could carry our tailor-made messages into plant cells and thus allow us to direct or genetically engineer plant development." This certainly sounds like what Peter had in mind. If successful, this method would apply to other plants as well, making it possible to produce blue roses, blue daylilies, etc. Then, Peter said, he'd give his discovery to the APS and enjoy the acclaim, but without Mary to help celebrate, he'd not be extremely happy.

Peter had been very interested in rose breeding and described a breakthrough he'd had but subsequently lost. He had pollinated about 500 blossoms of Orangeade, a cultivar that accepts many species pollens, with pollen from a rose relative (I forget the name). Some seeds were formed and produced five plants, true hybrids according to their leaf characteristics. But they were later lost when accidentally exposed for too long a time to the hot sun. In making the crosses he had used some chemical (gibberellic acid) applied to the stigmas at some time after the pollinations, which dilated the pollen tubes, allowing the male gamete or cell to travel down the tube for fertilization. He thought the same technique should be tried in Ito crosses and lutea hybrid crosses, especially in the backcross to suffruticosa parents.

I don't think Peter had actively embarked on any hybridizing program (that is, made any crosses or gathered any seed) but he was certainly interested in the tree peony hybrids and especially large flower size. He seemed excessively prejudiced in favor of large, even immense, flowers and thought the ideal tree hybrid would be 15/16 suffruticosa and 1/16 lutea, often comparing this future hybrid with present-day hybrid tea roses that have about 1/16 foetida blood in them. (He thought peony shows should soon combine the suffruticosas and lutea hybrid sections as one competitive group; eventually the same for lactiflora and herbaceous hybrids, with the Itos remaining separate.) He also wanted to make the difficult, innovative cross, saying he'd rather have ten, five, or even one seed of a truly rare cross than 100 or 1000 of an easier cross. With regard to TP hybridizing he often referred to the APS's 75 Years± book, page 141, Cooper's article on Peony Flower Pigments and especially to the cultivars on page 143, lists 1 and 3, containing the pigment pelargonidin. He believed all TPs were diploid, including 'Shintenchi' and 'Golden Era' despite their heavily substantiated foliage and thought sterility problems in the hybrids were due to the dissimilarity of the chromosome pairs. The same was true for the Ito hybrids and he considered it a worthwhile project to treat them with colchicine to induce tetraploids with expected fertility. (Surprisingly, looking back, we never discussed the same project with respect to tree peonies. Because they have vegetative buds above ground they would be easier to treat and then, later, to propagate by grafting. Dr. August Kehr, in *Magnolia*, Vol. XX, No. 2, pp 6-9, describes his attempts at inducing polyploidy in magnolia seedlings and larger plants. Compared to germinating seedlings, larger plants are much more difficult to successfully treat. In TPs the assured superior quality to be obtained by treating selected cultivars as compared to the uncertain quality of treated seedlings ought to make the extra effort worthwhile.) While visiting the Andersons, Roger got out his copy of Boyd's Manual where Peter pointed out a reference to an Arnold Arboretum article dealing with meiosis in peonies. He said it was necessary to know when this occurred in order to choose the proper time to treat the peony with colchicine.

Besides sheer size, Peter was also interested in variations from the norm. In a Japanese gardening magazine featuring TPs he pointed out streaked and speckled patterns that had occurred and a picture of a semi-double pure white, without flares, but with a

showy red sheath, carpels, and stigma. When I arrived at Reath's, June 13th, David and Peter were evaluating two TP blossoms on the kitchen table, one an attractive bloom of '**Marie Laurencin**' and the other a single yellow lutea hybrid, quite striking for its pure yellow effect due to a complete absence of flares. But, it was pointed out, the effect was enhanced by the same deep yellow of the filaments, sheath, carpels, and stigma, something that Peter had noticed in the field and which had been overlooked until then. I think Peter was especially alert to these details as he had been recently measuring, observing, and writing about such things in preparation for a TP cultivar identification book.

