# Ecological Importance

Lichens are bio-indicators of healthy air quality. They will not grow where toxic air pollutants are abundant. Lichens, having no vascular system, can absorb these toxins but have no way to release them. *Ramalina* and *Usnea* lichens are particularly sensitive to air pollution.

Lichenometry, a method of dating which relates to the growth rate of lichens to the passage of time, is used in analyzing the speed of glacial retreat due to climate change.

Crustose lichens are active participants in soil formation through rock decomposition.

# Fun Facts

Lichens are traditionally used by native people for their antibiotic properties.

*Ramalina menziesii*, Lace Lichen, was named the official lichen of California in 2015. It is found in every county of the state.

Lichens are used in making litmus paper, and have been used as odor fixatives in perfumes and as natural dyes for wool.

Hummingbirds use lichens in their nests.

# Common Genera

In the Botanic Garden, there are three primary types of lichens—crustose, foliose and fruticose. Please see reverse for photos and descriptions.

## Crustose

*Buellia,* Button Lichens
*Caloplaca,* Firedot Lichens
*Chrysothrix,* Gold Dust Lichens
*Lecanora,* Rim Lichens
*Rhizocarpon,* Map Lichens

## Foliose

*Flavoparmelia,* Greenshield Lichens
*Hypogymnia,* Pillow Lichens
*Lobaria,* Lung Lichens
*Parmotrema,* Ruffle Lichens
*Pelitgera,* Dog Lichens
*Tuckermannopsis,* Wrinkle Lichens
*Umbilicaria,* Rock Tripe Lichens
*Xanthoparmelia,* Rock-shield Lichens

## Fruticose

*Cladonia,* Matchstick Lichens
*Evernia,* Oakmoss Lichens
*Letharia,* Wolf Lichens
*Niebla,* Fog Lichens
*Ramalina,* Lace Lichens
*Teloschistes,* Orange Bush Lichens
*Usnea,* Beard Lichens

# Lichens Are Not...

Although classified in the Fungi Kingdom, lichens are neither fungi nor plants. They are often mistaken for some of the byrophtyes that grow in the same habitats, such as mosses, liverworts, and hornworts.

Moss: *Homalothecium nuttallii*

Liverwort: *Preissia (Lunularia) quadrata*

Hornwort: *Phaeoceros (Anthoceros)* sp.

# For More Information

If you have questions about lichens or other plants found in the East Bay, please contact the California Lichen Society (CALS) at californialichens.org, the Regional Parks Botanic Garden at nativeplants.org, or an East Bay Regional Parks Visitor Center:

Ardenwood Historic Farm
Fremont, (510) 544-2797

Big Break Visitor Center at the Delta
Oakley, (510) 544-3050

Black Diamond Mines Regional Preserve
Antioch, (510) 544-2750

Coyote Hills Regional Park
Fremont, (510) 544-3220

Crab Cove Visitor Center
Alameda, (510) 544-3187

Del Valle Regional Park
Livermore, (510) 544-3146

Regional Parks Botanic Garden
Berkeley, (510) 544-3169

Sunol Regional Wilderness
Sunol, (510) 544-3249

Tilden Nature Area/EEC
Berkeley, (510) 544-2233

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Concept and text: Morgan Evans
Lichen photos: Courtesy of Stephen Sharnoff
Bryophyte photos: Courtesy of Kiamara Ludwig
Design: Laura Stoll

*Parmelia sulcata* (foliose), Hammered Shield Lichen

*Usnea rubicunda* (fruticose), Red Beard Lichen

*Cladonia chlorophaea* (fruticose), Mealy Pixie Cup Lichen

# What Are Lichens?

Lichens are composite organisms made up of a fungal and an algal partner.

Two fungi, an ascomycete and a basidiomycete, and either a green algae or a type of cyanobacteria, form a special relationship called symbiosis. The fungal components, which are not free-living, give the lichen its form and provide shelter from harmful ultraviolet rays. The green algae or cyanobacteria component provide food in the form of glucose through photosynthesis.

This partnership allows both components to survive under conditions in which they would otherwise perish. There are 14,000 species of lichens worldwide, ranging from coastal bluffs to the highest mountain peaks.

Lichens are the only composite organisms that do not resemble the original partners.

Lichens are extremely diverse in form, color, and size.

