

PAEONIA

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LETTER FROM MRS. O. SLATER,  
WAITAWA ORCHARD, 4 R.D.,  
Timaru, South Canterbury  
New Zealand

July 27, 1990

Dear Chris,

Thank-you for sending me the Paeonia. I do enjoy reading it, especially the letters from other areas.

My husband and I are coming to the States in August for three weeks for a holiday so are looking forward to that. We will be in Baltimore, Maryland, Virginia and Illinois. While in Illinois we have made plans to visit Klehm's Nursery and they are going to show us the grafting of the tree Peonies. That is my main interest and the tree Peony seeds I received from you are doing very well, it certainly is an encouragement to grow more. I plan to import some named varieties three year old trees. Three years ago I imported some from Smirnow and they flowered last year so quite exciting.

Trust you had a good convention, all being well we plan to come to the next one in June 1991, so will be interested to find out where it will be. Nearer the time you may be able to let us know of some Peony gardens near the convention that we could visit. Peonies grow very well in our South Island climate, cold winters with a lot of frosts and warm summers often drought conditions. So far this winter it has been very mild with only a light coating of snow on the mountains.

We own an orchard growing nectarines, apricots, Asian pears and 11 varieties of apples.

As we have plenty of room we plan to extend our Peony growing and are considering going into exporting Peony blooms. Would there be a demand in the States around November and December?

Please find enclosed my subscription for the Paeonia. Hoping to meet you next year.

Yours sincerely,

Mrs. O. Slater

## "ALL ALBIFLORA — OUT"

This is taken from A. P. Saunders' "Big Notebook". There are many similar entries. He is, of course, referring to the fact that very frequently in using lactiflora (albiflora) (sinensis) as a seed parent in crosses, many or all of the seedlings obtained proved to be not hybrids at all, but pure lactifloras.

In the same notebook he attributes such happenings to "accidental self pollination." In another of his writings he explains this more fully. The following quotation is taken from an article "Some New Hybrid Peonies" written for Bulletin No. 27 of June, 1926, and reprinted in Bulletin No. 133, June, 1954.

"Thus, I am pretty well satisfied that I have never had any successes in crossing the various forms of shrubby peonies with any of the herbaceous species. It might seem an easy matter to be quite sure about the success or failure of a given cross, but it is not so easy as it looks. Of course if a cross is made and no seed is obtained it is plain enough that the cross has failed. But if the seed pod enlarges and in the autumn yields seed, it is by no means certain that the cross has been a success. For one must remember that the anthers of the peony often burst before the bloom has opened and consequently there is always a danger that a bloom may have fertilized itself, even though the petals and all the stamens may have been removed while the flower was still in bud."

It must be borne in mind that the passage quoted above was written early in Mr. Saunders' hybridizing career; at a time when he was blooming only his first generation of hybrid plants. It would be very interesting to know whether he may later have begun to have doubts about these accidental self pollinations having come about in just the way he explains them here. I began to be very puzzled about this several years ago.

Over the years my own experience has closely paralleled that of Mr. Saunders. I have bloomed out several thousands of pure lactifloras from supposed crosses and, except for the lacti x lobata cross, have found only a few hybrids. I guess I must admit though that carelessness may have played a bigger part in my poor results, even though Saunders often used single lactis as seed parents whereas I never did so. There should have been less chance of self pollination with the japs, anemones and bomb type doubles which I have used exclusively.

It was only when I started to try to make the lacti x "lutea hybrid" cross that I corrected my previous careless practices, trying by every means I knew to make only uncontaminated crosses.

I continued to use japs, anemones, etc, as seed parents. I chose buds at least one, and often two days away from opening. These were stripped very completely, pollinated and bagged immediately. I feel confident that many of the pollens I used could not have been previously contaminated by lactiflora pollen. My "fingertip" technique is such as to rule out any possibility of contamination at this stage.

In spite of all this I still continued to get seedlings which were pure lactifloras. As the genuine hybrids are very distinctive in appearance there could be no doubts on this matter. Yet there they were! It simply could not happen but still it did! I was completely baffled by now, really desperate for an explanation. I even grasped at the thought that parthenogenesis was involved. This could not be true either since these plants were not uniform in appearance, nor did they resemble the seed parent very much.

This frustrating dilemma continued until this summer when an observation in my garden startled me into the realization that I had an explanation which satisfied me.

