

KEYS TO THE VINES OF CAROLINA WETLANDS

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ABSTRACT

Keys developed as part of a broader guide to Carolina wetland vines are presented. Eighty-nine species in 24 families are treated. Wetland indicator designations are provided for all taxa.

Understanding factors controlling vine distributions is of interest in understanding broader patterns of vine species richness. Several factors, such as soil moisture (Bell et al. 1988; Collins & Wein 1993), availability of small diameter supports (Putz & Chai 1987), distribution and spatial arrangement of supports (Putz & Chai 1987), as well as preferences for light microenvironments within host canopies (Castellanos et al. 1999) have been found important, but further study is warranted before a synthesis can be obtained. Wetland vines present an interesting opportunity to further study structural, as well as eco-physiological, constraints that may be important limiting factors. However, as in many cases, research can be hindered by the lack of up-to-date taxonomic and nomenclatural treatments (Krings 1997). Although a revision is in progress (Weakley, pers. comm.), the most recent Flora of the Carolinas (i.e., Radford et al. 1968) is largely out of date from a taxonomic, nomenclatural, and species distributional stand point. Various other floras include vine taxa found in the Carolinas (e.g., Small 1933; Godfrey & Wooten 1981; Godfrey 1988; Wofford 1989), but are also either out of date or not focused specifically on climbing taxa

in a convenient way to facilitate further ecological study of vines as a group. In order to fill this void, as well as to provide a resource for field biologists engaged in wetland delineation (or simply plant enthusiasts who don't mind getting their feet wet!), a guide to Carolina wetland vines is currently being developed at the North Carolina State University herbarium (NCSC). Keys developed as part of the guide (which also includes descriptions, illustrations, and images) are released here.

METHODS

Keys were developed based on critical study of specimens held at NCSC and review of applicable literature. Eighty-nine species of lianas and herbaceous vines in 24 families are treated. These taxa include species known to occur in the wetlands of North and South Carolina (Reed 1988), as well as common relatives that may be found on adjacent non-wetlands. US Fish and Wildlife Service wetland indicator designations follow Reed (1988) and are provided following each species name in the following order: "Southeast Indicator; National Indicator." Table 1 highlights the standard abbreviations used to classify wetland plants.

TABLE 1. Wetland indicator abbreviations

OBL: Obligate Wetland. Occur almost always (estimated probability >99%) under natural conditions in wetlands.
 FACW: Facultative Wetland. Usually occur in wetlands (estimated probability 67% -99%), but occasionally found in non-wetlands.
 FAC: Facultative. Equally likely to occur in wetlands or non-wetlands (estimated probability 34% -66%).
 FACU: Facultative Upland. Usually occur in non-wetlands (estimated probability 67% -99%), but occasionally found in wetlands (estimated probability 1% -33%).
 UPL: Obligate Upland. Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.
 NI: No Indicator. Recorded for those species for which insufficient information was available to determine an indicator status.

Primary Keys

1. Leaves alternate
 2. Leaves simple...Key 1, p. 25
 2. Leaves compound...Key 2, p. 33
1. Leaves opposite
 3. Leaves simple...Key 3, p. 35
 3. Leaves compound...Key 4, p. 38

Key 1: Leaves alternate, simple

1. Vines tendrillate
 2. Tendrils stipular, paired at each petiole [Smilacaceae]
 3. Vines herbaceous; unarmed; peduncles typically > 4 cm long
 4. Abaxial leaf surface glaucous, glabrous; fruiting peduncles 2.5-8 times as long as the subtending petiole; fruit glaucous, dark bluish...*Smilax herbacea* FAC; FAC
 4. Abaxial leaf surface glossy, not glaucous, glabrous to puberulent at least along the vines; fruiting peduncles 1-6.4 times as long as the subtending petioles; fruits not glaucous, black...*Smilax pulverulenta* FAC; FACU, FAC
 3. Vines woody; armed or not; peduncles typically < 4 cm long
 5. Abaxial leaf surface strongly and conspicuously glaucous...*Smilax glauca* FAC; UPL, FAC
 5. Abaxial leaf surface not, or rarely only slightly, glaucous
 6. Stem prickles abundant, thin, acicular...*Smilax tamnoides* (incl. *S. hispida*) FAC+; FAC, FAC+
 6. Stem prickles few to somewhat abundant, bases broad, narrowly triangular or recurved
 7. Leaves evergreen, thick, coriaceous, the midvein conspicuously pronounced, the lateral veins scarcely raised...*Smilax laurifolia* FACW+; FACW, OBL
 7. Leaves evergreen or deciduous, typically thin, subcori-

