

A Field Guide to Selected Trees and Shrubs of the University of Massachusetts Dartmouth Campus

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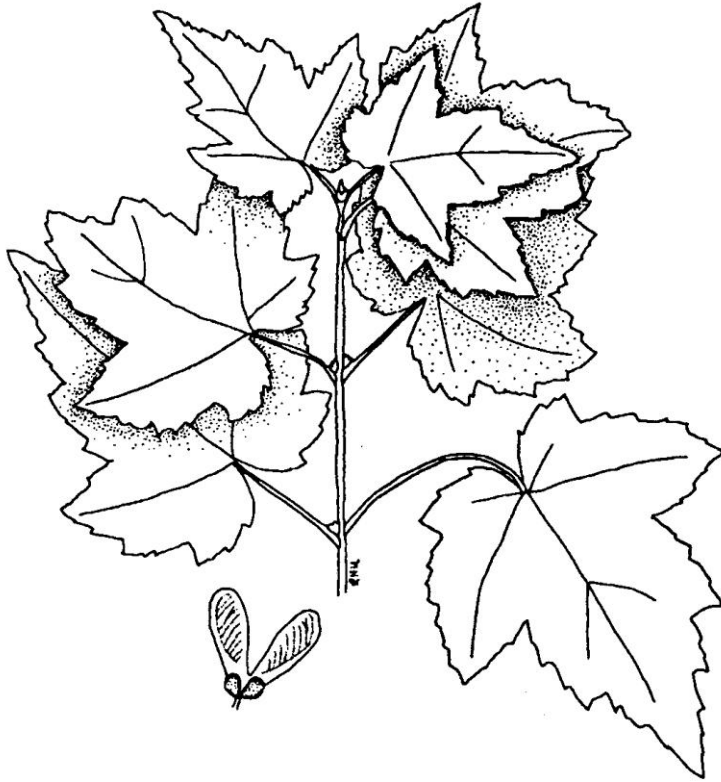
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Table of Contents

RED MAPLE - <i>ACER RUBRUM</i>	4
YELLOW BIRCH - <i>BETULA LUTEA</i>	6
GRAY BIRCH - <i>BETULA POPULIFOLIA</i>	8
SWEET PEPPERBUSH - <i>CLETHRA ALNIFOLIA</i>	10
SWEETFERN - <i>COMPTONIA PEREGRINE</i>	11
FLOWERING DOGWOOD - <i>CORNUS FLORIDA</i>	13
AMERICAN BEECH - <i>FAGUS GRANDIFOLIA</i>	15
WITCH-HAZEL - <i>HAMAMELIS VIRGINIANA</i>	17
INKBERRY - <i>ILEX GLABRA</i>	18
AMERICAN HOLLY - <i>ILEX OPACA</i>	19
WINTER BERRY - <i>ILEX VERTICILLATA</i>	21
EASTERN RED CEDAR - <i>JUNIPERUS VIRGINIANA</i>	22
NORTHERN BAYBERRY- <i>MYRICA PENSYLVANICA</i>	24
BLACK TUPELO - <i>NYSSA SYLVATICA</i>	26
PITCH PINE - <i>PINUS RIGIDA</i>	27
EASTERN WHITE PINE - <i>PINUS STROBUS</i>	29
BIGTOOTH ASPEN - <i>POPULUS GRANDIDENTATA</i>	31

QUAKING ASPEN - <i>POPULUS TREMULOIDES</i>	32
BLACK CHERRY - <i>PRUNUS SEROTINA</i>	33
WHITE OAK - <i>QUERCUS ALBA</i>	34
BLACK OAK - <i>QUERCUS VELUTINA</i>	35
SWAMP AZALEA - <i>RHODODENDRON VISCOSUM</i>	37
PUSSY WILLOW - <i>SALIX DISCOLOR</i>	38
SASSAFRAS - <i>SASSAFRAS ALBIDUM</i>	39
BLUEBERRY - <i>VACCINIUM CORYMBOSUM</i>	40
NORTHERN ARROWWOOD - <i>VIBURNUM RECOGNITUM</i>	42
GLOSSARY OF BOTANICAL TERMS	43

Red Maple – *Acer rubrum*



Red maple is one of the most common deciduous trees on campus where it grows 18-27 meters tall. The opposite arrangement of the green, palmately veined, 3 lobed leaves distinguishes red maple from most other deciduous trees on campus. On young trees the bark is silvery gray and smooth, but becomes dark and rough with age. Despite its specific epithet of 'rubrum', meaning red, the red maple is green most of the growing season. When without leaf, young twigs turn red in late winter, and their color is especially pronounced in early spring just prior to the flush of new spring growth. The buds and flowers are also a brilliant

red at this time of year, and it is this late winter-early spring color on which the name 'red maple' is based. The red flowers of spring give way to paired, winged, green fruits, the samaras, during early summer.

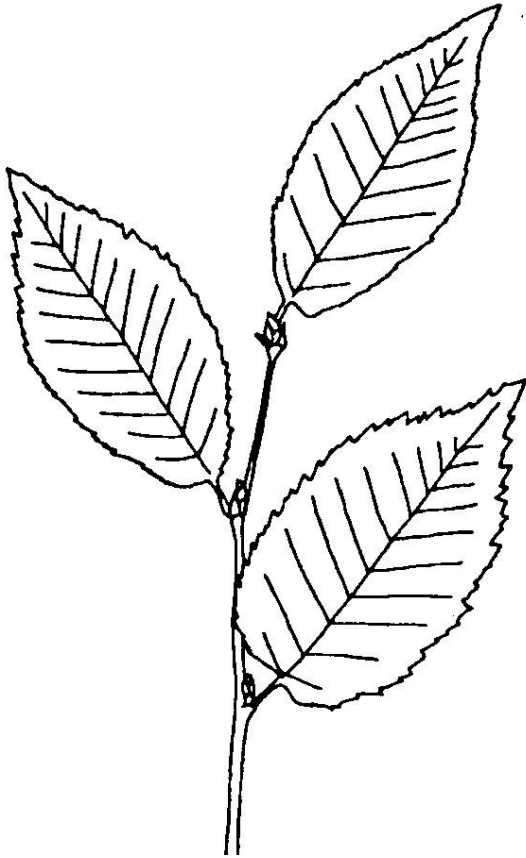
Few trees tolerate the range of soil conditions as can red maple. Most trees prefer either dry, damp, or wet soil conditions. Red maple is an exception; it has broad tolerance limits to soil moisture. It occurs in swamps where it is referred to as 'swamp maple', but it also grows well in dry upland areas.

Red maple is one of the first trees to display red, orange, and yellow leaf colors in the fall. This brilliant fall color, its large stature, and its broad tolerance to varied environmental conditions, has made red maple a favorite tree for landscaping.

Acer rubrum is not to be confused with the 'Crimson King' or other varieties of Norway maple (*Acer platanoides*). The latter have maroon-red leaves throughout the growing season and are not native to New England woodlands. Some cultivated varieties of Japanese maple, (*Acer palmatum*), may also have red leaves, but they are smaller trees with smaller more delicate leaves than *Acer rubrum*.

Red maple is native to North America and occurs from Newfoundland to Florida, west to Minnesota and Texas. At UMD red maple is common throughout woodlands on campus, especially in low areas between the parking lots and Ring Road. Its fall color can best be viewed in early October around the small pond near the entrance to campus.

Yellow Birch - *Betula lutea*



The texture and odor of the bark of the yellow birch is helpful in identifying this tall tree of relatively undisturbed woodlands. Like white birch, the bark peels in horizontal bands or curls, and it has a golden hue (almost like honey) and quite distinct from the white bark of white and gray birch. The bark has narrow horizontal slits or lenticels that, when first formed, allow for gas exchange. The simple, alternate, ovate leaves range in size from 7-11 cm long. Their margins are doubly serrate and meet unequally at the petiole.

Yellow birch is monoecious with male and female flowers occurring in separate, elongate cone like structures called catkins. They form in the previous year and remain tightly closed through winter to open in the following spring. Male catkins are 7-9 mm long with brown scales. The female catkins are larger (about 17 mm long) and are light reddish brown with white hairs. The male catkin

falls off after it has shed its pollen but the female catkin persists as a small cone containing small winged nutlets which mature in August through October.

Twigs are yellow brown to dark brown, and are smooth and shiny. Like the black birch, the twigs have a strong wintergreen flavor when broken. They can be made into a tea when steeped in hot water. Sap can be collected in early spring and reduced by boiling to make syrup.

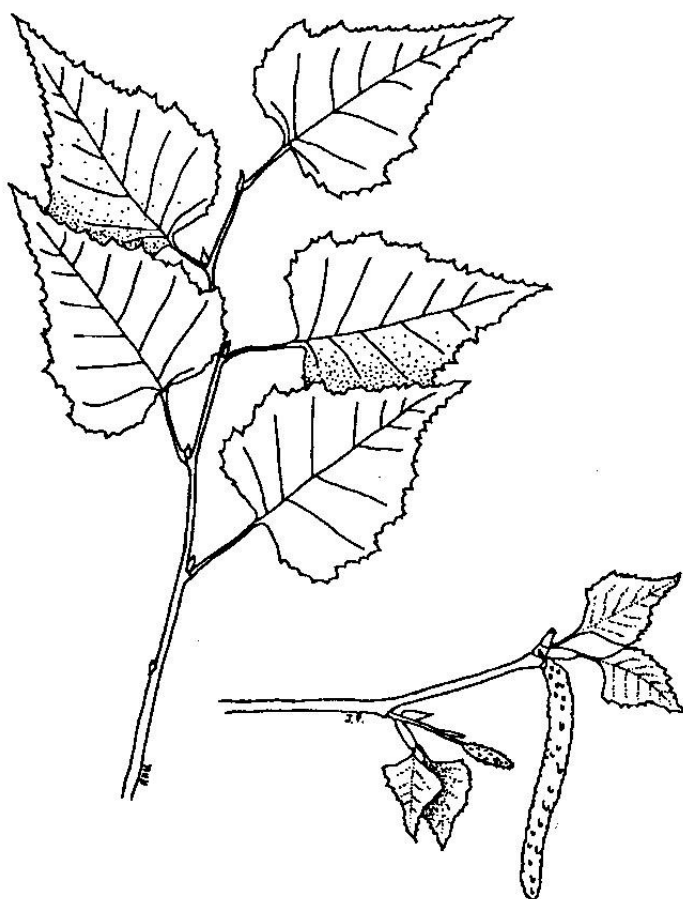
Yellow birch may reach a height of 20-30 m, making it one of the tallest deciduous trees in New England. As lumber, it is the birch that is harvested the most, and it is used for finish work in houses and in furniture. The curly peels of dry bark are useful tinder for starting campfires.

Yellow birch grows in rich soil in wet areas near swamps and streams. It is a tree often found growing in dark woods in association with hemlock. These favored conditions of shade, moisture, and rich soil may restrict its range to undisturbed areas. Yellow birch is often found on the sides of hills and ledges that have a northern exposure. Seedlings often sprout on dead

stumps and in soil-moss pockets on top of large rocks. As they grow, their roots engulf the stumps and send roots over the rocks, a very characteristic growth form for this species.

