

Betula papyrifera

Betulaceae family

Paper birch, paperbark birch, silver birch, white birch, canoe birch

[Description](#)

[Distribution in US](#)

[Images](#)

[Timing of growth](#)

[Phenophases to be monitored for NPN](#)

[Did you know](#)

[Bibliography](#)

[Notes](#)

Description: *Betula papyrifera* is a medium-sized, short-lived, fast-growing, deciduous, single to multi-trunked, tree. Monoecious; male flowers are preformed in aments/catkins in the late summer and mature the following spring. Seed production starts when the tree is about 15 years old. Stump bases will sprout, sometimes prolifically, following disturbance and injury.

Variation: *Betula papyrifera* has several recognized varieties, ranging across the northern half of the United States. The genus is genetically plastic, with morphologic variation continuous between species. Hybridization occurs with nearly every native species within the genus. There are a few cultivars developed for the horticultural trade.

Size: 30-80 ft. (9-24.4 m) tall; 20-40 ft. (6-12.2 m) wide; trunk 10-12 inches (25-30 cm) upwards to 30 inches (75 cm) in diameter.

Leaves: Leaves alternate. Leaf blade/lamina simple; oval to triangular; 2-5 in. (5-12.7 cm) long; 1-2.5 in. (2.5-6.4 cm) wide; upper surface leathery smooth, dark green; lower surface hairy on veins to nearly smooth, duller green; margins coarsely to doubly serrate; apex acute.

Inflorescence: Male flowers occur in a preformed (forms in the fall) ament/catkin, matures in the spring; pendulous, in groups of 1-5 at the ends of twigs and lateral shoots; 0.7-4 in. (1.8-10.2 cm) long. Female catkins erect; about 1-2 in. (2.5-5 cm) long; 0.03 in. (0.08 cm) wide (the shape of the bracts of the female catkin are useful in distinguishing varieties).

Flowers: Greenish-brownish. Male and female flowers occurring in separate catkins on the same tree (monoecious). *Need info.

Fruit: Samaras/winged-nutlets; 0.06 in. (1.5 mm) long; 0.03 in. (0.8 mm) wide; brownish.

Bark: Young stems thin, smooth and reddish brown; marked with horizontal lenticels; becoming bright creamy white, smooth, chalky, having peeling, papery texture; easily peeled off in sheets.

Roots: *Betula papyrifera* is shallow-rooted; few roots found deeper than 24 in. (60 cm) below the soil surface.

Habitat: *Betula papyrifera* grows on moist, cool soils; adapted to cold climates. It is most abundant on rolling upland terrain and alluvial sites, and grows on almost any soil and topographic situation (mountain slopes, open slopes, rock slides, bogs and swamps). It prefers well-drained to moderately well-drained soils. It is shade intolerant; in older forests it is restricted to forest openings.

Species distribution in US states: AK, CO, CT, ID, IL, IN, MA, ME, MI, MN, MT, NC, ND, NE, NH, NJ, NY, OH, OR, PA, RI, SD, TN, VA, VT, WA, WI, WV, WY

Species images:

Whole plant:

http://plants.usda.gov/java/largeImage?imageID=bepa_002_avp.tif

Bark:

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=14>

<http://www.forestryimages.org/images/768x512/5028011.jpg>

Leaf:

http://plants.usda.gov/java/largeImage?imageID=bepa_003_ahp.tif

<http://www.forestryimages.org/images/768x512/0008300.jpg>

<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=BETPAP>

Colored leaves:

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=14>

<http://www.hort.uconn.edu/Plants/b/betpap/betpap1.html>

Buds:

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=14>

<http://www.forestryimages.org/images/768x512/0008472.jpg>

Staminate (male) flowers:

<http://www.forestryimages.org/images/768x512/0008473.jpg>

http://plants.usda.gov/java/largeImage?imageID=bepa_008_ahp.tif

<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=BETPAP>

Pistillate (female) flowers: *Need photo.

