



Woody Peonies

Nate Bremer...Solaris Farms

1. Woody peonies can provide a lifetime of entertainment. Whether they are grown from seed, grafted or purchased the plants will supply beauty and intrigue each spring and summer season. Each gardener has different needs and expectations. These can be satisfied through the many choices within the woody peony groups. For me and many others this plant provides three seasons of gardening entertainment, unmatched by most hardy perennials.
2. Notes and Information. Slide notes may be viewed at: <https://solarisfarms.com/upcoming-events/> under **Garden Visions 2020**. Other Hemerocallis information may be found on our website under **CULTURE AND CARE>Hemerocallis** and **>Guides and Articles**. More related information may be found under **ABOUT>Literature** and **>Additional Resources**.
3. In cultivation we find herbaceous, woody and intersectional (Itoh) peonies. Intersectional peonies are hybrids between the woody and herbaceous sections. (herbaceous x woody).
4. The Woody Peonies...Species (*delavayi*, *decomposita*, *jishanensis*, *cathayana*, *rockii*, *qiui*, *rotundiloba*), Lutea hybrids (hybrids involving *delavayi* x *suffruticosa*), *P. rockii* hybrids (hybrids involving *rockii* x *suffruticosa*), Japanese *suffruticosa* (man-made species hybridized in Japan), Chinese *suffruticosa* (man-made species hybridized in China).
5. *Paeonia* species are the wild ancestors of the plants we now grow in our gardens. Taxonomists identify approximately 8 species, but many variants occur, making for a diverse gene pool. Plants are wide ranging in growth habits, stem hardiness, floral display and size, providing unique opportunities for hybridizers and gardeners alike. A number of species are becoming more available, but others remain rare in the specialized peony gardening trade. All originate from mountainous areas and China and are considered threatened or endangered in their habitats. The major threat to the species is the collection of their roots for use in Chinese medicine. *P. rockii*, *P. ostii* and *P. qiui* are of the easiest culture and are commonly available. *P. delavayi* and its many variants are fast growing, but are not suitable for areas with cold winters and hot summers. The other species are rare in cultivation at this point, thus little information is available concerning their suitability for gardens.
6. *Paeonia suffruticosa* is a man-made species. Many species were originally crossed in China over the millennia and offspring were crossed over and over to create a species race originated by man. For more than one hundred years, Westerners exploring China believed that *P. suffruticosa* would be found in the wild. The idea that *P. suffruticosa* is a species was only recently disproven through the use of genetic marker technologies, which showed that genetic material of at least 5 species was involved in their heredity. *Paeonia suffruticosa* was imported to Japan by monks and were further hybridized. The Chinese and Japanese *suffruticosas* differ in plant habit and flower form due to selective breeding in their respective countries of origin.
7. The run down on Chinese *suffruticosa* cultivars. They typically struggle in most continental climate zones of the United States. Most were selected in China to prosper in semi-arid

conditions with a somewhat warmer climate than the northern tier of the United States. Growing areas in China also have stable spring seasons which do not experience the wide swings which characterize many U.S. climate zones.

8. For thousands of years Chinese *P. suffruticosa* were only allowed to be grown by the emperors. Today they are a major export of China. Fewer plants have been imported in recent years due to identification of disease by the United States Department of Agriculture.
9. For thousands of years Chinese *P. suffruticosa* were only allowed to be grown by the emperors. Today they are a major export of China.
10. **Hua Hei Die.** A Chinese *P. suffruticosa* that has smaller flowers than many, but can be grown in Wisconsin in a protected garden. Plants seldom reach more than 18" in height in Wisconsin.
11. **Lan Bao Shi.** It resents clay soil, cold and too much water.
12. **Zi Er Qiao.** A Chinese *suffruticosa* that has performed poorly in Wisconsin and did not live through the winter of 2013-2014. This cultivar is reported to have variegated petals of red, pink and white.
13. **San Bian Sai Yu.** A cultivar that will bloom double on older plants, but is single on young less established plants. Ours never bloomed double and did not survive its third winter.
14. **Dou Lu** and divisions. Chinese *suffruticosas* are often short plants that produce many ground shoots. Because of their growth habit, they lend themselves to division. Most Chinese *suffruticosas* are sold as divisions. Own root divisions of woody peonies require warmer soil temperatures than herbaceous peonies in order to establish properly. Fall planting of own root divisions can result in loss due to cold soils.
15. The run down on Japanese *P. suffruticosa*. Japanese *P. suffruticosa*, while close relatives of those from China, are better suited for the United States. The plants were selectively bred in more rigorous conditions and those available withstand our cold winters more easily. Plant habits are more erect, flowers tend to be carried on sturdy stems and in greater abundance and flowers tend to be semi-double.
16. The Japanese *suffruticosas* are truly woody and have attractive/interesting buds as they unfurl in the spring. Foliage is often tinted red early in the season. Japanese *suffruticosas* are almost always sold as grafted plants, as they do not lend themselves to division due to their growth habit.
17. **Hana Kiso.** A Japanese *P. suffruticosa* that is easy to grow and highly productive in northern tier climates. The creped flowers are among the most beautiful of the group. There are a tremendous number of pink Japanese *P. suffruticosa* cultivars and identifying mislabeled or unlabeled plants is nearly impossible, due to similarities in cultivars.
18. **Yoshino Gawa.** A dwarf Japanese *P. suffruticosa* that blooms profusely with apple blossom pink flowers. Plants typically have a vase shape to 3 feet. Flowers are 5" to 6" in diameter. It has been an easy grower for us in Wisconsin.
19. **Shima Nishiki.** The flowers are often variegated red and white, but can be pink and white, all white, all red or all pink. The plants flowers are truly schizophrenic, displaying different color variations each year and sometimes on the same plant in the same year. It is vigorous grower, but is prone to botrytis stem and bud infections.