Yellow birch occurs from Newfoundland, west through the Great Lakes, and south to Maryland and at higher elevations in Tennessee. The favored environment of moist, shaded, rich woods restricts yellow birch on campus. There can be found numerous specimens growing with American holly and Canadian hemlock in a relatively undisturbed wooded area between Ring Road and Cedar Dell Pond across from parking lots #13 and 14. Several also grow in the damp area behind the tennis courts.

Gray Birch - *Betula populifolia*



The color and texture of the bark of gray birch are this tree's most distinctive features. It is white, like many birches, but does not peel off in curls to the extent it does in white or yellow birch. At the base of the branches, along the trunk, a black 'V' or chevron makes a distinctive pattern. Horizontal breaks (lenticels) occur on the bark and function in gas exchange. The bark of young branches is reddish-brown and turns white with age. The relatively small (5 cm wide by 7 cm long) triangular-shaped leaves have doubly serrate margins and are distinct from the more oval shape of other local birches. Gray birch is monoecious with separate, long-staminate and short-pistillate catkins.

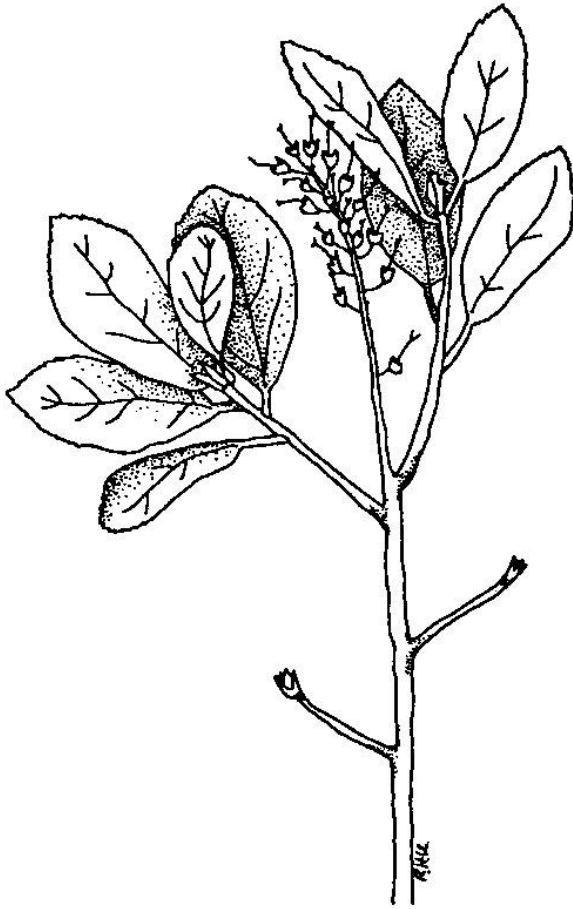
Gray birch grows in stands along the edges of woodlands and in open areas. It is usually seen as a small tree, seldom growing taller than 4.5-6 m. A single plant may have several main trunks.

The bark of this and many other birches is elastic; it expands to accommodate increases in girth from lateral growth. As a result of this elasticity the bark has a smooth surface, unlike the bark of most other kinds of mature trees. It is composed of many thin layers. The cells of the inner layers of bark contain tannic acid which gives newly exposed bark an orange color. Tannin does not occur in the outer layers. Here the dead, empty cells reflect light similar to the way snow reflects light, and the bark appears white.

Gray birch reproduces by seeds which are dispersed by wind. This effective long distance dispersal strategy, together with its tolerance of sandy, dry soils enables gray birch to be one of the first colonizers of abandoned fields, disturbed soils, or burned-over areas. As such, gray birch is in early succession stages of forest development and is not usually a member of a climax forest community. Reflecting its old field colonization it is sometimes called 'old field birch'.

Gray birch occurs from southeastern Canada, south through New England to Virginia. On campus it grows along the edges of fields where its white bark is easily recognized. It is particularly abundant along the outer edge of Ring Road near parking lots #2 and 9. Gray birch is often identified incorrectly as a white birch (*Betula papyrifera*), but the latter has a more northerly distribution and does not commonly grow out of cultivation in coastal southeastern Massachusetts.

Sweet Pepperbush - *Clethra alnifolia*



Sweet pepperbush is a deciduous shrub that grows to 3 meters in height. It is one of the most common woody plants around campus woodlands where its densely branched growth forms thickets. Three distinctive characteristics of *C. alnifolia* are its persistent dry fruit capsules, true, naked end buds, and its single bundle leaf scar. The alternate, obovate to elliptical leaves are 5-10 cm long with an acute tip. Green above and pale below, the leaves have a sharply serrated margin along their upper half. The slender stems are similar in form and size to those of mountain laurel and azaleas. The twigs are hairy and light brown when young but become smooth and gray to black with age.

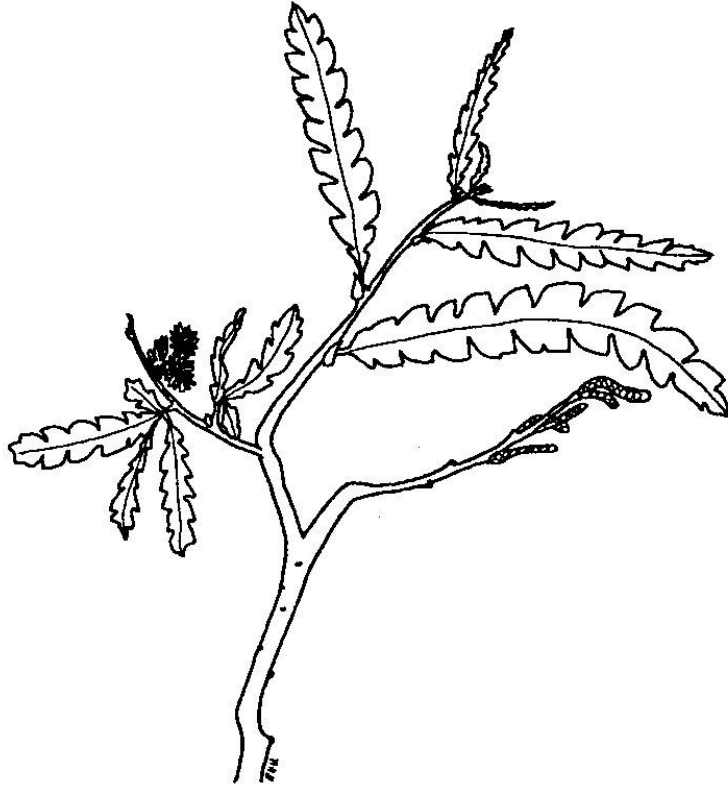
Young bark of the stems is brown, but turns grayish to black with age. The flowers occur in terminal spike-like racemes or spikes which are 7.5-13 cm long. Individual white flowers, each calyx 0.5 cm across, have 5 petals, 10 stamens, and a distinctive, persistent style that protrudes beyond the stamens and petals from the center of the flower. In July and August

sweet pepperbush blooms with an extremely strong fragrance. One of the easiest ways to recognize sweet pepperbush when not in flower is by its spikes of small round, woody capsules, each with its dried persistent stigma. Each fruit is only about 3 mm in diameter, but collectively in the raceme they are quite distinctive.

Clethra alnifolia forms a dense, almost impenetrable border along the edges of wood lots and ponds. Found in swamps and moist thickets it is a common wetland species. Because of its tolerance to wind-blown salt, sweet pepperbush is suited for landscaping along the coast.

Sweet pepperbush occurs in coastal locations from southern Maine south to Florida and west to eastern parts of Texas. As one of the most common shrubs on campus it can be found along the edges of most parking lots and wooded areas. Specimens also grow along the borders of the wooded areas behind the Visual and Performing Arts Building.

Sweetfern - *Comptonia peregrine*



Sweetfern is a small, woody, deciduous shrub approximately 0.5 m high. Superficially this plant's stature and foliage remind one of a fern. The linear, pinnately lobed leaves offer a delicate fernlike appearance. The leaves of sweetfern are very aromatic, and together with the woody, persistent, erect stems and small buds and flowers, distinguish this low shrubby plant from true ferns. Furthermore the stem of most true ferns is a rhizome. Mature leaves of sweetfern are somewhat rough and are 7- 15 cm long. They occur alternately along the stem, and have scalloped margins that curl towards the underside of the leaf. They persist through much of the winter but by spring are gone before new leaves form. The buds have 4 or more scales and the end buds are

false. These characteristics, plus the aromatic nature of the twig, and leaf scars with 3 bundle scars, help identify sweetfern in winter.

Sweetfern can be monoecious (as illustrated here) with separate male and female flowers occurring on the the same plant, but most specimens are dioecious. Berries occur in fall on the female plants. The male flowers appear at the tip of the previous year's growth in a spike-like cluster. The female flowers form a 1-2 cm burr-like duster of fruits in which the 3-4 mm seeds develop.

Sweetfern commonly grows on dry soils, especially recently disturbed areas where there is sparse tree cover-quite often in abandoned fields and along roadsides. Vegetative growth may occur by basal, rhizomatous shoots, to produce clonal populations. This growth strategy, together with its densely branched habit, produces a thicket which provides cover for wildlife.

Like bayberry (*Myrica pensylvanica*), sweetfern is a member of the wax-myrtle family (Myricaceae); it can be distinguished from bayberry by the absence of waxy berries and by the pinnate nature of the rugose leaves. The pinnately lobed leaves of sweetfern also distinguish it from *Myrica gale*, a plant of similar habit and fruit type, but which lives in wet areas and has smooth entire margins to its leaves.

The leaves of sweetfern can be dried and made into a tea, reportedly used topically by Indians to reduce the effects of poison ivy.

Sweetfern occurs from Saskatchewan east to Nova Scotia, southeast to Virginia and throughout the mountains of Georgia. At UMD sweetfern occurs along Ring Road between parking lots #15 and 16 as well as in upland areas along the trails near Cedar Dell Pond and at the edges of most woodland.

Flowering Dogwood - *Cornus florida*



Most people know the flowering dogwood as a traditional cultivated ornamental tree in parks and gardens, but it is also a native to our New England woodlands. Due to its spring blossoms it is one of the most popular trees of our area where it may reach 9 meters in height. The deciduous leaves are elliptically egg-shaped, 6-13 cm long and 4-6 cm wide, and occur opposite each other on branches. A noticeable characteristic of many members of the genus *Cornus* is the pattern of leaf venation. Young branches are green with a tinge of purple, and they are quite pliable. The bark of old branches and the trunk have the appearance of being broken into small squares.

