

## *Peltigera hydrothyrea*, Sponsorship for the CALS Conservation Committee

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### TAXONOMY

**Accepted scientific name:** *Peltigera hydrothyria*  
Miadlikowska & Lutzoni

**Common name:** Waterfan (Brodo et al. 2001) or  
Hydrothyria (local common usage)

**Synonyms:** *Hydrothyria venosa* J.L. Russell

### DESCRIPTION

Adapted from Brodo *et al.* 2001: Aquatic jelly lichen with fan shaped lobes 3-10 mm wide; translucent dark green or brownish when under water, much like a seaweed; dark blue-gray when dry; lower surface of most lobes with smooth, pale, branched veins composed of elongate-colorless hyphae; both upper and lower surfaces covered with a colorless cortex of pseudoparenchyma, lower surface deeply veined. Macula rather dense and thin. Photobiont cyanobacteria (*Nostoc*). Apothecia common on the upper surface of the lobes, biatorine, orange or red-brown, convex and without margins when mature (figure 1). Spores colorless, fusiform, 4 celled. 8 per ascus. Negative to reagents. Western populations lack any lichen substances.

**Similar species and distinguishing characteristics:**  
*Dermatocarpon luridum* is small-lobed and only needs to be periodically submerged. Grows on rock at stream edge. Photobiont is a green alga gives thallus a bright green appearance when wet. (Brodo et al. 2001)

*Leptogium rivale* has elongate lobes 0.1-1.5 mm wide forming small rosettes in and close to water (Brodo et al. 2001).

### BIOLOGICAL CHARACTERISTICS

**Growth form:** Foliose, gelatinous (McCune and Geiser 1997).

**Reproduction method:** sexual by spores from apothecia.

**Dispersal agents:** moving water is assumed.

**Substrate and specificity:** usually on rock submerged in streams. Has been seen on wood and Indian rhubarb (*Darmera peltata*) (Larson 2005).

**Habitat specificity:** aquatic in cool mountain streams.

**Pollution sensitivity:** only known in pollution free mountain streams. This lichen is a good indicator of water quality (Management recommendations for *H. venosa* (USFS 2000).

**Ecological function:** photobiont is *Nostoc* (cyanobacteria) which fixes nitrogen. This lichen is probably food for animals.

### GEOGRAPHY

**Global:** Endemic to North America. This lichen has been historically reported in all 4 major mountain chains in the United States but has apparently been extirpated in most of the Appalachians. (Dennis *et al.* 1981)

**Local:** Found in the Stanislaus, Mendocino, Plumas, Sequoia, Sierra, and Shasta-Trinity National Forests (figure 1, dark gray areas). According to the Region 5 Sensitive Plant Species Evaluation and Documentation Form (USFS 2005), Eldorado, Inyo, Klamath, Lassen, Six Rivers and Tahoe National Forests are within the potential range for this lichen (Figure 1, light gray areas). In California this document reports a total of 43 occurrences. (USFS 2005). Also one occurrence in Calaveras Big Trees State Park (Poulsen 2006). One occurrence in the stream on the "hanging meadow" on Mt. Dana, CA (Larson 2005).

### POPULATION TRENDS

As recent as 1988 it was thought to have been collected "just a few times in the Sierra" (Hale & Cole 1988), however the US Forest service reports that "it has been in decline throughout its historic



Figure 1. *Peltigera hydrothyria* from Calaveras Big Trees State Park in the Sierra Nevada. The thallus is under water, leading to image distortions. Note veins on lobe at center of image. Photo by Richard Doell.

range. Currently known Sierra populations appear to be stable at this time” (USFS 2005).

It is probable that not enough documentation over a long enough time has occurred to make any accurate evaluation of population trends (Poulsen 2006).

#### THREATS

**History:** Threats to this lichen are those actions that alter stream conditions including water quality, chemistry, temperature, light regime, level, opacity or sediment load, stream bank stability, altering of microclimate conditions. Building and decommissioning roads, run off from fertilizers (paraphrase from USFS 2000).

Water transfer projects (aqueducts, flumes, etc.) that reduce cold water flows in later summer and increased sedimentation (sandblasting the thallus) caused by road building/timber harvest where increased levels of sediment would be washed through the populations during snowmelt (i.e. peak flows) (Shevock 2006).

Cattle are known to destroy stream banks which cause an increase in sedimentation. They also are known to pollute streams.

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*P. hydrothyria* is considered uncommon throughout its range (USFS 2000).

**Future:** Logging, which can cause a local rise in temperature and a reduction in local ground water (Askins 2000) can have a potential affect on streams fed by springs. Livestock and recreation vehicles likely are also probable causes for concern along with acid rain or snow.

The effects of global warming may cause serious changes on stream temperatures and this lichen is very sensitive to water temperature. “The critical temperature above which degradation rapidly occurs is in the 15 to 18 degrees C range. Any environmental change that would raise the stream temperature into or over this range for an extended period would have a detrimental effect on this lichen” (Davis 1999).