aceous, the midvein scarcely, if any, more pronounced than the lateral veins

8. Leaves lanceolate, the bases cuneate, the apices acute to acuminate; fruits brownish red to blackish when mature...*Smilax smallii* FACU; FACU

8. Leaves ovate, oblong, pandurate, to hastate, the bases cuneate or not, the apices rounded to acute; fruits variously colored

9. Lamina with a prominently thickened marginal vein...*Smilax bona-nox* FAC; FACU, FAC

9. Lamina lacking a thickened marginal vein, though margins sometimes revolute

10. Leaves semi-evergreen or evergreen, the margins often (but not always) with minute, denticuloid projections, typically not revolute; perianth green; fruiting peduncle as long as or longer than the subtending petiole; fruits bluish-black... *Smilax rotundifolia* FAC; FAC

10. Leaves deciduous, the margins lacking denticuloid projections, frequently revolute; perianth dull or brownish-yellow; fruiting peduncle shorter than the subtending petiole; fruits red...*Smilax walteri* OBL; OBL

11. Leaf margins often spinulose; inflorescences only in the first 1-5 leaf axils of a branch...*Smilax bona-nox* FAC; FACU, FAC

11. Leaf margins never spinulose; inflorescences in all leaf axils of a branch (or essentially so...perhaps missing from the last 1-2)...*Smilax auriculata* FACU; FACU

2. Tendrils not stipular, not paired

12. Tendrils borne opposite the leaves [Vitaceae]

13. Bark of mature stems shredding, brown (except tight and gray in *V. rotundifolia*); piths brown; inflorescence paniculate

14. Bark of mature stems smooth, gray, adherent, not shred-

ding; piths continuous through the nodes; tendrils simple... *Vitis rotundifolia* FAC; FAC-, FACW

14. Bark of mature stems shredding, brown; piths interrupted at nodes; tendrils branched

15. Tendrils or inflorescences emerging at three or more successive nodes... *Vitis labrusca* FAC+; FACU, FAC+

15. Tendrils or inflorescences lacking every third node

16. Abaxial leaf surface glaucous when mature [*Vitis aestivalis*] FAC-; UPL, FAC

17. Nodal diaphragms typically > 2 mm thick; abaxial leaf surface floccose, essentially obscuring the glaucescence; growing tips arachnoid floccose... *Vitis aestivalis* var. *aestivalis*

17. Nodal diaphragms typically < 2 mm thick; abaxial leaf surface glabrous or essentially so; growing tips glabrous to somewhat arachnoid floccose... *Vitis aestivalis* var. *bicolor*

16. Abaxial leaf surface not glaucous when mature

18. Nodal diaphragms < 1 mm thick (typically < 0.5 mm); growing tips enveloped by enlarging, unfolded leaves... *Vitis riparia* FACW; FACU, FACW

18. Nodal diaphragms ≥ 1 mm thick; growing shoot tips not enveloped by enlarging, unfolded leaves

19. New stems terete (or essentially so), glabrous or arachnoid-pubescent, the nodes lacking red bands; abaxial leaf surface glabrous or with trichomes along the veins and in the axils; fruits typically > 8 mm in diam.... *Vitis vulpina* FAC+FAC, FACW-

19. New stems angled, glabrous or arachnoid-pubescent, the nodes generally with red bands (although sometimes lacking in *V. cinerea* var. *floridana*); abaxial leaf surface glabrous to slightly arachnoid floccose; fruits typically < 8mm in diam. [*Vitis cinerea*] FAC+; FAC, FACW