Not only was Peter interested in TP's and in obtaining all he could, including seedlings not considered worthy of introduction, but in Ito hybrids as well. I pointed out two plants of '**Yellow Emperor**' in my garden that had been selected and isolated for their white blooms. These are clearly mutations (occasionally a yellow-flowering stem appears and is cut out) and I also pointed out other variations, possibly mutations, of '**Yellow Emperor**' – some with deeper yellow coloring and/or inconspicuous flares, some with more prominent flares, some with varying degrees of semi-doubleness and singleness. Peter agreed that perhaps '**Yellow Emperor**' was prone to sporting just as certain rose strains were, especially some out of 'Ophelia', with sports giving rise to more sports. (I believe 'The Fairy' is also part of a sporting strain.) I had been hoping for the white mutation to sport again with a prominent dark flare but there is really no need to wait any longer as such a flower has already appeared in Roger's new Ito strain and more are likely to appear.

The white mutation has shown a tendency to singleness and multiple carpels. Peter had me cut one such bloom, with especially large ugly multi-carpels, to bring to the District Show. There we showed it, with feigned pride and enthusiasm, to Marvin Karrels, saying we had named it after him and registered it. You could see Marvin didn't want to hurt our feelings but finally mustered the will, to say, "Gee, boys, I wish you had consulted me first. Is it too late to withdraw the registration?" Whereupon we mercifully let Marvin off the hook and admitted to a little funin'.

At Roger's garden Peter admired the attractive foliage, vigor, and good health of the new Ito's. (Roger said some of '**Martha W.**'s lacti seedlings were also proving valuable in the Ito cross and Peter thought whatever chromosomal variation in '**Martha W.**' that made the cross possible could well be inherited by its seedlings.) With diagrams he tried to explain to us why, although diploids, they would be sterile – as would the F<sub>1</sub>'s in the tree hybrids (for the most part). Roger also showed us a potted plant of '**Martha W.**' x potaninii, with obvious hybrid foliage. Peter didn't seem terribly impressed (esp. for one so bent on the innovative cross) and I found out why on the trip back home. He felt Roger would be disappointed in the eventual size of the blooms. This was Peter's prejudice toward huge blossom-size coming to the fore and I tried to persuade him that there would be a welcome place for a plant producing small, single, yellow flowers, esp. if produced abundantly on long stems. In fact, such a plant would be unique.

At the start of Peter's second visit we stopped to visit with Dennis Ledvina in Green Bay, Dennis collects and hybridizes magnolias. Magnolia species occur with two, four, and six sets of chromosomes, and breeding has produced many sterile and partially fertile combinations, including two fertile seed-grown octaploids and possibly (by Kehr) colchicine-induced tets, octaploids, and even a duodecaploid (12 sets). (Since there are 19 chromosomes to a set, the latter would have a whopping 228 chromosomes.) There is also keen interest in propagation by tissue-culture with some isolated successes. With so many aspects that are common to peonies, I thought Peter could provide some expertise in this field. Dennis showed us photos of various yellow-flowered clones, one of the more exciting new developments. These were originated by the Brooklyn Botanic Garden and by a breeder near Detroit, MI. Dennis is too new at it to have flowered any yet but has three acres in young trees and perhaps a thousand-plus in pots, some of which are overwintered in a greenhouse and an unheated room. Dennis called his friend Ron in Sturgeon Bay to arrange for us to see his private tissue-culture lab. Ron is a propagator for a Sturgeon Bay nursery, has a master's degree in the biological sciences, and had TC work at the U.W. (Madison). Dennis and Ron had jointly financed the small lab with emphasis on TC of magnolias.

