

## Popularisert bidrag

### Ascomycetes new to Norway found at workshop in Hordaland, 13 -16 May 2019

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#### SAMMENDRAG

På en workshop i Hordaland med inviterte internasjonale eksperter fant vi 13 ascomycetarter som var nye for Norge. Disse artene er presentert med bilde og notater vedrørende mikromorfologi, økologi og utbredelse i Skandinavia. I tillegg rapporteres funn av den sjeldne artene *Melaspileella proximella* og av «*Dothiorina tulasnei*» (den asexuelle morph av *Chlorociboria aeruginascens*).

#### ABSTRACT

During a workshop in Hordaland with invited international experts, we found 13 ascomycete species new to Norway. These are presented with photos and notes on their micromorphology, ecology and occurrence in Scandinavia. In addition, the rarely collected species *Melaspileella proximella* and “*Dothiorina tulasnei*” (the asexual morph of *Chlorociboria aeruginascens*) are reported.

#### INTRODUCTION

Ascomycota is the most abundant and diverse fungal phylum, but its members are still poorly known in most countries. There are new country records of ascomycetes, and even new species to science, waiting to be



Figure 1. The participants in the workshop in front of Ørredalsfossen in Kvam, Hordaland. From the left: André Aptroot, Putarak Chomnunti, Björn Nordén, Walter Jaklitsch, Hermann Voglmayr, Gernot Friebes, Edvin Johannesen, John Bjarne Jordal, Roger Andersson, Mathias Andreasen. Foto: BN.

discovered in almost any forest. The problem is 'just' to find them and to identify them, something that requires long training and experience. Working with the few experts available is the best way to get forward in learning new taxa. As part of a biodiversity mapping project financed by the Norwegian Biodiversity Information Centre, the first author invited leading experts to a workshop in Norheimsund, Hordaland 13 May-16 May 2019 (Figure 1). The results in terms of new country records identified by morphological methods are presented below.

#### MATERIALS AND METHODS

The presented species were encountered in temperate deciduous forests on short excursions from Norheimsund, Hordaland. The area is situated on the northern side of the Hardanger fjord and has a temperate oceanic climate. The bedrock in the area ranges from acidic gneiss and granite to ultrabasic rock types, with according differentiation in deciduous forest types from poor oak forest to herb-rich elm forest. All collection sites were situated below 150 m a.s.l. Each forenoon was spent in the field where we surveyed twigs and branches and bark on living and dead trees, and the rest of the day was spent in the lab. We used the middle of each site as coordinates for all collections from that site.

The species were determined by studying the morphology of the sexual morph (teleomorph) or/and asexual morph (anamorph) under the microscope. Species distributions in Scandinavia were checked using the following sources: for Norway Artskart (2019), The Norwegian Mycological Database (NMD 2019), and Aarnæs (2002); for Sweden Eriksson (2014), Santesson et al. (2019) and Artportalen (2019), and for Denmark Atlas of Danish Fungi (2019).

Collectors, identifiers and photographers are designated by: BN: Björn Nordén, RA: Roger Andersson, MA: Mathias Andreasen,

AA: Andre Aptroot, PC: Putarak Chomnunti, GF: Gernot Friebes, WJ: Walter Jaklitsch, EJ: Edvin Johannesen, HV: Hermann Voglmayr. The nomenclature follows Eriksson (2014) for species occurring in Sweden, and otherwise MycoBank (mycobank.org) if not otherwise stated and should be treated as preliminary in several cases.

#### RESULTS

*Cucurbitaria pulveracea* P. Karst. (Pleosporales, Dothideomycetes)

This species, originally described from Finland, is new to Norway and is not known from Sweden or Denmark. It grows on dead corticated branches of *Prunus padus* and is characterized by reddish, thyridaria-like stromata, differing from the latter by muriform ascospores, which agree with type material - in contrast to the protologue, which only stated 3-5-septate ascospores.

Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Prunus padus* bark in mixed low-herb forest with *Taxus baccata*, 14 May 2019, leg. HV, det. WJ.

