

SPECIES FACT SHEET

Common Name: Cabbage lung lichen

Scientific Name: *Lobaria linita* (Ach.) Rabenh.

Division: Ascomycota

Class: Ascomycetes

Order: Peltigerales

Family: Lobariaceae

Technical Description:

Lobaria linita is a medium to large (5-15 cm broad), leafy, nitrogen-fixing lichen. The thallus has a conspicuous pattern of ridges and hollows, and is bright lime-green when wet. When dry, it can be greenish to brownish gray. The lobes are broad (up to 4x6 cm) and rounded with lobe tips that are often ascending, more or less shiny, and typically darker than the rest of the body. The upper surface is often scattered with cinnamon-colored, disk-like apothecia that are 1-4 mm broad and flat to strongly convex. Soredia, isidia and lobules are never present. The lower surface is creamy white, finely tomentose, and may be mottled with brown. White naked patches may be present, separated by channels of darker tomentum. There may be dark-colored rhizines, up to 4 mm long, in the older portions. The primary alga is green; the cyanobacterial component is housed in numerous internal cephalodia, which appear on both surfaces as hemispherical or globose swellings up to 2.0 mm broad, with a dark area at the pole. Pycnidia are absent or abundant. When present, they occur on the upper surface and sometimes at the margins as slight swellings. Chemical tests for the thallus are K-, C-, KC-, P-, PD-. (Jordan 1973, Goward et al.1994, McCune and Geiser 1997, Derr et al.2003).

Two varieties are sometimes recognized based on morphological and ecological differences. *Lobaria linita* var. *linita* tends to be small, wrinkled, and lacks apothecia; this variety is found in arctic and alpine areas growing on rock and soil. *Lobaria linita* var. *tenuior* is larger, "ribbed" and usually apotheciate. This variety grows on tree boles, usually in late-successional or old-growth forest at lower elevations (Jordan 1973).

Key characteristics of *L. linita* are its green alga photobiont and its lack of isidia, soredia and lobules. Two similar *Lobaria* species are more common in the Pacific Northwest. *Lobaria pulmonaria* can be distinguished by abundant soredia when mature, or in immature specimens lacking soredia, by a PD+O chemical spot test, which differs from the PD- result in *L. linita*. *Lobaria oregana* differs from *L. linita* in having abundant lobules at the margin, giving it a ruffled appearance. *Peltigera* species with green primary photobionts can superficially resemble *L. linita*, but differ in having raised veins on the lower surface as well as cephalodia that occur on the upper surface instead of as

internal swellings. The channels of dark tomentum sometimes occurring on the lower surface of *Lobaria* are never raised like *Peltigera* veins (Derr et al. 2003). *Pseudocyphellaria anthraspis*, which grows in similar habitats and resembles dry or unshaded *L. linita* in its brownish color, differs in having the small white dots on the lower surface (pseudocyphellae) that are characteristic of the genus (Derr 2003).

Life History:

Lobaria linita var. *tenuior* usually has apothecia while the sterile alpine variety may reproduce vegetatively by thallus fragmentation (Jordan 1973). The species lacks soredia or other specialized structures for asexual reproduction. Because lichens are present and identifiable year-round, surveys can be conducted during any season (USDA/USDI 1998).

Range, Distribution, and Abundance:

Lobaria linita has an incomplete circumpolar distribution, occurring sporadically in the European Alps, Norway, Siberia, eastern Asia and North America. In North America, it is found from the Alaskan and Canadian Arctic inland to the Rocky Mountains in western Montana (McCune and Geiser 1997, Rittenhouse 2003, NatureServe 2005).

In 1993 there were only 11 known occurrences of *L. linita*, but by 2004 there were 175 known sites within the Northwest Forest Plan area (USDA/USDI 2004a), most of these occurring on federal lands. *Lobaria linita* is most common in northwestern Washington, with the majority of known sites on the Mt. Baker-Snoqualmie and Olympic National Forests.

In Oregon there are approximately eight known locations of *L. linita*. Four of these are on the Willamette National Forest. There are evidently scattered sites in the Bull of the Woods Wilderness on the Mt. Hood National Forest (Derr et al. 2003). There is a site near the top of Mt. Hebo on the Siuslaw National Forest, although information on this site is unknown to the Forest. There is a confirmed record of *L. linita* from Timbered Rock along the southern boundary of the Umpqua National Forest. In addition, a new site has been located on Medford BLM.

An unvouchered sighting of *L. linita* in the Salem District BLM Little Sink Research Natural Area/Area of Critical Environmental Concern from the 1990s may have been a misidentification because numerous revisits have failed to relocate the species (Derr et al. 2003).

