Tree Spotters Phenophase Guide

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# Table of Contents

- Breaking leaf buds ................................................................. 3
- Leaves ............................................................................. 4
- Increasing leaf Size ............................................................ 5
- Colored leaves .................................................................... 6
- Falling leaves ..................................................................... 7
- Flowers or flower buds ........................................................ 8
- Open flowers ..................................................................... 9
- Pollen release .................................................................... 10
- Fruits ................................................................................. 11
- Ripe Fruits ....................................................................... 12
- Recent fruit drop .................................................................. 13

## Appendices

- Appendix A: Dormant Buds .................................................. 14
- Appendix B: Addenda ............................................................ 15

<table>
<thead>
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  - Leaves
  - Increasing Leaf Size
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  - Flowers or flower buds
  - Open flowers
  - Pollen release
  - Fruits
  - Ripe Fruits
  - Recent fruit drop

- Appendices
- Appendix A: Dormant Buds
- Appendix B: Addenda
Breaking leaf buds

Description
• One or more breaking leaf buds are visible on the tree.
• A leaf bud is considered breaking once a leaf tip is visible at the end of the bud, but before the first leaf has unfolded to expose the petiole (leafstalk).

Look for
• Green leaf tip visible at the end of the bud.

Clarification
• Buds begin to swell and the bud scales start to pull back from the tip before the buds actually break. Do not report the bud as breaking until you can actually see leaf tissue.

Notes
• Continue to report any breaking leaf buds you see throughout the season.
Leaves

Description
• One or more live, unfolded leaves are visible on the tree.
• A leaf is unfolded once its entire length emerges from a breaking bud, stem node, or growing stem tip and the point where the petiole attaches to the stem is visible.

Look for
• Petiole visible at the point at which it is attached to the stem.

Clarification
• Continue to report leaves from the time the first leaf unfolds until there are no leaves left on the tree.
• Do not include fully dried or dead leaves.

Note
• You may also see narrow bracts with no teeth emerging from the bud. These will later produce the flowers.
Increasing leaf size

Description
• A majority of leaves on the tree have not yet reached their full size and are still growing larger.

Look for
• Many leaves that are still growing.

Clarification
• Increasing leaf begins with the first unfolded leaf and ends when over 50% of leaves from that first flush have expanded to their full mature size.
• As they grow, leaves will gradually become dark green.
• This phenophase only happens in the spring. Do not include new leaves that may emerge at the ends of elongating stems throughout the growing season.
Colored leaves

**Description**
- One or more leaves:
  - Show late-season pale green or pale yellow colors.
  - Are yellow or brown due to drought or other stresses.

**Look for**
- Leaves that are turning pale green or pale yellow or have turned those colors.

**Clarification**
- *Do* make a note in the comments field when leaves are yellow or brown due to stress.
- *Do not* include:
  - Small spots of color due to minor leaf damage.
  - Dieback on branches that have broken.
  - Fully dried or dead leaves that remain on the tree.

In this photo, there are still a few pale greenish yellow leaves left on the tree, so you would say “Yes” to Colored leaves.
Falling leaves

Description
• One or more leaves are falling or have recently fallen from the tree since your last observation.

Look for
• Yellow leaves on the ground.

Clarification
• Summer wind storms often cause a few handfuls of healthy green leaves to fall. Do not report these as “Falling leaves”.
• Leaves may stop falling during a spell of mild weather. Report "No" to “Falling leaves” if none appeared to fall from the tree since your last observation, even if you previously reported “Yes”.

Note
• Your last “Yes” observation of the season will likely be “Yes “to “Falling leaves”: No leaves are left on the tree, but you observe leaves on the ground that were not there on your previous visit.
Flowers or flower buds

Description
• One or more fresh open flowers or unopened flower buds are on the tree.
• Flower clusters droop from a long, narrow, light green, papery, leaf-like bracts that act as a visual attractant for pollinators when the tree is in bloom and later help to disperse the seeds.
• A central stem (“peduncle”) emerges from the lower side of the bract. The flower buds are at the tip of the peduncle.

Look for
• Greenish yellow flower bundles containing 9-20 spherical flower buds that appear at the tip of the peduncle and then expand into clusters of flowers.

Clarification
• Do not include wilted or dry flowers.

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Open flowers

**Description**
- One or more open, fresh flowers are visible on the tree.
- Flowers are considered “open” when the reproductive parts (male stamens or female pistils) are visible between unfolded or open flower parts.
- Greenish yellow flowers have 5 cream-colored petals, 5 cream-colored sepals, a pistil with a white style, and multiple stamens with yellow anthers.

**Look for**
Clusters of fragrant yellow late spring flowers hanging from the bottom of a long, narrow, light green, papery, leaf-like bract.

**Clarification**
- Do not include wilted or dried flowers.

**Note**
- The fragrant flowers attract pollinators: flies and bees in the daytime and moths at night.

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- Breaking Leaf Buds
- Increasing Leaf Size
- Leaves
- Flower Buds
- Open Flowers
- Pollen Release
- Colored Leaves
- Falling Leaves
- Fruits
- Ripe Fruits
Pollen release

**Description**
- One or more flowers on the plant release visible pollen grains.

**Look for**
- Flowers that release visible pollen grains when shaken gently or blown into your palm or onto a dark surface.

**Clarification**
- The yellow anthers turn darker as the pollen matures, so look for darker anthers to shake.
**Fruits**

**Description**
- Fruits are small and nut-like.
- Fruits turn from green to brown or reddish-brown as they ripen.

**Look for**
- Small nut-like green, brown, or reddish-brown fruits.

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*Tilia americana*
**Ripe fruits**

**Description**
- Ripe fruits are dry with a tough brown or reddish brown seed coat.

**Look for**
- Small dry brown or reddish brown spherical fruits attached to a bract.

**Clarification**
- Continue to report ripe fruit that remains on the tree (which can be well after all of the leaves have fallen).

**Note**
- The fruits stay attached to the peduncle until they fall to the ground (typically still attached to the bract).

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Recent fruit drop

Description
• One or more ripe fruits are visible on the ground.

Look for
• Black or brown elliptical or lemon shaped seeds on the ground below the tree.

Clarification
• Do not include obviously immature fruits that have dropped before ripening, such as during a heavy rain or wind storm.

Note
• The top photo shows a dried bract and three ripe fruits.
Appendix A: Dormant Buds

Description
• The dormant bud scales can be either a light olive green or an orangy-red.

Note
• At this time we are not officially observing dormant buds, but if you are interested in the development of the *Tilia americana* buds over the course of the year, feel free to include those observations in the Comments section of the “Breaking leaf buds” phenophase.
Appendix B: Addenda

Credits
- Phenophase Guide Team: Betsey Henkels, Karen Owens Linehan, Suzanne Mrozak, Kathryn Wang, and Julie Whelan
- Photos: Unless otherwise noted, all photos were taken by Karen Owens Linehan or Suzanne Mrozak.
- Species timeline by Danny Schissler.

References
- Add Shade with American Basswood
- The Friends of the Wild Flower Garden, Inc.: Trees & Shrubs of the Eloise Butler Wildflower Garden
- Illinois wildflowers
- Nature’s Notebook. Tilia Americana NPN
- NPN Phenophase Primer for Plants (Current draft)
- Plant Guide: Tilia Americana USDA Plants Database
- Tilia Americana Plant Finder: Missouri Botanical Garden
- USDA Plants Database

Questions, Comments, Suggestions?
- Email TreeSpotters@fas.harvard.edu

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