

PAEONIA

Volume 13, No. 4

December, 1982

REQUIRED READING:

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

Editors are: Chris and Lois Laning,
553 West F Avenue,
Kalamazoo, Michigan, 49007.

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Dear Chris:

November 15, 1982

..... Chris, I don't know how many people are interested in the Itoh cross, but I have a good productive one. Marth Washington x Reath A-199. Martha Washington is our garden name for a single chance seedling out of '**M. Jules Elie**'. The first year I made the cross, I made 7 and gathered 31 seeds, 11 sprouted and grew under lights. Seven of these damped off, and 3 are growing in my garden. The second year Carroll Spangler and I made 100 to 150 crosses and had over 300 seeds and some 150 plants growing under lights. All true Itohs. Of these I lost 110 or so and have 40 in the garden.

This cross I shall continue as I believe it will produce a fertile Itoh. Both parents are extremely fertile seed and pollen so why not the offspring? Will know in a few years.

It is my idea that by using Jap and double type peonies as seed parents for the Itoh cross, we are giving up maternal fertility that we can't spare. What are your feelings on this, Chris?

Regards,

Roger Anderson - RR 4, Box 276 B
Fort Atkinson, WI 53538

ED: Surprises come occasionally and your success with the Itoh cross is really a surprise! We have been laboring many years with only limited success. Yes, I believe that doubles severely limit fertility.

- Chris

CHRIS asks questions about trying to produce seeds from the Itoh clones and

DON answers —

On "Circumventing Incompatibility"

Q. For added heat, how about an oil lantern or lamp — would it work. Will fumes be deleterious or enhance?

A. The carbon dioxide shouldn't be deleterious, possibly the incompletely burned hydrocarbons could get a little heavy. Could you run an electric cord to the location to supply a bulb or other electric heat source? Perhaps the most useful treatment for nighttime heat loss would be to throw over an insulating blanket of some sort to retain heat accumulated during the day. If a combustion heat source is used, it probably should be vented. I know of no finding that fumes from combustion would act as a growth substance or as an inhibitor to pollen tube growth.

Q. For what period of time should added heat be supplied and at what temperature?

A. Try for maintaining 75°F or above, but try to keep from going much over 95°, the former as nighttime minimum. Two days would seem to be sufficient and maybe just overnight from the day pollinated is enough. However, since not all flowers will open the same day, it will probably fall naturally to continue the control regimen for a continuous stretch of more than two days duration anyhow. In my observations of natural weather conditions under which Itoh hybrids were produced, pollination was done and again on the next day, which may mean only that it was warm overnight, as far as influence on fertilization is concerned.

Q. How about bottle gas — propane — will fumes need venting?

A. I would prefer to vent if I could work it out. In practice, however, we often don't attain the original plan. When the time comes that the flowers are going to open, you may decide to give up some of the original plans and still try. I am principally concerned about the problem of keeping the daytime temperature high while still keeping it from getting too high. It would be excellent to have electricity to run a rig which would open and close a vent, perhaps with a small fan to help, and then you could have the benefit and insurance of automatic ventilating. Night time then could be taken care of with an electric heater of some type and a blanket if extra cool.

Q. What is your guess as to a likely good pollen to use on flowers of the Itoh Hybrids, lutea hybrids, herbaceous hybrids — '**Garden Peace**' and '**White Innocence**'?

A. Unless I misunderstand, that sounds like a very complex question. To start with, anytime I am using an F₁ hybrid as seed parent, I want the most fertile pollen available that also has the plant and flower qualities which I want to bring into the mating. (Very seldom are prospects so dim that I merely want to find out if a seed can be produced. Might as well go for something desired in the progeny.) This pollinator might be another F₁, but in that case I want to have some reason to believe there is at least a small fraction of good, viable pollen grains normally produced by the variety. There is no substitute for microscopic examination and test germination when doing this kind of prospecting.

Unless you have some reason to believe there are some good pollen grains, you don't have a basis for judging whether one or both parents are poor prospects, as the explanation for no seeds.

In the case of the Itoh hybrids, I would first use *lactiflora*, *lutea*, hybrid or another Itoh, with the condition of testing the Itoh pollen to see if any could be induced to germinate on culture medium. Of *lutea* hybrids, I would prefer to use '**Alice Harding**' for its ability to give good flowers in the progeny of these hybrids, with next choice going to any of the *lutea* hybrids known to give progeny when used as pollen parent (either in the Itoh cross or *lutea* hybrid advanced generations.) Further, I am biased toward yellow in the Itoh hybrid flowers, so avoid red and purplish colored parent material.

