Lichens of Western Victoria

This identification key allows the most common and conspicuous lichens of western Victoria to be identified to the level of genus. Some local species are illustrated and named. This guide does not completely cover alpine, sub-alpine and rainforest genera. Crustose and leprose lichens are not included in the key, although some examples are shown

Top L: *Physcia adscendens*, *Lecanora campestris* and *Xanthoria parietina*. http://www.geograph.org.uk/geophotos

Below L: *Parmotrema chinense.* *http://farm1.static.flickr.com*

Centre: *Cladonia* spp. amongst mosses. http://farm4.static.flickr.com

R: *Ramalina celastri.* http://www.sbs.utexas.edu

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LICHEN STRUCTURE

Lichens are a partnership between a fungus and an alga, as shown below. The algae produce food via photosynthesis, while the fungi absorb water and minerals. The lichen "body" is called a **thallus**, since it is not subdivided into stems and leaves. Similarly, seaweeds and many liverworts have **thalli**.

upper cortex (UC)

Tightly woven fungal threads. This can be pigmented and can become more transparent when the lichen is moist, admitting more light to the algal zone below. The lichen then becomes more greenish.

algal layer

Fungal threads connect with the algae. This is where photosynthesis occurs.

medulla

Loosely woven fungal threads. This layer may hold much moisture.

lower cortex (LC)

Tightly woven fungal threads. The lichen either attaches to a surface by this layer or it attaches via root-like **rhizines** (below).

http://www.bobklips.com

rhizine (attachment organ)

Cross-section through a lichen thallus (L)

Pixie Cups *Cladonia pyxidata* and Matchstick Lichen (British Soldiers) *Cladonia cristellata* have two parts to their structure: the **primary thallus**, which appears first, and stalked fruiting bodies (**podetia**). The primary thallus consists of scales (**squamules**). These may persist, 'ascend' the podetia (R) or disappear.

L: http://www.lichen.com and R: http://farm4.static.flickr.com

Asexual reproduction: shedding parts of the thallus

Apothecia and perithecia (R) involve sexual reproduction by the fungal partner, with spores being produced. There are also ways in which both fungal and algal partners can reproduce at the same time. **Soredia** are small bundles of fungi and algae that erupt onto the surface and wash or blow away. Areas with soredia are called **soralia**. **Isidia** are small projections (lumps, finger-like, etc.) that break off and disperse. They also contain both partners.

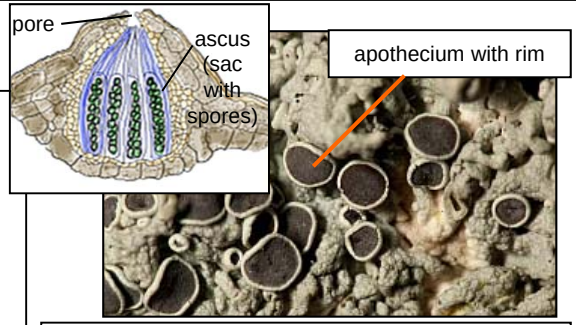
Above L (soredia): http://www.hiddenforest.co.nz

Below L (isidia): http://www.mushroomobserver.org

Fruiting bodies (R)

Here, the fungal partner in the lichen reproduces spores via fruiting bodies called **apothecia**. An **apothecium** can be various colours and shapes. In the two examples here, one is dark grey, flat and disc-like; the other is convex and red. Apothecia may have a margin similar in colour to the upper cortex (and contain algae) or may lack a margin.

Fruiting bodies can also be in the form of a chamber, with spores produced inside. These are called **perithecia** (inset, cross section).



Physcia stellaris. http://bobklips.com

Inset: perithecium XS. http://upload.wikimedia.org

Lichen growth forms

Gold-eye *Teloschistes chrysophthalmus*

http://www.societe.org.gg

FRUTICOSE LICHENS (erect or hanging lichens) >>p. 4

FOLIOSE LICHENS* (leafy, usually horizontal, lichens)

- Upper cortex (UC) grey to grey-green or blue-grey >>p. 6
- UC yellowish to yellowish-green >>p. 9
- UC orange to greenish-orange >>p. 11
- UC green >>p. 12
- UC olive-green to brownish or black-brown >>p. 13

Rock-shield *Xanthoparmelia* sp.

http://lh5..ggpht.com

Script Lichen *Graphis* sp.

SQUAMULOSE lichens (scaly lichens, scattered or crowded; a sub-category of foliose lichens) >>p. 15

CRUSTOSE (crust-like) AND LEPROSE (powdery) LICHENS >>p. 16

Sidewalk Firedot *Caloplaca* sp.

Mixed crustose lichens on rock

Above L: http://www.irishlichens.ie, R: http://www.adventurist.net

Below: http://upload.wikimedia.org

On the following pages, the identification boxes contain the following information:

COMMON NAME

SCIENTIFIC NAME (Generic name)

Substrates (types of surfaces) colonised:

b = bark, w = wood, r = rock, s = soil.

Gold-dust Lichen *Chrysothrix candelaris*

http://www.rbgsyd.nsw.gov.au

Fruticose lichens 1

*Fruiting body (podetium) is a toadstool,
*Primary thallus is a granular whitish to greenish crust (on damp soil, leaf litter or rock)

Cap of toadstool is beret-shaped and brownish*. No gills present

*If the cap is whitish or pink to orange, the lichen is *Dibaeis* sp.

O. chromacea

Cap pale brown to yellow, funnel-shaped, with gills visible beneath

Beret Lichen
Baeomyces
Damp soil or rock
http://upload.wikimedia.org

Yellow Navel
Omphalina
Soil
http://farm1.static.flickr.com

Foam or Snow Lichen
Stereocaulon
Siliceous r (esp. montane), peat
http://farm1.static.flickr.com

From p.3

*Stem solid, often white/pale grey
*'Warty' stems with numerous lumps (**cephalodia**) containing cyanobacteria ("blue-green algae")
*Granular primary thallus

S. ramulosum

apothecia brown to black or absent

*Fruiting bodies (podetia or pseudopodetia) are not toadstool-like
*Shrubby, much-branched thallus
*Primary thallus is usually not evident (often short-lived)

*Stems hollow & perforated
*Surface is glossy
*Insignificant primary thallus

Coral Lichen C. retipora. The dark dots are apothecia.

C. aggregata -fertile stems with apothecia and pores

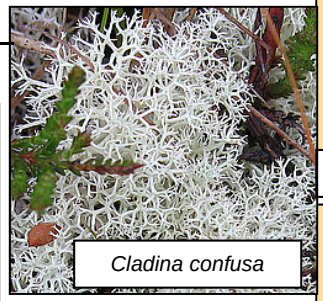
C. aggregata –sterile stems. (Fertile stems are broader.)

