

Liverworts
Liverworts are a bit more variable. Some liverworts are leaves on stems, some are flat and ribbon-like and the ground or along the bark of branches or trunks or even on rocks. Liverwort capsules are either spherical or matchstick head or oval in shape and will always be either black or red-brown in colour and only 1-2 mm in diameter. Capsule lengths vary from half a millimeter to 5mm long.

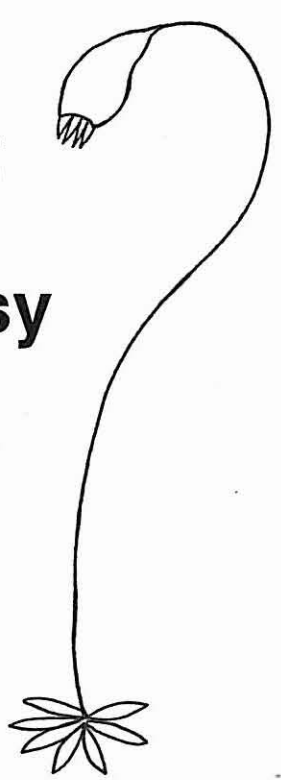
Mosses
Mosses are plants made up of leaves on stems. The leaves can at times be hard to see and can be as long as 10mm or as little as half a millimeter. If you can see your magnifier or the quality of light. Moss capsules sit atop thin stalks and come in a number of shapes, sizes and colours. The capsule may be perfectly spherical or urn shaped or oval shaped. When young they can be quite green in colour but when mature they may be chestnut, brown, golden or red-brown in colour. Capsule sizes vary from 1mm to 1cm long and from 1mm to 1cm in diameter.

What are bryophytes?
They are plants, but they do not produce flowers or seeds. Like ferns, they reproduce by spores. These spores are often the size of dust particles and are produced in small containers called capsules. The capsules are only produced by the plants at certain times of the year or may not be produced at all, and in some cases are quite short lived, lasting only a day or two. It is the green part of the plant which is long-lived and it looks different in each of the three groups.

Many people think of mosses as all those small, green plants that always grow in damp, shady places. In fact many mosses grow in dry, sunny places – and not all "mossy" things are mosses. There are also liverworts and hornworts. Together the mosses, liverworts and hornworts are called bryophytes.

Introduction

**What
mossy
thing
is
that**



A guide for use in the Australian National Botanic Gardens

This guide developed in 2003 by Christine Cargill, Judith Curnow, Lisa Kerr and Heino Lepp at ANBG. Current version: 2009.

If you would like to know more about the "mossy" things that you are looking at, there is a brief list of books and web pages that you may find useful.

GLASS SOLVE
The second section has been divided into three columns. In some parts you may need a magnifying glass or hand lens. First decide if your sample is flat and if so then look in the first column. If it is trailing with leaves on stems, look in the middle column, but if it is upright, hanging or shrubby, try the third column. Again, match the diagram and short description with your sample.

QUICK SOLVE
Quick Solve - if capsules are present; and Close Look - if capsules are not present.

How to use this guide
The simple guide in this leaflet is for use in ANBG. It aims to help you work out whether you are looking at a moss, a liverwort or a hornwort or something else again. You will see some simple diagrams and brief text. Use both to help you get to the right answer. In some cases you will need a magnifying glass or hand lens to see some of the identifying features. A magnifying glass magnifies 2-5 times, which can still be helpful. If you can see something easily with the naked eye you'll see this symbol: and if you need a magnifier you will see this symbol: .

Some things that aren't bryophytes
If you have something that is leafless and brightly coloured (e.g. orange, yellow, red) then you may be looking at a lichen. There are a few greenish lichens that may be confused with mosses and you will see them briefly noted in the guide. Lichens do not have capsules and forming a mat on the ground, then you are probably looking at an alga. Algae and lichens are otherwise not dealt with here. Sometimes ferns and even the flowering plants are mistaken for mosses, such as the small cushion-forming alpine plants. If they have flowers they are easy to tell apart but if not, it may be confusing and not so apparent. And I am going to whimp out at this point in explaining how you can tell the difference ... sorry!

