

Cladonia oricola, a new coastal species of reindeer lichen in eastern North America

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Abstract. A new species of reindeer lichens, *Cladonia oricola*, is reported from Newfoundland (type locality), Miquelon Island, Nova Scotia, and Massachusetts. The species was particularly observed in hyperoceanic maritime heaths on the Avalon Peninsula, Newfoundland. It resembles *C. rangiferina* but is distinguished by slender growth form, pale colour and presence of red slime in conidiomata. From *C. ciliata* it is distinguished by production of atranorin, lower frequency of dichotomous branching, and slightly stouter habit. All the earlier records of *C. ciliata* f. *ciliata* from eastern North America apparently belong to *C. oricola*.

1 Introduction

The widespread reindeer lichen *Cladonia rangiferina* (L.) F. H. WIGG. (*Cladina rangiferina* (L.) NYL.) is known to be fairly variable in many regions of its area, even at single localities. AHTI (1961) recognized four geographic races within it, and the names subsp. *abbayesii* (AHTI) AHTI & DEPRIEST and subsp. *grisea* AHTI are still in use. The former (Latin American) subspecies may even deserve species rank, as its distinction is supported by a molecular analysis (STENROOS et al. 2002), while the latter is more doubtfully distinguishable (in East Asia). Later AHTI (1986) described one more segregate of *C. rangiferina*, namely *C. conspicua* (AHTI) AHTI (type from Newfoundland!), but its status is still in need of confirmation. In addition, we (AHTI & HYVÖNEN 1985) earlier segregated *C. stygia* (Fr.) RUOSS from *C. rangiferina* after finding that the presence of red pigment in conidiomata could be used as a definite diagnostic character between the species (in addition to other characters). Since then AHTI (e.g. 2000) has recognized two more apparently close allies of *C. rangiferina* in South America (*C. argentea* (AHTI) AHTI & DEPRIEST, *C. kalbii* (AHTI) AHTI & DEPRIEST), in part based on this same character.

In September 2007 we participated in a lichenological foray, called Tuckerman Workshop, on the Avalon Peninsula, Newfoundland, Canada (HILTON 2007, PITCHER & CLAYDEN 2007). There, in several places we came across to a strange, very pale variant of *C. rangiferina*. Subsequent study revealed that the slime in conidiomata (pycnidial jelly) turned out to be purple, while it is hyaline in *C. rangiferina*. Since the purple pigment in conidia seems to correlate with other, more subtle characters, we think that

this variant should be considered as a distinct species, which will be described below. In fact, this lichen was observed in Newfoundland for the first time in 1956 by the senior author, but in the absence of clear-cut diagnostic characters it was not taxonomically recognized before.

2 *Cladonia oricola* AHTI & S. STENROOS, spec. nova

(Figs. 1, 2)

Sicut *Cladonia rangiferina* (L.) F. H. WIGG. sed podetia regulariter leucophaea, apice brunnescentia, internodiis elongatis (1-2 cm) et gelatina conidiomatum purpurea. Atranorinam et acidum fumarprotocetraricum continens.

Primary thallus not seen but presumably crustose. Podetia 5-15 cm tall, forming wide clonal patches, commonly 20-40 cm across, erect or ascendent, pale whitish to glaucescent gray, terminal branchlets usually conspicuously browned, not melanotic at dying base; branching type anisotomic, thus main axes distinct, terete, branching di- to tetrachotomic, dichotomy most frequent; apical main branchlets of individual podetia single or very few, not forming denser tops, strongly unilaterally deflexed; extreme tips acute to acuminate; axils closed or perforated. Surface of podetia fairly compactly arachnoid, smooth near tips, farther down becoming clearly maculate (sites of algal glomerules appearing as green or browned spots), slightly verruculose, but not scabrose. Podetial wall 130-150 μm thick, ectal layer + medulla 60-70 μm , stereome 50-75 μm , central canal papillulate. Conidiomata frequent, 90-160 x 50-110 μm , dolioliform or shortly cylindrical, containing purple slime; conidia 5 x 1 μm , falciform. Hymenial disks (apothecia) infrequent, in groups of 2-4 at tips of subapical branchlets, pale brown, 0.4-0.6 mm wide, convex, spores 7-12 x 2-3 μm , fusiform, simple, colourless.