*Dothidotthia ramulicola* (Peck) M.E. Barr (Botryosphaeriales, Dothideomycetes)

This species occurs on branches of various trees and has not been recorded from Sweden or Denmark. It has two-celled ascospores approximately  $26 \times 13 \mu\text{m}$  that slowly become dark brown, often develop secondary transverse and longitudinal septa (Barr 1989) and germinate from several cells. Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Prunus padus* bark in mixed low-herb forest with *Taxus baccata*, 14 May 2019, leg. & det. HV, WJ.

*Dothiorina tulasnei* (Sacc.) Höhn., the asexual morph of *Chlorociboria aeruginascens* (Helotiales, Leotiomyces), Fig. 2

This is not a new species to Norway but the asexual morph of the well-known disco-

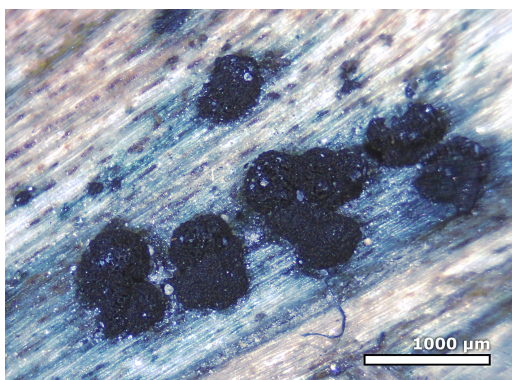


Figure 2. *Dothiorina tulasnei* conidiomata on stained wood of *Alnus glutinosa*. Photo: MA.

mycete *Chlorociboria aeruginascens*. It deserves to be mentioned since it is rarely collected and we are not aware of previous finds in Scandinavia. The genetic connection between an asexual and sexual morph was demonstrated by Tudor et al. (2014). Although the genus *Dothiorina* is older than *Chlorociboria*, the latter has been protected, and *Chlorociboria aeruginascens* remains the valid name to be used for the species (see <https://www.iapt-taxon.org/nomen/main.php>, Appendices I-VII). The asexual morph shares the blue-green wood stain of the teleomorph, which makes it relatively easy to identify in the field. The conidia measure  $3-7 \times 2-3$  μm. Material: Hordaland, Kvam, Berge, UTM32 343420/6689460, on *Alnus glutinosa* wood in mixed blueberry forest, 15 May 2019, leg. PC, det. GF.

*Dothivalsaria megalospora* (Auersw.) Petr. syn. *Massariovalsa megalospora*. (Dothideomycetes incertae sedis), Fig. 3

Further probable synonyms are *Cryptovalsaria americana* and *Cryptovalsaria rossica*, described from other species of *Alnus*.

This species is new to Norway and has not been found in Sweden or Denmark. In Europe it is so far only known from bark of living trunks of *Alnus incana* and has perithecia covered by thick stromatic tissue which

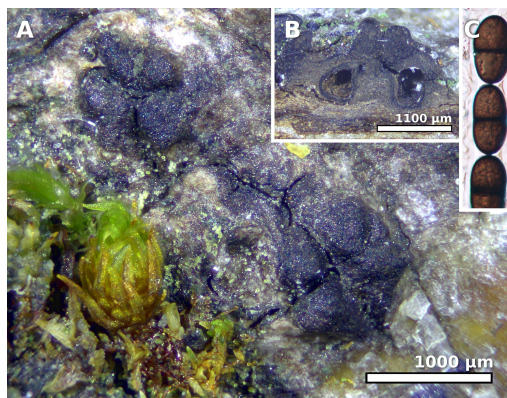


Figure 3. *Dothivalsaria megalospora* ascomata are formed under thick stromatic tissues on branch of *Alnus incana*; the conspicuous inversely stellate crests are characteristic for the species. Photo: MA.

typically forms inversely stellate crests around the inconspicuous ostiolar openings. The ascospores are dark brown, ellipsoid, 2(-3) septate,  $28-45 \times 15-20$  μm, with densely granular contents. Its systematic affiliation is yet unclear; while Müller & von Arx (1962) considered it to be closely related to *Massariovalsa sudans* (Diaporthales, Sordariomycetes), Barr (1987, 1990) placed it in Massariaceae (Pleosporales, Dothideomycetes). Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Alnus incana* in mixed low-herb forest with *Taxus baccata*, 14 May 2019, leg. BN, WJ, det. WJ, HV; Hordaland, Kvam, Berge, UTM32 343420/ 6689460, on *Alnus incana* close to a small rivulet, 15 May 2019, leg. & det. WJ.

