

## Magnolias in Ottawa, Canada

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Ottawa was founded as Bytown in 1826. The original name honored the city's founder, Colonel John By who was a British military engineer. He began the construction of the Rideau Canal that same year. Bytown was to be the northern terminus of this canal, which was to provide a military defense and an alternate safe route for commerce between Montreal and Lake Ontario following the War of 1812. Bytown was renamed Ottawa in 1855 in hope of being named capital of Canada. This would occur in 1857 following a pronouncement by Queen Victoria. Ottawa in its early days was the Canadian center of the timber trade. Some the finest pine stands in the world were located upstream from the city. As the timber stands were exhausted, the city gradually transformed into the government and high technology city that it is today. The city is known for its recreation facilities and extensive park system following most of the rivers and the canal.

Ottawa is located at the confluence of three great rivers, the Ottawa, the Gatineau and the Rideau; the Ottawa River later empties into the St. Lawrence River at Montreal. The city sits on the northern edge of a large valley through which all these rivers and the Great Lakes drain. To the north and the west are ancient mountain ranges, which have been severely worn down by ice ages over millions of years. This is known as the Canadian Shield. To the south are the Adirondack Mountains of New York State, USA.

Ottawa's latitude of 45°30' is the same as Milan, Italy. However, the climate bears no resemblance to what is typical in Western Europe. With massive mountain ranges extending the entire length of western North America, the moderating effects of the Pacific Ocean, are mostly restricted to the extreme western part of the continent. Frigid Siberian air masses are free to run across Alaska into northern Canada and then spill down the central and eastern parts of the continent, sometimes reaching the Gulf of Mexico in winter. The climate in Ottawa, as a result, is highly continental. Winters are long and cold while summers are often surprisingly hot and humid. The spring and fall transition periods can be rather sudden. Ottawa is in USDA zone 4b and temperatures typically reach -22°F (-30°C) once or twice each

winter. The January mean temperature is 12°F (-11°C) making it slightly colder than Moscow, Russia. Ottawa is considered the second coldest capital city in the world. Only Ulaanbaatar, Mongolia is colder. The coldest recorded temperature in the city was -33°F (-36°C) in January 1981 but that same year, it fell below -40°F (-40°C) in the rural areas surrounding the city. It is believed that temperatures were even colder in February 1934 although official records did not begin until a few years later. On average, the total amount of rainfall is 34 inches (86 centimeters), pretty much evenly distributed throughout the year. There is usually adequate and continuous snow cover from December through to the end of March. The amount of snow cover seems to have declined in recent years. Despite the even distribution of precipitation, summer drought is fairly common, with most of the summer rainfall coming as a result of thunderstorms, which can be sporadic. The growing season is relatively short, with the last spring frost occurring usually in early May and the first fall frost at the end of September.

Ottawa is near the northern limits for successful magnolia culture in this part of North America. Our only saving grace is the warm summers, which help ripen wood. We face many challenges. Success in magnolia cultivation requires not only good planning but also some luck. Site is very important, as shelter from the prevailing west winds will enhance survival. There are more problems that we face here, beyond just the lowest temperature each winter. Other things that affect success include the following:

- Summer drought.
- A relatively short growing season.
- Extended periods of low temperatures, even if not near record temperatures.
- Inadequate snow cover especially at the start of winter, resulting in deep frost penetration affecting sensitive magnolia roots.
- The early and sudden arrival of winter before plants have properly hardened off
- The extensive use of salt to keep roadways safe during winter is toxic to magnolias.
- In my own garden, dry sandy soil makes it more difficult to establish magnolias successfully.

As mentioned previously, the winter of 1980/1981 had a period of extreme cold. This caused damage on most magnolias in the city. January 1994, was the coldest month on record, and in some respects caused more damage than 1981. The winter of 2002/2003 was quite cold, and with inadequate snow cover, frost penetrated 6.5ft (2m) or more into the ground. This caused considerable damage to many magnolias and killed many young plants by the roots.



Despite all the challenges, we enjoy one benefit over most other parts of Eastern North America. Our local geography typically delays the arrival of spring as cold damp winds blow in from the Atlantic undercutting warm tropical air moving up from the Gulf of Mexico. In most years, this delay is sufficient to allow magnolias to flower without frost damage.

