



# CTPA Arboriculture 101

## Tree Identification

### *Part II Broad-leaved Trees with Alternate Simple leaves*

by Douglas J. Pistawka

Photos by Doug Pistawka, Oscar Stone,

University of Georgia @ [www.forestryimages.org](http://www.forestryimages.org), UCONN Plant Database and Vanderbilt bio images



## Flowering Crabapple

- Small tree with round or oval crown. Fragrant and showy white, pink or red flowers
- Small ¼" to 2" many seeded fruit in hues of red, orange or yellow (fruitless varieties are available)



## **Flowering Crabapple**

- Leaves often arise from short spurs
- Many species indigenous to US and hundreds of cultivars widely planted as ornamentals
- Choose a variety resistant to cedar apple rust and apple scab to avoid need for fungicide applications



## Hawthorne

- Clustered white flowers and small ¼” to 1” red to yellow apple-like fruit
- Round red buds and double serrate leaves (often occur on spur branches )
- Small oval/round crown
- Many species which hybridize in nature and many ornamental varieties i.e. Washington, Downy, English



A close-up photograph of Hawthorne branches. The leaves are green with serrated edges and show several brown and yellow spots, indicating foliar diseases. The branches are covered in sharp, dark spines. The background is a blurred, light-colored ground.

## Hawthorne

- Branches with long slender and sharp spines. Some thorn-less varieties available.
- Susceptible to foliar diseases though tolerant to wide range of sites and adverse conditions.

## Tulip Poplar

- 4 – tip truncate leaf has spicy aromatic fragrance
- Large leafy stipules encircle twig
- “Duck-bill” shaped terminal bud and diaphragmed pith





## Tulip Poplar

- Tall upward reaching crown, branches often angle upward like a dog's leg
- Forest grown trees are typically tall and straight, often branchless for over half of their height
- In Magnolia family with large orange and green tulip-like flower
- Slim upright seed cone often visible on branch tips during winter

# Sassafras

- Three leaf shapes – egg, mitten and three fingers
- Blue/black egg shaped fruit on red stalked cups
- Twigs have aromatic citrus fragrance thought to bring good luck
- Roots and twigs steeped into a tea once thought to be a medicinal “cure all”





# Sassafras

Green twigs and buds



- Mature bark red-brown and furrowed
- Root suckering species form thickets – poplar, locust, sumac, beech





## London Plane

- Commonly planted urban tree across US and Europe.
- Cross between Eastern Sycamore and Oriental Plane
- London Plane have 2 to 4 fruit per stalk (Sycamore has 1)
- 3 or 5 lobed leaf with large teeth (Sycamore generally have more teeth)
- Camouflage bark - Mottled brown bark flakes off exposing yellow and white inner bark



## **P.P. Pirone's London Plane New York Botanical Gardens**

- Large open irregular crown
- Resistant to anthracnose
- Sycamore are often hollow and were used by early settlers for storage bins, wash tubs and drums

# Sycamore

- Base of leafstalk is hollow and covers bud
- Leaf scar encircles bud
- Stipules encircle twig beneath bud





## Sweetgum

- Star-shaped leaves with 5 to 7 lobes, fragrant when crushed
- Dry prickly seed balls hang from long stems
- Twigs sometimes with corky wings
- Conical form and gray grooved bark
- Leaves turn brilliant scarlet to purple in fall
- Name comes from the sticky sap that exudes from wounds and can be chewed like gum





## Red Mulberry

- Variable leaves with 1 – 3 lobes (similar to Sassafras)
- Sandpapery leaves with even leaf base and milky sap
- Paper mulberry has sandpapery leaves and uneven leaf base
- White mulberry leaves are not sandpapery



## **Red Mulberry**

- Edible red-black berrylike fruit
- Elongate fruit on a stalk
- Red-brown bark



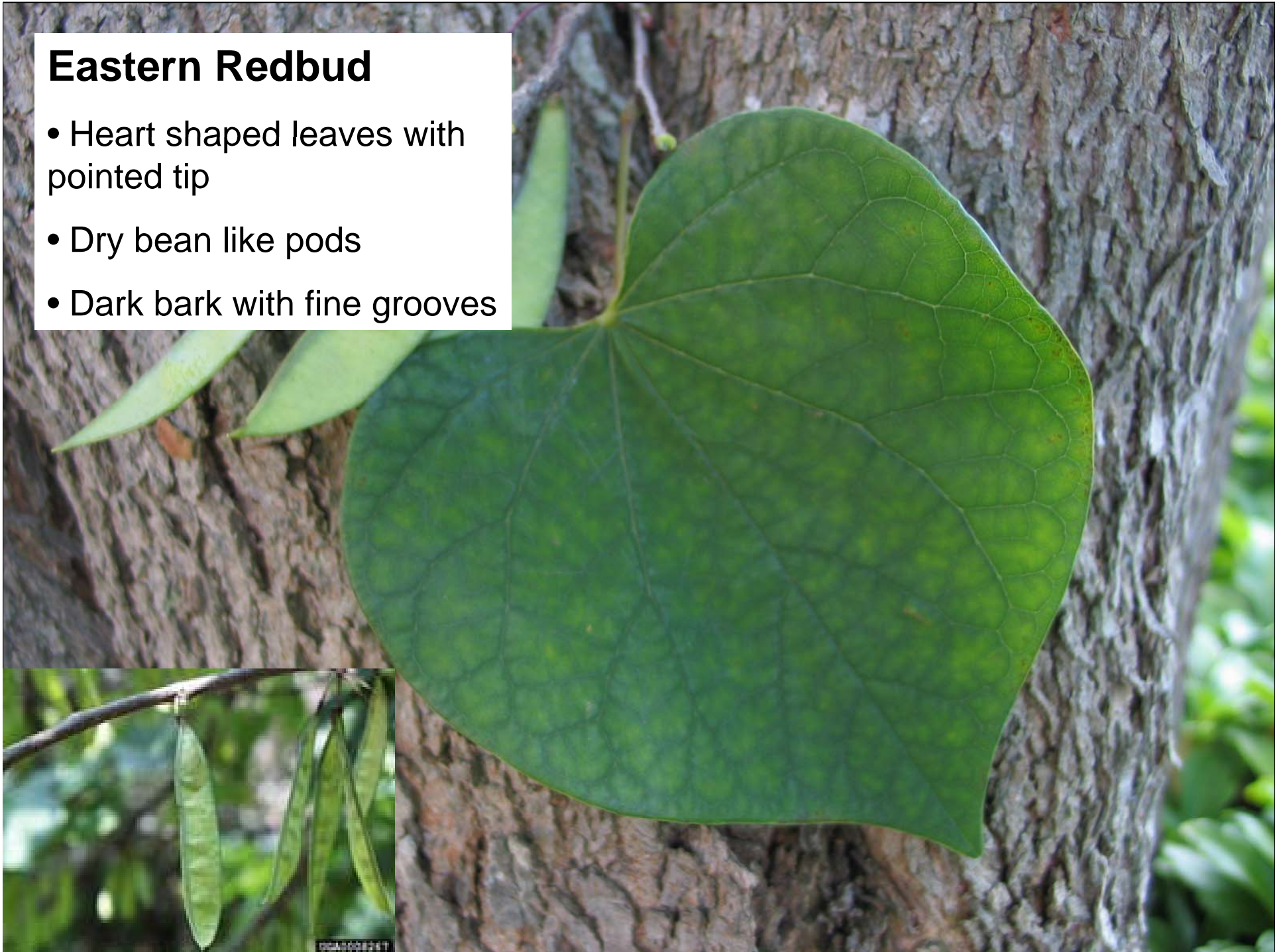
## Eastern Redbud

- Small tree with showy pink flowers blooming before leaf-out in Spring
- Stalked flower buds on twigs, overlapping bud scales and 3 bundle scars



