

Magnolia salicifolia An Arboretum Introduction

by STEPHEN A. SPONGBERG

Through the years, the Arnold Arboretum has introduced several species of *Magnolia* into western gardens from eastern Asia, the region in which the genus attains its greatest diversity. The majority of these introductions, however, has not proved hardy in the Boston area, and relatively few Asiatic species of *Magnolia* are included in the arboretum's living collections. We are particularly unfortunate that the several spectacularly ornamental species of section *Yulania* (including *M. dawsoniana* Rehder & Wilson, *M. sargentiana* Rehder & Wilson, and *M. sprengeri* Pampanini) have not withstood the New England climate. The likelihood that these and several other Asiatic species collected by E. H. Wilson would probably not prove hardy in Boston prompted C. S. Sargent, the arboretum's first director, to ship Wilson's collection of magnolias obtained in China to Leon Chenault in Orleans in the south of France with the request that they be propagated and distributed as widely as possible. Sargent's correspondence with Chenault (Sargent, 1913) states that of Wilson's Chinese magnolia collections at the arboretum, only one or two individuals of each remained, and that these involved too much labor since they were in pots that had to be placed in a pit for protection each winter.

Far greater success, however, has been achieved in the culture of



Illustration of Magnolia salicifolia from Curtis' Botanical Magazine (139 (1913) t 8483).

Asiatic species of section *Buergeria* at the Arnold Arboretum, and all of the species thus far tested have proved hardy in the Boston climate. The first plants of this Asiatic group to be received at the arboretum directly from Asia were raised from seed collected on the northern Japanese island of Hokkaido. These seeds were sent to Sargent in 1876 (four years after the establishment of the arboretum) by Professor William Smith Clark, a New Englander from the University of Massachusetts who was in Japan helping to establish the Hokkaido Agricultural College in Sapporo. Plants from Clark's seed were subsequently designated as *Magnolia kobus* Maxim. var. *borealis* (now included within var. *kobus*), which Sargent distinguished from typical *M. kobus* due to its northern origin and supposed more treelike habit. The original plant raised from Clark's seed was planted at Sargent's estate, Holm Lea, in Brookline, and plants for the arboretum were subsequently obtained from that tree.

The first magnolia to be introduced directly by the Arnold Arboretum was collected by Sargent himself during his first trip to Japan in 1892. Together with his nephew, Philip Codman, and James Herbert Veitch, who Sargent and Codman had met on Hokkaido, Sargent made an ascent of Mt. Hakkoda on northern Honshu (the main Japanese Island) in early October of that year. While the trek to the summit of the mountain was specifically to see and collect seed of the then little known fir, *Abies mariesii* Mast., the dominant forest tree at the summit, Sargent and Veitch returned with seed collections of *Magnolia salicifolia* (Sieb. & Zucc.) Maxim. collected on the lower slopes of the mountain.

Both Sargent and Veitch published accounts of their travels, and Veitch included in *A Traveler's Notes* a brief account of their ascent of Mt. Hakkoda. He wrote that "Within a few hundred feet of the top of the mountain we came to a collection of low straw huts in which we passed two nights. They were too low to stand in, and as they were without window or chimney, we were only glad to remain at full length to avoid the fumes of the smoke of the large fire rendered necessary by the intense cold. Immediately above these huts lies the forest of *Abies Mariesu*, a most handsome and striking fir. . . ." (Veitch, 1896, p. 130).

Veitch failed to mention *Magnolia salicifolia*, probably because he was too impressed with the Japanese white bark magnolia, *M. hypoleuca* Sieb. & Zucc., which the climbers encountered as a large forest tree on the lower slopes of Mt. Hakkoda. Sargent (1894), by contrast, gave no personal recollections of the climb in his *Forest Flora of Japan* but limited his observations to the plants seen and collected on his Japanese trip. He also included an illustration [Plate 4] of a branchlet of *M. salicifolia* with a mature fruit aggregate that was drawn from the dried specimens he had collected on Mt. Hakkoda. He wrote (Sargent, 1894, pp. 10, 11) that "On Mount Hakkoda *Magnolia salicifolia* is a common plant between 2,000 and 3,000 feet above sea-level. As it appears there it is a slender tree fifteen or twenty



Illustration of Magnolia salicifolia (pl 4) from Charles Sprague Sargent's Forest Flora of Japan published by Houghton Mifflin and Co , Boston, in 1894

feet high . . . *Magnolia salicifolia* is new to cultivation, and we were fortunate in obtaining a good supply of seeds, by means of which it is to be hoped, this interesting tree will soon appear in gardens."