The Magnolia flowering season normally begins in late April, and peaks in early May. Because of the abrupt transition to spring, the flowering season is much more compressed as compared to more southerly locations. Following the main flush of flowers, a few species will continue to flower into June and early July ending with *M. virginiana*.

I will now list as many magnolias as possible that have been known to be tested in this area.

## Species

*Magnolia kobus* and *Magnolia kobus* var. *borealis* and related selections and hybrids are considered to be among the best-adapted magnolias for the Ottawa area. Some of the largest magnolias in the city are of this species or its hybrids. A number of trees are growing in the Dominion Arboretum including some particularly old specimens of var. *borealis*. Even the old var. *borealis* trees still show the severe effects of the winter of 1980/1981 although they flower heavily every second year. Pure forms of *Magnolia kobus* are becoming increasingly difficult to obtain since they so readily hybridize with *Magnolia stellata* and *salicifolia*. The old trees are particularly pure forms. I was rather surprised that the selection, 'Pickard's Stardust' was quickly winterkilled. It was planted at the same time and adjacent to *M. amoena*, which has now grown for a number of years.

*Magnolia stellata* is commonly grown in this area and many forms show a similar hardiness as *Magnolia kobus*. 'Royal Star' is particularly vigorous and hardy, but many others have done well, including 'King Rosea,' 'Centennial,' 'Jane Platt,' 'Rosea,' 'Pink Perfection,' 'Kikuzaki,' and 'Waterlily.'

*Magnolia* × *loebneri* is also generally well adapted with 'Merrill' being amongst the best and hardiest. We have also had success with 'Spring Snow,' 'Willowwood,' 'Ballerina,' and 'Leonard Messel,' although the latter has significant bud damage some winters. I have two very good seedlings of 'Leonard Messel' producing flowers superior to the parent. A number of other cultivars are currently under evaluation including 'Donna,' which is budded for this coming spring.

It has been difficult to obtain pure forms of *Magnolia salicifolia* as most end up being hybrids. 'Miss Jack' is still a young plant but has been doing well, so far. Hybrids including 'Slavin's Snowy,' 'Wada's Memory,' and *M.* × *proc-toriana* have all been doing reasonably well. 'Slavin's Snowy' and *M.* × *proc-toriana* are the first magnolias to flower each year, the latter being very fra-

grant. Both frequently have some bud damage probably due to temperature fluctuations in late winter. 'Wada's Memory' has also experienced difficulties in its youth but this may have been related to the poor, sandy, and droughty soil that I have at my location.

*Magnolia zenii* has been grown for many years in my garden. It flowered in 2002 but being an unusually early spring, the flowers were frozen when fully open. In other years, the buds have been blasted, and occasionally there has been twig dieback. Nevertheless, the tree has reached well over 9.8ft (3m) tall.

I do not believe that the true form of *Magnolia biondii* has been grown in this area. Some years ago, seed was collected from a tree labeled as this species in Hamilton, Ontario. The mother tree flowered very early in the spring and produced distinctively ridged seeds. One of seedlings has reached flowering size, and puts on an excellent display of flowers every spring. It resembles *Magnolia*  $\times$  *loebneri*, so it may be a hybrid. Most question the identity of the original tree since it predates, by some decades, the first authenticated importation of this species.

I am presently growing *Magnolia amoena*. It has survived a few years so far and grows vigorously. Unfortunately, its vigor has been its downfall. It has been growing far too late in the season, and has significant winter dieback as a result. Hopefully, as the tree grows bigger, its growth will slow down and harden off better before the onset of winter. It has not flowered so far, nor has it produced flower buds.

*Magnolia cylindrica* has been tried a number of times. It is believed that each attempt has been with what is now known as the hybrid 'Pegasus.' This hybrid has never flourished and within a couple of years, the plant has on each occasion been winterkilled. A true form of *M. cylindrica* was planted in 2004.

