

CTPA Arboriculture 101

Tree Identification

Part II Broad-leaved Trees with Alternate Simple leaves

by Douglas J. Pistawka

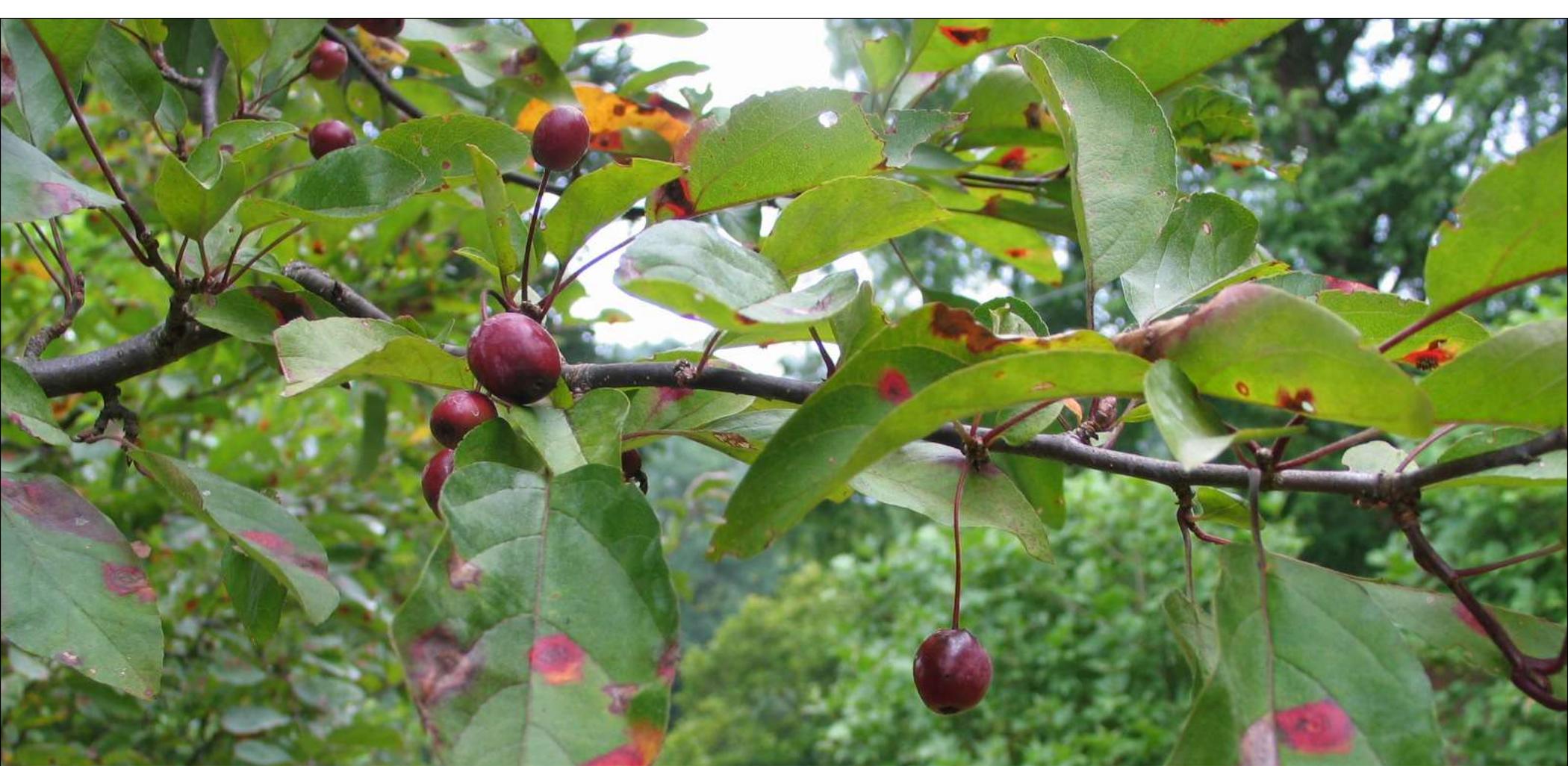
Photos by Doug Pistawka, Oscar Stone,

University of Georgia @ www.forestryimages.org, 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