*Julella macrospora* Döbberler (Ostropales, Lecanoromycetes), Fig. 4

This species grows on various bryophytes and is not lichenized. It is new to Scandinavia and is characterized by having brown muriform ascospores and by lacking a hamathecium. This means that it is not a *Julella* in the sense it is now known, but without sequence data it cannot be easily determined what genus it is related to. Material: Hordaland, Kvam, Ørre-

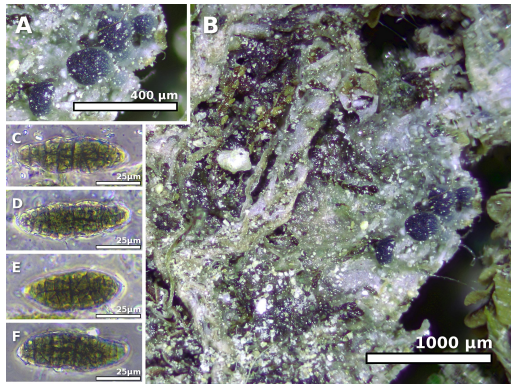


Figure 4. *Julella macrospora* growing on *Jungermannia*. A-B. perithecia. C-F. Muriform ascospores. Photo: MA.

dalsfossen, UTM32 344400/6699290, on *Jungermannia* sp. on soil in river gorge with deciduous forest (“lågurtskog”), weak low herb forest, 14 May 2019, leg. & det AA.

*Lentomitella investita* (Schwein.) Réblová (Xenospadicoidales, Sordariomycetes)

*L. investita* is new to Scandinavia and macroscopically looks like the more well-known *L. cirrhosa* with long black perithecial necks protruding from single perithecia sunken in wood. However, *L. investita* has longer and wider ascospores and longer asci (Réblová et al. 2018). Material: Hordaland, Granvin, Uraneset, UTM32 362780/6704090, on *Tilia* (?) in *Ulmus/Tilia* low-herb forest, 14 May 2019, leg. & det. EJ, conf. WJ.

*Melaspileella proximella* (Nylander) Ertz & Diederich (Eremithallales, Dothideomycetes), Fig. 5

*M. proximella* is not new to Norway but has not been collected since 1865, and this material should be checked. It is known from Sweden but not from Denmark. It is characterized by the unusual whorl of cilia at the apices of the ascospores. It's not lichenized. Material: Hordaland, Granvin, Uraneset, UTM32 343420/6689460, on dead twigs of *Juniperus communis* in broadleaved forest dominated by *Ulmus* and *Tilia*, 15 May 2019, leg. GF, det. GF & AA.

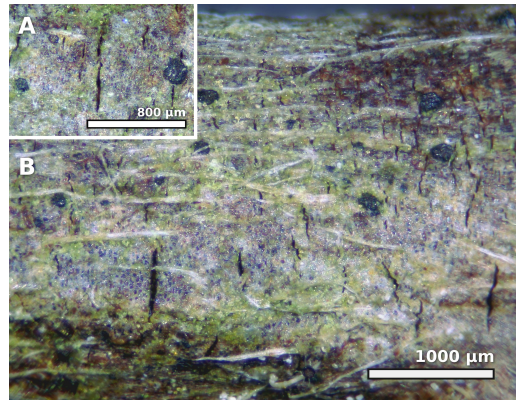


Figure 5. *Melaspileella proximella* on *Juniperus* branch. Photo: MA.

*Mycoporium sparsellum* Nyl. (Pleosporales, Dothideomycetes)

This non-lichenized species is new to Scandinavia and has irregularly shaped ascomata with several locules and two-celled clavate, 16-19 × 6-7 µm large ascospores. It typically grows on bark of *Corylus avellana* and can be confused with *Tomasellia gelatinosa*, which however has slender fusiform ascospores. Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Corylus avellana* in weak low-herb forest with *Taxus baccata*, 14 May 2019, leg. & det. AA.

