Lichens of Iller Creek: A checklist for the Iller Creek Unit, a division of Dishman Hills Conservation Area, Spokane Valley, WA

Devin M. Mumey
Eastern Washington University

Giovanna Bishop
University of Montana, Missoula

Jessica L. Allen
Eastern Washington University

Lichens of Iller Creek: A checklist for the Iller Creek Unit, a division of Dishman Hills Conservation Area, Spokane Valley, WA

Devin Mumey *EWU Biology Department, Cheney, WA*
Giovanna Bishop *University of Montana Herbarium, Missoula, MT*
Jessica L. Allen *Allen Lichen Lab, EWU Biology Department, Cheney, WA*

ABSTRACT

The field of biodiversity documentation encompasses a broad range of research including new species discovery and description, compilation of species present in a given area, and investigation of interspecies interaction. In an era of increasingly devastating and rapid environmental change, documenting biodiversity has become increasingly important. Anthropogenic effects on urban-adjacent natural areas are especially significant, as they can cause numerous, often drastic, responses in ecosystems. Our objective here was to document the lichen biodiversity in a large urban-adjacent protected area: the Iller Creek Unit of the Dishman Hills Conservation Area in Spokane Valley, Washington. This unit encompasses a diversity of habitat types: Ponderosa pine savannah, riparian forests, mixed mesic coniferous forests, and xeric rocky outcrops. Despite conservation efforts, no formal checklists have been assembled for this unit. To compile this checklist, our methods include collecting voucher specimens of all species from each habitat type. The identification process used relevant literature and standard techniques, including thin layer chromatography, chemical spot tests, and microscopy. A total of 101 species, spread throughout 55 genera of 27 families were identified. We identified 46 crustose, 49 foliose, and 6 fruticose. Moving forward, we intend to perform comprehensive searches of the less accessible areas without immediate trail access to compile a more complete checklist for use as a baseline for future lichen investigations of the inevitable anthropogenic effects that recreational use and expansion of the city will have on the lichen diversity.

METHODS

Dichotomous keys and light microscopy

- Color, size, growth form, reproductive structures, spore shape and size

Spot Tests

- Potassium hydroxide (K)
- Chlorine (C)
- p-Phenylenediamine (P)

Thin Layer Chromatography

- Solvent C: Toluene, Glacial Acetic Acid
- Hydrophobicity
- Long- and short-wave UV
- Acid Spray/Burn

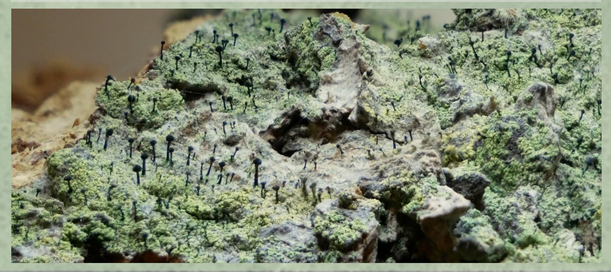
THE TAXA

Genus Peltigera

- Thallus: large-form foliose and lobate
- Upper surface color: dark blue-gray to bright green when wet; pale gray, blue, or gray-brown when dry
- Primary photobiont: dark blue-gray or brown indicates cyanobacteria; bright green are tripartite (primarily a green alga, secondary cyanobacteria in cephalodia)
- Lower surface: ecorticate, rhizinate, veinous with varying degrees of definition, color range: white to black
- Apothecia: oval, saddle-shaped and smooth, arising from lobe tips, color varies from red to brown.
- Habitat: terricolous, on soil or forest litter, or with moss and litter over rock
- Distribution: world-wide, prevalent in temperate N. America *(Nash et al., 2004)*

Genus Chaenotheca

- Common name: ‘stubble’ or ‘pin’ lichens
- Thallus: crustose, superficial or immersed, grayish to bright yellow-green
- Apothecia: stalked with a rounded head containing spores, dark brown to black, occasionally bright green
- Habitat: bark or exposed wood *(Nash et al., 2004)*



Family Parmeliaceae

- Very diverse family – 80+ genera, approx. 2700 species
- Growth forms range from appressed or fluffy foliose to subfruticose, fruticose and pendulous. *(Gomez-Serranillos et al., 2014)*