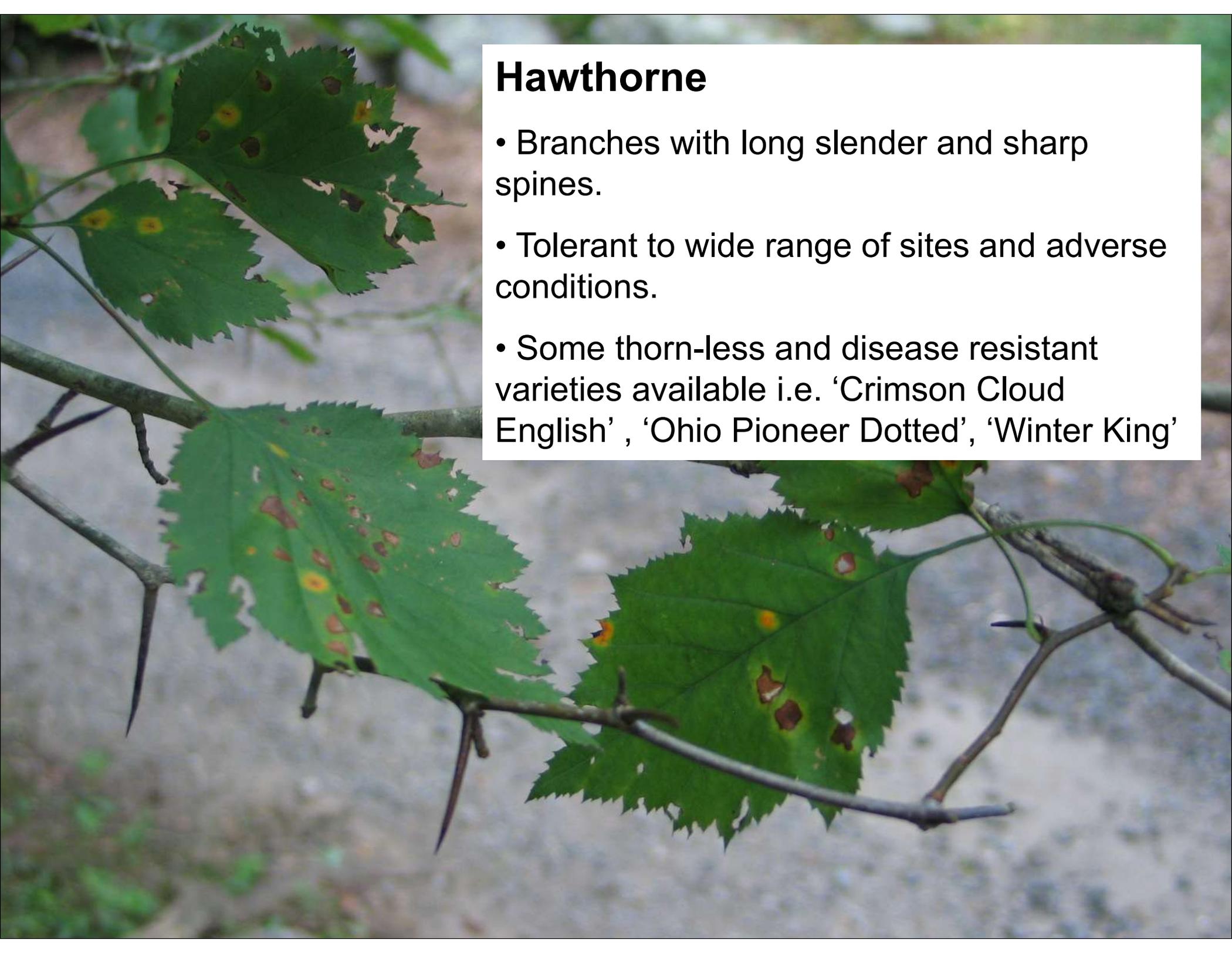
- Leaves often arise from short spurs
- Many species indigenous to U.S. and hundreds of cultivars widely planted as ornamentals
- Choose a variety resistant to cedar apple rust (shown here) and apple scab to avoid need for fungicide applications i.e. 'Adams', 'Prairie Fire', 'Red Jewel'



Hawthorne

- Clustered white flowers and small $\frac{1}{4}$ " to 1" red to yellow apple-like fruit
- Round red buds and double serrate leaves (often occur on spur branches)
- Small oval/round crown
- Over 140 species which hybridize in nature and many ornamental varieties