I had pulled off all the terminal blooms on a clump of '**Vista**' which had opened too far to be safely pollinated. When I returned to this plant the lateral blooms too had opened a little too far to be sure that insect pollination had not occurred, so I decided to use lobata pollen on them. This pollen is so effective that I could be sure that most of the seeds would be hybrid anyway. Then I noticed something unusual. About ten of these blooms had tiny yellow nodules or specks of what I assumed to be pollen, located at intervals within the "crease" formed by the incomplete fusing of the two edges of tissue on which the stigmatic surface is developed. If these are really tiny lumps of pollen they are ideally placed to effect the self pollination of that particular carpel on which they are seen.

Beginning hybridizers, and especially those who use a brush to pollinate their blooms, may never have noticed the existence of these incompletely sealed edges at the active surface of the stigma. I notice it occasionally when applying pollen with the fingertip. Sometimes in rubbing the fingertip crosswise over the stigma the two surfaces will be seen to separate. I have seen this only on those varieties which have a narrow, attenuated stigma with a very narrow active surface. '**Vista**' is one of these. I think it is much less prevalent in those more "normal" kinds which have a much broader "easy to pollinate" stigma.

Because the fossil record of soft plant parts is very poor, botanists have not been able to trace the evolutionary steps involved in the development of flowering plants from simpler precursors. It seems clear however that each separate part of a flower has evolved by the modification of a single leaf. This has been accompanied by a shortening of internode spacing almost to nothing. Because the flower parts in the peony are far less elaborately specialized than in many other plants, the peony can be considered a flowering plant of a "primitive" sort. It is comparatively easy to imagine that the carpel and its attached stigma may have evolved from a single leaf of some remote ancestor. Let's do so, briefly. Let's say that a single leaf folds inward along its mid rib and that the edges fuse to enclose the ovules which somehow develop from cells on the enclosed leaf surface. Ripened seeds are released when these fused edges become "unstuck" later. The very tip of this leaf extends beyond the part which becomes the seed box. Its two edges normally fuse also and the stigmatic tissues develop along the line of these fused edges. Only a slight abnormality in development would be required to provide the incompletely fused edges I've described, and between which I believe I saw those small inclusions of pollen.

It is suggested that this idea is not a fantastic one when one considers the other sex reversals and abnormalities which have been seen. In doubling of any degree, stamens

and even carpels become petals — a more leaf like form. Stebbins and Saunders (Genetics", Vol. 23, 1938) describe the occurrence of small outgrowths of stigmatic tissues on small atrophied stamens in a hybrid of lacti x Vietchii. Saunders obtained even more startling reversals (multicarpy) in many seedlings between lacti and several members of the "anomala" group of species. In these, the many stamens are changed to a mass of very small non-functioning carpels complete with stigmas. '**White Innocence**' is a perfect example of these. In corn I often see seeds formed in the tassel (the staminate bloom) of the plant.

I believe all the above is sufficient to establish that my conclusion could be correct. It should be tested microscopically by someone with the facilities and the opportunity to do so.

It's not a terribly important matter. Even if it proves to be correct there's still no way to guard against the unwanted seeds. We will still get self pollinated lactifloras to discard but we will understand why it happens.

- Roy

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Editor's Note: -- So there you have it, dear hearts and gentle people, our peers have spoken. So be it, "All Albiflora — Out". But being a novice, I am just wondering if the lactiflora (albiflora) could be completely dominant in all appearances in the seedling while its partner (the pollen parent) gives all the recessives. Then the plant would look 100% lactiflora but actually be a hybrid. Therefore, Roy Pehrson, all your "All Albiflora — Out" plants of the lactiflora x lutea hybrids crosses are of interest to me. Will you give them to me? Or else, keep them until one more observation is made. The check that you could make that would satisfy me is this: does the seedling set. seeds or have viable pollen? If the plants which are to be destroyed or discarded are fertile, I can agree with the whole article and the plants are 100% lactiflora and not hybrids at all. But if they are sterile, I would, question the whole matter.

- Chris

*(from PAEONIA, Vol. 3, No. 4, December, 1972, p. 10)*

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#### INSULATING MATERIAL

Chris, your article prompts me to tell you about the use of insulating material in road construction. The Dow Chemical Company manufactures foamed polystyrene (Styrofoam) in a grade intended for this use. This is a little more dense than grades commonly used in building construction. It is supplied in "boards" 2 feet wide x 8 feet long and 1", 1½", or 2" thickness. Without going into details concerning the situations where the use of insulation is indicated, I'll just describe the effect obtained.

