

# Dendrology

(or the least amount of stuff a landowner needs to know about trees and their identification)



John Peterson

Virginia Tech Forest Resources and  
Environmental Conservation

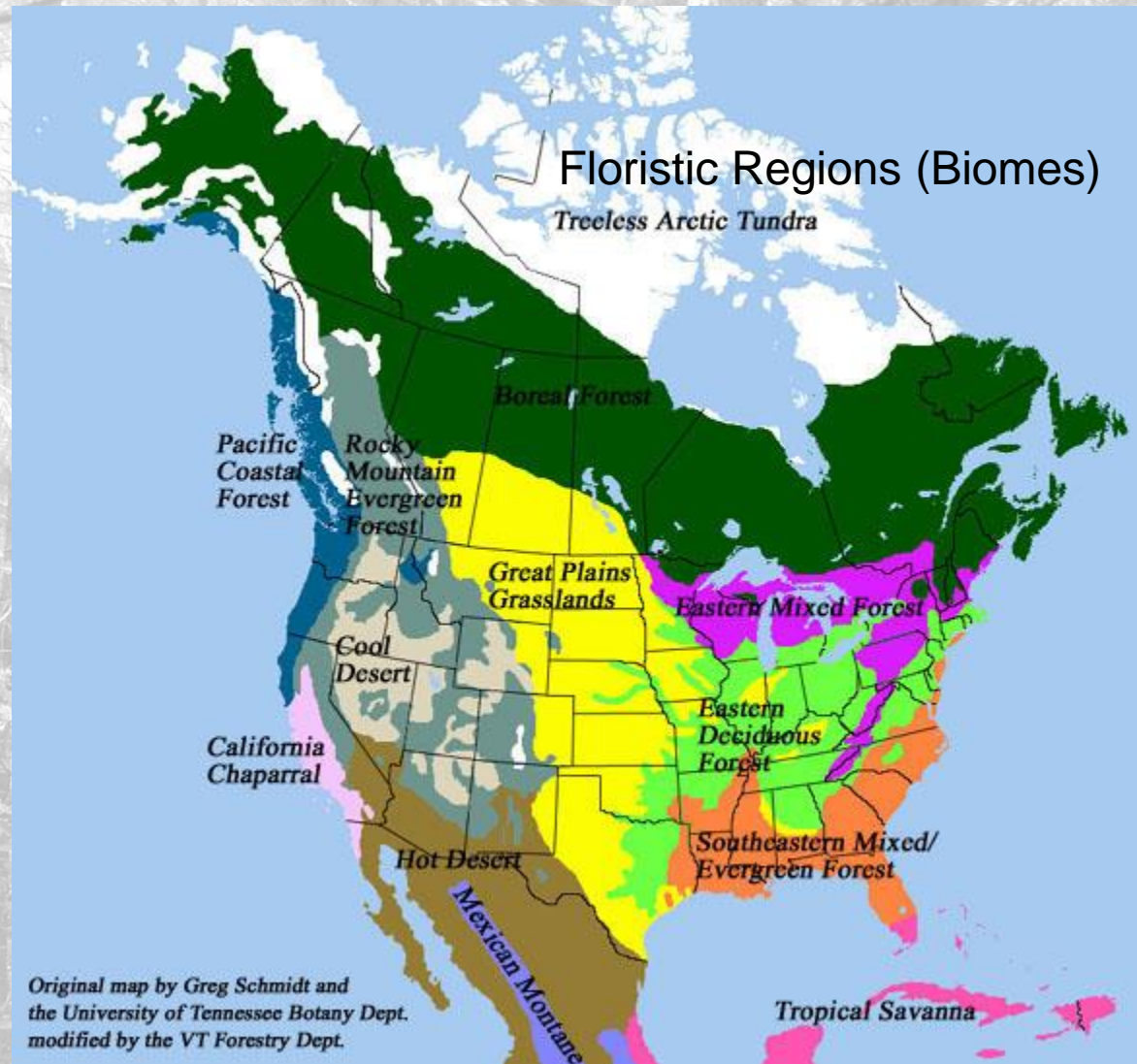


VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY



## Virginia Diversity

- 4 floristic regions
- 300 tree species
- 300 shrub species

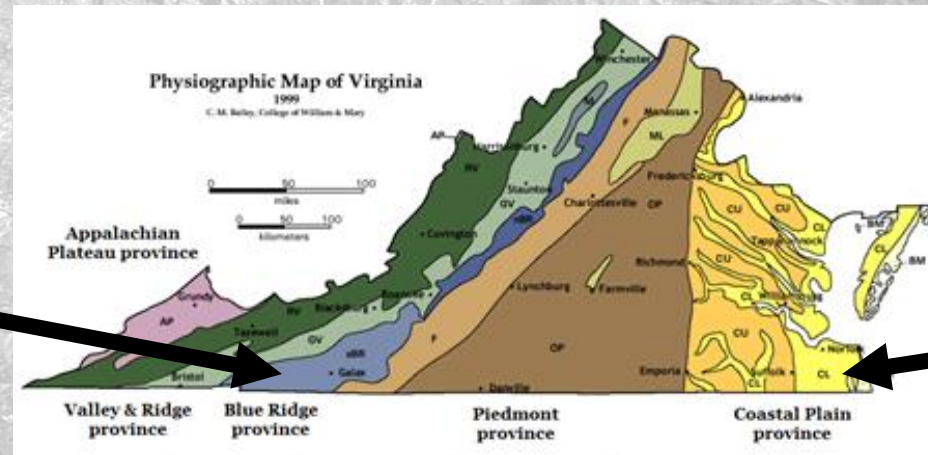




# Virginia Diversity

## Why so many species?

- geology and soils
- elevation 0 to 5729 feet
- varied land use
- disturbance
- mild climate
- introduced species





# Taxonomy overall view

<b>Kingdom</b>	<u><i>Plantae</i></u> – Plants	<u><i>Plantae</i></u> – Plants	<u><i>Plantae</i></u> – Plants
<b>Division</b>	<u><i>Magnoliophyta</i></u> – Flowering plants	<u><i>Coniferophyta</i></u> – Conifers	<u><i>Lycopodiophyta</i></u> – Lycopods
<b>Class</b>	<u><i>Magnoliopsida</i></u> – Dicotyledons	<u><i>Pinopsida</i></u> –	<u><i>Lycopodiopsida</i></u> –
<b>Order</b>	<u><i>Sapindales</i></u> –	<u><i>Pinales</i></u> –	<u><i>Lycopodiales</i></u> –
<b>Family</b>	<u><i>Aceraceae</i></u> – Maple family	<u><i>Pinaceae</i></u> – Pine family	<u><i>Lycopodiaceae</i></u> – Club- moss family
