

## ***Acer saccharum***

## **Aceraceae family**

Sugar maple, hard maple, rock maple

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**Description:** *Acer saccharum* is a long-lived, deciduous, dioecious to monoecious (sometimes having flowers of both sexes in the upper canopy of the tree, and male flowers in lower canopy) tree. Flowering occurs 1-2 weeks before leaf emergence. Male and female flowers mature at slightly different rates, supporting cross-pollination; the flowers are typically wind pollinated. Flowering rarely occurs in trees less than 22 years of age. Root sprouting occurs when the tree is damaged (except by fire).

Variation: *Acer saccharum* is highly variable genetically, with much taxonomic discussion. It has several recognized varieties, and several forms have been noted; all distributed in the eastern United States. Some taxonomists include other closely related species as subspecies of *Acer saccharum*. Hybrids have been reported between sugar maple and black (*Acer nigrum*), Florida maple (*A. barbatum*), chalk maple (*A. leucoderme*), and red maple (*A. rubrum*). There are numerous cultivars developed within the horticultural trade.

Size: *Acer saccharum* reaches 50-130 feet (15-42 m) in height, and 30-36 inches (76-91 cm) in diameter.

Leaves: Leaves opposite. Leaf blade/lamina simple; palmately veined; 3-6 in. (7.6-15.3 cm) long; 5 lobed; margin entire; upper surface green, lower surface paler green.

Inflorescence: Raceme; pendulous/drooping; about 2.5 in (6.4 cm) long; contains 8-14 flowers.

Flowers: Appear perfect, yet are functionally either male or female (i.e. cryptically monoecious). No petals; yellow to yellow-green; peduncle 1-3 in. (2.5-7.6 cm) long.

Fruit: Double samara; typically only one seed viable; approximately 1 in. (2.5 cm) long. Yellowish-green to brown when seeds mature.

Bark: Light gray to gray-brown; becomes rough and deeply furrowed with age. Twigs are shiny and reddish-brown.

Roots: The root system relatively deep-rooted, and has strong laterals having extensive branching. Roots are sensitive to flooding.

Habitat: Grows in regions of cool, moist climates. Most commonly occurs in rich, mesic woods but also grows in drier upland woods. It typically grows best on deep, moist, fertile, well-drained soils, although grows on a wide variety of soils. Seedlings and mature trees are very shade tolerant.

**Species distribution in US states:** AL, AR, CT, DE, GA, IA, IL, IN, KS, KY, LA, MA, ME, MI, MN, MO, MS, NC, NH, NJ, NY, OH, OK, PA, RI, SD, TN, VA, VT, WI, WV

### Species images:

Whole plant:

[http://plants.usda.gov/java/largeImage?imageID=acsa3\\_003\\_avp.jpg](http://plants.usda.gov/java/largeImage?imageID=acsa3_003_avp.jpg)  
<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=2>

Bark:

<http://www.cas.vanderbilt.edu/bioimages/species/frame/acsa3.htm>  
<http://www.forestryimages.org/images/768x512/1219037.jpg>

Leaf:

[http://plants.usda.gov/java/largeImage?imageID=acsa3\\_002\\_avp.jpg](http://plants.usda.gov/java/largeImage?imageID=acsa3_002_avp.jpg)  
<http://www.forestryimages.org/images/768x512/0008379.jpg>

Colored leaves:

<http://www.forestryimages.org/browse/detail.cfm?imgnum=5032015>  
<http://www.forestryimages.org/browse/detail.cfm?imgnum=1480023>

Buds:

<http://www.cas.vanderbilt.edu/bioimages/species/frame/acsa3.htm>  
<http://www.cnr.vt.edu/DENDRO/dendrology/syllabus/factsheet.cfm?ID=2>

Staminate (male) flowers:

<http://www.cas.vanderbilt.edu/bioimages/species/frame/acsa3.htm>  
<http://www.forestryimages.org/images/768x512/0008110.jpg>

Pistillate (female) flowers:

<http://www.cas.vanderbilt.edu/bioimages/species/frame/acsa3.htm>

Fruit:

[http://plants.usda.gov/java/largeImage?imageID=acsa3\\_004\\_ahp.tif](http://plants.usda.gov/java/largeImage?imageID=acsa3_004_ahp.tif)  
<http://www.cas.vanderbilt.edu/bioimages/species/frame/acsa3.htm>

### **Expected timing of growth stages:**

Flowering: Late March to June, dependent on geographic location.

Bud break/Leaf out: \*Need info.

Leaf/canopy development: \*Need info.

Fruit ripening: June-Oct, dependent on location.

Fruit fall: Fruit begins to fall approximately 2 weeks after ripening.

Leaf coloration: \*Need info.

Leaf fall: \*Need info.

### **Phenophases to be monitored for NPN:**

#### **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 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 *Acer saccharum*, a good test for ripeness is fruit drop; ripe samaras will easily fall into your hand when touched or gently handled. Ripeness may also be indicated by the presence of at least 3 samaras 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 *Acer saccharum*, this occurs when half (50%) of the samaras have dropped.
- *All fruit ripe* [**Intensive only**]  
For the whole plant, virtually all (95-100%) of the fruits are ripe. In *Acer saccharum*, this occurs when all (95-100%) of the samaras 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?** Sugar maple is one of the most important hardwoods in the United States, providing material for furniture and building, musical, hunting, and gaming goods, and most notably, for its being the primary source of maple sugar and syrup.

### **Bibliography:**

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[http://plants.usda.gov/java/largeImage?imageID=acsa3\\_004\\_ahp.tif](http://plants.usda.gov/java/largeImage?imageID=acsa3_004_ahp.tif)  
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## Notes

The USDA PLANTS symbol for this plant is ACSA3.  
The ITIS Taxonomic Serial No. for this species is 28731.

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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