## Eastern Redbud

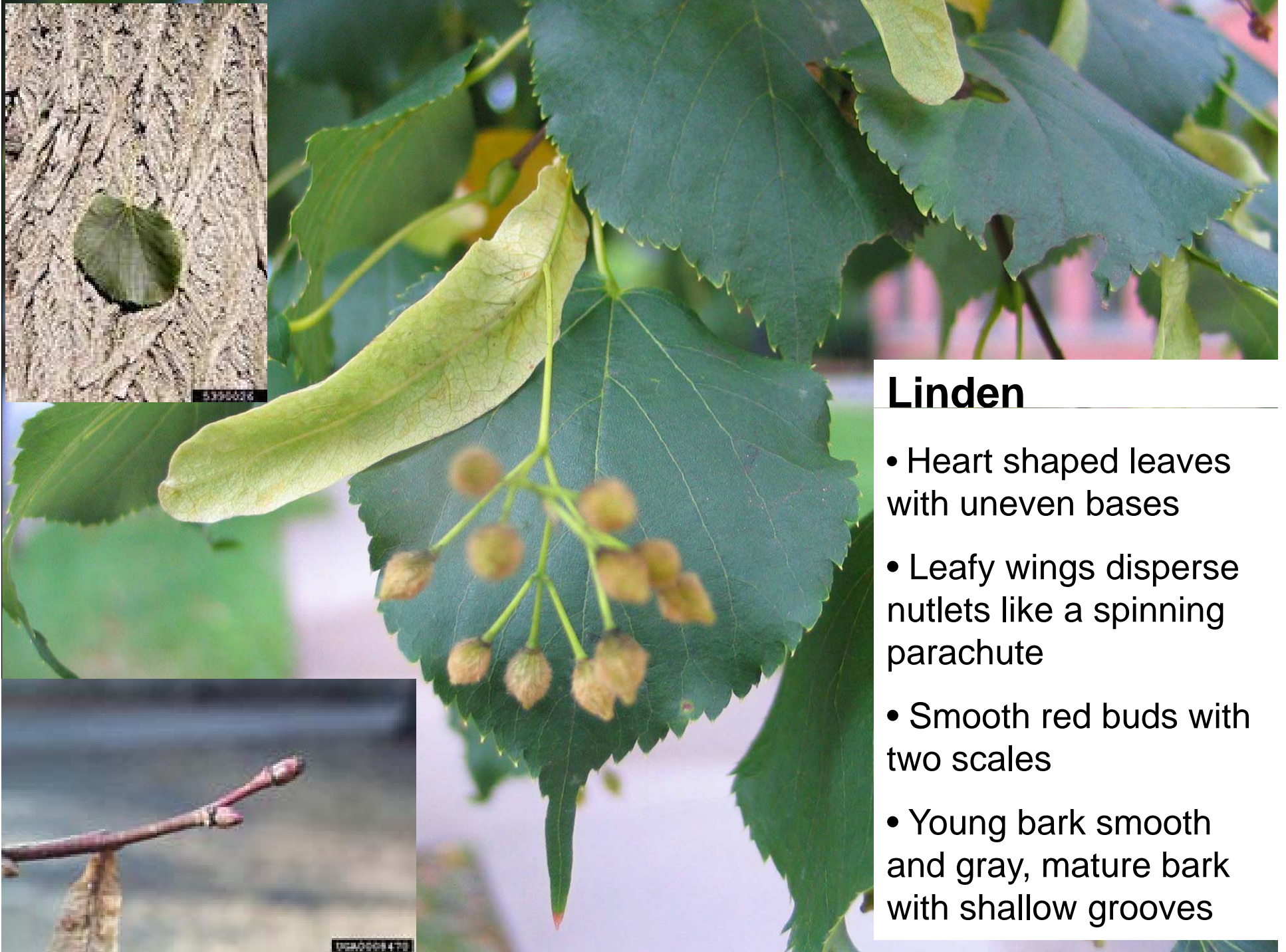
- Heart shaped leaves with pointed tip
- Dry bean like pods
- Dark bark with fine grooves



# Linden



- Commonly planted street tree tolerant of urban conditions
- Oval to round crown
- Yellow fragrant flowers - Watch out for the bees!



## Linden

- Heart shaped leaves with uneven bases
- Leafy wings disperse nutlets like a spinning parachute
- Smooth red buds with two scales
- Young bark smooth and gray, mature bark with shallow grooves



## Eastern Cottonwood

- Coarse toothed triangular leaves
- Flattened leafstalks with glands where leaf margin and petiole meet





## Eastern Cottonwood

- Young bark is smooth whitish-yellow
- Mature bark becoming dark and ridged
- Large sticky buds with caterpillar-like catkins
- Star shaped pith
- Wide spreading open crown tree of bottomlands



## Oaks – clustered buds

**Red Oaks** (Red, Pin, Scarlet and Black) have:

- Clustered pointed buds
- Pointed bristle tipped leaves

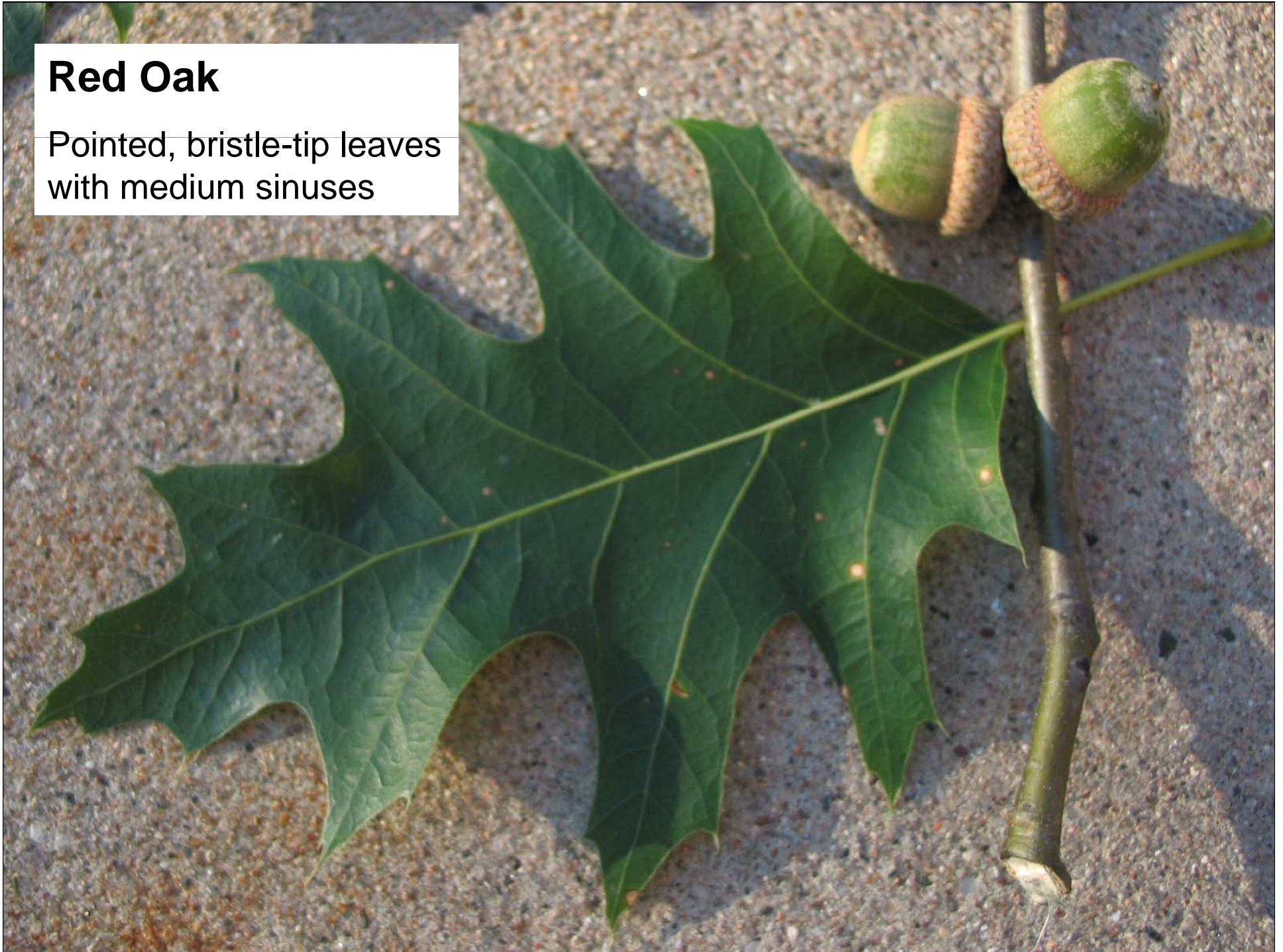
**Red Oak** (shown here)