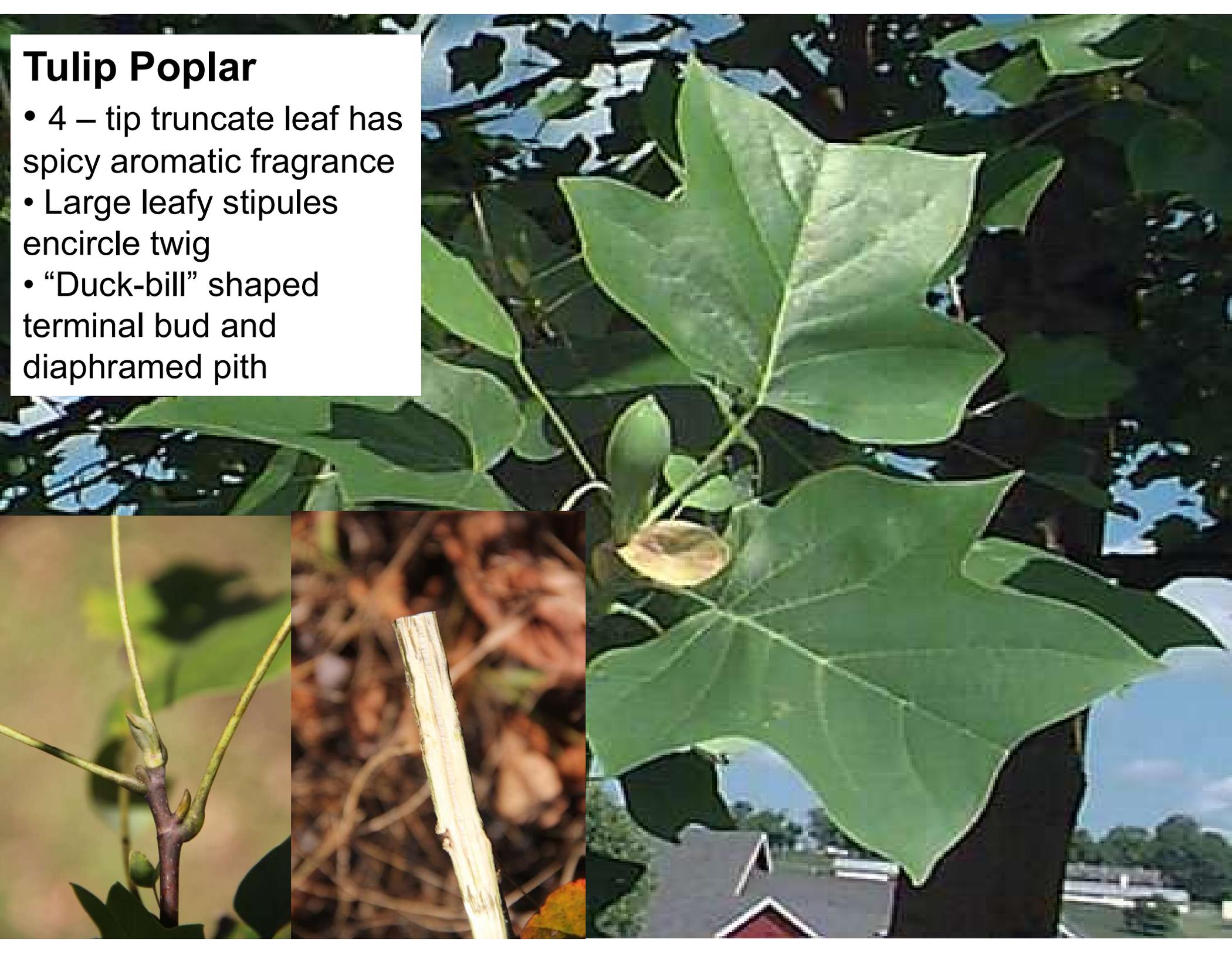
A close-up photograph of Hawthorne branches with several large, serrated green leaves. The leaves exhibit significant damage, including numerous small holes and larger irregular lesions in shades of brown and yellow, characteristic of fungal diseases like Septoria leaf spot. The branches are covered in sharp, dark thorns. The background is a blurred outdoor setting.

Hawthorne

- Branches with long slender and sharp spines.
- Tolerant to wide range of sites and adverse conditions.
- Some thorn-less and disease resistant varieties available i.e. 'Crimson Cloud English' , 'Ohio Pioneer Dotted', 'Winter King'

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, American beech and sassafras





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 green/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 a hollow cone, covering bud like a birthday hat
- Leaf scar encircles bud
- Stipules encircle twig beneath bud



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Sweetgum

Star-shaped leaves with 5 to 7 lobes, nutmeg fragrance when crushed

- Dry prickly seed balls hang from long stems. Fruitless varieties available
- Twigs sometimes with corky wings (below)
- 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, elongate red-black berrylike fruit on a stalk resembles blackberry
- Red-brown bark

