PAEONIA

Volume 14, No. 1 March, 1983

REQUIRED READING:

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

Editors are Chris and Lois Laning,
553 West F Avenue,
Kalamazoo, Michigan, 49007.
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Letter from Father Joseph Syrovy, Vinings Iowa

DATE: February 15, 1983

Dear Chris and Lois:

Because of the unusual warm weather we had in our territory last fall, all peonies kept their foliage until very late. I wanted to start the fall clean-up, especially of the T. peonies, but the leaves still clung to the stems and the buds were swelling as if they wanted to start growing. In other words, the plants hadn't matured. Nevertheless I stripped the leaves off, as some came easily, .and disposed of them. I found plenty of borer damage in the stems and burned them. We wonder now if the buds not having their usual brown winter covering suffered any damage. Did anyone else have this trouble last fall?

The Ito's were in the same immature condition but I cut them down and gave them a covering of sawdust. I hill them up a little with dirt each year. We found an unusual thing on our '**Yellow Dream**' Ito. Near the top was an outgrowth of a side bud which I believe is unusual. I cut it off with a piece of the stem, made a cut below it and dusted it with Rotenone, kept it in the refrigerator in a plastic bag hoping it would root. However, I lost it a month or so later. We wish to report this as we believe a side bud in an Ito sprouting is a bit unusual. We don't have any of our own Ito's as yet.

Regards,

Father Joe

LETTER FROM DON HOLLINGSWORTH, January 6, 1983

Dear Chris:

This is to comment on the startling and intriguing assertion by Betty Halas that the Mloko peony is tetraploid instead of diploid as has long been published.

This is startling because findings of diploidy were independently reported upon examinations of a plant from Stern in England and plants from Saunders in North America by different research cytologists. The results in both cases were included in reports which were published in refereed journals. I believe we must presume that the plants represented by these reports were, in fact, diploid.

The Halas report is intriguing in the possibility that Paeonia mlokosewitschii, known only from a limited range in the Eastern Caucasus Mountains, may have been found to have both diploid and tetraploid members.

Accordingly, I am keenly disappointed that Ms. Halas has told us nothing of the source(s) of the plants, the methods used to determine their chromosome number, or the number of different clones tried.

Dark (1936) in Great Britain, using a plant from F. C. Stern, studied the chromosomes of peonies in pollen mother cells. He includes his discussions of Mloko chromosome behavior in his observations concerning the diploid species.

North American studies using Saunders plants and with supporting observations on herbarium specimens were reported by Hicks and Stebbins (1934), Saunders and Stebbins (1938), and Stebbins (1938, 1939). These reports covered studies of chromosome behavior during meiosis, compatibility of the species in. hybrid crosses, analyzed the appearance of the hybrid progeny and Stebbins projected the meaning of these results in terms of the probable systematic relationships among the peony species. Throughout these reports Mloko is presented as diploid.

To read these studies and comprehend what was done, the results reported, and the conclusions arrived at by the number of trained scientists involved leaves virtually no room for doubt about the quality of the work that was performed

Reference List

Dark, S. 0. S. (1936). "Meiosis in diploid and tetraploid *Paeonia* species." Journal of Genetics 32:3, pp 353-372.

Saunders, A. P., and G. L. Stebbins, Jr. (1938). "Cytogenetic studies in *Paeonia* I. The compatibility of the species and the appearance of the hybrids." Genetics 23, pp 65-82.

Hicks, G. C. and G. L. Stebbins, Jr. (1934). "Meiosis in some species and a hybrid of *Paeonia*." American Journal of Botany 21, pp 228-240.

Stebbins, G. L., Jr. (1938). "Cytogenetic studies in *Paeonia* II. The cytology of the diploid species and hybrids." Genetics 23, pp 83-110.

Stebbins, G. L., Jr. (1939). "Notes on some systematic relationships in the genus *Paeonia*." California Publications in Botany 19:7, pp 245-266.

Stebbins, G. L., Jr. (1948). "Review of A Study of the genus *Paeonia*. by F.C. Stern", in Madrono, The West America Journal of Botany 9, pp193-199.

Stern, F. C. (1946). A Study of the genus *Paeonia*. London: The Royal Horticultural Society.

Any treatment of the subject of chromosome studies in peonies is inadequate until it has included consideration of the information reported in the first four references listed above. However, in making this statement I do not mean in any to disparage opposing findings when reported along with appropriate documentation of the work and the worker who makes the discovery. But, the fact of discovering an actual or apparent opposing finding inevitably leads to deliberations and re-evaluation of the theoretical structure that has been established before. This is the way that new technical knowledge evolves. We also want to know any logical explanation the discoverer has for the difference in findings.