20. **Seidei.** The large double flowers are deep pink and spectacular in form. Plants are of relative ease to grow. Flowers can be 9" in size here in Wisconsin and have relatively sturdy stems.
21. **Shintenchi.** A gorgeous flower that is difficult to capture on film. Flowers open a deep pink and then fade over time. It has darker pink flares on the petals at the center. Used extensively in hybridizing for its varied genetic makeup, it has produced numerous registered offspring. Plants can be somewhat challenging to keep healthy and may require some extra attention. Other cultivars are often substituted, or incorrectly labeled in place of this cultivar. Most commonly, *Yachio-tsbaki* is confused with this plant.
22. **Renkaku.** White Japanese suffruticosas are abundant and many look much the same. Most are of easy culture and are productive bloomers. *Renkaku* is very hardy and produces an abundance of nice 7" flowers, sometimes flushed in pink as they open. This has been a very hardy cultivar for us and looks great under lightly shaded tree-line. Most Japanese *P. suffruticosa* cultivars do well in partially shaded locations which protects their large flowers of light substance from sun damage. Flowers will last longer if kept cool.
23. **Hakubanryu.** Another beautiful white Japanese *suffruticosa*. Note that the flowers do not look all that different than *Renkaku*.
24. **Rimpo.** This cultivar is a heavy bloomer that produces large, bright magenta flowers. The buds look like roses as they open. Some people have reported this cultivar as difficult to grow in some locations, but has proven easy for us to date. Plant height for us has been around 3-4 feet and as wide.
25. **Muramatsu Zakura.** A very large brilliant pink flower. Single to Semi-double in form, it is of great beauty, but does not bloom with the profusion of some of the other Japanese *suffruticosa* cultivars. Leaves are larger and more elongated than many others in this group, making it a wonderful plant out of bloom. Plants are easy to grow and have shown excellent cold tolerance.
26. **'Schichifukujin'.** A wonderful vase shaped plant that can attain heights of 5 feet or more in Wisconsin. Flowers are large and are carried on sturdy stems. Pink in color, the petal edges fade more quickly than the rest of flower giving it a nice frosted affect.
27. **Shimane Chojuraku.** This plant is characterized by very large semi-double lavender flowers with dark maroon basal flares. One drawback to the plant is that its flowers can be killed by late frosts. The buds remain green, but never enlarge to produce flowers when damaged. Plants can grow to 5 feet or more in a protected garden.
28. **Princess Chiffon.** American's have gotten in on the act of hybridizing *P. suffruticosa* as well. The American selections are even better adapted to our gardens and are of great beauty. This is a Roy Klehm introduction, out of Song Sparrow Nursery, Avalon, Wisconsin. She's a beauty with wonderful bright pink flowers.
29. **Ruffled Pink Petticoats.** Another American *suffruticosa* hybridized by Roy Klehm. Flowers are very large and are loose semi-doubles. Plants grow to 2 ½ feet for us and are covered in gorgeous large blooms each year. We have our display plant located under a Canadian lilac to protect the flowers from intense sun. The plants would like to be in full sunlight, but flowers last longer with a bit of shade.
30. **Shima-tsubeni.** In our opinion, this Japanese *suffruticosa* is the pinnacle of red cultivars in this group. Flowers are very large, often measuring nine inches in diameter and are carried on

sturdy stems. Plants grow to 3 ½ feet and stems are not as long lived as some in this group. It is a difficult cultivar to locate, but worth the extra efforts to obtain.

31. ***Iphegenia***. The lutea hybrids are a relatively new arrival on the peony scene. It is a true hybrid and flower colors range from yellow, pink, red, coral and multiple blends. Plants typically reach 3 feet in Wisconsin. Stem hardiness is poor compared to the Japanese *suffruticosas*, but any loss to winter is quickly regrown from basal shoots the following spring. Unlike the *suffruticosas*, lutea hybrids are able to bloom on new shoots arising from the ground. Thus winter stem loss is acceptable.
32. ***Paeonia delavayi (lutea)***. The yellow form of this species was once known as *P. lutea*, but has been recently reclassified as *P. delavayi*, to include all color and plant variants. *Paeonia delavayi* comes from China and has small nodding flowers of about 2" in size. Up to 6 flowers per stem can be produced. Foliage is finely cut. Flower color is wide ranging from yellow to red to orange. When crossed with *P. suffruticosa*, many new colors, shapes and plant habits have been obtained. Unfortunately *Paeonia delavayi*, itself, is not particularly hardy in northern gardens. However, it is much more tolerant of excessive water and poor air movement than *P. suffruticosa*. By crossing it with *suffruticosa*, hardiness has increased significantly (from the *P. suffruticosa* parent) as has disease resistance (from the *P. delavayi* parent).
33. ***Paeonia delavayi x Paeonia suffruticosa*** produces a first generation lutea hybrid. In this case *Age of Gold*. The F1 generations of lutea hybrids often lack fertility and many hybridizers have spent significant parts of their lives trying to produce second generation (F2) hybrids. *Age of Gold* will produce a rare seed, but does not have fertile pollen.
34. Characteristics of lutea hybrids. The first generations (and many of the advanced generations) were and are plagued by flowers that hang downward on long stems. This is a characteristic of *Paeonia delavayi* and is easily inherited by its offspring. *Paeonia delavayi* also produces a hook in it's flowering stem just before the bud, which causes the flowers to have a nodding appearance (causes flowers to face down). These two characteristics are seen as problems to hybridizers, since flowers are not presented at their best. *P. delavayi* may produce up to 6 buds per stem, this characteristic was inherited in many of the lutea hybrids. This increases the bloom period as the side buds open after the terminal flower. In the image at right is a 6th generation lutea hybrid seedling (unnamed) that carries the 'lutea hook' trait from the original F1 cross with *P. delavayi*.
35. Early lutea hybrids: ***Alice Harding, Madame Louise Henry, Souvenir de Maxime Cornu*** and ***Satin Rouge***. The first hybridizers of lutea hybrids were the Frenchmen Lois Henry and Victor Lemoine. Their hybrids were presumably produced from different color variants of *P. delavayi* crossed with Chinese *suffruticosa* cultivars. In most cases the flowers are heavy doubles and are produced on plants that are lacking in stem hardiness. The plants exhibit hybrid vigor, but typically lose most of their stems each winter in Wisconsin, only to regrow from basal shoots each spring. Flower carriage is downward and can often be hidden in the foliage. *Souvenir de Maxime Cornu* is commonly available and makes a beautiful flower for floating in a bowl. These plants are not recommended for cold climates as they may struggle for survival and are not as floriferous as more advanced generations. No parental background on these cultivars is

available, but they may be the product of *P. delavayi* crossed with Chinese *suffruticosa*, lending reason to their poor stem hardiness and heavy nodding flowers.

