Karstenia 51: 17–22, 2011

Hypoxylon macrosporum P.Karst. (Xylariaceae) new to Finland – and a new northern limit

GEIR MATHIASSEN, ALFRED GRANMO and TEPPO RÄMÄ

MATHIASSEN, G., GRANMO, A. & RÄMÄ, T. 2011: Hypoxylon macrosporum P.Karst. (Xylariaceae) new to Finland – and a new northern limit. – Karstenia 51: 17– 22. Helsinki ISSN 0453-3402.

Hypoxylon macrosporum P.Karst. is recorded for the first time from Finland. It was found on different species of *Salix* in nine localities in the north of the country, in the biogeographical provinces of Enontekiön Lappi, Inarin Lappi and Kittilän Lappi in 1995, 1996 and 2002. We also report new finds in Norway representing the hitherto northernmost known limit for the species in Fennoscandia. *Hypoxylon macrosporum* has a wide distribution, but is infrequent outside Scandinavia. In addition to Norway and Sweden, the species is known from France, Switzerland, Russia (Kola Peninsula and eastern Siberia), Iceland, Greenland, western United States and western Canada.

Key words: Ascomycota, Xylariales, *Hypoxylon macrosporum*, Finland, distribution, ecology, host preference, taxonomy

Geir Mathiassen & Alfred Granmo & Teppo Rämä, Department of Natural Sciences, Tromsø University Museum, University of Tromsø, NO-9037 Tromsø, Norway; e-mails: geir.mathiassen@uit.no & alfred.granmo@uit.no & teppo.rama@uit.no

Introduction

In 1861 the renowned Finnish mycologist P.A. Karsten discovered, and later described, *Hypoxylon macrosporum* on *Salix* near Kola and Olenji in the Murmansk region (Karsten 1882). This region was in those days a part of Finland. About 100 years after Karsten's report, it was recorded from several localities in Norway by Granmo (1977). He reported it as new to Norway and Scandinavia. Since then, *H. macrosporum* has been found in several new localities in both Norway and Sweden (Mathiassen 1985, 1989, 1993, Granmo 1999, Mathiassen & Økland 2007). In Norway, the very first find of *H. macrosporum* was apparently an old voucher specimen collected by J.M. Norman in Tromsø, most probably in the 1860's or1870's (in herb. O, without year). But as Norman had no knowledge of the species, it remained undetermined until identified by Granmo in the 1970's.

Apart from Karsten's 1861 collections (Karsten 1882), the species had not been recorded in Europe outside the Nordic countries until it was collected in the Alps in 1982 (Whalley & Petrini 1984, Petrini & Müller 1986). *Hypoxylon macrosporum* has been found several times in Greenland (Rostrup 1891, Whalley & Knudsen 1985, Granmo et al. 1989, Mathiassen et al. 2011), and in 2005 it was also found in Iceland (Mathiassen et al. 2011). Here we report the first records of *Hypoxylon macrosporum* within today's Finland. The species is also described and its host preference, ecology and distribution discussed.

Brief description of *Hypoxylon macrosporum* and its differentiation

Stromata in small patches or somewhat elongated bands on wood, more rarely erumpent from bark, faintly reddish brown to dark brown (Fig. 1). Stroma surface at times partly covered with a thin, greyish or brown pruina. Perithecial elevations conspicuous, ostioles umbilicate or bluntly papillate. *Asci* p.sp. 130–180 × 13–19 µm, cylindrical-

clavate, long-stiped, with amyloid apical ring in Melzer's reagent. *Ascospores* 22–34 × 7–13 µm, mean 25.5 × 9.4 µm (n = 220/10), oblong ellipsoid to inequilaterally ellipsoid with narrowly rounded ends, light brown to brown, with a straight, pale germ slit somewhat shorter than spore-length (Fig. 2). *Paraphyses* exceeding the asci, septate and sparsely branched. Extractable stromatal pigment in 10% KOH olivaceous brown.

The species most closely resembling *Hypoxylon macrosporum* in macromorphology is *H. salicicola* Granmo, a species closely related to *H. rubiginosum* (Pers.: Fr.) Fr. *Hypoxylon salicicola* also has strong preference for *Salix* as a host genus. It is quite common in for instance North Norway (Granmo 1999). It has smaller perithecia and much smaller spores (7–10 × 3–4.5 µm) than *H. macrosporum* and the KOH-extractable stromatal pigment is reddish brown. *Hypoxylon salicicola* has not been reported from Finland yet, but most probably occurs there.

For more comprehensive descriptions and illustrations see Mathiassen (1989, 1993), Granmo (1999), Fournier & Magni (2010).

