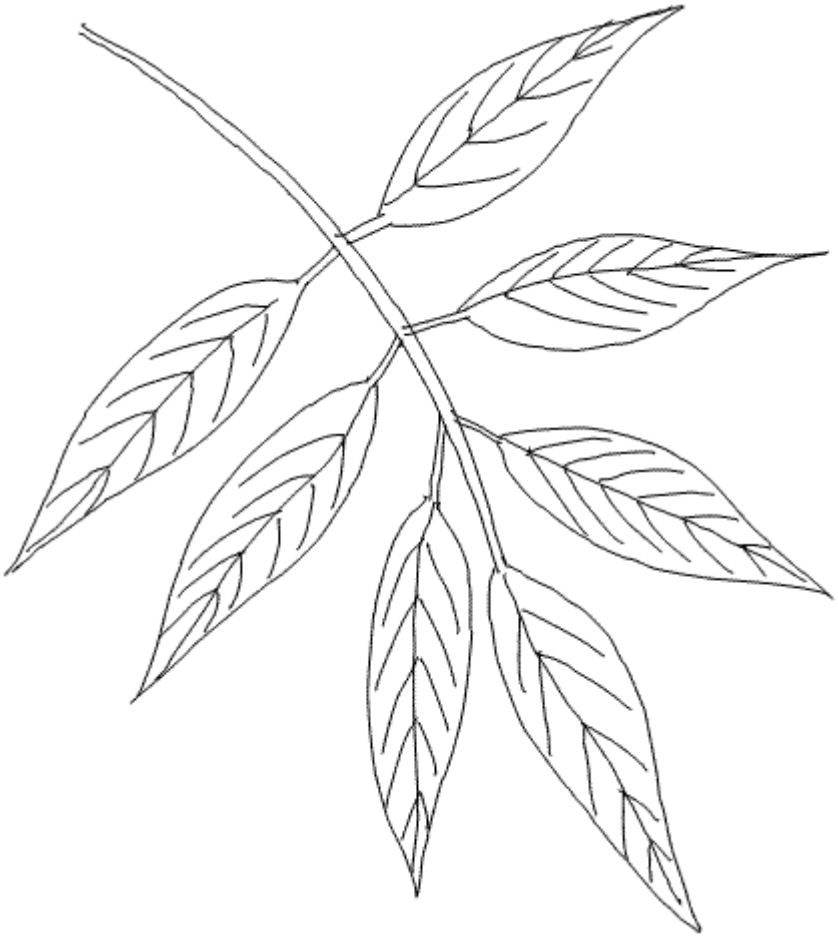
Penn State New Kensington Nature Trail: Arboretum



The Arboretum at Penn State New Kensington 2008

Background:

In Spring 2000 with the financial and administrative support of the Alcoa Foundation and Penn State University, Dr. William E. Hamilton (Assistant Professor of Biology) and Ms. Deborah Y. Sillman (Instructor of Biology) organized the renovation and expansion of the New Kensington Campus's Nature Trail. In addition to publishing a Nature Trail brochure, Dr. Hamilton and Ms. Sillman also authored a series of web pages in which they described the trail, its representative flora and fauna, and many of its significant ecological features and processes. This series of web pages became "The Virtual Nature Trail." (www.nk.psu.edu/naturetrail).

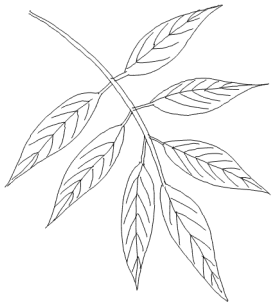
Directions to the Penn State New Kensington Campus, location of the trail, and current trail maps are all available on "The Virtual Nature Trail" web site.

In Spring 2007 using funds generously provided by the Alcoa Foundation, new signs and a system of tree markers were purchased for the trail. Mr. Chris Hone (Schreyer Honors Scholar, School of Forestry, Penn State University) located and identified twenty-three species of tree easily visible from the path of the Nature Trail (ten additional tree species were identified but specimens were not easily accessible from the trail).

The tree number indicated in the pamphlet corresponds to the number on the arboretum marker affixed to each tree along the Nature Trail. An "*" beside a tree's name in the pamphlet indicates that a species page for this tree can be found on The Virtual Nature Trail web site.

This pamphlet was written and illustrated by Dr. William Hamilton.