Chemistry: PD+ orange red, K+ yellow. Atranorin and fumarprotocetraric acid, with traces of protocetraric and confumarprotocetraric acids (TLC).

Holotype: Canada. Newfoundland. Avalon Peninsula: Witless Bay Line, at boundary of Hawke Hills Ecological Reserve, 2007 *Teuvo Ahti 67674 & Soili Stenroos* (H; isotypes in CANL, BM, NFM, NY).

Etymology: *Oricola*, lat., “coast dweller”, from *ora*, coast.

Habitats: The major habitat type of *Cladonia oricola* seems to be constantly humid, wind-exposed, maritime heath, a community type which is characteristic of SE

Newfoundland. The species can also occur on hummocks of wet peat bogs, but up to now always near the sea.

Distribution: *Cladonia oricola* is so far only known from coastal eastern Canada, mostly from the south coast of Newfoundland but also from Nova Scotia and Massachusetts. It is expected to be widespread right on the coast. However, it was observed at least to 200 m on the mountain slopes.



Fig. 1: *Cladonia oricola* at type locality, Hawke Hills, Avalon Peninsula, Newfoundland. The associated plants *Kalmia angustifolia* and *Sibbaldiopsis tridentata* are some of the dominant plants of the maritime heath communities in this area. Photo S. Stenroos 2007.

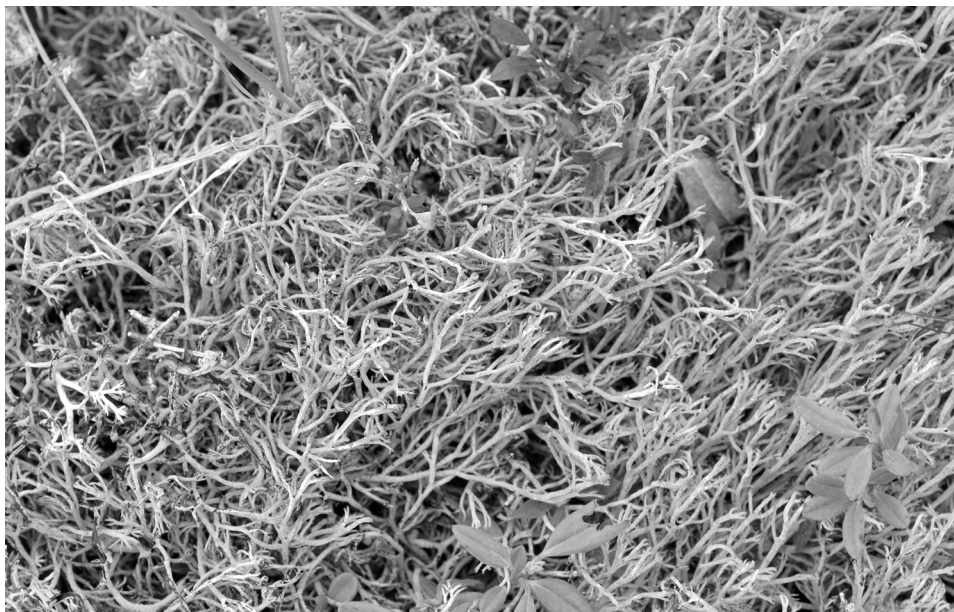


Fig. 2: *Cladonia oricola*, west of Trepassey, Avalon Peninsula, Newfoundland. Photo S. Stenroos 2007.

3 Discussion

The colour of the slime in the conidiomata is an important diagnostic character of *Cladonia oricola*, but it is unfortunately rarely visible neither in fresh material nor herbarium specimens. The conidiomata are regularly present but are usually either immature or empty. When the conidia are being ejaculated, a purple drop is seen at the ostiolum of the conidioma, even in older herbarium specimens. Usually several conidiomata adjacent to each other exhibit the purple slime at the ostiolum. When dried at the right stage, the drop remains even in older collections. For instance the purple pigment is still visible (not faded) in specimens (PC) collected by the French explorer E.-A. Delamare on Miquelon in 1882, and the colour is distinct on many conidiomata in the specimen (H) collected by Eli Lear on 5 June 1956.