The next day we drove to Sturgeon Bay (60 miles north) and met Ron at 5 p.m. at his residence. He took us down into the basement of the rented home and showed us his small set-up. (He had to originally convince his landlord the lab was not some mysterious, illegal venture.) Many magnolia "explants" had leafed out on the agar in baby-food jars. Although I did not see any rooted, I believe he had done so successfully on some previous samples. (I also brought along a stem of my lutea hybrid '**Anna Marie**', with axial buds forming, for Ron to experiment with. It had been disbudded a couple weeks earlier to encourage development of the axial buds. These are excised, sterilized, and used to initiate the TC multiplication.) For about an hour and a half I was a good listener as Peter and Ron exchanged views and ideas on TC and, what else, the blue peony. Afterwards, with a couple hours of daylight still left, we drove northwards through the Door Peninsula. This is beautiful country surrounded by Lake Michigan to the east and the bay of Green Bay to the west, and heavily visited by tourists during the summertime. However, I think Peter missed most of the scenery as his mind was in overdrive, thinking about further suggestions to improve Ron's TC methods. The perspicacious Peter persisted and persevered in pondering each perplexing problem and, with each picture-postcard scene passing by, popped up with a new solution. When we finally arrived home that night I had him explain all his suggestions again while I wrote them down to mail to Ron the next day. There were at least six or seven but the only one I recall was this:

For the many weeks that the explants were in culture and the many hours of light they were receiving, Peter thought the growth should have been much more advanced. (Ron had expressed satisfaction with the progress to date.) He felt the reason was too little carbon dioxide available to the plants. All they got was atmospheric CO<sub>2</sub> when the agar was changed, which of course wasn't often since

the growth was slow. He had me draw a diagram of a baby-food jar with a smaller open jar placed inside, partially filled with bicarbonate of soda, and a small test-tube of vinegar placed inside that, leaning against the side. When the baby-food jar was tilted slightly, a drop of vinegar would escape, run down the side of the smaller jar and react with the bicarb to produce CO<sub>2</sub> for the explants in the larger jar.

I asked Peter if glassware in this small size was available and he said yes. I've not seen Ron since then but I later talked to Dennis about it and I gather they thought most of the suggestions too impractical. More likely too expensive to implement as at our July 1 meeting Ron said they only had \$400 left in their limited budget... and Ron's wife expecting their first child. At least there'd be no more scrounging around for baby food jars. (Peter's rationale for the increased CO<sub>2</sub> was that magnolias were primitive plants that had evolved at a time when the earth's atmosphere was considerably richer in CO<sub>2</sub>.) While visiting the rose gardens at Whitnall Park, just outside Milwaukee, we also walked by the mixed perennial beds and looked for labels on the various TP's scattered therein. About half the labels were either missing or perhaps just hidden from view but we did find one plant labeled '**Segovia**', a Saunders variety that Peter had thought extinct. A workman on the site said he had a plant location diagram but as it was in a distant building we did not press to see it. At the nearby administration building Bill Radler allowed us to look through their files where Peter found an "active" card for '**Segovia**' and also ... one for another "extinct" Saunders variety (?? '**Trophy**' ?? forgot the name, began with a "t").

In the French peony catalog of Michel Riviere that I received from Peter is a picture of the variety '**Mme. Andre Devillers**' and alongside it I have made the note that it is repeat-blooming and has no sheath. He also presented me with two Japanese handbooks/magazines featuring tree peonies; translations are lacking but I understand they were in the works or had been made, at least in identification of the cultivar pictures. One evening he showed me various papers with addresses of Japanese nurseries. He said most peony production was centered in three quite widely scattered areas (Niigata was one; I think the other two were near Yokohama and west of Osaka) so it took a lot of traveling time to cover all three. One nursery he visited was the home of '**Shintenchi**', their most popular introduction and still highly regarded. Another nursery named their introductions with the suffix "-mon" (meaning "gate"). He said most of the Saunders and some of the newer American originations are in Japan and valued for their color but faulted for lack of size. He felt such new ones as '**Zephyrus**' and '**Hephestos**' would be well-received because of their larger size. Also, in Japan, Ito was not considered the first to make the herbaceous-tree cross. I'm not sure who Peter said the credit was given to, perhaps the originator of '**Yellow Gem**' (Higuchi??) and he has been slow to release plants, if any. I don't recall any comments about further progress in the Ito cross. If they did not have F<sub>2</sub>'s such as '**Golden Era**', to work with, only very slow progress might be assumed.