Results and discussion

During fieldwork in the northern part of Finland in 1995, 1996, and 2002, the senior author (GM) also collected several specimens of *Hypoxylon macrosporum*. The species was found in six localities in the biogeographical province Enontekiön Lappi, in two localities in Inarin Lappi, and in one locality in Kittilän Lappi. These are the first records of *H. macrosporum* from Finland. As elsewhere in Scandinavia, the hosts included several *Salix* species. During fieldwork in the northern part of Norway Granmo and Mathiassen found (Granmo 2008) the hitherto northermost locality of the species in Oksevågdalen Nature Reserve, Finnmark, Norway (70º 57' N, 27º 30' E). It was frequently recorded, and must be considered as rather common in the reserve (Granmo 2008).

Apart from 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), *Hypoxylon macrosporum* has hitherto only been found on *Salix*, and we still regard *Salix* to be its main host. In central and northern Scandinavia, *Hypoxylon macrosporum* is almost exclusively found on medium-sized or tall *Salix* bushes. The species shows a particular preference for *S. myrsinifolia* ssp. *myrsinifolia* and ssp. *borealis*, and is also common on *S. glauca* ssp. *glauca*, and *S. lapponum*. It is also found on *S. arbuscula, S. caprea* ssp. *sphacelata, S. lanata* ssp. *lanata,* and *S. phylicifolia*, but it has never been found on *S. pentandra* or *S. caprea* ssp. *caprea*, even though both taxa are common in Scandinavia (Mathiassen 1989, 1993, Mathiassen & Økland 2007). In northern Finland, *H. macrosporum* was most frequently found on *S. glauca* agg. and on *S. phylicifolia*. Five specimens were found on *S. lapponum*, and some on *S. hastata* ssp. *hastata*, *S. lanata* ssp. *lanata*, and *S. myrsinifolia* ssp. *borealis*. *Hypoxylon macrosporum* was quite frequent in the majority of the nine localities, but particularly common in the locality near Anttila in Inarin Lappi. Here it was found growing on the majority of all the low shrubs of *S. phylicifolia* along the bank of the river Kielajoki.

In all Finnish localities, *Hypoxylon macrosporum* was mainly found and collected close to the ground, where conditions are often more humid than higher above the ground. Such affinity for humidity is also often the case in central and northern Scandinavia, and also in Iceland (Mathiassen et al. 2011).

Hypoxylon macrosporum is predominantly a lignicolous species, most frequently found on dead branches or twigs, growing typically 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.

The Finnish localities of *Hypoxylon macrosporum* are all in the northern continental part of the country, in north boreal and low alpine zones (Fig. 3). In Scandinavia, its main distribution is also 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, Russia but gradually diminishes towards east and south. The southernmost locality in Norway is Sogndal (Sogn & Fjordane), and in Sweden in the mountains northwest of Östersund in Jämtland (Mathiassen 1989, 1993, Granmo 1999). The distribution thus corroborates the statement of Granmo (1999: 22), who characterizes its distribution as boreal–montane.

As mentioned above, *Hypoxylon macrosporum* has now been recorded from several new

localities along the Scandinavian mountain range since Granmo (1977) reported it as new to Norway. Today it must be considered as quite common in these north boreal and low alpine areas. The transition from being unknown to being quite common was commented on by Granmo (1999: 48): "Bearing in mind the extensive botanical investigations carried out in the Scandinavian mountains, it is remarkable that no one had ever collected or recognized this large pyrenomycete here until 1973." The same can be said about the investigations carried out in the northern parts of Sweden and Finland. Mathiassen (1993: 95), however, expected *H. macrosporum* to be rather common in the northernmost parts of these two countries. As far as we know, however, it has not yet been recorded from the northernmost part of Sweden.

Hypoxylon macrosporum has quite an extensive world distribution (see Mathiassen et al. 2011), but is infrequent outside Scandinavia. In addition to Norway, Finland, Sweden and Iceland (Mathiassen et al. 2011), the species is known from France and Switzerland (Whalley & Petrini 1984, Fournier in litt., Fournier & Magni 2010), and from Russia (Kola Peninsula and eastern Siberia) (Karsten 1882, Vasilyeva 1984), Greenland (Granmo et al. 1989), western United States and Canada (Miller 1933, 1961, Ju & Rogers 1996).

