

# Keys to identifying trees in winter

- Opposite vs. alternate branching
- Bark
- Dried fruit/seeds
- Buds, twigs, and leaf scars
- Growth form (Silhouettes)
- Fallen leaves on ground



versus



Examples:

White oak

Red oak

American beech

Tulip poplar

Black cherry

Black birch

Examples:

Red maple

Sugar maple

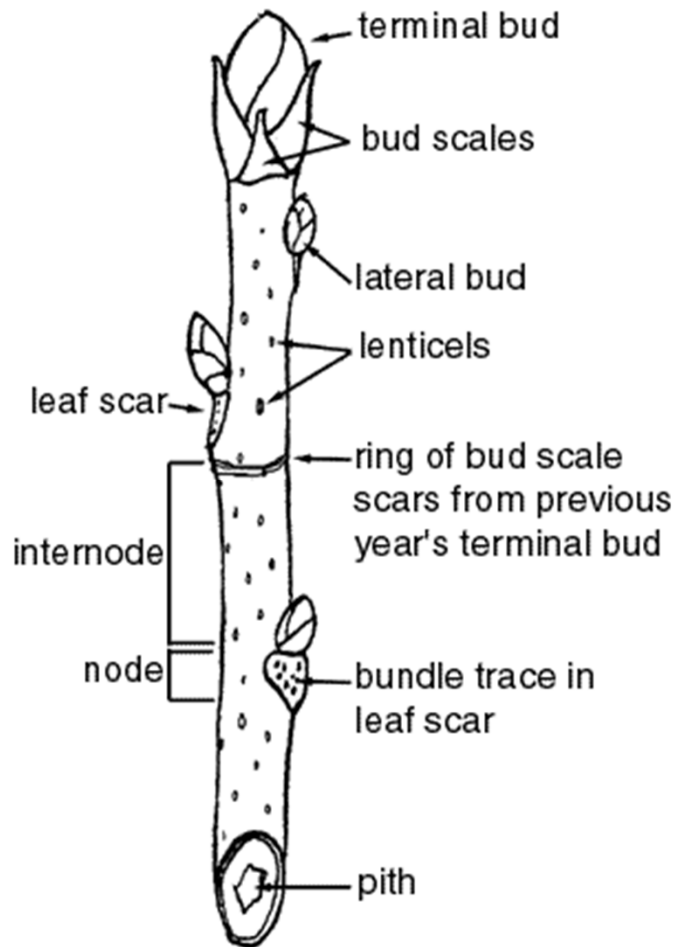
White ash

Remember "MADHORSE" for species with opposite branching –  
Maples, Ashes, Dogwoods, Horse Chestnuts

# Bark & Dried Fruit/Seeds

- Takes practice to identify trees by bark
- 6 general bark 'types':
  - Peeling horizontally in curly strips
  - Smooth & unbroken
  - Vertical cracks or seams
  - Vertical strips
  - Blocky scales or plates
  - Ridged or furrowed
- Dried fruit & seeds offer good clues to tree identity.
- Examples of trees that hold onto dried fruit/seed through the winter:
  - Tulip poplar – 'candelabras'
  - White ash –wiry brown seed stalks
  - Crab apples - apples
  - Hawthorns – small fruits (like rosebuds)
  - Staghorn sumac - (red 'antlers')
  - Sweet gum – seed ball
  - American sycamore – seed ball
  - Eastern redbud – small seed pods
  - Black locust – long seed pods

# Buds, Twigs, & Leaf Scars



Bud – next season's leaf will grow from a bud

Terminal Bud – The bud at the end of a twig. Often larger than lateral buds

Bud Scales – Protect the developing leaf from damage. Number of scales and arrangement (e.g. overlapping, paired) are useful for identification

Lateral Bud - Buds along the sides of twigs. Often smaller than the terminal bud

Lenticels - Short, horizontal markings. Allow for gas exchange through the bark. More visible in some species than others

Leaf Scar - This is where a leaf was attached to the twig in a previous season. Shape & size useful for identification

Bud Scale Scar – Where bud scales from previous seasons terminal bud attached

Node – area of twig where leaf scar, leaf, or bud present

Internode – Area between nodes

Bundle trace (or bundle scar) – Leaf 'veins' attached here. Look for patterns in the scars for identification