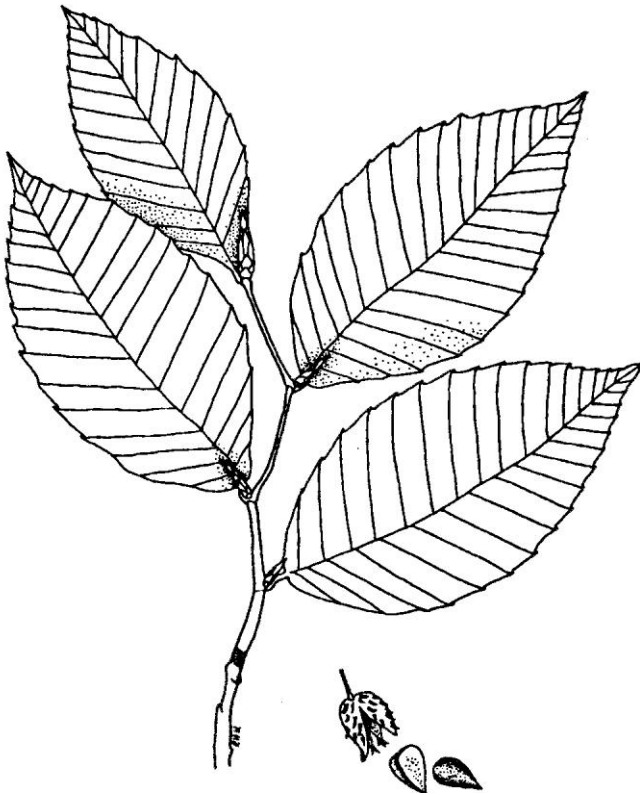
Flower buds are larger than the slender taper of leaf buds. They are gray, broadly conical, and taper moderately to a pointed tip. They

consist of two outer pointed scales folded over 2 inner scales so that flower buds are weakly 4-sided. They are short stalked. Probably the most conspicuous characteristic of flowering dogwood can be seen in May when the white bracts of the flower clusters develop. These look superficially like white petals but are actually 4 bracts (modified leaves) surrounding a cluster of 15-30 inconspicuous flowers. The bracts are 5-10 cm long and have a notch at their blunt tips. These bright bracts develop from the bud scales. Following pollination, the bisexual flower produces a cluster of drupes, each fruit containing 1-2 seeds. At maturity in late summer and fall the fruits are 8-18 mm long and are shiny red.

Dogwood is a popular ornamental known universally for its white 'flowers' in the spring. In the fall its red foliage, and red berries that remain after the leaves have dropped, also add to its landscaping value. Another favorable characteristic is its almost shrub-like height and the horizontal position of its branches when grown in full sun. In natural woodlands older plants become tall and have a vertical habit as their branches reach upward in to the canopy of neighboring trees. Dogwood prefers well-drained, somewhat acidic soil, and is slow growing. In wooded areas it grows as an understory tree tolerating lower light conditions.

Flowering dogwood ranges from southern parts of New Hampshire, Vermont, and Maine south to northern Florida and west to Minnesota and Texas. At UMD a specimen of flowering dogwood is located in the eastern section of the Arboretum between the Textile and Violette buildings. It grows next to a Japanese dogwood (*Cornus kousa*), which is similar in appearance but can be distinguished in the spring by smaller, more pointed bracts that come into bloom in July, and by its smaller, pointed, V-shaped leaves with wavier margins. The fruit also differs in these two species, with those of *C. kousa* looking much like a single round, pendulous dull-red strawberry, unlike the solitary bright red berries of *C. florida*.

American Beech - *Fagus grandifolia*



The smooth, silvery-gray bark and the elongate, sharply pointed buds of *Fagus grandifolia* distinguish this deciduous tree from most other New England woodland tree species. Large specimens may reach 35m in height. Short petiole leaves of the American beech are 2.5 -12.5 cm long, elliptical to ovate in shape, and have a coarsely toothed border. A distinguishing feature of the beech leaf is the very regular, pronounced, straight and parallel veins angled from the leaves' midrib. The bark is uniformly smooth throughout the tree, as it does not become furrowed with age. The light-colored bark stands out noticeably against the darker bark of the oaks and pines in the winter forest. Twigs are encircled by stipule scars at each leaf scar. Beech is monoecious with separate male and female flowers developing in the upper branches after

the leaves open. The fertile female flowers usually produce 2 elongate conical, triangular nuts enclosed inside a woody bur.

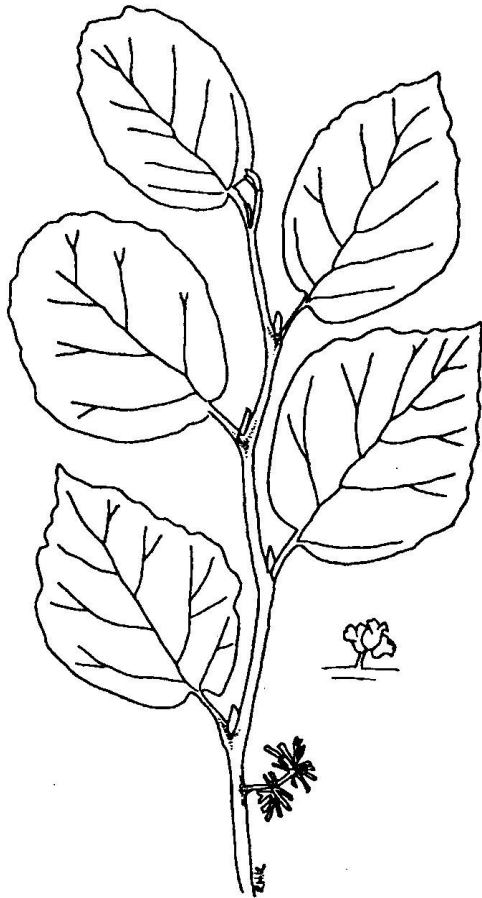
The beech nut is consumed by birds such as bobwhite, and mammals such as gray squirrels and opossum. The nuts were roasted and eaten whole or ground into flour in earlier times. A vegetable oil can be extracted from the crushed kernels. The nuts fall from the tree in early October as the nights get colder. The heaviest crops of nuts are produced in the northern parts of the United States and Canada, the largest crops every third year. The American beech is a popular landscaping tree but not as popular as its European relative, *Fagus sylvatica*. European beech has a darker bark and smaller, more rounded leaves. Cultivated varieties of European beech may have deep maroon foliage and a drooping habit. Many of these cultivars were planted in the late 19th century around stately homes in New Bedford and Newport.

The beech has a shallow root system which often extends above the soil. Sometimes its roots even break through pavement, as one can see walking along the path from parking lot #13 to the UMD library.

Beech occurs late in forest succession, and in the woodlands of southeastern New England it is a part of the climax forest community. Because of its tolerance to shade conditions, beech can develop under an established canopy, where it grows up to block out less shade-tolerant trees. Beech prefers a rich, loam soil.

Fagus grandifolia ranges from Nova Scotia and Prince Edward Island, south to northern Florida and parts of Texas. It is one of the trees of the beech-oak community of southeastern New England. On campus a stand of beech can be found along Ring Road at the entrance to parking lot#2, the walk from lot# 14 to the library, and in the woods along the eastern edges of the playing fields.

Witch-hazel - *Hamamelis virginiana*



Witch-hazel is a deciduous shrub or small tree growing 7-8 meters tall, but is usually of shorter stature in our area. Simple, broadly ovate leaves are shallowly toothed and have slightly undulated margins. They are 5-12 cm long, and almost as broad, and are oppositely arranged on new growth. Their bases are asymmetrical, their veins straight, and the surface is slightly corrugated.

The simple, naked buds are hairy and are without scales. Lateral buds are .75-1.5 cm long; terminal buds are slightly longer. Witch-hazel is one of the few plants of this area that flowers late in fall or even into winter. The spider-like flowers may appear after the leaves have fallen and commonly after the first snowfall. Flowers occur in short axillary clusters with linear, strap-shaped petals which become twisted with maturity. The petals of the flower curl back into a bud if the temperature gets too low. The yellow blossoms are pollinated in the fall and early winter and occur together with the matured seed capsules from the previous season's flowers.

Dispersion of seed is interesting in witch-hazel. Unlike the maple, which produces a propeller-like samara that can be blown distances in the wind or Junipers, whose edible 'berries' are eaten and dispersed by birds the witch-hazel shoots its seeds out of cannon-like seed capsules to disperse them away from the parent plant. The seeds take a year to develop and are ejected forcibly from the capsule as it dries in late fall. They fall 5-10 meters away. The dried gaping capsules persist throughout winter.

Distilled extracts of witch-hazel bark have traditionally been used medicinally. The bark is also eaten by rabbits and other browsers in the winter. The branches have been used by dowsers in their mysterious process of locating underground water.

Witch-hazel ranges from Nova Scotia south to Florida and westward across the eastern half of the United States. At UMD, scattered specimens of witch-hazel can be found in the natural oak woodlands surrounding the playing fields and along the walkway from parking lot# 12 to the campus.

Inkberry - *Ilex glabra*



Although not associated with Christmas as is American holly, inkberry is of the same genus, in the holly family (Aquifoliaceae). Inkberry is an evergreen shrub that may reach 3 meters in height. The leathery leaves are narrow and elliptical and may have smooth margins or may have a few rounded teeth at their tips. The species epithet 'glabra' gives a good indication of the texture of the leaves. Glabrous is the term used to describe a smooth, hairless texture. The leaves are 2.5-7.5 cm long. New twigs are light green but become gray with age. Flowers are dioecious, small and white, and occur in clusters of 5-6. The young green fruits mature to black lustrous berry-like drupes 5-7 mm wide in late summer. These berries may persist through the winter.

Three hollies grow on campus. While their vegetation structure would suggest a diverse group, all are members of the genus *Ilex* and have some easily recognized characteristics in common. All three have small, greenish-white dioecious flowers and drupes for fruits. The bundle scars of each are single and the end buds

are true. All have alternate leaves, but ink berry and American holly have evergreen leaves while those of winterberry are deciduous. Ink berry and winterberry are shrubs with soft smooth leaves while American holly is a conical-shaped tree with the sharply pointed leaves we associate most with holly.

Inkberry often grows in low, sandy areas and is especially common near the coast. It can be found growing on the edges of wood lots and ponds as well as wet thickets and the edges of bogs.

Inkberry occurs along the coast from Nova Scotia to Florida. At UMD it is scattered around the borders of wooded areas commonly along Ring Road and at the edges of the sward of growth leading to Cedar Dell Pond.

American Holly - *Ilex opaca*



American holly, probably the most recognized tree in our area, with its distinct leaves and red berries, is universally the symbol of Christmas. It is a conically shaped evergreen tree which may reach 15 m height. The alternate, simple leaves are dull green and leathery. It is one of the few native, broad-leaved evergreens in our area. Individual leaves can persist up to 3 years. Rather sharp to the touch, the spine tipped leaves may reach 4-8 cm in length and about half as broad. The bark is thin and gray. The twigs are glabrous and are gray or brownish.

Holly is dioecious, and the flowers appear with the new leaves from May through June. The small flowers are about 6 mm wide with 4 rounded, greenish-white petals. The bright red, round fruits persist into the winter. Some cultivated varieties have yellow fruits.

