Psilolechia clavulifera, a Lichen Species New to Canada

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Lewis, Chris. 2010. *Psilolechia clavulifera*, a lichen species new to Canada. Canadian Field-Naturalist 124(2): 181–182.

Psilolechia clavulifera is reported as new to Canada, where it was been found growing under a shaded rock overhang near Temagami, Ontario. This is the first record of the species for Canada. This occurrence represents only the fourth documented record of the species for North America since it was first discovered in 1939 by J. Lowe. This specimen was found growing with other rarely collected cryptic species found in unique microhabitats: *Psilolechia lucida, Protothelenella corrosa,* and *Microcalicium arenarium*.

Key Words: *Psilolechia clavulifera,* lichen, new to Canada.

Psilolechia clavulifera (Nyl.) Coppins was described in 1939 as *Lecidea adirondackii* by Josiah L. Lowe (Lowe 1939) based on material from the Adirondack Mountains of New York. The first North American collections from New York were made some 70 years ago, between the years 1932 and 1935. The type specimen is from the Huntington Forest near Newcomb, New York in Essex County (44'00°N, 74'13°W). In spite of the numerous floristic studies and the increased interest in lichens during the past 70 years, no recent collections have been made, even in New York. A 1990 collection, however, is stored in the Arizona State University (ASU) herbarium collected from the state of Washington. The notes on ecology and associations described here in the first Canadian record will hopefully help other lichenologists find this species.

There are three species of *Psilolechia* found in North America and Greenland: *P. lucida*, *P. clavulifera*, and *P. leprosa* (the last being found growing on copper-rich rock so far reported only from Greenland). *P. lucida* and *P. clavulifera a*re both typically found on vertical or overhung rock substrates in shaded humid situations (Coppins and Purvis 1987; Wirth 1995) with *P. lucida* also being found growing on old wood (Brodo et al. 2001). A review of *Psilolechia* Massal by Coppins and Purvis (1987) describes a fourth species, *P. purpurascens*, known only from Tasmania.

Methods

Specimens collected and identified by the author were presented to Dr. Irwin Brodo at the Canadian Museum of Nature for verification. The specimens were studied using standard microscopic techniques, and vouchers were deposited in the National Herbarium of Canada lichen collection (CANL).

Observations

Specimens Examined

Canada. *Ontario*: TEMAGAMI DISTRICT: South Lorrain Township, (approx 17.5 km E of Temagami and approximately 82 km north of North Bay, underside of a rock overhang, on a treed talus slope, on the shore of the Matabichuan River.), 47°3'45"N, 79°33'25"W, *C. Lewis 165* (OAC University of Guelph), *C. Lewis 166* (CANL – #122546), June 28th, 2008; **Czech Republic**.

Psilolechia clavulifera (Nyl.) Coppins, Bulletin of the British Museum (Natural History), Botany Series **11(2)**: 17-214. 1983. *Lecidea clavulifera* Nyl. In Flora Jene 52: 294 (1869).

Synonyms: *Lecidea adirondackii* H. Magn., *Micarea clavulifera* (Nyl.) Coppins & P. W. James

Thallus: forming small patches, granular to granular-verrucose, the granules elongate or irregular, 14-33 x 1.0-14 µm, often growing together, effuse; ***surface:*** white to pale greenish gray (yellowish green to dark green according to Lowe); ***photobiont:*** *Stichococcus*; ***Apothecia:*** frequent, 0.1-0.3(-0.4) mm diameter, globose to tuberculate, convex to hemispherical; discs dark brown to blue-black or sometimes livid blackish or reddish brown; often surrounded by a basal white rim of protruding excipular hyphae (byssoid); hypothecium hyaline to pale green (pale olivaceous to green-black according to Lowe); hymenium pale greenish to blue-greenish; epihymenium pale green to blue-green (olivaceous or greenish black according to Lowe), K+ greenish, N+ purple-red; ascospores 4-7 × 1.2-2.0 µm, tear-shaped, (oblong-ovoid); ***Anamorph:*** frequent, the thallus surface often with scattered conidiogenous cells 7-12 × 1-2 µm, ± cylindrical (no pycnidia observed); ***conidia:*** 7-15 x 2-2.3 µm, ± oblong; ***Chemistry:*** thallus K-, C-, KC-, P-, UV-; no lichen substances.