<b>Genus</b>	<u><i>Acer L.</i></u> – maple	<u><i>Pinus L.</i></u> – pine	<u><i>Lycopodium L.</i></u> – clubmoss
<b>Species</b>	<u><i>Acer rubrum L.</i></u> – red maple	<u><i>Pinus strobus L.</i></u> – eastern white pine	<u><i>Lycopodium obscurum</i></u> <u><i>L.</i></u> – rare clubmoss





**There might be 100 woody species in this photo.**

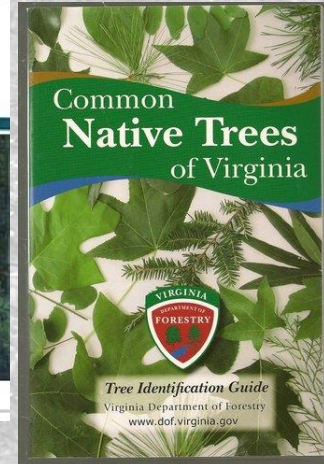
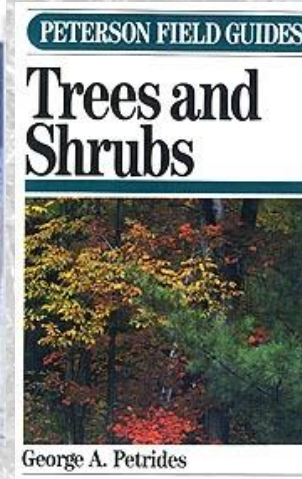
**We're going to need some tools.**





# Several Types of Tools

- Go To Class
- Dichotomous Keys
- Databases
- Other Clues
- Dr. Dendro



<http://dendro.cnre.vt.edu/dendrology/ident.htm>



# Dichotomous Keys

*Woody Plants in Winter*  
CORE and AMMONS



PETERSON FIELD GUIDES®

**Trees and Shrubs**



George A. Petrides

Common  
**Native Trees**  
of Virginia

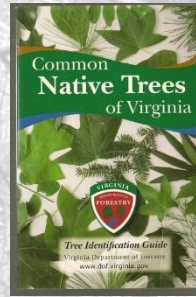


*Tree Identification Guide*  
Virginia Department of Forestry  
[www.dof.virginia.gov](http://www.dof.virginia.gov)





# Dichotomous Keys



1

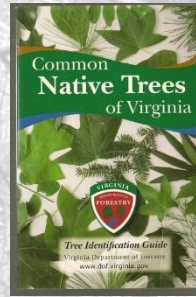
a. Leaves are needle or scale-like, go to 2.

b. Leaves are broad and flat, go to 14.





