

North American Fungi



Volume 3, Number 2, Pages 1-7
Published March 30, 2008
Formerly *Pacific Northwest Fungi*

***Leptogium siskiyouensis*, a new epiphytic lichen species from the Pacific Northwest of the United States**

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D. Stone, and A. Ruchty. 2008. *Leptogium siskiyouensis*, a new epiphytic lichen species from the Pacific Northwest of the United States. *North American Fungi* 3(2): 1-7. doi: 10.2509/naf2008.003.002

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Abstract: A new species, *Leptogium siskiyouensis*, is described from the Pacific Northwest.

Keywords: *Leptogium pseudofurfuraceum*, *Leptogium tacomae*, *Leptogium subaridum*, epiphyte, California, Oregon, Siskiyou Mountains, Trinity Alps.

Introduction: The genus *Leptogium* is well-represented in the wet, moderate climate of the Pacific Northwest (Brodo, Sharnoff and Sharnoff 2001, Goward, McCune and Meidinger 1994,

Jørgensen and Goward 1994, McCune and Geiser 1997, Sierk 1964), yet because of the difficulty in identification, the species have not been fully explored. *Leptogium* species produce

no lichen acids and many of their characters are highly plastic. Often species determination is based on location in a narrow habitat. Other species are known to have a broad geographic range.

The authors became entangled in the study of small, epiphytic *Leptogium* species while examining many specimens searching for new locations of *L. cyanescens* (Rabenh.) Korber, a species common on the east coast of North America but rare in the Pacific Northwest (McCune and Geiser 1997). The discovery of the new species came during the examination of these specimens; the overall character of the new species is unique, so after examination of only two specimens we realized that it was an undescribed species.

Materials and Methods: Collections from the following sources were searched and examined: OSC, WTU, UBC, ID, UC, WS, BG, Region 6 Forest Service and Bureau of Land Management (from surveys conducted on federal lands throughout the Pacific Northwest region), and from the personal herbaria of Dr. Bruce McCune at Oregon State University and Dr. Daphne Stone. Material was studied using standard light microscope techniques. Lichen nomenclature follows Esslinger 2007.

Leptogium siskiyouensis Daphne Stone & Andrea Ruchty *sp. nov.*

Thallus foliaceus rotundus usque ad 3 cm, centra loborum ad substratum adnata, sed margines loborum erectiusculi; margines loborum rotundati planique. Lobi 0.3 mm ad 4 mm lati, 44 µm ad 87 µm (-125 µm) crassi, sinus rotundati. Thallus fumosus, apices loborum spadicei; levis; et nitidus vel hebetatus, sine rugis. Hyphae medullarum breves, usque ad 3:1, subinde usque ad 5:1, hyphae cyanobacteriae arctae contiguae. Cortices una cellula crassi, cellulis isodiametris, 5 ad 8 µm, exteris paginis rotundatis. Cortex infernus

pilis albis caespitosis sed non similis Leptogium mallotae. Isidia marginalia vel laminalia, formosa et fuliginosa, subinde inaequalia e cylindris simplicibus angustis nodosis, divisa isodiametris furcatis coralliformibusque, sine lacunis. Apothecia rara, sphaericis juvenilibus, maturitibus applanatis non immersis. Sporae hyalinae 6- ad 8-septatae transverse, 0- ad 1-septatae in longitudinem.

HOLOTYPE: U. S. A. OREGON. Josephine County, northeast of Cave Junction, 42° 11.62' N, 123° 31.69' W, 991 m elev., on *Quercus chrysolepis* Liebm. trunk. Daphne Stone 5610.4, 10 April 2003. (OSC).

OTHER SPECIMENS: U. S. A., CALIFORNIA. Monterey Co., China Camp. 1290 m. McCune 25896 (herbarium of Bruce McCune); Trinity Co., Mad Ridge west of Ruth, 1162 m elev. Fertile. Carlberg 00772 (UC); Trinity Co., Mad Ridge west of Ruth, 1174 m elev. Carlberg 00770 (Smithsonian); OREGON. Jackson Co., north of Gold Hill 610 m elev., Kofranek 500 (OSC).