Many of the American species have very good hardiness and are well adapted to this climate. The best and the easiest to grow is *Magnolia acuminata*, which is actually a native tree in a few locations in Ontario near Lake Erie. Unfortunately, there does not seem to be sufficient genetic diversity in these populations, as all the seedlings have proven to be weaklings. From other locations, this species grows vigorously and is normally completely hardy. Following the winter of 1980/1981, the oldest and largest local specimen did experience some damage, but all magnolias did that year. *Magnolia acuminata* var. *subcordata* can also be grown and appears to have the same hardiness as the species but more yellow flowers. A seedling of 'Miss Honeybee' has reached over 23ft (7m) tall and flowers prolifically every spring with flowers that are quite bright yellow. It will often repeat with a second flush of flowers in mid summer.



Surprisingly, *Magnolia fraseri* has proven to be just as hardy as *Magnolia acuminata*. The three trees in the Arboretum survived the winter of 1980/1981 surprisingly well, and flower and fruit each year. This is a difficult species to grow even further south near where it is native. Seedlings are very susceptible to slug damage, to the point that all leaves and buds are eaten. This species does not tolerate droughty locations. The Arboretum trees are perhaps 49ft (15m) tall and I am not entirely sure why they are flourishing so well. I do have the theory that the trees are doing well because of the limestone-based soil with limestone bedrock fairly near the surface.

*Magnolia tripetala* also performs quite well, although slightly less hardy. There was a large specimen in the Dominion Arboretum for many years but it was killed to the ground in 1981. A few other younger trees were also damaged that same year but all have re-grown and have since flowered and fruited every year. A young tree in my garden has grown well, but was slightly damaged in 2003.

*Magnolia macrophylla* has also been grown here although again is less hardy. A couple of trees have reached flowering size although neither attained a large size. There appears to be some variation in hardiness in this species as a number of seedlings have been killed outright but others have performed better. The closely related *Magnolia macrophylla* ssp *ashei* has persisted in my garden for a number of years but is likely never to reach flowering size. Although closely related, and similar in many ways, the differences can be seen particularly in the fall. When *M. macrophylla* has defoliated, *M. macrophylla* ssp *ashei*, remains completely green. Obviously, the latter is better adapted to longer growing seasons, similar to the conditions where it is native in Florida. I have seen ssp *ashei* growing well in the Niagara region of Ontario just south of Lake Ontario which is quite a bit milder than here.

The native range of *Magnolia virginiana* is considerably further south and generally it has not performed well here. Many trees have been planted and seedlings grown. Some seedling strains have been hardier than others with some small plants surviving but growing very slowly. I have twice tried var. *australis* 'Henry Hicks' but it was not hardy. Another clone, 'Moonglow' was also winterkilled the first year. A couple of small plants have flowered in friends' gardens but they are also growing very slowly. The climate and growing conditions are obviously not suited to this species. The winters are too long and cold, the growing season too short, and the summers are not hot enough. Now, in saying all of this, one tree of var. *virginiana* has grown surprisingly well and flowers each year. It is now over 9.8ft (3m) tall. This tree has larger leaves and originated in Louisiana. Why this one is doing so much better than any other, I have no idea. This species flowers in early July in my garden.

*Magnolia grandiflora* is certainly not hardy in this area. This soil is frozen much too long for a broadleaf evergreen tree to survive. Despite that, a few attempts have been made with 'Edith Bogue' and 'Poconos.' One small plant of 'Edith Bogue' persists in a friend's garden. It is growing against a south wall in a very sheltered location and receives a tremendous amount of winter protection. The plant is wrapped and insulated and completely buried in mulch. It is not likely to ever get big enough to flower. This species can be grown with some success in the mildest parts of Ontario in the Niagara region and likely on the shores of Lake Erie and towards Detroit, Michigan in the extreme southwest corner of Ontario. The hardiest clones will flower there most years and retain their evergreen leaves, perhaps with some burning. After harsh winters, there will be damage and defoliation even there. It will never achieve the size that it attains in the Southern United States.

*Magnolia obovata* has been attempted many times. Young plants have grown quite vigorously but injury has been common and most have eventually died out. The current crop of plants were seriously damaged two years ago but have made a good recovery. To my knowledge, no plant of this species has attained tree size here, nor has any tree flowered.