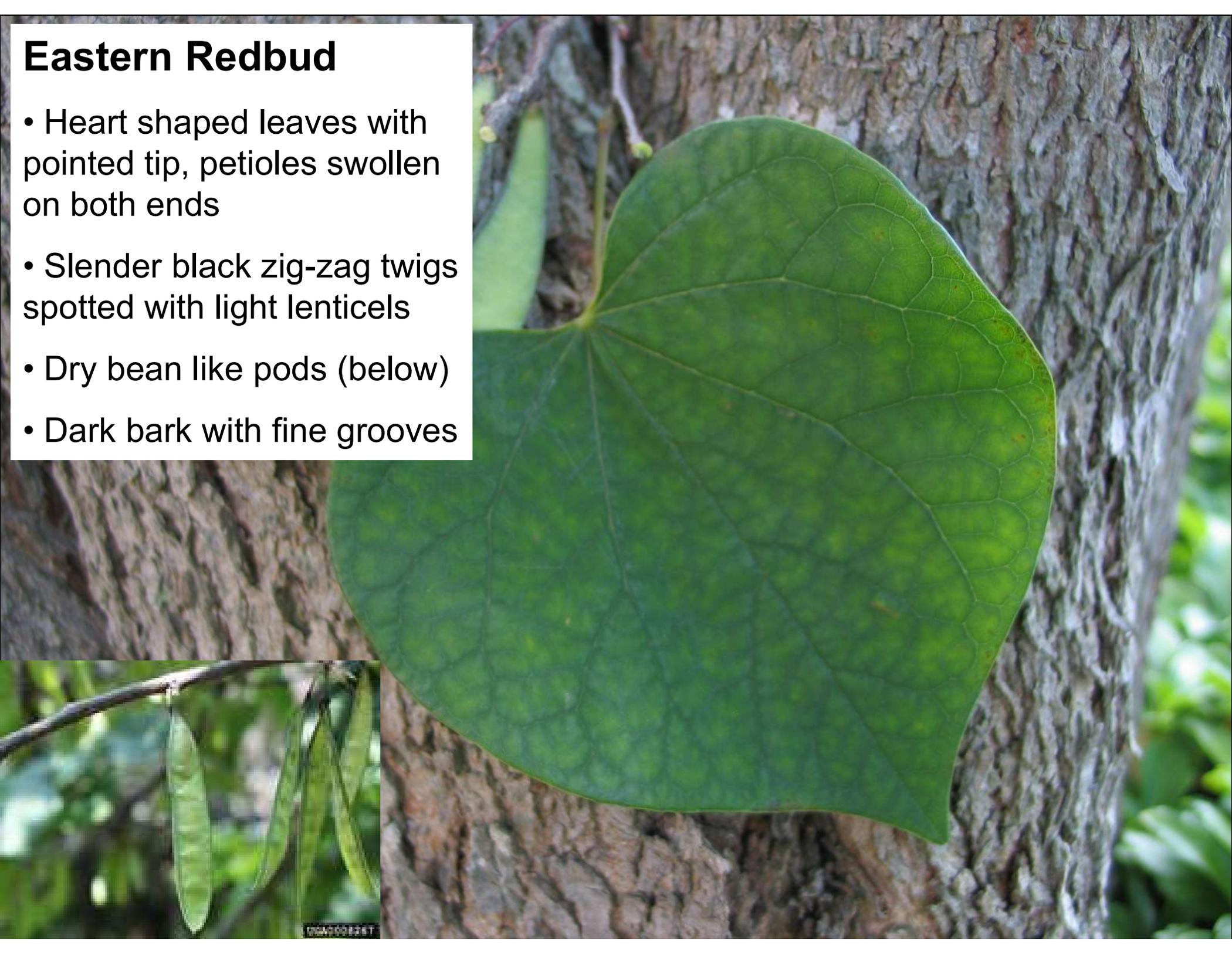


Eastern Redbud

- Small native 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, petioles swollen on both ends
- Slender black zig-zag twigs spotted with light lenticels
- Dry bean like pods (below)
- Dark bark with fine grooves



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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 (bottom left)
- 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 (right)



Eastern Cottonwood

- Young bark is smooth whitish-yellow
- Mature bark becoming dark and ridged
- Large sticky buds with caterpillar-like catkins, releases snow like seed in late Spring
- Star shaped pith (bottom right)
- Wide spreading open crown tree of bottomlands



Oaks – clustered buds

Red Oaks (Red, Black, Pin and Scarlet) 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 “ski-slope” like furrows
- Large fat nut
- Saucer shaped cap (covering less than $\frac{1}{4}$ of nut)



