A new hybrid of M. grandiflora+ x M. sieboldii^

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Summary: A hybrid of *Magnolia grandiflora* L. 'Little Gem' as female parent by *Magnolia sieboldii* C. Koch 'Genesis' as male parent is described. Characteristics of the hybrid are compared to those of each parent. Especially definitive as evidence of hybridity are patterns of secondary veins. Two plants of the hybrid now growing in the field will be further evaluated. Neither has yet flowered. Photographic evidence is also presented.

Introduction

Hybrids between *Magnolia grandiflora* L. and other species of the genus have been long sought for by magnolia hybridizers. The lack of successful hybrids with *M. grandiflora* is not because so few people have attempted such crosses because innumerable, but to date unsuccessful, attempts have been made. More likely the paucity of successes is largely caused by the isolation of the Theorhodon Section from the other ten Sections of the genus, and the fact the *M. grandiflora* is the only member of that section presently available.

Earlier hybrids with grandiflora

At present the only widely-grown hybrid of *M. grandiflora* is that of *M. virginiana*+ L. x *M. grandiflora*^ made by Oliver Freeman in 1930. The Freeman hybrids have been dealt with in depth by Treseder (1978) and will not be discussed further in this article. Readers are referred to Treseder's detailed description for further reference.

Hybrids between *M. grandiflora*+ and *M. acuminata* var. *subcordata*^ (Spach) Dandy were reported by Santamour (1979). These hybrids were made in 1971. Santamour (1981) also reported hybrids of *M. grandiflora*+ with *M. liliiflora*^ Desrouss. made in 1961. To the knowledge of the authors, Santamour has not published further reports on these hybrids. It is believed by Galyon that both "hybrids" reported by Santamour were thought *M. grandiflora* apomicts instead of being true hybrids.

Dennis Ledvina has reported (personal communication) that he has successfully hybridized *M. acuminata*+ L. with *M. grandiflora*^. These plants have had poor roots

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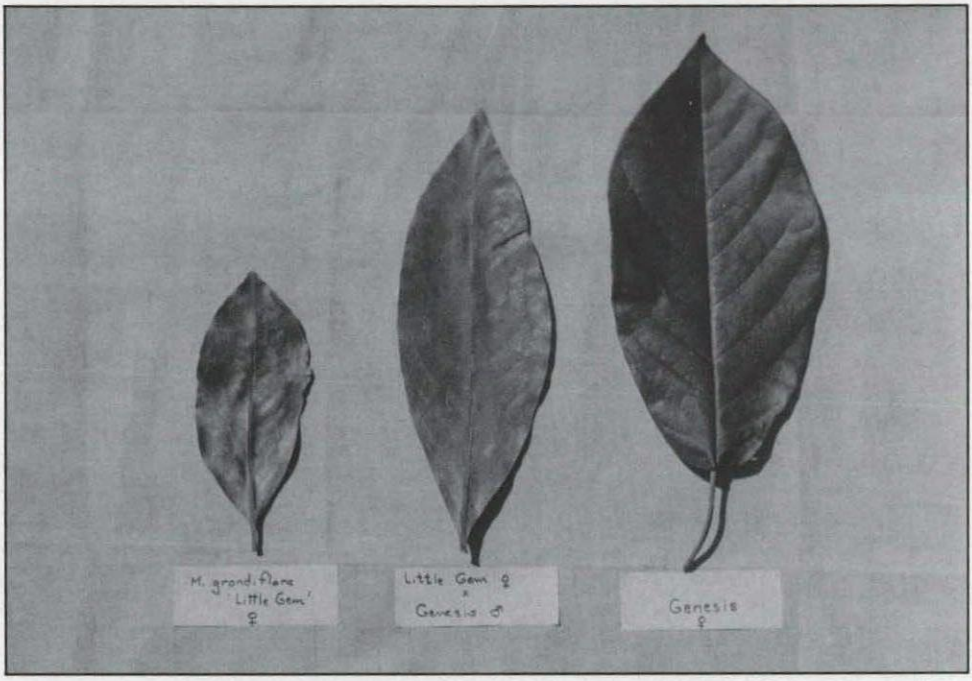