At the latitude of Mankato (in Minnesota), frost penetrates a bare roadway to about 5'. If a 2½" layer of this Styrofoam is placed approximately 1' below the finished elevation of the roadway surface, the upward movement of summer's heat is slowed enough so that soil temperature immediately underneath it never falls below 32 degrees. This has been proven through instrumentation (thermocouples). It is probable that this same thickness placed on the soil's surface, as over a seedling bed, would be about equally effective.

Since there is loss of heat around the edges it is necessary to apply the material at least 2 feet beyond the nearest; point requiring protection. If, therefore, someone were to use it over a single garden row, quite a bit would be needed. A seedbed planting could be protected very economically. Any of the types of foamed plastic boards or panels sold in lumber yards should work OK.

What might happen if the soil in a seedbed were kept completely unfrozen? Might it be possible that seedlings would start to emerge much too early and "bump their heads" into the underside of the plastic boards? Would they break? (The seedlings, that is.)

I think nobody knows the soil temperature at which sprouted tree peony seeds are destroyed. Might it be possible, that a thinner layer, which would permit SOME freezing, would be better? And how should thickness used be modified for areas where winters are different? Obviously anyone considering the use of insulation should try to evaluate all the variables and make his own best guess as how to proceed. — Roy Pehrson

*(from PAEONIA, Vol. 3, No. 4, December, 1972, p. 10)*

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EDITOR'S NOTE: Mutations in My Garden

Bill Seidl, in the following article (Mutations in My Garden), is using new words such as "intersectional", "shrubaceous" and "Ito". These were considered unacceptable since the peony members seem to register confusion with these terms. We will not include them in our peony literature in the Bulletin; however, for PAEONIA, when they appear in Bill's writing, they will not be deleted.

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#### MUTATIONS IN MY GARDEN

Bill Seidl

Chris's article on this subject (Paeonia, June '89) set me to thinking about the ones I've observed in my garden over the past 15-20 years, and listed here in the order of their occurrence.

(1) YELLOW EMPEROR. This intersectional hybrid from the Ito Nursery was purchased, from Louis Smirnow in 1968, along with its three named siblings. Soon thereafter it began displaying varying degrees of yellow and flaring. After trying to isolate these variants, I concluded that the other three are just that: mutant variations of one seedling. These conclusions are reinforced by the similarities of the registered descriptions, and by Mr. Smirnow's article (APS Bul. 225: 19)

that Japanese nurserymen were selling all four under one name. (He objected to that name, Oriental Gold, already in use here, but not to the four-as-one practice.)

(2) YELLOW EMPEROR, again. In 1976 a clump produced two stems with all-white flowers and inconspicuous flares. It's been divided and I'm still in the process of isolating crown tissue that will consistently produce the white flowers.

(3) VIKING FULL MOON. This intersectional by Roy Pehrson is a 10-petalled light yellow with inconspicuous flares. In 1983 one stem produced a light pink flower with medium purple flares; very pretty. Regrettably, I did not try to isolate it that season and it never reappeared. Last spring, in Roger Anderson's garden, I saw a flower on his plant with a quarter-inch wide pink streak. Perhaps an all-pink flower will reappear on divided and re-divided plants. The few who have this variety should be alert for this.

(4) Anderson 81-15. This intersectional reject by Roger is lavender with darker flares and incomplete flowers, i.e. narrow-petalled. In 1987 it sported a couple maroon flowers, also incomplete. By chance, Chris and Company were visiting here that year and Chris espied the two different colors within five minutes of arrival. "I am trying to isolate it but it is very likely inferior to Pehrson's i-hybrid, LAFAYETTE ESCADRILLE.

(5) VIKING VANGUARD. This is Pehrson's herbaceous hybrid out of emodi. It usually produces single, purplish-red flowers, but in 1989 one stem produced a pink flower. The crown tissue was isolated but the stem from it died of disease this past season.

(6) SH-92. This shrub hybrid is from my own breeding, seedling SH-11 x GOLDEN ERA. The seed parent is a single, purplish-red from D223 (it. yellow) x CHINESE DRAGON. SH-92 bloomed for the first time in 1989 bearing ten flowers as a four-year-old after being transplanted from the nursery-bed Nov. 10 the previous fall. Nine of the ten flowers were a tannish-cream flushed rose, and one was a rose-purple sport. The mutated stem was marked but no attempts were made to take scions for grafting. This spring, in April, the still-dormant plant had to be transplanted off rented property, and the marked stem produced two rose-purple sported flowers, giving me a second chance to graft from it.