Black Oak

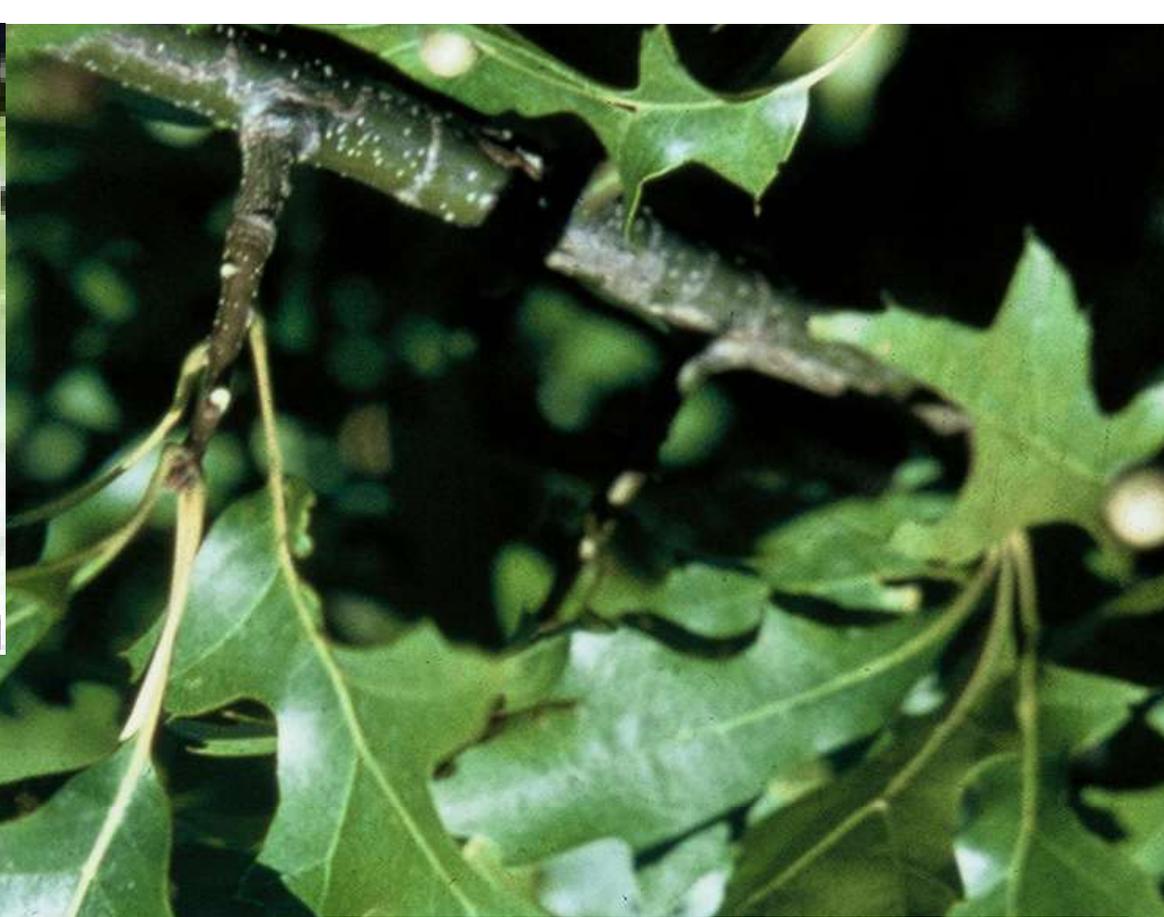


- Large woolly gray buds and angled buds and twigs
- Thick leathery leaves with pointed bristle tip and medium sinuses

Black Oak

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





Pin Oak

- Pointed leaf tips with deeply cut "U" shaped leaf sinuses
- Small pointed buds on short stubby "pin" like branches
- Small thumbnail size acorns with saucer shaped cap