Thallus: Foliose, lobes in a regular, radial pattern, forming a closely adnate circular thallus of up to 3 cm (Fig. 1a.). Lobe edges rounded, 0.3 - 4.0 mm wide, flat to slightly cupped and/or wavy on the outer edge; sinuses between lobes rounded leaving a small hole through which the bark is visible (Fig. 1d.). As each lobe matures it is closely attached to the bark down the center but raised almost to 90° from the bark along the edges (Fig. 1c.). Thallus grey, lobe tips and isidia becoming brown; thin, 44 µm – 87 µm (-125 µm), smooth and shiny to matte; with an irregular texture in some specimens but not distinctly wrinkled (Fig. 1b.). *Medulla* of short hyphae to 3:1 (length:width) but occasionally as long as 5:1, packed closely; most spaces between hyphae filled with the photobiont (Figs. 2a, b.). *Photobiont* clumped or single cells. *Cortices* one cell thick, of isodiametric cells 5µm-8µm across. Upper and lower cortices similar in cross section, with exterior surfaces rounded and the upper cortex sometimes thickened slightly.

Lower cortex has tufts of white hairs at least one mm back from the growing edge.

Isidia: Along the upturned lobe edges a dense fringe of isidia forms, sometimes starting as simple, narrow, knobby cylinders, becoming isodiametrically forked and then coralloid (Figs. 1e, f.), and sometimes starting as finely divided lobed edges approaching lobules in appearance, that develop simple isidia that become knobby, forked and then coralloid; these lobe edges can look like raised hands (Fig. 1c.). Isidia are corticate, matte to shiny, grey to brown, becoming dark brown and shiny at the tips, without dimpling; convex and having several constricted areas along their length (Fig. 1g.). Isidia also arise laminally; laminal isidia often remain smaller and less coralloid than marginal isidia.

Apothecia uncommon; only one fertile specimen seen. Apothecia spherical, becoming flattened or hemispherical with age, not immersed; some appear almost stalked. *Spores* 38 μm x 11 μm , 6- to 8-septate transversely, 0-1-septate longitudinally, colorless (Fig. 2c.).

Habitat: *Leptogium siskiyouensis* is epiphytic, usually on smooth bark of young *Quercus kelloggii* Newb. and *Chrysolepis chrysophylla* (Hook.) Hjelmq. boles and branches in mixed conifer-hardwood forest. It typically occurs where the overstory is midseral *Pseudotsuga menziesii* (Mirbel) Franco with some *Calocedrus decurrens* (Torrey) Florin or *Pinus ponderosa* Laws. and the understory includes *Arbutus menziesii* Pursh, *Quercus kelloggii* and *Q. garryana* Hook., and sometimes *Lithocarpus densiflorus* (Hook.) & Arn.) Rehder and *Chrysolepis chrysophylla*. The canopy is partially closed but some direct sunlight reaches the thalli during the day. One specimen from Oregon was found on *Pseudotsuga menziesii*, and one specimen from California (Shasta County) was found on *Fraxinus latifolia* Benth.

Range: Most specimens examined were found in the Siskiyou Mountains of southern Oregon and northern California, and the Trinity Alps of northern California (Fig.3), at elevations between 610 and 1463 m. In addition, it has been collected in Monterey, Shasta and Humboldt Counties in California at elevations of 1280 m, 396 m, and 1158 m, respectively. It appears to be infrequent and is possibly endemic to southern Oregon and northern California.

Discussion: *Leptogium siskiyouensis* can be confused superficially with several other species of *Leptogium*, including *L. pseudofurfuraceum* P. M. Jørg. & Wallace, *L. tacomae* P. M. Jørg. & Tønberg, and *L. subaridum* P. M. Jørg. & Goward.

Several characters distinguish *L. pseudofurfuraceum* from *L. siskiyouensis*. *Leptogium pseudofurfuraceum* has a brown, finely wrinkled thallus that has lobes to 1 cm wide (Jørgensen 1997) and grows to a much larger thallus diameter than *L. siskiyouensis*. In *L. pseudofurfuraceum*, lobe edges are downturned and the lower surface is of the mallotium-type. Although *L. siskiyouensis* may have hairs on the lower cortex, they are not distributed uniformly across the lower surface as in the mallotium hairy species. The medulla of *L. pseudofurfuraceum* has hyphae at least 5:1 and usually much longer, with space between the photobiont and the hyphae in cross-section. The isidia of *L. pseudofurfuraceum* are dimpled at the tip and often somewhat flattened.

Leptogium tacomae differs from *L. siskiyouensis* in having a medulla of bifurcate hyphae up to 8:1 with space between them and the photobiont as opposed to the tightly packed, cellular medulla of *L. tacomae*. In addition, highly isidiate *L. tacomae* specimens generally form less adnate rosettes than *S. siskiyouensis*, with lobes arising to form a lettuce-like to cushion-like thallus (Jørgensen and Tønberg, 1999). In contrast, *L.*

siskiyouensis is usually tightly adnate, with steeply rising lobe edges with upright, branched to coralloid isidia that are consistently shiny at the tips.