- Robust red/brown pointed buds
- Bud scales sometimes fringed with hairs



## Red Oak

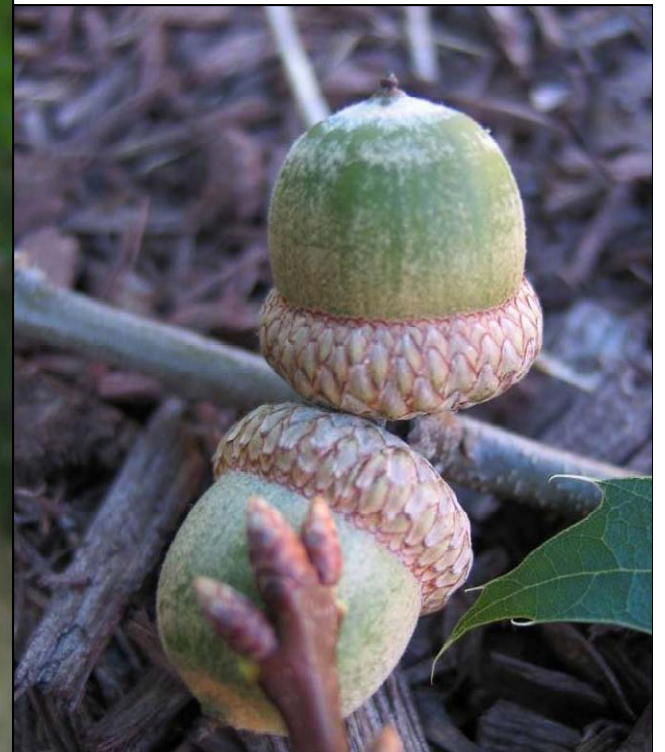
Pointed, bristle-tip leaves  
with medium sinuses





## Red Oak

- Dark brown/gray bark with red-orange furrows
- Large fat nut
- Saucer shaped cap (covering less than  $\frac{1}{4}$  of nut)







## Pin Oak

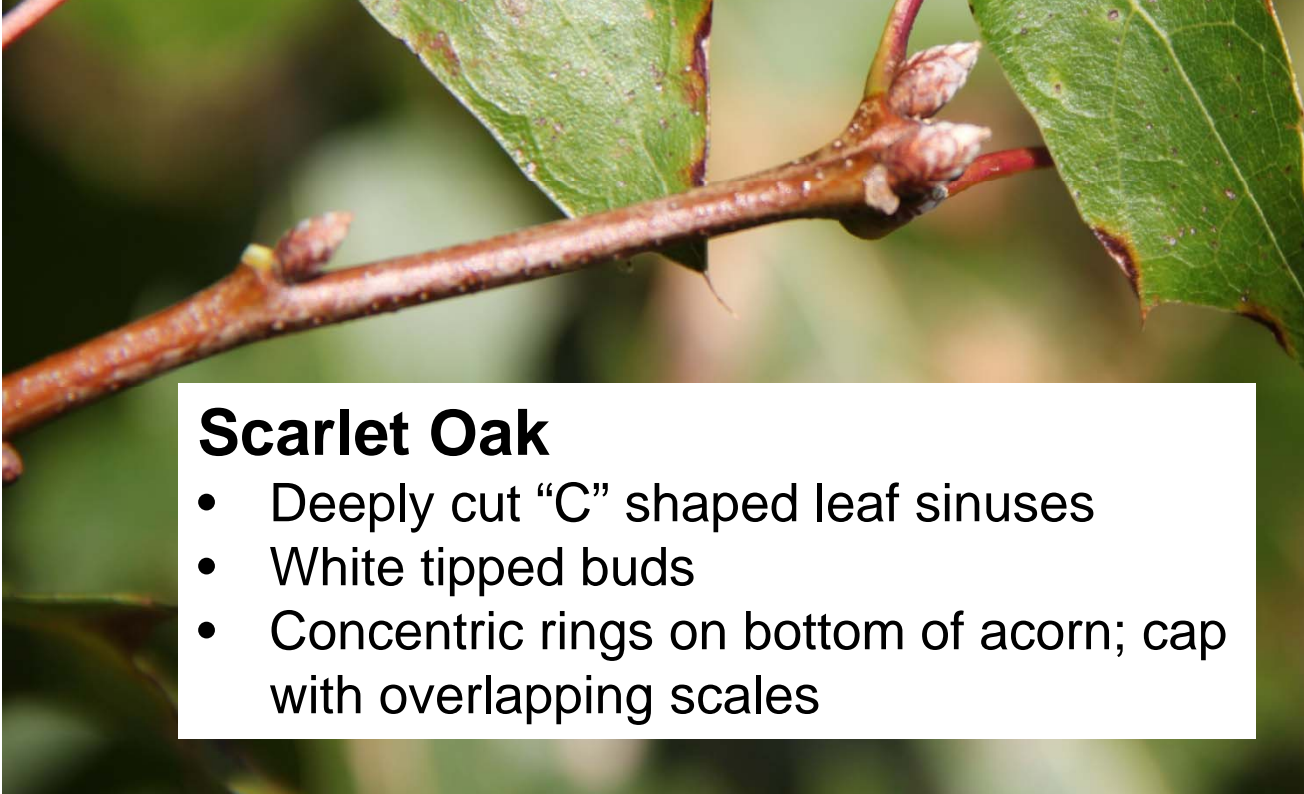
- Pointed leaf tips
- Deeply cut "U" shaped leaf sinuses
- Small pointed buds
- Small acorns with saucer shaped cap



## Pin Oak

- Form:
  - Upper branches ascend
  - Center branches horizontal
  - Lower branches droop
- Commonly planted street and landscape tree
- Native to bottomlands but does well in dry sites
- Smooth gray bark with shallow ridges and furrows





## Scarlet Oak

- Deeply cut "C" shaped leaf sinuses
- White tipped buds
- Concentric rings on bottom of acorn; cap with overlapping scales