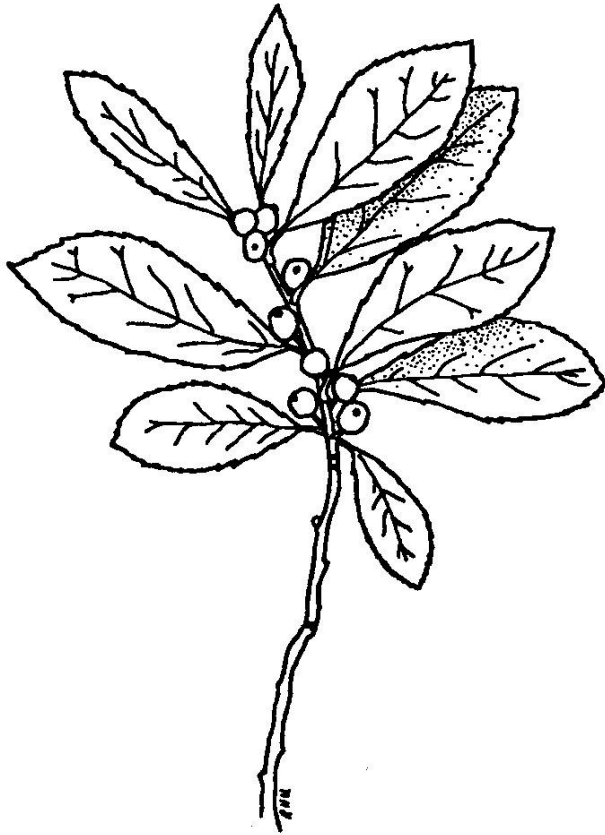
Holly is a popular Christmas green and has been overharvested in areas. It is now uncommon near towns and cities and other areas easily accessible to Christmas decorators and floral arrangers. Compounding this problem is the fact that it is slow

growing and its reproduction is rather low. American holly is used in landscaping along with English Holly (*Ilex aquifolium*). While they are similar in appearance, the leaves of English holly are a darker, shinier green. As with all dioecious plants, and hollies in particular, male trees must be nearby for female trees to bear berries.

American holly is most often found in sandy, moist, sheltered locations. It is very common on Cape Cod near Falmouth and Mashpee, where it and other species of *Ilex* have been protected at the Massachusetts Audubon Societies' Ashumet Holly Reservation. American holly ranges from Southeastern coastal Massachusetts south along the Eastern seaboard through northern Florida and to Texas, extending inland to Ohio, Missouri, and Oklahoma. At UMD

American holly is scattered throughout the moist woodlands of the campus, and specimen trees have been saved in open areas. A male and female pair of trees stand together along the walk from parking lot #14 to the Violette Building and another along the same walkway grows sheltered under a white pine. A group of male and female specimens also grow along the walk to Group 1 from parking lot #3.

Winter berry - *Ilex verticillata*



3 meters.

During fall and winter, winterberry's most noticeable characteristic is its red, berry-like fruits. These stalked, round fruits measure about 6 mm across and are solitary or occur in small clusters.

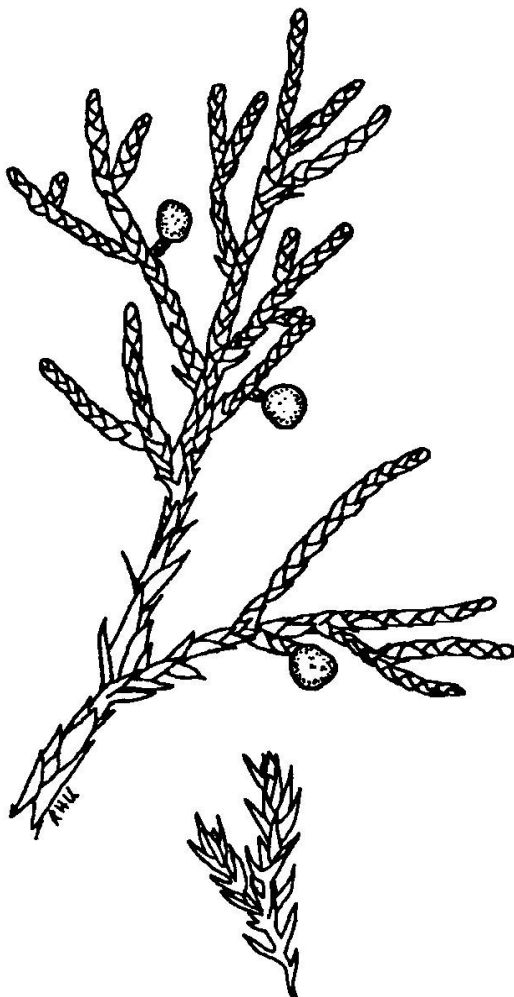
The leaves are 5 cm long, alternate, and are elliptical-shaped. The leaf margins are toothed, but are not spiny like those of American Holly. Unlike other hollies (*Ilex* species), winterberry leaves change from dark green to black in fall, giving the shrub its other common name, black alder. The leaves fall rather early in autumn exposing the bright red berries of the female plants. Like all hollies, winterberry is dioecious.

Flowers of winterberry are small, white, and are present on the female shrubs from July to August. They grow in clusters, or occur singularly, from the leaf axils on short peduncles. The young stems are smooth and light gray, becoming darker with age. The shrub ranges in height from 1-

Its berries make winterberry an attractive ornamental, but it may be limited in use due to its high moisture requirement. Cultivated varieties exist with larger berries that persist longer than those of the native species. Berries are often cut and used as winter decorations.

Preferring moist sites, winterberry is commonly found in bogs, moist thickets, swamps, and around the borders of ponds. It ranges from Newfoundland west to Minnesota and south through Tennessee to Georgia. At UMD a thicket of winterberry can be found on the right at the entrance to parking lot #1. Two specimens of cultivated winterberry can be found in the Arboretum between the Violette and Textile Buildings. After the leaves of the trees have fallen, the red berries of another specimen of winterberry can be viewed looking across the small pond near the entrance to campus.

Eastern Red Cedar - *Juniperus virginiana*



The slender, conical-to columnar-shaped trees of *Juniperus virginiana* are easily recognized by their tightly appressed evergreen foliage and by their reddish-brown, fibrous bark. The common name, eastern red cedar, is partly derived from the bark, and partly from the bright red color of the tree's heartwood. The color of the foliage varies from tree to tree, and ranges from light to dark green or various shades of blue-green. Most trees turn reddish-brown in response to the short, cold days of winter. Trees can grow to a height of 15 meters, though most specimens at UMD are shorter.

Two kinds of leaves may be present on a single tree. Mature foliage consists of 2-ranked scalelike leaves, 2-3 mm long. These cover the twig and are smooth to the touch. Juvenile foliage, about 10 mm long, is needle-like and sharply pointed. The solitary needles are 3-sided but appressed to the twigs; they are less densely spaced on young branches than are the mature scale-like leaves. This juvenile foliage is sharp to the touch and usually occurs near the bases of young trees or on seedlings.

Male and female cones are born on separate trees. Male cones are 3-6 mm long and are seen only during spring. After shedding their pollen

these dry, papery cones are dropped. The female 'cones' look more like a small solitary berry-like fruit than a cone. They are distinctly blue-colored, and by fall they reach 6-8 mm diameter. Its dioecious character, this division of the sexes, explains why some red cedars have 'berries' while others do not. Eastern red cedar has been a useful tree to mankind. The outer bark, when stripped from the tree, dried, and rolled between the hands provides good tinder for starting fires. The bark is traditionally used in "flint and steel" methods of starting fires as the thin shreds of bark readily catch a spark. The wood is very aromatic and is often used to line closets and chests because of its tendency to keep away moths. The wood is also resistant to decay and thus is used for fence posts. Oil derived from juniper is used in perfumes and the berries were once used for flavoring gin.

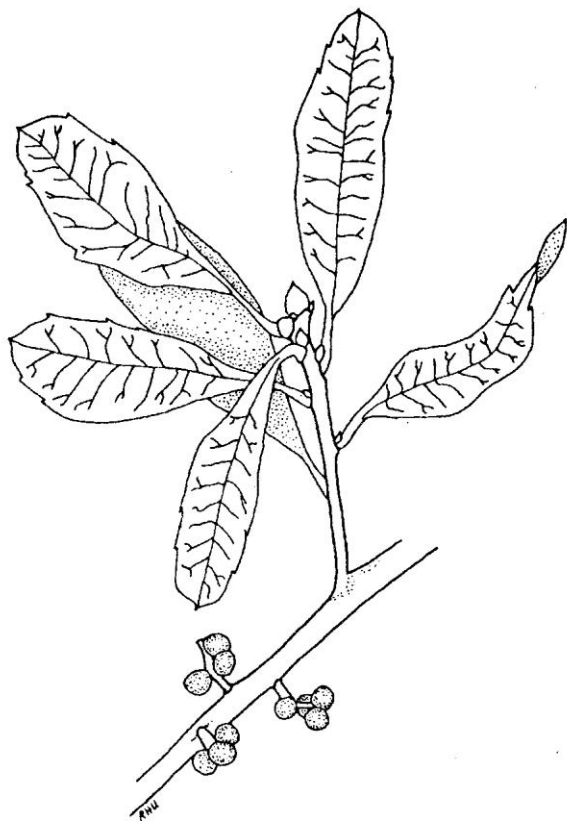
The seed cones are prized by many birds and are consumed by bobwhite, pheasant, and mourning dove. Seeds are dispersed as they pass undamaged through the gut of a bird to be

deposited nearby. Often a line of junipers can be seen growing along an old fence row or stone wall in the vicinity of good bird perches, or in fields near stones.

Red cedar is no friend to apple orchardists. The rust fungus, *Gymnosporangium juniperi* spends half of its life on the cedar tree, and the other half on apple trees, where its spots of infection discolor the fruits and leaves and ultimately weaken the tree.

Red cedar ranges from Nova Scotia throughout most of the eastern half of the United States. It is one of the first trees seen upon entering campus. Several specimens grow by the stone wall near the entrance as well as behind the flagpole area.

Northern Bayberry- *Myrica pensylvanica*



Bayberry is a deciduous shrub, 1-3 meters in height with noticeably aromatic leaves and berries. The alternately arranged, oblong leaves are 4-6 cm long by 1-1.5 cm wide and have a few broad teeth near their pointed tips. They are a dull, dark-green above and light green below, and a thick cuticle imparts a waxy texture to their surface.