Pith - Inside of a twig. Can be hollow, chambered, or solid. Also, can be variable colors

# Growth form (Silhouette)

- Individuals of a species do not have a set shape or form like animals. Their shape depends largely on environmental factors, but each species does have a basic architectural plan and general shape.
- Typical growth forms (silhouettes) include:



<http://www.ag.ndsu.edu/pubs/plantsci/trees/eb38-2.htm>

Elm: vase shape



<http://oregonstate.edu/dept/ncs/newsarch/2008/Sep08/whiteoak.html>

White oak: wide-spreading



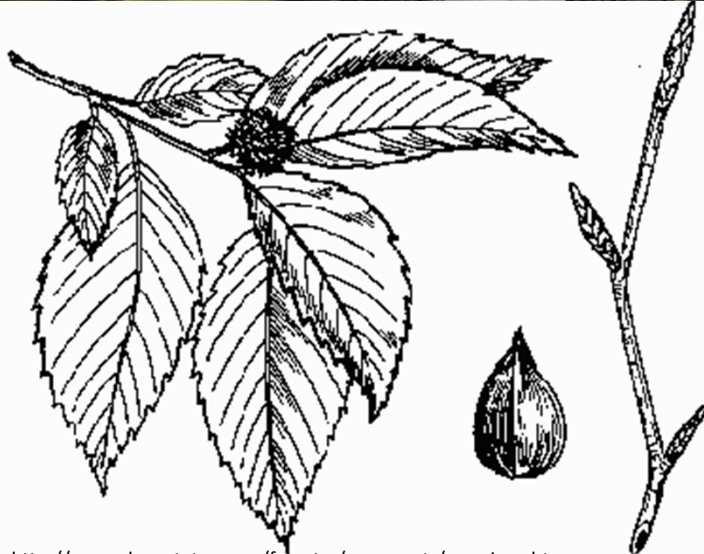
<http://myqualityday.blogspot.com/2010/04/shapes-of-trees.html>

Tulip poplar – Tall & narrow

# Key to trees in winter

- No/few leaves present
  - Smooth bark (even on older trees).....American beech
  - Bark with cracks, peeling strips, plates, or furrows
    - Older bark peeling in horizontal curly strips; horizontal lenticels visible; twigs smell like wintergreen.....Black birch
    - Older bark with vertical cracks, vertical strips, plates, or furrows
      - Bark with blocky scales or plates
        - » Distinctive light flaking bark, one fruit ball dangling from branches.....Sycamore
        - » Bark large black blocky plates; horizontal lenticels visible.....Black cherry
      - Bark with vertical strips, vertical cracks, or furrows
        - » Bark with peeling vertical strips
          - Opposite twigs/branches; smooth to peeling grey bark.
            - Red twigs and blunt red buds.....Red maple
            - Brown twigs and sharp, pointy buds.....Sugar maple
          - Alternate twigs/branches; bark whitish, flaking in long, vertical strips.....White oak
        - » Bark with vertical cracks/seams or furrows
          - Bark with vertical cracks or seams
            - Bark light gray & tight, buds long and bright yellow.....Bitternut hickory
            - Bark dark, tight, with long vertical shining strips (ski tracks); buds clustered at tip.....Red oak
          - Bark with furrows or ridges
            - Opposite twigs/branches; stout twigs; ‘smiling’ leaf scars.....White ash
            - Alternate twigs/branches; bark light brown to grey
              - End buds false, buds small & reddish, trunks sprouting twigs.....American elm
              - End buds false, buds large & green to red .....American basswood
              - End buds true, dark purple & fleshy; candelabras in canopy.....Tulip poplar
  - Needles present
    - Short, flat needles attached in a flat array, white-striped underside.....Eastern hemlock
    - Long thin needles attached in a cluster of 5.....White pine
    - Short, stiff needles arranged around a rough twig.....Norway spruce

