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Lophiotrema borealiforme, a new species close to L. boreale

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Lophiotrema borealiforme (Ascomycota, Lophiotremataceae) is described as a new species. The description is based mainly on the holotype collection, but also on the eight other known specimens. Similarities and differences to the closest related species, *Lophiotrema boreale*, are described. *Lophiotrema borealiforme* is only known from southeastern, and the very southern part of Sweden.

Keywords: Ascomycota, Lophiotremataceae, Sweden, taxonomy

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Introduction

Kerstin and Lennart Holm found this small ascomycete for the first time in 1977. They found it near their home "Jerusalem" in Sweden, in the municipality Dalby in Uppland. In the following years, they found several specimens, all from Uppland, and published these as *Lophiotrema boreale* Math. (Holm & Holm 1988). However, all those specimens turned out to represent an undescribed species (Mathiassen 1993). They found a further specimen in 1989 in Skåne, in the very southern part of Sweden.

Material and methods

The collections of *Lophiotrema borealiforme* were studied using a Wild M10 dissecting microscope and a Leitz DMRBE light microscope. Microscopic slides were prepared from dried herbarium material and mounted in water for measurements and photographs. The photo was taken with an Olympus DP27 digital camera. The specimens are deposited in Museum of Evolution, Uppsala University (UPS).

Taxonomy

Lophiotrema borealiforme Math., Granmo & Stensrud, **sp. nov**a – Figs. 1–3

MycoBank no.: MB 820743

Pseudothecia (200–) 250–300 (–375) µm diametro, immersa vel erumpentia, sparsa aut densa, globosa sive pyroformia, nigra; collo saepe demisso sive minuto, crista tamen distincta (75–) 100–150 µm longa instructo; huc illuc, in cortice quoad grana plerumque perpendiculariter sese

Fig. 1. *Lophiotrema borealiforme*. Ascomata in the inner bark of *Betula*, associated with *Diatrype stigma* (bar = 500 µm). Holotype. – Photo: G. Mathiassen.

tendentia. Superficies ligni inter pseudothecia paulum obscurata. *Peridium* 25–40 µm crassum, textura plus minusve angulari. Extrema parte, lateraliter ad basim cellulae prismaticae strata aliquot saepe formant. *Asci* 70–90 (–100) × (6–) 7–8 µm, stipitibus brevissimis, cylindrici, bitunicati, 8-spori. *Paraphysoides* numerosae, anastomosantes, septatae, e filamentis (0.7–) 1.0–1.7 µm crassis formatae. *Ascosporae* (12.5–) 14–17.5 (–18.7) × 2.5–4 µm, ellipsoides vel fusiformae, interdum leviter curvatae, uniseptatae, constrictae, super septum paulo inflatiores, hyalinae, biseriatae, sive etiam oblique uniseriatae.

Holotypus: Die 16 mensis Aprilis anni 1980 in Tunaskog prope vicum Dalby in Uplandia Sueciae, in cortice et ligno *Betulae* sp. una cum *Diatrype stigmate* crescens a K. & L. Holm lectus, siccus in Museo Upsaliensi depositus (UPS, F-634463).

Pseudothecia (200–) 250–300 (–375) µm diam., immersed-erumpent, scattered or crowded, globose - pyriform, black, neck often low or reduced but with a distinct crest (75–) 100–150 µm long, orientated in several directions, but in bark often perpendicular to the direction of the grain. Wood surface slightly blackened between the pseudothecia. *Peridium* 25–40 µm thick, ± *textura angularis*. A few layers of long, prismatic cells often observed outermost laterally at base. *Asci* 70–90 (–100) × (6–) 7–8 µm, cylindrical, short-stiped, bitunicate, 8-spored. *Paraphysoids* (0.7–) 1.0–1.7 µm diam., abundant, branched, anastomosing, septate. *Ascospores* (12.5–) 14–17.5 (–18.7) × 2.5–4 µm, ellipsoid-fusiform, often slightly curved, 1-septate, constricted, somewhat inflated above the septum, hyaline, biseriate, but also obliquely uniseriate.

Etymology: *borealiforme* - from borealis, northern and -formis, similar to, i.e. similar to *Lophiotrema boreale* Math.

Discussion

Holm & Holm (1988) briefly described, illustrated and discussed *Lophiotrema borealiforme*, but they erroneously treated this species as *L. boreale*. Later, Mathiassen (1993) found that eight of the eleven collections mentioned by Holm & Holm actually represented an undescribed *Lophiotrema* species, which is described here as *L. borealiforme*. Unfortunately, we did not succeed in extracting DNA from any of the examined specimens.

Lophiotrema borealiforme is similar to *L. boreale*, but distinctive by the shape and size of the ascospores, which remain 1-septate, and lack the typical guttules (observed in water). They are also reminiscent of *Lophiostoma fuckelii* Sacc., but lack terminal appendages (cf. Holm & Holm 1988). The spores are biseriate, but asci with obliquely uniseriate spores are also observed.

