

# 2019 Junior Envirothon Forest Plants Study Materials

Eastern Hemlock
Eastern White Pine
Red Oak
Black Walnut
Sugar Maple
Bitternut Hickory
American Chestnut
Tulip Poplar
Great Rhododendron
Mountain Laurel
Sweet Birch
Sassafras

Reference:

<http://dendro.cnre.vt.edu/dendrology/>

## Eastern Hemlock

**Leaf:** Evergreen, flat, single needles, 1/2 inch long, tapering to a dull point, primarily two-ranked, shiny dark green above, 2 lines of white stomata below.

**Flower:** Species is monoecious; males yellow, small, round; females light green at branch tips

**Fruit:** Ovoid light brown cone, 3/4 inch long with rounded, entire scales, maturing in early fall.

**Twig:** Slender, gray-brown in color; buds are very small

**Bark:** Initially gray-brown and smooth then turning scaly; older trees are red-brown with wide ridges and furrows; when cut or broken, purple streaks are obvious.



Eastern hemlock is a long-lived conifer of cool eastern climates. It offers valuable shade and shelter to wildlife, and it often planted ornamentally due to its versatility and beauty. The future of eastern hemlock is in question due to the spread of the hemlock woolly adelgid, an accidentally introduced sap-feeding insect. A medium sized tree with a dense, conical crown, fine branches and a drooping terminal shoot reaching up to 80 feet tall, typically a poor natural pruner.

### Light

Superior shade tolerance allows for regeneration by the shelterwood and group selection methods. Eastern hemlock responds well to release from competition from above and below. It is very shade tolerant and grows best with some shade.

### Timber Value

Eastern hemlock is used for light framing, roofing, sheathing, subflooring, boxes, crates, and pulpwood.

### Wildlife Value

Eastern hemlock provides shade to aquatic ecosystems and shelter to wildlife, especially deer, during the winter. Large hollow trees are commonly used as dens by black bears.

**Attracts** voles, squirrels, snowshoe hares, deer, ruffed grouse, turkey, warblers

### Insects and Diseases

- hemlock woolly adelgid - white cottony substance on lower needle surfaces; declining foliage color and density

### Fun Facts

Hemlocks were once used for structural timbers, as the wood is known for its nail-holding ability. Hemlock bark was once harvested for tannins. Hemlock woolly adelgid, which appears as small cottony tufts, is causing considerable damage in hemlock's range. Hemlocks can live in deep shade suppression for as long as 400 years

## Eastern White Pine

Fast growth enhances eastern white pine's practicality for timber, landscaping, and reforestation purposes. A large tree with a very straight trunk often reaching well over 100 feet in height. The crown is conical when young, later developing wispy, horizontal, upturning branches.

**Leaf:** Evergreen needles, 3 to 5 inches long, with five, slender, flexible needles per fascicle or bundle; needles appear blue-green.

**Flower:** Species is monoecious; males cylindrical, yellow, in clusters near branch tips; females light green, tinged in red, at ends of branches.

**Fruit:** Cones are 4 to 7 inches long, cylindrical, with thick, rounded cone scales, very resinous, borne on a long stalk and maturing in late summer.

**Twig:** Slender, gray-green to orange-brown in color; buds long, ovoid, reddish brown.

**Bark:** On young trees, thin, smooth and gray-green with some lighter splotchy patches; later becoming thick, reddish brown to gray-brown with prominent finely scaly, rounded, long ridges and darker furrows.



### Light

Eastern white pine is especially suited for shelterwood regeneration. Clearcut, seed-tree, and group selections are also successfully used.

### Timber Value

Eastern white pine is used for lumber, furniture, doors, moldings, trim, siding, paneling, cabinets, matches, extracts, and Christmas trees.

### Wildlife Value

Seeds, bark, and foliage are eaten by wildlife. Black bear mothers and cubs utilize large eastern white pines for climbing to safety.

