

Melanelia has been split into three genera. See the table below for the features of the new genera. All three genera, plus some morphologically similar species, are treated in the *Melanelia* key below.

Table 3. Selected morphological and chemical features in the monophyletic groups of *Melanelia s. lat.*

Taxon	Epicortex	Pseudocyphellae	Upper surface	Lobes	Lobe periphery	Cortical hairs	Medullary chemistry	Substrate
<i>Melanelia stygia</i>	Non-pored	Flat, effigurate	Undulate	Long, narrow to terete	Plane to convex, inflated	Absent	Depsidones	Saxicolous
<i>M. disjuncta</i>	Non-pored	Flat, effigurate	Undulate	Short, narrow	Plane to convex, inflated	Absent	Long side-chain depsides	Saxicolous
<i>Melanohalea</i>	Non-pored	On verrucae or isidial tips, circular to slightly elliptic	Undulate	Broad	Plane to concave, flat	Absent	Absent or depsidones	Corticolous or rarely saxicolous
saxicolous <i>Melanelixia</i>	Pored or fenestrate	Absent	Smooth	Broad	Plane to concave, flat	Present in some species	Depsides	Corticolous or sometimes saxicolous

DICHOTOMOUS KEY –*Melanelia*, *Melanelixia*, *Melanohalea*, *Tuckermanella* in part, *Tuckermannopsis* in part, *Cetrariella* in part

Modified and updated from Brodo et al. 2001, with additional information from Nahs 2002, Goward et al. 1994, Blanco et al. 2004

*Often K and C reactions are faint and ephemeral in these species, fading within seconds - use drawn out pipettes to add tiny amounts of chemical to pieces of medulla for these chemical tests. PD tests can be conducted as with other genera – break off a small piece, exposing the relevant thallus anatomy, place on a glass slide on a white background, and push the fragment into a drop of PD on the slide.

- 1a. Soredia present..... **Group 1, Lead 2**
- 1b. Soredia absent9
 - 9a. Isidia present..... **Group 2, Lead 10**
 - 9b. Isidia absent, apothecia usually present.....21
 - 21a. Growing on bark **Group 3, Lead 22**
 - 21b. Growing on rock **Group 4, Lead 29**

Group 1 – Sorediate appressed brown foliose lichen (may also bear isidia)

- 2a. Medulla CR or Pink, sorediate or sorediate with cylindrical isidia3
 - 3a. Pseudocyphellae abundant and conspicuous; lobes elongated; white or brown soralia laminal or partly marginal; soredia granular; **growing on exposed non-calcareous rock***Melanelia tominii*
 - 3b. Pseudocyphellae absent; lobes rounded; CR; **usually on wood or bark, rarely mossy rock**4
 - 4a. Soredia at least partly laminal; soredia granular, often mixed with or arising from isidia5
 - 5a. Soredia mostly laminal, arising from a disintegration of the cortex or isidia, leaving yellowish green patches; isidia narrowly cylindrical at maturity, about 0.2mm long; thallus surface epruinose, lacking cortical hairs (carefully check lobe tips) (While most resources indicate soralia are entirely laminal, specimens in herbaria ID'ed by Dr. Esslinger and ABMI specimens also exhibit marginal soralia, though not to the extent of *M. subargentifera*) *Melanelixia subaurifera*

- 5b. Soredia both laminal and marginal, arising from pustules or break-down or cortex, brown to whitish; lacking true isidia; thallus surface commonly pruinose and often with minute colorless hairs on lobe tips, occasionally into central thallus..... *Melanelixia subargentifera*
- 4b. Soralia entirely marginal, either linear along the margin or forming ascending labriform crescents, isidia absent *Melanelixia albertana*
- 2b. Medulla C-, strictly sorediate or sorediate with granular isidia..... 6
- 6a. Soredia predominantly on upper surface of lobes 7
- 7a. Soredia restricted to upper surface of lobes, soralia well-delimited and circular in outline, usually small; isidia granular and solid; **grows over bark or sometimes rock** in open boreal habitat, UV-, PD- or PDR *Melanohalea olivaceoides*
- 7b. Soralia farinose in rounded mounds at lobe tips or coarse and in irregular patches towards centre of thallus; thallus dark brown (or whitish where abraded); rhizines abundant, brown or black; lower surface dark brown or black; medulla UV+ blue-white (perlatolic acid), PD-; **growing on exposed acidic rock like granite** 8
- 8a. Soredia fine, in rounded mounds usually near lobe tips; lacking pseudocyphellae *Melanelia sorediata*
- 8b. Soredia coarse, granular, in irregular patches on the older parts of the thallus; pseudocyphellae present, either small and inconspicuous or conspicuous and close to lobe margins..... *Melanelia disjuncta*
- 6b. Soredia predominantly marginal; rhizines predominantly marginal, sparse, very pale beige or tan; lower surface pale brown; medulla UV-, K-, PD-, C-, but fatty acids present; **on bark and wood, rarely growing on rock**; lobes concave, undulating or crisped at the margins, ascending *Tuckermannopsis chlorophylla*

