KEY TO THE GENERA OF OHIO MACROLICHENS

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1 Thallus foliose (subfruticose in *Pseudevernia* and *Cetraria*)……...**2**
Thallus fruticose or cladoniform ……**63**

FOLIOSE LICHENS

2(1) Thallus bright lemon-colored (tinged with green) or golden-yellow or orange (tinged with red)……...**3**
Thallus some shade of gray, green, yellow-green, brown, or black; not as above……**5**

3(2) Thallus some shade of yellow, K- ..……..…..…***Candelaria***
Thallus some shade of orange, K+ purple ……...…….....**4**

4(3) Thallus attached to substrate by pointed rhizines ……..……***Xanthomendoza***
Thallus attached to substrate by hapters (like a rhizine but with a wider 'foot' which anchors to the substrate) ……..***Xanthoria***

5(2) Thallus thin and brittle when dry, gelatinous when wet; medullary fibers apparently absent, the interior a homogeneous mixture of cyanobacteria and hyphae; color slate gray, olive-brown, or dark greenish-black …….……..…**6**
Thallus thick or thin, not gelatinous when wet; white medullary fibers usually apparent, color various ……**7**

6(5) Thallus some shade of gray, very thin upper and lower cortex present, or thallus quasi-cellular throughout ……..…….….***Leptogium***
Thallus usually dark greenish-black or olive-brown in color, lacking an organized upper and lower cortex …….……***Collema***

7(5) Rhizines lacking ...……...**8**
Rhizines present from lower surface (may be massed as a felty mat or umbilicate) …..**13**

8(7) Foliose, with narrow lobes ……..**9**
Sub-fruticose, thallus channeled below; free-growing over soil or on twigs and branches ……**12**

9(8) Thallus not inflated or perforated, very tightly appressed ……**10**
Thallus inflated and hollow (at least at lobe tips) ……..…....**11**

10(9) Thallus light gray, always on rock …….. ***Dirinaria frostii***
Thallus gray-brown to brown, usually on bark ……...….***Hyperphyscia***

11(9) Thallus with perforations ……..…...***Menegazzia terebrata***
Thallus without perforations ……..***Hypogymnia physodes***

12(8) Lobes flattened, channeled, narrow and ciliate-spinulate; growing on soil; green-brown to darkening in color ……***Cetraria arenaria***
Lobes flattened, channeled, and narrow, but lacking cilia; growing on bark; light mineral gray in color ……...***Pseudevernia consocians***

13(7) Perithecial openings dotting the upper surface; perithecia imbedded in thallus; lower surface smooth to pimply ……**14**
Perithecia absent; apothecia, if present, saucer-shaped and superficial on the surface of the thallus ……..**15**

14(13) Thallus on rock, umbilicate or attached to the surface by hapters (footed rhizines) ……..***Dermatocarpon***
Thallus on soil or bark (very rarly on rock), attached to the substrate by a mat of short, numerous rhizines; ……...……***Placidium***

15(13) Thallus umbilicate, attached to the substrate at one point by a holdfast; on rock only ……...**16**
Thallus not umbilicate, broadly attached to the substrate with scattered rhizines; on rock, soil or bark ……**17**

16(15) Thallus pustulate above, pitted below ……..***Lasallia***
Thallus not pustulate, smooth below with short, felty rhizines ……...***Umbilicaria***

17(15) Thallus containing cyanobacteria ……..**18**
Thallus containing green algae ...……....**21**

18(17) Only the upper cortex present; lower surface fibrous and usually with raised vein-like ridges ……...…***Peltigera***
Upper and lower cortex present; lower cortex often thin, sometimes covered with a velvety nap or rhizines or with a fibrous hypothallus .....……..**19**

19(18) Thallus slate-blue, usually small; lower surface a dense mat of blue-black rhizines ……..***Coccocarpia palmicola***
Thallus brownish or blue-gray ……**20**

20(19) Thallus subfoliose to squamulose, usually with a fibrous hypothallus showing from below; apothecia on surface of lobes ……***Fuscopannaria/Pannaria***
Thallus distinctly foliose, without a hypothallus; apothecia on the underside of the lobes, often at tips ……...…***Nephroma helveticum***