In traveling together some minor but memorable incidents come to mind, like the narrow escape from a head-on collision on a busy downtown Milwaukee street. It was during a thundershower and I was searching for an entrance to I-43 south to the airport; Peter showed me a picture of a woman in a French magazine (\*) and I veered into the oncoming lane. And then, in one of many MacDonalD restaurants, our favorite rest stop, Peter went back for a second cup of coffee and took a long time paying. I finally went back to investigate. It seems he wanted to get rid of some of his loose change and had the counter strewn with French, Austrian, Japanese, and other foreign coins as he fished in his pockets for sufficient U.S. coinage to pay for the coffee. Then there was the night in a Milwaukee hotel when we looked at slides until very late, when I feigned sleep to forestall further conversation, and we overslept anyway when we should have been readying exhibits for the District Show. I'm sure I've forgotten some of Peter's ideas as he was a continuous fountain of ideas and memories; my car radio never got such a rest on trips before. Politics, world affairs, and religion were not off-limits either.

In the last hour spent with him, Peter said he intended to pursue one of three goals, ranked from easy to difficult; (1) tissue culture of peonies, (2) conversion of Ito hybrids to tetraploids through colchicine treatment, and (3) a blue peony. He asked which I thought he should try. I voted for the second.

But now it will have to be somebody else's dream. Good-bye, Peter. Sorry I didn't get to see all your slides; I thought there'd be other opportunities. Thanks for all those Big-Macs and your friendship.

*(\*) Madame Devillers in the Riviere catalog. What did you think?*

- Bill Seidl



LETTER FROM - Roger R. Nelson (Iris Country)  
118 S. Lincoln St.  
Wayne, NE 68787

Dear Chris:

Greta Kessenich called upon me to write an article for one of the upcoming APS Bulletins. I managed to get one composed and mailed to her just the other day. I hope it is what others will enjoy reading. I wrote Ben Gilbertson about the ultra-vigorous Peony tenuifolia Rubra Plena (double) that he discovered or originated. He indicated that he was not shipping peonies much anymore. Did I remember hearing from someone (and really do not remember who) that you are growing this more vigorous form of P. tenuifolia Rubra Plena? If so, would you be able to spare one in 1986?

I hope that you do not mind my asking you about this. I am not trying to be a nuisance. If you have it available, please quote me what the price would be. I grow this species peony in three places; but one plant especially is very slow. Please use the enclosed envelope for a reply. Thanks for all your help and interest.

Roger R. Nelson

P.S. I have not been able to locate the Glasscock-Falk hybrid (herbaceous) peony '**Illini Rose**'. Would you have it available or know who may have it?

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REPLY:

Dear Roger:

Ben Gilbertson's outstanding Tenuifolia Rubra Plena clone has impressed me too but I don't own any of it though am interested in obtaining this collector's item.

Hybridizing is my special interest so am not too interested in acquiring named varieties unless they can be used in seed production, so probably have less than one hundred.

Some of my tetraploid seedlings are truly outstanding but stock is not sufficient for distribution. These are exciting times for "Peony Growers."

We will make your request known in our PAEONIA newsletter, March issue. Perhaps other members can help us out.

Sincerely,

Chris

LETTER FROM ROGER ANDERSON: R 4, Box 276B, Fort Atkinson, WI 53538

Dear Chris,

As I review old Paeonia articles on the Ito cross by Roy Pehrson, I can't help but think that Roy might have thrown out a good many hybrids without knowing it. However, I don't know how well Roy protected his crosses, but I personally bag all of mine.

My reasoning is this. For 8 years I've been making this cross with only the last five being successful. Of the 5 successful years all crosses were of lacti x F<sub>2</sub> lutea pollen. All seedlings showed tree peony foliage with the exception of one 80-03. This plant is 6 years old and hasn't bloomed yet. However, when this plant emerges from the ground in early spring it looks very tree peonyish but by July it is strictly a lactiflora.

