

## LIVERWORTS

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Many people who can recognise a moss when they see one, have never noticed liverworts. This is not surprising as many hepatics are very similar to mosses in their general appearance and are easily mistaken for them.

This article is intended as a brief introduction to this interesting and beautiful group of plants and has as a further aim a discussion of those features which set liverworts apart from mosses.

The name Liverworts or Hepatics, as they are also called, is very old. It was used as early as the 9th century for a species of Marchantia which, because its flat thallus lobes superficially resembled the lobes of the human liver, was believed to cure liver diseases.

Liverworts are the most primitive group of the Bryophytes, a division of plants which also includes the Mosses. Bryophytes differ from ferns and the flowering plants in possessing neither true roots nor efficient transporting tissues. Instead they have thin, thread-like rhizoids by means of which they attach themselves to soil, rock, bark, etc. and which in many species are also used for the absorption of water and salts. In the leafy hepatics where a waterproof cuticle is generally lacking, water can also be absorbed through the leaf surface itself.

Many biologists believe that this lack of a true root system and efficient transporting tissues has prevented bryophytes from attaining the size and complexity found in ferns and the flowering plants. Whether true or not, it is a fact that few bryophytes exceed a foot in length and most species are very much smaller than that.

New Zealand, in spite of its geographical isolation and no doubt because of its varied topography, its generally humid and temperate climate is particularly rich in liverworts. There are at least 500 different species belonging to no less than 130 genera and newly discovered species are constantly being added to this list.

The absence of a waterproof cuticle in most liverworts renders them particularly vulnerable to the drying effects of sun and wind - and thus it is to be expected that most species in New Zealand, as well as elsewhere in the World, are found in moist, shady situations. Wet rock and boulders, the banks of streams, shaded clay banks are the habitats for numerous species. Many also grow on earth, litter and decaying logs on forest floors or cover the bark of trees and shrubs. Some very small species can even be found growing on the leaves of

the Broadleaf and the Peppertree. A few species are aquatic and occur either fully submerged or floating on the surface of stagnant pools.

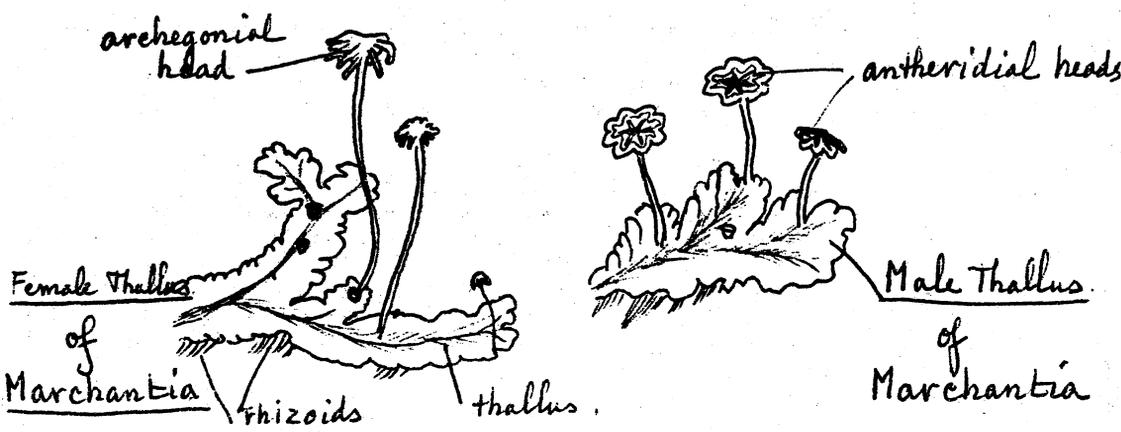
Hepatics are gregarious creatures and usually form close compact masses, often intertwined with other species of liverworts and mosses.

Although liverworts generally prefer moist and shady habitats, some species growing on bark and rock surfaces appear to be quite resistant to desiccation as they have been observed to survive several months of drought without apparent injury. During such times growth is temporarily at a standstill and is not resumed until water becomes plentiful again.

In contrast to mosses which form a rather uniform group of plants, liverworts show much variation in body form, leaf shape and in the nature and arrangement of their reproductive structures.

Most liverworts are prostrate, more or less horizontally growing plants with clearly differentiated upper and lower structures. On the basis of their general appearance and body organisation they can be subdivided into 2 main groups - called the Thallose - and Foliose Liverworts.

The Thallose Liverworts possess no stems with leaves but typically form a flattish, sheetlike or ribbon-shaped, forked plant body or thallus. This thallus is attached to the soil etc. by numerous rhizoids, is composed of many layers of cells and usually contains air chambers which open to the upper surface of the thallus by minute pores - visible to the naked eye. This group of liverworts is represented by such genera as Lunularia which is such a troublesome weed of potplants and soils in glasshouses and Marchantia so easily recognised by the conspicuous umbrella like organs which carry the male and female sex organs. Other common genera are Asterella, Plagiochasma and Reboulia.