Coral Lichens & allies:
Glossy Shrub-lichens
Cladia
Soil, peat

L: http://www.farm1.static.flickr.com
Centre: www.fieldmuseum.org
R: http://www.rbgsyd.nsw.gov.au

no apothecia

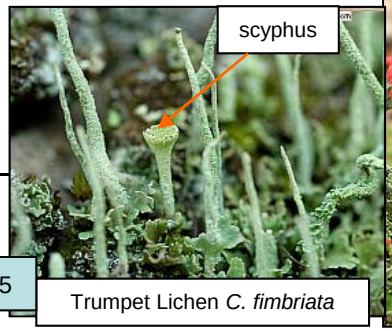
*Stems hollow, not (or rarely) perforated
*Surface is dull, 'cob-webby'



Cladina confusa

'Reindeer Lichens'
Cladina
(Sometimes placed in *Cladonia*.)
Organic & inorganic acidic soils
http://farm1.static.flickr.com

*Podetia are cup-like (**scyphi**), finger-like, in tiers or branched, with apothecia on tips
*Unbranched to moderately branched
*Primary thallus of leafy scales (squamules, p. 2), granules or crust



Trumpet Lichen *C. fimbriata*

British Soldiers *Cladonia cristellata*

apothecia red or brown

Cladonias, Pixie-cups, British Soldiers (etc.)
Cladonia
w/b, s, peat (open, acidic sites)

L: http://www.floralimages.co.uk
R: http://www.upload.wikimedia.org

Tufted, often on bark or wood –> p.5

Fruticose lichens 2

Greenish-grey to yellowish-grey, occasionally somewhat reddish

- *Flattened to inflated (puffed up) lobes
- *Without many fine hair-like branchlets
- *Cartilage-like (tough and leathery) when dry
- *No central tough core in branches

R. fastigiata

R. celastri

Cartilage Lichen, Gristle

Ramalina

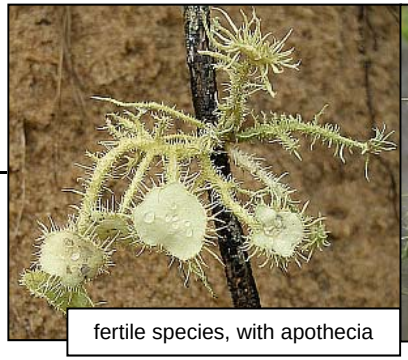
b/w (especially if acidic), r

L: http://toyen.uio.no

R: http://www.sbs.utexas.edu

From P. 4

- *Stems simple or elaborately branched, cylindrical or slightly flattened
- *Often with many fine hair-like branchlets
- *The centre of each stem has a tough or elastic white core



fertile species, with apothecia

sterile species (no cups)

Beard (Lichen), Old Man's Beard

Usnea

b/w (especially if acidic), r

L: http://farm4.ststic.flickr.com

R: http://www.rbgsyd.nsw.gov.au

Greenish-orange to orange or yellowish

- *Richly branched
- *Branches often bearing branchlets, fibrils or cilia
- *Apothecial margins with fine branchlets
- *Fertile (with stalked or unstalked apothecia) or sterile (lacking in apothecia)

Golden Hair *T. flavicans*

Gold-eye *T. chrysophthalmus*

Golden Eye, Gold-eye, Golden Hair

Teloschistes

w/b, r, mosses

L: http://eol.org

R: http://www.rbgsyd.nsw.gov.au

Grey to grey-green foliose lichens 1

From P. 3

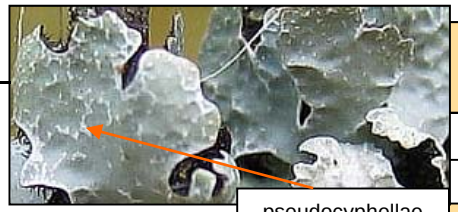
Lower cortex (LC) black or dark brown

*Solid (not hollow) thallus and lobes

*Conspicuous holes, cracks, pores or spots on the upper cortex

*UC with elongated white cracks (**pseudocyphellae**)

*No marginal cilia; LC black

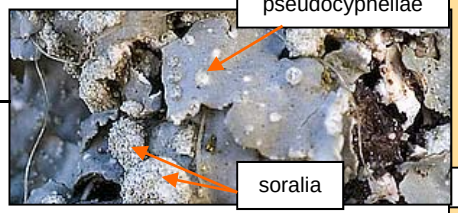


Shield Lichen, Crottle
Parmelia
b/w, r
http://www.korseby.net

*UC with white dot-like pores (**pseudocyphellae**). On lobe margins these combine into powdery ridges (**soralia**). [See P. 8]

*No marginal cilia

*LC white to pale brown



Spotted Shield Lichen, Speckleback
Punctelia
(Some spp.) b/w.r
http://farm4.static.flickr.com

*UC with rows of fine spots (**maculae**); these join to form a network of fine cracks at maturity

*Broad lobes with long black marginal 'hairs' (cilia)

*LC glossy black with brown edges

Cracked Ruffle or Reticulate Shield Lichen
Rimelia
(Recent studies place *Rimelia* within *Parmotrema*.) b/w, r
http://californialichens.org

See P. 7

*Solid thallus and lobes

*UC lacking conspicuous pseudocyphellae and maculae as above (but with or without soredia)

Port-hole or Treeflute Lichen
Menegazzia
b/w
http://homepage1.nifty.com

*Thallus and lobes inflated and hollow, with blunt tips, adnate

*Upper surface perforated by conspicuous **pores** (most spp.)

*LC glossy black; no rhizines. Attaches via lower cortex.

Lower cortex (LC) whitish or pale to brown, or yellow-brown

*Thallus and lobes usually inflated & hollow (occasionally solid), slender or broad, overlapping. These often extend out from the surface with their ends horizontal/upturned. (Older areas of some species have extensive soredia.)

*UC: no perforations; with irregular black markings

*LC glossy black, edged brown, wrinkled; no rhizines. (Attaches to surface via the corrugated lower cortex.)

Tube Lichen, Bone
Hypogymnia
(Some spp.) b/w, r, s
L: http://www.alm.-neu.de
R: http://www.korseby.net

See P. 8

Grey to grey-green foliose lichens 2

*Lobes broad (19-30 mm wide) and rounded, but may be notched

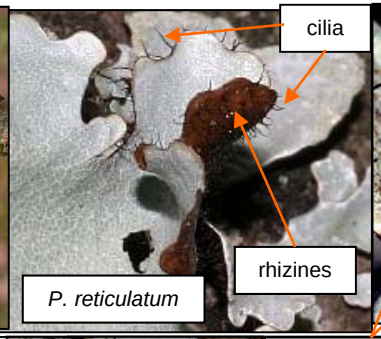
*Lichen typically frilly or ruffle-like, with lobes raised and with sinuate (wavy) edges

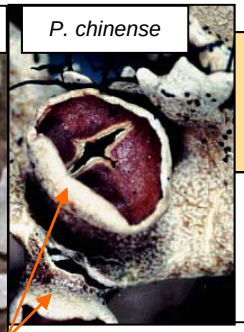
*LC black with wide (several mm) brown marginal zone that is naked (without rhizines)

*Apothecia stalked

Lobes often with (few to many) cilia, but cilia are absent in a few species

Apothecia are often perforated





Ruffle Lichen

Parmotrema

b/w, r

L: http://blogimages.seniorennet.be

Ctr: http://www.uklichens.co.uk

R: http://upload.wikimedia.com

*Lobes narrow (1-6 mm wide), tips rounded or “cut off” (truncated)

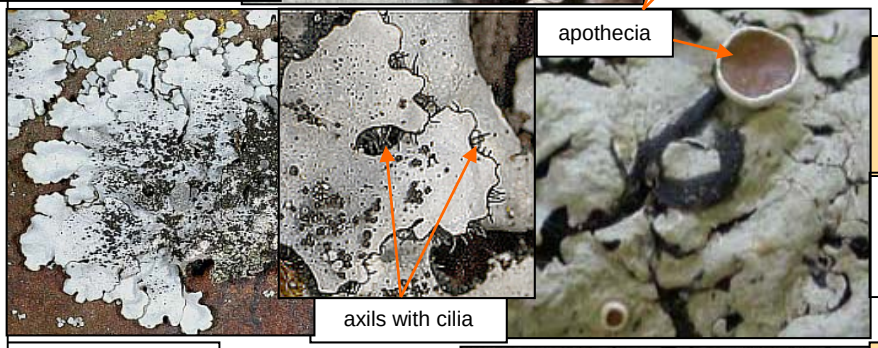
*Lichen ~ flat or (in *Hypotrachina*) not strongly frilly

*LC black (with narrow naked brown margins in some *Parmelina* spp.)

