

## UMBILICATE LICHENS

This group of lichens, as circumscribed herein, are umbilicate lichens that are gray, brown or olive, without a yellow tint. They are KC- or KC+ red, lacking usnic acid. To get to a genus, use the key below, modified from Brodo et al. 2001 Key H.

- 1a. Black dots abundant all over upper surface caused by immersed perithecia ..... ***Dermatocarpon*(not treated further here)**
- 1b. Black dots absent or rare, and then caused by scattered pycnidia; fruiting bodies when present apothecia ..... 2
- 2a. Apothecia brown, sometimes pruinose, broken up into segments by sterile tissue, sunken into thallus; thallus thick, surface areolate or cracked, chalky white to pale grey; rare, in the arid interior or arctic, on limestone.. ***Glypholecia scabra*→**
- 2b. Apothecia black, usually with concentric or radiating bands of sterile tissue, superficial or sunken; very dark brown to gray; common and widespread; on siliceous rock ..... 3
- 3a. Surface pustulate or warty, with depressions on underside corresponding to upper surface pustules; 1-2 large muriform spores per ascus..... ***Lasallia* (not treated further here)**
- 3b. Surface smooth, warty, or covered in rough pruina; lower surface with plates of tissue or rhizines, smooth or wrinkled but never with depressions as above; spores mostly 8 per ascus, varying from 1-celled to muriform..... ***Umbilicaria***



## UMBILICARIA Hoffm.

21 species recorded in Alberta:

- americana** Poelt & T. H. Nash (ACIMS)  
**angulata** Tuck. Syn.: *Gyrophora angulata* (ACIMS)  
**arctica** (Ach.) Nyl. Syn.: *Gyrophora arctica* (ACIMS)  
**cinereorufescens** (Schaerer) Frey (ACIMS)  
**cylindrica** (L.) Delise ex Duby Syn.: *Gyrophora cylindrica* (ACIMS)  
**decussata** (Vill.) Zahlbr. Syn.: *Omphalodiscus decussatus*, *Gyrophora decussata* (ACIMS)  
**deusta** (L.) Baumg. Syn.: *Gyrophora deusta* (ACIMS)  
**hirsuta** (Sw. ex Westr.) Hoffm. (ACIMS)  
**hyperborea** (Ach.) Hoffm. var. **hyperborea** Syn.: *Gyrophora hyperborea* (ACIMS)  
**krascheninnikovii** (Savicz) Zahlbr. Syn.: *Omphalodiscus krascheninnikovii* (ACIMS)  
**lambii** Imshaug (ACIMS)  
**lyngei** Schol. Syn.: *Agyrophora lyngei* (ACIMS)  
**mammulata** (Ach.) Tuck. Syn.: *Gyrophora dillenii* (ACIMS)  
**muehlenbergii** (Ach.) Tuck. Syn.: *Actinogyra muehlenbergii*, *Gyrophora muehlenbergii* (ABMI, ACIMS)  
**phaea** Tuck. Syn.: *Gyrophora phaea* (ACIMS)  
**polaris** (Schol.) Zahlbr. Syn.: *Omphalodiscus krascheninnikovii* auct. proboscidea (L.),  
*Umbilicaria krascheninnikovi*  
**polyphylla** (L.) Baumg. Syn.: *Gyrophora polyphylla* (ACIMS)  
*Schrader* Syn.: *Gyrophora proboscidea* (ACIMS)  
**rigida** (Du Rietz) Frey Syn.: *U. coriacea*, *Agyrophora rigida*, *Gyrophora anthracina* (ACIMS)  
**torrefacta** (Lightf.) Schrader Syn.: *Gyrophora erosa*, *G. torrefacta* (ACIMS)  
**vellea** (L.) Hoffm. Syn.: *Gyrophora vellea* (ACIMS)  
**virginis** Schaerer Syn.: *Omphalodiscus virginis*, *Gyrophora rugifera* (ACIMS)

## DICHOTOMOUS KEY – *Umbilicaria*

Based largely on McCune and Geiser 2009, with addition of *mammulata* and *muhlenbergii*