As I have written before in these pages and those of the American Peony Society Bulletin, the above listed references are accessible through library network services, at least through photocopy services, and can be seen directly at many science library collections. Further, I will photocopy from my own file if someone is having difficulty through normal channels — on a cost reimbursement basis, of course.

I will look forward to having additional documentation on the new findings which Ms. Halas has reported.

Sincerely,

Don Hollingsworth
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Kansas City, MO 64151

COMMENTS FROM — Helena Howard, Rte 1, Box 476, Pelzer, SC 29669

Dear Chris,

Regarding the use of an oil (kerosene) lantern or lamp "for added heat" — for a number of years in Maryland (D.C. area) and now in S.C., I've used oil heat in a small greenhouse to keep temperatures from going below 50° or so, for seedlings of tomatoes, cantaloupes, peppers, etc. As you may know, tomatoes are very sensitive to air pollution and are used as indicators (like canaries in mines) in some commercial greenhouses where they burn kerosene. I used a Perfection heater in a 75 sq. ft. homemade greenhouse. Then I got an Aladdin down here because it would burn longer and I could get a good night's sleep. I've also used lanterns and lamps in little cold frame structures. They tend to smoke if you try to turn them up — and lamps and lanterns don't give off much heat.

REPLY TO DON HOLLINGSWORTH'S LETTER OF JANUARY 6, 1983.

By Betty Halas
B.S.B.S. & M.S.B.S.

First I wish to thank all those favorable comments both written and otherwise that I have received, concerning the original article on the classification of the Peony Mlokosewitschii as a tetraploid rather than erroneously as a diploid as it has been listed for so many years. Certainly the opportunity to have the opportunity to share viewpoints and information is vital in the further enjoyment of the Peony for many years to come.

I would wish to recommend to those of the readers who have not already done so, to purchase a copy of the best work that I know of "The Peonies" by J.C. Wister. The most outstanding article that I have read and re-read for a great many years is the classic article in the book written by Sylvia Saunders from pages 40 to page 6l. It is invaluable as a record, very objective of the history of peony breeding by Professor Saunders in an objective way. I feel that the article should be read at least once a week to get the full gist of the meaning in the progress that was made.

As for myself, I have in the past seven years grown a great many peonies and my laboratory has been my garden. In a way, to understand them it is necessary to communicate with the Peonies and to ask them what their breeding preferences are, they will reply to you, but long term historical records or your own and others will tell the whole story to you, such as Professor Saunders chose to tell in his records. His records really did have a great deal of information in them but they had to be studied objectively over and over again. I look at it as Professor Saunders' best text book.

The Mloko peonies that I had experimented with very reliably came from both England and America. There were no differences between either that I could observe in any way.

While Don has been good enough to present some references, his main case rests upon the writings of Stebbins. I have obtained some of Stebbins writings from the University of California, that does have most of his writings, since he was a professor there at one time. I also have the complete works of Stern, Xeroxed, since I was unable to find a copy of the book anywhere. Stern quite simply did not determine the genetic classification of the Peony Mloko himself, he had the Johns Innes Institute do it. Now, I was a graduate student myself once and as a matter of fact I spent some two years in the field gathering both plant and insect specimens as well as time in the Herbarium cataloging them. Generally the plant specimens are pressed between separate newspaper sheets since so many are gathered. In the herbarium the graduate students paste the leaves, stems, etc. on large sheets for cataloging. I remember on one occasion, my professor came to me with a large page citing a new rare plant and flower discovery. When I saw it, I could hardly keep my laughter, the flower didn't match the leaves. I recognized both the leaves and flower as belonging to two different species, and in this case I knew exactly what they were, and there were good leaf and flower identifications to verify that. My professor may have spent a lifetime searching for an extremely rare plant that was in fact non-existent. What had happened was that some graduate student had dropped the leaves on the floor, since they slid out of the newspapers and put them back into the wrong place with the wrong flower. Upon gluing the specimens into a permanent sheet, a new rare

plant was created, that some people might have spent a lifetime trying to find. Accidents do happen to confuse some information that is printed in good faith at that time.

In determining the chromosome counts of plants, which is by the way, still very difficult to do accurately, generally the easier way of examining the leaf cell structures under the microscope is relied upon. Unfortunately, the cell structure is compared to some standard, and in the years past there were so few standards to go to. If you had a well fertilized plant, the leaves would have been much more vigorous and the cells would have been giving the misleading impression of being tetraploid, when in fact they were not. Generally several Checkpoints would always have to be used to either verify or not verify material. The cleverness or skill that an investigator may or may not possess would either give to him an edge or advantage in making a determination.