*Nigrograna mycophila* Jaklitsch, Friebes & Voglmayr (Pleosporales, Dothideomycetes)

This species forms 200-350 µm wide globose ascomata close to or on old ascomata of Diaporthales, and has fusoid to narrowly ellipsoid two-celled ascospores measuring ca 14-17 × 5.5-6.5 µm. The species is not known from other Sandinavian countries. Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Diaporthe impuls*a on *Sorbus aucuparia* in *Taxus baccata* forest, weak low-herb forest, 14 May 2019, leg. & det. WJ. A similar species, *N. norvegica* Jaklitsch & Voglmayr, was described from material collected at a previous workshop and is only known from the holotype location in

Aust-Agder, Arendal kommune, Nedenes, Langevoll. It has a similar ecology and was found in association with a *Diaporthe* sp. on a twig of *Tilia* lying on the ground, 4 Oct. 2014. *N. norvegica* differs from *N. mycophila* by faintly verruculose ascospores that are slightly smaller ( $13.0\text{-}17.0 \times 4.5\text{-}5.8 \mu\text{m}$ ). The two species were described in Jaklitsch and Voglmayr (2016).

*Ptychographa xylographoides* Nyl. (Trapeliales, Lecanoromycetes), Fig. 6

This weakly lichenized species is new to Scandinavia. It grows on dead wood on living trees and has an indistinct granulate thallus with narrowly elongate, usually unbranched apothecia measuring  $0.3\text{-}1.4 \times 0.1\text{-}0.3 \text{ mm}$ . The ascospores are ellipsoid and measure  $8.5\text{-}13 \times 4.5\text{-}6.5 \mu\text{m}$ . Material: Hordaland, Kvam, Berge, UTM32 343420/6689460, on old oak in mixed blueberry forest, 15 May 2019, leg. & det. BN, conf. AA

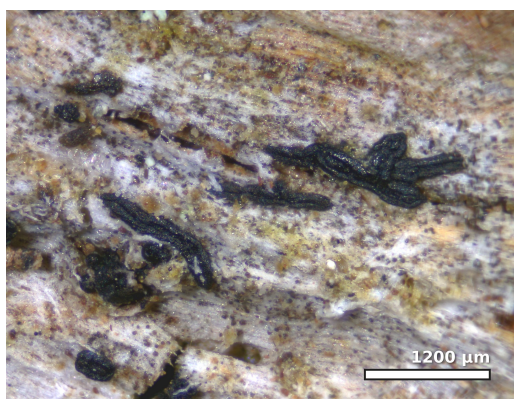


Figure 6. *Ptychographa xylographoides* showing lirellate apothecia or hysterothecia. Photo: MA.

*Rutstroemia tiliacea* (Fr.) K. & L. Holm (Helotiales, Leotiomyces)

This large discomycete with leathery apothecia is new to Norway but was previously reported from Sweden and Denmark. It grows in small groups on twigs, mainly on *Tilia* but has also been found on *Salix*, *Ulmus* and *Pinus* (Pärtel et al. 2016). The apothecia are 4–8 mm

in diameter and ochraceous- to dark chestnut-brown, the ascospores are cylindrical-subellipsoid, and about  $13\text{-}18 \times 3\text{-}4 \mu\text{m}$ , when over-mature two-celled and forming microconidia at both ends (Pärtel et al. 2016). Material: Hordaland, Granvin, Uraneset, UTM32 362780/6704090, on *Tilia cordata* in *Ulmus/Tilia* low-herb forest, 14 May 2019. leg. & det. WJ.

*Saccardoëlla canadensis* Ellis & Everh. (Sordariomycetes incertae sedis), Fig. 7

The species appears to be new to Scandinavia. Mathiassen (1993) argued that *S. canadensis*, *S. kanderana* and *S. transylvanica* probably represent a single taxon, but *S. canadensis* differs from the two other species by the shape of the papilla, ascus length, and ontogeny, shape, septation and size of the ascospores. The ascospores are cylindrical,  $40\text{-}70 \times 9\text{-}12 \mu\text{m}$ , 12–15 celled, hyaline, and slightly constricted at the septae, with ends not or only slightly attenuated (Petraik 1961). Ascospores of *S. transylvanica* and *S. kanderana* do not exceed  $50 \mu\text{m}$  in length and are only constricted at the middle septa. Material: Hordaland, Kvam, Skeianeset, UTM32 351870/6698600, on *Salix* sp. in low-herb forest, 13 May 2019, MA19-061, leg. MA, det. WJ. Material of *S. canadensis* was previously found by BN in 2014 and 2018, but was only identified with certainty together with the new material.