Fruit:

<http://www.forestryimages.org/images/768x512/0008175.jpg>
http://plants.usda.gov/java/largeImage?imageID=bepa_006_ahp.tif
<http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betpap01.htm>

Expected timing of growth stages:

Germination: Spring.

Flowering: April-June, depending on location.

Bud break/Leaf out: April-May.

Leaf/canopy development: *Need info.

Fruit ripening: August-mid-September.

Seed dispersal: August-November.

Leaf coloration: September.

Leaf fall: Late September-October.

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 papyrifera*, 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 papyrifera*, 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 papyrifera*, 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 papyrifera*, 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 papyrifera* was used by the Native Americans for many items; for example, food, tea, canoes, sleds, snowshoes, mats, baskets and containers/buckets, utensils, spears/arrows, bows, baby carriers, for animal calls. The plant is also used medicinally for many ailments. Its sap is used to make beer, wine, syrup, vinegar, and to treat leather. Its oils are used to repel insects. It is used commercially for plywood and veneer, furniture, fuel, and as pulpwood. It is important browse for wild animals, especially moose.

Bibliography:

NDSU, Selected North Dakota and Minnesota Range Plants; accessed 2/26/08
<http://www.ag.ndsu.edu/trees/handbook/th-3-105.pdf>

680 Tree Fact Sheets, University of Florida; accessed 2/26/08
<http://hort.ufl.edu/trees/BETPAPA.pdf>

Uchytel, Ronald J. 1991. *Betula papyrifera*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available:
<http://www.fs.fed.us/database/feis/>; accessed 2/26/08:
<http://www.fs.fed.us/database/feis/plants/tree/betpap/all.html>

USA-NPN Plant Phenology Programs; accessed 2/26/08
http://www.windows.ucar.edu/citizen_science/budburst/participate_plants.php#paper_birch

USDA Plants Database; accessed 2/26/08
<http://plants.usda.gov/>

U.S. Forest Service, Silvics Manual, Volume 2; accessed 2/26/08
http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/betula/papyrifera.htm

Virginia Tech, Department of Forestry, College of Natural Resources; accessed 2/26/08
<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=14>

images:

USA-NPN Plant Phenology Protocol, *Betula_papyrifera_v1.0(beta).doc*

Cofrin Center for Biodiversity, Herbarium, University of Wisconsin, Green Bay;
accessed 2/26/08

<http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/betpap01.htm>

Forestry Images : Forest Health, Natural Resources & Silviculture Images; accessed
2/26/08

<http://www.forestryimages.org/images/768x512/5028011.jpg>

<http://www.forestryimages.org/images/768x512/0008473.jpg>

<http://www.forestryimages.org/images/768x512/0008300.jpg>

<http://www.forestryimages.org/images/768x512/0008175.jpg>

<http://www.forestryimages.org/images/768x512/0008472.jpg>

Robert W. Freckmann Herbarium, University of Wisconsin, Stevens Point; accessed
2/26/08

<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=BETPAP>

UConn Plant Database of trees, shrubs, and vines; accessed 2/26/08

<http://www.hort.uconn.edu/Plants/b/betpap/betpap1.html>

USDA Plants Database; accessed 2/26/08

http://plants.usda.gov/java/largeImage?imageID=bepa_003_ahp.tif

http://plants.usda.gov/java/largeImage?imageID=bepa_006_ahp.tif

http://plants.usda.gov/java/largeImage?imageID=bepa_002_avp.tif

http://plants.usda.gov/java/largeImage?imageID=bepa_008_ahp.tif

Virginia Tech, Department of Forestry, College of Natural Resources; accessed 2/26/08

<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=14>

Notes

The USDA PLANTS symbol for this plant is BEPA.

The ITIS Taxonomic Serial No. for this species is 19489.

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.

Document history: V1.0(beta) 05/19/08

Protocol compiler: Patty Guertin

USA-NPN Plant Phenology Protocol, *Betula_papyrifera_v1.0(beta).doc*

Reviewers: Ellen Denny

USA National Phenology Network
National Coordinating Office
1955 East 6th Street
Tucson, AZ 85719
www.usanpn.org