

The Gaupne area in Sogn og Fjordane – a hot-spot for lichens in Norway

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Arup, U., Blom, H. H. & Lindblom, L. 2021. The Gaupne area in Sogn og Fjordane – a hot-spot for lichens in Norway. *Graphis Scripta* **33** (3): 31–49. Oslo. ISSN 2002-4495.

During a three-day field trip to the Gaupne area, Luster kommune, three main localities were visited in search of lichens. A total of 35 lichens or lichenicolous fungi were found to be new to Sogn og Fjordane, most of which are also rare on a national scale. Three species on rocks, *Calogaya biatorina*, *Lecanora gisleriana* and *L. subaurea*, are red-listed and two species, *Blastenia monticola* and *Caloplaca squamuleoisidiata*, are new to Norway. Most of the species new to Sogn og Fjordane are calcicolous or prefer siliceous rocks containing high levels of heavy metals. The area around Gaupne is shown to be a previously unknown lichen hot-spot.

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Introduction

In 2017 the second author participated in two bryological excursions to a limestone area in Engjadalen, Luster municipally, inner Sognefjord area, Norway. These limestone cliffs, despite their limited area, at c. 700–750 m elevation turned out to be astonishingly rich in bryophytes, including several rare species and species new to Norway or northern Europe (Ellis et al. 2020). Limestone habitats in the subalpine and alpine zones are very scarce in S Norway, comprising mostly small and widely scattered outcrops. Thus, we decided to explore the lichen flora of the limestone area in Engjadalen as a contribution to the still very incomplete knowledge of lichens growing on limestone at higher altitudes in Norway. Here we present the results from the localities in Engjadalen as well as a few other localities investigated during our three-day trip in 2018.

Material and Methods

The material was collected during a field trip to the Gaupne area, Luster municipality, Sogn og Fjordane, Norway 12–14 June 2018. A list of the localities visited is provided in Table 1 and also shown in Fig. 1. The material was studied using an Olympus SZ40 stereo microscope and an Olympus CX43 compound microscope. Reference material in the Lund herbarium (LD) was consulted when needed. In addition, species determinations have been checked for two specimens in the herbaria BG and O. DNA analyses of the ITS marker were conducted on parts of the material following the standard procedure described in Arup et al. (2015). The material will be deposited in LD. Nomenclature follows Santesson's checklist online (Nordin et al. 2021).

Table 1. All visited localities in the Gaupne area, loc. 1–15, together with two localities in Sogndal and Lærdal municipalities, loc. 16–17. Coordinates are given in the EUREF89/WGS84 map datum.

Locality number	Municipality	Locality	Elevation m a.s.l.	Latitude	Longitude
1	Luster	Junction to Skisete	405	61.34917	7.23956
2	Luster	Kvalryggen	910	61.35581	7.19049
3	Luster	Kvalryggen	938	61.35535	7.18794
4	Luster	Kvalryggen	920	61.35541	7.19018
5	Luster	Kvalryggen	918	61.35615	7.18806
6	Luster	Kvalryggen	905	61.35664	7.18821
7	Luster	Kvalryggen	862	61.35727	7.19144
8	Luster	Helvetesberget	10	61.39216	7.31076
9	Luster	Engjadalen	713	61.42036	7.29886
10	Luster	Engjadalen	733	61.42048	7.30186
11	Luster	Engjadalen	758	61.42178	7.30114
12	Luster	Engjadalen	745	61.42133	7.30280
13	Luster	Engjadalen	758	61.42221	7.30444
14	Luster	Engjadalen	748	61.42342	7.30840
15	Luster	Engjadalen	730	61.42376	7.31207
16	Sogndal	Kaupanger church	20	61.18412	7.23413
17	Lærdal	Furehovden	88	61.04713	7.55757

Names of Norwegian counties and municipalities refer to the older names prior to the governmental changes due from 1 January 2020 (<https://www.regjeringen.no/no/tema/kommuner-og-regioner/kommunereform/nykommuneogfylkesnummer/id2629203/>). The old county of Sogn og Fjordane is abbreviated S&F. Coordinates are given in the EUREF89/WGS84 map datum. Information on bedrock types are taken from the geological map (1: 50 000) of The Geological Survey of Norway (<http://geo.ngu.no/kart/berggrunn/>).

