

Hypoxylon macrosporum P. Karst., a new species for Iceland

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ABSTRACT: The ascomycete *Hypoxylon macrosporum* (Xylariaceae, Sordariomycetes) is recorded for the first time from Iceland. It was found on a dead branch of *Salix phylicifolia* in Skaftafell National Park in 2005. *Hypoxylon macrosporum* has a quite extensive distribution, but is infrequent outside Scandinavia.

INTRODUCTION

ROSTRUP (1903) and LARSEN (1932) reported *Hypoxylon fuscum* from Iceland, collected on *Betula* in Hálsskógur in Fnjóskadalur by Ólafur Davíðsson in 1900. The material is deposited in herb. C, Copenhagen. According to GRANMO (1977) and JENSSON (1978), no fertile *Hypoxylon* specimens were present in this poor voucher specimen, consisting of nothing but a brown, thin covering, reminiscent of a stroma, but with no perithecia. GRANMO et al. (1989) pointed out that the depauperate material was most likely not *H. fuscum*, but another species. LÆSSØE (in litt.) noted that it resembled a sterile *H. macrosporum* although *Betula* has never been recorded as host for that species.

In Norway, *Hypoxylon macrosporum* was first reported by GRANMO (1977). Apart from Karsten's collections in the Murmansk Region from 1861 (then a part of Finland) (KARSTEN 1882), the species had not been recorded in Europe outside Scandinavia until it was collected in the Alps in 1982 (WHALLEY & PETRINI 1984, PETRINI & MÜLLER 1986). In 1984, it was found by H. Knudsen in SW Greenland. Although this was considered by WHALLEY & KNUDSEN (1985) as the first report of *H. macrosporum* (as *H. vogesiacum* var. *macrospora*) from

Greenland, it had already been found at Tasermiut by N. Hartz in 1889 (ROSTRUP 1891 as *H. macrosporum*, GRANMO et al. 1989). Hartz collected three specimens of *H. macrosporum*, and the material is kept in Copenhagen (C) (LÆSSØE in litt.). Today we know that *H. macrosporum* has been found four times in Greenland, besides the records already mentioned; viz. in 1946 by M. Lange, in 1978 by V. Alstrup, in 1982 by T. Borgen, and in 1987 by H. Knudsen (LÆSSØE in litt.).

Because no species of *Hypoxylon* were known from Iceland in the mid 1980s, MATHIASSEN (1989) argued that it was unlikely that the species in Greenland and Scandinavia were of common origin. However, in 1988 *H. multiforme* was found in Iceland by Helgi Hallgrímsson. The fungus was growing on a still-standing fence pole of birch in Droplaugarstaðir in Austurland (eastern Iceland) (GRANMO et al. 1989, HALLGRÍMSSON & EYJÓLFSDÓTTIR 2004). This was the first confirmed record of *Hypoxylon* in Iceland, thus filling the gap in distribution of the genus between Scandinavia and Greenland.

HYPOXYLON MACROSPORUM DISCOVERED IN ICELAND

During a two weeks' holiday in Iceland in 2005, Mathiassen and family collected fungi at Akureyri and Hallormsstaðaskógur and searched particularly for *Hypoxylon macrosporum* without finding it. However, about 30 specimens of various pyrenomycetes were found in these two localities.

During a walk to Svartifoss in the Skaftafell National Park (Fig. 1), a black spot on a dead branch of the tea-leaved willow *Salix phylicifolia* (Icel. gulvíðir) was noticed and collected. The collection site is in the district Austur-Skaftafellssýsla (A.-Skaft.) in the province East Iceland (Au) (cf. KNUDSEN & VESTERHOLT 2008). The willow was growing in a native birchwood, ca. 150 m a.s.l., and the specimen was collected on September 2, 2005 (TROM 23843, dupl. in AMNH). The determination of the species was later confirmed by microscopy. It is the first record from Iceland (Fig. 2). Collecting material in a National Park is normally prohibited, but with permission of the environmental authorities, a voucher specimen was saved.

Short description of the Icelandic specimen

About ten small stromata were found along 20 cm on a branch of *Salix phylicifolia* only 1.5-2 cm in diam. They were growing on bare wood close to the edges of bark or in cracks in the bark itself. The stromata were partly hidden by tufts of moss (*Orthotrichum* sp.).