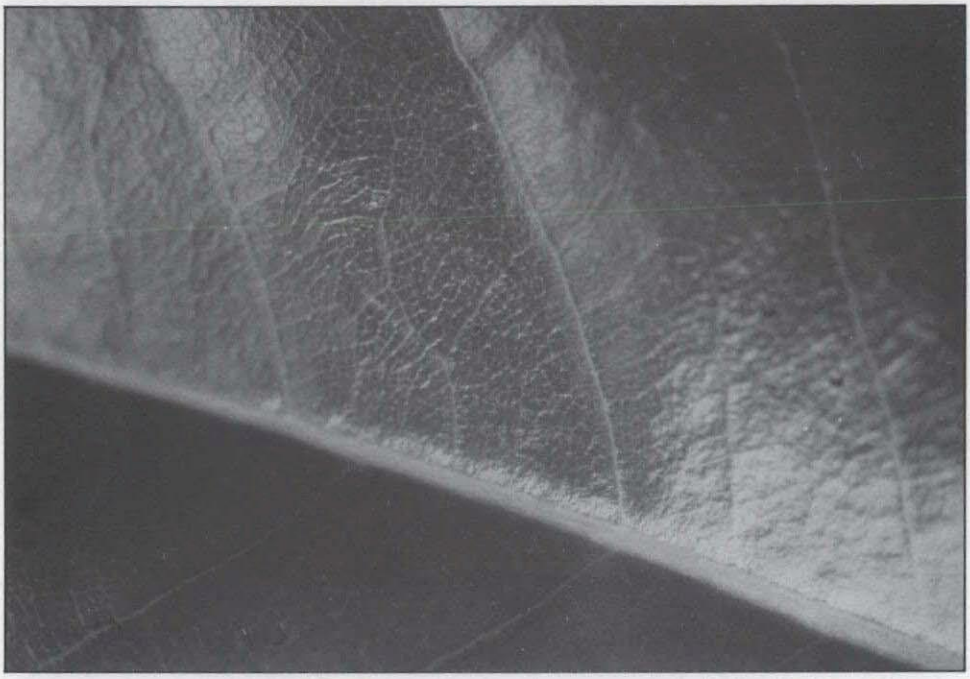
Leaves of parents and leaf of their hybrid. Pictured is a leaf of the Galyon clone ('Millie Galyon')

and therefore are only successfully maintained by grafting on other root stock.

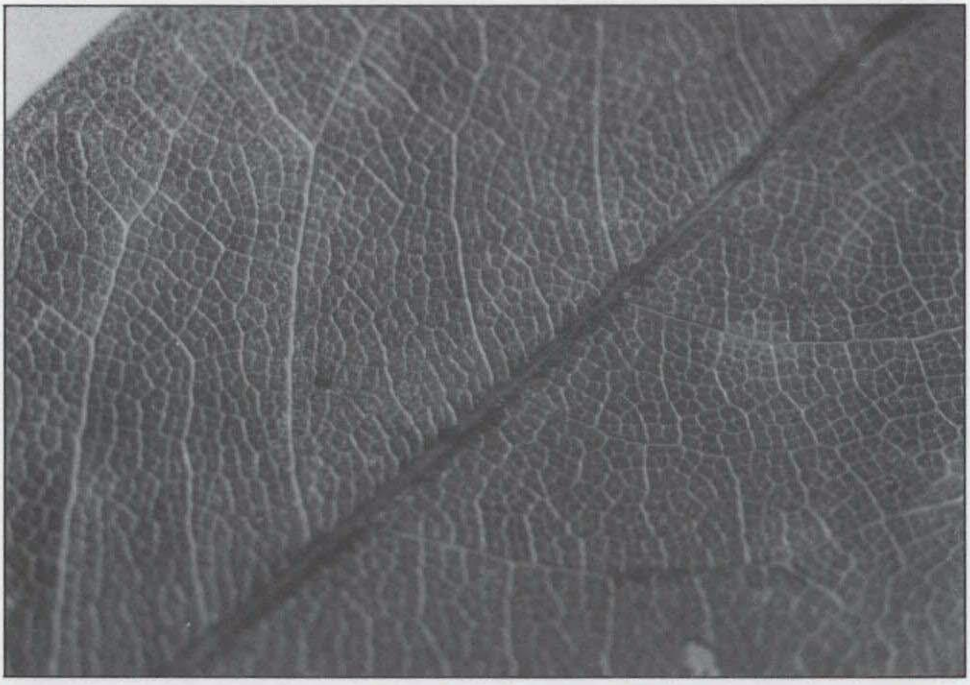
A new hybrid between *M. grandiflora* and *M. sieboldii*

