

## Mosses, liverworts, fungi and lichens

Cryptogamic organisms of Melbourne's Middle Yarra region



### *Campylopus clavatus*

Very common and readily found growing on soil within the region. Leaf shoots detach when brushed, a character which may help with identification in the field.



### *Campylopus introflexus*

Similar to *C. clavatus* (above) although generally distinguishable by having leaf tips that are bent outwards. This image shows a range of life cycle stages and both male and female plants.



### *Tortula papillosa*

The leaves of this moss have small rounded structures (gemmae) on the upper surface. These structures detach and grow into new individuals. It is reasonably common within the region where found on small clumps on tree trunks and decaying wood.



### *Barbula calycina*

A widespread species, particularly where there are sandy soils. In dry conditions, the leaves twist around the stem. When wet the leaves spread into a star-like rosette.



### *Breutelia affinis*

In suitably moist habitats, this moss forms impressive, large clumps on rock and soil. The stems are densely covered with brown hairs. Leaves are often minutely toothed towards the tip while the leaf bases may appear longitudinally creased.



### *Hypnum cupressiforme*

Five varieties of this species are currently recognised in Victoria. It is one of the most common mosses throughout the world. Locally it is very common in natural and disturbed habitats.



### *Racopilum cuspidigerum* var. *convolutaceum*

The distinctive near-parallel, flattened shoots have a less obvious row of leaves on the upper surface. It is widespread and found in most situations on ground or wood.



### *Thuidopsis furfurosa*

This well-forming moss is very common within the region. It may form dense mats on the ground or decaying wood e.g. under dense tea-tree. The branches of each shoot are covered with small, leaf-like structures (paraphyses) between the leaves.



### *Dicranoloma billarderi*

The yellowish shoots have gradually tapering leaves which curve more or less to one side. The fine leaf tips give the shoots a feathery appearance. It forms conspicuous clumps on the ground or on bark and is moderately common in more sheltered sites.



### *Wijkia extenuata*

Leaves lie close to the stems and are arranged to form a fine point toward the branch tips. The relatively large shoots overlap in suitable situations to form dense mats on a range of substrates. It is associated with wetter vegetation types.



### *Tayloria octoblepharum*

Often seen growing in clumps on the ground, this moss commonly uses animal droppings as a substrate. It has evolved an unpleasant scent to attract flies which aid spore dispersal to other sites containing animal droppings.



### *Pseudoscleropodium purum*

This moss is introduced to Australia and is now common in many bushland areas. It may form very large, dense mats and there is some concern regarding the associated ecological impacts to native flora and fauna.



### *Entosthodon subnudus* var. *gracilis*

Occasionally seen growing on moist soil where it is more readily noticed when capsules are present. The tip of each calyptra (protective cover on capsules) commonly point to one side, a useful character for recognising species of *Entosthodon*. It is generally common.



### *Eurhynchium praelongum*

Probably introduced to Australia and commonly seen in residential areas but may also be found in areas of native vegetation. It may be mistaken for some native species including forms of *Hypnum* and *Thuidopsis*. It is shown here growing on brick.



### *Ptychomnion aciculare*

Leaves of this species have a crepe paper feel when dry and the large shoots look not unlike pipe cleaners. Hence, it is sometimes referred to as Paper Moss or Pipe Cleaners. It is very common and easily identified in the field where known from a range of wet to dry vegetation types.

# Mosses and Liverworts

This brochure illustrates some of the mosses, liverworts, hornworts, fungi and lichens within Melbourne's Middle Yarra region and surrounds. All species shown are also found within many other parts of southeastern Australia. They have immense biological value, although they are often overlooked in conservation efforts.

### Mosses, liverworts and hornworts

Mosses, liverworts and hornworts are non-vascular plants. They are separated in botanical classification although they share a similar lifeform and lifecycle, having a leafy or thallose photosynthetic gametophyte generation and a largely non-photosynthetic sporophyte generation (see below). These plants generally reproduce by spores or by vegetative fragments. Their distribution is affected by climate, vegetation type, soil type and the availability of substrates, among other things. They are important for stabilising soil, controlling water movement, providing resources for fauna (e.g. nesting material) and a range of other environmental processes.

### Habitat

Habitats for the species shown on this brochure occupy all parts of native vegetation, from the top of the tree canopy to beneath the ground. They may also be found where there is no other vegetation e.g. on rock outcrops or exposed soil. Different tree and shrub species provide different substrate characteristics, such as bark texture and water holding capacity.

Decaying wood is particularly important as a substrate for most of the species shown on this brochure. Many species of fungus would not persist if there were no wood substrates available from which they could gain nutrients. It is important that logs and fallen branches are retained on the ground in bushland.



### *Chiloscopus semiteres*

This is probably the most common liverwort species within the Middle Yarra region. It can be commonly seen on logs, rock, soil or the base of tree trunks.



