

SYMBIOSIS in Nature

Part 1: Lichen, Alga & Fungus *Elnora A. Old Coyote*

Symbiosis is the close, interdependent association of two organisms. Most symbiotic relationships are beneficial, but some can be harmful. Often overlooked, symbiosis is a very important part of nature. For example, if most plants didn't have fungus living on their roots, they would die from lack of water and nutrients.

There are several good examples of symbiosis in nature. Coral reefs with algae, mycorrhizae with fungus, and termites with trichonympha all have beneficial symbiotic relationships. They would not be able to survive without their vital symbiotes. Both organisms are better off because of the relationship.



Coral reefs have minuscule dinoflagellate algae living in their tissues. These photosynthetic protists produce food that the coral uses. The algae is provided a safe place to live, so both benefit from the relationship. Both play an important role in each others' survival.

Mycorrhizae are a beneficial fungus that live with the roots of many plants. The fungus helps the plant by facilitating water and nutrient absorption from the surrounding soil, helping the plant to tolerate extreme conditions such as drought and high soil acidity, and protecting it from harmful pathogens. In return, the fungus gets an ample food supply and a safe refuge from harmful soil conditions.



Termites and trichonympha also have a significant symbiotic partnership. Best known for their often destructive eating of wood, termites would not be able to digest the wood without the help of the trichonympha protists living in their gut. The microscopic protists break down the food for the termite while

getting great lodging and food. Without their little protist friends, termites would no longer be able to eat the wood that has given them such a bad reputation.

These are only a few of the numerous symbiotic relationships in nature, which play a vital role in our ecosystem. [Excerpted from natureeniche.tripod.com]



In this series, *Natural Life News* columnist, Elnora Old Coyote, illustrates three examples of symbiosis in Montana: Lichen, Alga and Fungus; Milkweed and the Monarch Butterfly; and the Yucca and Wee Aphid.



I am the anchoring strands, you are the factory of leaves of our orange-green tapestry.

Here on this hardened rock, this bared, dry tree bark, this forest-fire-charred soil.

Together, we restore life to each barren place.

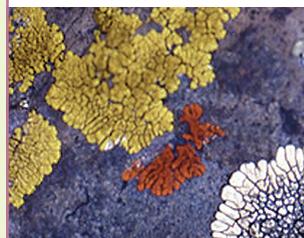
— LICHENS —

The lichen is known to be a combination of an alga and a fungus growing together in a symbiotic relationship to each other.



Fungal mycelia on a leaf

In this relationship, the fungus, with its strands of mycelia, cling to and grow in crevices on bare rock, tree trunks, even to charred soil; while the foliage of the alga, green and containing chlorophyll, manufactures food for both. Each plant is dependent upon the other.



Crustose lichen

logs, soil in moister situations (foliose lichens); or as larger, hair-like strands hanging from trees, as spruce, pines (fructose lichens).

Lichens may be on dry surfaces as a crusty growth on rocks, bare soil, dry trees (crustose lichens); a more foliage form still on trees,



Foliose lichens



Black tree lichen

— **PINE MOSS, TREE LICHEN** —

Evernia vulpina (L.) Ach.

Crow Indian people called this “awische,” pine moss or tree lichen. They mixed it with willow bark (*Salix amygdaloides* Anders., which they called “peelatchisbalé”) to make tea for eyewash, or used to gargle for laryngitis. It was parched and pulverized for use as a mouthwash for canker sores, or chewed to prevent teeth cavities. This plant grows as green lichen on pine trees (called “baaiishi-ile”) and was used for yellow dye, and for incense to hasten childbirth, or as ceremonial incense. Northern Cheyenne people record *Evernia* as HE 'YO 'YOTSE, and boiled it in water to make a deep yellow dye, cooled and quickly used to dip porcupine quills in for at least a day for a good color.



Tree lichen, a.k.a. pine moss

— **BLACK TREE LICHEN** —

Alectoria fremontii Tuck.

Fine, little, bent, twisted black strands of lichen cling beard-like to trees, grow in crevices of rocks and on bare soil. Dark brownish to olive stalks fork and twist on trunks and branches of dry conifer trees. Algae, yellowish-green to yellow-brown, to relish, intertwine with the fungi. They support green chlorophyll cells that make food for themselves and for the clinging fungi.

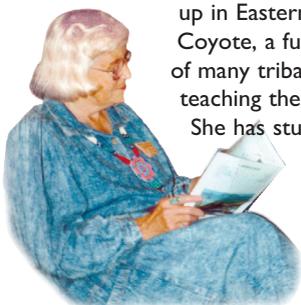
Black tree lichen was an important source of food for the interior Indian peoples of western North America. Some Plains and Northwest tribes harvested, cleaned, and soaked the hair-like branches in water, then baked them for two days in fire pits, as they did camas roots. When baked, tree lichen loses the coarse stringi-

ness and becomes a gelatin-like mass, to be eaten right away or to be sun dried, powdered and boiled in water to a thick mush and sweetened to taste. Sometimes it was mixed with powdered camas roots. Rathead and

Kootenai Indian people used it more in times of food shortage. Nez Perce Indians used tree lichen medicinally for upset stomach (indigestion) and diarrhea. ■



Crustose lichen



DR. ELNORA (STENERSEN) OLD COYOTE, age 87, grew up in Eastern Montana and married John M. Old Coyote, a full-blooded Crow Indian. With the help of many tribal people, she has been researching and teaching the use of native plants for many years. She has studied and written about over 300 Montana plants. Included here are her notes on ecology and folklore, and her original sketches and poems. Elnora lives in Huntley, Montana, and can be reached at (406) 348-2474.