

## What are lichens?

### Symbiosis

#### Intimate biological union of two different organisms

–*Mycorrhizae*—over 90% of plants have fungi growing on their roots

–*Lichens*—Relationship between algae & fungus that forms a “new” organism that bears no resemblance to either “parent.”

#### Symbiotic relationships form a continuum

### Symbiotic relationships in lichens

#### One alga species + one fungus

–*Either green algae or cyanobacteria*

#### Two algal species + one fungus

–*both green algae and cyanobacteria, or two different green algae may be possible*

### Lichen-forming fungi

Basidiomycetes

Ascomycetes

–*Over 200 genera, ~15,000 species*

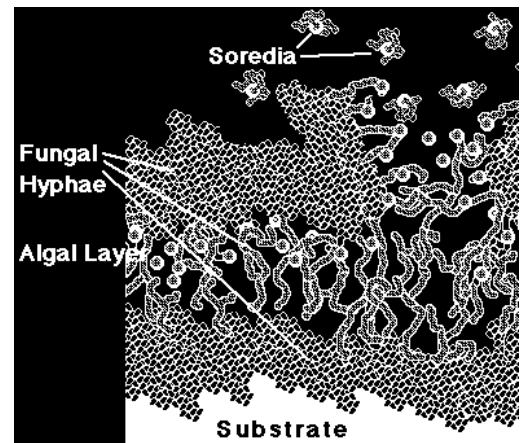
### Major Categories of Ascomycetous Lichens

Crustose

Foliose

Fruticose

### General anatomy of a lichen



## Crustose lichens

Crust-like, flat, more or less prostrate,

Anchored to the substrate over all or most of their underside.

More or less firmly attached to the substrate by their bodies but not by rhizines;

Always lacking a lower cortex

## Foliose lichens

Flat, more or less prostrate,

Anchored to the substrate over much or all of their underside.

–More or less loosely attached to the substrate, usually by rhizines;

Have a lower cortex.

Colour varies

–pale grey, yellowish green, dark green, light brown, dark brown, orange, red to almost black, depending on species.

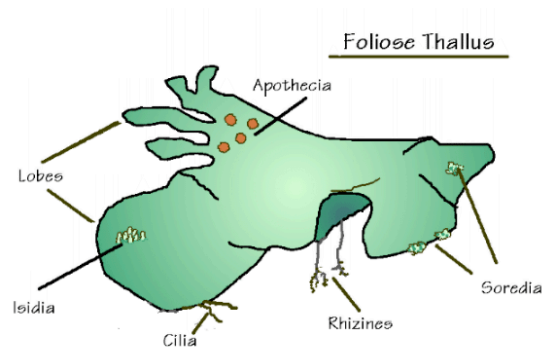
## Generalized foliose lichen

### Foliose lichens

### Introduction to Lichen Morphology

**Biodiversity** After McCune's key in *Macrolichens of*

### Unstratified gelatinous lichens



and  
the PNW.

## Stratified lichens

Have distinct algal layer

–Can see medulla and green layer with hand lens

–Rip lichen and view with hand lens

## Fruticose lichens

Composed of an upright or hanging axis

Anchored at the base to the substrate

More or less round in cross-section,

Often found hanging from tree branches.

## Lichen structures

Soredia

–Asexual reproductive structure that are algal cells coated with mycelium

Cephalodia

–Cyanobacteria-containing structures in lichens where the primary photobiont is green algae