# Dichotomous Keys



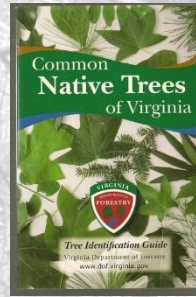
14

- a. Leaves opposite, go to 15.
- b. Leaves alternate, go to 25.





# Dichotomous Keys



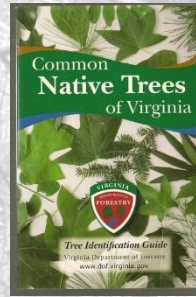
15

- a. Leaves compound, go to 16.
- b. Leaves simple, go to 19.





# Dichotomous Keys



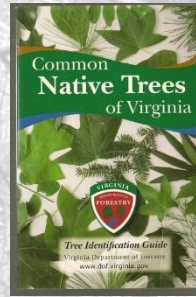
16

- a. Leaves are pinnately compound, go to 17.
- b. Leaves are palmately compound – Yellow Buckeye pg. 91.





# Dichotomous Keys



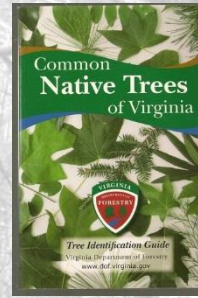
17

- a. Leaflets with large teeth, twig covered with whitish wax, bud covered with soft white hairs – Boxelder pg. 86.
- b. Leaflets with small teeth, twig not covered with wax, bud not covered with hairs, go to 18.





# Dichotomous Keys



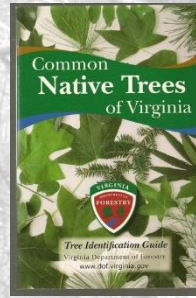
1

- a. Leaves are needle or scale-like, go to 2.
- b. Leaves are broad and flat, go to 14.





# Dichotomous Keys



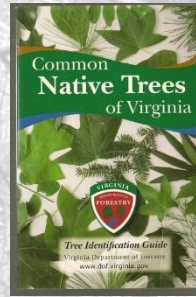
2

- a. Needles at least 1 inch long, go to 3.
- b. Needles less than 1 inch long or scale-like, go to 10.





# Dichotomous Keys



3

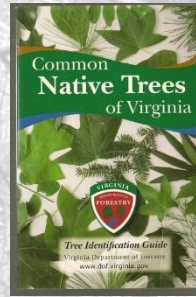
a. Needles in groups of 5, and 3 to 5 inches long – Eastern White Pine, pg. 22.

b. Needles in groups of 2 or 3, go to 4.



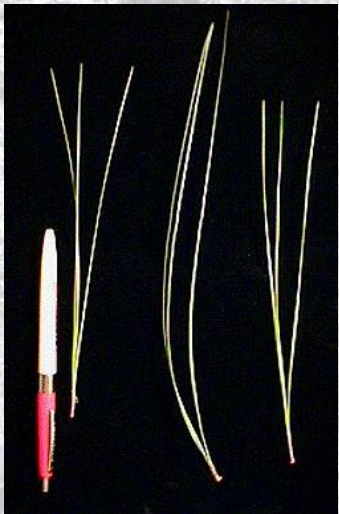


# Dichotomous Keys



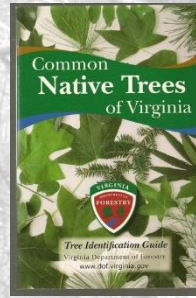
4

- a. Needles mostly in groups of 3, go to 5.
- b. Needles mostly in groups of 2, go to 8.





# Dichotomous Keys



8

a. Needles 3 to 5 inches, dark yellow green, cones 1½ to 2½ inches long –

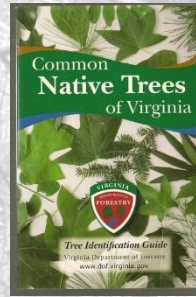
Shortleaf Pine, pg. 23.

b. Needles less than 3 inches, go to 9.





# Dichotomous Keys



9

a. Needles 1½ to 3 inches, yellow-green and twisted, cones 1½ to 3 inches long.

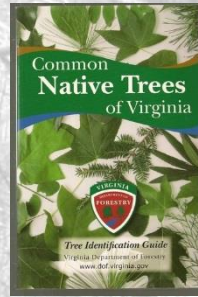
Scaly bark on older trees, may be orange-brown on upper trunk and large limbs – Virginia Pine, pg. 27.

b. Needles 1½ to 2½ inches, dark green, and somewhat twisted, cones 2 to 3½ inches – Table Mountain Pine, pg. 29.