White Ash (*)

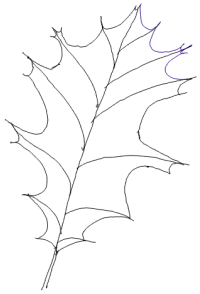


White ash (***Fraxinus americana***) is the most common ash species found in North America. It is a tall, straight-trunked tree with a conical or rounded crown of foliage. It has compound leaves that are made up of five to nine (usually seven) leaflets. Each leaflet is eight to twelve inches long and is oval to oblong in shape with very fine, saw-toothed edges. The leaflets are arrayed opposite each other and are dark green above and whitish-green below. Its bark is gray and is finely furrowed into close, diamond shapes. The bark on young trees may also have a tint of orange. It is most typically found in mixed stands of hardwoods on moist, fertile, upland soils. Its seedlings grow well in the shaded conditions of the forest floor and are capable of very rapid growth.

Bigtooth Aspen

Big tooth aspen (***Populus grandidentata***) is a tree of medium height (up to sixty feet tall) and girth (one to one and a half feet in diameter). Its leaves are ovate, dark green above, and paler below and are easily distinguished by their large, curved, "teeth-like" edge margins. Its bark is gray tinged with green and marked by patterns of thin, concentric ridges. It is distributed through south-eastern and south-central Canada and the Great Lakes region, south to northern Virginia. It is a fast growing, "pioneer" species naturally seen in early successional stages following a fire or logging. It has also been extensively planted in re-claimed lands (like strip mines).

Northern Red Oak

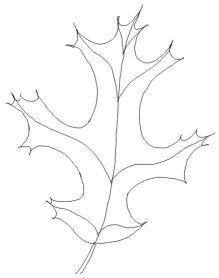


Northern red oak (***Quercus rubra***) is the northernmost distributed, eastern North American oak species. Reaching heights up to ninety feet and diameters of one to two and a half feet, this species can be found in both mixed hardwood and pure stands. Its leaves are five to eight inches long with seven to eleven shallow lobes and wavy edges tipped with bristles made by edge extensions of the leaf veins. Its bark is dark gray to black and furrowed with long, smooth, vertical lines around which the inner bark (which is red) may be seen. It favors moist, rich soils but can grow densely on drier, even rocky upland sites.

Pignut Hickory

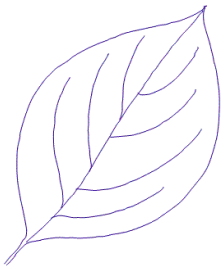
Pignut hickory (also called the "broom" or "smooth-bark" hickory) (***Carya glabra***) is the only hickory species easily seen from the path of the nature trail. It is a tree of moderate height (up to eighty feet tall) with girths of one to two feet. It has compound leaves with five, lance-shaped, saw-toothed edged leaflets that are closely attached to their central rachis. Its bark is light gray and initially smooth. In older trees bark furrows with forked ridges develop. Hickory wood is noted for its great strength and has been utilized for many human products (like wagon wheels, tool handles, etc.). The small, thick-shelled nuts were once used to feed hogs, hence the common name "pignut."

Black Oak



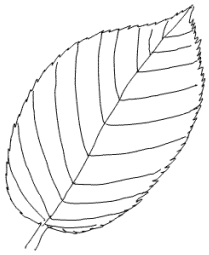
Black oak (***Quercus velutina***) may reach heights of eighty feet and diameters of one to two and a half feet, but more often it develops a shorter, more crooked growth form. On mature trees the bark is black, deeply furrowed, and broadly ridged with a distinctive yellow or orange inner bark. Leaves are five to six inches (or, possibly, more) long and three to five inches wide with seven to nine lobes of varying shapes with bristle tipped teeth edges (generated, as in the red oaks, by extensions of the leaf veins). The leaves are green above and yellowish with brown hairs below. The inner bark is very rich in both tannins and a yellow dye which were once extensively harvested. Black oaks are found primarily on dry, upland ridges often in mixed hardwood associations but occasionally in pure stands.

