Parmelia hygrophiila, a new lichen species from the Pacific Northwest of North America

TREVOR GOWARD and TEUVO AHTI


The lichen Parmelia (subg. Parmelia) hygrophiila Goward & Ahti, sp. nova, is reported from Alaska, British Columbia (typus), Idaho and Washington, where it is a widespread epiphyte in humid and subhumid sectors at low and middle elevations. Salazinic acid and atranorin are its major phenolic constituents. A key to the species of the P. saxatilis group in the Pacific Northwest is presented.

Key words: lichen, Parmelia, epiphyte, phenols, British Columbia

T. Goward, c/o Herbarium, Department of Botany, University of British Columbia, Vancouver, B. C., Canada V6T 2B1; T. Ahti, Department of Botany, University of Helsinki, Unioninkatu 44, SF-00170 Helsinki 17, Finland

Recent lichenological studies in the “Interior Wet Belt” of British Columbia, Canada, especially in Wells Gray Provincial Park and its vicinity, have turned up a common lichen which is here described as a new species, Parmelia hygrophiila. Although usually readily distinguishable from P. saxatilis (L.) Ach., P. hygrophiila has hitherto been either included in that species, or else treated as a variety of it, namely P. saxatilis “var. divaricata” Delise ex Nyl. (see Ahti 1962, Hämet-Ahti 1965, Otto & Ahti 1967). This latter variety, however — actually originally described from Japan as P. saxatilis [subsp.] divaricata Delise ex Nyl. — is now known to be a synonym of P. squarrosa Hale. Delise's epithet divaricata was never published by him and likely referred to a specimen from Newfoundland.

Parmelia hygrophiila Goward & Ahti, sp. nova (Fig. 1)

Thallus foliosus. Parmeliae saxatilis similis sed isidis soredioideis fragilissimis, pro parte maxima ecorticatis praeditus; lobis marginalibus vix rufescensibus; vulgo corticola.

Typus: Canada, British Columbia, Kokanee Creek Park, 17 km E of Nelson, 49°36'N, 117°07'W, alt. 530 m, in rather dense Populus trichocarpa — Abies grandis — Thuja plicata — Betula papyrifera stand on interfluve of Kokanee Creek delta, on trunk of inclining Betula papyrifera; northern temperate zone (Interior Western Hemlock Zone), 25.VII.1981 Trevor Goward 81–1601. Roz Scebrelli & Sherry Kirkbild (UBC, holotypus; BM, CANL, H, US, isotypi).

Thallus foliösus, appressed, moderately to rather loosely adnate, 4–10 cm in diameter. Lobes 1–5 mm wide, weakly reticulate-ridged to almost plane or concave with age, linear and elongate, somewhat dichotomously branching, more or less divergent. Upper surface pale to dark greenish grey, occasionally bluish grey, slightly or not at all browning at lobe tips; checkered with effigurate pseudococcyllae which typically become fissular toward the thallus centre, somewhat shiny, pruinose or not at lobe tips; isidiate, the isidia not at all hard-corticate, largely ecorticate (never shiny), not or little embrowned at tips, soon becoming soredioid, short-granulose, simple or irregularly branched, extremely fragile, generally disposed in intermittent clusters along laminal or marginal pseudococcyllae, c. 0.08–0.16 mm high and 0.08–0.1 mm in diameter, forming continuous, readily eroding masses at centres of old thalli. Lower surface dark brown at lobe tips, otherwise entirely black, smooth and shiny; moderately to rather sparsely rhizinate, the rhizinae black, up to 1(1.5) mm long, simple or apically furcate, occasionally with a few short lateral branchlets
Parmelia hygrophila

P. hygrophila is a common epiphyte of numerous coniferous and deciduous tree and shrub species, e.g. Abies amabilis, A. lasiocarpa, Picea engelmannii, P. glauca, P. sitchensis, Tsuga heterophylla, Pseudotsuga menziesii, Juniperus scopulorum, Betula papyrifera, Alnus rubra, Quercus garryana, Acer glabrum, A. macrophyllum and Shepherdia canadensis. More rarely, it has also been collected over other substrata including rock, saxicolous moss and the (shaded) cedar shakes of an abandoned farmhouse roof.