**Attracts** birds, mice, squirrels, beaver, porcupines, rabbits, hare, deer, bear, pocket gophers

### Insects and Diseases

- white pine weevil - shoot die back
- white pine blister rust - yellow spots on needles; lesions on stems

### Fun Facts

White pine (also called ship-mast pine) had a pivotal role in the American revolution and provided lumber for colonial expansion westward. Eastern white pine has the distinction of being the tallest tree in eastern North America. While the tallest known tree today is ~185 feet tall, there are pre-colonial accounts of the trees over 200 feet tall.

## Northern Red Oak

**Leaf:** Alternate, simple leaf, 5 to 8 inches long, oblong in shape with 7 to 11 bristle-tipped lobes, sinuses extend 1/3 to 1/2 of the way to midvein, generally very uniform in shape, dull green to blue-green above and paler below. A medium sized to large tree that reaches up to 90 feet tall

**Flower:** Flowers have both stamens and pistils on the same tree..

**Fruit:** Acorns are 3/4 to 1 inch long and nearly round; cap is flat and thick, covering about 1/4 or less of the acorn, resembling a beret; matures in 2 growing seasons, in late summer and fall.

**Twig:** Quite stout, red-brown and glabrous; terminal buds multiple, quite large, conical, and covered with red-brown, mostly hairless scales but terminal scales may bear some frosty pubescence.

**Bark:** On young stems, smooth; older bark develops wide, flat-topped ridges and shallow furrows. The shallow furrows form a pattern resembling ski tracks.



Northern red oak is an eastern species capable of tolerating a range of sites. Generally, northern red oak is found on relatively moist sites with deep, rich soils. The wood of northern red oak commands high value. The species also provides acorns for wildlife and shade for suburban streets and lawns.

### Light

Northern red oak stump sprouts profusely and this helps greatly with regeneration. Intermediate in shade tolerance, northern red oak is suitable for shelterwood and group selection methods. The presence of red oak saplings in the understory is very important for successful regeneration.

### Size

A medium sized to large tree that reaches up to 90 feet tall, develops a short trunk and round crown when open grown, straight with a clear, long bole when grown with competition.

### Timber Value

Northern red oak is used for flooring, furniture, cabinets, paneling, timbers, agricultural implements, handles, caskets, boats, pallets, slack cooperage, and millwork, fuel and pulpwood.

### Wildlife Value

Acorns are consumed by a variety of wildlife. Rabbits, deer, and moose browse on stems and foliage.

**Attracts** mice, voles, squirrels, deer, turkeys, water fowl and many other birds

### Insects and Diseases

- gypsy moth - chewed leaves, defoliation
- oak decline - limb die back

### Fun Facts

Northern red oak is used for many wood products. Barrels made from northern red oak cannot hold water as the wood does not form tyloses. Tyloses are often described as balloon-like swellings capable of clogging vascular cells.

## Black Walnut

**Leaf:** Alternate, pinnately compound leaf, 12 to 24 inches long with 10 to 24 leaflets (poorly formed or missing terminal leaflet), leaflets are ovate-lanceolate, finely serrate, and 3 to 3 1/2 inches long, yellow-green to green above, slightly paler below.

**Flower:** Flowers include both stamens and pistils on the same tree.

**Fruit:** Round, 2 to 2 1/2 inches across, with a thick, green indehiscent husk. The husk contains an irregularly furrowed, hard nut that contains sweet, oily meat (edible), mature in late summer to fall.

**Twig:** Stout, light brown, with a buff-colored chambered pith; buds are tan, and large with a few pubescent scales; leaf scars are 3-lobed, resembling a "monkey face".

**Bark:** Brown on surface, darker brown when cut, ridged and furrowed with a rough diamond pattern.

**Form:** A medium to large tree up to 100 feet in height



Black walnut is one of the most prized and valuable of North American hardwoods. The wood is famous for its rich, dark beauty and is coveted by wood dealers and woodworkers internationally. The nuts are enjoyed by squirrels, as well as people.

### Light

Black walnut is intolerant of shade at all stages of maturity and must be dominant to thrive. Black walnut responds quickly to release from competition for light, water, and nutrients.

### Timber Value

Black walnut is used for veneer, fine furniture, gunstocks, interior paneling, and specialty products.

### Wildlife Value

Squirrels eat walnuts when they are green or bury them for future consumption. Deer browse the buds; mice and rabbits nibble young tree stems. Squirrels and birds eat black walnuts. Eastern screech owl often roosts in black walnut.