20. Stems slightly angled, arachnoid floccose; abaxial leaf surface floccose; vines of the Coastal Plain (mostly)... *Vitis cinerea* var. *floridana*

20. Stems conspicuously angled, glabrous to slightly arachnoid-pubescent; abaxial leaf surface glabrous to slightly arachnoid-pubescent; vines of the Piedmont and Mountains (primarily)... *Vitis cinerea* var. *baileyana*

13. Bark of mature stems otherwise; piths white; inflorescence cymose

21. Young stems glabrous; leaves unlobed or only obscurely 3-lobed; native, occurs along rivers and rich bottomlands... *Ampelopsis cordata* FAC+; UPL, FAC+

21. Young stems pubescent; leaves 3 (-5) lobed, sometimes the lobes, pinnately lobed; introduced, adventive along edges, disturbed places... *Ampelopsis heterophylla* var. *brevipedunculata* NI

12. Tendrils borne at right angle to petiole or terminating short lateral branches or inflorescences

22. Tendrils terminating short lateral branches or inflorescences... *Brunnichia ovata* FACW; FACW-, FACW

22. Tendrils borne at right angle to petiole [Cucurbitaceae]

23. Tendrils simple; berries fleshy

24. Leaf lobes deltate, the sinuses angulate; berries green to black; seeds white... *Melothria pendula* FACW-; FAC-, FACW-

24. Leaf lobes rhombic to elliptic, the sinuses rounded; berries red; seeds dark brown... *Cayaponia quinqueloba* FACW-; FAC, FACW-

23. Tendrils bifid to many-branched; berries fleshy or not

25. Tendrils bifid; berries red, smooth, neither hispid nor echinate... *Cayaponia quinqueloba* FACW-; FAC, FACW-

25. Tendrils 3-4-fid; berries not red, hispid or echinate

26. Corollas 5-lobed; berries 1-2 cm long; seeds 1... *Sicyos angulatus* FACW-; FACU, FACW-

26. Corollas 6-lobed; berries 3-5 cm long; seeds
4...*Echinocystis lobata* FACW-; FACU, FACW-
1. Vines not tendrillate
27. Ocreae (sheathing stipules) prominent [Polygonaceae, in part]
28. Stems lacking barbs or prickles, flexuous; inflorescence fasciculate or racemose; nutlets trigonous
29. Calyx wing-keeled in fruit, the wings ≥ 1 mm wide; nutlets lustrous...*Polygonum scandens* FAC-; FACU, FACW
29. Calyx not wing-keeled in fruit or the wings greatly reduced, ≤ 0.5 mm wide; nutlets dull...*Polygonum convolvulus* FACU; FACU-, FAC
28. Stems retrorsely barbed, somewhat rigid, the internodes essentially of linear segments; inflorescence racemose or capitate; nutlets biconvex or trigonous
30. Leaves hastate, the adaxial surface pubescent or the abaxial surface stellate-pubescent, the apices acuminate; inflorescence racemose; nutlets biconvex; common in outer coastal plain, rarer in inner coastal plain and piedmont...*Polygonum arifolium* OBL; OBL
30. Leaves sagittate, both surfaces glabrous, the apices acute; inflorescence capitate; nutlets trigonous; throughout the Carolinas...*Polygonum sagittatum* OBL; OBL
27. Ocreae lacking
31. Leaves cordate, 7-11 veined from the base, the veins parallel, tertiary veins many, crossing secondary veins at essentially right angles; flowers 3-merous; fruit a 3-angled capsule; seeds compressed, broadly winged [Dioscoreaceae]
32. Stems narrowly winged or ribbed, polygonal in cross-section (8-14-angulate)...*Dioscorea villosa* FAC; FACU, FAC+
32. Stems terete, lacking narrow ribs ...*Dioscorea quaternata* FAC; UPL, FAC
31. Leaves cordate or not, lacking the combination of 7-11, parallel-veined from the base with tertiary veins crossing secondary veins at essentially right angles; flowers 3-5-merous; fruit a capsule or not; seeds not winged
33. Petioles swollen just below leaf blade attachment or leaf blades peltate; flowers usually 3-merous [Menispermaceae]
34. Leaves not mucronate; petals lacking or vestigial; anthers 2-locular; stigma many-cleft...*Calycocarpum lyonii* FACW-; FACW-, FACW
34. Leaves mucronate; petals well-developed; anthers 4-locular; stigma entire or slightly lobed
35. Leaf blade peltate; petals 4-12 (usually 6), lacking auriculate basal lobes; stamens 12-36; pistils 2-4 (usually 3); drupe blue to blackish...*Menispermum canadense* NI; FAC
35. Leaf blade not peltate; petals 6, with auriculate basal lobes; stamens 6; pistils 6; drupe red...*Cocculus carolinus* FAC; FACU, FAC
33. Petioles not swollen below leaf blade attachment, leaves not peltate; flowers 3-5-merous
36. Apical leaf margins crenate-denticulate to crenate, sometimes obscurely so, OR the secondary venation pinnate, the veins straight and strictly parallel and narrowly spaced
37. Bark of mature vines greenish-red to reddish; secondary venation pinnate, the veins 8-11, essentially parallel, narrowly spaced (ca. 5 mm or less); phyllotactic spiral $\frac{1}{2}$...*Berchemia scandens* FACW; FAC+, FACW
37. Bark of mature vines gray; secondary venation pinnate, the veins 3-6, curved, or if somewhat straight and parallel, then ca. 1 cm apart, not narrowly spaced; phyllotactic spiral $\frac{2}{5}$ [Celastraceae]
38. Leaves elliptic to obovate; inflorescence terminal, racemose-thyrsoid, generally with 6 or more flowers...*Celastrus scandens* NI; UPL, FACU
38. Leaves broadly obovate to suborbicular; inflorescence axillary, cymose, generally with 1-3 flowers...*Celastrus orbiculatus* NI; UPL
36. Apical leaf margins entire and secondary venation not strictly parallel and narrowly spaced