# Dichotomous Keys



1

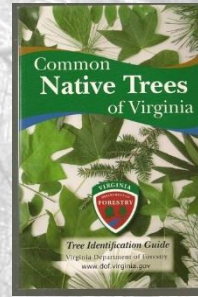
a. Leaves are needle or scale-like, go to 2.

b. Leaves are broad and flat, go to 14.





# Dichotomous Keys



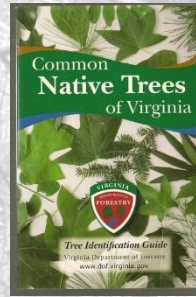
14

- a. Leaves opposite, go to 15.
- b. Leaves alternate, go to 25.





# Dichotomous Keys



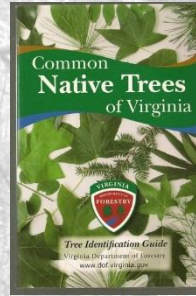
25

- a. Leaves compound, go to 26.
- b. Leaves simple, go to 36.





# Dichotomous Keys



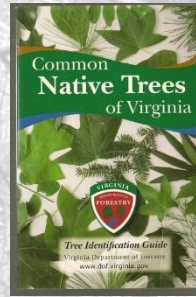
36

- a. Leaves have lobes with or without teeth, or large rounded teeth appearing like a wavy margin, go to 37.
- b. Leaves do not have lobes or margins as above, and may or may not be toothed or spined, go to 53.





# Dichotomous Keys



53  
No more help...  
See what you get!





# Twig Keys



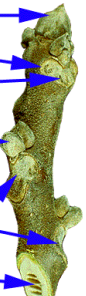
by/location.htm VT Dendrology Twig Key

**VirginiaTech** Department of Forest Resources and Environmental Conservation  
*Invent the Future*

## vTree Twig Key

If your unknown is a component of the natural landscape select your state:

OR if you suspect your unknown has been planted select your hardiness zone:

Terminal bud, in this case pubescent (fuzzy). 

Leaf scar, where the leaf was attached.

Vascular bundle scars, where the xylem entered the leaf and phloem entered the twig.

Lateral bud

Pubescence might appear on the bud or on the twig, in this case it appears on both.

Leaf arrangement, in this case the leaves do not appear opposite each other but alternate on the twig.

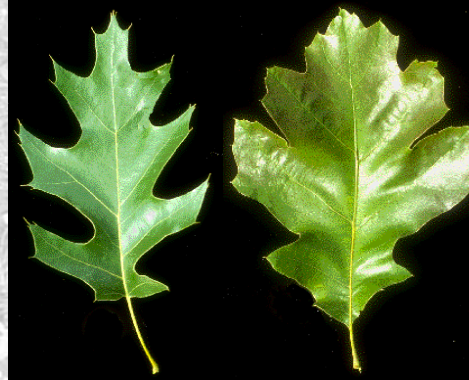
Pith, in this case chambered (divided).

[More information about zones.](#)

[to the top](#)