In 1984 I made many Ito crosses using both F<sub>2</sub> and F<sub>1</sub> pollens. In the spring of 1985 when these crosses came through the ground, much to my surprise, there were many that looked like pure lactiflora, closer examination revealed this. All seedling rows from F<sub>1</sub> pollen showed about 50% which looked like herbaceous and 50% tree. All rows using F<sub>2</sub> pollen looked strictly like tree peonies.

Once again all crosses were bagged and the same care given to keep from contamination. As I remember all crosses showed some ruptured seed. NOTE: Ruptured seed will germinate and is the best indicator I know of a noncontaminated cross.

Now my question is how many good Itos have been thrown away prematurely and why the difference between lutea F<sub>1</sub> and F<sub>2</sub> pollen? Has anybody ever raised a seedling to blooming age that they thought was contaminated?

A question about Martha W. After the convention last year you asked the question in Paeonia if any reader had any idea why Martha W. was so compatible with tree peony pollen. Well, I've always thought M.W. to be a twin because of her double and single form. What's the chances of the single form being monoploid? The double form will not set seed with tree peony pollen.

Chris, I do believe at this point as I sit and dream that the road leading to herbaceous yellow will come from the Ito cross. Of those that bloomed for me this year there were 3 yellows and upon examination of the pollen through a microscope the pollen looked about like some of our F<sub>1</sub> luteas. I know the microscope doesn't reveal much but it is a starting point. I should, try growing some of the pollen in a medium.

I would think as these plants grow older the fertility would increase, not only in pollen but in seed. We'll just have to keep fingers crossed.

I think that if we are ever going to get this fertility bridge crossed we must have full participation of all members interested in the Ito cross. Remember the more shot the hunter puts in the air, the better the chance of falling the duck.

Best regards,

Roger

January 10, 1985

Dear Roger:

My experience with peony species seeds and Itoh crosses -- they need the same winter protection that is given tree peony seed. That means -- prevent their freezing during the first three winters.

Disconcerting is the fact that species seeds generally take two years to germinate. Some species such as *P. obovata*, *P. coriacea*, *P. emodi*, and *P. cambessedesi* are not hardy in our Michigan climate.

1. L.T.K.A. - Roy Pehrson's own seedling, pollinated by Saunders F2A
2. 'Vesper' x F<sub>2</sub>A
3. 'Golden Dawn' x *P. lutea*
4. 'Christine x lutea
5. 'Golden Dawn' x F<sub>2</sub>A
6. 'Nippon Gold' x F<sub>2</sub>A
7. 'Shaylor's Sunburst' x lutea and F<sub>2</sub>A
8. Mauve Bomb x F<sub>2</sub>A
9. Red Ja.p seedling x F<sub>2</sub>A
10. 'Plainsman' x F<sub>2</sub>A

This list of hand pollinated protected crosses shows the extent of Roy's efforts in trying for Itoh's. Each of the ten crosses was germinated individually. If any seedling in these several batches appeared to be a true Itoh cross, I suppose it was removed and upon my insistence the remainder was given to me. I figured there was a possibility that some of the rejects could be Itohs but with lactiflora appearance. (Roy Pehrson insisted that a true cross would have tree peony foliage.) The 100-plus plants were planted and finally came into bloom, all appeared to be pure lacti. The one final proof that I insist upon deciding to discard a protected cross is that it produces abundance of seeds. I believe Roy didn't throw away any true Itohs!

Roy P. made many crosses of lactiflora x suffruticosa but the resulting plants produced "incomplete flowers". When questioned about this he was definite in his thinking that this cross could be successful; his opinion was that the Japanese had produced plants of this cross having excellent flowers as was indicated in Smirnow's catalog. We must try this one too!! Probably we should try lactiflora x suffruticosa using the purple T.P. clones as pollen parents.