39. Vine woody; leaves basally deeply auriculate; corolla rotate, purple, lobes reflexed, each with two greenish basal spots...*Solanum dulcamara* FAC; FACU, FAC+

39. Vine herbaceous or woody; leaves not basally auriculate, lobed or not; corolla tubular, campanulate to infundibuliform, or zygomorphic, variously colored, the lobes lacking greenish basal spot

40. Leaves small, generally < 3.5 cm long

41. Medial leaves hastate to sagittate; corolla spurred, two-lipped, cream to yellow, the upper lip purplish...*Kickxia elatine* FACU; UPL, FAC

41. Leaves oblong to oblong-lanceolate; corolla not spurred, campanulate to infundibuliform, pink to purple...*Stylisma aquatica* FACW+; FACW-, FACW+

40. Leaves not small, (3) 5-15 cm long

42. Flowers curved-tubular, 3-merous; vine woody when mature...*Aristolochia tomentosa* FAC; FAC

42. Flowers campanulate to infundibuliform, never curved, 5-merous; vine herbaceous

43. Stigmas 2, oblong, twice as long as wide or nearly so...*Calystegia sepium* FAC; FACU, OBL

43. Stigma 1, globose to biglobose, as wide as long or wider [*Ipomoea*]

44. Sepals not corniculate

45. Leaves conspicuously pubescent above and below

46. Sepal tips shorter than the rest of the sepal or only somewhat longer...*Ipomoea purpurea* FACU; UPL, FAC

46. Sepal tips much longer than the rest of the sepal...*Ipomoea hederacea* FAC-; FACU, FAC

45. Leaves glabrous above and below, or essentially so

47. Outer sepal surface pubescent, at least near

the base, sepal margins ciliolate; corolla 2.8-5 cm long...*Ipomoea cordatotriloba* FACU; FACU, FAC

