

LICHENS OF GEORGIA

This poster does not illustrate all of the lichens found in Georgia. In fact, the exact number of Georgia lichens remains unknown, perhaps as many as a thousand. As recently as 2008 a new species was described, named *Megalaria beechingii*, in honor of one of this poster's contributors.

Lichens are Alive!

Lichens are "composite" life forms living in a relationship called *symbiosis*. Although at times lichens look like plants, they are in fact not, but rather are comprised of a *photosynthetic partner* (algae or cyanobacteria) and a *fungus*, associated together in a body called a *thallus*. The fungus provides shelter, protection, and stability, for the photosynthetic partner while the algae or cyanobacteria supply energy to the fungus through the process of *photosynthesis*. In reality, lichens are *ecosystems* including bacteria, and many microscopic and larger animals. Many lichens are known to be sensitive to pollutants and to environmental disturbances.

Lichen Body Types (Morphology)

Although lichens have diverse shapes and colors, there are a few basic lichen body types. The most visible lichen types are those with larger thalli (plural of thallus) called *foliose* and *fruticose*, and those with smaller thalli called *crustose*.



Xanthoparmelia sp. is a **foliose** (leaf-like) lichen



Ramalina sp. is a **fruticose** (shrub-like) lichen



Caloplaca sp. is a **crustose** (crust-like) lichen

A Rare Lichen in Georgia

The Rock Gnome Lichen (*Cetradonia linearis*) is an endangered species under the authority of the federal Endangered Species Act. This lichen is distributed in a very limited range, restricted to mountaintops, cliff faces, and gorges in the Southern Blue Ridge. It is threatened primarily by logging, habitat disturbance, collection, and possibly air pollution. It is the only endangered lichen in Georgia, however, there are a number of species of special concern that are rare, such as *Usnea angulata*.



Cetradonia linearis

Primary References

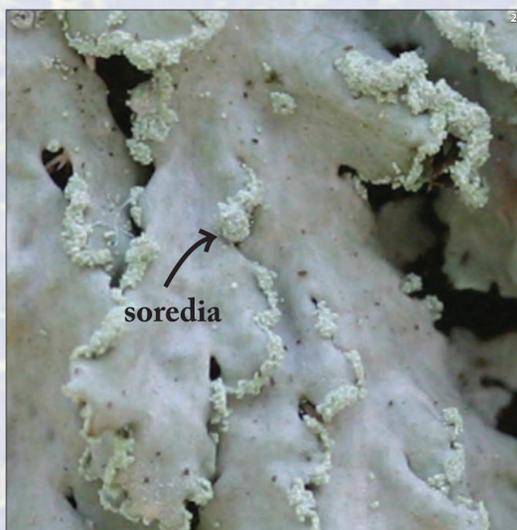
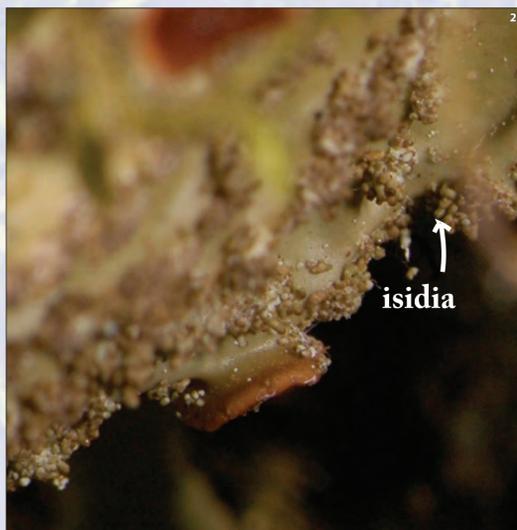
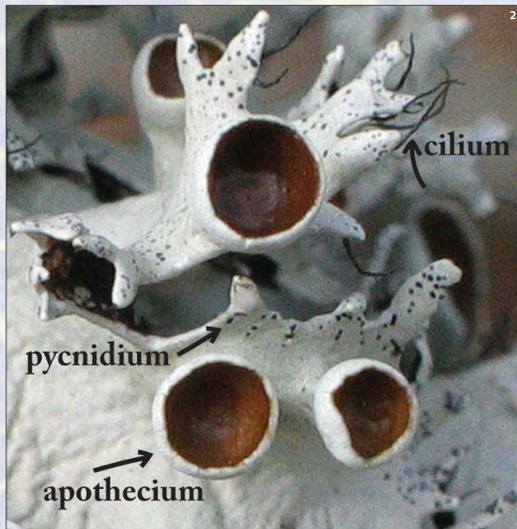
Brodo, I. M. (2001). *Lichens of North America*. New Haven, CT: Yale University Press. <http://www.lichen.com/>

The UGA *Georgia Lichens Project*, <http://www.georgialichens.org> (supported through the Teacher Quality Improvement Grant, U.S. Department of Education, Oconee River Georgia Youth Science & Technology Center (GYSTC) at Northeast Georgia Regional Educational Service Agency. Activities designed to enhance Georgia Performance Standards (GPS) for Science education are found at <http://www.georgialichens.org>.