21(17) Medulla yellow, red-orange, or red, especially beneath the soredia and/or apothecia ……...**22**
Medulla white or whitish, sometimes stained pale buff or pink due to aging, chemicals, or weathering ……**26**

22(21) Medulla red to red-orange ……..***Phaeophyscia rubropulchra***
Medulla pale yellow, golden-yellow, or orange-yellow …….**23**

23 (22) Medulla bright golden-yellow or sulphur-yellow ……**24**
Medulla light yellow or orange-yellow ……...**25**

24(23) Medulla golden-yellow; upper cortex chocolate-brown when dry, green when wet, with yellow soredia and yellow pores in the lower cortex; lobe margins yellow ……. ……..***Pseudocyphellaria aurata***
Medulla sulphur-yellow; upper cortex yellowish-green; light yellowish below or white below, without pores ……***Vulpicida viridis***

25(23) Pruina massed or spotted on the surface of the lobe tips; lower surface with white-tipped, dark rhizines; medulla yellow or yellow-orange; always sorediate ……..***Pyxine***
No massed pruina as above; thallus pustulate-sorediate, isidiate, or NIS; medulla pale yellow at least beneath the soredia and/or the apothecia; rhizines dark, but lacking white tips ……***Myelochroa***

26(21) Thallus with rounded paw-shaped, or fist-shaped lobe tips ……..**27**
Thallus various, but without paw-shaped or fist-shaped lobe tips ……..……**28**

27(26) Undersurface black, ecorticate, a dense felty mat of dark hyphae ...***Anzia colpodes***
Undersurface pale brown, corticate, light-colored rhizines present ...***Physcia adscendens***

28(26) Lower surface of thallus with a dense, brownish, velvety nap of short rhizines; broadly foliose, the lobes consistently more than 3 mm wide ……..**29**
Lower surface with sparse to moderate or occasionally numerous rhizines, variable in color and length but not forming a uniform, brown, velvety nap ……**30**

29(28) Lower surface of thallus with holes having a cortical rim (cyphellae); upper cortex brownish ……***Sticta beauvoisii***
Lower surface of thallus more or less uniform; if white-spotted, the spots irregular and without a cortical rim (pseudocyphellae); upper cortex mineral-gray or brownish …… ……..***Lobaria***

30(28) Upper cortex instantly K+ deep yellow, lobes rarely exceeding 3 mm in width ….. ……..…***Imshaugia***
Upper cortex K- or K+ weak yellow, lobes variable in width ……..…..**31**

31(30) Lower surface without a cortex, fibrous at least beneath the lobe tips; thallus lobes narrow ……***Heterodermia***
Lower surface with a cortex throughout; lobes narrow or broad …….……...**32**

32(31) Thallus with tiny white markings (pseudocyphellae) on the upper surface (use hand lens for magnification) …..……...**33**
Thallus without pseudocyphellae, may be uniform or variously cracked, ridged, or white-maculate ……..……**37**

33(32) Upper surface color some shade of brown .....…….***Melanelia***
Upper surface some shade of gray, gray-green, or yellowish green ……..……..**34**

34(33) Lower surface pale brown to white ……...***Punctelia***
Lower surface black, sometimes with a dark brown marginal zone ..…….**35**

35(34) Thallus yellow-green in color ……..……***Flavopunctelia***
Thallus mineral-gray in color ……..……**36**

36(35) Lobes of intermediate width (up to 1 cm), lower surface not mottled ……..
……...…***Punctelia borreri***
Lobes very broad (usually greater than 2 cm) and rotund, lower surface mottled light and dark …..……***Cetrelia***

37(32) Thallus some shade of gray, gray-green, greenish, brown, or gray-brown ……...**38**
Thallus yellow-green in color, usnic acid present ……..**58**

38(37) Thallus brown, bronze or green-brown in color ……**39**
Thallus some gray, gray-green, or greenish in color ……..**41**

39(38) Thallus appressed, either sorediate-isitiate, OR with regularly scattered pseudocyphellate warts; apothecia and pycnidia laminal (when present) …….***Melanelia***
Thallus partly ascendant OR appressed and with very narrow and linear lobes; NIS and without pseudocyphellate warts; apothecia and pycnidia marginal to submarginal .……**40**