In communicating with peonies, for example, if crossing Mloko with Officinalis (a known tetraploid) gives a fertile tetraploid; and crossing Mloko with Macrophylla (a known tetraploid) gives a fertile tetraploid; and crossing Mloko with Tenuifolia (a known diploid) provides an infertile F_1 cross; among other examples; it becomes time to reassess the chromosome count. My argument is that both Macrophylla and Officinalis know another tetraploid and they will make fertile crosses with them. These in part are my referees. There are human referees as well however. The final understanding has to come from the peonies themselves, who can neither read, nor count, but continue to make useful crosses if given the proper opportunity.

The readers all have their beautiful garden laboratories, and can continue their studies there, as well, they should. Peonies are for enjoyment of us all. Doctors often prescribe a garden for a high-strung businessman, as a means of reducing his blood pressure about thirty points without medication of any kind. Additionally many mental Institutions have beautiful gardens as well as a form of therapy for their patients. Gardens are healthy, whether the food is eaten or the flowers just enjoyed for their beauty.

I have not seen the article by Dark, but I am rather suspect of it now. My opinion at this time is that there is no diploid Peony Mlokosewitschii anywhere. I certainly wish there were.

In my studies I have observed that there is a possibility of doubleness to occur when a tetraploid was the pod parent and a diploid was the pollen parent. This is however an extremely difficult cross made more often by bees than by man, simply because of the large number of failures. This leads me to suspect that the Peony Wittmanniana is a tetraploid because in the only known cross made by Professor Saunders of a diploid onto Wittmanniana there was a flower dwarf and with double flowers. In peonies many tetraploids are dwarf. However I am still trying, as I have for several years, to concretely prove or disprove it. The work on peonies is very slow as you can gather. However I am in no great hurry because I do It for the sheer pleasure of the study. Occasionally I have to work too, but its nice to play with the flowers when you can.

The best work on peonies is still to be done although it would take a lifetime to top Dr. Saunder's objective works.

Sincerely yours

Betty Hallas

A SHORT NOTE ON PAEONIA CALIFORNICA

By Betty M. Hallas
B.S. & M.S. B.S.

This is one of the two native North American peonies that has for one reason or another always been neglected by plant breeders. The easiest source of comparison is to consider it similar to that of a tomato plant, since the flowers are almost fruit-like and resemble a goldfish bowl in appearance in that they do not fully open but remain more like a ball type structure. Not to mislead the reader, the flowers are not orange but are a very dark maroon to deep red. The flowers are about one inch in diameter for the ball, but if it were unfolded it would easily be about three inches flat. The sepals are green and only slightly shorter than the petals, sometimes the sepals give the illusion of the flower being darker than it actually is. A good portion of the red color is actually masked by the green sepals which cling rather closely to the petals. There is a two-tone effect of green and red. However, green and red are not necessarily the best two-tone combination. The flowers are nodding, much like 'Alice Harding' in the tree peonies. There appears to be a single flower per stem, and this would provide the possibility that selective breeding could increase the flower size in time. The most attractive feature of the plant is that it has a very attractive habit in a mature plant of several years' growth.

The best plant to compare it to that we are more familiar with, is tenuifolia. They are both the same height approximately. The difference in flowering is that tenuifolia opens up into a cup and gets to be about three inches in diameter, while californica never opens up that much, but resembles a sherry goblet. In color, tenuifolia is a bright blood red with a contrast of bright yellow stamens while californica is far more conservative in outward appearance and could be more tulip-like in the early stages in the combination of green, dark red and black overtones. While tenuifolia has a fern-like leaf structures this structure is also a handicap for the plant as well since the surface area does not have the food manufacturing capacity that would develop this into a large bushy plant. In fact, those tenuifolia plants have never been bushy, but rather more poppy-like in plant habit except for the leaf structure. Of the two, californica has the superior plant habit. However, while the leaves of californica are also finely divided, they are of a larger surface area and favor the development of more robust roots. While tenuifolia will endure cold weather and clay hard soils and will tolerate a wet foot structure, Paeonia californica will not. The lower limit for californica appears to be 15 degrees Fahrenheit, and it is a true member of the crowfoot family in that it definitely doesn't like wet feet. It prefers a sandy, fast draining soil that is almost without nutrient value. In fact, californica has a vigorous appetite in that it will grow at a tremendous rate when it decides to grow, on a very poor soil fare. It would appear that a good soil will provide the symptoms of fertilizer burn. It appears to be a desert style plant adapted for survival in an arid area with very little rainfall. Even the flower structure appears adapted for retaining moisture in the incurved goblet and resist evaporation of a hot noonday sun. The nodding flowers don't want to face the drying of the sun's rays but rather appear as if to have an afternoon siesta rather than compete with the sun for energy or moisture. Since the plant is designed for retaining moisture in a difficult location, it cannot survive where the soil will retain the moisture as in clay structures, or where there is regular rain accumulation. This rather normal situation causes the plant to drown mostly, and to develop root rot and serious fungus