I have two plants of *Magnolia officinalis* or perhaps a hybrid with *M. tripetala*. Both have grown quite well, and one has flowered on a number of occasions. The trees resemble *M. tripetala* but the flowers have a pleasant fragrance. Some injury can be seen following some winters, including 2003. I have also tried var. *biloba*, and the plant persisted for a few years before being winterkilled. I now have a number of seedlings of this variety and we will see how they perform this year, if they survive this winter.

*Magnolia denudata* is unlikely to ever prove hardy. I have planted it on at least four occasions. The largest grew far too vigorously and would not harden off in the fall. It would seriously dieback each year and eventually it became weaker with each year. Two other small plants including the cultivar 'Gere' persist but are not growing well. 'Forrest's Pink' was also planted and was winterkilled after a few years.

*Magnolia sieboldii* can be grown but is best with adequate moisture and sufficient shade. In drier locations, such as my garden, the leaves will generally burn in the summer. Two forms have been seen locally, a sprawling form which is prone to some winter injury and an upright form, which is harder. In any event, both will flower regularly. The cultivar 'Colossus' is also being grown and has flowered but has not shown any special merit as of yet. The hybrid cultivar 'Charles Coates' appears to enjoy the same conditions as the species and will likely be hardy, with upright instead of pendulous flowers. To my knowledge, both *M. sinensis* and *wilsonii* have been attempted but none have survived to reach flowering size.



*Magnolia sprengeri* 'Diva' has never survived a winter in this area. The closest flowering tree was found in suburban Detroit, Michigan just west of the southwest tip of Ontario, an area that area is considerably milder than here. Seedlings have also been grown and generally are winterkilled the first year. I have heard that a friend has over wintered at least one plant although it suffered some injury.

*Magnolia liliiflora* 'Nigra' has grown in the Dominion Arboretum for decades. It flowers following most winters but they have developed into unsightly stunted plants, showing considerable dieback after most winters. I have tried this species a number of times in my own garden with no success. The Little Girl hybrids have proven to be hardier than *M. liliiflora* but they can all be damaged following a bad winter. They can be difficult to establish and remain stunted for years or they can be totally winterkilled if they are planted the wrong year. On the other hand, once they are established, they can flower well following most winters. I have found that 'Ricki' is among the hardiest and 'Pinkie' is the least hardy. The closely related 'George Henry Kern' has grown in my garden for many years. It has flowered but it has done poorly. Even in milder climates, this is a weak grower. From my observations, I have concluded that vigorous magnolias have a better chance of survival in a cold climate than selections chosen for slow growth or dwarfed characteristics.

## Hybrids

The yellow hybrids are amongst the best adapted to this climate. The best so far include 'Elizabeth,' 'Yellow Bird,' 'Ivory Chalice' (which is very fast growing and tree-like), 'Legend,' 'Gold Star,' and 'Sunburst.' Another local enthusiast is having some success with 'Yellow Lantern.' 'Sundance' can suffer some tip damage but flowers most years. 'Hattie Carthan' will sometimes suffer bud damage but is lovely with the straw colored flowers and the purplish stripe. Newer forms including 'Yellow Fever,' 'Gold Cup,' 'Golden Pond,' 'Solar Flair,' 'Stellar Acclaim,' and 'Golden Endeavour' look promising. 2003 was a difficult year for a few yellow hybrids. Both 'Golden Gift' and 'Coral Lake' were severely damaged. 'Butterflies' was, sadly, completely winterkilled. 'Butterflies' has now been replanted with hopes of a better outcome. Other yellow hybrids are currently under trial and I expect that some of these will eventually be added to the recommended list.

