

Betula alleghaniensis

Betulaceae family

Yellow birch, gray birch, silver birch, swamp birch

[Description](#)

[Distribution in US](#)

[Images](#)

[Timing of growth](#)

[Phenophases to be monitored for NPN](#)

[Did you know](#)

[Bibliography](#)

[Notes](#)

Description: *Betula alleghaniensis* is a slow-growing, short to long-lived, monoecious, deciduous tree. Flowering initiates before leaves emerge. Reproduction occurs primarily by seed. Plants become mature at approximately 40 years of age, rarely as young as 20 years old. Seedlings and saplings will sprout following damage, but sprouts are weak and short-lived; older trees do not sprout. Latent branch/stem bud (epicormic) sprouting can occur following disturbance.

Variation: *Betula alleghaniensis* has several recognized varieties and a recognized form, with great overlap in their distributions. *Betula alleghaniensis* hybridizes with *Betula papyrifera* and *Betula pumila*. Observations have been noted of within-population variation of morphology (many characteristics), phenology, and growth for this species. Chromosome counts have also shown variability.

Size: Grows to 50-100 ft. (15-30 m) tall; *Need info ft. (m) wide; its trunk grows to 2 ft. (0.6 m) in diameter, occasionally to 4 ft. (1.2 m) in diameter.

Leaves: Leaves alternate. Leaf blades/lamina simple; narrowly ovate to ovate-oblong; 2.4-6 in. (6-15.2 cm) long; 1.2-2.2 in. (3-5.5 cm) wide; margins sharply doubly serrate, teeth coarse, irregular; apex acuminate; 9-18 pairs of lateral veins, pinnate; upper surface dark green, pubescent; lower surface lighter green, moderately pubescent along the major veins and in vein axils; often having scattered resinous glands, minute; petioles up to 0.5 in. (1.3 cm) long.

Inflorescence: Male and female flowers occur in separate catkins on same tree (monoecious).

Staminate (male): Staminate catkins pendulate, at tips of long shoots; singly, or in clusters of 2-3; elongate, 2.8-4 in. (7-10 cm); purplish-yellow; shed pollen for 3-5 days. Initiated during late summer, erect, 2.2 in. (6 cm) long, 2-3 mm wide; buds over-winter, elongating and becoming pendulate the following spring.

Pistillate (female): Pistillate catkins solitary on branchlet terminus, erect; ovoid; 0.6-1.2 in. (1.5-3 cm) long; 0.4-1 in. (1-2.5 cm) wide; usually persistent after fruit fall. Initiated in autumn, buds over-winter; terminal on short branchlets.

Flowers:

Staminate (male) flowers: 3 flowers per bract/scale; sepal 1; petals 0; stamen 2.

Pistillate (female) flowers: 3 naked flowers subtended by one 3-lobed bract. Bract/scales 0.2-0.5 in. (0.5-1.3 cm) long; sparsely to moderately pubescent. Each flower has sepals 0; petals 0; pistil 1, carpels 2; 2 styles. Flowers receptive 2-5 days before male flowers shed pollen on same tree.

Fruit: Two-winged nutlet, contained/attached in a cone-like spike until seed dispersal occurs, spike 0.8-1.3 in. (1.9-3.3 cm) long, plump, with hairy scales, 3 scales per winged nutlet; nutlet wings narrower than body, broader near apex; nutlet 0.1 in. (3.2-3.5 mm) long (without wings). Seeds have light brown to tan seed coat.

Bark: Bark of young trunks and branches dark reddish brown to shiny bronze to gray. Mature trees have smooth shiny bark, tan to yellowish to yellowish-bronze to grayish; irregularly exfoliating by separating into thin layers or darkening and remaining close; horizontal dark lenticels. On old trees the bark is deeply grooved with scaly plates, red-brown. Twigs green-brown; have an odor and taste of wintergreen, usually having small resinous glands; glabrous to sparsely pubescent.

Roots: The roots are generally shallow, but variable; it has a well-developed lateral root system with roots spreading or penetrating more than 5 ft. (1.5 m).