diseases. The plant must have a lengthy summer drought period to reorganize for its next growth period. Apparently during the drought period the plant slowly develops the growth hormones and other natural plant products that will, like insulin within the human body, enable it to extract the most nutrient from a limited soil structure with almost nothing apparent there for the plants we normally know of. However, since the peony is adapted for one sudden growth surge in a limited desert season, it just doesn't have enough for a longer season, and in fact cannot physically respond to stimulation for another growth season until its resources are once again ready for it. This adaptation has taken place over countless centuries; who are we to expect & sudden transformation?

It isn't fair to compare californica to a developed peony, since it has never been crossed, with any other peony that we know of. I can't compare californica with Paeonia Brownii, because I have never seen a plant of Brownii, but have to refer to it from hearsay only. I have heard that Brownii is a smaller plant than californica, with flowers slightly different and more sparse. That the cold weather tolerance of Brownii is much improved, but that it has two dormant seasons in a year. Also that where californica will tolerate a very poor sandy soil, Brownii will go one step better and tolerate a soil that is rocky and cold or freezing over much of the year, high in the mountains. It may tolerate more moisture than californica depending upon which side of the mountain it likes to grow. But information is very sparse on this peony, it is exceedingly difficult to obtain seeds of the plants and, the plant itself is rarely offered for sale. Probably because the culture of the plant is largely unknown and after a few attempts to grow it end up in failure, the demand for the plant diminishes entirely.

My best guess is that Paeonia californica can be crossed with P. tenuifolia and that probably will be more successful, with P. tenuifolia as the pod parent. Because of the difference in growing seasons, it will be difficult to have californica as the pod parent. The cross would likely be an improvement over both plants and share the best qualities of both plants.

To close this brief article, the best recommendations for cultivation of californica is that: (1) It needs good to perfect drainage, (2) It needs low organic soil (such as loam gravel), (3) It needs summer dormancy (summer drought), (4) It may need winter protection in some areas (15° F), (5) To keep summer rains from the plant, it could be on the south side of a house with overhead protection to keep summer rains off it, (6) Perlite or volcanic pumice to about 20% of mix might help.

To summarize, this is an attractive plant that I consider beautiful in a well developed bush. The flowers can be developed further by crossing with other species, possibly tenuifolia. While the plant has been developed only by many centuries of nature, it would be interesting to see how the chromosomes of this plant would interpret those of other species into a new hybrid. This is a bit like playing a lottery, in that the breeding combinations may come up with a jackpot of a new genetic interpretation of plant habit, flower and color that may excite us tremendously and even have better moisture and cold resistance perhaps . . . . ? In any event, it will still be a long time before we see a hybrid of this form.

Chris Laning
Editor Paeonia
553 West F Avenue
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January 31, 1983

Dear Chris:

Thank you for your kind letter of January 22, 1983.

Recently I received some more information from Mr. Dick Tilford, Horticulturist with the "Rancho Santa Ana Botanic Garden" on his personal experience with the growth of Peony Californica. He conveys the following:

Quote, The Paeonia Californica is a chaparral plant which means that it grows on hot, dry slopes with a summer dormancy. They start to show above ground soon after the first rains in the spring. After flowering and fruiting, they dry up and all above ground parts disintegrate and it survives the hot dry summers by its deep heavy roots.

Our experience shows that we pretty much have to follow this same pattern. Very little or no water during this summer dormancy period and a coarse gravely porous soil .Watering during this dormant period will rot the roots and the plant is finished.

Seed germination does not seem to be a problem, the normal procedures produce good results. Care should be taken not to let the roots become restricted in a small container as the plant's survival depends upon the deep large root system.
Unquote.

A chaparral area is a shrubby wooded area of small oaks and pines. There probably is a nutrient of pine needles and oak leaves for the plant to eventually assimilate. This would lead to the assumption that P. Californica is a woody area plant and that it may actually prefer a more acid soil than what the regular peonies like to have. It would appear that the cultivation would require a location around the home sheltered from summer rain and one that gave it some shade as in a chaparral. A mature plant should have a deep.root system in the zone where it reaches warmer soil in the winter.