Similarly, *L. subaridum* (Jørgensen and Goward, 1994) differs from *L. siskiyouensis* in having bifurcate hyphae up to 8:1 long with space between them and the photobiont as opposed to a tightly packed, cellular interior. *L. subaridum* does not have coralloid isidia, but has simple to branched clavate isidia (Aragón, Martínez and Otálora 2004) that are deeply dimpled, often appearing like deflated balloons. In addition, *L. subaridum* has squared, dentate lobes and a distinctive blackish brown color with a matte texture (Jørgensen and Goward, 1994).

The new species is named after the Siskiyou Mountains of southern Oregon and northern California, which appear to be its center of distribution. The name was also chosen to honor the native American tribes who named these mountains.

Acknowledgements: The authors wish to thank the Interagency Special Status Sensitive Species Program, Region 6 Forest Service and Bureau of Land Management, for providing funding to help complete this research. Thanks to Tom Carlberg for his observant collection of specimens. We also thank Dr. Bruce McCune for his generosity with his laboratory and specimens as well as his thoughts on the research.

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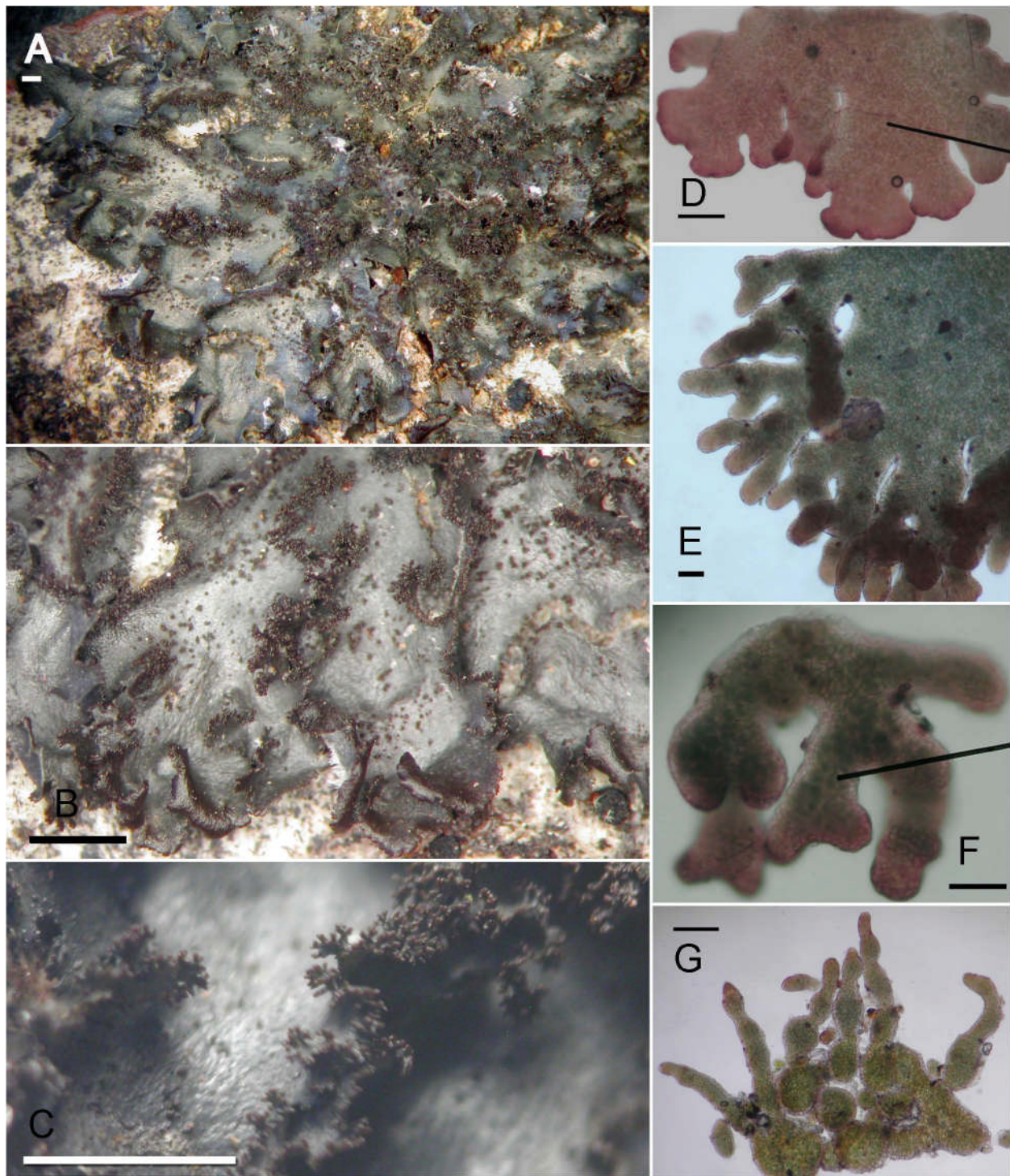


