

PAEONIA

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THE "LATEST" ON MERISTEM CULTURE –

Telephone conversation between Roy Klehm and Chris Laning, November 1974.

The Klehms started two years ago working with iris, daylilies; are now thinking about going into peonies.

"Possibly a duplication."

Scientist's name is Dr. Martin Meyer who works at Purdue University. He has given no information to Roy re. meristem culture with peonies. His research findings would become available as he must publish his work.

"If successful, new plants will cost a quarter."

Going ahead with our own project of meristem culture development (with Dr. Murashige) may be a duplication of effort since the Klehms have this venture in their plans. Roy Klehm has suggested that he and I visit Dr. Meyer next January or February and get some understanding on how things stand. Dr. Meyer opined that we might help (American Peony Society and Paeonia readers), in financing and helping to expedite matters.

More definite information, we hope, will be available to you readers in the March issue.

-Chris

## P. EMODI

From the price list obtained from P. Kohli and Co., Park Road, Srinagar-10, Kashmir, India, comes this description of *P. emodi*:

"*P. emodi* — a stout erect perennial, bearing 4-5 inch across, showy, white flowers with yellow stamens in April, May; 2-½ feet tall; medicinal plant — 7000 to 10,000 feet elevation."

Emodi has fernlike foliage (page 52 in "The Peonies") and is a tall plant with more than one flower per stem. These white flowers are very different in appearance from other peonies, having solitary carpels that are hairy.

What has been done with this species to date and what more from it could we expect in the future? Judging from what A.P. Saunders had done, and believing this to be but a token of things to come (or things that could be expected), I plan to give it a try. A plant of *P. emodi* came from Louis Smirnow late this fall, and seeds from India (Kashmir) about two weeks ago. The seeds were 100 grams for \$13.50, (100 grams is about 4 ounces or about 250 good seeds.)

These seeds are now in damp vermiculite awaiting spring. If they should start to sprout, the sprouted ones will be refrigerated for three months before planting. The rest of the seeds will be sown out of doors next June.

Work that has been done with the pollen of this plant indicates that Dr. Saunders had merely shown us the way. He didn't complete the job nor develop much of its potential even though the hybrids that came from his hands are grand!

**'White Innocence'** (lacti x emodi) in my opinion is the greatest hybrid ever developed. It stands five feet tall and has a bouquet of white flowers on every stem!! To get a good idea of its beauty, turn to page 10 of "The Peonies" and see for yourself. And I must say they are just as great when in bloom in my garden!

**'Early Windflower'**- Veitchi x emodi displays flowers that show the emodi blood, charming white blooms. The F2 that David Reath had offered is red. Certainly there is more "hidden stuff" in this clone than is visible.

**'Late Windflower'**- beresowski x emodi, hasn't bloomed as of '74 so I cannot evaluate it, nor even guess its potential.

Emodi x mloko — has been in my garden for three years and has failed to bloom. The big buds freeze before I get a chance to see a fully opened flower.

Veitchi x emodi wasn't big enough to bloom – must take an extra year to become established.

Any information that any of you readers may have (or suggestion) with regard to emodi and its offspring, send to me for the next March issue! - Chris

EXCERPT FROM LETTER FROM P. KOHLI & CO., KASHMIR (INDIA) 11-15-74

We have enclosed with seeds our descriptive list of Alpine Himalayan Wild Perennials of great garden merits and trust that you will find several other items of great interest in the list. Our printed prices are also enclosed with the list for your ready reference and selection.

Could you very kindly send us a list of addresses of leading Alpine Plant Nurseries of your country, as we feel that our seeds collected from high altitudes will prove quite hardy for Michigan climate.

Thank you and looking forward for many more opportunities of being of service and assuring you of our best attention at all time.

### HOT WEATHER AN AID IN MAKING THE ITOH CROSS?

November 19, 1974

A scientist has written that the failure to obtain certain desired hybrids provides the greatest impetus to research in plant breeding. In recent peony history perhaps the most notorious failure and the greatest effort have centered around the Itoh Cross. (P. lactiflora herbaceous varieties x Lutea Hybrid tree peony varieties). This cross has proven most tantalizing, once in a while giving a few hybrids but most times nothing or, even worse, P. lactiflora rogues from unintended stray pollen which fact shows up only after one has waited in anticipation for a year or two.