36. **A.P. Saunders** and F1 lutea hybrids: ***Canary and Daredevil***. A.P. Saunders was the first American to pursue the lutea hybrid cross. His efforts made use of different parents, namely, better performing Japanese *P. suffruticosa* cultivars. Saunders produced hundreds of seedlings and selected those with the best plant habits for introduction during the 1930's, 1940's and 1950's. He grouped his many lutea hybrids into like classes, such as: "The Golden Hind Group", "The Tea Rose Group", "Banquet Group", among others. These woody hybrids remain popular today and represent some of the finest efforts of any hybridizer, however, A.P. Saunders recognized that more work could be done to improve the lutea hybrid. Unfortunately, most of his hybrids were infertile and could not be used to produce a next generation of lutea hybrids. Due to age and the time needed to proceed with producing next generation plants, Saunders released two promising plants to William Gratwick to continue his work. These two plants are referred to as F2A and F2B and would serve as a foundation for advanced generation hybrids of the future. Little did Saunders know that a number of his other hybrids were also fertile, and it would be many years before this was revealed.
37. Saunders' F1 lutea hybrids: ***Hesperus, Golden Mandarin, Right Royal, Banquet*** and ***Damask***. The Saunders woody peonies remain among the finest of all introductions in the group. Most are single or semi-double in form and have excellent flower carriage. He introduced approximately 84 named cultivars into commerce, a number of which appear lost due to poor distribution to propagators and perhaps difficulties in growing them.
38. Saunders' F1 lutea hybrids: ***Marchioness, Renown, Mystery, Spring Carnival*** and ***Savage Splendor***. Notice the rather waxy looking anthers on this group of cultivars, this is the marker for pollen infertility. While the anthers are yellow, they do not contain viable pollen. The stigmas on these plants appear to be complete, but are also incapable of seed production. Aesthetically, the flowers have tremendous beauty in their subtle color variations.
39. Saunders' F1 lutea hybrids: ***Happy Days, Black Panther, High Noon***, F2A or F2B= ***Cranapple*** and ***Heart of Darkness***. *Heart of Darkness* is reported to be an F2, but this is questionable due to completeness of available documentation. It may be pollen fertile, but no data supports this at this time. *High Noon* has been found to be seed fertile since Saunders' death. The various color variations seen in Saunders' cultivars is inherited from both the *suffruticosa* parent and the *delavayi* parent. The yellow and sunset tones are most certainly from the *P. delavayi* parent.
40. Saunders' F1 lutea hybrids: ***Coronal, Black Pirate, Age of Gold, Ice Age*** and ***Infanta***. *Age of Gold* is an outstanding plant that has better than average stem hardiness and produces medium sized light yellow semi-double flowers. In the 1990's Bill Seidl noticed a stem mutation produced light cream colored flowers on one of his plants. This stem was grafted and produced what is now known as *Ice Age*. The mutation has the same excellent characteristics of *Age of Gold*, but is a different color. Bill Seidl also found that *Age of Gold* would produce fertile seed, although numerous pollinations are required to do so. Resulting seedlings are almost always outstanding. Not pictured is *Chinese Dragon*, another cultivar of A.P. Saunders that Bill Seidl found pollen fertility in.
41. Saunders' F1 lutea hybrids: ***Anglet, Vesuvian, Golden Bowl, Thunderbolt*** and ***Golden Isles***.

42. Saunders' F1 lutea hybrid: **Vesuvian**. Plants are short and form a gorgeous mound shape. Flowers hang down a bit, but also face outward. A beautiful plant that should be widely grown. Of very easy culture. Lutea hybrid cultivars have wide ranging flower colors and forms, but are equally diverse in plant habit and leaf structure. These striking variations lend themselves to a variety of uses in the garden and landscape.
43. Saunders' F1 lutea hybrid: **Renown**. *Renown* is one of the strongest and fastest growing of the lutea hybrids. Although it lack stem hardiness and annually loses its stems to winter conditions, they are regrown from basal shoots reliably. Basal shoots often grown 3 to 4 feet in a single season and many produce blooms of rosy-orange coloration.
44. Saunders' F1 lutea hybrid: **Savage Splendor**. *Savage Splendor* is another vigorous growing lutea hybrid from the Saunders' lutea hybridizing program. It sports gorgeous cream based flowers with varying degrees of rose in the petals and a picotee. Each twisting petal has deep maroon colored flares at their base. Stems are not hardy on this cultivar and routinely die to the ground, only to grow new shoots from basal buds each year.
45. The advanced generation lutea hybrids are generally considered those plants that are 3rd generation or greater. These were the plants that A.P. Saunders worked to produce, but fertility in his F1 hybrids prevented. From his experience with plant breeding, Saunders knew that many advances in plant habit, flower form and color could be gained in further generations. This group of plants were advanced by hybridizers that used his fertile F2A, F2B seedlings (note the fertility of these plants was low), as well as *Chinese Dragon*, *Age of Gold*, *Golden Isles* and a couple of other cultivars. Advances have been outstanding and continuing work is being carried out to refine a number of characteristics.
46. The first to take serious steps in creating advanced generation lutea hybrids was **Nassos Daphnis**, a Greek borne artist and friend of William Gratwick, who was the recipient of Saunders' F2A and F2B. Unfortunately there were very few F1 plants to work with, as most were sterile. After years of work he was able to make crosses using Saunders' F2A and F2B, which ultimately opened the doors for more fertile hybrids. Daphnis was very focused in his selections and paid particular attention to flower carriage. This also advanced the lutea hybrids to new heights. Daphnis numbered approximately 375 seedlings and of those 46 were named or registered.
- Many of Nassos Daphnis' introductions are named for Greek gods, goddesses and a variety of other mythological characters. The names are as intriguing and inspiring as the plants and flowers themselves.
47. Daphnis lutea hybrids: **Ariadne, Antigone, Hephestos, Artemis** and **Gauguin**. Daphnis' hybrids were among the finest peony introductions of their time and continue to be sought after plants by collectors of woody peonies. His body of work involved many different crosses, but mainly backcrosses to suffruticosa cultivars or other lutea hybrids. This practice often produces offspring with greater fertility and to a certain degree, this goal was accomplished. Among his most popular introductions are *Hephestos* which sports highly ruffled deep red blooms of outstanding form. *Gauguin* is popular for its unusual coloration, but severely lacks stem hardiness in cold climates like Wisconsin.