The localities in the Gaupne area, Luster

Dalestølen road by junction to Skisete (Fig. 1 loc. 1) and Mt. Kvalryggen (Fig. 1 loc. 2–7, Fig. 2)

The mountain Kvalryggen is situated some 8 km SSW of Gaupne. Kvalryggen reaches almost 1000 m and the neighbouring peak Høgaleine NW of it is slightly higher with 1066 m a.s.l. We visited the N and NE side of the mountain, from Dale at c. 550 m elevation and up to around 950 m. The



Figure 1. Map showing the 15 localities in the Gaupne area, Luster, visited during a three-day field trip.



Figure 2. Habitat of several rare calciferous lichens on low marble rocks and boulders at Mt. Kvalryggen.



Figure 3. Large perpendicular rock rich in various heavy metals at Helvetesberget, E of Gaupne, hosting many rare species confined to rocks of this kind.



Figure 4. The habitat in Engjadalen with S-exposed limestone outcrops intermixed with shrubs and low trees.

vegetation is open and only around Dale taller trees are found. Above the tree limit there are also willow communities and scattered small trees. Some hundred meters up the mountain side smaller ridges and scattered boulders appear. The bedrock itself is mainly siliceous with rather species poor lichen communities. Above 900 m elevation scattered limestone boulders of marble occur, covered by mainly rather small and inconspicuous lichens. More interesting lichens were mainly found on the side of the boulders or on perpendicular surfaces of rocks. Many boulders were situated in hollows where the air humidity is even higher than in the already moist N-facing slope. At a roadside stop by the junction to Skisete we collected on solitary aspen trees and slate rock walls.



Figure 5. Typical limestone outcrops with a layered structure in Engjadalen, with overhangs and crevices resulting in many micro niches.



Figure 6. Lichen-rich overhang with many calcicolous species.

Helvetesberget (Fig. 1 loc. 8, Fig. 3)

Just SE of Gaupne along road 55 (Lustravegen), between the road and the fjord, there is a high, perpendicular, S-facing rock with a zone of iron-sulphite within a phyllite formation. Some large boulders are situated below the rock wall and climbing these boulders offer opportunities to study the lichen flora of the cliff above. Despite a very small area available for studies a fair number of new species for S&F were found here including many heavy-metal lichens which are rare in Norway.

Engjadalen (Fig. 1 loc. 9–15, Fig. 4–6)

The village Gaupne is situated right at the foot of Mt. Vorfjellet, 1209 m high, from which a road takes you up to Engjadalen on the SE side of the peak. On the NW side of the valley there are further roads that lead up to farms just below the forest boundary, at 720–730 m elevation. Here, there are open meadows grazed mainly by sheep but also rather many low trees of *Betula pubescens*, *Picea abies*, *Alnus incana* and *Salix caprea*, scattered shrubs of *Juniperus communis* and some old spruce trees planted by the roads. The bedrock consists of phyllite rather poor in calcium exposed as boulders and low outcrops and a several hundred meter long, partly interrupted chain of S-facing limestone cliffs situated between 740 and 780 m above sea level. The cliffs are rich in lichens and many colourful species make the perpendicular surfaces bright orange. Here and there are also overhanging rocks giving shelter from direct rain. Further up the hills more limestone rocks occur, but mainly in the very steep slopes with forest surrounding them, resulting in more shaded conditions less favorable for a lichen-rich flora.

In addition to the investigated localities in the Gaupne area shown in Fig. 1, we collected at sites in Kaupanger, Sogndal, and Lærdal. These collecting sites as well as coordinates for all investigated localities are listed in Table 1.

