

Attempted Intersubgeneric Hybridization With *Magnolia virginiana*: An Exercise in Failure

by Frank S. Santamour, Jr.

Spongberg (1976) did not consider the differences between the more southern and more northern ecotypes of *Magnolia virginiana* L. sufficient to warrant their characterization as true botanical varieties. There are, however, very good horticultural, cultural, and possibly genetic reasons for distinguishing between var. *australis* Sargent and var. *virginiana* L.

At the U.S. National Arboretum, specimens of var. *australis* retain most of their leaves through the winter, grow as single-stemmed erect trees, and are highly self-incompatible. Plants of var. *virginiana* are typically multiple-trunked, deciduous, and self-compatible (or, at least, produce viable seed to self-pollination).

At any rate *M. virginiana* has a considerable number of horticultural attributes to interest the plant breeder. Interspecific hybrids have been obtained with *M. grandiflora* L. (Freeman 1937), *M. tripetala* L. (McDaniel 1966), and by William F. Kosar with *M. hypoleuca* Siebold & Zuccarini (Santamour, 1969). Putative hybrids between *M. virginiana* and *M. macrophylla* Michaux. also exist. All of the above hybrids were made with var. *virginiana*.

These hybrid combinations involved only species of the subgenus *Magnolia*. The parent species produce only white tepals and they flower at about the same time (May-June in Washington). What were the possibilities of crossing *M. virginiana* with species of the other subgenus, *Yulania*? The potential variations and combinations of colored tepals, floral scent, and plant form were exciting to contemplate.

In view of our recent successful intersubgeneric crosses with *M. grandiflora* (unpublished as yet), we decided that a similar effort should be expended on *M. virginiana*. If such crosses could be achieved, it was likely, because *M. virginiana* was only a diploid, that the polyploid, colored-tepal species of subgenus *Yulania* would be at least partially dominant.

Past Work

Since 1967, we have used *M. virginiana* seldom in our program of interspecific hybridization. In 1969, the same year that the first intersubgeneric *M. grandiflora* hybrids were produced, we also tried a couple of crosses on *M. virginiana* var. *virginiana*. Four flowers pollinated with *M.*

quinquepeta Buc'hoz 'Darkest Purple' failed to mature fruit. On the other hand, four fruit matured from the same number of pollinations with *M. × soulangiana* Paris Linn. ex Soulange Bodin 'Lennei' (See Dudley and Dudley 1978 for authority). This cultivar is a septaploid with $2n=133$ chromosomes (Santamour 1970). Seventy-eight seedlings germinated from the 94 seed sown, but all appeared to be apomictic—that is, the result of asexual seed development. Subsequent cytological studies showed that the seedlings were, indeed, diploid non-hybrids and they were (perhaps mistakenly) discarded. It might have been interesting to follow the development of these potential apomicts, but space and time dictated otherwise.

1976-77 Crosses

Because of the late-season flowering of *M. virginiana*, this species was used only as the female parent in our attempted intersubgeneric hybridizations. The two trees of var. *australis* were young specimens (NA 31021) grown from seed collected in Tennessee by J.C. McDaniel in 1967. The two trees of var. *virginiana* were older specimens (NA 1418-A, 1418-B) of uncertain origin.

The species and cultivars used as male parents are listed in Table I. Where only a species name or hybrid formula is listed, at least two cultivars or individuals were utilized as pollen sources.

Pollinations were made at various stages of flower bud development—but before the flower opened naturally. The stage of development did not influence the results.

Results and Discussion

Intraspecific Crosses. A number of "control" crosses were made at the same time as the intersubgeneric attempts. The results of these pollinations served to substantiate previous findings. No fruit matured to self-pollination of the var. *australis* parents, nor did any of the attempts to cross *australis* siblings (progeny of the same mother tree) succeed. Both self-pollination and intravarietal crosses were successful on var. *virginiana*. Crosses between the varieties were more successful when var. *virginiana* was used as the female parent.

Intersubgeneric Crosses. The numbers of flowers pollinated, on each variety of *M.*

Table 1

Numbers of flowers pollinated in attempted intersubgeneric crosses on *Magnolia virginiana*, 1976-77.

Male Parents	Female Parent <i>virginiana</i> vars.	
	<i>australis</i>	<i>virginiana</i>
DIPLOIDS		
'Merrill'	—	7
TETRAPLOIDS		
<i>quinquepeta</i> (2)	30	7
<i>acuminata</i> (2)	10	9
PENTAPLOIDS		
<i>quinquepeta</i>		
× 'Diva'	8	11
'Verbanica'	—	7
HEXAPLOIDS		
'Diva'	31	11
<i>heptapeta</i>	—	7
'Diva'		
× <i>heptapeta</i>	10	10
'Peter Veitch'		
× <i>heptapeta</i>	—	6
SEPTAPLOIDS		
'Lennei'	3	6
OCTOPLLOIDS		
'Rustica Rubra'	—	6

virginiana, are given in Table 1. The male parents comprised a wide range of species and hybrid germplasm, with chromosome numbers from $2n=38$ (diploid) to $2n=152$ (octoploid). No fruit were produced from these 179 crosses.

The reader may question why such lack of success should be publicized or why the data should be presented in tabular form. The reason for the Table was that I could not think of a simpler, textual method of providing the information. The reason for publication is that I believe it is important to document failures as well as successes if we

M. 'Forrest's Pink'

This magnolia was reported by Sir Peter Smithers, CH-6911 Vico Morcote, Switzerland, who received it under that name in spring of 1976 from Treseders Nurseries, Truro, Cornwall, England. It flowered at the same time as the *M. × soulangiana* cvs. 'Sundew,' 'Burgundy,' 'Grace McDade,' 'Picture,' and 'Verbanica,' overlapping with the late blooms of the two last. The flower is a far clearer, purer pink than any of them (see Vol. XIV, No. 2, p. 10) and is in fact a striking contrast, he reports. Treseders, he said, reported that the original plant was at Caerhays Castle, Cornwall, England, and was believed to have been sent there by the noted early 20th century plant explorer George Forrest.

are committed to a better understanding of the species relationships in any horticultural plant group.

All too frequently a plant breeder may name a hybrid cultivar or report a successful cross without presenting data to show how "easy" or "difficult" the cross may be. Did 72 seed develop from a single pollination or was only one seed produced from 1000 pollinations? Your fellow plant breeders, and allied scientists, would like to know.

Intersubgeneric crosses with *M. virginiana* may be possible. Our data suggest that such crosses will be difficult to obtain. My best wishes to you in your attempts. And when and if success comes, please let us know the price of that success.

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St. Louis Woman

Speaking of St. Louis, where we'll meet in April, I was there several years ago during all the early publicity about women's lib, when the newspapers were running photographs of women holding their bras aloft to signify that they had freed themselves from soem of the conventions imposed by society. On my way to lunch I passed a granite statue in front of the Federal court building that so surprised me I went back for a second look. It was the Goddess of Justice holding aloft a pair of scales, presumably weighing justice against injustice. But the pair of scales looked so much like a pair of C cups that for an instant I thought the good gray goddess might appropriately have been the first women's libber. —Editor.