Finnish material of *Hypoxylon macrosporum* *(Finnish grids given in Finnish uniform grid (27°E):*

Kittilän Lappi. Muonio, Pallas-Yllästunturi National Park, W of Pallaskero, 7554:3377, on *Salix glauca* ssp. *glauca*, 3.VIII.1996 *Mathiassen 10669, 10670* (JOE), *10689, 10692, 10715* (KUO), *10694, 10716* (TROM); same area, on *S. lapponum, Mathiassen 10704, 10706* (TROM). **Enontekiön Lappi.** Enontekiö, near Kelottijärvi, 7615:3296, on *S. phylicifolia*, 4.VIII.1995 *Mathiassen 10233* (H); Kilpisjärvi, SW slope of Saana, 7675:3253, on *S. glauca* ssp. *glauca*, 30.VII.1996, *Mathiassen 10353* (H), *10355*, *10367*, *10373* (TROM), *10370*, *10378* (OULU), *10381* (TUR), in coll. *Mathiassen* 10372 & 10374 (TROM); same area, on *S. glauca* ssp. *stipulifera, Mathiassen 10309, 10336, 10337*, in coll. *Mathiassen* 10340 (TROM); same area, on *S. hastata, Mathiassen 10384* (TUR); same area, on *S. lanata* ssp. *lanata, Mathiassen 10343* (TROM); same area, on *S. myrsinifolia* ssp. *borealis, Mathiassen 10313, 10324* (TROM); same area, on *S. phylicifolia*, *Mathiassen 10333 & 10334* (H), *10365* (TUR); same area, on *Salix* sp., *Mathiassen 10386* (OULU); SE of lake Kilpisjärvi, at Leutsuvaara, 7660-1:3257, on *S. glauca* ssp. *glauca,* 31.VII.1996, *Mathiassen 10409* (TUR), *10410, 10413, 10417* (TROM); same area, on *S. glauca* ssp. *stipulifera, Mathiassen 10399* (TROM); SE of Saarikoski, near Lammasoaivi, 7642-3:3269, on *S. glauca* ssp. *glauca*, 31.VII.1996 *Mathiassen 10454*, *10459* (TROM); same area, on *S. phylicifolia, Mathiassen 10444* (TROM); Lammasoaivi, 7643:3271-2, on *S. glauca* ssp. *glauca*, 31.VII.1996, *Mathiassen 10465* (JYV), same area, on *S. lapponum, Mathiassen 10469*, *10471* (JOE), *10470* (TROM); SE of lake Kilpisjärvi, at Muotkatakka, 7660:3258, on S. *myrsinifolia* ssp. *borealis*, 6.IX.1998, *Granmo* 23/98; same area, on *S. phylicifolia, Granmo* 27/98 (TROM); same area, on *S. glauca* ssp. *glauca*, 9.IX.2002 *Mathiassen 11614A, 11615A, 11595, 11600, 11608*, in coll. *Mathiassen* 11624A, 11610A (TROM); same area, on *S. glauca* ssp. *stipulifera Mathiassen 11630*, in coll. *Mathiassen* 11627A, 11628 (TROM); same area, on *S. phylicifolia Mathiassen 11580, 11582, 11585, 11602, 11602A*, in coll. *Mathiassen* 11586 (TROM). **Inarin Lappi.** Inari, 2 km NW of Inari, 7648:3499, on *S. phylicifolia*, 5.VIII.1996 *Mathiassen 10783* (OULU), *10788, 10800* (JYV); NW of Anttila, along the river Kielajoki, 7690:3489, on *S. glauca* ssp. *glauca*, 8.VIII.1996 *Mathiassen 11021* (TROM); same area, on *S. phylicifolia*, *Mathiassen 11009* (JYV), *11011, 11012, 11013, 11014, 11015, 11016, 11018, 11019* (TROM).

Fig. 1. *Hypoxylon macrosporum*. Finland, Kilpisjärvi, Saana, 1996 (*Mathiassen 10370*). Photo: A. C. Nilssen, 2010.

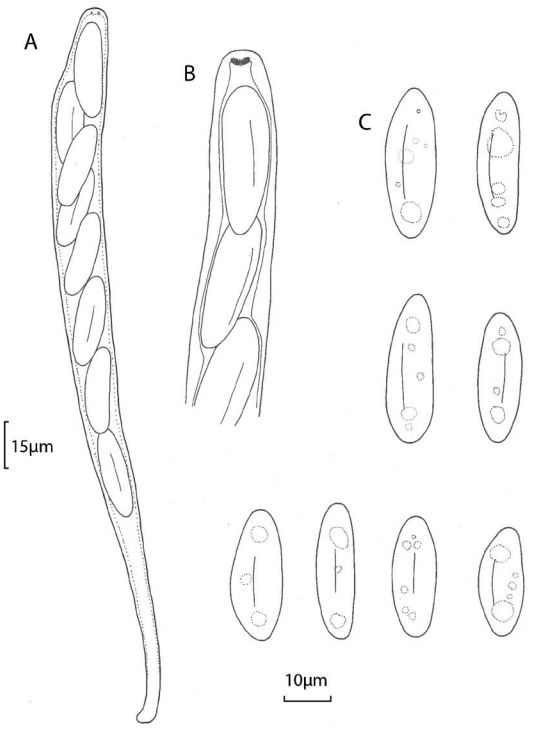

Fig. 2. *Hypoxylon macrosporum*. A = ascus with eight ascospores, B = ascal apex in Melzer's reagent, C = ascospores. Drawing: Mathiassen (1989).

