

WINTER KEYS TO COMMON, WETLAND TREES, SHRUBS, AND WOODY VINES OF THE NORTH CAROLINA COASTAL PLAIN

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Abstract. Bracketed, illustrated keys based on winter twig and leaf features are presented for common woody, wetland plant species of the North Carolina Coastal Plain. These keys will also provide identifications for many Piedmont wetland species. Eighty-two species and eighteen species groups (two or more species that cannot be reliably distinguished using winter features) can be identified with these keys. Winter descriptions of each taxon are also presented.

Keywords: Flora of North Carolina Coastal Plain, wetland, dichotomous keys, trees, shrubs, vines.

Much of the North Carolina Coastal Plain is wet and supports plant communities that are dominated by woody species. Identifying these species is important for several purposes including wetland delineation and restoration, rare species conservation, wildlife habitat evaluation, and academic research. Plant species are identified during the growing season with the aid of keys that are based

on leaf, flower, and fruit features. However, woody species can also be identified during the dormant season by using keys based on winter stem features. We here present keys to eighty-two species and eighteen species groups of common, wetland trees, shrubs and woody vines of the North Carolina Coastal Plain.

METHODS

Taxa included in the keys are those which the authors have more than occasionally encountered in Coastal Plain wetlands in North Carolina. Species that occur only occasionally to rarely in wetlands were not included and they are listed following the key. The keys are based mainly on the authors' observations of living material and herbarium specimens in NCSC. Weakley (2004) provided the treatment of *Smilax*. Additional information came from Core & Ammons (1958), Godfrey & Wooten (1981), Godfrey (1988), Preston &

Wright (1988), and Grimm (1993). Winter descriptions of the included taxa follow the list of excluded species. A glossary of ninety-nine terms follows the descriptions. Underlined items in key leads are illustrated. Scientific and common plant names were taken from the PLANTS Database (USDA, NRCS 2004). Author abbreviations follow Brummitt & Powell (1992). Synonyms and alternative common names that are frequently used are listed in parentheses following the names taken from the PLANTS Database.

RESULTS AND DISCUSSION

Winter plant identification is challenging because many of the diagnostic characters are small, difficult to observe, and, not infrequently, character states vary within individual taxa. Given this situation, it is necessary to consider all information in individual key leads and to carefully observe character states in order to correctly identify specimens. The winter stem characteristics referred to

in the following keys can be observed with a 10x magnifying hand lens. Winter stem features of deciduous species should be observed after natural leaf fall which is completed in the Coastal Plain during late November of most years. Vascular bundle scars are often difficult to see if leaves are pulled from stems before the dormant season. Additionally, mature bud features may not be evi-

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dent prior to leaf fall. All winter twig features, except pith type, should be observed on the distal portions of healthy stems that were produced during the immediately preceding growing season. Pith type should be observed in twig segments that are, at least, one full year old. To see the pith, the stem should be carefully sliced lengthwise with a sharp knife until the pith is exposed. Cuts made with dull knives often tear the pith, making it difficult to determine pith pattern.

Users should become familiar with the winter features of *Toxicodendron radicans* (poison ivy) and *T. vernix* (poison sumac) before using the keys (Fig. 1). Contact with these species during the winter can cause skin rash in susceptible persons.

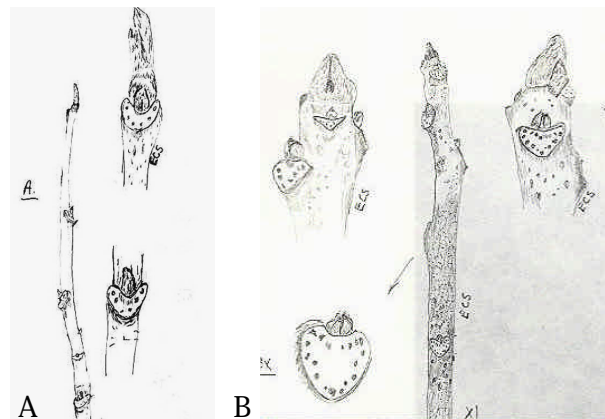


FIG. 1. Twigs and vascular bundle scars of: A, *Toxicodendron radicans*; B, *Toxicodendron vernix*.

GENERAL KEY

1. Seeds borne in cones; leaves are evergreen needles, decussate scales, or deciduous and shed as a unit with their branchlets..... Key 1 (Gymnosperms)
1. Seeds borne in fruits; leaves are foliar, shed separately 2. (Angiosperms)

2. Stem subterranean; leaves evergreen; petioles emerging from ground in a cluster, to 15 dm long.....
..... *Sabal minor* (dwarf palmetto)
2. Stem aerial; leaves evergreen or deciduous; petioles not as above 3.

3. Plant a colonial grass with "woody" stems.....*Arundinaria gigantea* (giant cane, switch cane)
3. Plant not a grass..... 4.

4. Plant a climbing, prostrate, or scandent vine Key 2
4. Plant a sapling, tree, erect or arching shrub or subshrub 5.

5. Nodes opposite or whorled Key 3
5. Nodes alternate 6.

6. Leaves evergreen or tardily deciduous..... Key 4
6. Leaves deciduous..... Key 5

KEY 1

(gymnosperms; seeds borne in cones; leaves are evergreen needles, decussate scales, awl - shaped, or deciduous and shed as a unit with their branchlets)

1. Leaves are evergreen needles or decussate scales; seed cones either elongate and composed of overlapping woody scales or spherical and ≤ 15 mm diameter; male cones solitary or in short, compact groups at end of branches, sessile, not dangling..... 2.
1. Leaves deciduous, shed as a unit with their branchlets; seed cones spherical and >15 mm diameter; male cones in dangling clusters, evident throughout winter.....*Taxodium distichum* (bald cypress) or *T. ascendens* (pond cypress)



FIG. 2. Male cones of *Taxodium*.

- 2. Leaf length > 20 times width (needles), leaves borne in bundles of 2-3.....3.
- 2. Leaf length < 3 times width (scales), mostly decussate.....
.....*Chamaecyparis thyoides* (Atlantic white cedar)
- 3. Female cones 2-2.5" broad and long, basally as broad as long ("squat"), remaining closed until heated by fire; short branchlets frequently borne on trunk (epicormic branches); inhabits frequently wet, organic soil.....
.....*Pinus serotina* (pond pine)
- 3. Female cones 2-10" long, longer than broad, opening when mature; branchlets absent from trunk; inhabits dry – moist mineral soil..... 4.
- 4. Vegetative buds silvery-white; twigs conspicuously thick; needles 8-18" long *Pinus palustris* (longleaf pine)
- 4. Vegetative buds gray, brown, or reddish – brown; twigs not conspicuously thick; needles 6-12" long..... 5.
- 5. Female cone scales shining as if varnished, cinnamon-brown or chocolate-brown.....*Pinus elliotii* (slash pine);
formerly frequently planted, not native to North Carolina
- 5. Female cone scales dull, gray or brown..... *Pinus taeda* (loblolly pine)



FIG. 3. Leaves of *Chamaecyparis thyoides*.

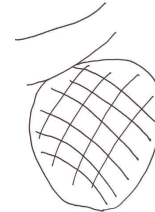


FIG. 4. Female cone of *Pinus serotina*.

KEY 2

(angiosperms; vine, climbing, scandent, or prostrate)

- 1. Leaves and nodes opposite 2.
- 1. Leaves and nodes alternate..... 5.
- 2. Leaves deciduous..... *Campsis radicans* (trumpet creeper)
- 2. Leaves evergreen or tardily deciduous..... 3.
- 3. Leaves trifoliolate, terminal leaflet a tendrill.....
..... *Bignonia capreolata* (= *Anisostichus capreolata*) (crossvine)
- 3. Leaves simple..... 4.
- 4. Adventitious roots present.....
..... *Decumaria barbara* (woodvamp, climbing hydrangea)
- 4. Adventitious roots lacking
..... *Gelsemium sempervirens* (evening trumpetflower, yellow jessamine)
- 5. Vine prostrate..... *Vaccinium crassifolium* (creeping blueberry)
- 5. Vine scandent, tendrillate, or climbing..... 6.
- 6. Prickles present 7.
- 6. Prickles lacking..... 12.
- 7. Leaves deciduous.....
..... *Smilax bona-nox*, *S. glauca*, *S. rotundifolia*, or *S. walteri* (greenbrier)
- 7. Leaves evergreen or tardily deciduous..... 8.

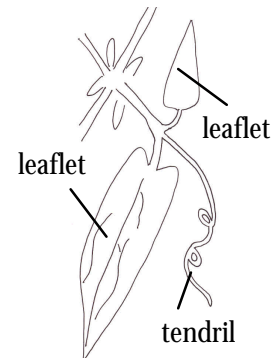


FIG. 5. Leaf and tendrill of *Bignonia capreolata*.

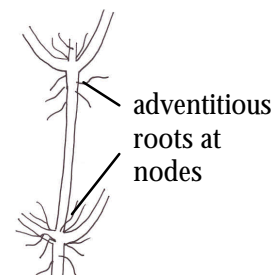


FIG. 6. Adventitious roots of *Decumaria barbara*.

8. Leaves distinctly leathery; “midvein (as seen on the lower surface) much more pronounced than the principal lateral veins, which are scarcely raised” (Weakly 2004)..... *Smilax laurifolia* (laurel greenbrier)
8. Leaves thin or slightly leathery; “midvein (as seen on the lower surface) little if any more pronounced than the principal lateral veins” (Weakly 2004) ..9
9. Leaves lanceolate or elliptic, base cuneate.....
..... *Smilax smallii* (lanceleaf greenbrier)
9. Leaves ovate, oblong, or pandurate, base truncate, rounded or cordate....10
10. Margin of leaf blade thickened with a marginal vein
..... *Smilax bona-nox* (saw greenbrier)
10. Margin of leaf blade thin11
11. Leaf undersurface coated with white wax that can be rubbed off.....
..... *Smilax glauca* (cat greenbrier)
11. Leaf undersurfaces green or slightly white waxy
..... *Smilax rotundifolia* (roundleaf greenbrier)
12. Leaves evergreen..... *Smilax smallii* (lanceleaf greenbrier)
12. Leaves deciduous.....13
13. Plant scandent14
13. Plant tendrillate or held to tree trunk by adventitious roots.....15
14. Stem flexible enough to be knotted without breaking; fruit a drupe.....
..... *Berchemia scandens* (Alabama supplejack)
14. Stem not flexible enough to be knotted without breaking; fruit a legume...
..... *Wisteria frutescens* (American wisteria)
15. Adventitious roots distributed along stem; tendrils lacking.....
..... *Toxicodendron radicans* (= *Rhus radicans*) (poison ivy)
15. Adventitious roots lacking; tendrills present.....16
16. Tendril tips that contact a surface modified as adhesive disks.....
..... *Parthenocissus quinquefolia* (Virginia creeper)
16. Tendril tips not so modified
..... *Ampelopsis arborea* or *Vitis* spp. (pepper-vine or grape)



FIG. 7. Leaf of *Smilax laurifolia*.