40(39) Thallus 2-7 cm wide, lobes 1-4 mm wide ……..***Tuckermanopsis***
Thallus 1-2 cm wide, lobes less than 1 mm wide ……***Tuckermanella fendleri***

41(38) Thallus broadly foliose, the lobes 4-20 mm wide, apically rounded; thallus usually loosely attached with lobe tips somewhat ascending ……**42**
Lobes generally narrow and linear, 0.5-6 mm wide, apically obtuse; thallus usually adnate to appressed ……...**44**

42(41) Lower surface with marginal bare zone free of rhizines, cilia usually present; upper surface smooth to wrinkled but not pitted ……..……***Parmotrema***
Lower surface with rhizines to the margins, upper surface various, may be patterned maculate or wrinkled and pitted ……....**43**

43(42) Cilia absent, lower surface wrinkled and reverse-pitted, white to cream-colored; marginal pycnidia numerous …….***Platismatia tuckermanii***
Cilia present, lower surface brown …….***Canomaculina***

44(41) Undersurface white to tan ……**45**
Undersurface black, at least centrally (sometimes pale at lobe margins) ……...**51**

45(44) Apothecia and/or pycnidia common, marginal; lobes ascending …….**46**
Apothecia and pycnidia, if present, laminal or terminal; lobes appressed …….**47**

46(45) Soredia present on lobe margins ……..…***Allocetraria oakesiana***
Soredia lacking …….***Ahtiana aurescens***

47(45) Upper cortex usually hard, composed of horizontally oriented, interwoven hyphae (difficult to separate from the medulla below when using a razor blade), lower cortex usually absent ……...…….**48**
Upper cortex usually rather soft (like cutting into a bar of soap), lower cortex present ……...…….**49**

48(47) Thallus usually densely lobulate or squamulate towards the center and along the lobe margins, dark colored when dry, green when wet ……...***Anaptychia palmulata***
Not densly lobulate, some shade of gray ……....***Heterodermia***

49(47) Upper cortex K+ yellow, lower surface light colored ……..***Physcia***
Upper cortex K- ……...…….**50**

50(49) Thallus gray-brown, up to 3 cm broad, closely adnate but with conspicuous rhizines; lobes sorediate, rounded to short-elongate ……... ***Physciella***
Thallus gray-brown, usually less than 2 cm broad, tightly appressed and lacking rhizines; lobes sorediate or not, elongate or strap shaped; (see *Physcia* key) ***Hyperphyscia***

51(44) Lower surface fibrous or cottony, white at the tip of the lobes but darkening at the center ……..***Heterodermia***
Lower surface smooth, corticate and shiny, black to dark brown near the margins …...**52**

52(51) Upper surface with irregular white markings towards the tips of the lobes; lobes often strap-shaped to linear (if upper surface has pseudocyphellae, see *Punctelia*) …… ……***Parmelia***
Upper surface without distinct white markings at the lobe tips; upper surface may be smooth, convex, or reticulate-cracked, but lacking the irregular white markings ……**53**

53(52) Upper surface reticulately cracked, patterned or ridged to the lobe tips; lobes without cilia ……..……***Canoparmelia***
Upper surface plain to irregularly wrinkled, not reticulate-patterned or cracked; ciliate or not ……**54**

54(53) Upper cortex K+ yellow ……**55**
Upper cortex K- ……..**57**

55(54) Lobes without cilia (do not confuse projecting rhizines for cilia); rhizines dichotomously branched ……..***Hypotrachyna***
Lobes or lobe axils with cilia, sometimes sparsely so, rhizines not dichotomously branched ……..**56**

56(55) Medulla white, C+ rose and/or KC+ red; marginal cilia present …..***Parmelinopsis***
Medulla white or often pale yellowish, (especially beneath soredia and apothecia), C-, KC- or KC+ yellow-orange; marginal cilia sparse, usually found only in the lobe axils ……***Myelochroa***