Even in northwestern Washington where *L. linita* is most common, most populations are reported to be small and sporadically distributed (Leshner et al. 2003, USDA/USDI 2004a). *Lobaria linita* is sometimes patchy within a

stand and is often absent from much of the apparently suitable substrate. The lack of colonization of apparently suitable habitat suggests dispersal limitation.

Habitat Associations:

L. linita is strongly associated with old-growth and climax forests (USDA/USDI 2000a, Leshner et al.2003). In northwestern Washington these are typically in the *Abies amabilis* to lower *Tsuga mertensiana* Zones, in mesic to moist *Vaccinium alaskaense* plant associations, between 700-4500 ft in elevation (Derr et al.2003). At lower elevations it occurs in areas of high precipitation or in sites with cold air drainage. *Lobaria linita* prefers the lower boles of conifers, especially *A. amabilis*, but in drier habitats or at higher elevations it may also grow on moss-covered boulders or rock outcrops in cool, shaded, humid microsites. The two known sites from the Wenatchee National Forest were similar to those west of the Cascade crest. The lichen was found on moss-covered rocks in cool, moist areas in forests bordering the *T. heterophylla* and *A. amabilis* Zones.

Documented habitats in Oregon appear to be similar to those in northwestern Washington. *Lobaria linita* occurs in old-growth coniferous forests on the northern side of Mt. Hood within the Bull Run drainage, and on a mossy boulder in an old-growth forest in the transition area between the *T. heterophylla* and *A. amabilis* Zones at 3000 ft in Bull of the Woods Wilderness. According to Derr et al. (2003), on the Siuslaw NF it occurs on young *Picea sitchensis* next to an older stand of second growth on Mt. Hebo (Specific information about this site is unknown to the Forest though, so additional follow-up and a further assessment of habitat is unable to be performed). On the Umpqua NF, it occurs on a mossy, north-facing rock outcrop at 4400 ft in a stand of *Pseudotsuga menziesii*, *A. concolor* and *Acer macrophyllum*.

Threats:

The major threats are removal of colonized substrates, alteration of microclimate or forest structure, harvest of special forest products that may include *L. linita*, or over-collection of specimens. Like other nitrogen-fixing species, *L. linita* may be sensitive to air pollution, but this has not yet been documented.

Conservation Considerations:

Recommendations (USDA/USDI 2000a) for sustaining populations of *Lobaria linita* at known sites include maintaining undisturbed forest structure, interior forest microclimate and the presence of suitable substrate. Restrict thinning or other stand treatments that will alter stand microclimate. Target the older stands in watersheds to meet the Standard and Guideline for 15% retention of old-growth in watersheds where little remains. Provide a well-distributed network of older forests in the range of *L. linita* to provide stands that will replace those lost to fire, blowdown, or other natural disturbance events.

Other pertinent information (includes references to Survey Protocols, etc):

Technical keys are available in McCune and Geiser (1997) and Goward et al.(1994). Survey protocols (USDA/USDI 1998, Derr et al.2003) and Management Recommendations (USDA/USDI 2000a) were developed for *Lobaria linita* by the USDA Forest Service/USDI Bureau of Land Management Survey and Manage Program. The information in this Species Fact Sheet updates some of the information presented in those documents.

ATTACHMENTS:

(1) References cited

(2) Map of known locations in Oregon and Washington

The map included here is a product of a query of the Agencies' databases as of October 2006, and does not include all of the sites mentioned in this Fact Sheet. Some sites have not been input into the databases, and are therefore missing from the map.

(3) Photo and line drawing

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Date Completed: March 2006

Revised: Richard Helliwell, March 2007

Revised: Rob Huff, August 2011. Revision added information about a new location from Medford BLM, and clarified that site information on the Siuslaw NF is unavailable.