Hornworts
Hornworts are flat and lobed and do look very much like flat lobed liverworts their capsules give them away. The hornwort capsules are the least variable among the bryophytes and are always horn-like (hence their common name) or needle-shaped. They are usually about 2mm diameter and vary from 2cm to 8cm long. When immature they are green and look very much like blades of grass. As they mature the top part of the needle will become black or brown or yellow in colour and will split into two thin sections.

BIBLIOGRAPHY

T = technical, text book
NT = non-technical, will require some effort by reader but explains much, doesn't expect prior knowledge of the subject's basics, good introductory material
GP = great colour photographs

Beever, J.E., Allison, K.W. & Child, J. 1992.
The Mosses of New Zealand. 2nd Ed. University of Otago Press, Dunedin.
Good book to start with. Many taxa in common with Australia. T. GP.

Buck, W.R., Vitt, D.H. & Malcolm, W.M. 2002.
Key to the Genera of Australian Mosses. Flora of Australia Supplementary Series Number 14. Australian Biological Resources Study, Canberra.
The key for the Flora of Australia Moss volumes, but useful on its own. T. GP.

Catcheside, D.G. 1980.
Mosses of South Australia. Handbook of the Flora and Fauna of South Australia. South Australian Government Printer, Adelaide.
Good for dry areas, good diagrams. T.

Dashorst, G.R.M. & Jessop, J.P. 1990.
Plants of the Adelaide Plains and Hills. The Botanic Gardens of Adelaide. Kangaroo Press, Kenthurst.
Very good paintings, three bryophyte pages. NT.

Eldridge, D. & Tozer, M.E. 1996.
A Practical Guide to Soil Lichens and Bryophytes of Australia's Dry Country. Dept. of Land and Water Conservation, NSW.
The title says it all! NT. GP.

Jarman, S.J. & Fuhrer, B.A. 1995.
Mosses and Liverworts of Rainforest in Tasmania and Southeastern Australia. CSIRO Publishing, Melbourne.
A nice selection. NT. GP.

Malcolm, W.M. & Malcolm, N. 1989.
The Forest Carpet. New Zealand's little-noticed forest plants - mosses, lichens, liverworts, hornworts, fork-ferns, and lycopods. Craig Potton Publishing Ltd, Nelson.
The subtitle says it all. NT. GP.

Malcolm, W.M. & Malcolm, N. 2000.
Mosses and Other Bryophytes: An illustrated glossary. Micro-Optics Press, Nelson.
Encyclopaedic bryophyte glossary. T. GP.

McCarthy, P.M. (Ed.) 2006.
Flora of Australia vol. 51 Mosses 1. ABRS & CSIRO Publishing, Canberra & Melbourne.
The first moss volume of the Flora of Australia, has key to genera, introduction to mosses and treats 22 families. T. GP.

Meagher, D. & Fuhrer, B. 2003.
A field guide to the mosses & allied plants of southern Australia. Flora of Australia Supplementary Series Number 20. ABRS, Canberra & The Field Naturalists Club of VIC.
Good field guide with leaf diagrams and photos, let down by printing colour registration. NT. GP.

Richards, P. 1950.
A Book of Mosses. The King Penguin Books # 57. Penguin Books, London.
Excellent reproductions of 18th century paintings. NT.

Schofield, W.B. 1985.
Introduction to Bryology. Macmillan Publishing Co., New York.
Detailed text on structure with good diagrams. T.

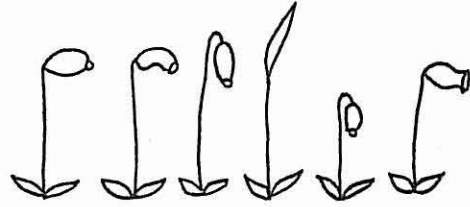
Scott, G.A.M. 1985.
Southern Australian Liverworts. Australian Flora and Fauna Series Number 2. Australian Government Publishing Service, Canberra.
So far the only such guide, descriptions with some diagrams. T. Good black & white photographs.