Species list

The L-numbers are personal collection numbers and the U-numbers indicate an ITS sequence obtained from the collection.

***Acarospora cf. macrospora* (Hepp) A. Massal. ex Bagl.**

Found in several places on perpendicular surfaces of limestone. Morphologically and anatomically these specimens correspond well to *A. macrospora* and the three ITS sequences produced from the collected material form a monophyletic group together with two sequences downloaded from GenBank. However, within the clade three separate lineages are formed on very long branches, indicating that more than one species may be present under that name. There seems to be only one previous record from S&F, and that is close to our locality N of Gaupne.

Specimens examined: Loc. 11, Arup L18278–L18280 (U3030, U3031, U3058).

***Acarospora moenium* (Vain.) Räsänen**

Found on perpendicular limestone cliff. It is rare in western Norway and new to S&F.

Specimens examined: Loc. 11, Arup L18257.

***Amundsenia approximata* (Lyng) Søchting et al.**

On perpendicular surfaces of limestone. With approximately ten previous records this species is rare but probably somewhat under-recorded in Norway, as it has been in Sweden, where it has been found to be more common than previously understood. It is very similar to *Athallia holocarpa* but can normally be recognized in the field by the better developed yellow thallus. Previously only known from one record in Lærdal, but nowhere else in S&F.

Specimens examined: Loc. 11, Arup, L18259, L18260.

***Athallia vitellinula* (Nyl.) Arup et al.**

Found under overhang of a perpendicular limestone cliff. There are only around ten records of this species in Norway, and only one previously in S&F.

Specimens examined: Loc. 11, Arup L18255.

***Blastenia monticola* Vondrák & Arup**

Fig. 7

Found on thin twigs of *Juniperus* in an open situation. This species was recently described as new to science (Vondrák et al. 2019) and is so far known from mountain areas of Europe and western Asia. It may resemble *B. herbidella*, but the thallus is usually less well developed. In Norway it is likely that many records of *B. herbidella* represent this species as *B. herbidella* seems to have a more southern distribution in the Nordic countries and *B. monticola* a northern (Arup in prep). *Blastenia*



Figure 7. Habit of *Blastenia monticola*, showing a rather poorly developed, grey thallus with small scattered isidia-like outgrowths and apothecia typical of the genus with a ferruginous colour. Holien 10782 (TRH). Bar = 1 mm.

furfuracea is also similar to *B. monticola*, but differs in the darker grey to almost black thallus with smaller, granular isidia that are never branched. There are further DNA proved specimens from Norway: viz. from Sør-Trøndelag (Holien 10782, TRH-L-11502) and from Nord-Trøndelag (Klepsland JK15-L383, priv. herb.). Confirmed from Norway and new to S&F.

Specimens examined: Loc. 12, Arup L18285 (U3051).

***Calogaya biatorina* (A. Massal.) Arup et al.**

Found on a perpendicular limestone cliff. This species is rare in Norway and known only from Akershus, Hedmark, and S&F. Red-listed as Endangered (EN).

Specimens examined: Loc. 11, Arup L18275–18276 (U3034).



Figure 8. *Caloplaca squamuloisidiata*. A sterile thallus showing the scabrous, beige to dark bluish grey surface. Arup L18404 (LD). Bar = 1 mm.

***Caloplaca isidiigera* Vezda**

Growing on limestone boulders in an open mountain slope and on a boulder of calciferous slate. These are the fourth and fifth localities in Norway of this rare species. It was recently reported as new to Norway (Klepsland 2020), but there are two previous records from Finnmark, Arup L14102, L14133 (LD) as well as two older records in BG (Havaas, 1900, BG-L-58366) and O (Timdal, 1982, O-L-67239). However, we evaluated the latter records from high resolution images and determined them to *Caloplaca chlorina* (Havaas) and *Caloplaca soralifera* (Timdal). New to S&F.