48. Daphnis lutea hybrids: ***Iphegenia, Aphrodite, Leda, Terpsichore*** and ***Zephyrus***. One of the drawbacks to many lutea hybrids is their overall lack of flower production compared to the Japanese *suffruticosas*. However, *Iphegenia* rivals any *suffruticosa* in this regard, but is unfortunately sterile. *Terpsichore* and *Zephyrus* have some degree of fertility, but overall fertility remained low in his cultivar introductions. Some degree of confusion in the market place circles around the cultivar *Aphrodite*, as its true identity in commerce is in question.
49. Daphnis lutea hybrids: ***Kronos, Urania, Maria Teresa, Clytie*** and ***Pluto***. Rare in commerce these plants are in high demand. Like most woody peonies, propagation is often slow and requires specialized techniques, making their availability scarce. The lutea hybrids can often be divided after some time, but grafting is mainly used to produce greater quantities for distribution. No matter what form of propagation that is used, the resulting plants take extra time to grow and become high performance adult plants. Another reason for scarcity with Daphnis' plants is the lack of initial distribution to growers that propagate woodies. This lack of initial distribution is the same reason for many other woodies being in short supply, with the added problem of a shortage of experienced propagators.
50. **William Seidl** of Manitowoc, Wisconsin used many of the Saunders and Daphnis hybrids to produce new advanced generation hybrids during the 1970's, 1980's and 1990's. He realized that Daphnis and Saunders had not identified key fertile hybrids that were available for breeding. The Saunders hybrids *Age of Gold* and *Chinese Dragon* were key plants identified by Bill as breeding plants. Many of Bill's hybrids have shown better fertility than those of earlier generations, allowing for further work to be completed more easily. Unlike Daphnis, Bill Seidl did few backcrosses, but relied more heavily on line breeding. Here Bill is standing in one of Klehm's Song Sparrow hoop houses in which lutea hybrids selected in New Zealand are grown. During the late 1980's and early 1990's Bill sent thousands of lutea hybrid seeds to New Zealand and Australian growers, due to a lack of interest in the United States. These seeds were grown to maturity and the best were selected and registered by the New Zealand growers. Roy Klehm, of Song Sparrow Nursery imported a number of the registered plants back into the United States in the early 2000's, reuniting Bill with his hybridizing efforts. Bill, some years before his death in 2016, would take yearly trips to Song Sparrow to collect pollen from these plants to use in his hybridizing program.
51. Seidl lutea hybrids: ***Autumn Harvest, Aussie Peach, Anna Marie, Mystic Mood*** and *Brassy Lady*. Forty-four of Bill Seidl's advanced generation lutea hybrids are registered with the American Peony Society. Limited by the space of his 1 acre growing lot, he was only able to grow 246 lutea hybrid seedlings to select from, fortunately he sold and shared seed with numerous other growers. His registrations and those of others that grew his seed represented a large step forward in fertility, plant characteristics and flower form/color. Bill's first registration was *Anna Marie*, a rare lavender in the lutea hybrids-named for his mother. A number of other registrations and seedlings that Bill produced have unusual colors that border on orange-something Bill was working toward. *Brassy Lady* is a good example of the somewhat orange coloration that may be seen in the advanced generation lutea hybrids.

52. Seidl lutea hybrids: ***Theresa Ann, Fuchsia Ruffles, Cathedral Echo, Irena Sendler*** and ***Coral Star***. Oddly, Bill was partially color blind and had great difficulties with red and green perception. Fortunately he had many friends that had good eyes for color to rely upon. All of the cultivars in this group of images have some form of fertility, something his predecessors could not achieve. The Irvine/Sutherland registrations are direct products of Bill's hybridizing program from seed that he sold to them in the late 1980's. The New Zealand woody peonies are often promoted as the hybridizing efforts by Irvine and Sutherland, but in reality they selected and registered the plants from Bill's efforts. Hybridizing has many steps and growing and selection is part of the process, but does not play a part in the production of seed or genetics of the plants chosen for registration.
53. Seidl lutea hybrids: ***Mother Theresa, Door County Sunset, Grandmother's Symphony, Pleasant Point*** and ***Firey Coals***. The Seidl advanced generation lutea hybrids are wide ranging in color and form as seen in the introductions above. Few lutea hybrids are white in color and *Mother Teresa* is close to achieving this sought after color. Unfortunately the plants are prone to botrytis infections and seldom show their potential.
54. Seidl lutea hybrid: ***Moonlit Castle Ruins***. *Moonlit Castle Ruins* has proven to be quite interesting. Some of the plants have produced a variegated leaf mutation (pictured), which is very ornamental. The plants with variegated leaves are slower growing and prone to sun burn. Flowers are large and cream in color, but sparsely produced in Wisconsin (due to winter stem kill). This plant is often a target of agricultural inspectors at Solaris Farms, due to the resemblance of the foliage coloration to a virus infection.
55. Seidl lutea hybrid: ***Door County Sunset***. *Door County Sunset* is particularly popular for its unusual coloration and probably its name. However, it lacks stem hardiness and is not particularly well suited for northern gardens. Stem hardiness remains an issue with most lutea hybrids compared to Japanese *suffruticosas* and *rockii* cultivars. This image shows a plant in bloom after an unusual winter in which temperatures did not fall below 15 degrees. Flowers upon open are red and then fade to pleasing blends within a day or two.
56. A number of other American hybridizers have worked to produce lutea hybrids of note. **Dr. David Reath** and **Chris Laning** were able to hybridize some excellent cultivars that are available in the peony commerce. The advanced generation lutea hybrids have for the most part been an American development.
57. Dr. David Reath lutea hybrids: ***Waucedah Princess, Strawberry Delight, Golden Era*** and ***Ruffled Sunset***. Chris Laning lutea hybrid: ***Lois Elaine Laning***. Dr. Reath's *Golden Era* has been widely used in producing new lutea hybrids, but has been used more so in the Itoh hybrid cross. In the production of lutea hybrids, the outcomes have been less than stellar, producing many offspring that lack stem hardiness and bloom abundance. As an Itoh parent the offspring have been outstanding, testament that different crosses will often produce different outcomes.