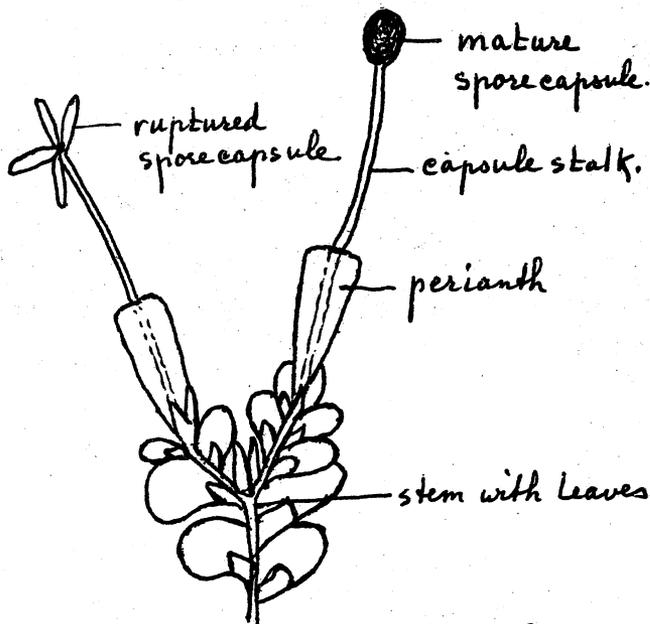


The Foliose or Leafy Liverworts are much more numerous than the previous group and as its members possess stems with closely crowded, overlapping leaves, they are easily confused with mosses.

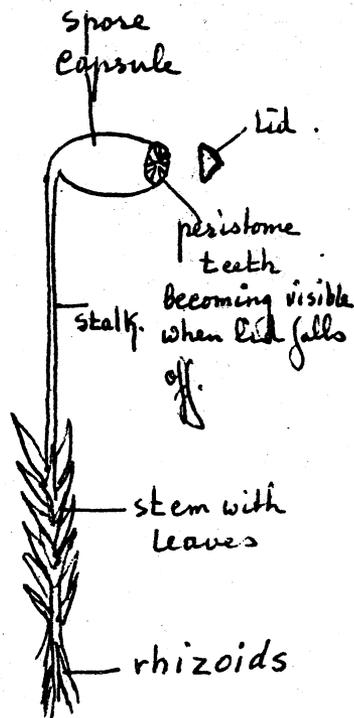
Perhaps the surest way of telling them apart from the true mosses is by means of their reproductive structures. The spore capsules of mosses are generally red brown when mature and release their spores through a circular mouth opening fringed by one or two rows of teeth - the peristome. The capsule stalk or seta is firm, variously coloured red, yellow or brown and generally lasts throughout the season.

On the other hand the foliose liverworts produce rather small, ovoid, glossy black spore capsules supported by white, rather fragile and shortlived stalks. At maturity the spore capsules split lengthwise and generally open by 4 valves to release the spores. After spore dispersal the capsule stalk collapses and shrivels up.

Another distinctive feature of the leafy liverworts is the perianth, a tubular, spherical or funnel shaped structure which acts as a protective sheath first for the female sex organs and after fertilization of the eggs for the young developing spore capsules. When the capsule stalks lengthen the spore capsules burst through the tips of the perianths to be carried upwards and above them. The perianth is an important structure of the leafy liverworts and never found in mosses.



Foliose Liverwort (Radula)



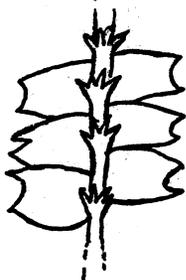
Moss plant.

When there are no reproductive structures we need to look at the leaves for clues.

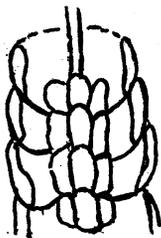
The foliose liverworts typically have their leaves arranged in 3 rows along the stem but because of their horizontal growth habit the ventral leaves or underleaves as they are called are usually different in size and shape from the other two and in some genera e.g. Radula and Plagiochila these underleaves may be absent altogether.

Although similar to moss leaves in that the blade consists of only one layer of cells, the leaves of foliose liverworts never possess a true midrib; moreover their leaves are generally split or divided into two lobes and each lobe in turn may again be divided and the margins armed with teeth, spines or long hairs. By contrast the leaves of mosses are relatively simple structures and are never lobed. An added development in the more advanced foliose liverworts has been that in many bilobed species the leaf has become folded so that the lower lobe lies flat against the upper one. This is shown by such N.Z. genera as Schistochila, Diplophyllum and Porella.

In species of Frullania and Goebeliella the lower lobe of each leaf has become modified into a pouch or helmet shaped structure and this is carried a step further in Lepidolaena where not only portions of leaves but also the underleaves have become modified into pitcher like structures. It has been suggested that these structures serve to catch water that trickles down a tree trunk after a shower.



a Lophocolea



b Porella



c Frullania

Diagrams a, b & c.  
represent 3 common  
genera of ~~N.Z.~~ leafy  
liverworts as seen  
from the underside

I hope that the points discussed in this article may lead to a better understanding of this beautiful and interesting group of plants which up to now have been much neglected by both botanists and amateurs alike.

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