Any disturbance could have an adverse effect as although “it appears that there are a lot of occurrences, this still translates into few acres occupied by this lichen” (Shevock 2006).

#### PROTECTION

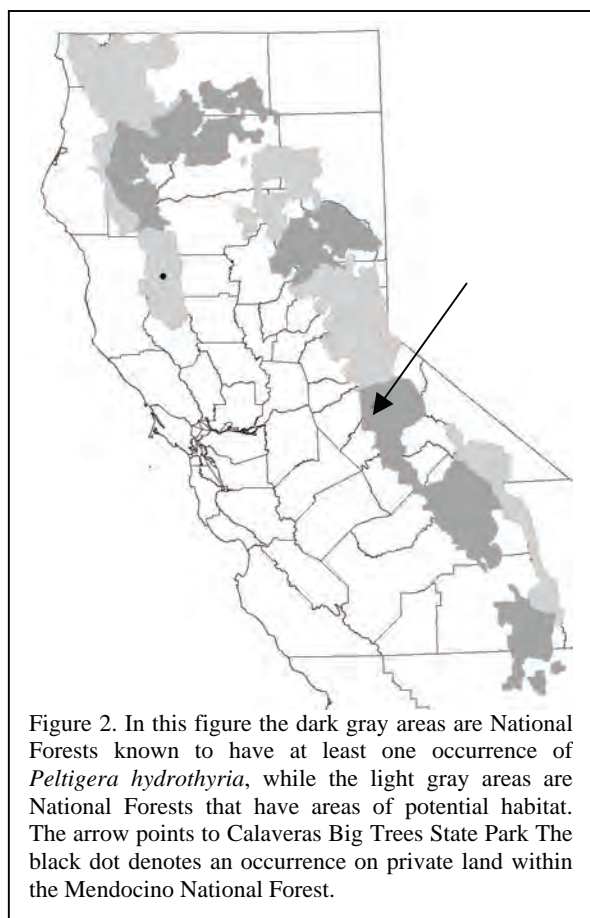
*Peltigera hydrothyria* is a Sensitive plant in Region 5 of the US Forest Service (USDA 2005), and as such is managed for on certain forests (Figure 1). The California Department of Recreation and Parks protects all flora and fauna as does the U.S. Park Service. Protection methods on private lands are unknown and probably do not exist. The California Department of Recreation and Parks monitors this lichen at Calaveras Big Trees State Park.

#### CONSERVATION STATUS SUMMARY

*P. hydrothyria* has been partially extirpated in the Appalachian mountain range showing that it is vulnerable to human caused events.(see above)

Because of its very limited habitat of cool mountain streams and that it is uncommon in this habitat and because it is a good indicator of water quality, it should continue to be monitored and/or managed by those agencies who now do so. The Calaveras Big Trees State Park (CBTSP) Resource Management Office is committed to monitoring *Peltigera hydrothyria* for abundance, water temperature, chemical analysis, water flow etc. It should be recommended that other agencies such as California Department of Forestry etc. manage for it also on private holdings within the forests.

Big Trees Creek in the South Grove of CBTSP (Tuolumne County) is approximately three and one half miles in length and the lichen grows in abundance throughout most of its length. (personal and staff observation). Water quality studies were performed in the summer of 2006, including water



temperature monitoring and nitrate, sulfate and phosphate monitoring (see addendum). These studies show that in Big Trees Creek, July water temperatures already exceed the critical temperature at which *Peltigera hydrothyria* begins to degrade (Davis 1999).

I would suggest that other agencies could be asked to do the same as CBTSP has done such as Sequoia National Park and possibly a USNFS management unit in the northern part of the state.

*Peltigera hydrothyria* may prove to be an indicator of change due to global warming and/or local warming due to nearby logging. Logging also can contribute to lower local ground water and higher local temperature (see above).

**SPECIFIC CONSERVATION RECOMMENDATIONS**

**Recommended Global Rarity Rank:** : G4  
North American endemic.

**Recommended Global Threat Rank:** N/A

**Recommended Local Rarity Rank:** CA: S3

**Recommended Local Threat Rank:** CA: .2

**Recommended List:** CA: 4

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# The Bulletin of the California Lichen Society

Vol. 14, No. 1

Summer 2007

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The deadline for submitting material for the Winter 2007 CALS Bulletin is 2 November 2007.

### Back cover:

- A) *Peltigera hydrothyria* from Calaveras Big Trees State Park in the Sierra Nevada. The thallus is under water, leading to image distortions. Note veins on lobe at center of image. Photo by Richard Doell.
- B) *Peltula euploca* at Hough creek. Photography by Tara Collins.
- C) *Caloplaca* sp. at Hough Creek. Photography by Bill Hill.
- D) Rock outcrop above Lizard Rock. Photography by Carrie J. Diamond.
- E) Oddly pale - possibly *Phaeophyscia* being invaded by *Xanthoria*, on canyon live oak above Lizard Rock. Note the gradient in the color of the cortex, which tested K+ purple, regardless of color. Photography by Pete Sands.