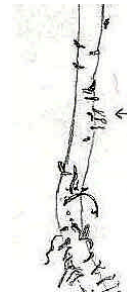


FIG. 8. Adventitious roots of *Toxicodendron radicans*.

KEY 3

(angiosperms; trees, saplings, shrubs, or subshrubs; nodes opposite or whorled)

1. Stem woody basally, branchlets herbaceous; plants of fresh to salt water wetlands.....2.
1. Stem woody throughout; plant of fresh water wetlands.....4.
2. Stem basally much branched; leaves tardily deciduous or evergreen; nodes with or without a line between the opposite leaf scars.....3.
2. Stem basally unbranched or sparingly branched; leaves deciduous; “nodes with a distally-projecting, sharp-pointed, triangular wedge of tissue between

- the nearly-meeting leaf scars" (Godfrey 1988)
 *Borrchia frutescens* (bushy seaside tansy, sea – oxeye)
3. Leaves tardily deciduous; node with a line between the opposite leaf scars;
 buds hidden in bark; twig with fine lines; plants of coastal salt marshes
 *Iva frutescens* (Jesuit's bark, marsh elder)
3. Leaves evergreen or tardily deciduous; no line between opposite leaf scars;
 buds often developed; brown wings on stem; leaves with translucent dots;
 plants of fresh water wetlands..... *Hypericum* (St. Johnswort, St. Peterswort)
4. Leaves & leaf scars all or mostly whorled.....
 *Kalmia carolina* (= *Kalmia angustifolia* var. *carolina*) (Carolina laurel, lambkill)
4. Leaves and leaf scars mostly opposite, distal scars may be whorled 5.
5. Leaves evergreen or tardily deciduous..... 6.
5. Leaves deciduous..... 7.
6. Stem green to ground level; leaves finely toothed.....
 *Euonymus americanus* (strawberry bush, hearts a bustin')
6. Stem brown; leaves entire, slightly undulate.....
 *Ligustrum sinense* (Chinese privet)
7. Twigs angled, two opposite surfaces nearly flat; twigs and stems green to
 ground level or nearly to ground level.....
 *Euonymus americanus* (strawberry bush, hearts a bustin')
7. Twigs round, surfaces not flat; twigs and stems often brown, gray, red-
 reddish, or maroon to ground level (*Acer negundo* saplings usually have green
 stems nearly to ground level but their stems are round)..... 8.
8. Main stems strongly arching, some rooting at tips and then forming new
 stems; older stems woody, bark exfoliating in long cinnamon-colored strips;
 younger stems herbaceous
 *Decodon verticillatus* (water willow, swamp loosestrife)
8. Main stems rigid, not arching, not rooting at tips; stems woody, bark not
 exfoliating in long strips..... 9.
9. Axillary bud hairy, hairs gray – white, dense; transverse line connecting op-
 posite leaf scars projected toward stem tip as a sharp ridge; twig bark green
 *Acer negundo* (boxelder)
9. Axillary bud smooth or hairy, if hairy, then hairs not gray – white nor dense;
 transverse line lacking or, if present, then not projected toward stem tip as a
 sharp ridge; twig bark brown, gray, maroon, pink, or red-reddish..... 10.
10. Vascular bundle scars ≥ 6 per leaf scar; crowded together in deep U-shape
 arrangement.....
 *Fraxinus pennsylvanica* (green ash) or *F. caroliniana* (Carolina ash)
10. Vascular bundle scars 1-6 or not evident; spaced apart, arranged variously
 11.
11. Axillary buds sunken into stem tissue; terminal leaf scars often whorled

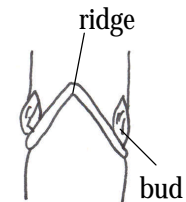


FIG. 9. Ridge of *Acer negundo*.



FIG. 10. Vascular bundle scars of *Fraxinus*.

-*Cephalanthus occidentalis* (common buttonbush)
11. Axillary buds not sunken; terminal leaf scars opposite 12.
12. Axillary bud scales woody/leathery; pith spongy & white; stem lenticels numerous, large, noticeably rough
.....*Sambucus nigra* ssp. *canadensis* (= *Sambucus canadensis*) (elderberry)
12. Axillary bud scales membranaceous; pith spongy & white or otherwise; lenticels not as above 13.
13. Leaf scar large, triangular or shield-shaped or roundish
.....*Aesculus pavia* (red buckeye)
13. Leaf scar narrow, V- or crescent-shaped 14.
14. Axillary buds imbricate 15.
14. Axillary buds valvate 17.
15. Bud scales and bark of new growth red-reddish or pink
.....*Acer rubrum* (red maple)
15. Bud scales and bark of new growth green-greenish or brown-brownish 16.
16. Visible bud scales ≤ 4 *Viburnum dentatum* (southern arrowwood)
16. Visible bud scales > 4
.....*Acer barbatum* (= *Acer saccharum* ssp. *floridanum*) (southern sugar maple)
17. Bud scales rusty brown 18.
17. Bud scales black, gray, green, or brown (but not rusty)
.....*Viburnum prunifolium* (blackhaw)
18. Bud scales covered with smaller, rusty, rough, scales
.....*Viburnum nudum* (possumhaw)
18. Bud scales covered with stiff, short, rust-brown hairs
Cornus asperifolia (toughleaf or roughleaf dogwood) or *C. foemina* (= *Cornus stricta*) (swamp dogwood)



FIG. 11. Node of *Sambucus nigra* ssp. *canadensis*.



FIG. 12. Leaf scar of *Aesculus pavia*.

KEY 4

(angiosperms; trees, saplings, shrubs, or subshrubs; nodes alternate; leaves evergreen or tardily deciduous)

1. Buds clustered at or just below branchlet tips 2.
1. Buds not clustered at or just below branchlet tips 3.
2. Leaves broadest at or near apex *Quercus nigra* (water oak)
2. Leaves broadest at or near the middle *Quercus laurifolia* (laurel oak)
3. Stems armed with prickles
.....*Rubus* (blackberry, raspberry, dewberry, bramble)
3. Stems unarmed, prickles lacking 4.
4. Insect galls deform leaf margins
Persea palustris (swamp bay, red bay, swamp red bay) (= *P. borbonia* var. *pubescens*; *P. borbonia* (red bay) is less hairy and inhabits drier habitats)



FIG. 13. Clustered buds of *Quercus*.

4. Insect galls lacking from leaf margins..... 5.
5. Golden glands present on lower leaf surface 6.
5. Golden glands lacking from lower leaf surface..... 7.
6. Golden glands present on both upper and lower leaf surfaces.....
.....*Morella cerifera* (= *Myrica cerifera*) (wax myrtle)
6. Golden glands present on only lower leaf surface
.....*Morella caroliniensis* (= *Myrica heterophylla*) (southern bayberry)
7. Twigs with multiple decurent ridges, ridges originate at angles of leaf scar.
Baccharis angustifolia (eastern baccharis), *B. glomeruliflora* (saltwater false wil-
low), or *B. halimifolia* (silverling, groundsel)
7. Twigs lacking ridges or with single ridge originating below each distal leaf
scar 8.
8. Pith chambered or diaphragmed..... 9.
8. Pith homogeneous..... 10.
9. Leaf undersurface coated with white wax..... *Magnolia virginiana* (sweetbay)
9. Leaf undersurface not waxy.....
.....*Symplocos tinctoria* (common sweetleaf, horse sugar)
10. Stipule persistent, small (\leq 1mm long), black – dark brown, triangular..11.
10. Stipule lacking or, if present, not as above..... 15.
11. Lower leaf surface minutely punctate, punctae dark (Look carefully with
handlens 12.
11. Lower leaf surface not punctate 13.
12. Marginal teeth tipped with sharp bristle, bristle divergent from margin,
near apex only or distributed through much of margin
.....*Ilex coriacea* (large gallberry)
12. Marginal teeth lacking bristle or, if bristle-tipped, then appressed and bris-
tle not sharp, restricted to portion of margin near apex
.....*Ilex glabra* (inkberry)
13. Blade apex with bristle that is long & stiff enough to poke a hole in the
skin..... *Ilex opaca* (American holly)
13. Blade apex lacking bristle or if bristle present, then not as above..... 14.
14. Leaf blade 9 – 45 mm broad..... *Ilex cassine* (dahoon)
14. Leaf blade \leq 8 mm broad..... *Ilex myrtifolia* (myrtle dahoon)
15. Silver scales on bottom leaf surface, rusty scales on upper leaf surface
..... *Chamaedaphne calyculata* (= *Cassandra calyculata*) (leatherleaf)
15. Silver scales and rusty scales lacking from leaf surfaces..... 16.



FIG. 14. Insect galls on leaves of *Persea palustris*.

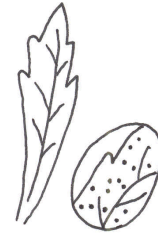


FIG. 15. Foliar glands of *Morella cerifera*.



FIG. 16. Stem ridges of *Baccharis*.

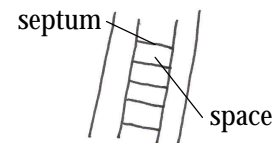


FIG. 17. Chambered pith.

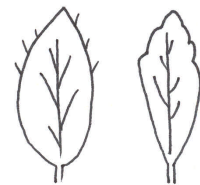


FIG. 18. Divergent and appressed bristles of *Ilex coriacea* and *I. glabra*, respectively.