Why does the Itoh Cross only occasionally work and what can be done on purpose to increase the number of takes? These questions have plagued me for at least three years. I first learned of the cross from Miss Silvia Saunders in the Autumn of 1968. By a fortunate fluke (or call it dumb luck) the cross succeeded for me the following year. Though the pattern of seed production was erratic (seeds in three pods on one plant, yet no hybrid seeds on several others), the results were certainly encouraging. However, in 1970 and 1971 a much larger number of pollinations gave no hybrids at all. Then from 1972 pollinations two hybrid seedlings emerged and three came from 1973 crosses, welcomed but baffling. Meanwhile Roy Pehrson produced a much larger number of these

hybrids and also reported erratic results. Roy and I have exchanged much correspondence upon the questions posed above — why and what.

Prior to the 1974 peony flowering season, I undertook an examination of plant breeding research pertaining to pollen storage techniques. Right away my attention was diverted. In a book on pollen physiology considerable space was found devoted to "pollen incompatibility," the failure of fertilization which is associated with poor growth or inhibition of the pollen tube. Normally, when pollen grains reach a receptive stigma, germination takes place, A pollen tube grows into the stigmatic tissues, continues through the style and into the ovary. After entering the ovary, the pollen tube grows toward an ovule progressing until it reaches the embryo sac where fertilization takes place. Pollen incompatibility mechanisms act to prevent, retard, or abort growth of the pollen tube. Incompatibility seems to exist widely in the plant kingdom and functions to provide isolation from disadvantageous pollinations which would be a potential threat to survival of the species. Because such barriers interfere directly with the achievement of desired hybrids, the question of how to overcome them has received a great deal of attention in plant research.

In a recent survey of advances in the study of incompatibility the writer states that "the effects of various physiological treatments on the self-incompatibility reaction have been investigated, but relatively high temperatures have been the most effective in breaking down or changing the incompatibility reaction in the species tested. (E.E. Townsend, Agricultural Research Service, U.S.D.A.). It was also reported that the self-incompatibility inhibition of tube growth I was similar to incompatibility reactions between species.

Following these leads, I looked up the weather statistics for the dates of Itoh Cross matings which were successful in producing hybrid seedlings. Last Spring I sent a tabulation of these observations to Roy Pehrson and to Chris Laning for their reaction. Subsequently, Chris reproduced the tabulation in the June issue of PAEONIA. The Itoh Cross fertilizations using pollen of '**Alice Harding**' had occurred in 1969, 1972, and 1973

only on days that exceeded the normal average temperature by 10 degrees F or more, with an average of 75 degrees. Relatively high temperatures occurred on the following day in each instance. Fertile pollinations using 'Banquet' pollen in 1973 could not be dated so precisely but temperatures above 70 degrees occurred on one of these dates, as well.

Armed with these observations I made a crude effort in 1974 to enhance temperatures of the carpels when making Itoh Cross matings during the cool days which prevailed. The Crosses were made only in the morning of sunny days and the pollinated flower heads were enclosed in clear plastic bags, aiming to trap heat from the sun. I have no way of knowing how high the temperature went, but many carpels atrophied which may have been due to excess heat. However, I also have seeds from some of them and by next May will know whether any are true hybrids.

Meanwhile, Roy Pehrson has written one time that it was extremely hot when his 1973 pollinations were made and that far more Itoh Hybrids were produced than in any other season.

All of this encourages me to attempt more careful temperature control for my 1975 Itoh Cross pollinations. Present plans envision encasing the whole plant of the seed parent in a clear plastic. For this purpose I will prepare some circles of wire mesh made big enough to surround the plants and 30 to 36 inches high. These will preferably be of a size that a large clear plastic bag can be pulled over them and down to the ground. A cheap thermometer can be hung inside at one or more typical locations, to keep track of the temperature (at least when one is able to be around), and provide ventilation if it goes too high. At this time I would estimate that 95 to 100 degrees should be considered maximum and safe for only short periods. While these methods are crude, I believe they will be adequate for a test of the proposition that hot weather helps make this important cross. If it should prove true, why not try it with crosses using the Japanese tree peonies or the lutea species directly on herbaceous garden varieties?

