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Ameliella, a new genus of lichen-forming fungi from north-west Europe and western Canada

Alan M. FRYDAY and Brian J. COPPINS

Abstract: *Ameliella* Fryday & Coppins gen. nov. is proposed to accommodate two inconspicuous, undescribed species, *A. andreaeicola* and *A. grisea*, collected from high altitude in the Scottish Highlands. Outside the Scottish Highlands, *Ameliella andreaeicola* is known from single collections from Norway and Canada, and *A. grisea* from a single collection from Norway. The new genus appears to have some affinity with *Miriquidica*.

Key words: alpine heaths, late snow-lie, *Lecanoraceae*, *Miriquidica*, Scottish Highlands

Introduction

The recent revival of interest in the lichen vegetation of high-altitude areas of the Scottish Highlands has resulted in numerous puzzling collections being made (Gilbert *et al.* 1988; Gilbert & Coppins 1992; Fryday & Coppins 1996; Fryday 1996*a*, 1997, 2000, 2002, 2005). Among these are two, closely related species that we have been unable to assign to any previously described genus and, consequently, the new genus *Ameliella* is here erected to accommodate them. The genus and the two species are described along with notes on their ecology and systematic position.

Methods

Apothecial characteristics were examined by light microscopy on hand-cut sections mounted in water, 10% KOH (K), 50% HNO3 (N) or 0·15% aqueous IKI. Thallus sections were investigated in water, 10% KOH (K) and lactophenol cotton-blue. The ascus structure was studied in 0·15% aqueous IKI, both without prior treatment and after pretreatment with 10% KOH. Measurements of ascospores, paraphyses and conidia were made in 10% KOH. For irregularly shaped areoles, the width was taken as the lowest measurement.

All specimens of the newly described species are in the first author's personal herbarium unless stated otherwise.

Additional comparative material examined (all in MSC unless stated otherwise). *Bryodina rhypariza* (Nyl.) Hafellner (syn. *Bryonora rhypariza* (Nyl.) Poelt. **Canada:** *Nunavut*: Baffin Island, Head of Clyde Fiord, 1950, *Hale* 681.—**Sweden:** *Torne Lappmark*: Karesuando sn, Peldsaområdet, Gåbnetjåkko, N-branten, hammaren, bland mossa, reg. alp. 1948, *Hasselrot* s.n.;—**Norway:** [*Oppland*:] Dovre, Kongevold, 1863, *Th. Fries* s.n.

Bryonora castanea (Hepp) Poelt. **USA:** *Colorado*: Gunnison-Chaffee Cos., above Cotton wood Pass, Sawatch Mts., 1952, *Imshaug* 11682-A; *ibid.*, Huerfano-Las Animas Cos., Sangre de Cristo Range, summit of West Spanish Peak, 1952, *Imshaug* 12048.

Bryonora pruinosa (Th. Fr.) Holtan-Hartwig. **USA:** *Washington*: Okanogan-Whatcom Cos., Cascade Mts., summit of Slate Peak, 1955 *Imshaug* 18606.

Miriquidica complanata (Körb.) Hertel & Rambold. **Great Britain:** *Scotland*: **V.C. 105**, West Ross: Kintail, Kintail Estate, bealach between Sgurr nan Saighead and Sgurr Fhuaran, 18(NG)/976.174, alt. 800 m, damp, shaded N-facing rock face, 2005, *Fryday* 9092.

Miriquidica instrata (Nyl.) Hertel & Rambold. **Norway:** *Hordaland*: Steinsaethorgen, near the town of Granvin, Sept. 1944, *Havaas* s.n.; *ibid.*, Smøreggen, near the town of Granvin, *Havaas* s.n.

Miriquidica leucophaea (Flörke ex Rabenh.) Hertel & Rambold. **Czech Republic:** *Moravia*: Telč, ad saxa granitica montis Javořice, *c.* 800 m., 28 viii 1957, *A. Vězda* (*Lichenes Bohemoslavakiae exsiccati* #160).—**Sweden:** *Västergötland*: Göseborg, [Huiberg?], 1916, *Magnusson* s.n.—**Great Brtitain:** *Scotland*: **V.C. 88**,

A. M. Fryday: Herbarium, Dept Plant Biology, Michigan State University, East Lansing, MI 48824-1312, USA. Email: fryday@msu.edu
B. J. Coppins: Royal Botanic Garden, Inverleith Row, Edinburgh EH3 5LR, UK.

Mid-Perth: Ben Lawers range, Meall Corranaich, 27/6142, 975 m, top of hard acid rock on boulder field, 1991, *Fryday* 2162 (hb. *Fryday*).—**USA:** *Maryland*: Plummer's Island, on rock near water, 11 viii 1907, *B. Fink* s.n. (MICH—isotype of *Lecidea marylandensis* H. Magn.).

Taxonomy

Ameliella Fryday & Coppins gen. nov.

Mycobank: MB 511792

Ad *Lecanoraceae* provisorie interposita. Thallus bryophyto maxime consociatus, crustosus, verrucoso-areolatus, cortice tenui vel indistincto, medullo et prothallo absenti, alga chlorococcoidea. Apothecia numerosa maximam partem thallum tegentia, parva, ad initium intra areolas evoluta postea emergentia et biatorinascens, disco pallide rufo vel badio sed translucenti ubi madefacto, excipulo proprio tenui pallidiore quam disco, excipulo pseudothallino mox excluso. Hymenium hyalinum, J in parte (prope ascos) amyloideum, epihymenio infuscato; paraphyses ramosae, ad apicem incrassatae pileum tenuem brunneum vestitae. Asci 8-spori, parte exteriore et tholo amyloideo. Ascosporae aseptatae, anguste ellipsoideo-fusiformes vel oblongo-ellipsoideae, laeves, sine perispora. Pycnidia pauca, inconspicua, intra areolas immersa. Conidia aseptata, arcuata vel hamata.