47. Outer sepal surface glabrous, sepal margins ciliolate; corolla 1.5-2.3 cm long...*Ipomoea lacunosa* FAC+; FAC+, FACW

44. Sepals corniculate (sometimes minutely so in *Ipomoea sagittata*)

48. Corolla salverform, red to scarlet, stamens and stigma exerted

49. Leaves unlobed...*Ipomoea coccinea* FAC; FACU, FAC

49. Leaves deeply, pinnately divided into linear segments...*Ipomoea quamoclit* FACU+; UPL, FACU+

48. Corolla infundibuliform or campanulate, white to yellow, rose, or purple, stamens and stigma included

50. Leaves strongly sagittate or hastate-sagittate, the apices acute to acuminate, not retuse...*Ipomoea sagittata* FACW; FACW

50. Leaves lanceolate, deltate-lanceolate, to orbicular, the apices retuse

51. Leaves oblong to pandurate, lobed or not; corolla white with a yellow center...*Ipomoea imperati* FACU; FACU, FAC

51. Leaves suborbicular to orbicular, unlobed, generally with two abaxial glands near the base; corolla rose to purple...*Ipomoea pes-caprae* FAC; FAC

Key 2: Leaves alternate, compound

1. Vine a fern, reproductive structures borne directly on leaf surface; fronds consisting of two basal pinnules and a dormant bud
 2. Pinnules palmately-lobed, segments 4-8, rounded...*Lygodium palmatum* FACW-; FACW-, FACW
 2. Pinnules pinnately-compound, segments irregular, serrate...*Lygodium japonicum* FAC; FAC, FACW
1. Vine not a fern, reproductive structures not borne on leaf surface; leaves trifoliolate, palmately or pinnately-compound
 3. Leaves palmately 5-foliolate; vine tendrillate, the tendrils disk-tipped...*Parthenocissus quinquefolia* FAC; FACU, FAC
 3. Leaves trifoliolately, biternately, bipinnately or pinnately compound; vine tendrillate (but lacking disk-tips) or not
 4. Leaves trifoliolate; vine lacking tendrils
 5. Vine climbing with adventitious roots, becoming large and woody with age...*Toxicodendron radicans* FAC; FACU, FACW
 5. Vine lacking adventitious roots, climbing by twining, essentially herbaceous
 6. Style bearded above
 7. Corolla yellow to greenish-yellow...*Vigna luteola* FACW; FACW-, FACW
 7. Corolla pink to purple to white
 8. Leaflets conspicuously 3-lobed; bracteoles as long as the calyx tube, if not exceeding it, lanceolate, acute...*Strophostyles helvula* FAC; FACU-, FAC+
 8. Leaflets unlobed; bracteoles only half the length of the calyx tube, ovate to oblong, blunt...*Strophostyles umbellata* FAC-; FACU, FAC-

9. Calyx lobes constituting greater than half the length of the tube, often exceeding the tube in length; only petaliferous flowers present, the petals pink; legume 0.4-0.5 cm wide...*Galactia volubilis* FACU; FACU, FAC+
4. Leaves pinnately, bipinnately, or biternately compound; vine tendrillate or not
 10. Vines not tendrillate
 11. Plant a woody vine; leaflets 9-19...*Wisteria frutescens* FACW; FACW-, FACW
 11. Plant an herbaceous vine; leaflets (3) 5-9
 12. Leaflets oblong to elliptic, 7-9; calyx nearly regular, appearing 4-lobed due to fusion of upper two lobes; petals white or reddish-tinged...*Galactia elliottii* FACU; FACU
 12. Leaflets lanceolate to ovate-lanceolate, 5-7; calyx typically with one well-developed lobe, essentially as long as the tube, the other 4 lobes quite reduced; petals brownish-red...*Apios americana* FACW; FAC, FACW
 10. Vines tendrillate
 13. Tendrils borne opposite the leaves; leaves bi-pinnately or bi-ternately compound...*Ampelopsis arborea* FAC+; FAC, FACW
 13. Tendrils axillary or terminating the rachis; leaves bi-pinnately or bi-ternately compound or not
 14. Tendrils axillary, bifid; leaves bi-ternately compound...*Cardiospermum halicacabum* FAC; FACU, FAC
 14. Tendrils terminating the rachis; leaves pinnately compound
 15. Styles flattened, bearded laterally; stems winged or not
 16. Leaflets 2...*Lathyrus pusillus* FACW-; FAC, FACW-
 16. Leaflets 4 or more
 17. Leaflets 4-8 (10); racemes typically 2-6 flowered; lowermost calyx lobe generally 2/3 as long as the tube, ≤ 2.5 mm long...*Lathyrus palustris* OBL; FAC, OBL