Group 2 – Non-sorediate, isidiate appressed brown foliose lichen

- 10a. Lobes 0.4-0.7mm wide, rhizines predominantly marginal; **on wood or bark**; isidia spherical to cylindrical, becoming branched in well-developed specimens; not recorded in AB, closest locations are interior USA *Tuckermanella coralligera*
- 10b. Lobes usually more than 1mm wide; rhizines over lower surface; on rock, wood or bark..... 11
- 11a. Isidia spherical or globular..... 12
- 12a. On rock..... 13
- 13a. Isidia hollow 14
- 14a. Medulla K-, PD-, KCPinkish-violet (perlatolic acid); Also see Xanthoparmelia key; this species not recorded in AB..... *Xanthoparmelia loxodes*
- 14b. Medulla KY or R, PDO, KC-; also see Xanthoparmelia key; this species not recorded in AB..... *Xanthoparmelia subhosseana*
- 13b. Isidia solid, cylindrical, developing from globular warts that can be constricted at the base *Melanohalea infumata*
- 12b. On bark or wood, rarely mossy rocks; isidia solid, developing from conical to hemispherical warts *Melanohalea elegantula*
- 11b. Isidia cylindrical, flattened, club-shaped, or conical, unbranched or branched 15
- 15a. Medulla CR or Pink (lecanoric acid) 16
- 16a. Isidia unbranched, mostly shorter than 0.2mm, abrading to leave yellowish-green patches; **growing on bark** *Melanelixia subaurifera*
- 16b. Isidia frequently branched and longer than 0.2mm; medulla white where isidia and cortex abraded, but with patches of orange that are KViolet; **growing on bark or acidic rock** *Melanelixia fuliginosa*
- 15b. Medulla C..... 17
- 17a. Isidia cylindrical or conical; pruina often present..... 18

- 18a. Isidia unbranched, developing from small conical to hemispherical warts; upper surface dull; often lightly to heavily pruinose; **grows mainly on trees and shrubs, rarely on mossy rock** *Melanohalea elegantula*
- 18b. Isidia becoming branched and flattened at maturity into appressed dorsiventral lobes; occasionally pruinose; **grows on bark or wood** *Melanohalea subelegantula*
- 17b. Isidia flattened or club-shaped; upper surface more shiny than dull 19
- 19a. Isidia solid 20
- 20a. Lower surface black; **growing on rock**; medulla UVBW (perlatolic acid) *Melanelia panniformis*
- 20b. Lower surface brown; **growing on bark**; all chemical tests -; see lead 16b also *Melanohalea subelegantula*
- 19b. Isidia hollow; lower surface pale to dark brown; **growing on bark, rarely wood or rock**; medulla UV *Melanohalea exasperata*

Group 3 – Bark- or wood-dwelling, non-sorediate, non-isidiate appressed brown foliose lichen, often bearing apothecia