Substrate and ecology: On roots, stones and firm or compacted soil under dry overhangs on banks or the root systems of fallen trees, rarely on bark (Wirth 1995; Ryan 1994-1999*, Purvis et al. 1992; Coppins and Purvis 1987; Czarnota and Kukwa 2008). Other lichen species often found in similar habitats include: *Chaenotheca furfuracea, Psilolechia lucida,* and *Microcalicium arenarium*. *Psilolechia lucida* is relatively rare in Ontario (Wong and Brodo 1992). ***Distribution:*** The North American distribution of *P. clavulifera* is relatively unclear due to its relatively few documented occurrences: Ontario, New York, and Washington. It

is known in Canada from a single locality. In Europe *P. clavulifera* has been reported from Iceland, United Kingdom, Norway, Germany, Austria, Sweden, and Czechoslovakia (GBIF, 2008*), Poland (Czarnota and Kukwa 2008), Finland (Coppins and Purvis 1987) and Italy (Benesperi et al. 2007). It has been found historically in Australia, New Zealand, Costa Rica, and Hawaii (Coppins and Purvis 1987). It was also recently reported new from South American when it was found in Bolivia (Flakus et al. 2006) and (Wirth 1995) considered it as rare but recent findings has indicated that it is more common than once thought. New data clearly shows that this species is much more widespread, and especially in boreal/pre-Cambrian rock regions it should be regarded as quite common lichen and is just potentially overlooked (Czarnota and Kukwa 2008).

BOHEMIA centralis, distr. Příbram, Brdy Hills: near lake/reservoir "Hořejší Padrt'ský Rybník", elevation 640 m, amongst Piceae sp. roots on soil, Š. Bayerová, April 5th, 1998 (ASU): **United States of America**. *New York*: ESSEX COUNTY, Huntington Forest at Newcomb near the Chapel Pond, on rock on talus slope, Lowe 4096 (CANL - #23646), August 13, 1934. ESSEX COUNTY, Huntington Forest at Newcomb, Lichens of New York State, on rock on talus slope, Lowe 4359 (CANL - #4664), August 20, 1934 *Washington*: SKAMANIA COUNTY: Carson National Fish Hatchery, on shaded underside of log, 45°50'N, 121°59'W, J. Davis, ca. 1990 (ASU).

Key to *Psilolechia* in North America and Greenland

1. Thallus bright greenish yellow, or completely yellow, UV+ dull to bright orange (rhizocarpic acid). Apothecia yellow-green to pale or lemon yellow or yellow-orange, to olivaceous or brownish yellow, convex, margin less. Epihymenium intense yellow-olivaceous, granular, K-, N-; spores (4-)5-7(-8) × (1-) 1.5-2 µm, oblong-ellipsoid. Photobiont *Trebouxia*-like algae. New York, Massachusetts, Maine, Minnesota, and Pennsylvania, Alberta, Saskatchewan, Ontario . . . . . *P. lucida*

1. Thallus whitish to greenish. Apothecia not yellow **2**

2. Thallus C-, UV- (no lichen substances), white to pale greenish gray or yellowish green to dark green, granular, Apothecia dark brown to blue-black or sometimes livid blackish or reddish brown (shade form pale, blue-gray, gray-brown), convex to hemispherical, evenly distributed. Hymenium greenish to blue-greenish; epihymenium pale green to blue-green, olivaceous or greenish black, K+ greenish, N+ purple-red. Spores 4-7 × 1.2-2 um, tear-shaped or drop-shaped (oblong-ovoid). *United States*: New York, Washington, Ontario . . . . . *P. clavulifera*

2. Thallus C+ red (gyrophoric and lecanoric acid) leprose. Apothecia pale, rose, dark brown, sometimes with a violet tint, convex to spherical, often agglomerated. Hymenium colourless to yellow; epihymenium pinkish or dark brown, K-, N-. Spores 4.5-6.5 (7) × 1.3-1.8 µm, tear-shaped or drop-shaped (oblong-ovoid). Also contains porphyrilic acid. Greenland. . . . . *P. leprosa*

Acknowledgments

I am grateful for the specimens sent to me on loan by Tom Nash (ASU). I would also like to thank Irwin Brodo for confirming all my identifications of the specimens and for his valuable comments on the manuscript.

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Received 13 October 2009
Accepted 23 June 2010