Flowers are inconspicuous and dioecious, with male and female flowers occurring on separate plants. The waxy berries, which are characteristic of the species, will develop only on the female plants. The rounds, berrylike fruits, while commonly referred to as 'berries', are botanically called drupes, i.e. fruits with a soft outer layer surrounding a hard pit or seed. Green in early summer, these drupes turn pale, blue-gray by fall, and match the light gray twigs in winter. Bayberry is well known for the use of its berries in making candles. The outer waxy layer is collected after boiling the berries in water. The inner

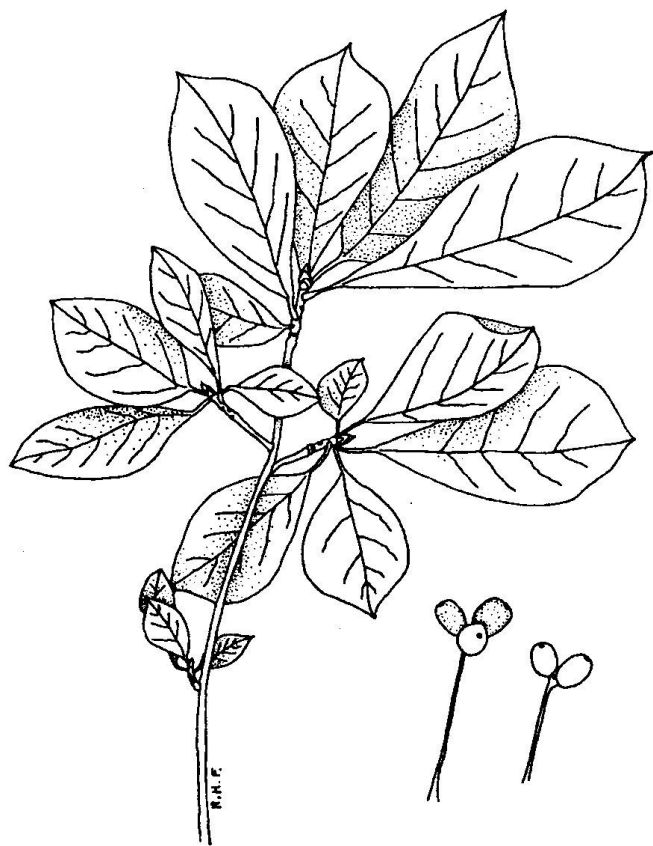
seed settles to the bottom, and after cooling, the greyish-green wax is collected from the surface. As the wax burns a pleasant aromatic fragrance is given off. It has the same aroma as that of the leaves when they are crushed. The berry is also food for birds-ruffed grouse, bobwhite, and pheasant. The yellow-rumped warbler (myrtle warbler), *Dendroica coronata* has evolved enzymes capable of digesting wax from the fruits of bayberry and wax myrtle (*Myrica cerifera*). This additional source of food allows the bird to extend its winter range farther north than most wood warblers.

Bayberry can reproduce vegetatively by rhizomes. After several years of this type of propagation a clonal population of plants develops. Such clumps have the oldest and toughest shrub in the middle, with shorter, younger plants at the edges.

Bayberry grows along the edges of ponds, marshes, and wood lots where it prefers sandy soils, and it commonly occurs on dunes where the sand has become stabilized. Northern bayberry occurs along the eastern seaboard from Newfoundland south to North Carolina and around shores of the Great Lakes. At UMD bayberry is widespread along the edges of the woods

bordering Ring Road and in the cleared area leading to Cedar Dell Pond, adjacent to the apartments. It prefers open, sunny locations.

Black Tupelo - *Nyssa sylvatica*



From a distance black tupelo is best recognized by the horizontal, zig-zag pattern of its branches. Also, black tupelo is one of the first trees to turn color in the fall when its scarlet-maroon foliage contrasts with the green color of other trees. During the growing season the leathery egg-shaped, elliptic leaves are lustrous green and are alternately arranged along the stem. They are 5-13 cm long and 2.5-7.5 cm wide on short shoots where little stem elongation occurs, crowded together in what appears to be a whorled arrangement.

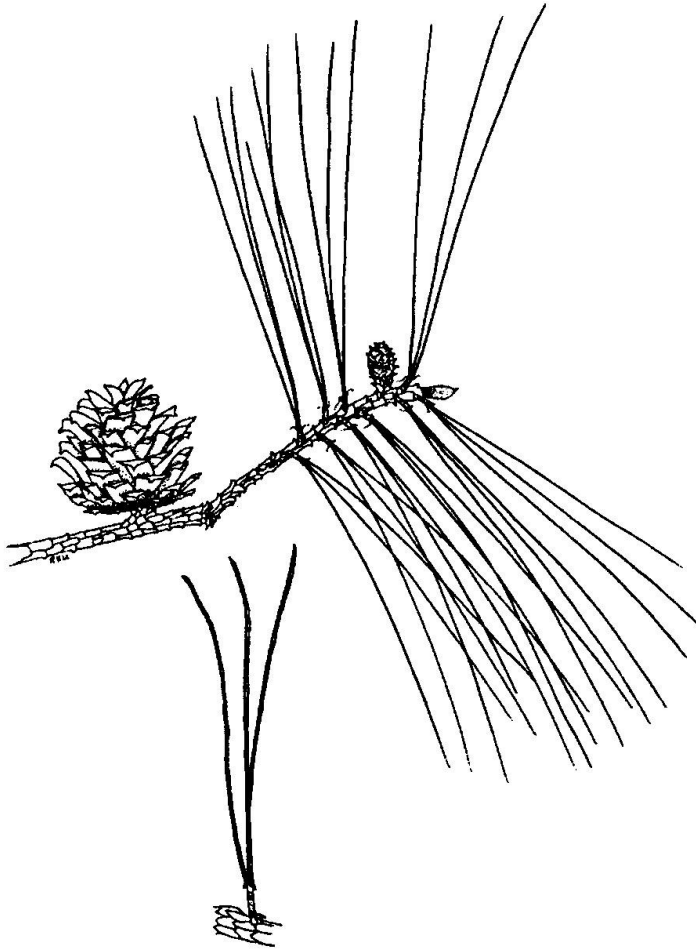
Several traits are especially important to winter identification. The bundle scars are three/leaf scar; end buds are true and have several scales. Pith of the slender brown twigs is chambered. Black tupelo varies in height from a small shrubby tree up to 30 m, though most large trees on campus probably reach only about 15-20 m.

Greenish flowers are present in the spring, and they give way to dark blue, elliptical, berry-like drupes during August through October. They are 1 cm

long on a 7 cm stalk. They usually occur in groups of two and three. Being dioecious, only the female trees have berries.

Black tupelo is often found in wet soils, swamps, and bogs, but it may grow on dry uplands as well. It ranges from parts of Maine south to Florida, west to Texas and north to Michigan. On campus it occurs near both ponds, and a particularly striking specimen is seen along the walk from Cedar Dell Village to the quad just inside Ring Road by the soccer fields.

Pitch Pine - *Pinus rigida*



The two prominent pines on campus, eastern white pine and pitch pine, are easily distinguished by the number of needles occurring in each bundle or fascicle. Needles of pitch pine occur in bundles of 3. They are stiff, sharply pointed and are approximately 1.5mm wide, 7.5-13 cm long. The fascicles occur at a right angle to the stem and give the branches a cylindrical outline. The margins of the needles have minute teeth that are noticeably rough if you run your finger from the tip of the needle to its base. Cones are stout, 3-7cm long and are ovoid to conical in shape. The cones mature and open in the second fall after their formation and pollination, but may persist on the tree for several years after their seeds are dispersed. Each cone scale is tipped with a small barb, and bears 2 winged seeds at its base.

The bark of mature trees forms plates separated by grooves giving trunks and older branches a

scale-like appearance. A resinous pitch oozes from stems where the bark is broken. A characteristic of pitch pine is the tendency for short branches and needles to grow directly out of the trunk. When damaged by fire, pitch pine can rejuvenate with their young sprouts rising from partially burned stumps and trunks.

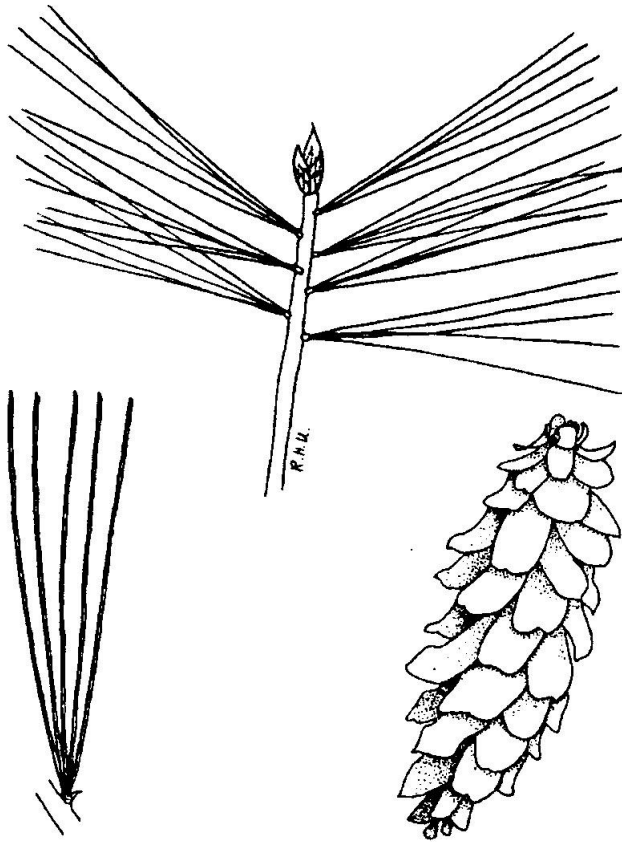
Branches on most plants arise from buds in the axils of leaves. The fascicles of pines are actually reduced branches called spur or short shoots. Like other branches each fascicle arises from the axil of a small, dry scale-like leaf along the branch axis. While pitch pine has 3 needles/fascicle, white pine (*Pinus strobus*) has 5 needles/ fascicle, and red pine (*Pinus resinosa*), has 2 long needles/fascicle. The cones of white pine are longer and more slender than either red or pitch pine.

On first encounter with this tree, you will recognize the origins of the common name 'pitch' pine. The resin is very sticky. Turpentine was produced from the resinous knots, and the pitch was also used for wagon axle grease by colonists. The pitch-filled knots were clustered

together to make torches. The wood is not used much today, but was once important for its durability, and was used for railroad ties and for making charcoal.

Pitch pine is an inhabitant of dry, sandy areas, and often grows in association with scrub oak and gray birch-plants also known for their ability to inhabit poor soil. It is the pine that dominates the New Jersey pine barrens as well as the oak-pine woodlands of Cape Cod. Pitch pine ranges from southern Maine west to New York State, and southwest to parts of Georgia and Tennessee. In New England, it is common along the coast where damage by high winds and salt spray may produce a picturesque shape, reduced in size and contorted in form. In more sheltered areas it may grow to 15-18 m in height. On the UMD campus it is not as abundant as eastern white pine, but a good size stand grows around the borders of parking lot #2 and between lots #1 and 2 and near the smaller pond by the entrance to campus.

Eastern White Pine - *Pinus strobus*



White pine is the dominant evergreen tree on the UMD campus. From a distance the clusters of blue-green needles and the thin flexible twigs supported by horizontally disposed branches give the entire tree a soft appearance. This soft textural appearance contrasts with the more rigid appearance of other pines and is a useful diagnostic feature when seen from a distance. Viewed up close, the occurrence of five, soft and flexible needles in each fascicle, or bundle, is the most distinguishing character and delineates this species from the two needles/fascicle of red pine, and the three needles/fascicle of pitch pine.

The light-colored bark of young trees is smooth, but becomes dark and furrowed as the tree ages. Young trees form a pyramidal shape which becomes broadened in the upper reaches, especially in open field grown trees.

