

Tilia americana

Tiliaceae family

Bass wood, American basswood, American linden, white basswood

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Description: *Tilia americana* is a large, moderate to fast growing, deciduous tree. Flowers are pollinated by insects. Trees reach reproductive maturity at approximately 15 years of age, rarely as soon as 8 years old. Reproduction is by seed and vegetatively by sprouting. Sprouting occurs from the root crown following disturbance or damage.

Variation: *Tilia americana* has several recognized varieties with overlapping distribution. Cultivars have been developed in the horticultural trade.

Size: Grows 40-130 ft. (12-40 m) tall; 35-50 ft (10.6-15.3 m) wide. Trunk to 3-6 ft. (0.9-1.8 m) in diameter.

Leaves: Leaves alternate, simple, petiolate; stipulate, stipules caducous. Leaf blade/lamina ovate to cordate-ovate to cordate-orbicular, 1.7-8 in. (4.5-20.3 cm) long, 2-5 in. (5-12.5 cm) wide, slightly leathery, pinnately veined, apex contracted into slender acuminate point, margins coarsely or shallowly serrate with incurved glandular teeth, upper surface dark, dull green, glabrous to nearly glabrous, lower surface light green, lustrous, with tufts of rusty brown hairs in the axils of principal veins, hairs simple trichomes to stellate. Petiole 1.5-4 in. (3.8-10 cm) long, glabrous.

Inflorescence: An open cyme, axillary; 2-3 in. (5-7.6 cm) wide, pendulous, few- to many-flowered (5-20 flowers or more), hanging on a stalk/peduncle which diverges from near the center of an oblong, leaf-like, strongly veined, bract; bracts 2-5.1 in. (5-13 cm) long, 0.3-1 in. (0.8-2.6 cm) wide. Peduncle 0.8-1.6 in. (2-4 cm) long.

Flowers: Flowers perfect, 0.5 in. (1.3 cm) long, 0.4-0.6 in. (1-1.4 cm) in diameter; sepals 5, ovate-lanceolate, acuminate, one-third shorter than petals, densely hairy on inner surface, slightly pubescent outer surface, nectary at base appearing as a translucent hump; petals 5, lanceolate to oblanceolate or spatulate, cupped, alternate with sepals, greenish white to creamy white to yellow, each petal associated with a sterile stamen (staminodium); fertile stamens many, in 5 groups; pistil 1, style with 5 spreading stigmatic lobes, style hairy at base. Pedicel to 0.3 in. (0.75 cm) long, pubescent.

Fruit: A drupe, nut-like; dry, hard, short-oblong to oblong-obovoid or subglobose, rounded or pointed at apex, 0.2-0.5 in. (0.4-1.3 cm) long, covered with short, thick, rufous tomentum, tan, indehiscent. Seeds 1-2, rarely 3; obovoid, light reddish-brown.

Bark: Bark smooth, gray green on younger trees, maturing to deeply furrowed with flat ridges, with surface broken into small thin scales, light brown to gray. Twigs glabrous, light gray to light brown, with numerous oblong dark lenticels, becoming darker and conspicuously rugose with age.

Roots: The root system is mostly shallow lateral roots, usually without a taproot.

Habitat: *Tilia americana* grows on rich, mesic sites, usually on deep, well-drained soils; in coves, mid- and lower slopes, and river bottoms, but sometimes in swamps and on dry, exposed rock ridges. It tends to occur on loamy soils but can be found on well-drained coarser soils (sand dunes). It is moderately tolerant of shade.

Species distribution: AL, AR, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, ND, NE, NH, NJ, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, WV

Species images:

Whole plant:

http://plants.usda.gov/java/largeImage?imageID=tiam_002_avp.tif

<http://www.hort.uconn.edu/Plants/t/tilame/tilame1.html>

sprouting: <http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-wproot-sprouts11666.JPG>

Bark:

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-brlarge-tree11463.JPG>

<http://biology.missouristate.edu/Herbarium/Plants%20of%20the%20Interior%20Highlands/Flowers/Tilia%20americana,%20bark.jpg>

young, and mature: <http://www.hort.uconn.edu/Plants/t/tilame/tilame1.html>

Branch:

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-tw11464.JPG>

Leaf:

http://plants.usda.gov/java/largeImage?imageID=tiam_003_ahp.tif

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-lf11751.JPG>

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-lf11643.JPG>

http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&enlarge=0000+0000+0506+3302

underside: <http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-lflower-more11752.JPG>
<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-lmargin-uplow15576.JPG>
stellate hairs: <http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-lflower-hair11753.JPG>

Colored leaves:

<http://www.hort.uconn.edu/Plants/t/tilame/tilame1.html>

Buds:

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-twbud11653.JPG>
http://plants.usda.gov/java/largeImage?imageID=tiam_005_ahp.tif
<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-twwinter-bud16689.JPG>
http://www.uwgb.edu/BIODIVERSITY/herbarium/trees/tilame_bud01.jpg

flower:

http://www.plantsystematics.org/imgs/robbin/r/Tiliaceae_Tilia_americana_31962.html
http://www.plantsystematics.org/imgs/robbin/r/Tiliaceae_Tilia_americana_31961.html

Inflorescence:

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-fldistant11733.JPG>
http://131.230.176.4/users/paraman1/10_2_07_10/OctSlideScans8/25_17.jpg

Flowers:

http://www.uvawise.edu/natural_sciences/localflora/Tilia_americana.html
http://www.northernontarioflora.ca/images/descriptions/1004895_flw2.jpg
http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&enlarge=0000+0000+0605+0663

dissected: http://131.230.176.4/users/paraman1/10_2_07_10/OctSlideScans8/25_14.jpg
http://www.botany.wisc.edu/wisflora/pictures/xl_photos/TILAMEvAME_JB_XL.jpg

Fruit:

developing:

<http://www.forestryimages.org/images/768x512/2118040.jpg>
<http://biology.missouristate.edu/Herbarium/Plants%20of%20the%20Interior%20Highlands/Flowers/Tilia%20americana%20-%20N1.jpg>
http://plants.usda.gov/java/largeImage?imageID=tiam_004_avp.tif

mature:

<http://www.cas.vanderbilt.edu/bioimages/biohires/t/htiamh-fr15581.JPG>
<http://botany.cs.tamu.edu/FLORA/dcs420/b/hdw30069909b.jpg>
http://plants.usda.gov/java/largeImage?imageID=tiam_008_ahp.tif

Expected timing of growth stages:

Bud swell: Late April to early May, in Minnesota. *Need info.

Bud break/Leaf out: Mid-May. *Need info.

Flowering: May-July, depending on location. Flowers appear 1-4 weeks following leaf emergence.

Leaf/canopy development: *Need info.

Fruiting ripening: September-October, depending on location. *Need info.

Seed dispersal: October, can persist on tree until midwinter. *Need info.

Leaf color: *Need info.

Leaf fall: September-October, depending on location. *Need info.

Phenophases to be monitored for NPN:

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.

Flowering

- *First flower*
In at least 3 locations on the plant, a flower has opened completely. Flowers are considered 'opened' when the reproductive parts are visible between unfolded or opened flower parts.
- *Full flower [Intensive only]*
The plant has reached its peak floral display. This occurs when half (50%) of the flowers on the whole plant have opened completely.
- *Last flower*
The last visible flower has opened completely and is still fresh.

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 *Tilia americana*, a fruit is considered ripe when it has turned from green to brown or reddish-brown in color.
- *50% of fruit ripe* [**Intensive only**]
For the whole plant, half (50%) of the fruits are ripe.
- *All fruit ripe* [**Intensive only**]
For the whole plant, virtually all (95-100%) of the fruits are ripe.

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? *Tilia americana* is used for pulp, wooden ware, inexpensive furniture, carriage panels, and for inner shoe soles; in parts of its range it is also known for the choice honey produced from its nectar. Native Americans used the fibrous inner bark to make ropes, mats, fishing nets, and baskets.

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http://www.missouriplants.com/Whitealt/Tilia_americana_page.html

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http://www.windows.ucar.edu/citizen_science/budburst/participate_plants.php#american_linden

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Virginia Tech, Department of Forestry, College of Natural Resources; accessed 8/12/08: <http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=88>

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Notes

USA-NPN Plant Phenology Protocol, *Tilia_americana_v1.0(beta).doc*

The USDA PLANTS symbol for this plant is TIAM.
The ITIS Taxonomic Serial No. for this species is 21536.

BBCH codes for phenophases used for these plants 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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