- 16. Plant a tree; dominant stem (trunk) single, distinct.....
.....*Gordonia lasianthus* (loblolly bay)
- 16. Plant a shrub; dominant stem lacking, not distinct, or several equally dominant stems..... 17.
- 17. Perimarginal leaf vein present.....*Lyonia lucida* (fetterbush)
- 17. Perimarginal leaf vein lacking..... 18.
- 18. Plant \leq 1.5 m tall; stems arching; leaves broadest at middle or base
.....*Leucothoe axillaris* (coastal doghobble)
- 18. Plant $>$ 1.5 m tall; stems rigid; leaves broadest at or above middle
.....*Cyrilla racemiflora* (swamp titi)



FIG. 19. Leaves of *Ilex cassine* and *I. myrtifolia*, respectively.

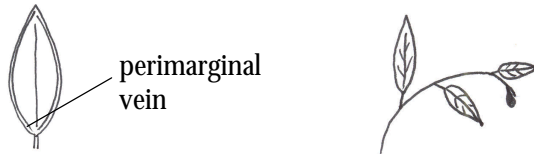


FIG. 20. Perimarginal vein of *Lyonia lucida*.

FIG. 21. Arching stems.



FIG. 22. *Cyrilla racemiflora*.

KEY 5

(angiosperms; trees, saplings, shrubs, or subshrubs; nodes alternate; leaves deciduous)

CAUTION:
Poison ivy and poison sumac are in Key 5.

- 1. Stem armed with thorns or prickles..... 2.
- 1. Stem unarmed..... 5.
- 2. Thorns (sharp-tipped branches) present; prickles (sharp projections in internodes) lacking.....*Crataegus* spp. (hawthorns)
- 2. Thorns lacking; prickles present..... 3.
- 3. Stems arching, grooved.....*Rubus* (blackberry, raspberry, dewberry, bramble)
- 3. Stem rigid, not grooved 4.
- 4. Bundle scars numerous per leaf scar; leaf scar wraps nearly around stem.....
.....*Aralia spinosa* (devil's walkingstick, Hercules' club)
- 4. Bundle scars three per leaf scar; leaf scar does not wrap nearly around stem
.....*Rosa palustris* (marsh rose)
- 5. Pith chambered or diaphragmed..... 6.
- 5. Pith homogeneous..... 13.
- 6. Vascular bundle scars \geq 3 per leaf scar 7.
- 6. Vascular bundle scars 1 per leaf scar 12.
- 7. Vascular bundle scars $>$ 3 per leaf scar 8.
- 7. Vascular bundle scars 3 per leaf scar 10.



FIG. 23. Node of *Aralia spinosa*.

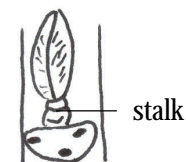


FIG. 24. Node of *Asimina*.



FIG. 25. Valvate bud scales of *Liriodendron tulipifera*.

8. Stipular scars encircling twig..... 9.
 8. Stipular scars not encircling twig..... *Asimina triloba* (pawpaw)
9. Bud scales valvate
 *Liriodendron tulipifera* (tuliptree, tulip poplar, yellow poplar)
 9. Bud scales capitate..... *Magnolia tripetala* (umbrella-tree)
10. Distal twig bark reddish or green; buds superposed in some leaf axils
 *Itea virginica* (Virginia sweetspire, Virginia-willow)
 10. Distal twig bark brown, gray, or greenish; buds solitary in all leaf axils ..11.
11. Buds appressed to stem, deltate; twigs greenish-brown or gray; bark of trunk gray, smooth or with corky outgrowths..... *Celtis laevigata* (sugarberry)
 11. Buds more or less divergent from stem; twigs light brown; bark of trunk light brown, often in a pattern of squarish blocks, no corky outgrowths
Nyssa biflora (= *N. sylvatica* var. *biflora*) (swamp tupelo) or *N. aquatica* (water tupelo)
12. Pith diaphragmed; bud scales dark brown to black
 *Diospyros virginiana* (common persimmon)
 12. Pith chambered; bud scales brown
 *Symplocos tinctoria* (common sweetleaf, horse sugar)
13. Bud scales valvate, capitate, or lacking..... 14.
 13. Bud scales imbricate..... 20.
14. Bud scales lacking (buds naked)..... 15.
 14. Bud scales present, valvate or capitate..... 16.
15. Shrub ≤ 1.3 m tall; vascular bundle scars 3 per leaf scar
 *Fothergilla gardenii* (dwarf witchalder)
 15. Shrub > 1.3 m tall; vascular bundle scars 1 per leaf scar
 *Styrax americanus* (American snowbell)
16. Bud scales capitate..... 17.
 16. Bud scales valvate..... 18.
17. Leaf scar encircles bud; stipular scar encircles stem
 *Platanus occidentalis* (American sycamore)
 17. Leaf scar does not encircle bud; stipular scar does not encircle stem.....
 *Salix nigra* (black willow) or *S. caroliniana* (coastal plain willow)
18. Buds stalked..... *Alnus serrulata* (hazel alder, tag alder)
 18. Buds sessile 19.
19. Buds appressed, ovate or lanceolate, 3 – 4 mm long.....
 *Lyonia ligustrina* (maleberry)
 19. Buds divergent, conical, 2 – 3 mm long..... *Zenobia pulverulenta* (honeycups)

FIG. 26. Superposed bud of *Itea virginica*.FIG. 27. Node of *Nyssa*.FIG. 28. Node of *Diospyros virginiana*.FIG. 29. Node of *Symplocos tinctoria*.FIG. 30. Node of *Styrax americanus*.FIG. 31. Capitate bud scales of *Salix*.FIG. 32. Stalked bud of *Alnus serrulata*.

20. Buds clustered at or just below branchlet tips.....21.
 20. Buds not clustered at or near branchlet tips.....22.
21. Plant a sapling that is unbranched or with few branches or a tree.....
Quercus lyrata (overcup oak), *Q. michauxii* (swamp chestnut oak), *Q. nigra*
 (water oak), *Q. pagoda* (cherrybark oak), or *Q. phellos* (willow oak)
21. Plant a much-branched shrub..... *Rhododendron atlanticum* (dwarf azalea), *R.*
periclymenoides (pink azalea), or *R. viscosum* (swamp azalea)
22. Buds > 1 in some leaf axils.....23.
 22. Buds solitary in or lacking from leaf axils.....24.
23. Wood aromatic when scratched.....*Lindera benzoin* (northern spicebush), *L.*
melissaefolia (southern spicebush), or *L. subcoriacea* (bog spicebush)
23. Wood not aromatic*Ilex decidua* (possumhaw), *I. laevigata* (smooth winter-
 berry), *I. verticillata* (common winterberry), or *I. amelanchar* (sarvis holly)
24. Twigs with multiple decurrent ridges that originate at angles of each distal
 leaf scar.....
Baccharis angustifolia (eastern baccharis), *B. glomeruliflora* (saltwater false wil-
 low), or *B. halimifolia* (silverling, groundsel)
24. Twigs unridged or with individual ridge associated with each distal leaf scar
25.
25. Vascular bundle scars ≥ 3 per leaf scar.....26.
 25. Vascular bundle scars 1 per leaf scar35.
26. Vascular bundle scars > 3 per leaf scar.....27.
 26. Vascular bundle scars 3 per leaf scar30.
27. Leaf scars narrow, crescent; inner bark & wood yellow.....
 *Xanthorhiza simplicissima* (yellowroot)
27. Leaf scars half-round, oval, broadly shield-shaped or three-lobed; inner
 bark & wood white or tan28.
28. Bud scales hairy, hairs red or reddish-brown.....
 *Toxicodendron vernix* (poison sumac)
28. Bud scales smooth, glandular, or scaly; glands or scales, if present, yellow
 or brownish.....29.
29. Bud scales smooth; leaf scar oval or half-round, unlobed, perimeter slightly
 raised as a rim.....*Morus rubra* (red mulberry)
29. Bud scales glandular or scaly; leaf scar heart-shaped or three-lobed.....
 *Carya cordiformis* (bitternut hickory) or *C. aquatica* (water hickory)
30. Leaf scar narrow, crescent- or V-shaped.....
*Photinia pyrifolia* (= *Aronia arbutifolia*) (red chokeberry)
30. Leaf scar broadly crescent-shaped, half-circular, or obovate31.



FIG. 33. Appressed
bud of *Lyonia ligus-
trina*.



FIG. 34. Clustered
buds of *Quercus*.



FIG. 35. Collateral
buds of *Lindera*.



FIG. 36. Stem ridges
of *Baccharis*.



FIG. 37. *Toxicodendron
vernix*.



FIG. 38. Leaf scar of-
Carya.

31. Lowest bud scale centered above middle of leaf scar
 *Populus heterophylla* (swamp cottonwood)
31. Lowest bud scale(s) centered to the side of leaf scar32.
32. Each bundle scar a white ring with a dark center.....
 *Liquidambar styraciflua* (sweetgum)
32. Each bundle scar uniformly colored.....33.
33. Visible bud scales 2-3, lowest pair forming V-shaped angle above leaf scar
 *Betula nigra* (river birch)
33. Visible bud scales ≥ 4 , not forming V-shaped angle above leaf scar34.
34. Buds attached toward one side of upper edge of leaf scar
 *Ulmus americana* (American elm) or *U. rubra* (slippery elm)
34. Buds attached at middle of upper edge of leaf scar (centered above leaf
 scar *Carpinus caroliniana* (American hornbeam)
35. Branch stems instead of axillary buds above leaf scars (Buds usually de-
 velop into branch stems before end of growing season.....
 *Clethra alnifolia* (coastal sweetpepperbush)
35. Axillary buds above leaf scars.....36.
36. Stem unbranched or sparingly so....*Lyonia mariana* (Piedmont staggerbush)
36. Stem with several.....37.
37. Golden glands on bud scales.....
 *Gaylussacia frondosa* (blue huckleberry, dangleberry)
37. Golden glands lacking on bud scales.....38.
38. Bud scale apex acuminate.....39.
38. Bud scale apex acute or blunt.....40.
39. Stems green throughout or nearly to ground level.....
 *Vaccinium elliotii* (Elliott's blueberry)
39. Stems green only distally *Vaccinium corymbosum* (highbush blueberry) (or *V.*
fuscatum (= *V. atrococcum*) (black highbush blueberry)
40. Distal portions of stems longitudinally angled-ridged immediately below
 leaf scars..... *Cyrilla racemiflora* (swamp titi)
40. Distal portions of stems not longitudinally angled-ridged.....41.
41. Stipules and stipular scars minute (≤ 1.5 mm long), dark; flower buds axil-
 lary and superposed or lacking; fruit a drupe, in axillary clusters *Ilex decidua*
 (possumhaw), *I. laevigata* (smooth winterberry), *I. verticillata* (common
 winterberry), or *I. amelanchar* (sarvis holly)
41. Stipules and stipular scars lacking; flower buds in elongate racemes, fruit a
 capsule, in racemes.....
 *Leucothoe racemosa* (swamp doghobble, fetterbush, swamp snowbell)

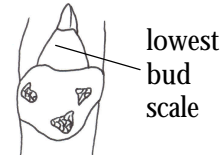


FIG. 39. Leaf scar of *Populus heterophylla*.