Pin Oak

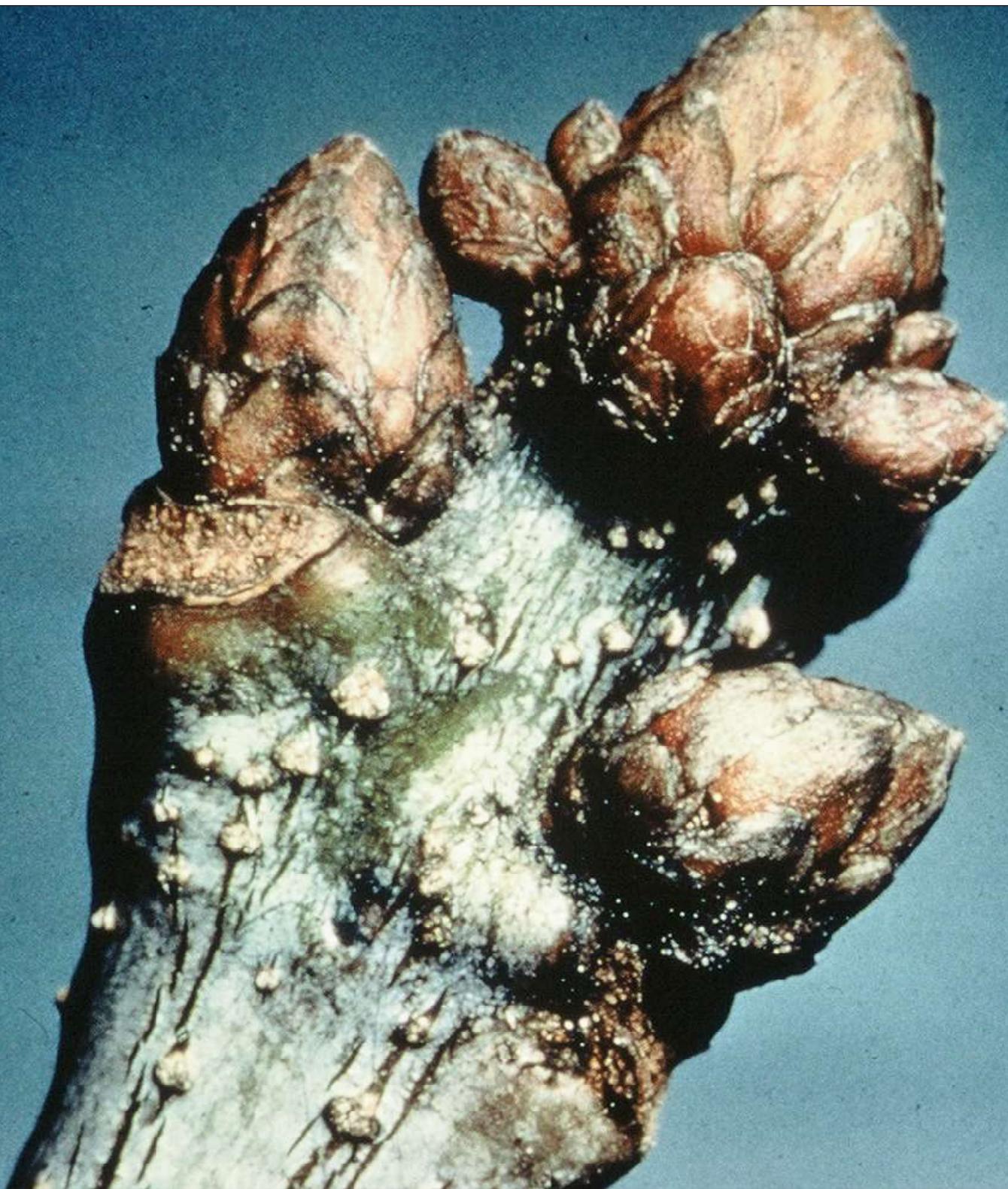
- Form:
Upper branches ascend
Center branches horizontal
Lower branches droop
- Commonly planted street and landscape tree
- Native to bottomlands but does well in dry sites
- Smooth gray bark with shallow ridges and furrows





Scarlet Oak

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



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



Oak Leaf Shapes

Red Oak

Pin Oak



White Oak Chestnut Oak

Black Oak

Scarlet 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 Foundation 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