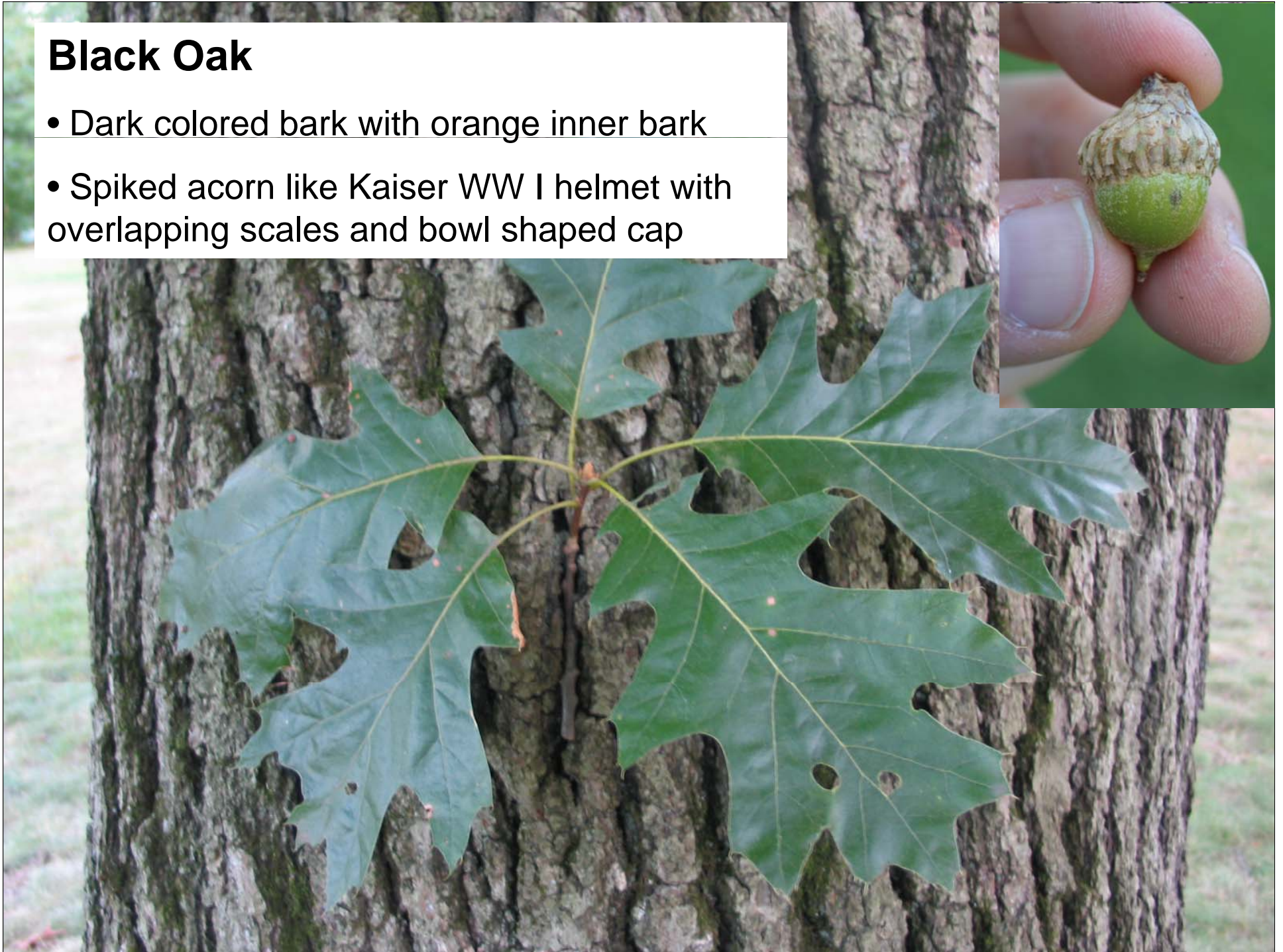
## Black Oak

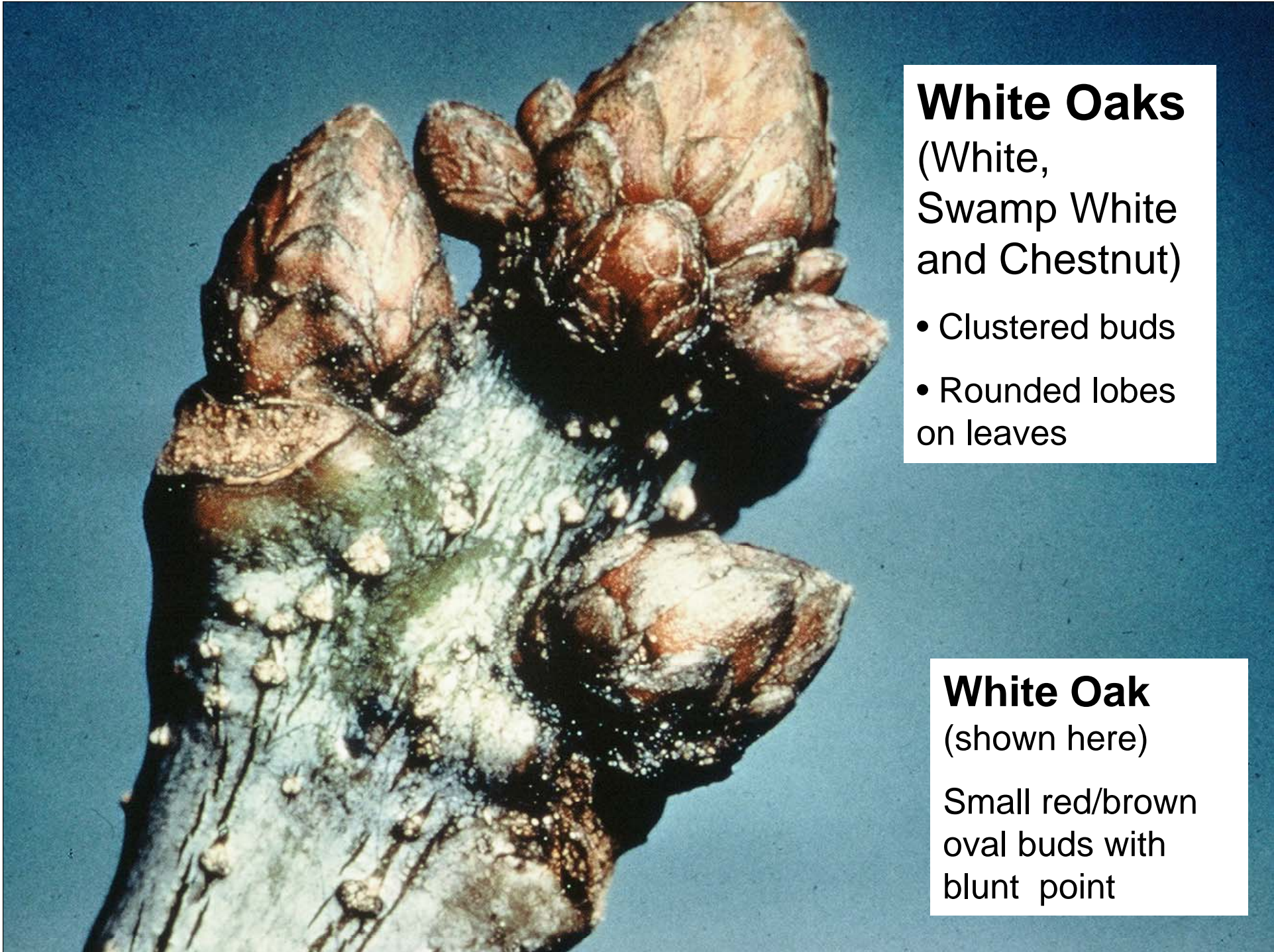


- Large woolly gray buds and angled buds and twigs
- Thick leathery leaves with pointed bristle tip and medium sinuses