Scott, G.A.M., Stone, I.G. & Rosser, C.E. 1976.
The Mosses of Southern Australia. Academic Press, London.
Detailed descriptions, accurate, detailed drawings by Celia Rosser - an excellent artist, well-known for her Banksia paintings. T.

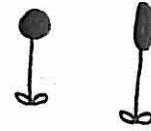
Websites:
<http://www.anbg.gov.au/anbg/#cryptogams>
<http://www.anbg.gov.au/bryophyte/>
<http://rbg-web2.rbge.org.uk/bbs/bbs.htm>
http://www.rbv.vic.gov.au/research_and_conservation/publications/forgotten_flora

Quick Solve

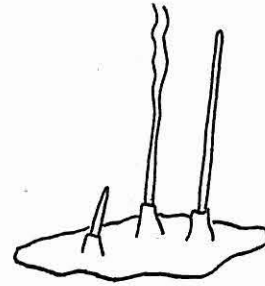
Can you see any of these features or structures?



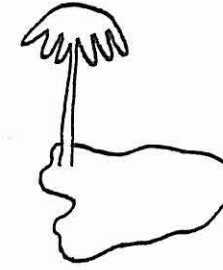
Plant with green or brown capsule on coloured stalk similar to one of these → MOSS



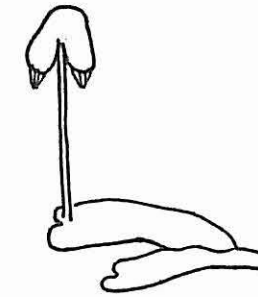
Plant with blackish capsule on white or transparent stalk similar to one of these → LIVERWORT



Plant with needle-like capsule similar to this → HORNWORT



Plant with green umbrella-like structure similar to this → LIVERWORT in Genus: *Marchantia*



Plant with a helmet-like structure with white ribbons hanging from it, similar to this → LIVERWORT in Genus: *Asterella*




Lots of little scale-like pieces with trumpets or spikes up from them, similar to these → LICHEN

Close Look &


Flat, either lobed or ribbon-like
- liverworts, hornworts and lichens

Which ONE looks like yours?




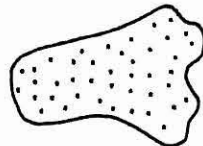
 Dull grey/green, brittle, tough to touch or like dried paint, possibly with small round cups on it of a different colour to lobes → LICHEN




 Fleshy, soft and bright green, if cups present then same colour as lobe and crescent shaped → LIVERWORT in Genus: *Lunularia*




 Fleshy, soft and bright green, if cups present then same colour as lobe and circular → LIVERWORT in Genus: *Marchantia*



 Fleshy, soft and bright green with no cups and lots of white dots/blisters on the surface → LIVERWORT in Genus: *Marchantia*




 Thin fleshy, soft or crisp, dark green with occasional black dots on surface → HORNWORT



 A long, thin, strap-like or Y-branched structure → LIVERWORT



 An olive-brown, shapeless sheet or bubbly mat, loose on soil → CYANOBACTERIUM in Genus: *Nostoc*

Prostrate with leaves on stems - mosses and liverworts


Does it look like this, growing along the soil, rock or bark?



→ It's either MOSS or LIVERWORT.


To decide which, you will need to look at the leaves.




 Look for a nerve in the leaf, similar to any of these → MOSS

If there is no nerve in the leaf, check the leaf shape to select below



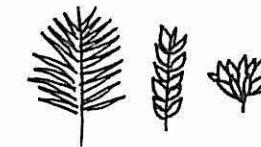
 If the leaves have a single point like one of these → MOSS



 If the leaves are rounded or have multiple points or teeth something like this → LIVERWORT

Upright or pendulous - mosses and lichens

Or does it look like this? 



Leaves on stems similar to any of these and

growing either straight up or out from the surface it is growing on

or with lots of stems growing together to form a clump/cushion or mat,

→ MOSS



A dull, grey/green, branching growth, (stems and branches without leaves)

growing either upright or hanging downwards from a branch of a tree → LICHEN

(Note: Sometimes a lichen's fine branches may have tiny spikes or knobs on them. Don't mistake these for leaves.)