

Variations in Sweet Bay Magnolias

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As a horticulturist who since 1961 has been following Oliver Freeman (1937) and others in hybridizing *Magnolia virginiana* L. with several other American species, I have observed major and minor variations among both wild and cultivated plants commonly referred to this species. My conclusion is that none of horticultural or botanical articles I have read, not even the generally good recent treatment by Mr. J.E. Dandy (1964), gives quite the complete situation seen in these Magnolias. A probable separation into three varieties (or possibly even into two species) of the American sweet bay *Magnolia* trees seems the most reasonable disposition after studies with flowering trees of them from different sources, wild and cultivated. Some characters, overlooked by Sargent and others who have studied primarily herbarium materials, need inclusion in the description of var. *australis*, which then is seen to be well separated from other taxa.

Sargent (1919) published *M. virginiana* var. *australis*, which Ashe (1931) later raised to specific rank, for the more pubescent, more persistent-leaved, generally larger-growing tree occurring from the vicinity of Wilmington, N.C. to southern Florida and near the coast at least to Hardin County, Texas (Lowrey, 1965.) Its known range was extended inland by

Sargent (1922) to Hot Spring County, Arkansas, and I have further identified the trees of outposts in both eastern and western Tennessee (Polk and McNairy Counties) as belonging to this taxon, which evidently ranges farther inland than Sargent had originally supposed. Fernald (1950) had included Tennessee in the range of typical *M. virginiana*, but it does not seem to grow wild there.

The Polk County, Tennessee, outpost, at 1600 feet, may be the highest altitude at which *Australis* or any native sweet bay occurs. Its southern limits are in dispute. For its Texas limit of distribution, Sargent (1919, 1922) probably meant Valley of the lower Neches River, where it is still found, but he wrote "Nueces." It occurs along creeks of the San Jacinto drainage, as far west as Montgomery County. In Florida, it occurs in most counties, including the Everglades southwest of Miami, but John Popenoe (1965) can find no evidence of it on the Florida Keys, where Dandy and previous authors place *M. virginiana* or a variety. Both varieties (following Sargent) overlap to some extent in range in eastern Georgia and the Carolinas. Whether var. *virginiana* gets as far south as Florida (various authors) and whether var. *australis* as I redefine it may be found wild sparingly in southeastern Virginia (Fernald, 1950), are details that need further study. (In a cursory survey in 1965, I found only var. *virginiana* in Virginia and south near the coast to Dare County, N.C.) There is general agreement among those who recognize var. *australis* that the typical glabrous and deciduous var. *virginiana* does not occur naturally in the states west of Georgia, and it seems rare even there.

Its total native population (in Massachusetts and New York to Georgia) is probably much less than that of var. *australis* in the southern U.S., through var. *virginiana* seems the more common variety in cultivation.

Though Ashe reported seeing no intergrading forms in the coincident range of the typical "Northern" *M. virginiana* and his *M. australis*, there are in cultivation in Britain (Dandy, 1964) and in America many somewhat ambiguous specimens. These, as I have seen them, agree with or approach var. *australis* principally in their persistence of pubescence (on shoots, pedicels and leaf parts) and in tending to open their flower buds rather late in the afternoon, but are uniformly much more like the typical *M. virginiana* in some of the characteristics (autumn-deciduous leaves, shrub or small tree stature, and the usual leaf shapes) mentioned by Sargent and Ashe, and in several other characteristics, not previously mentioned in the literature, in which I have observed consistent differences between the northern and southern sweet bay Magnolias. Expand Sargent's too-brief description of var. *australis* to include these other rather fundamental differences I have observed where it is cultivated in the same locality with typical *M. virginiana* (particularly items 1-4 below), and it should, I believe, be recognized at least as a separate variety, if not a species. I consider the "intermediate" uniform enough to be worthy of variety status under *M. virginiana*.

Here are some of the key points of separation:

(1) Var. *australis* has much paler colored pollen than var. *virginiana*. (The "intermediate" plants have pollen like the typical variety.)