- Don Hollingsworth, Kansas City, MO.

TO PAEONIA EDITORS AND READERS: - from Ben Gilbertson

Roy Pehrson's statement on page 4 of the September issue of PAEONIA that "we should be looking for better seed parents" in our peony breeding efforts, struck a responsive chord with me as I have been working to that end ever since I made my first peony cross. The varieties I had then, in 1955, were almost totally devoid of any carpels.

We now have several new varieties that combine a very fine background with well developed carpels that produce seed very well. I am naming two of these varieties this year — 1974 — so that they will have their own identity and be given the chance to make their way in this world on their own merit. They are the following:

#### 'WINE RED'

The name of this plant is the color of its full bomb type flower's borne in from 1 to 3 on each of its sturdy stems of about 24 inches in height. It blooms midseason lactiflora time and is a good seed producer, having very good carpels and is entirely free of pollen.

This plant is a second generation offspring of my original peony cross, of '**Philippe Rivoire**' on '**Kansas**' and has seedling 5908 as its seed parent and 6001 as its pollen parent, these two being the result of my initial peony cross. It does not look much like either of its grandparents but would fit in somewhere between the two of them.

#### 'MULTIFLORA'

This plant is a three-way hybrid, its seed parent being  $\frac{1}{4}$  Mloko and  $\frac{3}{4}$  Lactiflora. Its pollen parent is  $\frac{1}{4}$  Tenuifolia and  $\frac{3}{4}$  Lactiflora. It is free of pollen and has good carpels and sets seed very well. The large flowers are high built bomb type full double of a light pink color, 3 to 11 per stem and bloom very early. It is the most floriferous peony that I have ever grown or seen. One three year old plant in summer '74 had 49 large flowers over a period of two weeks. Its stems are straight up and sturdy, rather short -- 26" tall, of medium green color which holds well until a hard freeze comes.

While these two varieties are fine garden peonies, I feel that they are far more valuable as breeding stock and I plan therefore to try and get them out to the breeders and hybridizers rather than the general public where their real value would be totally lost. I would like to have our readers comment on this idea as it would help me decide which course to follow, I was 78 years old last week and anticipate several more years of peony breeding. - Ben Gilbertson

Kindred, North Dakota, 58051

Dear Readers:

Order early, then he won't have to make a decision. Really, these are plants that would seem to be extremely valuable in hybridizing.

And did you take note: Ben writes that there are from 3 to 11 flowers per stem! My goal is 15 blooms per stem — he's almost there!

Ben, I'll take one of each. .

- Chris

#### CONCERNING THE SAUNDERS HYBRID PEONY 'RED LACQUER' --

Since '**Red Lacquer**' is referred to as one of our lobata-hybrid F-2's, I think a few words of explanation are in order:

This plant, to begin with, is now non-existent.

It did once exist, under number only, in a bed of seedlings, some of which were supposed to be F-2's. It was seen by a painter-neighbor who admired its brilliant red; "Like Chinese red lacquer", he said, My father gave him his only plant, and the neighbor took it home and planted it in his own garden.

Its stamens were a funny caterpillary sort of texture, something like chenille. I cannot recall ever having seen pollen on them.

Many years later, our neighbor gave me permission to dig up his plant with the idea that I would take some small divisions of it and replace the largest piece in his garden. As with some plants, the more you try to have more of them, the more you have less and less. And what you do have does not grow well. My neighbor's division finally died. The pieces in my garden, when they bloomed in the following years, never had the "chenille" stamens and I finally came to question whether I hadn't mixed up some plants in the bed.

So, it is not a proven F-2. May never have set a seed. May not have had viable pollen. And is now, as I said at first, non-existent.

For lobata hybrid F-2's, we shall have to concentrate on **'Moonrise'**.