*Apothecia stalkless or nearly so

*Lobes flat and irregular, but tips are rounded, not truncated

*Usually with cilia (sparse to dense, often short) found mainly in lobe axils, which take various shapes



Parmelina Lichen

Parmelina

b/w, rarely r

L: http://www.britishlichens.co.uk

Ctr: http://farm4.static.flickr.com

R: http://www.uklichens.co.uk

*Lobes elongate, branched, flat or not

*Lobe tips truncate (“cut off”); tips not rounded

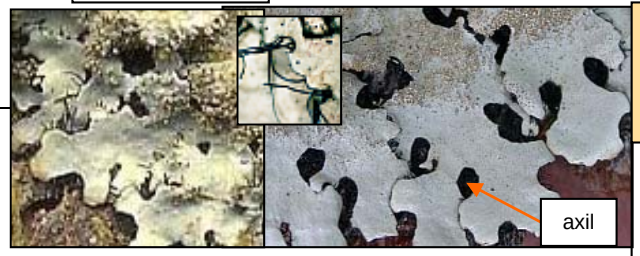
*+/- cilia

*Axils rounded

*With cilia on lobe margins

*Rhizines simple

*Lobes flat



Flat-shield Lichen

Parmelinopsis

b/w, rarely r

L: http:www.ucm.es

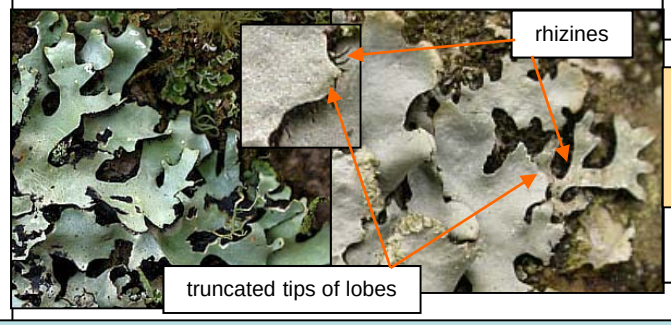
R: http://content14.eol.org

Inset (axils with cilia): http://upload.wikimedia.org

*Axils of various shapes

*No cilia, but branched rhizines extend to lobe margins

*Lobes sinuate (wavy) or arched, not adnate



Loop Lichen

Hypotrachyna

(Some spp.) b/w, r

L: http://www.ut.ee

R/inset: http://www.nhm.uio.no

From P. 6

*Otherwise.

*Most lobes very narrow (0.3-1 mm wide)

*Thallus not frilly, usually rather round and wreath-like: lobes branch regularly

*LC black with numerous rhizines

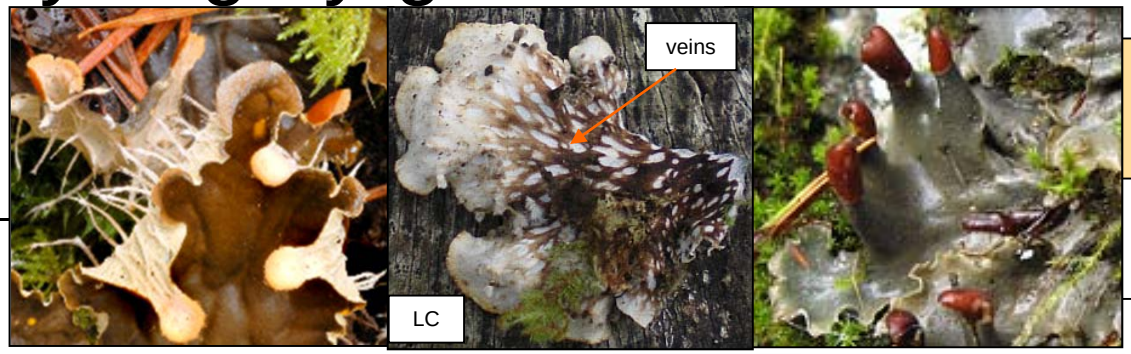
Phaeophyscia or *Hyperphyscia* spp. with a relatively grey UC may key out here. See P. 13.

Grey to grey-green foliose lichens 3

*Underside (LC) is whitish or brownish

*LC with prominent brown veins bearing bushy rhizines

*Apothecia brown and saddle-shaped, held above the lichen on the tips of enfolding lobes



Dog Lichen, Pelt

Peltigera

b/w, s, r, moss

L: http://www.paulnoll.com/Oregon/

Centre: http://2.bp.blogspot.com

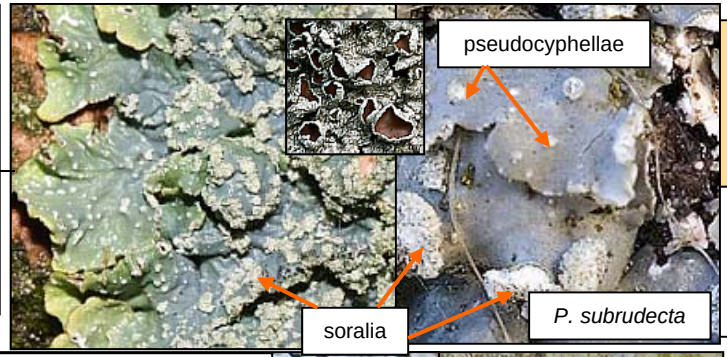
R: http://farm1.static.flickr.com

From P. 6

*LC pale blue-grey or pale brown to yellowish-brown (tinged green when damp), with sparse rhizines

*UC with round, dot-like patches (pseudocyphellae), aggregated into powdery soralia on lobe edges

*If fertile, with brown to red-brown apothecia with greyish rims



Spotted Shield Lichen, Speckleback

Punctelia

(Some spp.) b/w, r

L: http://farm2.static.flickr.com

R: http://farm4.static.flickr.com

Inset (detail of apothecia): http://farm2.static.flickr.com

*LC pale

*LC lacks prominent brown veins or bushy rhizines

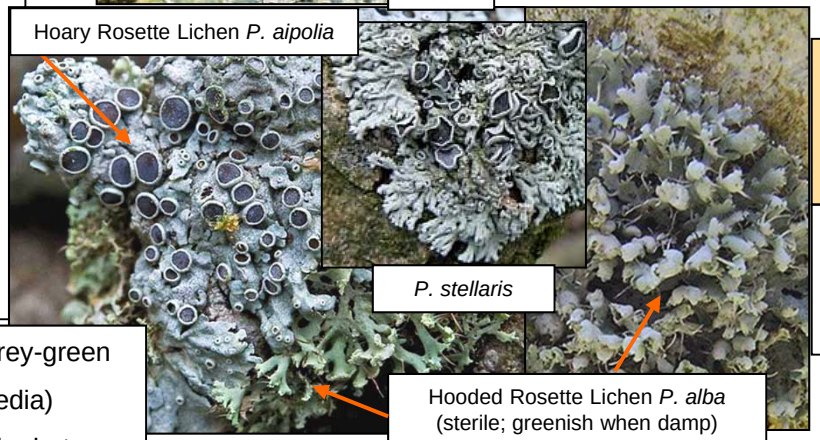
*Rhizines are simple (i.e. unbranched) or absent

*Apothecia disc-like, sessile (stalkless) or short-stalked; not as above

*LC white to pale grey or brownish-grey, with few to many rhizines

*UC flat/convex, no dark lobe edges, with/without soredia, but no pseudocyphellae

*If fertile, with black apothecia (often with a whitish surface bloom), rims grey



