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3. Flowering trees

North Carolina is famous for its assemblage of spring-flowering trees. The most abundant species in the wild and in cultivation are the flowering dogwood, *Cornus florida*, and the redbud, *Cercis canadensis*, which account for much the display. In addition, several introduced species, mostly native to the moist warm-temperate zones in southeast Asia, are also common. An even larger spectrum of smaller ornamental trees will survive and prosper in this climate, but they are rarely seen outside of private collections. The species included here are those seen more or less commonly in the yards and gardens of the central part of the state.

Albizia julibrissin Durazzini, Mimosa. A rapidly growing small tree that may reach 35 feet in height. Its flat-topped and spreading habit creates a strongly horizontal impression at all stages of development. A fine-textured appearance is produced by the tiny leaflets on the large, doubly-compound pinnate leaves. The autumn coloration of the deciduous foliage is not showy. Foamy pink flower clusters are produced in quantity from early to mid summer. In full bloom the mimosa is an impressive sight. A few years ago the showy, fast-growing and rather weedy mimosa was widely planted and volunteered over much of North Carolina, but a fungal disease, mimosa wilt, which reached epidemic proportions has killed the majority of the trees in this species. Some partially resistant selections are available, but in our area planting mimosa may lead to disappointment in few years.

Aesculus hippocastanum L., Horse Chestnut. An erect-growing tree of medium size and moderate growth rate. The outline of the mature tree is roughly oval-shaped, and the height is up to about 50 feet in our area. A coarse-textured appearance is produced by the large palmately compound leaves, and the fall coloration is not showy. Large, erect racemes of candle-like white flower clusters are produced in late spring. Further north and in Europe this is a very large and widely planted flowering tree. In our area it may prematurely defoliate and remain a rather small specimen over a long period; however, some local specimens have been observed to hold healthy foliage into the autumn.

Another species, *Aesculus octandra* Marshall, is a massive tree native to the coves of the southern Appalachian Mountains, but it is rarely cultivated on the piedmont. One specimen of this species that has been observed to be growing locally is a very large tree in good health and vigor.

Catalpa speciosa Warder ex Engelm., Catalpa, Indian Cigar Tree, Catawba Tree. An erect tree of moderately rapid growth rate that usually matures into a round-topped specimen of 60 feet or occasionally more. A very coarse appearance is created by the large cordate leaves, but the fall coloration is not showy. Large terminal clusters of white flowers are produced in late spring, with open-grown trees producing a very showy floral effect. This is an easily grown and rather weedy tree that is grown for shade, floral display and fishing worms ("Catawba worms"). The caterpillars, while possibly useful for fishing, strip the tree of its leaves and contributes nothing to the aesthetic value of the plant.

Cercis canadensis L., Redbud, Judas Tree. A small tree of moderately rapid growth rate that may reach up to 30 feet in height. It is a spreading tree, often with several trunks, which often has a branch spread equal to, or greater than, the height. As a result of its rather large cordate leaves, this species creates an impression of medium coarseness. In favorable seasons, the deciduous foliage turns to bright yellow, but in some years the color is inconspicuous. Clusters of small magenta-pink flowers are produced on wood of all ages over the tree just before foliation. The redbud is capable of producing a striking floral display, but it is not at its best in the shade of larger trees. The "Canada" redbud is best known as a weed tree that lines old meadows and roadsides in the southern piedmont regions. Since the tree is widely planted and easily grown both in and adjacent to its native area, spectacular displays of redbud are part of our spring scene. Although it is generally easy to culture, the best results are achieved with full sun exposure on rich, moist and well drained soils.

Cercis chinensis Bge., Chinese Redbud. A large shrub to small tree of moderately rapid growth rate not observed to be over 15 feet in height, and developing a rounded shape with maturity. This species branches more freely from the base than the native species, but the leaf shape, texture and autumn