**Attracts** squirrels, deer, mice, rabbits, yellow-bellied sapsuckers, eastern screech owls

### Insects and Diseases

- target (*Nectria*) cankers - distorted, sunken areas of bark
- thousand cankers - leaf yellowing and wilting

**Fun Facts:** The wood of black walnut is dark brown in color and is easily worked. The nuts are said to be superior in flavor to other walnuts and are used primarily for baked goods and ice cream. The shells of black walnut have many uses including an abrasive cleaning agent for jet engines, filler for dynamite, a filter agent in smokestacks, and a flour-like carrying agent for insecticides. Black walnut is known to exude from its roots a chemical which is highly toxic to other plants. Black walnut is currently being threatened by a newly recognized fungal disease known as "thousand cankers black walnut disease".

## Sugar Maple

**Leaf:** Opposite, simple and palmately veined, 3 to 6 inches long, 5 delicately rounded lobes, entire margin; green above, paler below.

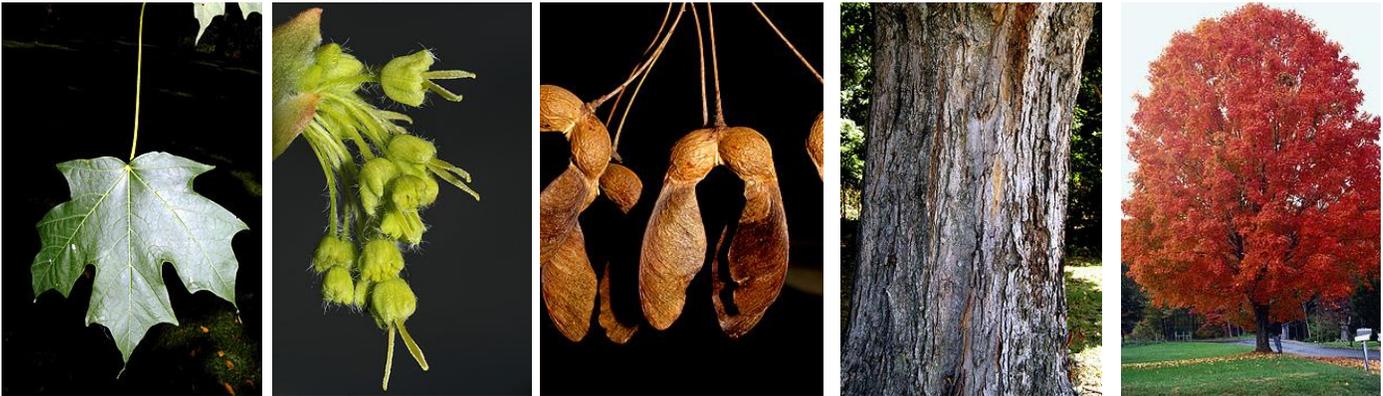
**Flower:** Light yellow-green, small, clustered, hanging from a long, slender (1 to 3 inch) stem, appearing with or slightly before the leaves in early spring.

**Fruit:** Two-winged horseshoe-shaped samaras about 1 inch long, appearing in clusters, brown when mature in the fall.

**Twig:** Brown, slender and shiny with lighter lenticels; terminal buds brown, very sharp pointed, with tight scales.

**Bark:** Variable, but generally brown, on older trees it becomes darker, develops furrows, with long, thick irregular curling outward, firm ridges.

**Form:** Medium to tall tree (to 100 feet) with very dense elliptical crown.



Sugar maple is one of the most well-known and respected of U.S. hardwoods.

### Light

Due to great shade tolerance and release potential, regeneration systems with an element of shelter are useful, i.e. shelterwoods, group and single tree selections. Release from competition with striped maple, black cherry, yellow-poplar, and oaks is advised.

### Size

Medium to tall tree (to 100 feet).

### Timber Value

Sugar maple is used to make furniture, veneer, paneling, flooring, gunstocks, tool handles, plywood dies, cutting blocks, woodenwares, bowling pins, musical instruments, etc.

