Liking Lichens

by Jim Cornish

Lichens. We see them hanging hair-like from branches, spreading finger-like along tree trunks, carpeting barren lands or forest floors and encrusting bare soils, rocks, headstones and buildings like a mosaic of colourful tiles. Lichens are fascinating organisms and can be found just about anywhere (meaning that inner-city Scouts can find them just as easily as their "rural" neighbours). Considered "the poor peasants of nature" by early botanists, lichens were often overlooked and seen as having no ecological importance or practical value. But, as you will discover, looks are sometimes deceiving.

The word lichen has two origins; from the Greek meaning "wart" and from the Latin meaning "tree moss". Although plant-like in appearance and traditionally studied as part of the plant kingdom, lichens are not really plants at all. They lack a protective waxy cuticle, roots and a vascular network to transport water and nutrients. They exist because two organisms, a thread-like fungus and a green algae, live together in a mutually beneficial relationship called symbiosis. The fungus provides shelter and protection to the algae and in return the algae uses photosynthesis to make food for itself and the fungus.

Lichens thrive in moisture environments. When conditions are dry, they become dormant, which may explain their slow growth rate (less than a centimetre per year) and their longevity (some being over 1000 years old). Lichen colours (bright in open spaces and darker in shaded ones) reflect sensitivities to light and the presence of various acids. Although they are attached to trees, lichens are not parasitic; they do not remove nutrients from trees.

About 45,000 lichen species exist worldwide. Many live in rainforests while the hardiest survive in hot and cold deserts — environments too extreme for any other life-forms. Some 3600 lichens are native to Canada. While many are cosmopolitan (covering much of a continent), others are limited in their distribution. Like so many other creatures on this planet today, a growing number of lichen species are either threatened or endangered.

Types of Lichens

Lichens are diverse. Identifying them to the species often requires special chemical tests and microscopic study. For Scouting purposes, knowing the type and some of the common names will suffice.

Lichens are classified as fungi and are typed according to their physical appearance. Leaf-like types are **foliose**. Lichens that look like miniature shrubs are **fruticose** and lichens that encrust surfaces are **crustose**.

Type	Common Characteristics
Fruticose/ Terricolous	Erect, free-standing, hollow tube-like structures attached to the substrate only at the base. Ends can be pointed, branched, clubbed or cupped. Usually grows on the ground or decaying wood. Light grey to grey green in colour. Can also be hair-like and hanging from tree trunks, branches and twigs. Dark brown, light grey to grey green in colour.
Foliose/Terricolous/ Saxicolous/Corticolous	Flat, sheet, lettuce or leaf-like structures often with radially arranged lobes. Overall shield-like shape. Sometimes paper or coral-like in appearance. Colours vary from greys to greens to browns. Grows on trunks, branches and twigs of trees and on surfaces of some rocks. Attached to substrate by root-like structures, sometimes at a single point. Bull's eye pattern common for some species. Underside may have root-like threads.
Crustose/Saxicolous/ Corticolous	Flat, paint-like, scaly and crusty. Sometimes branchy. Often very colourful (black, grey, red, yellow, orange and green). Grow on rocks and bark. Colours more stain-like on bark. Firmly attached to substrate.

Lichens are also typed based on substrate — where they grow. Those that colonize tree bark are **corticolous**. S**axicolous** occupy bedrock and boulders while **terricolous** lichens exist only on soil. Since several species of the same type and different types can co-exist in the same habitat and even on the same substrate, lichen growths sometimes look like miniature jungles.

The table on the opposite page is a very simplified list of the most common lichen characteristics based on type. Use it to help identify lichen you find on your next field trip.

Ecological Value

Slow-growing, hardy and drought-resistant, lichens are considered pioneering plants. They colonize habitats where few other macroscopic organisms can grow and begin the process of creating soils in which moss spores and plant seeds can establish themselves. Some types of lichens are nitrogen fixers, extracting nitrogen from the air and converting it into a form plants can use after the lichen dies and decays. Other foliose lichens are homes for spiders, mites, lice and other insects as well as unusual collections of microscopic invertebrates and protozoan. Rich in carbohydrates, lichens serve as food for insects and animals such as deer, squirrels, caribou and snails. Many birds also use lichens to build their nests.

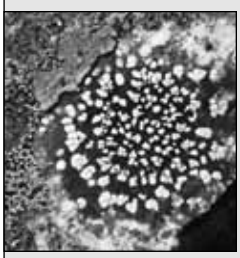
Practical Value

Lichens are used by humans for making medicines, perfumes and dyes. More recently they have become environmental indicators — "canaries in the cage." Because lichens remove particulate matter from the air and rain to help make food, they accumulate pollutants and toxins that either kill them or the animals that feed on them. Some industrial areas and cities are so polluted,

Lichen Descriptions

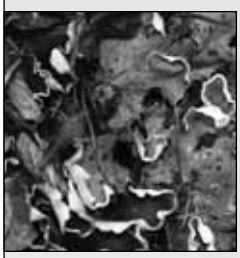
British Soldiers (Genus Cladonia)

Tipped with red bulb-like structures resembling the colour of hats of British soldiers during the American Revolution, these fruticose lichens prefer sunny locations and a decaying wood and humus substrate.



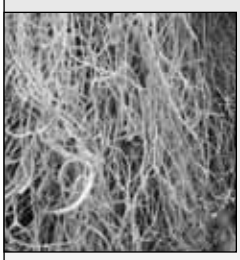
Speckled lichen (Genus Rhizocarpon)

This crustose lichen comes in a variety of colours (orange, grey, green, yellow) all speckled with black. Grows on exposed rocks and boulders.