17. Leaflets (8) 10-14; racemes typically 10+ flowered (10-30); lowermost calyx lobe only slightly shorter than the tube (rarely longer), 3.5-4.5 mm long...*Lathyrus venosus* FAC; FAC, FACW
15. Styles terete, or essentially so, encircled by a distal tuft of hair or with an abaxial tuft of hair; stems not winged
18. Tendrils typically branched (typically trifid); flowers solitary or paired (-4), in subsessile, axillary clusters near the stem apex...*Vicia sativa* ssp. *nigra* FACU; UPL, FACW
18. Tendrils simple or branched; flowers 4-20, in distinctly long-peduncled racemes
19. Tendrils simple or bifid; leaflets ≥ 10 , ovate to elliptic, < 4 (6) times as long as wide; flowers 7-20; calyx lobes subequal; corolla pale lavender to white, the keel blue-tipped, the standard 0.8-1.2 cm long...*Vicia caroliniana* FACU; UPL, FACU
19. Tendrils simple; leaflets 2-4 (-6), narrowly oblong to linear, ≥ 8 times as long as wide; flowers 4-10; calyx lobes unequal, the lowermost the longest; corolla pale blue, the standard 0.7-0.9 cm long...*Vicia acutifolia* FACW+; FACW+

Key 3: Leaves opposite, simple

1. Vine climbing by adventitious roots; leaves unlobed, apices typically coarsely serrate to crenulate (rarely entire), leaf bases cuneate (sometimes cordate)...*Decumaria barbara* FACW; FACW, OBL
1. Vine climbing by twining or retrorse prickles, adventitious roots lacking; leaves lobed or not, typically entire (toothed only in *Mikania scandens* [flowers in heads], *Kickxia elatine* [basal foliar lobe only], and *Humulus* [stems with retrorse prickles]), leaf bases

cuneate or not

2. Vines armed with retrorse prickles; leaves palmately 3-5-lobed [Cannabaceae]
3. Leaves generally 3-lobed (sometimes also with unlobed leaves on same plant); bracts of female flowers not ciliate, or if minutely so (visible only under magnification), then the hairs weak, not rigid...*Humulus lupulus* NI; FACU
3. Leaves 5-9-lobed; bracts of female flowers conspicuously spinulose-ciliate, the pubescence visible without magnification...*Humulus japonicus* FAC-; FACU, FAC-
2. Vines unarmed; leaves not palmately 3-5-lobed
4. Leaves coarsely serrate or dentate; flowers in heads...*Mikania scandens* FACW+; FACW+, OBL
4. Leaves entire (sometimes coarsely pinnately-lobed in *Lonicera japonica*); flowers not in heads
5. Leaves 7-11-veined from the base, the tertiary veins essentially perpendicular to the secondary veins [Dioscoreaceae]
6. Stems narrowly winged or ribbed, polygonal in cross-section (8-14-angulate) ...*Dioscorea villosa* FAC; FACU, FAC+
6. Stems terete, lacking narrow ribs...*Dioscorea quaternata* FAC; UPL, FAC
5. Leaves not as above
7. Vines exuding milky latex when cut [Apocynaceae]
8. Leaf bases cordate; leaves widely ovate or oblong-ovate; corollas rotate and the lobes maroon or greenish-maroon OR campanulate and the petals white, free
9. Corolla rotate, the lobes maroon or greenish-maroon; follicles sharply angled, glabrous...*Gonolobus suberosus* FACW; FACW
9. Corolla campanulate, petals white, free; follicles only somewhat angled, if at all, glabrous...*Cynanchum laeve* FAC; FAC
8. Leaf bases cuneate to rounded, not cordate; leaves elliptic to lanceolate or linear; corollas campanulate to infun-

dibuliform or salverform, the lobes yellow, creamish, white, or pinkish-white

10. Slender woody vine; stems reddish-brown; leaves ovate to elliptic or lanceolate, tertiary leaf venation conspicuous and perpendicular to midvein; corolla infundibuliform to salverform, yellow or creamish...*Trachelospermum difforme* FACW; FACW