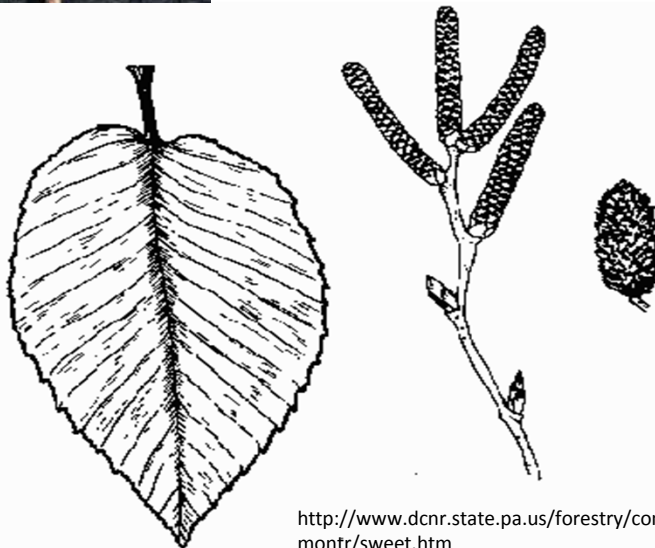
# American beech (*Fagus grandifolia*)



- **Size** – Large size tree (60 - 80 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds. Twigs are slender. Buds have numerous scales, are slender & long (~1 inch). Leaf scars encircled by stipule scars
- **Distinguishing characteristics** – Distinctive smooth grey bark, long pointy hairless buds, sucker sprouts from roots around main trunk.
- **Bark** – Smooth grey bark
- **Habitat** – Rich mature woods, moist uplands, well-drained lowlands.
- **Silhouette** – Wide-spreading if grown in the open. Ruffled edge due to dense twig growth along outer edges of branches.
- **Similar species** –
  - Only young maples have somewhat similar bark. Very distinctive tree.
  - American chestnut has similar leaves, but very rare now.



# Black birch (*Betula lenta*)



- **Size** – Tall tree (50 - 70 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds.
- **Distinguishing characteristics** – Distinctive dark cracked bark with lots of lenticels, wintergreen smell of bruised twigs, hairless buds
- **Bark** – Bark of trunk is distinctive, dark, cracked, with lots of lenticels. Younger bark shiny, smooth, lots of lenticels. Bark similar to Black Cherry
- **Habitat** – Cool, moist uplands.
- **Silhouette** – Rounded crown, spreading branches
- **Similar species** –
  - Black Cherry: Similar bark. Older bark more plated & cracked than black birch. No wintergreen smell. Bitter, floral smell.
  - Yellow birch: Peeling, lighter tan/yellow bark. Hairy buds & twigs. In summer, leaves are hairy and have un-branched secondary veins

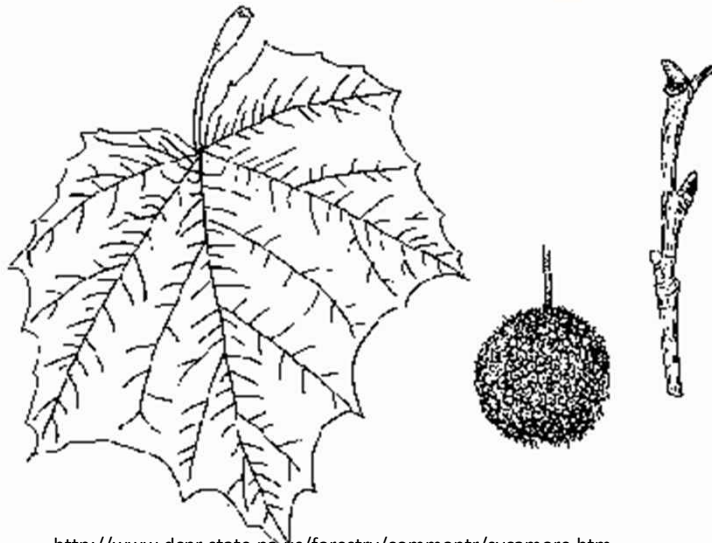


# American sycamore (*Platanus occidentalis*)



<http://forestry.sfasu.edu/faculty/jstovall/dendro/index.php/factsheets/photographs/12-platanus-occidentalis-american-sycamore>

Michael Fountain



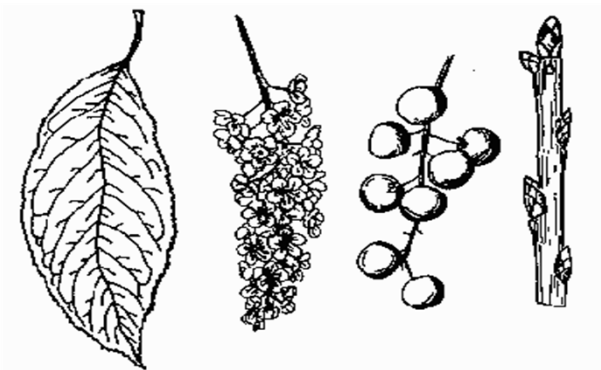
<http://www.dcnr.state.pa.us/forestry/commontr/sycamore.htm>