If your program is to test tetraploid pollens on the Itohs, pick out something that is an effective pollinator, in general, again one that has the color and other plant qualities that you choose to bring into the cross. Personally, I am inclined to be negative on this, because I favor the interpretation that the distorted flowers which have been found in so many of the F₁ Itohs as to be the result of too much genetic variance between the parents. Skimpy flowers show up among the *lutea* hybrids, too, but it is worse in the Itohs. One way to interpret this (hypothetically) is that bringing in the third diverse species in the Itoh cross has made the divergence of genetic material too wide in most matings. If this is valid, then bringing in the very different tetraploid early hybrids materials has a probability of aggravating what is already a bad situation from a breeding standpoint. However, this discussion is strictly hypothetical, as far as I know. I've not heard of anyone describing the progeny of even *lutea* hybrids and an early tetraploid. Therefore, the actuality is presumably untested and, accordingly a valid approach, if one has the diligence and ambition to run the project far enough to come to some reasonably well grounded conclusion. The poor prospect of obtaining seedlings from the F₁ interspecies hybrid parents means one may probably have to wait quite a while to find out. Therefore, it takes quite a lot of hope and confidence in the rewards to sustain the necessary effort.

'**Garden Peace**' is said to be a macro hybrid back crossed to *lacti* (as is '**Requiem**'). Since fertility in the macro hybrids is established as better than is expected, of triploids in general, I would be inclined to breed them to their own kind rather than to advanced generation or the parent strain (probably the macro F₂ parent in this case). However, the early hybrids ancestor species all seem to be quite compatible unlike the ancestor species of the Itoh hybrids and I expect one might get good results with a wide range of tetraploid crosses using '**Garden Peace**' as the other parent. If you're thinking of using GP with the Itohs, I am not hopeful about the results on the basis of what I can see, but if you get good results, I'll be able to see a whole lot better!.

'**White Innocence**' doesn't offer many alternatives by my principles of selecting mating partners. The choices are, as I see it, backcross to (by) *lacti* or use the '**Windflowers**' as pollen source. The former would be expected, on probability, to move the progeny form in the direction of *lacti*, while the latter ought to keep the form more to the *emodi* side. (I am thinking of both '**Sparkling Windflower**' and the F₁ clones.)

Some Principles to Guide the Selection of Peony Matings: There are some general principles which underlie the answers to selection questions above. These are generally firm in my current belief, but evolve as new information is obtained, primarily in the direction of refinement, rather than overturning the principle.

First, plant breeding necessarily involves choice — supposedly purposeful choice. While an individual's purposes may range from more general to more precise, there is at least some reason for what one does, even if it is to just get some seeds and plant them. However, this is not necessarily breeding, unless there was an element of choice of which parents to grow seeds from and an expectation of selecting the offspring for any desirable characters which may come to light. The selection of plants for one's garden from among those offered is purposeful, but is not breeding. I prefer the more precise level of purposes in the range of breeding choices, e.g., goals of flower color, flower form, plant health while retaining or improving flower quality, etc.

Second, we must keep in mind that the characters upon which we find a particular plant to be desirable are not the inheritance factors, but the outward expression of the underlying inheritance factors. The role of breeding is to manipulate the underlying inheritance factors, primarily through sexual reproduction, with the goal of obtaining progeny which carry equal or more desirable combinations of inheritance complexes, as measured by the outward expression of these inheritance factors. The study of genetics will help one interpret results and may enable one to make more successful choices. However, such knowledge is not mandatory. For centuries breeders made progress toward their purposes upon the use of principles, such as "like begets like", "breed the best to the best", and "repeat the matings that have given good results."

Third, we get changes in the progeny through segregation of parental genetic materials during germ cell formation and this leads to new combinations of the genetic factors during fertilization – Mendelian principles of inheritance. Improvements are principally obtained by concentrating the inheritance factors of desirable combinations of characters and/or dropping out undesirable factors which would dilute or mask the desirable combinations. Mutations are a factor in getting changes, but rarely are desirable and are not much amenable to control.

Fourth, outcrossing tends to dilute the complexes that are responsible for the individual parent characteristics, while increasing the opportunity to test for new characters which result from new complexes of genetic materials.

Close breeding tests the effect of concentrating the parental genetic materials and of segregating them (drop out effects) while enabling retention of the parental complexes of genetic material.