The most popular hybrid grown in Ontario is *Magnolia*  $\times$  *soulangeana*. The vast majority of plants sold are a mediocre trade clone with light mauve pink flowers. This one will flower here in Ottawa, but they perform better following some winters than others. The winters of 1980/1981 and 1993/1994 were devastating to most trees of this hybrid in the city. Only trees growing in the most sheltered locations survived with little damage. There have been a number of named forms growing especially in the Dominion Arboretum

including 'Lennei,' 'Lilliputian,' 'Alba Superba,' 'Amabilis,' 'Alexandrina,' 'Rustica Rubra.' Many of these performed well for many years, but were severely damaged or totally winterkilled in 1994. 'Amabilis' and 'Alba Superba' have survived better than the others. I have found that the named forms are very difficult to establish in my own garden. In the last few years, I had thought I had established a few of them only to have them severely damaged in 2003. I am not sure whether they will ever recover. 'Burgundy' is one of those weak selections that persists but does not want to grow in this climate. A friend with a sheltered city garden has been able to flower 'Pickard's Sundew' whereas it has failed in my garden. 'Eskimo,' a hybrid, which appears similar to this group but is believed to have *M. kobus* in its parentage, has flowered locally in more than one location. The flowers generally resemble *M. x soulangeana* but are actually better. They are soft pink with a darker eye at the base. The winter of 2002/2003 was not kind to my young plant, but I expect it will have rather good hardiness, if it doesn't have to face a difficult winter early on.

More recent hybrids have been tried on a number of occasions. 'Galaxy' reached flowering size in 2002 only to be devastated in 2003, cutting it back to almost the ground. There was a similar result for both 'Galaxy' and 'Spectrum' in the Arboretum. I would say both are less hardy as compared with *M. x soulangeana*. 'Legacy' is perhaps even worse, growing very vigorously only to dieback year after year. One tree reached 9.8ft (3m) without any signs of flower buds only to be killed almost to the ground. 'Big Dude' flowered in the spring of 2000 and has been declining ever since. 'Orchid' has been grown twice with little success so far.

I am not sure about 'Daybreak.' The good news is that one local young plant flowered last spring and it certainly was beautiful and the fragrance heavenly. My own plant has shown significant dieback but that changed this past year and it has now set flower buds for this coming spring. I wait with great expectation!

My own experience with 'Marilyn' has been disappointing, however, a friend is growing this hybrid very well and his tree is flowering. Perhaps, I just have a very poor plant.

The record with most other named hybrids has been dismal. Gresham hybrids have been uniformly failures. 'Paul Cook,' 'Frank's Masterpiece,' 'Picture' 'Purple Prince,' 'Marjory Gossler,' 'Pristine' and *M. x thompsoniana* 'Urbana' have not survived a single winter. 'Vulcan' somehow survived one winter without damage only to be winterkilled after two more difficult winters. I have not grown 'Purple Eye' but it is growing well in Hamilton, Ontario, which has a significantly milder climate. It was noted in 1994 that the flower buds were all blasted following a  $-22^{\circ}\text{F}$  ( $-30^{\circ}\text{C}$ ) winter. It appeared to be slightly less hardy than most of the *M. x soulangeana* cultivars, which had flowered at the same location that year. 'Purple Eye' is unlikely to be hardy



here. *M. × wieseneri* failed to establish but this may have been a question of lack of vigor rather than hardiness. On the other hand, 'Aashild Kalleberg' seems to be establishing quickly and looks promising.

## Summary

As I have demonstrated in this report, magnolia culture is difficult in this climate. The best performers are generally selections and hybrids of *M. kobus*, *stellata*, *salicifolia*, *sieboldii*, and *acuminata*, including most of the yellow cultivars. *M. fraseri* would be included if it wasn't so culturally particular. Even with this limited range, I am optimistic that more complex hybrids will expand our choice in future years and there are signs of this already.

However, we have a further challenge. The Canadian market for magnolias is rather small and there are stricter border controls than exist within Europe. This is restricting the variety of magnolias that are available to us for testing. Most American sources are no longer available to us because of shipping hassles, and this also substantially increases costs. I am thankful, that Pat McCracken has been willing to continue to supply us, despite past border problems. We also must be concerned about grafted plants and the rootstock used. I have seen supposedly hardy magnolias such as 'Woodsman' grafted onto some tender rootstock with the obvious results. I have also heard that *M. sieboldii* is used to control the size of the resulting tree. This is not a good choice for our warm summer climate. If grafting must be done, *M. acuminata* or *M. kobus* produce plants with the vigor and hardiness necessary to survive our tough conditions.