This paper describes a hybrid between *M. grandiflora*+ and a tetraploid form of *M. sieboldii* C. Koch registered by Kehr under the cultivar name of 'Genesis.' This new hybrid has not yet flowered, but is described here because of its high interest to hybridizers and others. Its history is as follows. In June, 1988, Galyon applied pollen of *M. sieboldii* 'Genesis' (received from Kehr) on stigmas of *M. grandiflora* 'Little Gem.' In the fall of 1988, a few seeds were collected. These seeds were placed in water, and 4 seeds sank, which is the common test for viability. Of these four viable seeds at least one was sent to Kehr and the others planted by Galyon in May 1989. From these four seeds, two seedlings were grown in the summer of 1989, one by Galyon and one by Kehr. In late fall of 1989 Galyon gave his seedling, grown in a pot, to Stansberry to nurse along until it was large enough to plant outside. Kehr also protected his seedling over the first winter in a freeze-free house.

None of the authors paid much attention to the two plants during the entire 1990 growing season because they showed no unusual promise and appeared to resemble the *M. grandiflora* parent, in common with so many earlier attempts at similar crosses involving grandiflora. All earlier attempts



Above: *Venation pattern of* Magnolia grandiflora.
Below: Venation pattern of Galyon plant ('Millie Galyon')



Above: Venation pattern of Kehr plant ('Exodus')
Below: Venation pattern of Magnolia sieboldii *'Genesis'*

resulted in nothing more than *M. grandiflora* seedlings, or in other words, apomictic seedlings, not hybrids. In fact Kehr had already labeled his plant as 'Little Gem selfed' and did not note any special evidence of hybridity in his plant.

In the 1991 season Stansberry became excited about the seedling in his planting and called it to the attention of Galyon in October, 1991, because it was so decidedly different from any magnolia he had previously seen. In turn they alerted Kehr to examine his plant. All three of the authors then became convinced that the two plants were true hybrids between *M. grandiflora* 'Little Gem'+ and *M. sieboldii* 'Genesis'^ because of the hybrid characteristics which follow. At this writing (November, 1991), the Galyon plant, now in the Galyon garden, is 15 inches (36 cm) tall and the Kehr plant about 24 inches (62 cm) tall.

Characteristics of the hybrid

The distinct characteristics of the hybrid as compared to each of its parents are as shown in the accompanying chart and in Figure 1.

Of the five characteristics on the chart it is probable that the most definitive are the vein patterns on the upper side of the leaves.

Vein patterns of the upper side of the leaves: When one examines carefully the pattern of the secondary veins on the top side of the leaves, distinctive differences of the hybrid with its two immediate parents are quite apparent. (See Fig. 3-6) The secondary veins of *M. grandiflora* form an extremely fine pattern, while those of *M. sieboldii*, in comparison, are extremely coarse; a very marked difference. On the other hand, the secondary vein patterns of both the Galyon plant and the Kehr plant are intermediate in size, being much smaller than *M. sieboldii* and considerably larger than the *M. grandiflora* parent. This characteristic is uniform in all leaves examined and as can be seen in the photographs is uniformly intermediate. These venation patterns become more distinctly visible in semi-dried leaves as compared to fresh leaves. In fact, it is difficult to see this character in the fresh leaves, especially *M. grandiflora* because of its relatively thick, flesh-like texture.

It is interesting that this same intermediate venation pattern exists in another somewhat related hybrid, that of *M. sieboldii* 'Genesis'+ x *M. virginiana*^. The latter hybrid will be described in a subsequent paper because it is expected to flower in the 1992 season. The unique venation pattern of the latter hybrid was first pointed out to Kehr by Dr. John Giordano when he and Carl Amason visited the Kehr garden in the spring of 1990. Without Giordano first noting this distinctive venation pattern in the above hybrid, it might be that this definitive characteristic would have been overlooked in the grandiflora-sieboldii hybrid being described.

