

## Lichens, Lichens Everywhere!

These special organisms are found throughout the world, with over 3,600 species in North America. On a walk in the woods you can probably pick out a dozen species growing on tree trunks alone, but if you look around you'll find them on rocks, soils and fence posts. Their small size and complex taxonomy means that they are unfortunately rarely studied. That is why the Appalachian Corridor (ACA), in partnership with a group of students from the McGill School of Environment, hopes to improve the knowledge of lichens on the Appalachian Corridor's territory.

### Lichens in Ecosystems

While lichens are intrinsically valuable in their diversity of species and growth forms, they also play important ecological roles. Lichens are able to colonize surfaces inhospitable to nearly all other forms of life by breaking down rock and stabilizing soil, opening up habitat for other types of organisms.

Some lichens fix nitrogen from the air, playing an important role in forest nutrient cycles. They provide microhabitats in the forest canopy and are the main food source for caribou. They can also be part of the diet of numerous species including moose, deer, flying squirrels, and a host of invertebrates including mites, slugs and snails. Lichens are used as nesting material by flying squirrels and by almost fifty species of birds. The roles of lichens are numerous and important to ecosystem function.



Lichens growing on rock

### Lichen Biology

Animals, plants and fungi are three major groupings of multicellular life on earth. Fungi are primarily responsible for decomposition, or biological recycling; their diversity is well beyond that of plants and animals. Examples of fungi include the mushrooms you eat and the bracket polypores that look like shelves growing out of trees, although many of their roles are at the microscopic level in ecosystems. When fungi form a symbiosis (mutually beneficial relationship) with an algae or cyanobacteria they become lichens, a large and important group of organisms. The fungus anchors the lichen to its substrate while the algae, or cyanobacteria, collects the energy for the lichen using photosynthesis. Lichens are slow-growing organisms found on a wide variety of substrates from rocks and trees to rusted metal and the backs of insects. Due to their small size, many are identifiable only by microscopic characters and chemical tests. With a little bit of practice, most people can pick out several common species, such as "British Soldiers".



*Cladonia cristatella* (British Soldiers) on a stump

## A diversity of forms

Although lichens can be found from the ground to tree branches in the canopy they can all be grouped into four main growth forms: crustose, squamulose, foliose and fruticose.

Crustose lichens usually appear to be clumps of tiny specks of colour; they grow right on the substrate and cannot be removed intact. *Lecanora* sp. is one such lichen, shown on the picture to the right.



*Lecanora* sp. – a crustose lichen

Squamulose lichens are also very small but form a series of tiny shelves, like in the *Cladonia* to the left.

Foliose lichens have a more visible structure, usually creating circular patterns composed of flat ribbons expanding outwards from a central point. The edges often curl up and you can see that there is a distinct top and bottom to the ribbons. *Punctelia rudecta* commonly known as the rough speckled shield lichen is the largest specimen in the picture below.

Finally, fruticose lichens take advantage of three dimensional space, growing in tubes up or out from the surface it is growing on. British Soldiers or *Cladonia cristatella* are a very common fruticose species pictured on the previous page.



*Cladonia* sp. – a squamulose species

Recognizing the growth forms of lichens can be tricky, but it is the first step in appreciating their diversity.

## Lichens and Conservation

Lichens are an integral part of the ecosystem, making nutrients available to other biota, fixing nitrogen, and providing food and shelter for vertebrates and invertebrates alike. Their diversity can be conserved by protecting their habitats. Lichens can also be excellent indicators of air quality and they illustrate ecological continuity in forest stands. Special attention must be paid to species found locally yet considered “at risk” in Canada. Lichens have a role to play in conservation, recognizing them and their importance in natural ecosystems is a significant step in the right direction!

For more information on lichens in the area or to find out about conservation tools available to landowners for the protection of natural habitats in perpetuity, please get in touch with your local conservation organization or contact Appalachian Corridor at [info@corridorappalachien.ca](mailto:info@corridorappalachien.ca) or (450) 297-1145.



Over five species of lichens share space on this tree trunk

## Source

COSEWIC 2006. COSEWIC assessment and status report on the ghost antler *Pseudevernia cladonia* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 29 pp. ([www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm)).



## Close-up on a Species at Risk

*Pseudevernia cladonia*, also called **Ghost Antler**, is a species of macrolichen found in the mountainous forests of the Appalachians, which are mostly constituted of spruce and fir.

The Ghost Antler grows mainly on the branches of conifers and is easily recognizable thanks to its chalky white colour. Its thallus divides itself from the base creating symmetrical ramifications, visible on the picture (right). *P. cladonia* can grow up to 12 cm in diameter and 4 cm in height (width) when good conditions are present to favour its development.



### Did you know ?

A thallus (*pl.* thalli) is a plant body not differentiated into stem, leaves and roots, and without a vascular system. Thalli are typical of algae, fungi, lichens and some liverworts.

## Ghost Antler's actual situation

In Quebec, before 2004, *P. cladonia*'s presence had been recorded only once, on Mount Orford, in 1959. Recent field work carried out by Appalachian Corridor's biologists, amongst others, revealed however that the species is now relatively well spread-out over a small region in South-East Quebec, adjacent to the mountains of Western Maine and Northern New Hampshire. It is found especially in mature forests of Balsam Fir at altitudes exceeding 800m.

## A promising future

The construction of transmission towers, the development of ski slopes and the occurrence of logging activities led to a certain decline in the size of the Ghost Antler's mountainous territory and the quality of its habitat.

Nonetheless, these serious threats are not the only news regarding *P. cladonia*'s future; the abundance of the species on a great portion of its area of occurrence and the potential discovery of important populations on some of Quebec's summits compensate for these threat.

With the results of species inventories carried out by Appalachian Corridor's biologists during the falls of 2008, 2009 et 2010 in the Sutton Mountain range, the Ghost Antler may now be facing a more reassuring future.



**Appalachian Corridor is a conservation organisation with a mission to implement, in collaboration with Nature Conservancy Quebec and local conservation organisations, a transborder conservation strategy for the protection of a natural corridor extending from the Green Mountains of Vermont to Mount Orford, passing through the Sutton Mountains in the Eastern Townships.** The following partners support Appalachian Corridor's global vision: Mount Echo Conservation Association, Association pour la conservation de la nature de Stukely-Sud, Ruiter Valley Land Trust, Parc d'environnement naturel de Sutton, Mount Pinnacle Land Trust, Alderbrooke Marsh Land Trust, Memphremagog Wetlands Foundation, Brome Lake Land Foundation, Société de conservation du corridor naturel de la rivière au Saumon, Conservation des vallons de la Serpentine, Société de protection foncière du lac Montjoie, Les Sentiers de l'Estrie, Conservation Espace Nature Shefford and Massawippi Conservation Trust.

**Initial research on lichens was conducted by the McGill School of Environment, photography by Elizabeth Wanless and Appalachian Corridor.**