- Silvia Saunders, October 24, 1974

LETTER TO SILVIA SAUNDERS --

Thank you for your prompt response to my inquiry about **'Red Lacquer'**. I became interested in this variety when it was mentioned in PAEONIA and then last spring it was listed by the Goldsmith Nursery. It is described as a "rich clear red, fine texture, center" and priced at \$15.00.

I then ordered and have recently received and planted both **'Red Lacquer'** and **'Scarlet Tanager'**. However, I wondered a little about these varieties when the roots arrived. The two roots were almost identical to each other in appearance and all the extended roots were first about a quarter inch in diameter for approximately one to two inches and then became almost a half inch in diameter up to the point where they had been cut off. When you picked up the roots the effect was similar to picking up a small block of wood to which carrots were attached by strings.

I also received 10 lobata hybrid roots from Mission Gardens this fall which did not resemble the Goldsmith roots at all.

In view of your comment that **'Red Lacquer'** is non-existent, I wonder whether I may not have received two **'Scarlet Tanager'**.

Yes, I do get PAEONIA and have all the issues put out since the Lanings took it over.

- Dick Edblom  
6917 - 45th Avenue North  
Minneapolis, Minnesota 55428  
October 29, 1974 \_

LETTER TO CHRIS IANING --

I wrote Dick Edblom, sending him virtually the same information I put in a recent piece to you about **'Red Lacquer'**. Now I hear this from him. What would be best to do about this? Would you, for instance, want to run the whole thing in a part-page called **'Red Lacquer'**? Since indeed, it was described as an F-2 (or a possible F-2) it just might be worthwhile to try to discuss it. Maybe the Goldsmiths will write something about it. Do they get PAEONIA?

Keith and Peggy Goldsmith  
9108 Olympic View Drive  
Edmonds, Washington. 98020

They've never been on the lists of Actual or Potential Breeders, for I never heard of them hybridizing, but they are a great pair, and might love to have PAEONIA if they saw a copy. - Silvia Saunders

KEITH AND PEGGY GOLDSMITH:

Will you kindly write the final chapter of this story? Please solve for us the mystery of the year. I'd like to receive your catalog or price list too!

- Chris



## ROY PEHRSON SAYS --

My Ito seedlings have not as yet begun to bloom, but the very first ones obtained are now four and five years old. These have developed to the point where it is now possible to get a very good idea about their final plant and foliage forms. These forms are so varied that it keeps me wandering from one plant to another, wondering or trying to visualize what sort of flower will be carried by each. The suspense is becoming almost intolerable.

To judge from what I have seen of them up to now, it looks like they will have bloom stems on the order of 22" to 28" in height. It looks like all of them will grow erect. They will have slender but very strong stems. A very few of them will show a little inclination toward a woody habit but without succeeding. These will grow perfectly well in the herbaceous manner.

There is a wide range of foliage patterns in these plants, but even so it seems to me that every plant can be compared with one or the other of two distinct types, quite different from each other.

I think of the first of these as the "coarse" type. Foliage is quite large and is not extensively dissected. Leaf petioles are very long and the internodes tend to be long, giving the plant a sort of "open" appearance. The color is a medium green and the surface texture is dull or rough.

The other, "glossy" type grows more compactly, has smaller leaf segments, and has harder textured, even glossy leaves. Their color ranges all the way from a rather light green to the darkest green possible.

The rough leaved plants all become infected to some degree with the Leaf-Spot fungus. It seems odd that a few of these seem more susceptible to the fungus than any other peony and become badly disfigured by it. The smooth leaved plants seem highly resistant, even immune to infection. Among the 29 plants growing in the "front garden" this summer, 18 were of the rough leaved kind and 11 were the more desirable glossy kind.

A few of the glossy leaved plants more than make up for any faults found in the others. They resist fall freezes better than any herbaceous peonies and then go on to acquire fall colors of the most brilliant and attractive kind. Some of them rival the sumacs and the maples. Today, November 8, just one plant remains unfrozen in the garden. This Ito had the darkest green foliage of them all and has now turned a deep purple-bronze.

With such nice plants at hand it would be deplorable if these do not become coupled with some very pretty bloom. We'll just have to wait, I guess.

