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Short communication

Colura calyptrifolia a new oceanic liverwort to Norway and Scandinavia

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Colura calyptrifolia is for the first time reported from Scandinavia, it was discovered in Femanger, Fusa municipality, Hordaland county. *C. calyptrifolia* was growing on an east to northeast facing cliff by a small brook. It was found mainly growing directly on the cliff, but small patches were also found on twigs of *Lonicera periclymenum*.

Colura calyptrifolia (Hook.) Dumort. belongs to a hyperoceanic southern-temperate biogeographic element (Ratcliff 1968, Crundwell 1992, Hill and Preston 1998). Most of the species in this element are found in tropical areas, while their European distribution is mainly confined to Macaronesia and Britain and Ireland. In Britain and Ireland Hill and Preston (1998) assign seven mosses and 29 liverworts to this element. Out of these 36 species, two mosses and 11 liverworts are previously known from Norway, i.e. *Dicranum scottianum* Turner ex Robt. Scott, *Fissidens polyphyllus* Wilson ex B.S.G., *Harpalejeunea molleri* (Steph.) Grolle, *Lejeunea lamacerina* (Steph.) Schiffn., *Lejeunea patens* Lindb., *Lepidozia cupressina* (Sw.) Lindenb., *Leptoscyphus cuneifolius* (Hook.) Mitt., *Plagiochila exigua* (Taylor) Taylor, *Plagiochila punctata* (Taylor) Taylor, *Plagiochila spinulosa* (Dicks.) Dumort., *Radula aquilegia* (Hook. f. et. Taylor) Gottsche, Lindenb. et. Nees and *Scapania gracilis* Lindb. The distribution of these species in northwestern Europe is mainly confined to southwestern Norway and The Faroe Islands. Only *Dicranum scottianum* and *Scapania gracilis* have a somewhat wider distribution, and these species represent most of the outliers in Fig. 1, showing the distribution of this biogeographic element in Norway. Størmer (1969) classified mosses with a southern and western distribution into different groups based on mean January and July temperatures, and precipitation frequency. Among the groups defined by Størmer (1969) especially species of the *Campylopus brevipilus* Bruch & Schimp. group, *Dicranodontium uncinatum* (Harv.) A. Jaeger group and *Fissidens polyphyllus* group have similarity in distribution patterns with the hyperoceanic southern-temperate element of liverworts in western Norway (Fig. 1).

During a field meeting on the project 'Liverworts of Western Norway' funded by the Norwegian Species Initiative, where one of the main aims is to discover new liverworts to Norway, we had an excursion to Femanger in Fusa municipality, Hordaland county (60°7'29.26"N, 5°46'15.24"E) on 29 May 2013. Femanger is situated in the highly oceanic section and on the transition between the boreonemoral and southern boreal zone (Moen 1999). The mean temperature at Eikelandsosen, 13 km north of Femanger, is for the coldest (February) and warmest month (July) 0.4°C and 14.4°C, respectively, while the

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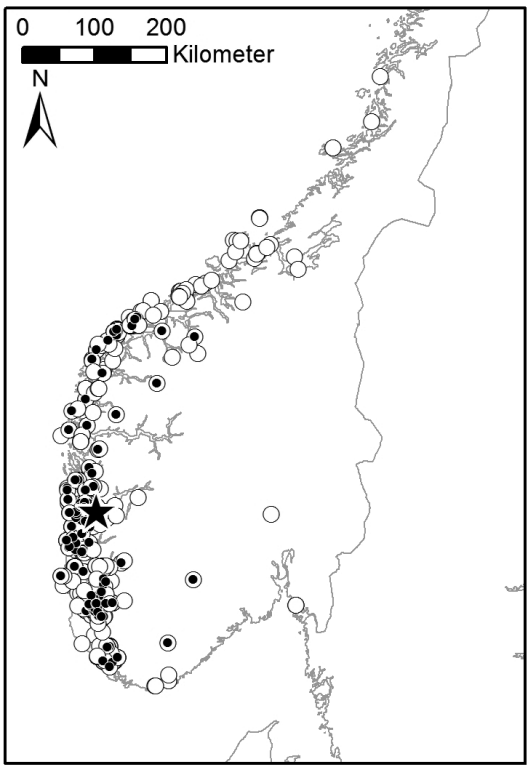