FIG. 40. Leaf scar of *Liquidambar styraciflua*.



FIG. 41. Bud scales of *Betula nigra*.



FIG. 42. Bud attachment in *Ulmus* and *Carpinus*, respectively.



FIG. 44. Bud scale glands in *Gaylussacia*.



FIG. 44. Acuminate bud scales of *Vaccinium corymbosum*.



FIG. 45. Angled-ridged stems of *Cyrilla racemiflora*.

* Infrequent wetland taxa not included in keys: *Amelanchier obovalis*, *Kalmia cuneata*, *Litsea aestivalis*, *Planera aquatica*, *Spiraea tomentosa*.

WINTER DESCRIPTIONS OF TAXA INCLUDED IN KEYS

- The description of each species group is of the genus to which the species belong.
- Bud scales are imbricate unless otherwise indicated.
- Pith is homogeneous unless otherwise indicated.
- Generally, a species bears fruits during a characteristic portion of the year. However, environmental factors (wind, flooding, herbivory, fire, temperature) may cause certain individuals to lose their fruits earlier than usual or, perhaps, retain their fruits longer than usual. Given this variability and given that fallen fruits may be evident beneath specimens in the field, they are described for each species. Colors are for mature fruits.

Acer barbatum Michx. (southern sugar maple)

Tree, deciduous, overwintering leaves frequently remain on branches, light brown; leaf scars opposite, leaf scar narrow, V- or crescent-shaped, stipules lacking; bundle scars 3; axillary bud acute, solitary, scales brown and with short marginal hairs; twig bark gray-brown; trunk bark gray, smooth when young, with broad, flat, vertically elongated plates when mature; fruit paired samaras. (= *Acer saccharum* ssp. *floridanum*)

Acer negundo L. (box elder)

Tree, deciduous; leaf scars opposite, narrow, edges of opposite scars meet and project upward forming a ridge; bundle scars several; axillary buds hidden by petiole bases, gray-hairy; twigs green (reddish), stout, glaucous when young; trunk bark light - dark brown, with squarish segments (grooved); fruit paired samaras, 2.5 – 3.5 cm long.

Acer rubrum L. (red maple)

Tree, deciduous; leaf scars opposite, narrow, V- or U-shaped, opposite scars connected by horizontal line across the node; bundle scars 3; axillary buds acute or blunt, often collateral, scales reddish; twig bark reddish, lenticels evident; trunk bark grayish, smooth when young, mature bark with broad, flat, vertically elongated plates; flowers open during late winter; fruit paired samaras.

Acer saccharum ssp. *floridanum*, see *Acer barbatum*

Aesculus pavia L. (red buckeye)

“Shrub or small understory tree, infrequently to about 12m tall. Twigs dark reddish brown at first and with sparse, irregularly scattered, very short, grayish pubescence, later becoming gray and glabrous; pith relatively small, white, continuous.”

(Godfrey 1988). “Stout twigs with large scaly buds and large opposite leaf scars with several bundle scars. Leaf scars opposite, large, triangular to shield-shaped or round. Bundle scars conspicuous, usually 6-7 in V-shaped row or in 3 groups.” (Preston & Wright 1988); fruit a leathery berry, 1-3 large seeds.

Alnus serrulata (Aiton) Willd. (hazel alder, tag alder)

Shrub, occasionally small tree, deciduous; leaf scar alternate, half-round to triangular; stipular scar narrow; bundle scars 3; axillary buds stalked, blunt, scales valvate; twig bark hairy; stem bark smooth, gray; plant monoecious; male flowers in elongate, dangling, catkins, female flowers in stiff catkins, emergent before leaves; fruit a small, winged, nutlet, subtended by clusters of persistent woody scales, one year-old scale clusters look like small pine cones.

Ampelopsis arborea (L.) Koehne (pepper-vine)

Vine, deciduous; leaves alternate, compound; fruit a berry, blue.

Anisostichus capreolata, see *Bignonia capreolata*

Aralia spinosa L. (devil's walkingstick, Hercules' club)

Shrub or small tree, usually not more than 4 m tall, deciduous; leaf scars alternate, narrow, nearly encircling stem, ridge-like; bundle scars 6-15, in an arc; axillary bud solitary, appressed, large basal scale leathery; stem stout, with numerous stout prickles; fruit a dark purple – black drupe, in compound umbels.

Aronia arbutifolia, see *Photinia pyrifolia*

Arundinaria gigantea (Walt.) Muhl. (giant cane, switch cane)

“Woody” grass, to 4 – 5 m tall, evergreen, coarse rhizomes, forming dense colonies; stem coarse, woody, branching, to 4m tall (8m tall); leaves alternate, leaf blades to 30 cm long, basally narrowed to form short, sheathing petiole, often subtended by tuft of long stiff hairs; seed heads rarely produced.

Asimina triloba (L.) Dunal (pawpaw)

Shrub or small tree, to 12 m tall, usually in colonies, deciduous; leaf scars alternate, crescent or horseshoe-shaped, somewhat elevated on short stem projection; bundle scars 5-7; axillary buds naked, solitary or superposed, rusty-brown hairy; pith diaphragmed or chambered; fruit a fleshy berry, to 10 cm long.

Baccharis spp. (eastern baccharis, saltwater false willow, silverling, groundsel)

Shrub, to 3 – 4 m tall, leaves tardily deciduous; leaf scars alternate, narrow; bundle scars obscure; axillary buds small, scales frequently coated with gummy exudates; twigs multiply grooved(ridged); plants dioecious, fruit an achene, small, dry, tufted with a plume of white hairs, borne in heads subtended by a series of bracts.

Berchemia scandens (Hill) K. Koch (Alabama supplejack)

Scandent vine, deciduous; leaf scars alternate, 2-ranked, raised on platform, half-round or oval; bundle scars difficult to see; axillary buds appressed, acute; stem very flexible; fruit a drupe.

Betula nigra L. (river birch)

Tree, deciduous; leaf scars alternate, half-round or triangular; bundle scars 3; axillary bud, ovoid, acute, appressed, lowest two scales forming V-shaped angle above leaf scar; male catkins terminal on twigs, usually paired or in threes; twig bark with conspicuous lenticels; trunk bark peeling, grayish - cinnamon brown; fruit a small, winged nutlet, shed early in season.

Bignonia capreolata L. (crossvine)

Vine, evergreen; leaves opposite, compound, each composed of 2 leaflets & 1 terminal tendril; leaflets lanceolate or elliptic or oblanceolate, apex

acuminate, base cordate, tendril with very small, adhesive disks at its branch tips; leaflets often fall from persistent stout petiole leaving roundish leaflet scars; leaf scar shield-shaped; bundle scar one; axillary bud stout; fruit a capsule, somewhat flattened, 10 – 20 cm long. (= *Anisostichus capreolata*)

Borrhichia frutescens (L.) DC. (bushy seaside tansy, sea – oxeye)

Subshrub, deciduous; “Subshrubby maritime plant, rhizomatous and forming extensive clones. Stem 1.5-12 dm tall, usually with relatively few strongly ascending branches, these at first clothed with a dense, compact, gray pubescence, eventually becoming glabrous and light brown, finally gray; older stems very irregularly ridged and grooved. . . an acutely triangular projection of stem tissue on either side of the node forming a wedge between the nearly-meeting petiole bases; the wedges commonly becoming free as sharp points after leaf-fall.” (Godfrey 1988); fruit an achene, remnants of fruit heads often persistent, apices of scales prickly.

Campsis radicans (L.) Seem. ex Bureau (trumpet-creeper)

Vine, deciduous; leaf scars opposite, shield-shaped, opposite scars connected by a horizontal line across the node; bundle scar one; axillary bud hairy, short, outer scale apices short-acuminate and frequently recurved; stem light brown, climbing on objects (trailing on ground), frequently with rows of short aerial rootlets at nodes; fruit a capsule, 10 – 20 cm long, seeds numerous, winged.

Carpinus caroliniana Walt. (American hornbeam, musclewood, ironwood)

Tree, deciduous; leaf scars alternate, oval to crescent-shaped; bundle scars 3; stipular scar small, crescent-shaped; axillary bud acute, appressed, scales ≥ 5 , marginally hairy; trunk bark light gray, smooth, trunk with longitudinal broad swellings; twigs slender, angled at nodes; fruit a small nutlet, subtended by 3-lobed, papery bracts, aggregated in catkin.

Carya spp. (hickory)

Trees, deciduous; leaf scars alternate, large, shield-shaped or obovate; vascular bundle scars scattered or in three groups; axillary buds variable

between species, sulphur-yellow and valvate in *C. cordiformis* and *C. aquatica*; fruit a nut, enclosed by a leathery husk.

Cassandra calyculata; see *Chamaedaphne calyculata*

Celtis laevigata Willd. (sugarberry)

Tree, deciduous; leaf scars alternate, 2-ranked, oval or crescent-shaped, on elevated projection; stipular scar small, narrow; bundle scars 3; axillary bud appressed, ovoid, acute; trunk bark gray or brown, usually with isolated corky ridges, sometimes smooth; twigs slender, pith of mature twigs chambered; fruit round, semi-fleshy, purple or reddish, 3-6 mm in diameter.

Cephalanthus occidentalis L. (common buttonbush)

Shrub, to 3 m tall, deciduous; leaf scars opposite, often whorled near stem tips, circular or oval or shield-shaped; stipules semi-persistent, deltoid, 2-3 mm long, dark brown to black, stipular scar a line connecting opposite leaf scars; bundle scar one, C-shaped; twig bark reddish-brown; fruits small, cylindrical, dry, in terminal, spherical heads.

Chamaecyparis thyoides (L.) B.S.P. (Atlantic white cedar)

Tree, evergreen; leaves small, scale-like, opposite, decussate, with gland on outer surface; branchlet systems flattened; trunk bark brown to cinnamon-brown, with elongated flattened ridges; male cones inconspicuous, light brown; female cones angular-globose, woody at maturity, 4-7 mm diameter; could be mistaken for *Juniperus virginiana* (red cedar) but round, woody female cones, flattened branchlets, and occurrence on wet, organic soils distinguish it from red cedar.

