

CONTRIBUTIONS TO THE  
FLORA OF NAGS HEAD WOODS, I:  
KEY TO THE TREES AND SHRUBS

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ABSTRACT

A key to the trees and shrubs vouchered and reported from the Nags Head Wood Ecological Preserve (Kill Devil Hills, Dare Co., North Carolina) is presented. The key was developed as part of a larger effort to develop a flora of the preserve.

The Nags Head Woods Ecological Preserve (Kill Devil Hills, Dare Co.) comprises one of the best remaining examples of mid-Atlantic maritime deciduous forest (Schafale & Weakley 1990). The preserve spans 1,092 acres, including an extensive system of dunes, interdunal ponds, and wetlands. Although Nags Head Woods was referenced in their checklist of the flora of the Outer Banks, Stalter and Lamont (1997) unfortunately did not cite voucher specimens. Recent work by the author has resulted in vouchered checklists of both the Nags Head Woods collections at the National Park Service Cape Hatteras National Seashore Unit Herbarium (CAHA) (Krings 2002a) and additions to the flora of the preserve (Krings 2002b). As a preliminary component of a larger flora and to facilitate the identification of plants by researchers, staff, and visitors, this paper provides a key to the trees and shrubs vouchered or reported from the preserve.

METHODS

The key was developed based on critical study of plants in the field, as well as numerous herbarium specimens held at CAHA and NCSC.

RESULTS

The presented key includes both taxa vouchered from or reported for the preserve. See Krings (2002a, 2002b) for vouchered species.

*Key to trees and shrubs*

1. Leaves needle-like or scale-like, < 3 mm wide AND plant bearing cones (appearing berry-like in *Juniperus*) .....2.
- 1.' Leaves broad, not needle- or scale-like, > 5 mm wide, except in *Baccharis angustifolia* (leaves 1-5 mm wide; flowers and fruits aster-like); plant not bearing cones .....7.
2. Trees, evergreen; bark of mature trees of polygon-shaped plates or elongate platy ridges, neither fibrous nor shredding; needles 2-3 per fascicle; female cones oblong or ovoid, generally = 4 cm long [*Pinus*] .....3.
- 2.' Trees or shrubs, evergreen or not; bark of mature trees fibrous and shreddy, not in plates; needles not in fascicles; female cones essentially spherical or ovoid and generally ≤ 2 cm long .....5.
3. Bark plates yellowish-brown beneath, numerous small holes present when plates chipped off (resin pockets); leaves mostly 2 per fascicle, (5-) 7-11 (-13) cm long, the fascicle sheath ≤ 1 cm long; female cones sub-sessile to sessile, 4-7 cm long...*Pinus echinata*
- 3.' Bark plates chocolate-brown to lighter brownish beneath, lacking numerous small holes (resin pockets) when plates chipped off; leaves mostly 3 per fascicle, the fascicle sheaths of various lengths; female cones sessile or not .....4.
4. Buds with silvery, fimbriate scales; leaves typically > 25 cm long; female cones typically > 15 cm long when mature .....*Pinus palustris*
- 4.' Buds with reddish-brown scales, the scales not fimbriate; leaves typically < 25 cm long; female cones typically typically 5-14 cm

- long when mature .....*Pinus taeda*
- 5. Trees, deciduous; needles flattened-linear (the largest > 10 mm long), neither appressed, nor scale-like, distichous; cones generally 20 mm in diam.; seeds winged or angled ..... *Taxodium distichum*
- 5.' Trees or shrubs, evergreen; needles short (the largest < 3 mm long), scale-like or awl-shaped, appressed, in alternating pairs (leaves of immature twigs sometimes slightly spreading and in whorls of 3); cones 3-6 mm long (the female cones appearing as bluish, glaucous "berries"); seeds wingless [*Juniperus*] .....6.
- 6. Crown narrow to conic or rounded; bark reddish-brown; scale-like leaves acute apically; male cones 3-4 mm long; female cones 4-6 (-7) mm long .....*Juniperus virginiana* var. *virginiana*
- 6.' Crown flattened or conic; bark cinnamon-reddish; scale-like leaves obtuse to acute apically; male cones 4-5 mm long; female cones 3-4 mm long.....*Juniperus virginiana* var. *silicicola*
- 7. Leaves opposite or whorled .....8.
- 7.' Leaves alternate ..... 17.
- 8. Leaves compound .....*Sambucus canadensis*
- 8.' Leaves simple .....9.
- 9. Leaf margins entire ..... 10.
- 9.' Leaf margins toothed ..... 14.
- 10. Leaves evergreen, thick and leathery.... *Osmanthus americanus*
- 10.' Leaves deciduous, thin and flexuous..... 11.
- 11. Leaves stipulate .....*Cephalanthus occidentalis*
- 11.' Leaves estipulate ..... 12.
- 12. Primary leaf veins numerous, averaging 15 or more, not