Rosette Lichen

Physcia

b/w (especially if alkaline), less often on rocks

L: http://1.bp.blogspot.com

R: http://upload.wikimedia.org

Inset (Starry Rosette Lichen): http://content10.eol.com

*LC pale brown, UC grey to grey-green

*No pseudocyphellae (+/- soredia)

*Dark-edged flat lobes, irregular but rounded

*Apothecia brown, rims greyish

b/w, rarely r

See *Parmelina*, p. 7

Yellowish to yellowish-green foliose lichens 1

From P. 3

*LC black, brown or tan, with or without pale margins

*Lobe margins: undersides with or without a paler (naked) marginal zone

*Lobe tips rounded

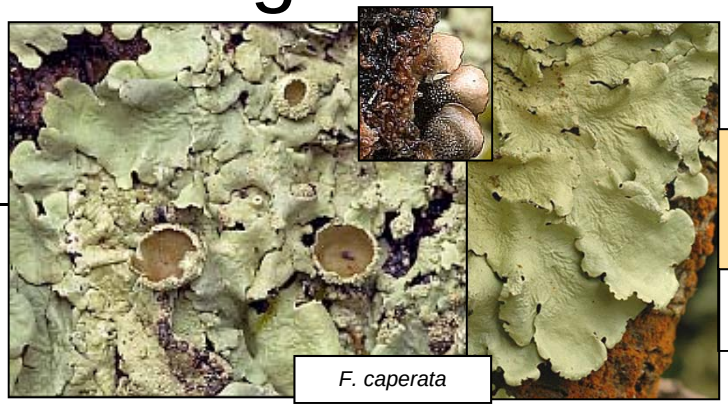
*Margins of lobes lack cilia; axils of various shapes

*On bark or wood

*Lobes broadly rounded & adnate (attached to the surface)

*Lobes not sinuate (wavy)

*LC black with lobes having pale margins (see inset)



F. caperata

Greenshield Lichen

Flavoparmelia

b/w, occasionally rock

L/inset: http://farm4.static.flickr.com

R: http://britishlichens.co.uk

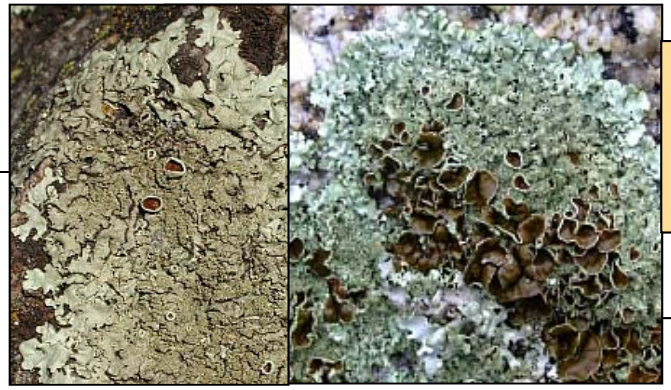
*On rocks or soil

*Very diverse; some almost crustose

*Lobes appressed or not; not wavy

*Older (central) parts of UC darken with age

*LC: black, brown or pale tan; no pale margin



Rock-shield, Rockfrog

Xanthoparmelia

r, s, concrete, bitumen. Soil-dwelling specimens are sensitive to excessive trampling and recover very slowly.

L: http://www.nhm.uio.no

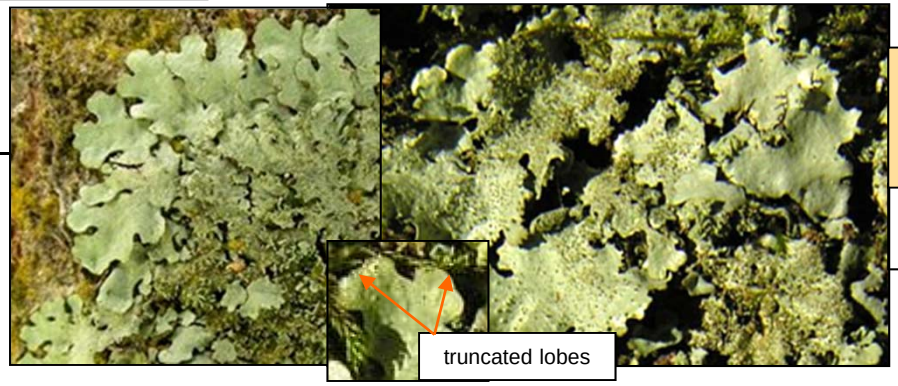
R: http://aphotofungi.com

*LC black

*Lobe margins: the undersides lack a pale or naked zone

*Tips of lobes are held flat and are truncate ("cut off")

*Lobes are often elongated, with cilia (hairs) on margins & rounded axils



truncated lobes

Flat-shield Lichen

Parmelinopsis

(Some spp.) Usually on bark. b/w, r

L: http://content14.eol.org

R/inset: http://www.britishlichens.co.uk

*LC off-white to black

*No pale marginal zone

*Lobes not truncated or wavy

See P. 10

Yellowish to yellowish-green foliose lichens 2

*UC yellow-green to yellow-brown, dull to slightly shiny

*Lobes 6-12 mm wide, frilly, thin and flattened to convex, tending to ascend; margins recurved (bend backwards)

*Lobes don't tend to overlap extensively

*Lower surface felt-like, lacks a cortex, off-white to blackish with a network of dark veins and a dense mat of rhizines

H. muelleri

Ground-frill Lichen

Heterodea

Loosely attached to soil (hard-setting soil in particular), as well as leaf litter. Occasionally on logs or trunk bases. Often in open woodlands.

http://www.rbgsyd.nsw.gov.au

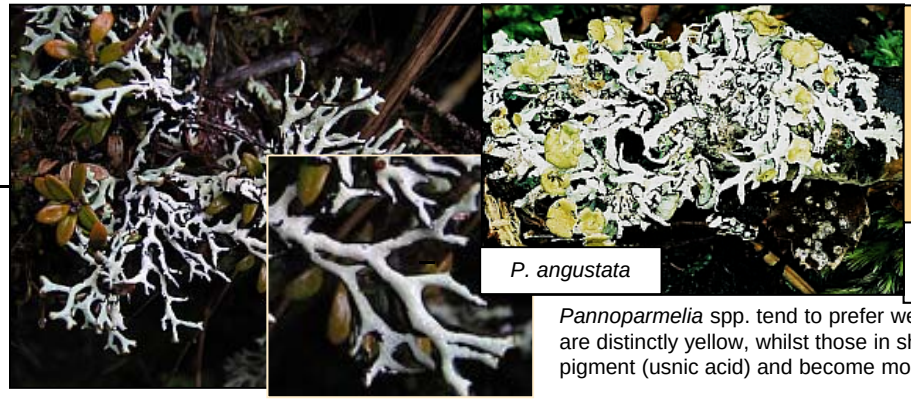
From P. 9

*UC greyish-yellow or yellow-green to yellow, not shiny

*Lobes 0.5-2 mm wide, thick, spongy and elongated (finger-like), forking regularly and tending to have dark margins, not recurved. Lobes are often constricted at branching points.

*Lobes overlap extensively

*LC is matted below, with spongy clumps of dark hyphae; no veins. The LC between the clumps is white or yellow (shiny or matt) with dark rhizines.



P. angustata

Spongy Fingers

Pannoparmelia

Often loosely attached. b/w, including twigs and branches in rainforest (*P. angustata*), also (*P. wilsonii*) logs in dry eucalypt forest.

L: http://farm1.static.flickr.com

R: http://hiddenforest.co.nz

Pannoparmelia spp. tend to prefer well-lit sites. Individuals in full sun are distinctly yellow, whilst those in shade lose much of their yellow pigment (usnic acid) and become more greyish (as shown here).