10. Herbaceous perennial vine; stems greenish; leaves linear, tertiary venation inconspicuous, not perpendicular to midvein; corolla campanulate, the lobes white to pinkish-white...*Cynanchum angustifolium* FACW; FACW, OBL

7. Vines not exuding milky latex when cut

11. Vine diminutive, often creeping; leaves basally serrate-dentate to hastate or sagittate; flowers zygomorphic, spurred, sepals 5, corolla yellowish, the upper lip purple, stamens 4...*Kickxia elatine* FACU; UPL, FAC

11. Vine not diminutive, typically twining into shrubs and lower canopy; leaves entire, basally rounded to cuneate; flowers zygomorphic or not, not spurred, calyx 5-lobed, corolla yellowish or not, stamens 5

12. Plants with stipules or at least exhibiting a stipular scar [Loganiaceae]

13. Calyx lobes obtuse; capsule beak < 2 mm long; seeds winged...*Gelsemium sempervirens* FAC; FAC

13. Calyx lobes acute to acuminate; capsule beak > 2 mm long; seeds wingless...*Gelsemium rankinii* FACW+; FACW+

12. Plants estipulate [Caprifoliaceae]

14. Leaf abaxial surface not glaucous; inflorescence axillary, subtending leaves not perfoliate; corolla white or yellow; ovaries connate; berries black...*Lonicera japonica* FAC-; FACU, FAC+

14. Leaf abaxial surface glaucous; inflorescence terminal, subtending leaves perfoliate; corolla red, fre-

quently yellow inside the tube; ovaries not connate; berries red

15. Corolla ≥ 2.9 cm long, nearly actinomorphic, not 2-lipped, the lobes subequal; throughout the Carolinas...*Lonicera sempervirens* FAC; FACU, FAC

15. Corolla ≤ 1.5 cm long, distinctly zygomorphic, 2-lipped, the lobes unequal; mountain woodlands and thickets...*Lonicera dioica* FACU; FACU

Key 4: Leaves opposite, compound

1. Vine tendrillate, the tendril borne between two leaflets; leaves bifoliolate...*Bignonia capreolata* FAC; FAC, FACW

1. Vine not tendrillate (although the terminal leaflet in *Clematis* sometimes tendril-like); leaves trifoliolate, pinnate, or bi-ternate

2. Vine climbing by adventitious roots; leaves pinnate, leaflets 7-15...*Campsis radicans* FAC; FACU, FAC

2. Vine climbing by twining, twisting rachises, petioles, or petioles, adventitious roots lacking; leaves trifoliolate, pinnate, or bi-ternate, leaflets 3-10 [Ranunculaceae]

3. Inflorescence paniculate, flowers not nodding; perianth broadly campanulate, the sepals thin, spreading, not connivent; white to cream

4. Flowers bisexual (some unisexual); pistils numbering ≤ 10 per flower; anthers ca. 3 mm long...*Clematis terniflora* FAC-; UPL, FAC-

4. Flowers unisexual; pistils numbering $\geq 18-70$ per flower; anthers < 1 mm long

5. Leaves trifoliolate; pistils 40-70...*Clematis virginiana* FAC+; FACU, FAC+

5. Leaves pinnately or bi-ternately compound; pistils 18-35...*Clematis catesbyana* FAC+; FAC+

3. Flowers solitary, nodding; perianth urceolate to campanulate,

the sepals thick and leathery, connivent proximally, red to purplish-red or violet-blue

6. Abaxial leaf surface glaucous; sepals red to purplish-red, the margins not crispate; achene beaks ≥ 5 cm long, plumose ...*Clematis glaucophylla* FAC-; FAC-, FACW

6. Abaxial leaf surface not glaucous; sepals violet-blue, the margins distally crispate; achene beaks ≤ 3.5 cm, appressed puberulent...*Clematis crispa* FACW+; FAC, OBL

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