### Key to the Groups

- 1a. Isidia or soredia present ..... Grp 1
- 1b. Isidia and soredia lacking ..... 2
  - 2a. Apothecia lacking fissures; disk smooth, flat ..... Grp 2
  - 2b. Apothecia with concentric or radiating fissures, central sterile button or apothecia lacking ..... 4
    - 3a. Apothecia present with a central sterile button, often with fine secondary concentric fissures ..... Grp 3
    - 3b. Apothecia not as above or lacking ..... 4
      - 4a. Apothecia with radiating fissures, sunken in thallus. Lower surface rhizinate, black, papillate; rhizines often ball-tipped; upper surface dark brown to dark gray brown, smooth ..... *U. polyrrhiza*
      - 4b. Apothecia with concentric fissures or lacking (sterile material of all species key here) ..... 5
        - 5a. Thallus almost crustose or squamulose; thallus dark brown to black, to 3 mm thick; apothecia smooth, not fissured; upper surface often with an irregular network of indented lines; exposed alpine and subalpine summits ..... *U. lambii*
        - 5b. Thallus foliose ..... 6
          - 6a. Lower surface with rhizines or plate-like structures or both ..... 7
            - 7a. Lower surface rhizinate, not plate-like except occasionally near umbilicus.... Grp 4
            - 7b. Lower surface plate-like, rhizines present or not ..... Grp 5
          - 6b. Lower surface lacking both rhizines and plates, smooth ..... Grp 6

### Group 1 – sorediate or isidiate

- 1a. Isidia present, laminal; soredia lacking; thallus dark brown above, brown-black below ..... *U. deusta*
- 1b. Isidia lacking, soredia powdery, diffuse, near margins; thallus gray to brown gray above, pale gray, brown or black below ..... *U. hirsuta*

### Group 2 - apothecia lacking fissures, disk flat, smooth

- 1a. Lower surface with rhizines, upper surface dark brown to black, smooth to faintly net-ridged, frosty pruinose in centre; lower surface black; thallus to 2 cm in diameter, apothecia common [not likely in AB] ..... *U. scholanderi*
- 1b. Lower surface lacking rhizines ..... 2
  - 2a. Lower surface warty, light brown to black; upper surface black to brownish black, net ridged and frosty pruinose in the centre, areolate cracked toward the margins; thallus to 15 cm diameter; apothecia common, stipitate ..... *U. rigida*
  - 2b. Lower surface smooth, mostly sooty black; upper surface dark gray, net ridged nearly throughout; thallus to 4 cm in diameter; apothecia rare, stipitate ..... *U. lyngei*

### Group 3 - apothecia with a central sterile button, otherwise disk ± smooth

- 1a. Lower surface with rhizines, rhizines brown to buff or pinkish when shaded to black where exposed ..... *U. virginis*
- 1b. Lower surface lacking rhizines ..... 2
  - 2a. Lower surface sooty black with a paler band near the margin; apothecia rare; upper surface rugose or net-ridged, some shade of gray; thallus to 8 cm diam; ..... *U. decussata*
  - 2b. Lower surface smooth, gray tan or brown ..... *U. polaris* (syn. *U. krascheninnikovi*)

### Group 4 – apothecia (if present) with concentric fissures, lower surface with rhizines (not plate-like)

- 1a. Upper surface gray to warmred-brown; lower surface generally black, papillose to warty, with black to brown or pale rhizines or lower surface pale with dense black rhizines; apothecia rare ..... 2
  - 2a. Lower surface with pale slender rhizines arising from the coarse, stubby, thick warts; lower surface often pale between the rhizines; thallus generally <10 cm ..... *U. vellea*
  - 2b. Lower surface with velvety knap of slender sooty black rhizines (sometimes stubby and degenerate); lower surface black, granular to areolate; thallus often 10 cm or more in diam ..... 3
    - 3a. Thallus warm red-brown to grayish brown, thin and membranous to thick but fragile; pruina rare ..... *U. mammulata*

