



Lichens in Landscape Plantings

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WHAT IS A LICHEN?

A lichen is a complex living organism that is composed of multiple organisms growing together for the mutual benefit of one another (a mutualistic symbiotic relationship). One component, an alga, provides food through photosynthesis; a second component, a fungus, provides physical structure and protection. Recent research has identified the presence of a third component, a yeast (Basidiomycete, a different group of fungi), in many lichens. The yeast is believed to produce substances that help prevent infections and repel predators.

WHERE DO THEY GROW?

Lichens grow in colonies everywhere and anywhere, including the tropics and polar regions. Because they prefer clean, fresh air, lichens are less likely to be found where the atmosphere is polluted. They also grow on pretty much any substrate, such as rocks, fences, tombstones, and soil, as well as trunks and branches of both live or dead woody plants (FIGURES 1 & 2).

WHAT IS THE CONCERN?

Lichens growing on living trees and shrubs can raise concerns that the lichens are causing a disease; however, lichens are neither pathogenic nor parasitic.

While these organisms often do appear on woody plants in poor or declining health, they are not causing the decline. Some lichen growth on tree trunks is not unusual (particularly in higher light conditions or high humidity environments); however, abundant growth of lichens is often an indicator that the tree is in decline from other causes:

- Lichens have a photosynthetic component and require sunlight. The canopy of a healthy tree tends to limit sunlight penetration. However, trees under stress often have a thinning canopy or dieback, allowing more sunlight to get through and providing favorable conditions for lichen growth.



FIGURE 1. THE CANDLE FLAME LICHEN (*CANDELARIA CONCOLOR*; CANDELARIACEAE FAMILY) HAS A FOLIOSE GROWTH HABIT. HERE SHOWN ON MAPLE, IT IS ALSO OFTEN FOUND ON ASH, WILLOW, AND ELM TREES, AS WELL AS ON WOODEN FENCES AND POLES.

FIGURE 2. THIS FOLIOSE LICHEN IS A MEMBER OF THE PHYSCIACEAE FAMILY, A DIVERSE GROUP OF LICHENS THAT CAN ALSO HAVE FRUTICOSE OR CRUSTOSE GROWTH HABIT.

- Abundant lichens on a trunk suggests a relatively slow-growing tree, otherwise lichens would not easily grow on their surfaces. While slow growth is normal for some trees and in some settings, this may also indicate other stresses in the tree that are slowing its growth and reducing its health.

WHAT ARE THE TYPES OF LICHENS?

Lichens exist in a variety of forms:

- *Foliose* – flattened, leaf-like layers
- *Fruticose* – erect branching tubes
- *Crustose* – firmly attached crust on surfaces

Many lichens are brown to grey-green when observed on woody plants (FIGURES 3 to 6); however, they can also be many other colors, such as yellow, pink, orange, and red (FIGURES 7 to 9). Color can be determined by the species of organisms in the symbiotic relationship, environmental factors, and the type of substrate. Lichens are classified and named by their fungal component, generally an Ascomycete.



FIGURE 3. A GREEN LICHEN IN THE PARMELIACEAE FAMILY WITH FOLIOSE GROWTH HABIT WAS LOCATED ON A DECLINING SILVER MAPLE TREE WITH ARMILLARIA ROOT ROT. THIS FAMILY OF LICHENS IS VERY COMMON AND EXTREMELY DIVERSE.

FIGURE 4. THE GREEN SHIELD LICHEN (*FLAVOPARMELIA CAPERATA*; PARMELIACEAE FAMILY) HAS A FOLIOSE GROWTH HABIT AND IS FOUND HERE ON A STRESSED TREE.

FIGURE 5. THIS LEAFY LICHEN WITH A FOLIOSE GROWTH HABIT IS ALSO IN THE PARMELIACEAE FAMILY. IT WAS FOUND ON A STRESSED MAGNOLIA IN A RESIDENTIAL LANDSCAPE.

FIGURE 6. THE BEARD OR BEARDED LICHEN (*USNEA* spp.; PARMELIACEAE FAMILY) WITH ITS FRUTICOSE GROWTH HABIT DEMONSTRATES THE GREAT DIVERSITY IN THIS FAMILY OF LICHENS. BEARD LICHEN MAY BE FOUND ON THE BARK OR TWIGS OF UNHEALTHY, DYING, OR DEAD TREES ALL OVER THE WORLD.