*UC pale greenish-yellow if dry, greener and often shiny if wet. Rosettes 1-4 cm across.

*Lobes elongate, convex and narrow (1-3 mm wide), forking but remaining separate. Strongly curved inwards into balls when dry, but lobes flatten out when moist (as in photo to right).

*LC wrinkled, pale yellow, naked (no rhizines)

C. semiviridis

Curl-ups, Tumbling or Vagrant Lichen

Chondropsis

Sometimes placed in *Parmeliopsis*

Loose on soil in dry areas and in sub-alpine sites. Wind-dispersed.

Both: http://www.anbg.gov.au

Orange to greenish-orange foliose lichens

From p. 3

*Foliose, varies from loosely attached to closely appressed, with sparse rhizines

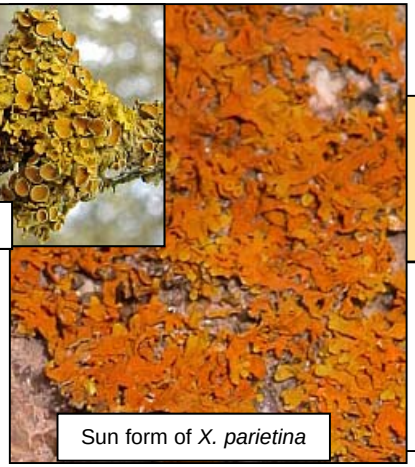
*Lobes usually 1 mm or more wide, may be appressed or not

*Apothecia not fringed

*LC white to pale brown

Shade form of *X. parietina*

On twig



Sun form of *X. parietina*

Sunburst Lichen

Xanthoria

b/w (especially alkaline surfaces), also rocks, concrete

L: http://wildaboutbritain.co.uk

R: www.unige.ch/sciences/

Inset: http://naturspaziergang.de

See also the title page (P. 1) of this key.

*Foliose/fruticose.

This genus is mostly fruticose, although *T. chrysophthalmus* can take a foliose form, with LC yellow to orange and UC white to yellow (veined & wrinkled)

*Apothecia with a fringe of fine branches

H. chrysophthalmus

Golden Eye or Gold-eye

Teloschistes

w/b, r, mosses

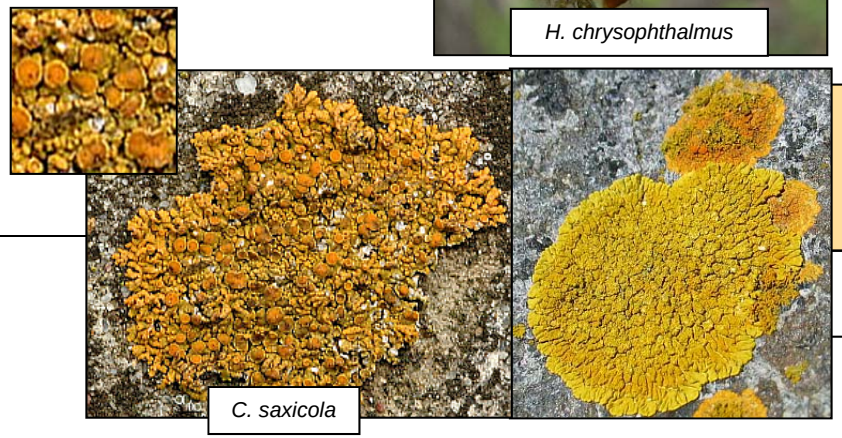
http://rbgsyd.nsw.gov.au

*Crustose/sub-foliose, whole lichen pressed closely to surface; no rhizines

*Lobes usually less than 1 mm wide, appressed

*Apothecia not fringed

*Lacks a LC; attached to surface by hyphae from the (usually white) medulla



C. saxicola

Firedot or Orange Lichen

Caloplaca

Rocks, especially alkaline ones such as limestone, also concrete

L/inset: http://upload.wikimedia.org

R: http://www.racerocks.com

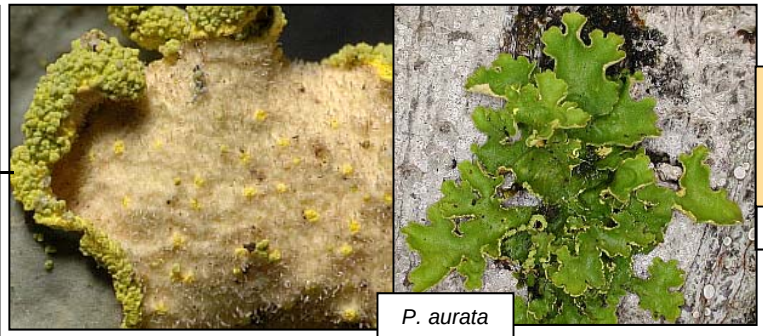
Green foliose lichens

*Foliose; white or yellow pores in LC

*Often large and luxuriantly leafy, with ascending lobes

(Typically found in wetter, more sheltered forests)

*Pseudocyphellae (pores) on underside (LC) are flat or plug-like & raised above the surface; not rimmed
*UC green to green-brown
*If soralia are present, they have white or yellow soredia



P. aurata

Specklebelly

Pseudocyphellaria

b/w, r. bryophytes, leaf litter

Both: http://www.stridvall.se

*Cyphellae (pores) are crater-like: sunken and with a distinct ring
*UC green to brown to grey-brown
*If soralia are present, their soredia are white.

Moon (Lichen)

Sticta

w/b, also r,s

http://gis.nacse.org

From P. 3

*Foliose; no white or yellow pores in LC

*Usually closely adnate (attached to surface) or appressed, with lobes that spread and fork

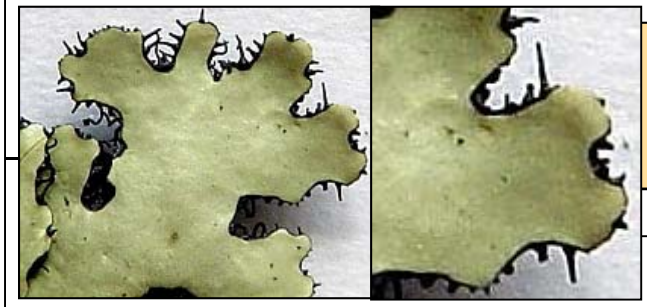
*Lobes solid, flat, often appressed to surface

*Upper surface not perforated

*UC without soredia

*LC black or pale to dark brown, with rhizines

*Margins of lobes with hollow **bulbate cilia** (thickened cilia with a swollen base)



Green Peg-lichen

Relicina

Mostly on tree canopy branches.
b/w, r

Both: http://www.ucm.es

*Squamulose (thallus made up of leafy scales, crowded or scattered)

See P. 13

*Lobes inflated, hollow, with blunt tips; adnate
*Upper surface usually perforated (with pores)
*UC with/without soredia
*LC glossy black; no rhizines (attaches via LC)
*No bulbate cilia

Port-hole or Treeflute Lichen

Menegazzia

(Some species.) b/w

http://www.uklichens.co.uk

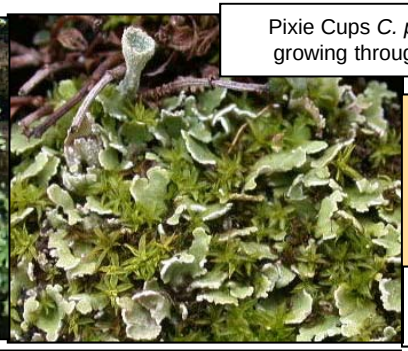
Squamulose lichens

*Squamules leafy, whitish or silvery below, attached on one side to the substrate

*Apothecia often convex, raised on a podetium (stalk or cup) if present

Some *Cladonia* species do not produce podetia, especially in very dry conditions, and may only be represented by the leafy scales (squamules).