Sincerely,

Chris

cc: Don Hollingsworth

First, a note of explanation and apology to those of you who expected to receive a list of available plants from me in 1985. I simply didn't get one prepared, although I didn't give up on the plan to do so until about September. Several things went awry, but the over-riding factor was that I have been swamped with work in my area of gainful employment. About 13 months ago I agreed to be available to do emergency financial consulting with farmers under a State of Missouri assistance program. We thought the work load would work itself out about planting time -- April here -- but it kept right on throughout the year.

Not only did the peony project not get tended (weeds, etc.), last year's seedlings didn't get planted and, this fall, propagation did not get done.

I made some crosses, but did not get seeds collected until late such that the earlier maturing crosses were largely lost. However, the Lutea Hybrid crosses gave several seeds and there are some indications from the results which bear reporting here. I have a little collection of advanced generation LHs along with quite a few of the named kinds (F<sub>1</sub> Hybrids), mostly Saunders and some Daphnis/Gratwick. While I have said this before, it bears repeating that a substantial proportion of the F<sub>1</sub> hybrids will give a seed or several when pollinated with suitable pollen. I say "suitable pollen" as much by way of speculation as of conviction, because it appears that upon occasion many of the F<sub>1</sub>'s give suitable pollens just as they do seed. The trouble with the F<sub>1</sub>'s as pollinators is that the results are especially erratic, such that it is hard to find patterns of performance -- possibly as much so because of the small numbers for analysis. Anyway, since I have had a couple of good advanced generation pollinators, the seeding results are much better and more encouraging of continued efforts.

Reath's A199 has been a regular performer as a pollinator and has to be highly recommended as a breeder upon its fertility alone, given that there is so little to choose from and perhaps none better in this respect. In addition it is a good flower for me, although not so far competitive with the best of the F<sub>1</sub>s. However, I feel there is not a lot of room to be critical on ornamental qualities in this group when selecting for breeding, until we have a sizable pool of fertile clones from which to select. At the present stage of breeding advanced generation Lutea Hybrids we need numbers and the clones that will do the best production are at a premium. Another which I have through David's generosity on a recent exchange is D-74. It gave good results as a pollinator in 1985, comparable to A199. In addition I have had a couple of '**Amber Moon**' seedlings (D-105 and D-106) for several years, which have regular flowers but not special, which may be about as fertile on the pollen side of a cross as the previous two.

My most regular seeder of advanced generation LHs is D-222 which I have from Chris. Another Daphnis from Roy Pehrson (as a scion) is apparently mis-marked based on his description. My number for it is 1332 and I am getting a few seeds every year, although often soft. It is a very good flower, single clear yellow on a short plant. Which pollinator used makes a difference on this one, and that is possibly the case with many of the ones which have marginal fertility. In that respect, A-199 seems to work better and more frequently on a wider range of seed parents.

Seeders among the advanced generation hybrids which I have tried have been no more frequent, as I recall, than among the F<sub>1</sub>s. This has been a disappointment and possibly cooled my diligence on this group for several years. Of course anything that flowers midway into the season suffers a certain lack of attention here simply because I have by then somewhat exhausted my license to ignore other responsibilities for the peonies! At any rate I can testify that acquiring a few good pollinators gives me considerable encouragement.

Among F<sub>1</sub> seeders I want to mention '**Thunderbolt**', '**Demetra**', '**High Noon**', '**Age of Gold**' and '**Roman Gold**' as being more or less regular when pollinated with a better pollinator. '**Guaguin**' gave a couple of good seeds last year from pollination, but nothing so far from '**Marchioness**' and '**Amber Moon**', both of which are known seeders. '**Alice Harding**' will nearly always give a few seeds if diligently pollinated. '**Zephyrus**' gave a couple of good seeds in 1985 without help while whatever I used on it the year before didn't work. The yield has never been great on this group of plants, at best; all the more reason that diligence in applying a "good" pollen pays off.