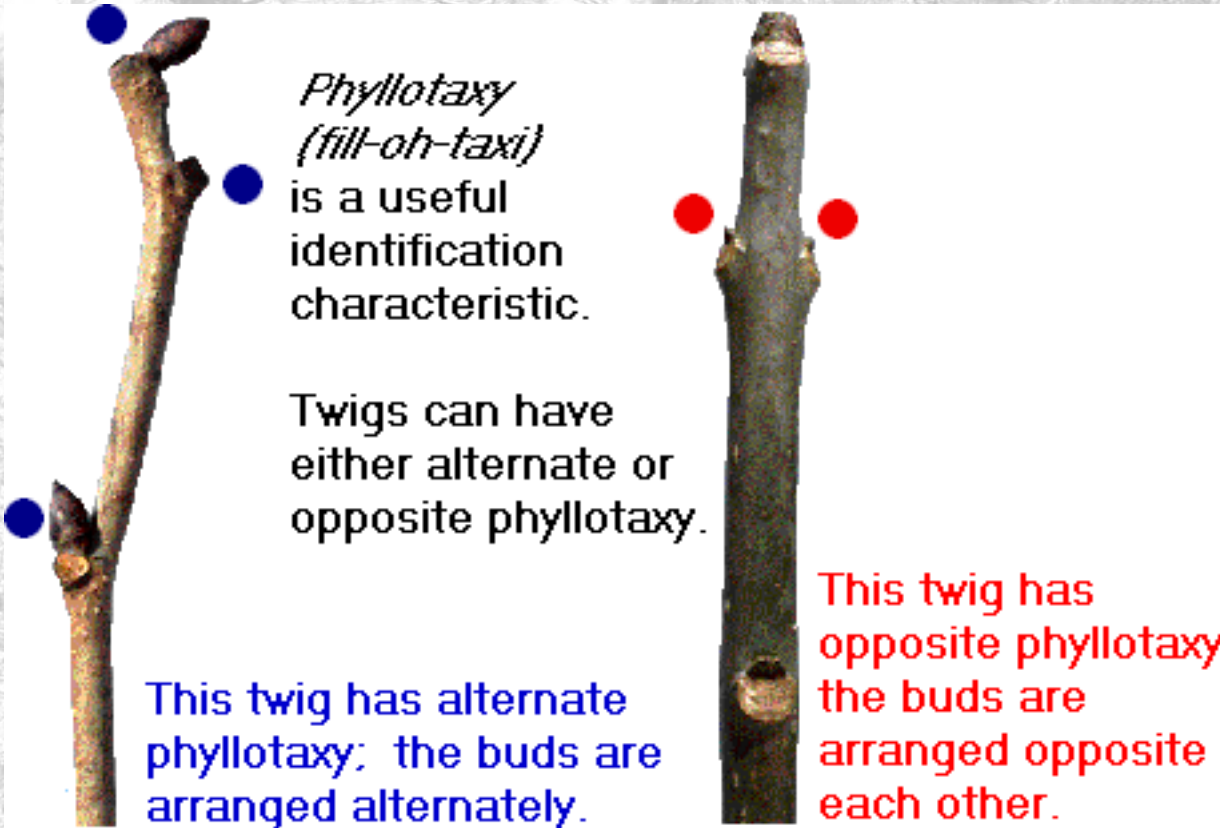
<http://dendro.cnre.vt.edu/dendrology/idit.htm>





# Twig Keys

- **phyllotaxy**



*Phyllotaxy* (fill-oh-taxi) is a useful identification characteristic.

Twigs can have either alternate or opposite phyllotaxy.

This twig has alternate phyllotaxy; the buds are arranged alternately.

This twig has opposite phyllotaxy; the buds are arranged opposite each other.

The image shows two vertical twigs. The left twig is light brown and has two buds at different heights, one above the other. The right twig is dark brown and has two buds at the same height, one on the left and one on the right. Blue dots are placed next to the buds on the left twig, and red dots are placed next to the buds on the right twig.