Fifth, the process of finding out what can be accomplished by close breeding the progeny of existing interspecies hybrids cannot be determined in one generation. It may take two generations to restore good fertility. Therefore, the presently available hybrids are largely untested, for most of the advanced generation hybrids have been the result of outcrossing. My bias is to emphasize close breeding in "lines" which are based upon closely related individuals which have desired characters (such as doubling of flowers in the advanced generation tetraploids or scarlet reds and pinks of the SLP hybrids) and work these for as many generations as continued refinement can be obtained.

Post Office Box 2682,
Detroit, MI 48231

Chris and Lois Laning
Kalamazoo, MI

On the basis of studies and observation, I report that *Paeonia mlokosewitschii* is not a diploid as erroneously reported, but a tetraploid and in fact always has been.

I am not certain of *P. wittmanniana* except that it may be a diploid, since it has the characteristics of one. However it will be several years before I can confirm it due to the difficulty of having experimental blossoms. I can't seem to get very many Wittmanniana flowers and so I can't confirm or deny my suspicions quickly or easily. The flowers don't have reflecting pigments and have to be in the shade.

Sincerely,

E. Halas

E. Halas
PO Box 2682
Detroit, MI 48231

Dear Mr. Halas:

November 3, 1982

It would be mighty interesting to hear about your observations and studies of the species *mlokosewitschii* and how you have arrived at the conclusion that it is not diploid. Up until the present, I have considered that when the chromosome count was found to be ten, we could conclude that *P. mlokosewitschii* is a diploid. If your findings can be established, great changes must be made in our hybridisation and thinking processes!

An illustration of my experiences with this plant can give you an understanding of my thinking. It is as follows: Mloko x tenui cross gave the clone '**Playmate**' which is an F₁.

A seedling from 'Playmate' parentage gave 'Nosegay'. After raising a batch of seedlings from seeds produced by the fertile 'Nosegay', a group of plants has been produced, all of which range from creamy yellow to a rather deep yellow. These seedlings appear to have none of the tenuifolia characteristics of color, form, or root structure. And when considering that they are fertile and cross willingly with many tetraploids, I could consider that they are tetraploids. My thinking as to how this has come about is — *P. mlokosewitschii* (a diploid) x *P. tenuifolia* (a diploid) can be successfully crossed by means of unreduced gametes, hence an allopolyploid. Through chromosome shuffling, in the forming of the 'Nosegay' zygote, the tenui contribution had been eliminated, hence what appears to be a tetraploid *mlokosewitschii*.

If all the foregoing appears to be ambiguous, let me conclude this matter with these thoughts?

1. Report your findings.
2. Come visit my peony garden next May.
3. Choose a plant from the row of seedlings that I have described, thereby adding another "yellow" to your collection.

Sincerely,

Chris Laning

PO Box 2682
Detroit, MI 48231
November 9, 1982

553 West F Avenue
Kalamazoo, MI 49007

Dear Mr. Laning:

Thank you for your letter of November 3, 1982. I have referred your letter to my daughter, Betty, who has some background in Biological Sciences and she has agreed to write a simple explanation for publications that does not get too technical, and will be easy to comprehend.

I will accept your offer, one day, and would ask for a rain check on the opportunity to visit your garden.

Sincerely yours,

Mr. E. Halas

ON THE TETRAPLOID CLASSIFICATION OF MLOKOSEWITSCHII

By Batty Halas

B.S. B.S.

M.S. B.S.

To answer the Question of the Editor of *Paeonia* on how a diploid *mlokosewitschii* and a diploid *tenuifolia* could in the F₂, F₃, and F₄ generations come up with a tetraploid throughout? The answer is, they couldn't, if *Mlokosewitschi* were really a diploid, the F₁ generation would also be a diploid and in fact it would be fertile, knowing that *tenuifolia* was a member of the cross; additionally the F₂, F₃, F₄ generations would also be diploid as well under the circumstances.

I have never either had or seen a diploid *mlokosewitschii* plant, nor do any of the descriptions of the crosses obtained correctly describe a tetraploid Mloko. Although I have searched for the sources of the error in the archives as we know them for the introduction of the error, I have been unable to be certain as to who incorrectly labelled the chromosome count of that plant. While Stern in his classic monograph, did refer to it as a tetraploid, and attributed it to a determination of the John Innes Horticultural Institution. However I don't know what specimen Stern may have sent to be evaluated or whether it may have somehow been mislabelled in the process. Although Stern was conscientious in his efforts, it is certain that no known diploid form of Mloko does exist.