- strongly arcuate; plants shrubby .....*Decodon verticillatus*
- 12.' Primary leaf veins relatively few, averaging between 6-8, strongly arcuate; plants small trees [*Cornus*].....13.
- 13. Leaves 3-7 cm wide; cymes subtended by 4 white or pink, showy bracts (2-5 cm long); drupes red..... *Cornus florida*
- 13.' Leaves 1.5-4 cm wide; cymes not subtended by showy bracts; drupes blue .....*Cornus foemina*
- 14. Leaves lobed .....*Acer rubrum*
- 14.' Leaves unlobed .....15.
- 15. Twigs and leaf abaxial surfaces stellate-pubescent; fruits fleshy, borne in dense, axillary cymes, pinkish to lavender .....  
..... *Callicarpa americana*
- 15.' Twigs and leaf abaxial surfaces not stellate-pubescent; fruits not fleshy, not borne in dense cymes .....16.
- 16. Stems green, the youngest tetragonal in cross-section; leaves finely toothed; fruit a capsule, reddish-purplish, dehiscent at maturity and displaying bright red seeds; plants of forests .....  
..... *Euonymus americanus*
- 16.' Stems tannish or brownish, all terete in cross-section; leaves coarsely toothed; fruit an achene, blackish-brown; plants of brackish marshes and wet ditches.....*Iva frutescens*
- 17. Petioles woody, stout 5 mm wide or broader; leaves palmately divided, plicate or appearing so (especially at the base).....  
..... *Sabal minor*
- 17.' Petioles < 5 mm broad, or not stout and woody; leaves palmately divided or not, leaf segments not plicate.....18.
- 18. Leaves compound (upper leaves unifoliolate in *Cytisus*) .....19.
- 18.' Leaves simple or unifoliolate.....34.

- 19. Leaves palmately compound or trifoliolate .....20.
- 19.' Leaves pinnately compound with 5 or more leaflets.....22.
  
- 20. Plant armed .....*Rubus trivialis*
- 20.' Plant unarmed.....21.
  
- 21. Leaflets broad, 5-20 cm long, 2-12 cm wide, lobed .....
- .....*Toxicodendron radicans*
- 21.' Leaflets narrow, 0.5-1.5 cm long, < 1 cm wide, unlobed.....
- .....*Cytisus scoparius*
  
- 22. Plant armed .....23.
- 22.' Plant unarmed.....27.
  
- 23. Leaves decompose .....*Aralia spinosa*
- 23.' Leaves once-pinnately compound .....24.
  
- 24. Plant an arching shrub; stipules somewhat leafy, adnate to the  
petiole [*Rosa*].....25.
- 24.' Plant a tree or a small tree; stipules modified to spines, not ad-  
nate to the petiole .....26.
  
- 25. Stipules pectinate .....*Rosa bracteata*
- 25.' Stipules entire .....*Rosa palustris*
  
- 26. Leaves glandular-punctate ..... *Zanthoxylum clava-herculis*
- 26.' Leaves not glandular-punctate..... *Robinia pseudo-acacia*
  
- 27. Leaves bi-pinnately compound .....*Albizia julibrissin*
- 27.' Leaves once-pinnately compound .....28.
  
- 28. Rachis winged.....*Rhus copallina*
- 28.' Rachis not winged .....29.

- 29. Leaves even-pinnate [*Sesbania*].....30.
- 29.' Leaves odd-pinnate .....31.
  