## MORE FROM ROY -- (Lactiflora x suffruticosa)

Hybridizers should take a real careful look at the color pictures of '**Pink Symphony**' and '**Pink Harmony**' on page 45 of the current Smirnow catalog. These pictures were surely taken in the garden of the originator in Japan. One of the blooms in the picture of '**Pink Harmony**' is held in a position where its form can be easily judged. It looks like a really fine flower, comparable in quality with the best lactifloras. Both varieties appear to be very good bloomers.

The original lacti. x lutea hybrids cross is sure to remain the more popular of the two with hybridizers for a long time to come because the good yellows in herbaceous peonies are still so rare. Some will surely try the cross out of simple curiosity; others because of their own special circumstances coupled with the two advantages provided by suffruticosa.

These are:

1. Suffruticosa is much more commonly grown and blooms quite a bit earlier. It is possible to use pollen from one's own plants on even the earliest lactiflora blooms, as well as on fertile hybrids if one should care to try this
2. Pollen is produced in abundance on most suffruticosas, whereas it may be downright sparse or even absent on many lutea hybrids.

The story of the Ito lacti-suffruticosa hybrids has not been told. Nobody has told how difficult the cross may be.

I have made crosses on a very few blooms several times in past years. This summer I used the pollen on all the blooms on my big plant of '**Christine**'. Just one seed was harvested and, of course, I shall not know until next summer whether or not it is really a hybrid. I have a hunch that it is.

Can someone add to this account?

ED.: See Page 4 in Smirnow's catalog and see what he writes about these two clones.

#### 'ROY PEHRSON ALSO TELLS US ABOUT ——— MINI VANDALS

I walked out to the "west" garden on October 4 to be greeted by a depressing sight. One hundred eighty of the garden stakes identifying one, two, three and four year old seedlings had been pulled up and strewed about. Two weeks later all but six of the remainder were also pulled out, 252 altogether. I have been able to reset only a handful based on memory.

I'll be able to recognize the Lobatas by their foliage but won't know the seed parent. I will find the Itos again too, but won't know either parent of more than half of them. The record of most other hybrids will remain unknown.

Our nearest neighbor's little monster and his sister were involved in this, but I don't think they would have done it alone. But with about four more three to six year olds from farther up the block the mass excitement of the projects could not be resisted.

ED.: This is sad news, Roy! I'll take it to heart and keep record of the placement of my seedlings, set dummy stakes flush with the ground along side the identification stakes. And I'll do it this month — for sure! — NOVEMBER, 1974

— Chris

seeds... seeds... seeds... seeds... seeds... seeds... seeds... seeds

The following seeds have been received from Roy Pehrson and are available by request from Chris Laning. These seeds should be sown in June or July.

1. '**Moonrise**' - open pollinated
2. Quads - open
3. Roy's Second Best Yellow
4. Quad F2 x Moonrise F2
5. Quad F3
6. '**Moonrise**' x '**Rushlight**' F3 (open)

## RESULTS FROM "FERTILIZER TO HELP GROW PEONIES"

Don Hollingsworth

May, 1974

A progress report on my use of heavy applications of commercial fertilizer on peonies can now be made. I had some "burn" from excess muriate of potash in a second application during late April. On the positive side, however, some of the peony flowers showed dramatically improved color compared to previous seasons when little or no fertilizer was used.

The good results from heavy fertilization were more than had been hoped for. Many seedlings flowered for the first time and I am confident most of these would have flowered last year had I been fertilizing regularly. Older plants gave more and finer flowers than they had ever produced before in my garden. For the first time in five years of flowering '**Ellen Cowley**' gave flowers like I saw of it at the 1972 Minneapolis National Peony Exhibition. I can now understand what Dave Reath means when he writes in his catalogue that '**Ellen Cowley**' is like '**Cytherea**'. As a group the Saunders Lobata Hybrids, which are a big thing among peonies to me, were more highly colored than I have had previously.