The ascomata grow on wood, but most often on the inner bark of the hosts *Betula*, *Corylus*, *Fagus* and *Fraxinus*. In bark they are very often orientated parallel to the long axis of the host substrate. *Lophiotrema boreale* is predominantly lignicolous, and only found on rather decayed substrates of *Alnus, Betula* and *Salix* (Mathiassen 1989).

Lophiotrema borealiforme has a rather restricted distribution in Sweden (Fig. 3), and is only known from the boreonemoral region in southeast Sweden (Uppland), and in the nemoral region (Påhlsson & Danielsson 1984, Granmo et al. 1999) in the very southern part (Skåne). *Lophiotrema boreale*, on the other hand, is more

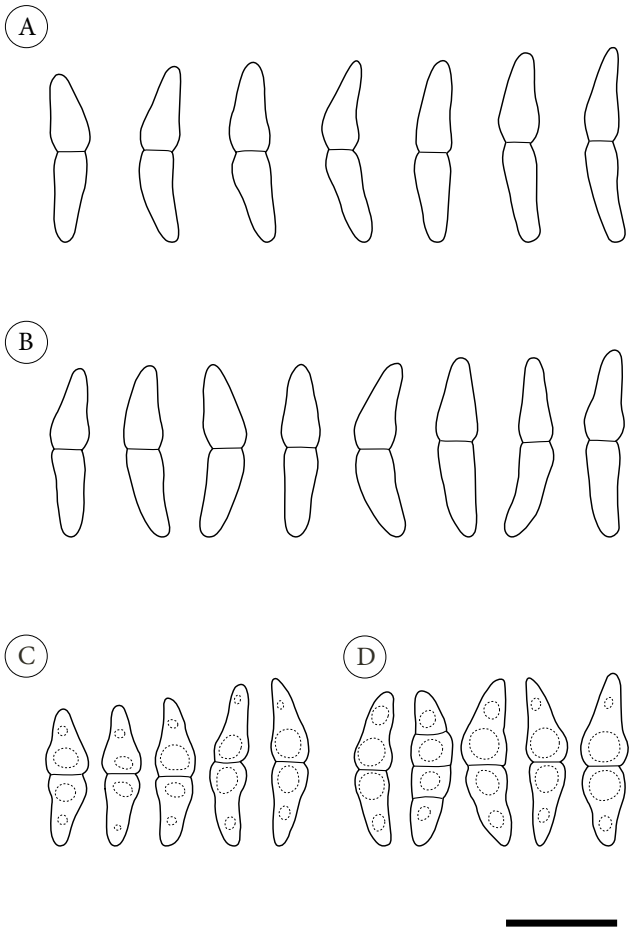

Fig. 2. *Lophiotrema borealiforme* (A–B), *L. boreale* (C–D). Ascospores (bar = 10 µm). (A) Holotype. (B) K. & L. Holm 1967b. (C) Holotype. (D) Mathiassen 207. – Drawing: (A–B) Mathiassen & E. Høgtun, (C–D) Mathiassen (1993).

widely distributed (Mathiassen 1989, 1993, Nordén & Paltto 1997, Granmo 2008, Mathiassen & Granmo 2012). In Fennoscandia (Fig. 3), its main distribution is in the north boreal and low alpine areas (Påhlsson & Danielsson 1984, Moen 1998, Granmo et al. 1999). It probably occurs all along the Scandinavian mountain range, and seems to be more frequent in continental areas. The southernmost locality in Norway is near Oslo, but it is found elsewhere almost throughout the country. The hitherto northernmost locality is in Oksevågdalen Nature Reserve, Lebesby, Finnmark (Granmo 2008). In Sweden, it is found in the central and northern part, but was once reported as far south as Öland (Nordén & Paltto 1997). In Finland, it was found only once in the far north, viz. in the Kilpisjärvi area.

Specimens of Lophiotrema borealiforme examined: **SWEDEN**. **Uppland**. Dalby, ca. 500 m SW of "Jerusalem", on bark of *Betula verrucosa,* with *Diatrype* sp.*,* 8.IV.1977 *Holm & Holm 960c* (UPS, F-634456); Tunaskog, ca. 500 m NE of Östbergstorpet, on bark and wood of *Betula* sp., with *Diatrype stigma,* 16.IV.1980 *Holm & Holm 2018c* (holotype – UPS, F-634463); "Jerusalem", near the eastern barn bridge, on bark of *Fraxinus excelsior,* 23.II.1984 *Holm & Holm*