Cladonia sp.



Pixie Cups *C. pyxidata*, growing through moss

Cladonias, Pixie-cups, British Soldiers

Cladonia

w/b, s, peat (open, acidic sites)

L: http://www.glaucus.org.uk

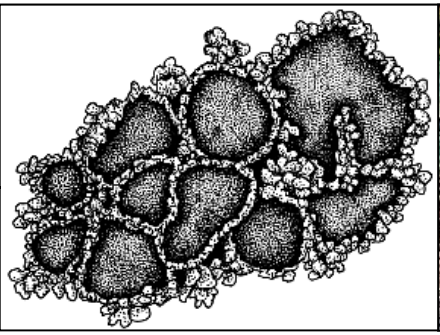
R: http://www.nature-diary.co.uk

From P. 3

*Squamules flat or ascending, closely grouped or scattered

*Various grey, green and yellow-brown to yellowish colours

*Apothecia have a rough lumpy margin



Bowl Lichen

Psoroma

On bark, moss and litter

L: http://www.fs.fed.us/r6/aq/lichen

R: http://www.hiddenforest.co.nz

*Squamules leafy or not, but not white or silvery below

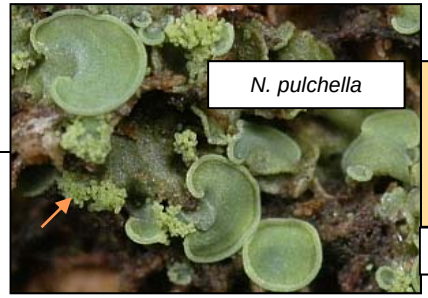
* Apothecia are cup-like, not on a podetium, not convex

*Tiny (1-2 (-3) mm wide) green ear-like squamules with raised margins

*Attached on one side to mosses or other lichens that grow on bark or rock

*Sometimes with green soredia (arrow)

*No apothecia



N. pulchella

Clam Lichen, Elf-ears

Normandina

On mosses or other lichens growing on bark or rock

http://www.uklichens.co.uk

*Otherwise. (Not covered in this key.)

Most other squamulose lichens have tiny scales, up to a few mm across. Apothecia or perithecia may be present.

Many (e.g. *Toninia*) have flat or warty scales and may be green, yellow-green, greyish or other colours. They grow in alpine, sheltered or damp habitats, usually on bark or rock.

Others (e.g. *Catapyrenium*, *Dermatocarpon*) grow on dry soils. Dry soil lichens tend to be brownish to grey and roughly circular, perhaps with a raised margin and often attached by a central cord.

Bruised Lichen *Toninia aromatica*
http://www.uklichens.co.uk

Earth Lichen *Catapyrenium* sp.
http://www.britishlichens.co.uk

Stippleback *Dermatocarpon*
http://farm4.static.flickr.com

Olive-green to brownish foliose lichens 1

*Most lobes narrow (0.3-1 mm wide)

*Lobes not with pale margins below

*LC: no pores

*Not leathery or gelatinous

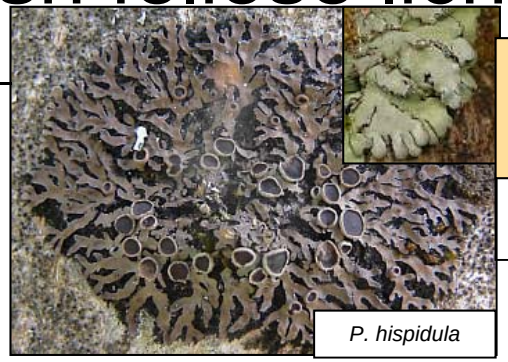
*Loosely attached, with very narrow lobes

*Thallus tends to be rather circular and wreath-like, as the lobes spread and branch relatively evenly

*UC grey or grey-brown to brown (greenish if moist)

*LC brown or black, with abundant dark rhizines that project beyond the margins of the lobes (and so resemble a shadow)

*Apothecia (fruiting bodies) brown or black



P. hispidula

Wreath or Shadow Lichen

Phaeophyscia

b/w, occasionally r

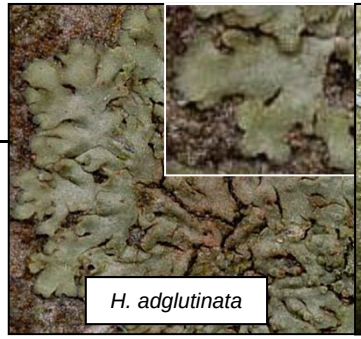
Main: http://thump01.pbase.com

Inset: http://www.uklichens.co.uk

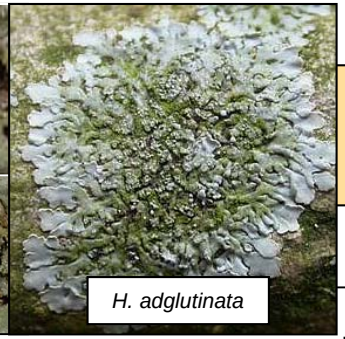
From P. 4

*UC grey or grey-brown to brown, tinged greenish when moist

*Similar to *Phaeophyscia*, but closely appressed to surface, no 'shadow' of projecting rhizines; rhizines sparse



H. adglutinata



H. adglutinata

Shadowcrust Lichen

Hyperphyscia

b/w, rarely on r (alkaline), brick walls

L: http://britishlichens.co.uk

R: http://blogimages.seniorennet.be

*Most lobes 1-6 mm wide, OR

*Lobes less than 1 mm wide, and with paler margins below or UC of lobes paler than thallus

*LC: no pores

*Not leathery or gelatinous

*On bark or wood (rare on rocks)

*LC pale brown or tan to black, paler margins

*UC brown to brownish-black

*Lobes short and rounded, flat to relatively convex, 0.5-4 mm wide

*Lobes are branching and often imbricate (overlap extensively, like tiles on a roof), sometimes discrete

Brown-shield, Toad or Camouflage Lichen

Melanelia

b/w (often twigs), rarely on rocks or moss; loosely to strongly attached

http://www.britishlichens.co.uk

*Not as above

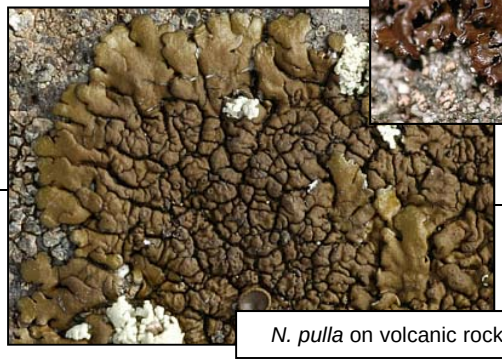
*Prominent yellow or white pores on LC OR uniformly dark, gelatinous/leathery

*On rocks, soil

*LC ivory or pale tan to black

*UC often rough and wrinkled towards centre, brown or olive-brown to brown or grey-black

*Lobes flat to convex, short and rounded, (UC) paler, may be glossy, 0.5-6 mm wide, overlap a little



N. pulla on volcanic rock

Camouflage Lichen

Neofuscelia

(Recent genetic studies place *Neofuscelia* in *Xanthoparmelia*)

r (esp. siliceous/acidic: granite, quartz, gneiss, slate), s, bitumen

http://www.stridvall.se/lichens/

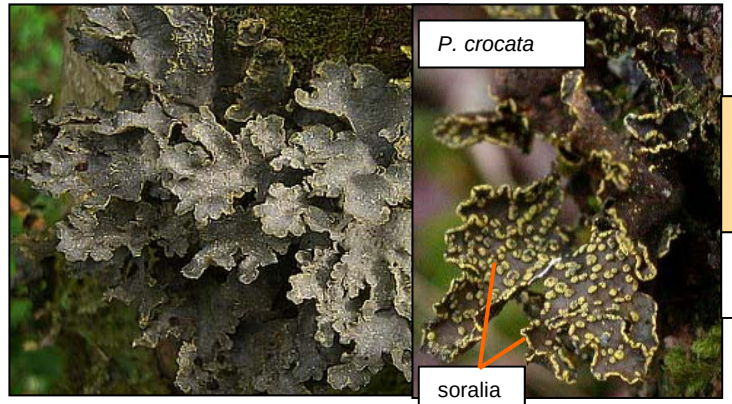
See P. 15

Olive green to brownish foliose lichens 2

*Pores (**pseudocyphellae**) on underside (LC) are flat or plug-like & raised above the surface; not rimmed (see p. 12), yellow or white

*UC green to brown to grey-brown.