### *Heteroscyphus fissistipus*

A moderately common leafy liverwort that is distinguishable from *C. semiteres* (above) by having several teeth along the leaf margins (the smaller underleaves are divided on both species).



### *Marchantia berteroana*

A robust thallose liverwort that is prevalent following fire. The lobed structures (archegoniophores) shown are specialised branches on which the female reproductive organs are borne, later producing sporophytes.



### *Asterella drummondii*

This thallose liverwort is moderately common on dry soil throughout the region. It has characteristic archegoniophores (see *Marchantia*) as shown. The thallose part of the gametophyte is shown on the front cover.



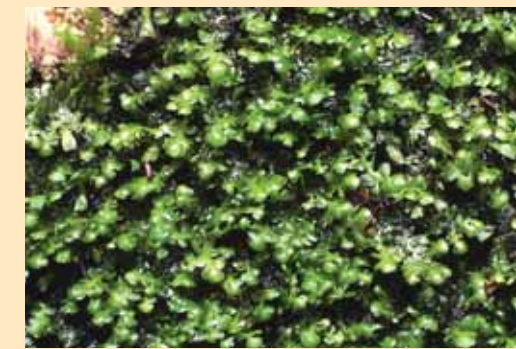
### *Fossombronia* sp.

Most *Fossombronia* species have a thallose with tightly packed 'leafy' lobes. *Fossombronia intestinalis* (right) is moderately common on soil within the region. The left photograph shows sporophytes of another species.



### *Lunularia cruciata*

A very common thallose liverwort found in a range of vegetation types and a common coloniser of modified environments such as residential gardens. Gemmae (reproductive buds) are formed in semi-circular structures as shown. Gemmae are dispersed and grow into new individuals.



### *Radula buccinifera*

This leafy liverwort is most often found in shady, wet sites on rocks or the bark of various shrubs and trees. Leaves are simple lobes with a folded segment on the underside.



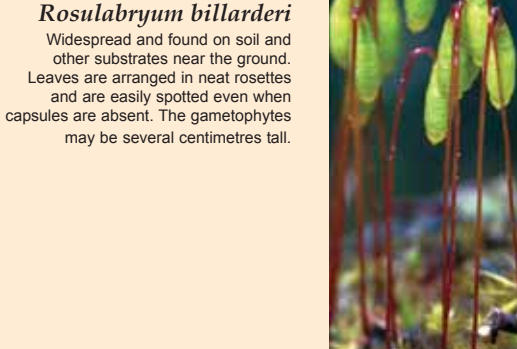
### *Riccia bifurca*

*Riccia* species are principally found on soil. This thallose liverwort may be found in a range of natural vegetation types but may also occupy disturbed areas including paddocks and residential gardens.



### *Phacoceros* sp.

This is the only hornwort species illustrated on this brochure. Hornwort capsules differ from liverwort capsules. They are long and narrow, arise from a short tube on the gametophyte surface and split along their length to release spores.



### *Rosulabryum billarderi*

Widespread and found on soil and other substrates near the ground. Leaves are arranged in neat rosettes and are easily spotted even when capsules are absent. The gametophytes may be several centimetres tall.



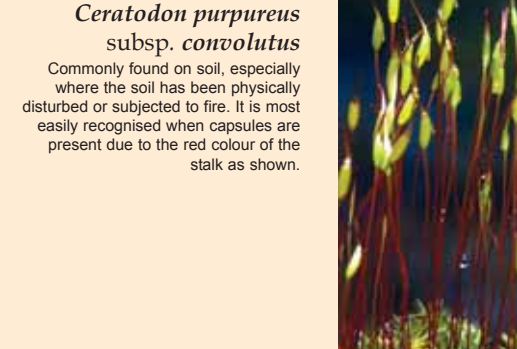
### *Triquetrella papillata*

Leaves of this species are arranged in three more or less regular rows. This moss is well known for its change in appearance between wet (left) and dry specimens. The leaves of dry specimens are pressed closer to the stem. It is most often found growing on soil.



### *Pleuridium nervosum*

This minute moss is easily overlooked, however it is more noticeable when sporophytes are present. It grows to about 5 mm tall. The capsules mature to a reddish colour as shown.



### *Ceratodon purpureus* subsp. *convolutus*

Commonly found on soil, especially where the soil has been physically disturbed or subjected to fire. It is most easily recognised when capsules are present due to the red colour of the stalk as shown.



### *Dawsonia longiseta*

The pale reddish calyptra (protective cover on capsules) of this moss make it easy to spot in the field. Its leaves are pointed and firm. It is very common on exposed earth and responds favourably for some time following disturbance including fire.



### *Fissidens asplenoides*

*Fissidens* species within the region grow mostly on soil or rock. Road or driveway cuttings make ideal habitat. They are readily recognised by a division of the leaf so as to appear as if a smaller leaf was enclosed near the base of each leaf.