(2) Flower odor consistently differs, being more lemon-like in var. *australis*.

(3) Flowering, and apparently vegetative growth, starts three or more

weeks later in the spring with var. *australis*.

(4) Var. *australis* flower buds in June open near sundown, about two to five hours later than buds on var. *virginiana*, and close the same evening an hour or two later than those of var. *virginiana*. (Some, at least, of the "intermediate" plants also have bud-opening near sunset.) All day-old flowers re-open and shed pollen the following afternoon, but with a similar time difference between the taxa. In *australis*, at least, flowers can re-close again, before re-opening permanently on the third afternoon.

(5) Fruits of var. *australis* are slower to mature than those of var. *virginiana* and the "intermediates," taking about 90 days from flowering time, compared to 70 days for the others.

(6) Var. *australis* usually has one or a few trunks dominant and rather erect, with a crown spread, even when open-grown, usually less than half the tree height. Var. *virginiana* and the intermediates have more tendency toward a multi-stemmed condition, with diverging trunks and a total crown spread often greater than half their height.

"Evergreen" leaves probably will not always separate the taxa. Though flowering-age var. *australis* specimens, at such locations as Swarthmore and Brookville, Pennsylvania, and in central Illinois, all well north of their natural range, have been more evergreen than exposed plants of *Pyracantha coccinea* or most plants of *Mahonia Aquifolium*, and though other comparable age *M. virginiana* taxa were more deciduous, leaf retention seems to vary with the site, with the age of plant and apparently to a considerable degree among individual clones within each taxon. In Texas and western Louisiana, most var. *australis* plants were partly deciduous by the end of December, 1965, but an

occasional tree retained nearly all its 1965 foliage green.

Small plants, and young basal suckers of var. *virginiana* and the "intermediate," also tend frequently to hold some leaves green until March or April, particularly southward, so it is not enough to see retention of one or a few green leaves and conclude, "This is *australis*." The fresh flowers are a much more certain key. But if the plant is of flowering age, shows dense pubescence on last year's shoots and retains many green leaves on upper branches in March, it probably is *australis*, even if far short of fifty feet tall. A tree that tall or taller almost certainly will be *australis*.

No nursery that I know of in America has heretofore offered clonal cultivars of any variety of sweet bay. We need selection of cultivars for different situations. Though *M. virginiana* can be grown from cuttings or layers (and Sargent suggested grafts on the very dissimilar *M. acuminata* for taller and faster growth), most material offered by nurserymen now seems to be miscellaneous seedlings. A few nurseries have propagated seedlings from lines that tended to have a better than average growth habit, or larger flowers, or (with *australis* in Tennessee) more strongly persistent foliage. Some registered cultivars, however, are in prospect for the near future, including probably selections from all three taxa, and perhaps even shrubby ones from var. *australis*. John Popenoe tells me that the shrubs of it reported from south Florida (var. *parva* Ashe) are probably shrubby because of unfavorable sites. I should make the same guess for some plants seen recently northeast of Buna, Texas. There are some clones under trial here and elsewhere that may remain shrubby even in fertile soils. I have one clone tracing to a nursery source near Lafayette, Louisiana, with very compact growth and small, narrow

leaves, but it has not yet been exposed to Illinois winters.

Some clones, at least, of var. *australis* are hardier than Sargent and Rehder (1927) thought, succeeding to the northern border of the U.S.D.A. (1960) Zone 6a (average winter minimum temperature -10° to 0° F.) in central Illinois, and one is doing well with David G. Leach at Brookville, Pennsylvania (Zone 5a). This variety, at least in that clone or in another collected from its most northern upland source in Tennessee (Zone 7a), should be more hardy than most forms of *M. grandiflora*, which U.S.D.A. (1960) considers doubtful in Zone 7a. The "intermediate" variety, which one or more nursery sources have distributed widely, though I don't know from what original point, has been observed in floriferous growth at such Zone 5 locations as Lisle, Illinois (Morton Arboretum) and Shenandoah,