Typus: *Ameliella andreaeicola* Fryday & Coppins

Thallus of small, grey to brown, matt, verrucose to subsquamulose areoles; forming small patches (1–2 cm diam.). In sections: cortex thin or poorly differentiated; algal layer occupying the remainder of the thallus; medulla not developed and prothallus not evident. *Photobiont* chlorococcoid, cells (6–)8–10(–12) μm diam., or to 15 μm when dividing internally to form 4(–8) autospores; cell walls *c*. 1 μm thick.

Apothecia abundant, often covering much of the thallus, initially immersed in thalline verrucae but becoming 1/2–3/4 emergent, small, 0·1–0·4 mm diam., disc pale to dark brown (translucent when moist) usually with a paler proper exciple; flat to slightly convex, becoming strongly convex and distorted when over-mature. Thalline exciple (remains of thalline warts) present in young apothecia but soon becoming excluded. *Hymenium* 100–120 μm tall, I+ pale bluish or greenish. *Paraphyses* branched above but not anastomosing, septate; *c*. 1·5–2 μm wide slightly swollen at apex (to 3 μm) with brown cap. *Epihymenium* with brown granules decolourizing in K. *Asci* numerous, 8-spored, cylindrical-clavate, *Lecanora*-type (Fig. 1), 45–50 × 17–22 μm, contents I+ red-brown. *Ascospores* simple, hyaline, narrowly ellipsoid-fusiform to oblong-ellipsoid, 10–24 × 5–7 μm, without a distinct epispore or ornamentation. *Hypothecium* colourless, strongly conglutinated. *Excipulum* hyaline, but with brown or dull green (K+ brown, N+ red) pigment at its outer edge, I+ deep blue or mauve.

Conidiomata pycnidia, immersed in areoles, conidia curved to hamate.

Chemistry. C −, KC −, K −, PD −, UV −, no lichen substances detected by TLC.

Etymology. We originally intended to use the name *Amelia*, which is derived from the Greek '*ameleô*' meaning 'neglected' or 'overlooked' and is also the name of the daughter of the first author. This name was used in some publications (e.g., Gilbert 2000), but we then discovered that it had previously been used for a genus in the *Pyrolaceae* (*Amelia* Alef., *Linnaea* **28:** 8, 25. Aug 1856), and although this genus has been synonymized with *Braxilia* Raf. 1840 by lectotypification, the name is still not available for use.

Remarks. Most species in the *Lecanoraceae* have angiocarpic apothecia (i.e., the hymenium is exposed from the earliest stages) but those of *Ameliella* are hemiangiocarpic. The ascomata develop in swollen thalline warts that open in a narrow split (Fig. 2 letters a & b) that then widens and becomes 'star-like' with the remains of the thalline wart forming a pseudothalline margin (Fig. 2 letter c). As the slit widens the pseudothalline margin becomes excluded and the apothecia expand to flat, biatorine discs at maturity (Fig. 2 letter d). A similar development is seen in the *Lecidea hypnorum* group and the tropical genus *Traponora* Aptroot (Aptroot *et al*. 1997), and is also similar to that found in some morphs of *Miriquidica leucophaea* (Flörke ex Rabenh.) Hertel &

TABLE 1. *The main similarities and differences between* Ameliella *and* Miriquidica

Character	*Ameliella*	*Miriquidica*
Substratum	bryophilous	saxicolous
Cortex	poorly developed	well-developed, often with an epinecral layer
Medulla	usually absent	well-developed
Chemistry	no substances detected by TLC	depsides and/or depsidones present in all except one species
Apothecia development	hemiangiocarpic	hemiangiocarpic
Apothecia size	0·1–0·3(0·4) mm diam.	0·3–0·8(1·2) mm diam.
Apothecia colour	persistently red-brown	black, brown in shade forms
Exciple	poorly formed	well-developed with swollen cortical cells
Ascus	weakly *Lecanora*-type	weakly *Lecanora*-type
Conidia	filiform, hamate	filiform, hamate
Paraphyses	sparse; apices to 3 µm	Numerous; apices to 5 µm

Rambold (e.g., the isotype of *Lecidea marylandensis, cf.* Methods and Materials). In fact, *Ameliella* is probably closely related to *Miriquidica* Hertel & Rambold; the asci of *Ameliella* closely resemble those of *Miriquidica* and, as in specimens of that genus, sometimes appear to have little or no axial structure (''masse axiale schwach ausgepägt oder fehlend'': Hertel & Rambold 1987). The apothecial disc of *M. leucophaea* is often a translucent pale brown, especially in shade forms, and very similar to those of *Ameliella* and both genera also have similar, filiform to hamate, conidia. However, *Ameliella* differs in being bryicolous or terricolous, whereas *Miriquidica* is almost exclusively saxicolous, as well as having smaller apothecia (0·1–0·4 mm diam.; *Miriquidica* 0·2–0·8 mm diam.) that are also persistently red-brown, whereas brown apothecia only occur in shade forms of *Miriquidica.* The thallus of *Miriquidica* is also much better developed, having a distinct cortex and medulla, whereas these are poorly developed in *Ameliella*. Thalline chemistry is also different with *Ameliella* lacking secondary metabolites detected by TLC, whereas all species of *Miriquidica* [except *M. plumbeoatra* (Vain.) A.J. Schwab & Rambold] contain the rare depside miriquidic acid and/or the depsidones lobaric acid, psoromic acid, protocetraric acid, stictic acid, or norstictic acids (Andreev 2004; Owe-Larsson & Rambold 2001) or the depside confluentic acid (Fryday 2008). Internally, *Miriquidica* has a better developed exciple with a cortex of swollen cells to 5 µm across, and more numerous paraphyses that have swollen apices (to 5 µm). The main similarities and differences between *Ameliella* and *Miriquidica* are shown in Table 1.