(7) AGE OF GOLD. This Saunders' shrub hybrid produced a most exciting sport just this year, 1990: a white flower, double, with quite prominent, medium purple flares. Upon discovery I staked the mutant stem and removed half the adjacent stems. It presently (Aug. 20) appears it will yield three scions for grafting and have two buds left on the mutant stem for next year's growth, more if the mutation occurred deeper down.

I grow Klehm's MR. ED, lactiflora, a chimeral mutation arising from colchicine treatment, but otherwise have never observed any mutations in my lactifloras or mutants. This confirms the oft-made statement that hybrids of very dissimilar parents are somewhat genetically "unstable" and more likely to mutate.

## PLANT EXCHANGE AND SEED EXCHANGE

### HYBRID SEEDS EXCHANGE AS PROPOSED BY MISS SILVIA SAUNDERS —

Will someone offer to run our peony seed exchange at least for a year or two for the benefit of mankind, or at least that part of it interested in growing peonies from seed. Duties would consist of receiving seeds, re-packaging them into suitable size envelopes (depending on the number of persons wanting each given kind) and mailing them out. The work would be presumably from late August or early September to perhaps late October. Some charge to cover at least the expenses should be made, say \$2 per person, should not seem overpaying.

Last year I got big quantities of seed from David Reath and big quantities from Roy Pehrson, of course all precious hybrid seeds, and all labeled. It is too much to ask these busy men to bother with shipping out tiny orders of seeds, or even to sort the seed — but someone who isn't doing anything else special just then could well take it on. I don't see why David, Roy, and maybe other growers wouldn't be glad to have their seeds distributed in this way, and it will make fun for beginning hybridists until they begin to get seeds enough from their own plants and their own crossings.

### PLANT EXCHANGE AS ENVISIONED BY MR. DON HOLLINGSWORTH —

I vote for some sort of swap section for plants. Its primary purpose should be to assure that surplus rare plants with breeder or historical significance do not go to waste. It should NOT be organized as a dodge to avoid purchase of plants from our commercial friends specializing in peony plants.

Perhaps in one issue each year, perhaps mid to late summer, both wants and surplus plants would be listed. For the first listing you might set up rather general ground rules, then refine them as experience indicates the need.

Publication of "wants" might be limited to:

1. the species and their varieties, (excepting the lacti or Chinese and Japanese tree peonies)
2. uncommon hybrids which can be specified by established name or pedigree.
3. lacti or tree peony cultivars that are rarely available in commercial lists.

The listing should include both name and address of the inquirer so that suppliers could contact them directly with no more attention required from you.

Listings of surplus plants should probably be limited to species and cultivars that are seldom or never listed by the commercial peony specialists. This would no doubt include all of the species and unnamed hybrids that may reasonably be of value for breeding, plus others. If the supplier has only a few things that qualify, the items might be individually named. However, longer listings should probably be described in general terms and the supplier expected to mail a list upon direct inquiry. Suppliers with qualified plants would be given equal treatment whether commercial or not.

*(from Paeonia, vol. 3, No. 2, June 1972, p. 8)*

## P. MLOKOSEWITSCHI

Roy Pehrson

This, the only yellow herbaceous species is described in "The Peonies." In my garden it appears to be dependable, but it has always been much shorter in growth than the 40" given in the description. Mloko is a real gem which you may want to grow, even though it may not be really needed as a breeder plant.

Not so very long ago it seemed that the only way to get yellow color into herbaceous peonies would be through the use of mloko bloodlines in one way or another. Saunders had provided a tremendously time-saving boost to this effort with several series of fertile hybrids containing mloko blood. In these, the rather pale yellow of mloko is diluted or may not be evident at all. Logically the way to restore more of the yellow color would be to cross them again with mloko pollen. Unfortunately there are serious obstacles to rapid progress using this approach.

1. Mloko pollen "takes" poorly on those hybrids on which it has been tried.
2. The most fertile, most available hybrids of this, kind are tetraploids. Even if seeds could be had more easily, the seedlings would be quite sterile triploids.

All this would be tolerable if there were no other possibilities, but recent findings show that we may be able to get what we want without further direct infusions of mloko blood.

1. Further advanced generations of the Saunders hybrids, intercrossed, and crossings with other promising material may restore full mloko color values.
2. *P. lobata* has been found to contain the very same yellow dye as the one found in mloko. Hopefully the enzymes which provide for the synthesis of yellow dye is controlled by identical gene action in both species. If so the two strains might be usefully intercrossed, reinforcing each other.
3. A breeding result obtained by the late Sam Wissing seems to show that a factor for this kind of yellow exists in *P. macrophylla* too. If this is true it may be fortunate that some of Saunders hybrids with mloko blood also have macro in them.