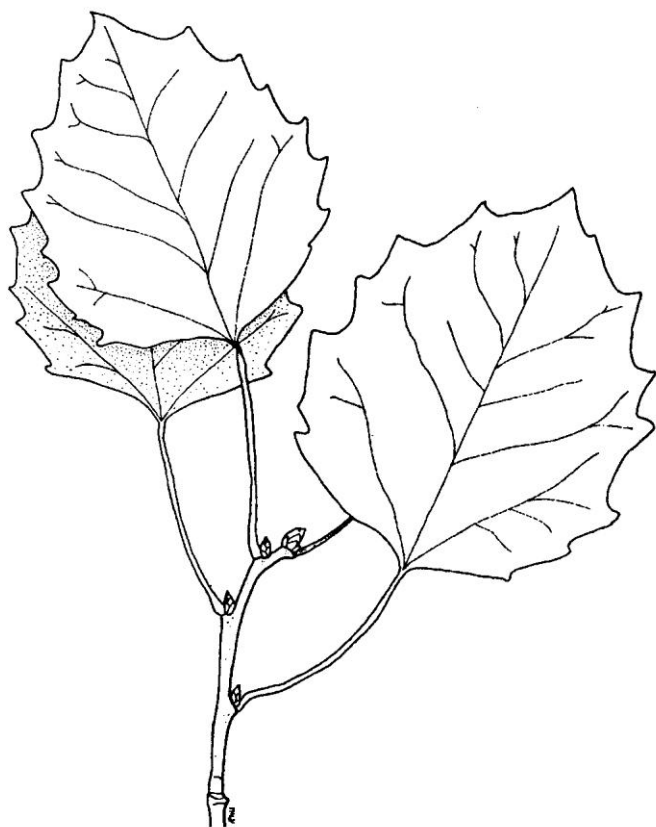
The elongate, slightly curved, cylindrical cones of white pine are about 12-15 cm long by 2.5-4 cm wide. The paired seeds at the base of each cone scale are a favorite food of squirrels. Patches of pitch often cover the cone.

White pine is prized for its straight grained, light colored, soft wood. Because of the ease with which it is worked, white pine is a popular wood for making cabinets, especially before power tools were invented. Much early American cabinetry is of white pine. It is still a valuable lumber product, but it is susceptible to the white pine blister rust, the fungus *Cronartium ribicola*, which affects the inner bark and eventually kills the tree. The white pine weevil, another pest, attacks the growing tips and deforms future growth.

Also known as 'old field pine', white pine is one of the first trees to invade and colonize abandoned farmland or otherwise open fields. Following the abandonment of farm land in much of New England shortly after the Civil War, white pine came to dominate old fields. These 'old field' pines provided an extensive lumber resource in New England, where they were harvested in the 1920's and 1930's.

White pine extends from Newfoundland to Georgia in woodlands and forests and is especially abundant in New England. There are areas of the campus that have been allowed to return to woodlands and these are dominated by white pine. Such early successional forests of white pine can be seen on the walk from Cedar Dell Village along the soccer fields. White pine also occurs in most of the woods of campus, especially near the Cedar Dell Village. A planting of white pine can be seen near the entrance to the UMD Library and along the edges of the campus quad.

Bigtooth Aspen - *Populus grandidentata*

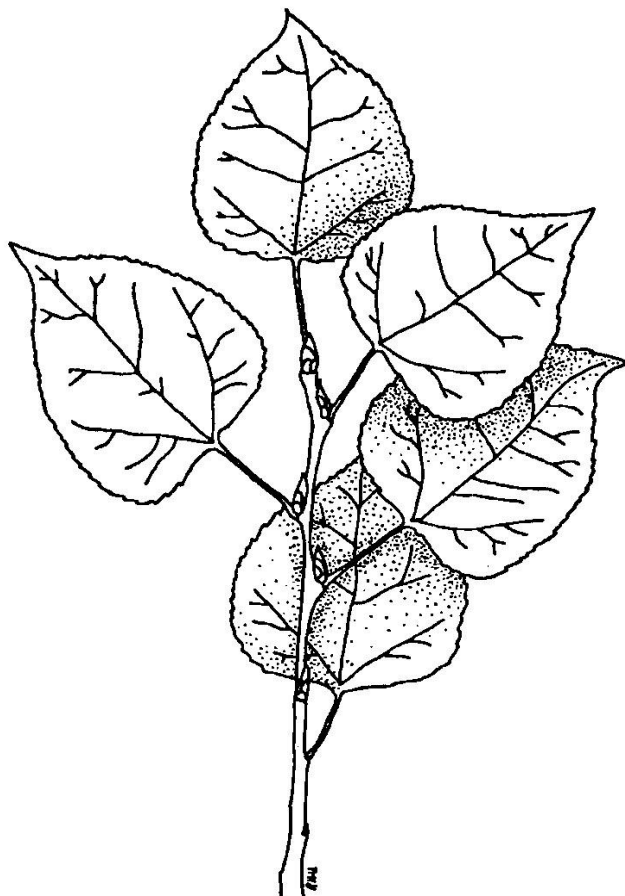


Of the two poplars on campus, the bigtooth and the quaking aspens, the bigtooth aspen can be distinguished by its larger leaves, each bearing 5-15 pairs of large curved teeth along its margins. Quaking aspen has smaller leaves with many, smaller teeth. The leaves of bigtooth aspen are alternate, ovate, 6-10 cm long, and 5-9 cm wide. Like other poplars the leaf petioles are long and vertically flattened, causing them to waver in the wind. When young, these deciduous leaves are white and woolly, but become smooth and green as they mature.

The flowers occur in dioecious catkins and are wind-pollinated before the leaves form in the spring. Young branches of the bigtooth aspen are gray, and the bark may be yellowish. The buds of bigtooth aspen are wide, and the brown scales are covered by small white hairs. In contrast, quaking aspen has smooth, narrower buds that conform to the outline of the stem.

Bigtooth aspen can be found on sandy uplands as well as in moist locations. It is quick to grow on disturbed, burned over, and abandoned farmland sites. Bigtooth aspen ranges from southern parts of Manitoba, east of the Atlantic Ocean and south to North Carolina, and Iowa. At UMD, bigtooth aspen is best viewed at the edge of the wooded area along the walk from parking lot #14 to the lecture halls of Group 2, where the path branches off toward the library. Specimens of both bigtooth aspen and quaking aspen occur there, making a comparison of the species easy.

Quaking aspen - *Populus tremuloides*



Quaking aspen is similar to bigtooth aspen but it can be distinguished by the different-shape of its leaves. Leaves of quaking aspen are rounded to heart-shaped, with an abrupt point at the tip, 3-7.5 cm long, and margins with 20-40 pairs of small teeth. The leaf petiole is long and variably flattened, causing the leaves to 'tremble' in the slightest of breezes. The trembling leaves reflect sunlight and help identify this tree from a distance.

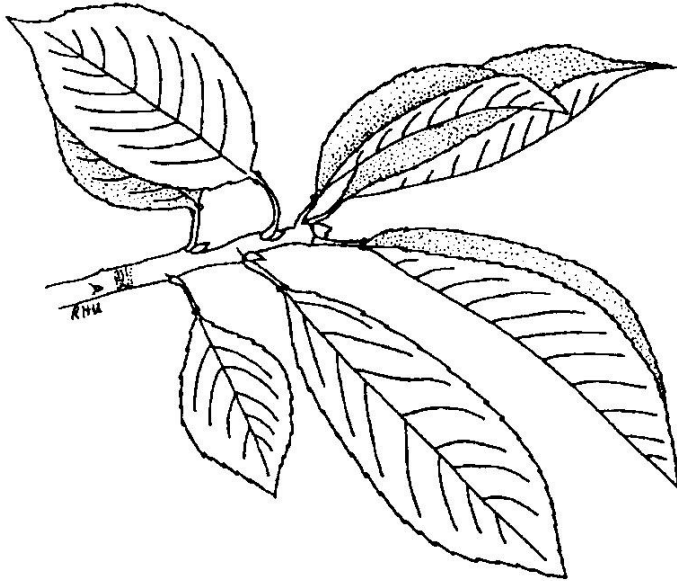
The bark is green-gray, becoming darker on old trunks. Buds are shiny, smooth, and conform snugly to the outline of the stem. The leaves are arranged alternately on the brown twigs.

Quaking aspen is often found growing in groves or stands. This growth habit may be brought about by its ability to send up suckers from its roots. As these suckers grow into other trees a clonal stand of aspen develop. The foliage is rather sparse, allowing light to penetrate down through the fairly short branches.

The habit of quaking aspen is thin and ranges in height from 12-21 meters. Like the bigtooth aspen, this tree is rather short lived. Its seeds are carried by air currents, and it is quick to invade abandoned fields, burned out areas, and places that have been cleared by logging. It is thus an early tree in plant succession and in our area usually gives way to conifers such as white pine. Buds and twigs of the quaking aspen are food for a large variety of birds and mammals across North America, including beaver, rabbits, and quail.

Quaking aspen has one of the largest ranges of all the trees in North America. It grows from Newfoundland west to Alaska, south to Virginia, and through the Rockies to Mexico. It is scattered in the wooded areas around campus, but a good place to observe it is at the edge of the wooded area along the walk from parking lot #14 to the lecture halls of Group2, where the walk branches off towards the library. Both quaking aspen and bigtooth aspen occur here, making for easy comparison of these closely related species.

Black Cherry - *Prunus serotina*

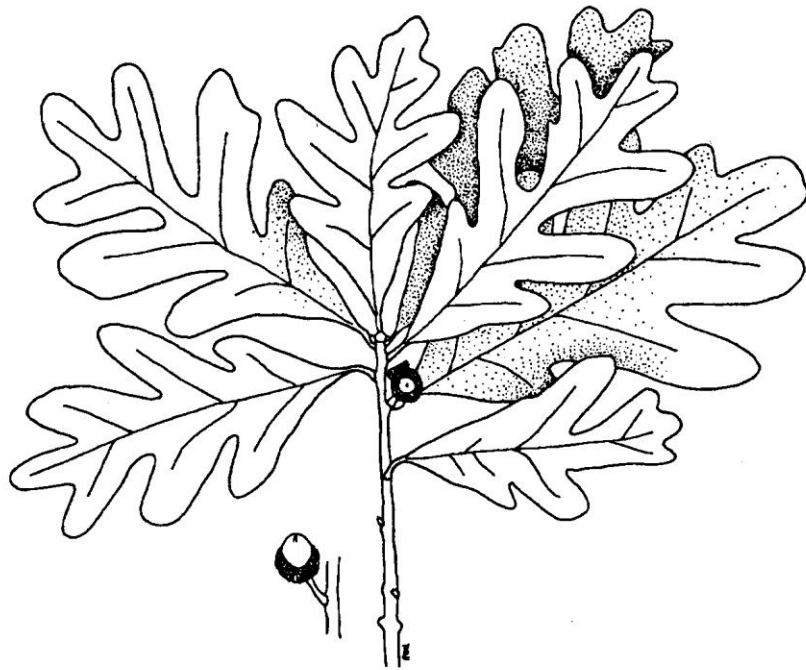


The leaves of black cherry have two unique characteristics: one is the presence of a pair of glands at the base of each leaf where the petiole meets the blade; the second characteristic is that the teeth of the leaf margin, unlike those of other serrated leaves, hook inward toward the leaf. The alternate, simple leaves range in length from 5-13cm. They are shiny above and have hair along the midrib beneath. Young bark is smooth and light colored with horizontal lenticels, while the older bark becomes darker and rougher. On older branches lateral growth may occur on short spur shoots.