The new genus also has some resemblance to *Bryonora*; it is primarily bryicolous in alpine habitats, has apothecia with a soon-excluded thalline margin and *Lecanora*-type asci, and similar shaped ascospores. However, it differs from that genus in having a less apparent exciple composed of thick, outwardly radiating hyphae (well-developed, composed of narrow, randomly orientated, richly anastomosing hyphae in *Bryonora*), and in having arcuate to hamate, rather than bacilliform, conidia.

Ameliella is provisionally referred to the *Lecanoraceae* because of the *Lecanora*-type asci and some similarities to the genera *Bryonora* and *Miriquidica*. However, it is unlikely to belong to the core of the family if, indeed, it belongs there at all.

Distribution and ecology. The genus appears to be confined to highly oceanic regions, being known from only the Scottish Highlands, Norway, and British Columbia.

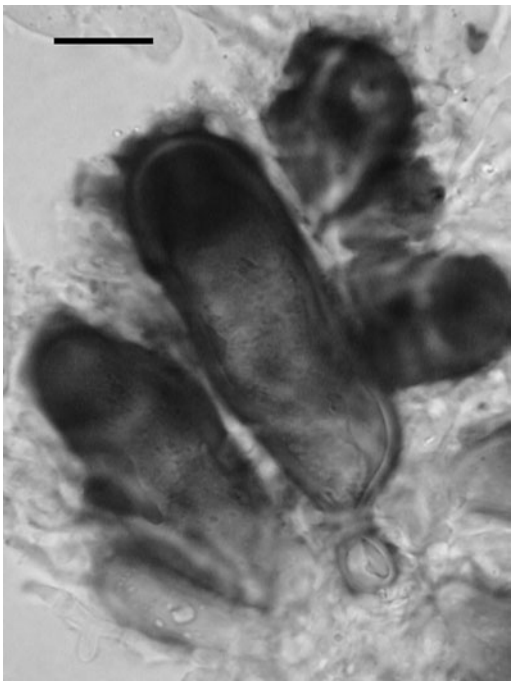

FIG. 1. *Ameliella andreaeicola*, ascus in KI (*Fryday* 5556). Scale = 20 μm.

Ameliella andreaeicola Fryday & Coppins sp. nov.

Mycobank: MB 511822

Thallus areolis verrucosis vel subsquamulosis, castaneis vel atrobrunneis, 0·1–0·45 mm diam.; in sectione, cellulis extimis cum parietibus brunneis. Apothecia (0·1–)0·2–0·4 mm diam., castaneae vel atrobrunneae. Ascosporae anguste ellipsoideo-fusiformes, 18–24 × 5–7 μm.

Typus: Caledonia, South Aberdeenshire (V.C. 92), Glas Maol, 37/161771, 900 m, over *Andreaea* sp. on small stones and boulders in north-facing coire affected by late snow-lie, 12 September 1991, *A. M. Fryday* 2938 (E—holotypus).

(Figs 1, 3A, 4 & 5)

Thallus of small verrucose to subsquamulose areoles, 0·1–0·45 mm wide, which sometimes coalesce with the thallus becoming secondarily cracked (Fig. 3A); chestnut to dark brown (paler in shade) occasionally greyish. Forming small patches (to *c.* 2 cm diam.), usually over *Andreaea* spp. In section: with a thin cortex, 5–7 μm thick, of brown-walled (K−, N−) rounded cells *c.* 3–3·5 μm wide, sometimes overlain by a hyaline epicortex *c.* 2–4 μm thick (Fig. 4A). *Photobiont* chlorococcoid, cells (6–)8–10 (–12) μm diam., or up to 15 μm when dividing internally to form 4(–8) autospores; cell walls *c.* 1 μm thick (Fig. 4B).

Apothecia abundant, often covering much of the thallus, small, (0·1–)0·2–0·4 mm diam.; disc dark to chestnut brown (translucent when moist) usually with a paler proper exciple, flat to slightly convex becoming strongly convex and distorted when overmature. Initially immersed in thalline verrucae and appearing only as a narrow slit (see Fig. 2) but becoming 1/2–3/4 emergent. Pseudothalline margin present in young apothecia but soon becoming excluded. *Hymenium* 100–120 μm tall, I+ blue around the asci, but I− or I+ pale bluish elsewhere. *Paraphyses* branched above but not anastomosing, septate, *c.* 1·5–2 μm wide slightly swollen at apex (to 3 μm) with brown cap. *Epihymenium* with brown granules decolourizing in K. *Asci* (few seen in good condition), weakly *Lecanora*-type, 45–50 × 17–22 μm, contents I± red-brown (Fig. 1). *Ascospores* narrowly ellipsoid-fusiform, 18–24 × 5–7 μm (Fig. 5), often wider at one end. *Hypothecium* hyaline, strongly conglutinated. *Excipulum* a narrow indistinct zone, when well-developed *c.* 10–20 μm wide, hyaline, but brown (K−, N−) or dull green (K+ brown, N+ red) pigmented at its outer edge, I+ deep blue or mauve, composed of outwardly radiating conglutinated hyphae with lumina *c.* 2–2·5 μm wide.