Earlier Stebbins wanted to call the cross of *tenuifolia* and Mloko as the new specie (sic) *Saundersi*. It was inappropriate because the F₁ form of that cross was in a transition state and was therefore sterile, namely because Mloko is tetraploid and *tenuifolia* is diploid. Generally the result of a diploid and a tetraploid will be different in both directions depending upon which is the pollen parent and the seed parent. The results of such a cross could be either tetraploid, triploid or diploid. However they favour the most developed state and that is usually tetraploid in the F₂ stage. The F₁ stage will be infertile as it always is in that type of a cross. It is still a good idea to name the new specie (sic) of yellow in the F₃ or F₄ stage as *Saundersi* and at least allot to his memory, a fertile yellow plant with the compatibility of hybridization that the true Mloko does not have.

The most fertile plant that we know of that literally crosses both ways with almost every known specie (sic), is tenuifolia. I have yet to see a cross of tenui that I didn't like. Saunders crossed tenui both ways with Mloko. When Mloko was the pod parent the resulting offspring was in the F₁ stage a plant with magnified tenuifolia leaf structure and the color dominant in the first generation, F₁. When tenuifolia was the pod parent, the leaf structure was improved, however the color was still transmitted throughout. In effect you are getting a more favorable interpretation of the genetic code in this direction with a prettier plant. Really every hybridizer searches for a plant that will misinterpret the genetic code of a different specie (sic) into something more beautiful. This is where the fun of hybridizing really lies. What Saunders did teach was the use of tenuifolia as a key to developing a difficult specie (sic) into something useful over a period of time. Apparently there is something that tenuifolia gives to the F₁ generation, like Royal Jelly in Bees, to make the new crosses compatible with Peonies that we are more familiar with. It is a very useful tool in a hybridizer's bag of tricks, so to speak. Tenuifolia crossed with Officinalis gave a pretty dwarf red called '**Laddie**'. Tenuifolia crossed with albiflora has been called Smoothi (sic) and laciniata, presumably these are in different directions and are not exactly the same although both are extremely pretty. The plant '**Peter Barr**' is likely Anomala and Tenuifolia although I'm not certain in which direction. There are many plants crossed with Albiflora, too numerous to mention. I have heard that tenuifolia has successfully crossed with a tree peony and that the F₁ plant appeared to be fertile at times. All of these are very attractive plants. At this time, I don't believe that there is any specie (sic) that Tenuifolia will not cross with, in time, and that the resulting F₁, F₂ generations will not be favorably enhanced.

While the tetraploid Mloko was crossed with Albiflora to produce '**Claire de Lune**' by the Dentist, White; my best guess is that the more difficult cross, diploid Albiflora onto tetraploid Mloko was made in Japan and is known as '**Oriental Gold**'. The leaf structure favors that type of cross in my examination of the plant.

Where a diploid and a tetraploid have been crossed, occasionally the resulting F₁ plant will have fertile pollen. Any cross from this pollen generally seems to produce an anemone type of plant with tufts of short petals bunched in the middle with single flower on the outside of these. If we refer to the book "The Peonies" by J.C. Wister, 1962; we refer to the article written by Sylvia Saunders on page 56 "Mlokosewitschii x Macrophylla - to quote "Mloko crosses reluctantly with macrophylla, but by good fortune the hybrids are fertile in the first generation, this is surprising, for both in appearance and chromosome numbers they are different....." No Silvia, it isn't surprising, because both are tetraploid and there appears no good reason why the F₁ stage should not be fertile when the plants come from the same region as they do. Apparently Professor Saunders had accepted the classification of Mloko as being Diploid, although it seemed to bother him somewhat. Probably the classification of Mloko as tetraploid came from Stern and Dr. Saunders perhaps should have challenged it, but didn't. In any event there is nothing in the breeding records of Dr. Saunders as published by Silvia Saunders that would indicate that he ever had any diploid Mloko plants.

Still uncertain is the status of Wittmanniana. I have always felt that it could be a diploid and it does in fact develop huge seed pods in the hybrids that I have grown. However I have never had any seeds to this date. While I have attributed this to the fact that my pollen may not have been viable at that time and there was no other available that early in the blooming season, perhaps some of the readers have fertile Wittmanniana F₁ plants. If that is the case then Wittmanniana would have to be reclassified from tetraploid to diploid. However as of this time I have been unable to obtain any seed in the F₁ stage, but some of the readers may have been able to do this. If that has happened then the classification of Wittmanniana may be suspect. However it would still take me more time to decide from my own plants whether this is true or not. We could save some time if it has already been verified by one of the readers.

Prior to Dr. Saunders' work, all the crosses were with Albiflora and Officinalis only. Dr Saunders did open up the field and teach us some new breeding techniques.