Veitch's share of the seeds of *Magnolia salicifolia*, which were handled by the Veitch family's famous Royal Exotic Nursery in Chelsea, England, failed to grow, but those brought back to the Arnold Arboretum by Sargent and Codman were successfully germinated. Sargent and Codman returned not only with the Mt. Hakkoda seed but also with seed from an isolated plant of *M. salicifolia* that was located a month later when they were collecting 200 miles further south in the hills below Mt. Ontake. The species is now known to have a wide distribution in Japan (Kurata, 1971, distribution map, p. 175), occurring on Honshu, Shikoku, and Kyushu, where it grows at moderate elevations in beech and oak forests primarily in the Sea of Japan drainage.

It appears that germination must have been sufficient for Sargent

to share either seedlings or young plants with the Veitch firm, since the species was listed in their 1902 catalogue (Bean, 1973, p. 125). Treseder (1978, p. 125), however, states that *Magnolia salicifolia* was probably not introduced into European gardens until 1906 when a plant was sent to the Royal Botanic Gardens, Kew, by the Yokohama Nursery Company of Japan. Moreover, it is not evident from the arboretum's records if plants were grown at the Arnold Arboretum from both the Hakkoda and Ontake collections or only from the former. It is also not known if Sargent distributed his seedlings widely in North America; unfortunately, none of the plants of *M. salicifolia* growing in our living collections today can be traced back directly to Sargent's introduction.

When Sargent introduced *Magnolia salicifolia* into cultivation, its flowers were apparently unknown to botanists. The species had been described as early as 1846 by Siebold and Zuccarini, who placed it in the genus *Buergeria*, but in 1872 it was transferred to *Magnolia* by the Russian botanist, Maximowicz. Considering the fact that each spring the plants are covered with a profusion of flowers that almost obscure the slender, twiggy branches, it is difficult to think that the flowers of such a profusely floriferous species were unknown until after its introduction into cultivation.

Like other species of sect. *Buergeria*, the flowers of *Magnolia salicifolia* appear before the plants have come into leaf, and the plants are usually covered by the white flowers (even at an early age) that emerge from the silvery- or yellowish-hairy terminal buds. These buds differ from the smaller, yellowish or blackish vegetative buds that are finely silky hairy or occasionally glabrous, and flowering occurs during the first warm days of spring, usually toward the end of April at the Arnold Arboretum.

The flowers are often faintly fragrant, are held more-or-less horizontally at the ends of the branchlets on glabrous or slightly hairy flower stalks, and are often subtended by a small, expanding leaf. The petal-like structures that give the flowers their beauty are botanically termed tepals and consist of two types. There is an outer whorl of three (rarely more) very small tepals (up to 3.5 cm. long by 1 cm. wide), and by comparison to the inner tepals, each looks like a small sepal. The two (rarely three) inner whorls consist of six (rarely to twelve) petal-like tepals that usually measure between 5 and 12 cm. in length and 2 and 4 cm. in width. Each of these petaloid tepals is broadly spatulate or straplike in outline and is snowy white except for the lower portion on the outer surface, which is sometimes greenish or flushed pink. The size (and probably the weight) of the individual tepals often cause them to droop, and the flowers to appear rather floppy and shapeless. If the center of the flower is examined numerous yellowish or whitish, often pinkish-tinged stamens will be seen immediately below the small, greenish, protruding gynoecium or female reproductive portion of the flower. As the flowers age, or if a late spring frost damages them, the tepals turn brownish and fall to the ground. If pollination

has been affected, the gynoeceium, a spindle-like structure that consists of an aggregation of small carpels, remains on the brachlets and will gradually develop into a mature fruit aggregate as the growing season progresses. By late summer and fall it will have achieved a cylindrical shape and attain a length of up to 7.5 cm. Occasionally these aggregates of mature carpels, termed follicles, will be symmetrical, but usually (due to the unequal development of seeds in the individual follicles and the complete abortion of others) the aggregates become twisted or curved. Initially green, the aggregates become a dull pink or reddish as the individual follicles split open and the red seeds are exposed and pushed out and hang suspended from the follicle walls on thin threads.