Petiole: The petiole in the Galyon plant is very short to nonexistent. This shortening of the petiole is a very distinctive feature of that plant. However, the Kehr plant has a petiole of about the same length as *M. grandiflora*.

Indumentum: The hybrid has none of the indumentum of the female parent.

A consideration of chromosome numbers

A question arises as to whether the ploidy level of the pollen parent was somehow involved in the success of the unique cross that resulted in the new hybrid. This question may be in part answered by experience in another genus.

In Rhododendrons the cross of the diploid *R. carolinianum* with the tetraploid *R. augustinii* is nearly impossible to make. There is only one instance of a successful cross which resulted in a 100% sterile triploid hybrid both as seed and as a pollen parent. However, when a tetraploid form of *R. carolinianum* named 'Epoch' is used, the cross is easily made and results in a bountiful supply of seed. In addition, the resultant hybrid is fully fertile, both as a seed parent and as a pollen parent. Thus the ploidy of *R. carolinianum* is critical to its functioning in hybridizations with another species.

If one may properly transmute the experience from Rhododendrons to Magnolias, the above experience may explain why the cross was successful using the tetraploid form of *M. sieboldii* whereas the same cross has never been successfully made by the authors using the normal diploid form of *M. sieboldii* despite many attempts to do so. Polyploidy in magnolias could offer significant advancements in hybridizing.

There may be another explanation. The second author has speculated that *M. grandiflora* 'Little Gem' may be a tetraploid. He has researched the origin of 'Little Gem' with Warren Steed who was its developer.

'Little Gem,' according to Steed resulted from locally grown *M. grandiflora* seed. When Galyon asked Steed if it was possible that pollen from *M. virginiana* might have gotten to the grandiflora flower and pollinated it, Steed replied it was possible because there were plants of *M. virginiana* close enough to the grandiflora parent plant for beetles to cross-pollinate the two species. If this supposition is indeed correct, the chromosome number of 'Little Gem' would most likely be at the tetraploid level (i.e. one set of chromosomes from virginiana and three sets of chromosomes from grandiflora). Thus 'Little Gem' would be a hybrid of the reverse parental lineage as the Freeman hybrids, and not truly a cultivar of *M. grandiflora* which it is considered by many persons today. Following this reasoning the parentage of the hybrid being described would be written as (*M. grandiflora* x *M. virginiana*) 'Little Gem'+ crossed with *M. sieboldii* 'Genesis'^. Its chromosome complement (make up) would be either Case A or Case B:

Case A

Parent 1
From *M. grandiflora*
3 sets of chromosomes = 57
From *M. virginiana*
1 set = 19
76 chromosomes, which when reduced by 1/2 at meiosis = 38

Parent 2
From *M. sieboldii* tetraploid
2 sets of chromosomes = 38
Total = 76

On the other hand, if 'Little Gem' is truly a cultivar of *M. grandiflora* and not a Freeman type hybrid, its chromosome constitution would be

Case B

Parent 1
From *M. grandiflora*
3 sets of chromosomes = 57
Parent 2
From *M. sieboldii* tetraploid
2 sets of chromosomes = 38
Total = 95

This discussion merely points up the great need for chromosome counts to be made in magnolias as the only means of clarification of the parental background of many of our present day magnolia cultivars. Without such counts we are forced to these unfortunate conjectures about possible chromosome numbers. An accurate chromosome count would indicate which of the above cases of origins of the present hybrid is most nearly correct.

The two clones

There are apparent differences between the two clones of this hybrid in size, shape, and leaf texture. Such differences may be less of genetic origin than environmental differences between the gardens. For the time being, efforts will be made to keep careful records of each clone and to insure that they will not be mixed. As an aid it is proposed that temporary names be assigned to the two clones, but that these names not be officially registered until more information becomes available. Names assigned temporarily are (1) Galyon clone—'Millie Galyon' and (2) Kehr clone—'Exodus' ("A departure" —in deference to the male parent being named 'Genesis'—"the beginning.") Plans are being made to have each clone placed eventually into tissue culture for rapid propagation. ❧

Literature cited

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