## Black Oak

- Dark colored bark with orange inner bark
- Spiked acorn like Kaiser WW I helmet with overlapping scales and bowl shaped cap





**White Oaks**

(White,  
Swamp White  
and Chestnut)

- Clustered buds
- Rounded lobes on leaves

**White Oak**

(shown here)

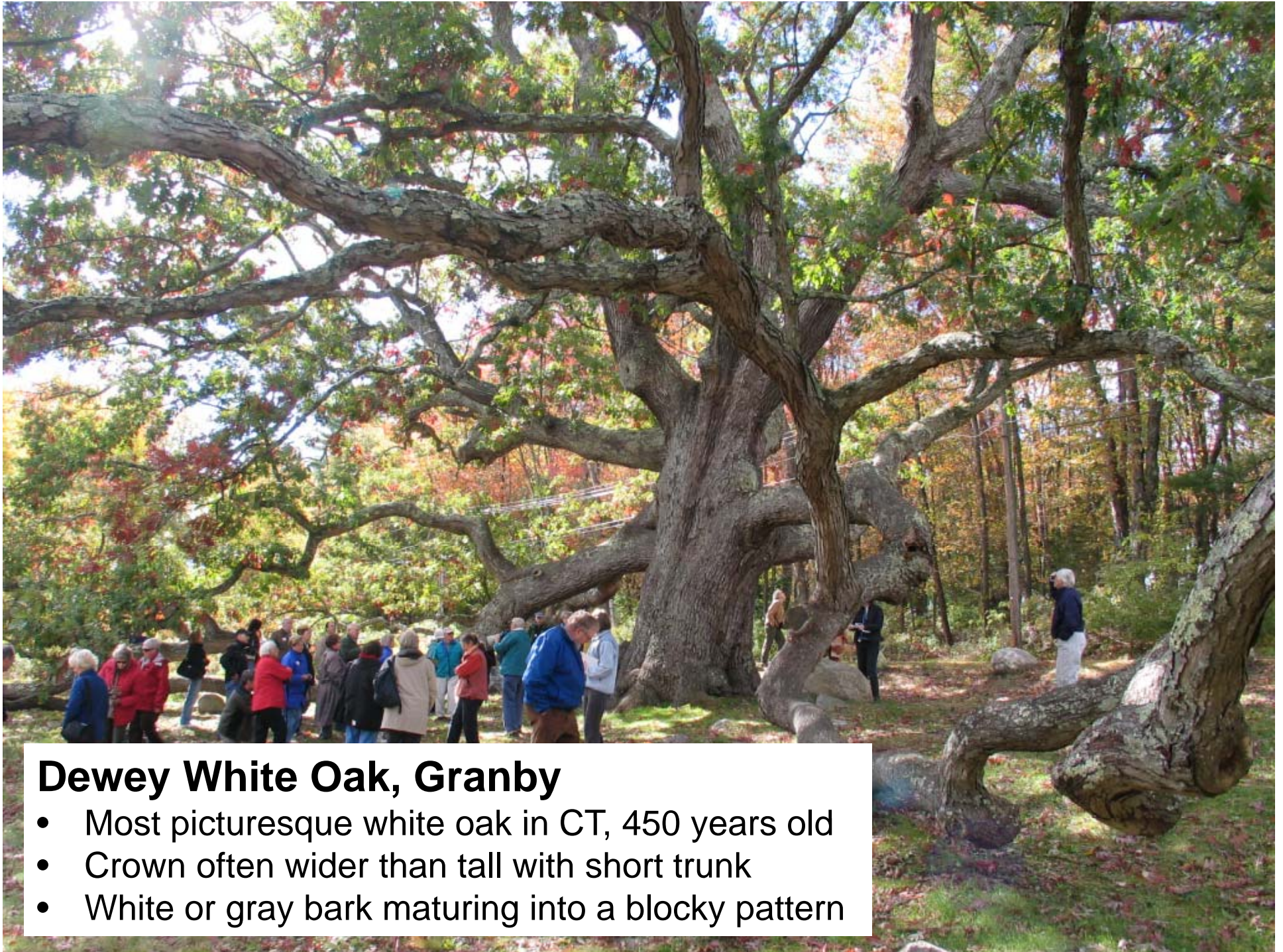
Small red/brown  
oval buds with  
blunt point



## White oak

- Leaf with rounded lobes and medium sinuses, white underneath
- Bowl shaped nut cap covering at least  $\frac{1}{4}$  of the nut. Swollen warty scales on cap and oblong nut.





## **Dewey White Oak, Granby**

- Most picturesque white oak in CT, 450 years old
- Crown often wider than tall with short trunk
- White or gray bark maturing into a blocky pattern





## Swamp White Oak

- Pear shaped leaves with rounded shallow lobes and white underside. Small smooth round buds
- Light gray bark with ridges and furrows in a blocky pattern
- Acorn has bowl-shaped cap, oblong nut with a 1" to 3" stalk
- Prefers wet woods but tolerates well drained soils



**Red Oak**



**White Oak**



**Pin Oak**



**Swamp White Oak**



# Acorns

**White Oaks** - Acorns mature in 1 year and are hairless inside nut shell

**Red Oaks** – Acorns take 2 years to mature and are hairy inside nut shell

Bowl shaped caps cover more than  $\frac{1}{4}$  of nut, Saucer shaped caps cover less than  $\frac{1}{4}$  of nut



**Swamp White**

**White**

**Black**

**Scarlet**

**Red**

**Bowl**

**Bowl**

**Bowl**

**Bowl**

**Saucer**

**Oblong with  
1"-3" stalk**

**Oblong with  
warty cap**

**Spiked tip**

**Bulls-eye ring**

**Large, fat**

## Chinese Chestnut

- American Chestnut was decimated by Chestnut blight in early 1900's
- Chinese Chestnut is resistant to chestnut blight and planted as an ornamental
- American Chestnut Society is developing hybrids between American and Chinese Chestnut resistant to blight
- Long narrow leaves with toothed margin, underside of leaf white
- Large prickly fruit



## Beech

- Long, narrow pointed bud
- Overlapping scales



**American Beech**

Toothed leaf margin

**European Beech**

Wavy leaf margin

**Waxpaper like leaves**

Note: Lateral buds point away from stem (divergent)