Specimens examined: Loc. 3, Arup L18224, loc. 10, Arup L18251.

***Caloplaca squamuloisidiata* van den Boom & V. J. Rico**

Fig. 8

Found on N-facing, perpendicular granite rocks. *Caloplaca squamuloisidiata* was described by van den Boom & Rico (2006) from Spain. It is recognized by the beige to bluish, dark gray, scabrous thallus lacking anthraquinones, but often being covered by isidia-like formations. Marginal, small lobes can sometimes be found. Apothecia are often lacking or very scarce, have an orange disc and grey margin. There are also three other localities from Norway known to us, two in Nordland (Gildeskål, Klepsland JK14-L222, priv. herb. and Brønnøy, Tønsberg 43126, BG-L-105404) and one in Bygland, Aust-Agder (Klepsland JK15-L095, priv. herb.). New to Norway and to S&F.

Specimens examined: Loc. 17, Arup L18315, L18404 (U3055).

***Caloplaca stillicidiorum* (Vahl) Lyngø**

Growing on a moss cushion on limestone. This species has over periods been included in *C. cerina*, but it has been shown to be a taxon of its own, consisting of several genetic lineages separate from *C. cerina* (Soun et al. 2011). They can usually be recognized by their different habitats with *C. cerina* growing on bark and wood whereas *C. stillicidiorum* is found in bryophytes, on plant debris and on bone, horn or antlers. New to S&F.

Specimens examined: Loc. 11, Arup L18269 (U3062).

***Caloplaca turkuensis* (Vain.) Zahlbr.**

Growing on a road side tree of *Populus tremula*. There are still just a few records of this species in Norway and one previous from S&F (Sunnfjord; 2012 Nordén & Jordal, O-L-180127, as *Caloplaca jemtlandica*). It has been poorly understood but the recent taxonomic treatment by Soun et al. (2011), will probably lead to a better understanding and more records.

Specimens examined: Loc. 1, Arup L18219.

***Carbonea aggregantula* (Müll. Arg.) Diederich & Triebel**

Found on *Lecanora stenotropa* on a perpendicular limestone wall. There are only two previous records of this small lichenicolous fungus in Norway, in Troms (2015, Frisch, TRH-L-652395) and in Hedmark (2004, Haugan & Mathisen, O-L-161471). New to S&F.

Specimens examined: Loc. 13, Arup L18293.

***Catapyrenium cinereum* (Pers.) Körb.**

Growing on moist calcareous soil in an open mountain slope. This species has many records in most districts except for the south-eastern parts of Norway and S&F. New to S&F.

Specimens examined: Loc. 5, Arup L18232.

***Catillaria aphana* (Nyl.) Coppins**

Found on the vertical side of marble boulders in an open mountain slope. This species is extremely rare in Norway as well as in Sweden. In Norway there are previous records from Aust-Agder and from Sør-Trøndelag (Artskart 2021). New to S&F.

Specimens examined: Loc. 2, 3, and 4, Arup L18222, L18228, L18231.

***Diploschistes gypsaceus* (Ach.) Zahlbr.**

On a perpendicular limestone wall. There seems to be only one previous record in S&F of this species that has a scattered and uneven distribution in Norway.

Specimens examined: Loc 11, Arup L18281.

***Flavoplaca citrina* (Hoffm.) Arup et al.**

Found on exposed limestone rocks. It is a common species in certain areas in Norway, but in S&F it seems to be very rare or under-recorded. New to S&F.

Specimens examined: Loc. 15, Arup L18305.

***Henrica theleodes* (Sommerf.) Savic et al.**

Found on a perpendicular limestone wall. It is scattered over most of Norway, but there are no previous records from S&F. New to S&F.

Specimens examined: Loc. 11, Arup L18282, L18283.