Table 2. Parameters of cultivation of flowering trees grown in North Carolina

Species	Date brought into cultivation	Place of origin	Frequency of cultivation
<i>Albizia julibrissin</i>	before 1800	Warm temperate Asia	common
<i>Aesculus hippocastanum</i>	long cultivated	Balkan Peninsula	rare
<i>Catalpa speciosa</i>	native	Central U.S.A.	occasional
<i>Cercis canadensis</i>	native	East, southeast U.S.A.	common
<i>C. chinensis</i>	before 1850	China	rare
<i>Cladrastis lutea</i>	native	Southern Appalachians	rare
<i>Cornus florida</i>	native	East, southeast U.S.A.	common
<i>C. kousa</i>	1875	China, Japan, Korea	rare
<i>C. mas</i>	long cultivated	Europe, West Asia	rare
<i>Franklinia alatamaha</i>	native?	Georgia	rare
<i>Koelreuteria paniculata</i>	1763	China, Japan, Korea	infrequent
<i>Lagerstroemia indica</i>	before 1800	China	common
<i>Magnolia grandiflora</i>	native	Southeastern U.S.A.	common
<i>M. liliiflora</i>	1790	China	infrequent
<i>M. stellata</i>	1862	Japan	rare
<i>M. X soulangeana</i>	1820	Orig. in cultivation	occasional
<i>Malus</i> species	-	Mostly Old World	common
<i>Melia azedarach</i>	long cultivated	India, China	common
<i>Oxydendrum arboreum</i>	native	East, southeast U.S.A.	rare *
<i>Paulownia tomentosa</i>	1834	China	occasional*
<i>Prunus mume</i>	1844	China, Japan	rare
<i>P. serrulata</i>	1900	China, Japan, Korea	occasional
<i>P. subhirtella</i>	1894	Japan	occasional
<i>Pyrus calleryana</i>	1908	China	infrequent
<i>Sassafras albidum</i>	native	Eastern U.S.A.	rare *

* Some of these species are more common than the frequency indicates because they are prone to volunteer.

coloration are much like the native plant. Abundant clusters of small magenta-pink flowers are produced on wood of all ages over the tree just before foliation. The bloom is a few days earlier (late March), heavier and the color is slightly warmer in tone in comparison with the native redbud. While this species is very easily cultured, it seems to have requirements similar to those of *C. canadensis*.

Cladrastis lutea (Michaux f.) K. Koch, Yellowwood. A small tree of moderate growth rate sometimes reaching 50 feet in cultivation. The adult habit is rounded to more or less spreading. The small leaflets on the pin-

nately compound leaves give a moderately fine texture, and the coloration of the deciduous foliage is reported to be orange to yellow. *Wisteria*-like clusters of hanging white, pea-like flowers cover the tree in late spring or early summer, depending on locality. The yellowwood is one of our native endangered species. In the southern Appalachian Mountains it only occurs in a few rich coves, otherwise it is limited to cultivation. Although it is rarely planted in central North Carolina, it is a well shaped small tree with attractive smooth gray bark. Specimens observed here are in good health, and there is no indication of obvious cultural difficulties. This is a tree that deserves to be more widely planted.

Cornus florida L., Flowering Dogwood. A small tree of moderate growth rate reaching 40 feet, but usually only about one half that height. Initially, it is more erect than spreading, but mature specimens assume a more or less rounded habit. The entire, oval leaves are similar to those of a number of other tree species, and the texture of the tree is medium. The red shades of the deciduous foliage can make a contribution to the landscape as spectacular as the spring bloom. The coloration is long-lasting, as it begins with a purpling of the sun leaves in early autumn, and becomes progressively redder until the time of defoliation. This autumn display is augmented by the red berry-like fruits that persist until early winter. The horizontally arranged sheets of white dogwood inflorescences cover the tree in early April just before foliation. Pink, light red and double-flowered forms are occasionally grown also. The flowering dogwood, both as a common woodland tree in our piedmont woods and as part of our horticultural plantings, is undoubtedly our best known and most widely planted flowering tree. The combination of excellent plant shape, dependable bloom and good fall color make the flowering dogwood one of our best all-around landscape ornamentals; however, it is not the easiest of our native trees to cultivate. It has a shallow root system and specimens growing on dry sites develop poorly and often decline or die during prolonged dry periods. It is at its best in moist, but well drained soils with a mulch layer around its base.

Cornus kousa Hance., Japanese Dogwood. The tree is similar to *C. florida* in size, shape and growth rate. The texture of the tree is also similar

though the leaves of the Japanese dogwood are a little smaller. Autumn coloration of the deciduous foliage and the fruit display are much like our native species. The sterile bracts surrounding the inflorescence are similar to *C. florida* except that the bracts are more pointed in *C. kousa*, and appear a few weeks after the foliage has developed. This tree is occasionally planted in the North Carolina mountains but is rarely seen in the piedmont. The small number of younger specimens that have been observed are in good vigor and growing well.