North American Lichen Checklist at <http://www.ndsu.nodak.edu/instruct/esslinge/checklst/chcklst7-12.htm#S>

Lichen Reproduction

Lichen reproduction is complex. The fungal partner may reproduce through *spores* that develop in specialized structures called *apothecia* or *perithecia*. Lichens also reproduce in vegetative ways. In some instances, lichen bodies break up, resulting in new lichens if the pieces lodge in suitable habitats. Some lichens produce outgrowths of the surface, called *isidia*. These may vary in shape. Other lichens produce loosely organized collections of photosynthetic cells and fungal threads called *soredia* that occur in patches called *soralia*.



Selected Glossary of Terms

Apothecium (plural, *apothecia*). A cup or disk-shaped structure that produces, sexually, the spores from which the fungal partner develops.

Cilium (plural, *cilia*). Hair-like bristle lining the *edge* of a lichen part such as the *thallus*.

Crustose. A lichen body that is growing so tightly to a substrate, such as a rock or tree bark, that it can not be easily separated from it.

Cyanobacterium (plural, *cyanobacteria*). Bacteria-like organisms that get their energy through carbon dioxide, water, and sunlight. They are unique in that they fix nitrogen, a valuable nutrient, from the air, making it available to plants and the ecosystem.

Ecosystem. A place where life forms, such as plants, animals and micro-organisms, live and function together with the non-living (physical) conditions that are part of their environment.

Foliose. A lichen body that has a leaf like appearance and which normally has an upper and a lower protective layer, called a cortex.

Fruticose. A lichen body that is shrubby, stalked, or hanging like a pendulum, and which usually has no distinguishable upper and lower protective layer.

Isidium (plural, *isidia*). Tiny, fine projections, often finger-like, emerging from the lichen body, that act as vegetative (asexual) propagules.

Organism. An individual form of life such as a plant, mammal, insect, lichen, fungus, etc.

Perithecia (plural, *perithecium*). A structure that is partially or completely embedded in the thallus, that opens with a pore, and produces fungal spores.

Photosynthesis. A process that uses light energy to convert carbon dioxide and water into chemical energy, such as sugars and starches, and oxygen.

Pycnidium (plural, *pycnidia*). An asexual fruiting body of the fungus. It produces a type of spore that escapes through a hole, much the same as in a perithecium. The main difference is that pycnidia produce spores asexually.

Soralium (plural, *soralia*). Dusty patches on the lichen surface that produce *soredia*.

Soredium (plural, *soredia*). Fine particles of mixed fungal threads and algae that act as vegetative propagules.

Spores. Single or multicellular structures that result typically from cell divisions. In lichens, these are most often produced in fungal *apothecia* or *perithecia*.

Symbiotic. A long-term association between at least two dissimilar organisms.

Thallus (plural, *thalli*). The lichen body.

Credits

Poster Design: James Savage, <http://www.jimsavagefineart.com>. Resources: Jim Candler and Ken Bradley, GA Power, and The Environmental Resource Network (TERN). Photographs: Hugh & Carol Nourse, (photographs numbered 1-8,10,14-16,18-20,24, and 26) and Vitaly Charny, (photographs numbered 9,11-13,17,21-23, 25 and 27). Project coordinators: Robert Hill, and Tommy Jordan (UGA). Consultants: Lisa Kruse, (DNR), Sean Beeching, Malcolm Hodges, Nikolai Curtis, Pamela Park, Thomas Sewell and Tina Pagan. Grant Administrator: Wayland Walker. Thanks are due to Drs. Irwin Brodo and Richard Harris for helpful comments.

GEORGIA POWER
A SOUTHERN COMPANY



LICHENS OF GEORGIA

Cladonia rangiferina



Dibaeis baeomyces



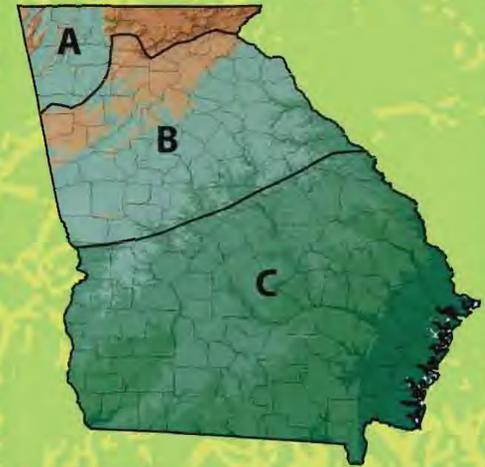
Species Distribution

Regions:

A. Mountain

B. Piedmont

C. Coastal Plain



The Letters located in the bottom left of each lichen photograph correspond to the region in which that lichen is generally found.

Cladonia caroliniana



Ochrolechia africana



Cryptothecia rubrocincta



Umbilicaria mammulata



Sticta beauvoisii



Buellia spuria



Cladonia evansii



Cladonia leporina



Xanthomendoza fulva



Physcia pumilior



Teloschistes exilis



Lobaria pulmonaria



Parmotrema hypotropum



Ramboldia russula



Parmotrema submarginale



Hypotrachyna livida



Lasallia papulosa



Usnea strigosa



Lichens not shown actual size.
Species distributions are generalized.