- **Size** – One of our tallest trees (50 - 130 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds. 1 budscale, endbuds false (off-center). Twigs ringed with stipule scar
- **Distinguishing characteristics** – Distinctive light peeling bark, one fruit ball per stalk dangling from branches, single budscale
- **Bark** – Bark of trunk is distinctive, peeling. Light grey or brown. Thin bark.
- **Habitat** – Streambanks & bottomlands.
- **Silhouette** – Massive tree with bone-white upper branches contrasting against the blue sky. Secondary branches grow perpendicular to main branches
- **Similar species** –
  - London plane tree: Similar bark, but less yellow-ish underbark and no mottled bark at base of trunk. Have 2 fruit balls per stalk. Most commonly found as street tree & rarely in forests or woods.

# Black cherry ( *Prunus serotina* )



- **Size** – Small to large size tree (60 - 80 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds. Twigs are slender. Buds are small, bud scales pointed
- **Distinguishing characteristics** – Distinctive plated trunk bark, reddish shiny branch bark with numerous short horizontal lines (lenticels)
- **Bark** – Trunk bark is dark & plated. Bark of smaller branches & twigs is reddish with numerous lenticels (short horizontal lines), Black knot fungal infection growths
- **Habitat** – Woods & thickets; generalist
- **Silhouette** – Tall, usually single-trunk. Not wide-spreading.
- **Similar species** –
  - Other cherry trees – none have distinctive bark.
  - Black birch: does not have distinctive bark. Has wintergreen smell when twigs bruised.



<http://www.dcnr.state.pa.us/forestry/commontr/blackche.htm>

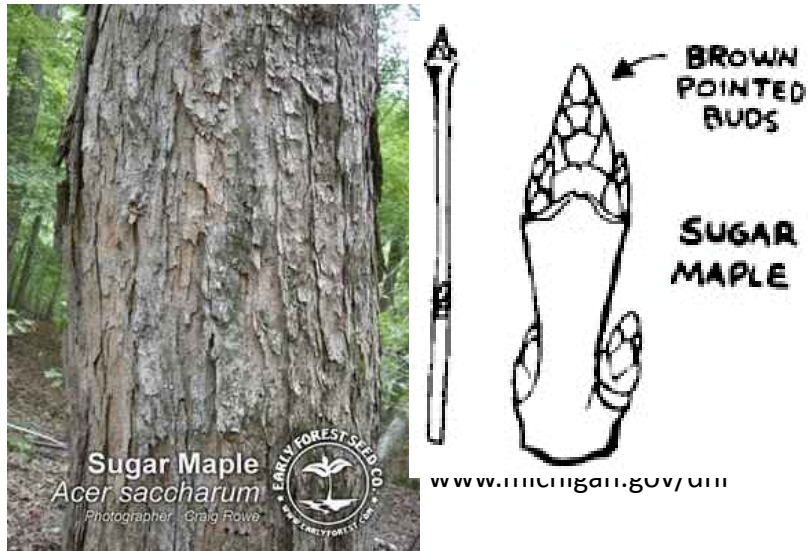
# Red maple (*Acer rubrum*)

- **Size** - Medium size tree (up to 20 - 40 feet)
- **Buds & Twigs** - Opposite buds, twigs, branches
- **Distinguishing characteristics** - Red, blunt buds with numerous scales. Red twigs.
- **Bark** – Older bark is rougher, grey color. Not as rough as sugar maple. Branches typically smooth grey color.
- **Habitat** – lowlands, swamps, but spreading to all woodlands, forests.
- **Silhouette** – Short trunk with dense oval crown
- **Similar species** –
  - Sugar maple: pointer buds, rougher bark, no red
  - Silver maple: thin flaking bark, unpleasant smelling broken twigs
  - Norway maple: milky sap from broken twigs