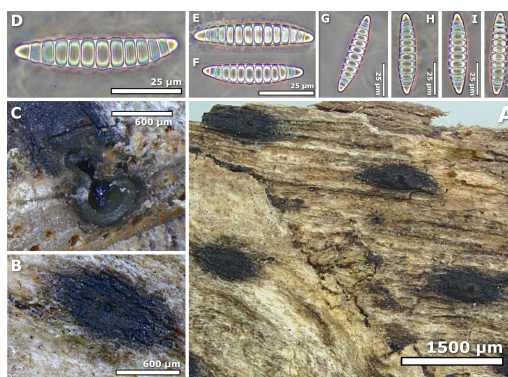


Figure 7. *Saccardoëlla canadensis*. Photo: MA.

*Splanchnonema britzelmayrianum* (Rehm) Boise (Pleosporales, Dothideomycetes)

This aquatic species is new to Norway but was previously reported from Sweden. The ascospores are mostly 7-septate (but up to 10-septate) and characteristic in shape and size (ca 40 × 10 µm). Material (en route to Bergen): Hordaland, Oppland, Grønlistølen, UTM32 451002, 6783177, on deciduous wood (bark-less twig, probably *Salix* sp.) in a stream, 12 May 2019, leg & det. RA, conf BN.

*Strigula taylorii* (Carroll ex Nyl.) R.C. Harris. (Strigulales, Dothideomycetes)

This lichenized species is not known from Norway or Sweden but there is an old find from Denmark. It has a brownish thallus and has conical ascomata that are 0.2-0.3 mm in diameter. The ascospores are two-celled and 19-24 × 4-5 µm, and typically break in two part-spores at early stage of development. Material: Hordaland, Kvam, Skeianeset, UTM32 351870/ 6698600, on deciduous tree in low-herb forest, 13 May 2019, leg & det. BN, conf. AA. It was previously found by BN and JBJ in Hordaland, Bømlø, Spissøy, Stølsvika sør, 295859/6626507, on an old *Ulmus* tree, 11 May 2013.

*Thyronectria coryli* (Fuckel) Jaklitsch & Voglmayr (Hypocreales, Sordariomycetes), Fig. 8

This species is new to Norway but was previously reported from Sweden. Its yellow scurf on the reddish cupulate ascomata is diagnostic for the genus *Thyronectria*, within which it is characterized by hyaline, uniseptate, narrowly fusiform to oblong ascospores budding within the asci. Unlike many other species of *Thyronectria*, *T. coryli* shows little host specificity, and it is known from various different broadleaf trees and shrubs (Jaklitsch and Voglmayr 2014). Material: Hordaland, Kvam, Barlindflaten, UTM32 356860/6702450, on *Prunus padus* in mesic low-herb forest with

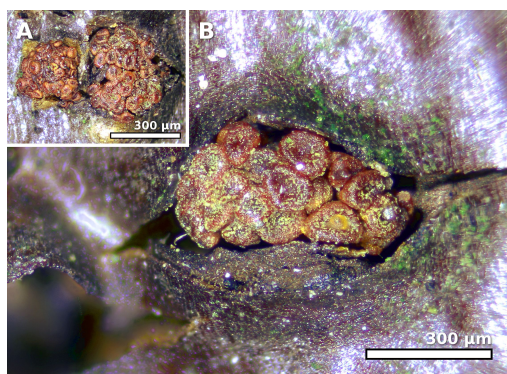


Figure 8. *Thyronectria coryli*. Clusters of perithecia breaching the bark of *Prunus padus*. Photo: MA.

*Taxus baccata*, 16 May 2019, leg. & det. WJ & HV.

## DISCUSSION

The results of the workshop show that many interesting species can be found by a team of experts during just a few brief excursions. As identification of ascomycetes can be laborious, and may in many cases require advanced microscopy, cultivation and/or sequencing, many specimens from the workshop remain to be identified. We found several species that appear to be undescribed. Some of these are currently under processing, but describing new species is often a very time-consuming process so publishing the new names may take a long time.

## ACKNOWLEDGMENTS

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