Stromata 0.2–3 × 0.1–1.2 cm, in small patches or somewhat elongated bands, faintly reddish brown to dark brown. Stroma surface partly covered with a thin, white pruina in one stroma. Perithecial elevations strong, ostioles umbilicate or bluntly papillate. *Asci* p.sp. 150–175 × 13–16.5 μm, cylindrical-clavate, long-stiped, with amyloid ring at the top. *Paraphyses* exceeding the asci, septate and sparsely branched. *Ascospores* 22–32 × 8–12.5 μm, oblong ellipsoid



FIGURE 1. The waterfall Svartifoss, at Skaftafell National Park, Iceland, 2.9.2005. Photo: Geir Mathiassen.

to inequilaterally ellipsoid with narrowly rounded ends, light brown to brown, with a straight, pale germ slit somewhat shorter than spore-length.

For more comprehensive descriptions and illustrations see MATHIASSEN (1993), GRANMO (1999).

HOSTS

Hypoxylon macrosporum is regularly found on *Salix* spp., and this agrees well with the record from Iceland (*S. phyllicifolia*). Other hosts include one record on *Alnus viridis* in the Swiss Alps, one on *A. crispa* in southwest Greenland and one on *Populus* sp. in Canada (JU & ROGERS 1996).

In central and northern Scandinavia, *Hypoxylon macrosporum* is almost exclusively found on medium tall or tall *Salix* shrubs. Based on 186 samples of *Hypoxylon macrosporum* collected by Mathiassen in central and northern Scandinavia, the species apparently shows a particular preference for *S. myrsinifolia* ssp. *myrsinifolia* and ssp. *borealis* (81 collections). It is also common on *S. glauca* ssp. *glauca* and *S. lapponum*, and also found on *S. arbuscula*, *S. lanata* ssp. *lanata*, and *S. phyllicifolia*. Only six of the 186 samples were found on the arborescent *Salix caprea* ssp. *sphacelata*. It has to date never been recorded on *S. pentandra* or *S. caprea* ssp. *caprea*, though both species are common in Scandinavia



FIGURE 2. *Hypoxylon macrosporum* from Skaftafell National Park, Iceland, 2.9.2005, associated with *Orthotrichum* sp. Photo: Mari Karlstad, Tromsø Museum, 2007.

(MATHIASSEN 1989, 1993, MATHIASSEN & ØKLAND 2007). In Iceland the potential hosts, in addition to *S. phyllicifolia*, would be *S. lanata* ssp. *lanata* and perhaps the recently naturalized *S. myrsinifolia* ssp. *borealis*.

ECOLOGY

Hypoxylon macrosporum is predominantly a lignicolous species, most frequently found on dead twigs, typically growing in elongated bands on wood close to the bark. Dark stromatic zones extend down into the dry, fresh wood. GRANMO (1999) considered the species to be a primary, aggressive saprobe.

In Iceland, *Hypoxylon macrosporum* was found on a dead branch near the ground, which was still attached to the tree. This is also often the case in Scandinavia, particularly on shrubby species of *Salix*. The absence of *H. macrosporum* on the larger species of *Salix* in central and northern Scandinavia, such as *S. pentandra* and *S. caprea* ssp. *caprea*, is very interesting. The biochemical contents and the anatomy of bark and wood are possibly slightly different than