Figure 1. The distribution of the hyperoceanic southern-temperate biogeographic element in Norway i.e. *Dicranum scottianum* Turner ex Robt. Scott, *Fissidens polyphyllus* Wilson ex B.S.G., *Harpalejeunea molleri* (Steph.) Grolle, *Lejeunea lamacerina* (Steph.) Schiffn., *Lejeunea patens* Lindb., *Lepidozia cupressina* (Sw.) Lindenb., *Leptoscyphus cuneifolius* (Hook.) Mitt., *Plagiochila exigua* (Taylor) Taylor, *Plagiochila punctata* (Taylor) Taylor, *Plagiochila spinulosa* (Dicks.) Dumort., *Radula aquilegia* (Hook. f. et Taylor) Gottsche, Lindenb. et Nees and *Scapania gracilis* Lindb. (based on http://artskart.artsdatabanken.no). The star marks the locality for *Colura calyptrifolia* (Hook.) Dumort., open circles indicates records of *D. scottianum* and *S. gracilis*, while the rest of the species is represented by black dots.



Figure 2. The habitat of *Colura calyptrifolia* in Femanger, an east to northeast facing cliff with a small brook at the base of the cliff. *Colura calyptrifolia* was growing as small patches within the red circle. (Photo K. Hassel).

mean annual precipitation varies between 2000 and 2500 mm (Førland 1993). The minimum temperature during winter is usually in January or February, and in Bergen 30 km northwest of Femanger the minimum temperature of January or February after the year 2000 varies from –3.0°C to –13.4°C (Norwegian Meteorological Institute 2013). The topography of the Femanger area is varied, and the area houses small lakes, brooks, rivers and small gorges. The bedrock is dominated by schist and phyllite (Norges Geologiske Undersøkelser 2013). The vegetation of the area is dominated by pine forest (*Pinus sylvestris* L.), mixed deciduous forest and wetlands, depending on elevation, exposition or topography.

The locality for *Colura calyptrifolia* is a small gorge with a seemingly high variation in water flow, depending on season and precipitation. The first patches of *C. calyptrifolia* were discovered by LS on a nearly vertical cliff wall about five meters high. The cliff was facing east to northeast with a small brook at the base of the cliff (Fig. 2). At this point the gorge opened up and flattened out, and further upstream there was a fen with open mixed deciduous forest. Mixed deciduous forest was also dominating just east of the cliff. Downstream from the cliff the vegetation was dominated by pine forest with *Calluna vulgaris* L. and *Sphagnum* spp. *Colura calyptrifolia* was found growing in scattered, small patches on the cliff over a distance of about 10 meters. It was growing in a zone between 0.5 and 2 m above the brook at the cliff base. The main population was growing in a one meter broad zone with about 30 patches. The patches had a characteristic yellowish green color and the size of the patches varied from just a few mm^2 to 3 × 4 cm^2 (Fig. 3). No perianths were found on the collected material (TRH 695399). However, rounded gemmae of 85–110 µm diameter were found on the leaf tips of several plants (Fig. 4). The long beaked leafs are very characteristic and the species is hardly con-

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Figure 3. *Colura calyptrifolia* growing in yellow green patches on the cliff wall. (Photo K. Hassel).

fusable with any other species in Europe. The cliff wall was rather dry, but the locality has damp climate, with high and regular precipitation. The brook at the base of the cliff is also contributing to maintain a moist local climate. *Colura calyptrifolia* was mainly found growing directly on the cliff, but small patches were also found on twigs of *Lonicera periclymenum* L. Other bryophytes growing on the cliff wall were *Radula aquilegia, Plagiochila exigua, Frullania jackii* Gottsche, *Frullania fragilifolia* (Taylor) Gottsche, Lindenb. et. Nees, and *Andreaea rupestris* Hedw.