The ecology of P. hygrophila has been particularly observed in the Columbia Mtns and Shuswap Highland region of south-central B.C. Here it often grows in the company of P. sulcata Taylor. This latter species, however, is much the more widespread of the two, P. hygrophila being confined mostly to rather humid situations, for example, the sheltered side of tree trunks. This hygrophytic tendency, moreover, is especially underlined by P. hygrophila's total absence from the arid and subarid sectors of Interior B.C. (e.g. from the so-called Interior Douglas Fir Zone and the Ponderosa Pine – Bunchgrass Zone; Krajina 1965). Its scarcity in forests of Upper Boreal and Hemiarctic (timberline) elevations may also be explained on hygric (rather than thermic) grounds. At any rate, this species is best represented in humid and subhumid Thuja plicata, Abies lasiocarpa and Tsuga heterophylla forests at low to middle elevations.

In oceanic and suboceanic regions, the microdistribution of P. hygrophila is apparently controlled more by illumination than it is by hygric factors. Thus, whilst this species is often abundant over the trunks of rather exposed trees in city parks (e.g. in Vancouver and Victoria), it is nevertheless generally absent from all but the most open native forest types. In open forests, however, it may be locally common, occurring at least up to Middle Boreal elevations.

**Distribution**

P. hygrophila seems to be an oceanic to subcontinental species of western North America (Fig. 2). Besides British Columbia, it has been recorded from adjacent parts of Alaska, Idaho and Washington. In addition to our personal field notes and collections we have examined the collections of several public herbaria, primarily in Vancouver (UBC), Ottawa (CANL) and Helsinki (H). However, the extent of the range southwards and northwards, in particular, is still poorly defined.
Discussion

Though superficially similar to *P. sasatilis*, *P. hygrophila* may be readily distinguished from that species by its typically ephistemic, soredioid isidia, its typically somewhat greener upper cortex, and by its nearly exclusive occurrence over bark. *P. sasatilis* has a definitely non-soredioid, hard-corticate isidia, an often bluish-grey (or embrowned) upper cortex, and a less frequent occurrence over bark. In continental regions *P. sasatilis* is a more or less strict saxicolous. However, in oceanic climates, it may occur sparsely, but regularly, over bark — and may then sometimes be difficult to separate from *P. hygrophila*. Rarely, the two species have been found growing intermixed.

*P. squarrosa*, a common epiphyte in both eastern and western North America (especially in coastal areas), as well as in eastern Asia (e.g. Lamb 1954, Hale 1971, Dey 1978), may be easily separated from *P. hygrophila* on the basis of the former's squarrose rhizinae. The isidia of *P. squarrosa* are generally hard corticate in western material, thereby differing from the isidio-soredia of *P. hygrophila*. Interestingly, the isidia of eastern populations of *P. squarrosa* often develop a somewhat more soredioid appearance (rarely observed in the western material also). However, *P. squarrosa* regularly has brown-tipped isidia, whereas the isidia of *P. hygrophila* nearly always tend to be "clean", i.e. pale grey.

From *P. sulcata* our new species may be differentiated by its large, granular "isidia" and simple (vs. squarrose) rhizinae.

Like *P. hygrophila*, *P. pseudosulcata* Geylnik is a western North American corticole. The isidia of this latter species, however, are always hard-corticate and often elongate-cylindrical, as against *P. hygrophila*'s more soredioid and short-granular isidia. In *P. pseudosulcata*, moreover, the upper cortex seldom bears the obvious checkered-pseudocyphellate pattern typical of *P. hygrophila*. *P. pseudosulcata* is primarily restricted to coastal localities.