Long before the fruit aggregates mature but shortly after the flowers have browned and as the tepals drop to the ground, the leaves from the terminal and lateral vegetative buds begin to expand and the plants come into leaf. The leaves of *Magnolia salicifolia* are generally needed for the correct identification of the species since the flowers are very difficult to distinguish from those of *Magnolia kobus*, another Japanese species of section *Buergeria*. Each leaf is borne on a yellowish leaf stalk 12–20 mm. long, and the blades are usually lanceolate or oblong-lanceolate in outline, widest at or below the middle, and with acute to almost rounded apices, irregularly wavy margins, and tapering to almost rounded bases. In general appearance the leaves are suggestive of those several species of willow, and this similarity has given rise to the use of the common name, willow-leaf magnolia. When the leaves are crushed, or if the branchlets are snapped or bruised, they emit a pleasing lemony or anise-like odor that has given rise to another common name, anise magnolia.

While the upper surfaces of the leaves are dull green and usually without any hairs, the pale green lower leaf surfaces are sometimes covered with a whitish bloom and are always very finely and inconspicuously hairy over the entire surface or at least adjacent to the yellowish-green midveins. A hand lens is often needed to detect these hairs. The combination of leaf shape and lower leaf surface pubescence is diagnostic for the species and allows for correct identification (Spongberg, 1976a, Christensen, 1980).

Plants of *Magnolia salicifolia* are quite variable in habit, and they appear to be very tolerant of a wide range of soils and exposures. Sargent (1894, p. 10) noted that on Mt. Hakkoda this magnolia "is a slender tree fifteen or twenty feet high, with stems three or four inches thick, covered with pale smooth bark, and sometimes solitary, or more commonly in clusters of three or four." Richard E. Weaver and I were fortunate to collect seeds of *Magnolia salicifolia* during our arboretum-sponsored collecting trip to Japan in 1977, and our seeds were collected from small multi-stemmed shrubs that grew to about eight feet in height in the densely shaded understory of the deciduous forest on the slopes of Mt. Kashi near Nikko. These plants were growing on relatively steep slopes and on the shoulder of the trail, and it is



The buds and flowers of Magnolia salicifolia Photographs from the Arnold Arboretum archives

probable that the plants were in well drained soils. Sargent observed that on Mt. Hakkoda the plants grow "in low wet situations, generally near streams," and he surmised that it is a moisture-loving plant. Kurata (1971, p. 18) writes that "This magnolia is not uncommon in the cool-temperate forests in Japan, especially on the Japan Sea side in Honshu, favoring rather dry sites along mountain-ridges." At the Arnold Arboretum we have been equally successful in growing *Magnolia salicifolia* on the margin of the Leitneria Swamp along Meadow Road, as well as in the better drained soils of the gentle slope below the Arborway wall. In both of these locations our plants have formed rather slender, pyramidal, somewhat fastigate single-trunked trees with dull silvery or brownish-gray bark, although other plants known in cultivation are large, multi-stemmed shrubs or rounded-crowned trees.

The variability in plant habit as well as in the size, shape, and degree of glaucousness of the under surfaces of the leaves have been the basis on which several botanists and horticulturists have described variants of *Magnolia salicifolia* (see Millais, 1927; Johnstone, 1955; and Treseder, 1978). And, it is my opinion (Spongberg, 1976a) that this variability, coupled with variation in the number and size of the inner, petaloid-like tepals of the flowers (cf. Kurata, 1971, *pl.* 9), led to the mistaken recognition of seedlings of *M. salicifolia* that arose in cultivation as hybrids. In two of the three instances in which putative hybrids involving *M. salicifolia* were described, it was suspected that other species of section *Buergeria* were the pollen parents. Thus Rehder (1939) described a hybrid between the anise magnolia and *M.*