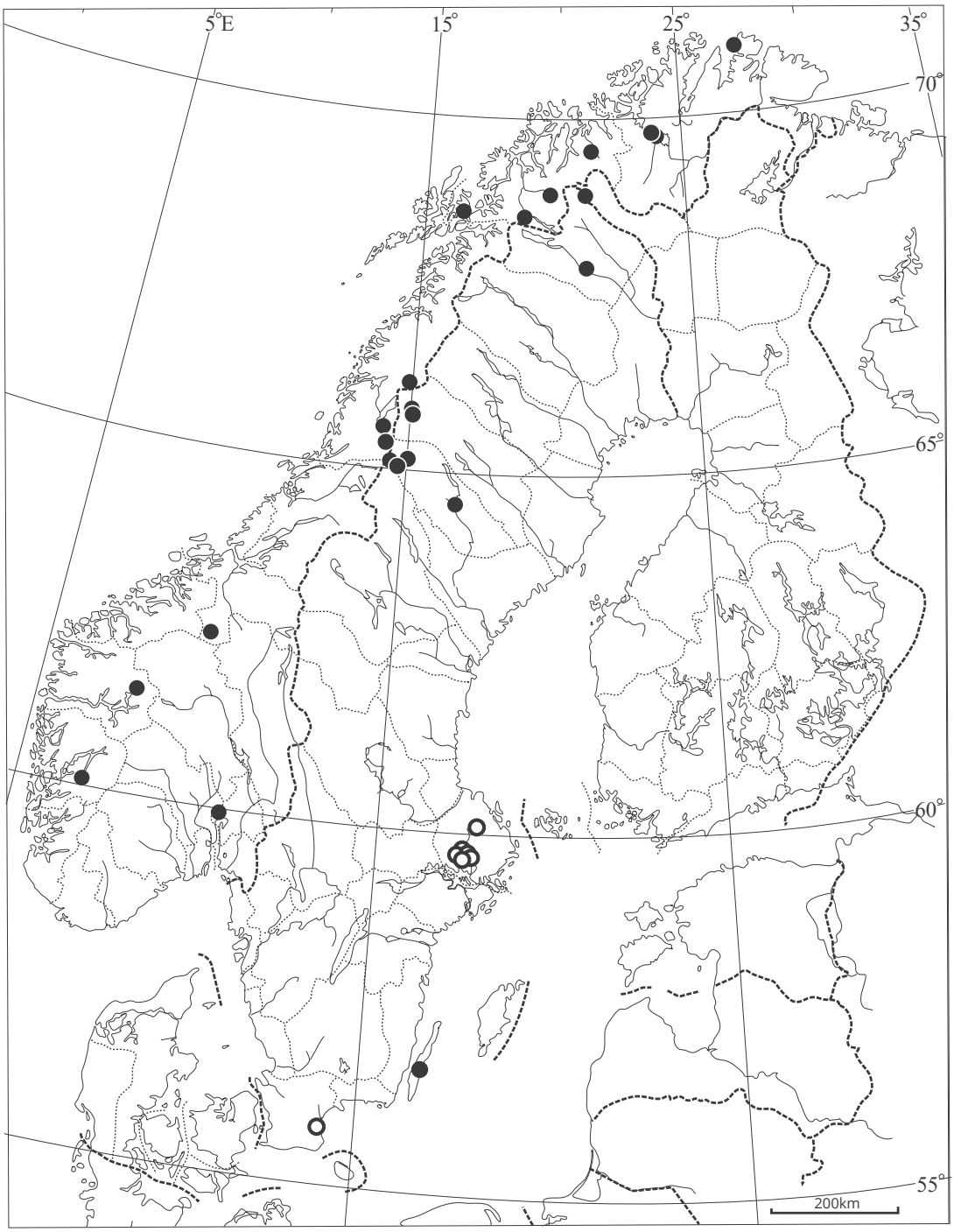

Fig. 3. Distribution. *Lophiotrema borealiforme* (circles), and *L. boreale* (dots). – Map: Ernst Høgtun ©, Tromsø University Museum, 2017.

3010e (UPS, F-634464); near Björkdal, on old bark of *Betula pendula,* 17.III.1985 *Holm & Holm 3414b* (UPS, F-634459); south of Dalby farm, on bark of *Betula* sp., 21.IV.1985 *Holm & Holm 3445a* (UPS, F-634458); Dannemora, hazel grove between Ekvik and Ralby, on bark and wood of *Corylus avellana,* 5.VII.1984 *Holm & Holm 3163a* (UPS, F-634457), *3164b* (UPS, F-634461); Skokloster, ca. 200 m NE of Botorp, on bark of *Betula* sp., 11.III.1980 *Holm & Holm 1967b* (UPS, F-634462). **Skåne**. Degerberga, beech forest ca. 1 km N of Forsaker, on bark of *Fagus sylvatica,* 17.IV.1989 *Holm & Holm 5401g* (UPS, F-709910).

Specimens of Lophiotrema boreale examined: **FINLAND. Enontekiön Lappi.** SE of Kilpisjärvi, Muotkatakka, on wood of *S. glauca ssp. glauca*, 9.IX.2002 *Mathiassen 11632* (TROM, F-14941). **NORWAY. Troms**. Harstad, Sørvik-Sørvikfjellet, on wood of *Salix nigricans ssp. nigricans,* 7.VII.1981 *Mathiassen 218* (holotype – TROM, F-6942).

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