<http://ostermiller.org/tree/redmaple.html>

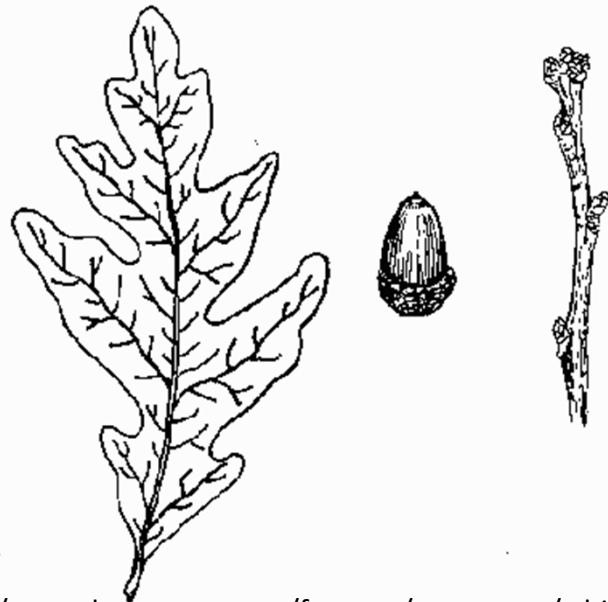
# Sugar maple (*Acer saccharum*)



- **Size** – Large size tree (up to 40 - 60 feet)
- **Buds & Twigs** - Opposite buds, twigs, branches. Buds have numerous scales.
- **Distinguishing characteristics** – Opposite, pointy buds
- **Bark** – Older bark is rougher, grey-brown color. Rougher and deeper grooved and flaky than red maple. Ends of branches typically smooth grey color
- **Habitat** – mature, upland forests
- **Silhouette** – Short trunk, many steeply ascending branches form rounded, oval crown
- **Similar species** –
  - Red maple: blunt buds, smoother bark, red twigs, buds
  - Norway maple: milky sap from broken twigs
  - Black maple: more common west of Pittsburgh. Difficult to distinguish from sugar maple in winter



# White oak (*Quercus alba*)



<http://www.dcnr.state.pa.us/forestry/commontr/whiteoak.htm>

- **Size** – Large size tree (60 - 80 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless buds & twigs. Terminal buds red-brown, blunt, clustered at twig tip.
- **Distinguishing characteristics** – Often keeps leaves in winter, long flaky peeling bark,
- **Bark** – White bark, long flaking strips
- **Habitat** – moist upland & lowland forests
- **Silhouette** – Majestic form with widespread, arching branches.
- **Similar species** –
  - Swamp [white] oak: found in swamps & bottomlands. Difficult to distinguish in winter (need leaves)
  - Mossycup oak: Hairy buds, fringed acorn cups
  - Overcup oak: Hairy buds/twigs, brownish bark

# Red oak (*Quercus rubra*)



<http://www.forestryforum.com/board/index.php?topic=22406.0>



<http://www.cas.vanderbilt.edu/bioimages/image/q/qruru--br15732.htm>

- **Size** – Large size tree (60 - 80 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds. Terminal buds green to red-brown, conical, clustered.
- **Distinguishing characteristics** – Distinctive bark, spreading silhouette, hairless buds
- **Bark** – Dark with long vertical shiny stripes
- **Habitat** – woodlands & forests; generalist
- **Silhouette** – Noble & picturesque form with widespread, arching branches. One of the most beautiful large trees
- **Similar species** –
  - Black oak: Hairy & larger buds, darker bark (almost black) without shiny strips & blockier
  - Pin oak: Hairy buds, lower branches point downwards. Straight trunk, branches covered with short pinlike twigs.
  - Scarlet oak: Dark, finely grooved bark. Typically keeps dead lower branches