Chamaedaphne calyculata (L.) Moench (leatherleaf)

Shrub, to 1 m tall, colonial, evergreen; leaves simple, alternate, gradually reduced toward stem tips, leathery, oblong (elliptic or oblanceolate), margin slightly revolute, apex obtuse or acute, base acute to cuneate, grayish-green, with silver scales on bottom leaf surface, rusty scales on upper leaf surface, entire or obscurely toothed, petioles short; leaf scar half-round; bundle scar one; axillary bud globose, hairy; stem bark smooth, copper-colored; fruit a small capsule, each subtended by a bract (reduced leaf). (= *Cassandra calyculata*)

Clethra alnifolia L. (coastal sweetpepperbush)

Shrub, to 2-3 m tall, deciduous; leaf scars alternate, obovate or obcordate; bundle scar one; axillary bud scales large and leafy, buds often develop into short branches before end of growing season; bark near stem tips slightly roughened with light, cinnamon-brown, star-shaped hairs; fruit a small capsule, aggregated in terminal racemes, racemes long persistent, initially erect, gradually becoming drooping.

Cornus spp. (dogwood)

Trees or tall shrub, deciduous; leaf scars opposite, narrowly crescent-shaped; bundle scars 3; axillary bud appressed, scales valvate; fruit a drupe, in flat-topped or somewhat convex clusters.

Crataegus spp. (hawthorns)

Shrubs or small trees, deciduous; leaf scars alternate; bundle scars 3; simple thorns present in most species; buds small, often reddish; fruit a fleshy berry (pome), often persistent.

Cyrilla racemiflora L. (swamp titi)

Shrub or small tree, evergreen or tardily deciduous; leaves alternate, entire, somewhat leathery, oblanceolate to narrowly obovate, apex obtuse (acute), base cuneate, usually becoming red-spotted in autumn; leaf scar raised, triangular; bundle scar one, large, curved; axillary bud scales loosely overlapping; longitudinal ridge on twig extending downward from node 2-7 cm; twig bark smooth, light brown; fruit a small capsule, borne on stiff, downwardly angled raceme, racemes clustered at previous year's growth node.

Decodon verticillatus (L.) Elliott (water-willow, swamp loosestrife)

Shrub, to 1.5 m tall, deciduous; leaf scars opposite, half-round; bundle scar one; stems woody basally, herbaceous distally, arching, rooting at nodes, under water bark soft-corky, above water bark peeling in long cinnamon-brown strips; fruit an axillary, round capsule.

Decumaria barbara L. (woodvamp, climbing hydrangea)

Vine, deciduous or tardily deciduous; leaves opposite, simple, ovate-elliptic, apex obtuse to acute, base truncate or acute, slightly undulate or

toothed, bright green and glossy on upper surface, somewhat thickened; leaf scar narrowly crescent-shaped; bundle scars 3; axillary bud densely hairy, scales obscured by hairs; stems ridged, nodes swollen, adventitious roots on stems; fruit a capsule, in flat-topped clusters.

Diospyros virginiana L. (common persimmon)

Tree, deciduous; leaf scars alternate, half-round or shield-shaped; bundle scar 1, curved; axillary bud appressed, ovoid, visible scales usually 2, black or nearly so; twig bark dark brown, terminal bud with conspicuous aborted twig tip; trunk bark dark brown-black, often with square blocks; plant dioecious; fruit an orange-pinkish berry, to 3.5 cm diameter; seeds large, brown, flat.

Euonymus americana L. (strawberry bush, hearts a bustin')

Shrub, to 2 m tall, deciduous or tardily deciduous; leaf scars opposite, half-round; bundle scar 1; axillary bud ellipsoid, acute; stems green to ground level, 4-angled with two flat surfaces, openly branched; fruit a capsule, bright pink, warty, seeds 4, bright orange, seed coat somewhat fleshy.

Fothergilla gardenii L. (dwarf witchhazel)

Shrub, to 1 m tall, deciduous; leaf scars alternate, half-round; bundle scars 3; axillary buds naked, sometimes superposed, hairy; terminal bud stalked, stem densely hairy; hairs on buds and stem branched; fruit a capsule.

Fraxinus spp. (ash)

Tree, deciduous; leaf scars opposite, half-round, large, raised; bundle scars numerous but sometimes confluent, in U-shaped arc; axillary bud densely brown hairy; fruit a samara, to 4 cm long, in dangling cluster.

Gaylussacia frondosa (L.) Torr. & A. Gray ex Torr. (blue huckleberry, dangleberry)

Shrub, to 2 m tall, deciduous; leaf scar half-round or crescent-shaped; bundle scar one; axillary bud obtuse or acute, scales with golden glands; fruit a berry, blue, 6-9 mm in diameter.

Gelsemium sempervirens (L.) St. Hil. (evening trumpetflower, yellow jessamine)

Vine, evergreen, twining, often climbing in

higher branches of trees; leaves opposite, simple, lanceolate (ovate), apex acute to acuminate, base acute to rounded, glossy green on upper surface; leaf scar half-round; bundle scar one; axillary bud scales loosely disposed; stipular scar is a line that connects base of opposite leaves; stem slender, smooth, young bark dark brown-reddish brown and often glaucous, shining; fruit a flattened capsule, 2 cm long, brown – gray, seeds winged.

Gordonia lasianthus (L.) Ellis (loblolly bay)

Tree, evergreen; leaves simple, alternate, leathery, shallowly crenate to serrate, apex obtuse to acute, base cuneate, 8-18 cm long, short petiole; leaf scar shield-shaped; bundle scars several, in line or U-shaped row; axillary bud naked, large, hairy; bark gray, with flat-topped ridges separated by narrow furrows; fruit a capsule, woody, to 2 cm long.

Hypericum spp. (St. Johnswort, St. Peterswort)

Subshrub, rarely to 2 m, stem woody basally, distal branches herbaceous; leaves opposite, tardily deciduous to evergreen, simple, ovate to elliptical, entire, with translucent dots when held up to light (use hand lens); leaf scar narrow; bundle scar one; axillary buds obscure and papery or already developed; stems usually winged, brown bark exfoliates into thin plates and strips; fruit a narrow pointed capsule.

Ilex cassine L. (dahoon)

Shrub or tree, to 8 m tall, evergreen; leaves simple, alternate, leathery; blades usually oblanceolate, entire or sometimes with teeth, basally short tapered, 2-8 cm long, stipule minute; leaf scar crescent-shaped or half-round, bundle scars 3; axillary bud small; bark gray, smooth; plants dioecious, fruit a persistent red drupe.

Ilex coriacea (Pursh) Chapm. (large gallberry)

Colonial shrub, to 5 m tall, evergreen; leaves simple, alternate, broadly elliptic to obovate (lanceolate or ovate), leathery, apex acute or short-acuminate & often with a short bristle, marginal teeth tipped with short, divergent bristles, near apex or scattered throughout, upper surface glossy, abaxial punctate glands brown to black (handlens); stipule persistent, dark brown - black, minute; leaf scar half-round; bundle scar 1, curved;

axillary bud small, globose, scales often indistinct; plants dioecious; fruit a black drupe, axillary, 6-8 mm diameter.

Ilex glabra (L.) A. Gray (inkberry)

Colonial shrub, to 2-3 m tall, evergreen; leaves simple, alternate, leathery, with a few appressed teeth near apex, elliptic to oblanceolate, abaxial glands brown to black, apex obtuse & often with short bristle, base acute or obtuse; stipule often persistent, dark brown - black, minute; leaf scar half-round; bundle scar 1, curved; axillary bud small, scales often indistinct; plants dioecious; fruit a black drupe, axillary, 5-7 mm diameter, persistent.

Ilex myrtifolia Walt. (myrtle dahoon)

Shrub or small tree, to 6 m tall, evergreen; leaves simple, alternate, leathery, narrowly elliptic-lanceolate-oblong-oblanceolate, apex acute with short bristle, base rounded or short cuneate, < 0.8 cm broad, entire or with a few inconspicuous teeth in apical half, lustrous green above, petiole short; stipule minute, persistent or deciduous; leaf scar half-round; bundle scar 1, curved; axillary bud small, globose, scales often indistinct; branches stiff, straight, widely diverging; plants dioecious; fruit a persistent red drupe.

Ilex opaca Aiton (American holly)

Tree, evergreen; leaves simple, alternate, ovate or lanceolate or elliptic or obovate, apex acute to acuminate and spine-tipped, base cuneate, leathery, upper surface lustrous, marginal teeth tipped with stiff bristles; minute stipule sometimes persistent; leaf scar half-round; bundle scar 1, curved; axillary bud small, globose, scales often indistinct; bark smooth, gray; plants dioecious; fruit a persistent red drupe.

Ilex spp. (deciduous hollies)

Shrub, deciduous; leaf scars alternate, shield - shape, stipular scars minute; vascular bundle scar one; may have short spur shoots; plants dioecious; fruit a red drupe.

Itea virginica L. (Virginia sweetspire, Virginia-willow)

Shrub, to 2 m tall, deciduous; leaf scars alternate, crescent-shaped; bundle scars 3; axillary buds of-

ten superposed, small; bark of new twig growth green or red; pith chambered; fruit a spindle-shaped capsule, in terminal racemes.

Iva frutescens L. (Jesuit's bark, marsh elder)

Subshrub, stem woody basally, distal branches herbaceous, to 3 m tall; leaves mostly opposite, tardily deciduous, simple, tapered basally, blades 4-7 cm long, margins of some leaves serrate, others entire, lanceolate or elliptic; line connecting opposite leaf scars; fruit an achene, borne in heads subtended by leafy bracts.

Kalmia angustifolia var. *carolina*; see *Kalmia carolina*

Kalmia carolina Small (Carolina laurel, lambkill)

Shrub, to 1.5 m tall, evergreen; leaves simple, whorled, occasionally opposite, elliptic or oblong, leathery, gray-whitened beneath, lower surface with dark gland-tipped hairs, apex acute or obtuse, base cuneate or acute; leaf scar 3-lobed, sides concave; bundle scar, one, difficult to see; axillary bud mostly obscured by petiole base, hairy, appressed; twig bark reddish-brown; fruit a globose capsule, in axillary clusters. (= *Kalmia angustifolia* var. *carolina*)

Leucothoe axillaris (Lam.) D. Don (coastal dog hobble)

Colonial shrub, to 1.5 m tall, evergreen, branches arching; leaves simple, alternate, leathery, dark green, ovate or elliptic or oblong; apex acute or short-acuminate, base obtuse or short-cuneate, toothed or entire; leaf scar half-round; bundle scar 1; axillary bud large; fruit a capsule, in axillary racemes.