The flowers are about 1 cm long and are clustered together at the end of the branch on a 10-15cm spike or raceme. The flowers develop into small, purple-black cherries in late summer. Although fruits are edible, and at one time commonly made into jelly and wine, the bark, leaves, and seeds of this tree contain prunasin, a chemical which converts to toxic hydrocyanic acid when digested. Black cherry was one of the first trees sent to Europe from North America, and was under cultivation in England by 1629. Its wood is used in making furniture and paneling.

Black cherry prefers rich soil on moist sites. It is common over the eastern half of the United States. At UMD, black cherry can be found along the stonewall near the Dion Science and Engineering Building, across from the main entrance to the campus.

White Oak - *Quercus alba*



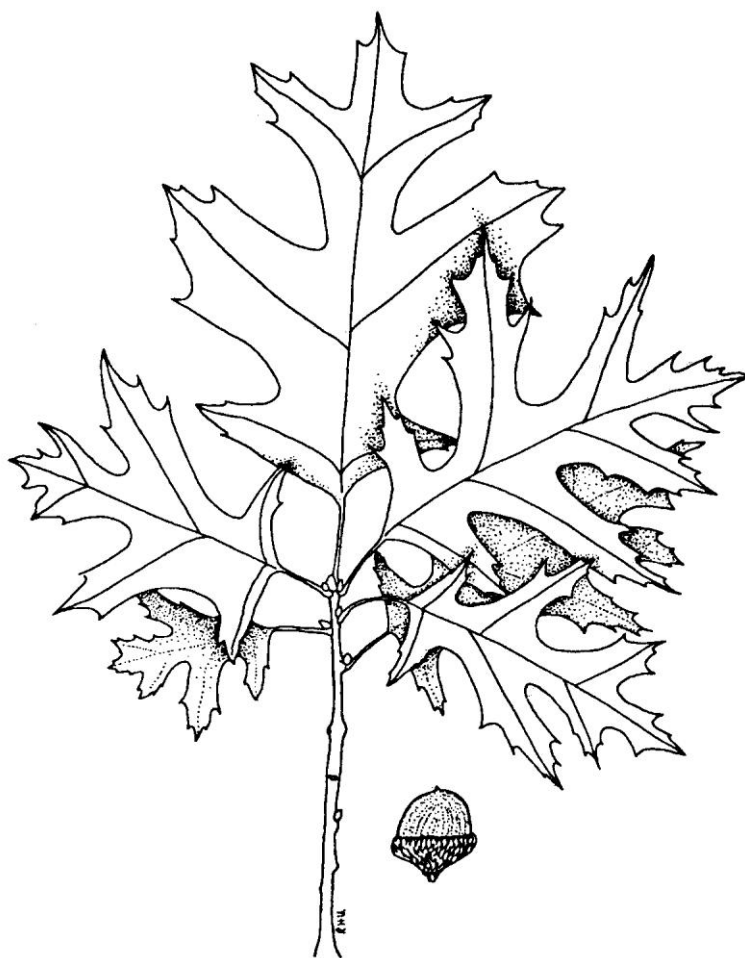
Oaks are some of the most readily recognized trees because of their familiar, alternate, simple but lobed leaves and pronounced acorns. The oaks are divided into two major groups, the 'red oak group' and the 'white oak group' each containing several species. The red oaks are characterized by having pointed tips on their leaf lobes and hairy linings with yellow meat on the inside of their acorns. The rounded lobes, and acorns with white meat and a hairless lining. The most common representative of the 'white oak' group is *Quercus alba*, the white oak.

The simple, alternate leaves of white oak are 10-20cm long and may have up to 11 rounded lobes. The sinuses may extend almost to the mid-rib, or the leaves may be narrower with shallower sinuses. In the fall the deciduous leaves turn a reddish brown and may remain on the tree through the winter.

The acorns are egg-shaped and 1-3cm long. The acorn's cup has scales that are tightly appressed and may be bumpy or rough. The acorns of the white oak mature in their first year, and are found on the season's new wood. White oak can grow to a height of 30m and may live for hundreds of years. In an open area such as a field or lawn it will grow with long, spreading branches; in a wooded area when it might compete with other trees for light, it will grow tall and narrow. The wood from white oak makes it an important lumber tree today, in the past even more so as it was used for ship building and to make barrels. The acorns are an important food for wildlife. The acorns from white oak are less bitter than those of the reds, and after the tannin has been extracted through several boiling they can be eaten.

White oak ranges from Maine south to northern Florida and west to Minnesota and Texas. While most of the large oaks on campus are in the red oak group, many white oaks are growing along the edges of Ring Road and around the borders of the parking lots. Several specimens of white oak and red oak grow together along the path to the Dion Building from parking lot #17.

Black Oak - *Quercus velutina*



Characteristic of all of the oaks are their clustered true end buds, 3 bundle scars/leaf scar, and acorn fruits. The 'red oak group', of which both black oak and scarlet oak are members, has pointed lobed leaves, hairy surfaces on the inside surface of the acorn's shell (not the cup), and acorns that mature at the end of the second summer after pollination.

Several oaks of our area hybridize with each other, making them difficult to identify. The leaves vary in form; even on the same tree the leaves of mature wood differ from those on basal suckers. Stem and bud shapes and degree of hairiness vary, adding to the difficulty of species identification.

Black oaks can usually be identified by end buds that are large, sharp with an angular appearance, and gray-haired. The inner bark is a yellowish color. The leaves are 5-9 lobed, sharply

pointed, and have an overall glossy appearance. Its acorns are 15-19 mm long, and the acorn cup has relatively loose scales. Another member of the 'red oak group' which is native to New England is the northern red oak, *Quercus rubra*. It is similar in appearance to black oak, but the surface of its leaves is dull rather than shiny, its acorn cups are shallow, its inner bark red, and end buds are narrow, sharply pointed, and hairless.

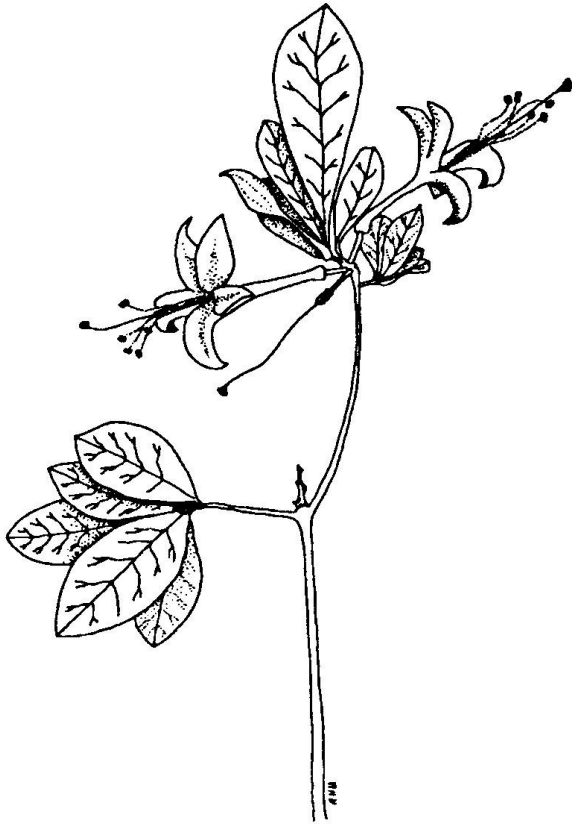
A third member of the red oak group on the UMD campus is scarlet oak, *Quercus coccinea*. Its buds are smaller than black oak's, rounded, blunt, and may have silky hairs on the upper half of their scales. The inner bark is light red in contrast to the yellow of black oak. The leaves are somewhat glossy, deeply lobed, with large circular sinuses that may go more than half-way to the midrib. Acorns are 1.2-2.5 cm long, may have concentric rings near the apex, and have cups with tightly appressed scales.

Both scarlet and black oak prefer dry, sandy, soils and range in height from 16-24m.

Scarlet oak is a popular ornamental because of its bright red, fall foliage, and summer shade. Black oak is harvested for lumber, and at one time the inner yellow bark was a source of dye as well as a source of tannin, which was extracted and used in leather tanning.

Black oak grows over much of the eastern half of the United States from Maine south to northern Florida and west to Texas and Minnesota. Scarlet oak's range is smaller, extending from Maine south to Georgia and west to Illinois. The oaks are abundant trees on campus; they occur through drier woods, and some grow as specimen trees in open areas.

Swamp Azalea - *Rhododendron viscosum*



Swamp azalea is known for its summer fragrance which earns it another of its common names, swamp honeysuckle. Its fragrant trumpet-shaped flowers resemble true honeysuckle, (*Lonicera*), both in fragrance and general appearance. When growing in the open, *R. viscosum* appears similar to its relative, the blueberry, *Vaccinium corymbosum*, 1-3 meters high, densely branched, and with an upright growth habit.

The alternately arranged, narrowly obovate leaves are glossy green above and greenish-white below. Approximately 2.5-6.5 cm in length, their midrib may be bristly or hairy beneath. Young stems are hairy and reddish-brown but become smooth and light brown with a thin bark on aging.

The white flowers appear after the leaves do and may be present from June through August. The flowers may occur in clusters, with individuals 4-5 cm long. Longer than the 5-lobed corolla, the 5 stamens and 1 style protrude from the center of the

flower. Winter flower buds are terminal and are larger than the lateral vegetative buds. They have 8-12 scales. The seeds are produced in a persistent woody capsule.

Swamp azalea is known for its sticky flowers. The outside of the trumpet-shaped flower have red sticky hairs. In Latin the word 'viscosum' means sticky. Another common name for this shrub is clammy azalea, another reference to the sticky nature of the fused flower petals.

Members of the genus *Rhododendron* include the deciduous azaleas and ever-green rhododendrons. These are among the most commonly utilized plants in landscaping because of their colorful flowers, manageable size, and attractive foliage.

Swamp azalea grows in swamps, bogs, and wetlands near the coast from Maine south to Georgia and west to Texas. At UMD, several 1.5-2 m high specimens of swamp azalea are growing at the open edges of Cedar Dell Pond as well as in many other wet areas of the campus.

Pussy Willow - *Salix discolor*



bark on the twigs is thin and may be hairy.

Pussy willow is a common ornamental, its popularity due to its spring catkins and its ability to be propagated rather easily. New plants can be started by rooting young branches in water, then simply planting them in the ground. If the ground is moist, many twigs will root directly in the ground. Posts of willow hammered into the ground have been known to root, sprout leaves and grow into trees.