- 22a. Medulla C-, KC 23
- 23a. Rhizines sparse, predominantly marginal and resembling cilia (but description says rhizines scattered over a pale bottom); lobes 0.5-1.6mm wide, often with tiny lobules & pycnidia and small pseudocyphellae along margins, but lacking isidia or soredia; apothecia abundant; thallus turns green when wet *Tuckermanella fendleri*
- 23b. Rhizines abundant over lower surface, never resembling cilia; lobes (0.5-)1-5mm wide 24
- 24a. Medulla PDitY, R or O 25
- 25a. Medulla PDitY or O, KY (norstictic acid); spores 16-32/ascus; lobes less than 1.5mm wide; lower surface net ridged or bearing overlapping plates of tissue *Melanohalea trabeculata*
- 25b. Medulla PDR, (fumarprotocetraric acid), spores 8/ascus 26
- 26a. Pseudocyphellae sparse or inconspicuous on the thallus and apothecial margins; lobes smooth and even; may be slightly pruinose; 8 spores/ascus, 6-7.5x10-13µm *Melanohalea septentrionalis*
- 26b. Pseudocyphellae abundant and conspicuous especially on apothecial margins; lobes smooth and even; lobes wrinkled or bumpy; 8 spores/ascus, 7-8.5x12-15µm *Melanohalea olivacea*
- 24b. Medulla PD 27
- 27a. Spores 12-32/ascus, lobes often with lobules at least in centre of thallus *Melanohalea multispora*
- 27b. Spores 8/ascus, lobules absent 28
- 28a. Pseudocyphellae absent or rare *Melanohalea subolivacea*
- 28b. Pseudocyphellae on apothecial margins, lobes and on thallus warts; not recorded in AB at this point *Melanohalea exasperata*
- 22b. Medulla CR, KCR (lecanoric acid); thallus thick, wrinkled towards the middle; not recorded in AB at present, closest locations are Idaho and California *Melanelixia glabra*

Group 4– Rock-dwelling, non-sorediate, non-isidiate appressed brown foliose lichen, often bearing apothecia

- 29a. Pseudocyphellae abundant and conspicuous; rhizines mostly on or close to the margins (but variable? check *Melanelia agnata* in herbarium) 30
- 30a. Pseudocyphellae marginal; lobe edges distinctly thickened, resulting in flattened, channeled lobes 31

- 31a. Pycnidia prominent, on lobe margins; medulla PDO, KY (stictic acid); conidia dumbbell-shaped; lower surface black in centre and lighter at margins.....**Melanelia hepatizon**
- 31b. Pycnidia ? (check PMAE specimens, also pseudocyphellae); all chemical tests negative; conidia are cylindrical or ellipsoid; lower surface pale to medium brown..... **Cetrariella commixta**
- 30b. Pseudocyphellae laminal; pycnidia scattered on lobe surface, entirely buried in thallus with just the ostiole showing or somewhat emergent; medulla PD- or PDR, K..... **32**
- 32a. Medulla CPink, KCR, PD- (gyrophoric acid); thallus thick and stiff; pycnidia sparse or very inconspicuous; conidia rod-shaped.....**Melanelia tominii**
- 32b. Medulla C-, KC-, PD- or R (fumarprotocetraric acid sometimes present); conidia dumbbell-shaped **33**
- 33a. Thallus moderately thick; pycnidia abundant and conspicuous but buried in thallus; medulla PD- or R; lower cortex black, sometimes pale at margins **Melanelia stygia**
- 33b. Thallus ?; pycnidia large and somewhat emergent; medulla PD-; lower cortex pale to medium brown, sometime with black patches..... **Melanelia agnata**
- 29b. Pseudocyphellae absent or inconspicuous; rhizines more uniformly distributed **34**
- 34a. Surface reticulately ridged and pitted, particularly near periphery, becoming tuberculate and/or lobulate near centre; apothecia rare; pseudocyphellae absent over surface, but may be present as faint lines on lobe margins; medulla CPink to R, KCR (lecanoric acid) **Melanelixia glabroides**
- 34b. Surface smooth; apothecia common; medulla C- (rarely CPink in *Xanthoparmelia loxodes*), KC- or Pink or Violet..... **35**
- 35a. Thallus brown to olive-brown, usually producing abundant, overlapping, flattened lobules; lower surface wrinkled; conidia rod-shaped..... **Melanelia panniformis**
- 35b. Thallus reddish brown or yellowish brown, without lobules; lower surface smooth, lower surface and rhizines dark brown or black; pycnidia sparse or very inconspicuous; conidia dumbbell-shaped; medulla K, PD-, KCPinkish-violet (perlatic acid); Also see *Xanthoparmelia* key; this species not recorded in AB at present..... **Xanthoparmelia loxodes**

MELANELIA Essl.