Cornus mas L., Cornelian Cherry. A large shrub or small tree of moderate or moderately slow growth rate that takes on a rounded habit at maturity and reaches about 20 feet in height. The leaves are similar in shape to the previous two species, but are a little smaller and produce a medium-fine texture. The autumn coloration of the deciduous foliage is usually red, and the purplish fruits are sometimes colorful. A dense mass of small yellow flowers is produced before foliation in March. A few older specimens of this species observed locally show some decline, but adjacent trees of *Cornus florida* are in equally poor condition. At the very least the Cornelian cherry requires conditions that are favorable for the growth of the flowering dogwoods, and perhaps it is only well suited to the cooler climates of our mountains.

Franklinia alatamaha Marsh., Franklinia. A small upright-growing tree of moderately slow growth rate not observed to be over 12 feet tall in North Carolina. The elongate entire leaves give a medium-fine texture, and the deciduous foliage turns to shades of orange-red in the autumn. The large white flowers are produced in the late summer when few trees or shrubs are in bloom. Specimens have been seen in the North Carolina mountains and some individuals have been recently planted on the piedmont; however, no mature specimens have been observed in central North Carolina.

Koelreuteria paniculata Laxm., Golden Raintree. A small medium-sized tree of rounded habit and medium growth rate that may reach about 40 feet in height. The large pinnately compound leaves give a medium texture, and the autumn color is not conspicuous. Small yellow flowers are produced in large terminal clusters in early summer at a time when few other trees are in bloom,

and the display is quite striking. The bladderlike seed pods are also ornamental in the autumn and early winter. This tree seems to be tolerant of a wide variety of cultural conditions.

Lagerstroemia indica L., Crepe Myrtle, Southern Lilac. A large shrub to small tree that is slightly more erect in habit than spreading, often with several trunks from the base. It may grow rapidly under favorable conditions, and reach up to about 30 feet height. The fine texture of the plant is produced by the very small entire leaves. The fall coloration of the deciduous foliage is highly variable, ranging from inconspicuous on vigorous specimens to brilliant shades of red, orange and yellow on starved trees growing on poor sites. The crepe myrtle is primarily grown for its showy clusters of red, pink, lavender or white flowers. It blooms in mid to late summer and may be pruned to stimulate the production of very large inflorescences. Unpruned, it produces a larger number of flower clusters, but each cluster is usually much smaller. This is justifiably one of our most widely planted flowering trees in the southeast. Like the flowering dogwood, it has something for every season. In age, the trunks and the major branches take on a white-mottled appearance which is striking in the winter landscape. Although heading back improves the size of flower cluster, it detracts from the winter appearance of the tree. Unlike the flowering dogwood, it is tolerant of a wide variety of growing conditions, but in very poor or dry sites, it grows slowly and flowers sparingly. In moist shaded areas it sometimes becomes infected with mildew, so best results are achieved with full-sun culture.

Magnolia grandiflora L., Bull Bay or Southern Magnolia. A large tree of moderate growth rate that may reach to 80 feet or more in height at maturity. It is a pyramidal or columnar-shaped tree in youth that becomes more dome-like in habit at maturity. On unpruned individuals the lower branches often reach to the ground. The coarse texture of this tree is produced by the large, leathery, entire evergreen leaves. The great, white, lemon-scented blooms are known to all. In the autumn cone-shaped fruits release bright red seeds that are very attractive but only for a very short period. The southern magnolia is one of our grandest and probably our largest flowering trees. It adapts to a fantastic range of soils and climates, being cultivated widely in

Asia, Europe and western North America. It can be controlled by pruning or even trained into exotic espaliers. Central North Carolina is about as far north as it can be grown without winter damage to the foliage, although some clones have been selected that do passably well in somewhat cooler areas.

Several other native *Magnolia* species are very rarely cultivated including the cucumber tree, *M. acuminata* L., Fraser's magnolia, *M. fraseri* Walter, and the umbrella tree, *M. tripetala* L.

Magnolia liliflora Desrouss. A large shrub of moderate growth rate and of somewhat spreading habit that produces many stems from the base and reaches about 12 feet in height. The elongate entire leaves give the plant a medium texture. The deciduous foliage is not colorful in the autumn. Large elongate purple to magenta flowers cover the tree just before the leaves are produced, but the flowers do not open as widely as *M. X soulangeana*, and they appear about a week later than the hybrid species (early April). In many years the flowers of *M. liliflora* are ruined by spring frost. The form *nigra* is most commonly offered by nurseries in our area.

