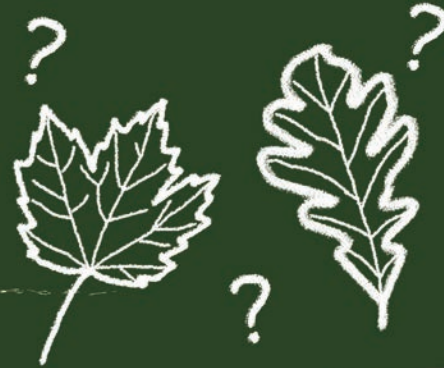


FORESTRY 101



Tree Identification

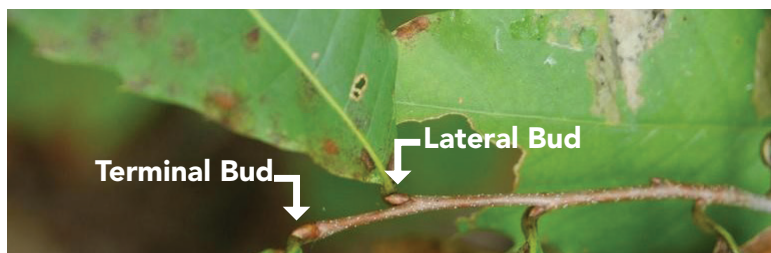
by Laurie Taylor Thomas

Kentucky's trees are beautiful, beneficial, valuable and very numerous. Kentucky has more than 12 million acres of very diverse forests with more than 120 different tree species. Kentucky owes a great deal of its tree diversity to our geographical location and our wide variety of habitats from the mountains of Eastern Kentucky to the bottomlands of Western Kentucky. Learning to identify our trees can be challenging but very rewarding. In this article we will discuss tree characteristics and how to use a dichotomous tree leaf key. Learning to identify your trees will allow you to enjoy your woodlands even more. Please be warned...once you start to learn your trees it is difficult to look at any tree and not want to try and figure out what species it is.

Trees, like all organisms, have identifying characteristics. The main characteristics we use to aid in tree identification are the leaves, buds, flowers, fruit and bark. In winter, the buds are the main characteristic used for identification unless the tree is a conifer with needle-like leaves. During the growing season the leaves are the primary and easiest characteristic to use for identification. However, the buds are still an important characteristic for identification even during the growing season. The two best characteristics and the ones most dichotomous keys use are based on tree leaves and buds.



Beautiful fall color in Kentucky. Photo courtesy: Tom Barnes



Karan A. Rawling, UGA, Bugwood.org

A bud is a small lateral (along the stem) or terminal (tip of the stem) bulge on vascular plants that may develop into a leaf, flower or shoot during the next growing season. Buds are helpful for identification during all seasons except spring when those buds are beginning to expand into new growth.

A dichotomous leaf key is a great tool to use for identifying trees. Dichotomous keys are also used for flowers, animals, rocks, fish, and more!

A dichotomous key contains a series of choices that lead the user to the correct name of an item or organism. "Dichotomous" means "divided into two parts." Therefore, a dichotomous key will give two choices in each step and lead you to the name of the organism you are trying to identify.

Most dichotomous tree keys begin with looking at the leaves. The leaves come in a variety of shapes, sizes, arrangements and forms. The first characteristic in a dichotomous leaf key is the type of leaves the tree has, conifer (needle-like, ex. pine) or deciduous (broadleaf, ex. oak). In this article we will focus on identifying our broadleaf trees. Kentucky has eight native conifers or trees with needle-like leaves. If you are interested in identifying our trees with needle-like leaves, refer to *Kentucky Woodlands, Forestry 101 "Conifers in Kentucky" Volume 3, Issue 3*.

Leaf Arrangement

The next broadleaf characteristic you will encounter in a dichotomous key is the leaf arrangement or how those leaves are arranged on the twig. Depending on the broadleaf species, leaves will be arranged in one of three ways: opposite, alternate or whorled. Oppositely arranged leaves are paired on the twig, across the stem from each other. In Kentucky, we have four groups or families of native trees with oppositely arranged leaves: maples, ashes, dogwoods and buckeyes so if you can remember the mnemonic MADBUck you can remember our oppositely arranged

Type



BROADLEAF



SCALE-LIKE



NEEDLE-LIKE

Arrangement



OPPOSITE



ALTERNATE



WHORLED

Form



SIMPLE



PALMATELY COMPOUND



PINNATELY COMPOUND



BIPINNATELY COMPOUND

tree groups. Alternately arranged leaves, which comprise most of our groups of trees, are leaves that alternate from side to side along the stem. Whorled arranged leaves will be three or more leaves that are arranged around the twig at the same location—they are whorled around the twig.