Leucothoe racemosa (L.) A. Gray (swamp doghobble, fetterbush, swamp snowbell)

Shrub, to 3 m tall, deciduous; leaf scar alternate, half-round; bundle scar 1, curved; axillary bud 1-2 mm long, blunt, brown; twig bark gray or brown; racemes of immature flower buds evident in fall & throughout winter prior to blooming in subsequent early spring; fruit a capsule, to 5 mm, style persistent.

Ligustrum sinense Lour. (Chinese privet)

Shrub, to 4 m tall, evergreen; leaves opposite, simple, entire or somewhat undulate, widely di-

verging from stems, elliptic-ovate, dull green, apex obtuse, base short tapered or rounded, petiole short; leaf scar half-round, raised; bundle scar 1; axillary bud small, green, acuminate; twigs densely short-pubescent, relatively slender; fruit a drupe, dark blue, in terminal clusters, abundant on plants in sun, usually absent on plants in shade.

Lindera spp. (spice bush)

Shrub, to 4–5 m tall, deciduous; leaf scars alternate; 1 solitary or 3 collateral axillary buds, the two lateral flower buds of a collateral trio obovate, the central bud lanceolate, 1–3 supra-axillary buds may also be present; broken stem tissue aromatic; plants dioecious; fruit an ellipsoidal drupe, red, axillary.

Liquidambar styraciflua L. (sweetgum)

Tree, deciduous; leaf scars alternate, half-round or triangular, raised; bundle scars 3, each a white ring with a dark center; axillary bud stout, scales glossy, green or tan or reddish-brown; stipular scar inconspicuous, slit-like; bark of young twigs commonly with corky wings; trunk bark light brown to brown, somewhat furrowed; branch tips coarse; fruits globose, woody, dangling, brown, multiple, each segment with a pair of projecting woody tips.

Liriodendron tulipifera L. (tuliptree, tulip poplar, yellow poplar)

Tree, deciduous; leaf scars alternate, shield-shaped or nearly round; bundle scars scattered; bud scales valvate, gray; stipular scar completely encircles stem, pith diaphragmed; immature specimens have straight trunks with gray (light brown), shallowly furrowed bark; mature specimens may have crooked trunks and bark that is deeply furrowed and brown; main lateral branches frequently arching; fruit an aggregate of samaras, erect, cone-shaped.

Lyonia ligustrina (L.) DC. (maleberry)

Shrub, to 4 m tall, deciduous; leaves alternate; leaf scar half-round, raised; bundle scar 1; axillary buds appressed, scales valvate, maroon; young twigs maroon to reddish-brown, slightly angled at nodes; fruit a capsule, small, round, with pale sutures.

Lyonia lucida (L.) K. Koch (fetterbush)

Shrub, to 4 m tall, evergreen; leaves simple, al-

ternate, elliptic (ovate or obovate), apex acute to short-acuminate, base acute – short tapered, dark glossy green upper surface, leathery, entire, with a perimarginal vein; leaf scar half-round, raised; bundle scar 1; longitudinal ridge running down twig approximately 2–3 cm below each node; stems freely branching, frequently arching; fruit a capsule, sutures pale.

Lyonia mariana (L.) D. Don (piedmont staggerbush)

Shrub, to 1.2 m tall, deciduous; leaf scars alternate; axillary bud obtuse, stout, scales pinkish; stem angled at nodes, unbranched or sparingly branched; fruit a capsule, dark brown, sutures light brown, becoming gray in second season, in axillary clusters.

Magnolia tripetala (L.) L. (umbrella-tree magnolia)

Small tree, deciduous; leaf scars alternate, half-round or triangular; bundle scars many, scattered or in U-shape; stipular scar completely encircles stem; terminal bud large, dark purple or black, apex sharp, often falcate, axillary buds similar but frequently do not develop; often more than one main stem from the base, main stems sparingly branched; trunk bark smooth, light gray or light brown; fruit a cone-like woody aggregate of follicles, seeds red or pink.

Magnolia virginiana L. (sweetbay)

Shrub or tree, evergreen or semi-evergreen; leaves simple, alternate, long-elliptic, apex acute or obtuse, base cuneate or acute, leathery, whitened on bottom surface with waxy coating and gray hairs, slightly aromatic when crushed; leaf scar half-round or horizontally flattened oval; bundle scars several, scattered; axillary buds few, scales with hairy margins; stipular scar completely encircles stem; twigs green or greenish glaucous; fruit a cone-like woody aggregate of follicles, seed red or pink.

Morella caroliniensis (Mill.) Small (southern bayberry)

Shrub, to 3 m tall, evergreen; leaves alternate, simple, oblanceolate tending toward obovate, irregularly few-toothed in apical half or entire, apex obtuse, base cuneate, leathery, yellow-brown glandular on only lower surface, crushed leaves aromatic; leaf scar triangular; bundle scars 3; axillary bud small, yellow-glandular; plants dioecious, fruit

a small drupe, white, gray, or bluish, waxy, clustered along leafless portion of twigs, persistent. (= *Myrica heterophylla*)

Morella cerifera (L.) Small (wax myrtle)

Shrub, to 10 m tall, evergreen; leaves alternate, simple, oblanceolate (elliptic), irregularly few-toothed in apical half or entire, apex obtuse or acute, base cuneate, leathery, yellow-brown glandular on both surfaces, crushed leaves aromatic; leaf scar triangular; bundle scars 3; axillary bud small (except larger flower buds), scales yellow-glandular; plants dioecious, fruit a small drupe, white, gray, or bluish, waxy, clustered along leafless portion of twigs, persistent. (= *Myrica cerifera*)

Morus rubra L. (red mulberry)

Tree, deciduous; leaf scar half-round or oval, perimeter slightly raised as a low rim; bundle scars several; axillary bud ovate, scales tan; bark of twigs tan; plant monoecious; fruit a multiple cluster of achenes surrounded by succulent tissue, red or dark purple.

Myrica cerifera; see *Morella cerifera*

Myrica heterophylla; see *Morella caroliniensis*

Nyssa spp. (tupelo, gum)

Tree, deciduous; leaf scars alternate; bundle scars 3; pith diaphragmed; plants dioecious; fruit a drupe, in clusters.

Parthenocissus quinquefolia (L.) Planch. (Virginia creeper)

Vine, deciduous; leaves alternate; leaf scar nearly round; bundle scars scattered; axillary bud scales acute; branched tendrils opposite some leaves, with terminal adhesive disks; fruit a berry, dark blue on red pedicel, round but slightly flattened, in clusters.

Persea borbonia var. *pubescens*; see *Persea palustris*

Persea palustris (L.) Planch. (swamp bay, red bay, swamp red bay)

Tree, evergreen; leaves simple, alternate, long-elliptic or long-oblong or lanceolate, apex acute or acuminate or obtuse, base cuneate, leathery, aromatic when crushed, frequently with margins deformed by insect galls, reddish - brown hairs on

bottom surface especially noticeable on veins, upper surface somewhat glossy; leaf scar elliptic; bundle scar single, linear; axillary bud naked, hairy; fruit a drupe, dark blue, globose, 7-10 mm in diameter, on long axillary peduncles, few per tree. (= *Persea borbonia* var. *pubescens*)

Photinia pyrifolia (Lam.) K.R. Robertson & J.B. Phipps (red chokeberry)

Shrub, to 2-3 m tall, deciduous; leaves alternate, stipulate; leaf scar narrow, crescent-shaped or U-shaped; bundle scars 3; axillary bud appressed, acute, green or pinkish; twig bark hairy; fruit a pome, red, fleshy, like a small apple, 7 - 10 mm diameter. (= *Aronia arbutifolia*)

Pinus elliotii Engelm. (slash pine)

Tree, evergreen; terminal vegetative bud brown; needles 2 or 3 per bundle, 10-22 cm long; female cones 9-15 cm long, 8-10 cm broad basally, scales lustrous, cinnamon-brown.

Pinus palustris Mill. (longleaf pine)

Tree, evergreen; terminal vegetative bud silvery-gray; needles 3 per bundle, 20-45 cm long, clustered near branch tips; female cones 15-20 cm long, 10-12 cm broad basally, scales dull brown.

Pinus serotina Michx. (pond pine)

Tree, evergreen; terminal vegetative bud brown, often with small branchlets emanating from trunk; needles 3 per bundle, 6-20 cm long; female cones 5-8 cm long, 4-7 cm broad basally, short-ovoid, scales dull brown.

Pinus taeda L. (loblolly pine)

Tree, evergreen; terminal vegetative bud brown; needles 3 per bundle, 8-22 cm long; female cones 6-10 cm long, 4-7 cm basally, scales dull brown.

Platanus occidentalis L. (American sycamore)

Tree, deciduous; leaves alternate; leaf scar narrow, encircling base of bud; bundle scars 5-9; axillary bud enclosed within petiole base, evident only after leaf fall, scale single, capitate, brown, glossy; stipular scar encircles twig; trunk bark mottled with light gray, olive green, and light brown, bark pieces fall irregularly; fruit a fuzzy aggregate of achenes, globose, dangling.

Populus heterophylla L. (swamp cottonwood)

Tree, deciduous; leaf scars alternate, triangular or 3-lobed, raised; bundle scars 3 or clustered in 3 groups; axillary bud divergent, apex acuminate, bottom scale centered above leaf scar; vigorous stems with longitudinal ridges; trunk bark gray, deeply furrowed; fruit a capsule, seeds with plume of white hairs.

Quercus laurifolia Michx. (laurel oak)

Tree, deciduous or tardily deciduous; leaves broadest at or near middle, alternate; leaf scars raised, half-round; bundle scars numerous, scattered; buds clustered near stem tips, ovoid, bud scales numerous, in 5 rows, reddish brown; trunk bark rough basally and becoming noticeably smoother toward canopy; fruit an acorn, cup covers 1/3 – 1/2 of the nut, inner cup surface densely hairy.