***Kiliasia tristis* (Müll. Arg.) Hafellner**

Growing on a limestone boulder in an open mountain side. This species was recently reported as probably new to Norway under the name *Toninia subnitida*, with records from from Akershus and Nord-Trøndelag (Svensson et al. 2017). New to S&F.

Specimens examined: Loc. 3, Arup L18227.

***Lecanora excludens* Malme**

Found on *Alnus incana* in a fairly open situation alongside a gravel road, together with *Caloplaca sorocarpa*. This is a more northern distributed species, but there is one previous record from S&F, where it occurs at its known southern limit. It has recently been suggested that *Lecanora septentrionalis* H. Magn. is a synonym of *L. excludens* (Brodo et al. 2019), an opinion that was also supported by McCune et al. (2020).

Specimens examined: Loc. 9, Arup L18248–L18250 (U2936).

***Lecanora gisleriana* Müll. Arg.**

Fig. 9

Found growing as a lichenicolous fungus on *Lecanora handelii* on rocks and boulders rich in heavy metals. It is known from four previous records in Norway, two from Hedmark and two from Oppland. Red-listed as Endangered (EN). New to S&F.

Specimens examined: Loc. 8, Arup L18241, L18322 (U3033).

***Lecanora handelii* J. Steiner**

Found on rocks and boulders rich in heavy metal. Previously known from Akershus and Hordaland. This is a fairly rare species occurring mainly in southeastern Norway where it normally grows on stone rich in heavy metals. New to S&F.

Specimens examined: Loc. 8, Arup L18246 (U3039).

***Lecanora stenotropa* Nyl.**

On a perpendicular limestone cliff. This is a very rare species with two previous records in Norway, in Hedmark and Vest-Agder, the latter fairly recent (2015, Klepsland, O). This species is not very well known and has very few trustworthy determined specimens in the herbaria for comparison. The substrate for *L. stenotropa* is normally stated to be siliceous rocks, but in the Gaupne area it was found on limestone. The ITS marker shows that the specimen is clearly separate from but related to *L. polytropia*, from which it differs morphologically mainly in the smaller spore size. Our specimen



Figure 9. *Lecanora gisleriana*. Pinkish orange apothecia with a coarse disc. Arup L18241 (LD). Bar = 1 mm.

fits well with descriptions of *L. stenotropa* and with the few specimens available for comparison in LD. New to S&F.

Specimens examined: Loc. 13, Arup L18293 (U3053).

***Lecanora subaurea* Zahlbr.**

Found growing on rocks and boulders rich in heavy metals. This is a representative of a group of species that usually grow on rocks rich in heavy metals and it has mainly scattered localities in southeastern and eastern Norway but also a couple of records from Troms and Finnmark. Red-listed as Near Threatened (NT). New to S&F.

Specimens examined: Loc. 8, Arup L18244.

***Lecanora subintricata* (Nyl.) Th. Fr.**

Growing on wood of solitary standing *Quercus*. The ITS sequences of these two specimens group in a clade corresponding to *L. subintricata* s.lat., but within this there are three subclades that may correspond to species, the identities of which are not yet settled. New to S&F.

Specimens examined: Loc. 16, Arup L18310–L18311 (U3046).

***Lecanora umbrosa* Degel.**

Growing on limestone boulders in open mountain slopes. This species has a split distribution in Norway with most records on limestone in Troms and Finnmark and a few in the Dovrefjell mountains and a single locality at Hedmarksvidda further south (Artskart 2021). In general it must be considered rare. New to S&F.

Specimens examined: Loc. 2–7, fertile and soreciate specimens, field note.

***Lecidea silacea* (Hoffm.) Ach.**

Found on rocks and boulders rich in heavy metals. New to S&F, but wide-spread in most parts of Norway.

Specimens examined: Loc. 8, Arup 18243.

***Lepraria diffusa* (J. R. Laundon) Kukwa var. *chrysodetoides* (J. R. Laundon) Kukwa**

Growing on moss cushions on a perpendicular calciferous slate cliff and on the side of marble boulders in an open mountain slope. New to S&F.