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Iowa, and in Zone 6b to 7a (The Arnold Arboretum and Cairo, Illinois.) From appearances, it should be as hardy as typical *M. virginiana*, which grows well in southern Michigan and at Durham, New Hampshire (Zone 5a). Farther south, say in much of Zones 6 through 8 of U.S.D.A., select clones of all three taxa might be considered for ornamental plantings. Var. *australis* probably excels in far-southern adaptation. It tends to have more evergreen foliage and has (to my nose, at least) somewhat more interesting flower odor, but generally makes a taller tree. The other two offer more picturesque silhouettes and generally better plant size for growing in home landscapes, displaying their flowers and fruits nearer to eye-level. Var. *virginiana* has the most extreme variations I have seen, in flowers, fruits and leaves, among the sweet bays.

One of the prospective cultivar sources in var. *virginiana* with many flowers is in Mt. Pulaski, Illinois. It is the largest-flowered one of a number of survivors among sweet bays distributed there around seventy-five years ago by the Capps Nursery, now out of business. One of his descendants told me that Mr. Capps got his original seeds from trees at the Missouri Botanical Garden, where a somewhat similar, but not quite so multi-petaled old specimen of *M. virginiana* still graces the garden east of the Linnean House. Dr. Edgar Anderson suggests that Henry Shaw would most probably have sent to his native England for sweet bays, which have been cultivated there since 1688, longer than any other *Magnolia*. The Mt. Pulaski trees thus may represent several generations of seed selection.

Clonal propagation has just been started from another *M. virginiana* planted on the Vilas V. Hensel farm near Princeton, Illinois in 1912. It has large flowers for the species, and the most extremely fertile fruits that I have seen in the whole genus. These

frequently have three seeds per carpel, and sometimes as many as five.

Good sources for shrubby forms of *M. virginiana* include a narrow-leaved plant in Champaign, Illinois whose seedlings, under test as far south as Mobile County, Alabama (Zone 9a), have reproduced its dwarf habit. Several began flowering when just over two years old. At the Holden Arboretum *M. virginiana* is represented by a shrubby multi-stemmed plant with broader petals and leaves, which I join several other *Magnolia* enthusiasts in nominating for cultivar status.

A deciduous *M. virginiana* clone with generally retuse leaves is at Winchester, Tennessee, where several similar plants appeared among nursery seedlings obtained originally from New Jersey. This is a compact growing clone, also scheduled for commercial increase and introduction.

Plants of var. *australis* from its two Tennessee outposts and other sources are being evaluated now at Urbana, where it has been used for intra-varietal, intervarietal and interspecific crosses. The *australis* clone that has



The photo of a *Magnolia*-like fruit, collected by Frank D. Mossman on a tour of northern Borneo and described to readers in his article, *Magnoliaceae on Mt. Kinabalu*, in the Spring-Summer 1982 issue, was omitted from the article because the editor mislaid it. Guess what? The editor found it, and we print it as we promised.

probably been best tested for leaf persistence and good performance under northern conditions, however, stems from a tree that the late Henry Hicks, Long Island nurseryman, gave to the Arthur H. Scott Horticultural Foundation at Swarthmore College. We do not know his original source, but grafts of this clone show typical *australis* characteristics at Urbana. It has remained evergreen even with Mr. Leach at Brookville, Pennsylvania, in winters with -17° F. temperatures, so apparently it should become a widely-adapted evergreen cultivar. It apparently is slower growing than many *australis* seedlings.

Most of the "intermediate" clones I have examined show a habit generally similar to typical *M. virginiana*, without such wide variations in flowers, foliage and fruits as noted above for some clones. One "intermediate" tree in Springfield, Illinois, bears seeds with the palest colored coat I have seen in the species.

A more detailed taxonomic paper on varieties in *Magnolia virginiana* awaits further studies of living and herbarium material. Meanwhile, I should be glad to hear from anyone who has found an "intermediate" tree of it in the wild, or who has observed any other variant form of horticultural interest.