I have bloomed considerably less than 200 seedlings containing mloko blood. One of these (Quad F2 x Moonrise F2) is about as yellow as a pale clone of mloko. It will be seen that this cross has in it all three of the species listed above. Obviously there is no way to determine which species, or combination of species, is responsible for the yellow color. It is enough just to know that further use of mloko itself is not necessary.

I have no competence at all in the field of chemistry, but something Fred Cooper, our expert on this subject, once wrote to me raises some interesting speculations.



Unless I misunderstood, the sense of it goes like this; the white color in peonies is produced by compounds which differ but very little from that which makes mloko yellow. That yellow indeed, is only an intermediate stage in the biosynthesis of "white".

Accepting this explanation, it then seems reasonable to think that "white" results from "epistasis" or "multigenic action". Then if a final gene responsible for changing "yellow" to "white" should be absent, the color synthesis process will be halted at the "yellow" stage.

I can't think of any way to make practical use of information of this kind. We shall have to be content with knowing that if we grow enough seedlings from suitable crosses we will get some yellows. "Experts" have no advantage here. Here is how I would rate the hybrids containing mloko blood for potential for producing yellows.

1. The most promising perhaps -
  - a. The mloko-maco hybrids such as 4710 F2, 9037 F2 and the '**Nova**' strain,
  - b. The Quads. Actually their F2, F3 descendants.
  - c. The '**Roselette**' and '**Rushlight**' group. Again, the advanced generation plants.
  - d. '**Nancy**'.
  
2. A bit less useful — again "Perhaps"
  - a. The '**Nosegay**' and '**Gwenda**' group
  
3. More difficult — I think.
  - a. emodi-mloko and vietchi-mloko
  - b. P. mloko itself
  - c. '**Belinda**'

Progress toward the goal of yellow peonies may seem rather slow, but nothing, once gained can be lost. There are no steps backward. The change in prospects from only a few years ago is very encouraging. The pale yellow of mloko will yet provide us with very nice peonies, including blended colors. But this is not all. When the big breaks start to come through the use of the two other, and very different yellows in *P. lutea* and *P. ludlowi*, the final outcome may exceed our wildest imaginings.

(from PAEONIA Vol. 4, No. 1, March 1973)

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Ed: The above article was printed in 1973 — since then progress in yellows has been satisfactory in my garden. As of now, several full doubles and a number of single yellow seedlings have appeared; these are fertile and set seed rather well.

- Chris

## MY 1990 PEONY ADVENTURE

Beauty to behold, a row of Itohs in full bloom. Ten to twenty flowers of bright yellow on each of 78 plants gives a view that few peony collections can challenge. For passers-by who have never seen a yellow peony before, the reaction is almost of unbelief. Ownership desire is there but when informed that a division from one of these will cost \$50.00, they no longer see the pretty flowers — only the pile of dollars these Itohs represent!

To get a seed which is fertile from this collection is a goal that rates #1 with me. The desire is there but success is nowhere to be found! Mixed pollen from herbaceous lactiflora, tetraploid seedlings, tree peony (suffruticosa), lutea hybrids, and species was applied several times to each bloom (open pollination) on several succeeding days. NO SEED HAS BEEN FOUND!!

There is a group of Itohs of my own breeding which are lovely, very lovely, of a deep rose color when first opening. After two or three days of flower color progression, the blooms are more yellow than rose. These plants with a total of 100 or 200 blooms were also pollinated with mixed pollen. Success was nowhere to be found — NO SEED!

Maybe the same procedure will be followed next year with the additional job of using the Itoh pollens on herbaceous plants such as Roger Anderson's '**Martha W.**', other lactifloras, tetraploid hybrids, and lutea hybrids.

This has been an excellent year for hybridizing in spite of lack of success in the quest for an Itoh F<sub>2</sub> seed.

- Chris

## PEONY SEED DISTRIBUTION

P. lutea, P. delavayi, and Moly from F. G. Cochrane, New Zealand

P. ludlowii from Mrs. Allen, New Zealand

The following from Chris Laning:

- lactiflora select
- tetraploid mix (very early)
- 'Archangel' x 'Nancy'
- 'Serenade' F<sub>3</sub>

From Robert Geller, Ohio

- lactiflora - open pollinated
- species hybrid seedlings - open pollinated.

Probably more varieties will arrive later. These will appear in the December issue of PAEONIA and also in our American Peony Society Bulletin.