- 30. Leaflet pairs 10-17; legume conspicuously 4-winged .....
- .....*Sesbania punicea*
- 30.' Leaflet pairs 15-20; legume not winged .....*Sesbania herbacea*
  
- 31. Plant a shrub, the stems to 0.6 m tall; petiole bases conspicu-  
ously, cylindrically swollen; leaflets 1.5 cm wide or narrower  
.....*Tephrosia spicata*
- 31.' Plant a tree, the stem to 20 m tall; petiole bases not conspicu-  
ously, cylindrically swollen; leaflets typically > 1.5 cm wide  
[*Carya*].....32.
  
- 32. Leaflets 7-11; bud scales valvate, the terminal bud elongate,  
sulfur-yellow in color..... *Carya cordiformis*
- 32.' Leaflets 3-9 (usually 5-7); bud scales imbricate, the terminal  
bud ovoid, not sulfur-yellow in color .....33.
  
- 33. Petioles and rachises pubescent with trichomes in fascicles;  
abaxial leaf surface pubescent.....*Carya tomentosa*
- 33.' Petioles and rachises glabrous or glabrate; abaxial leaf surface  
glabrous or glabrate..... *Carya glabra*
  
- 34. Upper leaves unifoliolate, lower leaves typically trifoliolate .....
- .....*Cytisus scoparius*
- 34.' All leaves simple .....35.
  
- 35. Leaves lobed .....36.
- 35.' Leaves unlobed .....43.
  
- 36. Leaves and twigs sweetly aromatic when crushed (smelling like  
root beer to some); leaves variously one to three-lobed (often mit-  
ten-shaped), the margins entire ..... *Sassafras albidum*
- 36.' Leaves and twigs not sweetly aromatic; leaves variously lobed,

leaf margins various.....	37.	43.' Terminal bud solitary or absent .....	46.
37. Leaf apex broadly emarginate to truncate .....		44. Abaxial surface of mature leaves entirely glabrous .....	
..... <i>Liriodendron tulipifera</i>		..... <i>Quercus hemisphaerica</i>	
37.' Leaf apex variously rounded to acuminate, but never emarginate or truncate .....	38.	44.' Abaxial surface of mature leaves densely pubescent .....	45.
38. Terminal buds clustered at twig tips; leaf margins entire [ <i>Quercus</i> ] .....	39.	45. Leaves deciduous, the adaxial surface dull bluish-green; acorn < 1.5 times longer than wide, the peduncle ≤ 1 cm long .....	
38.' Terminal buds solitary; leaf margins toothed .....	41.	..... <i>Quercus incana</i>	
39. Leaves with pointed lobes (the shade leaves typically resembling a duck footprint, the sun leaves a turkey print), the lobes bristle-tipped .....		45.' Leaves evergreen, the adaxial surface shiny dark green; acorn 1.5 times longer than wide, the peduncle 1-10 cm long .....	
..... <i>Quercus falcata</i>		..... <i>Quercus virginiana</i>	
39.' Leaves with rounded lobes, not bristle-tipped.....	40.	46. Leaf margins crenate, leaf bases oblique <i>Hamamelis virginiana</i>	
40. Leaves 7-11-lobed, the lobing not forming a conspicuous cross; cup with large rounded scales giving the appearance of cobble stones or warts .....		46.' Leaf margins entire, serrate, dentate, or if crenate then the bases not oblique .....	47.
..... <i>Quercus alba</i>		47. Leaves aromatic when crushed .....	48.
40.' Leaves (3-) 5-lobed, the lobing giving the appearance of a cross; cup with flat, appressed scales .....		47.' Leaves not aromatic when crushed.....	51.
..... <i>Quercus stellata</i>		48. Leaf margins coarsely toothed toward the apex, at least the abaxial leaf surface glandular-punctate [ <i>Morella</i> ] .....	49.
41. Plant with at least some leaves asymmetrically lobed, resembling mittens; leaf margins crenate to serrate .....		48.' Leaf margins entire, neither leaf surface glandular-punctate	50.
..... <i>Morus rubra</i>		49. Both leaf surfaces densely glandular-punctate; fruits typically < 3.5 mm diam .....	
41.' Leaves all symmetrically lobed; leaf margins serrate .....	42.	..... <i>Morella cerifera</i>	
42. Plant a tree; stems glabrous or essentially so, sometimes conspicuously corky-winged; leaves palmately (3-) 5 (-7)-lobed; capsules borne in pendent, globose heads .....		49.' Lower leaf surface densely glandular-punctate, upper leaf surface eglandular or only sparsely glandular-dotted; fruits > 4.5 mm diam.....	
..... <i>Liquidambar styraciflua</i>		..... <i>Morella pensylvanica</i>	
42.' Plant a shrub; stems stellate-pubescent, never corky-winged; leaves 3-lobed at most; capsules solitary, not in heads, not pendent .....		50. Leaves thick and leathery, frequently curled from galls.....	
..... <i>Hibiscus moscheutos</i>		..... <i>Persea palustris</i>	
43. Terminal buds numerous, clustered [ <i>Quercus</i> ].....	44.	50.' Leaves thin and flexuous, not curled from galls.....	
		..... <i>Sassafras albidum</i>	