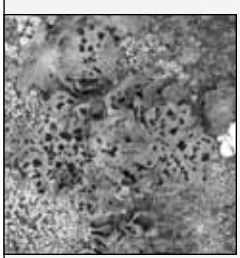
Dog lichen (Genus Peltigera)

Foliose lichen is so named because root-like structures underneath resemble dog's teeth. Upper surface commonly green (bright green when wet) and grey and covered with black wart-like structures. Underside can also be veined and white or black in colour. Forest floor habitat.



Hair Lichen (Genus Bryoria and Alectoria)

Hanging from trees, these fruticose lichens are the easiest to identify and are often lumped together as "old man's beard". The brown species (called horse hair) belongs to the Bryoria genus. The greenish ones (called witches hair) belong to Alectoria.



Rock Tripe (Umbilicaria)

Looking like rotten lettuce leaves and attached to the substrate in one spot (hence the genus name), this lichen is the one most often eaten by humans in an emergency. Usually brown and covered with wart-like structures.

Photographs: Jim Comish

Notice of Annual Meeting
Boy Scouts of Canada

Saturday,
November 25, 2006
4:30 p.m.
Winnipeg Convention Centre,
Presentation Theatre
Winnipeg, Manitoba

Purpose:

(1) Receipt and consideration of reports including the Corporation's annual report.

(2) Receipt and consideration of the financial statement for the National operation and the auditor's report thereon for the preceding year.

(3) Election of Honorary Officers and Honorary Members.

(4) Recommendation to the Chief Scout of an individual to fill the position of Chief Commissioner.

(5) Appointment of Officers and election of Members of the Board (except for the Executive Commissioner & Chief Executive Officer, who is appointed by the Board, and the Chief Commissioner, who is appointed by the Chief Scout).

(6) Appointment of an auditor.

(7) Consideration of any matter placed before it by the Chief Commissioner on behalf of the Board.

(8) Selection of three (3) Voting Members to serve on the Nominating Committee for the ensuing year.

(9) Consideration of any resolution(s) introduced by the Voting Members in accordance with Article III i., and the recommendation(s) of the Board relating thereto.

(10) Such other business as may come before the meeting and which the Members under applicable law are authorized to transact.

they have become lichen-less; a condition ecologists call a "lichen desert". Because certain types grow at predictable rates, lichen growth is being used to measure climate change in extreme environments such as high mountain ranges and the Arctic.

Field Studies

If collecting samples threatens their survival in a habitat, study lichens in the field. Here are some suggestions:

1. Compare lichens in undisturbed wooded areas to lichens collected in settled areas.
2. Compare types of lichens growing on different substrates, i.e. trees vs. rocks, deciduous trees vs. coniferous trees, rocks of one kind vs. rocks of another. (Lichens are often picky about where they live.)
3. Determine the effects of habitat destruction on the distribution and the types of lichens common in your area. (Exposing certain species to more sunlight may kill them.)
4. Determine the presence/absence of lichens to draw conclusions about air quality in your area. Compare locations downwind of pollution sources compared to other areas mainly upwind from the source.
5. Study how the abundance of lichen changes as distance from industrial sites change. Compare presence/absence of lichens along prevailing wind direction.
6. Study where lichens grow on a tree (compass points, varying heights above ground on a freshly fallen/cut tree). Identify the factors that might affect lichen growth such as bark type, moisture and availability of sunlight.
7. Study lichen growth on ornamental trees. Compare it to native species. Determine the dates on which the trees were planted to create a time-line for initial lichen growth.
8. Study headstones in a cemetery. Use the burial dates to determine age of any lichens present.

Collecting Lichens

Equipment: pocket knife, magnifying glass/hand lens, envelopes, permanent maker, field book/index cards, shoe box, compass, water bottle.

Choosing Sites

Choose different habitats for collecting; old cemeteries, open spaces, forest floor, different species of coniferous and deciduous trees, rocks and man-made structures. Choose locations within and outside a city or town. Determine the prevailing wind direction for your location.

Collecting Samples

1. Collect lichens dry. Their colours better match the descriptions in books and on-line. Be careful. Dry lichen is usually very brittle and will break easily if roughly handled.
2. Collect a piece of substrate along with the lichen if possible. If this is not possible, use a knife to pry samples from the substrate. It may help to moisten a lichen to make it pliable for easy removal.
4. Place individual lichens in a paper bag or envelope to allow further drying.
5. Use a shoe box for transportation and storage.

Taking Field Notes

1. Number each envelope. Record the location, date, weather conditions and name of collector on envelope. Use the sheet at www.cdli.ca/CITE/lichens/record.pdf.
2. Record nature of substrate (forest floor, decaying wood, rock type, tree type and location).
3. If collecting from a tree, determine on what side (north, south, east or west) and at what height the lichens grow. Some lichens prefer the north side of trees as they remain moister longer than the sun-exposed south side. Because of moisture and sunlight requirements, various species occupy various levels on a tree.
4. Mark the location of samples on a map.

Studying Collected Lichens

1. Group lichens by type or by substrate.
2. First study the lichens dry. Then soak a portion in water for a few minutes. Note colour, feel and stiffness changes in the lichen. Colour change means the chlorophyll in the algae is actively making food again and is now more visible through the wet translucent fungus.
3. Use a magnifying glass to study the top surface. Use words like rough, smooth, fuzzy, veined, granular, frosty, ridged, veined or cupped to describe its appearance. Look for reproductive structures (cups, granules, eruptions, fine powder).
4. Compare the upper surface with the lower surface one. (In most foliose lichens, they are distinctly different.)
5. Identify lichens using common names and genus using the image gallery link on the lichen web page.

For a list of Web sites to support the study of lichens with your troop, go to: www.cdli.ca/CITE/scouts/lichens.htm

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Linking to Strategic Direction #1.