3b. Thallus gray, thick and cardboard like; usually pruinose.....	<i>U. americana</i>	
1b. Upper surface varied in color but if gray or red-brown then lower surface not sooty.....		4
4a. Apothecia present, with concentric ridges .....		5
5a. Upper surface with a network or whitish ridges that fade radially; apothecia seldum stipitate; lower surface mainly gray, occasionally with a few rhizines .....	<i>U. proboscidea</i>	
5b. Upper surface otherwise generally grayish pruinose; apothecia distinctly stipitate; lower surface brown to pinkish, occasionally gray toward the margin; rhizines generally long, usually concentrated toward the margins .....		
	<i>U. cylindrica</i>	
4b. Apothecia absent.....		6
6a. Lower surface and rhizines dark brown to black; lower surface granular to warty .....		7
7a. Upper surface dark brown to black, with a frosty centre.....	<i>U. scholanderi</i>	
7b. Upper surface brown to olive brown or gray brown.....		8
8a. Rhizines ball-tipped at least in part, moderately dense to dense, often quite long and projecting from the margins .....	<i>U. polyrrhiza</i>	
8b. Rhizines not ball-tipped, sparse to dense.....	<i>U. angulata</i>	
[Rare specimens of <i>U. havassii</i> with abundant rhizines may key here; the lower surface is sooty black but pale near the umbo. The upper surface is frosty near the umbo and the thallus edges thin and often perforate. See Grp 6]		
6b. Lower surface and rhizines brown to gray or pink; lower surface and rhizines smooth to finely granulose .....		9
9a. Upper surface developing a network of raised ridges, rhizines seldom concentrated towards the middle.....	<i>U. virginis</i>	
9b. Upper surface smooth or nearly so; rhizines often concentrated toward the edges.....	<i>U. cylindrica</i>	

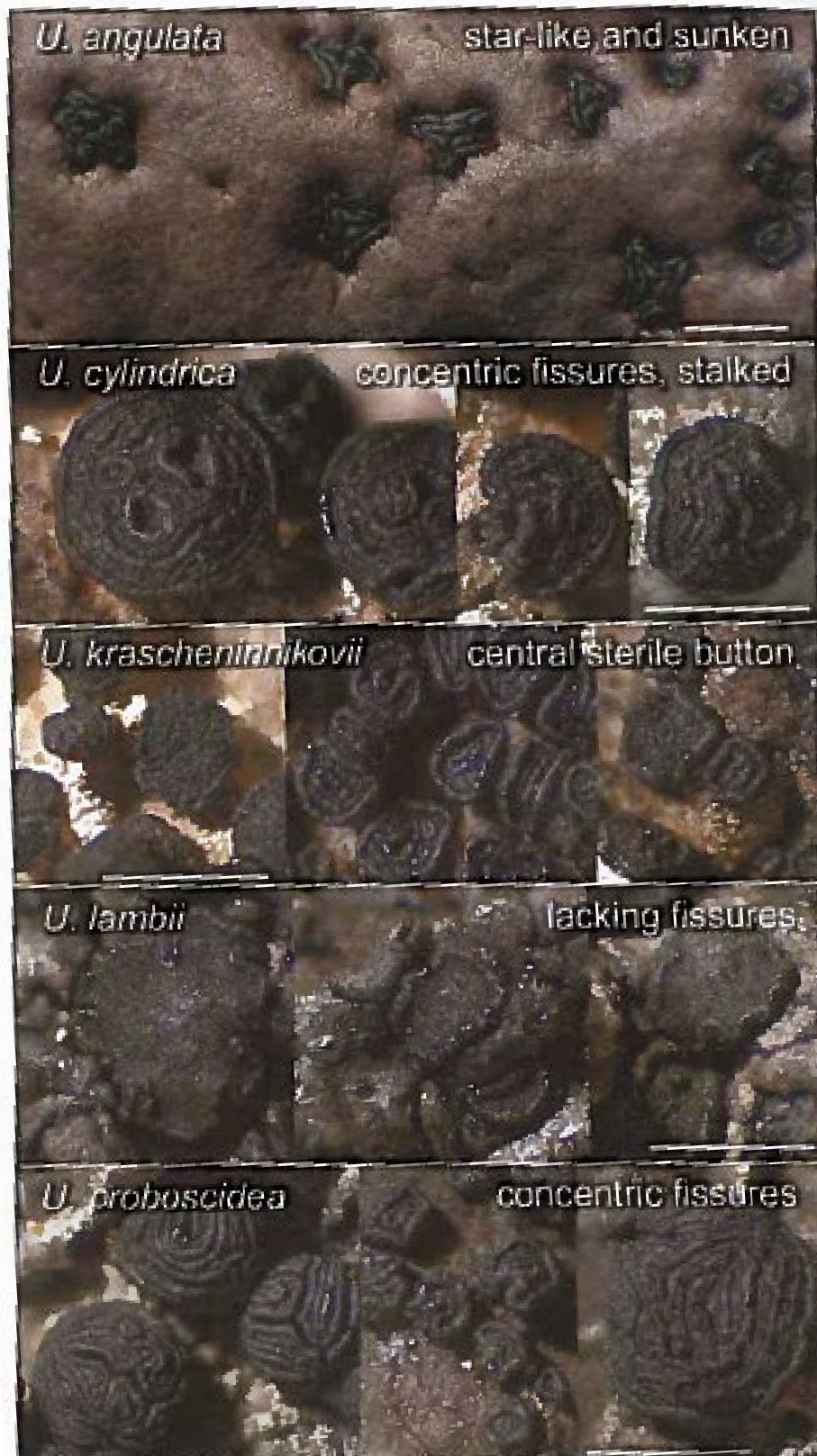
**Group 5 – apothecia (if present) with concentric fissures, lower surface with plate-like structures ± rhizines**

