Lichens

By Valerie Jean Rose
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What's not to like about lichens?

"Lichens are a case of fungi that have discovered agriculture."
Canadian Botanist Trevor Goward

Lichen as farmers?

That's how Canadian Botanist Trevor Goward describes this symbiotic relationship. As curator of the lichen collection of the Beaty Biodiversity Museum at the University of British Columbia, Goward knows the unique qualities of these often-misunderstood organisms. Lichens are varieties of fungi that cultivate partners, usually algae, who use photosynthesis to manufacture food. Through photosynthesis, algae produce carbohydrates that feed the fungus. In turn the fungi provide a steady supply of moisture and helps provide the right amount of light for photosynthesis. About one-quarter of the world's known fungi are "lichenized." Fungi that are not lichenized include mushrooms, yeasts and bread molds.

These seemingly humble organisms serve very important functions in their ecosystems. They provide shelter and food for beneficial insects, including lacewings. Lichens also help "fix" nitrogen. Not that the nitrogen is broken – it's just that, though 79% of the air we breathe is nitrogen, plants can't make use of this in its atmospheric form. Some plants convert atmospheric nitrogen, making it available in the soil. Peas and legumes have specialized soil bacteria growing on their roots. Atmospheric nitrogen collects in tiny root nodules - when the roots are allowed to decompose in the soil, nitrogen is made available to other plants. Legumes are often used as a cover crop, adding nitrogen and organic matter to soil. In forest ecosystems some lichens serve the same role, taking in atmospheric nitrogen and releasing it with decomposition. Rain also leaches nitrogen from living or decaying lichens, washing it into the soil.

Some people mistakenly think lichens damage trees. Terry Ettinger, a former Cornell University Extension agent, tells this sad story: "I once had an elderly couple bring in a fairly large garbage bag filled with bark…they had removed from the trunk of their favorite shade tree. They feared the "disease" that had infected their tree would kill it, so they felt it would be best to remove the infected bark and [bring] it to our office for identification. Needless to say, they were beyond dismayed when I explained the "disease" was actually a healthy growth of lichens that would not hurt their tree at all - though by removing so much bark and wood, they had quite likely done the tree in themselves." Linda McMahan, an Oregon State University Extension faculty member in

Oakmoss lichen commonly grows in mountainous, temperate forests in the northern hemisphere. It is commercially harvested in south-central Europe, then shipped to the Grasse region of France, where its fragrant compounds are used in perfumes. **Photo by Llondelyon via Wikimedia.**

Yamhill County, says, "I see very little reason to control lichen, except perhaps on fruit or nut trees when it interferes with spur production or is heavy enough to break limbs,"

Lichens are found on every continent, as well as the Arctic and Antarctic. It would probably grow on us if we stood outside long enough. Over 1,000 varieties of lichens are found in Washington, Oregon, British Columbia and Alaska. Adapting to a wide range of environments, lichens produce more than 500 unique biochemical compounds to control light exposure, kill attacking microbes, repel animals and discourage plant competitors. Some of these compounds make lichen useful to many animals, including people.

Lichens for Lunch?

In winter, reindeer, moose, mountain goats and elk all eat lichen flourishing in harsh arctic climates. Caribou can smell lichen beneath snow – a useful skill since lichens make up 90 per cent of their winter diet. Along the northwestern coast of North America, snow often covers the usual plants eaten by black-tailed deer, so they consume a stringy-looking lichen called Witch's Hair. Normally growing in tall conifers, the lichen is blown to the ground during winter storms. And when they're not dining on Bryoria lichen, Northern flying squirrels use the spongy material to build nests.

Over 50 species of North American birds, including the Golden Plover, use lichens as home-building materials. Other varieties of lichens grow in hot, dry ecosystems, providing food for sheep grazing in deserts. Native North American eat a variety of lichen called Bryoria fremontii. For some groups, this was a delicacy – for others it was only eaten when famine was imminent.

Ancient Romans created a purple dye for cotton using lichen from Mediterranean rocks. In Scotland another variety of lichen is still used to dye wool for authentic Harris Tweed. Traditional artisans, from the desert-dwelling Navajo to the coastal Kilchoat Tlingit, also use lichens for dyeing wool.

A Planet Transformed By Lichen

Lichens help break down bare rock – without these plant-like organisms, much of the earth's crust would be lifeless, devoid of vegetation. Lichens begin the process of turning rock into soil, gradually breaking apart the substrate on which they grow. Once lichens are established, plants can take root, living on bits of humus and disintegrated rock. Mosses and grasses usually are first to move in after the lichens. When enough humus is created, seeds of woody plants can germinate. Those plant roots of continue to break down rocks. In a few decades, this newly-formed soil can support a forest where once only bare rock stood.

Sensitive to airborne toxins, lichens are studied by scientists to measure pollution. These plant-like organisms are seldom seen in large cities with poor air quality. If you find lichens on your property, you can truly breathe easier.

Left: The Orange Sea lichen (Caloplaca marina) covers a rock on Ardrossan North Beach, Ayrshire, Scotland. **Photo by Roger Griffith / Wikimedia.** **Right:** "This lichen is Parmelia sulcata, a common species in North America. Lichens -- which are often mistaken for moss -- are unusual plant-like organisms. They often grow on trees without causing harm." **Photo by Derrick Ditchburn / US Geological Service.**

RESOURCES:

- Macrolichens of the Pacific Northwest. McCune, B. and Geiser, L. 2009.

- Uses of Lichens, Past and Present, http://www.unomaha.edu/lichens/Bio%204350%20PDF/Uses%20of%20Lichens.pdf

- Bryophytes and Lichens: Small But Indispensable Forest Dwellers, US Geologic Survey: http://fresc.usgs.gov/products/fs/fs-154-02.pdf

- Washington State University Extension helps people develop leadership skills and use research-based knowledge to improve economic status and quality of life. Cooperating agencies: Washington State University, U.S. Department of Agriculture, and Skagit County. Extension programs and policies are available to all without discrimination. To request disability accommodations contact us at least ten days in advance.