Conidiomata pycnidia, few seen, inconspicuous, *c.* 50–100 μm diam.; wall hyaline or pale brown in part; *conidiogenous cells* *c.* 5–10 × 1·5 μm; *conidia* arcuate or hamate, 11–12 × 0·7–1 μm.

Chemistry. C−, KC−, K−, PD−, UV−; no lichen substances detected by TLC.

Remarks. This species was first recorded by Gilbert & Fox (1985), although they initially identified it as *Caloplaca nivalis*. *Ameliella andreaeicola* resembles that species

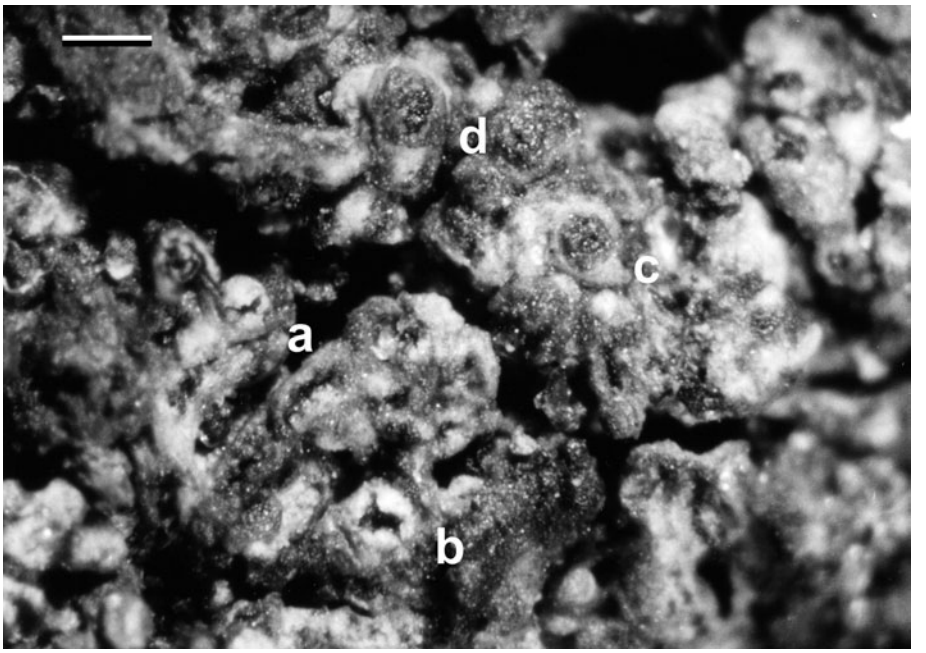

FIG. 2. *Ameliella grisea*, development of apothecia of (*Fryday* 6130–holotype). The letters indicate the sequence of development of the ascomata (see text). Scale = 0·2 mm.

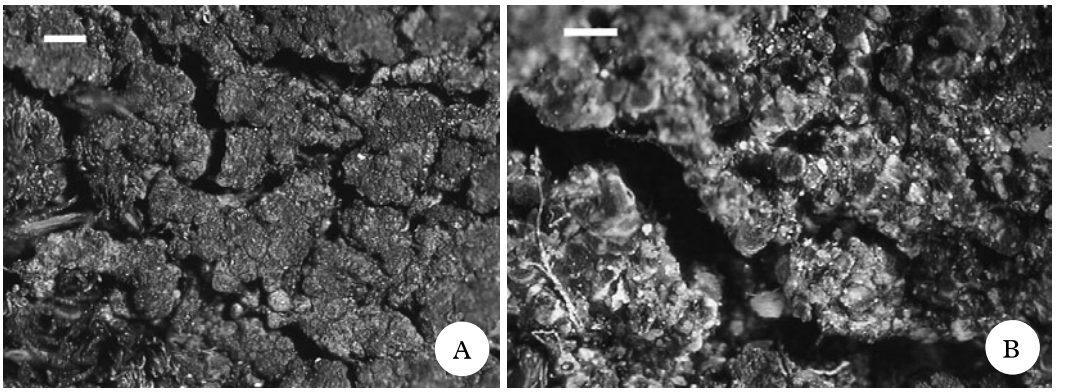

FIG. 3. Thallus and apothecia of *Ameliella* spp. A, *A. andreaeicola* (*Fryday* 5550); B, *A. grisea* (Fryday 6311). Scales A = 0·4 mm; B = 0·3 mm.

in the shape of its ascospores and habitat but differs from it in all other respects; most obviously in the colour and size of its apothecia.

Two collections of *A. andreaeicola* were tested by TLC. One (*Fryday* 5550) contained no substances but the other (*Fryday* 5606) gave a faint yellow (UV −, UVC −) spot at Rf 5–6 in solvent C. However, that specimen was interspersed with numerous areoles of *Lecanora leptacina* Sommerf., and it is probable that this spot is the result of contamination by psoromic acid from that species.