Flowering Dogwood



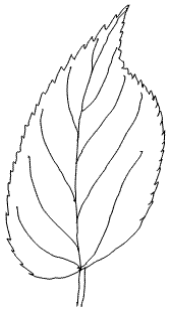
Flowering dogwood (***Cornus florida***) is a small, early spring-flowering tree of the forest understory. It can reach heights of thirty feet and diameters of eight inches, but most specimens are significantly smaller. In the understory, the spreading, horizontal arrangement of its branches often results in a "parasol" shape. Leaves are elliptical and opposite with a very fine, toothed edge. They are green and smooth on the upper surfaces and paler and hairy underneath. The flowers themselves are actually quite small but are surrounded by large white (or pink) bracts which generate the beautiful display of the species. The bark is dark (nearly black on older trees) and broken into many small, square blocks. The wood of the dogwood is extremely hard and was once used to make mallet heads, weaving shuttles, spools, and pulleys. Flowering dogwood is found naturally in the understory of both wet and dry forests, in old fields, and in ecotones and roadsides throughout the eastern half of the United States. It has also been extensively planted as an ornamental in yards and gardens. It is under great stress due to an extremely aggressive, introduced fungus (*Discula destructiva)* that causes the disease "dogwood anthracnose."

Eastern Hophornbeam



Eastern hophornbeam ("American hophornbeam," "ironwood") (***Ostrya virginiana***) is a relatively small (up to fifty feet tall), slow growing, understory tree found in a variety of upland hardwood forest associations. Its distinctive bark which is gray-brown and twisted into a sinewy, muscle-like surface is usually sufficient for identification. Its leaves are three to five inches long, ovate, doubly saw-toothed on their edges, and deeply veined. The fruit clusters of the species resemble the fruits of hops and are favored food of many birds and mammals. The wood is extremely strong and was used for tool handles and long-lasting fence posts.

Hackberry



Hackberry (***Celtis occidentalis***) exists in many shapes and sizes. In some ecosystems it grows as a low shrub while in others it grows as a soaring tree up to ninety feet tall. Its bark is gray and covered with warty growths and ridges, and its leaves are two to three inches long, and ovate with a pointy tip, sharply toothed leaf edges, and non-symmetrically structured, rounded bases growing in two, non-opposite rows. It produces a small, sweet fruit in the fall that has a purple coat and an orange flesh. Many birds consume these fruits (and thus help to distribute the tree).

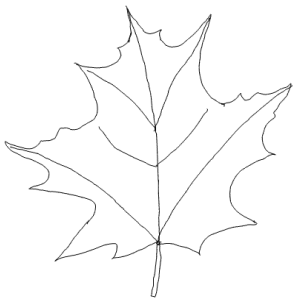
Sassafras

Sassafras (***Sassafras albidum***) is a small tree (twenty to thirty feet in height) of the forest understory here in the northern parts of its ecological range but can be quite large (sixty to eighty feet in height) in the south. Its bark is reddish to gray brown and is thin and fissured in young trees but becomes thick and deeply furrowed in older trees. Its leaves, though, are its most distinctive feature: the three, smooth edged leaf types (elliptical, one blunt lobe ("thumbed mitten"), or three blunt lobes ("doubly thumbed mitten")) are four to six inches long, yellow green above and pale below. The roots, bark, and leaves of the sassafras are rich sources of aromatic chemicals that have been historically used as perfumes, tonics, and flavorings. These sassafras chemicals influence plants growing near it and may have significant allelopathic properties.

Black Tupelo

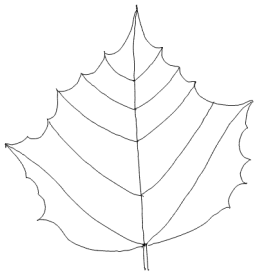
Black tupelo (**Nyssa sylvatica**) is a medium sized tree (typically thirty but occasionally up to sixty feet in height) of the moist forest. It has glossy, almost "evergreen" looking elliptical leaves that are smooth edged and two to five inches long and one to three inches wide. These leaves turn bright red in the fall. It has a thick, dark bark that is divided by close, deep furrows that are in turn interconnected by cross-furrows forming a system of irregular, rectangular plates. The wood is susceptible to rot and mature trees are frequently seen to be decaying from the top down. The heartwood decays particularly rapidly and, so, hollow, trees can be frequently observed. Its autumn ripening fruit is blue-black and berry-like and is consumed by many birds and mammals.