Magnolia stellata (Sieb. and Zucc.) Maxim., Star Magnolia. A moderately slow-growing large shrub to small tree that may reach 15 feet or more in height. The habit is usually slightly taller than spreading, but some cultivars are most distinctly spreading. The foliage is smaller and more finely textured than the more commonly planted *M. X soulangeana*. The autumn coloration of the deciduous foliage is not showy. While the star magnolia flowers even earlier (early March or even mild periods in January or February in mild winters) than the other commonly planted deciduous species, the unopened buds on the star magnolia are not injured by cold as the case with *M. X soulangeana*, so some show is produced after the cold weather passes (only the open flowers are killed); thus the smaller *M. stellata* is the better choice for our area. The cultural requirements seem similar for the common deciduous species from Asia. These are all easily cultivated in a variety of situations, but they can decline during severe drought.

Magnolia X soulangeana Soul. (*M. denudata* X *M. liliflora*), Tulip Magnolia. A small tree of moderate growth rate that may reach 30 feet or more in height, often developing several trunks. Specimens mature into small trees

of rounded or oval habit. The medium texture of the tree is produced by the elongate entire leaves. The deciduous foliage does not produce a show in the autumn. Large cream-colored flowers with magenta markings (colors vary greatly from clone to clone) cover the tree during March before the foliage is produced. Unfortunately, in our area in about three out of four years the floral display is damaged or ruined by spring frosts. While this hybrid is easily cultivated in any reasonably good horticultural environment (except excessively dry sites), the floral display is so frequently ruined by spring frost that it often is a great disappointment. Further north, where it remains dormant longer, the bloom is somewhat more dependable.

Malus species, Flowering crab. A large highly variable group of species and hybrids of moderately rapid growth rate that usually have a spreading habit at maturity and reach 15 to 30 (or more) feet in height. Small ovate to trilobate leaves give these trees a moderately fine texture. The deciduous foliage turns pale yellow or is inconspicuous in the autumn. In earliest spring (middle March) before the leaves are developed, the flowering crabs open into a mass of color ranging from white through shades of pink to light red depending on cultivar. In cases more than one shade of color may be present on a single tree. The crabs are tolerant of a wide variety of cultural conditions and thus are among our most easily cultivated spring-flowering trees. They have a few pests, but they seem to satisfactorily withstand our typical spring freezes. There are a great number of clones, representing several species, available, and some produce a much showier bloom than others. The fruit from the larger-fruited cultivars is tart but edible and is often used for preserves. On many cultivars the fruit is very ornamental in the autumn and early winter. There will be no attempt to enumerate the large number of clones that may be seen locally.

Melia azedarach L., Chinaberry Tree. A small or medium size tree of relatively rapid growth rate that takes on a rounded to slightly erect habit with maturity and reaches about 30 feet in height. Small serrate leaflets on the large, twice pinnately compound leaves give the tree a fine texture. The deciduous foliage does not produce showy coloration in the autumn. The small pinkish-lavender flowers are produced in the early summer, but the bloom is

not conspicuous in the landscape; however, the tan fruit clusters are of some interest in the winter landscape. Although only occasionally planted, this species is readily cultivated and is somewhat weedy.

The related tree *M. a. umbraculiformis* Berckmans., the Umbrella Tree, has crowded branches that produce a flattened head, the total height of which is much less than that for the normal form of the species. The crowded branches resemble a witch's broom growth pattern, and the scaffolds tend to decay prematurely. The singularly unattractive abnormality is occasionally seen around poor country houses.

Oxydendrum arboreum (L.) DC., Sourwood. A small tree of erect-growing habit and relatively rapid growth rate that may reach 50 feet in height, usually less. The medium texture of the tree results from the elongate, entire leaves. The deciduous foliage turns brilliant shades of red in the autumn. In summer, racemes of tiny bell-like flowers are produced, and on an open-grown tree may be very showy. Although not often cultivated, this common woodland tree can be a rather attractive ornamental, particularly as the leaves redden in the autumn. It requires rich sites with well-drained soils and like many other heaths is intolerant of root disturbance after it has become established.

Paulownia tomentosa (Thunberg) Steudel, Princess Tree. A tree of medium size and very rapid growth rate that may reach 40 feet or more in height. The adult habit is usually more or less rounded, with a coarse texture due to the very large cordate leaves. The autumn coloration of the deciduous foliage is not of interest. In early April, just before the leaves are produced, large clusters of blue-violet flowers appear with some trees producing a striking display while others are less impressive. The princess tree at its best is a striking specimen in the landscape with its immense leaves and colorful bloom. It is also very fast growing and produces very weak wood that is subject to decay (in the piedmont area), especially in older specimens. This species commonly escapes onto roadsides and other areas of disturbed vegetation.