The use of *Tenuifolia* to make a new specie (sic) available was perhaps his most spectacular discovery. *Tenuifolia* adds compatibility to a cross and that is what makes it valuable, although it's pretty red color isn't a handicap either.

If we did call the F₄ a new specie (sic) "Saundersi" it would be in recognition of Dr. Saunders' pioneering work and his patience in keeping good records of the work that he did do. Certainly we can go on from what he started, perhaps a little faster because he has given us some guidelines to follow.

Sincerely,

Miss Betty M. Halas.



LETTERS FROM AUSTRALIA —

Dear Chris,

7-4-82

The back issues of Paeonia arrived two days ago and are much appreciated. Thank you for all your trouble. I am getting a collection from David Reath. He has been wonderfully cooperative. I read in Paeonia of the Domoto hybrids and would like to purchase his introductions. I understand Wayside Gardens is distributing them but do not know their address I found Mr. Domoto's address in Paeonia and have written to him. To save time, could you please request Wayside Gardens to send me their list by air mail. No special certification is necessary for Australia, They take no notice and fumigate and quarantine everything so for them to export would not require any extra paperwork on their behalf. If anything has ever a trace of soil on roots on arrival, it is destroyed.

I have contacted Gordon Boote (retired Hereford cattle breeder with diminished interest in peonies), Patricia Plunket (not in best of health), but very pleasant), Peter Rafferty (teaches horticulture, extremely well informed, could not be more cooperative and with tons of seedlings), and we have become firm friends; Mr. Simpson, about 80 years old, active and alert, a nurseryman who sells a lot of seedlings. Neville Harrop in Hobart, Tasmania, sells a limited number of plants each year of his own grafting. The offering varies annually (about 20 varieties in a year). He is most meticulous about names and we correspond regularly. He is an engineer with the Tasmanian Hydroelectric Commission and is most cooperative and interesting.

I have not met Huw Evans but he is a very well known T.V. Quizmaster here. No one here seems to do any breeding but I hope to start as soon as I have the nucleus. I have built my own quarantine house and had it passed.

If you know of any other exporters beside David Reath, Klehm, Smirnow and Wayside could you please get them to send me catalogs or let me know their names. In a year or so I hope to be able to contribute to Paeonia.

Peter E. Hughes, M.D.
70 Studley Park Road
Kew, Victoria, Australia 3101

Dear Chris,

7-22-82

Thank you for all the back issues of Paeonia. In David Reath's article, Vol. 10, No. 2, 1979 in "Peonies for Hybridizing" he lists (1) P. lutea (Fay), (2) P. Potaninii tall yellow (Stern) divisions, and (3) P. lutea Gratwick No. 14 grafts. These are presently not available. Do you think any reader who obtained plants in 1979 might have any for sale? I am most anxious to obtain plants of all three as part of a breeding nucleus. David Reath has not divided these varieties this year. If you know of any please let me know.

Regards,

Peter Hughes

(Could you Paeonians help Peter find these plants?)

ROUND ROBIN

Australian Friends:

You would profit greatly by corresponding with each other on a regular basis, exchanging ideas and solving problems together. Guidance from this side of the world is difficult and probably not applicable in all cases. Help each other.

Why are not herbaceous peonies acceptable in your areas. None of you has asked for them.

p.s. Round Robin means the exchanging of ideas and aids in regard to your hobby (of hybridising), etc. This should be done on a systematic basis with each one of you contributing periodically — sending the letter to each one of your fellow Australian partners.

Please include: Tobias Fourie, 9 Peace Haven
Turnbull Street, Empangeni, 3880, Republic South Africa

HOW TO RAISE PEONIES FROM SEED:

Tree Peony (Suffruticosa)

1. Put seeds into polyethylene plastic bag along with moist vermiculite or sphagnum moss.
2. Hold these seeds at room temperature for several weeks.
3. Roots will form in eight to twelve weeks, and when roots are 1/2 to 1-1/2 inches long, plant them in a pot — not closer than one inch apart. Vermiculite or a light soil mixture should be used.
4. Place in cool place (refrigerator) for 8 to 12 weeks.
5. Place pot in sunny location and water as needed.
6. Transplant when seedlings are two years old.
7. After each growing season, cold (not freezing) is needed.

Herbaceous Peonies

1. Plant in cold frame in June.
2. Seeds root during summer and fall so keep weeds out and water when necessary.
3. March or April of the following year is the time when the seedlings appear above ground.

For Australians:

Use the same procedure but your December is our June so figure accordingly. This applies to you too, Mr. Fourie, as Southern Africa and Australia have reverse cycles or seasons.