Leaf Form

Leaf form or leaf composition is the next characteristic you will encounter in a dichotomous leaf key. Leaf form can be simple or compound. The lateral bud is critical in helping determine leaf form. A leaf with a single blade attached to the petiole with the bud at the base of the petiole is a simple leaf. An example of a simple leaf is an oak leaf. A leaf with several blades attached to the stalk or rachis is a compound leaf and the blades are called leaflets; they will not have a bud at the base of the blade. Locating the lateral bud will indicate if a leaf is simple or compound. There are several types of compound leaf forms, depending on the arrangement of the leaflets. Leaflets that radiate from one end or point of the rachis in a star or palm shape is a palmately compound leaf such as a buckeye. When the leaflets are laterally arranged on each side of the rachis the leaf is pinnately compound; black walnut has pinnately compound leaves. Bipinnately or double compound leaves are when pinnately compound leaves are again compounded. Kentucky coffeetree is a species that has this characteristic. Remember, leaflets do not have buds at the base of their stalk so look for the lateral bud.

Leaf Margin

The next characteristic you will observe is the leaf edge or margin. A leaf with smooth margins and no teeth (serrations) or lobes has an entire leaf margin; dogwood is an example of a leaf with entire margins. A leaf's margin can have teeth or serrations and the types of serrations can vary depending on species. Some serrations are small with sharp tips like a steak knife (hackberry), some are larger with sharp tips like a bread knife (American beech), and some serrations have rounded tips (mulberry). A leaf that is divided into lobes separated by sinuses that are rounded or have v-shaped indentations are said to have lobed margins; silver maple and red oak are examples of lobed leaves. A leaf can be lobed and serrated (red maple) depending on species. There are several other technical terms that are applied to leaf margins, but these are the basic margins you will encounter in an average dichotomous leaf key.

There are other characteristics you will encounter in a dichotomous leaf key and they are usually explained or are descriptive words most people are familiar with such as describing the surface of the leaf as shiny or the underside of the leaf as fuzzy or hairy. The main characteristics for you to become familiar and comfortable with as you learn to identify trees by their leaves are 1) leaf arrangement, 2) leaf form and 3) leaf margin.



Photos courtesy: Laurie Thomas



Entire Leaf Margin



Serrated Leaf Margin



Lobed Leaf Margins

The Dichotomous Leaf Key

Now that you have learned how to identify a few of the major leaf characteristics and practiced an abbreviated dichotomous leaf key the next step is find a dichotomous key that you can take into the field with you that you are comfortable using. Go out and practice using your dichotomous leaf key and get to know the trees in your woodland.

Happy Identifying!

A few useful resources to take out into your woodland for tree identification:

“Tree Finder: A Manual for the Identification of Trees by Their Leaves” May Theilgaard Watts. An inexpensive dichotomous leaf key pocket guide to identifying native trees of U.S. and Canada east of the Rocky Mountains. Includes 161 species with illustrated with line drawings. The small (6- by 4-inch) format fits in pocket or pack to take along on a hike.

“What Tree Is That” By the Arbor Day Foundation. A 164-page guide-book, with step-by-step approach dichotomous key approach for 250 common trees in North America with a water-resistant cover. <https://shop.arborday.org/what-tree-is-that>

Virginia Tech Tree Identification App. A free App for your phone from Virginia Tech digital dendrology. It contains fact sheets for over 1000 woody plants from all over North America with an in-depth description, range map and thousands of color images of leaves, flowers, fruit, twigs, bark and form.

About the Author:

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Test time!

(answers at end of article)

- 1) Broadleaf or conifer?
- 2) Leaves / alternately or oppositely arranged?
- 3) Is the leaf form simple or compound?
(Remember to look for the bud.)
- 4) Is the leaf margin entire or lobed?
- 5) Is the leaf margin entire or serrated?



Answers: 1) conifer, 2) opposite, 3) compound, 4) lobed, & 5) serrated

Abbreviated Example of a Dichotomous Leaf Key

- Does the tree have needle or scale like leaves? Go to F
- Does the tree have broad leaves? Go to B ✓
- Are the leaves arranged oppositely on the twig? Go to G
- Are the leaves arranged alternately on the twig? Go to C ✓
- Are leaves simple in form? Go to D ✓
- Are the leaves compound in form? Go to H
- Are the leaf margins entire and smooth? Go to E ✓
- Are the leaf margins serrated? Go to I
- Is the leaf heart-shaped? **Eastern redbud**
- Is the leaf oblong in shape with a hair-like, bristle tip? Shingle oak
- Probably a conifer
- Probably a maple, ash, dogwood or buckeye
- Probably a walnut or hickory
- Probably a hackberry