57(54) Upper surface pruinose, at least on lobe ends, sometimes completely so (see *Physcia* key) ……***Physconia***
Upper surface not pruinose ……..***Phaeophyscia***

58(37) Lobes quite broad, apically rounded, 3-10 mm wide ……**59**
Lobes narrower, 0.1-3 mm wide, usually linear ……**61**

59(58) Margins of lobes ciliate ……***Parmotrema***
Margins of lobes not ciliate ……**60**

60(59) Upper surface with white markings (pseudocyphellae), sometimes quite small (use hand lens or magnification) ……..……...…..***Flavopunctelia***
Upper surface without pseudocyphellae ……..……..……***Flavoparmelia***

61(58) On bark or twigs ……...……**62**
On rock ……***Xanthoparmelia***

62(61) Thallus sorediate ……..***Allocetraria oakesiana***
Neither soredia nor isidia present ……..……***Ahtiana***

FRUTICOSE LICHENS

63(1) Thallus fruticose, erect and bushlike, pendulous, or vinelike; one point of attachment often evident; primary thallus (on the substrate), if formed, usually soon disappearing ……..…**64**
Thallus cladoniform, usually twofold; a primary thallus on the substrate, crustose or squamulose in form, and a secondary thallus of erect podetia (occasionally lacking) …**75**

64(63) Thallus golden-yellow, K+ purple, or sometimes almost gray with scattered yellow, K+ purple areas ……***Teloschistes chrysophthalmus***
Thallus various shades of gray, gray-green, yellow-green, or brown ……**65**

65(64) Thallus forming a dark, greenish-brown or blackish furry mat; usually near the waterline of streams or lakes; on rock ……***Ephebe lanata***
Thallus elongate, tufted, bushy, or pendulous, not a furry mat ……..**66**

66(65) Thallus with the upper and lower (front and back) surfaces distinctly different; branches flattened, at least in part ……**67**
Thallus with upper and lower (front and back) surfaces more or less alike; flattened or cylindrical ……**70**

67(66) Thallus flabby, the interior more or less filled with webby hyphae …… ……***Evernia mesomorpha***
Thallus rigid and brittle; erect, tufted, tangled, or in extensive mats ……**68**

68(67) Thallus tufted or in dense mats on soil or rock, flattened squamules on upper surface, an apparent midrib on the lower surface ……...***Stereocaulon***
Thallus in extensive, loosely tangles mats on the soil or in loosely-tangled narrow-lobed, sub-fruticose thalli, channeled below; on twigs and branches ……**69**

69(68) Thallus growing on soil, brown or green-brown or darkening in color, margins spinulate-ciliate ……***Cetraria arenaria***
Thallus growing on twigs or branches, light mineral gray in color, lacking cilia …….. …..……..…..…..***Pseudevernia consocians***

70(66) Thallus flattened, rigid, and tufted; (thallus flabby, see *Evernia*) …….**71**
Thallus cylindrical ……. **72**

71(70) Thallus black, on calcareous rock ……...***Thyrea confusa***
Thallus yellow-green to gray-green, on acidic rock or bark …….***Ramalina***

72(70) Interior webby, uniform; branches usually dark shiny brown or brownish-green ……***Bryoria furcellata***
Interior hollow or with a solid threadlike core ……**73**

73 (72) Interior with a hard, threadlike core; thallus bushlike or vinelike; on bark or rock ……***Usnea***
Interior hollow, pipelike; thallus bushlike and usually mat-forming; on soil, rarely on rock ……***Cladonia***

74(63) Primary thallus squamulose, the squamules somewhat erect or not; poditia tipped with brown or red (sometimes pale), apothecia or pycnidia, when present; poditia usually club-shaped, cup-shaped, or pointed …….***Cladonia***
Primary thallus crustose, at times vaguely lobed, may like a stain over the soil ……**75**

75(74) Poditia without a cortex, tipped with pink or pinkish-brown, dough-like (in appearance) apothecia; interior not hollow, filled with webby hyphae ……***Dibaeis***
Poditia with a cortex, smooth, nipple-shaped, and sometimes branched; interior hollow, apothecia, when present, tiny, brown or darkening ……..***Pycnothelia papillaria***