### Wildlife Value

Deer browse can reduce development/regeneration and allow for American beech to assume the upper hand vs. sugar maple in long-term forest succession. Red, gray, and flying squirrels eat seeds, buds, twigs, and leaves. Porcupines eat the bark and sometimes girdle the trees.

**Attracts** deer, moose, snowshoe hare, squirrels, porcupines, screech owls, pileated woodpeckers, common flickers

### Insects and Diseases

#### Fun Facts

Sugar maple is commonly planted as an ornamental because of its potential for fantastic bright orange fall foliage. Sugar maple is the classic maple syrup provider - 35 to 50 gallons of sap are required to produce 1 gallon of maple syrup. Its wood is very hard.

## Bitternut Hickory

**Leaf:** Alternate, pinnately compound leaf, 7 to 10 inches long, with 7 to 11 leaflets, dark green above, paler below.

**Flower:** Flowers include both stamens and pistils on the same tree. Drooping catkins with 3 hanging from one stalk.

**Fruit:** Nearly round but slightly flattened, 1 inch long, husk is thin..

**Twig:** Moderately stout to slender (when compared to other hickories), leaf scars are 3-lobed; terminal bud is valvate, 4-angled and sulfur-yellow to brown in color.

**Bark:** Thin, tight and hard; initially smooth and silvery gray, much later gray with shallow furrows and interlacing ridges.

**Form:** A medium to large tree capable of reaching over 100 feet tall.



Bitternut hickory is found throughout a broad range of eastern and midwestern forests. Though not equal to other hickories in terms of wood strength and wildlife value, bitternut hickory is often sold and used similarly.

### Light

Clearcutting with some amount of bitternut advanced regeneration results in a fast-growing stand of saplings. Stump-sprouting allows bitternut to withstand browsing, breakage, drought, and fire.

### Size

A medium to large tree capable of reaching over 100 feet tall.

### Timber Value

Bitternut hickory is used for lumber, furniture, dowels, tool handles, ladders, paneling, flooring, pallets, crates, pulpwood, fuelwood, charcoal, and the smoking of meats.

### Wildlife Value

The extremely bitter nuts are not a favorite of wildlife, but they are still eaten.

**Attracts** squirrel, rabbits, beavers, small rodents and mammals

### Insects and Diseases

### Fun Facts

The wood of bitternut hickory is very dense and is considered a high quality firewood. Leaf litter from bitternut hickory adds calcium to the soil. Early settlers used oil extracted from the nuts to fuel oil lamps.

## American Chestnut

**Leaf:** Alternate, simple leaf, oblong to lanceolate, 5 to 8 inches long, pinnately veined, sharply and coarsely serrated with each serration bearing a bristle tip, dark green above and paler below, both sides are hairless.

**Flower:** On the same tree, many small, pale green (nearly white) male flowers found tightly occurring along 6 to 8 inch catkins; female flowers found near base of catkins (near twig); appearing in late spring to early summer.

**Fruit:** Large, round spiny husk (very sharp), 2 to 2 1/2 inch in diameter, enclosing 2 to 3 shiny, chestnut brown nuts, 1/2 to 1 inch in diameter, mostly round but flattened on 1 or 2 sides ripen in early fall.

**Twig:** Hairless, chestnut- to orange-brown in color, numerous lighter lenticels; buds are orange-brown, 1/4 inch long, covered with 2 or 3 scales (they somewhat resemble a kernel of wheat), buds are set slightly off center from semicircular leaf scar.

**Bark:** Smooth and chestnut-brown in color when young, later shallowly fissured into flat ridges, older trees develop distinctive large, interlacing ridges and furrows. Blight infested bark is sunken and split, often with orange fungal fruiting bodies.

**Form:** *Once a very tall, well formed, massive tree reaching over 100 feet tall. The chestnut is now found mostly as stump sprouts, less than 20 feet tall. Larger stems are often deformed by blight and sprouting below cankers.*



A giant tree of our state's past. It was once the most common tree of the forest. Colonists made a tea from the leaves to comfort coughs, poultices to relieve itches, and even used the leaves as stuffing in their mattresses. Trees were destroyed in the early 1900's by a wood boring insect that caused the American Chestnut blight. Most of the intact, living trees in the wild were gone by the 1950's, and all that remains today are a few stump sprouts that still linger (attaining heights of about 25 feet before they succumb to the fungus). Breeding programs that have introduced resistance genes from Japanese and Chinese Chestnuts into moderately resistant strains of American Chestnut have met with some success, but the ultimate goal of large scale reintroduction into forests will not occur for some time, if ever.