MAD Cap Horse

Whorled



# Twig Keys

- terminal buds



naked - you can clearly see tiny leaves



Just one or two apparent bud scales



scaly

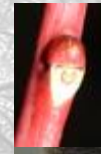


fuzzy



# Twig Keys

- leaf scars



1 bundle scar



3 bundle scars



more than 3 bundle scars



broad and shield-shaped



narrow



# Twig Keys

- pith





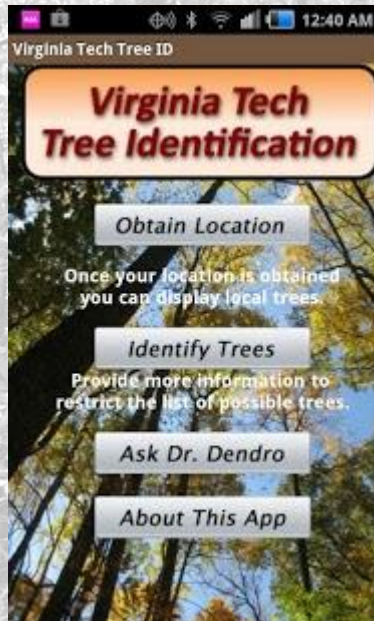
# Twig Keys

- miscellaneous





# Database Keys



dzones=unknown&state=unknown&habit=unknown&environment=unkno

Dendrology a... x Virginia Tech

VirginiaTech  
Invent the Future

Department of  
Forest Resources and Environmental Conservation

Class | Fact Sheets | Features | Tools

**vTree**

### Multichotomous Key [Restart the Interview](#)

#### Your Search Criteria:

**Step 1: Location**  
Wild or Planted  unknown  
State or Province  unknown

**Step 2: Growth Habit**  unknown



**Step 3: Habitat**  unknown

**Step 4: Fruit Type**  acorn

**Step 5: Flower Color**  unknown

**Step 6: Leaf Type**  broadleaf

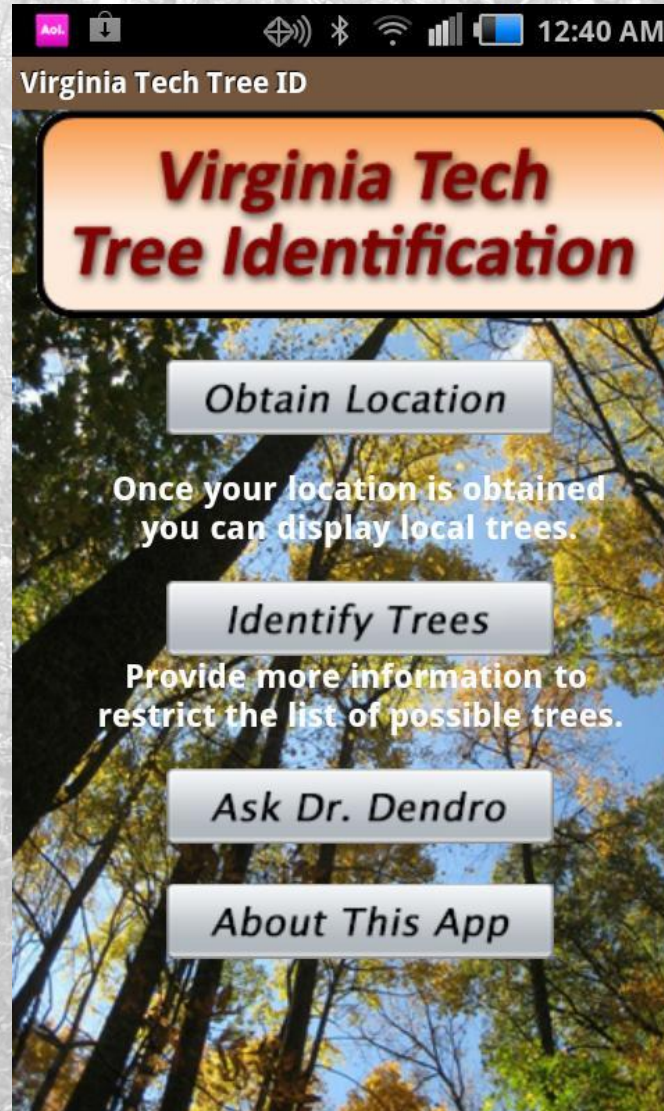
**Step 7: Leaves**  
Conifer Leaf Type  unknown  
Broadleaf Type  simple  
Lobes  unknown  
Edges  unknown  
Shape  unknown  
Thickness  unknown

**Step 8: Broadleaf Arrangement**  
 I'm not sure.  
  alternate  
  opposite

<http://dendro.cnre.vt.edu/dendrology/ident.htm>



# Database Keys



**Virginia Tech  
Tree Identification**

*Obtain Location*

Once your location is obtained  
you can display local trees.

*Identify Trees*

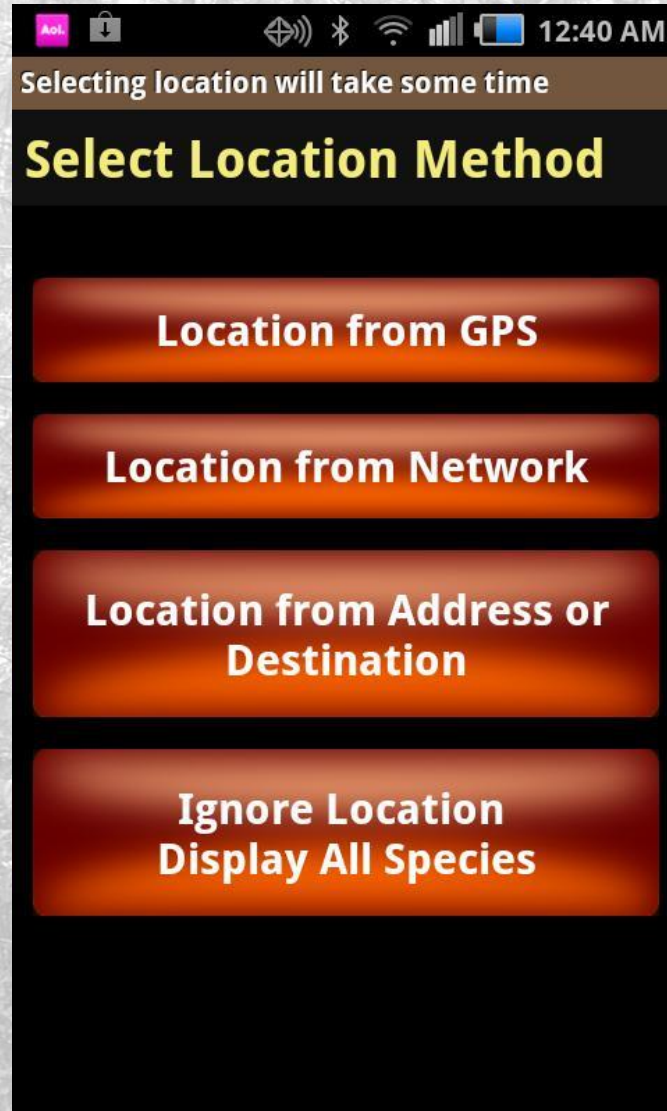
Provide more information to  
restrict the list of possible trees.