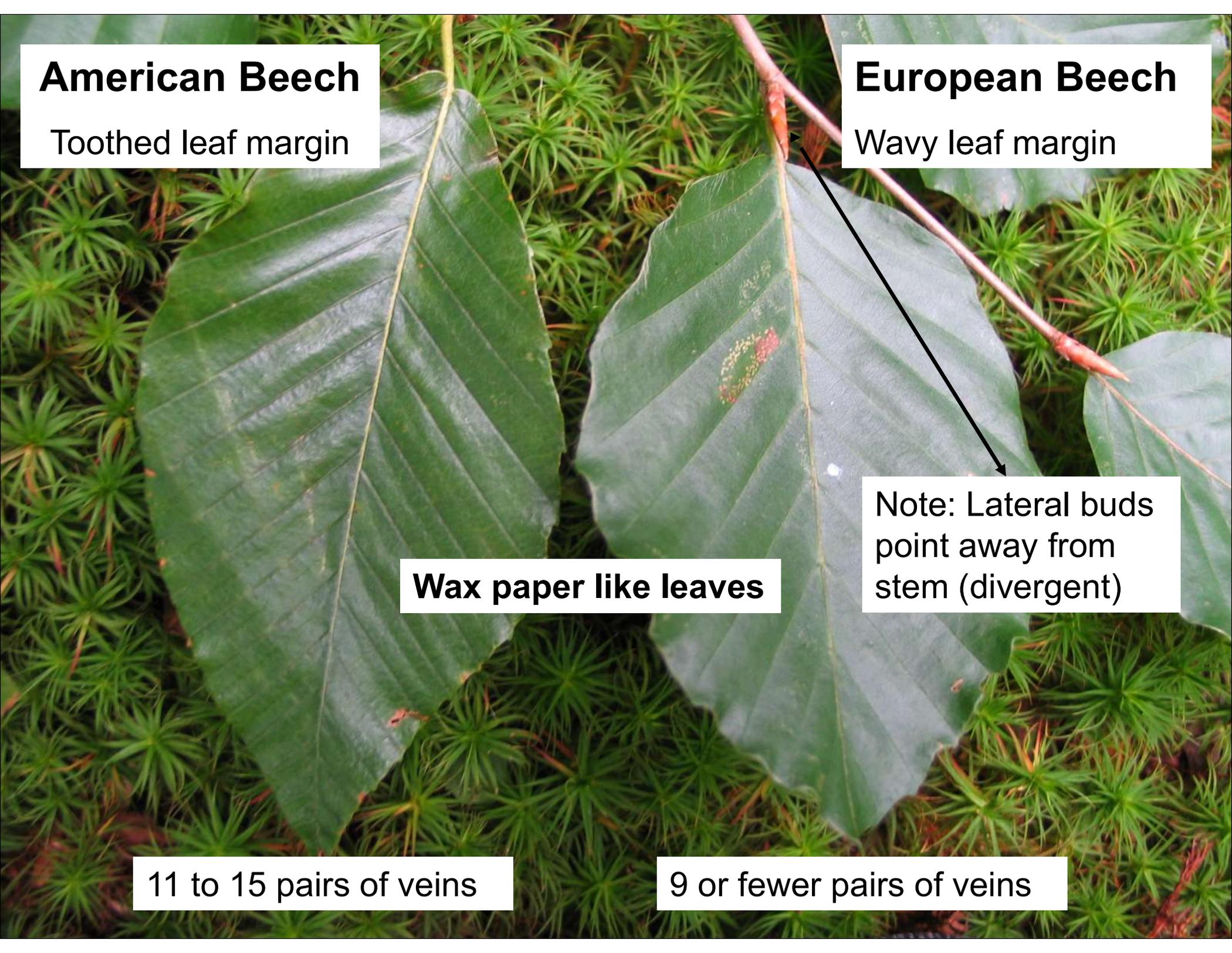
Wavy leaf margin

Wax paper 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, fern leaf and fastigiata



Purple Copper Beach



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
- Avoid monocultures – plant no more than 5% of a species, 10% of a genus and 20% of a family



- 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. Valley Forge and Princeton are resistant but split due to poor form; New Harmony is said to have better form.



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 square base and long pointed tip
- 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, often with 2 glands on petiole
- 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



Black Cherry

Red-brown bark with white horizontal lenticels (left)

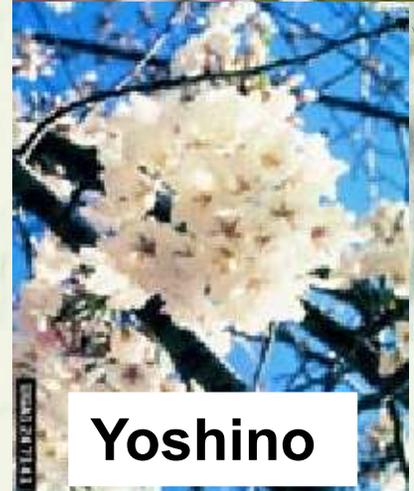
Bark becomes dark, rough and flaky like burnt “Cornflakes” cereal as it matures (center)