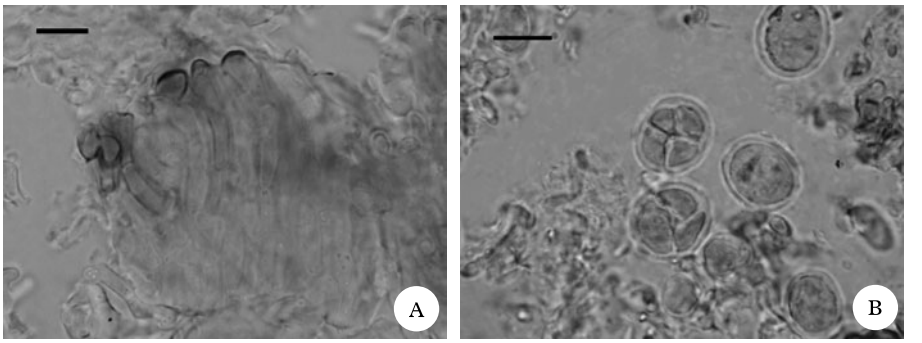

FIG. 4. *Ameliella andreaeicola* (*Fryday* 5550). A, pigmented cortical cells; B, photobiont cells. Scale: A=5 µm; B=10 µm.

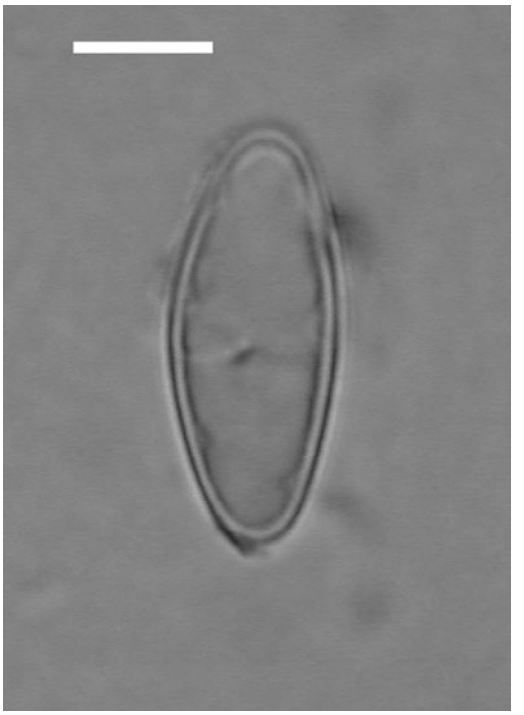

FIG. 5. *Ameliella andreaeicola*, ascospore (*Fryday* 5556). Scale=5 µm.

Ecology. *Ameliella andreaeicola* is a frequent species around areas of late snow-lie in the Scottish Highlands where it overgrows *Andreaea* spp. on the flat upper surfaces of siliceous rocks (Fig. 6). It belongs to a very specialized community restricted to that habitat (Fryday 2001), associated species including *Euopsis pulvinata*, *Lecanora leptacina*, *Frutidella caesioatra*, *Lecanora formosa*, *Lepraria neglecta*, *Micarea paratropa*, *Miriquidica griseoatra*, *Polyblastia gothica*, *Rhizocarpon anaperum*, *Stereocaulon plicatile*, *S. tornense* and '*Toninia*' *squalescens*. Relevés containing *A. andreaeicola* from Cairn Gorm in the Eastern Highlands and Creag Meagaidh in the Central Highlands are given in Tables 2 & 3.

Distribution. *Ameliella andreaeicola* appears to be restricted to hyper-oceanic montane areas. Although it is widespread in its specialized habitat in the Scottish Highlands, there is only one record from Scandinavia (Norway) and it is unknown in Central Europe. The only other record of this species is from mountains near the coast of British Columbia – another region with a highly oceanic climate. The known British distribution of *A. andreaeicola* is shown in Fig. 7.

Additional specimens examined. **Great Britain:** *Scotland*: **V.C. 88**, Mid-Perthshire: Ben Lawers, Gully on south ridge, 27/637410, 1150 m, over *Andreaea* sp. on exposed rock face, 11 vii 1989, *Fryday* (hb Fryday). **V.C. 92**, South Aberdeenshire: Ben Macdui boulder bed, Garbh Uisge Mor, 27/995995, 1250 m, ix 1999, *S. Street* (E); Beinn a'Bhuird, 37/096977, 1000 m, on *Andreaea* sp., 9 September 1990, *R. C. Munro* (E); Glas Maol, N-W Coire, 37/1677, 900 m, on *Andreaea* sp. on damp boulder, 1991, *Fryday* 2938 (E). **V.C. 94**, Banffshire: Cairn Lochan, Feith Buidhe, 28/9801, *c.* 1125 m, over *Andreaea* sp. on granite boulder beside area of prolonged snow-lie, 7 ix 1989, *Fryday* (E, hb Fryday). **V.C. 96**, Easterness: Ben Alder Range,

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FIG. 6. Area of late snow-lie at Ciste Mhearad, Cairn Gorm. *Ameliella andreaeicola* occurs on the tops of boulders above and below the snow-bed, and *A. grisea* on damp soil above the snow-bed.