Fig. 1. *Leptogium siskiyouensis* habit and isidia. A. Whole thallus, scale bar 1 mm. B. Lobes, showing adnate habit, scale bar 1 mm. C. Thallus margin raised at 90° angle and coralloid-isidiate, scale bar 1 mm. D. Young lobe, scale bar 100 μ m. E. Isodiametrically forked isidia, scale bar 40 μ m. F. Coralloid isidium, scale bar 40 μ m. G. Opuntoid isidia, showing constrictions along length, scale bar 100 μ m.

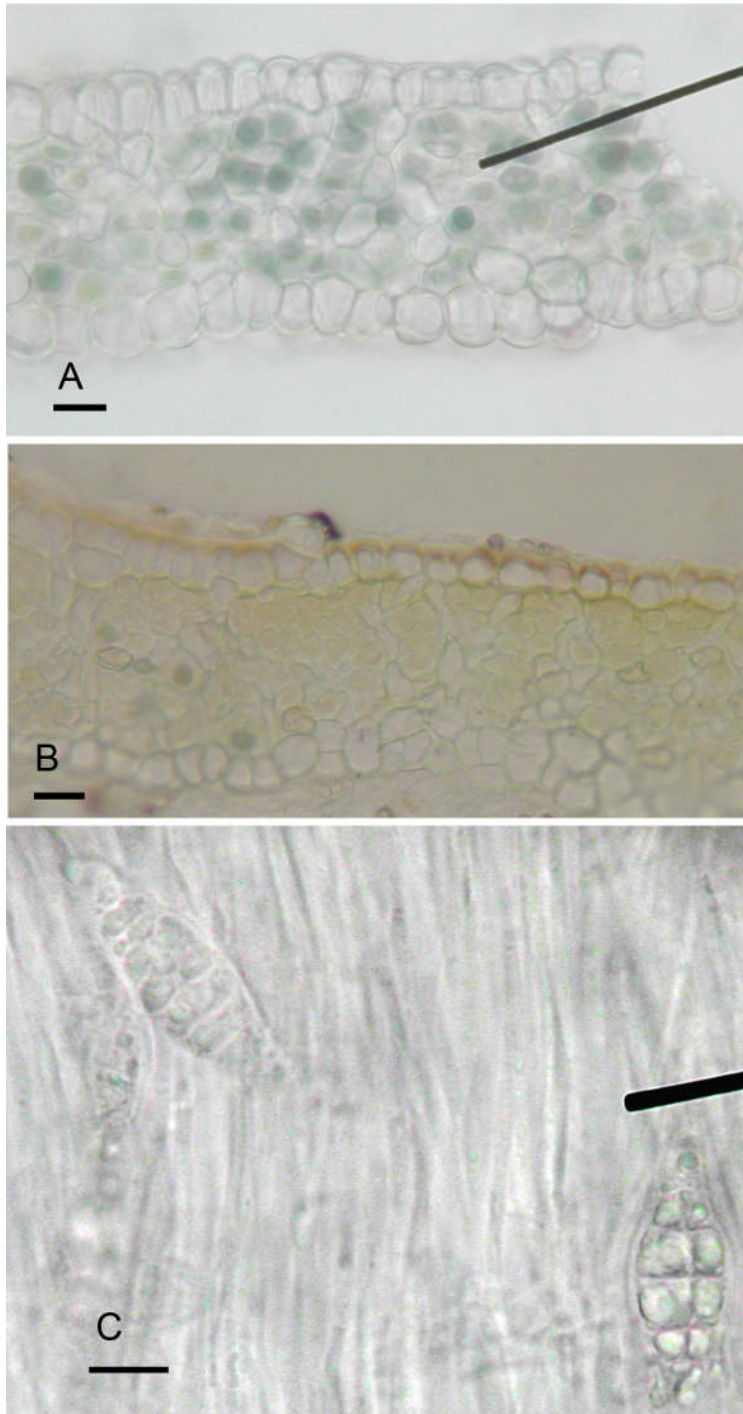


Fig. 2, A and B. Cross sections of *Leptogium siskiyouensis* thallus, scale bars 10 μm . C. Spores in hymenial tissue, scale bar 10 μm .