Chris Lanning's *Lois Elaine Laning* is an outstanding plant and flower, but lacks fertility. Foliage is wonderfully dissected and lightly rimmed in red, while the flowers are large and elegantly formed.

58. **Nate Bremer** and **woody seedling** at left, lutea hybrid: ***Aegean***. All hybridizer's stand on the shoulders of those that came before us. In Nate's case, thanks go to A.P. Saunders, Nassos Daphnis, Bill Seidl and Dr. David Reath, all who produced key material and knowledge. No book or single reference is available as a plan in hybridizing lutea hybrids, but some careful research often reveals patterns and possibilities.

Bill Seidl was a friend for many years and was responsible for getting Nate involved with peonies in general, but also helped to hook him on lutea hybrids. The most important singular lesson that Bill shared with Nate was to explore what others have overlooked or may have gotten wrong. In the peony world plant fertility is a major frustration borne of climate impact and genetic complexity. Many hybridizers get stuck on ploidy (diploid vs. tetraploid) which should indicate compatibility to a certain extent. Bill noted that peonies often don't play by the same rules as other plants and may produce an array of compatible combinations. The problem is to find the correct combination! In any event, the lesson was a good one and has helped Nate to quiet the lutea hybrid fertility issue. Many of Nate's new hybrids are easily fertile (with a compatible parent) and flower and plant forms continue to move forward.

59. Nate Bremer lutea hybrids: ***Aquila***, ***Copper King***, ***Beach Comber*** and ***Aquarius***. American gardeners love double form flowers and great progress has been made in developing new cultivars. One of the largest issues of double form lutea hybrid flowers is that they are heavy and often face down. Lutea hybrid flower substance is heavier and waxier than other woody peony flowers and this is a major obstacle when it comes to carriage, not to mention they are predisposed genetically to hang down from *P. delavayi* trait inheritance.

The above hybrids, with exception of *Aquarius*, have excellent upright to outward carriage. *Aquarius* is acceptable, but has one other unique trait-it is FRAGRANT. While a good number of lutea hybrids have light fragrance, *Aquarius* has a fairly strong citrus fragrance that can be smelled from a distance.

60. Nate Bremer lutea hybrids: ***Lyra***, ***Coral Nebula***, ***Tethys***, ***Wisteria Reflections*** and ***Fire Down Below***. New developments in flower color patterns are being revealed in each new generation. *Coral Nebula* exemplifies lighter outer petals with a darker center, this is becoming a more common occurrence in the new hybrids.

Tethys is the first full double lutea hybrid that has upright carriage that rivals the Japanese suffruticosas.

Wisteria Reflections is extremely floriferous (never shy about producing numerous flowers).

61. Nate Bremer lutea hybrids: ***Manchurian Promise*** x 2, ***Charon***, ***Elemental*** and ***Mimas***. Here again, color and patterns are emerging in the advanced generation hybrids. Lutea hybrids could be said to be "chameleons" impacted by the climate they are experiencing in a given year. Color can be quite variable from year to year, to the point that identifying a cultivar as the same one the next year can be a challenge.

Manchurian Promise is a good example of this "chameleon" effect. Some years the plants have a deep apricot-pink coloration, while other years they are a soft light salmon color and other

years they can be nearly a creamy yellow. All variations are quite appealing and flower form is nearly the same.

62. Nate Bremer lutea hybrid **Beach Comber**. This cultivar is named for a friend that was instrumental in getting Nate interested in woody peonies (Kris Casey). *Beach Comber* has extremely large blooms that are of heavy substance. Outer petals are lighter in color than the central mass and provide a perfect frame for the rose-salmon coloration. Carriage is outstanding, considering that each flower can weigh nearly a pound. Each bloom stem carries up to 3 side buds, providing a longer season of bloom. Stem hardiness has been above average compared to other lutea hybrids.
63. Nate Bremer advanced generation lutea hybrid seedlings. All new plants arise from the seed grown plants, these seedling plant often have flaws, but a few may become registrations and reach commerce.
64. Nate Bremer advanced generation lutea hybrid seedlings. Producing new plants with red colored flowers is a challenge in the lutea hybrids and selecting better plants than what has already been introduced is even more challenging. Fertility in the few good red lutea hybrids has been lacking and some progress has been made with the seedlings in this slide. Superior ruffling can also be seen in this group of seedlings.
65. Nate Bremer advanced generation lutea hybrid seedlings. Will orange be in the future? One of the largest problems with orange coloration is that its expression is not stable. Variable climate conditions often impact the degree of expression and cultivars that appear orange one year, may express a completely different color the next.
66. ***Paeonia rockii*** is another species from China with a more northerly distribution, making it an excellent plant for northern hybridizing programs. The species and *Rock's Variety* has a long and storied background that has lent confusion to its identity in the wild. The species itself is not readily available in American commerce, but is more commonly represented in hybrids with *P. suffruticosa* cultivars (*Rock's Variety*).
67. ***Paeonia rockii* subspecies *atava***. *Paeonia rockii* can grow to heights of 6 feet in Wisconsin, is very cold hardy and blooms heavily in early spring. The species is white or very light pink with maroon flares. It is of easy culture, adapting to many soil types and climate conditions.
68. Bill Seidl ***P. rockii* x *P. suffruticosa*** hybrids. *P. rockii* is easily crossed with Japanese *P. suffruticosa* cultivars and the resulting offspring are often spectacular. *P. rockii* often donates its hardy plant habits and floriferous nature to the offspring, while the Japanese *P. suffruticosa* parent will impart color and form. Here pictured are Seidl seedling #MRV-13, and *Capt'n Kate*.
69. *Rock's Variety* x *P. suffruticosa* hybrids: ***Baron Thyssen Bornemisza*, *Angel Choir*, *Lavender Hill*, *Dojean* and *Lydia Foote***. Note that all of the above hybrids have the characteristic '*rockii* flares'. While having these flares is not completely indicative of *P. rockii* lineage, it is common trait. Notable hybridizers of *P. rockii* hybrids are: Bill Seidl, Peter Smithers and Roger Anderson. Numerous other European hybridizers have produced excellent cultivars as well.
70. Bill Seidl *Rock's Variety* x *Kamata Fuji* hybrid: ***Angel Emily***. *Angel Emily* has large semi-double flowers and is a heavy blooming cultivar. It is in high demand and has been slow to propagate through grafting, but is of easy culture. If allowed to grow to maturity, *Angel Emily* may produce

more than 100 flowers at a time. This is one of the better performing woody peonies in Wisconsin due to hardiness of stems and massive production of blooms each spring.

