

Discovery of *Hypogymnia pulverata* on the Gaspésie Peninsula in eastern Canada

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ABSTRACT. – *Hypogymnia pulverata* appears to be uncommon in North America. Previous collections are known from Alaska, Oregon, and near the coast of Hudson Bay in northwestern Québec. Here we report it from Mont Olivine and along the Rivière Sainte-Anne in Parc national de la Gaspésie, Québec. These occurrences are approximately 1,000 km southeast of the Hudson Bay locality, and extend the known range of *H. pulverata* to the Atlantic Coastal Region of eastern North America.

KEYWORDS. – Phytogeography, Tuckerman Workshop, rare, lichen.

INTRODUCTION

The genus *Hypogymnia* comprises a group of charismatic macrolichens that is particularly common and speciose in arctic and boreal regions of the northern and southern hemispheres (Elix 1979, Brodo et al. 2001, McCune 2008, Hansen & McCune 2010, Elvebakk 2011, Goward et al. 2012). Currently, thirty-eight species of *Hypogymnia* are known from North America (Miadlikowska 2011, Esslinger 2014). *Hypogymnia pulverata* (Nyl. ex Cromb.) Elix is the only member of the genus that consistently has a solid medulla (i.e., the lobes are solid rather than hollow, despite appearing inflated), lacks a pitted lower surface, and has laminal soredia (Figure 1).

Globally, *H. pulverata* has a widespread distribution that includes Australasia, China, eastern Russia, Japan, and South America (Rassadina 1971; Elix 1979, 1992; Elvebakk 2011). It appears to be uncommon in North America, where a single population was first encountered by Claude Roy and Robert Gauthier along the Hudson Bay coast in northwestern Québec (Brodo 1989). Later it was found along the coast of Oregon, again as a single population (McCune et al. 1997). More recently a number of populations were discovered in Alaska between 2004 and 2010 (Nelson et al. 2011). Considering the broad gap between its known occurrences in the Pacific and Hudson Bay coastal regions, we have long speculated that *H. pulverata* may also occur along the Atlantic Coast of northeastern North America. As such, it was gratifying to discover a population in Parc national de la Gaspésie on the Gaspésie Peninsula in Québec

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Figure 1, *Hypogymnia pulverata* from Mont Olivine (Lendemer 32486, NY; scale = 1.0 cm).

during the 21st Tuckerman Workshop. We formally document this occurrence here, and extend the known distribution of *H. pulverata* in eastern North America by about 1,000 km to the southeast (Figure 2).

MATERIALS AND METHODS

Specimens collected by the authors are deposited at the Canadian Museum of Nature (CANL), the Louis-Marie Herbarium at Laval University (QFA), the New Brunswick Museum (NBM), and the New York Botanical Garden (NY). Reference specimens of *Hypogymnia pulverata* deposited at NY were also used for comparison, as was a duplicate (at NBM) of the collection made by Claude Roy in northwestern Québec that was reported by Brodo (1989). Specimens were examined dry using standard dissecting and compound light microscope techniques. The chemistry of specimens was examined using the standard spot tests reagents outlined by Brodo et al. (2001) and some specimens were also examined with thin-layer chromatography (TLC) using solvent C as outlined by Lendemer (2011).

RESULTS

All of the specimens we collected on the Gaspésie Peninsula were found in mature conifer forests on the southern slopes of Mont Olivine (Figure 3) or along the Rivière Sainte-Anne at the base of Mont Albert. They were collected from the bark of conifer trees or conifer snags. This habitat and substrate is consistent with the collections made in other parts of North America (Brodo 1989, McCune et al. 1997, Nelson et al. 2011). We observed at least ten individual thalli of the species on Mont Olivine, and it should be noted that the collections reported here were found independently by the collectors (i.e., the species is frequent enough at this locality to be located by multiple individuals searching a large area independently).

The specimens we collected all have a P+ red medulla, which is in accordance with the other specimens reported from North America, except for the P- one from Oregon (McCune et al. 1997). Our specimens that were examined with TLC contained atranorin and physodic, physodalic, and 3-hydroxyphysodic acids, which is the same result Brodo (1989) had when he examined the collection from northwestern Québec. Nelson et al. (2011) reported protocetraric acid in their specimens from Alaska, but



Figure 2, known geographic distribution of *Hypogymnia pulverata* in North America based on specimens examined for this study and those published by Brodo (1989), McCune et al. 1997 and Nelson et al. (2011).

they did not report any of the acids that were found in our specimens. Elix (1979) stated that the chemical causing the P+ red reaction is consistently physodalic acid and protocetraric acid is either present or absent. Our collections and the specimen from the other Québec location lack procetraric acid (Brodo 1989), which agrees with the findings of Elix (1979). It was not stated if the collections from Alaska were examined with TLC (Nelson et al. 2011), so there may be other substances present in addition to protocetraric acid in that material.

Specimens examined. – **CANADA. QUÉBEC:** Gaspésie Peninsula, M.R.C. de la Haute-Gaspésie, Parc national de la Gaspésie – Mont Olivine, Mont Olivine trail, 48.88646°N, 66.1117°W, mixed conifer forest, 2.vii.2012, on a conifer snag, *R.C. Harris 57555* (NY); Mont Olivine, trail to La Serpentine 0–2.5 km N of junction with the Mont Olivine trail, 48.8931°N, 66.1158°W, mixed wood forest (with *Abies*, *Acer*, *Betula*, *Larix*, *Ilex* and *Picea*) with serpentine and mafic outcrops, 2.vii.2012, on a snag, *J.C.*



Figure 3, habitat of *Hypogymnia pulverata* on Mont Olivine (top) and image of Roy & Gagnon 12-5990-C in the field (bottom).

Lendemer 32486 (NY), on *Abies balsamea*, J.C. Lendemer 32459 (NY); Mont Olivine, Mont Olivine trail, between the trail where it forks and the edge of the corridor for power transmission lines, 48.887222°N, 66.113611°W, in an *Abies-Picea* forest, 6.vii.2012, on *A. balsamea*, C. Roy & J. Gagnon 12-5990-C (NBM, QFA), C. Roy & J. Gagnon 12-5993-C (CANL, QFA); Rivière Sainte-Anne near look-off over Chute Sainte-Anne, 48.9404°N, 66.1241°W, forest of *A. balsamea* and *Thuja occidentalis* near falls, 3.vii.2012, on branch of *A. balsamea*, S.R. Clayden 23173 (NBM).

DISCUSSION

The remarkably scattered distribution of *Hypogymnia pulverata* in North America suggests that it may also occur between the locations that are presently known. Scattered distributions, however, are common in several other sorediate *Hypogymnia* species (Miadlikowska et al. 2011). Therefore, *H. pulverata* may in fact be a rare species, whose occurrence is restricted to coastal or other areas with a very humid climate.

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