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



Sargeant



Yoshino



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



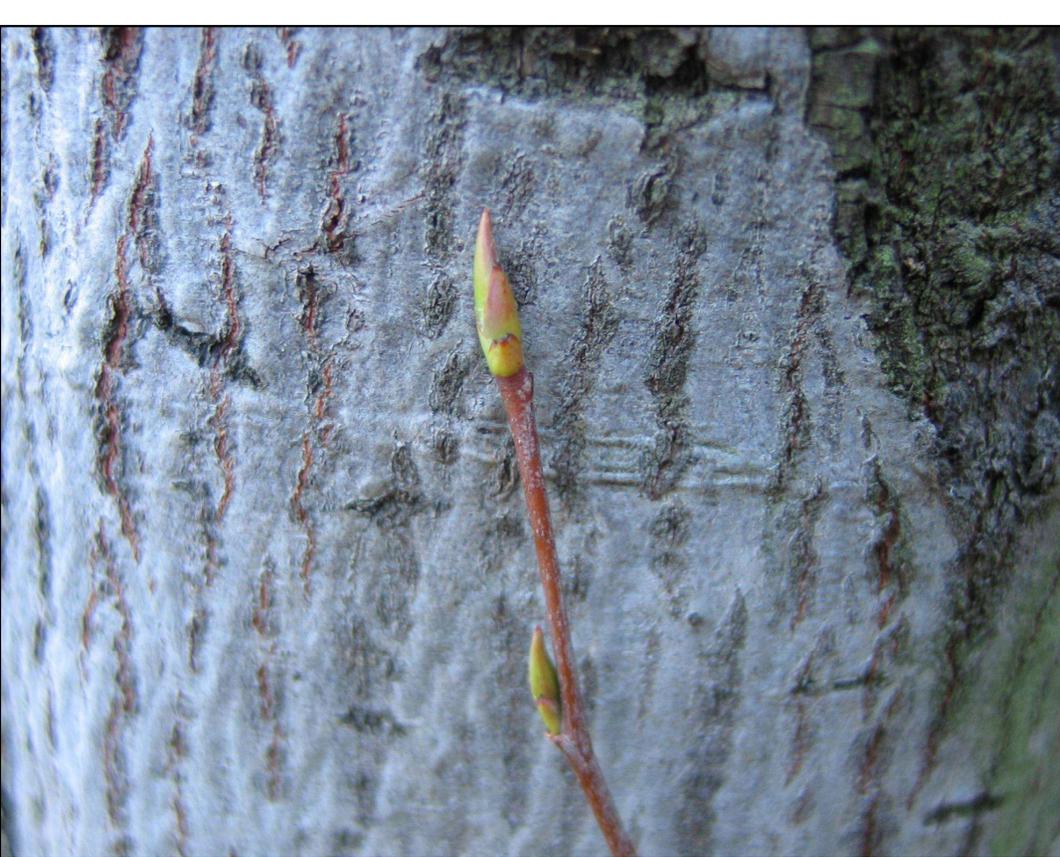
- Showy red berries make it a popular Christmas decoration
- Evergreen, thick and glossy leaves with prickly margin, “U” shaped leaf bases and minute buds
- Dioecious with reproductive organs on separate trees



Shadbush (aka Shadblow, Serviceberry, Juneberry)

- Attractive five petal white flower and small $\frac{1}{4}$ - $\frac{1}{2}$ " 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, many species hybridize
- Planted in landscapes i.e. 'Autumn Brilliance' 20-25', 'Princess Diana' 15-20'



Stewartia

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



Black Tupelo (Blackgum, Sourgum or Pepperidge)

- Shiny elliptical leaves
- Single seeded, raisin like fruit in clusters of 2 and 3, turns blue when ripe
- Diaphramed 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
- Many cultivars – ‘Ann’, ‘Jane’, Merrill’, ‘Galaxy’, ‘Star’ (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)



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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



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/ 203 322-6971
- Conn College Arboretum, New London
www.arbor@conncoll.edu 860 439-5020
- Elizabeth Park, Hartford www.elizabethpark.org
- Bushnell Park, Hartford www.bushnellpark.org
- Cedar Hill Cemetery, Hartford cedar.hill@snet.net
860 956-3311
- Institute of Living, Hartford 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
- Connecticut's Notable trees @ notabletrees.conncoll.edu/

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

Dichotomous key - "continually forks in two"

WOODY PLANTS OF EASTERN NORTH AMERICA

43

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

Quiz

What tree did these fruit come from?

Definition: fruit is the seed bearing portion of the plant

Answers:

1. White Pine
2. Norway Spruce
3. White Spruce
4. Douglas Fir
5. Tulip Poplar
6. Sweet Gum
7. Sycamore
8. Kousa Dogwood
9. Honey Locust
10. Catalpa
11. Ailanthus
12. Black Walnut
13. Butternut
14. Pignut Hickory
15. Mockernut Hickory
16. Shagbark Hickory

Thank you

Canadian National Gardens Vancouver, B.C.

