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A Practical Application of Lichenology for Urban Livability---Lichens as Canaries in the Coal Mine  
By Daniel Salomon

How polluted is the air in your neighborhood? Look for the presence/absence of this pollution-tolerant lichen---*Xanthoria*?

*Xanthoria* is golden colored crust lichen. Take into account that this species of lichen can also grow in areas with bird droppings. It is important to separate whether this species of lichen is present because the air in your neighborhood is polluted or because there is an abundance of birds in a particular place like a tree where birds roost.

Are there any lichens in your neighborhood at all?

The presence/absence of lichens in your neighborhood can also determine the air quality of your neighborhood because some species of lichens are sensitive to air pollution and need clean air to survive.

(Peter McCoy, *Radical Mycology-A Treatise on Seeing and Working with Fungi*).

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Bibliography on Mosses, Lichens and Liverworts by Daniel Salomon

- Irin Brodo, Sylvia Sharnoff and Stephen Sharnoff, *Lichens of North America-First Printing Edition* (Yale University Press, 2001).
- "Guidelines for the Sustainable Harvest of Forest Moss" by International Association of Bryologists, <http://iab-bryologists-website.blogspot.com/search/label/Conservation>.
- "More Questions about Toxic Hot Spots" by Rob Davis, *the Oregonian*, February 12, 2016.
- "Another Danger In The Air: Chromium" by Rob Davis, *the Oregonian*, February 13, 2016.
- Janice Glime, *Bryophyte Ecology* (e-book: 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015) <http://www.bryoecol.mtu.edu/>.
- Haufler CH (2014) Ever since Klekowski: Testing a set of radical hypotheses revives the genetics of ferns and lycophytes. *American Journal of Botany* 101: 2036-2042.
- Haufler CH, Pryer KM, Schuettpelz E, Sessa EB, Farrar DR, Moran R, Schneller JJ, James E. Watkins J, Windham MD (2016) Sex and the Single Gametophyte: Revising the Homosporous Vascular Plant Life Cycle in Light of Contemporary Research *Bioscience* 66: 928-937.
- "Toxic metals worry Portland area Catholics" by Kristen Hannum and Ed Langlois, *Catholic Sentinel*, March 4, 2016.
- Himanshu, R., D. Upreti, and R. Grupta (2012). Diversity and distribution of terricolous lichens as indicator of habitat heterogeneity and grazing induced trampling in a temperate-alpine shrub and meadow. *Biological Conservation*. 21: 97-113.
- "Lichens, Bryophytes and Climate Change," <http://lbcc1.acis.ufl.edu/>.

- Bruce McCune and Linda Geiser, *Macrolichens of the Pacific Northwest* (Corvallis: Oregon State University Press---U.S.D.A. Forest Service, 1997 2000).
- Dr. Elissa Mendenhall, "Toxic Air In Portland-A Health Action Plan," Amenda Clinic, March 2, 2016, <http://www.amendaclinic.com/blog/2016/03/02/toxic-air-portland-health-action-plan>.
- Peter McCoy, *Radical Mycology-A Treatise on Seeing and Working with Fungi* (Portland, Oregon: Chthaeus Press, 2016) Pay particular attention to "Chapter 5: Racial Lichenology" by Nastassja Noell, 111-142.
- "Assessing the relationship among urban trees, nitrogen dioxide, and respiratory health" by Meenakshi Rao, Linda George, Todd Rosenstiel, Vivek Shandas and Alexis Dinno, *Environmental Pollution* 194 (2014) 96-104.
- Jim Pojar and Andy MacKinnon, *Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska-Revised* (Vancouver, British Columbia: Lone Pine Publishing, 1994 2004) 417-504.
- "Scientific progress, continental drift and glaciers: The history of a paper on the complex thalloid liverworts" by Juan Carlos Villarreal, Barbara Cradall-Stotler, Michelle Hart, David Long and Laura Forrest, October 25, 2015, <http://stories.rbge.org.uk/archives/17684>.
- USFS, National Lichen and Air Quality Database and Clearinghouse, Accessed April 2017, <http://gis.nacse.org/lichenair/index.php>.
- "New model systems for early land plant evolution---Vienna 22-24 June 2016" by J Carlos Villarreal, October 13, 2015, <http://internationalassociationofbryologist.blogspot.com/2015/10/new-model-systems-for-early-land-plant.html>.
- "Capturing genes from (old) herbarium material" by Carlos Villarreal, August 2, 2015, <http://internationalassociationofbryologist.blogspot.com/2015/08/capturing-genes-from-old-herbarium.html>.
- Yeshitela, Kumelachew (2008). Effects of Anthropogenic Disturbance on the Diversity of Follicolous Lichens. Published Cuvellier Verlag Gottingen.

