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Perspective

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Lichens and its Applications

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Lichens plant-like appearance conceals their real nature. Lichen is the outcome of a mutualistic symbiosis between a fungus and an alga or cyanobacteria, rather than a single organism. Three or more partners are required to create some lichens. Lichen's body is made up of fungal filaments (hyphae) that surround green algae and/or blue-green cyanobacteria cells. The mutualistic symbiosis in lichens is based on the same principles as the mycorrhizal relationship that exists between some fungi and the roots of most plants. The lichen fungus benefits its partner(s) by providing protection in exchange for nutrients. Lichens have been referred to as "small ecosystems" due of the complexity of their interactions. Systematizes classify them as members of the Fungus Kingdom since the fungus partner is always the dominant partner. Following the establishment of a lichen symbiosis, the fungus has the largest influence on the ultimate shape of the lichen body, as well as whether it is tough or flexible. Lichen cross-section Ascomycetes, or "cup fungi," account for the vast bulk of the 13,500-18,000 species of lichened fungi. Basidiomycetes, or "mushrooms," comprise about 20 species in tropical and temperate rain forests. Lichen partnerships contain about 40 genera of algae and cyanobacteria.

What causes lichens to grow?

The green pigment chlorophyll is present in the algal and/or cyanobacteria partners, allowing them to use sunlight's energy to create their own food from water and carbon dioxide through photosynthesis. They also give the fungus vitamins. Cyanobacteria, unlike fungus and algae, can produce amino acids directly from nitrogen gas in the atmosphere. The fungus, in turn, shields its photosynthesizing partners from drying out and provides shade from direct sunlight by enclosing them within the lichen's body.

Lichens have been able to colonise a wide range of ecosystems thanks to this life style. Drought resilience in lichens is absolutely extraordinary. A dry lichen may absorb up to 35 times its weight in water in a few of seconds! Lichens can take moisture from dew or fog, as well as the air itself if humidity is high and temperature is low. They also dry slowly, allowing the photosynthesizing partner(s) to continue producing food for as long as feasible. Lichens can survive in extreme conditions such as deserts and arctic regions, as well as on exposed surfaces such as bare rocks, rooftops, and tree branches, thanks to their capacity to quickly absorb and hold water from a variety of sources.

Applications

Lichens offer a wide range of applications. Their sensitivity to pollution varies, and the presence or absence of different lichens in a given location has been used to map pollutant concentrations. In model train layouts, foliose lichens are used to simulate trees. There are roughly 400 recognized "secondary products" made by lichens. These compounds are hypothesized to be produced by lichens as defenses against disease and parasites, as well as to make the lichen taste unpleasant to animals in some situations. Antiviral and antibacterial drugs are now made from several of these molecules.

Some are used to manufacture perfumes and scent Wool Dyed with Lichen soaps. Others have been used to colour woollen cloth in the past. The majority of the colors were brown or yellow, with a few species producing blue. The market for lichen dyes was slashed when synthetic colour were discovered. Synthetic dyes produced a wider range of hues and did not fade. Some craft weavers still employ lichen dyes because they prefer the gentle, calm colors. Litmus paper is used to assess the acidity of liquids, and the only commercially important lichen dye is used to create it. In "basic" (low-acid) solutions like ammonia, the litmus dye turns blue, while in acid solutions like vinegar, it turns red.

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