51. Abaxial leaf surface bearing a distinct perimarginal vein .....  
 ..... *Lyonia lucida*
- 51.' Abaxial leaf surface not bearing a distinct perimarginal vein....  
 .....52.
52. Stipular scar completely encircling the twig [*Magnolia*] .....53.  
 52.' Stipular scar, if present, not encircling the twig.....54.
53. Leaves reddish-scurfy or reddish-tomentose beneath.....  
 .....*Magnolia grandiflora*
- 53.' Leaves glaucous beneath.....*Magnolia virginiana*
54. Terminal buds naked (i.e., lacking scales), resembling a paint-  
 brush .....*Asimina parviflora*
- 54.' Terminal bud scales imbricate or the buds absent.....55.
55. Leaf abaxial surface golden glandular-punctate .....  
 ..... *Gaylussacia frondosa*
- 55.' Leaf abaxial surface not golden glandular-punctate...56.
56. Leaf margins entire .....57.  
 56.' Leaf margins serrate, crenate, or spinulose-dentate .....67.
57. Plants armed with thorns; milky sap present .....  
 .....*Sideroxylon lycioides*
- 57.' Plants unarmed; sap not milky .....58.
58. Plants shrubby or if a small tree (*V. arboreum*), then the leaves  
 shiny.....59.
- 58.' Plants small to large trees, the leaves not lustrous .....65.
59. Leaves linear to narrowly elliptic, to 0.5 cm wide .....  
 .....*Baccharis angustifolia*
- 59.' Leaves broader, elliptic to ovate, or obovate or oblanceolate

- [*Vaccinium*] .....60.
60. Plant a shrub or small tree; leaves lustrous, evergreen or tardily  
 deciduous ..... *Vaccinium arboreum*
- 60.' Plant a shrub; leaves dull, not lustrous, deciduous .....61.
61. Abaxial midrib bearing stipitate glands .....62.  
 61.' Abaxial midrib lacking stipitate glands .....63.
62. Twigs of the season not verrucose; leaf margins near base  
 sometimes exhibiting gland-tipped teeth; corollas campanulate .....  
 ..... *Vaccinium stamineum*
- 62.' Twigs of the season verrucose; leaf margins near base lacking  
 gland-tipped teeth; corollas urceolate ..... *Vaccinium pallidum*
63. Leaf margins near base sometimes exhibiting gland-tipped  
 teeth; corollas campanulate ..... *Vaccinium stamineum*
- 63.' Leaf margins near base lacking gland-tipped teeth; corollas ur-  
 ceolate .....64.
64. Hairs of the leaf surfaces brownish or dark; berries black, not  
 glaucous ..... *Vaccinium fuscatum*
- 64.' Hairs of the leaf surfaces whitish; berries blue, glaucous .....  
 ..... *Vaccinium formosum*
65. Pith homogenous or chambered in older twigs; bundle scars 1  
 .....*Diospyros virginiana*
- 65.' Pith diaphragmed; bundle scars 3 [*Nyssa*].....66.
66. Trunk swollen or buttressed basally; leaves typically widest be-  
 yond middle, the apices obtuse; pistillate flowers and fruits (1-) 2 (-  
 3) per peduncle; primarily in periodically flooded swamps .....  
 ..... *Nyssa biflora*
- 66.' Trunk straight, neither swollen nor buttressed basally; leaves  
 typically widest near middle, the apices acuminate; pistillate flowers

and fruits (2-) 3-5 (-8) per peduncle; throughout, but less common in flooded sites ..... *Nyssa sylvatica*

67. Stipules or stipular scars present ..... 68.  
67.' Stipules or stipular scars absent ..... 81.

68. Bundle scar 1 [*Ilex*] ..... 69.  
68.' Bundle scar >1 ..... 72.

69. Leaves crenate or crenulate, not spinulose; drupes red or yellowish-orange ..... *Ilex vomitoria*

69.' Leaves remotely crenate, crenate-serrate, or dentate, often spinulose toward the apex; if drupes red or orangish-red, then leaves spinulose or nearly entire, but not crenate ..... 70.