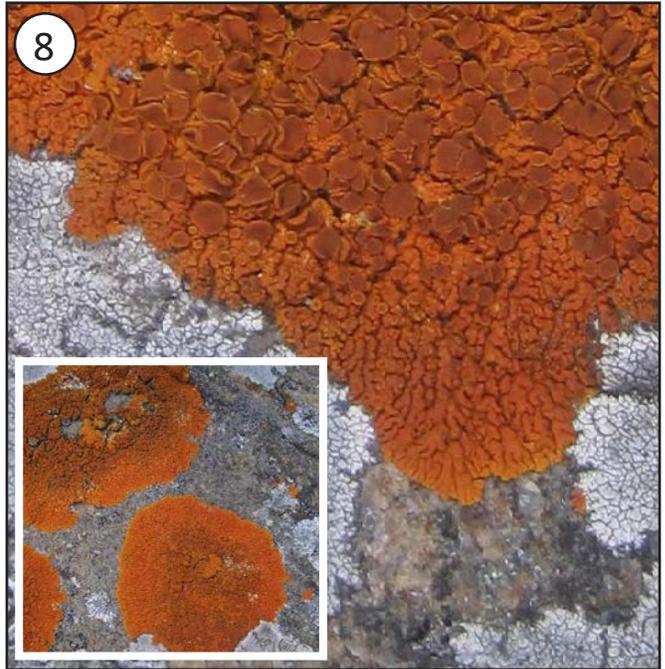


FIGURE 7. THE BRITISH SOLDIERS LICHEN (*CLADONIA CRISTATELLA*; CLADONIAEAE FAMILY) FREQUENTS MOSSY LOGS, TREE STUMPS, DEAD WOOD, AND EVEN THE GROUND. THIS FRUTICOSE LICHEN HAS BRIGHT RED CAPS THAT ARE ACTUALLY FUNGAL STRUCTURES (APOTHECIA) THAT PRODUCE SPORES.

FIGURE 8. THE ELEGANT SUNBURST LICHEN (*XANTHARIA ELEGANS*; TELOSCHISTACEAE FAMILY) PREFERENCES EXPOSED ROCK FACES AND HAS A CRUSTOSE GROWTH HABIT (INSET). A CLOSE-UP REVEALS THE CUP-LIKE SPORE-PRODUCING STRUCTURES (APOTHECIA) OF THE FUNGAL PARTNER IN THE LICHEN.

FIGURE 9. OFTEN CALLED THE MAP LICHEN (*RHIZOCARPON GEOGRAPHICUM*; RHIZOCARPACEAE FAMILY), THIS CRUSTOSE LICHEN DISPLAYS DIVERSE COLORATION AND PREFERENCES ROCK SUBSTRATES.

WHAT SHOULD BE DONE?

Lichens are considered harmless when present on trees and shrubs, so no control is necessary. These organisms are actually beneficial to the ecosystem (see U.S. Forest Service information in Additional Resources). Removing lichens from the trunks of trees does not benefit the tree and can actually be damaging (potentially injuring the bark and vascular system).

The best thing you can do when finding lichens on a tree or shrub that appears unhealthy is to try to determine the actual cause of the plant's decline, and then try to relieve any stresses that the plant might be under. Decline can be due to biotic causes (such as insects or diseases) or abiotic causes (such as site and environmental stresses) (see *Stress and Decline in Woody Plants*, ID-50).

WHERE IS THERE MORE INFORMATION?

- Lichens (U.S. Forest Service)
<https://www.fs.usda.gov/wildflowers/beauty/lichens/about.shtml>
- Stress and Decline in Woody Plants
<http://www2.ca.uky.edu/agcomm/pubs/id/id50/id50.pdf>

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Photos: University of Kentucky—Nicole Gauthier (2), Cheryl Kaiser (3, 5), and Ellen Crocker (4, 6); Bugwood.org—Joseph O'Brien, USDA Forest Service (1, 7), Rob Routledge, Sault College (8), and Gerald Holmes Strawberry Center, Cal Poly San Luis Obispo (9)