11 to 15 pairs of veins

9 or fewer pairs of veins





## **European Beech**

Bark resembles saggy elephant hide



## **American Beech**

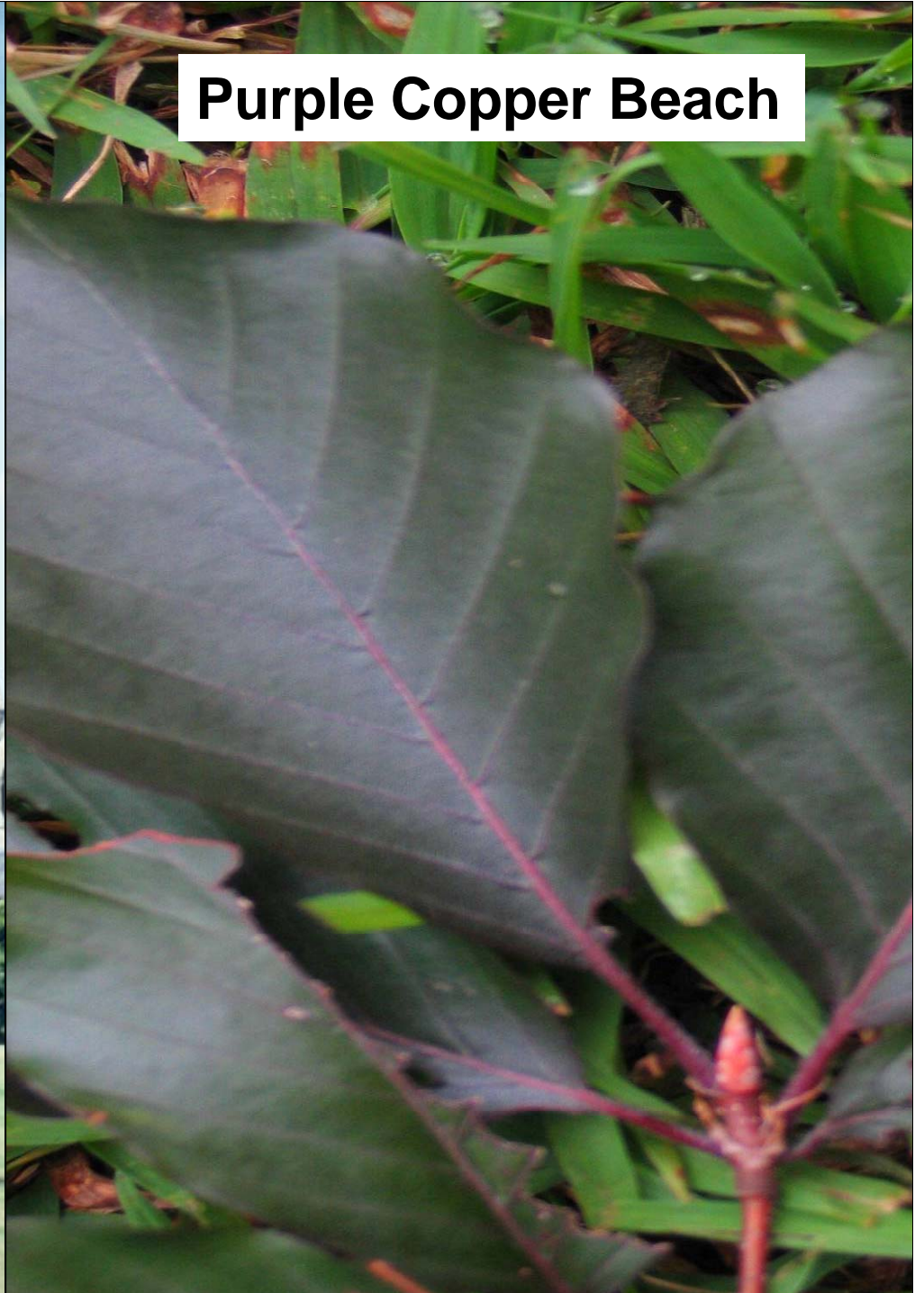
Smooth gray bark

## European Beech

Popular shade tree with many varieties i.e. copper (below) weeping, fernleaf and fastigate



## Purple Copper Beech





# American Elm

- Double toothed leaves and uneven leaf base
- Gray bark with vertical cross-thatched ridges
- Strong, durable and fibrous wood resists splitting; used for ship blocks, wheel hubs and ox yokes



## American Elm

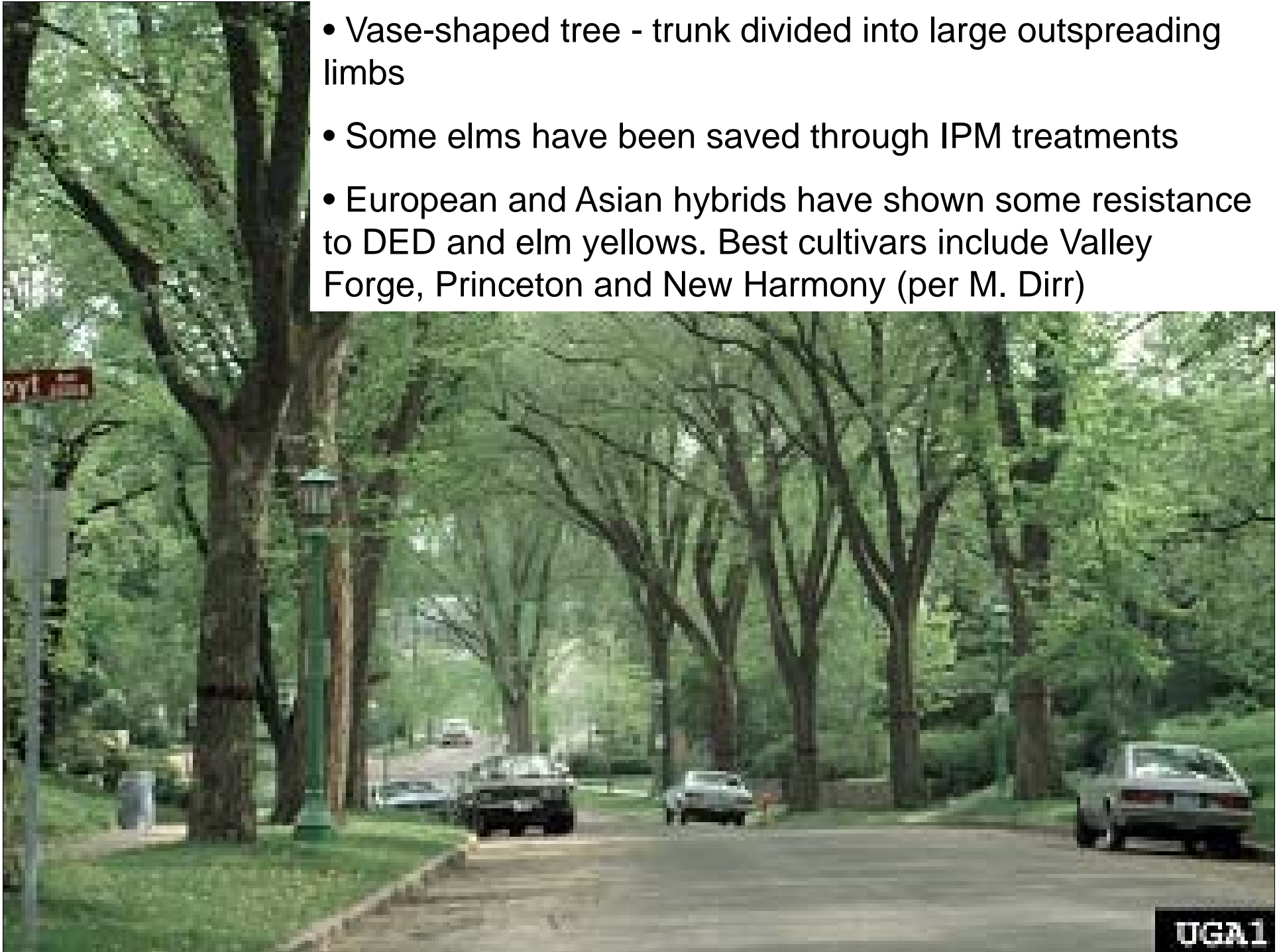
- Pseudo (false) terminal bud creates zig-zag shaped twigs
- Seeds develop within a flattened papery husk
- American elm has hairless buds and sandpapery leaves
- Slippery elm has hairy buds and sandpapery leaves
- Rock elm has hairy buds and wings on the twigs, leaves are not sandpapery



- Elms that once graced our city streets have been decimated by Dutch Elm Disease
- DED is spread by Elm bark beetles and root grafts