<http://www.dcnr.state.pa.us/forestry/commontr/northern.htm>

# Bitternut hickory (*Carya cordiformis*)



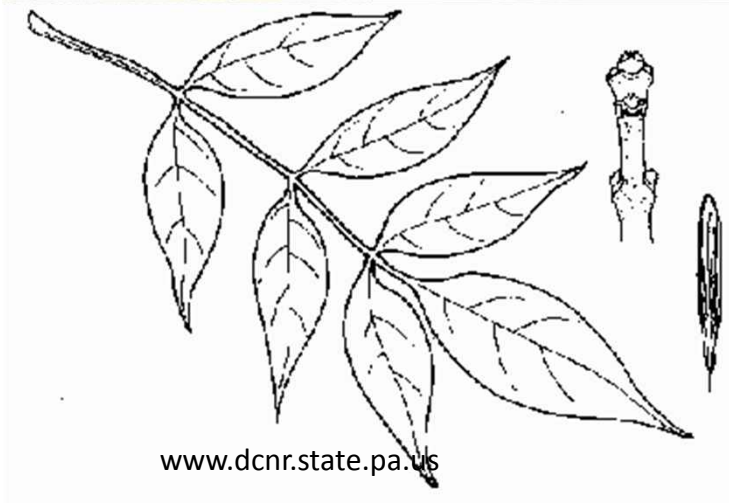
- **Size** – Medium-sized trees (~60 feet)
- **Leaves** – Pinnate – compound. 5 – 11 leaflets with one terminal leaflet. Leaflets have serrated edge.
- **Buds & Twigs** – Alternate buds, twigs. Stout twigs slender & pointed dusty yellow buds
- **Distinguishing characteristics** – Alternate compound leaves; yellow buds; hickory nuts
- **Bark** – Gray to brown-gray, tight intersecting vertical strips (appears woven) with yellow or orange vertical lines in furrow bottoms
- **Habitat** – Rich moist woods to drier upland woods
- **Silhouette** – Relatively narrow growth form
- **Similar species** –
  - Other hickory species; walnut; white ash



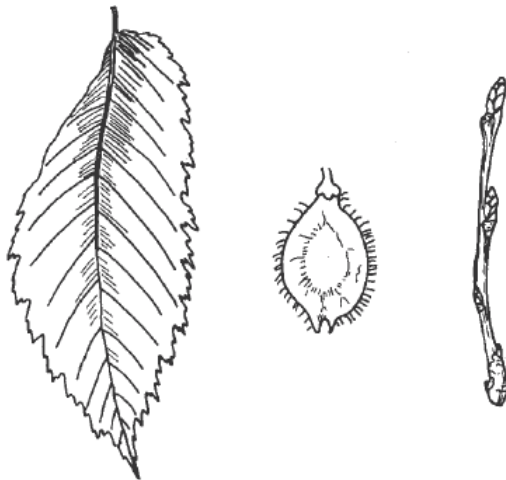
# White ash (*Fraxinus americana*)



- **Size** – Large size tree (70 - 80 feet)
- **Buds & Twigs** - Opposite buds, twigs, branches. Buds have numerous scales.
- **Distinguishing characteristics** – Opposite, large rounded buds. Large, 'smiling' leaf-scar. Distinctive furrowed bark.
- **Bark** – Greyish/white, tight ridges & furrows interwoven up trunk
- **Habitat** – mature, upland forests
- **Silhouette** – Tall, straight trunk. Broad, rounded top.
- **Similar species** –  
Biltmore Ash: a variety of white ash with hairy twigs



# American Elm (*Ulmus americana*)



- **Size** – Historically, a large tree (80 – 100 feet); now mostly smaller trees survive (< 40 feet).
- **Buds & Twigs** – Alternate buds, twigs. Smooth or slightly fuzzy buds & twigs. Two types of buds visible in winter: 1) flower buds - red-brown & larger at base of last seasons twig, and 2) leaf buds - smaller, red-brown and at the tip of twig.
- **Distinguishing characteristics** – Small twigs grow from trunk (epicormic twigs). Can flower in January or February; definitely by March & April.
- **Bark** – flattened ridges with intervening furrows. Gray-brown/tan coloration
- **Habitat** – moist lowland, valley, & riparian forests
- **Silhouette** – Majestic vase-shaped form with spreading branches.
- **Similar species** –
  - Slippery elm (*U. rubra*): found in similar habitats and is difficult to distinguish from American elm in winter. Twigs and buds are hairier & more reddish than American elm. Fruit is larger and flowers are on shorter stalks than American elm.

# American basswood (*Tilia americana*)



- **Size** – Medium to large trees (50 - 75 feet)
- **Buds & Twigs** – Alternate buds, twigs. Buds short and fat, green to dark red, with 2-3 scales.
- **Distinguishing characteristics** – Heart-shaped leaves, fruits clustered below large leafy 'wing'
- **Bark** – Smooth gray when young, shallow furrowed when older.
- **Habitat** – Moist rich woods, often on slopes
- **Silhouette** – Upright tree with rounded crown.
- **Similar species** –
  - Other lindens and lime species. A very complex group
  - Red mulberry – Some mulberry leaves are lobed, basswood leaves are never lobed.