Habitat: *Betula alleghaniensis* occurs on moist, well-drained soils on uplands and mountain ravines, and along stream banks and in swampy woods, and occasionally where drainage is restricted. It prefers well-drained fertile loams and moderately well-drained sandy loams. It doesn't tolerate drought well where roots are shallow; is intermediate in shade tolerance; is sensitive to high soil temperatures; and has some sensitivity to sulfur dioxide. This species is sensitive to excessive and/or sudden exposure. Seedlings cannot succeed under a closed canopy (openings have to be present), nor where the hardwood litter is compacted.

Species distribution in US states: CT, GA, IL, IN, KY, MA, ME, MI, MN, NC, NH, NJ, NY, OH, PA, RI, TN, VA, VT, WI, WV

Species images:

Whole plant:

http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betall_aspect01_web400gf.jpg

Bark:

<http://www.hort.uconn.edu/Plants/b/betall/betall1.html>

<http://www.cas.vanderbilt.edu/bioimages/species/frame/beal2.htm>

<http://www.forestryimages.org/images/768x512/1377004.jpg>

<http://www.forestryimages.org/images/768x512/5349075.jpg>

young and old tree:

<http://oregonstate.edu/dept/ldplants/bealle3.htm>

Leaf:

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=12>

<http://www.forestryimages.org/images/768x512/5349050.jpg>

leaf upper and lower surfaces:

<http://www.cas.vanderbilt.edu/bioimages/biohires/b/hbeal2-lf49247.jpg>

leaf expansion:

<http://www.unbf.ca/forestry/species/images/im133862.jpg>

Colored leaves:

<http://oregonstate.edu/dept/ldplants/bealle7.htm>

Buds:

http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betall_bud01.jpg

leaf buds, with male aments; winter:

<http://oregonstate.edu/dept/ldplants/bealle4.htm>

Flowers, overview:

http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betall_flowers01_web400gf.jpg

<http://www.unbf.ca/forestry/species/images/im133857.jpg>

Staminate (male) flowers:

<http://www.cas.vanderbilt.edu/bioimages/biohires/b/hbeal2-fl26426.JPG>

<http://www.cas.vanderbilt.edu/bioimages/biohires/b/hbeal2-flinflor26421.JPG>

Pistillate (female) flowers:

<http://www.unbf.ca/forestry/species/images/im133857.jpg>

<http://www.hort.uconn.edu/Plants/b/betall/betall1.html>

developing fruit:

<http://www.unbf.ca/forestry/species/images/im133859.jpg>

<http://www.unbf.ca/forestry/species/images/im133860.jpg>

Fruit:

before seed dispersal, in cone-like infructescence:

<http://www.unbf.ca/forestry/species/images/im133861.jpg>

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=12>

<http://oregonstate.edu/dept/ldplants/bealle2.htm>

fruit, with infructescence bracts/scales:

http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betall_fruit01.jpg

Expected timing of growth stages:

Gemination: early June, northern U.S.

Flowering: April-June, depending on location.

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Bud break/Leaf out: April- May. Flowering initiates before leaves emerge.

Leaf/canopy development: May

Fruit ripening: July-September, depending on location.

Seed dispersion: August-October, depending on location. Some seeds fall shortly after maturity, but heavy seedfall occurs with the onset of cold weather in the northern U.S. and Canada.

Leaf coloration: *Need info.

Leaf fall: September-October.

Flower development: Staminate catkins are initiated in late summer, over-winter on the tree, and elongate the following spring. Pistillate catkins are initiated in the autumn, overwintering enclosed in buds, and develop the following spring.

Phenophases to be monitored for NPN:

Flowering

- *First pollen released* [**Intensive only**]
In at least 3 locations on the plant, pollen is released from a flower when gently shaken or blown. For *Betula alleghaniensis*, the male flowers from which pollen is released are arranged on catkins. Where catkins are out of reach, pollen release may be estimated by observing the degree of catkin elongation and looseness. Once the initially compact catkins have unfolded and are hanging loosely, pollen will be released.

Leaf out

- *First leaf*
In at least 3 locations on the plant, the very first green tip of a young leaf has visibly moved out of the leaf bud.

Leaf elongation

Note: These measures can be difficult to estimate without a few seasons of practice.