Another willow that may be found in this area is *Salix humilis*, the prairie willow. Reaching 4 m in height, it is smaller than the pussy willow. The leaves of prairie willow differ from those of pussy willow in that their margins are smooth instead of toothed and their edges are rolled inward. The stipules are small. It is difficult to tell these and other willow species apart because of their tendency to hybridize. Both species tend to have a shrubby habit with several main trunks or branches.

Both species of willow occur throughout New England. *Salix discolor* prefers a wet soil and lives in bogs, swamps, and other wet areas, whereas *S. humilis* tolerates a drier soil. Large willows can be found in front of the small pond near the entrance to campus as well as along the border of wet wooded areas.

Pussy willow is best known for its familiar, gray, furry catkins, harbingers of spring. These furry flowers appear before the leaves in early spring. All willows are dioecious and it is the male catkin that is most ornamental. When branches with closed buds are cut in late winter and brought indoors, flower buds enlarge and catkins elongate. If kept in water for awhile, the yellow pollen from each individual flower can be seen.

The leaves of pussy willow are elliptic and whitened beneath. When young they are hairy, but become smooth with age. Margins of the leaf may be toothed from the middle of the leaf to the tip. Leaves range in length from 5-12 cm and occur alternately arranged along the stem. Stipules may be present and are often large. The

Sassafras - *Sassafras albidum*



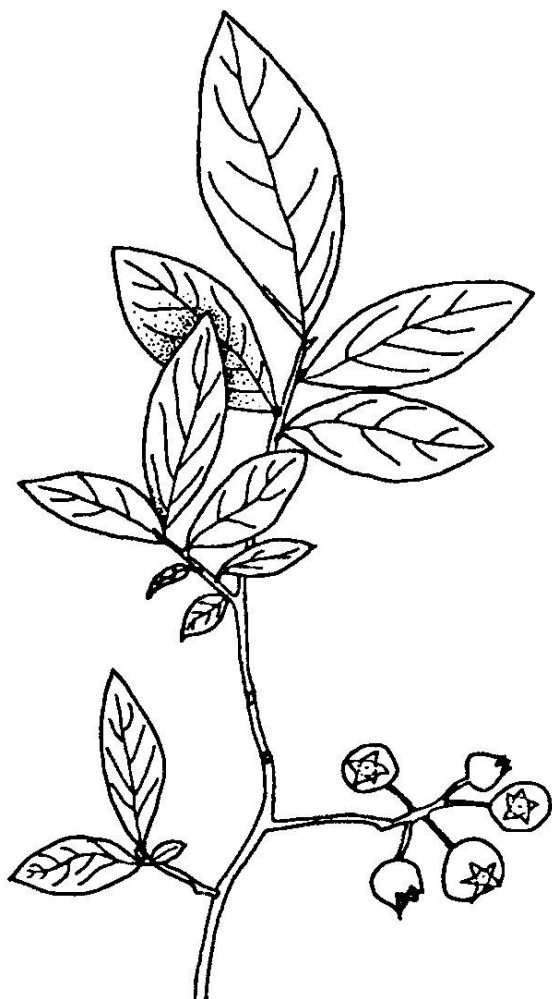
Sassafras is a common tree in the woodlands of UMD. Almost all ages can be seen, from seedlings to mature trees 10-15 meters high. The two most distinctive features of sassafras are the spicy fragrance of its crushed leaves, bark, roots, and wood, and the unusual and varied forms of its leaves. Leaves, 7-15 cm long, are alternately arranged and have smooth margins. In shape they may be ovate and without lobes, bilobed like 'mittens' with either one right or one left 'thumb', or trilobed with the center lobe being larger than the two side lobes. The tree is deciduous, but before falling in late autumn,

the shiny green leaves turn yellow with a warm pinkish-orange color. Twigs are green, have true end buds, and show a single bundle scar where leaves were attached. The wood of sassafras is brittle, and the trees often do not attain great size. The mature bark is reddish-brown and furrowed on older trunks.

The inconspicuous flowers are small, greenish-yellow and are dioecious, that is, male and female flowers are on different trees. Fruit of the sassafras is a drupe-like berry, about 1 cm long, and hangs from a red club-shaped pedicel 3-5 cm long. The berries mature in one year and are eaten by songbirds, bobwhite, wild turkey and bear, though of course the latter two browsers are not so common in UMD's woods. Twigs may be browsed by deer and, when low enough to the ground, by rabbits.

Sassafras is perhaps known best for its tea which can be made by boiling the bark of its roots in water. Spicy oil can be extracted from sassafras root bark and was once used in lotions, perfumes and soaps. Once thought to be a panacea for many ailments, sassafras was imported to England in the early 1600's and was one of the first exports from the Jamestown colony in Virginia. The wood was also thought to drive away bugs.

Blueberry - *Vaccinium corymbosum*



When in fruit, blueberry is easily identified. The blue to blue-black berries are produced in terminal clusters from mid- July through mid-August. Fruits of wild blueberries are smaller than cultivated varieties, but are similar in appearance, with their characteristic 5-pointed 'crown' of dried flower remnants at their tops. They sometimes have a white, powdery, covering called a bloom.

The small white flowers, each with a green or pink tinge, bloom in early May. They are bell- or urn-shaped, 6-13mm long, and individually are not particularly conspicuous. Collectively however, they are quite noticeable, and the bees frequent them to collect nectar. Fruits develop by the end of July.

Leaves are elliptical, 3.5-7.5cm long, and may be slightly hairy beneath. The leaf margins are usually entire but maybe somewhat toothed. On a fruit-bearing branch the leaves near the branch tips are often larger than those near the base. Stems of the blueberry are green, but by winter young shoots often turn red. The older stems and branches develop a thin bark and numerous

brown twigs. Leaves turn bright red in autumn, and while they are deciduous, they may persist longer than those of many other deciduous shrubs. Individual shrubs reach 4.5 m height.

Highbush blueberry often hybridizes in nature with other members of genus *Vaccinium*, and it is sometimes difficult to tell species and hybrids apart. All members have false end buds, one bundle scar/leaf scar, and edible fruits.

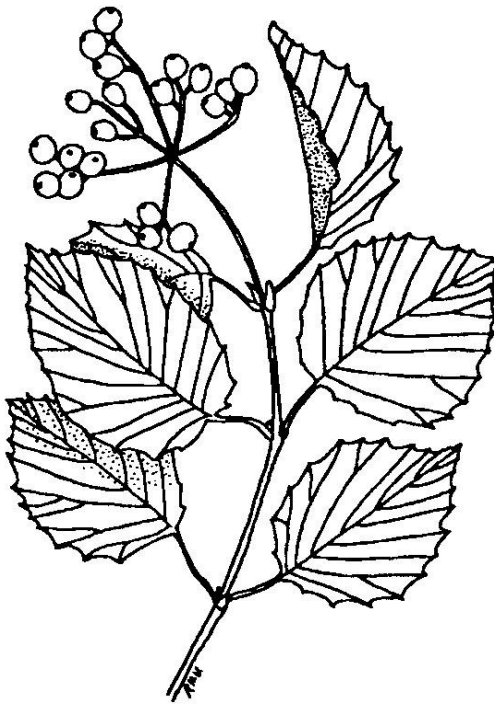
Vaccinium corymbosum is the species from which most of the cultivated varieties have been developed. The sweet berries are an economically important crop and are used in preserves, pies, and other pastries. As an important natural food, the berries are eaten by birds and mammals, and the twigs may be browsed by rabbits. Commercially grown berries often require nets to keep birds from devouring the crop. The food value, combined with the colorful fall foliage, makes blueberry an important landscaping plant. Suckers from the base of the plant

can be divided and transplanted.

Often found in bogs and swamps, blueberry may also grow in dry uplands. Whether wet or dry, it requires acidic soils. It is a close relative of the cranberry, (*Vaccinium macrocarpon*), and they often occur together in wet, acidic soil. It is quick to colonize abandoned cranberry bogs and transforms these bogs from an open mat of vegetation to dense blueberry thickets within a few years.

Blueberry grows in acidic soils from Nova Scotia and Quebec south to Florida and Louisiana. At UMD, wild blueberry bushes are widespread on the edges of moist wooded areas along Ring Road and along the borders of the parking lots where it often occurs with sweet pepperbush. Red or green twigs, the small round berries, and the dense growth distinguish blueberry from other shrubs of UMD.

Northern Arrowwood - *Viburnum* *recognitum*



Arrowwood is a deciduous shrub which may reach 4.5 meters in height. Its branches are mostly straight and are densely arranged as they grow from the base. The opposite, coarsely toothed leaves are quite distinctive in this species. They are heart-shaped, 3.5-7.5 cm long and have 4-22 pairs of teeth. The leaf scars have 3 bundle scars. Young twigs are light gray and 6-sided, not round as in most New England shrubs. The bark of older wood is blackish-brown.

The small individual flowers are small up to 5 mm wide, but they are grouped into clusters, or cymes, that resemble a single large flower 5-7.5 cm across. Fruits develop in clusters of bluish-black berry-like drupes that are approximately 10 mm in diameter. These fruits provide many birds, and mammals such as chipmunks, with a winter meal.

Two species of arrowwood are recognized in our area, but because of their variability in shoot and leaf morphology, they are sometimes difficult to distinguish. Northern arrowwood, *V.*

recognitum, is characterized by twigs and leaves that are hairless, and by a shallow broad groove on the pit of the fruit. Southern arrowwood, *V. dentatum*, may have hair on twigs and on the undersurface of leaves; the pits (seeds) of the fruit have a deep narrow groove.

New shoots, and sucker growth from basal regions, are often very straight. Arrowwood gets its name from one of its historic uses: Indians used the long, straight and narrow branches to make arrows.

Northern arrowwood ranges from southeast New York, northern Ohio, and Michigan, north to New Brunswick, while southern arrowwood grows from Texas and Florida to southeastern Massachusetts. Arrowwood can be found in wet or dry thickets, and at the borders of woods. At UMD, specimens occur along the stone wall between Ring Road and the Dion Building as well as at the edges of woodlands along Ring Road and many of the parking lots.

Glossary of Botanical Terms

Appressed: Lying flat or pressed closely against something, as hairs on certain plant stems.

Bract: A leaflike or scalelike plant part, usually small, sometimes showy or brightly colored, and located just below a flower, a flower stalk, or an inflorescence.

Catkin: A usually dense, cylindrical, often drooping cluster of unisexual apetalous flowers found in willows, birches, and oaks.

Deciduous: Plant life that sheds its leaves seasonally.

Dioecious: having the male and female organs in separate and distinct individuals; having separate sexes.

Drupe: A fleshy fruit with thin skin and a central stone (e.g. almonds, cherries, plums, olives)

Evergreen: A plant that retains its leaves in all seasons.

Monoecious: Having unisexual reproductive organs or flowers, with the male and female sex organs or flowers borne on a single plant.

Palmate: Having three or more veins, leaflets, or lobes radiating from one point.

Petiole: The stem that supports foliage leaves.

Pinnate: The leaflets grow opposite each other in pairs on either side of the stem.

Vegetative Reproduction: The process by which new individuals arise without production of seeds or spores, asexual reproduction.