- Vase-shaped tree - trunk divided into large outspreading limbs
- Some elms have been saved through IPM treatments
- European and Asian hybrids have shown some resistance to DED and elm yellows. Best cultivars include Valley Forge, Princeton and New Harmony (per M. Dirr)



# Paper Birch

- Beautiful native tree with open crown
- White peeling bark easily separates into papery layers with narrow horizontal streaks
- Double toothed ovate leaves
- Gummy buds
- Few black chevrons on trunk beneath branches



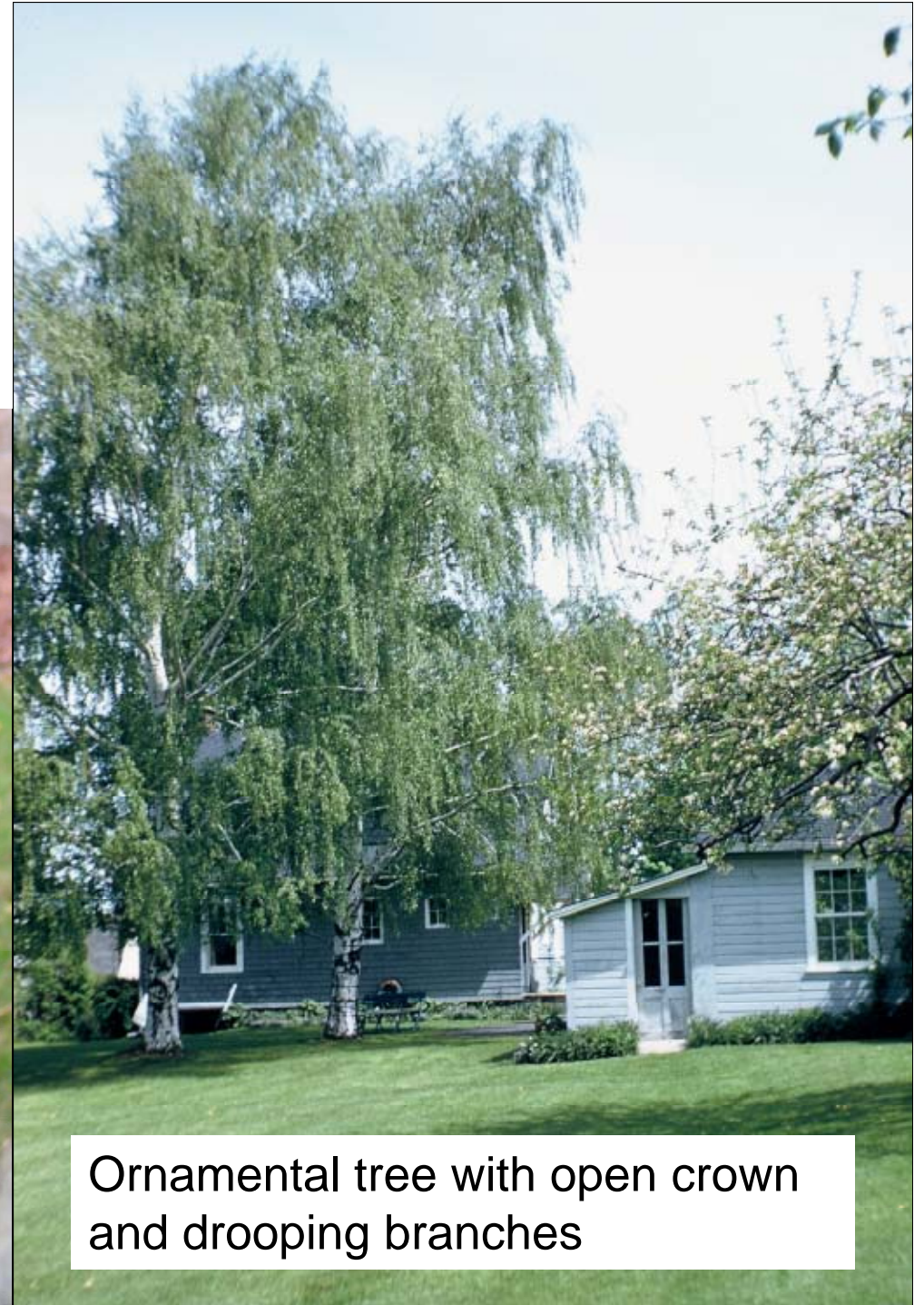
## Gray Birch

- Dull, chalky white bark less prone to peeling as paper birch
- Triangular leaves with long point
- Many dark chevrons beneath branches
- Trees often multi-stemmed, only reaching upwards of 20 to 30 feet



# European White Birch

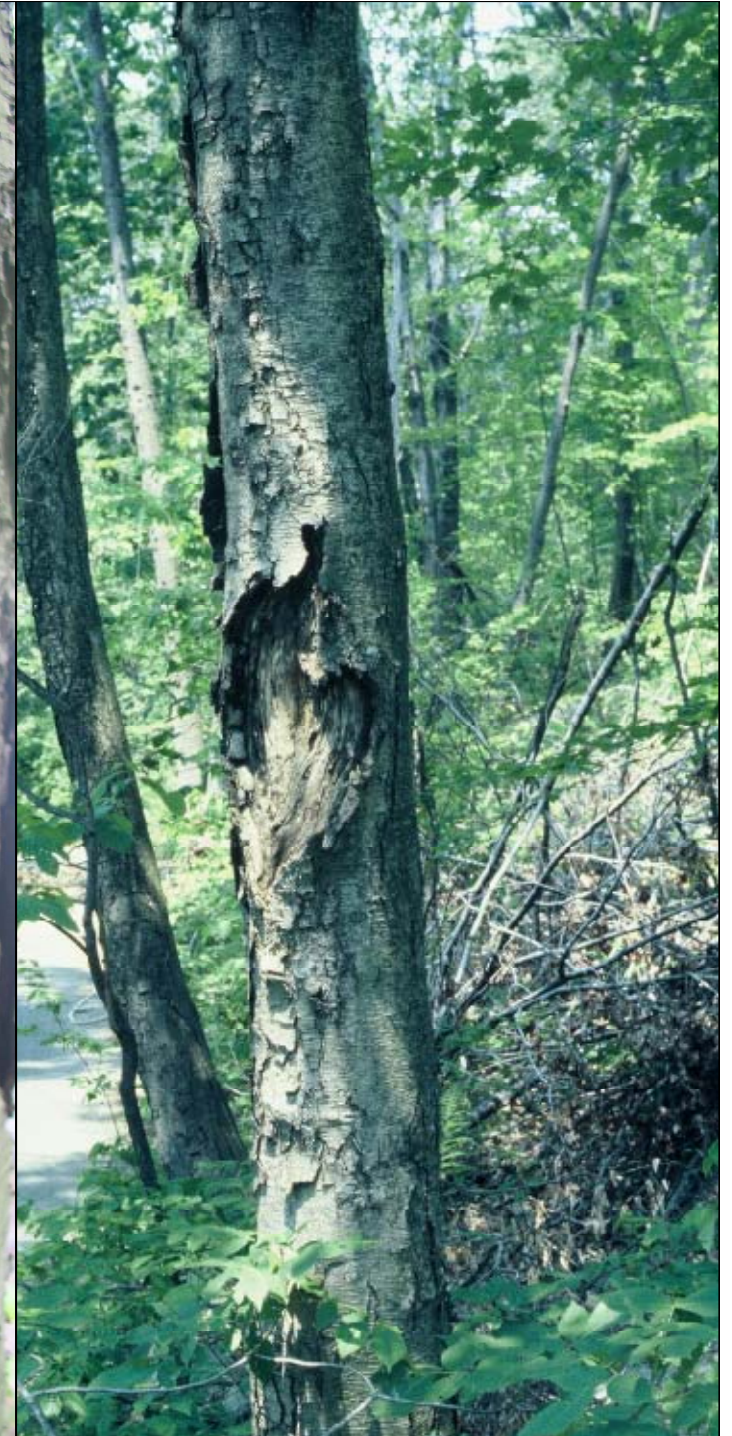
- Characteristics of paper and gray birch
- Ovate or nearly triangular leaves
- White papery bark, peeling in strips