kobus var. *stellata* (Sieb. & Zucc.) Blackburn, the star magnolia (which is sometimes retained as a distinct species, *M. stellata*), giving the name *M. × proctoriana* to the hybrid group, while S.A. Pearce (1952) gave the collective name *M. × kewensis* to presumed hybrids between *M. salicifolia* and *M. kobus* var. *kobus*. The third hybrid recognized that presumably involved *M. salicifolia* as the seed parent and *M. × soulangiana* as the pollen parent was named *M. × slavonii* by Bernard Harkness in 1954. However, this putative trihybrid was later (Harkness, 1961) reduced to the synonymy of *M. × proctoriana* since its chromosome number, $2n = 38$, is the same as that of *M. salicifolia* and not what was to be expected if *M. × soulangiana*, $2n = 95$, 114, had been the pollen parent.

While it is well known that magnolias hybridize freely in cultivation (see Spongberg, 1976a & 1976b, and Treseder, 1978), and a new magnolia cultivar is described and named elsewhere in this issue of *Arnoldia* that is considered to be a putative hybrid, the detection of chance magnolia hybrids should be based on a careful analysis that includes a review of the variability of the suspected parental species in nature as well as in cultivation. While the putative hybrids involving *Magnolia salicifolia* mentioned above do not appear (based on the type specimens and/or plants) to be hybrids but only variants of *M. salicifolia* itself, more study is definitely needed to fully resolve this problem. The most direct approach to these problems would involve a controlled hybridization program that would include documentation of the morphological characteristics of both parents and the hybrid offspring, should any result.

As indicated above, two of the putative hybrids involving *Magnolia salicifolia* were suspected of involving other taxa of section *Buergeria*. All of the species of this Asiatic section are now thought to be in cultivation, and many fine ornamentals have been selected from this group and are available commercially. In addition to the willow-leaf magnolia, the species of section *Buegeria* include the well known *M. kobus* of Japan, which includes var. *stellata*, the star magnolia, and var. *loebneri* (Kache) Spongberg, an intraspecific hybrid that arose in cultivation between *M. kobus* var. *kobus* and *M. kobus* var. *stellata*. Another less well known but beautiful species of the section is *M. cylindrica* Wilson, which was introduced from China by the late Mrs. J. Norman Henry of Gladwyne, Pennsylvania, in 1936. Even less well known, but perhaps the closest relative of *M. salicifolia* is *M. biondii* Pampanini, also of China, which was originally introduced by E.H. Wilson for the Arnold Arboretum in 1908. Wilson's seeds, however, apparently failed to germinate, and it was not until Dr. Ting Yu-chen of Boston University traveled to China in 1977 that viable seed of *M. biondii* was re-introduced to the United States. A portion of Dr. Ting's seed was kindly given to the Arnold Arboretum, and we are now growing plants from which quantities of grafted plants of *M. biondii* will eventually be made available for distribution and testing both in the United States and abroad.

Like *Magnolia salicifolia* when it was introduced by Sargent in 1892, *M. biondu* is an imperfectly known species and we should caution that a true impression of that species will probably not be forthcoming from Dr Ting's introduction into western gardens. It should also be mentioned that two additional Chinese magnolias, *M. amoena* Cheng, and *M. zenu* Cheng, are other imperfectly known species that have tentatively been placed in section *Yulan*, but which may prove in the final analysis to be members of section *Buergeria*. The sectional placement of *M. zenu* may soon be resolved, since the American members of the 1980 Sino-American Botanical Expedition to Western Hubei Province were fortunate to be given seed of that species in October of 1980 when visiting in Nanking. A portion of these seeds are currently being processed at the arboretum's Dana Greenhouses, and it is gratifying to me that 88 years after the Arnold Arboretum introduced its first Asiatic magnolia another introduction has been received. A tradition established by Charles Sprague Sargent is being continued in the arboretum's second century, and it is heartening that this new magnolia introduction resulted from the cooperative efforts of five American botanical institutions and our Chinese colleagues.

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Magnolia salicifolia in full-bloom at the Arnold Arboretum

Photograph by G Koller