

Root, Heather T., Jesse E.D. Miller, and Bruce McCune. 2011. Biotic soil crust lichen diversity and conservation in shrub-steppe habitats of Oregon and Washington. *The Bryologist* 114(4), pp. 796–812.

ABSTRACT. Biological soil crusts are ecosystem engineers in arid and semi-arid habitats; they affect soil chemistry, stability, and vegetation. Their ecosystem functions may vary depending on species composition; however, lichen species diversity is poorly known in the Pacific Northwestern drylands of North America. We sampled 59 random and 20 intuitive plots throughout central and eastern Oregon identifying 99 lichen taxa, 33 of which occurred in only one plot and seven of which were new to Oregon (*Acarospora obpallens*, *A. terricola*, *Catapyrenium psoromoides*, *Placidium fingens*, *P. pilosellum*, *P. yoshimurae* and *Psora luridella*). We compile records from herbaria and other studies to evaluate the rarity of observed species and potentially rare species known from nearby locations. We conclude that 37 species are likely rare or uncommon in our study area. Many of these appear to be associated with calcareous substrates. We model occurrences in relation to climate and soil variables for four uncommon lichen species: *Acarospora schleicheri*, *Fuscopannaria cyanolepra*, *Rhizocarpon diploschistidina*, and *Texasporium sancti-jacobi*. Based on climate and soil variables, we map regions of Oregon that may support new populations of these species and overlay habitats unsuitable for biotic crusts due to development and agriculture. These species, except *Fuscopannaria cyanolepra*, are strongly associated with the fine soils along the Columbia and Treasure Valleys that are most intensively used for agriculture. We anticipate that our summaries will further the understanding of lichen component of biological soil crust communities in eastern Oregon and suggest focal species for future conservation efforts.

KEYWORDS. *Acarospora*, biological soil crusts, climate models, *Fuscopannaria cyanolepra*, *Rhizocarpon diploschistidina*, sagebrush steppe, soil texture, *Texasporium*.

Note: National policies for the Forest Service (Forest Service Manual (FSM) Section 2670) and the Bureau of Land Management (BLM Manual Section 6840) establish categories of “Sensitive” species, where analysis is required to ensure the conservation of these species during land management actions. Working through a Cooperative Ecosystems Study Unit Agreement with Oregon State University, the Interagency Special Status/ Sensitive Species Program (ISSSSP) helped to fund Heather Root’s Ph.D. research into the biological soil crusts of the Pacific Northwest drylands. ISSSSP’s support of this project was designed to help agency botanists better understand and evaluate the effects of certain land management actions on biological soil crusts, and implement effective conservation measures to meet agency Sensitive species policy goals.

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