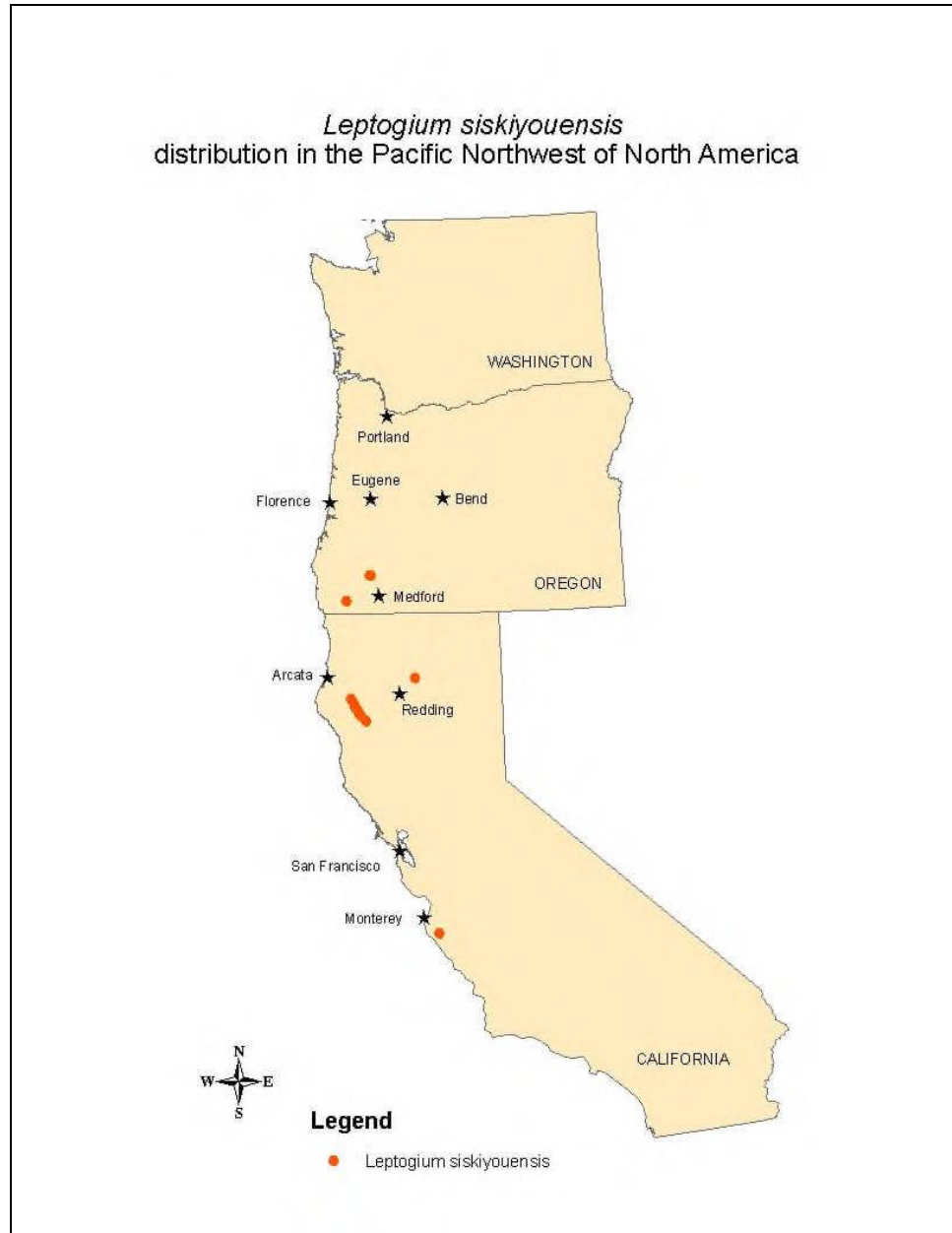


Fig. 3. Distribution of *Leptogium siskiyouensis* in the Pacific Northwest.