**Russula purpureoflava**  
Common in eucalypt forests including those of eastern Melbourne and more widely within healthy vegetation types. Cap to 6 cm wide, gills simple.



**Amanita farinacea**  
Common in eucalypt forests and woodlands. Caps may be seen to 10 cm wide although it is smaller and more rounded during much of its development. Gills simple.



**Lactarius eucalypti**  
Common in eucalypt forests. Fully developed caps are often funnel-shaped (as shown above) to about 4 cm wide. Gills simple.



**Aleuria aurantia**  
This cup fungus is well known to many bushwalkers and has acquired the common name Orange-peel Fungus. Fruit bodies to 7 cm wide. The white cloud above the fruiting bodies are spores being released into the air.



**Dermocybe splendida**  
Common in eucalypt and tea-tree forest. Cap to about 5 cm wide. The simple gills are bright orange-red in colour, becoming brown as spores develop.



**Boletus barragensis**  
The stems of this fleshy pore-fungus are characteristically wider towards the base. The cap undersurface (pore tissue) is yellow and bruises blue when touched. Caps to 6 cm wide.



**Hypholoma fasciculare**  
This poisonous fungus occurs on decaying wood and branches, often in dense groups. Young gills are distinctly greenish yellow, but are darkened by the release of purple-brown spores. Caps to 7 cm wide. Gills simple.



**Omphalina umbellifera** MD  
This species is a lichenised fungus. It may be found in large scattered colonies over clay or rather gravelly soils which are covered in algae. Caps to 1.5 cm wide. Gills simple.



**Cortinarius sinapicolor**  
Found in a range of forest habitats and easily recognised by its slimy, bright yellow fruiting body and slight curry scent. Cap to 8 cm wide, gills simple.



**Cortinarius archeri**  
Reasonably common in eucalypt forests. Caps to 10 cm wide and very slimy when moist. A membranous ring is present on the stem. Gills simple.



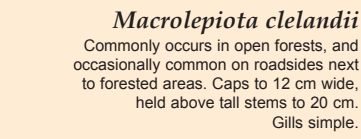
**Omphalotus nidiformis**  
This poisonous fungus occurs on decaying wood in eucalypt and pine forests and less commonly at the base of living trees. Caps to 20 cm wide and glow in the dark. Gills forked.



**Geastrum triplex**  
Commonly known as an Earth Star, this species occurs in most forest types, varying in size up to 10 cm across. The globe-shaped sac contains a mass of dark brown spores.



**Amanita muscaria**  
This poisonous species is introduced to Australia. It is commonly found fruiting under the canopy of Monterey Pine and some other introduced trees. Caps to 20 cm wide. Gills simple.



**Macrolepiota clelandii**  
Commonly occurs in open forests, and occasionally common on roadsides next to forested areas. Caps to 12 cm wide, held above tall stems to 20 cm. Gills simple.



**Fungi**  
Fungi are one of the most diverse biological groups on earth. While a significant proportion of species live underground or within other species (such as trees), there are a very large number of commonly seen species that have a fruit body readily seen in the open. Fungi are so unique that they are assigned their own kingdoms (they are not plants). They are critical for the growth of most Australian plant species, allowing these plants to occupy areas where resources such as soil nutrients are limited. This brochure illustrates a range of macrofungus lifeform groups, some of which are illustrated below.



**Lichens**  
Lichens are an alga and a fungus living in a mutually beneficial state and functioning as a single organism. They are grouped into seven lifeform types. For example, crustose (A) or foliose (B) and are referred to as either microlichens (A) or macrolichens (B). Some common species are shown on this brochure.

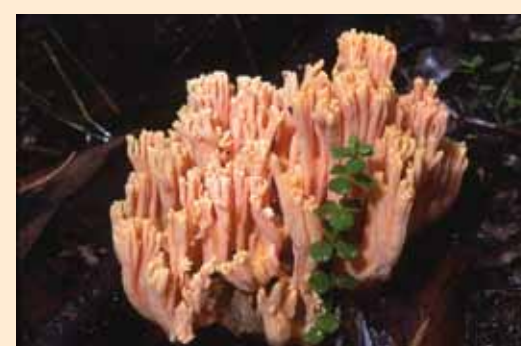


**Fire**  
The Australian biota has an evolutionary history strongly influenced by fire. Some cryptogamic species are cued by fire to undertake their reproductive cycle. Accordingly, these species are conspicuous and often very abundant soon after fire, well before most vascular plant species have resprouted or germinated. Some examples of cryptogamic, post-fire colonisers are shown below.

# Fungi and Lichens



**Artomyces piperatus**  
Known as Peppery Coral Fungus, this species is typically found on decaying wood in moist forests. Its branching pattern is distinctive with fruit bodies growing to 10 cm tall.