Fig. 3. Distribution of *Hypoxylon macrosporum* in Fennoscandia. ○ = localities in Finland, and the northernmost locality in Fennoscandia. Map: E. Høgtun ©, Tromsø University Museum, 2010.

Acknowledgements: We thank Ernst Høgtun for drawing the map, and Rob Barrett and Ernest Emmett for improving the English. Thanks also to herbarium authorities at the Finnish herbaria in H, JOE, JYV, KUO, OULU and TUR for checking possible collections of *Hypoxylon macrosporum*. The investigation has been financially supported by the University of Tromsø, the County Governor of Finnmark, and Artsdatabanken (The Norwegian Biodiversity Information Centre).

References

Fournier, J. & Magni, J-F. 2010: Pyrenomycetes from southwestern France. http://pyrenomycetes.free.fr/index.htm (Last update: December 24, 2004).

Granmo, A. 1977: Slekten Hypoxylon i Norge. – 191 pp. + 6 pl. Cand. real. Thesis, University of Bergen. [In Norwegian].

Granmo, A. 1999: Morphotaxonomy and chorology of the genus Hypoxylon (Xylariaceae) in Norway. – Sommerfeltia 26: 1–81.

Granmo, A. 2008: Sopp i Oksevågdalen naturreservat. – Naturkonsulenten, rapp. 2008-2. pp. 35. Fylkesmannen i Finnmark. Miljøvernavdelingen, rapport nr. 2-2009. [In Norwegian]. http://fylkesmannen.no/liste.aspx?m=1935&amid=1001566

Granmo, A., Hammelev, D., Knudsen, H., Læssøe, T., Sasa, M. & Whalley, A.J.S. 1989: The genera Biscogniauxia and Hypoxylon (Sphaeriales) in the Nordic countries. – Opera Botanica 100: 59–84.

Ju, Y-M. & Rogers, J.D. 1996: A revision of the genus Hypoxylon. – Mycologia Memoir 20: 1–365.

Karsten, P.A. 1882 (1866 as preprint n.v.): Enumeratio fungorum et Myxomycetum in Lapponia orientali aestate 1861 lectorum. – Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar 8: 193–217.

Mathiassen, G. 1985: Pyrenomyceter (Ascomyceter) på Salix i Troms. – 197 pp. + 8 pl. Cand. real. Thesis, University of Tromsø. [In Norwegian].

Mathiassen, G. 1989: Some corticolous and lignicolous Pyrenomycetes s. lat. (Ascomycetes) on Salix in Troms, N Norway. – Sommerfeltia 9: 1–100.

Mathiassen, G. 1993: Corticolous and lignicolous Pyrenomycetes s.lat. (Ascomycetes) on Salix along a mid-Scandinavian transect. – Sommerfeltia 20: 1–180.

Mathiassen, G. & Økland, R.H. 2007: Relative importance of host tree species and environmental gradients for epiphytic species composition, exemplified by pyrenomycetes s. lat. (Ascomycota) on Salix in central north Scandinavia. – Ecography 30: 251–263.

Mathiassen, G., Granmo, A., Eyjólfsdóttir, G.G. & Stensrud, Ø. 2011: Hypoxylon macrosporum P.Karst., a new species for Iceland. – Acta Botanica Islandica 15. In press.

Miller, J.H. 1933: Some new species of Hypoxylon. – Mycologia 25: 321–329.

Miller, J.H. 1961: A monograph of the world species of Hypoxylon. – 158 pp. University of Georgia Press, Athens, Georgia (USA).

Petrini, L.E. & Müller, E. 1986: Haupt- und Nebenfruchtformen europäischer Hypoxylon-Arten (Xylariaceae, Sphaeriales) und verwandter Pilze. – Mycologia Helvetica 1: 501–627.

Rostrup, E. 1891: Tillæg til "Grønlands Svampe (1888)". – Meddelelser om Grønland 3: 592–643. [In Danish].

Vasilyeva, L.N. 1984: Rod Hypoxylon Bull. ex Fr. na Dalnem Vostoke. – In: Cherdantseva, B.Ya., Azbukina, Z.M. & Egorova, L.N. (eds). Sistematiko-floristicheskiye issledovaniya sporovykh rasteniy Dalnego Vostoka, 10–13. Akademiya Nauk SSSR, Vladivostok. [In Russian].

Whalley, A.J.S. & Petrini, L.E. 1984: Hypoxylon vogesiacum var. macrospora from Europe. – Transactions of the British Mycological Society 82: 364–368.

Whalley, A.J.S. & Knudsen, H. 1985: Hypoxylon vogesiacum var. macrospora, a new record for Greenland. – Transactions of the British Mycological Society 84: 563.