Sincerely yours,

Miss Betty Halas.

FROM A FRIEND IN AUSTRALIA - 1/10/83

Dear Chris,

Many thanks for the wonderful selection of peony seeds which arrived 24th December. Also thank you for the two copies of your interesting and specialised magazine. I followed the instructions, or have done so far, on growing peonies from seed.

I first soaked the seeds in tap water, changing the water every day, until they stopped floating and sank to the bottom of their jars. Most submerged in the end, and this took four days. At the present they are being stored at room temperature until I can divide them each into two lots, and. put half in the garden and the other half I shall continue to keep in peat moss in jars, at room temperature until they germinate. (I scratched the cornea of my eye the other day — haven't done any gardening since, but it is getting better.)

The previous batch of seeds you sent last September were stored in peat moss, after preliminary soaking and many have small roots, one or two about 1 inch long, but most shorter. I inspected the sends every few weeks and discarded any that developed mould on the seed coats, assuming they would be dead. The remaining are quite healthy but not all have developed roots. Some which developed roots showed a "browning" on the tips of the roots after a spell of very hot weather. I'm not sure whether to wait for the ungerminated seeds to "catch up", but in view of the fact that we still expect more hot weather, it may be better to remove any (as suggested) with longer roots, put them in little pots, and take them to a cold room (5° C) at Monash University for 8 weeks. There isn't any room in my refrigerator, unfortunately. The other alternative is to take them to the Botanic Garden's cold room at 10° C, which is a rather involved business, being a government institution, requiring letters back and forth, etc. etc. I'll probably try Monash because their cold room would be close to that of a fridge, and is close by.

I've noticed that the tree peonies this year although slow growing by U.S. standards are very much healthier since I treated them last spring with iron chelates. Their leaves are a darker green and there is no browning on the edges of leaves, so far this summer.

The only tree peony that has been in this country for a long time (the one in the Botanic Gardens) and the same that a friend gave me a division from, seems to grow-well in Melbourne and my guess is, it is either acclimatized or requires less of a "chill factor" than others as discussed in an article in your magazine.

This year, this tree peony had 14 very large double flowers of a lovely pink which no color film does justice to. The edges of all the petals are "fringed" and some have fine hairlines of a darker raspberry pink, in the over-all "orchid pink" color.

Unfortunately, it isn't fertile. It doesn't set seeds for some reason. As there are no others flowering (as yet) at the same time, this may be why. I would have sent you seeds if I had any.

I had to cover all the newly-arrived peonies with an awning of 70% Sarlon shade-cloth to keep off the affects of the sizzling hot days in the 90's (F). These were mostly in 4 to 6 inch pots from Quarantine. The only safe time to transplant peonies here is in the fall, or autumn.

Once they are more established, I'll treat them all with duck eggs in spring, plus half-strength Phostrogen, plus a weak solution if iron chelates (one a year).

Our soils lack zinc, also manganese, and are low in superphosphate, so I build up the soil with horse and cow manure, seaweed and add the appropriate chemical plant foods as well.

I have to spray my citrus trees every year with a foliar spray of ZN-MG, so I tried this on the peonies, again with good results, and darker green larger leaves. It has to be done in spring.

Everyone is surprised that I can grow mandarins in Mt. Waverley, not only healthy trees but many mandarins on each. The Dept. of Agriculture says that mandarins can't be grow in Melbourne. It shows you that with extra treatment they can. Also, as these little trees are frost-sensitive, I cover them up at night if it drops to 5° C (which isn't very often, although last winter was an exception). I also give them a lot of sea-weed, as a mulch in bulk and as an extract, as they say sea-weed treatment has been shown to cause more tolerance to frost in citrus. I also have a navel orange, a cross between a grapefruit and an orange, and a huge grapefruit tree, plus 3 varieties of mandarin trees. I make a lot of jam and marmalade, etc. as you can imagine.

Although herbaceous peonies can grow in Melbourne, they either won't flower or become dwarfed. I only know of one very old-fashioned white herbaceous peony that I've seen around Melbourne, whereas in the Dandenongs about 50 miles north of Melbourne at an altitude of say about 1,000 to 1,500 ft. (and continuing further north to higher altitudes) herbaceous peonies will thrive and flower, but they are very rare. A few months ago at a flower show mostly of lilliums, which was held in the Dandenongs, there was also a stand of other flowers including a few herbaceous peony flowers, huge. I spoke to the grower, who lives in the Dandenongs. Everyone was talking about them and asking what they were. They call all peonies "peony roses" because there is so little information here.

Must finish this now. Kindest regards.

Patricia Plunkett
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Victoria, Australia