Among the North American species of the *P. sasatilis* group, *P. hygrophila* is perhaps most closely related to the saxicolous *P. fraudans*. From this species it differs primarily in its corticolous habitat and lack of usnic acid. Points of similarity include the simple rhizinae, typical absence of apothecia and (perhaps most importantly) soredioid isidia. These last, however, are larger, more copious, more marginally disposed and more apically embrowned in *P. fraudans* than in *P. hygrophila*.

Outside North America a very similar species is *P. cortorta* Bory, which is widespread in the Mediterranean region extending northward to southern Germany and Czechoslovakia (Schindler 1975). It tends to be more robust and has contorted lobes, less effigurate pseudocyphellae, and punctiform isidia-bearing soralia.

The diagnostic characters of *P. hygrophila* and its allies — all members of *Parmelia* subg. *Parmelia*, subsect. *Parmelia* (Hale & Kurokawa 1964) — are included in the following key.

Key to species of the *Parmelia sasatilis* group in the Pacific Northwest

1. Thallus without soredia or isidia (check lobe margins) ........................................... 1. *P. omphalodes* (L.) Ach.
   1. Thallus with distinct (rarely sparse) soredia and/or isidia
   2. Thallus sorediate; soredia farinose and confined to discrete soralia; rhizinae more or less richly squarrose ........................................... 2. *P. sulcata* Taylor
2. Thallus isidiate, isidia occasionally soredoid and then often branched and associated with pseudocyphellae and marginal or laminal cracks, never farinose; soralia lacking or inconspicuous; rhizinae simple (squared in P. squarrosa)

3. Isidia distinctly hard-corticate (often shiny), with distinctly embrowned tips, often becoming long-cylindrical

4. Collected over rock (rarely over bark); rhizinae simple; upper cortex bluish grey or brownish grey (rarely greennish grey); apical portions of lobes often covered in more or less raised white reticulations; medulla K-reddish; widespread .......... P. saxatilis (L.) Ach.

4. Collected over bark (rarely over rock); rhizinae simple or squared; upper cortex whitish, greenish or greenish grey; apical portions of lobes often checkered-pseudocyphellate, but without raised reticulations; medulla K-reddish or K-; mostly restricted to oceanic localities

5. Rhizinae at least in part squaredly branching; medulla K-reddish (salazinic acid) ..................... P. squarrosa Hale

5. Rhizinae simple to apically dichotomous; medulla K-(protoetaric acid) P. pseudosulcata Gyelnik

3. Isidia not at all hard-corticate, often ecoricate and soredoid (never shiny), with or without distinctly embrowned tips, generally short-granular

6. Collected over rock; rhizinae simple or somewhat apically branching, but never squared; isidia (or isidio-soredia) obviously in large part marginal (especially on young lobes), densely clustered and typically disposed in extensive rows; upper cortex with a generally distinct yellow-green cast (contains usnic acid) ..................... P. fraudans Nyl.

6. Collected over bark (rarely over rock); rhizinae simple or squared; isidia (or isidio-soredia) in large part laminal, more or less clustered, but seldom disposed in extensive marginal rows; upper cortex blue-green or greenish grey (without usnic acid)

7. Isidia (isidio-soredia) with regularly and conspicuously embrowned tips; rhizinae strongly squaredly branching; restricted to oceanic localities .................. P. squarrosa Hale

7. Isidia (isidio-soredia) mostly with pale tips (or rarely with irregularly embrowned tips); rhizinae simple or somewhat apically branching; widespread ......... P. hygrophila Goward & Ahti

REFERENCES

Ahti, T. 1962: Ecological investigations on lichens in Wells Gray Provincial Park, with special reference to their importance to mountain caribou. — 69 pp., unpubl. report, B.C. Dept. Recreation and Conservation, Victoria, B.C.


Received 20.1.1983