The find of *C. calyptrifolia* in western Norway is not totally unexpected as several other species of this hyperoceanic temperate element are already recorded. In Britain and Ireland, most findings of *Colura calyptrifolia* are located in the western, most oceanic parts, where it can grow on a variety of substrates. It is found as epiphyte on small twigs, in conifer plantations, on rock walls, but also on a variety of man-made substrates like plastic, metal and glass rubbish (Averis 2009). It is an opportunistic species but probably a weak competitor, recent studies in Scotland indicate that *C. calyptrifolia* is possibly expanding its current distribution (Averis 2007, 2009). The species is autoicious and commonly found with perianths and the finds in Scotland (Averis 2007, 2009) indicate efficient modes of dispersal. At the Norwegian locality *C. calyptrifolia* was found only on one cliff, although it was searched for on suitable substrates in the area. In light of the experience from Scotland this could indicate that *C. calyptrifolia* is a recent immigrant to Norway, and the population in Femanger may have resulted from a single dispersal event that established a small population. Fragmentation and gemmae production probably facilitate dispersal within the cliff wall. Further investigations in the area will show if there are more populations and if spore production also takes place in western Norway.

Colura calyptrifolia has a very wide but somewhat scattered global distribution. In Europe it is known only from the most oceanic parts of Ireland, Britain and France, in addition to the Macaronesian islands. In Africa it is widely distributed in montane areas of central and southern Africa, including the islands of Réunion and St. Helena. In Asia it is known only from Himalaya and Sri Lanka, while it is widely distributed in South America, from the Caribbean to southern Chile. It is also known from several sub-Antarctic islands (ELPT's database; cf. von Konrat et al. 2010). This is the only species of the genus occurring in northern temperate regions and most

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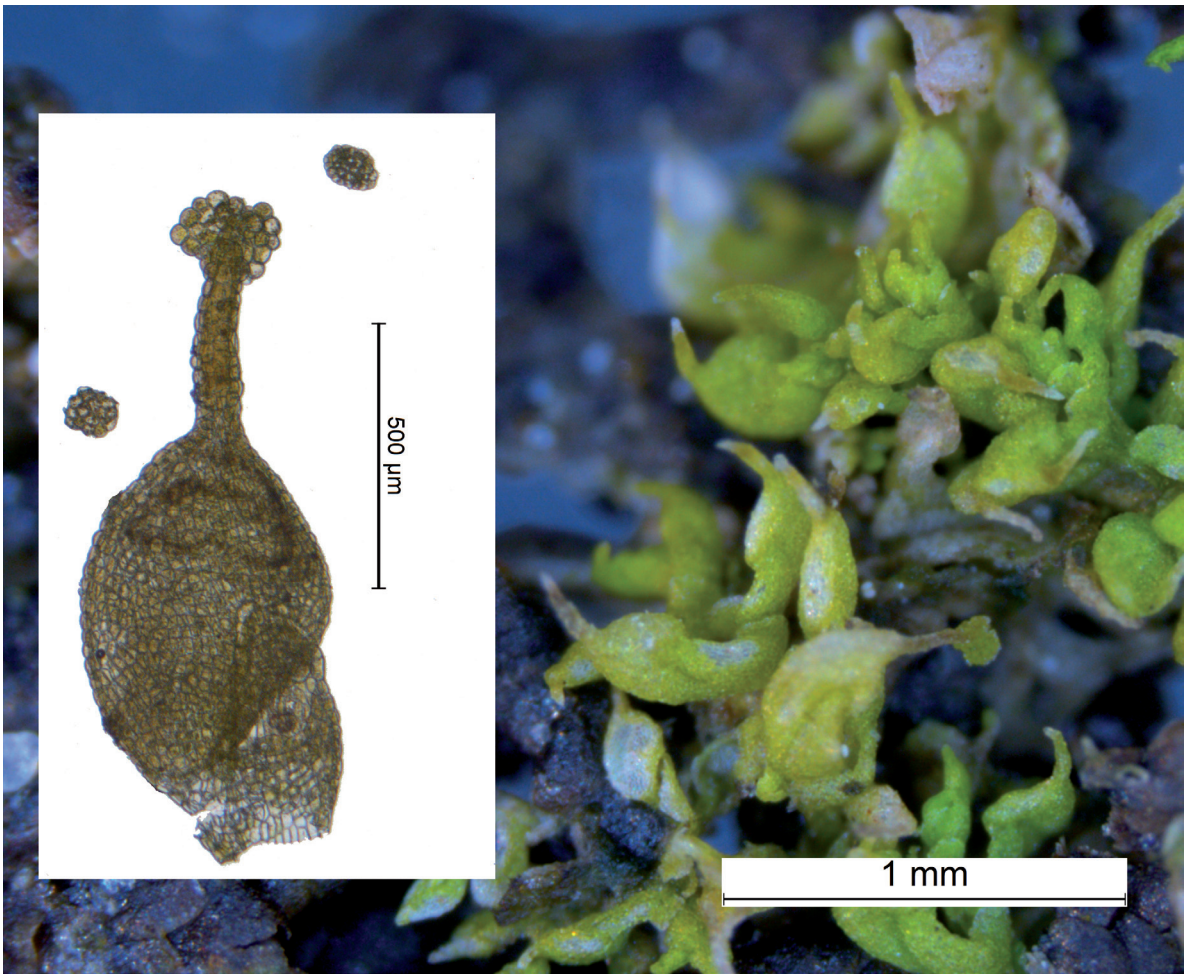