A very similar lichen is *Cladonia ciliata* STIRT., which is a species only known from the maritime heaths of SE Newfoundland in eastern North America. It has two colour forms: f. *ciliata* (*Cladonia leucophaea* ABBAYES), which is bluish-grey, containing no usnic

acid, and *f. flavicans* (FLÖRKE) AHTI & DEPRIEST (*Cladonia tenuis* (FLÖRKE) HARM.) with usnic acid. The former has almost the same colouring as *C. oricola*, and even the slime in the conidiomata is purple. However, *C. ciliata* never contains atranorin, is thinner, and the branching is even more dichotomous. When AHTI (1960, 1961) reported *C. ciliata* (under the name *C. tenuis*) as new to North America, he did not know any record of the usnic-acid deficient strain in eastern North America. Only later (AHTI 1983: 328, fig. 3C) he listed it to occur there.

The Newfoundland material of *f. ciliata* in H was restudied. Although not all specimens were subjected to a chemical analysis by thin-layer chromatography, it seems clear that they all contain atranorin and are now referable to *C. oricola*. Thus *C. ciliata f. ciliata* should be excluded from the known biota of eastern North America. *C. ciliata f. flavicans* does occur there, but is much less frequent than *C. oricola*.

4 Specimens examined

The following specimens of *Cladonia oricola* have been examined in addition to sight records in the field:

CANADA. Newfoundland. Peters River Road, 1956 Lear *s.n.* (H, NFLD); 9.5 km NE of Portugal Cove South, 1956 *Ahti* 2989 (H); Bay Roberts, Mad Point, 2007 *Ahti* 67861 (CANL, H, MIN, NFM, UPS), 67875 (H), 67884 (DUKE, FH, H, TNS), 67885 (B, BM, H, NY), 67886 (H); Bristy Cove River, 2007 *Ahti* 67648 (H); 7 km E of Peter's River, 2007 *Ahti* 67668 (H); by Hawke Hills Ecological Reserve, 2007 *Ahti* 67705 & *Stenroos* (H); Hawke Hills, 5.9 km E of Trans-Canada Highway, 2007 *Ahti* 67919 (H); same, 2 km E, 1999 *Ahti* 56952a & *Scott* (H, NFM., US); Doe Hills, WNW of Chapel Arm, 2007 *Ahti* 67969, 67970, 68015f (H); 24 km N of Port-aux-Basques, 1966 *Norris* 3148 (H).
Nova Scotia. Halifax Co., Sable Island, Main Station, 1976, *Wright* (H, NSPM); Peggys's Cove, 2004 *Ahti* 62681 (CANL, H, NSPM).

ST. PIERRE & MIQUELON. Miquelon, 1882, *Delamare* (PC), Olivier, Herb. Lich. No. 401, as *Cladonia gigantea* (PC), Butte d'Abondance, 1882, *Delamare* 457 (PC).

U.S.A. Massachusetts. Dukes Co., Martha's Vineyard, S side, 1936, *Torrey* (G, H).

Acknowledgements. We wish to thank the curators of the herbaria, where lichen specimens were examined. The help in the field in Newfoundland by our Canadian colleagues Stephen R. Clayden, Nathalie Djan-Chékar, Mac Pitcher, Peter J. Scott and others is gratefully acknowledged. Financial support was received from the Academy of Finland (No. 211172).

We dedicate this paper to our good friend Prof. Dr. Fred Daniëls on the occasion of his retirement in honour of his many contributions to the ecology of the arctic and subarctic plant communities, including various lichen-rich communities.

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Zeitschrift/Journal: [Abhandlungen aus dem Westfälischen Provinzial-Museum für Naturkunde](#)

Jahr/Year: 2008

Band/Volume: [70_3-4_2008](#)

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