Sugar Maple (*)



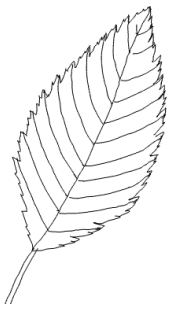
Sugar maple (***Acer saccharum***) may reach a height of seventy to one hundred feet and a diameter of two to three feet. Some individuals attain ages of over three hundred years. Sugar maple is called a "hard" maple because of the density and strength of its wood. The long life of the tree and its resistance to disease and infestations are due to the durability of its trunk and branch wood. Like other maples, sugar maple has a shallow, spreading root system that is well adapted to wet soil conditions. Sugar maple is not as restricted as the other maples to wet habitats and can form a deep root system in well-drained, deep upland soils. The distinctive leaves of sugar maple are from three to five inches long and equally as wide. They have five deep, long-pointed lobes that often have a variable number of narrow, pointed teeth. The leaves are dark green above and a paler green below. In the fall the leaves turn an assortment of colors, including deep red, orange, and yellow making a very distinctive autumnal crown appearance. The bark of sugar maple is light gray. It becomes very rough and deeply furrowed as the tree ages forming irregular ridges, plates and scales. The appearance and patterning of the bark of specific trees is quite individualized and variable.

American Sycamore



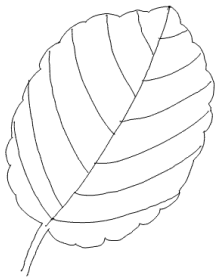
American sycamore (***Platanus occidentalis***) is one of the largest trees of the moist sections of the eastern forest. With heights over one hundred feet and average diameters of two to four feet (with recorded specimens having over fourteen foot diameters!), it can be a very dominating tree. Its leaves are four to eight inches long and equally wide with three to five lobes and a broadly toothed edge. Its bark is thin, smooth, and peeling and a distinctive mix of whites, browns, and greens. Sycamores are especially abundant along steam banks, and on the edges of ponds and lakes. They are also important indicators of springs on wooded ridges: their pale bark stands out even in the dense green of the summer to mark these potential sources of fresh water.

American Hornbeam



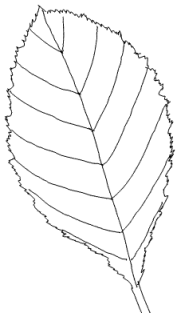
American hornbeam (***Carpinus caroliniana***) is a small, shrub-like tree of the mixed eastern forest understory. It can reach heights of thirty feet and diameters of one foot but is frequently much smaller in the light deprived habitat of the heavily shaded forest. Its bark is thin, blue-gray, and smooth with vertical ridges. Its leaves are elliptical, two to four inches long, with pointed tips and doubly saw-toothed edges and distinctive, parallel cross-veins. Its wood is dense and very tough and can be used to make wooden tool handles, levers, etc.. Its nuts are consumed by grouse, quail, and pheasant.

Witch Hazel (*)



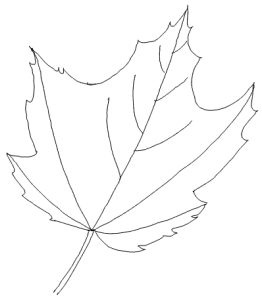
Witch hazel (***Hamamelis virginiana***) is a large shrub found extensively throughout the eastern and mid-western United States and southern Canada. It is a woody plant with branches six to eight inches in diameter, and a smooth, even bark. It has a characteristic growth pattern of basal branches that spread laterally into an arching, dome-like form. It can grow twenty to thirty feet tall and its leaves are oval shaped and are three to five inches long and one to two inches wide. Witch hazel is most abundantly found in the under-story of well shaded forests with typically low to moderate soil moisture levels. It is very tolerant of wide ranges of both light and moisture and so can also occur in dry or sunny habitats. Witch hazel flowers in the autumn, long after the flowering season has passed for most plants. Its flowers are typically bright yellow, complete, and potentially self-pollinating, however pollination is usually accomplished by a variety of insects. Seeds develop inside a woody, two chambered capsule from which they are forcibly ejected at maturity in the following spring. Ejected seeds typically remain dormant for two years prior to germination. This ejection, accompanied by a distinct “snapping” sound, shoots the seeds twenty to thirty feet away from the parent plant and helps to explain the observed clustering and clumping of witch hazel plants.

Fleshy Hawthorn



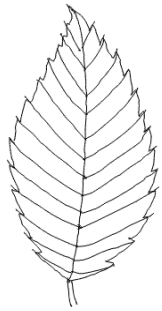
Fleshy hawthorn (***Crataegus succulentia***) is small, bushy, shrub-like tree that can reach twenty feet in height and six inches in diameter. It is found in moist forest systems and is a component of early successional ecosystems and the forest understory especially in open areas and edge ecotones. Its bark is dark, red-brown and scaly, and its twigs have many gently curved, sharp thorny spikes. Its leaves are two to three inches long, elliptical, with a gradual taper from middle to base and a doubly saw toothed edge. Its bright red fruits contain two to four tiny nutlets and are about one half an inch in diameter. The fruits mature in early fall and hang in clusters on long twig stalks.