Prunus mume (Sieb.) Sieb. and Zucc., Japanese Apricot. A small tree of moderately rapid growth rate and spreading habit that grows to a height of

about 20 feet. The tree has a medium-fine texture produced by the small ovate leaves. The autumn coloration is inconspicuous. The bloom is much like the cultivated apricot but occurs much earlier, often in midwinter (January to early March). It is of potential importance for the landscape because of its tendency to winter bloom, often in January in our areas. The fruits are apparently of little value, even if they could survive spring frost, and the tree is grown strictly for its ornamental value. Indications are that it is easily cultivated.

Prunus serrulata Lindl., Flowering Cherry. A small tree of moderately rapid growth occasionally reaching 30 feet in height but usually less. A large number of clones of this species are available, and while most of them have a moderate to strongly spreading habit, a few are distinctly erect in stance. Rather large serrate leaves give the tree an appearance of medium texture. The deciduous foliage turns yellowish or is inconspicuous in the autumn. Many forms of this species that produce a striking floral display in late March to early April are available. The one most commonly seen in our area is the deep pink-flowered 'Kwanzen' flowering cherry (doubled-flowered). Our climate is a bit too warm for a good performance from this species. Younger plants bloom well, but many older trees decline prematurely.

Prunus subhirtella Miq., Higan Cherry, Weeping Cherry (the form of this species most commonly grown in our area). A small to medium-sized tree of moderate growth rate that may reach 30 or more feet in height. The habit

Figure 2. Typical leaves of flowering trees listed in chapter 3.

1. <i>Aesculus hippocastanum</i>	14. <i>M. liliiflora</i>
2. <i>Albizia julibrissin</i>	15. <i>M. stellata</i>
3. <i>Catalpa speciosa</i>	16. <i>M. X soulangeana</i>
4. <i>Cercis canadensis</i>	17. <i>Malus</i> species
5. <i>C. chinensis</i>	18. <i>Melia azedarach</i>
6. <i>Cladrastis lutea</i>	19. <i>Oxydendrum arboreum</i>
7. <i>Cornus florida</i>	20. <i>Paulownia tomentosa</i>
8. <i>C. kousa</i>	21. <i>Prunus mume</i>
9. <i>C. mas</i>	22. <i>P. serrulata</i>
10. <i>Franklinia alatamaha</i>	23. <i>P. subhirtella</i>
11. <i>Koelreuteria paniculata</i>	24. <i>Pyrus calleryana</i>
12. <i>Lagerstroemia indica</i>	25. <i>Sassafras albidum</i>
13. <i>Magnolia grandiflora</i>	



is usually broadly pyramidal, and rather small serrate leaves give the tree a medium-fine texture. The deciduous foliage is not particularly showy in the autumn. The single pale pink flowers are produced in profusion before the foliage appears in late March. With its early, prolific bloom, this species is very popular in plantings. The vigorous pendulous clone commonly grown in our area seems tolerant of a wide variety of soil conditions and is better adapted and longer lived here than the clones of *Prunus serrulata*.

Pyrus calleryana Dcne., Callery Pear. A fast-growing tree of medium (or larger?) size reaching 40 feet or more in height. The shape is fastigiate in youth becoming more elliptic in habit with maturity. The medium-fine texture of the tree is produced by the rather small ovate leaves. The late autumn display of deep red coloration on a yellow background can be spectacular. The somewhat short-lived white flowers appear before the leaves come out in late March and make a considerable display. In the last few years this species has been planted widely in North Carolina (particularly the 'Bradford' selection), and all specimens observed are in excellent vigor. One older tree (twenty or so years) on the North Carolina State University campus is already a large tree. With the combination of spring bloom, good fall color and ease of culture, it can be anticipated that this species will become very common.

Sassafras albidum (Nuttall) Nees., Sassafras. A shrub or small tree of distinctly erect growth habit and moderate growth rate that may grow to 20 or 30 feet in height; however, much larger specimens are sometimes encountered. A tree of medium texture with leaves that are variously one, two or three lobed. The deciduous foliage turns shades of yellow in the autumn. Clusters of small yellow flowers are produced in late March before the leaves expand, but a showy effect is produced only when the flowers are in quantity. An easily but rarely cultivated common native tree, which is also aromatic and of use as an herb.