Quercus nigra L. (water oak)

Tree, deciduous or tardily deciduous; leaves broadest near apex; leaf scars raised, half-round; bundle scars numerous, scattered; buds clustered near stem tips, ovoid, scales brown, hairy; trunk bark of mature trees blackish and irregularly scaly or ridged; fruit an acorn, cup encloses only base of acorn.

Quercus spp. (oak)

Tree, deciduous or tardily deciduous; leaf scars alternate, raised; bundle scars numerous, scattered; buds clustered at stem tips, many scales; fruit an acorn.

Rhododendron spp. (azalea)

Shrub, deciduous, some branches whorled or nearly so; leaf scars alternate, obcordate; bundle scar one; buds clustered near stem tips, flower buds larger than vegetative buds, scales numerous; fruit an elongate capsule, seeds numerous.

Rhus radicans; see *Toxicodendron radicans**Rosa palustris* Marshall (marsh rose)

Shrub, to 2 m tall, deciduous; leaf scars alternate, narrow, crescent-shaped; bundle scars several; axillary bud ovate; stem prickles broad-based, recurved, frequently more numerous immediately below nodes, fewer scattered in internodes; acces-

sory fruit a “hip”, red, globose, with stalked glands.

Rubus spp. (blackberry, raspberry, dewberry, bramble)

Shrub, deciduous or tardily deciduous; to 2.0 – 2.5 m tall; stems arching, longitudinally grooved, angular, prickly, biennial, producing flowers during second year; fruit an aggregate of drupelets, each drupelet red or purple.

Sabal minor (Jacq.) Pers. (dwarf palmetto)

Shrub to 1.5 m, with subterranean stem; leaves evergreen, blade cleft into many radiating divisions, to 1.5 m broad, petioles smooth, to 1.5 m long; leaf scar on elevated platforms on trunk; bundle scar obscure; axillary bud not evident; fruit a drupe, black, lustrous, 8 – 10 mm diameter, on naked stalk to 1.5 m long.

Salix spp. (willow)

Tree or shrub, deciduous; leaf scar alternate, narrow, crescent-shaped; bundle scars 3; axillary bud scale single, capitate; twigs gracile; plants dioecious; fruit a capsule, in catkins, seeds with tuft of silky hairs.

Sambucus canadensis; see *Sambucus nigra* ssp. *canadensis**Sambucus nigra* L. ssp. *canadensis* (L.) Bolli (elderberry)

Shrub, to 4 m tall, deciduous; leaf scar opposite, broadly crescent-shaped; bundle scars several; axillary bud bulky, leathery or woody, scales may be indistinct; stem stout, somewhat flexible, lenticels large and numerous; pith large, white, looks like styrofoam; fruit a drupe, 4-6 mm diameter, purplish-black, in large, terminal, flat clusters, edible when ripe. (= *Sambucus canadensis*)

Smilax bona-nox L. (saw greenbrier)

Vine, deciduous or tardily deciduous, tendrillate, prickly; leaves often with pale green mottles, ovate to lance-ovate, basally hastate, margin with thickened band; petiole breaks several mm from stem leaving persistent petiole base attached to stem; leaf scars obscured by persistent petiole bases; plants dioecious; fruit a berry, black, in axillary umbels

Smilax glauca Walt. (cat greenbrier)

Vine, deciduous or tardily deciduous, tendrillate, prickly; leaves glaucous beneath, broadly ovate, base truncate or cordate, margin entire; petiole breaks several mm from stem leaving persistent petiole base attached to stem; leaf scars obscured by persistent petiole bases; plants dioecious; fruit a berry, black, in axillary umbels.

Smilax laurifolia L. (laurel leaf greenbrier)

Vine, evergreen, tendrillate; leaves alternate, simple, elliptic or oblong (lance-elliptic), apex rounded with short point, base rounded or broadly obtuse, distinctively leathery, only 3 main veins evident; petiole breaks several mm from stem leaving persistent petiole base attached to stem after leaf falls; leaf scar on stem lacking; bundle scars not evident in broken petiole stub; stems round, prickled; plants dioecious; fruit a berry, black & glossy at maturity in the second year.

Smilax rotundifolia L. (roundleaf greenbrier)

Vine, deciduous or tardily deciduous, tendrillate, prickly; leaves usually broadly ovate, basally cordate or sometimes truncate, margins entire; petiole breaks several mm from stem leaving persistent petiole base attached to stem; leaf scars obscured by persistent petiole bases; plants dioecious; fruit a berry, bluish-black, in axillary umbels.

Smilax smallii Morong (lanceleaf greenbrier)

Woody vine, evergreen, often climbs high into trees; leaf lanceolate, pliable, upper surface dark green & lustrous; petiole breaks several mm from stem leaving persistent petiole base attached to stem; leaf scar obscured by petiole base; prickles scattered; fruit a berry, red – brown maturing black, in axillary umbels.

Smilax walteri Pursh (coral greenbrier)

Vine, often climbing high in canopies, deciduous or tardily deciduous, tendrillate, sparingly prickly; leaves ovate, lanceolate, or oblong, base truncate or rounded, apex acute to obtuse, margin entire; petiole breaks several mm from stem leaving persistent petiole base attached to stem; plants dioecious; fruit a berry, red, in axillary umbels.

Smilax spp. (greenbrier)

Vine, deciduous or tardily deciduous, tendrillate, prickly; leaves short-petiolate, leaf scars obscured

by persistent petiole bases; plants dioecious; fruit a berry, in axillary umbels.

Styrax americanus Lam. (American snowbell)

Shrub or small tree, deciduous; leaf scars alternate, half-round or shield-shaped, often with upward projections extending around the basal axillary bud; bundle scar one, arched; axillary buds superposed, 2 or 3, naked, upper bud thumb-shaped; fruit dry, globose, 5 mm long.

Symplocos tinctoria (L.) L'Hér. (common sweetleaf, horse sugar)

Shrub or small tree, deciduous or semi-evergreen, leaves shed in early spring before growing season begins or as it begins; leaves simple, alternate, elliptic or oblanceolate or narrowly obovate, apex acute, base cuneate, somewhat leathery, dull green, lower surface hairy, entire or slightly crenate apically, older leaves slightly sweet to taste, petiole frequently yellowish; leaf scar obtusely triangular or broadly crescent-shaped; bundle scar one, arched transverse line; axillary leaf buds small, conical, flower buds larger, globose; young branches short hairy; older branches frequently slightly waxy, straight, pith chambered; fruit a drupe, bluish, oblong, about 1 cm long, blunt at both ends.

Taxodium spp. (cypress)

Tree, deciduous; leaves shed with branchlets; branchlet scars alternate; leaf scars alternate on branchlets; female cone globose, leathery, 2-3 cm diameter, shed by mid-winter; male cones very small, numerous, in drooping clusters, evident throughout winter.

Toxicodendron radicans (L.) Kuntze (poison ivy)

Contact with plant may cause skin rash in susceptible persons. Woody vine or short erect shrub, deciduous; leaf scars alternate, broadly crescent-shaped or half-round; bundle scars several; buds hairy, hairs rust-colored; adventitious roots filamentous and may form woolly covering on older climbing stems; fruit a drupe, in short panicles, roundish, pale-colored, sometimes vertically streaked with purple. (= *Rhus radicans*)

Toxicodendron vernix (L.) Kuntze (poison sumac)

Contact with plant may cause skin rash in susceptible persons. Shrub or small tree, de-

ciduous; leaf scars alternate, scar half-round or broadly crescent-shaped; bundle scars numerous, often irregularly scattered; axillary bud scales imbricate, hairy; stem stout, unbranched or sparingly branched; fruit a drupe, in drooping subterminal panicles, roundish, cream-colored, often with vertical purplish streaks.

Ulmus spp. (elm)

Tree, deciduous; leaf scars alternate, half-round; bundle scars 3; flower buds swollen by mid-winter, axillary bud positioned above one side of leaf scar (not centered above leaf scar), scales brown, imbricate; trunk bark scaly or ridged and furrowed; flowers open during late winter; fruit a samara, rounded, usually dispersed in late winter or early spring.

Vaccinium crassifolium Andr. (creeping blueberry)

Trailing vine, evergreen; leaves alternate, simple, leathery, elliptic or oval, 5-15 mm long, 3-10 mm broad, apices blunt or rounded, margins slightly revolute & crenate; fruit a berry, black, 5 mm diameter.

Vaccinium elliotii Chapm. (Elliott's blueberry)

Shrub, to 4 m tall, deciduous; leaf scars alternate, half-round; bundle scar one; axillary bud scales acuminate; bark green & often slightly warty; flower buds usually reddish fruit a berry, black, 5-10 mm diameter.

Vaccinium spp. (blueberry)

Shrub, to 4 m tall, deciduous; leaves alternate; leaf scar half-round, vascular bundle scar 1; axillary bud scales acuminate, flower buds globose, reddish; fruit a berry.

Viburnum dentatum L. (southern arrowwood)

Shrub, to 3 m tall, deciduous; leaves opposite; leaf scar narrowly crescent-shaped; bundle scars 3; axillary bud imbricate, appressed; fruit a drupe, in terminal clusters, each fruit laterally compressed, black, 5-8 mm long.

Viburnum nudum L. (possumhaw)

Shrub or small tree, deciduous; leaves opposite; leaf scar narrowly crescent-shaped; bundle scars 3; axillary buds appressed, cinnamon brown, scurfy, valvate; fruit a drupe, in terminal clusters, each

drupe somewhat laterally flattened, initially pinkish but at maturity dark blue, 6-10 mm long.

Viburnum prunifolium L. (blackhaw)

Shrub or small tree, deciduous, usually with spur shoots; leaf scars opposite, narrowly crescent-shaped; bundle scars 3; axillary bud appressed, scales valvate, dark brown or black; fruit a drupe, laterally compressed, black, 9-14 mm long.

Vitis spp. (grape)

Woody vine, tendrillate, deciduous; leaf scars alternate; tendrils forked on all wetland species except *V. rotundifolia*, opposite, borne at only two consecutive nodes; fruit a globose berry.

Wisteria frutescens (L.) Poir. (American wisteria)

Twining vine, deciduous; leaf scars alternate, transversely elliptical, much raised, with a protuberance on each side; bundle scar one, transversely elongated; axillary bud silky hairy, narrowly elliptic, acute, nearly surrounded by outer scale; woody stems slender, somewhat angled; fruit a legume, linear or constricted between seeds, glabrous, 5-10 cm long.