70. Plant a small to medium tree; leaf margins dentate, spinulose (or sometimes entire with a single apical spine); flowers 4-merous; drupes red or orangish-red ..... *Ilex opaca*

70.' Plants small to medium shrubs; leaf margins remotely crenate (*I. glabra*), if spinulose then generally only towards the apex; flowers 5-7-merous; drupes black ..... 71.

71. Leaves remotely crenate toward the tip, spines or teeth pointing toward the leaf tip ..... *Ilex glabra*

71.' Leaves remotely serrate, apical leaf spines pointing away from the leaf tip ..... *Ilex coriacea*

72. Bundle scars >3; abaxial leaf surface densely stellate-pubescent, the pubescence obscuring the surface and giving a greyish appearance to the lower leaf side ..... *Hibiscus moscheutos*

72.' Bundle scars 3; abaxial leaf surface various ..... 73.

73. Leaves more than 2-ranked ..... 74.

73.' Leaves 2-ranked ..... 76.

74. Buds with 3-9, imbricate scales ..... *Prunus serotina*  
74.' Buds with a single, cap-like scale [*Salix*] ..... 75.

75. Abaxial leaf surface greenish, glabrous to sparsely pubescent ..... *Salix nigra*

75.' Abaxial leaf surface whitish, sparsely pubescent ..... *Salix caroliniana*

76. Leaf bases oblique [**Ulmaceae**] ..... 77.

76.' Leaf bases symmetrical ..... 78.

77. Leaves 3-veined from the base; fruit a drupe .... *Celtis laevigata*

77.' Leaves not 3-veined from the base; fruit a samara ..... *Ulmus americana*

78. Leaf margins doubly-serrate [**Betulaceae**] ..... 79.

78.' Leaf margins shallowly to strongly singly serrate, sometimes bristle-tipped [**Fagaceae**] ..... 80.

79. Bark gray, smooth; staminate bract acute; involucrel bract subtending fruit ..... *Carpinus caroliniana*

79.' Bark brownish to reddish-brown, fibrous or shreddy; staminate bract awned; involucrel bract enclosing fruit ..... *Ostrya virginiana*

80. Bark interlacing, ridged; involucrel spines straight, clustered; mature buds <1 cm long ..... *Castanea pumila*

80.' Bark smooth; involucrel spines recurved, single; mature buds >1 cm long ..... *Fagus grandifolia*

81. Pith diaphragmed [*Nyssa*] ..... 82.

81.' Pith homogenous ..... 83.

82. Trunk swollen or buttressed basally; pistillate flowers and fruits (1-) 2 (-3) per peduncle; primarily in periodically flooded swamps

- .....*Nyssa biflora*  
 82.' Trunk straight, neither swollen nor buttressed basally; pistillate flowers and fruits (2-) 3-5 (-8) per peduncle; throughout, but less common in flooded sites .....*Nyssa sylvatica*
83. Leaves broad (> 6 mm wide) and coarsely toothed, especially apically, OR linear [*Baccharis*] .....84.  
 83.' Leaves broad, finely toothed, essentially from apex to base, elliptic to elliptic-ovate or oblong [*Amelanchier*] .....85.
84. Leaves ovate, obovate, or elliptic, > 6 mm broad, the margins typically coarsely toothed (especially apically), rarely entire .....  
 .....*Baccharis halimifolia*  
 84.' Leaves linear, ≤ 5 mm broad, the margins entire or rarely remotely serrate.....*Baccharis angustifolia*
85. Racemes typically drooping; hypanthium neck and sepal bases glabrous .....*Amelanchier arborea*  
 85.' Racemes typically erect; hypanthium neck and sepal bases pubescent .....*Amelanchier canadensis*

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