- *25% leaf elongation* [**Intensive only**]

The majority of young leaves have unfolded completely and have expanded to one-quarter (25%) of their mature size. Leaf elongation may also be estimated by viewing the canopy as a whole. At 25% leaf elongation, the canopy appears to be approximately one-quarter (25%) full.

- *50% leaf elongation* [**Intensive only**]

The majority of young leaves have unfolded completely and have expanded to half (50%) of their mature size. Leaf elongation may also be estimated by viewing the canopy as a whole. At 50% leaf elongation, the canopy appears to be approximately half (50%) full.

- *75% leaf elongation*

The majority of young leaves have unfolded completely and have expanded to three-quarters (75%) of their mature size. Leaf elongation may also be estimated by viewing the canopy as a whole. At 75% leaf elongation, the canopy appears to be approximately three-quarters (75%) full.

- *Full leaf elongation* [**Intensive only**]

The majority of young leaves have unfolded completely and have expanded to 95-100% of their mature size. At full leaf elongation, the canopy appears to have reached its full density.

Fruit ripening

- *First fruit ripe*

In at least 3 locations on the plant, a fruit has become ripe. In *Betula alleghaniensis*, a good test for ripeness is fruit drop; mature cones will release winged nutlets into your hand when touched or gently handled. Ripeness may also be indicated by the presence of at least 3 nutlets on the ground below the plant (that are not apparently from a nearby tree).

- *50% of fruit ripe* [**Intensive only**]

For the whole plant, half (50%) of the fruits are ripe. In *Betula alleghaniensis*, this occurs when half (50%) of the nutlets have dropped.

- *All fruit ripe* [**Intensive only**]

For the whole plant, virtually all (95-100%) of the fruits are ripe. In *Betula alleghaniensis*, this occurs when all (95-100%) of the nutlets have dropped.

Leaf color change

Note: If drought seems to be the cause of leaf color change for a plant, please make a comment about it for that plant.

- *First leaf colored* [**Intensive only**]
In at least 3 locations on the plant, the green leaves have begun to change to their late season colors.
- *25% of leaves colored* [**Intensive only**]
For the whole plant, one-quarter (25%) of the leaves (including any that have fallen to the ground) have changed to their late season colors.
- *50% of leaves colored*
For the whole plant, half (50%) of the leaves (including any that have fallen to the ground) have changed to their late season colors.
- *75% of leaves colored* [**Intensive only**]
For the whole plant, three-quarters (75%) of the leaves (including any that have fallen to the ground) have changed to their late season colors.
- *All leaves colored*
For the whole plant, virtually all (95-100%) of the leaves (including any that have fallen to the ground) have changed to their late season colors and there is virtually no green left in the leaves.

Leaf fall

Note: If drought seems to be the cause of leaf fall for a plant, please make a comment about it for that plant.

- *First leaf fallen* [**Intensive only**]
In at least 3 locations on the plant, a leaf easily falls off into your hand when touched or gently handled. First leaf fallen may also be indicated by the presence of at least 3 leaves on the ground below the plant (that are not apparently from another individual nearby).
- *25% of leaves fallen* [**Intensive only**]
For the whole plant, one-quarter (25%) of the leaves have fallen.
- *50% of leaves fallen*
For the whole plant, half (50%) of the leaves have fallen.
- *75% of leaves fallen* [**Intensive only**]
For the whole plant, three-quarters (75%) of the leaves have fallen.

- *All leaves fallen*
For the whole plant, virtually all (95-100%) of the leaves have fallen.

Did you know? *Betula alleghaniensis* is an important source of lumber, used for furniture, furnishings, tool handles, boxes, interior doors, charcoal, and pulp. It is one of the principal hardwoods used for wood alcohol, tar, and oils. Its sap is also used for syrup. And other parts of the plant were used by Native Americans, and is still used, medicinally. Some wildlife browse heavily and depend on this plant, along with birds and other mammals which eat its seeds and bark.

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Notes

The USDA PLANTS symbol for this plant is BEAL2.

The ITIS Taxonomic Serial No. for this species is 19481.

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BBCH codes for phenophases used for this plant are available from the USA-NPN office upon request.

Proposed modifications, updates or corrections to this protocol are welcome; please direct correspondence to the USA-NPN National Coordinating Office.

Prior versions of this species protocol will be made available in a documents library on USA-NPN webpage.

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