

# Lichens

Edwin R. Duke and Samuel E. Hand, Jr.



FLORIDA A&M UNIVERSITY  
**COOPERATIVE  
EXTENSION**  
COLLEGE OF AGRICULTURE AND FOOD SCIENCES

## Introduction

Lichens are found in almost every terrestrial ecosystem in Florida. Estimates are that there are between 13,000 and 30,000 lichen species world-wide and approximately 3,600 species in North America. They can be found growing on rocks, trees, soil and even on manmade materials like concrete. They are not parasitic as they simply use the host for support.

Lichens are unique among living organisms in that they are made up of organisms from three different kingdoms: fungi, plants and bacteria. Lichens consist of a fungus living with an alga and a cyanobacteria (formerly blue-green algae). These three organisms form what can be described as a mutualistic relationship - two or more organisms living in a mutually beneficial arrangement. The algal and bacterial components of a lichen often can survive outside of the relationship, while the fungal component cannot.

## Lichen Biology

### *Fungi*

The taxonomy of lichens is based on the fungal component, or mycobiont. This structure feeds off of the sugars produced by the photosynthetic ability of the algae/bacteria component, photobiont(s). The most common fungi in these associations belong to the Ascomycetes, or cup fungi. Lichens retain the ability of the fungus to form the cup-shaped reproductive structures called ascocarps, which contain spore-producing cells. As mentioned above, the fungus is the one part of this association that cannot survive as a free-living species. Both the algae and bacteria, can and do exist independently.

### *Plant*

The algae component of the lichen is represented by several species of photosynthetic, single-celled alga. These photosynthetic algae give the characteristic green-gray color of many lichens. However, they may contain other pigments besides chlorophyll, giving the lichen an orange or yellow appearance. The algae processes atmospheric carbon dioxide into sugars through the process of photosynthesis and supplies it to the other components.

### *Bacteria*

Cyanobacteria, formerly known as blue-green algae, make up the third component of this mutualistic organism. These are true bacteria, neither plant nor fungus. Many cyanobacteria have the ability to fix atmospheric nitrogen into a form that may be taken up by the other two living components. Because of its nutrient harvesting capacity, the cyanobacteria allow lichens to live in nutrient-poor conditions where plants normally would not survive.

## Lichen Morphology

Lichens are categorized by their growth forms and three main type have been recognized.

### *Crustose*

Crustose lichens grow close to the surface that they are found on. They may appear as if they are painted on. It is nearly impossible to pry the organism from the surface without tearing the lichen apart. Many crustose lichens are gray-green in color, however some may be founds in shades of pink, orange and yellow.

Edwin R. Duke, Associate Professor, College of Agriculture and Food Sciences; FAMU Cooperative Extension, Tallahassee, FL 32307. Samuel E. Hand, Jr., Associate Professor and Director of Industry Credentialing Training Programs, FAMU Cooperative Extension, Tallahassee, FL 32307.

The Florida A&M University Cooperative Extension Program is an equal employment/ educational opportunity access organization that provides research-based educational information and services only to eligible individuals and institutions regardless of race, color, national origin, religion, gender, age, disability, martial or veteran status.

**Foliose**

Foliose lichens have structures (thalli) that appear leaf-like (Figure 1). These thalli may be folded up and off of the surface on which they are growing. These type of lichens are commonly found on many surfaces. They often are used as indicators of air quality. Many lichens are quite intolerant to air pollutants.



Figure 1. This foliose species of lichen has leafy-like thalli which are raised above the surface of the plant stem. It is important to note that neither this lichen nor the Spanish Moss (*Tillandsia usneoides*) are parasitic or are harming the plant in any way.

**Fruticose**

Fruticose lichens have small, branched, filamentous structures which give them a coral-like appearance (Figure 2). There are both terrestrial species and those which are found growing on the trunk and branches of various species of trees. A number of fruticose lichens have proven useful as a winter forage for various species including deer.

**Lichen Management**

Many homeowners have the misconception that lichens are harmful to their trees and shrubs. This is most definitely not true. Lichens are most observable on deciduous trees in the winter and on trees that have thinning foliage due to stress. The stress is NOT caused by the lichen. It is merely an

indicator of another physiological problem. The lichen is merely taking advantage of the thinning plant canopy which provides more opportunity for the lichen to produce its own carbohydrates due to photosynthesis. To reiterate, the lichens are not parasitic and are not harming the plant in any way.

Lichen management can be accomplished for aesthetic purposes, especially when growing on non-plant structures. Pressure washing or mechanical removal by scraping or scouring is feasible as long as the process does not damage the underlying surface. Removal from plants is not recommended. If lichens are on living plants, their removal could damage the plant and create wound sites where plant pathogens could enter and cause infection.



Figure 2. Fruticose lichens such as this *Usnea* sp. Are most easily observed in the winter when trees are deciduous. Notice the cup-like ascocarps of the ascomycete component of this mutualistic organism.