Comment on the Itoh cross results reported by L.J. as compared to what seems to be happening with Roger's unusual Lacti seeder. L.J. has reported what seems to agree with my past results -- you go along for a season or two or more with essentially no results although you may make many crosses, when something "right" happens and you get multiple seeds. As some of you will recall, a few years ago I was able to trace the fertile pollinations to especially hot days --should say "correlate" instead of "trace", as this did not prove a causal relationship. Anyway, when I obtained the cross, there tended to be several hybrid seeds in a pod, compared to many of the same cross with nothing true hybrid. Roger, on the other hand, has found a clone which appears to regularly set seeds of the Itoh cross without the need for any rare special stimulus. A logical explanation of this, for me, falls in the area of a pollen related physiological incompatibility between the two parents, which is characteristic of the species involved. When I was doing some reading on this a few years ago I found that this subject has had considerable attention in research. In clover (White Dutch) it was found that there is an incompatibility to self-pollination, which is overcome in a hot environment (thus my tracing of the weather on my cross dates). Roger's clone appears to be an exception among Lacti peonies in that it does not carry whatever incompatibility barrier is in the species in general. He is also getting white flower colors and reds (purples) without yellow undercolor (as I understand it). It has been a source of curiosity that no whites had shown up previously. Thinking up a possible explanation for the previous lack of yellow-free flowers one can easily move to the question whether only pollen grains carrying the "yellow" gene-bearing chromosome are subject to whatever stimulus breaks down the incompatibility barrier of those Lacti which possess the barrier, thus effectively screening out all pollen grains carrying other than the yellow gene. Presumably the odds are that the gene causing yellow color would not also be the source of the incompatibility, so maybe linkage on a segment of chromosome which nearly always bypasses breakage, etc. would be involved. Anyway, Roger's experience supports the belief that 'if we try enough different parents, sooner or later most any "impossibility" might be surmounted!

All of you, have a good season!

Sincerely, Don Hollingsworth

## Californica Seedling Peony Pot Culture

Nancy Ann Halas

Germination of Peony seeds from species such as *P. Californica* and many of the Mediterranean species is somewhat unique in that no cold weather stratification is required. In fact the seedlings may be lost outdoors in the early stages of development. Also many of these peonies do survive when they are mature enough to place outdoors in a sheltered place if it is essential to that plant.

As usual the simplest techniques are always best. Success becomes more certain when only a few cents worth of materials is involved in the pot culture. Peony Californica resembles the ancient Pharaohs of ancient Egypt, who also practiced close inbreeding. Peony Californica is a plant that is very disease prone, much as you would expect from centuries of inbreeding. However the peony also possesses certain gene traits that will make a desirable hybrid with vigor and resiliency in the first successful cross. I recommend a mixture of peat and perlite, which will produce a very sterile soil medium. However to further guarantee germination and rapid growth, a simple technique is described that will produce germination and rapid growth. The whole object is to create a simple controlled environment in a pot. Use about 8 plastic straws and press them equi-spaced around the perimeter of the pot, a short distance into the sterile medium. Then spray the pot rim and straws with a fine mist of water. Wrap the top one inch of the pot and the moistened straws with Dow Handi Wrap plastic film or some other equivalent brand and fold over at the top to completely enclose the inside volume of the straw structure. The plastic wrap sticks to itself when it is wet and it does not fall off at a later time. This creates a simple and inexpensive greenhouse for those difficult to germinate and grow peony seeds that does not require cold stratification.

The readers will find the technique works very well and will get more fun out of their hobby with the previous difficult seeds to develop. I can tell you that mature plants can in some conditions be placed outdoors where they will continue to grow permanently in sheltered locations. Many of these plants still require some experimentation in that early morning sun does not suit them, but afternoon sun does not bother them. Just why I'm uncertain except that with new species, you should expect to lose some plants until you find exactly what sun and wind exposure they prefer. People reputed to possess a green thumb are more often only very careful observers with an experimental frame of mind.

Don Hollingsworth showed some interest in peony pot culture and this is a description of a technique that may bring much pleasure to many people who do not know how to develop plants of this type. Periodically, it is necessary to spray moisture into plastic wrapped interior since it loses some moisture by gravity. However, you now have your own little greenhouse for under a dollar.