

**C**ompared with other temperate regions, New Zealand is exceptionally rich in mosses.

‘The lush appearance of our forests is due largely to the small plants which find a niche on trunks and twigs, on rotting logs and on the forest floor,’ wrote scientist Jessica Beever in *The Mosses of New Zealand*. She says New Zealand mosses are so diverse and luxuriant that foreign moss experts ‘go gaga’ when they visit.

New Zealand has (at last count) 523 species of moss and 23 further varieties. (See box, ‘A Great Variety’.)

These mosses grow from the sea shore to the alpine zone; from moist, temperate western areas to places ruled by semi-arid eastern climates. They may grow 30 metres deep in lakes and streams, or on exposed rocks, on rotting wood, and even on animal carcasses. Some grow in thermal regions on soils hotter than 50 degrees Celsius, and some in very dry environments. Their cells can dry out completely and come to life again when re-wetted.

Landcare scientist Allan Fife — one of New Zealand’s few full-time moss scientists — writes that bryophytes (including the mosses) offer important clues to the history and geography of all plant communities. They are ancient plants, which seem to evolve slowly, and be able to persist within specialised habitats without changing.

Some species are very particular about

where they’ll grow. For example, Jessica Beever has found that a very different mixture of moss species grows on the black tree fern (mamaku) compared with the ponga tree fern, and nikau palms, in the same forest.

Some mosses have important ecosystem roles. In forests, mosses hold groundwater and release it slowly, stopping erosion and nutrient run-off. They also provide homes for invertebrates.

## Identifying Mosses

**H**ow do you tell mosses apart? Here’s the bad news: if you’ve only got a handglass, often you can’t. To identify most mosses to their species, you need to look under a microscope.

The good news is that you can learn to distinguish the most common moss families by sight, and if you want to learn more, Jessica Beever’s moss book is very helpful. Then, if you get really keen, you can come along to an annual bryophyte workshop, and ‘hang out’ with the rest of us! I’ve found from personal experience that by far the easiest way of identifying a moss is to point a moss expert at a microscope and look interested.

There’s so little known about most mosses, including their geographical spread, their growth rates or where they fit in their habitat, that even beginners learning about mosses can make worthwhile

## A Great Variety

**N**ew Zealand has (at last count) 523 species of moss and 23 further varieties, in 208 genera.

Only 20 percent of our moss species are unique to New Zealand, however.

We share many moss species with South America, Australia and smaller islands in the South Pacific. This compares with other plant groups which contain many species found only in New Zealand — about 80-85 percent of our flowering species and 45 percent of ferns are found here and nowhere else.

It is not known how many mosses may have been introduced.

contributions to scientific knowledge.

Identification of mosses is determined by the shape of the tiny leaves, how far the central nerve of the leaf extends, and the cell structure. Sporophyte design and colour are also key identifying features. The first step, however, is to sort out mosses from liverworts, hornworts and lichens. Lichens are different altogether; they are a combination of algae and fungus, often coloured brilliantly, and looking almost as if made of plastic.

Leafy liverworts and mosses can be very similar, however — they both belong to a group of plants called bryophytes (see box, ‘Two Plants in One’) — but there are a number of striking differences. The easiest way is to look for stalks and capsules (sporophytes). If you find some, your subject is probably a moss. Moss sporophytes have a wiry stalk, coloured red, brown or black, which lasts for some time. The stalks of liverwort sporophytes are translucent and flimsy, and last only a day or so.

Liverwort spore capsules split open into quarters to fling out the spores. Moss capsules start off green, usually ripen to yellow or red or brown and disperse their spores through a round hole at one end, which is ringed with tiny ‘teeth’. This can all be seen with the naked eye — look for sporophytes next time you see a patch of moss, and take a close look at the capsule.

Moss and liverwort leaves also differ: liverwort leaves are often deeply lobed, never have central veins, and tend to sit fairly flat in two rows, with a third row of leaves on the underside. Moss leaves aren’t lobed and most do have nerves. Their leaves can be flattened, in swirls, or rows.

## Two Plants in One

**T**he moss life cycle is fascinating — it alternates between two totally different generations of plant.

The leafy green thing we call a moss is one generation.

The stalks with capsules that grow from the leafy plant is the second generation — but also a different plant.

The leafy generation (gametophyte) has only half the chromosomes of the stalk and capsule (sporophyte).

The leafy plant has male and female parts that reproduce sexually to produce the sporophyte, which simply releases spores that grow again into the leafy generation. The leafy generation can also reproduce asexually, often producing special ‘bodies’ that break away to grow into a new plant.

This two-plant life cycle is shared with liverworts and hornworts which make up a group of plants called bryophytes.

New Zealand has about 580 species of liverworts, which together with mosses make up more than 1100 species of bryophytes. This number of bryophytes compares significantly with the roll call of about 2500 species of vascular plants.