Genus Cladonia

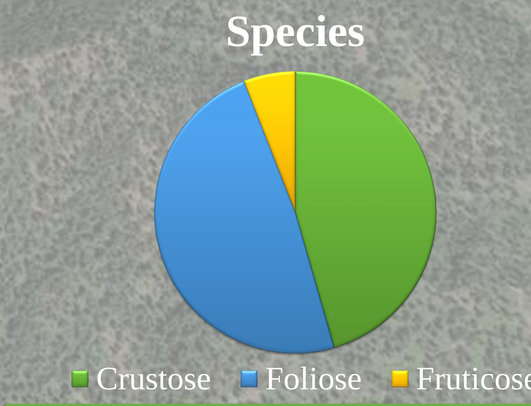
- Thallus: dimorphic; composed of squamules and erect podetia
- Upper surface: varies from gray-green to yellow-green
- Podetia: stalked, generally hollow, ending in points, blunt tips, or cup shapes; sometimes ecorticate, can be covered with a combination of ascending squamules, soredia, continuous or granular cortex
- Habitat: On soil, leaf litter, bark, or wood, on rock where moss or a thin layer of organic substrate is available.
- Distribution: Widespread from the tropics to the tundra; not generally found in particularly arid regions. *(Nash et al., 2004)*

ACKNOWLEDGEMENTS

Our appreciation for the support, encouragement, and funding goes to the McNair Scholar Program and Eastern Washington University. We would also like to thank Paul Knowles and the Spokane County Parks, Recreation & Golf Department for allowing the collection of specimens in the Iller Creek Unit, and Ruth Gifford, Executive Director of the Dishman Hills Conservancy for supporting our project and providing background documentation on the land and Conservancy’s history.

RESULTS

27 families - 55 genera - 101 species
Crustose: 21 families, 46 species
Foliose: 9 families, 49 species
Fruticose: 1 family, 6 species



REFERENCES

Bishop, G. M. Untitled Lichen and Bryophyte Checklist. [In prep as of April 2023]. Bishop, G. M. 2021. Impacts of rock climbing on lichen and bryophyte communities at McLellan Rocks and Sharon Climbing Areas, Spokane County, WA. Master’s thesis, Eastern Washington University, Cheney, Washington, USA. Brodo, I. M., et al. 2016. Keys to the Lichens of North America. Yale University Press, New Haven, CT. Brodo, I. M., et al. 2001. Lichens of North America. Yale University Press, New Haven, CT. County Buildings, Parks, Fair & Expo Facilities and other Locations. “Dishman Hills Conservation Area - Iller Creek Unit.” [online] https://www.spokanecounty.org/Facilities/Facility/Details/Dishman-Hills-Conservation-Area-Iller-Cr-60 [Accessed 9 January 2023]. Elix, J.A. 2018. A Catalogue of Standardized Chromatographic Data and Biosynthetic Relationships for Lichen Substances. Fourth Edition. Published by the author, Canberra. Lafferty, D., Bungartz, F. & Elix, J.A. 2021. Wintab 64bit – a program developed at Arizona State University for the analysis of secondary metabolites of lichens, based on an original concept published by E. Mietzsch, H.T. Lumbsch & J.A. Elix. *Help & Resources for the Consortium of Lichen Herbaria*, https://help.lichenportal.org/index.php/en/resources/metabolites/ McCune, B., and Geiser, L. Macrolichens of the Pacific Northwest. 2009. Oregon State University Press, Corvallis OR. McCune, B., and Geiser, L. Microlichens of the Pacific Northwest: Volumes 1 and 2. 2017. Oregon State University Press, Corvallis OR. Nash, Thomas III, P Diederich, Frank Bungartz and BD Ryan. 2004. Lichen Flora of the Greater Sonoran Desert Region. Vol. I. and Vol. II. Lichen Unlimited: Tempe, AZ USA. Gómez-Serranillos, Maria & Andez-Moriano, Carlos & Alez-Burgos, Elena & Divakar, Pradeep & Crespo, Ana. (2014). Parmeliaceae family: Phytochemistry, pharmacological potential and phylogenetic features. RSC Advances. 4. 59017–59047. 10.1039/c4ra09104c.