1a. True rhizines present along with plate-like structures.....		2
2a. Apothecia flat and angular in outline, usually abundant; upper cortex smooth to areolate, often with a gray to purplish cast; lower cortex warty or papillose, black, with cylindrical to flat tangled, elongate black rhizines, which may be sparse.....	<i>U. angulata</i>	
2b. Apothecia round in outline.....		3
3a. Thallus monophyllous, thick (300-500um), gray to white, lower surface with black or pale rhizines, platy surface when present typically sparse .....	<i>U. vellea</i>	
3b. Thallus polyphyllous, thallus thinner (200-300um), dark gray, reddish or violet gray; often forming dense clusters of small thalli; lower surface with black rhizines that are typically short, flattened and irregularly thickened and lumpy .....	<i>U. cinereorufescens</i>	
1b. Rhizines absent, only plate-like structures present on lower surface .....		4
4a. Margins finely perforate (hold up to the light or use transmitted light on the scope) and dissected; upper surface distinctly segmented and/or apparently composed of close-fitting lobes when mature; lower surface with plates most often restricted to the area near the umbilicus .....	<i>U. torrefacta</i>	
4b. Margins entire; upper surface occasionally cracked but not at all distinctly segmented; lower surface with plates running parallel to surface almost to lobe edges; plates sometimes appearing rhizines-like at the edges .....	<i>U. muhlenbergii</i>	

**Group 6– apothecia (if present) with concentric fissures, lower surface smooth**

1a. Upper surface smooth or nearly so.....		2
2a. Upper surface orangish red to burnt red .....	<i>U. phaea var. coccinea</i>	
2b. Upper surface brown to black .....		3
3a. Lower surface black, smooth to papillose; upper surface chocolate brown to dark brown; thallus deeply lobate; apothecia rare .....	<i>U. polyphylla</i>	
3b. Lower surface black to brown; upper surface light brown to gray brown or black brown; thallus shallowly lobate; apothecia common .....		4
4a. Lower surface papillose to Verrucose, may have scattered or massed stumpy rhizines.....	<i>U. phaea</i>	

- 4b. Lower surface smooth.....*U. hyperborea*
- 1b. Upper surface ridged or rugose, sometimes mainly near the umbo .....5
  - 5a. Upper surface with contorted, rounded ridges, often most prominent toward the margins.....6
    - 6a. Lower surface black, covered with thalloconidia ..... *U. nylanderiana*
    - 6b. Lower surface largely gray, brown or black-brown.....7
      - 7a. Lower surface dark gray to brown or brown black.....*U. hyperborea*
      - 7b. Lower surface black around the umbilicus and occasionally near the margins, but mostly dove-gray to tan ..... *U. arctica*
  - 5a. Upper surface with coarse network of generally light-colored ridges, radiating from the umbo .....8
    - 8a. Lower surface black, often paler near the margins; apothecia usually lacking but when present with a central sterile button (Grp 3); upper surface rugose, smooth or ridged, often developing a network of raised light-colored ridges especially towards the centre, generally grayish to blackish gray.....*U. decussata*
    - 8b. Lower surface gray to tan, occasionally sooty black toward margins.....9
      - 9a. Lower surface with sooty black areas (thalloconidia); margins becoming perforate..... *U. havaasii*
      - 9b. Lower surface otherwise; margins entire to lacerate to occasionally perforate .....10
        - 10a. Lower surface gray pruinose only near margins, smooth; difficult to distinguish from *U. krascheninnikovii* when sterile (when fertile has apothecia with concentric rings with the latter species has a central sterile button) ..... *U. proboscidea*
        - 10b. Apothecia with central sterile button, with or without concentric secondary fissures; lower surface pruinose, smooth to finely chinky..... *U. polaris* (syn. *U. krascheninnikovi*)



Apothecia of *Umbilicaria*.