71. Chinese Gansu Mudan: ***Lan Yu San Cai, Jiao Rong, He Ping Lan, Hung Kung Yu Zhu*** and ***Yin Zhaung sug ou***. The Gansu Mudan are *P. rockii* cultivars that originate in Gansu, China. This group of *P. rockii* cultivars are, for the most part, not registered with the APS, as this has not been a practice of Chinese growers. This group of plants have been very good performers in northern tier gardens, easily shrugging off winter cold and climate variation. One problem with the group is that they are often mislabeled or are deceptively marketed. Finding a reliable source is paramount in getting what you pay for. Plants from this group have a variety of plant habits-some upright, other's globe shaped and yet others lower growing.
72. Gansu Mudan: ***Xue Hai Bing Xin, Zei Mei Cha Cui, Ye Guang Bei*** and ***Zhong Chuan Huang***. German *P. rockii*: ***Souvenir de Ingo Schiewe***.
Xue Hai Bing Xin is the tallest rockii cultivar we grow at nearly 6 ½ feet and 4 feet in width. It has extremely long lived stems and is strong measured grower. The other Gansu Mudan in the slide are large globe shaped growing plants that have been productive/beautiful additions to our landscape.
Souvenir de Ingo Schiewe is of German origin and sports an outstanding deep lavender coloration. Plants are strong growers with thick woody stems. For us, this plant is grown in the middle of an open field and never loses stems to winter cold (-35F).
73. Nate Bremer *P. rockii* lineage seedlings: Plants that are of rockii lineage often exhibit superior stem hardiness and flower production in Wisconsin. Nate would like to cross this plant with the lutea hybrids to bring more color and hardiness to the offspring, but genetically they have thus far been incompatible.
74. Growing points. Woody peonies are not difficult to grow, they simply require different conditions than their herbaceous cousins.
 - a. A well drained site, like all peonies, is required.
 - b. Full sun good for plants...shade helps flowers to last longer.
 - c. Fertile soils, avoid overly sandy soils (clay is fine).
 - d. **Plant them deeply, so stems extent 6 inches below ground.** This is the most common reason plants fail.
 - e. Cut off stems when transplanting, it helps the root system establish.
 - f. Sleep-Creep-Leap growth pattern-3 or 4 years to LEAP, thus patience is required.
 - g. Stems may be short lived, expect to do pruning each spring to remove older dead wood.
 - h. Grafted root systems vs. own root. Both have strengths. MORE LATER.
 - i. Small plants establish more easily due to youthful vigor.
 - j. Patience is required, but rewarded.
 - k. Three to four feet of space is required on all sides.
 - l. Select plants from a group that is appropriate for your growing zone.
75. Woody peonies may be damaged during the winter months by rodents and rabbits. While this kills the mature stems, most will dependably grow from basal buds the following spring. The lutea hybrids often bloom on the very new wood, the others less so. The above image is of a plant of ***Rock's Variety*** that had its stems girdled by voles during the winter. The plant

produced large amounts of growth from dormant basal buds in the spring and recovered nicely! Loss of old stems often reinvigorates plants, thus should not be viewed as a bad thing.

76. Peonies often get caught in spring with emerging growth during cold and snowy weather. This is not generally a problem for them at this stage, as they have a great deal of anti-freeze remaining in their new growth. Temperatures as low as 24F seem to have little impact on them at this stage of growth.

77. For a lifetime of intrigue-grow a woody peony!

Questions?

78. **PROGRAM BREAK.** Grafting... if time permits.

79. Grafting is the main method of propagation for woody peonies. It is not a complex process, but is labor and time intensive. This is a major reason that woody peonies are more expensive.

Propagation...

- a. Left: Own root woody peony. Note the narrow long roots that woody peonies produce. Own root plants have received much positive attention, but they do have some drawbacks. Woody peony roots grow more slowly than herbaceous peony roots and at in warmer temperature range. Own root woody peonies planted in cold soils make little if any growth until the following early fall season. They are also less cold resistant and water tolerant than herbaceous peony roots used in grafting. Thus a grafted herbaceous nurse root can endure colder temperatures and keep a woody peony alive.
- b. Center: An 8 year old grafted woody peony with a large nurse root and own roots growing over the top of it. Herbaceous nurse roots may become very large and actually occupy space in which the woody peony's own roots could use. While nurse roots are seldom a problem, in certain soils they may become so large that they push the entire plant toward the surface, leaving no part of the woody peony below the surface. Since woody peonies have crown tissue much like herbaceous peonies, the crown may be killed during winter months and the plant will be lost. This is an underlying reason that grafted peonies fail for some gardeners. Planting deeply rectifies this issue in most cases.
- c. Right: A 4 year old graft that was planted deeply, consequently it produced own roots over the top of the nurse root. The nurse root could be cut away at this point and the woody peony planted on its own roots if soil conditions remain warm enough for root growth.

80. Grafting:

- a. Two types of plant material are required to make a graft, a woody peony scion and herbaceous peony's roots. There are some careful considerations that need to be made for success. Timing is important and will vary depending on your location. Woody peonies must have developed mature resting buds. This happens in mid-August in Wisconsin and is the prime time for grafting.
- b. A scion is a cutting from the woody peony to be replicated. Scions must have mature resting buds and those with large terminal buds are the best candidates for grafting. Larger buds presumably contain more hormones that are required for growth and they

are more likely to produce successful grafts. **Left:** A large terminal bud is a prime candidate for grafting.

- c. At **right** is an image of a woody peony that was cut to the ground in the fall to produce a large number of basal ground shoots. These young stems are often topped with a terminal bud if they do not bloom. Stems from this type of plant will produce strong scion wood for grafting purposes.

