

Sorting Out the Yellow Magnolias

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INTRODUCTION

Magnolia ×soulangiana remains the most popular tree magnolia in the northern part of eastern North America in spite of the fact that its flowers appear early enough in the season that they are frequently ruined by frost. Seeking to produce magnolias that would bloom late enough to escape most frosts, plant breeders at the Brooklyn Botanic Garden began a hybridization program in the 1950s that involved the use of a native species, *M. acuminata*, that normally begins to bloom in late May/early June in our area. The results of this work, repeated and built upon by other breeders, yielded a new class of yellow-flowered magnolias that begin to bloom in late April or later, evading the frosts and providing a reliable annual display.

Magnolia acuminata in its most common form bears mostly greenish flowers with some yellow on the inner tepals. Remarkably, when used as a seed parent, it transmits mostly yellow pigment to the flowers of its offspring. *Magnolia acuminata* 'Golden Glow', a clone found in the Smoky Mountains in Tennessee, bears flowers that are much more yellow than the average. *Magnolia acuminata* var. *subcordata* bears smaller flowers of a good yellow and usually reaches less than half the 80 to 90 ft that is the mature height for the species. It has been used in some hybrids where a smaller tree was the desired result.

HYBRIDIZATION

One primary cross brought together *M. acuminata* and *M. denudata*, a Chinese species with white flowers of exquisite form that are usually borne in March or early April, and consequently are very vulnerable to frost. The hybrids are usually in bloom the last week in April or first week in May here, appearing before the leaves expand. The first of this hybrid was 'Elizabeth', introduced by the Brooklyn Botanic Garden in 1976. The flower color, as for many of the other cultivars resulting from this cross, is a clear light yellow, fading in hot weather to an ivory color. Specimens of 'Elizabeth' have already reached 35 ft in height, and considering the ultimate dimensions of the parents, an ultimate height of 50 ft may well be achieved. Other cultivars belonging to this hybrid group are:

'Sundance' - raised by August Kehr, Hendersonville, North Carolina

'Yellow Fever' — selected by Kenneth Durio, Louisiana Nursery, Opelousas, Louisiana

'Yellow Garland' — introduced by David G. Leach, Madison, Ohio

'Ivory Chalice' (Leach) — flowers ivory in color

'Legend' (Leach) — selected because it readily sets fertile seeds when pollinated, principally valuable for breeding.

'Golden Sun' (Leach).

'Golden Gift' (Leach) — compact growth habit. Produces numerous axillary flower buds, leading to a prolonged bloom period.

'Goldfinch' — selected by Philip Savage, Bloomfield Hills, Michigan.

'Butterflies' — (Savage and patented) flowers deeper yellow, tree more compact.

'Sun Ray' (Kehr) — the result of treating 'Sundance' with colchicine to double its chromosome number. Flowers larger than 'Sundance', of heavier texture and slightly darker yellow.

A second class of hybrids was produced by crossing *M. acuminata* with *M. liliiflora*, a shrubby Chinese species with dark purple flowers. Although not reliably hardy in USDA Zone 5, *M. liliiflora* is valued for its highly pigmented flowers and blooming period, which begins in May. Again, Brooklyn Botanic Garden first made this cross, which yielded 'Evamaria', with somewhat bizarre flowers colored a mixture of purple, green, and yellow. Joseph McDaniel of the University of Illinois repeated the cross, and introduced 'Woodsman', of similar color. Although the first generation hybrids have not become wildly popular, they were used in further breeding, where it was discovered that they produced principally yellow progeny. Because both parents flower later in the season, the hybrid does as well, after the leaves have appeared, making cultivars of this group useful in areas that experience very late frosts. This hybrid was given the name *M. ×brooklynensis*. Because of the stature of the *M. liliiflora* parent, plants of *M. ×brooklynensis* mature at a smaller height than the *M. acuminata* × *M. denudata* hybrids. Except for 'Hattie Carthan' the following cultivars are the result of backcrosses to *M. acuminata*:

'Yellow Bird' — (Brooklyn Botanic Garden) flowers are a clear yellow, scattered repeat bloom in summer.

'Hattie Carthan' — (Brooklyn Botanic Garden) yellow flowers with a crimson stain at the base of the tepals. Resulted from a cross between two *M. ×brooklynensis* seedlings.

'Ultimate Yellow' — introduced by Harry Heineman, Scituate, Massachusetts. Tepals yellow with some green. Tree 17 ft in height at 20 years. Flower buds hardy to -30F.

Other crosses that have yielded yellow-flowered magnolias of note:

'Yellow Lantern' (Savage) — *M. acuminata* × *M. ×soulangiana* 'Alexandrina' — light yellow flowers hold "tulip" shape well, upright habit.

'Gold Star' (Savage) — *M. acuminata* × *M. stellata* 'Rubra', small, light yellow star flowers on a medium tree. Bronze new foliage.

'Gold Crown' (Kehr) — *M. 'Woodsman'* × *M. 'Sundance'*, 8- to 10-inch yellow flowers on a columnar tree. Late flowering.

'Sunburst' (Kehr) — *M. 'Woodsman'* × *M. 'Gold Star'*, deep yellow flowers of medium size, floriferous. Late flowering.

PROPAGATION

Some of these cultivars can be propagated from leafy, semi-ripe cuttings in summer, particularly if juvenile material is available. Alternatively, these can be grafted,

with *M. acuminata* and *M. kobus* being the recommended rootstocks in our area (USDA Zone 5 and colder).

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Pot-In-Pot Tree Production for Municipal Use

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INTRODUCTION

The City of Columbus, Ohio comprises 135,000 acres: 2050 miles of streets and 202 parks (7000 acres). In 1996, an independent consulting firm accomplished a street tree inventory, concluding that the City had 85,000 trees and slots for 45,000 additional trees.

At that time, the City of Columbus made a commitment, and in my opinion, undertook the most aggressive approach to planting street trees in the United States. In the fall of 1999, the Columbus Ohio Municipal Nursery will be in full production planting 4000 container-grown and 1000 bareroot trees along the streets and in the parks each year.

PRODUCTION

The pot-in-pot system optimizes the growing environment of a tree through highly controlled germination, propagation, and root control methods. The process combines several different production methods that have been developed over the years. The unique combination of these methods and critical timing at different stages during the growth period results in a superior tree.

In the fall, seed is collected locally, specifically from mature trees exhibiting exceptional form, foliage, and resistance to insect/disease/air pollution. Table 1 represents a list of trees that I consistently produce from seed.

After collection, seed is given the proper stratification/scarification treatment and stored in the cooler. Once dormancy requirements have been satisfied, the seed is germinated. By the end of the greenhouse phase, the trees usually produce three flushes of growth and are approximately 18 to 24 inches tall.

Trees are then acclimated under shade and transplanted into 3-gal containers for one growing season. During the 1st year of growth, trees are monitored closely to insure central leaders are maintained and to accomplish selective pruning.

In the fall, some trees will be transplanted into 10-gal containers, while others will remain in the 3-gal containers and overwintered in the polyhouse. Transplanting is dependent upon the size of the tree as well as the species. In the spring, the remaining trees are transplanted into 10-gal containers and will remain there for 2 years. During each phase of production, containers treated with Spin-Out™ are utilized to prevent root girdling.