## Tulip Poplar

**Leaf:** Alternate, simple leaf, palmately veined, orbicular, 4-lobed with an entire margin, 4 to 8 inches long, notched to flat top. Somewhat shaped like a tulip, light green to green.

**Flower:** Perfect, showy, resembling a large tulip, but high in the tree, 2 1/2 inches long, with yellow-green petals and an orange corolla, appearing in late spring to early summer.

**Fruit:** An oblong (cone-like) aggregate of samaras (2 inches long), deciduous at maturity; each samara is 1-winged, 1 1/2 inches long, and curved upwards at seed cavity (resembling the front keel of a boat); maturing August to October and dropping through late fall and winter; base whorls of samaras persist on fruit into following spring and resemble wooden flowers high in the tree.

**Twig:** Red-brown in color, often with a shiny appearance or a waxy bloom. Stipules encircle the twig; buds are elongated, resembling a "duck bill". Twigs have a sweet, spicy odor when broken.

**Bark:** Light gray-green and smooth when young, later developing flat-topped ridges and conspicuous white colored furrows in diamond shaped patterns. On older trees sapsucker holes are common.

**Form:** A large tree with a long, straight limb-free bole very often reaching over 100 feet tall..



Tulip poplar is a tall, fast growing, deciduous tree of eastern forests. Its name is a misnomer: it is not a poplar but a relative of the magnolias. Tulip poplar is valued for its soft, versatile wood, and typically straight, limb-free trunk.

### Light

Clearcut and seed-tree methods work best to exploit yellow poplar's fast growth and full-sun preference.

### Timber Value

Yellow poplar wood is used for furniture, cabinets, veneer, plywood, and pulpwood.

### Wildlife Value

The seeds are eaten by various species. Yellow-bellied sapsucker feeds on phloem tissue. Ruby-throated hummingbird consumes nectar from the flowers.

**Attracts** northern bobwhites, purple finch, cottontail rabbits, gray squirrels, mice

### Fun Facts

Yellow poplar is tallest hardwood in North America. The tree's tulip-shaped greenish-yellow and orange striped flowers are very attractive and worth a second look. The wood is used for veneer-based engineered wood products and interior bracing for furniture. There are also local cottage industries that make shingles and siding from the bark. It is also a high nectar yielding honey tree.

## Great Rhododendron

**Leaf:** Alternate, evergreen, simple leaf, elliptical, 4 to 10 inches long, pinnately veined, entire margins or slightly revolute, leathery, dark green above and paler with rust-colored hair below.

**Flower:** Showy, pale pink or white with a corolla of five rounded petals, occur in large clusters in late spring to early summer.

**Fruit:** Red-brown elongated capsule, splitting along five lines, containing many tiny seeds, in a long-stemmed cluster, maturing in fall.

**Twig:** Yellow-green in color, often with reddish brown hair; vegetative buds are small, appearing enclosed in tiny leaves, flower buds are quite large..

**Bark:** Thin, light brown and smooth when young; broken into thin scales on older stems.

**Form:** A large shrub or small tree with several twisted stems that may form an impassable, dense thicket up to 20 feet tall.



## Mountain Laurel

**Leaf:** Alternate, simple leaf, evergreen, elliptical, 2 to 5 inches long, entire margin, pointed tip, mid-vein raised on upper surfaces, shiny/waxy green above, yellow green below.

**Flower:** Flowers in showy clusters (3 to 6 inches across), white to rose colored with purple markings, each flower 1 inch across, with the petals forming a distinct firm bowl around the pistil and stamens, appear in late spring and early summer.

**Fruit:** A round, brown capsule, splitting into 5 valves when dry, occur in open clusters; releasing very small seeds when mature in the fall.