Perhaps the most surprising result was the discovery that I have a "scarlet" tree peony. About eight years in its present location the plant had long ago been dubbed "Rose Pink," although at times the flower color was near red shortly after opening. However, it soon passed off to familiar blue tones. This year, the petals had color tones close to those of '**Laddie**' and retained this color until petal fall. What is most frustrating is that during the past five years I have added several tree peonies selected for scarlet color which have so far declined to flower. Meanwhile, I could have been using pollen from my old "scarlet" had I recognized it!

At the outset I had settled upon the plan of using a mixed fertilizer balanced to give an analysis of 1:2:2 or 1:3:3 (nitrogen:phosphate:potash, respectively). This was to be applied in the amount necessary to give 2 lbs. of N (nitrogen) equivalent per 1000 square feet of bed area for the whole season, half to be given in early March ahead of growth and the remainder about mid-May. The higher amounts of P (phosphate) and K (potash) would assure a rich reserve of these nutrients without risking N excess. I was later to be reminded that potash should be carefully controlled also when applied at high rates.

Superphosphate, the common P source used in mixed fertilizers, should be placed well into the root zone because it is not much soluble and does not move well with the soil water. Since annual treatments to perennial plants cannot be placed deeply into the root zone, the more soluble combination product ammoniated superphosphate (N&P) is the better choice.

In Kansas City around March first it was tough to find any fertilizer in bag-sized lots, let alone find a particular formula. After considerable running around I located enough for immediate requirements by accepting some of 0-24-24 and some of 12- 24-24 (percentage analyses of N-P-K). Only after commencing to apply this material did I realize I had overlooked the matter of ammoniated superphosphate. When I attempted to make a water suspension of the 12-24-24 for seedling frames it took several days soaking just to get the pellets broken down enough to give the even distribution desired. So, I

went back to the dealers and took 12-12-12 made from ammoniated superphosphate. Now it would be necessary to compromise the original plan of amount to use.

That wasn't the only compromise of plan, however. In the press of spring work my zeal for accuracy and precision fell by the wayside. After the 12-12-12 had been put on, guided from observing the appearance of how thickly the granules lay at half cup in a ring around a plant, I found that I actually about doubled the intended rate. By crude measure, I estimated that around 20 lbs of 12-12-12 was applied per 1000 square feet or 2.4-2.4-2.4 (lbs.) of each N, P and K, respectively. This was just the early treatment and I had already exceeded the intended amount of N for the whole season. At that time I still planned to use additional potash in nematode areas, but did not then get it on.

Later, I acquired a supply of 5-20-20 with trace elements: boron, manganese, molybdenum and zinc. (Hybridizers please note: although boron in larger amounts is toxic to plants, as a trace element it is of critical importance in pollen production and pollen tube growth. When deficient, pollen is not produced by some plants and if deficient in the seed parent the pollen tube may be unable to grow through to the ovum. Boron's role in peony pollination has not been determined, however.

Application of the 5-20-20 was immediately made around plants growing in the nematode area. Besides, I then added the muriate of potash which had been intended for earlier application. I foolishly did not take time to compute amounts, perhaps over confident because things had gone so well after the earlier application of greater than intended amounts. At any rate, a few leaves and stems soon wilted and died, very similar in appearance to that of a flat of annual seedlings which has been allowed to dry out. When water has been restored it is found that some of the plants turned black and dried up. That is the way these few stems and/or leaves of peony looked and I laid it to the potash in the late treatment, for the potash is as soluble as table salt and very similar in chemical composition.

This loss of a few seedlings doesn't mean (to me) that the fertilization should be stopped. It does tell me, however, that I must use the scales to measure amounts appropriate to measured bed areas. Then I must take pains to assure even distribution, especially in crowded seedling areas where it is not possible to keep the chemicals in the outer zone of roots, several inches away from the stem zone. A water solution (or suspension) may be the best way to get uniform distribution on smaller areas where plants are crowded.

Overall, I am satisfied with fertilizer results so far and will continue to evaluate what happens as a help in planning future use.

\* \* \* \* \*

#### PHILOSOPHY:

Until mortals know all there is to know about any one subject, (for us) there can be no absolute right and no absolute wrong. Nor can there be complete success and complete failure. We must learn to accept the thought of being approximately right and approximately wrong. This kind of thinking leads to a magnanimous attitude toward others and toward self. - C.L.