Ornamental tree with open crown and drooping branches

## Black Birch

- Black bark with cracks or large plates
- Broken twigs have wintergreen fragrance
- Elliptical toothed leaves, notched at the base
- Sharply pointed divergent buds
- Nectria canker disease often found on trunk and limbs







## Yellow Birch

- Yellow to silver-gray bark peels in small thin curls
- Aromatic, but less so than black birch

## River Birch

- Shaggy red-brown to orange bark
- Resistant to borers and leaf miners

# Black Cherry

- Long narrow pointed leaves with serrate margins
- Midrib on bottom of leaf has orange hairs
- Small buds with pointed scales
- Twigs with burnt almond odor
- Slender clusters of red berries turn black when ripe



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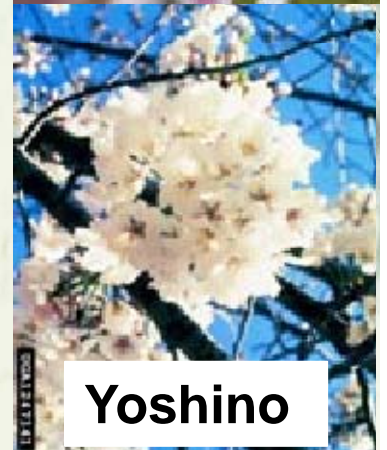
## Black Cherry

Red-brown bark with white horizontal lenticels (left)

Bark becomes dark, rough and flaky like burnt “Cornflakes” cereal as it matures (center)

UGA0008010

- Valuable wood used for cabinets and furniture
- Many flowering cherries planted in landscapes. Sargeant, Higan and Yoshino live longer than Kwanzan.
- Yoshino and 15 varieties at National Cherry Blossom Festival, Wash D.C.





## **Weeping Willow**

- Over 400 species of willow (trees and shrubs) in North America
- Long drooping twigs; brittle, weak wooded tree; prefers wet soils

## Willow

- Bud with one hood-like scale lying flat against the twig
- Dark brown bark becomes fissured with age often forking
- Narrow long pointed leaves, whitened beneath with a fine toothed margin



# American Holly



- Foliage and red berries used in Christmas decorations
- Prickly evergreen leaves with “U” shaped leaf bases and minute buds
- Dioecious with reproductive organs on separate trees



## **Shadbush** (aka Shadblow, Juneberry)

- Five petal flower and ¼ - ½” red edible fruit
- Ovate leaves with fine toothed margin





## Shadbush

- Long pointed buds with overlapping scales
- Gray bark with twisting ridges
- Attractive low growing native tree often planted in landscapes





# Stewartia

- Landscape tree with year round interest
- Showy white flowers with orange center
- Elliptical leaves with burgundy fall foliage
- Round dry fruit with short point mature into winter nutlets
- Mottled exfoliating bark



## Black Tupelo (Sourgum or Pepperidge)

- Shiny elliptical leaves
- Single seeded, raisin like fruit in clusters of 2 and 3, turns blue when ripe
- Diaphragmed pith
- Dark, deeply checkered bark



## **Black Tupelo**

- Horizontal branching structure
- Prefers wet soil
- Excellent burgundy fall color





## Magnolia

- One of the first spring flowering trees
- Saucer magnolia with large showy bell-shaped flowers of pink, white or purple
- Star magnolia flower below



# Magnolia

- Large hairy buds with a single bud scale
- Some have large cone-like seed pods which turn bright red when ripe (Cucumber magnolia on right)

UGA0008517



## Bradford Pear

- Planted for its showy white flowers and tolerance to urban conditions
- Of Chinese origin, brought to U.S. as an under stock for fruit trees



UGA2308070

# Bradford Pear

- Small ½” round fruit
- Egg shape leaves with fine teeth
- Large brown buds
- Poor branch structure and overplanted in landscapes





## **Bradford Pear**

- Weak crotches and poor branch structure lead to tree failure
- More recent varieties such as Aristocrat claim to have better branch structure though many arborists do not favor new plantings





## **Zelkova**

**Avoid volcano mulch!**

- Native of Asia, originally recommended as a substitute for American elm
- Similar form to elm with ascending branches and a vase shape crown, though not nearly as large or majestic as the elms
- Hardy tree resistant to Dutch Elm Disease

# Zelkova

- Toothed elliptical leaves
- Large red buds
- Smooth gray bark becomes flaky with age, exfoliates to reveal small orange patches as it matures



# Tree Walks and Arboretums

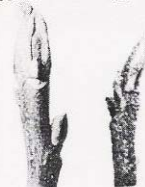
- Bartlett Arboretum, Stamford  
[www.bartlettarboretum.org/](http://www.bartlettarboretum.org/) 203 322-6971
- Conn College Arboretum, New London  
[www.arbor@conncoll.edu](mailto:www.arbor@conncoll.edu) 860 439-5020
- Elizabeth Park, Hartford [www.elizabethpark.org](http://www.elizabethpark.org)
- Bushnell Park, Hartford [www.bushnellpark.org](http://www.bushnellpark.org)
- Cedar Hill Cemetery, Hartford [cedar.hill@snet.net](mailto:cedar.hill@snet.net)  
860 956-3311
- Institute of Living, Hartford [www.instituteofliving.org/](http://www.instituteofliving.org/)  
1 800 673-2411
- Kellogg Environmental Center, Derby 203 734-2513
- Virtual plant walks of New England universities including UCONN @ [www.hort.uconn.edu/plants](http://www.hort.uconn.edu/plants)
- Connecticut's Notable trees @ [notabletrees.conncoll.edu/](http://notabletrees.conncoll.edu/)



Canadian National Gardens Vancouver, B.C.

Key to the Common Hickories

- 1. Bud scales paired, valvate; buds often appearing naked ----- 2
- 1. Bud scales imbricate, usually more than 2 visible ----- 3
- 2. Buds bright yellow. Bitternut Hickory *Carya cordiformis* (Wangenh.) K. Koch. 1
- 2. Buds brownish. Pecan Hickory *Carya illinoensis* (Wang.) K. Koch. 2
- 3. Terminal buds short and stout; somewhat globose, usually glabrous. Pignut Hickory *Carya glabra* (Mill.) Sweet; and Red Hickory *Carya ovalis* (Wang.) Sarg. 3  
The 1953 "Checklist" considers *C. ovalis* a synonym for *C. glabra*.
- 3. Terminal buds larger, more ellipsoidal, more or less hairy ----- 4
- 4. Outer scales soon deciduous, showing the lighter colored ones beneath; twigs often hairy, and quite fragrant when bruised. Mockernut Hickory *Carya tomentosa* Nutt. 4
- 4. Outer scales persistent, twigs less hairy, or glabrous ----- 5
- 5. Twigs orange-brown, or buff colored, lenticels orange colored. Shellbark Hickory *Carya laciniosa* (Michx. f.) Loud.
- 5. Twigs dark reddish brown. Shagbark Hickory *Carya ovata* (Mill.) K. Koch. 5



1

2



3



4



5

Dichotomous key - "continually forks in two"

William H. Harlow, Fruit Key and Twig Key to Trees and Shrubs