TABLE 2. *Lichens recorded from upper surface of boulders above an area of late snow-lie at Ciste Mhearad on Cairn Gorm*

Distance from edge of snow-bed (m) Maximum height of boulder (m)	5·00 n.r.	9·20 0·25	11·5 0·2	14·7 0·25	15·8 0·25	18·8 0·3	24·8 n.r.	32·0 0·2	34·0 0·25	41·0 0·4	45·0 0·4	50·0 0·2
Ameliella andreaeicola	.	+	+	+	.	.	.	.	.	.	+	.
Lecanora formosa	.	+	+	+	+	.	+	+	.	.	+	.
L. leptacina	.	+	+	+	+	+	.	.	.	.	.	.
Miriquidica griseoatra	.	+	+	+	+	.	.	.	.	.	.	.
Frutidella caesioatra	.	.	+	+	+	.	+	+	+	.	.	.
Lepraria neglecta	.	.	.	.	+	+	.	.	.	.	.	+
Porpidia contraponenda	.	.	.	.	.	+	.	.	.	.	.	.
Rhizocarpon jemtlandicum	.	.	.	.	.	+	+	+	.	.	+	.
R. geographicum	.	.	.	.	.	+	+	+	+	+	+	+
R. lecanorinum	.	.	.	.	.	+	.	.	.	.	.	.
Cetrariella commixta (syn. *Melanelia commixta*)	.	.	.	.	.	.	.	.	+	+	+	+
Lecanora polytropa	.	.	.	.	.	.	.	.	+	.	.	+
Lecidea swartzioidea	.	.	.	.	.	.	.	.	+	.	.	.
Miriquidica leucophaea	.	.	.	.	.	.	.	.	.	+	.	.
Rhizocarpon hochstetteri	.	.	.	.	.	.	.	.	.	+	.	+
Umbilicaria cylindrica	.	.	.	.	.	.	.	.	.	+	.	+

n.r.: not recorded

Aonach Beag, above Coire Cheap, 27/4575, 1025 m, over *Grimmea* sp. on rock affected by prolonged snow-lie, 1994, *Fryday* [5550] *& S. Chambers*; Cairn Gorm, Ciste Mhearad [Margaret's Coffin], 38/011047, 1100 m, over *Andreaea blyttii*, August 1983, *O. L. Gilbert* (E); *ibid.* over *Andreaea* sp. on granite boulder beside area of prolonged snow-lie, 1994, *Fryday* 5606. **V.C. 97**, Westerness: Seang Aonach Mór, Aonach Mór,

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TABLE 3. *Cover values (Domin scale) for lichen species recorded from relevés on boulders on eastern (uncovered) section of snow-bed on Creag Meagaidh (GR 27/4087), alt. 1000 m*

Relevé	1	2	3	4	5	6	7	8
Lichen cover (%)	95	90	50	75	60	65	75	95*
Bryophyte cover (%)	2	6	30	30	25	40	30	15†
Bare rock (%)	5	<1	20	3	5	5	10	5
Slope (°)	3	5	10	2	7	0	5	0
Aspect (°)	250	320	350	180	350	–	260	–
Andreaea spp.	8	5	3	3	3	3	4	1
Racomitrium heterostichum	1	3	5	5	5	5	2	3
R. lanuginosum	.	.	1	.	1	1	1	.
Gleocapsa sp.	5	3	.	.	.	.	.	.
'Toninia' squalescens	7	3	1	.	.	1	1	.
Lecanora leptacina	5	3	2	4	.	.	.	.
Frutidella caesioatra	3	2	.	1	2	.	1	.
Micarea paratropa	3	3	4	1	3	2	3	.
Lecanora formosa	2	1	.	.	.	3	.	.
Lepraria neglecta	2	3	1	3	4	.	.	1
Stereocaulon tornense	2	1	1	.	1	1	1	1
Rhizocarpon hochstetteri	1	2	2	4	4	3	1	1
Miriquidica griseoatra	.	6	5	7	4	3	.	.
Ionaspis odora	.	3	.	.	.	.	1	.
Stereocaulon vesuvianum	.	1	3	.	3	.	1	2
Amygdelaria pelobotryon	.	.	1	.	.	.	.	.
Porpidia crustulata	.	.	1	.	1	.	.	.
Rhizocarpon anaperum	.	.	.	1	.	.	.	.
Cladonia bellidiflora	.	.	.	.	1	.	1	.
Euopsis pulvinata	.	.	.	.	1	.	.	.
Ionaspis lacustris	.	.	.	.	1	.	6	.
Protothelenella corrosa	.	.	.	.	1	.	.	.
Stereocaulon leucophaeopsis	.	.	.	.	1	.	.	.
Trapelia obtegens	.	.	.	.	1	.	.	.
Ameliella andreaeicola	.	.	.	.	.	**2**	.	.
Rhizocarpon lavatum	.	.	.	.	.	2	.	.
Pilophorus strumaticus	.	.	.	.	.	.	1	.
Lecanora polytropa	.	.	.	.	.	.	.	6
Lecidea lactea s. lat.‡	.	.	.	.	.	.	.	6
L. lithophila	.	.	.	.	.	.	.	5
Rhizocarpon geographicum	.	.	.	.	.	.	.	5
Umbilicaria cylindrica	.	.	.	.	.	.	.	3
Aspicilia cinerea	.	.	.	.	.	.	.	1
Fuscidea kochiana	.	.	.	.	.	.	.	1
Porpidia cinereoatra	.	.	.	.	.	.	.	1

*Relevé recorded from a boulder outside the area of prolonged snow-lie.

†Bryophyte cover is an indication of visible bryophytes. It does not include the area of bryophytes covered by lichens.

‡Includes *Lecidea lapicida* var. *pantherina* (syn. *L. lactea*) and *L. swartzioidea* (Hertel 1995).