*Ask Dr. Dendro*

*About This App*



# Database Keys





# Database Keys



239 species normally found at Lat:  
35.896 Lng: -84.254 Elevation: 865.

Show me only... e.g. oak or quercus

**Press to narrow  
species list**

**Acer negundo**

boxelder

**Acer nigrum**

black maple

**Acer platanoides**

Norway maple \*\*Exotic\*\*

**Acer pseudoplatanus**

sycamore maple \*\*Exotic\*\*

**Acer rubrum**

red maple

**Acer saccharinum**



# Database Keys




Aoi. [lock icon] [signal icon] [Bluetooth icon] [Wi-Fi icon] [cellular signal icon] [battery icon] 12:43 AM


**Interview**

To remove, Press image or text:  
tree

**3) What best describes your leaves?**



[needles or scaly leaves](#)



[broadleaves](#)

Previous      Next      Clear Questions



# Database Keys



Information and images

**vTree** Florida maple (*Acer barbatum* Michx.) **Aceraceae** family

**Leaf:** Opposite, simple, orbicular in shape, 1 1/2 to 3 1/2 inches in length and width, entire margin with 3 or 5 somewhat rounded lobes, green above, paler and often fuzzy below.


**Flower:** Yellow-green, small, hanging from a long (1 to 2 inches) stalk in clusters of a few flowers, appearing with the leaves.

**Fruit:** Samara, about 3/4 inch long, spreading at about 65 degrees (wider than sugar maple), mature in the mid-summer.

**Twig:** Slender and shiny, reddish brown, terminal buds sharp pointed, brown and fuzzy.

**Bark:** Light gray, with thick irregular curling ridges, becoming plated.

**Form:** Medium sized tree to 60 feet, elliptical crown.



Previous Species      Next Species

⋮




# Database Keys





# Database Keys




Department of  
Forest Resources and Environmental Conservation

Class | Fact Sheets | Features | Tools
 **vTree**

## Factsheets

**Search the database:**

- You can search for all or part of a name.
- No fields are required.
- If you return no matches, try a more general search (ie. "maple" instead of "ashleaf maple").


Family:  State:   
 Genus:  Hardiness Zone:   
 species:  Floristic Region (Biome):  
 common:


[more info on Plant Hardiness Zones and Floristic Regions](#)

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**View trees at any North American location:**

(Click the map to select your location)




Department of  
Forest Resources and Environmental Conservation

Class | Fact Sheets | Features | Tools
 **vTree**

## Possible Matches

[Back to Search](#)

**There are 7 ID Fact Sheet matches at Latitude: 38.473030, Longitude: -77.998123, Elevation: 392.**

You can narrow the list of possibilities with additional information:

Growth Habit	<input type="text" value="vine"/>
Fruit Type	<input type="text" value="fleshy"/>
Flower Color	<input type="text" value="I'm not sure"/>
Leaf Type	<input type="text" value="broadleaf"/>
Conifer Leaves	<input type="text" value="I'm not sure"/>
Broadleaves (Hardwoods)	<input type="text" value="I'm not sure"/>
Arrangement	<input type="text" value="I'm not sure"/>
Leaf	<input type="text" value="simple"/>
- simple or compound	<input type="text" value="I'm not sure"/>
- lobes	<input type="text" value="I'm not sure"/>
- edges	<input type="text" value="serrated"/>
- shape	<input type="text" value="round (in outline)"/>
- thickness	<input type="text" value="I'm not sure"/>
Twig	<input type="text" value="I'm not sure"/>
- bundle scars	<input type="text" value="I'm not sure"/>
- leaf scars	<input type="text" value="I'm not sure"/>
- end buds	<input type="text" value="scaly"/>
- special features	<input type="text" value="I'm not sure"/>

- ◆ = nonnative, planted and a wildland component, commonly "escapes" cultivation
- ◆ = a North American native, may naturalize outside its native range