Specimens examined: Loc. 1, Arup L18284.

***Myochroidea* cf. *porphyrospoda* (Anzi) Printzen et al.**

On twigs of a shrub (not identified to species). The specimen cannot be assigned to any known species and is currently under investigation. It reminds of *M. porphyrospoda*, but is not sorediate.

Specimens examined: Loc. 4, Arup L18230.

***Myriolecis albescens* (Hoffm.) Sliwa et al.**

Found on a perpendicular limestone cliff. *M. albescens* seems to be a rare species in S&F with only one previous record.

Specimens examined: Loc. 13, Arup L18295 (U3049).

***Myriolecis crenulata* (Hook.) Sliwa et al.**

Growing on perpendicular limestone cliffs. The species has no previous records in S&F and is rare in all parts of Norway. New to S&F.

Specimens examined: Loc. 11, Arup L18256, L18277 (U3036, U3047) and loc. 13 Arup L18292, L18306 (U3052, U3059).

***Myriolecis perpruinosa* (Fröberg) Sliwa et al.**

Fig. 10

Growing on perpendicular limestone rock. This is a rarely recorded species with only three previously known localities in Norway; in Troms, Oppland and Hedmark. It is rather small but can usually be spotted and recognized by the very heavy white pruina covering both disc and margin of the apothecia. New to S&F.

Specimens examined: Loc. 11, Arup L18268 and loc. 15 Arup L18304.

***Myriolecis semipallida* (Magn.) Sliwa et al.**

Found on a perpendicular limestone rock. The distribution of this species in Norway is not completely known since it was recently separated from *M. dispersa* and is probably more common than the three records in Artskart (2021) indicate. New to S&F.

Specimens examined: Loc. 14, Arup L18301 (U3057).



Figure 10. *Myriolecis perpruinosa*. Typical apothecia with prominent margin covered by a thick white pruina. Arup L18268 (LD). Bar = 1 mm.

***Parabagliettoa dufourii* (DC.) Guidan & Cl. Roux**

This species was found on the sides of marble boulders. There are only two known localities in Norway, from Troms (Norman, undated, O-L-96177) and from Oslo (Moe, 1865, O-L-96159, O-L-96164). According to the checklist (Nordin et al. 2021) it is also known from Nord-Trøndelag, but there are no records from NT in NLD or Artskart (2021). New to S&F.

Specimens examined: Loc. 2 and loc. 3, Arup L18223, L18229.

***Parvoplaca tirolensis* (Zahlbr.) Arup et al.**

Growing on bryophytes on perpendicular limestone rock. This is not a very rare lichen in Norway occurring on bryophytes and plant debris on calcareous ground, but there seem not to be any previous records from S&F. New to S&F.

Specimens examined: Loc. 11, Arup L18261 (U3061).

***Polyblastia fuscoargillacea* Anzi**

Growing on the side of a limestone boulder. According to Tibell & Tibell (2017) there are three previous records of this species in Norway; Sør-Trøndelag, Nordland and Troms, but none from S&F. New to S&F.

Specimens examined: Loc. 7, Arup 18236.

***Polysporina subfuscescens* (Nyl.) K. Knudsen & Kocourk.**

Found on a perpendicular limestone rock. The taxonomy of this complex is not fully understood and several species are polyphyletic. This particular specimen had a rather well developed, pale grey thallus compared to the often brown or reduced thallus of other taxa in the group. New to S&F.

Specimens examined: Loc. 13, Arup L18297 (U3060).

***Protoblastenia incrustans* (DC.) J. Steiner**

Growing on limestone boulders in open mountain slopes. This species is not reported from S&F previously but has several known localities around Oslo and in Troms. New to S&F.

Specimens examined: Loc. 2–6, field notes.