**Ramaria ochraceosalmonicolor**  
Occurs mainly in eucalypt forests, where it commonly forms rings or arcs on the forest floor. Fruit bodies to about 15 cm tall with tips of branches paler yellow as shown, which may be tightly compressed.



**Trametes versicolor**  
Widely known as Rainbow Fungus, this species is important for wood decay and can parasitise live trees. It forms brackets to about 7 cm wide, with a cream coloured underside made up of tiny pores.



**Clavaria miniata**  
Known as Flame Fungus, this species is rather common in a range of forest types with fruit bodies to 10 cm tall. Branching is simple or sparse.



**Ramaria lorithamnus**  
Found in a range of eucalypt forests or under a dense canopy of Kunzea. It generally forms clumps to 10 cm tall. Individual fruit bodies develop up to three branches.



**Dictyopanus pusillus**  
Often forms large colonies on dead wood. Caps grow to 1.5 cm wide, with an undersurface of small pores and a small, lateral stem. Glows in the dark.



**Clavaria amoena**  
Commonly occurs amid mosses in eucalypt forests and in some other habitats. Fruit bodies are simple, to 10 cm tall.



**Ramaria aff. formosa**  
Widespread and occurring in a range of vegetation types from dry eucalypt forests to rainforests. Fruit bodies are known to grow quite large on occasion, up to 15 cm tall. Can be found forming rings or colonies on the forest floor.



**Podocyptha petalodes**  
This leathery shelf-fungus forms colonies of funnel-shaped rosettes around trees. It is also known to grow on the ground, living on buried, decaying wood. Fruit bodies to 4 cm wide.



**Cladonia capitellata**  
This lichen may be grey, yellow or straw coloured. It can be seen growing in scattered clumps on the ground or on decaying wood, and is quite abundant in suitable open areas. It becomes brittle when dry.



**Cladonia floerkeana**  
Substrates for this lichen include soil and decaying wood. It is also seen following fire on burnt wood. When fertile as shown above, it is readily found amongst vegetation.



**Cladonia pleurota**  
This lichen occurs on soil, peat or decaying wood, often covering extensive areas along forest margins. Colour varies from pale yellow to blue-green depending on conditions.



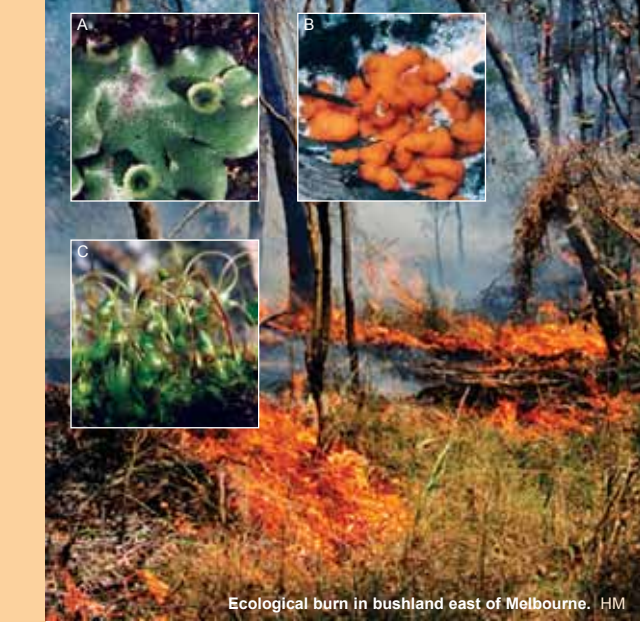
**Cladia aggregata**  
This lichen is amongst the most common in Australia, occurring in most vegetation types on a large variety of substrates. On close inspection, it has the appearance of some marine corals.



**Teloschistes sieberianus**  
The orange fruit body of this lichen may grow up to 6 cm in diameter but are typically smaller. It is most commonly found on decaying wood and twigs of a range of plant species. Habitats are usually damp.



**Hypogymnia subphysodes**  
The thallus of this lichen is loosely attached to a range of substrates including bark on lower tree trunks. The lobes of the thallus are hollow. Habitats are typically dry including eucalypt forests.



Ecological burn in bushland east of Melbourne. HM

The three species shown above are post fire colonisers. A) *Marchantia berteroana* (a thallose liverwort), B) *Pyronema omphalodes* (a fungus) and C) *Funaria hygrometrica* (a moss).

**Further reading**  
Fuhrer B (2005) *A field guide to Australian fungi*. Bloomings Books, Melbourne. Mosgher D and Fuhrer B (2003) *A field guide to the mosses and allied plants of southern Australia*. Flora of Australia supplementary series number 20. Australian Biological Resources Study, Canberra and the Field Naturalists Club of Victoria, Blackburn.

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