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This brochure honors Irene Winston, long-time educator, RPBG docent, and lichenologist who passed away in late 2020. Funding for this project was provided by friends of Irene Winston and the Friends of the Regional Parks Botanic Garden.
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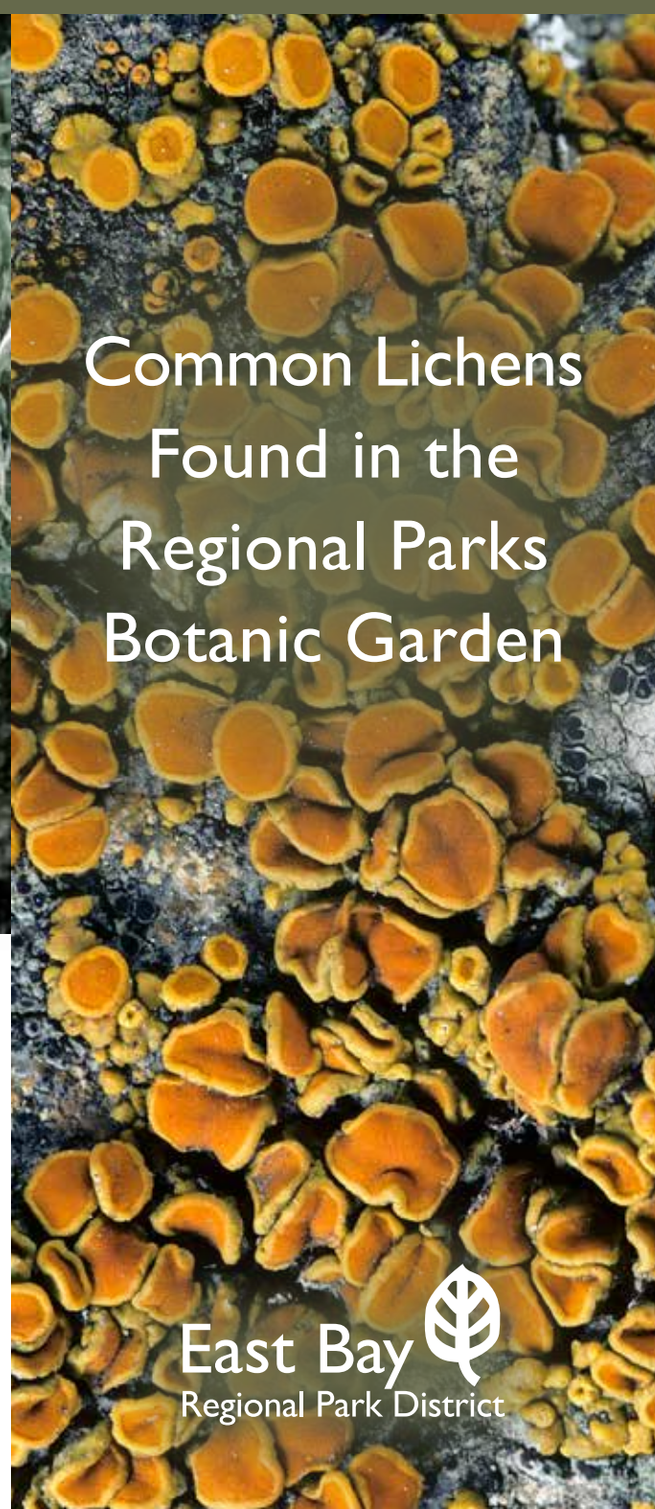
*Ramalina farinacea* (fruticose), Dotted Ramalina Lichen

*Polycauliona bolacina* (crustose), Waxy Firedot Lichen



# Common Lichens Found in the Regional Parks Botanic Garden

FRIENDS OF THE REGIONAL PARKS BOTANIC GARDEN
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nativeplants.org | regionalparksfoundation.org
ebparks.org | 1 (888) EBPARKS
Persons with hearing impairment, please use the Telecommunications Relay Service at 711

East Bay Regional Park District

# Crustose

The simplest form of lichens, crustose attach firmly to rock surfaces to form thin patches that come in a multitude of colors.

▼ *Acarospora socialis*
Yellow Cobblestone Lichen

▼ *Aspicilia pacifica*
Pacific Sunken Disk Lichen

▼ *Lecanora muralis*
Stonewall Lichen

▼ *Lecidea tessellata*
Tile Lichen

# Foliose

Loosely attached to substrates by tough black fibers, foliose lichens grow as flat leaf-like lobes or rosettes and have distinct upper and lower surfaces.

▼ *Parmotrema perlatum*
Black Stone Flower Lichen

▼ *Umbilicaria phaea*
Emery Rock Tripe Lichen

▼ *Xanthoparmelia cumberlandia*
Cumberland Rock-shield Lichen

▼ *Xanthoria parietina*
Common Orange Lichen

# Fruticose

The most advanced lichens, with three-dimensional branches and cup-like structures, fruticose can be pendulant (hanging) or shrub-like (erect).

▼ *Cladonia furcata*
Many-forked Cup Lichen

▼ *Cladonia macilenta*
Lipstick Powderhorn Lichen

▼ *Ramalina menziesii*
Lace Lichen

▼ *Usnea intermedia*
Western Bushy Beard Lichen