Xanthorhiza simplicissima Marshall (yellow root)

Colonial shrub, 0.5-1.0 m tall, deciduous; leaf scars alternate, narrowly crescent-shaped, extend nearly completely around slender stem, crowded in zones that mark the base of each growing season and evenly dispersed along stem; bundle scars several, in a line; axillary buds few, appressed, apex obtuse, scales papery; terminal bud 1.5 – 2.5 cm long with about 5 red – brown scales; stem unbranched-sparingly branched, bark light brown, wood yellow; fruit an aggregate of 1-seeded follicles, in drooping racemes.

Zenobia pulverulenta (Bartr. ex Willd.) Pollard (honeycups)

Shrub, to 2.5-3.0 m tall, deciduous; leaf scar alternate, triangular or shield-shaped; bundle scar one; axillary bud conical, short, usually solitary but occasionally superposed; bud scales reddish-brown, usually two but occasionally three; bark of current growth reddish-brown, a slight longitudinal ridge below node; fruit a capsule, in axillary clusters.

GLOSSARY

abaxial: bottom leaf surface

abscise: fall off

accessory fruit: a fruit, such as the pear or strawberry, that develops from a ripened ovary or ovaries but includes a significant portion derived from nonovarian tissue

achene: a small, dry, one-seeded, indehiscent fruit (i.e. one that does not split open), deriving from a one-chambered ovary

acuminate: tapering gradually to a pointed apex with more or less concave sides along the tip



acuminate

acute: sharp pointed but not long tapering



acute

adventitious: occurring in unusual or unexpected locations such as roots on aerial stems

aggregate fruit: fruits developing from the several – many carpels of a single flower

appressed: lying flat against or nearly parallel to

axil: the upper angle formed between two structures or organs, such as a leaf and the stem from which it grows

axillary: borne or carried in the axil

bract: small leaf often associated with flower or fruits; see *Carpinus* female catkin

bristle: a stiff hair, usually erect or curving away from its attachment point

bundle: cluster of gymnosperm needles basally surrounded by small sheathing leaf

bundle scar: scar left on a stem by a vascular bundle when a leaf abscises

capitate: situated over a structure, as a cap

catkin: usually pendant, elongated cluster of flowers

chambered: a type of pith with partitions separating hollow spaces, chambers

collateral: situated side-by-side, a type of bud arrangement

compound leaf: composed of > 2 separate leaf blade segments, leaflets

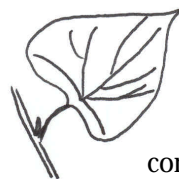


pinnately compound



palmately compound

cordate: with a sinus and rounded at the base; like the notched/rounded part of a valentine; type of leaf base or shape of leaf with notched/rounded base



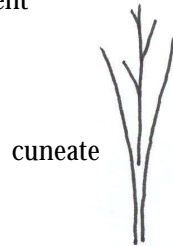
cordate leaf base

crenate: with shallow roundish or bluntish teeth on the margin, scalloped

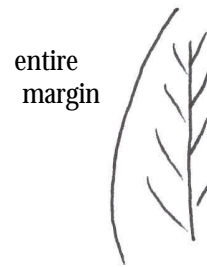


crenate margin

cuneate: wedge-shaped, with the narrow part at the point of attachment



cuneate



entire margin

deciduous: falling off, as deciduous leaves that fall during autumn

decurrent: adnate to the petiole or stem and extending downward, as a leaf base that extends downward along the stem

decussate: arranged in pairs along the stem with each pair at right angles to the one above and below

deltate: triangular in planar view

diaphragmed: a type of pith with partitions separating sections of solid pith tissue

dioecious: having staminate and pistillate flowers on separate plants (compare monoecious)

distal: the end opposite the point of attachment, away from the axis

drupe: a fleshy indehiscent fruit enclosing one or more hard stones each containing a single seed; examples include peach and cherry, which contain a single stone, and holly, which contains several stones in each drupe

elliptic: broadest at or near the middle and tapering gradually to both ends



elliptic

exfoliating: peeling off in thin layers or flakes

falcate: sickle-shaped, curved

follicle: a dry, many-seeded fruit derived from a single carpel and opening along only one side, like a milkweed pod

glabrous: lacking hairs, sometimes called "smooth"

gland: a depression or protuberance that secretes, often a different color than surrounding tissue

glaucous: covered with a thin, light-colored waxy or powdery coating

homogeneous: a type of pith with continuous tissue, lacking partitions

imbricate: overlapping, like shingles on a roof

indehiscent: type of fruit that does not open when mature

internode: the portion of a stem between two successive nodes

lanceolate: significantly longer than wide and widest below the middle, gradually tapering toward the apex



lanceolate

entire margin: leaf margin that is continuous, unbroken, with no teeth or lobes

leaf scar: scar left on a stem by the petiole of a deciduous leaf (see p. 67 for various shapes)

leaflet: one of several separate blade segments of a compound leaf

legume: a dry, dehiscent fruit derived from a single carpel and usually opening along two lines of dehiscence like a pea pod

lenticel: small, visible hole in bark through which gasses are exchanged between plant and atmosphere

lobe: a portion of a leaf or leaflet blade that is partially separated from other portions by a marginal incision; The distinction between a lobe and a large marginal tooth is subjective; the deeper the incision, the more likely that the leaf portion will be called a lobe.



lobed leaf

margin: the edge of a leaf blade

monoecious: having both male and female flowers on the same plant (compare dioecious)

naked bud: bud lacking scales

node: point on a stem where one or more leaves are/were attached

ob-: prefix signifying inversion or reversal of normal direction

oblanceolate: inversely lanceolate



oblanceolate

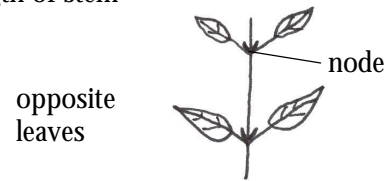
oblong: two to four times longer than broad with nearly parallel sides, but broader than 'linear'

obovate: inversely ovate, wider in the upper half



obovate

opposite: type of leaf arrangement in which 2 leaves are attached to each node; i.e. leaves are paired along length of stem



ovate: egg-shaped, wider below the middle



ovate

pandurate: fiddle-shaped

peduncle: stalk of a group of flowers or fruits

perimarginal: close to and paralleling leaf margin

petiole: leaf stalk

pith: central tissue cylinder that extends longitudinally throughout stems

pome: a fleshy, indehiscent fruit derived from an inferior, compound ovary and tissue closely associated with the ovary, apple is an example

prickle: sharp, short, rigid projection from internode and node regions of stem; usually basally thickened, not as flexible as bristle



pubescence: hairy covering

punctuate: dotted or pitted, often with glands

raceme: type of flower/fruit arrangement with individual flrs./frts. each attached by stalk (pedicel) to an elongated central axis

raceme



revolute: having the margins inrolled toward the underside

rhizome: an underground stem capable of producing new stems or plants at its nodes

rhizomatous: bearing a rhizome

samara: dry, indehiscent fruit with wings; fruits of maple, ash, and elm are examples

scale: a greatly reduced leaf or other outgrowth on a plant surface

scandent: climbing

scurfy: covered with small scale-like or bran-like particles or projections

serrate: having sharp, forward-pointing teeth on the margin

serrate margin



sessile: attached directly and without a petiole, pedicel or other type of stalk, said of either leaves or buds

sheath: a leafy, tubular structure that envelopes another structure

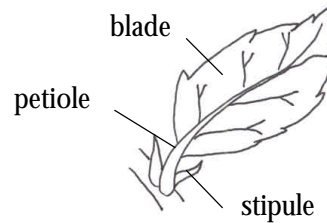
sheathing: structure modified to form a sheath

simple: a leaf that has one blade segment, not divided into leaflets

stalk: a slender, basal support structure

stalked: borne on a stalk

stipule: an appendage at the base of a petiole, usually in pairs; can be a small bract, spine, or leafy



stipular scar: scar formed when stipule falls off

stipulate: bearing stipules

subshrub: plant with stems that are woody basally and herbaceous distally

superposed: situated one above the other, a type of axillary bud arrangement

suture: a junction or seam of union, or a line along which a fruit splits open

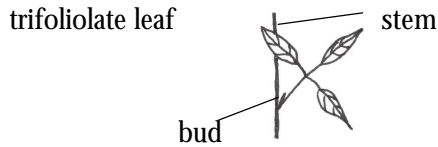
tardily deciduous: shedding the majority of leaves significantly after the beginning of the dormant season; usually retaining a portion of the leaf crop throughout the dormant season; retention of browned leaves throughout the dormant season does not constitute tardily deciduous

tendrils: elongated, twining appendage; a slender portion of a leaf or stem modified for twining

tendrillate: type of vine that bears tendrils

thorn: a short, stiff, sharp-pointed branch

trifoliolate: having three leaflets



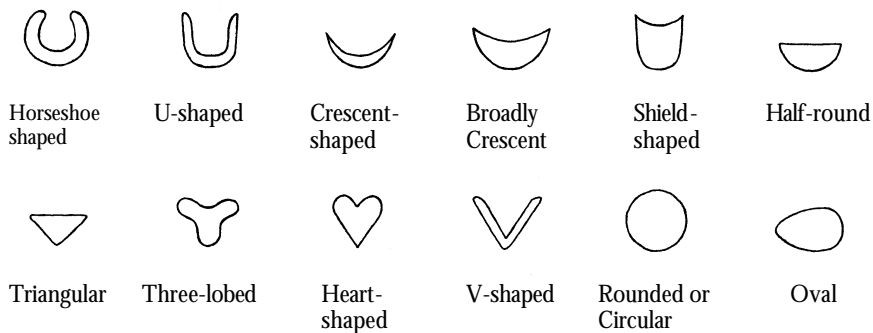
truncate: blunt; somewhat squared off



umbel: flower cluster with flower stalks (pedicels) originating from a common point



Leaf scar shapes



undulate: wavy

valvate: a type of bud scale arrangement in which two scales meet throughout their margins, opening by two valves as in a bivalved organism such as a clam

vascular bundle scar: scar left within a leaf scar by a vascular bundle when a leaf abscises

vine: plant with an elongated stem that attaches to and/or climbs on structures, or a plant with an elongate, prostrate stem

whorled: a circle of three or more structures radiating outward from the same node



opposite

alternate

whorled

From: Preston & Wright (1988)

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