

## **HABITAT FEATURES AND DIVERSITY OF BRYOPHYTES**

Bryophytes exist in a wide variety of habitats. They can be found growing in a range of temperatures, elevations and moisture. They can grow where vascularized plants cannot because they do not depend on roots for an uptake of nutrients from soil. Some bryophytes are unusually tolerant of extended periods of dryness and freezing, and, upon the return of moisture, they rapidly resume photosynthesis. Many bryophytes grow on soil or on the persistent remains of their own growth, as well as on living or decomposing material of other plants. Some grow on bare rock surfaces, and several are aquatic. The main requirements for growth appear to be a relatively stable substratum for attachment, a medium that retains moisture for extended periods, adequate sunlight, favourable temperature, and, for richest luxuriance, a nearly constantly humid atmosphere.

### **SUBSTRATES**

Bryophyte members grow arctic and antarctic to the hot deserts of the world and from sea level to alpine peaks. Some of them may be found in a wide variety of habitats while others have a very restricted range.

Bryophytes can be observed on soil, rocks and tree trunks. These are very common substrates throughout most of the world. They can be found on the leaves of vascular plants, especially in the tropics. These are called epiphyllous Bryophytes. In humid forests, they can grow on invertebrates. Some liverworts members can be observed on beetles. The beetles often have ridges, depressions or hairy to bristly surfaces that aid in trapping propagules of bryophytes, lichens, algae and fungi. Similar species grow in the surrounding vegetation so the beetles are camouflaged by having growths of bryophytes and other organisms. The leafy liverwort *Taxilejeunea obtusangula* was found growing with several algae on the head of the Mexican rainforest lizard species *Corythophanes cristatus*. The lizard may stay still for hours, moves slowly and the top of its head is slightly concave, ideal for catching moisture dripping

from above. These characteristics would also ensure that liverwort propagules are readily caught, as well as providing a site conducive to gametophytic growth. It is unlikely that the liverwort would ever reach sexual maturity since the lizards possibly shed their skins more than once a year. The liverwort is widespread in the Neotropical rainforests where it is commonly found on bark or living leaves. Bryophytes members may also grow on several substrates such as Glass, plastic, rubber, roof tiles, dung, bones and carcasses.

### **HABITATS AND DISTRIBUTION**

Bryophytes exist in a wide variety of habitats. They can be found growing in a range of temperatures (cold arctics and in hot deserts), elevations (sea-level to alpine), and moisture (dry deserts to wet rainforests). Bryophytes can grow where vascularized plants cannot because they do not depend on roots for an uptake of nutrients from soil. They have ability to survive on rocks and bare soil.

There are various factors that influence the distribution of bryophytes and a few examples are: climate (including aspects such as yearly temperature and rainfall patterns); substrate chemistry (e.g. whether it's alkaline or acidic); physical factors such as surface texture, degree of shading; pollution level. Take a moss such as *Papillaria flavolimbata*, shown here growing as a well-developed curtain from the branch of a rainforest tree. Such a curtain has a large surface area-to-volume ratio and so is very effective at trapping atmospheric moisture. The necessary humidity need not come from rainfall since moss curtains are also very effective at trapping moisture carried by fogs or mists.

Some bryophyte members are restricted to very specific habitats or substrates, but others are found in more than one habitat or on several substrates. In some cases that's not too surprising. Well-rotted wood need not be much different to rich, organic soil in terms of texture, chemistry and water-holding capacity. It would therefore be no surprise to find some species growing on both soil and well-rotted wood. There are some species of bryophytes that

will only ever be found on alkaline substrates, others must have acidic substrates and some will tolerate both.

Broad types of habitats, such as rainforests, grasslands and deserts are significant but it is also very important to look at the small scale when it comes to bryophytes. Within a single broad habitat (such as "woodland" for example) there are invariably numerous micro-habitats. Here's a log, a tree, a boulder, a depression – all in this one woodland area and each creating distinct surfaces, levels of exposure, chemistry, patterns of water flow and so on. In other words, different micro-habitats which appeal to different bryophytes.

Bryophytes are distributed throughout the world, from polar and alpine regions to the tropics. Water must, at some point, be present in the habitat in order for the sperm to swim to the Bryophytes do not live in extremely arid sites or in seawater, although some are found in perennially damp environments within arid regions and a few are found on seashores above the intertidal zone. A few bryophytes are aquatic. Bryophytes are most abundant in climates that are constantly humid and equable. The greatest diversity is at tropical and subtropical latitudes. Bryophytes dominate the vegetation of peatland in extensive areas of the cooler parts of the Northern Hemisphere.

The geographic distribution patterns of bryophytes are similar to those of the terrestrial vascular plants, except that there are many genera and families and a few species of bryophytes that are almost cosmopolitan. Indeed, a few species show extremely wide distribution. Some botanists explain these broad distribution patterns on the theory that the bryophytes represent an extremely ancient group of plants, while others suggest that the readily dispersible small gemmae and spores enhance wide distribution.

The distribution of some bryophytes, however, is extremely restricted, yet they possess the same apparent dispersibility and ecological plasticity as do widespread bryophytes. Others show broad interrupted patterns that are represented also in vascular plants.

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