Several young seedlings I have grown from seeds of two Illinois-planted var. *australis* trees need further observation as they develop. From open-pollinated seed (possibly pollinated by typical var. *virginiana*, or else from selfing within the clone) some so far anomalous-appearing seedlings do not fit into either typical *virginiana*, *australis* or the "intermediate" as discussed above. One, though holding most of its leaves green until their second autumn in a house-shaded site at Urbana, has as little pubescence as typical *virginiana*. From pollination of *australis* with pollen of *M. grandiflora* 'Samuel Sommer', I obtained two true hybrids and some apparent apomicts,

(common in several *M. virginiana* progenies), plus a seedling generally resembling *australis*, except that its leaves are not really glaucous. It is densely pubescent on leaf undersides and first-year stems. Perhaps it is a mutant.

Hybrids of sweet bay are worthy of another article. Known primary hybrids between one or more *M. virginiana* variety and other American or Asian species of the subgenus *Magnolia* include the following:

M. virginiana × *M. tripetala* (= *M.* × *Thompsoniana*)

M. virginiana (including var. *australis*) × *grandiflora*

M. virginiana × *M. macrophylla*

M. virginiana × *M. obovata*

Back-crosses to both parents have been made with pollen of the 'Freeman' hybrid (*M. virginiana* × *M. grandiflora*) and one semi-evergreen clone was produced by William F. Kosar at the U.S. National Arboretum, from 'Freeman' × *M. Fraseri*. The other two diploid North American *Magnolias* not included in the crosses just listed, *M. pyramidata* and *M. ashei*, have ranges on the Gulf Coastal Plain where *M. virginiana* var. *australis* is abundant. There flowering seasons begin earlier, but may occasionally overlap with that of the southern sweet bay, so that crossing with them could occur. I have seen one sterile specimen collected by Tom Dodd, Jr., near De Funiak Springs, Florida (October, 1965) which I think combines *australis* and *pyramidata*.

Crossing between the diploid *M. virginiana* and the hexaploid *M. grandiflora* in their large coincident range may have been rather frequent. The not entirely sterile behavior of the 'Freeman' and similar hybrids indicates that *virginiana* var. *australis* × *grandiflora* crosses of natural occurrence may well have introduced some of the extreme variability we now see in *M. grandiflora*. While *M. grandiflora* will contribute a

preponderance of chromosomes, and tend therefore to be highly dominant in the F_1 of any cross with a diploid, and in later segregating generations, introgressions could occur from backcrosses to either parent species. The indications are that a number of the more extreme forms in *M. grandiflora*, including perhaps several of those introduced as cultivars over the past 150 years, are derived from at least remote hybridization with one or another of the sweet bays. Similarly, forms of *M. virginiana* var. *australis* with longer than average leaf-retention may owe this character to introgression by *M. grandiflora*. Studies with my developing back-cross seedlings of *M. virginiana* × 'Freeman' (and similar-appearing seedlings of *virginiana* × 'Charles Dickens') should give more information on this possibility.

References.

- Ashe, W.W. 1931. *Torreya* XXXI: 39.
 Dandy, J.E. 1964. *Magnolia virginiana*.
 Curt. Bot. Mag. CLXXV: sub. t. 457.
 Fernald, M.L. 1950. *Gray's Manual of Botany* (8th ed.).
 Freeman, Oliver M. 1937. A New Hybrid *Magnolia*. *Nat. Hort. Mag.* 16: 161-162.
 Lowrey, Lynn (Houston, Texas), 1965. Personal communication.
 Popenoe, John (Miami, Florida). 1965. Personal communication.
 Rehder, Alfred. 1927 (2nd ed. 1940). *Manual of Cultivated Trees and Shrubs*.
 Santamour, Frank S., Jr. 1965. Biochemical Studies in *Magnolia* I. Floral Anthocyanins. *Morris Arb. Bull.* 16: 43-48.
 Sargent, C.S. 1919. *Bot. Gaz.* LXVII: 231-232.
 Sargent, C.S. 1922. *Manual of the Trees of North America* (2nd ed.)
 U.S. Department of Agriculture. 1960. *Plant Hardiness Zones*.

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