Attachment 1 – References

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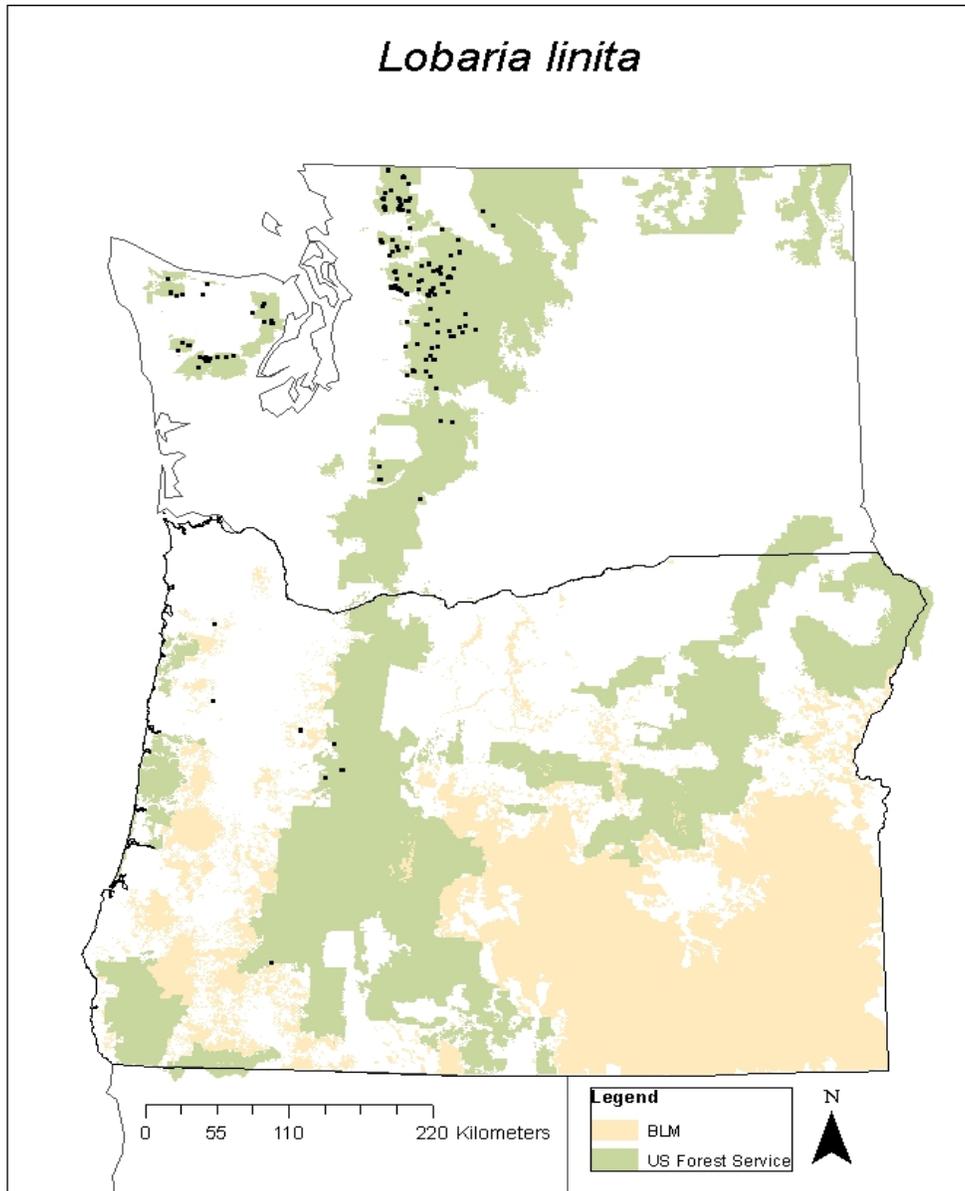
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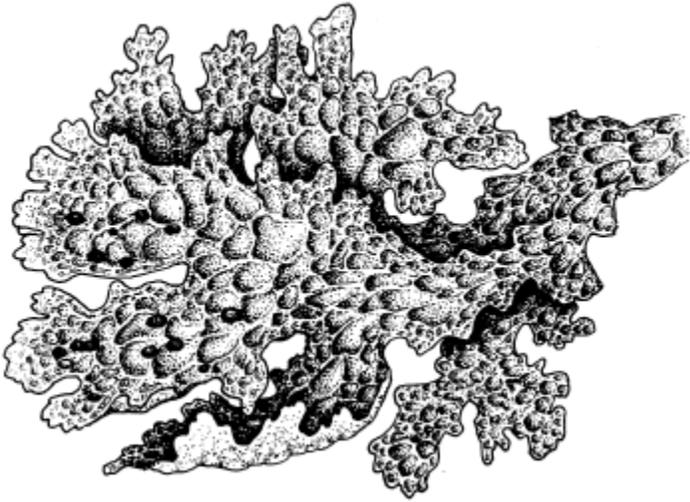
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Attachment 2 – Map of known locations in Oregon and Washington The map included here is a product of a query of the Agencies’ databases as of October 2006, and does not include all of the sites mentioned in this Fact Sheet. Some sites have not been input into the databases, and are therefore missing from the map.



Attachment 3 – Photo and line drawing of *Lobaria linita*



Drawing by Alexander Mikulin



Photo by Sylvia Sharnoff, used with permission