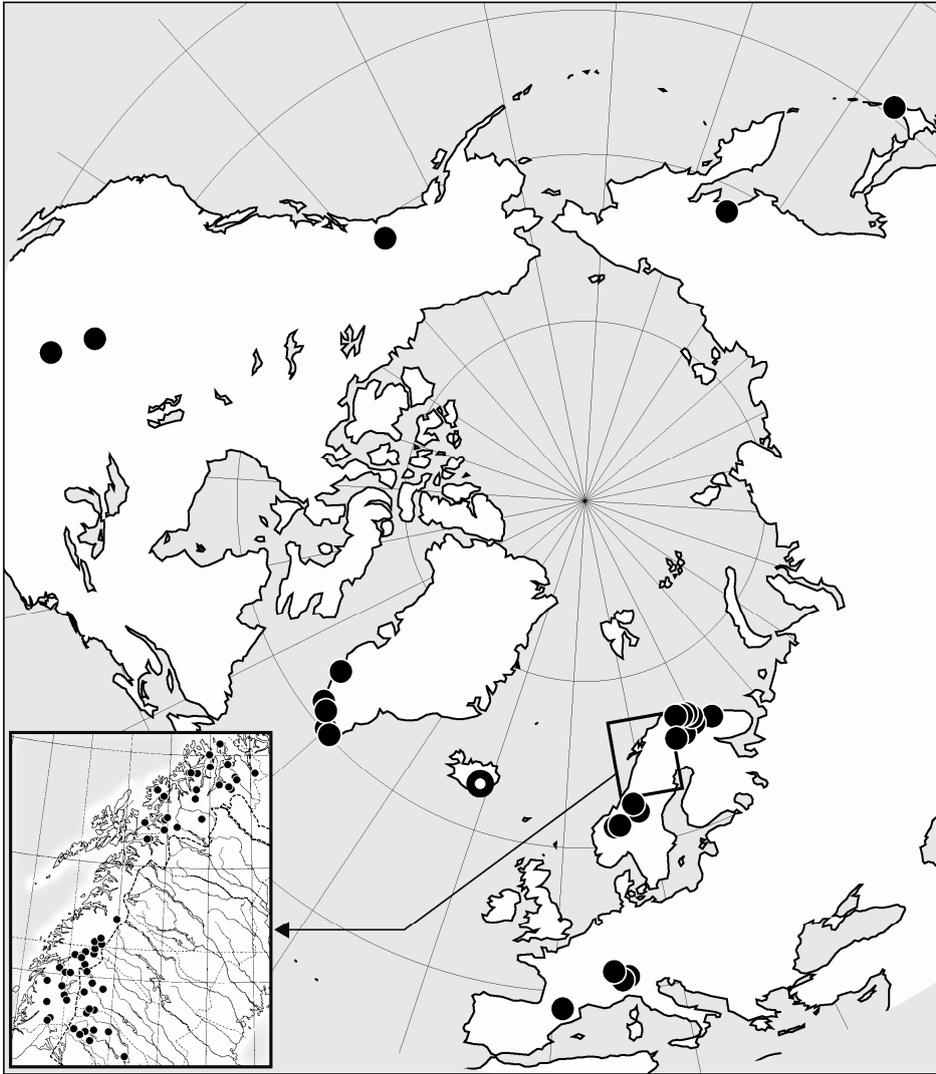


FIGURE 3. Distribution of *Hypoxylon macrosporum*. Open circle = New find 2005.
Map: Ernst Høgtun ©Tromsø University Museum, 2007.

in other salices, thus making these hosts unfavourable for *H. macrosporum* (MATHIASSEN 1993).

DISTRIBUTION

The Icelandic locality of *Hypoxylon macrosporum* is in the south of the country, in the north boreal zone. In Scandinavia, its main distribution is in the north boreal and low alpine areas, and it seems to be most frequent in the northern parts of

that region. It occurs all along the Scandinavian mountain range, extending to the Kola Peninsula, but gradually diminishes towards east and south. No Finnish records are published. The southernmost locality in Norway is Sogndal (Sogn & Fjordane), and in Sweden, in the mountains west of Östersund (Jämtland) (MATHIASSEN 1989, 1993, GRANMO 1999).

Hypoxylon macrosporum has a quite extensive distribution (Fig. 3), but is infrequent outside Scandinavia. In addition to Norway, Finland, Sweden and Iceland, the species is known from France (FOURNIER in litt.) and Switzerland (WHALLEY & PETRINI 1984), and from Russia (Kola Peninsula and eastern Siberia) (KARSTEN 1882, VASILYEVA 1984), Greenland (GRANMO et al. 1989), western United States (MILLER 1961) and western Canada (JU & ROGERS 1996).

GRANMO (1977) and WHALLEY & KNUDSEN (1985) suggested *Hypoxylon macrosporum* to be an arctic-alpine species, although its main distribution is in the boreal and low-alpine areas, and not in the arctic regions. Hence, we adopt the view of GRANMO (1999: 22), who characterizes its distribution as boreal-montane.

The distribution patterns of the *Hypoxylon* species in Scandinavia seem to be correlated with specific vegetation regions, but even more with regional climatic factors, and, as the least decisive factor, is the distribution area of their actual host trees (GRANMO 1999). Regarding *Hypoxylon macrosporum*, the climate in the boreal and low-alpine regions in central and northern Scandinavia seems to suit the species quite well, but the same is apparently not the case in the Alps, where it seems to be rare (MATHIASSEN 1989).

An open question is whether the collections of *Hypoxylon macrosporum* world-wide in fact represent the same biological species. Large geographic distances may present barriers to genetic exchange, and the observed host diversity between the plant families Salicaceae (*Salix* and *Populus*) and Betulaceae (*Alnus*) is noteworthy. Molecular data, paired with morphological and ecological observations, would probably be necessary to resolve this topic.

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