Red Maple (*)



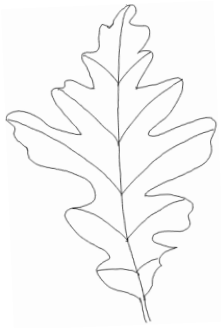
Red maple (***Acer rubrum***) is a medium sized tree ranging from fifty to seventy feet tall at maturity with a trunk one to two feet in diameter. Its crown is irregular or rounded and is highlighted by reddish colored terminal twigs. Its leaves are two to six inches in diameter and are often nearly as wide as they are long. The leaves have three major, short pointed lobes that are dull green above and whitish-green below. The leaves turn a bright red in the fall after frost. Red maple's bark is light gray and smooth on young trees becoming increasingly furrowed and plate-like on older trees. It is one of the first trees to flower as spring approaches. Flowering may begin in the late winter or early spring. These red and yellow flowers very distinctly identify the distribution of this tree species. Red maple is quite possibly the most common and the most widely distributed hardwood tree in eastern North America. It is especially found in the wet soils along streams and in swampy areas and has a dense, shallow root system well adapted to the poor soil aeration properties of these sites. It can also, however, grow abundantly in well-drained, upland and even rocky soils.

American Beech (*)



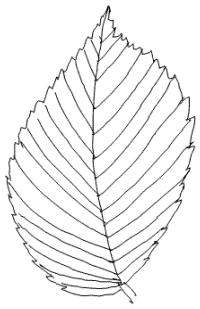
American beech (***Fagus grandifolia***) is easily recognized even in dense, complex forests by its thin, smooth, light gray bark. Unlike most other hardwood trees, the American beech retains this smooth bark throughout its "mature" years. American beeches can live for three hundred to four hundred years and can reach heights of eighty feet and diameters in excess of three feet. In the shaded conditions of a forest stand, American beech forms a long, straight, massive trunk that rises up into a small, dense crown of foliage. In sunnier, more open sites, it forms a short (still massive) trunk that diverges into a large number of horizontal branches to form a huge, widely spreading crown. It is most often found in sites that have moist soils, especially along streams and creeks, in bottom lands, and in shaded, protected ravines. Its leaves are from two and a half to six inches long and two and a half inches wide, elliptical in shape with many parallel side veins and coarse, saw-toothed edges. They are dull green above and lighter green below and turn yellow or brown in the autumn. The leaves may remain attached to their trees through the winter. These leaves decompose relatively slowly and are, therefore, found in thick layers on the soil surface beneath the trees.

White Oak (*)



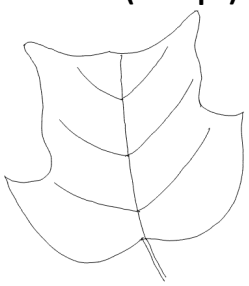
White oak (***Quercus alba***) is the classic eastern oak species. It is tall (eighty to one hundred feet) and stout (three to four feet diameter) with heavy, nearly horizontal branches that form a rugged, widely spreading crown in open habitats. Under shaded forest conditions the trunk is tall and straight and runs up into a tight, small crown. Its leaves are five to nine inches long and two to four inches wide. They have five to nine blunt-ended lobes and vary in exact size and shape in different layers of the canopy. The leaves are relatively heavy and thick and may remain attached to the tree through the winter. Fallen leaves accumulate in dense, slowly decomposing masses on the forest floor. Its bark is light gray and divided by shallow fissures into small, vertically aligned blocks. The growth rates of all life stages of white oak are slow. Seedlings grow well in the shaded conditions of the forest floor. Individuals can live for five hundred to six hundred years, though, especially in deep, moist but well drained soils, and through their slow and steady growth can come to dominate all of the other tree species within a great variety of forest ecosystems.

Slippery Elm



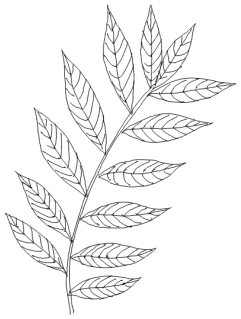
Slippery elm (***Ulmus fulva***) is a medium sized (up to seventy feet in height with trunk diameters of two to three feet), elegantly shaped tree found throughout the eastern United States especially, but not exclusively, on moist sites. Its bark is dark brown with deep fissures with an inner layer that has a distinctive, mucilaginous feel and taste. Its leaves are present in two rows and are elliptical, four to seven inches long, with doubly saw-toothed edges, and deep parallel side veins. The inner, gluey bark has been used historically as a cough medicine and as a wound dressing.