***Protoblastenia rupestris* (Scop.) J. Steiner**

Growing on limestone boulders in open mountain slopes. Despite being a rather common species in Norway there seems to be only one previous record in S&F.

Specimens examined: Loc. 2–6, field notes.

***Rhizocarpon ridescens* (Nyl.) Zahlbr.**

Fig. 11

Growing on rocks and boulders rich in heavy metals. There are approximately 10 previous localities known from Norway, all in the central southern part, but no records from S&F. To the list can also be added a previously unpublished record from Graddis, Saltdal kommune, Nordland (2003, Arup L03578), that is an outlier compared to the more southern records. New to S&F.

Specimens examined: Loc. 8, Arup L18238.

***Rinodina milvina* (Wahlenb.) Th. Fr.**

Growing on limestone in an open mountain slope. There are approximately 20 previous records scattered over the whole country, but not from S&F. New to S&F.

Specimens examined: Loc. 10, Arup L18253.

***Rufoplaca arenaria* (Pers.) Arup et al.**

Found on limestone in an open mountain slope. This is a very rare species in Norway with only scattered records, mainly in the southern part. New to S&F.

Specimens examined: Loc. 10, Arup L18252 (U3038).



Figure 11. *Rhizocarpon ridescens*. Typical wart-like areolae that sometimes develop yellow to bluish grey soralia on top. Arup L18238 (LD). Bar = 1 mm.

***Sagedia simoënsis* (Räsänen) A. Nordin**

Growing on rocks and boulders rich in heavy metals. There are scattered records of this species mainly in the southern part of Norway, but no previous from S&F. New to S&F.

Specimens examined: Loc. 8 (Field note)

***Tetramelas chloroleucus* (Körb.) A. Nordin**

Found on twigs of *Juniperus*. The distribution in Norway is split with an almost continuous band of localities from Hedmark to Troms, plus a single locality in northern Finnmark, separate from a southern population in Aust- and Vest-Agder. The new locality in Gaupne decreases the distance between the northern and the southern populations. New to S&F.

Specimens examined: Loc. 12, Arup L18286.

***Xanthocarpia crenulatella* (Nyl.) Frödén et al. s.lat.**

Growing on perpendicular limestone rock. On a European scale the taxonomy of this species is currently unresolved, since it is paraphyletic in analyses of the ITS marker (Vondrák et al. 2011). New to S&F.

Specimens examined: Loc. 13, Arup L18289 (U3050), and 14, Arup L18302.

Xanthomendoza borealis (R. Sant. & Poelt) Søchting et al.

The species was growing on a perpendicular calciferous slate below an overhang. Lindblom et al. (2019) recently reported *X. borealis* as new to S&F based on this observation.

Specimens examined: Loc. 14, Arup L18300.

Discussion

The lichen flora of the Gaupne area turned out to be very interesting, both from a national and a regional perspective. A total of 35 new species for S&F were found and of these the majority are also rare on a national scale with three species red-listed (Henriksen & Hilmo 2015). Two species, *Blastenia monticola* and *Caloplaca squamuleoisidiata*, are identified as new to Norway. In S&F the bedrock is mainly siliceous and the few places with limestone naturally will house species confined to such substrates. However, not only the substrate is an important factor explaining the occurrence of different species; climate, exposure, natural history, number of micro-habitats and several other factors are also important. Obviously, the few sites we visited in the Gaupne area fulfill several of the requirements for a number of rare lichens or at least locally rare species to occur. From our short visit it is clear that the area hosts an until now unrecognized high level of rare lichens, and is a previously unknown lichen hot-spot.

Acknowledgements: We are grateful to Einar Timdal at the Oslo herbarium and Astri Botnen, Jenny Smedmark and Tor Tønsberg at the Bergen herbarium for kindly providing photos of two specimens previously determined to *Caloplaca isidiigera*. UA is grateful to the other authors for inviting him to take part in the trip that turned out to be very rewarding.

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