

Root, Heather T. and Bruce McCune. 2012. Regional patterns of biological soil crust lichen species composition related to vegetation, soils, and climate in Oregon, USA. *Journal of Arid Environments* 79, pp. 93-100.

ABSTRACT. Biological soil crusts are ecosystem engineers in arid and semi-arid habitats; they affect soil chemistry stability, and vegetation. Little is known about regional variation in biotic crust communities of North America. We explored how biotic crust lichen community composition and richness are related to vascular plant, soil and climate characteristics in Oregon. In 59 0.4-ha plots, we found 99 biotic crust lichen species, one-third of which were observed only once. Biotic crust lichen communities rich in cyanolichens characterized *Juniperus* stands whereas warm grasslands were home to regionally uncommon species including *Texosporium sancti-jacobi* and *Rhizocarpon diploschistidina*. We discerned biotic crust communities in sandy *Artemisia tridentata* ssp. *wyomingensis* sites from those loamy *A. arbuscula* sites. Hotspots of biotic crust lichen species richness were geographically scattered, weakly negatively associated with abundance of shrubs of disturbed sites, *Gutierrezia* and *Chrysothamnus*. The sites with lowest biotic crust lichen richness were heavily grazed, burned plots with *Gutierrezia* in the grassy north; unstable steep talus slopes at the center of the study area; and sandy, grazed sites with *Chrysothamnus* in the southern portion of our region. Overall, regional patterns in biotic crust lichen communities were strongly associated with vegetation, soils, and climate.

KEYWORDS. Climate, Lichen, Microbiotic soil crust, Sagebrush, Soil pH, Soil texture.

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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