**Twig:** Generally forked and twisted, green or red when young, later brownish red, leaves cluster at branch tips.

**Bark:** Thin, dark brown to red in color, shredding and splitting on old stems.

**Form:** A small tree or shrub with many twisted stems reaching up to 10 feet tall in mountains.



## Sweet Birch

**Leaf:** Alternate, simple leaf, pinnately-veined, ovate, with an acute tip and base, singly or irregularly doubly, sharply serrate margins, 2 to 4 inches long, dark shiny green above, paler below.

**Flower:** Flowers include both stamens and pistils on the same tree

**Fruit:** Cone-like, brown, 1 to 1 1/2 inches long, scales hairless, containing very small 2-winged nutlets, ripen and break apart in late summer and fall.

**Twig:** Twigs are slender, reddish brown with a wintergreen smell when cut.

**Bark:** Reddish brown to black on young trees, later gray to nearly black; eventually breaking up into large, thin, irregular, scaly plates.

**Form:** A medium sized tree with a single straight trunk reaching up to 60 feet tall.



Sweet birch, also known as black birch, is a deciduous tree of northeastern forests primarily known for the wintergreen aroma that comes from the leaves and twigs when they are crushed or torn.

### Light

Sweet birch is intolerant of shade and can be regenerated by clearcutting or large group selection methods.

### Timber Value

Sweet birch is used similarly to yellow birch. It is often used as paper pulp to mixed with other wood pulps. Other uses include lumber, veneer, furniture, cabinets, woodenware, boxes, handles.

### Wildlife Value

Black birch is browsed by deer. The seeds, buds, and catkins are eaten by a variety of birds and small mammals.

**Attracts** deer, porcupines, rabbits, many species of birds

### Fun Facts

Oil of wintergreen may be extracted from the twigs and bark of sweet birch. In the past, sweet birch was the primary source of this compound. The inner bark can be used as an emergency survival food. Trees can be tapped in spring and the sap fermented to make birch beer. Early settlers fancied the supple spring growth of sweet birch for use "flossing" between sporadic remnants of teeth.

Virginia roundleaf birch (*Betula uber*) is a closely related species that is nearly extinct in the wild. All characteristics are similar, except leaves are nearly round or sweet.

## Sassafras

**Leaf:** Alternate, simple leaf, ovate to elliptical, entire, 3 to 6 inches long, pinnately veined and variably lobed, green above and below and fragrant when crushed; leaves may be unlobed, 2-lobed (resemble a mitten), or 3-lobed (resemble a trident), and all three shapes may be present on the same branch.

**Flower:** Species is dioecious; small but quite showy, both male and females are bright yellow-green.

**Fruit:** Dark shiny blue, ovoid, fleshy drupes (1/3 inch long) that are borne in a red cup attached to a red stalks, held upright, maturing late summer.

**Twig:** Slender, with a spicy-sweet aroma when broken; buds are green.

**Bark:** Brown, with cinnamon-brown inner bark, becoming coarsely ridged and furrowed; when cut the spicy aroma is obvious.

**Form:** Small to medium sized tree up to 60 feet tall.



Sassafras is a widely distributed eastern species known for its aromatic nature and variably shaped leaves. A pioneer on abandoned and neglected lands, sassafras also provides browse material and fruit for wildlife. The wood is used for various purposes and oils are extracted from the root bark for the perfume industry. Sassafras is a pioneer tree that readily invades edges and fields.

### Light

Sassafras is not commonly regenerated.

### Timber Value

Sassafras wood is used for cooperage, buckets, posts, rails, furniture, interior finish, cabinets, and fuelwood.

### Wildlife Value

Bark, twigs, and leaves are browsed by various species.

**Attracts** woodchucks, deer, rabbits, bears, beavers, bobwhites, turkeys, kingbirds, woodpeckers, flycatchers, mockingbirds

### Insects and Diseases

### Fun Facts

Sassafras root was one of the earliest new world exports - it was used to perfume soaps and make tea. Native Americans used to use sassafras trees for dugout canoes. Large, extended doses of sassafras are not recommended since it contains a chemical called safrole which in laboratory tests has been found to cause liver damage and cancer in animals. Sassafras extracts which do not contain safrole are still used in some commercial teas and root beer.