*Soralia or soredia, if present, are yellow or white



Specklebelly

Pseudocyphellaria

b/w, r. bryophytes, leaf litter

L: (UC): http://farm4.static.flickr.com

R: (UC): http://www.nature-diary.co.uk/nn-images/

*LC is dotted with white or yellow pores

*Pores (**cyphellae**) in LC are crater-like: sunken and with a distinct ring, white

*UC green to brown to grey-brown

*Soralia or soredia, if present, are white.

Moon (Lichen)

Sticta

Often on w/b, also r, s

L: Cyphellae (LC): http://www.nature-diary.co.uk

R: (UC): http://upload.wikimedia.org

From P. 10

*LC is not dotted with pores

Gelatinous Lichens:

*Dark, gel-like. May be swollen when wet; shrunken and leathery or parchment-like when dry. Apothecia are reddish-brown to dark brown.

*Best identified using microscopic features such as spore details and cortex structure.

*UC lacks rhizines

*Swells markedly when wet

**Jelly Lichen or Tarpaper

Collema

w/b and r

http://www.biologie.uni-hamburg.de

*UC with grey rhizines

*Scarcely swells when wet; thicker and more wrinkled than *Collema*.

**Vinyl or Skin Lichen

Leptogium

w/b, also r, mosses, s

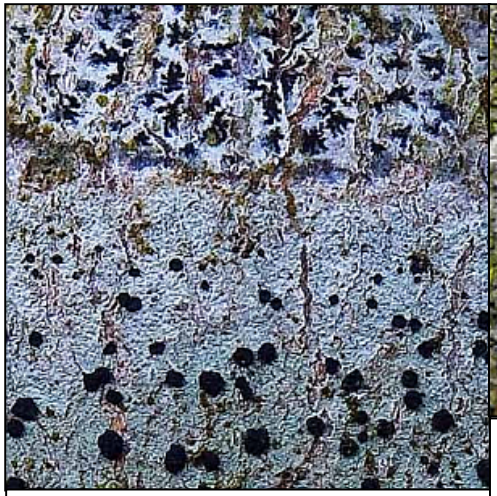
http://lh6..ggpht.com

*UC with prominent veins & shaggy rhizines

See Dog Lichens or Pelts *Peltigera* (p. 8).

Crustose and leprose lichens

There are very many crustose lichens. Often, their identification involves chemical tests and microscopic examination and is best left to experts. However, a selection of some of the more recognisable local crustose lichens is shown on this page.



These twig-dwellers have whitish thalli and black apothecia without a margin. Two species are seen: Asterisk Lichen *Arthonia* sp. (top) with irregular squiggle-like apothecia and Rim-lichen *Lecanora* sp. (below) with round apothecia. http://1.blogspot.com

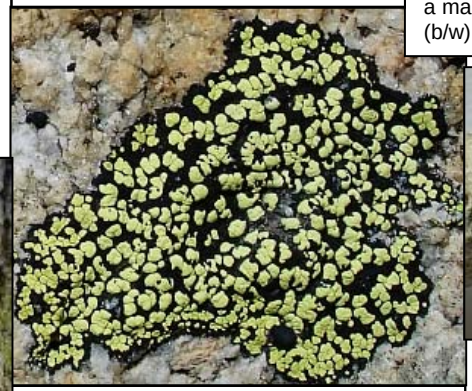
Rim-lichen *Lecanora campestris* has light chestnut to dark-brown apothecia with white rims and a whitish thallus. Outer areas are smooth, while the central older parts of the lichen are contorted, with **areoles** (plates) and many apothecia. *L. campestris* prefers calcareous rocks and nutrient-enriched bark, wood and rocks. http://www.irishlichens.ie

Rim-lichen *Lecanora chlarotera* has brownish apothecia with a white margin and a whitish thallus. (b/w). It prefers limestone, alkaline bark (e.g. ash trees, some fence-posts) and other alkaline surfaces. http://1.blogspot.com

Lecidella elaeochroma, with a pale greenish thallus. The black apothecia lack a margin and have a whitish surface bloom. (b/w) http://1.bp.blogspot.com

Dust Lichen *Lepraria incana*, a grey leprose lichen, is often seen on the relatively acidic bark of conifers. http://www.commanster.eu

Gold Dust Lichen *Chrysothrix* (*Lepraria) candelaris* is a powdery lemon yellow leprose lichen of shaded bark and wood, particularly on rough patches that hold extra moisture or on other areas receiving additional moisture. http://cms.ifm.liu.se



Yellow Map Lichen *Rhizocarpon geographicum* is a bright yellow and black crustose lichen with conspicuous **areoles** (plates) and black apothecia. It is found on siliceous (quartz-rich) rocks. Its known rate of growth enables rock surfaces to be dated. http://3.bp.blogspot.com

Saucer or Crab's-eye Lichen *Ochrolechia* forms a whitish crust with stalkless thick-walled apothecia, usually pinkish to tan in the centre, with a white surface bloom. On bark or rock. http://content10.eol.org

NOT LICHENS!

http://www.algaebase.org

Main: http://nagrzyby.pl, top: http://homepage2.nifty.com

Algae that live on land, exposed to the air, are called **sub-aerial algae**. These algae are most common where humidity and moisture persist over long periods, such as near waterfalls, in forests and fern gullies. Most of these algae have flat, disc-like cells or branching threads. Their colours vary according to the balance of pigments they contain. Amongst the Green Algae, those with abundant **chlorophylls** (a and b) are bright green. In others the green pigments are overwhelmed by warm-coloured accessory pigments known as **carotenoids** (which can be orange, yellow, red or brown).

Sub-aerial algae can absorb and make use of water vapour. Most, especially the cyanobacteria (the so-called "blue-green algae") and microscopic diatoms, tend to be surrounded by water-absorbing and retaining envelopes made of gels and other substances. These materials can make wet rocks and footpaths slippery. Sub-aerial algae usually form thick-walled resistant spores (akinetes, etc.) when they desiccate.

Over winter many tree branches and poles develop a green film composed of sub-aerial algae. The power pole above (L) has a film of *Desmococcus olivaceus* (= *D. viridis*), one of the most common species. Other common sub-aerial greens include *Chlorella*, *Chlorococcum*, *Neochloris* and *Trebouxia*.

Red Rust or Orange Velvet (*Trentepohlia* sp., top R) is a "green" alga in which orange β carotenoids dominate. These protect the chlorophyll from strong sunlight. *Trentepohlia* gives a rusty colour to the shaded side of power poles and the trunks of some trees (e.g. pines, Cherry Ballart, some wattles). Cyanobacteria and *Trentepohlia* and its allies seem to prefer more well-lit situations than the green algae. Sub-aerial green and blue-green algae may be enveloped by fungal threads growing nearby and incorporated into lichens.