Yellow ("Tulip") Poplar (*)



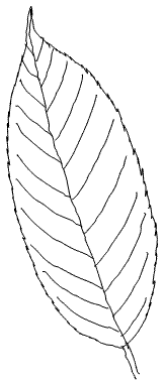
Yellow poplar (***Liriodendron tulipifera***) is also called the "tulip tree" because of its "tulip-flower" shaped leaves. It is one of the tallest (up to 120 feet!) and most distinctive eastern North American hardwood trees. Its long, arrow-straight trunk, which may be two to three feet in diameter, reaches high up into a small, oblong crown of branches and foliage. These tall, straight trees stand like supporting pillars for the very forest itself. They are very fragile trees, though, and are quite susceptible to wind damage and breakage. The bark of a mature yellow poplar is dark gray and deeply furrowed into long, rough, interconnecting ridges that are separated by lighter gray fissures. The leaves are four to six inches in diameter with four lobes that are notched into the rough "tulip-flower" shape. The leaves are attached to their twigs and branches by long (five to six inch) petioles which allow the leaves to rotate very freely even in very light breezes.

Black Walnut (*)



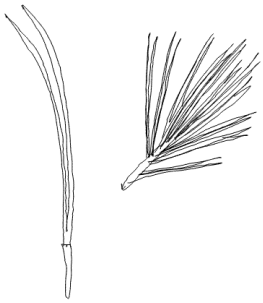
Black walnut (***Juglans nigra***) is represented on the Nature Trail by just two specimens. Its scarcity not only here but throughout its eastern United States range reflects the intensity by which this species has been harvested for its valuable wood. A mature black walnut may reach ninety feet in height and between two and four feet in diameter. Its leaves are compound and are made up of nine to twenty-one, lance-shaped leaflets (each three to five inches long). The leaflets are shiny and hairless above but hairy on their underside. The bark is dark brown and deeply furrowed into broken ridges. The black walnut nuts are encased in a husk rich in a black-staining dye. These husks should be abundant on the ground around the walnut tree. Polyphenolic chemicals from the fallen walnut leaflets, nut husks, and root exudates make the soil around a black walnut tree inhospitable to many plants. This phenomenon is called "allelopathy" and provides the tree with a competitive edge over potential plant encroachers and competitors.

Black Cherry



Black cherry (***Prunus serotina***) is an increasingly common tree in our Pennsylvania forests. It can grow to heights of eighty feet and attain diameters of up to two feet even though it is a relatively short-lived tree species. It has extremely recognizable bark: dark gray to black, broken up into irregular plates that suggest the scales of some primordial reptile. Its leaves are elliptical, two to five inches long, dark above and pale below, with a blunted, fine toothed edge. The black cherry is thought to be becoming increasingly abundant in our forests because of the tendency of deer to avoid browsing on its bitter tasting seedlings. The increasing ecological pressure of our rising deer population has, quite possibly, resulted in a changing forest dynamic and composition throughout the state.

European Black Pine



European black pine (***Pinus nigra)*** is also called "Austrian pine" in recognition of the source location for most of the stock planted in the United States. Its natural range in Europe is quite extensive but primarily confined to cool to cold temperate climate zones. It was one of the first non-native tree species introduced into North America (first record of introduction is in 1759). It is very fast growing and withstands urban and pollution stresses well. It grows especially well in high pH soils that are deep and well drained, but is not a particularly “demanding” species. It is one of the most common introduced ornamental trees in the United States and has also been extensively planted in windbreaks and shelterbelts. It has also “escaped” from cultivation and entered the forests across the northern United States and southern Canada. It is said to grow in all but the “coldest, hottest, and driest regions.” Its needles are in groups of two and are from 4 1/2 to 6 1/2 inches long. Its bark is dark gray and rough and furrowed into sets of irregularly shaped plates. The European black pine is very intolerant of shade. In a mixed woodland, a common fate of a black pine is to be shaded out by hardwood tree seedlings (like maple or oak or aspen) that readily germinate and grow in the moist, protected, shaded conditions of the pine forest floor. These hardwood trees slowly grow up and through the established canopy, eventually killing the standing pines. The European black pine closely resembles the native red pine. The black pine, though, has stiffer needles and also has tiny spikes on the keels of its cone scales.