7 Species/subspecies recorded or high potential to be recorded in Alberta [May 2011 ACIMS list used; June 2011 NA list used]:

- agnata** (Nyl.) Thell Syn.: *Cetraria agnata* (Kooteneys, BC; NA, none; UBC)
- disjuncta** (Erichsen) Essl. Syns.: *Parmelia granulosa*, *P. disjuncta*, *P. denalii* (ACIMS, some in PMAE)
- hepatizon** (Ach.) Thell Syn.: *Cetraria hepatizon*, *C. polyschiza* (ACIMS, some in PMAE)
- panniformis** (Nyl.) Essl. Syn.: *Parmelia panniformis* (ACIMS, some in PMAE; Rare)
- sorediata** (Ach.) Goward & Ahti Syns.: *Parmelia sorediosa*, *P. sorediate* (ACIMS)
- stygia** (L.) Essl. Syn.: *Parmelia stygia* (ACIMS, some in PMAE)
- tominii** (Oxner) Essl. Syns.: *Parmelia substygia*, *P. saximontana* (ACIMS, some in PMAE)

DICHOTOMOUS KEY – see *Melanelia* Group Key

MELANELIXIA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch (Blanco et al. 2004)

6 Species/subspecies recorded or high potential to be recorded in Alberta [May 2011 ACIMS list used; June 2011 NA list used]:

- albertana** (Ahti) O. Blanco et al. Syns.: *Melanelia albertana*, *Parmelia albertana* (ACIMS, some in PMAE)
- fuliginosa** (Fr. ex Duby) O. Blanco et al. Syns.: *Melanelia fuliginosa*, *M. glabratula*, *Parmelia fuliginosa*, *P. glabratula* (ACIMS, some in PMAE)
- glabra** (Schaerer) O. Blanco et al. Syns.: *Melanelia glabra*, *Parmelia glabra* (Idaho; NA, some in

PMAE)
glabroides (Essl.) O. Blanco et al. Syns.: *Melanelia glabroides*, *Parmelia glabroides* (Montana; NA, none; UBC)
subargentifera (Nyl.) O. Blanco et al. Syns.: *Melanelia subargentifera*, *Parmelia subargentifera*, *P. conspurcata* (ACIMS, some in PMAE)
subaurifera (Nyl.) O. Blanco et al. Syns.: *Melanelia subaurifera*, *Parmelia subaurifera* (ACIMS, some in PMAE)

1 North American species not recorded or not likely to be recorded in Alberta:

villosella (Essl.) O. Blanco et al. Syns.: *Melanelia villosella*, *Parmelia villosella* (Arizona; NA, none; UBC, tentative ID of one specimen, discussed in NASH02)

DICHOTOMOUS KEY – see *Melanelia* Group Key

MELANOHALEA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch (Blanco et al. 2004)

11 Species/subspecies recorded or high potential to be recorded in Alberta [May 2011 ACIMS list used; June 2011 NA list used]:

elegantula (Zahlbr.) O. Blanco et al. Syns.: *Melanelia elegantula*, *M. incolorata*, *Parmelia elegantula* (ACIMS)
exasperata (De Not.) O. Blanco et al. Syns.: *Melanelia exasperata*, *Parmelia exasperata*, *P. aspera*, *P. aspidota* (Yukon, Montana, Idaho; NA, none; UBC)
exasperatula (Nyl.) O. Blanco et al. Syns.: *Melanelia exasperatula*, *Parmelia exasperatula* (ACIMS)
infumata (Nyl.) O. Blanco et al. Syns.: *Melanelia infumata*, *Parmelia infumata* (ACIMS)
multispora (A. Schneider) O. Blanco et al. Syns.: *Melanelia multispora*, *Parmelia multispora* (ACIMS)
olivacea (L.) O. Blanco et al. Syns.: *Melanelia olivacea*, *Parmelia olivacea* (ACIMS)
olivaceoides (Krog) O. Blanco et al. Syns.: *Melanelia olivaceoides*, *Parmelia olivaceoides* (ACIMS)
septentrionalis (Lynge) O. Blanco et al. Syns.: *Melanelia septentrionalis*, *Parmelia septentrionalis* (ACIMS)
subelegantula (Essl.) O. Blanco et al. Syns.: *Melanelia subelegantula*, *Parmelia subelegantula* (ACIMS)
subolivacea (Nyl.) O. Blanco et al. Syns.: *Melanelia subolivacea*, *Parmelia subolivacea* (ACIMS)
trabeculata (Ahti) O. Blanco et al. Syns.: *Melanelia trabeculata*, *Parmelia trabeculata* (ACIMS)