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#### Places to Go Around the Portland Area to See Mosses, Lichens and Liverworts by Daniel Salomon

- Crystal Springs Rhododendron Garden: A good introduction.
- Cooper Mountain: A good place to see Apple Moss which grows in open prairie.
- Goose Hollow: A good place to see liverworts, as well as mosses and lichens in the city. In-fact, you will find mosses, lichens and liverworts throughout Goose Hollow. Just keep your eyes peeled.
- Hoyt Arboretum: A good place to see mosses, peat mosses, lichens including lungwort and frog pelts, horsetails and tree ruffle liverwort. One of the best places to see mosses and lichens is around the Hoyt Visitor Center, parking lot, trail around visitor center and the lower Overlook Trail (ADA accessible), the Maple Trail between the two staircases and the two staircases. Bray Lane has some impressive stand of horsetails. Also many of the drainage lawns around the Hoyt are also excellent places to see whole stands of horsetails. A stand of horsetails also comes up each year in the witch-hazel garden across the street from the Vietnam Memorial.
- Japanese Garden: Mosses, lichens and liverworts are protected as a valued and integral part of their collection, where visitors are even prohibited from touching all plants including mosses, lichens and liverworts.
- Oregon Zoo Max Station: A good place to see crust lichens growing on the surrounding rock gardens.
- Our Lady of Sorrowful Mother-The Grotto: A good introduction.
- Oxbow Regional Park: Harbors a true old-growth forest which has an unusual abundance of mosses and liverworts.
- Pittock Mansion and Sanctuary: A good place for mosses, lichens, liverworts and horsetails. Walk the main road to the mansion from Burnside and you have a good chance of seeing some liverwort stands and a stand of horsetails. Explore the house and grounds. There are sometimes even mosses and lichens growing on the mansion. Look into the deep rainforests surrounding the mansion and you will see tapestries of mosses. If you walk the Wildwood Trail from Burnside to the Mansion, you will have an opportunity to find one of the moss species with vascular looking leaves (leaves like the leaves of flowering plants and ferns). I even discover a little bit of peat moss on this stretch of the Wildwood.
- Portland Art Museum: The Native American collection has at least one case of First Nation baskets decorated with lichen dyes.
- Portland Florists: Many Portland florists sell moss as well as lichens as curiosity plants.

- Silver Falls State Park: You can find examples of almost everything we have covered in this workshop. Both rag and crust lichens, mosses and peat mosses and multiple species of liverworts. Cushions, draperies, tapestries, hanging hairs and fruiting bodies. An excellent comprehensive sample of substrates of all kinds, from rocks to the forest canopy, from the forest floor to flowing water, logs to seepages even the caves behind the waterfalls. There is so much lichen, moss and liverwort diversity at Silver Falls because of an almost year round supply of water and moisture supplied by an unusual abundance of waterfalls, flowing streams and seepages, combined with the dense shade of a mature temperate rainforest ecosystem with some old-growth.
- Tryon Creek State Park: A good place to find wavy-leaved cotton moss, wavy broom moss and curly heron's-bill moss.