27/1972, 1150 m, over *Andreaea* sp. on granite boulder above area of prolonged snow-lie, 1990, *Fryday* [1218], *O. L. Gilbert & B. Coppins* (13821, E); Coire an Lochain, Aonach Mór, 27/1973, 1000 m, over *Andreaea* sp. on acid rock boulder below area of prolonged snow lie, 1990, *Fryday* [1327] *& O. L. Gilbert*; Creag Meagaidh, NW of summit, 27/407871, 1000 m, over *Andreaea* sp. on acid rock above area of prolonged snow lie, 1994, *Fryday* [5624] *& O. L. Gilbert.*— **Norway:** *N-Trøndelag* [*Nord-Trøndelag*]: Steinkjer, E of Svartåsklumpen, *c.* 470 m, UTM 598 966, map 1722 I (WGS84), on *Andreaea* on boulder in subalpine

TABLE 4. *Cover value data* (*Domin* scale) *from a 2 × 2 m relevé taken from the SE ridge of Ben Lawers, Mid-Perthshire (GR 27/6441), alt. 1050 m*

Cover	80%	Height of Vegetation	1–3 cm
Bryophyte cover	20%	Slope	3°
Lichen cover	3%	Aspect	80°
Vascular Plants		**Lichens**	
Salix herbacea	7	*Cladonia bellidiflora*	3
Carex bigelowii	7	*Protomicarea limosa*	3
Festuca ovina	4	*Frutidella caesioatra*	2
Galium saxatile	2	*Micarea turfosa*	2
Nardus stricta	1	*Stereocaulon saxatile*	2
		Ameliella grisea	1
Bryophytes		*'Catillaria' contristans*	1
Gymnomitrion sp.	5	*Micarea cinerea* f. *tenuispora*	1
Polytrichum sexangulare	3	*M. peliocarpa*	1
P. alpinum	2	*Ochrolechia androgyna*	1
		Omphalina sp. (sterile)	1

situation, 2002, *H. Holien* 9251 (TRH).—**Canada:** *British Columbia*: North Vancouver, Mt. Seymour, 49°20′N, 122°59′W, 4000 ft [1219 m], overgrowing *Andreaea sinuosa*, dry boulder top, 1961, *W. B. Schofield* 14561 (ALA).

Ameliella grisea Fryday & Coppins sp. nov.

Mycobank: MB 511823

Ameliellae andreaeicola similis sed thallo pallidiore (cellulis extimis hyalinis), apotheciis parvioribus (0·15–0·23 mm diam.), ascosporis oblongo-ellipsoideis et brevioribus, 10–14 × 5–7 µm, praecipue differt.

Typus: Caledonia, Mid-Perthshire (V.C. 88), Ben Lawers, north side of east summit ridge, 27/637413, 1190 m, on bryophyte turf in summit heath, 13 July 1995, *A. M. Fryday* 6130 (E—holotypus).

(Figs 2 & 3B)

Thallus grey-white, matt, thin to verrucose-areolate, areoles 0·15–0·3 (–0·4) mm diam., forming small patches (to 1 cm), usually in montane heaths. In section cortex indistinct, and outer cells not pigmented, sometimes with a *c.* 5 µm thick, hyaline epinecral layer. *Photobiont* as for genus description.

Apothecia similar to *A. andreaeicola* but smaller, 0·15–0·23 mm diam., and with an often paler disc, and ascospores which are oblong-ellipsoid, 10–14 × 5–7 µm.

Conidiomata not seen.

Chemistry. C −, KC −, K −, PD −, UV −, not tested by TLC (insufficient material).

Remarks. *Ameliella grisea* is similar to *A. andreaeicola* but differs in its terricolous habitat, thinner, grey thallus, and shorter ascospores. All except one record of the species are from exposed montane heaths. The anomalous record is from Ciste Mhearad, Cairn Gorm (*Fryday* 6311) where *A. grisea* was collected, growing adjacent to *A. andreaeicola*, on the top of a granite boulder protruding from an area of late snow-lie. Habitat details for three specimens (*Fryday* 5556, 6113 & 6115) indicate that they occur in N.V.C. community U8 *Carex bigelowii-Polytrichum alpinum* sedge heath (Rodwell 1992). The data from a 2 × 2 m relevé taken at one site are given in Table 4. The vegetation formed a mosaic of areas dominated by either *Salix herbacea*/*Carex bigelowii* or *Gymnomitrion* sp./*Polytrichum sexangulare* with *Cladonia bellidiflora* and *Stereocaulon saxatile* strongly associated with the former and crustose lichens (including *A. grisea*) with the latter. Further east in the Cairngorm Mountains the species is restricted to the damp soils surrounding areas of prolonged snow-lie dominated by *Salix herbacea* and *Gnaphalium supinum* (Fryday