81. **Woody peony scions from cultivar Aegean.** Grafting begins with the collection of scions (stems with buds) in mid-August in Wisconsin, later in warmer climates. Buds should be well formed as seen in the image at lower right. Some cultivars do not produce nice budded scions and are more challenging to grow from this form of propagation. Buds contain key chemicals that help the scion grow/join with the nurse root. Note that all leaves are stripped away leaving only woody stems.

82. **Herbaceous peony roots from lactiflora cultivars.** Before scions are collected from woody peonies, clumps of 3 to 5 year old herbaceous *P. lactiflora* clumps are dug. Roots are 'robbed' from these clumps and the rootless crown stubs are saved for replanting. The cut away roots are soaked in bleach solution (10 parts water to 1 part bleach) for 30 to 40 minutes. The root surfaces will change color from tan-brown to cream, indicating they have been disinfected. Roots are then washed in clean water and then allowed to dry slightly. They are then stored in a clean plastic tub or bucket that is covered with a bag to prevent further drying. Some grafting guides recommend drying the roots further until they become rubbery and easy to work with. We've found that this is detrimental to successful grafting, thus fresh hydrated roots are used.

Note: Many woody peonies are sold on nurse roots that are from herbaceous hybrids. This practice can produce grafts that will grow stems from the nurse root. Growth from the nurse root is unwanted as it is not the desired woody peony that is making growth and robs the woody peony of needed energy. It is important to use non-adventitious rooting cultivars (see next slide).

83. Adventitious root stock in bloom. Often these nurse roots begin to grow a plant of their own and energy is directed away from the desired woody peony grafted to it. When this happens, the woody peony is weakened and will be overtaken by the more vigorous herbaceous peony. Many of the grafted plants available in retail nurseries not specializing in peonies are imports that have this characteristic. Roots originating from hybrid peonies should be avoided, as they are sometimes adventitious. *P. lactiflora* roots on the other hand are seldom adventitious and have are often more durable and compatible for grafting purposes.

84. Making the scion cut. Woody peony scions are cut with a 'V' at the bottom. This 'V' will be slipped into a slot cut in the nurse root. Flat surfaces are important so that contact is precise between scion and nurse root. Much attention is given to this procedure, but it is not the most common point of failure. See healing for further information.

85. A cut perpendicular to the top is made completely through the diameter of the nurseroot. The cut must be long enough to accept the cut portion of the scion. The scion is slipped into the cut in the nurse root and then wrapped with a rubber band to bring the two surfaces together

tightly. Matching the cut surfaces of the scion to the nurse root must be accurate in order for the two plant parts to grow together.

86. The graft is then wrapped with grafting tape, a pliable plastic and wax covering. This prevents contaminants from entering the cut areas and keeps the area from drying excessively.
87. Healing is the process in which the scion and nurse root grow together to become a single plant. Grafts are set in a soil pit-row and covered with soil so that the tops of the grafts are not less than 2' inches from the surface. Damp soil is firmed and mounded and a layer of plastic is laid over the top to warm the grafts for two weeks. Grafts need temperatures in the upper 70s to mid 80's to heal and mesh woody peony to nurse root. After two weeks of healing the grafting bed is uncovered and allowed to cool until late fall. Just before the ground freezes a layer of wood mulch is applied and the bed again is covered in plastic for the winter. In very early spring, as soon as the soil allows, the plastic is removed or the young grafts will begin to grow beneath the plastic prematurely. Grafts that begin growth early are out of synchronization with the climate and often become damaged by frosts and dry spring air conditions.

More failures occur in healing grafts than from improper grafting. Careful timing is required as is soil temperature and moisture. If the bed is too cold or too dry the best looking grafts in the world will not heal. If the bed is poorly protected to the winter climate, grafts that did heal will die from freeze thaw and excessive water (or drying depending on the climate).

88. A grafted peony after the healing process. The scion and the root have grown together as one.
89. If successful, grafts will arise from the soil and produce a few leaves each the following spring. They often look stunted and rather weak the first year and may produce an uncharacteristic flower. It is advised to remove the buds on those that attempt to bloom, which allows the plant to hold its stored energy. In the second year plants attain a greater size, and will likely not bloom. Third year plants often bloom well and are certainly ready for transplant. Young grafts that are 3 years in age are extremely vigorous and in a youthful state. These are the best candidates for gardeners wishing to plant woody peonies. Older plants may be large and enticing, but lack the youthful growth rate of young plants and take longer to establish and provide little advantage.

For further detailed information about grafting procedures visit the American Peony Society's website and look at the Woody Peony page under Propagation. Skill is required, but the activity can be quite successful with practice.

90. **PROGRAM BREAK.** Woody Peony Division...if time permits
91. Woody peony division. *Sometimes woody peonies can be divided, given that the plant habit allows for such practice. Each cultivar has its own growth habit which dictates the options. When dividing a woody peony, each division must include at least a couple of larger roots and crown tissue. A saw will be need to cut the woody crown into sections.* Woody peony **Moonlit Castle Ruins**. The image (left) is of an 8 year old plant that was originally the product of grafting, the most common form of propagation for woody peonies. Plants like this are too large to ship and must be divided. At right are two of the divisions that were from this project. These were divisions from the nurse root being cleaved in half with a pruning saw. These two divisions have both nurse root and own root remaining. Other divisions with own roots (woody peony roots)

were also produced from this division and a total of 8 good plants was had. Like herbaceous peonies, the divisions should be dried before storage in peat.