- ◆ *Celastrus orbiculatus*: Oriental bittersweet
- ◆ *Celastrus scandens*: American bittersweet
- ◆ *Euonymus fortunei*: wintercreeper



# Identification Tools and Vocabulary

## • Flower – color, shape, number of petals



catkin



spike



raceme



panicle



umbel



cyme





# Identification Tools and Vocabulary

## •Fruit





# Identification Tools and Vocabulary

## •Bark





# Identification Tools and Vocabulary

- Form





# Identification Tools and Vocabulary

- Location (locally, topography is biggest influence)



**Some common trees of  
local landforms...**



# Identification Tools and Vocabulary

## •Location

### •Rivers

- [sycamore](#)
- [silver maple](#)
- [willows](#)
- [boxelder](#)
- [hackberry](#)
- [green ash](#)
- [red maple](#)





# Identification Tools and Vocabulary

- Location

- Coves

- dead hemlock
    - yellow-poplar
    - sugar maple
    - white oak
    - northern red oak
    - basswood
    - beech
    - white ash
    - blackgum
    - red maple





# Identification Tools and Vocabulary

## •Location

### •Hillsides

- [pignut hickory](#)
- [mockernut hickory](#)
- [white oak](#)
- [black oak](#)
- [chestnut oak](#)
- [scarlet oak](#)
- [blackgum](#)
- [sassafras](#)
- [sourwood](#)
- [white pine](#)
- [Virginia pine](#)
- [red maple](#)

(aspect dependent)





# Identification Tools and Vocabulary

- Location

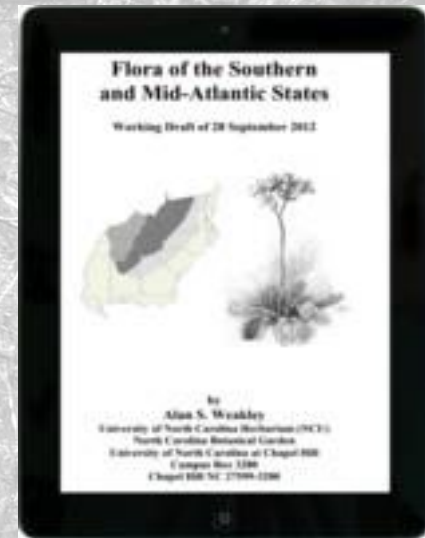
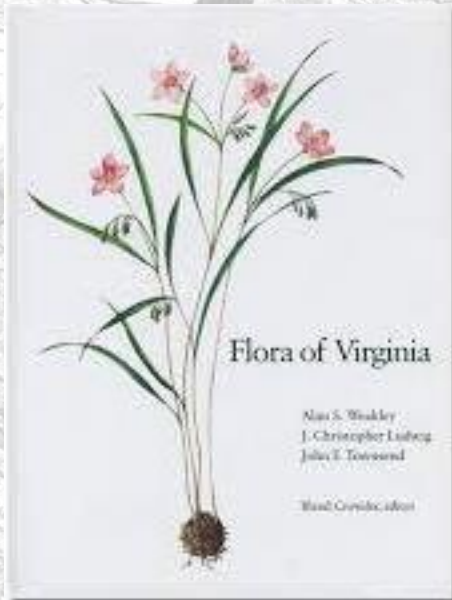
- Dry Ridges

- [Virginia pine](#)
    - [pitch pine](#)
    - [table mtn pine](#)
    - [scarlet oak](#)
    - [blackgum](#)
    - [sourwood](#)
    - [tree nerds](#)
    - [red maple](#)





# If you really get into plant ID:



<http://www.herbarium.unc.edu/flora.htm>



# Doctor Dendro


 **VirginiaTech**  
*Invent the Future*

Department of  
**Forest Resources and Environmental Conservation**

Class | Fact Sheets | Features | Tools | **vTree**

## Dr. Dendro will entertain any of your tree-related questions.

Dr. Dendro checking for flowers in a subalpine larch in northern Idaho



Dr. Dendro (on right) with former graduate students John Butnor (left, now with USDA Forest Service) and Dr. Chris Gough (center, now a Professor at Virginia Commonwealth University).

**Ask Dr. Dendro a question.**  
For tree identification questions please feel free to attach digital photos. Be sure and indicate what region of the country the plant is from, whether it is wild or in a yard, and any other information you noticed about the plant.

Last Updated: April 2011    [Contact Us](#)    [Photo Use](#)

Or email John  
Peterson directly  
[jopeters@vt.edu](mailto:jopeters@vt.edu)