Figure 4. Gemmae production at leaf tips of *Colura calyptrifolia*. (Photo K. Hassel).

of the other ca 80 species occurs in the tropics with a few species in the southern temperate regions (ELPT's database). One of its closest relative, *Colura tenuicornis* (A.Evans) Steph., is widely distributed in the tropics (Grolle and Zhu 2002).

Other species occurring in Britain and Ireland in this hyperoceanic southern–temperate element, with regular spore production, that also could be expected to appear in western Norway are e.g. *Cololejeunea minutissima* (Sm.) Schiffner, *Daltonia splachnoides* (Sm.) Hook. et. Taylor, *Frullania teneriffae* (F. Weber) Nees and *Jubula hutchinsiae* (Hook.) Dumort.

References

Averis, A. B. G. 2007. Habitats of *Colura calyptrifolia* in north-western Britain. – Field Bryol. 91: 17–21.

Averis, A. B. G. 2009. *Colura calyptrifolia* growing on rubbish in a Scottish conifer plantation. – Field Bryol. 99: 19–22.

Crundwell, A. C. 1992. The bryophytes of Britain and Ireland in a European context. – In: Hill, M. O., Preston, C. D.and Smith, A. J. E. (eds), Atlas of the bryophytes of Britain and Ireland, Vol. 2. Harley Books, pp. 9–16.

Førland, E. J. 1993. Nedbørsnormaler, Normalperiode 1961–1990. – DNMI-Rapport. 39: 1–63.

Grolle, R. and Zhu, R. L. 2002. On *Macrocolura* and the subdivision of *Colura* (Lejeuneaceae, Hepaticae). – J. Hattori Bot. Lab. 92: 181–190.

Hill, M. O. and Preston, C. D. 1998. The geographical relationships of British and Irish bryophytes. – J. Bryol. 20: 127–226.

Moen, A. 1999. National atlas of Norway: vegetation. – Norwegian Mapping Authority, Hønefoss.

Norges Geologiske Undersøkelser, N. G. U. 2013. Berggrunn, Nasjonal berggrunnsdatabase. – <http://geo.ngu.no/kart/berggrunn/:> Accessed 3 June 2013.

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Norwegian Meteorological Institute, N. M. I. 2013. Yr.no. – <www.met.no/> Accessed 19 October 2013.
Ratcliff, D. A. 1968. An ecological account of atlantic bryophytes in the British Isles. – New Phytol. 67: 365–439.
Størmer, P. 1969. Mosses with a western and southern distribution in Norway. – Universitetsforlaget, Oslo.
von Konrat, M., Söderström, L. and Hagborg, A. 2010. The early land plants today project: a community-driven effort and a new partnership with Phytotaxa. – Phytotaxa 9: 11–21.

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