92. Gansu Mudan: ***Xue Hai Bing Xin***. Many of the *P. suffruticosa* cultivars and rockii hybrids are plants that grow on nearly singular stems or small diameter trunks. The plant on this slide is an example of one that is not easily divisible, if at all. This plant requires the use of grafting to propagate it.
93. Lutea Hybrid: ***Antigone***. Another example of a woody peony that can be depended upon to produce own root divisions. Notice that the stems are trimmed back heavily, causing the plant to produce new growth from buds that will be buried when planted. A common myth and practice is to leave the stems on the plants. This ill-advised practice places extra strain on an already compromised root system to produce growth it cannot support. If the stems are left on the plant, they often die or are short lived anyway, only to be replaced with below ground buds. Lutea hybrids tend to be better candidates for division due to their tendency to produce many ground shoots that often produce roots. Cold climate areas are less likely to reliably be able to produce large quantities of own root woody peonies through division. This partially true due to our shorter growing season, but also that divisions have greater difficulty establishing in the cool soils of autumn.
94. **PROGRAM BREAK.** From Seed...New Cultivars...if time permits
95. Woody peonies from seed. Lutea Hybrid ***Coral Nebula***. New peony cultivars are grown from seed. Each seed carries genes and expresses traits from its parents, making it a unique individual. Thus peonies do not come true from seed (they are not copies of a single parent). Growing woody peonies from seed is not difficult and can be as involved or as simple as the grower would like to make the process.
96. What it takes to get seed. Woody peonies have nearly all of the same reproductive structures within their flowers as their herbaceous relatives. Anthers carry pollen (male cells) and the stigmas (female receptacles) receive the pollen which allows the pollen to grow a tube that will deposit its genetic material into ovules (female cell). If successfully fertilized the ovule will become a seed. The finger-like structures that contain the ovules and later the seeds are appropriately named carpels.
Hybridizers will place pollen from one plant onto the stigmas of another plant to perform cross pollination. Many gardeners allow insects to perform pollen transfer, but this does not allow for selection of parents with desired traits. In any event, if seed is produced, woody peonies that are grown from seed often produce beautiful flowers, with only a few 'clunkers'.
Some groups of woodies are more fertile and produce greater numbers of viable seeds. *P. rockii* and *P. suffruticosa* cultivars are often capable of producing numerous viable seeds per carpel, while lutea hybrids are much less likely to do so.
Lutea hybrids are not easily crossed with other groups and crosses that involve lutea hybrid x lutea hybrid are often unsuccessful. Soft seed, incomplete seed and poor germination plague the lutea hybrid group and difficulties appear to be connected to their highly complex genetic arrangements. Beginning hybridizers often believe they have produced a great deal of seed from lutea hybrid crosses, only to find out that their seeds do not grow. Recognizing good seed

from this group is difficult and takes much practice. A cross is only successful if it produces seedlings that grow, not simply the production of what appears to be seed.

Seeds should be collected as carpels begin to split in late summer to early fall. The *P. suffruticosa* cultivars will ripen first, followed by the *P. rockii* cultivars and then the lutea hybrids. For best germination results the seed should be planted immediately after harvest.

97. *P. suffruticosa* and *P. rockii* seeds are best planted outdoors immediately after harvest for success. All peony seeds require a warm cycle followed by a cool cycle in order to reduce dormancy factors within the seed. This is easily accomplished by planting them in warm autumn soils, which then cool through fall and winter. During this period many of the seeds will produce their initial root. As soil temperatures warm during the following spring, the tiny plants will produce their first single leaf, a plumule. This leaf will likely be the only one grown during its first year of life. In the following years plants will begin to add more and more leaves and grow stems. After 3 to 7 years plants should produce their first flowers.

Dry seed that is purchased or stored over winter should be planted in June or July in the garden. Dry seed may take an extra year to begin visible growth, thus patience is required. *P. rockii* seed are notorious for slow germination and often require two to three years before they produce their first leaf.

Many hybridizers and gardeners choose to germinate their seeds indoors using artificial media in bags. The same temperature cycles that are experienced in outdoor planting will need to be replicated indoors. After dormancy reduction has been taken care of small rooted seedlings are then transferred into pots. Plants are grown for a period in the pots and then transferred to the garden. While this procedure appears to give the hybridizer/gardener more control and would seemingly increase success, we have found the opposite to be true. The tiny plants are highly prone to damage from handling and are susceptible to fungal diseases which often take their toll. Further problems may arise from excessive water in the media due to grower error. Skill and careful observation is required for indoor germination and results can be disappointing. Use Mother Nature-she does it better.

98. Lutea hybrid seed is the exception to outdoor planting. Lutea hybrid seeds are large, spherical and black in color. Seed is best collected fresh and planted immediately before drying. Lutea hybrid seed must be started indoors in cold climates, as the young seeds do not fare well outside. Due to their large size and late ripening, they often rot before germination is initiated outdoors. We plant ours in wooden boxes filled with sterile soil. Wooden boxes allow water to wick away at an even rate and provides even moisture (which is never wet), something plastic does not do very well. Keep them warm (70 to 80 degrees) for 9 weeks, then keep them cool (35 to 42 degrees) for 9 weeks. After their last cooling period spring will have arrived and the boxes can be warmed by placing them outdoors. Soon the young plants will emerge. The young plants are removed from the boxes immediately and planted in the garden or field. Not all seeds germinate, but don't throw them away. Plant them in pots and set them aside. They will often grow the following season. Lutea hybrids have a complex genetic background that appears to cause wide ranging germination rates, thus expectation for uniform growth is not to be expected.

99. Lutea hybrid seedlings in this image are ready to be planted in the garden. Holding them longer in their wooden flat does little good for the young plants and getting them into a more permanent location will help them long term. They are made to grow out of doors and will reward the grower with an extra set of leaves their first year if well grown. It is recommended that all young seedlings be mulched their first year in the garden so that frost heaving does not force them out of the ground as it thaws (a common problem). Note the first leaves-plumules. The lutea hybrids have unique leaves with many notches and an overall circular plumule.
100. Most woodies will bloom in years 4 to 6 from seed. A few outliers may bloom earlier or later. Flowers produced in their first couple of seasons of bloom may not be indicative of the mature flower form.
101. Woody Peonies, often and incorrectly referred to as tree peonies, are a highly variable group of *Paeonia*. Largely unknown to American gardeners, the group is gaining popularity. Plants have persistent woody stems, which serve as extensions of the crown, more familiarly seen in herbaceous peonies. The flowers have the widest range of color variation and pattern seen in peonies, which are displayed in an array of forms and petal configurations. Flowers may be more than 10 inches in diameter in some cultivars, while some of the diminutive species have flowers no larger than 2 inches. Plant habits and sizes are equally as variable, some attaining 6 or more feet in height and others only reaching a foot or two. Plants may be columnar, spreading, mounded or irregular, allowing for a multitude of landscape uses. Some cultivars grow to only a couple feet in width and others may occupy spaces greater than 10 feet.