Lichen Classification

Foliose and squamulose genera are shown in black. Fruticose genera are shown in blue, or in maroon if they are lichenised (basidiomycete) toadstools. This list does not include crustose or leprose genera.

Family Baeomycetaceae
Baeomyces

Family Cladiaceae*
Cladia

Family Cladoniaceae
Cladina
Cladonia
Heterodea

Family Collemataceae
Collema
Leptogium

Family Hypogymniaceae
Hypogymnia
Menegazzia

Family Lobariaceae
Pseudocyphellaria
Sticta

Family Pannariaceae
Psoroma
Psoromidium

Family Parmeliaceae
Chondropsis (Parmeliopsis)
Flavoparmelia
Hypotrachyna
Melanelia
Neofuscelia
Pannoparmelia
Parmelia
Parmelina
Parmelinopsis
Parmotrema
Punctelia
Relicina
Rimelia
Xanthoparmelia

Family Peltigeraceae
Peltigera

Family Physciaceae
Hyperphyscia
Phaeophyscia
Physcia

Family Ramalinaceae
Ramalina

Family Stereocaulaceae**
Stereocaulon

Family Usneaceae
Usnea

Family Teloschistaceae
Caloplaca
Teloschistes
Xanthoria

Family Tricholomataceae
Omphalina

Family Verrucariaceae
Normandina

*Recent molecular studies suggest that *Cladia* should be included in the Family Cladoniaceae.
**Further studies are needed to see whether *Stereocaulon* should also join this family.

Glossary

Adnate. Closely attached to a substrate. (P. 6.) (Compare with **appressed**.)

Apothecium (plural: **apothecia**). A sexual fruiting body of a lichen that produces spores of the fungal partner on an exposed surface. The spores are in sacs (asci). (P. 2) Apothecia can be flat, concave or convex; rimless or rimmed; round/compact or elongated (See *Graphis*, P. 3.)

Appressed. Closely pressed to a surface. (See *Hyperphyscia*, P. 14.) (Compare with **adnate**.)

Areola or **areole** (pl: **areolae**, adj: **areolate**). A well defined section (plate or chink) of a lichen thallus, separated from neighbouring areolae by distinct crevices. (Areolate: divided into areolae.) (Examples: see P. 16.)

Ascus (pl: **asci**). Sac-like body containing (usually 8) sexually produced spores. Large numbers of asci line the fertile surface of fruiting bodies. (P. 2.)

Axil. The gap between neighbouring lobes of a thallus. (See *Parmelina*, P. 7.)

Cephalodium (pl: **cephalodia**). Lump or 'wart' on a lichen that contains colonies of nitrogen-fixing cyanobacteria (blue-green bacteria). (See *Stereocaulon*, P. 4.)

Cilium (pl: **cilia**, adj. **ciliate**). Hair-like structure, typically on lobe margins. (See *Rimelia*, P. 6.)

Cortex (pl: **cortices**). Outer layers of a lichen, constructed of closely woven hyphae (fungal threads). Foliose lichens usually have distinctly different upper and lower cortices, whereas fruticose and crustose lichens lack a lower cortex. (Diagram, P. 2.)

Crustose. Crust-like lichens that are largely embedded in the substrate on which the lichen grows. The exposed surface produces spores. Crustose lichens lack a lower cortex. (P. 16.)

Cyphella (pl: **cyphellae**, adj: **cyphellate**). A crater-like pore, with a rim, on a lichen thallus (See *Sticta*, P. 12.) (Compare with **pseudocyphella**.)

Foliose. A leafy growth form, typically lobed, that is more or less horizontal. (P. 3, pp. 6-14.)

Fruticose. A lichen that extends out from the substrate on which it is growing. These lichens lack a lower cortex. They can be erect or pendulous (hanging). (Pp. 4-5.)

Isidium (pl: **isidia**). Projections (lumps, finger-like, etc.) from a lichen thallus that break off and wash or blow away, lodging elsewhere and forming new individuals. (P. 2.)

Leprose. A powdery growth form, with the lichen surface dissolved into soredia. (e.g. P. 16, also *Chrysothrix*, *Lepraria* on P. 13.)

Macula (pl: **maculae**, adj. **maculate**). Spots or blotches on the lichen surface, often found above a discontinuity in the algal layer. (See *Rimelia*, P. 6.)

Medulla. The "middle layer" of a lichen, usually composed of loosely woven hyphae (fungal threads), but occasionally forming a tough cord or absent. (See diagram, P. 2.)

Perithecium (pl: **perithecia**). A sexually reproductive chamber, often recessed into the thallus, with an exit pore (ostiole). Its walls bear sacs (asci) with fungal spores. (P. 2.)

Podetium (pl: **podetia**). Hollow stalk of reproductive tissue that bears apothecia. (See *Cladonia*, Pp. 2 & 4.)

Primary thallus. That part of the thallus that runs along the substrate, as opposed to the erect fruiting structures. (See *Cladonia*, Pp. 2 & 4.)

Pseudocyphella (pl: **pseudocyphellae**). A pore that is flat or plug-like, lacking a rim. (See *Punctelia*, P. 8, *Pseudocyphellaria*, P. 12.) (Compare with **cyphella**.)

Pseudopodetium (pl: **pseudopodetia**). Solid or hollow vegetative (non-reproductive) stalk that bears apothecia. (See *Stereocaulon*, *Cladia*, P. 4.)

Rhizine. A root-like anchoring structure, composed of clustered hyphae (fungal threads), that grows from the lower cortex (P. 2, also *Parmotrema*, P. 7, and *Peltigera*, P.8.)

Scyphus (pl: **scyphi**). A cup-like fruiting body (podetium). (See *Cladonia*, Pp. 2 & 4.)

Sinuate. Wavy or frilly. (See *Parmotrema*, P. 1.)

Soralium (pl: **soralia**). Regions of a lichen with powdery or crumbly soredia. (P. 2.)

Soredium (pl: **soredia**). Bundles of fungi and algae that erupt onto the surface of the lichen from its interior, giving it a crumbly appearance. Soredia are blown or washed away and grow into new lichen individuals. (P. 2, also *Normandina*, P. 13.)

Squamulose. A growth form where the thallus is divided into individual scales that may be leafy, lumpy, crust-like, etc. The squamules may be packed closely together into a patch (e.g. *Psoroma*, P. 13) or be well separated (e.g. *Cladonia*, *Dermatocarpon*, P. 13).

Thallus (pl: **thalli**). The "body" of a photosynthesising organism (e.g. lichen, seaweed, liverwort) that is not divided into stems and leaves. (P. 2.)

Truncate (adj.) A lobe tip that is "cut off" rather than rounded. (See *Parmelinopsis*, P. 7.)

References

- Eldridge D. & Tozer M. E. (1997) *A practical guide to soil lichens and bryophytes of Australia's dry country.* Department of Land and Water Conservation, Sydney, NSW.
- Galloway D. J. (1985) *Flora of New Zealand. Lichens.* Government Printer, Wellington, NZ.
- Kantvilas G., Elix J. A. & Jarman, S. J. (2002). *Tasmanian lichens. Identification, distribution and conservation status. 1. Parmeliaceae.* Flora of Australia Supplementary Series no. 15. Australian Biological Resources Study & Tasmanian Herbarium, Hobart.
- Kantvilas G. & Jarman S. J. (1999) *Lichens of rainforest in Tasmania and south-eastern Australia.* Flora of Australia Supplementary Series no. 9. Australian Biological Resources Study, Canberra.
- McCarthy P. M. & Malcolm W. M. (2004) *Key to the genera of Australian macrolichens.* Flora of Australia Supplementary Series no. 23. Australian Biological Resources Study, Department of the Environment and Heritage, Canberra.