# Tulip poplar (*Liriodendron tulipifera*)



<http://www.dcnr.state.pa.us/forestry/commontr/tuliptre.htm>



- **Size** – One of our tallest trees (50 - 100 feet)
- **Buds & Twigs** – Alternate buds, twigs. Hairless twigs, buds. Twigs are ringed by leaf scars. Buds are large, reddish, with 2 fleshy bud scales
- **Distinguishing characteristics** – Distinctive grooved or furrowed light grey bark, candelabras (empty seed pods) present in canopy throughout winter, distinctive buds
- **Bark** – Trunk bark is distinctive and grooved or furrowed. Bark is grey
- **Habitat** – Fertile woods; often in formerly disturbed areas (requires high light to grow when young)
- **Silhouette** – Tall, straight, stately tree.
- **Similar species** –
  - White ash: has superficially similar bark. Has opposite twigs, no candelabras, no fleshy buds



# Eastern hemlock (*Tsuga canadensis*)



- **Size** – One of our taller trees (80 - 120 feet)
- **Leaves** – Evergreen. Small, flat, stiff needles with 2 white stripes on bottom
- **Buds & Twigs** – Alternate buds, twigs. Twigs slender & yellow-brown or gray-brown
- **Distinguishing characteristics** – Evergreen. Small stiff needles with 2 white stripes on bottom. Small cones
- **Bark** – Thick and rough grooved when older; flaky when young; reddish brown
- **Habitat** –Cool, moist woods & old forest stands
- **Silhouette** – Pyramidal growth form
- **Similar species** –
  - Spruces: Thin needles; needles arranged in whorl around dangling twigs; large cones

# White pine (*Pinus strobus*)



- **Size** – Tall, often over 100 feet
- **Leaves** – Evergreen. 2 – 4” slender needles in clusters of 5
- **Buds & Twigs** – Alternate buds, twigs. Twigs slender & yellow-brown or gray-brown
- **Distinguishing characteristics** – Evergreen, 2 – 4” slender needles in clusters of 5. Long slender cones
- **Bark** – Grayish to reddish brown. Square-ish scales and flakes that turn into tight, rough jigsaw-like scales as trees mature
- **Habitat** – Rich, moist sandy or well-drained soils
- **Silhouette** – Large irregular crown with graceful, long horizontal branches
- **Similar species** –
  - Other pines: White pine has long thin needles in clusters of 5
  - Spruces: shorter, stiffer needles arranged in whorl around dangling twigs; pyramidal shape

# Norway spruce (*Picea abies*)



- **Size** – Medium to large tree (50 - 80 feet)
- **Leaves** – Evergreen. Small, prickly, stiff needles
- **Buds & Twigs** – Alternate buds, twigs. Twigs stout & orange brown
- **Distinguishing characteristics** – Evergreen. Small stiff needles on drooping twigs on ascending branches
- **Bark** – Reddish-brown with stiff roundish scales.
- **Habitat** – Native to Europe & Asia. Planted for reforestation & ornamental, now naturalized in N. America.
- **Silhouette** – Pyramidal growth form with drooping branches
- **Similar species** –
  - Other spruces: most other spruces don't have drooping branches; large long cones



# More resources

## Books

- Petrides, George A. 1972. Peterson Field Guide: A Field Guide to Trees and Shrubs. Houghton Mifflin Company, New York
- Sibley, David. 2009. Sibley Guide to Trees. Knopf Publishing.
- Wojtech, Michael. 2011. Bark: A Field Guide to Trees of the Northeast. Univ. Press of New England.

## Websites

- Pennsylvania Department of Conservation and Natural Resources. Common Trees of Pennsylvania. [http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr\\_20029752.pdf](http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20029752.pdf)
- Virginia Tech Department of Forest Resources and Environmental Conservation. VT Tree ID Web Page. <http://www.dendro.cnre.vt.edu/dendrology/ident.htm>
- University of Illinois Extension: <https://web.extension.illinois.edu/fjprw/downloads/56616.pdf>