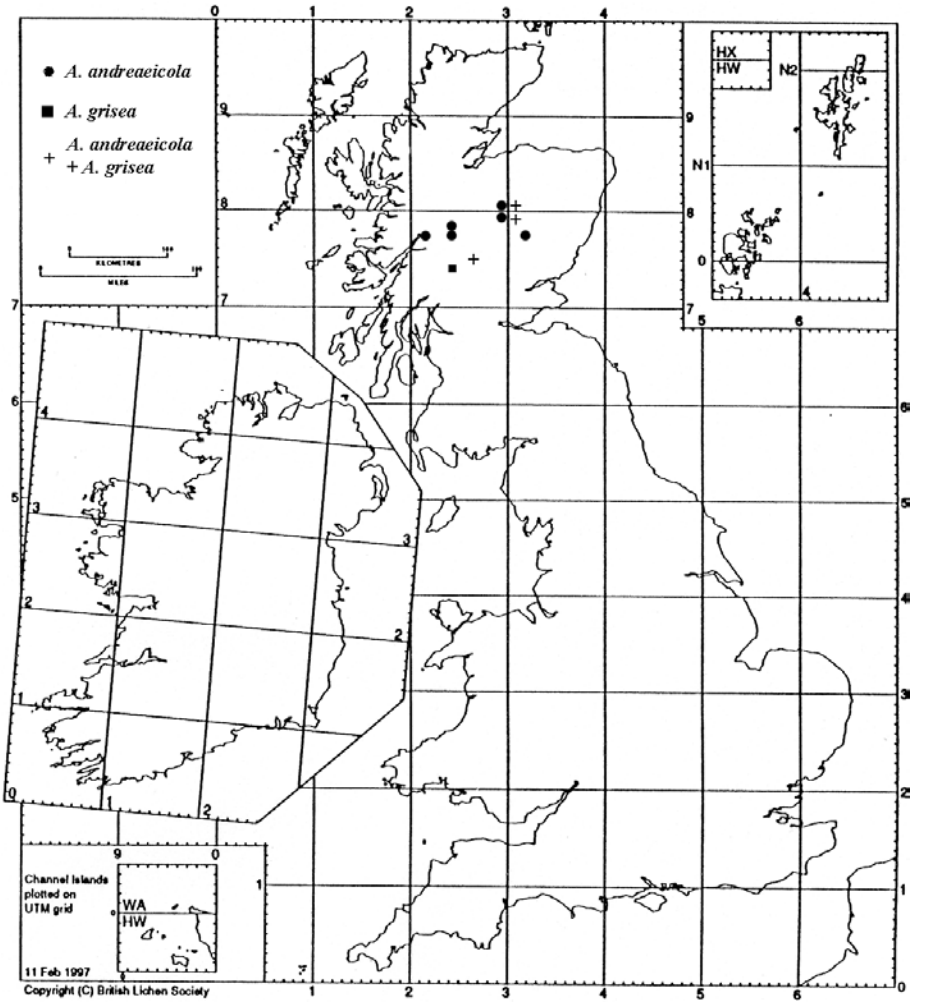

FIG. 7. Distribution of *Ameliella* spp. in the British Isles; ● *A. andreaeicola*; ■ *A. grisea*; + *A. andreaeicola* and *A. grisea*.

1997, Fryday 2001). Associated species here include *Belonia incarnata*, *Catillaria contristans*, *Protomicarea limosa* (syn. *Lecidea limosa*), *Micarea cinerea* f. *tenuispora*, *M. turfosa*, *M. viridiatra*, *Polyblastia gothica*, *P. helvetica*, *Protothelenella sphinctrinoidella* and *Stereocaulon saxatile*. In its single known station outside Scotland (northern Norway), *A. grisea* occurred on the ground in an area of moderately late snow-lie, where the ground was dominated by a thin hepatic crust of *Gymnomitrion* sp. Associated lichen species were *Absconditella annexa*, *Catillaria contristans*, *Euopsis pulvinata*, *Frutidella caesioatra*, *Micarea cinerea* f. *tenuispora*, *M. incrassata*, *Protomicarea limosa*, and *Protothelenella sphinctrinoidella* with *Lecidea alpestris* and *Micarea assimilata*, in drier niches (small raised knolls) and *Caloplaca nivalis* on a low boulder.

Ameliella grisea, like *A. andreaeicola*, appears to be confined to oceanic montane areas as it has been recorded from only the Scottish Highlands (Fig. 7) and northern Norway (Troms). However, it is a more inconspicuous species than *A. andreaeicola* and

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may be overlooked in these and other areas. A brief description of *A. grisea* was given by Gilbert *et al.* 1988: 239 as *Lecidea* sp. 'A'.

Additional specimens examined. **Great Britain:** *Scotland*: **V.C. 88**, Mid-Perthshire: Ben Lawers, *c.* 250 m E. of summit in area of late snow-lie, 27/636412, *c.* 1160 m, on turf with *Catillaria contristans*, *Frutidella caesioatra* etc., 1985, *Coppins* (11067, E), *O. L. Gilbert & B. Fox*; *ibid.* east ridge, 27/636412, 1100 m, on turf in area of late snow-lie 1985, *Coppins* (11444, E), *O. L. Gilbert & B. Fox*; *ibid.* Crater Gully area of late snow-lie, 27/637412, *c.* 1180 m, on turf amongst *Catillaria contristans*, *Frutidella caesioatra*, *Micarea turfosa*, 1985, *Coppins* (11452, E), *O. L. Gilbert & B. Fox*; *ibid.* S-E ridge, 27/6441, 1050 m, over *Gymnomitrion* sp. in montane heath on exposed ridge, 1994, *Fryday* 5556; Beinn Heasgarnich, summit heath, 27/413383, 1075 m, on the ground, 1995, *Fryday* 6112; *ibid.* eastern flank, 27/415383, on ground in *Carex bigelowii*/*Polytrichum alpinum* heath near area of prolonged snow-lie, 1995, *Fryday* 6113 & 6115. **V.C. 96**, Easterness: Cairn Gorm, Ciste Mhearad, 38/011045, 1100 m, over *Andreaea* sp. on top of granite boulder in late snow field, 1995, *Fryday* 6311.—**Norway:** *Troms*: Storfjord, mountain range S of Skibotndalen, Lávkavággi, Lávkávri, *c.* 69°12.9′–69°13.2′N 20°28.6′–20°29.3′ E, UTM_{WGS84}: DB 794–798, 785–790, 619–680 m, on the ground in area of late snow-lie, 2003, *Coppins* 21500 (E).

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